CITY OF ELK GROVE
GENERAL PLAN UPDATE
DRAFT ENVIRONMENTAL IMPACT REPORT

SCH No. 2017062058

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ES EXECUTIVE SUMMARY

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This section provides an overview of the Project and the environmental analysis. For additional detail regarding specific issues, please consult the appropriate section (Sections 5.1 through 5.13) of Section 5.0, Introduction to the Environmental Analysis and Assumptions Used.

ES.1 PURPOSE AND SCOPE OF THE EIR

The California Environmental Quality Act (CEQA) requires the preparation of an environmental impact report (EIR) when there is substantial evidence that a project could have a significant effect on the environment. The purpose of an EIR is to provide decision-makers, public agencies, and the general public with an objective and informational document that fully discloses the potential environmental effects of the proposed Project. The term "proposed Project," as used in this Draft EIR, refers to the City of Elk Grove General Plan Update Project. The EIR process is specifically designed to describe the objective evaluation of potentially significant direct, indirect, and cumulative impacts of the proposed Project, to identify alternatives that reduce or eliminate the Project's significant effects, and to identify feasible measures that mitigate significant effects of the Project. In addition, CEQA requires that an EIR identify those adverse impacts determined to remain significant after mitigation. This Draft EIR provides an analysis of the potential environmental effects associated with the adoption and implementation of the proposed City of Elk Grove General Plan Update Project.

This EIR has been prepared as a program EIR pursuant to CEQA Guidelines Section 15168. A Program EIR examines the environmental impacts of an overall area that may contain a series of subsequent projects. This type of EIR focuses on the changes in the environment that would result from implementation of the overall Project, including development of land uses and transportation systems identified in the Project, as well as other infrastructure required to serve the Project. The General Plan Update EIR will serve as the environmental review document for subsequent activities in the program. Consistent with CEQA Guidelines Section 15168(c), the City will review subsequent activities to determine whether the activity is within the scope of the Project covered by the Program EIR or whether an additional environmental document must be prepared.

ES.2 PROJECT CHARACTERISTICS

The Project includes the following components as directed by the City Council:

- **General Plan Update.** The General Plan and implementing programs serve as the blueprint for future growth and development. The General Plan would provide for the future development of approximately 48,102 housing units, as well as the creation of approximately 77,339 jobs.

- **Climate Action Plan Update.** The updated Climate Action Plan (CAP) will include an updated community-wide emissions inventory for Elk Grove, along with updated emissions forecasts for 2020, 2030, and 2050 based on land use activities anticipated with implementation of the updated General Plan.

- **Specific Plan Actions.** To implement the policies and programs proposed in the General Plan update, the Project includes changes to the East Elk Grove Specific Plan, the East Franklin Specific Plan, and the Laguna Ridge Specific Plan.

- **Zoning Code Amendments.** To maintain consistency with the updated General Plan, the Project also includes a number of amendments to the Zoning Code.

- **Parks and Recreation Master Plan Update.** The Cosumnes Community Services District (CCSD) is preparing an update to the Parks and Recreation Master Plan that will be coordinated with the General Plan Update.

PROJECT OBJECTIVES

The City has identified the following objectives for the proposed Project:

1) Provide for growth of the City to meet long-term needs, including housing, employment, and recreational opportunities.

2) Facilitate orderly and logical development, including economic development, while maintaining the character of existing communities.

3) Provide an improved transportation system that includes an array of travel modes and routes, including roadways, mass transit, walking, and cycling.

4) Protect open space, providing trails, parkland, and a range of recreational opportunities.

5) Provide mechanisms to minimize noise and safety risks associated with natural and human-caused noise and safety hazards.

6) Promote sustainability and community resiliency through reductions in vehicle miles traveled, improved air quality, reductions in energy usage, and a diversified economy.

7) Provide and support public facilities and infrastructure with sufficient capacity to adequately serve the needs of the growing community.

ES.3 PROJECT ALTERNATIVES SUMMARY

CEQA Guidelines Section 15126.6 requires that an EIR describe a range of reasonable alternatives to the project, which could feasibly attain the basic objectives of the project and reduce the degree of environmental impact. Section 7.0, Project Alternatives, provides a qualitative analysis of five alternatives, including the no project alternative:

- Alternative 1 – No Project Alternative
- Alternative 2 – Additional Climate Action Plan Measures
- Alternative 3 – Reduced Study Areas
- Alternative 4 – Increased Development Intensity Alternative
- Alternative 5 – Increased Employment Alternative

Alternative 1 – No Project Alternative

The No Project Alternative assumes implementation of the existing General Plan (2003) instead of the proposed General Plan Update. Under this alternative, the existing General Plan land uses would remain in place and development in the City would occur as anticipated in the 2003 General Plan, with an emphasis on carefully managed growth and buildout of the Southeast Policy Area.

Alternative 2 – Additional Climate Action Plan Measures

Under this alternative, the City would adopt additional measures in the Climate Action Plan (CAP) that would further exceed established GHG reduction targets for 2020 and 2030 and allow the City to meet the State's targets for 2050. The Draft EIR concludes that GHG emissions are a less than significant impact for 2020 and 2030, but a significant and unavoidable impact for 2050 due to uncertainty regarding the availability of measures to reach 2050 emissions reduction targets. Additional measures may include, but are not limited to, CALGreen Tier 1/NetZero by 2020, additional transportation sector measures, a direct offset program, and other emissions reduction options discussed as part of the Project but not included in the proposed CAP.

Alternative 3 – Reduced Study Areas

This alternative reduces the extent of the Study Areas to those areas within the existing Sacramento County Urban Services Boundary (USB) as well as the area included in the Kammerer/99 Sphere of Influence Amendment that was filed by a private developer for the area south of Kammerer Road and west of State Route (SR) 99. This would result in a reduction in the size of the West and South Study Areas by 2,502 acres and 1,436 acres, respectively, for a total reduction in the Planning Area of 3,938 acres. The East and North Study Areas would remain the same with this alternative as with the proposed Project.

Alternative 4 – Increased Development Intensity Alternative

This alternative increases the allowable residential density and nonresidential development intensity for selected key sites around the City. In addition, the land use designations for several additional sites would be changed from Low Density Residential (LDR) to High Density Residential (HDR) or other land use designations for this alternative. HDR sites, which total approximately 67 acres, would be changed to the HDR land use designation under the Increased Development Intensity Alternative. Based on these land use changes, this alternative could accommodate up to 515 more High Density Residential units, 89 Medium Density Residential units, and 597 Mixed Use Village Center units. Low-density units and mixed-use residential units would be reduced by 148 and 65 units, respectively. Overall, this alternative could result in up to 988 additional dwelling units compared to the proposed Project. This alternative would also generate approximately 300 more jobs due to the increase in Mixed Use Village Center acreage.

Alternative 5 – Increased Employment Alternative

This alternative would change the land use designations for certain areas of the City to allow for more office development, thereby generating a greater number of jobs in Elk Grove.

In addition to less population growth, this scenario would result in a greater number of jobs in the City, which could allow Elk Grove residents to work locally and therefore have shorter commutes (or be able to walk, cycle, or use local transit for their commutes). This alternative would yield approximately 330 fewer housing units and as many as 5,700 more jobs as compared to the proposed Project.

ES.4 AREAS OF CONTROVERSY

The City of Elk Grove was identified as the lead agency for the proposed Project. In accordance with Section 15082 of the CEQA Guidelines, the City prepared and distributed a Notice of Preparation (NOP) of an EIR on June 23, 2017. This notice was circulated to the public, local, state, and federal agencies, and other interested parties to solicit comments on the proposed Project. The NOP is presented in **Appendix A**. Concerns raised in response to the NOP were considered during the preparation of the Draft EIR. Comment letters are presented in **Appendix B**.

ES.5 Summary of Environmental Impacts

Table ES-1 presents a summary of project impacts and proposed mitigation measures that would avoid or minimize potential impacts. In the table, the level of significance of each environmental impact is indicated both before and after the application of the recommended mitigation measure(s).

For detailed discussions of all project impacts and mitigation measures, the reader is referred to the topical environmental analysis in Section 5.0.

TABLE ES-1
PROJECT IMPACTS AND PROPOSED MITIGATION MEASURES

Impact	Level of Significance Without Mitigation	Mitigation Measures	Resulting Level of Significance
5.1 Aesthetics, Light, and Glare			
Impact 5.1.1 There are no designated scenic vistas or highways within view of the Planning Area.	NI	None required.	NI
Impact 5.1.2 Implementation of the General Plan will encourage new development and redevelopment activities that could degrade the existing visual character or quality of the Planning Area.	PS	No additional feasible mitigation available beyond compliance with the City's Design Guidelines, supplemental guidelines, and proposed General Plan policies.	SU
Impact 5.1.3 Implementation of the General Plan would create new sources of daytime glare, and would change nighttime lighting and illumination levels associated with new and redevelopment activities in the Planning Area, which would contribute to skyglow.	PS	No additional feasible mitigation available beyond compliance with the City's Design Guidelines, supplemental guidelines, and proposed General Plan policies.	SU
Impact 5.1.4 Implementation of the proposed Project, in addition to other reasonably foreseeable projects in the region, would introduce new development into undeveloped agricultural and rural areas that would have a cumulatively considerable contribution to impacts on visual character.	CC	No additional feasible mitigation available beyond compliance with the City's Design Guidelines, supplemental guidelines, and proposed General Plan policies.	CC/SU
Impact 5.1.5 Implementation of the proposed Project, in addition to other reasonably foreseeable projects in the region, would introduce new development	CC	No additional feasible mitigation available beyond compliance with the City's Design Guidelines, supplemental guidelines, and proposed General Plan policies.	CC/SU

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Impact	Level of Significance Without Mitigation	Mitigation Measures	Resulting Level of Significance
into undeveloped agricultural and rural areas, increasing nighttime lighting and daytime glare and contributing to regional skyglow.			
5.2 Agricultural Resources			
Impact 5.2.1 Implementation of the proposed Project would allow for new development in areas of the Planning Area that are designated Important Farmland and/or under Williamson Act contract.	PS	No additional feasible mitigation available beyond compliance with existing laws and procedures and proposed General Plan policies.	SU
Impact 5.2.2 Implementation of the proposed Project would place urban land activity types adjacent to primarily agricultural land activity types, which may impair agricultural production and result in land use compatibility conflicts.	LS	No additional mitigation required beyond compliance with proposed General Plan policies and applicable Municipal Code sections.	LS
Impact 5.2.3 Implementation of the proposed Project would ultimately result in the conversion of Important Farmland and the cancellation of Williamson Act contracts. This loss would contribute to the cumulative loss of farmland in the region.	CC/SU	No additional feasible mitigation available beyond compliance with existing laws and procedures and proposed General Plan policies.	CC/SU
5.3 Air Quality			
Impact 5.3.1 Buildout of the proposed Project could result in short-term construction emissions that could violate or substantially contribute to a violation of federal and state standards for ozone, PM_{10}, and $PM_{2.5}$.	PS	No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies.	SU

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Impact	Level of Significance Without Mitigation	Mitigation Measures	Resulting Level of Significance
Impact 5.3.2 The Project could result in long-term operational emissions that could violate or substantially contribute to a violation of federal and State standards for ozone and coarse and fine particulate matter.	PS	No additional feasible mitigation available beyond compliance with proposed General Plan policies.	SU
Impact 5.3.3 The Project would not contribute to localized concentrations of mobile-source carbon monoxide that would exceed applicable ambient air quality standards.	LS	None required.	LS
Impact 5.3.4 The proposed Project could result in increased exposure of existing or planned sensitive land uses to stationary or mobile-source TACs that would exceed applicable health risk standards.	PS	No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies.	SU
Impact 5.3.5 Implementation of the Project could result in increased exposure of sensitive receptors to odorous emissions as compared to baseline conditions.	PS	No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies.	SU
Impact 5.3.6 The Project would be substantially consistent with all applicable control measures in the Sacramento Regional NAAQS 8-Hour Ozone Attainment and Further Progress Plan (Attainment Plan), but because the Project would exceed the SMAQMD's air quality thresholds of significance, the Project would not be considered to be fully consistent with the Plan's goals.	PS	No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies.	SU

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Impact 5.3.7 The proposed Project in combination with growth throughout the air basin will exacerbate existing regional problems with criteria air pollutants and ozone precursors.	CC	No additional feasible mitigation available beyond compliance with proposed General Plan policies.	CC
5.4 Biological Resources			
Impact 5.4.1 Implementation of the proposed Project could result in adverse effects, either directly or indirectly, on species listed as endangered, threatened, rare, proposed, and candidate plants and wildlife.	PS	No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies and standards.	SU
Impact 5.4.2 Implementation of the proposed Project could result in adverse effects, either directly or indirectly, on non-listed special status species (Species of Special Concern, fully protected, and locally important).	PS	No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies and standards.	SU
Impact 5.4.3 Implementation of the proposed Project could result in the loss of riparian vegetation, sensitive natural communities, and/or state or federally protected wetlands.	LS	No additional mitigation required beyond compliance with existing regulations and proposed General Plan policies.	LS
Impact 5.4.4 Implementation of the proposed Project could interfere with wildlife movement.	LS	No additional mitigation required beyond compliance with existing regulations and proposed General Plan policies and standards.	LS
Impact 5.4.5 Implementation of the proposed Project would not conflict with any local policies or ordinances protecting biological resources.	NI	None required.	NI

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Impact 5.4.6 Implementation of the proposed Project would not conflict with the provisions of an adopted habitat conservation plan by allowing development of land planned for preservation as part of the proposed South Sacramento Habitat Conservation Plan.	NI	None required.	NI
Impact 5.4.7 Future development in the Planning Area, when considered together with other past, existing, and planned future projects, could result in a significant cumulative impact on biological resources in the region.	CC	No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies and standards.	CC/SU
5.5 Cultural Resources			
Impact 5.5.1 Implementation of the proposed Project would allow for new development throughout the Planning Area which has the potential to impact historical resources, archaeological resources, tribal cultural resources, and human remains.	PS	**MM 5.5.1a** Prior to the approval of subsequent development projects in the Planning Area, a detailed cultural resources study of the subject property shall be conducted by the applicant and peer reviewed by the City. The cultural resources study shall identify, evaluate, and mitigate impacts to cultural resources as defined by CEQA and/or the NHPA. Mitigation methods to be employed include, but are not limited to, the following: • Redesign of the project to avoid the resource. The resource site shall be deeded to a nonprofit agency to be approved by the City for maintenance of the site. • If avoidance is determined to be infeasible by the City, the resource shall be mapped, stabilized, and capped pursuant to appropriate standards. • If capping is determined infeasible by the City, the resource shall be recovered to appropriate standards. **MM 5.5.1b** If cultural resources or tribal cultural resources are discovered during grading or construction activities within the Planning Area, work shall	LS

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		halt immediately within 50 feet of the discovery, the Planning Department shall be notified, and a professional archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards in archaeology shall be retained to determine the significance of the discovery. If resources are determined to be potentially significant, the City shall require the preparation of a treatment plan and report of findings for cultural and tribal cultural resources. The City and the applicant shall consult and agree to implement all measures the City deems feasible. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. The applicant shall be required to implement measures necessary for the protection and documentation of cultural resources.	
Impact 5.5.2 Development of the proposed Project could contribute to the cumulative disturbance of cultural resources (i.e., prehistoric sites, historic sites, historic buildings/structures, and isolated artifacts and features) and human remains.	LCC	No additional mitigation required beyond compliance with existing laws and regulations, proposed General Plan policies, and mitigation measures **MM 5.5.1a** and **MM 5.5.1b.**	LCC
5.6 Geology, Soils, Mineral Resources, and Paleontology			
Impact 5.6.1 The Planning Area is not located in an area that is susceptible to adverse impacts associated with seismic ground failure, including surface rupture, ground shaking, liquefaction, or landslides.	LS	No additional mitigation required beyond compliance with existing State and local regulations and standards.	LS
Impact 5.6.2 Future development resulting from the proposed Project, including buildings, pavement, and utilities, would include grading and excavation activities that could result in the potential for topsoil erosion.	LS	No additional mitigation required beyond compliance with existing State and local regulations and standards.	LS

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Impact 5.6.3 Future development resulting from the proposed Project, including buildings, pavement, and utilities, could incur damage as a result of underlying expansive or unstable soil properties.	LS	No additional mitigation required beyond compliance with existing State and local regulations and standards.	LS
Impact 5.6.4 Future development resulting from the proposed Project could occur in locations where public sewer service is not available.	LS	No additional mitigation required beyond compliance with existing State and local regulations and standards and proposed General Plan policies.	LS
Impact 5.6.5 Construction activities in the Planning Area could affect undiscovered unique paleontological resources in paleontologically sensitive rock formations.	PS	**MM 5.6.5** Before the start of any earthmoving activities, the project owner shall retain a qualified scientist (e.g., geologist, biologist, paleontologist) to train all construction personnel involved with earthmoving activities, including the site superintendent, regarding the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction, and proper notification procedures should fossils be encountered. Training on paleontological resources shall also be provided to all other construction workers but may use videotape of the initial training and/or written materials rather than in-person training. If any paleontological resources (fossils) are discovered during grading or construction activities within the project area, work shall be halted immediately within 50 feet of the discovery, and the City Planning Division shall be immediately notified. The project owner will retain a qualified paleontologist to evaluate the resource and prepare a recovery plan in accordance with Society of Vertebrate Paleontology guidelines (SVP 2010). The recovery plan may include but is not limited to a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations in the recovery plan that are determined by the City to be necessary and feasible will be implemented by the applicant before construction activities resume in the area where the paleontological resources were discovered.	LS

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Impact 5.6.6 Implementation of the proposed Project, in combination with other reasonably foreseeable development, would not contribute to cumulative geologic and soil impacts, as the impacts would be site-specific.	LCC	No additional mitigation required beyond compliance with existing State and local regulations and standards and proposed General Plan policies.	LCC
Impact 5.6.7 Development of the proposed Project could contribute to the cumulative disturbance of paleontological resources (i.e., fossils and fossil formations).	LCC	No additional mitigation required beyond compliance with existing laws and mitigation measure **MM 5.6.5.**	LCC
5.7 Greenhouse Gas Emissions and Energy			
Impact 5.7.1 Development that would occur under the proposed General Plan Update would result in construction- and operational-related GHG emissions that contribute to climate change on a cumulative basis. However, the General Plan and the associated CAP Update would result in GHG emissions reductions sufficient to meet GHG reduction targets and goals, which are consistent and aligned with the goals identified 2017 Scoping Plan to meet the statewide GHG emission reduction targets for 2020 and 2030, as established by AB 32 and SB 32.	LS	No additional mitigation required beyond compliance with the CAP Update and proposed General Plan policies.	LS
Impact 5.7.2 Adoption of the proposed General Plan and CAP Update would result in emission reductions that are consistent with statewide reduction targets for 2020 and 2030. However, based on current emission estimates for the City projected	PS	No additional feasible mitigation available beyond compliance with the CAP Update and proposed General Plan policies.	SU

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for 2050, and considering the proposed policies and programs included in the General Plan and CAP Update, the proposed General Plan and CAP Update would likely not result in sufficient GHG reductions for the City to meet the longer-term goal for 2050 as stated in EO S-3-05.			
Impact 5.7.3 Land uses developed and operated under the proposed General Plan would increase electricity and natural gas consumption. Buildings developed under the proposed General Plan would comply with CCR Title 24 standards for building energy efficiency, and actions under the proposed CAP would include zero net energy requirements in 2020 and 2030 for residential and commercial development, respectively. Actions under the proposed General Plan and CAP would include the requirement of a 15 percent VMT reduction for new development projects, installation of more bicycle and pedestrian infrastructure, as well as improved public transportation options that would reduce VMT and associated consumption of automotive fuel. Construction-related energy consumption would be temporary and not require additional capacity or increased peak or base period demands for electricity or other forms of energy. Thus, energy consumption associated with the development of the project would not result in wasteful, inefficient, or unnecessary consumption of energy.	LS	No additional mitigation required beyond compliance with the CAP Update and proposed General Plan policies.	LS

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Further, development of the project would not conflict with a State or local plan for renewable energy or energy efficiency.			
5.8 Hazards and Hazardous Materials			
Impact 5.8.1 Construction and/or operation of future projects in the Planning Area would involve the routine use, transport, storage, and disposal of hazardous materials.	LS	No additional mitigation required beyond compliance with existing standards and regulations and General Plan policies.	LS
Impact 5.8.2 Construction and demolition activities associated with future development under the proposed Project could result in the inadvertent or accidental release of hazardous materials, which could pose a human health and/or environmental risk.	PS	**MM 5.8.2** Prior to approval of improvement plans, grading permits, and or demolition permits for properties in the Planning Area that have not already been evaluated for the potential for the presence of hazardous materials and hazardous conditions, Phase I ESAs shall be prepared by a qualified professional. Each Phase I ESA shall assess the potential for hazards and provide recommendations whether additional investigation (Phase II ESA) should be completed. If determined necessary, a Phase II ESA shall be conducted to determine the lateral and vertical extent of soil, groundwater, and/or soil vapor contamination, as recommended by the Phase I ESA. The City shall not issue a grading or building permit for a site where contamination has been identified until remediation or effective site management controls appropriate for the site use have been completed consistent with applicable regulations and to the satisfaction of the Sacramento County Environmental Management Department, the California Department of Substances Control, and/or Central Valley Regional Water Quality Control Board, as appropriate. If the Phase I ESA determines there are no recognized environmental conditions, no further action is required. However, the City shall ensure any grading or improvement plan or building permit includes a statement that if hazardous materials contamination is discovered or suspected during construction activities, all work in the vicinity of the contamination shall stop immediately until a qualified professional has evaluated the site and determined an appropriate course of action.	LS

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Impact 5.8.3 The proposed Project could involve activities that have the potential to generate hazardous materials emissions within one-quarter mile of existing schools.	LS	No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards	LS
Impact 5.8.4 The proposed Project would result in construction activities that could temporarily affect roadways and increase the number of people who may need to evacuate the Planning Area in the event of an emergency.	LS	No additional mitigation required beyond compliance with existing regulations and standards and proposed General Plan policies.	LS
Impact 5.8.5 The proposed Project would include development that could be subject to wildland fire hazard risk	LS	No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.	LS
Impact 5.8.6 Cumulative development would increase the use, storage, disposal, and transport of hazardous materials.	LCC	No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.	LS
Impact 5.8.7 Cumulative development would result in construction activities that could temporarily affect roadways and increase the number of people who may need to evacuate the region in the event of an emergency.	LSS	No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.	LCC
Impact 5.8.8 Cumulative development could be subject to wildland fire hazard risk.	LCC	No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.	LCC
5.9 Hydrology and Water Quality			
Impact 5.9.1 Implementation of the proposed Project would result in future development in the Planning Area that would involve construction-related	LS	No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.	LS

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activities that could expose soil to erosion during storm events, causing degradation of water quality. Urban runoff from new projects in the Planning Area post-construction could also contribute pollutants that could affect surface water or groundwater quality.			
Impact 5.9.2 Implementation of the proposed Project would result in future urbanization in the Planning Area that would increase stormwater runoff as a result of changes in drainage patterns and increases in impervious surface.	PS	No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.	LS
Impact 5.9.3 Future development in the Planning Area may occur in locations subject to 100- and/or 200-year flood risk, including flooding from levee failure, or could place structures where they may have the potential to impede or redirect flood flows.	LS	No additional mitigation required beyond compliance with existing laws, regulations, and proposed General Plan policies and standards.	LS
Impact 5.9.4 The proposed Project would increase the demand on water supplies, some of which would be groundwater.	PS	**MM 5.9.4** Implement mitigation measure **MM 5.12.1.1** (Plan for Services).	SU
Impact 5.9.5 Development of the Planning Area, in combination with other development in the Sacramento River and Cosumnes River watersheds, would increase the potential for pollutants to be discharged to surface water and groundwater.	LCC	No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.	LCC

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Impact 5.9.6 Development of the Planning Area, in combination with cumulative development in the Sacramento River watershed, including its American River and Cosumnes River tributaries, could be located in areas subject to 100-year and/or 200-year flood hazard.	LCC	No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.	LCC
Impact 5.9.7 Development of the Planning Area, in combination with other development in the Central Basin, would increase demand for groundwater and could potentially interfere with recharge of the aquifer.	PCC	No additional feasible mitigation available beyond compliance with existing laws, proposed General Policies, and mitigation measure MM 5.12.1.1.	SU
5.10 Noise			
Impact 5.10.1 Construction activities could result in a substantial temporary increase in noise levels at nearby noise-sensitive land uses, which may result in increased levels of annoyance, activity interference, and/or sleep disruption.	PS	No additional mitigation required beyond compliance with existing standards and proposed General Plan policies.	LS
Impact 5.10.2 Implementation of the proposed Project would result in a significant increase in transportation noise, including traffic noise levels along many existing roadways in the City. Even with implementation of proposed policies to limit traffic noise impacts, predicted traffic noise levels would still result in potential increases above applicable standards.	PS	No additional feasible mitigation measures available beyond compliance with proposed General Plan policies.	SU

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Impact 5.10.3 The proposed Project would result in future development that could expose existing noise-sensitive land uses to new non-transportation noise sources that could exceed the City's applicable noise standards. However, several policies, discussed below, address and limit the exposure of existing and future noise-sensitive land uses to non-transportation noise sources.	LS	No additional mitigation required beyond compliance with existing standards and proposed General Plan policies.	LS
Impact 5.10.4 The proposed Project would result in development projects involving construction activities that could expose receptors to excessive groundborne vibration, and new industrial and commercial land uses that could expose receptors to excessive groundborne vibration from long-term operations.	LS	No additional mitigation required beyond compliance with existing standards and proposed General Plan policies.	LS
Impact 5.10.5 Implementation of the proposed Project would contribute to cumulative noise levels along many roadway segments in the Planning Area due to increased cumulative traffic volumes.	CC	No additional feasible mitigation available beyond compliance with proposed General Plan policies.	CC/SU
Impact 5.10.6 Implementation of the proposed Project would not result in a substantial contribution to cumulative construction vibration and noise levels in the Project area.	LCC	No additional mitigation required beyond compliance with existing standards and proposed General Plan policies.	LCC

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Impact	Level of Significance Without Mitigation	Mitigation Measures	Resulting Level of Significance
5.11 Public Services and Recreation			
Impact 5.11.1.1 Implementation of the proposed Project would increase demand for fire protection and emergency medical services, which could trigger the need for additional fire stations, the construction of which could result in impacts on the physical environment.	LS	No additional mitigation required beyond compliance with existing regulations and proposed General Plan policies.	LS
Impact 5.11.1.2 Implementation of the proposed Project, in combination with other development within the CCSD's service area, would increase demand for fire protection and emergency medical services.	LCC	No additional mitigation required beyond compliance with existing regulations and proposed General Plan policies.	LCC
Impact 5.11.2.1 Implementation of the proposed Project would increase demand for law enforcement services, which could trigger the need for additional law enforcement facilities, the construction of which could result in impacts on the physical environment.	LS	No additional mitigation required beyond compliance with existing regulations and General Plan policies.	LS
Impact 5.11.2.2 Implementation of the proposed Project, in combination with other development in the Planning Area, would increase demand for law enforcement services.	LCC	No additional mitigation required beyond compliance with existing regulations and General Plan policies.	LCC
Impact 5.11.3.1 Implementation of the proposed Project would allow for future development in the Planning Area, which would result in an increase of school-aged children and require the construction of new public school facilities, the	PS	No additional feasible mitigation available beyond compliance with existing laws and proposed General Plan policies.	SU

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Impact	Level of Significance Without Mitigation	Mitigation Measures	Resulting Level of Significance
construction of which could have impacts on the physical environment.			
Impact 5.11.3.2 Implementation of the proposed Project, in combination with other development in the EGUSD service area, would result in the increase of school-aged children, which would require the construction of new public school facilities, which could have impacts on the environment.	CC	No additional feasible mitigation available beyond compliance with existing laws and proposed General Plan policies.	SU
Impact 5.11.4.1 Implementation of the proposed Project would increase requirements for park and recreation facilities, and trails, the construction of which could result in impacts on the physical environment.	LS	No additional mitigation required beyond compliance with proposed General Plan policies and construction-related mitigation identified in this EIR.	LS
Impact 5.11.4.2 The proposed Project would result in a cumulative increase in demand for parkland and recreational facilities, the construction of which could impact the physical environment.	LCC	No additional mitigation required beyond compliance with proposed General Plan policies and construction-related mitigation measures identified in this EIR.	LCC
5.12 Public Utilities			
Impact 5.12.1.1 Implementation of the proposed Project would increase demand for domestic water supply, which may result in the need for additional water supplies.	S	**MM 5.12.1.1** Prior to LAFCo approval of annexation of any portion of the Planning Area into the City of Elk Grove for which the SCWA would be the retail provider for water service, the City must prepare the Plan for Services to allow LAFCo to determine that: (1) the requirement for timely water availability, as required by law, is met; (2) its water purveyor is a signatory to the Water Forum Successor Effort and that groundwater will be provided in a manner that ensures no overdraft will occur, (3) the amount of water provided will be consistent with the geographical extent of the annexation territory; and (4) existing water customers will not be adversely affected. The Plan for Services	SU

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Impact	Level of Significance Without Mitigation	Mitigation Measures	Resulting Level of Significance
		shall be sufficient for LAFCo to determine timely water availability to the affected territory pursuant to Government Code Section 56668, subdivision (l), or its successor. The Plan for Services shall demonstrate that the SCWA water supplies are adequate to serve the amount of development identified in the annexation territory, in addition to existing and planned development under normal, single-dry, and multiple-dry years. The Plan for Services shall depict the locations and approximate sizes of all on-site water system facilities to accommodate the amount of development identified for the specific annexation territory; demonstrate that the SCWA has annexed the territory into its service area; and demonstrate that adequate SCWA off-site water facilities are available to accommodate the development identified in the annexation territory, or that fair-share funding will be provided for the construction of new or expanded treatment and/conveyance facilities and/or improvement of existing off-site water system facilities with no adverse fiscal impacts on existing ratepayers.	
Impact 5.12.1.2 Implementation of the proposed Project would require the construction of new and expanded water supply infrastructure, which could result in impacts to the physical environment.	PS	Implement mitigation measure MM 5.12.1.1.	SU
Impact 5.12.1.3 Implementation of the proposed Project, in combination with other development, would contribute to cumulative demand for domestic water supply.	CC	No additional feasible mitigation available beyond compliance with proposed General Plan policies and mitigation measure MM 5.12.1.1.	SU
Impact 5.12.2.1 Implementation of the proposed Project would result in additional wastewater generation and require treatment of additional wastewater at the Sacramento Regional Wastewater	LS	None required.	LS

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Impact	Level of Significance Without Mitigation	Mitigation Measures	Resulting Level of Significance
Treatment Plant. There is sufficient capacity at the existing Regional San treatment plant to accommodate Project demand.			
Impact 5.12.2.3 Implementation of the proposed Project, in addition to other development in the Regional San service area, would generate new wastewater flows requiring conveyance and treatment.	CC	No additional feasible mitigation available beyond mitigation measure MM 5.12.2.1.	SU/CC
Impact 5.12.3.1 Construction and operation of future development projects within the Planning Area would generate solid waste, thereby increasing demand for waste collection and disposal services.	LS	No additional mitigation required beyond compliance with existing regulations and General Plan policies.	LS
Impact 5.12.3.2 Implementation of the proposed Project, in combination with other development in other jurisdictions that contribute to regional landfills, would generate solid waste, thereby increasing demand for hauling and disposal services. The Project's solid waste generation would be substantially less than average.	LCC	No additional mitigation required beyond compliance with existing regulations.	LCC
Impact 5.12.4.1 Implementation of the proposed Project would increase demand for electric, natural gas, and telephone services.	LS	None required.	LS
Impact 5.12.4.2 Implementation of the proposed Project, in combination with other development within the service areas of the applicable providers, would increase demand for electric, natural gas, and telephone services.	LCC	None required beyond compliance with the CAP Update and proposed General Plan policies.	LCC

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Impact	Level of Significance Without Mitigation	Mitigation Measures	Resulting Level of Significance
5.13 Transportation			
Impact 5.13.1 Implementation of the proposed Project could cause unacceptable level of service conditions at some intersections and on some roadway segments.	PS	No additional feasible mitigation available beyond compliance with proposed General Plan policies.	SU
Impact 5.13.2 Implementation of the proposed Project would exacerbate unacceptable (LOS F) conditions on SR 99 and I-5.	PS	No additional feasible mitigation available beyond compliance with proposed General Plan policies.	SU
Impact 5.13.3 Implementation of the proposed Project would result in increased VMT.	PS	No additional feasible mitigation available beyond compliance with proposed General Plan policies.	SU
Impact 5.13.4 Implementation of the proposed Project includes land use changes that would have only a limited influence on air traffic patterns.	LS	None required beyond implementation of proposed General Plan policies.	LS
Impact 5.13.5 Implementation of the proposed Project will modify the existing transportation network to accommodate existing and future users, which could change existing travel patterns or traveler expectations.	LS	None required beyond compliance with proposed General Plan policies.	LS
Impact 5.13.6 Implementation of the proposed Project would alter land use patterns and increase travel demand on the transportation network, which may influence emergency access.	LS	None required beyond compliance with proposed General Plan policies	LS

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PS – Potentially Significant LCC – Less Than Cumulatively Considerable PCC – Potentially Cumulatively Considerable CS – Cumulative Significant

Impact	Level of Significance Without Mitigation	Mitigation Measures	Resulting Level of Significance
Impact 5.13.7 Implementation of the proposed Project would not result in conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities.	LS	None required beyond compliance with proposed General Plan policies.	LS

S – Significant CC – Cumulatively Considerable LS – Less Than Significant SU – Significant and Unavoidable NI – No Impact
PS – Potentially Significant LCC – Less Than Cumulatively Considerable PCC – Potentially Cumulatively Considerable CS – Cumulative Significant

1.0 Introduction

1.1 PURPOSE AND BACKGROUND

This Draft Environmental Impact Report (EIR) has been prepared in conformance with the California Environmental Quality Act (CEQA) to evaluate the environmental impacts associated with the City of Elk Grove General Plan Update Project (Project, proposed Project). CEQA requires the preparation of an EIR prior to approving any project that may have a significant effect on the environment. For the purposes of CEQA, the term "project" refers to the whole of an action which has the potential to result in a direct physical change or a reasonably foreseeable indirect physical change in the environment (CEQA Guidelines Section 15378[a]). With respect to the proposed Project, the City of Elk Grove has determined that the proposed General Plan Update is a project under the definition of CEQA.

The City, acting as the lead agency, has caused this EIR to be prepared to provide the public and responsible and trustee agencies with information about the potential environmental effects of the proposed Project. As described in CEQA Guidelines Section 15121(a), an EIR is a public informational document that assesses potential environmental effects of the proposed project and identifies mitigation measures and alternatives to the proposed project that could reduce or avoid its adverse environmental impacts. Public agencies are charged with the duty to consider and minimize environmental impacts of proposed land use plans and development where feasible, and are obligated to balance a variety of public objectives, including economic, environmental, and social factors.

This section summarizes the purpose of the EIR, describes the environmental review procedures required by State law, discusses the intended uses of the EIR, and describes the EIR's scope and organization, lead agency contact person, and impact terminology.

1.2 TYPE OF DOCUMENT

The General Plan Update EIR was prepared as a program EIR, pursuant to Section 15168 of the CEQA Guidelines. A program EIR examines potential environmental impacts on a geographical area in which the lead agency will evaluate a series of subsequent projects. This type of EIR focuses on the changes in the environment that would result from implementation of the overall project, including land uses, transportation systems, and other infrastructure required to serve the project. The General Plan Update EIR will provide program-level environmental review of these subsequent activities. Consistent with CEQA Guidelines Section 15168(c), the City will review subsequent activities to determine whether the activity is within the scope of the Project covered by the program EIR or whether a project-specific environmental document must be prepared. If the City finds, pursuant to CEQA Guidelines Section 15162, that no new significant effects would occur and no new mitigation measures would be required, the City may determine that the Project was adequately evaluated in the program EIR and that no new environmental document is required.

1.3 INTENDED USES OF THE EIR

The purpose of an EIR is neither to recommend approval nor denial of a project. An EIR is an informational document used in the planning and decision-making process by the lead agency and responsible and trustee agencies. An EIR describes the significant environmental impacts of a project, potentially feasible measures to mitigate significant impacts that are identified, and potentially feasible alternatives that can avoid significant environmental effects or reduce them to less than significant. CEQA requires decision-makers to balance the benefits of a project against its unavoidable environmental effects when deciding whether to approve a project. The General Plan is a long-term policy guide for the development of the City, but does not propose specific development that can be analyzed at a project-specific level. Therefore, the City prepared a program EIR for the General Plan Update. A program EIR provides a more general analysis of the General Plan that focuses on the *overall* effects of the proposed General Plan. Because the General Plan is a policy-level document, the City is not committed to development at any particular densities or intensities and there is no assurance that development will occur under the proposed Project, even though the General Plan designates areas for a particular land use and specifies minimum and maximum intensities. CEQA recognizes that the impacts of policy-level decisions cannot be predicted or examined with the same exactitude and detail required for a construction project, and where the proposed project is a large-scale, planning-level decision, an EIR may contain only generalized mitigation criteria and policy-level alternatives, and defer future study of the formulation of details regarding later, site-specific projects (*Koster v. County of San Joaquin* (1996) 47 Cal.App.4th 29 at pp. 37, 41).

Tiering refers to the concept of a multilevel approach to preparing environmental documents set forth in Public Resources Code Section 21083.3 and State CEQA Guidelines Section 15152. Subsequent project-level environmental analysis can be streamlined to limit the scope of site-specific approvals following the preparation of an EIR for a general plan. This streamlining provision applies to site-specific approvals for projects that are consistent with the general plan. This program EIR will, in practice, help determine the need for and streamline the scope of subsequent environmental review for projects addressed in the general plan EIR. Furthermore, a program EIR can be incorporated by reference in subsequent project-specific documents to address cumulative impacts and growth-inducing impacts. In this way, subsequent documents may focus on new or site-specific impacts (State CEQA Guidelines Section 15168[d]).

This EIR includes quantified estimates of potential impacts on transportation, air quality, greenhouse gas emissions, noise, and other topics, based on reasonable assumptions regarding the amount, type, and character of land use changes described in the General Plan. In addition, this EIR references General Plan policies and programs that will serve to avoid or reduce the impacts of future projects accommodated under the General Plan. Thus, the impact analysis in this program EIR will serve to streamline and expedite environmental review of later projects that are consistent with the policies and programs of the General Plan and adopt the relevant mitigation measures in the General Plan EIR. Because the General Plan does not contain details of any specific project, the project-specific effects cannot be analyzed without speculation as to the ultimate use that could be proposed on a particular site. The proposed General Plan designations provide the parameters of uses that would be allowed, but a multitude of different business types or residential uses could be developed at varying intensities or densities at any particular location, so the project-level detail is not available to support meaningful environmental evaluation of project-level impacts at specific sites.

This program EIR also addresses the potential environmental effects associated with implementing the City's Climate Action Plan. The emissions reduction measures in the Climate Action Plan implement policies outlined in the General Plan; therefore, this analysis of the environmental impacts of adopting the General Plan also addresses implementation of the Climate Action Plan, including beneficial impacts related to reducing greenhouse gas emissions and energy conservation.

To maximize the value of the General Plan EIR to future projects that are consistent with the General Plan's objectives, the City has strategically integrated the General Plan and the environmental review. The General Plan Update process, including the development of policies that will reduce environmental effects, was used to refine the City's policies and programs to serve as uniformly applied standards and to limit the scope of analysis for projects consistent with the General Plan.

RESPONSIBLE AGENCIES AND TRUSTEE AGENCIES

Responsible agencies are State and local public agencies, other than the lead agency, that have some authority to carry out or approve the project or a portion of the project for which a lead agency is preparing or has prepared an EIR.

Trustee agencies under CEQA are designated public agencies with legal jurisdiction over natural resources that are held in trust for the people of California and that would be affected by a project.

Because the proposed Project is a General Plan, there are no agencies other than the City of Elk Grove that have approval or permitting authority for the Plan's adoption. However, implementation of the proposed General Plan (i.e., approval of specific projects) could involve many responsible agencies depending upon the specifics of later projects. The following are some of the agencies that could be required to act as responsible agencies for subsequent projects under the General Plan:

- California Department of Fish and Wildlife (CDFW)
- State Lands Commission
- State Water Resources Control Board
- Central Valley Regional Water Quality Control Board
- Sacramento Metropolitan Air Quality Management District
- California Department of Transportation (Caltrans)
- Sacramento County Local Agency Formation Commission (LAFCo)
- Elk Grove Unified School District (EGUSD)

1.4 EIR SCOPE AND ORGANIZATION

Sections 15120 through 15132 of the CEQA Guidelines identify the content requirements for Draft and Final EIRs. An EIR must include a description of the environmental setting, an environmental impact analysis, mitigation measures, alternatives, significant unavoidable environmental changes, growth-inducing impacts, and cumulative impacts.

SCOPE

The City determined the scope for this EIR based on the Notice of Preparation (NOP), comments in response to the NOP, agency consultation, and review of the proposed General Plan. The NOP identified that one issue area would result in no impact, and this issue is scoped out of the EIR:

Seiche, Tsunami, and Mudflow

Based on the Project's location (inland, away from any water bodies) and topography (relatively flat), there would be no impact related to seiche, tsunami, or mudflow. This impact will not be discussed further.

ORGANIZATION

This Draft EIR is organized in the following manner:

Section ES – Executive Summary

This section summarizes the characteristics of the proposed Project and includes a summary table of the Project's significant environmental impacts and associated mitigation measures.

Section 1.0 – Introduction

Section 1.0 provides an introduction and overview describing the intended use of the EIR and the review and certification process.

Section 2.0 – Project Description

Section 2.0 describes the proposed Project in detail, including intended objectives, background information, and physical and technical characteristics.

Section 3.0 – Demographics

Section 3.0 describes the existing population, employment, and housing levels in the City and Sacramento County and evaluates population, employment, and housing changes caused by the proposed Project that could have the potential to cause physical environmental effects.

Section 4.0 – Land Use

Section 4.0 addresses the land use and planning implications of the Project and discusses potential inconsistencies with land use plans.

Section 5.0 – Environmental Setting, Impacts, and Mitigation Measures

Section 5.0 contains an analysis of environmental topic areas as identified below. Each subsection contains a description of the existing setting of the Project area, identifies standards of significance, identifies Project-related impacts, and recommends mitigation measures to reduce significant impacts to less than significant.

The following major environmental topics are addressed in this section:

- Aesthetics, Light, and Glare
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology, Soils, and Seismicity
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Noise
- Public Services and Recreation
- Public Utilities
- Transportation

Section 6.0 – Other CEQA Considerations

This section contains discussions and analysis of various topical issues mandated by CEQA. These include significant environmental effects that cannot be avoided if the Project is implemented, growth-inducing impacts, and energy conservation. As required by CEQA Section 15130, an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. The cumulative impacts of the Project are addressed in the technical sections of this Draft EIR and summarized in this section.

Section 7.0 – Project Alternatives

CEQA Guidelines Section 15126.6 requires that an EIR describe a range of reasonable alternatives to the project which could feasibly attain the basic objectives of the Project and avoid and/or lessen its environmental effects. This alternatives analysis provides a comparative analysis between the Project and the selected alternatives, which include the following:

Alternative 1 – No Project Alternative

The No Project Alternative assumes the implementation of the existing General Plan (2003), instead of the proposed General Plan Update. Under this alternative, the existing General Plan land uses would remain in place and development within the City would occur as originally anticipated, with its emphasis on carefully managed growth and buildout of the SEPA community plan area.

Alternative 2 – Additional Climate Action Plan Measures

Under this alternative, the City of Elk Grove would adopt additional measures in the Climate Action Plan (CAP) that would further exceed established GHG reduction targets for 2020 and 2030, and allow the City to meet the State's targets for 2050. The Administrative Draft EIR concludes that GHG emissions are a less than significant impact for 2020 and 2030, but a significant and unavoidable impact for 2050 due to uncertainty regarding availability of measures to reach 2050 emissions reduction targets. Additional measures may include, but are not limited to, CALGreen Tier 1/NetZero by 2020, additional transportation sector measures, a direct offset program, and other emissions reduction options discussed as part of the project but not included in the proposed CAP.

Alternative 3 – Reduced Study Areas

This alternative reduces the extent of the Study Areas to those areas within the existing Sacramento County Urban Services Boundary (USB) as well as the area included in the Kammerer/99 Sphere of Influence Amendment that was filed by a private developer for the area south of Kammerer Road and west of State Route 99. This would result in a reduction in the size of the West and South Study Areas. The East and North Study Areas would remain the same as the proposed Project.

Alternative 4 – Increased Development Intensity Alternative

This alternative increases the allowable residential density and non-residential development intensity for selected key sites around the City. In addition, for this alternative the land use designations for several additional sites would be changed from Low Density Residential (LDR) to High Density Residential (HDR).

Alternative 5 – Increased Employment Alternative

This alternative changes the land use designations for certain areas of the City in order to allow for more office development, thereby generating a greater number of jobs in Elk Grove.

Section 8.0 – Report Preparation

This section lists all authors and agencies that assisted in the preparation of the report by name, title, and company or agency affiliation.

Appendices

This section includes all notices and other procedural documents pertinent to the EIR, as well as technical material prepared to support the analysis.

1.5 ENVIRONMENTAL REVIEW PROCESS

The review and certification process for the EIR will involve the following procedural steps:

NOTICE OF PREPARATION AND INITIAL STUDY

In accordance with Section 15082 of the CEQA Guidelines, the City prepared an NOP of an EIR for the Project on June 23, 2017. This notice was circulated to the public, local, State, and federal agencies, and other interested parties to solicit comments on the Project. After initial review of the Project, the City determined that an EIR should be prepared and therefore no initial study was prepared and is not required, pursuant to CEQA Guidelines Section 15063(a). The NOP is presented in **Appendix A**. The City held an EIR scoping meeting on July 11, 2017, pursuant to Public Resources Code Section 21083.9 and CEQA Guidelines Section 15083.

DRAFT EIR PUBLIC NOTICE/PUBLIC REVIEW

This Draft EIR contains a description of the Project, description of the environmental setting, identification of Project impacts, and mitigation measures for impacts found to be significant, as well as an analysis of project alternatives. Upon completion of the Draft EIR, the City filed the Notice of Completion (NOC) with the State Office of Planning and Research to begin the public review period (Public Resources Code Section 21161). Concurrent with the NOC, the City provided public Notice of Availability (NOA) of the Draft EIR for public review to invite comment from the public, agencies, organizations, and other interested parties.

The review period for this Draft EIR is 60 days, from July 27 through September 26, 2018. Public comment on the Draft EIR will be accepted both in written form and orally at public hearings. Although no public hearings to accept comments on the EIR are required by CEQA, the City will hold a public comment meeting during the 60-day review period prior to EIR certification. Notice of the time and location of the hearing will be published prior to the hearing. All comments or questions regarding the Draft EIR should be addressed to:

Christopher Jordan, AICP
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

RESPONSE TO COMMENTS/FINAL EIR

Following the public review period, a Final EIR will be prepared. The Final EIR will respond to written comments received during the public review period and to oral comments made at public hearings regarding the Project.

CERTIFICATION OF THE EIR/PROJECT CONSIDERATION

The Elk Grove Planning Commission will review and consider the Final EIR. If the Planning Commission finds that the Final EIR is "adequate and complete," the Planning Commission will make a recommendation to the City Council whether to certify the EIR, and the City Council will make a final decision as to what action to take. The Planning Commission and City Council will each hold a hearing on the Project as part of consideration of its requested entitlements. A decision to approve the Project would be accompanied by written findings in accordance with CEQA Guidelines Section 15091 and, if applicable, a Statement of Overriding Considerations in accordance with Section 15093. A Mitigation Monitoring and Reporting Program (MMRP), as described below, would also be adopted for the mitigation measures contained in the EIR to reduce or avoid significant effects on the environment. This MMRP would be designed to ensure that these measures are carried out by assigning responsibility for implementation and monitoring as well as a schedule for implementation.

MITIGATION MONITORING AND REPORTING PROGRAM

CEQA Section 21081.6(a) requires lead agencies to adopt an MMRP to describe measures that have been adopted or made a condition of Project approval to mitigate or avoid significant effects on the environment. The specific "reporting or monitoring" program required by CEQA is not required to be included in the EIR; however, it will be presented to the City Council for adoption. Throughout the EIR, mitigation measures are clearly identified and presented in language that will facilitate establishment of an MMRP. Any mitigation measures adopted by the City as conditions for approval of the Project will be included in the MMRP to facilitate compliance tracking.

1.6 COMMENTS RECEIVED ON THE NOTICE OF PREPARATION

The City received comment letters on the NOP for the Project (see **Table 1.0-1**). A copy of each letter is provided in **Appendix B** of this Draft EIR. **Table 1.0-1** summarizes the comments contained in each letter from agencies and interested parties.

TABLE 1.0-1
LIST OF NOP COMMENT LETTERS

Agency/Individual	Date	Comment	Location Addressed in EIR
Elk Grove Unified School District (EGUSD)	7-24-17	• Opportunity sites 2 and 3 will have significant regional and cumulative impacts to the District's existing facilities based on the recommended alternatives and capacity is not available at Irene B. West school with the new land use plan. • Anticipated future students for the regional middle and high school capacity has already been allocated in the existing land use plans.	Section 5.11, Public Services and Recreation

Agency/Individual	Date	Comment	Location Addressed in EIR
		• If infill land use changes are made, it will trigger the need for an additional middle/high school site. • Until development plans are presented for sites 2 and 3, it seems prudent to plan for the maximum number of dwelling units and additional students from those planning areas, which could trigger need for both an additional elementary and regional middle/high school if developed as projected. • As development occurs, EGUSD planning staff will work with City staff and developers to identify school sites.	
United Auburn Indian Community (UAIC)	7-24-17	UAIC recommends updates in the General Plan to the following: • Consult pursuant to Assembly Bill 52 and Senate Bill 18. • Update addressing the City's Tribal Consultation Policy. • City's Historic Preservation ordinances for Native American and historic cultural resources.	Section 5.5, Cultural Resources
Triangle Community Group	7-22-17	• Evaluate nighttime light and glare for Triangle area. • Mitigate for air pollution, greenhouse gas emissions, and noise pollution related to transit traffic; traffic circles at all intersections. • Excavated channels that support native plant and wildlife species. • Endangered Swainson's hawk in the Triangle area. • Cultural resources. • Evaluate any potential changes in residential density in the Triangle area. • Higher housing densities bring increased need for more police and fire protection. How much and when will increased police and fire services be provided regardless of the zoning? • Concern for reduction in sources for groundwater recharge. • References California Sustainable Groundwater Management Act impacts on the Triangle area. • Surface drainage continues to be a problem; higher-density housing has potential to increase flows beyond current infrastructure capabilities. • Intersection congestion expected at Bradshaw/Elk Grove Boulevard; Elk Grove Boulevard/Grant Line Road; and Bradshaw Road/Grant Line Road.	Section 5.1, Aesthetics, Light, and Glare Section 5.3, Air Quality Section 5.4, Biological Resources Section 5.5, Cultural Resources Section 5.7, Greenhouse Gas Emissions Section 5.9, Hydrology and Water Quality Section 5.10, Noise Section 5.11, Public Services and Recreation Section 5.13, Transportation
Sacramento Metropolitan Air Quality Management District (SCAQMD)	7-21-17	• Evaluate the Project's consistency with existing plans: o Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) o California Air Resources Board's (CARB) Climate Change Scoping Plan o Elk Grove's Climate Action Plan (CAP) o Elk Grove's Bicycle, Pedestrian, and Trails Master Plan	Section 5.3, Air Quality Section 5.7, Greenhouse Gas Emissions Section 5.13, Transportation

Agency/Individual	Date	Comment	Location Addressed in EIR
		o Sacramento Tree Foundation's Regional Greenprint Initiative o Capital SouthEast Connector Project Design Guidelines • Evaluate the effectiveness of the existing CAP. • Expand the City's existing tree policies and evaluate tree canopy as a climate adaptation measure. • Evaluate exposure reduction measures to reduce sensitive receptor exposures to air pollution near major roadways and railways. • Disclose potential cancer risk to receptors near major roadways. • Vehicle miles traveled (VMT). • Consider additional multimodal performance indicators such as transit capacity or quality of service as part of roadway efficiency analysis. • Transit-oriented development.	
Lynn Wheat		• Develop traffic model for entire area covered by the EIR and assume worst case. • Acknowledge the qualitative or perceived impacts from a quality of life perspective. • Quantify projected peak vehicle travel times along major arterials. • Assess traffic levels on major arterials at less than full roadway buildout scenarios—phased or interim approach. • Include updated air quality modeling that considers full buildout of the entire region. • Health risk assessment for air quality. • Take proactive approach to risk assessment due to Elk Grove 24-million-gallon aboveground propane storage tanks. • Evacuation plans. • Potential risk sites. • Consider risk sites susceptible to terrorism. • Risks from transportation of hazardous materials, including by rail.	Section 5.3, Air Quality Section 5.8, Hazards and Hazardous Materials Section 5.13, Transportation
Laguna Creek Watershed Council	7-24-17	• Integrate a creek corridor protection policy into the General Plan. • Adopt subdivision standards that optimize use of low-impact development practices. • Set aside areas in City parks to maintain features, not only landscape features. • Implement overlay zones that protect riparian corridors and aquifer recharge areas. • Integrate climate mitigation and adaptation strategies whenever possible.	Section 5.4, Biological Resources Section 5.7, Greenhouse Gas Emissions Section 5.9, Hydrology and Water Quality

Agency/Individual	Date	Comment	Location Addressed in EIR
Sacramento Local Area Formation Commission (LAFCo)	7-24-17	• Study areas identified in NOP Figure 3 are outside of the City's SOI. • LAFCo is a responsible agency pursuant to CEQA. • Define the Opportunity Sites and Study Areas in detail to allow permit reviewer to determine land use designations and uses within such areas, land use intensities, and policies that will apply within those designations. • Articulate infill strategy and encouragement of infill and the provision of service to such projects. • SACOG Blueprint and the MTP/SCS consistency. • Include comprehensive annexation policies, thorough agriculture and open space preservation program. • Future role and sequence of LAFCo in any General Plan Update New Growth strategy and LAFCo's role as a responsible agency. • Loss of affordable housing. • Primary and secondary effects of construction/operation on services and utilities. • Capacity to serve new development. • Evaluate whether providers can service infill and new growth areas without affecting existing service levels. • Would City perform any services now being provided by another service provider? Effects on those providers. • Agricultural lands, loss trends. • Williamson Act contracts. • Farmland security zone. • Characteristics of soil. • Prime agricultural land displayed on a map. • Evaluate countywide agricultural land loss, and what portion of the overall inventory and loss that such a project represents. • Open space resources should be depicted on a map. • Evaluate countywide open space loss and what portion of the overall inventory and loss that such a project represents. • Environmental justice. • Disadvantaged unincorporated communities. • Include map of analysis of the characteristics of any island, fringe, or legacy unincorporated communities as defined. • Biological resource evaluation should include an evaluation of impacts to the South Sacramento Habitat Conservation Plan (SSHCP). • The City is not a participant in the SSHCP, and coverage within those unincorporated areas that are currently in the USB may cease upon annexation to the City. Additionally, there are portions of the Study Areas that	Throughout EIR

Agency/Individual	Date	Comment	Location Addressed in EIR
		are outside of the USB and are not scheduled to receive coverage by the SSHCP. • Floodplain areas. • Include evaluation of the City's existing/future compliance with regulations of the Central Valley Flood Protection Plan. • 200-year (0.5 percent) flood. • Consistency evaluation with SACOG Blueprint and MTP/SCS and SSHCP. • Climate change.	
Sacramento Area Council of Governments (SACOG)	7-24-17	• Implementation of the Blueprint vision depends on cities to implement it. • The Draft Land Use Map and Draft Transportation Network Diagram included in the NOP include potential growth areas and proposed transportation projects that are not included in the 2016 MTP/SCS.	Section 3.0, Demographics Section 4.0, Land Use
Michael Monasky	7-24-17	• Pedestrians aren't safe due to auto-oriented streets. • No sufficient soccer facilities. • Groundwater table is being severely depleted. • SSHCP. • Ignored global warming threats. • Advanced minimum wage ordinance. • Prepare health impact assessment through County Health Department for heart and lung disease, obesity, diabetes, mental health, anxiety, depression, and air and water pollution.	Section 5.3, Air Quality Section 5.4, Biological Resources Section 5.7, Greenhouse Gas Emissions Section 5.9, Hydrology and Water Quality Section 5.11, Public Services and Recreation Section 5.12, Public Utilities Section 5.13, Transportation
Sacramento Municipal Utility District (SMUD)	7-24-17	• Overhead/underground transmission and distribution line easements. • Utility line routing. • Electrical load needs/requirements. • Energy efficiency. • Climate change. • Cumulative impacts related to the need for increased electrical delivery.	Section 5.12, Public Utilities Section 6.0, Energy Conservation
Delta Protection Commission	7-25-17	• Consider the Commission's Land Use and Management Plan and its policies when assessing the Project's consistency with applicable land use plans and policies.	Section 4.0, Land Use
California Department of Transportation	7-21-17	• Coordination for work within, over, under, or adjacent to public transportation rights-of-way. • Include traffic study to determine potential project	Section 5.13, Transportation

Agency/Individual	Date	Comment	Location Addressed in EIR
(Caltrans)		impacts to State and local facilities; must include State Route 99 and Interstate 5 mainline and interchanges in the Elk Grove Planning Area. • Multimodal (vehicle, bike pedestrian, and transit) transportation opportunities. • Consider if there will be a reduction or increase in VMT. • Include a VMT-based transportation analysis, develop VMT threshold for CEQA analysis. • Analyze potential direct and cumulative State Highway System impacts and mitigate by General Plan and associated documents. • It is recommended the City adopt the I-5 Subregional Corridor Mitigation Program (SCMP).	
Central Valley Regional Water Quality Control Board	7-18-17	• Provide overview of the Regional Board's jurisdiction and regulations.	Section 5.9, Hydrology and Water Quality

1.7 IMPACT TERMINOLOGY

This Draft EIR uses the following terminology to describe environmental effects of the proposed Project:

- ***Standards of Significance:*** A set of criteria used by the lead agency to determine at what level or "threshold" an impact would be considered significant. Significance criteria used in this EIR include the CEQA Guidelines, factual or scientific information, regulatory performance standards of local (e.g., City and County), State, and federal agencies, and City goals, objectives, and policies.

- ***Less Than Significant Impact:*** A less than significant impact would cause no substantial change in the environment. No mitigation is required.

- ***Significant Impact:*** A significant impact would cause, or would potentially cause, a substantial adverse change in the physical conditions of the environment. Significant impacts are identified by the evaluation of Project effects using specified standards of significance. Mitigation measures and/or Project alternatives are identified to reduce Project effects on the environment.

- ***Significant and Unavoidable Impact:*** A significant and unavoidable impact would result in a substantial change in the environment that cannot be avoided or mitigated to a less than significant level.

2.0 Project Description

This section describes the proposed City of Elk Grove General Plan Update Project (Project, proposed Project) in compliance with CEQA Guidelines Section 15124. It depicts the location of the City and the areas planned for future development and conservation, as well as existing conditions in the Planning Area and vicinity. It lists the City's Project objectives and a general description of the Project's technical and environmental characteristics. Further, it provides a detailed list of the approvals that would be required for future development in the Planning Area. As the City would have several discretionary actions or decisions subject to California Environmental Quality Act (CEQA) review, these decisions and the process for implementing them are described. These include actions the City would take now and actions that may be taken in the future.

2.1 PROJECT LOCATION AND SETTING

The Project site consists of the Planning Area for the General Plan Update, which contains all land within City boundaries, as well as lands outside the City in unincorporated Sacramento County to the south and east that have been included in the City's planning activities pursuant to California Government Code Section 65300. The Planning Area encompasses approximately 48.8 square miles (31,238 acres) in south-central Sacramento County (see **Figure 2.0-1**). The City limits and the Planning Area boundary are shown in **Figure 2.0-2** and are generally described as follows:

- The City is generally bounded by Interstate 5 (I-5) on the west, Calvine Road and the City of Sacramento on the north, Grant Line Road on the east, and Kammerer Road on the south. State Route (SR) 99 runs north–south, bisecting the City near its center.
- The Planning Area boundaries generally coincide with the City limits on the north and west, but the Planning Area extends to Core Road and Eschinger Road to the south and to the Deer Creek floodplain to the east.

In the Planning Area, existing land uses include a mix of agriculture (10 percent), residential (55 percent), nonresidential (commercial, office, and industrial) (7 percent), parks and open space (9 percent), civic/institutional (5 percent), public and quasi-public spaces, roadways, and other infrastructure (2 percent), and vacant land (12 percent). Existing land uses in the Planning Area are illustrated in **Figure 2.0-2** and discussed in greater detail in Section 4.0, Land Use.

Aside from portions of the City of Sacramento to the northwest, all land surrounding the Project site is in unincorporated Sacramento County and consists of rural residential and agricultural uses to the south and east and urban development (residential neighborhoods and commercial areas) to the north.

BACKGROUND

The City's current General Plan was adopted in November 2003 following incorporation of the City. Since its adoption, the City has grown and changed and numerous developer and City-initiated amendments to the current General Plan have been adopted, including, but not limited to:

- Laguna Ridge Specific Plan, adopted 2004
- Safety Element, updated 2005
- Laguna West, annexed 2004
- Housing Element, updated 2009 and 2014

- Sustainability Element, adopted 2013
- Southeast Policy Area Community Plan, adopted 2014

Additionally, new laws affecting general plans have been passed, new social and environmental issues have emerged, and new planning strategies and practices have been developed. Therefore, beginning in 2015, the City engaged the community through a series of events and workshops, as well as a series of City Council/Planning Commission study sessions, to develop the proposed Project.

2.2 PROJECT OBJECTIVES

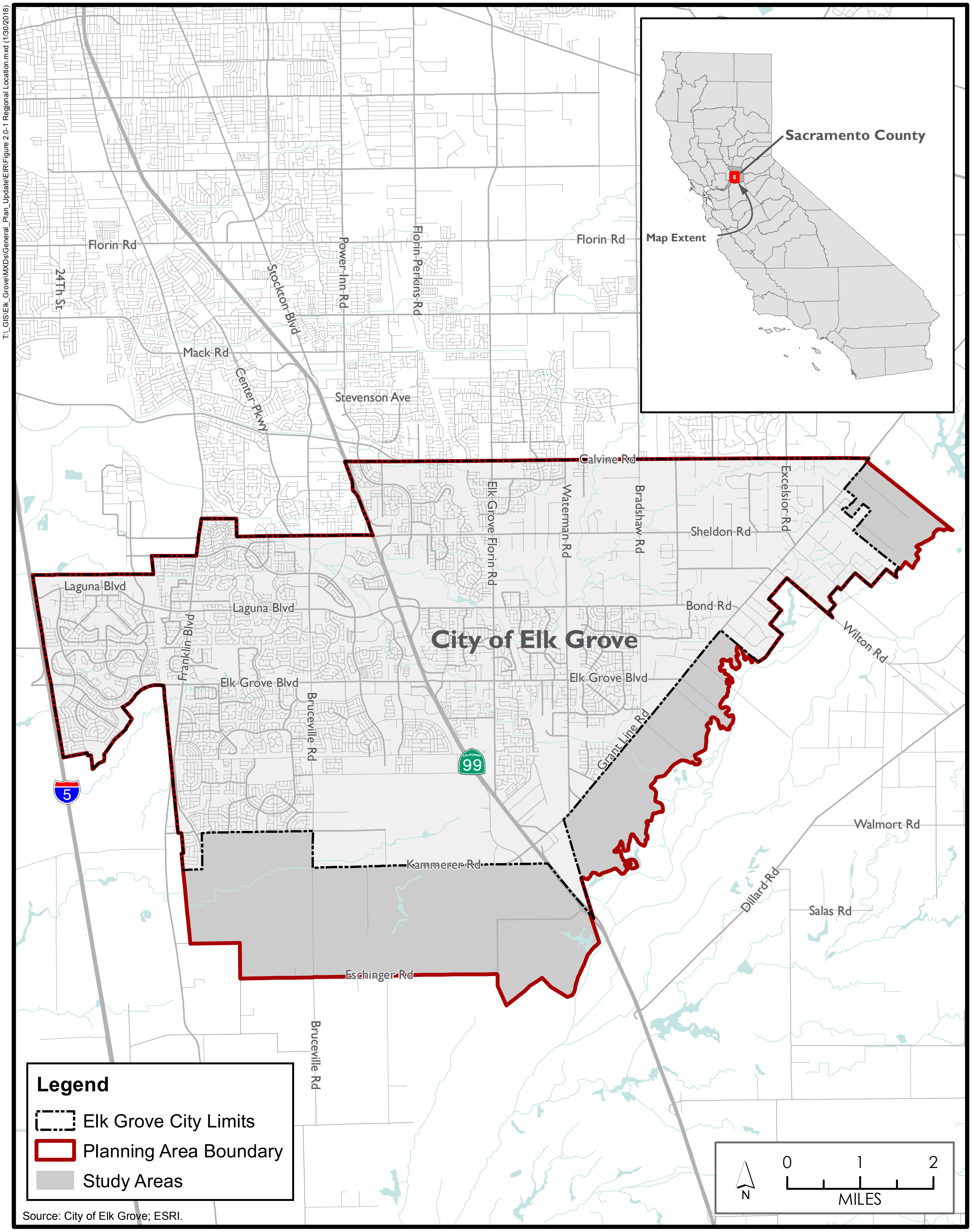
Section 15124 of the State CEQA Guidelines requires that a project description be accompanied by a "statement of objectives sought by the proposed project." The guidelines go on to state that the "objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project."

The City has identified the following objectives for the proposed Project:

1) Provide for growth of the City to meet long-term needs, including housing, employment, and recreational opportunities.
2) Facilitate orderly and logical development, including economic development, while maintaining the character of existing communities.
3) Provide an improved transportation system that includes an array of travel modes and routes, including roadways, mass transit, walking, and cycling.
4) Protect open space, providing trails, parkland, and a range of recreational opportunities.
5) Provide mechanisms to minimize noise and safety risks associated with natural and human-caused noise and safety hazards.
6) Promote sustainability and community resiliency through reductions in vehicle miles traveled, improved air quality, reductions in energy usage, and a diversified economy.
7) Provide and support public facilities and infrastructure with sufficient capacity to adequately serve the needs of the growing community.

2.3 PROJECT CHARACTERISTICS

The City of Elk Grove is conducting a comprehensive update of its General Plan. State law (Government Code Section 65300) requires each city and county to adopt a comprehensive, long-term general plan for its physical development. The City's current General Plan was adopted in 2003, with various amendments and changes made since then, and serves to direct the City's future growth and development as well as its conservation policy. The General Plan is now being updated to ensure that this guiding policy document remains a useful tool, keeps pace with change, and provides workable solutions to current and future issues.



City of Elk Grove
Development Services

Figure 2.0-1

Regional Location

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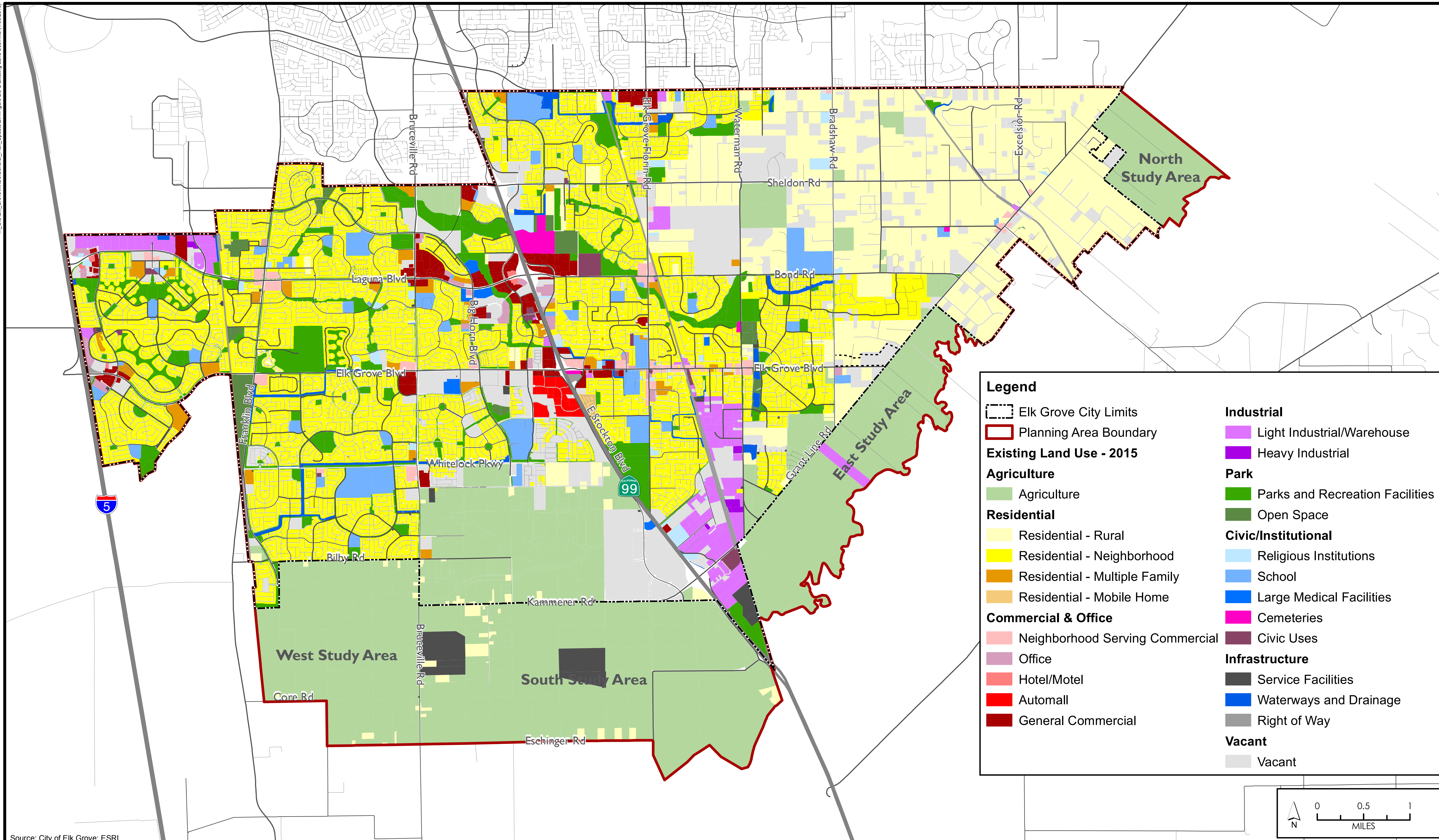

City of Elk Grove
Development Services

Figure 2.0-2

Existing Land Use

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The Project includes the following components:

GENERAL PLAN UPDATE

The General Plan and implementing programs serve as the blueprint for future growth and development. These documents contain policies and programs designed to provide decision-makers with a solid basis for future decisions related to land use and development. General Plan update documents and presentations developed to date are available at the following website: http://www.elkgrovecity.org/city_hall/departments_divisions/planning/a_brighter_future/

Vision Statement and Supporting Principles

The following community Vision Statement supports the proposed Project:

> *The City of Elk Grove is a great place to make a home, a great place to work, and a great place to play. Our community is diverse, healthy, safe, and family-oriented, with thriving schools and plentiful parks, shops, and places to work. Agriculture, rural homes, and urban life flourish together. Our natural resources, including water and open spaces, are protected and offer a variety of recreational opportunities. Community members travel easily by automobile, by bicycle, on foot, or using transit. The City is proactive in making daily life healthy and sustainable—considering the needs of future generations while protecting what is valued today.*
>
> *Well-maintained infrastructure and the right mix of services and amenities draw new and dynamic businesses and development to Elk Grove. Development is guided to ensure responsible growth and opportunities for a diversity of individuals who call Elk Grove home.*

Elk Grove's Vision Statement is supported by a series of Supporting Principles, described below, that provide an overarching rationale for more specific General Plan goals and policies.

Regional Goals & Influence – Our Regional Neighbors Know Us & Our Contributions

Elk Grove occupies a prominent place in the regional dialogue. The City's identity and brand are clear in the minds of its neighbors. Our contributions to the region continue to strengthen that identity and include recreational opportunities, higher education, job centers, and quality neighborhoods. City officials engage with other cities, Sacramento County, and other partners to plan and build for an ever more dynamic region. The City's employment potential within the regional economy is fulfilled.

New businesses have emerged, providing new employment centers that support technology and build from our agricultural roots. Both housing and jobs are available in the community, providing flexible opportunities for many lifestyles.

Infill Development & Outward Expansion – Development Fills in the Gaps & Expansion Occurs with Purpose

Unfinished, undeveloped gaps found throughout the City become opportunities to develop economically successful additions that provide added value to our community as well as new job opportunities and lifestyle improvements. Existing small businesses are protected even as we invite in new businesses and different economic opportunities. New development plans are grounded by community needs and market demand, and are carried out efficiently and holistically. New housing built in a variety of shapes and sizes to meet the needs and desires of our diverse community also fills in these gaps.

Infill development is consistently executed with programs that address impacts and encourage innovative building solutions. A creative growth management strategy allows expansion to occur when economic need, community vision, and regional goals align. There is a strong system in place to guarantee that, as the community accommodates new neighbors and new jobs, it continues to maintain and improve facilities and services, such as schools, roads, and parks.

Economic Vitality – Our Economy is Diverse & Balanced & Enhances Quality of Life

Major employment centers make their home in Elk Grove, providing employment opportunities and stimulating ancillary businesses as well. We continue to invite businesses that are competitive in the region and set the stage to attract these businesses by providing resources and amenities they need. Old and new businesses together improve our lives by providing new jobs as well as convenient places to get amenities and entertainment. Elk Grove has a diverse economy that builds from our heritage, but also invites in new and changing industries. Higher education and technical training are available to our community members as they pursue diverse job opportunities in these new industries. The City is leading the way in innovative technology infrastructure, technical education opportunities, sports activities and entertainment, and a safe and crime-free environment. These features attract business and offer a better quality of life for individuals and families of all incomes, ages, abilities, and backgrounds.

Growth and development in the City are built with our historic resources and identity in mind. These businesses bolster the community by providing jobs, services, goods, and recreational opportunities for residents.

Community Identity – City Core, Heritage, & Well-Known Neighborhoods

The City includes a civic core that offers central gathering spaces which all community members enjoy and feel welcome in. The City and community organizations partner to foster a thriving and safe civic core. Successful projects and annual events enhance vitality and camaraderie in this place.

Old Town Elk Grove continues to protect and showcase our heritage for the enjoyment of residents and visitors alike.

All of our neighborhoods are built around our top-notch parks and schools. Preservation and change in our neighborhoods are guided by values of diversity, neighborly spirit, and small-town character.

Rural Areas – Protecting Our Farming Heritage & Rural Life

We celebrate the Rural Area and its heritage, and balance that heritage with other needs, services, and lifestyles desired in Elk Grove. The Rural Area is valued in our community for its aesthetic and cultural significance, as well as the economic and educational opportunities that agriculture provides. Our commitment to maintaining the Rural Area is clear and codified in core planning documents through programs that preserve the aesthetics and style of our rural heritage. Agricultural producers and other land uses remain good neighbors, each with desired services and infrastructure needs fully met.

Open Space & Resource Management – Outdoor Recreation Is Right Outside Our Door

Our parks and trails are of high quality and highly valued. We continue to enhance and maintain our recreational open spaces so that they are safe, connected, and accessible to all. Our trails connect easily to other trails and parks in the region, and community gardens are a source of local food and local involvement.

Multimodal & Active Transportation: Moving Around Anywhere, Any Way

Our residents, workers, and visitors need to move about efficiently, and have a variety of ways to do so. Connected transportation networks, regional coordination, and public and active transportation options are priorities for our community. Connected and mobile community members have the ability to travel within the City and to other places in the region by a variety of methods, with seamless transitions between modes and regions. Our community has roadways in place that allow for efficient movement and safe travel spaces for all modes of travel. The infrastructure and facilities for pedestrians, bicyclists, and transit users are clean, safe, and well maintained, and walkways and bike lanes are continuous and complete with convenient connections to local and regional transit.

Sustainable & Healthy Community – Clean, Green Practices & Healthy Living

Sustainable practices are at the forefront of environmental concerns in Elk Grove. Organizations, businesses, and residents desire a city that is adaptive to and resilient against climate change, is a leader in conservation, and embraces innovations in green technologies. The City layout and land uses promote healthy living, with healthy grocery options and destinations nearby that people can get to by walking and biking. The City's residents and businesses recognize the importance of responsible resource use, and they work together to conserve and use water and energy to their full potential.

Coordinated Services, Technology, & Infrastructure – Services for the Needs of All Residents

Safety and services are important to all members of our community, and services for youth, seniors, and disadvantaged families are readily available. Entertainment and social centers create a thriving and diverse economy and give residents a place to shop, play, and relax. The City ensures that important services in our community, including social, housing, transportation, health, and education, are available and efficiently obtainable for community members that choose or need them to thrive.

General Plan Structure

The General Plan must include subject matter identified in State law for the following State-required elements or topics: Land Use, Circulation, Housing, Conservation, Open Space, Noise, Safety, and Environmental Justice. The updated Elk Grove General Plan is divided into 10 chapters, which together address the topics mandated by the State, as well as additional topics of interest to the City. Each chapter is briefly described below.

1. **Introduction**: Addresses the purpose and scope of the General Plan; background on Elk Grove's history, current demographics, and economic conditions; planning context (other local and regional plans); the relationship of the General Plan to other plans and documents, including the City's Municipal Code; and the geographic area and topics covered in the General Plan.

2. **Vision**: Includes the Community Vision Statement and nine Supporting Principles that guide the General Plan, as developed during the public engagement process for the General Plan Update.

3. **Planning Framework:** Presents the three main components of the General Plan—the Land Use Plan, the Transportation Plan, and the Resource Conservation Plan—and lays out the key concepts and components underlying each. Includes three long-range planning policy diagrams: the Land Use Diagram, the Transportation Network Diagram, and the Resource Conservation Diagram. Describes the relationship between these three components, as well as their relationship to other planning documents such as the City's Housing Element.

4. **Urban and Rural Development:** Identifies the City's goals and policies related to development and expansion of urban areas, including both infill development and annexation of new land into the City. Summarizes key goals and policies from the City's Housing Element and how these relate to urban development and expansion policies. Discusses goals and policies related to agriculture and ongoing preservation of rural areas.

5. **Economy and the Region:** Presents the City's goals and policies related to economic vitality and economic development. Discusses regional coordination with public and private entities related to economic goals.

6. **Mobility:** Presents the City's goals and policies related to multimodal and active transportation, including complete streets design, public transit, maintenance and expansion of the roadway system, and the rail transportation network. Addresses related transportation topics, including safety and metrics for measuring traffic volumes and vehicle miles traveled.

7. **Community and Resource Protection:** Defines the City's goals and policies related to preserving the character and identity of neighborhoods and districts, protecting historic and cultural resources, promoting arts and culture, providing public open spaces and recreational facilities, and conserving the environment and natural resources. Summarizes community governance and decision-making goals and processes.

8. **Services, Health, and Safety:** Addresses the City's goals and policies related to health and safety, including disaster and emergency preparedness, public safety services (police and fire), and noise. Discusses specific risks such as hazardous materials and waste, flooding and drainage, and geologic and seismic hazards, and outlines policies to address these risks. Discusses environmental equity and community health. Presents the City's goals and policies related to community services, including libraries, schools, and youth and senior services.

9. **Community and Area Plans:** Describes three Community and Area Plans that are existing or will be developed as part of this plan or in the future to further refine the goals and objectives of the General Plan in key, specific geographical areas of the City:

   - Southeast Policy Area Community Plan (adopted)
   - Sheldon/Rural Area Community Plan (prepared as part of the Project)
   - Eastern Elk Grove Community Plan (prepared as part of the Project; this community plan includes various policies currently contained in the East Elk Grove Specific Plan, which is proposed to be rescinded.)

10. **Implementation:** Sets forth specific actions and tools for implementation of the General Plan, along with a detailed work program. Describes the process for maintaining and monitoring progress in implementing the General Plan.

11. **Glossary and Acronyms:** Provides definitions for key terms and acronyms used in the General Plan.

12. **Appendices**: A series of technical appendices addressing land use, mobility, housing, and safety.

The mandated elements of the General Plan will be addressed in the chapters as identified in **Table 2.0-1**.

TABLE 2.0-1
COMPARISON OF PROPOSED GENERAL PLAN CHAPTERS AND STATE-MANDATED GENERAL PLAN ELEMENTS

Proposed General Plan Chapters	Elements Mandated by Government Code							
	Land Use	Circulation	Housing	Conservation	Open Space	Noise	Safety	Environmental Justice
1. Introduction								
2. Vision								
3. Planning Framework	O	O	O		O			O
4. Urban and Rural Development	X		X					O
5. Economy and the Region								
6. Mobility		X					O	
7. Community and Resource Protection				X	X			
8. Services, Health, and Safety		O				X	X	X
9. Community and Area Plans	O	O	O	O	O	O	O	O
10. Implementation	O	O	O	O	O	O	O	O
11. Glossary and Acronyms								
12. Technical Information	T	T	T			T	T	T

X = Chapter that primarily addresses element requirements pursuant to the Government Code.

O = Chapter that has policies or discussion that supports the element requirements or addresses components pursuant to the Government Code not addressed in the primary chapter.

T = Chapter that has technical information mandated by the element requirements in the Government Code.

Land Use Diagram

The Preferred Alternative Land Use Map (**Figure 2.0-3**) establishes the general pattern of uses in the Planning Area. The maximum permitted land use densities and intensities are identified in the General Plan for these land uses. As the density and intensity standards for each land use designation are applied to future development projects and land use decisions, properties will gradually transition from one use to another, and land uses and intensities will gradually shift to align with the intent of the General Plan. Within the Study Areas identified on the Land Use Diagram, future uses may be developed in accordance with annexation policies identified in the General Plan and are subject to more detailed planning (e.g., specific plan).

Table 2.0-2 identifies anticipated land use changes that would occur with implementation of the General Plan, both from a 2015 baseline condition and relative to the currently adopted General Plan. For purposes of the EIR, analysis of potential environmental effects will be based on the net change between 2015 baseline conditions and the proposed General Plan.

TABLE 2.0-2
DEVELOPMENT POTENTIAL SUMMARY

	Acres	Dwelling Units	Population	Jobs	Jobs/Housing Ratio
Existing Development[1] Total	**31,238**	**53,829**	**171,059**	**45,463**	**0.84**
Current General Plan[2] Total	**31,448**	**77,737**	**252,628**	**97,373**	**1.25**
City Limits Subtotal	*23,441*	*75,718*	*246,108*	*89,097*	
Study Areas Subtotal	*8,007*	*2,019*	*6,520*	*8,276*	
Preferred Land Use Map[3] Total	**31,448**	**101,931**	**329,238**	**122,802**	**1.20**
City Limits Subtotal	*23,441*	*71,334*	*230,407*	*82,446*	
Study Areas Subtotal	*8,007*	*30,598*	*98,831*	*40,356*	
Difference Between Existing Development and Proposed General Plan	**210**	**48,102**	**158,179**	**77,339**	**0.36**

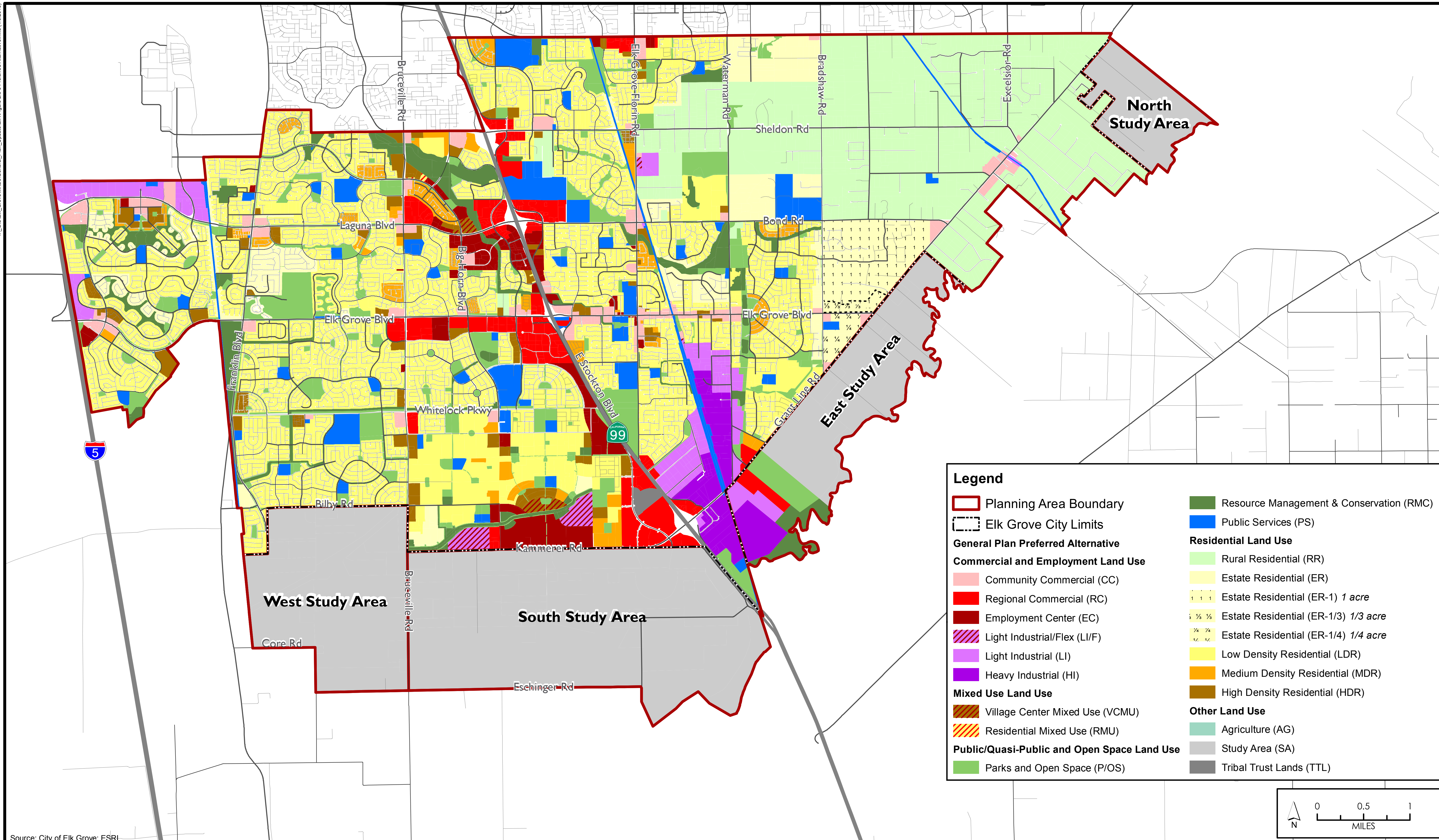
Source: City of Elk Grove 2018

Note: Numbers may not sum due to rounding.

1. *Existing development represents 2017 population and dwelling information and 2013 jobs data. These are the latest datasets that are available.*
2. *Current General Plan refers to buildout of the existing General Plan Land Use Diagram.*
3. *Preferred Land Use Map refers to the buildout of the proposed General Plan Land Use Diagram.*

Transportation Network Diagram

The transportation network is a major determinant of urban form and land use. Factors such as traffic patterns and congestion, access to transit, and ease and safety of walking and biking may determine where people choose to live, work, and visit. **Figure 2.0-4** illustrates anticipated roadway capacities needed to serve vehicle traffic anticipated with the proposed land uses and transportation policies. Policies developed for the General Plan will ensure a complete network including fixed transit, pedestrian and bicycle routes, and Class 1 trails.



City of Elk Grove
Development Services

Figure 2.0-3

Preferred Alternative Land Use Map

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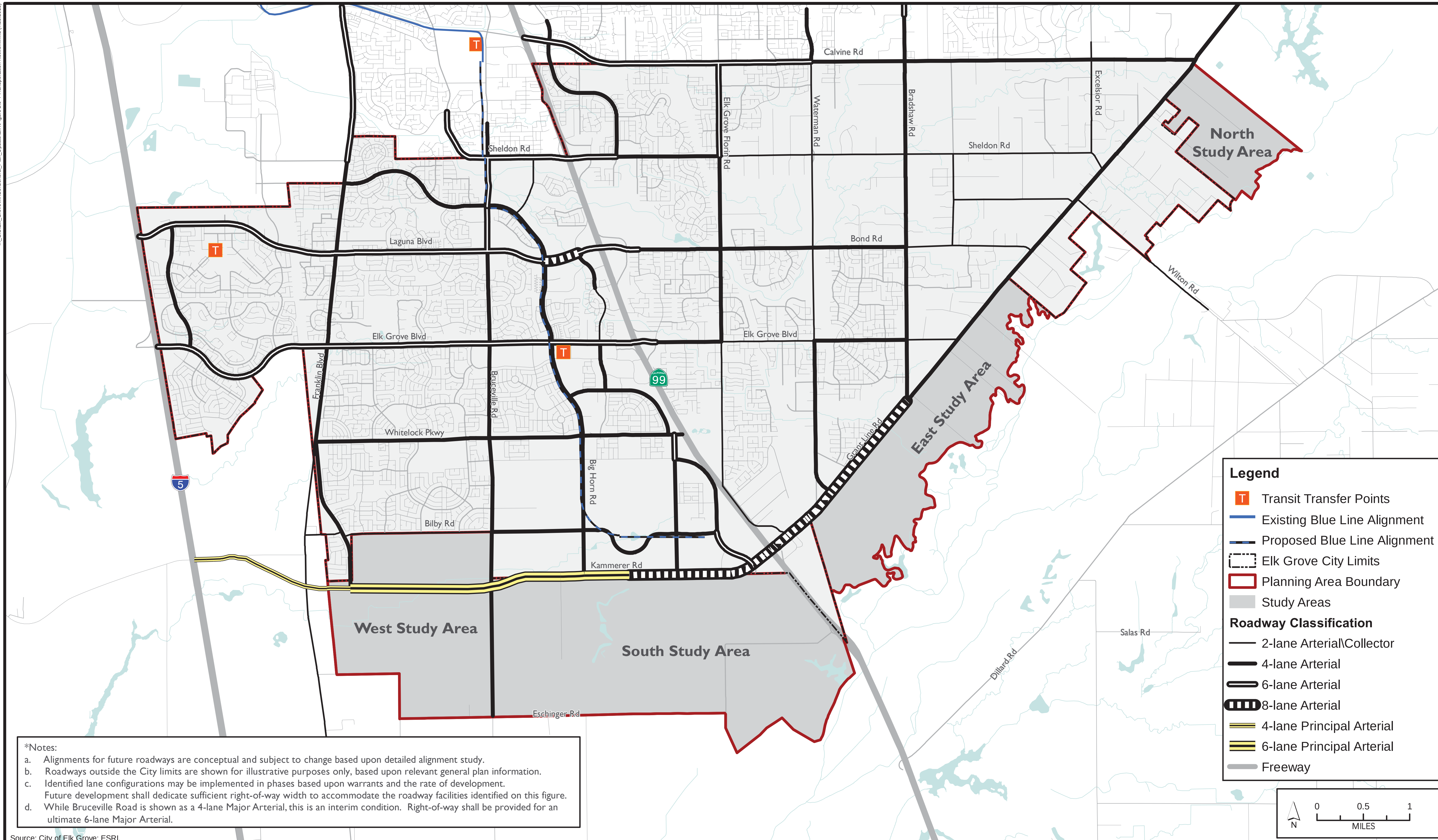

*Notes:
a. Alignments for future roadways are conceptual and subject to change based upon detailed alignment study.
b. Roadways outside the City limits are shown for illustrative purposes only, based upon relevant general plan information.
c. Identified lane configurations may be implemented in phases based upon warrants and the rate of development. Future development shall dedicate sufficient right-of-way width to accommodate the roadway facilities identified on this figure.
d. While Bruceville Road is shown as a 4-lane Major Arterial, this is an interim condition. Right-of-way shall be provided for an ultimate 6-lane Major Arterial.

Source: City of Elk Grove; ESRI.

City of Elk Grove
Development Services

Figure 2.0-4
Transportation Network Diagram

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CLIMATE ACTION PLAN UPDATE

The City of Elk Grove adopted a Climate Action Plan (CAP) in 2013. As part of the proposed Project, the City is also updating the CAP. The updated CAP includes an updated community-wide emissions inventory for Elk Grove, along with updated emissions forecasts for 2020, 2030, and 2050 based on land use activities anticipated with implementation of the updated General Plan.

While the existing CAP was originally designed to meet a 2020 target and provide CEQA streamlining benefits under Section 15183.5 of the CEQA Guidelines, the updated CAP is consistent with new State legislation and guidance issued since the existing CAP was adopted in 2013, such as Senate Bill (SB) 32, Executive Order (EO) B-30-15, and updates to the State's Climate Change Scoping Plan. This information was used to update the existing CAP emissions reduction measures to outline a strategy for achieving reduction targets consistent with State law and guidance. The updated CAP also includes an implementation program identifying time frames, responsible parties, indicators, potential costs and benefits, funding sources, and monitoring mechanisms.

SPECIFIC PLANS

To implement the policies and programs proposed in the General Plan Update, the Project includes the following actions related to existing Specific Plans in the City:

- Rescind the East Elk Grove Specific Plan, integrating various policies into the proposed Eastern Elk Grove Community Plan and establishing relevant development standards in Title 23 (Zoning) of the City's Municipal Code (hereinafter the Zoning Code).
- Rescind the East Franklin Specific Plan, integrating various policies into the proposed General Plan as relevant and establishing relevant development standards in the Zoning Code.
- Amend various sections of the Laguna Ridge Specific Plan for consistency with the updated General Plan.

ZONING CODE AMENDMENTS

To maintain consistency with the updated General Plan, several amendments to the Zoning Code will be required.

Phase I Amendments will be processed concurrently with the General Plan Update and be recommended for approval by City Council along with the recommendation for adoption of the updated General Plan. These amendments are focused on establishing a framework for new regulations not currently existing in the Code, along with some limited additional amendments to ensure consistency with the General Plan upon adoption. Phase I Amendments include:

1. Amendments to Title 23 (Zoning) of the Elk Grove Municipal Code as follows:
    a. Establishment of new base zone districts to implement the General Plan Update including allowed uses, entitlements required, and development standards:
        1) Village Center Mixed Use (VCMU)
        2) Residential Mixed Use (RMU)

3) Light Industrial/Flex (LI/F)

4) Public Services (PS)

b. Establishment of new overlay districts to retain unique development standards or allow for limited uses consistent with the General Plan Update:

1) East Elk Grove Overlay

2) East Franklin Overlay

3) Calvine Road/Highway 99 Overlay

c. Focused revisions to the Multifamily Overlay District for consistency with the General Plan Update.

d. Focused revisions to the allowed use listings for specific commercial uses for consistency with the General Plan Update.

2. Changes to the following Special Planning Areas (SPAs), as noted:

a. Focused revisions to the allowed uses for the Southeast Policy Area SPA, as necessary.

b. Repackage the Elk Grove-Florin Bond SPA and prepare a map to accompany the text (provided by City). Focused updates to the text are anticipated to ensure consistency.

c. Repeal the Laguna Gateway, Laguna Floodplain, and Calvine Road/Highway 99 SPAs.

3. Updates to the Zoning Map for consistency with the General Plan Land Use Map.

4. Updates to Chapter 6.32 (Noise) for consistency with General Plan policy.

5. Creation of a permit procedure for approving development applications proposed through the Clustering Policy.

Phase II Amendments are not intended for adoption within the same timeline as the General Plan Update. These amendments also include items necessary for implementation of the General Plan; however, they may require additional consideration, input, or policy direction to prepare. Phase II amendments will also provide an opportunity for staff to identify additional amendments needed to the Zoning Code. Phase II Amendments may include:

1. Refinements to any of the Phase I amendments.

2. Amendments to Title 23 (Zoning) of the Elk Grove Municipal Code for consistency with the General Plan update as follows:

a. Focused updates recommended based on an assessment of:

1) Permit and processing procedures

2) Existing zone district development standards

3) Allowed uses and entitlements required by zone district

4) Site planning and general development regulations

5) Special use regulations

b. Updates necessary for implementation of the House Element, as needed (to be determined).

3. Revisions to the following existing Special Planning Areas:

a. Old Town Elk Grove

b. Southeast Policy Area

PARKS AND RECREATION MASTER PLAN UPDATE

The Cosumnes Community Services District (CCSD) is preparing an update to the Parks and Recreation Master Plan, which describes how parks and recreation services are provided to the residents of Elk Grove. The City is fully located within the parks and recreation service area of the CCSD. As part of the Parks and Recreation Master Plan, the City and CCSD will jointly adopt amendments to the Park Design Principles, which establish requirements for the siting and sizing of new park facilities, as well as the design characteristics for these facilities. The update to the Parks and Recreation Master Plan and the Park Design Principles is being coordinated with the proposed Project as these describe the service area and design objectives for new parks and recreation facilities in the community.

2.4 REGULATORY REQUIREMENTS, PERMITS, AND APPROVALS

CITY OF ELK GROVE

The Planning Area is under the jurisdiction of the City. Actions that are proposed for the City include, but are not limited to, the following:

- Certification of an EIR and adoption of an MMRP
- Adoption of the General Plan
- Approval of changes to the Zoning Code to provide consistency with the General Plan
- Approval of the update to the CAP
- Approval of changes to the Laguna Ridge Specific Plan
- Rescind the East Elk Grove Specific Plan
- Rescind the East Franklin Specific Plan

The EIR will be used to support subsequent City actions, including, but not necessarily limited to:

- Rezones
- Subdivision and Parcel Maps
- Community Plans

- Specific Plans
- Conditional Use Permits
- Design Review Actions
- Zoning Administrator Actions
- Planning Actions
- Infrastructure and Public Facilities Siting and Project Approvals
- Other related actions

3.0 DEMOGRAPHICS

This section discusses the effects of the proposed Project on current and future population, housing, and employment. It also contains information regarding the Project's relationship to adopted programs and plans related to population projections for the City.

3.1 EXISTING SETTING

Prior to incorporation in 2000, the City was an unincorporated community in Sacramento County. The City was not recognized as a governmental entity in terms of census data, and it did not have legally prescribed boundaries, powers, or functions. Because data for the 2000 US Census was collected on April 1, 2000, and City incorporation occurred on July 1, 2000, the Elk Grove data for the 2000 Census was for the Elk Grove Census Designated Place (CDP), not the City's subsequent incorporated boundaries. Therefore, the current 2003 Elk Grove General Plan (current General Plan) was based on tabulating the Census data that best represented the City's boundaries. Thus, in cases where Census data are presented for 2000 and before, it may be based on the Elk Grove CDP.

The 2010 Census was completed based on the City's current boundaries. Data from the 2010 Census and from the annual American Community Survey (ACS) more accurately reflect the City's boundaries.

POPULATION AND POPULATION TRENDS

The City's population in the year 2000 was 72,665 persons, compared to Sacramento County's population of 1,223,499 (US Census Bureau 2000). Between 1990 and 2000, prior to incorporation, the City's population increased at an average rate of 7 percent annually (City of Elk Grove 2003a). Sacramento County experienced a much slower rate of growth during that period, with a population increase of 17.5 percent from 1,041,219 in 1990 to 1,223,499 in 2000 (US Census Bureau 1990, 2000). Growth in Sacramento County declined slightly to approximately 16 percent between 2000 and 2010.

The City experienced continued population growth after its incorporation in 2000, with an average annual growth rate of over 7 percent between 2000 and 2010. This growth was in part due to the annexation of Laguna West in 2003, which had a population of approximately 13,000. This growth rate declined, however, when new housing development stalled throughout the Sacramento region between 2008 and 2013 due to economic conditions.

Table 3.0-1 lists past and projected population growth in the City through the year 2036. Population growth in the City accounted for nearly 20 percent of Sacramento County's total growth between the years 2005 and 2010. The Sacramento Area Council of Governments (SACOG) (2016) projects that the population of Sacramento County will increase to approximately 1,986,543 by the year 2036. It should be noted that this population projection does not account for the Land Use Plan proposed by the Project.

TABLE 3.0-1
CITY OF ELK GROVE POPULATION TRENDS

Year	Population	Change	Average Annual Percentage Change
1990[1]	42,626	N/A	N/A
2000[2]	72,665	30,039	7.0
2005[3]	110,843	38,178	10.5
2010[4]	153,015	42,172	7.6
2015[4]	164,997	11,982	1.6
2016[4]	168,118	3,121	1.9
2017[4]	171,059	2,941	1.8
2036[5]	201,197	30,138	0.9

Sources:
1. *US Census Bureau 1990*
2. *US Census Bureau 2000*
3. *DOF 2012*
4. *DOF 2017*
5. *SACOG 2016*

HOUSEHOLDS

The US Census Bureau defines a household as all people who occupy a housing unit, which is defined as a house, an apartment, a mobile home, or a group of rooms or a single room that is occupied as separate living quarters. The total number of households in Elk Grove was 53,829 in 2017, with an average household size (the average number of people occupying a single housing unit) of 3.29 persons (DOF 2017), which is an increase in household size from 2003.

HOLDING CAPACITY

Holding capacity is expressed as the total number of people that would be accommodated in a planning area if the land within that area were developed to the maximum potential allowed by the land use designations in a general plan.

According to the Draft EIR for the current (2003) General Plan, the City had a buildout capacity of 63,340 housing units and an estimated holding capacity of approximately 194,453 persons (based upon a household size of 3.07 persons per household as defined in 2003, multiplied by 63,340 housing units) (City of Elk Grove 2003b). However, the City annexed Laguna West in 2003, adding housing units and acreage available for residential development. As disclosed in the Draft EIR for the current General Plan, the current General Plan land uses with Laguna West, the City has a buildout capacity of 77,737 housing units and an estimated holding capacity of 252,628 persons within the existing City limits. It should be noted that these estimates do not constitute a population cap for the City.

HOUSING

The Demographic Research Unit of the Department of Finance (DOF) is the official source of demographic data for State planning and budgeting and provides population and housing estimates for the State, as well as for counties and cities. In May 2017, DOF released housing unit estimates for the years 2011 through 2017. As shown in **Table 3.0-2**, the total number of housing units in Elk Grove increased by approximately 5.8 percent during that period. However, it should be noted that the number of housing units increased by an average of 11.2 percent each year between 2001 and 2007. After 2007, the housing market slowed significantly due to economic conditions, and new housing development in Elk Grove dropped to well below the levels experienced between 2001 and 2007. As shown in the table, the period between 2012 and 2013 saw the largest increase in new housing in years, with a 1.5 percent increase. Since 2013, there have been continuing indicators of housing market recovery. Several new home builders have recently begun new home development, and many new housing projects that became dormant after 2007 have shown new activity. SACOG (2016) projects that the City will have 65,367 housing units by 2036. It should be noted that this housing unit projection does not account for the Land Use Plan proposed by the Project.

TABLE 3.0-2
CITY OF ELK GROVE HOUSING UNITS ESTIMATES 2010–2017

Year	Total Housing Units	Single-Family		Multi-Family		Mobile Homes
		Detached	Attached	2–4 Units	5+ Units	
2011	50,869	44,275	1,535	962	3,820	277
2012	51,207	44,498	1,535	962	3,935	277
2013	51,973	44,876	1,537	962	4,319	279
2014	52,383	45,285	1,537	962	4,319	280
2015	52,723	45,623	1,537	962	4,319	282
2016	53,269	46,168	1,537	962	4,319	283
2017	53,829	46,728	1,537	962	4,319	283

Source: DOF 2017

With the economic decline of the late 2000s, housing prices throughout the country dropped significantly, and Elk Grove was no exception. Housing prices in Elk Grove peaked in late 2005, and over the next few years, home prices dropped considerably each year, reaching a minimum median price of $203,000 in February 2012, after which prices began to recover (Zillow 2017). As of August 2017, the average home value in Elk Grove was $397,500, an 8.9 percent increase from the previous year (Zillow 2017).

EMPLOYMENT AND INCOME

In 2015, 80,216 residents of Elk Grove were available for the labor force. As shown in **Table 3.0-3**, 72,268 of those were employed in the civilian labor force and 154 were in the armed forces (US Census Bureau 2016a). Approximately 7,794 or 9.7 percent of the labor force living in Elk Grove was unemployed in 2015. This was a decrease in the unemployment rate from 10.6 percent in 2014 and 10.8 in 2013. Thus, concurrent with the housing market recovery, the unemployment rate has declined in recent years.

TABLE 3.0-3
ELK GROVE EMPLOYMENT STATUS 2015

Employment Status	Estimates
Population 16 years and over	121,509
In labor force	80,216
Civilian labor force	80,062
Employed	72,268
Unemployed	7,794
Armed Forces	154
Not in labor force	41,293

Source: US Census Bureau 2015

Between 2000 and 2013, the City experienced an 8.7 percent average annual growth per year, with 29,601 jobs added in the City, and in 2013, the City had 44,806 jobs at 8,710 businesses (EPS 2016). SACOG (2016) projects the City will have 50,865 jobs by 2036, an increase of 5,402 jobs compared to SACOG's estimated 2015 jobs numbers. Major employers in the City include the Elk Grove Unified School District, Apple Computer, and Kaiser Permanente. It should be noted that these employment projections do not account for the Land Use Plan proposed by the Project.

The median household income between 2011 and 2015 was $55,987 in Sacramento County (US Census Bureau 2016b). The median family income in Elk Grove for that same period was nearly 42 percent higher at $79,487 (US Census Bureau 2016a), with 40.4 percent of households earning more than $100,000 annual gross income.

JOBS-TO-HOUSING RATIO

Elk Grove is the second largest city in Sacramento County and in the Sacramento-Roseville-Arden-Arcade Metropolitan Statistical Area. Within the metro regional context, the City can be considered a "bedroom community," with a large number of residents who live in the community but work elsewhere. More than 90 percent of residents work outside the City limits, with the majority commuting into Sacramento, according to 2013 Census data. This is at least partially a result of somewhat lower housing prices in the City than Sacramento and other communities in the metro area, and to the desirability of the park and school systems in the community.

A jobs-to-housing ratio is a tool used to gauge the relative balance of jobs and housing units within a community. One way to determine a jobs-to-housing ratio is to divide the number of jobs by the number of occupied housing units in a specific area to estimate the number of jobs per housing unit. It is generally considered ideal to have one job per employed resident or 1.5 jobs per housing unit (APA 2003). As discussed in Section 2.0, Project Description, based on 2017 population and dwelling information and based on 2013 jobs data, there are 45,463 jobs in the City compared to 53,829 housing units for a jobs-to-housing ratio of 0.84.

While a jobs-to-housing ratio of 1:1 may balance jobs and housing in a defined geographical area, the jobs could be in one side of the community and the housing in the other. In addition, while the number of jobs and housing units in the community may be balanced, that does not dictate actual commute patterns. Other factors influencing the ratio may include the types of employment available. Residents may still commute out of the community for employment, while residents from outside the area may commute into the community for employment. Consequently, SACOG looks at the jobs/housing balance within a regional context, focusing on locating Major Employment Centers throughout the region, and providing for housing in areas surrounding them. SACOG has identified 13 such employment centers of varying size and employment density in the region. The two smallest employment centers are located in or near Elk Grove: the Elk Grove/Laguna Springs Employment Center in the City, and the South Sacramento Medical Employment Center directly to the north. Larger and higher-density employment centers are located in eastern and downtown Sacramento, Rancho Cordova, and West Sacramento.

An alternative approach to analyzing the jobs-to-housing ratio, advanced by SACOG, deemphasizes the need for jobs and housing within a City boundary and instead focuses on regional accessibility of jobs within a reasonable commute from one's home. Consequently, SACOG emphasizes the development of robust job centers within reasonable distances of cities, even if they are not within City limits, and effective transportation options to both, including high-quality roads and transit. The SACOG MTP/SCS forecast is based on a jobs-to-housing ratio of 1.4 for the region. This approach balances out jobs within reasonable commuting distance if regional assumptions are met. Considering the location of jobs relative to housing is important because regional accessibility to jobs, or the number of jobs within a reasonable drive time from a residence, affects vehicle miles traveled, which in turn affects traffic congestion, air quality, and access to goods and services (City of Elk Grove 2016).

3.2 REGULATORY FRAMEWORK

REGIONAL

Sacramento Area Council of Governments

<u>Sacramento Region Blueprint</u>

The Sacramento Region Blueprint is intended to guide land use and transportation choices through 2050 in the Sacramento region, which includes the counties of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba and their 22 constituent cities. The Sacramento Region Blueprint includes detailed land use and travel data, as well as technical and community outreach. The Blueprint is intended to be used as a framework to guide local government in growth and transportation planning. It is also used by the SACOG Board of Directors to make choices about transportation projects that will best serve the region as it changes. Another important component of the Blueprint effort is a Community Design Incentive Program that will provide $500 million between 2005 and 2030 to fund projects that incorporate principles of "smart growth" identified by the Blueprint. The Preferred Blueprint Scenario was adopted and became part of SACOG's Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS), a formal document that serves as a long-range transportation plan for the six-county region. The 2016 MTP/SCS was adopted in February 2016.

<u>Regional Housing Needs Plan and Regional Housing Needs Allocation</u>

The Regional Housing Needs Plan (RHNP) allocates to SACOG cities and counties their "fair share" of the region's projected housing needs as determined by the State. California's housing element law (Government Code Section 65584) mandates that councils of governments develop the RHNP for their service area. SACOG is the lead agency in developing the Regional Housing Needs Allocation (RHNA) and approving the RHNP for the 22 cities and 6 counties that it serves. Each city and county in the RHNP received an RHNA of the total number of housing units that it must plan for within a 7.5-year time period through their general plan housing elements.

Within the total number of units, allocations were made for the number of units in four economic categories: very low, low, moderate, and above moderate incomes.

The City of Elk Grove's 2013–2021 RHNA allocation is 7,402 housing units, with 2,035 of those units in the very low-income category, 1,427 units in the low-income category, 1,377 units in the moderate-income category, and 2,563 in the above moderate-income category (City of Elk Grove 2014).

LOCAL

City of Elk Grove Housing Element

The General Plan Housing Element identifies and analyzes the City's housing needs in order to maintain, improve, and create housing for the SACOG-defined economic segments of the population. In addition to establishing specific goals and strategies to guide the development of housing in the City, the element requires the City to ensure an adequate supply of land for the development of affordable housing. The City updated its Housing Element for the 2013–2021 period in February 2014.

3.3 CHANGES IN POPULATION, EMPLOYMENT, AND HOUSING

Changes in population and employment are not, in and of themselves, environmental impacts. However, they may result in the need for the construction of new housing, businesses, infrastructure, and services to accommodate increases in population and employment.

The proposed Project would, over a considerable period of time (30+ years), result in the development of up to 48,102 housing units that would provide housing for 158,179 new residents, and nonresidential development that would provide approximately 77,339 new jobs in the Planning Area. This development would result in impacts on the physical environment, which are evaluated in Sections 5.1 through 5.13 of this EIR. This section identifies the projected increases in population, employment, and housing that would result from adoption and implementation of the proposed Project.

PROPOSED PROJECT POPULATION AND HOUSING SUPPLY

The proposed Project would result in the construction of up to approximately 48,102 new homes in the Planning Area. This includes several different housing types, including rural residential, estate residential, lower density residential, medium density residential, high density residential, and mixed uses that include residential units. Each housing type could accommodate different sizes of households. For example, low-density housing is more likely to house families with children, whereas high-density housing is more likely to accommodate single-person households. The City calculated the population potential for each type of housing and determined that the proposed Project would increase the population of the Planning Area by 158,179 residents to a total of 329,238 at buildout. This would represent an approximately 92 percent increase over the City's 2017 population of 171,059 (DOF 2016). This projected population growth would occur gradually as both infill and construction in new areas occurs as part of the Project. As shown in **Table 3.0-1**, SACOG estimates that the City's population will reach 201,197 by 2036, which represents an increase of 30,138 or 17.6 percent over the City's 2017 population. The proposed Project does not assume full buildout by 2036. However, if full buildout were to occur by 2036, it would exceed SACOG's population, housing and employment projections for Elk Grove.

PROPOSED PROJECT EMPLOYMENT

One of the Supporting Principles of the proposed Project is to develop job-supporting land uses that bring more jobs to the City and aid in balancing the City's existing jobs-to-housing ratio. The City currently has 0.84 jobs for each housing unit. This ratio indicates that most residents must travel to other areas for work, which results in traffic congestion, longer commute times, and increases in air pollution.

The proposed Project would allow for up to 77,339 new jobs in the Planning Area compared to existing conditions, for a total of 122,802 jobs. This would occur through the future development of a wide range of commercial, office, industrial/flex space, mixed-use, and public uses and would represent a 41 percent increase from the City's 2013 job pool of approximately 45,463. SACOG (2016) projects that there will be 50,865 jobs in Elk Grove in 2036. The proposed Project does not assume full buildout by 2036. However, if full buildout were to occur by 2036, the proposed Project would also exceed SACOG's 2036 projection for jobs in the City.

PROPOSED PROJECT JOBS-TO-HOUSING RATIO

The proposed Project would allow for the future development of up to 48,102 new housing units of varying densities and nonresidential land uses that would generate 77,339 new jobs. Based on these data, buildout of the proposed Project's land uses would give the City a jobs-to-housing ratio of 1.21 jobs for every home. While this does not attain the 1.5 jobs per home ratio that is considered by urban planners to represent a balance, it represents a substantial increase from the current jobs-to-housing ratio of 0.84.

While there is no buildout date anticipated for the proposed General Plan, the contribution of the jobs and housing that would be generated by the proposed Project would help the City improve its jobs-to-housing ratio. While SACOG data assumes a modest increase of jobs in the City, jobs generated in excess of SACOG projections would only further improve the City's jobs-to-housing ratio. Therefore, the proposed Project would have a positive effect on the City's jobs-to-housing ratio and could reduce future increases in traffic congestion and air emissions.

REFERENCES

APA (American Planning Association). 2003. Planning Advisory Service Report Number 516: Jobs-Housing Balance.

City of Elk Grove. 2003a. *Elk Grove General Plan*.

———. 2003b. *Elk Grove General Plan Draft Environmental Impact Report*. SCH# 2002062082.

———. 2014. *City of Elk Grove 2013–2021 Housing Element*.

———. 2016. *City of Elk Grove Existing Conditions Report for the General Plan Update*.

DOF (California Department of Finance). 2012. *E-4 Population Estimates for Cities, Counties and the State, 2001–2010, with 2000 & 2010 Census Counts*.

———. 2017. *E-5 Population and Housing Estimates for Cities, Counties and the State, January 1, 2011–2017, with 2010 Benchmark.*

EPS (Economic and Planning Systems Inc.). 2016*. Elk Grove Employment Dynamics.*

SACOG (Sacramento Area Council of Governments). 2016. *Jurisdiction Level Summary 2012 Estimate, 2020 and 2036 Projections*.

US Census Bureau. 1990. 1990 Census.

———. 2000. 2000 Census.

———. 2016a. *QuickFacts: Elk Grove City, California; United States*. https://www.census.gov/quickfacts/fact/table/elkgrovecitycalifornia/PST045216.

———. 2016b. *QuickFacts: Sacramento County, California; United States*. https://www.census.gov/quickfacts/fact/table/sacramentocountycalifornia,US/PST045216.

Zillow. 2017. *Elk Grove Home Prices & Values*. Accessed August 23. https://www.zillow.com/elk-grove-ca/home-values.

4.0 LAND USE

This section describes the existing land uses in the Planning Area and the surrounding area, the land use designations and zoning in the current General Plan, and the proposed land use and zoning designations in the proposed Project.

The chapter discusses the existing land use and population of the City and Planning Area, establishing the context of the analysis in subsequent chapters of this EIR relative to the Project. Pursuant to CEQA Guidelines Section 15131, CEQA does not treat planned changes relating solely to land use or socioeconomic, population, employment, or housing issues as direct physical impacts on the environment. Thus, an EIR may provide information regarding land use, planning, and socioeconomic effects; however, CEQA documents evaluate these planning changes for their physical environmental impacts in areas such as air emissions, noise, and traffic.

Section 15125(d) of the CEQA Guidelines states, "The EIR shall discuss any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans." As such, this chapter discusses potential inconsistencies between the proposed Project and the City's current General Plan and Zoning Code, as well as SACOG's Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) and the proposed South Sacramento Habitat Conservation Plan (SSHCP). Impacts from the proposed Project's physical effects, including on agricultural land uses, are addressed in the appropriate technical sections of this Draft EIR (see Sections 5.1 through 5.13).

4.1 EXISTING SETTING

PLANNING AREA

The Planning Area encompasses 49 square miles (31,449 acres) in the south-central part of Sacramento County (see **Table 4.0-1**). Land within the current City limits comprises 37 square miles (23,453 acres), while the Study Areas together comprise 12.2 square miles (7,795 acres), or 35 percent of the Planning Area.

Prior to its incorporation in July 2000, Elk Grove was part of unincorporated Sacramento County. Historically, the area now encompassed by the City was primarily agriculture and ranchettes, except for the Old Town area. Over the last 30 years, the area began converting from agricultural uses to predominantly suburban development. Following the City's incorporation, the suburban conversion continued as evidenced by new residential subdivisions, offices, and shopping centers, many of which were approved by Sacramento County prior to incorporation. Currently, most new development is concentrated on the west side of State Route (SR) 99. Areas in the far eastern portion of the City near Grant Line Road are characterized as rural residential. Lands adjacent to the City limits to the east and to the south within Sacramento County are designated for agriculture.

EXISTING LAND ACTIVITIES

The Planning Area includes a mix of activities, including agricultural, residential, commercial/office, industrial, park and open space, civic/institutions, public uses, and roadways and infrastructure, as well as vacant land, which has no defined activity. **Figure 2.0-2** (see Section 2.0, Project Description) shows the distribution of existing land activity types in the Planning Area, and **Table 4.0-1** shows the acreage of each existing land activity type in the Planning Area, broken out by the current City limits and the study areas.

TABLE 4.0-1
EXISTING CITYWIDE AND STUDY AREA LAND ACTIVITY ACREAGES (2015)

Existing Land Activity Type[1]	Citywide			Study Areas						Total Planning Area Acreage
	Citywide Total Acreage	% Total Citywide	% Total Planning Area	East	South	West	North	Study Area Total Acreage	% Total Planning Area	
Agricultural Production	**2,252.1**	**10%**	**7%**	**1,701.6**	**3,252.0**	**1,869.1**	**624.0**	**7,446.7**	**24**	**9,698.8**
Residential	**12,878.1**	**55%**	**41%**	**—**	**108.5**	**23.4**	**21.6**	**153.5**	**—**	**13,031.6**
Residential--Rural	4,788.9	20%	15%	—	108.5	23.4	21.6	153.5	—	4,942.4
Residential--Neighborhood	7,791.7	33%	25%	—	—	—	—	—	—	7,791.7
Residential--Multiple Family	277.3	1%	1%	—	—	—	—	—	—	277.3
Residential--Mobile Home	20.1	0%	—	—	—	—	—	—	—	20.1
Commercial & Office	**887.5**	**4%**	**3%**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**887.5**
Neighborhood-Serving Commercial	184.5	1%	1%	—	—	—	—	—	—	184.5
General Commercial	477.9	2%	2%	—	—	—	—	—	—	477.9
Office	117.5	1%	—	—	—	—	—	—	—	117.5
Hotel/Motel	11.8	—	—	—	—	—	—	—	—	11.8
Auto Mall	95.9	—	—	—	—	—	—	—	—	95.9
Industrial	**660.4**	**3%**	**2%**	**44.8**	**0.0**	**0.0**	**0.0**	**44.8**	**0.0**	**705.3**
Light Industrial/ Warehouse	635.6	3%	2%	44.8	—	—	—	44.8	—	680.4
Heavy Industrial	24.8	—	—	—	—	—	—	—	—	24.8
Park & Open Space	**2,107.2**	**9%**	**7%**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2,107.2**
Parks and Recreation Facilities	1,870.7	8%	6%	—	—	—	—	—	—	1,870.7
Open Space	236.5	1%	1%	—	—	—	—	—	—	236.5

Existing Land Activity Type[1]	Citywide			Study Areas						Total Planning Area Acreage
	Citywide Total Acreage	% Total Citywide	% Total Planning Area	East	South	West	North	Study Area Total Acreage	% Total Planning Area	
Civic/Institutional	**1,193.0**	**5%**	**4%**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1193.0**
Schools	791.3	3%	3%	—	—	—	—	—	—	791.3
Large Medical Facilities	56.1	—	—	—	—	—	—	—	—	56.1
Cemeteries	80.6	—	—	—	—	—	—	—	—	80.6
Civic Uses	87.6	—	—	—	—	—	—	—	—	87.6
Other Institutional[2]	177.4	1%	1%	—	—	—	—	—	—	177.4
Infrastructure	**555.2**	**2%**	**2%**	**25.7**	**315.1**	**22.1**	**0.0**	**362.9**	**1**	**918.1**
Right of Way	214.0	1%	1%	25.7	58.3	22.0	0	106.0	—	320.0
Service Facilities[3]	78.8	—	—	—	256.8	0.1	—	256.9	—	335.8
Waterways and Drainage	262.3	1%	1%	—	—	—	—	—	—	262.3
Vacant	**2,907.7**	**12%**	**9%**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2,907.7**
Total	**23,441.1**	**100%**	**75%**	**1,772.1**	**3,675.6**	**1,914.7**	**645.5**	**8,007.9**	**25**	**31,449.1**

Sources: SACOG 2012; Sacramento County Assessor's Office 2015; Sacramento County 2015a, 2015b; Google Earth 2015; Google Street View 2012, 2015

Note: Numbers have been rounded and therefore may not add up to 100 percent.

1. Refers to activities occurring on a piece of land or site. This is distinguished from 'land use,' which refers to the zoning of a site.

2. Includes a range of institutional activities including but not limited to assembly, such as religious institutions.

3. Includes railroad right-of-way, concrete channels/public works facilities, a solar farm, and substations for various utilities.

Existing Land Activity Utilization in City Limits

Table 4.0-1 provides acreages of various uses of land in the City. A brief summary of existing activity types within the current City limits is provided below.

Agricultural Production

Over 2,200 acres of land in the current City limits are utilized for agricultural production. Agricultural production is the third-largest existing activity by acreage in the City, following residential and vacant land with no utilization. Much of the agricultural land is in the southern and eastern portions of the City, interspersed with rural residential areas, which are usually residences set on large rural lots, surrounded by active or inactive agricultural land. Agricultural activities include grazing, hay crops, irrigated pasture, row crops, and agricultural processing operations. Agricultural land used for growing hay is the predominant activity, accounting for 1,461 acres in the City.

Residential

The predominant existing activity type in the City is residential housing, which comprises 12,878.1 acres. A total of 53,673 housing units were identified in the existing conditions survey conducted by the City for the General Plan planning process. Residential activities are distributed throughout the City. Neighborhood Residential, including single-family, condominiums, duplex, triplex, and four-plex units, comprises the majority of residential development, accounting for nearly two-thirds (7,791.7 acres) of residential land with an average density of 6.0 dwelling units per acre (du/ac). Rural residential development accounts for 20 percent of residential land uses in the City, with an average density of 0.3 du/ac. Multiple Family Residential, comprising multiple family complexes of more than four, typically apartments, is 1 percent of residential uses with an average density of 20.3 du/ac. Mobile homes account for the remaining less than 1 percent of residential land.

Commercial and Office

There are 887.5 acres of land in the current City limits with commercial- and office-related activities. Of this, 477.9 acres are designated General Commercial, 95.9 acres are Auto Mall, and 184.5 acres are Neighborhood-serving Commercial. An additional 117.5 acres of land are Office, and Motel and Hotel activities make up the remaining 11.8 acres. General Commercial activities are located mostly along Laguna Boulevard and Elk Grove Boulevard near their intersections with SR 99. Larger-scale commercial developments, oriented toward serving the entire City and surrounding communities, are located around three intersections: SR 99 with Elk Grove Boulevard, SR 99 with Laguna Boulevard, and Laguna Boulevard with Bruceville Road. A large area devoted to auto sales is located south of the intersection of SR 99 with Elk Grove Boulevard. The majority of neighborhood-serving commercial developments are located in Old Town along Elk Grove Boulevard, although there are pockets of Neighborhood Commercial located throughout the City.

Industrial

Industrial development in Elk Grove includes heavy industrial, light industrial, and warehouse. In total, there are 660.4 acres of industrial development. Most of these activities (635.6 acres) are designated Light Industrial/Warehouse. The remaining 24.8 acres are heavy industrial parcels. The bulk of industrial activity is in the southeast part of the City between SR 99 and the Union

Pacific Railroad. The largest concentrations of industrial land in the City are in the north-central, northwest, and south-central sections.

Park and Open Space

Park and open space uses amount to 2,107.2 acres of land scattered throughout the City. Valley High Country Club, a private golf course, is the largest green space in the City, encompassing over 151 acres. Elk Grove Park, the City's second largest green space, is the largest public green space in the City with close to 120 acres. Other large open spaces include Camden Park (30.9 acres), Emerald Lake Golf Course (24.7 acres), and green space around the Laguna Creek Trail (18.5 acres) and Elk Grove Creek north of Big Horn Boulevard (18.3 acres). Undeveloped open space account for approximately 12.6 percent of total park and open space.

Mixed-Use Development

Mixed-use development generally includes residential development with integrated compatible office or retail uses. Mixed use can be horizontal, on the same property, or vertical, with uses adjacent to each other or with commercial or office on the ground floor and other uses above, respectively. Although the City has a Mixed Use land designation, no existing mixed-use developments were identified in the City based on data from SACOG (2012) or the Sacramento County Assessor Parcel Viewer 2015 (Sacramento County Assessor's Office 2015).

Civic and Institutional

Existing civic and institutional development in the City includes schools, medical and healthcare facilities, cemeteries, City-owned buildings (e.g., City Hall, libraries) and other miscellaneous civic services such as community centers and assemblies. Together, these land uses comprise 1,193 acres.

Schools, including private and public education facilities from pre-kindergarten through college, account for 791.3 acres Citywide. Elk Grove Unified School District accounts for 83 percent (664 acres) of school uses. The CCSD, which offers before- and after-school programs and summer camps, accounts for 51 acres, which is the second largest use in the school category. The Los Rios Community College District (Cosumnes River College) campus comprises 32 acres. California Northstate University comprises 13 acres.

Assembly facilities focused on religious activities make up roughly 177.4 acres of this use type. These uses are scattered throughout the City, primarily in residential neighborhoods. Uses such as the Sutter Medical, Dignity Medical, and Kaiser Foundation facilities make up 56.1 acres or 4.7 percent of civic and institutional uses. The remaining parcels in this category include cemeteries (80.6 acres) and other City-owned land (87.6 acres).

Infrastructure

Public, quasi-public, and infrastructure account for 555.2 acres of land in the City. Of these acres, infrastructure dedicated to storm drainage and control accounts for 262.3 acres. Service facilities, which include railroad right-of-way, a solar farm, and various utility substations, account for another 78.8 acres. Road rights-of-way make up the remaining acres in this category.

Airports

There are no active airports within the City boundaries or in the Study Areas. There is one public airport and two private airports within 3 miles of the Planning Area. They are Franklin Field, which is public, and Sky Way Estates Airport and Borges-Clarksburg Airport, which are private. Sacramento Executive Airport, a smaller public use airport, is approximately 6 miles north-northwest of the City, and Sacramento International Airport, a high-traffic airport, is approximately 20 miles north-northwest. Elk Grove is not within the safety or overflight zones for either Sacramento Executive or Sacramento International airports (SACOG 1999: Figure 11; 2013: Map 6).

Vacant Land

There is vacant land zoned for commercial, industrial, and residential uses throughout the City limits. In total, excluding land in active agricultural production that may have more intensive zoning, vacant land accounts for 2,907.7 acres. The largest concentration of vacant land is along SR 99 near Kammerer Road. The largest category of vacant land is designated for future residential development. However, many of these parcels are in some stage of the planning approval or building permit process.

Study Area Existing Land Activity Types

The four Study Areas contain a variety of activities, which are described below and summarized in **Table 4.0-1**. Agriculture, rural residential, and infrastructure are the predominant activities in these areas.

Agricultural

Agriculture is the predominant land activity in all four of the Study Areas. The East Study Area contains approximately 1,702 acres of agriculture; the South Study Area contains approximately 3,252 acres; the West Study Area contains 1,869 acres; and the North Study Area contains 624 acres.

Residential

The East, South, West, and North Study Areas currently contain 32, 11, 5, and 3 dwelling units, respectively, on land zoned Agricultural Production. The South and West Study Areas also have dwelling units on property zoned Rural Residential. A small number of dwelling units in the South Study Area are of slightly higher density with neighborhood residential uses. The West Study Area has 19 dwelling units spread across agricultural production and rural residential uses.

Commercial and Industrial

There are minimal commercial, office, or industrial activities within the Study Areas. The East Study Area contains 44.8 acres zoned for warehouse.

Park and Open Space

None of the Study Areas contain any land zoned for or developed with open space or parkland.

Civic and Institutional

None of the Study Areas contain any land zoned for or developed with civic or institutional uses.

Infrastructure

Each of the four Study Areas, except the North Study Area, contain infrastructure, primarily right-of-way. The East Study Area contains 25.7 acres; the South Study Area contains 315.1 acres; and the West Study Area contains 22.1 acres.

Airport

There are no operational public or private airports or airstrips within the Study Areas. Franklin Field (operated by Sacramento County) is located approximately 2.6 miles south of the West Study Area.

Vacant

None of the Study Areas contain any vacant land.

CURRENT LAND USE DESIGNATIONS AND ZONING

In general, existing land use categories reflect Elk Grove's current General Plan land use designations and zoning map. Current General Plan (2003) land use designations for the Planning Area are shown on **Figure 4.0-1**. Current zoning classifications within the Planning Area are shown on **Figure 4.0-2.**

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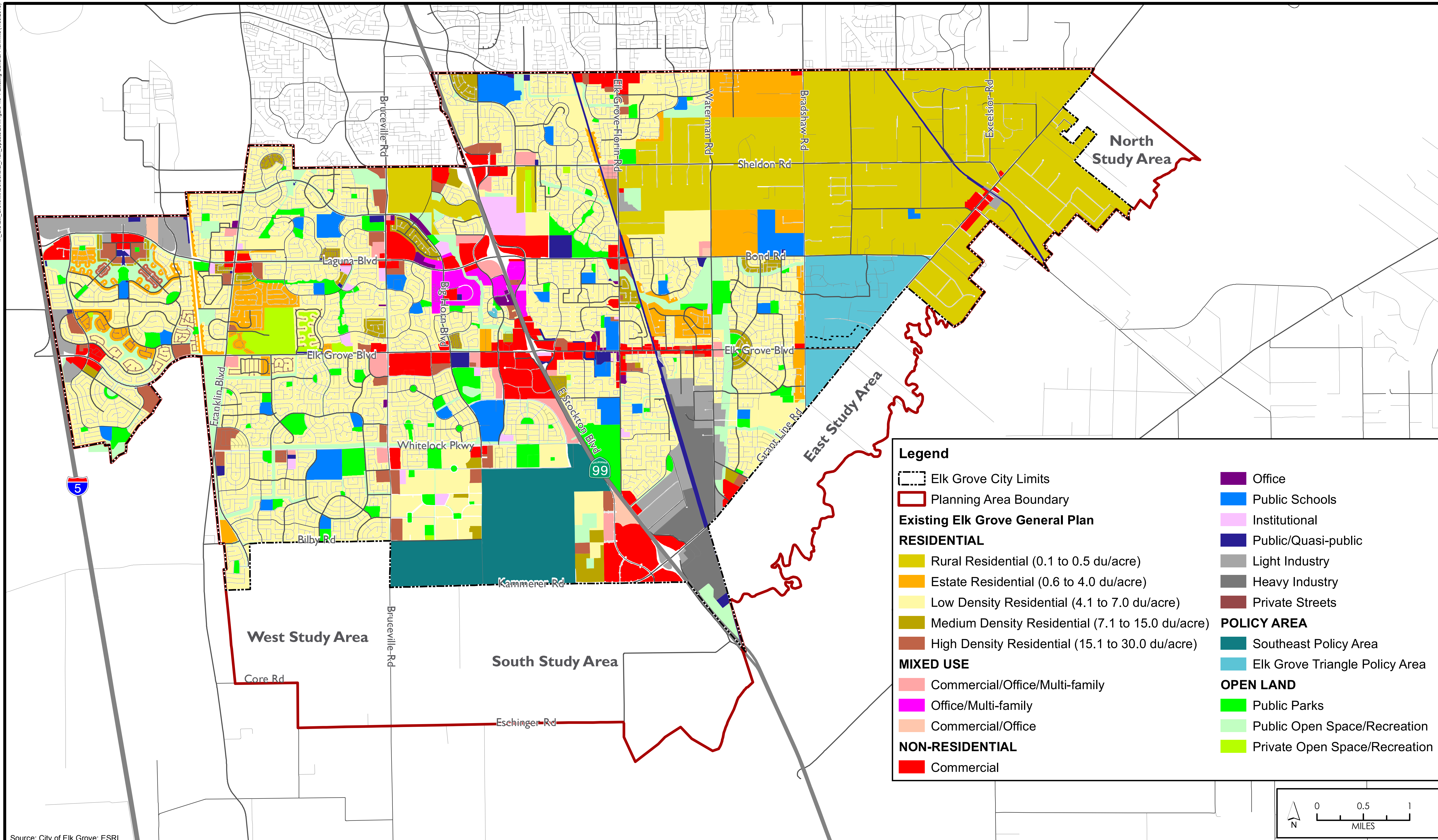

Figure 4.0-1

Existing General Plan Land Use Designations

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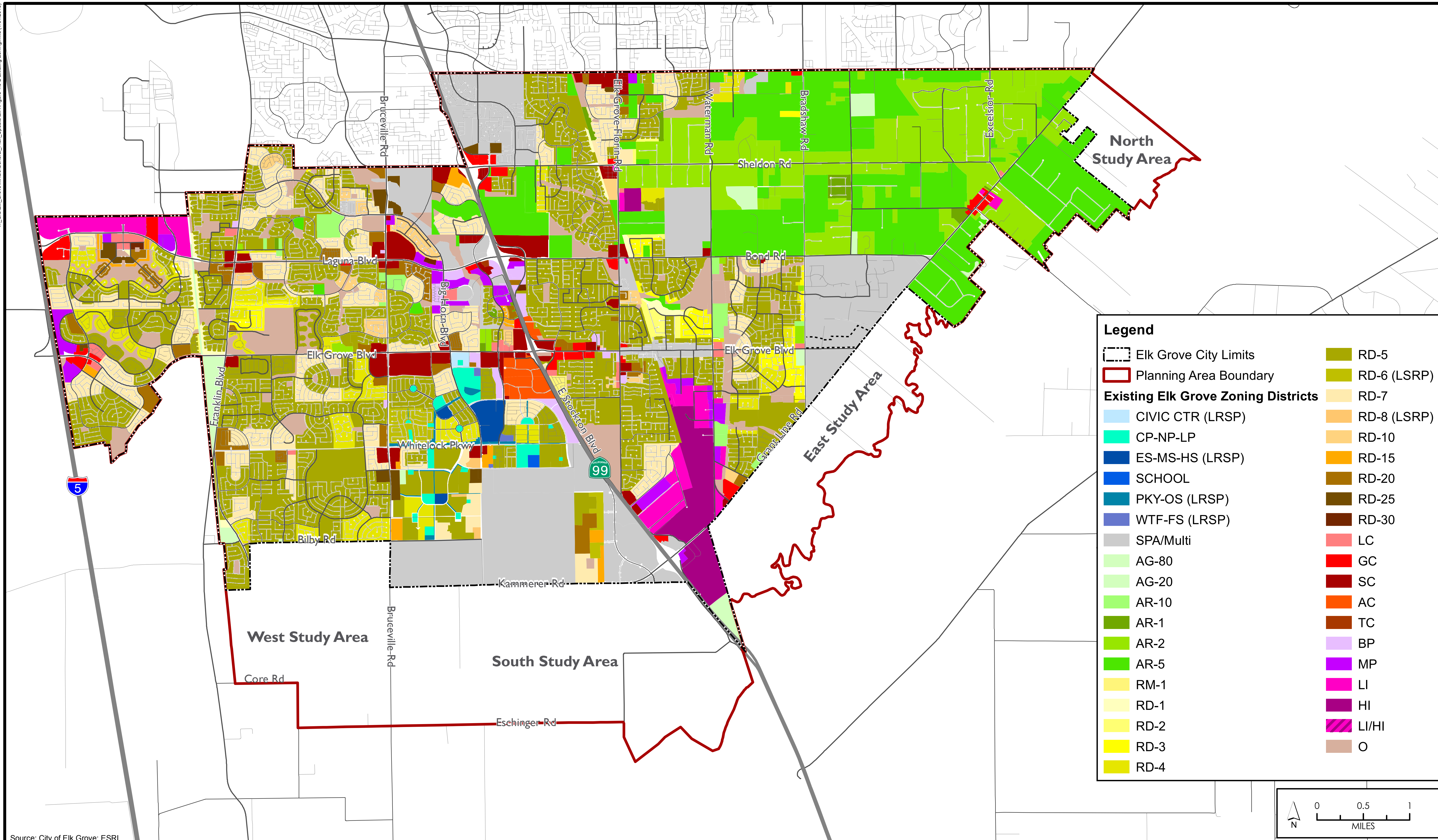

City of Elk Grove
Development Services

Figure 4.0-2
Existing Zoning Districts

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4.2 REGULATORY FRAMEWORK

STATE AND REGIONAL

Sacramento County Local Agency Formation Commission

LAFCo is a countywide commission, required in each California county. The Sacramento County LAFCo is responsible for spheres of influence updates, annexation decisions, the consolidation or reorganization of special districts, and formation of new agencies. In addition, LAFCo is responsible for conducting periodic municipal service reviews for the City and independent districts, such as the CCSD. LAFCo has adopted goals of ensuring the orderly formation of local governmental agencies, preserving agricultural and open space lands, and discouraging sprawl.

California Planning Law and General Plan

California planning law requires cities and counties to prepare and adopt a "comprehensive, long-range general plan" to guide development (Government Code Section 65300). General plans require a complex set of analyses, comprehensive public outreach, and broad public policy covering a range of topics to successfully guide long-range development. State law specifies the content of general plans. A general plan must contain development policies, diagrams, and text that describe objectives, principles, standards, and plan proposals. Pursuant to the Governor's Office of Planning and Research (OPR) General Plan Guidelines (last updated in 2017), topics from different elements may be combined, but all must be addressed in the general plan (OPR 2017).

Delta Plan

The Delta Plan is a comprehensive, long-term management plan for the Sacramento-San Joaquin Delta. Required by the 2009 Delta Reform Act, the Delta Plan creates new rules and recommendations to further the State's coequal goals for the Delta: Improve statewide water supply reliability, and protect and restore a vibrant and healthy Delta ecosystem, all in a manner that preserves, protects, and enhances the unique agricultural, cultural, and recreational characteristics of the Delta. The Cosumnes River and other waterways near Elk Grove drain into the Delta ecosystem.

Bay Delta Conservation Plan

The Bay Delta Conservation Plan seeks to balance ecological needs with those of the urban and agricultural users across the State, including Elk Grove. After attempts to develop a plan that would include habitat restoration and conveyance, the State and federal agencies tasked with developing a project proposal established a new preferred alternative. This plan would split the conveyance and habitat restoration goals of the original conservation plan into two separate efforts.

Sacramento Area Council of Governments (SACOG) Metropolitan Transportation Plan (MTP)/Sustainable Communities Strategy (SCS)

SACOG is an association of local governments (including the City) in the six-county Sacramento region. SACOG provides transportation planning and funding for the entire six-county region (SACOG 2017a). SACOG must update its regional MTP every four years. California adopted

Senate Bill (SB) 375, which requires councils of governments to adopt an SCS as part of the MTP. The current MTP/SCS was adopted in February 2016 (SACOG 2017b).

The MTP addresses existing needs in the area's communities as well as those of future residents. This includes increasing maintenance of existing roads and adding more sidewalks and bike lanes, and restoring, maintaining, and expanding transit, making it possible for more people to live and work in the same community and live independently as they age. The plan provides policy and strategy suggestions for jurisdictions in the region to promote the MTP/SCS goals of smart land use, environmental quality and sustainability, financial stewardship, economic vitality, access and mobility, and equity and choice (SACOG 2016). While the City may strive to achieve this regional vision, the MTP/SCS is not mandatory and cannot regulate local land use decisions for the local jurisdictions in the Sacramento region, instead relying on voluntary land use decisions by cities and counties.

The following guiding principles are from the MTP/SCS (SACOG 2016):

Smart Land Use: Design a transportation system to support good growth patterns, including increased housing and transportation options, focusing more growth inward and improving the economic viability of rural areas.

Environmental Quality and Sustainability: Minimize direct and indirect transportation impacts on the environment for cleaner air and natural resource protection.

Financial Stewardship: Manage resources for a transportation system that delivers cost-effective results and is feasible to construct and maintain.

Economic Vitality: Efficiently connect people to jobs and get goods to market.

Access and Mobility: Improve opportunities for businesses and citizens to easily access goods, jobs, services and housing.

Equity and Choice: Provide real, viable travel choices for all people throughout our diverse region.

The proposed Project supports the following SACOG policies and strategies:

3. Policy: SACOG encourages local jurisdictions in developing community activity centers well-suited for high-quality transit service and complete streets.

3.4. Strategy: Support efforts by transit agencies and local governments to site and design transit centers and stations close to economic centers and neighborhoods and to expand park-and-ride facilities at a few key stations.

3.5. Strategy: Encourage local agencies to develop an interconnected system of streets, bikeways, and walkways that support a more compact development form; avoid building new circulation barriers; accommodate safe travel for all users; and provide connections across creeks, freeways and high-speed/high volume arterials and through existing gated communities, walls and cul-de-sacs to access schools, activity centers and transit stops.

3.6. Strategy: Encourage development patterns that provide safe and efficient pedestrian and bicycle access to transit stops and trunk commuter transit lines.

4. Policy: SACOG encourages every local jurisdiction's efforts to facilitate development of housing in all price ranges, to meet the housing needs of the local workforce and population, including low-income residents, and forestall pressure for long external trips to work and essential services.

4.2. Strategy: Encourage adequate supply of housing at a variety of price ranges in the region, which will help to meet local demand, prevent the export of housing to adjacent regions, and, consistent with federal and state statutory goals, promote integrated and balanced living patterns that help provide access and opportunity for all residents and reduce the concentration of poverty.

6. Policy: SACOG encourages local governments to direct greenfield developments to areas immediately adjacent to the existing urban edge through data-supported information, incentives and pursuit of regulatory reform for cities and counties.

8. Policy: Support and invest in strategies to reduce vehicle emissions that can be shown as cost effective to help achieve and maintain clean air and better public health.

8.1. Strategy: Continue the region's previous commitment to Transportation Demand Management (TDM) programs as a strategy for education and promotion of alternative travel modes for all types of trips toward reducing Vehicle Miles Traveled (VMT) by 10 percent.

SACOG Sacramento Region Blueprint

Prior to the adoption of SB 375 and the development of SACOG's MTP/SCS, the Sacramento region developed the Blueprint Transportation and Land Use Plan to plan for a future that could support the region's expected growth. In 2004, the SACOG Board of Directors adopted the Preferred Blueprint Scenario to establish a vision for regional land use and transportation growth through 2050. When SB 375 established requirements for the MTP/SCS, the Preferred Blueprint Scenario served as the preferred development pattern to guide the documents in the same direction that stakeholders had chosen for the Blueprint four years prior.

South Sacramento Habitat Conservation Plan (SSHCP)

Sacramento County, the City of Rancho Cordova, the City of Galt, and other local partners are proposing the establishment of the South Sacramento Habitat Conservation Plan. The SSHCP will likely streamline federal and State permitting processes for SSHCP-covered development and infrastructure projects while protecting habitat, open space, and agricultural lands. The SSHCP area encompasses 317,656 acres (including the proposed West and South Study Areas) that are bordered by Highway 50 on the north, San Joaquin County on the south, El Dorado County on the east, and the Sacramento River on the west, and include Galt and most of Rancho Cordova. Within the SSHCP area, 36,282 acres would become part of an interconnected preserve system, including approximately 1,000 acres of vernal pool habitat. Twenty-eight plant and wildlife species, and their natural habitats, would be conserved under the plan. The SSHCP is led by a multijurisdictional collaborative that includes Sacramento County, the Cities of Rancho Cordova and Galt, the Sacramento County Water Agency, the Sacramento Regional County Sanitation District, and the Capital SouthEast Connector Joint Powers Authority (Sacramento County 2017). The draft SSHCP and associated Draft EIR/EIS were released for public review on June 2, 2017; however, the SSHCP has not yet been adopted. See Section 5.4, Biological Resources, for further discussion of the SSHCP.

LOCAL

City of Elk Grove Climate Action Plan

The Elk Grove City Council adopted the City's Climate Action Plan (CAP) in March 2013. The CAP is a strategic planning document that identifies sources of greenhouse gas emissions and their sources, and forecasts how those emissions will grow with the City in future years. The CAP identifies ways to reduce these emissions through energy use, transportation, land use, water use, and solid waste strategies. Greenhouse gas emissions-reducing strategies in the CAP's Transportation Alternatives and Congestion Management section relate to General Plan Land Use policies, such as by recommending programs that promote transit-oriented development and a more balanced jobs-housing balance. An update to the CAP is a component of the proposed Project.

City of Elk Grove Policy Areas and Specific Plans

The City establishes Land Use Policy Areas to reflect existing and pending major project approvals, or to reflect the need for more detailed land use planning at a future date. Policy Areas typically specify the types of uses to be permitted and circulation and infrastructure improvements more broadly defined by the General Plan. The City currently has six Policy Areas: East Franklin, East Elk Grove, Laguna Ridge, Old Town Elk Grove, South Pointe, and Southeast Policy Area.

In addition, the City includes a rural residential area known as the Sheldon area with recognized unique characteristics. This area has a "rural lifestyle," typified by homes on lots that are 2 gross acres in size and larger.

City of Elk Grove Municipal Code

The Elk Grove Zoning Code (Municipal Code Title 23) serves as the main implementation tool for the City's General Plan Land Use Element. While the General Plan land use designations are more general, the Zoning Code provides specific controls on land use, density, or intensity of development. Other sections of the Municipal Code, such as Title 10 (Vehicles and Traffic), Title 12 (Streets and Sidewalks), Title 16 (Buildings and Construction), and Title 19 (Trees), are also instruments to implement the goals and policies of the General Plan (City of Elk Grove 2017).

4.3 LAND USE EVALUATION

METHODOLOGY

In the following analysis, the proposed Project is evaluated for consistency with adopted local and regional plans and policies as well as for compatibility among proposed land uses. Environmental impacts resulting from the Project are discussed in the environmental subsections in Section 5.0. Land use impacts are considered significant if the proposed Project would conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. The City Council is ultimately responsible for interpreting the General Plan and would determine whether the Project is inconsistent with any adopted land use goals or policies. This section differs from other discussions in that only plan consistency and land use compatibility are addressed, as opposed to environmental impacts and mitigation measures. This discussion complies with CEQA Guidelines Section 15125(d), which requires an EIR to discuss inconsistencies with general plans, specific plans, and regional plans as part of the environmental setting.

CONSISTENCY

Specific Plans

The proposed Project includes various changes to the land use plan for the City. For consistency with the updated General Plan, the Project includes the following amendments to specific plans in the City:

- Rescind the East Elk Grove Specific Plan, integrating various policies into the proposed Eastern Elk Grove Community Plan and establishing relevant development standards in Title 23 (Zoning) of the City's Municipal Code (hereinafter the Zoning Code).
- Rescind the East Franklin Specific Plan, integrating various policies into the proposed General Plan as relevant and establishing relevant development standards in the Zoning Code.
- Amend various sections of the Laguna Ridge Specific Plan for consistency with the updated General Plan.

The proposed changes to the City's Specific Plans would ensure consistency between the proposed Project and these plans. The potential physical environmental effects resulting from the proposed changes are analyzed in the appropriate technical sections of this Draft EIR.

Zoning Code

The proposed Project includes various minor land use designation changes throughout the current City limits as well as proposed designations for each Study Area. To maintain consistency with the updated General Plan, the Project includes several amendments to the Zoning Code. Amendments planned as part of the Project include, but are not limited to, the following:

- Updating the allowed uses in commercial, office, and industrial zones as necessary for consistency with the General Plan land use designations.
- Updating the Multifamily Overlay Zone for consistency with the General Plan land use designations.
- Rezoning various properties to zoning districts consistent with the General Plan land use designations.
- Rescinding the Laguna Community/Floodplain SPA zoning district.
- Rescinding the Laguna Gateway SPA zoning district.
- Rescinding the Calvine Road/Highway 99 SPA zoning district.
- Establishing new zoning district(s) as necessary to implement the updated General Plan.
- Updating the Elk Grove-Florin and Bond Road SPA zoning district.
- Updating other development standards as necessary to implement the updated General Plan.

The proposed zoning amendments would ensure consistency between the proposed Project and the City's Zoning Code. The potential physical environmental effects resulting from the proposed land use designations and zoning changes are analyzed in the appropriate technical sections of this Draft EIR.

Climate Action Plan

The proposed Project includes a comprehensive update to the City's CAP. The proposed CAP is described in Section 2.0, Project Description. Section 5.7, Greenhouse Gas Emissions, analyzes the proposed Project's consistency with the current and proposed CAPs.

SACOG Metropolitan Transportation Plan/Sustainable Communities Strategy

As described in Sections 2.0, Project Description, and 3.0, Demographics, the proposed Project would provide job-generating land uses that would help balance the City's jobs-to-housing ratio, develop a range of housing types to accommodate varying lifestyles and affordability levels, and provide for roadway and transit improvements intended to reduce VMT. By implementing these concepts, the Project would help improve the City's jobs-to-housing ratio (from the current 0.84 to 1.21) and commute times, reduce traffic in the Planning Area and surrounding region, and reduce the physical environmental impacts associated with long commutes and traffic, such as air quality, noise, and greenhouse gas emissions. This is the general intent of the MTP/SCS, and the City maintains consistency with these concepts.

South Sacramento Habitat Conservation Plan

Section 5.4, Biological Resources, describes the SSHCP and analyzes its consistency with the proposed Project.

COMPATIBILITY

Adjacent Land Uses

Incompatible land uses occur when the physical effects (e.g., noise, hazards, odor, dust, light) associated with the operation of one land use adversely affect an adjacent land use. The Land Use Map, shown in **Figure 2.0-3**, illustrates the proposed land use designations within the current City limits and proposed Study Areas. To the extent that potential incompatibilities result in a physical environmental effect, those effects are addressed in the appropriate technical sections of this EIR. Where appropriate, the respective environmental sections are referenced for discussion of any identified potential physical/environmental impacts.

Potential incompatibilities could occur throughout the Planning Area. For instance, low-density residential and other sensitive receptors could be incompatible with busy commercial or industrial uses if not properly designed. To the extent that there is the potential for specific incompatibilities associated with noise, odor, dust, or light, these concerns are addressed in the appropriate technical sections of this Draft EIR. However, based on the analysis of the proposed Project, this EIR concludes that implementation of the goals and policies intended to minimize incompatibilities where differing land uses abut would be effective in reducing impacts. For instance, proposed Policies N-1.1 through N-1.10 would ensure that new development conforms to the City's noise standards, and that acoustical studies are prepared for projects when necessary; and Policies N-2.1 through N-2.4 require site design and other mitigation to reduce or shield excessive noise (see Section 5.10, Noise). Proposed Policies ER-1.1 through ER-1.7 would prohibit new hazardous uses based on the probability of the occurrence of a hazardous event;

require strict regulation and oversight of the use and storage of hazardous materials; and direct trucks routinely transporting large quantities of hazardous materials away from residential and commercial areas.

Elk Grove Municipal Code Section 23.60.030, Hazardous Materials, provides further regulation of the use, storage, and transport of hazardous materials to minimize potential risks to the public and the environment (see Section 5.8, Hazards and Hazardous Materials). Elk Grove Municipal Code Section 23.60.050 regulates odors, dust, and smoke to minimize adverse impacts on sensitive uses by prohibiting the emission of dust and particulate matter in noticeable quantities, and requires exhaust air ducts to be directed away from abutting residentially zoned properties (see Section 5.3, Air Quality). Elk Grove Municipal Code Chapter 23.56, Lighting, is dedicated to regulating lighting and minimizing glare and light pollution. For instance, lighting fixtures at new multifamily and nonresidential development projects would be required to be shielded and directed downward such that no lighting is visible within any residential unit. This chapter also regulates lighting levels, the height of light poles, and the hours of illumination (see Section 5.1, Aesthetics, Light, and Glare).

In addition to future development within the current City limits, the Project would also allow for future annexation and development within the proposed Study Areas. Over the lifetime of the proposed Project, most of the Study Areas could be converted from rural residential and agricultural uses to more urbanized uses, including residential, commercial, and public uses and related infrastructure. Urban development located adjacent to active agricultural operations may be incompatible. Agricultural activities generate dust, smoke, and odors that could be considered a nuisance by future residents of the Study Areas and the movement of heavy agricultural equipment on public roadways could create traffic hazards. Conversely, agricultural operations can be affected by complaints by neighboring residential development and the presence of more people nearby.

The City is committed to preserving agriculture within and outside of the existing City limits, pursuant to proposed General Plan Policy AG-1-3, which affirms the City’s commitment to the preservation of agricultural production, established in Elk Grove Municipal Code Title 14, Agricultural Activities and Water Use and Conservation. Policy AG-1-6 also limits the siting of projects near agriculture that might result in conflicts. In addition, Elk Grove Municipal Code Chapter 14.05, Agricultural Activities, would reduce the potential for conflict where urban uses and agriculture interface. Specifically, the chapter includes policies to ensure that agricultural operations are conducted in a manner consistent with proper and accepted customs and standards. It also requires that notification be provided to residents of property located near properties designated for agricultural use, and includes notification and mediation procedures for cases in which agricultural activities are not being conducted in a reasonable manner, or when the operator of an agricultural operation is not using currently acceptable methods.

As shown on General Plan Figures 4-6, 4-7, and 4-8, the East, South, and West Study Areas would feature buffers along the urban edge to help minimize potential conflicts. In addition, the General Plan requires Land Use Program standards for each Study Area, which would include determining the most appropriate land use designations along the urban edge and establish policies to minimize land use conflicts, such as the provision of buffers, fencing, and signage. As shown on General Plan Figure 4-5, the North Study Area would have no such buffer. However, land uses in this area would be restricted to rural residential and agriculture. Therefore, the potential for conflicts would be minimal, and implementation of the General Plan policies noted above would further reduce the potential for incompatibility with adjacent uses.

REFERENCES

City of Elk Grove. 2017. *Elk Grove Zoning Code*.

Google Earth. 2015. “Elk Grove.” 38˚24’31.41 N 121 22’40.62 W. eye alt. 20983. 2015. Accessed September 2015.

Google Street View. 2012. East of SR 99. Accessed September 2015.

———. 2015. West of SR 99. Accessed September 2015.

OPR (California Office of Planning and Research). 2017. *General Plan Guidelines*.

SACOG (Sacramento Area Council of Governments). 1999. *Sacramento Executive Airport Comprehensive Land Use Plan*.

———. 2012. *Metropolitan Transportation Plan/Sustainable Communities Plan.* http://www.sacog.org/2012-plan.

———. 2013. *Sacramento International Airport Land Use Compatibility Plan*.

———. 2016. *2016 Metropolitan Transportation Plan/Sustainable Communities Strategy.* https://www.sacog.org/2016-mtpscs.

———. 2017a. *About SACOG*. http://sacog.org/about.

———. 2017b. *2016 MTP/SCS*. https://www.sacog.org/2016-mtpscs.

Sacramento County. 2015a. *Sacramento County General Plan*. http://www.elkgrovecity.org/city_hall/departments_divisions/planning/land_use_regulations/general_plan_and_community_plans.

———. 2015b. *Cosumnes Community Services District*. ArcGIS, Version 8.3.

———. 2017. *South Sacramento Habitat Conservation Plan*. http://www.southsachcp.com/.

Sacramento County Assessor’s Office. 2015. Parcel Viewer. http://assessorparcelviewer.saccounty.net/jsviewer/assessor.html.

5.0 Introduction to the Environmental Analysis and Assumptions Used

5.0 Introduction to the Environmental Analysis and Assumptions Used

The following is an introduction to the Project-specific and cumulative environmental analysis and general assumptions used in the analysis. The reader is referred to the individual technical sections (Sections 5.1 through 5.13) of this Draft Environmental Impact Report (Draft EIR) regarding specific assumptions, methodology, and significance criteria used in the analysis for each topic.

Analysis Assumptions Generally Used to Evaluate the Impacts of the Project

Baseline Environmental Conditions Assumed in the Draft EIR

Section 15125(a) of the California Environmental Quality Act (CEQA) Guidelines requires that an EIR include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the Notice of Preparation (NOP) is published. The CEQA Guidelines also specify that this description of the physical environmental conditions is to serve as the baseline physical conditions by which a lead agency determines whether impacts of a project are considered significant. For the proposed Project, the physical environment as it existed at the time the NOP was published generally serves as the baseline.

The environmental setting conditions of the Project area and the surrounding area are described in the technical sections of this Draft EIR (see Sections 5.1 through 5.13). In general, these setting discussions describe the setting conditions as they existed when the NOP for the Project was released in June 2017. It is appropriate to evaluate impacts against the conditions that exist when the NOP was published for most issue areas. For issue areas either directly or indirectly related to infrastructure, impacts are more conservatively analyzed against future baseline conditions that consider General Plan and approved growth, because improvements (e.g., roadway widenings, intersection improvements, wastewater distribution and conveyance, solid waste disposal, water supply, electricity and natural gas supplies) must consider and accommodate ultimate demand. The assumptions inherent in the Air Quality and Noise analysis are derived from the Transportation and Circulation analysis (prepared by Fehr and Peers Associates); therefore, the baseline is the same as the other issue areas related to infrastructure.

Project Buildout Assumptions

The Draft EIR impact analysis is based on the buildout conditions allowed by the land use designations proposed within the Planning Area. **Table 2.0-2** (see Section 2.0, Project Description) identifies the potential population and employment that would result from development of the Planning Area. Operational impacts of the Project are based on those buildout conditions. The City anticipates that planned buildout conditions would occur gradually over a timeframe between the baseline year and beyond 2050.

Approach to the Project Analysis

Sections 5.1 through 5.13 of this Draft EIR contain a description of current setting conditions (including applicable regulatory setting), an evaluation of the direct and indirect environmental effects resulting from implementation of the proposed Project with implementation of applicable regulations and General Plan policies and implementation measures, identification of measures that mitigate the identified significant environmental effects, and, if applicable, identification of whether significant environmental effects of the proposed Project would remain after application of proposed mitigation measures. The individual technical sections of the Draft EIR follow the following format.

Existing Setting

This subsection includes a description of the physical conditions associated with each technical area, consistent with CEQA Guidelines Section 15125. As identified above, the existing setting is the baseline against which environmental impacts of the Project are evaluated.

Regulatory Framework

This subsection describes applicable federal, state, regional, and local plans, policies, laws, and regulations that apply to each technical area. The analysis of impacts assumes that all applicable regulations will be applied to future projects.

Impacts and Mitigation Measures

The Impacts and Mitigation Measures subsection of each technical section identifies direct and indirect environmental effects associated with implementation of the proposed Project and identifies proposed measures to mitigate environmental effects, where applicable. Environmental effects are determined by comparing the existing environmental setting with build out of the proposed Project. A statement is included in each impact discussion identifying the level of significance the impact will have both before and after mitigation. The analysis considers application of all applicable regulations and implementation of the proposed General Plan policies and implementation measures.

Standards of significance are identified and utilized to determine whether identified environmental effects are considered "significant" and require the application of mitigation measures. Each environmental impact analysis is supported by substantial evidence included in the discussion.

Feasible mitigation measures that could minimize significant adverse impacts are discussed, after which the impact discussion notes whether the impact has been mitigated to a less than significant level or if it remains significant and unavoidable. CEQA requires that mitigation to lessen the environmental impact must be feasible. CEQA Guidelines Section 15126.4(a)(1) states, "An EIR shall describe feasible measures which could minimize significant adverse impacts…." Feasible is defined as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (California Public Resource Code Section 21061.1).

Effect of the Environment on the Project

In *California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369, 377, the California Supreme Court held that "agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents." The court did not hold that CEQA never requires consideration of the effects of existing environmental conditions on the future occupants or users of a proposed project. But the circumstances in which such conditions may be considered are narrow: "when a proposed project risks exacerbating those environmental hazards or conditions that already exist, an agency must analyze the potential impact of such hazards on future residents or users. In those specific instances, it is the project's impact on the environment—and not the environment's impact on the project—that compels an evaluation of how future residents or users could be affected by exacerbated conditions." There are noted exceptions to this ruling: development projects involving or near schools; development projects near airports; and analysis in determining CEQA exemptions for certain housing projects. In addition, the court explained in a footnote that CEQA does not prohibit an agency from considering as part of an environmental review how existing conditions might impact a project's future users or residents. However, the court stopped short of suggesting that the agency should determine the significance of such impacts and require mitigation.

Consequently, the City is not required by CEQA to address the extent to which existing risks or conditions could affect future occupants or users of lands that might be developed in the future, with the exceptions of specific risks involving schools and airports. Any such discussion in this Draft EIR has been provided to the public on a voluntary basis in the interests of full disclosure.

APPROACH TO THE CUMULATIVE IMPACT ANALYSIS

Definition of Cumulative Setting

CEQA Guidelines Section 15130(a) requires that an EIR "discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable." CEQA Guidelines Section 15130(b) states, "The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact."

Because the proposed General Plan is essentially a set of guidelines for projects that could occur within the timeframe of the General Plan, the Plan itself represents the cumulative development scenario for the reasonably foreseeable future in the City. Therefore, the analysis presented in this Draft EIR generally represents a cumulative analysis of Elk Grove as a whole over the General Plan planning horizon described above. In instances where other cumulative development in neighboring jurisdictions or within the region as a whole could contribute to impacts generated by the proposed General Plan, those impacts, as well as the context, are discussed in the cumulative impact discussion that follows the project-specific impacts in each section.

Consideration of Cumulative Impacts

Each technical section in the Draft EIR considers whether the Project's effect on anticipated cumulative setting conditions is cumulatively considerable (i.e., a significant effect). The determination of whether the Project's impact on cumulative conditions is considerable is based on applicable public agency standards, consultation with public agencies, and/or expert opinion. Section 6.0, Other CEQA Considerations, summarizes the cumulative impacts associated with the development of the Project.

EFFECTS FOUND NOT TO BE SIGNIFICANT

As discussed in the Notice of Preparation prepared for the proposed Project (see **Appendix A**) and Section 1.0, Introduction, the proposed Project was determined to have no impacts related to the following issue area. This issue will not be further evaluated in the EIR.

- Seiche, tsunami, and mudflow

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5.1 Aesthetics, Light, and Glare

This section describes the existing visual character and aesthetic resources in the Planning Area and evaluates the potential visual impacts implementing the General Plan. The impact analysis focuses on changes in the existing visual character and the potential effects of added lighting and sources of glare. It evaluates the effect of existing City regulations and proposed General Plan policies intended to reduce or avoid these impacts. The analysis is based on the existing visual character of the Planning Area; a review of the Project description (Section 2.0 of this Draft EIR); City regulations; and the proposed General Plan policies related to aesthetics, light, and glare.

5.1.1 EXISTING SETTING

VISUAL CHARACTER

The visual character of a landscape is determined by how the form, line, color, and texture of the components of an area create patterns of scale, diversity, and continuity. When changes create a disruption in these patterns, they may detract from visual character.

The Planning Area is set in the Sacramento Valley and contains mostly flat land with no significant land forms, offering a wide view of the surrounding region. The visual character of the Planning Area generally consists of suburban development, including single and multifamily homes set along wide meandering streets lined with sidewalks, commercial and office uses set in large retail and business centers, and smaller strip malls, parks, and public spaces, as well as roadways and other infrastructure. There are also scattered vacant parcels and open agricultural land. The western and central portions of the Planning Area are more urbanized. The eastern portions and the areas south and west of the City boundaries predominantly contain rural residential uses surrounded by agricultural land and natural grasslands, with riparian habitat areas to the southeast along the Cosumnes River. State Route (SR) 99 bisects the City, extending north to south and providing access to the primary commercial areas along Bond Road/Laguna Boulevard and Elk Grove Boulevard. Interstate 5 (I-5) also runs in a north–south direction along the City's western boundary.

Land Types

The City has a combination of rural and developed land. Each land type has a visual character and contains potential scenic resources, discussed below.

Agricultural Lands

The Planning Area contains a variety of agricultural uses, including row crops, field crops, orchards, vineyards, and livestock. These open landscapes provide a visual resource that is of high aesthetic quality and characteristic of Elk Grove's agricultural heritage. Much of the agricultural land is in the northeastern, southern, and southwestern parts of the Planning Area. Further description of the agricultural resources in the Planning Area can be found in Section 5.2, Agricultural Resources.

Rural Development Lands

Rural development lands are primarily located in the eastern section of the Planning Area and contain low-density residential (one- and two-story) units, annual grasslands, and agricultural fields.

Developed Lands

The Planning Area has a variety of buildings, farms, structures, and other built environment features that contribute to the character of the area. Within this built environment is one property listed in the National Register of Historic Places (the Erhardt House/Jungkeit Dairy in the East Franklin neighborhood) and one site listed in the California Register of Historic Resources (the first County branch library in California in Old Town Elk Grove), as well various structures in Old Town which contribute to Elk Grove Historic District in Old Town. Another five sites are listed as Properties of Historic Interest by the State. Additional sites around the City have been identified for further evaluation for possible listing on a local list of historic properties pursuant to Chapter 7 of the Elk Grove Municipal Code). Section 5.5, Cultural Resources, provides a more detailed description of the Planning Area's historic resources.

Areas of Visual Identity

The Planning Area contains areas with distinct identities, including the communities of Sheldon, Franklin, and Old Town Elk Grove.

Sheldon

The community of Sheldon is typified by agricultural and rural residential areas with commercial and residential developments interspersed, but mostly located along Grant Line Road and Pleasant Grove School Road. Many buildings in this area exhibit rural and historic architecture and were either built in the late 1800s to early 1900s or in the architectural style of this period. Large agricultural fields, very low density or rural residential development, and natural landscapes contribute to the visual character of the Sheldon area.

Franklin

Franklin is located around the intersection of Franklin Boulevard and Bilby Road. It was originally a township founded in 1856, and grew around the Franklin House, a stagecoach stop for those traveling between Sacramento and Stockton. Much of the original agricultural land is still in use and surrounds commercial and light industrial development. Franklin Elementary School is in the western portion of the developed area, with Franklin Cemetery to the east. Commercial buildings in the area exhibit historical architectural traits, and are mostly clustered along Franklin Boulevard south of Bilby Road. Low-density housing is located to the north, between Bilby Road and Kenneth Way. This area has a mixture of older and newer housing with many trees.

Old Town Elk Grove

Old Town is the historic center of the City. It is located along Elk Grove Boulevard, between Elk Grove Florin Road and Waterman Road, and features several historic buildings that are still in use. To preserve the historic and visual character of Old Town, the area was placed into a Special Planning Area (SPA) in August 2005 (last amended August 2014). The Old Town SPA, which is part of the City's Zoning regulations (EGMC Title 23), provides design standards and guidelines for development and redevelopment of the area. The historic nature of Old Town is discussed further in Section 5.5, Cultural Resources.

The Old Town area is mostly commercial, with some residences and a library. The architecture is a mixture of historic and historically inspired, interspersed with more contemporary commercial buildings. The area contains street-oriented storefronts with parking either in the front or rear, trees and landscaping, and some single-family residences.

SCENIC RESOURCES

Scenic resources are defined as significant visual features that contribute to the overall visual character of the area. They can be land form elements, such as hillsides or valleys; land cover components, such as rivers, streams, and forests; or areas that are unique and valuable to the community, such as parks and preserves.

Stone Lakes National Wildlife Refuge

The Stone Lakes National Wildlife Refuge is located southwest of the City, approximately 2.5 miles from the Planning Area boundary. It straddles I-5 and extends to the south for 14 miles from the Town of Freeport west of Franklin Boulevard. The Stone Lakes National Wildlife Refuge contains 18,212 acres of natural habitat and agricultural land. The refuge supports migratory birds, a great blue heron rookery, a warm water fishery, and several local endangered, threatened, and special-status species.

Cosumnes River Preserve

The Cosumnes River Preserve is a 50,000-acre preserve along the Cosumnes River, south of the Planning Area. While not located in the Planning Area itself, it is visible from the southern portion and accessible to the community. It includes a riparian corridor along the Cosumnes River, floodplain, wetlands, and vernal pool grasslands. The preserve contains over 11 miles of hiking trails and provides valuable wildlife habitat. In addition, it contains ranches and farmlands that sustain native plant and wildlife species.

Parks and Open Space

The Planning Area contains numerous parks and open space areas that contribute to its visual character. These areas are operated and maintained primarily by the CCSD and provide recreation, conservation, water quality, and visual benefits. The largest park is Elk Grove Regional Park, a 127-acre open space area in central Elk Grove. It contains a variety of amenities, including an aquatic center, youth center, natural areas, sports fields, a picnic area, and a lake with two islands. A community icon, the park's open space and natural and man-made features are valuable to the City's sense of community.

Lakes, Rivers, and Creeks

Numerous rivers and creeks are in or near the Planning Area, such as the Sacramento River to the west, the Cosumnes River to the south, and Deer Creek, Franklin Creek, and Laguna Creek, which all cross the Planning Area. These streams and rivers support riparian habitats that contribute to the natural scenic views of the area. Laguna Creek runs through Elk Grove, provides aesthetic and recreational benefits, and is accessed through existing bicycle and pedestrian trails. Laguna Lake and other man-made lakes are located in neighborhoods in the Laguna Creek section of the City, west of SR 99.

SCENIC VISTAS AND CORRIDORS

Scenic vistas and corridors are designated by local, regional, or state jurisdictions to identify and preserve areas of significant aesthetic value. These designated areas generally have development and design requirements pertaining to the preservation of views, minimization of visual impact, and visual integration into the overall landscape.

Vistas

Areas may be designated as a scenic vista by jurisdictions in local and regional plans. There are currently no officially designated scenic vistas in the Planning Area.

Corridors

Scenic corridors are designated under the California Scenic Highway Program to preserve the aesthetic value of lands adjacent to and visible from highways. There are currently no designated scenic corridors within or visible from the Planning Area. However, a portion of SR 160, 1 mile west of the current City limits, is an officially designated scenic corridor.

There are three sections of classified landscaped freeway in the Planning Area: one along SR 99 and two along I-5. This classification, which is separate from the scenic corridor designation, identifies sections of freeway with plantings that meet the criteria of the State's Outdoor Advertising Act and Regulations, Sections 2500–2513. The landscaping assists in the control of outdoor advertising displays.

LIGHT AND GLARE

Light and glare may be caused by street and parking lot lighting, building or landscape lighting, illuminated signs, recreational facilities, and to some extent interior lighting of residential and nonresidential buildings. Materials such as glass, metal, and polished surfaces can contribute to glare. Excessive light and glare can interfere with the scenic quality of an area and contribute to light pollution. In the Planning Area, light and glare are concentrated in the western and central portions where commercial and more densely developed residential areas are located.

5.1.2 REGULATORY FRAMEWORK

STATE

Caltrans Scenic Highway Program

The Scenic Highway Program was created in 1963 to protect and enhance the natural beauty of California highways and corridors. A scenic highway may be any freeway, highway, road, or other public right-of-way that has views of exceptional scenic quality. The California Department of Transportation (Caltrans) designates a highway as eligible for scenic highway status by evaluating the amount of natural landscape visible from the highway and how much development intrudes on the view. Once highways are designated as eligible by Caltrans, the local governing body may apply for scenic highway approval and adopt a Corridor Protection Program, following which the highway may be officially designated a Scenic Highway.

LOCAL

City of Elk Grove Zoning Code

The Elk Grove Zoning Code (Municipal Code Title 23) provides development standards that address building mass, setbacks, landscaping, lighting, and signage to achieve an aesthetically pleasing appearance. Chapter 23.56, Lighting, addresses lighting specifically, which would reduce the potential for local light and glare, as well as contribution to skyglow. Section 23.56.030 contains requirements for shielding of fixtures and levels of illumination, as well as restrictions on fixture heights and hours of illumination for multifamily and nonresidential uses. Municipal Code Section 23.56.040 prohibits certain types of lighting, such as neon tubing or band lighting along building structures, searchlights, illumination of entire buildings, roof-mounted lights (except for security purposes with motion detection), and any light that interferes with a traffic signal or other necessary safety or emergency light.

City of Elk Grove Design Guidelines

In 2003, the City Council adopted revisions to the Municipal Code establishing a Design Review process for new development and redevelopment of properties. This requirement is currently enumerated in Municipal Code Section 23.16.080, Design Review, and has been updated several times, as recently as 2017. Adoption of the Design Review process was accompanied by adoption of the corresponding Elk Grove Design Guidelines (City of Elk Grove 2003), which were amended as recently as 2015. Section 23.16.080 establishes an expanded design review process for all development Citywide requiring additional site and design consideration beyond conformance with minimum standards of the Zoning Code. The Design Guidelines include design provisions for site planning, architecture, lighting, and landscaping, as well as provisions regarding the preservation of natural features and compatibility with surrounding property. The City strongly encourages project design that incorporates existing natural features of project areas, including but not limited to trees/tree clusters, topography, and creeks. The guidelines encourage the use of landscaping to reduce potential impacts of lighting from parking areas on both the project area and on adjacent vacant land. In addition, the guidelines specify that perimeter landscaping be designed to maximize screening and buffering between adjacent uses. In addition to these Citywide guidelines, supplemental guidelines have been established for the Laguna Ridge and Southeast Policy Areas.

5.1.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Have a substantial adverse effect on a scenic vista.
2) Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
3) Substantially degrade the existing visual character or quality of public views of the site and its surroundings. If the project is in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.
4) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

METHODOLOGY

The following evaluation of the proposed Project's potential aesthetic, light, and glare impacts is based on a review of relevant planning documents, including the City's current General Plan, Design Guidelines, and Zoning Code; review of aerial and street view photographs of the

Planning Area; and review of available information regarding designated scenic resources and highways in the Planning Area.

It is important to note that aesthetics is an abstract issue; one person may consider a particular feature to be a scenic resource, and another person might disagree. Similarly, what one person may feel is a significant adverse impact on scenic resources may be an improvement in visual character to another person. Due to the inherently subjective nature of this type of analysis, this section assumes that any permanent substantial change in the existing visual character of an area is considered a significant adverse impact.

General Plan Policies and Standards

The proposed Project contains the following policies and standards for managing future development in the City to protect visual resources.

Policy LU-1-5: To support intensification of identified growth areas, restrict new development on properties in rural and transitional areas.

Policy LU-1-6: Support the development of neighborhood-serving commercial uses adjacent to residential areas and that provide quality, convenient, and community-serving retail choices in a manner that does not impact neighborhood character.

Policy LU-2-4: Require new infill development projects to be compatible with the character of surrounding areas and neighborhoods, support increased transit use, promote pedestrian and bicycle mobility, and increase housing diversity.

Policy LU-5-2: Provide and implement regulations that encourage high-quality signage, ensure that businesses and organizations can effectively communicate through sign displays, promote wayfinding, achieve visually vibrant streetscapes, and control excessive visual clutter.

Policy LU-5-3: Reduce the unsightly appearance of overhead and aboveground utilities by requiring the undergrounding of appropriate services within the urban areas of the City.

Standard LU-5-3.a: New utility facilities should be located underground to the extent possible. Facilities to be placed underground should include electrical transformers (where consistent with the guidelines of the electrical utility), water backflow preventers, and similar items.

Standard LU-5-3.b: Require that existing overhead utility facilities be undergrounded as a condition of project approval. This shall include electrical service lines under 69kV. Electrical service lines of 69 kV and higher are encouraged to be undergrounded.

Policy LU-5-4: Require high standards of architectural and site design, and apply strong design controls for all development projects, both public and private, for the enhancement and development of community character and for the proper transition between areas with different types of land uses. Design standards shall address new construction and the reuse and remodeling of existing buildings.

Standard LU-5-4.a: Nonglare glass shall be used in all nonresidential buildings to minimize and reduce impacts from glare. Buildings that are allowed to use semi-reflective glass must be oriented so that the reflection of sunlight is minimized. This requirement shall be included in subsequent development applications.

Policy LU-5-6: Improve the visual appearance of business areas and districts by applying high standards for architectural design, landscaping, and signs for new development and the reuse or remodeling of existing buildings.

Policy LU-6-1: Maintain and improve the aesthetic quality and architectural diversity of the Old Town historical district.

Policy NR-1-8: Encourage development clustering where it would facilitate on-site protection of woodlands, grasslands, wetlands, stream corridors, scenic areas, or other appropriate features such as active agricultural uses and historic or cultural resources under the following conditions and requirements. Except as otherwise provided, clustering shall not be allowed in the Sheldon Rural Area.

- Urban infrastructure capacity is available for urban use. If clustering is allowed in the Rural Area, those properties shall be exempt from providing urban water and sewer connections in accordance with the policies of the Sheldon/Rural Area Community Plan (see Chapter 9).
- On-site resource protection is appropriate and consistent with other General Plan policies.
- The architecture and scale of development are appropriate for and consistent with the intended character of the area.
- Development rights for the open space area are permanently dedicated and appropriate long-term management is provided for by a public agency or another appropriate entity.

Policy NR-2-3: Ensure that trees that function as an important part of the City's or a neighborhood's aesthetic character or as natural habitat on public and private land are retained or replaced to the extent possible during the development of new structures, roadways (public and private, including roadway widening), parks, drainage channels, and other uses and structures.

PROJECT IMPACTS AND MITIGATION MEASURES

Scenic Vistas and Highways (Standards of Significance 1 and 2)

Impact 5.1.1 There are no designated scenic vistas or highways within view of the Planning Area. There would be **no impact**.

No scenic vistas or designated scenic highways are within or visible from the Planning Area (Caltrans 2011). Therefore, there is **no impact**.

Mitigation Measures

None required.

Degradation in Existing Visual Character (Standard of Significance 3)

Impact 5.1.2 Implementation of the General Plan will encourage new development and redevelopment activities that could degrade the existing visual character or quality of the Planning Area. This is considered a **potentially significant** impact. The Planning Area contains numerous areas with important visual character, including agricultural and rural areas; the communities of Sheldon, Franklin, and Old Town; various parks and open spaces, and waterways including lakes, rivers and creeks, and surrounding habitat, including the nearby scenic resource areas of Stone Lakes National Wildlife Refuge and Cosumnes River Preserve. Implementation of the General Plan would change the visual character of the Planning Area through intensification of urban uses within the existing City limits and introduction of urban uses within the Planning Area.

Within the existing City limits, the central and western areas are predominately urban in character with some vacant or underutilized areas planned for development. Examples of these vacant or underutilized areas include, but are not limited to, the undeveloped areas of the Laguna Ridge Specific Plan, Southeast Policy Area, and the Sheldon Farms property at Sheldon Road and Bruceville Road. The northeastern area of the City is characterized by the Sheldon/Rural Area and is predominately developed with agricultural and rural residential uses on a minimum lot size of two acres. Development under the proposed Project would continue this use pattern and the current character of area within the existing City limits would not be substantially changed by subsequent development.

Land use designation changes are not proposed for the communities of Sheldon, Franklin, and Old Town, but buildout of the Planning Area as envisioned in the proposed Project would result in new development in currently undeveloped and rural areas and an increase in density in urbanized areas through infill development on currently vacant parcels. Such development would convert the visual character of these areas from agricultural fields, natural habitat, and vacant parcels to an urban/suburban developed character. Views of these undeveloped areas would be replaced by views of houses, office and commercial buildings, light industrial complexes, public facilities, and associated improvements including roads, parking lots, fencing, utilities, and ornamental landscaping.

The southern and eastern portions of the Planning Area, which includes the Study Areas, are predominately large lots and are rural/agricultural in nature. Implementation of the General Plan would result in the conversion of many of these rural areas into suburban and urban development. Over time, implementation of the General Plan would change the visual character of the area into an urban landscape from a rural landscape of relatively flat agricultural areas interspersed with native trees and drainage channels.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Development within the City is subject to discretional Design Review pursuant to Municipal Code Section 23.16.080 (Design Review). All new development in the Planning Area would be required to comply with the City's Design Guidelines, which address site planning, architecture, lighting, landscaping, and preservation of natural features. In addition, new development in the Laguna Ridge Specific Plan (LRSP) area and the Southeast Policy area would be required to comply with the City's supplemental design guidelines developed specifically for those areas. These guidelines are intended to support development with visual character that is consistent with existing surrounding development and with the City's long-term vision for project design.

Proposed policies from the General Plan, identified below, are intended to protect the natural features and transition land uses with appropriate density and intensity from rural areas to urbanized areas and provide for the orderly development of the area.

Land Use Goal LU-3 (Expansion with Purpose) and corresponding policies, provide a process for future development. Included in these policies is LU-3-1 (and subsequent discussion), which established organizing principles for orderly development of the Study Areas. Policy LU-3-11 establishes land use programs for each of the four Study Areas, which guide the balance between land development and conservation in each Study Area.

Proposed goals and policies, including but not limited to Goal LU-5 (Consistent, High Quality Urban Design) and Policies LU-5-1 through LU-5-12 would ensure the compatibility of adjacent land uses, protection of residential neighborhoods from incompatible activities, and buffering of incompatible uses to retain the existing community character. Further, the proposed Project establishes land use development standards for all land use designations, including standards relative to allowed density and intensity, which would limit the maximum allowed development within a particular designation.

In addition, the proposed Project includes numerous policies to both protect the existing visual character of the Planning Area and to ensure that new development is well designed and cohesive with the surrounding area. For example, Policies LU-1-5, NR-1-8, and NR-2-3 discourage new development in rural and transitional areas and encourage development clustering where possible to protect scenic resources, including trees. Policy LU-6-1 would protect the unique aesthetic quality and architecture found in the Old Town area. In addition, the East, South, and West Study Areas are proposed to have agricultural buffers to provide a visual separation between future growth areas and the active agricultural uses outside the Planning Area (see proposed General Plan Figures 4-6, 4-7, and 4-8). Additional policies in the Natural Resources section (e.g., NR-1-4 and NR-1-8) require the protection of stream corridors, wetland features, native trees, and other natural resources.

Conclusion

Compliance with the City's Design Guidelines, supplemental guidelines, and proposed General Plan policies would guide future projects to provide a quality visual character of future development. However, buildout of the Planning Area as proposed would still cause conversion from the current rural/natural character in the Study Areas to a more urbanized character. This conversion would be substantial and permanent and would be a significant impact. There are no feasible mitigation measures beyond those policies and standards included in the proposed Project that would further lessen these impacts or reduce them to less than significant. Therefore, this impact would be **significant and unavoidable**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with the City's Design Guidelines, supplemental guidelines, and proposed General Plan policies.

Light and Glare (Standard of Significance 4)

Impact 5.1.3 Implementation of the General Plan would create new sources of daytime glare, and would change nighttime lighting and illumination levels associated with new and redevelopment activities in the Planning Area, which would contribute to skyglow. This is considered a **potentially significant** impact.

Implementation of the General Plan would introduce new sources of daytime glare and substantially change nighttime lighting and illumination levels in the Planning Area. Lighting nuisances typically are categorized by the following:

1) Glare – Intense light that shines directly, or is reflected from a surface into a person's eyes;

2) "Skyglow"/Nighttime Illumination – Artificial lighting from urbanized sources that alters the rural landscape in sufficient quantity to cause lighting of the nighttime sky and reduction of visibility of stars and other astronomical features; and

3) "Spillover" Lighting – Artificial lighting that spills over onto adjacent properties, which could interrupt sleeping patterns or cause other nuisances to neighboring residents.

The main sources of daytime glare in the existing City limits portion of the Planning Area are from sunlight reflecting from structures with reflective surfaces such as windows. The proposed General Plan would provide for various densities of commercial, office, recreation and other public development containing structures and other potential sources of glare. Building materials (i.e., reflective glass and polished surfaces) are the most substantial sources of glare. The amount of glare depends on the intensity and direction of sunlight, which is more acute at sunrise and sunset because the angle of the sun is lower during these times. Implementation of the Project would increase the amount of daytime glare in existing developed areas through additional development. It would add new sources of daytime glare in new development areas (the Study Areas) that currently have few sources of glare due to lack of existing structures.

A source of glare during the nighttime hours is artificial light. The sources of new and increased nighttime lighting and illumination include, but are not limited to, new residential developments, lighting from nonresidential uses, lights associated with vehicular travel (i.e., car headlights), street lighting, parking lot lights, and security related lighting for nonresidential uses. Increased nighttime lighting and illumination could result in adverse effects to adjacent land uses through the "spilling over" of light into these areas and "sky glow" conditions.

Development would also introduce new sources of nighttime lighting and illumination into the undeveloped or underutilized portions of the Planning Area. Additional nighttime lighting associated with future development in the Planning Area, particularly in the Study Areas where there is little nighttime lighting, would also contribute to skyglow conditions, in which artificial lights produce a diffuse glow over cities and towns that can be seen from large distances. For example, additional skyglow could be visible to residents in existing rural areas east of SR 99 with unobstructed views of the Planning Area (i.e., areas that currently appear "dark" to those observers would no longer appear dark). Skyglow effects may also be subjectively perceived as more prominent in communities such as Galt to the south because the source of nighttime lighting would be closer to the community. Increased skyglow resulting from new sources of nighttime lighting in the Planning Area could further diminish visibility of stars and other astronomical features within the Planning Area as well as in the region. Thus, the effects of skyglow could extend beyond the Planning Area, affecting rural areas and other jurisdictions.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Daytime and nighttime glare can be reduced or eliminated by using appropriate building materials and architectural coatings, roof overhangs, and proper structural design. Municipal Code Chapter 23.56 addresses standards for lighting as part of new development, including requirements that lighting is constructed with shielding to reduce glare so that the light source is not visible from within any adjoining residential dwelling. This chapter also establishes required levels of illumination for parking lots, driveways, pedestrian walkways, and other areas of new development, and requires limitations on light trespass onto abutting property. Further, the City's Design Guidelines require that exterior building and site lighting be designed so that light is not directed off site and the light source is shielded downward from direct off-site viewing.

Proposed Land Use Policy LU-5-4 and Standard LU-5-4.a requires that nonglare glass be used in all nonresidential buildings to reduce impacts from glare. Standard LU-5-4.a also requires that buildings that are allowed to use semi-reflective glass must be oriented so that the reflection of sunlight is minimized.

Conclusion

Implementation of provisions in the Municipal Code and proposed General Plan standards would reduce localized effects of light and glare, such as spillover light, associated with development of individual projects within the Planning Area. No additional mitigation would be required for this effect.

However, while the Municipal Code and proposed General Plan standards would reduce light trespass and pollution of the night sky, the addition of over 48,000 new dwelling units and areas of nonresidential development and associated infrastructure that would occur Citywide, with most of the new development occurring in the West and South Study Areas where there is currently no lighting, would create substantial new sources of light throughout the Planning Area. These new light sources would increase the skyglow effect within the City and increase the area of skyglow effects outside of the Planning Area. There are no feasible mitigation measures that would further lessen these impacts or reduce them to less than significant Citywide. Therefore, the Project's contribution of light and glare from future development throughout the City and its effects on skyglow would be **significant and unavoidable**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with the City's Design Guidelines, supplemental guidelines, and proposed General Plan policies.

5.1.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for aesthetics, light, and glare impacts is Sacramento County, including Elk Grove, Sacramento, Rancho Cordova, and Folsom, and all existing, approved, proposed, and reasonably foreseeable development projects within these jurisdictions. This includes development in the City of Elk Grove as well as the general plans of each jurisdiction and other large regional projects such as Folsom Ranch. The Capital SouthEast Connector project is a planned 35-mile parkway that would span from I-5, south of Elk Grove, to Highway 50 in El Dorado County.

Sacramento County includes several cities and unincorporated communities containing urban and suburban development with an array of residential, commercial, industrial, and civic land uses surrounded by open space and agricultural land. The Planning Area is situated in southern Sacramento County. While the western and central portions of the Planning Area are generally developed with urban uses, the eastern and southern portions, which include the proposed Study Areas, are primarily undeveloped and characterized by agricultural land and rural residential uses.

The Planning Area contains several planned and approved development projects, including the LRSP, Sterling Meadows, Elk Grove Promenade, the Southeast Policy Area Community Plan, and the City's proposed Multi-Sport Park Complex in the Study Area south of Grant Line Road. The LRSP has been approved and is in the process of being developed. A 36-acre portion of the Elk Grove Promenade will be developed with the Wilton Rancheria Casino, a 12-story resort and casino with 300 rooms and 30,000 square feet of event space. Other projects, including the City's Multi-Sport Park Complex, are in various stages of approval. Most of the necessary infrastructure, such as lighting, roadways, and traffic signals, needed to accommodate those developments has already been constructed. These projects would add residential and commercial development to the area, changing the visual character and creating new sources of light and glare.

The impact analysis presented below focuses on the Project's contribution to cumulative visual changes in the cumulative setting.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Because there would be no impacts associated with scenic vistas or state scenic highways, the Project would not contribute to a cumulative impact; therefore, no further evaluation is required.

Cumulative Visual Resource Impacts (Standard of Significance 3)

Impact 5.1.4 Implementation of the proposed Project, in addition to other reasonably foreseeable projects in the region, would introduce new development into undeveloped agricultural and rural areas that would have a **cumulatively considerable** contribution to impacts on visual character.

Continued urbanization of the region in accordance with approved plans, together with the proposed development projects described above, would convert agricultural and open space land to urban uses with residential and nonresidential buildings and associated roadways and other infrastructure. Although individual development projects would be responsible for incorporating mitigation to minimize their visual impacts, the net result would be a general conversion of areas with an open, rural character to a more urban and developed character. The change in character associated with this development would be a significant cumulative impact.

The proposed Project would be a continuation of the overall urbanization of the City and would extend the City's developed area along the urban edge. While it is the City's intention to develop these areas, development under the proposed Project, in combination with other development in the region, would permanently alter the character of lands with rural and agricultural visual character to urban developed uses. Therefore, the Project's contribution to the change in character is **cumulatively considerable** and **significant and unavoidable**.

Mitigation Measures

Compliance with the City's Design Guidelines, supplemental guidelines, and proposed General Plan policies would guide future projects to provide a quality visual character of future development. However, even with implementation of these guidelines and policies, future development would substantially change the visual character of the Planning Area and the Project's contribution to the urbanization of the region. No further mitigation is available to reduce the Project's contribution to the regional change in visual character.

Cumulative Light and Glare Impacts (Standard of Significance 4)

Impact 5.1.5 Implementation of the proposed Project, in addition to other reasonably foreseeable projects in the region, would introduce new development into undeveloped agricultural and rural areas, increasing nighttime lighting and daytime glare and contributing to regional skyglow. This is a **cumulatively considerable** impact.

Continued urbanization of the region in accordance with applicable land use plans, together with the proposed development projects described above, would introduce sources of light and glare to areas that currently contain few light sources. Development of the Capital SouthEast Connector project, as well as development in Rancho Cordova, the Delta Shores area of the City of Sacramento, and Folsom Ranch, would add substantial sources of light and glare. Overall, this development would increase skyglow and other nighttime illumination within the region into areas that currently experience little to no skyglow. The change in amount of light and glare associated with this development would be a significant cumulative impact.

While future development projects in the City would be required to comply with the design guidelines and with Municipal Code Chapter 23.56 for lighting standards and General Plan Standard LU5-4. a, which would reduce light and glare impacts, the adverse effects of adding new light and glare sources to areas that currently have little to no on-site lighting would substantially contribute to the cumulative impact. These impacts cannot be mitigated to less than significant, and this impact would be **cumulatively considerable** and **significant and unavoidable**.

Mitigation Measures

All new development in the Planning Area would be required to comply with existing code requirements regulating lighting and glare and proposed General Plan Standard LU-5-4.a would further reduce the potential for glare. While implementation of existing codes and the proposed standard would likely reduce impacts of individual development projects to less than significant, the effect of light and glare from new development Citywide would substantially increase. No further mitigation is available to reduce the Project's contribution to increased light and glare in the region.

REFERENCES

Caltrans (California Department of Transportation). 2011. California Scenic Highway Mapping Program. Accessed September 21, 2017. http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm.

City of Elk Grove. 2003. *Elk Grove Design Guidelines*.

5.2 Agricultural Resources

This section describes the agricultural resources in the Planning Area and the existing policies pertaining to these resources. Sources used to assess impacts of the Project include the General Plan Existing Conditions Report (City of Elk Grove 2016), the California Department of Conservation (DOC) Farmland Conversion Reports (2015), the DOC Important Farmlands Map (2017a) for Sacramento County, and the Soil Survey of Sacramento County, California (USDA 1993).

5.2.1 EXISTING SETTING

FARMLAND AND SOIL CLASSIFICATIONS

The two systems used by the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) to determine a soil's agricultural productivity are the Soil Capability Classification and the Storie Index Rating System. The "prime" soil classifications of both systems indicate the absence of soil limitations, which if present, would require the application of management techniques (e.g., drainage, leveling, special fertilizing practices) to enhance production.

SOIL CAPABILITY CLASSIFICATION

The Soil Capability Classification system takes into consideration soil limitations, the risk of damage when the soils are used, and the way in which soils respond to treatment. Capability classes range from Class I soils, which have few limitations for agriculture, to Class VIII soils, which are unsuitable for agriculture. Generally, as the ratings of the capability classification system increase, the desired yields and profits are more difficult to obtain. A general description of soil classification, as defined by the NRCS, is provided in **Table 5.2-1**.

TABLE 5.2-1
SOIL CAPABILITY CLASSIFICATION

Class	Definition
I	Soils have few limitations that restrict their use.
II	Soils have moderate limitations that reduce the choice of plants, or that require special conservation practices.
III	Soils have severe limitations that reduce the choice of plants, require conservation practices, or both.
IV	Soils have very severe limitations that reduce the choice of plants, require very careful management, or both.
V	Soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife habitat.
VI	Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, or range, woodland, or wildlife habitat.
VII	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat.
VIII	Soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife habitat, or water supply, or to aesthetic purposes.

Source: NRCS 1993

Storie Index Rating System

The Storie Index Rating system ranks soil characteristics according to their suitability for agriculture from Grade 1 soils (80 to 100 rating), which have few or no limitations for agricultural production, to Grade 6 soils (less than 10), which are not suitable for agriculture. Under this system, soils deemed less than prime can function as prime soils when limitations such as poor drainage, slopes, or soil nutrient deficiencies are partially or entirely removed. The six grades, ranges in index rating, and definition of the grades as defined by the NRCS, are provided in **Table 5.2-2**.

TABLE 5.2-2
STORIE INDEX RATING SYSTEM

Grade	Index Rating	Definition
1 – Excellent	80 through 100	Soils are well suited to intensive use for growing irrigated crops that are climatically suited to the region.
2 – Good	60 through 79	Soils are good agricultural soils, although they may not be so desirable as Grade 1 because of moderately coarse, coarse, or gravelly surface soil texture; somewhat less permeable subsoil; lower plant available water holding capacity; fair fertility; less well drained conditions, or slight to moderate flood hazards, all acting separately or in combination.
3 – Fair	40 through 59	Soils are only fairly well suited to general agricultural use and are limited in their use because of moderate slopes; moderate soil depths; less permeable subsoil; fine, moderately fine, or gravelly surface soil textures; poor drainage; moderate flood hazards; or fair to poor fertility levels, all acting alone or in combination.
4 – Poor	20 through 39	Soils are poorly suited. They are severely limited in their agricultural potential because of shallow soil depths; less permeable subsoil; steeper slope; more clayey or gravelly surface soil textures than Grade 3 soils, as well as poor drainage; greater flood hazards; hummocky micro-relief; salinity; or fair to poor fertility levels, all acting alone or in combination.
5 – Very Poor	10 through 19	Soils are very poorly suited for agriculture, are seldom cultivated and are more commonly used for range, pasture, or woodland.
6 – Nonagricultural	Less than 10	Soils are not suited for agriculture at all due to very severe to extreme physical limitations, or because of urbanization.

Source: NRCS 1993

Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP) was established for California in 1982 to continue the Important Farmland mapping efforts begun in 1975 by the USDA Soil Conservation Service (USDA-SCS) (now the NRCS). The intent of the USDA mapping efforts was to produce agricultural resource maps based on soil quality and land use across the nation. As part of this effort, the USDA-SCS developed a series of definitions known as Land Inventory and Monitoring (LIM) criteria. The LIM criteria classified the land's suitability for agricultural production; suitability included both the physical and chemical characteristics of soils and the actual land use. Important Farmland Maps are derived from the USDA-SCS soil survey maps using the LIM criteria.

Since 1980, the State of California has assisted the USDA-SCS with completing its mapping in the State. The FMMP was created in DOC to continue the mapping activity with a greater level of detail, which was achieved by modifying the LIM criteria for use in California. The LIM criteria in

California utilize the Soil Capability Classification and Storie Index Rating systems, but also consider physical conditions, such as a dependable water supply for agricultural production, soil temperature range, depth of the groundwater table, flooding potential, rock fragment content, and rooting depth.

Important Farmland Maps for California are compiled using the modified LIM criteria, as described above, and current land use information. The minimum mapping unit is 10 acres unless otherwise specified. Units of land smaller than 10 acres are incorporated into the surrounding classification. The Important Farmland Maps identify five agriculture-related categories: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, and Grazing Land. Definitions for each Important Farmland classification are shown below, based on information from the DOC (2017a) Farmland Mapping and Monitoring Program web page.

Prime Farmland

Prime Farmland is farmland with the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

Farmland of Statewide Importance

Farmland of Statewide Importance is similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

Unique Farmland

Unique Farmland is composed of lesser quality soils used for the production of the State's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been in agricultural production at some time during the four years prior to the mapping date.

Farmland of Local Importance

Farmland of Local Importance is land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee. Sacramento County defines its Farmland of Local Importance as lands that do not qualify as Prime, Statewide, or Unique designation, but are currently irrigated crops or pasture or nonirrigated crops; lands that would be Prime or Statewide designation and have been improved for irrigation but are now idle; and lands that currently support confined livestock, poultry operations, and aquaculture (DOC 2017b).

Grazing Land

Grazing Land is land on which the existing vegetation is suited to the grazing of livestock.

Urban and Built-Up Land

Urban and Built-Up Land is land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.

Other Land

Other Land is land not included in any other mapping category. Common examples include low-density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry, or aquaculture facilities; strip mines; borrow pits; and water bodies smaller than 40 acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.

CONTRIBUTION OF AGRICULTURE TO THE SACRAMENTO COUNTY ECONOMY

In 2015, Sacramento County ranked twenty-fourth in total value of agricultural production out of 58 counties in California, with gross revenues from the sales of agricultural commodities of $470 million (CDFA 2016). The leading products included wine grapes, milk, pears, poultry, and aquaculture (Sacramento County Agricultural Commissioner 2016). In 2017, 10,700 people in Sacramento County were employed in the farm industry, which represents approximately 1.1 percent of the County's total workforce (EDD 2017).

SACRAMENTO COUNTY FARMLAND CONVERSION

One of the basic underlying premises of agricultural conversion states that the proximity of agricultural land to urban uses increases the value of the agricultural land, either directly through formal purchase offers or indirectly through recent sales in the vicinity, and through the extension of utilities and other urban infrastructure into productive agricultural areas. The conversion of Important Farmlands in Sacramento County from 2000 (the year of City incorporation) to 2016 is presented in **Table 5.2-3**.

In Sacramento County between 2000 and 2016, there was a decrease of nearly 25,000 acres of Prime Farmland and a more than 20,000-acre decrease in Farmland of Statewide Importance. In this same period, however, there was an increase of more than 24,000 acres of Farmland of Local Importance and a 64-acre increase in Unique Farmland. The increases are explained by several factors: the redistribution of farmland between categories; conversion of fallow land to irrigated cropland after a long drought; conversion due to land left idle for three or more update cycles; and new vineyards and corn production in the southeastern portion of the county. Nevertheless, as presented in **Table 5.2-3**, the total amount of agricultural land in Sacramento County decreased by nearly 9 percent during the period from 2000 to 2016 (DOC 2016a).

TABLE 5.2-3
FARMLAND CATEGORY SUMMARY – SACRAMENTO COUNTY (2002 TO 2016)

Farmland Category	Acreage by Category									2000–2016 Net Acreage Changed	Average Annual Acreage Change
	2000	2002	2004	2006	2008	2010	2012	2014	2016		
Prime Farmland	115,389	112,037	110,278	106,667	104,366	97,477	93,916	91,568	90,691	-24,698	-1,544
Farmland of Statewide Importance	63,536	60,817	56,141	51,218	49,470	45,263	43,580	43,105	43,342	-20,194	-1,262
Unique Farmland	15,476	15,743	15,187	15,267	15,463	15,076	15,060	15,125	15,540	64	4
Farmland of Local Importance	33,530	37,924	39,873	41,960	43,819	53,929	56,981	58,852	57,910	24,380	1,524
Grazing Land	168,144	165,023	163,175	156,979	156,144	155,824	154,744	153,452	153,174	-14,970	-936
Agricultural Land Total	396,075	391,544	384,654	372,091	369,262	367,569	364,281	362,102	360,657	-35,418	-2,214

Source: DOC 2016a

PLANNING AREA CHARACTERISTICS

Production and Soil Conditions

The Planning Area contains a mix of agricultural, residential, commercial, industrial, civic, and recreational activities. Within the current City limits, approximately 2,252 acres, or 9.6 percent, are in agricultural production. Much of the agricultural land is in the southern and eastern portions of the City, interspersed with rural residential areas, which are generally residences set on large rural lots, surrounded by active or inactive agricultural land. Agricultural activities include grazing, hay crops, irrigated pasture, row crops, and agricultural processing operations. Agricultural land used for growing hay is the predominant activity, accounting for 1,461 acres or nearly 65 percent of agricultural uses within the City. Within the Planning Area, approximately 9,699 acres, or 41.3 percent, are in agricultural production. With the exception of the City of Sacramento to the northwest of the Planning Area, the surrounding area is mostly rural residential and agriculture (City of Elk Grove 2016).

In total, the NRCS Web Soil Survey identifies 38 soil types within the Planning Area (NRCS 2017). The San Joaquin soil series is the most prevalent in the Planning Area. Along with similar soil types, these account for nearly 85 percent of soils in the Planning Area (USDA 2015). The San Joaquin series is alluvium deposits from mostly granitic rocks. It has a breadth of characteristics that can vary from loam to clay, depending on soil depth. Typically, these soils are well- or moderately well-drained with medium to very high runoff potential and very slow permeability (City of Elk Grove 2016).

The soil capability classification, Storie Index rating and grade, and Important Farmland designation are presented for each soil type in **Table 5.2-4**. As shown, Planning Area soils include mostly Class III and Class IV soil capability classifications with Storie Index grades ranging mostly from poor to excellent.

TABLE 5.2-4
ON-SITE SOIL CAPABILITY CLASSIFICATION AND STORIE INDEX RATING

Soil Map Symbol and Name	Soil Capability Classification[1]	Storie Index Rating	Storie Index Grade	Important Farmlands Designation	Acres within Planning Area
111 Bruella sandy loam, 0 to 2 percent slopes	I/III	68	2 - Good	Prime farmland if irrigated	822
112 Bruella sandy loam, 2 to 5 percent slopes	II/III	65	2 - Good	Prime farmland if irrigated	40
114 Clear Lake clay, partially drained, 0 to 2 percent slopes, frequently flooded	IV/IV	22	4 - Poor	Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season	51
115 Clear Lake clay, hardpan substratum, 0 to 1 percent slopes	II/III	25	4 - Poor	Prime farmland if irrigated	114
117 Columbia sandy loam, drained, 0 to 2 percent slopes	II/III	86	1 - Excellent	Prime farmland if irrigated	7

Soil Map Symbol and Name	Soil Capability Classification[1]	Storie Index Rating	Storie Index Grade	Important Farmlands Designation	Acres within Planning Area
118 Columbia sandy loam, drained, 0 to 2 percent slopes, occasionally flooded	II/III	80	1 - Excellent	Prime farmland if irrigated	0
120 Columbia sandy loam, clayey substratum, drained, 0 to 2 percent slopes	II/III	77	2 - Good	Prime farmland if irrigated	54
121 Columbia sandy loam, clayey substratum, drained, 0 to 2 percent slopes, occasionally flooded	II/III	65	2 - Good	Prime farmland if irrigated	5
125 Corning complex, 0 to 8 percent slopes	NA/VI	28	4 - Poor	Not prime farmland	13
126 Corning-Redding complex, 8 to 30 percent slopes	II/III	68	2 - Good	Prime farmland if irrigated	12
134 Dierssen sandy clay loam, drained, 0 to 2 percent slopes	III/III	18	5 - Very Poor	Not prime farmland	35
135 Dierssen clay loam, deep, drained, 0 to 2 percent slopes	II/III	27	4 - Poor	Prime farmland if irrigated	17
137 Durixeralfs, 0 to 1 percent slopes	NA/VIII	27	4 - Poor	Not prime farmland	54
138 Durixeralfs-Galt complex, 0 to 2 percent slopes	IV/IV	12	5 - Very Poor	Not prime farmland	246
145 Fiddyment fine sandy loam, 1 to 8 percent slopes	NA/IV	11	5 - Very Poor	Not prime farmland	304
151 Galt clay, leveled, 0 to 1 percent slopes	III/III	15	5 - Very Poor	Farmland of statewide importance	1,925
152 Galt clay, 0 to 2 percent slopes	III/III	14	5 - Very Poor	Farmland of statewide importance	733
153 Galt clay, 2 to 5 percent slopes	NA/III	15	5 - Very Poor	Farmland of statewide importance	50
154 Galt-Urban land complex, 0 to 2 percent slopes	NA/III	15	5 - Very Poor	Not prime farmland	12
158 Hicksville loam, 0 to 2 percent slopes, occasionally flooded	II/III	61	2 - Good	Prime farmland if irrigated	90
164 Kimball silt loam, 0 to 2 percent slopes	III/III	55	3 - Fair	Farmland of statewide importance	42
165 Kimball silt loam, 2 to 8 percent slopes	III/III	49	3 - Fair	Farmland of statewide importance	106
174 Madera loam, 0 to 2 percent slopes	IV/IV	20	4 - Poor	Not prime farmland	38
175 Madera loam, 2 to 8 percent slopes	IV/IV	18	5 - Very Poor	Not prime farmland	16
176 Madera-Galt complex, 0 to 2 percent slopes	NA/IV	20	4 - Poor	Not prime farmland	171

Soil Map Symbol and Name	Soil Capability Classification[1]	Storie Index Rating	Storie Index Grade	Important Farmlands Designation	Acres within Planning Area
197 Redding loam, 2 to 8 percent slopes	III/III	20	4 - Poor	Not prime farmland	123
198 Redding gravelly loam, 0 to 8 percent slopes	IV/IV	16	5 - Very Poor	Not prime farmland	1,720
208 Sailboat silt loam, drained, 0 to 2 percent slopes, occasionally flooded	II/III	64	2 - Good	Prime farmland if irrigated	35
213 San Joaquin silt loam, leveled, 0 to 1 percent slopes	III/III	28	4 - Poor	Farmland of statewide importance	14,826
214 San Joaquin silt loam, 0 to 3 percent slopes	III/III	28	4 - Poor	Farmland of statewide importance	4,531
215 San Joaquin silt loam, 3 to 8 percent slopes	III/III	26	4 - Poor	Farmland of statewide importance	876
216 San Joaquin-Durixeralfs complex, 0 to 1 percent slopes	IV/IV	28	4 - Poor	Not prime farmland	822
217 San Joaquin-Galt complex, leveled, 0 to 1 percent slopes	III/III	19	5 - Very Poor	Farmland of statewide importance	3,199
218 San Joaquin-Galt complex, 0 to 3 percent slopes	NA/III	27	4 - Poor	Farmland of statewide importance	1,933
219 San Joaquin-Urban land complex, 0 to 2 percent slopes	NA/IV	27	4 - Poor	Not prime farmland	590
221 San Joaquin-Xerarents complex, leveled, 0 to 1 percent slopes	III/III	28	4 - Poor	Farmland of statewide importance	678
238 Xerarents-San Joaquin complex, 0 to 1 percent slopes	III/III	38	4 - Poor	Farmland of statewide importance	238
240 Xerarents-Urban land-San Joaquin complex, 0 to 5 percent slopes	NA/III	38	4 - Poor	Not prime farmland	264

Source: NRCS 2017

Note: 1. Irrigated/Non-irrigated

Important Farmland

The Planning Area contains land classified by the FMMP as Important Farmland (see **Figure 5.2-1** and **Table 5.2-5**). There are 348 acres of Prime Farmland, 5,016 acres of Farmland of Statewide Importance, and 270 acres of Unique Farmland in the Planning Area. As shown in the figure, all 348 acres of Prime Farmland are located outside the current City limits in the West and South Study Areas. Most lands designated as Farmland of Statewide Importance and Unique Farmland are located throughout the Study Areas, with approximately 627 acres located within the current City limits. Farmland of Local Importance and Grazing Land are not considered Important Farmland under CEQA.

TABLE 5.2-5
ACRES OF IMPORTANT FARMLANDS AND LOSS FROM PROJECT

Type of Farmland	Acres of Important Farmland within Planning Area						Acres of Important Farmland in County (2016)	Total Acres Lost from Project	County Percentage Loss from Project
	Total	City Limits	North Study Area	East Study Area	South Study Area	West Study Area			
Prime Farmland	347.8	—	9.7	—	225.8	112.2	90,691	347.8	0.38%
Farmland of Statewide Importance	5,015.7	490.5	364.8	1,076.8	1,890.6	1,193.1	43,342	5,015.70	11.57%
Unique Farmland	269.9	136.8	28.1	94.9	10.2	—	15,540	269.9	1.74%
Total	**5,633.4**	**627.3**	**402.6**	**1,171.7**	**2,126.6**	**1,305.3**	**149,573**	**5,633.40**	3.77%

Source: DOC 2016a

Williamson Act Contracts

Under the California Land Conservation Act of 1965, also known as the Williamson Act, local governments can enter into contracts with private property owners to protect land (within agricultural preserves) for agricultural and open space purposes. The Planning Area contains approximately 2,892 acres of agricultural land under Williamson Act contract. As shown in **Figure 5.2-2** and summarized in **Table 5.2-6**, approximately 272 acres are within the current City limits, with the remaining 2,620 acres located in the East, South, and West Study Areas.

TABLE 5.2-6
PLANNING AREA WILLIAMSON ACT LANDS

Type of Contract	Current City Limits	Study Areas				Totals
		East	South	West	North	
Non-Prime	—	246.3	195.2	134.7	—	576.2
Prime	272.4	641.2	884.6	329.7	—	2,127.9
Non-Renewal	—	22.0	165.7	—	—	187.7
Total	**272.4**	**909.5**	**1,245.5**	**464.4**	**—**	**2,891.8**

Source: DOC 2016b

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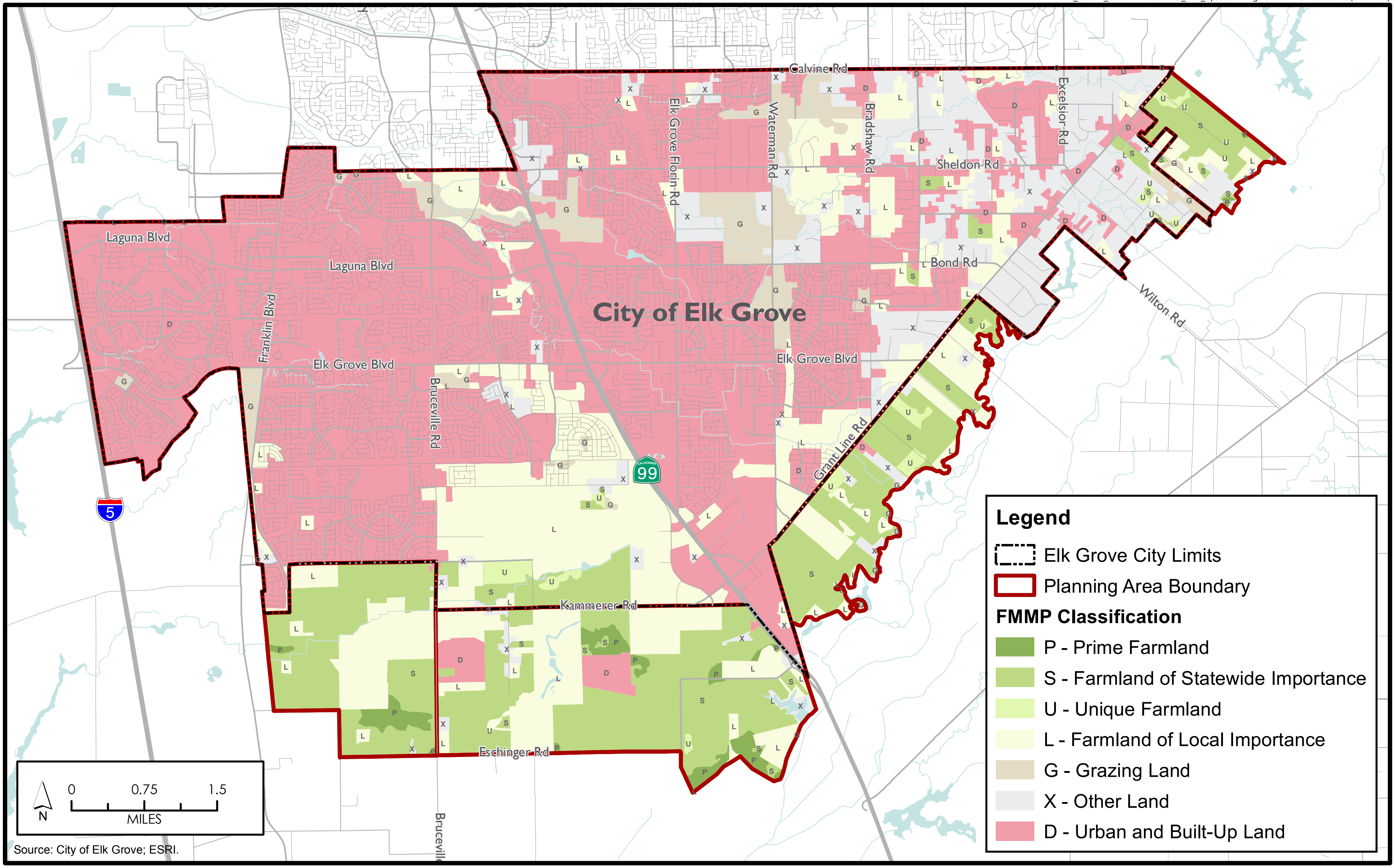

Source: City of Elk Grove; ESRI.

City of Elk Grove
Development Services

Figure 5.2-1

FMMP Important Farmlands

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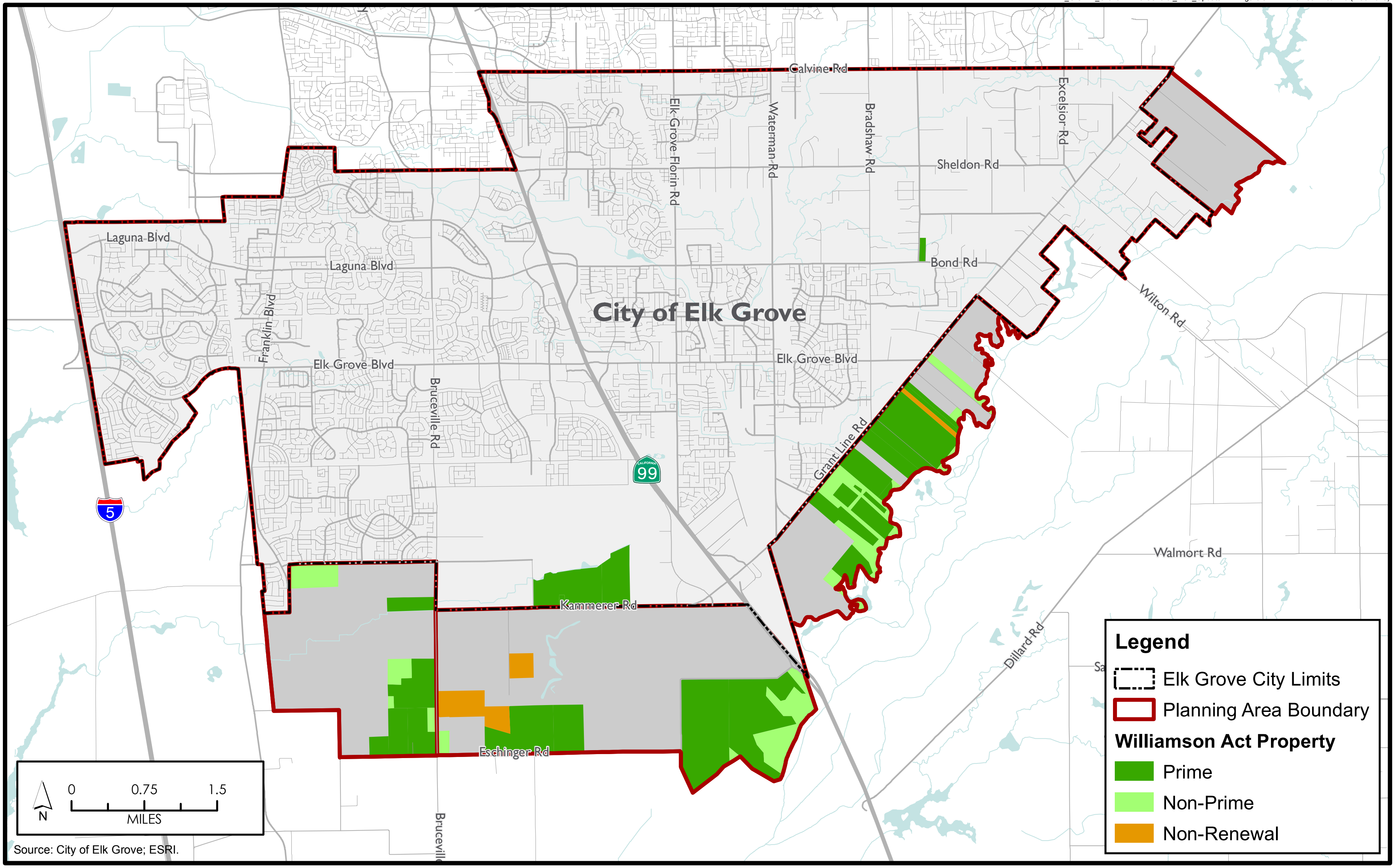

City of Elk Grove
Development Services

Figure 5.2-2

Williamson Act Properties

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5.2.2 REGULATORY FRAMEWORK

STATE

California Environmental Quality Act

Public Resources Code (PRC) Section 21060.1(a) defines agricultural land as prime farmland, farmland of statewide importance, or unique farmland, as defined by the USDA land inventory and monitoring criteria, as modified for California.

Williamson Act

The California Land Conservation Act of 1965 (the Williamson Act) enables local governments to form contracts with private landowners to promote the continued use of the relevant land in agricultural or related open space use. In return, landowners receive property tax assessments that are based on farming and open space uses instead of full market value. Local governments receive an annual subvention (subsidy) of forgone property tax revenues from the State via the Open Space Subvention Act of 1971.

The Williamson Act empowers local governments to establish "agricultural preserves" consisting of lands devoted to agricultural uses and other compatible uses. When such preserves are established, the locality may offer agricultural landowners the option of annually renewable contracts that restrict the land to agricultural use for at least 10 years. (The contract is in effect for 10 years following the first date upon which the contract is not renewed.) In return, the landowner is guaranteed a tax rate based on the land's value as agricultural/open space use, rather than its development potential.

Cancellation of a Williamson Act contract involves an extensive review and approval process, and the landowner may be required to pay a fee of up to 12.5 percent of the property value. The local jurisdiction approving the cancellation must make either one of the following findings:

- The cancellation is consistent with the purposes of the California Land Conservation Act (Section 51282[a][1] of the California Government Code).

- The cancellation is in the public interest (California Government Code Section 51282[a][2]).

To support a finding that the cancellation of a Williamson Act contract is consistent with the purpose of the California Land Conservation Act, all of the following subfindings must be made:

- The cancellation is for land on which a notice of nonrenewal has been served in accordance with Section 51245 of the California Government Code.

- Cancellation is not likely to result in the removal of adjacent lands from agricultural use.

- Cancellation is for an alternative use that is consistent with the applicable provisions of the city or county general plan.

- Cancellation will not result in discontiguous patterns of urban development.

- No proximate noncontracted land is both available and suitable for the use to which it is proposed the contracted land be put, or development of the contracted land would provide more contiguous patterns of urban development than development of proximate noncontracted land.

To support the finding that the cancellation of a Williamson Act contract is in the public interest, both of the following subfindings must be made:

- Other public concerns substantially outweigh the objectives of the Williamson Act.
- No proximate noncontracted land is both available and suitable for the use to which it is proposed the contracted land be put, or development of the contracted land would provide more contiguous patterns of urban development than development of proximate noncontracted land.

LOCAL

City of Elk Grove Municipal Code

The Sacramento County Board of Supervisors passed a Right-to-Farm Ordinance on July 10, 1990. This ordinance was subsequently adopted by the City upon Elk Grove's incorporation in July 2000. Municipal Code Chapter 14.05, Agricultural Activities, is intended to ensure that agricultural operations conducted in a manner consistent with proper and accepted customs and standards are allowed to continue. This chapter requires that residents of property located near properties designated for agricultural use be notified that these agricultural uses are encouraged, that accepted agricultural practices may continue, and that efforts to prohibit, ban, restrict, or otherwise eliminate established agricultural uses will not be favorably received. It also includes notification and mediation procedures for cases in which agricultural activities are not being conducted in a reasonable manner, or when an operator is not using currently acceptable methods in the agricultural operations of the farm.

5.2.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use.

2) Conflict with existing zoning for agricultural use, or a Williamson Act contract.

3) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)).

4) Result in the loss of forest land or conversion of forest land to non-forest use.

5) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of farmland to nonagricultural use.

METHODOLOGY

Evaluation of potential agricultural impacts of the proposed Project was based on review of available data from the DOC FMMP and Williamson Act Program as well as the proposed Land Use Diagram and General Plan policies. There is no forest land in the Planning Area, so standards of significance 3 and 4 are not addressed.

General Plan Policies and Standards

The proposed General Plan contains the following policies and standards for managing future development in the City to protect agricultural lands.

Policy NR-1-8: Encourage development clustering where it would facilitate on-site protection of woodlands, grasslands, wetlands, stream corridors, scenic areas, or other appropriate features such as active agricultural uses and historic or cultural resources under the following conditions and requirements. Except as otherwise provided, clustering shall not be allowed in the Sheldon Rural Area.

- Urban infrastructure capacity is available for urban use. If clustering is allowed in the Rural Area, those properties shall be exempt from providing urban water and sewer connections in accordance with the policies of the Sheldon/Rural Area Community Plan (see Chapter 9).
- On-site resource protection is appropriate and consistent with other General Plan policies.
- The architecture and scale of development are appropriate for and consistent with the intended character of the area.
- Development rights for the open space area are permanently dedicated and appropriate long-term management, with funding in perpetuity, is provided for by a public agency or another appropriate entity.

Policy AG-1-2: As appropriate, protect agricultural lands from conversion.

Policy AG-1-3: Recognize the right of existing agricultural uses to continue as long as individual owners/farmers desire. As appropriate for the neighborhood, allow for buffers or feathering of lot sizes where appropriate between farmland and urban uses. Additionally, continue implementing the City's Right to Farm regulations and property title disclosures to notify prospective buyers of agricultural activities in the area.

Standard AG-1-3.a: Notify prospective buyers of property adjacent to agricultural land through the title report that they could be subject to inconvenience or discomfort resulting from accepted farming activities pursuant to provisions of the City's right-to-farm regulations.

Policy AG-1-5: Protect agricultural lands from future risk of conversion by requiring mitigation of the loss of qualified agricultural lands at a 1:1 ratio.

Policy AG-1-6: Limit the siting of projects with land uses that might result in conflicts near existing agriculture due to noise, air quality, or odors.

PROJECT IMPACTS AND MITIGATION MEASURES

Conversion of Agricultural Land/Loss of Important Farmland and Conflicts with Williamson Act Contracts (Standards of Significance 1 and 2)

Impact 5.2.1 Implementation of the proposed Project would allow for new development in areas of the Planning Area that are designated Important Farmland and/or under Williamson Act contract. This impact would be **potentially significant**.

The Planning Area includes lands classified as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland (see **Table 5.2-4** and **Figure 5.2-1**). The proposed Project would allow for development to occur in these areas, which could result in the conversion and permanent loss of up to 5,633.4 acres of Important Farmlands. The conversion of this land would reduce the amount of Important Farmland in Sacramento County by approximately 3.8 percent. **Table 5.2-6** summarizes the total amount of each specific type of Important Farmland in the Planning Area and each Study Area and how many acres would be lost with General Plan buildout.

In addition to conversion of Important Farmland, the proposed Project could result in conflicts with active Williamson Act contracts. As shown in **Table 5.2-6**, there are approximately 2,892 acres within the Planning Area subject to Williamson Act contracts, with approximately 272 acres located within the current City limits and the remaining 2,620 acres spread throughout the East, South, and West Study Areas. The proposed Project would allow for development to occur in these areas, requiring nonrenewal or cancellation of the associated Williamson Act contracts. This urban development may impede the ability for the landowner to farm their land according to the Williamson Act contract and therefore be in violation of that contract.

Existing Laws, Procedures, and Proposed General Plan Policies That Provide Mitigation

Because the timing of future development applications is unknown, contract cancellation requests would be submitted as development applications are received and in conjunction with tentative map approval, subsequent project-specific CEQA review, or other entitlement actions. The project applicant(s) for contracted parcels would apply to the City for contract cancellation; as a result, the actual determination of consistency with the statutory consistency requirements would be made by the Elk Grove City Council, as Sacramento County would succeed to the contracts upon annexation of the relevant parcel. The City would be required to make findings pursuant to Section 51282 of the California Government Code by determining whether the cancellation is consistent with the California Land Conservation Act or in the public interest. Portions of the lands under Williamson Act contract are located in the 100-year floodplain, beyond the County's Urban Services Boundary and Urban Policy Area.

The proposed Project includes Policies AG-1-2 and AG-1-3, which are intended to protect farmland from conversion. In addition, Policy AG-1-5 requires mitigation of the loss of qualified agricultural lands at a 1:1 ratio.

Conclusion

While proposed General Plan policies would discourage the premature conversion of farmland, they would not prevent conversion of Important Farmland and per Policy AG-1-5 would not provide CEQA-compliant mitigation and would still result in the overall loss of farmland from current levels. Therefore, this impact would be **significant and unavoidable**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing laws and procedures and proposed General Plan policies.

Conflicts Resulting in Conversion of Farmland to Nonagricultural Use (Standard of Significance 5)

Impact 5.2.2 Implementation of the proposed Project would place urban land activity types adjacent to primarily agricultural land activity types, which may impair agricultural production and result in land use compatibility conflicts. This would result in a **less than significant** impact**.**

There is the potential for issues related to compatibility between agricultural activities and future suburban and urban activities. From the perspective of the occupants of future residential uses, adjacent agricultural land activity types may result in nuisances and perceived hazards, such as concerns over pesticide, herbicide, and fungicide use on adjacent properties, odors, dust, noise, and slow-moving vehicles.

Agricultural production could be adversely affected by restrictions on pesticide, herbicide, and fungicide use, conflicts with agricultural equipment and vehicles, trespassing and pilferage, noise and odor complaints, and littering of fields. These potential conflicts can individually or cumulatively decrease the efficiency of farming operations, causing production costs to rise and make farming less appealing, which could induce farmers to convert land to urban uses. As such, the Project may result in significant impacts due to the impairment of productivity and land activity type conflicts.

Agricultural Chemical Usage

Current and future agricultural practices in and adjacent to the Planning Area would involve the use of restricted and nonrestricted pesticides, herbicides, and fungicides. These materials could be applied through either manual application and/or aerial spraying.

Agriculture Odors

Agricultural odors may be of concern to some in the Planning Area and are primarily related to dairy farm operations. Odors associated with dairy farm operations are generated by cattle grazing and the breakdown of manure. These processes typically result in the generation of hydrogen sulfide, methane, and ammonia. Fertilizer and pesticide use in agricultural areas can also generate noticeable odors.

Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Agricultural properties are protected pursuant to Chapter 14.05 of the Municipal Code, provided farming activities are properly conducted in accordance with City standards. Policy AG-1-3 allows for buffers or feathering of lot sizes between farmland and urban uses to reduce potential impact and property title disclosures pursuant to Municipal Code Chapter 14.05.

Currently, the Sacramento County Department of Agriculture and Measurements regulates and imposes limitations on the use of all restricted materials as part of the conditions for obtaining a use permit. Based on State law and County policy, permit limitations would include, but are not limited to, not allowing chemicals to drift to adjacent properties (Food and Agricultural Code Section 12972), limiting chemical application to periods when the pesticides are least likely to affect adjacent land uses, and requiring buffers for some restricted chemicals. The County of Sacramento issues the permit conditions for restricted chemicals on a case-by-case basis, taking into consideration surrounding land uses and the chemicals being applied. There is no single buffer distance that is applied to all chemicals. For instance, nonrestricted materials, such as Roundup and other chemicals commonly found in the household, do not require a permit for application.

Conclusion

Future development could result in the siting of residential activities directly adjacent to ongoing agricultural operations. However, agricultural buffers and transition areas can reduce conflicts between urban and agricultural activities. Separating agricultural from urban activities can help reduce the actual or perceived impacts on residents (spray drift, noise, odor, dust) and on agricultural operations (theft, trespass, restrictions on farming practices). Depending on their design, buffers can also provide associated visual, recreational, and wildlife habitat benefits. Policy AG-1-3 allows for buffers or feathering of lot sizes between farmland and urban uses to reduce potential impact and property title disclosures pursuant to Municipal Code Chapter 14.05. In addition, the land plan for the Project features buffers along the urban edge of the East, South, and West Study Areas to help minimize potential conflicts. Thus, while there is the potential for agricultural activities to occur in proximity to future development, implementation of Chapter 14.05 would ensure that development of the proposed Project does not substantially impair agricultural productivity off-site. This impact would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with proposed General Plan policies and applicable Municipal Code sections.

5.2.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

With the exception of the urbanized City of Sacramento to the north, the Planning Area is surrounded by rural residential and active agricultural land. Because conversion of fertile agricultural land is a regional issue, the cumulative setting for this analysis is Sacramento County.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Loss of Agricultural Land (Standards of Significance 1 and 2)

Impact 5.2.3 Implementation of the proposed Project would ultimately result in the conversion of Important Farmland and the cancellation of Williamson Act contracts. This loss would contribute to the cumulative loss of farmland in the region. The loss of such farmland from the proposed Project would contribute to a **cumulatively considerable** and **significant and unavoidable** impact.

As discussed above, there was a decrease of nearly 25,000 acres of Prime Farmland and more than 20,000 acres of Farmland of Statewide Importance in Sacramento County between 2000 and 2016, and cumulative development in the County would continue the trend of conversion of agricultural land to nonagricultural use, despite required mitigation for the loss of farmland. This is considered a significant cumulative impact. Future development in the Planning Area associated with Project buildout would contribute to the ongoing conversion of farmland in Sacramento County to urban uses by converting up to 5,633 acres of Important Farmland to nonagricultural uses. The Project, in combination with the adopted land use plans of Sacramento County and other neighboring jurisdictions, would result in the conversion of Important Farmland, including land under Williamson Act contract, to urban uses. The loss of such farmland resulting from implementation of the proposed Project would contribute to a significant cumulative impact.

Proposed General Plan Policy AG-1-5, which requires mitigation for the loss of qualified agricultural lands at a 1:1 ratio, would ensure the protection of an amount of agricultural land equal to that converted. However, because the mitigation only requires protection of farmland and as a way to limit future development and does not prevent the direct loss of farmland as a result of a specific development project, General Plan policies would not prevent such conversion from occurring and the proposed Project would still contribute to the loss of Important Farmland in the County. Therefore, the impact would be **cumulatively considerable** and **significant and unavoidable**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing laws and procedures and proposed General Plan policies.

As noted above, proposed General Plan Policy AG-1-5 requires mitigation for the loss of qualified agricultural lands at a 1:1 ratio, which would ensure the protection of an amount of agricultural land equal to that converted by development in the Planning Area. However, even with implementation of General Plan Policy AG-1-5, agricultural conversion would still occur and the proposed Project would still contribute to the loss of Important Farmland in the County. No further mitigation is available to reduce the Project's contribution to the loss of Important Farmland.

REFERENCES

CDFA (California Department of Food and Agriculture). 2016. *California County Agricultural Commissioners' Reports Crop Year 2014–2015.*

City of Elk Grove. 2016. *General Plan Update Existing Conditions Report*.

DOC (California Department of Conservation. 2015. Farmland Conversion Reports.

———. 2016a. *Sacramento County Land Use Summary 1988–2016.*

———. 2016b. *Sacramento County Williamson Act Fiscal Year 2015/2016*.

———. 2017a. *FMMP – Important Farmland Map Categories*. Accessed September 20. http://www.conservation.ca.gov/dlrp/fmmp/mccu/Pages/map_categories.aspx.

———. 2017b. *Farmland of Local Importance.* Accessed June 20. http://www.conservation.ca.gov/dlrp/fmmp/Documents/Farmland_of_Local_Importance_2016.pdf.

EDD (California Employment Development Department). 2017. California Labor Market Info Data Library. *Employment by Industry (Not Seasonally Adjusted) in Sacramento—Roseville—Arden-Arcade* MSA. Accessed August 24. http://www.labormarketinfo.edd.ca.gov/data/employment-by-industry.html.

NRCS (US Department of Agriculture, Natural Resources Conservation Service). 2017. Web Soil Survey. Accessed September 14. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Sacramento County Agricultural Commissioner/Director of Weights and Measurements. 2016. *Sacramento County 2015 Crop and Livestock Report.*

5.3 AIR QUALITY

This section examines the existing conditions in the Planning Area related to air quality, includes a summary of applicable air quality regulations, analyzes potential air quality impacts associated with the proposed Project, and outlines mitigation measures where required.

5.3.1 EXISTING SETTING

Air quality in a region is determined by its topography, meteorology, and existing air pollutant sources. These factors are discussed below, together with the current regulatory structure that applies to the Sacramento Valley Air Basin (SVAB), which encompasses the City, pursuant to the regulatory authority of the Sacramento Metropolitan Air Quality Management District (SMAQMD).

Ambient air quality is commonly characterized by climate conditions, the meteorological influences on air quality, and the quantity and type of pollutants released. The air basin is subject to a combination of topographical and climatic factors that affect the potential for high levels of regional and local air pollutants. The following section describes pertinent characteristics of the air basin and provides an overview of the physical conditions affecting pollutant dispersion in the Planning Area.

AIR BASIN CHARACTERISTICS

Sacramento Valley Air Basin

The California Air Resources Board (CARB) divides the state into air basins that share similar meteorological and topographical features. The City is located in the SVAB, which includes Shasta, Tehama, Glenn, Butte, Colusa, Sutter, Yuba, Sacramento, northeastern Solano, and western Placer counties. The air basin is relatively flat, bordered by mountains to the east, west, and north and by the San Joaquin Valley to the south. The SMAQMD is the regulatory agency authorized by the State to oversee air quality in the basin.

Air flows into the SVAB through the Carquinez Strait, moving across the Sacramento Delta, and bringing with it pollutants from the heavily populated San Francisco Bay Area. The climate is characterized by hot, dry summers and cool, rainy winters. Characteristic of the SVAB winter weather are periods of dense and persistent low-level fog, which are most prevalent between storm systems. From May to October, the region’s intense heat and sunlight lead to high ozone pollutant concentrations. Summer inversions are strong and frequent, but are less troublesome than those that occur in the fall. Autumn inversions, formed by warm air subsiding in a region of high pressure, have accompanying light winds that do not provide adequate dispersion of air pollutants.

Most precipitation in the SVAB results from air masses moving in from the Pacific Ocean during the winter months. These storms usually move through the area from the west or northwest. Over half the total annual precipitation falls during the winter rainy season (November through February); the average winter temperature is a moderate 49 degrees Fahrenheit (°F). During the summer, daytime temperatures can exceed 100°F. Dense fog occurs mostly in mid-winter and never in the summer. Daytime temperatures from April through October average between 70 and 90°F with extremely low humidity. The inland location and surrounding mountains shelter the valley from most of the ocean breezes that keep the coastal regions moderate in temperature. The only breach in the mountain barrier is the Carquinez Strait, which exposes the midsection of the valley to the coastal air mass.

Winds across the Planning Area are an important meteorological parameter because they control the dilution of locally generated air pollutant emissions and their regional trajectory. Based on data obtained from the Sacramento Executive Airport, the closest station to the City that measures wind speed and direction, southwest winds are the most predominant (CARB 1992).

Meteorological Influences on Air Quality

Regional flow patterns affect air quality patterns by directing pollutants downwind of sources. Localized meteorological conditions, such as moderate winds, disperse pollutants and reduce pollutant concentrations. However, the mountains surrounding the Sacramento Valley can create a barrier to airflow, which can trap air pollutants in the valley when meteorological conditions are right and a temperature inversion exists. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells overlie the valley. The lack of surface wind during these periods and the reduced vertical flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with smoke from agricultural burning or when temperature inversions trap cool air, fog, and pollutants near the ground (SMAQMD 2011a).

The ozone season (May through October) in the valley is characterized by stagnant morning air or light winds, with the Delta sea breeze arriving in the afternoon out of the southwest. Usually the evening breeze transports the airborne pollutants to the north out of the valley. During about half of the days from July to September, however, a phenomenon called the Schultz Eddy prevents this from occurring. Instead of allowing for the prevailing wind patterns to move north and carry the pollutants out of the valley, the Schultz Eddy causes the wind pattern to circle back south. Essentially, this phenomenon causes the air pollutants to be blown south toward the Sacramento area, which exacerbates the pollution levels in the area and increases the likelihood of violating federal or State air quality standards (SMAQMD 2011a). During late autumn and winter, solar angles are low, resulting in insufficient ultraviolet light and warming of the atmosphere to drive photochemical reactions. Therefore, ozone concentrations do not exceed air quality standards in the air basin during these seasons.

Climatic Influences on Air Quality

Climate can be a significant influence on the air quality in the SVAB. The climate in the air basin is characterized by hot, dry summers and cool, rainy winters. The frequency of hot, sunny days during the summer months in the air basin is an important factor that affects air pollution potential. Higher temperatures result in the formation of ozone. In the presence of ultraviolet sunlight and warm temperatures, reactive organic gases and oxides of nitrogen react to form secondary photochemical pollutants, including ozone. Because summer temperatures in the SVAB typically reach into the 90s (degrees Fahrenheit) and often exceed 100°F, the region is especially prone to photochemical air pollution during this season.

REGIONAL AMBIENT AIR QUALITY

Motor vehicle transportation, including automobiles, trucks, transit buses, and other modes of transportation, is the major contributor to regional air pollution. Stationary sources were once important contributors to both regional and local pollution, and remain significant contributors in other parts of the State and country. However, their role has been substantially reduced in recent years by pollution control programs, as discussed below. Any further progress in air quality improvement now focuses heavily on transportation sources.

Criteria Air Pollutants

Criteria air pollutants are defined as those pollutants for which the federal and State governments have established air quality standards for outdoor or ambient concentrations to protect public health. The national and California ambient air quality standards have been set at levels to protect human health with a determined margin of safety. For some pollutants, there are also secondary standards to protect the environment. Ozone and particulate matter (PM) are generally considered to be regional pollutants because they or their precursors affect air quality on a regional scale. Pollutants such as carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead are local pollutants because they tend to accumulate in the air locally. In addition to being considered a regional pollutant, PM is considered a local pollutant. In the Planning Area, ozone and PM are of concern. Health effects commonly associated with criteria pollutants are summarized in **Table 5.3-1.**

TABLE 5.3-1
CRITERIA AIR POLLUTANTS: SUMMARY OF COMMON SOURCES AND EFFECTS

Pollutant	Major Man-Made Sources	Human Health & Welfare Effects
Carbon Monoxide (CO)	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
Nitrogen Dioxide (NO_2)	A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Motor vehicles, electric utilities, and other sources that burn fuel.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Contributes to global warming, and nutrient overloading which deteriorates water quality. Causes brown discoloration of the atmosphere.
Ozone (O_3)	Formed by a chemical reaction between volatile organic compounds and nitrous oxides (NOx) in the presence of sunlight. Volatile organic compounds are also commonly referred to as reactive organic gases (ROGs). Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, gasoline storage and transport, solvents, paints and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield. Damages rubber, some textiles and dyes.
Particulate Matter (PM_{10} & $PM_{2.5}$)	Power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles and others.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).
Sulfur Dioxide (SO_2)	A colorless, nonflammable gas formed when fuel containing sulfur is burned; when gasoline is extracted from oil; or when metal is extracted from ore. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships.	Respiratory irritant. Aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid which can damage marble, iron and steel; damage crops and natural vegetation. Impairs visibility. Precursor to acid rain.
Lead	Metallic element emitted from metal refineries, smelters, battery manufacturers, iron and steel producers, use of leaded fuels by racing and aircraft industries.	Anemia, high blood pressure, brain and kidney damage, neurological disorders, cancer, lowered IQ. Affects animals, plants, and aquatic ecosystems.

Source: CAPCOA 2011

CURRENT CRITERIA POLLUTANT EMISSIONS

Operational activities associated with day-to-day operations in the City result in emissions of ROG, nitrogen oxides (NO_X), CO, sulfur oxides (SO_X), respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$). Operational criteria air pollutant emissions are generated from three primary sources as identified in **Table 5.3-2**.

TABLE 5.3-2
OPERATIONAL CRITERIA AIR POLLUTANTS SOURCES

Sources	Definitions
Area Source Emissions	**Architectural Coatings** – Emissions resulting from the evaporation of solvents contained in paints, varnishes, primers, and other surface coatings are generated within the City as part of building maintenance. **Consumer Products** – Consumer products include but are not limited to detergents, cleaning compounds, polishes, personal care products, and lawn and garden products. Many of these products contain organic compounds which when released in the atmosphere can react to form ozone and other photochemically reactive pollutants. **Hearths/Fireplaces** – The combustion of wood is a major source of particulate matter and reactive organic gases. **Landscape Maintenance Equipment** – Landscape maintenance equipment generates emissions from fuel combustion and evaporation of unburned fuel. Equipment in this category includes lawnmowers, shedders/grinders, blowers, trimmers, chain saws, and hedge trimmers used to maintain the landscaping.
Energy Source Emissions	**Combustion Emissions Associated with Natural Gas and Electricity** – Electricity and natural gas are used by almost every building in the City. Criteria pollutant emissions are emitted through the generation of electricity and consumption of natural gas. Since air pollutants generated from electrical-generating facilities are already regulated by the California Energy Commission and California Public Utilities Commission, criteria pollutant emissions from off-site generation of electricity is excluded from the evaluation of significance; only natural gas use is considered.
Mobile Source Emissions	**Vehicles** – Operational, vehicular-generated air pollutants are dependent on both overall daily vehicle trip generation and peak-hour traffic volumes and traffic operations in the City. **Fugitive Dust Related to Vehicular Travel** – Vehicles traveling on paved roads would be a source of fugitive emissions due to the generation of road dust inclusive of tire wear particulates.

AMBIENT AIR QUALITY

Ambient air quality refers to the concentration of pollutants in the air. Ozone, PM_{10}, and $PM_{2.5}$ are the most potent pollutants affecting ambient air quality in the air basin due to their high concentrations. The US Environmental Protection Agency (EPA) and the State of California have established health-based ambient air quality standards (shown in **Table 5.3-3**) for ozone, PM_{10}, $PM_{2.5}$, and other air pollutants such as CO, NO_2, SO_2, to protect the health and welfare of the population with a reasonable margin of safety.

The determination of whether a region's air quality is unhealthy is made by comparing contaminant levels in ambient air samples to the State and federal standards presented in **Table 5.3-3**. The air quality in a region is considered in attainment by the State if the measured ambient air pollutant levels for ozone, CO, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ are not equaled or exceeded at any time in any consecutive three-year period; and the federal standards (other than ozone, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not exceeded more than once per year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

Table 5.3-3 also shows the federal and State attainment status for the City's portion of the SVAB. Areas with air quality that exceed adopted air quality standards are designated as nonattainment areas for the relevant air pollutants, while areas that comply with air quality standards are designated as attainment areas. As shown, the region is in nonattainment status for federal ozone and $PM_{2.5}$ standards, as well as for State ozone and PM_{10} standards (CARB 2017a).

TABLE 5.3-3
AIR QUALITY STANDARDS AND FEDERAL AND STATE AMBIENT AIR QUALITY ATTAINMENT STATUS FOR ELK GROVE

Pollutant	Averaging Time	California Standards		National Standards	
		Concentration	Attainment Status	Concentration	Attainment Status
Ozone (O_3)	8-Hour	0.070 ppm (137µg/m3)	Nonattainment	0.070 ppm	Nonattainment
	1-Hour	0.09 ppm (180 µg/m3)	Nonattainment	No Standard	N/A
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m3)	Attainment	9 ppm (10 mg/m3)	Attainment
	1-Hour	20 ppm (23 mg/m3)	Attainment	35 ppm (40 mg/m3)	Attainment
Nitrogen Dioxide (NO_2)	1-Hour	0.18 ppm (339 µg/m3)	Attainment	0.100 ppm	Attainment
	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)	N/A	0.053 ppm (100 µg/m3)	Attainment
Sulfur Dioxide (SO_2)	24-Hour	0.04 ppm (105 µg/m3)	Attainment	0.14 ppm (365/µg/m3)	Unclassified
	1-Hour	0.25 ppm (665 µg/m3)	Attainment	0.075 ppm (196/µg/m3)	Unclassified
	Annual Arithmetic Mean	N/A	N/A	0.030 ppm (80/µg/m3)	Unclassified
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m3	Nonattainment	No standard	N/A
	24-Hour	50 µg/m3	Nonattainment	150 µg/m3	Attainment
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m3	Attainment	15 µg/m3	Nonattainment
	24-Hour	N/A	N/A	35 µg/m3	Nonattainment

Source: CARB 2017a

Notes: mg/m3 =milligrams per cubic meter; ppm=parts per million; ppb=parts per billion; µg/m3 =micrograms per cubic meter N/A = not applicable

Real-time ambient air quality in the City can be inferred from ambient air quality measurements conducted at nearby air quality monitoring stations maintained by the SMAQMD. There is one air quality monitoring station in the City located along Bruceville Road south of Lambert Road, which monitors ambient concentrations of ozone. Additionally, concentrations of ozone and airborne particulate matter were obtained from a monitoring station located in the City of Sacramento (Sacramento-T Street air monitoring station) (see **Table 5.3-4**). Ambient emissions concentrations would vary due to localized variations in emissions sources and climate and should be considered representative of ambient concentrations affecting the City.

Table 5.3-4 summarizes the most recent three years of published data from the Bruceville Road monitoring station and the Sacramento-T Street air monitoring station. As depicted, State and federal ozone and PM standards have been exceeded on several occasions during the last three years. CARB provides data through calendar year 2016, based on actual reports from monitoring stations in or near the City.

TABLE 5.3-4
AMBIENT AIR QUALITY MONITORING DATA FOR ELK GROVE AND SACRAMENTO

Pollutant Standards	2014	2015	2016
Elk Grove-Bruceville Road Air Quality Monitoring Station			
Ozone			
Max 1-hour concentration (ppm)	0.089	0.091	0.089
Max 8-hour concentration (ppm) (state/federal)	0.072/0.072	0.082/0.082	0.072/0.072
Number of days above state 1-hr standard	0	0	0
Number of days above state/federal 8-hour standard	1	2	1
Sacramento-T Street Air Quality Monitoring Station			
Ozone			
Max 1-hour concentration (ppm)	0.085	0.092	0.094
Max 8-hour concentration (ppm) (state/federal)	0.072/0.072	0.076/0.076	0.074/0.074
Number of days above state 1-hr standard	0	0	0
Number of days above state/federal 8-hour standard	0/3	4	3
Respirable Particulate Matter (PM_{10})			
Max 24-hour concentration (µg/m3) (state/federal)	106.4/105.7	59.1/57.8	51.4/50.3
Number of days above state/federal standard	4/0	6/0	1/0
Fine Particulate Matter ($PM_{2.5}$)			
Max 24-hour concentration (µg/m3) (state/federal)	33.2/26.3	42.1/36.3	39.8/24.4
Number of days above federal standard	0	1	0

Source: CARB 2017b

µg/m^3 = micrograms per cubic meter; ppm = parts per million

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. Like many other air pollutants, TACs partially result from combustion activities, especially motor vehicles in the City and the region. General Plan policies can reduce source activities that contribute to TACs.

TACs can cause long-term health effects such as cancer, birth defects, neurological damage, or genetic damage; or short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches. Regulating TACs is important not only because of the severity of their health effects, but also because the health effects can occur with exposure to even small amounts of TACs. TACs are not classified as criteria air pollutants and no ambient air quality standards have been established for them.

There are many different types of TACs with varying degrees of toxicity. The effects of various TACs are diverse and their health impacts tend to be local rather than regional; consequently, uniform standards for these pollutants have not been established.

TACs can be separated into carcinogens and noncarcinogens based on the nature of the physiological degradation associated with exposure to the pollutant. For regulatory purposes, carcinogens are assumed to have no safe threshold below which health effects would not occur and cancer risk is expressed as excess cancer cases per one million exposed individuals. Noncarcinogens differ in that there is generally assumed to be a safe level of exposure below which no negative health effects are believed to occur. These levels are determined on a pollutant-by-pollutant basis. Acute and chronic exposure to noncarcinogens is expressed using a Hazard Index, which compares the ratio of expected exposure levels to health-acceptable exposure levels.

The dose of a TAC to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance(s). Dose is positively correlated with the concentration of a toxic substance, which generally disperses with distance from the emissions source under normal meteorological conditions. Dose is also positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for an exposed individual. Thus, the risks estimated for a receptor are higher if a fixed exposure occurs over a longer period. The breathing rate of an exposed individual is also an important factor. For instance, children have higher intake rates on a per kilogram body weight basis and thus receive a higher dose of airborne pollutants.

The California Almanac of Emissions and Air Quality, which is published annually by CARB, presents the trends of various TAC emissions in California (CARB 2013c). Currently, the estimated risk from PM emissions from diesel exhaust (diesel PM) is higher than the risk from all other TACs combined; thus, diesel PM poses the most significant risk to California's population. CARB estimates that 79 percent of the known Statewide cancer risk from the top 10 outdoor air toxics is attributable to diesel PM (SMAQMD 2011a).

In September 2000, CARB adopted the Diesel Risk Reduction Plan, which recommends many control measures to reduce the risks associated with diesel PM and achieve a goal of 85 percent PM reduction by 2020. The key elements of the plan are to clean up existing engines through engine retrofit emissions control devices; adopt stringent standards for new diesel engines; lower the sulfur content of diesel fuel; and implement advanced technology emissions control devices on diesel engines.

Additionally, CARB promulgates Air Toxic Control Measures which specifically address diesel PM emissions from a range of sources, including portable engines, cargo handling equipment used at ports, transport refrigeration units, and idling by commercial vehicles and school buses. For example, the On-Road Heavy-Duty Diesel Vehicle (In-Use) Regulation (13 California Code of Regulations 2025), adopted in 2010, requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. Heavier trucks were required to be retrofitted with PM filters beginning January 1, 2012, and older trucks were required to be replaced as of January 1, 2015.

By January 1, 2023, nearly all trucks and buses will need to have 2010 model year or equivalent engines. The regulation applies to nearly all privately and federally owned diesel-fueled trucks and buses, in addition to privately and publicly owned school buses with a gross vehicle weight rating greater than 14,000 pounds.

Sensitive Receptors

Certain land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include the elderly, children, the acutely ill, and the chronically ill, especially those with cardiorespiratory diseases. Based on an understanding of sensitive receptors and their locations, the General Plan can assign land uses accordingly to reduce impacts to sensitive receptors.

Residential areas are sensitive receptors to air pollution because residents, including children and the elderly, tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Recreational land uses, such as parks and golf courses, are considered moderately sensitive to air pollution. Schools and hospitals are also sensitive receptors. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation.

5.3.2 REGULATORY FRAMEWORK

This section details federal, State, and local plans, policies, regulations, and laws that pertain to regional and local air quality conditions in the Planning Area. These regulations provide a framework for addressing air quality related issues in the General Plan and will inform the goals and policies that are adopted.

FEDERAL

Clean Air Act

The EPA is responsible for enforcing the federal Clean Air Act (CAA). The CAA requires the EPA to establish national ambient air quality standards (NAAQS) for six common air pollutants: ozone, CO, NO_X, SO_2, PM_{10}/$PM_{2.5}$, and lead. The standards identify levels of air quality, which are considered the maximum levels of ambient (background) air pollutants considered safe, with an adequate margin of safety, to protect public health and welfare. The EPA identifies these pollutants as "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally based criteria (science-based guidelines) for establishing permissible levels. EPA limits based on human health are called primary standards. The secondary standards of the EPA limits are intended to prevent environmental and property damage.

As part of its enforcement responsibilities, the EPA requires each state with nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the federal standards. The SIP must integrate federal, State, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs.

STATE

California Clean Air Act

CARB oversees air quality planning and control throughout California. CARB is primarily responsible for ensuring implementation of the California Clean Air Act (CCAA), responding to the CAA requirements, and regulating emissions from motor vehicles and consumer products in the State. CARB has established emissions standards for vehicles sold in California and for various types of equipment available commercially. It also sets fuel specifications to further reduce vehicular emissions.

The CCAA establishes ambient air quality standards for the state (CAAQS) and a legal mandate to achieve these standards by the earliest practical date. These standards apply to the same six criteria pollutants as the CAA and also include sulfate, visibility, hydrogen sulfide, and vinyl chloride. They are generally more stringent than the NAAQS and, in the case of PM_{10} and NO_2, are far more stringent.

CAAQS are health-based to protect the health and welfare of the populace with a reasonable margin of safety. These pollutants include ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, sulfates, lead, hydrogen sulfide, vinyl chloride, and visibility-reducing particles.

Toxic Air Contaminant Regulations

In 1983, the California legislature enacted a program to identify the health effects of TACs and reduce exposure to these contaminants to protect the public health. The Health and Safety Code defines a TAC as “an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health.” A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the CAA (42 United States Code Section 7412[b]) is considered a TAC. Under State law, the California Environmental Protection Agency (CalEPA), acting through CARB, is authorized to identify a substance as a TAC if it determines the substance is an air pollutant that may cause or contribute to an increase in mortality or to an increase in serious illness, or may pose a present or potential hazard to human health.

California regulates TACs primarily through Assembly Bill (AB) 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics “Hot Spot” Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an “airborne toxics control measure” for sources that emit designated TACs. If there is a safe threshold for a substance (a point below which there is no toxic effect), the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate best available control technology to minimize emissions. CARB has, to date, established formal control measures for eleven TACs, all of which are identified as having no safe threshold.

Air toxics from stationary sources are also regulated in California under AB 2588, wherein TAC emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High-priority facilities are required to perform a health risk assessment and, if specific thresholds are exceeded, to communicate the results to the public in the form of notices and public meetings.

Office of Environmental Health Hazard Assessment

The California Office of Environmental Health Hazard Assessment (OEHHA reviews advances in science concerning health effects and exposure assessment. Periodically, OEHHA updates its Health Risk Assessment guidelines, which are used to estimate health risk. In 2015, OEHHA adopted updates to its Health Risk Assessment Guidance Manual, which more intensely characterizes early childhood exposures and refines exposure assessment for all ages (OEHHA 2015). OEHHA guidance, published in 2015, assumes 30 years is a representation of a high-end duration living at a given residence, and 70 years represents a person's lifetime.

LOCAL

The SMAQMD coordinates the work of government agencies, businesses, and private citizens to achieve and maintain healthy air quality for the Sacramento area. The SMAQMD develops market-based programs to reduce emissions associated with mobile sources, processes permits, ensures compliance with permit conditions and with the SMAQMD rules and regulations, and conducts long-term planning related to air quality.

As a nonattainment area, the region is also required to submit rate-of-progress milestone evaluations in accordance with the federal CAA Amendments. These milestone reports include compliance demonstrations that the requirements have been met for the Sacramento nonattainment area. The air quality attainment plans and reports present comprehensive strategies to reduce ROG, NO_X, and PM_{10} emissions from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations, implementation of a new and modified indirect source review program, adoption of local air quality plans, and stationary-, mobile-, and indirect-source control measures.

Sacramento Area Regional Ozone Attainment Plan

As previously stated, the region is nonattainment for both federal and State ozone standards. The federal 8-hour ozone regulations require that areas classified as serious or above submit a reasonable further progress demonstration plan that shows a minimum of 18 percent volatile organic compound (and/or NO_X) emission reductions over the first six years following the 2002 baseline year, and then an average of 3 percent reductions per year for each subsequent three-year period out to the attainment year. (The 2002 baseline emissions for volatile organic compounds and NOx in the SVAB equaled 97 tons per day and 109 tons per day, respectively.) The Sacramento Regional 2008 8-Hour Ozone Reasonable Further Progress Plan includes the information and analyses to fulfill CAA requirements for demonstrating reasonable further progress toward attaining the 8-hour ozone NAAQS for the Sacramento region (SMAQMD 2008). In addition, this plan establishes an updated emissions inventory and maintains existing motor vehicle emission budgets for transportation conformity purposes. CARB (2017c) evaluated the efficacy of the plan in November 2017 and concluded that the emission reduction achieved by existing control measures would be sufficient to attain the NAAQS for ozone by June 2025.

Section 181(b)(3) of the CAA permits a state to request that the EPA reclassify or "bump up" a nonattainment area to a higher classification and extend the time allowed for attainment. This bump-up process is appropriate for areas that must rely on longer-term strategies to achieve the emission reductions needed for attainment. The air districts in the Sacramento region submitted a letter to CARB in February 2008 to request a voluntary reclassification (bump-up) of the Sacramento federal nonattainment area from a serious to a severe 8-hour ozone nonattainment area with an extended attainment deadline of June 15, 2019. On May 5, 2010, the EPA approved the request, effective June 4, 2010.

Sacramento Area Regional PM_{10} Attainment Plan and $PM_{2.5}$ Implementation Plan

As previously stated, the region is in nonattainment status for both national and California PM_{10} and $PM_{2.5}$ standards. The SMAQMD prepared the PM_{10} Implementation/Maintenance Plan and Re-Designation Request for Sacramento County in compliance with the CAA requirements pertaining to PM_{10} nonattainment areas (SMAQMD 2010). The purpose of this plan is to fulfill the requirements for the EPA to redesignate Sacramento County from nonattainment to attainment of the PM_{10} NAAQS by preparing the following plan elements and tasks:

- Document the extent to which PM_{10} air quality standards are exceeded in Sacramento County.
- Determine the emission inventory sources contributing to PM_{10} concentrations.
- Identify the appropriate control measures that achieved attainment of the PM_{10} NAAQS.
- Demonstrate maintenance of the PM_{10} NAAQS.
- Request formal redesignation to attainment of the PM_{10} NAAQS.

The $PM_{2.5}$ SIP attempts to demonstrate that the EPA's $PM_{2.5}$ standards have been achieved in the SVAB in order to redesignate Sacramento County from nonattainment to attainment of the $PM_{2.5}$ NAAQS (SMAQMD 2016a).

The SMAQMD has also adopted various rules and regulations pertaining to the control of emissions from area and stationary sources. Some of the more pertinent regulatory requirements applicable to the proposed Project are identified as follows (SMAQMD 2011a):

- *Rule 402: Nuisance*. The purpose of this rule is to limit emissions which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause or have natural tendency to cause injury or damage to business or property.
- *Rule 403: Fugitive Dust*. The purpose of this rule is to require that reasonable precautions be taken so as not to cause or allow the emissions of fugitive dust from noncombustion sources from being airborne beyond the property line from which the emission originates.
- *Rule 442: Architectural Coatings.* The purpose of this rule is to limit the quantity of volatile organic compounds in architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within the district.

5.3.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

2) Expose sensitive receptors to substantial pollutant concentrations.

3) Create objectionable odors affecting a substantial number of people.

4) Conflict with or obstruct implementation of any applicable air quality plan.

5) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

For individual and subsequent projects developed consistent with the General Plan, the following SMAQMD standards would apply (SMAQMD 2015):

- Short-term (construction) project-generated emissions of NO_X above 85 pounds per day (lb/day), 80 lb/day of PM_{10}, and 82 lb/day of $PM_{2.5}$;
- Long-term (operational) project-generated emissions of NO_X or ROG above 65 lb/day, 80 lb/day of PM_{10}, and 82 lb/day of $PM_{2.5}$; or
- Project-generated TAC emissions from stationary sources that would result in an incremental increase in cancer risk greater than 10 in 1 million at any off-site receptor.
- Ground-level concentration of project-generated TAC emissions from stationary sources that would result in a Hazard Index greater than 1 at any off-site receptor.

METHODOLOGY

The analysis in this section is consistent with the recommendations of the SMAQMD's Guide to Air Quality Assessment in Sacramento County, Chapter 9, "Program-Level Analysis of General Plans and Area Plans" (SMAQMD 2016b). The analysis primarily focuses on the extent to which the Project would conflict with air quality planning efforts. The net increase in criteria air pollutant (PM_{10} and $PM_{2.5}$) and ozone precursor (ROG and NO_X) emissions (i.e., pollutants for which the region is in nonattainment of ambient air quality standards) generated by the proposed Project were estimated based on predicted vehicle miles traveled (VMT) and land use buildout assumptions contained in the proposed Land Use map.

Construction and operational emissions were estimated based on the net change in land uses and associated growth forecasts between 2015 baseline conditions and buildout of the proposed Project. Construction emissions account for estimated changes in acreage of on-site and off-site improvements. Both short-term construction emissions and long-term operational emissions were calculated using the California Emissions Estimator Model (CalEEMod), version 2016.3.2, computer program. This model was developed in coordination with the South Coast Air Quality Management District and is the most current emissions model approved for use in California by various air districts, including the SMAQMD. **Appendix C** includes outputs from the model runs for both construction and operational activity associated with future buildout conditions.

Operational on-road mobile emissions (i.e., local and regional mobile-source emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$) were estimated using the latest version of CARB's Mobile-Source Emission Factor Model (EMFAC 2014) based on inputs from the transportation analysis (see Section 5.13, Transportation, of this EIR). For more specific information regarding modeling inputs and outputs, see **Appendix C.**

The Project was also reviewed to determine consistency with the control measures of the SMAQMD Sacramento Regional NAAQS 2008 8-Hour Ozone Attainment and Reasonable Further Progress Plan.

General Plan Policies and Standards

The proposed Project contains the following policies and standards for managing future development in the City to improve air quality within the Planning Area.

Policy NR-4-1: Require all new development projects which have the potential to result in substantial air quality impacts to incorporate design and/or operational features that result in a reduction in emissions equal to 15 percent compared to an "unmitigated baseline project." An unmitigated baseline project is a development project which is built and/or operated without the implementation of trip reduction, energy conservation, or similar features, including any such features which may be required by the Zoning Code or other applicable codes.

Standard NR-4-1a: As part of the environmental review of projects that are not exempt, the City shall identify the air quality impacts of development proposals to avoid significant adverse impacts and require appropriate mitigation measures to the extent feasible and appropriate, potentially including—in the case of projects which may conflict with applicable air quality plans—emission reductions in addition to those required by Policy NR-4-1.

Policy NR-4-2: Minimize air pollutant emissions from all City facilities and operations to the extent feasible and consistent with the City's need to provide a high level of public service.

Policy NR-4-3: Implement and support programs that reduce mobile source emissions.

Policy NR-4-4: Promote pedestrian/bicycle access and circulation to encourage residents to use alternative modes of transportation in order to minimize direct and indirect emissions of air contaminants.

Policy NR-4-5: Emphasize demand management strategies that seek to reduce single-occupant vehicle use in order to achieve State and federal air quality plan objectives.

Policy NR-4-6: Offer a public transit system that is an attractive alternative to the use of private motor vehicles.

Policy NR-4-7: Support intergovernmental efforts directed at stringent tailpipe emission standards and inspection and maintenance programs for all feasible vehicle classes, as well as revisions to the Air Quality Attainment Plan.

Policy NR-4-8: Require that development projects incorporate best management practices during construction activities to reduce emissions of criteria pollutants.

Standard NR-4-8.a: All future projects with construction emissions shall incorporate the Sacramento Metropolitan Air Quality Management District's (SMAQMD) Basic Construction Emission Control Practices as identified in the most current version of the SMAQMD CEQA Guide in effect at the time of construction.

Standard NR-4-8.b: All projects with construction emissions exceeding the SMAQMD ozone precursors thresholds shall implement enhanced exhaust control practices as identified in the most current version of the SMAQMD CEQA Guide in effect at the time of construction.

Standard NR-4-8.c: All projects with construction emissions exceeding the SMAQMD fugitive particulate matter (PM) thresholds shall implement enhanced fugitive PM dust control practices as identified in the most current version of the SMAQMD CEQA Guide in effect at the time of construction.

Standard NR-4-8.d: For projects exceeding the SMAQMD NOx and PM construction emissions thresholds that cannot be mitigated to less than significant with implementation of Standards NR-4-8.a, NR- 4-8.b, and NR-4-8.c, the project shall pay a mitigation fee into the SMAQMD's off-site mitigation program.

Policy NR-4-9: Prohibit the future siting of sensitive land uses, such as hospitals, schools, day care facilities, elderly housing, convalescent facilities, and all residential uses within the distances recommended by the California Air Resources Board for air pollutant emission sources, unless adequate mitigation measures are adopted and implemented.

Policy NR-4-10: Require new air pollution point sources, such as industrial, manufacturing, and processing facilities, to be located an adequate distance from residential areas and other sensitive land uses.

Policy NR-4-11: Work with Sacramento County and the Sacramento Metropolitan Air Quality Management District to address cross-jurisdictional and regional transportation and air quality issues.

Policy NR-4-12: Coordinate with the Sacramento Metropolitan Air Quality Management District on the review of proposed development projects, specifically projects that could conflict with any applicable air quality plans and/or the State Implementation Plan.

Policy NR-4-13: Minimize the exposure of sensitive land uses to objectionable odors.

Standard NR-4-13.a: Future sensitive land uses, such as hospitals, schools, day care facilities, elderly housing, convalescent facilities, and all residential uses shall not be sited within the distance from odor sources recommended in the SMAQMD's most current CEQA Guide - Recommended Odor Screening Distance Table unless documentation is provided that the proposed site would not expose a substantial number of people to objectionable odors.

The Mobility Element references sustainable development and reduction in VMT, which would produce co-benefits to air quality related to operational mobile- and area-source emissions within the Planning Area. The following policies would produce benefits to ambient air quality within the Planning Area:

Policy MOB-1-1: Achieve State-mandated reductions in VMT by requiring land use and transportation projects to comply with the following metrics and limits. These metrics and limits shall be used as thresholds of significance in evaluating projects subject to CEQA.

Projects that do not achieve the limits outlined below shall be subject to all feasible mitigation measures necessary to reduce the VMT for, or induced by, the project to the applicable limits. If the VMT for or induced by the project cannot be reduced consistent with the performance metrics outlined below, the City may consider approval of the project, subject to a statement of overriding considerations and mitigation of transportation impacts to the extent feasible, provided some other stated form of public objective including specific economic, legal, social, technological or other considerations is achieved by the project.

a) **New Development** – Any new land use plans, amendments to such plans, and other discretionary development proposals (referred to as "development projects") are required to demonstrate a 15 percent reduction in VMT from existing (2015) conditions. To demonstrate this reduction, conformance with the following land use and cumulative VMT limits is required:

(i) **Land Use** – Development projects shall demonstrate that the VMT produced by the project at buildout is equal to or less than the VMT limit of the project's General Plan land use designation, as shown in Table 6-1,[1] which incorporates the 15 percent reduction from 2015 conditions.

(ii) **Cumulative for Development Projects in the Existing City** – Development projects within the existing (2017) City limits shall demonstrate that cumulative VMT within the City and including the project would be equal to or less than the established Citywide limit of 5,412,660 VMT (total daily VMT), which incorporates the 15 percent reduction from 2015 conditions.

(iii) **Cumulative for Development Projects in Study Areas –** Development projects located in Study Areas shall demonstrate that cumulative VMT within the applicable Study Area would be equal to or less than the established limit shown in Table 6-2,[2] which incorporates the 15 percent reduction from 2015 conditions.

b) **Transportation Projects** – Transportation projects likely to lead to a substantial or measurable increase in VMT shall:

(i) **Not increase VMT per service population.** Projects must demonstrate that the VMT effect of the project does not exceed the project's baseline condition VMT.

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[1] Refer to page 6-6 of the Mobility Element of the General Plan Update for Table 6-1.

[2] Refer to page 6-7 of the Mobility Element of the General Plan Update for Table 6-2.

(ii) **Be consistent with the regional projections and plans.** The project shall be specifically referenced or listed in the region's MTP/SCS and accurately represented in the regional travel forecasting model. Qualifying transportation projects that are not consistent with the MTP/SCS shall also demonstrate that the cumulative VMT effect does not increase regional VMT per service population.

Policy MOB-3-2: Support strategies that reduce reliance on single-occupancy private vehicles and promote the viability of alternative modes of transport.

Standard MOB-3-2.a: Require new commercial development for projects equal to and greater than 100,000 square feet to provide an electric vehicle charging station and new residential development to pre-wire for plug-in electric vehicles.

Policy MOB-4-5: Encourage employers to offer incentives to reduce the use of vehicles for commuting to work and increase commuting by active transportation modes. Incentives may include a cash allowance in lieu of a parking space and on-site facilities and amenities for employees such as bicycle storage, shower rooms, lockers, trees, and shaded seating areas.

The Community and Resource Protection Element also contains the following policy which would provide benefits related to air quality:

Policy NR-2-4: Maintain and enhance an urban forest by preserving and planting trees in appropriate densities and locations to maximize energy conservation and air quality benefits.

The Urban and Rural Development Element of the General Plan also contains the following policy related to air quality and odor:

Policy AG-1-3: Recognize the right of existing agricultural uses to continue as long as individual owners/farmers desire. As appropriate for the neighborhood, allow for buffers or feathering of lot sizes where appropriate between farmland and urban uses. Additionally, continue implementing the City's Right to Farm regulations and property title disclosures to notify prospective buyers of agricultural activities in the area.

Policy AG-1-6: Limit the siting of projects with land uses that might result in conflicts near existing agriculture due to noise, air quality, or odors.

PROJECT IMPACTS AND MITIGATION MEASURES

Short-Term Construction-Related Criteria Air Pollutant Impacts (Standard of Significance 1)

Impact 5.3.1 Buildout of the proposed Project could result in short-term construction emissions that could violate or substantially contribute to a violation of federal and state standards for ozone, PM_{10}, and $PM_{2.5}$. This is considered a **potentially significant** impact.

Construction-related activities would result in Project-generated emissions of ROG, NO_X, $PM_{2.5}$, and PM_{10} from site preparation (e.g., grading and clearing), off-road equipment, material delivery, worker commute exhaust emissions, vehicle travel, building construction, asphalt paving, and application of architectural coatings. Fugitive dust emissions would be associated primarily with site preparation and would vary as a function of soil silt content, soil moisture, wind speed, and area of disturbance. Other PM emissions would result from use of internal combustion engines, and from tire and brake wear. Emissions of ozone precursors of ROG and NO_X would be associated primarily with exhaust from construction equipment, haul truck trips, and worker trips. ROG would be emitted during asphalt paving and the application of architectural coatings.

Since the timing and intensity of future development under the proposed Project is not known at this time, construction-related emissions were modeled assuming an equal annual distribution of proposed development consistent with the General Plan over a 20-year period as measured from the baseline year of 2015 through 2035. For the purposes of this analysis, the Project's nonresidential square footage and residential units are divided by 20 to generally characterize potential annual construction-related air pollutant emissions. This impact discussion assumes full growth potential as identified in Section 2.0, Project Description, within 20 years to present a conservative estimate of annual pollutant emissions.

Construction-generated emissions were calculated using CalEEMod, which is designed to model emissions for land use development projects, based on typical construction requirements. Modeling was based primarily on CalEEMod default values for Sacramento County. CARB regulations require off-road diesel-powered construction fleets to incrementally reduce diesel PM and NO_x emissions through the year 2028. Therefore, to provide a more conservative estimate, 2015 was assumed as the "worst-case" construction year. Construction equipment requirements and usage rates used in the model were based on model default assumptions as shown in **Appendix C**.

Predicted maximum average daily construction-generated emissions for the Project are summarized in **Table 5.3-5**, which shows Project emissions resulting from construction would exceed the SMAQMD significance criteria of 85 lb/day for NO_X and 80 lb/day for PM_{10}.

TABLE 5.3-5
AVERAGE ANNUAL CONSTRUCTION EMISSIONS FROM DEVELOPMENT UNDER THE PROPOSED 2035 GENERAL PLAN UPDATE

Construction Year	Average Annual Daily Emissions (lb/day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
"Worst-Case" Construction Year (2015)	161.3[1]	378.5	235.0	64.0
SMAQMD Threshold of Significance	N/A	85	80	82
Exceed SMAQMD Threshold?	**—**	**Yes**	**Yes**	**No**

Source: Ascent Environmental 2017. Refer to ***Appendix C*** *for model data outputs.*

Notes: lb/day = pounds per day, ROG = reactive organic gases, NO_X = nitrogen oxides, PM_{10} = respirable particulate matter, $PM_{2.5}$ = fine particulate matter.

[1] ROG emissions were adjusted to reflect a more accurate phasing of construction and associated emissions.

Existing Regulations and Proposed General Plan Policies That Provide Mitigation

Construction-generated sources of criteria air pollutants from new development under the Project would be minimized through implementation of General Plan Policy NR-4-8, which includes Standards NR-4.8.a through NR-4.8.d that require implementation of the SMAQMD recommended standard construction mitigation.

All projects that will involve construction activities, regardless of the significance determination, are required to implement the SMAQMD Basic Construction Emission Control Practices (Basic Practices) for controlling fugitive dust at construction sites. These practices collectively reduce fugitive PM by approximately 54 percent. For projects that will generate maximum daily NO_X emissions exceeding the SMAQMD threshold of significance, the SMAQMD recommends implementation of the Enhanced Exhaust Control Practices for off-road construction equipment. The SMAQMD considers implementation of the Enhanced Exhaust Control Practices to achieve a 20 percent reduction for NO_X and a 45 percent reduction for PM_{10} from off-road construction equipment exhaust when compared to the State fleet average. The SMAQMD requires projects that exceed the PM_{10} and $PM_{2.5}$ emissions thresholds after implementation of the Basic Practices to implement all feasible and applicable measures of the Enhanced Fugitive PM Dust Control Practices. Implementation of the Enhanced Fugitive PM Dust Control Practices will reduce total fugitive PM dust emissions by an additional 21 percent above the Basic Practices (SMAQMD 2017).

For projects where emissions still exceed the SMAQMD daily emissions threshold for NO_x and PM after application of the above measures, the SMAQMD requires the project applicant to pay into the SMAQMD's construction mitigation fund to offset construction-generated emissions of NO_X and/or PM. Payment into this program allows the air district to offset the contribution of emissions associated with individual construction projects by removing other NO_X or PM generating sources elsewhere in the air basin. Although construction has the potential to locally exceed the CAAQS for ozone resulting from ROG emissions, the SMAQMD has no established daily thresholds for temporary construction emissions. The SMAQMD requires that all construction activities in the SVAB adhere to Rule 403, which stipulates taking reasonable precautions to prevent the emissions of fugitive dust, such as using water or chemicals for control of dust in construction operations or limiting the speed of off-road construction equipment traveling across unpaved surfaces.

Conclusion

As shown in **Table 5.3-5**, construction emissions of NO_x and PM_{10} could exceed the SMAQMD thresholds of significance. This impact would be **potentially significant.** The SMAQMD (2016b) CEQA Guide, Chapter 9, "Program-Level Analysis of General and Area Plans," recommends that general or area plans found to have a significant adverse impact implement all feasible mitigation measures to reduce the impact; and that binding, enforceable mitigation measures be incorporated as policies and implementation programs within the general or area plan.

Because multiple projects could be constructed simultaneously, which would collectively generate emissions, and project-specific details are unknown for individual projects at this time, it cannot be known with certainty that implementation of Standards NR-4-8.a through NR-4-8.d would reduce aggregated emissions to below the applicable SMAQMD thresholds. There are no additional plan-level measures available that would further reduce impacts from short-term construction-related emissions. All feasible construction emission reduction measures have been incorporated into the Project through the inclusion of the General Plan Policy NR-4-8, as discussed above.

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies.

All feasible construction emission reduction measures have been incorporated into the Project through the inclusion of the General Plan Policy NR-4-8 and implementation of Standards NR-4-8.a through NR-4-8.d would reduce aggregated emissions. However, these standards may not be sufficient to fully reduce emissions below the applicable SMAQMD thresholds, especially since a component includes payment of a mitigation fee. There are no other additional available mitigation measures that would further reduce impacts from short-term construction-related emissions. No additional plan-level measures mitigation are available. Therefore, impacts associated with short-term construction emissions under the Project would be **significant and unavoidable.**

Long-Term Criteria Air Pollutant Impacts (Standard of Significance 1)

Impact 5.3.2 The Project could result in long-term operational emissions that could violate or substantially contribute to a violation of federal and State standards for ozone and coarse and fine particulate matter. This is considered a **potentially significant** impact.

Implementation of the Project would result in long-term increases in operational emissions of criteria air pollutants and ozone precursors (i.e., ROG and NO_X). Project-generated increases in emissions would be predominantly associated with motor vehicle use. To a lesser extent, area sources, such as the use of natural gas-fired appliances, landscape maintenance equipment, and architectural coatings, would also contribute to overall increases in operational emissions.

Mobile-source emissions were calculated using EMFAC 2014 and the daily average VMT values generated within the Planning Area boundary for the baseline year 2015 (i.e., 2,321,878) and Project conditions for 2035 (i.e., 4,562,035).[3] The vehicle fleet mix information contained in the EMFAC model for Sacramento County is representative of vehicles in Elk Grove and was therefore used for purposes of preparing a Project model.

Area-source emissions were estimated using CalEEMod. Area-source emissions include emissions from consumer products, landscaping and maintenance, wood-burning appliances, and other off-road equipment. Energy-related emissions would be associated with space and water heating. Both area-source and energy emissions were calculated using land use type and acreage inputs consistent with the Project description and default model assumptions in CalEEMod.

Consistent with guidance provided by the SMAQMD, the net change in total daily emissions associated with operation of development generated through Project buildout was estimated for the assumed buildout year and compared with existing conditions in **Table 5.3-6**.

TABLE 5.3-6
NET CHANGE IN OPERATIONAL EMISSIONS:
PROJECT COMPARED WITH BASELINE CONDITIONS

Emission Source	Net Change in Average Daily Emissions (lb/day)[1]			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Baseline Emissions				
Area-Source Emissions	6,596	71	32	32
Energy-Source Emissions	132	1,176	92	92

3 These average daily VMT figures were calculated using the boundary method in which only the portion of trips which occurs within the boundary of the Planning Area is included in the VMT total.

Emission Source	Net Change in Average Daily Emissions (lb/day)[1]			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Mobile-Source Emissions	396	2,976	36	34
Total	7,124	4,223	160	158
Operational Emissions with the Project				
Area-Source Emissions	7,876	96	47	47
Energy-Source Emissions	156	1,384	108	108
Mobile-Source Emissions	248	1,193	22	13
Total	8,280	2,673	177	168
Net Change in Daily Emissions				
Area-Source Emissions	1,280	25	15	15
Energy-Source Emissions	24	208	16	16
Mobile-Source Emissions	-148	-1,783	-14	-21
Total Net Change	**1,156**	**-1,550**	**17**	**10**

Source: Ascent Environmental 2017

Notes: lb/day=pounds per day, ROG=reactive organic gases, NO_X=oxides of nitrogen, PM_{10}=respirable particulate matter, $PM_{2.5}$=fine particulate matter

[1] Emissions estimates assumes full buildout of Study Areas under the Project by 2035.

As shown in **Table 5.3-6**, emissions of NO_X in the City would substantially decrease as compared to baseline conditions. This is primarily because mobile-source operational emission factors would decrease due to more stringent vehicle emission standards over the planning period. EMFAC 2014, the emissions model used in this analysis, accounts for already enacted (present) and approved (future) vehicle emissions control measures contained in SIPs submitted to the EPA, smog check programs, truck and bus emissions rules, and fuel economy standards, which would result in foreseeable mobile-source emission reductions in the region. Total PM_{10} and $PM_{2.5}$ emissions would experience a slight net increase under the Project compared to baseline conditions.

As shown above, total emissions of ROG would increase substantially. This increase is attributable to the development of the four currently undeveloped Study Areas, which is a component of the Project. The model assumes the full development of the anticipated capacity of the North Study Area (323 dwelling units [DUs]), East Study Area (4,806 DUs), South Study Area (16,250 DUs), and the West Study Area (9,224 DUs). Operational emissions of ROG would occur from the use of consumer products (i.e., cleaning supplies, kitchen aerosols, cosmetics, toiletries, pesticides, and fertilizers) and reapplication of architectural coatings (i.e., paint).

Proposed General Plan Policies That Provide Mitigation

General Plan Policy NR-4-1 requires that all new development projects in the City with the potential to result in substantial air quality impacts incorporate features to reduce emissions equal to 15 percent compared to an "unmitigated baseline" project. An unmitigated baseline project is a development project that is built and/or operated without the implementation of trip reduction, energy conservation, or similar features. Standard NR-4-1a requires appropriate mitigation measures to the extent feasible and appropriate, potentially including—in the case of projects which may conflict with applicable air quality plans—emission reductions in addition to those required by Policy NR-4-1.

The General Plan contains additional policies that would contribute to lower operational-related emissions. Policy NR-4-2 aims to minimize air pollutant emissions from all City facilities and operations while maintaining a high level of public service. As such, it would be expected that municipal building emissions would be minimized.

Policy MOB-1-1 requires that new land use plans, amendments to such plans, and other discretionary development proposals demonstrate 15 percent reduction in VMT from existing conditions. While the primary intent of this policy would be to reduce emissions of greenhouse gases (see Section 5.7, Greenhouse Gas Emissions), this policy would have beneficial effects on ambient air quality in the Planning Area. However, a 15 percent reduction in VMT may be achieved through several pathways which are unknown at the time of writing this Draft EIR. As such, the composition of reductions for air pollutants would differ depending on the type of project. Policy MOB-4-5 encourages employers to offer incentives to reduce the use of vehicles for commuting to work and increase commuting by active transportation modes and Standard MOB-3-2.a requires new commercial development greater than 100,000 square feet to provide an electric vehicle charging station and new residential development to pre-wire for plug-in electric vehicles, which would further reduce emissions.

Operational emissions would additionally be reduced through the implementation of Policy NR-4-3, which promotes programs that would reduce mobile-source emissions of criteria air pollutants (i.e., VMT). Further, Policies NR-4-4, NR-4-5, NR-4-6 would reduce single-occupant vehicle use through emphasis on demand management strategies and development of attractive alternative public transit options, which would serve to improve ambient air quality in the Planning Area to meet and/or maintain the NAAQS and CAAQS. Implementation of Policy NR-4-7 would also produce air quality benefits through the support of intergovernmental efforts to enforce more stringent tailpipe emission standards and inspection and maintenance programs.

Ambient air quality in the Planning Area would also benefit from Policy NR-4-11, which advocates working with Sacramento County and the SMAQMD to address cross-jurisdictional and regional transportation and air quality issues. Finally, successful implementation of Policy NR-2-4 would provide air quality benefits through the maintenance and enhancement of an urban forest in the Planning Area.

Conclusion

The proposed Project would result in a net increase in criteria air pollutant emissions. development under the Project would occur in an unpredictable pattern, and would vary in size, land use type, and build-out duration. Given that the rate, magnitude, and location of development under the proposed Project is uncertain at the time of writing this Draft EIR, an initial estimate of Project-related air pollutant emissions, along with a theoretical maximum 15 percent reduction in average daily emissions for air pollutants was applied to full buildout as compared to baseline conditions. **Table 5.3-7** summarizes the emissions shown in **Table 5.3-6** with the application of a 15 percent reduction from General Plan Policy NR-4-1.

TABLE 5.3-7
NET CHANGE IN OPERATIONAL EMISSIONS:
GENERAL PLAN POLICY NR 4-1 APPLIED TO PROJECT COMPARED WITH BASELINE CONDITIONS

Emissions Scenario	Average Daily Emissions (lb/day)[1]			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Baseline Project	7,124	4,223	160	158
Unmitigated Project	8,280	2,673	177	168
Project with 15% Reduction per GP Policy NR 4-1[2]	7,038	2,272	150	143
Net Change from Baseline	**-86**	**-1,951**	**-10**	**-15**

Source: Ascent Environmental 2017

Notes: lb/day = pounds per day, ROG = reactive organic gases, NO_X = oxides of nitrogen, PM_{10} = respirable particulate matter, $PM_{2.5}$ = fine particulate matter.

[1] Emissions estimates assume full buildout of Study Areas under the Project by 2035. Values reflect the net change in emissions from 2015 as compared to 2035 under two scenarios (i.e., unmitigated project and project with General Plan Policy NR-4-1).

[2] The application of a 15 percent reduction in air pollutants from the application of General Plan Policy NR-4-1 assumes that all development would be subject to the policy; however, some future individual projects could still exceed the project-level thresholds of significance with application of the policy. Additionally, some development projects could fall below the operational project-level threshold of significance; and, finally, reductions shown do not account for any additional reductions in air pollution associated with vehicle miles traveled associated with General Plan Policy MOB-1.1

As shown above, implementation of General Plan Policy NR-4-1 could help reduce emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ to levels below the baseline conditions. However, as stated previously, there is inherent uncertainty as to size, intensity, and timing of future development that could occur over the Project's assumed buildout. The values shown in **Table 5.3-7** assume that all future development under the Project would trigger the requirements of General Plan Policy NR-4-1, which requires a 15 percent reduction in emissions. However, not all future development would be subject to the requirements of General Plan Policy NR-4-1: some smaller development projects could generate emissions at levels below the SMAQMD thresholds of significance and, thus, would not be subject to the 15 percent reduction requirement under General Plan Policy NR-4-1. In addition, because the thresholds are based on daily emissions, some larger projects could generate project-level emissions that exceed the SMAQMD thresholds, even with a 15 percent reduction after application of General Plan Policy NR-4-1. Similarly, multiple unrelated projects could be constructed concurrently, and the combined emissions from those multiple projects could exceed thresholds. Therefore, because the details of future development (e.g., the size, intensity, duration of construction, overlap of construction with other projects) cannot be determined at this time, the assumed levels of emissions estimated and presented in **Table 5.3-7** may not fully encompass total net changes in future emissions with the Project.

Emissions of operational air pollutants would be assessed on a project-by-project basis and, where applicable, projects will be required to reduce emissions by 15 percent. However, due to the uncertainties discussed above, the reductions that may be achieved through implementation of General Plan policies cannot be assumed to be sufficient to reduce operational emissions to meet the SMAQMD thresholds for all projects and in instances where concurrent projects may combine to exceed thresholds. Therefore, emissions associated with the proposed Project could exceed the SMAQMD significance thresholds; thus, this impact would be **potentially significant**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with proposed General Plan policies.

Policies included in the proposed Project would reduce emissions of criteria air pollutants in the Planning Area, but it cannot be assumed to be sufficient to reduce operational emissions to meet the SMAQMD thresholds. No further mitigation is available. There are no additional plan-level measures available that would reduce impacts from long-term operational-related emissions. All feasible operational emissions reduction measures have been incorporated into the Project through the inclusion of the General Plan policies discussed above. There could be additional project-specific mitigation measures to reduce long-term operational-generated emissions of air pollutants to levels below the SMAQMD's thresholds of significance. However, the nature, feasibility, and effectiveness of such project-specific mitigation cannot be determined at this time. As such, the City cannot assume that mitigation would be available and implemented such that all future operational-related emissions of air pollutants would be reduced to less-than-significant levels. Therefore, this impact would remain **significant and unavoidable.**

Exposure of Sensitive Receptors to Substantial Carbon Monoxide Pollutant Concentrations (Standard of Significance 2)

Impact 5.3.3 The Project would not contribute to localized concentrations of mobile-source carbon monoxide that would exceed applicable ambient air quality standards. This impact would be **less than significant**.

As noted previously, Sacramento County, which encompasses the City, is currently designated attainment for both California and national CO ambient air quality standards, and the county typically experiences low background CO concentrations.

Concentrations of CO are a direct function of the number of vehicles, length of delay, and traffic flow conditions. Transport of this criteria pollutant is extremely limited: CO disperses rapidly with distance from the source under normal meteorological conditions. Under certain meteorological conditions, however, CO concentrations close to congested intersections that experience high levels of traffic and elevated background concentrations may reach unhealthy levels, affecting nearby sensitive receptors. Therefore, CO modeling is typically conducted for intersections that are projected to operate at unacceptable levels of service during peak commute hours and have unusually high volumes of traffic.

The City does not have a methodology for assessing CO exposure; therefore, SMAQMD guidance was applied. The SMAQMD (2016c) provides a two-tiered, project-level screening procedure to determine whether detailed CO hotspot modeling is required for a proposed development project. This preliminary screening methodology provides lead agencies with a conservative indication of whether project-generated vehicle trips would result in the CO concentrations that exceed thresholds of significance. According to the SMAQMD, the Project would result in a less than significant impact to air quality for local CO if:

- Traffic generated by the Project would not result in deterioration of intersection level of service (LOS) to LOS E or F;[4] or
- The Project would not contribute additional traffic to an intersection that already operates at LOS E or F.

[4] Level of service (LOS) is a measure used by traffic engineers to determine the effectiveness of transportation infrastructure. LOS is most commonly used to analyze intersections by categorizing traffic flow with corresponding safe driving conditions. LOS A is considered the most efficient level of service and LOS F the least efficient.

As discussed in Section 5.13, Transportation, implementation of the proposed Project would result in LOS E or F operations at several study intersections.

According to the SMAQMD, if the first tier of screening criteria is not met, the second tier of screening criteria must be examined. The second tier of the screening criteria states that the Project would result in a less than significant impact to air quality for local CO if:

- The Project would not result in an affected intersection experiencing more than 31,600 vehicles per hour;
- The Project would not contribute traffic to a tunnel, parking garage, bridge underpass, urban street canyon, or below-grade roadway, or other locations where horizontal or vertical mixing of air would be substantially limited; and
- The mix of vehicle types at the intersection is not anticipated to be substantially different from the county average (as identified by the EMFAC or CalEEMod models).

As discussed in Section 5.13, none of the intersections analyzed in the Planning Area would have more than 31,600 vehicles per hour. The Kammerer Road/Grant Line Road/SR 99 southbound ramps intersection would have the greatest volume of traffic in the Planning Area with 9,010 during the A.M. and 9,240 vehicle trips during the P.M. peak periods. These volumes are well below the 31,600 vehicles per hour threshold used by the SMAQMD. In addition, the proposed Project would not contribute traffic to a tunnel, parking garage, bridge underpass, urban street canyon, or below-grade roadway where horizontal or vertical mixing of air would be substantially limited. The mix of vehicle types is not anticipated to be substantially different from the county average. Therefore, the Project would not exceed the SMAQMD's significance thresholds and would not expose people to CO hot spots. This would be considered a **less than significant** impact.

Mitigation Measures

None required.

Exposure of Sensitive Receptors to Toxic Air Contaminant Pollutant Concentrations (Standard of Significance 2)

Impact 5.3.4 The proposed Project could result in increased exposure of existing or planned sensitive land uses to stationary or mobile-source TACs that would exceed applicable health risk standards. As a result, this impact is considered **potentially significant**.

Sensitive land uses are generally defined as locations where people reside or where the presence of TAC emissions could adversely affect the health of sensitive receptors (i.e., persons occupying the given land use[s]). Typical sensitive receptors include residents, schoolchildren, hospital patients, and the elderly. Construction of future projects in the Planning Area could result in short-term emissions of TACs. Long-term emissions of TACs would be primarily associated with mobile emissions and, to a lesser extent, from new stationary sources.

Short-Term Construction Sources

Diesel-powered construction equipment is a primary potential source of TACs and associated with the release of diesel PM. CARB identified particulate exhaust emissions from diesel-fueled engines as a TAC in 1998.

Health-related risks associated with diesel PM are primarily linked to long-term exposure and the correlated risk of contracting cancer. As disclosed above OEHHA guidance assumes 30 years is a representation of a high-end duration living at a given residence and 70 years represents a person's lifetime; thus, the calculation of cancer risk associated with exposure to TACs should generally be based on a 70- or 30-year period of exposure. However, OEHHA also advises that such assessments should be limited to the period/duration of activities associated with the Project (OEHHA 2015). Thus, the duration of the proposed construction activities would only constitute a small percentage of the total 70- or 30-year exposure period. The timing and intensity of future construction activities allowed under the proposed Project is not known at this time. While the construction of uses allowed in the Planning Area could occur over several years, it is not anticipated that construction of the entire Planning Area would last 70 or 30 years.

Existing Regulations and Proposed General Plan Policies That Provide Mitigation

General Plan Policy NR-4-8 requires that development projects incorporate the applicable SMAQMD construction mitigation measures. The SMAQMD considers implementation of the Enhanced Exhaust Control Practices to achieve a 20 percent reduction for NO_X and a 45 percent reduction for PM_{10} from off-road construction equipment exhaust when compared to the State fleet average.

Conclusion

With reductions achieved through compliance with SMAQMD construction mitigation measures, and because the use of diesel-powered equipment during construction would be temporary and episodic and not concentrated in any one area for extended periods, diesel PM generated by Project construction would not be expected to create conditions where the probability of contracting cancer is greater than 10 in 1 million for nearby receptors. Construction TAC impacts would be **less than significant**.

Long-Term Operational Sources

As discussed in Section 5.0, Introduction to the Environmental Analysis and Assumptions Used, the effect of the environment on the project is generally not a CEQA consideration, including the effect of existing unhealthy concentrations of TACs on new sensitive receptors (with the exception of schools).

Major freeways and major roadways, defined by CARB as facilities that accommodate more than 100,000 daily vehicle trips, are another source of TACs, particularly diesel PM. Locating sensitive land uses such as residences, schools, or parks near major freeways and major roadways that accommodate more than 100,000 daily vehicle trips could result in negative health effects.

The only roadways that would exceed a volume of 100,000 vehicles per day in the Planning Area are SR 99, which runs directly through the Planning Area, and I-5, adjacent to the western boundary of the Planning Area. Annual average daily trips values for baseline (2015) and future conditions were projected by Fehr & Peers for segments of SR 99 and I-5 in the Planning Area and are presented in **Table 5.3-8.**

TABLE 5.3-8
DAILY TRAFFIC VOLUMES FOR BASELINE AND PROJECT CONDITIONS (2015 AND 2035)

Roadway Segment	Daily Traffic Volumes		
	Existing Volume (2015)	Future Volume (2035)	Exceeds 100,000 Daily Vehicle Trips?
SR-99			
Calvine Rd. to Sheldon Rd.	104,500	202,800	Yes
Sheldon Rd. to Bond Rd.	96,500	196,300	Yes
Bond Rd. To Elk Grove Blvd.	81,300	177,700	Yes
Elk Grove Blvd. to Whitelock Pkwy.	71,500	157,900	Yes
Whitelock Pkwy. to Grant Line Rd.	71,500	132,700	Yes
Grant Line Rd. to Eschinger Rd.	76,700	131,900	Yes
I-5			
Cosumnes River Blvd. to Laguna Blvd.	95,600	155,200	Yes
Laguna Blvd. to Elk Grove Blvd.	76,700	130,700	Yes
Elk Grove Blvd. to Hood Franklin Blvd.	64,000	113,200	Yes

Source: Fehr & Peers 2017

Notes: Rd. = Road, Blvd. = Boulevard, Pkwy. = Parkway

As shown in **Table 5.3-8**, existing traffic volumes on SR 99 from Calvine Road to Sheldon Road exceed the CARB- and SMAQMD-recommended 100,000 daily vehicle trips screening thresholds for exposure of sensitive receptors to TACs. With the addition of the Project, 2035 traffic volumes on the roadway segments would increase substantially such that volumes would surpass the 100,000 daily vehicle trips threshold for all segments shown.

Existing Regulations, Guidelines, and Proposed General Plan Policies That Provide Mitigation

Proximity to Mobile Source TAC Emissions

In April 2005, CARB released the *Air Quality and Land Use Handbook: A Community Health Perspective*, which offers guidance on siting sensitive land uses in proximity to sources of air toxics. The handbook recommends that sensitive land uses be sited no closer than 500 feet from a major freeway or major roadway, a buffer distance that was developed to protect sensitive receptors from exposure to diesel PM. This distance was based on traffic-related studies that showed a 70 percent drop in PM concentrations at a distance of 500 feet from the roadway. Presumably, acute and chronic risks as well as lifetime cancer risk due to diesel PM exposure are lowered proportionately (CARB 2005).

The SMAQMD builds upon the CARB guidance in its March 2011 *Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways*. The SMAQMD provides a three-part screening approach to assess cancer risk when siting sensitive receptors near congested roadways. New receptors located beyond the 500-foot buffer zone, as recommended by CARB, would not require further evaluation under the SMAQMD protocol; however, new sensitive receptors located within the 500-foot buffer must be assessed against an evaluation criterion of 276 cancer cases in one million. This evaluation is derived from roadway orientation, project orientation, and peak hourly traffic volumes provided by Caltrans (SMAQMD 2011b).

In accordance with General Plan Policy NR-4-9, future sensitive land uses proposed within 500 feet of these roadway segments would be compared to the SMAQMD screening table to assess whether TAC exposure would exceed the evaluation criterion (i.e., 276 cancer cases in one million). In cases where the evaluation criterion is exceeded, project applicants would be required to conduct site-specific air dispersion modeling and a health risk assessment (SMAQMD 2011b).

In April 2017, CARB released the *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways* report as a supplement to the *Air Quality and Land Use Handbook*. Increased development under the Project would result in increased traffic volumes on SR 99 and I-5. In such cases, the following strategies could be applied to reduce exposure from mobile-source TACs (CARB 2017d):

- Use of designs that promote air flow and pollutant dispersion along street corridors.
- Construction of solid barriers, such as sound walls.
- Planting of vegetation for pollutant dispersion.

As previously mentioned, Policy NR-2-4 directs the City to foster and enhance an urban canopy to improve ambient air quality within the Planning Area. Deployment of this policy would be consistent with the above-referenced CARB strategy to use vegetation to disperse air pollution. General Plan policies such as MOB-3-1, MOB-3-2, MOB-3-5, MOB-3-6, and MOB-3-7 would serve to improve the design of roadways in the Planning Area to include speed-reducing measures, traffic signaling, and promote alternative modes of transportation including walking, bicycling, and public transit. Utilization of these modes would reduce dependency on single-occupancy vehicles and would reduce daily trips on roadway segments.

General Plan Policy MOB-7-5 commits the City to assisting Caltrans in implementing improvements to I-5 and SR 99 as outlined in the most recent Caltrans Transportation Concept Report. The report entails multiple improvement strategies, including the deployment of Traffic Operations System Elements, which serve to improve the efficiency of roadways without adding new capacity. Strategies include use of traffic signaling, which is consistent with the CARB guidance to reduce exposure of sensitive receptors to TACs (Caltrans 2017).

Stationary Sources

General Plan Policy NR-4-9 prohibits the future siting of sensitive land uses (including schools) within distances specified by the SMAQMD of stationary sources of TACs unless adequate mitigation measures are adopted and implemented.

Policy NR-4-10 requires that new air pollution point sources (e.g., industrial, manufacturing, and processing facilities) be located an adequate distance from sensitive receptors. If a new stationary source of TACs is proposed to be sited in or near the Planning Area, it would be subject to the rules under the SMAQMD Regulation 2, Permits. Under this regulation, each new stationary source is evaluated by the SMAQMD to determine whether it has the potential to produce concentrations of TACs that would result in a health risk. The SMAQMD would assess the impact from TACs based on its guidance document, *Supplemental Risk Assessment Guidelines for New and Modified Sources*, as well as guidance documents from the OEHHA, CARB, and California Air Pollution Control Officers Association (CAPCOA). The SMAQMD requires emission controls, similar to best available control technology, called toxic best available control technology (T-BACT) for certain sources. In addition to T-BACT requirements, permits for equipment that may emit TACs may also contain conditions required by the National Emission Standards for Hazardous Air

Pollutants and Air Toxic Control Measures promulgated by the EPA and CARB, respectively. In short, a new stationary source of TACs would not receive the authority to construct or permit to operate if it would result in:

- an incremental increase in cancer risk greater than 10 in one million at any off-site receptor; and/or
- an off-site ground-level concentration of noncarcinogenic TACs generated from the use that would result in a Hazard Index greater than 1 (unless approved by OEHHA).

These permitting requirements are identical to the SMAQMD's thresholds of significance for TACs generated by stationary sources or land uses that include nonpermitted sources (e.g., truck distribution yards). Therefore, lead agencies can determine that a new stationary source of TACs that attains the authority to construct and permit to operate from the district would not exceed the SMAQMD's applicable TAC thresholds of significance.

Conclusion

It is reasonably foreseeable that increased traffic on roadways resulting from the proposed Project could exacerbate existing concentrations of TACs, resulting in a health risk for existing or new sensitive receptors. Implementation of General Plan Policies NR-2-4, NR-4-9, NR-4-10, MOB-3-1, MOB-3-2, MOB-3-5, MOB-3-6, MOB-3-7, MOB-3-13, and MOB-7-5 would serve to lower exposure of sensitive receptors to sources of TACs throughout the Planning Area. As discussed previously, the CARB Diesel Risk Reduction Plan and Air Toxic Control Measures would help reduce future emissions of diesel PM (the primary TAC of concern in mobile emissions). However, the amount of reduction in diesel PM concentrations and the resulting reduction in health risks cannot be anticipated for any specific area, including the Planning Area. As such, it cannot be assumed that the policies discussed above or the CARB diesel PM reduction efforts would be sufficient to reduce exposure of sensitive receptors to TACs to a less than significant level. For these reasons, the Project could expose sensitive land uses to mobile-source TACs and result in increased health risks above the SMAQMD thresholds and the impact would be **potentially significant**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies.

All feasible mobile source TAC health risk reduction measures have been incorporated into the Project through the inclusion of the General Plan policies discussed above. There could be additional project-specific mitigation measures to reduce the health risks of mobile-source TACs to levels below the SMAQMD's thresholds of significance. However, the nature, feasibility, and effectiveness of such project-specific mitigation cannot be determined at this time. As such, the City cannot assume that mitigation would be available and implemented such that all future health risk increases (i.e., an incremental increase in cancer risk greater than 10 in one million or concentrations of TACs with a Hazard Index greater than 1) from exposure to TACs would be reduced to less than significant levels. Therefore, this impact would remain **significant and unavoidable**.

Exposure of Sensitive Receptors to Odorous Emissions (Standard of Significance 3)

Impact 5.3.5 Implementation of the Project could result in increased exposure of sensitive receptors to odorous emissions as compared to baseline conditions. The potential exposure of sensitive receptors to odors would be considered **potentially significant**.

The occurrence and severity of odor impacts depends on numerous factors, including the nature, frequency, and intensity of the source, wind speed and direction, and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they can be unpleasant and lead to distress among the public and generate citizen complaints to local governments and regulatory agencies. Land uses commonly considered to be potential sources of odorous emissions include wastewater treatment plants, sanitary landfills, food processing facilities, chemical manufacturing plants, rendering plants, paint/coating operations, and agricultural feedlots and dairies.

A major source of odor within the Planning Area originates from agricultural activity. Agricultural odors are primarily related to dairy farm operations. Odors associated with dairy farm operations are generated by the breakdown of manure. These processes typically result in the generation of hydrogen sulfide, methane, and ammonia. Fertilizer and pesticide use in agricultural areas can also generate noticeable odors.

The Sacramento Regional Sanitation District (Regional San) wastewater treatment plant (WWTP) is located 1 mile north of northern boundary of the Planning Area. The SMAQMD recommends that projects including sensitive receptors be located with a buffer zone of at least 2 miles from WWTPs; however, the SMAQMD (2016d) notes that "odor screening distances should not be used as absolute thresholds of significance for an odor determination." Implementation of the Project would not introduce dissimilar land uses to the portion of the Planning Area within the vicinity of the WWTP as compared to baseline conditions. Further, development under the Project would undergo project-specific environmental review, wherein odor impacts would be assessed, and mitigation would be implemented if feasible and necessary.

The proposed Project could result in the development of industrial land uses that could be a source of odors. However, the actual uses that would be developed is not known at this time, as no specific development projects are currently proposed or have been identified. As such, the degree of impact with respect to potential odors associated with future projects and their effects on adjacent receptors is uncertain.

Existing Regulations and Proposed General Plan Policies and Standards That Provide Mitigation

Agricultural properties are protected pursuant to Chapter 14.05 of the Municipal Code, provided farming activities are properly conducted in accordance with City standards. General Plan Policy AG-1-6 limits the siting of projects with sensitive land uses within existing agricultural sites to mitigate odor impacts. Policy AG-1-3 allows for buffers or feathering of lot sizes between farmland and urban uses and property title disclosures, pursuant to Municipal Code Chapter 14.05, to reduce potential impacts.

General Plan Policy NR-4-13 and Standards NR-4-13.a and NR-4-13.b would prohibit siting of new sources of odors or siting of new sensitive land uses near existing sources of odor if the minimum screening distances listed in the SMAQMD CEQA Guide – Recommended Odor Screening Distances (SMAQMD 2009) is not met, or evidence is provided that a significant number of people would not be exposed to substantial odors.

Conclusion

Implementation of the Project could result in increased exposure of sensitive receptors to odors. Implementation of General Plan Policies AG-1-3, AG-1-6, and NR-4-13 and Municipal Code Section 14.05 would help reduce exposure of substantial numbers of people to adverse odors, but there is inherent uncertainty regarding the size, land use type, specific building locations and site designs, and build-out periods for future individual development projects that would occur under the Project. Emissions of odors and exposure to existing odors would be assessed on a project-by-project basis. It is reasonably foreseeable that, depending on the project, receptors could be subjected to adverse odors; thus, this impact would be **potentially significant**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies.

Policies included in the proposed Project would help reduce the possibility of odor exposure in the Planning Area, but it cannot be assumed to be sufficient to reduce odors to less than significant levels. There are no additional plan-level measures available that would reduce impacts from short-term and long-term odors. All feasible odor reduction measures have been incorporated into the Project through the inclusion of the General Plan policies discussed above. There could be additional project-specific mitigation measures to reduce odors to less than significant levels. However, the nature, feasibility, and effectiveness of such project-specific mitigation cannot be determined at this time. As such, the City cannot assume that mitigation would be available and implemented such that all future odors would be reduced to less than significant levels. Therefore, this impact would remain **significant and unavoidable**.

Conflict with or Obstruct Implementation of an Applicable Air Quality Plan (Standard of Significance 4)

Impact 5.3.6 The Project would be substantially consistent with all applicable control measures in the Sacramento Regional NAAQS 8-Hour Ozone Attainment and Further Progress Plan (Attainment Plan), but because the Project would exceed the SMAQMD's air quality thresholds of significance, the Project would not be considered to be fully consistent with the Plan's goals. This impact would be **potentially significant.**

The primary goal of the Attainment Plan is to achieve attainment status for ozone under the NAAQS. The SMAQMD recommends that compliance with its CEQA thresholds of significance be used as the measure for determining consistency with the Attainment Plan's objectives to reduce ozone precursor emissions to levels below the NAAQS. If no significant air quality impacts are identified, after the application of all feasible mitigation, the Project would be consistent with the Attainment Plan. As explained in Impacts 5.3.1, 5.3.2, and 5.3.7, implementation of the Project would result in significant and unavoidable impacts after the application of all feasible mitigation. Therefore, the Project would not be considered fully consistent with the primary goal of the Attainment Plan.

As such, levels of criteria air pollutants associated with the Project during construction activity and under full buildout could conflict with long-term ozone planning efforts for the Sacramento region and/or contribute substantially to a net increase in ozone concentrations for Sacramento County, which is in nonattainment for both the State and federal standards for ozone. For these reasons, this impact would be **potentially significant.**

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies.

All feasible operational emission reduction measures have been incorporated into the Project through the inclusion of the General Plan policies. There are no additional plan-level measures available that would reduce impacts from short-term construction or long-term operational-related emissions. There could be additional project-specific mitigation measures to reduce emissions of air pollutants to levels below the SMAQMD's thresholds of significance. However, the nature, feasibility and effectiveness of such project-specific mitigation cannot be determined at his time. As such, the City cannot assume that mitigation would be available and implemented such that all future emissions of air pollutants would be reduced to less than significant levels. Therefore, this impact would remain **significant and unavoidable.**

5.3.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for air quality is the Sacramento Valley Air Basin. The SVAB includes the counties of Sacramento, Placer, Yuba, Sutter, and parts of Solano and Yolo counties. The climate and geography of the lower SVAB severely limits the dilution and transportation of any air pollutants that are released to the atmosphere. At current levels of development (residential, commercial, industrial) and activity, the air basin exceeds the state/federal ambient standards for particulates and ozone. As a result, the region is required to submit air quality attainment plans (i.e., Sacramento Area Regional Ozone Attainment Plan and/or the Sacramento Area Regional PM_{10} Attainment Plan) that present comprehensive strategies to reduce air pollutant emissions from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations, enhancement of CEQA participation, implementation of a new and modified indirect source review program, adoption of local air quality plans, and stationary-, mobile, and indirect-source control measures. Cumulative growth in population, vehicle use, and industrial activity in the SVAB region could inhibit efforts to improve regional air quality and attain the ambient air quality standards. For example, the Capital SouthEast Connector project has proposed to construct a 35-mile-long multimodal transportation facility that would link communities in Sacramento and El Dorado counties, including Elk Grove, Rancho Cordova, Folsom, and El Dorado Hills. According to the EIR prepared for the Capital SouthEast Connector project, it would have a significant cumulative impact on NO_X emissions and there is no feasible mitigation to reduce NO_X emissions to a less than significant level. Therefore, the combined emissions from the Capital SouthEast Connector project and the Project would also exceed significance thresholds and the cumulative impact is considered significant.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Air Quality Impacts

Impact 5.3.7 The proposed Project in combination with growth throughout the air basin will exacerbate existing regional problems with criteria air pollutants and ozone precursors. This is considered a **cumulatively considerable** impact.

Due to the region's nonattainment status for ozone and PM, if Project-generated emissions of either of the ozone precursor pollutants (i.e., ROG and NO_X) or PM exceed the long-term SMAQMD thresholds, the Project's cumulative impacts would be considered significant as determined by the SMAQMD. In addition, if the Project results in a change in land use and corresponding increases in VMT, the regional emissions inventories contained in regional air quality control plans, such as the Sacramento Area Regional Ozone Attainment Plan and/or the Sacramento Area Regional PM_{10} Attainment Plan, may not account for the resultant increase in VMT. Substantial increases in VMT that are not accounted for in the emissions inventory may result in a considerable cumulative contribution to the region's existing air quality nonattainment status.

The proposed Project would result in an increase in VMT not accounted for in these regional air quality control plans; however, the implementation of the aforementioned General Plan policies, as well as deployment of SB 743, would produce beneficial effects to ambient air quality. However, the efficacy of policies contained in the Mobility Element would be project-dependent and require project-specific environmental review.

The proposed Project includes specific policies (i.e., General Plan Policies MOB-1-1 and MOB-1-2) that target reductions in VMT within the Planning Area. General Plan Policy MOB-1-1 requires new projects to be consistent with State-mandated reductions in VMT through compliance with metrics and limits as contained in the General Plan Update. For projects that do not comply, all feasible mitigation measures necessary to reduce VMT to acceptable limits must be implemented. Further, the Statewide deployment of the provisions of SB 743 would manage congestion while promoting infill development and active transportation, thus reducing Statewide VMT and improving ambient air quality. However, the Project proposes changes in land uses as compared to baseline conditions and, as discussed in Impact 5.3.2, predicted long-term operational emissions attributable to the Project would exceed the SMAQMD significance thresholds. As such, development constructed and operated under the proposed Project could result in a **cumulatively considerable** contribution to regional problems with criteria air pollutants and ozone precursors.

Mitigation Measures

No additional feasible mitigation available beyond compliance with proposed General Plan policies.

REFERENCES

Ascent Environmental. 2017. Elk Grove GPU Emissions – CalEEMod Modeling Results.

Caltrans (California Department of Transportation). 2017. *Transportation Concept Report: Interstate 5, District 3.* http://www.dot.ca.gov/dist3/departments/planning/tcr/tcr5.pdf.

CAPCOA (California Association of Air Pollution Control Officers). 2011. *Health Effects*. http://www.capcoa.org/health-effects.

CARB (California Air Resources Board). 1992. Aerometric Data Division. *California Surface Wind Climatology*. Accessed December 1, 2017. https://www.arb.ca.gov/research/apr/reports/l013.pdf.

———. 2005. *Air Quality and Land Use Handbook: A Community Health Perspective*. Accessed December 1, 2017. https://www.arb.ca.gov/ch/handbook.pdf.

———. 2013a. Air Quality Data Statistics. Accessed December 1, 2017. http://www.arb.ca.gov/adam/index.html.

———. 2013b. Ambient Air Quality Standards. Accessed December 1, 2017. http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

———. 2013c. *The California Almanac of Emissions and Air Quality 2013 Edition*. Accessed December 1, 2017. https://www.arb.ca.gov/aqd/almanac/almanac13/almanac2013all.pdf.

———. 2017a. Area Designation Maps/State and National. Accessed December 8, 2017. https://www.arb.ca.gov/desig/adm/adm.htm.

———. 2017b. Top 4 Summary. Accessed December 1, 2017. https://www.arb.ca.gov/adam/topfour/topfour1.php.

———. 2017c. *Staff Report: CARB Review of the Sacramento Regional 2008 NAAQS 8-Hour Ozone Attainment and Reasonable Further Progress Plan*. https://www.arb.ca.gov/planning/sip/planarea/sacsip/2017_sraprfp_staffreport.pdf/.

———. 2017d. Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways: Technical Advisory. https://www.arb.ca.gov/ch/rd_technical_advisory_final.PDF.

Fehr & Peers. 2017. *Draft Transportation Impact Analysis: Elk Grove General Plan Update*.

OEHHA (Office of Environmental Health Hazard Assessment). 2015. *The Air Toxics Hot Spot Program Guidance Manual for Preparation of Health Risk Assessments*. https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.

SMAQMD (Sacramento Metropolitan Air Quality Management District). 2008. *Sacramento Regional 8-Hour Ozone 2011 Reasonable Further Progress Plan*. https://www.arb.ca.gov/planning/sip/planarea/sacsip/sacplanozone2009.pdf.

———. 2009. *CEQA Guidelines – Chapter 7, Odors – Recommended Odor Screening Distances Table.* Accessed December 8, 2017. http://www.airquality.org/businesses/ceqa-land-use-planning/ceqa-guidance-tools.

———. 2010. *PM_{10} Implementation/Maintenance Plan and Re-Designation Request for Sacramento County*. http://www.airquality.org/ProgramCoordination/Documents/10%29%20%20PM10%20Imp%20and%20MP%202010.pdf.

———. 2011a. *Guide to Air Quality Assessment in Sacramento County*. http://www.airquality.org/businesses/ceqa-land-use-planning/ceqa-guidance-tools.

———. 2011b. Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways Version 2.4. Accessed December 11, 2017. http://www.airquality.org/LandUseTransportation/Documents/Final%202011%20Recommended%20Roadway%20Protocol.pdf.

———. 2015. SMAQMD Thresholds of Significance Table. Accessed December 6, 2017. http://www.airquality.org/LandUseTransportation/Documents/CH2ThresholdsTable5-2015.pdf.

———. 2016a. Recommended Guidance for Land Use Emission Reduction (for Operational Emissions), Version 3.3. Accessed December 1, 2017. http://www.airquality.org/LandUseTransportation/Documents/SMAQMD%20Land-Use-Emission-Reductions-FINALv3-3.pdf.

———. 2016b. Program-Level Analysis of General Plans and Area Plans. Accessed December 1, 2017. http://www.airquality.org/LandUseTransportation/Documents/Ch9ProgramLevelFINAL8-2016.pdf.

———. 2016c. Operational Criteria Air Pollutant and Precursor Emissions. Accessed December 1, 2017. http://www.airquality.org/LandUseTransportation/Documents/Ch4OperationalFINAL8-2016.pdf.

———. 2016d. SMAQMD's Recommended Odor Screening Distances. Accessed: December 8, 2017. http://www.airquality.org/LandUseTransportation/Documents/Ch7ScreeningDistancesFINAL12-2009.pdf.

———. 2017. *CEQA Guidelines – Chapter 3, Construction-Generated Criteria Air Pollutant and Precursor Emissions*. Accessed December 8, 2017. http://www.airquality.org/businesses/ceqa-land-use-planning/ceqa-guidance-tools.

5.4 BIOLOGICAL RESOURCES

This section describes the existing biological resources, including special-status species and sensitive habitat, known to occur and/or have the potential to occur in the Planning Area. It includes a summary of the regulations and programs that provide protective measures to special-status species, an analysis of impacts to biological resources that could result from Project implementation, and a discussion of mitigation measures necessary to reduce impacts to a less than significant level, where feasible.

5.4.1 EXISTING SETTING

REGIONAL SETTING

The Planning Area is located in the California Dry Steppe ecological province. This province occurs on the flat alluvial plain between the Sierra Nevada and Coast Ranges in the Central Valley of California. The California Dry Steppe province is characterized by hot summers and mild winters with precipitation largely occurring during the winter months (December–February). The landscape consists of broad, flat valleys bordered by sloping alluvial fans, slightly dissected terraces, and the lower foothills of the surrounding mountain ranges (McNab et al. 2007).

The California Dry Steppe province is composed of only one ecological section, the Great Valley; therefore, the geomorphology is the same as described for the province as a whole. The Great Valley, or Central Valley as it is more commonly called, was once dominated by natural grasses; however, a long history of plowing, fire suppression, and grazing related to agricultural conversion has eliminated these habitats with the exception of a few remaining areas. Many slow-moving rivers flow through the Central Valley, to the delta region east of the San Francisco Bay. These river systems have been altered with levees, dams, and channels to regulate the flows throughout the year (McNab et al. 2007).

LAND COVER TYPES IN THE PLANNING AREA

The Planning Area consists of a mix of urban, agricultural, and natural land cover types. Agricultural lands are divided into subcategories including cropland, irrigated pasture, vineyard, and orchard. Natural land covers include annual grasslands, mixed riparian scrub, mixed riparian woodland, valley oak riparian woodland, blue oak woodland, seasonal wetlands, vernal pools, freshwater marshes, open water, and streams. Land cover type and land uses in the Planning Area are shown in **Figure 5.4-1**.

Each cover type is described below based upon the California Department of Fish and Wildlife's (CDFW) *A Guide to Wildlife Habitats of California* (2017a), and Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986). The location and extent of land cover types in the Planning Area is based upon the South Sacramento County Habitat Conservation Plan (Sacramento County 2018) land cover GIS database and is updated as needed.

Table 5.4-1 summarizes the acreages of agricultural and natural community land cover types in the Planning Area.

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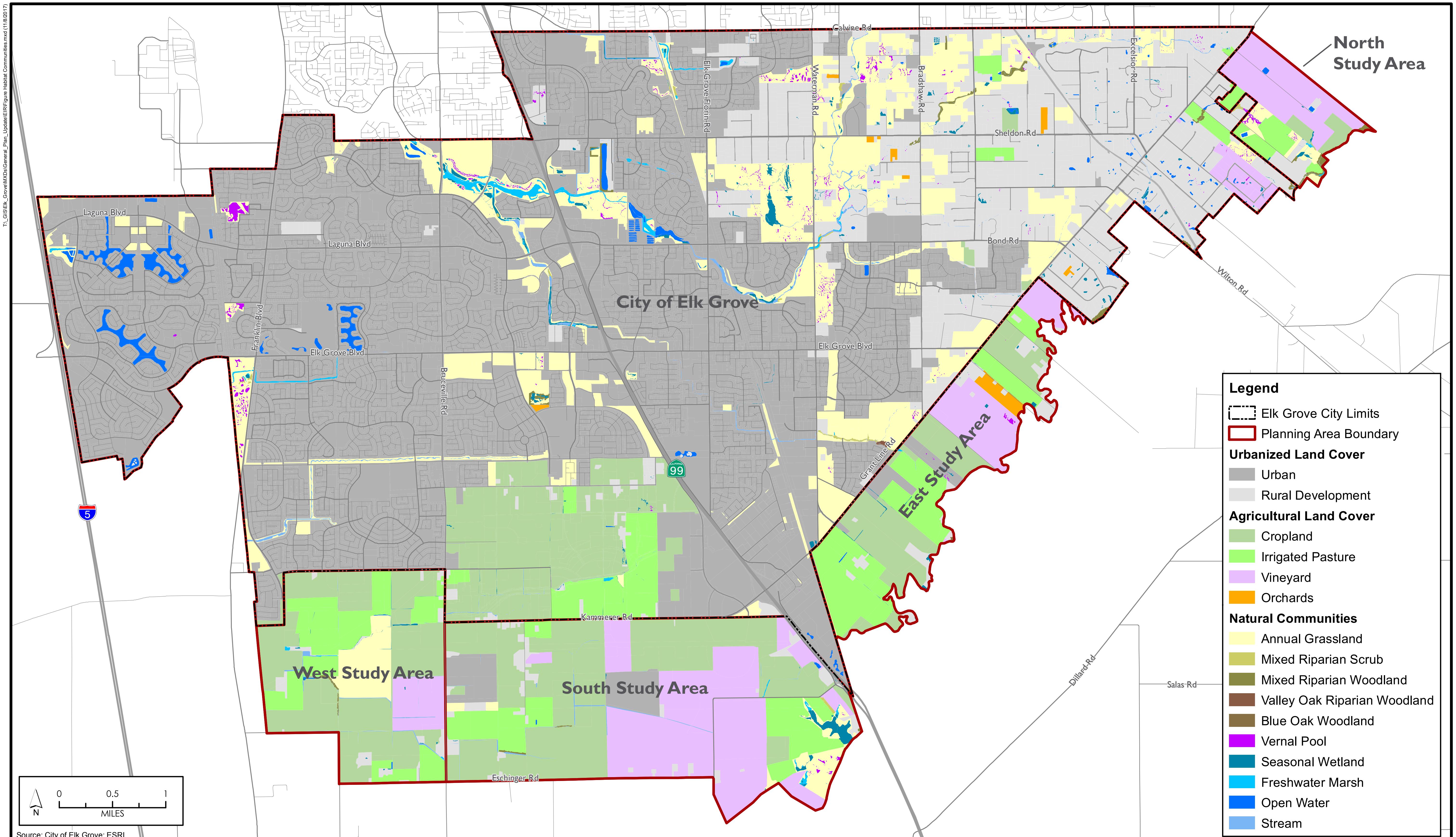

City of Elk Grove
Development Services

Figure 5.4-1

Vegetative Communities/Land Uses

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TABLE 5.4-1
ACRES OF LAND COVER TYPES IN THE PLANNING AREA

Land Cover Type	Existing City Limits	North Study Area	East Study Area	South Study Area	West Study Area	Total
Aquatic Land Cover Types						
Freshwater Marsh	85	1	1	7	2	96
Open Water	234	4	1	2	2	243
Seasonal Wetland	105	4	11	30	6	156
Stream	107	2	0	16	17	142
Vernal Pool	79	4	2	3		88
Agricultural Land Cover Types						
Cropland	1,654	58	551	1,506	986	4,755
Irrigated Pasture	469	107	583	402	471	2,032
Orchards	28		41			69
Vineyard	112	337	341	1,162	156	2,108
Natural Land Cover Types						
Annual Grassland	3,243	58	4	126	193	3,624
Blue Oak Woodland			1			1
Mixed Riparian Scrub	20	1	1	3	1	26
Mixed Riparian Woodland	47	16	0	5	4	72
Valley Oak Riparian Woodland	2					2

The following discussion describes each land cover type and associated general wildlife communities. Sensitive species associations with the land cover types is discussed in the section entitled Special-Status Species**.**

Urbanized Land Cover Types

Urban

Urban land cover encompasses the majority of the Planning Area. These areas are heavily modified from natural habitat and consist of roadways, buildings and structures, routinely disturbed areas, recreation fields, lawns, and landscaped vegetation. Vegetation in this community is generally dominated by ornamental and invasive species including eucalyptus, Italian cypress (*Cupressus sempervirens)*, Washington fan palms (*Washingtonia robusta)*, and various pines. Turf grass and English ivy (*Hedera helix*) are frequently used as groundcover. Native trees, such as oaks (*Quercus* sp.), California sycamore (*Platanus racemosa)* and Northern California black walnut (*Juglans hindsii)* can be found interspersed in urban areas.

Due to the high disturbance, urban areas are considered low quality habitat for wildlife. However, migratory birds and other common species may utilize the habitat, such as common raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), American crow *(Corvus brachyrhynchos*), mourning dove (*Zenaida macroura*), and northern mockingbird (*Mimus polyglottos).*

Rural Development

Rural development primarily consists of rural residences and generally occurs in the eastern portion of the Planning Area. Residential properties in this community are lower density than urban housing, with lots ranging from 2 to 10 acres. Annual grassland is common around the properties and may contain vernal pools, seasonal wetlands, ditches, and other water features that are not found in the urban setting.

The low density of man-made structures results in a higher habitat value than that of urban areas. In addition, the remnants of vernal pool complexes are found throughout this community.

Agricultural Lands

Cropland

In the Planning Area, cropland encompasses both irrigated hayfields and row and field crops. Crop types may include wheat (*Triticum aestivum*), alfalfa (*Medicago sativa*), safflower (*Carthamus tinctorius*), sorghum (*Sorghum bicolor*), tomato (*Lycopersicon esculentum*), and various other vegetables. This cover type varies in structure, height, and density and is generally surrounded by agricultural weeds, including mustard (*Brassica* sp.), filarees (*Erodium* sp.) and English plantain *(Plantago lanceolata*).

Due to the frequency of disturbance, cropland generally does not provide suitable breeding habitat for wildlife. However, croplands are known to provide foraging habitat for a variety of species, including white-tailed kite (*Elanus leucurus)*, northern harrier (*Circus cyaneus*), mourning dove, Brewer's blackbird (*Euphagus cyanocephalus*), and the State-listed threatened Swainson's hawk (*Buteo swainsoni)*. Other species that may use cropland for foraging and cover include sandhill cranes (*Grus canadensis*), gophers, garter snakes (*Thamnophis* sp.), deer, rabbits, mice, and squirrels.

Irrigated Pasture

Irrigated pasture typically includes a mix of native and nonnative perennial grasses and legumes that provide 100 percent canopy closure. The height of the vegetation varies based on season and intensity of livestock grazing. Common species in pasture include ryegrass (*Festuca* sp. and *Lolium* sp.), dallisgrass (*Paspalum* sp.), annual bluegrass (*Poa annua*), and clovers (*Trifolium* sp.).

Species utilization of irrigated pasture is similar to that of cropland.

Vineyard

Vineyards generally occur along the southern and eastern edge of the Planning Area. Vineyards typically comprise a single species such as grape, raspberry, or kiwifruit. The understory is generally bare due to herbicide application; however, some invasive species may be present.

Conversion to vineyard has resulted in the loss of foraging habitat for Swainson's hawk and other raptors. Deer and rabbits are known to forage on the vines while squirrels and various birds will forage on the fruit. Some wildlife has been known to utilize the shade during hot weather.

Orchard

Similar to vineyards, orchards are typically made up of one deciduous tree species (almonds, apricots, cherries, etc.). Planted in rows, the tree crowns typically touch, and the understory is generally bare but may contain some weedy species. Wildlife utilize orchards in a similar manner as vineyards.

Eucalyptus stands are included in this community and are defined by a monotypic stand with closed canopy. There are several dense stands in the western portion of the Planning Area that were planted as windbreaks. Eucalyptus stands provide suitable nesting habitat for raptors and other birds.

Natural Communities

Annual Grassland

Annual grassland land cover in the Planning Area is characterized by open grassland that is dominated by annual nonnative grass and forb species. Native grasslands have disappeared due to overgrazing and encroachment of exotic species. Annual grasslands occur in patches throughout the Planning Area, generally in the rural areas. Oak and eucalyptus trees are scattered throughout this community. Vernal pools, seasonal wetlands, and streams are found in annual grasslands.

Common grass species include Italian ryegrass (*Lolium multiflorum*), wild oats *(Avena fatua*), soft chess (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), foxtail barley (*Hordeum jubatum*), medusahead (*Taeniatherum caput-medusae),* and dallisgrass. Forbs species are intermixed, including bindweed (*Convolvulus arvensis*), rose clover (*Trifolium hirtum*), vetch (*Vicia* sp.), spiny-fruit buttercup (*Ranunculus muricatus),* and curly dock (*Rumex crispus*).

Annual grasslands provide cover, foraging habitat, and breeding habitat for a wide variety of species including raptors, seed-eating birds, mammals, amphibians, and reptiles. Species that may be observed in this community include, but are not limited to, western fence lizard (*Sceloporus occidentalis*), gophers, black-tailed hares (*Lepus californicus*), California ground squirrel (*Otospermophilus beecheyi*), coyote (*Canis latrans)*, and common garter snake (*Thamnophis sirtalis*).

Special-status species that may be observed in the annual grassland in the Planning Area include burrowing owl (*Athene cunicularia*), short-eared owl (*Asio flammeus)*, grasshopper sparrow (*Ammodramus savannarum*), loggerhead shrike (L*anius ludovicianus*), northern harrier, and badger (*Taxidea taxus)*. Various special-status species may use this community solely for foraging, including Swainson's hawk, peregrine falcon, white-tailed kite, and golden eagle. Nesting birds may utilize trees scattered throughout annual grasslands.

Mixed Riparian Scrub

Mixed riparian scrub land cover type is often interspersed with mixed riparian woodland found in the floodplain waterways throughout the Planning Area. This community typically consists of a mixture of sandbar willow *(Salix interior*), Arroyo willow *(S. lasiolepis*), red willow (*S. laevigate*), Gooding's willow (*S. gooddingii)*, and interspersed mixed riparian woodland trees (see below). Other shrubs associated with this community include blue elderberry (*Sambucus cerulean*) and buttonbush (*Cephalanthus occidentalis)*.

Dense stands of mixed riparian scrub typically lack an understory while more open areas support an understory of native and nonnative species including tamarisk (*Tamarix* sp.) and giant European reed (*Arundo donax*).

Riparian scrub supports a variety of wildlife due to the combination of surface water, layered vegetation, and high nutrient availability. This community provides high-quality cover, foraging opportunity, and nesting habitat. Cavity nesting species, such as bats, squirrels, and certain bird species, are typically found in riparian scrub. Mammals associated with riparian areas include Virginia opossum, raccoon, striped skunk (*Mephitis mephitis*), and beaver (*Castor canadensis*). Common amphibians found in and along the drainages include western toad (*Bufo boreas*) and Pacific chorus frog (*Pseudacris regilla*). Riparian areas provide cover and nesting habitat for many species of bird, including northern flicker (*Colaptes auratus*), California quail (*Callipepla californica*), northern mockingbird, towhees (*Pipilo* spp.), and cedar waxwing (*Bombycilla cedrorum*), as well as raptors such as red-shouldered hawk (*Buteo lineatus*) and great-horned owl (*Bubo virginianus*).

Mixed Riparian Woodland

Mixed riparian woodland is a diverse and multilayered land cover type that is typically found along waterways in the Planning Area and is often intermixed with mixed riparian scrub. This community is associated with low-velocity flows, floodplains, streams, and basins. In the Planning Area, this community is dominated by various willow species, Fremont cottonwood *(Populus fremontii*), valley oak (*Quercus lobata*), Oregon ash (*Fraxinus latifolia*), box elder (*Acer negundo*), and Northern California black walnut. Mid-story species include Himalayan blackberry (*Rubus armeniacus*), poison oak (*Toxicodendron diversilobum*), wild grape (*Vitis californica*), coyote bush (*Baccharis pilularis*) and tall flat sedge (*Cyperus eragrostis*). The understory is similar to that of mixed riparian scrub.

Wildlife is known to utilize mixed riparian woodland in a similar manner as mixed riparian scrub.

Valley Oak Riparian Woodland

This land cover type typically intergrades with annual grasslands and borders along streams, agricultural fields, and ditches in the Planning Area. This community is almost exclusively valley oaks and is represented by a partially closed canopy. Historically this community was more common but now only occurs in small pockets along streams and drainages. Other canopy species found in this community include California sycamore, California black walnut, interior live oak (*Quercus wislizeni)*, and blue oak (*Quercus douglasii)*. Understory consists of poison oak, blue elderberry, wild grape, and California blackberry (*Rubus ursinus)*.

Due to the open nature of this community, species utilization is similar to that of blue oak woodland (discussed below) and annual grassland. Swainson's hawk and other nesting birds will nest in valley oak riparian woodland.

Blue Oak Woodland

Blue oak woodland is characterized by a canopy composed predominantly of blue oak with an understory dominated by annual grassland species. There is one small pocket of blue oak woodland in the southern portion of the Planning Area near Deer Creek. Many species, such as western gray squirrel (*Sciurus griseus*) and black-tailed deer (*Odocoileus hemionus*), forage in oak woodland. Raptors may use the oak trees for nesting and additional wildlife utilization is similar to that found in adjacent annual grassland.

Seasonal Wetland

Seasonal wetlands are defined as ephemeral wetlands that pond during the rainy season and are dry by summer. Wetlands are created either by seasonally wet natural depressions and swales or through artificial impoundments. Seasonal wetlands are found throughout the Planning Area, but more so in rural areas. This community can occur in isolated patches and within the banks of streams, creeks, ponds, and lakes.

Hydrophytic grasses, herbs, and forbs dominate seasonal wetlands. Common species include curly dock, fiddle leaf dock (*Rumex pulcher)*, rabbitsfoot grass, perennial ryegrass (*Polypogon monspeliensis*), tall flatsedge, and a variety of other sedges and rushes. During the wet season, wetlands provide seasonal habitat for invertebrates, birds, and mammals. Occasionally, seasonal wetlands may provide suitable habitat for vernal pool associates, including rare plants and special-status vernal pool crustaceans.

Vernal Pool

Vernal pools are a subset of seasonal wetlands often found in annual grasslands. This community includes vernal pool swales that interconnect pools, creating large complexes. Vernal pools exhibit a four-stage hydraulic cycle: a wetting phase, an inundation phase, a waterlogged phase, and a dry phase.

Low-growing annual species are found in vernal pools, including California goldfields (*Lasthenia californica*), Fremont's goldfields (*Lasthenia fremontii*), downingia (*Downingia* sp.), water pygmyweed (*Crassula aquatica*), hyssop loosestrife (Lythrum hyssopifolia), brass buttons (*Leptinella squalida*), and coyote thistle (*Eryngium vaseyi*). Special-status plants, including legenere (*Legenere limosa*) and dwarf downingia (*Downingia pusilla),* may be found in vernal pools.

Vernal pools provide an important habitat for a variety of plants and animals. Several aquatic crustaceans and insects are dependent on vernal pools, including clam shrimp (*Cyzicus californicus*), seed shrimp (*Cypria* sp.) and the special-status vernal pool fairy shrimp and vernal pool tadpole shrimp.

Freshwater Marsh

Freshwater marshes are characterized by erect, rooted herbaceous hydrophytic species. In the Planning Area, this community typically occurs in and along the edge of streams, lakes, and other bodies of water. Freshwater marshes are typically perennial wetlands but may dry out for short periods.

Freshwater marshes support both moist soil plants (upper edges) and species adapted to perennially inundated conditions (lower margins). Marsh habitats in the Planning Area are typically dominated by bulrush (*Schoenoplectus* sp.), broad-leaved cattail (*Typha latifolia*), narrow-leaved cattail (*Typha angustifolia*), floating water primrose (*Ludwigia peploides*), water plantain (*Alisma plantago-aquatica*), smartweed (*Polygonum* sp.), and bog rush. One special-status plant, Sanford's arrowhead (*Sagittaria sanfordii*), may occur in this community.

This community provides habitat for a variety of wildlife species. Fish often use marsh habitats as nurseries. Belted kingfisher, great blue heron, great egret, and other bird species may forage in this community. Beavers are often found in marshes throughout the Planning Area.

Open Water

Open water refers to perennially wet lakes, ponds, basins, and dammed stream channels in the Planning Area. Floating aquatic plants such as water lilies (*Nymphaeaceaa* sp.) and smartweed occur in the shallow areas. Weedy species, such as floating primrose and water hyacinth (*Eichhornia crassipes*), create dense mats over standing water. This community supports fish, aquatic reptiles, and various waterfowl.

Stream

Streams are characterized by intermittent to continually flowing water. They typically originate at some elevated source, such as a spring or lake, and flow downhill at a rate relative to the slope or gradient. There are three stream classifications throughout the Planning Area: perennial, intermittent, and ephemeral.

Perennial streams are areas that are inundated with water throughout the year and frequently support floating or emergent hydrophytic vegetation, similar to that in a freshwater marsh or open water. Perennial streams in the Planning Area include Laguna Creek, Elk Grove Creek, Strawberry Creek, Shed A Channel, Franklin Creek (previously Shed B Channel), an unnamed channel north of Laguna Boulevard, and portions of Whitehouse and Sheldon Creeks.

Intermittent streams are characterized as areas that are seasonally inundated with water and frequently support a mix of vegetation typically found in freshwater marsh and seasonal wetlands. Intermittent streams in the Planning Area include Toad Creek (aka Laguna Creek Tributary #1), portions of Sheldon Creek, other tributaries to Laguna Creek, and portions of Whitehouse Creek.

An ephemeral stream only contains flowing water for a short duration after precipitation events. Groundwater is not a source of water for ephemeral streams; therefore, runoff from rainfall is the primary water source.

Wildlife utilization in the Planning Area for this community is variable and dependent upon hydroperiod, vegetation, and surrounding land use. Perennial streams are utilized by wildlife similar to that of freshwater marsh and riparian communities. Ephemeral streams are used similar to that of annual grasslands.

Sensitive Habitats

This section identifies sensitive natural communities that are of special concern to resource agencies and local groups.

Vernal Pools

Due to the unique plant and wildlife species that utilize this community, vernal pools are considered sensitive terrestrial communities by the CDFW and local environmental groups. There are several nearby protected areas that are devoted to protecting vernal pools. These include the Sacramento County Vernal Pool Prairie Preserve Area, Mather Field Regional Park, and Stones Lake National Wildlife Refuge, a portion of which overlaps with the Planning Area.

Wetlands and Other Waters of the United States

Jurisdictional waters of the United States (WoUS), along with isolated wetlands, provide a variety of functions for plants and wildlife. Wetlands and other water features provide habitat, foraging, cover, and migration and movement corridors for both special-status and common species. In addition, these features physically convey surface water flows capable of handling large stormwater events. Large storms can produce extreme flows that cause bank cutting and sedimentation of open waters and streams. Vegetation and other features in jurisdictional waters can slow these flows and lessen the effects of these large storm events, protecting habitat and other resources. The US Army Corps of Engineers (USACE) asserts jurisdiction over all WoUS. Streams are also regulated under Section 404 of the Clean Water Act and Section 1600 of the California Fish and Game Code.

Riparian Communities

Riparian woodland and scrub communities are rapidly dwindling in the Central Valley. Riparian communities are diverse and multilayered and provide important nesting and foraging habitat for numerous species native to the Central Valley. In addition, dense cover and linear nature make riparian communities important for wildlife movement. Riparian areas are considered sensitive terrestrial communities and are typically under the jurisdiction of the CDFW. In addition, trees typically found in riparian areas (oaks, sycamores, and black walnuts) are protected under Chapter 19.12, Tree Preservation and Protection, of the Elk Grove Municipal Code.

Oak Woodland

Oak woodlands are locally important and often considered sensitive terrestrial communities by the CDFW. In addition, oak trees are protected under both the Elk Grove Municipal Code and Sacramento County Code. Oak woodland is scarce in the Planning Area; however, stands of oak woodland are protected as part of preserves noted above.

Swainson's Hawk Foraging Habitat

Upland communities such as annual grassland, cropland, and irrigated pasture are considered special habitat because of their role in Swainson's hawk foraging. Although not all "natural," these communities are afforded protection under Chapter 16.130, Swainson's Hawk Impact Mitigation Fees, of the Elk Grove Municipal Code. As part of its mitigation program, the City has received easements on several parcels of land throughout the Planning Area. These easements are monitored to ensure that agricultural practices, such as grazing, are consistently providing suitable foraging habitat. Recent conversion of cropland to vineyard and orchard in the Planning Area has resulted in loss of foraging habitat as well as habitat fragmentation.

Stone Lakes National Wildlife Refuge

Stone Lakes National Wildlife Refuge bounds the Planning Area to the west and partially overlaps the Planning Area west of Franklin Boulevard between Elk Grove Boulevard and Whitelock Parkway. The Wetlands Preserve Unit, the portion of the refuge that overlaps with the Planning Area, consists of a 90-acre grassland and vernal pool complex. The refuge conserves a range of scarce Central Valley habitats, including vernal pools, riparian corridors, marshes, and grasslands. Several special-status species are known to occur in the refuge; the refuge also facilitates wildlife movements and serves as an important stop along the Pacific Flyway for migrating shorebirds and wintering waterfowl. Much of the surface water in the Planning Area drains into the Stone Lakes area. The urbanized and agricultural land upstream of the refuge can lead to water quality issues in the refuge, and negative impacts on wildlife.

Cosumnes River Preserve

The Cosumnes River Preserve is not situated within the Planning Area; however, it is located directly south. The preserve includes riverine, vernal pool, grassland, and wetland communities, as well as one of California's largest remaining valley oak riparian woodlands. The preserve provides important habitat for a variety of local and migratory species, such as waterfowl and fish. The preserve is managed by a team of government and nongovernment agencies, including the CDFW, the Bureau of Land Management, Ducks Unlimited, and the Nature Conservancy.

Bufferlands

The Bufferlands are not located in the Planning Area; however, they border the Planning Area to the northwest and Laguna Creek flows through the Bufferlands before draining into Stone Lakes National Wildlife Refuge. The Bufferlands are roughly 2,650 acres of wetlands, oak woodland, and riparian communities that act as a barrier between the operations of the Sacramento Regional Wastewater Treatment Plant and the neighboring residential communities of Elk Grove and Sacramento. The Bufferlands are actively managed by the Sacramento Regional County Sanitation District and are home to a diverse array of species.

WILDLIFE MOVEMENT CORRIDORS

Wildlife corridors refer to established migration routes commonly used by resident and migratory species for passage from one geographic location to another. Corridors are present in a variety of habitats and link otherwise fragmented acres of undisturbed area. Maintaining the continuity of established wildlife corridors is important to (a) sustain species with specific foraging requirements, (b) preserve a species' distribution potential, and (c) retain diversity among many wildlife populations.

With the exception of the City of Sacramento to the north, the Planning Area is bounded on all sides by agricultural uses and open space. Most of the central and northern portions of the Planning Area have been built out. In the urban areas, streams and riparian corridors provide corridors for wildlife. The edges of the Planning Area and adjacent open spaces facilitate local and regional movement.

Stone Lakes National Wildlife Refuge is located to the west of the City, and the Cosumnes River–Deer Creek riparian corridor is located southwest of the City. These areas likely provide the most suitable wildlife corridors in the area. The mosaic of habitat at Stone Lakes is known to provide habitat for local and migratory species. The riparian corridor around Deer Creek and the Cosumnes River provides dense cover and is relatively removed from human activity.

Available data on movement corridors and linkages was accessed via CDFW's (2017c) BIOS 5 Viewer. Data reviewed included the Essential Connectivity Areas map layer and the Missing Linkages in California map layer. The Cosumnes River corridor is a documented essential connectivity area, as is Stone Lakes National Wildlife Refuge.

SPECIAL-STATUS SPECIES

Candidate, sensitive, or special-status species are commonly characterized as species that are at potential risk or actual risk to their persistence in a given area or across their native habitat. These species have been identified and assigned a status ranking by governmental agencies such as the CDFW, the US Fish and Wildlife Service (USFWS), and private organizations such as the California Native Plant Society (CNPS). The degree to which a species is at risk of extinction is the determining factor in the assignment of a status ranking. Some common threats to a species' or population's persistence include habitat loss, degradation, and fragmentation, as well as human conflict and intrusion. For the purposes of this biological review, special-status species are defined by the following codes:

- Listed, proposed, or candidates for listing under the federal Endangered Species Act (ESA) (50 Code of Federal Regulations [CFR] 17.11 – listed; 61 Federal Register [FR] 7591, February 28, 1996, candidates)
- Listed or proposed for listing under the California Endangered Species Act (CESA) (Fish and Game Code [FGC] 1992 Section 2050 et seq.; 14 California Code of Regulations [CCR] Section 670.1 et seq.)
- Designated as Species of Special Concern by the CDFW
- Designated as Fully Protected by the CDFW (FGC Sections 3511, 4700, 5050, 5515)
- Species that meet the definition of rare or endangered under CEQA (14 CCR Section 15380) including CNPS List Rank 1b and 2

The USFWS, CDFW, and CNPS database queries identified several special-status species with the potential to occur in the Planning Area. **Table 5.4-2** provides a summary of all special-status species identified in the database results, a description of the habitat requirements for each species, and conclusions regarding the potential for each species to be affected by the proposed Project. The California Natural Diversity Database (CNDDB) results within 1 mile of the Planning Area are depicted on **Figures 5.4-2** and **5.4-3.**

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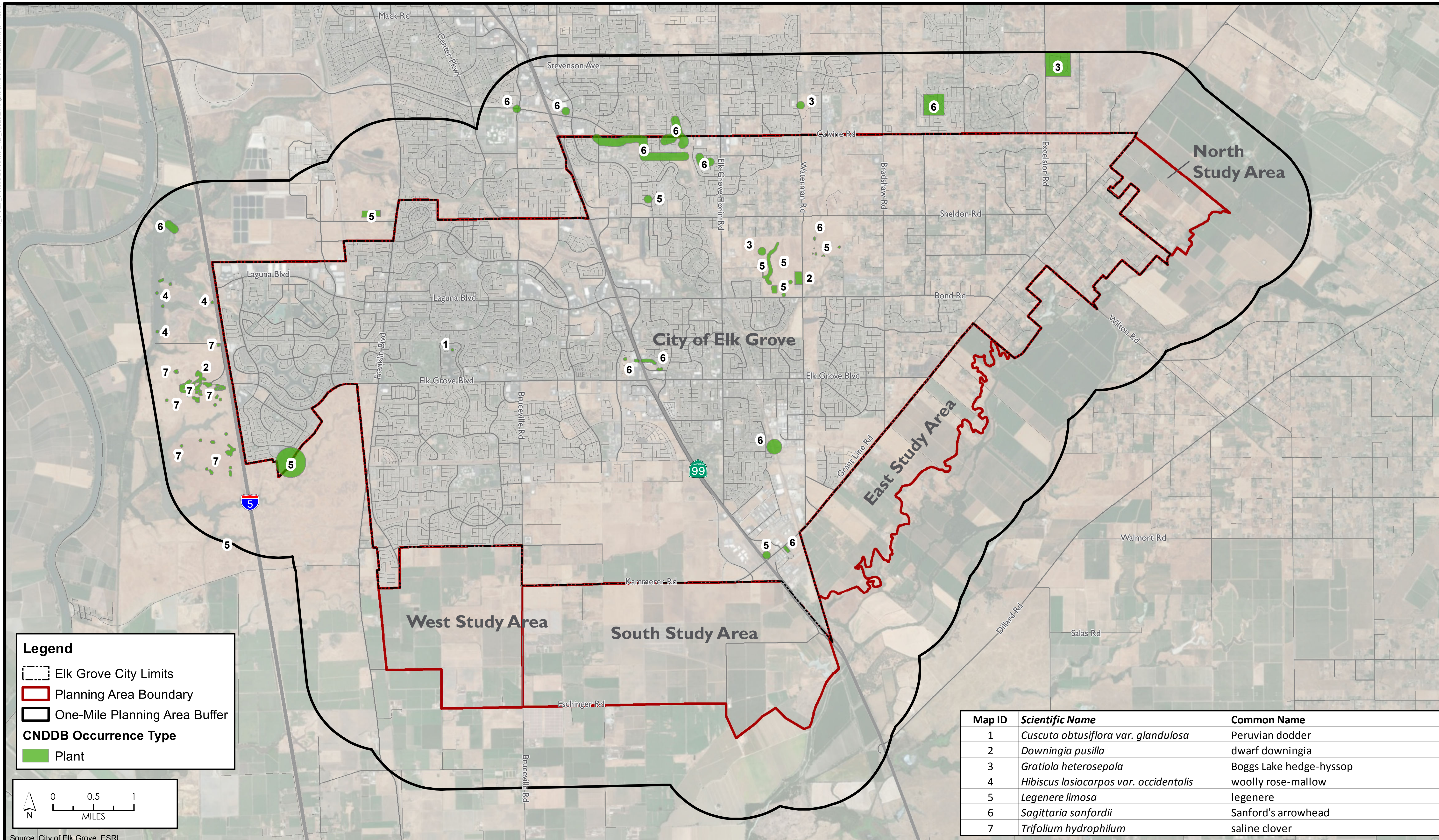

Map ID	Scientific Name	Common Name
1	*Cuscuta obtusiflora var. glandulosa*	Peruvian dodder
2	*Downingia pusilla*	dwarf downingia
3	*Gratiola heterosepala*	Boggs Lake hedge-hyssop
4	*Hibiscus lasiocarpos var. occidentalis*	woolly rose-mallow
5	*Legenere limosa*	legenere
6	*Sagittaria sanfordii*	Sanford's arrowhead
7	*Trifolium hydrophilum*	saline clover

City of Elk Grove
Development Services

Figure 5.4-2

Recorded Occurrences of Special-Status Plant Species within One-Mile of the Planning Area

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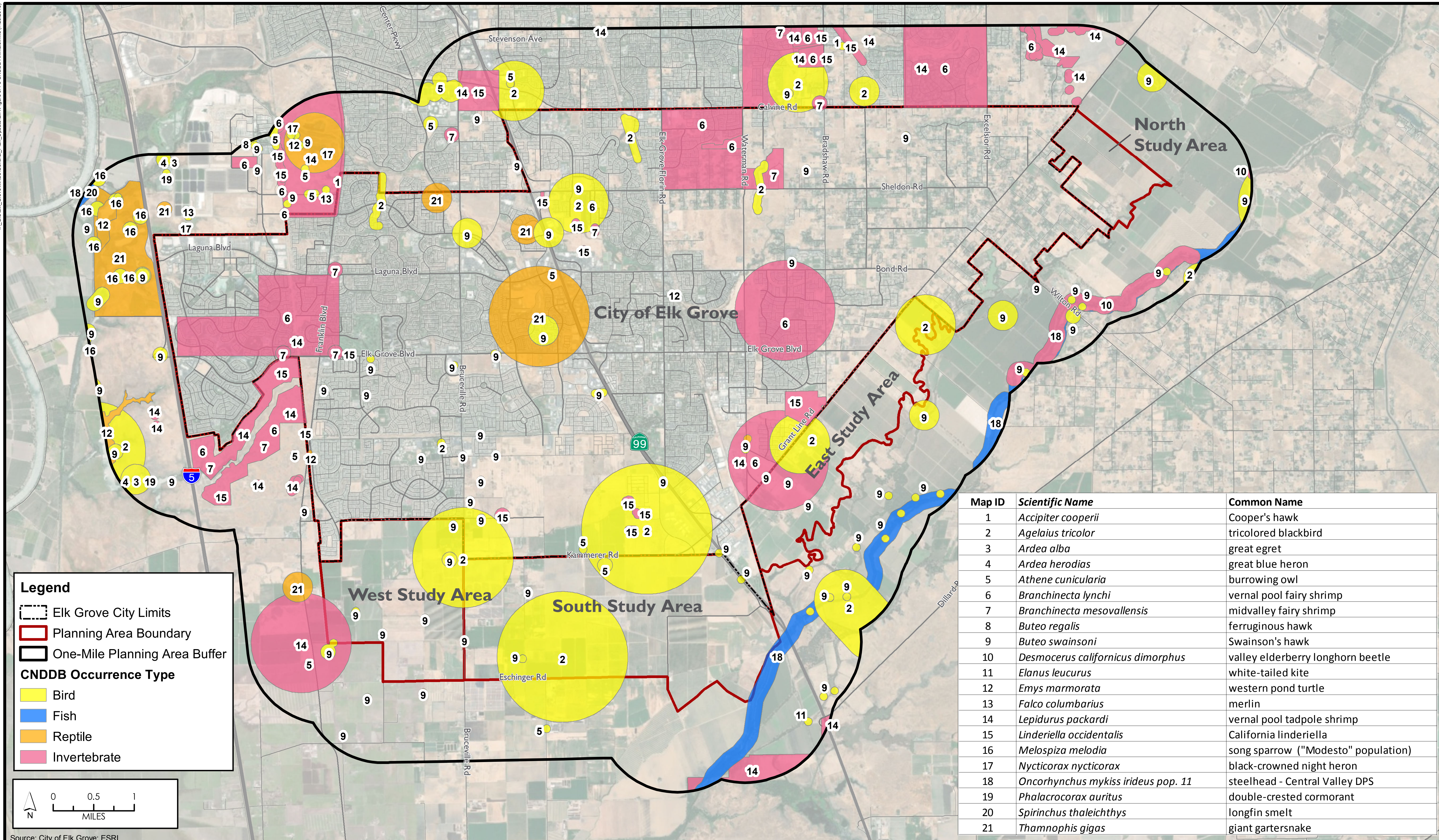
City of Elk Grove
Development Services



Map ID	Scientific Name	Common Name
1	*Accipiter cooperii*	Cooper's hawk
2	*Agelaius tricolor*	tricolored blackbird
3	*Ardea alba*	great egret
4	*Ardea herodias*	great blue heron
5	*Athene cunicularia*	burrowing owl
6	*Branchinecta lynchi*	vernal pool fairy shrimp
7	*Branchinecta mesovallensis*	midvalley fairy shrimp
8	*Buteo regalis*	ferruginous hawk
9	*Buteo swainsoni*	Swainson's hawk
10	*Desmocerus californicus dimorphus*	valley elderberry longhorn beetle
11	*Elanus leucurus*	white-tailed kite
12	*Emys marmorata*	western pond turtle
13	*Falco columbarius*	merlin
14	*Lepidurus packardi*	vernal pool tadpole shrimp
15	*Linderiella occidentalis*	California linderiella
16	*Melospiza melodia*	song sparrow ("Modesto" population)
17	*Nycticorax nycticorax*	black-crowned night heron
18	*Oncorhynchus mykiss irideus pop. 11*	steelhead - Central Valley DPS
19	*Phalacrocorax auritus*	double-crested cormorant
20	*Spirinchus thaleichthys*	longfin smelt
21	*Thamnophis gigas*	giant gartersnake

Figure 5.4-3

Recorded Occurrences of Special-Status Animal Species within One-Mile of the Planning Area

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TABLE 5.4-2
SPECIAL-STATUS SPECIES OCCURRENCE DATA

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Plants							
Astragalus tener var. *tener*	Ferris' milk-vetch	—	—	1B.1	Vernally mesic meadows and seeps, and subalkaline flats in valley and foothill grasslands. Elev: 7-246 ft (2-75 m). Blooms: Apr-May (CNPS 2017).	N	Nearest record of this species is nearly 10 miles west of the Planning Area. These occurrences are all west of the Sacramento River (CDFW 2017b).
Brasenia schreberi	watershield	—	—	2B.3	Freshwater marshes and swamps. Elev: 98-7,218 ft (30-2,200 m). Blooms: June-Sept (CNPS 2017).	N	Planning Area below species elevation range. One 40-year-old record of these species in Stone Lakes (CDFW 2017b).
Carex comosa	bristly sedge	—	—	2B.1	Marshes, swamps, lake margins, and valley and foothill grassland. Elev: 0-2,051 ft (0-625 m). Blooms: May-Sept (CNPS 2017).	Y	Known populations in Stone Lakes just west of the Planning Area (CDFW 2017b).
Castilleja campestris ssp. *succulenta*	succulent owl's-clover	FT	SE	1B.1	Acidic vernal pools. Elev: 164-2,461 ft (50-750 m). Blooms: Apr-May (CNPS 2017).	N	Planning Area below species elevation range. No known occurrence in the vicinity (CDFW 2017b).
Cicuta maculata var. *bolanderi*	Bolander's water-hemlock	—	—	2B.1	Coastal, fresh or brackish marshes and swamps. Elev: 0-656 ft (0-200 m). Blooms: July-Sept (CNPS 2017).	N	All CNDDB records occur in marshes in the Delta. Nearest occurrence is nearly 6 miles south of the Planning Area in Walnut Grove (CDFW 2017b).
Cuscuta obtusiflora var. *glandulosa*	Peruvian dodder	—	—	2B.2	Freshwater marshes and swamps. Elev: 49-919 ft (15-280 m). Blooms: July-Oct (CNPS 2017).	N	One 20-year-old occurrence near Laguna Lake; however, presence was not confirmed and requires "more fieldwork" (CDFW 2017b, 2017d). No other occurrences in the region.
Downingia pusilla	dwarf downingia	—	—	2B.2	Vernal pools and mesic valley and foothill grasslands. Elev: 3-1,459 ft (1-445 m). Blooms: Mar-May (CNPS 2017).	Y	Populations recorded in and adjacent to the Planning Area.

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Gratiola heterosepala	Boggs Lake hedge-hyssop	—	SE	1B.2	Clay soils in marshes, swamps, lake margins, and vernal pools. Elev: 33-7,792 ft (10-2,375 m). Blooms: Apr-Aug (CNPS 2017).	Y	Populations recorded in and adjacent to the Planning Area.
Hibiscus lasiocarpus var. *occidentalis*	woolly rose-mallow	—	—	1B.2	Freshwater marshes and swamps. Elev: 0-394 ft (0-120 m). Blooms: June-Sept (CNPS 2017).	Y	Populations recorded immediately west of the Planning Area.
Juglans hindsii	Northern California black walnut	—	—	1B.1	Riparian forest/woodland. Elev: 0-1,444 ft (0-440 m). Blooms: Apr-May (CNPS 2017).	Y	Individuals (likely planted or remnant orchard stock) occur in the Planning Area; however, no native riparian stands are present.
Juncus leiospermus var. *ahartii*	Ahart's dwarf rush	—	—	1B.2	Mesic valley and foothill grasslands. Elev: 98-751 ft (30-229 m). Blooms: Mar-May (CNPS 2017).	N	Planning Area below species elevation range. One 40-year-old record of these species in Stone Lakes (CDFW 2017b).
Lathyrus jepsonii var. *jepsonii*	Delta tule pea	—	—	1B.2	Freshwater and brackish marshes and swamps. Elev: 0-13 ft (0-4 m). Blooms: May-Sept (CNPS 2017).	N	All CNDDB records occur in the Delta. Nearest occurrence is over 5 miles south of the Planning Area in Snodgrass Slough north of Walnut Grove (CDFW 2017b).
Legenere limosa	legenere	—	—	1B.1	Vernal pools. Elev: 3-2,887 ft (1-880 m). Blooms: Apr-June (CNPS 2017).	Y	Populations recorded in and adjacent to the Planning Area.
Lepidium latipes var. *heckardii*	Heckard's pepper-grass	—	—	1B.2	Alkaline flats in valley and foothill grasslands. Elev: 7-656 ft (2-200 m). Blooms: Mar-May (CNPS 2017).	Y	Populations recorded west of Planning Area in Stone Lakes (CDFW 2017b).
Lilaeopsis masonii	Mason's lilaeopsis	—	SR	1B.1	Riparian scrub, and brackish or freshwater marshes and swamps. Elev: 3-33 ft (0-10 m). Blooms: Apr-Nov (CNPS 2017).	N	Nearest populations recorded along the Sacramento Deep Water Ship Channel. Other occurrences near Walnut Grove (CDFW 2017b).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Limosella australis	Delta mudwort	—	—	2B.1	Usually mud banks in riparian scrub, and freshwater or brackish marshes and swamps. Elev: 0-10 ft (0-3 m). Blooms: May-Aug (CNPS 2017).	N	All CNDDB records occur in the Delta. Nearest occurrence is over 5 miles south of the Planning Area in Snodgrass Slough north of Walnut Grove (CDFW 2017b).
Orcuttia tenuis	slender Orcutt grass	FT	SE	1B.1	Vernal pools. Elev: 115-5,774 ft (35-1,760 m). Blooms: May-Oct (CNPS 2017).	Y	Populations mapped just north of Planning Area (CDFW 2017b).
Orcuttia viscida	Sacramento Orcutt grass	FE	SE	1B.1	Vernal pools. Elev: 98-328 ft (30-100 m). Blooms: Apr-Sept (CNPS 2017).	N	Planning area outside known species range (USFWS 2005).
Sagittaria sanfordii	Sanford's arrowhead	—	—	1B.2	Assorted shallow freshwater marshes and swamps. Elev: 0-2,133 ft (0-650 m). Blooms: May-Oct (CNPS 2017).	Y	Populations mapped within waterways in the Planning Area; however, several records are suspected misidentifications, as species is easily confused with water plantain (*Alisma* spp.) when no flowers are present (CDFW 2017b).
Scutellaria galericulata	marsh skullcap	—	—	2B.2	Lower montane coniferous forest, meadows, seeps, marshes, and swamps. Elev: 0-6,890 ft (0-2,100 m). Blooms: June-Sept (CNPS 2017).	N	All CNDDB records occur in the Delta. Nearest occurrence is over 5 miles south of the Planning Area just north of Walnut Grove (CDFW 2017b).
Scutellaria laterifolia	side-flowering skullcap	—	—	2B.2	Marshes, swamps, mesic meadows, and seeps. Elev: 0-1,640 ft (0-500 m). Blooms: July-Sept (CNPS 2017).	N	All CNDDB records occur in the Delta. Nearest occurrence is over 5 miles south of the Planning Area just north of Walnut Grove (CDFW 2017b).
Symphyotrichum lentum	Suisun Marsh aster	—	—	1B.2	Brackish and freshwater marshes and swamps. Elev: 0-10 ft (0-3 m). Blooms: May-Nov (CNPS 2017).	N	Nearest populations recorded along the Sacramento Deep Water Ship Channel. Other occurrences south, throughout the Delta (CDFW 2017b).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Trifolium hydrophilum	saline clover	—	—	1B.2	Marshes and swamps, valley and foothill grassland (mesic, alkaline), and vernal pools. Elev: 0-984 ft (0-300 m). Blooms: Apr-June (CNPS 2017).	Y	Numerous populations recorded west of Planning Area in Stone Lakes (CDFW 2017b).
Invertebrates							
Branchinecta lynchi	vernal pool fairy shrimp	FT	—		Found only in vernal pools and ephemeral wetlands. Distributed throughout the Central Valley, including Sacramento County (USFWS 2005).	Y	Vernal pools and seasonal wetlands throughout the Planning Area provide suitable habitat for this species. Several occurrences mapped within the Planning Area (CDFW 2017b).
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	FT	—		Dependent on hostplant, elderberry (*Sambucus* spp.), which generally grows in riparian woodlands and upland habitats of the Central Valley. Current distribution in the Central Valley from Shasta County to Fresno County (USFWS 1999).	Y	Elderberry shrubs occur throughout the Planning Area and may act as host plants for this species. No occurrences within Planning Area; however, records are present in riparian areas along the Cosumnes River just east of the Planning Area (CDFW 2017b).
Lepidurus packardi	vernal pool tadpole shrimp	FE	—		Wide variety of ephemeral wetland habitats, including vernal pools. Distributed throughout Central Valley and San Francisco Bay Area (USFWS 2005).	Y	Vernal pools and seasonal wetlands throughout the Planning Area provide suitable habitat for this species. Several occurrences mapped within and adjacent to the Planning Area (CDFW 2017b).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Fish							
Hypomesus transpacificus	delta smelt	FT	SE		Distribution includes the Sacramento River below Isleton, San Joaquin River below Mossdale, and Suisun Bay. Spawning areas include the Sacramento River below Sacramento, Mokelumne River system, Cache Slough, the delta, and Montezuma Slough (USFWS 1996).	N	Planning Area outside known species range (UC Davis 2015).
	Critical Habitat, delta smelt	X	—			N	Critical habitat is located adjacent to the Planning Area; however, it is not present in the Planning Area.
Lampetra ayresii	river lamprey	—	SSC		Adults require clean, gravelly riffles in permanent streams for spawning, while the ammocoetes require sandy backwaters or stream edges in which to bury themselves, where water quality is continuously high and temperatures do not exceed 25°C (Moyle et al. 1995).	Y	Has been observed in Stone Lakes National Wildlife Refuge (USFWS 2006a).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Mylopharodon conocephalus	hardhead	—	SSC		Small to large streams in a low- to mid-elevation environment. May also inhabit lakes or reservoirs. Their preferred stream temperature might easily exceed 20ºC, though these fish do not favor low dissolved oxygen levels. Therefore, the hardhead minnow is usually found in clear deep streams with a slow but present flow. Though spawning may occur in pools, runs, or riffles, the bedding area will typically be characterized by gravel and rocky substrate (UC Davis 2015).	Y	Planning Area is within species range. Has been observed in Stone Lakes National Wildlife Refuge, including Laguna Creek and Morrison Creek (UC Davis 2015; USFWS 2006a).
Oncorhynchus keta	chum salmon	—	SSC		Chum salmon adults and maturing juveniles live in the open waters of the ocean, but juveniles are bottom-oriented in rivers and streams. Relatively shallow depths (13-50 cm) for spawning are preferred. Eggs and alevins occur primarily in fresh water, although spawning in intertidal areas occurs (UC Davis 2015).	N	Planning Area outside known species range (UC Davis 2015).
Oncorhynchus mykiss	Central Valley steelhead	FT	—		Spawning habitat = gravel-bottomed, fast-flowing, well-oxygenated rivers and streams. Non-spawning = estuarine, marine waters (Busby et al. 1996).	Y	Known to occur in large rivers adjacent to Planning Area; thus, may occur in Planning Area tributaries (UC Davis 2015).
	steelhead, central California coast	FT	—			N	Planning area outside species range (UC Davis 2015).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Oncorhynchus tshawytscha	Central Valley spring-run chinook salmon	FT	ST		Spawning habitat = fast moving, freshwater streams and rivers. Juvenile habitat = brackish estuaries. Non-spawning = marine waters (Myers et al. 1998).	Y	Known to occur in large rivers adjacent to Planning Area; thus, may occur in Planning Area tributaries (UC Davis 2015).
	winter-run chinook salmon, Sacramento River	FE	SE			Y	Known to occur in large rivers adjacent to Planning Area; thus, may occur in Planning Area tributaries (UC Davis 2015).
	chinook salmon, Central Valley fall/late fall-run ESU[1]	—	SSC			Y	Known to occur in large rivers adjacent to Planning Area; thus, may occur in Planning Area tributaries (UC Davis 2015).
	chinook salmon, spring-run Klamath-Trinity Rivers	—	SSC			N	Planning area outside species range (UC Davis 2015).
Pogonichthys macrolepidotus	Sacramento splittail	—	SSC		Prefer slow-moving sections of freshwater rivers and sloughs. Most abundant in Suisun Bay and Marsh region. Largely absent from Sacramento River except during spawning (USFWS 1996).	Y	Known to occur in the Sacramento River. Planning Area is within species range.
Spirinchus thaleichthys	longfin smelt	FC	ST/SSC		Adults and juveniles require salt or brackish estuary waters. Spawning takes place in freshwater over sandy-gravel substrates, rocks, and aquatic plants (Moyle et al. 1995).	N	Planning area outside known species range (UC Davis 2015).

[1] Evolutionary specific unit

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Amphibians							
Ambystoma californiense	California tiger salamander, central population	FT	ST		Occurs in grasslands of the Central Valley and oak savannah communities in the Central Valley, the Sierra Nevada and Coast Ranges, and the San Francisco Bay Area. Needs seasonal or semi-permanent wetlands to reproduce, and terrestrial habitat with active ground squirrel or gopher burrows (Bolster 2010).	N	Planning Area outside known species range (Nafis 2017).
Rana boylii	foothill yellow-legged frog	—	SSC		Frequents rocky streams and rivers with rocky substrate and open, sunny banks, in forests, chaparral, and woodlands. Sometimes found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools. From sea level to 6,700 ft (2,030 m) (Nafis 2017).	N	Waterways within the Planning Area do not provide suitable habitat for this species. Planning area outside known species range (Nafis 2017).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Rana draytonii	California red-legged frog	FT	SSC		Found mainly near ponds in humid forests, woodlands, grasslands, coastal scrub, and streamsides with plant cover. Most common in lowlands or foothills. Frequently found in woods adjacent to streams. Breeding habitat is in permanent or ephemeral water sources; lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps. Ephemeral wetland habitats require animal burrows or other moist refuges for estivation when the wetlands are dry. From sea level to 5,000 ft (1,525 m) (Nafis 2017).	N	This species is mostly extirpated from the Central Valley. Waterways within the Planning Area do not provide suitable habitat for this species (Nafis 2017).
Spea hammondii	western spadefoot	—	SSC		Open areas with sandy/gravelly soils. Variable habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Rainpools which do not contain bullfrogs, fish, or crayfish are necessary for breeding (Nafis 2017).	Y	Nearby occurrences are mostly associated with the foothills; however, Planning Area overlaps with species range (CDFW 2017b; Nafis 2017).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Reptiles							
Emys marmorata	western pond turtle	—	SSC		Found in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches, with abundant vegetation, and either rocky or muddy bottoms, in woodland, forest, and grassland. In streams, prefers pools to shallower areas. Logs, rocks, cattail mats, and exposed banks are required for basking. May enter brackish water and even seawater. Found at elevations from sea level to over 5,900 ft (1,800 m) (Nafis 2017).	Y	Waterways and open water within the Planning Area provide suitable habitat for this species. Occurrences in and adjacent to Planning Area (CDFW 2017b).
Thamnophis gigas	giant garter snake	FT	ST		Marshes, sloughs, ponds, small lakes, low gradient streams, irrigation and drainage canals, and rice fields and their associated uplands. Upland habitat should have burrows or other soil crevices suitable for snakes to reside during their dormancy period (November–mid-March). Ranges in the Central Valley from Butte County to Buena Vista Lake in Kern County. Endemic to valley floor wetlands (USFWS 2012).	Y	Waterways and open water within the Planning Area provide suitable habitat for this species. Historic occurrences in and adjacent to Planning Area (CDFW 2017b).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Birds							
Agelaius tricolor	tricolored blackbird	—	SE		Nests in wetlands or in dense vegetation near open water. Dominant nesting substrates: cattails, bulrushes, blackberry, agricultural silage. Nesting substrate must either be flooded, spinous, or in some way defended against predators (Hamilton 2004).	Y	Dense vegetation in and along waterways provides suitable habitat for this species. Several occurrences in and around the Planning Area (CDFW 2017b).
Ammodramus savannarum	grasshopper sparrow	—	SSC		In the foothills and lowlands west of the Cascades/Sierras. Dry, dense grasslands, especially those with a variety of grasses and tall forbs and scattered shrubs for singing perches (CDFW 2017e).	Y	No known occurrence within the Planning Area; however, grassland areas may provide suitable habitat for this species (CDFW 2017b).
Aquila chrysaetos	golden eagle	—	FP		Uncommon resident and migrant throughout California, except center of Central Valley. Habitat typically rolling foothills, mountain areas, sage-juniper flats, desert (CDFW 2017e).	Y	Has been observed in Stone Lakes National Wildlife Refuge (USFWS 2006a).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Athene cunicularia	burrowing owl	—	SSC		Open, flat expanses with short, sparse vegetation and few shrubs, level to gentle topography and well-drained soils. Requires underground burrows or cavities for nesting and roosting. Can use rock cavities, debris piles, pipes and culverts if burrows unavailable. Habitats include grassland, shrub steppe, desert, agricultural land, vacant lots, and pastures (CDFW 2017e).	Y	Occurrences in and around the Planning Area (CDFW 2017b). Open, sparsely vegetated areas provide suitable habitat for this species.
Buteo swainsoni	Swainson's hawk	—	ST		Nests in stands with few trees in riparian areas, juniper-sage flats, and oak savannah in the Central Valley. Forages in adjacent grasslands, agricultural fields, and pastures (CDFW 2017e).	Y	Numerous occurrences in and around the Planning Area (CDFW 2017b). Nests in large trees throughout the Planning Area, especially in riparian corridors, annual grassland, and croplands. Forages in cropland, pastures, and annual grasslands.
Chaetura vauxi	Vaux's swift	—	SSC		Prefers redwood and Douglas fir habitats with nest sites in large hollow trees and snags, especially tall, burnt-out stubs (CDFW 2017e).	N	Outside species range (Shuford and Gardali 2008).
Charadrius montanus	mountain plover	—	SSC		Overwinters in California. Frequents open plains with low, herbaceous, or scattered shrub vegetation below 3,200 ft (1,000 m) (CDFW 2017e).	Y	No known occurrence within the Planning Area; however, grassland areas may provide suitable overwintering habitat for this species (CDFW 2017b).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Circus cyaneus	northern harrier	—	SSC		Nests on the ground in patches of dense, tall vegetation in undisturbed areas. Breeds and forages in variety of open habitats such as marshes, wet meadows, weedy borders of lakes, rivers and streams, grasslands, pastures, croplands, sagebrush flats, and desert sinks (Shuford and Gardali 2008). Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas (CDFW 2017e).	Y	No CNDDB occurrences within Planning Area; however, northern harrier is known to occur in the Planning Area.
Coccyzus americanus occidentalis	western yellow-billed cuckoo	FT	SE		Requires large, dense tracts of riparian woodland with well-developed understories. Occurs in deciduous trees or shrubs. Prefers willow, but will also nest in orchards adjacent to streams in Sacramento Valley. Restricted to moist habitats along slow-moving waterways during breeding season (CDFW 2017e).	N	All CNDDB occurrences in the vicinity of the Planning Area are extirpated (CDFW 2017b). Large, dense tracts of riparian woodland do not occur in the Planning Area.
Elanus leucurus	white-tailed kite	—	FP		Typically nests in the upper third of trees that may be 10–160 ft (33-525 m) tall. These can be open-country trees growing in isolation, or at the edge of or within a forest (Cornell 2017).	Y	No CNDDB occurrences within Planning Area; however, white-tailed kite is known to occur in the Planning Area.
Grus canadensis canadensis	lesser sandhill crane	—	SSC		In summer, occurs in and near wet meadow, shallow lacustrine,	Y	Suitable habitat is present. Overwinters in irrigated pasture, cropland, and wetlands.

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Grus canadensis tabida	greater sandhill crane	—	ST/FP		and fresh emergent wetland habitats. In winter, frequents moist croplands with rice or corn stubble, and open, emergent wetlands. Prefers treeless plains. Nests in remote portions of extensive wetlands or sometimes shortgrass prairies (CDFW 2017e).	Y	Suitable habitat is present. Overwinters in irrigated pasture, cropland, and wetlands.
Haliaeetus leucocephalus	bald eagle	—	SE		Nests in large, old-growth, or dominant live tree with open branchwork, especially ponderosa pine. Requires large bodies of water or rivers with abundant fish and adjacent snags (CDFW 2017e).	N	Suitable habitat not present.
Icteria virens	yellow-breasted chat	—	SSC		Nest in early-successional riparian habitats with a well-developed shrub layer and an open canopy. Restricted to narrow border of streams, creeks, sloughs, and rivers. Often nests in dense thicket plants such as blackberry and willow (Shuford and Gardali 2008).	Y	No known occurrence within the Planning Area; however, riparian areas may provide suitable habitat for this species (CDFW 2017b).
Ixobrychus exilis	least bittern	—	SSC		Large, freshwater wetlands with dense emergent vegetation (CDFW 2017e).	Y	No known occurrence within the Planning Area; however, marshy areas may provide suitable habitat for this species (CDFW 2017b).
Lanius ludovicianus	loggerhead shrike	—	SSC		Breeds in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground. Breeds in riparian areas in the Central Valley (Shuford and Gardali 2008).	Y	No known occurrence within the Planning Area; however, suitable habitat is present (CDFW 2017b).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Laterallus jamaicensis	black rail	—	ST		Yearlong resident of saline, brackish, and fresh emergent wetlands (CDFW 2017e).	N	Planning area outside known species range (CDFW 2017e).
Melospiza melodia	song sparrow ("Modesto" population)	—	SSC		Breeds and winters in riparian, fresh or saline emergent wetland, and wet meadows. Breeds in riparian thickets of willows, other shrubs, vines, tall herbs, and fresh or saline emergent vegetation (CDFW 2017e).	Y	Numerous populations recorded west and south of the Planning Area (CDFW 2017b).
Progne subis	purple martin	—	SSC		Woodland and forest habitats with numerous suitable nest cavities, open air space above nest sites, and aerial insect prey (Shuford and Gardali 2008). Nests mostly in old woodpecker cavities, but also in human-made structures. Nests often located in tall, isolated tree/snag (CDFW 2017d).	Y	No records of this species in the Planning Area; however, there are several records of this species nesting in man-made structures north of the Planning Area in the City of Sacramento (CDFW 2017b).
Riparia riparia	bank swallow	—	ST		Riparian areas with sandy, vertical bluffs or riverbanks. Also nests in earthen banks and bluffs, as well as sand and gravel pits (CDFW 2017e).	N	Suitable habitat not present.
Setophaga petechia	yellow warbler	—	SSC		Riparian vegetation along streams and in wet meadows. Willow cover and Oregon ash important predictors of abundance in Northern California (CDFW 2017e).	Y	Riparian scrub and woodlands provide suitable nesting habitat for this specie.

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Sternula antillarum browni	California least tern	FE	SE/FP		Nests and roosts in colonies on open beaches, forages near shore ocean waters and in shallow estuaries and lagoons (USFWS 2006b).	N	Suitable habitat not present.
Vireo bellii pusillus	least Bell's vireo	FE	SE		Obligate riparian breeder. Cottonwood willow, oak woodlands, and mule fat scrub along watercourses (USFWS 1998a).	N	Only known occurrence in recent years in the vicinity of the Planning Area is in Yolo County along Putah Creek (CDFW 2017c).
Xanthocephalus xanthocephalus	yellow-headed blackbird	—	SSC		Nests in marshes with tall, emergent vegetation (e.g., tules and cattails) adjacent to deep water (Shuford and Gardali 2008).	Y	Freshwater marshes provide suitable habitat for this specie.
Mammals							
Lasiurus blossevillii	western red bat	—	SSC		Roosting habitat includes forests and woodlands, often in edge habitats adjacent to streams, fields, or urban areas (CDFW 2017e).	Y	Trees and human structures provide suitable habitat for this spece.
Sylvilagus bachmani riparius	riparian brush rabbit	FE	SE		Inhabits the brushy understory of valley riparian forests. Prefers an open canopy that allows understory shrubs (rose, grape, and blackberry) to grow and act as cover. Distribution has been reduced to a few small, fragmented populations, the largest of which is along the Stanislaus River (USFWS 1998b).	N	Planning area outside known specie range (CDFW 2017e).

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	Habitat	Potential to Occur in the Planning Area?	Comments
Taxidea taxus	American badger	—	SSC		Open shrub, forest, and herbaceous habitats with friable soils. Associated with treeless regions, prairies, park lands, and cold desert areas. Range includes most of California, except the North Coast (CDFW 2017e).	Y	Open, undeveloped areas throughout the Planning Area provide suitable habitat for this specie.

Key	
Federal & State Status	CNPS Rare Plant Rank
(FE) Federal Endangered	*Rareness Ranks*
(FT) Federal Threatened	(1A) Presumed Extinct in California, and Either Rare or Extinct Elsewhere
(FC) Federal Candidate	(1B) Rare, Threatened, or Endangered in California and Elsewhere
(FD) Federally Delisted	(2A) Presumed Extirpated in California, but More Common Elsewhere
(SE) State Endangered	(2B) Rare, Threatened, or Endangered in California, but More Common Elsewhere
(ST) State Threatened	(3) More Species Information Needed
(SSC) State Species of Special Concern	(4) Limited Distribution
(SCT) State Candidate Threatened	*Threat Ranks*
(FP) Fully Protected	(0.1) Seriously threatened in California
	(0.2) Fairly threatened in California
	(0.3) Not very threatened in California

Special-Status Plant Species

Based on database search results, 10 special-status plant species have the potential to occur in the Planning Area. Each special-status plant species that is considered in the impact analysis is described below based on the data obtained from the CNPS (2017) Inventory of Rare, Threatened, and Endangered Plants of California.

Bristly Sedge (*Carex comosa*)

Bristly sedge has a CNPS rare plant rank of 2B.1. It is not federally or State listed. This species is a perennial rhizomatous herb that blooms from May through September. It is found in a range of habitats, including coastal prairie, marshes and swamps along lake margins, and valley and foothill grassland. It occurs at elevations ranging from sea level to 2,051 feet (625 meters) above mean sea level (amsl).

Dwarf Downingia (*Downingia pusilla*)

Dwarf downingia is an annual herb with a CNPS rare plant rank of 2B.2. It is not federally or State listed. This species blooms from March through May. It is typically found growing in vernal pools or in mesic areas of valley and foothill grassland. This species ranges from sea level to 1,460 feet (445 meters) amsl. Dwarf downingia is threatened by urbanization, development, agriculture, grazing, and nonnative species.

Boggs Lake Hedge-Hyssop (*Gratiola heterosepala*)

Boggs Lake hedge-hyssop is an annual herb with a CNPS rare plant rank of 1B.2. This species has no federal listing, but is listed as endangered under the CESA. Boggs Lake hedge-hyssop blooms between April and August. It typically grows on clay soils in vernal pools and in marshes and swamps along lake margins. This species ranges from 33 to 7,792 feet (10–2,375 meters) amsl and is threatened by development, agriculture, grazing, trampling, and vehicles.

Woolly Rose-Mallow (*Hibiscus lasiocarpus* var. *occidentalis*)

Woolly rose-mallow is a perennial rhizomatous herb endemic to California. It has a CNPS rare plant rank of 1B.2 and has no federal or State listing. This species blooms from June through September and ranges in elevation from sea level to 394 feet (120 meters) amsl. It is typically found growing near freshwater marshes and swamps and is often found in riprap on the sides of levees. Woolly rose-mallow is seriously threatened by habitat disturbance, development, agriculture, recreational activities, and channelization of the Sacramento River and its tributaries.

Northern California black walnut (*Juglans hindsii*)

Northern California black walnut is a perennial deciduous tree with a CNPS rare plant rank of 1B.1 and no State or federal listing. This species blooms from April through May and ranges in elevation from sea level to 1,444 feet (440 meters) amsl. The native habitat for Northern California black walnut includes riparian forest and riparian woodland. This species has been historically cultivated as rootstock for English walnut (*Juglans regia*) orchards and very few native occurrences remain. This species is threatened by urbanization, agriculture, and hybridization with orchard trees.

Legenere (*Legenere limosa*)

Legenere is an annual herb endemic to California. It has a CNPS rare plant rank of 1B.1 and has no federal or State listing. This species blooms from April to June and ranges in elevation from sea level to 2,887 feet (880 meters) amsl. It is typically found growing in vernal pools. Legenere is threatened by grazing, road widening, nonnative plants, and development.

Heckard's Pepper-Grass (*Lepidium latipes* var. *heckardii*)

Heckard's pepper-grass is an annual herb endemic to California. It has a CNPS rare plant rank of 1B.2 and has no federal or State listing. This species blooms from March to May and ranges in elevation from 7 to 656 feet (2–200 meters) amsl. It is typically found growing on mesic, alkaline flats in valley and foothill grassland and along the edges of vernal pools.

Slender Orcutt Grass (*Orcuttia tenuis)*

Slender Orcutt grass is an annual herb that is endemic to California. It has a CNPS rare plant rank of 1B.1 and is State listed as endangered and federally listed as threatened. This species blooms from May to October and ranges in elevation from 115–5,775 feet (35–1,760 m). This species is dependent on vernal pools but may be found in artificial wetlands. This species is threatened by the decline in habitat and habitat fragmentation.

Sanford's Arrowhead (*Sagittaria sanfordii*)

Sanford's arrowhead is a California endemic herb and has a CNPS rare plant rank of 1B.2. This species has no federal or State listing. Sanford's arrowhead is a perennial rhizomatous herb that blooms between May and October. It is typically found in assorted shallow freshwater marshes and swamps at elevations ranging from sea level to 2,133 feet (650 meters) amsl. Sanford's arrowhead is threatened by grazing, development, recreational activities, nonnative plants, road widening, and channel alteration and maintenance.

Saline Clover (*Trifolium hydrophilum*)

Saline clover is an annual herb endemic to California. It has a CNPS rare plant rank of 1B.2 and has no federal or State listing. This species blooms from April through June and is found at elevations ranging from sea level to 984 feet (300 meters) amsl. Saline clover can be found growing in marshes and swamps, vernal pools, and mesic, alkaline valley, and foothill grasslands. This species is threatened by development, trampling, road construction, and vehicles.

Special-Status Wildlife Species

Based on database search results, 32 special-status wildlife species have the potential to occur in the Planning Area. Each species considered in the impact analysis is described below based on the data obtained from various published data sources.

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

The vernal pool fairy shrimp is a federally listed threatened species. Vernal pool fairy shrimp are found in disjunct, fragmented habitats distributed across the Central Valley from Shasta County to Tulare County and across the central and southern Coast Ranges from northern Solano County to Ventura County. Additional isolated occurrences have been identified in Southern California and in Oregon. Vernal pool fairy shrimp occupy a variety of different vernal pool habitats, from small, clear, sandstone rock pools to large, turbid, and alkaline grassland valley floor pools. Although the species has been collected from large vernal pools, including one exceeding 25 acres, it tends to occur in smaller pools and is most frequently found in pools measuring less than 0.05 acres (USFWS 2003).

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

The valley elderberry longhorn beetle is federally listed as a threatened species. This insect is endemic to the Central Valley of California and inhabits riparian and associated upland habitats where elderberry (*Sambucus mexicana* or *Sambucus racemosa* var. *microbotrys*), its host plant, grows. Specifically, its range includes the upper Sacramento Valley to the central San Joaquin Valley. The beetle's habitat consists of riparian forests whose dominant plant species include cottonwood (*Populus spp.*), sycamore, valley oak, and willow (*Salix* spp.), with an understory of elderberry shrubs. Blue elderberry shrubs in the Central Valley with basal stem diameters larger than 1 inch are considered potential habitat for this beetle by the USFWS.

Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)

The vernal pool tadpole shrimp is federally listed as an endangered species. Vernal pool tadpole shrimp are found in the Central Valley from Shasta County to northern Tulare County and in the central coast range from Solano County to Alameda County. This species inhabits vernal pool or other seasonally ponded habitats. Vernal pool tadpole shrimp have been collected from vernal pools ranging in size from 6.5 square feet to 88 acres. Inhabited pools have also varied widely in temperature, pH, soil type, and geologic formation (USFWS 2005).

River Lamprey (*Lampetra ayresii*)

The river lamprey is a State Species of Special Concern. This species ranges from Alaska to the San Francisco Bay; however, detailed information about its distribution is lacking. River lamprey are known to occur in the lower Sacramento and San Joaquin Rivers system and tributaries. Historically they were known to occur in Alameda and Napa River (Moyle 2002).

Hardhead (*Mylopharodon conocephalus*)

The hardhead is a State Species of Special Concern. This species is widely distributed in low- to mid-elevation streams in the Sacramento and San Joaquin drainages. In the Sacramento drainage, hardhead are known to occur in the Sacramento River and its large tributaries (Moyle 2002).

Central Valley Steelhead (*Oncorhynchus mykiss*)

The Central Valley steelhead is federally listed as threatened. This evolutionary specific unit (ESU) includes the Sacramento and San Joaquin Rivers and their tributaries. Hatchery populations from the Coleman National Fish Hatchery and the Feather River Hatchery are included in the Central Valley steelhead ESU because of the genetic similarities that exist between them and wild steelhead populations from Deer and Mill Creeks. Central Valley steelhead mature in the ocean and arrive on the spawning grounds (i.e., rivers and tributaries of the Central Valley) nearly ready to spawn. Adult migration from the ocean to spawning grounds may occur throughout the year, with peak migration occurring in the fall or early winter. Migration in the Sacramento River takes place from as early as July and runs through April, with peak migration generally occurring from September through February. Spawning begins in late December and can extend into April. Egg incubation occurs from January through June (USFWS 1996).

Central Valley Spring-run Chinook Salmon, Sacramento River Winter-run Chinook Salmon, Central Valley Fall-run Chinook Salmon (*Oncorhynchus tshawytscha*)

The Central Valley spring-run chinook salmon is listed as State and federally threatened. The Sacramento River winter run chinook salmon is listed as State and federally endangered. The Central Valley fall run chinook salmon is a State Species of Special Concern.

The ESU includes all spawning populations of fall-run chinook salmon in the Sacramento and San Joaquin River basins and their tributaries east of Carquinez Strait, California (NOAA 2009).

Fish in this ESU enter freshwater from June through December and spawn from October through April. Eggs may incubate in the gravel through the end of May. After emergence from the gravels, fry chinook salmon rear in shallow slow water habitats commonly found along stream margins, usually near some type of object cover such as woody debris, vegetation, cobbles, and other structures. As they grow larger, juvenile chinook begin to use deeper habitats with slightly higher water velocities. Downstream migration coincides with higher flows that naturally occur in the spring.

Sacramento Splittail (*Pogonichthys macrolepodotus)*

The Sacramento splittail is a California Species of Special Concern. From November through February they typically migrate upstream to spawn. They utilize floodplains for spawning habitats and by the end of April swim back downstream into brackish estuary waters. Spawning success is thus reliant on availability of flooded habitats. Sacramento splittail have been observed in the American River and largely in the Delta, but may be found in the Sacramento River during spawning (USFWS 1996).

Western Spadefoot (*Spea hammondii)*

The Western spadefoot is a California Species of Special Concern found in the southern portion of the Coast Ranges from San Luis Obispo County south to Baja California, as well as in the Central Valley and surrounding foothills. Western spadefoots are associated primarily with grasslands at elevations up to 6,400 feet (1,950 meters). This species has been found in valley-foothill hardwood woodlands and even orchard and vineyard habitats. Western spadefoots require shallow ephemeral water bodies for reproduction. Individuals are rarely seen on the surface; most of the year is spent in underground burrows (Nafis 2017).

Western Pond Turtle (*Emys marmorata*)

Western pond turtles are a designated California Species of Special Concern. This species is associated with aquatic habitats throughout California, west of the Sierra-Cascade crest, at elevations from near sea level to 5,900 feet (1,800 meters) amsl. They are mostly absent from California's desert regions, with the exception of the Mojave River and its tributaries. The western pond turtle is found in the quiet waters of ponds, marshes, creeks, and irrigation ditches. This species requires basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks. Nests are located in upland locations that may be a considerable distance (up to 0.25 mile) from the aquatic site (CDFW 2017c).

Giant Garter Snake (*Thamnophis gigas*)

The giant garter snake is a State- and federally listed threatened species. The giant garter snake is endemic to the Sacramento and San Joaquin Valleys. This species inhabits agricultural wetlands and associated waterways such as irrigation and drainage canals, rice fields, marshes, sloughs, ponds, small lakes, low-gradient streams, and adjacent uplands. Important features of these habitats include:

- Sufficient water during the snake's active season (early spring through mid-fall) to maintain an adequate prey base;
- Emergent vegetation such as cattails (*Typha* spp.) and bulrushes (*Schoenoplectus* spp.) for escape cover and foraging habitat;
- Upland habitat with grassy banks and openings to waterside vegetation for basking; and
- Adjacent upland areas that contain cover and refuge from floodwaters during the species' inactive season (USFWS 2012).

Tricolored Blackbird (*Agelaius tricolor*)

The tricolored blackbird is State-listed as endangered. Mostly a resident in California, this species is common throughout the Central Valley and coastally south of Sonoma County. Tricolored blackbirds breed near fresh water and feed in nearby grassland and cropland habitats. They prefer to nest in emergent wetlands with dense tule or cattails, but will also nest in dense thickets of blackberry (*Rubus* spp.), willow, wild rose (*Rosa californica*), or tall herbs. Tricolored blackbirds are colonial, so nesting sites must be relatively large (CDFW 2017d).

Grasshopper Sparrow *(Ammodramus savannarum)*

The grasshopper sparrow is a State Species of Special Concern. This species tends to nest on the ground in moist grasslands and meadows, and occasionally hayfields. Grasshopper sparrows forage on grass, seeds, insects, and spiders and generally forage in grasslands (CDFW 2017e).

Golden Eagle *(Aquila chrysaetos)*

The golden eagle is a California fully-protected species and is federally protected under the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the Lacey Act. Golden eagles typically inhabit rolling foothills, mountain areas, sage-juniper flats, and desert habitats from sea level up to 11,500 feet. Nest sites are typically on cliffs and in large trees in open areas (CDFW 2017c).

Burrowing Owl (*Athene cunicularia*)

The burrowing owl is a California Species of Special Concern and is federally protected under the Migratory Bird Treaty Act and as a bird of prey under the Raptor Recovery Act. Burrowing owls prefer nesting in mammal burrows in open areas of dry, open, rolling hills; grasslands; fallow fields; sparsely vegetated desert scrub with gullies, washes, and arroyos; and along the edges of human-disturbed lands. This species can also be found inhabiting golf courses, airports, cemeteries, vacant lots, and road embankments with friable soils for nesting. The elevation range for this species extends from 200 feet (60 meters) below mean sea level (bmsl) to 12,000 feet (3,636 meters) amsl at the Dana Plateau in Yosemite (Bates 2006).

Swainson's Hawk (*Buteo swainsoni*)

Swainson's hawks are listed by the State of California as threatened. Swainson's hawks are typically complete migrants in that they breed in North America and winter in South America. They typically arrive at their breeding grounds in early to mid-April and begin their southern migration in early September. The majority of breeding Swainson's hawk occurs in two disjunct populations in California—the Great Basin and the Central Valley—although they can be found in desert, shrubsteppe, grassland, and agricultural habitats across the State. This species is not an obligate riparian species; the correlation with riparian habitat is variable and dependent on the availability and distribution of suitable nest sites in proximity to high-value foraging habitat (Woodbridge 1998).

High-value foraging habitat is largely a function of prey abundance and availability. Different crop types support different levels of prey abundance, and the timing of tilling and harvest affects prey availability within each crop type. Alfalfa fields contain low prey abundance, but prey is accessible throughout the growing season due to the low stature of this crop type. Tomato and beet crops support a high prey density, but due to crop heights and density, prey access is limited to harvest periods. Fallow fields along with dry and irrigated pastures also provide important foraging habitat, whereas vineyards, mature orchards, and cotton fields contain low prey abundance and availability (Woodbridge 1998).

Mountain Plover *(Charadrius montanus)*

The mountain plover is a California Species of Special Concern. It is present in California mostly for overwintering between September and March. They can be found in short grasslands and plowed or furloughed fields in the Central Valley south of Sutter and Yuba Counties, as well as in the foothills west of San Joaquin and Imperial Valleys. They typically feed on large terrestrial insects. They often roost in ground depressions in areas with sparse vegetation and sagebrush landscapes. They typically breed in the Rocky Mountain and western Great Plains states (not California) from late April through June (Shuford and Gardali 2008).

Northern Harrier (*Circus cyaneus)*

The northern harrier is a State Species of Special Concern. This species is commonly found in open grasslands, agricultural areas, and marshes. Nests are built on the ground in areas where long grasses or marsh plants provide cover and protection. Harriers hunt for a variety of prey, including rodents, birds, frogs, reptiles, and insects, by flying low and slow in a traversing manner utilizing both sight and sound to detect prey items. Northern harriers are common in the Central Valley, especially during winter (Cornell 2017).

White-Tailed Kite (*Elanus leucurus*)

The white-tailed kite is a fully protected species. This species can be found in association with the herbaceous and open stages of a variety of habitat types. The white-tailed kite is found year-round in both the coastal zones and lowlands of the Central Valley in California. Nests are constructed near the top of dense oaks, willows, or other tree stands located adjacent to foraging areas. The species forages in undisturbed, open grasslands, meadows, farmlands and emergent wetlands. White-tailed kites are seldom observed more than 0.5 mile (0.8 km) from an active nest during the breeding season (CDFW 2017d).

Greater Sandhill Crane (*Grus canadensis tabida*) and Lesser Sandhill Crane (*Grus canadensis tabida*)

The greater sandhill crane is a State threatened and fully protected species. This species prefers open habitats such as cropland, irrigated pasture-grassland and valley grassland for foraging, and vernal pools, vernal swales, seasonal wetlands, seasonal impoundments, and freshwater marshes for roosting.

The lesser sandhill crane is a State Species of Special Concern and is a winter resident and migrant in California from mid-September to early April. This species prefers to forage in irrigated pasture, grain fields, and grasslands.

Yellow Breasted Chat *(Icteria virens)*

The yellow-breasted chat is a State Species of Special Concern. This species is a neotropical migrant that occurs in riparian or marsh habitats throughout California. Yellow-breasted chats are found in valley foothill riparian habitat with thickets of dense willow and brushy tangles near watercourses. Forage patterns usually involve gleaning insects, spiders, and berries from the foliage of shrubs and low trees. Nests are often low to the ground in dense shrubs along streams. They occur as summer breeding residents in the Sacramento River Valley and its tributaries (CDFW 2017c).

Least Bittern (*Ixobrychus exilis)*

The least bittern is a State Species of Special Concern. This species spends April to September in the Sacramento and San Joaquin Valleys (CDFW 2017e). It nests in emergent wetlands, typically in the cattails and tules. Least bitterns forage on small fish, aquatic and terrestrial insects, and crayfish.

Loggerhead Shrike (*Lanius ludovicianus)*

The loggerhead shrike is a State Species of Special Concern. This species prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches located in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats. Loggerhead shrikes skewer their prey on thorns or barbs on barbed-wire fences. The purpose of this trait may be to help kill the prey or to cache the food for later consumption. The loggerhead shrike is a common resident and winter visitor in lowlands and foothills throughout California. The species occurs year-round in both the coastal zones and lowlands of the Central Valley in California (CDFW 2017c).

Song Sparrow "Modesto" Population *(Melospiza melodia)*

The song sparrow is a State Species of Special Concern. This species is common around most of California and spends most of its time in riparian, fresh or saline emergent wetlands, and wet meadows. Song sparrows forage mostly on seeds but will also eat insects, spiders, and other small invertebrates. The Modesto population range occurs in the north-central portion of the Central Valley (Shuford and Girardi 2008).

Purple Martin (*Progne subis)*

The purple martin is a State Species of Special Concern. It spends its summer in a variety of wooded, low-elevation habitats. It is typically found in valley foothills, montane hardwood conifer, and riparian habitats. This species feeds primarily on insects while flying, but occasionally forages on the ground (CDFW 2017e).

Yellow Warbler (*Setophaga petechia)*

The yellow warbler is a California Species of Special Concern. Breeding distribution includes the Coast Range in Del Norte County, east to the Modoc plateau, south along the Coast Range to Santa Barbara and Ventura Counties, along the western slope of the Sierra Nevada south to Kern County, and along the eastern side of California from Lake Tahoe south through Inyo County. Breeding habitat includes riparian woodlands from coastal and desert lowlands up to 8,000 feet amsl in the Sierra Nevada. Other breeding habitats include montane chaparral, open ponderosa pine, and mixed conifer habitats with substantial shrub cover (CDFW 2017e).

Yellow-Headed Blackbird (*Xanthocephalus xanthocephalus)*

The yellow-headed blackbird is a State Species of Special Concern. This species breeds commonly in the Sierra Nevada, Central Valley, and selected locations along the coast. Nests are made in fresh emergent wetlands or along the edge of lakes or ponds. Yellow-headed blackbirds feed primarily on seeds and cultivated grains (Cornell 2017).

Western Red Bat *(Lasiurus blossevillii)*

The western red bat is a California Species of Special Concern. This species is common in some areas of California, occurring to the west of the Sierra Nevada/Cascade mountain ranges from Shasta County to the Mexican border. The winter range for migratory individuals and populations includes western lowlands and coastal regions south of San Francisco Bay. The migration between summer and winter ranges causes migrants to be outside of their normal range. This species prefers to roost in forests and woodlands anywhere from sea level to alpine habitat. The western red bat is not found in desert areas. They feed over grasslands, shrublands, open woodlands and forests, and croplands (CDFW 2017c).

American Badger (*Taxidea taxus*)

The American badger is a California Species of Special Concern and an uncommon resident throughout the State, except in the northern North Coast area. This species is typically associated with drier open stages of most forest, shrub, and herbaceous habitats with friable soils. Badgers find cover in burrows. American badgers regularly reuse old burrows, but some may dig a new den each night (CDFW 2017c).

5.4.2 REGULATORY FRAMEWORK

This section identifies environmental review and consultation requirements as well as permits and approvals that local, State, and federal agencies may require for future development under the General Plan.

FEDERAL

Endangered Species Act of 1973

The ESA, as amended, provides protective measures for federally listed threatened and endangered species, including their habitats, from unlawful take (16 United States Code (USC)

Sections 1531–1544). The ESA defines "take" to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Title 50, Part 222, of the Code of Federal Regulations (50 CFR Section 222) further defined "harm" to include "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including feeding, spawning, rearing, migrating, feeding, or sheltering."

ESA Section 7(a)(1) requires federal agencies to utilize their authority to further the conservation of listed species. ESA Section 7(a)(2) requires consultation with the USFWS or the National Marine Fisheries Service (NMFS) if a federal agency undertakes, funds, permits, or authorizes (termed the federal nexus) any action that may affect endangered or threatened species, or designated critical habitat. For projects that may result in the incidental "take" of threatened or endangered species, or critical habitat, and that lack a federal nexus, a Section 10(a)(1)(b) incidental take permit can be obtained from the USFWS and/or the NMFS.

Clean Water Act

The basis of the Clean Water Act (CWA) was established in 1948; however, it was referred to as the Federal Water Pollution Control Act. The act was reorganized and expanded in 1972 (33 USC Section 1251), and at this time the Clean Water Act became the act's commonly used name. The basis of the CWA is the regulation of pollutant discharges into waters of the United States, as well as the establishment of surface water quality standards.

Section 404

The Section 404(b)(1) Guidelines (40 CFR Part 230) are mandatory criteria used for evaluating discharges of dredged or fill material into WoUS. The Guidelines prohibit discharges to WoUS where a practicable alternative exists that would have fewer adverse effects on the environment, so long as the alternative does not have other significant adverse environmental effects. Project applicants must demonstrate that impacts on WoUS have been avoided to the extent possible. Compensatory mitigation is not considered during the evaluation of potentially practicable alternatives, but is typically required for unavoidable impacts on WoUS.

The primary objective of this program is to ensure that the discharge of dredged or fill material is not permitted if a practicable alternative to the proposed activities exists that results in less impact to WoUS or the proposed activity would result in significant adverse impacts to these waters. To comply with these objectives, a permittee must document the measures taken to avoid and minimize impacts to WoUS and provide compensatory mitigation for any unavoidable impacts.

The US Environmental Protection Agency (EPA) and the USFWS are assigned roles and responsibilities in the administration of this program; however, the USACE is the lead agency in the administration of day-to-day activities, including permitting. The agencies will typically assert jurisdiction over the following waters: (1) traditional navigable waters (TNW); (2) wetlands adjacent to TNWs; (3) relatively permanent waters (RPW) that are non-navigable tributaries to TNWs and have relatively permanent flow or seasonally continuous flow (typically three months); and (4) wetlands that directly abut RPWs. Case-by-case investigations are usually conducted by the agencies to ascertain their jurisdiction over waters that are non-navigable tributaries and do not contain relatively permanent or seasonal flow, wetlands adjacent to the aforementioned features, and wetlands adjacent to but not directly abutting RPWs (USACE 2007). Jurisdiction is not generally asserted over swales or erosional features (e.g., gullies or small washes characterized by low-volume/short-duration flow events) or ditches constructed wholly within and draining only uplands that do not have relatively permanent flows.

The extent of jurisdiction within WoUS, which lack adjacent wetlands, is determined by the ordinary high-water mark (OHWM). The OHWM is defined in 33 CFR Section 328.3(e) as the "line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." Wetlands are further defined under 33 CFR Section 328.3 and 40 CFR Section 230.3 as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions"; these typically include "swamps, marshes, bogs, and similar areas." The USACE (1987) *Corps of Engineers Wetland Delineation Manual* (1987 Manual) sets forth a standardized methodology for delineating the extent of wetlands under federal jurisdiction.

The 1987 Manual outlines three parameters that all wetlands, under normal circumstances, must contain positive indicators for it to be considered jurisdictional: (1) wetland hydrology, (2) hydrophytic vegetation, and (3) hydric soils. In 2006, the USACE issued a series of regional supplements to address regional differences that are important to the functioning and identification of wetlands. The supplements present "wetland indicators, delineation guidance, and other information" that is specific to the region. The USACE requires that wetland delineations submitted after June 5, 2007, be conducted in accordance with both the 1987 Manual and the applicable supplement.

Section 401

Under CWA Section 401 (33 USC Section 1341), federal agencies are not authorized to issue a permit and/or license for any activity that may result in discharges to WoUS, unless a state or tribe where the discharge originates either grants or waives CWA Section 401 certification. CWA Section 401 provides states or tribes with the ability to grant, grant with conditions, deny, or waive certification. Granting certification, with or without conditions, allows the federal permit/license to be issued and remain consistent with any conditions set forth in the CWA Section 401 certification. Denial of the certification prohibits the issuance of the federal license or permit, and waiver allows the permit/license to be issued without state or tribal comment. Decisions made by states or tribes are based on the proposed project's compliance with EPA water quality standards as well as applicable effluent limitations guidelines, new source performance standards, toxic pollutant restrictions, and any other appropriate requirements of state or tribal law. In California, the State Water Resources Control Board is the primary regulatory authority for CWA Section 401 requirements (additional details below).

Migratory Bird Treaty Act

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC Sections 703–711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Section 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR Section 21). The majority of birds found in the Project vicinity would be protected under the MBTA.

Bald and Golden Eagle Protection Act

The bald eagle and golden eagle are federally protected under the Bald and Golden Eagle Protection Act (16 USC Sections 668–668c). Under the act, it is illegal to take, possess, sell, purchase, barter, offer to sell or purchase or barter, transport, export, or import at any time or in any manner a bald or golden eagle, alive or dead, or any part, nest, or egg of these eagles, unless authorized by the Secretary of the Interior. Violations are subject to fines and/or imprisonment for up to one year. Active nest sites are also protected from disturbance during the breeding season.

Executive Order 13112 – Invasive Species

This executive order directs all federal agencies to refrain from authorizing, funding, or carrying out actions or projects that may spread invasive species. The order further directs federal agencies to prevent the introduction of invasive species; control and monitor existing invasive species populations; restore native species to invaded ecosystems; research and develop prevention and control methods for invasive species; and promote public education on invasive species.

Fish and Wildlife Coordination Act of 1958 (16 USC 661 et seq.)

The Fish and Wildlife Coordination Act requires that whenever any body of water is proposed or authorized to be impounded, diverted, or otherwise controlled or modified, the lead federal agency must consult with the USFWS, the State agency responsible for fish and wildlife management, and the NMFS. Section 662(b) of the act requires the lead federal agency to consider the recommendations of the USFWS and other agencies. The recommendations may include proposed measures to mitigate or compensate for potential damages to wildlife and fisheries associated with a modification of a waterway.

Executive Order 11990 Protection of Wetlands (42 FR 26961, May 25, 1977)

Executive Order 11990 requires federal agencies to provide leadership and take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural qualities of these lands. Federal agencies are required to avoid undertaking or providing support for new construction located in wetlands unless (1) no practicable alternative exists and (2) all practical measures have been taken to minimize harm to wetlands.

STATE

California Endangered Species Act

Under the CESA, the CDFW has the responsibility for maintaining a list of endangered and threatened species (FGC Section 2070). The CDFW also maintains a list of "candidate species," which are species formally noticed as being under review for potential addition to the list of endangered or threatened species, and a list of "Species of Special Concern," which serve as species "watch lists."

Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present and determine whether the proposed project will impact such species. In addition, the CDFW encourages informal consultation on any proposed project that may impact a candidate species.

"Take" of protected species incidental to otherwise lawful management activities may be authorized under FGC Section 206.591. Authorization from the CDFW would be in the form of an incidental take permit.

California Fish and Game Code

Streambed Alteration Agreement (FGC Sections 1600–1607)

State and local public agencies are subject to FGC Section 1602, which governs construction activities that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated as waters of the State by the CDFW. Under FGC Section 1602, a discretionary Streambed Alteration Agreement must be issued by the CDFW prior to the initiation of construction within lands under CDFW jurisdiction.

Native Plant Protection Act

The Native Plant Protection Act (FGC Sections 1900–1913) prohibits the take, possession, or sale in the State of any plants with a State designation of rare, threatened, or endangered (as defined by the CDFW). An exception in the act allows landowners, under specified circumstances, to take listed plant species, provided that the owners first notify the CDFW and give the CDFW at least 10 days to retrieve the plants before they are plowed under or otherwise destroyed (FGC Section 1913).

Birds of Prey

Under FGC Section 3503.5, it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this Code or any regulation adopted pursuant thereto.

Fully Protected Species

California statutes also afford "fully protected" status to a number of specifically identified birds, mammals, reptiles, and amphibians. These species cannot be "taken," even with an incidental take permit. FGC Sections 3505, 3511, 4700, 5050, and 5515 protect from take a number of fully protected birds, mammals, reptiles, amphibians, and fish.

California Wetlands and Other Waters

The California Natural Resources Agency and its various departments do not authorize or approve projects that fill or otherwise harm or destroy coastal, estuarine, or inland wetlands. Exceptions may be granted if all of the following conditions are met:

- The project is water-dependent.
- No other feasible alternative is available.
- The public trust is not adversely affected.
- Adequate compensation is proposed as part of the project.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1966 (California Water Code Section 13000 et seq.; CCR Title 23, Chapter 3, Subchapter 15) is the primary State regulation that addresses water quality. The requirements of the act are implemented by the State Water Resources Control Board at the State level and by nine Regional Water Quality Control Boards (RWQCB) at the local level. The RWQCBs carry out planning, permitting, and enforcement activities related to water quality in California. The act provides for waste discharge requirements and a permitting system for discharges to land or water. Certification is required by the RWQCBs for activities that can affect water quality.

Clean Water Act, Section 401 Water Quality Certification

CWA Section 401 (33 USC Section 1341) requires that any applicant for a federal license or permit, which may result in a pollutant discharge to WoUS, obtain state certification that the discharge will comply with EPA water quality standards. The state or tribal agency responsible for issuing of the Section 401 certification may also require compliance with additional effluent limitations and water quality standards set forth in state/tribal laws. In California, the RWQCB is the primary regulatory authority for CWA Section 401 requirements.

The Central Valley RWQCB is responsible for enforcing water quality criteria and protecting water resources in the Planning Area. In addition, the RWQCB is responsible for controlling discharges to surface waters of the State by issuing waste discharge requirements or commonly by issuing conditional waivers to waste discharge requirements. The RWQCB requires that a project proponent obtain a CWA Section 401 water quality certification for CWA Section 404 permits issued by the USACE.

State Definition of Covered Waters

California Water Code Section 13050(e) defines waters of the State as "any surface water or groundwater, including saline waters, within the boundaries of the state." Therefore, water quality laws apply to both surface water and groundwater. After the US Supreme Court decision in *Solid Waste Agency of Northern Cook County v. US Army Corps of Engineers, 531 U.S. 159* (2001), the Office of Chief Counsel of the State Water Resources Control Board released a legal memorandum confirming the State's jurisdiction over isolated wetlands. The memorandum stated that under Porter-Cologne, discharges to wetlands and other waters of the State are subject to State regulation, and this includes isolated wetlands. In general, the State Water Resources Control Board regulates discharges to isolated waters in much the same way as it does for WoUS, using Porter-Cologne rather than CWA authority.

LOCAL

City of Elk Grove Municipal Code

Tree Preservation and Protection

Municipal Code Chapter 19.12, Tree Preservation and Protection, strives to protect and preserve trees of local importance, including coast live oak, valley oak, blue oak, interior live oak, oracle oak, California sycamore, and California black walnut with a single trunk 6 inches diameter at breast height (dbh) or greater or multiple trunks with a combined dbh of 6 inches or greater. Chapter 19.12 requires mitigation for the removal of trees of local importance with dimensions described above, trees that have been selected for preservation, all portions of adjacent off-site native trees that have driplines that extend onto a project site, and all off-site native trees that may be impacted by utility installation and/or improvements associated with a project. Current policies require that every inch lost will be mitigated by an inch planted or equivalent credit obtained from a tree mitigation bank.

Swainson's Hawk Impact Mitigation Fees

Municipal Code Chapter 16.130, Swainson's Hawk Impact Mitigation Fees, is aimed at mitigating impacts from typical urban development projects and requires mitigation for the loss of Swainson's hawk habitat at a 1:1 ratio. Mitigation can be achieved through purchase of City-owned credits for projects 40 acres or less. For projects larger than 40 acres, options for achieving mitigation through the code include the direct transfer to the City of a Swainson's hawk habitat conservation easement along with an easement monitoring endowment; or the purchase of credits at a CDFW-approved conservation bank. The easement must be surveyed to determine whether it is suitable Swainson's hawk foraging habitat.

OTHER

Proposed South Sacramento County Habitat Conservation Plan

The purpose of the proposed South Sacramento County Habitat Conservation Plan (SSHCP) is to encourage and simplify the process of conserving sensitive habitats for special-status species within the southern portion of the county. This would be accomplished by creating a streamlined process for incidental take authorization under both the federal and California ESA, permitting under Section 404 of the federal CWA, quality certification under Section 401 of the federal CWA, and Lake and Streambed Alteration Agreements under Section 1602 of the FGC. Land developers that convert habitat within the urban services boundary would pay a defined per-acre fee to mitigate impacts; these fees would be used to protect, restore, maintain, and monitor habitat. Species analyzed in the plan include white-tailed kite, northern harrier, tricolored blackbird, giant garter snake, vernal pool fairy shrimp, and Sanford's arrowhead. The complete list can be found on the Sacramento County Planning and Community Development Department website (Sacramento County 2018).

A public review draft of the SSHCP and Implementing Agreement, as well as the associated joint draft Environmental Impact Statement/EIR, and draft Aquatic Resources Program, were released for agency and public review on June 2, 2017. However, the SSHCP has not yet been adopted. The City is not a party to the HCP; however, it may be able to utilize the benefits of its mitigation.

California Native Plant Society

The CNPS is a nongovernmental agency that ranks native plant species according to current population distribution and threat level in regard to extinction. These data are utilized by the CNPS to create/maintain a list of native California plants that have low numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the *Inventory of Rare, Threatened, and Endangered Vascular Plants of California* (CNPS 2017). Potential impacts to populations of CNPS-listed plants receive consideration under CEQA review.

The following identifies the definitions of the CNPS ranks:

- **List 1A**: Plants believed to be extinct, and either rare or extinct elsewhere
- **List 1B**: Plants that are rare, threatened, or endangered in California and elsewhere

- **List 2A:** Plants that are presumed extirpated in California, but are more numerous elsewhere
- **List 2B**: Plants that are rare, threatened, or endangered in California, but are more numerous elsewhere

All of the plant species on Lists 1 and 2 meet the requirements of the Native Plant Protection Act Section 1901, Chapter 10, or FGC Section 2062 and Section 2067, and are eligible for State listing. Plants appearing on Lists 1 or 2 are considered to meet the criteria of CEQA Section 15380, and effects on these species are considered "significant." Classifications for plants on List 3 (plants about which we need more information) and/or List 4 (plants of limited distribution), as defined by the CNPS, are not currently protected under State or federal law. Therefore, no detailed descriptions or impact analyses were completed for species with these classifications.

5.4.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or the USFWS.
2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or the USFWS.
3) Have a substantial adverse effect on state or federally protected wetlands, including but not limited to, marsh, vernal pool, coastal, or similar through direct removal, filling, hydrological interruption, or other means.
4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
6) Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.
7) Reduce the number or restrict the range of an endangered, rare, or threatened plant or animal species or biotic community, thereby causing the species or community to drop below self-sustaining levels.

METHODOLOGY

The following evaluation of the proposed Project's potential biological resources impacts is based on a review of relevant documents, including the City's current General Plan, current and historical mapping and aerial photographs, and a review of available information regarding current habitat types and land covers in the Planning Area.

General Plan Policies and Standards

The proposed Project contains the following policies and standards for managing future development in the Planning Area to protect biological resources.

Policy NR-1-2: Preserve and enhance natural areas that serve, or may potentially serve, as habitat for special-status species. Where preservation is not possible, require that appropriate mitigation be included in the project.

Standard NR-1-2a: Require a biological resources evaluation for private and public development projects in areas identified to contain or possibly contain special-status plant and animal species.

Standard NR-1-2b: Require development projects to retain movement corridor(s) adequate (both in size and in habitat quality) to allow for the continued wildlife use based on the species anticipated in the corridor.

Policy NR-1-3: Support the establishment of multipurpose open space areas to address a variety of needs, including but not limited to maintenance of agricultural uses, wildlife habitat, recreational open space, aesthetic benefits, and flood control. To the extent possible, lands protected in accordance with this policy should be in proximity to Elk Grove to facilitate use of these areas by Elk Grove residents, assist in mitigation of habitat loss within the City, and provide an open space resource close to the urbanized areas of Elk Grove.

Policy NR-1-4: Avoid impacts to wetlands, vernal pools, marshland, and riparian (streamside) areas unless shown to be technically infeasible. Ensure that no net loss of wetland areas occurs, which may be accomplished by avoidance, revegetation, and restoration on-site or through creation of riparian habitat corridors.

Policy NR-1-5: Encourage the retention of natural stream corridors, and the creation of natural stream channels where improvements to drainage capacity are required.

Standard NR 1-5a: Stream crossings shall be minimized and be aesthetically compatible with the natural appearance of the stream channel. The use of bridges and other stream crossings with natural (unpaved) bottoms shall be encouraged to minimize impacts to natural habitat.

Standard NR 1-5b: Uses in the stream corridors shall be limited to recreation and agricultural uses compatible with resource protection and flood control measures. Roads, parking, and associated fill slopes shall be located outside of the stream corridor, except at stream crossings.

Standard NR 1-5c: Open space lands within a stream corridor shall be required to be retained as open space as a condition of development approval for projects that include a stream corridor. Unencumbered maintenance access to the stream shall be provided.

Policy NR-1-6: Consider the adoption of habitat conservation plans for rare, threatened, or endangered species.

Policy NR-1-8: Encourage development clustering where it would facilitate on-site protection of woodlands, grasslands, wetlands, stream corridors, scenic areas, or other appropriate features such as active agricultural uses and historic or cultural resources under the following conditions and requirements. Except as provided below, clustering shall not be allowed in the Sheldon Rural Area.

- Urban infrastructure capacity is available for urban use. If clustering is allowed in the Rural Area, those properties shall be exempt from providing urban water and sewer connections in accordance with the policies of the Sheldon/Rural Area Community Plan (see Chapter 9).
- On-site resource protection is appropriate and consistent with other General Plan policies.
- The architecture and scale of development are appropriate for and consistent with the intended character of the area.
- Development rights for the open space area are permanently dedicated and appropriate long-term management, with funding in perpetuity, is provided for by a public agency or another appropriate entity.

Policy NR-2-1: Preserve large native oak and other native tree species as well as large nonnative tree species that are an important part of the City's historic and aesthetic character.

Policy NR-2-2: Maximize and maintain tree coverage on public lands and in open spaces.

Policy NR-2-3: Ensure that trees function as an important part of the City's or a neighborhood's aesthetic character or as natural habitat on public and private land that are retained or replaced to the extent possible during the development of new structures, roadways (public and private including roadway widening), parks, drainage channels, and other uses and strictures.

Policy NR-2-4: Maintain and enhance an urban forest by preserving and planting trees in appropriate densities and locations to maximize energy conservation and air quality benefits.

Policy NR-3-1: Ensure that the quality of water resources (e.g. groundwater, surface water) is protected to the extent possible.

Policy PT-2-6: Locate trails which parallel streams beyond riparian corridors and wetlands to minimize wildlife impacts and restrict such trails to nonmotorized traffic.

Policy LU-3-22: Identify a mitigation program for critical habitat for special status species known to occur within the Study Areas. A proposed project determined to have a significant impact to habitat for special-status species shall implement all feasible mitigation measures established in the program, including but not limited to land dedication (which may be located either inside or outside the corresponding Study Area) or fee payment, or both.

Policy LU-3-9: Public, Open Space, and Conservation land uses in Open Space/Conservation Districts should meet the following guidelines:

- Provide a buffer between residential, commercial, and industrial uses.
- In areas designed to promote open space or recreational uses over conservation uses, provide nonvehicular access points within one-half mile of all residential uses.
- Be publicly accessible and, where feasible, be integrated with surrounding land uses.
- Maximize connectivity for both humans and animal life by connecting to an integrated network of passive and active open space corridors and uses.
- Contain all areas located in the 100-year or 200-year floodplain, unless this would result in "islanding" of higher-density land uses. Areas located in the 100-year or 200-year floodplain shall be retained for agriculture if it is the existing use, continues to be economically viable, and would not result in islanding of higher-density land uses.

PROJECT IMPACTS AND MITIGATION MEASURES

Impacts to Endangered, Threatened, Candidate or Rare Species (Standards of Significance 1 and 7)

Impact 5.4.1 Implementation of the proposed Project could result in adverse effects, either directly or indirectly, on species listed as endangered, threatened, rare, proposed, and candidate plants and wildlife. This impact would be **potentially significant.**

The Planning Area contains suitable habitat for plant and wildlife species listed as endangered, threatened, rare, or proposed, or candidates for listing (listed species). Species with these designations are either rare or endangered or threatened with extinction. Reasons for population declines in these species are numerous but are largely related to habitat loss. Impacts from buildout in the current City limits under the proposed Project land use designations are presented quantitatively. **Table 5.4-1** lists land cover types in the City limits and Study Areas that could be built out under proposed land use designations of the proposed Project. The land cover in the proposed Study Areas is largely undeveloped and provides large, contiguous areas of habitat for special-status species; therefore, future buildout in the proposed Study Areas would also result in impacts to listed species. Most direct impacts would occur from development of nonnative annual grassland, vernal pools, wetlands, and other WoUS, waters of the State, riparian communities, and oak woodlands; however, impacts to any community could also result in impacts on special-status species. The bolded names in **Table 5.4-3** are listed species that are associated with the land cover types in the Planning Area.

Development of parcels and associated structures in the Planning Area could result in disturbance and habitat loss for special-status bat and bird species. Indirect impacts may also occur, such as habitat modification, increased human/wildlife interactions, habitat fragmentation, encroachment by exotic weeds, and area-wide changes in surface water flows and general hydrology due to development of previously undeveloped areas.

TABLE 5.4-3
SPECIAL-STATUS SPECIES AND THEIR ASSOCIATED VEGETATIVE COMMUNITY

Vegetation Community	Special-Status Species	
Urban*	**Swainson's hawk** (N) burrowing owl	white-tailed kite western red bat
Rural Development**	**Swainson's hawk** (F, N) burrowing owl mountain plover (W)	white-tailed kite western red bat
Cropland	**Swainson's hawk (F)** **tricolored blackbird (N)** golden eagle (F) burrowing owl northern harrier peregrine falcon (F)	**greater sandhill crane (W)** lesser sandhill crane (W) short-eared owl (F) mountain plover (W) white-tailed kite (F)
Irrigated Pasture	**Swainson's hawk (F)** loggerhead shrike golden eagle (F) burrowing owl northern harrier peregrine falcon (F)	**greater sandhill crane (W)** lesser sandhill crane (W) short-eared owl (F) mountain plover (W) white-tailed kite (F)
Vineyard	Does not provide habitat for special-status species	
Orchard	Does not provide habitat for special-status species	
Annual Grassland	**dwarf downingia** **saline clover** **Swainson's hawk (F)** **giant garter snake (A, N)** **tricolored blackbird** western pond turtle (A, N) loggerhead shrike short-eared owl (F) mountain plover (W) white-tailed kite (F) peregrine falcon (F)	**bristly sedge** **Heckard's pepper grass** **greater sandhill crane (W)** lesser sandhill crane (W) western spadefoot (A, F) grasshopper sparrow (N) golden eagle (F) burrowing owl northern harrier American badger
Blue Oak Woodland	**Swainson's hawk (N)** western pond turtle (A, N) loggerhead shrike white-tailed kite (N) western red bat	western spadefoot (A, F) grasshopper sparrow (N) golden eagle (F) short-eared owl (F, N) American badger
Mixed Riparian Scrub	**valley elderberry longhorn beetle** **giant garter snake (A, N)** loggerhead shrike white-tailed kite yellow-breasted chat western red bat	western pond turtle (A, N) **tricolored blackbird (N)** short-eared owl (F, N) peregrine falcon (N) yellow warbler

Vegetation Community	Special-Status Species	
Mixed Riparian Woodland	**Northern California black walnut** **Swainson's hawk (N)** **valley elderberry longhorn beetle** loggerhead shrike white-tailed kite (N) yellow warbler	western red bat western pond turtle (A, N) **tricolored blackbird (N)** short-eared owl (F, N) peregrine falcon (N) yellow-breasted chat
Valley Oak Riparian Woodland	**Swainson's hawk (N)** **valley elderberry longhorn beetle** loggerhead shrike white-tailed kite (N) western pond turtle (A, N)	**tricolored blackbird (N)** short-eared owl (F, N) peregrine falcon (N) western red bat
Vernal Pool	**Boggs Lake hedge-hyssop** **legenere** **slender Orcutt grass** **Vernal pool fairy shrimp** **Vernal pool tadpole shrimp**	**dwarf downingia** **Heckard's pepper grass** **saline clover** western spadefoot (B)
Seasonal Wetland	**bristly sedge** **dwarf downingia** **Heckard's pepper grass** **saline clover** **vernal pool fairy shrimp**	**vernal pool tadpole shrimp** **Boggs Lake hedge-hyssop** **legenere** **slender Orcutt grass** western spadefoot (B)
Freshwater Marsh	**bristly sedge** **woolly rose mallow** **saline clover** **giant garter snake (B, F)** **tricolored blackbird (N)** western pond turtle (B, F) northern harrier least bittern yellow-headed blackbird	**Boggs Lake hedge-hyssop** **Sanford's arrowhead** **greater sandhill crane (W)** lesser sandhill crane (W) river lamprey golden eagle (F) short-eared owl (F) peregrine falcon (F)
Open Water	**Sanford's arrowhead** **Giant garter snake (B, F)** river lamprey **Central Valley steelhead**	Western pond turtle (B, F) Hardhead **Chinook salmon** Sacramento splittail
Stream***	**bristly sedge** **woolly rose mallow** **giant garter snake (B, F)** river lamprey **Central Valley steelhead** **Boggs Lake hedge-hyssop**	**Sanford's arrowhead** western pond turtle hardhead **Chinook salmon** Sacramento splittail

** Northern California black walnut is found in urban area; however, these are planted and not part of native stands.*
*** Rural development may include species found in annual grassland communities.*
**** Includes stream banks.*
*****Bolded species are considered "Listed" as referenced in the impact analyses.*
Source: CDFW 2017b; USFWS 2015a; data compiled by Michael Baker International 2015
KEY: *A = Aestivation; B = Breeding, F = Foraging, N = Nesting, W = Wintering*
Note: Species with no letters use habitat for entire life cycle, except the anadromous fish which spend portion of life in the ocean

Much of the development planned in the current City limits would occur within existing community and specific plan areas that have been planned to avoid impacts to special-status species habitat where practicable, and were evaluated under CEQA in various documents (e.g., Laguna Ridge Specific Plan EIR, Southeast Policy Area Strategic Plan EIR). Development in these areas would continue to be subject to mitigation measures identified in those documents to reduce impacts to habitat. Other development outside of areas covered by specific plans or areas not covered by an existing project approval would be subject to the policies and standards in the General Plan Update. Development in the proposed Study Areas would be planned as part of future community plans, which would be similarly planned to avoid impacts to significant biological resources, where practicable, and would be subject to further CEQA review and the resulting program- and project-level mitigation measures to address identified impacts.

Existing Laws, Regulations, and Proposed General Plan Policies and Standards That Provide Mitigation

Future development in the Planning Area would be subject to regulations protecting biological resources at the federal, State, regional, and local levels. Pursuant to the requirements of the CESA, project applicants must determine whether any State-listed endangered or threatened species may be present and evaluate whether the proposed project will impact such species. "Take" of protected species incidental to otherwise lawful management activities may be authorized under FGC Section 206.591. Authorization from the CDFW would be in the form of an incidental take permit. However, under FGC Section 3503.5, it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this Code or any regulation adopted pursuant thereto.

California statutes afford "fully protected" status to a number of specifically identified birds, mammals, reptiles, and amphibians. These species cannot be "taken," even with an incidental take permit. FGC Sections 3505, 3511, 4700, 5050, and 5515 protect from take a number of fully protected birds, mammals, reptiles, amphibians, and fish.

Individual projects would also be required to obtain permits as described above under the regulatory setting. Federal and State permitting requirements would include consultation with appropriate agencies and implementation of mitigation measures to address direct and indirect impacts to special-status species and associated habitat. The City's Tree Preservation and Protection Code (Municipal Code Chapter 19.12) and Swainson's Hawk Code (Municipal Code Chapter 16.130) provide further protection of special-status species and habitat.

Development in community and specific plan areas (e.g., Laguna Ridge Specific Plan and Southeast Area Strategic Plan would continue to be subject to mitigation measures identified in those documents to reduce impacts to habitat.

The proposed Project includes goals, policies, and standards that would further minimize direct and indirect impacts on special-status species. Standard NR-1-2a would require a biological resources evaluation for private and public development projects to identify the potential for the presence of special-status plant and animal species. Policies PT-2-6, NR-1-2, and NR-1-3 would result in the avoidance, preservation, and/or enhancement of habitat for special-status species. Policy NR-1-4 would ensure no net loss of wetlands. Policies NR-2-1, NR-2-2, NR-2-3, and NR-2-4 would result in the preservation of trees, tree cover, and functionality of tree locations and, therefore, provide habitat for special-status nesting birds. Policy NR-3-1 would ensure the quality of water resources, which are utilized by special-status species. Policy NR-1-6 would introduce the consideration of a habitat conservation plan, which would serve to protect special-status species. Under Policy LU-3-22, a mitigation program for critical habitat for special status species known to occur within the Study Areas would be identified. This would require that a proposed project determined to have a significant impact to habitat for special-status species must implement all feasible mitigation measures established in the program, including but not limited to land dedication (which may be located either inside or outside the corresponding Study Area) or fee payment, or both.

Conclusion

The Planning Area contains suitable habitat for plant and wildlife species listed as endangered, threatened, rare, or proposed, or candidates for listing (listed species). Future development, particularly in the Study Areas, which are largely undeveloped, could result in direct and indirect impacts on species or habitat.

Though application of existing regulations and proposed Project policies and standards would reduce impacts to listed species, individual species populations would experience habitat losses where creation and enhancement of habitat is not feasible, thereby causing an overall reduction in available habitat. Therefore, impacts to special-status species would be **potentially significant**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies and standards.

Implementation of existing regulations and proposed General Plan policies would help reduce direct and indirect impacts to listed species in the Planning Area. Nonetheless, an overall loss of listed species and their habitats would still occur with development in the Planning Area. Therefore, implementation of the proposed Project would result in a **significant and unavoidable** impact to special-status species.

Impacts to Non-Listed Special Status Species (Standard of Significance 1)

Impact 5.4.2 Implementation of the proposed Project could result in adverse effects, either directly or indirectly, on non-listed special status species (Species of Special Concern, fully protected, and locally important). This impact would be **potentially significant.**

As discussed in **Impact 5.4.1**, the Planning Area contains suitable habitat for many plant and wildlife species. **Table 5.4-3** lists the non-listed special-status species and their associated habitat. Fully protected species and Species of Special Concern may have declining populations but are not facing imminent extinction. **Table 5.4-3** lists land cover types in the City limits that could be built out under the proposed Project. The land cover existing in the proposed Study Areas (**Table 5.4-1**) is largely undeveloped and provides large, contiguous areas of habitat for special-status species. Future buildout in the proposed Study Areas would also result in impacts to non-listed special-status species.

As presented for listed species, redevelopment of parcels within the Planning Area that contain structures could result in disturbance and habitat loss for special-status bat and bird species. Indirect impacts may also occur, such as habitat modification, increased human/wildlife interactions, habitat fragmentation, encroachment by exotic weeds, and area-wide changes in surface water flows and general hydrology due to development of previously undeveloped areas.

Existing Laws, Regulations, and Proposed General Plan Policies and Standards That Provide Mitigation

As described in Impact 5.4-1, above, there are numerous federal and state laws and regulations concerning protected species and habitat and permitting requirements with which project applicants would be required to comply.

The proposed Project includes goals, policies, and standards that would further minimize direct and indirect impacts on special-status species. Standard NR-1-2a would require a biological resources evaluation for private and public development projects to identify the potential for the presence of special-status plant and animal species. Policies PT-2-6, NR-1-2, and NR-1-3 would result in the avoidance, preservation, and/or enhancement of habitat for special-status species. Policy NR-1-4 would ensure no net loss of wetlands. Policies NR-2-1, NR-2-2, NR-2-3, and NR-2-4 would result in the preservation of trees, tree cover, and functionality of tree locations and, therefore, provide habitat for special-status nesting birds. Policy NR-3-1 would ensure the quality of water resources, which are utilized by special-status species. Policy NR-1-6 would introduce the consideration of a habitat conservation plan, which would serve to protect special-status species.

Conclusion

Future buildout, particularly in the Study Areas where there are large, contiguous areas for special-status species habitat, could result in disturbance and/or habitat loss. Though application of regulations and proposed Project policies and standards would reduce impacts to non-listed special-status species, individual species populations would experience habitat losses where creation and enhancement of habitat is not feasible. Therefore, impacts to these species would be **potentially significant**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies and standards.

Implementation of the above policies and standards would reduce direct and indirect impacts to non-listed species in the Planning Area. Nonetheless, an overall loss of species and their habitats would still occur with development in the Planning Area. Therefore, implementation of the proposed Project would result in a **significant and unavoidable** impact to special-status species.

Impacts to Riparian Habitat, Sensitive Natural Communities, or Protected Wetlands (Standards of Significance 2 and 3)

Impact 5.4.3 Implementation of the proposed Project could result in the loss of riparian vegetation, sensitive natural communities, and/or state or federally protected wetlands. This impact would be **less than significant**.

Sensitive habitats include those that are of special concern to resource agencies and those that are protected under CEQA, Section 1600 of the FGC, and Section 404 of the CWA. **Table 5.4-1** provides an estimate of aquatic and riparian land cover types in Planning Area. Aquatic land cover types may be linear, as in stream and creek corridors, or appear as inclusions on a larger land cover type. Based upon aquatic land cover type configuration in the landscape, many of these features can be avoided during project development and design.

Vernal pools, wetlands, other WoUS, waters of the State, riparian communities, oak woodland, and Swainson's hawk foraging habitat provide suitable habitat for listed species in the Planning Area. They also provide suitable habitat for non-listed special-status and common species, including a variety of waterfowl and migratory passerines.

Existing Laws, Regulations, and Proposed General Plan Policies That Provide Mitigation

The RWQCB requires that a project proponent obtain a CWA Section 401 water quality certification for CWA Section 404 permits issued by the USACE. Under FGC Section 1602, a discretionary Streambed Alteration Agreement must be issued by the CDFW prior to the initiation of construction on lands with resources under CDFW jurisdiction.

The proposed Project includes policies that would minimize impacts on riparian habitat, sensitive natural communities, and protected wetlands. **Policy NR-1-3** would preserve and enhance some of these communities. **Policy NR-1-4** would ensure no net loss of wetland areas and avoid impacts to wetlands, vernal pools, marshlands, and riparian areas. **Policy NR-1-8** encourages development design to protect sensitive natural communities.

Conclusion

Future construction under the proposed Project could have the potential to substantially adversely affect riparian habitat, state or federally protected wetlands, and/or other sensitive natural communities identified in local or regional plans, policies, or regulations, by the CDFW or by the USFWS. However, compliance with existing regulations and application of the proposed Project policies, including those that require preservation and enhancement of some of these communities, ensuring no net loss of wetland areas and avoiding impacts to wetlands, vernal pools, marshlands, and riparian areas, would reduce impacts to riparian habitat, sensitive natural communities, and protected wetlands. This impact would be **less than significant**.

Mitigation Measures

None required beyond compliance with existing regulations and proposed General Plan policies.

Impacts to Wildlife Movement (Standard of Significance 4)

Impact 5.4.4 Implementation of the proposed Project could interfere with wildlife movement. This impact would be **less than significant**.

Wildlife corridors provide connectivity between open space areas, are present in a variety of habitats, and link areas of suitable wildlife habitat that are otherwise separated by human disturbance. Wildlife movement likely encompasses agricultural and rural areas, and adjacent open spaces. In addition, drainages and associated riparian corridors throughout the Planning Area likely facilitate wildlife movement. The edges of the Planning Area and adjacent open spaces facilitate local and regional movement. Future development that converts open space or encroaches on open space could result in alteration or loss of movement corridors.

Proposed General Plan Policies and Standards That Provide Mitigation

The proposed Project includes policies and standards to help reduce impacts to wildlife movement and corridors. Standard NR-1-2a would require a biological resources evaluation for private and public development projects, which would help determine if wildlife corridors could be affected. Standard NR-1-2b requires development projects to retain movement corridors to allow for continued wildlife use by those species anticipated in the corridor. Policy PT-2-6 would help maintain wildlife movement corridors by restricting travel to nonmotorized traffic. Policy NR-2-4 would help maintain and enhance urban forests, which provide cover for wildlife movement. Policy LU-3-9 directs that Public, Open Space, and Conservation land uses in Open Space/Conservation Districts should address connectivity for both humans and animal life by connecting to an integrated network of passive and active open space corridors and uses.

Conclusion

Implementation of the proposed Project could interfere with wildlife movement, particularly in the Study Areas which are characterized by large, contiguous areas of open space. However, application of the proposed Project's policies and standards, such as Policy LU-3-9 that promotes buffers between residential, commercial, and industrial uses and maximization of connectivity for animal life with passive and active open space corridors, would reduce impacts to wildlife movement and corridors. This impact would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and proposed General Plan policies and standards.

Conflict with Local Policies and Ordinances (Standard of Significance 5)

Impact 5.4.5 Implementation of the proposed Project would not conflict with any local policies or ordinances protecting biological resources. This is considered to have **no impact.**

The proposed Project would result in future land development activities that could require tree removal or pruning or could affect Swainson's hawk habitat. The City has adopted regulations that provide mitigation for potential impacts to these resources. The City's Municipal Code includes Chapter 19.12, Tree Preservation and Protection, and Chapter 16.130, Swainson's Hawk Impact Mitigation Fee. Chapter 19.12 requires mitigation for impacts to trees of local importance. Trees of local importance include coast live oak, valley oak, blue oak, interior live oak, oracle oak, California sycamore, and California black walnut with a single trunk 6 inches dbh or greater or multiple trunks with a combined dbh of 6 inches or greater. Chapter 16.130 requires mitigation for the loss of Swainson's hawk habitat at a 1:1 ratio. Development of the proposed Project would be required to be consistent with all local policies and codes protecting biological resources. Therefore, **no impact** would occur with regard to consistency with local ordinances or policies protecting biological resources.

Mitigation Measures

None required.

Conflict with Conservation Plans (Standard of Significance 6)

Impact 5.4.6 Implementation of the proposed Project would not conflict with the provisions of an adopted habitat conservation plan by allowing development of land planned for preservation as part of the proposed South Sacramento Habitat Conservation Plan. There would be **no impact**.

There is a conservation plan in process that includes the Planning Area: the SSHCP. A public review draft of the SSHCP and Implementing Agreement, as well as the associated joint draft Environmental Impact Statement/EIR, and draft Aquatic Resources Program, were released for agency and public review on June 2, 2017. However, the SSHCP has not yet been adopted.

The Planning Area is partially within the proposed SSHCP area; however, the City is not a participant in the SSHCP. As described previously, the purpose of the SSHCP is to provide a streamlined process for incidental take authorization and conserve habitat for special-status plant and wildlife species to address the biological impacts of future urban development. The SSHCP is expected to be adopted sometime in 2018, potentially before adoption of the proposed Project.

Because the SSHCP has not been adopted or implemented at this time, there would be **no impact** related to potential conflicts with an adopted habitat conservation plan under existing conditions.

The SSHCP assumes development in an Urban Development Area (UDA), which is generally contiguous with the County's Urban Services Boundary (USB). Outside the UDA, the SSHCP identifies Planned Preserve Units (PPUs), which contain areas of suitable habitat that are planned for use as mitigation land to offset development within the UDA. The draft SSHCP identifies a 9,750-acre conservation target in the 67,120-acre PPU. The North and East Study Areas are located within the UDA; thus, their development was accounted for in the SSHCP and would not conflict with the SSHCP's implementation.

The proposed West and South Study Areas, which total approximately 5,200 acres, are located outside the UDA and within PPU 6. Though future development in the West and South Study Areas would preclude the use of this area as mitigation lands in PPU 6, the mitigation for the loss of Swainson's hawk foraging habitat, which would be required of all development projects in these areas, as well as mitigation for impacts for other biological resources, would contribute to the SSHCP's overall conservation goals. Thus, development allowed under the General Plan would not be inconsistent with the provisions of the SSHCP, if it is adopted.

<u>Mitigation Measures</u>

None required.

5.4.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The habitat within the region is highly developed with large areas of natural or agricultural lands. Developed areas have encroached into some natural habitat, particularly annual grasslands, and aquatic features. The natural communities and some agricultural communities provide suitable habitat for special-status species, including Sanford's arrowhead, valley elderberry longhorn beetle, vernal pool branchiopod, giant garter snake, western pond turtle, Swainson's hawk, burrowing owl, and tricolored blackbird.

There is a higher level of protection for special-status species due to urban encroachment and development significantly impacting the species and their habitat. Because there has already been a large decline in available habitat for special-status species, there has been a significant cumulative impact on biological resources and the habitat that at present is particularly important.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impacts to Biological Resources

Impact 5.4.7 Future development in the Planning Area, when considered together with other past, existing, and planned future projects, could result in a significant cumulative impact on biological resources in the region. The proposed Project's contribution to this impact would be **cumulatively considerable**.

As development occurs in the Planning Area and vicinity, habitat for biological resources will continue to be converted to urban development. More mobile species may survive this development by moving to other areas, but less mobile species would not. Natural habitat conversion will reduce the availability of habitat for special-status species. The natural areas remaining will likely be isolated and not support biological resources beyond their current carrying capacity.

The proposed Project will result in the increase of urban buildout and contribute to the loss of habitat for special-status species, as well as common species. Therefore, the Project's contribution to the cumulative loss of habitat would be **cumulatively considerable.**

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing regulations and proposed General Plan policies and standards.

Implementation of existing regulations and proposed Project policies and standards would reduce the direct Project-specific impacts on special-status plants and wildlife, native trees, and jurisdictional wetlands and/or waters to a less than significant level. However, impacts to listed species would remain significant and unavoidable. On a cumulative level, the Project's contribution to direct and indirect impacts would remain **cumulatively considerable** and would be considered **significant and unavoidable**.

REFERENCES

Bates, C. 2006. "Burrowing Owl (*Athene cunicularia*)." In *The Draft Desert Bird Conservation Plan: a strategy for reversing the decline of desert-associated birds in California*. California Partners in Flight.

Bolster, B.C. 2010. "A Status Review of the California Tiger Salamander *(Ambystoma californiense).*" Nongame Wildlife Program Report 210-4. Sacramento: California Department of Fish and Game. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=21754.

Busby, P. J., T. C. Wainwright, G. J. Bryant, L. J. Lierheimer, R. S. Waples, F. W. Waknitz, and I. V. Lagomarsino. 1996. "Status review of west coast steelhead from Washington, Idaho, Oregon, and California." Seattle: NOAA Technical Memorandum NMFS-NWFSC-27. http://www.nwfsc.noaa.gov/assets/25/5592_06172004_122523_steelhead.pdf.

CDFW (California Department of Fish and Wildlife). 2017a. *A Guide to Wildlife Habitats of California* (online edition). Sacramento: CDFW Biogeographic Data Branch. Accessed November 2017. https://www.wildlife.ca.gov/Data/CWHR/Wildlife-Habitats.

———. 2017b. California Natural Diversity Database – November 2017 update. Sacramento: CDFW Biogeographic Data Branch.

———. 2017c. BIOS 5 Viewer. Sacramento: CDFW Biogeographic Data Branch. Accessed November 2017.

———. 2017d. Rarefind 5. CDFW Biogeographic Data Branch. https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data#43018407-rarefind-5.

———. 2017e. *California Wildlife Habitat Relationships System Life History Accounts and Range Maps* (online edition). Sacramento: CDFW Biogeographic Data Branch. Accessed November 2017. https://www.wildlife.ca.gov/Data/CWHR/Life-History-and-Range.

CNPS (California Native Plant Society). 2017. *Inventory of Rare, Threatened, and Endangered Plants* (online edition, v8-02). Sacramento: CNPS. Accessed November 2017. http://www.rareplants.cnps.org/.

Cornell (Cornell Lab of Ornithology). 2017. All About Birds: White-tailed Kite. Cornell University. https://www.allaboutbirds.org/guide/White-tailed_Kite/id.

Hamilton, W. J. 2004. "Tricolored Blackbird (*Agelaius tricolor*)." In *The Riparian Bird Conservation Plan: a strategy for reversing the decline of riparian-associated birds in California*. California Partners in Flight. https://www.prbo.org/calpif/pdfs/riparian_v-2.pdf.

Holland, Robert F. 1986. "Preliminary Descriptions of the Terrestrial Natural Communities of California." Department of Fish and Game. Nongame-Heritage Program.

McNab, W. H., D. T. Cleland, J. A. Freeouf, J. E. Keys, Jr., G. J. Nowacki, and C. A. Carpenter, compilers. 2007. "Description of ecological subregions: sections of the conterminous United States." GTR WO-76B. Washington, DC: USDA, Forest Service.

Moyle, P. B. 2002. *Inland Fishes of California*. Berkeley: University of California Press.

Moyle, P. B., R. M. Yoshiyama, J. E. Williams, and E. D. Wikramanayake. 1995. "Fish Species of Special Concern in California," 2nd Edition. Final report submitted to California Department of Fish and Game, Inland Fisheries Division for Contract No. 21281F.

Myers, J. M, R. G. Kope, G. J. Bryant, D. Teel, L. J. Lierheimer, T. C Wainwright, W. S. Grant, F. W. Waknitz, K. Neely, S. T. Lindley, and R. S. Waples. 1998. "Status review of Chinook salmon from Washington, Idaho, Oregon, and California." NOAA Technical Memorandum NMFS-NWFSC-35.

Nafis, Gary. 2017. California Herps: A Guide to Reptiles and Amphibians of California. Accessed November 2017. http://www.californiaherps.com/.

NOAA (National Ocean and Atmospheric Administration). 2009. *Public Draft Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the Distinct Population Segment of Central Valley Steelhead*. Sacramento Protected Resources Division.

Sacramento County. 2018. *SSHCP South Sacramento County Habitat Conservation Plan*. https://www.southsachcp.com/.

Shuford, W. D., and Gardali, T., editors. 2008. "California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California." *Studies of Western Birds 1*. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

USACE (US Army Corps of Engineers). 1987. *Corps of Engineers Wetland Delineation Manual.*

———. 2007. *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook.*

UC Davis (University of California, Davis). 2015. PISCES Fish Species Data. http://pisces.ucdavis.edu/fish.

USFWS (US Fish and Wildlife Service). 1996. *Sacramento-San Joaquin Delta Native Fishes Recovery Plan*. Portland, OR: USFWS.

———. 1998a. *Draft Recovery Plan for the Least Bell's Vireo (Vireo bellii pusillus).* Portland, OR: USFWS.

———. 1998b. *Recovery Plan for the Upland Species of the San Joaquin Valley*. Sacramento: USFWS.

———. 1999. *Conservation Guidelines for the Valley Elderberry Longhorn Beetle*. Sacramento: USFWS.

———. 2003. *Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon*. Sacramento: USFWS.

———. 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. Portland, OR: USFWS.

———. 2006a. *Stone Lakes National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment*. Sacramento: USFWS.

———. 2006b. *California Least Tern 5-Year Review*. Carlsbad. CA: USFWS.

———. 2012. *Giant Garter Snake* (Thamnophis gigas) *5-Year Review: Summary and Evaluation.* Sacramento: USFWS.

Woodbridge, B. 1998. “Swainson’s Hawk (*Buteo swainsoni*).” In *The Riparian Bird Conservation Plan: a strategy for reversing the decline of riparian-associated birds in California*.” California Partners in Flight. https://www.prbo.org/calpif/pdfs/riparian_v-2.pdf.

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5.5 Cultural Resources

This section describes the cultural and tribal cultural resources in the Planning Area and considers and evaluates the potential impacts on these resources with implementation of the proposed Project.

CONCEPTS AND TERMINOLOGY

The following definitions are common terms used to discuss the regulatory requirements and treatment of cultural resources:

Cultural resources include archaeological and built environment resources. Definitions in the National Register of Historic Places (National Register) and adopted by the California Office of Historic Preservation (OHP) are listed below.

Archaeological resources are subsurface human cultural remains that are over 50 years old. Archaeological resources in the region are generally divided into two temporal categories: prehistoric (12,000+ years ago–1541) and historic-period (1542–50 years ago).

Site: A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure.

Built environment resources are defined as buildings, structures, objects, and districts.

Building: A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. The term may also be used to refer to a historically and functionally related unit, such as a courthouse and jail or a house and barn.

Structure: The term is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter.

Object: The term is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment.

District: A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

Tribal cultural resources are defined in CEQA as a site, feature, place, cultural landscape, sacred place, or object with cultural value to a California Native American tribe, which may include nonunique archaeological resources previously subject to limited review under CEQA.

REGULATORY TERMS FOR CULTURAL RESOURCES

Historic property is a term defined by the National Historic Preservation Act (NHPA) as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register, including artifacts, records, and material remains related to such a property.

Historical resource as described in CEQA includes buildings, sites, structures, objects, or districts, each of which may have historical, prehistoric, architectural, archaeological, cultural, or scientific importance and is eligible for listing or is listed in the California Register of Historical Resources (California Register) or a local register of historical resources. The California Register includes resources listed in, or formally determined eligible for listing in, the National Register, as well as some California State Landmarks and Points of Historical Interest.

5.5.1 EXISTING SETTING

PREHISTORY/ETHNOGRAPHY

Elk Grove's prehistory and ethnographic history is presented in the General Plan Existing Conditions Report (City of Elk Grove 2016) and is summarized below.

The Paleo-Archaic-Emergent cultural sequence developed by Fredrickson (1974) and recalibrated by Rosenthal, White, and Sutton (2007) is commonly used to interpret the prehistoric occupation of the Sacramento Valley. The recalibrated sequence is broken into three broad periods: the Paleoindian period (11,550–8550 cal BC); the three-staged Archaic period, consisting of the Lower Archaic (8550–5550 cal BC), Middle Archaic (5550–550 cal BC), and Upper Archaic (550 cal BC–cal AD 1100); and the Emergent period (cal AD 1100–Historic).

The Paleo period began with the first entry of people into California. These people probably subsisted mainly on big game, minimally processed plant foods, and had no trade networks. Current research, however, indicates more sedentism, plant processing, and trading than previously believed. The Archaic period is characterized by increased use of plant foods, elaboration of burial and grave goods, and increasingly complex trade networks (Bennyhoff and Fredrickson 1994; Moratto 1984). The Emergent period is marked by the introduction of the bow and arrow, the ascendance of wealth-linked social status, and the elaboration and expansion of trade networks, signified in part by the appearance of clam disk bead money (Moratto 1984).

The Sacramento Valley has had many population movements and waves of cultural influence from neighboring regions. The valley was settled by native Californians at the end of the Pleistocene (approximately 11,500–7,500 years ago) (Moratto 1984). Hokan speakers may have been the earliest occupants of the San Joaquin Valley, eventually becoming displaced by migrating Penutian speakers (ancestral Yokuts) coming from outside of California. The Penutians most likely entered the San Joaquin Valley in several minor waves, slowly replacing the original Hokan speakers, causing the Hokan speakers to migrate to the periphery of the valley (Shipley 1978, p. 81). By about AD 300–500, the Penutian settlement of the Sacramento Valley was complete.

ETHNOGRAPHY

Ethnographically, the Planning Area is within the Plains Miwok territory (Levy 1978). The Plains Miwok are one of four Eastern Miwok groups. Linguistically, the Plains Miwok were part of the eastern group of the two subdivisions of Miwokan speakers. Plains Miwok territory included the lower Mokelumne River, Cosumnes River, and the Sacramento River from Rio Vista to Sacramento. The Sierra Nevada foothills formed the eastern boundary; the western boundary was between Fairfield and the Sacramento River (Bennyhoff 1977, p. 165; Levy 197, pp. 398–409).

The Plains Miwok were seasonal hunter-gatherers with semi-permanent settlements. Winter villages were located on high ridges near watercourses. Villages were divided into tribelets. Tribelets averaged 300 to 500 individuals, and controlled specific lands and the natural resources within their territory, which included a main village and smaller satellite villages. The main village included a large semi-subterranean or simple circular brush structure which served as the dance or assembly house. Villages also contained dwellings, acorn granaries, conical sweathouses, and winter grinding houses. Their dwellings were either aboveground conical houses made with tule-matting or were semi-subterranean. Cremation, rather than interment, was practiced by the Plains Miwok (Levy 1978, pp. 408–410; Kroeber 1925, pp. 447, 452).

Similar to many other Native American groups in California, the acorn was the primary food staple of the Plains Miwok, supplemented by fish, shellfish, waterfowl, and large and small mammals. Acorns were collected in the late fall/early winter and stored in the conical-shaped granaries prior to processing. Large and small animals regularly hunted by the Plains Miwok included deer, elk, pronghorn, rabbits, squirrels, beaver, and woodrats. Salmon were an important fish resource, along with sturgeon and lamprey (Bennyhoff 1977; Levy 1978, pp. 402–403).

The Plains Miwok used a variety of tools for hunting and collecting resources, including the bow and arrow, snares, traps, nets, enclosures or blinds, nets, seines, hook and line, harpoons, and basketry. On navigable rivers, the principal watercraft was the tule balsa canoe. They made both twined and coiled basketry, and used woven burden baskets to transport seeds, roots, or nuts for processing or storage (Levy 1978, pp. 403–404, 406).

Tools used to process food included bedrock mortars, cobblestone pestles, anvils, and portable stone mortars and pestles to grind or mill acorns and seeds. Food preparation included a variety of knives, leaching and boiling baskets, woven strainers and winnowers, and woven drying trays. Earth ovens were used to bake acorn bread (Levy 1978, p. 405).

Trade included marine shell (olivella and abalone) and steatite with coastal groups; basketry from various areas; and salt and obsidian from the Sierras and Great Basin (Levy 1978, pp. 411–412).

The Native American population in the Sacramento Valley first came into contact with Spanish explorers in the late 1700s as the Franciscan missions sought converts. Plains Miwok converts were sent to Mission San José in the early 1800s. Many labored in large ranchos awarded during the Mexican period (Levy 1978, pp. 400–402).

During two epidemics in 1830 and 1837, foreign diseases decimated the indigenous populations in the Sacramento Valley. Soon after the gold discovery in 1848 and the ensuing Gold Rush, the Miwok population declined from nearly 20,000 in 1805 to approximately 3,000 by 1856. Surviving Miwok labored for the growing mining, ranching, farming, and lumber industries (Cook 1955, 1943).

HISTORY

Early American Period and Statehood

Beginning in the eighteenth century, California was a territory of Spain, and later of Mexico. In the mid-1840s, Mexico's interest in developing and strengthening its hold on California decreased as the Mexican government became distracted by political developments in central Mexico. The native-born Spanish speakers of Alta California, known as Californios, long accustomed to governmental neglect, experienced relative peace and enjoyed minimal intrusion into their social, political, and economic affairs (Monroy 1990, pp. 113–116). During this period, the United States aggressively sought access to the Pacific Ocean, resulting in the Mexican-American War.

Following the American victory and ratification of the Treaty of Guadalupe Hidalgo in 1848, California became a United States territory and, on September 9, 1850, formally joined the Union as the 31st state. Sacramento County was one of the original 27 California counties established by the legislature the same year (Coy 1923, p. 262).

Following the discovery of gold at Sutter's Mill on the American River in January 1848, the region surrounding Sutter's Fort was inundated with prospectors from around the world. Named after the river, Sacramento sprang up seemingly overnight as a boomtown in 1848 as a direct response to the gold discovery. Located at the confluence of the Sacramento and American Rivers, the city's location provided excellent access to San Francisco's shipping routes, yet was relatively close to the gold fields in the Sierra foothills and was an important transportation and trading center for those destined for the northern mines (Page & Turnbull 2012, pp. 41–42).

Elk Grove

A description of each period of the City's history through 1967, as adapted from the Elk Grove Historic Context Statement (Page & Turnbull 2012), is presented in the General Plan Existing Conditions Report (City of Elk Grove 2016) and summarized below. During the Gold Rush, both Sacramento and Stockton served as convenient departure points for the mining camps in the Sierra Nevada foothills. The Monterey Trail, an important California transportation route connecting Sacramento to Stockton and eventually to Monterey, passed through the City. The trail, also known as the Lower Stockton and Upper Stockton Roads, increased traffic through the area and encouraged business opportunities, including a network of stage stops and hotels along Upper Stockton Road. The Elk Grove House, the first hotel and stage stop in Elk Grove, was opened in 1850 by English immigrant James Watson Hall. The hotel ultimately served as the namesake for the area and was located in the immediate vicinity of what is today Elk Grove Regional Park (Page & Turnbull 2012, pp. 42–43).

By the mid-1850s, discouraged gold miners turned to ranching or farming to meet the agricultural demands of California's growing population. Business pursuits in the area shifted from the service industry to ranching and farming. The principal agricultural output of the region included cattle, sheep, wheat, and barley until the late nineteenth century (Page & Turnbull 2012, pp. 44–50).

Rapid railroad transportation introduced to the area, beginning in 1868, allowed agricultural production to shift to more perishable fruit products. As a result, area farmers experimented with fruit orchards, including peaches, plums, apricots, figs, lemons, and prunes, as well as vineyards and nut orchards (Page & Turnbull 2012, pp. 71–72).

In the twentieth century, strawberries emerged as an important agricultural produce along with ranching, dairying, nut and fruit production, and wine grapes (Page & Turnbull 2012, pp. 113–114).

KNOWN CULTURAL RESOURCES IN THE PLANNING AREA

General Plan Existing Conditions Report

According to the Existing Conditions Report (City of Elk Grove 2016), 44 known prehistoric and historic-period archaeological resources were identified within the Planning Area. Most of the resources included foundations, privies/dumps/trash scatters, pestles, bottle fragments, wells, cisterns, midden soil, mounds, lithic scatters, roads, and railroad grades.

The Existing Conditions Report also identified 288 built environment resources in the Planning Area that have either been identified or evaluated for inclusion in the Elk Grove Register of Historic Resources (Elk Grove Register), California Register, or National Register. Identified resources and resources determined not eligible for inclusion in the National Register and/or California Register include farms and ranches, water conveyance features, single-family and multifamily residences, ancillary buildings, transmission lines and towers, commercial buildings, historic districts, railroads, industrial buildings, bridges, schools, parks, churches, utility buildings, government buildings, and a cemetery. The Existing Conditions Report (City of Elk Grove 2016) includes a list of the known historical resources in Elk Grove and their location, type, and status.

Records Searches

The information summarized above was derived from a North Central Information Center (NCIC) records search (SAC-15-137) conducted for the Planning Area on August 26, 2015. The NCIC of the California Historical Resources Information System, California State University, Sacramento, is an affiliate of OHP, and is the official State repository of cultural resource records and reports for Sacramento County. As part of the records search, the following federal and State of California inventories were reviewed:

- California Inventory of Historic Resources (OHP 1976)
- California Points of Historical Interest (OHP 1992 and updates)
- California Historical Landmarks (OHP 1996)
- Archaeological Determinations of Eligibility (OHP 2012a)
- Directory of Properties in the Historic Property Data File for Sacramento County (OHP 2012b)

Native American Consultation

Assembly Bill (AB) 52 and Senate Bill (SB) 18 consultation for the General Plan was completed.

5.5.2 REGULATORY FRAMEWORK

FEDERAL

National Historic Preservation Act

The NHPA requires that the federal government identify and mitigate adverse effects to historic properties that result from federal undertakings. Part of the identification efforts include evaluating cultural resources for inclusion in the National Register, which is the nation's master inventory of known historic properties. The National Register is administered by the National Park Service and includes listings of buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance at the national, State, or local level.

Structures, sites, buildings, districts, and objects over 50 years of age can be listed in the National Register. However, properties under 50 years of age with exceptional importance or that are contributors to a historic district can also be included in the National Register. The criteria for listing in the National Register include resources that:

a) Are associated with events that have made a significant contribution to the broad patterns of history;

b) Are associated with the lives of persons significant in our past;

c) Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

d) Have yielded or may likely yield information important in prehistory or history.

STATE

California Environmental Quality Act

Under CEQA, public agencies must consider the effects of their actions on both historical resources and unique archaeological resources. Pursuant to Public Resources Code (PRC) Section 21084.1, a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment. Section 21083.2 requires agencies to determine whether proposed projects would have impacts on unique archaeological resources.

The term *historical resource* is defined in PRC Section 21084.1. The State CEQA Guidelines Section 15064.5 describes how significant impacts on historical and archaeological resources are determined. Under Section 15064.5(a), historical resources include the following:

1) A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (Public Resources Code Section 5024.1).

2) A resource included in a local register of historical resources, as defined in Public Resources Code Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g), will be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

3) Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource will be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing in the California Register of Historical Resources (Public Resources Code Section 5024.1), including the following:

   a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

   b) Is associated with the lives of persons important in our past;

   c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

   d) Has yielded, or may be likely to yield, information important in prehistory or history.

4) The fact that a resource is not listed in, or determined to be eligible for listing in the California Register, not included in a local register of historical resources (pursuant to Public Resources Code Section 5020.1(k)), or identified in a historical resources survey (meeting the criteria in Section 5024.1(g)) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Section 5020.1(j) or 5024.1.

Historical resources are usually 50 years old or older and must meet at least one of the criteria for listing in the California Register, described above (such as association with historical events, important people, or architectural significance), in addition to maintaining a sufficient level of physical integrity.

Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the California Register and are presumed to be historical resources for purposes of the CEQA, unless a preponderance of evidence indicates otherwise (PRC Section 5024.1 and California Code of Regulations, Title 14, Section 4850). Unless a resource listed in a survey has been demolished, lost substantial integrity, or there is a preponderance of evidence indicating that it is otherwise not eligible for listing, a lead agency should consider the resource to be potentially eligible for the California Register.

For historic buildings, CEQA Guidelines Section 15064.5(b)(3) indicates that the impacts of a project that follows the Secretary of the Interior's Standards for either the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings, or the Rehabilitation and Guidelines for Rehabilitating Historic Buildings, have been mitigated to less than significant.

As noted above, CEQA also requires lead agencies to consider whether projects will impact unique archaeological resources. PRC Section 21083.2(g) states:

> "Unique archaeological resource" means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:
>
> (1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
>
> (2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
>
> (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Treatment options under Section 21083.2 include activities that preserve such resources in place in an undisturbed state. Other acceptable methods of mitigation under Section 21083.2 include excavation and curation or study in place without excavation and curation (if the study finds that the artifacts would not meet one or more of the criteria for defining a unique archaeological resource).

Section 7050.5(b) of the California Health and Safety Code specifies protocol when human remains are discovered, as follows:

> In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.

CEQA Guidelines Section 15064.5(e) requires that excavation activities stop whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the Native American Heritage Commission must be contacted within 24 hours. At that time, the lead agency must consult with the appropriate Native Americans, if any, as timely identified by the commission. Section 15064.5 directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

In addition to the provisions pertaining to accidental discovery of human remains, the Guidelines also require that a lead agency make provisions for the accidental discovery of historical or archaeological resources, generally. Pursuant to Section 15064.5(f), these provisions should include "an immediate evaluation of the find by a qualified archaeologist. If the find is determined to be an historical or unique archaeological resource, contingency funding and a time allotment sufficient to allow for implementation of avoidance measures or appropriate mitigation should be available. Work could continue on other parts of the building site while historical or unique archaeological resource mitigation takes place."

California Health and Safety Code

California Health and Safety Code Section 7050.5 regulates the procedure in the event of Native American human remains discovery. Pursuant to PRC Section 5097.98, in the event of human remains discovery, no further disturbance is allowed until the county coroner has made the necessary findings regarding the origin and disposition of the remains. If the remains are determined to be Native American, the coroner is required to contact the Native American Heritage Commission. The commission is responsible for contacting the most likely Native American descendent, who will consult with the local agency regarding how to proceed with the remains. According to CEQA Guidelines Section 15064.5, Native American human remains are a significant resource.

Senate Bill 18

California Government Code Section 65352.3 (SB 18) incorporates the protection of California's traditional tribal cultural places into land use planning for cities, counties, and agencies by establishing responsibilities for local governments to contact, refer plans to, and consult with California Native American tribes as part of the adoption or amendment of any general plan or specific plan. SB 18 requires public notice to be sent to tribes listed on the Native American Heritage Commission's SB 18 Tribal Consultation list within the geographical areas affected by the proposed changes. Tribes must respond to a local government notice within 90 days (unless a shorter time frame has been agreed upon by the tribe), indicating if they want to consult with the local government. Consultations are for the purpose of preserving or mitigating impacts on places, features, and objects described in PRC Sections 5097.9 and 5097.993 that may be affected by the proposed adoption or amendment to a general plan or specific plan.

Assembly Bill 52

AB 52 requires the lead agency (in this case, the City) to begin consultation with any California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed Project prior to the release of a negative declaration, mitigated negative declaration, or EIR if (1) the California Native American tribe requested to the lead agency, in writing, to be informed by the lead agency through formal notification of proposed projects in the geographic area that is traditionally and culturally affiliated with the tribe, and (2) the

California Native American tribe responds, in writing, within 30 days of receipt of the formal notification and requests the consultation (PRC Section 21080.3.1[d]).

California Register of Historical Resources

The State Historical Resources Commission has designated the California Register for use by State and local agencies, private groups, and citizens to identify, evaluate, register, and protect California's historical resources. The California Register is the authoritative guide to the State's significant historical and archaeological resources. The California Register program encourages public recognition and protection of resources of architectural, historical, archaeological, and cultural significance; identifies historical resources for State and local planning purposes; determines eligibility for State historic preservation grant funding; and affords certain protections under CEQA.

LOCAL

Certified Local Government Status

On January 24, 2007, the City adopted Ordinance No. 3-2007, which became the Historic Preservation Chapter (Chapter 7) of the Municipal Code, the purpose of which is to promote the general welfare and economic and social vitality of the City by recognizing those special elements that reflect the City's heritage and cultural diversity. Chapter 7 also established a Historic Preservation Committee. In 2010, the City of Elk Grove became a Certified Local Government (CLG), or a local government certified by the National Park Service to carry out the purposes of the NHPA of 1966, as amended.

City of Elk Grove Municipal Code

Municipal Code Chapter 7, Historic Preservation, was last updated in 2017 and contains regulatory requirements to provide for "the identification, designation, protection, enhancement, perpetuation and use of historical resources including buildings, structures, objects, sites, districts, cultural landscapes, tribal cultural resources, and the historical personal histories and family stories of individuals, businesses, and associations in the City that reflect special elements of the City's heritage and cultural diversity." Substantive changes consisted of evaluation thresholds, Historic Preservation Committee membership, and thresholds for certificates of appropriateness.

5.5.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Cause a substantial adverse change in the significance of a historical resource as defined in Public Resources Code Section 21084.1 and CEQA Guidelines Section 15064.5, respectively.

2) Cause a substantial adverse change in the significance of an archaeological resource as defined in CEQA Guidelines Section 15064.5.

3) Disturb any human remains, including those interred outside of formal cemeteries.

4) Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code Section 21074.

CEQA Guidelines Section 15064.5 defines *substantial adverse change* as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource is materially impaired.

CEQA Guidelines, Section 15064.5(b)(2) defines *materially impaired* for purposes of the definition of substantial adverse change as follows:

> The significance of an historical resource is materially impaired when a project:
>
> (A) Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources; or
>
> (B) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
>
> (C) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

CEQA requires that if a project would result in an effect that may cause a substantial adverse change in the significance of a historical resource or would cause significant effects on a unique archaeological resource, then alternative plans or mitigation measures must be considered. Therefore, prior to assessing effects or developing mitigation measures, the significance of cultural resources must be determined. The steps that are normally taken in a cultural resources investigation for CEQA compliance are as follows:

1) Identify potential historical resources and unique archaeological resources.

2) Evaluate the significance of historical resources.

3) Evaluate the effects of the project on eligible historical resources.

METHODOLOGY

Evaluation of the Project's potential to result in a significant impact on cultural and tribal cultural resources is based on the resource identification efforts presented in the City's General Plan Existing Conditions Report (City of Elk Grove 2016), the land uses defined in the proposed Project, the activities required to develop the land uses described in the proposed Project, and consideration of the City's proposed Project policies that are intended to reduce environmental impacts.

General Plan Policies and Standards

The proposed Project contains the following policies and standards for managing future development in the City to protect cultural resources and tribal cultural resources.

Policy HR-1-1: Encourage the preservation and enhancement of existing historical and archaeological resources in the City.

Policy HR-1-2: Strive to preserve historic buildings and resources through adaptive re-use.

Policy HR-1-3: Encourage appropriate adaptive reuse of historic resources to prevent misuse, disrepair, and demolition.

Policy HR-2-1: Protect and preserve prehistoric and historic archaeological resources throughout the City.

Policy HR-2-2: Consult with local Native American tribes, the Native American Heritage Commission, and any other appropriate organizations and individuals to minimize potential impacts to cultural and tribal resources.

Policy HR-2-3: Identify and evaluate local archaeological resources for inclusion in the National Register of Historic Places.

Policy HR-2-4: Ensure that City ordinances, programs, and policies create an environment that fosters the preservation, rehabilitation, and maintenance of historic, archaeological, and tribal resources.

Policy HR-3-1: Communicate Elk Grove's history using a variety of methods.

Policy HR-3-2: Encourage new development to be compatible with adjacent existing historic structures in terms of scale, massing, building material, and general architectural treatment.

PROJECT IMPACTS AND MITIGATION MEASURES

Historical Resources, Archaeological Resources, Tribal Cultural Resources, and Human Remains (Standards of Significance 1, 2, 4, and 5)

Impact 5.5.1 Implementation of the proposed Project would allow for new development throughout the Planning Area which has the potential to impact historical resources, archaeological resources, tribal cultural resources, and human remains. This impact would be **potentially significant**.

The NCIC records search and AB 52 and SB 18 Native American consultation completed for the Project identified historical resources, archaeological resources, and tribal cultural resources throughout the Planning Area. Furthermore, there are likely previously unidentified historical resources, archaeological resources, tribal cultural resources, and human remains within the Planning Area. Therefore, it is possible that the excavation and grading required to construct future developments could impact these resources. Future development under the proposed Project could also impact known built resources, such as those listed in the Community and Resource Protection chapter of the General Plan. It is also possible that construction activities could damage or destroy as-yet undiscovered resources or human remains, if present, if procedures are not in place to manage them if found.

Existing Laws and Regulations and Proposed General Plan Policies That Provide Mitigation

Under CEQA, public agencies must consider the effects of their actions on both historical resources and unique archaeological resources. Pursuant to PRC Section 21084.1, a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment. Section 15064.5 of the CEQA Guidelines sets for the criteria for historical resource significance determination. Section 21083.2 requires agencies to determine whether proposed projects would have impacts on unique archaeological resources.

For historic buildings, CEQA Guidelines Section 15064.5(b)(3) indicates that the impacts of a project that follows the Secretary of the Interior's Standards for either the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings, or the Rehabilitation and Guidelines for Rehabilitating Historic Buildings, have been mitigated to less than significant.

CEQA Guidelines Section 15046.5(f) requires that a lead agency make provisions for the accidental discovery of historical or archaeological resources, generally. These provisions should include "an immediate evaluation of the find by a qualified archaeologist.

California Health and Safety Code Section 7050.5(b) specifies protocol when human remains are discovered. CEQA Guidelines Section 15064.5(e) requires that excavation activities stop whenever human remains are uncovered and that the county coroner be called in to assess the remains. Section 15064.5 directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

Proposed Project policies have the potential to reduce impacts on historical resources, archaeological resources, tribal cultural resources, and human remains. Policy HR-2-2 requires consultation with Native American tribes, the Native American Heritage Commission, and any other appropriate organizations and individuals prior to project approval and construction to minimize potential impacts to archaeological resources and tribal cultural resources. Policy HR-2-3 requires project applicants for future projects to identify and evaluate cultural resources; when resources are identified, implementation of Policy HR-2-4 would foster the preservation, rehabilitation, and maintenance of historic, archaeological, and tribal resources.

Policy HR-3-2, which encourages new development to be compatible with adjacent existing historical resources, would limit impacts on built environment resources. Similarly, Policy HR-1-3, which encourages appropriate adaptive reuse of historic resources to prevent misuse, disrepair, and demolition, would also limit impacts on built environment resources. Even more generally, Policy HR-1-2 encourages preservation of historic buildings and resources.

Conclusion

Policies HR-1-1, HR-1-2, HR-1-3, HR-2-1, HR-2-2, HR-2-3, HR-2-4, HR-3-1, and HR-3-2 encourage protection and preservation of known and unknown (not yet identified) archaeological resources, historical resources, tribal cultural resources, and human remains. However, construction could damage or destroy as-yet undiscovered resources. This impact would be **potentially significant**, and the City would require the following mitigation measures.

Mitigation Measures

MM 5.5.1a Prior to the approval of subsequent development projects in the Planning Area, a detailed cultural resources study of the subject property shall be conducted by the applicant and peer reviewed by the City. The cultural resources study shall identify, evaluate, and mitigate impacts to cultural resources as defined by CEQA and/or the NHPA. Mitigation methods to be employed include, but are not limited to, the following:

- Redesign of the project to avoid the resource. The resource site shall be deeded to a nonprofit agency to be approved by the City for maintenance of the site.
- If avoidance is determined to be infeasible by the City, the resource shall be mapped, stabilized, and capped pursuant to appropriate standards.
- If capping is determined infeasible by the City, the resource shall be recovered to appropriate standards.

MM 5.5.1b If cultural resources or tribal cultural resources are discovered during grading or construction activities within the Planning Area, work shall halt immediately within 50 feet of the discovery, the Planning Department shall be notified, and a professional archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards in archaeology shall be retained to determine the significance of the discovery.

If resources are determined to be potentially significant, the City shall require the preparation of a treatment plan and report of findings for cultural and tribal cultural resources. The City and the applicant shall consult and agree to implement all measures the City deems feasible. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. The applicant shall be required to implement measures necessary for the protection and documentation of cultural resources.

Mitigation measure **MM 5.5.1a** requires that future projects complete cultural resources studies to identify cultural resources, evaluate potential effects, and develop mitigation according to CEQA and/or the NHPA. Mitigation measure **5.5.1b** addresses the potential for encountering undiscovered cultural resources and tribal cultural resources. If human remains are discovered during construction, PRC Section 5097.98 and California Health and Safety Code Section 7050.5, detailed in the CEQA regulatory section above, would be followed. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed. These measures and California State laws require that construction and/or grading be halted upon discovery of cultural resources, tribal cultural resources, or human remains and that the resources discovered are protected using measures specific to the resource as determined by a qualified professional. Implementation of these mitigation measures and laws would reduce impacts to **less than significant**.

5.5.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative context associated with the Project includes proposed, planned, reasonably foreseeable, and approved projects in the Planning Area and surrounding region. Much development has occurred in the region prior to protections for historic and prehistoric resources. This past urban development in the region has likely resulted in adverse impacts to historical and prehistoric resources, and it there is potential for present and future development activities to affect as-yet undiscovered cultural resources, tribal cultural resources, and human remains. Federal, State, and local laws provide protections for historical resources, but protection may not always be feasible. For these reasons, the cumulative effects of future development on cultural resources, tribal cultural resources, and human remains are considered significant.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Prehistoric Resources, Historic Resources, and Human Remains (Standards of Significance 1, 2, and 3)

Impact 5.5.2 Development of the proposed Project could contribute to the cumulative disturbance of cultural resources (i.e., prehistoric sites, historic sites, historic buildings/structures, and isolated artifacts and features) and human remains. This impact would be **less than cumulatively considerable**.

Implementation of the proposed Project has the potential to contribute to cumulative impacts on cultural resources, including archaeological and historic resources, as well as interred human remains. The past, present, and foreseeable projects have affected, or will affect, cultural resources throughout the region despite the federal, State, and local laws designed to protect them. These laws have led to the discovery, recording, preservation, and curation of artifacts and historic structures; however, more have been destroyed in the period before preservation efforts began or are inadvertently destroyed during grading and excavation for construction. For these reasons, cumulative impacts on cultural resources in the region are significant.

Construction activities resulting from the Project would include grading and excavation in previously disturbed areas where undiscovered subsurface resources may exist; these impacts would be potentially significant. Future projects occurring under the proposed Project would implement the mitigation measures as described above, including **MM 5.5.1a** and **MM 5.5.1b**. **MM 5.5.1a** requires future projects to complete cultural resources studies that document the cultural resources identification, evaluation, and mitigation efforts required according to CEQA and/or the NHPA. **MM 5.5.1b** address the potential for encountering undiscovered cultural resources or tribal cultural resources. These measures require construction and/or grading work to be halted upon discovery of these resources to ensure their protection. While past projects constructed prior to protection measures have negatively affected historic and prehistoric resources, implementation of mitigation measures **MM 5.5.1a** and **MM 5.5.1b** would ensure that the Project's contribution to the cumulative impact would be **less than cumulatively considerable**.

Mitigation Measures

No additional mitigation required beyond compliance with existing laws and regulations, proposed General Plan policies, and mitigation measures **MM 5.5.1a** and **MM 5.5.1b**.

REFERENCES

Bennyhoff, James A. 1977. "Ethnography of the Plains Miwok." *Center for Archeological Research at Davis Publications 5.* University of California, Davis.

Bennyhoff, James A., and David A. Fredrickson. 1994. "A Proposed Integrative Taxonomic System for Central California Archaeology." In *Toward a New Taxonomic Framework for Central California Archaeology*, edited by Richard E. Hughes, pp. 15–24. University of California Archaeological Research Facility Contributions.

California State Coastal Conservancy and US Army Corps of Engineers. 2003. *Responses to Comments Final Supplemental Environmental Impact Report/Environmental Impact Statement Bel Marin Keys Unit V expansion of the Hamilton Wetland Restoration Project.*

City of Elk Grove. 2016. *General Plan Update Existing Conditions Report.*

Cook, Sherburne F. 1943. "The Conflict between the California Indian and White Civilization, III: The American Invasion 1848–1870." *Ibero-Americana* 24. Berkeley, CA.

———. 1955. "The Epidemic of 1830–1833 in California and Oregon." *University of California Publications in American Archaeology and Ethnology* 43 (3): 303–326.

Coy, Owen C. 1923. *California County Boundaries: A Study of the Division of the State into Counties and Subsequent* Changes *in their Boundaries*. Sacramento: California State Printing Office.

Davis, S. N., and F. R. Hall. 1959. "Water Quality of Eastern Stanislaus And Northern Merced Counties, California." Stanford Univ. Pubs. *Geological Sciences* 6(1): 1–112.

Fredrickson, David A. 1974. "Cultural Diversity in Early Central California: A View from the North Coast Ranges." *Journal of California Anthropology* 1(1): 41–53.

Kroeber, Alfred L. 1925. "Handbook of the Indians of California." *Bulletin of American Ethnology Bulletin 78*. Washington, DC: Smithsonian Institution. Reprinted 1976 by Dover, New York.

Levy, Richard. 1978. "Eastern Miwok." In *California*, edited by Robert F. Heizer, pp. 398-413. *Handbook of North American Indians, volume 8*, William C. Sturtevant, general editor. Washington, DC: Smithsonian Institution.

Monroy, Douglas. 1990. *Thrown Among Strangers: The Making of Mexican Culture in Frontier California*. Berkeley: University of California Press.

Moratto, Michael J. 1984. *California Archaeology*. Orlando, FL: Academic Press, Inc.

OHP (California Office of Historic Preservation). 1976. California Inventory of Historic Resources.

———. 1992. Points of Historical Interest.

———. 1996. California Historical Landmarks.

———. 2012a. Archaeological Determinations of Eligibility.

———. 2012b. Directory of Properties in the Historic Property Data File.

Page & Turnbull. 2012. *Elk Grove Historic Context Statement*. Prepared for the City of Elk Grove. http://www.elkgrovecity.org/UserFiles/Servers/Server_109585/File/City%20Government/Committees/hcs-final-draft.pdf.

Piper, A. M., H. S. Gale, and H. E. Thomas. 1939. *Geology and Ground-Water Hydrology of the Mokelumne Area, California*. U.S. Geological Survey Water-Supply Paper 780, 230 pp. with 10 plates (maps and hydrographs of the Mokelumne River).

Rosenthal, Jeffrey, Gregory G. White, and Mark Q. Sutton. 2007. "The Central Valley: A View from the Catbird's Seat." In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar. Plymouth, United Kingdom: AltaMira Press.

Shipley, William, F. 1978. "Native Languages of California." In *California*, edited by Robert F. Heizer, pp. 80–90. *Handbook of North American Indians, volume 8*; William C. Sturtevant, general editor. Washington, DC: Smithsonian Institution.

5.6 Geology, Soils, Mineral Resources, and Paleontology

This section discusses the geology of the Planning Area and general vicinity and analyzes hazards related to geology and soils, such as potential exposure of people and property to geologic hazards, landform alteration, and erosion. Mineral resource locations and paleontological resources and potential impacts are also evaluated in this section. Erosion-related water quality issues are addressed in Section 5.9, Hydrology and Water Quality.

5.6.1 EXISTING SETTING

GEOLOGY AND TOPOGRAPHY

Regional Setting

Most of Sacramento County, including the entire City, lies in the Great Valley geomorphic province.[1] The Great Valley geomorphic province is an alluvial plain approximately 50 miles wide and 400 miles long located in central California, bounded on the north by the Klamath and Cascade mountain ranges, on the east by the Sierra Nevada, and on the west by the Coast Ranges. Sediments consisting of Cenozoic non-marine (continental) sedimentary rocks and alluvium (loose, unconsolidated soil) have been deposited in the Great Valley geomorphic province almost continuously since the Jurassic period, approximately 160 million years ago. The Sacramento River, which drains the east side of the Great Valley into the Sacramento-San Joaquin Delta, is located west of the City, and is the region's major northern drainage (City of Elk Grove 2016).

Planning Area

The Planning Area is primarily underlain by the Riverbank Formation. A section of the Laguna Formation runs north to south through the center of the Planning Area (CGS 1981). These are sedimentary deposits containing layers of weathered gravel, sand, and silt eroded from metamorphic and granitic rocks of the Sierra Nevada.

The Planning Area is flat, with little variation in topography. Elevations in the Planning Area range from 10 feet above average sea level in the west to 150 feet in the east (City of Elk Grove 2016).

SEISMIC HAZARDS

Regional Faults and Seismicity

Sacramento County is less affected by seismic events and geologic hazards than other portions of the state. The California Geological Survey's (CGS) map of seismic shaking hazards in California shows that most of Sacramento County, including the Planning Area, is located in a relatively low-intensity ground shaking zone. The county generally experiences little seismic activity, but could be affected by ground motion originating in other regions that experience more seismic activity, such as the San Francisco Bay Area and the Sierra Nevada. Some property damage has occurred because of seismic events in the past; however, it was largely the result of major seismic events occurring in these adjacent areas. The areas of Sacramento County most vulnerable to seismic and geologic hazards are typically those areas subject to liquefaction and subsidence.

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[1] A geomorphic province is defined as an area with similar geologic origin and erosional/depositional history.

Table 5.6-1 identifies known faults in the region and their maximum magnitudes. There are no known active faults in the Planning Area, and no active or potentially active faults underlie the City. The City is not located in an Alquist-Priolo Earthquake Fault Zone (City of Elk Grove 2016).

TABLE 5.6-1
REGIONAL FAULTS

Fault Name	Approximate Distance from Elk Grove (in miles)	Maximum Magnitude (MW)
Foothills Fault System	21	6.5
Great Valley (segment 5)[1]	27	6.5
Great Valley (segment 4)[1]	29	6.6
Greenville	41	6.9
Concord-Green Valley	42	6.9
Hunting Creek-Berryessa	45	6.9
West Napa	49	6.5
Calaveras	50	6.8
Rodgers Creek	56	7.0
Hayward	59	7.1
Bartlett Springs	72	7.1
Maacama (south)	73	6.9
Collayomi	76	6.5
Ortigalita	76	6.9
San Andreas	76	7.9
San Gregorio	78	7.3
Monte Vista-Shannon	80	6.8
Mohawk Valley-Honey Lake Fault Zone	82	7.3
Point Reyes	82	6.8
Genoa	87	6.9
Sargent	91	6.8
Zayante-Vergeles	94	6.8

Source: City of Elk Grove 2003

Note: 1. Nine segments of the Great Valley Fault are located approximately 27 to 91 miles west of the City and have maximum magnitudes of 6.4 to 6.8.

Surface Rupture

In major earthquakes, fault displacement can cause rupture along the surface trace of the fault, leading to severe damage to structures, roads, and utilities located on the fault trace. Surface rupture generally occurs along an active fault trace, but can occasionally occur along presumably inactive faults. Because no known faults traverse the Planning Area, the risk of surface rupture in the Planning Area is considered low.

Ground Shaking

Ground shaking is motion that occurs as a result of energy released during earthquakes. The damage or collapse of buildings and other structures caused by ground shaking is among the most serious seismic hazards. The intensity of shaking and its potential impact on buildings is determined by the physical characteristics of the underlying soil and rock, building materials and design, earthquake magnitude, location of the epicenter, and the character and duration of ground motion. Ground motion lasts longer and waves are amplified on loose, water-saturated materials as compared to solid rock; as a result, structures located on alluvium typically suffer greater damage. Much of Sacramento County is on alluvium, which increases the amplitude of an earthquake wave.

Liquefaction

Liquefaction is the loss of soil strength due to seismic forces generating various types of ground failure. The evaluation of potential for liquefaction is complex, and factors that must be considered include soil type, soil density, groundwater, and the duration and intensity of shaking. Liquefaction is most likely to occur in deposits of water-saturated alluvium or similar deposits of artificial fill. In Sacramento County, the Delta and downtown Sacramento are the two areas most susceptible to liquefaction in the event of an earthquake.

The soils underlying the Planning Area are relatively dense/stiff and the upper 50 feet of soil are above the depth of groundwater; therefore, the potential for liquefaction in the Planning Area is considered low. The potential for ground lurching, differential settlement, or lateral spreading to occur during or after seismic events in the Planning Area is also considered low (City of Elk Grove 2003).

SOILS

The Natural Resources Conservation Service (NRCS) Web Soil Survey identifies 38 soil types within the Planning Area. These soil types are listed in **Table 5.2-4** in Section 5.2, Agricultural Resources. The San Joaquin soil series is the most prevalent in the Planning Area. Along with similar soil types, these soils account for nearly 85 percent of soils in the Planning Area. The San Joaquin series consists of alluvium deposits from mostly granitic rock. It has a wide range of characteristics, varying from loam to clay, depending on depth of soil. Typically, these soils are well- or moderately well-drained with medium to very high runoff potential and very slow permeability (City of Elk Grove 2016).

Erosion

Erosion is a geomorphic process that occurs when sand, soil, and rocks are loosened, worn away, decomposed, or dissolved, moving materials from one place to another. Rain, snow, running water, waves, and wind can all cause erosion. In the City, wind is not a major hazard, thus reducing the likelihood of wind erosion of natural soils. However, strong winds are a secondary impact of heavy rain and storms, and may pair with increased rains to erode soils. During storm events, erosion can also result from heavy precipitation and stormwater runoff. The City's Municipal Code establishes policies to reduce sedimentation and erosion during demolition and construction. Stormwater requirements also serve to limit erosion and sedimentation. The San Joaquin soils exhibit slight erosion hazard, indicating that erosion under ordinary climatic conditions is unlikely (NRCS 2016).

Agricultural Soils/Topsoil

Table 5.2-4 in Section 5.2, Agricultural Resources, lists the characteristics of site soils for agricultural production. As indicated by the ratings, the San Joaquin soils are severely limited in their agricultural potential because of shallow soil depths, less permeable subsoil, and clayey or gravelly surface soil textures. The San Joaquin series soils are rated by the NRCS as a fair source of topsoil for construction materials because of the presence of cemented pan (NRCS 2016).

Expansive Soils

Expansive soils are soils that shrink or swell depending on the level of moisture they absorb. These soils typically contain clay minerals. As they get wet, the clay minerals absorb water molecules and expand; conversely, as they dry, they shrink, leaving large voids in the soil. Settlement caused by soils with a high shrink-swell potential can potentially result in damage from differential settlement. When structures are located on expansive soils, foundations have the tendency to rise during the wet season and drop during the dry season. This movement can create new stresses on building foundations and connected utilities and lead to structural damage. The San Joaquin soil group, the main soil series in the Planning Area, has potential for expansion because of its high proportion of clay, especially at depths of 16 inches or greater (City of Elk Grove 2016).

SUBSIDENCE

When subsurface earth materials move, the movement can cause the gradual settling or sudden sinking of ground. This phenomenon of settling or sinking ground is referred to as subsidence or settlement. Although causes of subsidence and settlement are numerous, frequent factors are aquifer-system compaction, drainage of organic soils, underground mining, hydrocompaction, natural compaction, sinkholes, and thawing permafrost. Elk Grove is located over a principal groundwater basin in a potential subsidence area, making groundwater pumping the City's largest potential cause for subsidence (City of Elk Grove 2016).

MINERAL RESOURCES

The California Department of Conservation Division of Mines and Geology has classified the region and the Planning Area for its mineral resource potential. A large portion of the northern section of the Planning Area is covered by the MRZ-2 classification. Sites described by this classification are areas underlain by mineral deposits where geologic data indicate that significant measured, indicated, or inferred mineral resources are present. Inferred mineral resources in the Planning Area are Portland cement concrete-grade aggregate composed of Lower Unit Riverbank Formation alluvium deposits (California Department of Conservation 1999).

PALEONTOLOGICAL RESOURCES

The General Plan Existing Conditions Report (City of Elk Grove 2016) stated that although no fossil discoveries have been officially reported in the Planning Area, there have been finds. For example, in 1959, a local farmer discovered a Pleistocene bone bed in the Riverbank Formation along the west side of Deer Creek. While the find was reportedly examined by a geologist from California State University, Sacramento, the find was apparently never published.

The Sacramento Valley and the San Joaquin Valley comprise the Great Valley geomorphic province of California, which is located between the Sierra Nevada on the east and the Coast

Range mountains on the west. The Great Valley is composed of thousands of feet of sedimentary deposits that have undergone periods of subsidence and uplift over millions of years. During the Jurassic and Cretaceous periods of the Mesozoic era, the Great Valley existed in the form of an ancient ocean. By the end of the Mesozoic, the northern portion of the Great Valley began to fill with sediment as tectonic forces caused uplift of the basin. By the time of the Miocene epoch, approximately 24 million years ago, sediments deposited in the Sacramento Valley were mostly of terrestrial origin. Most of the surface of the Great Valley is covered with Recent (Holocene, i.e., 10,000 years Before Present [BP] to present day) and Pleistocene (i.e., 10,000–1,800,000 years BP) alluvium. This alluvium is composed of sediments from the Sierra Nevada to the east and the Coast Range to the west that were carried by water and deposited on the valley floor. Siltstone, claystone, and sandstone are the primary types of sedimentary deposits.

There are two formations in the Planning Area that are sensitive for paleontological resources, described below.

Laguna Formation

The Laguna Formation was named for arkosic alluvial deposits near Laguna Creek, San Joaquin County. It consists of lenticular cobble gravel, sand, and small amounts of reddish to yellowish brown silt from metamorphic, granitic, and volcanic sources. This sediment is located only in the east and northeast portions of the Planning Area. The gravels that overlay this formation have been mined in some portions of the Planning Area. This formation is known to produce Pliocene fossils. As a result, this formation has a high sensitivity rating.

Riverbank Formation

Davis and Hall were the first to name the Riverbank Formation. They designated the type section in the city of Riverbank in an area along the south bank of the Stanislaus River. Sediments in the Riverbank Formation consist of weathered reddish gravel, sand, and silt that form alluvial terraces and fans. In the Sacramento Valley, this formation contains more mafic igneous rock fragments than the San Joaquin Valley, and thus tends toward stronger soil profile developments that are more easily distinguishable from the Modesto Formation which overlies the Riverbank Formation. The Riverbank Formation is Pleistocene in age, but is considerably older than the Modesto Formation; estimates place it between 130,000 and 450,000 years BP. Similar to the Modesto Formation, the Riverbank Formation forms alluvial fans and terraces of the Feather and Bear Rivers; however, Riverbank fans and terraces are higher in elevation and generally have a more striking topography than those formed by the Modesto Formation. Most of the sediments in the Planning Area are Riverbank Formation.

The Riverbank Formation is known to produce vertebrate fossils dating to the late Pleistocene west of Elk Grove Florin Road. The fossils recovered to date from the Riverbank Formation are typically large, late Pleistocene vertebrates, although fish, frogs, snakes, turtles, and a few plants such as prune, sycamore, and willow are known as well. The typically large, Rancholabrean vertebrates include bison, horse, camel, mammoth, ground sloth, and wolf. These types of fossils suggest a wet grassland environment interspersed with rivers, streams, ponds, and bogs. The Rancholabrean fauna and flora are well known in California, and they typically include many more species than reported from Sacramento County (City of Elk Grove 2003). As a result, this formation has a high sensitivity rating.

5.6.2 REGULATORY FRAMEWORK

STATE

California Building Code

Building codes are intended to ensure public safety and help protect, among other things, against future earthquake damage. Records of building response to earthquakes, especially those from structures that failed or were damaged, have led to many code revisions and improvements. The California Building Code (CBC) specifies the levels of earthquake forces that structures must be designed to withstand. A geotechnical report is required for new or replacement occupied buildings to determine existing soils conditions and to specify design specifications based on those conditions. The design specifications are based on current information from strong-motion instruments and observed seismic effects on buildings. As ground motions of greater intensity have been recorded, the minimum seismic design specifications have been refined. In addition, provisions for different soil conditions have been added to the CBC as scientists have documented the effects of soil type on shaking intensity. Buildings constructed to comply with modern codes have generally sustained relatively little damage from recent earthquakes.

NPDES Construction General Permit

The SWRCB has adopted a statewide Construction General Permit (CGP) (Water Quality Order No. 2009-0009-DWQ, as amended by 2010-0014 DWQ and 2012-0006-DWQ) for construction activities in the State. The CGP applies to construction activity that disturbs 1 acre or more and requires the preparation and implementation of a stormwater pollution prevention plan (SWPPP) that identifies best management practices (BMP) to minimize erosion and to control pollutant discharges from the construction site that could affect water quality. Section 15.12.020(B)(3) of the City's Municipal Code establishes that the City is responsible for ensuring compliance with the National Pollutant Discharge Elimination System (NPDES) requirements pertaining to the CGP. Additional information about the CGP is provided in Section 5.9, Hydrology and Water Quality.

Paleontological Resources

Paleontological resources are classified as nonrenewable scientific resources and are protected by State statute (Public Resources Code [PRC] Section 5097.5, Archeological, Paleontological, and Historical Sites). However, no State or local agencies have specific jurisdiction over paleontological resources but all must evaluate potential impacts and provide any applicable mitigation measures. No State or local agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction-related earthmoving on State or private land in a project area.

LOCAL

City of Elk Grove Municipal Code

The City has adopted the 2016 Edition of the California Building Code, Title 24, Part 2, Volumes 1 and 2 as set forth by the State of California Building Standards Commission (Elk Grove Municipal Code Section 16.04.010). The California Building Code is updated every three years, and the 2019 edition will become effective in 2020.

Municipal Code Chapter 16.44, Land Grading and Erosion Control, establishes administrative procedures, minimum standards of review, and implementation and enforcement procedures for controlling erosion, sedimentation, and other pollutant runoff, including construction debris and hazardous substances used on construction sites, and disruption of existing drainage and related environmental damage caused by land clearing, grubbing, grading, filling, and land excavation activities. The chapter applies to projects that would disturb 350 cubic yards or more of soil, but could also apply in instances where the drainage course is amended or negatively affected through grading. Currently, a grading permit is required when 350 cubic yards or more of soil would be disturbed. The City is planning an update to the Grading Ordinance that will lower the permit threshold for activities requiring a grading permit. That is, smaller projects will trigger the requirement. Upon adoption, the revised threshold will apply, as appropriate, to future development under the General Plan.

Chapter 15.12, Stormwater Management and Discharge Control, also includes regulations pertaining to erosion control.

Sacramento County Code – Septic Systems

On-site management of wastewater is regulated under Chapter 6.32 of the Sacramento County Code. The Sacramento County Environmental Management Department (EMD) has jurisdiction over the construction, installation, and operation of on-site wastewater treatment systems in the unincorporated areas and incorporated cities in Sacramento County. If a septic system or alternative on-site treatment and disposal method is considered, soil testing would be required, and a site approval report must be submitted to EMD before a sewage disposal system permit application for a new installation can be obtained.

5.6.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

    a) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.

    b) Strong seismic ground shaking.

    c) Seismic-related ground failure, including liquefaction.

    d) Landslides.

2) Result in substantial soil erosion or the loss of topsoil.

3) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

4) Be located on expansive soil, as defined in Section 1803.5.3 of the 2016 California Building Code, creating substantial risks to life or property.

5) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

6) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature.

In the NOP (see **Appendix A**), the City determined that implementation of the proposed Project would have no impacts associated with seiche, tsunami, and mudflow. Therefore, these issues are not addressed further in this Draft EIR.

METHODOLOGY

The evaluation of potential geologic, soil, mineral resources, and paleontological resources impacts of the proposed Project was based on review of NRCS soil survey maps and data, information published by the CGS, the City's Municipal Code, and the City of Elk Grove General Plan Update Existing Conditions Report (2016). This analysis assumes that future development projects in the Planning Area would comply with all applicable laws, regulations, and building codes pertaining to seismic and geological safety, as required under the City's Municipal Code.

General Plan Policies and Standards

The proposed Project contains the following policies and standards for managing future development in Elk Grove to reduce the potential for hazards related to geology and soil conditions.

Policy INF-2-1: Sewage conveyance and treatment capacity shall be available in time to meet the demand created by new development, or shall be assured through the use of bonds or other sureties to the City's satisfaction.

Policy INF-2-2: Development along corridors identified by sewer providers in their master plans as locations of future sewerage conveyance facilities shall incorporate appropriate easements as a condition of approval.

Policy INF-2-3: Reduce the potential for health problems and groundwater contamination resulting from the use of septic systems.

Policy INF-2-4: Residential development on lots smaller than 2 gross acres shall be required to connect to public sewer service, except in the Rural Area.

There are no policies that are specific to the protection of paleontological resources.

PROJECT IMPACTS AND MITIGATION MEASURES

Seismic Hazards (Standard of Significance 1)

Impact 5.6.1 The Planning Area is not located in an area that is susceptible to adverse impacts associated with seismic ground failure, including surface rupture, ground shaking, liquefaction, or landslides. This impact would be **less than significant**.

The Planning Area is not located within an Alquist-Priolo Earthquake Fault Zone or in an area with any known active faults. As shown in **Table 5.6-1**, the nearest fault is the Foothills Fault System, which is 21 miles from the City. For this reason, it is unlikely that an earthquake would result in surface rupture in the Planning Area.

However, even faults far from the Planning Area have the potential to cause damage in the City resulting from primary seismic hazards, including ground shaking, which is one of the biggest risks to human life and property in an earthquake. The risk of other types of seismic-related ground failure, such as liquefaction, is low because the Planning Area does not have soils prone to liquefaction. In addition, the flat nature of the Planning Area and surrounding areas would preclude the potential for landslides that could affect the Planning Area.

Existing Regulations and Standards That Provide Mitigation

The California Building Code (CBC) specifies the levels of earthquake forces that structures must be designed to withstand. The City has adopted the 2016 Edition of the California Building Code, Title 24, Part 2, Volumes 1 and 2 (City of Elk Grove Municipal Code Section 16.04.010). A geotechnical investigation is required for new or replacement occupied buildings to determine potential seismic hazards at a site and recommendations for construction methods and building design features to minimize seismic hazard risk.

Conclusion

The low risk of ground shaking in the City minimizes associated seismic hazards. Implementation of the CBC as set forth in Municipal Code Section 16.04.010 and required geotechnical investigations therein would ensure that buildings and infrastructure are designed and constructed to minimize potential damage resulting from primary or secondary seismic hazards. This impact would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with existing State and local regulations and standards.

Soil Erosion (Standard of Significance 2)

Impact 5.6.2 Future development resulting from the proposed Project, including buildings, pavement, and utilities, would include grading and excavation activities that could result in the potential for topsoil erosion. This impact would be **less than significant**.

Future development and construction activities could require large-scale grading and excavation, which, if done improperly, could result in topsoil erosion. In the City, the primary concern with erosion is deposition of sediment into surface waters near a construction site via overland flow or through storm drains, and increases in the amount of particulate matter in the air, resulting in adverse air quality impacts. For analyses specific to these issue areas, refer to Section 5.3, Air Quality, and Section 5.9, Hydrology and Water Quality. From a geotechnical perspective, erosion generally does not pose a hazard during construction or occupancy because the City is flat and exposed native San Joaquin soils exhibit minimal erosion hazard. However, cut and fill activities required to prepare a site for development could result in temporary conditions that could cause erosion.

Existing Regulations and Standards That Provide Mitigation

Section 15.12.020(B)(3) of the City's Municipal Code establishes that the City is responsible for ensuring compliance with the NPDES requirements pertaining to the CGP, which requires use of BMPs to control erosion during land development activities. Municipal Code Chapter 16.44, Land Grading and Erosion Control, establishes administrative procedures, minimum standards of review, and implementation and enforcement procedures for controlling erosion caused by land clearing, grubbing, grading, filling, and land excavation activities. The chapter applies to projects that would disturb 350 cubic yards or more of soil, but could also apply in instances where the drainage course is amended or negatively affected through grading. As noted above, the City is planning an update to the ordinance that will lower the threshold, and this requirement will apply to future projects under the General Plan, as appropriate.

Conclusion

The potential for erosion resulting from future development activities in the Planning Area would be minimized by adhering to the CGP, as enforced through Municipal Code Section 15.12.020(B)(3) and Municipal Code Chapter 16.44, Land Grading and Erosion Control. Compliance with existing regulations would ensure that the Project would not result in substantial erosion. This impact would be **less than significant**.

While future development in the Planning Area could result in the loss of approximately 5,600 acres of Important Farmland, the San Joaquin soils—the primary soil type in the Planning Area—are severely limited in their agricultural potential as topsoil because of shallow soil depths, less permeable subsoil, and clayey or gravelly surface soil textures. The potential loss of topsoil is generally associated with agricultural land conversion. See Impact 5.2.1 in Section 5.2, Agricultural Resources, for additional information.

Mitigation Measures

No additional mitigation required beyond compliance with existing State and local regulations and standards.

Unstable and Expansive Soils (Standards of Significance 3 and 4)

Impact 5.6.3 Future development resulting from the proposed Project, including buildings, pavement, and utilities, could incur damage as a result of underlying expansive or unstable soil properties. Compliance with applicable building codes and commonly accepted engineering practices that address these conditions would ensure impacts associated with expansive or unstable soils are **less than significant**.

When structures are located on expansive soils, movements can occur under the structures, creating new stresses on foundations and connected utilities. These variations in ground settlement can lead to structural failure and damage to infrastructure. Subsidence with little or no horizontal motion could also occur in the Planning Area. Land subsidence is most often caused by human activities, mainly from pumping of subsurface water (groundwater) for water supply. Pumping of water for residential, commercial, and agricultural activities is the greatest cause of subsidence in the City (City of Elk Grove 2016).

Buildout of the proposed Project would increase the development intensity in the Planning Area, which would include construction of office, light industrial/flex space, commercial, residential, and schools, thereby resulting in an increased risk associated with expansive and unstable soils.

Existing Regulations and Standards That Provide Mitigation

The City has adopted the 2016 Edition of the California Building Code, Title 24, Part 2, Volumes 1 and 2 (City of Elk Grove Municipal Code Section 16.04.010). The CBC's accepted engineering practices require special design and construction methods for dealing with expansive soils. The two most common methods to prevent damage from expansive soils are to design the building's foundation to resist soil movement and to control surface drainage in order to reduce seasonal fluctuations in soil moisture. Pursuant to the CBC, future projects would be required to submit a geotechnical report for the site. Based on conditions at the site, the geotechnical study would identify appropriate construction and structural design methods to reduce the potential for damage from unstable soil conditions.

Conclusion

Compliance with recommendations included in the geotechnical reports and applicable building codes, which would be verified by City staff prior to the issuance of a grading and/or building permit, would ensure that soils at future development sites are capable of supporting the structures in the Planning Area and that potential unstable soils are accounted for in building design. Therefore, impacts resulting from expansive and unstable soils would be reduced to a **less than significant** level.

Mitigation Measures

No additional mitigation required beyond compliance with existing State and local regulations and standards.

Septic Systems (Standard of Significance 5)

Impact 5.6.4 Future development resulting from the proposed Project could occur in locations where public sewer service is not available. This is a **less than significant** impact.

Two regional entities, the Sacramento Area Sewer District (SASD) (responsible for sewage conveyance) and Sacramento Regional County Sanitation District (Regional San) (responsible for sewage treatment and discharge), provide the City with wastewater services. The SASD is responsible for the collection of wastewater from the unincorporated areas of Sacramento County, the cities of Citrus Heights, Rancho Cordova, and Elk Grove, and portions of the cities of Folsom and Sacramento. Although there is extensive wastewater collection infrastructure, some areas in the City rely on septic systems where public sewer is not available (City of Elk Grove 2016).

Future development could occur in areas where SASD and Regional San collection systems do not exist. However, the use of septic or alternative wastewater treatment systems is anticipated to be minimal because Policy INF-2-4 states that residential development on lots smaller than 2 gross acres shall be required to connect to public sewer, except in the Rural Area.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Policy INF-2-1 requires that sewage conveyance and treatment capacity be available in time to meet demand created by new development, or shall be assured through the use of bonds or other sureties to the City's satisfaction. If a septic system or alternative on-site treatment and disposal method is considered, soil testing would be required, and a site approval report must be submitted to Sacramento County before a sewage disposal system permit application for a new installation can be obtained. Property owners would be required to monitor and maintain the system.

Conclusion

The use of septic or alternative wastewater treatment systems is anticipated to be minimal, and if such systems are used, they would be required to obtain a permit from Sacramento County in accordance with Chapter 6.32 of the Sacramento County Code. With implementation of proposed General Plan policies and existing regulations, the proposed Project would not result in conditions where soils would not be capable of adequately supporting the use of septic tanks or alternative wastewater disposal systems, and the impact would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with existing State and local regulations and standards and proposed General Plan policies.

Paleontological Resources (Standard of Significance 6)

Impact 5.6.5 Construction activities in the Planning Area could affect undiscovered unique paleontological resources in paleontologically sensitive rock formations. This impact would be **potentially significant**.

Impacts on paleontological resources could occur when excavation activities encounter fossiliferous geological deposits and cause physical destruction of fossil remains. The potential for impacts on fossils depends on the sensitivity of the geologic unit and the amount and depth of grading and excavation. Much of the Planning Area is considered highly sensitive for paleontological resources. The City is underlain by the Riverbank Formation and Laguna Formation, which are considered sensitive for paleontological resources. Fossil remains, fossil sites, fossil-producing geologic formation, and geologic formations with the potential for containing fossil remains are all considered paleontological resources or have the potential to be paleontological resources. Fossil remains are considered important if they are (1) well preserved; (2) identifiable; (3) type/topotypic specimens; (4) age diagnostic; (5) useful in environmental reconstruction; and/or (6) represent new, rare, and/or endemic taxa.

Existing Laws That Provide Mitigation

Paleontological resources are classified as nonrenewable scientific resources and are protected by State statute (PRC Section 5097.5, Archeological, Paleontological, and Historical Sites). However, no State or local agencies have specific jurisdiction over paleontological resources but all must evaluate potential impacts and provide any applicable mitigation measures.

Conclusion

There is a possibility of the unanticipated discovery of paleontological resources during ground-disturbing activities as well as the potential to damage or destroy paleontological resources that may be present below the ground surface. Therefore, future developments that require grading and excavation in sensitive formations could affect unique paleontological resources and this impact would be **potentially significant**.

Mitigation Measures

MM 5.6.5 Before the start of any earthmoving activities, the project owner shall retain a qualified scientist (e.g., geologist, biologist, paleontologist) to train all construction personnel involved with earthmoving activities, including the site superintendent, regarding the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction, and proper notification procedures should fossils be encountered. Training on paleontological resources shall also be provided to all other construction workers but may use videotape of the initial training and/or written materials rather than in-person training.

If any paleontological resources (fossils) are discovered during grading or construction activities within the project area, work shall be halted immediately within 50 feet of the discovery, and the City Planning Division shall be immediately notified. The project owner will retain a qualified paleontologist to evaluate the resource and prepare a recovery plan in accordance with Society of Vertebrate Paleontology guidelines (SVP 2010). The recovery plan may include but is not limited to a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations in the recovery plan that are determined by the City to be necessary and feasible will be implemented by the applicant before construction activities resume in the area where the paleontological resources were discovered.

Future projects occurring under the proposed Project would be required to implement mitigation measure **MM 5.6.5**, which requires discovery procedures for paleontological resources during project construction and requires a qualified paleontologist to recommend measures specific to the discovered resource to mitigate adverse impacts discovered during construction activities. Implementation of mitigation measure **MM 5.6.5** would reduce impacts to paleontological resources to **less than significant**.

5.6.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

Impacts associated with geology and soils are generally site-specific rather than cumulative in nature as geologic properties can vary by site. Individual development projects would be subject to, at a minimum, uniform site development and construction standards relative to seismic and other geologic conditions that are prevalent in the region. Refer to Section 5.9, Hydrology and Water Quality, regarding cumulative water quality impacts from soil erosion.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Geologic and Soil Impacts (Standards of Significance 1 through 5)

Impact 5.6.6 Implementation of the proposed Project, in combination with other reasonably foreseeable development, would not contribute to cumulative geologic and soil impacts, as the impacts would be site-specific. This impact would be **less than cumulatively considerable**.

Implementation of the Project would allow an increase in the number of structures that could be subject to seismic hazards and/or the effects of expansive soils or other soil constraints, which could affect structural integrity, roadways, or underground utilities. Potentially adverse environmental effects associated with seismic hazards, expansive soils, topographic alteration, and erosion are site-specific and generally do not combine with similar effects that could occur with other projects in the City or elsewhere. Implementation of the provisions of the CBC, NPDES permit requirements, Municipal Code Chapters 16.44 and 15.12, and proposed Project policies would ensure that potential site-specific geotechnical conditions and soil conditions would be addressed fully in the design of future development. The use of septic or alternative wastewater systems would be minimal because new development (with few exceptions) would be required to connect to the public sewer system. Therefore, the proposed Project's contribution to cumulative geology and soil-related impacts would be considered **less than cumulatively considerable**.

Mitigation Measures

No additional mitigation required beyond compliance with existing State and local regulations and standards and proposed General Plan policies.

Paleontological Resources

Impact 5.6.7 Development of the proposed Project could contribute to the cumulative disturbance of paleontological resources (i.e., fossils and fossil formations). This impact would be **less than cumulatively considerable**.

There are no known paleontological resources within the Planning Area; however, the geological formations present in the Planning Area and region are considered sensitive for paleontological resources, and excavation and grading during construction could affect previously undiscovered fossils. Past projects throughout the region, including in south Sacramento County, have discovered fossilized Rancholabrean-age remains, including mammoth. As a result, ground-disturbing activities within the Planning Area could potentially uncover previously unknown paleontological resources, and these impacts would contribute to the cumulative loss of paleontological resources, specifically in the Riverbank and Laguna Formations. This potential loss of paleontological resources would be cumulatively considerable, when considered together with the effects of past, present, and reasonably foreseeable projects, including the proposed Project. Future projects would be required to implement mitigation measure **MM 5.6.5**, which addresses the inadvertent discovery of previously unknown paleontological resources, which would ensure that the Project's contribution to these impacts would be **less than cumulatively considerable**.

Mitigation Measures

No additional mitigation required beyond compliance with existing laws and mitigation measure **MM 5.6.5**.

REFERENCES

California Department of Conservation. 1999. *Mineral Land Classification: Portland Cement Concrete-Grade Aggregate and Kaolin Clay Resources in Sacramento County, California*. ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/OFR_99-09/OFR_99-09_Text.pdf.

CGS (California Department of Conservation, California Geological Survey). 1981. Regional Geologic Map, Sacramento.

City of Elk Grove. 2003. *City of Elk Grove General Plan Background Report*.

———. 2016. *General Plan Update Existing Conditions Report.*

NRCS (US Department of Agriculture, Natural Resources Conservation Service). 2016. Web Soil Survey. Official Soil Series Descriptions. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053587.

SVP (Society of Vertebrate Paleontology). 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources.*

5.7 Greenhouse Gas Emissions and Energy

This section examines the effects of implementation of the City of Elk Grove General Plan Update Project (Project) on climate change in the Planning Area and the potential for conflicts with greenhouse gas (GHG) reduction planning efforts. This section was also prepared in accordance with Section 15126 and Appendix F of the State California Environmental Quality Act (CEQA) Guidelines. Appendix F requires that Environmental Impact Reports (EIRs) include a discussion of the potential energy impacts of projects, with emphasis on considering whether implementing a project would result in inefficient, wasteful, and unnecessary consumption of energy. This section discusses the energy impacts of implementing the project.

5.7.1 EXISTING CONDITIONS

INTRODUCTION TO GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-caused (i.e., anthropogenic) emissions of these GHGs in excess of natural ambient concentrations are found to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other climate forcings such as the release of smoke, soot, and methane from natural processes (e.g., permafrost melt, forest fires) (IPCC 2014).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas most pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the lifetime of any GHG molecule is dependent on multiple variables and cannot be determined with any certainty, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent is estimated to be sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO_2 emissions remains stored in the atmosphere (IPCC 2013, p. 467).

The quantity of GHGs in the atmosphere that ultimately result in climate change is not precisely known but is enormous; no single project alone would measurably contribute to an incremental change in the global average temperature, or to global, local, or micro climates. From the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative.

The following compounds are GHGs subject to control under California State law (CARB 2014b; EPA 2015a).

- Carbon dioxide (CO_2). Carbon dioxide is produced through the burning of fossil fuels, solid waste, and wood products, and is generated through certain chemical reactions, such as cement manufacturing.
- Methane (CH_4). Methane is produced during the production and transportation of fossil fuels, such as coal, natural gas, and oil. It also results from organic decay in landfills, livestock, and other agricultural processes.
- Nitrous oxide (N_2O). Nitrous oxide is generated during agricultural and industrial activities, combustion of fossil fuels, and decay of solid waste.
- Hydrofluorocarbons (HFCs). HFCs are used as refrigerants in both stationary refrigeration and mobile air conditioning.
- Perfluorocarbons (PFCs). Perfluorocarbons are created as a byproduct of aluminum production and semiconductor manufacturing.
- Sulfur hexafluoride (SF_6). Sulfur hexafluoride is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity.

CO_2 is the most widely emitted GHG and is the reference gas for determining the global warming potential (GWP) of other GHGs. GHG emissions are typically converted into the common unit of measurement of metric tons of carbon dioxide equivalent ($MTCO_2e$). As shown In **Table 5.7-1**, gases such as methane and N_2O are more potent than CO_2 at trapping heat and have higher GWP.

The Intergovernmental Panel on Climate Change (IPCC) prepares comprehensive global assessment reports about the state of scientific, technical, and socioeconomic knowledge on climate change, its causes, potential impacts, and response strategies. The IPCC periodically updates GWPs to reflect the latest scientific understanding of the behavior and warming potential of GHGs in the atmosphere (IPCC 2014). As described in further detail below, the City of Elk Grove Climate Action Plan (CAP) includes a 2005 GHG inventory that relies on the 2nd Assessment GWPs. The City revised the 2005 GHG inventory to account for newer, 5th Assessment GWPs. Updates to GWPs provide consistency with current practices and a newer, 2013 inventory of GHG emissions in the Planning Area. More information on the 2005 and 2013 GHG inventories follows below in this section.

TABLE 5.7-1
COMPARISON OF GLOBAL WARMING POTENTIALS, 2ND ASSESSMENT REPORT AND 5TH ASSESSMENT REPORT

Pollutant	IPCC 2nd Assessment Report GWP	IPCC 5th Assessment Report GWP
Carbon Dioxide (CO_2)	1	1
Methane (CH_4)	21	28
Nitrous Oxide (N_2O)	310	265

Source: IPCC 2013

STATEWIDE GREENHOUSE GAS EMISSIONS INVENTORY

The California Air Resources Board (CARB) prepares an annual GHG inventory for all activities occurring within the State. The sectors in the statewide inventory and forecast are similar, although not identical, to the U.S. Community Protocol sectors used in the GHG inventory for the City. CARB prepared a statewide inventory for 2005, as well as a recent inventory for 2013 (**Table 5.7-2**). Emissions in the statewide inventories are measured in millions of $MTCO_2e$ ($MMTCO_2e$). In 2013, statewide emissions had declined approximately 5.9 percent from 2005 levels (CARB 2015).

TABLE 5.7-2
CALIFORNIA GREENHOUSE GAS EMISSIONS, 2005 AND 2013 ($MMTCO_2E$)

Category	2005 Emissions ($MMTCO_2e$)	2013 Emissions ($MMCO_2e$)	Percentage Change (2005–2013)
Transportation	186.1	169.02	-10.5%
Industrial	92.3	92.68	-3.5%
Electric Power	109.0	90.45	-16.1%
Commercial and Residential	41.0	43.54	3.1%
Agriculture	32.6	36.21	3.2%
High GWP	13.3	18.50	78.9%
Recycling and Waste	7.0	8.87	11.9%
Total	482.5	459.28	-5.9%

Source: CARB 2011, 2015 Planning Area Community-Wide Greenhouse Gas Emissions Inventories

Note: $MMTCO_2e$ = million metric tons of carbon dioxide equivalent

This section presents an analysis of GHG emissions for the entire Planning Area, including both areas within jurisdictional City limits and the study areas. Although data is generally available to calculate GHG emissions associated with activity in the jurisdictional boundary of the City, comparable data is not available for each of the City's study areas. Instead, the study areas are local planning designations that do not correlate to the types of data outputs from key sources for the GHG inventory. Instead, local data is reported for different jurisdictional entities. Therefore, alternate methods were used to develop a plan-level GHG emissions inventory for the study areas that is comparable to the GHG inventory for the City. The GHG inventories for the City limits and each study area estimate GHG emissions using two different approaches:

- The inventory of GHG emissions in City limits reflects (1) actual activity data within the City limits as reported by utilities and State agencies, and (2) modeled data for activity within the City limits, based on regional travel models and proxy indicators such as acreage of agricultural activity or proportion of countywide permit activity and dwelling units in the City.
- The inventory of GHG emissions in the study areas reflects (1) average rates of GHG emissions generation within the City by land use type, and (2) modeled GHG emissions based on existing land uses in the study areas, including the number of current dwelling units, square footage of nonresidential space, and acreage of agricultural land uses.

The following sections first present results for GHG emissions associated with City limits, followed by a summary of the modeled GHG emissions estimates for the study areas. Additional information on the approach to calculate and model GHG emissions is provided in **Appendix D**.

OVERVIEW

The GHG inventories for the City are based on activity data for day-to-day occurrences in the community for the calendar years 2005 and 2013. Activity data measures actions in the City that cause GHG emissions, such as energy use, waste disposal, and vehicle miles traveled. In some instances, the GHG emissions are generated within the Planning Area itself. For instance, driving a gasoline-powered car in the City will create direct GHG emissions within the City limits. In other cases, GHG emissions will physically occur elsewhere, but are included in this inventory because actions within the City were responsible for causing or triggering those GHG emissions. One key example is the use of electricity in the City, which causes GHG emissions to be generated from power plants that are located outside City limits in other communities. GHG inventories use emissions factors to convert activity data to total GHG emissions. Emission factors describe the amount of GHGs emitted per unit of activity data. Service providers such as utility companies, scientific research documents, and State and federal agencies all provide emissions factors for various activities.

The City conducted the 2005 baseline year community-wide GHG inventory through a regional effort, the Sacramento Area Green Partnership, in 2009 (2005 data were the most complete, current data available). The baseline inventory estimates municipal and community-wide GHG emissions caused by activities in 2005, including transportation, waste, water, and energy-related activities. The inventory established a baseline against which future changes in GHG emissions can be measured and provides an understanding of major sources of GHG emissions in the City and the region.

Since 2009, the City has revised the 2005 community-wide inventory twice. The first round of revisions to the 2005 inventory occurred during development of the CAP for new data and methods. City Council adopted the revised 2005 inventory as part of the CAP in 2013. The second round of revisions to the 2005 inventory occurred in 2015 for the General Plan Update, as documented in this report. Updates in 2015 incorporated new data, GHG accounting methods, and up-to-date protocols. Revisions allow for comparison of the 2005 baseline inventory to the 2013 inventory, supporting identification and analysis of progress since 2005.

METHOD

Consistent with guidance from the Governor's Office of Planning and Research (OPR), the 2005 and 2013 inventories use the 2012 U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, commonly known as the U.S. Community Protocol (ICLEI 2012). This common protocol ensures that the methods used in the 2005 and 2013 inventories are consistent, allowing for an effective comparison.

The 2005 inventory used GWPs from the IPCC's 2nd Assessment Report, which was published in 1995. Current inventories use GWPs from the IPCC's 5th Assessment Report, published in 2014, which demonstrates changes to expected emissions from methane and nitrous oxide (**Table 5.7-1**). The 2005 inventory was updated to use GWPs from the 5th Assessment Report, to ensure that emissions could be accurately compared to findings in the 2013 inventory. The updated 2005 inventory included emissions from off-road equipment, making the 2005 inventory more complete and supporting comparisons to activity in the unincorporated Planning Areas. Updates also included refinement to the electricity use associated with water and wastewater based on revised data from the Sacramento Municipal Utility District (SMUD). The analysis of transportation emissions was revised to reflect more accurate countywide vehicle fuel use data from CARB. Based on this new data, staff made minor adjustments to the 2005 inventory. Additional details are available in **Appendix D**.

GREENHOUSE GAS EMISSIONS SOURCES IN ELK GROVE

The 2005 and 2013 inventories estimate GHG emissions from the following types of activities, also known as sectors, within the City limits. These sectors capture GHG emissions resulting from various activities in the community, whether those GHG emissions result directly where the activity occurs, or indirectly at a different location. For instance, the combustion of vehicle fuel within the community results in GHG emissions emitted from the tailpipe of vehicles traveling in the community, whereas local electricity demand may be supplied by a fossil-fuel power plant outside of the community. Both types of GHG emissions are captured in the City's GHG inventories. These inventories include the five required reporting sectors identified by the U.S. Community Protocol (ICLEI 2012), in addition to optional sectors that fall under the jurisdictional control of the City:

- **Residential built environment:** Electricity and natural gas used in residential settings.
- **Nonresidential built environment:** Electricity and natural gas used in nonresidential settings.
- **Transportation:** On-road vehicle usage for trips that begin and/or end in the Planning Area.
- **Off-road equipment:** The use of equipment and off-road vehicles in the Planning Area, such as landscaping and construction equipment.
- **Solid waste:** Materials thrown away in landfills in the inventory year.
- **Landfills:** Emissions from the decomposition of materials thrown away in previous years in landfills inside the Planning Area.
- **Water and wastewater:** Energy used to treat and pump potable water used, and wastewater generated, in City limits, and emissions from the processing of wastewater.
- **Agriculture:** Emissions from fertilizer use, livestock operations, and agricultural equipment.

A comparison of GHG emissions for activities occurring within City limits in 2005 and 2013 is shown in **Table 5.7-3**. The City's GHG emissions increased by approximately 13 percent from 2005 to 2013. The overall distribution of GHG emissions by sector remained relatively constant from 2005 and 2013. The on-road transportation sector was the largest contributor of GHG emissions in both 2005 and 2013, contributing 348,370 $MTCO_2e$ and 430,340 $MTCO_2e$, respectively. In 2013, the transportation sector comprised 47.0 percent of total community-wide emissions in City limits. Following the transportation sector, the residential sector contributed 25 percent of total GHG emissions in the City limits (231,400 $MTCO_2e$), with just a 3 percent decline from total contribution in 2005. Nonresidential GHG emissions, the third largest GHG emissions sector in both 2005 and 2013, slightly increased in total contribution, growing from 12.8 percent of total emissions in City limits in 2005 to 14.2 percent of total emissions in City limits in 2013. The off-road equipment sector generated 10.2 percent of total emissions in 2013 (93,340 $MTCO_2e$), while the solid waste sector contributed 2.6 percent of total emissions in 2013 (23,720 $MTCO_2e$). The three remaining sectors contributed less than 1 percent of total GHG emissions, consisting of the water and wastewater sector (2,860 $MTCO_2e$, or 0.3 percent of total emissions), landfills in City limits (2,540 $MTCO_2e$, or 0.3 percent of total emissions), and agriculture (1,020 $MTCO_2e$, or 0.1 percent of total emissions).

The overall 12 percent increase in GHG emissions from 2005 to 2013 is attributed to several notable changes.

- GHG emissions from the nonresidential built environment sector increased 26 percent, driven largely by increased jobs and economic activity in the community that caused a similar growth in nonresidential natural gas use.

- Similarly, emissions from transportation increased by 24 percent because of increased economic activity and population growth.

- Agricultural GHG emissions declined by 81 percent, reflecting a decline in land in active agricultural uses because of urbanization of rural land. This development also dovetails with the increases in nonresidential and transportation emissions described above. Changes in the agriculture sector were the largest proportional change in any sector since 2005, reflecting the overall conversion of agricultural land to other uses within the City limits.

- The 2005 inventory excluded fugitive emissions from wastewater, which have been included in the 2013 inventory, contributing to the 134 percent increase in emission for the water and wastewater sector.

- Even with an overall increase in GHG emissions throughout the region, emissions from solid waste disposal declined by 35 percent from 2005 to 2013, equivalent to a reduction of 12,660 $MTCO_2e$. This notable reduction in solid waste occurred even with an increase in the City's service population (population + employment). While GHG emissions from solid waste declined by 35 percent, the City's service population increased by approximately 24 percent during the same time period. Similarly, per capita waste generation in the City from 2005 to 2013 declined by 49 percent. These declines in waste generation are consistent with regional reductions in waste disposal, despite the State's overall increase in waste emissions for the same time period (see **Table 5.7-2**).

- The decline in landfill GHG emissions reflects the nature of waste decomposition. This sector captures GHG emissions from waste-in-place in the closed Dixon Pit and Elk Grove landfills in the City. Waste disposed and buried at these landfills continues to emit methane, a potent GHG, during decomposition. The decline in GHG emissions from landfills does not reflect a change in activity data or waste disposal, but rather the declining rate of GHG emissions during the decomposition process.

TABLE 5.7-3
COMMUNITYWIDE GREENHOUSE GHG EMISSIONS BY SECTOR IN ELK GROVE CITY LIMITS, 2005–2013

Sector	2005 $MTCO_2e$	Percentage of Total	2013 $MTCO_2e$	Percentage of Total	Percentage Change, 2005–2013
Residential built environment	225,190	27.9%	231,400	25.3%	+3%
Nonresidential built environment	103,170	12.8%	129,860	14.2%	+26%
Transportation	348,370	43.1%	430,340	47.0%	+24%
Off-road equipment	83,800	10.4%	93,340	10.2%	+11%
Solid waste	36,380	4.5%	23,720	2.6%	-35%
Landfills	2,980	0.4%	2,540	0.3%	-15%

Sector	2005 $MTCO_2e$	Percentage of Total	2013 $MTCO_2e$	Percentage of Total	Percentage Change, 2005–2013
Water and wastewater	3,070	0.4%	7,177	0.8%	+134%
Agriculture	5,450	0.7%	1,020	0.1%	-81%
Total	808,410	100%	919,407	100%	+13%

Source: City of Elk Grove 2016. GHG emissions estimates for 2005 and 2013 rely on numerous methods, protocols, and data sources. A summary of key data sources and methods is included in both the Climate Change section of the Existing Conditions Report and ***Appendix D*** *of this Draft EIR.*

Note: $MTCO_2e$ = metric tons of carbon dioxide equivalent

INTRODUCTION TO ENERGY

Energy Service in the Planning Area

Electric services in the City are provided by the Sacramento Municipal Utility District (SMUD) and natural gas services by the Pacific Gas and Electric Company (PG&E). These utility providers would continue to serve the Planning Area.

Energy Types and Sources

California relies on a regional power system composed of a diverse mix of natural gas, petroleum, renewable, hydroelectric, and nuclear generation resources. One-third of energy commodities consumed in California is natural gas. In 2014, approximately 35 percent of natural gas consumed was used to generate electricity. Residential land uses represented approximately 17 percent of California's natural gas consumption with the balance consumed by the industrial, resource extraction, and commercial sectors (EIA 2014).

Power plants in California meet approximately 68 percent of the in-state electricity demand, hydroelectric power from the Pacific Northwest provides another 12 percent, and power plants in the southwestern United States provide 20 percent (EIA 2014). The contribution of in- and out-of-state power plants depends on, among other factors, the precipitation that occurred in the previous year and the corresponding amount of hydroelectric power that is available. PG&E is the primary electricity supplier in Sacramento County. As of 2016, PG&E was powered by 33 percent renewables, including biomass, geothermal, small hydroelectric, solar, and wind (CPUC 2018).

Alternative Fuels

A variety of alternatives are used to reduce demand for petroleum-based fuel and their use is encouraged through various statewide regulations and plans (e.g., Low Carbon Fuel Standard, Assembly Bill [AB] 32 Scoping Plan). Conventional gasoline and diesel may be replaced (depending on the capability of the vehicle) with many transportation fuels, including the following:

- biodiesel
- electricity
- ethanol (E-10 and E-85)
- hydrogen
- natural gas (methane in the form of compressed and liquefied natural gas)

- propane
- renewable diesel (including biomass-to-liquid)
- synthetic fuels
- gas-to-liquid and coal-to-liquid fuels

California has a growing number of alternative fuel vehicles through the joint efforts of the California Energy Commission (CEC), California Air Resources Board, local air districts, federal government, transit agencies, utilities, and other public and private entities. As of February 2018, Sacramento County contained more than 197 alternative fueling stations (Alternative Fuels Data Center 2018).

Commercial and Residential Energy Use

Homes built between 2000 and 2015 use 14 percent less energy per square foot than homes built in the 1980s, and 40 percent less energy per square foot than homes built before 1950. However, in some cases, the increased size of newer homes has offset these efficiency improvements. Primary energy consumption in the residential sector totaled 21 quadrillion British thermal units (BTUs) in 2009 (the latest year in EIA's Residential Energy Consumption Survey was completed), equal to 54 percent of consumption in the buildings sector and 22 percent of total primary energy consumption in the United States. Overall residential energy increased by 24 percent from 1990 to 2009. However, because of projected improvements in building and appliance efficiency, the EIA 2017 Annual Energy Outlook forecast a 5 percent increase in energy consumption from 2016 to 2040 (EIA 2017).

Energy consumption in commercial buildings represents just under one-fifth of U.S. energy consumption with office space, retail, and educational facilities representing about half of commercial sector energy consumption. In aggregate, commercial buildings consumed 46 percent of the building energy consumption and approximately 19 percent of energy consumption in the United States. The residential sector consumed approximately 22 percent of energy consumption (US Department of Energy 2012).

Energy Use for Transportation

On-road vehicles use about 90 percent of the petroleum consumed in California. Caltrans (2008) projected that 782 million gallons of gasoline and diesel were consumed in Sacramento County in 2015, which represents an increase of approximately 88 million gallons of fuel from 2010 levels.

5.7.2 REGULATORY FRAMEWORK

This section details federal, State, and local plans, policies, regulations, and laws that pertain to local GHG emissions and energy consumption in the Planning Area. These existing regulations provide a framework for addressing current and future emissions and energy consumption in the General Plan and will inform the goals and policies that are adopted.

Energy conservation is embodied in many federal, State, and local statutes and policies. At the federal level, energy standards apply to numerous products (e.g., EPA's EnergyStar Program) and transportation (e.g., fuel efficiency standards). At the State level, Title 24 of the California Code of Regulations sets forth energy standards for buildings. Further, the State provides rebates/tax credits for installation of renewable energy systems and offers the Flex Your Power program, which promotes conservation in multiple areas.

FEDERAL

Clean Air Act

In 2007, the United States Supreme Court held that EPA has the statutory authority to regulate GHG emissions from the transportation sector. After the court decision, President Bush signed Executive Order 13432 directing the EPA, along with the Departments of Transportation (DOT), Department of Energy (DOE), and Department of Agriculture (DOA), to initiate a regulatory process that responds to the Supreme Court's decision.

On July 11, 2008, the EPA issued an Advance Notice of Proposed Rulemaking on regulating GHGs under the Clean Air Act (CAA). The Advance Notice of Proposed Rulemaking reviews the various CAA provisions that may be applicable to the regulation of GHGs and presents potential regulatory approaches and technologies for reducing GHG emissions and seeks further public comment on the regulation of GHG emissions under the CAA. In September 2009, the EPA issued a final rule on mandatory GHG reporting, requiring that GHG emissions from large sources and suppliers of GHGs, including facilities that emit at least 25,000 $MTCO_2e$ each year, report these emissions annually to the EPA (EPA 2017).

While the EPA and the federal government have established the CAA, California has the authority to implement the federal regulations. Additionally, the State has established laws and policies that go beyond the statutes of the CAA to further promote healthy air in California. CARB enforces California's implementation of the CAA as an extension of its statewide rulemaking.

Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Clean Air Act

In 2009, the EPA Administrator issued a final endangerment finding and final cause finding for light duty vehicles under Section 202(a) of the CAA. The findings include:

- Endangerment finding: The EPA found that current and projected concentrations of the six GHG emissions in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or contribute finding: The EPA found that the combined emissions of these greenhouse gases from new motor vehicles contribute to the GHG pollution which threatens public health and welfare.

These findings do not impose any requirements on industry or other entities. However, this action was a prerequisite to finalizing the EPA's proposed GHG emissions standards for light-duty vehicles, which were jointly proposed by the EPA and the DOT's National Highway Traffic Safety Administration (NHTSA).

Regulations for Greenhouse Gas Emissions from Passenger Cars and Trucks and Corporate Average Fuel Economy Standards

In October 2012, the EPA and the National Highway Traffic Safety Administration (NHSTA), on behalf of the Department of Transportation, issued final rules to further reduce GHG emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 FR 62624). The NHTSA's CAFE standards have been enacted under the Energy Policy and Conservation Act since 1978. This national program requires automobile manufacturers to build a single light-duty national fleet that meets all requirements under both federal programs and the standards of California and other states. This program would increase fuel economy to the equivalent of 54.5 miles per gallon (mpg) limiting vehicle emissions to 163 grams of CO_2 per mile for the fleet of cars and light-duty trucks by model year 2025 (77 FR 62630).

In January 2017, EPA Administrator Gina McCarthy signed her determination to maintain the current GHG emissions standards for model year 2022–2025 vehicles. However, on April 2, 2018, the new EPA Administrator, Scott Pruitt, and Department of Transportation Secretary Elaine Chao announced a Final Determination that the current standards are not appropriate and should be revised. It is not yet known when these revisions are anticipated to occur (EPA 2018).

US Environmental Protection Agency SmartWay Program

SmartWay is an EPA program that reduces transportation-related emissions by creating incentives to improve supply chain fuel efficiency. The program has five primary components: (1) SmartWay Transport Partnership, a partnership in which freight carriers and shippers commit to benchmark operations, track fuel consumption and improve performance annually; (2) SmartWay Technology Program, a testing, verification, and designation program to help freight companies identify equipment, technologies, and strategies that save fuel and lower emissions; (3) SmartWay Finance Program, a competitive grant program that makes investing in fuel-saving equipment easier for freight carriers; (4) SmartWay Vehicles, a program that ranks light-duty cars and small trucks and identifies superior environmental performers with the SmartWay logo; and (5) SmartWay International Interests, which provides guidance and resources for countries seeking to develop freight sustainability programs modeled after SmartWay.

Energy Policy and Conservation Act of CAFE Standards

The Energy Policy and Conservation Act of 1975 established nationwide fuel economy standards to conserve oil. Under this act, the National Highway Traffic and Safety Administration, part of the US Department of Transportation (DOT), is responsible for revising existing fuel economy standards and establishing new vehicle economy standards.

The Corporate Average Fuel Economy (CAFE) program was established to determine vehicle manufacturer compliance with the government's fuel economy standards. Compliance with CAFE standards is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States. A CAFE value for each manufacturer is calculated by the EPA based on the city and highway fuel economy test results and vehicle sales. The CAFE values are a weighted harmonic average of the EPA city and highway fuel economy test results. Based on information generated under the CAFE program, the DOT is authorized to assess penalties for noncompliance. Under the Energy Independence and Security Act of 2007 (described below), the CAFE standards were revised for the first time in 30 years.

Energy Policy Act (1992 and 2005) and Energy Independence and Security Act of 2007

The Energy Policy Act of 1992 (EPAct) was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles in large, centrally-fueled fleets in metropolitan areas. The Energy Policy Act of 2005 provides renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

The Energy Independence and Security Act of 2007 is designed to improve vehicle fuel economy and help reduce the United States' dependence on oil. It increased the supply of alternative fuel sources by setting a mandatory renewable fuel standard that requires fuel producers to use at least 36 billion gallons of biofuel in 2022, which represents a nearly fivefold increase over current levels and reduces U.S. demand for oil by setting a national fuel economy standard of 35 miles per gallon by 2020—an increase in fuel economy standards of 40 percent. By addressing renewable fuels and CAFE standards, the Energy Independence and Security Act will build on progress made by the Energy Policy Act of 2005 in setting out a comprehensive national energy strategy for the twenty-first century.

STATE

California has adopted various administrative initiatives and enacted a variety of legislation relating to climate change, much of which sets aggressive goals for GHG emissions reductions within the State. However, none of this legislation provides definitive direction regarding the treatment of climate change in the environmental review documents prepared under CEQA. In particular, the CEQA Guidelines do not require or suggest specific methodologies for performing an assessment or thresholds of significance and do not specify greenhouse gas reduction mitigation measures. Instead, the CEQA amendments continue to rely on lead agencies to choose methodologies and make significance determinations based on substantial evidence, as discussed in further detail below. In addition, no State agency has promulgated binding regulations for analyzing GHG emissions, determining their significance, or mitigating any significant effects in CEQA documents. Thus, lead agencies exercise their discretion determining how to analyze greenhouse gases.

The discussion below provides a brief overview of CARB and Office of Planning and Research (OPR) documents and of the primary legislation relating to climate change that may affect the emissions associated with the proposed Project. It begins with an overview of the primary regulatory acts that have driven GHG regulation and analysis in California.

Executive Order S-3-05

Executive Order (EO) S-3-05, signed by Governor Arnold Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the executive order established total GHG emission targets for the State. Specifically, statewide emissions are to be reduced to 2000 levels by 2010, 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

This executive order was the subject of a California Appellate Court decision, *Cleveland National Forest Foundation v. San Diego Association of Governments* (SANDAG) (November 24, 2014) 231 Cal.App.4th 1056, which was reviewed by the California Supreme Court in January 2017. The Supreme Court decided a singular question in the case, which was released on July 13, 2017. The California Supreme Court ruled that SANDAG did not abuse its discretion by declining "to adopt the 2050 goal as a measure of significance in light of the fact that the Executive Order does not specify any plan or implementation measures to achieve its goal" *Cleveland National Forest Foundation v. San Diego Association of Governments*, 3 Cal 5th 497, 517 (2017).

In addition to concluding that an EIR need not use this executive order's goal for determining significance, the Court described several principles relevant to CEQA review of GHG impacts, including: (1) EIRs should "reasonably evaluate" the "long-range GHG emission impacts for the year 2050;" (2) the 2050 target is "grounded in sound science" in that it is "based on the scientifically supported level of emissions reduction needed to avoid significant disruption of the climate;" (3) in the case of the SANDAG plan, the increase in long-range GHG emissions by 2050, which would be substantially greater than 2010 levels, was appropriately determined to be significant and unavoidable; (4) the reasoning that a project's role in achieving a long-range emission reduction target is "likely small" is not valid for rejecting a target; and (5) "as more and better data become available," analysis of proposed plan impacts will likely improve, such that "CEQA analysis stays in step with evolving scientific knowledge and state regulatory schemes." The Court also ruled that "an EIR's designation of a particular adverse environmental effect as 'significant' does not excuse the EIR's failure to reasonably describe the nature and magnitude of the adverse effect." The Court also recognized that the 40 percent reduction in 1990 GHG levels by 2030 is "widely acknowledged" as a "necessary interim target to ensure that California meets its longer-range goal of reducing greenhouse gas emission 80 percent below 1990 levels by the year 2050." Senate Bill (SB) 32 has since defined the 2030 goal in statute (discussed below).

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, Governor Schwarzenegger signed the California Global Warming Solutions Act of 2006, Assembly Bill (AB) 32. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. AB 32 also requires that "(a) the statewide greenhouse gas emissions limit shall remain in effect unless otherwise amended or repealed; (b) It is the intent of the Legislature that the statewide greenhouse gas emissions limit continue in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020; (c) The [California Air Resources Board (CARB)] shall make recommendations to the Governor and the Legislature on how to continue reductions of greenhouse gas emissions beyond 2020." [California Health and Safety Code, Section 38551]

Senate Bill 375 of 2008

SB 375, signed by Governor Schwarzenegger in September 2008, aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy, showing prescribed land use allocation in each MPO's Regional Transportation Plan. CARB, in consultation with the MPOs, is to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in their respective regions for 2020 and 2035. The Sacramento Area Council of Governments (SACOG) serves as the MPO for Sacramento, Placer, El Dorado, Yuba, Sutter, and Yolo Counties, excluding those lands located in the Lake Tahoe Basin. The project site is in Sacramento County. SACOG adopted its Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) 2035 in 2012, and completed an update adopted on February 18, 2016. SACOG was tasked by CARB to achieve a 7 percent per capita reduction compared to 2012 emissions by 2020 and a 16 percent per capita reduction by 2035, which CARB confirmed the region would achieve by implementing its SCS (CARB 2013). In June 2017, CARB released the proposed Target Update for the SB 375 targets tasking SACOG to achieve a 7 percent and a 19 percent per capita reduction by 2020 and 2035, respectively (CARB 2017a). At the time of writing this Draft EIR, the Target Update has not been approved by CARB.

Cap-and-Trade Regulatory Program

In 2011, CARB adopted the cap-and-trade regulation and created the cap-and-trade program. The program covers sources of GHG emissions that emit more than 25,000 MT CO_2e per year in the State such as refineries, power plants, industrial facilities, and transportation fuels. The cap-and-trade program includes an enforceable statewide emissions cap that declines approximately 3 percent annually. CARB distributes allowances, which are tradable permits, equal to the emissions allowed under the cap. Sources that reduce emissions more than their limits can auction carbon allowances to other covered entities through the cap-and-trade market. Sources subject to the cap are required to surrender allowances and offsets equal to their emissions at the end of each compliance period (CARB 2012). The cap-and-trade program took effect in early 2012 with the enforceable compliance obligation beginning January 1, 2013. The cap-and-trade program was initially slated to sunset in 2020, but the passage of SB 398 in 2017 extended the program through 2030.

Advanced Clean Cars Program

In January 2012, CARB approved the Advanced Clean Cars program which combines the control of GHG emissions and criteria air pollutants, as well as requirements for greater numbers of zero-emission vehicles, into a single package of regulatory standards for vehicle model years 2017 through 2025. The new regulations strengthen the GHG standard for 2017 models and beyond. This will be achieved through existing technologies, the use of stronger and lighter materials, and more efficient drivetrains and engines. The program's zero-emission vehicle regulation requires battery, fuel cell, and/or plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025. The program also includes a clean fuels outlet regulation designed to support the commercialization of zero-emission hydrogen fuel cell vehicles planned by vehicle manufacturers by 2015 by requiring increased numbers of hydrogen fueling stations throughout the State. The number of stations will grow as vehicle manufacturers sell more fuel cell vehicles. By 2025, when the rules will be fully implemented, the statewide fleet of new cars and light trucks will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions than the statewide fleet in 2016 (CARB 2016).

Senate Bill X1-2, the California Renewable Energy Resources Act of 2011 and Senate Bill 350, the Clean Energy and Pollution Reduction Act of 2015

SB X1-2 of 2011 requires all California utilities to generate 33 percent of their electricity from renewables by 2020. SB X1-2 sets a three-stage compliance period requiring all California utilities, including independently-owned utilities, energy service providers, and community choice aggregators, to generate 20 percent of their electricity from renewables by December 31, 2013; 25 percent by December 31, 2016; and 33 percent by December 31, 2020. SB X1-2 also requires the renewable electricity standard to be met increasingly with renewable energy that is supplied to the California grid from sources within, or directly proximate to, California. SB X1-2 mandates that renewables from these sources make up at least 50 percent of the total renewable energy for the 2011–2013 compliance period, at least 65 percent for the 2014–2016 compliance period, and at least 75 percent for 2016 and beyond. In October 2015, SB 350 was signed by Governor Brown, which requires retail sellers and publicly owned utilities to procure 50 percent of their electricity from renewable resources by 2030.

Executive Order B-30-15

On April 20, 2015 Governor Brown signed EO B-30-15 to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. The Governor's EO aligns California's GHG reduction targets with those of leading international governments such as the 28-nation European Union, which adopted the same target in October 2014. California is on track to meet or exceed the target of reducing GHG emissions to 1990 levels by 2020, as established in the California Global Warming Solutions Act of 2006 (AB 32, discussed above). California's new emission reduction target of 40 percent below 1990 levels by 2030 sets the next interim step in the State's continuing efforts to pursue the long-term target expressed under Executive Order S-3-05 to reach the ultimate goal of reducing emissions 80 percent below 1990 levels by 2050. This is in line with the scientifically established levels needed in the United States to limit global warming below

2 degrees Celsius, the warming threshold at which major climate disruptions are projected, such as super droughts and rising sea levels.

Senate Bill 32 of 2016

In August 2016, Governor Brown signed SB 32, which serves to extend California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include Section 38566, which contains language to authorize CARB to achieve a statewide GHG emission reduction of at least 40 percent below 1990 levels by no later than December 31, 2030. SB 32 codified the targets established by EO B-30-15 for 2030, which set the next interim step in the State's continuing efforts to pursue the long-term target expressed in EOs S-3-05 and B-30-15 of 80 percent below 1990 emissions levels by 2050.

California Building Efficiency Standards of 2016 (Title 24, Part 6)

Buildings in California are required to comply with California's Energy Efficiency Standards for Residential and Nonresidential Buildings established by the California Energy Commission (CEC) in Title 24, Part 6 of the California Code of Regulations. These standards were first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption and are updated on an approximately 3-year cycle to allow consideration and possible incorporation of new energy efficient technologies and methods. All buildings for which an application for a building permit is submitted on or after January 1, 2017 must follow the 2016 standards (CEC 2015). Energy efficient buildings require less electricity and natural gas; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions.

California Integrated Waste Management Act

To minimize the amount of solid waste that must be disposed of in landfills, the State Legislature passed the California Integrated Waste Management Act of 1989 (AB 939), effective January 1990. According to AB 939, all cities and counties were required to divert 25 percent of all solid waste from landfill facilities by January 1, 1995, and 50 percent by January 1, 2000. Through other statutes and regulations, this 50 percent diversion rate also applies to State agencies. In order of priority, waste reduction efforts must promote source reduction, recycling and composting, and environmentally-safe transformation and land disposal.

In 2011, AB 341 modified the California Integrated Waste Management Act and directed CalRecycle to develop and adopt regulations for mandatory commercial recycling. The resulting Mandatory Commercial Recycling Regulation (2012) requires that on and after July 1, 2012, certain businesses that generate four cubic yards or more of commercial solid waste per week shall arrange recycling services. To comply with this requirement, businesses may either separate recyclables and self-haul them or subscribe to a recycling service that includes mixed waste processing. AB 341 also established a statewide recycling goal of 75 percent; the 50 percent disposal reduction mandate still applies for cities and counties under AB 939, the Integrated Waste Management Act.

Low Carbon Fuel Standard

In January 2007, Executive Order S-01-07 established a Low Carbon Fuel Standard (LCFS). The Order calls for a statewide goal to be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020, and that a LCFS for transportation fuels be established for California. The LCFS applies to all refiners, blenders, producers, or importers ("Providers") of transportation fuels in California, including fuels used by off-road construction equipment. The LCFS is measured on a full fuels cycle basis and may be met through market-based methods by which providers exceeding the performance required by an LCFS receive credits that may be applied to future obligations or traded to Providers not meeting LCFS.

In June 2007, CARB adopted the LCFS as a Discrete Early Action item under AB 32 pursuant to Health and Safety Code Section38560.5, and, in April 2009, CARB approved the new rules and carbon intensity reference values with new regulatory requirements taking effect in January 2011. The standards require providers of transportation fuels to report on the mix of fuels they provide and demonstrate they meet the LCFS intensity standards annually. This is accomplished by ensuring that the number of "credits" earned by providing fuels with a lower carbon intensity than the established baseline (or obtained from another party) is equal to or greater than the "deficits" earned from selling higher-intensity fuels.

After some disputes in the courts, CARB re-adopted the LCFS regulation in September 2015, and the LCFS went into effect on January 1, 2016. New amendments were adopted on April 27, 2018, that strengthen reduction targets through 2030.

Climate Change Scoping Plan and Updates

In December 2008, CARB adopted its first version of its Climate Change Scoping Plan, which contained the main strategies California will implement to achieve the mandate of AB 32 (2006) to reduce statewide GHG emissions to 1990 levels by 2020.

In May 2014, CARB released and subsequently adopted the First Update to the Climate Change Scoping Plan to identify the next steps in reaching the goals of AB 32 (2006) and evaluate the progress made between 2008 and 2012 (CARB 2014). According to this update, California is on track to meet the near-term 2020 GHG limit and is well positioned to maintain and continue reductions beyond 2020 (CARB 2014). This update also reported the trends in GHG emissions from various emissions sectors (e.g., transportation, building energy, agriculture).

On December 14, 2017, CARB adopted the 2017 Climate Change Scoping Plan (2017 Scoping Plan), which lays out the framework for achieving the mandate of SB 32 (2016) to reduce statewide GHG emissions to at least 40 percent below 1990 levels by the end of 2030 (CARB 2017b).

The 2017 Scoping Plan includes guidance to local governments in Chapter 5, including plan-level GHG emissions reduction goals and methods to reduce communitywide GHG emissions. In its guidance, CARB recommends that "local governments evaluate and adopt robust and quantitative locally-appropriate goals that align with the statewide per capita targets and the State's sustainable development objectives and develop plans to achieve the local goals." CARB further states that "it is appropriate for local jurisdictions to derive evidence-based local per capita goals [or some other metric that the local jurisdiction deems appropriate, such as mass emissions or per service population] based on local emissions sectors and population projections that are consistent with the framework used to develop the statewide per capita targets" (CARB 2017b: 99–100).

CARB developed statewide per capita GHG emissions targets of 6 $MTCO_2e$, and 2 $MTCO_2e$ by 2020 and 2050, respectively. These statewide per capita targets account for all emissions sectors in the State's GHG emissions inventory, statewide population forecasts recently prepared for 2030 and 2050, and all statewide reductions necessary to achieve the 2030 statewide target under SB 32 in all sectors. Consequently, the statewide emissions sectors and the total reductions achieved in these sectors through the Scoping Plan may not be directly applicable to GHG emissions inventories for individual cities or counties. Thus, while the statewide GHG efficiency targets of 6 $MTCO_2e$ per capita and 2 $MTCO_2e$ per capita goals are certainly a starting point for understanding how statewide GHG reductions required by SB 32 might be achieved, additional analysis may be necessary to determine more specific and locally appropriate targets that reflect local conditions and emissions sources.

Senate Bill 743

SB 743 changes the way that public agencies must evaluate the transportation impacts of projects under CEQA. The bill requires revisions to the CEQA guidelines that would establish new criteria for determining the significance of a project's transportation impacts that will more appropriately balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of GHG emissions.

As required under SB 743, OPR has developed potential metrics to measure transportation impacts that may include, but are not limited to, VMT, VMT per capita, automobile trip generation rates, or automobile trips generated. The new metric would replace the use of delay and level of service (LOS) as the metric to analyze transportation impacts under CEQA. OPR recommends different thresholds of significance for projects depending on land use types. For example, residential and office space projects must demonstrate a VMT level that is 15 percent less than that of existing development in the region may be a reasonable criterion for determining whether the mobile-source GHG emissions associated with the project are consistent with statewide GHG reduction targets (OPR 2017, p. 9). OPR's guidance explains that this criterion is consistent with Section 21099 of the California's Public Resources Code, which states that the criteria for determining significance must "promote the reduction in greenhouse gas emissions." It is also consistent with the statewide VMT reduction target developed by Caltrans in its Strategic Management Plan, which calls for a 15 percent reduction in per capita VMT, compared to 2010 levels, by 2020 (Caltrans 2015, p. 11; OPR 2017). Additionally, the California Air Pollution Control Officers Association determined that a 15 percent reduction in VMT is typically achievable for projects (CAPCOA 2010, p. 55) and the call for local governments to set communitywide GHG reduction targets of 15 percent below then-current levels by 2020 in CARB's First Update to the AB 32 Scoping Plan (CARB 2014, p. 113). With respect to retail land uses, any net increase of VMT may be sufficient to indicate a significant transportation impact.

In November 2017, OPR submitted final proposed changes to the CEQA Guidelines implementing SB 743 as part of a comprehensive CEQA Guidelines Update proposal to the California Natural Resources Agency. New rules would go into effect after the Secretary for the Natural Resources Agency adopts the new Guidelines, and the package undergoes review by the Office of Administrative Law. While a public agency could immediately apply the proposed new Guidelines section regarding the evaluation of transportation impacts (proposed Guidelines Section 15064.3), statewide application of that new section would not be required until January 1, 2020 (OPR 2017).

State of California Energy Plan

CEC is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The current plan is the 1997 California Energy Plan. The plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies strategies such as helping public agencies and fleet operators in implementing incentive programs for zero-emission vehicles and addressing their infrastructure needs, and encourage urban design that reduces VMT and accommodates pedestrian and bicycle access.

Assembly Bill 1007: State Alternative Fuels Plan

AB 1007 (Chapter 371, Statutes of 2005) required CEC to prepare a state plan to increase the use of alternative fuels in California. CEC prepared the State Alternative Fuels Plan (SAF Plan) in partnership with CARB and in consultation with other federal, State, and local agencies. The SAF Plan presents strategies and actions California must take to increase the use of alternative nonpetroleum fuels in a manner that minimizes the costs to California and maximizes the economic benefits of in-state production. The SAF Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuel use, reduce GHG emissions, and increase in-state production of biofuels without causing a significant degradation of public health and environmental quality.

Executive Order S-06-06

EO S-06-06, signed on April 25, 2006, establishes targets for the use and production of biofuels and biopower and directs State agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The EO establishes the following targets to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels in California by 2010, 40 percent by 2020, and 75 percent by 2050. The EO also calls for the State to meet a target for use of biomass electricity. The 2011 Bioenergy Action Plan identifies those barriers and recommends actions to address them so that the State can meet its clean energy, waste reduction, and climate protection goals. The 2012 Bioenergy Action Plan updates the 2011 plan and provides a more detailed action plan to achieve the following goals:

- Increase environmentally and economically sustainable energy production from organic waste.
- Encourage development of diverse bioenergy technologies that increase local electricity generation, combined heat and power facilities, renewable natural gas, and renewable liquid fuels for transportation and fuel cell applications.
- Create jobs and stimulate economic development, especially in rural regions of the State.
- Reduce fire danger, improve air and water quality, and reduce.

LOCAL

Sacramento Metropolitan Air Quality Management District

The Sacramento Metropolitan Air Quality Management District (SMAQMD) is the primary agency responsible for addressing air quality concerns in all of Sacramento County—its role is discussed further in Section 5.3, Air Quality. The SMAQMD also recommends methods for analyzing programmatic, plan-level GHGs in CEQA analyses and offers multiple potential GHG reduction measures for land use development projects. The SMAQMD also recommends thresholds of significance to provide a uniform scale to measure the significance of GHG emissions from land use and stationary source projects in compliance with CEQA and AB 32. The SMAQMD's goals in developing GHG thresholds include ease of implementation; use of standard analysis tools; and emissions mitigation consistent with AB 32. However, since the passage of SB 32 and the associated adoption of a revised statewide emissions target of 40 percent below 1990 levels by 2030, the SMAQMD has not developed new thresholds in compliance with this target (SMAQMD 2016).

The SMAQMD recommends that analyses of general plan-related GHG emissions include projections extending to the first year of the general plan buildout under two scenarios: without mitigation initiated by the lead agency and with mitigation from the implementation of goals and policies. The difference between these two scenarios should then be evaluated against the SMAQMD's adopted project-level thresholds to make a significance determination (SMAQMD 2016).

City of Elk Grove Climate Action Plan and Sustainability Element

Background

On March 27, 2013, the City adopted a CAP and the Sustainability Element of the General Plan. The Sustainability Element and CAP are two separate but related components of the City's sustainability strategy. The CAP is a culmination of existing and proposed initiatives to reduce GHG emissions through goals and measures related to transportation, land use, energy use, waste, and water use. The CAP is a tool for the City to achieve the State-recommended GHG emissions reduction targets through new and existing land uses, transportation, and City codes and programs. Concurrently with the CAP, the City adopted a new General Plan Sustainability Element. The Sustainability Element is a long-term (20+ years) plan that organizes and highlights the City's goals related to sustainability and provides new direction and vision to maintain a healthy, balanced community. As an element of the City's General Plan, the Sustainability Element governs land use decisions. The Sustainability Element also creates an overarching framework for the City to achieve GHG emissions reductions.

The CAP functions as an implementation tool of the Sustainability Element, focusing specifically on strategies to reduce GHG emissions and providing direction to reduce emissions consistent with State recommendations. It also builds on the goals and vision of the Sustainability Element but translates these goals into numeric estimates of GHG emissions reduction potential. While the CAP is not an adopted component of the General Plan, it is connected to the General Plan as an implementation item of the Sustainability Element to directly implement the goals and policies of the element.

In March 2013, the City certified a Subsequent Environmental Impact Report (SEIR) for the Sustainability Element and CAP (City of Elk Grove 2013b). The City prepared the SEIR for use as a tiering and streamlining document for GHG emissions as allowed under Section 15183.5 of the CEQA Guidelines. The SEIR allows the City to use the CAP to determine that a subsequent project's incremental contribution to GHG and climate change impacts is not cumulatively considerable if the project complies with the CAP.

An update to the City's CAP is proposed concurrently with the General Plan Update and is discussed below in Section 5.7.3.

5.7.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

Greenhouse Gas Emissions

For the purposes of this EIR, climate change impacts are considered significant if the proposed Project would:

1) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

2) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Energy

Based on Appendix F (energy) of the State CEQA Guidelines, implementing the Project would have a potentially significant impact on energy if it would:

3) Result in wasteful, inefficient, or unnecessary consumption of energy, during project construction or operation, as evidenced by a failure to decrease overall per capita energy consumption or decrease reliance on fossil fuels such as coal, natural gas, and oil.

4) Fail to incorporate feasible renewable energy or energy efficiency measures into building design, equipment use, transportation, or other project features, or otherwise fail to increase reliance on renewable energy sources.

5) Exceed the available capacities of energy supplies that require the construction of facilities.

6) Conflict with or obstruct a State or local plan for renewable energy or energy efficiency.

METHODOLOGY

Greenhouse Gas Emissions

The analysis in this section is consistent with the recommendations of the Sacramento Metropolitan Air Quality Management District's (SMAQMD) Guide to Air Quality Assessment in Sacramento County, Chapter 9, Program-Level Analysis of General Plans and Area Plans (SMAQMD 2016). The analysis primarily focuses on the extent to which the proposed General Plan Update would conflict with a plan for reduction of GHG emissions as defined by CEQA Guidelines Section 15183.5.

The City is updating its CAP concurrently with the General Plan. The CAP update is intended to carry out the proposed General Plan goals and policies to reduce GHG emissions and address the impacts of climate change. The City's GHG emissions inventory and forecasts have been updated to reflect new activity data and both current and projected population, housing, and employment demographic information consistent with the proposed General Plan. The CAP update includes new GHG emissions reduction targets of 7.6 $MTCO_2e$ per capita by 2020, and 4.1 $MTCO_2e$ per capita by 2030. These targets are consistent with guidance provided to local governments in the 2017 Scoping Plan on setting plan-level GHG reduction goals that are consistent with the State's efforts to achieve the 2030 target established by SB 32.

For transportation sector emissions, projected VMT under the cumulative General Plan conditions was obtained from the SACMET travel demand model based on the VMT attribution methodology known as the "Origin-Destination" method (Fehr & Peers 2017), as recommended by the CARB-appointed Regional Targets Advisory Committee (RTAC) for purposes of evaluating transportation plan consistency with SB 375 requirements (CAPCOA 2009).

Additional information regarding methods used in the CAP update, including the GHG emissions inventory, forecasts, reduction targets, and GHG emissions reduction measures that would be implemented in the Planning Area are included in **Appendix D** of this Draft EIR.

Energy

Energy use related to the Project would include energy directly consumed for space heating and cooling, electricity- and gas-powered equipment (including industrial equipment), and interior and exterior lighting of all buildings (residential and commercial) in the Planning Area. Indirect energy consumption includes the energy used (by consuming other fuel types) for generation of electricity at power plants and the energy used for the treatment of water and the transportation of water to and from the Planning Area. Transportation-related energy consumption includes the use of fuels and electricity to power cars, trucks, and public transportation. Energy would also be consumed by equipment and vehicles used during construction and routine maintenance activities.

Levels of construction- and operation-related energy consumption by land uses developed under the proposed General Plan were estimated, including the number of megawatt-hours of electricity, therms of natural gas, gallons of gasoline, and gallons of diesel fuel. Energy consumption estimates were calculated using the California Emissions Estimator Model (CalEEMod) version 2016.3.2 computer program (CAPCOA 2017). Where specific information about the land uses that would be developed under the proposed General Plan were not known, CalEEMod default values based on the location of the Planning Area were used. The following discussion summarizes the levels of energy consumption for each year of construction and for the first year of operation at full buildout. It also summarizes the gasoline and diesel consumption estimated for the City at full buildout of the proposed General Plan.

PROPOSED GENERAL PLAN POLICIES

The following goals, policies, and implementation programs from the proposed General Plan are specifically relevant to climate change and GHG emissions and energy consumption within the Planning Area. Numerous policies and programs in the General Plan address sustainable development, which influence operational mobile- and area-source emissions in the Planning Area. Policies and implementation programs throughout the Land Use and Mobility elements promote reductions in VMT through the mix and density of land uses, walkable neighborhood design, bicycle facilities and infrastructure, and public transportation facilities and infrastructure. In some cases, only components of General Plan policies were included. Refer to the full text of the General Plan for complete policy descriptions.

Land Use

Goal LU-1: A coordinated development pattern.

Policy LU-1-9: Encourage employee-intensive commercial and industrial uses to locate within walking distance of fixed transit stops. Encourage regional public transit providers to provide or increase coordinated services to areas with high concentrations of residents, workers, or visitors.

Goal LU-2: A focus on infill.

Policy LU-2-4: Require new infill development projects to be compatible with the character of surrounding areas and neighborhoods, support increased transit use, promote pedestrian and bicycle mobility, and increase housing diversity.

Goal LU-3: Expansion with purpose.

Policy LU-3-9: Public, Open Space, and Conservation land uses in Open Space/Conservation Districts should meet the following guidelines:

- Contain all areas located in the 100-year or 200-year floodplain, unless this would result in "islanding" of higher-density land uses. Areas located in the 100-year or 200-year floodplain shall be retained for agriculture if it is the existing use, continues to be economically viable, and would not result in islanding of higher-density land uses.

Policy LU-3-25: Require annexation proposals to demonstrate compliance with all of the following criteria:

- Criteria 2. The annexation proposal is consistent with the City's multimodal transportation goals, including integration of alternative transportation facilities as applicable.

Policy LU-3-26: Require the following items be submitted with all annexation applications:

- Performance Standards. An analysis of the projected VMT and GHG emissions for the proposed development.

Goal LU-4: Thriving activity centers.

Policy LU-4-1: Establish activity centers as community gathering places characterized by the following design element related actions

- Prioritize pedestrian and bicycle access.
- Ensure local and regional transit connections are provided throughout each activity center.

Goal LU-5: Consistent, high-quality urban design.

Policy LU-5-12: Integrate sustainable stormwater management techniques in site design to reduce stormwater runoff and control erosion.

Goal LU-6: Context-appropriate development of land use policy areas

Policy LU-6-8: Support the development of transit-friendly land uses and densities in the Land Use Policy Area, consistent with the City-preferred alignment of the Blue Line extension and the light rail station.

Policy LU-6-10: Prioritize land development of the type and scale in the South Pointe Policy Area to allow for and support a fixed rail or BRT transit service with regional connectivity.

Agriculture

Goal AG-1: Integrated and sustained agriculture.

Policy AG-1-4: Cultivate local food systems that encourage health eating and support the regional economy.

Policy AG-1-5: Support the protection of agricultural lands from future risk of conversion by requiring mitigation of the loss of qualified agricultural lands at a 1:1 ratio. The protection of existing agricultural land through the purchase of fee title or easements is not considered by the City to provide mitigation, because programs of this type result in a net loss of farmland.

Goal AG-2: Urban agriculture that is environmentally sustainable and a healthy food source.

Policy AG-2-1: Maintain existing, and facilitate the development of new and expanded, community gardens and farmers markets throughout Elk Grove.

Policy AG-2-2: Support urban agriculture opportunities such as backyard, rooftop, indoor, and other gardens that produce ecologically sound food for personal consumption.

Policy AG-2-3: Utilize the City's public works projects (e.g., parks, street tree planting, planted medians) as community gardens in locations deemed appropriate by the City.

Economic Development

Goal ED-3: Successful local businesses.

Policy ED-3-1: Promote a thriving local retail, personal services, and business services sector, particularly in the civic one, Old Town, and near major transit stops.

Regional Coordination

Goal RC-1: A new regional employment center.

Policy RC-1-5: In addition to establishing a primary Major Employment Center, consider options to develop additional Major Employment Centers in portions of the City with enough available undeveloped land and potential sufficient transit access to support such a center.

Goal RC-3: Regional mobility and infrastructure to support the local economy.

Policy RC-3-1: Integrate economic development and land use planning in Elk Grove with planning for regional transportation systems.

Policy RC-3-4: Advocate for fixed-transit service in Elk Grove as part of a coordinated regional network designed and routed to serve Major Employment Centers, residential centers, shopping centers, and colleges and universities.

Mobility

Goal MOB-1: A connected transportation network that provides for the safe and efficient movement of people and goods across all modes while accounting for environmental effects.

Policy MOB-1-1: Achieve State-mandated reductions in VMT by requiring land use and transportation projects to comply with the specific metrics and limits. These metrics and limits shall be used as thresholds of significance in evaluating projects subject to CEQA.

Policy MOB-1-2: Prepare and regularly update guidelines for the preparation of transportation impact analyses for consistency with VMT policies.

Policy MOB-1-4: Consider all transportation modes and the overall mobility of these modes when evaluating transportation design and potential impacts during circulation planning.

Goal MOB-3: All streets in the city are complete and sensitive to context.

Policy MOB-3-1: Implement a balanced transportation system using a layered network approach to building Complete Streets that ensure the safety and mobility of all users, including pedestrians, cyclists, motorists, children, seniors, and people with disabilities.

Policy MOB-3-2: Support strategies that reduce reliance on single-occupancy private vehicles and promote the viability of alternative modes of transport.

Policy MOB-3-3: Whenever capital improvements are being performed within the public right-of-way that alter street design, retrofit the right-of-way to enhance multimodal access to the most practical extent possible.

Policy MOB-3-6: Execute Complete Streets design in accordance with neighborhood context and consistent with specific guidance in community plans or area plans, as applicable.

Policy MOB-3-7: Develop a complete and connected network of sidewalks, crossings, paths, and bike lanes that are convenient and attractive, with a variety of routes in pedestrian-oriented areas.

Policy MOB-3-9: Fund development, operation, and maintenance of facilities for bicycle and pedestrian networks proportionate to the travel percentage milestone goals for each mode of transportation in the Bicycle, Pedestrian, and Trails Master Plan.

Policy MOB-3-15: Utilize reduced parking requirements when and where appropriate to promote walkable neighborhoods and districts and to increase the use of transit and bicycles.

Policy MOB-3-16: Establish parking maximums, where appropriate, to prevent undesirable amounts of motor vehicle traffic in areas where pedestrian, bike, and transit use are prioritized.

Policy MOB-3-17: Ensure new multifamily and commercial developments provide bicycle parking and other bicycle support facilities appropriate for the users of the development.

Goal MOB-4: Active transportation for all.

Policy MOB-4-1: Ensure that community and area plans, specific plans, and development projects promote pedestrian and bicycle movement via direct, safe, and pleasant routes that connect destinations inside and outside the plan or project area. This may include convenient pedestrian and bicycle connections to public transportation.

Policy MOB-4-2: Provide on-site facilities and amenities for active transportation users at public facilities, including bicycle parking and/or storage and shaded seating areas.

Policy MOB-4-3: Prioritize infrastructure improvements that benefit bicycle and pedestrian safety and convenience around community facilities and locations in activity centers and other pedestrian-oriented areas over vehicle efficiency improvements.

Policy MOB-4-4: Employ the recommendations and guidelines in the Bicycle, Pedestrian, and Trails Master Plan when planning and designing bicycle, pedestrian, and trail facilities and infrastructure, including updates to the Capital Improvement Program.

Policy MOB-4-5: Encourage employers to offer incentives to reduce the use of vehicles for commuting to work and increase commuting by active transportation modes. Incentives may include a cash allowance in lieu of a parking space and on-site facilities and amenities for employees such as bicycle storage, shower rooms, lockers, trees, and shaded seating areas.

Goal MOB-5: A safe, connected, and convenient transit system.

Policy MOB-5-1: Support a pattern of land uses and development projects that are conducive to the provision of a robust transit service.

Policy MOB-5-2: Advocate for the City's preferred fixed transit alignment from north of the City to the Southeast Policy Area and ensure proposed projects are complementary to such an alignment.

Policy MOB-5-3: Consult with Regional Transit when identifying and designing Complete Streets improvements near likely light rail alignment corridors in order to prioritize access to and use of transit to sites along that corridor.

Policy MOB-5-4: Support mixed-use and high-density development applications close to existing and planned transit stops.

Policy MOB-5-5: Promote strong corridor connections to and between activity centers that are safe and attractive for all modes.

Policy MOB-5-6: Provide the appropriate level of transit service in all areas of Elk Grove, through fixed-route service in urban areas, and complementary demand response service in rural areas, so that transit-dependent residents are not cut off from community services, events, and activities.

Policy MOB-5-7: Maintain and enhance transit services throughout the City in a manner that ensures frequent, reliable, timely, cost-effective, and responsive service to meet the City's needs. Enhance transit services where feasible to accommodate growth and transit needs as funding allows.

Policy MOB-5-8: Continue working with community partners to expand public transit service that benefits Elk Grove workers, residents, students, and visitors. Examples of expanded transit service included increased service frequency, establishing additional routes and stops, and creating dedicated transit lanes that would provide enhanced transit priority.

Policy MOB-5-9: Encourage the extension of bus rapid transit and/or light rail service to existing and planned employment centers by requiring a dedication of right-of-way. Advocate and plan for light rail alignment and transit stop locations that best serve the needs to the community and fit within the planned mobility system.

Policy MOB-5-10: Encourage commuter rail transportation by providing for a potential train station location for Amtrak and/or other rail service providers along the Sacramento Subdivision line.

Goal MOB-7: Adequate mobility system maintenance and operation.

Policy MOB-7-8: Support and use infrastructure improvements and technological advancements such as intelligent transportation management tools to facilitate the movement and security of goods through the City in an efficient manner.

Policy MOB-7-9: Assist in the provision of support facilities for emerging technologies such as advanced fueling stations (e.g., electric and hydrogen) and smart roadway signaling/signage.

Policy MOB-7-10: Work with a broad range of agencies to encourage and support programs that increase regional average vehicle occupancy. Examples include providing traveler information, shuttles, preferential parking for carpools/vanpools, transit pass subsidies, road and parking pricing, and other methods.

Policy MOB-7-11: Encourage and create incentives for the use of environmentally friendly materials and innovative approaches in roadway designs that limit runoff and urban heat island effects. Examples include permeable pavement, bioswales, and recycled road base, asphalt, and concrete.

Community and Resource Protection

Goal PT-2: A connected parks and trails system.

Policy PT-2-4: Continue to implement the adopted Bicycle, Pedestrian, and Trails Master Plan and complete regular updates to the plan as necessary.

Goal NR-2: Preserved trees and urban forest.

Policy NR-2-2: Maximize and maintain tree coverage on public lands and in open spaces.

Policy NR-2-4: Maintain and enhance an urban forest by preserving and planting trees in appropriate densities and locations to maximize energy conservation and air quality benefits.

Goal NR-3: A clean and adequate water supply.

Policy NR-3-2: Integrate sustainable stormwater management techniques in site design to reduce stormwater runoff and control erosion during and after construction.

Policy NR-3-6: Continue interagency partnerships to support water conservation.

Policy NR-3-7: Continue to eliminate water use inefficiencies and maintain ongoing communication with water suppliers to ensure sustainable supply.

Policy NR-3-8: Reduce the amount of water used by residential and nonresidential uses by requiring compliance with adopted water conservation measures.

Policy NR-3-9: Promote the use of greywater systems and recycled water for irrigation purposes.

Policy NR-3-10: Improve the efficiency of water use at City facilities through retrofits and employee education.

Policy NR-3-11: Promote upgrades to existing buildings for water conservation.

Policy NR-3-12: Advocate for native and/or drought-tolerant landscaping in public and private projects.

Goal NR-4: Improved air quality.

Policy NR-4-1: Require all new development projects which have the potential to result in substantial air quality impacts to incorporate design, construction, and/or operational features that result in a reduction in emissions equal to 15 percent compared to an "unmitigated baseline project." An "unmitigated baseline project" is a development project which is built and/or operated without the implementation of trip reduction, energy conservation, or similar features, including any such features which may be required by the Zoning Code or other applicable codes.

Policy NR-4-3: Implement and support programs that reduce mobile source emissions.

Policy NR-4-4: Promote pedestrian/bicycle access and circulation to encourage community residents to use alternative modes of transportation in order to minimize direct and indirect emissions of air contaminants.

Policy NR-4-5: Emphasize demand management strategies that seek to reduce single-occupant vehicle use in order to achieve State and federal air quality plan objectives.

Policy NR-4-6: Offer a public transit system that is an attractive alternative to the use of private motor vehicles.

Policy NR-4-11: Work with Sacramento County and the Sacramento Metropolitan Air Quality Management District to address cross-jurisdictional and regional transportation and air quality issues.

Goal NR-5: Reduced greenhouse gas emissions that align with local, state, and other goals.

Policy NR-5-1: By 2030, reduce community-wide greenhouse gas emissions to 4.1 metric tons of carbon dioxide equivalent ($MTCO_2e$) per capita. By 2050, reduce community-wide greenhouse gas emissions to 1.4 $MTCO_2e$ per capita to meet the State's 2050 greenhouse gas emissions reduction goals.

Policy NR-5-2: Improve the health and sustainability of the community through improved regional air quality and reduction of greenhouse gas emissions that contribute to climate change.

Policy NR-5-3: Support efforts by the Sacramento Metropolitan Air Quality Management District and the California Air Resources Board to decrease greenhouse gas emissions from stationary sources.

Policy NR-5-4: Preserve, protect, and enhance, as appropriate, the community's carbon sequestration resources to improve air quality and reduce net carbon emissions.

Goal NR-6: Reduced energy demand and increased renewable sources.

Policy NR-6-1: Promote energy efficiency and conservation strategies to help residents and businesses save money and conserve valuable resources.

Policy NR-6-2: Improve energy efficiency.

Policy NR-6-3: Promote innovation in energy efficiency.

Policy NR-6-4: Explore public-private partnerships to upgrade existing buildings for energy efficiency.

Policy NR-6-5: Encourage renewable energy options that are affordable and benefit all community members.

Policy NR-6-6: Encourage the use of solar energy systems in homes, commercial businesses, and City facilities as a form of renewable energy.

Policy NR-6-7: Promote energy conservation measures in new development to reduce on-site emissions and seek to reduce the energy impacts from new residential and commercial projects through investigation and implementation of energy efficiency measures during all phases of design and development.

Goal SD-1: Sustainable city management.

Policy SD-1-1: Participate in local, regional, and Statewide sustainability efforts and programs that further the goals and policies outlined in the General Plan.

Policy SD-1-2: Assess the City's progress toward achieving its sustainability objectives.

Policy SD-1-4: Use funding and financing mechanisms to support sustainability and environmentally friendly government programs.

Goal SD-2: Green building.

Policy SD-2-1: Incorporate green building techniques and best management practices in the site design, construction, and renovation of all public projects.

Policy SD-2-2: Support innovation and green building best management practices for all new private development.

Services, Health, and Safety

Goal ER-2: Minimal damage from flooding and drainage.

Policy ER-2-2: Require that all new projects not result in new or increased flooding impacts on adjoining parcels or on upstream and downstream areas.

Policy ER-2-3: Locate, and encourage other agencies to locate, new essential government service facilities and essential health care facilities outside of 100-year and 200-year flood hazard zones, except in cases where such locations would compromise facility functioning.

Policy ER-2-4: Relocated or harden existing essential government service facilities and essential health care facilities that are currently located inside of the 100-year and 200-year flood hazard zones.

Policy ER-2-6: Development shall not be permitted on land subject to flooding during a 100-year event, based on the most recent floodplain mapping prepared by the Federal Emergency Management Agency (FEMA) or updated mapping acceptable to the City of Elk Grove. Potential development in areas subject to flooding may be clustered onto portions of a site which are not subject to flooding may be clustered onto portions of a site which are not subject to flooding, consistent with other policies of this General Plan.

Policy ER-2-10: Work with regional, county, and state agencies to develop mechanisms to finance the design and construction of flood management and drainage facilities to achieve an urban level of flood protection in affected areas.

Goal ER-6: An adaptable and resilient community.

Policy ER-6-1: Develop a guide of City procedures in the event of severe weather conditions such as excessive heat including the deployment of emergency services, opening of local cooling shelters, and community notification procedures.

Policy ER-6-2: Coordinate with the Sacramento County Office of Emergency Services (SacOES) and the County Department of Public Health to provide information to vulnerable populations on the resources available and key actions to take both for mitigation on their property in preparation of excessive heat events and services during events.

Policy ER-6-4: In construction of new roadways, utilize cool pavements and higher-albedo impervious materials as well as trees and foliage along rights-of-way.

Policy ER-6-5: Allocate funds as appropriate to address anticipated additional repairs to damaged infrastructure that will be required due to increased stress from climate effects such as extreme heat and storms.

Policy ER-6-6: Work with the Sacramento County Water Agency, Elk Grove Water Agency, and other water utilities to support programs and conservation activities intended to help water customers voluntarily conserve approximately 10 percent over time.

Policy ER-6-7: Enforce the City's water conservation ordinance and State Water Resource Control Board regulations affecting local water agencies and encourage public reporting of violations.

Policy ER-6-9: Facilitate implementation of measures identified in the Metro Fire's Community Wildfire Protection Plan (CWPP) for the protection of human life and reduction in loss of property, critical infrastructure, and natural resources associated with wildfire.

Policy ER-6-11: Seek to provide the community with information relating to sustainability, climate change, and innovative development strategies.

Goal INF-1: An efficient water delivery and storage system.

Policy INF-1-3: Protect the quality and quantity of groundwater resources, including those which serve households and businesses which rely on private wells.

Policy INF-1-4: Establish and expand recycled water infrastructure for residential, commercial, industrial, and recreational facilities and support the use of reclaimed water for irrigation wherever feasible.

Goal CIF-1: Minimal solid waste generation.

Policy CIF-1-1: Facilitate recycling, reduction in the amount of waste, and reuse of materials to reduce the amount of solid waste sent to landfill from Elk Grove.

Policy CIF-1-2: Reduce municipal waste through recycling programs and employee education.

Policy CIF-1-3: Encourage businesses to emphasize resource efficiency and environmental responsibility and to minimize pollution and waste in their daily operations.

Goal HTH-1: Health living options for all residents.

Policy HTH-1-3: Provide comfortable, safe pedestrian and bicycle connections between residential areas and recreational opportunities.

Policy HTH-1-5: Promote access to healthy food options by preserving and expanding local food production.

Policy HTH-1-6: Support and consider incentives to encourage the development of new retail venues that sell local, fresh produce, including farmers markets, community-supported agriculture programs, and grocery stores, especially in underserved areas and near schools.

Policy HTH-1.7: Strive to increase the number of farmers markets and community gardens throughout the City.

SouthEast Policy Area Community Plan

Goal SEPA-1: An efficient roadway network.

Policy SEPA-1.3: Provide for the future extension of fixed transit service through the Plan Area via Big Horn Boulevard and Bilby Road.

Goal SEPA-4: A wide range of housing types.

Policy SEPA-4.1: Support a wide range of housing types in the Plan Area. Residential developers are encouraged to be innovative and responsive to the changing lifestyle of future residents and trends toward transit, telecommuting, zero-emissions vehicles, and other.

Goal SEPA-10: Sustainable design.

Policy SEPA-10.1: Require development in the Plan Area to provide opportunities for implementation of sustainable design principles. Design opportunities include, but are not limited to, the following:

- Orienting homes and buildings in an east-west alignment for southern exposure to take advantage of passive or natural heating or cooling.
- Incorporating photovoltaic and other renewable energy systems into building and site design.
- Incorporating low-impact development features, such as bioswales and permeable materials for paved areas.

Eastern Elk Grove Community Plan

Goal EEG-2: Enhanced stream corridors and wetlands.

Policy EEG-2.8: Require the provision of pedestrian and bicycle access between the industrial properties and trail systems in adjacent open space areas.

Goal EEG-3: A complete circulation system.

Policy EEG-3.3: Include a network of interconnected bicycle and pedestrian facilities within the Community Plan area.

CLIMATE ACTION PLAN UPDATE

The Elk Grove City Council adopted the 2013 CAP with the primary objective to reduce GHG emissions throughout the community and prepare for climate change. The 2013 CAP was designed to reduce community-wide emissions 15 percent below 2005 levels by the year 2020, and to set the City on a course to achieve a long-term emissions reduction goal to reduce emissions by an additional 80 percent by 2050.

The GHG emissions projections in **Table 5.7-4** account for the land use pattern and demographic assumptions contained in the General Plan, which were incorporated into the SACMET travel demand model. GHG emissions from mobile sources and energy consumption (e.g., electricity and natural gas) from residential and nonresidential land uses are the largest sources of GHG emissions in the City.

TABLE 5.7-4
CITY OF ELK GROVE COMMUNITY-WIDE GREENHOUSE GAS EMISSIONS INVENTORY AND LEGISLATIVE-ADJUSTED EMISSIONS FORECASTS ($MTCO_2E$/YEAR)

Sector	2013	2020	2030	2050
Residential Energy	231,400	245,995	240,585	289,705
Commercial/Industrial Energy	129,860	142,309	144,486	198,485
On-Road Vehicles	430,340	541,455	524,978	681,001
Off-Road Vehicles	93,340	27,206	14,685	20,648
Solid Waste	26,260	36,181	39,817	47,781
Wastewater	3,854	4,251	5,083	6,781
Water	2,708	2,421	2,182	2,910
Agriculture	1,030	2,585	1,061	299
Total	**918,790**	**1,002,402**	**972,878**	**1,247,610**
GHG Emissions Reduction Targets	N/A	1,384,355	888,509	401,347

**Note: $MTCO_2e$ = metric tons of carbon dioxide equivalent; GHG = greenhouse gas; N/A = not applicable. Due to rounding, the total may not be the sum of component parts.*

The City is updating the General Plan concurrently with an update to the CAP. The proposed General Plan includes Policy NR-5-1 to achieve a GHG emissions reduction target of 7.6 $MTCO_2e$ per capita by the year 2020, and 4.1 $MTCO_2e$ per capita by the year 2030. The proposed General Plan also recommends a longer-term goal for GHG reductions of 1.4 $MTCO_2e$ per capita by 2050. This longer-term goal is based on statewide directives in Executive Order S-3-05 to reduce GHG emissions to 80 percent below 1990 levels by 2050. The CAP update is designed to meet these targets and thus serves as a vehicle for implementing the updated General Plan.

Total GHG emissions reductions require to meet the targets account for both State and federal regulatory actions, and locally based GHG emissions reductions in the CAP Update, which are summarized below in **Table 5.7-6**. Additional net GHG emissions reductions would be required to meet the long-term goal for 2050; however, the scale of reductions required to achieve the much more aggressive longer-term emissions reduction goals will require significant improvements the availability and/or cost of technology, as well as potential increased reductions from ongoing State and federal legislative actions.

A comprehensive list of specific General Plan policies and programs that correspond with the proposed GHG emissions reduction measures in the CAP Update are included in **Table 5.7-6**. As shown in the table, the GHG reduction measures in the CAP Update are consistent with the proposed General Plan policies. The GHG emissions reduction measures apply to existing development, new development, or both, depending on the measure and implementation methods. Implementation of the GHG emissions reduction measures in the proposed CAP Update would reduce GHG emissions by approximately 94,778 $MTCO_2e$ below 2020 projected emissions. When combined with State and federal legislative reductions, per capita GHG emissions would meet the target of 7.6 $MTCO_2e$ per capita by 2020. Detailed assumptions and emissions reduction estimates associated with the proposed GHG reduction measures are shown in **Appendix D** of this Draft EIR. Wherever assumptions could be supported regarding expected participation and emissions reduction potential of the proposed GHG reduction measures in the CAP Update, those assumptions were documented in **Appendix D**.

PROJECT IMPACTS AND MITIGATION MEASURES

Generate GHG Emissions and Consistency with Scoping Plan (Standards of Significance 1 and 2)

Impact 5.7.1 Development that would occur under the proposed General Plan Update would result in construction- and operational-related GHG emissions that contribute to climate change on a cumulative basis. However, the General Plan and the associated CAP Update would result in GHG emissions reductions sufficient to meet GHG reduction targets and goals, which are consistent and aligned with the goals identified 2017 Scoping Plan to meet the statewide GHG emission reduction targets for 2020 and 2030, as established by AB 32 and SB 32. Thus, this impact would be **less than significant.**

Development that would occur under the proposed General Plan would result in construction- and operation-related GHG emissions that would contribute to climate change on a cumulative basis. Detailed construction information for individual projects is unknown at this time but would typically involve use of heavy-duty equipment, construction worker commute trips, material deliveries, and vendor trips. These activities would result in GHG emissions limited in duration for any given project, but when taken together over buildout of the General Plan, could be considerable. Long-term operational sources of GHG emissions associated with the proposed General Plan would include mobile sources (e.g., vehicle exhaust), energy consumption (e.g., electricity and natural gas), solid waste (e.g., emissions that would occur at a landfill associated with solid waste decomposition), wastewater treatment, and water consumption (e.g., electricity used to deliver and treat water consumed by customers in the Planning Area). Operational GHG emissions associated with buildout of the proposed General Plan are summarized in **Appendix D**.

Growth assumptions (**Table 5.7-5**) relied upon for the City's GHG emissions projections are presented in **Table 5.7-4**. Because GHG emissions from vehicles are one of the largest sources of GHG emissions in the Planning Area, VMT is an important metric to help measure progress toward reducing GHG emissions. VMT per capita is expected to increase by about 60 percent in the Planning Area through the buildout horizon, which means that vehicle trips or trip lengths are expected to increase.

TABLE 5.7-5
GENERAL PLAN GROWTH ASSUMPTIONS AND ACTIVITY DATA

	2013	2020	2030	2050
Population	163,093	181,257	218,503	291,481
Employment	45,463	51,704	68,632	93,423
Housing	52,783	58,095	70,033	102,765
VMT	878,312,710	1,304,308,676	1,705,930,899	2,509,175,345
VMT per capita	5,385	7,196	7,807	8,608

Source: City of Elk Grove 2018

Note: VMT = vehicle miles traveled estimated using SACMET travel demand model calculated according to "Origin-Destination" method.

Proposed CAP Update Strategies and General Plan Policies That Provide Mitigation

Policies in the General Plan that would reduce construction-related GHG emissions from development include Policy NR-4-1, which requires all new development project with the potential to result in substantial air quality impacts to incorporate design, construction, and/or operational features that result in a reduction in emissions equivalent to 15 percent compared to an "unmitigated baseline project." Policy NR-4-8 requires development projects to incorporate best management practices during construction activities to reduce emissions of criteria pollutants and Policy NR-4-13 requires coordination with the SMAQMD on the review of proposed development projects, specifically projects that could conflict with any applicable air quality plans and/or the State Implementation Plan. These policies would result in projects incorporating feasible best practices for reducing GHG emissions from construction activities.

Implementation Actions listed under "Environment, Conservation and Sustainability" of the General Plan commit the City to assess and monitor performance of GHG emissions reduction efforts through 2030, and progress toward meeting long-term GHG emissions reduction goals.

The CAP Update contains a comprehensive strategy that achieves a community-wide GHG emissions reduction target of 7.6 $MTCO_2e$ per capita by 2020 and 4.1 $MTCO_2e$ per capita by 2030. The CAP Update is designed to implement the General Plan by demonstrating specific GHG reduction measures and implementing actions for achieving the General Plan's proposed GHG emissions reduction policy of 7.6 $MTCO_2e$ per capita by 2020, 4.1 $MTCO_2e$ per capita by 2030, and 1.4 $MTCO_2e$ per capita by 2050 (see Policy NR-5-1).

Conclusion

The estimated GHG emissions reduction potential of CAP actions are summarized in **Table 5.7-6**. The GHG emissions reductions presented in **Table 5.7-6** are estimates and not precise values. The estimates are based on conservative assumptions and performance standards that are included in the proposed CAP Update.

The City's forecast emissions under the General Plan, both without and with the GHG emissions reduction measures in the CAP Update, are presented relative to the 2020, 2030, and 2050 GHG reduction targets and goals in **Figure 5.7-1**. The CAP Update would meet (and exceed) the 2020 target with a 446,677 $MTCO_2e$/year surplus and exceed the 2030 target with a 62,893 $MTCO_2e$ per year surplus.

TABLE 5.7-6
SUMMARY OF GREENHOUSE GAS EMISSIONS REDUCTION ACTIONS

CAP Action	Location in General Plan	Action Description	GHG Reduction ($MTCO_2e$/year)		
			2020	2030	2050
BE-1	NR-6-1	Promote Energy Conservation	1,876	4,340	11,393
BE-2	NR-6-2	Upgrade Residential Appliances in Existing Development	4,487	10,134	19,250
BE-3	NR-6-2	Upgrade Nonresidential Appliances in Existing Development	912	2,116	5,642

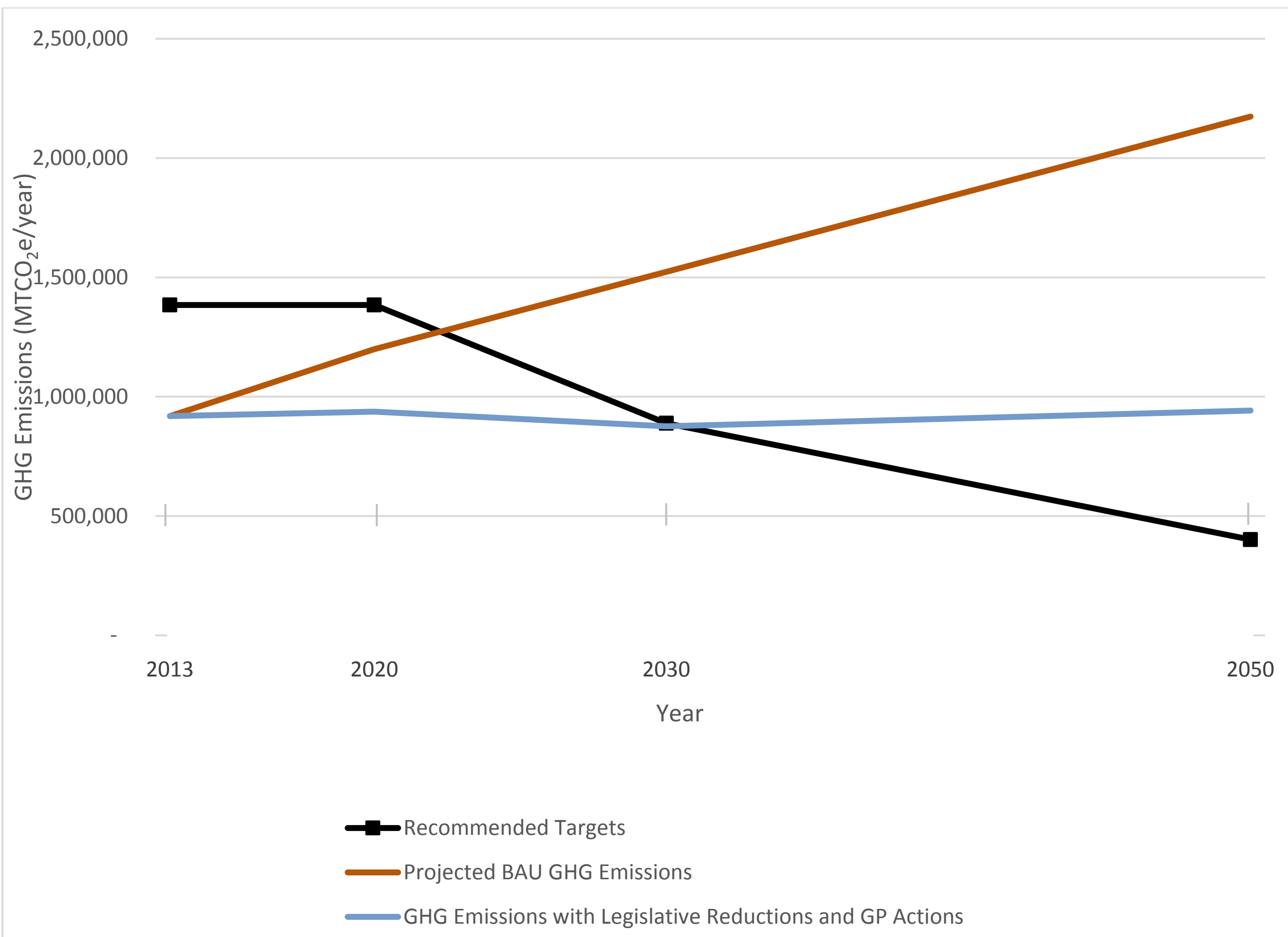
CAP Action	Location in General Plan	Action Description	GHG Reduction ($MTCO_2e$/year)		
			2020	2030	2050
BE-4	NR-6-1; NR-6-2; NR-6-3; SD-2-1; SD-2-2	Encourage or Require Green Building Practices in New Construction1	59	924	3,836
BE-5	NR-6-1; NR-6-2; NR-6-3; SD-2-1; SD-2-2	Phase in Zero Net Energy Standards in New Construction	0	29,930	163,902
BE-6	NR-6-1; NR-6-2; NR-6-3; SD-2-1; SD-2-2	Encourage or Require Green Building Practices in Existing Buildings	1,986	3,404	8,511
BE-7	NR-6-6; NR-6-5	Solar PV in Residential and Commercial Development	5,488	13,459	44,544
BE-8	NR-6-6	SMUD Greenergy and SolarShares Programs	12,193	19,846	33,167
BE-9	NR-2-2; NR-2-3; NR-2-4	Increase City Tree Planting	173	421	1,235
RC-1	CIF-1.1; CIF-1.2; CIF-1.3	Waste Reduction	5,272	10,169	16,957
RC-2	CIF-1.1; CIF-1.2	Reduce Organic Waste	3,208	6,791	9,713
TACM-1	MOB-3.5; MOB-6.4; MOB-7.8	Local Goods	4,388	7,008	9,935
TACM-2	NR-4-6	Transit Oriented Development	3,189	6,963	14,613
TACM-3	NR-4-5	Intra-City Transportation Demand Management	5,485	9,344	24,838
TACM-4	NR-4-4; PT-2-4; MOB-1.5; MOB-3.1; MOB-3.7; MOB-3.9; MOB-3.15; MOB-3.16; MOB-3.17; MOB-4.2; MOB-4.3; MOB-4.4; MOB-4.5; HTH-1.3	Pedestrian and Bicycle Travel	3,299	4,265	5,533
TACM-5	H-2-1	Affordable Housing	12,028	16,018	21,193
TACM-6	MOB-1.1; NR-4-3	Vehicle Miles Traveled Reduction Policy	NA	NA	NA
TACM-7	N/A	Traffic Calming Measures	274	292	828
TACM-8	NR-4-8	Tier 4 Final Construction Equipment	0	644	892
TACM-9	MOB-7.9	Install EV Charging Stations	316	794	689
Citywide GHG Emissions without Legislative Reductions (BAU)			1,199,232	1,523,936	2,174,042
Total GHG Reductions Achieved from Legislative Reductions and General Plan Actions			261,554	647,866	1,232,101

CAP Action	Location in General Plan	Action Description	GHG Reduction ($MTCO_2e$/year)		
			2020	2030	2050
Citywide GHG Emissions with Legislative Reduction and General Plan Actions			937,678	876,070	941,941
Target GHG Reductions			1,384,355	888,509	401,347
Additional GHG Reductions Needed to Meet Targets			(446,677)	(62,893)	448,186
GHG Emissions per Capita with Legislative Reductions and General Plan Actions			5.2	3.8	2.9

Source: Data compiled by Ascent Environmental 2018

Notes: CAP = Climate Action Plan; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

FIGURE 5.7-1
CITY OF ELK GROVE GENERAL PLAN PROJECTED GREENHOUSE GAS EMISSIONS AND REDUCTION TARGETS



Notes: BAU = business-as-usual; does not account for GHG reduction actions from the General Plan or the 2013 CAP; GHG = greenhouse gas; GP = general plan; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Although implementation of the proposed General Plan would result in both direct and indirect GHG emissions, the CAP and proposed General Plan policies would reduce emissions consistent with local GHG emissions reduction targets that are aligned with the statewide 2020 and 2030 targets established by the State's Scoping Plan. The proposed General Plan, along with the proposed CAP Update, would be consistent with the directives of AB 32, the Global Warming Solutions Act of 2006, which requires the State to reduce GHG emissions to 1990 levels by 2020, and SB 32, which requires the State to reduce GHG emissions 40 percent below 1990 levels by 2030. Therefore, the proposed General Plan and CAP Update would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. This impact would be **less than significant.**

Mitigation Measures

No additional mitigation required beyond compliance with the CAP Update and proposed General Plan policies.

Potential to Conflict with Long-term Statewide GHG Emissions Reduction Goal for 2050 (Standard of Significance 2)

Impact 5.7.2 Adoption of the proposed General Plan and CAP Update would result in emission reductions that are consistent with statewide reduction targets for 2020 and 2030. However, based on current emission estimates for the City projected for 2050, and considering the proposed policies and programs included in the General Plan and CAP Update, the proposed General Plan and CAP Update would likely not result in sufficient GHG reductions for the City to meet the longer-term goal for 2050 as stated in EO S-3-05. Thus, this impact would be **potentially significant.**

As noted in the 2017 Scoping Plan, the long-term goal of achieving a GHG emissions reduction of 80 percent below 1990 levels by 2050, equivalent to 2 $MTCO_2e$ per capita, represents the State's commitment to achieving its "fair share" of GHG emissions reductions required under the Paris Agreement, which identified scientifically-based global emissions levels required to put the world on track to limit global warming to below 2°C, thereby avoiding the most catastrophic and dangerous impacts of global climate change (CARB 2017b, p. 99). Additionally, the 2020 and 2030 targets codified into State law per AB 32 and SB 32 were established consistent with the long-term trajectory of emissions reductions required to achieve the 2050 goal.

Although the statewide GHG reduction goals for 2050 have not been codified, it is still considered imperative that projects demonstrate progress toward achieving longer-term GHG reduction goals under CEQA. A recent California Appellate Court decision, *Cleveland National Forest Foundation v. San Diego Association of Governments* (November 24, 2014) 231 Cal.App.4th 1056, examined whether EO S-3-05 should be viewed as having the equivalent force of a legislative mandate for specific emissions reductions. The case was reviewed by the California Supreme Court in January 2017 and a decision was released on July 13, 2017. The California Supreme Court ruled that SANDAG did not abuse its discretion by declining to adopt EO S-3-05 as a measure of significance for the specific GHG reduction target years, especially in analyzing the significance of impacts in 2050. Despite this, the California Supreme Court cautioned that future analyses may have greater capacity to analyze impacts through 2050 and would be required to perform those analyses if that capacity is achievable.

CAP Update and Proposed General Plan Policies That Provide Mitigation

The proposed General Plan includes Policy NR-5-1 that requires the City to achieve GHG emissions reductions that are consistent with State targets. Additionally, as stated in the proposed General Plan implementation programs under "CAP and GHG emissions inventory updates," the City would conduct an update of the community-wide GHG emissions inventory every five years to assess progress to date in meeting the adopted targets, and periodically update the CAP in response to post-2030 emissions reduction targets and associated updates to the Scoping Plan that could be approved by the State, in light of State's long-term 2050 emission reduction goal established by EO S-3-05 and guidance stated in the 2017 Scoping Plan.

Conclusion

As discussed above under Impact 5.7-1, adoption of the proposed General Plan and CAP Update would result in emissions reductions that would ensure the City would meet the 2020 and 2030 emissions limits of 7.6 and 4.1 $MTCO_2e$ per capita, respectively. As a result of the GHG reduction measures listed in the CAP Update, per capita emissions would continue to decline beyond 2030. As shown in **Table 5.7-6**, 2050 per capita emissions would be reduced to 2.9 $MTCO_2e$.

However, based on current emission estimates for the City projected for 2050, and considering the proposed policies and programs listed above under Impact 5.7-1, the proposed General Plan would not result in sufficient GHG reductions for the City to meet the longer-term 2050 goal of 1.4 $MTCO_2e$ per capita. Additional technological advances across multiple sectors would be required to reduce emissions further, combined with additional regulatory actions at the State or federal levels that are currently unknown beyond the year 2030. Currently, the 2017 Scoping Plan only identifies known commitments and proposed actions that will be taken by the State to achieve the 2030 target. Furthermore, the State has not yet proposed a detailed update to the Scoping Plan for future targets that may be adopted beyond 2030 on the path to meeting the 2050 goal. The City would continue to monitor the status of communitywide GHG emissions over time; monitor and report on progress toward achieving adopted GHG reduction goals through implementation of the General Plan and CAP; and, identify new or modified GHG reduction measures that would achieve longer-term, post-2030 targets that may be set by the State or others in the future. This is a **significant** impact.

Mitigation Measures

No additional feasible mitigation available beyond compliance with the CAP Update and proposed General Plan policies.

Despite the General Plan policies, implementation programs, and CAP Update GHG reduction measures that would be implemented under the Project, per capita emissions would not meet the long-term adjusted statewide emissions reduction goal of 1.4 $MTCO_2e$ per capita by 2050, consistent with EO S-3-05 and the 2017 Scoping Plan. No additional mitigation or information regarding future available technology advancements or future State plans for achieving post-2030 emission reductions is available at this time that can be further quantified. This impact would be **significant and unavoidable.**

Energy Use and Conservation (Standards of Significance 3, 4, 5, and 6)

Impact 5.7.3 Land uses developed and operated under the proposed General Plan would increase electricity and natural gas consumption. Buildings developed under the proposed General Plan would comply with CCR Title 24 standards for building energy efficiency, and actions under the proposed CAP would include zero net energy requirements in 2020 and 2030 for residential and commercial development, respectively. Actions under the proposed General Plan and CAP would include the requirement of a 15 percent VMT reduction for new development projects, installation of more bicycle and pedestrian infrastructure, as well as improved public transportation options that would reduce VMT and associated consumption of automotive fuel. Construction-related energy consumption would be temporary and not require additional capacity or increased peak or base period demands for electricity or other forms of energy. Thus, energy consumption associated with the development of the project would not result in wasteful, inefficient, or unnecessary consumption of energy. Further, development of the project would not conflict with a State or local plan for renewable energy or energy efficiency. This impact would be **less than significant.**

Appendix F of the State CEQA Guidelines requires the consideration of the energy implications of a project. CEQA requires mitigation measures to reduce "wasteful, inefficient, and unnecessary" energy usage (PRC Section 21100, subdivision [b][3]). Neither the law nor the State CEQA Guidelines establish criteria that define wasteful, inefficient, or unnecessary use. Compliance with CCR Title 24 Energy Efficiency Standards and zero net energy building standards in 2020 and 2030 for residential and commercial, respectively, would result in energy-efficient buildings. However, compliance with building codes does not adequately address all potential energy impacts during construction and operation. For example, energy would be required to transport people and goods to and from the Planning Area.

Construction-Related Energy

Energy would be required to construct, operate, and maintain construction equipment and to produce and transport construction materials associated with the construction of the development of the proposed General Plan. The one-time energy expenditure required to construct the physical buildings and infrastructure associated with the development would be nonrecoverable. Most energy consumption would result from operation of construction equipment and vehicle trips associated with commutes by construction workers and haul trucks supplying materials.

An estimated 4,525,380 gallons of gasoline and 228,362 gallons of diesel would be consumed each year during construction in the Planning Area, as shown in **Table 5.7-7**. The energy needs for project construction would be temporary and are not anticipated to require additional capacity or increase peak or base period demands for electricity or other forms of energy. Use of construction equipment and associated energy consumption would be typical of that associated with construction of new residential and commercial projects in a suburban setting.

TABLE 5.7-7
CONSTRUCTION ENERGY CONSUMPTION

	Gallons/Year
Gasoline	4,525,380
Diesel	228,362

Transportation Energy

Fuel use estimates were calculated from the combination of fuel consumption rates and fuel mix by vehicle class from CARB's EMFAC2014 model with overall VMT and mode share by vehicle class modeled for the project in CalEEMod (see Section 5.3 "Air Quality," and **Appendix C** of this Draft EIR). State and federal regulations regarding standards for vehicles in California are designed to reduce wasteful, unnecessary, and inefficient use of energy for transportation. Implementing the proposed General Plan and CAP Update would include VMT reduction requirements for new development, new bicycle and pedestrian facilities, improved public transit, and other trip reducing measures.

Fuel consumption associated with vehicle trips generated by implementation of the project would not be considered inefficient, wasteful, or unnecessary in comparison to that associated with other, similar cities in the region. The estimated weekday daily VMT (74,519,700 miles) in the region is based on the regional average for 2036 as reported in the Sacramento Area Council of Government's 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy (2016). Daily VMT associated with project buildout would be 4,562,035, accounting for approximately 6 percent of regional VMT. Annual VMT associated with the Project would be 1,665,142,793 and would consume 85,397,417 gallons of gasoline per year and 24,600,519 gallons of diesel per year (**Table 5.7-8**).

Per capita fuel consumption associated with buildout of the General Plan would result in decreased gasoline use per capita by 19 percent and an increase in diesel consumption by 51 percent.

TABLE 5.7-8
ANNUAL GASOLINE AND DIESEL CONSUMPTION ASSOCIATED WITH THE PROPOSED GENERAL PLAN

Vehicle Category	Gasoline (gallons/year)		Diesel (gallons/year)	
	Baseline	Proposed General Plan	Baseline	Proposed General Plan
Passenger Vehicles	34,133,190	42,159,997	185,725	450,827
Trucks	40,940,306	42,230,806	10,707,147	23,127,574
Buses	608,793	791,113	859,796	979,188
Other Vehicles	264,065	215,501	43,575	42,930
Total (All Vehicle Types)	75,946,355	85,397,417	11,796,244	24,600,519
Population	171,059	236,346	171,059	236,346
Per Capita Fuel Consumption	444	361	69	104

Source: Data compiled by Ascent Environmental 2018

Existing Regulations, CAP Update, and Proposed General Plan Policies That Provide Mitigation

The project would reduce the City's VMT by reductions in VMT from new development, new bicycle and pedestrian facilities, and improved transit connections and trip reduction features through the following policies and programs:

- CAP Measure TACM-1 – Local Goods
- CAP Measure TACM-2 – Transit Oriented Development

- CAP Measure TACM-3 – Intra-City Transportation Demand Management
- CAP Measure TACM-4 – Pedestrian and Bicycle Travel
- CAP Measure TACM-5 – Affordable Housing
- CAP Measure TACM-6 – Vehicle Miles Traveled Reduction Policy
- CAP Measure TACM-7 – Traffic Calming Measures
- CAP Measure TACM-9 – Electric Vehicle Charging Stations
- GP Zoning Code Update
  - Requirements for bicycle parking, pedestrian amenities, and transit access (as applicable) for new commercial and multifamily residential development
  - Requirements for new commercial and multifamily residential developments to provide electric vehicle charging stations
- GP Design Guidelines Update
  - Transit-oriented development design guidelines
  - Pedestrian environment and amenities
  - Shade requirements for new commercial and multifamily residential development
- GP Housing Programs
  - Continue to promote and support energy efficiency in new construction by encouraging developers to utilize SMUD energy programs and other energy efficiency programs
  - Continue to encourage participation in SMUD's PV Pioneer program by issuing PV system permits at no charge upon SMUD's approval
- GP Transportation Plans and Programs
  - Transportation Demand Management (TDM) Program updates
  - City employee incentives for alternative transportation
  - Coordination for regional TDM efforts
  - Citywide complete streets analysis
  - Bicycle, Pedestrian, and Trails Master Plan update
  - Review of and modifications to transit service
  - Incentives for alternative fueling stations

- Coordination for EV charging facility incentives

- GP Financing and Budgeting
    - Funding for transit and active transportation improvements

BUILDING ENERGY

Operation of residential, commercial, educational, and industrial buildings in the Planning Area would include typical use of electricity and natural gas for lighting, space and water heating, appliances, and landscape maintenance activities. Indirect energy use would include wastewater treatment and solid waste removal. Implementing the project would increase electricity and natural gas consumption in the region relative to existing conditions and would require construction of new utility connections and potentially new substations. **Table 5.7-9** summarizes estimated operational energy demand at buildout.

Existing Regulations, CAP Update, and Proposed General Plan Policies That Provide Mitigation

Buildings constructed in the Planning Area would meet the CCR Title 24 standards for energy efficiency that are in effect at the time of construction. Future development would occur consistent with the General Plan over several decades, and these standards likely would continue to be updated in the future to require improved building energy efficiency. Per capita electricity building energy would decrease by 20 percent between baseline and buildout of the proposed General Plan, and natural gas building energy would decrease 14 percent during the same time.

Implementation of the following actions and programs in the proposed General Plan and CAP would further reduce building energy consumption in new development:

- CAP Measure BE-1 – Promote Energy Conservation
- CAP Measure BE-4 – CALGreen Tier 1: New Construction
- CAP Measure BE-5 – Zero Net Energy: New Construction
- CAP Measure BE-7 – Solar PV in All Residential and Commercial Development
- CAP Measure BE-9 – Increase Tree Planting
- GP Building Code Update
    - Update the building code to incorporate current state requirements for green building
    - Adopt a requirement for new single family residential development to pre-wire for plug-in electric vehicles
- GP Environment, Conservation and Sustainability
    - Outreach on energy conservation and renewable energy programs and incentives

  - Remove Municipal Code impediments to renewable energy programs and incentives

- GP City Services and Operations

  - Urban forestry best management practices

  - Energy and water retrofits for City facilities

  - Solar energy systems for City facilities

TABLE 5.7-9
OPERATIONAL ENERGY CONSUMPTION ASSOCIATED WITH PROPOSED GENERAL PLAN AT FULL BUILDOUT

	Electricity (kWh/year)		Natural Gas (kBTU/year)	
	Baseline	Proposed General Plan	Baseline	Proposed General Plan
Total Energy Consumption	64,737,634	71,515,795	111,963,831	132,583,176
Per Capita Energy Consumption	378	303	655	561

Source: Data compiled by Ascent Environmental 2018

Notes: kWh = kilowatt hours; kBTU = thousand British thermal units.

Conclusion

According to Appendix F of the State CEQA Guidelines, the means to achieve the goals of conserving energy including decreasing overall per capita energy consumption, decreasing reliance on natural gas and oil, and increasing reliance on renewable energy sources. These actions would reduce building energy consumption and would reduce per capita energy use for both electricity and natural gas building energy. Through the policies and actions of the proposed General Plan and CAP, incorporation of bicycle and pedestrian facilities and increased transit availability and trip reduction features, implementing the project would not result in a wasteful or inefficient use of transportation-related energy. Further, implementation of the project would not conflict with State or local plans for renewable energy or energy efficiency.

Energy consumption through construction, transportation, or building operation associated with the project would not be considered wasteful, inefficient, or unnecessary. This impact would be **less than significant.**

Mitigation Measures

No additional mitigation required beyond compliance with the CAP Update and proposed General Plan policies.

REFERENCES

Alternative Fuels Data Center. 2018. Alternative Fueling Station Counts by State. Accessed February 2, 2018. https://www.afdc.energy.gov/data_download.

California Climate Action Registry. 2009a. California Climate Action Registry General Reporting Protocol Version 3.1.

———. 2009b. *2004–2008 Utility Specific Emissions Rates.*

Caltrans (California Department of Transportation). 2008. 2007 California Motor Vehicle Stock, Travel and Fuel Forecast.

———. 2015. *Caltrans Strategic Management Plan 2015–2020.* Accessed January 26, 2018. http://www.dot.ca.gov/perf/library/pdf/Caltrans_Strategic_Mgmt_Plan_033015.pdf.

CAPCOA (California Air Pollution Control Officers Association). 2009. *Model Policies for Greenhouse Gases in General Plans.* Accessed January 26, 2018. http://www.capcoa.org/wp-content/uploads/downloads/2010/05/CAPCOA-ModelPolicies-6-12-09-915am.pdf.

———. 2010. *Quantifying Greenhouse Gas Mitigation Measures.* Accessed January 26, 2018. http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf.

———. 2017. California Emissions Estimator Model Version 2016.3.2.

CARB (California Air Resources Board). 2011. *California Greenhouse Gas Emissions Inventory: 2000–2009.* Accessed January 25, 2018. https://www.arb.ca.gov/cc/inventory/pubs/reports/ghg_inventory_00-09_report.pdf.

———. 2012. *California Air Resources Board Quarterly Auction 1, November 2012 Summary Results Report.* Accessed January 26, 2018. https://www.arb.ca.gov/cc/capandtrade/auction/november_2012/updated_nov_results.pdf.

———. 2013. *California Greenhouse Gas Inventory for 2001–2011 – By Category as Defined in the 2008 Scoping Plan.* http://www.arb.ca.gov/cc/inventory/data/data.htm.

———. 2014. *First Update to the Climate Change Scoping Plan.* Accessed January 26, 2018. https://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

———. 2015. *California Greenhouse Gas Emissions for 2000 to 2013 – Trends of Emissions and Other Indicators.* Accessed January 25, 2018. https://www.arb.ca.gov/cc/inventory/pubs/reports/ghg_inventory_trends_00-13%20_10sep2015.pdf.

———. 2016. *Advanced Clean Cars Summary.* Accessed January 26, 2018. https://www.arb.ca.gov/msprog/clean_cars/acc%20summary-final.pdf.

———. 2017a. *Proposed Update to the SB 375 Greenhouse Gas Emissions Reduction Targets.* Accessed January 26, 2018. https://www.arb.ca.gov/cc/sb375/final_staff_proposal_sb375_target_update_october_2017.pdf.

———. 2017b. *California's 2017 Climate Change Scoping Plan.* Accessed January 25, 2018. https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf.

CEC (California Energy Commission). 2015. Building Energy Efficiency Standards for Residential and Nonresidential Buildings. Accessed January 3, 2017. http://www.energy.ca.gov/2015publications/CEC-400-2015-037/CEC-400-2015-037-CMF.pdf.

City of Elk Grove. 2013a. City of *Elk Grove Public Climate Action Plan*. Adopted March 27, 2013. http://www.elkgrovecity.org/UserFiles/Servers/Server_109585/File/Departments/Planning/climate-action-plan-public.pdf. Accessed: January 25, 2018.

———. 2013b. *City of Elk Grove Public Climate Action Plan Subsequent Environmental Impact Report.*

———. 2016. *Existing Conditions Report for the General Plan Update.*

———. 2018. Proposed General Plan Update Land Use Data.

CPUC (California Public Utilities Commission). 2018. California Renewables Portfolio Standard (RPS). Accessed February 2. http://www.cpuc.ca.gov/renewables/.

EIA (US Energy Information Administration). 2014. California Energy Highlight. 2014 EIA reports and publications. Accessed February 2, 2018. https://www.eia.gov/state/state_one_pager/California.pdf.

———. 2017. *Annual Energy Outlook 2017.* Accessed February 2, 2018. https://www.eia.gov/outlooks/aeo/.

EPA (US Environmental Protection Agency). 2017. *New Source Review Permitting: Clean Air Act Permitting for Greenhouse Gases.* Accessed January 26, 2018. https://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases. Web page last updated March 14, 2017.

———. 2018. EPA Administrator Pruitt: GHG Emissions Standards for Cars and Light Trucks Should Be Revised. News Releases. Accessed May 30. https://www.epa.gov/newsreleases/epa-administrator-pruitt-ghg-emissions-standards-cars-and-light-trucks-should-be.

Fehr & Peers. 2017. *Draft Transportation Impact Analysis: Elk Grove General Plan Update.*

ICLEI (Local Governments for Sustainability). 2012. U.S. Community Protocol for Accounting and Reporting Greenhouse Gases. Accessed January 26, 2018. http://icleiusa.org/publications/us-community-protocol/.

IPCC (Intergovernmental Panel on Climate Change). 2013. "Carbon and Other Biogeochemical Cycles." In *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Accessed January 3, 2017. https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WGIAR5_SPM_brochure_en.pdf.

———. 2014. *Climate Change 2014 Synthesis Report Summary for Policymakers*. Geneva, Switzerland. Accessed January 3, 2017. https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.

OPR (Office of Planning and Research). 2017. *Proposed Updates to the CEQA Guidelines.* Accessed January 25, 2018. http://opr.ca.gov/docs/20171127_Comprehensive_CEQA_Guidelines_Package_Nov_2017.pdf.

Sacramento Area Council of Governments. 2016. *2016 Metropolitan Transportation Plan/Sustainable Communities Strategy.*

SMAQMD (Sacramento Metropolitan Air Quality Management District). 2016. *Program-Level Analysis of General Plans and Area Plans.* Accessed January 25, 2018. http://airquality.org/LandUseTransportation/Documents/Ch9ProgramLevelFINAL8-2016.pdf.

US Department of Energy. 2012. Annual Energy Outlook 2012 with Projections to 2035. Accessed February 2, 2018. https://www.eia.gov/outlooks/aeo/pdf/0383(2012).pdf.

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5.8 HAZARDS AND HAZARDOUS MATERIALS

This section addresses the potential presence of hazardous materials and conditions within the Planning Area and analyzes the potential risk of such materials in proximity to proposed development and human activities that could occur under the proposed Project. It describes the existing conditions in the Planning Area, identifies hazardous materials that may affect public safety, and identifies mitigation measures to reduce the impacts to less than significant, if necessary. Section 5.3, Air Quality, evaluates potential impacts from toxic air contaminant emissions; Section 5.6, Geology, Soils, and Seismicity, evaluates geologic hazards; and Section 5.9, Hydrology and Water Quality, evaluates potential flooding risks.

5.8.1 EXISTING SETTING

HAZARDOUS MATERIALS

A hazardous material is any material that, due to its quantity, concentration, physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released. Hazardous materials include, but are not limited to, hazardous substances, hazardous wastes, and any material that a business or local implementing agency has a reasonable basis to believe would be injurious to the health and safety of persons, or would be harmful to the environment if released. In addition to chemicals, which are most commonly associated with the term *hazardous materials*, other hazardous materials include radioactive materials and wastes, biohazardous materials (e.g., infectious agents), and medical waste (biohazardous materials and devices capable of cutting or piercing, such as hypodermic needles).

Public health is potentially at risk whenever hazardous materials are or will be used. The impact evaluation in this section differentiates between the “hazard” of these materials and the acceptability of the “risk” they pose to human health and the environment. A hazard is any situation that has the potential to adversely affect human health or the environment. The risk to health and public safety is determined by the probability of exposure, in addition to the inherent toxicity of a hazardous material. When the risk of an activity is judged acceptable by society, in relation to perceived benefits, then the activity is judged to be safe. Factors that can influence the health effects of exposure to hazardous materials include the dose to which the person is exposed, the frequency and/or duration of exposure, the exposure pathway (route by which a chemical enters a person’s body), and the individual’s unique biological susceptibility.

Facilities Where Hazardous Materials Are Used or Stored

Businesses and services in the City where hazardous materials are used or stored include fuel stations (underground fuel tanks) and automotive service businesses, dry cleaners, schools, medical and dental facilities, and laboratories, among others. Consumer products such as cleaning and maintenance supplies, paints, pesticides, and herbicides are also used and/or stored at retail stores, businesses, and residences. Some of these facilities generate hazardous waste.

Industrial land activity types in Elk Grove include heavy industrial, light industrial, and warehousing. The bulk of industrial uses are in the southeast part of the City between State Route (SR) 99 and the Union Pacific Railroad (UPRR) line.

Suburban Propane Facility

There is one major industrial facility in the Planning Area that handles large quantities of hazardous materials: the Suburban Propane facility, which is located in the industrial area east of SR 99 and north of Grant Line Road. The Suburban Propane facility is considered one of the largest aboveground propane storage facilities in the United States. This facility receives pressurized ambient temperature liquid propane from tank trucks and railcars, and stores both ambient temperature and refrigerated liquid propane. The propane is subsequently loaded onto trucks or railcars for off-site transport. The major components at the Suburban Propane facility include four 60,000-gallon pressurized, ambient temperature propane storage tanks (referred to as "bullet tanks"); two 12,000,000-gallon refrigerated, low-pressure storage tanks; tank truck and railcar loading/unloading stations; a propane refrigeration system; a flare; and safety systems, such as a water spray system in the railcar and truck loading area. Propane stored in the bullet tanks is used to fill tank trucks or railcars for off-site delivery. The facility is also equipped with water deluge systems, which are intended to help prevent tank trucks and railcars from failing catastrophically due to excessive heat and internal pressure.

A risk evaluation was prepared in 2003 as part of the EIR prepared for the previous General Plan. The *Review of Suburban Propane Hazards Analysis Studies and Evaluation of Accident Probabilities Report* (Quest 2003) assessed how a release of propane, either by accident or by intentional act, could affect surrounding areas in the event of a failure of one or both refrigerated storage tanks. Under the flash fire scenario, the impact extent could be out to 1.5 miles, with an accidental incident probability of one chance in 2.8 million in a year, and an intentional act probability of one chance in 2.1 million in a year. For a vapor cloud explosion, the impact extent could be out to 0.75 miles, with an accidental incident probability of one chance in 104 million in a year, and an intentional act probability of one chance in 3.2 million in a year.

The potential for an accidental or intentional event resulting in either a vapor cloud or a flash fire is not substantial. In addition, as discussed in Section 5.0, Introduction to the Environmental Analysis, the effect of this existing condition would be an impact of the environment on the Project, and, as such, is not a CEQA consideration. Because the Suburban Propane facility is not operated by the City and the proposed Project would not involve any changes in facility operations, the potential for a catastrophic event and its effects on surrounding land activity types would not be exacerbated by the Project and is therefore not subject to further analysis in this EIR.

Contaminated Sites

There are approximately 54 sites in the Planning Area that are listed on the Hazardous Waste and Substances Site List (Cortese List) compiled pursuant to Government Code Section 65962.5(a) (DTSC 2017; SWRCB 2017), as of October 2017. These are sites where soil or groundwater contamination has resulted from the use and/or disposal of hazardous materials or wastes. Of the 54 listed sites, most were school sites, investigations for which are required under the California Education Code. Except for three sites, all the listed sites are shown as completed-case closed, certified closure, no action required, or no further action required. Sites are typically investigated in cases where there is known contamination or the potential for contamination requires investigation. Only sites that have been investigated and/or cleaned up under the oversight of the California Department of Toxic Substances Control (DTSC) or the State Water Resource Control Board (SWRCB) are on the Cortese List. The three sites where some State oversight is still under way are Obie's Dump (8437 Sheldon Road), ARCO #2123 (8500 Elk Grove Boulevard), and a proposed charter school site (9185 Grant Line Road).

The Sacramento County Environmental Management Department maintains a list of sites where unauthorized releases of potentially hazardous materials have occurred. As of November 2017, there were approximately 50 locations on that list (SCEMD 2017). Most of these sites are associated with gasoline stations, and the investigation and remediation (as necessary) of sites on the County's list may be managed at the local level or State level, depending on the site.

The number and locations of sites are as of the publication date of this Draft EIR and are subject to change as new sites are added or others are removed from the list. As such, it is possible that a new site or sites could be added to this list, while other sites that are currently open cases may be removed from the list by a regulatory agency. Sites indicated as open or active are in the process of being investigated and/or remediated. Sites listed as closed, inactive, or no further action may have been investigated and/or remediated, but may have residual contamination as allowed by the regulatory agencies. For example, the State allows for deed restrictions that specify land use prohibitions or limitations on sites where contaminants may still be present. For any site included on a State or local list, regardless of its status, or sites that may be added in the future, the City will require future project applicants to submit up-to-date information regarding the status of the site.

There could also be sites in the Planning Area that may be contaminated but have not yet been identified or investigated, particularly in developed areas where infill development may occur under the proposed Project. In addition, past land activity types may have resulted in contamination outside the Planning Area, typically associated with migration of contaminated groundwater.

Residual Agricultural Chemicals

Much of the remaining vacant land in the Planning Area has been or is currently used for agricultural purposes. Past use of agricultural chemicals such as pesticides can result in residual chemicals in the soil that can expose people to possible health risks. Certain types of agricultural chemicals used in past decades can persist in soils for years. Irrigated pasture, dry-farmed crops, and natural grasses typically require little to no applications of environmentally persistent pesticides, but cultivated irrigated row crops may have been subject to applications of restricted agricultural chemicals, which could be persistent. Orchards and orchard-cultivated soils may have been contaminated through the repeated application of agricultural chemicals to fruit or nut trees.

Potentially Hazardous Building Materials

Existing structures in the Planning Area that could be renovated or demolished in conjunction with future development projects under the proposed Project may contain asbestos-containing materials in building components, lead-based paint, or polychlorinated biphenyls (PCBs) in electrical equipment.

Asbestos-Containing Building Materials

Structures constructed or remodeled between 1930 and 1981 have the potential to contain asbestos-containing materials. These materials can include, but are not limited to, resilient floor coverings, drywall joint compounds, acoustic ceiling tiles, piping insulation, electrical insulation, and fireproofing materials.

Lead-Based Paint Materials

Lead-based paints were phased out of production in the early 1970s. Exposure to lead from vintage paint is possible when the paint is in poor condition or during its removal. In construction settings, workers can be exposed to airborne lead during renovation, maintenance, or removal work.

Polychlorinated Biphenyls

In 1976, the United States Congress enacted the Toxic Substances Control Act (TSCA), which reviewed all industrial chemicals, including PCBs. Since the passage of the TSCA, the production and use of PCBs has been prohibited, limited, or phased out. Potential sources of PCBs in older buildings in the Planning Area include fluorescent light ballast and some electrical equipment such as elevators. However, according to a US Environmental Protection Agency (EPA) database of federally registered PCB transformer data, the City is not listed as having PCB transformers in the Planning Area (City of Elk Grove 2017).

Hazardous Materials Transportation

Hazardous materials may be legally transported on area roadways, including SR 99 and I-5. The transportation of hazardous materials within and through the City is subject to various federal, State, and local regulations. The only roadway and transportation route approved for the transportation of explosives, poisonous inhalation hazards, and radioactive materials in the City is I-5. Smaller quantities of hazardous materials, such as medical supplies, pool chemicals, cleaning agents, paint, and household chemicals, may be transported on all roadways throughout the City. Hazardous materials may also be transported via rail along the UPRR, which passes through Elk Grove.

Since the City's incorporation in 2000, there have been 31 reported incidents involving the transport of hazardous materials. These incidents did not result in releases to the environment or human fatalities or injuries but rather damage to containers (crushed boxes or drums) in vehicles transporting them or while moving the items (e.g., with a forklift). There have been no rail incidents in the City (PHMSA 2017; NTSB 2017).

Natural Gas and Hazardous Liquid Pipelines

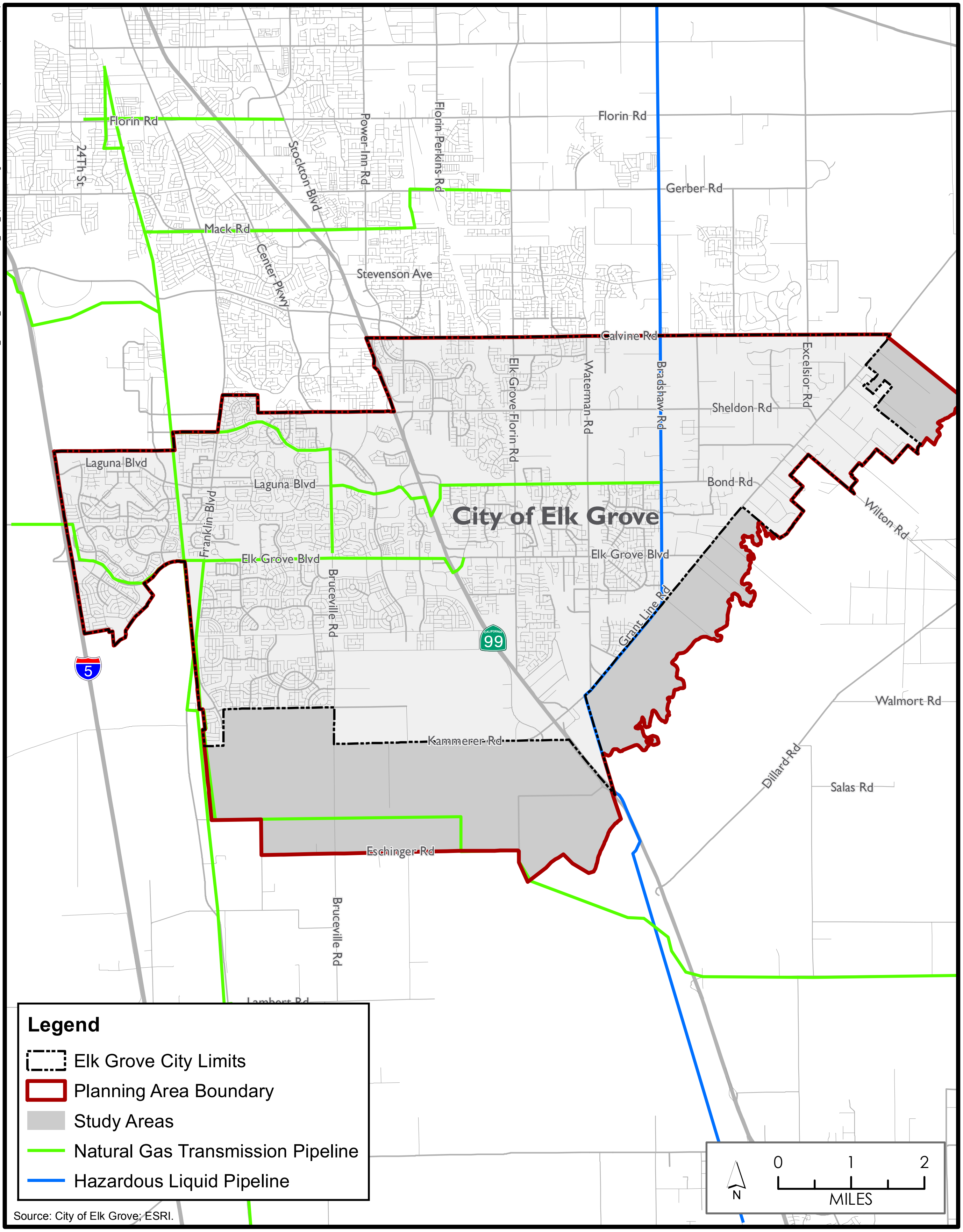
The US Pipeline and Hazardous Materials Safety Administration provides summary maps of natural gas transmission and hazardous liquid pipelines. Based on available data as of 2015, two natural gas (one operated by SMUD and one operated by PG&E) and one hazardous liquid transmission line exist in the Planning Area, as shown in **Figure 5.8-1** (City of Elk Grove 2017).

Radon

Radon isotope-22 is a colorless, odorless, tasteless radioactive gas that is a natural decay product of uranium. Uranium and radon are present in varying amounts in rocks and soil, and radon is present in background concentrations in the atmosphere. Current evidence indicates that radon-decay products is directly related to increased lung cancer risk. The EPA has recommended an "action" level for indoor radon concentrations at or exceeding 4 picocuries per liter (pCi/l) of air. California ranks as the third lowest state for percentage of homes exceeding 4 pCi/l.

The EPA uses three zone designations to reflect the average short-term radon measurement that can be expected in a building without the implementation of radon control methods. The zone designation of the highest potential (predicted average indoor radon screening levels greater than 4 pCi/l) is Zone 1. A review of the California Statewide Radon Survey indicated that for the zip codes in the Planning Area, 65 tests were conducted as part of the survey. Of the 65 tests, 5 had radon levels greater than 4.0 pCi/l. The EPA has identified Sacramento County (including the Planning Area) as a Zone 3 area (counties with predicted indoor levels less than 2 pCi/l) (DHS 2016; EPA n.d.).

T:_GIS\Elk_Grove\MXDs\General_Plan_Update\EIR\Figure 5.8-1 Tansmission Pipelines.mxd (1/31/2018)



City of Elk Grove
Development Services

Figure 5.8-1

Natural Gas and Hazardous Liquid Transmission Pipelines

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ELECTROMAGNETIC FIELDS (HIGH-VOLTAGE POWER LINES)

Electromagnetic fields (EMF) are generated wherever electricity is being conducted. Common sources of EMF include wiring in homes and electrical appliances. Electrical distribution lines that carry power from transmission lines to homes and high-voltage transmission lines are also sources of EMF.

Studies indicate that EMF may have adverse human health impacts; however, the studies are inconclusive. While laboratory experiments have shown that EMF can have biological effects at the cellular level in animals, experiments have shown that short-term exposure at levels present in the environment or the home do not cause any apparent detrimental effects. However, it is not known whether long-term low-level exposure can result in adverse human health impacts. There are no scientific or regulatory criteria or standards for EMF. The City does not have setback requirements related to EMF. Exposure to EMF is generally reduced through "prudent avoidance," which serves to limit public exposure to EMF through planning and design measures. As an example of a rigorous standard, the California Department of Education requires that school buildings be set back a minimum of 100 feet up to 350 feet from transmission line rights-of-way, depending on the voltage. Therefore, it is not possible to determine whether the distance between a potential housing site and high-voltage transmission lines is adequate and whether potential exposure to EMF would be a significant effect under CEQA. CEQA Guidelines Section 15145 state "[i]f, after thorough investigation, a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact." Based on available information regarding hazards related to EMFs, potential impacts would be too speculative for evaluation. In addition, as discussed in Section 5.0, Introduction to the Environmental Analysis and Assumptions Used, the effect of this existing condition would be an impact of the environment on the Project, and, as such, is not a CEQA consideration. Because the presence of EMF in the Planning Area is an existing condition that would not be exacerbated by the Project, it is not subject to CEQA analysis.

AIRPORTS

There are no active airports within the City boundaries or in the Study Areas. There is one public airport and two private airports within 3 miles of the Planning Area. They are Franklin Field, which is public, and Sky Way Estates Airport and Borges-Clarksburg Airport, which are private. Sacramento Executive Airport, a smaller public use airport, is approximately 6 miles north-northwest of the City, and Sacramento International Airport, a high-traffic airport, is approximately 20 miles north-northwest. Elk Grove is not within the safety or overflight zones for either Sacramento Executive or Sacramento International airports (SACOG 1999: Figure 11; 2013: Map 6).

WILDLAND FIRE HAZARDS

Public Resources Code (PRC) Sections 4201–4204 and Government Code Sections 51175–51189 require identification of fire hazard severity zones (FHSZ) in the State of California. FHSZs are modeled based on vegetation, topography, weather, fuel load type, and ember production and movement. FHSZs are defined as moderate, high, and very high fire hazard severity by the California Department of Forestry and Fire Protection (Cal Fire). Fire prevention areas under State jurisdiction are referred to as State Responsibility Areas (SRA), while areas under local jurisdiction are called local responsibility areas (LRA). There are no moderate, high, or very high FHSZs as identified by Cal Fire, and the Planning Area is identified within an LRA that extends beyond the Planning Area boundaries (City of Elk Grove 2017). The Sacramento County Local Hazard Mitigation Plan Update (LHMP) indicates the probability of a wildfire is highly likely and could be extensive geographically, and that climate change may be a factor in the probability of future occurrence (Sacramento County 2016: Table ES-2).

The Study Areas are largely vacant and undeveloped agricultural lands with scattered residential and some limited commercial uses. There is a wildland-urban interface at some locations where the boundaries of the Study Areas adjoin the City limit boundary.

Fire protection services in the Planning Area are provided by the Cosumnes Fire Department, which is part of the Cosumnes Community Services District (CCSD). The Cosumnes Fire Department provides emergency services such as fire suppression, emergency medical services, technical rescue, and arson and explosion investigations in a 157-square-mile service area covering Elk Grove, Galt, and a portion of unincorporated southern Sacramento County. In addition to eight existing stations, there are three planned future stations: one in the Laguna Ridge Specific Plan Area near Whitelock Parkway; one in the South Pointe Land Use Policy Area near Kammerer Road; and one in the East Elk Grove Community Plan Area near Grant Line Road.

5.8.2 REGULATORY FRAMEWORK

Numerous federal, State, and local laws have been enacted to regulate the management of hazardous materials and wastes and fire hazards. These laws are regulated through programs administered by various agencies at the federal, State, and local levels.

FEDERAL

Federal agencies that regulate hazardous materials include the EPA, the Occupational Safety and Health Administration (OSHA), the Department of Transportation (US DOT), and the National Institutes of Health. The following are the primary federal laws and guidelines governing hazardous materials: the TSCA (see above); Clean Water Act; Clean Air Act; Occupational Safety and Health Act; Federal Insecticide, Fungicide, and Rodenticide Act; Comprehensive Environmental Response, Compensation, and Liability Act; Superfund Amendments and Reauthorization Act Title III; Resource Conservation and Recovery Act; and the Safe Drinking Water Act.

Worker Safety

The Hazard Communication Standard (Title 29, Section 1910.1200(g) of the Code of Federal Regulations [CFR]) requires that workers be informed of the hazards associated with the materials they handle. Workers must be trained in the safe handling of hazardous materials, use of emergency response equipment, and the building emergency response plan and procedures. Containers must be appropriately labeled, and Material Safety Data Sheets must also be available in the workplace.

Hazardous Waste Handling

The California DTSC is authorized by the EPA to enforce hazardous waste laws and regulations in California. Requirements place "cradle-to-grave" responsibility for hazardous waste disposal on hazardous waste generators, which must ensure that their wastes are disposed of properly. Regulatory requirements dictate the disposal methods for many waste streams (e.g., banning many types of hazardous wastes from landfills).

Hazardous Materials Transportation

US DOT developed regulations pertaining to the transport of hazardous materials and hazardous wastes by all modes of transportation. In addition to US DOT, the US Postal Service, the EPA, the California Highway Patrol, the California Department of Transportation (Caltrans), and the DTSC implement and enforce State and federal laws regarding hazardous materials transportation. The US Postal Service has regulations for the transport of hazardous materials by mail. The EPA has also promulgated regulations for the transport of hazardous wastes. These more stringent requirements include tracking shipments with manifests to ensure that wastes are delivered to their intended destinations. At the State level, Section 31303 of the California Vehicle Code and US DOT regulations require that hazardous materials be transported with the least overall travel time.

STATE

The California Environmental Protection Agency (CalEPA) DTSC and the SWRCB establish rules governing the use of hazardous materials and the management of hazardous waste. Applicable State and local laws include the following: Public Safety/Fire Regulations/Building Codes; Hazardous Waste Control Law; Hazardous Substances Information and Training Act; Air Toxics Hot Spots and Emissions Inventory Law; Underground Storage of Hazardous Substances Act; and Porter-Cologne Water Quality Control Act.

Hazardous Materials Management

CalEPA has established regulations governing the use of hazardous materials in the State. Within CalEPA, the DTSC has primary hazardous materials regulatory responsibility, but can delegate enforcement responsibilities to local jurisdictions that enter into agreements with the DTSC, for the generation, transport, and disposal of hazardous materials under the authority of the Hazardous Waste Control Law. State regulations applicable to hazardous materials are contained primarily in Title 22 of the California Code of Regulations (CCR). Title 26 of the CCR is a compilation of those chapters or titles of the CCR that are applicable to hazardous materials management. Cal/OSHA standards are presented in Title 8 of the CCR; these are more stringent than federal OSHA regulations and address workplace regulations involving the use, storage, and disposal of hazardous materials.

CalEPA adopted regulations implementing a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The six elements of the Unified Program are hazardous waste generation and on-site treatment, underground storage tanks, aboveground storage tanks, hazardous material release response plans and inventories, risk management and prevention programs, and Uniform Fire Code hazardous materials management plans and inventories. The program is implemented at the local level by a local agency, referred to as the Certified Unified Program Agency (CUPA), which is responsible for consolidating the administration of the six program elements within its jurisdiction. The Sacramento County Environmental Management Department (SCEMD) is the CUPA for Sacramento County.

State and federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, if such materials are accidentally released, to prevent or to mitigate injury to health or the environment. California's Hazardous Materials Release Response Plans and Inventory Law, also called the Business Plan Act, is intended to minimize the potential for accidents involving hazardous materials and facilitate an appropriate response to possible hazardous materials emergencies. The law requires businesses that use hazardous materials to provide inventories of those materials to designated emergency response agencies, to illustrate on a diagram where the materials are stored on-site, to prepare an emergency response plan, and to train employees to use the materials safely. This information is compiled into a Hazardous Materials Business Plan, which is submitted to the SCEMD.

Worker Safety

Occupational safety standards exist in federal and State laws to minimize worker safety risks from both physical and chemical hazards in the workplace. Cal/OSHA is responsible for developing and enforcing workplace safety standards and ensuring worker safety in the handling and use of hazardous materials. Among other requirements, Cal/OSHA obligates many businesses to prepare Injury and Illness Prevention Plans and Chemical Hygiene Plans. As at the federal level, the Hazard Communication Standard requires that workers be informed of the hazards associated with the materials they handle. This is achieved through actions such as requiring manufacturers to appropriately label containers, make Material Safety Data Sheets available in the workplace, and require employers to properly train workers.

Uniform Fire Code

The Uniform Fire Code contains regulations relating to construction and maintenance of buildings and the use of premises. The code includes specification for fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions intended to protect and assist fire responders, industrial processes, and many other general and specialized fire-safety requirements for new and existing buildings and premises.

The California Building Code includes provisions for ignition-resistant construction standards in the wildland-urban interface. The broad objective of the Wildland-Urban Interface Fire Area Building Standards is to establish minimum standards for materials and material assemblies and provide a reasonable level of exterior wildfire exposure protection for buildings in wildland-urban interface areas. The standards require the use of ignition-resistant materials and design to resist the intrusion of flame or burning embers projected by a vegetation fire (wildfire exposure).

In addition to Fire Code requirements, PRC Section 4290 requires local jurisdictions to implement fire-safe standards for defensible space. The intent is to reduce the intensity of a wildland fire by reducing the volume and density of fuels (e.g., vegetation that can transmit fire from the natural growth to a building or structure); to provide increased safety for fire equipment and evacuating civilians; and to provide a point of attack or defense from a wildland fire. The current defensible space clearance requirement to be maintained around buildings and structures is 100 feet (PRC 4291).

California Accidental Release Prevention Program

The California Accidental Release Prevention Program (CCR Title 19, Division 2, Chapter 4.5) covers businesses that store or handle more than a specified volume of specific regulated substances at their facilities. The list of regulated substances is found in Article 8, Section 2770.5 of the program regulations. Businesses that use a regulated substance above the specified threshold quantity must implement an accidental release prevention program, and some may be required to complete a risk management plan (RMP). An RMP is a detailed engineering analysis of the potential accident factors present at a business and the mitigation measures that will be implemented to reduce this accident potential. The purpose of an RMP is to decrease the risk of an off-site release of a regulated substance. An RMP includes the following components: safety information, hazard review, operating procedures, training, maintenance, compliance audits, and incident investigation. The RMP must consider the proximity to sensitive populations located in schools, residential areas, general acute care hospitals, long-term health care facilities, and child daycare facilities. Further, it must consider external events such as seismic activity.

Hazardous Emissions Near Schools

CEQA Guidelines Section 15186 establishes a special requirement for certain school projects, as well as certain projects near schools, to ensure that potential health impacts resulting from exposure to hazardous materials, wastes, and substances will be evaluated and disclosed in an environmental document, and that the lead agency will consult with other agencies in this regard. For projects that would handle hazardous substances in a quantity that exceeds the State threshold quantity specified in Section 25532(j) of the California Health and Safety Code, the lead agency must consult with the affected school district(s) regarding the potential impact of the project on the school and notify the affected school district(s) of the project, in writing, not less than 30 days prior to approval or certification of the negative declaration or EIR. Additional requirements apply to school districts, such as the Elk Grove Unified School District (EGUSD), prior to purchase of a school site or construction.

School Site Investigations

The California Education Code (Sections 17210 through 17224) sets forth requirements for investigation of potential school sites for environmental contamination. Compliance would be the responsibility of the EGUSD. Additionally, if any State school bonds are used for a proposed school land use, the EGUSD must assess the site for environmental contamination through a Phase I Environmental Site Assessment (ESA) and complete any other DTSC-ordered studies to ensure safety on the school site when it is developed and occupied. The results of the evaluation would be subject to review and approval by the DTSC prior to construction. If the DTSC does not approve the Phase I document, a Preliminary Environmental Assessment (PEA) would be required.

LOCAL

Sacramento County

The County of Sacramento Office of Emergency Services implements the State's Right-to-Know Ordinance that gives it the authority to inventory hazardous materials used by businesses. The County collects information regarding existing and proposed locations of hazardous material disposal, storage, handling, and transportation facilities.

The SCEMD is responsible for enforcing State regulations at the City and county level, governing hazardous waste generators, hazardous waste storage, underground storage tanks, and environmental health including inspections and enforcement. The SCEMD also regulates the use, storage, and disposal of hazardous materials and the abandonment of wells (Chapter 6.28 of the Sacramento County Code) and septic systems (Chapter 6.32 of the Sacramento County Code) in the county by issuing permits, monitoring regulatory compliance, investigating complaints, and other activities. The SCEMD reviews technical aspects of hazardous waste site cleanups and oversees remediation of contaminated sites resulting from leaking underground storage tanks (USTs) and aboveground storage tanks. The SCEMD is also responsible for providing technical assistance to public and private entities that seek to minimize the generation of hazardous waste. As noted above, the SCEMD is the CUPA for Sacramento County and administers the local regulatory programs for all CUPA program elements through inspections, permit issuance, enforcement, complaint response, local ordinance maintenance and oversight, and establishment of administrative policy.

Sacramento Metropolitan Air Quality Management District

The Sacramento Metropolitan Air Quality Management District (SMAQMD) is the primary agency responsible for air quality in the region and has adopted rules and regulations pertaining to the control of emissions from area and stationary sources. Rule 902 (Asbestos) requires a developer or contractor to notify SMAQMD of any regulated renovation or demolition activity. Rule 902 contains specific requirements for surveying, notification, removal, and disposal of material containing asbestos.

City of Elk Grove Municipal Code

Municipal Code Section 23.60.030, Hazardous Materials, establishes the following standards to ensure that the use, handling, storage and transportation of hazardous materials comply with all applicable state laws (Section 65850.2 of the Government Code and Section 25505 et seq. of the Health and Safety Code) and that appropriate information is reported to the Cosumnes Fire Department as the regulatory authority.

A. Reporting Requirements. All businesses required by State law (Section 25500 of the Health and Safety Code) to prepare hazardous materials release response plans and hazardous materials inventory statements shall, upon request, submit copies of these plans, including any revisions, to the Fire Department.

B. Underground Storage. Underground storage of hazardous materials shall comply with all applicable requirements of State law (Chapter 6.7 of the Health and Safety Code and Articles 679 and 680 of the California Fire Code, or as subsequently amended). Businesses that use underground storage tanks shall comply with the following procedures:

    1) Notify the Fire Department of any unauthorized release of hazardous materials prescribed by City, County, State and Federal regulations;

    2) Notify the Fire Department and the Sacramento County Health Department of any proposed abandoning, closing or ceasing operation of an underground storage tank and actions to be taken to dispose of any hazardous materials; and

    3) Submit copies of the closure plan to the Fire Department.

C. Above-Ground Storage. Above-ground storage tanks for hazardous materials and flammable and combustible materials may be allowed subject to the approval of the Fire Department.

D. New Development. Structures adjacent to a commercial supply bulk transfer delivery system with at least six (6") inch pipes shall be designed to accommodate a setback of at least one hundred (100'0") feet from that delivery system. The setback may be reduced if the Development Services Director, with recommendation from the Fire Department, can make one or more of the following findings:

    1) The structure would be protected from the radiant heat of an explosion by berming or other physical barriers;

2) A one hundred (100'0") foot setback would be impractical or unnecessary because of existing topography, streets, parcel lines or easements; or

3) A secondary containment system for petroleum pipelines and transition points shall be constructed. The design of the system shall be subject to the approval of the Fire Department.

E. Notification Required. A subdivider of a development within five hundred (500'0") feet of a pipeline shall notify a new/potential owner before the time of purchase and the close of escrow of the location, size and type of pipeline.

City of Elk Grove Local Hazard Mitigation Plan

The City participates in the multijurisdictional Sacramento County LHMP, last updated in 2016. The purpose of the plan is to guide hazard mitigation planning to better protect the people and property of the county from the effects of hazard events, such as flood, drought, earthquake, and severe weather. This plan also ensures that Sacramento County and participating jurisdictions, including the City, continue to be eligible for federal disaster assistance including the FEMA Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and the Flood Mitigation Assistance Program. The County LHMP provides policies and programs for participating jurisdictions to implement that reduce the risk of hazards and protect public health, safety, and welfare.

City of Elk Grove Emergency Operations Plan

The City's Emergency Operations Plan (EOP) provides a strategy for the City to coordinate and conduct emergency response. The EOP establishes an Emergency Management Organization and assigns functions and tasks consistent with California's Standardized Emergency Management System and the National Incident Management System. The intent of the EOP is to provide direction on how to respond to an emergency from the initial onset, through an extended response, and into the recovery process. The EOP integrates and coordinates the planning efforts of multiple jurisdictions. This plan was reviewed and approved by representatives from each City department, local special districts with emergency services responsibilities in the City, and the Sacramento Operational Area Office of Emergency Services. The content is based upon guidance approved and provided by the State of California, FEMA, and the federal Department of Homeland Security.

5.8.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

2) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. [Criteria for reasonably foreseeable risks are defined in City of Elk Grove General Plan Update Policy ER-1.2, Table 8-1.]

3) Emit hazardous emissions or handle acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

4) Be located on a site which is included on a list of hazardous materials compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment.

5) For a project located within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or a public use airport, result in a safety hazard for people residing or working in the project area.

6) For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area.

7) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan.

8) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

The Planning Area is not located within 2 miles of public or private airport, or within an airport land use plan. Therefore, Standards of Significance 5 and 6 do not apply, and these issues are not addressed in this Draft EIR.

METHODOLOGY

The analysis of the potential public safety and hazards impacts is qualitative and based on review of the Preferred Alternative Land Use Map (**Figure 2.0-3** in Section 2.0, Project Description) and development assumptions to identify potential environmental effects. The analysis included a review of publicly available information and data compiled by regulatory agencies with jurisdiction over hazardous materials use. As discussed in the Regulatory Framework subsection above, the transport, use, storage, and disposal of hazardous materials are governed by a substantial body of existing regulations. These regulations are intended to reduce the potential for exposure by controlling the pathways by which persons could be exposed to hazardous substances. Compliance with these regulations is required, not optional. In determining the level of significance, the analysis assumes that the proposed Project would comply with all applicable laws, ordinances, and regulations, and the EIR does not present mitigation measures that duplicate existing regulations or state that the City or future applicants must comply with.

General Plan Policies and Standards

The proposed Project contains the following policies and standards for managing future development in the City to reduce the potential for hazards related to hazardous materials and other physical hazards that could affect or be affected by development in the Planning Area.

Policy EM-1-1: Seek to maintain acceptable levels of risk of injury, death, and property damage resulting from reasonably foreseeable safety hazards.

Policy ER-1-1: In considering the potential impact of hazardous facilities on the public and/or adjacent or nearby properties, the City will consider the hazards posed by reasonably foreseeable events. Evaluation of such hazards will address the potential for events at facilities to create hazardous physical effects at off-site locations that could result in death, significant injury, or significant property damage. The potential hazardous physical effects of an event need not be considered if the occurrence of an event is not reasonably foreseeable as defined in Policy ER-1-2. Hazardous physical effects shall be determined in accordance with Policy ER-1-3.

Policy ER-1-2: For the purpose of implementing Policy ER-1-1, the City considers an event to be "reasonably foreseeable" when the probability of the event occurring is as indicated in the table "Reasonably Foreseeable Risks," below.

Reasonably Foreseeable Risks	
Land Use	**Probability of Occurrence Per Year**
Agriculture, Light Industrial and Industrial Uses involving continuous access and the presence of limited number of people but easy evacuation, e.g., open space, warehouses, manufacturing plants	Between 100 in one million and 10 in one million (10^{-4} to 10^{-5})
Commercial Uses involving continuous access but of easy evacuation, e.g. commercial uses, offices, etc.	Between 10 in one million and 1 in one million (10^{-5} to 10^{-6})
Residential All other land uses without restriction including institutional uses, residential areas, etc.	1 in one million and less (10^{-6})

Policy ER-1-3: For purposes of implementing Policy ER-1-1, use the Threshold of Exposure standards shown in Table 8-2 [in the General Plan Update] to determine the potential "hazardous physical effect" from either:

(a) Placing a use near an existing hazardous facility which could expose the new use to hazardous physical effects, or

(b) Siting a hazardous facility that could expose other nearby uses to hazardous physical effects.

Reasonably foreseeable level of risk standards may be considered by the City when supported by substantial evidence.

Policy ER-1-4: Work to identify and eliminate hazardous waste releases from both private companies and public agencies.

Standard ER-1-4a: Industries which store and process hazardous or toxic materials shall provide a buffer zone between the installation and the property boundaries sufficient to protect public safety, the adequacy of which will be determined by the City of Elk Grove.

Policy ER-1-5: Storage of hazardous materials and wastes will be strictly regulated, consistent with State and federal law.

Standard ER-1-5a: Future land uses that are anticipated to utilize hazardous materials or waste shall be required to provide adequate containment facilities to ensure that surface water and groundwater resources are protected from accidental releases. This shall include double-containment, levees to contain spills, and monitoring wells for underground storage tanks, as required by local, state and federal standards.

Policy ER-1-6: Seek to ensure that all industrial facilities are constructed and operated in accordance with up-to-date safety and environmental protection standards.

Policy ER-1-7: To the extent feasible, uses requiring substantial transport of hazardous materials should be located such that traffic is directed away from the City's residential and commercial areas.

Policy ER-1-8: Support continued coordination with the California Office of Emergency Services, the California Department of Toxic Substances Control, the California Highway Patrol, the Sacramento County Department of Environmental Health Services, the Cosumnes Community Services District Fire Department, the Elk Grove Police Department, and other appropriate agencies in hazardous materials route planning and incident response.

Policy ER-4-1: Cooperate with the Cosumnes Community Services District (CCSD) Fire Department to reduce fire hazards, assist in fire suppression, and promote fire safety in Elk Grove.

Standard ER-4-1b: Require the installation of earthquake-triggered automatic gas shut-off sensors in high-occupancy facilities and in industrial and commercial structures.

Policy ER-4-2: Work with the CCSD to develop a fire prevention plan that lists major fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each major hazard.

Policy MOB 6-4: Regulate truck travel as appropriate for the transport of goods, consistent with circulation, air quality, congestion management, and land use goals.

Policy MOB-6-5: Safely accommodate truck traffic serving the City's industrial areas.

Policy SAF-1-3: Coordinate with the CCSD Fire Department to ensure that new station siting and resources are available to serve local needs.

Policy SAF-1-4: Expand emergency response services as needed due to community growth.

Policy INF-1-2: Require that water flow and pressure be provided at sufficient levels to meet domestic, commercial, industrial, and firefighting needs.

PROJECT IMPACTS AND MITIGATION MEASURES

Hazardous Materials Use, Transport, Storage, and Disposal (Standards of Significance 1 and 2)

Impact 5.8.1 Construction and/or operation of future projects in the Planning Area would involve the routine use, transport, storage, and disposal of hazardous materials. This impact would be **less than significant**.

Construction Activities

Construction activities would use hazardous materials such as fuels (gasoline and diesel), oils and lubricants, paints and paint thinners, glues, cleaners (which could include solvents and corrosives in addition to soaps and detergents), and possibly pesticides and herbicides.

Operation

Future development under the proposed Project would primarily result in additional residential and employment-generating commercial uses, with most of the development envisioned in the Study Areas. Residential land uses would not be expected to transport, use, store, or dispose of substantial amounts of hazardous materials. Some of the nonresidential uses may use, sell, or store some hazardous materials, and potentially in greater quantities than residential uses. For example, the commercial uses could include home improvement stores, hardware stores, gas stations, or auto parts stores that sell paints, oils, and solvents. Office land uses could be developed with medical offices that use, store, or dispose of materials such as pressurized oxygen tanks, small volumes of medical waste, biohazardous materials, and/or radioactive materials. Light industrial/flex space and industrial uses could include manufacturing uses that use, store, or dispose of hazardous materials. In the Study Areas, the proposed Project could accommodate up to 168 acres with capacity for such uses, although there is no requirement that this level of development be obtained or that these particular uses occur. This would represent approximately 2 percent of the overall acreage of the Study Areas. As indicated in the General Plan, such development would occur when there is a demonstrated community benefit or need. With additional commercial and industrial uses, there may be increased hazardous materials directly transported to the Planning Area via major roadways and local streets. While transport of hazardous materials via rail may occur through the Planning Area, the City does not have regulatory authority over railroad operations. Any goods or materials transported via rail, including hazardous materials, must be handled consistent with State and federal regulations. As such, the potential for accidental releases of hazardous materials during transportation would not pose a new or substantial increase in risk as a result of the proposed Project compared to existing conditions.

With regard to the Suburban Propane facility, as described in the Existing Setting subsection, a risk evaluation was prepared in 2003 as part of the EIR prepared for the previous General Plan. The evaluation concluded an accidental incident probability of one chance in 2.8 million in a year, and an intentional act probability of one chance in 2.1 million in a year, and for a vapor cloud explosion an accidental incident probability of one chance in 104 million in a year, and an intentional act probability of one chance in 3.2 million in a year. In other words, the potential for an accidental or intentional event resulting in either a vapor cloud or a flash fire is not substantial. The facility is designed and constructed for a certain level of operation, as assumed in the Quest study, and operations at the facility have not changed or increased beyond the designed capacity assumed in the study. Therefore, the analysis presented in the Quest report is consistent with the current operating characteristics of the site. Because conditions at the facility have not changed, the facility is not operated by the City, and the proposed Project would not involve any changes in facility operations, the potential for a catastrophic release and its impact on surrounding land activity types would not be exacerbated by the Project.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

The use, storage, and transportation of hazardous materials are subject to local, State, and federal regulations, the intent of which is to minimize risks to human health and the environment. General Plan Policies ER-1-1, ER-1-4, ER-1-5, ER-1-6, MOB-6-4, and MOB-6-5 support these regulations. Facilities that store or use certain types of hazardous materials or store hazardous materials in large amounts are required to obtain permits and comply with appropriate regulatory agency standards designed to avoid hazardous material releases. These regulations include compliance with Hazardous Materials Business Plan requirements, which is regulated and enforced at the local level by SCEMD as the CUPA. Hazardous materials in the City must also be stored and used in compliance with Municipal Code Section 23.60.030. Policy ER-1-7 directs that uses requiring substantial transport of hazardous materials be located to direct such traffic away from the City's residential and commercial areas.

Special regulations may also apply to certain operations (e.g., those that may result in hazardous emissions or use large quantities of regulated materials) to ensure accidental release scenarios are considered and measures are included in project design and operation to reduce the risk of accidents. Under the California Accidental Release Prevention Program (CCR Title 19, Division 2, Chapter 4.5), an RMP may be required. In addition to State regulations, the City also has existing General Plan Policies (SA-1, SA-2, SA-3, and SA-4), which are carried forward into the General Plan Update as Policies EM-1-1, ER-1-2, ER-1-3, and ER-1-4, which address the need to maintain acceptable levels of risk and identify specific reasonably foreseeable risk criteria for general land use categories and when such criteria would apply to a proposed use involving hazardous materials.

Conclusion

The proposed Project could result in an increase in hazardous materials used, stored, and transported in the Planning Area. However, risks to human health and the environment would be minimized through implementation of General Plan policies and applicable regulations. Development projects would be reviewed by City staff for consistency and conformance with applicable requirements as part of the approval and entitlement process. This impact would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with existing standards and regulations and General Plan policies.

Hazardous Materials Contamination (Standards of Significance 2 and 4)

Impact 5.8.2 Construction and demolition activities associated with future development under the proposed Project could result in the inadvertent or accidental release of hazardous materials, which could pose a human health and/or environmental risk. This impact is **potentially significant.**

Three locations in the Planning Area are on the Cortese List. Over the planning horizon, some sites may be removed and new sites may be added. The Cortese List also includes several sites in the Planning Area that have already been investigated for the presence of hazardous materials contamination, and remediation has been implemented as necessary. However, not all locations in the Planning Area where future development may occur have been evaluated for potential contamination. Contaminated soil could be encountered during soil-disturbing activities such as excavation and trenching, which could pose a risk to construction workers through direct contact and inhalation of contaminated dust. Dust from contaminated soil could be dispersed beyond a construction site and adversely affect public health. If contaminated groundwater were encountered and disposed of improperly, this could pose a human health or environmental risk. Single-family homes, multifamily residences, and structures with subterranean features (e.g., parking garage) constructed on a site where hazardous materials contamination has not been remediated to acceptable risk levels could pose a risk to occupants through direct contact (e.g., soil disturbance) or inhalation (soil vapor).

Older structures that may be demolished or renovated to accommodate future development could contain asbestos and/or lead-based paint. If not properly mitigated, demolition and/or renovation of these structures could result in the release of hazardous materials, which could pose a threat to people and the environment, including schools within one-quarter mile.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Separate and independent of the CEQA process, federal and State laws and regulations require measures to reduce human exposure to hazardous materials. For known or potential contaminated sites, prior to issuing a grading or building permit, the City would require an assessment of potential hazards. If the development project could pose a human health or environmental risk, the City would require that such hazards be managed appropriately. This could include but would not be limited to such actions as removal of the contaminants (remediation), site controls to reduce exposure (e.g., capping soils, installation of soil vapor barriers), or administrative mechanisms (deed restrictions). In the case of environmental contamination, depending on the type and level of contamination, regulatory oversight would be performed by SCEMD, the DTSC, or the Central Valley Regional Water Quality Control Board. For new school sites that may be considered in the Planning Area, each would require investigation pursuant to the Education Code.

Asbestos and lead abatement must be performed and monitored by contractors with appropriate certifications from the California Department of Public Health. All demolition and/or renovation activities that could result in the release of asbestos-containing material and/or lead-based paint must be conducted according to Cal/OSHA standards and SMAQMD Rule 902, Asbestos. Under Rule 902, prior to demolition, structures must be tested for the presence of asbestos-containing materials. Any asbestos would be removed and disposed of by an accredited contractor in compliance with federal, State, and local regulations. Compliance with these regulations would result in the safe disposal of asbestos-containing materials. For the purposes of compliance with Cal/OSHA regulations, a survey for indicators of lead-based coatings must be conducted before demolition to further characterize the presence of lead. There is also a potential for soil contamination because of deposition of deteriorated (i.e., flaked, peeled, chipped) lead-based paint adjacent to structures where lead-based exterior paints were used. Loose or peeling paint may be classified as a hazardous waste if lead concentrations exceed total threshold limits. Cal/OSHA regulations require air monitoring, special work practices, and respiratory protection during demolition where lead has been detected.

General Plan Policy EM-1-1, which seeks to maintain acceptable levels of risk of injury, death, and property damage resulting from reasonably foreseeable safety hazards would be applicable to the investigation and cleanup of contaminated sites.

Conclusion

Contaminated soil or groundwater may be present in the Planning Area at locations where hazardous materials may have been used historically. Older structures that may be demolished or renovated to accommodate future development could contain asbestos and/or lead-based paint. Each of these situations could pose a threat to public health and the environment if not properly managed. This is a **potentially significant** impact. Existing regulations and Policy EM-1-1 provide mitigation, but additional mitigation is required.

Mitigation Measures

MM 5.8.2 Prior to approval of improvement plans, grading permits, and or demolition permits for properties in the Planning Area that have not already been evaluated for the potential for the presence of hazardous materials and hazardous conditions, Phase I ESAs shall be prepared by a qualified professional. Each Phase I ESA shall assess the potential for hazards and provide recommendations whether additional investigation (Phase II ESA) should be completed. If determined necessary, a Phase II ESA shall be conducted to determine the lateral and vertical extent of soil, groundwater, and/or soil vapor contamination, as recommended by the Phase I ESA. The City shall not issue a grading or building permit for a site where contamination has been identified until remediation or effective site management controls appropriate for the site use have been completed consistent with applicable regulations and to the satisfaction of the Sacramento County Environmental Management Department, the California Department of Substances Control, and/or Central Valley Regional Water Quality Control Board, as appropriate. If the Phase I ESA determines there are no recognized environmental conditions, no further action is required. However, the City shall ensure any grading or improvement plan or building permit includes a statement that if hazardous materials contamination is discovered or suspected during construction activities, all work in the vicinity of the contamination shall stop immediately until a qualified professional has evaluated the site and determined an appropriate course of action.

Mitigation measure **MM 5.8.2** requires that properties that have not already been investigated for the potential for hazards and/or hazardous materials have Phase I ESAs prepared, which would identify if any hazards exist, and if so, how those hazards can be safely managed. This mitigation measure would ensure that hazardous materials, if found, are properly cleaned up and are not released into the environment, where they could pose a threat to human health or the environment. This would reduce this impact to **less than significant**.

Remediation activities, such as excavation of contaminated media or treatment systems, could involve activities that result in the release of hazardous materials through dust or other emissions or extraction of contaminated groundwater, to name a few. Remediation projects are required to be implemented in accordance with established hazardous materials and waste laws and regulations. Moreover, the benefits of remediation generally outweigh the risks associated with the cleanup activities.

Hazardous Materials Emissions Near Schools (Standard of Significance 3)

Impact 5.8.3 The proposed Project could involve activities that have the potential to generate hazardous materials emissions within one-quarter mile of existing schools. This impact would be **less than significant**.

There are numerous elementary schools, middle schools, and high schools as well as several private schools, preschools, and child-care facilities in the existing City limits. New schools could be constructed by the EGUSD or others in the Planning Area, as allowed under the Public Services designation.

Implementation of the proposed Project could result in the development of new commercial, retail, and industrial uses which could occur within one-quarter mile of an existing or future school. As explained in Impact 5.8.1, none of these uses would involve large quantities of hazardous materials or any industrial or other uses that would be expected to cause hazardous emissions or generate acutely hazardous wastes. The effect of emissions, if any, would generally be limited to those individuals handling the materials or to persons in the immediate vicinity of the materials.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Emissions from construction activities, such as diesel particulate matter, or operation of industrial or commercial uses that may generate toxic air contaminants, would be controlled through adherence to General Plan policies, State regulations, and SMAQMD standards, as explained in more detail in Impact 5.3.4 in Section 5.3, Air Quality. Projects must be reviewed for conformance with General Plan policies, as explained in Impact 5.8.2, to minimize the potential for airborne emissions. Additional requirements apply to school districts, such as the EGUSD, prior to purchase of a school site or construction.

General Plan Policies ER-1-1 through ER-1-3 require that any proposed future development would be evaluated to determine if it could expose other nearby uses to hazardous physical effects.

Conclusion

The proposed Project could result in activities that involve the use of hazardous materials within one-quarter mile of a school. With adherence to existing regulations and General Plan Policies ER-1-1 through ER-1-3, the impact would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.

Emergency Response/Evacuation Plans (Standard of Significance 7)

Impact 5.8.4 The proposed Project would result in construction activities that could temporarily affect roadways and increase the number of people who may need to evacuate the Planning Area in the event of an emergency. This impact would be **less than significant**.

The proposed Project would result in construction activities that could temporarily affect roadways as a result of lane closures or narrowing for roadway and/or utility improvements. This could affect emergency response times or evacuation routes. Major roadways that could be affected include Big Horn Boulevard, Bilby Road, Bond Road, Bradshaw Road, Bruceville Road, Calvine Road, Center Parkway, Elk Grove Boulevard, Franklin Boulevard, Grant Line Road, Kammerer Road, Laguna Boulevard, Sheldon Road, Waterman Road, and Whitelock Parkway. The proposed Project would increase the number of people who may need to evacuate the Planning Area in the event of an emergency.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Elk Grove participates in the multijurisdictional Sacramento County LHMP, last updated in 2016 (Sacramento County 2016). The purpose of the plan is to guide hazard mitigation planning to better protect the people and property of the county from the effects of hazard events. The Sacramento LHMP includes policies and programs for participating jurisdictions to implement that reduce the risk of hazards and protect public health, safety, and welfare. The City's EOP provides a strategy for the City to coordinate and conduct emergency response. The intent of the EOP is to provide direction on how to respond to an emergency from the initial onset, through an extended response, and into the recovery process.

Sacramento County's Evacuation Plan identifies key evacuation routes as major interstates, highways, and major roadways. The plan indicates that specific evacuation routes would be established for individual situations based on the geographical location and magnitude of the emergency, as well as the time of day and day of the week. During an evacuation, County DOT staff would calculate traffic flow capacity and decide which of the available traffic routes should be used to move people in the correct directions.

Section 12 of the City's Standard Construction Specifications (Construction Area Traffic Control), identifies specific actions that must be implemented for traffic control to ensure safety for motorists and workers. These requirements must be stated in the General Notes on project improvement plans, which is confirmed by City staff during plan review.

All existing roadway modifications and new roadways that would occur with implementation of the proposed Project to accommodate future growth must be constructed based on industry and City design standards consistent with Policy MOB-3.10 (see Impact 5.13.4 in Section 5.13, Transportation). Future roadways in the Planning Area would also be required to demonstrate compliance with the CCSD Fire Department requirements pertaining to access/egress to ensure adequate emergency access. These efforts would minimize the potential for a roadway design that could hinder its use for emergency response or evacuation. Policy MOB-6.1 includes the planning and pursuit of funding for strategic grade-separated crossings of rail corridors.

Conclusion

As described in Impact 5.13.5 in Section 5.13, Transportation, the proposed Project contains various policies to ensure that adequate emergency response is provided as needed to accommodate planned population and employment growth. Therefore, with implementation of these policies and standard, the proposed Project would not impair or hinder emergency response or evacuation in the Planning Area, and the impact is **less than significant.**

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and standards and proposed General Plan policies.

Wildland Fire Hazard (Standard of Significance 8)

Impact 5.8.5 The proposed Project would include development that could be subject to wildland fire hazard risk. This impact would be **less than significant**.

Wildland fires, particularly grass fires, are those that pose a threat to the more rural areas in Sacramento County, including portions of the Planning Area. There are no moderate, high, or very high FHSZs in Elk Grove, and the Planning Area is not within a State Responsibility Area (City of Elk Grove 2017). However, the Sacramento County LHMP indicates the probability of a wildfire is highly likely and could be extensive geographically, and that climate change may be a factor in the probability of future occurrence (Sacramento County 2016: Table ES-2 and p. 4-190).

Implementation of the proposed Project, particularly in the West and South Study Areas, would result in the conversion of undeveloped land to urban uses, which would remove much of the flammable vegetation. While this would reduce grass fire hazard to some extent, there would still be open areas within and adjacent to the Planning Area that could pose a grass fire hazard.

As explained in Impact 5.11.1.1 in Section 5.11, Public Services, developed portions of the Planning Area are adequately served by the CCSD's existing fire stations, and substantial new growth is not anticipated in these areas under the proposed Project.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Prior to development in the Study Areas, community plans must be prepared, which would identify sites and funding sources for future fire stations determined necessary to meet anticipated demand in those areas. Proposed General Plan Policies ER-4-1 and ER-4-2 are intended to reduce fire risk in the Planning Area by encouraging cooperation between the City and the CCSD as well as development of a fire prevention plan. Policies SAF-1-3 and SAF-1-4 call for coordination with the CCSD Fire Department to ensure that new station siting and resources are available to serve local needs and emergency response services are expanded as needed to respond to planned community growth. Policy INF-1-2 requires that water flow and pressure be provided at sufficient levels to meet domestic, commercial, industrial, and firefighting needs.

All new development would be required per the California Fire Code to incorporate ignition-resistant construction standards such as ignition-resistant materials and design to resist the intrusion of flame or embers projected by a vegetation fire (wildfire exposure). In addition to Fire Code requirements, the City would be responsible for ensuring that fire safe standards for defensible space are included in project design to reduce the intensity of a wildland fire by reducing the volume and density of fuels (e.g., vegetation that can transmit fire to a building or structure); to provide increased safety for fire equipment and evacuating civilians; and to provide a point of attack or defense from a wildland fire. The current defensible space clearance requirement to be maintained around buildings and structures is 100 feet (PRC 4291).

Conclusion

The proposed Project would result in additional development that could be exposed to wildland fire hazard risk, particularly where new development adjoins open grasslands to the south. With implementation of General Plan policies and applicable Fire Code regulations, wildland fire hazard impacts would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.

5.8.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

For the cumulative hazards and hazardous materials impact analysis, the cumulative setting is as described in Section 5.0, which is the entire Planning Area and surrounding region of unincorporated Sacramento County, including buildout of the Laguna Ridge Specific Plan, Sterling Meadows, and the Elk Grove Promenade/Lent Ranch Marketplace, as well as other proposed development projects in the City and adjacent areas.

Hazardous materials contamination impacts, including remediation activities to protect public health and safety, are site-specific and do not combine with the effects on other sites to result in a cumulative effect. No further analysis of this impact (Standard of Significance 4) is necessary.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Transport, Use, Storage, and Disposal of Hazardous Materials (Standards of Significance 1, 2, and 3)

Impact 5.8.6 Cumulative development would increase the use, storage, disposal, and transport of hazardous materials. The proposed Project's contribution would be **less than cumulatively considerable**.

Cumulative development would include continued operation or development of light-industrial uses, commercial uses, residential uses, medical facilities, open space, and public/quasi-public facilities (e.g., sanitary sewer facilities). Many of these development projects, including medical and industrial projects, would increase the use of hazardous materials within the surrounding area.

Cumulative development would be required to comply with applicable hazardous materials management laws and regulations adopted at the federal, State, and local level including but not limited to Titles 10, 29, 40, and 49 of the CFR, which regulate the handling (including transportation), storage, and disposal of hazardous materials and wastes; and Titles 8, 22, and 26 of the CCR, which address the handling, storage, disposal and management (including workplace safety) of hazardous materials and wastes. Compliance with these regulations would be monitored during construction and occupancy of new projects through a variety of agencies including the regional OSHA and EPA offices, California Highway Patrol, County DOT, DTSC, CalEPA, and SCEMD.

The Project does not propose land use changes that would substantially intensify industrial uses in the Planning Area compared to existing conditions, as explained in Impact 5.8.1. As such, the types of hazardous materials in the Planning Area (and the potential hazards they pose) would generally remain similar to existing conditions and would be maintained at acceptable levels through implementation of General Plan policies and applicable regulations. Development projects would be reviewed by City staff for consistency and conformance with applicable requirements as part of the approval and entitlement process. The proposed Project's contribution would be **less than cumulatively considerable.**

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.

Emergency Response/Evacuation Plans (Standard of Significance 7)

Impact 5.8.7 Cumulative development would result in construction activities that could temporarily affect roadways and increase the number of people who may need to evacuate the region in the event of an emergency. This impact would be **less than cumulatively considerable**.

Construction activities associated with cumulative development would involve the movement of heavy equipment, material deliveries, and utility work. Similar to the proposed Project, these activities could result in the need for lane closures or narrowing. Such impacts tend to be localized, would be short-term, and would not combine to produce a significant cumulative effect. Construction traffic control plans are typically used to mitigate potential effects. Thus, the cumulative impact would not be significant. Future development under the proposed Project would also be required to prepare traffic control plans in cases where off-site traffic could be negatively affected, which would ensure the proposed Project would not result in a significant cumulative impact. The proposed Project contribution would be **less than cumulatively considerable**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.

Wildland Fire Hazard (Standard of Significance 8)

Impact 5.8.8 Cumulative development could be subject to wildland fire hazard risk. This impact would be **less than cumulatively considerable**.

Cumulative development would be at risk of wildland fire hazard, primarily grass fires because of the area's flat topography and extent of undeveloped land. There are no moderate, high, or very high FHSZs or SRAs in the cumulative development area. The Sacramento County LHMP indicates the probability of a wildfire is highly likely and could be extensive geographically, and that climate change may be a factor in the probability of future occurrence. While the risk of wildland fire cannot be avoided, it would be minimized to the extent practicable through Fire Code-compliant design, which would apply to any new development in the cumulative setting. Sacramento County has a permit review process to ensure State and local fire safe regulations are being implemented. Compliance with State and local fire safe regulations would reduce the wildland fire hazard risk on cumulative development and would thus be a less than significant cumulative impact. The City's permit review process would also ensure implementation of State and local fire safe regulations. Implementation of State and local fire safe regulations and General Plan Policies ER-4-1and ER-4-2 would ensure that future development in the Planning Area would not increase wildland fire hazard risks. The Project's contribution would be **less than cumulatively considerable.**

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.

REFERENCES

DHS (California Department of Health Services). 2016. *California Indoor Radon Levels Sorted by Zip Code.* Accessed October 18, 2017. https://www.cdph.ca.gov/Programs/CEH/DRSEM/CDPH%20Document%20Library/EMB/Radon/Radon%20Test%20Results.pdf.

DTSC (California Department of Toxic Substances Control). 2017. EnviroStor. Accessed October 18. http://www.envirostor.dtsc.ca.gov/public.

EPA (US Environmental Protection Agency). n.d. EPA Radon Zones. Accessed October 18, 2017. https://geopub.epa.gov/Radon.

NTSB (National Transportation Safety Board). 2017. Hazardous Materials Accident Reports.

PHMSA (Pipeline and Hazardous Materials Safety Administration). 2017. Incident Statistics. https://www.phmsa.dot.gov/hazmat-program-management-data-and-statistics/data-operations/incident-statistics.

Quest (Quest Consultants). 2003. *Review of Suburban Propane Hazards Analysis Studies and Evaluation of Accident Probabilities Report.*

SACOG (Sacramento Area Council of Governments). 1999. *Sacramento Executive Airport Comprehensive Land Use Plan*.

———. 2013. *Sacramento International Airport Land Use Compatibility Plan*.

Sacramento County. 2016. *Local Hazard Mitigation Plan Update*. http://www.waterresources.saccounty.net/stormready/Documents/LHMP%20Draft%20Document/Sacramento%20County%20LHMP%20Update%20Chapters%20Complete.pdf.

SCEMD (Sacramento County Environmental Management Department). 2017. Toxic Site Cleanup – Site Specific Report. Accessed November 2. http://www.emd.saccounty.net/EMDForms/Documents/tox1.pdf.

SWRCB (State Water Resources Control Board). 2017. GeoTracker. Accessed October 18. http://geotracker.waterboards.ca.gov.

5.9 HYDROLOGY AND WATER QUALITY

This section describes existing drainage and water resources in the Planning Area and the region, and evaluates potential impacts of the Project with respect to flooding, surface water resources and quality, and groundwater resources. Water supply impacts are evaluated in Section 5.12, Public Utilities.

5.9.1 EXISTING SETTING

SURFACE WATER

Hydrology

Sacramento County is part of the Sacramento River watershed, which covers approximately 27,000 square miles, with 400 miles of riverbed from Lake Shasta to the convergence of the Sacramento-San Joaquin Delta. The Planning Area is also part of this watershed. Laguna Creek, the Cosumnes River, and the Sacramento River are the main surface hydrological features in and near the Planning Area.

Surface water resources in the Planning Area are part of the Morrison Creek Stream Group, and include Elder, Elk Grove, Laguna (and tributaries), Morrison, Strawberry, and Whitehouse Creeks. The Morrison Creek Stream Group drainage basin covers 192 square miles. The nine creeks that drain into Morrison Creek flow southwest and eventually drain into the Beach-Stone Lakes area west of Interstate 5 (I-5). Florin, Gerber, and Unionhouse Creeks are located close to the Planning Area in Sacramento County. Deer Creek is in the eastern portion of the Planning Area, parallel to the Cosumnes River. The Cosumnes River floodplain forms the eastern border of the Planning Area, and the river is part of the San Joaquin River watershed. **Figure 5.9-1** shows the location of major surface water features in and around the Planning Area.

Laguna Creek, the main creek that flows through the City, has been altered by development. Channels, levees, and culverts have been created to alleviate the possibility of flooding, as well as accommodate different development scenarios. Other creeks in the Planning Area have also been similarly altered. However, the Cosumnes River is one of the last free-flowing, undammed rivers on the western slope of the Sierra Nevada.

Drainage

Urban runoff within the City limits is conveyed through a storm drainage and flood control collection system that includes nearly 400 miles of underground piping and 60 miles of natural and constructed channels. The City owns and operates these facilities and channels, including pump stations, levees, detention basins, and other flood control features. The system manages drainage from 13 contributing watersheds and 10 major natural creeks that convey runoff in the City, which are listed in **Table 5.9-1** and **Table 5.9-2**, respectively. The City's watersheds ultimately drain into the Stone Lakes National Wildlife Refuge area of Sacramento County, with the exception of the Deer Creek and Grant Line Channel watersheds, which drain to Deer Creek and ultimately to the Cosumnes and Mokelumne Rivers.

TABLE 5.9-1
DRAINAGE WATERSHEDS IN THE CITY

Deer Creek Watershed	Laguna Creek Watershed	Elk Grove Creek Watershed
Grant Line Channel Watershed	Laguna Stone Lake Watershed	Laguna West Channel Watershed
Laguna West Lakes Watershed	Lakeside Watershed	Shed A Watershed
Shed B Watershed	Shed C Watershed	Strawberry Creek Watershed
Whitehouse Creek Watershed		

Source: City of Elk Grove 2016a

TABLE 5.9-2
RUNOFF CONVEYANCE CREEKS AND CHANNELS IN THE CITY

Elk Grove Creek	Laguna Creek	Strawberry Creek
Whitehouse Creek	Deer Creek	Franklin (Shed A) Channel
Erhardt (Shed B) Channel	Shed C Channel	Grant Line Channel
Laguna West Channel		

Source: City of Elk Grove 2016a

In 2011, the City approved a Storm Drainage Master Plan (SDMP), which identifies and analyzes the existing drainage deficiencies throughout the City, provides a range of drainage concepts for the construction of future facilities, and establishes criteria for selecting and prioritizing drainage improvements. The SDMP addresses drainage issues for four separate regions, each of which has unique and different land use characteristics (City of Elk Grove 2011). The four regions are located within the current City limits and do not extend into the Study Areas.

- *Elk Grove Creek Region:* Southeast portion of the City, beginning just east of Grant Line Road and joining Laguna Creek just west of State Route (SR) 99.
- *Shed C Region:* Southernmost portion of the City, beginning on the west side of SR 99 and continuing southwest outside the City limits to the Stone Lakes National Wildlife Refuge west of Interstate 5.
- *East Elk Grove Area/Rural Region:* Bounded by Waterman Road on the west, Calvine Road on the north, and Grant Line Road/City boundary on the east, this area includes Grant Line Channel, Deer Creek, and Laguna Creek.
- *Other Urbanized Areas:* Includes developed areas in the City that are built out with residential, commercial, or industrial land uses.

The Study Areas have minimal existing storm drainage services because they are primarily agricultural. Nearly all the natural drainage courses in the area east of SR 99 have been altered by agricultural activities, and surface water flows are channeled into agricultural and roadside ditches.

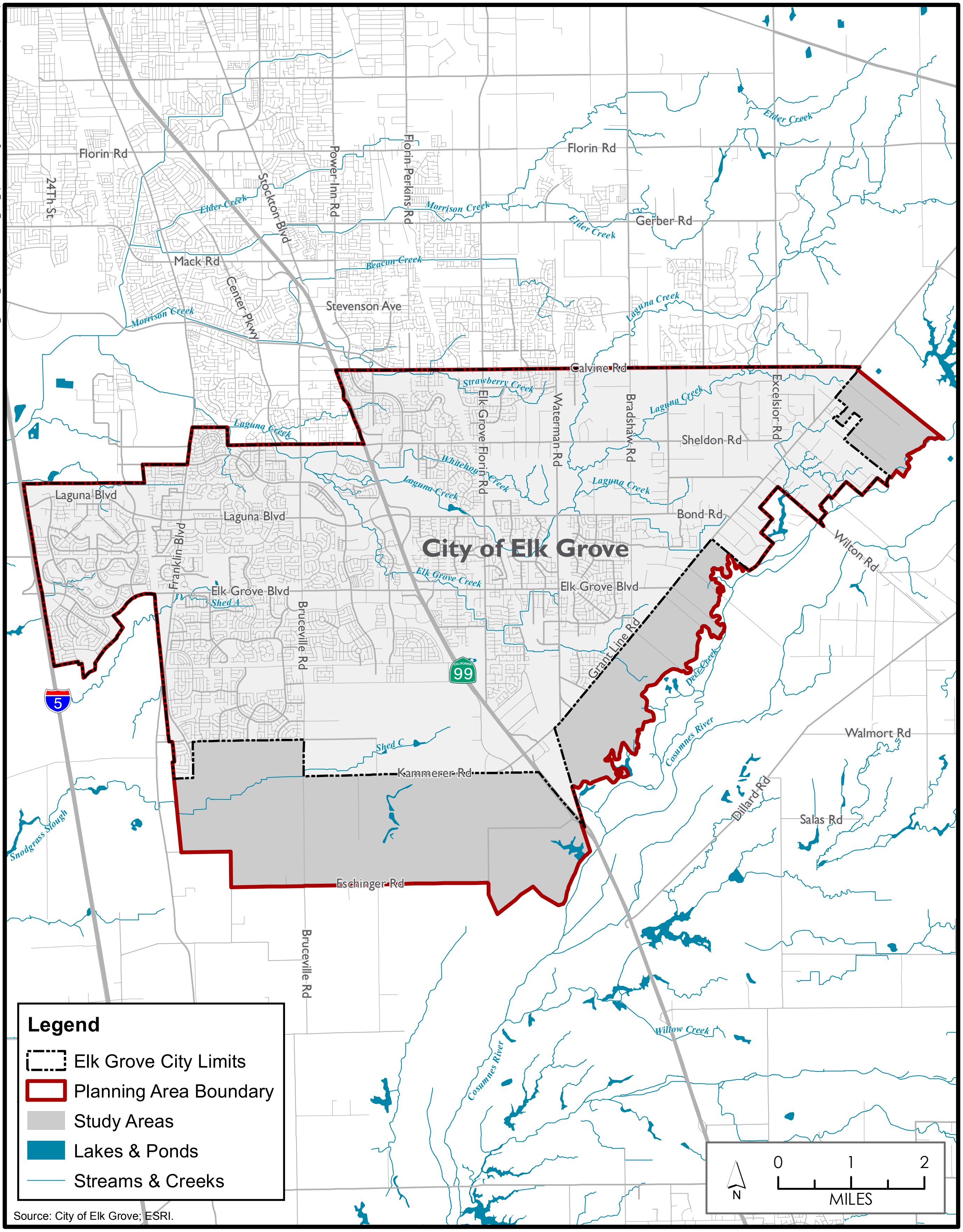

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Figure 5.9-1

Water Features

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Flooding

Flooding affects portions of the Planning Area. Flood Insurance Rate Maps (FIRMs) for the City issued by the Federal Emergency Management Agency (FEMA) identify areas in the City that are within 100- and 500-year flood zones. FEMA establishes these flood zones to estimate the potential frequency of flooding in any given year, based on historical average recurrence intervals. The 100-year floodplain zone estimates inundation areas based on a flood that has a 1 percent chance of occurring in any given year. In the Planning Area, 100-year flood zones include areas along Laguna Creek in the northwest and north-central portion of the City, and along the Cosumnes River to the southeast, primarily outside of City limits, but still within the Planning Area; see **Figure 5.9-2**. Flood risk is intensified in the lower stream reaches by high tides occurring in the Delta at the same time as strong offshore winds during heavy rainfall. A majority of the special flood hazard areas in the City are in Zone A or Zone AE, as designated by FEMA. Both zones correspond with the 100-year floodplain, and mandate flood insurance for certain homeowners with mortgages. Zone A shows no base flood elevations (BFE), while Zone AE has a BFE of less than 1 foot. The BFE represents the computed elevation to which water is expected to rise during the base flood event, and is used to determine floodproofing requirements for buildings. A 500-year flood event, which has a 0.2 percent chance of occurring in any given year, is possible in the northern portion of the City along the Sacramento River and Laguna Creek.

200-Year Floodplain

In the latter part of 2007, the governor signed six Senate and Assembly bills that addressed flood protection that were intended to improve flood management at the state and local levels. One bill (Senate Bill [SB] 5) defined the “urban level of flood protection” as the “level of protection that is necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year using criteria consistent with, or developed by, the California Department of Water Resources [DWR].” SB 5 does not specify any enforcement authority for urban level of flood protection but relies on the due diligence of cities and counties to incorporate flood risk considerations into floodplain management and planning.

The limits of the 200-year floodplain are shown in **Figure 5.9-3**. This map identifies areas where higher standards of development and flood protection may be required prior to the issuance of building permits. **Figure 5.9-3** was developed using data provided by DWR, supplemented by floodplain studies commissioned by the City, covering local creek systems that have watershed areas of at least 10 square miles. These areas include the Laguna Creek and Deer Creek/Cosumnes River watersheds, as well as the Sacramento River watershed, which affects local creek systems.

The City commissioned hydrologic modeling to supplement the DWR 200-year floodplain mapping of Laguna Creek to account for levee improvements completed or in process that were not included in the DWR mapping. The Sacramento Area Flood Control Agency (SAFCA) is in the process of implementing a levee improvement project to provide 200-year flood protection for the Sacramento River, and the US Army Corps of Engineers has completed improvements to the Folsom Dam spillway on the American River. These projects were not accounted for in the DWR mapping. Because of these improvements, the City’s supplemental 200-year floodplain calculations use a scenario in which the levees and dams along the Sacramento and American Rivers do not fail.

The City’s supplemental mapping also differs from DWR 200-year floodplain mapping by adding 200-year water surface elevations along Deer Creek. The DWR did not assess Deer Creek since no State flood improvement projects are located in this watershed. Levees in this area have not been certified to provide 100-year protection and have failed in the past during large storm events. Therefore, modeling for this area considers the possibility of extensive levee failure, especially along the north bank of the Cosumnes River.

The area potentially affected by a 200-year flood event in the City is located along Deer Creek and the Cosumnes River. Much of this land is preserved for agricultural use and would be at limited risk of damage from flood hazard zones. However, a 200-year flood event caused by levee breaks along the Sacramento River could result in flooding in small portions of Laguna West, an existing residential neighborhood on the western side of the City. If, in the future, the City were to consider expanding beyond its existing Planning Area north or south along I-5, development in these areas would also be at risk in a 200-year flood event.

The City recognizes that flood risk conditions can change over time through natural processes or project improvements on the local or regional scale. Therefore, the 200-year flood map is considered the base case for establishing potential flood risk. The City will keep updated data on the 200-year floodplain through an annual review, accounting for the results of new technical studies and changes in flood protection infrastructure. This updated information will be referenced during the development review process for areas on the base case 200-year flood map, as shown in **Figure 5.9-3**.

As required by the flood management requirements in Government Code Section 65302(g), the City has incorporated Central Valley Flood Protection Plan (CVFPP) measures into the Safety Element of the General Plan through the inclusion of urban level flood protection mapping, as well as through more extensive flood risk analysis. The City has also incorporated related measures into Title 23 of the Municipal Code. The City applies these more stringent development standards in identified areas when considering approval of future projects and developments (City of Elk Grove 2016b).

Levees

The existing levee system in areas surrounding the City was initially constructed by hand labor, and later by dredging to hold back river floods and tidal influences, in order to obtain additional lands for grazing and crop growing. Continued maintenance is necessary to hold these levees against the river floods that threaten surrounding areas. Because levees are vulnerable to peat oxidation as well as sand, silt, and peat erosion, new material is continually added to maintain them. Subsiding farmlands adjacent to levees may increase water pressure against the levees, adding to the potential for levee failure. In addition, many levees, known as non-project levees, are not maintained to any specified standard, which can increase the likelihood of failure and inundation. Levee failures can be difficult to predict, since even inspected project levees are prone to failure under certain conditions. The DWR has, using the best available information, identified areas where flood levels would be more than 3 feet deep if a project levee were to fail; these areas are known as Levee Flood Protection Zones.

Levee construction, operation, and maintenance that is the responsibility of a federally authorized flood project in the State is considered part of the State Plan of Flood Control. These are referred to as "project levees." There are no project levees in the City, although several project levees are located outside of the Planning Area along the Sacramento River. Non-project levees are levees that were generally constructed prior to project levees and without federal or State assistance, and are not part of the State Plan of Flood Control. Non-project levees are located along the eastern side of I-5 and along Morrison Creek, Laguna Creek, and the Cosumnes River, and provide flood protection to the community.

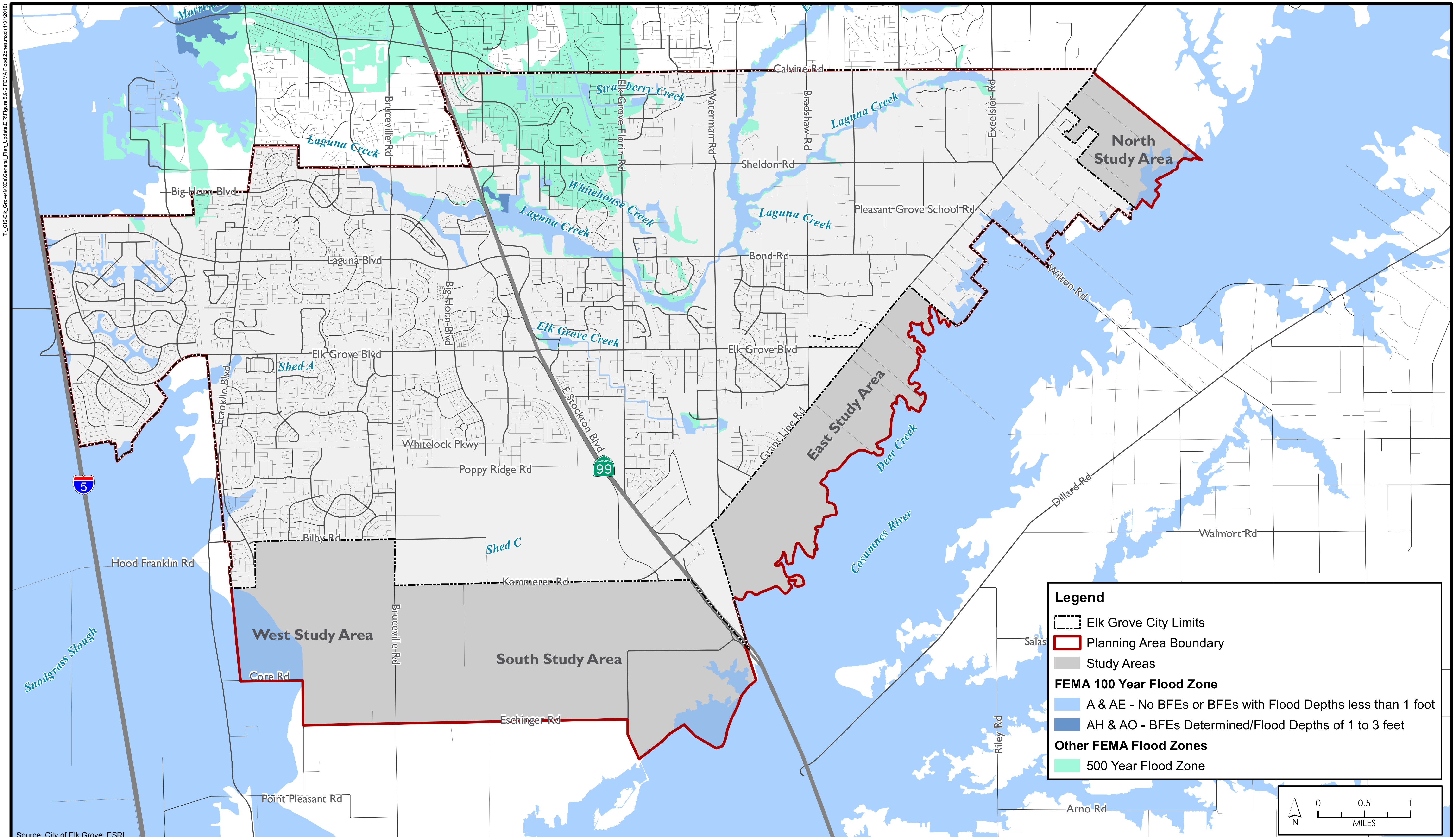

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Figure 5.9-2
FEMA Flood Zones

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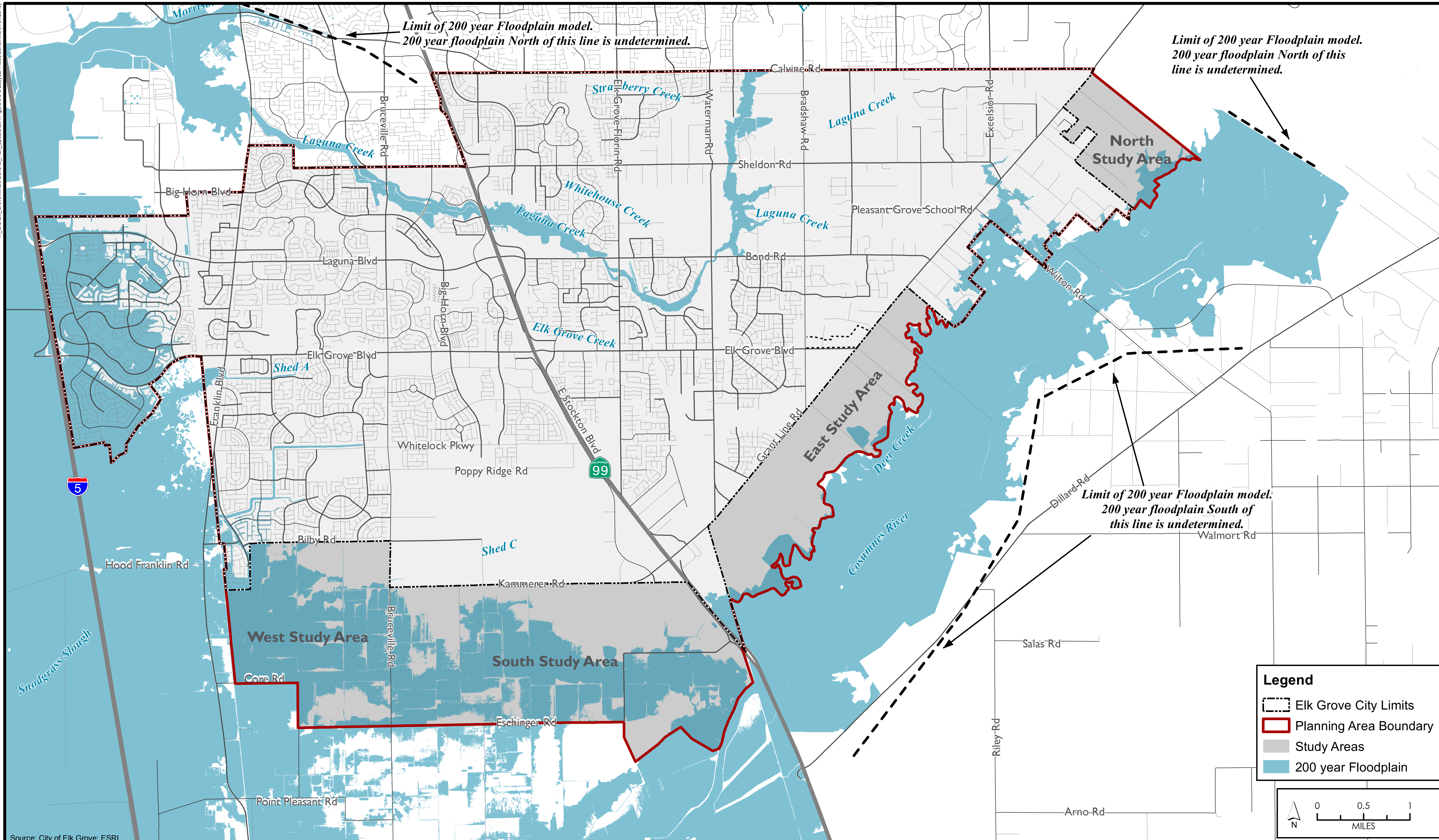

City of Elk Grove
Development Services

Figure 5.9-3

200 year Floodplain

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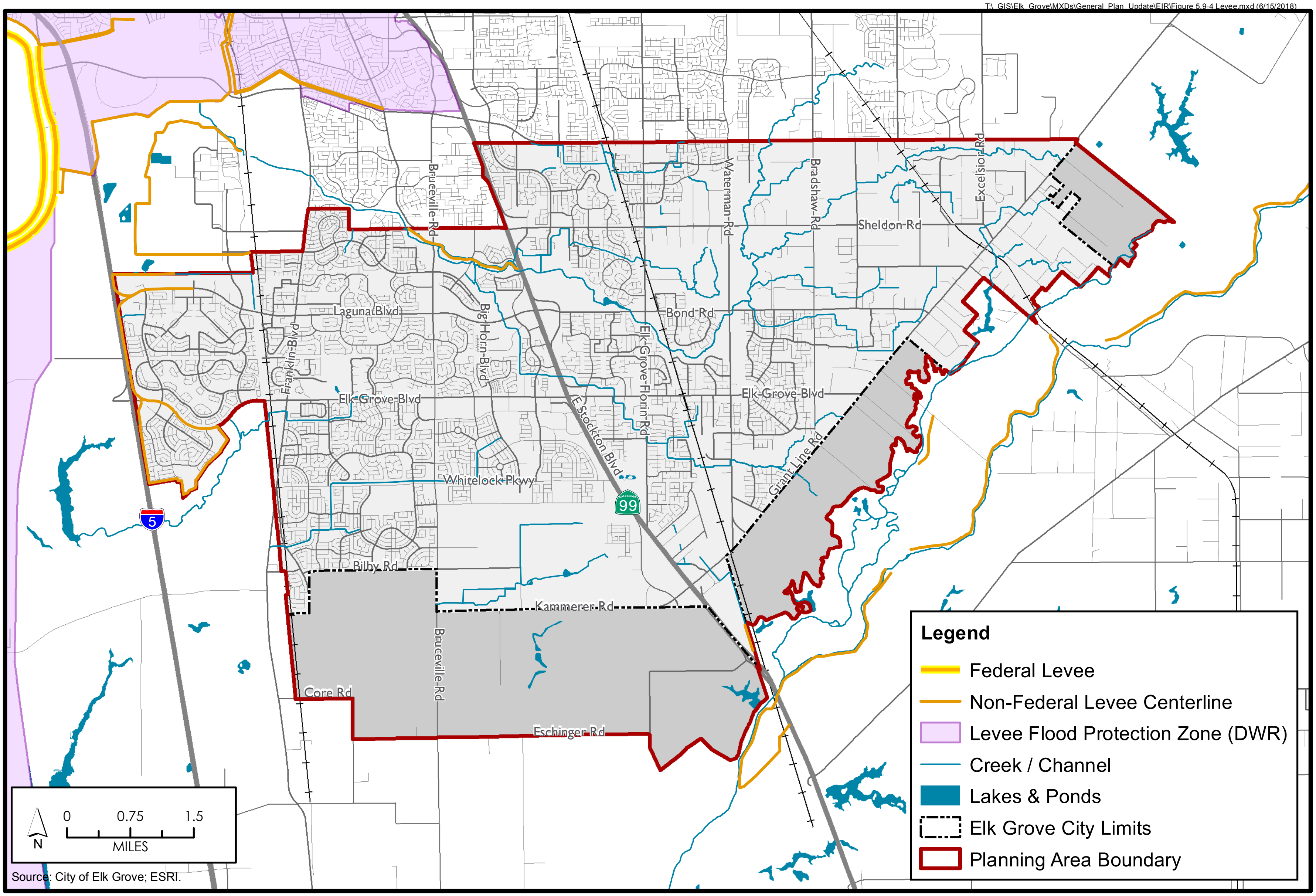

City of Elk Grove
Development Services

Figure 5.9-4

DWR Levee Flood Protection Zones

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The City conducts levee operation and maintenance activities that result in recommendations as well as requirements for specific levee inspections and maintenance operations. **Figure 5.9-4** identifies the locations of project levees, non-project levees, and DWR Levee Flood Protection Zones that affect the Planning Area.

Dams

Dam inundation refers to flooding that occurs when dams fail. Typically, dam failure results when a dam is not structurally sound to withstand damages resulting from seismic activity. The degree and rapidity of dam failure depends on the dam's structural characteristics and the level of stress due to the seismic event. The Governor's Office of Emergency Services provides model estimates of degree and extent of flooding that would occur in the case of a dam failure in or near the City. Although they are not located in the Planning Area, Folsom Dam (South Fork American River) and Sly Park Dam (which stores water diverted from the North Fork Cosumnes River at Jenkinson Lake) have the potential to cause flooding in the Planning Area, specifically in the northwestern and southeastern portions, in the event of dam failure. Dam inundation areas are shown in **Figure 5.9-5**.

Climate Change

Climate change will likely result in new flooding hazards throughout California. Climate change–induced sea level rise is likely to create hydrologic changes in the San Francisco Bay and Delta that could affect the City. While uncertainty exists regarding the extent of sea level rise, there is consensus that it will increase the frequency, duration, and magnitude of flood events in the San Francisco Bay and Sacramento-San Joaquin Delta (Bay-Delta) area that borders the western edge of the City. Given a 1-foot rise in sea level, as predicted in low-end sea level rise projections, the occurrence of a 100-year storm surge–induced flood event would shift to once every 10 years. In other words, the frequency of a 100-year event could increase tenfold. Sea level rise and the associated increases in flood events would place greater strain on existing levee systems and could expand floodplains affecting the City. In addition to the pressure resulting from sea level rise, climate change is anticipated to result in increased severity of winter storms, particularly in El Niño years. Such weather events will result in higher levels of seasonal flooding than those currently experienced. Such changes in weather events will further strain levees and increase floodplain areas (City of Elk Grove 2016b).

Surface Water Quality

Section 303(d) of the federal Clean Water Act establishes the total maximum daily load (TMDL) process, which requires states to identify waters whose water quality is "impaired" (affected by the presence of pollutants or contaminants), and to establish a TMDL or the maximum quantity of a particular contaminant that a water body can assimilate without experiencing adverse effects on the waterbody's identified beneficial uses. The 303(d) list, approved by the EPA, identifies these impaired water bodies. According to the most recent 303(d) list, Elder, Elk Grove, and Morrison creeks are designated as impaired water bodies for various pesticides and sediment toxicity, resulting from urban runoff, agriculture, and unknown sources. The segment of the Sacramento River west of the Planning Area is listed for diazinon and mercury. The Delta waterways (northern portions), which are the downstream receiving waters for the Sacramento River, are designated as impaired water bodies. The upper Cosumnes River (above Michigan Bar) is listed for invasive species from an unknown source, and Deer Creek in Sacramento County is listed for iron from an unknown source (SWRCB 2010).

Surface Water Use

The Sacramento County Water Agency (SCWA) manages water supplies in the greater Sacramento area. These supplies consist of surface water, groundwater, recycled water, and purchased water. The SCWA relies fully on local water supplies with no use of imported water. Water programs utilized to maximize regional supply reliability include the Water Forum Agreement, to which SCWA is a signatory. The coequal objectives of the Water Forum Agreement are to (1) provide a reliable and safe water supply for the region's economic health and planned development through the year 2030; and (2) preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River. The Water Forum Agreement contains seven major elements to meet its objectives, including purveyor-specific agreements.

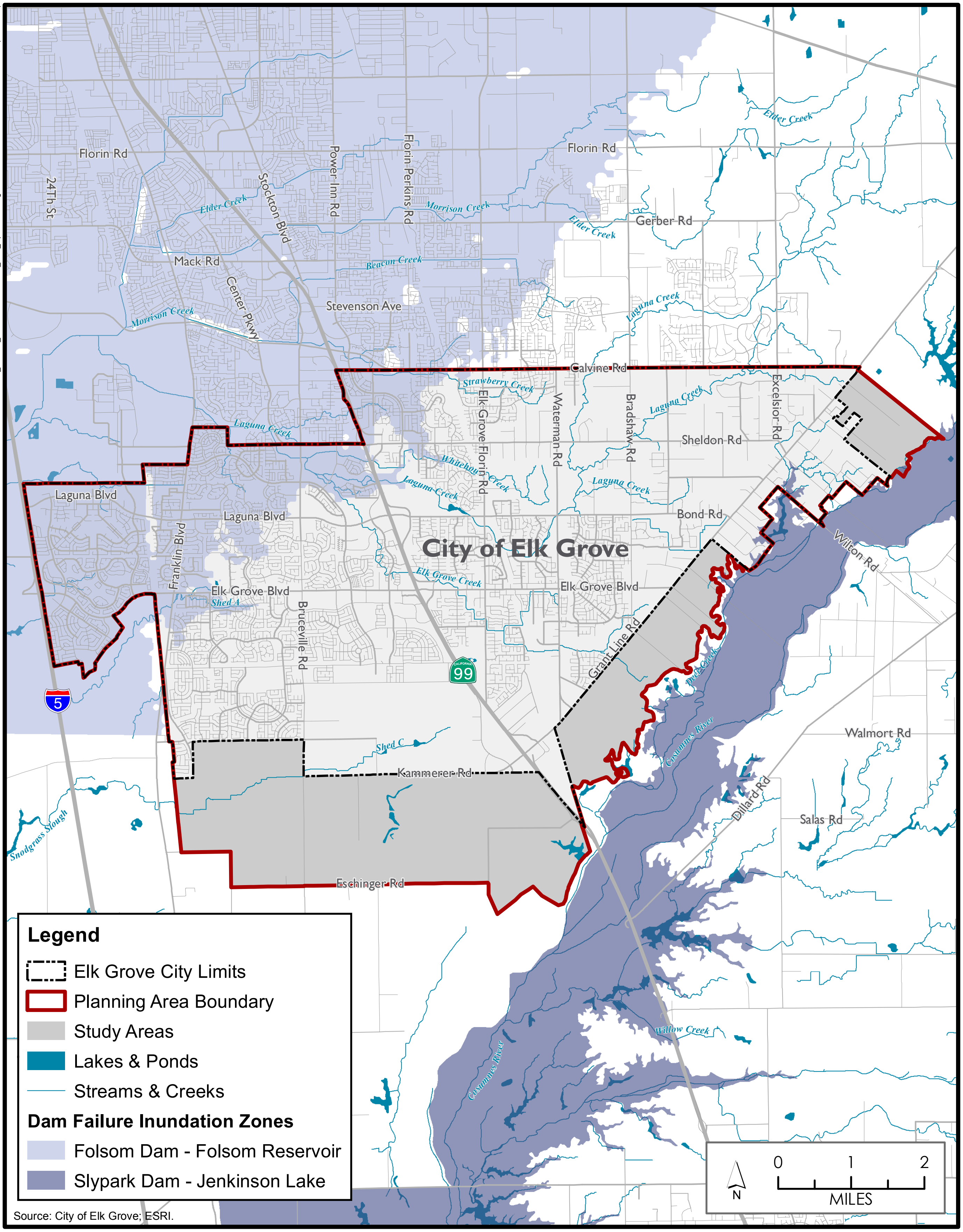
Climate change is anticipated to have an impact on water demands and supplies. A quantitative vulnerability assessment prepared by the Regional Water Authority and included in the American River Basin Integrated Regional Water Management Plan evaluated the effects on both surface water and groundwater. The quantitative assessment indicates that surface water supplies would be reduced and would be mostly associated with reduced diversions from the American River. Planned actions to address vulnerabilities from the climate change assessment include decreasing urban per capita water demand and continuing current efforts such as implementing conjunctive use management, recycled water use, and interconnections between adjacent water purveyors (SCWA 2016, Section 6.11). Additional information on surface water use and supply and related water supply planning considerations is presented in Section 5.12, Public Utilities.

GROUNDWATER

Hydrogeology

The Central Valley of California contains the largest basin-fill aquifer system in the State. From north to south, the aquifer system is divided into the Sacramento Valley, Sacramento-San Joaquin Delta, and the San Joaquin Valley subregions. The City is situated within the Sacramento Valley Groundwater Basin, South American Subbasin. Within the larger South American Subbasin, there are three groundwater basins—North, Central, and South—in Sacramento County; the Planning Area overlies the Central Basin. The Central Basin also includes areas of Sacramento County and the City of Sacramento, surrounding the Planning Area. Groundwater in the Central Basin generally occurs in a shallow aquifer zone (Laguna or Modesto Formation) or in an underlying deeper aquifer zone (Mehrten Formation). There is some potential for movement of groundwater between the two aquifers, usually the result of heavy groundwater pumping, and the effects on groundwater levels are a function of whether the pumping occurs in the shallow aquifer or the deeper aquifer.

Groundwater in the Planning Area moves from sources of recharge to areas of discharge. Recharge to the local aquifer system occurs along active river and stream channels where extensive sand and gravel deposits exist, particularly along the American, Cosumnes, and Sacramento River channels. Additional recharge occurs along the eastern boundary of Sacramento County at the transition point from the consolidated rocks of the Sierra Nevada to the alluvial deposited basin sediments. This typically occurs through fractured granitic rock that makes up the Sierra Nevada foothills. Other sources of recharge in the area include deep percolation from applied surface water, precipitation, and small streams.



City of Elk Grove
Development Services

Figure 5.9-5

Dam Failure Inundation Zones

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Groundwater Levels

Changes in the groundwater surface elevation result from changes in groundwater recharge, discharge, and extraction.

Intensive groundwater extraction from the South American Subbasin has, in the past, resulted in a general lowering of groundwater elevation. Most of these decline areas are on the eastern side of the subbasin, close to where multiple groundwater remediation programs have been established to address past practices of disposing of chemical constituents that are harmful to drinking water supplies. There is a groundwater level decline in the southeast part of the subbasin near where Deer Creek flows out of the foothills into the Central Valley. This decline is also due to remediation activities, reductions in minimum discharge requirements of El Dorado Irrigation District's wastewater discharge flowing into the Deer Creek watershed, and State drought conditions reducing the total base flow of Deer Creek in 2015.

Decline areas along the Cosumnes River are a direct result of drought conditions and less total available water for recharge from flows down the Cosumnes River to the Delta and from water held back for recharge via temporary flash dams. Groundwater in this portion of the basin is reliant on Cosumnes River recharge, and local agricultural practices are in place to capture as much water as possible for recharge purposes during late spring of each year. This decline area is expected to recover, and has shown past resilience with the return of wet year conditions.

Decline areas in the Cosumnes Subbasin to the south are the result of reliance on groundwater by growing water demands in municipal, agriculture, and aquiculture uses, and have been exacerbated by the drought's impact on Cosumnes River flows. The level of groundwater level decline in the Cosumnes Subbasin and impacts to the South American Subbasin have not risen to the level of an undesirable effect. The annual average storage loss in the decline areas is calculated to be 11,000 acre-feet per year (AFY).

A recharged area in the western portion of the South American Subbasin, underlying the City and surrounding areas, is the result of in-lieu recharge from the construction of large conjunctive use and surface water infrastructure facilities; fallowing and urban development of historically irrigated agricultural lands; increased use of recycled water; and water conservation. The increase in storage in this portion of the subbasin has filled the long-term cone of depression and has eroded the ridge of higher groundwater separating it from the Cosumnes Subbasin.

A recharged area underlying the American River near the City of Sacramento's Fairbairn Water Treatment Plant and Diversion Structure has occurred likely because of a long-term average increase in flows in the lower American River, with the filling of a cone of depression in that area between 2005 and 2015. The overall gain in storage, based on the recharged areas only within the South American Subbasin, is approximately 66,000 AF. The average annual storage increase over these recharged areas totals 7,000 AFY.

The difference in total annual average change in storage over the 2005 to 2015 timeframe is calculated to be approximately 4,000 AFY. This equates to 4 to 5 large municipal wells in the subbasin, and is representative of a basin in equilibrium—where natural recharge from deep percolation, hydraulically connected rivers, and boundary subsurface inflows are keeping up with active pumping and changes in hydrology.

Groundwater sustainability has existed since the mid-1980s when recovery of the basin began after a period of overdraft (i.e., when more groundwater is extracted than is replaced). Between 2005 and 2015, the basin continues to recover at its deepest points (SCGA 2016, pp. ES-8–ES-9).

Groundwater Supply and Use

Groundwater Management

The City does not directly manage groundwater supplies. The Sacramento Central Groundwater Authority (SCGA) manages groundwater in the Central Basin portion of the South American Subbasin. The SCGA was formed in 2006 through a joint powers agreement signed by the cities of Elk Grove, Folsom, Rancho Cordova, and Sacramento, and Sacramento County. Among its many purposes, the SCGA is responsible for managing the use of groundwater in the Central Basin to ensure long-term sustainable yield, and facilitating a conjunctive use program. The framework for maintaining groundwater resources in the Central Basin is the SCWA Groundwater Management Plan, which includes specific goals, objectives, and an action plan to manage the basin. The plan also prescribes a well protection program to protect existing private domestic well and agricultural well owners from declining groundwater levels resulting from increased groundwater pumping due to new development in the basin (SCWA 2016).

The Sustainable Groundwater Management Act enacted by the State legislature in 2014, with subsequent amendments in 2015, directs the DWR to identify groundwater basins and subbasins in conditions of critical overdraft. Neither of the two subbasins that supply the SCWA are on the list issued by DWR in 2015. Groundwater basins designated as high or medium priority and critically overdrafted must be managed under a groundwater sustainability plan by January 31, 2020. All other high- and medium-priority basins must be managed under such a plan by January 31, 2022. The two subbasins that supply the SCWA are covered by the latter deadline. The act also requires formation of groundwater sustainability agencies. The SCGA is currently in discussions with other groundwater basin users of the South American Subbasin to evaluate options for management of the basin to meet agency and groundwater sustainability plan requirements (SCWA 2016).

The Sustainable Groundwater Management Act also authorizes a groundwater management agency in a basin compliant with the California Statewide Groundwater Elevation Monitoring program to prepare an “Alternative” to a groundwater sustainability plan. The SCGA submitted a Final Draft South American Subbasin Alternative Submittal document to the DWR for review in December 2016 (SCGA 2016). As of March 2018, DWR has not made a decision on the adequacy of the Alternative Submittal (SCGA 2018: Section 2.2).

The SCGA has prepared an annual report describing groundwater conditions in the South American Subbasin for the 2017 Water Year (i.e., inclusive of months October 2016 to September 2017) in support of its pending Alternative Submittal, described above. The report is intended to convey monitoring and water use data to gauge performance of the groundwater subbasin relative to the sustainability goal set forth in the Alternative Submittal. Total groundwater extractions for the 2017 water year were estimated to be approximately 219,193 AF. Relative to the Alternative Submittal, data show an improvement in groundwater conditions throughout the subbasin and a marked increase in total groundwater storage in the subbasin. As stated in the annual report, subbasin conditions continue to show sustainability in areas of active management, including significant improvements to the Elk Grove cone of depression (SCGA 2018).

Under the Water Forum Agreement, the long-term average annual pumping from the Central Basin is limited to 273,000 AFY. Monitoring and data analysis by the SCGA indicate that subbasin operations from 2005 through 2017 have not exceeded the sustainable yield conditions set forth in the Water Forum Agreement. Groundwater production in the South American Subbasin has varied from a low of approximately 202,300 AFY in 2011 to a high of 260,200 AFY in 2008, with agriculture the primary water use sector accounting for approximately 65 percent of extractions (SCGA 2016, Section 2.3.1; SCGA 2018: Section E.7).

Groundwater Supply and Demand Projections

Three water purveyors provide service to the Planning Area: the SCWA, Elk Grove Water District (EGWD), and Omochumne-Hartnell Water District. Only the SCWA and EGWD extract groundwater as part of their supplies.

Sacramento County Water Agency

Groundwater is a component of SCWA's water supply portfolio and consists of both groundwater from its wells and remediated groundwater that is extracted by others.[1] Although the Water Forum Agreement establishes a limit on the Central Basin's pumping amount, it does not assign or allocate a specific groundwater pumping amount for SCWA in the Central Basin. Groundwater pumping by the SCWA in the larger South American Subbasin between 2011 and 2015 has decreased from a high of approximately 34,600 AFY in 2011 to approximately 24,600 AFY in 2015 (SCWA 2016, Table 6-2). This amount is approximately 10 percent, on average, of the Water Forum Agreement limit for the entire Central Basin.

The SCWA 2015 Urban Water Management Plan (UWMP) (2016, Table 6-12) provides projections of "reasonably available" groundwater volume, based on groundwater supply capacity, with safe yield not quantified. For 2020 and 2025, the reasonably available groundwater volume is projected to be 47,000 AFY, increasing to 52,000 AFY in 2030, and 62,000 AFY in 2035 and 2040. The remediated supply (8,900 AFY) is the same through the planning period, but the SCWA may vary the amount.

Even though the surface water supplies are not available consistently, the SCWA has available groundwater supplies to meet future demand for its existing service area boundary and, during dry years, can replace the reduction in surface water supplies (SCWA 2016, Section 7.1). While groundwater is more consistently available over different climate year types, it has been constrained by groundwater contamination plumes, some naturally occurring contaminants, and the long-term need to not exceed the safe yield.

Elk Grove Water District

The EGWD provides service to residents and businesses for an approximately 13-square-mile area in the current City limits. The Sheldon/Rural Area Community Plan and Eastern Elk Grove Community Plan areas are in the eastern part of the EGWD service area boundary.

The EGWD's service area is separated into two subareas. Service Area 1 relies entirely on groundwater from seven wells and a potable groundwater treatment plant owned by the EGWD (Railroad Street Treatment and Storage Facility). Service Area 2 is served by water purchased from the SCWA, which delivers both surface water and groundwater from its

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[1] SCWA has a remediated groundwater supply of 8,900 AFY in accordance with the terms and conditions in the agreement entitled "Agreement between Sacramento County, SCWA, and Aerojet-General Corporation with Respect to Transfer of GET Water" dated May 18, 2010. The remediated groundwater is pumped from the northern portion of the South American Subbasin and discharged into the American River from Aerojet's Groundwater Extraction and Treatment (GET) facilities in the Rancho Cordova area that are used for groundwater cleanup operations. This remediated groundwater supply is diverted by the SCWA from the Sacramento River at Freeport along with SCWA's surface water supplies.

conjunctive use operations; but as a matter of practice, water served to customers in Service Area 2 is almost entirely derived from SCWA's production wells (EGWD 2016, p. 3-1).

The EGWD covers approximately 3 percent of the entire Central Basin. Taking into account the Groundwater Management Plan's overall estimated sustainable groundwater yield of 273,000 AFY, the EGWD has 9,168 AFY of groundwater available within its service area. In 2015, the district supplied 5,312 acre-feet of water, 1,914 of which was supplied by the SCWA and 3,398 of which was produced from the EGWD's groundwater wells. The EGWD projects that total demand for both service areas would increase from 7,694 AFY in 2020 to 8,059 AFY in 2040, and that there would be sufficient water to meet current needs and anticipated future demand. The EGWD assumed the majority of growth resulting in future demand would be in Service Area 2 (EGWD 2016, Table 4-5, Table 4-6, p. 4-10 and p. 4-12).

Groundwater Quality

The groundwater quality in the South American Subbasin is generally good, although iron and manganese are common and there are some occurrences of arsenic and nitrate. Groundwater in the upper aquifer system is of higher quality than that found in the lower aquifer system, although there are some occurrences of arsenic (which is known to occur naturally in aquifer sediments) and nitrate. Water from the upper aquifer generally does not require treatment other than disinfection for public drinking water systems, unless high arsenic or nitrate values are encountered. The lower aquifer system contains higher concentrations of iron, manganese, and total dissolved solids (TDS), and wells that pump from the lower aquifer often require treatment for iron and manganese. Most of the SCWA's Zone 40 wells have iron and manganese treatment facilities. Principal groundwater contaminant plumes within the South American Subbasin emanate from source areas including Mather Field, Aerojet, Boeing, the former Army Depot, and various landfills. The presence of these contaminant plumes has impacted some existing municipal wells. Significant remediation efforts/programs by federal, State, and local government agencies are in progress to clean up the contaminated groundwater and confine the contaminant plumes from further spreading. Currently, remediated groundwater is discharged into natural water bodies and flows out of the South American Subbasin, as noted above. There are ongoing discussions and negotiations between purveyors and parties responsible for the cleanup to keep the remediated groundwater in the South American Subbasin and put it to beneficial use (SCWA 2016).

Climate Change

Climate change is anticipated to have an impact on groundwater. Groundwater stores are directly linked to surface water in Sacramento County and snowmelt in the Sierra Nevada; therefore, increased average temperatures and changes in the timing, amounts, and snow/rain form of precipitation could affect local aquifer recharge for groundwater supplies. Groundwater use typically increases during droughts. With the potential for precipitation patterns to become more erratic and less predictable, groundwater may become a more significant resource as part of an overall water supply portfolio. Due to increased uncertainty in the amount and timing of water availability and the stress placed on aquifers during droughts, there may be increased challenges in providing adequate groundwater supplies to meet future demand (Ascent Environmental 2017).

A quantitative vulnerability assessment prepared by the Regional Water Authority and included in the American River Basin Integrated Regional Water Management Plan evaluated the effects on both surface water and groundwater and identified the need for increased groundwater pumping to meet urban and agricultural demands. The long-term average groundwater pumping in the Central Basin would increase by 6 percent. Groundwater elevations would decrease from 6 to 15 feet from the baseline condition in SCWA's service area (SCWA 2016, Section 6.11).

5.9.2 REGULATORY FRAMEWORK

FEDERAL

Clean Water Act

The Clean Water Act (CWA) regulates the discharge of pollutants into watersheds throughout the nation.

Sections 401 and 404

Sections 401 and 404 of the CWA are administered through the regulatory program of the US Army Corps of Engineers and regulate the water quality of all discharges of fill or dredged material into waters of the United States, including wetlands and intermittent stream channels. Additional information on Sections 401 and 404 of the CWA is provided in Section 5.4, Biological Resources.

Section 402 – National Pollutant Discharge Elimination System

As authorized by Section 402(p) of the CWA, the NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The State Water Resources Control Board (SWRCB) issues NPDES permits to cities and counties through the Regional Water Quality Control Boards (RWQCB). It is the responsibility of the RWQCBs to preserve and enhance the quality of the State's waters by developing water quality control plans and issuing waste discharge requirements. Waste discharge requirements for discharges to surface waters also serve as NPDES permits.

Section 303 – List of Impaired Water Bodies

CWA Section 303(d) requires that all states in the United States identify water bodies that do not meet specified water quality standards and that do not support intended beneficial uses. Identified waters are placed on the Section 303(d) List of Impaired Water Bodies. Once waters are placed on this list, states are required to develop TMDLs limit for each water body and each associated pollutant/stressor.

National Flood Insurance Program

FEMA oversees floodplains and administers the National Flood Insurance Program (NFIP). Special flood hazard areas (those subject to inundation by a 100-year flood) are identified by FEMA through regulatory flood maps called FIRMs. Participants in the NFIP must satisfy certain mandated floodplain management criteria. The City, along with Sacramento County, participates in the NFIP and implements the program requirements, which include regulations for development in floodplains, through Chapter 16.50 of the Municipal Code.

STATE

Porter-Cologne Water Quality Control Act

In 1969, the California legislature enacted the Porter-Cologne Water Quality Control Act to preserve, enhance, and restore the quality of the State's water resources. The act established the SWRCB and nine RWQCBs as the principal State agencies with the responsibility for controlling water quality in California. Under the act, water quality policy is established, water quality standards are enforced for both surface water and groundwater, and discharges of pollutants from point and nonpoint sources are regulated. The SWRCB is responsible for implementing the CWA and issues NPDES permits to cities and counties through the RWQCBs. The Planning Area is located in a portion of the State that is regulated by the Central Valley RWQCB.

Under CWA Section 303(d) and the Porter-Cologne Water Quality Control Act, the State of California is required to establish beneficial uses of State waters and to adopt water quality standards to protect those beneficial uses. The Water Quality Control Plan for the Sacramento River Basin and San Joaquin River Basin (Basin Plan), prepared by the Central Valley RWQCB, establishes water quality objectives and implementation programs to meet stated objectives and to protect the beneficial uses of water in the Sacramento-San Joaquin River Basin. The Basin Plan requirements apply to the Sacramento River and its tributaries, such as the Cosumnes River and streams and creeks in and adjacent to the Planning Area.

Municipal Stormwater NPDES Permit

NPDES discharge requirements address waste discharge, such as stormwater, from municipal separate storm sewer systems (MS4s). The City jointly participates as an MS4 permittee, together with Citrus Heights, Folsom, Galt, Rancho Cordova, Sacramento, and the County of Sacramento. NPDES permit terms are five years. The current region-wide permit (Order No. R5-2016-0040) adopted by the Central Valley RWQCB in June 2016 allows each permittee to discharge urban runoff from MS4s in its respective municipal jurisdiction, and requires Phase I MS4 permittees to enroll under the region-wide permit as their current individual permits expire. Regional MS4 permit activities are managed jointly by the Sacramento Stormwater Quality Partnership, which consists of the seven jurisdictions covered by the permit.

Under the permit, each permittee is also responsible for ensuring that stormwater quality management plans are developed and implemented that meet the discharge requirements of the permit.[2] Under the 2016 permit, measures should be included in the stormwater quality management plan that demonstrate how new development would incorporate low-impact development (LID) design in projects. The new permit also includes requirements for addressing TMDLs. The City's Department of Public Works is responsible for ensuring its specific MS4 permit (Order No. R5-2016-0040-005) requirements are implemented. Compliance with the MS4 permit is regulated through Chapter 15.12 of the City's Municipal Code.

Construction General Permit

The SWRCB has adopted a General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) (CAS000002, Waste

[2] The most recent stormwater quality improvement plan was prepared by the Sacramento Stormwater Quality Partnership in 2009 and approved by the RWQCB. The MS4 General Permit requires the continued implementation of the permittees' 2009 plan and the associated annual work plans. The City submitted a 3-year Work Plan (2016-2019) with its Notice of Intent in November 2016 to augment the 2009 annual work plan.

Discharge Requirements, Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ and Order 2012-0006-DWQ). The Construction General Permit applies to any construction activity affecting 1 acre or more. The focus of the permit is to minimize the potential effects of construction runoff on receiving water quality. The permit requires preparation of a stormwater pollution prevention plan (SWPPP) that identifies best management practices (BMPs) describing erosion control measures.

Project proponents are required to submit a Notice of Intent, a site map, a signed certification statement, an annual fee, and an SWPPP. The permit program is risk-based, wherein a project's risk is based on the project's potential to cause sedimentation and the risk of such sedimentation on the receiving waters. A project's risk determines its water quality control requirements, ranging from Risk Level 1, which consists of only narrative effluent standards, implementation of BMPs, and visual monitoring, to Risk Level 3, which consists of numeric effluent limitations, additional sediment control measures, and receiving water monitoring. Additional requirements include compliance with post-construction standards focusing on low-impact development, preparation of rain event action plans, increased reporting requirements, and specific certification requirements for certain project personnel.

The SWPPP must include BMPs to reduce construction effects on receiving water quality by implementing erosion control measures and reducing or eliminating non-stormwater discharges. Examples of typical construction BMPs include using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks cannot enter the storm drain system or surface water; developing and implementing a spill prevention and cleanup plan; and installing sediment control devices such as gravel bags, inlet filters, fiber rolls, or silt fences to reduce or eliminate sediment and other pollutants from discharging to the drainage system or receiving waters.

Certain activities during construction may also need to conform to the Waste Discharge Requirements included in the General Order for Dewatering and Other Low Threat Discharges to Surface Waters (Water Quality Order No. 5-00-175). The Dewatering General Order requires that a permit be acquired for dewatering and other low threat discharges to surface waters, provided they do not contain significant quantities of pollutants and either: (1) are four months or less in duration, or (2) the average dry weather discharge does not exceed 0.25 million gallons per day (mgd). Activities that may require the acquisition of such a permit include well development, construction dewatering, pump/well testing, pipeline/tank pressure testing, pipeline/tank flushing or dewatering, condensate discharges, water supply system discharges, and other miscellaneous dewatering/low threat discharges. However, the actions applicable to site development may already be covered under the Construction General Permit, in which case a separate permit may not be required.

Industrial Stormwater General Permit

Stormwater discharges associated with industrial sites must comply with the regulations contained in the Industrial Stormwater General Permit (Order No. 2014-0057-DWQ).

Central Valley Flood Protection Act

SB 5, which became effective January 1, 2008, is one of several pieces of interrelated legislation comprising the Central Valley Flood Protection Act of 2008 (California Water Code Section 9600). SB 5 requires all cities and counties in the Sacramento-San Joaquin Valley to make findings related to an urban level of flood protection or the FEMA standard of flood protection before: (1) entering into a development agreement for any property that is located within a flood hazard zone; (2) approving a discretionary permit or other discretionary entitlement, or a ministerial permit that would result in the construction of a new residence, for a project that is located within a flood hazard zone; or (3) approving a tentative map, or a parcel map for which a tentative map was not required, for any subdivision that is located within a flood hazard zone.

As set forth in Section 65865.5 of the Government Code, the possible findings are:

(1) The facilities of the State Plan of Flood Control or other flood management facilities protect the property to the urban level of flood protection in urban and urbanizing areas or the national Federal Emergency Management Agency standard of flood protection in nonurbanized areas.

(2) The city or county has imposed conditions on the development agreement that will protect the property to the urban level of flood protection in urban and urbanizing areas or the national Federal Emergency Management Agency standard of flood protection in nonurbanized areas.

(3) The local flood management agency has made adequate progress on the construction of a flood protection system that will result in flood protection equal to or greater than the urban level of flood protection in urban or urbanizing areas or the national Federal Emergency Management Agency standard of flood protection in nonurbanized areas for property located within a flood hazard zone, intended to be protected by the system. For urban and urbanizing areas protected by project levees, the urban level of flood protection shall be achieved by 2025.

(4) The property in an undetermined risk area has met the urban level of flood protection based on substantial evidence in the record.

REGIONAL

Central Valley Flood Protection Plan

California Water Code Section 8710-8723 established the authority of the Central Valley Flood Protection Board (CVFPB) to regulate construction, maintenance, and protection of adopted plans of flood control that protect public lands from floods. Implementing regulations are set forth in Title 23 of the California Code of Regulations Section 112. Adopted plans of flood control include federal-State facilities of the State Plan of Flood Control, regulated streams, and designated floodways. The geographic extent of CVFPB jurisdiction includes the Central Valley, and all tributaries and distributaries of the Sacramento and San Joaquin Rivers, and the Tulare and Buena Vista basins. As required under the Central Valley Flood Protection Act of 2008, the CVFPB prepared a Central Valley Flood Protection Plan in 2012. A five-year update was adopted in August 2017.

As required by the flood management requirements in Government Code Section 65302(g), the City has incorporated CVFPP measures into the General Plan through the inclusion of urban level flood protection mapping, as well as through more extensive flood risk analysis, as described above.

Sacramento Area Flood Control Agency

The SAFCA was formed in 1989 through a joint powers agreement between the City of Sacramento, the County of Sacramento, the County of Sutter, the American River Flood Control District, and Reclamation District No. 1000 to address the Sacramento area's vulnerability to catastrophic flooding. SAFCA conducts flood control improvement projects such as levee enforcement and dam improvements.

SAFCA's mission is to provide the region with at least a 100-year level of flood protection as quickly as possible, while seeking a 200-year or greater level of protection over time. The SAFCA board of directors implemented a development fee program to ensure that new structures placed in the 200-year floodplain do not increase Sacramento's exposure to flood damages and the associated governmental costs. The fee program is intended to fund a series of flood risk reduction projects that will achieve the goal of at least a 200-year level of protection (SAFCA 2017).

Senate Bill 610 (California Water Code Section 10910) – Groundwater Supply Planning

Senate Bill 610 (Sections 10910 et seq. of the California Water Code) sets forth the circumstances in which CEQA lead agencies must seek preparation of, or prepare themselves, water supply assessments (WSAs) for certain types of proposed projects. The specific criteria for which project types require a WSA are defined in Section 10912. SB 610 functions together with CEQA, in that a WSA must be included in any environmental document for any project subject to SB 610, which includes negative declarations and draft and final EIRs. Additional information on SB 610 requirements are included in Section 5.12, Public Utilities, subsection 5.12.1, Water Service. If groundwater is a part of supply, pursuant to Section 10910, the WSA is required to provide an analysis of the sufficiency of groundwater from the basin from which a proposed project will be supplied to meet the projected demand associated with that project. The groundwater component of the WSA must include and consider information about groundwater sustainability plans or approved alternative, among other items.

Sustainable Groundwater Management Plan

As described above under the "Groundwater Management" subheading, the SCGA is currently in discussions with other groundwater basin users of the South American Subbasin to evaluate options for management of the basin to meet Sustainable Groundwater Management Act requirements (SCWA 2016). The Sustainable Groundwater Management Act also authorizes a groundwater management agency in a basin compliant with the California Statewide Groundwater Elevation Monitoring program to prepare an "Alternative" to a groundwater sustainability plan. The SCGA submitted a Final Draft South American Subbasin Alternative Submittal document to DWR for review in December 2016 (SCGA 2016). Approval is anticipated in 2018, but as of the date of publication of this Draft EIR, DWR had not yet approved the alternative submittal (SCGA 2018).

LOCAL

Sacramento County Storm Drainage Utility Zone 11A

Most of the City is within the boundaries of Zone 11A of the Sacramento County Storm Drainage Utility. The City participates in the regional trunk drainage development fee program, which is specific to Zone 11A. Under a development impact fee program administered by Sacramento County, development in Zone 11A pays a Beach Stone Lake volume mitigation fee held in a trust for a future project. The Sacramento County Department of Water Resources pays flood insurance premiums for many homes in this floodplain from interest earned on funds held in the account.

Sacramento County Water Agency Zone 40

The SCWA created Zone 40 through Resolution No. 663 in May 1985. The purpose of Zone 40 is the acquisition, construction, maintenance, and operation of facilities for the production, conservation, transmittal, distribution, and sale of groundwater and surface water for the present and future beneficial use of the lands or inhabitants in the zone. The boundaries and scope of Zone 40's activities also include the use of recycled water in conjunction with groundwater and surface water. Most of the Planning Area is within Zone 40. The Zone 40 Water Supply Master Plan, adopted in 2005, provides a plan of water management alternatives to be implemented and revised as availability and feasibility of water supply sources change in the future. The Zone 40 Groundwater Management Plan is a planning tool that assists the SCWA in maintaining a safe, sustainable, and high-quality groundwater resource for users of the groundwater basin underlying Zone 40. Section 5.12, Public Utilities, provides additional information regarding water supply and delivery.

City of Elk Grove Development Standards

Stormwater Management and Discharge Control Ordinance

Municipal Code Chapter 15.12 provides authority to the City for inspection and enforcement related to control of illegal and industrial discharges to the City storm drainage system and local receiving waters. It also addresses the requirement for BMPs and regulations to reduce pollutants in the City's stormwater.

Land Grading and Erosion Control Ordinance

Municipal Code Chapter 16.44 establishes administrative procedures, standards for review and implementation, and enforcement procedures for controlling erosion, sedimentation, other pollutant runoff, and the disruption of existing drainage and related environmental damage to ensure compliance with the City's NPDES permit. The Chapter requires that prior to grading activities, a detailed set of plans be developed that include measures to minimize erosion, sediment, and dust created by development activities.

Flood Damage Prevention

Municipal Code Chapter 16.50 regulates development in flood-prone areas through specific siting and design requirements consistent with FEMA regulations.

Flood Combining District

As required by the CVFPP flood management requirements, the City has incorporated related measures into Title 23 of its Municipal Code. Section 23.42.040 establishes a flood (F) combining district comprising all known land covered by rivers, creeks, and streams and land subject to flooding within the City. For certain regulations and standards, the district is divided into three components: F 100 corresponding to the 100-year floodplain; F 200 corresponding to the 200-year floodplain; and F 100/200 corresponding to the area overlapped by both the 100-year and 200-year floodplain. This section also identifies specific restrictions (e.g., buildings and structures) and development standards. Section 23.42.040.E (Findings) specifically incorporates Government Code Section 65007(n) concerning urban level of flood protection for the 200-year floodplain.

City of Elk Grove Storm Drainage Master Plan

The City's comprehensive SDMP identifies drainage concepts for upgrading the existing storm drainage and flood control collection system. The SDMP identifies and analyzes existing drainage deficiencies throughout the City, provides a range of drainage concepts for the construction of future facilities required to serve the City at buildout of the existing General Plan, and establishes criteria for selecting and prioritizing projects. The SDMP may also be utilized for the development of a capital drainage financing program (City of Elk Grove 2011).

5.9.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water or groundwater quality.

2) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

3) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.

4) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.

5) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

6) Conflict with or obstruction implementation of water quality control plan or sustainable groundwater management plan.

7) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

8) Place within a 100-year flood hazard area structures which would impede or redirect flood flows.

9) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

10) Inundation by seiche, tsunami, or mudflow.

In the event of dam failure, Folsom Dam and Sly Park Dam have the potential to cause flooding in the Planning Area, as shown in **Figure 5.9-4**. Flooding from Folsom Dam would affect existing development in the northwestern part of the City, which is already urbanized. The US Army Corps of Engineers is completing improvements to the Folsom Dam spillway on the American River to help reduce downstream flood risk. Flooding from Sly Park Dam would generally follow the Cosumnes River and would only affect a small area located between the North and East Study Areas. The potential for flooding from failure of either Folsom Dam or Sly Park Dam would not be exacerbated by the Project. Therefore, this issue (Standard of Significance 9) as it relates to flooding due to dam failure is not subject to further analysis in this Draft EIR.

Section 1.0, Introduction, of this Draft EIR identifies that the proposed Project would result in no impacts related to inundation by seiche, tsunami, and mudflow. Therefore, this issue (Standard of Significance 10) is not addressed further in the Draft EIR.

METHODOLOGY

Drainage, Stormwater Runoff, and Water Quality

The evaluation of surface water and groundwater quality impacts is qualitative and is based on a review of development assumptions for the Planning Area in the context of existing drainage and water quality management programs, policies, permits, and regulations.

Flood Hazard

Flood hazard impacts are evaluated qualitatively based on FEMA FIRMs for 100-year flood hazards, the City's 200-year flood mapping prepared in accordance with State law, and review of the Land Use Diagram, General Plan policies, and Municipal Code regulations.

Groundwater

The analysis of impacts on groundwater is based on a water demand estimate (see Impact 5.12.1.1 in Section 5.12, Public Utilities) and review of the SCWA's 2015 UWMP, Zone 40 Groundwater Management Plan, Water Forum Agreement, and the SCGA plan for the South American Subbasin. Additional information is provided in Section 5.12, Public Utilities.

General Plan Policies and Standards

The proposed Project contains the following policies and standards for managing future development in the City to protect hydrology and water quality.

Policy NR-3-1: Ensure that the quality of water resources (e.g., groundwater, surface water) is protected to the extent possible.

Policy NR-3-2: Integrate sustainable stormwater management techniques in site design to reduce stormwater runoff and control erosion.

Standard NR-3-2.a: Where feasible, employ on-site natural systems such as vegetated bioswales, living roofs, and rain gardens in the treatment of stormwater to encourage infiltration, detention, retention, groundwater recharge, and/or on-site water reuse.

Policy NR-3-3: Implement the City's National Pollutant Discharge Elimination System permit through the review and approval of development projects and other activities regulated by the permit.

Policy NR-3-4: Ensure adequate water supply is available to the community by working with water providers on facilities, infrastructure, and appropriate allocation.

Policy NR-3-5: Continue to coordinate with public and private water users, including users of private wells, to maintain and implement a comprehensive groundwater management plan.

Policy ER-2-1: Oppose the construction of flood management facilities that would alter or reduce flows in the Cosumnes River and support retention of the Cosumnes River floodplain in nonurban uses consistent with location in an area subject to flooding.

Policy ER-2-2: Require that all new projects not result in new or increased flooding impacts on adjoining parcels or on upstream and downstream areas.

Policy ER-2-3: Locate, and encourage other agencies to locate, new essential government service facilities and essential health care facilities outside of 100-year and 200-year flood hazard zones, except in cases where such locations would compromise facility functioning.

Policy ER-2-4: Relocate or harden existing essential government service facilities and essential health care facilities that are currently located inside of 100-year and 200-year flood hazard zones.

Policy ER-2-5: Give priority to the designation of appropriate land uses in areas subject to flooding to reduce risks to life and property. Construction of new flood management projects shall have a lower priority, unless land use controls (such as limiting new development in flood-prone areas) are not sufficient to reduce hazards to life and property to acceptable levels.

Policy ER-2-6: Development shall not be permitted on land subject to flooding during a 100-year event, based on the most recent floodplain mapping prepared by FEMA or updated mapping acceptable to the City of Elk Grove. Potential development in areas subject to flooding may be clustered onto portions of a site which are not subject to flooding, consistent with other policies of this General Plan.

Policy ER-2-7: A buildable area outside the 100-year floodplain must be present on every residential lot sufficient to accommodate a residence and associated structures. Fill may be placed to create a buildable area only if approved by the City and in accordance with all other applicable policies and regulations. The use of fill in the 100-year floodplain to create buildable area is strongly discouraged and shall be subject to review to determine potential impacts on wildlife, habitat, and flooding on other parcels.

Policy ER-2-8: The City will not enter into a development agreement, approve a building permit or entitlement, or approve a tentative or parcel map for a project located within an urban level of flood protection area, identified in Figure 8-2 [of the General Plan], unless it meets one or more established flood protection findings. Findings shall be based on substantial evidence, and substantial evidence necessary to determine findings shall be consistent with criteria developed by DWR.

The four potential findings for a development project within the 200-year floodplain, as shown on Figure 8-2, are: 1) the project has an urban level of flood protection from flood management facilities that is not reflected in the most recent map of the 200-year floodplain; 2) conditions imposed on the project will provide for an urban level of flood protection; 3) adequate progress has been made toward construction of a flood protection system to provide an urban level of flood protection for the project, as indicated by the Central Valley Flood Protection Board; or 4) the project is a site improvement that would not result in the development of any structure, and would not increase risk of damage to neighboring development or alter the conveyance area of a watercourse in the case of a flood.

Policy ER-2-9: Ensure common understanding and consistent application of urban level of flood protection criteria and conditions.

Policy ER-2-10: Work with regional, county, and State agencies to develop mechanisms to finance the design and construction of flood management and drainage facilities to achieve an urban level of flood protection in affected areas.

Policy ER-2-11: Vehicular access to the buildable area of all parcels must be at or above the 10-year flood elevation.

Policy ER-2-12: Creation of lots whose access will be inundated by flows resulting from a 10-year or greater storm shall not be allowed. Bridges or similar structures may be used to provide access over creeks or inundated areas, subject to applicable local, State, and federal regulations.

Policy ER-2-13: Discourage the number of crossings over natural creeks to reduce potential flooding and access problems.

Policy ER-2-14: Parcels should not be created where any of the parcel's access or preservation easements, floodplain, marsh or riparian habitat, or other features would leave insufficient land to build and operate structures. This policy shall not apply to open space lots specifically created for dedication to the City or another appropriate party for habitat protection, flood hazard management, drainage, or wetland maintenance.

Policy ER-2-15: Where necessary due to clear dangers to life or property, the City will support the construction of flood hazard management projects.

Policy ER-2-16: New and modified bridge structures shall not cause an increase in water surface elevations of the 100-year floodplain exceeding 1 foot, unless analysis clearly indicates that the physical and/or economic use of upstream property will not be adversely affected.

Policy ER-2-17: Require all new urban development projects to incorporate runoff control measures to minimize peak flows of runoff and/or assist in financing or otherwise implementing comprehensive drainage plans.

Policy ER-2-18: Drainage facilities should be properly maintained to ensure their proper operation during storms.

Policy ER-6-8: Continue to participate in the Sacramento Stormwater Quality Partnership to educate and inform the public about urban runoff pollution, work with industries and businesses to encourage pollution prevention, require construction activities to reduce erosion and pollution, and require developing projects to include pollution controls that will continue to operate after construction is complete.

Policy INF-1-1: Water supply and delivery systems shall be available in time to meet the demand created by new development, or shall be assured through the use of bonds or other sureties to the City's satisfaction.

Policy INF-2-3: Reduce the potential for health problems and groundwater contamination resulting from the use of septic systems.

Policy INF-2-4: Residential development on lots smaller than 2 gross acres shall be required to connect to public sewer service, except in the Rural Area.

Policy INF-2-5: Independent community sewer systems shall not be established for new development.

Policy LU-5-12: Integrate sustainable stormwater management techniques in site design to reduce stormwater runoff and control erosion.

Standard LU-5-12.a: Where feasible, require on-site natural systems such as vegetated bioswales, green roofs, and rain gardens in the treatment of stormwater to encourage infiltration, detention, retention, groundwater recharge, and/or water reuse on-site.

PROJECT IMPACTS AND MITIGATION MEASURES

Water Quality (Standards of Significance 1 and 3)

Impact 5.9.1 Implementation of the proposed Project would result in future development in the Planning Area that would involve construction-related activities that could expose soil to erosion during storm events, causing degradation of water quality. Urban runoff from new projects in the Planning Area post-construction could also contribute pollutants that could affect surface water or groundwater quality. This is a **less than significant** impact.

Construction Water Quality Impacts

Construction activities associated with development of future projects in the Planning Area would include grading, demolition, and vegetation removal, which would disturb and expose soils to water erosion, increasing the amount of silt and debris entering downstream waterways. In addition, refueling and parking of construction equipment and other vehicles on project sites during construction could result in oil, grease, or related pollutant leaks and spills that may discharge into storm drains. Improper handling, storage, or disposal of fuels and materials or improper cleaning of machinery close to the on-site drainage canal could degrade water quality.

Operational Water Quality Impacts

Future development under the proposed Project would result in additional urbanization in the Planning Area. Direct surface water quality impacts could occur from the following general land use activities:

- Residential: Maintenance of yards associated with the use of fertilizers, herbicides, and pesticides, driveways (parked vehicles and car washing), roadways (vehicle operation), and pet care.

- Commercial/Industrial/Community: Stormwater runoff from parking lots and outdoor storage areas, maintenance of landscaped areas including the use of fertilizers, herbicides, and pesticides, and motor vehicle operation and maintenance.

- Recreation/Education: Maintenance of parks and playfields associated with the use of fertilizers, herbicides, and pesticides, and motor vehicle operation and maintenance.

Runoff typically contains oils, grease, fuel, antifreeze, and byproducts of combustion (such as lead, cadmium, nickel, and other metals), as well as nutrients, sediments, and other pollutants. Additionally, animal waste from pets (e.g., dogs and cats) could lead to fecal contamination of water sources. Precipitation during the early portion of the wet season (December to April) displaces these pollutants into stormwater runoff, resulting in high pollutant concentrations in the initial wet weather runoff. This initial runoff, containing peak pollutant levels, is referred to as the "first flush" of storm events. It is estimated that during the rainy season, the first flush of heavy metals and hydrocarbons would occur during the first 5 inches of seasonal rainfall.

Development in portions of the Planning Area that are largely undeveloped would substantially increase the impervious surface area, thus increasing runoff flow rates (see Impact 5.9.2). This could result in an increase of such urban runoff pollutants, first flush roadway contaminants, and nutrients (e.g., fertilizers) and other chemicals. These constituents could result in water quality impacts to on- and off-site drainage flows to area waterways. Conversely, conversion of agricultural lands to urban uses with limited landscaping could result in an overall reduction of fertilizers, pesticides, and animal waste in runoff entering downstream waterways.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Construction

Individual development projects in the Planning Area would be required to comply with Chapter 16.44 of the Elk Grove Municipal Code, which requires implementation of measures to minimize erosion, sediment, dust, and other pollutant runoff created by improvement activities. Individual development projects that would disturb 1 acre or more would also be required to obtain coverage under the State's Construction General NPDES permit, which requires projects to develop and implement a SWPPP that includes BMPs and requires inspections of stormwater control structures and pollution prevention measures. Examples of typical construction BMPs include using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks cannot enter the storm drain system or surface water; developing and implementing a spill prevention and cleanup plan; installing traps, filters, or other devices at drop inlets to prevent contaminants from entering storm drains; and using barriers, such as straw bales or plastic, to minimize the amount of uncontrolled runoff that could enter drains or surface water. The discharger must also install structural controls, such as sediment control, as necessary, which would constitute best available technologies to achieve compliance with water quality standards. Compliance with these requirements would ensure that site development activities do not result in the movement of unwanted material into waters within or outside the Planning Area.

Operation

The City implements a stormwater quality program to preserve and improve water quality in its natural waterways, which includes ongoing compliance with the joint MS4 NPDES permit, stream maintenance, permit inspections and construction compliance, and collaboration with the other joint permittees in the Sacramento Stormwater Quality Partnership. The partnership educates and informs the public about urban runoff pollution, encourages public participation in cleanup events, works with industries and businesses to encourage pollution prevention, and requires development projects to implement construction and post-construction pollution controls. Drainage plans for future development projects must be designed to provide flood protection and mitigation, stormwater quality treatment, and hydromodification mitigation.

Potential impacts to water quality from construction and operation activities would be addressed through the existing requirements of the State's Construction General Permit, Municipal Code Chapter 16.44, and the MS4 permit. These regulations require the use of effective construction phase, source control, and treatment control BMPs that include site preparation, runoff control, sediment retention, and other similar measures. The effectiveness of BMPs would be ensured through routine City inspections and monitoring and reporting to the RWQCB, as directed under General Plan Policy NR-3-3. In addition, several policies address requirements for water quality protection through the use of stormwater runoff controls, including NR-3-1, NR-3-2, and ER-2-17, as well as LU-5-12 and its implementing standard LU-5-12.a, which require sustainable stormwater management techniques.

Conclusion

Construction projects that disturb soil and operational stormwater discharges from new impervious surfaces could contain sediment and chemical pollutants that, if conveyed to local waterways, could adversely affect water quality. Discharges to land could also affect groundwater quality. Through compliance with applicable water quality regulations and proposed General Plan policies, the proposed Project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water or groundwater quality. And, as a result, it would not violate the Water Quality Control Plan for the Sacramento River Basin and San Joaquin River Basin (Basin Plan). Impact associated with implementation of the proposed Project would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.

Drainage Patterns and Stormwater Runoff (Standard of Significance 5)

Impact 5.9.2 Implementation of the proposed Project would result in future urbanization in the Planning Area that would increase stormwater runoff as a result of changes in drainage patterns and increases in impervious surface. This impact is **potentially significant**.

Drainage patterns of a site may be altered by grading, excavation, or cut-and-fill activities that alter the site's topography. Changes in drainage patterns could result in the redirection of stormwater flows over a site. These changes can be localized and temporary during construction activities, when alteration of drainage patterns has the potential to cause or exacerbate erosion if soils are exposed to rainfall. Permanent changes in drainage patterns in combination with the addition of new impervious surfaces can increase the rate and volume of stormwater runoff.

The General Plan Land Use Map (**Figure 2.0-3**) establishes the general pattern of uses in the Planning Area. Within the City limits, infill-type development and development near transportation modes would be encouraged under the proposed Project. This type of future development would not have a substantial effect on drainage patterns or stormwater runoff volumes. Some additional runoff due to changes in drainage patterns and increases in impervious surfaces would be expected if vacant or underutilized parcels, which are primarily located in the eastern part of the Planning Area, are urbanized. Stormwater management within the City limits would be guided by the SDMP.

For future development in the Study Areas, which are not covered by the SDMP, future uses could include a range of residential housing types and densities, employment centers, commercial, public facilities, and parks and open space. The South and West Study Areas, because they are currently primarily agricultural and largely undeveloped, would experience the greatest amount of planned growth. Future development in these areas would substantially increase the overall impervious surface area, which would then be expected to generate a substantial increase in runoff flow rates compared to existing conditions.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Section 16.44 of the Municipal Code requires projects that would increase drainage flows and have the potential to exceed the capacity of existing drainage facilities to identify, on project plans, the improvements needed to accommodate the increased flows. This would be accomplished through preparation of site-specific drainage studies, which must include, at a minimum, a description of existing conditions, the effects of project improvements, all appropriate calculations, a watershed map, potential increases in downstream flows and volumes, proposed on-site improvements, and drainage easements, if necessary, to accommodate flows from the site. The site-specific drainage studies must demonstrate how each project would meet the performance standards set forth in the City's NPDES MS4 permit. These studies must be reviewed and approved by the Public Works Department prior to improvement plan approval for new development.

General Plan Policies NR-3-2, NR-3-3, and LU-5-12 would require projects to integrate sustainable stormwater management techniques in site design to reduce stormwater runoff and to comply with the City's NPDES MS4 permit, including incorporation of LID design features, to reduce stormwater flows. In accordance with Policy ER-2-17, all new urban development projects, regardless of whether they are located within the existing City limits or in the Study Areas, would be required to minimize peak flows or runoff and/or assist in financing or otherwise implementing comprehensive drainage plans to mitigate their contribution to stormwater flows and potential impacts on drainage system capacity. Proposed drainage plans would also need to demonstrate how they support and/or would be integrated with drainage concepts for the construction of future facilities under the SDMP for the four separate regions within the City limits. Policy ER-2-18 requires that drainage facilities be maintained to ensure proper operation during storms.

Conclusion

Implementation of the proposed Project would result in future urbanization in the Planning Area that would increase stormwater runoff as a result of changes in drainage patterns and increases in impervious surfaces. With adherence to General Plan policies, the City's NPDES MS4 requirements, and Section 16.44 of the Municipal Code, all of which would be confirmed by City staff during project approval and entitlement processes, future projects that could be constructed in the Planning Area under the proposed Project would not create or contribute runoff that would exceed the capacity of existing or planned stormwater drainage systems, or contribute additional sources of polluted runoff. This impact would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.

Flood Hazard (Standards of Significance 4, 7, and 8)

Impact 5.9.3 Future development in the Planning Area may occur in locations subject to 100- and/or 200-year flood risk, including flooding from levee failure, or could place structures where they may have the potential to impede or redirect flood flows. This is a **less than significant** impact.

In the Planning Area, 100-year flood zones include areas along Laguna Creek in the northwest and north-central portion of the City, and along the Cosumnes River to the southeast, primarily outside of the City limits, but still within the Planning Area (**Figure 5.9-2**). As shown in **Figure 5.9-3**, a portion of the Planning Area along Deer Creek and the Cosumnes River is within the 200-year flood zone. On the City's western border, a 200-year flood event caused by levee breaks along the Sacramento River could result in flooding in portions of Laguna West, an existing residential neighborhood, as well as the Hood-Franklin Road area and the West Study Area. Areas along Deer Creek and Cosumnes River would be preserved for agricultural use and would be at limited risk of damage from flood events.

Within the City limits, infill-type development would largely occur in locations not subject to 100-year and/or 200-year flood hazards. Some locations east of SR 99 that are vacant or undeveloped may have localized flood hazard risks. The Study Areas could include a range of residential housing types and densities, employment centers, commercial uses, public facilities, and parks and open space. Portions of the West Study Area may be subject to flood hazard from levee breaks, while the North and East Study Areas' flood hazards are primarily associated with proximity to Deer Creek and the Cosumnes River. However, the Open Space/Conservation District concept for the Study Areas includes natural resources such as rivers or streams and related floodplains; thus, the potential for highly developed urban areas that could be subject to flood risk in the Study Areas would be minimal. Nonetheless, development in any Study Area must comply with annexation policies identified in the General Plan and would be subject to more detailed planning (e.g., specific plan).

Existing Laws, Regulations, and Proposed General Plan Policies That Provide Mitigation

Site-specific flood hazard risk is one of many factors that would be used in siting and designing land development projects, as required under General Plan Policies ER-2-6, ER-2-7, ER-2-11, ER-2-13, and ER-2-14. As directed under Policy ER-2-8, the City would not be allowed to enter into a development agreement, approve a building permit or entitlement, or approve a tentative or parcel map for a project located within an urban level of protection area unless it makes one of the four findings in Government Code Section 65865.5, which are listed in the Regulatory Framework, above.

Prior to approval of a development project in flood-prone locations, a project proponent would also be required to demonstrate to the satisfaction of the City that the design and structures comply with applicable flood protection regulations set forth in Chapter 16.50 of the City's Municipal Code. If a project is within a flood combining district, it would also be required to comply with Section 23.42.040 of the Municipal Code, which restricts building in certain flood zones and provides standards to protect the health, general welfare, and safety of the public for development that is allowed in certain flood zones. Implementation of General Plan policies and the City's flood ordinances would ensure new development is adequately protected from flood hazard in accordance with federal and State regulations. General Plan policies (e.g., ER-2-2 and ER-2-13) and City ordinances also provide a mechanism to ensure new development, which could include new creek or stream crossings, would not site structures or features where they have the potential to affect floodplain storage capacity or adversely redirect or impede flood flows. The City also intends to support retention of the Cosumnes River floodplain in non-urban uses consistent with location in an area subject to flooding, as provided in Policy ER-2-1.

The City recognizes that flood risk conditions can change over time through natural processes or project improvements on the local or regional scale. Therefore, the 200-year flood map is considered the base case for establishing potential flood risk. The City will keep updated data on the 200-year floodplain as part of the General Plan annual review and reporting process, accounting for the results of new technical studies and changes in flood protection infrastructure. This updated information will be referenced during the development review process for areas on the base case 200-year flood map.

In addition, development within existing City limits or the Study Areas may result in an increase in impervious surfaces, as explained in Impact 5.9.2. An increase in impervious surfaces could increase the rate and volume of stormwater runoff into local creeks and streams, which could exacerbate flood hazards in areas already subject to flood risk. This potential impact would be mitigated by adhering to General Plan Policy ER-2-17, which requires that all new projects incorporate runoff control measures to minimize peak flow runoff and/or assist in financing or otherwise implementing comprehensive drainage plans. Projects must also comply with the City's NPDES MS4 permit and Municipal Code.

Conclusion

Future development in the Planning Area may occur in locations subject to 100- and/or 200-year flood risk, including flooding from levee failure, or could place structures where they may have the potential to impede or redirect flood flows. However, with implementation of General Plan policies and existing regulations, exposure of new development to flood hazard risk and the potential for future development to cause new flooding or exacerbate flood hazards would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with existing laws, regulations, and proposed General Plan policies and standards.

Groundwater Supplies (Standard of Significance 2 and 6)

Impact 5.9.4 The proposed Project would increase the demand on water supplies, some of which would be groundwater. This impact would be **potentially significant.**

Under the General Plan Land Use Map, the proposed Project would add approximately 24,000 new residential units to the Planning Area to buildout assumptions of the current General Plan, with most of that development directed to the West and South Study Areas. It would also add approximately 25,000 jobs, which would be accommodated in future employment centers and commercial uses in the West and South Study Areas. Impact 5.12.1.1 in Section 5.12, Public Utilities, presents the water supply analysis for the proposed Project. Relevant portions that pertain to groundwater supplies are summarized below.

In the area served by EGWD Service Area 2, which relies primarily on groundwater, the proposed Project provides development capacity for 1,400 units, which would be less than the 2,000 units of future growth projected by the EGWD in its 2015 UMWP and would not, therefore, be anticipated to exceed demand projections. Little growth is anticipated in Service Area 1. As noted above, the EGWD projects that there would be sufficient water to meet current needs and anticipated future demand, and groundwater is part of the supply that would meet that demand.

Therefore, almost all new demand anticipated under the proposed Project would result from development in the Study Areas. The SCWA would be the likely purveyor of water supply for the Study Areas not served by the EGWD or the Omochumne-Hartnell Water District, because the Planning Area is located in Sacramento County. The SCWA, as a member of the SCGA, actively participates in implementation of a Groundwater Management Plan, which was developed to maintain a safe and sustainable groundwater resource within the Central Basin. Subbasin operations from 2005 through 2015 have not exceeded the sustainable yield conditions set forth in the Water Forum Agreement (SCGA 2016, page ES-5 and Section 2.3.1). The groundwater basins are not critically overdrafted or adjudicated. Groundwater is more consistently available over different climate year types compared to surface water supplies, and the SCWA has available groundwater supplies to be able to replace the reduction in surface water supplies in dry years, for locations within its existing service area (SCWA 2016, Section 7.1).

Table 5.12-1 in Section 5.12, Public Utilities, which summarizes the SCWA's retail supply available through its UWMP planning period, shows that supplies would increase slightly. The additional supply is a function solely of increases in groundwater pumping (surface water and other supplies are held constant). The SCWA is not projecting a shortfall and therefore has not identified future water supply projects (other than infrastructure-related projects) that could meet future additional demand. As explained in Impact 5.12.1.1 in Section 5.12, Public Utilities, in 2025 and beyond for the first- and third-year multiple dry year scenarios, there may not be sufficient surplus water with SCWA's existing supplies and entitlements to meet proposed Project demands. In addition, the West and South Study Areas are not in SCWA's current service area. Climate change may also affect the reliability of groundwater supplies.

Surface water from the City of Sacramento's American River Place of Use would not be available for the Study Areas unless the SCWA obtains approvals from the DWR to modify the Place of Use. Based on the data, analysis, and information presented in the UWMP, it is possible that Study Area demand may need to be met with increased groundwater pumping from the Central Basin in shortfall years, or the SCWA could seek to increase surface water supplies.

The City would not direct how water supplies would be managed. If it is conservatively assumed that the Study Area demand were to be served entirely by groundwater, the additional demand, when added to a recent historic high of 34,600 acre-feet annually, could exceed the SCWA's projection of available groundwater volume in 2020 and 2025, but may be accommodated beyond that. However, this estimate does not account for cumulative future demand on groundwater supplies.

As described in the Existing Setting subsection, groundwater levels have been recovering after a period of overdraft. Conditions are representative of a basin in equilibrium where natural recharge from deep percolation, hydraulically connected rivers, and boundary subsurface inflows are keeping up with active pumping and changes in hydrology. Maintaining the regional long-term average groundwater extraction rate at or below the sustainable yield of 273,000 acre-feet annually established by the Water Forum for the Central Basin, which is the responsibility of the SCGA, is mandatory. The extent to which a determination of the specific volume of additional groundwater development that may be needed to serve the proposed Project is beyond the scope of this EIR. The management of groundwater resources to ensure compliance would not be within the purview of the City to implement or monitor.

Existing Laws and Proposed General Plan Policies That Provide Mitigation

Policy INF-1-1 requires that water supply must be available in time to meet the demand created by new development, or shall be assured through the use of bonds or other sureties to the City's satisfaction. To accomplish this, as directed by Policy NR-3-4, long-term water supply planning to meet buildout demand for the Study Areas will need to be coordinated with the SCWA. There are established laws, regulations, and mechanisms in place that provide for such planning. When groundwater is a part of supply, pursuant to California Water Code Section 10910, the WSA, where one is required, must provide an analysis of the sufficiency of groundwater from the basin from which a proposed project will be supplied to meet the projected demand associated with that project. The groundwater component of the WSA must include and consider information about groundwater sustainability plans or approved alternative, among other items. The evaluation and analysis needed to demonstrate sufficient supply, along with necessary environmental review and implementation of mitigation measures, would be the responsibility of the SCWA, not the City.

Conclusion

Although existing programs are in place to protect groundwater resources in the Central Basin to ensure the sustainable yield set forth in the Water Forum Agreement, it is conservatively concluded this is a **potentially significant** impact because the proposed Project may contribute to conditions that could affect aquifer volume or groundwater levels, and the City has no authority over management of groundwater resources. Further, the development of future groundwater supplies by the SCWA (if determined by the SCWA to be necessary) could result in environmental impacts, some of which may be significant. Examples of such impacts could include effects on biological resources, changes in surface water flows, or changes in groundwater levels. The SCWA would need to conduct project-level CEQA and possibly NEPA analysis, as necessary, to analyze specific impacts and identify any required mitigation measures.

As of the time of preparation of this Draft EIR, DWR has not approved a sustainable groundwater management plan for the South American Subbasin. As such, the proposed Project would not conflict with the plan.

Mitigation Measures

MM 5.9.4 Implement mitigation measure **MM 5.12.1.1** (Plan for Services).

Mitigation measure **MM 5.12.1.1** requires demonstration of adequate water supply prior to annexation through preparation of a Plan for Services prepared by the City and submitted to Sacramento LAFCo for approval. Condition (2) specifically requires that the Plan for Services demonstrate the water purveyor is a signatory to the Water Forum Agreement and that groundwater will be provided in a manner that ensures no overdraft will occur (i.e., the sustainable yield for the Central Basin will not be exceeded). LAFCo would condition future annexations on compliance with mitigation measure MM 5.12.1.1. Documenting sufficient water supply, which would include groundwater, would conform to Policy INF-1-1 requirements. However, the evaluation and analysis needed to demonstrate sufficient supply, along with necessary environmental review and implementation of mitigation measures to ensure groundwater resources would not be adversely affected, would be the responsibility of SCWA, not the City. Such an evaluation by the City would be remote and speculative, considering the programmatic nature of this Draft EIR. There is no additional feasible mitigation to reduce this impact to less than significant, and this would remain a **significant and unavoidable** impact.

5.9.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for drainage and water quality impacts in the Sacramento River watershed, which receives drainage from the portions of the Morrison Creek Stream Group, and the American River, which flows through El Dorado and Sacramento Counties, as well as the Cosumnes River watershed in El Dorado County. The cumulative setting for groundwater impacts is the area that pumps groundwater from the Central Basin portion of the South American Subbasin, which includes the Cities of Elk Grove, Sacramento, and Folsom as well as areas of unincorporated Sacramento County.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Drainage and Water Quality Impacts (Standards of Significance 1, 3, and 5)

Impact 5.9.5 Development of the Planning Area, in combination with other development in the Sacramento River and Cosumnes River watersheds, would increase the potential for pollutants to be discharged to surface water and groundwater. The proposed Project's contribution would be **less than cumulatively considerable**.

Cumulative development would alter drainage patterns through the conversion of undeveloped land to developed uses. This would result in an increase in impervious surfaces, which would change the rate and volume of stormwater runoff across individual project sites, as well as contribute flows to local creeks and streams that drain the various locations. Increased water levels in local creeks and streams resulting from stormwater runoff have the potential to cause flooding. In locations where a 100-year or 200-year flood hazard risk exists, flooding could be exacerbated. Sacramento County and El Dorado County Subdivision Ordinances require drainage plans be submitted prior to the approval of tentative maps. The drainage analysis must include an analysis of upstream, on-site, and downstream facilities, and off-site drainage facilities. Tentative maps must include details on the location and size of proposed drainage structures. As a performance standard, measures must be implemented to provide for no net increase in peak stormwater discharge relative to current conditions, both to ensure that the 100-year flood is maintained at or below current elevations, and that people and structures are not exposed to additional flood risk. Each county also regulates development within the 100-year floodplain under its respective ordinances to ensure development does not increase flood risk or expose new uses to flood hazards. All cumulative projects would be required to comply with these requirements and standards.

Construction activities in the creek watersheds that drain to the Cosumnes and American Rivers could cumulatively affect water quality if measures are not implemented to control the type and amount of pollutants potentially carried to waterways. Cumulative development would involve soil disturbance through such activities as vegetation removal, grading, and excavation. These disturbances would expose the native soil to wind- and water-generated erosion, most likely at accelerated rates. As such, surface runoff could transport increased sediment loads. Sediment from erosion can have short- and long-term water quality effects, including increased turbidity and sedimentation, which could result in adverse impacts on fish and wildlife habitat, reduced efficacy of diversion structures, impaired recreation and aesthetic values, and increased downstream flood hazards due to a decrease in channel capacity. Erosive conditions created during grading activities can persist well into the post-construction time frame. The amount and rate of erosion is variable and depends on a range of factors, including soil characteristics (e.g., susceptibility to erosion), the time of year of construction activities, the intensity and duration of precipitation, and the amount of vegetative cover. Another potential source of water quality impairment is the accidental release of petroleum-based fluids used in heavy equipment and machinery or from construction materials that contain hazardous materials and/or heavy metals.

Post-construction cumulative water quality effects could be expected from continued development in the creek subwatersheds that drain to the Sacramento and Cosumnes Rivers. Cumulative development would result in increased impervious surfaces that increase the rate and amount of runoff which, in turn, could increase urban contaminant loading, which could adversely affect existing water quality. The primary sources of pollution include runoff from roadways, parking lots, and landscaped areas, non-stormwater connections to local drainage systems, accidental spills, and illegal dumping.

Project applicants would be required to apply for coverage and comply with the various federal, State, and local permits, which include the General NPDES Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-006-DWQ). In Sacramento County, post-construction stormwater runoff must be managed in accordance with a stormwater quality management program required under NDPES MS4 general permit Order No. R5-2016-0040) issued to the cities of Elk Grove, Citrus Heights, Folsom, Galt, Rancho Cordova, Sacramento, and the County of Sacramento. In El Dorado County, stormwater runoff is managed through its Small Municipal Separate Storm Sewer Systems General Permit No. CAS000004 [Order 2013-001-DWQ] [Small MS4 Permit]). Finally, EGMC Chapter 15.12 (Stormwater Management and Discharge Control) requires minimization of impacts from site modification activities. Thus, cumulative development in other jurisdictions within the Sacramento River and Cosumnes River watersheds would control runoff from projects such that substantial pollutants would not be discharged to surface water and groundwater. This cumulative impact would, therefore, be less than significant.

The proposed Project's contribution to the cumulative impact of development on water quality from stormwater runoff would be reduced through runoff controls, sediment retention, LID features, and other similar measures required by General Plan policies, the City's NPDES MS4 permit, and the Municipal Code, as described in Impact 5.9.1. Compliance with these policies and regulations would minimize the proposed Project's contribution to a level that is **less than cumulatively considerable**, and the cumulative impact would remain less than significant.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.

Cumulative Flood Hazard Impacts (Standards of Significance 4, 7, and 8)

Impact 5.9.6 Development of the Planning Area, in combination with cumulative development in the Sacramento River watershed, including its American River and Cosumnes River tributaries, could be located in areas subject to 100-year and/or 200-year flood hazard. The proposed Project's contribution would be **less than cumulatively considerable**.

Areas of 100-year and 200-year flood hazard risk are present throughout Sacramento County. Cumulative development could result in placement of housing or structures in floodplains. Impacts would be site-specific, and flood hazard risk associated with floodplains would be mitigated through implementation of FEMA-required flood protection design and as required by local ordinances, and, where applicable, General Plan policies of affected jurisdictions. In addition, cities and counties would be required to make the appropriate Government Code findings pursuant to the CVFPP. This would be a less than significant cumulative impact. Because the proposed Project would also be required to comply with the same FEMA-required flood protection design, the proposed Project's contribution would be less than cumulatively considerable relative to placement of housing and/or structures in flood-prone areas.

However, cumulative urbanization in the region would continue to increase drainage flows through the creation of impervious surfaces, including roads, parking lots, and rooftops, which could generate stormwater runoff. Increased drainage flows could exceed existing and/or planned drainage or stormwater management facilities, causing new flooding or exacerbating existing flooding. This is considered a significant cumulative impact.

The City's SDMP identifies deficiencies in the City's drainage system and plans for necessary improvements to accommodate drainage flows as the City is built out in accordance with the proposed Project. In addition, Section 16.44 of the Municipal Code requires projects that would increase drainage flows and have the potential to exceed the capacity of existing drainage facilities to identify, on project plans, the improvements needed to accommodate the increased flows. Implementation of the City's SDMP and compliance with this existing requirement would ensure that future development projects in the Planning Area are designed and constructed with adequate drainage facilities to minimize flooding. Therefore, contributions by the Project would be **less than cumulatively considerable**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies and standards.

Cumulative Groundwater Use (Standard of Significance 2 and 6)

Impact 5.9.7 Development of the Planning Area, in combination with other development in the Central Basin, would increase demand for groundwater and could potentially interfere with recharge of the aquifer. The proposed Project's contribution would be **potentially cumulatively considerable**.

As cumulative development occurs in the region, the demand for groundwater resources may increase, resulting in greater withdrawals from the Central Basin portion of the South American subbasin. Continued implementation of the Water Forum Agreement and the Groundwater Management Plan, which would be the responsibility of SCWA, would protect the Central Basin from overdraft by limiting withdrawals to below the established sustainable yield. This would be considered a less than significant cumulative impact.

The proposed Project, as described under Impact 5.9.4, could increase demand for water resources, a portion or all of which would be met with groundwater, at the discretion of the SCWA. Because the West and South Study Areas have not been included in the projected demand relative to supply, and additional groundwater production may be needed to meet proposed Project demand and may result in withdrawals that exceed the 273,000 acre-feet annual sustainable yield, the proposed Project's contribution to this impact would be **potentially cumulatively considerable**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing laws, proposed General Policies, and mitigation measure **MM 5.12.1.1**.

Mitigation measure MM 5.12.1.1 is intended to ensure that sufficient water supplies are available to meet the demand of new development in the Planning Area, in addition to existing and planned development under normal, single dry, and multiple dry years. However, the determination of whether additional groundwater production is needed and how it would be managed to ensure compliance with the Water Forum Agreement is not within the purview of the City to implement. Therefore, because the proposed Project's contribution to the impact would be cumulatively considerable and unavoidable, the cumulative impact would be **significant and unavoidable**.

REFERENCES

Ascent Environmental. 2017. *Climate Change Vulnerability Assessment for the Sacramento County Climate Action Plan*. http://www.per.saccounty.net/PlansandProjectsIn-Progress/Documents/Climate%20Action%20Plan/Climate%20Change%20Vulnerability%20Assessment.pdf.

City of Elk Grove. 2011. *Storm Drainage Master Plan*.

———. 2016a. *General Plan Update Existing Conditions Report*.

———. 2016b. *General Plan Update, Services, Health and Safety Element*.

EGWD (Elk Grove Water District). 2016. *Elk Grove 2015 Urban Water Management Plan*.

SAFCA (Sacramento Area Flood Control Agency). 2017. *Draft Sacramento Comprehensive Flood Risk Reduction Program.*

SCGA (Sacramento Central Groundwater Authority). 2016. *South American Subbasin Alternative Submittal, 2014 Sustainable Groundwater Management Act, Final Draft*.

———. 2018. *2017 SGMA Annual Report, South American Subbasin (5-021.65), Sacramento Central Groundwater Authority*.

SCWA (Sacramento County Water Agency). 2006. *Central Sacramento County Groundwater Management Plan*.

———. 2016. 2015 *Urban Water Management Plan*.

SWRCB (State Water Resources Control Board). 2010. *Impaired Water Bodies 2010 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report) – Statewide*. http://www.waterboards.ca.gov/water_issues/programs/tmdl /integrated2010.shtml.

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5.10 Noise

This section describes the existing noise environment in the Planning Area and the potential of the proposed Project to generate noise levels exceeding the City's applicable exterior noise level standards at noise-sensitive receptors in the Planning Area. This section includes analysis of potential non-transportation and transportation source noise and groundborne vibration impacts at nearby existing as well as proposed land uses.

5.10.1 BACKGROUND INFORMATION ON NOISE AND VIBRATION

ACOUSTIC FUNDAMENTALS

Prior to discussing the noise setting for the Project, background information about sound, noise, and vibration and common noise descriptors is needed to provide context for the technical terms referenced throughout this section.

Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a human ear. Noise is defined as loud, unexpected, annoying, or unwanted sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz, or thousands of hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this large range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB).

Addition of Decibels

Because decibels are logarithmic units, SPLs cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness at the same time, the resulting sound level at a given distance would be only 3 dB higher than if only one of the sources was producing sound under the same conditions. For example, if one idling truck generates an SPL of 70 dB, two trucks idling simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level approximately 5 dB louder than one source.

A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within this range better than sounds of the same amplitude with frequencies outside of this range. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an "A-weighted" sound level (expressed in units of A-weighted decibels, dBA) can be computed based on this information.

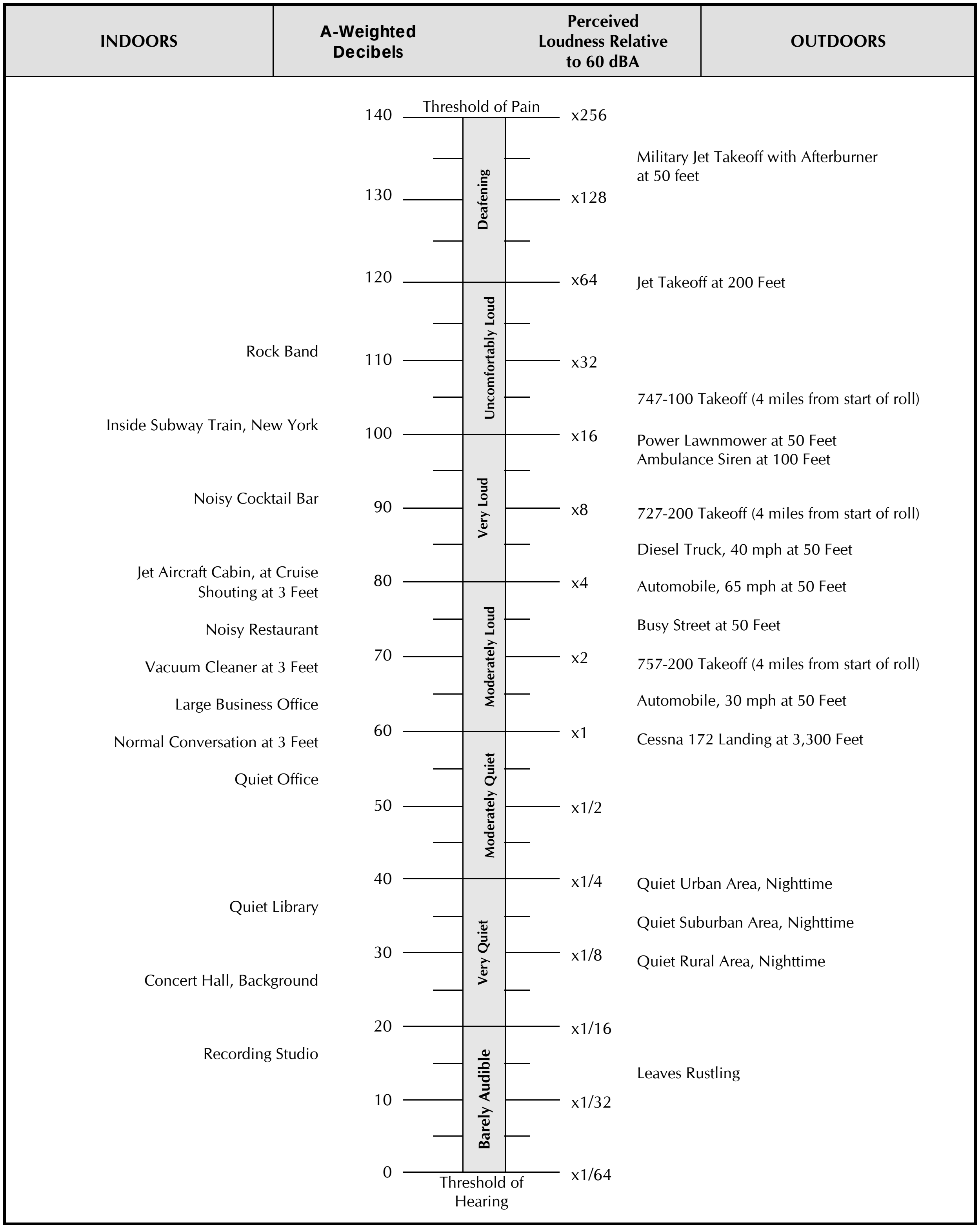
The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgment correlates well with the A-scale sound levels of those sounds. Thus, noise levels are typically reported in terms of A-weighted decibels. All sound levels discussed in this section are A-weighted decibels (dBA), but may be expressed as dB, unless otherwise noted. **Figure 5.10-1** describes typical A-weighted noise levels for various noise sources.

HUMAN RESPONSE TO NOISE

As discussed above, the doubling of sound energy results in a 3-dB increase in the sound level. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different from what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency (1,000–8,000 Hz) range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 Hz and perceives both higher and lower frequency sounds of the same magnitude with less intensity (Caltrans 2009). In typical noisy environments, changes in noise of 1–2 dB are generally not perceptible. However, it is widely accepted that people can begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound would generally be perceived as barely detectable.

FIGURE 5.10-1
TYPICAL NOISE LEVELS



Sources: Caltrans 2002a; HUD 1985

As depicted in **Table 5.10-1**, based on criteria recommended by the Federal Interagency Committee on Noise (FICON), a noise level increase of 5.0 or greater would typically be considered to result in increased levels of annoyance where existing ambient noise levels are less than 60 dB. Within areas where the ambient noise level ranges from 60 to 65 dB, increased levels of annoyance would be anticipated at increases of 3 dB, or greater. Increases of 1.5 dB, or greater, could result in increased levels of annoyance in areas where the ambient noise level exceeds 65 dB. The rationale for the FICON-recommended criteria is that as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause significant increases in annoyance (FICON 1992).

TABLE 5.10-1
FEDERAL INTERAGENCY COMMITTEE ON NOISE
RECOMMENDED CRITERIA FOR EVALUATION OF INCREASES IN AMBIENT NOISE LEVELS

Ambient Noise Level Without Project	Increase Required for Significant Impact
<60 dB	5.0 dB, or greater
60–65 dB	3.0 dB, or greater
>65 dB	1.5 dB, or greater

Source: FICON 1992

VIBRATION

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, (e.g., operating factory machinery) or transient in nature (e.g., explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV and RMS vibration velocity are normally described in inches per second (in/sec) or in millimeters per second. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (FTA 2006:7-3).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a 1-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to compress the range of numbers required to describe vibration (FTA 2006:7-4). This is based on a reference value of 1 micro inch per second.

The typical background vibration-velocity level in residential areas is approximately 50 VdB. Ground vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FTA 2006:7-8).

Typical outdoor sources of perceptible ground vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Construction activities can generate sufficient ground vibrations to pose a risk to nearby structures. Constant or transient vibrations can weaken structures, crack facades, and disturb occupants (FTA 2006:7-5).

Vibrations generated by construction activity can be transient, random, or continuous. Transient construction vibrations are generated by blasting, impact pile driving, and wrecking balls. Continuous vibrations are generated by vibratory pile drivers, large pumps, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment.

Table 5.10-2 summarizes the general human response to different ground vibration-velocity levels.

TABLE 5.10-2
HUMAN RESPONSE TO DIFFERENT LEVELS OF GROUND NOISE AND VIBRATION

Vibration-Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Source: FTA 2006, pp. 7–8

Notes: VdB = vibration decibels referenced to 1 μ inch/second and based on the root-mean-square (RMS) velocity amplitude.

COMMON NOISE DESCRIPTORS

Noise in our daily environment fluctuates over time. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors used throughout this section.

Equivalent Continuous Sound Level (L_{eq}): L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound level that occurs during the same period. For instance, the 1-hour A-weighted equivalent sound level (L_{eq}), also referred to as the hourly L_{eq}, is the energy average of A-weighted sound levels occurring during a 1-hour period and is the basis for noise abatement criteria used by Caltrans and the Federal Highway Administration (FHWA) (Caltrans 2013:2-47; FTA 2006:2-19).

Maximum Sound Level (L_{max}): L_{max} is the highest instantaneous sound level measured during a specified period (FTA 2006:2-16).

Day-Night Level (L_{dn}): L_{dn} is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB "penalty" applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m. (FTA 2006:2-22).

Community Noise Equivalent Level (CNEL): CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m. and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m. Many agencies and local jurisdictions in California often have established noise standards using the CNEL metric. Because L_{dn} and CNEL are similar 24-hour averages, some agencies and local jurisdictions use L_{dn} and CNEL interchangeably.

SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The way a noise level decreases with distance depends on the following factors:

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Roads and highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources, thus propagating at a slower rate in comparison to a point source. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

Ground Absorption

The propagation path of noise from a source to a receiver is usually very close to the ground. Noise decreases from ground absorption and reflective-wave canceling provides additional attenuation associated with geometric spreading, which has traditionally also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., sites with features such as soft dirt, grass, or scattered bushes and trees), an excess additional ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the attenuation rate associated with line sources, the excess additional ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance. For point sources, this would result in an overall drop-off rate of up to 7.5 dB per doubling of distance.

Atmospheric Effects

Because wind can carry sound, receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased over large distances (e.g., more than 500 feet) from the source because of atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects on sound attenuation.

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction. Taller barriers higher than the line of sight provide increased noise reduction (FTA 2006, p. 2-12). Vegetation between the source and receiver is rarely effective in reducing noise because, unless there are multiple rows of dense vegetation, it does not create a solid barrier (FTA 2006, p. 2-11).

5.10.2 EXISTING SETTING

EXISTING NOISE RECEPTORS

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential uses are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels, and because these land uses are places of rest and sleep for City residents. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses. The City includes many of these types of noise-sensitive land uses including residential, hotel/motel, parks and recreational facilities, religious institutions, and schools. These land uses are given priority in assessing and addressing noise exposure given the noise-sensitive nature of the land uses and activities occurring in these locations.

EXISTING NOISE ENVIRONMENT

The noise environment in the Planning Area is defined primarily by vehicular traffic on State Route (SR) 99, Interstate 5 (I-5), and local roadways. To a lesser extent, railroad traffic, occasional aircraft overflights, nearby agricultural activities, and landscape maintenance activities at residential and commercial uses also contribute on an intermittent basis to ambient noise levels. Industrial uses in the City are located primarily in the south-central and northwest portions of the City and are co-located adjacent to the two existing rail lines which run north–south through the City.

TRANSPORTATION NOISE SOURCES

Roadway Noise Sources

Noise levels along roadways are affected by several traffic characteristics, including average daily traffic (ADT) volumes, the vehicle mix, roadway conditions, vehicle speed, and the gradient of the roadway. The major east–west roadways in the City are Laguna Boulevard, Elk Grove Boulevard, and Calvine Road. The major north–south roadways are Grant Line Road, Bond Road, Elk Grove Florin Road, Bruceville Road, and Franklin Boulevard. SR 99 runs north–south through the City, running adjacent to predominantly mixed-use, commercial, and office land uses. In general, these roadways abut commercial or residential land uses with some sound-reducing measures (e.g., sound walls, setbacks from roadways) incorporated into site design. I-5 runs north–south along the western border of the City's boundaries. Currently, residential, commercial, and residential land uses are located adjacent to I-5, although a significant buffer distance (approximately 160 feet) exists between City boundaries and the nearest travel lane on I-5. Land uses adjacent to I-5 also include some sound-reducing measures to address traffic noise exposure for nearby noise-sensitive land uses.

Rail Noise

Two major rail lines run through the Planning Area. A Union Pacific Railroad (UPRR) line in the eastern portion of the Planning Area runs north–south and enters the City just south of Eschinger Road. This rail line is adjacent to residential and industrial land uses in the City and currently has an average of 32 daily pass-through train trips. The UPRR line bisects some of the City's major arterials, including Grant Line Road, Elk Grove Boulevard, Bond Road, Elk Grove Florin Road, Sheldon Road, and Calvine Road. This rail line also serves Amtrak passenger trains with an average of seven daily passenger train trips. Except for Grant Line Road, these crossings occur at grade. The UPRR line in the western portion of the Planning Area runs north–south and bisects Franklin Boulevard, Elk Grove Boulevard, and Laguna Boulevard. This line is located adjacent to residential and industrial land uses in the City and currently has an average of three daily freight train trips. At 100 feet, the average train operating on these tracks would produce a sound exposure level of approximately 105 dB with usage of the warning horn, and approximately 100 dB without usage of the horn. Trains are generally required to sound warning horns within 800 feet of at-grade crossings.

The City has established a series of quiet zones for many of the at-grade crossings to limit noise exposure to residents from train warning horns. These quiet zones include the at-grade crossings which intersect with Calvine Road, Sheldon Road, Elk Grove Florin Road, Bond Road, Elk Grove Boulevard, Franklin Boulevard, and Bilby Road. While railroads are directed to not sound warning horns at these crossings, warning horns would still be used in emergency situations per Federal Railroad Administration regulations and UPRR operating rules. Where the rail lines are adjacent to residential uses, sound walls have been erected to reduce noise exposure levels.

Aircraft Noise

There are seven airports in Sacramento County. Each airport has an Airport Land Use Compatibility Plan (also previously referred to as a Comprehensive Land Use Plan) that identifies hazard zones surrounding the airport. No portion of the Planning Area is located within noise contours or land use overlay areas for any airport in Sacramento County. One public airport and two private airports are located within 3 miles of the Planning Area, which, though small, might have some impacts on surrounding land uses. They are Franklin Field, which is public, and the Sky Way Estates Airport and Borges-Clarksburg Airport, which are private. In addition, the Sacramento International Airport (SMF) is a high-traffic airport approximately 20 miles north-northwest of Elk Grove, and the City is not within the airport influence area, nor is it within the primary or secondary approach area in which aircraft fly below 3,000 feet (SACOG 2013 :Map 6). Flights arriving at SMF from the south that may fly over Elk Grove are typically more than 8,000 feet in altitude and, therefore, result in minimal noise exposure in the City.

Construction Noise Sources

Construction activities are a regular and ongoing source of noise throughout the City. The noise levels generated by construction activities are generally isolated to the vicinity of a construction site and occur during daytime hours in accordance with City regulations. Construction activities also occur for relatively short-term periods of a few weeks to several months; upon completion of construction activity, noise exposure ceases. **Table 5.10-3** illustrates noise levels for common construction equipment and activities at 50 feet. According to the EPA, construction noise levels are highest for pile-driving activities, and can reach as high as 107 dBA.

TABLE 5.10-3
NOISE RANGES OF TYPICAL CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Levels at dBA Leq at 50 feet
Front Loader	73-86
Truck	82-95
Crane (movable)	75-88
Crane (derrick)	86-89
Vibrator	68-82
Saw	72-82
Pneumatic Impact Equipment	83-88
Pile Driving (peaks)	95-107
Jackhammer	81-98
Pump	68-72
Generator	71-83
Compressor	75–87
Concrete Mixer	75–88
Concrete Pump	81–85
Backhoe	73–95
Tractor	77–98
Scraper/Grader	80–93
Paver	85–88

Source: EPA 1971

Industrial Noise Sources

The largest concentrations of industrial land in the City are in the north-central, northwest, and south-central sections. Current industrial uses in the City include heavy industrial and light industrial/warehouse. Generally, heavy industrial uses are located away from noise-sensitive uses and near other noise-generating land uses such as major roadways and/or railroad lines. Primary noise sources associated with industrial uses include motors, agitators, forklifts, air compressors, and heavy- and medium-duty trucks with specific equipment use largely based on the type of industrial operation or use occurring at specific locations.

Agricultural Activities

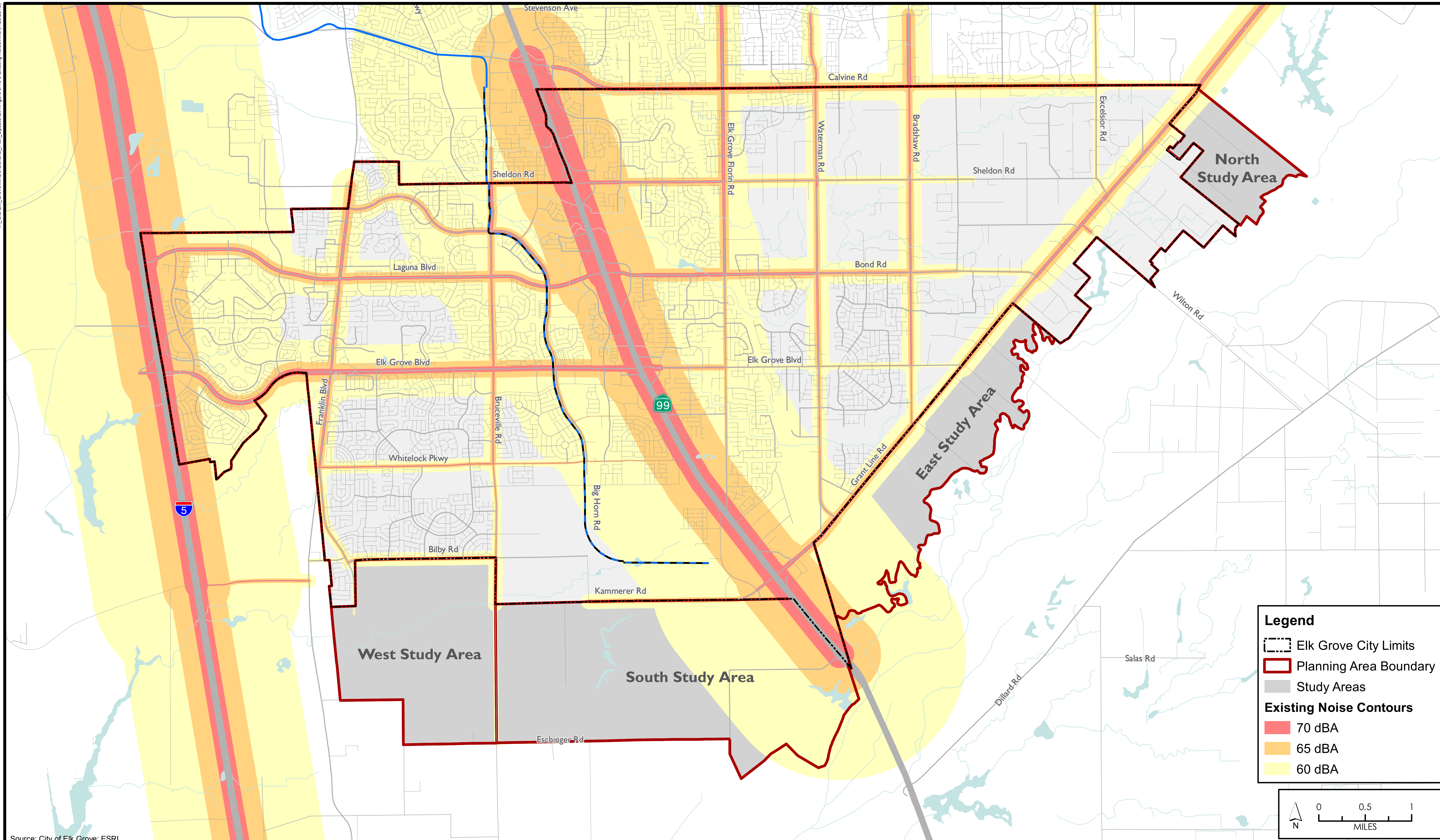
Noise levels associated with agricultural activities can vary substantially depending on the type of activities being conducted and equipment used. Depending on various factors such as horsepower ratings and equipment age, maximum noise levels generated by farm-related tractors typically range from approximately 77 to 85 dBA at a distance of 50 feet. Due to the seasonal nature of agricultural activities, there are often extended periods of time when no noise is generated on properties that are actively being farmed, followed by short-term periods of more intensive equipment use and associated noise levels. However, such noise levels are typically distributed over a large area and prolonged noise levels at individual nearby receptors would not be anticipated for most activities. In addition, given that agricultural activities typically occur during the daytime hours, noise generated by nearby agricultural activities are often largely masked by vehicle traffic noise along nearby roadways (i.e., Kammerer Road, Bruceville Road, Promenade Parkway, and SR 99).

Roadway Traffic

As mentioned previously, major east–west roadways in the City include Laguna Boulevard, Elk Grove Boulevard, and Calvine Road. Major north–south roadways include Grant Line Road, Bond Road, Elk Grove Florin Road, Bruceville Road, and Franklin Boulevard. The FHWA Highway Traffic Noise Prediction Model was used to determine noise levels associated with existing vehicle traffic on major roadways in the City. The FHWA model used California vehicle reference noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, and distance to the receiver. Traffic data used in the modeling effort was obtained from the traffic analysis data prepared for this Project (Fehr & Peers 2017).

Table 5.10-4 depicts predicted existing average-daily traffic noise levels (in L_{dn}) at 50 feet from the near travel-lane centerline for major roadways in the Planning Area, as well as distances to the predicted 70, 65, and 60 dBA L_{dn} traffic noise contours. Existing noise contours are illustrated in **Figure 5.10-2.** Several roadway segments in the table are left blank because existing traffic volume data were not available for this roadway segment, in most cases because these are future roadways that would be built and used as part of the Project. Noise levels associated with future traffic volumes on these roadway segments are provided and discussed further in the impact analysis section of this chapter.

The extent to which nearby land uses are affected by existing traffic noise depends on multiple factors, including their respective proximity to the roadways, shielding provided by intervening terrain and structures, and their individual sensitivity to noise.



City of Elk Grove
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Figure 5.10-2
Existing Noise Contours

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TABLE 5.10-4
EXISTING TRAFFIC NOISE LEVELS

Roadway	From	To	Distance to Directional Centerline, L_{dn} (50 feet)	Distance (feet) to Noise Level Contours (L_{dn}, dBA) from Roadway Centerline		
				70	65	60
Big Horn Blvd	Franklin Blvd	Bruceville Rd	69.5	66	209	662
	Bruceville Rd	Laguna Blvd	70.0	75	236	745
	Laguna Blvd	Elk Grove Blvd	67.9	39	124	393
	Elk Grove Blvd	Lotz Pkwy	68.1	40	126	397
	Lotz Pkwy	Whitelock Pkwy	65.3	23	71	225
	Whitelock Pkwy	Bilby Rd	—	—	—	—
	Bilby Rd	Kammerer Rd	—	—	—	—
	Kammerer Rd	Eschinger Rd	—	—	—	—
Bilby Rd	Franklin Blvd	Willard Pkwy	63.4	11	35	110
	Willard Pkwy	Bruceville Rd	68.9	39	123	390
	Bruceville Rd	Big Horn Blvd	55.0	2	5	16
	Big Horn Blvd	Lotz Pkwy	—	—	—	—
	Lotz Pkwy	Promenade Pkwy	—	—	—	—
Bond Rd	SR 99	E Stockton Blvd	70.6	112	355	1,124
	E Stockton Blvd	Elk Crest Dr	72.0	108	342	1,082
	Elk Crest Dr	Elk Grove Florin Rd	74.4	118	374	1,183
	Elk Grove Florin Rd	Waterman Rd	72.1	91	287	909
	Waterman Rd	Bradshaw Rd	70.4	64	202	638
	Bradshaw Rd	Bader Rd	66.3	42	132	417
	Bader Rd	Grant Line Rd	63.4	21	67	212
Bradshaw Rd	Vintage Park Dr	Calvine Rd	72.2	122	386	1,220
	Calvine Rd	Sheldon Rd	67.4	60	191	605
	Sheldon Rd	Bond Rd	68.0	68	214	675
	Bond Rd	Elk Grove Blvd	67.0	54	170	536
	Elk Grove Blvd	Grant Line Rd	65.5	34	108	341
Bruceville Rd	Damascus Dr	Sheldon Rd	67.3	46	146	462
	Sheldon Rd	Big Horn Blvd	69.1	86	273	864
	Big Horn Blvd	Laguna Blvd	69.2	65	206	650
	Laguna Blvd	Elk Grove Blvd	69.2	64	204	644
	Elk Grove Blvd	Whitelock Pkwy	68.3	53	166	526
	Whitelock Pkwy	Bilby Rd	65.9	27	86	272

Roadway	From	To	Distance to Directional Centerline, L_{dn} (50 feet)	Distance (feet) to Noise Level Contours (L_{dn}, dBA) from Roadway Centerline		
				70	65	60
	Bilby Rd	Kammerer Rd	68.4	42	132	417
	Kammerer Rd	Eschinger Rd	63.3	13	41	130
Calvine Rd	Power Inn Rd	Elk Grove Florin Rd	71.7	117	370	1,169
	Elk Grove Florin Rd	Waterman Rd	70.6	101	318	1,007
	Waterman Rd	Bradshaw Rd	69.2	79	249	786
	Bradshaw Rd	Vineyard Rd	69.3	67	211	668
	Vineyard Rd	Excelsior Rd	68.2	63	200	631
	Excelsior Rd	Grant Line Rd	65.9	27	87	275
Center Parkway	Laguna Village	Bruceville Rd	65.8	31	97	305
E. Stockton Blvd	Grant Line Rd	Elk Grove Florin Rd	63.3	21	65	206
Elk Grove Blvd	I-5	Harbour Point Dr	68.9	91	286	906
	Harbour Point Dr	Four Winds Dr	70.3	138	438	1,385
	Four Winds Dr	Franklin Blvd	70.8	182	577	1,825
	Franklin Blvd	Bruceville Rd	72.0	153	483	1,526
	Bruceville Rd	Big Horn Blvd	72.6	156	493	1,558
	Big Horn Blvd	Laguna Springs Dr	70.3	165	520	1,646
	Laguna Springs Dr	Auto Center Dr	73.5	185	584	1,845
	Auto Center Dr	SR 99	73.6	200	632	2,000
	SR 99	Emerald Vista Dr/ E Stockton Blvd	73.1	188	594	1,878
	Emerald Vista Dr/ E Stockton Blvd	Elk Grove Florin Rd	69.2	57	180	569
	Elk Grove Florin Rd	Waterman Rd	63.8	15	46	146
	Waterman Rd	Bradshaw Rd	64.9	20	62	197
	Bradshaw Rd	Grant Line Rd	59.4	10	32	102
Elk Grove Florin Rd	Vintage Park Dr	Calvine Rd	70.3	106	336	1,063
	Calvine Rd	Sheldon Rd	71.4	103	325	1,028
	Sheldon Rd	Bond Rd	69.9	86	272	859
	Bond Rd	Elk Grove Blvd	68.2	37	119	375
	Elk Grove Blvd	E Stockton Blvd	67.9	30	96	305
Eschinger Rd	Willard Pkwy	Bruceville Rd	—	—	—	—
	Bruceville Rd	Big Horn Blvd	—	—	—	—
	Big Horn Blvd	Lotz Pkwy	—	—	—	—
	Lotz Pkwy	Promenade Pkwy	—	—	—	—

Roadway	From	To	Distance to Directional Centerline, L_{dn} (50 feet)	Distance (feet) to Noise Level Contours (L_{dn}, dBA) from Roadway Centerline		
				70	65	60
Excelsior Rd	Gerber Rd	Calvine Rd	62.5	20	64	203
	Calvine Rd	Sheldon Rd	62.8	17	55	173
Franklin Blvd	Sims Rd	Big Horn Blvd	70.4	104	330	1,043
	Big Horn Blvd	Laguna Blvd	70.4	98	311	983
	Laguna Blvd	Elk Grove Blvd	69.0	72	229	723
	Elk Grove Blvd	Whitelock Pkwy	66.6	70	220	697
	Whitelock Pkwy	Bilby Rd	—	—	—	—
	Bilby Rd	Hood Franklin Rd	—	—	—	—
	Hood Franklin Rd	Lambert Rd	—	—	—	—
Grant Line Rd	Sloughhouse Rd	Calvine Rd	71.7	112	354	1,119
	Calvine Rd	Sheldon Rd	69.4	91	288	912
	Sheldon Rd	Wilton Rd	71.4	107	339	1,073
	Wilton Rd	Bond Rd	70.9	98	309	979
	Bond Rd	Elk Grove Blvd	68.5	68	216	682
	Elk Grove Blvd	Bradshaw Rd	66.1	47	148	467
	Bradshaw Rd	Mosher Rd	68.9	79	249	789
	Mosher Rd	Waterman Rd	69.2	85	267	846
	Waterman Rd	E. Stockton/Survey Rd	70.4	110	347	1,098
	E. Stockton/Survey Rd	SR 99	71.1	148	468	1,481
Harbour Point Dr	Elk Grove Blvd	Laguna Blvd	66.7	40	126	399
Hood Franklin Rd	I-5	Franklin Blvd	66.6	39	124	392
Kammerer Rd	Franklin Blvd	Willard Pkwy	—	—	—	—
	Willard Pkwy	Bruceville Rd	—	—	—	—
	Bruceville Rd	Big Horn Blvd	—	—	—	—
	Big Horn Blvd	Lotz Pkwy	68.9	43	137	434
	Lotz Pkwy	Promenade Pkwy	66.6	47	148	467
	Promenade Pkwy	SR 99	68.8	78	248	785
Laguna Blvd	SR 99	Franklin Blvd	70.8	111	350	1,108
	Franklin Blvd	Bruceville Rd	70.5	102	323	1,022
	Bruceville Rd	Big Horn Blvd	70.8	104	329	1,039
	Big Horn Blvd	Laguna Springs Dr	71.2	131	414	1,310
	Laguna Springs Dr	SR 99	71.1	128	405	1,280

Roadway	From	To	Distance to Directional Centerline, L_{dn} (50 feet)	Distance (feet) to Noise Level Contours (L_{dn}, dBA) from Roadway Centerline		
				70	65	60
Laguna Springs Dr	Laguna Blvd	Laguna Palms Wy	64.8	23	72	229
	Laguna Palms Wy	Elk Grove Blvd	65.6	22	70	222
	Elk Grove Blvd	Lotz Pkwy	60.8	9	27	87
Lent Ranch Pkwy	Kammerer Rd	Promenade Pkwy	44.8		1	2
Lewis Stein Rd	Sheldon Rd	Big Horn Blvd	65.3	20	64	202
Lotz Pkwy	Big Horn Blvd	Laguna Springs Dr	58.6	6	18	56
	Laguna Springs Dr	Whitelock Pkwy	53.1	1	4	12
	Whitelock Pkwy	Promenade Pkwy	—	—	—	—
	Promenade Pkwy	Bilby Rd	—	—	—	—
	Bilby Rd	Kammerer Rd	—	—	—	—
	Kammerer Rd	Eschinger Rd	—	—	—	—
Mosher	Grant Line Rd	Waterman Rd	62.0	9	28	88
Power Inn Rd	Calvine Rd	Sheldon Rd	65.8	25	80	254
Promenade Pkwy	Lotz Pkwy	Bilby Rd	—	—	—	—
	Bilby Rd	Kammerer Rd	64.2	20	63	200
	Kammerer Rd	Eschinger Rd	—	—	—	—
Sheldon Rd	Bruceville Rd	Lewis Stein Rd	68.6	65	207	654
	Lewis Stein Rd	SR 99	70.7	97	306	969
	SR 99	E. Stockton Blvd	70.8	118	372	1,177
	E. Stockton Blvd	Power Inn Rd	71.0	109	344	1,087
	Power Inn Rd	Elk Grove Florin Rd	69.5	78	246	777
	Elk Grove Florin Rd	Waterman Rd	66.1	39	124	392
	Waterman Rd	Bradshaw Rd	66.3	24	75	237
	Bradshaw Rd	Bader Rd	65.8	21	67	213
	Bader Rd	Dillard Oaks Ct	64.5	19	59	187
	Excelsior Rd	Grant Line Rd	65.3	22	70	222
Waterman Rd	Vintage Park Dr	Calvine Rd	69.0	55	174	550
	Calvine Rd	Sheldon Rd	70.0	57	181	573
	Sheldon Rd	Bond Rd	66.2	56	178	564
	Bond Rd	Elk Grove Blvd	70.7	66	208	659
	Elk Grove Blvd	Grant Line Rd	66.9	42	132	417
Whitelock Pkwy	Franklin Blvd	Bruceville Rd	66.9	36	114	361
	Bruceville Rd	Big Horn Blvd	63.1	19	61	191

Roadway	From	To	Distance to Directional Centerline, L_{dn} (50 feet)	Distance (feet) to Noise Level Contours (L_{dn}, dBA) from Roadway Centerline		
				70	65	60
	Big Horn Blvd	Lotz Pkwy	62.3	13	41	128
	Lotz Pkwy	SR 99	—	—	—	—
Willard Pkwy	Whitelock Pkwy	Bilby	65.1	32	102	322
	Bilby Rd	Kammerer Rd	58.2	6	19	59
Wilton Rd	Grant Line Rd	Leisure Oak Ln	68.7	57	179	565
SR-99	Calvine Rd	Sheldon Rd	78.8	1,000	3,162	9,999
	Sheldon Rd	Bond Rd	77.4	902	2,854	9,024
	Bond Rd	Elk Grove Blvd	76.4	744	2,352	7,438
	Elk Grove Blvd	Whitelock Pkwy	77.2	669	2,116	6,691
	Whitelock Pkwy	Grant Line Rd	70.1	643	2,032	6,425
	Grant Line Rd	Eschinger Rd	75.4	708	2,238	7,077
I-5	Cosumnes River Blvd	Laguna Blvd	65.0	855	2,702	8,546
	Laguna Blvd	Elk Grove Blvd	75.0	712	2,251	7,117
	Elk Grove Blvd	Hood Franklin Rd	73.8	592	1,871	5,915
	Hood Franklin Rd	Twin Cities Rd	62.5	474	1,498	4,738

Source: Ascent Environmental 2017

Notes: Traffic inputs include cumulative development in addition to the proposed Project volumes. Traffic noise levels were calculated using the FHWA Roadway Noise Prediction Model and do not include shielding from existing structures, sound barriers, or intervening terrain. Roadway segments that do not include traffic noise levels are future roadway segments in which existing data is not available.

*Refer to **Appendix E** for modeling assumptions and results.*

MEASURED AMBIENT NOISE LEVELS

Long- and short-term noise measurements were taken over the course of a three-week period in August and September 2015 for inclusion in the General Plan Existing Conditions Report (City of Elk Grove 2016). These measurements are the most recent noise measurement data available that assess the whole Planning Area. Noise sources that would substantially alter ambient noise levels in the Planning Area would be associated primarily with traffic volumes on roadways throughout the City. Considering that traffic volumes do not typically change drastically from year to year, the noise measurement data included in this section are considered adequate for this analysis. Noise measurements were conducted using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter positioned at a height of approximately 5 feet above ground level. For details on noise measurements, see the Existing Conditions Report.

Long-Term Results

Long-term 24-hour ambient noise measurements were taken at eight locations throughout the Planning Area chosen in consultation with City staff. These locations were identified as unique noise generators in the Planning Area due to a high volume of traffic, large number of truck trips, or commercial activities occurring in the vicinity. As shown in **Figure 5.10-3**, monitoring was conducted in residential, commercial, and industrial portions of the Planning Area. **Table 5.10-5** summarizes the L_{eq} measurements by location for each 24-hour period of the survey and the 24-hour L_{dn}, and the L_{max} and L_{min} for each hour of the 24-hour recording. As shown in the table, the average 24-hour noise levels ranged between 55.3 dBA L_{eq} and 73.0 dBA L_{eq}, with L_{dn} noise levels ranging between 61.2 dBA and 77.7 dBA. The highest recorded noise levels occurred adjacent to major roadways including Sheldon Road (LT-4), Laguna Boulevard (LT-6), and Elk Grove Boulevard (LT-7). Noise levels in the residential and rural residential areas, such as locations LT-1 and LT-5, were substantially lower than levels in the commercial areas.

TABLE 5.10-5
SUMMARY OF LONG-TERM AMBIENT NOISE MEASUREMENT DATA

Site	Location	Date	Measured Noise Levels (dBA, L_{eq})					
			24-Hour L_{eq}	L_{max}	L_{min}	Daytime (7:00 a.m. to 10:00 p.m.) L_{eq}	Nighttime (10:00 p.m. to 7:00 a.m.) L_{eq}	L_{dn}
LT-1	Iron Rock Way/ Hampton Oak Drive	August 26, 2015	55.3	90.8	37.4	54.6	55.3	61.2
LT-2	Elk Grove Florin Road, south of Sharkey Avenue	September 2, 2015	61.7	91.6	39.1	62.6	58.5	65.5
LT-3	Foulkes Ranch Road, north of Elk Grove Boulevard	September 1, 2015	59.9	96.6	31.1	61.4	51.4	61.4
LT-4	Sheldon Road, west of rail line	November 20, 2015	69.6	99.7	34.6	70.5	66.8	73.7
LT-5	Maritime Drive, south of Sea Cliff Way	August 28, 2015	57.7	82.6	37.3	58.7	54.3	61.5
LT-6	Laguna Boulevard, west of Bruceville Road	August 31, 2015	71.4	94.1	34.8	72.7	66.5	74.4
LT-7	West Stockton Boulevard, north of Elk Grove Boulevard	August 27, 2015	73.0	92.6	43.7	73.7	71.1	77.7
LT-8	Visalia Way, south of Lemon Grove	September 2, 2015	66.1	96.4	33.8	68.0	63.4	66.0

Source: City of Elk Grove 2016

Short-term (i.e., 15-minute) noise measurement surveys were conducted at 20 locations throughout the Planning Area from September 2 through September 4, 2015, with supplemental measurements taken on November 20, 2015. The locations of the short-term sites were chosen in consultation with City staff. The sites generally represent residential areas in the Planning Area where ambient noise levels are anticipated to be lower than those along the major transportation corridors and commercial areas. The microphone was positioned at a height of 5 feet, 6 inches above ground level during the short-term measurements.

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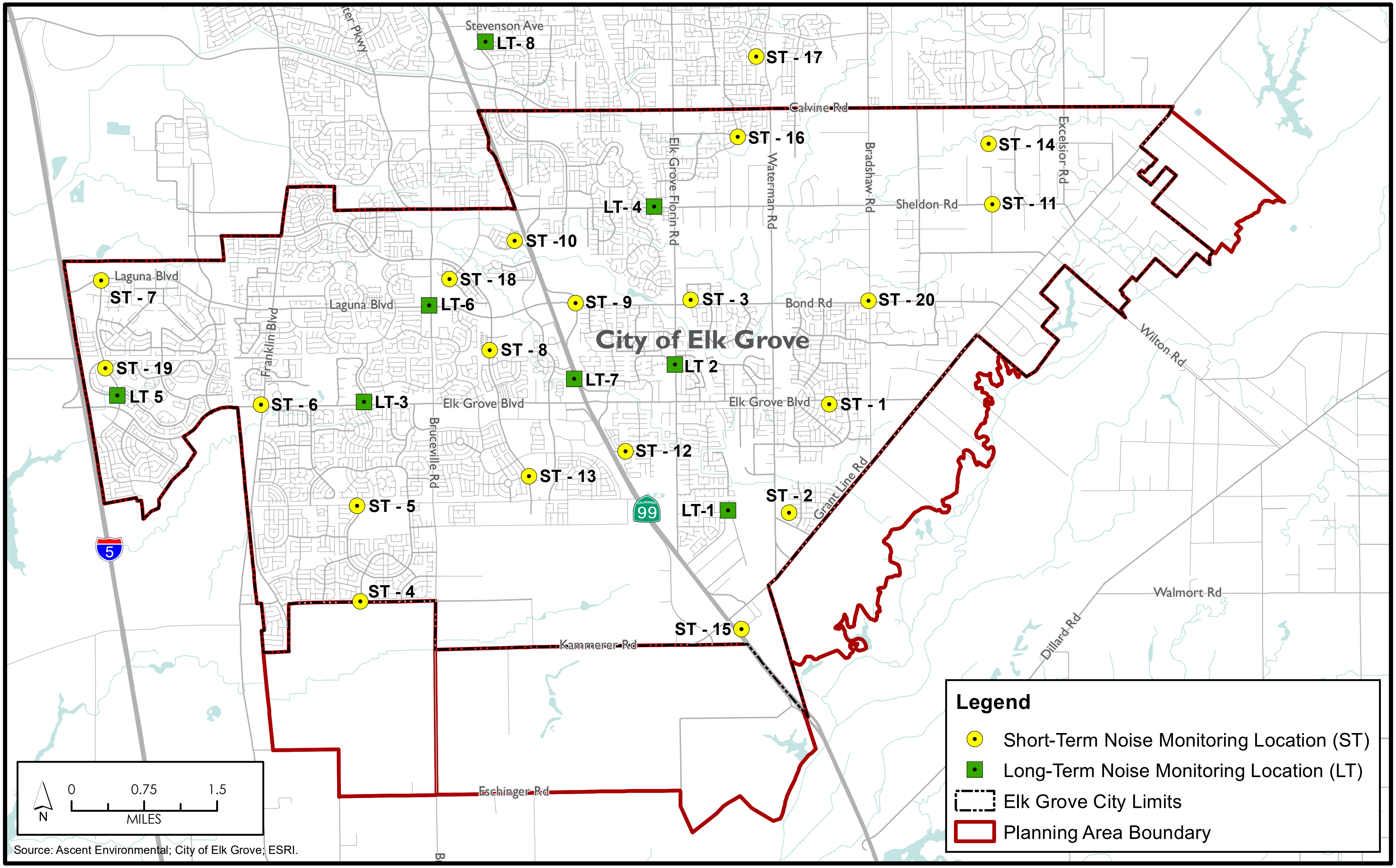

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Figure 5.10-3

Short- and Long-Term Noise Monitoring Locations

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Short-term noise measurement data corresponding to these measurement locations are summarized in **Table 5.10-6**. Based on the measurements conducted, ambient noise levels at the measurement locations generally range from approximately 50 to 71 dBA L_{eq}.

TABLE 5.10-6
SUMMARY OF SHORT-TERM AMBIENT NOISE MEASUREMENT DATA

Site	Location	Date	Primary Noise Source	Measured Noise Levels (dBA)		
				L_{eq}	L_{max}	L_{min}
ST-1	Grasmeer Way and Hagerman Drive	September 2, 2015 10:00 a.m.	Traffic on Elk Grove Boulevard	67.5	73.3	59.1
ST-2	Oreo Ranch Circle, adjacent fallow agricultural land	September 2, 2015 10:29 a.m.	Traffic on Waterman Avenue	57.7	64.6	51.1
ST-3	Quail Cove Drive, north of Quail Brook Circle	September 2, 2015 11:04 a.m.	Railroad noise	65.7	71.2	56.4
ST-4	Bilby Road, west of Stathos Drive	September 2, 2015 11:40 a.m.	Traffic on Bilby Road	66.0	75.0	49.5
ST-5	Whitelock Parkway, west of Franklin High Way	September 2, 2015 12:08 p.m.	Traffic on Whitelock Parkway	67.4	76.4	50.9
ST-6	Elk Grove Boulevard, west of Franklin Boulevard	September 2, 2015 12:39 p.m.	Traffic on Elk Grove Boulevard, railroad	60.9	70.3	44.4
ST-7	Laguna Boulevard, east of Harbor Point Drive	September 2, 2015 1:21 p.m.	Traffic on I-5, Laguna Boulevard	57.6	63.4	52.7
ST-8	Big Horn Boulevard and Crystal Walk Circle	September 2, 2015 2:02 p.m.	Traffic on Big Horn, commercial parking lot	50.5	56.7	46.4
ST-9	Bond Road, east of West Stockton Boulevard	September 2, 2015 2:35 p.m.	Traffic on Bond	54.6	57.9	51.9
ST-10	Lauffer Way, west of Grisham Way	September 2, 2015 3:06 p.m.	Traffic on SR 99	70.6	75.7	62.6
ST-11	Sheldon Road, east of Mackey Road	September 2, 2015 3:35 p.m.	Traffic on Sheldon	55.9	62.9	49.6
ST-12	Valley Oak Lane, west of Corte Dorado Court	September 2, 2015 4:05 p.m.	Traffic on SR 99	64.0	71.1	57.9
ST-13	Big Horn Boulevard, south of Hopewell Drive	September 3, 2015 1:05 p.m.	Traffic on Big Horn	50.6	55.9	46.1
ST-14	Atlantis Drive, east of railroad	September 4, 2015 10:20 a.m.	Railroad approximately 300 feet from measurement site	52.7	68.3	35.9
ST-15	East Stockton Road and Survey Road	September 4, 2015 12:35 p.m.	Industrial uses, railroad and SR 99	71.3	78.9	61.8
ST-16	Heritage Hill Drive, south of Brown Road	November 20, 2015 4:03 p.m.	Traffic on Heritage Hill	57.2	71.5	35.9
ST-17	Westray Drive, east of Rothbury Drive	September 4, 2015 11:13 a.m.	Machinery associated with Westray Water Well	55.4	74.4	40.6

Site	Location	Date	Primary Noise Source	Measured Noise Levels (dBA)		
				L_{eq}	L_{max}	L_{min}
ST-18	Generations Drive, east of Ancestor Drive	September 3, 2015 1:36 p.m.	Commercial uses to south	49.7	56.7	41.9
ST-19	Maritime Drive, west of Harbour Point Drive	September 3, 2015 2:12 p.m.	Traffic off Harbour Point Drive, water treatment plan	62.5	70.1	52.8
ST-20	Bradshaw Road, north of Bond Road	September 3, 2015 1:51 p.m.	Traffic on Bradshaw Road	68.8	78.6	44.1

Source: City of Elk Grove 2016

5.10.3 REGULATORY FRAMEWORK

US ENVIRONMENTAL PROTECTION AGENCY OFFICE OF NOISE ABATEMENT AND CONTROL

The EPA Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. In 1981, the EPA administrators determined that subjective issues such as noise would be better addressed at local levels of government. Consequently, in 1982, responsibilities for regulating noise control policies were transferred to state and local governments. However, documents and research completed by the EPA Office of Noise Abatement and Control continue to be valuable in the analysis of noise effects.

FEDERAL TRANSIT ADMINISTRATION

To address the human response to ground vibration, the Federal Transit Administration (FTA) has set forth guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines are presented in **Table 5.10-7.**

TABLE 5.10-7
GROUNDBORNE VIBRATION IMPACT CRITERIA FOR GENERAL ASSESSMENT

Land Uses	Groundborne Vibration Impact Levels (VdB re 1 micro-inch/second)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	654	654	654
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83

Source: FTA 2006, Table 8-1

Notes: VdB = vibration decibels referenced to 1 μ inch/second and based on the root-mean-square (RMS) velocity amplitude.

1. *"Frequent Events" is defined as more than 70 vibration events of the same source per day.*
2. *"Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.*
3. *"Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.*
4. *This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research would require detailed evaluation to define acceptable vibration levels.*

STATE

California Building Code

Title 24 of the California Code of Regulations contains standards for allowable interior noise levels associated with exterior noise sources (California Building Code, 2016 edition, Volume 1, Chapter 12, Section 1207). The standards apply to new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family residences. The standards state that the interior noise level attributable to exterior sources may not exceed 45 dBA L_{dn} or CNEL in any habitable room, consistent with the noise element of the local general plan. Worst-case noise levels, either existing or future, are to be used as the basis for determining compliance with these standards.

LOCAL

City of Elk Grove General Plan Noise Element

The City's existing Noise Element (2003) includes goals and policies to address noise exposure within the community. The Noise Element also includes noise level criteria both for transportation noise sources and for non-transportation (stationary) noise sources.

General Plan

Transportation Noise Sources

For transportation noise sources, the current General Plan includes the noise criteria presented in **Table 5.10-8** for determination of land use compatibility ranges from an exterior noise level of 60 dBA CNEL/L_{dn} for residential uses to 70 dBA CNEL/L_{dn} for parks and playgrounds. The intent of this standard is to provide an acceptable noise environment for outdoor activities. The City has also established an interior noise standard of 45 dBA CNEL/L_{dn} for residential, school, and office uses exposed to transportation noise sources. Interior hourly noise limitations (in dBA L_{eq}) are also established for land uses that are sensitive to daytime noise levels, such as churches, offices, libraries, and schools. The intent of the interior noise standards is to provide a suitable environment for indoor activities and reduced levels of annoyance.

TABLE 5.10-8
MAXIMUM ALLOWABLE NOISE EXPOSURE –TRANSPORTATION NOISE SOURCES
(EXISTING GENERAL PLAN TABLE NO-C)

Land Use	Outdoor Activity Areas[1] L_{dn}/CNEL, dB	Interior Spaces	
		L_{dn}/CNEL, dB	L_{eq}, dB[2]
Residential	60[3]	45	-
Residential subject to noise from railroad tracks, aircraft overflights, or similar noise sources which produce clearly identifiable, discrete noise events (the passing of a single train, as opposed to relatively steady noise sources as roadways)	60[3]	40[5]	
Transient Lodging	60[4]	45	-
Hospitals, Nursing Homes	60[3]	45	-
Theaters, Auditoriums, Music Halls	-	-	35
Churches, Meeting Halls	60[3]	-	40

Land Use	Outdoor Activity Areas[1] Ldn/CNEL, dB	Interior Spaces	
		Ldn/CNEL, dB	Leq, dB[2]
Office Buildings	-	-	45
Schools, Libraries, Museums			45
Playgrounds, Neighborhood Parks	70		

Source: City of Elk Grove 2003

Notes:

1. *Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use. Where it is not practical to mitigate exterior noise levels at patio or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.*
2. *As determined for a typical worst-case hour during periods of use.*
3. *Where it is not possible to reduce noise in outdoor activity areas to 60 dB Ldn/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB Ldn/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.*
4. *In the case of hotel/motel facilities or other transient lodging, outdoor activity areas such as pool areas may not be included in the project design. In these cases, only the interior noise level criterion will apply.*
5. *The intent of this noise standard is to provide increased protection against sleep disturbance for residences located near railroad tracks.*

Non-Transportation Noise Sources

Table 5.10-9 provides the current (2003) General Plan noise level performance criteria for new projects that are affected by or include non-transportation noise sources, such as those attributed to commercial and industrial land uses. These criteria are applied at the property line of noise-sensitive land uses. Typical noise sources in this category include drive-through speaker boxes, punch presses, steam valves, and transformer stations.

TABLE 5.10-9
EXTERIOR NOISE LEVEL PERFORMANCE STANDARDS FOR NON-TRANSPORTATION NOISE SOURCES
(EXISTING GENERAL PLAN TABLE NO-A)

Performance Standards for Stationary Sources	Noise Level Descriptor	Maximum Acceptable Noise Level, dBA	
		Daytime (7 a.m.–10 p.m.)	Nighttime (10 p.m.–7 a.m.)
Performance Standards for Typical Stationary Noise Sources[a]	Hourly Leq, dB	55[c,d]	45[c,d]
Performance Standards for Stationary Noise Sources Which Are Tonal, Impulsive, Repetitive, or Consist Primarily of Speech or Music[b]	Hourly Leq, dB	50[c,d]	40[c,d]

Source: City of Elk Grove 2003

Notes:

a. *These standards will apply generally to noise sources that are not tonal, impulsive, or repetitive in nature. Typical noise sources in this category would include HVAC systems, cooling towers, fans, and blowers.*

b. *These standards apply to noises which are tonal in nature, impulsive, repetitive, or which consist primarily of speech or music (e.g., humming sounds, outdoor speaker systems). Typical noise sources in this category include: pile drivers, drive-through speaker boxes, punch presses, steam valves, and transformer stations.*

c. *These noise levels do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).*

d. *The City may impose noise level standards which are more or less restrictive based upon determination of existing low or high ambient noise levels.*

ELK GROVE MUNICIPAL CODE

The City's noise control requirements for existing non-transportation noise sources are included in Chapter 6.32 of the Municipal Code. The noise control chapter identifies hourly noise standards that are applicable to existing non-transportation noise sources and consistent with those identified in the current General Plan, as depicted in **Table 5.10-9**. In accordance with the Municipal Code Section 6.32.100, construction activities are generally prohibited between the hours of 7:00 p.m. and 7:00 a.m., excluding emergency work. In addition, the operation of pavement-sweeping equipment and associated equipment (e.g., blowers), as well as material loading and unloading activities that would result in a noise disturbance, are typically prohibited between the hours of 10:00 p.m. and 7:00 a.m. Section 6.32.110 establishes noise standards for mechanical equipment, pump, fan, air conditioning apparatus, similar mechanical devices, or any combination thereof. The City is considering an amendment to this section that would provide for specific exemptions for certain types of activities or equipment (e.g., home improvement projects, power tool use, pool filters, HVAC units).

VIBRATION CRITERIA

The City does not have specific policies or standards pertaining to vibration levels. However, various agencies, such as Caltrans, have developed recommended criteria for the evaluation of groundborne vibration levels regarding potential human annoyance and building structural damage. Caltrans-recommended criteria for the evaluation of groundborne vibration events are summarized in **Table 5.10-10**. The vibration levels are presented in terms of peak particle velocity (ppv) in inches per second (in/sec) for continuous/frequent sources.

The effects of groundborne vibration levels regarding human annoyance and structural damage are influenced by numerous factors, including soil type and moisture content, frequency (Hz) of vibrations, distance between source and receptor, duration, and the type of vibration events (i.e., continuous or transient). As indicated in **Table 5.10-10,** the threshold at which there is a risk to normal structures is 0.2 PPV in/sec. This same threshold is typically considered the level at which increased levels of annoyance may begin to occur to occupants of nearby buildings. The recommended criteria for transient sources of single isolated events (i.e., blasting or demolition ball drops) is generally twice the level identified for continuous/frequent sources (Caltrans 2002b, 2004).

TABLE 5.10-10
EFFECTS OF VIBRATION ON PEOPLE AND BUILDINGS

Peak Particle Velocity (inches/second)	Human Reaction	Effect on Buildings
0.006–0.019	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level to which ruins and ancient monuments should be subjected
0.1	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Virtually no risk of architectural damage to normal buildings

Peak Particle Velocity (inches/second)	Human Reaction	Effect on Buildings
0.2	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to normal dwellings
0.4–0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Architectural damage and possibly minor structural damage

Source: Caltrans 2002b, 2004

Notes: Vibration levels are based on peak particle velocity in the vertical direction for continuous/frequent intermittent sources. The criteria for transient sources of single isolated events (i.e., blasting or demolition ball drops) is generally twice the level identified for continuous/frequent sources. Where human reactions are concerned, the value is at the point at which the person is situated. For buildings, the value refers to the ground motion. No allowance is included for the amplifying effect, if any, of structural components.

5.10.3 IMPACTS AND MITIGATION MEASURES

The following section discusses the analysis methodology and significance criteria used for assessing noise-related impacts associated with the proposed Project. The section includes results and discussion of each noise-related impact analyzed using the established significance criteria.

METHODS OF ANALYSIS

Short-Term Construction Activities

Predicted short-term noise levels at nearby noise-sensitive land uses were calculated using typical noise levels and usage rates associated with construction equipment, derived from the FHWA's Roadway Construction Noise Model (Version 1.1). The proposed Project was assumed to result in construction activity typical of residential and commercial developments. To remain conservative, construction noise was modeled for construction phases which typically use the loudest equipment (i.e., demolition, site preparation).

Long-Term Operational Activities

Non-Transportation Noise

Long-term non-transportation noise impacts were assessed based on representative noise levels obtained from existing literature, as well as noise measurement data obtained from similar land uses. Noise levels were predicted assuming an average noise attenuation rate of 6 dB per doubling of distance from the source. To determine the impact significance, estimated operational noise levels were compared to the City's proposed noise standards for non-transportation noise sources, as summarized in **Table 5.10-12**.

Transportation Noise and Land Use Compatibility

Traffic noise levels were calculated using the FHWA Roadway Noise Prediction Model (FHWA-RD-77-108) based on California vehicle reference noise emission factors. Traffic data for City roadways and adjacent federal and State routes were obtained from the traffic analysis prepared for this Project for modeling purposes. Additional input data included day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. For this analysis, the mix of vehicles on the roadway was adjusted based on information from the traffic analysis conducted for the Project. For roadway segments included in this analysis, distances to the nearest receptor adjacent to roadways were used in the FHWA model to calculate traffic noise level at the receptor site. Increases in traffic noise levels attributable to the Project were determined based on a comparison of predicted noise levels, with and without adoption and buildout of the General Plan. For roadway segments that would be constructed or widened due to Project buildout, future roadway widths were assumed to be the same as existing roadways with similar characteristics (e.g., number of lanes). Note that the modeling does not account for any natural or human-made shielding (e.g., trees, vegetation, solid backyard fences, walls); consequently, it estimates worst-case noise exposure levels. The compatibility of proposed land uses was evaluated based on projected future transportation noise levels. Predicted noise levels were compared with the City's corresponding noise criteria for determination of land use compatibility (**Table 5.10-11**). For complete details on model inputs, outputs, and assumptions, see **Appendix E**.

For analysis of potential noise exposure from railroads, the Transit Noise and Vibration Impact Assessment Guidelines (FTA 2006) were used to determine approximate noise and vibration levels near rail lines. As with the roadway modeling, no natural or human-made noise shielding or barriers are accounted for; therefore, modeled noise levels are also considered worst-case conditions along the rail corridors. Modeling for train-related noise exposure was adjusted to specific characteristics of each rail line (e.g., at grade crossing) as well as specific quiet zones in the City which would exclude noise exposure associated with the train warning horns.

Groundborne Vibration

Construction activities in the Planning Area have the potential to expose nearby buildings to levels of ground vibration that could result in structural damage and/or negative human response. These activities were assessed based on the types of construction equipment that would be used, the levels of ground vibration typically generated by these types of equipment, and the proximity of construction activity to existing nearby buildings. Referenced ground vibration levels for typical construction equipment are provided by FHWA's Roadway Construction Noise Model (FHWA 2006). Construction vibration levels and contour distances were calculated based on typical construction equipment vibration levels and assuming a conservative rate of 1.1 for ground attenuation. Groundborne vibration impacts were evaluated based on Caltrans's (2004) recommended standard of 0.2 ppv in/sec for the prevention of structural damage to nonhistorical buildings. This is also the level at which vibrations may begin to annoy people in buildings (see **Table 5.10-10**).

Substantial Increases in Noise Levels

For purpose of this analysis, a substantial increase in noise levels is defined as an increase of 5.0 dBA, or greater, where noise levels are less than the City's normally acceptable minimum noise level of 60 dBA L_{dn}; 3 dBA, or greater, where noise levels range from 60 to 65 dBA L_{dn}; and 1.5 dBA, or greater, where the noise level exceeds 65 dBA L_{dn} without the proposed Project. These criteria are based on the FICON criteria (**Table 5.10-1**) and are consistent with the City's commonly applied noise criteria for roadway construction and improvement projects. In the proposed Project, Policy N-2-2 includes CEQA significance thresholds for incremental noise increases, which are also consistent with the FICON criteria in **Table 5.10-1.**

General Plan Policies and Standards

The proposed Project contains the following policies and standards for managing future development in the City to reduce effects related to noise and vibration.

Policy N-1-1: New development of the uses listed in Table 8-3 [**Table 5.10-11**, below] shall conform with the noise levels contained in the table. All indoor and outdoor areas shall be located, constructed, and/or shielded from noise sources in order to achieve compliance with the City's noise standards.

Policy N-1-2: Where noise mitigation measures are required to achieve the standards of Tables 8-3 [**Table 5.10-11**, below] and 8-4 [**Table 5.10-12**, below], the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered a means of achieving the noise standards only after all other practical design-related noise mitigation measures, including the use of distance from noise sources, have been integrated into the project.

Policy N-1-3: Use the noise contour mapping identified in Figure 8-6 [**Figure 5.10-4**, below] to inform land use decisions.

Policy N-1-4: Protect noise-sensitive land uses, identified in Table 8-3 [**Table 5.10-11**, below], from noise impacts.

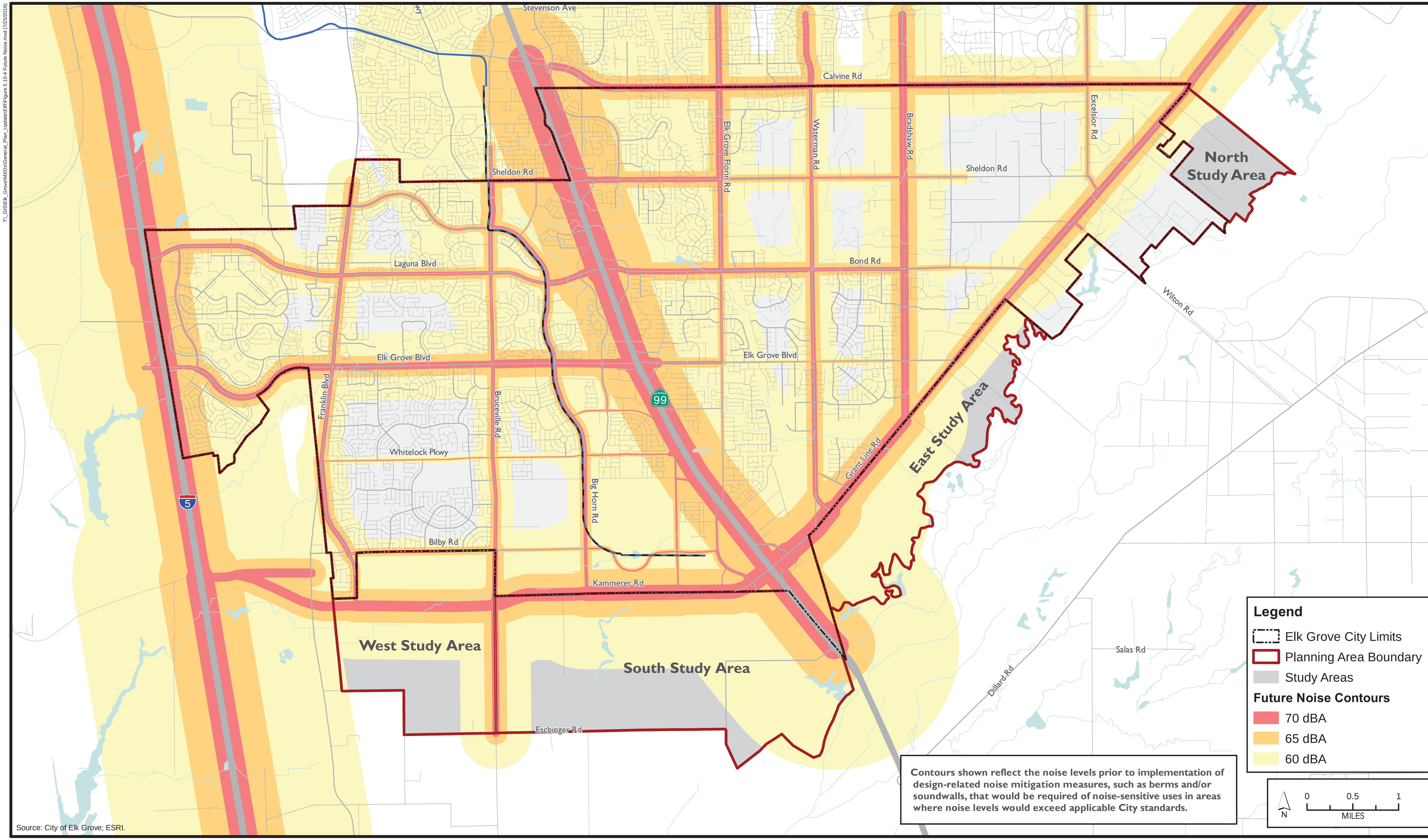
Policy N-1-5: Where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels specified in Table 8-3 [**Table 5.10-11**, below] or the performance standards of Table 8-4 [**Table 5.10-12**, below], an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design.

Policy N-1-6: Where proposed nonresidential land uses are likely to produce noise levels exceeding the performance standards of Table 8-4 [**Table 5.10-12**, below] at existing or planned noise-sensitive uses, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design.

Policy N-1-7: The standards outlined in Table 8-4 [**Table 5.10-12**, below] shall not apply to transportation- and City infrastructure-related construction activities as long as construction occurs between the hours of 7 a.m. and 7 p.m., Monday through Friday, and 8 a.m. and 5 p.m. on weekends and federally recognized holidays. Work may occur beyond these time frames for construction safety or because of existing congestion that makes completing the work during these time frames impractical.

Policy N-1-8: For development projects that are subject to discretionary review, the City may require applicants to assess potential construction noise impacts on nearby sensitive uses and to minimize impacts on those uses.

Policy N-1-9: For projects involving the use of major vibration-generating equipment (e.g., pile drivers, vibratory rollers) that could generate groundborne vibration levels in excess of 0.2 in/sec ppv, the City may require a project-specific vibration impact assessment to analyze potential groundborne vibrational impacts and may require measures to reduce ground vibration levels.



City of Elk Grove
Development Services

Figure 5.10-4
Future Noise Contours

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Policy N-1-10: For new development involving noise-sensitive receptors that could be exposed to high levels of ground vibration levels generated by freight or transit rail, the City may require a project-specific vibration impact assessment to analyze potential groundborne vibrational impacts and may require measures to reduce ground vibrational levels.

Policy N-2-1: Noise created by new proposed non-transportation noise sources shall be mitigated so as not to exceed the noise level standards of Table 8-4 [**Table 5.10-12**, below] as measured immediately within the property line of lands designated for noise-sensitive uses.

Policy N-2-2: The following criteria shall be used as CEQA significance thresholds for transportation and stationary noise sources:

- Where existing ambient noise levels are less than 60 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +5 dB Ldn increase in noise levels shall be considered significant; and
- Where existing ambient noise levels range between 60 and 65 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +3 dB Ldn increase in noise levels shall be considered significant; and
- Where existing ambient noise levels are greater than 65 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +1.5 dB Ldn increase in noise levels shall be considered significant.
- Public roadway improvements to alleviate traffic congestion and safety hazards shall utilize FHWA noise standards to allow a reasonable dollar threshold per dwelling to be used in the evaluation and abatement of impacts. [Subject to removal pending City review]
- The standards outlined in Table 8-4 [**Table 5.10-12**, below] shall not apply to public projects to alleviate traffic congestion and safety hazards.

Policy N-2-3: Emphasize methods other than installation of sound walls in front yard areas to reduce noise to acceptable levels in residential areas that were originally constructed without sound walls.

Policy N-2-4: Where sound walls or noise barriers are constructed, strongly encourage and consider requiring a combination of berms and walls to reduce the apparent height of the wall and produce a more aesthetically appealing streetscape.

For transportation noise sources, the proposed Project includes noise criteria for determination of land use compatibility ranges from an exterior noise level of 60 dBA L_{dn} for residential uses to 70 dBA L_{dn} for parks and playgrounds. The proposed Project would also establish an interior noise standard of 45 dBA L_{dn} for residential, school, and office uses exposed to transportation noise sources. The proposed Project criteria for transportation noise sources are summarized in **Table 5.10-11**.

TABLE 5.10-11
MAXIMUM ALLOWABLE NOISE EXPOSURE – TRANSPORTATION NOISE SOURCES
(PROPOSED GENERAL PLAN TABLE 8-3)

Land Use	Outdoor Activity Areas[a,b] L_{dn} dB	Interior Spaces	
		L_{dn} dB	L_{eq} dB[c]
Residential	60[d,g]	45	-
Residential subject to noise from railroad tracks, aircraft overflights, or similar noise sources which produce clearly identifiable, discrete noise events (the passing of a single train, as opposed to relatively steady noise sources as roadways)	60[d,g]	40[f]	
Transient Lodging	60[e,g]	45	-
Hospitals, Nursing Homes	60[d,g]	45	-
Theaters, Auditoriums, Music Halls	-	-	35
Churches, Meeting Halls	60[d,g]	-	40
Office Buildings	-	-	45
School, Libraries, Museums			45

Notes:

a. *Where the location of outdoor activity areas is unknown, the exterior noise level standards shall be applied to the property line of the receiving land use. Where it is not practical to mitigate exterior noise levels at patios or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.*

b. *Transportation projects subject to Caltrans review or approval shall comply with the Federal Highway Administration noise standards for evaluation and abatement of noise impacts.*

c. *As determined for a typical worst-case hour during periods of use.*

d. *Where it is not possible to reduce noise in outdoor activity areas to 60 dB Ldn or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB Ldn may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.*

e. *In the case of hotel/motel facilities or other transient lodging, outdoor activity areas such as pool areas may not be included in the project design. In these cases, only the interior noise level criterion will apply.*

f. *The intent of this noise standard is to provide increased protection against sleep disturbance for residences located near railroad tracks.*

g. *In cases where the existing ambient noise level exceeds 60 dBA, the maximum allowable project-related permanent increase in ambient noise levels shall be 3 dBA Ldn.*

Non-Transportation Noise Sources

Table 5.10-12 provides the proposed Project noise level performance criteria for new projects that would be affected by or include non-transportation noise sources. These criteria are applied at the property line of noise-sensitive land uses.

TABLE 5.10-12
EXTERIOR NOISE LEVEL PERFORMANCE STANDARDS FOR NON-TRANSPORTATION NOISE SOURCES
(PROPOSED GENERAL PLAN TABLE 8-4)

Performance Standards for Stationary Sources	Noise Level Descriptor	Maximum Acceptable Noise Level, dBA	
		Daytime (7 a.m.–10 p.m.)	Nighttime (10 p.m.–7 a.m.)
Performance Standards for Typical Stationary Noise Sources [a]	Hourly L_{eq}, dB	55[c,d]	45[c,d]
Performance Standards for Stationary Noise Sources Which Are Tonal, Impulsive, Repetitive, or Consist Primarily of Speech or Music [b]	Hourly L_{eq}, dB	50[c,d]	40[c,d]

Notes:

a. *These standards will apply generally to noise sources that are not tonal, impulsive, or repetitive in nature. Typical noise sources in this category would include cooling towers, fans, and blowers.*

b. *These standards apply to noises which are tonal in nature, impulsive, repetitive, or which consist primarily of speech or music (e.g., humming sounds, outdoor speaker systems). Typical noise sources in this category include pile drivers, drive-through speaker boxes, punch presses, steam valves, and transformer stations.*

c. *These noise levels do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwelling).*

d. *The City may impose noise level standards which are more or less restrictive based upon determination of existing low or high ambient noise levels.*

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A noise impact is considered significant if implementation of the Project would result in the projected noise contour zones of surrounding airports and the proposed Project is not in conflict with airport land use compatibility plans for any of the surrounding airports in the region. Therefore, Standards of Significance 5 and 6 would not apply and are not discussed further in the impact analysis section.

PROJECT IMPACTS AND MITIGATION MEASURES

Short-Term Construction Noise Impacts (Standards of Significance 1 and 4)

Impact 5.10.1 Construction activities could result in a substantial temporary increase in noise levels at nearby noise-sensitive land uses, which may result in increased levels of annoyance, activity interference, and/or sleep disruption. Therefore, this impact would be **potentially significant.**

Construction noise associated with future land uses or infrastructure development would be temporary in nature and would vary depending on the characteristics of the construction activities being performed. Noise generated during construction of buildings and related structures is typically associated with the operation of off-road equipment, including excavation and demolition equipment. Noise levels associated with construction activities occurring during the more noise-sensitive evening and nighttime hours (i.e., 7 p.m. to 7 a.m.) are of increased concern. Because exterior ambient noise levels typically decrease during the nighttime hours as community activities (e.g., commercial activities, vehicle traffic) decrease, construction activities performed during these evening hours could result in increased annoyance and potential sleep disruption for occupants of nearby residential dwellings. See **Table 5.10-3** for a list of typical uncontrolled noise levels generated by commonly used construction equipment.

The proposed Project includes new land use designations and new growth areas that would have construction activity as future development projects are approved over a period of several decades. The Project also includes planned construction of new roadways and expansion of existing roadways, with new growth occurring predominantly in the southern portion of the City. Under the proposed Project, the primary sources of temporary or periodic noise would be construction activity and maintenance work. Considering this, construction is a continuous source of temporary noise and would continue to be a major noise source in the City.

Construction noise modeling was conducted for this analysis, using equipment typical of the loudest construction phase (e.g., site preparation), assuming a worst-case scenario for construction noise disturbance. Equipment used in the modeling included an excavator, dozer, dump truck, front end loader, and grader. Modeling results were compared to **Table 5.10-12** to assess potential significant impacts. Results show that typical construction site noise levels could be as high as 93 L_{eq} dBA at 25 feet and 81 L_{eq} dBA at 100 feet. Construction activity that would include an impact pile driver could reach 96.6 L_{eq} dBA at 25 feet and 84.6 L_{eq} dBA at 100 feet. These construction noise levels would exceed the proposed standard (see **Table 5.10-12**) for typical stationary noise sources for residential and agricultural land uses.

Existing Regulations and Proposed General Plan Policies That Provide Mitigation

The City's Municipal Code includes standards for noise-related activities, including exemptions for intermittent noise sources including construction activities. Municipal Code Chapter 6.32.100 contained in Title 6, Health and Sanitation, exempts construction noise from the standards set forth in **Table 5.10-12** for non-transportation noise between the hours of 6:00 a.m. and 8:00 p.m., but construction activities may only occur between the hours of 7:00 a.m. and 7:00 p.m. when located in proximity to residential uses. Policy N-1-7 addresses potential impacts on current and future sensitive land uses associated with construction noise by setting allowable construction hours to limit impacts on sensitive land uses. It does allow for construction outside of the above hours for construction safety or because of existing congestion that makes completing the work during these time frames impractical. Policy N-1-8 would serve to further protect current and future sensitive land uses from noise impacts related to future development in the City. Under Policy N-1-8, for development projects that are subject to discretionary review, the City may require applicants to assess potential construction noise impacts on nearby sensitive uses and to minimize impacts on those uses.

Conclusion

Future construction activity is anticipated with adoption of the proposed Project, but the activity would be temporary, intermittent, and vary in size and characteristics depending on the type of development. Existing receptors and sensitive land uses may be adversely affected by anticipated noise levels from new construction. Construction-related noise generated during the day (7:00 a.m. through 7:00 p.m. in proximity to residential uses and 6:00 a.m. through 8:00 p.m. in other instances) is generally exempt from meeting noise standards, as provided under the Municipal Code and General Plan Policy N-1-7. However, in certain cases, the City could require a site-specific assessment and require mitigation to reduce construction noise levels on nearby sensitive uses. In consideration of these standards and policies, this impact would be reduced to a **less than significant** level.

Mitigation Measures

No additional mitigation required beyond compliance with existing standards and proposed General Plan policies.

Long-Term Traffic Noise Impacts (Standards of Significance 1 and 3)

Impact 5.10.2 Implementation of the proposed Project would result in a significant increase in transportation noise, including traffic noise levels along many existing roadways in the City. Even with implementation of proposed policies to limit traffic noise impacts, predicted traffic noise levels would still result in potential increases above applicable standards. As a result, this impact is considered **potentially significant**.

Railroad Noise

The proposed Project has the potential to expose new receptors to noise exposure levels above the City's outdoor and indoor noise exposure standards from the two railroad lines that currently run through the City. The most common noise sources from railroad operations are generated by diesel locomotives, rail car wheel and track interaction, train warning horns, and gate bells at railroad crossings in the City. However, as discussed previously, the City has established a series of quiet zones for many of the at-grade crossings within the City boundaries to limit noise exposure to residents from train warning horns.

Two existing rail lines run north–south through the City. The rail line running through the western portion of the City is adjacent to residential and industrial land uses within the City and currently has an average of three daily pass-through train trips. The railroad line running through the eastern portion of the City is adjacent to residential, commercial, and industrial land uses within the City and currently supports an average of 32 daily freight train trips. This rail line also services Amtrak passenger trains with an average of seven daily passenger train trips. The proposed Project would allow for development near this rail line and could expose new receptors to noise levels exceeding City standards. However, as discussed in Section 5.0, Introduction to the Environmental Analysis and Assumptions Used, the effect of this existing condition related to rail noise would be an impact of the environment on the Project, and, as such, is not a CEQA consideration. Because the operations on the rail lines are not under control of the City and the proposed Project would not involve any changes in rail operations, the potential for changes in rail operations and potential effects on surrounding land uses would not be exacerbated by the Project and is, therefore, not subject to further analysis in this EIR.

Traffic Noise

The proposed Project includes a series of new land use modifications and designations that would result in increased traffic volumes on major arterial and collector roadways in the City as well as increased volumes on I-5 and SR 99. The Project also includes new proposed roadways which would increase traffic volumes on new and existing City roadways. These increased traffic volumes could expose existing and future sensitive receptors and noise-sensitive land uses to increased traffic noise. Residential developments, schools, libraries, hospitals, convalescent homes, and places of worship are the most noise-sensitive land uses. As shown in **Table 5.10-13**, many of the roadway volumes that were modeled for future conditions under the proposed Project would generate noise levels that exceed the City's current General Plan outdoor noise exposure standard (60 dBA L_{dn}) for residential and other noise-sensitive land uses. See **Table 5.10-11** for the full list of noise standards by land uses. Predicted increases would primarily occur on major arterial and collector roadways that run north–south and east–west through the City. The predicted increase in traffic volumes resulting from implementation of the proposed Project would therefore contribute to increases in traffic noise levels.

While many roadways would experience increased traffic noise levels under the proposed Project, as shown in **Table 5.10-4**, existing traffic noise levels adjacent to many of the major roadways in the City currently exceed the City's noise standard (60 dBA L_{dn}). For cases in which existing noise levels exceed the standard, **Table 5.10-1** serves to determine the standards for incremental noise level increases that would be considered substantial. This policy framework is also included in proposed General Plan Policy N-2-2 and would continue as the threshold used for determining allowable incremental noise increases for transportation and stationary sources used in the CEQA environmental review process. For this analysis, this threshold was used to determine which roadway segments would incur a substantial increase in noise levels over existing conditions. See the Methods of Analysis section for a full description of the traffic noise modeling.

As seen below, **Table 5.10-13** includes modeled traffic noise levels for existing conditions and existing plus Project conditions, as well as the relative distances at which traffic noise would be below 70, 65, 60, and 50 dBA. Future noise contours are illustrated in **Figure 5.10-4**.

TABLE 5.10-13
PREDICTED INCREASES IN TRAFFIC NOISE LEVELS
EXISTING AND EXISTING PLUS PROJECT CONDITIONS

Roadway	From	To	L_{dn} at 50 Feet from Near-Travel-Lane Centerline[1]		Noise Level Increase	Substantial Noise Level Increase?	Distance to Contour (feet)		
			Existing	With Project			70 dBA	65 dBA	60 dBA
Big Horn Blvd	Franklin Blvd	Bruceville Rd	69.5	69.7	0.2	No	70	221	698
	Bruceville Rd	Laguna Blvd	70.0	72.1	2.1	Yes	121	384	1,213
	Laguna Blvd	Elk Grove Blvd	67.9	71.9	4.0	Yes	98	309	977
	Elk Grove Blvd	Lotz Pkwy	68.1	72.8	4.8	Yes	119	376	1,189
	Lotz Pkwy	Whitelock Pkwy	65.3	72.1	6.8	Yes	108	340	1,077
	Whitelock Pkwy	Bilby Rd		71.4	—	Yes	103	325	1,027
	Bilby Rd	Kammerer Rd		71.6	—	Yes	107	337	1,066
	Kammerer Rd	Eschinger Rd		72.3	—	Yes	126	399	1,263
Bilby Rd	Franklin Blvd	Willard Pkwy	63.4	64.5	1.1	No	14	45	141
	Willard Pkwy	Bruceville Rd	68.9	71.9	3.0	Yes	78	245	776
	Bruceville Rd	Big Horn Blvd	55.0	68.6	13.6	Yes	37	115	365
	Big Horn Blvd	Lotz Pkwy		68.0	—	Yes	46	147	465
	Lotz Pkwy	Promenade Pkwy		67.9	—	Yes	45	143	453
Bond Rd	SR 99	E Stockton Blvd	70.6	72.1	1.6	Yes	162	512	1,618
	E Stockton Blvd	Elk Crest Dr	72.0	74.4	2.4	Yes	189	597	1,888
	Elk Crest Dr	Elk Grove Florin Rd	74.4	75.9	1.5	Yes	168	531	1,678
	Elk Grove Florin Rd	Waterman Rd	72.1	74.1	2.0	Yes	145	458	1,450

Roadway	From	To	L_{dn} at 50 Feet from Near-Travel-Lane Centerline[1]		Noise Level Increase	Substantial Noise Level Increase?	Distance to Contour (feet)		
			Existing	With Project			70 dBA	65 dBA	60 dBA
	Waterman Rd	Bradshaw Rd	70.4	72.9	2.5	Yes	114	360	1,138
	Bradshaw Rd	Bader Rd	66.3	67.4	1.1	No	54	171	541
	Bader Rd	Grant Line Rd	63.4	65.4	2.0	No	34	107	339
Bradshaw Rd	Vintage Park Dr	Calvine Rd	72.2	76.1	3.9	Yes	230	728	2,303
	Calvine Rd	Sheldon Rd	67.4	76.0	8.6	Yes	224	707	2,237
	Sheldon Rd	Bond Rd	68.0	76.3	8.2	Yes	239	757	2,393
	Bond Rd	Elk Grove Blvd	67.0	76.2	9.2	Yes	237	749	2,369
	Elk Grove Blvd	Grant Line Rd	65.5	76.0	10.5	Yes	226	713	2,255
Bruceville Rd	Damascus Dr	Sheldon Rd	67.3	70.6	3.3	Yes	100	316	998
	Sheldon Rd	Big Horn Blvd	69.1	72.8	3.6	Yes	200	631	1,997
	Big Horn Blvd	Laguna Blvd	69.2	70.8	1.6	Yes	127	403	1,273
	Laguna Blvd	Elk Grove Blvd	69.2	71.0	1.8	Yes	97	306	969
	Elk Grove Blvd	Whitelock Pkwy	68.3	71.3	3.0	Yes	105	331	1,048
	Whitelock Pkwy	Bilby Rd	65.9	71.2	5.3	Yes	102	323	1,021
	Bilby Rd	Kammerer Rd	68.4	73.2	4.8	Yes	162	513	1,622
	Kammerer Rd	Eschinger Rd	63.3	74.2	10.9	Yes	204	646	2,044
Calvine Rd	Power Inn Rd	Elk Grove Florin Rd	71.7	74.5	2.8	Yes	220	697	2,203
	Elk Grove Florin Rd	Waterman Rd	70.6	73.8	3.2	Yes	189	599	1,895
	Waterman Rd	Bradshaw Rd	69.2	71.0	1.8	Yes	119	377	1,193
	Bradshaw Rd	Vineyard Rd	69.3	73.6	4.2	Yes	176	557	1,762
	Vineyard Rd	Excelsior Rd	68.2	73.1	4.9	Yes	159	504	1,594
	Excelsior Rd	Grant Line Rd	65.9	72.4	6.5	Yes	135	428	1,353
Center Parkway	Laguna Village	Bruceville Rd	65.8	68.5	2.7	Yes	57	180	571
E. Stockton Blvd	Grant Line Rd	Elk Grove Florin Rd	63.3	69.7	6.4	Yes	73	231	730
Elk Grove Blvd	I-5	Harbour Point Dr	68.9	70.2	1.3	No	121	384	1,213
	Harbour Point Dr	Four Winds Dr	70.3	71.5	1.2	No	182	577	1,824
	Four Winds Dr	Franklin Blvd	70.8	71.6	0.8	No	220	694	2,195
	Franklin Blvd	Bruceville Rd	72.0	73.0	1.1	No	196	619	1,957
	Bruceville Rd	Big Horn Blvd	72.6	74.6	2.1	Yes	250	791	2,502

Roadway	From	To	L_{dn} at 50 Feet from Near-Travel-Lane Centerline[1]		Noise Level Increase	Substantial Noise Level Increase?	Distance to Contour (feet)		
			Existing	With Project			70 dBA	65 dBA	60 dBA
	Big Horn Blvd	Laguna Springs Dr	70.3	71.8	1.5	Yes	232	733	2,317
	Laguna Springs Dr	Auto Center Dr	73.5	75.2	1.7	Yes	274	867	2,740
	Auto Center Dr	SR 99	73.6	75.4	1.8	Yes	302	954	3,018
	SR 99	Emerald Vista Dr/E Stockton Blvd	73.1	75.1	2.0	Yes	300	950	3,004
	Emerald Vista Dr/E Stockton Blvd	Elk Grove Florin Rd	69.2	71.3	2.1	Yes	92	291	922
	Elk Grove Florin Rd	Waterman Rd	63.8	65.2	1.4	No	20	64	202
	Waterman Rd	Bradshaw Rd	64.9	66.9	2.0	No	31	99	313
	Bradshaw Rd	Grant Line Rd	59.4	62.4	2.9	No	20	63	200
Elk Grove Florin Rd	Vintage Park Dr	Calvine Rd	70.3	72.8	2.4	Yes	186	590	1,865
	Calvine Rd	Sheldon Rd	71.4	74.3	2.9	Yes	202	638	2,018
	Sheldon Rd	Bond Rd	69.9	72.1	2.2	Yes	143	453	1,431
	Bond Rd	Elk Grove Blvd	68.2	70.8	2.7	Yes	69	218	690
	Elk Grove Blvd	E Stockton Blvd	67.9	68.6	0.7	No	36	113	357
Eschinger Rd	Willard Pkwy	Bruceville Rd		71.3	—	Yes	66	208	657
	Bruceville Rd	Big Horn Blvd		72.5	—	Yes	88	277	877
	Big Horn Blvd	Lotz Pkwy		73.4	—	Yes	108	342	1,080
	Lotz Pkwy	Promenade Pkwy		73.7	—	Yes	114	360	1,138
Excelsior Rd	Gerber Rd	Calvine Rd	62.5	67.4	5.0	Yes	64	203	641
	Calvine Rd	Sheldon Rd	62.8	67.8	5.0	Yes	55	174	551
Franklin Blvd	Sims Rd	Big Horn Blvd	70.4	71.8	1.4	No	143	453	1,433
	Big Horn Blvd	Laguna Blvd	70.4	71.4	1.0	No	124	391	1,238
	Laguna Blvd	Elk Grove Blvd	69.0	70.9	1.9	Yes	112	353	1,115
	Elk Grove Blvd	Whitelock Pkwy	66.6	68.8	2.2	Yes	115	363	1,147
	Whitelock Pkwy	Bilby Rd		59.1	—	No	8	25	78
	Bilby Rd	Hood Franklin Rd		61.8	—	Yes	14	43	136
	Hood Franklin Rd	Lambert Rd		58.4	—	No	6	20	63

Roadway	From	To	L_{dn} at 50 Feet from Near-Travel-Lane Centerline[1]		Noise Level Increase	Substantial Noise Level Increase?	Distance to Contour (feet)		
			Existing	With Project			70 dBA	65 dBA	60 dBA
Grant Line Rd	Sloughhouse Rd	Calvine Rd	71.7	74.3	2.6	Yes	242	765	2,420
	Calvine Rd	Sheldon Rd	69.4	74.6	5.3	Yes	200	632	1,998
	Sheldon Rd	Wilton Rd	71.4	75.0	3.6	Yes	218	690	2,183
	Wilton Rd	Bond Rd	70.9	75.1	4.3	Yes	224	709	2,242
	Bond Rd	Elk Grove Blvd	68.5	74.1	5.5	Yes	175	554	1,753
	Elk Grove Blvd	Bradshaw Rd	66.1	70.9	4.9	Yes	143	452	1,431
	Bradshaw Rd	Mosher Rd	68.9	75.5	6.6	Yes	360	1137	3,595
	Mosher Rd	Waterman Rd	69.2	75.8	6.5	Yes	379	1200	3,794
	Waterman Rd	E. Stockton/ Survey Rd	70.4	77.5	7.1	Yes	568	1796	5,680
	E. Stockton/ Survey Rd	SR 99	71.1	77.8	6.7	Yes	685	2166	6,848
Harbour Point Dr	Elk Grove Blvd	Laguna Blvd	66.7	68.6	1.9	Yes	61	194	614
Hood Franklin Rd	I-5	Franklin Blvd	66.6	74.9	8.3	Yes	266	841	2,660
Kammerer Rd	Franklin Blvd	Willard Pkwy		74.2	—	Yes	271	856	2,708
	Willard Pkwy	Bruceville Rd		74.8	—	Yes	309	978	3,092
	Bruceville Rd	Big Horn Blvd		75.7	—	Yes	377	1193	3,773
	Big Horn Blvd	Lotz Pkwy	68.9	76.3	7.4	Yes	438	1,386	4,382
	Lotz Pkwy	Promenade Pkwy	66.6	76.1	9.5	Yes	418	1,320	4,175
	Promenade Pkwy	SR 99	68.8	77.4	8.5	Yes	562	1,776	5,618
Laguna Blvd	SR 99	Franklin Blvd	70.8	71.6	0.8	No	131	416	1,315
	Franklin Blvd	Bruceville Rd	70.5	71.0	0.5	No	115	363	1,147
	Bruceville Rd	Big Horn Blvd	70.8	70.4	-0.4	No	98	310	979
	Big Horn Blvd	Laguna Springs Dr	71.2	73.2	2.0	Yes	188	594	1,877
	Laguna Springs Dr	SR 99	71.1	74.1	3.0	Yes	231	731	2,311
Laguna Springs Dr	Laguna Blvd	Laguna Palms Wy	64.8	66.0	1.2	No	30	96	303
	Laguna Palms Wy	Elk Grove Blvd	65.6	66.0	0.4	No	24	77	244
	Elk Grove Blvd	Lotz Pkwy	60.8	68.4	7.6	Yes	50	159	502

Roadway	From	To	L_{dn} at 50 Feet from Near-Travel-Lane Centerline[1]		Noise Level Increase	Substantial Noise Level Increase?	Distance to Contour (feet)		
			Existing	With Project			70 dBA	65 dBA	60 dBA
Lent Ranch Pkwy	Kammerer Rd	Promenade Pkwy	44.8	65.6	20.8	Yes	25	79	251
Lewis Stein Rd	Sheldon Rd	Big Horn Blvd	65.3	66.4	1.2	No	26	83	264
Lotz Pkwy	Big Horn Blvd	Laguna Springs Dr	58.6	65.7	7.1	Yes	29	92	290
	Laguna Springs Dr	Whitelock Pkwy	53.1	67.2	14.0	Yes	31	98	311
	Whitelock Pkwy	Promenade Pkwy		71.3	—	Yes	81	255	807
	Promenade Pkwy	Bilby Rd		69.5	—	Yes	53	167	528
	Bilby Rd	Kammerer Rd		68.3	—	Yes	41	128	406
	Kammerer Rd	Eschinger Rd		70.8	—	Yes	71	225	712
Mosher	Grant Line Rd	Waterman Rd	62.0	67.8	5.8	Yes	33	106	335
Power Inn Rd	Calvine Rd	Sheldon Rd	65.8	67.4	1.6	Yes	37	116	368
Promenade Pkwy	Lotz Pkwy	Bilby Rd		69.6	—	Yes	62	195	616
	Bilby Rd	Kammerer Rd	64.2	70.3	6.1	Yes	97	307	972
	Kammerer Rd	Eschinger Rd		67.9	—	Yes			
Sheldon Rd	Bruceville Rd	Lewis Stein Rd	68.6	71.7	3.0	Yes	132	417	1,318
	Lewis Stein Rd	SR 99	70.7	72.6	1.9	Yes	166	524	1,657
	SR 99	E. Stockton Blvd	70.8	73.6	2.8	Yes	206	651	2,059
	E. Stockton Blvd	Power Inn Rd	71.0	73.0	2.1	Yes	181	574	1,815
	Power Inn Rd	Elk Grove Florin Rd	69.5	72.4	2.9	Yes	152	479	1,516
	Elk Grove Florin Rd	Waterman Rd	66.1	68.8	2.7	Yes	72	228	721
	Waterman Rd	Bradshaw Rd	66.3	70.7	4.4	Yes	65	205	647
	Bradshaw Rd	Bader Rd	65.8	69.4	3.6	Yes	48	153	484
	Bader Rd	Dillard Oaks Ct	64.5	68.7	4.1	Yes	48	153	483
	Excelsior Rd	Grant Line Rd	65.3	70.6	5.4	Yes	76	241	763
Waterman Rd	Vintage Park Dr	Calvine Rd	69.0	74.2	5.2	Yes	181	573	1,813
	Calvine Rd	Sheldon Rd	70.0	72.4	2.4	Yes	100	315	998
	Sheldon Rd	Bond Rd	66.2	69.4	3.2	Yes	119	375	1,186
	Bond Rd	Elk Grove Blvd	70.7	73.8	3.0	Yes	133	420	1,329
	Elk Grove Blvd	Grant Line Rd	66.9	72.5	5.6	Yes	150	475	1,502

Roadway	From	To	L_{dn} at 50 Feet from Near-Travel-Lane Centerline[1]		Noise Level Increase	Substantial Noise Level Increase?	Distance to Contour (feet)		
			Existing	With Project			70 dBA	65 dBA	60 dBA
Whitelock Pkwy	Franklin Blvd	Bruceville Rd	66.9	64.9	-2.0	No	23	72	227
	Bruceville Rd	Big Horn Blvd	63.1	63.9	0.8	No	23	72	229
	Big Horn Blvd	Lotz Pkwy	62.3	67.0	4.7	Yes	38	121	381
	Lotz Pkwy	SR 99		72.5	—	Yes	125	395	1,248
Willard Pkwy	Whitelock Pkwy	Bilby	65.1	71.7	6.6	Yes	147	464	1,467
	Bilby Rd	Kammerer Rd	58.2	70.3	12.2	Yes	97	308	973
Wilton Rd	Grant Line Rd	Leisure Oak Ln	68.7	70.5	1.7	Yes	84	266	842
SR-99	Calvine Rd	Sheldon Rd	78.8	81.7	2.9	Yes	1,000	3,162	9,999
	Sheldon Rd	Bond Rd	77.4	80.5	3.1	Yes	902	2,854	9,024
	Bond Rd	Elk Grove Blvd	76.4	79.8	3.4	Yes	744	2,352	7,438
	Elk Grove Blvd	Whitelock Pkwy	77.2	80.6	3.4	Yes	669	2,116	6,691
	Whitelock Pkwy	Grant Line Rd	70.1	72.8	2.7	Yes	643	2,032	6,425
	Grant Line Rd	Eschinger Rd	75.4	77.7	2.3	Yes	708	2,238	7,077
I-5	Cosumnes River Blvd	Laguna Blvd	65.0	67.1	2.1	Yes	855	2,702	8,546
	Laguna Blvd	Elk Grove Blvd	75.0	77.3	2.3	Yes	712	2,251	7,117
	Elk Grove Blvd	Hood Franklin Rd	73.8	76.3	2.5	Yes	592	1,871	5,915
	Hood Franklin Rd	Twin Cities Rd	62.5	64.3	1.9	No	730	2,307	7,295

Source: Ascent Environmental 2017

Note: 1. Substantial increases defined as an increase of 5.0, or greater, where noise levels are less than the City's normally acceptable minimum noise level of 60 dBA L_{dn}; 3 dBA, or greater, where noise levels range from 60 to 65 dBA L_{dn}; and 1.5 dB, or greater, where the noise level exceeds 65 dBA L_{dn} without the proposed Project.

As shown in **Table 5.10-13** and **Figure 5.10-4**, the proposed Project would increase traffic noise levels to above the current 60 dBA L_{dn} standard for many existing roadway segments in the City, and would also result in significant increases in traffic noise levels along many roadways that are already above the 60 dBA L_{dn} threshold, including the federal and State routes providing access to the City. Additionally, the proposed Project includes plans for new roadway segments to be developed in the City. As indicated by blank cells, new roadway segments do not include existing condition noise levels, but future traffic noise levels are estimated using modeled future traffic volumes for these new roadways. See **Appendix E** for traffic noise modeling assumptions and results.

Proposed General Plan Policies That Provide Mitigation

The proposed Project includes a series of policies to address future impacts caused by increases in traffic noise. Proposed Policy N-1-1, Policy N-1-2, Policy N-1-4, Policy N-1-5, and Policy N-2-3 all serve to address and limit noise impacts caused or subject to future development in the City.

These policies are intended to ensure that new specific proposed development would comply with noise standards and would not adversely impact sensitive land uses from traffic noise.

Conclusion

While General Plan policies would serve to limit traffic noise exposure to sensitive receptors, these policies cannot ensure that noise levels would be reduced to levels within the City's noise standards at all sensitive receptors. With increases for existing roadways ranging from 3 dB or more and up to 20 dB along some roadway segments, the ability to reduce impacts along roadways with measures such as sound walls or berms may not be feasible. Therefore, this impact would remain **significant and unavoidable**.

Mitigation Measures

No additional feasible mitigation measures available beyond compliance with proposed General Plan policies.

Exposure to Non-Transportation Source Noise (Standard of Significance 3)

Impact 5.10.3 The proposed Project would result in future development that could expose existing noise-sensitive land uses to new non-transportation noise sources that could exceed the City's applicable noise standards. However, several policies, discussed below, address and limit the exposure of existing and future noise-sensitive land uses to non-transportation noise sources. Therefore, this impact would be considered **less than significant**.

The proposed Project would allow for future development of land uses including residential, light and heavy industrial, commercial, employment center/offices, and public services. Buildout of the Project could potentially result in the exposure of new or existing receptors and noise-sensitive land uses to noise levels above the City's established threshold for outdoor noise exposure from non-transportation sources (see **Table 5.10-12**). Typical stationary and area noise sources include landscaping activities, building maintenance, stationary mechanical equipment (e.g., pumps, generators, HVAC units), garbage collection activities, and commercial and industrial processes.

Residential Land Uses

The Project would allow for the development of new residential land uses, predominantly located in the southern portion of the Planning Area. Noise from proposed residential land uses could increase ambient noise levels, due to typical activities associated with residential land uses, such as lawn and garden equipment, voices, and amplified music. These noise sources would be intermittent in nature and would vary considerably, depending on the specific characteristics of that residential area.

Commercial and Industrial Land Uses

The Project would allow for development of various nonresidential land uses, including commercial, heavy industrial, light industrial/flex, and public services. Noise sources associated with these land uses can vary substantially depending on the type of business or facility in operation. Noise sources often associated with these uses can include site-specific mechanical building equipment (e.g., heating equipment, HVAC systems) and other types of machinery associated with the use, such as impact processes, electrical machines, internal combustion engines, pneumatic equipment, electric motors, and machine tools. In consideration of the land use changes included in the proposed Project, siting of new commercial and industrial uses could result in new stationary and area sources as well as exposure of new sensitive land uses to existing stationary and area sources.

Existing Regulations and Proposed General Plan Policies That Provide Mitigation

The City's noise control requirements for existing non-transportation noise sources such as mechanical equipment are included in Section 6.32.110 of the Municipal Code. The noise control chapter identifies hourly noise standards that are applicable to non-transportation noise sources and consistent with those identified in the current General Plan, as depicted in **Table 5.10-9**. Policy N-1-6 requires an acoustical study to assess and limit impacts from any proposed nonresidential land uses that are likely to produce noise levels exceeding the performance standards included in **Table 5.10-12**.

Conclusion

While the proposed Project includes land uses that could result in future non-transportation or stationary noise increases, it also includes several policies to assess and limit potential increases in noise levels from stationary and area sources associated with the proposed Project.

The proposed policies, as well as existing standards included in the City's Municipal Code regarding applicable non-transportation noise sources (Section 6.32.110), serve to address and limit the noise impacts of non-transportation noise sources on sensitive land uses. With implementation of these standards and policies, this impact would be **less than significant.**

Mitigation Measures

No additional mitigation required beyond compliance with existing standards and proposed General Plan policies.

Groundborne Vibration Impacts (Standard of Significance 2)

Impact 5.10.4 The proposed Project would result in development projects involving construction activities that could expose receptors to excessive groundborne vibration, and new industrial and commercial land uses that could expose receptors to excessive groundborne vibration from long-term operations. This impact is considered **less than significant.**

Long-Term Operational Impacts

Groundborne vibration is most commonly associated with land uses near transit system routes and maintenance activities. Groundborne vibration associated with buses or trucks are not commonly perceptible. Roadway vibration is correlated to the smoothness of the running surface for vehicles. If the roadway is smooth, vehicle groundborne vibration is typically not perceptible (FTA 2006, p. 7-5). While the proposed Project includes land use changes as well as population and job growth assumptions that would result in traffic volume increases along major arterial and collector roads throughout the City, these increases in vibration would not be perceptible based on the aforementioned factors.

Long-term operational activities associated with the proposed Project would include new commercial or industrial land uses. Depending on the type of activities occurring, new commercial excessive groundborne vibration. Given that groundborne vibration associated with commercial or industrial processes is specific to the type of operation, groundborne vibration impacts for specific development projects cannot be assessed at this time.

Two major rail lines run through the Planning Area. The eastern line runs north–south and enters the City just south of Eschinger Road, and is operated by UPRR and Amtrak. The western UPRR line runs north–south and bisects Franklin Boulevard, Elk Grove Boulevard, and Laguna Boulevard. Noise-sensitive land uses currently exist adjacent to both rail lines. The proposed Project would allow for development activity adjacent to the eastern rail line and would result in development of new noise-sensitive land uses near this rail line.

The FTA's Transit Noise and Vibration Impact Assessment Guidelines provide recommended vibration level thresholds for various land uses based on the frequency of exposure from vibration events (i.e., number of trains passing by a sensitive land uses). Based on FTA guidance, development within 200 feet of an existing railroad could be exposed to vibration that exceeds the recommended threshold of 72 VdB for sensitive receptors that are exposed to a frequent amount of vibration events, i.e., 70 or more trains passing by in one day (see **Table 5.10-7**). While vibration-sensitive land uses currently exist within as little as 200 feet from the two existing rail lines in the City, as discussed previously in **Impact 5.10.4**, rail transportation activity consists mostly of freight trains and does not exceed 32 trains passing through the City within any given 24-hour period. Based on this relatively low frequency, this would not exceed the recommended threshold of 70 daily train passes for human disturbance.

Short-Term Construction Impacts

Implementation of the proposed Project would result in future construction activities, some of which would occur near existing residences and noise-sensitive land uses throughout the City. Vibration from these activities could cause structural damage to nearby existing buildings and/or cause annoyance to occupants in nearby buildings. The vibration standards in **Table 5.10-10** are used by the City as significance thresholds for analyzing vibration impacts. As stated in the table, a vibration threshold of 0.2 in/sec ppv is typically considered sufficient to protect against structural damage. This same threshold also represents the level at which vibrations would be potentially annoying to people in buildings (Caltrans 2002b, 2004).

Increases in groundborne vibration levels attributable to the proposed Project would be primarily associated with short-term construction-related activities. Groundborne vibration levels associated with typical construction equipment are summarized in **Table 5.10-14.** Based on the levels shown, construction activities often associated with development projects that do not require the use of pile drivers would typically generate ground vibration levels of approximately 0.09 in/sec ppv, or less, at 25 feet.

TABLE 5.10-14
DISTANCE TO POTENTIAL VIBRATION IMPACT CONTOUR FOR CONSTRUCTION EQUIPMENT

Equipment	PPV at 25 feet (in/sec)[1]	Approximate Lv (VdB) at 25 feet[2]
Pile Driver (impact) upper range	1.518	112
typical	0.644	104
Pile Driver (sonic) upper range	0.734	105
typical	0.170	93
Blasting	1.13	109

Equipment	PPV at 25 feet (in/sec)[1]	Approximate Lv (VdB) at 25 feet[2]
Large Dozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Rock Breaker	0.059	83
Jackhammer	0.035	79
Small Dozer	0.003	58

Source: FTA 2006, pp.12-6,12-8

PPV = peak particle velocity; LV = the root-mean-square velocity expressed in vibration decibels (VdB), assuming a crest factor of 4

1. *Does not include the simultaneous operation of multiple pieces of equipment.*
2. *Based on a vibration threshold of 0.2 in/sec ppv, which is typically considered sufficient to protect against structural damage (excluding fragile and historic structures). This same threshold also represents the level at which vibrations would be potentially annoying to people in buildings (Caltrans 2002b, 2004). Does not include vibration-sensitive exterior activities.*

For most construction projects, groundborne vibration levels would not pose a significant risk to nearby structures or occupants. However, the construction of some facilities may require the use of construction equipment that can cause vibrational impacts (i.e., pile drivers). In addition, road improvement projects often require the use of vibratory rollers, which, when operated close to existing structures, can result in increased levels of annoyance. As depicted in **Table 5.10-14**, ground vibration levels associated with pile drivers can reach levels of approximately 1.52 in/sec ppv at 25 feet. Pile drivers can generate ground vibration levels of 0.2 in/sec ppv at distances up to approximately 200 feet.

Construction activities involving equipment which causes elevated levels of groundborne vibration tend to occur in the early stages of site development (e.g., demolition, site preparation, pile driving) and occur intermittently within the construction phase. In consideration of the potential groundborne vibration impacts associated with construction activities as part of future development in the Planning Area, occupants and residents in nearby buildings may be annoyed or be exposed to temporary disturbance. However, considering the scope of the Project, certain types of construction activity could still result in groundborne vibrational impacts on nearby building occupants.

Depending on the distance to nearby existing structures, the more vibration-intensive construction activities (e.g., pile driving, vibratory rollers) could potentially exceed the criterion of 0.2 in/sec ppv at nearby structures.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Municipal Code Chapter 6.32 includes a noise control standard for construction, limiting construction activity to occur between 7 a.m. and 7 p.m. adjacent to residential land uses and 6 a.m. and 8 p.m. adjacent to nonresidential uses. By restricting construction activities when City residents are typically resting or sleeping (i.e., evening, nighttime), the standard greatly reduces potential vibrational impacts that would result in annoyance or loss of sleep. Policy N-1-7 addresses potential impacts on current and future sensitive land uses associated with construction noise, which would also address construction-generated vibration. Policy N-1-9 requires an impact assessment for projects using major vibration-generating equipment and the implementation of measures to reduce impacts associated with that equipment.

Conclusion

Construction activities in the Planning Area could generate groundborne vibration. In some cases, vibration levels may be high enough to affect structures or cause annoyance at sensitive receptors. As discussed above, the proposed Project includes policies to address the assessment and siting of development that may exceed the City's performance standard for noise-sensitive land uses. These policies would have a mitigating effect on construction vibration. With implementation of Policy N-1.9, this would be a **less than significant** impact.

Mitigation Measures

No additional mitigation required beyond compliance with existing standards and proposed General Plan policies.

5.10.5 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The proposed Project would result in population and employment growth over the planned buildout period for the Project. This growth would result in increased roadway traffic volumes and associated noise levels for major arterial and collector roadways throughout the Planning Area. Two rail lines currently run north–south through the City. Future plans regarding these rail lines, including increased frequency of train trips, may also affect noise-sensitive land uses in the City. Additionally, the City is located within the greater Sacramento metropolitan area and is also affected by cumulative impacts, including traffic noise, of projects in the surrounding areas that are not under the jurisdiction of the City. Cumulative development conditions would result in increased cumulative roadway noise levels. No stationary or non-transportation noise sources were identified in the surrounding area of the Planning Area that would have a cumulative impact on noise-sensitive land uses in the City. Therefore, the primary factor for cumulative impact analysis is the consideration of future roadway traffic noise levels.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Contribution to Cumulative Traffic Noise (Standards of Significance 1 and 3)

Impact 5.10.5 Implementation of the proposed Project would contribute to cumulative noise levels along many roadway segments in the Planning Area due to increased cumulative traffic volumes. As a result, the proposed Project would have a **cumulatively considerable** contribution to traffic noise levels on area roadways.

Predicted future cumulative transportation noise levels are projected to exceed the City's noise standards (see **Table 5.10-11**). This is considered a significant cumulative impact. While traffic volumes would likely increase irrespective of Project implementation, the proposed Project would introduce future development that would contribute to cumulative traffic volumes. Modeling results for traffic volumes resulting from the proposed Project show that there would be a cumulative contribution to traffic noise levels along major roadways in the Planning Area. As seen in **Table 5.10-13**, which includes cumulative traffic volumes in the with-Project scenario, traffic noise levels along roadways in the Planning Area would exceed the City's applicable noise standards for traffic noise as well as contribute to substantial increases in traffic noise levels along roadways that already currently exceed the City's noise level standards. These noise levels represent the existing plus Project condition. The cumulative condition would include this noise and any traffic noise resulting from growth outside of the Planning Area and would still exceed the City's noise level standards. The proposed Project's contribution would be cumulatively considerable.

Mitigation Measures

No additional feasible mitigation available beyond compliance with proposed General Plan policies.

The proposed Project includes policies specifically to address and limit traffic noise impacts on noise-sensitive land uses. However, given that information on all future development activity is not currently available, traffic noise mitigation measures may not be considered feasible for all noise-sensitive land uses that may be impacted. This may result in noise-sensitive land uses that are still exposed to traffic noise levels above applicable City standards. As a result, this impact is considered **cumulatively considerable** and **significant and unavoidable**.

Contribution to Cumulative Construction Noise and Vibration (Standards of Significance 1, 2, and 4)

Impact 5.10.6 Implementation of the proposed Project would not result in a substantial contribution to cumulative construction vibration and noise levels in the Project area. As a result, this impact would be considered **less than cumulatively considerable.**

Because construction noise and vibration are localized effects, only construction projects that occur close to one another could combine to result in a cumulative noise or vibration effect. Therefore, noise and vibration from construction projects outside of the City would not contribute to noise and vibration impacts in the City. This would be a **less than cumulatively considerable** impact. Impact 5.10.1 considers the potential for concurrent projects to be constructed in the City. As discussed in Impact 5.10.1, construction activities associated with future development projects may result in increases in noise levels surrounding individual project sites and may expose noise-sensitive land uses to intermittent vibration and noise levels above the City's applicable standards. As discussed previously, this construction activity would be intermittent and highly localized in nature. Policy N-1-7 addresses potential impacts on current and future sensitive land uses associated with construction noise by setting allowable construction hours to limit impacts on sensitive land uses. Considering the anticipated construction activity associated with the proposed Project, Policy N-1-8 would serve to further protect current and future sensitive land uses from noise impacts related to future development in the City. The City's Municipal Code regulations (Chapter 6.32) would also serve to mitigate the severity of construction noise associated with the proposed Project. With regard to construction vibration, Policy N-1-9 requires an impact assessment for projects using major vibration-generating equipment and the implementation of measures to reduce impacts associated with that equipment. In addition, noise-related policies controlling for construction noise would have a mitigating effect on construction vibration. With implementation of these policies, the proposed Project's contribution to construction-related noise and vibration would be **less than cumulatively considerable** and the cumulative impact would remain less than significant.

Mitigation Measures

No additional mitigation required beyond compliance with existing standards and proposed General Plan policies.

REFERENCES

Ascent Environmental. 2017. *Traffic Noise Spreadsheet Calculator*.

Caltrans (California Department of Transportation). 2002a. *California Airport Land Use Planning Handbook.*

———. 2002b. *Transportation Related Earthborne Vibrations (Caltrans Experiences).*

———. 2004. *Transportation and Construction-Induced Vibration Guidance Manual*.

———. 2009. *Technical Noise Supplement, Traffic Noise Analysis Protocol.*

———. 2013. *Transportation and Construction Vibration Guidance Manual*.

City of Elk Grove. 2003. *Elk Grove General Plan*.

———. 2016. *Elk Grove General Plan Update – Existing Conditions Report*

EPA (US Environmental Protection Agency). 1971. *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.*

Fehr & Peers. 2017. *Transportation Impact Analysis City of Elk Grove General Plan Update.*

FHWA (Federal Highway Administration). 2006. *Roadway Construction Noise Model User's Guide*. FHWA-HEP-05-054.

FICON (Federal Interagency Committee on Noise). 1992. *Federal Agency Review on Selected Airport Noise Analysis Issues.* Washington, D.C.

FTA (Federal Transit Administration). 2006. *Transit Noise and Vibration Impact Assessment Guidelines.* https://www.transit.dot.gov/regulations-and-guidance/environmental-programs/fta-noise-and-vibration-impact-assessment.

HUD (US Department of Housing and Urban Development, Office of Community Planning and Development). 1985. *The Noise Guidebook.*

SACOG (Sacramento Area Council of Governments). 2013. *Sacramento International Airport Land Use Compatibility Plan*.

5.11 PUBLIC SERVICES AND RECREATION

This section discusses potential environmental impacts associated with public facilities and services that would serve the Planning Area. Public services include fire protection, law enforcement, schools, parks and recreation, and libraries.

5.11.1 FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES

FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES EXISTING SETTING

Cosumnes Community Services District Fire Department

Fire protection services in the Planning Area are provided by the Cosumnes Community Services District (CCSD). Services include fire suppression, emergency medical services, technical rescue, and arson and explosion investigations in a 157-square-mile service area covering the City, Galt, and a portion of unincorporated southern Sacramento County. The service area encompasses a population of more than 185,000. The CCSD has 175 personnel in its Operations Division and operates out of eight fire stations with eight advanced life support (ALS) engine companies, one aerial ladder truck company, six rescue ambulance units, and one command vehicle, as well as other specialized apparatus for specialized emergency circumstances (CCSD 2017a). In 2016, the CCSD responded to 18,592 incidents, an 8.2 percent decrease from 2015. The CCSD's fire stations are at the following locations:

- Fire Station 45, 229 5th Street, central Galt
- Fire Station 46, 1050 Walnut Avenue, northeast Galt
- Fire Station 71, 8760 Elk Grove Boulevard
- Fire Station 72, 10035 Atkins Drive
- Fire Station 73, 9607 Bond Road; this station provides fire and emergency medical services
- Fire Station 74, 6501 Laguna Park Drive
- Fire Station 75, 2300 Maritime Drive
- Fire Station 76, 8545 Sheldon Road

In addition, three new fire stations are planned in the Planning Area: (1) Station 77 to be located within the Laguna Ridge Specific Plan Area near Whitelock Parkway; (2) Station 78, to be located within the South Pointe Land Use Policy Area near Kammerer Road; and (3) Station 79 to be located within the Eastern Elk Grove Community Plan Area near Grant Line Road.

Wildland Fire Hazards

Wildland fire hazards in the Planning Area are limited; there are no moderate, high, or very high fire hazard severity zones identified by the California Department of Forestry and Fire Protection (Cal Fire) in or adjacent to the Planning Area. However, the Sacramento County Local Hazard Mitigation Plan Update (LHMP) indicates the probability of a wildfire is highly likely and could be extensive geographically, and that climate change may be a factor in the probability of future occurrence (Sacramento County 2016: Table ES-2). Wildland fire hazard is discussed further in Section 5.8, Hazards and Hazardous Materials.

FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES REGULATORY FRAMEWORK

State

California Occupational Safety and Health Administration

In accordance with the California Code of Regulations, Title 8, Sections 1270 "Fire Prevention" and 6773 "Fire Protection and Fire Fighting Equipment," the California Occupational Safety and Health Administration has established minimum standards for fire suppression and emergency medical services. The standards include guidelines on the handling of highly combustible materials, fire hose sizing requirements, restrictions on the use of compressed air, access roads, and the testing, maintenance, and use of all firefighting and emergency medical equipment.

Uniform Fire Code

The Uniform Fire Code (Fire Code) (California Code of Regulations, Title 24, Part 9) contains regulations relating to construction, maintenance, and use of buildings. Topics addressed in the Fire Code include fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions intended to protect and assist fire responders, industrial processes, and many other general and specialized fire-safety requirements for new and existing buildings and the surrounding premises. The Fire Code also contains specialized technical regulations related to fire and life safety.

California Health and Safety Code

State fire regulations are set forth in Sections 13000 et seq. of the California Health and Safety Code. Regulations address building standards, fire protection and notification systems, fire protection devices such as extinguishers, smoke alarms, high-rise buildings, child care facility standards, and fire suppression training, among other topics.

Local

Elk Grove Municipal Code Chapter 16.85 Elk Grove Fire Fee

Municipal Code Chapter 16.85 establishes a fee program to fund the cost of capital facilities, the need for which is generated by the type and level of development designated in the current General Plan (City of Elk Grove 2003). The fee program applies to both residential and nonresidential development.

Elk Grove Municipal Code Chapter 17.04 California Fire Code

Municipal Code Chapter 17.04 codifies the City's adoption of the 2016 California Fire Code in its entirety.

FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES IMPACTS AND MITIGATION MEASURES

Standards of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G threshold of significance. A project is considered to have a significant effect on the environment if it will:

1) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection.

Methodology

The following impact analysis is based on a review of the proposed Land Use Diagram and General Plan policies related to fire protection and emergency medical services as well as discussions with CCSD Fire Department staff.

General Plan Policies and Standards

The proposed General Plan contains the following policies and standards for managing future development in the City to ensure adequate public services are provided for future development.

Policy ER-4-1: Cooperate with the Cosumnes Community Services District (CCSD) Fire Department to reduce fire hazards, assist in fire suppression, and promote fire safety in Elk Grove.

Standard ER-4-1.a: Require, where appropriate, on-site fire suppression systems for all new commercial and industrial development to reduce the dependence on fire department equipment and personnel.

Standard ER-4-1.b: Require the installation of earthquake-triggered automatic gas shut-off sensors in high-occupancy facilities and in industrial and commercial structures.

Policy ER-4-2: Work with the CCSD to develop a fire prevention plan that lists major fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each major hazard.

Policy SAF-1-3: Coordinate with the CCSD Fire Department to ensure that new station siting and resources are available to serve local needs.

Policy SAF-1-4: Expand emergency response services as needed due to community growth.

Project Impacts and Mitigation Measures

Fire Protection and Emergency Medical Services

Impact 5.11.1.1 Implementation of the proposed Project would increase demand for fire protection and emergency medical services, which could trigger the need for additional fire stations, the construction of which could result in impacts on the physical environment. This impact would be **less than significant**.

Implementation of the proposed Project in accordance with the proposed Land Use Diagram would result in new development and associated population growth, which would increase demand for fire protection and emergency medical services, thus requiring additional firefighters, paramedics, and other personnel. This increase in population is discussed in Section 3.0, Demographics, and the environmental impacts associated with the population increase are addressed throughout the technical sections (Sections 5.1 through 5.13) of this EIR.

Developed areas of the Planning Area are adequately served by the CCSD's existing fire stations and substantial new growth is not anticipated in these areas under the proposed Project. Where new growth areas within the City have been identified, new fire stations are planned to accommodate the anticipated growth. Because the timing of development that would occur in the Planning Area is not yet known, the physical impacts of construction of these facilities cannot be evaluated at this time.

Existing Regulations and Standards and Proposed General Policies That Provide Mitigation

Prior to development in the Study Areas, the City will require preparation of specific plans or other master planning, which would identify sites and funding sources for future stations determined necessary to meet anticipated demand. CEQA review of project-level impacts of future community plans would also be required, and would evaluate the environmental effects of any new facilities. Proposed General Plan Policies ER-4-1 and ER-4-2 are intended to reduce fire risk in the Planning Area by encouraging cooperation between the City and the CCSD as well as development of a fire prevention plan. Policies SAF-1-3 and SAF-1-4 call for coordination with the CCSD Fire Department to ensure that new station siting and resources are available to serve local needs and emergency response services are expanded as needed due to community growth.

The CCSD Fire Department receives its funding through property taxes, fees for service, and grant funding and can, therefore, fund expanded services as new development occurs. Pursuant to Municipal Code Chapter 16.85, Elk Grove Fire Fee, all new development projects would be required to pay fire protection development fees to fund additional facilities and equipment. These funds would help to pay for costs associated with the development of new fire stations, if needed, including any required environmental analysis.

Conclusion

Buildout of the Planning Area in accordance with the proposed Project would increase the number of residents and jobs in the City, which would increase demand for fire protection and emergency medical services. Compliance with applicable regulations and proposed General Plan policies would ensure new fire station siting and resources are available and that required environmental review would be conducted as specific fire protection facilities are proposed. Impacts associated with the construction of needed fire protection facilities would not exceed construction impacts disclosed in the technical sections of this EIR. Therefore, impacts related to the provision of fire services would be **less than significant.**

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and proposed General Plan policies.

FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for fire and emergency medical services includes all approved, proposed, and reasonably foreseeable development projects in the service area of the CCSD Fire Department.

Cumulative Impacts and Mitigation Measures

Cumulative Impacts to Fire Protection and Emergency Medical Services

Impact 5.11.1.2 Implementation of the proposed Project, in combination with other development within the CCSD's service area, would increase demand for fire protection and emergency medical services. This impact would be **less than cumulatively considerable**.

With adoption and implementation of the Project, proposed, approved, and reasonably foreseeable development in the CCSD service area would increase the demand for fire protection and emergency medical services, which would result in the need for new fire protection facilities, the construction of which could result in physical environmental effects. This is a potentially significant cumulative impact.

Funding from property taxes, development impact fees, and other sources of funding would provide sufficient resources to expand the department's staff, equipment, and facilities to accommodate future growth within the CCSD service area. In addition, as described previously, the City requires preparation of community plans prior to development in the Study Areas, which would determine the need for new stations and, if necessary, identify sites and funding sources. Further CEQA review of project-level impacts would be required prior to development of any new facilities. Implementation of applicable regulations and policies contained in the proposed Project would ensure further environmental review would be conducted as specific facilities are proposed, which would reduce the proposed Project's contribution to this impact to **less than cumulatively considerable**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and proposed General Plan policies.

5.11.2 LAW ENFORCEMENT

LAW ENFORCEMENT EXISTING SETTING

City of Elk Grove Police Department

The City of Elk Grove Police Department (EGPD) was provided at incorporation through a contract with the Sacramento County Sheriff's Department. The City created its own police department on October 28, 2006, with service boundaries that are contiguous with the City limits. The EGPD provides all law enforcement services in the service boundaries, including responding to crime-related events, handling traffic-related issues, and providing community services to the residents of Elk Grove.

The EGPD operates primarily out of two facilities located in the City Hall complex at 8380 and 8400 Laguna Palms Way. The service area is split into five police beats that are regularly patrolled. The EGPD has an authorized strength of 141 sworn officers and 86 civilian personnel and responds to an average of 52,000 calls for service per year (EGPD 2017).

California Highway Patrol

The California Highway Patrol (CHP) provides traffic regulation enforcement, emergency accident management, and service and assistance on State roadways, as well as traffic regulation enforcement throughout the State (including in the City), from its station located at 6 Massie Court, near the interchange of Mack Road and State Route (SR) 99. The CHP patrols all of Sacramento County south of the American River, which includes I-5 and SR 99 (City of Elk Grove 2003, p. 11-6).

LAW ENFORCEMENT REGULATORY FRAMEWORK

There are no federal, State, or local regulations related to law enforcement services associated with the proposed Project.

LAW ENFORCEMENT IMPACTS AND MITIGATION MEASURES

Standards of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G threshold of significance. A project is considered to have a significant effect on the environment if it will:

1) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for police protection.

Methodology

The following impact analysis is based on consultation with the EGPD as well as a review of proposed General Plan policies.

General Plan Policies and Standards

The proposed General Plan contains the following policies and standards for managing future development in Elk Grove to ensure adequate law enforcement services are provided for future development.

Policy SAF-1-1: Regularly monitor and review the level of police staffing provided in Elk Grove and ensure that sufficient staffing and resources are available to serve local needs.

Project Impacts and Mitigation Measures

Impacts to Law Enforcement Services

Impact 5.11.2.1 Implementation of the proposed Project would increase demand for law enforcement services, which could trigger the need for additional law enforcement facilities, the construction of which could result in impacts on the physical environment. This impact would be **less than significant**.

Buildout of the Planning Area in accordance with the proposed Project would increase the number of residents and jobs in the City, which would increase demand for law enforcement services. The EGPD would need to hire additional officers and other staff to accommodate this increased demand. The environmental impacts associated with the increase in population are evaluated in Section 3.0, Demographics as well as throughout the technical sections (Sections 5.1 through 5.13) of this EIR.

The EGPD operates out of a centralized facility at the City Hall complex and does not currently use any other facilities, such as substations. Assuming continued operation of the centralized facility, with the addition of new patrols in newly developed areas, the developed areas of the City and identified growth areas could be adequately served by this existing facility and no new facilities would be required. However, the community planning process for the Study Areas could identify sites and funding sources for future police substations or other facilities if determined necessary to meet anticipated demand. If such facilities are required, further CEQA review of project-level impacts would be conducted prior to any development. If new facilities are required to be constructed, however, the impacts of these facilities would not exceed the impacts assumed as part of development of the Planning Area and analyzed throughout this EIR.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

Proposed General Plan Policy SAF-1-1 directs regular monitoring and review of the level of police staffing provided in Elk Grove and to ensure that sufficient staffing and resources are available to serve local needs. Similar to funding for fire protection services, new staff and equipment necessary to provide additional law enforcement services would be funded by development impact fees, which would be required to be paid by all proposed development within the Planning Area, as well as by ongoing payments of property taxes.

Conclusion

Buildout of the Planning Area in accordance with the proposed Project would increase the number of residents and jobs in the City, which would increase demand for law enforcement services. Because additional police services to accommodate development can be accomplished through additional personnel and equipment, the physical impacts associated with the provision of law enforcement services would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies.

LAW ENFORCEMENT CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for law enforcement services includes all approved, proposed, and reasonably foreseeable development projects in the Planning Area, which is the area served by the EGPD.

Cumulative Impacts and Mitigation Measures

Cumulative Law Enforcement Impacts

Impact 5.11.2.2 Implementation of the proposed Project, in combination with other development in the Planning Area, would increase demand for law enforcement services. The proposed Project's contribution to this impact would be **less than cumulatively considerable**.

Future development consistent with the existing General Plan that could occur in the current City limits could be adequately served by the EGPD. Thus, there would not be a significant cumulative impact without the proposed Project. Additional development in the Study Areas, as proposed by the Project, would further increase demands on police protection services. The proposed Project, in combination with other proposed, approved, and reasonably foreseeable development in the City, would contribute to a cumulative increase in the demand for law enforcement services.

As discussed above, the addition of new patrols in newly developed areas could be adequately served by the existing centralized facility; no new facilities would be required. If new facilities are determined necessary to serve future development, CEQA review of project-level impacts would be conducted for those facilities. Because the entire Planning Area is assumed for development, however, the physical impacts of facility construction would not exceed the impacts assumed as part of development of the Planning Area and analyzed throughout this EIR. Because additional police services to accommodate development can be accomplished through additional personnel and equipment, the proposed Project's contribution to this impact would be **less than cumulatively considerable**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies.

5.11.3 PUBLIC SCHOOLS

PUBLIC SCHOOLS EXISTING SETTING

The City is located within the service area of the Elk Grove Unified School District (EGUSD). The EGUSD covers 320 square miles and is the fifth largest school district in California and the largest in Northern California (CDE 2017). The EGUSD boundaries encompass the entire City, portions of the Cities of Sacramento and Rancho Cordova, and most of southern Sacramento County. Currently, the EGUSD provides education to over 62,000 students and operates 66 schools: 42 elementary schools, 9 middle schools, 9 high schools, 1 alternative education school, 4 continuation schools, and 1 special education school. As shown in **Table 5.11.3-1**, enrollment in the EGUSD has remained essentially unchanged since the 2011/12 school year (2011). The EGUSD's average classroom size in the 2015/16 school year was 21.3, which was lower than the County and State averages of 24.0 and 25.4, respectively (EDP 2018).

TABLE 5.11.3-1
ELK GROVE UNIFIED SCHOOL DISTRICT ENROLLMENT BY GRADE (2011/12–2016/17)

Enrollment by Grade	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17
Kindergarten	4,483	4,470	4,588	4,721	4,869	4,961
Grade 1	4,586	4,624	4,583	4,425	4,158	4,353
Grade 2	4,651	4,593	4,627	4,676	4,507	4,210
Grade 3	4,611	4,715	4,647	4,705	4,762	4,656
Grade 4	4,622	4,641	4,820	4,734	4,791	4,863
Grade 5	4,678	4,715	4,731	4,851	4,786	4,873
Grade 6	4,766	4,766	4,805	4,813	4,929	4,936
Grade 7	4,875	4,835	4,866	4,942	4,978	5,071
Grade 8	4,918	4,850	4,904	4,901	4,995	5,013
Grade 9	4,975	4,850	4,865	4,918	4,860	4,984
Grade 10	4,698	4,941	4,812	4,836	4,880	4,841
Grade 11	4,792	4,659	4,885	4,766	4,819	4,867
Grade 12	5,006	4,994	4,843	5,035	4,898	4,925
Ungraded	462	484	523	565	535	509
Total	**62,123**	**62,137**	**62,499**	**62,888**	**62,767**	**63,061**

Source: EDP 2018

PUBLIC SCHOOLS REGULATORY FRAMEWORK

State

Leroy F. Greene School Facilities Act of 1998 (SB 50)

Proposition 1A/SB 50 (Chapter 407, Statutes of 1998) created the School Facility Program where eligible school districts can obtain State bond funds. State funding requires matching local funds, which generally come from developer fees. SB 50 significantly altered the system of fees that can be placed on new development in order to pay for the construction of school facilities. SB 50 also eliminated the ability of cities and counties to require full mitigation of school impacts, replacing it with the ability of school districts to assess fees to offset the costs associated with increasing school capacity due to new development. Three levels of developer fees were established by SB 50. Level 1 fees are currently capped at $2.97 per square foot for new residential development and $0.47 per square foot for commercial and industrial (nonresidential) development and age-restricted senior housing. As an alternative to Level 1 fees, school districts meeting certain criteria may collect Level 2 fees, which are calculated under a formula in SB 50. Level 3 fees are approximately double Level 2 fees and are implemented only when the State Allocation Board is not apportioning State bond funds. Proposition 1D, passed on November 7, 2006, precludes the implementation of Level 3 fees for the foreseeable future. Although SB 50 states that payment of developer fees are "deemed to be complete and full mitigation" of the impacts of new development, there is potential that fees and State funding do not necessarily fully fund new school facilities.

The three levels of developer fees established by SB 50 are further described below.

1) Level 1 fees are base statutory fees. As of January 30, 2008, the maximum assessment for fees was $2.97 per square foot of residential development and $0.47 per square foot of commercial/industrial development and age-restricted senior housing.

2) Level 2 fees allow the school district to impose developer fees above the statutory levels, up to 50 percent of certain costs under designated circumstances. The State would match the 50 percent funding if funds are available.

3) Level 3 fees apply if the State runs out of bond funds after 2006, allowing the school district to impose 100 percent of the cost of the school facility or mitigation minus any local dedicated school monies.

In order to levy the alternate (Level 2) fee and qualify for 50 percent State-matching funds, a school district must prepare and adopt a school facilities needs analysis, apply and be eligible for State funding, and satisfy specified criteria. The ability of a city or county to impose fees is limited to the statutory and potential additional charges allowed by the act, as described above.

Local

Elk Grove Unified School District Funding

EGUSD operations are primarily funded through local property tax revenue that is first accrued in a common statewide pool, and then allocated to each school district based on average daily attendance. State law also permits the charging of development fees to assist the EGUSD in funding capital acquisition and improvements to programs for school facilities, based on documented justification that residential and nonresidential development projects generate students. The EGUSD allows the imposition of fees that can be adjusted periodically, consistent with SB 50. Developer fees, adopted by the Board of Education on May 16, 2017, are $5.43 per square foot of residential space and $0.56 per square foot of commercial/industrial space. The EGUSD also collects a Mello-Roos tax, with the taxes applied at various stages during project review and development.

PUBLIC SCHOOLS IMPACTS AND MITIGATION MEASURES

Standards of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G threshold of significance. A project is considered to have a significant effect on the environment if it will:

1) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for schools.

Methodology

To determine the proposed Project's impact on school facilities, student generation rates were obtained from the EGUSD. Based on these generation rates and the number of residential units proposed, this analysis estimates the number of elementary, middle, and high school students who would need to be accommodated by the EGUSD.

General Plan Policies and Standards

The proposed General Plan contains the following policies and standards related to the provision of public schools to serve the Planning Area:

Policy CIF-4-1: While recognizing that public school siting and development are not within the jurisdiction of the City to control, the City strongly encourages the school district to consider the following school siting criteria:

- Traffic impacts on nearby roadways should be addressed and mitigated to meet City standards for roadway performance targets.
- Schools should not be located on main roadway corridors characterized by high speeds (>35 miles/hr).
- Schools should serve as a focal point of neighborhood activity and be interrelated with congregation facilities, parks, greenways and off-street paths whenever possible.
- Almost all residences should be within walking distance of a school (1 mile or less) and all residences should be located within 2 miles of a school whenever possible.
- New schools should be located adjacent to neighborhood and community parks whenever possible and designed to promote joint use of appropriate facilities.
- New schools should link with trails, bikeways, and pedestrian paths wherever possible.

Policy CIF-4-2: Require specific plans and other land use master plans to identify existing and planned school sites within their project areas and to propose guidance for incorporating new schools into overall neighborhood design.

Project Impacts and Mitigation Measures

Public School Facilities

Impact 5.11.3.1 Implementation of the proposed Project would allow for future development in the Planning Area, which would result in an increase of school-aged children and require the construction of new public school facilities, the construction of which could have impacts on the physical environment. This impact would be **potentially significant**.

With the anticipated development under the proposed Project, a substantial number of school-aged children would reside in the Planning Area, triggering the need for additional public school facilities. **Table 5.11.3-2** summarizes the EGUSD student generation rates from the School Facility Needs Analysis (EGUSD 2017).

TABLE 5.11.3-2
STUDENT GENERATION RATES

Grade Level	Single-Family Units	Multi-Family Units
Elementary K–6	0.4044	0.2108
Middle School 7–8	0.1108	0.0541
High School 9–12	0.2004	0.1270

Source: EGUSD 2017

The student generation rates are for single-family and multi-family units. For the purposes of this analysis, it is assumed that all land designated high-density residential or mixed-use would be multifamily units; all land designated low-density residential, estate residential, or rural residential would be single-family units; and land designated medium-density residential would be 50 percent multifamily units and 50 percent single-family units. Dwelling units proposed are based on development capacity assumptions for the proposed Project. **Table 5.11.3-3**, which summarizes the Project's anticipated student generation, shows the proposed Project would be expected to generate a total of 28,608 school-aged children, including 15,981 kindergarten through sixth grade students; 4,315 seventh through eighth grade students; and 8,311 ninth through twelfth grade students.

TABLE 5.11.3-3
STUDENT GENERATION

	Dwelling Units Proposed		Student Generation			
	Single-Family	**Multifamily**	**K–6**	**7–8**	**9–12**	**Total**
City Limits	8,753	8,752	5,385	1,443	2,866	9,694
North Study Area	310	0	125	34	62	221
East Study Area	4074	737	1,803	491	910	3,204
South Study Area	11,278	4,697	5,551	1,504	2,587	9,642
West Study Area	6,050	3,183	3,118	843	1,617	5,578
		Subtotal	15,982	4,315	8,042	
					Total	**28,339**

Developed areas within the current City limits are adequately served by existing EGUSD schools. Anticipated growth under the proposed Project in the current City limits and the Study Areas would require new or expanded public school facilities. Where new growth in the existing City would occur, such as in approved specific plan areas, new school sites have been assumed as part of the planning process to accommodate the anticipated growth. Prior to development of the Study Areas, community plans would be prepared that would identify sites and funding sources for future schools as determined necessary to meet anticipated demand.

Existing Laws and Proposed General Plan Policies That Mitigate Impacts

Proposed General Plan Policy CIF-4-2 requires specific plans and other land use master plans to identify future school sites and propose guidance for incorporating new schools into overall neighborhood design.

California Government Code Section 65995(h) states that "the payment or satisfaction of a fee, charge or other requirement levied or imposed...[is] deemed to be full and complete mitigation of the impacts of any legislative or adjudicative act, or both, involving, but not limited to, the planning, use, or development of real property, or any change in governmental organization or reorganization as defined in Section 56021 or 56073, on the provision of adequate school facilities." All residential development within the Planning Area would be subject to the EGUSD residential fee in place at the time an application is submitted for a building permit. Under CEQA, payment of EGUSD residential development fees is considered to fully mitigate the need for school facilities generated by Project implementation.

Conclusion

The proposed Project would increase enrollment in the EGUSD, which could exceed school capacities. Exceeding school capacity would not be considered a physical impact under CEQA, and payment of fees is considered full mitigation. Policy CIF-4-2 requires specific plans and other land use master plans to identify future school sites and propose guidance for incorporating new schools into overall neighborhood design. Payment of fees is considered full mitigation related to school capacity.

Construction or expansion of public school facilities to accommodate population growth could result in significant impacts on such resources as aesthetics, air quality, biology, cultural resources, geology, hazards and hazardous materials, water quality, noise, and transportation. Because the location of any such public school facility has not been determined, it is speculative to address any precise environmental impacts associated with them. The actual impacts of new school facilities would depend upon the specific type and location of those facilities, and therefore project-specific environmental review would be required. Because the entire Planning Area is assumed for development, however, the physical impacts of facility construction would not exceed the impacts assumed as part of development of the Planning Area and analyzed throughout this EIR. Nonetheless, because school facilities would be constructed by the EGUSD, which is not subject to local regulations or any proposed General Plan policies, this impact would be **potentially significant**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing laws and proposed General Plan policies.

While the EGUSD could and should implement measures to reduce physical environmental effects of school development, the EGUSD is not subject to mitigation adopted by the City. No enforceable measures are available. Therefore, this impact would remain **significant and unavoidable.**

PUBLIC SCHOOLS CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for the proposed Project is the service area of the EGUSD.

Cumulative Impacts and Mitigation Measures

Cumulative Public School Impacts

Impact 5.11.3.2 Implementation of the proposed Project, in combination with other development in the EGUSD service area, would result in the increase of school-aged children, which would require the construction of new public school facilities, which could have impacts on the environment. This impact would be **cumulatively considerable**.

As noted above, the EGUSD boundaries encompass not only the Planning Area, but portions of the cities of Sacramento and Rancho Cordova, and most of southern Sacramento County. The EGUSD (2017) determined in the facility needs analysis that it is currently lacking capacity for 7,244 grades K–6 students, 359 grades 7–8 students, 129 grades 9–12 students, and 1,240 Special Day Class Severe students. Given the EGUSD's current shortage of classroom space and the potential for additional development to further increase demand for school space, and thus school construction, the cumulative impact is considered significant.

Implementation of the proposed Project, in combination with the existing shortage in class space and other planned and approved projects in the EGUSD service area, would increase the student population in the district, requiring the expansion of existing facilities or construction of new facilities. Construction of these facilities would be similar to that identified throughout this EIR for development within the Planning Area. While the proposed Project includes policies to ensure development in the Planning Area would be reduced to the extent feasible, these policies would not apply to the EGUSD. Therefore, the Project's contribution to this impact would be **cumulatively considerable**.

Mitigation Measures

No additional feasible mitigation available beyond compliance with existing laws and proposed General Plan policies.

While the EGUSD could and should implement measures to reduce physical environmental effects of school development, the EGUSD is not subject to mitigation adopted by the City. No enforceable measures are available. Therefore, this impact would remain **significant and unavoidable**.

5.11.4 PARKS AND RECREATION

PARKS AND RECREATION EXISTING SETTING

Cosumnes Community Services District

The CCSD provides parks and recreation services to the City through its Parks and Recreation Department. CCSD parks and recreation services operate exclusively within the local community. The CCSD encompasses an area bounded on the north by Calvine Road, on the south by Twin Cities Road, and on the east by Grant Line Road. The western boundary of the CCSD is approximately 1.5 miles west of I-5 (CCSD 2009).

The CCSD plans and designs new parks; owns, operates, and maintains parks and community centers; manages rentals of community centers, picnic sites, and sports fields; and offers recreation programs. Currently, the CCSD manages 98 parks, 18 miles of off-street trails, 2 community centers, 4 recreation centers, and 2 aquatics complexes. Within the City, as of 2016, there are 883.3 acres of parkland. The Parks and Recreation Department has a staff of 68 full-time employees (CCSD 2017b).

The City and the CCSD maintain a goal of providing a minimum of 5 acres of active use parkland per 1,000 residents (CCSD 2009).

The CCSD also provides recreation services and recreation programs for all ages, including special events, preschools, summer camps, teen programs, special interest classes, before- and after-school recreation, nontraditional sports, therapeutic recreation, youth and adult sports, and aquatic programming (CCSD 2017b).

The City and CCSD have entered into a Memorandum of Understanding (MOU) concerning the development of park and recreation facilities in the City. The MOU addresses funding, programming, construction, ownership, and maintenance of park and recreational facilities in the geographic limits of the City.

Park Descriptions and Park Design Principles

Following are the park categories and associated descriptions and design principles used by the CCSD and the City in park facility planning and design (CCSD 2009).

The CCSD is preparing an update to the Parks and Recreation Master Plan. As part of the Parks and Recreation Master Plan, the City and CCSD will jointly adopt amendments to the Park Design Principles, which establish requirements for the siting and sizing of new park facilities, as well as the design characteristics for these facilities. The update to the Parks and Recreation Master Plan and the Park Design Principles is being coordinated with the proposed Project, as these describe the service area and design objectives for new parks and recreation facilities in the community.

Local Park

Local parks generally range from one to three net acres and include amenities such as playgrounds targeted for ages 2 to 5 and 5 to 12, small sport court, swings, benches, and landscaping. Local parks typically have a localized service radius of approximately one-quarter mile and include passive and active land usage, reflecting the overall standards of the entire park system. Local parks serve limited and/or isolated recreational needs. Neighborhood Parks

A neighborhood park should be 3 to 10 acres; however, some neighborhood parks are determined by use and facilities offered and not by size alone. The service radius for a neighborhood park is one-half mile or six blocks. Neighborhood parks should have safe pedestrian access for surrounding residents; parking may or may not be included but, if included, accounts for less than ten cars and provides ADA access. Neighborhood parks serve as the recreational and social focus of the adjoining neighborhoods and contribute to a distinct neighborhood identity.

Community Park

Community parks generally range from 20 to 100 acres, and are designed to be accessible to multiple neighborhoods and focus on meeting community-based recreational needs, as well as preserving unique landscapes and open spaces. Community parks are generally larger in scale than neighborhood parks, but smaller than regional parks, and are designed for residents who live within a one- to two-mile radius. When possible, the park should be developed adjacent to a school.

Community parks provide recreational opportunities for the entire family and often contain facilities for specific recreational purposes such as the following: athletic fields, aquatic center, tennis courts, multipurpose recreation center, loop trails, picnic areas, reservable picnic shelters, sports courts, permanent restrooms, large playgrounds for both age 2 to 5 and 5 to12, large turfed and landscaped areas, and a playground or spray ground. Passive outdoor recreation activities such as meditation, quiet reflection, and wildlife watching also take place at community parks.

Regional Park

Regional parks serve a large area of several communities, residents within a city or county, or across multiple counties. Depending on activities within a regional park, users may travel as many as 60 miles for a visit. Regional parks include recreational opportunities such as soccer, softball, golf, boating, camping, conservation-wildlife viewing, and fishing. Although regional parks usually have a combination of passive areas and active facilities, they are likely to be predominantly natural resource-based parks.

Regional parks are commonly 100 to 1,000 acres, but some can be 2,000 to 5,000 acres in size. A regional park focuses on activities and natural features not included in most types of parks and are often based on a specific scenic or recreational opportunity. Facilities could include those found in a community park as well as specialized amenities such as an art center, amphitheater, boating facility, golf course, or natural area with interpretive trails. Regional parks can and should promote tourism and economic development, as they can enhance the economic vitality and identity of the entire region.

Sports Complex

Sports complexes at community parks and stand-alone sports parks are developed to provide 4 to 16 fields or courts in one setting. A sports complex may also support extreme sports facilities, such as BMX and skateboarding. Sports complexes can be single-focused or multi-focused and can include indoor or outdoor facilities to serve the needs of multiple users. Outdoor fields should be lighted to maximize value and productivity of the complex. Agencies developing sports complexes focus on meeting the needs of residents. This may include facilities appropriate for attracting sport tournaments.

Special Use Park/Facility

Special use facilities are those spaces that do not fall within a typical park classification. A major difference between a special use facility and other parks is that they usually serve a single purpose, whereas other park classifications are designed to offer multiple recreation opportunities. It is possible for a special use facility to be located inside another park. Special use facilities generally fall into one of the following categories:

- Historic/Cultural/Social Sites – Unique local resources offering historical, educational, and cultural opportunities. Examples include historic downtown areas, commercial zones, plaza parks, performing arts parks, arboretums, display gardens, performing arts facilities, indoor theaters, churches, and amphitheaters. Frequently, these are located in community parks.

- Golf Courses – Nine- and 18-hole complexes with ancillary facilities such as clubhouses, driving ranges, program space, and learning centers. These facilities are highly maintained and can support a wide age range. Programs are targeted for daily use play, tournaments, leagues, clinics, and special events. Operational costs come from daily play, season pass holders, concessions, driving range fees, earned income opportunities, and sale of pro shop items.

- Indoor Recreation Facilities – Specialized or single-purpose facilities. Examples include multipurpose recreation centers and community theaters. Frequently, these are located in community parks.

- Outdoor Recreation Facilities – Examples include aquatic parks, disc golf, skateboard, BMX, and dog parks, which may be located in a park.

Greenbelt/Trail/Paseo

Greenbelts, trails, and paseos are recognized for their ability to connect people and places and often include either paved or decomposed granite trails. Trails can also be loop trails in parks. Linking neighborhoods, parks, recreation facilities, attractions, and natural areas with a multiuse trail fulfills two guiding principles simultaneously: protecting natural areas along river and open space areas and providing people with a way to access and enjoy them. Multiuse trails also offer a safe, alternative form of transportation, substantial health benefits, habitat enhancements for plants and wildlife, and unique opportunities for outdoor education and cultural interpretation.

Open Space/Natural Area

Open space and natural areas are undeveloped but may include natural or paved trails. Grasslands under power line corridors are one example; creek areas are another. Open spaces often contain natural resources that can be managed for recreation and natural resource conservation values such as a desire to protect wildlife habitat, water quality, and/or endangered species. Open spaces also can provide opportunities for nature-based, unstructured, low-impact recreational opportunities such as walking and nature viewing.

Funding

Landscape and Lighting Assessment District Funds

The CCSD's Landscape and Lighting Assessment District was originally formed in 1994 and included nine benefit zones. Subsequent zones were formed and added to the CCSD as the City developed. As of 2008, 13 geographic benefit zones, plus a district-wide benefit zone, have been created.

Fees are levied on parcels to help fund maintenance, repair, replacement, services, utilities, and capital improvements associated with parks, certain landscape medians owned by the City, corridors, trails, open space, and recreation facilities. The assessment rates in each zone are set to be consistent with the benefits received by the property owners paying the assessments in each zone. The facilities and benefits are specific to each zone; thus, the rates vary based on the number and types of facilities present in that zone and the costs required to maintain them (CCSD 2009).

Quimby Act Fees

Quimby Act fees are collected from developers in lieu of land dedication for parks and recreation facilities. The revenues must be used "for the purpose of developing new or rehabilitating existing neighborhood or community parks or recreational facilities to serve the subdivision." California Government Code Section 66477 provides the authority and formula for the dedication or the payment of fees for subdivisions. The City conditions projects for the payment of Quimby fees, while the CCSD administers the fee collection.

Park Development Impact Fees

Park development impact fees (park fees) are a revenue source approved as part of a public facility financing plan. These fees are collected from developers at the time a building permit is issued. The revenue must be used to benefit the residents of the planning area from which the fee was collected. Park fees are collected in the East Franklin and Eastern Elk Grove areas, including the Elk Grove/West Vineyard and Eastern Elk Grove fee programs.

California Government Section 66000 et seq. sets forth the procedural requirement for establishing and collecting park fees. These procedures require that "a reasonable relationship or nexus must exist between a governmental exaction and the purpose of the condition."

Other Sources of Funding

New park facilities are also funded through property taxes, Mello-Roos funds, and grants. In addition, the City has identified six plan area development impact fee programs that are used to fund parks and related facilities in specific planning areas. These plan areas include Stonelake, Lakeside, Laguna West, Laguna Ridge, Eastern Elk Grove, and East Franklin.

PARKS AND RECREATION REGULATORY FRAMEWORK

State

Quimby Act

The goal of the 1975 Quimby Act (California Government Code Section 66477) was to require developers to help mitigate the impacts of property improvements by requiring them to set aside land, donate conservation easements, or pay fees for park improvements. The Quimby Act gave authority for passage of land dedication ordinances only to cities and counties, thus requiring special districts to work with cities and/or counties to receive parkland dedication and/or in-lieu fees. The fees must be paid and land conveyed directly to the local public agencies that provide parks and recreation services community-wide. Revenues generated through the Quimby Act cannot be used for the operation and maintenance of park facilities (Westrup 2002).

Originally, the Quimby Act was designed to ensure "adequate" open space acreage in jurisdictions adopting Quimby Act standards (e.g., 3 to 5 acres per 1,000 residents). In some California communities, the acreage fee was very high where property values were high, and many local governments did not differentiate on their Quimby fees between infill projects and greenbelt developments. In 1982, the Quimby Act was substantially amended via AB 1600. The amendments further defined acceptable uses of or restrictions on Quimby funds, provided acreage/population standards and formulas for determining the exaction, and indicated that the exactions must be closely tied (nexus) to a project's impacts as identified through traffic studies required by CEQA. AB 1600 requires agencies to clearly show a reasonable relationship between the public need for the recreation facility or parkland and the type of development project on which the fee is imposed (Westrup 2002). Cities or counties with a high ratio of parkland to inhabitants can set a standard of 5 acres per 1,000 residents for new development; those with a lower ratio can only require the provision of up to 3 acres of parkland per 1,000 residents. The calculation of this parkland-to-population ratio is based on a comparison of the population count of the last federal census to the amount of city- or county-owned parkland.

Local

City of Elk Grove – Park and Recreation Dedication and Fees

Municipal Code Chapter 22.40 requires tentative subdivision and tentative parcel map applicants to dedicate land or pay an in-lieu fee for the development of neighborhood and community parks, and provides a formula for calculating the in-lieu fee. The parkland acquisition and development standard is 5 acres per 1,000 residents when not located in Laguna Ridge.

Parks and Recreation Master Plan

The Parks and Recreation Master Plan is a joint document prepared and approved by the CCSD and the City. The Master Plan was developed to guide both agencies in providing parks and recreation opportunities for residents in the City and in the CCSD boundaries. The Master Plan establishes a clear direction for the CCSD's core services and responsibilities, defines service priorities and capital investments, and outlines the manner in which the parks and recreation facilities and program services will be funded and delivered (CCSD 2009).

Elk Grove Bicycle, Pedestrian and Trails Master Plan

The Elk Grove Bicycle, Pedestrian and Trails Master Plan (2014) is the expression of the City's desire to have an exemplary off-street multiuse trail system that provides connectivity throughout the City and the wider Sacramento region in order to offer recreational opportunities and an alternative method for transportation for City residents. To achieve this trail system, the City acknowledges the necessity to provide direction on where trails should be located; set design standards and guidelines to describe the desired characteristics of trails; identify funding sources for trail planning, construction, and maintenance; establish prioritization criteria for which trail projects to implement first; and describe the City and interagency collaborative actions required to create the trail system. The City Council adopted the first Trails Master Plan in January 2007, but the plan is continually updated as goals are achieved, as new funding sources become available. The current plan was adopted in 2014.

PARKS AND RECREATION IMPACTS AND MITIGATION MEASURES

Standards of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G threshold of significance. A project is considered to have a significant effect on the environment if it will:

1) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives for parks.

Methodology

The following impact analysis is based on the development potential of the proposed Project (see **Table 2.0-2** in Section 2.0, Project Description) as well as the Parks and Recreation Master Plan and the City's park standards.

General Plan Policies and Standards

The proposed Project contains the following policies and standards for managing future development in the City to ensure adequate park and recreation facilities are provided for future development.

Policy PT-1-1: Work in conjunction with the CCSD to provide parks and recreation services for Elk Grove residents in accordance with the Parks and Recreation Master Plan, the Park Design Principles, and the Bicycle, Pedestrian, and Trails Master Plan.

Policy PT-1-2: Land use and management of parks and facilities will be provided in conjunction with all other agencies that provide park and trail facilities.

Policy PT-1-3: Require the provision of park land at a minimum of 5 acres per 1,000 residents, consistent with the Quimby Act.

Policy PT-1-4: Promote investment in and upgrades to park infrastructure and services within the City's limited role under the Memorandum of Understanding with the CCSD.

Policy PT-1-5: Funding for maintenance of parks and/or trails shall be assured to the City's satisfaction prior to approval of any Final Subdivision Map which contains or contributes to the need for public parks and facilities.

Policy PT-1-6: Work with the CCSD to provide designated park and open space areas in growth areas, and require developers to incorporate open space where appropriate as a condition of project approval.

Policy PT-1-7: Coordinate with the CCSD to prioritize the development of new parks and other recreational services, including low-impact facilities and equipment for older adults and the disabled, in underserved neighborhoods.

Policy PT-1-8: Encourage the CCSD to develop self-supporting recreation programs for those activities that go beyond basic recreation needs. Examples include outdoor and indoor swimming lessons or sports teams, and classes (such as a preschool or day care facility) or reading groups at community centers. The City may also develop and operate such programs independently.

Policy PT-1-9: The City encourages park development adjacent to school sites to allow for concurrent use of the facilities when appropriate.

Policy PT-1-11: Incorporate open space areas into all projects to the extent feasible.

Policy PT-1-12: Design projects adjacent to open space areas in a manner that protects the integrity and function of the open space area.

Policy PT-1-14: Where feasible, provide pedestrian, bicycle, and equestrian trails in open space areas, with an emphasis on trail connections to area-wide systems.

Policy PT-2-1: Work with nearby jurisdictions to plan for a connected network of trails and parks throughout the region that link to housing, employment and commercial centers, public transit, and community facilities.

Policy PT-2-2: Explore additional trail and path connections between parks, greenbelts, waterways, and regional open spaces to enhance access and recreational opportunities for the community.

Project Impacts and Mitigation Measures

Increased Demand for Park and Recreational Facilities

Impact 5.11.4.1 Implementation of the proposed Project would increase requirements for park and recreation facilities, and trails, the construction of which could result in impacts on the physical environment. This impact would be **less than significant**.

Buildout of the Planning Area in accordance with the proposed Project would substantially increase the number of residents and jobs in the City, which would increase demand for parks and other recreational facilities. Within the City, as of 2016 there are 883.3 acres of parkland, which adequately serves the existing population of 171,059 at a ratio of approximately 5 acres per 1,000 residents. At buildout of the Planning Area, the City is projected to have a total population of 329,338. To meet the City standard of 5 acres of developed parkland per 1,000 residents, an additional 764 acres of developed parkland, at minimum, would need to be developed. Increased demand on existing facilities would also occur.

The Preferred Alternative Land Use Map (see **Figure 2.0-3** in Section 2.0, Project Description) identifies approximately 2,333 acres of land that would be designated parks and open space (including existing park and recreational facilities). A portion of this would count towards the City's parkland requirements, while the balance includes other open space areas including trails. In addition, individual development projects under the proposed Project would be reviewed to ensure consistency with the Elk Grove Bicycle, Pedestrian, and Trails Master Plan, which may result in the requirement for new or expanded bicycle routes and trails.

Construction or expansion of park, recreation, and trail facilities to achieve and maintain City standards and to accommodate future population growth could result in significant impacts on such resources as aesthetics, air quality, biology, cultural resources, geology, hazards and hazardous materials, water quality, noise, and transportation. Because the location of any such facilities has not been determined, determining any associated environmental impacts would be speculative at this time. Future new or expanded park facilities would be constructed within the Planning Area boundaries. Because the entire Planning Area is assumed for development, the physical impacts of facility construction would not exceed the impacts assumed as part of development of the Planning Area as analyzed in this EIR.

Existing Regulations and Standards and Proposed General Plan Policies That Provide Mitigation

CCSD parkland standards, Municipal Code Chapter 22.40, and proposed General Plan Policy PT-1-3 require a minimum of 5 acres of developed parkland per 1,000 residents. The City requires that private developers proposing residential projects in the City either dedicate land for park facilities or pay a fee in lieu of providing parkland. These fees are collected by the City as part of the development review process and used for the purpose of developing new park facilities to serve the development for which the fees were paid.

In addition to parkland requirements established in Policy PT-1-3, Policy PT-1-5 requires assurance of funding for maintenance of parks and/or trails prior to City approval of any Final Subdivision Map that contain or contributes to the need for public parks and facilities. Policy PT-1-6 directs coordination with the CCSD to provide designated park and open space areas in growth areas, and requires developers to incorporate open space where appropriate as a condition of approval. Policies PT-1-9 encourages park development adjacent to school sites to allow for concurrent use of the facilities when appropriate.

As part of the CCSD's Parks and Recreation Master Plan update, the City and the CCSD will jointly adopt amendments to the Park Design Principles, which establish requirements for the siting and sizing of new park facilities, as well as the design characteristics for these facilities. The update to the Parks and Recreation Master Plan and the Park Design Principles is being coordinated with the proposed Project, as these describe the service area and design objectives for new parks and recreation facilities in the community.

Conclusion

Buildout of the Planning Area in accordance with the proposed Project would increase the use of existing and generate new demand for parkland and facilities. The dedication of land or payment of in-lieu fees, in combination with policies in the proposed General Plan, would ensure that impacts related to deterioration of existing parks and recreation facilities would not occur. New parkland and facilities would be constructed using development impact fees to ensure a minimum of 5 acres of developed parkland per 1,000.

As noted above, the City and the CCSD have entered into an MOU regarding delivery of some parks and recreation facilities within the City's existing boundaries. Development projects outside of the MOU areas that include the construction of recreation facilities would be subject to proposed General Plan policies and mitigation measures identified in this EIR to reduce physical environmental effects. The CCSD would be responsible for the construction of facilities in the MOU areas and would be required to comply with mitigation monitoring and reporting program (MMRP) from the relevant project-level CEQA document in which the park facilities would be located. Therefore, the construction of park facilities would be subject to policies, standards, and mitigation measures from the General Plan and this EIR, or the mitigation identified in project-specific MMRPs. The impacts of park construction would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with proposed General Plan policies and construction-related mitigation identified in this EIR.

PARKS AND RECREATION CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for parks and recreation is the CCSD service area. The CCSD provides parks and recreation services to the City, and these services operate exclusively within the City.

Cumulative Impacts and Mitigation Measures

Cumulative Impacts to Park and Recreational Facilities

Impact 5.11.4.2 The proposed Project would result in a cumulative increase in demand for parkland and recreational facilities, the construction of which could impact the physical environment. This impact would be **less than cumulatively considerable**.

The CCSD provides parks and recreation services exclusively within the City. Therefore, the cumulative impact of providing parks and recreation services in the City would not differ from that described in Impact 5.11.4.1, and would not exceed impacts of provision of parks and recreation facilities for the proposed Project. The CCSD would be responsible for the construction of facilities in the MOU areas and would be subject to project-specific mitigation identified in applicable MMRPs and other park construction would be subject to policies, standards, and mitigation measures from the General Plan and this EIR, the cumulative impact would be significant. The proposed Project would not change the significance of the impact and the Project's contribution to the impact would be **less than cumulatively considerable**.

Mitigation Measures

No additional mitigation required beyond compliance with proposed General Plan policies and construction-related mitigation measures identified in this EIR.

REFERENCES

CCSD (Cosumnes Community Services District). 2009. *Parks and Recreation Master Plan Summary Report, September 2009 Update*.

———. 2017a. "About the Cosumnes CSD Fire Department." Accessed September 13. http://www.yourcsd.com/157/About-Us/.

———. 2017b. "About Parks & Recreation." Accessed September 19. http://www.yourcsd.com/170/About-Us/.

CDE (California Department of Education). 2017. *Largest and Smallest Public School District – CalEdFacts*. Accessed September 13. http://www.cde.ca.gov/ds/sd/cb/ceflargesmalldist.asp.

City of Elk Grove. 2003. *City of Elk Grove General Plan*.

———. 2014. *City of Elk Grove Bicycle, Pedestrian and Trails Master Plan*.

EDP (Education Data Partnership). 2017. *District Profile: Elk Grove Unified*. Accessed September 13. https://www.ed-data.org/district/Sacramento/Elk-Grove-Unified.

———. 2018. *District Profile: Elk Grove Unified*. Accessed May 15. https://www.ed-data.org/district/Sacramento/Elk-Grove-Unified.

EGPD (Elk Grove Police Department). 2017. Department website. Accessed December 2017. http://www.elkgrovepd.org/about_us.

EGUSD (Elk Grove Unified School District). 2017. *School Facilities Needs Analysis*. Prepared by ODELL Planning & Research, Inc.

Westrup, Laura. 2002. Planning Division, California Department of Parks and Recreation. *Quimby Act 101: An Abbreviated Overview*.

5.12 PUBLIC UTILITIES

This section analyzes impacts on City utility and service systems that may result from the implementation of the proposed Project. The section identifies anticipated demand and existing and planned infrastructure availability. The utilities addressed in this section include water supply, storage, and distribution; wastewater collection, transmission, and treatment; solid waste collection and disposal; and energy and natural gas supply. Storm drainage utilities are addressed in Section 5.9, Hydrology and Water Quality.

5.12.1 WATER SERVICE

This subsection provides information on water supplies that would be used by and may be available to the proposed Project. This subsection also discusses the availability and adequacy of existing and planned water treatment and conveyance infrastructure for use by the proposed Project.

WATER SERVICE EXISTING SETTING

There are three water service providers in Elk Grove: Sacramento County Water Agency (SCWA); Elk Grove Water District (EGWD), which is a department of the Florin Resource Conservation District; and Omochumne-Hartnell Water District (OHWD) (**Figure 5.12-1**).

The SCWA is both a retail urban water supplier and a wholesale water supplier; it provides retail water supply to the City, as well as portions of unincorporated Sacramento County and the City of Rancho Cordova. The EGWD serves an area of approximately 13 square miles in the City limits east of SR 99. Part of its supply is water purchased from the SCWA. The OHWD overlaps with parts of the SCWA, providing service to customers in both the incorporated City and in the East and North Study Areas. Additional information on each of these providers is presented below.

The Rural Area of the City, which is located within the service areas of these water providers, is not provided service for residential hookups, consistent with City policy and receives water from wells.

Sacramento County Water Agency

The SCWA manages water supplies in Sacramento County, and boundaries of the SCWA are identical to the county boundaries. Water supplies consist of surface water, groundwater, recycled water, and purchased water. As authorized by the Sacramento County Water Agency Act in 1952, the agency may contract with the federal government and the State of California with respect to the purchase, sale, and acquisition of water. The service area is divided into eight systems, the largest of which are the Mather Sunrise and Laguna Vineyard systems. The City, within City limits, is in the Laguna Vineyard system.

The SCWA constructs and operates water supply infrastructure as well as some drainage systems. Zones have been approved by the Sacramento County Board of Supervisors to "finance, construct, acquire, reconstruct, maintain, operate, extend, repair, or otherwise improve any work or improvement of common benefit to such zone." (SCWA 2018) There are eight water and drainage zones, some of which are for drainage and long-range planning for water resources development. Other zones are specifically for planning, design, and construction of major water supply facilities that benefit the zone. Each zone encompasses a unique geographic area of benefit to achieve the desired objectives. Funding derived from a zone can only be used to benefit that zone.

Zone 40 comprises the Mather Sunrise and Laguna Vineyard potable water system service areas. The southern boundary of the Zone 40 service area is Kammerer Road, and the eastern boundary is the Cosumnes River, which also coincides with the boundaries of Zone 40. The western boundary is Interstate 5, and the northern boundary is irregularly shaped, extending through unincorporated Sacramento County from the Florin area northeast to the City of Rancho Cordova. A portion of the Planning Area (existing City limits) not served by the EGWD is located in SCWA Zone 40.

Zone 40 is divided into three service areas (north, central, and south). The Laguna Vineyard water system consists of the central service area (CSA) and the south service area (SSA). The City limits are in the CSA and SSA. The CSA is east of SR 99 and is supplied by surface water from the Vineyard Surface Water Treatment Plant (SWTP) and groundwater. The Elk Grove wholesale area is in the CSA and comprises much of the Planning Area east of Waterman Road. The EGWD, also in the CSA, is between the wholesale area and SR 99. The SSA is west of SR 99 and is supplied by a mix of surface water, groundwater, and recycled water. Both the CSA and SSA are predominantly residential.

Water Supplies

The SCWA uses purchased water, surface water, groundwater, and recycled water as sources of water supply. The California Department of Water Resources (DWR) defines purchased water as water purchased from other suppliers, including non-self-supplied surface water. Surface water is defined as self-supplied water that is drawn from streams, lakes, and reservoirs. **Table 5.12-1** lists the SCWA's water supplies and amounts delivered in 2015. There is not a specific actual delivery identified for portions of the City served by Zone 40 supply.

Purchased Water

The SCWA has two sources of purchased water: the Central Valley Project (CVP) and the City of Sacramento's American River Place of Use (POU) Supply.

Central Valley Project Water

CVP water consists of the following:

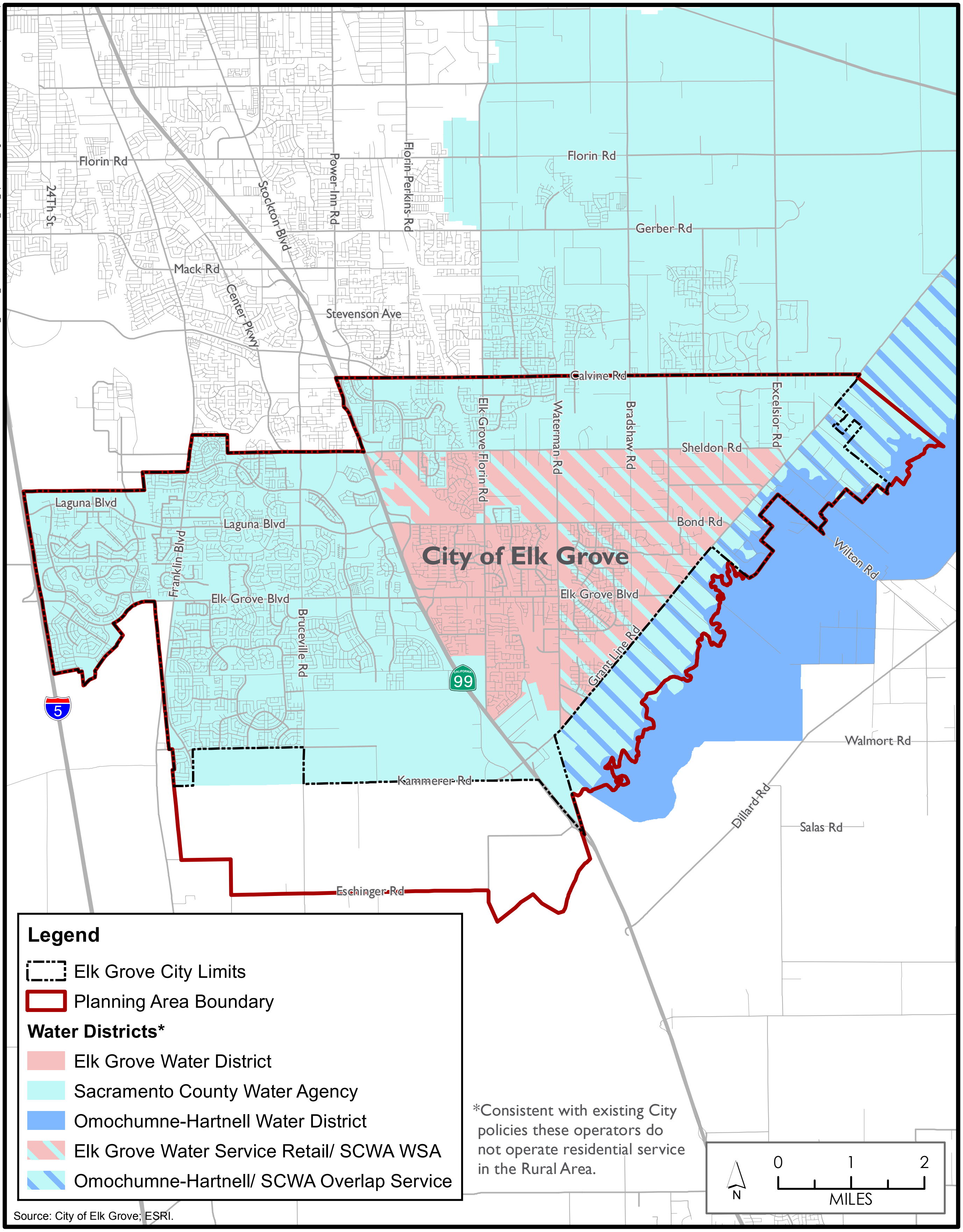
- SMUD 1 Assignment – 15,000 acre-feet per year (AFY) of Sacramento Municipal Utility District's (SMUD) CVP contract water has been assigned to the SCWA under the terms of an agreement with SMUD.

- SMUD 2 Assignment – 15,000 AFY of SMUD's CVP contract water has been assigned to the SCWA under the terms of an agreement with SMUD.

- CVP Water Public Law 101-514 ("Fazio" Water) – The SCWA has entered into a contract with the US Bureau of Reclamation for 22,000 AFY. Of this total, 7,000 AFY has been subcontracted to the City of Folsom for diversion from Folsom Lake. The remaining 15,000 AFY will be diverted by the SCWA from the Sacramento River. (SCWA 2016a, p. 6-1)

The SCWA's total CVP supply is subject to reductions in dry years.

T:_GIS\Elk_Grove\MXDs\General_Plan_Update\EIR\Figure 5.12-1 Water Service.mxd (1/31/2018)



City of Elk Grove
Development Services

Figure 5.12-1

Water Service Boundaries

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City of Sacramento's American River Place of Use

A portion of Zone 40 lies within the City of Sacramento's American River POU. The City of Sacramento has a pre-1914 water right to the American River with a POU boundary that extends beyond the City's boundary and includes a portion of Zone 40. The amount of water available to serve the POU area within Zone 40 is estimated to be 9,300 AFY. SCWA is planning for the future wholesale delivery of American River water within the POU. (SCWA 2016a, p.6-2) The City is not located in the POU.

TABLE 5.12-1
SCWA WATER SUPPLIES AND 2015 DELIVERIES

Water Supply	Additional Detail on Water Supply	2015		
		Volume Delivered	Water Quality	Total Right or Safe Yield
Retail Water Supplies – Actual (AFY)				
Purchased or imported water	CVP water	115	Drinking water	45,000
Surface water	Appropriative water	2,125	Drinking water	71,000
Groundwater		21,963	Drinking water	[1]
Groundwater	Remediated groundwater	4,176	Drinking water	8,900
Transfers	Other surface water supplies	0	Drinking water	9,600
Recycled water	Regional San	575	Recycled water	1,700
Raw water		170	Raw water	—
Other	Supply for SW Tract	25	Drinking water	—
Subtotal Retail		29,149		136,200
Wholesale Water Supplies – Actual (AFY)				
Purchased or imported water	CVP water	0	Drinking water	0
Surface water	Appropriative water	0	Drinking water	0
Groundwater		2,689[(2)]	Drinking water	
Groundwater	Remediated groundwater	0	Drinking water	0
Transfers	Other surface water supplies	0	Recycled water	0
Recycled water		0	Drinking water	0
Subtotal Wholesale		2,689		
Total		**31,838**		**136,200**

Source: SCWA 2016a: Tables 6-10, 6-11

Notes:

1. *Safe yield not determined*
2. *UWMP assumes wholesale water is supplied by groundwater.*

Surface Water

The SCWA has an appropriative water supply that consists of self-supplied surface water drawn from the Sacramento River. In February 2008, the SWRCB approved the SCWA's appropriative right permit application to divert water from the American and Sacramento Rivers (Permit 21209). The amount of appropriated water available for use could range up to 71,000 AFY in wet years, primarily during the winter months. This water would be diverted at the Freeport diversion on the Sacramento River. Since the SCWA's demand is low in the winter months, it is possible that not all of this supply could be utilized without the ability to store the water (SCWA 2016a, p.6-2).

Groundwater

The SCWA's water supply portfolio includes groundwater. The Laguna Vineyard system, which supplies the City, is supplied by groundwater as well as purchased water, surface water, and a small amount of recycled water. The Laguna Vineyard system depends on mostly groundwater during dry years when available surface water supplies are reduced. The groundwater is supplied by a system of groundwater wells and groundwater treatment plants. The other seven public water systems in the SCWA are completely reliant on groundwater. The SCWA system obtains water from the Sacramento Valley Groundwater Basin, South American Subbasin. The City overlies the Central Basin portion of the South American Subbasin. Additional information about groundwater basin characteristics is in Section 5.9, Hydrology and Water Quality. The South American Subbasin is not in critical overdraft or adjudicated.

As set forth in the Water Forum Agreement (see Regulatory Framework below), the long-term average annual pumping from the Central Basin is limited to 273,000 AFY. Groundwater production in the South American Subbasin has varied from approximately 202,300 AFY in 2011 to 260,200 AFY in 2008. Agriculture is the primary water use sector, accounting for approximately 65 percent of extractions. Monitoring and data analysis by the SCGA indicate that subbasin operations from 2005 through 2017 have not exceeded the sustainable yield conditions set forth in the Water Forum Agreement (SCWA 2016a, Section 2.3.1; SCGA 2018). No annual groundwater pumping amount has been defined in the Water Forum Agreement specifically for the SCWA in the Central Basin. Groundwater pumping by the SCWA in the South American Subbasin between 2011 and 2015 has decreased from a high of approximately 34,600 AFY in 2011 to approximately 24,600 AFY in 2015 (SCWA 2016a, Table 6-2). This represents approximately 10 percent, on average, of the limit established in the Water Forum Agreement for the South American Subbasin.

Even though the surface water supplies are not available for use at a consistent level, the SCWA has groundwater supplies available to be able to replace the reduction in surface water supplies in dry years. While groundwater is more consistently available over different climate year types, it has been constrained by groundwater contamination plumes, some naturally occurring contaminants, and the long-term need to not exceed the safe yield (SCWA 2016a, pp. 7-1).

Other Water Supply Sources

Recycled Water

The Sacramento Regional County Sanitation District (Regional San) is responsible for the collection, treatment, disposal, and reuse of wastewater throughout most of the urbanized areas of Sacramento County. This includes much of the area where the SCWA provides retail water service. Through an agreement, Regional San has successfully implemented a nominal capacity of 5 million gallons per day (mgd) water recycling program with the SCWA. This program provides recycled water for Regional San on-site uses and for large commercial irrigation customers within a portion of the Laguna Vineyard water system service area (e.g., commercial, industrial, right-of-way landscaping, schools, and parks). Recycled water is a desirable source of water for outdoor landscape irrigation and other nonpotable uses because of its high reliability and its independence of hydrologic conditions in any given year. Regional San's objective is to increase recycled water use in the Sacramento region during peak irrigation months to approximately 30 to 40 mgd. Water recycling at this scale will allow Regional San to better manage its effluent discharge to the Sacramento River and could help Sacramento area water purveyors improve water supply availability and reliability (SCWA 2016a, p.6–8).

Water Transfers

Water transfers are water supplies obtained from various water users that hold surface water rights on the Sacramento River and the American River upstream of the SCWA's points of diversion. To obtain these supplies, the SCWA would enter into purchase and transfer agreements with other entities that hold these surface water rights. The assumed quantity of other water supplies is 9,600 AFY in dry years and no supplies transferred in wet years. The amount of needed water transfer supplies would vary depending on the amount of supplies needed to close the gap between supply and demand (SCWA 2016a, p. 6–14).

SCWA Water Supply and Demand

The SCWA 2015 Urban Water Management Plan (UWMP) (2016a) provides estimates of existing and future water supply availability and demand for the areas it serves. In 2015, as shown in **Table 5.12-1**, retail deliveries were approximately 29,000 AFY. Of that amount, approximately 24,400 AFY was for the Laguna Vineyard and Mather Sunrise systems, combined. The demand for the Laguna Vineyard (which includes the City) and Mather Sunrise systems was based on the SCWA's 2016 Zone 40 Water System Infrastructure Plan (WSIP). The WSIP included projections for the Southeast Policy Area (SCWA 2016b, Table 3-20).[1] Because the SCWA's system is not fully metered, this is an estimate based on use type (SCWA 2016a, p. 4–1). There is not a specific demand identified in the UWMP for the portion of the City in Zone 40.

The projected reasonably available water supply volume for SCWA's retail water systems through 2040, during a normal climate year considering facility capacity constraints, is presented in **Table 5.12-2**. The increase in supply is the result of planned projects that will expand infrastructure capacity to allow the SCWA to use more of its available water supplies (i.e., it is not due to the acquisition of new or additional supplies) (SCWA 2016, Table 6-9). **Table 5.12-2** also summarizes the total projected retail demand for the same time frame. The projected annual availability of each water supply is constrained by available water infrastructure capacity (SCWA 2016a, p. 6-17).

Over 90 percent of the future demand is associated with the Mather Sunrise and Laguna Vineyard water systems, and most of the demand within those two systems is for residential uses (SCWA 2016a, Table 4-3 and Table 4-4). No demand was projected in the UWMP for the West and South Study Areas, because they are not within the SCWA planning area.

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[1] A Water Supply Assessment prepared in accordance with Senate Bill 610 and approved by the SCWA was prepared for the Southeast Policy Area General Plan Amendment project, which concluded there would be sufficient water supplies to meet the water demands of that project over the next 20 years during normal, single-dry, and multiple-dry years (SCWA 2013).

In multiple-dry years, less water would be available for retail use because of reduced CVP supply, but wholesale supply would remain the same. The retail and wholesale demand for single-dry and multiple-dry years is assumed to be identical to normal year demand, which is shown in **Table 5.12-2**. Demands in dry years may be a few percentage points higher due to a typical hotter and drier climate, which leads to higher outdoor water use. On the other hand, during 2015, the SWRCB mandated demand reductions that amounted to 32 percent for SCWA. It is possible that future years with the same water supply conditions as 2015 may have similar demand reductions (SCWA 2016a, p. 7-4).

TABLE 5.12-2
SCWA REASONABLY AVAILABLE VOLUME OF WATER SUPPLIES COMPARED TO DEMAND (NORMAL YEAR)

Water Supply	Source	2020	2025	2030	2035	2040
Purchased or imported water	CVP water. SCWA may vary this amount in combination with the appropriative surface water, remediated groundwater, and transfer supplies so that the combined total does not exceed the total annual demand (approximately 34,200 ac-ft/yr) that the Vineyard SWTP can supply.	21,300	21,300	21,300	21,300	21,300
Purchased or imported water	City of Sacramento supply. Not planned for use until the interconnection with the City is constructed after 2040.	0	0	0	0	0
Surface water	Appropriative water. SCWA may vary this amount as described for purchased water.	4,000	4,000	4,000	4,000	4,000
Groundwater	Available volume based on groundwater supply capacity. Safe yield not quantified.	47,000	47,000	52,000	62,000	62,000
Groundwater	Remediated groundwater. SCWA may vary this amount as described for purchased water.	8,900	8,900	8,900	8,900	8,900
Transfers	Other surface water supplies. SCWA may vary this amount as described for purchased water.	0	0	0	0	0
Recycled water	Regional San	1,700	1,700	1,700	1,700	1,700
Total Retail Supply		82,900	82,900	87,900	97,900	97,900
Total Wholesale Supply	Groundwater	5,000	5,000	6,000	7,000	7,000
Total Supply		87,900	87,900	93,900	104,900	104,900
Total Retail Demand		48,121	55,489	63,288	71,145	79,278
Total Wholesale Demand		4,120	4,826	5,733	6,233	6,769
Total Demand		52,241	60,315	69,021	77,378	86,047
Surplus		**35,659**	**27,585**	**24,879**	**27,522**	**18,853**

Source: SCWA 2016a, Table 4-6, Table 4-7, Table 6-12, and Table 6-13

A comparison of supply and demand for single-dry and multiple-dry year scenarios for the combined retail and wholesale uses is presented in **Table 5.12-3**. The multiple-dry year scenario mimics the water supply conditions of 2013 through 2015 when CVP allocations were 100 percent, 75 percent, and 25 percent of the average use of supplies during the previous three years.[2] The demands are the same as the normal year demands, but as explained for the single-dry year scenario, the second and third year demands might be lower if demand reduction mandates are imposed by the State (SCWA 2016a, p. 7-4).

Groundwater represents a substantial part of the SCWA's water supply portfolio to meet projected demand, particularly for the area that includes the City. The SCWA 2015 UWMP (2016a, Table 6-12 and Table 7-10) provides projections of "reasonably available" groundwater volume, based on groundwater supply capacity, with safe yield not quantified. As shown in **Table 5.12-2**, the reasonably available groundwater volume would remain the same for normal, single-dry, and multiple-dry year scenarios, ranging from 47,000 AFY in 2020 and 2025, increasing to 52,000 AFY in 2030, and 62,000 AFY in 2035 and 2040. The remediated supply (8,900 AFY) is the same through the planning period, but the SCWA may vary the amount.[3] Therefore, to meet demand during dry years, the SCWA would seek to supplement its reduced CVP supplies with the use of other surface water supplies (SCWA 2016a, p. 7-5).

TABLE 5.12-3
SCWA PROJECTED SUPPLY-DEMAND COMPARISON FOR SINGLE-DRY AND MULTIPLE-DRY YEAR SCENARIOS

Supply-Demand	2020	2025	2030	2035	2040
Single-Dry Year					
Supply total	75,200	75,500	80,600	90,600	90,800
Demand total	52,241	60,315	69,021	77,378	86,047
Surplus	**22,959**	**15,185**	**11,579**	**13,222**	**4,753**
Multiple-Dry Year – First Year					
Supply total	87,900	87,900	93,900	104,900	104,900
Demand total	52,241	60,315	69,021	77,378	86,047
Surplus	**35,659**	**27,585**	**24,879**	**27,522**	**18,853**
Multiple-Dry Year – Second Year					
Supply total	82,900	82,900	87,900	97,900	97,900
Demand total	52,241	60,315	69,021	77,378	86,047
Surplus	**30,659**	**22,585**	**18,879**	**20,522**	**11,853**

[2] The CVP dry year allocation is determined based on a percentage of the previous three years of use. During dry years, the SCWA would seek to supplement its reduced CVP supplies with other surface water supplies (SCWA 2016a, p.7-5).

[3] The SCWA has a remediated groundwater supply of 8,900 AFY in accordance with the terms and conditions in the agreement entitled "The Agreement between Sacramento County, Sacramento County Water Agency, and Aerojet-General Corporation With Respect To Transfer of GET Water" dated May 18, 2010. The remediated groundwater is pumped from the northern portion of the South American Subbasin and discharged into the American River from Aerojet's Groundwater Extraction and Treatment (GET) facilities in the Rancho Cordova area that are used for groundwater clean-up operations. This remediated groundwater supply is diverted by the SCWA from the Sacramento River at Freeport along with the SCWA's surface water supplies.

Supply-Demand	2020	2025	2030	2035	2040
Multiple-Dry Year – Third Year					
Supply total	75,200	75,500	80,600	90,600	90,800
Demand total	52,241	60,315	69,021	77,378	86,047
Surplus	**22,959**	**15,185**	**11,579**	**13,222**	**4,753**

Source: SCWA 2016a, Tables 7-4 through 7-8

SCWA Water Supply Infrastructure

Existing Surface Water Treatment and Conveyance Facilities

SCWA surface water supplies for Zone 40 are diverted from the Sacramento River at Freeport and through the City of Sacramento's Sacramento River SWTP. Surface water diverted from the Sacramento River at the Freeport diversion structure is conveyed through the Freeport Regional Water Authority pipeline, treated at the Vineyard SWTP, and then delivered via a SCWA 6-inch pipeline to the Zone 40 service area. The current capacity of the Vineyard SWTP is 50 mgd with an ultimate capacity of 100 mgd. The Vineyard SWTP currently provides treated surface water primarily to customers in the CSA with a smaller amount supplied to customers in the SSA.

Surface water diverted from the Sacramento River and treated at the Sacramento River SWTP is provided to the SSA through the Franklin Intertie, which has capacity of 11.1 mgd. Water from the intertie flows into the SSA though two routes. A dedicated transmission main connects to SCWA's Dwight Road facility where the supply is pumped into the SSA. Water from the intertie is also supplied to the SSA through an in-line booster pump that connects directly to the SSA distribution system.

Existing water distribution facilities in Zone 40 include storage tanks and pipelines. Three pipelines cross SR 99 and hydraulically connect the CSA and the SSA at Sheldon Road, Bond Road, and Grant Line Road. The two nearest points of connection to major SCWA infrastructure near the Study Areas are water transmission mains along Bilby Road at West Stockton Boulevard and at the Grant Line Road/SR 99 interchange.

Existing Groundwater Production, Treatment, and Conveyance Facilities

Groundwater is supplied to Zone 40 from wells that that are connected to groundwater treatment plants (GWTPs) and from wells that pump directly into the distribution system (direct feed). Each GWTP consists of wells that are manifolded into a treatment plant, a ground-level storage tank, and a pump station. Zone 40 has 14 active storage tanks. Eleven of the storage tanks are located at GWTPs. These tanks are used to meet the peak hour increment of demand that is greater than the maximum day demand as well as emergency and fire flow demands. Most GWTPs are supplied by more than one well. Treated water from the GWTPs flows into the ground-level storage tanks and is subsequently pumped into the distribution system. The pump stations are typically sized larger than the GWTP capacities so that peak hour supply can be pumped to the distribution system from the storage tanks.

The CSA is supplied water from five groundwater treatment plants and the Vineyard SWTP. There are also three direct feed wells that supply the CSA. In the case of the Dwight Road GWTP in the SSA, the pump station is sized larger than the GWTP to also pump the Franklin Intertie supply into the SSA. The direct feed wells pump directly into the distribution system and do not require treatment. Direct feed wells are located in some areas of the CSA and SSA. The SCWA also has some wells that were drilled and planned to be equipped in the future. The existing capacity of groundwater facilities and of the Vineyard SWTP (50 mgd) each is sufficient to meet the CSA's existing water demand.

The SSA is supplied water from four GWTPs and from the Franklin Intertie. There are six direct feed wells that supply the SSA. The SSA also receives some supply from the CSA. The three existing connections between the CSA and SSA can be used to supply surface water or groundwater to the SSA. The CSA has minimal to no spare surface water capacity in a wet/average year and no groundwater capacity in a dry year on the maximum demand day (SCWA 2016b).

The closest facilities to the West and South Study Areas are the Poppy Ridge GWTP and storage tanks in the Southeast Policy Area (the policy area has not yet been developed and does not have any distribution infrastructure); the Lakeside GWTP and storage tank in the eastern portion of the City in the SSA; and some wells and storage tanks in the CSA (SCWA 2016b, Figure 2-2 and Figure 2-3).

Planned Facilities

The SCWA has identified six projects that would increase the projected supplies shown in **Table 5.12-1**. As noted previously, these projects would expand infrastructure capacity to allow the SCWA to use more of its available water supplies. These projects are the Phase A NSA project and disconnection of the Anatolia GWTP in 2020 (with equivalent supply to come from the Poppy Ridge GWTP expansion in 2020), the Phase B NSA project in 2025, and the West Jackson GWTP and Big Horn GWTP expansion in 2035 (SCWA 2016a, Table 6-9).

Elk Grove Water District

The EGWD is a department of the Florin Resource Conservation District, and operates the Elk Grove Water District's water system. The EGWD provides service to residents and businesses within an approximately 13-square-mile area within the current City limits (see **Figure 5.12-1**). The service area is bounded to the north by Sheldon Road, to the east by Grant Line Road, to the south by Union Industrial Park, and to the west by SR 99. The Sheldon/Rural Area Community Plan and Eastern Elk Grove Community Plan areas are in the eastern part of the EGWD service area boundary, though no services are provided in the Sheldon/Rural Area.

The EGWD's service area is separated into two subareas. Service Area 1 relies entirely on groundwater from seven wells and a potable groundwater treatment plant owned by the EGWD (Railroad Street Treatment and Storage Facility). Service Area 2 is served by water purchased from the SCWA, which delivers both surface water and groundwater from its conjunctive use operations; but as a matter of practice, water served to customers in Service Area 2 is almost entirely derived from SCWA's production wells (EGWD 2016, p. 3-1). There are approximately 7,500 residential accounts and approximately 500 acres of nonresidential uses served in Service Area 1, which is mostly built out, and approximately 4,100 residential accounts and approximately 220 acres of nonresidential uses served in Service Area 2 (EGWD 2016, Table 4-4).

The EGWD covers approximately 3 percent of the entire Central Basin. Taking into account the Central Sacramento County Groundwater Management Plan's (2006) overall estimated sustainable groundwater yield of 273,000 AFY, the EGWD has 9,168 AFY of groundwater available within its service area. In 2015, the district supplied 5,312 acre-feet of water, 1,914 of which was supplied by the SCWA, and 3,398 of which was produced from the EGWD's groundwater wells. The EGWD projects that total demand for both service areas would increase from 7,694 AFY in 2020 to 8,059 AFY in 2040, and that there would be sufficient water to meet current needs and anticipated future demand. The EGWD assumed the majority of growth would be in Service Area 2, which would consist of approximately 2,000 new residential accounts and an additional approximately 120 acres of nonresidential uses (EGWD 2016, Table 4-5, Table 4-6, p. 3-10 and p. 4-10).

Omochumne-Hartnell Water District

The OHWD serves the region surrounding the Cosumnes River, including the City's eastern planning areas (North and East Study Areas). The region overlaps with a portion of the SWCA service area along the City's southeastern border. The OHWD purchases and manages supplemental water from the CVP for the benefit of South Basin Groundwater District agricultural users adjacent to the Cosumnes River and Deer Creek.

Climate Change

Climate change is anticipated to have an impact on water supplies. Changes in weather patterns resulting from increases in global average temperature could bring about a decreased proportion and total amount of precipitation falling as snow. This phenomenon is predicted to result in an overall reduction of snowpack in the Sierra Nevada. Runoff from precipitation and snowmelt from the Sierra Nevada is the main source of surface water supply for SCWA and other purveyors in the Planning Area, as well as in the entire Sacramento region and much of the rest of the State. During the summer months, irrigation and agricultural runoff are the main sources of surface water. Most streams are intermittent and historically dry during the summer; however, urbanization and agricultural practices have resulted in low summer flows consisting of runoff.

The US Bureau of Reclamation has evaluated the risks and impacts of climate change in the Sacramento River Basin, which is detailed in the Sacramento and San Joaquin Climate Impact Assessment. The report incorporates an overview of the current climate and hydrology of California's Central Valley as well as projections of hydrologic changes that the basin may experience because of climate change. The report projects a north-to-south trend of decreasing annual average precipitation throughout the 21st century. Additionally, the report predicts a shift to an increase in the rate of winter runoff and a decrease in precipitation falling as snow in the winter months. These shifts in precipitation patterns may result in an exceedance of surface water capacity earlier in the year. If flow rates exceed the capacity of reservoirs in the Sacramento and American River watersheds, fresh water would need to be released to accommodate river flow, which comprises a source of potable water that previously would have been stored in the Sierra Nevada snowpack. These conditions are already affecting summer water supply in the county (Ascent Environmental 2017).

A quantitative vulnerability assessment prepared by the Regional Water Authority included in the American River Basin Integrated Regional Water Management Plan (IRWMP) evaluated the effects on both surface water and groundwater. The assessment indicates that surface water supplies would be reduced and would be mostly associated with reduced diversions from the American River. Climate change is also anticipated to have an impact on groundwater. Also noted is that increased groundwater pumping would occur to meet urban and agricultural demands, i.e., the long-term average groundwater pumping in the Central Basin would increase by 6 percent. Groundwater elevations would decrease from 6 to 15 feet from the baseline condition in the SCWA's service area. Planned actions to address these vulnerabilities include decreasing urban per capita water demand and continuing current efforts such as implementing conjunctive use management, recycled water use, and interconnections between adjacent water purveyors (SCWA 2016a, Section 6.11).

WATER SERVICE REGULATORY FRAMEWORK

Overview

The City is not a water purveyor, and it does not manage supply or infrastructure. However, there are several regional and local programs and plans administered by various entities that direct water supply planning and management of water resources in Sacramento County. Those regional and local programs and plans affect the amount of water available to the Planning Area; they are briefly described below, following the "State" subheading. The City's General Plan supports goals to ensure a sustainable future water supply to support growth while also advancing water conservation objectives.

In addition, the SCWA and EGWD, as operators of public water systems, are required to comply with certain federal and State water quality requirements, such as the federal Safe Drinking Water Act, which is regulated at the State level by the California Department of Public Health. As such, these regulations are not directly applicable to private discretionary projects or public projects approved by the City. However, the City is responsible for ensuring that development within its boundaries does not affect surface water quality or groundwater quality. Applicable regulations and General Plan policies are identified in Section 5.9, Hydrology and Water Quality.

State

Water Supply Planning

Although the City does not directly provide water to the Planning Area, there are specific State requirements that apply to water purveyors, and the City has a responsibility to identify existing and potential water supplies and their availability to serve the proposed Project.

Urban Water Management Planning Act – Assembly Bill 797

The Urban Water Management Planning Act (California Water Code Section 10610 et seq.) requires water suppliers in California providing water for municipal purposes, either directly or indirectly to more than 3,000 customers or supplying more than 3,000 AFY of water, to prepare and adopt a plan every five years that defines their current and future water use, sources of supply and its reliability, and existing conservation measures. The adopted plan must be updated at least once every five years on or before December 31 in years ending in five and zero. The UWMP contains information about water supplies, water supply reliability, water conservation, water shortage contingencies, and recycled water usage and is the foundation document for water supply assessments. Water Code Section 10631 directs that the UWMPs include further information on future water supply projects and programs and groundwater supplies. Both the SCWA and EGWD adopted 2015 UWMP; however, the OHWD is not required to prepare one.

Senate Bill 610 (California Water Code Section 10910)

As revised by SB 610 (Stats. 2002, ch. 643), Sections 10910 et seq. of the California Water Code set forth the circumstances in which CEQA lead agencies must seek preparation of, or prepare themselves, water supply assessments (WSAs) for certain types of proposed projects. The specific criteria for which project types require a WSA are defined in Section 10912. SB 610 functions together with CEQA, in that a WSA must be included in any environmental document for any project subject to SB 610, which includes negative declarations and draft and final EIRs.

One of the fundamental tasks of a WSA is to determine whether total projected water supplies available during normal, single-dry, and multiple-dry water years during a 20-year projection will meet the projected water demand associated with a proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses. When making such a determination, the authors of the WSA must address several factors. Specifically, the WSA must contain information regarding existing water supplies, projected water demand, and dry year supply and demand. In *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 433 (*Vineyard*), the California Supreme Court briefly summarized the key content requirements as follows:

> With regard to existing supply entitlements and rights, a water supply assessment must include assurances such as written contracts, capital outlay programs and regulatory approvals for facilities construction … but as to additional future supplies needed to serve the project, the assessment need include only the public water system's plans for acquiring the additional supplies, including cost and time estimates and regulatory approvals the system anticipates needing. (Wat. Code, §§ 10910, subd. (d)(2), 10911, subd. (a).)

Existing water supplies can be based on different kinds of legal rights or arrangements, including entitlements, water rights, and water service contracts. In many cases, these supplies are likely already described in detail in the supplier's UWMP. Suppliers are expressly permitted to rely on information contained in the most recently adopted UWMPs, so long as the water needed for the proposed project was accounted for therein.

A finding of insufficiency in a WSA does not require a city or county to deny or downsize a proposed development project. Rather, after identifying a shortfall, the public water system must provide its plans for acquiring "additional supplies" (or what the California Supreme Court called "future" supplies). The Water Code requires the public water system to lay out a roadmap for obtaining new water supplies once it becomes aware that existing supplies are insufficient for the proposed project together with other foreseeable planned growth.

Regardless of the information provided to a city or county in a WSA, SB 610 stops short of preventing cities and counties from approving the projects under consideration absent sufficient water supplies. However, where existing water supply entitlements, water rights, or water service contracts are or may be insufficient to serve proposed projects, SB 610 does require that, in approving projects in the face of insufficient supplies, cities and counties must include in their findings for the project[s] their determination[s] regarding water supply insufficiency.

The California Supreme Court's decision in *Vineyard* also resulted in the requirement of an assessment of potential environmental effects of supplying water to large land use projects. In general, EIRs for such projects should address the following: (1) disclose the existing (or realistically available) water supplies for a proposed project; (2) assess whether such supplies are reasonably likely or reasonably certain; (3) address alternative water supplies if a primary proposed supply is not reasonably likely or reasonably certain; and (4) assess the physical impacts associated with providing water to the project from the preferred source and, if that source is not reasonably likely, from an identified alternative source as well. Under the last scenario, an EIR must also address the potential environmental consequences of curtailing planned development due to inadequate supplies (i.e., a partially built-out project).

Senate Bill 221 (California Government Code Section 66473.7)

SB 221 was enacted to ensure that collaboration on finding the needed water supplies occurs early in the planning process. California Government Code Section 66473.7 applies to subdivisions and requires an affirmative written verification of sufficient water supply. This verification must also include documentation of historical water deliveries for the previous 20 years, as well as a description of reasonably foreseeable impacts of the proposed subdivision on the availability of water resources of the region. Government Code Section 66473.7 (b)(1) states, "The legislative body of a city or county or the advisory agency, to the extent that it is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map, shall include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available. Proof of the availability of a sufficient water supply shall be requested by the subdivision applicant or local agency, at the discretion of the local agency, and shall be based on written verification from the applicable public water system within 90 days of a request." As a result of the information contained in the written verification, the city or county may attach conditions to assure there is an adequate water supply available to serve a project as part of the tentative map approval process.

Water Conservation

Senate Bill x7-7 (Chapter 4, Statutes of 2009)

SBx7-7, the Water Conservation Act of 2009, requires the State to achieve a 20 percent reduction in urban per capita water use by December 31, 2020. The responsibility for this conservation falls to local water agencies, which must increase water use efficiency through promotion of water conservation standards that are consistent with the California Urban Water Conservation Council's best management practices. Each urban retail water supplier was also required to develop urban water use targets and an interim urban water use target, expressed in units of gallons per capita per day (gpcd) by July 1, 2011, based on the alternative methods set out in the 2009 act. The agencies must meet those targets by the 2020 deadline. These requirements and the SCWA's specific compliance plan are outlined in its 2015 UWMP. For 2015, the SCWA reported actual water use at 153 gpcd, which was well below its 2015 interim target of 265 gpcd. The 2020 per capita demand target is 236 gpcd (SCWA 2016a, Section 5.0).

California Building Code

The California Green Building Standards Code (California Code of Regulations, Title 24, Part 11), commonly referred to as the CALGreen Code, is a Statewide mandatory construction code that was developed and adopted by the California Building Standards Commission and the California Department of Housing and Community Development. The CALGreen standards require new residential and commercial buildings to comply with mandatory measures for water efficiency and conservation, among others. CALGreen also has voluntary tiers and measures that local governments may adopt that encourage or require additional measures in the five green building topics.

California Model Water Efficient Landscape Ordinance

In 2006, the Water Conservation in Landscaping Act was enacted, which required the DWR to update the Model Water Efficient Landscape Ordinance. The provisions of this ordinance are applicable to new construction with a landscape area greater than 2,500 square feet. The State updated provisions of the Model Ordinance in 2015. The City incorporated requirements mandated by DWR into Elk Grove Municipal Code Chapter 14.10.

Regional and County Programs and Plans

Water Forum Agreement

The Water Forum was developed to address water-related issues facing the Sacramento region and resulted in the development of the Water Forum Agreement. The coequal objectives of the Water Forum Agreement are to: 1) provide a reliable and safe water supply for the region's economic health and planned development through the year 2030; and 2) preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River. The Water Forum Agreement contains seven major elements to meet its objectives, including purveyor-specific agreements: increased surface water diversions; actions to meet customer needs while reducing diversion impacts in drier years; support for improved pattern of fishery flow releases from Folsom Reservoir; lower American River habitat management; water conservation; groundwater management; and the Water Forum Successor Effort. The Groundwater Element of the Water Forum Agreement sets out specific recommendations designed to protect groundwater resources, including on the sustainable yields and groundwater management governance structures for the three Sacramento groundwater basins. The SCWA is a signatory to the Water Forum Agreement and the Water Forum Successor Effort, but the City is not.

Groundwater Management

In 2002, stakeholders of the Central Basin began a process of groundwater management planning and development of a governance structure. That effort resulted in the adoption of the Central Sacramento County Groundwater Management Plan in February 2006, and the formation of the Sacramento Central Groundwater Authority (SCGA) through a joint powers agreement signed by the Cities of Elk Grove, Folsom, Rancho Cordova, and Sacramento, and Sacramento County. Among its many purposes, the SCGA is responsible for managing the use of groundwater in the Central Basin to ensure long-term sustainable yield, and facilitating a conjunctive use program. The SCGA's Groundwater Management Plan identifies available water supplies to meet the total water demands of users within the basin, partakes in maintaining ecological flows in the Cosumnes River, and includes specific goals, objectives, and an action plan to manage the basin. The plan also prescribes a well protection program to protect existing private domestic well and agricultural well owners from declining groundwater levels resulting from increased groundwater pumping due to new development in the basin (SCWA 2016a).

The Sustainable Groundwater Management Act enacted by the State legislature in 2014, with subsequent amendments in 2015, directs the DWR to identify groundwater basins and subbasins in conditions of critical overdraft. None of the basins that provide groundwater for the SCWA and EGWD are on the list issued by DWR in 2015. Groundwater basins designated as high or medium priority, and critically overdrafted must be managed under a groundwater sustainability plan by January 31, 2020. All other high- and medium-priority basins must be managed under a groundwater sustainability plan by January 31, 2022. The two subbasins that supply the SCWA are covered by the latter deadline. The act also requires formation of groundwater sustainability agencies. The SCGA is currently in discussions with other groundwater basin users of the South American Subbasin to evaluate options for management of the basin to meet these requirements (SCWA 2016a).

The Sustainable Groundwater Management Act also authorizes a groundwater management agency in a basin compliant with the California Statewide Groundwater Elevation Monitoring program to prepare an "Alternative" to a groundwater sustainability plan. The SCGA submitted a Final Draft South American Subbasin Alternative Submittal document to DWR for review in December 2016 (SCGA 2016). Approval is anticipated in 2018.

SCWA Zone 40 Water Supply Master Plan

The Water Forum Agreement is the foundation for the Zone 40 Water Supply Master Plan (WSMP), which was adopted in February 2005 by the SCWA. The Zone 40 WSMP describes available water supply and makes recommendations to meet future water demands in Zone 40 through 2030 through implementation of a regional conjunctive use program that balances the use of groundwater, surface water, and recycled water supplies. The SCWA prepared amendments to the 2005 Zone 40 WSMP to address the sufficiency of water supply for the West Jackson, Jackson Township, and NewBridge projects (SCWA 2016b, Section 1). The existing City limits are within the boundaries of the Zone 40 WSMP, but the West and South Study Areas are not located within the buildout area identified in this plan.

SCWA Zone 40 Water Supply Infrastructure Plan

In 2006, the SCWA prepared the Water Supply Infrastructure Plan (WSIP), which identified the water supply infrastructure needs necessary to support buildout of Zone 40. The SCWA updated the plan in 2016 to reflect changes in the Zone 40 water supply portfolio, adoption of the Sacramento County General Plan, and completion of the Freeport Regional Water Project. The 2016 WSIP (SCWA 2016b) includes water demand factors, growth projections, and estimates of projected water demand and supply. It also identifies recommended infrastructure types, locations, and timing to meet future demand through buildout.[4] The West and South Study Areas are not located within the buildout area of the 2016 WSIP.

Local

Climate Action Plan

The City adopted a Climate Action Plan (CAP) in 2013. The CAP, which is currently being updated as part of the proposed Project, identifies water use strategies, among others, to help reduce the City's greenhouse gas emissions. Resource Conservation Strategy RC-2 addresses water conservation, and RC-3 addresses recycled water. The strategies are narrative and describe various measures that may be used to reduce water consumption. The CAP also recognizes the requirements of CalGreen.

City of Elk Grove Municipal Code

Municipal Code Chapter 14.10 (Water Efficient Landscape Requirements) outlines provisions for water management practices and water waste prevention for existing landscapes. It also specifies the requirements for planning, designing, installing, maintaining, and managing water-efficient landscapes in new construction and rehabilitated projects. Recycled water systems for irrigation are allowed, provided they comply with code requirements.

Chapter 22.24 (Water and Sewer Requirements) establishes that for subdivisions less than 2 acres in size, domestic water must be provided to all lots from a public water supply source and

[4] The 2016 WSIP identifies buildout for the CSA as 2051 and 2031 for the SSA (SCWA 2016b, Table 3-8).

distribution system conforming to the standards of Sacramento County or a water purveyor acceptable to the City's Public Works Director.

WATER SERVICE IMPACTS AND MITIGATION MEASURES

Standards of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Not have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years.

2) Require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

Methodology

The following impact analysis is based on information presented in SCWA's and EGWD's 2015 UWMPs, SCWA Zone 40 planning documents, and development capacity assumptions for the proposed Project.

As shown in **Table 2.0-2** in Section 2.0, Project Description, with the proposed Project, there would be an increase in residential units in the Planning Area compared to existing conditions, but a reduction in the number of projected residential units in the existing City limits compared to the existing General Plan. However, there would be a substantial increase in the Study Areas, with most of that growth directed to the West and South Study Areas. Therefore, for purposes of the water supply analysis, the primary and largest source of water demand under the proposed Project would be associated with the Study Areas. The West and South Study Areas are not currently within the SCWA service area and therefore are not accounted for in the SCWA 2015 UWMP. No water supply assessments pursuant to SB 610 have been prepared for any location in the Study Areas because no specific projects triggering a WSA are proposed as part of the proposed Project.

Development capacity assumptions (acreages) for general land use types in the Study Areas were multiplied by the SCWA demand factors to generate total demand, not accounting for system losses. Although the Study Areas are not in the current SCWA service area, the demand factors in the SCWA 2016 WSIP are appropriate to provide a reasonable estimate of future water supply demand for the Study Areas because the future types of development would be of similar scale and intensity as uses in the City limits. This provides a rough, order-of-magnitude estimate of water demand for the planning horizon. The analysis also assumes the SCWA, or water made available by the SCWA (e.g., wholesale supply to the EGWD), would be the likely water provider because the Study Areas are in Sacramento County.

Identification of infrastructure locations and facilities to serve the Study Areas is beyond the scope of the programmatic analysis presented in this Draft EIR.

General Plan Policies and Standards

The proposed Project contains the following policies and standards related to the provision of water to future development in the Planning Area.

Policy INF-1-1: Water supply and delivery systems shall be available in time to meet the demand created by new development.

Standard INF-1-1.a: The following shall be required for all subdivisions to the extent permitted by State law:

- Proposed water supply and delivery systems shall be available at the time of tentative map approval to the satisfaction of the City. The water agency providing service to the project may use several alternative methods of supply and/or delivery, provided that each is capable individually of delivering water to the project.
- The agency providing water service to the subdivision shall demonstrate prior to the City's approval of the Final Map that sufficient capacity shall be available to accommodate the subdivision plus existing development, and other approved projects in the same service area, and other projects that have received commitments for water service.
- Off-site and on-site water infrastructure sufficient to provide adequate water to the subdivision shall be in place prior to the approval of the Final Map or their financing shall be assured to the satisfaction of the City, consistent with the requirements of the Subdivision Map Act.
- Off-site and on-site water distribution systems required to serve the subdivision shall be in place and contain water at sufficient quantity and pressure prior to the issuance of any building permits. Model homes may be exempted from this policy as determined appropriate by the City, and subject to approval by the City.

Policy INF-1-3: Establish and expand recycled water infrastructure for residential, commercial, industrial, and recreational facilities and support the use of reclaimed water for irrigation wherever feasible.

Policy IFP-1-7: New development shall fund its fair share portion of impacts to all public facilities and infrastructure as provided for in State law.

Policy IFP-1-8: Infrastructure improvements must be financed and constructed concurrent with or prior to completion of new development.

Standard IFP-1-8.a: Establish concurrency measures to ensure infrastructure adequately serves future development:

- Coordinate public facility and service capacity with the demands of new development.
- Require that the provision of public facilities and service to new development does not cause a reduction in established service levels for existing residents.
- Ensure that new infrastructure will meet the required level of service standards set by the City's General Plan and Municipal Code.

Standard IFP-1-8.b: Phase new development in expansion areas to occur where public services and infrastructure exist or may be extended to serve the public interest with minimal impact.

Policy NR-3-4: Ensure adequate water supply is available to the community by working with water providers on facilities, infrastructure, and appropriate allocation.

Policy NR-3-5: Continue to coordinate with public and private water users, including users of private wells, to maintain and implement a comprehensive groundwater management plan.

Policy NR-3-6: Continue interagency partnerships to support water conservation.

Policy NR-3-7: Continue to eliminate water use inefficiencies and maintain ongoing communication with water suppliers to ensure sustainable supply.

Policy NR-3-8: Reduce the amount of water used by residential and nonresidential uses by requiring compliance with adopted water conservation measures.

Policy NR-3-9: Promote the use of greywater systems and recycled water for irrigation purposes.

Policy NR-3-10: Improve the efficiency of water use at City facilities through retrofits and employee education.

Policy NR-3-11: Promote upgrades to existing buildings to support water conservation.

Policy NR-3-12: Advocate for native and/or drought-tolerant landscaping in public and private projects.

Standard NR-3-12.a: Require the planting of native and/or drought-tolerant landscaping in landscaped medians and parkway strips to reduce water use and maintenance costs.

Policy ER-6-6: Work with the Sacramento County Water Agency and water utilities to support programs and conservation activities intended to help water customers voluntarily conserve approximately 10 percent over time.

Policy ER-6-7: Enforce the City's water-efficient landscape ordinance that is as strict or stricter than the State Water Resources Control Board regulations affecting local water agencies, and ensure future state updates are incorporated in some form to the City's ordinance. Provide opportunity for and encourage public reporting of violations.

Policy SRA-2-4: Limit the extension of water service into the Sheldon/Rural Area. Lot sizes should be large enough to accommodate private water wells. This policy shall not be construed to limit the ability of any water agency to construct lines through or adjacent to the Sheldon/Rural Area.

Policy SRA-2-5: Lots should be large enough to accommodate private water wells with adequate spacing to minimize the potential for groundwater depletion.

Project Impacts and Mitigation Measures

Sufficiency of Water Supplies (Standard of Significance 1)

Impact 5.12.1.1 Implementation of the proposed Project would increase demand for domestic water supply, which may result in the need for additional water supplies. This is a **significant** impact.

General Plan Update policies and the General Plan Land Use Map provide development capacity for up to approximately 48,000 new homes in the Planning Area compared to existing conditions, although there is no requirement that this level of development be achieved. This includes several different housing types, including rural residential, estate residential, lower-density residential, medium-density residential, high-density residential, and mixed uses that include residential units. Future nonresidential development would include a wide range of commercial, office, industrial/flex space, mixed-use, and public uses. Population growth would occur gradually as both infill in the existing City limits and construction in the Study Areas.

For development within the existing City limits, water demand and supply projections associated with the existing General Plan are accounted for in the SCWA 2015 UWMP and EGWD 2015 UWMP. As indicated in **Table 2.0-2** in Section 2.0, Project Description, fewer residential units are anticipated for the existing City limits, most of which is served by SCWA Zone 40. As such, demand would not be expected to be substantially greater than assumed in the SCWA 2015 UWMP. In the Eastern Elk Grove Community Plan area, which is served by EGWD Service Area 2, the proposed Project provides development capacity for 1,400 units. This is less than the 2,000 units of future growth projected by the EGWD in its 2015 UMWP and would not, therefore, be anticipated to exceed demand projections. In the area served by the OHWD, little growth is anticipated because that area would remain rural.

Therefore, almost all of the new demand under the proposed Project would be the result of development in the Study Areas. The anticipated land uses in the Study Areas and the estimated water demand associated with those uses are provided in **Table 5.12-4**, which includes demand for the four Study Areas based on the development capacity assumptions for the proposed Project. The projected annual water demand for developed uses in the Study Areas is approximately 14,600 AFY, not including system losses.[5] Most of the demand is from the West and South Study Areas. As noted in Methodology, above, this is a rough order-of-magnitude approximation because no specific projects are proposed or specific land uses and associated densities identified in the proposed Project for the Study Areas. The demand would not occur all at once, but would be expected to increase over time. The proposed Project includes numerous policies directed at water conservation, such as policies NR-3-6 through NR-3-12 and ER-6-6 and ER-6-7, which would help reduce demand.

The SCWA would be the likely purveyor of water supply for the Study Areas not served by the EGWD or OHWD because the Planning Area is located in Sacramento County. **Table 5.12-2** shows the SCWA's projected surplus for normal years, and **Table 5.12-3** shows the projected surplus for single-dry and multiple-dry year scenarios associated with demand in its current water service area. This includes Zone 40 deliveries as well as deliveries in its wholesale area (EGWD

[5] By comparison, the EIR prepared by Sacramento LAFCo for the previously proposed Elk Grove Sphere of Influence Amendment, which included the Study Areas, projected an estimated demand of approximately 15,249 AFY corresponding to 7,869 acres of developed uses. As such, the estimate provided in Table 5.12-4 is in general agreement with previous estimates and is a reasonable estimate of future demand in the Study Areas for purposes of this EIR.

Service Area 2). Under a normal year and first-year multiple-dry scenario, the SCWA projects a surplus over its 20-year UWMP planning horizon, and the additional demand generated by the proposed Project specific to the Study Areas would not exceed the surplus. However, in 2025 and beyond for the first and third year multiple-dry year scenarios, there may not be sufficient surplus water with SCWA's existing supplies and entitlements to meet proposed Project demands. In addition, the West and South Study Areas are not in the SCWA's current service area. As noted above, climate change may also have an effect on water supplies.

TABLE 5.12-4
ELK GROVE GENERAL PLAN UPDATE PLANNING AREA STUDY AREAS WATER DEMAND ESTIMATE

Elk Grove General Plan Update Land Use Type	Area (acres)[1]	Corresponding Land Use Classification in WSIP	Unit Water Demand Factor[2] (AF/acre/year)	Water Demand (AFY)
Community Commercial	258	Commercial	2.02	522
Regional Commercial	163	Commercial	2.02	330
Employment Center	390	Commercial	2.02	787
Light-Industrial/Flex	74	Industrial	2.02	148
Light Industrial	74	Industrial	2.02	148
Heavy Industrial	147	Industrial	2.02	297
Village Center Mixed Use	108	Mixed Land Use	2.15	231
Residential Mixed Use	179	Mixed Land Use	2.15	384
Parks and Open Space	624	Public Recreation	2.8	1,746
Public Services	280	Public	0.81	226
Rural Residential	716	Rural Estate	1.37	981
Estate Residential	1,497	Rural Estate	1.37	2,051
Low Density Residential	2,291	Single Family	2.13	4,881
Medium Density Residential	525	Single Family	2.13	1,119
High Density Residential	315	MFR-LD	2.44	768
Total Demand				**14,619**

Notes:

1. *Acreage based on land use density and development capacity assumptions for the proposed General Plan Land Use Diagram. The proposed Project includes descriptions for specific estate residential sizes 1 acre or less, agriculture, roads, and tribal trust lands, but the development capacity assumptions do not specify acreages for these particular land use types. Acreage is allocated to the resource management and conservation category, but this would not result in water demand. Therefore, no water demand estimate is calculated for those categories.*
2. *Demand factors from SCWA 2016b. The unit water demands in this table use SCWA land use type factors that generally correspond with the land use types identified for development capacity assumptions in the General Plan Update for the Study Areas.*

As shown in **Table 5.12-2**, the SCWA's retail supply available through the UWMP planning period would increase slightly, and is a function solely of increases in groundwater pumping (surface water and other supplies are held constant). The SCWA has not identified future water supply projects (other than infrastructure-related projects) that could meet future additional demand because it is not projecting any shortfalls. Surface water for the American River POU would not be available for the Study Areas unless the SCWA obtains approvals from the DWR to modify the

POU. Based on the data, analysis, and information presented in the UWMP, it is possible that Study Area demand may need to be met with increased groundwater pumping in shortfall years, or the SCWA could seek to increase surface water supplies. This is a **potentially significant** impact because new or expanded entitlements may be needed to meet the SCWA's projected demands for its service area in addition to the demand of the proposed Project in buildout years. The City would not determine how the SCWA might manage its existing supplies and proceed with acquiring additional entitlements, if needed, to meet the buildout demand generated by the Study Areas.

Existing Laws, Regulations, Procedures, and General Plan Policies That Provide Mitigation

General Plan Update Policy INF-1-1 requires that water supply and delivery systems must be available in time to meet the demand created by new development, or shall be assured using bonds or other sureties to the City's satisfaction. To accomplish this, as directed by Policy NR-3-4, long-term water supply and infrastructure planning to meet buildout demand for the Study Areas will need to be coordinated with SCWA. There are established laws, regulations, and mechanisms in place that provide for such planning. These include preparation of WSAs pursuant to California Water Code Section 10910, as applicable, and written verification of supply (California Government Code Section 66473.7). Prior to providing water to new development that is not within its service area (i.e., Study Areas), the SCWA would need to annex the Study Area into its service area, and plan and extend infrastructure and services to serve the Study Area. This would not require any action by Sacramento LAFCo, but a Plan for Services would need to be submitted by the City as required by Government Code Section 56430, or its successor. The SCWA would need to update its Zone 40 WSMP and WSIP, which would include a determination regarding whether supplies would be adequate or whether additional supplies would be needed. WSAs that may be required for specific projects, and the results of those WSAs would help inform the Zone 40 WSMP and/or WSIP.

Conclusion

Implementation of the proposed Project would increase demand for domestic water supply, which may result in the need for additional water supplies. General Plan Update Policy INF-1-1 requires that water supply and delivery systems must be available in time to meet the demand created by new development. However, the development of future water supplies by the SCWA (if determined by the SCWA to be necessary) could result in environmental impacts, some of which may be significant. Examples of such impacts could include effects on biological resources, changes in surface water flows, or changes in groundwater levels. The SCWA would need to conduct project-level CEQA and possibly NEPA analysis, as necessary, to analyze specific impacts and identify any required mitigation measures.

Mitigation Measures

MM 5.12.1.1 Prior to LAFCo approval of annexation of any portion of the Planning Area into the City of Elk Grove for which the SCWA would be the retail provider for water service, the City must prepare the Plan for Services to allow LAFCo to determine that: (1) the requirement for timely water availability, as required by law, is met; (2) its water purveyor is a signatory to the Water Forum Successor Effort and that groundwater will be provided in a manner that ensures no overdraft will occur, (3) the amount of water provided will be consistent with the geographical extent of the annexation territory; and (4) existing water customers will not be adversely affected. The Plan for Services shall be sufficient for LAFCo to determine timely water availability to the affected territory pursuant to Government Code Section 56668, subdivision (l), or its successor.

The Plan for Services shall demonstrate that the SCWA water supplies are adequate to serve the amount of development identified in the annexation territory, in addition to existing and planned development under normal, single-dry, and multiple-dry years. The Plan for Services shall depict the locations and approximate sizes of all on-site water system facilities to accommodate the amount of development identified for the specific annexation territory; demonstrate that the SCWA has annexed the territory into its service area; and demonstrate that adequate SCWA off-site water facilities are available to accommodate the development identified in the annexation territory, or that fair-share funding will be provided for the construction of new or expanded treatment and/conveyance facilities and/or improvement of existing off-site water system facilities with no adverse fiscal impacts on existing ratepayers.

Implementation of mitigation measure **MM 5.12.1.1** requires demonstration of adequate water supply prior to annexation. LAFCo would condition future annexation on compliance with mitigation measure **MM 5.12.1.1**. Documenting sufficient water supply would conform to General Plan Update Policy INF-1-1 requirements. However, the evaluation and analysis needed to demonstrate sufficient supply and the effects of obtaining and delivering that supply, along with necessary environmental review and implementation of mitigation measures, would be the responsibility of the SCWA, not the City. Such an evaluation by the City would be remote and speculative, considering the programmatic nature of this EIR. There is no additional feasible mitigation to reduce this impact to less than significant, and this would remain a **significant and unavoidable impact**.

Require Construction of Water System Facilities (Standard of Significance 2)

Impact 5.12.1.2 Implementation of the proposed Project would require the construction of new and expanded water supply infrastructure, which could result in impacts to the physical environment. This impact would be **potentially significant**.

Water demand within the existing City limits and the East and North Study Areas were accounted for in the SCWA demand projections and therefore the 2016 WSIP, but the West and South Study Areas were not. As a result, necessary infrastructure, such as water conveyance facilities, are also not reflected in the 2016 WSIP.

New water transmission infrastructure would be required for the Study Areas. Some improvements may also be needed in the existing City limits. The SCWA may also determine that improvements are needed elsewhere within its service area to meet Planning Area demand at buildout.

Proposed General Plan Policies and Standards That Provide Mitigation

General Plan Update Standard INF-1-1.a sets forth specific requirements for ensuring necessary infrastructure is in place to serve new development. General Plan Standard IFP-1-8.b directs that new development in expansion areas should be phased where public services and infrastructure exist or may be extended with minimal impact. Policies IFP-1-7 and IFP-1-8 and Standard IFP-1-8a provide similar direction to ensure that adequate infrastructure is in place to serve future development.

Conclusion

Potential impacts of construction of new or modified water system infrastructure could include disturbance of biological and/or cultural resources, conversion of agricultural land, construction-related air emissions, soil erosion and water quality degradation, handling of hazardous materials (e.g., fuels), temporary excessive noise, and temporary construction traffic. Because new water system facilities would be required, and the construction of such facilities could result in environmental impacts, this is a **potentially significant** impact.

Mitigation Measures

Implement mitigation measure **MM 5.12.1.1**.

Mitigation measure **MM 5.12.1.1** requires demonstration of adequate water system facilities prior to annexation. However, the evaluation and analysis needed to identify the required water system infrastructure improvements, environmental review, and implementation of mitigation measures would be the responsibility of the SCWA, not the City. Such an evaluation by the City would be remote and speculative, considering the programmatic nature of this EIR. There is no additional feasible mitigation to reduce this impact to less than significant, and this would remain a **significant and unavoidable** impact.

WATER SERVICE CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for water supply is the boundary of the SCWA, which includes the entire City as well as portions of the cities of Sacramento and Rancho Cordova.

Cumulative Impacts and Mitigation Measures

Cumulative Water Service Impacts

Impact 5.12.1.3 Implementation of the proposed Project, in combination with other development, would contribute to cumulative demand for domestic water supply. The proposed Project's contribution to this impact may be **cumulatively considerable**.

As discussed above, the SCWA projects a water surplus for cumulative development for all scenarios out to 2040. Therefore, the cumulative demand for domestic water supply is considered a less than significant cumulative impact. As described under Impact 5.12.1.1, the proposed Project's projected total water demand at buildout would be approximately 15,000 AFY, which predominantly includes demand associated with future development in the West and South Study Areas. This demand was not considered in the SCWA's 2015 UWMP, and the infrastructure to deliver water to and within the West and South Study Areas is not a component of the Zone 40 WSMP or WSIP. While the demand associated with the proposed Project could be accommodated in the short term by the surplus identified by the SCWA, in the long term, project demand would be greater than this surplus. Therefore, because the proposed Project's long-term demand would exceed projected supply and infrastructure was not assumed for the West and South Study Areas, the proposed Project's contribution to significant cumulative water supply and infrastructure impacts would be **cumulatively considerable.**

Mitigation Measures

No additional feasible mitigation available beyond compliance with proposed General Plan policies and mitigation measure **MM 5.12.1.1**.

Implementation of mitigation measure **MM 5.12.1.1** is intended to ensure that sufficient water supplies are available to meet the demand of new development in the Planning Area, in addition to existing and planned development under normal, single-dry, and multiple-dry years. However, the identification of potential supplies and their management is not within the purview of the City to implement. Provision of water supplies and distribution infrastructure may also result in significant impacts, and therefore the Project's contribution to this impact would remain **cumulatively considerable**, and the impact would remain **significant and unavoidable**.

5.12.2 WASTEWATER SERVICE

WASTEWATER SERVICE EXISTING SETTING

Wastewater Service

Sacramento Regional County Sanitation District

The Sacramento Regional County Sanitation District (Regional San) provides wastewater treatment for the City. Regional San serves approximately 1.4 million residents, industrial and commercial customers, and owns and operates the regional wastewater conveyance system. Regional San manages wastewater treatment, major conveyance, and wastewater disposal (Regional San 2017a).

Sacramento Area Sewer District

The Sacramento Area Sewer District (SASD) serves as one contributing agency to Regional San. The SASD provides wastewater collection and conveyance services in the urbanized unincorporated area of Sacramento County, in the Cities of Citrus Heights, Elk Grove, and Rancho Cordova, and in a portion of the Cities of Sacramento and Folsom. The SASD owns, operates, and maintains a network of 107 pump stations and approximately 80 miles of pressurized force main pipes (SASD 2017).

SASD trunk sewer pipes function as conveyance facilities to transport the collected wastewater flows to the Regional San interceptor system. The existing City trunk line extends southeast from the Sacramento Regional Wastewater Treatment Plant (SRWTP) influent diversion structure to Laguna Boulevard, then parallel to SR 99 along East Stockton Boulevard, extending close to the southern City boundary.

Sacramento Regional Wastewater Treatment Plant

The SRWTP, operated by Regional San, is located on 900 acres of a 3,550-acre site between I-5 and Franklin Boulevard, north of Laguna Boulevard. The remaining 2,650 acres serve as a "bufferland" between the SRWTP and nearby residential areas.

The SRWTP has 169 miles of pipeline and treats an average of 181 million gallons of wastewater per day. Wastewater is treated by accelerated physical and natural biological processes before it is discharged to the Sacramento River (Regional San 2017b).

The Sacramento Regional Wastewater Treatment Plant 2020 Master Plan provides a phased program of recommended wastewater treatment facilities and management programs to accommodate planned growth and to meet existing and anticipated regulatory requirements in the Regional San service area through the year 2020. The Master Plan uses SACOG population projections multiplied by per capita flow and load values to determine future facility needs (Regional San 2008, p. 14). The SRWTP's reliable capacity is currently limited, based on hydraulic considerations, to an equivalent 207 mgd average dry weather flow (ADWF). This existing capacity falls short of the projected 218 mgd ADWF in 2020. Therefore, the SRWTP has been master planned to accommodate 350 mgd ADWF (Regional San 2008, p. 15). In addition, Regional San has prepared a long-range master plan for the large-diameter interceptors that transport wastewater to the SRWTP. The master plan includes interceptor upgrades/expansions to accommodate anticipated growth through 2035 (Regional San 2008, p. 5).

Septic Service

Sacramento County Environmental Management Department

The Sacramento County Environmental Management Department (EMD) provides mandated regulatory services in food service, hazardous materials, solid waste facilities, and septic service. The EMD is responsible for regulating septic systems within the county. The eastern portions of the City, which comprise primarily agriculture and rural residential land uses, are generally served by individual septic systems.

WASTEWATER SERVICE REGULATORY FRAMEWORK

Federal

Clean Water Act

The Clean Water Act (CWA) was established in 1972, authorizing the EPA as the federal body responsible for developing water quality standards and implementing the act to assure the protection of human health and the environment. The CWA made grant funds available to construct wastewater treatment plans and upgrades. The act also made it unlawful to discharge pollutants directly to land and water bodies, such as oceans, rivers, lakes, or creeks, without a permit from the EPA.

State

Regional Water Quality Control Board

The Central Valley RWQCB regulates and enforces permits to dischargers in the Central Valley, including the SRWTP. The National Pollutant Discharge Elimination System (NPDES) is the permitting system for discharges to water bodies. The NPDES goal is to protect beneficial uses of the water body. Beneficial uses of the Sacramento River include, but are not limited to, agricultural irrigation, drinking water supply, recreation, and freshwater habitat. The SRWTP's NPDES permit requires specific, measurable quality assurance and is updated every five years to accommodate new environmental concerns and larger wastewater flows. Permit limitations explain, in detail, the quality that the SRWTP's discharge must achieve. Permit monitoring requirements provide a basis for systematic sampling of the discharge and the Sacramento River to monitor water quality. In addition to limitations and monitoring requirements, the RWQCB requires several studies to evaluate the impacts of the SRWTP's discharge to the Sacramento River.

Local

Sacramento Regional County Sanitation District

Sacramento Regional Wastewater Treatment Plant 2020 Master Plan

The SRWTP 2020 Master Plan provides a phased program of recommended wastewater treatment facilities and management programs to accommodate planned growth and to meet existing and anticipated regulatory requirements through the year 2020. The Master Plan addresses both public health and environmental protection issues while ensuring reliable service at affordable rates for Regional San customers. The Master Plan's key goals are to provide sufficient capacity to meet growth projections and an orderly expansion of SRWTP facilities, to comply with applicable water quality standards, and to provide for the most cost-effective facilities and programs from a watershed perspective (Regional San 2008).

Regional Interceptor Master Plan 2000

Regional San has prepared a long-range master plan for the large-diameter interceptors that transport wastewater to the SRWTP, which includes interceptor upgrades/expansions to accommodate anticipated growth through 2035 (Regional San 2000).

Sacramento County Environmental Management Department

Onsite Wastewater Treatment System Guidance Manual

The EMD regulates the design, installation, and operation of on-site wastewater treatment systems, the management of non-discharging liquid waste systems, and liquid waste disposal requirements associated with land use modifications such as subdivisions, parcel splits, and lot line adjustments. The EMD oversees the on-site wastewater treatment systems for the unincorporated areas and incorporated cities in Sacramento County. The Onsite Wastewater Treatment System Guidance Manual complements Sacramento County Code 6.32 (EMD 2013).

WASTEWATER SERVICE IMPACTS AND MITIGATION MEASURES

Standards of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.

2) Require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

3) Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

Methodology

The following evaluation of the proposed Project's potential wastewater facilities and services impacts, as well as septic system impacts, are based on a review of relevant planning documents, including the SRWTP 2020 Master Plan, Regional Interceptor Master Plan 2000, and the City's current General Plan and Zoning Code, as well as of available information regarding wastewater and septic systems in the Planning Area.

General Plan Policies and Standards

The proposed Project contains the following policies and standards related to the provision of wastewater services to future development in the Planning Area.

Policy INF-2-1: Sewage conveyance and treatment capacity shall be available in time to meet the demand created by new development, or shall be assured through the use of bonds or other sureties to the City's satisfaction.

Standard INF-2-1.a: The following shall be required for all development projects, excluding subdivisions:

- Sewer/wastewater treatment capacity shall be available at the time of project approval.
- All required sewer/wastewater infrastructure for the project shall be in place at the time of project approval, or shall be assured through the use of bonds or other sureties to the City's satisfaction.

Standard INF-2-1.b: The following shall be required for all subdivisions to the extent permitted by State law:

- Sewage/wastewater treatment capacity shall be available at the time of tentative map approval.
- The agency providing sewer service to the subdivision shall demonstrate prior to the City's approval of the Final Map that sufficient capacity shall be available to accommodate the subdivision plus existing development, and other approved projects using the same conveyance lines, and projects which have received sewage treatment capacity commitments.
- On-site and off-site sewage conveyance systems required to serve the subdivision shall be in place prior to the approval of the Final Map, or their financing shall be assured to the satisfaction of the City, consistent with the requirements of the Subdivision Map Act.
- Sewage conveyance systems in the subdivision shall be in place and connected to the sewage disposal system prior to the issuance of any building permits. Model homes may be exempted from this policy as determined appropriate by the City, and subject to approval by the City.

Policy INF-2-2: Development along corridors identified by sewer providers in their master plans as locations of future sewerage conveyance facilities shall incorporate appropriate easements as a condition of approval.

Policy INF-2-3: Reduce the potential for health problems and groundwater contamination resulting from the use of septic systems.

Policy INF-2-4: Residential development on lots smaller than 2 gross acres shall be required to connect to public sewer service, except in the Rural Area.

Policy INF-2-5: Independent community sewer systems shall not be established for new development.

Policy SRA-2-1: Prohibit the extension of sewer service into the Sheldon/Rural Area. Lots in the Sheldon/Rural Area should be large enough to accommodate septic systems. This policy shall not be construed to limit the ability of any sewer agency to construct interceptor lines through or adjacent to the Sheldon/Rural Area, provided that no trunk or service lines are included.

Policy SRA-2-2: The City shall not require the installation of dry sewers as a condition of approval of development.

Policy SRA-2-3: The City shall not require residential development on lots less than 2 gross acres which existed as legal lots as of November 19, 2003, to connect to public sewer service.

Project Impacts and Mitigation Measures

Increase Demand for Wastewater Treatment (Standards of Significance 1, 2, and 3)

Impact 5.12.2.1 Implementation of the proposed Project would result in additional wastewater generation and require treatment of additional wastewater at the Sacramento Regional Wastewater Treatment Plant. There is sufficient capacity at the existing Regional San treatment plant to accommodate Project demand. Therefore, this impact would be **less than significant**.

Potential increases in wastewater generation from the proposed Project were calculated based upon equivalent dwelling units for land uses proposed for the Project, assuming 310 gallons per day per equivalent dwelling unit (Wood Rodgers 2014). Using these assumptions, the proposed Project would generate an additional 16.2 million gallons per day of wastewater. As described previously, the SRWTP's Master Plan 2020 identifies that existing facilities are limited, based on hydraulic considerations, to an equivalent 207 mgd ADWF and do not meet the year 2020 projection of 218 mgd ADWF. However, the SRWTP has been master planned to accommodate additional growth beyond the planning year to 350 mgd ADWF of conventional and advanced treatment capacity (Regional San 2008, p.15).

Planned facility expansions are based on projected growth rates provided by SACOG. The construction of future treatment facilities will occur in incremental stages to best accommodate the growth rates. If the actual growth rate is slower than projected, construction of the next increment of treatment capacity can be delayed. Conversely, if the growth rate is faster than projected, the next increment of treatment capacity can be constructed earlier than anticipated (Regional San 2008, p. 14). As a result, additional Project-generated wastewater would not exceed capacity of the treatment plant, and the treatment plant would have adequate capacity to serve the proposed Project. In addition, the SRWTP currently operates in compliance with all applicable existing regulatory requirements. Therefore, the proposed Project would not exceed the Central Valley RWQCB's wastewater treatment requirements. This impact would be **less than significant**.

Mitigation Measures

None required.

Require Construction of Wastewater System Facilities (Standard of Significance 2)

Impact 5.12.2.2 Implementation of the proposed Project may require the construction of new and expanded wastewater infrastructure, which could result in impacts to the physical environment. This impact would be **less than significant**.

According to SRWTP Master Plan 2020, conventional secondary treatment facilities will be based on wastewater flow and load projections. Generally, facility expansion is phased in five- to ten-year increments over the planning period to allow for observation of the economy and wastewater flows/loads, and to determine if facilities are idle and need to be minimized (Regional San 2008, p. 41). Also, as discussed above, SRWTP Master Plan 2020 provides recommended wastewater treatment facilities and management programs to provide service for planned growth. Currently capacity is limited, and does not achieve the projected 2020 average dry weather flow of 218 mgd (ADWF). However, the SRWTP has been designed to accommodate 350 mgd ADWF and would, therefore, be able to accommodate the approximately 16.2 mgd demand generated by the proposed Project (Regional San 2008, p. 15).

Construction impacts associated with extension, expansion, and/or replacement of on-site wastewater system facilities may result in temporary aesthetic impacts, disturbance of biological and/or cultural resources, conversion of agricultural land, temporary air emissions, soil erosion and water quality degradation, handling of hazardous materials, temporary excessive noise, and temporary construction traffic. However, the impact of development in the entire Planning Area, including the provision of infrastructure, are considered throughout this Draft EIR. There would be no additional impacts, so this impact would be **less than significant**.

Mitigation Measures

None required.

WASTEWATER SERVICE CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for wastewater impacts would be the Regional San service area, which includes portions of unincorporated Sacramento County as well as the Cities of Citrus Heights, Elk Grove, Folsom, Rancho Cordova, Sacramento, and West Sacramento and the communities of Courtland and Walnut Grove.

Cumulative Impacts and Mitigation Measures

Cumulative Wastewater Impacts

Impact 5.12.2.3 Implementation of the proposed Project, in addition to other development in the Regional San service area, would generate new wastewater flows requiring conveyance and treatment. The proposed Project's contribution to this significant impact would be **cumulatively considerable**.

Future development in the Regional San service area would result in an incremental cumulative demand for wastewater and related services, and the construction of new and expanded wastewater facilities would provide additional capacity to accommodate current and future demand. The construction of these facilities would result in associated environmental impacts. This is considered a significant cumulative impact.

As described under Impact 5.12.2.1, the SRWTP has been master planned to accommodate 350 mgd ADWF to accommodate future growth in the Regional San service area, and the plant would be expanded and upgraded to respond to future growth. Similarly, Regional San has prepared a master plan for the district's regional interceptors that would ensure adequate capacity for future growth to 2035. As noted above, the proposed Project would generate approximately 16.2 mgd of wastewater that would require treatment at the SRWTP, increasing demand beyond that assumed for the plant. Because the design and location of any future improvements at the SRWTP that may be required to accommodate the Project's increased contribution is at the discretion of Regional San and is currently unknown, this analysis cannot adequately assess the potential environmental impacts of such improvements without speculating. Therefore, this would remain a **significant and unavoidable** impact, and the proposed Project's contribution would be **cumulatively considerable**.

Mitigation Measures

No additional feasible mitigation available beyond mitigation measure **MM 5.12.2.1**.

5.12.3 SOLID WASTE SERVICE

SOLID WASTE EXISTING SETTING

Existing Solid Waste Collection and Disposal

Republic Services, formerly known as Allied Waste, provides residential solid waste services in the City under an exclusive franchise agreement (City of Elk Grove 2017d). Solid waste generated by commercial and multifamily residential developments is served by registered commercial haulers or county-authorized recyclers (City of Elk Grove 2017a).

Landfill Capacity

Solid waste generated in the Planning Area is taken to a variety of landfills. **Table 5.12-5** shows landfills used by the City and the permitted and remaining capacities of those landfills. As shown, the majority of the landfills serving City waste haulers have over 70 percent remaining capacity (CalRecycle 2017a).

TABLE 5.12-5
DISPOSAL FACILITIES AND REMAINING CAPACITIES

Facility	Total Estimated Permitted Capacity (in cubic yards)	Total Estimated Capacity Used		Remaining Estimated Capacity		Estimated Closure Year
		Cubic Yards	Percentage	Cubic Yards	Percentage	
Altamont Landfill & Resource Recovery (01-AA-0009)	124,400,000	59,000,000	47.4%	65,400,000	52.6%	2025
Recology Hay Road (48-AA-0002)	37,000,000	6,567,000	17.7%	30,433,000	82.3%	2077
Bakersfield Metropolitan SLF (15-AA-0273)	53,000,000	20,191,740	38.1%	32,808,260	61.9%	2046
Foothill Sanitary Landfill (39-AA-0004)	138,000,000	13,000,000	9.4%	125,000,000	90.6%	2082
Forward Landfill, Inc. (39-AA-0015)	51,040,000	28,940,000	56.7%	22,100,000	43.2%	2020
Keller Canyon Landfill (07-AA-0032)	75,018,280	11,609,870	15.5%	63,408,410	91%	2030
L and D Landfill Co. (34-AA-0020)	6,031,055	1,931,055	32%	4,100,000	84.5%	2023
North County Landfill (39-AA-0022)	41,200,000	5,800,000	14.1%	35,400,000	85.9%	2048
Potrero Hills Landfill (48-AA-0075)	83,100,000	69,228,000	83.3%	13,872,000	16.7%	2048
Sacramento County Landfill (Kiefer) (34-AA-0001)	117,400,000	4,500,000	3.8%	112,900,000	96.2%	2064

Source: CalRecycle 2017a

SOLID WASTE SERVICES REGULATORY FRAMEWORK

State

California Integrated Waste Management Act

The California Integrated Waste Management Act of 1989 (AB 939) required all California cities and counties to reduce the volume of waste deposited in landfills by 50 percent by the year 2000, and requires all California cities and counties to continue to remain at 50 percent or higher for each subsequent year. The purpose of AB 939 is to reduce the amount of solid waste generated and extend the life of landfills.

AB 939 requires each California city and county to prepare, adopt, and submit to California Department of Resources Recycling and Recovery (CalRecycle) a source reduction and recycling element (SRRE) that demonstrates how the jurisdiction will meet the act's mandated diversion goals. Each jurisdiction's SRRE must include specific components defined in PRC Sections 41003 and 41303. In addition, the SRRE must include a program for management of solid waste generated within the jurisdiction that is consistent with the following hierarchy: (1) source reduction, (2) recycling and composting, and (3) environmentally safe transformation and land disposal. Included in this hierarchy is the requirement to emphasize and maximize the use of all feasible source reduction, recycling, and composting options in order to reduce the amount of solid waste that must be disposed of by transformation and land disposal (PRC Sections 40051, 41002, and 41302) (CalRecycle 2017b).

CalRecycle Model Ordinance

Subsequent to the Integrated Waste Management Act, additional legislation was passed to assist local jurisdictions in accomplishing the goals of AB 939. The California Solid Waste Re-use and Recycling Access Act of 1991 (SB 1327) (PRC Sections 42900–42911) required CalRecycle to approve a model ordinance for adoption by any local government for the transfer, receipt, storage, and loading of recyclable materials in development projects by March 1, 1993. The act also required local agencies to adopt a local ordinance by September 1, 1993, or to allow the model ordinance to take effect.

Local

City of Elk Grove Source Reduction and Recycling Element

In response to AB 939, the City prepared an SSRE that includes policies and programs that will be implemented by the City to achieve the State waste reduction mandates. As required by AB 939, the SRRE must project the amount of disposal capacity needed to accommodate the waste generated within the City for a 15-year period. In addition, the jurisdictional mandated goal is 50 percent diversion, with diversion meaning source reduction, recycling, composting, and related activities.

Space Allocation and Enclosure Design Guidelines for Trash and Recycling

Municipal Code Chapter 30.90, Space Allocation and Enclosure Design Guidelines for Trash and Recycling, provides recycling and waste collection requirements for all development in the City. Integrated collection areas with recycling components assist in the reduction of waste materials, thereby prolonging the life of landfills and promoting environmentally sound practices, and help the City meet the State-mandated recycling requirements described previously in this subsection.

The guidelines include information and resources for designing trash and recycling sites that will be used by building occupants in new developments or significant remodels. Conventional recycling and green waste recycling must be designed into the site along with the trash capacity. The California Solid Waste Reuse and Recycling Access Act of 1991 requires new commercial and multifamily developments of five units or more, or improvements that add 30 percent or more to the existing floor area, to include adequate, accessible, and convenient areas for collecting and loading recyclable materials (City of Elk Grove 2017c).

Construction and Demolition Debris Reduction, Reuse, and Recycling

Municipal Code Chapter 30.70, Construction and Demolition Debris Reduction, Reuse, and Recycling, makes construction and demolition debris recycling mandatory for all new construction (with a valuation greater than $200,000) and demolition projects. Materials required to be recycled include scrap metal, inert materials (concrete, asphalt paving, bricks, etc.), corrugated cardboard, wooden pallets, and clean wood waste. A waste management plan must be completed to identify waste that would be generated by a project as well as the proposed recycling and hauling methods. During construction and/or demolition, a waste log must be maintained on the project area and submitted to the City at project completion (City of Elk Grove 2017b).

Commercial Refuse Hauler Fee

Municipal Code Chapter 30.50, Nonresidential Haulers, provides information relating to the setting, charging, collecting, and enforcement of nonresidential refuse hauler fees, as well as establishing registration requirements stating that all nonresidential waste haulers operating, conducting business, or providing solid waste services must register with the City and receive a registration decal to operate and remit an amount based on their diversion performance (City of Elk Grove 2010).

SOLID WASTE IMPACTS AND MITIGATION MEASURES

Standards of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure, or negatively impact the provisions of solid waste services.

2) Impair the attainment of solid waste reduction goals.

Methodology

The following impact analysis is based on discussions with City Staff, and review of available landfill capacity data; population and employee projections for the proposed Project; and planning documents such as the City's current General Plan, Design Guidelines, and Zoning Code.

General Plan Policies and Standards

The proposed Project contains the following policies and standards related to the provision of solid waste services to future development in the Planning Area.

Policy CIF-1-1: Facilitate recycling, reduction in the amount of waste, and reuse of materials to reduce the amount of solid waste sent to landfill from Elk Grove.

Policy CIF-1-2: Reduce municipal waste through recycling programs and employee education.

Standard CIF-1-2.a: Recycle waste materials for all municipal construction and demolition projects.

Policy CIF-1-3: Encourage businesses to emphasize resource efficiency and environmental responsibility and to minimize pollution and waste in their daily operations.

Project Impacts and Mitigation Measures

Increase Demand for Solid Waste Collection Services and Landfill Capacity (Standards of Significance 1 and 2)

Impact 5.12.3.1 Construction and operation of future development projects within the Planning Area would generate solid waste, thereby increasing demand for waste collection and disposal services. This impact would be **less than significant**.

Implementation of the proposed Project would result in the development of residential and nonresidential uses, the construction and operation of which would generate new volumes of solid waste and recyclable materials. Using the most recent disposal projections, which are based on 10 years of historical disposal data from 2006 to 2016 and California's projected population, the predicted Statewide per capita disposal rate for 2017 is an average of 5.9 pounds per person per day (using AB 347's measurement system). It is important to note that there is no sure way to project future disposals, as many factors influence the amount of waste generated and ultimately disposed.

TABLE 5.12-6
PROJECTED SOLID WASTE GENERATION

Projection	Daily Disposal Rate Target	Annual Disposal Rate	Total Annual Projected
158,179 residents	5.9 lbs/resident[1]	1.08 tons/resident	170,319 tons
77,339 employees	11.4 lbs/employee[2]	2.08 tons/employee	160,904 tons
Total Projected Solid Waste Generation			**331,223 tons/year**

Source: CalRecycle 2017c, 2017d

Notes:

1 *Calculated with per capita disposal rate using AB 347's measurement system (2017c)*

2 *Calculated with per capita disposal rate using SB 1016's measurement system (2017d)*

As shown in **Table 2.0-2** in Section 2.0, Project Description, the proposed Project would generate approximately 158,179 new residents and 77,339 new employees in the Planning Area. Based on these estimates, the proposed Project would generate an additional 331,223 tons of solid waste annually as shown in **Table 5.12-6**. However, according to the City's Integrated Waste Manager (Neff 2018), based on CalRecycle data, the City achieved a per capita disposal rate in 2016 of 2.8 pounds per capita per day. This rate far exceeded (i.e., is better than) the State's disposal rate target for the City of 5.9 pounds per capita per day. Assuming a disposal rate of 2.8 pounds per capita per day, the proposed Project would generate approximately 241,733 tons per year. Therefore, with implementation of the City's recycling program, actual total solid waste generated by the proposed Project would be approximately 27 percent less than what would be required to meet the Statewide target rate

Future construction in the Planning Area would also generate significant volumes of construction and demolition debris. However, the City's construction diversion rate is estimated at over 50 percent. Therefore, implementation of the City's existing recycling programs and associated regulations would significantly reduce the volume of generated wastes that would be disposed of in landfills. In addition, Elk Grove Municipal Code Section 30.70.030(E) requires that all projects recycle or divert at least 65 percent of the material collected at the construction site, not including excavated soil and land clearing debris.

Solid waste generated by existing and future residential uses could be hauled by Republic Services. Waste generated by existing and future commercial and multifamily uses could be hauled by several permitted haulers as selected by the individual developer, and wastes would be hauled to a permitted landfill for disposal as selected by the hauler. Republic Services and the other permitted haulers that serve the City would need to expand services to meet this projected future demand, which would be funded by service fees imposed on customers. As shown in **Table 5.12-5**, there is substantial remaining capacity in the landfills serving local waste haulers, with an average remaining capacity of more than 70 percent. Therefore, the proposed Project would be served by solid waste management companies and landfills with sufficient capacity to serve the future development.

In addition, all future development projects in the Project area would be required to comply with all applicable solid waste regulations, including the City's Space Allocation and Enclosure Design Guidelines for Trash and Recycling. Compliance with these regulations would be ensured through the development review process. Therefore, because the proposed Project would not generate solid waste in excess of State or local standards or in excess of the capacity of the local infrastructure, negatively impact the provisions of solid waste services, or impact the attainment of solid waste reduction goals, this impact would be **less than significant**.

Mitigation Measures

None required.

SOLID WASTE CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for solid waste impacts the service areas of the landfills that serve the City. **Table 5.12-5** provides descriptions of the landfills which receive waste from the City, including an estimated remaining capacity and estimated closure date for each.

Cumulative Impacts and Mitigation Measures

Cumulative Solid Waste Service (Standards of Significance 1 and 2)

Impact 5.12.3.2 Implementation of the proposed Project, in combination with other development in other jurisdictions that contribute to regional landfills, would generate solid waste, thereby increasing demand for hauling and disposal services. The Project's solid waste generation would be substantially less than average, so the Project's contribution to this impact would be **less than cumulatively considerable**.

As discussed above, there is substantial remaining capacity in the landfills serving City waste haulers and the majority of which have over 60 percent remaining. However, any existing capacity that currently exists within a landfill's service area is finite; although several landfills have remaining capacity, any additional solid waste incrementally added to these existing facilities will decrease the amount of time until they are completely full. Without approved plans for substantial expansion of these landfill facilities, solid waste generation from future recycle or divert at least 65 percent of the material collected at the construction site, not including excavated soil and land clearing debris.

Solid waste generated by existing and future residential uses could be hauled by Republic Services. Waste generated by existing and future commercial and multifamily uses could be hauled by several permitted haulers as selected by the individual developer, and wastes would be hauled to a permitted landfill for disposal as selected by the hauler. Republic Services and the other permitted haulers that serve the City would need to expand services to meet this projected future demand, which would be funded by service fees imposed on customers. As shown in **Table 5.12-5**, there is substantial remaining capacity in the landfills serving local waste haulers, with an average remaining capacity of more than 70 percent. Therefore, the proposed Project would be served by solid waste management companies and landfills with sufficient capacity to serve the future development.

In addition, all future development projects in the Project area would be required to comply with all applicable solid waste regulations, including the City's Space Allocation and Enclosure Design Guidelines for Trash and Recycling. Compliance with these regulations would be ensured through the development review process. Therefore, because the proposed Project would not generate solid waste in excess of State or local standards or in excess of the capacity of the local infrastructure, negatively impact the provisions of solid waste services, or impact the attainment of solid waste reduction goals, this impact would be **less than significant**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations and General Plan policies.

SOLID WASTE CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative setting for solid waste impacts the service areas of the landfills that serve the City. **Table 5.12-5** provides descriptions of the landfills which receive waste from the City, including an estimated remaining capacity and estimated closure date for each.

Cumulative Impacts and Mitigation Measures

Cumulative Solid Waste Service (Standards of Significance 1 and 2)

Impact 5.12.3.2 Implementation of the proposed Project, in combination with other development in other jurisdictions that contribute to regional landfills, would generate solid waste, thereby increasing demand for hauling and disposal services. The Project's solid waste generation would be substantially less than average, so the Project's contribution to this impact would be **less than cumulatively considerable**.

As discussed above, there is substantial remaining capacity in the landfills serving City waste haulers and the majority of which have over 60 percent remaining. However, any existing capacity that currently exists within a landfill's service area is finite; although several landfills have remaining capacity, any additional solid waste incrementally added to these existing facilities will decrease the amount of time until they are completely full. Without approved plans for substantial expansion of these landfill facilities, solid waste generation from future development would continue to affect regional landfill capacity. This is considered a significant cumulative impact.

Future development projects in the Planning Area would be reviewed during the development review process to ensure they are designed to comply with all applicable solid waste regulations, including the City's Space Allocation and Enclosure Design Guidelines for Trash and Recycling. In addition, the City implements EGMC Chapter 30.70 (Construction and Demolition (C&D) Debris Reduction, Reuse and Recycling) and regularly reviews solid waste disposal data provided by its contracted haulers to ensure that it achieves the mandated diversion rate. Implementation of source reduction measures would be required on a project-specific basis and plans, such as those for recycling, would partially address landfill capacity issues by diverting additional solid waste at the source of generation.

As described under Impact 5.12.3.1, at buildout, the Planning Area could generate as much as 331,223 additional tons of solid waste each year. However, the City exceeds the mandated 50 percent diversion rate, so the amount of material reaching the landfills would be less than that amount, likely as low as 241,733 tons per year. Solid waste generated in the City is ultimately disposed of in a variety of landfills. While the proposed Project would generate additional solid waste that would be sent to regional landfills, because the proposed Project would generate less solid waste per capita than the State's diversion requirement, due to the success of existing solid waste reduction programs, the proposed Project's contribution to this impact would be **less than cumulatively considerable**.

Mitigation Measures

No additional mitigation required beyond compliance with existing regulations.

5.12.4 ELECTRIC, NATURAL GAS, AND TELEPHONE SERVICES

ELECTRIC, NATURAL GAS, AND TELEPHONE SERVICES EXISTING SETTING

Electric Service

The Sacramento Municipal Utility District (SMUD) provides all electric services in the City. SMUD is an independent operator of power and generates, transmits, and distributes electricity to an approximately 900-square-mile area with 10,473 miles of power lines located mostly in Sacramento County and small portions of Placer and Yolo Counties. With 626,460 total customers, SMUD is the nation's sixth largest community-owned electric utility in terms of customers served (SMUD 2017a).

SMUD gets its electricity from a variety of resources, including hydropower, natural gas-fired generators, renewable energy such as solar and wind power, and power purchased on the wholesale market. SMUD's largest single source of electricity is the 500-megawatt Cosumnes Power Plant located in southern Sacramento County (SMUD 2017c).

SMUD owns and operates the Upper American River Project (UARP), which consists of 11 reservoirs and 8 powerhouses. In a normal water year, the UARP provides approximately 1.8 billion kilowatt-hours of electricity—enough energy to power approximately 180,000 homes—and provides operational flexibility, system reliability, and economical power generation for SMUD. The value of the UARP extends beyond the boundaries of SMUD's service territory by assisting in the maintenance of integrity for Northern California's entire electric transmission system (SMUD 2017b).

reliable utility service at reasonable rates. The CPUC also protects against fraud and promotes the health of California's economy.

California Building Energy Efficiency Standards, Title 24

In 1977, the California Energy Resources Conservation and Development Commission adopted energy conservation standards for new residential and commercial buildings. The California building energy efficiency standards were most recently updated in 2016 (Title 24, Part 6 of the California Code Regulations). In general, Title 24 requires the design of building shells and building components to conserve energy. The standards are updated approximately every three years to allow consideration and possible incorporation of new energy efficiency technologies and methods. See also Section 5.7, Greenhouse Gas Emissions and Energy, for additional information on Title 24.

ELECTRIC, NATURAL GAS, AND TELEPHONE IMPACTS AND MITIGATION MEASURES

Standard of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G threshold of significance. A project is considered to have a significant effect on the environment if it will:

1) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for other public facilities.

Methodology

The following impact analysis is based on a review of available service level and infrastructure information, discussions with utility provider staff, and population and employment projections for the proposed Project.

General Plan Policies and Standards

The proposed Project contains the following policies and standards related to the provision of electric, natural gas, and telephone services to future development in the Planning Area.

Policy CIF-2-2: Require that new utility infrastructure for electrical, telecommunication, natural gas and other services avoid sensitive resources, be located so as to not be visually obtrusive, and, if possible, be located within roadway rights-of-way or existing utility easements.

Policy CIF-2-3: To minimize damage to roadways and reduce inconvenience to residents and businesses, the City shall seek to coordinate roadway utility efforts so that they are installed in a single operation whenever possible. Multiple installations in which separate utilities are installed at different times and/or in different trenches, are specifically discouraged.

Policy CIF-2-4: Maintain, improve, and modernize existing facilities and services when necessary in order to meet the needs of Elk Grove residents and businesses.

Policy CIF-3-1: Be a regional leader in technology infrastructure.

Policy CIF-3-2: Encourage and coordinate with service providers to utilize advanced technologies such as fiber optic internet and Citywide information services.

Standard CIF-3-2.a: Conduit to support future technologies shall be laid in new development areas as a condition of project approval.

Policy CIF-3-3: Support technology that builds on the City's agricultural legacy.

Policy CIF-3-4: Acknowledge and adapt to innovations in technology to facilitate infrastructure investments as appropriate.

Project Impacts and Mitigation Measures

Impacts to Electric, Natural Gas Service, and Telecommunication Utilities (Standard of Significance 1)

Impact 5.12.4.1 Implementation of the proposed Project would increase demand for electric, natural gas, and telephone services. This impact would be **less than significant**.

Implementation of the proposed Project would result in the development of residential and nonresidential uses which would increase demand for electric, natural gas, and telephone services.

Electric Service

Implementation of the proposed Project would increase use of electricity in the City, in particular, for electricity to light, heat, ventilate, and air condition new buildings. As discussed in Section 5.7, Greenhouse Gas Emissions and Energy, the proposed Project would increase electricity demand by 6,778,161 kilowatts per year, which equates to an approximately 10.5 percent increase from existing demand. These projections for electricity use assume implementation of the policies and actions of the proposed General Plan and CAP that would reduce energy consumption in the Planning Area.

The 1,000-megawatt Cosumnes Power Plant currently provides adequate electrical supply to accommodate existing and proposed growth. In addition, SMUD's Franklin Electric Transmission Project, an electric substation, would increase electric system capacity by providing approximately 299 kV in power lines and overhead transmission facilities to meet the customer electric load growth due to the planned development in the southwest portion of Sacramento County. The impacts associated with the construction and operation of this transmission project were determined to be less than significant with mitigation identified by SMUD (SMUD 2016a).

Potential environmental effects of generating and conveying more power through the development of substations and additional power lines include impacts on air quality (during construction), biological resources (depending on location), cultural resources (depending on location), hazardous materials, land use, noise and vibration (during construction), traffic, visual resources, waste management, water and soil resources, and personal health. Construction of electrical infrastructure within the Planning Area boundaries is assumed throughout this EIR; there would be no additional impact associated with the provision of electrical facilities in the Planning Area. The extent to which additional off-site infrastructure would be required is not known at this time and evaluation of potential infrastructure would be remote and speculative, considering the programmatic nature of this EIR. Therefore, this impact would be less than significant.

Natural Gas Service

The anticipated population increase associated with the proposed Project would increase demand for natural gas and related facilities. As discussed in Section 5.7, Greenhouse Gas Emissions and Energy, the proposed Project would increase demand for natural gas by 20,619,345 thousand British thermal units per year. This represents an increase of approximately 18.4 percent increase from existing demand. PG&E declares itself a reactive utility that provides natural gas as customers request its services. It is anticipated that PG&E would be able to provide services to the growing population in the Planning Area, as PG&E is responsible for natural gas services to the greater Sacramento area and Northern California (PG&E 2014).

PG&E purchases gas supplies from producers and marketers in Canada, the Rockies and the U.S. Southwest. PG&E makes purchases on a daily, monthly, and longer-term basis to ensure supplies to its customers (PG&E 2018). Potential environmental effects associated with developing new sources of natural gas and construction of gas lines include impacts on air quality (during construction), biological resources (depending on location), cultural resources (depending on location), hazardous materials, land use, noise and vibration (during construction), traffic, and personal health. Construction of natural gas infrastructure within the Planning Area boundaries is assumed throughout this EIR; there would be no additional impact associated with the provision of natural gas facilities in the Planning Area. The extent to which additional off-site infrastructure would be required is not known at this time and evaluation of potential infrastructure would be remote and speculative, considering the programmatic nature of this EIR. Therefore, this impact would be less than significant.

Telephone Service

Development in the Planning Area would result in an increase in demand for telephone service and related facilities. Most underground and aerial telephone transmission lines and wireless facilities are co-located with other utilities on poles or in underground trenches and constructed in public rights-of-way to reduce visual and aesthetic impacts and potential safety hazards. As noted above, construction of infrastructure within the Planning Area boundaries is assumed throughout this EIR; there would be no additional impact associated with the provision of telecommunications facilities in the Planning Area. It is not anticipated that substantial off-site infrastructure would be required to serve the telecommunications needs of the Planning Area. Therefore, this impact would be **less than significant**.

Mitigation Measures

None required.

ELECTRIC, NATURAL GAS, AND TELEPHONE SERVICES CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Cumulative Setting

The cumulative settings for electric, natural gas, and telephone service impacts would be the service areas of the respective service providers as described previously in this subsection.

Cumulative Impacts and Mitigation Measures

Cumulative Electric, Telephone, and Natural Gas Impacts (Standard of Significance 1)

Impact 5.12.4.2 Implementation of the proposed Project, in combination with other development within the service areas of the applicable providers, would increase demand for electric, natural gas, and telephone services. The proposed Project's contribution to this impact would be **less than cumulatively considerable**.

Cumulative development within SMUD and PG&E's service boundaries would result in the permanent and continued use of electricity and natural gas resources. SMUD is in the process of approving a substation facility to accommodate expected customer electrical load growth in the anticipated future development in the southwest portion of Sacramento County. In addition, as PG&E is a reactive provider that supplies natural gas services to customers at their request, it is assumed that PG&E would also serve future development under the proposed Project, in combination with projected future developments in its service boundaries. However, existing facilities may not be adequate to meet this cumulative demand. Development in undeveloped areas of these providers' service areas could require the extension of existing lines, new transmission facilities, and substations. Natural gas regulators and transmission lines would be required to serve residences and businesses. Expansion of these types of facilities would be required to serve the growing population of the service areas, and would be required to be constructed by the service provider as demand warrants. The physical impacts of construction of these facilities within the Planning Area are addressed throughout the Draft EIR. The location of future facilities outside the Planning Area is not known at this time and it would be speculative to determine potential effects of construction and operation of those facilities.

As described under Impact 5.12.4.1, implementation of the proposed Project would result in the development of residential and nonresidential uses that would increase demand for electric, natural gas, and telecommunication services. While the proposed Project would contribute to increased demand for these resources, implementation of proposed General Plan and CAP policies and actions would reduce energy consumption in the Planning Area. Because the proposed General Plan contains policies for energy-efficient buildings that would reduce the increase in demand for energy, the proposed Project's contribution to this impact would be **less than cumulatively considerable**.

Mitigation Measures

None required beyond compliance with the CAP Update and proposed General Plan policies.

REFERENCES

Ascent Environmental. 2017. *Climate Change Vulnerability Assessment for the Sacramento County Climate Action Plan.* http://www.per.saccounty.net/PlansandProjectsIn-Progress/Documents/Climate%20Action%20Plan/Climate%20Change%20Vulnerability%20Assessment.pdf.

CalRecycle (California Department of Resources Recycling and Recovery.) 2017a. "*Facility/Site Search*." Accessed December 26. http://www.calrecycle.ca.gov/SWFacilities/Directory/Search.aspx.

———. 2017b. "*History of California Solid Waste Law, 1985–1989*." Accessed December 26. http://www.calrecycle.ca.gov/laws/legislation/calhist/1985to1989.htm.

———. 2017c. *"State of Disposal and Recycling in California 2017 Update."* Accessed December 28. http://www.calrecycle.ca.gov/publications/Documents/1612 /2017%20State%20of%20Recycling%20and%20Disposal%20Report_01612.pdf.

———. 2017d. "*California's Statewide Per Resident, Per Employee, and Total Disposal Since 1989."* Accessed December 28. http://www.calrecycle.ca.gov/lgcentral/goalmeasure/disposalrate/Graphs/Disposal.htm.

City of Elk Grove. 2010. "Nonresidential Haulers." Accessed December 28. http://www.codepublishing.com/CA/ElkGrove/#!/ElkGrove30/ElkGrove3050.html.

———. 2017a. "Commercial Service Providers." Accessed December 26. http://www.elkgrovecity.org/city_hall/departments_divisions/garbage_recycling/commercial/commercial_service_providers/.

———. 2017b. "Construction and Demolition Debris Recycling." Accessed December 26. http://www.elkgrovecity.org/city_hall/departments_divisions/garbage_recycling/commercial/construction_and_debris_recycling.

———. 2017c. "Design Guidelines for Trash and Recycling." Accessed December 26. http://www.elkgrovecity.org/cms/One.aspx?portalId=109669&pageId=233750.

———. 2017d. "*Guide to Collection Services."* Accessed December 26. http://www.elkgrovecity.org/cms/One.aspx?portalId=109669&pageId=8403143.

EGWD (Elk Grove Water District). 2016. *2015 Urban Water Management Plan*.

EMD (Sacramento County Environmental Management Department). 2013. *Onsite Wastewater Treatment System Guidance Manual.*

Neff, Heather. 2018. City of Elk Grove. Email to Stephanie Wen Re: Disposal Rates. January 2.

PG&E (Pacific Gas & Electric). 2014. "*Gas Service Area Maps."* Accessed December 28. https://www.pge.com/tariffs/tm2/pdf/GAS_MAPS_Service_Area_Map.pdf.

———. 2017. "*Company Profile."* Accessed December 26. https://www.pge.com/en_US/about-pge/company-information/profile/profile.page.

———. 2018. "*Discover Core Gas Supply*." Accessed June 2018. https://www.pge.com/enUS/for-our-business-partners/energy-supply/core-gas-supply/core-gas-supply.page.

Regional San (Sacramento Regional County Sanitation District). 2000. *Regional Interceptor Master Plan 2000*.

———. 2008. *2020 Master Plan Final Executive Summary*, *Sacramento Regional Wastewater Treatment Plant*.

———. 2017a. "*About Us.*" Accessed December 26. https://www.regionalsan.com/about-us.

---------. 2017b. *"Protecting Our Community – Safeguarding the Environment."* Accessed December 26. https://www.regionalsan.com/sites/main/files/file-attachments/brochure-gen.pdf.

SASD (Sacramento Area Sewer District). 2017. "All About SASD." Accessed December 26. https://www.sacsewer.com/all-about-sasd.

SCGA (Sacramento Central Groundwater Authority). 2016. *South American Subbasin Alternative Submittal, 2014 Sustainable Groundwater Management Act, Final Draft*.

———. 2018. *2017 SGMA Annual Report, South American Subbasin (5-021.65), Sacramento Central Groundwater Authority*.

SCWA (Sacramento County Water Agency). 2006. *Central Sacramento County Groundwater Management Plan*.

———. 2013. *Water Supply Assessment for Elk Grove Southeast Policy Area*.

———. 2016a. 2015 *Urban Water Management Plan*. http://www.waterresources.saccounty.net/Documents/2015%20UWMP.pdf

———. 2016b. Zone 40 Water Supply Infrastructure Plan Update.

———. 2018. Sacramento County Water Agency – About Us. http://www.waterresources.saccounty.net/scwa/Pages/AboutUs.aspx

SMUD (Sacramento Municipal Utility District.) 2016a. *Notice of Intent to Adopt a Mitigated Negative Declaration - Sacramento Municipal Utility District Franklin Electric Transmission Project.*

———. 2016b. "*Power Content Label.*" Accessed December 26. https://www.smud.org/-/media/Documents/Environmental-Leadership/Power-Content-Label-full.ashx?la=en&hash=3D17476C1682037DDB092E2B0E19BA77A7A4B677.

———. 2017a. "*Company Information.*" Accessed December 26. https://www.smud.org/en/Corporate/About-us/Company-Information.

———. 2017b. "*Hydropower.*" Accessed December 28. https://www.smud.org/en/Corporate/Environmental-Leadership/Power-Sources/Upper-American-River-Project/Hydropower.

———. 2017c. "*Power Sources.*" Accessed December 26. https://www.smud.org/en/Corporate/Environmental-Leadership/Power-Sources.

Wood Rodgers. 2014. *Elk Grove Southeast Policy Area Level II Sewer Study*.

5.13 Transportation

This section describes potential impacts to the transportation system associated with implementation of the proposed Project. The impact analysis examines the vehicular, transit, bicycle, and pedestrian components of the City's overall transportation system.

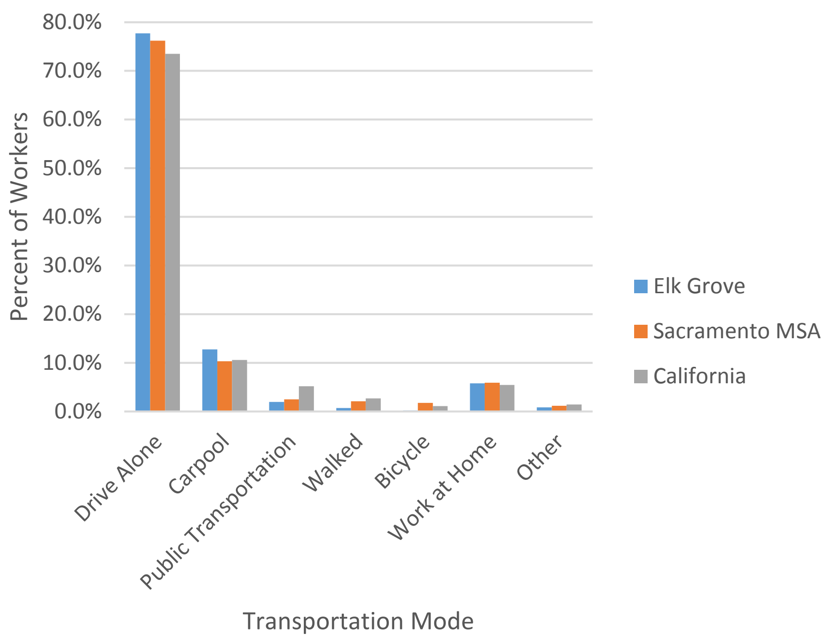
5.13.1 EXISTING SETTING

This section provides a contextual background to the City's transportation system. The proposed Project addresses the overall planning and development of the circulation of residents and visitors in a multimodal framework. The General Plan addresses the correlation between the quality of the transportation network and the quality of life, while preserving the City's character.

Travel Characteristics

Based on the 2016 5-year American Community Survey, in the City and the State of California, most residents commute by automobile (drive alone or in carpool) to get to work. The share of commuters driving to work is higher in the City (about 90 percent) compared to the Sacramento Metropolitan Statistical Area (MSA) (about 87 percent) and California (about 84 percent). However, more City commuters carpool, consistent with the availability of carpool lanes on State Route (SR) 99 between the City and downtown Sacramento. Those using public transit to get to work accounted for the next highest share (about 2 percent). In the City, fewer residents use public transportation to get to work compared to the Sacramento MSA (about 2.5 percent) and California (about 5 percent). Additionally, fewer residents (about 1 percent) rely on active transportation (walking and bicycling) to get to work than the local MSA and the State as a whole (both about 4 percent). About 6 percent of residents work at home. **Figure 5.13-1** compares the method of transportation to work between the three regions.

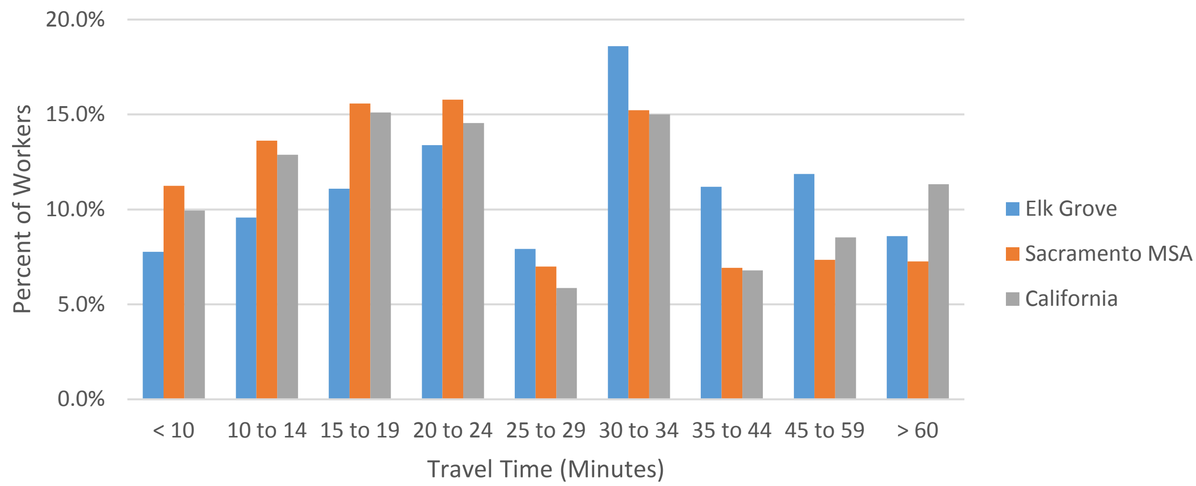
FIGURE 5.13-1
METHODS OF TRANSPORTATION TO WORK



According to the 2016 5-year American Community Survey, about 58 percent of workers living in the City traveled more than 25 minutes to work with an average reported travel time of about 28 minutes. While only 44 percent of workers living in the Sacramento MSA travel more than 25 minutes to work, the average commute time of workers in the Sacramento MSA is shorter than that of residents, at about 21 minutes. Work travel times for the City are longer than California as a whole, with about 48 percent of commuters in California traveling more than 25 minutes. The average commute time for California as a whole is about 24 minutes.

Work trips of this length are consistent with the dominant mode of travel to work (automobile) and with regional employment centers in downtown Sacramento and Rancho Cordova, which are each about 30 minutes from the City during the morning and evening peak periods. **Figure 5.13-2** compares the travel time to work of the three regions.

FIGURE 5.13-2
TRAVEL TIME TO WORK



Roadway System – Roadway Characteristics

The Planning Area is located in south Sacramento County, about 15 miles south of the City of Sacramento. Regional freeway access is provided by Interstate 5 (I-5) and SR 99. Grant Line Road provides access to regional destinations north and east of the City such as the City of Rancho Cordova, City of Folsom, and the community of El Dorado Hills in El Dorado County. The City is served by a network of arterial-level roadways on a 1-mile grid with interchanges on both I-5 and SR 99. I-5 has interchanges at Laguna Boulevard, Elk Grove Boulevard, and Hood Franklin Road that provide direct access to the City. SR 99 has interchanges at Calvine Road, Sheldon Road, Laguna Boulevard/Bond Road, Elk Grove Boulevard, and Grant Line Road that provide direct access to the City. The City's roadways include the following classifications:

- **Interstates and State Highways:** State highways provide mostly uninterrupted travel by car, bus, or truck, and are designed for high speeds over long distances. They have fully controlled access through on- and off-ramps, typically with separation between opposing traffic flows. Driveways and alternative modes of transportation such as walking or bicycling are forbidden, and intersections may only occur as freeway interchanges. There are two highways that cross through the Planning Area: Interstate 5 and California State Route 99.

- **Principal Arterials:** Principal arterials provide limited access on high-speed roads with a limited number of driveways and intersections. Principal arterials also allow bicycles, and pedestrians may be permitted in limited locations. Principal arterials are generally designed for longer trips at the county or regional level.

- **Major Arterials:** Major Arterials provide controlled access for all transportation modes to enter and leave the urban area. In addition, significant intra-area travel, such as between residential areas and commercial or business areas, should be served by this system. Major Arterials can include sidewalks for pedestrian connections, linking land uses to transit. They may have street parking or bike lanes. Arterials range in size from two to eight lanes. Major Arterials in the Rural Area are subject to the separate Rural Roads Improvement Standards, and may have separate pedestrian pathways, but no sidewalks.

- **Minor Arterials/Collectors:** Minor Arterials/Collectors are two-lane roadways providing access to all transportation modes, with a focus on local access. Pedestrian connections link land uses to local destinations and transit. The right-of-way associated with arterial/collectors may feature medians, parking lanes, and bike lanes. Arterial/collectors in the Rural Area are subject to the separate Rural Roads Improvement Standards, and may have separate pedestrian and multiuse pathways, but no sidewalks, and may have reduced speed requirements. This classification also includes Primary and Secondary Residential Streets.

- **Local Roads:** Local roads provide direct access to most properties and provide access to the higher roadway classifications described above. They are generally designed to discourage through traffic. Local roads are typically two lanes and are designed for low vehicle speeds. In the urban area of the City, they include pedestrian sidewalks. In the Rural Area, there are no sidewalks.

The City's backbone roadway system, including the number of existing and ultimate planned travel lanes, is shown **Figure 5.13-3** and described below.

- **Big Horn Boulevard** is a four-lane arterial street extending from Franklin Boulevard to Whitelock Parkway, with extension to Bilby Road in construction and future extension to Kammerer Road planned. Big Horn Boulevard, as currently constructed, is consistent with its existing General Plan designation.

- **Bilby Road** is an east–west roadway that extends from Franklin Boulevard to Bruceville Road, with extension to Big Horn Boulevard in construction and future extension to Promenade Parkway planned. Bilby Road is designated as a two-lane collector between Franklin Boulevard and Bruceville Road and as a four-lane arterial west of Bruceville Road to Promenade Parkway in the Lent Ranch Area.

- **Bond Road** is an east–west roadway that extends from SR 99 to Grant Line Road. Bond Road is six lanes from SR 99 to E. Stockton Boulevard (i.e., at the SR 99 Interchange) and four lanes between E. Stockton Boulevard to Bradshaw Road. East of Bradshaw Road, Bond Road is two lanes. Bond Road is improved to its existing General Plan designation between SR 99 and Bradshaw Road. In the existing General Plan, Bond Road is designated as a four-lane arterial between E. Stockton Boulevard and Bradshaw Road, and east of Bradshaw Road, as a four-lane roadway with expanded right-of-way. Bond Road east of Bradshaw Road is subject to the Elk Grove Rural Road Improvement Policy.

- **Bradshaw Road** is a two-lane north–south roadway extending from Folsom Boulevard in Sacramento County to Grant Line Road in Elk Grove. Bradshaw Road is designated as a six-lane arterial in the existing General Plan.

- **Bruceville Road** is a north–south road extending from Valley Hi Drive near the Kaiser Permanente hospital complex in unincorporated Sacramento County south through the City into San Joaquin County. Bruceville Road is four lanes between Sheldon Road and Laguna Boulevard, six lanes between Laguna Boulevard and Elk Grove Boulevard, four lanes between Elk Grove Boulevard and Whitelock Parkway, and two lanes south of Whitelock Parkway. Bruceville Road is designated as a six-lane arterial in the existing General Plan.

- **Calvine Road** is an east–west road extending from SR 99 to Grant Line Road and forms the City's northern edge. Calvine Road is six lanes from Power Inn Road to Cliffcrest Drive, transitions to four lanes from Cliffcrest Drive to Vintage Park Drive, and then to five lanes between Vintage Park Drive and Elk Grove-Florin Road. East of Elk Grove-Florin Road, Calvine alternates between four, five, and six lanes to Vineyard Road, where it continues as a two-lane road to Grant Line Road. Calvine Road is designated as a six-lane arterial in the existing General Plan.

- **Center Parkway** is a roughly north–south road extending west of Bruceville Road to the City limits. Center Parkway is four lanes from Hampton Cove Way (at the City limits) to Sheldon Road. Center Parkway is designated as a six-lane arterial in the existing General Plan.

- **Elk Grove Boulevard** is an east–west road extending from I-5 to Grant Line Road. Elk Grove Boulevard is six lanes from I-5 to East Stockton Boulevard, then four lanes to Elk Grove-Florin Road, and then two lanes to Grant Line Road. Elk Grove Boulevard is constructed to its General Plan designation between I-5 and Waterman Road. Elk Grove Boulevard is designated in the existing General Plan as a four-lane arterial east of Waterman Road.

- **Elk Grove-Florin Road** is a north–south arterial extending from Florin Road in Sacramento County to East Stockton Boulevard (near SR 99) in south Elk Grove. Elk Grove-Florin Road has four through lanes from Brittany Park Road to Elk Grove Boulevard and two lanes from Elk Grove Boulevard to East Stockton Boulevard. Elk Grove-Florin Road is designated as a six-lane arterial in the existing General Plan from Brittany Park Road to Bond Road, as a four-lane arterial between Bond Road and Elk Grove Boulevard, and as a two-lane collector south of Elk Grove Boulevard.

- **Franklin Boulevard** is a north–south arterial extending from the City of Sacramento south through the City into San Joaquin County. Franklin Boulevard is five lanes (in the City itself) north of Big Horn Boulevard, five lanes between Big Horn Boulevard and Laguna Boulevard, six lanes between Laguna Boulevard and Elk Grove Boulevard, and four lanes between Elk Grove Boulevard and Whitelock Parkway. South of Whitelock Parkway, Franklin Boulevard is two lanes. In the existing General Plan, Franklin Boulevard is designated as a six-lane arterial north of Whitelock Parkway and two lanes south.

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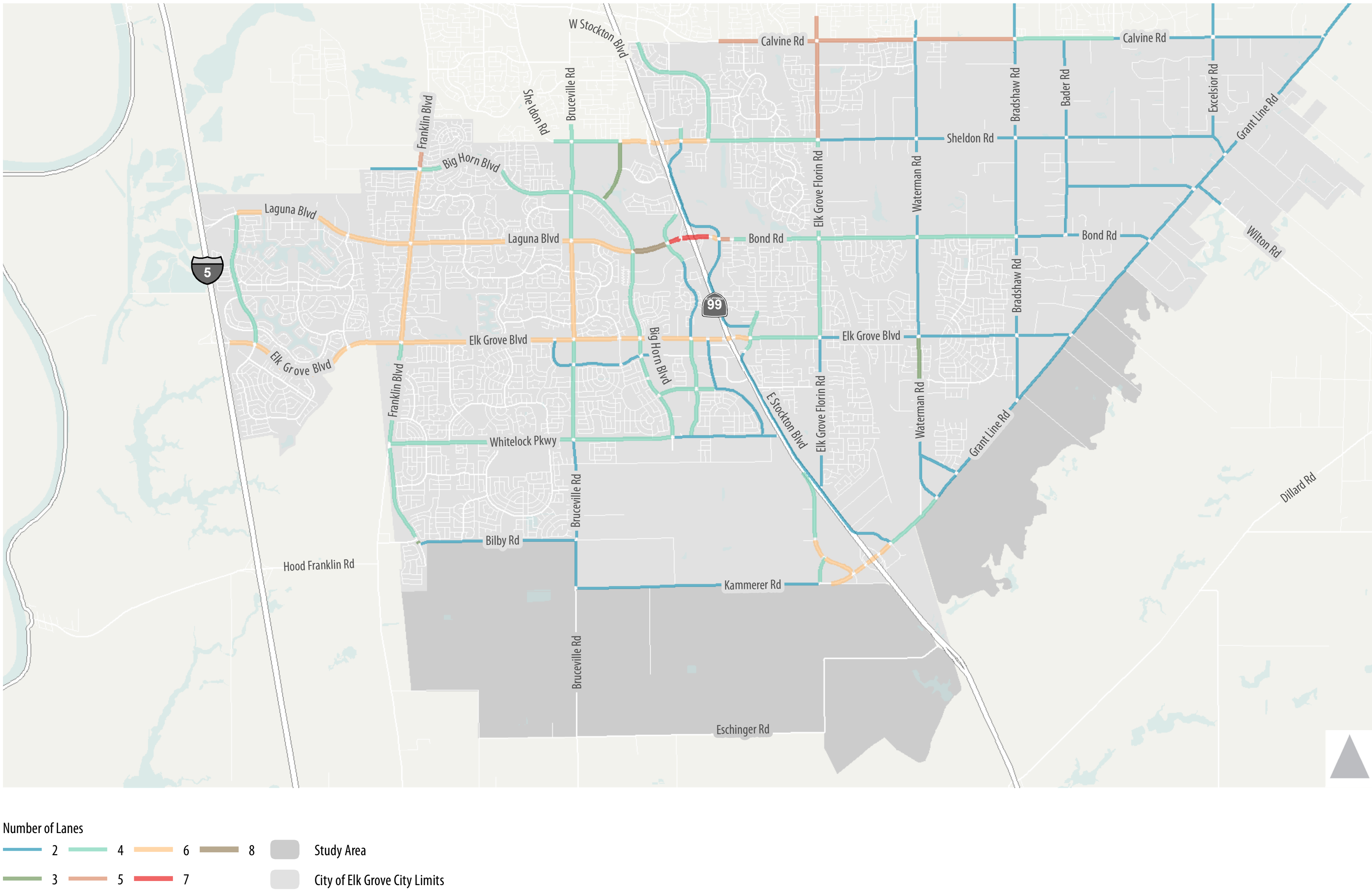

Source: Fehr & Peers, 2018

City of Elk Grove
Development Services

Figure 5.13-3
Existing Backbone Roadway and Number of Lanes

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- **Grant Line Road** traverses the City in a southwest to northeast direction. Grant Line Road extends from SR 99 through the City to White Rock Road in Rancho Cordova. Grant Line Road is six lanes between SR 99 and East Stockton Boulevard. Between East Stockton and Waterman Road, Grant Line Road is four lanes. East of Waterman Road Grant Line Road is two lanes. In the existing General Plan, Grant Line Road is designated as an eight-lane arterial between SR 99 and Bradshaw Road and as a six-lane arterial east of Bradshaw Road. Grant Line Road between Equestrian Drive and Calvine Road is subject to the Elk Grove Rural Road Improvement Policy. Grant Line Road is also part of the Capital SouthEast Connector project.

- **Kammerer Road** is an east–west road extending from Bruceville Road to West Stockton Boulevard. Kammerer Road is two lanes from Bruceville Road to just west of Lent Ranch Parkway. Kammerer Road is part of the Capital SouthEast Connector project and is designated in the existing General Plan as an eight-lane arterial from SR 99 to Lent Ranch Parkway and as a six-lane arterial from Lent Ranch Parkway to Franklin Boulevard. The existing General Plan includes the extension of Kammerer Road from Bruceville Road to Franklin Boulevard.

- **Laguna Boulevard** is an east–west roadway extending from I-5 to SR 99. Laguna Boulevard is six lanes from I-5 to Big Horn Boulevard and eight lanes between Big Horn Boulevard and Laguna Springs Drive/I-5. Laguna Boulevard is constructed to its existing General Plan designation.

- **Sheldon Road** is an east–west roadway that extends from Bruceville Road to Grant Line Road. Sheldon Road is five lanes from Bruceville Road to Lewis Stein Road, six lanes from Lewis Stein Road to Power Inn Road, four lanes between Power Inn Road and Elk Grove-Florin Road, and two lanes east of Elk Grove-Florin Road. Sheldon Road is improved to its existing General Plan designation between Lewis Stein Road and Elk Grove-Florin Road. In the existing General Plan, Sheldon Road is designated as a four-lane arterial between Elk Grove-Florin Road and Bradshaw Road, and as a two-lane roadway with expanded right-of-way between Bruceville Road and Grant Line Road. Sheldon Road between Elk Grove-Florin Road and Grant Line Road is subject to the Elk Grove Rural Road Improvement Policy.

- **Waterman Road** is a north–south roadway that extends from Calvine Road to Grant Line Road in the City. Waterman Road is generally two lanes with widening at improved intersections to accommodate its existing General Plan designation as a four-lane arterial. The segments of Waterman Road located one-half mile north and south of Sheldon Road are subject to the Elk Grove Rural Road Improvement Policy.

- **Whitelock Parkway** is an east–west road extending from Franklin Boulevard to Lotz Parkway. Whitelock Parkway is designated as a four-lane arterial in the existing General Plan and is constructed to its ultimate width. An interchange, serving only the area west of SR 99, is planned at SR 99.

- **State Route 99** is a north–south freeway that provides a connection between the major cities in the Central Valley, from Sacramento and Stockton in the north to the cities of Modesto, Merced, Fresno, and Bakersfield in the south. Access to SR 99 is provided through interchanges at Grant Line Road, Elk Grove Boulevard, Laguna Boulevard/Bond Road, and Sheldon Road. This section of SR 99 generally has two mainline travel lanes and one high-occupancy vehicle lane in either direction with a posted speed limit of 65 mph.

- **Interstate 5** is a north–south freeway that traverses California and is a major national freeway that connects between Mexico and Canada. Near the Hood Franklin Road interchange, I-5 is a four-lane freeway and transitions to a six-lane freeway north of Laguna Boulevard.

Existing Traffic Operations

Data Collection

To provide a baseline for the transportation analysis, traffic counts were collected at the existing study intersections at various dates in 2014, 2015, and 2016. The intersection turning movement counts were conducted during the AM (7:00 to 9:00) and PM (4:00 to 6:00) peak periods. During the counts, weather conditions were generally dry, no unusual traffic patterns were observed, and the Elk Grove Unified School District was in full session. Pedestrians were also counted at each study intersection.

Each intersection's peak hour within the peak period was used for the analysis. For the majority of study intersections, the counts indicate that the AM peak hour is 7:00 AM to 8:00 AM and the PM peak hour is 5:00 PM to 6:00 PM.

The following data sources were also used in the analysis of study facilities:

- Freeway traffic count data provided by Caltrans and available through the Caltrans Performance Measurement System (PeMS).
- Traffic signal timings provided by the City.

Intersection Operations and Roadway Capacity Utilization

Level of service (LOS) is a qualitative measure that describes operational conditions as they relate to the traffic stream and perceptions of motorists and passengers. LOS generally describes these conditions in terms of factors such as speed and travel time, delays, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. The operational levels of service are given letter designations from A to F, with A representing the best operating conditions (free-flow) and F the worst (severely congested flow with high delays). Intersections generally are the capacity-controlling locations with respect to traffic operations on arterial and collector streets in urban areas. LOS does not reflect the perspective of other roadway users such as pedestrians and bicyclists. **Table 5.13-1** provides general definitions of each LOS grade.

TABLE 5.13-1
LEVEL OF SERVICE DEFINITIONS

Level of Service	Description
A	LOS A describes primarily free-flow operation.
B	LOS B describes reasonably unimpeded operation.
C	LOS C describes stable operation.
D	LOS D indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed.
E	LOS E is characterized by unstable operation and significant delay.
F	LOS F is characterized by flow at extremely low speeds or stop and go conditions.

Source: Transportation Research Board 2010; Fehr & Peers 2017

Existing intersection LOS are shown in **Figure 5.13-4** and **Figure 5.13-5** for the AM and PM peak hours, respectively. Roadway results are shown in **Figure 5.13-6**, and the results are summarized in **Table 5.13-2**. **Appendix F** includes detailed analysis results.

As shown in **Table 5.13-2**, most intersections and roadway segments operate at LOS D or better. Five of the ten study freeway segments operate at LOS E or F.

The intersections that operate at LOS E or F include:

- Calvine Road/Elk Grove Florin Road: AM LOS E and PM LOS F
- Calvine Road/Waterman Road: AM LOS E
- Bond Road/Elk Grove Florin Road: AM and PM LOS E
- Sheldon Road/Waterman Road: AM and PM LOS F
- Sheldon Road/Bradshaw Road: AM and PM LOS F
- Bond Road/Bader Road: AM LOS E
- Laguna Boulevard/Franklin Boulevard: AM and PM LOS E
- Bighorn Boulevard/Bruceville Road: PM LOS F
- Elk Grove Boulevard at southbound offramp: PM LOS F

TABLE 5.13-2
PEAK HOUR INTERSECTION AND DAILY ROADWAY LEVEL OF SERVICE COMPARISON – EXISTING CONDITIONS

LOS	Number of Facilities Operating at Indicated Level of Service			
	Intersections		Roadway and Freeway Segments	
	AM	PM	Daily	
			Roadways	Freeways
A–C	60	64	96	1
D	9	5	35	4
E	5	2	2	2
F	2	5	2	3
Total	**76**	**76**	**135**	**10**

Source: Fehr & Peers 2017

Bicycle and Pedestrian Facilities

Bicycle and pedestrian trips account for approximately 2.8 percent of all work trips and 4.9 percent of all non-work trips made by residents and employees in suburban areas (SACOG 2000).

The majority of the bike paths in the City limits are Class II lanes, which are located on existing streets or highways and are striped for one-way bicycle travel. Below are descriptions of bicycle paths and their classifications.

- Class I bike paths provide a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross-flow minimized.
- Class II bike lanes are striped lanes for one-way bike travel on a street or highway.
- Class III bike routes provide for shared use with pedestrians or motor vehicle traffic.
- Class IV bikeways are on-street bike lanes that are physically separated from the adjacent general travel lane.

In July 2014, the City Council adopted the Bicycle, Pedestrian, and Trails Master Plan, which replaced the Trails Master Plan (2007) and Bicycle and Pedestrian Master Plan (2004). The plan identifies existing facilities, opportunities, constraints, and destination points for bicycle users and pedestrians. Existing and proposed bicycle and pedestrian facilities documented in the plan are shown on **Figure 5.13-7**. **Figure 5.13-8** shows existing sidewalk coverage.

Transit Facilities

The City is served by its own transit system, e-Tran, which includes local transit service and commuter routes. Local transit service is provided on weekdays (seven routes) and Saturdays (four routes). There is no Sunday service. E-Tran provides ten commuter routes that operate Monday through Friday. The current e-Tran system map is shown on **Figure 5.13-9**.

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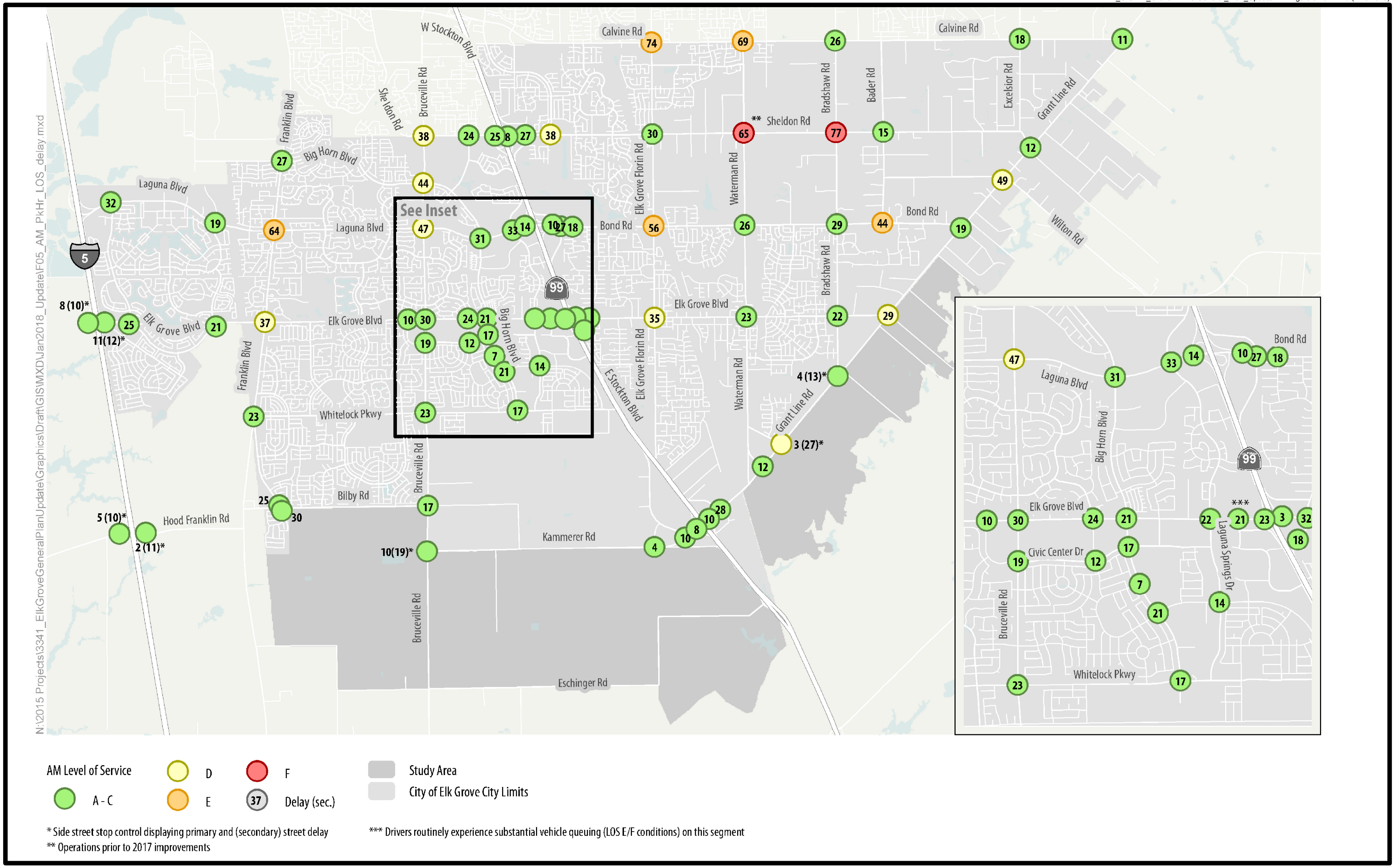

City of Elk Grove
Development Services

Figure 5.13-4
Existing AM Peak Hour Intersection LOS/Delay

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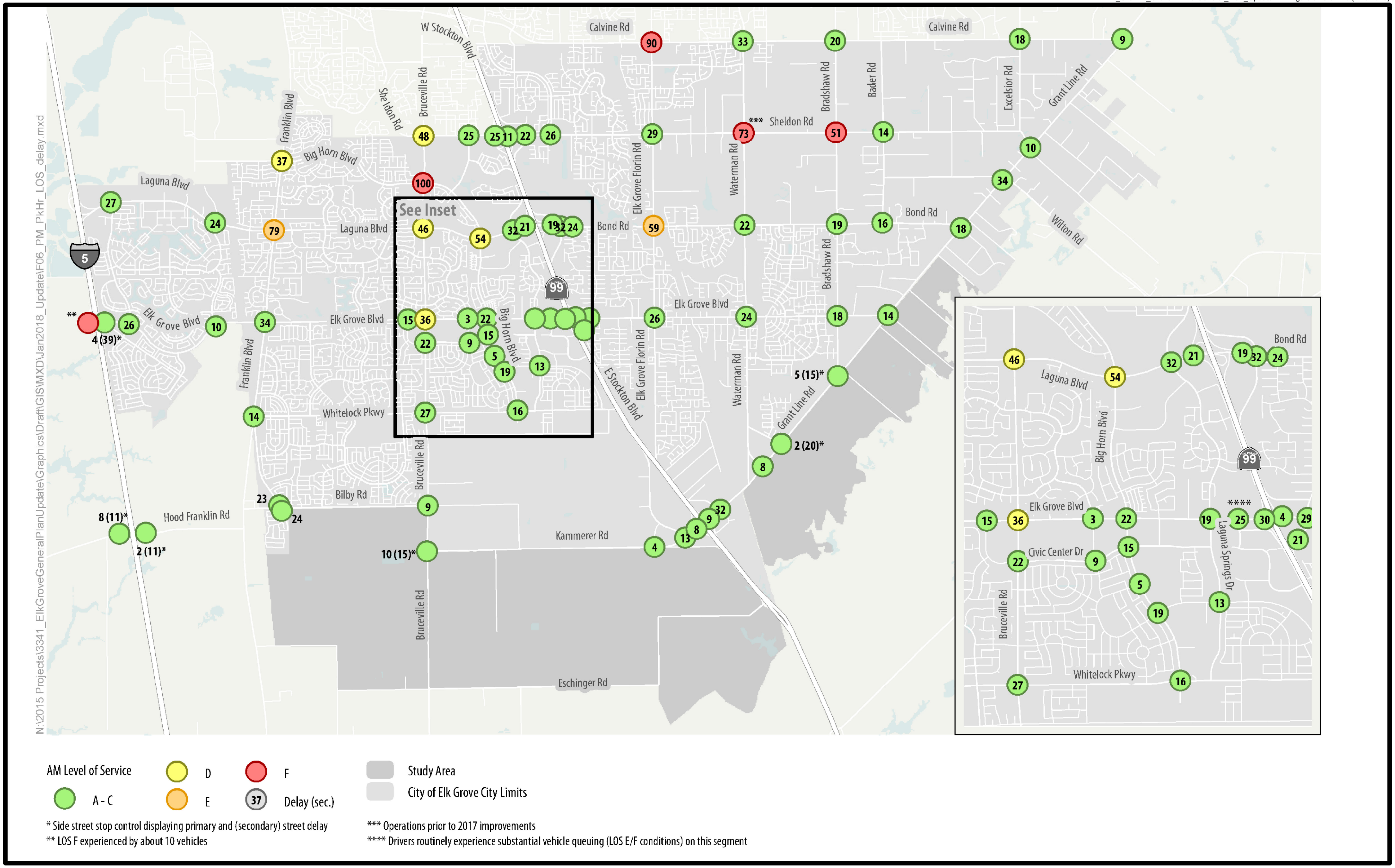

City of Elk Grove
Development Services

Figure 5.13-5
Existing PM Peak Hour Intersection LOS/Delay

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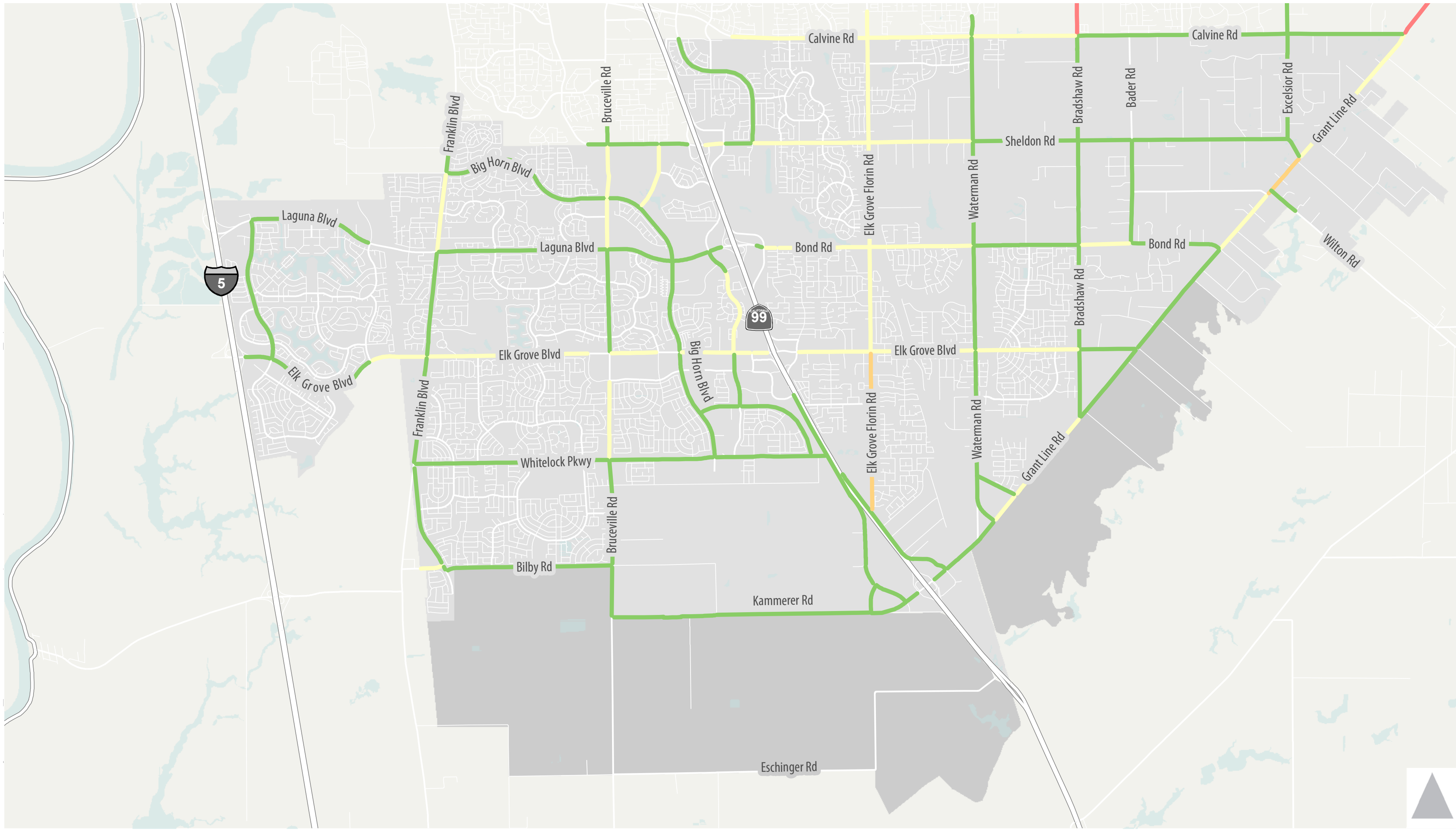

Roadway Level of Service
C or Better
D
E
F
Study Area
City of Elk Grove City Limits

Source: Fehr & Peers, 2018

City of Elk Grove
Development Services

Figure 5.13-6
Existing Roadway Segment LOS

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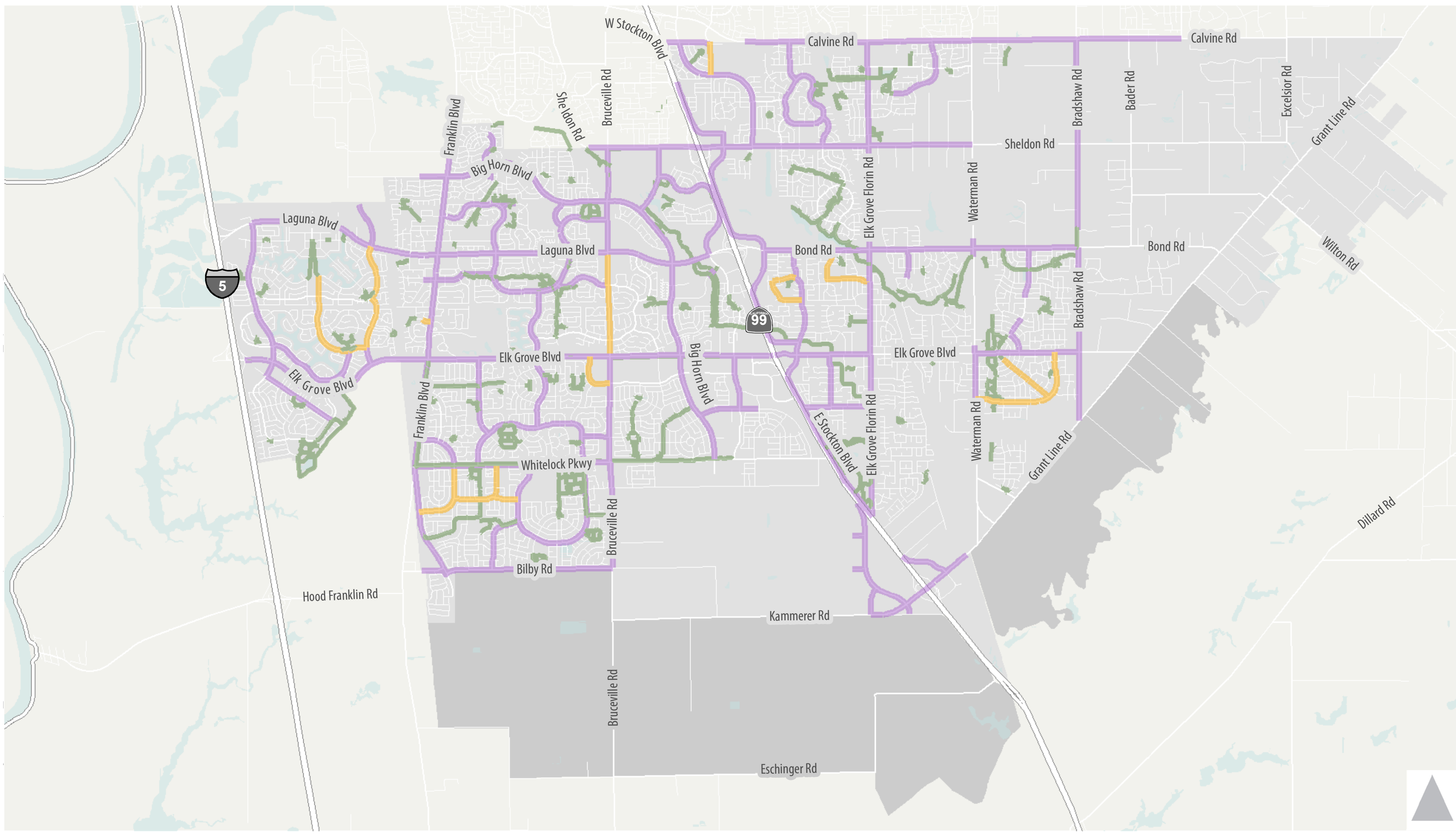

Source: Fehr & Peers, 2018

T:_CS\Work\Elk Grove, City of\General Plan 2017\Figures\ADEIR

ELK GROVE
PROUD HERITAGE. BRIGHT FUTURE.

City of Elk Grove
Development Services

Figure 5.13-7
Existing Bicycle Facilities

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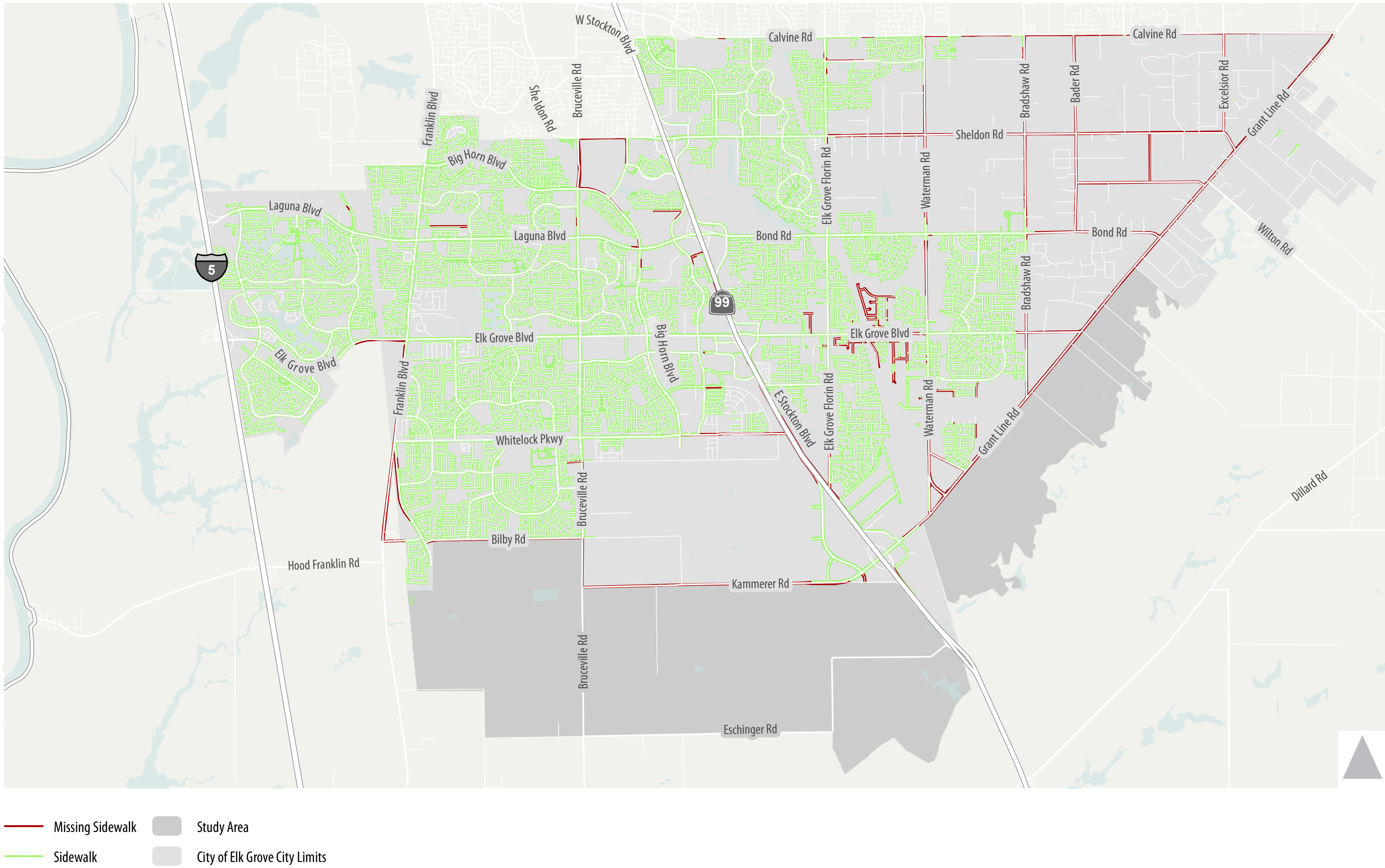

Source: Fehr & Peers, 2018

ELK GROVE
PROUD HERITAGE. BRIGHT FUTURE.

City of Elk Grove
Development Services

Figure 5.13-8
Existing Sidewalk Coverage

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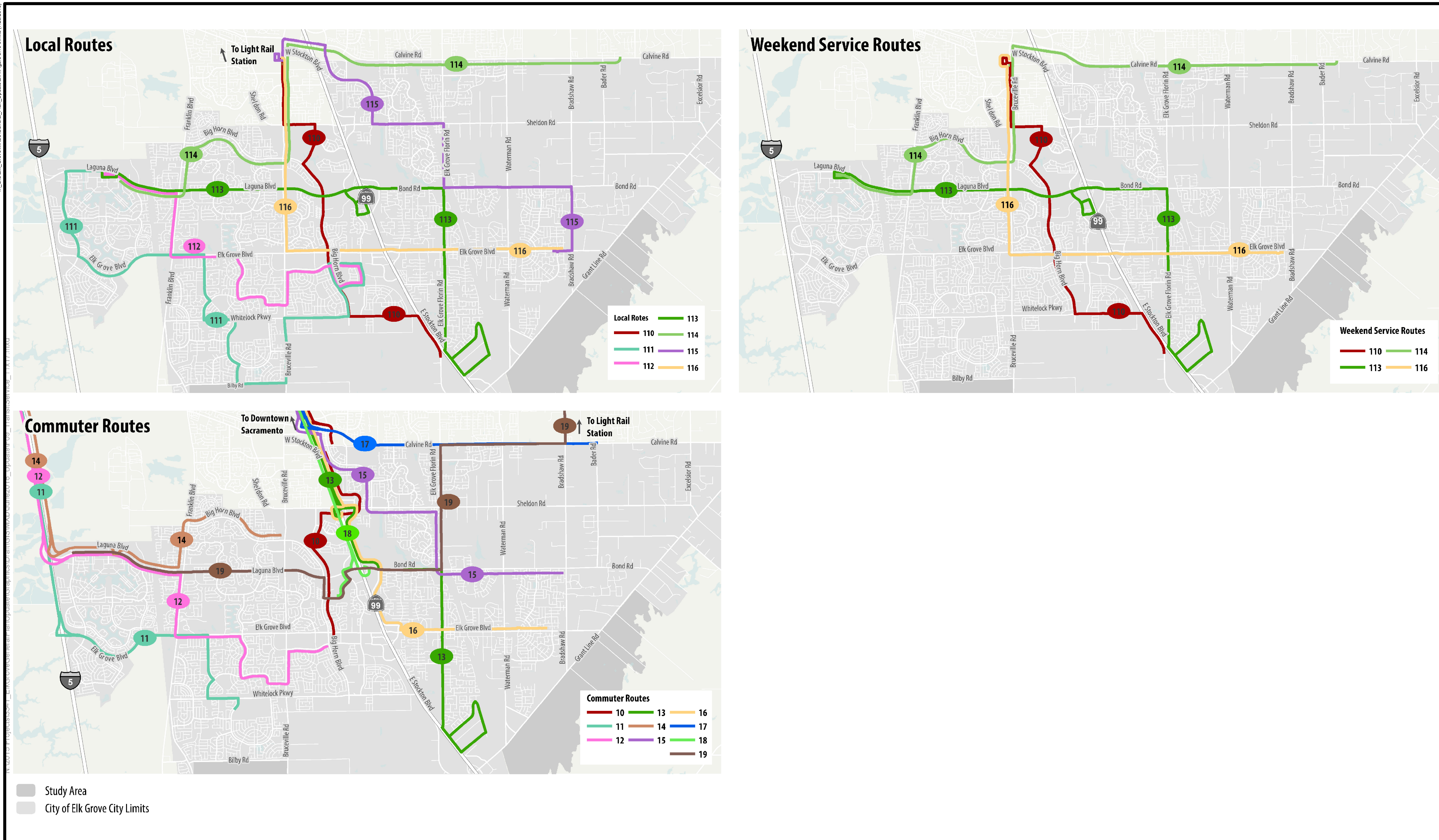

City of Elk Grove
Development Services

Figure 5.13-9
Existing Transit Facilities

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5.13.2 REGULATORY FRAMEWORK

FEDERAL

There are no applicable federal regulations pertaining to transportation that apply directly to the proposed Project.

STATE

California Department of Transportation

Caltrans is responsible for operating and maintaining the State highway system. In the Project vicinity, I-5 and SR 99 fall under Caltrans jurisdiction. Caltrans provides administrative support for transportation programming decisions made by the California Transportation Commission for State funding programs. The State Transportation Improvement Program is a multiyear capital improvement program that sets priorities and funds transportation projects envisioned in long-range transportation plans.

State Route 99 and Interstate 5 Corridor System Management Plan

In May 2009, Caltrans approved the State Route 99 & Interstate 5 Corridor System Management Plan. The purpose of this plan is to identify existing route conditions and future needs and to communicate the vision for the development of each route over a 20-year planning horizon. Plan objectives are to improve safety, reduce travel time or delay on all modes, reduce traffic congestion, improve connectivity between modes and facilities, improve travel time reliability, and expand mobility options along the corridor in a cost-effective manner. Caltrans has established LOS F as the 'concept LOS' for I-5 and SR 99 through the City. The concept LOS is a generalized level of service for large study segments used by Caltrans that reflects the minimum level of service or quality of operations acceptable for each route segment.

Guide for the Preparation of Traffic Impact Studies

The *Guide for the Preparation of Traffic Impact Studies* (Caltrans 2002) provides general guidance regarding the preparation of traffic impact studies for projects that may have an impact on the State highway system. The guidance includes identifying when a traffic study should be prepared and the methodology to use when evaluating operating conditions on the State highway system.

The guidance also states: "Caltrans endeavors to maintain a target LOS at the transition between LOS 'C' and LOS 'D' on state highway facilities; however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS." It also states that where "an existing State highway facility is operating at less than the appropriate target LOS, the existing MOE [measure of effectiveness] should be maintained."

Deputy Directive DD-64-R1 – Complete Streets – Integrating the Transportation System

Caltrans provides for the needs of travelers of all ages and abilities in all programming, planning, design, construction, operations, and maintenance activities and products on the State highway system. Caltrans views all transportation improvements as opportunities to improve safety, access, and mobility for all travelers in California and recognizes bicycles, pedestrians, and transit modes as integral elements of the transportation system.

Caltrans develops multimodal projects in balance with community goals, plans, and values. Implicit in these objectives is addressing the safety and mobility needs of bicyclists, pedestrians, and transit users in all projects, regardless of funding. Bicycle, pedestrian, and transit travel is facilitated by creating "complete streets," beginning early in the system planning process and continuing through project delivery and maintenance and operations.

California Public Utilities Commission

The California Public Utilities Commission sets guidelines for interactions between railroad facilities and ground transportation facilities. This includes location and type of crossing guards, design of railroad crossings, and other design criteria in and around railroad facilities. The guidelines come in the form of general orders.

General Order NO. 75-D – Regulations Governing Standards for Warning Devices for At-Grade Highway-Rail Crossings in the State of California

The general order provides regulations that govern the standards for warning devices for at-grade highway-rail crossings for motor vehicles, pedestrians, and/or bicycles. All warning devices shall be in substantial conformance with the applicable Standards, Guidance and Options set forth in the Manual on Uniform Traffic Control Devices in the for adopted by Caltrans.

Senate Bill 743

On September 27, 2013, Governor Brown signed Senate Bill (SB) 743, which made several changes to the California Environmental Quality Act (CEQA) for projects located in areas served by transit. The changes direct the Governor's Office of Planning and Research (OPR) to develop a new approach for analyzing transportation impacts under CEQA, which eliminates vehicle delay and level of service as CEQA impacts for many parts of California. SB 743 also creates a new exemption for certain projects that are consistent with a specific plan and, in some circumstances, eliminates the need to evaluate aesthetic and parking impacts of a project. The intent of SB 743 is to more appropriately balance the needs of congestion management with Statewide goals related to infill development, promotion of public health through active transportation, and reduction of greenhouse gas emissions.

The City, through the Project and this EIR, is implementing SB 743 through the utilization of the changes proposed to the State CEQA Guidelines.

REGIONAL

Sacramento Area Council of Governments

The Sacramento Area Council of Governments (SACOG) is an association of local governments in the six-county Sacramento region. Its members include the Counties of Sacramento, El Dorado, Placer, Sutter, Yolo, and Yuba as well as 22 cities, including Elk Grove. SACOG provides transportation planning and funding for the region, and serves as a forum for the study and resolution of regional issues. In addition to preparing the region's long-range transportation plan (the Metropolitan Transportation Plan), SACOG assists in planning for transit, bicycle networks, clean air, and airport land uses.

SACOG approved the 2016 *Metropolitan Transportation Plan/Sustainable Communities Strategy* (MTP/SCS), and EIR in February 2016. The MTP/SCS is a federally mandated, long-range, fiscally constrained transportation plan for the six-county area. Most of this area is designated a federal nonattainment area for ozone, indicating that the transportation system is required to meet stringent air quality emissions budgets to reduce pollutant levels that contribute to ozone formation. To receive federal funding, transportation projects nominated by cities, counties, and agencies must be consistent with the MTP/SCS.

The *2017–2020 Metropolitan Transportation Improvement Program* is a list of transportation projects and programs to be funded and implemented over the next three years. SACOG submits this document to Caltrans and amends the program on a quarterly cycle. Only projects listed in the MTP/SCS may be included in the improvement program.

5.13.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

CEQA Thresholds

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A project is considered to have a significant effect on the environment if it will:

1) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.

2) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.

3) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

4) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

5) Result in inadequate emergency access.

6) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

City of Elk Grove Thresholds

As noted above, SB 743 was signed in 2013, requiring a move away from vehicle delay and LOS as a threshold for CEQA transportation analysis. SB 743 requires OPR to identify new metrics for identifying and mitigating transportation impacts and, in November 2017, OPR released a CEQA Guidelines update package identifying vehicle miles traveled (VMT) per capita, VMT per employee, and net VMT as new metrics for transportation analysis. It is anticipated that regulatory language changes to CEQA will be adopted in 2018 and that Statewide implementation will occur on January 1, 2020.

However, while LOS will be removed as a threshold under CEQA, the new VMT metrics are not yet required and the City's current General Plan policies use LOS goals. Specifically, existing Policy CI-13 has a goal that roadway segments and intersections shall be maintained at LOS D or better, though existing Policy CI-14 acknowledges that LOS D may not be achieved on some roadway segments and may also not be achieved at some intersections. Therefore, both LOS and VMT are evaluated in this EIR to be consistent with the existing and future standards.

The following evaluation criteria were also used to determine the significance of Project impacts.

Intersections

An impact to a roadway segment is considered significant, and mitigation measures must be identified when:

- The traffic generated by the Project degrades the level of service from an acceptable LOS D or better (without the Project) to an unacceptable LOS E or LOS F (with the Project).
- The level of service (without Project) is unacceptable and Project-generated traffic increases the average vehicle delay by more than 5 seconds.

Roadway Segments

An impact to a roadway segment is considered significant, and mitigation measures will be identified when:

- The traffic generated by the Project degrades the level of service from an acceptable LOS D or better (without the Project) to an unacceptable LOS E or LOS F (with the Project).
- The level of service (without the Project) is unacceptable and Project-generated traffic increases the volume-to-capacity (V/C) ratio by 0.05 or more.

Freeway Facilities

An impact is considered significant on freeway facilities if the Project causes the facility to change from an acceptable to unacceptable level of service based on the concept LOS defined by Caltrans.

For facilities that are or will be (in the cumulative condition) operating at unacceptable LOS without the Project, an impact is considered significant if the Project:

- Increases the V/C ratio on a freeway mainline segment or freeway ramp junction by 0.05.
- Increases the number of peak-hour vehicles on a freeway mainline segment or freeway ramp junction ramp junction by more than 5 percent.

The 20-year concept LOS for both SR 99 and I-5 is LOS F.

Bicycle/Pedestrian/Transit Facilities

An impact is considered significant if implementation of the Project would disrupt or interfere with existing or planned bicycle, pedestrian, or transit facilities.

METHODOLOGY

The transportation analysis addresses the roadway, transit, bicycle, pedestrian, and rail components of the transportation system assuming adoption and implementation of the proposed Project. Analysis of the roadway system is based on the projected capacity utilization of existing and planned roadways, while the other components of the transportation network are evaluated based on whether implementation of the proposed Project would disrupt or interfere with the physical or operational condition of existing or planned facilities or services in 2036. Given the long-term nature of the proposed Project, the analysis does not attempt to develop a scenario in which development under the proposed Project is added to the existing condition without background levels of traffic being added. Thus, the analysis presented below represents the cumulative condition in which regional background traffic increases are included in modeling. This methodology represents a conservative approach, as the change from existing conditions reported in the analysis also report the impact associated with the background trips in the future conditions.

The influence of the proposed Project policy choices on the roadway system was quantified through an analysis of the roadway system that measures daily VMT on the regional roadway network, daily roadway capacity utilization for local City streets and Caltrans freeway facilities, and AM and PM peak hour intersection operations for local City intersections. The analysis included 145 roadway segments and 83 intersections and involved a multistep process to transform land use and network changes associated with the proposed Project into VMT and daily AM and PM peak hour traffic volume forecasts. The process started with a modified version of SACOG's regional SACSIM travel model.

Modifications to the model were made to tailor it for the City and the proposed Project. The transportation network, traffic analysis zone system, and select model parameters were refined to improve the model's ability to replicate existing observed traffic volume conditions, although the model may require further refinements if used for subsequent project-scale analysis. The network refinements focused on adding more local roadways and incorporating modifications to the proposed Project circulation diagram. More traffic analysis zones were added to improve how the traffic is assigned to the roadway network.

The modified version of SACOG's SACSIM model was used to develop VMT forecasts for the transportation analysis and for the air pollution and greenhouse gas analysis. All three resource areas require different VMT inputs. **Table 5.13-3** compares the three methods used to estimate VMT for the project analysis, include the types of trips included in the calculation, the amount of VMT captured by the method, and the source of the VMT. VMT for the air quality and GHG analysis are not discussed further in this chapter.

The transportation VMT analysis methodology presented in **Table 5.13-3** follows and is consistent with the technical guidance provided by the Governor's Office and Planning and Research (OPR), which is documented in Technical Advisory on Evaluating Transportation Impacts in CEQA (Office of Planning and Research, November 2017). Key aspects of the methodology include a more complete accounting of household and workplace travel, does not truncate trip lengths arbitrarily by using the entire SACSIM model area to calculate trip length, and measures transportation efficiency by analyzing VMT per service population.

TABLE 5.13-3
VEHICLE MILES TRAVELED METHODS

Method		Analysis Application	Approach	Formula	Trip Types Included[1]	Full Accounting?		Source
						Trip Length	Trips	
Boundary		Air Quality	Estimates/forecasts VMT for a specific boundary area, like the City of Elk Grove	Volume x Distance for all model links in the boundary	II IX XI XX	Does not account for entire trip length	Excludes trips without an origin or destination at the home	Assigned model roadway network
OD[2]	RTAC[3]	GHG	Estimates/forecasts VMT based on all trips that have one end in a project location	Trips x Trip Length	II 50% IX 50% XI	Fully accounts for entire trip length	Excludes trips without an origin or destination at the home	Model origin-destination trip matrix
	Tour-Based	Transportation	Estimates/forecasts VMT based on all trips that have one end in a project location	Trips x Trip Length	II IX XI	Fully accounts for entire trip length	Includes trips without an origin or destination at the home	SACSIM's DAYSIM travel diary

Source: Fehr & Peers 2017
Notes:
1 RTAC – Regional Targets Advisory Committee
2 OD – Origin/Destination
3 Description of Trip Types:
II – Internal to Internal Trips
IX – Internal to External Trips
XI – External to Internal Trips
XX – External to External (Through) Trips

The final step in the forecasting and analysis process compared daily traffic volume forecasts to roadway segment volume thresholds to analyze AM and PM peak hour intersection traffic operations. Roadway capacity utilization was used to assess the need for capacity expansion. Roadway capacity utilization is not fully sensitive to traffic operational conditions given the fluctuations that can occur in traffic conditions within any one hour, but it provides sufficient information to gauge the potential need for roadway capacity expansion. The intersection operations analysis considers the operational conditions during traditional morning and evening peak hours and the competition for green time at the intersection. However, performing this type of analysis for conditions decades into the future is somewhat speculative, given the limitations associated with predicting individual turning movement volumes.

Intersections were analyzed using procedures and methodologies in the Highway Capacity Manual (Transportation Research Board 2010). These methodologies were applied using the Synchro/SimTraffic traffic operations analysis software. SimTraffic, a micro-simulation model, analyzed intersection operations near interchanges on SR 99 where congested conditions cause vehicle queues to spill back through adjacent intersections. **Table 5.13-4** presents the intersection LOS thresholds for signal- and stop-controlled intersections.

TABLE 5.13-4
INTERSECTION LEVEL OF SERVICE THRESHOLDS

Level of Service	Average Control Delay (seconds/vehicle)[1]	
	Signal Control	Stop Control
A	≤10.0	≤10.0
B	10.1–20.0	10.1–15.0
C	20.1–35.0	20.1–25.0
D	35.1–55.0	35.1–35.0
E	55.1–80.0	55.1–50.0
F	>80.0	>50.0

Source: Fehr & Peers 2017

Roadway segments were analyzed by comparing average daily traffic volumes to the capacity thresholds for arterials, expressway, and freeway facilities. These are presented **Table 5.13-5**.

TABLE 5.13-5
LEVEL OF SERVICE DEFINITIONS FOR STUDY ROADWAYS

Facility Type	Lanes	Median	Speed	Maximum Daily Volume		
				LOS C	LOS D	LOS E
Arterial (Moderate Access Control)	2	No	25	4,200	13,600	18,900
			30	5,600	14,600	18,900
			35	7,000	15,700	18,900
			40	8,400	16,600	18,900
			45	9,800	17,700	18,900
			55	12,500	18,600	18,900
		Yes	25	4,400	14,300	19,900
			30	5,900	15,400	19,900
			35	7,400	16,500	19,900
			40	8,800	17,500	19,900
			45	10,300	18,600	19,900
			55	13,200	19,600	19,900
Arterial (Moderate Access Control)	4	No	30	10,700	29,800	36,000
			35	14,000	31,600	36,000
			40	17,100	33,500	36,000
			45	20,300	35,300	36,000
		Yes	30	11,300	31,400	37,900
			35	14,700	33,300	37,900
			40	18,000	35,300	37,900
			45	21,400	37,200	37,900

Facility Type	Lanes	Median	Speed	Maximum Daily Volume		
				LOS C	LOS D	LOS E
Arterial (Moderate Access Control)	5	Yes	45	26,700	45,600	46,100
Arterial (Moderate Access Control)	6	Yes	30	16,300	46,400	54,300
			35	21,500	48,900	54,300
			40	26,700	51,500	54,300
			45	31,900	54,000	54,300
Arterial (High Access Control)	6	Yes	55	48,000	54,000	60,000
Arterial	7	Yes	45	44,800	59,400	63,200
Arterial (Moderate Access Control)	8	Yes	55	57,600	64,800	72,000
Arterial (High Access Control)				64,000	72,000	80,000
Expressway	4	Yes	55	57,600	64,800	72,000
	6	Yes	55	86,400	97,200	108,000
Freeway	4	Yes	65	61,600	74,400	80,000
	6	Yes	65	92,400	111,600	120,000
	8	Yes	65	123,200	148,800	160,000

Source: Fehr & Peers 2017

General Plan Policies and Standards

The proposed Project contains the following policies and standards related to transportation and circulation.

Policy MOB-1-1: Achieve State-mandated reductions in VMT by requiring land use and transportation projects to comply with the following metrics and limits. These metrics and limits shall be used as thresholds of significance in evaluating projects subject to CEQA.

Projects that do not achieve the limits outlined below shall be subject to all feasible mitigation measures necessary to reduce the VMT for, or induced by, the project to the applicable limits. If the VMT for or induced by the project cannot be reduced consistent with the performance metrics outlined below, the City may consider approval of the project, subject to a statement of overriding considerations and mitigation of transportation impacts to the extent feasible, provided some other stated form of public objective including specific economic, legal, social, technological or other considerations is achieved by the project.

(a) **New Development** – Any new land use plans, amendments to such plans, and other discretionary development proposals (referred to as "development projects") are required to demonstrate a 15 percent reduction in VMT from existing (2015) conditions. To demonstrate this reduction, conformance with the following land use and cumulative VMT limits is required:

(i) **Land Use** – Development projects shall demonstrate that the VMT produced by the project at buildout is equal to or less than the VMT limit of the project's General Plan land use designation, as shown in Table 6-1, which incorporates the 15 percent reduction from 2015 conditions.

Table 6-1: Vehicle Miles Traveled Limits by Land Use Designation

Land Use Designation	VMT Limit (daily per service population)
Commercial and Employment Land Use Designations	
Community Commercial	41.6
Regional Commercial	44.3
Employment Center	47.1
Light Industrial/Flex	24.5
Light Industrial	24.5
Heavy Industrial	39.5
Mixed Use Land Use Designations	
Village Center Mixed Use	41.6
Residential Mixed Use	21.2
Public/Quasi Public and Open Space Land Use Designations	
Parks and Open Space	0.0
Resource Management and Conservation[1]	0.0
Public Services	53.1
Residential Land Use Designations	
Rural Residential	34.7
Estate Residential	49.2
Low Density Residential	21.2
Medium Density Residential	20.9
High Density Residential	20.6
Other Land Use Designations	
Agriculture	34.7

Notes:

1. *These land use designations are not anticipated to produce substantial VMT, as they have no residents and few to no employees. These land use designations therefore have no limit and are exempt from analysis.*

(ii) **Cumulative for Development Projects in the Existing City –** Development projects within the existing (2017) City limits shall demonstrate that cumulative VMT within the City including the project would be equal to or less than the established Citywide cumulative limit of 6,367,833 VMT (total daily VMT)

(iii) **Cumulative for Development Projects within Growth Areas –** Development projects located in Study Areas shall demonstrate that cumulative VMT within the applicable Study Area would be equal to or less than the established limit shown in Table 6-2.

Table 6-2: Study Area Total Vehicle Miles Traveled Limits

Study Area	VMT Limit (total VMT at buildout)
North Study Area	37,622
East Study Area	420,612
South Study Area	1,311,107
West Study Area	705,243

(b) **Transportation Projects** – Transportation projects likely to lead to a substantial or measurable increase in VMT shall:

(i) **Not increase VMT per service population.** Projects must demonstrate that the VMT effect of the project does not exceed the project's baseline condition VMT.

(ii) **Be consistent with the regional projections and plans.** The project shall be specifically referenced or listed in the region's MTP/SCS and accurately represented in the regional travel forecasting model. Qualifying transportation projects that are not consistent with the MTP/SCS shall also demonstrate that the cumulative VMT effect does not increase regional VMT per service population.

Policy MOB-1-2: Consider all transportation modes and the overall mobility of these modes when evaluating transportation design and potential impacts during circulation planning.

Policy MOB-1-3: Strive to implement the roadway performance targets (RPT) for operations of roadway segments and intersections, while balancing the effectiveness of design requirements to achieve the targets with the character of the surrounding area as well as the cost to complete the improvement and ongoing maintenance obligations. The Transportation Network Diagram reflects the implementation of the RPT policy at a macro level; the City will consider the specific design of individual segments and intersections in light of this policy and the guidance in the Transportation Network Diagram.

To facilitate this analysis, the City shall use the following guidelines or targets. Deviations from these metrics may be approved by the approving authority (e.g., Zoning Administrator, Planning Commission, City Council).

(a) **Vehicular Design Considerations** – The following targets apply to vehicular mobility:

(i) **Intersection Performance** – Generally, and except as otherwise determined by the approving authority or as provided in this General

Plan, the City will seek to achieve, to the extent feasible and desired, the peak-hour delay targets identified in Table 6-3.

Table 6-3: Vehicular Design Considerations: Intersection Performance Targets

Intersection Control	Intersection Control (Delay in Seconds)
Stop (Side-Street & All-Way)	< 35.1
Signal	< 55.1
Roundabout	< 35.1

(ii) **Roadway Performance** – Generally, and except as otherwise determined by the approving authority or as provided in this General Plan, the City will seek to achieve, to the extent feasible and desired, the average daily traffic design targets identified in Table 6-4.

Table 6-4: Vehicular Design Considerations: Segment Performance Targets

Facility Type	Number of Lanes	Median	Speed (mph)	Average Daily Traffic Design Target (Number of Vehicles)
Arterial or Arterial\Collector	2	No	25	13,600
			30	14,600
			35	15,700
			40	16,600
			45	17,700
			55	18,600
		Yes	25	14,300
			30	15,600
			35	16,500
			40	17,500
			45	18,600
			55	19,600
	4	No	30	29,800
			35	31,600
			40	33,500
			45	35,300
	4	Yes	30	31,400
			35	33,300
			40	35,300
			45	37,200
	5	Yes	45	45,600
	6	Yes	30	46,400
			35	48,900
			40	51,500
			45	54,000
	7	Yes	45	59,400

Facility Type	Number of Lanes	Median	Speed (mph)	Average Daily Traffic Design Target (Number of Vehicles)
	8	Yes	45	64,800
			55	72,000
Expressway	4[a]	Yes	55	64,800
	6	Yes	55	97,200
Freeway	4	Yes	55+	74,400
	6	Yes	55+	111,600
	8	Yes	55+	148,800

a. For the SouthEast Connector Expressway, the City may implement alternative design targets in consultation with the JPA.

(iii) **Pedestrian and Bicycle Performance** – The City will seek the lowest stress scores possible for pedestrian and bicycle performance after considering factors including design limitations and financial implications.

Policy MOB-2-1: The City shall consider the recommendations in the Comprehensive Land Use Plans (CLUPs) for airports near Elk Grove in the review of potential land uses or projects.

Policy MOB-2-2: The City shall ensure that new development is designed to protect public safety from airport operations consistent with recommendations and requirements of the Airport Land Use Commission, Caltrans, and the Federal Aviation Administration.

Policy MOB-3-1: Implement a balanced transportation system using a layered network approach to building complete streets that ensure the safety and mobility of all users, including pedestrians, cyclists, motorists, children, seniors, and people with disabilities.

Policy MOB-3-2: Support strategies that reduce reliance on single-occupancy private vehicles and promote the viability of alternative modes of transport.

Standard MOB-3-2.a: Require new commercial development for projects equal to and greater than 100,000 square feet to provide an electric vehicle charging station and new residential development to pre-wire for plug-in electric vehicles.

Policy MOB-3-3: Whenever capital improvements that alter street design are being performed within the public right-of-way, retrofit the right-of-way to enhance multimodal access to the most practical extent possible.

Policy MOB-3-4: As new roads are constructed, assess how the needs of all users can be integrated into the street design based on the local context and functional classification.

Policy MOB-3-5: Strive to balance needs for personal travel, goods movement, parking, social activities, business activities, and ease of maintenance when planning, operating, maintaining, and expanding the roadway network.

Policy MOB-3-6: Execute complete streets design in accordance with neighborhood context and consistent with specific guidance in community plans or area plans, as applicable.

Policy MOB-3-7: Develop a complete and connected network of sidewalks, crossings, paths, and bike lanes that are convenient and attractive, with a variety of routes in pedestrian-oriented areas.

Policy MOB-3-8: Provide a thorough and well-designed wayfinding signage system to help users of all modes of travel navigate the City in an efficient manner.

Policy MOB-3-9: As funds become available, provide for the operation and maintenance of facilities for bicycle and pedestrian networks proportionate to the travel percentage milestone goals for each mode of transportation in the Bicycle, Pedestrian, and Trails Master Plan.

Policy MOB-3-10: Design and plan roadways such that the safety of the most vulnerable user is considered first using best practices and industry design standards.

Policy MOB-3-11: Consider the safety of schoolchildren as a priority over vehicular movement on all streets within the context of the surrounding area, regardless of street classifications. Efforts shall specifically include tightening corner-turning radii to reduce vehicle speeds at intersections, reducing pedestrian crossing distances, calming motorist traffic speeds near pedestrian crossings, and installing at-grade pedestrian crossings to increase pedestrian visibility.

Policy MOB-3-12: Provide for safe and convenient paths and crossings along major streets within the context of the surrounding area, taking into account the needs of the disabled, youth, and the elderly.

Policy MOB-3-13: Continue to design streets and approve development applications in a manner that reduces high traffic flows and parking demand in residential neighborhoods.

Policy MOB-3-14: Regulate the provision and management of parking on private property to align with parking demand, with consideration for access to shared parking opportunities.

Policy MOB-3-15: Utilize reduced parking requirements when and where appropriate to promote walkable neighborhoods and districts and to increase the use of transit and bicycles.

Policy MOB-3-16: Establish parking maximums, where appropriate, to prevent undesirable amounts of motor vehicle traffic in areas where pedestrian, bike, and transit use are prioritized.

Policy MOB-3-17: Ensure new multifamily and commercial developments provide bicycle parking and other bicycle support facilities appropriate for the users of the development.

Policy MOB-4-1: Ensure that community and area plans, specific plans, and development projects promote pedestrian and bicycle movement via direct, safe, and pleasant routes that connect destinations inside and outside the plan or project area. This may include convenient pedestrian and bicycle connections to public transportation.

Policy MOB-4-2: Provide on-site facilities and amenities for active transportation users at public facilities, including bicycle parking and/or storage and shaded seating areas.

Policy MOB-4-3: Prioritize infrastructure improvements that benefit bicycle and pedestrian safety and convenience over vehicle efficiency improvements within and near community facilities, activity centers, and other pedestrian-oriented areas.

Policy MOB-4-4: Employ the recommendations and guidelines in the Bicycle, Pedestrian, and Trails Master Plan when planning and designing bicycle, pedestrian, and trail facilities and infrastructure, including updates to the Capital Improvement Program.

Policy MOB-4-5: Encourage employers to offer incentives to reduce the use of vehicles for commuting to work and increase commuting by active transportation modes. Incentives may include a cash allowance in lieu of a parking space and on-site facilities and amenities for employees such as bicycle storage, shower rooms, lockers, trees, and shaded seating areas.

Policy MOB-5-1: Support a pattern of land uses and development projects that are conducive to the provision of a robust transit service.

Policy MOB-5-2: Advocate for the City's preferred fixed transit alignment for light rail or bus rapid transit from north of the city to the Southeast Policy Area and ensure proposed projects are complementary to such an alignment.

Policy MOB-5-3: Consult with the Sacramento Regional Transit District when identifying and designing complete streets improvements near likely light rail alignment corridors in order to prioritize access to and use of transit to sites along that corridor.

Policy MOB-5-4: Support mixed-use and high-density development applications close to existing and planned transit stops.

Policy MOB-5-5: Promote strong corridor connections to and between activity centers that are safe and attractive for all modes.

Policy MOB-5-6: Provide the appropriate level of transit service in all areas of Elk Grove, through fixed-route service in urban areas, and complementary demand response service in rural areas, so that transit-dependent residents are not cut off from community services, events, and activities.

Policy MOB-5-7: Maintain and enhance transit services throughout the City in a manner that ensures frequent, reliable, timely, cost-effective, and responsive service to meet the City's needs. Enhance transit services where feasible to accommodate growth and transit needs as funding allows.

Policy MOB-5-8: Continue working with community partners to expand public transit service that benefits Elk Grove workers, residents, students, and visitors. Examples of expanded transit service include increased service frequency, establishing additional routes and stops, and creating dedicated transit lanes.

Policy MOB-5-9: Encourage the extension of bus rapid transit and/or light rail service to existing and planned employment centers by requiring a dedication of right-of-way. Advocate and plan for light rail alignment and transit stop locations that best serve the needs of the community and fit within the planned mobility system.

Policy MOB-5-10: Encourage commuter rail transportation by providing for a potential train station location for Amtrak and/or other rail service providers along the Union Pacific Railroad's Sacramento Subdivision line.

Policy MOB-6-1: Plan and pursue funding to construct strategic grade-separated crossings of rail lines, prioritizing available funds using appropriate metrics.

Policy MOB-6-2: Coordinate with the UPRR to ensure freight rail lines and crossings are maintained.

Policy MOB-6-3: Work with the UPRR to minimize the impact of train noise on adjacent sensitive land uses through the continued implementation of Quiet Zones.

Policy MOB-6-4: Regulate truck travel as appropriate for the transport of goods, consistent with circulation, air quality, congestion management, and land use goals.

Policy MOB-6-5: Safely accommodate truck traffic serving the City's industrial areas.

Policy MOB-7-1: Prioritize roadway improvements that result in appropriate capacity and multiuser facilities on major arterials consistent with the Transportation Network Diagram.

Standard-7-1.a: Generally, new roadway construction or road widening shall be completed to the ultimate width as provided in this General Plan and shall also provide required bicycle and pedestrian improvements and paths. However, phased improvements may be allowed based upon the timing of development and facility demand as determined by the City Engineer. Regardless, all roadways, pedestrian facilities, and bike routes or bikeways shall be constructed in logical and complete segments, connected from intersection to intersection, to provide safe and adequate access.

Policy MOB-7-2: Coordinate and participate with the City of Sacramento, Sacramento County, Capital SouthEast Connector Joint Powers Authority and Caltrans on roadway improvements that are shared by jurisdictions in order to improve operations. This may include joint transportation planning efforts, roadway construction, and funding.

Policy MOB-7-3: Require the dedication of right-of-way and the installation of roadway improvements as part of the review and approval of development projects. The City shall require the dedication of major road rights-of-way (generally, arterials and expressways) at the earliest opportunity in the development process.

Policy MOB-7-4: Require new development projects to provide funding or to construct roadway/intersection improvements to implement the City's Transportation Network Diagram. The payment of adopted roadway development or similar fees shall be considered compliant with the requirements of this policy with regard to those facilities included in the fee program, provided the City finds that the fee adequately funds required roadway and intersection improvements. If payment of adopted fees is used to achieve compliance with this policy, the City may also require the payment of additional fees if necessary to cover the fair share cost of facilities not included in the fee program.

Policy MOB-7-5: Assist Caltrans in implementing improvements to Interstate 5 and State Route 99 within the City as outlined in the most recent Caltrans Transportation Concept Report.

Policy MOB-7-6: Support efforts to develop the Capital SouthEast Connector, providing a regional roadway connection from Interstate 5 and State Route 99 to US 50. The City will work with the Capital SouthEast Connector Joint Powers Authority in implementing the planned roadway improvements without diminishing or altering any City-approved projects, land use authority, or authority to determine access to the Capital SouthEast Connector.

Policy MOB-7-7: Discourage the creation of private roadways unless the roadways are constructed to public roadway standards.

Policy MOB-7-8: Support and use infrastructure improvements and technological advancements such as intelligent transportation management tools to facilitate the movement and security of goods throughout the City in an efficient manner.

Policy MOB-7-9: Assist in the provision of support facilities for emerging technologies such as advanced fueling stations (e.g., electric and hydrogen) and smart roadway signaling/signage.

Policy MOB-7-10: Work with a broad range of agencies to encourage and support programs that increase regional average vehicle occupancy. Examples include providing traveler information, shuttles, preferential parking for carpools/vanpools, transit pass subsidies, road and parking pricing, and other methods.

Policy MOB-7-11: Encourage and create incentives for the use of environmentally friendly materials and innovative approaches in roadway designs that limit runoff and urban heat island effects. Examples include permeable pavement, bioswales, and recycled road base, asphalt, and concrete.

PROJECT IMPACTS AND MITIGATION MEASURES

Conflict with an Applicable Plan, Ordinance, or Policy Establishing Measures of Effectiveness for the Performance of the Circulation System by Resulting in Unacceptable Levels of Service on City of Elk Grove Roadways and Intersections — City Facilities (Standards of Significance 1 and 2)

Impact 5.13.1 Implementation of the proposed Project could cause unacceptable level of service conditions at some intersections and on some roadway segments. This impact is considered **potentially significant**.

The proposed Project includes land use and transportation network changes that would increase future traffic volumes on City roadways. **Figure 5.13-10** shows the circulation diagram for the proposed Project, including the expected future number of lanes on each roadway.

Intersection and roadway LOS results are shown on the following figures, and summarized in **Appendix F**, with the proposed Project and the transportation improvements displayed on **Figure 5.13-10**:

- **Figure 5.13-11** – General Plan Update AM Peak Hour Intersection LOS/Delay
- **Figure 5.13-12** - General Plan Update PM Peak Hour Intersection LOS/Delay
- **Figure 5.13-13** - General Plan Update Roadway Segment LOS

As shown on **Figures 5.13-11** through **5.13-13**, numerous intersections and roadway segments will exceed the current General Plan LOS thresholds. **Table 5.13-6** compares existing intersection and roadway segment operations to conditions with proposed Project at buildout with regional growth in 2036 based on current General Plan policies. **Table 5.13-7** shows intersection and interchange level of service under 2015 and cumulative conditions.

TABLE 5.13-6
PEAK HOUR INTERSECTION AND DAILY ROADWAY LEVEL OF SERVICE COMPARISON

LOS	Number of Facilities Operating at Indicated Level of Service							
	Existing				Proposed Project (2036)			
	Intersections		Roadway and Freeway Segments		Intersections		Roadway and Freeway Segments	
	AM	PM	Daily		AM	PM	Daily	
			Roadways	Freeways			Roadways	Freeways
A–C	60	64	96	1	20	28	27	—
D	9	5	35	4	21	19	69	—
E	5	2	2	2	14	11	6	—
F	2	5	2	3	28	25	33	10
Total	**76**	**76**	**135**	**10**	**83**	**83**	**135**	**10**

Source: Fehr & Peers 2017

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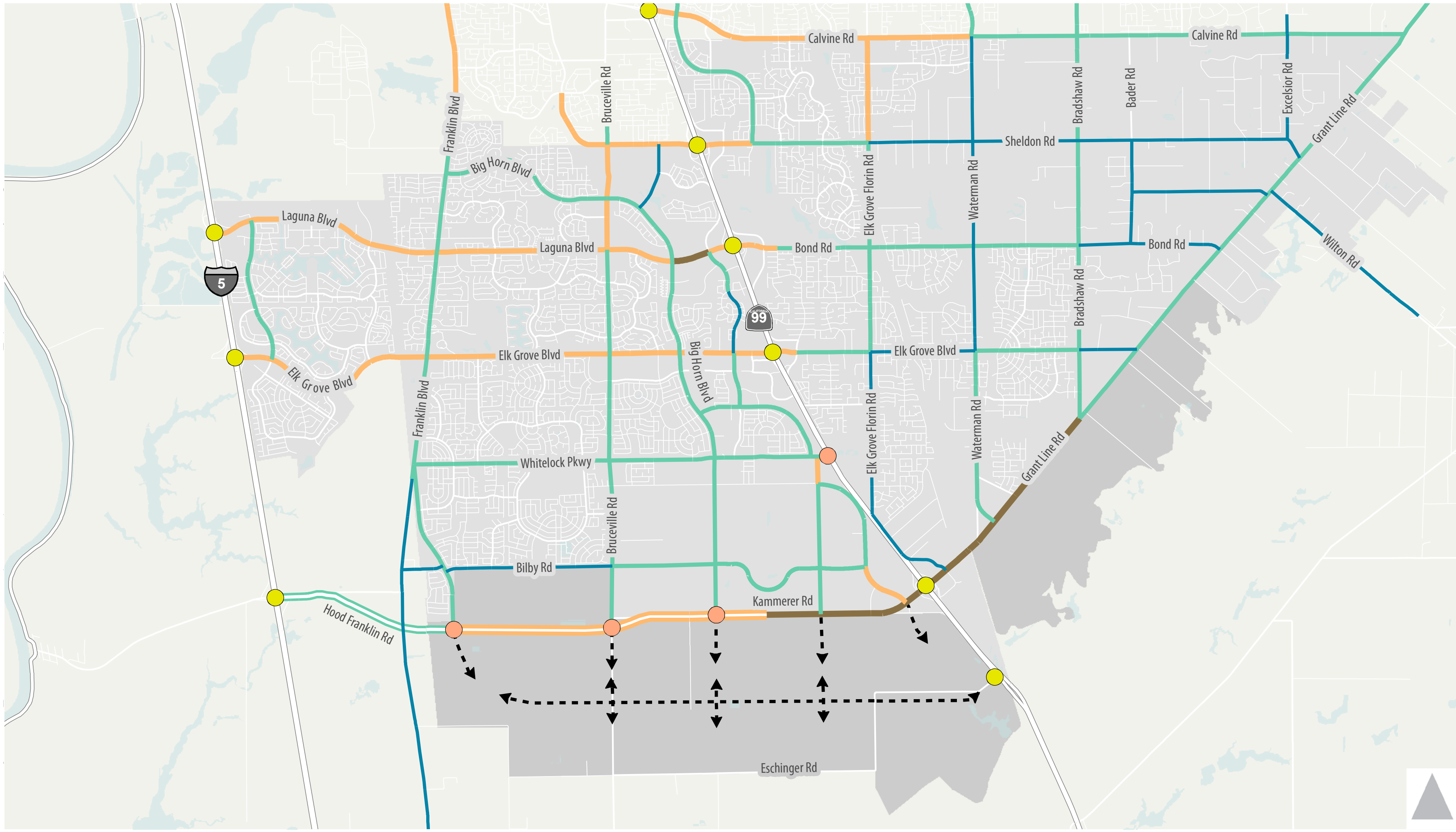

2-lane Arterial\Collector
4-lane Arterial
5-lane Arterial
6-lane Arterial
8-lane Arterial
4-lane Expressway
6-lane Expressway
Future Study Area Road
Freeway Interchange
Future Interchange
Study Area
City of Elk Grove City Limits

Source: Fehr & Peers, 2018

ELK GROVE
PROUD HERITAGE. BRIGHT FUTURE.

City of Elk Grove
Development Services

Figure 5.13-10
General Plan Update roadway System and Sizing Diagram

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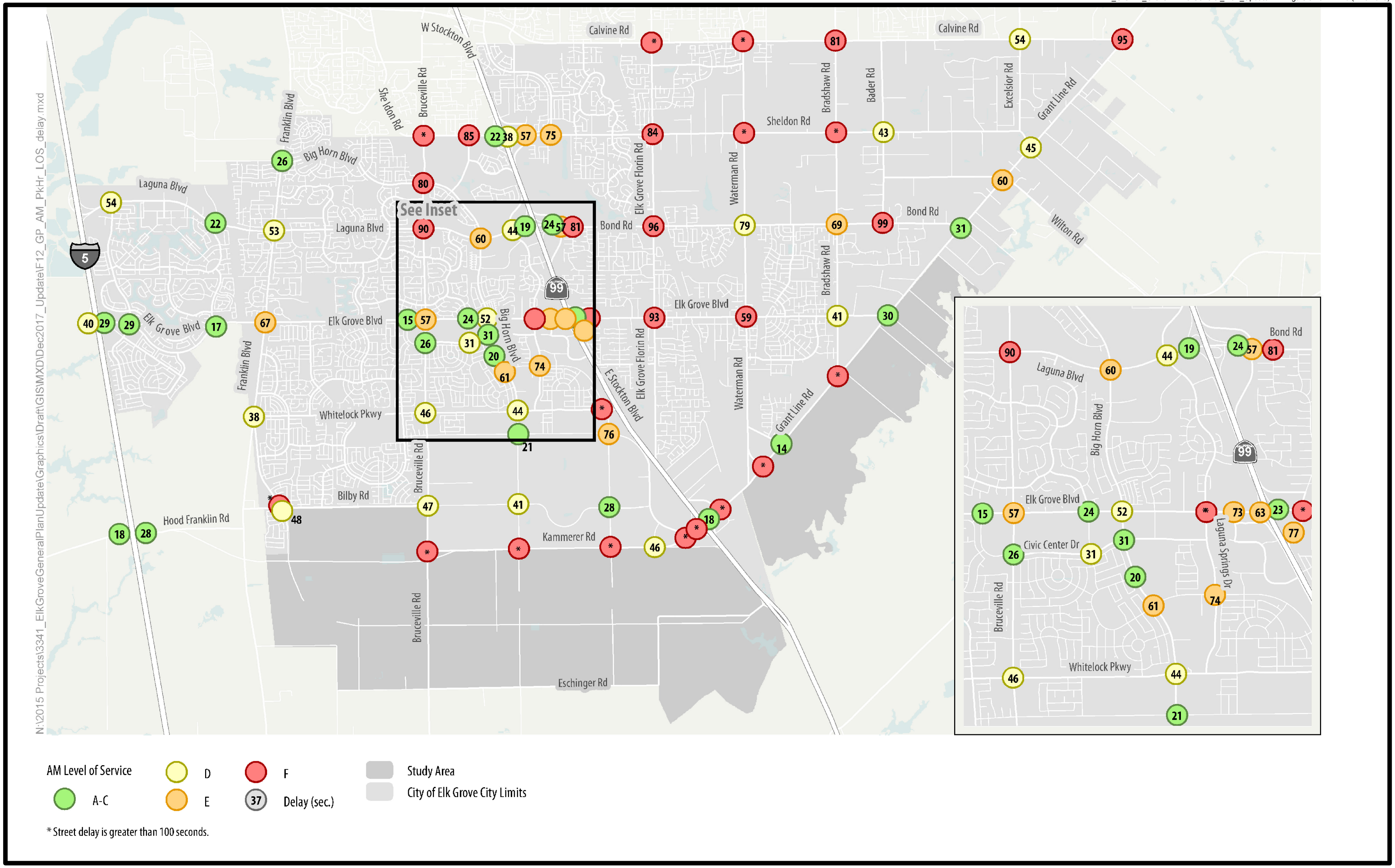

CITY OF ELK GROVE — PROUD HERITAGE. BRIGHT FUTURE.

City of Elk Grove
Development Services

Figure 5.13-11
Full General Plan Buildout with Study Areas
AM Peak Hour Intersection LOS/Delay

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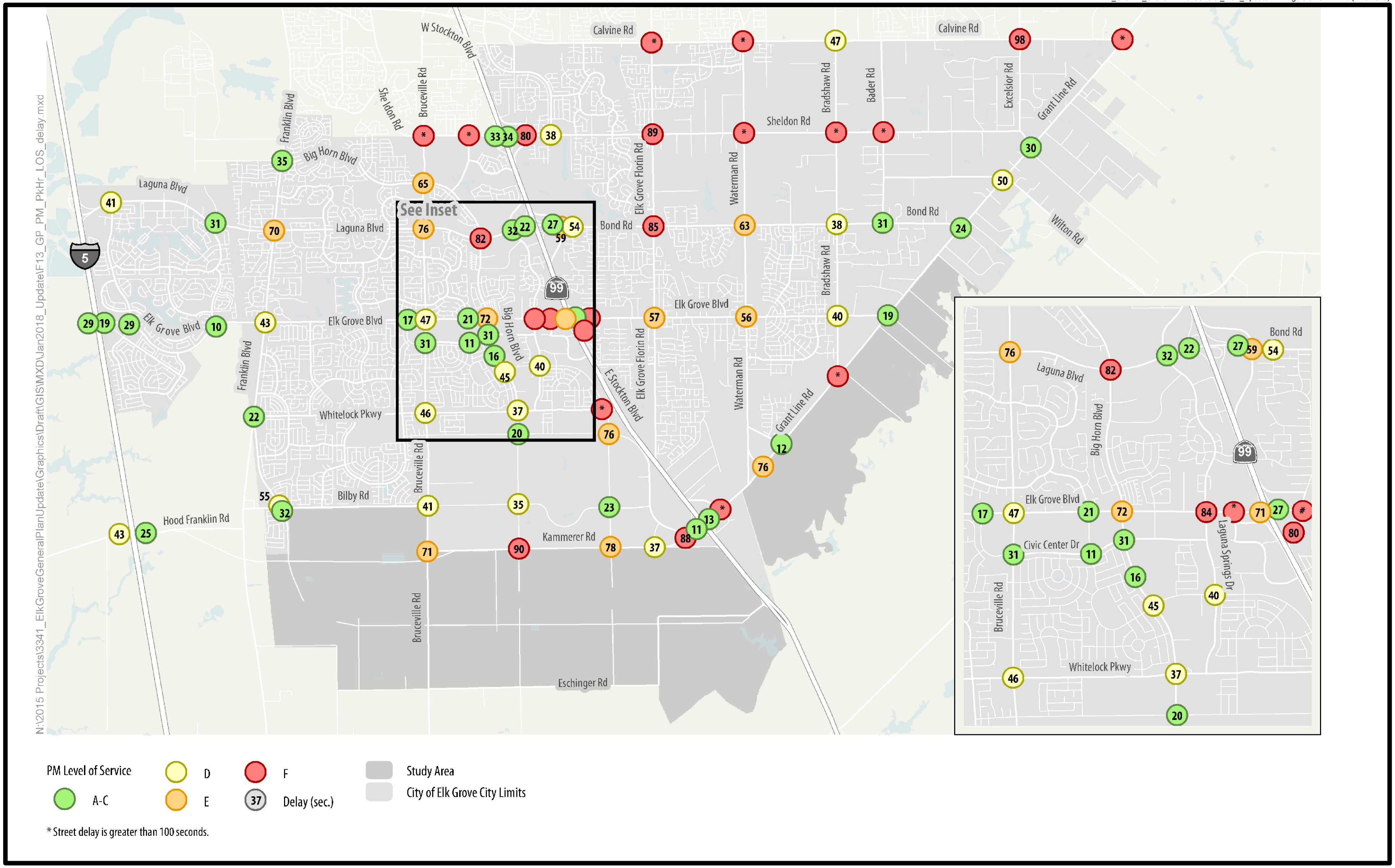

City of Elk Grove
Development Services

Figure 5.13-12
Full General Plan Buildout with Study Areas
PM Peak Hour Intersection LOS/Delay

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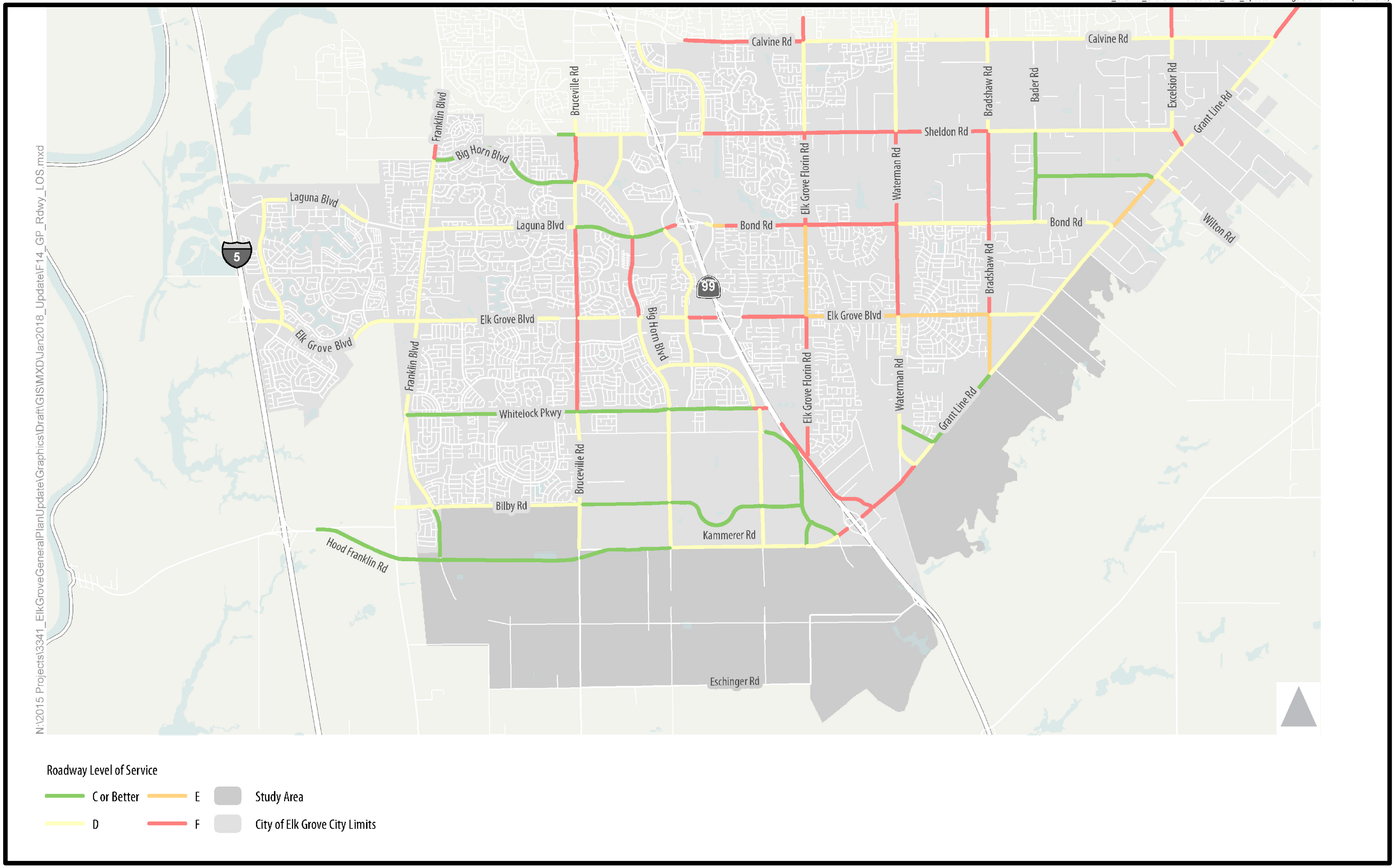

City of Elk Grove
Development Services

Figure 5.13-13
Full General Plan Buildout with Study Areas
Roadway Segment LOS

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TABLE 5.13-7
INTERSECTION LEVEL OF SERVICE – EXISTING AND CUMULATIVE CONDITIONS

Intersection	Control	Minimum Acceptable LOS	Existing Conditions				Cumulative Conditions			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
1. Elk Grove Florin Rd/Calvine Rd	Traffic Signal	D	**74**	**E**	**90**	**F**	**123**	**F**	**122**	**F**
2. Waterman Ave/Calvine Rd	Traffic Signal	D	**69**	**E**	33	C	**184**	**F**	**106**	**F**
3. Bradshaw Rd /Calvine Rd	Traffic Signal	D	26	C	20	C	**81**	**F**	47	D
4. Excelsior Rd /Calvine Rd	AWSC	D	18	C	18	C	54	D	**98**	**F**
5. Grant Line Rd/Calvine Rd	Traffic Signal	D	11	B	9	A	**95**	**F**	**200**	**F**
6. Bruceville Rd/Sheldon Rd	Traffic Signal	D	38	D	48	D	**145**	**F**	**118**	**F**
7. Lewis Stein Rd/Sheldon Rd	Traffic Signal	D	24	C	25	C	**85**	**F**	**106**	**F**
8. SR 99 SB Ramps/W Stockton Blvd/Sheldon Rd	Traffic Signal	D	25	C	25	C	22	C	33	C
9. SR 99 NB Ramps/Sheldon Rd	Traffic Signal	D	8	A	11	B	38	D	34	C
10. E Stockton Blvd/Sheldon Rd	Traffic Signal	D	27	C	22	C	**57**	**E**	**80**	**F**
11. Power Inn Rd/Sheldon Rd	Traffic Signal	D	38	D	26	C	**75**	**E**	38	D
12. Elk Grove Florin Rd/Sheldon Rd	Traffic Signal	D	30	C	29	C	**84.4**	**F**	**89**	**F**
13. Waterman Rd/Sheldon Rd	Roundabout	D	**65**	**F**	**73**	**F**	**167**	**F**	**130**	**F**
14. Bradshaw Rd/Sheldon Rd	Roundabout	D	**77**	**F**	**51**	**F**	**119**	**F**	**164**	**F**
15. Bader Rd/ Sheldon Rd	AWSC	D	15	B	14	B	43	D	**102**	**F**
16. Grant Line Rd/Sheldon Rd	SSSC	D	12	B	10	A	45	D	30	C
17. Franklin Blvd/Dwight Rd/Big Horn Blvd	Traffic Signal	D	27	C	38	D	26	C	35	C
18. Bruceville Rd/Big Horn Blvd	Traffic Signal	D	44	D	**100**	**F**	**80**	**F**	**65**	**E**
19. Grant Line Rd/Wilton Rd	Traffic Signal	D	49	D	34	C	**60**	**E**	50	D
20. Harbour Point Dr/Laguna Blvd	Traffic Signal	D	32	C	27	C	54	D	41	D
21. Dwight Rd/Babson Dr/Laguna Blvd	Traffic Signal	D	19	B	24	C	22	C	31	C

Intersection	Control	Minimum Acceptable LOS	Existing Conditions				Cumulative Conditions			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
22. Franklin Blvd/Laguna Blvd	Traffic Signal	D	**64**	**E**	**79**	**E**	53	D	**70**	**E**
23. Bruceville Rd/Laguna Blvd	Traffic Signal	D	47	D	46	D	**90**	**F**	**76**	**E**
24. Big Horn Blvd/Laguna Blvd	Traffic Signal	D	31	C	54	D	**60**	**E**	**82**	**F**
25. Laguna Springs Dr/W Stockton Blvd/Laguna Blvd	Traffic Signal	D	33	C	32	C	44	D	32	C
26. SR 99 SB Ramps/Laguna Blvd	Traffic Signal	D	14	B	21	C	19	B	22	C
27. SR 99 NB Ramps/Bond Rd	Traffic Signal	D	10	B	19	B	24	C	27	C
28. E Stockton Blvd/Bond Rd	Traffic Signal	D	27	C	32	C	**57**	**E**	**59**	**E**
29. Elk Crest Dr/Bond Rd	Traffic Signal	D	18	B	24	C	**81**	**F**	54	D
30. Elk Grove Florin Rd/Bond Rd	Traffic Signal	D	**56**	**E**	**59**	**E**	**96**	**F**	**85**	**F**
31. Waterman Rd/Bond Rd	Traffic Signal	D	26	C	22	C	79	D	**63**	**E**
32. Bradshaw Rd/Bond Rd	Traffic Signal	D	29	C	19	B	**69**	**E**	38	D
33. Bader Rd/ Bond Rd	Traffic Signal	D	**40**	**D**	19	B	**99**	**F**	31	C
34. Grant Line Rd/Bond Rd/Wrangler Dr	Traffic Signal	D	19	B	18	B	31	C	24	C
35. I-5 SB Ramps/Elk Grove Blvd	SSSC	D	8	A	—	**F**	40	D	29	C
36. I-5 NB Ramps/Elk Grove Blvd	SSSC	D	11(12)	B (B)	4 **(39)**	A **(E)**	29	C	19	B
37. Harbour Point Dr/W Taron Dr/Elk Grove Blvd	Traffic Signal	D	25	C	26	C	29	C	29	C
38. Four Winds Dr/Elk Grove Blvd	Traffic Signal	D	21	C	10	A	17	B	10	B
39. Franklin Blvd/Elk Grove Blvd	Traffic Signal	D	37	D	34	C	**67**	**E**	43	D
40. Backer Ranch Rd/Elk Grove Blvd	Traffic Signal	D	10	A	15	B	15	B	17	B
41. Bruceville Rd/Elk Grove Blvd	Traffic Signal	D	30	C	36	D	**57**	**E**	47	D
42. Wymark Dr/Elk Grove Blvd	Traffic Signal	D	24	C	3	A	24	C	21	C
43. Big Horn Blvd/Elk Grove Blvd	Traffic Signal	D	21	C	22	C	52	D	**72**	**E**
44. Laguna Springs Dr/Elk Grove Blvd	Traffic Signal	D	22	C	19	B	**121**	**F**	**84**	**F**

Intersection	Control	Minimum Acceptable LOS	Existing Conditions				Cumulative Conditions			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
45. Auto Center Dr/Elk Grove Blvd	Traffic Signal	D	21	C	25	C	**73**	**E**	**104**	**F**
46. SR 99 SB Ramps/Elk Grove Blvd	Traffic Signal	D	23	C	30	C	**63**	**E**	**71**	**E**
47. SR 99 NB On-Ramp/Elk Grove Blvd	Traffic Signal	D	3	A	4	A	23	C	27	C
48. SR 99 NB Ramps/E Stockton Blvd	Traffic Signal	D	18	B	21	C	**77**	**E**	**80**	**F**
49. E Stockton Blvd/Emerald Vista Dr/Elk Grove Blvd	Traffic Signal	D	32	C	29	C	**122**	**F**	**143**	**F**
50. Elk Grove Florin Rd/Elk Grove Blvd	Traffic Signal	D	35	D	26	C	**93**	**F**	**65**	**E**
51. Waterman Rd/Elk Grove Blvd	Traffic Signal	D	23	C	24	C	**59**	**F**	**56**	**E**
52. Bradshaw Rd/Elk Grove Blvd	AWSC	D	22	C	18	C	41	D	40	D
53. Grant Line Rd/Elk Grove Blvd	AWSC	D	29	D	14	B	30	C	19	B
54. Bruceville Rd/Backer Ranch Rd/Civic Center Dr	Traffic Signal	D	19	B	22	C	26	C	31	C
55. Wymark Dr/Civic Center Dr	AWSC	D	12	B	9	A	31	D	11	B
56. Big Horn Blvd/Civic Center Dr	Traffic Signal	D	17	B	15	B	31	C	31	C
57. Big Horn Blvd/Denali Cir	Traffic Signal	D	7	A	5	A	20	C	16	B
58. Big Horn Blvd/Denali Cir/Lotz Pkwy	Traffic Signal	D	21	C	19	B	**61**	**E**	45	D
59. Big Horn Blvd/Whitelock Pkwy	Traffic Signal	D	17	B	16	B	44	D	37	D
60. Laguna Springs Dr/ Wolf Pack Lane/Lotz Pkwy	Traffic Signal	D	14	B	13	B	**74**	**E**	40	D
61. Franklin Blvd/Willard Pkwy/Whitelock Pkwy	Traffic Signal	D	23	C	14	B	38	D	22	C
62. Bruceville Rd/Whitelock Pkwy	Traffic Signal	D	23	C	27	C	46	D	46	D
63. I-5 SB Ramps/Hood Franklin Rd	SSSC	D	5 (10)	A (A)	8 (11)	A (B)	18	B	43	D
64. I-5 NB Ramps/Hood Franklin Rd	SSSC	D	2 (11)	A (B)	2 (11)	A (B)	28	C	25	C
65. Willard Pkwy/Bilby Rd West	Traffic Signal	D	25	C	23	C	**111**	**F**	55	D
66. Willard Pkwy/Bilby Rd East	Traffic Signal	D	30	C	24	C	48	D	32	C
67. Bruceville Rd/Bilby Rd	Traffic Signal	D	17	B	9	A	47	D	41	D

Intersection	Control	Minimum Acceptable LOS	Existing Conditions				Cumulative Conditions			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
68. Bruceville Rd/Kammerer Rd/Driveway	SSSC	D	10(19)	A(C)	10 (15)	B (C)	116	F	71	E
69. Lent Rench Pkwy/Kammerer Rd	Traffic Signal	D	4	A	4	A	46	D	37	D
70. Promenade Pkwy/Kammerer Rd	Traffic Signal	D	10	A	13	B	**151**	**F**	**88**	**F**
71. SR 99 SB Ramps/Kammerer Rd	Traffic Signal	D	8	A	8	A	**80**	**E**	45	D
72. SR 99 NB Ramps/Grant Line Rd	Traffic Signal	D	10	A	9	A	61	E	41	D
73. E Stockton Blvd/Survey Rd/Grant Line Rd	Traffic Signal	D	28	C	32	C	**189**	**F**	**178**	**F**
74. Waterman Rd/ Grant Line Rd	Traffic Signal	D	12	B	8	A	**234**	**F**	**76**	**E**
75. Mosher Rd/Mosher Cattle Ranch/Grant Line Rd	Traffic Signal	D	3 (27)	A (D)	2 (20)	A (C)	14	B	12	B
76. Bradshaw Rd/Grant Line Rd	Traffic Signal	D	4 (13)	A (B)	5 (15)	A (C)	**261**	**F**	**199**	**F**
77. Whitelock Pkwy & Lotz Pkwy	Traffic Signal	D	—	—	—	—	**117**	**F**	**150**	**F**
78. Poppy Ridge Rd & Big Horn Blvd	Traffic Signal	D	—	—	—	—	21	C	20	B
79. Lotz Pkwy & Poppy Ridge Rd	Traffic Signal	D	—	—	—	—	**76**	**E**	**76**	**E**
80. Bilby Rd & Big Horn Blvd	Traffic Signal	D	—	—	—	—	41	D	35	D
81. Lotz Pkwy & Bilby Rd	Traffic Signal	D	—	—	—	—	28	C	23	C
82. Kammerer Rd & Big Horn Blvd	Traffic Signal	D	—	—	—	—	**169**	**F**	**90**	**F**
83. Kammerer Rd & Lotz Pkwy	Traffic Signal	D	—	—	—	—	**105**	**F**	**78**	**E**

Source: Fehr & Peers 2017
Note: 1. LOS and delay are reported in seconds per vehicle.

Applying the policies of the existing General Plan would require expanding the capacity of the impacted roadways and intersections. Capacity expansion beyond the lanes identified on **Figure 5.13-10** was not considered feasible by the City due to right-of-way impact, environmental impacts including induced travel (i.e., increased VMT), and inconsistency with both complete street concepts to accommodate all modes and users, and community values like maintaining the unique character of the City. Therefore, the proposed Project makes policy accommodations that support complete street concepts and community values and also eliminates LOS as a significance threshold for the evaluation of transportation projects under CEQA, consistent with the requirements of SB 743 and pending State guidance. These policies of the proposed Project are explained below.

The City considered the guidance from OPR when developing the policy direction of the proposed Project. The City recognizes that VMT reductions may be achieved through the implementation of individual development projects in the future and has included General Plan Policy MOB-1-1, which requires future development projects to demonstrate a 15 percent reduction in VMT from existing (2015) conditions. Policy MOB-1-1 includes VMT per service population metrics by land use category, VMT limits for development in the existing City limits, and VMT limits for the Study Areas.

To support the VMT reductions incorporated into Policy MOB-1-1, the proposed Project includes policies to support development of complete streets (MOB-3-1 through MOB-3-9), mobility for all system users (MOB-3-10 through MOB-3-13), managed parking supply (MOB-3-14 through MOB-3-17), improvements to the bicycle and pedestrian network (MOB-4-1 through MOB-4-3), transportation demand management (MOB-4-4 through MOB-4-5), and transit (MOB-5-1 through MOB-5-10).

Policy MOB-3-1 establishes roadway performance targets for roadways and intersections for use in project analysis not related to CEQA. The roadway performance targets include daily volume for roadways and delay for intersections and are used to evaluate a project's consistency with the Transportation Network Diagram, to maintain the safety of the transportation system, and to preserve the character of neighborhoods.

By incorporating these policies, the proposed Project would result in a transportation system that allows greater utilization of the roadway system, which would minimize the need to expand existing capacity, so that the City can focus on building complete streets, improving walking and biking as a viable travel option, and making transit more effective. These goals are directly related to the City's desires to improve community health, create livable neighborhoods, reduce air pollution, and minimize greenhouse gas emissions. A key part of these changes is a shift from automobile LOS to the VMT metrics embedded in Policy MOB-1-1, which will require new development projects to reduce VMT, which may contribute to lower peak hour traffic volumes. However, even with implementation of these policies and potential lower peak hour traffic volumes, the proposed Project would still result in decreases in LOS in the City and would result in a **significant** impact related to LOS.

Mitigation Measures

No additional feasible mitigation available beyond compliance with proposed General Plan policies.

While increasing roadway capacity would improve level of service on affected roadways, the increased capacity would result in other physical environmental effects associated with increased VMT, such as increased emissions of criteria pollutants and greenhouse gases. Because increased roadway capacity contributes to increased VMT, it would also be inconsistent with Project objective #5, which is intended to reduce vehicle miles traveled, improve air quality, and reduce energy usage. No measures are available. This impact on level of service conditions at some intersections and on some roadway segments would be **significant and unavoidable**.

Conflict with an Applicable Plan, Ordinance or Policy Establishing Measures of Effectiveness for the Performance of the Circulation System by Resulting in Unacceptable Levels of Service on Caltrans Roadways - Caltrans Roadways (Standards of Significance 1 and 2)

Impact 5.13.2 Implementation of the proposed Project would exacerbate unacceptable (LOS F) conditions on SR 99 and I-5. This impact is considered **potentially significant**.

The proposed Project includes land use and transportation network changes that would increase future traffic volumes on SR 99 and I-5. As shown in **Table 5.13-6**, all study segments of SR 99 and I-5 would operate at LOS F in 2036. Implementation of the proposed Project would contribute to unacceptable operations on these facilities.

As discussed above, the City of Elk Grove considered the guidance provided by OPR when developing the policy of the proposed Project. The City recognizes that VMT reductions may be achieved through the implementation of individual development projects as the General Plan is implemented and has proposed General Plan Policy MOB-1-1 (included above) that provides VMT metrics to guide new development that require development projects to demonstrate a 15 percent reduction in VMT from existing (2015) conditions. Policy MOB-1-1 includes VMT per service population metrics by land use category, VMT limits for development in the existing City, and VMT limits for Study Areas.

To support the VMT reductions incorporated into Policy MOB-1-1, the General Plan includes policies to support development of complete streets (MOB-3-1 through MOB-3-9), mobility for all system users (MOB-3-10 through MOB-3-13), managed parking supply (MOB-3-14 through MOB-3-17), improvements to the bicycle and pedestrian network (MOB-4-1 through MOB-4-3), transportation demand management (MOB-4-4 through MOB-4-5), and transit (MOB-5-1 through MOB-5-10).

As discussed under Impact 5.13-1, the goals and policies in the General Plan minimize potential impact by supporting efficient vehicle movement and reduced traffic congestion through reduction of trip making and VMT. In addition, the City recognizes the need for the construction of the roadway system shown on **Figure 5.13-10** to support the population and employment growth that is part of the proposed Project. Therefore, the General Plan includes Policy MOB-7-2 and Policy MOB-7-5 that address coordination with regional partners, including Caltrans, for shared roadway improvements that may include joint planning efforts, roadway construction, and funding of improvements on SR 99 and I-5. However, even with implementation of these policies and potential lower peak hour traffic volumes, the proposed Project would still result in decreases in LOS in the City and would result in a **significant** impact related to LOS on Caltrans facilities.

Mitigation Measures

No additional feasible mitigation available beyond compliance with proposed General Plan policies.

Proposed policies address coordination with regional partners, including Caltrans, for shared roadway improvements that may include joint planning efforts, roadway construction, and funding of improvements on SR 99 and I-5. However, even with implementation of these policies and potential lower peak hour traffic volumes, the proposed Project would still add trips to and negatively affect LOS on Caltrans facilities and the impact would be **significant and unavoidable**.

Conflict with an Applicable Plan, Ordinance, or Policy Establishing Measures of Effectiveness for the Performance of the Circulation System by Resulting in increased Vehicle Miles of Travel (Standards of Significance 1)

Impact 5.13.3 Implementation of the proposed Project would result in increased VMT. This impact is considered **potentially significant**.

The proposed Project would allow for population growth that would result in in an increase in VMT compared to existing baseline conditions. **Table 5.13-8** compares buildout of the proposed General Plan Land Use Diagram to existing (2015) baseline conditions.

TABLE 5.13-8
EXISTING AND PROJECTED DAILY VMT

Scenario	Acres	Dwelling Units	Population	Jobs	Jobs/Housing Ratio
Existing Development[1]	31,238	53,829	171,059	45,463	0.84
Preferred Land Use Map[2]	31,238	101,665	328,378	122,802	1.21
Growth	0	47.836	157,319	77,339	—

Notes:

1. *Existing development represents 2017 population and dwelling unit information and 2013 jobs data. These are the latest datasets that are available.*
2. *Preferred Land Use Map refers to the buildout of the proposed General Plan Land Use Diagram. See Project Description.*

The transportation network identified to support the population and employment growth summarized in **Table 5.13-8** is shown in **Figure 5.13-10.** The circulation diagram shows the expected future number of lanes on each roadway.

Table 5.13-9 compares existing daily VMT to the projected daily VMT with the proposed Project at buildout with regional growth in 2036 when analyzed with the transportation improvements displayed on **Figure 5.13-10**.

TABLE 5.13-9
EXISTING AND PROJECTED DAILY VMT

Scenario	VMT[1]
Existing (2015)	3,023,300
Proposed Project (2036)	6,874,500

Source: Fehr & Peers 2017

Note: 1. Includes travel from all vehicles. The allocation of VMT includes 100 percent responsibility for all trips with both trip ends in the City and 50 percent responsibility for trips with only one end in the City.

VMT performance, measured as VMT per service population, is displayed on **Figure 5.13-14**. As shown on **Figure 5.13-14,** areas identified in white have been determined to result in an average service population VMT 15 percent below the City's existing baseline limit (average VMT per service population is 12.0) and would satisfy the thresholds presented in Policy MOB-1-1, if new development is built to the specifications consistent with the General Plan Land Use Diagram. Areas shown in green exceed the 15 percent per service volume threshold and would require project modification or other reduction strategies to satisfy the threshold.

The City considered the guidance from OPR when developing the policy direction of the proposed Project. The City recognizes that VMT reductions may be achieved through the implementation of individual development projects in the future and has included General Plan Policy MOB-1-1, which requires future development projects to demonstrate a 15 percent reduction in VMT from existing (2015) conditions. Policy MOB-1-1 includes VMT per service population metrics by land use category, VMT limits for development in the existing City limits, and VMT limits for the Study Areas.

To support the VMT reductions incorporated into Policy MOB-1-1, the proposed Project includes policies to support development of complete streets (MOB-3-1 through MOB-3-9), mobility for all system users (MOB-3-10 through MOB-3-13), managed parking supply (MOB-3-14 through MOB-3-17), improvements to the bicycle and pedestrian network (MOB-4-1 through MOB-4-3), transportation demand management (MOB-4-4 through MOB-4-5), and transit (MOB-5-1 through MOB-5-10).

By incorporating these policies, the proposed Project would result in a transportation system that allows greater utilization of the roadway system, which would minimize the need to expand existing capacity, so that the City can focus on building complete streets, improving walking and biking as viable travel options, and making transit more effective. These goals are directly related to the City's desires to improve community health, create livable neighborhoods, reduce air pollution, and minimize greenhouse gas emissions. A key part of these changes is a shift from automobile LOS to the VMT metrics embedded in Policy MOB-1-1, which will require new development projects to reduce VMT. However, as shown on **Figures 5.13-14**, many areas (shown in green) will exceed the 15 percent per service population threshold. Projects in areas indicated in **Figure 5.13-14** as likely to exceed the 15 percent below baseline limit will be required to conduct a VMT analysis as described in the City's Transportation Analysis (TA) Guidelines. New land use plans or development projects must demonstrate through the TA that VMT produced by the proposed project does not exceed established VMT limits for the applicable land use designation. **Table 5.13-10** includes potential VMT reduction strategies that individual projects can use to achieve additional reductions beyond those incorporated in the proposed Project.

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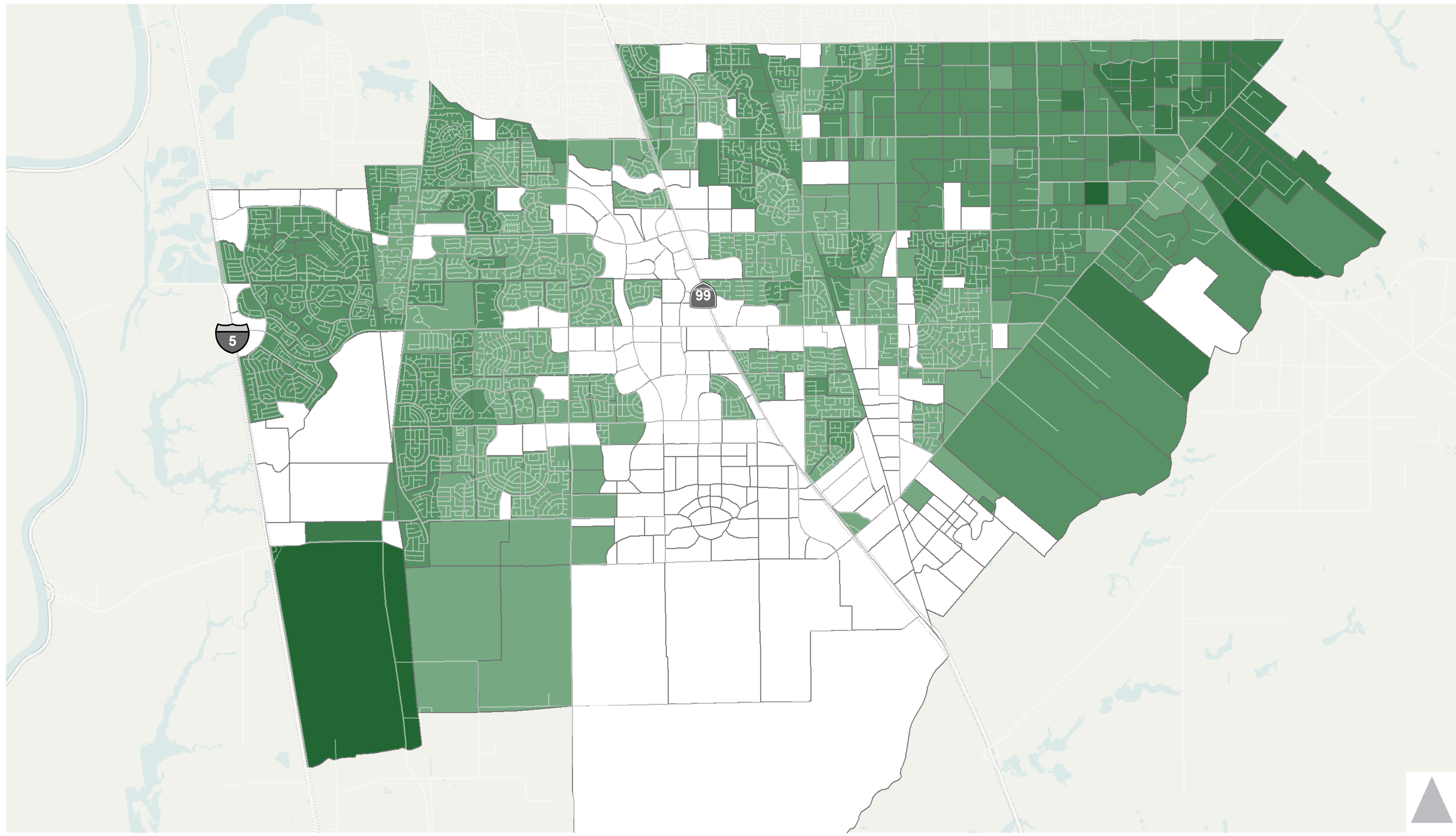

Residential and Work VMT

Average = 12.0

85% of Average = 10.2

- ≤ 85% of Average VMT
- >10.2 - 12 miles
- 13 - 17 miles
- 18 - 20 miles
- > 20 miles

Source:Fehr and Peers, 2018

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FIGURE 5.13-14
Residential and Work VMT
by Traffic Analysis Zone

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TABLE 5.13-10
VMT REDUCTION STRATEGIES

Data Set	Description
Land Use/Location	Land use-related components such as project density, location, and efficiency related to other housing and jobs; and diversity of uses within the project. Also includes access and proximity to destinations, transit stations, and active transportation infrastructure.
Site Enhancement	Establishing or connecting to a pedestrian/bike network; traffic calming within and in proximity to the project; car sharing programs; shuttle programs.
Transit System Improvement	Improvements to the transit system including reach expansion, service frequency, types of transit, access to stations, station safety and quality, parking (park-and-ride) and bike access (to transit itself and parking), last-mile connections. (Can be achieved through Travel Demand Management program measures.)
Commute Trip Reduction	For residential: transit fare subsidies, education/training of alternatives, rideshare programs, shuttle programs, bike share programs. For employer sites: transit fare subsidies, parking cash-outs, paid parking, alternative work schedules/telecommute, education/training of alternatives, rideshare programs, shuttle programs, bike share programs, end of trip facilities. (Can be achieved through Travel Demand Management program measures.)
In-Lieu Fee	A fee is leveed that is used to provide non-vehicular transportation services that connect project residents to areas of employment or vice versa. This service may be provided by the project applicant in cooperation with major employers.

Source: Fehr & Peers 2017

In addition, transportation and the future of travel is going through transformative changes that will influence the future forecasts upon which the impact analysis is based. Emerging technology and mobility services are increasingly becoming a factor in decisions regarding transportation investment and system performance. Vehicle availability is growing through car sharing, transportation network companies (e.g., Uber, Lyft, and similar) and micro-rentals (e.g., Zipcar), while public transportation infrastructure faces funding challenges related to investment priorities.

The proposed Project analysis extends to 2036 when autonomous vehicles are expected to be part of the network. Fully autonomous vehicles (e.g., driverless vehicles) are not expected to require parking spaces, but could increase vehicle use, demand for curb space to drop off and pick up passengers and goods, and VMT, while causing reductions in transit demand. Research quantifies some of the potential travel behavior responses, but many questions remain about how future networks will be designed and operated (Fehr & Peers 2016).

Mitigation Measures

No additional feasible mitigation available beyond compliance with proposed General Plan policies.

To support the VMT reductions incorporated into Policy MOB-1-1, the proposed Project includes policies to support development of complete streets (MOB-3-1 through MOB-3-9), mobility for all system users (MOB-3-10 through MOB-3-13), managed parking supply (MOB-3-14 through MOB-3-17), improvements to the bicycle and pedestrian network (MOB-4-1 through MOB-4-3), transportation demand management (MOB-4-4 through MOB-4-5), and transit (MOB-5-1 through MOB-5-10), which support the VMT reductions incorporated into Policy MOB-1-1. However, even with these measure, some areas in the Planning Area will still not achieve the VMT reductions specified in Policy MOB-1-1 and the effectiveness of VMT reductions strategies is not certain. In addition, disruptive changes occurring in transportation, such as transportation network companies (i.e., Uber, Lyft), autonomous vehicles, Mobility as a Service (i.e., ride-sharing, car-sharing), Amazon (increased deliveries), may increase VMT. This impact related to VMT would be **significant and unavoidable**.

Air Traffic Patterns (Standards of Significance 3)

Impact 5.13.4 Implementation of the proposed Project includes land use changes that would have only a limited influence on air traffic patterns. This impact is considered **less than significant**.

There are seven public airports in Sacramento County. Each airport has an Airport Land Use Compatibility Plan (also referred to as a Comprehensive Land Use Plan) that identifies hazard zones surrounding the airport. No portion of the Planning Area is located within noise contours or land use overlay areas for any airport in Sacramento County. One public airport (Franklin Field) and two private airports (Skyway Estates Airport and Borges-Clarksburg Airport) are located within 3 miles of the Planning Area. While the proposed Project would change land use patterns, it would not to a degree that would negatively affect existing air traffic patterns. In addition, the proposed Project includes policies intended to avoid or minimize compatibility issues between urban development and airports adjacent to the City. Policy MOB-2-1 requires that the City consider the recommendations in the plans for airports, and Policy MOB-2-2 ensures that new development near airports is designed to protect public safety. With implementation of the proposed Project, this impact would be **less than significant**.

Mitigation Measures

None required beyond implementation of proposed General Plan policies.

Hazards (Standards of Significance 4)

Impact 5.13.5 Implementation of the proposed Project will modify the existing transportation network to accommodate existing and future users, which could change existing travel patterns or traveler expectations. This impact is considered **less than significant**.

The proposed Project would modify the existing transportation network to expand existing facilities or construct new facilities to accommodate planned population and employment growth. All existing facility modifications and new facilities resulting from the proposed circulation diagram improvements would be constructed based on industry design standards consistent with Policy MOB-3-10, which stresses that the safety of the most vulnerable user is a priority. In addition, Policy MOB-3-1 focuses on the implementation of a balanced transportation system to ensure the safety of all users. Implementation of the proposed Project would not increase hazards due to design features of transportation facilities and this impact would be **less than significant**.

Mitigation Measures

None required beyond compliance with proposed General Plan policies.

Emergency Access (Standards of Significance 5)

Impact 5.13.6 Implementation of the proposed Project would alter land use patterns and increase travel demand on the transportation network, which may influence emergency access. This impact is considered **less than significant**.

The proposed Project would modify the existing transportation network to expand existing facilities or to construct new facilities to accommodate planned population and employment growth. The proposed Project contains various policies to ensure that adequate emergency response is provided as needed to accommodate this growth. Policy MOB-3-8 provides for a thorough and well-designed wayfinding system. Also, Policy MOB-6-1 includes the planning and pursuit of funding for strategic grade-separated crossings of rail corridors, and Policy MOB-7-8 addresses the use of technology to improve the operation of the City's transportation network. In addition, Policy MOB-7-4 requires new development projects to fund or construct infrastructure improvements needed to accommodate planned growth. With implementation of the proposed policies, the transportation system would be well planned and constructed to ensure that there would be adequate emergency access. This impact would be **less than significant**.

Mitigation Measures

None required beyond compliance with proposed General Plan policies.

Bicycle, Pedestrian, and Transit Facilities (Standard of Significance 6)

Impact 5.13.7 Implementation of the proposed Project would not result in conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. This impact is considered **less than significant**.

The proposed Project contains provisions that would enhance public transit, bicycle, or pedestrian facilities to encourage greater use of transit and more walking and bicycling in the future. All new facilities shown in the circulation diagram would be constructed to applicable design standards that have been created to minimize the potential for conflicts or collisions. Proposed General Plan policies are designed to accommodate travel growth by providing adequate facilities, including complete streets. Policy MOB-1-2 encourages consideration of all transportation modes when evaluating transportation design. Policy MOB-3-1 calls for implementation of a balanced transportation system to ensure the safety and mobility of pedestrians, cyclists, motorists, children, seniors, and people with disabilities. Policies MOB-3-7 and MOB-3-8 call for a complete and connected network of sidewalks, crossings, paths, and bike lanes and a wayfinding signage system. To encourage the use of transit, Policy MOB-5-4 supports mixed-use and high-density development applications close to existing and planned transit stops, while Policies MOB-5-6 and MOB-5-7 encourage the provision of the appropriate level of transit service in all areas of the City and the extension of bus rapid transit and/or light rail service (referred to as "fixed transit") to existing and planned employment centers. Implementation of these policies would improve the bike, pedestrian, and transit networks in the City and foster their use. With implementation of the proposed policies, the proposed Project would not conflict with adopted policies, plans, or programs for transit, bicycle, or pedestrian facilities nor would it adversely affect performance or safety of such facilities. This impact would be **less than significant**.

Mitigation Measures

None required beyond compliance with proposed General Plan policies.

REFERENCES

Caltrans (California Department of Transportation). 2002. *Guide for the Preparation of Traffic Impact Studies.*

Fehr & Peers. 2016. "How will autonomous vehicles influence the future of travel?" http://www.fehrandpeers.com/autonomous-vehicle-research/.

———. 2017. *Traffic Study.*

SACOG (Sacramento Area Council of Governments). 2000. *Household Travel Survey, Pre-Census Travel Behavior Report Analysis.*

———. 2012. *Metropolitan Transportation Plan/Sustainable Communities Strategy 2035.*

Transportation Research Board. 2010. *Highway Capacity Manual, Volume 3.*

6.0 Other CEQA Considerations

This section discusses additional topics statutorily required by CEQA, including growth-inducing impacts, significant irreversible environmental effects, energy consumption and conservation, significant and unavoidable environmental effects, and a summary of cumulative effects.

6.1 GROWTH-INDUCING IMPACTS

INTRODUCTION

CEQA Guidelines Section 15126.2(d) requires that an EIR evaluate the growth-inducing impacts of a proposed action. A growth-inducing impact is defined by CEQA Guidelines as:

> …the ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth…It must not be assumed that growth in an area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have direct and/or indirect growth inducement potential. Direct growth would result if, for example, a project involved construction of new housing. A project would have indirect growth inducement potential if, for example, it established substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises) or if it would involve a construction effort with substantial short-term employment opportunities that would indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, a project would indirectly induce growth if, for example, it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service. A project providing an increased water supply in an area where water service historically limited growth could be considered growth inducing.

CEQA Guidelines further explain that the environmental effects of induced growth are considered indirect impacts of the proposed action. These indirect impacts or secondary effects of growth may result in significant, adverse environmental impacts. Potential secondary effects of growth include increased demand on community and public services and infrastructure, increased traffic and noise, and adverse environmental impacts such as degradation of air and water quality, degradation or loss of plant and animal habitat, and conversion of agricultural and open space land to developed uses.

Growth inducement may constitute an adverse impact if the growth is not consistent with or accommodated by the land use plans and growth management plans and policies for the area affected. Local land use plans provide for land use development patterns and growth policies that allow for the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service, and solid waste service.

COMPONENTS OF GROWTH

The timing, magnitude, and location of land development and population growth in a community or region are based on various interrelated land use and economic variables. Key variables include regional economic trends, market demand for residential and nonresidential uses, land availability and cost, the availability and quality of transportation facilities and public services, proximity to employment centers, the supply and cost of housing, and regulatory policies or conditions. Since the general plan of a community defines the location, type and intensity of growth, it is the primary means of regulating development and growth in California.

GROWTH EFFECTS OF THE PROPOSED PROJECT

The proposed General Plan Update would guide future development throughout the Planning Area and would both directly and indirectly induce growth. Section 3.0, Demographics, of this Draft EIR provides a discussion of the City's existing population, housing, and employment conditions and trends as well as an analysis of the Project's growth potential. Changes in population and employment are not in and of themselves environmental impacts. However, they may result in the need for the construction of new housing, businesses, infrastructure, and services that provide for increases in population and employment. The Project's potential impacts on the physical environment are evaluated in Sections 5.1 through 5.13 of this Draft EIR.

Population and Employment Growth

The proposed Project would allow for the future construction of up to 47,836 new homes within the Planning Area at a wide range of types and densities. Construction of these homes would increase the City's population by approximately 157,319 residents to a total of 328,378 at build out. This would represent an approximately 92 percent increase over the City's 2017 population of 171,059 (DOF 2016).

In addition, the proposed Project would allow for substantial non-residential development throughout the Planning Area allowing for the creation of approximately 77,339 new jobs for a total of 122,802. This represents an increase of 63 percent over the City's existing job pool. The Project would therefore induce growth through the creation of permanent employment opportunities that would indirectly stimulate the need for additional housing and services to support the new employment demand. However, as discussed in Section 3.0, the City currently has a jobs-to-housing ratio of 0.84, indicating a shortage of jobs compared to available housing stock in the City. Consequently, some of the City's existing residents could find employment in the Planning Area. Furthermore, as described above, the Project includes residential development that could accommodate future workers relocating to the Planning Area.

The Project would induce substantial growth in the Planning Area but would result in a more balanced jobs-to-housing ratio of 1.21 at build out. A more balanced jobs-to-housing ratio can reduce environmental impacts by limiting commute vehicle miles traveled during peak periods in areas where congestion is growing.

Indirect Growth Effects

The proposed Project could also indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service.

Annexation of Study Areas

As described throughout this Draft EIR, the proposed Project includes preliminary planning efforts for four Study Areas located outside the City's current limits and sphere of influence (SOI) indicating the City's intent for future annexation and development of these areas. Annexation would allow for the extension of infrastructure into the Study Areas and make them available for future development including additional residential units and non-residential space. Each of the Study Areas is currently developed with rural residential and agricultural uses and could accommodate significant new growth.

Infrastructure

The proposed Project could also potentially indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service. The City's infrastructure and public services are largely provided by other public and private service providers (e.g., Sacramento County Water Agency and Elk Grove Water District for water supply; Sacramento Regional County Sanitation District and Sacramento Area Sewer District for wastewater service; Sacramento Municipal Utility District for electrical service; Cosumnes Community Services District for parks, recreation, and fire protection; Pacific Gas and Electric Company for natural gas service) that utilize master plans for guiding planned facility and service expansions that are subject to environmental review under CEQA.

The Study Areas are in an area that is, for the most part, rural and undeveloped. Infrastructure facilities such as water and sewer lines would need to be extended throughout the Planning Area to serve future development. The Project would require connection to transmission water mains and sewer interceptors that are existing or planned in the area and which have been planned on a cumulative basis through a series of studies for the various development projects in the area.

The Project also describes roadway improvements that are required to serve anticipated development, but these improvements would add capacity and could accommodate increased traffic volumes in the area. However, the proposed roadway improvements would involve widening and improving roadways to accommodate planned growth from the proposed Project and would not be designed to accommodate additional growth outside the Planning Area. Therefore, the Project's proposed roadway improvements would not indirectly result in any growth beyond that already considered in this Draft EIR.

ENVIRONMENTAL EFFECTS OF GROWTH

As described above, the proposed Project would induce substantial population growth in the Planning Area, both directly and indirectly. Future infrastructure and roadway improvements would support such growth within the Planning Area. As a result of the Project's potential to increase the City's housing supply and employment opportunities, the Project is considered to be growth-inducing. The environmental effects of this growth would result in substantial changes to demands for public services and utilities as discussed in Section 5.11, Public Services and Recreation and Section 5.12, Public Utilities. The effects of this growth are addressed in Sections 5.1 through 5.13 of this Draft EIR.

6.2 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL EFFECTS

CEQA Sections 21100(b)(2) and 21100.1(a) require that EIRs prepared for the adoption of a plan, policy, or ordinance of a public agency must include a discussion of significant irreversible environmental changes of project implementation. In addition, CEQA Guidelines Section 15126.2(c) describes irreversible environmental changes as:

> Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

Because the proposed Project is a long-range plan and not a development project, the proposed Project does not itself propose any new development or other physical changes which could result in significant irreversible environmental effects. However, the Project would allow for future build out of the proposed Land Use Diagram, which constitutes a long-term commitment to residential, non-residential, and public land uses. It is unlikely that circumstances would arise that would justify the return of the land to its original condition.

Build out of the Planning Area would irretrievably commit building materials and energy to the construction and maintenance of buildings and infrastructure proposed. Renewable, nonrenewable, and limited resources would likely be consumed as part of future development projects under the proposed General Plan Update and would include, but would not be limited to, oil, gasoline, lumber, sand and gravel, asphalt, water, steel, and similar materials. In addition, build out of the Planning Area would result in increased demand on public services and utilities (see Section 5.9, Hydrology and Water Quality, Section 5.11, Public Services and Recreation, and Section 5.12, Public Utilities, of this Draft EIR).

6.3 SIGNIFICANT AND UNAVOIDABLE PROJECT-SPECIFIC ENVIRONMENTAL EFFECTS

CEQA Guidelines Section 15126.2(b) requires an EIR to discuss unavoidable significant environmental effects, including those that can be mitigated but not reduced to a level of insignificance. In addition, Section 15093(a) of the CEQA Guidelines allows the decision-making agency to determine whether the benefits of a proposed project outweigh the unavoidable adverse environmental impacts of implementing the project. The City can approve a project with unavoidable adverse impacts if it prepares a "Statement of Overriding Considerations" setting forth the specific reasons for making such a judgment.

The following project-specific significant and unavoidable impacts associated with the proposed Project are specifically identified in Sections 5.1 through Section 5.13 of this Draft EIR. The reader is referred to the various environmental issue areas of these sections for further details and analysis of the significant and unavoidable impacts identified below.

AESTHETICS, LIGHT, AND GLARE

5.1.2 Implementation of the General Plan will encourage new development and redevelopment activities that could degrade the existing visual character or quality of the Planning Area.

5.1.3 Implementation of the General Plan would create new sources of daytime glare, and would change nighttime lighting and illumination levels associated with new and redevelopment activities in the Planning Area, which would contribute to skyglow.

AGRICULTURAL RESOURCES

5.2.1 Implementation of the proposed Project would allow for new development in areas of the Planning Area that are designated Important Farmland and/or under Williamson Act contract.

AIR QUALITY

5.3.1 Buildout of the proposed Project could result in short-term construction emissions that could violate or substantially contribute to a violation of federal and state standards for ozone, PM_{10}, and $PM_{2.5}$.

5.3.2 The Project could result in long-term operational emissions that could violate or substantially contribute to a violation of federal and State standards for ozone and coarse and fine particulate matter.

5.3.4 The proposed Project could result in increased exposure of existing or planned sensitive land uses to stationary or mobile-source TACs that would exceed applicable health risk standards.

5.3.5 Implementation of the Project would not result in increased exposure of sensitive receptors to odorous emissions as compared to baseline conditions.

5.3.6 The Project would be substantially consistent with all applicable control measures in the Sacramento Regional NAAQS 8-Hour Ozone Attainment and Further Progress Plan (Attainment Plan), but because the Project would exceed the SMAQMD's air quality thresholds of significance, the Project would not be considered to be fully consistent with the Plan's goals.

BIOLOGICAL RESOURCES

5.4.1 Implementation of the proposed Project could result in adverse effects, either directly or indirectly, on species listed as endangered, threatened, rare, proposed, and candidate plants and wildlife.

5.4.2 Implementation of the proposed Project could result in adverse effects, either directly or indirectly, on non-listed special status species (Species of Special Concern, fully protected, and locally important).

CULTURAL RESOURCES

None identified.

GEOLOGY, SOILS, MINERAL RESOURCES, AND PALEONTOLOGY

None identified.

GREENHOUSE GAS EMISSIONS AND ENERGY

None identified.

HAZARDS AND HAZARDOUS MATERIALS

None identified.

HYDROLOGY AND WATER QUALITY

5.9.4 The proposed Project would increase the demand on water supplies, some of which would be groundwater.

NOISE

5.10.2 Implementation of the proposed Project would result in a significant increase in transportation noise, including traffic noise levels along many existing roadways in the City. Even with implementation of proposed policies to limit traffic noise impacts, predicted traffic noise levels would still result in potential increases above applicable standards.

PUBLIC SERVICES AND RECREATION

5.11.3.1 Implementation of the proposed Project would allow for future development in the Planning Area, which would result in an increase of school-aged children and require the construction of new public school facilities, the construction of which could have impacts on the physical environment.

PUBLIC UTILITIES

5.12.1.1 Implementation of the proposed Project would increase demand for domestic water supply, which may result in the need for additional water supplies.

5.12.1.2 Implementation of the proposed Project would require the construction of new and expanded water supply infrastructure, which could result in impacts to the physical environment.

TRANSPORTATION

The traffic analysis was based upon a scenario in which development under the proposed Project was added to the existing condition with background levels of traffic included. See cumulative impacts.

6.4 SIGNIFICANT AND UNAVOIDABLE CUMULATIVE IMPACTS

This section summarizes the cumulative impacts associated with the proposed Project that are identified in the environmental issue areas in Chapter 5.0. Cumulative impacts are the result of combining the potential effects of the proposed Project with other recently approved, planned, and reasonably foreseeable development projects in the region. The reader is referred to Sections 5.1 through 5.13 for a full discussion of the proposed Project's cumulative impacts.

CEQA requires that an EIR contain an assessment of the cumulative impacts that could be associated with the proposed project. According to CEQA Guidelines Section 15130(a), "an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable." "Cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (as defined by Section 15130). As defined in CEQA Guidelines Section 15355, a cumulative impact consists of an impact that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. A cumulative impact occurs from:

> ...the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

In addition, Section 15130(b) identifies that the following three elements are necessary for an adequate cumulative analysis:

1) Either:

    a. A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or,

    b. A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.

2) A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available; and

3) A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency is not required to consider that effect significant, but must briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

A general description of the cumulative setting is provided in Section 5.0, Introduction to the Environmental Analysis and Assumptions Used, as well as in **Table 5.0-1.** In addition, the cumulative setting for environmental issue areas evaluated in the Draft EIR is described in the section specific to the issue area (see Sections 5.1 through 5.13).

Identified below is a compilation of the cumulative impacts that would result from implementation of the proposed Project and other approved and proposed development in the region. As described above, cumulative impacts are two or more effects that, when combined, are considerable or compound other environmental effects. Each cumulative impact is determined to have one of the following levels of significance: less than cumulatively considerable, potentially cumulatively considerable, or cumulatively considerable.

AESTHETICS, LIGHT, AND GLARE

5.1.4 Implementation of the proposed Project, in addition to other reasonably foreseeable projects in the region, would introduce new development into undeveloped agricultural and rural areas that would have a cumulatively considerable contribution to impacts on visual character.

5.1.5 Implementation of the proposed Project, in addition to other reasonably foreseeable projects in the region, would introduce new development into undeveloped agricultural and rural areas, increasing nighttime lighting and daytime glare and contributing to regional skyglow.

AGRICULTURAL RESOURCES

5.2.3 Implementation of the proposed Project would ultimately result in the conversion of Important Farmland and the cancellation of Williamson Act contracts. This loss would contribute to the cumulative loss of farmland in the region.

AIR QUALITY

5.3.7 The proposed Project in combination with growth throughout the air basin will exacerbate existing regional problems with criteria air pollutants and ozone precursors.

BIOLOGICAL RESOURCES

5.4.7 Future development in the Planning Area, when considered together with other past, existing, and planned future projects, could result in a significant cumulative impact on biological resources in the region.

CULTURAL RESOURCES

None identified.

GEOLOGY, SOILS, MINERAL RESOURCES, AND PALEONTOLOGY

None identified.

GREENHOUSE GAS EMISSIONS AND ENERGY

5.7.2 Adoption of the proposed General Plan and CAP Update would result in emission reductions that are consistent with statewide reduction targets for 2020 and 2030. However, based on current emission estimates for the City projected for 2050, and considering the proposed policies and programs included in the General Plan and CAP Update, the proposed General Plan and CAP Update would likely not result in sufficient GHG reductions for the City to meet the longer-term goal for 2050 as stated in EO S-3-05.

HAZARDS AND HAZARDOUS MATERIALS

None identified.

HYDROLOGY AND WATER QUALITY

5.9.7 Development of the Planning Area, in combination with other development in the Central Basin, would increase demand for groundwater and could potentially interfere with recharge of the aquifer.

NOISE

5.10.5 Implementation of the proposed Project would contribute to cumulative noise levels along many roadway segments in the Planning Area due to increased cumulative traffic volumes.

PUBLIC SERVICES AND RECREATION

5.11.3.2 Implementation of the proposed Project, in combination with other development in the EGUSD service area, would result in the increase of school-aged children, which would require the construction of new public school facilities, which could have impacts on the environment.

PUBLIC UTILITIES

5.12.1.3 Implementation of the proposed Project, in combination with other development, would contribute to cumulative demand for domestic water supply.

5.12.2.3 Implementation of the proposed Project, in addition to other development in the Regional San service area, would generate new wastewater flows requiring conveyance and treatment.

TRANSPORTATION

5.13.1 Implementation of the proposed Project could cause unacceptable level of service conditions at some intersections and on some roadway segments.

5.13.2 Implementation of the proposed Project would exacerbate unacceptable (LOS F) conditions on SR 99 and I-5.

5.13.3 Implementation of the proposed Project would result in increased VMT.

REFERENCES

DOF (California Department of Finance). 2017. *E-5 Population and Housing Estimates for Cities, Counties and the State, January 1, 2011–2017, with 2010 Benchmark.*

7.0 Project Alternatives

7.1 INTRODUCTION

This chapter evaluates potential alternatives to the proposed Project as required by the California Environmental Quality Act (CEQA). The alternatives selected for detailed analysis represent a reasonable range of alternatives that could feasibly attain most of the Project's basic objectives and that could avoid or substantially lessen significant impacts. This chapter presents the CEQA requirements for alternatives analysis, a summary of the selected alternatives, an overview of the proposed Project's potentially significant impacts, an evaluation of the alternatives, a comparison of the merits of the alternatives, selection of the environmentally superior alternative, and a summary of Project options that were considered but not included for evaluation in the environmental impact report (EIR).

CEQA REQUIREMENTS FOR ALTERNATIVES ANALYSIS

CEQA Guidelines Section 15126.6(a) states that an EIR must describe and evaluate a reasonable range of alternatives to a project that would feasibly attain most of the project's basic objectives, but that would avoid or substantially lessen any significant adverse environmental effects of that project.

An EIR is not required to consider every conceivable alternative to a proposed project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. CEQA Guidelines Section 15126.6(e) states that "[t]he specific alternative of 'no project' shall also be evaluated along with its impact." The EIR must evaluate the comparative merits of the alternatives and include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project.

Specifically, the CEQA Guidelines set forth the following criteria for selecting and evaluating alternatives:

> [T]he discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly (CEQA Guidelines Section 15126.6[b]).

> The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination (CEQA Guidelines Section 15126.6[c]).

> The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed (CEQA Guidelines Section 15126.6[d]).

> The specific alternative of "no project" shall be evaluated along with its impact. The purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. The CEQA Guidelines also require that the "no project" analysis "shall discuss the existing conditions at the time the [EIR] notice of preparation is published … as well as what would reasonably be expected to occur in the foreseeable future if the project were not approved, based on current plans…" (CEQA Guidelines Section 15126.6[e][1] and [2]).

> Alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decision-making (Section 15126.6[f]).

When addressing feasibility, CEQA Guidelines Section 15126.6 states that "among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, jurisdictional boundaries, and whether the applicant can reasonably acquire, control or otherwise have access to alternative sites." The CEQA Guidelines also specify that the alternatives discussion should not be remote or speculative.

The primary intent of the alternatives analysis is to disclose other ways that the objectives of the Project could be attained while reducing the magnitude of, or avoiding, the environmental impacts of the proposed Project. Alternatives that are included and evaluated in the EIR must be feasible alternatives. However, the Public Resources Code and the CEQA Guidelines direct that the EIR need "set forth only those alternatives necessary to permit a reasoned choice."

PROJECT OBJECTIVES

CEQA Guidelines Section 15124 requires that a project description be accompanied by a "statement of objectives sought by the proposed project." The guidelines go on to state that the "objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project."

The City has identified the following objectives for the proposed Project:

1. Provide for growth of the City to meet long-term needs, including housing, employment, and recreational opportunities.

2. Facilitate orderly and logical development, including economic development, while maintaining the character of existing communities.

3. Provide an improved transportation system that includes an array of travel modes and routes, including roadways, mass transit, walking, and cycling.

4. Protect open space, providing trails, parkland, and a range of recreational opportunities.

5. Provide mechanisms to minimize noise and safety risks associated with natural and human-caused noise and safety hazards.

6. Promote sustainability and community resiliency through reductions in vehicle miles traveled, improved air quality, reductions in energy usage, and a diversified economy.

7. Provide and support public facilities and infrastructure with sufficient capacity to adequately serve the needs of the growing community.

7.2 OVERVIEW OF THE PROPOSED PROJECT'S SIGNIFICANT IMPACTS

As described above, the selected alternatives are those that would reduce or avoid significant environmental impacts associated with the Project as proposed. The following is a list of the Project's potentially significant, significant, and cumulatively considerable impacts, including impacts that would be unavoidable because mitigation would not reduce the impacts to less than significant or no feasible mitigation measures are available.

AESTHETICS, LIGHT, AND GLARE

Project-Specific

5.1.2 Implementation of the General Plan will encourage new development and redevelopment activities that could degrade the existing visual character or quality of the Planning Area.

5.1.3 Implementation of the General Plan would create new sources of daytime glare, and would change nighttime lighting and illumination levels associated with new and redevelopment activities in the Planning Area, which would contribute to skyglow.

Cumulative

5.1.4 Implementation of the proposed Project, in addition to other reasonably foreseeable projects in the region, would introduce new development into undeveloped agricultural and rural areas that would have a cumulatively considerable contribution to impacts on visual character.

5.1.5 Implementation of the proposed Project, in addition to other reasonably foreseeable projects in the region, would introduce new development into undeveloped agricultural and rural areas, increasing nighttime lighting and daytime glare and contributing to regional skyglow.

AGRICULTURAL RESOURCES

Project-Specific

5.2.1 Implementation of the proposed Project would allow for new development in areas of the Planning Area that are designated Important Farmland and/or under Williamson Act contract.

Cumulative

5.2.3 Implementation of the proposed Project would ultimately result in the conversion of Important Farmland and the cancellation of Williamson Act contracts. This loss would contribute to the cumulative loss of farmland in the region.

AIR QUALITY

Project-Specific

5.3.1 Buildout of the proposed Project could result in short-term construction emissions that could violate or substantially contribute to a violation of federal and state standards for ozone, PM_{10}, and $PM_{2.5}$.

5.3.2 The Project could result in long-term operational emissions that could violate or substantially contribute to a violation of federal and State standards for ozone and coarse and fine particulate matter.

5.3.4 The proposed Project could result in increased exposure of existing or planned sensitive land uses to stationary or mobile-source TACs that would exceed applicable standards.

5.3.5 Implementation of the Project would not result in increased exposure of sensitive receptors to odorous emissions as compared to baseline conditions.

5.3.6 The Project would be substantially consistent with all applicable control measures in the Sacramento Regional NAAQS 8-Hour Ozone Attainment and Further Progress Plan (Attainment Plan), but because the Project would exceed the SMAQMD's air quality thresholds of significance, the Project would not be considered to be fully consistent with the Plan's goals.

Cumulative

5.3.7 The proposed Project in combination with growth throughout the air basin will exacerbate existing regional problems with criteria air pollutants and ozone precursors.

BIOLOGICAL RESOURCES

Project-Specific

5.4.1 Implementation of the proposed Project could result in adverse effects, either directly or indirectly, on species listed as endangered, threatened, rare, proposed, and candidate plants and wildlife.

5.4.2 Implementation of the proposed Project could result in adverse effects, either directly or indirectly, on non-listed special status species (Species of Special Concern, fully protected, and locally important).

Cumulative

5.4.7 Future development in the Planning Area, when considered together with other past, existing, and planned future projects, could result in a significant cumulative impact on biological resources in the region.

CULTURAL RESOURCES

None identified.

GEOLOGY, SOILS, MINERAL RESOURCES, AND PALEONTOLOGY

None identified.

GREENHOUSE GAS EMISSIONS AND ENERGY

Cumulative

5.7.2 Adoption of the proposed General Plan and CAP Update would result in emission reductions that are consistent with statewide reduction targets for 2020 and 2030. However, based on current emission estimates for the City projected for 2050, and considering the proposed policies and programs included in the General Plan and CAP Update, the proposed General Plan and CAP Update would likely not result in sufficient GHG reductions for the City to meet the longer-term goal for 2050 as stated in EO S-3-05.

HAZARDS AND HAZARDOUS MATERIALS

None identified.

HYDROLOGY AND WATER QUALITY

Project-Specific

5.9.4 The proposed Project would increase the demand on water supplies, some of which would be groundwater.

Cumulative

5.9.7 Development of the Planning Area, in combination with other development in the Central Basin, would increase demand for groundwater and could potentially interfere with recharge of the aquifer.

NOISE

Project-Specific

5.10.2 Implementation of the proposed Project would result in a significant increase in transportation noise, including traffic noise levels along many existing roadways in the City. Even with implementation of proposed policies to limit traffic noise impacts, predicted traffic noise levels would still result in potential increases above applicable standards.

Cumulative

5.10.5 Implementation of the proposed Project would contribute to cumulative noise levels along many roadway segments in the Planning Area due to increased cumulative traffic volumes.

PUBLIC SERVICES AND RECREATION

Project-Specific

5.11.3.1 Implementation of the proposed Project would allow for future development in the Planning Area, which would result in an increase of school-aged children and require the construction of new public school facilities, the construction of which could have impacts on the physical environment.

Cumulative

5.11.3.2 Implementation of the proposed Project, in combination with other development in the EGUSD service area, would result in the increase of school-aged children, which would require the construction of new public school facilities, which could have impacts on the environment.

PUBLIC UTILITIES

Project-Specific

5.12.1.1 Implementation of the proposed Project would increase demand for domestic water supply, which may result in the need for additional water supplies.

5.12.1.2 Implementation of the proposed Project would require the construction of new and expanded water supply infrastructure, which could result in impacts to the physical environment.

Cumulative

5.12.1.3 Implementation of the proposed Project, in combination with other development, would contribute to cumulative demand for domestic water supply.

5.12.2.3 Implementation of the proposed Project, in addition to other development in the Regional San service area, would generate new wastewater flows requiring conveyance and treatment.

TRANSPORTATION

Project-Specific

The traffic analysis was based on a scenario in which development under the proposed Project was added to the existing condition with background levels of traffic included. See cumulative impacts.

Cumulative

5.13.1 Implementation of the proposed Project could cause unacceptable level of service conditions at some intersections and on some roadway segments.

5.13.2 Implementation of the proposed Project would exacerbate unacceptable (LOS F) conditions on SR 99 and I-5.

5.13.3 Implementation of the proposed Project would result in increased VMT.

7.3 ALTERNATIVES

ALTERNATIVES CONSIDERED BUT NOT SELECTED FOR ANALYSIS

Alternatives may be removed from further consideration in an EIR if they fail to meet most of the project objectives, are infeasible, or do not avoid or substantially reduce any environmental effects (CEQA Guidelines Section 15126.6[c]). Additionally, alternatives that are remote or speculative, or the effects of which cannot be reasonably predicted, also do not need to be considered (CEQA Guidelines Section 15126[f][2]). The City considered several alternatives that ultimately were determined infeasible and these alternatives were removed from further consideration. These alternatives included the following:

Alternative Location/Off-Site Alternative

The General Plan Update addresses areas within the City and potential expansion areas directly adjacent to City boundaries that are in Sacramento County. It addresses planning changes within the City and Study Areas, some of which are in ongoing planning processes by the City and private parties and may be added to the City's Sphere of Influence. Consideration of lands beyond the identified Study Areas is infeasible because of existing municipal boundaries, natural features, or Local Agency Formation Commission (LAFCo) regulations, which discourage planning of areas that are discontiguous with existing boundaries. Thus, the areas available for planning are inherently limited. Any alternatives involving alternative or off-site areas are infeasible and not addressed in the EIR.

Reduced Density/Intensity Alternative

The City considered a reduced density alternative that would result in fewer residences and less office space, which would reduce community impacts such as air quality, greenhouse gas (GHG) emissions, traffic, noise, and demand for utilities and public services. However, such an alternative would not achieve or would only partially achieve General Plan objectives of providing for growth of the City, providing an improved transportation system, and reducing vehicle miles traveled (VMT). Further, such an alternative would not be consistent with regional planning and could increase development pressure in other areas. Therefore, this option was not evaluated in the EIR.

ALTERNATIVES SELECTED FOR ANALYSIS

The selection of alternatives considered the alternatives' ability to meet most of the project objectives as well as avoid or substantially lessen the project's significant effects. Five alternatives, including the no project alternative, were identified for evaluation and comparison to the proposed project, as listed below.

- Alternative 1 – No Project Alternative
- Alternative 2 – Additional Climate Action Plan Measures
- Alternative 3 – Reduced Study Areas
- Alternative 4 – Increased Development Intensity Alternative
- Alternative 5 – Increased Employment Alternative

The environmental effects of each of these alternatives are identified and compared with those resulting from the proposed Project. A table at the end of this section summarizes the comparisons and, per CEQA Guidelines Section 15126.6(e)(2), an "environmentally superior" alternative is identified. The selected alternatives are described below.

Alternative 1 – No Project Alternative

The No Project Alternative assumes implementation of the existing General Plan (2003) instead of the proposed General Plan Update. Under this alternative, the existing General Plan land uses would remain in place and development in the City would occur as anticipated in the 2003 General Plan, with an emphasis on carefully managed growth and buildout of the Southeast Policy Area (SEPA).

Alternative 2 – Additional Climate Action Plan Measures

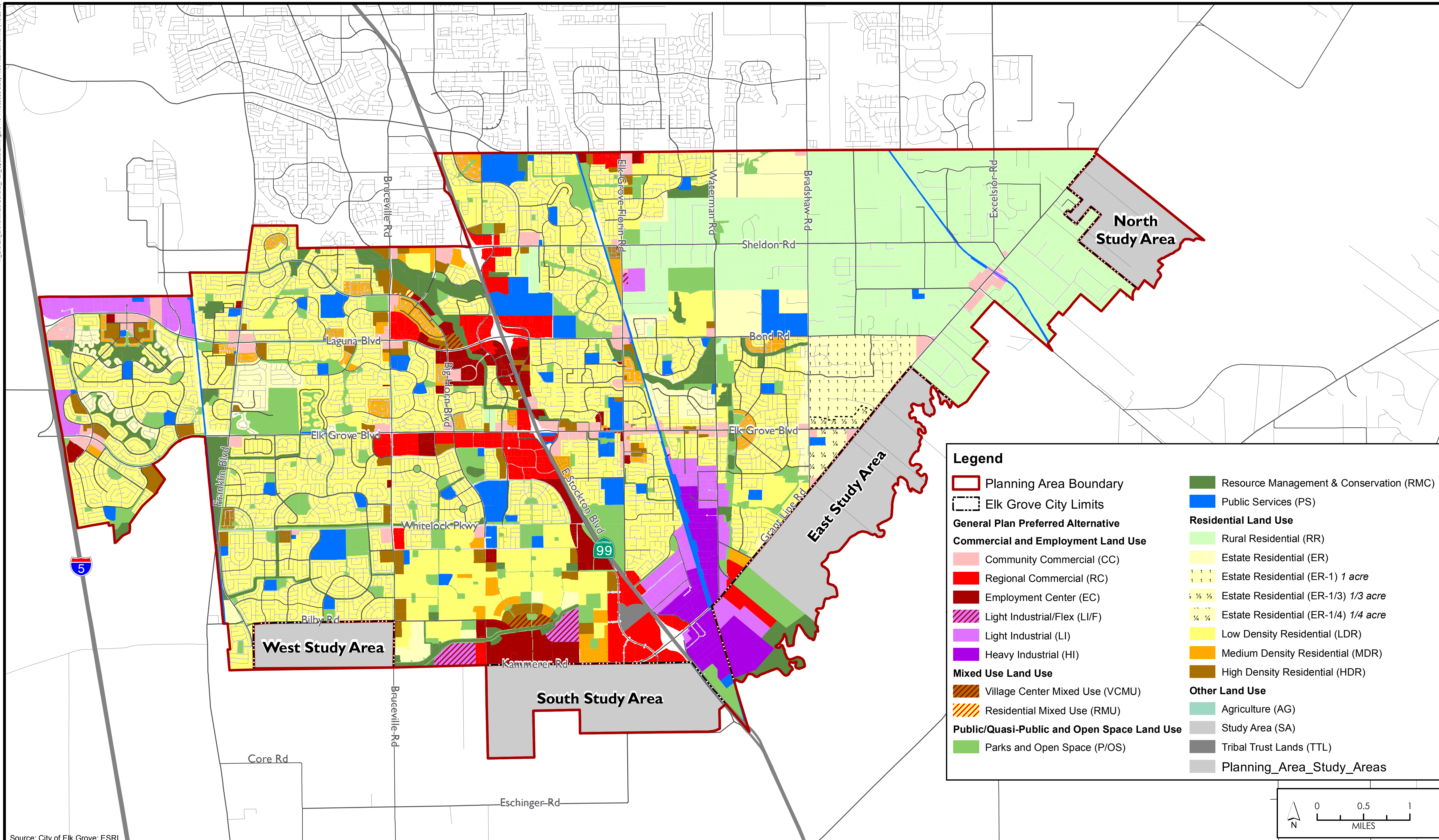
Under this alternative, the City would adopt additional measures in the Climate Action Plan (CAP) that would further exceed established GHG reduction targets for 2020 and 2030 and allow the City to meet the State's targets for 2050. The Draft EIR concludes that GHG emissions are a less than significant impact for 2020 and 2030, but a significant and unavoidable impact for 2050 due to uncertainty regarding the availability of measures to reach 2050 emissions reduction targets. Additional measures may include, but are not limited to, CALGreen Tier 1/NetZero by 2020, additional transportation sector measures, a direct offset program, and other emissions reduction options discussed as part of the Project but not included in the proposed CAP.

Alternative 3 – Reduced Study Areas

This alternative reduces the extent of the Study Areas to those areas within the existing Sacramento County Urban Services Boundary (USB) as well as the area included in the Kammerer/99 Sphere of Influence Amendment that was filed by a private developer for the area south of Kammerer Road and west of State Route (SR) 99 (**Figure 7.0-1**). This would result in a reduction in the size of the West and South Study Areas by 2,502 acres and 1,436 acres, respectively, for a total reduction in the Planning Area of 3,938 acres. The East and North Study Areas would remain the same with this alternative as with the proposed Project.

Alternative 4 – Increased Development Intensity Alternative

This alternative increases the allowable residential density and nonresidential development intensity for selected key sites around the City, as shown on **Figure 7.0-2**. In addition, the land use designations for several additional sites would be changed from Low Density Residential (LDR) to High Density Residential (HDR) or other land use designations for this alternative. HDR sites 1 through 6 on **Figure 7.0-2**, which total approximately 67 acres, would be changed to the HDR land use designation under the Increased Development Intensity Alternative. The land use designations for the remaining sites shown on **Figure 7.0-2** would be changed as shown in **Table 7.0-1**.



City of Elk Grove
Development Services

Figure 7.0-1

Reduced Study Area Alternative

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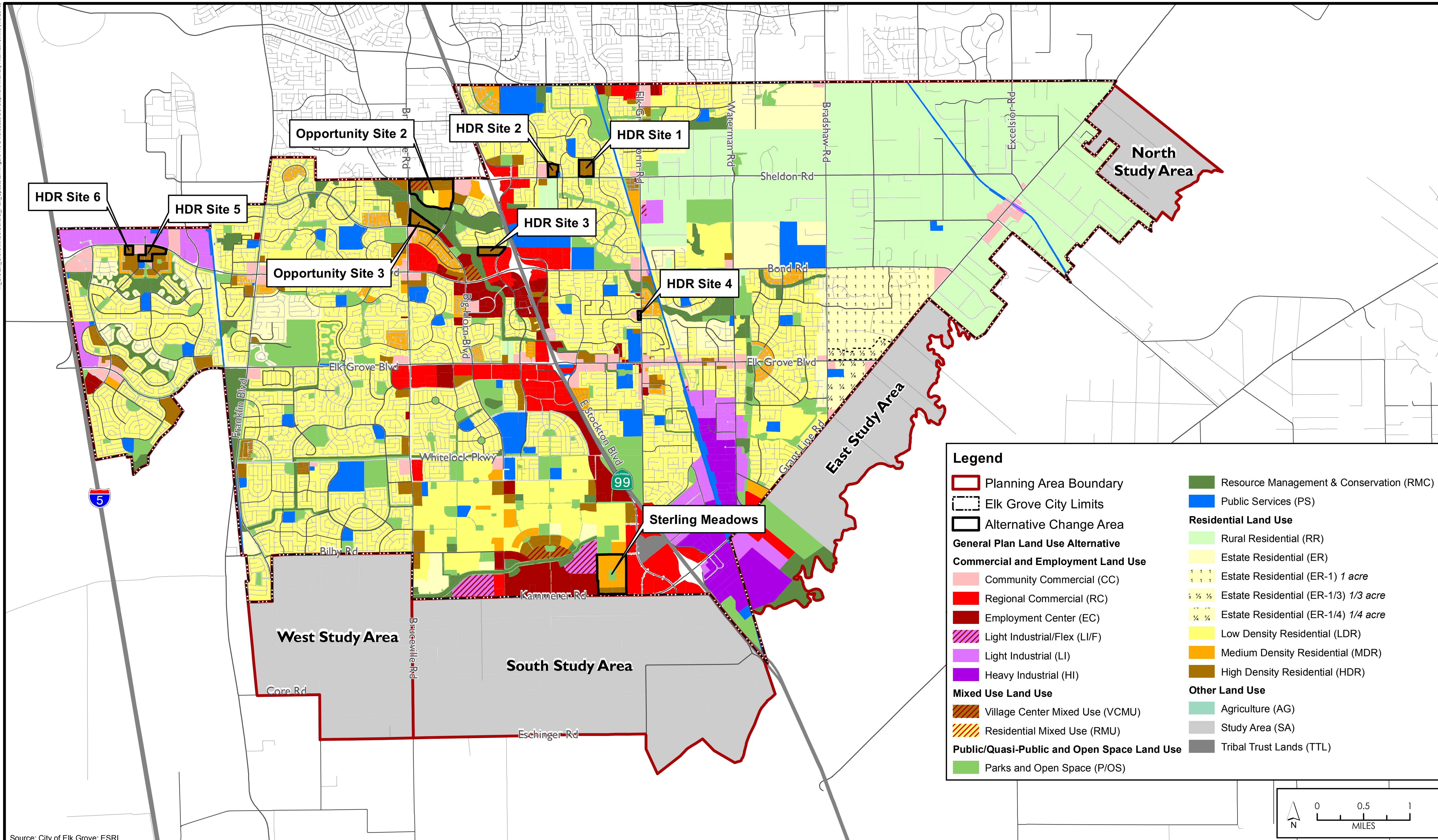

City of Elk Grove
Development Services

Figure 7.0-2

Increased Development Intensity Alternative

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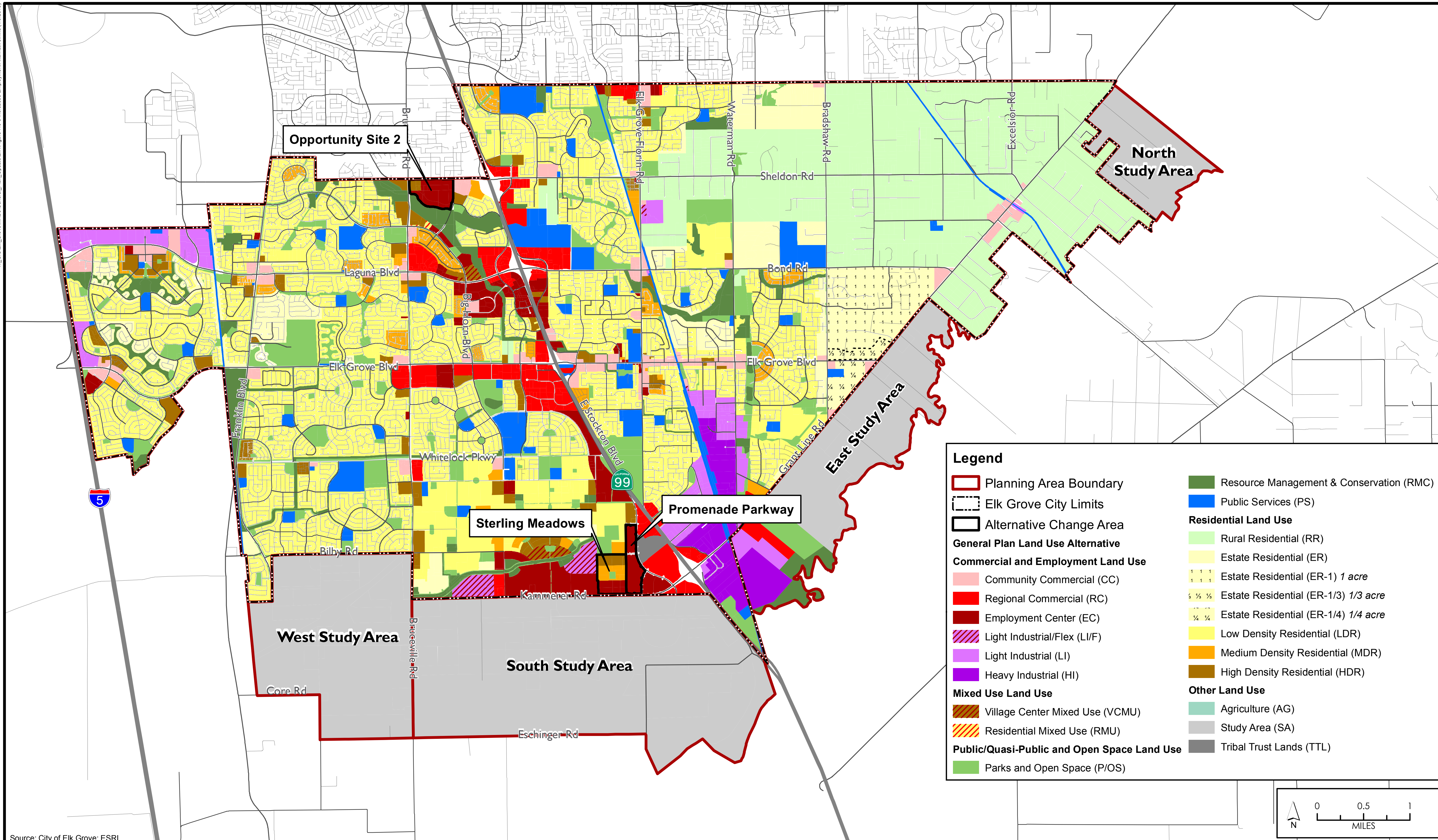

City of Elk Grove
Development Services

Figure 7.0-3
Increased Employment Alternative

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Based on these land use changes, this alternative could accommodate up to 515 more High Density Residential units, 89 Medium Density Residential units, and 597 Mixed Use Village Center units. Low-density units and mixed-use residential units would be reduced by 148 and 65 units, respectively. Overall, this alternative could result in up to 988 additional dwelling units compared to the proposed Project. This alternative would also generate approximately 300 more jobs due to the increase in Mixed Use Village Center acreage.

TABLE 7.0-1
LAND USE ACREAGE CHANGE FOR THE INCREASED DEVELOPMENT INTENSITY ALTERNATIVE

Land Use Designation	Proposed Project	Increased Development Intensity Alternative	Change
Opportunity Site 2			
Community Commercial	5.22	0	-5.2
High Density Residential	5.28	21.25	16.0
Low Density Residential	30.65	17.73	-12.9
Medium Density Residential	21.10	19.74	-1.4
Parks and Open Space	0.57	0	-0.6
Mixed Use Village Center	0.00	14.93	14.9
Resource Management and Conservation	17.85	7.02	-10.8
Opportunity Site 3			
Employment Center	3.21	0	-3.2
High Density Residential	12.75	19.72	7.0
Mixed Use Residential	3.75	0	-3.8
Sterling Meadows			
High Density Residential	12.17	0.00	-12.2
Low Density Residential	12.98	0	-13.0
Medium Density Residential	53.43	0.00	-53.4

Given recent trends and changes in market demand, availability of land for redevelopment, and development capacity in the traffic model prepared for the City, these areas would be logical locations for an increase in development intensity.

Alternative 5 – Increased Employment Alternative

This alternative would change the land use designations for certain areas of the City to allow for more office development, thereby generating a greater number of jobs in Elk Grove (see **Figure 7.0-3**).

In addition to less population growth, this scenario would result in a greater number of jobs in the City, which could allow Elk Grove residents to work locally and therefore have shorter commutes (or be able to walk, cycle, or use local transit for their commutes). This alternative would yield approximately 330 fewer housing units and as many as 5,700 more jobs as compared to the proposed Project.

ALTERNATIVES EVALUATION

This subsection evaluates the potential environmental impacts of the selected alternatives, including the No Project Alternative. The "build" alternatives (2 through 5) represent a range of feasible alternatives that would meet or partially meet the project objectives and would lessen one or more of the environmental impacts identified as potentially significant compared with the proposed Project.

Alternative 1 – No Project Alternative

Alternative 1 is the No Project Alternative. CEQA Guidelines Section 15126.6(e)(1) states that a No Project Alternative must be analyzed to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project, as well as to evaluate what would be reasonably expected to occur in the foreseeable future if the project were not built (CEQA Guidelines Section 15126.6[e][1] and [2]). Under the No Project Alternative, the General Plan Update would not be approved and no zoning changes or longer-term planning for development of the Study Areas would take place.

Characteristics

The No Project Alternative assumes implementation of the existing General Plan instead of the proposed General Plan Update. Under this alternative, the existing General Plan land uses would remain in place and development in the City would occur as anticipated in the 2003 General Plan, with emphasis on carefully managed growth and buildout of the SEPA and the Laguna Ridge area.

The No Project Alternative assumes that development would occur consistent with the existing General Plan land use designations. Because the proposed General Plan Update does not include substantial changes in land use designations within the existing City limits, the overall buildout under the current General Plan would be similar to the buildout of the proposed General Plan Update. It would not, however, address potential future development of the Study Areas and would not include an amended CAP.

The No Project Alternative would not preclude development of the Study Areas consistent with the existing Sacramento County General Plan and potential future amendments as development is proposed. For example, this could include development within the south of Grant Line area, for which Sacramento County has completed a visioning process.

Comparative Impacts

Natural Resources

Because development would continue to occur as currently planned and would not expand the City boundaries, the development impacts of the No Project Alternative on natural resources would be less than under the proposed Project. Development within the SEPA and other areas in the USB would continue to affect agricultural lands, topsoil, water quality, and habitat, including habitat for Swainson's hawk and other migratory birds. It could also have the potential to affect undiscovered cultural and paleontological resources. However, these impacts would be addressed by existing regulations, construction and operational best management practices (BMPs; e.g., erosion control), programmatic mitigation measures, and measures adopted for future projects covered by the existing General Plan.

Because the No Project Alternative would not convert agricultural areas in the Study Areas to urban uses, there would be no new direct impacts from the conversion of agricultural lands in these areas, including Important Farmland and parcels covered by Williamson Act contracts. Parcels under Williamson Act contracts in nonrenewal status would expire unless the property owner(s) file for renewal. Because agricultural land south of the City would not be converted, the No Project Alternative would have no new impacts on farmland.

Under the No Project Alternative, the City would continue to permit new construction in existing planned areas, including grading, excavation, and the addition of impervious surfaces, all of which would continue to affect downstream water quality. However, the impacts of these projects and activities would be addressed by existing regulations and City policies, including stormwater BMPs. The No Project Alternative would not include addition of impervious surfaces or new water demand in the Study Areas; therefore, any impacts on groundwater supplies would be less than with the proposed Project.

Because the No Project Alternative would not include development of the Study Areas, it would have less impact on natural resources (agricultural, biological, cultural, water quality, groundwater supplies, and soils) than the proposed Project.

Air Quality and Greenhouse Gas Emissions

Air emissions would continue to increase given the planned development in the existing City limits. Agricultural emissions would continue but could decrease as agricultural lands in Elk Grove are converted to urban use. However, this is consistent with existing conditions, and agricultural uses are permitted by right in the AG-20 and AG-80 zoning districts. Overall under this alternative, air pollutant emissions would be less than generated under the proposed Project because there would be less construction and no development of new emissions sources or traffic increases in the Study Areas, and no development of the internal roadways beyond those reflected in the existing General Plan.

Overall, GHG emissions would be less than under the proposed Project because there would be less development under this alternative. However, GHG emissions per person would be more than under the proposed Project, as the City would not adopt additional GHG emissions reduction measures, such as requirements for more energy- and water-efficient buildings and transportation sector measures, and the City would likely not achieve the GHG emissions reductions required by Assembly Bill (AB) 32 and Senate Bill (SB) 32.

Community Impacts

Under the No Project Alternative, the City would continue development within the existing City limits. Planned development in Elk Grove would result in community impacts, including additional lighting, noise from stationary sources and transportation, traffic, and demands on public services and utilities. These impacts would continue be addressed by existing policies, City code and zoning ordinances, and programmatic mitigation measures from the existing General Plan.

Any changes in the City's visual character and new sources of light or glare would be consistent with those analyzed in the existing General Plan EIR. Because there would be no new development in the Study Areas, there would be a reduced potential for exposure to residual soil contamination during construction compared to the proposed Project. The No Project Alternative would add less impervious surfaces (e.g., streets, buildings, parking lots), but the City would also continue to implement its Storm Drainage Master Plan to ensure adequate drainage and flood control.

The City would continue to improve its roadways, but with less population than would be generated by the proposed Project, the No Project Alternative would have lower noise levels along the transportation corridors. In addition, there would be no community impacts related to providing public services (e.g., fire stations), recreational facilities, or utilities (e.g., water, wastewater conveyance) in the Study Areas.

The No Project Alternative would include only planned development in the existing City limits and would include continued development and improvement of transportation facilities in those areas. Therefore, this alternative would not result in the need for additional transportation improvements to provide infrastructure for future development in the Study Areas, including homes, schools, and commercial and industrial uses, and would have less impact than the proposed Project. However, the No Project Alternative would provide fewer employment opportunities and therefore would not reduce VMT to the extent that the proposed Project would.

Overall, the community impacts (e.g., light and glare, seismic hazards, noise, traffic) of the No Project Alternative would be lower because this alternative would not include development of the Study Areas and would have lower impacts on visual character and quality, including views of agricultural areas and the Sierra Nevada foothills, and direct impacts of development (e.g., noise and traffic) compared with the proposed Project.

Conclusion

Overall, the No Project Alternative would reduce most of the impacts identified for the proposed Project, but it would not be consistent with SB 32 or the City's CAP, which require implementation of measures to reduce GHG emissions. This alternative would not achieve (or would only partially achieve) the Project objectives. Because the No Project Alternative would not promote further sustainability policies, the impacts associated with greenhouse gases and air quality would be greater than for the proposed Project.

The No Project Alternative may not be as consistent with the provisions of SB 375 and SB 743 and the VMT-reducing policies from the 2017 Scoping Plan. These plans and regulations are designed, in part, to reduce potential climate change impacts associated with GHG emissions and to meet goals for 2020, 2030, and 2050. Therefore, the No Project Alternative would result in greater impacts than the proposed General Plan Update with respect to consistency with a plan or regulation designed to reduce impacts to the environment.

Because the No Project Alternative would not include development beyond the existing City limits, it would not require mitigation measure MM 5.12.1.1, which requires the City to prepare and submit to LAFCo for approval a Plan of Services for areas proposed for annexation.

The No Project Alternative would either avoid or reduce the intensity of several impacts identified as significant and unavoidable impacts in the General Plan Update. These include impacts on aesthetics, agricultural land, air quality, biological resources, cultural and paleontological resources, groundwater supplies, traffic noise, construction of schools and utilities, and transportation plans and policies.

Alternative 2 – Additional Climate Action Plan Measures

Characteristics

Under this alternative, the City would adopt additional measures in the Climate Action Plan (CAP) that would further exceed established GHG reduction targets for 2020 and 2030 and allow the City to meet the State's targets for 2050. The Draft EIR concludes that GHG emissions are a less than significant impact for 2020 and 2030 but a significant and unavoidable impact for 2050 due to uncertainty regarding availability of measures to reach 2050 emissions reduction targets. Additional measures may include, but are not limited to, CALGreen Tier 1/NetZero by 2020, additional transportation sector measures, a direct offset program, and other emissions reduction options considered as part of the Project but not included in the proposed CAP.

Comparative Impacts

Greenhouse Gas Emissions

Under the Additional Climate Action Plan Measures Alternative, the changes to the CAP could include additional building and development requirements for conservation of electricity, natural gas, and water; additional transportation sector measures (e.g., transit-oriented development, pedestrian and bicycle measures, improved public transit, efficient and alternative vehicles); and purchasing and surrendering offset credits. These measures and emissions reductions would put the City closer to achieving the State's 2050 targets. However, the feasibility of achieving the target depends on implementation of the proposed CAP, achieving short-term targets, amending the CAP with additional measures, and monitoring emissions inventories over the next 30 years. Additional technologies and reduction measures could be developed in the coming decades that would increase the probability of reaching the 2050 emissions reduction targets; however, the efficacy of this alternative would be uncertain. Based on this uncertainty, like the proposed Project, GHG emissions under this alternative would also be significant and may be unavoidable.

Transportation

Under this alternative, the City would explore and implement additional transportation section measures that would reduce fuel use and VMT. These measures could include further efforts to adopt and promote transit-oriented development, pedestrian and bicycle measures, public transit, use of efficient and alternative vehicles, and other measures and technologies as they are developed and become available. These measures could involve physical impacts such as zoning changes and changes in development patterns, upgrading pedestrian and bicycle facilities, constructing upgraded and additional public transit facilities, installing additional public vehicle charging stations, and other measures. These projects would be subject to subsequent CEQA (and potentially National Environmental Policy Act [NEPA]) review and would reduce traffic impacts overall by reducing traffic and VMT.

Natural Resources and Community Impacts

Under the Additional Climate Action Plan Measures Alternative, buildout of the proposed General Plan Update would be the same as with the proposed Project. Thus, impacts on natural resources such as biological and cultural resources, soils, and water resources would be very similar to the proposed Project. In addition, the construction and operation of future development would have impacts similar to the proposed Project on the community from changes in visual character, loss of farmland, dust, potential exposure to hazards, increased potential for flooding, noise, and construction of public facilities.

Conclusion

Overall, this alternative would have the same impacts as the proposed Project but would be consistent with AB 32, SB 32, and the City's CAP, which require implementation of measures to reduce GHG emissions. This alternative would achieve all Project objectives and would increase the probability of achieving 2050 GHG reduction targets.

Regarding consistency with regional plans, Alternative 2 would be consistent with the Sacramento Area Council of Governments' (SACOG) current Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) and would be consistent with the 2017 AB 32 Scoping Plan. Therefore, this alternative would result in lower GHG emissions impacts than the proposed General Plan Update.

Alternative 2 would involve the same Planning Area as the proposed Project and would require the same mitigation measures, but it would reduce the intensity of the significant and unavoidable impact identified in the General Plan Update for GHG emissions approaching 2050. Other significant and unavoidable impacts, including on aesthetics, agricultural land, air quality, biological resources and conservation planning, cultural and paleontological resources, groundwater supplies, traffic noise, construction of schools and utilities, and transportation plans and policies, would be the same.

Alternative 3 – Reduced Study Areas

Characteristics

This alternative reduces the extent of the Study Areas to those areas within the existing Sacramento County Urban Services Boundary as well as the area included in the Kammerer/99 Sphere of Influence Amendment that was filed by a private developer for the area south of Kammerer Road and west of SR 99 and approved in February 2018. This would result in a reduction in the size of the West and South Study Areas. The East and North Study Areas would remain the same as with the proposed Project.

Reducing the study areas would not preclude the development of areas outside the USB consistent with the existing Sacramento County General Plan and potential future amendments as development is proposed. For example, this could include development within the south of Grant Line area, for which Sacramento County is undertaking a visioning process.

Comparative Impacts

Aesthetics

The Reduced Study Areas Alternative would have similar aesthetic impacts as the proposed Project for infill development. However, it would partially avoid impacts on visual character because it would avoid some impacts on agricultural landscapes to the south of the City that are characteristic of Elk Grove.

Agricultural Resources

This alternative would result in the loss of farmland in the Study Areas, but would reduce impacts on agricultural lands in the South and West Study Areas. Therefore, it would have reduced farmland impacts compared to those of the proposed Project.

Air Quality and Greenhouse Gas Emissions

The Reduced Study Areas Alternative would have reduced construction impacts on air quality when compared to the proposed Project because a smaller area would be affected by grading and excavation compared to the proposed Project. In addition, by reducing future development of residential and other land uses, this alternative would generate less traffic and less emissions. Overall, air quality impacts would be lower. The City and regulatory agencies would implement standard air quality mitigation measures required by the Sacramento Metropolitan Air Quality Management District (SMAQMD), and the City would adopt the same air quality policies as with the proposed Project.

Similarly, under this alternative, less greenhouse gases would be emitted during construction. The alternative would result in proportionately lower vehicle use. However, Alternative 3 would include the amended CAP and its GHG reduction measures. This alternative would likely achieve 2020 and 2030 targets, but like the proposed Project, it may not achieve 2050 emissions reduction targets.

Natural and Cultural Resources

The Reduced Study Areas Alternative would have reduced impacts on natural resources compared with the proposed Project. It would have reduced impacts on biological and cultural resources, topsoil, and water quality because it would affect less farmland to the south of the City that provides Swainson's hawk foraging habitat, may be prone to erosion resulting in downstream water quality issues, and may contain undiscovered cultural and paleontological resources. This alternative would be subject to the same City policies and regulatory measures as the proposed Project, but it would have less development impact on natural resources compared with the proposed Project.

Community Effects

The community effects of Alternative 3 would be lower than the proposed Project. This alternative would involve less development and fewer buildings and thus less construction in areas subject to geological risks, such as poor soil conditions and seismic hazards. It would add less impervious surface and thus would bring less flooding risk. It would involve less construction noise impacts on nearby sensitive receptors and lower long-term transportation noise impacts because there would be fewer transportation improvements and trips generated in the South and West Study Areas. Furthermore, this alternative would involve less construction for public services facilities and utilities. The Reduced Study Areas Alternative would have many of the same impacts as the proposed Project. These impacts would be addressed by complying with existing regulations (e.g., building codes) and the same City policies as the proposed Project.

Conclusion

Under Alternative 3, the Reduced Study Areas Alternative, impacts would be similar to the proposed Project. Because it would encompass a smaller area that would not include portions of the South and West Study Areas, Alternative 3 would reduce, but not avoid, some of the impacts of the proposed Project, including impacts that would be significant and unavoidable, such as aesthetic impacts due to the conversion of agricultural and natural resources landscapes.

This alternative would achieve most of the Project objectives and would be consistent with regional plans, including SACOG's current MTP/SCS, and would be consistent with the 2017 AB 32 Scoping Plan because it could reduce GHG emissions compared with the proposed Project.

The Reduced Study Areas Alternative would require the same mitigation measures that are required for the General Plan Update, which include mitigation of impacts on cultural resources and from hazardous materials discovered during construction. However, because it would not involve development beyond the existing USB, it would not require mitigation measure MM 5.12.1.1, which requires the City to prepare and submit to LAFCo for approval a Plan of Services for areas proposed for annexation.

Alternative 3 would reduce the intensity of several impacts identified as significant and unavoidable for the proposed Project. These include impacts on aesthetics, agricultural land, air quality, biological resources and conservation planning, cultural and paleontological resources, GHG emissions in 2050, groundwater supplies, traffic noise, construction of schools and utilities, and transportation plans and policies.

Alternative 4 – Increased Development Intensity Alternative

Characteristics

This alternative increases the allowable residential density and no-residential development intensity for selected key sites around the City. Land use designations for several sites would be changed from Low Density Residential (LDR) to High Density Residential (HDR). This alternative could accommodate up to 515 more High Density Residential units, 89 Medium Density Residential units, and 597 Mixed Use Village Center units. Low-density units and mixed-use residential units would be reduced by 148 and 65 units, respectively. Overall, this alternative could result in up to 988 additional dwelling units compared to the proposed Project. This alternative would also generate approximately 300 more jobs due to the increase in Mixed Use Village Center acreage.

Comparative Impacts

Aesthetics

The Increased Development Intensity Alternative would have similar aesthetic impacts as the proposed Project. However, some infill development sites would likely include higher-density residential buildings that could have multiple floors and more lighting for parking lots and common areas. Therefore, impacts on visual character and quality, and light and glare, would be similar to other residential development, but this alternative could have greater impacts on visual character due to larger buildings and require more lighting than the lower-density residential that is included in the proposed Project.

Air Quality and Greenhouse Gas Emissions

Alternative 4 would have similar construction impacts on air quality when compared to the proposed Project. However, by increasing the density of future development in some areas, this alternative could generate additional vehicle trips and traffic and thus additional emissions. The City would implement standard air quality mitigation measures required by the SMAQMD, and the City would adopt the same air quality policies. The increased density of development under this alternative could allow for alternative modes of travel in these areas (e.g., walking, cycling, or transit), which could result in fewer auto trips per unit. However, because this alternative would add more buildings and vehicles than the proposed Project, it is conservatively assumed that air quality impacts would be greater under Alternative 4 than with the proposed Project.

Under the Increased Development Intensity Alternative, more GHGs would be emitted during construction because building density would be higher. As noted above, increased density of development under this alternative could allow for alternative modes of travel in these areas, which could result in fewer GHG emissions per unit. However, because Alternative 4 would include more units, it is assumed that this development could result in greater vehicle use and more overall GHG emissions. GHG emissions would also be reduced by the proposed CAP Update and construction of higher-efficiency buildings. This alternative would likely achieve 2020 and 2030 targets, but like the proposed Project, it may not achieve 2050 emissions reduction targets.

Natural and Cultural Resources

This alternative would have similar impacts on natural resources as the proposed Project. Alternative 4 would include ongoing infill and development of the SEPA and the Study Areas, including farmland, areas that provide Swainson's hawk foraging habitat, areas that could contain undiscovered cultural and paleontological resources, and areas prone to erosion, the development of which could result in erosion and downgradient water quality effects. This alternative would have the same footprint as the proposed Project. The resulting impacts would be addressed by the same City policies and regulatory requirements as the proposed Project.

Community Effects

The community effects of the Increased Development Intensity Alternative would be similar to those of the proposed Project. This alternative would have the same footprint as the proposed Project. It could involve more impacts related to construction noise on nearby sensitive receptors than construction of single-family residences and higher long-term transportation noise impacts because higher-density developments could require more local transportation improvements to handle higher peak traffic volumes. Furthermore, this alternative could involve more construction of public services facilities and utilities (i.e., larger and higher-capacity water, wastewater, and stormwater facilities). The Increased Development Intensity Alternative would have many of the same impacts as the proposed Project. These impacts would be addressed by complying with existing regulations (e.g., building codes) and the same City policies as the proposed Project.

Conclusion

Impacts under the Increased Development Intensity Alternative would be similar to the proposed Project. The alternative would occur on the same footprint as the proposed Project; thus, impacts on natural resources would be the same. However, due to increased density in some areas, this alternative could result in more intense localized impacts on aesthetics and other community impacts, such as noise and traffic.

Alternative 4 would achieve most of the Project objectives and could be consistent with regional plans, including SACOG's current MTP/SCS, through infill development. However, this alternative could increase GHG emissions and may not be consistent with the updated CAP and the 2017 AB 32 Scoping Plan compared with the proposed Project. The addition of high-density residential development under this alternative would help the City meet its future housing allocation. However, this alternative could add housing that could be considered out of proportion with the number of jobs created over the same period, resulting in a lower jobs-housing balance, additional traffic, and higher VMT. This alternative facilitates development on vacant or underutilized lots in the City while also providing opportunities for purposeful expansion.

The Increased Development Intensity Alternative would require the same mitigation measures that are required for the General Plan Update, which include mitigation of impacts on cultural resources and from hazardous materials discovered during construction.

Alternative 5 – Increased Employment Alternative

Characteristics

The Increased Employment Alternative would increase the amount of office development compared to the proposed Project, resulting a greater number of jobs in the City. Specifically, south of Bilby Road in Sterling Meadows, the High Density Residential area would be increased by approximately 11.5 acres, and approximately 28 acres of the area designated as residential land use along Kammerer Road would be changed to Employment Center. The remaining 29 acres would be Medium Density Residential. The Commercial sites to the west of Promenade Parkway, as well as the majority of Opportunity Site 2 (except the portions designated as High Density Residential and Commercial), would also be changed to Employment Center. This alternative would yield approximately 330 fewer housing units and as many as 5,700 more jobs than the proposed Project.

Comparative Impacts

Aesthetics

The Increased Employment Alternative would have the same footprint as the proposed Project, but selected areas would be changed from residential to nonresidential uses. The aesthetics impacts of this alternative would be similar to the proposed Project in that undeveloped areas would be developed, though the type of development would differ. Existing agricultural areas in Sterling Meadows would be converted from farmland to urban development. This area would have a larger proportion of office development and would include changes in the Sterling Meadows area. The change from residential to office uses in this area would not affect views of agricultural landscapes to the south. Because the employment-generating uses under this alternative would include more lighting for parking areas, the impacts from light and glare would be greater than those of the proposed Project.

Air Quality and Greenhouse Gas Emissions

Alternative 5 would have similar construction impacts as the proposed Project. The project footprint and construction equipment and duration would be approximately the same for residential and office development. The air quality effects would not substantially differ between this alternative and the proposed Project.

The Increased Employment Alternative would generate fewer vehicle trips and lower VMT because there would be fewer residents and more existing residents would be able to find employment locally in this alternative's Employment Center. This reduction may be offset somewhat by additional miles driven by people commuting from outside of the City to Elk Grove for their employment. Overall, the Increased Employment Alternative would increase Elk Grove's jobs-housing balance and could reduce the number of miles driven, potentially reducing vehicular air emissions, by Elk Grove residents who would otherwise have to travel to employment centers in Sacramento and Rancho Cordova.

Under this alternative, similar quantities of GHGs would be emitted during construction and after development compared with the proposed Project. This alternative would include the amended CAP and its additional GHG reduction measures. Thus, Alternative 5 would likely achieve 2020 and 2030 emissions reduction targets but may not achieve 2050 targets.

Natural Resources and Community Impacts

The Increased Employment Alternative would have the same footprint as the proposed Project and would therefore have similar construction impacts on farmland, biological and cultural resources, topsoil erosion, potential exposure to contaminated soils, and downstream water quality effects. In addition, occupation and operation of future development would have impacts similar to the proposed Project on the community from dust, seismic effects, potential exposure to hazardous chemicals, introduction of impervious surfaces and decreased groundwater supplies, increased potential for flooding, and increased noise. Residential land uses produce greater demand for public services; therefore, the Increased Employment Alternative may require fewer community services, such as police protection, schools, and parks.

This alternative may also require less water and wastewater service. Residential uses require approximately 3.7 acre-feet (AF) of water per acre per year for medium density and 4.12 AF per acre per year for high density. In comparison, office uses typically require 2.75 AF per acre per year. Therefore, Alternative 6 would likely have less water demand than the proposed Project. Similarly, this alternative would likely generate less wastewater treatment demand because residential density would be lower overall.

In contrast, because employee-generating land uses tend to have higher solid waste disposal rates than residential land uses, this alternative would generate a higher demand for solid waste disposal capacity. However, given the available disposal capacity, Alternative 6 would not warrant new or expanded solid waste facilities.

Transportation

The Increased Employment Alternative would have the same footprint and similar construction traffic impacts as the proposed Project. However, this alternative would have less of a negative effect on traffic. It would generate fewer vehicle trips and lower VMT because there would be fewer new residents, and more existing residents could find employment locally in this alternative's Employment Center. This reduction could be partially offset by additional miles driven by people commuting to Elk Grove for their employment. Overall, the Increased Employment Alternative would have similar impacts compared with the proposed Project but could reduce the number of miles driven by Elk Grove residents to reach employment centers outside of the City.

Conclusion

Under Alternative 5, the Increased Employment Alternative, footprint-related impacts would be similar to the proposed Project. This alternative would have the same footprint as the proposed Project and would have very similar impacts on agricultural lands and habitats to the south. However, increased employment would allow for reductions in VMT compared to the proposed Project, which would result in the generation of fewer criteria air pollutant emissions and greenhouse gases.

This alternative would achieve most of the Project objectives and would be consistent with regional plans, including SACOG's current MTP/SCS, through employment development that would be consistent with the 2017 AB 32 Scoping Plan.

The Increased Employment Alternative would require the same mitigation measures as required for the General Plan Update, which include mitigation of impacts on cultural resources and from hazardous materials discovered during construction as well as the potential impacts of extending the USB.

COMPARISON OF ALTERNATIVES

Table 7.0-2 provides a summary by issue area of the potential impacts of the six alternatives compared with those of the proposed Project. As discussed above, the proposed Project would result in potentially significant and significant and unavoidable impacts, and for most resource areas, mitigation measures to mitigate project impacts to a less than significant level are not available or are infeasible. Alternative 1, the No Project Alternative, would have no new environmental impacts because the General Plan Update would not be adopted, zoning would be unchanged, and the City would not conduct long-range planning for the Study Areas.

TABLE 7.0-2
SUMMARY COMPARISON OF ALTERNATIVES

Resource Category	Proposed Project	Alternative 1 No Project	Alternative 2 Additional Climate Measures	Alternative 3 Reduced Study Areas	Alternative 4 Increased Development Intensity	Alternative 5 Increased Employment
Aesthetics	SU	NI	SU	SU (-)	SU (+)	SU (+)
Agriculture	SU	NI	SU	SU (-)	SU	SU
Air Quality	SU	NI	SU (-)	SU (-)	SU (+)	SU (-)
Biological Resources	SU	NI	SU	SU (-)	SU	SU
Cultural Resources	SU	NI	SU	SU (-)	SU	SU
Geology	LS	NI	LS	LS (-)	LS	LS
Greenhouse Gas Emissions	SU	NI	SU (-)	SU (-)	SU (+)	SU (-)
Hazards and Hazardous Materials	LS	NI	LS	LS (-)	LS	LS
Hydrology and Water Quality	SU	NI	SU	SU (-)	SU	SU
Noise	SU	NI	SU	SU (-)	SU (+)	SU (-)
Public Services	SU	NI	SU	SU (-)	SU (+)	SU
Transportation and Traffic	SU	NI	SU (-)	SU (-)	SU (+)	SU (-)
Utilities	SU	NI	SU	SU (-)	SU (+)	SU (-)

Notes:
LS: Less than Significant
NI: No Impact
SU: Significant and Unavoidable
(+) Level of impact is more severe than the proposed project
(-) Level of impact is less severe than the proposed project

The four "build" alternatives either include additional GHG emissions reduction measures, reduce the development footprint, or vary the City's zoning to allow increased development density or increased employment. All the build alternatives would achieve most of the Project objectives and would be generally consistent with SACOG's MTP/SCS. Due to the scale of the Project, none of the alternatives would reduce potentially significant or significant and unavoidable impacts identified for the General Plan to less than significant, with or without mitigation.

Alternative 2, the Additional Climate Action Plan Measures Alternative, would have the same footprint and similar impacts to those of the proposed Project. However, it would have reduced air and GHG emissions over the coming decades and would increase the probability of achieving 2050 GHG emissions reduction targets.

Alternative 3, the Reduced Study Areas Alternative, would reduce the General Plan's footprint and would reduce the areal extent of the proposed Project's Study Areas and reduce overall development in the Planning Area. The overall impacts of this alternative would be less than the proposed Project, reduced in intensity and extent by reducing the amount of farmland that would be affected by development.

Alternative 4, the Increased Development Intensity Alternative, would have the same footprint as the proposed Project and similar impacts. However, it would result in more intense local community impacts; thus, impacts on natural resources would be very similar. However, Alternative 4 could result in more intense localized impacts on aesthetics and other community impacts, such as noise and traffic.

Alternative 5, the Increased Employment Alternative, would have the same footprint as the proposed Project. Its impact on agricultural lands and habitats to the south would be the same as the proposed Project. However, increased employment would allow for reductions in VMT compared to the proposed Project, which would result in the generation of fewer criteria air pollutant emissions and greenhouse gases.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Pursuant to CEQA Guidelines Section 15126.6(e)(2), an environmentally superior alternative must be identified from among the other alternatives if the "no project" alternative would otherwise be the environmentally superior alternative. The environmentally superior alternative is the alternative that would result in the fewest or least significant environmental impacts. The No Project Alternative could be viewed as the environmentally superior alternative because it would avoid all of the potentially significant impacts of the proposed project in the short term. However, the No Project Alternative would not update the City's Climate Action Plan and would not have the beneficial effect of reducing GHG emissions consistent with the 2017 AB 32 Scoping Plan. Alternative 2, the Additional Climate Action Plan Measures Alternative, would have most impacts identical to the proposed Project, but it would reduce impacts on air quality and climate change by adopting the updated CAP.

The Reduced Study Areas Alternative would reduce the General Plan footprint by 3,938 acres without increasing development density. This alternative would reduce the footprint-related impacts on farmland, habitat, cultural resources, topsoil, and water quality. Due to the reduction in development compared to the proposed Project in these Study Areas, it would also reduce operational impacts, such as traffic, GHG emissions in 2050, groundwater supplies, traffic noise and air emissions, and construction of schools and utilities. Thus, Alternative 3 would reduce the areal extent and scope of all the environmental impacts of the updated General Plan. Therefore, while the proposed Project's significant impacts would be avoided in the short term under the No Project Alternative, Alternative 3, the Reduced Study Areas Alternative, is the environmentally superior alternative because it would reduce the footprint-related impacts compared to the proposed Project, as well as operational impacts associated with the reduction in development compared to the proposed Project.

The other build alternatives, including Alternative 2 and Alternatives 4 through 5, are not substantially different from the proposed Project or each other. Because of the fundamental nature of the General Plan, each of the alternatives involves continued development and population increases, and none of the alternatives would avoid potentially significant impacts or avoid impacts characterized as unavoidable.

REFERENCES

City of Elk Grove. 2003. *City of Elk Grove General Plan*.

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8.0 Report Preparation

CITY OF ELK GROVE

Christopher Jordan..Director, Strategic Planning and Innovation

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Alice Tackett..Environmental Planner

Martin Rolph ....Environmental Planner

Jonathan Faoro ....Geographic Information Systems

Ana Cotham ....Technical Review

Amanda Kraft... Publication

Air Quality, GHG, and Noise Analyses

Ascent Environmental

Honey Walters

Erik de Kok

Hannah Kornfeld

Biological Resources Analysis

Hunting Environmental

Joyce Hunting

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APPENDIX A:
NOTICE OF PREPARATION (NOP)

8401 Laguna Palms Way • Elk Grove, California 95758

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NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT

DATE:	**June 23, 2017**
TO:	**Responsible Agencies, Organizations, and Interested Parties**
LEAD AGENCY:	**City of Elk Grove** **Contact: Christopher Jordan, AICP** **8401 Laguna Palms Way** **Elk Grove, CA 95758**
SUBJECT:	**Environmental Impact Report for the City of Elk Grove General Plan Update**

In discharging its duties under Section 15021 of the California Environmental Quality Act (CEQA) Guidelines, the City of Elk Grove (as lead agency, hereinafter City) publicly announces the preparation of a Program Environmental Impact Report (EIR), consistent with State CEQA Guidelines Section 15168 (Division 6 of Chapter 3 of Title 14 of the California Code of Regulations, hereinafter the CEQA Guidelines), for the **City of Elk Grove General Plan Update Project** (the Project, described later in this document). In accordance with Section 15082 of the CEQA Guidelines, the City of Elk Grove has prepared this Notice of Preparation (NOP) to provide the Governor's Office of Planning and Research, responsible and trustee agencies, and other interested parties with sufficient information describing the Project and its potential environmental effects.

The City made the determination to prepare an EIR following preliminary review of the Project. Pursuant to CEQA Guidelines Section 15063(a), because an EIR is needed an initial study has not been prepared. Probable environmental effects of the Project are described in the attached Project Summary.

As specified by the CEQA Guidelines, the NOP will be circulated for a 30-day review period. **The comment period runs from Friday, June 23, 2017, to Monday, July 24, 2017.** The City of Elk Grove welcomes public input during the review period. In the event the City has not received either a response or a well-justified request for additional time by a responsible agency by the end of the review period, the City may presume that the responsible agency has no response (CEQA Guidelines Section 15082[b][2]).

Comments may be submitted in writing during the review period and may be addressed to:

City of Elk Grove
City Manager's Office
Strategic Initiatives and Long Range Planning
c/o Christopher Jordan, AICP
8401 Laguna Palms Way
Elk Grove, CA 95758
cjordan@elkgrovecity.org

A scoping meeting for the Project will be held from 6:00 p.m. to 7:30 p.m. on **Tuesday, July 11, 2017**, at the City of Elk Grove City Council Chambers, located at 8400 Laguna Palms Way in Elk Grove.

A copy of the NOP describing the Project location and potential environmental effects is available at the following locations:

- City of Elk Grove Development Services Department, 8401 Laguna Palms Way, Elk Grove, CA 95758
- Elk Grove Library, 8900 Elk Grove Boulevard, Elk Grove, CA 95624
- Franklin Library, 10055 Franklin High Road, Elk Grove, CA 95757
- The City's website: http://www.elkgrovecity.org/city_hall/departments_divisions/planning/a_brighter_future/

A. PROJECT LOCATION AND SETTING

The Project site consists of the Planning Area for the General Plan update, which contains all land within the Elk Grove City boundaries, as well as lands outside the City to the south and east that bear relation to City's planning activities as provided in California Government Code Section 65300. The Planning Area encompasses approximately 48.8 square miles (31,238 acres) located in south-central Sacramento County (see **Figure 1**). Elk Grove's City limits and the Planning Area boundary are shown in **Figure 2** and are generally described as follows:

- The City is generally bounded by Interstate 5 (I-5) on the west, Calvine Road and the City of Sacramento on the north, Grant Line Road on the east, and Kammerer Road on the south. State Route (SR) 99 runs north/south, bisecting the City near its center.
- The Planning Area boundaries generally coincide with the City limits on the north and west, but to the south the Planning Area extends to Eschinger Road and to Deer Creek to the east, as shown in **Figure 2**.

In the Planning Area, existing land uses include a mix of agriculture (10 percent), residential (55 percent), nonresidential (commercial, office, and industrial) (7 percent), park and open space areas (9 percent), civic/institutional (5 percent), public and quasi-public spaces, roadways, and other infrastructure (2 percent), and vacant land (12 percent). Existing land uses in the Planning Area are illustrated in **Figure 2**.

Aside from portions of the City of Sacramento to the northwest, all land surrounding the Project site is located in unincorporated Sacramento County and consists of mostly rural residential and agricultural uses.

B. PROJECT DESCRIPTION

The City of Elk Grove is conducting a comprehensive update of its General Plan. State law (Government Code Section 65300) requires each city and county to adopt a comprehensive, long-term general plan for its physical development. The City's current General Plan was adopted in 2003, with various amendments changes made since then, and serves to direct the City's future growth and development as well as its conservation policy. The General Plan is now being updated to ensure that the guiding policy document remains a useful tool, keeps pace with change, and provides workable solutions to current and future issues.

The General Plan Update Project includes the following related components:

1.0 GENERAL PLAN UPDATE

The General Plan and implementing programs serve as the blueprint for future growth and development. These documents contain policies and programs designed to provide decision-makers with a solid basis for future decisions related to land use and development.

General Plan update documents and presentations developed to date are available at the following website:
http://www.elkgrovecity.org/city_hall/departments_divisions/planning/a_brighter_future/

1.1 Vision Statement and Supporting Principles

The following community Vision Statement supports the General Plan Update Project:

> *The City of Elk Grove is a great place to make a home, a great place to work, and a great place to play. Our community is diverse, healthy, safe, and family-oriented, with thriving schools and plentiful parks, shops, and places to work. Agriculture, rural homes, and urban life flourish together. Our natural resources, including water and open spaces, are protected and offer a variety of recreational opportunities. Community members travel easily by automobile, by bicycle, on foot, or using transit. The City is proactive in making daily life healthy and sustainable—considering the needs of future generations while protecting what is valued today.*
>
> *Well-maintained infrastructure and the right mix of services and amenities draw new and dynamic businesses and development to Elk Grove. Development is guided to ensure responsible growth and opportunities for a diversity of individuals that call Elk Grove home.*

Elk Grove's Vision is supported by a series of Supporting Principles, described below, that provide an overarching rationale for more specific General Plan goals and policies.

<u>Regional Goals and Influence: Our Regional Neighbors Know Us and Our Contributions</u>

Elk Grove occupies a prominent place in the regional dialogue. The City's identity and brand are clear in the minds of its neighbors. Our contributions to the region continue to strengthen that identity and include recreational opportunities, higher education, job centers, and quality neighborhoods. City officials engage with other cities, Sacramento County, and other partners to plan and build for an ever more dynamic region. The City's employment potential within the regional economy is fulfilled. New businesses have emerged, providing new employment centers that support technology and build from our agricultural roots. Both housing and jobs are available in the community, providing flexible opportunities for many lifestyles.

<u>Infill Development and Outward Expansion: Development Fills in the Gaps and Expansion Occurs with Purpose</u>

Unfinished, undeveloped gaps once found throughout the City become opportunities to develop economically successful additions that provide added value to our community as well as new job opportunities and lifestyle improvements. Existing small businesses are protected even as we invite in new businesses and different economic opportunities. New development plans are grounded by community needs and market demand, and are carried out efficiently and holistically. New housing built in a variety of shapes and sizes to meet the needs and desires of our diverse community also fills in these gaps.

Infill development is consistently executed with programs that address impacts and encourage innovative building solutions. A creative growth management strategy allows expansion to occur when economic need, community vision, and regional goals align. There is a strong system in place to guarantee that, as the community accommodates new neighbors and new jobs, it continues to maintain and improve facilities and services, such as schools, roads, and parks.

Economic Vitality: Our Economy Thrives and New Business Adds Value

Major employment centers make their home in Elk Grove, providing employment opportunities and stimulating ancillary businesses as well. We continue to invite businesses that are competitive in the region and set the stage to attract these businesses by providing resources and amenities they need. Old and new businesses together improve our lives by providing new jobs as well as convenient places to get amenities and entertainment. Elk Grove has a diverse economy that builds from our heritage, but also invites in new and changing industries. Higher education and technical training are available to our community members as they pursue diverse job opportunities in these new industries. The City is leading the way in innovative technology infrastructure, technical education opportunities, sports activities and entertainment, and a safe and crime-free environment. These features attract business and provide a better quality of life for individuals and families of all incomes, ages, abilities, and backgrounds.

Growth and development in the City is built with mindfulness of our historic resources and identity. These businesses bolster the community by providing jobs, services, goods, and recreational opportunities for residents.

Neighborhood, District, and Community Identity: City Core, Heritage, and Well-Known Neighborhoods

The City includes a civic core that offers central gathering spaces that all community members enjoy and feel welcome in. The City and community organizations partner to foster the civic core to be both thriving and safe. Successful projects and annual events enhance vitality and camaraderie in this space.

Old Town Elk Grove continues to protect and showcase our heritage for the enjoyment of residents and visitors alike. All of our neighborhoods are built around our top-notch parks and schools. Preservation and change in our neighborhoods are guided by values of diversity, neighborly spirit, and small-town character.

Rural Areas: Protecting Our Farming Heritage and Rural Life

We celebrate the rural area and its heritage, and balance that heritage with other needs, services, and lifestyles desired in Elk Grove. The rural area is valued in our community for its aesthetic and cultural value, as well as the economic and educational opportunities agriculture provides. Our commitment to maintaining the rural area is clear and codified in core planning documents through programs that preserve the aesthetics and style of our rural heritage. Agricultural producers and other land uses remain good neighbors, each with desired services and infrastructure needs fully met.

Open Space and Resource Management: Outdoor Recreation Is Right Outside Our Door

Our parks and trails are high quality and highly valued. We continue to enhance and maintain our recreational open spaces so that they are safe, connected, and accessible to all. Our trails connect easily to other trails and parks in the region, and community gardens are a source of local food and local involvement.

Mobility and Active Transportation: Moving Around Anywhere, Any Way

Our residents, workers, and visitors need to move about efficiently, and have a variety of ways to do so. Connected transportation networks, regional coordination, and public and active transportation options are priorities for our community. Connected and mobile community members have the ability to travel within the City and to other places in the region by a variety of methods, with seamless transitions between modes and regions. Our community has roadways in place that allow for efficient movement and safe travel spaces for all modes of getting around. The infrastructure and facilities for pedestrians, bicyclists, and transit users are clean, safe, and well maintained, and walkways and bike lanes are continuous and complete with convenient connections to local and regional transit.

Sustainable and Healthy Communities: Clean, Green Practices and Healthy Living

Sustainable practices are at the forefront of environmental concerns in Elk Grove. Organizations, businesses, and residents desire a city that is adaptive to and resilient against climate change, is a leader in conservation, and embraces innovations in green technologies. The City layout and land uses promote healthy living, with healthy grocery options and destinations nearby that people can get to by walking and biking.

The City's residents and businesses recognize the importance of responsible resource use, and they work together to conserve and use water and energy to their full potential.

Coordinated Services, Technology, and Infrastructure: Services for the Needs of All Residents

Safety and services are important to all members of our community, and services for youth, seniors, and disadvantaged families are provided. Entertainment and social centers create a thriving and diverse economy and give residents a place to shop, play, and relax.

The City ensures that important services in our community, including social, housing, transportation, health, and education, are available and efficiently obtainable for community members that choose or need them to thrive.

1.2 General Plan Structure

The General Plan must include subject matter identified in State law for the following State-required elements or topics: Land Use, Circulation, Housing, Conservation, Open Space, Noise, and Safety. The updated Elk Grove General Plan will be divided into 10 chapters, which together address the topics mandated by the State, as well as additional topics of interest to the City. Each chapter is briefly described below.

1. **Introduction**: Addresses the purpose and scope of the General Plan; background on Elk Grove's history, current demographics, and economic conditions; planning context (other local and regional plans); the relationship of the General Plan to other plans and documents, including the City's Municipal Code; and the geographic area and topics covered in the General Plan.

2. **Vision**: Includes the Community Vision Statement and nine Supporting Principles that guide the General Plan, as developed during the public engagement process for the General Plan update.

3. **Planning Framework:** Presents the three main components of the General Plan—the Land Use Plan, the Transportation Plan, and the Resource Conservation Plan—and lays out the key concepts and components underlying each. Includes three long-range planning policy diagrams: the Land Use Diagram, the Transportation Network Diagram, and the Resource Conservation Diagram. Describes the relationship between these three components, as well as their relationship to other planning documents such as the City's Housing Element.

4. **Urban and Rural Development:** Identifies the City's goals and policies related to development and expansion of urban areas, including both infill development and annexation of new land into the City. Summarizes key goals and policies from the City's Housing Element and how these relate to urban development and expansion policies. Discusses goals and policies related to agriculture and ongoing preservation of rural areas.

5. **Economy and the Region:** Presents the City's goals and policies related to economic vitality and economic development. Discusses regional coordination with public and private entities related to economic goals.

6. **Mobility:** Presents the City's goals and policies related to multimodal and active transportation, including complete streets design, public transit, maintenance and expansion of the roadway system, and the rail transportation network. Addresses related transportation topics, including safety and metrics for measuring traffic volumes and vehicle miles traveled.

7. **Community and Resource Protection:** Defines the City's goals and policies related to preserving the character and identity of neighborhoods and districts, protecting historic and cultural resources, promoting arts and culture, providing public open spaces and recreational facilities, and conserving the environment and natural resources. Summarizes community governance and decision-making goals and processes.

8. **Services, Health, and Safety:** Addresses the City's goals and policies related to health and safety, including disaster and emergency preparedness, public safety services (police and fire), and noise. Discusses specific risks such as hazardous materials and waste, flooding and drainage, and geologic and seismic hazards, and outlines policies to address these risks. Discusses environmental equity and community health. Presents the City's goals and policies related to community services, including libraries, schools, and youth and senior services.

9. **Community and Area Plans:** Describes four Community and Area Plans that are existing or will be developed as part of this plan or in the future to further refine the goals and objectives of the General Plan in key, specific geographical areas of the city:

   - Southeast Policy Area Community Plan (adopted)
   - Sheldon/Rural Area Community Plan (to be prepared as part of the Project)
   - East Elk Grove Community Plan (to be prepared as part of the Project; this community plan will include various policies currently contained in the East Elk Grove Specific Plan, which is proposed to be rescinded, as noted in Section 3.0, Specific Plans.)
   - Central Elk Grove Community Plan (to be prepared in the future as a separate project)

10. **Implementation:** Sets forth specific actions and tools for implementation of the General Plan, along with a detailed work program. Describes the process for maintaining and monitoring progress in implementing the General Plan.

11. **Glossary and Acronyms:** Provides a list of acronyms and definitions for key terms used in the General Plan.

12. **Appendices**: A series of technical appendices addressing land use, mobility, housing, and safety.

The mandated elements of the General Plan will be addressed in the chapters as identified in **Table 1**.

TABLE 1
COMPARISON OF PROPOSED GENERAL PLAN CHAPTERS AND STATE MANDATED GENERAL PLAN ELEMENTS

Proposed General Plan Chapters	Mandated Government Code Elements						
	Land Use	Circulation	Housing	Conservation	Open Space	Noise	Safety
1. Introduction							
2. Vision							
3. Planning Framework	O	O	O		O		
4. Urban and Rural Development	X		X				
5. Economy and the Region							
6. Mobility		X					O
7. Community and Resource Protection				X	X		
8. Services, Health, and Safety		O				X	X
9. Community and Area Plans	O	O	O	O	O	O	O
10. Implementation	O	O	O	O	O	O	O
11. Glossary and Acronyms							
12. Appendices							
A. Land Use Technical Data	O						
B. VMT and Traffic Technical Data		O					
C. Housing Element Statutory Requirements			O				
D. Safety Element Statutory Requirements							O

X = Chapter that primarily addresses element requirements

O = Chapter has policies or discussion that supports the element requirements or addresses components not addressed in the primary chapter

1.3 Land Use Diagram

The Preferred Alternative Land Use Map (**Figure 3**) establishes the general pattern of uses in the Planning Area. The maximum permitted land use densities and intensities will be identified in the General Plan for these land uses. As the density and intensity standards for each land use designation are applied to future development projects and land use decisions, properties will gradually transition from one use to another, and land uses and intensities will gradually shift to align with the intent of the General Plan. Within the Study Areas identified on the Land Use Diagram, future uses may be developed in accordance with annexation policies identified in the General Plan and are subject to more detailed planning (e.g., specific plan).

Table 2 identifies anticipated land use changes that would occur with implementation of the General Plan, both from a 2015 baseline condition and relative to the currently adopted General Plan. For purposes of the EIR, analysis of potential environmental effects will be based on the net change between 2015 baseline conditions and the proposed General Plan.

TABLE 2
ANTICIPATED LAND USE CHANGES

	Acres	Dwelling Units	Population	Jobs	Jobs/Housing Ratio
Existing Development[1] Total	**31,238**	**53,829**	**171,059**	**45,463**	**0.84**
Current General Plan[2] Total	**31,238**	**77,716**	**252,560**	**97,373**	**1.25**
City Limits Subtotal	*23,441*	*75,718*	*246,108*	*89,097*	
Study Areas Subtotal	*7,797*	*1,997*	*6,452*	*8,276*	
Preferred Land Use Map[3] Total	**31,238**	**101,665**	**328,378**	**122,802**	**1.21**
City Limits Subtotal	*23,441*	*71,334*	*230,407*	*82,446*	
Study Areas Subtotal	*7,797*	*30,332*	*97,971*	*40,356*	
Difference Between Existing Development and Proposed General Plan	**0**	**47,836**	**157,319**	**77,339**	

Note: Numbers may not sum due to rounding

1. Existing development represents 2017 population and dwelling information and 2013 jobs data. These are the latest datasets that are available.

2. Current General Plan refers to buildout of the existing General Plan land use diagram.

3. Preferred Land Use Map refers to the buildout of the proposed General Plan Land Use Diagram.

1.4 Transportation Network Diagram

The transportation network is a major determinant of urban form and land use. Factors such as traffic patterns and congestion, access to transit, and ease and safety of walking and biking may determine where people choose to live, work, and visit. **Figure 4** illustrates anticipated roadway capacities needed to serve vehicle traffic anticipated with the proposed land uses. Policies developed for the General Plan will ensure a complete network including fixed transit, pedestrian and bicycle routes, and Class 1 trails.

2.0 CLIMATE ACTION PLAN UPDATE

The City of Elk Grove adopted a Climate Action Plan (CAP) in 2013. As part of the General Plan Update Project, the City is also completing an update to the CAP. The updated CAP will include an updated community-wide emissions inventory for Elk Grove, along with updated emissions forecasts for 2020, 2030, and 2050 based on land use activities anticipated with implementation of the updated General Plan.

While the existing CAP was originally designed to meet a 2020 target and provide CEQA streamlining benefits under Section 15183.5 of the CEQA Guidelines, the updated CAP will be consistent with new state legislation and guidance issued since the existing CAP was adopted in 2013, such as Senate Bill (SB) 32, Executive Order (EO) B-30-15, and updates to the State's Climate Change Scoping Plan. This information will be used to update the existing CAP emissions reduction measures to outline a strategy to achieve reduction targets consistent with State law and guidance. The updated CAP will also include an implementation program identifying time frames, responsible parties, indicators, potential costs and benefits, funding sources, and monitoring mechanisms.

3.0 SPECIFIC PLANS

To implement the policies and programs proposed in the General Plan update, the Project includes the following actions related to existing Specific Plans in the City:

- Rescind the East Elk Grove Specific Plan, integrating various policies into the proposed East Elk Grove Community Plan and establishing relevant development standards in Title 23 (Zoning) of the City's Municipal Code (herein after the Zoning Code).
- Rescind the East Franklin Specific Plan, integrating various policies into the proposed General Plan, as relevant and establishing relevant development standards in the Zoning Code.
- Amend various sections of the Laguna Ridge Specific Plan for consistency with the updated General Plan.

4.0 ZONING CODE AMENDMENTS

To maintain consistency with the updated General Plan, the Project also includes a number of amendments to the Zoning Code. Amendments planned as part of the Project include:

- Updating the allowed uses in commercial, office, and industrial zones as necessary for consistency with the General Plan Land Use Designations.
- Updating the Multifamily Overlay Zone for consistency with the General Plan Land Use Designations.

- Rezoning various properties to zoning districts consistent with the General Plan Land Use Designations.
- Rescinding the Laguna Community/Floodplain Special Planning Area zoning district.
- Rescinding the Laguna Gateway Special Planning Area zoning district.
- Rescinding the Calvine Road/Highway 99 Special Planning Area zoning district.
- Establishing new zoning district(s) as necessary to implement the updated General Plan.
- Updating other development standards as necessary to implement the updated General Plan.

5.0 PARKS AND RECREATION MASTER PLAN UPDATE

The Cosumnes Community Services District (CCSD) is preparing an update to the Parks and Recreation Master Plan, which describes how parks and recreation services are provided to the residents of Elk Grove. The City is fully located within the parks and recreation service area of the CCSD. The update to the Parks and Recreation Master Plan is being coordinated with the General Plan Update as the Master Plan describes the service area and design objectives for new parks and recreation facilities within the community. The EIR will address these updated parks criteria.

C. TYPE OF ENVIRONMENTAL DOCUMENT

The General Plan Update EIR will be prepared as a Program EIR, pursuant to Section 15168 of the CEQA Guidelines. A Program EIR examines the environmental impacts of an overall area that may contain a series of subsequent projects. This type of EIR focuses on the changes in the environment that would result from implementation of the overall Project, including development of land uses and transportation systems identified in the Project, as well as other infrastructure required to serve the Project. The General Plan Update EIR will serve as the environmental review document for subsequent activities in the program. Consistent with CEQA Guidelines Section 15168(c), the City will review subsequent activities to determine whether the activity is within the scope of the Project covered by the Program EIR or whether an additional environmental document must be prepared. If the City finds, pursuant to CEQA Guidelines Section 15162, that no new effects could occur or no new mitigation measures would be required, the City can approve the subsequent activity as being within the scope of the Project covered in the Program EIR, and no new environmental document would be required.

D. PROBABLE ENVIRONMENTAL EFFECTS

The EIR will evaluate whether the proposed Project would potentially result in one or more significant environmental effects. The following issues will be addressed in the EIR:

- Aesthetics, Light, and Glare
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Land Use
- Noise
- Mineral Resources
- Population and Housing
- Public Services

- Geology, Soils, and Seismicity
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Public Utilities
- Recreation
- Transportation
- Tribal Cultural Resources
- Energy Conservation and Other Required CEQA Topics

ISSUES SCOPED OUT FROM ANALYSIS IN THE EIR

One environmental issue would result in a less than significant impact and will not be discussed in the EIR for the reasons discussed below.

Seiche, Tsunami, and Mudflow

Based on the Project's location (inland, away from any water bodies) and topography (relatively flat), there would be no impact related to seiche, tsunami, or mudflow. This impact will not be discussed in the EIR.

E. EIR AND GENERAL PLAN UPDATE PROCESS

The Draft EIR will incorporate the input received at the scoping meeting and comments submitted on the NOP. The purpose of the Draft EIR is to examine and disclose the potential environmental impacts of the Project and to identify mitigation measures and alternatives that would reduce and/or avoid significant impacts.

The Draft EIR will have a 45-day public review period in which agencies and members of the public will review and comment on the Draft EIR. Comments received on the Draft EIR will be reviewed and addressed in the Final EIR. The Final EIR will be a document consisting of the Draft EIR, errata or changes to the Draft EIR, and responses to comments on the EIR, as well as any additional technical reports or follow-up documentation that may be necessary. The Elk Grove Planning Commission will hold a public hearing on the Final EIR and make a recommendation to the City Council regarding the Final EIR prior to action on the General Plan Update. The City Council will hold its own public hearing on the Final EIR and make its own determination on certification of the Final EIR prior to action on the General Plan Update.

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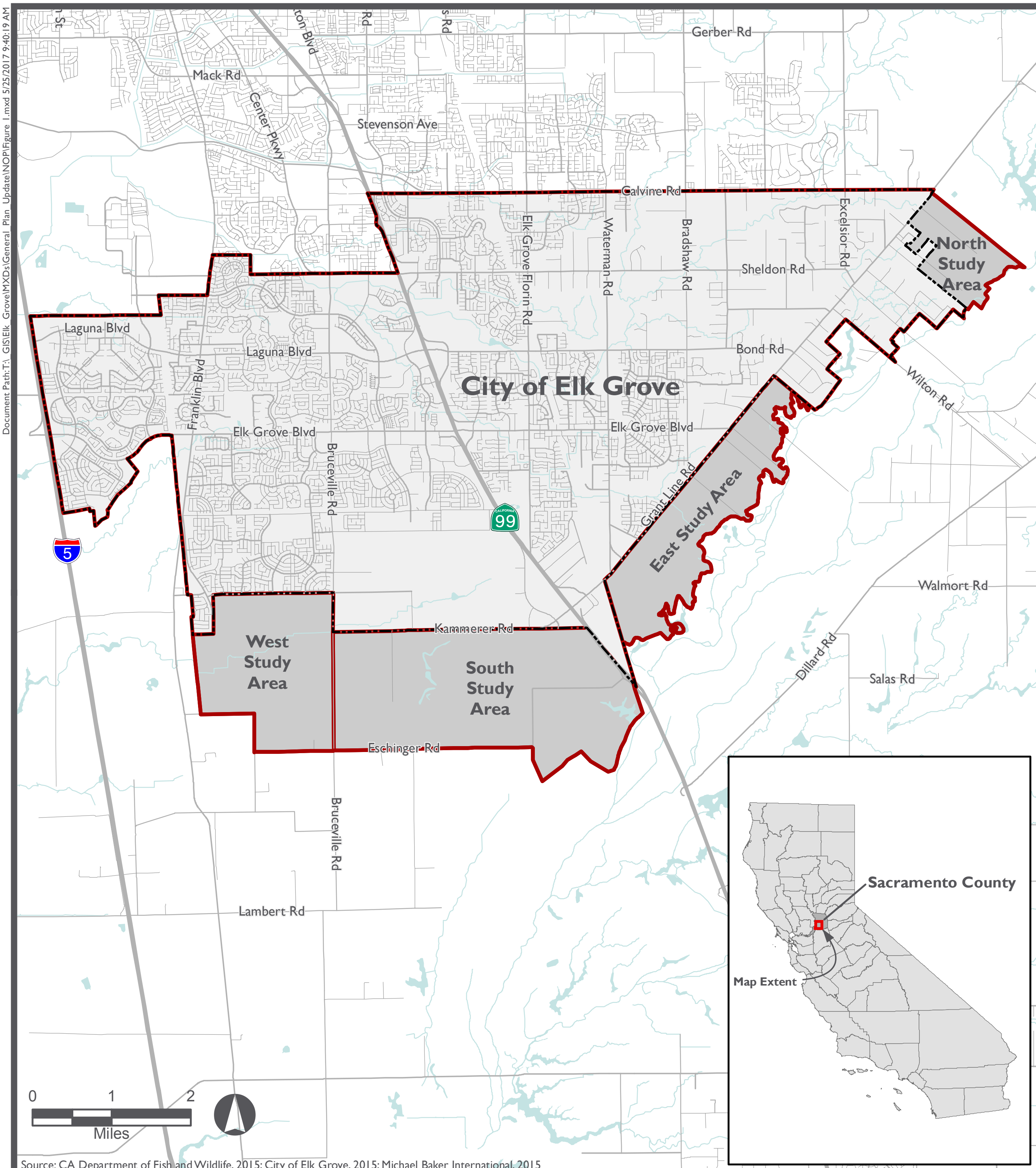
Document Path: T:\ GIS\Elk Grove\MXDs\General Plan Update\NOP\Figure 1.mxd 5/25/2017 9:40:19 AM



Source: CA Department of Fish and Wildlife, 2015; City of Elk Grove, 2015; Michael Baker International, 2015

LEGEND

- Elk Grove City Limits
- Planning Area Boundary
- Study Area

ELK GROVE EXISTING CONDITIONS REPORT
May 2017

FIGURE 1

Project Location and Vicinity

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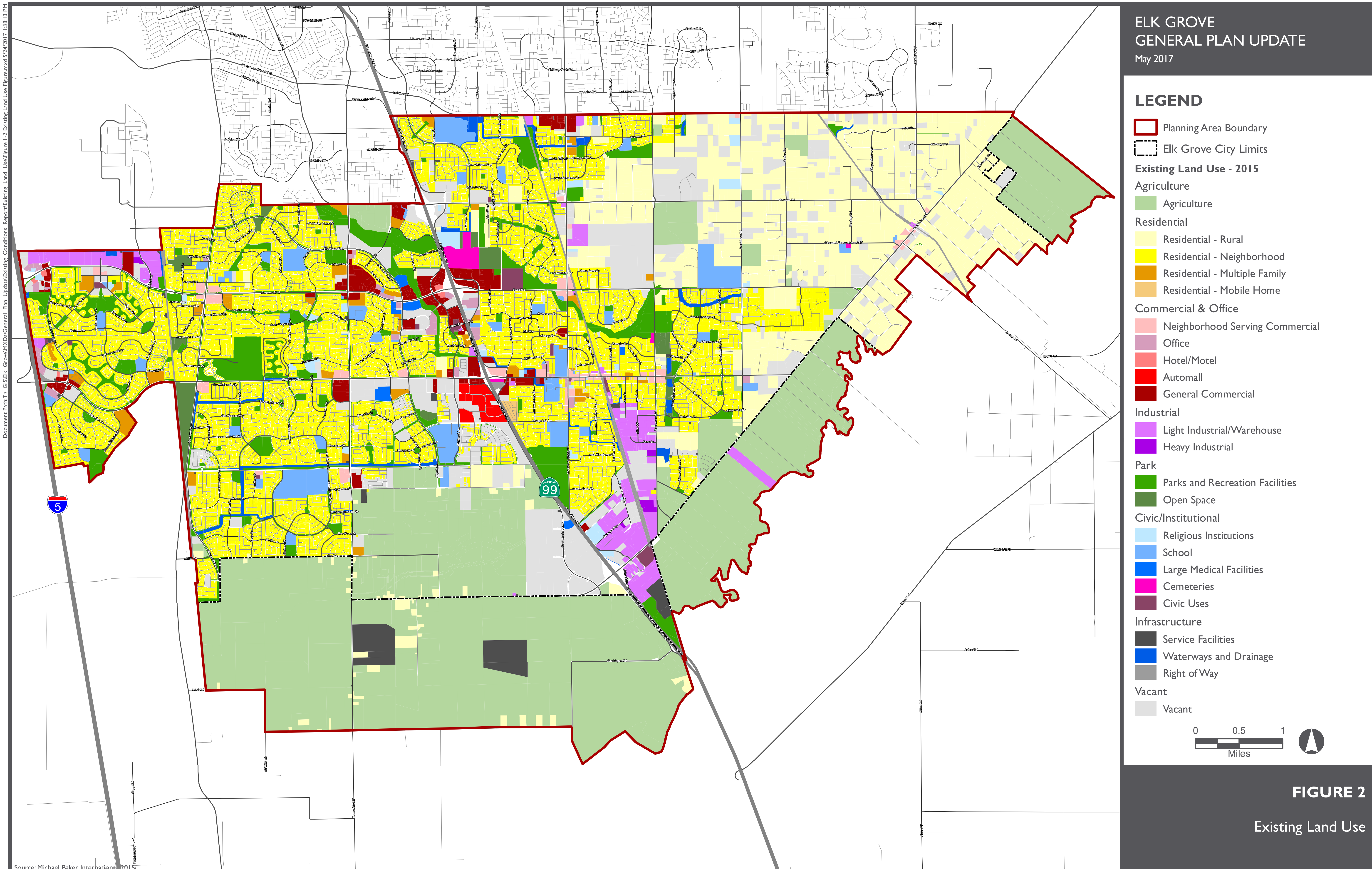

FIGURE 2

Existing Land Use

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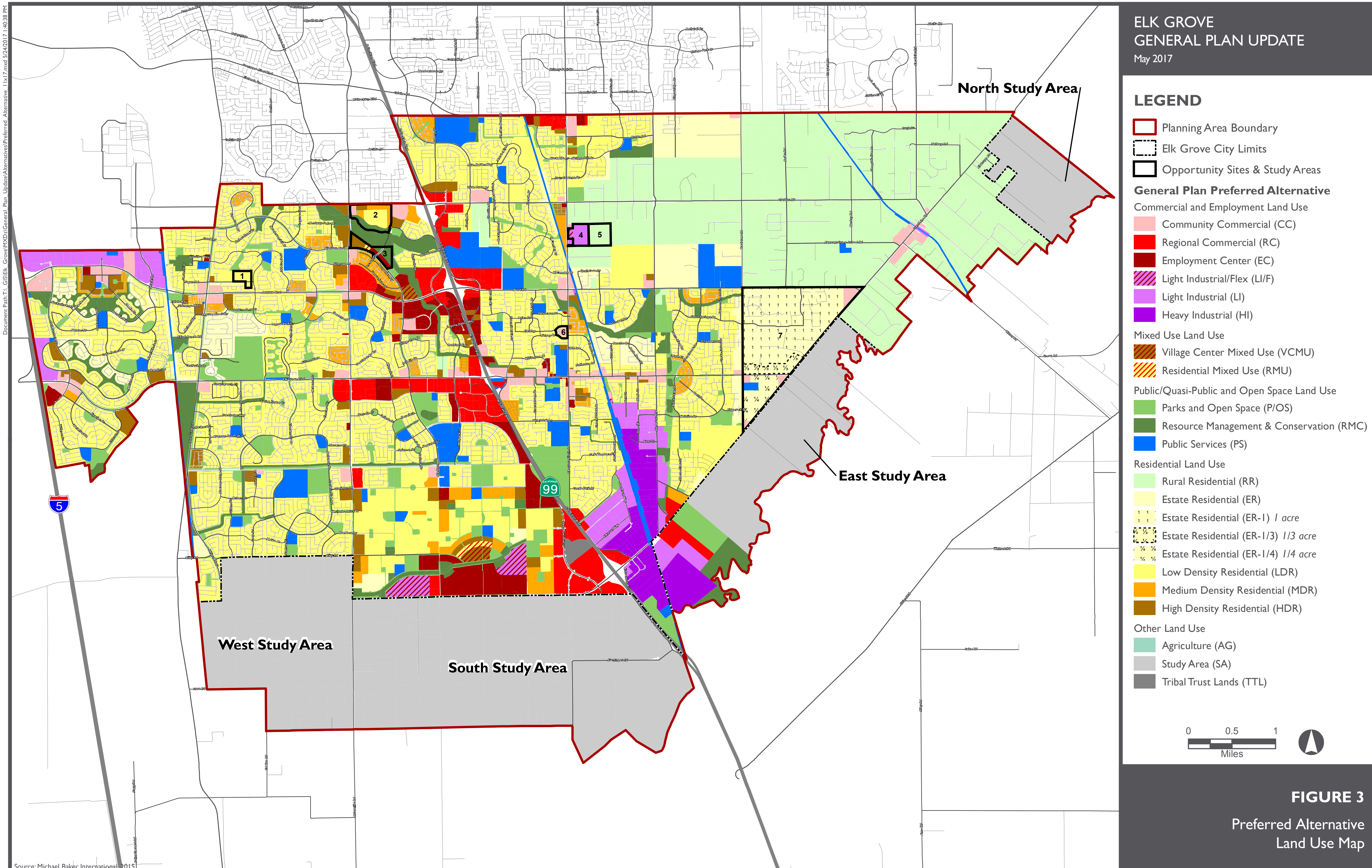

FIGURE 3

Preferred Alternative Land Use Map

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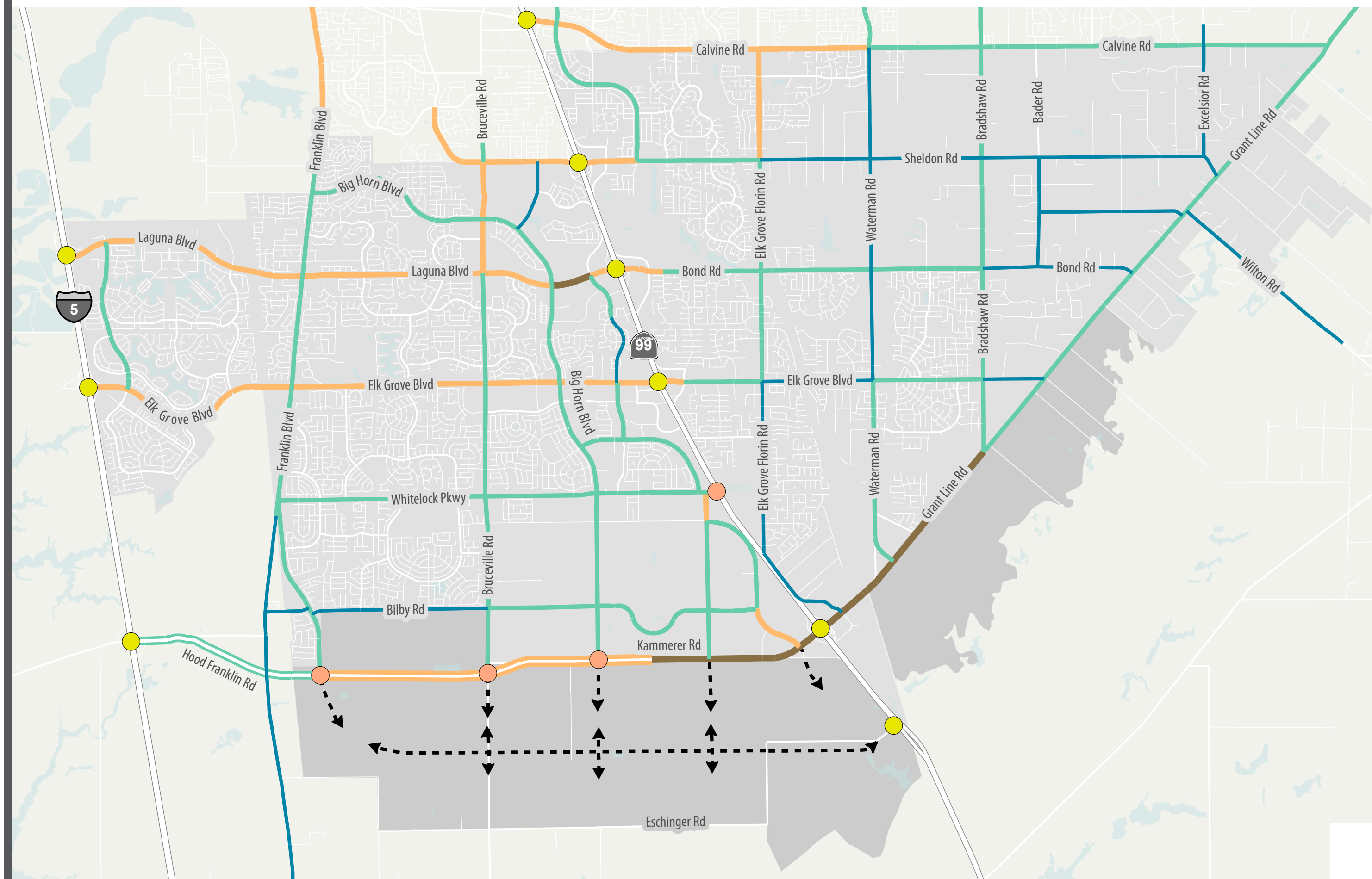
T:_CS\Work\Elk Grove, City of\General Plan 2017\Figures



ELK GROVE GENERAL PLAN UPDATE

May 2017

LEGEND

- 2-lane Arterial\Collector
- 4-lane Arterial
- 5-lane Arterial
- 6-lane Arterial
- 8-lane Arterial
- 4-lane Expressway
- 6-lane Expressway
- Future Study Area Road
- Freeway Interchange
- Future Interchange
- Study Area
- City of Elk Grove City

NOT TO SCALE

FIGURE 4

Transportation Network Diagram

Source: Fehr and Peers;2015

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APPENDIX B:
NOP COMMENT LETTERS

ELK GROVE Unified School District

Members of the Board:
Beth Albiani
Nancy Chaires Espinoza
Carmine S. Forcina
Chet Madison, Sr.
Dr. Crystal Martinez-Alire
Anthony "Tony" Perez
Bobbie Singh-Allen

Robert L. Trigg Education Center
9510 Elk Grove-Florin Road, Elk Grove, CA 95624

Susan Bell
Chief Facilities Officer
Facilities and Planning

(916) 686-7711
FAX: (916) 686-7754

July 24, 2017

SENT VIA EMAIL

City of Elk Grove
City Manager's Office
Strategic Initiatives and Long Range Planning
c/o Christopher Jordan, AICP
8401 Laguna Palms Way
Elk Grove, CA 95758

SUBJECT: Comments on the Notice of Preparation of a Draft Environmental Impact Report for the City of Elk Grove's General Plan Update

Dear Mr. Jordan:

Elk Grove Unified School District (EGUSD) appreciates the opportunity to review and comment on Notice of Preparation of the Draft Environmental Impact Report for the City of Elk Grove's General Plan Update. EGUSD requests that the following comments be considered as the process moves forward.

Ideally, during the planning stages of new residential projects, school sites are identified on land use plans to accommodate anticipated students. Subsequent rezoning of "infill" parcels to higher density residential neighborhoods can be problematic because they generate unanticipated students and do not provide an opportunity to mitigate those impacts with additional schools. Currently many of our existing schools are fully utilizing their sites, thereby making it challenging to add classrooms needed to house additional students. Furthermore, essential core facilities (i.e. administration, library, restrooms, multi-purpose room, playground, etc.) at many schools are not sized to adequately accommodate additional students and it may be unfeasible to expand those core facilities.

Most of the Opportunity Sites presented will not have a significant impact upon existing school facilities. However, the recommended alternatives for Opportunity Sites 2 and 3 will result in a significant regional and cumulative impact to the District's existing educational facilities. Although detailed housing unit counts were not included in the NOP, if both sites were to develop to the number of housing units for the staff recommended alternatives included in earlier staff reports, nearly 700 unanticipated elementary school students would reside there. Irene B. West, the neighborhood school that serves that region, has a capacity of 1,010 students but a current enrollment of nearly 900 students. Clearly, capacity to accommodate all the additional students that would be generated from the suggested new land use plan isn't available at the existing neighborhood school.

Any available capacity at the regional middle and high schools has already been allocated to the future students anticipated from existing land use plans; specifically, remaining unbuilt homes in Laguna Ridge, Sterling Meadows and the Southeast Policy Area. If the recommended infill land use changes are made it will trigger the need for an additional regional middle/high school site. EGUSD previously commented on the Southeast Policy Area Draft Environmental Impact Report and an excerpt from those comments follows:

Based upon the current housing unit counts in the Southeast Policy Area and the surrounding un-built developments, neither a middle school nor a high school will be needed within the proposed Southeast Policy Area, as the students generated from this project can be accommodated in nearby existing secondary schools. However, should the number of residential units in the region increase as the result of revisions to the land use plans, this may no longer be true. Should this occur the District will work with the City and land owners to identify a suitable secondary school site.

Until actual development plans are presented for Opportunity Sites 2 and 3, it seems prudent to plan for the maximum number of dwelling units identified by City staff. Additional students from those planning areas could trigger a need for both an additional elementary school and a regional middle/high school should the areas develop as projected by Staff.

The West, South, East and North Study Areas lie beyond currently planned development areas so as development occurs it will be necessary for EGUSD planning staff to work in concert with City staff and developers to identify school sites to serve those future planned communities.

Sincerely,

Kim Williams

Kim Williams
Planning Manager

cc: Susan Bell, Chief Facilities Officer
Bill Heinicke, Director of Planning

From:	Cherilyn Neider
To:	Christopher Jordan
Cc:	Matthew Moore; Marcos Guerrero; Melodi McAdams
Subject:	Consultation for the EIR for the City of Elk Grove General Plan Update
Date:	Monday, July 24, 2017 10:40:57 AM
Attachments:	4_Mitigation_Measures_CEQA_Discoveries_SiteVisit.docx 5_Mitigation_Measures_CEQA_Construction_Worker_Awareness_Training.docx 1_Mitigation_Measures_CEQA_TCR_Avoidance.docx 2_Mitigation_Measures_CEQA_NativeAmericanMonitors.docx 3_Mitigation_Measures_CEQA_Discoveries.docx

Dear Christopher Jordan,

Thank you for your letter received on 6/23/2017 (EIR for the City of Elk Grove General Plan Update). Attached you will find mitigation measures recommended by United Auburn Indian Community (UAIC) to be included in the EIR and the City's General Plan. In addition, UAIC recommends updates to the following:

- Legislative updates related to Assembly Bill 52, Senate Bill 18 and any additional cultural resource laws or bills that the City is incorporating into the General Plan;
- Language to be included in the City's update addressing the City of Elk Grove's Tribal Consultation Policy;
- The City's Historic Preservation Ordinances for Native American and historic cultural resources.

UAIC would like to receive electronic copies of documentation in the existing General Plan and proposed updates related to the above mentioned topics.

Thank you for involving UAIC in the planning process at an early stage. We ask that you make this correspondence a part of the project record and we look forward to working with you to ensure that tribal cultural resources are protected. Marcos Guerrero, UAIC Cultural Resources Manager, will be UAIC's point of contact for this consultation. Please contact Mr. Guerrero by phone at (530) 883-2364 or email at mguerrero@auburnrancheria.com to begin the consultation process.

Sincerely,

Cherilyn Neider
Administrative Assistant
Tribal Historic Preservation
United Auburn Indian Community
530.883.2394

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mail.

Tribal Cultural Resource Avoidance Mitigation Measure

Avoidance and preservation in place is the preferred manner of mitigating impacts to tribal cultural resources and will be accomplished by several means, including:

- Planning construction to avoid archaeological sites; incorporating sites within parks, green-space or other open space; covering archaeological sites; deeding a site to a permanent conservation easement; or other preservation and protection methods agreeable to consulting parties and regulatory authorities with jurisdiction over the activity. Recommendations for avoidance of cultural resources will be reviewed by the CEQA lead agency representative, interested Native American Tribes and the appropriate agencies, in light of factors such as costs, logistics, feasibility, design, technology and social, cultural and environmental considerations, and the extent to which avoidance is consistent with project objectives. Avoidance and design alternatives may include realignment within the project area to avoid cultural resources, modification of the design to eliminate or reduce impacts to cultural resources or modification or realignment to avoid highly significant features within a cultural resource. Native American Representatives from interested Native American Tribes will be allowed to review and comment on these analyses and shall have the opportunity to meet with the CEQA lead agency representative and its representatives who have technical expertise to identify and recommend feasible avoidance and design alternatives, so that appropriate and feasible avoidance and design alternatives can be identified.

- If the resource can be avoided, the construction contractor(s), with paid Native American Monitors from culturally affiliated Native American Tribes present, will install protective fencing outside the site boundary, including a buffer area, before construction restarts. The construction contractor(s) will maintain the protective fencing throughout construction to avoid the site during all remaining phases of construction. The area will be demarcated as an "Environmentally Sensitive Area". Native American Representatives from interested Native American Tribes and the CEQA lead agency representative will also consult to develop measures for long term management of the resource and routine operation and maintenance within culturally sensitive areas that retain resource integrity, including tribal cultural integrity, and including archaeological material, Traditional Cultural Properties and cultural landscapes, in accordance with state and federal guidance including National Register Bulletin 30 (*Guidelines for Evaluating* and *Documenting Rural Historic Landscapes*), Bulletin 36 (*Guidelines for Evaluating and Registering Archaeological Properties*), and Bulletin 38 (*Guidelines for Evaluating and Documenting Traditional Cultural Properties*); National Park Service Preservation Brief 36 (*Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes*) and using the Advisory Council on Historic Preservation (ACHP) *Native American Traditional Cultural Landscapes Action Plan* for further guidance. Use of temporary and permanent forms of protective fencing will be determined in consultation with Native American Representatives from interested Native American Tribes.

Native American Monitoring Mitigation Measure

To minimize the potential for destruction of or damage to existing or previously undiscovered archaeological and Cultural resources and to identify any such resources at the earliest possible time during project-related earthmoving activities, THE PROJECT PROPONENT and its construction contractor(s) will implement the following measures:

- Paid Native American Monitors from culturally affiliated Native American Tribes will be invited to monitor the vegetation grubbing, stripping, grading or other ground-disturbing activities in the project area to determine the presence or absence of any cultural resources. Native American Representatives from cultural affiliated Native American Tribes act as a representative of their Tribal government and shall be consulted before any cultural studies or ground-disturbing activities begin.

- Native American Representatives and Native American Monitors have the authority to identify sites or objects of significance to Native Americans and to request that work be stopped, diverted or slowed if such sites or objects are identified within the direct impact area. Only a Native American Representative can recommend appropriate treatment of such sites or objects.

Inadvertent Discoveries Mitigation Measures

Develop a standard operating procedure, points of contact, timeline and schedule for the project so all possible damages can be avoided or alternatives and cumulative impacts properly accessed.

If potential archaeological resources cultural resources, articulated, or disarticulated human remains are discovered by Native American Representatives or Monitors from interested Native American Tribes, qualified cultural resources specialists or other Project personnel during construction activities, work will cease in the immediate vicinity of the find (based on the apparent distribution of cultural resources), whether or not a Native American Monitor from an interested Native American Tribe is present. A qualified cultural resources specialist and Native American Representatives and Monitors from culturally affiliated Native American Tribes will assess the significance of the find and make recommendations for further evaluation and treatment as necessary. These recommendations will be documented in the project record. For any recommendations made by interested Native American Tribes which are not implemented, a justification for why the recommendation was not followed will be provided in the project record.

If adverse impacts to tribal cultural resources, unique archeology, or other cultural resources occurs, then consultation with UAIC regarding mitigation contained in the Public Resources Code sections 21084.3(a) and (b) and CEQA Guidelines section 15370 should occur, in order to coordinate for compensation for the impact by replacing or providing substitute resources or environments.

Post-Ground Disturbance Site Visit Mitigation Measure

A minimum of seven days prior to beginning earthwork or other soil disturbance activities, the applicant shall notify the CEQA lead agency representative of the proposed earthwork start-date, in order to provide the CEQA lead agency representative with time to contact the United Auburn Indian Community (UAIC). A UAIC tribal representative shall be invited to inspect the project site, including any soil piles, trenches, or other disturbed areas, within the first five days of ground breaking activity. During this inspection, a site meeting of construction personnel shall also be held in order to afford the tribal representative the opportunity to provide cultural resources awareness information. If any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, human remains, or architectural remains are encountered during this initial inspection or during any subsequent construction activities, work shall be suspended within 100 feet of the find, and the project applicant shall immediately notify the CEQA lead agency representative. The project applicant shall coordinate any necessary investigation of the site with a UAIC tribal representative, a qualified archaeologist approved by the City, and as part of the site investigation and resource assessment the archeologist shall consult with the UAIC and provide proper management recommendations should potential impacts to the resources be found by the CEQA lead agency representative to be significant. A written report detailing the site assessment, coordination activities, and management recommendations shall be provided to the CEQA lead agency representative by the qualified archaeologist. Possible management recommendations for historical or unique archaeological resources could include resource avoidance or, where avoidance is infeasible in light of project design or layout or is unnecessary to avoid significant effects, preservation in place or other measures. The contractor shall implement any measures deemed by CEQA lead agency representative staff to be necessary and feasible to avoid or minimize significant effects to the cultural resources, including the use of a Native American Monitor whenever work is occurring within 100 feet of the find.

Tribal Cultural Resource – Awareness Training - Mitigation Measure

A consultant and construction worker cultural resources awareness brochure and training program for all personnel involved in project implementation will be developed in coordination with interested Native American Tribes. The brochure will be distributed and the training will be conducted in coordination with qualified cultural resources specialists and Native American Representatives and Monitors from culturally affiliated Native American Tribes before any stages of project implementation and construction activities begin on the project site. The program will include relevant information regarding sensitive tribal cultural resources, including applicable regulations, protocols for avoidance, and consequences of violating State laws and regulations. The worker cultural resources awareness program will also describe appropriate avoidance and minimization measures for resources that have the potential to be located on the project site and will outline what to do and whom to contact if any potential archaeological resources or artifacts are encountered. The program will also underscore the requirement for confidentiality and culturally-appropriate treatment of any find of significance to Native Americans and behaviors, consistent with Native American Tribal values.

RECEIVED
OFFICE OF THE CITY CLERK

2017 JUL 24 AM 9:10

To: City of Elk Grove
c/o Christopher Jordon, AICP
8401 Laguna Palms Way
Elk Grove CA 95758

July 22, 2017

From: Triangle Community Group
c/o Michael F. Padilla
9435 Butterfly Lane
Elk Grove, CA 95624
mfpadilla@frontier.com

Subject: Response to the Notice of Preparation of a Draft Environmental Impact Report

The Triangle Community Group is making this submittal in response to the Notice of Preparation of a Draft Environmental Impact Report for the City of Elk Grove General Plan Update. The Triangle Community Group's comments address the concerns of the group regarding the environmental impacts as they relate to the proposed updates to the current City of Elk Grove General Plan and specifically as they relate to the approved Triangle Special Planning Area (TSPA) adopted April 12, 2004 and amended through June 27, 2012.

Although the final Environmental Impact Report (EIR) is intended to address the city's General Plan and its overall city-wide environmental issues, the Triangle Community Group feels that the specific environmental issues relevant to the Triangle Area are very much applicable to the city's environmental discussion. The Triangle Community Group's response, is in addition, intended to provide input to staff in its efforts to conduct a study of the Triangle Area as directed by the City Council as part of the General Plan revision

Furthermore, the group's submittal is intended to also make public its concerns as to how the city intends to meet its obligations as specified on page 4 of the TSPA: "Future entitlements for development will be evaluated for consistency with this SPA."

The following specific issues are addressed using the categories as presented on page 10 of the Notice of Preparation dated June 2017.

Aesthetics, Lighting, and Glare

The TSPA specifies that nighttime light and glare be kept at a minimum as an opportunity to maintain the area's rural character. Commercial property is even more specific as identified on page 51 of the TSPA. Higher density residential areas, greater than the one acre minimum, would increase nighttime light and glare if special attention is not taken to maintaining low nightlight emissions. This is especially true for those areas identified as commercial properties and major intersections which would require freestanding lighting fixtures higher than 10 feet and high intensity lighting as is the current practice on most city commercial properties and traffic intersections. The city should identify what measures it will take to insure that the Triangle Area lighting requirements will continue to meet the provisions of the TSPA.

Agricultural Resources

The TSPA recognizes the existence of agricultural uses within its boundaries and "specifically intends to provide for the continued existence of these uses". The city needs to make it clear as to how the agricultural uses in the Triangle Area are to be protected and to what extent they can contribute to the continued rural agricultural nature of the area.

Air Quality/Greenhouse Gas Emissions/Noise

The Triangle Area enjoys relatively clean air and benefits from frequent "delta breezes" which often cool hot evening nights and clears the air of pollutants. Although agricultural burning is allowed in the area, it is subject to designated burn days, time of day and months of the year as specified by conditions in the Consumes Fire District's Limited Area burn permit and the Sacramento Air Quality Management District. The area residents and households do not contribute significantly to air pollution, greenhouse emissions or noise pollution. However, transit traffic from roadways surrounding and within the Triangle Area are primary contributors, with potential higher density rezoning a future addition to pollutant levels. The city needs to provide strategies for mitigation of air pollution, greenhouse gas emissions and noise pollution attributed to transit traffic. A discussion of possible solutions should include the building of traffic circles at all intersections, which have shown to move traffic more efficiently and safer. Elimination of transit traffic is not possible but improving the flows and eliminating polluting idle time at intersections is a viable solution.

Biological Resources

Wetland features are located at various locations throughout the Triangle Area and include natural features as well as excavated channels that support native plant and wildlife species. Agricultural activity in the area also supports plant communities that include some species that can be found in wetlands such as perennial rye, curly dock and annual bluegrass. Some of these lands within the Triangle Area may be subject to Section 404 of the Clean Water Act and need to be clearly delineated by the city as part of the EIR.

Various mammals and birds inhabit the Triangle Area using it for foraging and breeding. Studies have identified that the endangered Swainson's hawk uses the Triangle Area and several nesting sites where noted to be in close proximity. The tri-colored blackbird, which is listed as a Species of Special Concern have been observed using the Triangle Area. Updated studies need to be conducted to determine to what extent native species are prevalent in the area and what, if any, measures are needed to safe guard their habitat.

Cultural Resources

Elk Grove was founded as an agricultural community. The Triangle Area is very much a part of that heritage with agriculture and the rural environment making up the current identity of the area. The close proximity of the Triangle Area to Old Town and the Sheldon Rural Area attest to its historical connection to this life style. Residents of the Triangle Area are active members of the 4H and Future Farmers of America, they: raise farm animals, plow fields, mow hay, raise crops, plant orchards and sell produce. Protecting these cultural resources is essential to Elk Grove keeping its history alive and not just an amusement at the local park or a motto on a city brochure. The TSPA was developed and approved with the specific intent of protecting its rural identity while providing an opportunity to provide uncongested living to its residents. Future development in the area must stay true to this promise with specific direction from the city on how it intends to protect this resource.

Land Use

The Land Use Plan and Development Standards for the Triangle Area has always been intended to retain the low density rural character of the area which still allows residential development of no less than one acre in association with agricultural activities as the primary land uses. Provisions for related recreational, institutional and commercial uses are also provided. ***"The plan specifically promotes the development of single family residences on parcels that are at least one acre."*** The city must, in good faith, give just cause as to why this very specific provision of the TSPA is not being considered in the Draft General Plan development phase. Prior city administrations and residents of the Triangle Area developed this plan as a blueprint for the future of the area with decisions by both the city and residents influenced by its provisions. The city needs to specifically state what new and overwhelming land use circumstances have made it essential that the approved land use provisions of the TSPA should be ignored in favor of a higher density rezoning that fundamentally changes the character and identity of the Triangle Area.

Population and Housing

The TSPA was established to supplement the standards and regulations provided in the City Zoning Code. The TSPA was also established to provide for "feathering" while allowing higher densities than the original AR-5 designation. As population increases in the Sacramento area begin to put pressure on available housing it is clear that there will be efforts to increase Elk Grove housing densities through zoning changes. Elk Grove planning has established a "feathering" approach to transitioning urban and rural land use within its boundaries. This practice has generally been accepted as the best method to preserve rural areas while allowing higher density housing to find its place in the city landscape. Elk Grove's need for increased housing units does not mean however, that there needs to be an abolishment of current zoning densities whenever possible. In fact, a greater variety in housing options is good for the diversity of the city, making it a place that attracts residents with varying interest. Housing sales data shows that there is a strong market for housing that provides for larger lots and space with in the urban/rural transition zone. Areas of low density also are shown to put less pressure on public services with a reduced footprint on the environment. Environmental assessments need to show the benefits and take-aways of all levels of zoning.

Public Services

The TSPA provides little discussion regarding Police and Fire protection for the Triangle Area but in general it has been adequate and can be expected to remain adequate with the current one acre zoning. However, higher housing densities bring with it the increase need for more police and fire protection. Consideration in the new General Plan needs to be given to how much and when increased police and fire services will be provided regardless of the zoning.

Hydrology and Water Quality

Many of the residents of the Triangle Area use ground water as a primary source of domestic water. The Triangle Area is located with the Sacramento Hydrologic Basin and Zone 40 of the Sacramento County Water Agency. Zone 40 is a shallow aquifer, extending 200-300 feet below the surface, with a deeper aquifer at approx. 1600 feet. Over drafting of the lower aquifer to supply commercial water demands and meet the needs of high density housing as well as the reduction in sources for ground water recharge are major concerns. The California Sustainable Groundwater Management Act has established guidelines and requirements that will have a future impact on the Triangle Area. Attention needs to be given to these impacts and what, if any, mitigation measures, guidelines or regulations are being considered by the responsible water agencies. Water conservation measures need to be also delineated for all types of water users.

Surface drainage continues to be a problem for much of the Triangle Area. Because of the relatively flat terrain, shallow flooding is prevalent with severe flooding at times along Elk Grove Boulevard. Individual property owners have exacerbated the problem through improper grading, road construction, and redirection of historical and established drainage. Buildout to one acre residents is not considered to be a significant contributor to increased surface runoff but higher density housing has the potential to increase flows beyond current infrastructure capabilities. The city should outline how future development in the area will address the overall impacts of uncontrolled drainage and what efforts will be used to insure that these flows will benefit local ground water recharge and water conservation efforts as well as provide for the safe flows during severe weather.

Transportation

The major mode of transportation in the Triangle Area is the automobile. Road infrastructure developments and improvements in the area have been minimal but traffic flows and associated backups have increased with daily commute traffic traversing the area combined with the impact of high traffic densities associated with Pleasant Grove High School along Bradshaw road. Triangle Area residents do not contribute significantly to traffic congestion which only increased with the addition of the homes in Silver Gate, Kapalua Estates and Van Ruiten Acres over ten years ago.

Under the TSPA with a one acre minimum lot size build out, traffic flows will increase along Elk Grove Blvd., Bradshaw and Grant Line but more than likely be able to be sustained with minimal improvements to the current road infrastructure. It is not clear however, what the impact will be if higher zoning densities are imposed on the area, only that it will get extremely congested not only on the roadways but all intersections which are now exceeding capacity at pick times at the intersections of: Bradshaw and Sheldon; Bond and Bader; and Grant Line and Wilton Road. In the future, with the introduction of higher density zoning, this type of intersection congestion can be expected at the intersections of: Bradshaw and Elk Grove Blvd.; Elk Grove Blvd. and Grant Line; and Bradshaw and Grand Line. Congestion can also be expected at all feeder roads to Bradshaw, Grant Line and Elk Grove Blvd.

Given the current traffic conditions and the city's need to address Vehicle Miles Traveled (VMT) in the CEQA process, it is imperative that the city discuss how it will manage current and future traffic in and around the Triangle Area to reduce VMT. In as much as transit automobiles are the major contributors to this congestion, the plan must not ignore this and consider mitigation measures that realistically address transit traffic. Conversely, there are few VMT strategies that can be applied to the reduction of vehicle miles traveled by Triangle residents other than reducing miles traveled to destinations. In that most day to day destinations are to work or shopping, it is obvious that increasing zoning density in a rural agricultural area does little to reduce miles traveled and in fact increases VMT.

SACRAMENTO METROPOLITAN

AIR QUALITY

MANAGEMENT DISTRICT

July 21, 2017

SENT VIA EMAIL

Mr. Christopher Jordan, AICP
City Manager's Office – Strategic Initiatives and Long Range Planning
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

RE: Notice of Preparation of an Environmental Impact Report for the City of Elk Grove General Plan Update

Dear Mr. Jordan:

Thank you for providing an opportunity for the Sacramento Metropolitan Air Quality Management District (SMAQMD) to review and comment on the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the City of Elk Grove General Plan Update (GPU). We review and provide comments through the lead agency planning, environmental and entitlement processes with the goal of reducing adverse air quality impacts and ensuring compliance with the California Environmental Quality Act (CEQA). We offer the following comments to ensure air quality impacts are adequately analyzed, disclosed and mitigated.

1. **Consistency with Existing Plans**
Evaluate the GPU's consistency with existing plans, especially those that reduce criteria air pollutants and greenhouse gases. Such plans include, but are not limited to, the Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS), the California Air Resources Board's (ARB) Climate Change Scoping Plan, Elk Grove's Climate Action Plan, Elk Grove's Bike, Pedestrian and Trails Master Plan, Sacramento Tree Foundation's Regional Greenprint Initiative, and the Capital Southeast Connector Project Design Guidelines.

2. **Climate Change**
Evaluate the effectiveness of the existing Climate Action Plan (CAP) measures adopted in 2013 and disclose what changes, updates or added measures are needed in the GPU. SMAQMD commends the City for addressing the 2050 emissions forecast in their CAP update. SMAQMD is available for technical assistance as the City proceeds with a qualified CAP. A qualified CAP would provide CEQA streamlining benefits for future development projects.

   Consider expanding the City's existing tree policies and evaluate tree canopy as a climate adaption measure. The air quality benefits of shade trees include removing particulate matter from the atmosphere and reducing urban heat island effect, which in turn lowers summertime temperatures and reduces the formation of ozone. Trees in parking lots also cool individual parked cars and reduce their emissions of volatile organic compounds. Other benefits of tree canopy include reducing energy use, reducing storm water runoff, and providing wildlife habitat. Greater neighborhood tree canopy has been related to improvement of overall human health, primarily healthier weight, social cohesion, and mental health.[i] Studies have correlated neighborhood tree shade to active transportation.[ii]

3. **Locating Sensitive Receptors Near Sources of Air Toxics**
Evaluate exposure reduction measures to reduce sensitive receptors to air pollution near major

roadways and railways. In April 2017, the California Air Resources Board (ARB) released the technical advisory *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways* [iii] to supplement the 2005 *Air Quality and Land Use Handbook: A Community Health Perspective*.[iv] The ARB's handbook, technical advisory and the SMAQMD's *Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways* [v] can be used to:

a. disclose the potential cancer risk to receptors located near major roadways and
b. choose exposure reduction measures, such as MERV 13 filters in residential units and installing a vegetative barrier between major roadways and residences.

Additionally, the SMAQMD in cooperation with the Sacramento Tree Foundation developed the 2017 *Landscaping Guidance for Improving Air Quality near Roadways* [vi] to provide local guidance and best practices for installing vegetative barriers between major roadways and sensitive receptors.

4. SB 743 – Vehicle Miles Traveled

SMAQMD commends the City for being the first jurisdiction within Sacramento County to adopt SB 743 (Steinberg), the Governor's Office of Planning and Research's approach to measuring a project's transportation impact using vehicle miles traveled (VMT) instead of vehicle delay, or level of service (LOS), for CEQA purposes. VMT is directly linked to both greenhouse gas emissions and criteria air pollution. Reducing VMT is an important component toward meeting clean air and greenhouse gas reduction goals.

With respect to analyzing Roadway Efficiency during the project review, consider additional multi-modal performance indicators, such as transit capacity or quality of service to complement the draft Transportation Analysis Guidelines and draft Vehicle Design Consideration categories. Furthermore, consider setting context sensitive Intersection and Roadway Performance Targets for higher density, mixed-use areas or special areas, such as the historic Old Town commercial district in Elk Grove.

5. Transit-Oriented Development

Consider the GPU's consistency with Sacramento Regional Transit's (SacRT) transit-oriented development (TOD) guidance.[vii] SacRT provides flexible recommendations for local governments to align supportive land use policies with current and future low carbon transportation investments.

Thank you for your consideration of these comments. If you have any questions, please contact me at 916-874-6267 or JChan@airquality.org.

Regards,

Joanne Chan
Air Quality Planner/Analyst

c: Paul Philley, Program Supervisor – CEQA & Land Use Section, SMAQMD
Karen Huss, Air Quality Planner/Analyst, SMAQMD
Kristi Grabow, Senior Planner, City of Elk Grove

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[i] Multiple health benefits of urban tree canopy: The mounting evidence for a green prescription, *Health and Place*, November 2016

[ii] Green Prescription: The Link Between Urban Tree Canopy Cover & Health Behaviors and Outcomes, *Greenprint Summit*, January 2017

[iii] Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways, California Air Resources Board, April 2017

[iv] Air Quality and Land Use Handbook: A Community Health Perspective, California Air Resources Board, April 2005

[v] Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways, Sacramento Metropolitan Air Quality Management District, January 2011

[vi] Landscaping Guidance for Improving Air Quality near Roadways, Sacramento Metropolitan Air Quality Management District, April 2017

[vii] A Guide to Transit Oriented Development (TOD), Sacramento Regional Transit, April 2009

City of Elk Grove
City Manager's Office
Strategic Initiatives and Long Range Planning
c/o Christopher Jordan AICP
8401 Laguna Palms Way Elk Grove Ca 95758
cjordan@elkgrovecity.org

Regarding: Notice of Preparation for the City of Elk Grove General Plan Update Environmental Impact Report

The Draft General Plan Update EIR needs to evaluate:

Traffic:

1. *The EIR needs to have a traffic model developed for the entire area covered by the EIR. For those areas such as SEPA, which include flexible zoning variants referred to as "hybrid" zoning, the model needs to address the worst-case land use scenario from a traffic standpoint.*

2. *The EIR needs to assess the projected level of service from a standard-practice technical basis, but acknowledge the qualitative or perceived impacts from a quality of life perspective.*

3. *The DEIR needs to quantify the projected peak vehicle travel times along major arterials from selected reference points, such as travel time from Elk Grove Blvd/Hwy 99 westbound to Elk Grove Blvd./Big Horn*

4. *The DEIR needs to assess traffic levels on major arterials at less than full roadway buildout scenarios. For example, Kammerer will probably be improved in phases, yet development along that corridor prior to full roadway buildout may create interim levels of unacceptable traffic.*

Background:

The 2003 General Plan EIR allowed for the roads to operate at D and F levels with justification through overriding considerations and findings of fact stating that road improvements were not feasible because of the extensive residential and commercial development immediately adjacent to the roadways.

Highway 99 between Eschinger Road and Grantline Road would experience LOS of F. The city's justification was that highway 99 is under Caltrans jurisdiction and the city could not implement improvements. Also, the 2003 General Plan EIR stated certain roadways even with improvements would not achieve acceptable service levels of D.

The significant social and environmental impacts of our congested and impacted roadways results in stressed driver's behaviors (road rage), increased accidents, and poor air quality. From January 2016 until October 2016 the Elk Grove Police Department reported 152 Collisions along our major roadways.

As reported in the 2015 National Citizen survey 65% of Elk Grove resident's main mode of transportation is the automobile. 65% of Elk Grove residents responded negatively to the flow of traffic with this number increased from the 2013 survey responses.

Air Quality:

1. The EIR needs to include updated air quality modeling that considers full buildout of the entire region, and current accepted health risk assessments.

2. The EIR needs to estimate the reductions that may occur by each mitigation being proposed. In other words, it is not acceptable to simply state air quality levels will be improved through greater utilization of transit buses--provide a percentage improvement.

<u>Background</u>:

The Sacramento Region remains in the severe non-attainment category for air quality. According to the 2014 Community Health Status Report, Sacramento County has a higher asthma rate than the state average. Elk Grove (95624) rated higher in deaths from chronic diseases from 2006-2010 than some other areas of Sacramento County.

For reasons noted above the traffic analysis needs to assess the impacts of traffic at full build out and provide further justification for overriding considerations than the Finding of Facts and Overriding Considerations used in the 2003 General Plan EIR.

The 2003 General Plan EIR Facts of Findings and Overriding Considerations has not provided the promised additional employment opportunities nor has it improved the jobs/housing balance of the city. As noted in an earlier General Growth report by the city, the majority of the General Plan amendments and rezones have been developer and <u>not</u> city initiated. There have been 47 general plan updates and rezones.

The worst case scenarios must include all any potential changes allowed within the newly defined "Flexible Zoning", and the project or potential project plans within the North, South, East, and West Study areas. For instance, The Bilby SOI application submitted plans for housing with very little commercial. The Elk Grove Multisport Complex submitted plans identifying the development of the area. At a city council meeting it was suggested to include the North Study area for a possible University.

The City of Elk Grove's ambitious plan for urban growth exceeds what the county envisioned will do nothing to change the severe non-attainment for air quality. How will this be reconciled?

Safety:

1. The EIR needs to take a proactive approach to risk assessment because Elk Grove's unique situation of having 24 million gallons of above-ground propane storage served by a rail line.

2. The EIR needs to outline the current or necessary evacuation plans in the event of a disaster.

3. The EIR needs to identify the potential risk sites resulting not only from normal operations, but in this age of increased terrorism, the sites where a man-made risk is present.

4. The EIR needs to address the transport of hazardous materials through the city, and summarize the average frequency, quantities, and type of materials being transported, including by rail.

The "baseline" EIR for the General Plan is now 14 years old. I would recommend that the proposed EIR not attempt to borrow heavily from that EIR.

The 2003 Elk Grove General Plan was to serve as a blueprint for the future growth of the area. The 47 general plan amendments and rezones significantly changed the blueprint by adding to our poor air quality, increased traffic patterns, continuing jobs/housing imbalance and uncertainty for residents and businesses alike. The general plan update must reflect the community vision statement and this statement must not be diluted by Facts and Findings of Overriding Considerations.

Thank you for the opportunity to submit comments.

Sincerely,

Lynn Wheat

Lynn Wheat

Wheat91@yahoo.com

City of Elk Grove
Contact: Christopher Jordan, AICP
8401 Laguna Palms Way
Elk Grove, CA 95758

July 24, 2017

SUBJECT: Notice of Preparation of Environmental Impact Report for the City of Elk Grove General Plan Update

Dear Mr. Jordan:

The Laguna Creek Watershed Council requests that the following issues be thoroughly explored and evaluated in the Environmental Impact Report for the City of Elk Grove General Plan Update so as to ensure consistency with the City's goal of preserving and enhancing Elk Grove's natural resources.

1. Integrate a creek corridor protection policy into the General Plan.
    - We suggest 300 feet from edge of creek, based on an analysis performed by Geosyntec.
    - Adopt creek corridor management practices based on the work of consultants for the City that is just beginning. We recognized this work is in progress but want to emphasize its importance.
2. Adopt subdivision standards that optimize use of Low Impact Development practices, stormwater reuse and groundwater recharge:
    - Require stormwater capture practices in new and infill development whenever possible
    - Utilize dry wells for stormwater management and groundwater recharge
    - Memorialize California Department of Water Resources guidelines for drought tolerant landscaping
    - Promote construction of roadways and parking lots that capture stormwater.
3. Set aside areas within City parks to maintain natural features, not only landscaped features.
4. Implement overlay zones that protect riparian corridors and aquifer recharge areas
5. Given the likelihood that climate change will adversely affect the health of the Laguna Creek and our neighbors in the Stone Lakes area, integrate climate mitigation and adaptations strategies whenever possible.
    - Identify ways to increase the number of trees in Elk Grove, reduce car traffic (subdivision design that do not fosters car dependency), traffic calming measures, public transportation, etc.

We look forward to working with the City as this process develops. Members of the LCWC remain available to assist and provide technical information whenever needed.

Very Truly Yours,

Barbara Washburn
President, Board of Directors
Laguna Creek Watershed Council

SACRAMENTO LOCAL AGENCY FORMATION COMMISSION
1112 I Street, Suite 100 •Sacramento, CA 95814• (916) 874-6458• Fax (916) 874-2939
www.saclafco.org

DATE: July 24, 2017

City of Elk Grove
City Manager's Office
Strategic Initiatives and Long Range Planning
c/o Christopher Jordan, AICP
8401 Laguna Palms Way
Elk Grove, CA 95758

Subject: Notice of Preparation for the City of Elk Grove General Plan Update

Dear Mr. Jordon,

Thank you for providing the Notice of Preparation (NOP) for the City of Elk Grove General Plan Update Environmental Impact Report (Elk Grove GPU EIR) to the Sacramento Local Agency Formation Commission (LAFCo) for review and comment. As described in the NOP, the project will result in a new General Plan for the City, including diagrams and policies for land use, transportation, and resource conservation. These three components will be further defined in chapters related to urban and rural development, the economy, mobility, community and resource protection, and public services, health and safety. The General Plan Update will also include modifications to existing community plans and the creation of two new community plans. Updates to the City's Climate Action Plan and Zoning Code will be developed concurrently with the General Plan. Simultaneously, the Cosumnes Community Services District will update its Park and Recreation Master Plan to coordinate the provision of recreation facilities with development in concert with the City's revised General Plan and Community Plans. According to the NOP, all of these actions will be assessed in the Elk Grove GPU EIR.

Several of the Study Areas identified in NOP Figure 3 are outside of the City's Sphere of Influence and corporate boundaries. Future amendments to the City's Sphere or annexations of these areas to the City or service providers will fall under the jurisdiction of LAFCo. Thus, we are a responsible agency pursuant to CEQA.

Following is a discussion of project description, EIR analysis and environmental issue areas of concern to LAFCo. It may be that the indirect effects of implementing the revised General Plan will have no adverse effect for one or more of these environmental issues. If so, we request that the environmental documentation clearly state that such resource is not present in the project area and that no impact would result.

A. Definition of Opportunity Sites and Study Areas – We note that NOP Table 2, Anticipated Land Use Changes, reports substantial increases in dwelling units, population and jobs within the Study Areas over existing conditions and over development that would occur with buildout of the current General Plan. Although not necessary at the NOP stage, we request that the DEIR define the Opportunity Site and Study Area designations in sufficient detail to permit reviewers to determine proposed land use designations and uses within such areas, land use intensities, and policies that will apply to areas within these designations.

B. Infill and Growth Strategies - This leads in to our overarching request to the City as expressed in comments made at the City's September 15, 2015 Regional Agency outreach session. At that time we requested that the City through its General Plan Update process more clearly articulate an infill strategy, including the encouragement of infill and the provision of services to such projects. The infill strategy should also identify the benefits of, and constraints to such development. Simultaneously, a growth strategy should describe how the City will grow, why it will grow, how growth will be phased - such the introduction of thresholds of land inventory, how services will be provided and financed for new growth areas, and how planned growth corresponds to regional planning initiatives such as the SACOG Blueprint and the Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS).

In furtherance of these strategies, it may be helpful that the General Plan also include comprehensive annexation policies, as well as a thorough agriculture and open space preservation program.

C. Role of LAFCo – The EIR should include a discussion regarding the future role and sequence of LAFCo in any General Plan Update's New Growth strategy and LAFCo's role as a responsible agency.

D. Environmental Issues - The EIR should address the following issues of statutory concern to LAFCo to permit LAFCo to use the City's environmental documentation in the Commission's consideration of any future annexation activity.

Population, Employment and Housing – The EIR's evaluation should discuss the presence and potential loss of affordable housing within the planning area and, if there would be any loss, what affect the loss would have on a countywide basis. As part of the Commission's review of future City boundary change requests, LAFCo is required to ensure that there be no net loss of targeted housing resources on a countywide basis. If targeted housing resources are located, or planned for the General Plan Study Areas, the EIR should evaluate whether implementation of the General Plan would maintain such resources or continue to allow their potential development. If not, the EIR should explain how this loss of affordable housing would affect the City's and County's provision of targeted housing types, and propose mitigation to ensure that both the City and County meet their state allocation for affordable housing.

Public Services and Utilities – The EIR's evaluation of public services and utilities should focus on the following issues, including whether any physical facilities would need to be constructed to serve development anticipated by the updated General Plan, including those outside of the City's planning area, whose construction potentially could have environmental effects. If so, the secondary effects of constructing and operating such facilities should be evaluated. Secondly, the evaluation should assess whether the City and any other service providers have (1) the service capability and capacity to serve development anticipated by the updated General Plan, and (2) whether they can provide services to infill and new growth areas without adversely affecting existing service levels elsewhere in their service areas.

The evaluation should assess whether the City would perform any services now being provided by another service provider in the planning area, and whether substitution of the City for that provider would have any adverse effects on the previous provider's ability to maintain services elsewhere in its service area.

Natural Resources - Agricultural Lands – In evaluating and considering future annexation requests, LAFCo is required to make findings regarding agricultural resources within the context of LAFCo enabling legislation, and local policies and standards. To permit LAFCo to complete this evaluation, the EIR's analysis should include a discussion of any current agricultural uses and activities within and adjacent to the General Plan Update planning area, including the presence of any lands protected by Williamson Act contracts or within a Farmland Security Zone. The evaluation should also discuss the characteristics of soils found within the area (NRCS land use capability classification and storie index rating [from soil survey], and FMMP classification [from DOC Important Farmlands Map]) to determine the presence or absence of "prime agricultural land" as defined by Government Code §56064. Areas of prime agricultural land should be displayed on a map. In addition to soils information, if agricultural uses are present, for each use or operation the EIR should determine if the use supports, at a minimum, one Animal Unit (AU)/acre or has returned, or would return if planted with fruit or nut bearing trees, an agricultural value of at least $400/acre for 3 of the last 5 years. Describe the location and determine the acreage of such areas. (See GC §56064) If there are lands protected by Williamson Act contracts or within a Farmland Security Zone, determine the status, location, and acreage of such lands (renewal, non-renewal), and if non-renewal, the expiration date of the contract(s). If the project would result in the loss of prime agricultural land or protected agricultural lands, evaluate the trend of agricultural land loss countywide, and what portion of the overall inventory and loss that such a project represents. The EIR should propose mitigation to reduce any potential impacts to important agricultural resources to a less-than-significant level. Please see Comment B, above.

LAFCo is required to make findings regarding five tests of "prime agricultural land" as defined by GC §56064. The General Plan EIR or a subsequent CEQA document needs to provide information regarding such lands to permit LAFCo to make future findings as a responsible agency.

Natural Resources - Open Space - The analysis should include an evaluation of any open space resources as defined by GC §65560 that are located within or adjacent to the planning area. Such resources should be depicted on a map. If implementation of the updated General Plan would result in the loss of open space resources, the EIR needs to evaluate the trend of open space loss countywide, and what portion of the overall inventory and loss that this project represents. The EIR should propose mitigation to reduce any potential impacts to open space resources to a less-than-significant level.

Environmental Justice - State law requires LAFCo to consider the extent to which a project will promote environmental justice. "Environmental justice" means the fair treatment of people of all races, cultures, and incomes with respect to the location of public facilities and the provision of public services. The EIR should provide sufficient evidence to permit LAFCo to make a future determination regarding this issue.

Disadvantaged Unincorporated Communities - "Disadvantaged unincorporated community" means inhabited territory, (having 12 or more registered voters as residents) that constitutes all or a portion of a "disadvantaged community" as defined by Section 79505.5 of the Water Code. If this General Plan Update includes an update to the Housing Element or the Land Use Element, it should include a map and analysis of the characteristics of any island, fringe, or legacy unincorporated communities. as defined. The EIR should address the existing and future service needs of any so identified communities.
Habitat Preservation – South Sacramento Habitat Conservation Plan – The biological resource evaluation should include an evaluation of impacts to the South Sacramento Habitat Conservation Plan (SSHCP) and other resource planning documents, and provide mitigation for any identified adverse

effects consistent with the requirements of State and Federal regulatory authorities for impacts to special status species and sensitive habitats.

The Study Areas identified in Figure 3 are currently within unincorporated Sacramento County, and unincorporated public and private development activities for areas within the County General Plan's Urban Services Boundary (USB) would be covered by the SSHCP, and would also be subject to the requirements and conservation measures of the SSHCP. As the City is not a plan participant in the SSHCP, coverage within those unincorporated areas that are currently in the USB may cease upon annexation to the City. Additionally, there are portions of the Study Areas that are outside of the USB, and that are not scheduled to receive coverage by the SSHCP.

Future City development in areas both inside and outside of the current USB could conflict with the assumptions regarding species, habitats, and preserves underlying the SSHCP's conservation strategy. The DEIR should evaluate the potential effect on the SSHCP of implementing the City's General Plan Update.

Floodplain Areas – The scope of the analysis of hydrology and water quality/stormwater quality set forth in the NOP should include an evaluation of the City's existing and future compliance with the requirements of the Central Valley Flood Protection Plan, including protection of urban areas from the 0.5 percent (200-year) flood, and with the regulations of all other applicable Federal, State, and regional agencies.

Land Use and Planning – The NOP discussion of topics to be evaluated within Land Use should include a consistency evaluation with not only the SACOG Blueprint, but also the Metropolitan Transportation Plan/Sustainable Communities Strategy and the SSHCP.

Climate Change – The analysis should include a consistency evaluation of the City's proposed Climate Action Plan Update with current State policies, requirements, and greenhouse gas emissions reductions goals.

We look forward to working with the City in the development of the updated General Plan and supporting documents and in its environmental review to provide the factual and policy basis to provide support for LAFCo action on future City boundary requests. Please do not hesitate to contact me if you have any questions regarding our comments.

Sincerely,

SACRAMENTO LOCAL AGENCY FORMATION COMMISSION

Donald J. Lockhart, AICP
Assistant Executive Officer

Cc:

Sacramento Area
Council of
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SACOG

July 24, 2017

City of Elk Grove
City Manager's Office
Strategic Initiatives and Long Range Planning
c/o Christopher Jordan, AICP
8401 Laguna Palms Way
Elk Grove, CA 95758

Re: Comments on the Notice of Preparation of a Draft Environmental Impact Report for the City of Elk Grove General Plan Update

Dear Mr. Jordan,

Thank you for inviting SACOG's comments on the Notice of Preparation of a Draft Environmental Impact Report (DEIR) for the City of Elk Grove General Plan Update. The basis for our comments is the Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) and Blueprint. SACOG's primary responsibility is developing and implementing the MTP/SCS, a document that establishes transportation spending priorities throughout the region. The MTP/SCS must be based on the most likely land use pattern to be built over the 20+ year planning period, and it must conform with federal and state air quality regulations. The foundation for the MTP/SCS land use forecast is local government general plans, community plans, specific plans, and other local policies and regulations. Other market and regulatory/policy variables that are considered help refine the sum of the local plans in order to determine the most likely future development pattern for a specific period of time. The Blueprint vision is based on the principles of smart growth and is intended to give general direction on how the region should develop to reap the benefits of the Blueprint Preferred Scenario (and related MTP/SCS). Implementation of the Blueprint vision depends greatly on the efforts of cities and counties to implement that vision through local plans and projects. The MTP/SCS and Blueprint are in alignment with each other because of these local efforts.

The current Metropolitan Transportation Plan/Sustainable Communities Strategy (2016 MTP/SCS) was adopted in February 2016. The 2016 MTP/SCS includes a transportation project list and forecasts housing and employment expected through 2036. The Draft Land Use Map and Draft Transportation Network Diagram included in the NOP includes potential growth areas and proposed transportation projects that are not included in the 2016 MTP/SCS. In general, it is not uncommon that a General Plan will include more growth and transportation projects than what is in the MTP/SCS. General Plans typically envision the ultimate build out of the jurisdiction whereas the MTP/SCS is a financially constrained plan for a particular period of time, is updated every four years, and is subject to a transportation conformity requirement under the federal Clean Air Act. SACOG will begin its quadrennial update of the MTP/SCS in early 2018 and will be working with the City of Elk Grove to determine if there is a need to update the project list and/or projections for the City in the next MTP/SCS.

SACOG is supportive of the City's efforts to grow jobs to balance the currently high ratio of housing to jobs, and we also recognize that the City may eventually need additional land outside of the current city limits to support that goal. In addition to the quality of life benefits residents get when they have jobs and services close to where they live, we know there is a strong connection between land use patterns, travel behavior, and air quality. Specifically, certain land use strategies, such as jobs-housing balance, lead to increased walking, biking, and transit use, shorter automobile trips, and reduced mobile-source air pollution. For the region to realize the reduction in vehicle miles traveled, congestion reduction, and air pollution reduction that the MTP/SCS achieves, it is important for communities that currently have a low ratio of jobs to housing, such as Elk Grove, to plan for and attract enough job growth over time to minimize the need for long-distance commuting out of the city. To ensure that the potential new growth areas that are outside of the current City limits achieve this shared goal, we recommend the City include policies around the timing and phasing of the proposed "Study Areas". Policies that require phased growth (including timing and conditions for when development can occur as well as establishing thresholds for employment and/or neighborhood serving commercial that must be reached before additional housing growth can occur) encourage a complete neighborhood and can be used to help the City ensure its goal of more employment is being met before a significant number of new homes are added in this area.

Additionally, the "Study Areas" outside the existing City limits comprise a larger area than the future urbanized area that the Blueprint Preferred Scenario envisions post-2050. We encourage the City to implement strong and specific policies around any potential future development of these areas for the reasons stated above, but also because research from our Rural-Urban Connection Strategy (RUCS) project indicates that the more certainty there is about the edge of future urbanization, the lesser the impact will be on neighboring farming operations. A higher percentage of land is more likely to remain in active agriculture if there is some long-term certainty that farming is an economically viable use of the land.

As noted earlier, SACOG will be starting an update to the MTP/SCS next year. With limited transportation funds available and constrained growth projections, we will be encouraging all our member jurisdictions to identify their high priority areas for growth and transportation funding. We look forward to further discussions with the City throughout the General Plan update process and as the MTP/SCS update process moves forward next year.

Thank you again for the opportunity to comment and for continuing to engage us in this important process. Please don't hesitate to contact me or Kacey Lizon, Planning Manager at klizon@sacog.org or 916-340-6265 if you have further questions.

Sincerely,

James Corless
Chief Executive Officer
JC:JH:sm

Comments by Michael Monasky
Notice Of Preparation
Elk Grove General Plan
Environmental Impact Report
Monday, July 24, 2017
Re: Need for Health Impact Assessment

The process of creating a general plan is one so complex it is left to specialists, mostly planners, whose insight can be vast or incredibly myopic. In this case, the plan's published vision is neither; it's delusional.

The Vision versus The Delusion

The City of Elk Grove is a great place to make a home, a great place to work, and a great place to play. Our community is diverse, healthy, safe, and family-oriented, with thriving schools and plentiful parks, shops, and places to work. Agriculture, rural homes, and urban life flourish together. Our natural resources, including water and open spaces, are protected and offer a variety of recreational opportunities. Community members travel easily by automobile, by bicycle, on foot, or using transit. The City is proactive in making daily life healthy and sustainable—considering the needs of future generations while protecting what is valued today. Well-maintained infrastructure and the right mix of services and amenities draw new and dynamic businesses and development to Elk Grove. Development is guided to ensure responsible growth and opportunities for a diversity of individuals that call Elk Grove home.

The general plan vision describes people who can easily get around, whether by car, on foot, or bicycle. Instead, our community is a series of arterials, north-south and east-west race tracks, where cars accelerate and brake hard from one traffic signal to another. Pedestrians aren't safe; bicycling is an exercise in suicide. In 1993 prior to city incorporation, about 30,000 people lived in what is now Elk Grove. The population is approaching six-fold growth, with over 170,000 people. Residency will have exceeded 200,000 by 2050.

Public Safety

So, the delusions abound. The west side of Elk Grove is plagued by an epidemic of criminal larceny. Former council and current state assembly member Jim Cooper recently lamented that 15,000 kids play soccer in Elk Grove and don't have sufficient facilities (which is debatable.) Scandalously, the schools have not been fire inspected by the Cosumnes Community Services District.

Natural Resources

I can only wonder what city this document's vision is describing when it remarks that water and open spaces are protected. The underground water table, upon which this city depends, is being severely depleted. A few years ago, the city council unilaterally withdrew from the South County Habitat Conservation Plan, a cooperative county work group; the council seeks to expand the southward sprawl of this giant suburb into the riparian floodplain in the hopes of building more rooftops to finance past financial blunders; so much for responsible growth policy. Yet twelve per cent of existing city land is vacant; that's over five square miles of undeveloped land within city limits (over 3,200 acres).

Public Assets/Economic Needs

The roads, Elk Grove's largest asset, are not being properly repaired; so much for a well-maintained infrastructure. The city council has ignored global warming threats by adopting the weakest possible climate change policy; so much for considering the needs of future generations. The city council has no interest in the current economic needs of its residents, workers, and citizens; it declares that the city has “plentiful places to work”, yet refuses to adopt an advanced minimum wage ordinance that the community could well afford, broadening the distribution of wealth to workers who live marginally in the poorest zip codes north of the city. The city manager, under direction of the council, has privatized over two-thirds of city staff, including billing, garbage collection, transit, planning, and engineering services while failing to hire minority staff reflective of the community's gender and ethnic diversity.

The city council, through its city manager and staff, is unable to understand the delusional schema under which it operates. The council's vision could improve from these delusions to a level of myopia; both perspectives imperil positive outcomes.

What The General Plan Should Look Like

There is only one plan that will work to improve Elk Grove as a place to live, work, and play. That plan ignores the needs of land speculators, financiers, and builders whose cash funds the political campaigns of the members of the city council. That positive plan incorporates respect for the will, desires, and dreams of the people who live, work, and play in Elk Grove. That plan protects Mother Nature and mitigates global warming. That plan remands the council to play well with the county, to re-engage with the remaining members of the habitat work group.

That plan tells special interests, like Howard Hughes, its subsidiary, Boyd Gaming, and the newly resurrected yet tragically fractured Wilton tribe to take a hike and make the corporate speculators pay dearly for their painful and destructive industries. That plan tells the council to develop vacant land within the city limits, and makes the areas roughly south of Kammerer Road and east of Grant Line Road into agricultural and natural preserves in perpetuity. That plan tells the city manager to stop privatizing our local government. That plan makes for composting of our green waste on agricultural lands, and forbids incineration of any waste. That plan makes for time to get it right, not just following the bankrupt, outdated CEQA guidelines which have, for five decades, been denigrated, excoriated, and debilitated by the moneyed financial, property, and building interests in our clotted court systems.

Health Impact Assessment

As ineffectual as CEQA is in protecting the environment, it still allows for protections of human health. There should be an additional section for a Health Impact Assessment coordinated with the Sacramento County Division of Public Health. This section should include rates of heart and lung disease, obesity and diabetes, as well as a mental health assessment of life satisfaction. Mental illness, anxiety and depression, as well as air and water pollution have impacts upon human health. There should be an assessment of physical activity based upon neighborhood walkability. The scope of the General Plan should include these factors as part of the claims of concern in the vision for human health and safety, as well as its declaration that Elk Grove is a “great place” to live, work, and play.

Conclusion

The council does not share the sensibilities of the fictional George Bailey of Bedford Falls in “It's a Wonderful Life”. Frank Capra's jingoistic tale let the rich bully, the despised but powerful banker Henry F. Potter, have everything but their small town. George Bailey railed against the bully, fearing his little burg would become a Pottersville with rows of casinos, bars, and brothels.

So far, the council's general plan expansion southward looks like a very large and powerful, half-billion dollar per year casino sandwiched between many rooftops, eventually degrading into suburban slums. What the plan should look like is a work in progress, carefully crafted with full government transparency and a complete complement of public input patiently applied to plan and evaluate the outcomes. The community does not need more strip malls, congested neighborhood traffic, and a casino-based economy; it needs streets that are walkable so that we get out of our cars and put an end to the obesity epidemic. People cannot live, work, and play in any other environment so hurriedly, inappropriately, and irresponsibly planned and built. It takes time to build a great community, that this council, its staff, and even our justice system will not yield.

Sent Via E-Mail

July 24, 2017

City of Elk Grove
City Manager's Office
Strategic Initiatives and Long Range Planning
C/O Christopher Jordan, AICP
8401 Laguna Palms Way
Elk Grove, CA 95758
cjordan@elkgrovecity.org

Subject: Notice of Preparation of a Draft Environmental Impact Report for the City of Elk Grove General Plan Update (Clearinghouse No. 2017062058)

Dear Mr. Jordan:

The Sacramento Municipal Utility District (SMUD) appreciates the opportunity to provide comments on the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the City of Elk Grove General Plan Update (Project). SMUD is the primary energy provider for Sacramento County and the proposed Project area. SMUD's vision is to empower our customers with solutions and options that increase energy efficiency, protect the environment, reduce global warming, and lower the cost to serve our region. As a Responsible Agency, SMUD aims to ensure that the proposed Project limits the potential for significant environmental effects on SMUD facilities, employees, and customers.

It is our desire that the DEIR will acknowledge any Project impacts related to the following:

- Overhead and or underground transmission and distribution line easements. Please view the following links on smud.org for more information regarding transmission encroachment:
  - https://www.smud.org/en/business/customer-service/support-and-services/design-construction-services.htm
  - https://www.smud.org/en/do-business-with-smud/real-estate-services/transmission-right-of-way.htm
- Utility line routing
- Electrical load needs/requirements
- Energy Efficiency
- Climate Change
- Cumulative impacts related to the need for increased electrical delivery

Based on our preliminary review of the Project NOP, SMUD will require additional information in order to evaluate the General Plan Update's impact on SMUD's electrical system. However, we encourage the City to continue providing SMUD the flexibility to site future substations and associated distribution facilities in all zoning districts/land use designations to promote safe and reliable electrical service citywide.

SMUD looks forward to discussing the above areas of interest as well as discussing any other potential issues. We aim to be partners in the efficient and sustainable delivery of the proposed Project. Please ensure that the information included in this response is conveyed to the Project planners.

Environmental leadership is a core value of SMUD and we look forward to collaborating with you on this Project. Again, we appreciate the opportunity to provide input on this NOP. If you have any questions regarding this letter, please contact Kim Crawford at kim.crawford@smud.org or (916)732-5063.

Sincerely,

Angela C. McIntire
Regional & Local Government Affairs
Sacramento Municipal Utility District
6301 S Street, Mail Stop A313
Sacramento, CA 95817
angela.mcintire@smud.org

Cc: Kim Crawford, SMUD

STATE OF CALIFORNIA – NATURAL RESOURCES AGENCY EDMUND G. BROWN, JR., *Governor*

DELTA PROTECTION COMMISSION
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July 25, 2017

Christopher Jordan
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

Re: City of Elk Grove General Plan Update Project (SCH# 2017062058)

Dear Mr. Jordan:

Thank you for providing the Delta Protection Commission (Commission) the opportunity to review the Notice of Preparation for the City of Elk Grove General Plan Update Project (Project). The Project involves a comprehensive update of the City's General Plan, including the State-required elements and topics.

The Commission is a state agency charged with ensuring orderly, balanced conservation and development of Delta land resources and improved flood protection. Proposed local government projects within the Primary Zone of the Legal Delta must be consistent with the Commission's Land Use and Resource Management Plan (LURMP). Portions of the city of Elk Grove border the Primary Zone and are located within the Secondary Zone.

Although the Project does not fall within the Commission's jurisdiction over "development" in the Primary Zone, we submit these comments under Public Resource Code Sections 29770(d) and 5852-5855 (The Great California Delta Trail Act). These sections state that the Commission may comment on projects in the Secondary Zone that impact the Primary Zone, and direct the Commission to develop and adopt a plan and implementation program for a continuous regional recreational corridor extending throughout the five Delta Counties linking to the San Francisco Bay Trail and Sacramento River Trail.

We encourage the Project EIR to consider the LURMP and its policies when assessing the General Plan Update's consistency with applicable land use plans, policies, and regulations and to discuss the Delta Trail in the recreation and transportation setting. The Commission is currently preparing the Great California Delta Trail Blueprint Report for Sacramento, San Joaquin, and Yolo counties.

Thank you for the opportunity to provide input. Please contact Blake Roberts, Senior Environmental Planner, at (916) 375-4237 for any questions regarding the comments provided.

Sincerely,

Erik Vink
Executive Director

cc: Don Nottoli, Sacramento County Board of Supervisors and Commission member

DEPARTMENT OF TRANSPORTATION
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Making Conservation
a California Way of Life

July 21, 2017

03-SAC-2017-00152
SCH# 2017062058

Mr. Christopher Jordan
Assistant to the City Manager
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

Notice of Preparation (NOP) – City of Elk Grove General Plan Update

Dear Mr. Jordan:

Thank you for including the California Department of Transportation (Caltrans) in the review process for the City of Elk Grove General Plan Update. Caltrans' new mission, vision, and goals signal a modernization of our approach to California's transportation system. We review this local development for impacts to the State Highway System (SHS) in keeping with our mission, vision and goals for sustainability/livability/economy, and safety/health. We provide these comments consistent with the State's smart mobility goals that support a vibrant economy, and build communities, not sprawl.

The City of Elk Grove is conducting a comprehensive update of its General Plan. The General Plan Update Project includes the following related components: (1) General Plan Update; (2) Climate Action Plan Update; (3) Specific Plan Amendments; (4) Zoning Code Amendments; and, (5) Parks and Recreation Master Plan Update. Caltrans provides the following comments for the NOP.

General Comments

It is suggested that the general plan make clear that early coordination with Caltrans is required for any project proposal that would entail any ongoing ingress or egress; or work within, over, under, or adjacent to public transportation rights of way (for example: driveways; striping; shoulder enhancement; cut and fill sloping; drainage changes; debris removal; utility installations and maintenance; sound walls; fencing; signage; lighting; vegetation alteration; sidewalks; transit pullouts or shelters; traffic management during events; use of cranes, etc.) that might require an encroachment permit, airspace lease, traffic management plan, or outdoor advertising permit to mitigate direct physical impacts. As a rule of thumb, in accordance with most local jurisdiction land use development permit requirements, Caltrans should be notified of all proposals that will entail construction or facilities on parcels with boundaries that occur within 300 feet of state right of way.

Transportation Concept Reports (TCRs) and Corridor System Management Plans (CSMPs) are documents that identify needed transportation improvements for the SHS in the City. These documents are available at: http://www.dot.ca.gov/dist3/departments/planning/systemplanning.htm. These reports provide information on the current and future projects as well as the future vision for these facilities. The General Plan should be consistent with these documents.

As part of the circulation network, improvements to the SHS and the operation of the SHS are a shared responsibility between the City and Caltrans. This should be reflected in a policy statement.

Traffic Operations

The EIR must include, in the traffic circulation section, a traffic study to determine potential project impacts to State and local facilities within the City of Elk Grove Planning Area and to propose improvements to mitigate those impacts. State facilities must include State Route 99 (SR 99) and Interstate 5 (I-5) mainline and interchanges within the City of Elk Grove Planning Area.

The EIR should also address complete street needs within the City of Elk Grove Planning Area as well as explore multi modal (vehicle, bike, pedestrian, and transit) transportation opportunities. Project proponents should consider whether there will be a reduction or an increase in VMT with the general plan update.

Moving toward the State's SB 743 goals includes supporting infill land use, reducing greenhouse gas emissions, and supporting active transportation. Caltrans suggests that general plan update includes a VMT-based transportation analysis that assesses impacts and mitigates with transportation demand management (TDM), multimodal, and operational efficiency projects. It is recommended that the City develop their own VMT threshold for CEQA analysis. Other jurisdictions are moving to this CEQA threshold as they look toward the near future where LOS is being phased out.

Roadway Sizing Diagram

It is recommended that the Roadway Sizing Diagram maintain roadway widths that support the targeted design, V/C ratio, and traffic forecasts, as well as support safety, access, and multimodal connectivity. Caltrans requests to be included in the State and local project level reviews for widening projects identified in the Roadway Sizing Diagram to assess any impacts they may have to the SHS and the multimodal transportation network.

CEQA Streamlining

As part of SB 375, a streamlined process for CEQA review was established for certain types of development. The Sacramento Area Council of Governments (SACOG) contained many of these policies in the Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS).

Since some streamlining provisions would essentially exempt project level analysis of impacts to the SHS, potential direct and cumulative SHS impacts should be analyzed and mitigated by the General Plan and associated documents. Caltrans has a common interest with the City to see that SHS safety impacts and other operational deficiencies are addressed to preserve mobility to, from, and within the City. By addressing impacts at the General Plan level, Caltrans and the City can ensure that those impacts are mitigated or avoided, while also providing streamlining benefits at the project level.

I-5 Subregional Corridor Mitigation Program (SCMP)

The SCMP is a voluntary impact fee program for new development within the I-5, SR 99, SR 51 and US 50 corridors between the cities of Elk Grove, Sacramento, and West Sacramento. The SCMP was developed with each city in collaboration with Caltrans for the purpose of promoting smart growth, reducing daily congested vehicle miles traveled (VMT) and delay on the SHS, and reduce daily VMT on the regional transportation system though funding an array of projects that includes all modes. The SCMP has been adopted by the cities of Sacramento and West Sacramento.

It is recommended the City adopt the I-5 SCMP to provide developers an alternative to mitigating SHS impacts under CEQA. Through the I-5 SCMP, impact fee contributions would be made in lieu of conducting a detailed traffic impact study for freeway mainline impacts, including freeway mainline analysis, "merge and diverge" analysis and weaving analysis on the mainline under either existing and cumulative conditions. If the applicant chooses to contribute towards the SCMP, the applicant would still be required to analyze intersection impacts, off-ramp traffic back-up onto the freeway mainline, and any significant safety issues in the vicinity of the intersection.

If the applicant elects not to contribute towards the SCMP, then a detailed traffic impact study may be required, along with mitigation measures, to lessen impacts to acceptable levels that are consistent with local and regional plans.

If you have any questions regarding these comments or require additional information, please contact Alex Fong, Intergovernmental Review Coordinator at (916) 274-0566 or by email at: Alexander.Fong@dot.ca.gov.

Sincerely,

JEFFREY MORNEAU, Chief
Office of Transportation Planning – South Branch

Central Valley Regional Water Quality Control Board

18 July 2017

Christopher Jordan
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

CERTIFIED MAIL
91 7199 9991 7035 8361 5301

COMMENTS TO REQUEST FOR REVIEW FOR THE NOTICE OF PREPARATION FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, CITY OF ELK GROVE GENERAL PLAN UPDATE PROJECT, SCH# 2017062058, SACRAMENTO COUNTY

Pursuant to the State Clearinghouse's 23 June 2017 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Notice of Preparation for the Draft Environment Impact Report* for the City of Elk Grove General Plan Update Project, located in Sacramento County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

I. Regulatory Setting

Basin Plan

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues.

For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website:
http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/.

Antidegradation Considerations

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Policy is available on page IV-15.01 at:
http://www.waterboards.ca.gov/centralvalleywater_issues/basin_plans/sacsjr.pdf

In part it states:

> *Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.*
>
> *This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.*

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

II. Permitting Requirements

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan

(SWPPP).

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]

The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/.

For more information on the Caltrans Phase I MS4 Permit, visit the State Water Resources Control Board at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/caltrans.shtml.

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml

Industrial Storm Water General Permit

Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 2014-0057-DWQ.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml.

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the

[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements.

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916) 557-5250.

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACOE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance (i.e., discharge of dredge or fill material) of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications.

Waste Discharge Requirements (WDRs)

Discharges to Waters of the State

If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation.

Land Disposal of Dredge Material

If the project will involve dredging, Water Quality Certification for the dredging activity and Waste Discharge Requirements for the land disposal may be needed.

Local Agency Oversite

Pursuant to the State Water Board's Onsite Wastewater Treatment Systems Policy (OWTS Policy), the regulation of septic tank and leach field systems may be regulated under the local agency's management program in lieu of WDRs. A county environmental health department may permit septic tank and leach field systems designed for less than 10,000 gpd. For more information on septic system regulations, visit the Central Valley Water Board's website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/owts/sb_owts_policy.pdf

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit2.shtml.

Dewatering Permit
If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Risk General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Risk Waiver) R5-2013-0145. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

For more information regarding the Low Risk General Order and the application process, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf

For more information regarding the Low Risk Waiver and the application process, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2013-0145_res.pdf

Regulatory Compliance for Commercially Irrigated Agriculture
If the property will be used for commercial irrigated agricultural, the discharger will be required to obtain regulatory coverage under the Irrigated Lands Regulatory Program. There are two options to comply:

1. **Obtain Coverage Under a Coalition Group.** Join the local Coalition Group that supports land owners with the implementation of the Irrigated Lands Regulatory Program. The Coalition Group conducts water quality monitoring and reporting to the Central Valley Water Board on behalf of its growers. The Coalition Groups charge an annual membership fee, which varies by Coalition Group. To find the Coalition Group in your area, visit the Central Valley Water Board's website at: http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/app_approval/index.shtml; or contact water board staff at (916) 464-4611 or via email at IrrLands@waterboards.ca.gov.

2. **Obtain Coverage Under the General Waste Discharge Requirements for Individual Growers, General Order R5-2013-0100.** Dischargers not participating in a third-party group (Coalition) are regulated individually. Depending on the specific site conditions, growers may be required to monitor runoff from their property, install monitoring wells, and submit a notice of intent, farm plan, and other action plans regarding their actions to comply with their General Order. Yearly costs would include State administrative fees (for example, annual fees for farm sizes from 10-100 acres are currently $1,084 + $6.70/Acre); the cost to prepare annual monitoring reports; and water quality monitoring costs. To enroll as an Individual Discharger under the Irrigated Lands Regulatory Program, call the

Central Valley Water Board phone line at (916) 464-4611 or e-mail board staff at IrrLands@waterboards.ca.gov.

Low or Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Dewatering and Other Low Threat Discharges to Surface Waters* (Low Threat General Order) or the General Order for *Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Superchlorination Projects, and Other Limited Threat Wastewaters to Surface Water* (Limited Threat General Order). A complete application must be submitted to the Central Valley Water Board to obtain coverage under these General NPDES permits.

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0074.pdf

For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0073.pdf

NPDES Permit

If the proposed project discharges waste that could affect the quality of the waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit.

For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit3.shtml

If you have questions regarding these comments, please contact me at (916) 464-4644 or Stephanie.Tadlock@waterboards.ca.gov.

for Stephanie Tadlock
Environmental Scientist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento

APPENDIX C:
AIR QUALITY MODEL OUTPUTS

Elk Grove GPU Construction Emissions

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	306.03	Dwelling Unit	99.36	550,854.00	817
General Light Industry	8.90	1000sqft	0.20	8,900.00	0
Regional Shopping Center	0.49	1000sqft	0.01	490.00	0
Condo/Townhouse High Rise	0.49	Dwelling Unit	0.01	490.00	1
City Park	1.65	Acre	1.65	71,874.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	58
Climate Zone	6			**Operational Year**	2020
Utility Company	Sacramento Municipal Utility District				
CO2 Intensity (lb/MWhr)	590.31	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Elk Grove GPU Average Annual Construction Emissions (Project-Baseline, units and square feet, divided by 20 years)

Land Use - Land use inputs based on net increase in GPU land use and units (Project minus baseline), average annual growth over 2. Note that SFDUs reflect development within study areas. Land Uses that decrease from baseline are not reflected. Values are scaled down and calculated off model to account for CalEEMod errors in estimating emissions for projects over 40 acres.

Construction Phase - Assumes all phases would occur within one calendar year to estimate average annual emissions. 2015 selected as baseline year to reflect more conservative scenario.

Off-road Equipment - Assumes CalEEMod Defaults

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	150.00	100.00
tblConstructionPhase	NumDays	220.00	18.00
tblConstructionPhase	NumDays	3,100.00	205.00
tblConstructionPhase	NumDays	200.00	7.00
tblConstructionPhase	NumDays	310.00	13.00
tblConstructionPhase	NumDays	220.00	13.00
tblConstructionPhase	NumDays	120.00	7.00
tblConstructionPhase	PhaseEndDate	12/25/2030	12/31/2015
tblConstructionPhase	PhaseEndDate	4/18/2029	11/19/2015
tblConstructionPhase	PhaseEndDate	10/7/2015	1/9/2015
tblConstructionPhase	PhaseEndDate	5/31/2017	2/5/2015
tblConstructionPhase	PhaseEndDate	2/20/2030	12/8/2015
tblConstructionPhase	PhaseEndDate	3/23/2016	1/20/2015
tblConstructionPhase	PhaseStartDate	2/21/2030	12/8/2015
tblConstructionPhase	PhaseStartDate	6/1/2017	2/6/2015
tblConstructionPhase	PhaseStartDate	3/24/2016	1/20/2015
tblConstructionPhase	PhaseStartDate	4/19/2029	11/20/2015
tblConstructionPhase	PhaseStartDate	10/8/2015	1/10/2015
tblGrading	AcresOfGrading	32.50	775.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	391.2468	131.4567	67.9807	0.1036	87.5996	6.6065	94.2061	20.1441	6.0780	26.2221			10,863.2112	3.1559	0.0000	10,942.1092
Maximum	**391.2468**	**131.4567**	**67.9807**	**0.1036**	**87.5996**	**6.6065**	**94.2061**	**20.1441**	**6.0780**	**26.2221**			**10,863.2112**	**3.1559**	**0.0000**	**10,942.1092**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	391.2468	131.4567	67.9807	0.1036	87.5996	6.6065	94.2061	20.1441	6.0780	26.2221			10,863.2112	3.1559	0.0000	10,942.1092
Maximum	**391.2468**	**131.4567**	**67.9807**	**0.1036**	**87.5996**	**6.6065**	**94.2061**	**20.1441**	**6.0780**	**26.2221**			**10,863.2112**	**3.1559**	**0.0000**	**10,942.1092**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	14.6903	0.2935	25.3735	1.3400e-003		0.1395	0.1395		0.1395	0.1395			45.5367	0.0444	0.0000	46.6469
Energy	0.2432	2.0837	0.9225	0.0133		0.1681	0.1681		0.1681	0.1681			2,653.4509	0.0509	0.0487	2,669.2191
Mobile	7.4729	24.5114	79.2561	0.2186	17.1122	0.2177	17.3299	4.5764	0.2047	4.7811			22,100.0621	1.0843		22,127.1687
Total	**22.4065**	**26.8886**	**105.5520**	**0.2332**	**17.1122**	**0.5253**	**17.6374**	**4.5764**	**0.5122**	**5.0886**			**24,799.0497**	**1.1795**	**0.0487**	**24,843.0346**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	14.6903	0.2935	25.3735	1.3400e-003		0.1395	0.1395		0.1395	0.1395			45.5367	0.0444	0.0000	46.6469
Energy	0.2432	2.0837	0.9225	0.0133		0.1681	0.1681		0.1681	0.1681			2,653.4509	0.0509	0.0487	2,669.2191
Mobile	7.4729	24.5114	79.2561	0.2186	17.1122	0.2177	17.3299	4.5764	0.2047	4.7811			22,100.0621	1.0843		22,127.1687
Total	**22.4065**	**26.8886**	**105.5520**	**0.2332**	**17.1122**	**0.5253**	**17.6374**	**4.5764**	**0.5122**	**5.0886**			**24,799.0497**	**1.1795**	**0.0487**	**24,843.0346**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2015	1/9/2015	5	7	
2	Site Preparation	Site Preparation	1/10/2015	1/20/2015	5	7	
3	Grading	Grading	1/20/2015	2/5/2015	5	13	
4	Building Construction	Building Construction	2/6/2015	11/19/2015	5	205	
5	Paving	Paving	11/20/2015	12/8/2015	5	13	
6	Architectural Coating	Architectural Coating	12/8/2015	12/31/2015	5	18	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 775

Acres of Paving: 0

Residential Indoor: 1,116,472; Residential Outdoor: 372,157; Non-Residential Indoor: 14,085; Non-Residential Outdoor: 4,695; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Elk Grove GPU Construction Emissions - Sacramento County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	145.00	46.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	29.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.4696	47.0522	23.3470	0.0388		2.4633	2.4633		2.2972	2.2972			4,012.0679	1.0845		4,039.1792
Total	**4.4696**	**47.0522**	**23.3470**	**0.0388**		**2.4633**	**2.4633**		**2.2972**	**2.2972**			**4,012.0679**	**1.0845**		**4,039.1792**

3.2 Demolition - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1086	0.0655	0.8829	1.3800e-003	0.1141	9.9000e-004	0.1151	0.0303	9.2000e-004	0.0312			136.7326	6.4000e-003		136.8925
Total	**0.1086**	**0.0655**	**0.8829**	**1.3800e-003**	**0.1141**	**9.9000e-004**	**0.1151**	**0.0303**	**9.2000e-004**	**0.0312**			**136.7326**	**6.4000e-003**		**136.8925**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.4696	47.0522	23.3470	0.0388		2.4633	2.4633		2.2972	2.2972			4,012.0679	1.0845		4,039.1792
Total	**4.4696**	**47.0522**	**23.3470**	**0.0388**		**2.4633**	**2.4633**		**2.2972**	**2.2972**			**4,012.0679**	**1.0845**		**4,039.1792**

3.2 Demolition - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1086	0.0655	0.8829	1.3800e-003	0.1141	9.9000e-004	0.1151	0.0303	9.2000e-004	0.0312			136.7326	6.4000e-003		136.8925
Total	**0.1086**	**0.0655**	**0.8829**	**1.3800e-003**	**0.1141**	**9.9000e-004**	**0.1151**	**0.0303**	**9.2000e-004**	**0.0312**			**136.7326**	**6.4000e-003**		**136.8925**

3.3 Site Preparation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.2493	55.4642	23.9236	0.0381		3.1336	3.1336		2.8830	2.8830			4,000.7845	1.1944		4,030.6445
Total	**5.2493**	**55.4642**	**23.9236**	**0.0381**	**18.0663**	**3.1336**	**21.1999**	**9.9307**	**2.8830**	**12.8136**			**4,000.7845**	**1.1944**		**4,030.6445**

3.3 Site Preparation - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1303	0.0786	1.0595	1.6600e-003	0.1369	1.1900e-003	0.1381	0.0363	1.1000e-003	0.0374			164.0791	7.6800e-003		164.2710
Total	**0.1303**	**0.0786**	**1.0595**	**1.6600e-003**	**0.1369**	**1.1900e-003**	**0.1381**	**0.0363**	**1.1000e-003**	**0.0374**			**164.0791**	**7.6800e-003**		**164.2710**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.2493	55.4642	23.9236	0.0381		3.1336	3.1336		2.8830	2.8830			4,000.7845	1.1944		4,030.6445
Total	**5.2493**	**55.4642**	**23.9236**	**0.0381**	**18.0663**	**3.1336**	**21.1999**	**9.9307**	**2.8830**	**12.8136**			**4,000.7845**	**1.1944**		**4,030.6445**

3.3 Site Preparation - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1303	0.0786	1.0595	1.6600e-003	0.1369	1.1900e-003	0.1381	0.0363	1.1000e-003	0.0374			164.0791	7.6800e-003		164.2710
Total	**0.1303**	**0.0786**	**1.0595**	**1.6600e-003**	**0.1369**	**1.1900e-003**	**0.1381**	**0.0363**	**1.1000e-003**	**0.0374**			**164.0791**	**7.6800e-003**		**164.2710**

3.4 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					69.2442	0.0000	69.2442	10.1367	0.0000	10.1367			0.0000			0.0000
Off-Road	6.2723	75.8267	41.8203	0.0621		3.4704	3.4704		3.1927	3.1927			6,516.0375	1.9453		6,564.6703
Total	**6.2723**	**75.8267**	**41.8203**	**0.0621**	**69.2442**	**3.4704**	**72.7146**	**10.1367**	**3.1927**	**13.3295**			**6,516.0375**	**1.9453**		**6,564.6703**

3.4 Grading - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1448	0.0873	1.1772	1.8400e-003	0.1521	1.3200e-003	0.1535	0.0404	1.2300e-003	0.0416			182.3101	8.5300e-003		182.5234
Total	**0.1448**	**0.0873**	**1.1772**	**1.8400e-003**	**0.1521**	**1.3200e-003**	**0.1535**	**0.0404**	**1.2300e-003**	**0.0416**			**182.3101**	**8.5300e-003**		**182.5234**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					69.2442	0.0000	69.2442	10.1367	0.0000	10.1367			0.0000			0.0000
Off-Road	6.2723	75.8267	41.8203	0.0621		3.4704	3.4704		3.1927	3.1927			6,516.0375	1.9453		6,564.6703
Total	**6.2723**	**75.8267**	**41.8203**	**0.0621**	**69.2442**	**3.4704**	**72.7146**	**10.1367**	**3.1927**	**13.3295**			**6,516.0375**	**1.9453**		**6,564.6703**

3.4 Grading - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1448	0.0873	1.1772	1.8400e-003	0.1521	1.3200e-003	0.1535	0.0404	1.2300e-003	0.0416			182.3101	8.5300e-003		182.5234
Total	**0.1448**	**0.0873**	**1.1772**	**1.8400e-003**	**0.1521**	**1.3200e-003**	**0.1535**	**0.0404**	**1.2300e-003**	**0.0416**			**182.3101**	**8.5300e-003**		**182.5234**

3.5 Building Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6734	30.2005	18.8039	0.0269		2.1245	2.1245		1.9976	1.9976			2,701.0442	0.6782		2,718.0002
Total	**3.6734**	**30.2005**	**18.8039**	**0.0269**		**2.1245**	**2.1245**		**1.9976**	**1.9976**			**2,701.0442**	**0.6782**		**2,718.0002**

3.5 Building Construction - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.4247	6.9602	3.6069	0.0117	0.2770	0.0846	0.3616	0.0797	0.0809	0.1606			1,232.409 1	0.0893		1,234.641 2
Worker	1.0496	0.6332	8.5350	0.0133	1.1030	9.6000e-003	1.1126	0.2926	8.8900e-003	0.3015			1,321.748 1	0.0619		1,323.294 3
Total	**1.4743**	**7.5933**	**12.1418**	**0.0251**	**1.3800**	**0.0942**	**1.4742**	**0.3723**	**0.0898**	**0.4621**			**2,554.157 2**	**0.1511**		**2,557.935 5**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6734	30.2005	18.8039	0.0269		2.1245	2.1245		1.9976	1.9976			2,701.044 2	0.6782		2,718.000 2
Total	**3.6734**	**30.2005**	**18.8039**	**0.0269**		**2.1245**	**2.1245**		**1.9976**	**1.9976**			**2,701.044 2**	**0.6782**		**2,718.000 2**

3.5 Building Construction - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.4247	6.9602	3.6069	0.0117	0.2770	0.0846	0.3616	0.0797	0.0809	0.1606			1,232.409 1	0.0893		1,234.641 2
Worker	1.0496	0.6332	8.5350	0.0133	1.1030	9.6000e-003	1.1126	0.2926	8.8900e-003	0.3015			1,321.748 1	0.0619		1,323.294 3
Total	**1.4743**	**7.5933**	**12.1418**	**0.0251**	**1.3800**	**0.0942**	**1.4742**	**0.3723**	**0.0898**	**0.4621**			**2,554.157 2**	**0.1511**		**2,557.935 5**

3.6 Paving - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3639	25.7121	15.2877	0.0228		1.4415	1.4415		1.3262	1.3262			2,390.748 6	0.7137		2,408.592 0
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.3639**	**25.7121**	**15.2877**	**0.0228**		**1.4415**	**1.4415**		**1.3262**	**1.3262**			**2,390.748 6**	**0.7137**		**2,408.592 0**

3.6 Paving - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1086	0.0655	0.8829	1.3800e-003	0.1141	9.9000e-004	0.1151	0.0303	9.2000e-004	0.0312			136.7326	6.4000e-003		136.8925
Total	**0.1086**	**0.0655**	**0.8829**	**1.3800e-003**	**0.1141**	**9.9000e-004**	**0.1151**	**0.0303**	**9.2000e-004**	**0.0312**			**136.7326**	**6.4000e-003**		**136.8925**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3639	25.7121	15.2877	0.0228		1.4415	1.4415		1.3262	1.3262			2,390.7486	0.7137		2,408.5920
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.3639**	**25.7121**	**15.2877**	**0.0228**		**1.4415**	**1.4415**		**1.3262**	**1.3262**			**2,390.7486**	**0.7137**		**2,408.5920**

3.6 Paving - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1086	0.0655	0.8829	1.3800e-003	0.1141	9.9000e-004	0.1151	0.0303	9.2000e-004	0.0312			136.7326	6.4000e-003		136.8925
Total	**0.1086**	**0.0655**	**0.8829**	**1.3800e-003**	**0.1141**	**9.9000e-004**	**0.1151**	**0.0303**	**9.2000e-004**	**0.0312**			**136.7326**	**6.4000e-003**		**136.8925**

3.7 Architectural Coating - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	388.1578					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4066	2.5703	1.9018	2.9700e-003		0.2209	0.2209		0.2209	0.2209			281.4481	0.0367		282.3643
Total	**388.5644**	**2.5703**	**1.9018**	**2.9700e-003**		**0.2209**	**0.2209**		**0.2209**	**0.2209**			**281.4481**	**0.0367**		**282.3643**

3.7 Architectural Coating - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.2099	0.1266	1.7070	2.6700e-003	0.2206	1.9200e-003	0.2225	0.0585	1.7800e-003	0.0603			264.3496	0.0124		264.6589
Total	**0.2099**	**0.1266**	**1.7070**	**2.6700e-003**	**0.2206**	**1.9200e-003**	**0.2225**	**0.0585**	**1.7800e-003**	**0.0603**			**264.3496**	**0.0124**		**264.6589**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	388.1578					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4066	2.5703	1.9018	2.9700e-003		0.2209	0.2209		0.2209	0.2209			281.4481	0.0367		282.3643
Total	**388.5644**	**2.5703**	**1.9018**	**2.9700e-003**		**0.2209**	**0.2209**		**0.2209**	**0.2209**			**281.4481**	**0.0367**		**282.3643**

3.7 Architectural Coating - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.2099	0.1266	1.7070	2.6700e-003	0.2206	1.9200e-003	0.2225	0.0585	1.7800e-003	0.0603			264.3496	0.0124		264.6589
Total	**0.2099**	**0.1266**	**1.7070**	**2.6700e-003**	**0.2206**	**1.9200e-003**	**0.2225**	**0.0585**	**1.7800e-003**	**0.0603**			**264.3496**	**0.0124**		**264.6589**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	7.4729	24.5114	79.2561	0.2186	17.1122	0.2177	17.3299	4.5764	0.2047	4.7811			22,100.0621	1.0843		22,127.1687
Unmitigated	7.4729	24.5114	79.2561	0.2186	17.1122	0.2177	17.3299	4.5764	0.2047	4.7811			22,100.0621	1.0843		22,127.1687

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	3.12	37.54	27.62	21,283	21,283
Condo/Townhouse High Rise	2.05	2.11	1.68	5,145	5,145
General Light Industry	62.03	11.75	6.05	129,581	129,581
Regional Shopping Center	20.92	24.49	12.37	28,239	28,239
Single Family Housing	2,913.41	3,032.76	2637.98	7,418,901	7,418,901
Total	3,001.53	3,108.64	2,685.70	7,603,149	7,603,149

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	10.00	5.00	6.50	33.00	48.00	19.00	66	28	6
Condo/Townhouse High Rise	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3
General Light Industry	10.00	5.00	6.50	59.00	28.00	13.00	92	5	3
Regional Shopping Center	10.00	5.00	6.50	16.30	64.70	19.00	54	35	11
Single Family Housing	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.551662	0.040953	0.203778	0.123762	0.021802	0.005583	0.018466	0.022043	0.002076	0.002280	0.006004	0.000618	0.000971
Condo/Townhouse High Rise	0.551662	0.040953	0.203778	0.123762	0.021802	0.005583	0.018466	0.022043	0.002076	0.002280	0.006004	0.000618	0.000971
General Light Industry	0.551662	0.040953	0.203778	0.123762	0.021802	0.005583	0.018466	0.022043	0.002076	0.002280	0.006004	0.000618	0.000971
Regional Shopping Center	0.551662	0.040953	0.203778	0.123762	0.021802	0.005583	0.018466	0.022043	0.002076	0.002280	0.006004	0.000618	0.000971
Single Family Housing	0.551662	0.040953	0.203778	0.123762	0.021802	0.005583	0.018466	0.022043	0.002076	0.002280	0.006004	0.000618	0.000971

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.2432	2.0837	0.9225	0.0133		0.1681	0.1681		0.1681	0.1681			2,653.4509	0.0509	0.0487	2,669.2191
NaturalGas Unmitigated	0.2432	2.0837	0.9225	0.0133		0.1681	0.1681		0.1681	0.1681			2,653.4509	0.0509	0.0487	2,669.2191

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Condo/Townhouse High Rise	13.0865	1.4000e-004	1.2100e-003	5.1000e-004	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004			1.5396	3.0000e-005	3.0000e-005	1.5487
General Light Industry	873.175	9.4200e-003	0.0856	0.0719	5.1000e-004		6.5100e-003	6.5100e-003		6.5100e-003	6.5100e-003			102.7265	1.9700e-003	1.8800e-003	103.3370
Regional Shopping Center	7.27616	8.0000e-005	7.1000e-004	6.0000e-004	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005			0.8560	2.0000e-005	2.0000e-005	0.8611
Single Family Housing	21660.8	0.2336	1.9962	0.8494	0.0127		0.1614	0.1614		0.1614	0.1614			2,548.3288	0.0488	0.0467	2,563.4723
Total		**0.2432**	**2.0837**	**0.9225**	**0.0133**		**0.1681**	**0.1681**		**0.1681**	**0.1681**			**2,653.4510**	**0.0509**	**0.0487**	**2,669.2191**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Condo/Townhouse High Rise	0.0130865	1.4000e-004	1.2100e-003	5.1000e-004	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004			1.5396	3.0000e-005	3.0000e-005	1.5487
General Light Industry	0.873175	9.4200e-003	0.0856	0.0719	5.1000e-004		6.5100e-003	6.5100e-003		6.5100e-003	6.5100e-003			102.7265	1.9700e-003	1.8800e-003	103.3370
Regional Shopping Center	0.00727616	8.0000e-005	7.1000e-004	6.0000e-004	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005			0.8560	2.0000e-005	2.0000e-005	0.8611
Single Family Housing	21.6608	0.2336	1.9962	0.8494	0.0127		0.1614	0.1614		0.1614	0.1614			2,548.3288	0.0488	0.0467	2,563.4723
Total		**0.2432**	**2.0837**	**0.9225**	**0.0133**		**0.1681**	**0.1681**		**0.1681**	**0.1681**			**2,653.4510**	**0.0509**	**0.0487**	**2,669.2191**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	14.6903	0.2935	25.3735	1.3400e-003		0.1395	0.1395		0.1395	0.1395			45.5367	0.0444	0.0000	46.6469
Unmitigated	14.6903	0.2935	25.3735	1.3400e-003		0.1395	0.1395		0.1395	0.1395			45.5367	0.0444	0.0000	46.6469

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.9142					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	12.0034					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Landscaping	0.7727	0.2935	25.3735	1.3400e-003		0.1395	0.1395		0.1395	0.1395			45.5367	0.0444		46.6469
Total	**14.6903**	**0.2935**	**25.3735**	**1.3400e-003**		**0.1395**	**0.1395**		**0.1395**	**0.1395**			**45.5367**	**0.0444**	**0.0000**	**46.6469**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.9142					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	12.0034					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Landscaping	0.7727	0.2935	25.3735	1.3400e-003		0.1395	0.1395		0.1395	0.1395			45.5367	0.0444		46.6469
Total	**14.6903**	**0.2935**	**25.3735**	**1.3400e-003**		**0.1395**	**0.1395**		**0.1395**	**0.1395**			**45.5367**	**0.0444**	**0.0000**	**46.6469**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Elk Grove GPU Operational Emissions

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	2,273.00	1000sqft	52.18	2,273,000.00	0
General Light Industry	763.00	1000sqft	17.52	763,000.00	0
General Heavy Industry	409.00	1000sqft	9.39	409,000.00	0
City Park	68.00	Acre	68.00	2,962,080.00	0
Single Family Housing	1,379.00	Dwelling Unit	447.73	2,482,200.00	3682
Apartments High Rise	253.00	Dwelling Unit	4.08	253,000.00	676
Apartments Mid Rise	143.00	Dwelling Unit	3.76	143,000.00	382
Condo/Townhouse	9.00	Dwelling Unit	0.56	9,000.00	24
Regional Shopping Center	26.00	1000sqft	0.60	26,000.00	0
Government Office Building	31.00	1000sqft	0.71	31,000.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 3.5 **Precipitation Freq (Days)** 58

Climate Zone 6 **Operational Year** 2015

Utility Company Sacramento Municipal Utility District

CO2 Intensity (lb/MWhr) 590.31 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Elk Grove GPU baseline operational emissions for 2015

Land Use - Base upon existing land use types in 2015 scaled down

Construction Phase - this model runs for operational emissions only

Vehicle Trips - mobile source emissions were modeling using EMFAC 2014

Energy Use - Assumes the existing buildings do not comply with the 2016 title 24 standard

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	150.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	150.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	4.6537	48.0329			0.1141	2.5257	2.6398	0.0303	2.3580	2.3883			4,186.2276	1.0979	0.0000	4,213.6741
2015	4.5782	47.1177			0.1141	2.4643	2.5784	0.0303	2.2982	2.3284			4,148.8005	1.0909	0.0000	4,176.0717
2016	4.4438	45.5073			0.1141	2.3637	2.4778	0.0303	2.2024	2.2327			4,110.9626	1.0839	0.0000	4,138.0604
2017	5.0646	52.3357			18.2032	2.8796	21.0828	9.9670	2.6493	12.6163			4,054.8622	1.1994	0.0000	4,081.8101
2018	4.6555	48.2514			18.2032	2.5779	20.7811	9.9670	2.3717	12.3387			3,984.1484	1.1981	0.0000	4,014.1005
2019	4.8326	54.5717			18.2032	2.3913	20.5945	9.9670	2.2000	12.1670			6,303.7478	1.9478	0.0000	6,352.4426

Elk Grove GPU Operational Emissions - Sacramento County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	4.5363	50.2433			8.8255	2.1750	11.0004	3.6369	2.0010	5.6378			6,164.5679	1.9470	0.0000	6,213.2420
2021	4.2713	46.4409			8.8255	1.9864	10.8119	3.6369	1.8275	5.4643			6,160.3393	1.9469	0.0000	6,209.0112
2022	3.6996	38.8804			8.8255	1.6359	10.4614	3.6369	1.5050	5.1419			6,159.2088	1.9479	0.0000	6,207.9058
2023	15.8393	121.0651			32.3947	1.4255	33.3962	8.7620	1.3114	9.7034			57,611.5724	2.7034	0.0000	57,679.1566
2024	14.9075	117.7060			32.3940	0.9047	33.2987	8.7618	0.8500	9.6118			56,520.9043	2.6282	0.0000	56,586.6080
2025	14.0851	114.4698			32.3933	0.8093	33.2026	8.7615	0.7602	9.5217			55,445.6754	2.5614	0.0000	55,509.7097
2026	13.4466	112.3613			32.3927	0.7981	33.1908	8.7613	0.7496	9.5109			54,477.0399	2.5057	0.0000	54,539.6831
2027	12.8331	110.4320			32.3922	0.7851	33.1773	8.7611	0.7374	9.4985			53,603.2133	2.4543	0.0000	53,664.5716
2028	12.2194	108.7702			32.3918	0.7707	33.1624	8.7609	0.7240	9.4849			52,833.2637	2.4077	0.0000	52,893.4564
2029	11.5669	107.1938			32.3914	0.7565	33.1479	8.7608	0.7107	9.4715			52,148.3005	2.3626	0.0000	52,207.3657
2030	10.8806	101.1928			32.3910	0.3635	32.7545	8.7607	0.3500	9.1106			51,885.1176	1.8354	0.0000	51,931.0031
2031	10.2315	99.8525			32.3907	0.3509	32.7417	8.7606	0.3382	9.0987			51,358.6433	1.7969	0.0000	51,403.5658
2032	9.6518	98.6217			32.3905	0.3398	32.7303	8.7605	0.3278	9.0882			50,905.6124	1.7632	0.0000	50,949.6925
2033	9.1752	97.5428			32.3902	0.3300	32.7202	8.7604	0.3186	9.0790			50,514.3318	1.7345	0.0000	50,557.6938
2034	8.7437	96.5562			32.3901	0.3207	32.7107	8.7603	0.3100	9.0703			50,178.2672	1.7077	0.0000	50,220.9584
2035	8.2772	94.9251			32.3899	0.2547	32.6446	8.7603	0.2446	9.0048			49,894.0791	1.6757	0.0000	49,935.9708
2036	8.2772	94.9251			32.3899	0.2547	32.6446	8.7603	0.2446	9.0048			49,894.0791	1.6757	0.0000	49,935.9708
2037	8.2772	94.9251			32.3899	0.2547	32.6446	8.7603	0.2446	9.0048			49,894.0791	1.6757	0.0000	49,935.9708

Elk Grove GPU Operational Emissions - Sacramento County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2038	8.2772	94.9251			32.3899	0.2547	32.6446	8.7603	0.2446	9.0048			49,894.0791	1.6757	0.0000	49,935.9708
2039	8.2772	94.9251			32.3899	0.2547	32.6446	8.7603	0.2446	9.0048			49,894.0791	1.6757	0.0000	49,935.9708
2040	6.8957	91.8257			32.3893	0.2131	32.6024	8.7600	0.2047	8.9648			49,087.9554	1.5916	0.0000	49,127.7452
2041	6.8957	91.8257			32.3893	0.2131	32.6024	8.7600	0.2047	8.9648			49,087.9554	1.5916	0.0000	49,127.7452
2042	6.8957	91.8257			32.3893	0.2131	32.6024	8.7600	0.2047	8.9648			49,087.9554	1.5916	0.0000	49,127.7452
2043	6.8957	91.8257			32.3893	0.2131	32.6024	8.7600	0.2047	8.9648			49,087.9554	1.5916	0.0000	49,127.7452
2044	6.8957	91.8257			32.3893	0.2131	32.6024	8.7600	0.2047	8.9648			49,087.9554	1.5916	0.0000	49,127.7452
2045	6.3719	90.2980			32.3889	0.2023	32.5912	8.7599	0.1947	8.9546			48,751.2480	1.5507	0.0000	48,790.0149
2046	6.3719	90.2980			32.3889	0.2023	32.5912	8.7599	0.1947	8.9546			48,751.2480	1.5507	0.0000	48,790.0149
2047	6.3719	90.2980			32.3889	0.2023	32.5912	8.7599	0.1947	8.9546			48,751.2480	1.5507	0.0000	48,790.0149
2048	6.3719	90.2980			32.3889	0.2023	32.5912	8.7599	0.1947	8.9546			48,751.2480	1.5507	0.0000	48,790.0149
2049	6.3719	90.2980			32.3889	0.2023	32.5912	8.7599	0.1947	8.9546			48,751.2480	1.5507	0.0000	48,790.0149
2050	6.2042	89.1882			32.3886	0.1974	32.5860	8.7598	0.1901	8.9499			48,666.4541	1.5180	0.0000	48,704.4038
2051	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2052	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2053	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2054	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2055	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2056	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2057	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2058	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2059	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2060	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2061	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2062	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2063	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2064	1.1970	6.8903			26.9876	0.1164	27.0613	6.6242	0.1164	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2065	1.0112	3.6566			0.0992	0.1164	0.2156	0.0243	0.1164	0.1408			2,656.5168	0.0893	0.0000	2,658.7489
2066	1.0112	3.6566			0.0992	0.1164	0.2156	0.0243	0.1164	0.1408			2,656.5168	0.0893	0.0000	2,658.7489
2067	110.2801	3.6566			4.3233	0.1164	4.3307	1.0612	0.1164	1.0686			2,656.5168	0.0893	0.0000	2,658.7489
2068	110.2801	0.7270			4.3233	7.4300e-003	4.3307	1.0612	7.4300e-003	1.0686			281.4481	9.9000e-003	0.0000	281.6957
2069	110.2801	0.7270			4.3233	7.4300e-003	4.3307	1.0612	7.4300e-003	1.0686			281.4481	9.9000e-003	0.0000	281.6957
2070	110.2801	0.7270			4.3233	7.4300e-003	4.3307	1.0612	7.4300e-003	1.0686			281.4481	9.9000e-003	0.0000	281.6957
Maximum	**110.2801**	**121.0651**			**32.3947**	**2.8796**	**33.3962**	**9.9670**	**2.6493**	**12.6163**			**57,611.5724**	**2.7034**	**0.0000**	**57,679.1566**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

Elk Grove GPU Operational Emissions - Sacramento County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	4.6537	48.0329			0.1141	2.5257	2.6398	0.0303	2.3580	2.3883			4,186.2276	1.0979	0.0000	4,213.6741
2015	4.5782	47.1177			0.1141	2.4643	2.5784	0.0303	2.2982	2.3284			4,148.8005	1.0909	0.0000	4,176.0717
2016	4.4438	45.5073			0.1141	2.3637	2.4778	0.0303	2.2024	2.2327			4,110.9626	1.0839	0.0000	4,138.0604
2017	5.0646	52.3357			18.2032	2.8796	21.0828	9.9670	2.6493	12.6163			4,054.8622	1.1994	0.0000	4,081.8101
2018	4.6555	48.2514			18.2032	2.5779	20.7811	9.9670	2.3717	12.3387			3,984.1484	1.1981	0.0000	4,014.1005
2019	4.8326	54.5717			18.2032	2.3913	20.5945	9.9670	2.2000	12.1670			6,303.7478	1.9478	0.0000	6,352.4426
2020	4.5363	50.2433			8.8255	2.1750	11.0004	3.6369	2.0010	5.6378			6,164.5679	1.9470	0.0000	6,213.2420
2021	4.2713	46.4409			8.8255	1.9864	10.8119	3.6369	1.8275	5.4643			6,160.3392	1.9469	0.0000	6,209.0112
2022	3.6996	38.8804			8.8255	1.6359	10.4614	3.6369	1.5050	5.1419			6,159.2088	1.9479	0.0000	6,207.9058
2023	15.8393	121.0651			32.3947	1.4255	33.3962	8.7620	1.3114	9.7034			57,611.5724	2.7034	0.0000	57,679.1566
2024	14.9075	117.7060			32.3940	0.9047	33.2987	8.7618	0.8500	9.6118			56,520.9043	2.6282	0.0000	56,586.6080
2025	14.0851	114.4698			32.3933	0.8093	33.2026	8.7615	0.7602	9.5217			55,445.6754	2.5614	0.0000	55,509.7097
2026	13.4466	112.3613			32.3927	0.7981	33.1908	8.7613	0.7496	9.5109			54,477.0399	2.5057	0.0000	54,539.6831
2027	12.8331	110.4320			32.3922	0.7851	33.1773	8.7611	0.7374	9.4985			53,603.2133	2.4543	0.0000	53,664.5716
2028	12.2194	108.7702			32.3918	0.7707	33.1624	8.7609	0.7240	9.4849			52,833.2637	2.4077	0.0000	52,893.4564
2029	11.5669	107.1938			32.3914	0.7565	33.1479	8.7608	0.7107	9.4715			52,148.3005	2.3626	0.0000	52,207.3657
2030	10.8806	101.1928			32.3910	0.3635	32.7545	8.7607	0.3500	9.1106			51,885.1176	1.8354	0.0000	51,931.0031

Elk Grove GPU Operational Emissions - Sacramento County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2031	10.2315	99.8525			32.3907	0.3509	32.7417	8.7606	0.3382	9.0987			51,358.6433	1.7969	0.0000	51,403.5658
2032	9.6518	98.6217			32.3905	0.3398	32.7303	8.7605	0.3278	9.0882			50,905.6124	1.7632	0.0000	50,949.6925
2033	9.1752	97.5428			32.3902	0.3300	32.7202	8.7604	0.3186	9.0790			50,514.3318	1.7345	0.0000	50,557.6938
2034	8.7437	96.5562			32.3901	0.3207	32.7107	8.7603	0.3100	9.0703			50,178.2672	1.7077	0.0000	50,220.9584
2035	8.2772	94.9251			32.3899	0.2547	32.6446	8.7603	0.2446	9.0048			49,894.0791	1.6757	0.0000	49,935.9708
2036	8.2772	94.9251			32.3899	0.2547	32.6446	8.7603	0.2446	9.0048			49,894.0791	1.6757	0.0000	49,935.9708
2037	8.2772	94.9251			32.3899	0.2547	32.6446	8.7603	0.2446	9.0048			49,894.0791	1.6757	0.0000	49,935.9708
2038	8.2772	94.9251			32.3899	0.2547	32.6446	8.7603	0.2446	9.0048			49,894.0791	1.6757	0.0000	49,935.9708
2039	8.2772	94.9251			32.3899	0.2547	32.6446	8.7603	0.2446	9.0048			49,894.0791	1.6757	0.0000	49,935.9708
2040	6.8957	91.8257			32.3893	0.2131	32.6024	8.7600	0.2047	8.9648			49,087.9554	1.5916	0.0000	49,127.7452
2041	6.8957	91.8257			32.3893	0.2131	32.6024	8.7600	0.2047	8.9648			49,087.9554	1.5916	0.0000	49,127.7452
2042	6.8957	91.8257			32.3893	0.2131	32.6024	8.7600	0.2047	8.9648			49,087.9554	1.5916	0.0000	49,127.7452
2043	6.8957	91.8257			32.3893	0.2131	32.6024	8.7600	0.2047	8.9648			49,087.9554	1.5916	0.0000	49,127.7452
2044	6.8957	91.8257			32.3893	0.2131	32.6024	8.7600	0.2047	8.9648			49,087.9554	1.5916	0.0000	49,127.7452
2045	6.3719	90.2980			32.3889	0.2023	32.5912	8.7599	0.1947	8.9546			48,751.2480	1.5507	0.0000	48,790.0149
2046	6.3719	90.2980			32.3889	0.2023	32.5912	8.7599	0.1947	8.9546			48,751.2480	1.5507	0.0000	48,790.0149
2047	6.3719	90.2980			32.3889	0.2023	32.5912	8.7599	0.1947	8.9546			48,751.2480	1.5507	0.0000	48,790.0149
2048	6.3719	90.2980			32.3889	0.2023	32.5912	8.7599	0.1947	8.9546			48,751.2480	1.5507	0.0000	48,790.0149

Elk Grove GPU Operational Emissions - Sacramento County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2049	6.3719	90.2980			32.3889	0.2023	32.5912	8.7599	0.1947	8.9546			48,751.2480	1.5507	0.0000	48,790.0149
2050	6.2042	89.1882			32.3886	0.1974	32.5860	8.7598	0.1901	8.9499			48,666.4541	1.5180	0.0000	48,704.4038
2051	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2052	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2053	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2054	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2055	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2056	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2057	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2058	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2059	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2060	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2061	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2062	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2063	1.1970	6.8903			26.9876	0.0737	27.0613	6.6242	0.0737	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2064	1.1970	6.8903			26.9876	0.1164	27.0613	6.6242	0.1164	6.6980			2,897.5471	0.1041	0.0000	2,900.1503
2065	1.0112	3.6566			0.0992	0.1164	0.2156	0.0243	0.1164	0.1408			2,656.5168	0.0893	0.0000	2,658.7489
2066	1.0112	3.6566			0.0992	0.1164	0.2156	0.0243	0.1164	0.1408			2,656.5168	0.0893	0.0000	2,658.7489

Elk Grove GPU Operational Emissions - Sacramento County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2067	110.2801	3.6566			4.3233	0.1164	4.3307	1.0612	0.1164	1.0686			2,656.516 8	0.0893	0.0000	2,658.748 9
2068	110.2801	0.7270			4.3233	7.4300e-003	4.3307	1.0612	7.4300e-003	1.0686			281.4481	9.9000e-003	0.0000	281.6957
2069	110.2801	0.7270			4.3233	7.4300e-003	4.3307	1.0612	7.4300e-003	1.0686			281.4481	9.9000e-003	0.0000	281.6957
2070	110.2801	0.7270			4.3233	7.4300e-003	4.3307	1.0612	7.4300e-003	1.0686			281.4481	9.9000e-003	0.0000	281.6957
Maximum	**110.2801**	**121.0651**			**32.3947**	**2.8796**	**33.3962**	**9.9670**	**2.6493**	**12.6163**			**57,611.57 24**	**2.7034**	**0.0000**	**57,679.15 66**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	164.9560	1.7701				0.8042	0.8042		0.8042	0.8042			265.7986	0.2779	0.0000	272.7450
Energy	3.3081	29.4342				2.2856	2.2856		2.2856	2.2856			36,088.2793	0.6917	0.6616	36,302.7339
Mobile	194.3331	534.8048			248.4217	6.0796	254.5013	66.5305	5.7593	72.2897			363,506.9212	24.7410		364,125.4453
Total	**362.5972**	**566.0091**			**248.4217**	**9.1694**	**257.5911**	**66.5305**	**8.8490**	**75.3795**			**399,860.9990**	**25.7105**	**0.6616**	**400,700.9242**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	164.9560	1.7701				0.8042	0.8042		0.8042	0.8042			265.7986	0.2779	0.0000	272.7450
Energy	3.3081	29.4342				2.2856	2.2856		2.2856	2.2856			36,088.2793	0.6917	0.6616	36,302.7339
Mobile	194.3331	534.8048			248.4217	6.0796	254.5013	66.5305	5.7593	72.2897			363,506.9212	24.7410		364,125.4453
Total	**362.5972**	**566.0091**			**248.4217**	**9.1694**	**257.5911**	**66.5305**	**8.8490**	**75.3795**			**399,860.9990**	**25.7105**	**0.6616**	**400,700.9242**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/1/2014	8/4/2017	5	700	
2	Site Preparation	Site Preparation	8/5/2017	3/15/2019	5	420	
3	Grading	Grading	3/16/2019	5/12/2023	5	1085	
4	Building Construction	Building Construction	5/13/2023	12/12/2064	5	10850	
5	Paving	Paving	12/13/2064	11/25/2067	5	770	
6	Architectural Coating	Architectural Coating	11/26/2067	11/7/2070	5	770	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 2712.5

Acres of Paving: 0

Residential Indoor: 5,846,580; Residential Outdoor: 1,948,860; Non-Residential Indoor: 5,253,000; Non-Residential Outdoor: 1,751,000; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	3,270.00	1,250.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	654.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.5339	47.9591				2.5246	2.5246		2.3570	2.3570			4,047.0313	1.0907		4,074.2982
Total	**4.5339**	**47.9591**				**2.5246**	**2.5246**		**2.3570**	**2.3570**			**4,047.0313**	**1.0907**		**4,074.2982**

3.2 Demolition - 2014

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1198	0.0738			0.1141	1.0800e-003	0.1152	0.0303	1.0000e-003	0.0313			139.1963	7.1800e-003		139.3759
Total	**0.1198**	**0.0738**			**0.1141**	**1.0800e-003**	**0.1152**	**0.0303**	**1.0000e-003**	**0.0313**			**139.1963**	**7.1800e-003**		**139.3759**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.5339	47.9591				2.5246	2.5246		2.3570	2.3570			4,047.0313	1.0907		4,074.2982
Total	**4.5339**	**47.9591**				**2.5246**	**2.5246**		**2.3570**	**2.3570**			**4,047.0313**	**1.0907**		**4,074.2982**

3.2 Demolition - 2014

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1198	0.0738			0.1141	1.0800e-003	0.1152	0.0303	1.0000e-003	0.0313			139.1963	7.1800e-003		139.3759
Total	**0.1198**	**0.0738**			**0.1141**	**1.0800e-003**	**0.1152**	**0.0303**	**1.0000e-003**	**0.0313**			**139.1963**	**7.1800e-003**		**139.3759**

3.2 Demolition - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.4696	47.0522				2.4633	2.4633		2.2972	2.2972			4,012.0679	1.0845		4,039.1792
Total	**4.4696**	**47.0522**				**2.4633**	**2.4633**		**2.2972**	**2.2972**			**4,012.0679**	**1.0845**		**4,039.1792**

3.2 Demolition - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1086	0.0655			0.1141	9.9000e-004	0.1151	0.0303	9.2000e-004	0.0312			136.7326	6.4000e-003		136.8925
Total	**0.1086**	**0.0655**			**0.1141**	**9.9000e-004**	**0.1151**	**0.0303**	**9.2000e-004**	**0.0312**			**136.7326**	**6.4000e-003**		**136.8925**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.4696	47.0522				2.4633	2.4633		2.2972	2.2972			4,012.0679	1.0845		4,039.1792
Total	**4.4696**	**47.0522**				**2.4633**	**2.4633**		**2.2972**	**2.2972**			**4,012.0679**	**1.0845**		**4,039.1792**

3.2 Demolition - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1086	0.0655			0.1141	9.9000e-004	0.1151	0.0303	9.2000e-004	0.0312			136.7326	6.4000e-003		136.8925
Total	**0.1086**	**0.0655**			**0.1141**	**9.9000e-004**	**0.1151**	**0.0303**	**9.2000e-004**	**0.0312**			**136.7326**	**6.4000e-003**		**136.8925**

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.3463	45.4497				2.3628	2.3628		2.2015	2.2015			3,977.1928	1.0783		4,004.1491
Total	**4.3463**	**45.4497**				**2.3628**	**2.3628**		**2.2015**	**2.2015**			**3,977.1928**	**1.0783**		**4,004.1491**

3.2 Demolition - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0974	0.0576			0.1141	9.3000e-004	0.1150	0.0303	8.6000e-004	0.0311			133.7698	5.6600e-003		133.9113
Total	**0.0974**	**0.0576**			**0.1141**	**9.3000e-004**	**0.1150**	**0.0303**	**8.6000e-004**	**0.0311**			**133.7698**	**5.6600e-003**		**133.9113**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.3463	45.4497				2.3628	2.3628		2.2015	2.2015			3,977.1928	1.0783		4,004.1491
Total	**4.3463**	**45.4497**				**2.3628**	**2.3628**		**2.2015**	**2.2015**			**3,977.1928**	**1.0783**		**4,004.1491**

3.2 Demolition - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0974	0.0576			0.1141	9.3000e-004	0.1150	0.0303	8.6000e-004	0.0311			133.7698	5.6600e-003		133.9113
Total	**0.0974**	**0.0576**			**0.1141**	**9.3000e-004**	**0.1150**	**0.0303**	**8.6000e-004**	**0.0311**			**133.7698**	**5.6600e-003**		**133.9113**

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.1031	42.7475				2.1935	2.1935		2.0425	2.0425			3,924.2833	1.0730		3,951.1070
Total	**4.1031**	**42.7475**				**2.1935**	**2.1935**		**2.0425**	**2.0425**			**3,924.2833**	**1.0730**		**3,951.1070**

3.2 Demolition - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0865	0.0503			0.1141	8.7000e-004	0.1150	0.0303	8.1000e-004	0.0311			130.5788	4.9700e-003		130.7032
Total	**0.0865**	**0.0503**			**0.1141**	**8.7000e-004**	**0.1150**	**0.0303**	**8.1000e-004**	**0.0311**			**130.5788**	**4.9700e-003**		**130.7032**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.1031	42.7475				2.1935	2.1935		2.0425	2.0425			3,924.2833	1.0730		3,951.1070
Total	**4.1031**	**42.7475**				**2.1935**	**2.1935**		**2.0425**	**2.0425**			**3,924.2833**	**1.0730**		**3,951.1070**

3.2 Demolition - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0865	0.0503			0.1141	8.7000e-004	0.1150	0.0303	8.1000e-004	0.0311			130.5788	4.9700e-003		130.7032
Total	**0.0865**	**0.0503**			**0.1141**	**8.7000e-004**	**0.1150**	**0.0303**	**8.1000e-004**	**0.0311**			**130.5788**	**4.9700e-003**		**130.7032**

3.3 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.9608	52.2754				2.8786	2.8786		2.6483	2.6483			3,894.9500	1.1934		3,924.7852
Total	**4.9608**	**52.2754**			**18.0663**	**2.8786**	**20.9448**	**9.9307**	**2.6483**	**12.5790**			**3,894.9500**	**1.1934**		**3,924.7852**

3.3 Site Preparation - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1038	0.0603			0.1369	1.0500e-003	0.1380	0.0363	9.7000e-004	0.0373			156.6946	5.9700e-003		156.8438
Total	**0.1038**	**0.0603**			**0.1369**	**1.0500e-003**	**0.1380**	**0.0363**	**9.7000e-004**	**0.0373**			**156.6946**	**5.9700e-003**		**156.8438**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.9608	52.2754				2.8786	2.8786		2.6483	2.6483			3,894.950 0	1.1934		3,924.785 2
Total	**4.9608**	**52.2754**			**18.0663**	**2.8786**	**20.9448**	**9.9307**	**2.6483**	**12.5790**			**3,894.950 0**	**1.1934**		**3,924.785 2**

3.3 Site Preparation - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1038	0.0603			0.1369	1.0500e-003	0.1380	0.0363	9.7000e-004	0.0373			156.6946	5.9700e-003		156.8438
Total	**0.1038**	**0.0603**			**0.1369**	**1.0500e-003**	**0.1380**	**0.0363**	**9.7000e-004**	**0.0373**			**156.6946**	**5.9700e-003**		**156.8438**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.5627	48.1988				2.5769	2.5769		2.3708	2.3708			3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**			**18.0663**	**2.5769**	**20.6432**	**9.9307**	**2.3708**	**12.3014**			**3,831.6239**	**1.1928**		**3,861.4448**

3.3 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0928	0.0526			0.1369	1.0100e-003	0.1379	0.0363	9.3000e-004	0.0373			152.5246	5.2500e-003		152.6557
Total	**0.0928**	**0.0526**			**0.1369**	**1.0100e-003**	**0.1379**	**0.0363**	**9.3000e-004**	**0.0373**			**152.5246**	**5.2500e-003**		**152.6557**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.5627	48.1988				2.5769	2.5769		2.3708	2.3708			3,831.6239	1.1928		3,861.4448
Total	**4.5627**	**48.1988**			**18.0663**	**2.5769**	**20.6432**	**9.9307**	**2.3708**	**12.3014**			**3,831.6239**	**1.1928**		**3,861.4448**

3.3 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0928	0.0526			0.1369	1.0100e-003	0.1379	0.0363	9.3000e-004	0.0373			152.5246	5.2500e-003		152.6557
Total	**0.0928**	**0.0526**			**0.1369**	**1.0100e-003**	**0.1379**	**0.0363**	**9.3000e-004**	**0.0373**			**152.5246**	**5.2500e-003**		**152.6557**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727				2.3904	2.3904		2.1991	2.1991			3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**			**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**			**3,766.4529**	**1.1917**		**3,796.2445**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0843	0.0463			0.1369	9.8000e-004	0.1379	0.0363	9.0000e-004	0.0372			147.3555	4.6400e-003		147.4714
Total	**0.0843**	**0.0463**			**0.1369**	**9.8000e-004**	**0.1379**	**0.0363**	**9.0000e-004**	**0.0372**			**147.3555**	**4.6400e-003**		**147.4714**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727				2.3904	2.3904		2.1991	2.1991			3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**			**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**			**3,766.4529**	**1.1917**		**3,796.2445**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0843	0.0463			0.1369	9.8000e-004	0.1379	0.0363	9.0000e-004	0.0372			147.3555	4.6400e-003		147.4714
Total	**0.0843**	**0.0463**			**0.1369**	**9.8000e-004**	**0.1379**	**0.0363**	**9.0000e-004**	**0.0372**			**147.3555**	**4.6400e-003**		**147.4714**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.7389	54.5202				2.3827	2.3827		2.1920	2.1920			6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**			**8.6733**	**2.3827**	**11.0560**	**3.5965**	**2.1920**	**5.7885**			**6,140.0195**	**1.9426**		**6,188.5854**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0937	0.0515			0.1521	1.0800e-003	0.1532	0.0404	1.0000e-003	0.0414			163.7283	5.1500e-003		163.8572
Total	**0.0937**	**0.0515**			**0.1521**	**1.0800e-003**	**0.1532**	**0.0404**	**1.0000e-003**	**0.0414**			**163.7283**	**5.1500e-003**		**163.8572**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.7389	54.5202				2.3827	2.3827		2.1920	2.1920			6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**			**8.6733**	**2.3827**	**11.0560**	**3.5965**	**2.1920**	**5.7885**			**6,140.0195**	**1.9426**		**6,188.5854**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0937	0.0515			0.1521	1.0800e-003	0.1532	0.0404	1.0000e-003	0.0414			163.7283	5.1500e-003		163.8572
Total	**0.0937**	**0.0515**			**0.1521**	**1.0800e-003**	**0.1532**	**0.0404**	**1.0000e-003**	**0.0414**			**163.7283**	**5.1500e-003**		**163.8572**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.4501	50.1975				2.1739	2.1739		2.0000	2.0000			6,005.8653	1.9424		6,054.4257
Total	**4.4501**	**50.1975**			**8.6733**	**2.1739**	**10.8472**	**3.5965**	**2.0000**	**5.5965**			**6,005.8653**	**1.9424**		**6,054.4257**

3.4 Grading - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0862	0.0458			0.1521	1.0600e-003	0.1532	0.0404	9.7000e-004	0.0413			158.7026	4.5500e-003		158.8163
Total	**0.0862**	**0.0458**			**0.1521**	**1.0600e-003**	**0.1532**	**0.0404**	**9.7000e-004**	**0.0413**			**158.7026**	**4.5500e-003**		**158.8163**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.4501	50.1975				2.1739	2.1739		2.0000	2.0000			6,005.8653	1.9424		6,054.4257
Total	**4.4501**	**50.1975**			**8.6733**	**2.1739**	**10.8472**	**3.5965**	**2.0000**	**5.5965**			**6,005.8653**	**1.9424**		**6,054.4257**

3.4 Grading - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0862	0.0458			0.1521	1.0600e-003	0.1532	0.0404	9.7000e-004	0.0413			158.7026	4.5500e-003		158.8163
Total	**0.0862**	**0.0458**			**0.1521**	**1.0600e-003**	**0.1532**	**0.0404**	**9.7000e-004**	**0.0413**			**158.7026**	**4.5500e-003**		**158.8163**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998				1.9853	1.9853		1.8265	1.8265			6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**			**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**			**6,007.0434**	**1.9428**		**6,055.6134**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0802	0.0410			0.1521	1.0300e-003	0.1532	0.0404	9.5000e-004	0.0413			153.2958	4.0800e-003		153.3978
Total	**0.0802**	**0.0410**			**0.1521**	**1.0300e-003**	**0.1532**	**0.0404**	**9.5000e-004**	**0.0413**			**153.2958**	**4.0800e-003**		**153.3978**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998				1.9853	1.9853		1.8265	1.8265			6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**			**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**			**6,007.0434**	**1.9428**		**6,055.6134**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0802	0.0410			0.1521	1.0300e-003	0.1532	0.0404	9.5000e-004	0.0413			153.2958	4.0800e-003		153.3978
Total	**0.0802**	**0.0410**			**0.1521**	**1.0300e-003**	**0.1532**	**0.0404**	**9.5000e-004**	**0.0413**			**153.2958**	**4.0800e-003**		**153.3978**

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	3.6248	38.8435				1.6349	1.6349		1.5041	1.5041			6,011.4105	1.9442		6,060.0158
Total	**3.6248**	**38.8435**			**8.6733**	**1.6349**	**10.3082**	**3.5965**	**1.5041**	**5.1006**			**6,011.4105**	**1.9442**		**6,060.0158**

3.4 Grading - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0748	0.0369			0.1521	1.0000e-003	0.1531	0.0404	9.2000e-004	0.0413			147.7983	3.6700e-003		147.8899
Total	**0.0748**	**0.0369**			**0.1521**	**1.0000e-003**	**0.1531**	**0.0404**	**9.2000e-004**	**0.0413**			**147.7983**	**3.6700e-003**		**147.8899**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	3.6248	38.8435				1.6349	1.6349		1.5041	1.5041			6,011.4105	1.9442		6,060.0158
Total	**3.6248**	**38.8435**			**8.6733**	**1.6349**	**10.3082**	**3.5965**	**1.5041**	**5.1006**			**6,011.4105**	**1.9442**		**6,060.0158**

3.4 Grading - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0748	0.0369			0.1521	1.0000e-003	0.1531	0.0404	9.2000e-004	0.0413			147.7983	3.6700e-003		147.8899
Total	**0.0748**	**0.0369**			**0.1521**	**1.0000e-003**	**0.1531**	**0.0404**	**9.2000e-004**	**0.0413**			**147.7983**	**3.6700e-003**		**147.8899**

3.4 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	3.3217	34.5156				1.4245	1.4245		1.3105	1.3105			6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**			**8.6733**	**1.4245**	**10.0978**	**3.5965**	**1.3105**	**4.9070**			**6,011.4777**	**1.9442**		**6,060.0836**

3.4 Grading - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0699	0.0332			0.1521	9.8000e-004	0.1531	0.0404	9.0000e-004	0.0413			142.2416	3.2900e-003		142.3238
Total	**0.0699**	**0.0332**			**0.1521**	**9.8000e-004**	**0.1531**	**0.0404**	**9.0000e-004**	**0.0413**			**142.2416**	**3.2900e-003**		**142.3238**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	3.3217	34.5156				1.4245	1.4245		1.3105	1.3105			6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**			**8.6733**	**1.4245**	**10.0978**	**3.5965**	**1.3105**	**4.9070**			**6,011.4777**	**1.9442**		**6,060.0836**

3.4 Grading - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0699	0.0332			0.1521	9.8000e-004	0.1531	0.0404	9.0000e-004	0.0413			142.2416	3.2900e-003		142.3238
Total	**0.0699**	**0.0332**			**0.1521**	**9.8000e-004**	**0.1531**	**0.0404**	**9.0000e-004**	**0.0413**			**142.2416**	**3.2900e-003**		**142.3238**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849				0.6997	0.6997		0.6584	0.6584			2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**				**0.6997**	**0.6997**		**0.6584**	**0.6584**			**2,555.2099**	**0.6079**		**2,570.4061**

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.8324	101.2489			7.5198	0.1423	7.6621	2.1637	0.1360	2.2998			31,799.85 38	1.5581		31,838.80 72
Worker	11.4342	5.4314			24.8749	0.1596	25.0344	6.5983	0.1470	6.7453			23,256.50 87	0.5374		23,269.94 34
Total	**14.2666**	**106.6802**			**32.3947**	**0.3018**	**32.6965**	**8.7620**	**0.2830**	**9.0450**			**55,056.36 25**	**2.0955**		**55,108.75 05**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849				0.6997	0.6997		0.6584	0.6584			2,555.209 9	0.6079		2,570.406 1
Total	**1.5728**	**14.3849**				**0.6997**	**0.6997**		**0.6584**	**0.6584**			**2,555.209 9**	**0.6079**		**2,570.406 1**

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.8324	101.2489			7.5198	0.1423	7.6621	2.1637	0.1360	2.2998			31,799.8538	1.5581		31,838.8072
Worker	11.4342	5.4314			24.8749	0.1596	25.0344	6.5983	0.1470	6.7453			23,256.5087	0.5374		23,269.9434
Total	**14.2666**	**106.6802**			**32.3947**	**0.3018**	**32.6965**	**8.7620**	**0.2830**	**9.0450**			**55,056.3625**	**2.0955**		**55,108.7505**

3.5 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438				0.6133	0.6133		0.5769	0.5769			2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**				**0.6133**	**0.6133**		**0.5769**	**0.5769**			**2,555.6989**	**0.6044**		**2,570.8077**

3.5 Building Construction - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.6988	99.3515			7.5191	0.1353	7.6544	2.1635	0.1294	2.2929			31,613.93 72	1.5390		31,652.41 26
Worker	10.7371	4.9107			24.8749	0.1560	25.0309	6.5983	0.1437	6.7420			22,351.26 82	0.4848		22,363.38 77
Total	**13.4359**	**104.2622**			**32.3940**	**0.2914**	**32.6853**	**8.7618**	**0.2731**	**9.0349**			**53,965.20 54**	**2.0238**		**54,015.80 03**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438				0.6133	0.6133		0.5769	0.5769			2,555.698 9	0.6044		2,570.807 7
Total	**1.4716**	**13.4438**				**0.6133**	**0.6133**		**0.5769**	**0.5769**			**2,555.698 9**	**0.6044**		**2,570.807 7**

3.5 Building Construction - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.6988	99.3515			7.5191	0.1353	7.6544	2.1635	0.1294	2.2929			31,613.9372	1.5390		31,652.4126
Worker	10.7371	4.9107			24.8749	0.1560	25.0309	6.5983	0.1437	6.7420			22,351.2682	0.4848		22,363.3877
Total	**13.4359**	**104.2622**			**32.3940**	**0.2914**	**32.6853**	**8.7618**	**0.2731**	**9.0349**			**53,965.2054**	**2.0238**		**54,015.8003**

3.5 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697				0.5276	0.5276		0.4963	0.4963			2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**				**0.5276**	**0.5276**		**0.4963**	**0.4963**			**2,556.4744**	**0.6010**		**2,571.4981**

3.5 Building Construction - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.5884	97.5397			7.5184	0.1286	7.6471	2.1632	0.1230	2.2862			31,433.9741	1.5209		31,471.9972
Worker	10.1293	4.4604			24.8749	0.1531	25.0280	6.5983	0.1410	6.7393			21,455.2270	0.4395		21,466.2144
Total	**12.7177**	**102.0002**			**32.3933**	**0.2818**	**32.6751**	**8.7615**	**0.2640**	**9.0255**			**52,889.2011**	**1.9604**		**52,938.2117**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697				0.5276	0.5276		0.4963	0.4963			2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**				**0.5276**	**0.5276**		**0.4963**	**0.4963**			**2,556.4744**	**0.6010**		**2,571.4981**

3.5 Building Construction - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.5884	97.5397			7.5184	0.1286	7.6471	2.1632	0.1230	2.2862			31,433.9741	1.5209		31,471.9972
Worker	10.1293	4.4604			24.8749	0.1531	25.0280	6.5983	0.1410	6.7393			21,455.2270	0.4395		21,466.2144
Total	**12.7177**	**102.0002**			**32.3933**	**0.2818**	**32.6751**	**8.7615**	**0.2640**	**9.0255**			**52,889.2011**	**1.9604**		**52,938.2117**

3.5 Building Construction - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697				0.5276	0.5276		0.4963	0.4963			2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**				**0.5276**	**0.5276**		**0.4963**	**0.4963**			**2,556.4744**	**0.6010**		**2,571.4981**

3.5 Building Construction - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.4910	95.8159			7.5179	0.1219	7.6397	2.1630	0.1165	2.2795			31,262.8504	1.5045		31,300.4632
Worker	9.5882	4.0757			24.8749	0.1487	25.0235	6.5983	0.1368	6.7351			20,657.7151	0.4003		20,667.7219
Total	**12.0792**	**99.8916**			**32.3927**	**0.2705**	**32.6632**	**8.7613**	**0.2534**	**9.0147**			**51,920.5655**	**1.9048**		**51,968.1850**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697				0.5276	0.5276		0.4963	0.4963			2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**				**0.5276**	**0.5276**		**0.4963**	**0.4963**			**2,556.4744**	**0.6010**		**2,571.4981**

3.5 Building Construction - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.4910	95.8159			7.5179	0.1219	7.6397	2.1630	0.1165	2.2795			31,262.8504	1.5045		31,300.4632
Worker	9.5882	4.0757			24.8749	0.1487	25.0235	6.5983	0.1368	6.7351			20,657.7151	0.4003		20,667.7219
Total	**12.0792**	**99.8916**			**32.3927**	**0.2705**	**32.6632**	**8.7613**	**0.2534**	**9.0147**			**51,920.5655**	**1.9048**		**51,968.1850**

3.5 Building Construction - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697				0.5276	0.5276		0.4963	0.4963			2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**				**0.5276**	**0.5276**		**0.4963**	**0.4963**			**2,556.4744**	**0.6010**		**2,571.4981**

3.5 Building Construction - 2027

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.4053	94.2319			7.5173	0.1162	7.6335	2.1628	0.1111	2.2739			31,101.9908	1.4885		31,139.2032
Worker	9.0604	3.7304			24.8749	0.1413	25.0162	6.5983	0.1301	6.7284			19,944.7482	0.3649		19,953.8703
Total	**11.4657**	**97.9623**			**32.3922**	**0.2575**	**32.6497**	**8.7611**	**0.2412**	**9.0023**			**51,046.7389**	**1.8534**		**51,093.0735**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697				0.5276	0.5276		0.4963	0.4963			2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**				**0.5276**	**0.5276**		**0.4963**	**0.4963**			**2,556.4744**	**0.6010**		**2,571.4981**

3.5 Building Construction - 2027

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.4053	94.2319			7.5173	0.1162	7.6335	2.1628	0.1111	2.2739			31,101.9908	1.4885		31,139.2032
Worker	9.0604	3.7304			24.8749	0.1413	25.0162	6.5983	0.1301	6.7284			19,944.7482	0.3649		19,953.8703
Total	**11.4657**	**97.9623**			**32.3922**	**0.2575**	**32.6497**	**8.7611**	**0.2412**	**9.0023**			**51,046.7389**	**1.8534**		**51,093.0735**

3.5 Building Construction - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697				0.5276	0.5276		0.4963	0.4963			2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**				**0.5276**	**0.5276**		**0.4963**	**0.4963**			**2,556.4744**	**0.6010**		**2,571.4981**

3.5 Building Construction - 2028

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.3298	92.8766			7.5169	0.1112	7.6281	2.1627	0.1063	2.2690			30,964.3641	1.4724		31,001.1728
Worker	8.5222	3.4239			24.8749	0.1319	25.0068	6.5983	0.1214	6.7197			19,312.4252	0.3344		19,320.7856
Total	**10.8520**	**96.3005**			**32.3918**	**0.2431**	**32.6349**	**8.7609**	**0.2277**	**8.9886**			**50,276.7894**	**1.8068**		**50,321.9583**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697				0.5276	0.5276		0.4963	0.4963			2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**				**0.5276**	**0.5276**		**0.4963**	**0.4963**			**2,556.4744**	**0.6010**		**2,571.4981**

3.5 Building Construction - 2028

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.3298	92.8766			7.5169	0.1112	7.6281	2.1627	0.1063	2.2690			30,964.36 41	1.4724		31,001.17 28
Worker	8.5222	3.4239			24.8749	0.1319	25.0068	6.5983	0.1214	6.7197			19,312.42 52	0.3344		19,320.78 56
Total	**10.8520**	**96.3005**			**32.3918**	**0.2431**	**32.6349**	**8.7609**	**0.2277**	**8.9886**			**50,276.78 94**	**1.8068**		**50,321.95 83**

3.5 Building Construction - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697				0.5276	0.5276		0.4963	0.4963			2,556.474 4	0.6010		2,571.498 1
Total	**1.3674**	**12.4697**				**0.5276**	**0.5276**		**0.4963**	**0.4963**			**2,556.474 4**	**0.6010**		**2,571.498 1**

3.5 Building Construction - 2029

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.2615	91.5857			7.5165	0.1061	7.6226	2.1625	0.1014	2.2639			30,839.1083	1.4563		30,875.5145
Worker	7.9380	3.1384			24.8749	0.1229	24.9977	6.5983	0.1131	6.7113			18,752.7179	0.3054		18,760.3531
Total	**10.1995**	**94.7241**			**32.3914**	**0.2290**	**32.6203**	**8.7608**	**0.2145**	**8.9753**			**49,591.8262**	**1.7617**		**49,635.8676**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697				0.5276	0.5276		0.4963	0.4963			2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**				**0.5276**	**0.5276**		**0.4963**	**0.4963**			**2,556.4744**	**0.6010**		**2,571.4981**

3.5 Building Construction - 2029

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.2615	91.5857			7.5165	0.1061	7.6226	2.1625	0.1014	2.2639			30,839.1083	1.4563		30,875.5145
Worker	7.9380	3.1384			24.8749	0.1229	24.9977	6.5983	0.1131	6.7113			18,752.7179	0.3054		18,760.3531
Total	**10.1995**	**94.7241**			**32.3914**	**0.2290**	**32.6203**	**8.7608**	**0.2145**	**8.9753**			**49,591.8262**	**1.7617**		**49,635.8676**

3.5 Building Construction - 2030

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346				0.1481	0.1481		0.1481	0.1481			2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**				**0.1481**	**0.1481**		**0.1481**	**0.1481**			**2,897.5468**	**0.1162**		**2,900.4529**

3.5 Building Construction - 2030

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.2001	90.3773			7.5161	0.1010	7.6171	2.1624	0.0965	2.2589			30,727.4950	1.4396		30,763.4838
Worker	7.3713	2.8809			24.8749	0.1145	24.9893	6.5983	0.1053	6.7036			18,260.0759	0.2796		18,267.0665
Total	**9.5714**	**93.2582**			**32.3910**	**0.2154**	**32.6064**	**8.7607**	**0.2018**	**8.9625**			**48,987.5708**	**1.7192**		**49,030.5503**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346				0.1481	0.1481		0.1481	0.1481			2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**				**0.1481**	**0.1481**		**0.1481**	**0.1481**			**2,897.5468**	**0.1162**		**2,900.4529**

3.5 Building Construction - 2030

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.2001	90.3773			7.5161	0.1010	7.6171	2.1624	0.0965	2.2589			30,727.4950	1.4396		30,763.4838
Worker	7.3713	2.8809			24.8749	0.1145	24.9893	6.5983	0.1053	6.7036			18,260.0759	0.2796		18,267.0665
Total	**9.5714**	**93.2582**			**32.3910**	**0.2154**	**32.6064**	**8.7607**	**0.2018**	**8.9625**			**48,987.5708**	**1.7192**		**49,030.5503**

3.5 Building Construction - 2031

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346				0.1481	0.1481		0.1481	0.1481			2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**				**0.1481**	**0.1481**		**0.1481**	**0.1481**			**2,897.5468**	**0.1162**		**2,900.4529**

3.5 Building Construction - 2031

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.1481	89.2798			7.5158	0.0964	7.6122	2.1623	0.0921	2.2544			30,632.7358	1.4251		30,668.3642
Worker	6.7743	2.6381			24.8749	0.1065	24.9813	6.5983	0.0979	6.6962			17,828.3607	0.2555		17,834.7487
Total	**8.9224**	**91.9179**			**32.3907**	**0.2028**	**32.5935**	**8.7606**	**0.1900**	**8.9506**			**48,461.0966**	**1.6807**		**48,503.1129**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346				0.1481	0.1481		0.1481	0.1481			2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**				**0.1481**	**0.1481**		**0.1481**	**0.1481**			**2,897.5468**	**0.1162**		**2,900.4529**

3.5 Building Construction - 2031

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.1481	89.2798			7.5158	0.0964	7.6122	2.1623	0.0921	2.2544			30,632.7358	1.4251		30,668.3642
Worker	6.7743	2.6381			24.8749	0.1065	24.9813	6.5983	0.0979	6.6962			17,828.3607	0.2555		17,834.7487
Total	**8.9224**	**91.9179**			**32.3907**	**0.2028**	**32.5935**	**8.7606**	**0.1900**	**8.9506**			**48,461.0966**	**1.6807**		**48,503.1129**

3.5 Building Construction - 2032

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346				0.1481	0.1481		0.1481	0.1481			2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**				**0.1481**	**0.1481**		**0.1481**	**0.1481**			**2,897.5468**	**0.1162**		**2,900.4529**

3.5 Building Construction - 2032

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.1047	88.2585			7.5156	0.0926	7.6082	2.1622	0.0886	2.2507			30,555.4793	1.4124		30,590.7899
Worker	6.2380	2.4286			24.8749	0.0990	24.9739	6.5983	0.0911	6.6894			17,452.5864	0.2345		17,458.4497
Total	**8.3427**	**90.6870**			**32.3905**	**0.1917**	**32.5821**	**8.7605**	**0.1797**	**8.9401**			**48,008.0656**	**1.6470**		**48,049.2396**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346				0.1481	0.1481		0.1481	0.1481			2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**				**0.1481**	**0.1481**		**0.1481**	**0.1481**			**2,897.5468**	**0.1162**		**2,900.4529**

3.5 Building Construction - 2032

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.1047	88.2585			7.5156	0.0926	7.6082	2.1622	0.0886	2.2507			30,555.4793	1.4124		30,590.7899
Worker	6.2380	2.4286			24.8749	0.0990	24.9739	6.5983	0.0911	6.6894			17,452.5864	0.2345		17,458.4497
Total	**8.3427**	**90.6870**			**32.3905**	**0.1917**	**32.5821**	**8.7605**	**0.1797**	**8.9401**			**48,008.0656**	**1.6470**		**48,049.2396**

3.5 Building Construction - 2033

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346				0.1481	0.1481		0.1481	0.1481			2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**				**0.1481**	**0.1481**		**0.1481**	**0.1481**			**2,897.5468**	**0.1162**		**2,900.4529**

3.5 Building Construction - 2033

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0681	87.3515			7.5154	0.0895	7.6048	2.1621	0.0855	2.2476			30,488.18 16	1.4012		30,523.211 0
Worker	5.7981	2.2567			24.8749	0.0924	24.9672	6.5983	0.0850	6.6833			17,128.60 35	0.2171		17,134.02 99
Total	**7.8661**	**89.6082**			**32.3902**	**0.1818**	**32.5721**	**8.7604**	**0.1705**	**8.9309**			**47,616.78 51**	**1.6182**		**47,657.24 10**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346				0.1481	0.1481		0.1481	0.1481			2,897.546 8	0.1162		2,900.452 9
Total	**1.3091**	**7.9346**				**0.1481**	**0.1481**		**0.1481**	**0.1481**			**2,897.546 8**	**0.1162**		**2,900.452 9**

3.5 Building Construction - 2033

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0681	87.3515			7.5154	0.0895	7.6048	2.1621	0.0855	2.2476			30,488.1816	1.4012		30,523.2110
Worker	5.7981	2.2567			24.8749	0.0924	24.9672	6.5983	0.0850	6.6833			17,128.6035	0.2171		17,134.0299
Total	**7.8661**	**89.6082**			**32.3902**	**0.1818**	**32.5721**	**8.7604**	**0.1705**	**8.9309**			**47,616.7851**	**1.6182**		**47,657.2410**

3.5 Building Construction - 2034

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346				0.1481	0.1481		0.1481	0.1481			2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**				**0.1481**	**0.1481**		**0.1481**	**0.1481**			**2,897.5468**	**0.1162**		**2,900.4529**

3.5 Building Construction - 2034

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0342	86.5118			7.5152	0.0864	7.6016	2.1620	0.0826	2.2446			30,431.9715	1.3907		30,466.7377
Worker	5.4004	2.1098			24.8749	0.0862	24.9610	6.5983	0.0793	6.6775			16,848.7490	0.2008		16,853.7679
Total	**7.4346**	**88.6216**			**32.3901**	**0.1725**	**32.5626**	**8.7603**	**0.1618**	**8.9221**			**47,280.7204**	**1.5914**		**47,320.5056**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3091	7.9346				0.1481	0.1481		0.1481	0.1481			2,897.5468	0.1162		2,900.4529
Total	**1.3091**	**7.9346**				**0.1481**	**0.1481**		**0.1481**	**0.1481**			**2,897.5468**	**0.1162**		**2,900.4529**

3.5 Building Construction - 2034

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0342	86.5118			7.5152	0.0864	7.6016	2.1620	0.0826	2.2446			30,431.97 15	1.3907		30,466.73 77
Worker	5.4004	2.1098			24.8749	0.0862	24.9610	6.5983	0.0793	6.6775			16,848.74 90	0.2008		16,853.76 79
Total	**7.4346**	**88.6216**			**32.3901**	**0.1725**	**32.5626**	**8.7603**	**0.1618**	**8.9221**			**47,280.72 04**	**1.5914**		**47,320.50 56**

3.5 Building Construction - 2035

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2168	7.1613				0.0904	0.0904		0.0904	0.0904			2,897.546 8	0.1079		2,900.244 8
Total	**1.2168**	**7.1613**				**0.0904**	**0.0904**		**0.0904**	**0.0904**			**2,897.546 8**	**0.1079**		**2,900.244 8**

3.5 Building Construction - 2035

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0041	85.7688			7.5150	0.0837	7.5988	2.1620	0.0800	2.2420			30,385.8328	1.3808		30,420.3529
Worker	5.0562	1.9950			24.8749	0.0806	24.9555	6.5983	0.0742	6.6724			16,610.6996	0.1870		16,615.3732
Total	**7.0604**	**87.7637**			**32.3899**	**0.1643**	**32.5542**	**8.7603**	**0.1542**	**8.9144**			**46,996.5324**	**1.5678**		**47,035.7261**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2168	7.1613				0.0904	0.0904		0.0904	0.0904			2,897.5468	0.1079		2,900.2448
Total	**1.2168**	**7.1613**				**0.0904**	**0.0904**		**0.0904**	**0.0904**			**2,897.5468**	**0.1079**		**2,900.2448**

3.5 Building Construction - 2035

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0041	85.7688			7.5150	0.0837	7.5988	2.1620	0.0800	2.2420			30,385.8328	1.3808		30,420.3529
Worker	5.0562	1.9950			24.8749	0.0806	24.9555	6.5983	0.0742	6.6724			16,610.6996	0.1870		16,615.3732
Total	**7.0604**	**87.7637**			**32.3899**	**0.1643**	**32.5542**	**8.7603**	**0.1542**	**8.9144**			**46,996.5324**	**1.5678**		**47,035.7261**

3.5 Building Construction - 2036

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2168	7.1613				0.0904	0.0904		0.0904	0.0904			2,897.5468	0.1079		2,900.2448
Total	**1.2168**	**7.1613**				**0.0904**	**0.0904**		**0.0904**	**0.0904**			**2,897.5468**	**0.1079**		**2,900.2448**

3.5 Building Construction - 2036

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0041	85.7688			7.5150	0.0837	7.5988	2.1620	0.0800	2.2420			30,385.8328	1.3808		30,420.3529
Worker	5.0562	1.9950			24.8749	0.0806	24.9555	6.5983	0.0742	6.6724			16,610.6996	0.1870		16,615.3732
Total	**7.0604**	**87.7637**			**32.3899**	**0.1643**	**32.5542**	**8.7603**	**0.1542**	**8.9144**			**46,996.5324**	**1.5678**		**47,035.7261**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2168	7.1613				0.0904	0.0904		0.0904	0.0904			2,897.5468	0.1079		2,900.2448
Total	**1.2168**	**7.1613**				**0.0904**	**0.0904**		**0.0904**	**0.0904**			**2,897.5468**	**0.1079**		**2,900.2448**

3.5 Building Construction - 2036

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0041	85.7688			7.5150	0.0837	7.5988	2.1620	0.0800	2.2420			30,385.8328	1.3808		30,420.3529
Worker	5.0562	1.9950			24.8749	0.0806	24.9555	6.5983	0.0742	6.6724			16,610.6996	0.1870		16,615.3732
Total	**7.0604**	**87.7637**			**32.3899**	**0.1643**	**32.5542**	**8.7603**	**0.1542**	**8.9144**			**46,996.5324**	**1.5678**		**47,035.7261**

3.5 Building Construction - 2037

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2168	7.1613				0.0904	0.0904		0.0904	0.0904			2,897.5468	0.1079		2,900.2448
Total	**1.2168**	**7.1613**				**0.0904**	**0.0904**		**0.0904**	**0.0904**			**2,897.5468**	**0.1079**		**2,900.2448**

3.5 Building Construction - 2037

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0041	85.7688			7.5150	0.0837	7.5988	2.1620	0.0800	2.2420			30,385.83 28	1.3808		30,420.35 29
Worker	5.0562	1.9950			24.8749	0.0806	24.9555	6.5983	0.0742	6.6724			16,610.69 96	0.1870		16,615.37 32
Total	**7.0604**	**87.7637**			**32.3899**	**0.1643**	**32.5542**	**8.7603**	**0.1542**	**8.9144**			**46,996.53 24**	**1.5678**		**47,035.72 61**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2168	7.1613				0.0904	0.0904		0.0904	0.0904			2,897.546 8	0.1079		2,900.244 8
Total	**1.2168**	**7.1613**				**0.0904**	**0.0904**		**0.0904**	**0.0904**			**2,897.546 8**	**0.1079**		**2,900.244 8**

3.5 Building Construction - 2037

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0041	85.7688			7.5150	0.0837	7.5988	2.1620	0.0800	2.2420			30,385.8328	1.3808		30,420.3529
Worker	5.0562	1.9950			24.8749	0.0806	24.9555	6.5983	0.0742	6.6724			16,610.6996	0.1870		16,615.3732
Total	**7.0604**	**87.7637**			**32.3899**	**0.1643**	**32.5542**	**8.7603**	**0.1542**	**8.9144**			**46,996.5324**	**1.5678**		**47,035.7261**

3.5 Building Construction - 2038

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2168	7.1613				0.0904	0.0904		0.0904	0.0904			2,897.5468	0.1079		2,900.2448
Total	**1.2168**	**7.1613**				**0.0904**	**0.0904**		**0.0904**	**0.0904**			**2,897.5468**	**0.1079**		**2,900.2448**

3.5 Building Construction - 2038

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0041	85.7688			7.5150	0.0837	7.5988	2.1620	0.0800	2.2420			30,385.83 28	1.3808		30,420.35 29
Worker	5.0562	1.9950			24.8749	0.0806	24.9555	6.5983	0.0742	6.6724			16,610.69 96	0.1870		16,615.37 32
Total	**7.0604**	**87.7637**			**32.3899**	**0.1643**	**32.5542**	**8.7603**	**0.1542**	**8.9144**			**46,996.53 24**	**1.5678**		**47,035.72 61**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2168	7.1613				0.0904	0.0904		0.0904	0.0904			2,897.546 8	0.1079		2,900.244 8
Total	**1.2168**	**7.1613**				**0.0904**	**0.0904**		**0.0904**	**0.0904**			**2,897.546 8**	**0.1079**		**2,900.244 8**

3.5 Building Construction - 2038

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0041	85.7688			7.5150	0.0837	7.5988	2.1620	0.0800	2.2420			30,385.8328	1.3808		30,420.3529
Worker	5.0562	1.9950			24.8749	0.0806	24.9555	6.5983	0.0742	6.6724			16,610.6996	0.1870		16,615.3732
Total	**7.0604**	**87.7637**			**32.3899**	**0.1643**	**32.5542**	**8.7603**	**0.1542**	**8.9144**			**46,996.5324**	**1.5678**		**47,035.7261**

3.5 Building Construction - 2039

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2168	7.1613				0.0904	0.0904		0.0904	0.0904			2,897.5468	0.1079		2,900.2448
Total	**1.2168**	**7.1613**				**0.0904**	**0.0904**		**0.0904**	**0.0904**			**2,897.5468**	**0.1079**		**2,900.2448**

3.5 Building Construction - 2039

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0041	85.7688			7.5150	0.0837	7.5988	2.1620	0.0800	2.2420			30,385.83 28	1.3808		30,420.35 29
Worker	5.0562	1.9950			24.8749	0.0806	24.9555	6.5983	0.0742	6.6724			16,610.69 96	0.1870		16,615.37 32
Total	**7.0604**	**87.7637**			**32.3899**	**0.1643**	**32.5542**	**8.7603**	**0.1542**	**8.9144**			**46,996.53 24**	**1.5678**		**47,035.72 61**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2168	7.1613				0.0904	0.0904		0.0904	0.0904			2,897.546 8	0.1079		2,900.244 8
Total	**1.2168**	**7.1613**				**0.0904**	**0.0904**		**0.0904**	**0.0904**			**2,897.546 8**	**0.1079**		**2,900.244 8**

3.5 Building Construction - 2039

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	2.0041	85.7688			7.5150	0.0837	7.5988	2.1620	0.0800	2.2420			30,385.83 28	1.3808		30,420.35 29
Worker	5.0562	1.9950			24.8749	0.0806	24.9555	6.5983	0.0742	6.6724			16,610.69 96	0.1870		16,615.37 32
Total	**7.0604**	**87.7637**			**32.3899**	**0.1643**	**32.5542**	**8.7603**	**0.1542**	**8.9144**			**46,996.53 24**	**1.5678**		**47,035.72 61**

3.5 Building Construction - 2040

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2040

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.9141	83.3059			7.5144	0.0776	7.5920	2.1617	0.0742	2.2359			30,301.3523	1.3427		30,334.9196
Worker	3.7847	1.6295			24.8749	0.0618	24.9366	6.5983	0.0568	6.6551			15,889.0560	0.1448		15,892.6752
Total	**5.6987**	**84.9354**			**32.3893**	**0.1394**	**32.5287**	**8.7600**	**0.1310**	**8.8910**			**46,190.4083**	**1.4875**		**46,227.5948**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2040

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.9141	83.3059			7.5144	0.0776	7.5920	2.1617	0.0742	2.2359			30,301.35 23	1.3427		30,334.91 96
Worker	3.7847	1.6295			24.8749	0.0618	24.9366	6.5983	0.0568	6.6551			15,889.05 60	0.1448		15,892.67 52
Total	**5.6987**	**84.9354**			**32.3893**	**0.1394**	**32.5287**	**8.7600**	**0.1310**	**8.8910**			**46,190.40 83**	**1.4875**		**46,227.59 48**

3.5 Building Construction - 2041

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2041

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.9141	83.3059			7.5144	0.0776	7.5920	2.1617	0.0742	2.2359			30,301.3523	1.3427		30,334.9196
Worker	3.7847	1.6295			24.8749	0.0618	24.9366	6.5983	0.0568	6.6551			15,889.0560	0.1448		15,892.6752
Total	**5.6987**	**84.9354**			**32.3893**	**0.1394**	**32.5287**	**8.7600**	**0.1310**	**8.8910**			**46,190.4083**	**1.4875**		**46,227.5948**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2041

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.9141	83.3059			7.5144	0.0776	7.5920	2.1617	0.0742	2.2359			30,301.35 23	1.3427		30,334.91 96
Worker	3.7847	1.6295			24.8749	0.0618	24.9366	6.5983	0.0568	6.6551			15,889.05 60	0.1448		15,892.67 52
Total	**5.6987**	**84.9354**			**32.3893**	**0.1394**	**32.5287**	**8.7600**	**0.1310**	**8.8910**			**46,190.40 83**	**1.4875**		**46,227.59 48**

3.5 Building Construction - 2042

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2042

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.9141	83.3059			7.5144	0.0776	7.5920	2.1617	0.0742	2.2359			30,301.35 23	1.3427		30,334.91 96
Worker	3.7847	1.6295			24.8749	0.0618	24.9366	6.5983	0.0568	6.6551			15,889.05 60	0.1448		15,892.67 52
Total	**5.6987**	**84.9354**			**32.3893**	**0.1394**	**32.5287**	**8.7600**	**0.1310**	**8.8910**			**46,190.40 83**	**1.4875**		**46,227.59 48**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2042

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.9141	83.3059			7.5144	0.0776	7.5920	2.1617	0.0742	2.2359			30,301.35 23	1.3427		30,334.91 96
Worker	3.7847	1.6295			24.8749	0.0618	24.9366	6.5983	0.0568	6.6551			15,889.05 60	0.1448		15,892.67 52
Total	**5.6987**	**84.9354**			**32.3893**	**0.1394**	**32.5287**	**8.7600**	**0.1310**	**8.8910**			**46,190.40 83**	**1.4875**		**46,227.59 48**

3.5 Building Construction - 2043

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2043

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.9141	83.3059			7.5144	0.0776	7.5920	2.1617	0.0742	2.2359			30,301.3523	1.3427		30,334.9196
Worker	3.7847	1.6295			24.8749	0.0618	24.9366	6.5983	0.0568	6.6551			15,889.0560	0.1448		15,892.6752
Total	**5.6987**	**84.9354**			**32.3893**	**0.1394**	**32.5287**	**8.7600**	**0.1310**	**8.8910**			**46,190.4083**	**1.4875**		**46,227.5948**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2043

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.9141	83.3059			7.5144	0.0776	7.5920	2.1617	0.0742	2.2359			30,301.3523	1.3427		30,334.9196
Worker	3.7847	1.6295			24.8749	0.0618	24.9366	6.5983	0.0568	6.6551			15,889.0560	0.1448		15,892.6752
Total	**5.6987**	**84.9354**			**32.3893**	**0.1394**	**32.5287**	**8.7600**	**0.1310**	**8.8910**			**46,190.4083**	**1.4875**		**46,227.5948**

3.5 Building Construction - 2044

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2044

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.9141	83.3059			7.5144	0.0776	7.5920	2.1617	0.0742	2.2359			30,301.35 23	1.3427		30,334.91 96
Worker	3.7847	1.6295			24.8749	0.0618	24.9366	6.5983	0.0568	6.6551			15,889.05 60	0.1448		15,892.67 52
Total	**5.6987**	**84.9354**			**32.3893**	**0.1394**	**32.5287**	**8.7600**	**0.1310**	**8.8910**			**46,190.40 83**	**1.4875**		**46,227.59 48**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2044

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.9141	83.3059			7.5144	0.0776	7.5920	2.1617	0.0742	2.2359			30,301.35 23	1.3427		30,334.91 96
Worker	3.7847	1.6295			24.8749	0.0618	24.9366	6.5983	0.0568	6.6551			15,889.05 60	0.1448		15,892.67 52
Total	**5.6987**	**84.9354**			**32.3893**	**0.1394**	**32.5287**	**8.7600**	**0.1310**	**8.8910**			**46,190.40 83**	**1.4875**		**46,227.59 48**

3.5 Building Construction - 2045

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2045

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8804	81.9100			7.5140	0.0749	7.5889	2.1616	0.0716	2.2331			30,237.3104	1.3155		30,270.1965
Worker	3.2945	1.4977			24.8749	0.0537	24.9286	6.5983	0.0494	6.6477			15,616.3905	0.1311		15,619.6680
Total	**5.1749**	**83.4077**			**32.3889**	**0.1286**	**32.5174**	**8.7599**	**0.1209**	**8.8808**			**45,853.7009**	**1.4466**		**45,889.8645**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2045

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8804	81.9100			7.5140	0.0749	7.5889	2.1616	0.0716	2.2331			30,237.3104	1.3155		30,270.1965
Worker	3.2945	1.4977			24.8749	0.0537	24.9286	6.5983	0.0494	6.6477			15,616.3905	0.1311		15,619.6680
Total	**5.1749**	**83.4077**			**32.3889**	**0.1286**	**32.5174**	**8.7599**	**0.1209**	**8.8808**			**45,853.7009**	**1.4466**		**45,889.8645**

3.5 Building Construction - 2046

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2046

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8804	81.9100			7.5140	0.0749	7.5889	2.1616	0.0716	2.2331			30,237.3104	1.3155		30,270.1965
Worker	3.2945	1.4977			24.8749	0.0537	24.9286	6.5983	0.0494	6.6477			15,616.3905	0.1311		15,619.6680
Total	**5.1749**	**83.4077**			**32.3889**	**0.1286**	**32.5174**	**8.7599**	**0.1209**	**8.8808**			**45,853.7009**	**1.4466**		**45,889.8645**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2046

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8804	81.9100			7.5140	0.0749	7.5889	2.1616	0.0716	2.2331			30,237.3104	1.3155		30,270.1965
Worker	3.2945	1.4977			24.8749	0.0537	24.9286	6.5983	0.0494	6.6477			15,616.3905	0.1311		15,619.6680
Total	**5.1749**	**83.4077**			**32.3889**	**0.1286**	**32.5174**	**8.7599**	**0.1209**	**8.8808**			**45,853.7009**	**1.4466**		**45,889.8645**

3.5 Building Construction - 2047

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2047

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8804	81.9100			7.5140	0.0749	7.5889	2.1616	0.0716	2.2331			30,237.3104	1.3155		30,270.1965
Worker	3.2945	1.4977			24.8749	0.0537	24.9286	6.5983	0.0494	6.6477			15,616.3905	0.1311		15,619.6680
Total	**5.1749**	**83.4077**			**32.3889**	**0.1286**	**32.5174**	**8.7599**	**0.1209**	**8.8808**			**45,853.7009**	**1.4466**		**45,889.8645**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2047

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8804	81.9100			7.5140	0.0749	7.5889	2.1616	0.0716	2.2331			30,237.3104	1.3155		30,270.1965
Worker	3.2945	1.4977			24.8749	0.0537	24.9286	6.5983	0.0494	6.6477			15,616.3905	0.1311		15,619.6680
Total	**5.1749**	**83.4077**			**32.3889**	**0.1286**	**32.5174**	**8.7599**	**0.1209**	**8.8808**			**45,853.7009**	**1.4466**		**45,889.8645**

3.5 Building Construction - 2048

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2048

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8804	81.9100			7.5140	0.0749	7.5889	2.1616	0.0716	2.2331			30,237.3104	1.3155		30,270.1965
Worker	3.2945	1.4977			24.8749	0.0537	24.9286	6.5983	0.0494	6.6477			15,616.3905	0.1311		15,619.6680
Total	**5.1749**	**83.4077**			**32.3889**	**0.1286**	**32.5174**	**8.7599**	**0.1209**	**8.8808**			**45,853.7009**	**1.4466**		**45,889.8645**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2048

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8804	81.9100			7.5140	0.0749	7.5889	2.1616	0.0716	2.2331			30,237.3104	1.3155		30,270.1965
Worker	3.2945	1.4977			24.8749	0.0537	24.9286	6.5983	0.0494	6.6477			15,616.3905	0.1311		15,619.6680
Total	**5.1749**	**83.4077**			**32.3889**	**0.1286**	**32.5174**	**8.7599**	**0.1209**	**8.8808**			**45,853.7009**	**1.4466**		**45,889.8645**

3.5 Building Construction - 2049

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2049

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8804	81.9100			7.5140	0.0749	7.5889	2.1616	0.0716	2.2331			30,237.3104	1.3155		30,270.1965
Worker	3.2945	1.4977			24.8749	0.0537	24.9286	6.5983	0.0494	6.6477			15,616.3905	0.1311		15,619.6680
Total	**5.1749**	**83.4077**			**32.3889**	**0.1286**	**32.5174**	**8.7599**	**0.1209**	**8.8808**			**45,853.7009**	**1.4466**		**45,889.8645**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2049

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8804	81.9100			7.5140	0.0749	7.5889	2.1616	0.0716	2.2331			30,237.3104	1.3155		30,270.1965
Worker	3.2945	1.4977			24.8749	0.0537	24.9286	6.5983	0.0494	6.6477			15,616.3905	0.1311		15,619.6680
Total	**5.1749**	**83.4077**			**32.3889**	**0.1286**	**32.5174**	**8.7599**	**0.1209**	**8.8808**			**45,853.7009**	**1.4466**		**45,889.8645**

3.5 Building Construction - 2050

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2050

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8702	80.8379			7.5137	0.0727	7.5865	2.1615	0.0695	2.2310			30,251.2310	1.2865		30,283.3925
Worker	3.1370	1.4600			24.8749	0.0509	24.9258	6.5983	0.0469	6.6452			15,517.6759	0.1274		15,520.8609
Total	**5.0072**	**82.2978**			**32.3886**	**0.1237**	**32.5123**	**8.7598**	**0.1164**	**8.8761**			**45,768.9070**	**1.4139**		**45,804.2535**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2050

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	1.8702	80.8379			7.5137	0.0727	7.5865	2.1615	0.0695	2.2310			30,251.2310	1.2865		30,283.3925
Worker	3.1370	1.4600			24.8749	0.0509	24.9258	6.5983	0.0469	6.6452			15,517.6759	0.1274		15,520.8609
Total	**5.0072**	**82.2978**			**32.3886**	**0.1237**	**32.5123**	**8.7598**	**0.1164**	**8.8761**			**45,768.9070**	**1.4139**		**45,804.2535**

3.5 Building Construction - 2051

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2051

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2051

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2052

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2052

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2052

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2053

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2053

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2053

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2054

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2054

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2054

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2055

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2055

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2055

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2056

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2056

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.5471	0.1041		2,900.1503
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.5471**	**0.1041**		**2,900.1503**

3.5 Building Construction - 2056

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2057

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2057

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2057

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2058

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2058

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2058

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2059

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2059

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2059

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2060

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2060

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2060

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2061

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2061

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2061

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2062

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2062

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2062

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2063

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2063

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2063

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.5 Building Construction - 2064

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2064

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1970	6.8903				0.0737	0.0737		0.0737	0.0737			2,897.547 1	0.1041		2,900.150 3
Total	**1.1970**	**6.8903**				**0.0737**	**0.0737**		**0.0737**	**0.0737**			**2,897.547 1**	**0.1041**		**2,900.150 3**

3.5 Building Construction - 2064

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					5.3711	0.0000	5.3711	1.3184	0.0000	1.3184			0.0000			0.0000
Worker					21.6165	0.0000	21.6165	5.3059	0.0000	5.3059			0.0000			0.0000
Total					**26.9876**	**0.0000**	**26.9876**	**6.6242**	**0.0000**	**6.6242**			**0.0000**			**0.0000**

3.6 Paving - 2064

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0112	3.6566				0.1164	0.1164		0.1164	0.1164			2,656.516 8	0.0893		2,658.748 9
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0112**	**3.6566**				**0.1164**	**0.1164**		**0.1164**	**0.1164**			**2,656.516 8**	**0.0893**		**2,658.748 9**

3.6 Paving - 2064

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0992	0.0000	0.0992	0.0243	0.0000	0.0243			0.0000			0.0000
Total					**0.0992**	**0.0000**	**0.0992**	**0.0243**	**0.0000**	**0.0243**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0112	3.6566				0.1164	0.1164		0.1164	0.1164			2,656.516 8	0.0893		2,658.748 9
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0112**	**3.6566**				**0.1164**	**0.1164**		**0.1164**	**0.1164**			**2,656.516 8**	**0.0893**		**2,658.748 9**

3.6 Paving - 2064

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0992	0.0000	0.0992	0.0243	0.0000	0.0243			0.0000			0.0000
Total					**0.0992**	**0.0000**	**0.0992**	**0.0243**	**0.0000**	**0.0243**			**0.0000**			**0.0000**

3.6 Paving - 2065

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0112	3.6566				0.1164	0.1164		0.1164	0.1164			2,656.516 8	0.0893		2,658.748 9
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0112**	**3.6566**				**0.1164**	**0.1164**		**0.1164**	**0.1164**			**2,656.516 8**	**0.0893**		**2,658.748 9**

3.6 Paving - 2065

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0992	0.0000	0.0992	0.0243	0.0000	0.0243			0.0000			0.0000
Total					**0.0992**	**0.0000**	**0.0992**	**0.0243**	**0.0000**	**0.0243**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0112	3.6566				0.1164	0.1164		0.1164	0.1164			2,656.516 8	0.0893		2,658.748 9
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0112**	**3.6566**				**0.1164**	**0.1164**		**0.1164**	**0.1164**			**2,656.516 8**	**0.0893**		**2,658.748 9**

3.6 Paving - 2065

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0992	0.0000	0.0992	0.0243	0.0000	0.0243			0.0000			0.0000
Total					**0.0992**	**0.0000**	**0.0992**	**0.0243**	**0.0000**	**0.0243**			**0.0000**			**0.0000**

3.6 Paving - 2066

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0112	3.6566				0.1164	0.1164		0.1164	0.1164			2,656.516 8	0.0893		2,658.748 9
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0112**	**3.6566**				**0.1164**	**0.1164**		**0.1164**	**0.1164**			**2,656.516 8**	**0.0893**		**2,658.748 9**

3.6 Paving - 2066

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0992	0.0000	0.0992	0.0243	0.0000	0.0243			0.0000			0.0000
Total					**0.0992**	**0.0000**	**0.0992**	**0.0243**	**0.0000**	**0.0243**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0112	3.6566				0.1164	0.1164		0.1164	0.1164			2,656.516 8	0.0893		2,658.748 9
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0112**	**3.6566**				**0.1164**	**0.1164**		**0.1164**	**0.1164**			**2,656.516 8**	**0.0893**		**2,658.748 9**

3.6 Paving - 2066

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0992	0.0000	0.0992	0.0243	0.0000	0.0243			0.0000			0.0000
Total					**0.0992**	**0.0000**	**0.0992**	**0.0243**	**0.0000**	**0.0243**			**0.0000**			**0.0000**

3.6 Paving - 2067

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0112	3.6566				0.1164	0.1164		0.1164	0.1164			2,656.5168	0.0893		2,658.7489
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0112**	**3.6566**				**0.1164**	**0.1164**		**0.1164**	**0.1164**			**2,656.5168**	**0.0893**		**2,658.7489**

3.6 Paving - 2067

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0992	0.0000	0.0992	0.0243	0.0000	0.0243			0.0000			0.0000
Total					**0.0992**	**0.0000**	**0.0992**	**0.0243**	**0.0000**	**0.0243**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0112	3.6566				0.1164	0.1164		0.1164	0.1164			2,656.516 8	0.0893		2,658.748 9
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0112**	**3.6566**				**0.1164**	**0.1164**		**0.1164**	**0.1164**			**2,656.516 8**	**0.0893**		**2,658.748 9**

3.6 Paving - 2067

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					0.0992	0.0000	0.0992	0.0243	0.0000	0.0243			0.0000			0.0000
Total					**0.0992**	**0.0000**	**0.0992**	**0.0243**	**0.0000**	**0.0243**			**0.0000**			**0.0000**

3.7 Architectural Coating - 2067

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	110.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1149	0.7270				7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003			281.4481	9.9000e-003		281.6957
Total	**110.2801**	**0.7270**				**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**			**281.4481**	**9.9000e-003**		**281.6957**

3.7 Architectural Coating - 2067

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					4.3233	0.0000	4.3233	1.0612	0.0000	1.0612			0.0000			0.0000
Total					**4.3233**	**0.0000**	**4.3233**	**1.0612**	**0.0000**	**1.0612**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	110.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1149	0.7270				7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003			281.4481	9.9000e-003		281.6957
Total	**110.2801**	**0.7270**				**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**			**281.4481**	**9.9000e-003**		**281.6957**

3.7 Architectural Coating - 2067

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					4.3233	0.0000	4.3233	1.0612	0.0000	1.0612			0.0000			0.0000
Total					**4.3233**	**0.0000**	**4.3233**	**1.0612**	**0.0000**	**1.0612**			**0.0000**			**0.0000**

3.7 Architectural Coating - 2068

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	110.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1149	0.7270				7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003			281.4481	9.9000e-003		281.6957
Total	**110.2801**	**0.7270**				**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**			**281.4481**	**9.9000e-003**		**281.6957**

3.7 Architectural Coating - 2068

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					4.3233	0.0000	4.3233	1.0612	0.0000	1.0612			0.0000			0.0000
Total					**4.3233**	**0.0000**	**4.3233**	**1.0612**	**0.0000**	**1.0612**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	110.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1149	0.7270				7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003			281.4481	9.9000e-003		281.6957
Total	**110.2801**	**0.7270**				**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**			**281.4481**	**9.9000e-003**		**281.6957**

3.7 Architectural Coating - 2068

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					4.3233	0.0000	4.3233	1.0612	0.0000	1.0612			0.0000			0.0000
Total					**4.3233**	**0.0000**	**4.3233**	**1.0612**	**0.0000**	**1.0612**			**0.0000**			**0.0000**

3.7 Architectural Coating - 2069

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	110.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1149	0.7270				7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003			281.4481	9.9000e-003		281.6957
Total	**110.2801**	**0.7270**				**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**			**281.4481**	**9.9000e-003**		**281.6957**

3.7 Architectural Coating - 2069

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					4.3233	0.0000	4.3233	1.0612	0.0000	1.0612			0.0000			0.0000
Total					**4.3233**	**0.0000**	**4.3233**	**1.0612**	**0.0000**	**1.0612**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	110.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1149	0.7270				7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003			281.4481	9.9000e-003		281.6957
Total	**110.2801**	**0.7270**				**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**			**281.4481**	**9.9000e-003**		**281.6957**

3.7 Architectural Coating - 2069

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					4.3233	0.0000	4.3233	1.0612	0.0000	1.0612			0.0000			0.0000
Total					**4.3233**	**0.0000**	**4.3233**	**1.0612**	**0.0000**	**1.0612**			**0.0000**			**0.0000**

3.7 Architectural Coating - 2070

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	110.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1149	0.7270				7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003			281.4481	9.9000e-003		281.6957
Total	**110.2801**	**0.7270**				**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**			**281.4481**	**9.9000e-003**		**281.6957**

3.7 Architectural Coating - 2070

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					4.3233	0.0000	4.3233	1.0612	0.0000	1.0612			0.0000			0.0000
Total					**4.3233**	**0.0000**	**4.3233**	**1.0612**	**0.0000**	**1.0612**			**0.0000**			**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	110.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1149	0.7270				7.4300e-003	7.4300e-003		7.4300e-003	7.4300e-003			281.4481	9.9000e-003		281.6957
Total	**110.2801**	**0.7270**				**7.4300e-003**	**7.4300e-003**		**7.4300e-003**	**7.4300e-003**			**281.4481**	**9.9000e-003**		**281.6957**

3.7 Architectural Coating - 2070

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Worker					4.3233	0.0000	4.3233	1.0612	0.0000	1.0612			0.0000			0.0000
Total					**4.3233**	**0.0000**	**4.3233**	**1.0612**	**0.0000**	**1.0612**			**0.0000**			**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	194.3331	534.8048			248.4217	6.0796	254.5013	66.5305	5.7593	72.2897			363,506.9212	24.7410		364,125.4453
Unmitigated	194.3331	534.8048			248.4217	6.0796	254.5013	66.5305	5.7593	72.2897			363,506.9212	24.7410		364,125.4453

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	1,062.60	1,259.94	923.45	2,748,079	2,748,079
Apartments Mid Rise	950.95	913.77	837.98	2,385,198	2,385,198
City Park	128.52	1,547.00	1138.32	877,122	877,122
Condo/Townhouse	52.29	51.03	43.56	130,520	130,520
General Heavy Industry	613.50	613.50	613.50	1,696,787	1,696,787
General Light Industry	5,318.11	1,007.16	518.84	11,109,047	11,109,047
General Office Building	25,071.19	5,591.58	2386.65	39,335,563	39,335,563
Government Office Building	2,136.83	0.00	0.00	2,194,594	2,194,594
Regional Shopping Center	1,110.20	1,299.22	656.24	1,498,402	1,498,402
Single Family Housing	13,128.08	13,665.89	11886.98	33,430,267	33,430,267
Total	49,572.27	25,949.09	19,005.52	95,405,580	95,405,580

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3
Apartments Mid Rise	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3
City Park	10.00	5.00	6.50	33.00	48.00	19.00	66	28	6
Condo/Townhouse	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3
General Heavy Industry	10.00	5.00	6.50	59.00	28.00	13.00	92	5	3
General Light Industry	10.00	5.00	6.50	59.00	28.00	13.00	92	5	3
General Office Building	10.00	5.00	6.50	33.00	48.00	19.00	77	19	4
Government Office Building	10.00	5.00	6.50	33.00	62.00	5.00	50	34	16
Regional Shopping Center	10.00	5.00	6.50	16.30	64.70	19.00	54	35	11
Single Family Housing	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.522941	0.049891	0.196257	0.142127	0.030999	0.006686	0.018431	0.019126	0.002284	0.002946	0.006372	0.000629	0.001312
Apartments Mid Rise	0.522941	0.049891	0.196257	0.142127	0.030999	0.006686	0.018431	0.019126	0.002284	0.002946	0.006372	0.000629	0.001312
City Park	0.522941	0.049891	0.196257	0.142127	0.030999	0.006686	0.018431	0.019126	0.002284	0.002946	0.006372	0.000629	0.001312
Condo/Townhouse	0.522941	0.049891	0.196257	0.142127	0.030999	0.006686	0.018431	0.019126	0.002284	0.002946	0.006372	0.000629	0.001312
General Heavy Industry	0.522941	0.049891	0.196257	0.142127	0.030999	0.006686	0.018431	0.019126	0.002284	0.002946	0.006372	0.000629	0.001312
General Light Industry	0.522941	0.049891	0.196257	0.142127	0.030999	0.006686	0.018431	0.019126	0.002284	0.002946	0.006372	0.000629	0.001312
General Office Building	0.522941	0.049891	0.196257	0.142127	0.030999	0.006686	0.018431	0.019126	0.002284	0.002946	0.006372	0.000629	0.001312
Government Office Building	0.522941	0.049891	0.196257	0.142127	0.030999	0.006686	0.018431	0.019126	0.002284	0.002946	0.006372	0.000629	0.001312
Regional Shopping Center	0.522941	0.049891	0.196257	0.142127	0.030999	0.006686	0.018431	0.019126	0.002284	0.002946	0.006372	0.000629	0.001312
Single Family Housing	0.522941	0.049891	0.196257	0.142127	0.030999	0.006686	0.018431	0.019126	0.002284	0.002946	0.006372	0.000629	0.001312

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	3.3081	29.4342				2.2856	2.2856		2.2856	2.2856			36,088.2793	0.6917	0.6616	36,302.7339
NaturalGas Unmitigated	3.3081	29.4342				2.2856	2.2856		2.2856	2.2856			36,088.2793	0.6917	0.6616	36,302.7339

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	6756.9	0.0729	0.6227				0.0504	0.0504		0.0504	0.0504			794.9297	0.0152	0.0146	799.6535
Apartments Mid Rise	3819.12	0.0412	0.3520				0.0285	0.0285		0.0285	0.0285			449.3081	8.6100e-003	8.2400e-003	451.9781
City Park	0	0.0000	0.0000				0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	506.743	5.4600e-003	0.0467				3.7800e-003	3.7800e-003		3.7800e-003	3.7800e-003			59.6168	1.1400e-003	1.0900e-003	59.9711
General Heavy Industry	40126.8	0.4327	3.9340				0.2990	0.2990		0.2990	0.2990			4,720.8026	0.0905	0.0866	4,748.8560
General Light Industry	74857.6	0.8073	7.3390				0.5578	0.5578		0.5578	0.5578			8,806.7784	0.1688	0.1615	8,859.1127
General Office Building	81578.9	0.8798	7.9979				0.6078	0.6078		0.6078	0.6078			9,597.5181	0.1840	0.1760	9,654.5514
Government Office Building	1112.6	0.0120	0.1091				8.2900e-003	8.2900e-003		8.2900e-003	8.2900e-003			130.8944	2.5100e-003	2.4000e-003	131.6723
Regional Shopping Center	386.082	4.1600e-003	0.0379				2.8800e-003	2.8800e-003		2.8800e-003	2.8800e-003			45.4214	8.7000e-004	8.3000e-004	45.6914
Single Family Housing	97605.6	1.0526	8.9950				0.7273	0.7273		0.7273	0.7273			11,483.0097	0.2201	0.2105	11,551.2475
Total		**3.3081**	**29.4342**				**2.2856**	**2.2856**		**2.2856**	**2.2856**			**36,088.2792**	**0.6917**	**0.6616**	**36,302.7339**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	6.7569	0.0729	0.6227				0.0504	0.0504		0.0504	0.0504			794.9297	0.0152	0.0146	799.6535
Apartments Mid Rise	3.81912	0.0412	0.3520				0.0285	0.0285		0.0285	0.0285			449.3081	8.6100e-003	8.2400e-003	451.9781
City Park	0	0.0000	0.0000				0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	0.506743	5.4600e-003	0.0467				3.7800e-003	3.7800e-003		3.7800e-003	3.7800e-003			59.6168	1.1400e-003	1.0900e-003	59.9711
General Heavy Industry	40.1268	0.4327	3.9340				0.2990	0.2990		0.2990	0.2990			4,720.8026	0.0905	0.0866	4,748.8560
General Light Industry	74.8576	0.8073	7.3390				0.5578	0.5578		0.5578	0.5578			8,806.7784	0.1688	0.1615	8,859.1127
General Office Building	81.5789	0.8798	7.9979				0.6078	0.6078		0.6078	0.6078			9,597.5181	0.1840	0.1760	9,654.5514
Government Office Building	1.1126	0.0120	0.1091				8.2900e-003	8.2900e-003		8.2900e-003	8.2900e-003			130.8944	2.5100e-003	2.4000e-003	131.6723
Regional Shopping Center	0.386082	4.1600e-003	0.0379				2.8800e-003	2.8800e-003		2.8800e-003	2.8800e-003			45.4214	8.7000e-004	8.3000e-004	45.6914
Single Family Housing	97.6056	1.0526	8.9950				0.7273	0.7273		0.7273	0.7273			11,483.0097	0.2201	0.2105	11,551.2475
Total		**3.3081**	**29.4342**				**2.2856**	**2.2856**		**2.2856**	**2.2856**			**36,088.2792**	**0.6917**	**0.6616**	**36,302.7339**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	164.9560	1.7701				0.8042	0.8042		0.8042	0.8042			265.7986	0.2779	0.0000	272.7450
Unmitigated	164.9560	1.7701				0.8042	0.8042		0.8042	0.8042			265.7986	0.2779	0.0000	272.7450

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	23.2403					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	136.8815					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000				0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Landscaping	4.8342	1.7701				0.8042	0.8042		0.8042	0.8042			265.7986	0.2779		272.7450
Total	**164.9560**	**1.7701**				**0.8042**	**0.8042**		**0.8042**	**0.8042**			**265.7986**	**0.2779**	**0.0000**	**272.7450**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	23.2403					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	136.8815					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000				0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Landscaping	4.8342	1.7701				0.8042	0.8042		0.8042	0.8042			265.7986	0.2779		272.7450
Total	**164.9560**	**1.7701**				**0.8042**	**0.8042**		**0.8042**	**0.8042**			**265.7986**	**0.2779**	**0.0000**	**272.7450**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Elk Grove GPU Operational Emissions 2035

Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	2,267.00	1000sqft	52.04	2,267,000.00	0
General Light Industry	785.00	1000sqft	18.02	785,000.00	0
General Heavy Industry	409.00	1000sqft	9.39	409,000.00	0
City Park	72.00	Acre	72.00	3,136,320.00	0
Single Family Housing	2,150.00	Dwelling Unit	698.05	3,870,000.00	5741
Apartments High Rise	272.00	Dwelling Unit	4.39	272,000.00	726
Apartments Mid Rise	131.00	Dwelling Unit	3.45	131,000.00	350
Condo/Townhouse	5.00	Dwelling Unit	0.31	5,000.00	13
Regional Shopping Center	27.00	1000sqft	0.62	27,000.00	0
Government Office Building	31.00	1000sqft	0.71	31,000.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 3.5 **Precipitation Freq (Days)** 58

Climate Zone 6 **Operational Year** 2035

Utility Company Sacramento Municipal Utility District

CO2 Intensity (lb/MWhr) 590.31 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Elk Grove GPU Project operational emissions for 2035

Land Use - Base upon projected land uses under the GPU in 2035 scaled down

Construction Phase - this model runs for operational emissions only

Vehicle Trips - mobile source emissions were modeling using EMFAC 2014

Energy Use - Assumes future buildings will comply with Title 24 standard

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	990.00	207.00
tblConstructionPhase	NumDays	13,950.00	123.00
tblConstructionPhase	NumDays	900.00	10.00
tblConstructionPhase	NumDays	1,395.00	350.00
tblConstructionPhase	NumDays	990.00	206.00
tblConstructionPhase	PhaseEndDate	11/1/2086	11/1/2020
tblConstructionPhase	PhaseEndDate	3/31/2079	3/31/2018
tblConstructionPhase	PhaseEndDate	5/11/2018	12/12/2014
tblConstructionPhase	PhaseEndDate	10/10/2025	10/8/2017
tblConstructionPhase	PhaseEndDate	1/15/2083	1/14/2019
tblConstructionPhase	PhaseEndDate	6/5/2020	6/3/2016
tblConstructionPhase	PhaseStartDate	1/16/2083	1/16/2020
tblConstructionPhase	PhaseStartDate	10/11/2025	10/11/2017
tblConstructionPhase	PhaseStartDate	6/6/2020	6/6/2016
tblConstructionPhase	PhaseStartDate	4/1/2079	4/1/2018
tblConstructionPhase	PhaseStartDate	5/12/2018	5/12/2014
tblGrading	AcresOfGrading	875.00	3,487.50

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	10.0422	103.9273			18.3173	5.6887	24.0060	9.9973	5.2680	15.2653			8,395.9308	2.3011	0.0000	8,453.4592
2015	5.3796	55.5428			18.2032	3.1348	21.3380	9.9670	2.8841	12.8511			4,164.8636	1.2021	0.0000	4,194.9156
2016	6.1997	72.5952			18.2032	3.3073	21.2731	9.9670	3.0427	12.7914			6,624.4676	1.9519	0.0000	6,673.2656
2017	32.6851	221.5218			35.8249	3.6803	39.5052	9.6880	3.4825	13.1705			70,796.8835	4.2354	0.0000	70,902.7686
2018	28.7127	206.6243			35.8239	3.0831	38.9070	9.6876	2.9176	12.6052			69,809.5221	3.9587	0.0000	69,908.4901
2019	1.5247	15.2827			0.1141	0.8254	0.9395	0.0303	0.7594	0.7896			2,379.7987	0.7180	0.0000	2,397.7476
2020	419.5958	3.3451			5.5227	0.1493	5.6720	1.4649	0.1463	1.6113			6,042.3521	0.1868	0.0000	6,047.0230
Maximum	**419.5958**	**221.5218**			**35.8249**	**5.6887**	**39.5052**	**9.9973**	**5.2680**	**15.2653**			**70,796.8835**	**4.2354**	**0.0000**	**70,902.7686**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	10.0422	103.9273			18.3173	5.6887	24.0060	9.9973	5.2680	15.2653			8,395.9308	2.3011	0.0000	8,453.4592
2015	5.3796	55.5428			18.2032	3.1348	21.3380	9.9670	2.8841	12.8511			4,164.8636	1.2021	0.0000	4,194.9155
2016	6.1997	72.5952			18.2032	3.3073	21.2731	9.9670	3.0427	12.7914			6,624.4676	1.9519	0.0000	6,673.2656
2017	32.6851	221.5218			35.8249	3.6803	39.5052	9.6880	3.4825	13.1705			70,796.8835	4.2354	0.0000	70,902.7686
2018	28.7127	206.6243			35.8239	3.0831	38.9070	9.6876	2.9176	12.6052			69,809.5221	3.9587	0.0000	69,908.4901
2019	1.5247	15.2827			0.1141	0.8254	0.9395	0.0303	0.7594	0.7896			2,379.7987	0.7180	0.0000	2,397.7476
2020	419.5958	3.3451			5.5227	0.1493	5.6720	1.4649	0.1463	1.6113			6,042.3521	0.1868	0.0000	6,047.0230
Maximum	**419.5958**	**221.5218**			**35.8249**	**5.6887**	**39.5052**	**9.9973**	**5.2680**	**15.2653**			**70,796.8835**	**4.2354**	**0.0000**	**70,902.7686**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	196.9435	2.4295				1.1716	1.1716		1.1716	1.1716			380.7827	0.3638	0.0000	389.8767
Energy	3.9173	34.6518				2.7065	2.7065		2.7065	2.7065			42,734.2801	0.8191	0.7835	42,988.2286
Mobile	59.8124	235.8321			289.8313	1.2382	291.0694	77.3805	1.1504	78.5308			263,870.8602	9.1933		264,100.6916
Total	**260.6732**	**272.9133**			**289.8313**	**5.1163**	**294.9475**	**77.3805**	**5.0285**	**82.4090**			**306,985.9229**	**10.3761**	**0.7835**	**307,478.7968**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	196.9435	2.4295				1.1716	1.1716		1.1716	1.1716			380.7827	0.3638	0.0000	389.8767
Energy	3.9173	34.6518				2.7065	2.7065		2.7065	2.7065			42,734.2801	0.8191	0.7835	42,988.2286
Mobile	59.8124	235.8321			289.8313	1.2382	291.0694	77.3805	1.1504	78.5308			263,870.8602	9.1933		264,100.6916
Total	**260.6732**	**272.9133**			**289.8313**	**5.1163**	**294.9475**	**77.3805**	**5.0285**	**82.4090**			**306,985.9229**	**10.3761**	**0.7835**	**307,478.7968**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/1/2014	12/12/2014	5	10	
2	Site Preparation	Site Preparation	5/12/2014	6/3/2016	5	540	
3	Grading	Grading	6/6/2016	10/8/2017	5	350	
4	Building Construction	Building Construction	10/11/2017	3/31/2018	5	123	
5	Paving	Paving	4/1/2018	1/14/2019	5	206	
6	Architectural Coating	Architectural Coating	1/16/2020	11/1/2020	5	207	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 3487.5

Acres of Paving: 0

Residential Indoor: 8,662,950; Residential Outdoor: 2,887,650; Non-Residential Indoor: 5,278,500; Non-Residential Outdoor: 1,759,500; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	3,630.00	1,364.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	726.00	0.00	0.00	10.00	6.50	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.5339	47.9591				2.5246	2.5246		2.3570	2.3570			4,047.031 3	1.0907		4,074.298 2
Total	**4.5339**	**47.9591**				**2.5246**	**2.5246**		**2.3570**	**2.3570**			**4,047.031 3**	**1.0907**		**4,074.298 2**

3.2 Demolition - 2014

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1198	0.0738			0.1141	1.0800e-003	0.1152	0.0303	1.0000e-003	0.0313			139.1963	7.1800e-003		139.3759
Total	**0.1198**	**0.0738**			**0.1141**	**1.0800e-003**	**0.1152**	**0.0303**	**1.0000e-003**	**0.0313**			**139.1963**	**7.1800e-003**		**139.3759**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.5339	47.9591				2.5246	2.5246		2.3570	2.3570			4,047.0313	1.0907		4,074.2982
Total	**4.5339**	**47.9591**				**2.5246**	**2.5246**		**2.3570**	**2.3570**			**4,047.0313**	**1.0907**		**4,074.2982**

3.2 Demolition - 2014

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1198	0.0738			0.1141	1.0800e-003	0.1152	0.0303	1.0000e-003	0.0313			139.1963	7.1800e-003		139.3759
Total	**0.1198**	**0.0738**			**0.1141**	**1.0800e-003**	**0.1152**	**0.0303**	**1.0000e-003**	**0.0313**			**139.1963**	**7.1800e-003**		**139.3759**

3.3 Site Preparation - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.2447	55.8058				3.1617	3.1617		2.9088	2.9088			4,042.6677	1.1947		4,072.5340
Total	**5.2447**	**55.8058**			**18.0663**	**3.1617**	**21.2280**	**9.9307**	**2.9088**	**12.8395**			**4,042.6677**	**1.1947**		**4,072.5340**

3.3 Site Preparation - 2014

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1438	0.0886			0.1369	1.2900e-003	0.1382	0.0363	1.2000e-003	0.0375			167.0355	8.6200e-003		167.2511
Total	**0.1438**	**0.0886**			**0.1369**	**1.2900e-003**	**0.1382**	**0.0363**	**1.2000e-003**	**0.0375**			**167.0355**	**8.6200e-003**		**167.2511**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.2447	55.8058				3.1617	3.1617		2.9088	2.9088			4,042.6677	1.1947		4,072.5340
Total	**5.2447**	**55.8058**			**18.0663**	**3.1617**	**21.2280**	**9.9307**	**2.9088**	**12.8395**			**4,042.6677**	**1.1947**		**4,072.5340**

3.3 Site Preparation - 2014

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1438	0.0886			0.1369	1.2900e-003	0.1382	0.0363	1.2000e-003	0.0375			167.0355	8.6200e-003		167.2511
Total	**0.1438**	**0.0886**			**0.1369**	**1.2900e-003**	**0.1382**	**0.0363**	**1.2000e-003**	**0.0375**			**167.0355**	**8.6200e-003**		**167.2511**

3.3 Site Preparation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.2493	55.4642				3.1336	3.1336		2.8830	2.8830			4,000.7845	1.1944		4,030.6445
Total	**5.2493**	**55.4642**			**18.0663**	**3.1336**	**21.1999**	**9.9307**	**2.8830**	**12.8136**			**4,000.7845**	**1.1944**		**4,030.6445**

3.3 Site Preparation - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1303	0.0786			0.1369	1.1900e-003	0.1381	0.0363	1.1000e-003	0.0374			164.0791	7.6800e-003		164.2710
Total	**0.1303**	**0.0786**			**0.1369**	**1.1900e-003**	**0.1381**	**0.0363**	**1.1000e-003**	**0.0374**			**164.0791**	**7.6800e-003**		**164.2710**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.2493	55.4642				3.1336	3.1336		2.8830	2.8830			4,000.7845	1.1944		4,030.6445
Total	**5.2493**	**55.4642**			**18.0663**	**3.1336**	**21.1999**	**9.9307**	**2.8830**	**12.8136**			**4,000.7845**	**1.1944**		**4,030.6445**

3.3 Site Preparation - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1303	0.0786			0.1369	1.1900e-003	0.1381	0.0363	1.1000e-003	0.0374			164.0791	7.6800e-003		164.2710
Total	**0.1303**	**0.0786**			**0.1369**	**1.1900e-003**	**0.1381**	**0.0363**	**1.1000e-003**	**0.0374**			**164.0791**	**7.6800e-003**		**164.2710**

3.3 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.2082	54.8153				3.0688	3.0688		2.8233	2.8233			3,957.970 4	1.1939		3,987.817 0
Total	**5.2082**	**54.8153**			**18.0663**	**3.0688**	**21.1351**	**9.9307**	**2.8233**	**12.7540**			**3,957.970 4**	**1.1939**		**3,987.817 0**

3.3 Site Preparation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1169	0.0692			0.1369	1.1100e-003	0.1380	0.0363	1.0300e-003	0.0374			160.5238	6.7900e-003		160.6935
Total	**0.1169**	**0.0692**			**0.1369**	**1.1100e-003**	**0.1380**	**0.0363**	**1.0300e-003**	**0.0374**			**160.5238**	**6.7900e-003**		**160.6935**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.2082	54.8153				3.0688	3.0688		2.8233	2.8233			3,957.9704	1.1939		3,987.8170
Total	**5.2082**	**54.8153**			**18.0663**	**3.0688**	**21.1351**	**9.9307**	**2.8233**	**12.7540**			**3,957.9704**	**1.1939**		**3,987.8170**

3.3 Site Preparation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1169	0.0692			0.1369	1.1100e-003	0.1380	0.0363	1.0300e-003	0.0374			160.5238	6.7900e-003		160.6935
Total	**0.1169**	**0.0692**			**0.1369**	**1.1100e-003**	**0.1380**	**0.0363**	**1.0300e-003**	**0.0374**			**160.5238**	**6.7900e-003**		**160.6935**

3.4 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					16.5892	0.0000	16.5892	4.4512	0.0000	4.4512			0.0000			0.0000
Off-Road	6.0698	72.5183				3.3061	3.3061		3.0416	3.0416			6,446.1078	1.9444		6,494.7172
Total	**6.0698**	**72.5183**			**16.5892**	**3.3061**	**19.8953**	**4.4512**	**3.0416**	**7.4928**			**6,446.1078**	**1.9444**		**6,494.7172**

3.4 Grading - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1299	0.0768			0.1521	1.2400e-003	0.1534	0.0404	1.1400e-003	0.0415			178.3597	7.5500e-003		178.5484
Total	**0.1299**	**0.0768**			**0.1521**	**1.2400e-003**	**0.1534**	**0.0404**	**1.1400e-003**	**0.0415**			**178.3597**	**7.5500e-003**		**178.5484**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					16.5892	0.0000	16.5892	4.4512	0.0000	4.4512			0.0000			0.0000
Off-Road	6.0698	72.5183				3.3061	3.3061		3.0416	3.0416			6,446.1078	1.9444		6,494.7172
Total	**6.0698**	**72.5183**			**16.5892**	**3.3061**	**19.8953**	**4.4512**	**3.0416**	**7.4928**			**6,446.1078**	**1.9444**		**6,494.7172**

3.4 Grading - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1299	0.0768			0.1521	1.2400e-003	0.1534	0.0404	1.1400e-003	0.0415			178.3597	7.5500e-003		178.5484
Total	**0.1299**	**0.0768**			**0.1521**	**1.2400e-003**	**0.1534**	**0.0404**	**1.1400e-003**	**0.0415**			**178.3597**	**7.5500e-003**		**178.5484**

3.4 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					16.5892	0.0000	16.5892	4.4512	0.0000	4.4512			0.0000			0.0000
Off-Road	5.7483	67.9396				3.0727	3.0727		2.8269	2.8269			6,344.886 3	1.9441		6,393.487 9
Total	**5.7483**	**67.9396**			**16.5892**	**3.0727**	**19.6619**	**4.4512**	**2.8269**	**7.2781**			**6,344.886 3**	**1.9441**		**6,393.487 9**

3.4 Grading - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1154	0.0670			0.1521	1.1700e-003	0.1533	0.0404	1.0800e-003	0.0414			174.1051	6.6300e-003		174.2709
Total	**0.1154**	**0.0670**			**0.1521**	**1.1700e-003**	**0.1533**	**0.0404**	**1.0800e-003**	**0.0414**			**174.1051**	**6.6300e-003**		**174.2709**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					16.5892	0.0000	16.5892	4.4512	0.0000	4.4512			0.0000			0.0000
Off-Road	5.7483	67.9396				3.0727	3.0727		2.8269	2.8269			6,344.8863	1.9441		6,393.4878
Total	**5.7483**	**67.9396**			**16.5892**	**3.0727**	**19.6619**	**4.4512**	**2.8269**	**7.2781**			**6,344.8863**	**1.9441**		**6,393.4878**

3.4 Grading - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.1154	0.0670			0.1521	1.1700e-003	0.1533	0.0404	1.0800e-003	0.0414			174.1051	6.6300e-003		174.2709
Total	**0.1154**	**0.0670**			**0.1521**	**1.1700e-003**	**0.1533**	**0.0404**	**1.0800e-003**	**0.0414**			**174.1051**	**6.6300e-003**		**174.2709**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1149	26.5546				1.7879	1.7879		1.6791	1.6791			2,650.9797	0.6531		2,667.3078
Total	**3.1149**	**26.5546**				**1.7879**	**1.7879**		**1.6791**	**1.6791**			**2,650.9797**	**0.6531**		**2,667.3078**

3.5 Building Construction - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	8.6282	182.8009			8.2115	1.6807	9.8922	2.3633	1.6078	3.9711			36,545.8235	2.3790		36,605.2993
Worker	20.9420	12.1663			27.6134	0.2117	27.8251	7.3247	0.1956	7.5203			31,600.0803	1.2033		31,630.1615
Total	**29.5702**	**194.9672**			**35.8249**	**1.8925**	**37.7173**	**9.6880**	**1.8034**	**11.4914**			**68,145.9037**	**3.5823**		**68,235.4608**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1149	26.5546				1.7879	1.7879		1.6791	1.6791			2,650.9797	0.6531		2,667.3078
Total	**3.1149**	**26.5546**				**1.7879**	**1.7879**		**1.6791**	**1.6791**			**2,650.9797**	**0.6531**		**2,667.3078**

3.5 Building Construction - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	8.6282	182.8009			8.2115	1.6807	9.8922	2.3633	1.6078	3.9711			36,545.8235	2.3790		36,605.2993
Worker	20.9420	12.1663			27.6134	0.2117	27.8251	7.3247	0.1956	7.5203			31,600.0803	1.2033		31,630.1615
Total	**29.5702**	**194.9672**			**35.8249**	**1.8925**	**37.7173**	**9.6880**	**1.8034**	**11.4914**			**68,145.9037**	**3.5823**		**68,235.4608**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900				1.4999	1.4999		1.4099	1.4099			2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**				**1.4999**	**1.4999**		**1.4099**	**1.4099**			**2,620.9351**	**0.6421**		**2,636.9883**

3.5 Building Construction - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	7.3259	172.6226			8.2105	1.3803	9.5909	2.3629	1.3205	3.6834			36,429.4700	2.2586		36,485.9359
Worker	18.7073	10.6117			27.6134	0.2029	27.8163	7.3247	0.1872	7.5119			30,759.1171	1.0580		30,785.5660
Total	**26.0332**	**183.2343**			**35.8239**	**1.5832**	**37.4071**	**9.6876**	**1.5076**	**11.1953**			**67,188.5870**	**3.3166**		**67,271.5018**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6795	23.3900				1.4999	1.4999		1.4099	1.4099			2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**				**1.4999**	**1.4999**		**1.4099**	**1.4099**			**2,620.9351**	**0.6421**		**2,636.9883**

3.5 Building Construction - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	7.3259	172.6226			8.2105	1.3803	9.5909	2.3629	1.3205	3.6834			36,429.4700	2.2586		36,485.9359
Worker	18.7073	10.6117			27.6134	0.2029	27.8163	7.3247	0.1872	7.5119			30,759.1171	1.0580		30,785.5660
Total	**26.0332**	**183.2343**			**35.8239**	**1.5832**	**37.4071**	**9.6876**	**1.5076**	**11.1953**			**67,188.5870**	**3.3166**		**67,271.5018**

3.6 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6437	17.5209				0.9561	0.9561		0.8797	0.8797			2,294.0887	0.7142		2,311.9432
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6437**	**17.5209**				**0.9561**	**0.9561**		**0.8797**	**0.8797**			**2,294.0887**	**0.7142**		**2,311.9432**

3.6 Paving - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0773	0.0439			0.1141	8.4000e-004	0.1149	0.0303	7.7000e-004	0.0310			127.1038	4.3700e-003		127.2131
Total	**0.0773**	**0.0439**			**0.1141**	**8.4000e-004**	**0.1149**	**0.0303**	**7.7000e-004**	**0.0310**			**127.1038**	**4.3700e-003**		**127.2131**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6437	17.5209				0.9561	0.9561		0.8797	0.8797			2,294.0887	0.7142		2,311.9432
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6437**	**17.5209**				**0.9561**	**0.9561**		**0.8797**	**0.8797**			**2,294.0887**	**0.7142**		**2,311.9432**

3.6 Paving - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0773	0.0439			0.1141	8.4000e-004	0.1149	0.0303	7.7000e-004	0.0310			127.1038	4.3700e-003		127.2131
Total	**0.0773**	**0.0439**			**0.1141**	**8.4000e-004**	**0.1149**	**0.0303**	**7.7000e-004**	**0.0310**			**127.1038**	**4.3700e-003**		**127.2131**

3.6 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441				0.8246	0.8246		0.7586	0.7586			2,257.0025	0.7141		2,274.8548
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4544**	**15.2441**				**0.8246**	**0.8246**		**0.7586**	**0.7586**			**2,257.0025**	**0.7141**		**2,274.8548**

3.6 Paving - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0703	0.0386			0.1141	8.1000e-004	0.1149	0.0303	7.5000e-004	0.0310			122.7963	3.8600e-003		122.8929
Total	**0.0703**	**0.0386**			**0.1141**	**8.1000e-004**	**0.1149**	**0.0303**	**7.5000e-004**	**0.0310**			**122.7963**	**3.8600e-003**		**122.8929**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4544	15.2441				0.8246	0.8246		0.7586	0.7586			2,257.0025	0.7141		2,274.8548
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4544**	**15.2441**				**0.8246**	**0.8246**		**0.7586**	**0.7586**			**2,257.0025**	**0.7141**		**2,274.8548**

3.6 Paving - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0703	0.0386			0.1141	8.1000e-004	0.1149	0.0303	7.5000e-004	0.0310			122.7963	3.8600e-003		122.8929
Total	**0.0703**	**0.0386**			**0.1141**	**8.1000e-004**	**0.1149**	**0.0303**	**7.5000e-004**	**0.0310**			**122.7963**	**3.8600e-003**		**122.8929**

3.7 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	416.2230					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838				0.1109	0.1109		0.1109	0.1109			281.4481	0.0218		281.9928
Total	**416.4652**	**1.6838**				**0.1109**	**0.1109**		**0.1109**	**0.1109**			**281.4481**	**0.0218**		**281.9928**

3.7 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	3.1306	1.6613			5.5227	0.0384	5.5611	1.4649	0.0354	1.5003			5,760.904 1	0.1651		5,765.030 2
Total	**3.1306**	**1.6613**			**5.5227**	**0.0384**	**5.5611**	**1.4649**	**0.0354**	**1.5003**			**5,760.904 1**	**0.1651**		**5,765.030 2**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	416.2230					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838				0.1109	0.1109		0.1109	0.1109			281.4481	0.0218		281.9928
Total	**416.4652**	**1.6838**				**0.1109**	**0.1109**		**0.1109**	**0.1109**			**281.4481**	**0.0218**		**281.9928**

3.7 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	3.1306	1.6613			5.5227	0.0384	5.5611	1.4649	0.0354	1.5003			5,760.904 1	0.1651		5,765.030 2
Total	**3.1306**	**1.6613**			**5.5227**	**0.0384**	**5.5611**	**1.4649**	**0.0354**	**1.5003**			**5,760.904 1**	**0.1651**		**5,765.030 2**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	59.8124	235.8321			289.8313	1.2382	291.0694	77.3805	1.1504	78.5308			263,870.8602	9.1933		264,100.6916
Unmitigated	59.8124	235.8321			289.8313	1.2382	291.0694	77.3805	1.1504	78.5308			263,870.8602	9.1933		264,100.6916

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	1,142.40	1,354.56	992.80	2,954,457	2,954,457
Apartments Mid Rise	871.15	837.09	767.66	2,185,042	2,185,042
City Park	136.08	1,638.00	1205.28	928,717	928,717
Condo/Townhouse	29.05	28.35	24.20	72,511	72,511
General Heavy Industry	613.50	613.50	613.50	1,696,787	1,696,787
General Light Industry	5,471.45	1,036.20	533.80	11,429,360	11,429,360
General Office Building	25,005.01	5,576.82	2380.35	39,231,730	39,231,730
Government Office Building	2,136.83	0.00	0.00	2,194,594	2,194,594
Regional Shopping Center	1,152.90	1,349.19	681.48	1,556,033	1,556,033
Single Family Housing	20,468.00	21,306.50	18533.00	52,121,156	52,121,156
Total	57,026.37	33,740.21	25,732.07	114,370,387	114,370,387

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3
Apartments Mid Rise	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3
City Park	10.00	5.00	6.50	33.00	48.00	19.00	66	28	6
Condo/Townhouse	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3
General Heavy Industry	10.00	5.00	6.50	59.00	28.00	13.00	92	5	3
General Light Industry	10.00	5.00	6.50	59.00	28.00	13.00	92	5	3
General Office Building	10.00	5.00	6.50	33.00	48.00	19.00	77	19	4
Government Office Building	10.00	5.00	6.50	33.00	62.00	5.00	50	34	16
Regional Shopping Center	10.00	5.00	6.50	16.30	64.70	19.00	54	35	11
Single Family Housing	10.00	5.00	6.50	46.50	12.50	41.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.578893	0.033999	0.212840	0.104491	0.010628	0.004325	0.018736	0.026318	0.001852	0.001362	0.005392	0.000598	0.000566
Apartments Mid Rise	0.578893	0.033999	0.212840	0.104491	0.010628	0.004325	0.018736	0.026318	0.001852	0.001362	0.005392	0.000598	0.000566
City Park	0.578893	0.033999	0.212840	0.104491	0.010628	0.004325	0.018736	0.026318	0.001852	0.001362	0.005392	0.000598	0.000566
Condo/Townhouse	0.578893	0.033999	0.212840	0.104491	0.010628	0.004325	0.018736	0.026318	0.001852	0.001362	0.005392	0.000598	0.000566
General Heavy Industry	0.578893	0.033999	0.212840	0.104491	0.010628	0.004325	0.018736	0.026318	0.001852	0.001362	0.005392	0.000598	0.000566
General Light Industry	0.578893	0.033999	0.212840	0.104491	0.010628	0.004325	0.018736	0.026318	0.001852	0.001362	0.005392	0.000598	0.000566
General Office Building	0.578893	0.033999	0.212840	0.104491	0.010628	0.004325	0.018736	0.026318	0.001852	0.001362	0.005392	0.000598	0.000566
Government Office Building	0.578893	0.033999	0.212840	0.104491	0.010628	0.004325	0.018736	0.026318	0.001852	0.001362	0.005392	0.000598	0.000566
Regional Shopping Center	0.578893	0.033999	0.212840	0.104491	0.010628	0.004325	0.018736	0.026318	0.001852	0.001362	0.005392	0.000598	0.000566
Single Family Housing	0.578893	0.033999	0.212840	0.104491	0.010628	0.004325	0.018736	0.026318	0.001852	0.001362	0.005392	0.000598	0.000566

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	3.9173	34.6518				2.7065	2.7065		2.7065	2.7065			42,734.2801	0.8191	0.7835	42,988.2286
NaturalGas Unmitigated	3.9173	34.6518				2.7065	2.7065		2.7065	2.7065			42,734.2801	0.8191	0.7835	42,988.2286

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	7264.34	0.0783	0.6695				0.0541	0.0541		0.0541	0.0541			854.6280	0.0164	0.0157	859.7066
Apartments Mid Rise	3498.63	0.0377	0.3224				0.0261	0.0261		0.0261	0.0261			411.6039	7.8900e-003	7.5500e-003	414.0499
City Park	0	0.0000	0.0000				0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	281.524	3.0400e-003	0.0259				2.1000e-003	2.1000e-003		2.1000e-003	2.1000e-003			33.1205	6.3000e-004	6.1000e-004	33.3173
General Heavy Industry	40126.8	0.4327	3.9340				0.2990	0.2990		0.2990	0.2990			4,720.8026	0.0905	0.0866	4,748.8560
General Light Industry	77016	0.8306	7.5506				0.5738	0.5738		0.5738	0.5738			9,060.7091	0.1737	0.1661	9,114.5524
General Office Building	81363.6	0.8775	7.9768				0.6062	0.6062		0.6062	0.6062			9,572.1837	0.1835	0.1755	9,629.0664
Government Office Building	1112.6	0.0120	0.1091				8.2900e-003	8.2900e-003		8.2900e-003	8.2900e-003			130.8944	2.5100e-003	2.4000e-003	131.6723
Regional Shopping Center	400.932	4.3200e-003	0.0393				2.9900e-003	2.9900e-003		2.9900e-003	2.9900e-003			47.1684	9.0000e-004	8.6000e-004	47.4487
Single Family Housing	152177	1.6411	14.0242				1.1339	1.1339		1.1339	1.1339			17,903.1695	0.3431	0.3282	18,009.5591
Total		**3.9173**	**34.6518**				**2.7065**	**2.7065**		**2.7065**	**2.7065**			**42,734.2801**	**0.8191**	**0.7835**	**42,988.2286**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments High Rise	7.26434	0.0783	0.6695				0.0541	0.0541		0.0541	0.0541			854.6280	0.0164	0.0157	859.7066
Apartments Mid Rise	3.49863	0.0377	0.3224				0.0261	0.0261		0.0261	0.0261			411.6039	7.8900e-003	7.5500e-003	414.0499
City Park	0	0.0000	0.0000				0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	0.281524	3.0400e-003	0.0259				2.1000e-003	2.1000e-003		2.1000e-003	2.1000e-003			33.1205	6.3000e-004	6.1000e-004	33.3173
General Heavy Industry	40.1268	0.4327	3.9340				0.2990	0.2990		0.2990	0.2990			4,720.8026	0.0905	0.0866	4,748.8560
General Light Industry	77.016	0.8306	7.5506				0.5738	0.5738		0.5738	0.5738			9,060.7091	0.1737	0.1661	9,114.5524
General Office Building	81.3636	0.8775	7.9768				0.6062	0.6062		0.6062	0.6062			9,572.1837	0.1835	0.1755	9,629.0664
Government Office Building	1.1126	0.0120	0.1091				8.2900e-003	8.2900e-003		8.2900e-003	8.2900e-003			130.8944	2.5100e-003	2.4000e-003	131.6723
Regional Shopping Center	0.400932	4.3200e-003	0.0393				2.9900e-003	2.9900e-003		2.9900e-003	2.9900e-003			47.1684	9.0000e-004	8.6000e-004	47.4487
Single Family Housing	152.177	1.6411	14.0242				1.1339	1.1339		1.1339	1.1339			17,903.1695	0.3431	0.3282	18,009.5591
Total		**3.9173**	**34.6518**				**2.7065**	**2.7065**		**2.7065**	**2.7065**			**42,734.2801**	**0.8191**	**0.7835**	**42,988.2286**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	196.9435	2.4295				1.1716	1.1716		1.1716	1.1716			380.7827	0.3638	0.0000	389.8767
Unmitigated	196.9435	2.4295				1.1716	1.1716		1.1716	1.1716			380.7827	0.3638	0.0000	389.8767

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	23.6050					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	167.0174					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000				0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Landscaping	6.3211	2.4295				1.1716	1.1716		1.1716	1.1716			380.7827	0.3638		389.8767
Total	**196.9435**	**2.4295**				**1.1716**	**1.1716**		**1.1716**	**1.1716**			**380.7827**	**0.3638**	**0.0000**	**389.8767**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	23.6050					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	167.0174					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000				0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Landscaping	6.3211	2.4295				1.1716	1.1716		1.1716	1.1716			380.7827	0.3638		389.8767
Total	**196.9435**	**2.4295**				**1.1716**	**1.1716**		**1.1716**	**1.1716**			**380.7827**	**0.3638**	**0.0000**	**389.8767**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

				CH4						
Year	pollutant	vehicle_cla	fuel	5	10	15	20	25	30	35
2015	CH4	HHDT	Dsl	0.005002392	0.00294525	0.000897	0.0001969	0.0002795	0.0001575	0.0001553
2015	CH4	HHDT	Gas	0.004918343	0.0031874	0.0021776	0.0015654	0.0011878	0.000949	0.0007984
2015	CH4	LDA	Dsl	3.25672E-05	2.344E-05	1.444E-05	9.005E-06	6.772E-06	5.554E-06	4.777E-06
2015	CH4	LDA	Elec	0	0	0	0	0	0	0
2015	CH4	LDA	Gas	0.000143118	9.1785E-05	6.175E-05	4.383E-05	3.283E-05	2.591E-05	2.151E-05
2015	CH4	LDT1	Dsl	7.07351E-05	4.9483E-05	3.522E-05	2.622E-05	2.079E-05	1.732E-05	1.511E-05
2015	CH4	LDT1	Elec	0	0	0	0	0	0	0
2015	CH4	LDT1	Gas	0.000326827	0.00021615	0.0001498	0.000109	8.337E-05	6.692E-05	5.62E-05
2015	CH4	LDT2	Dsl	2.93713E-05	2.1654E-05	1.164E-05	5.728E-06	3.924E-06	3.12E-06	2.609E-06
2015	CH4	LDT2	Gas	0.000178552	0.00011503	7.77E-05	5.534E-05	4.156E-05	3.286E-05	2.73E-05
2015	CH4	LHDT1	Dsl	8.11903E-05	5.74E-05	3.88E-05	2.729E-05	2.13E-05	1.766E-05	1.534E-05
2015	CH4	LHDT1	Gas	0.000370922	0.00024267	0.0001677	0.0001214	9.213E-05	7.414E-05	6.203E-05
2015	CH4	LHDT2	Dsl	7.86687E-05	5.6228E-05	3.594E-05	2.359E-05	1.804E-05	1.487E-05	1.285E-05
2015	CH4	LHDT2	Gas	0.000309778	0.00020448	0.0001424	0.000104	7.944E-05	6.433E-05	5.413E-05
2015	CH4	MCY	Gas	0.004592392	0.00301793	0.0020974	0.0015314	0.0011761	0.0009512	0.0008069
2015	CH4	MDV	Dsl	2.26519E-05	1.6703E-05	8.965E-06	4.403E-06	3.013E-06	2.394E-06	2.001E-06
2015	CH4	MDV	Gas	0.000305973	0.00019688	0.0001328	9.45E-05	7.09E-05	5.601E-05	4.649E-05
2015	CH4	MH	Dsl	0.000128737	9.7678E-05	5.038E-05	2.284E-05	1.619E-05	1.318E-05	1.087E-05
2015	CH4	MH	Gas	0.00087468	0.00058188	0.0004092	0.0003016	0.0002338	0.00019	0.0001623
2015	CH4	MHDT	Dsl	0.000288445	0.00021961	0.0001165	5.716E-05	4.174E-05	3.377E-05	2.757E-05
2015	CH4	MHDT	Gas	0.00110554	0.0007114	0.000485	0.0003473	0.0002622	0.0002081	0.000174
2015	CH4	OBUS	Dsl	0.000196352	0.00015211	8.667E-05	4.916E-05	3.54E-05	2.753E-05	2.148E-05
2015	CH4	OBUS	Gas	0.000650246	0.00041085	0.0002751	0.0001936	0.0001437	0.0001123	9.257E-05
2015	CH4	SBUS	Dsl	0.000131314	0.00010191	5.674E-05	2.859E-05	2.04E-05	1.645E-05	1.342E-05
2015	CH4	SBUS	Gas	0.002686893	0.00169459	0.0011249	0.0007879	0.0005818	0.0004533	0.0003718
2015	CH4	UBUS	Dsl	0.04726762	0.03562246	0.0179968	0.0079241	0.0055082	0.0043428	0.0034715
2015	CH4	UBUS	Gas	0.001157053	0.00074464	0.0005057	0.0003617	0.0002757	0.0002185	0.0001824
2015	CO	HHDT	Dsl	0.013634788	0.01051727	0.0067537	0.005031	0.0036219	0.0028172	0.0022625
2015	CO	HHDT	Gas	0.481076136	0.36032553	0.2859596	0.238368	0.2042967	0.1818166	0.1674313
2015	CO	LDA	Dsl	0.007170505	0.00529864	0.0029199	0.0015174	0.0010838	0.0008927	0.0007781
2015	CO	LDA	Elec	0	0	0	0	0	0	0
2015	CO	LDA	Gas	0.005830808	0.00505389	0.0044331	0.0039464	0.0035642	0.0032586	0.0030004
2015	CO	LDT1	Dsl	0.008460459	0.00604588	0.0043354	0.0032749	0.0026853	0.0023362	0.0021415
2015	CO	LDT1	Elec	0	0	0	0	0	0	0
2015	CO	LDT1	Gas	0.016540257	0.0135494	0.0114073	0.0098448	0.0087013	0.0078583	0.0072062
2015	CO	LDT2	Dsl	0.00457414	0.00339967	0.0017779	0.0008266	0.0005575	0.0004474	0.0003799
2015	CO	LDT2	Gas	0.007374993	0.00641091	0.0056331	0.0050187	0.0045331	0.004143	0.0038127
2015	CO	LHDT1	Dsl	0.006995962	0.00501889	0.0035004	0.0025671	0.002087	0.0018101	0.0016547
2015	CO	LHDT1	Gas	0.010923846	0.00860134	0.0070834	0.0060171	0.005248	0.0047218	0.0043184
2015	CO	LHDT2	Dsl	0.006569603	0.00474645	0.0031426	0.0021697	0.0017316	0.0014915	0.0013553
2015	CO	LHDT2	Gas	0.009622363	0.00742903	0.0060156	0.0050437	0.0043574	0.0039036	0.0035647
2015	CO	MCY	Gas	0.149199229	0.11009435	0.0859729	0.0699973	0.0594871	0.052804	0.0484661
2015	CO	MDV	Dsl	0.0070866	0.00528735	0.0026665	0.0011341	0.0007249	0.0005664	0.0004678
2015	CO	MDV	Gas	0.010864451	0.00935704	0.0081729	0.0072524	0.0065351	0.0059668	0.0054914
2015	CO	MH	Dsl	0.005631457	0.00468382	0.0031638	0.0021439	0.001719	0.0014618	0.0012536
2015	CO	MH	Gas	0.061791212	0.04538717	0.0349722	0.0283534	0.0240215	0.021231	0.0195852
2015	CO	MHDT	Dsl	0.008543242	0.00706676	0.0048233	0.0033456	0.0026816	0.0022684	0.001944
2015	CO	MHDT	Gas	0.038351027	0.03052847	0.0252873	0.0216768	0.0190951	0.0172099	0.0158749
2015	CO	OBUS	Dsl	0.007717941	0.00636653	0.0043862	0.0031452	0.0024028	0.001929	0.0015562
2015	CO	OBUS	Gas	0.014419784	0.01257859	0.0111939	0.010066	0.0091446	0.0083599	0.0077076
2015	CO	SBUS	Dsl	0.003582203	0.00308684	0.0023166	0.00175	0.0014088	0.0011629	0.0009629
2015	CO	SBUS	Gas	0.053929144	0.04922447	0.0449496	0.041167	0.0377807	0.0347682	0.0320232
2015	CO	UBUS	Dsl	0.087007294	0.07174456	0.0473208	0.0310327	0.0243762	0.0204072	0.0172216
2015	CO	UBUS	Gas	0.020542276	0.01783604	0.0157833	0.0141485	0.0129222	0.0118	0.0108671
2015	CO2	HHDT	Dsl	10.94705312	8.98478242	6.4300896	4.9708643	4.7629833	4.3418643	4.1930172
2015	CO2	HHDT	Gas	9.677498504	8.20904323	5.9217639	4.7844021	4.5010266	4.2854566	4.1100947
2015	CO2	LDA	Dsl	1.718352551	1.43154987	1.1774457	0.9658878	0.8096474	0.7013032	0.633964
2015	CO2	LDA	Elec	0	0	0	0	0	0	0
2015	CO2	LDA	Gas	2.342300076	1.73764598	1.3329127	1.0625397	0.880513	0.7579595	0.6771599
2015	CO2	LDT1	Dsl	2.146103585	1.80651816	1.4979013	1.2306403	1.0318475	0.8922561	0.8052954
2015	CO2	LDT1	Elec	0	0	0	0	0	0	0

2015	CO2	LDT1	Gas	2.713349683	2.01288419	1.5444821	1.2314217	1.0205235	0.8784763	0.7848263
2015	CO2	LDT2	Dsl	2.129452747	1.79250204	1.4862796	1.2210922	1.0238418	0.8853334	0.7990474
2015	CO2	LDT2	Gas	3.157735559	2.34256692	1.7971596	1.4327335	1.1873186	1.0220593	0.9131046
2015	CO2	LHDT1	Dsl	2.872246137	2.41457103	1.5769169	1.3440836	1.1920741	1.0825322	1.0825322
2015	CO2	LHDT1	Gas	3.102437551	3.05150576	2.1198418	1.8404896	1.6871155	1.5311636	1.5311636
2015	CO2	LHDT2	Dsl	3.026876067	2.69007933	1.7907049	1.5273396	1.3610985	1.2274938	1.2274938
2015	CO2	LHDT2	Gas	3.306668052	3.43218008	2.4143978	2.1130079	1.9106987	1.7269776	1.7269776
2015	CO2	MCY	Gas	1.174949164	0.87149564	0.6709134	0.5360716	0.4445644	0.3826525	0.3418443
2015	CO2	MDV	Dsl	2.625007968	2.22927074	1.8905713	1.570112	1.3276912	1.1467118	1.0404823
2015	CO2	MDV	Gas	4.09916547	3.04096035	2.3330585	1.8600198	1.5414292	1.3268808	1.1854304
2015	CO2	MH	Dsl	4.66705905	4.23770968	3.479527	2.8553657	2.561147	2.4040237	2.2736309
2015	CO2	MH	Gas	8.711056149	7.4363096	5.1258618	3.6039101	3.1469787	2.8919451	2.6699666
2015	CO2	MHDT	Dsl	5.153337109	4.62310728	3.8466918	3.2728125	2.9748889	2.7929605	2.6461708
2015	CO2	MHDT	Gas	8.704283827	7.43052832	5.1218767	3.6011083	3.1445321	2.8896968	2.6678909
2015	CO2	OBUS	Dsl	6.076409208	5.42764758	4.4933566	3.8871406	3.5282315	3.3302226	3.1687783
2015	CO2	OBUS	Gas	8.688099867	7.41671266	5.1123536	3.5944127	3.1386855	2.884324	2.6629304
2015	CO2	SBUS	Dsl	5.26902081	4.75274289	3.9296188	3.2873617	2.9665281	2.7833039	2.6341898
2015	CO2	SBUS	Gas	4.108716275	3.50746061	2.417699	1.6998449	1.4843255	1.3640346	1.2593347
2015	CO2	UBUS	Dsl	7.594354859	6.89570685	5.6619731	4.6463223	4.1675622	3.9118874	3.6997089
2015	CO2	UBUS	Gas	8.709333242	7.43483882	5.124848	3.6031973	3.1463563	2.8913732	2.6694385
2015	Fuel	HHDT	Dsl	0.985234781	0.80863042	0.5787081	0.4473778	0.4286685	0.3907678	0.3773715
2015	Fuel	HHDT	Gas	1.119738235	0.94019528	0.6824588	0.5523298	0.5157638	0.4886096	0.4672524
2015	Fuel	LDA	Dsl	0.15465173	0.12883949	0.1059701	0.0869299	0.0728683	0.0631173	0.0570568
2015	Fuel	LDA	Elec	0	0	0	0	0	0	0
2015	Fuel	LDA	Gas	0.250545989	0.18597317	0.1427389	0.1138478	0.0943891	0.0812807	0.072629
2015	Fuel	LDT1	Dsl	0.193149323	0.16258663	0.1348111	0.1107576	0.0928663	0.080303	0.0724766
2015	Fuel	LDT1	Elec	0	0	0	0	0	0	0
2015	Fuel	LDT1	Gas	0.29214873	0.21690758	0.1665808	0.1329271	0.1102429	0.0949533	0.0848571
2015	Fuel	LDT2	Dsl	0.191650747	0.16132518	0.1337652	0.1098983	0.0921458	0.07968	0.0719143
2015	Fuel	LDT2	Gas	0.337663756	0.25063238	0.1923861	0.1534547	0.1272267	0.1095552	0.0978924
2015	Fuel	LHDT1	Dsl	0.258502152	0.21731139	0.1419225	0.1209675	0.1072867	0.0974279	0.0974279
2015	Fuel	LHDT1	Gas	0.332574066	0.32661462	0.2270796	0.1971051	0.1806128	0.1638997	0.1638182
2015	Fuel	LHDT2	Dsl	0.272418846	0.24210714	0.1611634	0.1374606	0.1224989	0.1104744	0.1104744
2015	Fuel	LHDT2	Gas	0.354024241	0.36690057	0.2582301	0.2259346	0.204252	0.184598	0.1845297
2015	Fuel	MCY	Gas	0.161112902	0.11853251	0.0909505	0.0725631	0.0602043	0.0519502	0.0465289
2015	Fuel	MDV	Dsl	0.236250717	0.20063437	0.1701514	0.1413101	0.1194922	0.1032041	0.0936434
2015	Fuel	MDV	Gas	0.438633886	0.32558152	0.2499347	0.1993691	0.1652995	0.142343	0.1271914
2015	Fuel	MH	Dsl	0.420035314	0.38139387	0.3131574	0.2569829	0.2305032	0.2163621	0.2046268
2015	Fuel	MH	Gas	0.939203371	0.80028152	0.55227	0.38895	0.3394672	0.3117773	0.2878239
2015	Fuel	MHDT	Dsl	0.46380034	0.41607965	0.3462023	0.2945531	0.26774	0.2513664	0.2381554
2015	Fuel	MHDT	Gas	0.934598904	0.79717129	0.5501995	0.3875013	0.3383469	0.3108289	0.2869455
2015	Fuel	OBUS	Dsl	0.546876829	0.48848828	0.4044021	0.3498427	0.3175408	0.29972	0.28519
2015	Fuel	OBUS	Gas	0.928191511	0.79224179	0.5465073	0.3846087	0.3358752	0.3086254	0.2849215
2015	Fuel	SBUS	Dsl	0.474211873	0.42774686	0.3536657	0.2958626	0.2669875	0.2504973	0.2370771
2015	Fuel	SBUS	Gas	0.449504553	0.38358394	0.2662	0.1887577	0.1650126	0.1515564	0.139858
2015	Fuel	UBUS	Dsl	0.683491937	0.62061362	0.5095776	0.418169	0.3750806	0.3520699	0.3329738
2015	Fuel	UBUS	Gas	0.932035579	0.79541899	0.5488593	0.3864119	0.3374689	0.3100681	0.2862416
2015	NOx	HHDT	Dsl	0.052818954	0.04290806	0.0298946	0.023306	0.0194371	0.017467	0.0163027
2015	NOx	HHDT	Gas	0.018248637	0.01644906	0.0151727	0.0143622	0.0136372	0.013157	0.01286
2015	NOx	LDA	Dsl	0.000759435	0.00074477	0.0007054	0.0006869	0.0006939	0.0007117	0.0007335
2015	NOx	LDA	Gas	0.087923667	0.07617588	0.0676544	0.0609854	0.0559508	0.0523395	0.0496103
2015	NOx	LDT1	Dsl	9.01688E-07	9.4307E-07	9.836E-07	1.027E-06	1.073E-06	1.122E-06	1.171E-06
2015	NOx	LDT1	Gas	0.264042686	0.22501219	0.1980111	0.1778738	0.1633841	0.1536077	0.1468034
2015	NOx	LDT2	Dsl	0.001274196	0.00117181	0.0009902	0.000873	0.0008343	0.0008278	0.0008332
2015	NOx	LDT2	Gas	0.003176707	0.00272084	0.0023929	0.0021387	0.0019481	0.0018118	0.0017098
2015	NOx	LHDT1	Dsl	27.54059539	9.50777945	7.5529094	2.2512739	0.8915979	1.2363919	0.3800214
2015	NOx	LHDT1	Gas	0.010907112	0.00250075	0.0018042	0.0005005	0.0001284	0.0001689	3.434E-05
2015	NOx	LHDT2	Dsl	0.002305211	0.00238614	0.0024556	0.0025378	0.0026494	0.0027587	0.002887
2015	NOx	LHDT2	Gas	0.000201355	0.00017894	0.0001618	0.0001497	0.000142	0.0001348	0.0001326
2015	NOx	MCY	Gas	0.000102926	0.00028963	0.0003614	0.0012174	0.0031431	0.0023369	0.0079307
2015	NOx	MDV	Dsl	2.98875E-06	1.0335E-05	1.035E-05	2.875E-05	9.782E-05	6.829E-05	0.0003259
2015	NOx	MDV	Gas	0.028817968	0.02457155	0.0215401	0.0192128	0.0174816	0.0162552	0.0153493
2015	NOx	MH	Dsl	0.167659886	0.06904153	0.0228384	0.0047967	0.0016	0.0028615	0.0017943

2015	NOx	MH	Gas	0.000549752	0.00025003	0.0001021	2.601E-05	9.765E-06	1.689E-05	1.148E-05
2015	NOx	MHDT	Dsl	2.124898368	1.76533111	1.2548819	0.9639634	0.8546202	0.7930476	0.748608
2015	NOx	MHDT	Gas	0.015064741	0.01327094	0.0117924	0.0107343	0.0099227	0.0093568	0.0089578
2015	NOx	OBUS	Dsl	0.002519147	0.00208855	0.0014318	0.0011261	0.0009844	0.0009487	0.0009208
2015	NOx	OBUS	Gas	0.001243606	0.00108394	0.0009524	0.0008567	0.0007824	0.0007291	0.0006901
2015	NOx	SBUS	Dsl	0.027558108	0.0160037	0.0172098	0.0169514	0.0240523	0.0224087	0.0185485
2015	NOx	SBUS	Gas	0.001062258	0.00064079	0.0008958	0.0010512	0.0013587	0.0013365	0.0010432
2015	NOx	UBUS	Dsl	0.418017472	0.3283302	0.1965866	0.9956428	0.0071293	0.0059955	0.0073544
2015	NOx	UBUS	Gas	0.050964175	0.04210357	0.0318529	0.1859472	0.0012866	0.0010494	0.0012582
2015	PM10	HHDT	Dsl	0.000390115	0.00037802	0.0003195	0.0003598	0.0001994	0.0001806	0.0001613
2015	PM10	HHDT	Gas	4.67421E-05	3.1977E-05	2.295E-05	1.728E-05	1.364E-05	1.129E-05	9.786E-06
2015	PM10	LDA	Dsl	0.000294716	0.00020823	0.0001534	0.0001179	9.455E-05	7.931E-05	6.949E-05
2015	PM10	LDA	Elec	0	0	0	0	0	0	0
2015	PM10	LDA	Gas	2.62758E-05	1.6761E-05	1.127E-05	7.993E-06	5.971E-06	4.698E-06	3.891E-06
2015	PM10	LDT1	Dsl	0.000981311	0.00068395	0.0004987	0.0003804	0.0003036	0.0002535	0.0002215
2015	PM10	LDT1	Elec	0	0	0	0	0	0	0
2015	PM10	LDT1	Gas	5.17171E-05	3.3849E-05	2.332E-05	1.688E-05	1.284E-05	1.025E-05	8.586E-06
2015	PM10	LDT2	Dsl	0.000114858	8.3558E-05	6.286E-05	4.903E-05	3.972E-05	3.361E-05	2.96E-05
2015	PM10	LDT2	Gas	2.4848E-05	1.5885E-05	1.071E-05	7.604E-06	5.689E-06	4.48E-06	3.714E-06
2015	PM10	LHDT1	Dsl	0.00032552	0.0002291	0.0001683	0.000129	0.0001034	8.659E-05	7.581E-05
2015	PM10	LHDT1	Gas	2.42344E-05	1.5458E-05	1.04E-05	7.383E-06	5.525E-06	4.36E-06	3.626E-06
2015	PM10	LHDT2	Dsl	0.000254254	0.00018098	0.000134	0.0001034	8.317E-05	6.993E-05	6.135E-05
2015	PM10	LHDT2	Gas	1.92782E-05	1.2337E-05	8.328E-06	5.929E-06	4.45E-06	3.521E-06	2.936E-06
2015	PM10	MCY	Gas	1.77313E-05	1.1986E-05	8.514E-06	6.352E-06	4.975E-06	4.089E-06	3.526E-06
2015	PM10	MDV	Dsl	9.99272E-05	7.3317E-05	5.549E-05	4.345E-05	3.53E-05	2.994E-05	2.641E-05
2015	PM10	MDV	Gas	2.62127E-05	1.6811E-05	1.136E-05	8.093E-06	6.069E-06	4.789E-06	3.976E-06
2015	PM10	MH	Dsl	0.001153929	0.00097274	0.000677	0.00047	0.0003859	0.0003404	0.0003123
2015	PM10	MH	Gas	4.17058E-05	2.7442E-05	1.902E-05	1.389E-05	1.067E-05	8.62E-06	7.324E-06
2015	PM10	MHDT	Dsl	0.001106107	0.00093413	0.0006553	0.0004607	0.0003813	0.0003389	0.0003135
2015	PM10	MHDT	Gas	2.2052E-05	1.4367E-05	9.868E-06	7.142E-06	5.444E-06	4.368E-06	3.689E-06
2015	PM10	OBUS	Dsl	0.000605155	0.00050508	0.0003456	0.0002365	0.0001914	0.0001658	0.000148
2015	PM10	OBUS	Gas	1.059E-05	6.7248E-06	4.505E-06	3.184E-06	2.373E-06	1.865E-06	1.546E-06
2015	PM10	SBUS	Dsl	0.000700878	0.00058474	0.0003969	0.0002671	0.0002146	0.0001836	0.0001606
2015	PM10	SBUS	Gas	4.82581E-05	3.0364E-05	2.016E-05	1.411E-05	1.043E-05	8.126E-06	6.681E-06
2015	PM10	UBUS	Dsl	0.000808004	0.00068488	0.0004834	0.0003417	0.0002831	0.0002475	0.0002198
2015	PM10	UBUS	Gas	1.36965E-05	8.6945E-06	5.823E-06	4.114E-06	3.065E-06	2.408E-06	1.995E-06
2015	PM2_5	HHDT	Dsl	0.000373239	0.00036166	0.0003057	0.0003442	0.0001908	0.0001728	0.0001543
2015	PM2_5	HHDT	Gas	4.42047E-05	3.0256E-05	2.173E-05	1.636E-05	1.292E-05	1.069E-05	9.274E-06
2015	PM2_5	LDA	Dsl	0.000281966	0.00019922	0.0001467	0.0001128	9.046E-05	7.588E-05	6.648E-05
2015	PM2_5	LDA	Elec	0	0	0	0	0	0	0
2015	PM2_5	LDA	Gas	2.41946E-05	1.5436E-05	1.038E-05	7.363E-06	5.501E-06	4.328E-06	3.586E-06
2015	PM2_5	LDT1	Dsl	0.00093886	0.00065436	0.0004771	0.000364	0.0002905	0.0002426	0.0002119
2015	PM2_5	LDT1	Elec	0	0	0	0	0	0	0
2015	PM2_5	LDT1	Gas	4.77286E-05	3.1246E-05	2.153E-05	1.559E-05	1.186E-05	9.472E-06	7.934E-06
2015	PM2_5	LDT2	Dsl	0.00010989	7.9944E-05	6.015E-05	4.69E-05	3.801E-05	3.216E-05	2.832E-05
2015	PM2_5	LDT2	Gas	2.28824E-05	1.4631E-05	9.863E-06	7.006E-06	5.241E-06	4.129E-06	3.423E-06
2015	PM2_5	LHDT1	Dsl	0.000311438	0.00021918	0.000161	0.0001235	9.889E-05	8.285E-05	7.253E-05
2015	PM2_5	LHDT1	Gas	2.22985E-05	1.4224E-05	9.572E-06	6.794E-06	5.085E-06	4.013E-06	3.337E-06
2015	PM2_5	LHDT2	Dsl	0.000243256	0.00017315	0.0001282	9.893E-05	7.957E-05	6.691E-05	5.87E-05
2015	PM2_5	LHDT2	Gas	1.77314E-05	1.1347E-05	7.66E-06	5.454E-06	4.094E-06	3.239E-06	2.701E-06
2015	PM2_5	MCY	Gas	1.67496E-05	1.1326E-05	8.047E-06	6.005E-06	4.704E-06	3.867E-06	3.335E-06
2015	PM2_5	MDV	Dsl	9.56044E-05	7.0145E-05	5.309E-05	4.157E-05	3.377E-05	2.865E-05	2.526E-05
2015	PM2_5	MDV	Gas	2.41409E-05	1.5484E-05	1.047E-05	7.457E-06	5.592E-06	4.414E-06	3.664E-06
2015	PM2_5	MH	Dsl	0.00110401	0.00093066	0.0006477	0.0004497	0.0003692	0.0003257	0.0002988
2015	PM2_5	MH	Gas	3.8709E-05	2.5484E-05	1.768E-05	1.291E-05	9.92E-06	8.019E-06	6.816E-06
2015	PM2_5	MHDT	Dsl	0.001058257	0.00089372	0.0006269	0.0004407	0.0003648	0.0003242	0.0002999
2015	PM2_5	MHDT	Gas	2.0444E-05	1.3327E-05	9.159E-06	6.631E-06	5.057E-06	4.06E-06	3.429E-06
2015	PM2_5	OBUS	Dsl	0.000578976	0.00048323	0.0003307	0.0002263	0.0001831	0.0001586	0.0001416
2015	PM2_5	OBUS	Gas	9.75853E-06	6.1981E-06	4.153E-06	2.936E-06	2.188E-06	1.72E-06	1.426E-06
2015	PM2_5	SBUS	Dsl	0.000670558	0.00055945	0.0003798	0.0002555	0.0002053	0.0001757	0.0001536
2015	PM2_5	SBUS	Gas	4.43716E-05	2.7919E-05	1.853E-05	1.298E-05	9.587E-06	7.472E-06	6.143E-06
2015	PM2_5	UBUS	Dsl	0.00077305	0.00065525	0.0004625	0.0003269	0.0002709	0.0002368	0.0002103
2015	PM2_5	UBUS	Gas	1.2602E-05	8.0003E-06	5.358E-06	3.786E-06	2.821E-06	2.217E-06	1.836E-06

2015	ROG	HHDT	Dsl	0.003540001	0.00300932	0.0019869	0.001376	0.0008576	0.0006752	0.0005201
2015	ROG	HHDT	Gas	0.022560209	0.01503529	0.0105795	0.0078786	0.0061085	0.0049823	0.0042682
2015	ROG	LDA	Dsl	0.000701152	0.00050466	0.0003109	0.0001939	0.0001458	0.0001196	0.0001029
2015	ROG	LDA	Elec	0	0	0	0	0	0	0
2015	ROG	LDA	Gas	0.000430351	0.00028006	0.0001915	0.000138	0.0001048	8.381E-05	7.037E-05
2015	ROG	LDT1	Dsl	0.001522885	0.00106534	0.0007583	0.0005645	0.0004475	0.0003729	0.0003253
2015	ROG	LDT1	Elec	0	0	0	0	0	0	0
2015	ROG	LDT1	Gas	0.001190359	0.00079998	0.0005647	0.0004178	0.0003244	0.0002643	0.0002251
2015	ROG	LDT2	Dsl	0.000632347	0.00046619	0.0002505	0.0001233	8.448E-05	6.716E-05	5.617E-05
2015	ROG	LDT2	Gas	0.000518289	0.00033775	0.0002312	0.0001666	0.0001265	0.0001011	8.477E-05
2015	ROG	LHDT1	Dsl	0.00174798	0.00123578	0.0008353	0.0005874	0.0004585	0.0003803	0.0003304
2015	ROG	LHDT1	Gas	0.000955345	0.00062649	0.0004338	0.000315	0.0002398	0.0001933	0.0001624
2015	ROG	LHDT2	Dsl	0.00169369	0.00121055	0.0007739	0.0005079	0.0003883	0.0003201	0.0002766
2015	ROG	LHDT2	Gas	0.00078037	0.00051557	0.0003594	0.0002626	0.0002009	0.0001628	0.0001372
2015	ROG	MCY	Gas	0.029623169	0.01965515	0.0137961	0.0101587	0.0078595	0.0064	0.0054586
2015	ROG	MDV	Dsl	0.000487682	0.00035961	0.000193	9.479E-05	6.486E-05	5.154E-05	4.309E-05
2015	ROG	MDV	Gas	0.000860737	0.00055916	0.0003814	0.000274	0.0002075	0.0001654	0.0001384
2015	ROG	MH	Dsl	0.002771636	0.00210294	0.0010846	0.0004916	0.0003486	0.0002837	0.0002341
2015	ROG	MH	Gas	0.003448964	0.00233562	0.0016565	0.0012373	0.0009696	0.0007985	0.0006901
2015	ROG	MHDT	Dsl	0.006210141	0.00472809	0.0025072	0.0012307	0.0008987	0.000727	0.0005935
2015	ROG	MHDT	Gas	0.003331956	0.00217618	0.0014989	0.0010872	0.0008303	0.0006673	0.0005645
2015	ROG	OBUS	Dsl	0.004227403	0.0032749	0.001866	0.0010583	0.0007621	0.0005927	0.0004624
2015	ROG	OBUS	Gas	0.001685193	0.00106975	0.0007189	0.0005081	0.0003789	0.0002973	0.0002462
2015	ROG	SBUS	Dsl	0.002827153	0.00219406	0.0012217	0.0006155	0.0004392	0.0003541	0.0002889
2015	ROG	SBUS	Gas	0.006649399	0.00419369	0.0027837	0.0019499	0.0014399	0.0011218	0.0009202
2015	ROG	UBUS	Dsl	0.010147447	0.00773818	0.0040457	0.0018547	0.0013112	0.0010596	0.0008665
2015	ROG	UBUS	Gas	0.002902483	0.00186998	0.0012713	0.0009102	0.0006939	0.0005506	0.0004602
2035	CH4	HHDT	Dsl	0.004460976	0.00262135	0.0008294	0.0001376	0.0002748	0.0001423	0.0001391
2035	CH4	LDA	Dsl	9.13056E-06	6.8323E-06	3.345E-06	1.311E-06	7.908E-07	5.987E-07	4.771E-07
2035	CH4	LDA	Elec	0	0	0	0	0	0	0
2035	CH4	LDA	Gas	2.7389E-05	1.7444E-05	1.159E-05	8.092E-06	5.969E-06	4.658E-06	3.829E-06
2035	CH4	LDT1	Dsl	3.08652E-05	2.2658E-05	1.249E-05	6.473E-06	4.537E-06	3.636E-06	3.064E-06
2035	CH4	LDT1	Elec	0	0	0	0	0	0	0
2035	CH4	LDT1	Gas	3.78431E-05	2.4268E-05	1.623E-05	1.14E-05	8.455E-06	6.623E-06	5.456E-06
2035	CH4	LDT2	Dsl	2.69813E-05	2.0195E-05	9.87E-06	3.847E-06	2.313E-06	1.748E-06	1.391E-06
2035	CH4	LDT2	Gas	3.75344E-05	2.392E-05	1.59E-05	1.111E-05	8.202E-06	6.404E-06	5.265E-06
2035	CH4	LHDT1	Dsl	7.90155E-05	5.8564E-05	3.046E-05	1.396E-05	9.233E-06	7.248E-06	5.989E-06
2035	CH4	LHDT1	Gas	5.84872E-05	3.6809E-05	2.448E-05	1.71E-05	1.255E-05	9.783E-06	7.965E-06
2035	CH4	LHDT2	Dsl	7.62935E-05	5.7029E-05	2.811E-05	1.123E-05	6.865E-06	5.225E-06	4.187E-06
2035	CH4	LHDT2	Gas	2.26571E-05	1.4259E-05	9.483E-06	6.625E-06	4.862E-06	3.79E-06	3.085E-06
2035	CH4	MCY	Gas	0.005976292	0.00386155	0.0026345	0.0018966	0.001439	0.0011496	0.0009662
2035	CH4	MDV	Dsl	1.0758E-05	8.0521E-06	3.936E-06	1.535E-06	9.231E-07	6.978E-07	5.554E-07
2035	CH4	MDV	Gas	5.85945E-05	3.7546E-05	2.509E-05	1.762E-05	1.305E-05	1.022E-05	8.419E-06
2035	CH4	MH	Dsl	8.46388E-05	6.3446E-05	3.124E-05	1.262E-05	7.993E-06	6.187E-06	4.979E-06
2035	CH4	MH	Gas	9.44825E-05	5.9418E-05	3.96E-05	2.773E-05	2.05E-05	1.594E-05	1.309E-05
2035	CH4	MHDT	Dsl	2.46766E-05	1.9971E-05	1.403E-05	1.012E-05	7.415E-06	5.467E-06	4.031E-06
2035	CH4	MHDT	Gas	7.76164E-05	4.8811E-05	3.253E-05	2.278E-05	#DIV/0!	#DIV/0!	#DIV/0!
2035	CH4	OBUS	Dsl	3.83718E-05	3.1041E-05	2.142E-05	1.553E-05	1.132E-05	8.45E-06	6.283E-06
2035	CH4	OBUS	Gas	7.2011E-05	4.5286E-05	3.018E-05	2.114E-05	1.562E-05	1.215E-05	9.975E-06
2035	CH4	SBUS	Dsl	2.87312E-05	2.3166E-05	1.605E-05	1.145E-05	8.407E-06	6.23E-06	4.621E-06
2035	CH4	SBUS	Gas	5.12248E-05	3.2306E-05	2.144E-05	1.502E-05	1.109E-05	8.641E-06	7.088E-06
2035	CH4	UBUS	Dsl	0.026824107	0.02014228	0.0099907	0.0041218	0.0026656	0.0020573	0.0016379
2035	CH4	UBUS	Gas	0.000262453	0.00016514	0.0001097	7.675E-05	5.714E-05	4.443E-05	3.645E-05
2035	CO	HHDT	Dsl	0.019471472	0.01291171	0.0061544	0.0029764	0.0027837	0.0018715	0.0014803
2035	CO	LDA	Dsl	0.005911909	0.0044253	0.0021623	0.0008424	0.0005065	0.0003829	0.0003048
2035	CO	LDA	Elec	0	0	0	0	0	0	0
2035	CO	LDA	Gas	0.001416611	0.00130823	0.0011909	0.0010829	0.0009899	0.000912	0.0008402
2035	CO	LDT1	Dsl	0.006279332	0.00465008	0.0025139	0.0012569	0.000881	0.0007196	0.0006222
2035	CO	LDT1	Elec	0	0	0	0	0	0	0
2035	CO	LDT1	Gas	0.001744399	0.00160354	0.0014552	0.0013202	0.0012047	0.0011085	0.0010206
2035	CO	LDT2	Dsl	0.005874242	0.00439715	0.0021483	0.0008367	0.0005029	0.0003802	0.0003025
2035	CO	LDT2	Gas	0.001875804	0.00173116	0.0015756	0.0014328	0.0013096	0.0012064	0.0011115
2035	CO	LHDT1	Dsl	0.007738959	0.00575368	0.0030002	0.0013856	0.0009309	0.0007456	0.000632

2035	CO	LHDT1	Gas	0.001168085	0.00106399	0.0009734	0.0008893	0.0008113	0.000747	0.0006829
2035	CO	LHDT2	Dsl	0.007286259	0.00544844	0.0026892	0.0010787	0.0006625	0.0005069	0.000409
2035	CO	LHDT2	Gas	0.00051996	0.00047362	0.0004333	0.0003959	0.0003611	0.0003325	0.000304
2035	CO	MCY	Gas	0.099325689	0.07610539	0.0611848	0.0513012	0.0445664	0.0399346	0.0367429
2035	CO	MDV	Dsl	0.006727633	0.00503611	0.0024598	0.0009572	0.0005749	0.0004345	0.0003456
2035	CO	MDV	Gas	0.002435548	0.00224215	0.002037	0.0018497	0.001689	0.0015547	0.0014318
2035	CO	MH	Dsl	0.004813599	0.00366693	0.0019101	0.0008686	0.0005841	0.0004681	0.0003892
2035	CO	MH	Gas	0.001491367	0.00135751	0.0012445	0.0011396	0.0010469	0.0009618	0.0008866
2035	CO	MHDT	Dsl	0.002764291	0.00223898	0.0015768	0.0011406	0.000836	0.0006164	0.0004544
2035	CO	MHDT	Gas	0.001220503	0.00111096	0.0010185	0.0009326	#DIV/0!	#DIV/0!	#DIV/0!
2035	CO	OBUS	Dsl	0.004672221	0.00377889	0.0025988	0.0018846	0.0013723	0.0010268	0.0007646
2035	CO	OBUS	Gas	0.001084328	0.000987	0.0009048	0.0008286	0.0007611	0.0006993	0.0006446
2035	CO	SBUS	Dsl	0.002754958	0.00222968	0.001565	0.001129	0.0008292	0.0006139	0.0004553
2035	CO	SBUS	Gas	0.000721491	0.00065856	0.0006014	0.0005508	0.0005055	0.0004652	0.0004284
2035	CO	UBUS	Dsl	0.089575324	0.06850458	0.0361197	0.0167437	0.0112541	0.0089102	0.0072799
2035	CO	UBUS	Gas	0.004819692	0.00438941	0.00401	0.0036697	0.0033946	0.0031185	0.0028726
2035	CO2	HHDT	Dsl	8.592534848	7.03643495	5.1774304	4.1275284	3.9876398	3.6780698	3.5649491
2035	CO2	LDA	Dsl	1.074376009	0.89505663	0.7361815	0.6039079	0.5062207	0.4384801	0.3963771
2035	CO2	LDA	Elec	0	0	0	0	0	0	0
2035	CO2	LDA	Gas	1.428764832	1.06699413	0.8207574	0.6540023	0.541376	0.4661313	0.4161788
2035	CO2	LDT1	Dsl	1.368089292	1.15161177	0.954876	0.7845035	0.6577779	0.5687917	0.5133564
2035	CO2	LDT1	Elec	0	0	0	0	0	0	0
2035	CO2	LDT1	Gas	1.574860087	1.17583296	0.9045027	0.7207982	0.5967049	0.5137647	0.4587164
2035	CO2	LDT2	Dsl	1.333443161	1.12244782	0.9306942	0.7646364	0.64112	0.5543874	0.5003559
2035	CO2	LDT2	Gas	1.810988449	1.35212947	1.0401181	0.8288709	0.6861721	0.5907962	0.5274943
2035	CO2	LHDT1	Dsl	2.553025801	2.14621653	1.401659	1.1947026	1.0595875	0.96222	0.96222
2035	CO2	LHDT1	Gas	2.90669277	2.85897446	1.9860928	1.724366	1.5806688	1.4345566	1.4345566
2035	CO2	LHDT2	Dsl	2.638614935	2.34501953	1.561009	1.3314258	1.1865087	1.0700416	1.0700416
2035	CO2	LHDT2	Gas	3.036276133	3.15152483	2.2169684	1.9402237	1.7544576	1.5857597	1.5857597
2035	CO2	MCY	Gas	1.246407595	0.92449853	0.7117172	0.5686745	0.471602	0.4059247	0.3626347
2035	CO2	MDV	Dsl	1.651555591	1.40257271	1.1894758	0.987855	0.835333	0.7214676	0.6546321
2035	CO2	MDV	Gas	2.425274337	1.81071539	1.3928878	1.110007	0.9189152	0.7911876	0.7064163
2035	CO2	MH	Dsl	4.433566167	4.02569714	3.3054463	2.7125118	2.4330129	2.2837505	2.1598812
2035	CO2	MH	Gas	8.163562068	6.96893395	4.8036989	3.3774026	2.9491896	2.710185	2.5021579
2035	CO2	MHDT	Dsl	4.678621625	4.14883795	3.480655	3.0401106	2.8054756	2.6532858	2.5324213
2035	CO2	MHDT	Gas	8.100084681	6.91474563	4.7663468	3.351141	#DIV/0!	#DIV/0!	#DIV/0!
2035	CO2	OBUS	Dsl	5.608026183	4.96945422	4.1243423	3.6070139	3.3193744	3.1647145	3.0385422
2035	CO2	OBUS	Gas	8.089686538	6.90586912	4.7602282	3.3468391	2.9225011	2.6856594	2.4795148
2035	CO2	SBUS	Dsl	4.721128113	4.18921397	3.5153059	3.0692461	2.828996	2.6753849	2.5538086
2035	CO2	SBUS	Gas	3.853949903	3.28997589	2.2677864	1.5944438	1.3922879	1.2794558	1.181248
2035	CO2	UBUS	Dsl	6.559190915	5.95577354	4.8902064	4.0129959	3.5994942	3.3786696	3.1954126
2035	CO2	UBUS	Gas	8.195501718	6.99619966	4.8224932	3.3906166	2.9607282	2.7207885	2.5119475
2035	Fuel	HHDT	Dsl	0.773328136	0.63327915	0.4659687	0.3714776	0.3588876	0.3310263	0.3208454
2035	Fuel	LDA	Dsl	0.096693841	0.0805551	0.0662563	0.0543517	0.0455599	0.0394632	0.0356739
2035	Fuel	LDA	Elec	0	0	0	0	0	0	0
2035	Fuel	LDA	Gas	0.152388457	0.11384139	0.0875983	0.0698219	0.0578126	0.0497868	0.0444554
2035	Fuel	LDT1	Dsl	0.123128036	0.10364506	0.0859388	0.0706053	0.0592	0.0511913	0.0462021
2035	Fuel	LDT1	Elec	0	0	0	0	0	0	0
2035	Fuel	LDT1	Gas	0.168009837	0.12548656	0.0965641	0.0769771	0.0637423	0.0548935	0.0490164
2035	Fuel	LDT2	Dsl	0.120009885	0.1010203	0.0837625	0.0688173	0.0577008	0.0498949	0.045032
2035	Fuel	LDT2	Gas	0.193172061	0.14427781	0.1110229	0.0885021	0.0732851	0.0631111	0.0563542
2035	Fuel	LHDT1	Dsl	0.229772322	0.19315949	0.1261493	0.1075232	0.0953629	0.0865998	0.0865998
2035	Fuel	LHDT1	Gas	0.309736894	0.30461449	0.2116497	0.1837613	0.1684437	0.1528732	0.1528605
2035	Fuel	LHDT2	Dsl	0.237475344	0.21105176	0.1404908	0.1198283	0.1067858	0.0963037	0.0963037
2035	Fuel	LHDT2	Gas	0.323384836	0.33563815	0.2361238	0.2066493	0.186863	0.1688957	0.1688902
2035	Fuel	MCY	Gas	0.16027251	0.11824649	0.0908503	0.0726159	0.0603155	0.0520174	0.0465379
2035	Fuel	MDV	Dsl	0.148640003	0.12623154	0.1070528	0.0889069	0.07518	0.0649321	0.0589169
2035	Fuel	MDV	Gas	0.258692454	0.1932043	0.1486698	0.1185118	0.0981342	0.0845094	0.0754612
2035	Fuel	MH	Dsl	0.399020955	0.36231274	0.2974902	0.2441261	0.2189712	0.2055375	0.1943893
2035	Fuel	MH	Gas	0.869530404	0.74227645	0.5117026	0.359814	0.3141985	0.2887323	0.2665678
2035	Fuel	MHDT	Dsl	0.421075946	0.37339542	0.3132589	0.27361	0.2524928	0.2387957	0.2279179
2035	Fuel	MHDT	Gas	0.862707649	0.73645382	0.50768	0.3569777	#DIV/0!	#DIV/0!	#DIV/0!
2035	Fuel	OBUS	Dsl	0.504722356	0.44725088	0.3711908	0.3246312	0.2987437	0.2848243	0.2734688

2035	Fuel	OBUS	Gas	0.861571461	0.73548403	0.5070069	0.3565004	0.3113036	0.2860728	0.264113
2035	Fuel	SBUS	Dsl	0.42490153	0.37702926	0.3163775	0.2762321	0.2546096	0.2407846	0.2298428
2035	Fuel	SBUS	Gas	0.410508461	0.35043031	0.241576	0.1698695	0.148334	0.1363112	0.1258471
2035	Fuel	UBUS	Dsl	0.590327182	0.53601962	0.4401186	0.3611696	0.3239545	0.3040803	0.2875871
2035	Fuel	UBUS	Gas	0.873677091	0.74580579	0.5142453	0.3616994	0.315861	0.2902542	0.2679687
2035	NOx	HHDT	Dsl	0.028463614	0.02400954	0.016529	0.0093134	0.0055542	0.0036583	0.002612
2035	NOx	LDA	Dsl	0.000111621	9.3327E-05	6.359E-05	4.305E-05	3.363E-05	2.872E-05	2.548E-05
2035	NOx	LDA	Elec	0	0	0	0	0	0	0
2035	NOx	LDA	Gas	0.000100498	8.6754E-05	7.638E-05	6.853E-05	6.254E-05	5.797E-05	5.45E-05
2035	NOx	LDT1	Dsl	0.000733754	0.0007103	0.0006583	0.0006305	0.0006316	0.0006445	0.0006619
2035	NOX	LDT1	Elec	0	0	0	0	0	0	0
2035	NOx	LDT1	Gas	0.000134721	0.00011555	0.0001013	9.055E-05	8.245E-05	7.633E-05	7.173E-05
2035	NOx	LDT2	Dsl	0.000336912	0.00028019	0.0001882	0.0001246	9.515E-05	7.962E-05	6.924E-05
2035	NOx	LDT2	Gas	0.000135559	0.00011675	0.0001026	9.198E-05	8.388E-05	7.772E-05	7.305E-05
2035	NOx	LHDT1	Dsl	0.001980302	0.00194392	0.0018461	0.0017996	0.0018251	0.0018701	0.0019357
2035	NOx	LHDT1	Gas	0.000512366	0.00044441	0.0003916	0.0003526	0.0003256	0.0003012	0.0002891
2035	NOx	LHDT2	Dsl	0.000815295	0.00071994	0.0005602	0.0004521	0.0004093	0.0003907	0.0003838
2035	NOx	LHDT2	Gas	0.000175029	0.00015181	0.0001338	0.0001205	0.0001112	0.0001029	9.874E-05
2035	NOx	MCY	Gas	0.003646609	0.00325593	0.0029763	0.0027744	0.0026274	0.0025213	0.0024503
2035	NOx	MDV	Dsl	0.000129729	0.00010807	7.292E-05	4.861E-05	3.74E-05	3.151E-05	2.759E-05
2035	NOx	MDV	Gas	0.00022111	0.00018871	0.0001648	0.0001469	0.0001335	0.0001235	0.000116
2035	NOx	MH	Dsl	0.025196019	0.02095285	0.0141355	0.0095931	0.0075968	0.006534	0.0058139
2035	NOx	MH	Gas	0.000668214	0.00058113	0.0005094	0.000457	0.0004163	0.0003869	0.0003653
2035	NOx	MHDT	Dsl	0.021970307	0.01671165	0.0100672	0.0057115	0.0031625	0.0020095	0.001392
2035	NOx	MHDT	Gas	0.000491758	0.00042767	0.0003749	0.0003363	#DIV/0!	#DIV/0!	#DIV/0!
2035	NOx	OBUS	Dsl	0.031073393	0.02359302	0.0139936	0.0079173	0.004323	0.0027246	0.00186
2035	NOx	OBUS	Gas	0.000455243	0.00039591	0.000347	0.0003114	0.0002836	0.0002636	0.0002489
2035	NOx	SBUS	Dsl	0.020709072	0.01595559	0.0099471	0.0059878	0.0036996	0.0026483	0.0020665
2035	NOx	SBUS	Gas	0.000367861	0.00031827	0.000281	0.000252	0.0002299	0.0002131	0.0002015
2035	NOx	UBUS	Dsl	0.015953524	0.01300418	0.0086863	0.0064783	0.0060121	0.0058191	0.0056987
2035	NOx	UBUS	Gas	0.002241511	0.00194756	0.0017182	0.0015432	0.001386	0.0012884	0.0012185
2035	PM10	HHDT	Dsl	2.52246E-05	2.2704E-05	1.913E-05	1.464E-05	1.482E-05	1.359E-05	1.256E-05
2035	PM10	LDA	Dsl	5.7765E-06	5.2531E-06	4.509E-06	3.815E-06	3.254E-06	2.871E-06	2.591E-06
2035	PM10	LDA	Elec	0	0	0	0	0	0	0
2035	PM10	LDA	Gas	1.50169E-05	9.4513E-06	6.275E-06	4.395E-06	3.248E-06	2.531E-06	2.082E-06
2035	PM10	LDT1	Dsl	0.00013166	9.5783E-05	7.206E-05	5.62E-05	4.554E-05	3.853E-05	3.394E-05
2035	PM10	LDT1	Elec	0	0	0	0	0	0	0
2035	PM10	LDT1	Gas	1.60474E-05	1.0115E-05	6.726E-06	4.717E-06	3.489E-06	2.722E-06	2.239E-06
2035	PM10	LDT2	Dsl	2.08755E-05	1.9449E-05	1.689E-05	1.438E-05	1.231E-05	1.09E-05	9.85E-06
2035	PM10	LDT2	Gas	1.53377E-05	9.6545E-06	6.411E-06	4.491E-06	3.319E-06	2.587E-06	2.127E-06
2035	PM10	LHDT1	Dsl	7.75929E-05	6.1317E-05	4.871E-05	3.937E-05	3.265E-05	2.818E-05	2.511E-05
2035	PM10	LHDT1	Gas	1.67114E-05	1.0515E-05	6.979E-06	4.887E-06	3.611E-06	2.814E-06	2.313E-06
2035	PM10	LHDT2	Dsl	4.35965E-05	3.9218E-05	3.348E-05	2.824E-05	2.404E-05	2.119E-05	1.91E-05
2035	PM10	LHDT2	Gas	1.66551E-05	1.0479E-05	6.956E-06	4.871E-06	3.598E-06	2.804E-06	2.306E-06
2035	PM10	MCY	Gas	2.91486E-05	1.8769E-05	1.275E-05	9.128E-06	6.89E-06	5.479E-06	4.589E-06
2035	PM10	MDV	Dsl	6.93149E-06	6.4366E-06	5.581E-06	4.748E-06	4.063E-06	3.595E-06	3.248E-06
2035	PM10	MDV	Gas	1.62414E-05	1.0234E-05	6.803E-06	4.77E-06	3.527E-06	2.751E-06	2.263E-06
2035	PM10	MH	Dsl	0.000211758	0.0001853	0.0001407	0.0001071	9.032E-05	8.078E-05	7.491E-05
2035	PM10	MH	Gas	1.68391E-05	1.0595E-05	7.033E-06	4.925E-06	3.638E-06	2.835E-06	2.331E-06
2035	PM10	MHDT	Dsl	1.42678E-05	1.2732E-05	1.071E-05	9.37E-06	8.463E-06	7.764E-06	7.192E-06
2035	PM10	MHDT	Gas	1.64856E-05	1.0373E-05	6.885E-06	4.821E-06	#DIV/0!	#DIV/0!	#DIV/0!
2035	PM10	OBUS	Dsl	1.75388E-05	1.5767E-05	1.34E-05	1.197E-05	1.086E-05	1.007E-05	9.39E-06
2035	PM10	OBUS	Gas	1.68078E-05	1.0575E-05	7.02E-06	4.916E-06	3.631E-06	2.83E-06	2.327E-06
2035	PM10	SBUS	Dsl	2.17918E-05	1.9766E-05	1.713E-05	1.532E-05	1.402E-05	1.306E-05	1.235E-05
2035	PM10	SBUS	Gas	1.5507E-05	9.757E-06	6.476E-06	4.535E-06	3.35E-06	2.611E-06	2.147E-06
2035	PM10	UBUS	Dsl	0.000109849	8.9729E-05	5.722E-05	3.501E-05	2.623E-05	2.119E-05	1.761E-05
2035	PM10	UBUS	Gas	1.568E-05	9.8658E-06	6.549E-06	4.586E-06	3.388E-06	2.64E-06	2.171E-06
2035	PM2_5	HHDT	Dsl	2.41334E-05	2.1722E-05	1.83E-05	1.401E-05	1.418E-05	1.3E-05	1.202E-05
2035	PM2_5	LDA	Dsl	5.52661E-06	5.0258E-06	4.314E-06	3.65E-06	3.113E-06	2.747E-06	2.479E-06
2035	PM2_5	LDA	Elec	0	0	0	0	0	0	0
2035	PM2_5	LDA	Gas	1.38075E-05	8.6901E-06	5.77E-06	4.041E-06	2.986E-06	2.328E-06	1.914E-06
2035	PM2_5	LDT1	Dsl	0.000125964	9.164E-05	6.895E-05	5.377E-05	4.357E-05	3.687E-05	3.247E-05
2035	PM2_5	LDT1	Elec	0	0	0	0	0	0	0

2035	PM2_5	LDT1	Gas	1.4755E-05	9.3006E-06	6.184E-06	4.337E-06	3.208E-06	2.503E-06	2.059E-06
2035	PM2_5	LDT2	Dsl	1.99724E-05	1.8608E-05	1.616E-05	1.376E-05	1.178E-05	1.043E-05	9.424E-06
2035	PM2_5	LDT2	Gas	1.41024E-05	8.8769E-06	5.895E-06	4.129E-06	3.051E-06	2.379E-06	1.956E-06
2035	PM2_5	LHDT1	Dsl	7.42363E-05	5.8664E-05	4.66E-05	3.767E-05	3.124E-05	2.696E-05	2.402E-05
2035	PM2_5	LHDT1	Gas	1.53655E-05	9.6679E-06	6.417E-06	4.494E-06	3.32E-06	2.587E-06	2.127E-06
2035	PM2_5	LHDT2	Dsl	4.17105E-05	3.7522E-05	3.203E-05	2.702E-05	2.3E-05	2.027E-05	1.828E-05
2035	PM2_5	LHDT2	Gas	1.53137E-05	9.6354E-06	6.396E-06	4.479E-06	3.309E-06	2.578E-06	2.12E-06
2035	PM2_5	MCY	Gas	2.7179E-05	1.7502E-05	1.189E-05	8.512E-06	6.425E-06	5.109E-06	4.28E-06
2035	PM2_5	MDV	Dsl	6.63164E-06	6.1582E-06	5.34E-06	4.543E-06	3.888E-06	3.44E-06	3.108E-06
2035	PM2_5	MDV	Gas	1.49334E-05	9.4098E-06	6.255E-06	4.385E-06	3.243E-06	2.529E-06	2.081E-06
2035	PM2_5	MH	Dsl	0.000202597	0.00017729	0.0001346	0.0001025	8.641E-05	7.728E-05	7.167E-05
2035	PM2_5	MH	Gas	1.54829E-05	9.7418E-06	6.466E-06	4.528E-06	3.345E-06	2.607E-06	2.143E-06
2035	PM2_5	MHDT	Dsl	1.36506E-05	1.2181E-05	1.025E-05	8.965E-06	8.096E-06	7.428E-06	6.881E-06
2035	PM2_5	MHDT	Gas	1.51579E-05	9.5373E-06	6.331E-06	4.433E-06	#DIV/0!	#DIV/0!	#DIV/0!
2035	PM2_5	OBUS	Dsl	1.67801E-05	1.5085E-05	1.282E-05	1.145E-05	1.039E-05	9.63E-06	8.984E-06
2035	PM2_5	OBUS	Gas	1.54541E-05	9.7237E-06	6.454E-06	4.52E-06	3.339E-06	2.602E-06	2.139E-06
2035	PM2_5	SBUS	Dsl	2.08491E-05	1.8911E-05	1.639E-05	1.466E-05	1.341E-05	1.249E-05	1.181E-05
2035	PM2_5	SBUS	Gas	1.42581E-05	8.9712E-06	5.955E-06	4.17E-06	3.08E-06	2.401E-06	1.974E-06
2035	PM2_5	UBUS	Dsl	0.000105097	8.5847E-05	5.474E-05	3.349E-05	2.51E-05	2.028E-05	1.685E-05
2035	PM2_5	UBUS	Gas	1.44172E-05	9.0713E-06	6.021E-06	4.216E-06	3.115E-06	2.428E-06	1.996E-06
2035	ROG	HHDT	Dsl	0.000903725	0.0007853	0.0006059	0.0004404	0.0003287	0.0002463	0.0001797
2035	ROG	LDA	Dsl	0.000196576	0.00014709	7.202E-05	2.822E-05	1.703E-05	1.289E-05	1.027E-05
2035	ROG	LDA	Elec	0	0	0	0	0	0	0
2035	ROG	LDA	Gas	6.77812E-05	4.3169E-05	2.867E-05	2.002E-05	1.477E-05	1.153E-05	9.476E-06
2035	ROG	LDT1	Dsl	0.00066451	0.00048781	0.0002689	0.0001394	9.768E-05	7.829E-05	6.596E-05
2035	ROG	LDT1	Elec	0	0	0	0	0	0	0
2035	ROG	LDT1	Gas	9.36524E-05	6.0058E-05	4.016E-05	2.822E-05	2.092E-05	1.639E-05	1.35E-05
2035	ROG	LDT2	Dsl	0.000580892	0.00043479	0.0002125	8.282E-05	4.98E-05	3.764E-05	2.995E-05
2035	ROG	LDT2	Gas	9.28884E-05	5.9196E-05	3.935E-05	2.75E-05	2.03E-05	1.585E-05	1.303E-05
2035	ROG	LHDT1	Dsl	0.001701158	0.00126086	0.0006559	0.0003006	0.0001988	0.000156	0.0001289
2035	ROG	LHDT1	Gas	0.000144741	9.1094E-05	6.058E-05	4.232E-05	3.106E-05	2.421E-05	1.971E-05
2035	ROG	LHDT2	Dsl	0.001642554	0.0012278	0.0006053	0.0002418	0.0001478	0.0001125	9.014E-05
2035	ROG	LHDT2	Gas	5.60707E-05	3.5288E-05	2.347E-05	1.64E-05	1.203E-05	9.379E-06	7.636E-06
2035	ROG	MCY	Gas	0.027884181	0.01803925	0.0123237	0.0088837	0.0067488	0.0053977	0.0045409
2035	ROG	MDV	Dsl	0.000231614	0.00017336	8.473E-05	3.304E-05	1.987E-05	1.502E-05	1.196E-05
2035	ROG	MDV	Gas	0.000145007	9.2918E-05	6.208E-05	4.36E-05	3.231E-05	2.53E-05	2.084E-05
2035	ROG	MH	Dsl	0.001822224	0.00136596	0.0006727	0.0002717	0.0001721	0.0001332	0.0001072
2035	ROG	MH	Gas	0.000233821	0.00014704	9.8E-05	6.863E-05	5.073E-05	3.945E-05	3.239E-05
2035	ROG	MHDT	Dsl	0.00053128	0.00042997	0.000302	0.0002179	0.0001597	0.0001177	8.678E-05
2035	ROG	MHDT	Gas	0.000192082	0.00012079	8.05E-05	5.638E-05	#DIV/0!	#DIV/0!	#DIV/0!
2035	ROG	OBUS	Dsl	0.000826134	0.00066831	0.0004612	0.0003344	0.0002437	0.0001819	0.0001353
2035	ROG	OBUS	Gas	0.00017821	0.00011207	7.469E-05	5.231E-05	3.866E-05	3.007E-05	2.469E-05
2035	ROG	SBUS	Dsl	0.000618575	0.00049875	0.0003456	0.0002465	0.000181	0.0001341	9.948E-05
2035	ROG	SBUS	Gas	0.000126769	7.9949E-05	5.307E-05	3.717E-05	2.745E-05	2.138E-05	1.754E-05
2035	ROG	UBUS	Dsl	0.002460516	0.00185462	0.0009373	0.0004126	0.0002864	0.000225	0.0001791
2035	ROG	UBUS	Gas	0.000649508	0.00040868	0.0002714	0.0001899	0.0001414	0.00011	9.021E-05

40	45	50	55	60	65	70
9.878E-05	5.348E-05	2.43E-05	1.299E-05	1.287E-05	1.287E-05	#DIV/0!
0.0007063	0.0006575	0.0006439	0.0006639	0.0007188	0.0008183	#DIV/0!
4.3E-06	4.045E-06	3.977E-06	4.089E-06	4.421E-06	5.016E-06	5.43103E-06
0	0	0	0	0	0	0
1.872E-05	1.72E-05	1.665E-05	1.688E-05	1.794E-05	2.035E-05	2.14438E-05
1.379E-05	1.317E-05	1.316E-05	1.376E-05	1.506E-05	1.726E-05	1.87943E-05
0	0	0	0	0	0	0
4.933E-05	4.546E-05	4.392E-05	4.429E-05	4.671E-05	5.219E-05	5.50896E-05
2.279E-06	2.073E-06	1.962E-06	1.935E-06	2.025E-06	2.236E-06	2.38358E-06
2.375E-05	2.179E-05	2.104E-05	2.127E-05	2.252E-05	2.542E-05	2.67333E-05
1.395E-05	1.327E-05	1.32E-05	1.374E-05	#DIV/0!	#DIV/0!	#DIV/0!
5.452E-05	5.147E-05	5.167E-05	5.185E-05	#DIV/0!	#DIV/0!	#DIV/0!
1.161E-05	1.098E-05	1.085E-05	1.122E-05	#DIV/0!	#DIV/0!	#DIV/0!
4.782E-05	4.531E-05	4.56E-05	4.593E-05	#DIV/0!	#DIV/0!	#DIV/0!
0.0007218	0.0006778	0.0006667	0.0006892	0.0007523	0.0008545	0.000948513
1.748E-06	1.589E-06	1.503E-06	1.482E-06	1.549E-06	1.71E-06	1.82263E-06
4.042E-05	3.706E-05	3.578E-05	3.617E-05	3.826E-05	4.321E-05	4.5392E-05
9.218E-06	8.193E-06	7.78E-06	7.973E-06	8.789E-06	1.022E-05	#DIV/0!
0.0001457	0.0001376	0.0001354	0.0001403	0.0001529	0.0001759	#DIV/0!
2.301E-05	2E-05	1.847E-05	1.834E-05	1.881E-05	1.881E-05	#DIV/0!
0.0001534	0.0001426	0.0001386	0.0001422	0.000154	0.0001764	#DIV/0!
1.739E-05	1.375E-05	1.247E-05	1.195E-05	1.179E-05	1.135E-05	#DIV/0!
8.052E-05	7.405E-05	7.128E-05	7.255E-05	7.816E-05	8.931E-05	#DIV/0!
1.124E-05	9.849E-06	9.211E-06	9.289E-06	9.6E-06	#DIV/0!	#DIV/0!
0.000322	0.0002944	0.000285	0.0002865	0.0003087	#DIV/0!	#DIV/0!
0.0028759	0.0025471	0.0024803	0.0026726	0.0031301	0.0038492	#DIV/0!
0.0001607	0.0001496	0.0001446	0.0001479	0.0001599	0.0001835	#DIV/0!
0.0018187	0.001499	0.0012837	0.0011536	0.0011111	0.0011111	#DIV/0!
0.1592859	0.1580525	0.1612663	0.1713863	0.1927042	0.2281136	#DIV/0!
0.0007141	0.0006892	0.0007002	0.0007503	0.0008578	0.0010415	0.001170137
0	0	0	0	0	0	0
0.0027759	0.0026075	0.0024816	0.0023785	0.0023079	0.002339	0.002294844
0.0020677	0.0021027	0.0022521	0.0025409	0.0030214	0.0037855	0.004320369
0	0	0	0	0	0	0
0.0067104	0.006397	0.0062347	0.0061993	0.006348	0.0068407	0.007098789
0.0003389	0.0003169	0.000311	0.0003211	0.0003559	0.000421	0.000466627
0.0035251	0.003307	0.0031413	0.0030032	0.0029033	0.002923	0.002860602
0.0015935	0.0016163	0.001727	0.001944	#DIV/0!	#DIV/0!	#DIV/0!
0.0040462	0.0039398	0.0039827	0.004036	#DIV/0!	#DIV/0!	#DIV/0!
0.0012976	0.0013086	0.0013903	0.0015568	#DIV/0!	#DIV/0!	#DIV/0!
0.003347	0.0032891	0.0033726	0.0034602	#DIV/0!	#DIV/0!	#DIV/0!
0.0464635	0.04637	0.0480755	0.0521425	0.0599612	0.0720032	0.0829278
0.0004042	0.0003637	0.000341	0.000334	0.0003531	0.0003999	0.000432734
0.0050843	0.0047827	0.0045622	0.0043896	0.0042857	0.004371	0.004326255
0.0010911	0.0009729	0.0008981	0.0008661	0.000878	0.0009333	#DIV/0!
0.0188373	0.0187888	0.0197278	0.0217104	0.024963	0.0300867	#DIV/0!
0.0016992	0.0015271	0.0014228	0.0013828	0.0013853	0.0013853	#DIV/0!
0.0149782	0.0144339	0.0143179	0.0146909	0.0156287	0.0173593	#DIV/0!
0.0013023	0.0010384	0.0009462	0.0008855	0.0008368	0.0007849	#DIV/0!
0.0071649	0.0067246	0.0063427	0.0060731	0.0059222	0.0059185	#DIV/0!
0.0008042	0.0006833	0.0005979	0.0005462	0.0005321	#DIV/0!	#DIV/0!
0.0295959	0.0274469	0.0256102	0.0235981	0.0221436	#DIV/0!	#DIV/0!
0.0147296	0.0128878	0.0116728	0.011071	0.0111108	0.0117763	#DIV/0!
0.0101052	0.0095034	0.0089542	0.0085816	0.0083971	0.0084683	#DIV/0!
3.9266216	3.673345	3.4568105	3.3244683	3.2896026	3.2896026	#DIV/0!
3.961385	3.8742615	3.8261486	3.7541059	3.7015681	3.691473	#DIV/0!
0.5932484	0.5730324	0.5744911	0.6011597	0.6517293	0.7326756	0.79117381
0	0	0	0	0	0	0
0.6263798	0.6029784	0.603498	0.6252211	0.6697444	0.7532056	0.790406188
0.7515987	0.7246687	0.7258725	0.7589589	0.8221078	0.9234121	0.996273344
0	0	0	0	0	0	0

0.72611	0.6989662	0.6994552	0.7246709	0.7765512	0.8728342	0.917484463
0.7457673	0.7190462	0.7202407	0.7530704	0.8157294	0.9162477	0.988543622
0.8447014	0.8131351	0.813778	0.8430899	0.9032684	1.0155814	1.06652739
1.0528965	1.0270177	1.0766908	1.1251037	#DIV/0!	#DIV/0!	#DIV/0!
1.5254091	1.5184039	1.6012695	1.6871155	#DIV/0!	#DIV/0!	#DIV/0!
1.1826599	1.1368266	1.1786978	1.220009	#DIV/0!	#DIV/0!	#DIV/0!
1.6875294	1.6477585	1.7178443	1.7960568	#DIV/0!	#DIV/0!	#DIV/0!
0.316963	0.3050311	0.304674	0.3158516	0.3398488	0.3795287	0.40670845
0.9732281	0.9365915	0.9412848	0.9933842	1.0756352	1.2077876	1.300203504
1.0966605	1.0556745	1.0564811	1.0945446	1.1727396	1.3184383	1.384957584
2.1699685	2.0930366	2.042835	2.0193639	2.0226233	2.0526131	#DIV/0!
2.4840102	2.3080199	2.1590449	2.0995356	2.1125796	2.1517419	#DIV/0!
2.5274964	2.4327713	2.3593369	2.3081465	2.2892279	2.2892279	#DIV/0!
2.482079	2.3062256	2.1573664	2.0979033	2.1109372	2.1500691	#DIV/0!
3.0804737	2.8914877	2.8951253	2.8819375	2.81083	2.7088625	#DIV/0!
2.4774641	2.3019376	2.1533552	2.0940026	2.1070123	2.1460714	#DIV/0!
2.5151394	2.4237643	2.3585592	2.318535	2.3069943	#DIV/0!	#DIV/0!
1.1716252	1.0886164	1.0183499	0.9902813	0.9964337	#DIV/0!	#DIV/0!
3.5310269	3.4058413	3.3241521	3.2859594	3.2912631	3.3400632	#DIV/0!
2.4835189	2.3075634	2.1586179	2.0991203	2.1121618	2.1513164	#DIV/0!
0.3533959	0.3306011	0.3111129	0.2992021	0.2960642	0.2960642	#DIV/0!
0.4498899	0.4403308	0.4357295	0.4297984	0.4279055	0.4329829	#DIV/0!
0.0533924	0.0515729	0.0517042	0.0541044	0.0586556	0.0659408	0.071205643
0	0	0	0	0	0	0
0.0671812	0.0646596	0.0646932	0.0669893	0.0717196	0.0806144	0.084569754
0.0676439	0.0652202	0.0653285	0.0683063	0.0739897	0.0831071	0.089664601
0	0	0	0	0	0	0
0.0785126	0.0755647	0.0755878	0.0782681	0.0838221	0.0941658	0.098970083
0.0671191	0.0647142	0.0648217	0.0677763	0.0734156	0.0824623	0.088968926
0.090557	0.0871572	0.0871971	0.0902953	0.0966877	0.108653	0.114069051
0.0947607	0.0924316	0.0969022	0.1012593	#DIV/0!	#DIV/0!	#DIV/0!
0.1631514	0.1623841	0.1712141	0.1803636	#DIV/0!	#DIV/0!	#DIV/0!
0.1064394	0.1023144	0.1060828	0.1098008	#DIV/0!	#DIV/0!	#DIV/0!
0.1802861	0.1760391	0.1835154	0.1918578	#DIV/0!	#DIV/0!	#DIV/0!
0.0433395	0.0419488	0.0421724	0.0441035	0.0481314	0.054631	0.059601311
0.0875905	0.0842932	0.0847156	0.0894046	0.0968072	0.1087009	0.117018315
0.1176645	0.1132462	0.1132937	0.1173182	0.1256293	0.1411627	0.148241094
0.1952972	0.1883733	0.1838552	0.1817428	0.1820361	0.1847352	#DIV/0!
0.2678737	0.2491144	0.2334094	0.2274155	0.2293706	0.2344346	#DIV/0!
0.2274747	0.2189494	0.2123403	0.2077332	0.2060305	0.2060305	#DIV/0!
0.2669853	0.248157	0.2322848	0.2260225	0.2275841	0.2320705	#DIV/0!
0.2772426	0.2602339	0.2605613	0.2593744	0.2529747	0.2437976	#DIV/0!
0.2650701	0.2463006	0.2304141	0.2240515	0.2254181	0.2295894	#DIV/0!
0.2263625	0.2181388	0.2122703	0.2086682	0.2076295	#DIV/0!	#DIV/0!
0.1300574	0.1208288	0.1130296	0.1097062	0.1101429	#DIV/0!	#DIV/0!
0.3177924	0.3065257	0.2991737	0.2957363	0.2962137	0.3006057	#DIV/0!
0.2662946	0.2474472	0.2314916	0.2250984	0.2264699	0.2306775	#DIV/0!
0.0152899	0.0145315	0.0139467	0.0136021	0.0135539	0.0135563	#DIV/0!
0.0127535	0.0128633	0.012984	0.0131436	0.0136086	0.0141595	#DIV/0!
0.0007581	0.0007843	0.0008112	0.0008391	0.0008694	0.0008991	0.000917654
0.0480007	0.0471653	0.0469106	0.0474258	0.0490785	0.0510389	0.053849691
1.222E-06	1.273E-06	1.324E-06	1.376E-06	1.429E-06	1.48E-06	1.51124E-06
0.1436283	0.1429584	0.1442827	0.1483803	0.1566441	0.1664207	0.178308893
0.0008461	0.0008635	0.0008834	0.0009057	0.0009335	0.000963	0.00098178
0.0016499	0.0016195	0.0016121	0.0016349	0.0017017	0.0017839	0.001893729
0.1885736	0.4274867	1.6791781	0.6704969	0	0	0
8.734E-06	2.111E-05	0.0001477	2.741E-05	0	0	0
0.0030163	0.0031333	0.0032522	0.003391	#DIV/0!	#DIV/0!	#DIV/0!
0.0001328	0.0001295	0.0001257	0.0001337	#DIV/0!	#DIV/0!	#DIV/0!
0.0168486	0.0078313	0.0021047	0.0056318	#DIV/0!	#DIV/0!	#DIV/0!
0.001282	0.0005211	7.314E-05	0.0004262	#DIV/0!	#DIV/0!	#DIV/0!
0.014831	0.0145874	0.0145603	0.0148173	0.0154881	0.0163217	0.017378814
0.0018638	0.0030142	0.0032758	0.0030608	0.0038212	0.0052137	0

1.228E-05	2.256E-05	2.201E-05	1.88E-05	2.277E-05	3.073E-05	0
0.7166351	0.6936845	0.681666	0.6784181	0.6793941	0.6775457	#DIV/0!
0.0087003	0.0085098	0.0085715	0.0087112	0.0088856	0.0090679	#DIV/0!
0.0009691	0.000832	0.0009717	0.0010932	0.0010076	0.0008274	#DIV/0!
0.0006635	0.0006435	0.0006435	0.0006508	0.0006622	0.0006761	#DIV/0!
0.0092009	0.0058206	0.0022704	0.0021003	0.0010397	0	#DIV/0!
0.0005426	0.0002778	0.0001405	0.0001642	8.034E-05	0	#DIV/0!
0.0142674	0.0246768	0.0465032	0.0533837	0.1481172	#DIV/0!	#DIV/0!
0.0023954	0.0040679	0.0076914	0.0088474	0.0245755	#DIV/0!	#DIV/0!
0.0001549	0.0001565	0.0001658	0.0001818	0.0001915	0.0001915	#DIV/0!
8.891E-06	8.463E-06	8.439E-06	8.813E-06	9.641E-06	1.105E-05	#DIV/0!
6.354E-05	6.062E-05	6.034E-05	6.269E-05	6.816E-05	7.754E-05	8.40784E-05
0	0	0	0	0	0	0
3.394E-06	3.115E-06	3.01E-06	3.061E-06	3.278E-06	3.697E-06	4.00289E-06
0.0002025	0.0001937	0.0001938	0.0002028	0.0002222	0.0002547	0.000277356
0	0	0	0	0	0	0
7.54E-06	6.943E-06	6.704E-06	6.789E-06	7.216E-06	8.052E-06	8.66414E-06
2.709E-05	2.572E-05	2.535E-05	2.595E-05	2.779E-05	3.112E-05	3.34343E-05
3.239E-06	2.972E-06	2.87E-06	2.915E-06	3.117E-06	3.509E-06	3.79542E-06
6.931E-05	6.617E-05	6.596E-05	6.868E-05	#DIV/0!	#DIV/0!	#DIV/0!
3.178E-06	2.935E-06	2.855E-06	2.925E-06	#DIV/0!	#DIV/0!	#DIV/0!
5.611E-05	5.346E-05	5.308E-05	5.493E-05	#DIV/0!	#DIV/0!	#DIV/0!
2.579E-06	2.386E-06	2.325E-06	2.385E-06	#DIV/0!	#DIV/0!	#DIV/0!
3.188E-06	3.023E-06	3.005E-06	3.131E-06	3.42E-06	3.914E-06	4.26203E-06
2.416E-05	2.292E-05	2.252E-05	2.297E-05	2.449E-05	2.73E-05	2.92599E-05
3.471E-06	3.187E-06	3.078E-06	3.126E-06	3.339E-06	3.755E-06	4.05892E-06
0.0003014	0.0003077	0.0003312	0.0003718	0.0004296	0.0005046	#DIV/0!
6.542E-06	6.139E-06	6.052E-06	6.266E-06	6.812E-06	7.776E-06	#DIV/0!
0.0003051	0.0003136	0.0003391	0.0003816	0.0004091	0.0004091	#DIV/0!
3.277E-06	3.061E-06	3.006E-06	3.104E-06	3.368E-06	3.84E-06	#DIV/0!
0.0001392	0.0001346	0.0001432	0.0001593	0.0001672	0.0001626	#DIV/0!
1.35E-06	1.243E-06	1.207E-06	1.234E-06	1.33E-06	1.51E-06	#DIV/0!
0.0001455	0.0001383	0.0001391	0.0001479	0.0001552	#DIV/0!	#DIV/0!
5.795E-06	5.302E-06	5.118E-06	5.212E-06	5.6E-06	#DIV/0!	#DIV/0!
0.0002001	0.0001883	0.0001845	0.0001886	0.0002006	0.0002207	#DIV/0!
1.743E-06	1.604E-06	1.557E-06	1.592E-06	1.715E-06	1.948E-06	#DIV/0!
0.0001482	0.0001498	0.0001587	0.000174	0.0001832	0.0001832	#DIV/0!
8.427E-06	8.023E-06	8E-06	8.357E-06	9.142E-06	1.047E-05	#DIV/0!
6.079E-05	5.799E-05	5.773E-05	5.998E-05	6.521E-05	7.419E-05	8.04412E-05
0	0	0	0	0	0	0
3.127E-06	2.871E-06	2.774E-06	2.822E-06	3.022E-06	3.408E-06	3.69039E-06
0.0001937	0.0001853	0.0001854	0.0001941	0.0002126	0.0002437	0.000265357
0	0	0	0	0	0	0
6.969E-06	6.418E-06	6.199E-06	6.279E-06	6.674E-06	7.449E-06	8.01622E-06
2.591E-05	2.461E-05	2.425E-05	2.483E-05	2.659E-05	2.977E-05	3.1988E-05
2.985E-06	2.74E-06	2.645E-06	2.688E-06	2.874E-06	3.235E-06	3.49979E-06
6.632E-05	6.331E-05	6.311E-05	6.571E-05	#DIV/0!	#DIV/0!	#DIV/0!
2.925E-06	2.701E-06	2.628E-06	2.693E-06	#DIV/0!	#DIV/0!	#DIV/0!
5.368E-05	5.115E-05	5.078E-05	5.256E-05	#DIV/0!	#DIV/0!	#DIV/0!
2.372E-06	2.195E-06	2.139E-06	2.195E-06	#DIV/0!	#DIV/0!	#DIV/0!
3.016E-06	2.86E-06	2.843E-06	2.963E-06	3.236E-06	3.704E-06	4.03312E-06
2.312E-05	2.192E-05	2.155E-05	2.198E-05	2.343E-05	2.612E-05	2.79941E-05
3.2E-06	2.938E-06	2.838E-06	2.882E-06	3.079E-06	3.463E-06	3.74314E-06
0.0002884	0.0002944	0.0003169	0.0003557	0.000411	0.0004828	#DIV/0!
6.089E-06	5.716E-06	5.636E-06	5.836E-06	6.345E-06	7.244E-06	#DIV/0!
0.0002919	0.0003	0.0003244	0.0003651	0.0003914	0.0003914	#DIV/0!
3.047E-06	2.848E-06	2.797E-06	2.889E-06	3.134E-06	3.574E-06	#DIV/0!
0.0001331	0.0001288	0.000137	0.0001524	0.0001599	0.0001556	#DIV/0!
1.246E-06	1.147E-06	1.114E-06	1.139E-06	1.228E-06	1.394E-06	#DIV/0!
0.0001392	0.0001323	0.0001331	0.0001415	0.0001485	#DIV/0!	#DIV/0!
5.328E-06	4.875E-06	4.706E-06	4.793E-06	5.149E-06	#DIV/0!	#DIV/0!
0.0001914	0.0001802	0.0001765	0.0001804	0.000192	0.0002111	#DIV/0!
1.604E-06	1.477E-06	1.433E-06	1.465E-06	1.579E-06	1.793E-06	#DIV/0!

0.0004169	0.0003462	0.000302	0.0002796	0.000277	0.000277	#DIV/0!
0.0038453	0.0036572	0.0036198	0.0037427	0.0041029	0.0047086	#DIV/0!
9.257E-05	8.708E-05	8.562E-05	8.804E-05	9.518E-05	0.000108	0.000116927
0	0	0	0	0	0	0
6.203E-05	5.76E-05	5.621E-05	5.746E-05	6.168E-05	7.006E-05	7.51189E-05
0.0002969	0.0002835	0.0002833	0.0002962	0.0003243	0.0003716	0.000404631
0	0	0	0	0	0	0
0.0002009	0.000188	0.000184	0.0001883	0.0002024	0.0002279	0.000247358
4.906E-05	4.463E-05	4.225E-05	4.166E-05	4.36E-05	4.815E-05	5.13171E-05
7.456E-05	6.904E-05	6.715E-05	6.84E-05	7.31E-05	8.269E-05	8.83863E-05
0.0003003	0.0002856	0.0002841	0.0002957	#DIV/0!	#DIV/0!	#DIV/0!
0.0001434	0.0001352	0.0001353	0.0001368	#DIV/0!	#DIV/0!	#DIV/0!
0.00025	0.0002364	0.0002337	0.0002416	#DIV/0!	#DIV/0!	#DIV/0!
0.0001214	0.000115	0.0001156	0.0001168	#DIV/0!	#DIV/0!	#DIV/0!
0.0049086	0.0046287	0.0045661	0.0047312	0.0051783	0.0058815	0.006557443
3.762E-05	3.421E-05	3.237E-05	3.19E-05	3.336E-05	3.682E-05	3.92401E-05
0.0001214	0.0001122	0.000109	0.0001108	0.0001182	0.0001337	0.00014246
0.0001985	0.0001764	0.0001675	0.0001717	0.0001892	0.00022	#DIV/0!
0.0006255	0.000592	0.0005919	0.0006189	0.0006748	0.0007666	#DIV/0!
0.0004955	0.0004307	0.0003976	0.0003949	0.000405	0.000405	#DIV/0!
0.0005025	0.0004697	0.0004622	0.000478	0.0005185	0.0005903	#DIV/0!
0.0003744	0.0002959	0.0002684	0.0002574	0.0002537	0.0002443	#DIV/0!
0.0002149	0.0001982	0.0001916	0.0001956	0.000211	0.0002406	#DIV/0!
0.0002419	0.000212	0.0001983	0.0002	0.0002067	#DIV/0!	#DIV/0!
0.0007969	0.0007286	0.0007053	0.000709	0.0007639	#DIV/0!	#DIV/0!
0.0007315	0.0006546	0.0006356	0.0006745	0.0007714	0.0009262	#DIV/0!
0.0004057	0.0003777	0.0003657	0.0003743	0.0004048	0.0004643	#DIV/0!
8.129E-05	3.782E-05	1.192E-05	2.61E-06	2.254E-06	2.254E-06	#DIV/0!
3.944E-07	3.351E-07	2.91E-07	2.573E-07	2.441E-07	2.459E-07	2.47118E-07
0	0	0	0	0	0	0
3.313E-06	3.031E-06	2.935E-06	2.987E-06	3.17E-06	3.631E-06	3.83129E-06
2.698E-06	2.477E-06	2.37E-06	2.366E-06	2.5E-06	2.784E-06	2.98136E-06
0	0	0	0	0	0	0
4.725E-06	4.319E-06	4.171E-06	4.228E-06	4.465E-06	5.081E-06	5.34766E-06
1.148E-06	9.73E-07	8.421E-07	7.412E-07	6.998E-07	7.015E-07	7.02675E-07
4.557E-06	4.169E-06	4.035E-06	4.104E-06	4.354E-06	4.983E-06	5.25829E-06
5.162E-06	4.623E-06	4.295E-06	4.144E-06	#DIV/0!	#DIV/0!	#DIV/0!
6.835E-06	6.3E-06	6.184E-06	6.147E-06	#DIV/0!	#DIV/0!	#DIV/0!
3.484E-06	2.985E-06	2.623E-06	2.356E-06	#DIV/0!	#DIV/0!	#DIV/0!
2.648E-06	2.44E-06	2.395E-06	2.381E-06	#DIV/0!	#DIV/0!	#DIV/0!
0.0008555	0.000797	0.0007795	0.0008018	0.0008727	0.0009901	0.001087408
4.583E-07	3.885E-07	3.363E-07	2.962E-07	2.797E-07	2.805E-07	2.81084E-07
7.291E-06	6.665E-06	6.438E-06	6.529E-06	6.899E-06	7.857E-06	8.27103E-06
4.14E-06	3.558E-06	3.173E-06	2.951E-06	2.964E-06	3.171E-06	#DIV/0!
1.134E-05	1.04E-05	9.977E-06	1.013E-05	1.09E-05	1.244E-05	#DIV/0!
2.972E-06	2.193E-06	1.62E-06	1.198E-06	1.032E-06	1.032E-06	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4.771E-06	3.383E-06	2.637E-06	2.011E-06	1.693E-06	1.598E-06	#DIV/0!
8.644E-06	7.924E-06	7.604E-06	7.722E-06	8.306E-06	9.482E-06	#DIV/0!
3.432E-06	2.554E-06	1.905E-06	1.428E-06	1.239E-06	#DIV/0!	#DIV/0!
6.139E-06	5.613E-06	5.433E-06	5.461E-06	5.885E-06	#DIV/0!	#DIV/0!
0.0013522	0.0011738	0.0010881	0.001087	0.0011877	0.0013805	#DIV/0!
3.159E-05	2.896E-05	2.775E-05	2.816E-05	3.024E-05	3.448E-05	#DIV/0!
0.001028	0.0006931	0.0004652	0.0003264	0.0002811	0.0002811	#DIV/0!
0.0002516	0.0002134	0.0001848	0.0001629	0.0001542	0.000155	0.000155622
0	0	0	0	0	0	0
0.0007747	0.0007194	0.000673	0.0006278	0.0005789	0.0005531	0.000515099
0.0005661	0.0005412	0.0005442	0.0005769	0.0006539	0.0007883	0.000882377
0	0	0	0	0	0	0
0.000941	0.0008741	0.0008183	0.0007643	0.0007066	0.0006765	0.000631973
0.0002497	0.0002117	0.0001833	0.0001615	0.0001527	0.0001534	0.000153899
0.0010249	0.0009518	0.0008903	0.0008305	0.0007663	0.0007319	0.000682442
0.0005627	0.0005249	0.0005136	0.0005287	#DIV/0!	#DIV/0!	#DIV/0!

0.0006257	0.0005847	0.0005531	0.0005041	#DIV/0!	#DIV/0!	#DIV/0!
0.0003434	0.0002981	0.0002667	0.0002459	#DIV/0!	#DIV/0!	#DIV/0!
0.0002785	0.0002603	0.0002462	0.0002244	#DIV/0!	#DIV/0!	#DIV/0!
0.0348529	0.0341148	0.0344227	0.0360456	0.0399759	0.0460245	0.051467387
0.0002851	0.0002415	0.0002089	0.0001838	0.0001734	0.0001739	0.000174148
0.0013202	0.0012262	0.0011475	0.0010714	0.0009898	0.0009467	0.000883813
0.0003334	0.0002939	0.0002672	0.0002511	0.00025	0.0002614	#DIV/0!
0.0008199	0.0007622	0.0007053	0.0006563	0.0006148	0.0005808	#DIV/0!
0.0003351	0.0002472	0.0001824	0.0001347	0.0001158	0.0001158	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.0005836	0.0004111	0.0003235	0.0002481	0.0002082	0.0001946	#DIV/0!
0.0005961	0.0005542	0.0005128	0.0004772	0.000447	0.0004223	#DIV/0!
0.0003386	0.0002528	0.0001898	0.0001437	0.0001256	#DIV/0!	#DIV/0!
0.000396	0.0003672	0.0003426	0.0003157	0.0002963	#DIV/0!	#DIV/0!
0.0061017	0.0052492	0.0046545	0.0042781	0.0042023	0.004381	#DIV/0!
0.002657	0.0024704	0.0022822	0.0021221	0.0019849	0.0018727	#DIV/0!
3.366888	3.1749261	3.0056185	2.8921698	2.8560643	2.8560643	#DIV/0!
0.3709203	0.3582805	0.3591926	0.3758667	0.4074847	0.4580952	0.49467041
0	0	0	0	0	0	0
0.3852549	0.3707865	0.3712632	0.3849345	0.411227	0.4629795	0.48695746
0.4791261	0.4619588	0.4627262	0.483818	0.5240739	0.5886529	0.635100237
0	0	0	0	0	0	0
0.4246548	0.4087055	0.4091977	0.424264	0.4533506	0.510267	0.53702824
0.4669925	0.45026	0.4510079	0.4715655	0.510802	0.5737456	0.619016662
0.488326	0.4699853	0.4705508	0.4878761	0.5213251	0.5867738	0.617551605
0.935878	0.9128753	0.9570278	1.0000601	#DIV/0!	#DIV/0!	#DIV/0!
1.4291651	1.422602	1.5002392	1.5806688	#DIV/0!	#DIV/0!	#DIV/0!
1.0309586	0.9910045	1.0275048	1.063517	#DIV/0!	#DIV/0!	#DIV/0!
1.5495372	1.5130184	1.5773732	1.6491901	#DIV/0!	#DIV/0!	#DIV/0!
0.3362402	0.3235826	0.3232037	0.3350611	0.3605179	0.402611	0.431443774
0.6123183	0.5892679	0.5922207	0.6249997	0.676749	0.7598942	0.818038799
0.6539672	0.629405	0.6301554	0.6533567	0.6981738	0.7857958	0.827082851
2.061405	1.988322	1.940632	1.9183352	1.9214315	1.9499209	#DIV/0!
2.3278889	2.1629598	2.0233479	1.9675787	1.979803	2.0165039	#DIV/0!
2.4329019	2.3487799	2.2762448	2.2151436	2.1873346	2.1873346	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2.9704155	2.8118273	2.8120725	2.7889486	2.7244995	2.6393316	#DIV/0!
2.3068229	2.1433862	2.0050378	1.9497733	1.9618869	1.9982557	#DIV/0!
2.4541389	2.3703493	2.2985842	2.2362392	2.2080038	#DIV/0!	#DIV/0!
1.098977	1.0211154	0.9552057	0.9288776	0.9346485	#DIV/0!	#DIV/0!
3.0497231	2.9416012	2.8710468	2.83806	2.8426408	2.8847891	#DIV/0!
2.3369967	2.1714223	2.0312642	1.9752768	1.9875489	2.0243934	#DIV/0!
0.3030199	0.2857433	0.2705057	0.2602953	0.2570458	0.2570458	#DIV/0!
0.0333828	0.0322452	0.0323273	0.033828	0.0366736	0.0412286	0.044520337
0	0	0	0	0	0	0
0.0411514	0.0396014	0.0396443	0.0410924	0.0438838	0.0493901	0.051936858
0.0431213	0.0415763	0.0416454	0.0435436	0.0471667	0.0529788	0.057159021
0	0	0	0	0	0	0
0.0453758	0.043666	0.0437089	0.045304	0.0483915	0.054447	0.057289156
0.0420293	0.0405234	0.0405907	0.0424409	0.0459722	0.0516371	0.0557115
0.0521687	0.0502033	0.0502531	0.0520877	0.0556386	0.0626019	0.065870822
0.084229	0.0821588	0.0861325	0.0900054	#DIV/0!	#DIV/0!	#DIV/0!
0.1522756	0.1515694	0.15983	0.1683851	#DIV/0!	#DIV/0!	#DIV/0!
0.0927863	0.0891904	0.0924754	0.0957165	#DIV/0!	#DIV/0!	#DIV/0!
0.1650288	0.1611374	0.1679868	0.1756295	#DIV/0!	#DIV/0!	#DIV/0!
0.0432086	0.0416305	0.04161	0.0431856	0.0466854	0.0523958	0.05655721
0.0551086	0.0530341	0.0532999	0.05625	0.0609074	0.0683905	0.073623492
0.069857	0.0672254	0.0672919	0.0697495	0.0745079	0.0838309	0.088216699
0.1855265	0.178949	0.1746569	0.1726502	0.1729288	0.1754929	#DIV/0!
0.2480003	0.2304296	0.2155551	0.2096093	0.2109048	0.2148084	#DIV/0!
0.2189612	0.2113902	0.204862	0.1993629	0.1968601	0.1968601	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.2673374	0.2530645	0.2530865	0.2510054	0.245205	0.2375398	#DIV/0!

0.2457169	0.228308	0.2135707	0.2076809	0.2089662	0.2128356	#DIV/0!
0.2208725	0.2133314	0.2068726	0.2012615	0.1987203	#DIV/0!	#DIV/0!
0.1170813	0.1087859	0.1017642	0.0989566	0.0995682	#DIV/0!	#DIV/0!
0.2744751	0.2647441	0.2583942	0.2554254	0.2558377	0.259631	#DIV/0!
0.2493002	0.2316373	0.2166818	0.2106945	0.2119805	0.2158893	#DIV/0!
0.0019917	0.0015845	0.0012963	0.0010958	0.0010251	0.0010253	#DIV/0!
2.321E-05	2.155E-05	2.029E-05	1.931E-05	1.902E-05	1.916E-05	1.93115E-05
0	0	0	0	0	0	0
5.217E-05	5.077E-05	5E-05	5.002E-05	5.154E-05	5.304E-05	5.54185E-05
0.0006823	0.0007045	0.0007276	0.0007515	0.0007785	0.0008046	0.000820772
0	0	0	0	0	0	0
6.872E-05	6.697E-05	6.613E-05	6.642E-05	6.881E-05	7.127E-05	7.48235E-05
6.185E-05	5.633E-05	5.203E-05	4.86E-05	4.727E-05	4.732E-05	4.75317E-05
6.995E-05	6.811E-05	6.713E-05	6.725E-05	6.943E-05	7.16E-05	7.49533E-05
0.0020063	0.0020716	0.00214	0.0022229	#DIV/0!	#DIV/0!	#DIV/0!
0.0002831	0.0002711	0.0002595	0.0002728	#DIV/0!	#DIV/0!	#DIV/0!
0.0003822	0.0003823	0.000385	0.0003915	#DIV/0!	#DIV/0!	#DIV/0!
9.67E-05	9.26E-05	8.864E-05	9.318E-05	#DIV/0!	#DIV/0!	#DIV/0!
0.0024155	0.0024068	0.0024146	0.0024488	0.0025392	0.0026062	0.002722959
2.481E-05	2.274E-05	2.115E-05	1.988E-05	1.942E-05	1.949E-05	1.96008E-05
0.0001112	0.0001085	0.0001074	0.0001082	0.0001126	0.0001172	0.000123443
0.0052978	0.0049075	0.0046263	0.0044199	0.0043519	0.0043842	#DIV/0!
0.0003504	0.0003392	0.0003386	0.0003421	0.0003479	0.0003552	#DIV/0!
0.0010258	0.0007909	0.0006346	0.0005252	0.0004824	0.0004811	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.0013558	0.0010058	0.0007951	0.0006393	0.0005735	0.000567	#DIV/0!
0.0002388	0.0002311	0.0002307	0.000233	0.000237	0.000242	#DIV/0!
0.0017091	0.0014735	0.0013102	0.0011984	0.0011529	#DIV/0!	#DIV/0!
0.0001932	0.0001881	0.0001848	0.0001898	0.0001925	#DIV/0!	#DIV/0!
0.0056301	0.0055984	0.0056198	0.0056765	0.0057709	0.0058969	#DIV/0!
0.0011682	0.0011307	0.0011325	0.0011449	0.0011675	0.0011957	#DIV/0!
1.177E-05	1.114E-05	1.065E-05	1.029E-05	1.015E-05	1.015E-05	#DIV/0!
2.376E-06	2.208E-06	2.074E-06	1.968E-06	1.932E-06	1.956E-06	1.97256E-06
0	0	0	0	0	0	0
1.805E-06	1.652E-06	1.594E-06	1.623E-06	1.744E-06	1.976E-06	2.14577E-06
3.105E-05	2.948E-05	2.906E-05	2.975E-05	3.185E-05	3.567E-05	3.83257E-05
0	0	0	0	0	0	0
1.943E-06	1.777E-06	1.714E-06	1.744E-06	1.871E-06	2.117E-06	2.29764E-06
9.036E-06	8.383E-06	7.849E-06	7.404E-06	7.218E-06	7.241E-06	7.25739E-06
1.845E-06	1.688E-06	1.629E-06	1.659E-06	1.782E-06	2.018E-06	2.19198E-06
2.3E-05	2.161E-05	2.083E-05	2.06E-05	#DIV/0!	#DIV/0!	#DIV/0!
2.007E-06	1.836E-06	1.772E-06	1.805E-06	#DIV/0!	#DIV/0!	#DIV/0!
1.752E-05	1.629E-05	1.533E-05	1.458E-05	#DIV/0!	#DIV/0!	#DIV/0!
2E-06	1.83E-06	1.766E-06	1.799E-06	#DIV/0!	#DIV/0!	#DIV/0!
4.048E-06	3.759E-06	3.673E-06	3.778E-06	4.087E-06	4.652E-06	5.05845E-06
2.98E-06	2.765E-06	2.59E-06	2.445E-06	2.386E-06	2.396E-06	2.40387E-06
1.963E-06	1.796E-06	1.733E-06	1.763E-06	1.892E-06	2.141E-06	2.32436E-06
7.234E-05	7.285E-05	7.63E-05	8.26E-05	9.227E-05	0.0001052	#DIV/0!
2.022E-06	1.85E-06	1.786E-06	1.819E-06	1.954E-06	2.214E-06	#DIV/0!
6.717E-06	6.32E-06	5.986E-06	5.708E-06	5.588E-06	5.588E-06	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8.915E-06	8.188E-06	7.949E-06	7.649E-06	7.357E-06	7.124E-06	#DIV/0!
2.018E-06	1.847E-06	1.783E-06	1.815E-06	1.95E-06	2.21E-06	#DIV/0!
1.183E-05	1.149E-05	1.13E-05	1.125E-05	1.127E-05	#DIV/0!	#DIV/0!
1.862E-06	1.704E-06	1.645E-06	1.675E-06	1.799E-06	#DIV/0!	#DIV/0!
1.547E-05	1.476E-05	1.546E-05	1.757E-05	2.113E-05	2.612E-05	#DIV/0!
1.883E-06	1.723E-06	1.663E-06	1.693E-06	1.819E-06	2.062E-06	#DIV/0!
1.126E-05	1.066E-05	1.019E-05	9.843E-06	9.71E-06	9.71E-06	#DIV/0!
2.273E-06	2.112E-06	1.984E-06	1.883E-06	1.848E-06	1.871E-06	1.88723E-06
0	0	0	0	0	0	0
1.66E-06	1.519E-06	1.466E-06	1.493E-06	1.603E-06	1.817E-06	1.97296E-06
2.971E-05	2.821E-05	2.78E-05	2.846E-05	3.048E-05	3.412E-05	3.66677E-05
0	0	0	0	0	0	0

1.786E-06	1.634E-06	1.576E-06	1.603E-06	1.72E-06	1.947E-06	2.1126E-06
8.645E-06	8.021E-06	7.509E-06	7.084E-06	6.905E-06	6.928E-06	6.94343E-06
1.696E-06	1.552E-06	1.498E-06	1.525E-06	1.638E-06	1.856E-06	2.01545E-06
2.2E-05	2.068E-05	1.993E-05	1.971E-05	#DIV/0!	#DIV/0!	#DIV/0!
1.845E-06	1.688E-06	1.63E-06	1.66E-06	#DIV/0!	#DIV/0!	#DIV/0!
1.676E-05	1.559E-05	1.466E-05	1.395E-05	#DIV/0!	#DIV/0!	#DIV/0!
1.839E-06	1.682E-06	1.624E-06	1.654E-06	#DIV/0!	#DIV/0!	#DIV/0!
3.775E-06	3.506E-06	3.426E-06	3.523E-06	3.812E-06	4.339E-06	4.7177E-06
2.851E-06	2.646E-06	2.478E-06	2.339E-06	2.283E-06	2.293E-06	2.29988E-06
1.805E-06	1.651E-06	1.593E-06	1.621E-06	1.74E-06	1.969E-06	2.13716E-06
6.921E-05	6.97E-05	7.3E-05	7.903E-05	8.828E-05	0.0001006	#DIV/0!
1.859E-06	1.701E-06	1.642E-06	1.672E-06	1.796E-06	2.036E-06	#DIV/0!
6.427E-06	6.046E-06	5.727E-06	5.461E-06	5.346E-06	5.346E-06	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8.529E-06	7.834E-06	7.605E-06	7.318E-06	7.039E-06	6.816E-06	#DIV/0!
1.856E-06	1.698E-06	1.639E-06	1.669E-06	1.793E-06	2.032E-06	#DIV/0!
1.132E-05	1.099E-05	1.081E-05	1.076E-05	1.078E-05	#DIV/0!	#DIV/0!
1.712E-06	1.567E-06	1.512E-06	1.54E-06	1.654E-06	#DIV/0!	#DIV/0!
1.48E-05	1.412E-05	1.479E-05	1.681E-05	2.022E-05	2.499E-05	#DIV/0!
1.731E-06	1.584E-06	1.529E-06	1.557E-06	1.673E-06	1.896E-06	#DIV/0!
0.000134	0.0001003	7.52E-05	5.619E-05	4.854E-05	4.854E-05	#DIV/0!
8.491E-06	7.214E-06	6.265E-06	5.54E-06	5.255E-06	5.293E-06	5.3203E-06
0	0	0	0	0	0	0
8.2E-06	7.502E-06	7.264E-06	7.392E-06	7.845E-06	8.987E-06	9.48149E-06
5.808E-05	5.333E-05	5.103E-05	5.093E-05	5.382E-05	5.993E-05	6.41869E-05
0	0	0	0	0	0	0
1.169E-05	1.069E-05	1.032E-05	1.046E-05	1.105E-05	1.258E-05	1.32342E-05
2.471E-05	2.095E-05	1.813E-05	1.596E-05	1.507E-05	1.51E-05	1.51282E-05
1.128E-05	1.032E-05	9.986E-06	1.016E-05	1.078E-05	1.233E-05	1.3013E-05
0.0001111	9.953E-05	9.248E-05	8.923E-05	#DIV/0!	#DIV/0!	#DIV/0!
1.692E-05	1.559E-05	1.53E-05	1.521E-05	#DIV/0!	#DIV/0!	#DIV/0!
7.5E-05	6.427E-05	5.646E-05	5.073E-05	#DIV/0!	#DIV/0!	#DIV/0!
6.553E-06	6.039E-06	5.928E-06	5.893E-06	#DIV/0!	#DIV/0!	#DIV/0!
0.0040241	0.0037519	0.0036715	0.0037777	0.0041146	0.0046676	0.005129875
9.866E-06	8.364E-06	7.241E-06	6.376E-06	6.022E-06	6.039E-06	6.05157E-06
1.804E-05	1.649E-05	1.593E-05	1.616E-05	1.707E-05	1.944E-05	2.04688E-05
8.913E-05	7.66E-05	6.832E-05	6.353E-05	6.381E-05	6.827E-05	#DIV/0!
2.807E-05	2.573E-05	2.469E-05	2.507E-05	2.697E-05	3.079E-05	#DIV/0!
6.399E-05	4.721E-05	3.487E-05	2.58E-05	2.222E-05	2.222E-05	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.0001027	7.284E-05	5.677E-05	4.33E-05	3.646E-05	3.439E-05	#DIV/0!
2.139E-05	1.961E-05	1.882E-05	1.911E-05	2.056E-05	2.347E-05	#DIV/0!
7.389E-05	5.498E-05	4.102E-05	3.074E-05	2.667E-05	#DIV/0!	#DIV/0!
1.519E-05	1.389E-05	1.344E-05	1.352E-05	1.456E-05	#DIV/0!	#DIV/0!
0.000148	0.0001312	0.0001285	0.0001398	0.0001654	0.0002051	#DIV/0!
7.819E-05	7.168E-05	6.868E-05	6.969E-05	7.484E-05	8.532E-05	#DIV/0!

SUMMARY OF NET DIFFERENCE OF MOBILE-SOURCE EMISSIONS (2015-2035)

	CH4 (MT)	CO (lb/day)	CO2 (MT)	NOX (lb/day)	PM10 (lb/d	PM2.5 (lb/	ROG (lb/da	Fuel (1000 gallons)
2015 Total	0.05	9,494.47	1,043.98	2,975.88	36.34	34.42	396.26	240.75
2035 Total	0.04	5,361.87	1,332.92	1,193.32	14.40	13.38	248.04	301.36
Net Difference	(0.02)	(4,132.59)	288.95	(1,782.55)	(21.94)	(21.05)	(148.22)	60.62

notes:

Mobile-source emissions were calculated using CARB's 2014 EMFAC model independently of CalEEMod.
Emissions were calculated using VMT data by speed bin. These emissions were factored into the total
operational emissions presented in Tables 5.3-6 and 5.3-7 on pages 5.3-22 and 5.3-23 of the DEIR

CalYr	Veh & Tech	Fuel	Veh & Fuel Distribution (From EMFAC)	5MPH	10MPH	15MPH	20MPH	25MPH	30MPH	35MPH	40MPH	45MPH	50MPH	55MPH	60MPH	65MPH	Total VMT
				Daily VMT by Speed Bin													
2015				1,215	6,792	118,677	93,149	167,938	218,642	427,990	626,694	173,376	161,821	290,052	35,531		2,321,878
2035				3,595	2,101	423,712	273,508	448,371	723,355	1,233,886	536,586	536,967	232,965	96,572	50,417	-	4,562,035
2015	HHDT	Dsl	1.88%	23	128	2,231	1,751	3,158	4,111	8,048	11,784	3,260	3,043	5,454	668	-	43,658
2015	HHDT	Gas	0.03%	0	2	38	30	54	71	138	202	56	52	94	11	-	749
2015	LDA	Dsl	0.36%	4	25	429	337	607	790	1,547	2,266	627	585	1,049	128	-	8,395
2015	LDA	Elec	0.27%	3	18	318	250	451	587	1,148	1,682	465	434	778	95	-	6,230
2015	LDA	Gas	51.66%	628	3,509	61,314	48,125	86,764	112,960	221,118	323,777	89,574	83,603	149,853	18,357	-	1,199,581
2015	LDT1	Dsl	0.02%	0	2	26	21	37	48	95	138	38	36	64	8	-	513
2015	LDT1	Elec	0.01%	0	1	9	7	13	17	34	49	14	13	23	3	-	182
2015	LDT1	Gas	4.96%	60	337	5,885	4,619	8,328	10,843	21,225	31,079	8,598	8,025	14,384	1,762	-	115,147
2015	LDT2	Dsl	0.02%	0	1	24	19	34	45	87	128	35	33	59	7	-	473
2015	LDT2	Gas	19.61%	238	1,332	23,267	18,262	32,925	42,865	83,909	122,865	33,991	31,725	56,865	6,966	-	455,211
2015	LHDT1	Dsl	1.40%	17	95	1,664	1,306	2,355	3,066	6,002	8,789	2,431	2,269	4,068	498	-	32,561
2015	LHDT1	Gas	1.70%	21	115	2,015	1,581	2,851	3,712	7,265	10,639	2,943	2,747	4,924	603	-	39,416
2015	LHDT2	Dsl	0.43%	5	29	513	403	726	945	1,850	2,708	749	699	1,253	154	-	10,034
2015	LHDT2	Gas	0.24%	3	16	281	220	397	517	1,012	1,481	410	383	686	84	-	5,489
2015	MCY	Gas	0.64%	8	43	756	594	1,070	1,393	2,727	3,993	1,105	1,031	1,848	226	-	14,795
2015	MDV	Dsl	0.12%	1	8	143	112	202	263	514	753	208	194	348	43	-	2,789
2015	MDV	Gas	14.09%	171	957	16,725	13,127	23,667	30,812	60,315	88,317	24,433	22,805	40,876	5,007	-	327,213
2015	MH	Dsl	0.02%	0	2	29	23	42	54	106	155	43	40	72	9	-	575
2015	MH	Gas	0.11%	1	7	126	99	179	233	456	667	185	172	309	38	-	2,472
2015	MHDT	Dsl	1.51%	18	103	1,792	1,407	2,536	3,302	6,464	9,465	2,619	2,444	4,381	537	-	35,068
2015	MHDT	Gas	0.33%	4	23	395	310	559	728	1,424	2,085	577	538	965	118	-	7,726
2015	OBUS	Dsl	0.11%	1	7	127	100	180	234	457	670	185	173	310	38	-	2,482
2015	OBUS	Gas	0.12%	1	8	144	113	204	266	520	761	211	197	352	43	-	2,821
2015	SBUS	Dsl	0.04%	1	3	53	41	75	97	190	278	77	72	129	16	-	1,031
2015	SBUS	Gas	0.02%	0	1	22	17	31	40	79	116	32	30	54	7	-	430
2015	UBUS	Dsl	0.18%	2	12	211	165	298	388	760	1,113	308	287	515	63	-	4,122
2015	UBUS	Gas	0.12%	1	8	139	109	197	256	501	734	203	189	340	42	-	2,718
2035	HHDT	Dsl	2.61%	94	55	11,079	7,152	11,724	18,914	32,264	14,031	14,041	6,092	2,525	1,318	-	119,289
2035	LDA	Dsl	0.67%	24	14	2,839	1,833	3,005	4,847	8,268	3,596	3,598	1,561	647	338	-	30,570
2035	LDA	Elec	8.20%	295	172	34,762	22,439	36,785	59,346	101,231	44,023	44,054	19,113	7,923	4,136	-	374,280
2035	LDA	Gas	49.11%	1,765	1,032	208,064	134,306	220,173	355,204	605,901	263,491	263,678	114,397	47,422	24,757	-	2,240,191
2035	LDT1	Dsl	0.00%	0	0	10	6	11	17	29	13	13	6	2	1	-	108
2035	LDT1	Elec	0.00%	0	0	7	5	8	12	21	9	9	4	2	1	-	78
2035	LDT1	Gas	3.40%	122	71	14,411	9,302	15,250	24,602	41,966	18,250	18,263	7,923	3,285	1,715	-	155,162
2035	LDT2	Dsl	0.05%	2	1	196	126	207	334	570	248	248	108	45	23	-	2,108
2035	LDT2	Gas	21.27%	765	447	90,128	58,178	95,373	153,865	262,460	114,137	114,218	49,554	20,542	10,724	-	970,389
2035	LHDT1	Dsl	0.66%	24	14	2,792	1,803	2,955	4,767	8,132	3,536	3,539	1,535	636	332	-	30,065
2035	LHDT1	Gas	0.41%	15	9	1,718	1,109	1,818	2,933	5,003	2,176	2,177	945	392	204	-	18,496
2035	LHDT2	Dsl	0.31%	11	6	1,304	842	1,380	2,226	3,797	1,651	1,652	717	297	155	-	14,038
2035	LHDT2	Gas	0.13%	5	3	531	343	562	907	1,548	673	674	292	121	63	-	5,722
2035	MCY	Gas	0.54%	19	11	2,288	1,477	2,421	3,907	6,664	2,898	2,900	1,258	522	272	-	24,638
2035	MDV	Dsl	0.28%	10	6	1,178	761	1,247	2,012	3,431	1,492	1,493	648	269	140	-	12,687
2035	MDV	Gas	10.19%	366	214	43,165	27,863	45,677	73,690	125,700	54,664	54,702	23,733	9,838	5,136	-	464,748
2035	MH	Dsl	0.01%	0	0	53	34	56	90	154	67	67	29	12	6	-	569
2035	MH	Gas	0.04%	2	1	187	121	198	320	545	237	237	103	43	22	-	2,015
2035	MHDT	Dsl	1.72%	62	36	7,268	4,692	7,691	12,408	21,166	9,205	9,211	3,996	1,657	865	-	78,257
2035	MHDT	Gas	0.03%	1	1	112	72	118	191	326	142	142	62	26	13	-	1,205
2035	OBUS	Dsl	0.10%	4	2	426	275	451	727	1,240	539	540	234	97	51	-	4,585
2035	OBUS	Gas	0.08%	3	2	360	232	381	614	1,048	456	456	198	82	43	-	3,875
2035	SBUS	Dsl	0%	1	1	155	100	164	265	452	197	197	85	35	18	-	1,673
2035	SBUS	Gas	0%	1	0	99	64	104	168	287	125	125	54	22	12	-	1,061
2035	UBUS	Dsl	0%	3	1	296	191	313	505	861	374	375	163	67	35	-	3,182
2035	UBUS	Gas	0%	2	1	283	182	299	482	823	358	358	155	64	34	-	3,042

Daily CH4 Emissions (MT)													Daily CO Emissions (lb/day)										
5MPH	10MPH	15MPH	20MPH	25MPH	30MPH	35MPH	40MPH	45MPH	50MPH	55MPH	60MPH	65MPH	5MPH	10MPH	15MPH	20MPH	25MPH	30MPH	35MPH	40MPH	45MPH	50MPH	55MPH
0	0	0	0	0	0	0	0	0	0	0	0	-	0.31	1.34	15.07	8.81	11.44	11.58	18.21	21.43	4.89	3.91	6.29
0	0	0	0	0	0	0	0	0	0	0	0	-	0.19	0.79	10.95	7.16	11.07	12.82	23.11	32.20	8.84	8.42	16.03
0	0	0	0	0	0	0	0	0	0	0	0	-	0.03	0.13	1.25	0.51	0.66	0.71	1.20	1.62	0.43	0.41	0.79
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	0	0	0	0	0	-	3.66	17.73	271.81	189.92	309.24	368.09	663.43	898.77	233.56	207.47	356.43
0	0	0	0	0	0	0	0	0	0	0	0	-	0.00	0.01	0.11	0.07	0.10	0.11	0.20	0.29	0.08	0.08	0.16
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	0	0	0	0	0	-	1.00	4.56	67.14	45.48	72.47	85.21	152.95	208.55	55.00	50.03	89.17
0	0	0	0	0	0	0	0	0	0	0	0	-	0.00	0.00	0.04	0.02	0.02	0.02	0.03	0.04	0.01	0.01	0.02
0	0	0	0	0	0	0	0	0	0	0	0	-	1.76	8.54	131.06	91.65	149.25	177.59	319.92	433.11	112.41	99.66	170.78
0	0	0	0	0	0	0	0	0	0	0	-	-	0.12	0.48	5.83	3.35	4.92	5.55	9.93	14.00	3.93	3.92	7.91
0	0	0	0	0	0	0	0	0	0	0	-	-	0.23	0.99	14.27	9.51	14.96	17.53	31.37	43.05	11.60	10.94	19.87
0	0	0	0	0	0	0	0	0	0	0	-	-	0.03	0.14	1.61	0.87	1.26	1.41	2.51	3.51	0.98	0.97	1.95
0	0	0	0	0	0	0	0	0	0	0	-	-	0.03	0.12	1.69	1.11	1.73	2.02	3.61	4.96	1.35	1.29	2.37
0	0	0	0	0	0	0	0	0	0	0	0	-	1.15	4.76	65.01	41.55	63.66	73.57	132.17	185.54	51.23	49.57	96.37
0	0	0	0	0	0	0	0	0	0	0	0	-	0.01	0.04	0.38	0.13	0.15	0.15	0.24	0.30	0.08	0.07	0.12
0	0	0	0	0	0	0	0	0	0	0	0	-	1.86	8.96	136.69	95.20	154.67	183.85	331.21	449.04	116.86	104.04	179.43
0	0	0	0	0	0	0	0	0	0	0	0	-	0.00	0.01	0.09	0.05	0.07	0.08	0.13	0.17	0.04	0.04	0.06
0	0	0	0	0	0	0	0	0	0	0	0	-	0.08	0.33	4.42	2.81	4.29	4.94	8.92	12.57	3.47	3.40	6.70
0	0	0	0	0	0	0	0	0	0	0	0	-	0.16	0.72	8.65	4.71	6.80	7.49	12.57	16.08	4.00	3.48	6.06
0	0	0	0	0	0	0	0	0	0	0	0	-	0.16	0.69	9.99	6.72	10.67	12.52	22.61	31.23	8.33	7.71	14.18
0	0	0	0	0	0	0	0	0	0	0	0	-	0.01	0.05	0.56	0.31	0.43	0.45	0.71	0.87	0.19	0.16	0.27
0	0	0	0	0	0	0	0	0	0	0	0	-	0.02	0.10	1.61	1.14	1.87	2.22	4.01	5.46	1.42	1.25	2.14
0	0	0	0	0	0	0	0	0	0	0	0	-	0.00	0.01	0.12	0.07	0.11	0.11	0.18	0.22	0.05	0.04	0.07
0	0	0	0	0	0	0	0	0	0	0	0	-	0.01	0.06	0.99	0.71	1.17	1.41	2.54	3.43	0.88	0.77	1.27
0	0	0	0	0	0	0	0	0	0	0	0	-	0.00	0.00	0.27	0.06	0.12	0.20	0.54	0.29	0.07	0.03	0.02
0	0	0	0	0	0	0	0	0	0	0	0	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	1.83	0.71	68.19	21.29	32.64	35.40	47.76	14.42	9.73	2.83	0.82
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.14	0.06	6.14	1.54	1.52	1.86	2.52	0.90	0.77	0.29	0.11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	2.50	1.35	247.79	145.45	217.95	323.93	509.09	204.14	189.69	76.99	29.77
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.03	0.01	0.01	0.01	0.02	0.01	0.01	0.00	0.00
-	-	-	-	-	-	-	-	-	-	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.21	0.11	20.97	12.28	18.37	27.27	42.83	17.17	15.96	6.48	2.51
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.01	0.00	0.42	0.11	0.10	0.13	0.17	0.06	0.05	0.02	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	1.43	0.77	142.01	83.35	124.90	185.62	291.72	116.98	108.71	44.12	17.06
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.18	0.08	8.38	2.50	2.75	3.55	5.14	1.99	1.86	0.79	0.34
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.02	0.01	1.67	0.99	1.47	2.19	3.42	1.36	1.27	0.52	0.20
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.08	0.04	3.51	0.91	0.91	1.13	1.55	0.57	0.49	0.19	0.07
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.23	0.14	0.20	0.30	0.47	0.19	0.18	0.07	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	1.93	0.86	140.01	75.78	107.92	156.01	244.85	101.00	98.93	43.31	18.80
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.07	0.03	2.90	0.73	0.72	0.87	1.19	0.43	0.36	0.14	0.05
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.89	0.48	87.92	51.54	77.15	114.57	179.98	72.17	67.08	27.23	10.54
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.10	0.03	0.03	0.04	0.06	0.02	0.02	0.01	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.23	0.14	0.21	0.31	0.48	0.19	0.18	0.07	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	0.17	0.08	11.46	5.35	6.43	7.65	9.62	3.08	2.28	0.73	0.22
0.00	0.00	0.00	0.00	-	-	-	-	-	-	0.00	0.00	-	0.00	0.00	0.11	-	-	-	-	-	-	-	-
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.02	0.01	1.11	0.52	0.62	0.75	0.95	0.31	0.22	0.08	0.02
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.33	0.19	0.29	0.43	0.68	0.27	0.25	0.10	0.04
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.24	0.11	0.14	0.16	0.21	0.07	0.05	0.02	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.06	0.04	0.05	0.08	0.12	0.05	0.05	0.02	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.22	0.10	10.68	3.19	3.52	4.50	6.27	2.28	1.97	0.76	0.29
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.01	0.01	1.13	0.67	1.01	1.50	2.36	0.95	0.88	0.35	0.14

		Daily CO2 Emissions (MT/day)													Daily NOx Emissions (lb/day)														
60MPH	65MPH	5MPH	10MPH	15MPH	20MPH	25MPH	30MPH	35MPH	40MPH	45MPH	50MPH	55MPH	60MPH	65MPH	5MPH	10MPH	15MPH	20MPH	25MPH	30MPH	35MPH	40MPH	45MPH	50MPH	55MPH	60MPH	65MPH	5MPH	10MPH
0.74	-	0.11	0.52	6.51	3.95	6.82	8.10	15.31	20.99	5.43	4.77	8.23	1.00	-	1.21	5.48	66.71	40.82	61.38	71.81	131.20	180.17	47.37	42.44	74.18	9.06	-	0.01	0.05
2.21	-	0.00	0.01	0.10	0.07	0.11	0.14	0.26	0.36	0.10	0.09	0.16	0.02	-	0.01	0.04	0.58	0.43	0.74	0.93	1.78	2.58	0.72	0.68	1.23	0.16	-	0.00	0.00
0.11	-	0.00	0.02	0.23	0.15	0.22	0.25	0.45	0.61	0.16	0.15	0.29	0.04	-	0.00	0.02	0.30	0.23	0.42	0.56	1.13	1.72	0.49	0.47	0.88	0.11	-	0.00	0.01
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.29	1.39	21.54	15.24	25.21	30.71	56.97	80.72	21.94	20.37	36.91	4.68	-	-	-
42.37	-	0.67	2.77	37.08	23.20	34.66	38.85	67.94	92.02	24.51	22.89	42.51	5.58	-	0.00	0.00	0.06	0.05	0.09	0.13	0.26	0.40	0.11	0.11	0.21	0.03	-	0.02	0.06
0.02	-	0.00	0.00	0.02	0.01	0.02	0.02	0.03	0.05	0.01	0.01	0.02	0.00	-	0.07	0.34	5.19	3.66	6.06	7.42	13.88	19.89	5.48	5.16	9.51	1.23	-	0.00	0.00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.00	0.01	0.01	0.01	0.01	0.03	0.04	0.01	0.01	0.02	0.00	-	-	-
11.19	-	0.07	0.31	4.12	2.58	3.86	4.32	7.56	10.24	2.73	2.55	4.73	0.62	-	0.19	0.92	14.08	9.88	16.22	19.65	36.29	51.28	13.92	12.94	23.52	3.00	-	0.00	0.01
0.00	-	0.00	0.00	0.02	0.01	0.02	0.02	0.03	0.04	0.01	0.01	0.02	0.00	-	6.82	13.16	182.61	42.72	30.50	55.07	33.13	24.08	15.10	55.36	39.62	-	-	0.00	0.00
20.22	-	0.34	1.42	18.97	11.87	17.74	19.88	34.76	47.09	12.54	11.71	21.75	2.85	-	2.60	3.33	41.98	9.14	4.23	7.24	2.88	1.07	0.72	4.69	1.56	-	-	0.01	0.02
-	-	0.02	0.10	1.19	0.80	1.27	1.51	2.95	4.20	1.13	1.11	2.08	-	-	0.04	0.23	4.09	3.32	6.24	8.46	17.33	26.51	7.62	7.38	13.79	-	-	0.01	0.02
-	-	0.03	0.16	1.94	1.32	2.18	2.58	5.05	7.36	2.03	2.00	3.77	-	-	0.00	0.02	0.33	0.24	0.40	0.50	0.96	1.41	0.38	0.35	0.66	-	-	0.00	0.00
-	-	0.01	0.04	0.42	0.28	0.45	0.53	1.03	1.45	0.39	0.37	0.69	-	-	0.00	0.01	0.19	0.49	2.28	2.21	14.67	45.63	5.87	1.47	7.06	-	-	0.00	0.01
-	-	0.00	0.03	0.31	0.21	0.34	0.40	0.79	1.13	0.31	0.30	0.56	-	-	0.00	0.00	0.00	0.01	0.04	0.04	0.33	1.90	0.21	0.03	0.29	-	-	0.00	0.00
13.58	-	0.00	0.02	0.23	0.14	0.22	0.24	0.42	0.57	0.15	0.14	0.26	0.03	-	0.22	1.06	16.29	11.40	18.71	22.65	41.86	59.22	16.12	15.01	27.39	3.51	-	0.00	0.00
0.02	-	0.00	0.01	0.12	0.08	0.12	0.14	0.24	0.33	0.09	0.08	0.16	0.02	-	0.24	0.56	3.26	0.54	0.32	0.75	0.92	1.40	0.63	0.64	1.07	0.16	-	0.00	0.00
21.46	-	0.32	1.32	17.70	11.08	16.55	18.55	32.44	43.94	11.70	10.93	20.30	2.66	-	0.09	0.24	1.71	0.34	0.23	0.52	0.69	1.08	0.55	0.50	0.77	0.11	-	0.00	0.02
0.01	-	0.00	0.00	0.05	0.03	0.05	0.06	0.11	0.15	0.04	0.04	0.07	0.01	-	0.64	2.97	36.90	22.25	35.56	42.97	79.39	111.29	29.80	27.33	48.76	5.98	-	0.00	0.00
0.94	-	0.01	0.02	0.29	0.16	0.26	0.31	0.55	0.75	0.19	0.17	0.29	0.04	-	0.02	0.10	1.49	1.06	1.77	2.18	4.08	5.80	1.57	1.48	2.69	0.34	-	0.00	0.00
0.74	-	0.04	0.22	3.13	2.09	3.42	4.18	7.76	10.85	2.89	2.62	4.59	0.56	-	0.05	0.21	2.57	1.58	2.50	3.13	5.95	9.17	2.18	2.37	4.79	0.54	-	0.02	0.10
1.85	-	0.02	0.08	0.92	0.51	0.80	0.95	1.72	2.35	0.60	0.53	0.92	0.11	-	0.01	0.02	0.38	0.27	0.44	0.53	0.98	1.38	0.37	0.35	0.63	0.08	-	0.00	0.00
0.03	-	0.00	0.02	0.26	0.18	0.29	0.35	0.66	0.94	0.24	0.23	0.41	0.05	-	0.04	0.12	2.18	1.69	4.32	5.24	8.49	6.16	1.08	0.39	0.65	0.04	-	0.00	0.00
0.26	-	0.01	0.03	0.33	0.18	0.29	0.35	0.63	0.86	0.22	0.19	0.33	0.04	-	0.00	0.01	0.13	0.12	0.28	0.36	0.54	0.41	0.06	0.03	0.06	0.00	-	0.00	0.00
0.01	-	0.00	0.01	0.09	0.06	0.10	0.12	0.23	0.32	0.08	0.08	0.14	0.02	-	0.23	0.99	10.36	41.16	0.53	0.58	1.40	3.97	1.90	3.34	6.87	2.34	-	0.00	0.00
0.15	-	0.00	0.00	0.02	0.01	0.02	0.03	0.05	0.06	0.02	0.01	0.02	0.00	-	0.01	0.05	0.70	3.20	0.04	0.04	0.10	0.28	0.13	0.23	0.47	0.16	-	0.00	0.00
0.00	-	0.01	0.04	0.54	0.35	0.56	0.69	1.28	1.78	0.48	0.43	0.77	0.09	-	0.00	0.00	0.07	0.06	0.06	0.07	0.12	0.17	0.05	0.05	0.09	0.01	-	0.00	0.01
0.00	-	0.01	0.03	0.32	0.18	0.28	0.34	0.61	0.83	0.21	0.19	0.32	0.04	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	-	0.00	0.00
0.37	-	0.37	0.18	26.03	13.39	21.21	31.56	52.19	21.43	20.23	8.31	3.31	1.71	-	2.68	1.32	183.13	66.61	65.12	69.20	84.27	27.95	22.25	7.90	2.77	1.35	-	0.00	0.00
0.05	-	0.01	0.01	0.95	0.50	0.69	0.96	1.49	0.61	0.58	0.25	0.11	0.06	-	0.00	0.00	0.18	0.08	0.10	0.14	0.21	0.08	0.08	0.03	0.01	0.01	-	0.00	0.00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14.33	-	1.14	0.50	77.48	39.85	54.08	75.12	114.41	46.06	44.36	19.27	8.28	4.62	-	0.18	0.09	15.89	9.20	13.77	20.59	33.02	13.75	13.39	5.72	2.37	1.28	-	0.03	0.01
0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.01	0.00	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.00	-	0.00	0.00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.21	-	0.09	0.04	5.91	3.04	4.13	5.73	8.73	3.52	3.39	1.47	0.63	0.35	-	0.02	0.01	1.46	0.84	1.26	1.88	3.01	1.25	1.22	0.52	0.22	0.12	-	0.00	0.00
0.00	-	0.00	0.00	0.08	0.04	0.06	0.08	0.13	0.05	0.05	0.02	0.01	0.01	-	0.00	0.00	0.04	0.02	0.02	0.03	0.04	0.02	0.01	0.01	0.00	0.00	-	0.00	0.00
8.22	-	0.63	0.27	42.53	21.88	29.69	41.24	62.82	25.29	24.36	10.58	4.55	2.54	-	0.10	0.05	9.25	5.35	8.00	11.96	19.17	7.98	7.78	3.33	1.38	0.74	-	0.01	0.00
-	-	0.03	0.01	1.78	0.98	1.42	2.08	3.55	1.50	1.47	0.67	0.29	-	-	0.05	0.03	5.16	3.24	5.39	8.92	15.74	7.09	7.33	3.29	1.41	-	-	0.00	0.00
-	-	0.02	0.01	1.55	0.87	1.30	1.91	3.26	1.41	1.41	0.64	0.28	-	-	0.01	0.00	0.67	0.39	0.59	0.88	1.45	0.62	0.59	0.25	0.11	-	-	0.00	0.00
-	-	0.01	0.01	0.92	0.51	0.74	1.08	1.84	0.77	0.74	0.33	0.14	-	-	0.01	0.00	0.73	0.38	0.56	0.87	1.46	0.63	0.63	0.28	0.12	-	-	0.00	0.00
-	-	0.01	0.00	0.53	0.30	0.45	0.65	1.11	0.47	0.46	0.21	0.09	-	-	0.00	0.00	0.07	0.04	0.06	0.09	0.15	0.07	0.06	0.03	0.01	-	-	0.00	0.00
10.88	-	0.01	0.00	0.74	0.38	0.52	0.72	1.10	0.44	0.43	0.18	0.08	0.04	-	0.07	0.04	6.81	4.10	6.36	9.85	16.33	7.00	6.98	3.04	1.28	0.69	-	0.00	0.00
0.02	-	0.01	0.00	0.64	0.34	0.47	0.66	1.02	0.41	0.40	0.17	0.08	0.04	-	0.00	0.00	0.09	0.04	0.05	0.06	0.09	0.04	0.03	0.01	0.01	0.00	-	0.00	0.00
5.08	-	0.40	0.18	27.28	14.03	19.04	26.45	40.29	16.22	15.62	6.79	2.92	1.63	-	0.08	0.04	7.11	4.09	6.10	9.10	14.59	6.08	5.94	2.55	1.06	0.58	-	0.01	0.00
0.00	-	0.00	0.00	0.08	0.04	0.06	0.09	0.15	0.06	0.06	0.03	0.01	0.01	-	0.01	0.01	0.75	0.33	0.42	0.59	0.89	0.35	0.33	0.13	0.05	0.03	-	0.00	0.00
0.01	-	0.01	0.00	0.41	0.19	0.27	0.39	0.62	0.25	0.23	0.09	0.04	0.02	-	0.00	0.00	0.10	0.06	0.08	0.12	0.20	0.08	0.08	0.03	0.01	0.01	-	0.00	0.00
0.10	-	0.13	0.07	11.48	6.47	9.79	14.94	24.32	10.16	9.82	4.13	1.66	0.86	-	1.35	0.60	73.17	26.80	24.32	24.94	29.46	9.44	7.29	2.54	0.87	0.42	-	0.00	0.00
-	-	0.00	0.00	0.24	0.11	-	-	-	-	-	-	-	-	-	0.00	0.00	0.04	0.02	-	-	-	-	-	-	-	-	-	0.00	0.00
0.01	-	0.01	0.00	0.80	0.45	0.68	1.04	1.71	0.73	0.69	0.30	0.12	0.06	-	0.11	0.05	5.96	2.18	1.95	1.98	2.31	0.73	0.54	0.19	0.06	0.03	-	0.00	0.00
0.02	-	0.01	0.01	0.78	0.35	0.51	0.75	1.18	0.48	0.44	0.18	0.07	0.04	-	0.00	0.00	0.12	0.07	0.11	0.16	0.26	0.11	0.11	0.05	0.02	0.01	-	0.00	0.00
0.00	-	0.00	0.00	0.25	0.14	0.21	0.32	0.52	0.22	0.21	0.09	0.04	0.02	-	0.03	0.01	1.55	0.60	0.61	0.70	0.93	0.34	0.29	0.11	0.04	0.02	-	0.00	0.00
0.00	-	0.00	0.00	0.10	0.05	0.07	0.10	0.15	0.06	0.06	0.02	0.01	0.00	-	0.00	0.00	0.03	0.02	0.02	0.04	0.06	0.02	0.02	0.01	0.00	0.00	-	0.00	0.00
0.15	-	0.01	0.00	0.66	0.35	0.51	0.77	1.25	0.52	0.50	0.21	0.09	0.05	-	0.04	0.02	2.57	1.24	1.88	2.94	4.90	2.11	2.10	0.91	0.38	0.20	-	0.00	0.00
0.07	-	0.01	0.00	0.62	0.28	0.40	0.60	0.94	0.38	0.35	0.14	0.06	0.03	-	0.01	0.00	0.49	0.28	0.41	0.62	1.00	0.42	0.40	0.18	0.07	0.04	-	0.00	0.00

Daily PM10 Emissions (lb/day)											Daily PM2.5 Emissions (lb/day)													Daily RO					
15MPH	20MPH	25MPH	30MPH	35MPH	40MPH	45MPH	50MPH	55MPH	60MPH	65MPH	5MPH	10MPH	15MPH	20MPH	25MPH	30MPH	35MPH	40MPH	45MPH	50MPH	55MPH	60MPH	65MPH	5MPH	10MPH	15MPH	20MPH	25MPH	30MPH
0.71	0.63	0.63	0.74	1.30	1.82	0.51	0.50	0.99	0.13	-	0.01	0.05	0.68	0.60	0.60	0.71	1.24	1.75	0.49	0.48	0.95	0.12	-	0.08	0.38	4.43	2.41	2.71	2.78
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.01	0.03	0.40	0.24	0.33	0.35
0.07	0.04	0.06	0.06	0.11	0.14	0.04	0.04	0.07	0.01	-	0.00	0.00	0.06	0.04	0.05	0.06	0.10	0.14	0.04	0.03	0.06	0.01	-	0.00	0.01	0.13	0.07	0.09	0.09
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.69	0.38	0.52	0.53	0.86	1.10	0.28	0.25	0.46	0.06	-	0.02	0.05	0.64	0.35	0.48	0.49	0.79	1.01	0.26	0.23	0.42	0.06	-	0.27	0.98	11.74	6.64	9.09	9.47
0.01	0.01	0.01	0.01	0.02	0.03	0.01	0.01	0.01	0.00	-	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.03	0.01	0.01	0.01	0.00	-	0.00	0.00	0.02	0.01	0.02	0.02
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.14	0.08	0.11	0.11	0.18	0.23	0.06	0.05	0.10	0.01	-	0.00	0.01	0.13	0.07	0.10	0.10	0.17	0.22	0.06	0.05	0.09	0.01	-	0.07	0.27	3.32	1.93	2.70	2.87
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.01	0.00	0.00	0.00
0.25	0.14	0.19	0.19	0.31	0.40	0.10	0.09	0.17	0.02	-	0.01	0.02	0.23	0.13	0.17	0.18	0.29	0.37	0.09	0.08	0.15	0.02	-	0.12	0.45	5.38	3.04	4.16	4.33
0.28	0.17	0.24	0.27	0.46	0.61	0.16	0.15	0.28	-	-	0.01	0.02	0.27	0.16	0.23	0.25	0.44	0.58	0.15	0.14	0.27	-	-	0.03	0.12	1.39	0.77	1.08	1.17
0.02	0.01	0.02	0.02	0.03	0.03	0.01	0.01	0.01	-	-	0.00	0.00	0.02	0.01	0.01	0.01	0.02	0.03	0.01	0.01	0.01	-	-	0.02	0.07	0.87	0.50	0.68	0.72
0.07	0.04	0.06	0.07	0.11	0.15	0.04	0.04	0.07	-	-	0.00	0.01	0.07	0.04	0.06	0.06	0.11	0.15	0.04	0.04	0.07	-	-	0.01	0.04	0.40	0.20	0.28	0.30
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.01	0.10	0.06	0.08	0.08
0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.00	-	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.00	-	0.23	0.85	10.43	6.03	8.41	8.92
0.01	0.00	0.01	0.01	0.01	0.02	0.00	0.00	0.01	0.00	-	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.02	0.00	0.00	0.01	0.00	-	0.00	0.00	0.03	0.01	0.01	0.01
0.19	0.11	0.14	0.15	0.24	0.31	0.08	0.07	0.13	0.02	-	0.00	0.01	0.18	0.10	0.13	0.14	0.22	0.28	0.07	0.06	0.12	0.02	-	0.15	0.54	6.38	3.60	4.91	5.10
0.02	0.01	0.02	0.02	0.03	0.05	0.01	0.01	0.03	0.00	-	0.00	0.00	0.02	0.01	0.02	0.02	0.03	0.04	0.01	0.01	0.03	0.00	-	0.00	0.00	0.03	0.01	0.01	0.02
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.02	0.21	0.12	0.17	0.19
1.17	0.65	0.97	1.12	2.03	2.89	0.82	0.83	1.67	0.22	-	0.02	0.09	1.12	0.62	0.93	1.07	1.94	2.76	0.79	0.79	1.60	0.21	-	0.11	0.49	4.49	1.73	2.28	2.40
0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	-	0.01	0.05	0.59	0.34	0.46	0.49
0.04	0.02	0.03	0.04	0.07	0.09	0.02	0.02	0.05	0.01	-	0.00	0.00	0.04	0.02	0.03	0.04	0.06	0.09	0.02	0.02	0.05	0.01	-	0.01	0.02	0.24	0.11	0.14	0.14
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.01	0.10	0.06	0.08	0.08
0.02	0.01	0.02	0.02	0.03	0.04	0.01	0.01	0.02	0.00	-	0.00	0.00	0.02	0.01	0.02	0.02	0.03	0.04	0.01	0.01	0.02	0.00	-	0.00	0.01	0.06	0.03	0.03	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.01	0.06	0.03	0.04	0.05
0.10	0.06	0.08	0.10	0.17	0.22	0.06	0.05	0.10	0.01	-	0.00	0.01	0.10	0.05	0.08	0.09	0.16	0.21	0.06	0.05	0.09	0.01	-	0.02	0.09	0.85	0.31	0.39	0.41
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.01	0.18	0.10	0.14	0.14
0.21	0.10	0.17	0.26	0.41	0.17	0.16	0.06	0.03	0.01	-	0.00	0.00	0.20	0.10	0.17	0.25	0.39	0.16	0.15	0.06	0.02	0.01	-	0.08	0.04	6.71	3.15	3.85	4.66
0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.00	-	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.00	-	0.00	0.00	0.20	0.05	0.05	0.06
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.31	0.59	0.72	0.90	1.26	0.48	0.44	0.18	0.08	0.04	-	0.02	0.01	1.20	0.54	0.66	0.83	1.16	0.44	0.40	0.17	0.07	0.04	-	0.12	0.04	5.97	2.69	3.25	4.09
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.10	0.04	0.05	0.07	0.09	0.04	0.03	0.01	0.01	0.00	-	0.00	0.00	0.09	0.04	0.05	0.06	0.09	0.03	0.03	0.01	0.01	0.00	-	0.01	0.00	0.58	0.26	0.32	0.40
0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.04	0.01	0.01	0.01
0.58	0.26	0.32	0.40	0.56	0.21	0.19	0.08	0.03	0.02	-	0.01	0.00	0.53	0.24	0.29	0.37	0.51	0.19	0.18	0.07	0.03	0.02	-	0.07	0.03	3.55	1.60	1.94	2.44
0.14	0.07	0.10	0.13	0.20	0.08	0.08	0.03	0.01	-	-	0.00	0.00	0.13	0.07	0.09	0.13	0.20	0.08	0.07	0.03	0.01	-	-	0.04	0.02	1.83	0.54	0.59	0.74
0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.10	0.05	0.06	0.07
0.04	0.02	0.03	0.05	0.07	0.03	0.03	0.01	0.00	-	-	0.00	0.00	0.04	0.02	0.03	0.05	0.07	0.03	0.03	0.01	0.00	-	-	0.02	0.01	0.79	0.20	0.20	0.25
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.01	0.01	0.01	0.01
0.03	0.01	0.02	0.02	0.03	0.01	0.01	0.00	0.00	0.00	-	0.00	0.00	0.03	0.01	0.02	0.02	0.03	0.01	0.01	0.00	0.00	0.00	-	0.54	0.20	28.20	13.12	16.34	21.09
0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.10	0.03	0.02	0.03
0.29	0.13	0.16	0.20	0.28	0.11	0.10	0.04	0.02	0.01	-	0.01	0.00	0.27	0.12	0.15	0.19	0.26	0.10	0.09	0.04	0.02	0.01	-	0.05	0.02	2.68	1.21	1.48	1.86
0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.04	0.01	0.01	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.02	0.01	0.01	0.01
0.08	0.04	0.07	0.10	0.15	0.06	0.06	0.02	0.01	0.00	-	0.00	0.00	0.07	0.04	0.06	0.09	0.15	0.06	0.06	0.02	0.01	0.00	-	0.03	0.02	2.19	1.02	1.23	1.46
0.00	0.00	-	-	-	-	-	-	-	-	-	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-	0.00	0.00	0.01	0.00	-	-
0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.20	0.09	0.11	0.13
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.03	0.01	0.01	0.02
0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.05	0.02	0.03	0.04
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.01	0.00	0.00	0.00
0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.00	-	0.00	0.00	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	-	0.01	0.00	0.28	0.08	0.09	0.11
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.08	0.03	0.04	0.05

G Emissions (lb/day)							Daily Fuel Use (1000 gallons)																				
35MPH	40MPH	45MPH	50MPH	55MPH	60MPH	65MPH	5MPH	10MPH	15MPH	20MPH	25MPH	30MPH	35MPH	40MPH	45MPH	50MPH	55MPH	60MPH	65MPH	CH4 (MT)	CO (lb/day)	CO2 (MT)	NOx (lb/day)	PM10 (lb/day)	PM2.5(lb/day)	ROG (lb/day)	Fuel (1000gal)
4.19	4.91	1.13	0.92	1.52	0.19	-	0.02	0.10	1.29	0.78	1.35	1.61	3.04	4.16	1.08	0.95	1.63	0.20	-	0	104.02	81.75	731.82	8.03	7.68	25.65	16
0.59	0.78	0.20	0.19	0.35	0.05	-	0.00	0.00	0.03	0.02	0.03	0.03	0.06	0.09	0.02	0.02	0.04	0.00	-	0	133.79	1.41	9.86	0.01	0.01	3.52	0
0.16	0.21	0.05	0.05	0.09	0.01	-	0.00	0.00	0.05	0.03	0.04	0.05	0.09	0.12	0.03	0.03	0.06	0.01	-	0	7.85	2.57	6.35	0.63	0.60	0.98	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	315.98	-	-	-	-
15.56	20.08	5.16	4.70	8.61	1.13	-	0.16	0.65	8.75	5.48	8.19	9.18	16.06	21.75	5.79	5.41	10.04	1.32	-	0	3,562.50	392.67	1.45	5.21	4.80	93.44	93
0.03	0.04	0.01	0.01	0.02	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	-	0	1.24	0.20	77.88	0.12	0.12	0.18	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.16	-	-	-	-
4.78	6.24	1.62	1.48	2.71	0.36	-	0.02	0.07	0.98	0.61	0.92	1.03	1.80	2.44	0.65	0.61	1.13	0.15	-	0	842.75	43.69	201.88	1.09	1.01	28.34	10
0.00	0.01	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	-	0	0.22	0.18	498.16	0.01	0.01	0.03	0
7.11	9.16	2.35	2.13	3.89	0.51	-	0.08	0.33	4.48	2.80	4.19	4.70	8.21	11.13	2.96	2.77	5.13	0.67	-	0	1,715.95	200.93	79.43	1.88	1.74	42.64	47
1.98	2.64	0.69	0.64	1.20	-	-	0.00	0.02	0.24	0.16	0.25	0.30	0.58	0.83	0.22	0.22	0.41	-	-	0	59.93	16.36	95.00	2.64	2.52	11.72	3
1.18	1.53	0.40	0.37	0.67	-	-	0.01	0.04	0.46	0.31	0.51	0.61	1.19	1.74	0.48	0.47	0.89	-	-	0	174.32	28.41	5.25	0.16	0.15	7.01	7
0.51	0.68	0.18	0.16	0.30	-	-	0.00	0.01	0.08	0.06	0.09	0.10	0.20	0.29	0.08	0.07	0.14	-	-	0	15.25	5.65	79.87	0.65	0.63	3.06	1
0.14	0.18	0.05	0.04	0.08	-	-	0.00	0.01	0.07	0.05	0.08	0.10	0.19	0.27	0.07	0.07	0.13	-	-	0	20.27	4.39	2.85	0.02	0.02	0.82	1
14.89	19.60	5.11	4.71	8.74	1.17	-	0.00	0.01	0.07	0.04	0.06	0.07	0.13	0.17	0.05	0.04	0.08	0.01	-	0	778.16	2.45	233.44	0.06	0.05	89.09	1
0.02	0.03	0.01	0.01	0.01	0.00	-	0.00	0.00	0.02	0.02	0.02	0.03	0.05	0.07	0.02	0.02	0.03	0.00	-	0	1.67	1.39	10.49	0.08	0.08	0.14	0
8.35	10.72	2.74	2.49	4.53	0.59	-	0.08	0.31	4.18	2.62	3.91	4.39	7.67	10.39	2.77	2.58	4.80	0.63	-	0	1,783.26	187.51	6.85	1.45	1.33	50.08	44
0.02	0.03	0.01	0.01	0.01	0.00	-	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.03	0.01	0.01	0.01	0.00	-	0	0.75	0.60	443.86	0.20	0.20	0.16	0
0.31	0.42	0.11	0.10	0.19	0.03	-	0.00	0.01	0.07	0.04	0.06	0.07	0.13	0.18	0.05	0.04	0.07	0.01	-	0	52.87	3.04	22.58	0.02	0.02	1.87	1
3.84	4.69	1.13	0.97	1.73	0.22	-	0.01	0.04	0.62	0.41	0.68	0.83	1.54	2.15	0.57	0.52	0.91	0.11	-	0	71.45	42.35	35.05	12.48	11.94	24.08	8
0.80	1.05	0.27	0.25	0.46	0.06	-	0.00	0.02	0.22	0.12	0.19	0.23	0.41	0.56	0.14	0.13	0.22	0.03	-	0	126.65	9.50	5.43	0.03	0.03	4.84	2
0.21	0.25	0.05	0.05	0.08	0.01	-	0.00	0.00	0.05	0.03	0.06	0.07	0.13	0.19	0.05	0.05	0.08	0.01	-	0	4.05	3.61	30.39	0.41	0.39	1.30	1
0.13	0.16	0.04	0.04	0.07	0.01	-	0.00	0.01	0.08	0.04	0.07	0.08	0.15	0.20	0.05	0.05	0.08	0.01	-	0	21.49	3.46	1.99	0.00	0.00	0.78	1
0.05	0.07	0.02	0.01	0.03	0.00	-	0.00	0.00	0.02	0.01	0.02	0.02	0.05	0.06	0.02	0.02	0.03	0.00	-	0	1.00	1.24	73.66	0.18	0.17	0.35	0
0.07	0.09	0.02	0.02	0.04	0.01	-	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.02	0.00	0.00	0.01	0.00	-	0	13.37	0.25	5.42	0.00	0.00	0.44	0
0.66	0.81	0.20	0.18	0.35	0.05	-	0.00	0.01	0.11	0.07	0.11	0.14	0.25	0.35	0.09	0.09	0.15	0.02	-	0	1.60	7.02	0.76	0.96	0.92	4.33	1
0.23	0.30	0.08	0.07	0.13	0.02	-	0.00	0.01	0.08	0.04	0.07	0.08	0.14	0.20	0.05	0.04	0.08	0.01	-	0	0.03	3.34	0.03	0.01	0.01	1.39	1
5.80	1.88	1.41	0.46	0.14	0.06	-	0.07	0.03	5.16	2.66	4.21	6.26	10.35	4.25	4.01	1.65	0.66	0.34	-	0	235.99	199.91	534.53	1.58	1.51	28.25	40
0.08	0.03	0.03	0.01	0.00	0.00	-	0.00	0.00	0.19	0.10	0.14	0.19	0.29	0.12	0.12	0.05	0.02	0.01	-	0	15.90	6.23	0.93	0.09	0.08	0.53	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.74	2.16	1.98	0.83	0.35	0.19	-	0.27	0.12	18.23	9.38	12.73	17.68	26.94	10.84	10.44	4.54	1.95	1.09	-	0	1,962.99	485.18	129.24	6.02	5.54	27.42	114
0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0	0.09	0.03	0.07	0.00	0.00	0.01	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-
0.57	0.21	0.20	0.08	0.03	0.02	-	0.02	0.01	1.39	0.72	0.97	1.35	2.06	0.83	0.80	0.35	0.15	0.08	-	0	165.40	37.04	11.81	0.45	0.41	2.69	9
0.02	0.01	0.01	0.00	0.00	0.00	-	0.00	0.00	0.02	0.01	0.01	0.02	0.03	0.01	0.01	0.00	0.00	0.00	-	0	1.09	0.54	0.18	0.02	0.02	0.11	0
3.42	1.29	1.18	0.49	0.21	0.12	-	0.15	0.06	10.01	5.15	6.99	9.71	14.79	5.95	5.73	2.49	1.07	0.60	-	-	1,124.90	266.38	75.10	2.67	2.45	16.32	63
1.05	0.39	0.35	0.14	0.06	-	-	0.01	0.00	0.35	0.19	0.28	0.41	0.70	0.30	0.29	0.13	0.06	-	-	-	27.56	13.77	57.65	0.85	0.81	5.75	3
0.10	0.04	0.03	0.01	0.01	-	-	0.00	0.00	0.36	0.20	0.31	0.45	0.76	0.33	0.33	0.15	0.07	-	-	-	13.12	12.65	5.55	0.05	0.05	0.47	3
0.34	0.12	0.11	0.04	0.02	-	-	0.00	0.00	0.18	0.10	0.15	0.21	0.37	0.15	0.15	0.07	0.03	-	-	-	9.45	7.11	5.67	0.29	0.28	2.10	1
0.01	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.13	0.07	0.11	0.15	0.26	0.11	0.11	0.05	0.02	-	-	-	1.81	4.30	0.59	0.02	0.02	0.06	1
30.26	11.66	10.88	4.62	1.97	1.12	-	0.00	0.00	0.21	0.11	0.15	0.20	0.31	0.13	0.12	0.05	0.02	0.01	-	0	1,000.28	4.65	62.54	0.14	0.13	140.01	1
0.04	0.01	0.01	0.00	0.00	0.00	-	0.00	0.00	0.13	0.07	0.09	0.13	0.20	0.08	0.08	0.03	0.02	0.01	-	0	7.49	4.25	0.42	0.04	0.04	0.26	1
2.62	0.99	0.90	0.38	0.16	0.09	-	0.09	0.04	6.42	3.30	4.48	6.23	9.49	3.82	3.68	1.60	0.69	0.38	-	0	694.63	170.85	57.32	1.36	1.25	12.44	40
0.02	0.01	0.01	0.00	0.00	0.00	-	0.00	0.00	0.02	0.01	0.01	0.02	0.03	0.01	0.01	0.01	0.00	0.00	-	0	0.32	0.59	3.90	0.05	0.05	0.10	0
0.02	0.01	0.01	0.00	0.00	0.00	-	0.00	0.00	0.10	0.04	0.06	0.09	0.15	0.06	0.05	0.02	0.01	0.00	-	0	1.86	2.51	0.78	0.01	0.01	0.08	1
1.84	0.59	0.43	0.14	0.04	0.02	-	0.03	0.01	2.28	1.28	1.94	2.96	4.82	2.02	1.95	0.82	0.33	0.17	-	-	47.17	93.82	201.20	0.60	0.57	9.02	19
-	-	-	-	-	-	-	0.00	0.00	0.06	0.03	-	-	-	-	-	-	-	-	-	0	0.12	0.36	0.07	0.00	0.00	0.01	0
0.17	0.06	0.04	0.01	0.00	0.00	-	0.00	0.00	0.16	0.09	0.13	0.21	0.34	0.14	0.14	0.06	0.02	0.01	-	0	4.61	6.59	16.09	0.05	0.04	0.82	1
0.03	0.01	0.01	0.00	0.00	0.00	-	0.00	0.00	0.18	0.08	0.12	0.18	0.28	0.11	0.10	0.04	0.02	0.01	-	0	2.60	4.79	1.02	0.01	0.01	0.12	1
0.05	0.01	0.01	0.00	0.00	0.00	-	0.00	0.00	0.05	0.03	0.04	0.06	0.10	0.04	0.04	0.02	0.01	0.00	-	-	1.01	2.02	5.23	0.02	0.02	0.22	0
0.01	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.02	0.01	0.02	0.02	0.04	0.01	0.01	0.01	0.00	0.00	-	-	0.47	0.62	0.23	0.00	0.00	0.02	0
0.15	0.06	0.05	0.02	0.01	0.01	-	0.00	0.00	0.13	0.07	0.10	0.15	0.25	0.10	0.10	0.04	0.02	0.01	-	0	33.92	4.91	19.29	0.07	0.07	0.86	1
0.07	0.03	0.03	0.01	0.00	0.00	-	0.00	0.00	0.15	0.07	0.09	0.14	0.22	0.09	0.08	0.03	0.01	0.01	-	0	9.10	3.81	3.93	0.01	0.01	0.35	1

	CH4 (MT)	CO (lb/day)	CO2 (MT)	NOX (lb/da	PM10 (lb/d	PM2.5 (lb/	ROG (lb/da	Fuel (1000 gallons)
2015 Total	0	9,494	1,044	2,976	36	34	396	241
2035 Total	0	5,362	1,333	1,193	14	13	248	301

Unmitigated Net Difference between 2015-2035 Land Uses					
CalEEMod Outputs					
		lb/day			
	Source	ROG	NOX	PM10	PM2.5
2015	Area	4122.5	42.5	20	20
	Energy	82.5	735	57.5	57.5
	Mobile	396.26	2,975.88	36.34	34.42
Total		4,601.26	3,753.38	113.84	111.92
2035	Area	4922.5	60	30	30
	Energy	97.5	866.25	67.5	67.5
	Mobile	248.04	1,193.32	14.40	13.38
Total		5268.042	2119.573318	111.901073	110.87974
Net Difference	Area	800	18	10	10
	Energy	15	131	10	10
	Mobile	-148	-1783	-22	-21
Total		667	-1634	-2	-1

Net Difference between 2015-2035 Land Uses with GPP NR 4-1					
CalEEMod Outputs					
		lb/day			
	Source	ROG	NOX	PM10	PM2.5
2015	Area	4122.5	42.5	20	20
	Energy	82.5	735	57.5	57.5
	Mobile	396.26	2,529.50	36.34	34.42
Total		4,601.26	3,307.00	113.84	111.92
2035	Area	4184.125	51	25.5	25.5
	Energy	82.875	736.3125	57.375	57.375
	Mobile	210.84	1,014.32	12.24	11.37
Total		4477.83569	1801.63732	95.11591226	94.24777681
Net Difference	Area	62	9	6	6
	Energy	0	1	0	0
	Mobile	-185	-1515	-24	-23
Total		-123	-1505	-19	-18

Notes:

Operational mobile source emissions of CAPs were Calculated using CARB's 2014 EMFAC Model.

Operational Area and Energy source emissions of CAPS were modeled using the CalEEMod 2017.3.2 computer program.

General Plan Policy NR-1 requires that projects that exceed SMAQMD's TOS for air pollutants reduce emissions 15 percent below baseline (existing) emissions.

Operational emissions are presented in Table 5.3-6 and 5.3-7 on Pages 5.3-22 and 5.3-23 of the DEIR.

LAND USES PROVIDED BY CITY OF ELK GROVE

Land Use Designation	2015 (Existing Planned Uses) Acres	DU	EMP	2035 (Proposed Planned Uses) Acres	DU	EMP
Community Commercial	546	0	13252	554	0	14131
Regional Commercial	899	0	17421	899	0	17764
Employment Center	642	0	26930	629	0	25703
Light Industrial/Flex	118	0	5187	121	0	5291
Light Industrial	582	0	9804	600	0	9959
Heavy Industrial	376	0	2769	376	0	2788
Village Center Mixed Use	32	91	1187	46	129	1841
Residential Mixed Use	16	275	89	4	65	21
Parks and Open Space	1858	0	104	1881	78	83
Resource Management and Conservation	844	0	0	986	0	0
Public Services	1190	0	4000	1183	0	4203
Rural Residential	5065	2206	0	4883	1684	0
Estate Residential	1216	4931	0	1239	5033	0
Estate Residential (1/4ac)	0	0	0	83	389	0
Estate Residential (1/3ac)	0	0	0	50	150	0
Estate Residential (1ac)	694	486	0	522	527	0
Low Density Residential	8172	47338	0	8217	48065	0
Medium Density Residential	602	5715	0	555	5246	0
High Density Residential	550	10137	0	577	10896	0
Tribal Trust Lands	38	0	0	38	0	0
Subtotal City Limits	**23441**	**71179**	**80742**	**23441**	**72262**	**81784**
North Study Area				646	323	0
East Study Area				1772	4806	3875
South Study Area				3676	16250	30367
West Study Area				1915	9224	6129
Subtotal Study Areas				**8008**	**30603**	**40371**
Grand Total	**23441**	**71179**	**80742**	**31449**	**102865**	**122155**

NET INCREASE (2015 to 2035)

Net Increase (2015 to 2035)

Land Use	Acres	1,000 SF	Over 20 Years
Community Commercial	8	350.0	17.50
Regional Commercial	0	1.3	0.07
Employment Center	-13	-579.5	(28.98)
Light Industrial/Flex	2	102.7	5.14
Light Industrial	18	789.4	39.47
Heavy Industrial	0	0.0	-
Village Center Mixed Use	14	626.8	31.34
Residential Mixed Use	-12	-528.7	(26.43)
Parks and Open Space	23	999.7	49.98
Resource Management and Conservation	142	6196.2	309.81
Public Services	-7	-325.9	(16.29)
Rural Residential	-183	-7966.0	(398.30)
Estate Residential	24	1023.9	51.20
Estate Residential (1/4ac)	83	3636.1	181.81
Estate Residential (1/3ac)	50	2175.0	108.75
Estate Residential (1ac)	-173	-7526.1	(376.31)
Low Density Residential	45	1965.1	98.26
Medium Density Residential	-48	-2076.8	(103.84)
High Density Residential	26	1140.9	57.04
Tribal Trust Lands	0	0.0	-
Subtotal City Limits	0	4.1	0.21
North Study Area		0.0	-
East Study Area		0.0	-
South Study Area		0.0	-
West Study Area		0.0	-
Subtotal Study Areas	8008	348826.4	17,441.32
Grand Total	8,008	348,835	17,441.73

Notes

Acres/SF of Land Uses under 2015 (Existing Planned Uses) refers to the existing planned land uses under the current General Plan.

Acres/SF of Land Uses under 2035 (Proposed Planned Uses) refers to the proposed planned land uses proposed under the General Plan Update (project)

Columns I-L demonstrate the net difference between the 2015 and 2035 land uses.

Source: City of Elk Grove 2017

Off-Model ROG-Adjustments

	CalEEMod Outputs			
	ROG	NOX	PM10	PM2.5
Year	lb/day			
2015	1955.00	379.55	235	64

Phase	**# of Days (CalEEMod**	**% of year**	**Adjusted # of Days**
Demolition	10	3%	7
Site Prep	10	3%	7
Grading	30	8%	15
Building Co	300	79%	205
Paving	20	5%	13
Arch Coatir	20	5%	15
	380	100%	262

Start Date	End Date
1/1/2015	12/28/2015

Total Working Days	
262	

Adjusted Arch Coating Days	
182	
	based on 3/4 building days plus paving and arch coating
29325	
161.348	ROG lb/day

notes:
Off-model cals used to adjust over estimation of emissions of ROG from raw CalEEMod outputs. CalEEMod assumes that architectural coatings will over within a shorter timeframe than would normally occur during construction activity.
Construction-generated ROG emissions are summarized in Table 5.3-5 on page 5.3-19 of the DEIR.

Appendix D:
Greenhouse Gases

Memo

455 Capitol Mall, Suite 300
Sacramento, CA 95814
916.444-7301

Date: January 26, 2018

To: Christopher Jordan (City of Elk Grove) and Jeff Henderson (Michael Baker International)

From: Honey Walters, Erik de Kok, and Hannah Kornfeld

Subject: **City of Elk Grove Climate Action Plan Update**
Revised Technical Memorandum: Greenhouse Gas Emissions Forecasts, Targets, and Reduction Measures

INTRODUCTION

In 2013, the City of Elk Grove (City) completed a Climate Action Plan (CAP), using 2005 as the emissions baseline year (City 2013). The 2013 CAP was originally designed to meet a 2020 target and provide California Environmental Quality Act (CEQA) streamlining benefits under Section 15183.5 of the CEQA Guidelines.

The City is currently updating the CAP concurrent with efforts to update the Elk Grove General Plan (GPU). The updated CAP must be consistent with new State legislation and guidance issued since the 2013 CAP was adopted. Ascent has completed several technical analyses required for the preparation of the CAP update, including: (1) updates to the 2013 GHG emissions inventory previously prepared by Michael Baker International (Michael Baker); (2) new greenhouse gas (GHG) emission forecasts for 2020, 2030, and 2050; (3) revised GHG emission reduction targets for the forecast years; and, (4) preliminary GHG reduction measures that would be required to achieve the 2020 and 2030 targets. This technical memorandum summarizes the results of our analyses, including methods, assumptions, emission factors, and data sources.

ORGANIZATION OF THIS MEMORANDUM

This memorandum consists of four main parts:

- **Section 1: GHG Emissions Inventory** summarizes the modified 2013 GHG emissions inventory, adding the wastewater sector, which was excluded from the previous 2013 inventory. The emissions inventory also includes an adjusted inventory that accounts for emissions associated with four study areas located beyond the city limits that could be annexed into the city in the future.

- **Section 2: GHG Emissions Forecasts** summarizes the forecasted GHG emissions under "business-as-usual" (BAU) and legislative-adjusted BAU scenarios. A BAU scenario is one in which no action is taken by local, State or federal agencies to reduce GHG emissions. A legislative-adjusted scenario is one in which BAU conditions are adjusted to reflect policy or regulatory actions enacted by State or federal agencies, but without considering any local actions to reduce GHG emissions.

- **Section 3: GHG Reduction Targets** identifies recommended GHG emission reduction targets for 2020 and 2030, and the longer-term goal for 2050, and shows the calculated gap between estimated GHG reductions under the forecast scenarios and the recommended emission reduction targets.
- **Section 4: GHG Reduction Measures** quantifies GHG emissions reductions that could be achieved by the preliminary draft GHG reduction measures, and evaluates the calculated gap between the estimated GHG reductions and the recommended targets.

1 EMISSION INVENTORY

1.1 2013 GREENHOUSE GAS EMISSIONS INVENTORY

The purpose of a GHG emissions inventory is to gain an understanding of the sources and levels of GHG emissions within a jurisdiction, as well as to establish a level of GHG emissions against which future GHG emissions can be compared. GHG emissions inventories for the City were prepared for the calendar years 2005 and 2013. A new communitywide 2013 inventory was prepared by Michael Baker and summarized in the GPU Background Conditions Report. The 2013 inventory is considered the baseline year for preparation of GHG emissions forecasts and GHG reduction targets that would be used in the CAP update.

Subsequent to publication of the GPU Background Conditions Report, Ascent modified the 2013 inventory. This is because wastewater-related emissions were excluded from the previous inventory, but were added to this updated version. Wastewater emissions were estimated using ICLEI's Local Government Operations Protocol Version 1.1. The modified 2013 GHG emissions inventory is summarized below in Table 1. GHG emissions in the 2013 inventory include communitywide emissions in the existing city limits in that year, which were approximately 918,790 metric tons of carbon dioxide equivalent ($MTCO_2e$). Major emissions sectors included residential and commercial/industrial building energy use, on-road vehicles, off-road vehicles, solid waste, and wastewater. The City's population in 2013 was 163,093; thus, baseline per capita emissions were 5.6 $MTCO_2e$.

Table 1 2013 City of Elk Grove Community Greenhouse Gas Inventory

Sector	2013 ($MTCO_2e$/year)	Percent of Total
On-Road Vehicles	430,340	47%
Off-Road Vehicles	93,340	10%
Transportation Sector Total	***523,680***	***57%***
Residential Energy	231,400	25%
Commercial/Industrial Energy	129,860	14%
Building Sector Total	***361,260***	***39%***
Solid Waste	26,260	3%
Wastewater	3,854	<1%
Water-Related	2,708	<1%
Agriculture	1,030	<1%
Total (All Sectors)	***918,790***	***100%***

Notes: Totals may not add due to rounding. $MTCO_2e$ = metric tons of carbon dioxide equivalent; GWP = Global Warming Potential

Source: Data compiled by Ascent Environmental in 2017.

The City's 2013 GHG inventory, summarized in Table 1, includes only GHG emissions associated with activities within the city limits. However, under the GPU, four study areas are identified that could result in expansion of the city limits in the future; thus, emissions associated with existing land uses in these study areas were added to the GHG emissions inventory for the CAP. Table 2 shows both the 2013 citywide GHG emissions within the city limits, as well as the existing emissions associated with each of the study areas in 2013. This revised inventory is used to project emissions for the target years 2020 and 2030, and the longer-term goal for 2050.

Table 2 2013 City of Elk Grove Community Greenhouse Gas Inventory and Study Areas

Sector	GHG Emissions ($MTCO_2e$/year)				
	Citywide 2013 Inventory	East Study Area	South Study Area	West Study Area	North Study Area
Residential Energy	231,400	140	160	80	193
Commercial/Industrial Energy	129,860	660	1,250	720	724
On-Road Vehicles	430,340	280	230	100	159
Off-Road Vehicles	93,340	10	0	0	485
Solid Waste	26,260	10	10	10	34
Water-Related and Wastewater	6,562	700	1,340	770	259
Agriculture	1,030	750	1,560	760	150
Total	**918,790**	**2,550**	**4,550**	**2,440**	**2,004**

Notes: Totals may not add due to rounding. $MTCO_2e$ = metric tons of carbon dioxide equivalent; GWP = Global Warming Potential

Source: Data compiled by Ascent Environmental in 2017.

2 EMISSIONS FORECASTS

2.1 GREENHOUSE GAS EMISSIONS FORECASTS TO 2020, 2030, AND 2050

Emission forecasts were calculated for two emissions scenarios, including (1) BAU conditions and (2) legislative-adjusted BAU conditions. The BAU forecast scenario accounts for future growth in emissions associated with future growth in the City, but with no future action by State or federal agencies. In contrast, the legislative-adjusted BAU forecast scenario accounts for future growth in emissions associated with growth in the City, along with legislative actions to reduce emissions due to State and federal regulations, programs, or other mandated actions. A summary of legislative reductions applied is provided below in Table 5. These forecast scenarios provide the City with the information needed to focus efforts on certain emission sectors and sources that have the most GHG reduction opportunities, considering what State and federal legislative reductions are already achieving or are expected to achieve in the future.

BAU forecasts described in this section for 2020, 2030, and 2050 are generally based on the State's GHG reduction target years established in key State legislation and policies, including Assembly Bill (AB) 32, Senate Bill (SB) 32, Executive Order (EO) B-30-15, and EO S-3-05; as well as the buildout year for the GPU (2035). The Statewide GHG reduction targets are as follows:

- 1990 levels by 2020 (AB 32);

- 40 percent below 1990 levels by 2030 (SB 32 and EO B-30-15); and,
- 80 percent below 1990 levels by 2050 (EO B-30-15 and S-3-05).

Estimated BAU emission forecasts were based on predicted growth in existing demographic forecasts, including population, jobs, and household growth between 2013 and 2050 for the City, as provided by City staff and in alignment with the Notice of Preparation for the GPU (City 2017). Growth rates for each forecast year vary for population, dwelling units, and jobs. Table 3 below shows the growth rates used to forecast BAU emissions for 2020, 2030, and 2050 for most sectors in the inventory.

Table 3 Growth Factors (%)

Factor	2013 to 2020	2020 to 2030	2030 to 2050
Population	32	35	33
Dwelling Units	10	21	33
Jobs	14	33	50
Vehicle Miles Traveled	49	31	47
Agricultural Acres	-29	-60	-77

Source: Data compiled by Ascent Environmental in 2017.

Annual vehicle miles traveled (VMT) growth projections were provided by Fehr & Peers based on travel demand modeling for baseline and future conditions under the proposed GPU. VMT projections were used to scale emissions from the on-road vehicle sector. Agricultural acreage changes were based on GPU growth assumptions. Table 4 shows baseline emissions in 2013 and BAU emission forecasts for 2020, 2030, and 2050.

Table 4 Business-As-Usual Forecasts ($MTCO_2e$/year)

Sector	2013	2020	2030	2050
Residential Energy	231,400	257,171	310,017	413,560
Commercial/Industrial Energy	129,860	147,685	196,037	293,532
On-Road Vehicles	430,340	645,542	844,317	1,241,867
Off-Road Vehicles	93,340	102,776	123,896	165,275
Solid Waste	26,260	36,181	39,817	47,781
Wastewater	3,854	4,283	5,163	6,888
Water-Related	2,708	3,010	3,628	4,840
Agriculture	1,030	2,585	1,061	299
Total	**918,790**	**1,199,232**	**1,523,936**	**2,174,042**

Notes: $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Source: Data compiled by Ascent Environmental in 2017.

By comparison with the BAU analysis, the City's GHG emissions, accounting for applicable legislative reductions, would decrease by 3 percent between 2020 and 2030 rather than increase by 27 percent without legislative reductions, as shown in Tables 4 and 5 and in Figure 1. Figure 1 also shows the emissions trend that would occur without anticipated legislative reductions and accounting for only growth in the City. Without the legislative reductions, emissions would be 36 percent higher in 2030 compared to the legislative-adjusted BAU forecasts. The legislative reductions applied to each GHG emissions sector are summarized below in Table 6. The City's population projections for the target years were 181,257, 218,503, and 291,481 for 2020, 2030, and 2050, respectively. This equates to per capita emissions of 5.5 $MTCO_2e$, 4.5 $MTCO_2e$, and 4.3 $MTCO_2e$ in 2020, 2030, and 2050 under the legislative-adjusted BAU scenario, respectively.

Table 5 Legislative-Adjusted Business-As-Usual Forecasts ($MTCO_2e$/year)

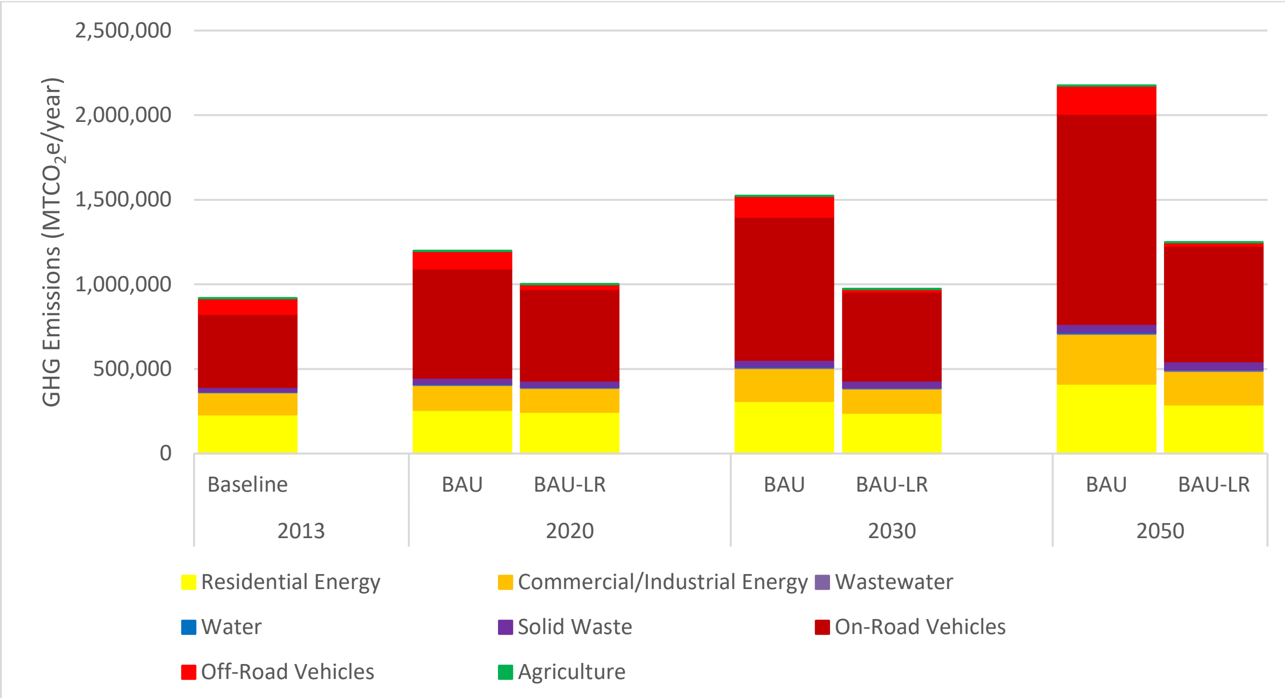
Sector	2013	2020	2030	2050
Residential Energy	231,400	245,995	240,585	289,705
Commercial/Industrial Energy	129,860	142,309	144,486	198,485
On-Road Vehicles	430,340	541,455	524,978	681,001
Off-Road Vehicles	93,340	27,206	14,685	20,648
Solid Waste	26,260	36,181	39,817	47,781
Wastewater	3,854	4,251	5,083	6,781
Water-Related	2,708	2,421	2,182	2,910
Agriculture	1,030	2,585	1,061	299
Total	**918,790**	**1,002,402**	**972,878**	**1,247,610**

Notes: BAU = business-as-usual; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year. Source: Data compiled by Ascent Environmental in 2017.

Table 6 Legislative Reductions Summary

Source	Legislative Reduction	Description	Sectors Applied
State	RPS	Requires California energy utilities to procure 33 percent of electricity from renewable sources by 2020.	Building Energy, Water
State	SB 350	Requires California energy utilities to procure 50 percent of electricity from renewable sources by 2030.	Building Energy, Water
State	California Building Efficiency Standards (Title 24, Part 6)	Requires all new buildings in California to comply with energy efficiency standards established by CEC.	Building Energy
State	AB 341	Requires California to achieve a 75 percent solid waste diversion target by 2020.	Solid Waste
State	Pavley Clean Car Standards	Establishes GHG emission reduction standards for model years 2009 through 2016 that are more stringent than federal CAFE standards.	On-Road Vehicles
State	Advanced Clean Car Standards	Establishes GHG emission reduction standards for model years 2017 through 2025 that are more stringent than federal CAFE standards.	On-Road Vehicles
State	SBX7-7	Requires a 20 percent reduction in per capita water usage by 2020.	Water, Wastewater
Federal	Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles	Establishes fuel efficiency standards for medium- and heavy-duty engines and vehicles.	On-Road Vehicles
Federal	EPA Off-Road Compression-Ignition Engine Standards	Establishes standards for phasing of EPA diesel engine tiers for off-road compression-ignition equipment.	Off-Road Vehicles

Notes: AB = Assembly Bill; CAFE = Corporate Average Fuel Economy; CEC = California Energy Commission; EPA = Environmental Protection Agency; GHG = greenhouse gas; RPS = Renewable Portfolio Standard; SB = Senate Bill; VMT = vehicle miles traveled. Source: Ascent Environmental 2017.



Notes: BAU = Business-As-Usual; BAU-LR = Business-As-Usual with Legislative Reductions; GHG = greenhouse gas; MTCO$_2$e/year = metric tons of carbon dioxide equivalent per year.

Figure 1 Business-As-Usual and Legislative-Adjusted Business-As-Usual Emissions Forecasts

Emission forecasts under the legislative-adjusted BAU forecast scenario are detailed for each sector and discussed below.

2.1.1 Building Energy

Emissions from future electricity and natural gas use were estimated by multiplying anticipated energy use with forecasted emission factors. Future energy use was forecasted in three parts. First, energy use was scaled by growth factors detailed in Table 3. Second, energy emission factors were adjusted to reflect California's Renewables Portfolio Standard (RPS) targets. Electricity emission factors are anticipated to decline based on current regulations, while natural gas emission factors stay constant. Third, energy intensity factors were adjusted to reflect increased stringency expected under California's Title 24 building energy efficiency standards (i.e., 2013 standards which became effective in 2014, and 2016 standards which became effective in 2017), which are expected to achieve decreases in electricity and natural gas consumption in new construction. The assumptions to energy efficiency and future electricity emission factors are described below. Table 7 summarizes the legislative factors used to scale building use by energy type.

Table 7 Building Energy Emissions Forecast Methods and Legislative Reductions by Source

Energy Type	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Electricity	Scaled by population growth for residential building energy; scaled by job growth for commercial/industrial building energy.	RPS achieved to date and scheduled targets (i.e., 33 percent renewable by 2020, 50 percent renewable by 2030) applied to SMUD's emission factors. Accounts for 2008 to 2013 and 2013 to 2016 Title 24 energy efficiency gains in new construction.
Natural Gas	Scaled by population growth for residential building energy; scaled by job growth for commercial/industrial building energy.	Accounts for 2008 to 2013 and 2013 to 2016 Title 24 energy efficiency gains in new construction.

Notes: RPS = Renewable Portfolio Standard; SMUD = Sacramento Municipal Utility District.

Source: Ascent Environmental 2017.

RESIDENTIAL BUILDING ENERGY

Between 2013 and 2030, electricity and natural gas emissions from residential buildings would increase by 9 percent from 231,400 to 240,585 $MTCO_2e$ per year with legislative adjustments and considering overall population growth of 34 percent over the same time. Table 8 shows the baseline and legislative-adjusted BAU forecasted emissions from the residential building energy sector by energy type for 2013, 2020, 2030, and 2050.

Table 8 Residential Building Energy Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050) ($MTCO_2e$/year)

Energy Type	2013	2020	2030	2050
Electricity	113,180	120,665	100,676	121,231
Natural Gas	118,220	125,330	139,909	168,474
Total Residential Building Energy Emissions	**231,400**	**245,995**	**240,585**	**289,705**

Notes: Totals may not add due to rounding. $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2017.

COMMERCIAL AND INDUSTRIAL BUILDING ENERGY

Between 2013 and 2030, electricity and natural gas emissions from commercial and industrial buildings would increase by 20 percent from 129,860 to 144,486 $MTCO_2e$ per year with legislative adjustments and considering job growth of 51 percent over the same time. Table 9 shows the baseline and legislative-adjusted BAU forecasted emissions for the commercial and industrial building energy sector by energy type for 2013, 2020, 2030, and 2050.

Table 9 Commercial and Industrial Building Energy Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050) ($MTCO_2e$/year)

Energy Type	2013	2020	2030	2050
Electricity	88,680	97,398	89,456	123,050
Natural Gas	41,180	44,911	55,030	75,436
Total Commercial and Industrial Building Energy Emissions	**129,860**	**142,309**	**144,486**	**198,485**

Notes: Totals may not add due to rounding.
$MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2017.

ELECTRICITY EMISSION FACTORS

Emissions from the building energy sector would see gradual declines through 2030 without additional City action, despite growth, due to State measures already in place. After 2030, growth in the City would outpace the reductions in emissions due to current State measures. Electricity emission factors for carbon dioxide (CO_2) are based on Sacramento Municipal Utility District (SMUD) reported for 2014 provided by SMUD directly (SMUD 2016). Electricity emission factors for methane (CH_4) and nitrous oxide (N_2O) were obtained from the U.S. Environmental Protection Agency's (EPA's) Emissions & Generation Resource Integrated Database (eGRID) 2012 GHG Annual Output Emission Rates (EPA 2015).

California utility providers, including SMUD, are scheduled to reach a 33 percent renewable electricity generation mix by 2020 and 50 percent by 2030, pursuant to statewide implementation of the RPS pursuant to SB 350. SMUD's 2020 emission factor is 529.47 pounds of CO_2 per megawatt hour (lb CO_2/MWh), the 2030 emission factor is 395.13 lb CO_2/MWh. It was assumed the 2030 emission factor would stay constant through forecast year 2050, as no relevant legislation has been adopted for this year. CH_4 and N_2O electricity emission factors in future years are assumed to stay constant.

ENERGY EFFICIENCY

The State's Title 24 Building Energy Efficiency Standards apply to both new construction and existing buildings. The 2016 Title 24 standards went into effect January 2017. The California Energy Commission (CEC) estimates that new residential buildings built to the 2016 standards would be 28 percent more efficient than residential buildings built to the previous standards (CEC 2015). CEC estimates that new non-residential built to the 2016 standards would be 5 percent more efficient than non-residential buildings built to the previous standards (CEC 2015).

Forecasts of future building energy accounts for Title 24 Building Energy Efficiency Standards. It is assumed that all new construction taking place between 2020 and 2050 would have energy efficiencies 28 percent better energy usage rates for residential buildings and 5 percent better energy usage rates for non-residential buildings.

2.1.2 Water and Wastewater

Between 2013 and 2030, water- and wastewater-related emissions from the City would increase by 20 percent from 6,562 to 7,265 $MTCO_2e$ per year, with legislative adjustments and considering population growth of 34 percent over the same time. This change reflects an increase in water consumption and wastewater generation with lower electricity factors related to the 2020 and 2030 RPS targets, consistent with SB 350 legislative actions described above, as well as a 20 percent water efficiency reduction, consistent with SBX7-7. Table 10 summarizes the legislative reductions used to forecast water and wastewater emissions.

Table 10 Water and Wastewater Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Water Consumption	Scaled by population growth.	Assumes electricity use for pumping, conveyance, and treatment follow the 2020 and 2030 RPS schedule. Assumes 20 percent reduction in water-related energy due to 20 percent reduction in water usage per requirements of SBX7-7.
Wastewater Treatment	Scaled by population growth.	Assumes electricity use for pumping, conveyance, and treatment follow the 2020 and 2030 RPS schedule. Assumes 20 percent reduction in wastewater-related energy due to 20 percent reduction in water usage per requirements of SBX7-7.

Notes: RPS = Renewable Portfolio Standard.
Source: Ascent Environmental 2017.

Table 11 shows the baseline and legislative-adjusted BAU forecasted emissions from water- and wastewater-related sources for 2013, 2020, 2030, and 2050. Population growth rates and electricity emission factors are detailed in Table 3 and Section 1.2.1.

Table 11 Water and Wastewater Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050) ($MTCO_2e$/year)

Activity	2013	2020	2030	2050
Water-Related	2,708	2,421	2,182	2,910
Wastewater Treatment	3,854	4,251	5,083	6,781
Total Water and Wastewater Emissions	**6,562**	**6,672**	**7,265**	**9,691**

Notes: Totals may not add due to rounding.
$MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2017.

2.1.3 Solid Waste

Between 2013 and 2030, solid waste emissions generated from the City would increase by 56 percent from 26,260 to 39,817 $MTCO_2e$ per year, with legislative adjustments applied and considering population growth of 34 percent over the same time. Table 12 summarizes the legislative reductions used to forecast emissions from the solid waste sector.

Table 12 Solid Waste Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Landfill Disposal	Scaled by population growth.	Assumes California's 75 percent waste diversion goal would be achieved by 2020.

Source: Ascent Environmental 2017.

The forecasts shown in Table 13 below account for the CH_4 and CO_2 emissions from waste decay generated annually. With respect to solid waste generation, the California Department of Resources Recycling and Recovery (CalRecycle) established a target pursuant to AB 341 (Chapter 476, Statutes of 2011) to achieve a statewide waste diversion of 75 percent by 2020, which is equivalent to a disposal rate of 2.7 pounds of waste per resident per day. The City's waste disposal tonnage, disposal rates, and disposal targets are reported to CalRecycle by year. These data show that the City has already achieved a disposal rate in terms of waste per resident that is lower than the target per capita disposal rate in 2013. Emission forecasts for this sector assume the City's disposal rate would remain constant through 2050.

Table 13 shows the baseline and legislative-adjusted BAU forecasted emissions from the solid waste sector for 2013, 2020, 2030, and 2050.

Table 13 Solid Waste Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050) ($MTCO_2e$/year)

Activity	2013	2020	2030	2050
Municipal Solid Waste	22,570	25,084	30,238	40,337
Alternative Daily Cover	1,150	1,278	1,541	2,055
Landfill	2,540	9,819	8,039	5,389
Total Solid Waste Emissions	**26,260**	**36,181**	**39,817**	**47,781**

Notes: Totals may not add due to rounding.
$MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2017.

2.1.4 Transportation

ON-ROAD VEHICLES

Between 2013 and 2030, GHG emissions from on-road vehicles would increase by approximately 36 percent from 430,340 to 524,978 $MTCO_2e$ per year, accounting for an increase in VMT of 94 percent, and future vehicle emission factors modeled in the California Air Resources Board's (CARB's) Emission Factor (EMFAC) 2014 model. With respect to the legislative adjustments included in this forecast, State and federal policies and associated regulations incorporated in the on-road vehicle sector include the Pavley Clean Car Standards, Advanced Clean Car Standards, and fuel efficiency standards for medium- and heavy-duty vehicles. These policies are already included in EMFAC's emission factor estimates and forecasts. It should be noted that the Low Carbon Fuel Standard was excluded in EMFAC 2014 forecasts because most of the emission benefits originate from upstream fuel production and do not directly reduce emissions in the City's GHG inventory or forecasts. Table 14 summarizes the legislative reductions used to forecast on-road vehicle emissions.

Table 14 On-Road Vehicles Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
On-Road Fleet	Scaled by VMT estimates provided by Fehr & Peers.	EMFAC emission factor considerations include ACC, Pavley, and fuel efficiency standards for medium- and heavy-duty vehicles.

Notes: VMT = vehicle miles traveled; EMFAC = California Air Resources Board's EMisson FACtor model; ACC = Advanced Clean Cars; Pavley = Pavley Clean Car Standards.

Source: Ascent Environmental 2017.

Table 15 shows the baseline and legislative-adjusted BAU forecasted emissions from on-road vehicles for 2013, 2020, 2030, and 2050.

Table 15 On-Road Vehicles Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050) ($MTCO_2e$/year)

Source	2013	2020	2030	2050
On-Road Vehicles	430,340	541,455	524,978	681,001

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2017.

OFF-ROAD VEHICLES

Between 2013 and 2030, emissions associated with off-road vehicles used in the city would decrease by 81 percent from 93,340 to 14,685 $MTCO_2e$ per year, with legislative adjustments applied and considering building permit and dwelling unit growth of 33 percent over the same time. With respect to the legislative adjustments in the off-road vehicle sector, emission factors were used from CARB's OFFROAD 2007 model, which incorporates regulatory actions such as reformulated fuels and more stringent emission standards. Table 16 summarizes the legislative reductions used to forecast off-road vehicle emissions.

Table 16 Off-Road Vehicles Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Off-Road Fleet	Construction equipment scaled by building permit growth; landscape equipment scaled by dwelling unit growth.	OFFROAD emission factor considerations include EPA off-road compression-ignition engine standards implementation schedule.

Notes: OFFROAD = CARB's OFFROAD 2007 model; EPA = U.S. Environmental Protection Agency.

Source: Ascent Environmental 2017.

Table 17 shows the baseline and legislative-adjusted BAU forecasted emissions from the off-road vehicle sector for 2013, 2020, 2030, and 2050.

Table 17 Off-Road Vehicles Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050) ($MTCO_2e$/year)

Source	2013	2020	2030	2050
Off-Road Vehicles	93,340	27,206	14,685	20,648

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2017.

2.1.5 Agriculture

Between 2013 and 2030, emissions associated with the agriculture sector in the City would decrease by 71 percent from 4,250 to 299 $MTCO_2e$ per year. Forecasted emissions from the agricultural sector are based on the City's forecasted changes in land use from agricultural to other developed urban uses under the GPU, as well as estimated future agricultural activities that would continue under certain land use designations in the GPU. These forecasted changes in agricultural land use can be found in Table 8 of Attachment 1. Agricultural emissions are directly scaled by the anticipated change in acreages, shown in Table 18. Table 18 also shows the baseline and legislative-adjusted BAU forecasted emissions from the agricultural sector for 2013, 2020, 2030, and 2050.

Table 17 Agriculture Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050) ($MTCO_2e$/year)

Source	2013	2020	2030	2050
Agricultural Equipment	2,920	2,006	812	214
Livestock	300	8	3	1
Fertilizer	1,030	571	246	84
Total Agricultural Emissions	**4,250**	**2,585**	**1,061**	**299**
Percent Change from 2013 (%)	0	-29%	-71%	-92%

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2017.

2.1.6 Discussion

As discussed above and shown in Figure 1 and Table 5, the City's legislative-adjusted BAU emissions would increase by 9 percent between 2013 and 2020. This is a result of anticipated growth, despite reductions that would be achieved from numerous legislative reductions including:

- A greater renewable mix in California's electricity supply (33 percent by 2020);
- Building energy efficiency through compliance with 2016 Title 24 standards (28 percent energy reduction for residential, 5 percent for non-residential);
- Water consumption reduction of 20 percent by 2020 through compliance with SBX7-7;
- Reductions in on-road vehicle emission factors forecasted in EMFAC 2014;
- Reductions in off-road vehicle emission factors forecasted in OFFROAD 2007; and

- Maintaining waste diversion goal of 75 percent, pursuant to AB 341.

From 2020 to 2030, the City's legislative-adjusted BAU emissions would decrease by 3 percent. This is a result of anticipated growth, despite reductions that would be achieved from numerous legislative reductions including:

- A greater renewable mix in California's electricity supply (50 percent by 2030);
- Building energy efficiency through compliance with 2016 Title 24 standards (28 percent energy reduction for residential, 5 percent for non-residential);
- Maintaining water consumption reduction of 20 percent through compliance with SBX7-7;
- Reductions in on-road vehicle emission factors forecasted in EMFAC 2014;
- Reductions in off-road vehicle emission factors forecasted in OFFROAD 2007; and
- Maintaining waste diversion goal of 75 percent, pursuant to AB 341.

From 2030 to 2050, fewer new legislative actions are assumed to be in place due to lack of available information about potential State or federal actions beyond 2030. Thus, the City's potential continued growth would begin to overtake any reductions afforded by existing legislative reductions. The main legislative reductions beyond 2030 would come from SB 350's target of a minimum of 50 percent renewable mix for all electricity providers. Other minor additional reductions would be in forecasted improvements in vehicle fuel economy and increased VMT share of electric vehicles (10 percent by 2050), as estimated in the EMFAC 2014 model. Other previous legislative actions would continue to apply in the future, but would not outpace growth in population and jobs.

3 GREENHOUSE GAS EMISSION REDUCTION TARGETS

3.1 REDUCTION TARGETS

As directed in AB 32, SB 32, EO B-30-15, EO S-3-05, and CARB's 2017 Climate Change Scoping Plan (Scoping Plan), the State aims to reduce statewide annual GHG emissions to:

- 1990 levels by 2020 (per AB 32), which is equivalent to 10.6 $MTCO_2e$ per capita;
- 40 percent below 1990 levels by 2030 (per SB 32 and EO B-30-15), which is equivalent to 6 $MTCO_2e$ per capita; and
- 80 percent below 1990 levels by 2050 (per EO S-3-05), which is equivalent to 2 $MTCO_2e$ per capita.

Similarly, the City should continue to reduce communitywide emissions in proportion to the State's goals. Because the City's 1990 emission levels were not estimated, proportional per capita targets for the CAP Update were developed that express the level of GHG emissions reductions that would be needed locally between 2013 and future target years. These are in alignment with the State's recommended per capita targets (i.e., 6 $MTCO_2e$ by 2030 and 2 $MTCO_2e$ by 2050).

To determine the local per capita reductions needed for each target year, specific per capita targets were derived using the Scoping Plan guidance for developing local plan-level GHG targets. The statewide per capita targets reported in the Scoping Plan are framed as statewide 2030 targets that must be met on a statewide basis; however, this does not mean that the statewide per capita targets must be applied uniformly to every local jurisdiction. CARB notes that local per capita goals that determine a jurisdiction's contribution to meeting the overall statewide emissions target need to be "evidence-based and consistent with the framework used to develop statewide per capita targets" (CARB 2017:100).

The statewide per capita targets account for all emissions sectors in the State's GHG emissions inventory, statewide population forecasts recently prepared for 2030 and 2050, and all statewide reductions necessary to achieve the 2030 statewide target under SB 32 in all sectors. Consequently, the statewide emissions sectors and the total reductions achieved in these sectors through the Scoping Plan are not directly applicable to GHG emissions inventories for individual cities or counties. For example, the high global warming potential (GWP) sector is a highly-regulated source of GHG emissions; thus, it is excluded from the City's inventory and forecasts. Similarly, forestry-related emissions from timber-harvesting or similar activities in "natural and working lands" are not included in or applicable to the City. Thus, an adjustment to the State reductions achieved under the Scoping Plan to reflect applicable sectors for local GHG reduction planning and target-setting is necessary and appropriate.

All sectors that were included in the Scoping Plan are shown below in Table 19. For the purposes of target setting for the City, all nonapplicable sectors (e.g., agriculture, high GWP, natural working lands, cap-and-trade) were removed from the per capita target calculation. These include high-GWP emissions, agriculture, natural working lands, and the cap-and-trade program. These were excluded because high-GWP emissions and the cap-and-trade program are regulated at the State level, and emissions associated with agriculture and natural and working lands in the City are negligible and anticipated to decline. Using the 2020 and 2030 California Department of Finance population projections for the State, per capita emissions targets would be lower than what is stated in the Scoping Plan, as shown in Table 20.

This target setting approach is consistent with the California Supreme Court decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming* (2015) 224 Cal.App.4th 1105, which determined that the approach of assessing a project's consistency with statewide emission reduction goals must include a "reasoned explanation based on substantial evidence" that links the project's emission to the statewide Scoping Plan reduction goals. For the purposes of this CAP, it is feasible to develop evidence-based targets with careful tailoring to consider only the relevant inventory sectors to the City from the Scoping Plan.

Thus, the following recommended GHG reduction targets would reduce the City's annual GHG emissions consistent with the framework used to develop the State's per capita targets:

- 7.6 $MTCO_2e$ per capita by 2020;
- 4.1 $MTCO_2e$ per capita by 2030; and
- 1.4 $MTCO_2e$ per capita by 2050.

Table 19 2017 Climate Change Scoping Plan Estimated Change in Emissions by Sector

GHG Emissions by Sector ($MMTCO_2e$)	1990	2020	2030[2]
Agriculture	26	36	24
Residential and Commercial	44	50	38
Electric Power	108	104	30
High GWP	3	31	8
Industrial	98	94	83
Recycling and Waste	7	9	8
Transportation	152	185	103
Natural Working Lands Net Sink[1]	-7	TBD	TBD
Cap-and-Trade	NA	78	34
Total	431	431	260

Notes: GHG=greenhouse gases; $MMTCO_2e$ = millions of metric tons of carbon dioxide equivalent; GWP = global warming potential; TBD = to be determined; NA = not applicable.
[1] Work is underway through 2017 to estimate the range of potential sequestration benefits from the natural and working lands sector.
[2] The 2030 values shown are from the lower end of the ranges reported in the 2017 Climate Change Scoping Plan, Table 3.
Source: CARB 2014; CARB 2017.

Table 20 2020, 2030, and 2050 Per Capita Target Adjustment

Source	2020	2030	2050
Scoping Plan Emissions Limit ($MMTCO_2e$)	431	260	NA
Statewide Population Forecast	40,791,999	44,019,846	NA
Statewide Per Capita Emissions Reduction Target ($MTCO_2e$)	10.6	6	2
Adjusted Scoping Plan Emissions Limit[1] ($MMTCO_2e$)	311	179	NA
Adjusted Per Capita Emissions Reduction Target ($MTCO_2e$)	7.6	4.1	1.4

Notes: $MMTCO_2e$ = millions of metric tons of carbon dioxide equivalent; $MTCO_2e$ = metric tons of carbon dioxide equivalent; NA = not available.
[1] Includes residential and commercial, electric power, recycling and waste, and transportation emissions sectors.
Source: Calculated by Ascent Environmental in 2017.

Based on the City's 2013 inventory shown in Table 2, the targets below aim to reduce annual City emissions to 1,384,355, 888,509, and 401,347 $MTCO_2e$ per year by 2020, 2030, and 2050, respectively. As shown in the legislative-adjusted BAU forecast in Table 4, the City would achieve the 2020 target through legislative reductions, but would still need to reduce annual emissions by 84,368 and 846,264 $MTCO_2e$ per year to achieve the 2030 target and 2050 goal, respectively.

The recommended targets, along with the estimated reductions required to achieve the targets, are summarized below in Table 21.

Table 21 Recommended Greenhouse Gas Emissions Reduction Targets: 2020, 2030, and 2050

Source	2013	2020	2030	2050
Baseline Emissions and Legislative-Adjusted BAU Forecast ($MTCO_2e$)	918,790	1,002,402	972,878	1,247,610
Population	163,093	181,257	218,503	102,765
Target Per Capita Emissions ($MTCO_2e$)	NA	7.6	4.1	1.4
Target Annual Emissions ($MTCO_2e$)	NA	1,384,355	888,509	401,347
Per Capita GHG Emissions with Legislative Reductions	NA	5.5	4.5	4.3
Reduction needed to meet Target ($MTCO_2e$)	NA	(381,953)[1]	84,368	846,264

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent; NA = not applicable.
[1] Negative values indicate a surplus in GHG reductions.
Source: Calculated by Ascent Environmental in 2017.

Figure 2 below depicts the baseline and legislative-adjusted BAU GHG emission forecasts by sector, as distinguished by colored wedges. The sum of the wedges represents anticipated annual GHG emissions each year. Each wedge shows how an emissions sector is expected to contribute to the City's annual inventory over time. For example, the reduction in BAU residential building energy emissions (yellow) between 2020 and 2030 illustrates the effect of statewide renewable energy policies on this sector. The black line indicates the recommended GHG reduction targets for 2020 and 2030, and longer-term goal for 2050. The additional reductions needed to meet the 2030 target to close the expected "gap" between the expected legislative-adjusted BAU emission levels and the recommended targets are also apparent in Figure 2. With respect to emissions beyond 2030, current legislation, such as SB 350 and the federal CAFE standards, have specific targets and policies that only address activities up to the year 2030. While advances in new technologies and new State policy strategies may allow for additional significant in the future, legislative reductions that may occur past 2030 are currently unknown. Additionally, many of the State's strategies outlined in the 2017 Scoping Plan (recently approved by CARB in December 2017) either have not yet been implemented, or sufficient detail regarding the timing and estimated effectiveness of implementation is not yet available.

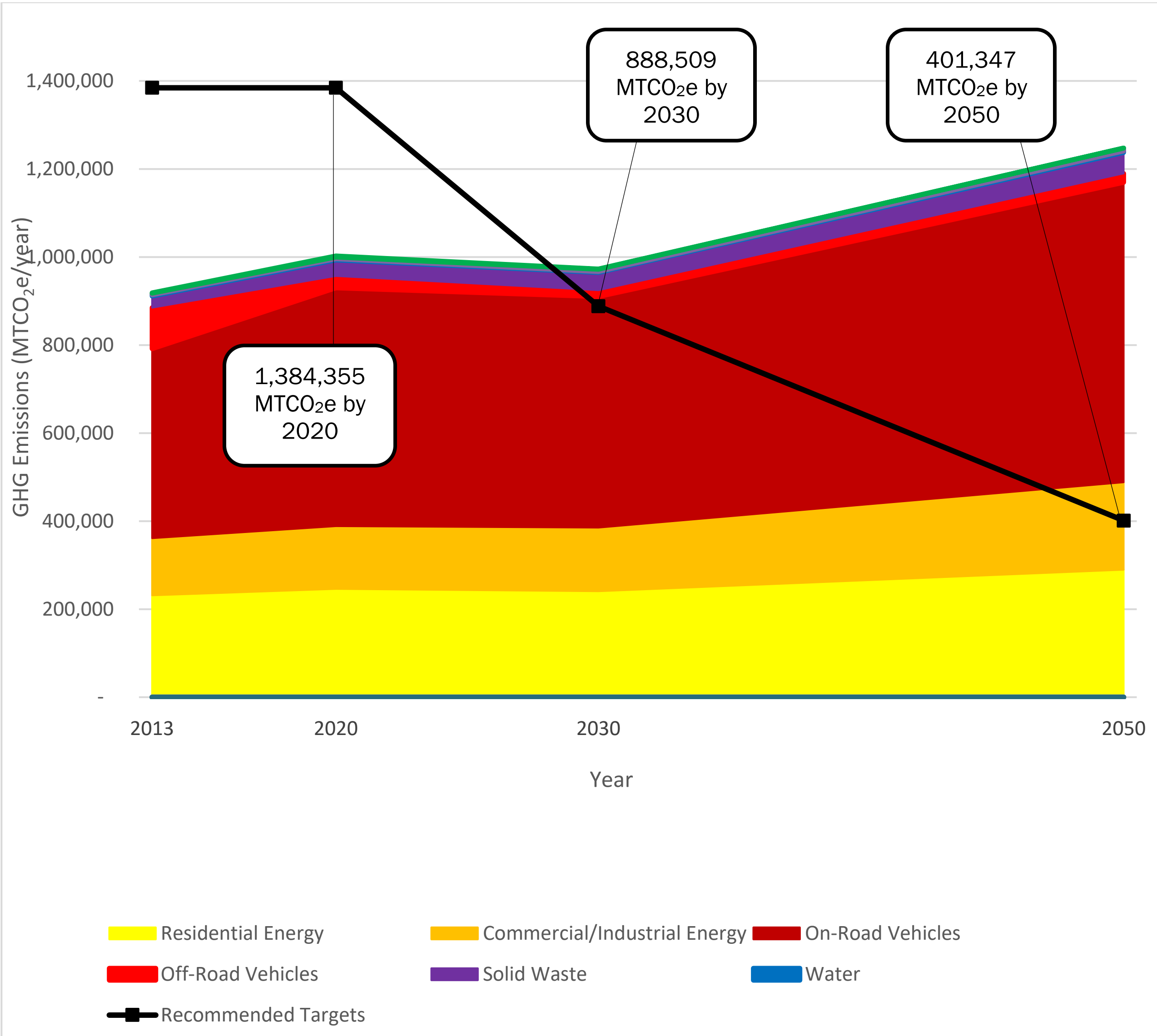


Figure 2 Legislative-Adjusted Business-As-Usual Forecast Emissions by Sector and Recommended Emission Reduction Targets: 2020, 2030, and 2050

A recent California Appellate Court decision, Cleveland National Forest Foundation v. San Diego Association of Governments (November 24, 2014) 231 Cal.App.4th 1056, examined whether EO S-3-05 should be viewed as having the equivalent force of a legislative mandate for specific emissions reductions. The case was reviewed by the California Supreme Court in January 2017 and a decision was released on July 13, 2017. The California Supreme Court ruled that SANDAG did not abuse its discretion by declining to adopt EO S-3-05 as a measure of significance for the specific GHG reduction target years, especially in analyzing the significance of impacts in 2050. Despite this, the California Supreme Court cautioned that future analyses may have greater capacity to analyze impacts through 2050 and would be required to perform those analyses if that capacity is achievable. Thus, while 2050 emission levels are forecast and a longer-term goal can be set for 2050, only 2020 and 2030 targets should be included in the CAP. The CAP may still analyze the longer-term trends in view of the State's longer-term 2050 goal, as 2050 goals were established in EOs B-30-15 and S-3-05 and referenced in the 2017 Scoping Plan (CARB 2017:99).

4 GREENHOUSE GAS REDUCTION MEASURES AND GAP ANALYSIS

GREENHOUSE GAS EMISSIONS REDUCTIONS

As discussed in Section 3 above, while legislative reductions would help to reduce future emissions and achieve the 2020 GHG reduction target, additional GHG reductions are needed to achieve the recommended GHG reduction targets and goals for 2030 and 2050. As a local government, the City can act to adopt or update land use plans, enforce or update ordinances, adjust municipal operations, encourage or influence residents and businesses by partnering with local organizations, and work with local and regional transportation planning or other agencies that provide services or maintain infrastructure that is not directly in the City's control. The City can effectively reduce emissions in some sectors where the City has jurisdictional control (e.g., municipal operations, land use changes, building or zoning codes), but in some cases the City has limited ability to influence reductions because the City has limited jurisdictional control (e.g., on-road transportation).

The 2017 Scoping Plan relies on local action to help achieve statewide GHG reduction targets. As stated in the Scoping Plan, "local efforts can deliver substantial additional GHG and criteria emissions reductions beyond what State policy alone can do, and these efforts will sometimes be more cost-effective and provide more co-benefits than relying exclusively on top-down statewide regulations to achieve the State's climate stabilization goals" (CARB 2017:97). Ascent reviewed and updated GHG reduction measures previously included in the City's 2013 CAP, and added new GHG reduction measures based on policies or programs assumed in the GPU, as well as new GHG reduction measures based on best practices and recommendations in the Scoping Plan.

GHG reductions associated with these recommended measures were calculated in a step-wise manner for the target years of 2020, 2030, and 2050. In other words, the GHG reductions (in $MTCO_2e$/year) are assessed during a snapshot of time in years 2020, 2030, and 2050. This is a simplified method of characterizing GHG reductions, which would more realistically occur on a continuous basis. However, a step-wise method is appropriate for a planning-level document because the City's GHG reduction targets and monitoring of CAP implementation progress would be tied to these future years.

Importantly, GHG emission reductions were quantified for measures wherever substantial evidence and reasonable assumptions were available to support calculations. Preliminary estimates of GHG emission reductions, along with an estimated emissions reduction "gap," are summarized below in Table 22 and illustrated in Figure 3. Descriptions, assumptions, and calculation methodology is detailed in Attachment 2.

The total estimated GHG emission reductions from all measures quantified is approximately 94,710 $MTCO_2e$ in 2020, 179,913 $MTCO_2e$ in 2030, and 470,508 $MTCO_2e$ in 2050. This would result in 4.8 and 3.4 $MTCO_2e$ per capita in 2020 and 2030, respectively. The total estimated reductions from all proposed GHG reduction measures would be sufficient to meet the 2020 and 2030 targets of 7.6 and 4.1 $MTCO_2e$ per capita, respectively.

The scale of reductions required to achieve the much more aggressive longer-term 2050 goal outlined earlier would require significant improvements in the availability and/or cost of near-zero and zero-emissions technology, as well as potential increased reductions from ongoing State and federal legislative actions that are currently unknown. Progress towards meeting potential future targets that could be set by the State or others would be part of the ongoing monitoring and updates to the CAP as new legislation or future updates to the State's Climate Change Scoping Plan are adopted. Ascent recommends that the City's CAP continue be updated at least every 5 years to periodically assess the City's progress toward meeting the GHG reduction targets and identify potential new or revised GHG measures that may be implemented as new technology and policy strategies become available.

Table 22 Summary of Greenhouse Gas Emissions Reduction Measures Performance

Measure Number	Measure Name	GHG Reductions ($MTCO_2e$/year)		
		2020	2030	2050
BE-1	Promote Energy Conservation	1,876	4,340	11,393
BE-2	Building Stock: Residential Appliances in Existing Development	4,487	10,134	19,250
BE-3	Building Stock: Non-Residential Appliances in Existing Development	912	2,116	5,642
BE-4	CALGreen Tier 1: New Construction	1,174	9,244	25,574
BE-5	Zero Net Energy: New Construction	0	29,930	163,902
BE-6	CALGreen Tier 1: Existing Buildings	3,972	8,511	34,043
BE-7	Solar PV in All Residential and Commercial Development	5,488	13,459	44,544
BE-8	SMUD Greenergy Off-Set Program for Electricity Use	12,193	19,846	33,167
BE-9	Increase Tree Planting	620	1,505	3,275
RC-1	Waste Reduction	5,272	10,169	16,957
RC-2	Reduce Organic Waste	3,208	6,791	9,731
TACM-1	Local Goods	4,388	7,008	9,935
TACM-2	Transit Oriented Development	3,189	6,963	14,613
TACM-3	Intra-City Transportation Demand Management	5,485	9,344	24,838
TACM-4	Pedestrian and Bicycle Travel	3,299	4,265	5,533
TACM-5	Affordable Housing	12,028	16,018	21,193
TACM-6	Vehicle Miles Traveled Reduction Policy (15%)	26,526	18,539	24,525
TACM-7	Traffic Calming Measures	274	292	828
TACM-8	Tier 4 Final Construction Equipment	0	644	892
TACM-9	Electric Vehicle Charging Stations	316	794	689
Total GHG Reductions from Proposed Measures		94,710	179,913	470,508
Total GHG Reductions Required to Meet the Targets		(381,953)	84,368	846,264
Per Capita GHG Emissions with Proposed Measures		4.8	3.4	2.4
Per Capita GHG Emissions Required to Meet the Targets		7.6	4.1	1.4
Remaining Gap (or Surplus)[1]		(476,663)	(95,545)	375,756

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent; NA = not applicable.
[1] Negative values indicate that the target would be met with a surplus of annual GHG emissions reductions, due to the target being achieved. Positive values indicate a "gap" or deficit, because further reductions are needed to meet the target or goal.
Source: Data compiled by Ascent Environmental in 2017.

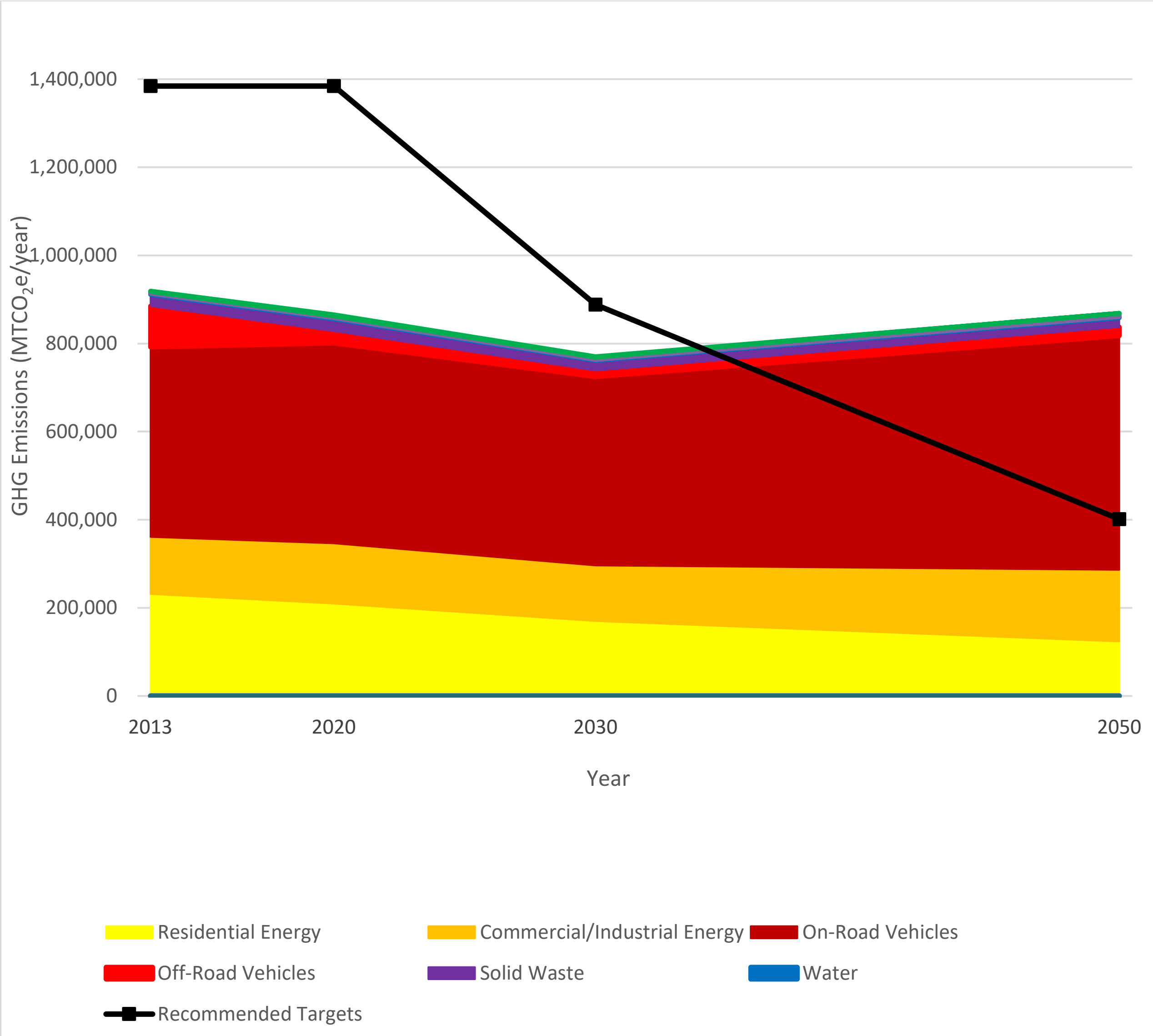


Figure 3 Projections of Greenhouse Gases by Sector with Implementation of Proposed GHG Reduction Measures and Recommended Targets: 2020, 2030, and 2050

REFERENCES

California Air Resources Board. 2017 (November). California's 2017 Climate Change Scoping Plan. Available: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed December 26, 2017.

______. 2014 (May). 2020 BAU Emissions by Scoping Plan Category. Available: https://www.arb.ca.gov/cc/inventory/data/tables/2020_bau_forecast_by_scoping_category_2014-05-22.pdf. Accessed January 18, 2018.

California Energy Commission. 2015 (June). Building Energy Efficiency Standards for Residential and Nonresidential Buildings. Available http://www.energy.ca.gov/2015publications/CEC-400-2015-037/CEC-400-2015-037-CMF.pdf. Accessed January 3, 2017.

CARB. *See* California Air Resources Board.

CEC. *See* California Energy Commission.

City. *See* City of Elk Grove.

City of Elk Grove. 2017 (June). Notice of Preparation of a Draft Environmental Impact Report for the City of Elk Grove General Plan Update. June 23, 2017. Elk Grove, CA.

______. 2013 (March). City of Elk Grove Climate Action Plan. Adopted March 27, 2013. Elk Grove, CA.

EPA. *See* U.S. Environmental Protection Agency.

Sacramento Municipal Utility District. 2016. Greenhouse gas emissions reported to the Climate Registry. Personal communication from Martha Helek (SMUD) to Dimitri Antoniou (Ascent Environmental). Email June 28th, 2016.

SMUD. See Sacramento Municipal Utility District.

U.S. Environmental Protection Agency. 2015 (October). eGRID 2012 Summary Tables. Available: https://www.epa.gov/energy/egrid-2012-summary-tables. Accessed: June 19, 2016.

Attachment 1

Inventory and Forecast

Table 1. 2013 Baseline Inventory

Sector	Subsector	Source	2013 Activity Data	Unit	MT CO2e
Residential	Electricity	SMUD	471,810,070	kWh	113,180
Residential	Natural Gas	PG&E	22,211,400	therms	118,220
Nonresidential	Electricity Total	SMUD	369,671,147	kWh	88,678
Nonresidential	Streetlights & Traffic Lights	SMUD	8,906,969	kWh	
Nonresidential	Agriculture	SMUD	3,390,289	kWh	
Nonresidential	Buildings	SMUD	357,373,889	kWh	
Nonresidential	Natural Gas	PG&E	7,736,910	therms	41,180
Transportation	On-Road	SACOG	878,312,710	Annual VMT	430,340
Off-Road Equipment	Construction/Mining Equipment	CARB OFFROAD	463	Average homes constructed	90,850
Off-Road Equipment	Lawn/Garden Equipment	CARB OFFROAD	51,973	Dwelling units	2,490
Solid Waste	Municipal Solid Waste	CalRecycle	76,180	tons	22,570
Solid Waste	Alternative Daily Cover	CalRecycle	4,670	tons	1,150
Solid Waste	Landfill	2009 ICF Sacramento County Inventory	679,800	tons	2,540
Water	Indirect Water	SMUD	11,289,140	kWh	2,708
Wastewater	Indirect Wastewater	SMUD	624,450	kWh	150
Wastewater	Fugitive	ICLEI US Community Protocol WW.6.b			3,704
Agriculture	Agriculture Equipment	CARB OFFROAD	2,252	acres	660
Agriculture	Livestock	Sacramento County Agricultural Commission	271	grazing acres	80
Agriculture	Fertilizer	Sacramento County Agricultural Commission	1,749	acres	290
Total					918,790

Table 2. 2013 Study Area Emissions

	Emissions (MTCO2e)					
Sector	Study Area 1	Study Area 2	Study Area 3	Study Area 4	City	Total
Residential	140	160	80	193	231,400	231,973
Non-Residential	660	1,250	720	724	41,180	44,533
Transportation	280	230	100	159	430,340	431,109
Off-Road Equipment	10	-	-	485	93,340	93,835
Solid Waste	10	10	10	34	23,720	23,784
Landfill	-	-	-	-	2,540	2,540
Water/Wastewater	700	1,340	770	259	6,562	9,631
Agriculture	750	1,560	760	150	1,030	4,250
Total	2,550	4,550	2,440	2,004	918,790	930,334
Acres	1,772	3,675	1,914	534	23441	31336
	1.4	1.2	1.3	3.8	39.2	29.7

Assumptions		
Electricity per home	8,810	kWh/home
Natural gas per home	410	therms/home
Electricity per nonresidential sq ft	25.5	kWh/sq ft
Electricity per ag acre	1,600	kWh/acre
Natural gas per nonresidential sq ft	0.54	therms/sq ft
Residential VMT per home	7,190	VMT/home
Nonresidential VMT per job	16,290	VMT/job
Tons solid waste per person	0.43	tons/person
Water-related kWh per person	40	kWh/person
Ag water-related kWh per ag acre	1,720	kWh/acre
Wastewater-related kWh per person	3	kWh/person
Lawn and garden off-road equip per home	0.047	MTCO2e/home
Construction off-road equip per nonresidential sq ft	0.006	MTCO2e/sq ft
Fertilizer per fertilized acre	0.17	MTCO2e/acre
Livestock per livestock acre	0.04	MTCO2e/acre
Ag off-road equip per ag acre	0.313	MTCO2e/acre

Study Area 4 Calcs	
Population	145.35
Residential acreage	45
Nonresidential acreage	80494
Residential electricity (kWh)	396450
Residential natural gas (therms)	18450
Nonresidential electricity (kWh)	2052597
Nonresidential natural gas (therms)	43466.76
Total VMT	323550
Total solid waste tons	62.5005
Water-related (kWh)	5814
Wastewater-related (kWh)	436.05
Ag-related water (kWh)	1073280

Table 3. Scale Factors

Factor	2012	2013	2015	2020	2030	2035	2050	Percent Change
Agriculture Acres		9,699		6,846	2,769	731	643	
Dwelling Units		52,783		58,095	70,033	75,752	93,423	
Population		163,093		181,257	218,503	236,346	291,481	
Jobs		45,463		51,704	68,632	75,752	102,765	
Annual VMT		878,312,710	1,103,497,565	1,304,308,676.43	1,705,930,899.29	1,906,742,010.71	2,509,175,345	
Local VMT			206,622,120	264,263,806.43	379,547,179.29	437,188,865.71	610,113,925	
Building Permits		384		423	509	551	626	
Persons per HH		3.25						
Vacancy Rate		5.30%						
Acreage		31,238						
Sac County Population Projections						1,854,128	2,105,299	0.85%
Sac County Dwelling Units	903,451			951,495	1,109,396.33	1,188,347	1,425,199	
Residential Building Permits				6,006	15,790	15,790	15,790	
Single Family Houses	89.20%	47,082	<-- source: ACS 5-year estimate 2013					
Multi Family Houses	10.80%	5,701	<-- source: ACS 5-year estimate 2013					

Growth Rate	2013 to 2020	2020 to 2030	2030 to 2035	2035 to 2050
Agriculture Acres	-29%	-60%	-74%	-12%
Dwelling Units	10%	21%	8%	23%
Population	11%	21%	8%	23%
Jobs	14%	33%	10%	36%
VMT	49%	31%	12%	32%

Table 4. BAU Forecast

Sector	Subsector	Source	2020 Activity Data	Unit	MT CO2e	Scale Factor	2030 Activity Data	Unit	MT CO2e	Scale Factor	2035 Activity Data	Unit	MT CO2e	Scale Factor	2050 Activity Data	Unit	MT CO2e	Scale Factor
Residential	Electricity	SMUD	524,356,520	kWh	125,785	2020 pop	632,105,092	kWh	151,632	2030 pop	683,722,924	kWh	164,015	2035 pop	843,222,401	kWh	202,276	2050 pop
Residential	Natural Gas	PG&E	24,685,129	therms	131,386	2020 pop	29,757,608	therms	158,385	2030 pop	32,187,620	therms	171,318	2035 pop	39,696,376	therms	211,284	2050 pop
Nonresidential	Electricity Total	SMUD	420,418,296	kWh	100,852	2020 jobs	558,064,144	kWh	133,871	2030 jobs	615,958,664	kWh	147,759	2035 jobs	835,608,196	kWh	200,450	2050 jobs
Nonresidential	Streetlights & Traffic Lights	SMUD	10,129,686	kWh	2,430	2020 jobs	13,446,167	kWh	3,226	2030 jobs	14,841,095	kWh	3,560	2035 jobs	20,133,398	kWh	4,830	2050 jobs
Nonresidential	Agriculture	SMUD	3,855,696	kWh	925	2020 jobs	5,118,059	kWh	1,228	2030 jobs	5,649,015	kWh	1,355	2035 jobs	7,663,442	kWh	1,838	2050 jobs
Nonresidential	Buildings	SMUD	406,432,914	kWh	97,497	2020 jobs	539,499,918	kWh	129,418	2030 jobs	595,468,553	kWh	142,844	2035 jobs	807,811,357	kWh	193,782	2050 jobs
Nonresidential	Natural Gas	PG&E	8,799,006	therms	46,833	2020 jobs	11,679,819	therms	62,166	2030 jobs	12,891,503	therms	68,615	2035 jobs	17,488,585	therms	93,083	2050 jobs
Transportation	On-Road	SACOG	1,304,308,676	VMT	645,542	2020 VMT	1,705,930,899	VMT	844,317	2030 VMT	2,509,175,345	VMT	943,704	2035 VMT	2,509,175,345	VMT	1,241,867	2050 VMT
Off-Road Equipment	Construction/Mining Equipment	CARB OFFROAD			99,993	2020 building permits			120,541	2030 building permits			130,384	2035 building permits			160,799	2050 building permits
Off-Road Equipment	Lawn/Garden Equipment	CARB OFFROAD	58,095	du	2,783	2020 dwellings	70,033	du	3,355	2030 dwellings	75,752	du	3,629	2035 dwellings	93,423	du	4,476	2050 dwellings
Solid Waste	Municipal Solid Waste	CalRecycle	84,664	tons	25,084	2020 pop	102,062	tons	30,238	2030 pop	110,396	tons	32,707	2035 pop	136,149	tons	40,337	2050 pop
Solid Waste	Alternative Daily Cover	CalRecycle	5,190	tons	1,278	2020 pop	6,257	tons	1,541	2030 pop	6,768	tons	1,667	2035 pop	8,346	tons	2,055	2050 pop
Solid Waste	Landfill	2009 ICF Sacramento County Inventory	679,800	tons	9,819	2020 pop	679,800	tons	8038.68	2030 pop	679,800	tons	6581.94	2035 pop	679,800	tons	5388.61	2050 pop
Water	Indirect Water	SMUD	12,546,435	kWh	3,010	2020 pop	15,124,567	kWh	3,628	2030 pop	16,359,642	kWh	3,924	2035 pop	20,176,033	kWh	4,840	2050 pop
Wastewater	Indirect Wastewater	SMUD	693,996	kWh	166	2020 pop	836,604	kWh	201	2030 pop	904,921	kWh	217	2035 pop	1,116,022	kWh	268	2050 pop
Wastewater	Fugitive				4,117	2020 pop			4,962	2030 pop			5,368	2035 pop			6,620	2050 pop
Agriculture	Agriculture Equipment	CARB OFFROAD	6,845.35	acres	2,006		2,769.12	acres	812		731	acres	214		731	acres	214	
Agriculture	Livestock	Sacramento County Agricultural Commission	192.51	acres	8		80.98	acres	3		25.22	acres	1		25.22	acres	1	
Agriculture	Fertilizer	Sacramento County Agricultural Commission	3,228	acres	571		1,392	acres	246		473.75	acres	84		473.75	acres	84	
Total					1,199,232				1,523,936				1,680,189				2,174,042	

Notes
Landfills in Elk Grove are closed, no increase in tonnage disposed but continued emissions

Table 5. Legislative-Adjusted BAU Forecast

Sector	Subsector	Source	2020 Activity Data	Unit	MT CO2e	2030 Activity Data	Unit	MT CO2e	2035 Activity Data	Unit	MT CO2e	2050 Activity Data	Unit	MT CO2e
Residential	Electricity	SMUD	500,185,153	kWh	120,665	558,369,382	kWh	100,676	586,243,011	kWh	105,702	672,372,729	kWh	121,231
Residential	Natural Gas	PG&E	23,547,214	therms	125,330	26,286,352	therms	139,909	27,598,559	therms	146,893	31,653,287	therms	168,474
Nonresidential	Electricity Total	SMUD	403,738,227	kWh	97,398	496,141,294	kWh	89,456	535,006,478	kWh	96,463	682,459,457	kWh	123,050
Nonresidential	Streetlights & Traffic Lights	SMUD	10,129,686	kWh	2,444	13,446,167	kWh	2,424	14,841,095	kWh	2,676	20,133,398	kWh	3,630
Nonresidential	Agriculture	SMUD	3,855,696	kWh	930	5,118,059	kWh	923	5,649,015	kWh	1,019	7,663,442	kWh	1,382
Nonresidential	Buildings	SMUD	389,752,845	kWh	94,024	477,577,068	kWh	86,109	514,516,367	kWh	92,769	654,662,618	kWh	118,038
Nonresidential	Natural Gas	PG&E	8,437,893	therms	44,911	10,339,230	therms	55,030	11,138,941	therms	59,287	14,173,016	therms	75,436
Transportation	On-Road	SACOG	1,304,308,676	VMT	541,455	1,705,930,899	VMT	524,978	1,906,742,011	VMT	586,775	2,509,175,345	VMT	681,001
Off-Road Equipment	Construction/Mining Equipment	CARB OFFROAD			25,176			12,885			14,896			17,846
Off-Road Equipment	Lawn/Garden Equipment	CARB OFFROAD			2,030			1,800			2,562			2,802
Solid Waste	Municipal Solid Waste	CalRecycle	84,664	tons	25,084	102,062	tons	30,238	110,396	tons	32,707	136,149	tons	40,337
Solid Waste	Alternative Daily Cover	CalRecycle	5,190	tons	1,278	6,257	tons	1,541	6,768	tons	1,667	8,346	tons	2,055
Solid Waste	Landfill	2009 ICF Sacramento County Inventory	679,800	tons	9,819	679,800	tons	8,039	679,800	tons	6,582	679,800	tons	5,389
Water	Indirect Water	SMUD	10,037,148	kWh	2,421	12,099,653	kWh	2,182	13,087,714	kWh	2,360	16,140,827	kWh	2,910
Wastewater	Indirect Wastewater	SMUD	555,197	kWh	134	669,283	kWh	121	723,937	kWh	131	892,817	kWh	161
Wastewater	Fugitive				4,117			4,962			5,368			6,620
Agriculture	Agriculture Equipment	CARB OFFROAD	6,845	acres	2,006	2,769	acres	812	731	acres	214	731	acres	214
Agriculture	Livestock	Sacramento County Agricultural Commission	193	acres	8	81	acres	3	25	acres	1	25	acres	1
Agriculture	Fertilizer	Sacramento County Agricultural Commission	3,228	acres	571	1,392	acres	246	474	acres	84	474	acres	84
Total					1,002,402			972,878			1,061,691			1,247,610

Table 6. Assumptions

Global Warming Potentials (AR 5)	CO2	CH4	N2O
	1	28	265

Conversions	
MT/ton	0.907185
mt/g	0.000001

Baseline Elk Grove's Share	2013
Lawn & Garden	9.28%
Construction	28.33%
Ag Equipment	1.02%

Title 24	2020	2030	2040	2050
Percent reduction from 2013 levels due to new building energy efficiency standards in new construction (Residential).	46%	46%	46%	46%
Percent reduction from 2013 levels due to new building energy efficiency standards in new construction (Commercial).	34%	34%	34%	34%
State Renewable Energy Targets	33%	50%	50%	50%

Building Energy Efficiency Assumptions						
	2020	2030	2050			
Percent reduction from 2015 levels due to new building energy efficiency standards in new construction (Residential).*	28%	28%	28%			
Percent reduction from 2015 levels due to new building energy efficiency standards in new construction (Commercial).*	5%	5%	5%			
Residential	**%**	**Notes**	**Source**			
Energy efficiency improvement of 2016 code above 2013 code	28%	For lighting, heating, cooling, ventilation, and water heating only	*http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/2016_Building_Energy_Efficiency_Standards_FAQ.pdf*			
Commercial						
Energy efficiency improvement of 2016 code above 2013 code	5%		http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/2015-06-			

Wastewater Treatment
Source: ICLEI US Community Protocol Methods WW.6.b and WW.12 used (no process-specific info available, lagoon system used)

***Equation WW.6.(alt)* Alternate Methane Emissions from Lagoons**

Annual CH_4 emissions = $((P \times F_{ind\text{-}com}) \times BOD_5\ load \times (1\text{-}FP) \times Bo \times MCF_a \times 365.25 \times 10^{-3}) \times GWP$

Where:

Description		Value
Annual CH_4 emissions	= Total annual CH_4 emitted by lagoon ($mtCO_2e$)	Result
P	= Population served by lagoon	User Input
$F_{ind\text{-}com}$	= Factor for significant industrial and commercial co-discharge waste (see definition above)	1.25
Description		**Value**
BOD_5 load	= Amount of BOD_5 treated per day (kg BOD_5/person/day)	0.090
F_P	= Fraction of BOD_5 removed in primary treatment	0.325
Bo	= Maximum CH_4 producing capacity for domestic wastewater (kg CH_4/kg BOD_5)	0.6
MCF_a	= CH_4 correction factor for anaerobic systems	0.8
365.25	= Conversion factor (day/year)	365.25
10^{-3}	= Conversion from kg to mt (mt/kg)	10^{-3}
GWP_{CH_4}	= Global Warming Potential; conversion from mt of CH_4 into mt of CO_2 equivalents	GWP[18]

Source: *As listed in LGO protocol Equation 10.4 from EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007, Chapter 8, 8-7 (2009); except F_P: Tchobanoglous, G., F.L. Burton, and H.D. Stensel, Wastewater Engineering: Treatment and Reuse, p. 396, 4th Edition (2003).*

Waste Diversion Rate			
Statewide per capita target	2.7	75%	diversion
2013 Average per capita disposal rate	2.6	78%	

Table 7. Emission Factors

Sector	Subsector	Source	Units	2013	2020	2030	2035	2050	Source
Residential	Electricity	SMUD	$MTCO_2e$/kWh	0.000240	0.000241	0.00018	0.00018	0.00018	2013: Pers. Comm. Dimitri Antoniou, June 28, 2016 2020: based on 2009 PUP of SMUD at 29% renewables 2030/2050: assumed 50% renewable
Residential	Natural Gas	PG&E	$MTCO_2e$/therm	0.005322					
Nonresidential	Electricity	SMUD	$MTCO_2e$/kWh	0.000240	0.000241	0.00018	0.00018	0.00018	2013: Pers. Comm. Dimitri Antoniou, June 28, 2016 2020: based on 2009 PUP of SMUD at 29% renewables 2030/2050: assumed 50% renewable
Nonresidential	Natural Gas	PG&E	$MTCO_2e$/therm	0.005322					
Transportation	On-Road	CARB EMFAC	$MTCO_2e$/VMT	0.000490					
Off-Road Equipme	Construction/Mining Equipment	MBI 2013							
Off-Road Equipme	Lawn/Garden Equipment	MBI 2013	MTCO2e/du	0.047909491					
Solid Waste	Municipal Solid Waste	CARB Landfill Model	$MTCO_2e$/ton	0.296272					
Solid Waste	Alternative Daily Cover	CARB Landfill Model	$MTCO_2e$/ton	0.246253					
Solid Waste	Landfills								
Water	Indirect Water	SMUD	$MTCO_2e$/kWh	0.000240	0.00024124	0.00018	0.00018	0.00018	2013: Pers. Comm. Dimitri Antoniou, June 28, 2016 2020: based on 2009 PUP of SMUD at 29% renewables 2030/2050: assumed 50% renewable
Wastewater	Indirect Wastewater	SMUD	$MTCO_2e$/kWh	0.000240	0.00024124	0.00018	0.00018	0.00018	2013: Pers. Comm. Dimitri Antoniou, June 28, 2016 2020: based on 2009 PUP of SMUD at 29% renewables 2030/2050: assumed 50% renewable
Wastewater	Fugitive								
Agriculture	Agriculture Equipment	MBI 2013	MTCO2e/acre	0.293072824					
Agriculture	Livestock	MBI 2013	MTCO2e/acre	0.04					
Agriculture	Fertilizer	ICLEI US Community Protocol	$MTCO_2e$/acre	0.176829					
Agriculture	Water	MBI 2013	kWh/acre	1720					
Agriculture	Electricity	MBI 2013	kWh/acre	1600					
Transportation	VMT	MBI 2013	MTCO2e/VMT	0.000489965					
Building Energy	Electricity	eGRID 2012	MT CH4/kWh	1.41158E-08					
Building Energy	Electricity	eGRID 2012	MT N2O/kWh	2.57187E-09					

Table 8. Agriculture Acreage

Row Labels	2013	2013 Emissions	Sector	2020	2030	2035	2050
				Acreage			
City							
Agricultural							
Grazing	90.79			68.22	35.96	19.84	19.84
Hay	1,556.25			1169.26	616.42	340.00	340.00
Irrigated Pasture	387.34			291.02	153.42	84.62	84.62
Operations	25.25	290	Fertilizer	18.97	10.00	5.52	5.52
Row Crop	192.37	80	Enteric Fermentati	144.53	76.20	42.03	42.03
Previous Agricultural Total	2,115	660	Ag Equipment				
Updated City Total	**2,252**			**1,692**	**892**	**492**	**492**
Plan Area 1							
Agricultural							
Hay	580			404.94	154.31	28.99	28.99
Irrigated Pasture	756	170	Fertilizer	527.79	201.12	37.79	37.79
Vineyard	365	50	Enteric Fermentati	254.47	96.97	18.22	18.22
Agricultural Total	1,702	530	Ag Equipment				
Plan Area 1 Total	**1,702**			**1,187.21**	**452.40**	**85**	**85**
Plan Area 2							
Agricultural							
Hay	1,417			979.57	354.99	42.69	42.69
Irrigated Pasture	614			424.76	153.93	18.51	18.51
Operations	18			12.38	4.49	0.54	0.54
Row Crop	102	460	Fertilizer	70.55	25.57	3.07	3.07
Vineyard	1,101	80	Enteric Fermentati	761.20	275.85	33.18	33.18
Agricultural Total	3,252	1,020	Ag Equipment				
Plan Area 2 Total	**3,252**			**2,248.46**	**814.82**	**98**	**98**
Plan Area 3							
Agricultural							
Grazing	180			124.29	45.02	5.39	5.386218608
Hay	491			339.44	122.95	14.71	14.71008447
Irrigated Pasture	1,098			759.18	274.99	32.90	32.89972428
Operations	25	100	Fertilizer	17.26	6.25	0.75	0.748043454
Row Crop	75	70	Enteric Fermentati	52.06	18.86	2.26	2.255929186
Agricultural Total	1,869	590	Ag Equipment				
Plan Area 3 Total	**1,869**			**1,292.23**	**468.08**	**56**	**56**
Plan Area 4							
Agricultural							
Irrigated Pasture	170			115.91	38.64	0	0
Hay	99			67.50	22.50	0	0
Operations	40	10	Fertilizer	27.27	9.09	0	0
Vineyard	315	20	Enteric Fermentati	214.77	71.59	0	0
Agricultural Total	624	120	Ag Equipment				
Plan Area 4 Total	**624**			**425.45**	**141.82**	**0**	**0**
Grand Total	**9,699**			**6,845**	**2,769**	**731**	**731**
				(0.29)	(0.71)	(0.92)	

Table 9. On-Road VMT From Traffic Study

2015

VMT by Speed Bin

Bin	CSPD	CSPD	PROJVMT_ RTAC	
1	>0	<=5	267	
2	>5	<=10	884	
3	>10	<=15	6,288	
4	>15	<=20	192,162	
5	>20	<=25	101,690	
6	>25	<=30	166,568	
7	>30	<=35	311,414	
8	>35	<=40	467,870	
9	>40	<=45	554,051	
10	>45	<=50	184,672	
11	>50	<=55	384,665	
12	>55	<=60	491,524	
13	>60	<=65	120,035	
14	>65	<=70	41,191	
15	>70	<=75	0	
16	>75		0	Annual
		Total	3,023,281	1,103,497,565
		II	566,088	206,622,120
		IX	1,230,807	
		XI	1,226,386	
		XX	54,776,923	

2036

VMT by Speed Bin

Bin	CSPD	CSPD	PROJVMT_ RTAC	
1	>0	<=5	633	
2	>5	<=10	4,820	
3	>10	<=15	32,464	
4	>15	<=20	522,929	
5	>20	<=25	253,660	
6	>25	<=30	458,924	
7	>30	<=35	879,317	
8	>35	<=40	1,251,261	
9	>40	<=45	1,020,631	
10	>45	<=50	661,963	
11	>50	<=55	799,371	
12	>55	<=60	810,534	
13	>60	<=65	139,909	
14	>65	<=70	38,037	
15	>70	<=75	0	
16	>75		0	Annual
		Total Daily	6,874,453	2,509,175,345
		II	1,671,545	610,113,925
		IX	2,604,795	
		XI	2,598,113	
		XX	68,468,704	

Table 10. VMT BAU

2020							
VMT	CO2 (g)	CO2 (MT)	CH4 (g)	CH4 (MT)	N2O (g)	N2O (MT)	CO2e (MT)
1304308676	632,138,406,004	632,138	50,072,897	50	45,287,759	45	645,542

2030							
VMT	CO2 (g)	CO2 (MT)	CH4 (g)	CH4 (MT)	N2O (g)	N2O (MT)	CO2e (MT)
1705930899	826,786,219,333	826,786	65,491,324	65	59,232,748	59	844,317

2035							
VMT	CO2 (g)	CO2 (MT)	CH4 (g)	CH4 (MT)	N2O (g)	N2O (MT)	CO2e (MT)
1906742011	924,110,125,998	924,110	73,200,537	73	66,205,243	66	943,704

2050							
VMT	CO2 (g)	CO2 (MT)	CH4 (g)	CH4 (MT)	N2O (g)	N2O (MT)	CO2e (MT)
2,509,175,345	1,216,081,845,991	1,216,082	96,328,177	96	87,122,727	87	1,241,867

1.00E-06 MT/g

Table 11. VMT - Legislative-Adjusted

2020							
VMT	CO2 (g)	CO2 (MT)	CH4 (g)	CH4 (MT)	N2O (g)	N2O (MT)	CO2e (MT)
1,304,308,676	535,066,984,575	535,067	25,720,772	26	21,388,287	21	541,455

2030							
VMT	CO2 (g)	CO2 (MT)	CH4 (g)	CH4 (MT)	N2O (g)	N2O (MT)	CO2e (MT)
1,705,930,899	521,114,306,502	521,114	17,823,250	18	12,698,055	13	524,978

2035							
VMT	CO2 (g)	CO2 (MT)	CH4 (g)	CH4 (MT)	N2O (g)	N2O (MT)	CO2e (MT)
1,906,742,011	582,456,499,855.01	582,456	19,921,287.55	20	14,192,787.19	14	586,775

2050							
VMT	CO2 (g)	CO2 (MT)	CH4 (g)	CH4 (MT)	N2O (g)	N2O (MT)	CO2e (MT)
2,509,175,345	677,148,417,543	677,148	18,011,791	18	12,633,254	13	681,001

1.00E-06 MT/g

Table 12. On-Road Vehicle Emission Factors

Year	CO2 (g/mi)	CH4 (g/mi)	N2O (g/mi)
2013	484.6539914	0.038390373	0.034721657
2020	410.2303345	0.019719851	0.016398179
2030	305.4721072	0.010447815	0.007443475
2040	275.2640092	0.007830538	0.005534158
2050	269.8689109	0.007178371	0.005034823

Table 13. Wastewater Treatment Emissions

Equation 10.3.2.2 Process N2O Emissions from WWTP without Nitrification/Denitrification

Amount	Unit	Description
163,093	people	2013 population
181,257	people	2020 population
218,503	people	2030 population
236,346	people	2035 population
291,481	people	2050 population
1.25	constant	co-discharge waste into sewer
3.2	g N2O/person/year	emission factor for nitrification/denitrification
265	GWP	N2O

Year	Annual N2O Process Emissions (MTCO2e/year)
2013	173
2020	192
2030	232
2040	251
2050	309

Equation 10.2 Stationary CH4 from Incomplete Combustion of Digester Gas

Amount	Unit	Description
163,093	people	2013 population
181,257	people	2020 population
218,503	people	2030 population
236,346	people	2035 population
291,481	people	2050 population
1	ft^3/person/day	cubic feet of digester gas produced per person per day
0.650	constant	fraction of methane in biogas
662.000	g/m^3	density of methane
0.99	constant	methane destruction efficiency
0.0283	constant	conversion from ft^3 to m^3
365.25	constant	conversion from days to year
0.000001	constant	conversion from g to metric tons
28	constant	global warming potential of methane for CO2e

Year	Annual Stationary CH4 Emissions (MTCO2e/year)
2013	203
2020	226
2030	272
2035	294
2050	363

Equation 10.10 Process N2O Emissions from Effluent Discharge

Amount	Unit	Description
163,093	people	2013 population
181,257	people	2020 population
218,503	people	2030 population
236,346	people	2035 population
291,481	people	2050 population
1.25	Constant	co-discharge waste into sewer
0.026	kg N/person/day	N per person served
0.050	kg N/kg BOD	nitrogen uptake for cell growth in aerobic system
0.005	kg N2O N/kg sewage-l	N2O effluent Emission Factor
0.09	kg BOD/person/day	BOD Load
1.57	Constant	molecular weight ratio N2O to N2
0	Constant	fraction of nitrogen removed from nitrification/denitrification
365	days/year	
0.001	metric ton/kg	
265	GWP	

Year	Annual Process N2O Emissions (MTCO2e/year)
2013	3,328
2020	3,699
2030	4,459
2035	4,823
2050	5,948

Year	Total Wastewater Treatment Emissions (MTCO2e/year)
2013	3,704
2020	4,117
2030	4,962
2035	5,368
2050	6,620

Table 14. OFFROAD Emissions 2020

Lawn and Garden Summary		
		Source
Total Lawn & Garden Emissions (MTCO2e)	33,254	
DU Elk Grove	58,095	Scale Factor
DU Sac County	951,495	SACOG 2016 RTP/SCS
Elk Grove % of Total	6.1%	
Elk Grove Emissions (MTCO2e)	2,030	

Construction Equipment Summary		
		Source
Total Const. Equipment Emissions (MTCO2e)	357,730	
Elk Grove Houses Constructed	422.64517	Scale Factor
Sac County Houses Constructed	6005.5	Extrapolated from SACOG RPT/SCS
Elk Grove % of Total	7.0%	
Elk Grove Emissions (MTCO2e)	25,176	

total ag -

CY	Season	AvgDays	Code	Equipment	Fuel	MaxHP	Class	C/R	Pre	Hand	Port	County	Air Basin	Air Dist.	Population	Activity	Consumpti	ROG Exhau	CO Exhaust	NOX Exhau	CO2 Exhau	SO2 Exhaus	PM Exhaus	N2O Exhau	CH4 Exhau	Total Annual County (MTCO2e)
2020	Annual	Mon-Sun	2260002006	Tampers/R	G2	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	9.71E+01	4.84E+01	9.77E+00	6.19E-04	2.64E-02	4.82E-04	5.04E-02	2.08E-06	4.23E-04	7.56E-05	3.85E-05	20.78224233
2020	Annual	Mon-Sun	2260002009	Plate Com	G2	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	8.33E+00	4.70E+00	9.48E-01	5.99E-05	2.56E-03	4.66E-05	4.90E-03	2.02E-07	4.11E-05	7.33E-06	3.72E-06	2.016249755
2020	Annual	Mon-Sun	2260004010	Lawn Mow	G2	15	Lawn and Ga	C	N	NHH	NP	Sacrament	SV	SAC	1.88E+03	1.18E+03	1.33E+02	1.50E-02	2.70E-01	4.04E-03	8.02E-01	3.30E-05	2.53E-03	1.04E-03	9.35E-04	357.085349
2020	Annual	Mon-Sun	2260004010	Lawn Mow	G2	15	Lawn and Ga	R	N	NHH	NP	Sacrament	SV	SAC	1.41E+04	5.99E+02	7.53E+01	8.54E-03	1.82E-01	1.92E-03	4.08E-01	1.68E-05	1.12E-03	4.92E-04	5.31E-04	186.3007878
2020	Annual	Mon-Sun	2260004020	Chainsaws	G2	2	Lawn and Ga	C	N	HH	NP	Sacrament	SV	SAC	3.36E+03	2.66E+03	1.59E+02	1.33E-01	2.40E-01	2.10E-03	6.50E-01	2.68E-05	3.78E-04	1.08E-03	8.26E-03	949.8886819
2020	Annual	Mon-Sun	2260004020	Chainsaws	G2	2	Lawn and Ga	R	N	HH	NP	Sacrament	SV	SAC	3.78E+04	5.08E+02	2.42E+01	8.90E-03	4.84E-02	4.09E-04	1.24E-01	5.10E-06	1.14E-04	2.07E-04	5.53E-04	91.4338104
2020	Annual	Mon-Sun	2260004020	Chainsaws	G2	15	Lawn and Ga	C	N	HH	NP	Sacrament	SV	SAC	2.37E+03	1.88E+03	2.71E+02	2.26E-01	4.09E-01	3.58E-03	1.11E+00	4.56E-05	6.44E-04	1.21E-03	1.41E-02	1611.880089
2020	Annual	Mon-Sun	2260004020	Chainsaws	G2	15	Lawn and Ga	R	N	HH	NP	Sacrament	SV	SAC	2.67E+04	3.58E+02	4.09E+01	1.47E-02	8.12E-02	6.93E-04	2.11E-01	8.68E-06	2.05E-04	2.33E-04	9.14E-04	152.1432445
2020	Annual	Mon-Sun	2260004021	Chainsaws	G2	15	Lawn and Ga	C	P	HH	NP	Sacrament	SV	SAC	2.95E+03	2.34E+03	3.37E+02	2.82E-01	5.09E-01	4.46E-03	1.38E+00	5.67E-05	8.02E-04	1.51E-03	1.75E-02	2006.229822
2020	Annual	Mon-Sun	2260004021	Chainsaws	G2	15	Lawn and Ga	R	P	HH	NP	Sacrament	SV	SAC	3.32E+04	4.45E+02	5.28E+01	2.05E-02	1.08E-01	8.21E-04	2.62E-01	1.08E-05	1.96E-04	2.82E-04	1.27E-03	201.3517007
2020	Annual	Mon-Sun	2260004025	Trimmers/	G2	2	Lawn and Ga	C	N	HH	NP	Sacrament	SV	SAC	1.10E+04	3.65E+03	1.62E+02	8.73E-02	2.87E-01	2.52E-03	7.77E-01	3.20E-05	4.52E-04	1.37E-03	5.42E-03	745.8906157
2020	Annual	Mon-Sun	2260004025	Trimmers/	G2	2	Lawn and Ga	R	N	HH	NP	Sacrament	SV	SAC	1.22E+05	7.20E+03	3.05E+02	1.37E-01	5.67E-01	4.97E-03	1.53E+00	6.31E-05	8.93E-04	2.71E-03	8.51E-03	1279.329564
2020	Annual	Mon-Sun	2260004030	Leaf Blowe	G2	2	Lawn and Ga	C	N	HH	P	Sacrament	SV	SAC	1.64E+04	8.81E+03	4.70E+02	3.24E-01	7.71E-01	6.76E-03	2.08E+00	8.59E-05	1.21E-03	3.51E-03	2.02E-02	2492.148438
2020	Annual	Mon-Sun	2260004030	Leaf Blowe	G2	2	Lawn and Ga	R	N	HH	P	Sacrament	SV	SAC	4.22E+04	5.55E+02	2.57E+01	9.38E-03	5.13E-02	4.34E-04	1.31E-01	5.41E-06	1.21E-04	2.23E-04	5.83E-04	96.71683244
2020	Annual	Mon-Sun	2260004050	Shredders	G2	15	Lawn and Ga	C	P	NHH	NP	Sacrament	SV	SAC	8.28E+01	3.08E+01	1.35E+01	7.59E-04	3.66E-02	5.92E-04	6.99E-02	2.88E-06	5.86E-04	6.82E-05	4.72E-05	27.91591803
2020	Annual	Mon-Sun	2260004050	Shredders	G2	15	Lawn and Ga	R	P	NHH	NP	Sacrament	SV	SAC	2.95E+03	7.27E+00	3.28E+00	3.02E-04	8.89E-03	1.17E-04	1.65E-02	6.80E-07	1.38E-04	1.46E-05	1.88E-05	7.249314121
2020	Annual	Mon-Sun	2260004070	Commercia	G2	15	Lawn and Ga	C	N	NHH	NP	Sacrament	SV	SAC	4.39E+01	9.62E+01	3.94E+01	1.77E-03	1.07E-01	1.34E-03	2.05E-01	8.44E-06	9.54E-05	1.80E-04	1.10E-04	79.16690349
2020	Annual	Mon-Sun	2260004070	Commercia	G2	25	Lawn and Ga	C	N	NHH	NP	Sacrament	SV	SAC	2.17E+01	4.75E+01	4.21E+01	1.84E-03	1.19E-01	1.42E-03	2.13E-01	8.79E-06	9.94E-05	1.33E-04	1.14E-04	81.91127482
2020	Annual	Mon-Sun	2260004075	Other Law	G2	2	Lawn and Ga	C	N	HH	NP	Sacrament	SV	SAC	1.85E+01	3.48E+00	1.95E-01	9.56E-05	3.54E-04	3.10E-06	9.57E-04	3.94E-08	5.57E-07	1.50E-06	5.94E-06	0.852161202
2020	Annual	Mon-Sun	2260004075	Other Law	G2	2	Lawn and Ga	R	N	HH	NP	Sacrament	SV	SAC	5.68E+02	6.69E+00	3.57E-01	1.27E-04	7.18E-04	6.07E-06	1.84E-03	7.57E-08	1.69E-06	2.91E-06	7.88E-06	1.326628843
2020	Annual	Mon-Sun	2260004075	Other Law	G2	15	Lawn and Ga	C	N	HH	NP	Sacrament	SV	SAC	8.07E+00	1.52E+00	4.23E-01	2.08E-04	7.70E-04	6.74E-06	2.08E-03	8.57E-08	1.21E-06	1.54E-06	1.29E-05	1.837948527
2020	Annual	Mon-Sun	2260004075	Other Law	G2	15	Lawn and Ga	R	N	HH	NP	Sacrament	SV	SAC	2.47E+02	2.91E+00	7.71E-01	2.67E-04	1.54E-03	1.32E-05	4.00E-03	1.65E-07	3.89E-06	2.98E-06	1.66E-05	2.810139971
2020	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.12E+00	2.30E+00	1.33E+00	1.01E-04	3.82E-03	7.52E-05	6.46E-03	1.84E-07	5.42E-05	6.59E-06	5.71E-06	2.7024123
2020	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.62E+00	3.93E+00	5.74E+00	4.46E-04	1.70E-02	2.91E-04	2.70E-02	6.85E-07	2.27E-04	1.74E-05	2.52E-05	11.32047168
2020	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.80E+00	3.01E+00	6.98E+00	1.29E-04	7.58E-03	1.72E-04	5.50E-02	6.68E-07	4.21E-06	1.10E-05	7.31E-06	18.94679493
2020	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.54E+00	1.66E+00	6.31E+00	6.88E-05	2.36E-03	1.72E-04	5.69E-02	5.50E-07	4.41E-06	7.63E-06	3.89E-06	19.25890226
2020	Annual	Mon-Sun	2265002006	Tampers/R	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	4.48E+00	2.24E+00	1.08E+00	8.20E-05	3.10E-03	6.11E-05	5.24E-03	1.49E-07	4.39E-05	5.82E-06	4.64E-06	2.195489856
2020	Annual	Mon-Sun	2265002009	Plate Com	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.64E+02	8.12E+01	1.47E+01	2.09E-03	3.13E-02	9.46E-04	8.45E-02	2.92E-06	2.76E-05	1.34E-04	1.18E-04	39.624189
2020	Annual	Mon-Sun	2265002009	Plate Com	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.74E+02	9.85E+01	4.23E+01	3.20E-03	1.21E-01	2.38E-03	2.05E-01	5.85E-06	1.72E-03	2.40E-04	1.81E-04	86.05532339
2020	Annual	Mon-Sun	2265002015	Rollers	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.83E+01	4.17E+00	1.12E+00	1.38E-04	2.63E-03	6.22E-05	6.12E-03	2.11E-07	1.99E-06	7.85E-06	7.80E-06	2.782515216
2020	Annual	Mon-Sun	2265002015	Rollers	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.96E+01	2.52E+01	1.37E+01	1.03E-03	3.93E-02	7.70E-04	6.65E-02	1.90E-06	5.58E-04	6.96E-05	5.85E-05	27.80994219
2020	Annual	Mon-Sun	2265002015	Rollers	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.00E+01	1.70E+01	2.01E+01	1.56E-03	5.95E-02	1.01E-03	9.48E-02	2.40E-06	7.95E-04	6.71E-05	8.80E-05	39.73860289
2020	Annual	Mon-Sun	2265002015	Rollers	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.98E+00	3.36E+00	9.10E+00	2.20E-04	1.30E-02	2.86E-04	6.66E-02	8.10E-07	5.10E-06	1.50E-05	1.24E-05	23.28911066
2020	Annual	Mon-Sun	2265002015	Rollers	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.71E+00	6.32E+00	2.87E+01	4.50E-04	1.52E-02	1.04E-03	2.51E-01	2.43E-06	1.94E-05	3.78E-05	2.54E-05	85.6995076
2020	Annual	Mon-Sun	2265002021	Paving Equ	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.30E+02	1.07E+02	2.09E+01	2.95E-03	4.48E-02	1.33E-03	1.20E-01	4.14E-06	3.91E-05	1.83E-04	1.67E-04	56.01973507
2020	Annual	Mon-Sun	2265002021	Paving Equ	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.89E+02	2.13E+02	1.23E+02	9.28E-03	3.53E-01	6.91E-03	5.96E-01	1.70E-05	5.00E-03	6.08E-04	5.25E-04	249.140365
2020	Annual	Mon-Sun	2265002021	Paving Equ	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	8.65E+00	4.74E+00	6.19E+00	4.79E-04	1.83E-02	3.12E-04	2.92E-02	7.39E-07	2.44E-04	1.97E-05	2.71E-05	12.21470808
2020	Annual	Mon-Sun	2265002021	Paving Equ	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	7.66E+00	3.68E+00	8.22E+00	9.66E-05	6.13E-03	1.46E-04	6.93E-02	8.43E-07	5.31E-06	1.14E-05	5.47E-06	23.53699708
2020	Annual	Mon-Sun	2265002021	Paving Equ	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.98E+00	9.48E-01	3.39E+00	1.86E-05	7.42E-04	4.83E-05	3.15E-02	3.04E-07	2.44E-06	3.17E-06	1.05E-06	10.55501192
2020	Annual	Mon-Sun	2265002024	Surfacing E	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	4.22E+01	2.32E+01	4.63E+00	6.74E-04	9.70E-03	3.05E-04	2.69E-02	9.28E-07	8.76E-06	4.08E-05	3.81E-05	12.62280164
2020	Annual	Mon-Sun	2265002024	Surfacing E	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.26E+02	1.73E+02	6.63E+01	5.20E-03	1.90E-01	3.87E-03	3.21E-01	9.16E-06	2.69E-03	4.05E-04	2.94E-04	135.9417492
2020	Annual	Mon-Sun	2265002024	Surfacing E	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.72E+00	2.37E+00	2.22E+00	1.78E-04	6.56E-03	1.16E-04	1.04E-02	2.65E-07	8.75E-05	8.43E-06	1.01E-05	4.421515808
2020	Annual	Mon-Sun	2265002027	Signal Boar	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	5.22E-01	1.86E-01	6.00E-02	7.80E-06	1.37E-04	3.52E-06	3.34E-04	1.15E-08	1.09E-07	3.98E-07	4.41E-07	0.153134419
2020	Annual	Mon-Sun	2265002027	Signal Boar	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.71E+00	2.89E+00	1.71E+00	1.29E-04	4.92E-03	9.57E-05	8.32E-03	2.37E-07	6.97E-05	8.34E-06	7.27E-06	3.470208172
2020	Annual	Mon-Sun	2265002030	Trenchers	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.43E+01	4.09E+01	2.63E+01	2.02E-03	7.55E-02	1.50E-03	1.28E-01	3.64E-06	1.07E-03	1.25E-04	1.14E-04	53.44633997
2020	Annual	Mon-Sun	2265002030	Trenchers	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.66E+01	3.17E+01	4.41E+01	3.47E-03	1.30E-01	2.26E-03	2.08E-01	5.26E-06	1.74E-03	1.38E-04	1.96E-04	87.27026292
2020	Annual	Mon-Sun	2265002030	Trenchers	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.80E+01	1.98E+01	4.36E+01	9.02E-04	5.02E-02	1.27E-03	3.39E-01	4.12E-06	2.59E-05	7.61E-05	5.10E-05	117.3391444
2020	Annual	Mon-Sun	2265002030	Trenchers	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	5.96E+00	6.58E+00	2.73E+01	3.49E-04	1.12E-02	9.08E-04	2.45E-01	2.36E-06	1.89E-05	3.51E-05	1.97E-05	83.02224561
2020	Annual	Mon-Sun	2265002033	Bore/Drill I	G4	15	Construction	U	P	NHH	P	Sacrament	SV	SAC	9.82E-01	3.34E-01	2.57E-01	1.91E-05	7.38E-04	1.42E-05	1.25E-03	3.56E-08	1.05E-05	1.10E-06	1.08E-06	0.518436554
2020	Annual	Mon-Sun	2265002033	Bore/Drill I	G4	25	Construction	U	P	NHH	P	Sacrament	SV	SAC	4.88E+00	1.66E+00	2.37E+00	1.81E-04	7.01E-03	1.18E-04	1.12E-02	2.83E-07	9.36E-05	7.18E-06	1.02E-05	4.659597884
2020	Annual	Mon-Sun	2265002033	Bore/Drill I	G4	50	Construction	U	P	NHH	P	Sacrament	SV	SAC	8.69E-01	2.55E-01	6.59E-01	1.00E-05	4.78E-04	1.69E-05	5.57E-03	6.77E-08	4.26E-07	9.90E-07	5.67E-07	1.901887372
2020	Annual	Mon-Sun	2265002033	Bore/Drill I	G4	120	Construction	U	P	NHH	P	Sacrament	SV	SAC	3.99E+00	1.17E+00	7.52E+00	6.47E-05	1.79E-03	2.17E-04	6.95E-02	6.71E-07	5.38E-06	7.02E-06	3.66E-06	23.3918366
2020	Annual	Mon-Sun	2265002033	Bore/Drill I	G4	175	Construction	U	P	NHH	P	Sacrament	SV	SAC	9.88E-01	2.90E-01	2.61E+00	1.42E-05	7.76E-04	8.47E-05	2.39E-02	2.38E-07	1.91E-06	2.21E-06	8.03E-07	8.020601564
2020	Annual	Mon-Sun	2265002039	Concrete/I	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.80E+01	6.42E+00	1.70E+00	2.21E-04	3.88E-03	9.98E-05	9.48E-03	3.27E-07	3.09E-06	1.24E-05	1.25E-05	4.351512142
2020	Annual	Mon-Sun	2265002039	Concrete/I	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	8.10E+01	6.88E+01	4.71E+01	3.55E-03	1.35E-01	2.65E-03	2.29E-01	6.52E-06	1.92E-03	2.15E-04	2.01E-04	95.39029471
2020	Annual	Mon-Sun	2265002039	Concrete/I	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.53E+01	2.15E+01	2.87E+01	2.22E-03	8.49E-02	1.45E-03	1.35E-01	3.43E-06	1.13E-03	9.06E-05	1.25E-04	56.62100761
2020	Annual	Mon-Sun	2265002039	Concrete/I	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.24E+00	5.42E+00	1.50E+01	1.57E-04	1.06E-02	2.32E-04	1.28E-01	1.55E-06	9.78E-06	1.79E-05	8.87E-06	43.23400452
2020	Annual	Mon-Sun	2265002039	Concrete/I	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.86E+00	3.11E+00	1.46E+01	6.45E-05	2.89E-03	1.48E-04	1.36E-01	1.32E-06	1.06E-05	1.09E-05	3.65E-06	45.61512035
2020	Annual	Mon-Sun	2265002042	Cement an	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.27E+02	8.25E+01	2.08E+01	2.66E-03	4.78E-02	1.20E-03	1.15E-01	3.98E-06	3.76E-05	1.53E-04	1.51E-04	52.78472846
2020	Annual	Mon-Sun	2265002042	Cement an	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	5.54E+02	1.40E+02	6.55E+01	5.55E-03	1.90E-01	3.66E-03	3.12E-01	8.90E-06	2.62E-03	3.55E-04	3.14E-04	134.2429788
2020	Annual	Mon-Sun	2265002042	Cement an	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.33E+00	5.88E-01	8.83E-01	7.48E-05	2.63E-03	4.42E-05	4.11E-03	1.04E-07	3.44E-05	2.62E-06	4.23E-06	1.755339263
2020	Annual	Mon-Sun	2265002045	Cranes	G4	50	Construction	U	P	NHH	P	Sacrament	SV	SAC	9.88E-01	1.12E+00	2.18E+00	4.56E-05	2.55E-03	6.40E-05	1.69E-02	2.05E-07	1.29E-06	4.05E-06	2.58E-06	5.851123381
2020	Annual	Mon-Sun	2265002045	Cranes	G4	120	Construction	U	P	NHH	P	Sacrament	SV	SAC	1.98E+00	2.25E+00	7.46E+00	9.66E-05	3.11E-03	2.49E-04	6.67E-02	6.45E-07	5.17E-06	1.07E-05	5.46E-06	22.67710188
2020	Annual	Mon-Sun	2265002045	Cranes	G4	175	Construction	U	P	NHH	P	Sacrament	SV	SAC	7.90E-02	8.99E-02	4.82E-01	4.09E-06	1.58E-04	1.88E-05	4.39E-03	4.36E-08	3.49E-07	5.94E-07	2.31E-07	1.477972315
2020	Annual	Mon-Sun	2265002054	Crushing/P	G4	15	Construction	U	P	NHH	P	Sacrament	SV	SAC	8.90E-01	7.05E-01	5.26E-01	3.95E-05	1.51E-03	2.94E-05	2.55E-03	7.28E-08	2.14E-05	2.30E-06	2.23E-06	1.062706633
2020	Annual	Mon-Sun	2265002054	Crushing/P	G4	25	Construction	U	P	NHH	P	Sacrament	SV	SAC	5.83E-01	4.62E-01	6.31E-01	4.86E-05	1.87E-03	3.17E-05	2.97E-03	7.54E-08	2.49E-05	1.96E-06	2.75E-06	1.243960142
2020	Annual	Mon-Sun	2265002054	Crushing/P	G4	120	Construction	U	P	NHH	P	Sacrament	SV	SAC	1.15E+00	7.57E-01	5.79E+00	6.10E-05	1.83E-03	1.79E-04	5.27E-02	5.10E-07	4.09E-06	5.28E-06	3.45E-06	17.81463932
2020	Annual	Mon-Sun	2265002057	Rough Terr	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.95E-01	4.47E-01	1.48E+00	3.08E-05	1.72E-03	4.33E-05	1.14E-02	1.39E-07	8.76E-07	2.14E-06	1.74E-06	3.959944479
2020	Annual	Mon-Sun	2265002057	Rough Terr	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	5.61E+00	6.35E+00	3.25E+01	4.19E-04	1.35E-02	1.08E-03	2.90E-01	2.81E-06	2.25E-05	3.81E-05	2.37E-05	98.5980401
2020	Annual	Mon-Sun	2265002057	Rough Terr	G4	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.98E-01	2.24E-01	1.82E+00	1.55E-05	5.96E-04	7.12E-05	1.66E-02	1.65E-07	1.32E-06	1.85E-06	8.74E-07	5.595330955
2020	Annual	Mon-Sun	2265002060	Rubber Tir	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	9.88E-01	1.39E+00	3.40E+00	7.26E-05	4.25E-03	9.43E-05	2.59E-02	3.14E-07	1.98E-06	5.50E-06	4.11E-06	8.973464077
2020	Annual	Mon-Sun	2265002060	Rubber Tir	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	6.56E+00	9.21E+00	3.44E+01	4.56E-04	1.54E-02	1.09E-03	3.06E-01	2.95E-06	2.37E-05	4.58E-05	2.58E-05	103.8701331
2020	Annual	Mon-Sun	2265002066	Tractors/Lo	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.48E+00	8.29E+00	2.43E+01	2.07E-04	1.22E-02	4.86E-04	2.14E-01	2.07E-06	1.66E-05	3.13E-05	1.17E-05	72.20915392
2020	Annual	Mon-Sun	2265002072	Skid Steer I	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.75E+00	1.53E+00	1.21E+00	9.28E-05	3.48E-03	6.91E-05	5.88E-03	1.68E-07	4.93E-05	5.21E-06	5.25E-06	2.455556826
2020	Annual	Mon-Sun	2265002072	Skid Steer I	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.17E+02	1.02E+02	1.13E+02	8.89E-03	3.35E-01	5.79E-03	5.34E-01	1.35E-05	4.47E-03	3.93E-04	5.03E-04	224.4168068
2020	Annual	Mon-Sun	2265002072	Skid Steer I	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.69E+01	2.29E+01	4.38E+01	4.82E-04	3.43E-02	6.88E-04	3.67E-01	4.46E-06	2.81E-05	6.27E-05	2.72E-05	124.4915539
2020	Annual	Mon-Sun	2265002072	Skid Steer I	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.61E+01	1.37E+01	5.85E+01	2.77E-04	1.32E-02	6.38E-04	5.43E-01	5.24E-06	4.20E-05	4.73E-05	1.57E-05	181.5157003
2020	Annual	Mon-Sun	2265002078	Dumpers/T	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.67E+01	6.82E+00	9.11E-01	1.33E-04	1.90E-03	6.01E-05	5.29E-03	1.83E-07	1.73E-06	9.71E-06	7.53E-06	2.503569445
2020	Annual	Mon-Sun	2265002078	Dumpers/T	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.56E+01	1.45E+01	5.30E+00	4.38E-04	1.53E-02	3.00E-04	2.54E-02	7.24E-07	2.13E-04	3.26E-05	2.48E-05	10.88698209

2020	Annual	Mon-Sun	2265002078	Dumpers/T	G4	25	Construction U	P	NHH	NP	Sacrament SV	SAC	6.60E+00	2.69E+00	2.13E+00	1.77E-04	6.32E-03	1.08E-04	9.94E-03	2.52E-07	8.33E-05	8.61E-06	1.00E-05	4.250571467
2020	Annual	Mon-Sun	2265002078	Dumpers/T	G4	120	Construction U	P	NHH	NP	Sacrament SV	SAC	7.11E-01	2.48E-01	6.20E-01	5.52E-06	1.55E-04	1.81E-05	5.72E-03	5.53E-08	4.43E-07	9.07E-07	3.12E-07	1.929990567
2020	Annual	Mon-Sun	2265002081	Other Cons	G4	175	Construction U	P	NHH	NP	Sacrament SV	SAC	2.77E+00	2.81E+00	1.54E+01	6.03E-05	4.66E-03	1.82E-04	1.41E-01	1.40E-06	1.13E-05	1.16E-05	3.41E-06	47.18174861
2020	Annual	Mon-Sun	2265004010	Lawn Mow	G4	5	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	1.11E+04	6.96E+03	8.31E+02	9.92E-02	1.84E+00	2.53E-02	4.75E+00	1.64E-04	1.50E-02	6.15E-03	5.54E-03	2114.240534
2020	Annual	Mon-Sun	2265004010	Lawn Mow	G4	5	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	1.76E+05	7.48E+03	9.93E+02	7.88E-02	2.66E+00	2.09E-02	5.10E+00	1.76E-04	1.22E-02	5.62E-03	4.40E-03	2127.207441
2020	Annual	Mon-Sun	2265004015	Tillers	G4	5	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	1.15E+03	1.77E+02	2.49E+01	2.22E-03	6.25E-02	5.60E-04	1.34E-01	4.62E-06	3.53E-04	1.45E-04	1.26E-04	56.68407169
2020	Annual	Mon-Sun	2265004015	Tillers	G4	5	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	4.48E+03	2.21E+02	3.20E+01	2.71E-03	8.33E-02	7.13E-04	1.67E-01	5.78E-06	4.17E-04	1.80E-04	1.53E-04	70.54801694
2020	Annual	Mon-Sun	2265004025	Trimmers/	G4	5	Lawn and Ga C	P	NHH	NP	Sacrament SV	SAC	2.03E+03	7.54E+02	2.31E+01	3.00E-03	5.25E-02	1.36E-03	1.29E-01	4.44E-06	4.19E-05	4.60E-04	1.70E-04	61.73601235
2020	Annual	Mon-Sun	2265004025	Trimmers/	G4	5	Lawn and Ga R	P	NHH	NP	Sacrament SV	SAC	9.46E+03	5.57E+02	1.80E+01	2.13E-03	4.49E-02	9.09E-04	9.49E-02	3.28E-06	4.89E-05	3.22E-04	1.20E-04	44.97207063
2020	Annual	Mon-Sun	2265004030	Leaf Blowe	G4	5	Lawn and Ga C	N	NHH	P	Sacrament SV	SAC	5.17E+02	8.80E+01	5.80E+00	4.30E-04	1.55E-02	1.07E-04	3.00E-02	1.04E-06	7.03E-05	4.34E-05	2.43E-05	12.46443204
2020	Annual	Mon-Sun	2265004030	Leaf Blowe	G4	5	Lawn and Ga R	N	NHH	P	Sacrament SV	SAC	4.44E+02	5.84E+00	4.12E-01	2.81E-05	1.19E-03	7.33E-06	1.99E-03	6.88E-08	3.97E-06	2.85E-06	1.59E-06	0.825690551
2020	Annual	Mon-Sun	2265004040	Rear Engin	G4	15	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	6.09E+03	4.53E+03	1.49E+03	6.95E-02	4.33E+00	5.03E-02	7.33E+00	2.09E-04	3.40E-03	7.29E-03	3.93E-03	2838.474763
2020	Annual	Mon-Sun	2265004040	Rear Engin	G4	15	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	5.34E+03	4.12E+02	1.36E+02	5.48E-03	3.95E-01	4.01E-03	6.68E-01	1.90E-05	2.66E-04	6.18E-04	3.10E-04	254.0089767
2020	Annual	Mon-Sun	2265004040	Rear Engin	G4	25	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	2.78E+01	2.07E+01	1.33E+01	5.96E-04	3.97E-02	4.39E-04	6.33E-02	1.60E-06	2.94E-05	4.71E-05	3.37E-05	24.34980335
2020	Annual	Mon-Sun	2265004040	Rear Engin	G4	25	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	2.40E+01	1.86E+00	1.19E+00	4.74E-05	3.56E-03	3.31E-05	5.67E-03	1.44E-07	2.26E-06	3.84E-06	2.68E-06	2.14950746
2020	Annual	Mon-Sun	2265004045	Front Mow	G4	15	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	2.79E+02	2.07E+02	1.09E+02	5.08E-03	3.17E-01	3.68E-03	5.36E-01	1.53E-05	2.49E-04	4.29E-04	2.87E-04	206.7399649
2020	Annual	Mon-Sun	2265004045	Front Mow	G4	15	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	9.02E+03	6.97E+02	3.66E+02	1.48E-02	1.07E+00	1.08E-02	1.80E+00	5.14E-05	7.19E-04	1.34E-03	8.36E-04	682.2783313
2020	Annual	Mon-Sun	2265004045	Front Mow	G4	25	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	2.19E+02	1.62E+02	1.15E+02	5.17E-03	3.45E-01	3.81E-03	5.49E-01	1.39E-05	2.55E-04	3.90E-04	2.92E-04	211.1165258
2020	Annual	Mon-Sun	2265004045	Front Mow	G4	25	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	7.07E+03	5.46E+02	3.86E+02	1.54E-02	1.16E+00	1.08E-02	1.84E+00	4.68E-05	7.36E-04	1.19E-03	8.73E-04	698.5277288
2020	Annual	Mon-Sun	2265004050	Shredders	G4	5	Lawn and Ga C	P	NHH	NP	Sacrament SV	SAC	2.19E+02	8.15E+01	2.21E+01	2.88E-03	5.04E-02	1.30E-03	1.23E-01	4.26E-06	4.02E-05	1.59E-04	1.63E-04	56.64252425
2020	Annual	Mon-Sun	2265004050	Shredders	G4	5	Lawn and Ga R	P	NHH	NP	Sacrament SV	SAC	8.15E+03	2.01E+01	6.50E+00	5.21E-04	1.93E-02	2.15E-04	3.04E-02	1.05E-06	2.17E-05	3.17E-05	2.95E-05	12.95798137
2020	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	15	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	1.12E+03	3.93E+02	2.49E+02	9.75E-03	7.26E-01	7.14E-03	1.23E+00	3.50E-05	4.82E-04	8.24E-04	5.51E-04	462.8028471
2020	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	15	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	7.25E+03	2.90E+02	1.84E+02	6.73E-03	5.36E-01	4.96E-03	9.06E-01	2.58E-05	3.30E-04	5.88E-04	3.81E-04	338.842102
2020	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	25	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	4.40E+02	1.55E+02	1.56E+02	6.05E-03	4.70E-01	4.22E-03	7.49E-01	1.90E-05	2.94E-04	4.03E-04	3.42E-04	281.6312757
2020	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	25	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	2.86E+03	1.14E+02	1.15E+02	4.24E-03	3.47E-01	2.87E-03	5.52E-01	1.40E-05	2.01E-04	2.84E-04	2.40E-04	206.5180977
2020	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	50	Lawn and Ga U	N	NHH	NP	Sacrament SV	SAC	6.37E+00	1.81E+00	2.76E+00	3.31E-05	1.90E-03	6.40E-05	2.35E-02	2.86E-07	1.80E-06	5.26E-06	1.87E-06	7.994951654
2020	Annual	Mon-Sun	2265004060	Wood Split	G4	5	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	3.75E+02	1.32E+02	3.86E+01	4.08E-03	9.00E-02	1.04E-03	2.16E-01	7.45E-06	6.33E-04	1.76E-04	2.31E-04	93.29014228
2020	Annual	Mon-Sun	2265004060	Wood Split	G4	5	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	9.37E+03	2.82E+01	9.71E+00	5.52E-04	2.89E-02	1.49E-04	4.61E-02	1.59E-06	8.23E-05	2.97E-05	3.12E-05	18.2813536
2020	Annual	Mon-Sun	2265004065	Chippers/S	G4	15	Lawn and Ga C	P	NHH	P	Sacrament SV	SAC	5.28E+00	1.83E+01	1.54E+01	1.22E-03	4.46E-02	9.00E-04	7.42E-02	2.12E-06	6.22E-04	6.49E-05	6.79E-05	31.12632041
2020	Annual	Mon-Sun	2265004065	Chippers/S	G4	15	Lawn and Ga R	P	NHH	P	Sacrament SV	SAC	9.44E+00	4.27E-01	3.60E-01	2.30E-05	1.06E-03	1.51E-05	1.73E-03	4.94E-08	1.42E-05	1.27E-06	1.30E-06	0.699789804
2020	Annual	Mon-Sun	2265004065	Chippers/S	G4	25	Lawn and Ga C	P	NHH	P	Sacrament SV	SAC	3.00E+01	1.04E+02	1.48E+02	1.19E-02	4.40E-01	7.73E-03	6.89E-01	1.75E-05	5.78E-03	4.60E-04	6.66E-04	291.0034238
2020	Annual	Mon-Sun	2265004065	Chippers/S	G4	25	Lawn and Ga R	P	NHH	P	Sacrament SV	SAC	5.34E+01	2.41E+00	3.42E+00	2.18E-04	1.03E-02	1.28E-04	1.60E-02	4.07E-07	1.32E-04	8.96E-06	1.23E-05	6.479009286
2020	Annual	Mon-Sun	2265004070	Commercia	G4	15	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	3.95E+02	8.66E+02	4.62E+02	2.61E-02	1.34E+00	1.87E-02	2.25E+00	6.43E-05	1.26E-03	1.99E-03	1.47E-03	893.7970503
2020	Annual	Mon-Sun	2265004070	Commercia	G4	25	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	1.95E+02	4.27E+02	4.04E+02	2.15E-02	1.21E+00	1.66E-02	1.92E+00	4.86E-05	1.07E-03	1.34E-03	1.21E-03	754.054816
2020	Annual	Mon-Sun	2265004070	Commercia	G4	50	Lawn and Ga U	N	NHH	NP	Sacrament SV	SAC	7.85E+01	1.58E+02	2.64E+02	4.73E-03	3.96E-01	9.10E-03	1.91E+00	2.32E-05	1.46E-04	5.96E-04	2.67E-04	659.9347119
2020	Annual	Mon-Sun	2265004070	Commercia	G4	120	Lawn and Ga U	N	NHH	NP	Sacrament SV	SAC	5.19E-01	1.04E+00	2.55E+00	1.14E-05	6.19E-04	6.85E-05	2.36E-02	2.28E-07	1.83E-06	4.33E-06	6.46E-07	7.903544041
2020	Annual	Mon-Sun	2265004075	Other Law	G4	5	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	3.47E+02	6.52E+01	1.34E+01	1.18E-03	3.36E-02	2.98E-04	7.16E-02	2.47E-06	1.88E-04	6.51E-05	6.70E-05	30.18828266
2020	Annual	Mon-Sun	2265004075	Other Law	G4	5	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	1.06E+04	1.25E+02	2.85E+01	1.90E-03	8.29E-02	4.98E-04	1.38E-01	4.75E-06	2.71E-04	1.13E-04	1.08E-04	56.05126584
2020	Annual	Mon-Sun	2265004075	Other Law	G4	15	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	1.54E+02	2.90E+01	1.29E+01	5.11E-04	3.76E-02	3.74E-04	6.36E-02	1.81E-06	2.52E-05	5.05E-05	2.89E-05	24.0644059
2020	Annual	Mon-Sun	2265004075	Other Law	G4	15	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	4.72E+03	5.56E+01	2.50E+01	1.00E-03	7.35E-02	7.02E-04	1.22E-01	3.48E-06	4.21E-05	9.55E-05	5.68E-05	46.33471372
2020	Annual	Mon-Sun	2265004075	Other Law	G4	25	Lawn and Ga C	N	NHH	NP	Sacrament SV	SAC	3.26E+00	6.12E-01	5.97E-01	2.33E-05	1.79E-03	1.63E-05	2.86E-03	7.24E-08	1.13E-06	1.57E-06	1.32E-06	1.075766837
2020	Annual	Mon-Sun	2265004075	Other Law	G4	25	Lawn and Ga R	N	NHH	NP	Sacrament SV	SAC	1.00E+02	1.18E+00	1.16E+00	4.68E-05	3.51E-03	2.93E-05	5.52E-03	1.40E-07	1.90E-06	2.91E-06	2.65E-06	2.086915304
2020	Annual	Mon-Sun	2265004075	Other Law	G4	50	Lawn and Ga U	N	NHH	NP	Sacrament SV	SAC	2.36E-01	3.94E-02	8.27E-02	1.04E-06	5.30E-05	2.03E-06	7.11E-04	8.64E-09	5.44E-08	1.38E-07	5.87E-08	0.241745488
2020	Annual	Mon-Sun	2265004075	Other Law	G4	120	Lawn and Ga U	N	NHH	NP	Sacrament SV	SAC	5.66E-01	9.46E-02	5.13E-01	3.29E-06	1.01E-04	1.77E-05	4.78E-03	4.62E-08	3.70E-07	6.52E-07	1.86E-07	1.604586162
2020	Annual	Mon-Sun	2270002003	Pavers	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	8.28E-01	1.86E+00	1.58E+00	2.10E-05	7.15E-05	1.33E-04	1.74E-02	2.20E-07	5.13E-06	0.00E+00	1.89E-06	5.918195657
2020	Annual	Mon-Sun	2270002003	Pavers	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	4.81E+01	1.10E+02	1.42E+02	4.59E-03	1.67E-02	1.31E-02	1.53E+00	1.98E-05	1.01E-03	0.00E+00	4.14E-04	543.730309
2020	Annual	Mon-Sun	2270002003	Pavers	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	5.67E+01	1.29E+02	4.09E+02	5.90E-03	3.10E-02	3.54E-02	4.47E+00	5.24E-05	2.78E-03	0.00E+00	5.32E-04	1525.554224
2020	Annual	Mon-Sun	2270002003	Pavers	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	3.53E+01	8.03E+01	4.70E+02	4.90E-03	3.05E-02	3.29E-02	5.15E+00	5.79E-05	1.85E-03	0.00E+00	4.42E-04	1743.053295
2020	Annual	Mon-Sun	2270002003	Pavers	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	4.25E+00	9.68E+00	8.52E+01	6.83E-04	2.28E-03	5.39E-03	9.40E-01	1.06E-05	1.97E-04	0.00E+00	6.16E-05	316.5644532
2020	Annual	Mon-Sun	2270002003	Pavers	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	4.36E+00	9.93E+00	1.05E+02	7.91E-04	3.12E-03	5.94E-03	1.16E+00	1.14E-05	2.23E-04	0.00E+00	7.14E-05	389.3529366
2020	Annual	Mon-Sun	2270002009	Plate Comp	D	15	Construction U	P	NHH	NP	Sacrament SV	SAC	1.78E+01	2.92E+01	5.76E+00	7.33E-05	3.85E-04	4.59E-04	6.30E-02	9.80E-07	1.79E-05	0.00E+00	6.62E-06	21.44237934
2020	Annual	Mon-Sun	2270002015	Rollers	D	15	Construction U	P	NHH	NP	Sacrament SV	SAC	3.34E+01	6.36E+01	1.84E+01	2.34E-04	1.23E-03	1.46E-03	2.01E-01	3.13E-06	5.72E-05	0.00E+00	2.11E-05	68.3719679
2020	Annual	Mon-Sun	2270002015	Rollers	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	1.40E+01	2.66E+01	1.62E+01	2.14E-04	7.30E-04	1.35E-03	1.77E-01	2.25E-06	5.05E-05	0.00E+00	1.93E-05	60.42013935
2020	Annual	Mon-Sun	2270002015	Rollers	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	4.34E+01	8.34E+01	9.97E+01	2.27E-03	1.02E-02	8.49E-03	1.08E+00	1.40E-05	5.33E-04	0.00E+00	2.05E-04	376.2555498
2020	Annual	Mon-Sun	2270002015	Rollers	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	2.33E+02	4.48E+02	1.20E+03	1.29E-02	8.66E-02	8.51E-02	1.32E+01	1.55E-04	6.07E-03	0.00E+00	1.17E-03	4469.030763
2020	Annual	Mon-Sun	2270002015	Rollers	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	9.38E+01	1.80E+02	8.86E+02	6.98E-03	5.50E-02	4.80E-02	9.72E+00	1.09E-04	2.58E-03	0.00E+00	6.30E-04	3274.625118
2020	Annual	Mon-Sun	2270002015	Rollers	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	1.33E+01	2.55E+01	1.77E+02	1.07E-03	4.08E-03	8.41E-03	1.95E+00	2.20E-05	2.85E-04	0.00E+00	9.69E-05	654.949238
2020	Annual	Mon-Sun	2270002015	Rollers	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	9.33E+00	1.79E+01	1.77E+02	1.03E-03	4.12E-03	7.48E-03	1.96E+00	1.92E-05	2.68E-04	0.00E+00	9.29E-05	656.9346323
2020	Annual	Mon-Sun	2270002018	Scrapers	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	2.15E+00	6.54E+00	2.81E+01	3.99E-04	2.16E-03	2.35E-03	3.07E-01	3.60E-06	1.81E-04	0.00E+00	3.60E-05	104.6786147
2020	Annual	Mon-Sun	2270002018	Scrapers	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	1.97E+01	5.98E+01	4.04E+02	4.20E-03	2.67E-02	2.70E-02	4.43E+00	4.98E-05	1.51E-03	0.00E+00	3.79E-04	1498.657734
2020	Annual	Mon-Sun	2270002018	Scrapers	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	1.92E+01	5.83E+01	5.53E+02	4.44E-03	1.47E-02	3.32E-02	6.10E+00	6.87E-05	1.20E-03	0.00E+00	4.00E-04	2055.921373
2020	Annual	Mon-Sun	2270002018	Scrapers	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	5.29E+01	1.61E+02	2.34E+03	1.77E-02	6.77E-02	1.25E-01	2.58E+01	2.53E-04	4.69E-03	0.00E+00	1.60E-03	8676.755208
2020	Annual	Mon-Sun	2270002018	Scrapers	D	750	Construction U	N	NHH	NP	Sacrament SV	SAC	2.11E+00	6.42E+00	1.61E+02	1.23E-03	4.68E-03	8.88E-03	1.78E+00	1.79E-05	3.28E-04	0.00E+00	1.11E-04	599.4575947
2020	Annual	Mon-Sun	2270002021	Paving Equ	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	1.43E+00	3.26E+00	1.87E+00	2.48E-05	8.47E-05	1.57E-04	2.06E-02	2.61E-07	5.86E-06	0.00E+00	2.24E-06	7.009582104
2020	Annual	Mon-Sun	2270002021	Paving Equ	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	1.21E+00	2.78E+00	3.08E+00	9.79E-05	3.58E-04	2.84E-04	3.32E-02	4.29E-07	2.18E-05	0.00E+00	8.83E-06	11.77223047
2020	Annual	Mon-Sun	2270002021	Paving Equ	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	1.75E+01	4.00E+01	9.98E+01	1.42E-03	7.53E-03	8.58E-03	1.09E+00	1.28E-05	6.78E-04	0.00E+00	1.28E-04	372.1945885
2020	Annual	Mon-Sun	2270002021	Paving Equ	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	8.22E+00	1.88E+01	8.66E+01	8.91E-04	5.59E-03	6.04E-03	9.50E-01	1.07E-05	3.40E-04	0.00E+00	8.04E-05	321.5344455
2020	Annual	Mon-Sun	2270002021	Paving Equ	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	2.32E+00	5.30E+00	2.94E+01	2.29E-04	7.67E-04	1.84E-03	3.24E-01	3.65E-06	6.61E-05	0.00E+00	2.07E-05	109.122086
2020	Annual	Mon-Sun	2270002024	Surfacing E	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	1.10E+00	1.37E+00	8.85E-01	1.82E-05	8.13E-05	7.30E-05	9.62E-03	1.24E-07	4.33E-06	0.00E+00	1.64E-06	3.330485036
2020	Annual	Mon-Sun	2270002024	Surfacing E	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	2.21E-01	2.73E-01	7.94E-01	7.80E-06	5.50E-05	5.52E-05	8.70E-03	1.02E-07	3.72E-06	0.00E+00	7.04E-07	2.942605803
2020	Annual	Mon-Sun	2270002024	Surfacing E	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	1.66E-01	2.05E-01	7.99E-01	5.65E-06	4.77E-05	4.28E-05	8.78E-03	9.88E-08	2.16E-06	0.00E+00	5.10E-07	2.951070885
2020	Annual	Mon-Sun	2270002024	Surfacing E	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	3.31E-01	4.10E-01	2.50E+00	1.34E-05	5.64E-05	1.17E-04	2.76E-02	3.11E-07	3.86E-06	0.00E+00	1.21E-06	9.24547983
2020	Annual	Mon-Sun	2270002024	Surfacing E	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	2.76E+00	3.41E+00	3.42E+01	1.72E-04	8.06E-04	1.44E-03	3.77E-01	3.70E-06	4.92E-05	0.00E+00	1.55E-05	126.2830091
2020	Annual	Mon-Sun	2270002024	Surfacing E	D	750	Construction U	N	NHH	NP	Sacrament SV	SAC	4.04E-01	5.00E-01	7.84E+00	3.99E-05	1.85E-04	3.39E-04	8.67E-02	8.71E-07	1.15E-05	0.00E+00	3.60E-06	29.00983291
2020	Annual	Mon-Sun	2270002027	Signal Boar	D	15	Construction U	P	NHH	NP	Sacrament SV	SAC	1.55E+02	3.19E+02	9.00E+01	1.15E-03	6.01E-03	7.18E-03	9.85E-01	1.53E-05	2.80E-04	0.00E+00	1.03E-04	335.1290971
2020	Annual	Mon-Sun	2270002027	Signal Boar	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	7.73E-01	1.13E+00	1.88E+00	2.85E-05	1.60E-04	1.49E-04	2.05E-02	2.65E-07	7.43E-06	0.00E+00	2.57E-06	7.010707293
2020	Annual	Mon-Sun	2270002027	Signal Boar	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	1.26E+01	1.85E+01	6.77E+01	5.17E-04	4.58E-03	4.10E-03	7.43E-01	8.71E-06	2.45E-04	0.00E+00	4.66E-05	250.0635531
2020	Annual	Mon-Sun	2270002027	Signal Boar	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	7.84E+00	1.15E+01	8.08E+01	4.66E-04	4.75E-03	3.61E-03	8.88E-01	9.99E-06	1.73E-04	0.00E+00	4.21E-05	297.5770416
2020	Annual	Mon-Sun	2270002027	Signal Boar	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	1.66E+00	2.43E+00	2.80E+01	1.24E-04	5.78E-04	1.06E-03	3.10E-01	3.49E-06	3.23E-05	0.00E+00	1.12E-05	103.5456878
2020	Annual	Mon-Sun	2270002030	Trenchers	D	15	Construction U	P	NHH	NP	Sacrament SV	SAC	4.14E+00	7.01E+00	2.71E+00	3.45E-05	1.81E-04	2.16E-04	2.97E-02	4.62E-07	8.45E-06	0.00E+00	3.12E-06	10.09394536
2020	Annual	Mon-Sun	2270002030	Trenchers	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	4.36E+00	7.39E+00	1.11E+01	1.47E-04	5.00E-04	9.26E-04	1.21E-01	1.54E-06	3.46E-05	0.00E+00	1.32E-05	41.38849788
2020	Annual	Mon-Sun	2270002030	Trenchers	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	1.66E+02	2.86E+02	4.35E+02	1.42E-02	4.99E-02	4.00E-02	4.70E+00	6.07E-05	3.13E-03	0.00E+00	1.28E-03	1666.935376
2020	Annual	Mon-Sun	2270002030	Trenchers	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	2.25E+02	3.87E+02	1.15E+03	1.65E-02	8.59E-02	1.01E-01	1.25E+01	1.47E-04	7.92E-03	0.00E+00	1.49E-03	4283.895207
2020	Annual	Mon-Sun	2270002030	Trenchers	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	2.46E+01	4.23E+01	2.78E+02	2.86E-03	1.78E-02	2.00E-02	3.04E+00	3.43E-05	1.11E-03	0.00E+00	2.58E-04	1030.621367
2020	Annual	Mon-Sun	2270002030	Trenchers	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	2.21E+00	3.80E+00	3.83E+01	3.04E-04	1.04E-03	2.50E-03	4.23E-01	4.76E-06	9.26E-05	0.00E+00	2.74E-05	142.4416614
2020	Annual	Mon-Sun	2270002030	Trenchers	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	2.81E+00	4.84E+00	6.83E+01	5.06E-04	2.10E-03	4.00E-03	7.53E-01	7.39E-06	1.51E-04	0.00E+00	4.57E-05	253.3711701
2020	Annual	Mon-Sun	2270002030	Trenchers	D	750	Construction U	N	NHH	NP	Sacrament SV	SAC	8.08E-02	1.39E-01	3.70E+00	2.75E-05	1.14E-04	2.21E-04	4.08E-02	4.10E-07	8.26E-06	0.00E+00	2.48E-06	13.71314791
2020	Annual	Mon-Sun	2270002033	Bore/Drill I	D	15	Construction U	P	NHH	P	Sacrament SV	SAC	5.52E-01	1.23E+00	5.79E-01	7.38E-06	3.87E-05	4.62E-05	6.34E-03	9.87E-08	1.81E-06	0.00E+00	6.66E-07	2.158649905
2020	Annual	Mon-Sun	2270002033	Bore/Drill I	D	25	Construction U	P	NHH	P	Sacrament SV	SAC	1.66E+00	3.68E+00	2.68E+00	3.55E-05	1.21E-04	2.24E-04	2.94E-02	3.73E-07	8.37E-06	0.00E+00	3.20E-06	10.01814079
2020	Annual	Mon-Sun	2270002033	Bore/Drill I	D	50	Construction U	P	NHH	P	Sacrament SV	SAC	7.23E+00	1.66E+01	2.35E+01	1.63E-04	1.83E-03	1.46E-03	2.58E-01	3.33E-06	1.63E-05	0.00E+00	1.47E-05	86.63526257
2020	Annual	Mon-Sun	2270002033	Bore/Drill I	D	120	Construction U	P	NHH	P	Sacrament SV	SAC	2.22E+01	5.10E+01	1.79E+02	7.14E-04	1.19E-02	5.94E-03	1.97E+00	2.31E-05	1.01E-04	0.00E+00	6.44E-05	656.4383641
2020	Annual	Mon-Sun	2270002033	Bore/Drill I	D	175	Construction U	P	NHH	P	Sacrament SV	SAC	5.13E+00	1.18E+01	7.56E+01	2.37E-04	4.45E-03	1.10E-03	8.32E-01	9.36E-06	2.99E-05	0.00E+00	2.14E-05	277.283693
2020	Annual	Mon-Sun	2270002033	Bore/Drill I	D	250	Construction U	N	NHH	P	Sacrament SV	SAC	4.41E+00	1.02E+01	8.62E+01	2.41E-04	1.74E-03	8.20E-04	9.54E-01	1.07E-05	2.22E-05	0.00E+00	2.17E-05	317.7829462

2020	Annual	Mon-Sun	2270002033	Bore/Drill I	D	500	Construction U	N	NHH	P	Sacrament SV	SAC	9.82E+00	2.26E+01	3.18E+02	8.84E-04	6.22E-03	2.96E-03	3.51E+00	3.45E-05	8.14E-05	0.00E+00	7.98E-05	1170.185999
2020	Annual	Mon-Sun	2270002033	Bore/Drill I	D	750	Construction U	N	NHH	P	Sacrament SV	SAC	1.25E+00	2.88E+00	8.00E+01	2.23E-04	1.57E-03	7.48E-04	8.85E-01	8.90E-06	2.05E-05	0.00E+00	2.01E-05	294.7686306
2020	Annual	Mon-Sun	2270002033	Bore/Drill I	D	1000	Construction U	N	NHH	P	Sacrament SV	SAC	2.10E+00	4.83E+00	2.02E+02	5.89E-04	3.96E-03	9.61E-03	2.24E+00	2.25E-05	1.28E-04	0.00E+00	5.31E-05	745.664007
2020	Annual	Mon-Sun	2270002036	Excavators	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	2.04E+00	7.82E+00	5.85E+00	7.74E-05	2.64E-04	4.89E-04	6.42E-02	8.14E-07	1.83E-05	0.00E+00	6.99E-06	21.86878323
2020	Annual	Mon-Sun	2270002036	Excavators	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	7.69E+01	2.98E+02	3.43E+02	5.72E-03	3.64E-02	2.77E-02	3.73E+00	4.82E-05	1.20E-03	0.00E+00	5.16E-04	1279.390372
2020	Annual	Mon-Sun	2270002036	Excavators	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	2.09E+02	8.10E+02	2.72E+03	2.36E-02	2.01E-01	1.50E-01	2.98E+01	3.49E-04	8.31E-03	0.00E+00	2.13E-03	10049.2976
2020	Annual	Mon-Sun	2270002036	Excavators	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	4.03E+02	1.56E+03	7.98E+03	5.48E-02	5.18E-01	3.02E-01	8.76E+01	9.85E-04	1.52E-02	0.00E+00	4.95E-03	29436.00787
2020	Annual	Mon-Sun	2270002036	Excavators	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	1.64E+02	6.35E+02	4.56E+03	2.62E-02	1.04E-01	1.43E-01	5.04E+01	5.67E-04	4.87E-03	0.00E+00	2.37E-03	16885.61839
2020	Annual	Mon-Sun	2270002036	Excavators	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	1.18E+02	4.58E+02	4.84E+03	2.74E-02	1.05E-01	1.38E-01	5.35E+01	5.25E-04	5.01E-03	0.00E+00	2.47E-03	17937.9075
2020	Annual	Mon-Sun	2270002036	Excavators	D	750	Construction U	N	NHH	NP	Sacrament SV	SAC	6.33E-01	2.46E+00	4.30E+01	2.44E-04	9.33E-04	1.25E-03	4.75E-01	4.78E-06	4.48E-05	0.00E+00	2.20E-05	159.2674391
2020	Annual	Mon-Sun	2270002039	Concrete/I	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	2.21E-01	3.58E-01	2.69E-01	3.56E-06	1.21E-05	2.25E-05	2.95E-03	3.74E-08	8.40E-07	0.00E+00	3.21E-07	1.004875024
2020	Annual	Mon-Sun	2270002039	Concrete/I	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	1.93E+00	3.07E+00	4.25E+00	6.52E-05	3.71E-04	3.42E-04	4.64E-02	5.99E-07	1.73E-05	0.00E+00	5.88E-06	15.86671482
2020	Annual	Mon-Sun	2270002039	Concrete/I	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	3.37E+00	5.35E+00	1.81E+01	1.40E-04	1.23E-03	1.10E-03	1.98E-01	2.33E-06	6.67E-05	0.00E+00	1.27E-05	66.77913179
2020	Annual	Mon-Sun	2270002039	Concrete/I	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	1.10E-01	1.76E-01	1.28E+00	7.59E-06	7.60E-05	5.75E-05	1.40E-02	1.58E-07	2.83E-06	0.00E+00	6.85E-07	4.711721194
2020	Annual	Mon-Sun	2270002042	Cement an	D	15	Construction U	P	NHH	NP	Sacrament SV	SAC	2.82E+01	2.32E+01	6.69E+00	8.53E-05	4.47E-04	5.34E-04	7.32E-02	1.14E-06	2.09E-05	0.00E+00	7.69E-06	24.92757696
2020	Annual	Mon-Sun	2270002042	Cement an	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	2.54E+00	2.09E+00	1.67E+00	2.33E-05	7.73E-05	1.43E-04	1.83E-02	2.32E-07	6.06E-06	0.00E+00	2.10E-06	6.248970654
2020	Annual	Mon-Sun	2270002045	Cranes	D	50	Construction U	P	NHH	P	Sacrament SV	SAC	1.88E+00	6.58E+00	7.04E+00	1.75E-04	7.97E-04	6.23E-04	7.62E-02	9.85E-07	3.98E-05	0.00E+00	1.58E-05	26.62804014
2020	Annual	Mon-Sun	2270002045	Cranes	D	120	Construction U	P	NHH	P	Sacrament SV	SAC	2.06E+01	7.22E+01	1.65E+02	1.96E-03	1.24E-02	1.20E-02	1.81E+00	2.12E-05	8.68E-04	0.00E+00	1.77E-04	614.3551576
2020	Annual	Mon-Sun	2270002045	Cranes	D	175	Construction U	P	NHH	P	Sacrament SV	SAC	2.06E+01	7.22E+01	2.64E+02	2.34E-03	1.71E-02	1.47E-02	2.90E+00	3.26E-05	8.08E-04	0.00E+00	2.11E-04	977.9616321
2020	Annual	Mon-Sun	2270002045	Cranes	D	250	Construction U	N	NHH	P	Sacrament SV	SAC	3.99E+01	1.40E+02	7.10E+02	4.92E-03	1.70E-02	3.47E-02	7.84E+00	8.82E-05	1.19E-03	0.00E+00	4.44E-04	2635.080626
2020	Annual	Mon-Sun	2270002045	Cranes	D	500	Construction U	N	NHH	P	Sacrament SV	SAC	1.46E+01	5.13E+01	4.18E+02	2.79E-03	9.83E-03	1.81E-02	4.61E+00	4.53E-05	6.59E-04	0.00E+00	2.51E-04	1550.008679
2020	Annual	Mon-Sun	2270002045	Cranes	D	750	Construction U	N	NHH	P	Sacrament SV	SAC	2.63E+00	9.21E+00	1.26E+02	8.45E-04	2.97E-03	5.62E-03	1.39E+00	1.40E-05	2.02E-04	0.00E+00	7.63E-05	468.3310386
2020	Annual	Mon-Sun	2270002045	Cranes	D	9999	Construction U	N	NHH	P	Sacrament SV	SAC	3.30E+00	1.16E+01	5.08E+02	3.87E-03	1.27E-02	4.07E-02	5.60E+00	5.64E-05	1.04E-03	0.00E+00	3.49E-04	1886.463782
2020	Annual	Mon-Sun	2270002048	Graders	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	7.73E-01	2.00E+00	2.54E+00	5.66E-05	2.77E-04	2.16E-04	2.76E-02	3.56E-07	1.25E-05	0.00E+00	5.11E-06	9.579308286
2020	Annual	Mon-Sun	2270002048	Graders	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	5.15E+01	1.34E+02	4.58E+02	4.95E-03	3.40E-02	3.06E-02	5.01E+00	5.87E-05	2.09E-03	0.00E+00	4.46E-04	1697.458462
2020	Annual	Mon-Sun	2270002048	Graders	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	1.76E+02	4.57E+02	2.58E+03	2.10E-02	1.66E-01	1.29E-01	2.83E+01	3.18E-04	6.95E-03	0.00E+00	1.90E-03	9531.890011
2020	Annual	Mon-Sun	2270002048	Graders	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	1.09E+02	2.84E+02	2.21E+03	1.42E-02	5.21E-02	9.52E-02	2.44E+01	2.74E-04	3.26E-03	0.00E+00	1.28E-03	8183.324777
2020	Annual	Mon-Sun	2270002048	Graders	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	3.09E+00	8.02E+00	8.32E+01	5.14E-04	1.99E-03	3.20E-03	9.19E-01	9.02E-06	1.16E-04	0.00E+00	4.64E-05	308.4417031
2020	Annual	Mon-Sun	2270002048	Graders	D	750	Construction U	N	NHH	NP	Sacrament SV	SAC	4.04E-02	1.05E-01	2.30E+00	1.43E-05	5.50E-05	9.11E-05	2.54E-02	2.56E-07	3.25E-06	0.00E+00	1.29E-06	8.534824859
2020	Annual	Mon-Sun	2270002051	Off-Highwa	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	3.59E+00	1.95E+01	1.11E+02	8.14E-04	7.33E-03	4.44E-03	1.22E+00	1.37E-05	2.27E-04	0.00E+00	7.35E-05	409.4118907
2020	Annual	Mon-Sun	2270002051	Off-Highwa	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	2.65E+01	1.44E+02	1.08E+03	6.66E-03	2.52E-02	3.62E-02	1.20E+01	1.35E-04	1.24E-03	0.00E+00	6.01E-04	4014.690526
2020	Annual	Mon-Sun	2270002051	Off-Highwa	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	3.73E+01	2.03E+02	2.49E+03	1.50E-02	5.51E-02	7.56E-02	2.76E+01	2.70E-04	2.76E-03	0.00E+00	1.36E-03	9243.158386
2020	Annual	Mon-Sun	2270002051	Off-Highwa	D	750	Construction U	N	NHH	NP	Sacrament SV	SAC	8.47E+00	4.60E+01	9.19E+02	5.55E-03	2.03E-02	2.84E-02	1.01E+01	1.02E-04	1.03E-03	0.00E+00	5.01E-04	3404.173613
2020	Annual	Mon-Sun	2270002051	Off-Highwa	D	1000	Construction U	N	NHH	NP	Sacrament SV	SAC	3.97E+00	2.15E+01	6.09E+02	3.89E-03	1.39E-02	4.19E-02	6.72E+00	6.76E-05	9.72E-04	0.00E+00	3.51E-04	2257.330426
2020	Annual	Mon-Sun	2270002054	Crushing/P	D	50	Construction U	P	NHH	P	Sacrament SV	SAC	8.83E+00	2.31E+01	4.68E+01	8.49E-04	4.66E-03	3.89E-03	5.08E-01	6.57E-06	2.09E-04	0.00E+00	7.66E-05	175.0686487
2020	Annual	Mon-Sun	2270002054	Crushing/P	D	120	Construction U	P	NHH	P	Sacrament SV	SAC	2.49E+01	6.52E+01	2.47E+02	2.26E-03	1.77E-02	1.55E-02	2.71E+00	3.18E-05	9.86E-04	0.00E+00	2.03E-04	914.2070151
2020	Annual	Mon-Sun	2270002054	Crushing/P	D	175	Construction U	P	NHH	P	Sacrament SV	SAC	1.05E+01	2.76E+01	2.10E+02	1.49E-03	1.31E-02	9.71E-03	2.31E+00	2.60E-05	5.07E-04	0.00E+00	1.35E-04	775.505541
2020	Annual	Mon-Sun	2270002054	Crushing/P	D	250	Construction U	N	NHH	P	Sacrament SV	SAC	1.05E+00	2.75E+00	3.04E+01	1.71E-04	6.64E-04	1.19E-03	3.35E-01	3.77E-06	3.86E-05	0.00E+00	1.54E-05	112.4156982
2020	Annual	Mon-Sun	2270002054	Crushing/P	D	500	Construction U	N	NHH	P	Sacrament SV	SAC	5.90E+00	1.55E+01	2.61E+02	1.43E-03	5.48E-03	9.13E-03	2.89E+00	2.83E-05	3.21E-04	0.00E+00	1.29E-04	967.037907
2020	Annual	Mon-Sun	2270002054	Crushing/P	D	750	Construction U	N	NHH	P	Sacrament SV	SAC	6.73E-02	1.76E-01	4.69E+00	2.57E-05	9.84E-05	1.68E-04	5.19E-02	5.21E-07	5.77E-06	0.00E+00	2.31E-06	17.37672465
2020	Annual	Mon-Sun	2270002054	Crushing/P	D	9999	Construction U	N	NHH	P	Sacrament SV	SAC	6.73E-02	1.76E-01	1.04E+01	6.68E-05	2.34E-04	7.50E-04	1.15E-01	1.16E-06	1.81E-05	0.00E+00	6.03E-06	38.67050709
2020	Annual	Mon-Sun	2270002057	Rough Terr	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	6.13E+00	1.90E+01	2.95E+01	4.94E-04	3.01E-03	2.42E-03	3.21E-01	4.15E-06	1.16E-04	0.00E+00	4.46E-05	110.2281062
2020	Annual	Mon-Sun	2270002057	Rough Terr	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	2.93E+02	9.09E+02	2.59E+03	2.25E-02	1.88E-01	1.51E-01	2.84E+01	3.33E-04	8.94E-03	0.00E+00	2.03E-03	9569.499709
2020	Annual	Mon-Sun	2270002057	Rough Terr	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	3.76E+01	1.16E+02	6.62E+02	4.58E-03	4.21E-02	2.74E-02	7.27E+00	8.18E-05	1.43E-03	0.00E+00	4.13E-04	2442.44105
2020	Annual	Mon-Sun	2270002057	Rough Terr	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	2.10E+00	6.50E+00	5.02E+01	2.86E-04	1.12E-03	1.75E-03	5.54E-01	6.24E-06	5.91E-05	0.00E+00	2.58E-05	185.8647529
2020	Annual	Mon-Sun	2270002057	Rough Terr	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	1.38E+00	4.28E+00	4.96E+01	2.77E-04	1.05E-03	1.56E-03	5.48E-01	5.38E-06	5.66E-05	0.00E+00	2.50E-05	183.6434281
2020	Annual	Mon-Sun	2270002060	Rubber Tir	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	7.73E-01	2.03E+00	1.56E+00	2.07E-05	7.06E-05	1.31E-04	1.71E-02	2.18E-07	4.88E-06	0.00E+00	1.87E-06	5.84128886
2020	Annual	Mon-Sun	2270002060	Rubber Tir	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	1.50E+01	4.00E+01	5.73E+01	1.23E-03	6.15E-03	4.84E-03	6.22E-01	8.04E-06	2.74E-04	0.00E+00	1.11E-04	215.6504528
2020	Annual	Mon-Sun	2270002060	Rubber Tir	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	4.08E+02	1.09E+03	2.92E+03	3.06E-02	2.16E-01	1.92E-01	3.20E+01	3.75E-04	1.29E-02	0.00E+00	2.76E-03	10829.91998
2020	Annual	Mon-Sun	2270002060	Rubber Tir	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	2.30E+02	6.12E+02	2.96E+03	2.35E-02	1.90E-01	1.45E-01	3.25E+01	3.66E-04	7.77E-03	0.00E+00	2.12E-03	10954.82373
2020	Annual	Mon-Sun	2270002060	Rubber Tir	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	2.29E+02	6.09E+02	4.10E+03	2.58E-02	9.61E-02	1.73E-01	4.53E+01	5.10E-04	5.92E-03	0.00E+00	2.33E-03	15211.02261
2020	Annual	Mon-Sun	2270002060	Rubber Tir	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	9.52E+01	2.53E+02	2.72E+03	1.65E-02	6.35E-02	1.02E-01	3.00E+01	2.95E-04	3.69E-03	0.00E+00	1.49E-03	10066.15597
2020	Annual	Mon-Sun	2270002060	Rubber Tir	D	750	Construction U	N	NHH	NP	Sacrament SV	SAC	1.63E+00	4.34E+00	9.53E+01	5.81E-04	2.23E-03	3.67E-03	1.05E+00	1.06E-05	1.31E-04	0.00E+00	5.24E-05	352.9768577
2020	Annual	Mon-Sun	2270002060	Rubber Tir	D	1000	Construction U	N	NHH	NP	Sacrament SV	SAC	1.75E-01	4.66E-01	1.25E+01	8.10E-05	3.06E-04	9.31E-04	1.38E-01	1.39E-06	2.29E-05	0.00E+00	7.31E-06	46.37736806
2020	Annual	Mon-Sun	2270002063	Rubber Tir	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	5.52E-01	2.45E+00	1.45E+01	1.85E-04	9.93E-04	1.22E-03	1.58E-01	1.78E-06	6.89E-05	0.00E+00	1.67E-05	53.8748479
2020	Annual	Mon-Sun	2270002063	Rubber Tir	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	1.35E+01	6.00E+01	4.99E+02	5.10E-03	1.58E-02	3.87E-02	5.50E+00	6.18E-05	1.54E-03	0.00E+00	4.60E-04	1860.020264
2020	Annual	Mon-Sun	2270002063	Rubber Tir	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	2.08E+01	9.23E+01	1.11E+03	1.06E-02	4.27E-02	7.78E-02	1.22E+01	1.20E-04	3.10E-03	0.00E+00	9.53E-04	4125.627193
2020	Annual	Mon-Sun	2270002063	Rubber Tir	D	750	Construction U	N	NHH	NP	Sacrament SV	SAC	1.79E+00	7.94E+00	1.44E+02	1.37E-03	5.53E-03	1.03E-02	1.58E+00	1.59E-05	4.06E-04	0.00E+00	1.24E-04	534.7477125
2020	Annual	Mon-Sun	2270002063	Rubber Tir	D	1000	Construction U	N	NHH	NP	Sacrament SV	SAC	1.21E-01	5.37E-01	1.44E+01	1.46E-04	6.04E-04	1.48E-03	1.59E-01	1.60E-06	4.48E-05	0.00E+00	1.32E-05	53.71870217
2020	Annual	Mon-Sun	2270002066	Tractors/Lo	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	1.56E+01	4.02E+01	2.90E+01	3.84E-04	1.31E-03	2.43E-03	3.19E-01	4.04E-06	9.14E-05	0.00E+00	3.47E-05	108.523897
2020	Annual	Mon-Sun	2270002066	Tractors/Lo	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	9.30E+01	2.45E+02	3.41E+02	4.98E-03	3.37E-02	2.66E-02	3.71E+00	4.80E-05	1.06E-03	0.00E+00	4.50E-04	1268.024516
2020	Annual	Mon-Sun	2270002066	Tractors/Lo	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	1.24E+03	3.27E+03	7.72E+03	5.98E-02	5.56E-01	4.03E-01	8.46E+01	9.92E-04	2.11E-02	0.00E+00	5.40E-03	28484.62995
2020	Annual	Mon-Sun	2270002066	Tractors/Lo	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	9.28E+01	2.44E+02	1.13E+03	6.97E-03	7.13E-02	3.93E-02	1.24E+01	1.39E-04	1.94E-03	0.00E+00	6.29E-04	4152.435474
2020	Annual	Mon-Sun	2270002066	Tractors/Lo	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	3.00E+01	7.90E+01	6.14E+02	3.20E-03	1.36E-02	1.75E-02	6.78E+00	7.63E-05	5.95E-04	0.00E+00	2.89E-04	2270.018729
2020	Annual	Mon-Sun	2270002066	Tractors/Lo	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	4.85E+01	1.28E+02	1.99E+03	1.02E-02	4.23E-02	5.18E-02	2.20E+01	2.47E-04	1.87E-03	0.00E+00	9.22E-04	7355.574908
2020	Annual	Mon-Sun	2270002066	Tractors/Lo	D	750	Construction U	N	NHH	NP	Sacrament SV	SAC	8.15E+00	2.14E+01	5.01E+02	2.58E-03	1.07E-02	1.33E-02	5.54E+00	6.23E-05	4.75E-04	0.00E+00	2.33E-04	1855.197156
2020	Annual	Mon-Sun	2270002069	Crawler Tr	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	7.73E-01	2.20E+00	2.53E+00	7.71E-05	3.05E-04	2.31E-04	2.73E-02	3.53E-07	1.65E-05	0.00E+00	6.96E-06	9.655210165
2020	Annual	Mon-Sun	2270002069	Crawler Tr	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	4.38E+02	1.25E+03	3.75E+03	5.20E-02	2.88E-01	3.06E-01	4.10E+01	4.81E-04	2.32E-02	0.00E+00	4.69E-03	13985.47461
2020	Annual	Mon-Sun	2270002069	Crawler Tr	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	1.48E+02	4.22E+02	2.33E+03	2.37E-02	1.54E-01	1.51E-01	2.55E+01	2.87E-04	8.44E-03	0.00E+00	2.14E-03	8646.882501
2020	Annual	Mon-Sun	2270002069	Crawler Tr	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	1.27E+02	3.63E+02	2.73E+03	2.15E-02	7.18E-02	1.58E-01	3.01E+01	3.39E-04	5.72E-03	0.00E+00	1.94E-03	10135.81905
2020	Annual	Mon-Sun	2270002069	Crawler Tr	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	8.74E+01	2.49E+02	2.92E+03	2.18E-02	8.27E-02	1.51E-01	3.22E+01	3.16E-04	5.66E-03	0.00E+00	1.97E-03	10828.87559
2020	Annual	Mon-Sun	2270002069	Crawler Tr	D	750	Construction U	N	NHH	NP	Sacrament SV	SAC	1.08E+00	3.06E+00	6.45E+01	4.85E-04	1.83E-03	3.43E-03	7.11E-01	7.15E-06	1.27E-04	0.00E+00	4.38E-05	239.3914893
2020	Annual	Mon-Sun	2270002069	Crawler Tr	D	1000	Construction U	N	NHH	NP	Sacrament SV	SAC	1.08E+00	3.06E+00	9.13E+01	7.39E-04	2.82E-03	7.97E-03	1.01E+00	1.01E-05	2.18E-04	0.00E+00	6.67E-05	339.1183698
2020	Annual	Mon-Sun	2270002072	Skid Steer I	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	1.06E+02	2.42E+02	1.52E+02	2.07E-03	6.96E-03	1.30E-02	1.67E+00	2.12E-05	5.27E-04	0.00E+00	1.87E-04	569.3014486
2020	Annual	Mon-Sun	2270002072	Skid Steer I	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	9.61E+02	2.24E+03	2.61E+03	2.58E-02	2.24E-01	1.85E-01	2.85E+01	3.69E-04	4.83E-03	0.00E+00	2.32E-03	9654.992026
2020	Annual	Mon-Sun	2270002072	Skid Steer I	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	5.04E+02	1.17E+03	2.28E+03	1.28E-02	1.57E-01	9.66E-02	2.51E+01	2.94E-04	3.76E-03	0.00E+00	1.15E-03	8399.278141
2020	Annual	Mon-Sun	2270002075	Off-Highwa	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	5.52E-02	1.68E-01	7.20E-01	1.22E-05	5.69E-05	7.07E-05	7.86E-03	9.22E-08	5.68E-06	0.00E+00	1.10E-06	2.699576603
2020	Annual	Mon-Sun	2270002075	Off-Highwa	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	6.75E+01	2.05E+02	1.22E+03	1.50E-02	8.23E-02	9.99E-02	1.34E+01	1.50E-04	5.63E-03	0.00E+00	1.35E-03	4547.048847
2020	Annual	Mon-Sun	2270002075	Off-Highwa	D	250	Construction U	N	NHH	NP	Sacrament SV	SAC	6.38E+01	1.94E+02	1.15E+03	1.11E-02	3.50E-02	8.59E-02	1.26E+01	1.42E-04	3.38E-03	0.00E+00	1.00E-03	4274.043926
2020	Annual	Mon-Sun	2270002075	Off-Highwa	D	750	Construction U	N	NHH	NP	Sacrament SV	SAC	6.76E+00	2.06E+01	5.30E+02	4.81E-03	1.93E-02	3.66E-02	5.84E+00	5.87E-05	1.43E-03	0.00E+00	4.34E-04	1970.356341
2020	Annual	Mon-Sun	2270002075	Off-Highwa	D	1000	Construction U	N	NHH	NP	Sacrament SV	SAC	7.14E-01	2.17E+00	8.02E+01	7.72E-04	3.19E-03	8.04E-03	8.82E-01	8.87E-06	2.40E-04	0.00E+00	6.97E-05	298.2205157
2020	Annual	Mon-Sun	2270002078	Dumpers/T	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	1.32E+00	2.40E+00	8.34E-01	1.11E-05	3.77E-05	6.99E-05	9.16E-03	1.16E-07	2.66E-06	0.00E+00	9.97E-07	3.11970257
2020	Annual	Mon-Sun	2270002081	Other Cons	D	15	Construction U	P	NHH	NP	Sacrament SV	SAC	1.83E+01	3.46E+01	1.59E+01	2.03E-04	1.07E-03	1.27E-03	1.75E-01	2.72E-06	4.97E-05	0.00E+00	1.83E-05	59.3908383
2020	Annual	Mon-Sun	2270002081	Other Cons	D	25	Construction U	P	NHH	NP	Sacrament SV	SAC	3.09E+00	5.85E+00	3.52E+00	4.66E-05	1.59E-04	2.94E-04	3.86E-02	4.90E-07	1.10E-05	0.00E+00	4.20E-06	13.15262962
2020	Annual	Mon-Sun	2270002081	Other Cons	D	50	Construction U	P	NHH	NP	Sacrament SV	SAC	4.75E+00	9.10E+00	1.17E+01	1.49E-04	1.03E-03	8.89E-04	1.27E-01	1.64E-06	3.56E-05	0.00E+00	1.35E-05	43.3013333
2020	Annual	Mon-Sun	2270002081	Other Cons	D	120	Construction U	P	NHH	NP	Sacrament SV	SAC	7.84E+00	1.50E+01	5.53E+01	3.76E-04	3.81E-03	2.88E-03	6.07E-01	7.12E-06	1.49E-04	0.00E+00	3.39E-05	203.8849137
2020	Annual	Mon-Sun	2270002081	Other Cons	D	175	Construction U	P	NHH	NP	Sacrament SV	SAC	1.08E+01	2.07E+01	1.00E+02	5.43E-04	6.07E-03	3.53E-03	1.10E+00	1.24E-05	1.70E-04	0.00E+00	4.90E-05	369.5993468
2020	Annual	Mon-Sun	2270002081	Other Cons	D	500	Construction U	N	NHH	NP	Sacrament SV	SAC	2.51E+01	4.81E+01	5.53E+02	2.43E-03	1.12E-02	1.46E-02	6.11E+00	6.00E-05	5.10E-04	0.00E+00	2.19E-04	2043.355639
2020	Annual	Mon-Sun	2270004030	Leaf Blowe	D	15	Lawn and Ga U	N	NHH	P	Sacrament SV	SAC	3.77E-01	1.24E-01	1.70E-02	1.93E-07	1.14E-06	1.36E-06	1.87E-04	2.90E-09	5.31E-08	0.00E+00	1.75E-08	0.063299776
2020	Annual	Mon-Sun	2270004030	Leaf Blowe	D	120	Lawn and Ga U	N	NHH	P	Sacrament SV	SAC	3.30E-01	1.09E-01	2.40E-01	1.26E-06	1.48E-05	1.37E-05	2.64E-03	3.10E-08	6.51E-07	0.00E+00	1.13E-07	0.883719581
2020	Annual	Mon-Sun	2270004030	Leaf Blowe	D	250	Lawn and Ga U	N	NHH	P	Sacrament SV	SAC	9.44E-02	3.10E-02	1.41E-01	4.01E-07	2.67E-06	5.04E-06	1.55E-03	1.75E-08	1.35E-07	0.00E+00	3.62E-08	0.5179113
2020	Annual	Mon-Sun	2270004055	Lawn & Ga	D	15	Lawn and Ga U	N	NHH	NP	Sacrament SV	SAC	9.11E+02	1.36E+03	5.75E+02	6.53E-03	3.85E-02	4.59E-02	6.30E+00	9.80E-05	1.79E-03	0.00E+00	5.90E-04	2138.105838
2020	Annual	Mon-Sun	2270004055	Lawn & Ga	D	25	Lawn and Ga U	N	NHH	NP	Sacrament SV	SAC	7.13E+02	1.06E+03	6.91E+02	9.15E-03	3.12E-02	5.78E-02	7.58E+00	9.62E-05	2.16E-03	0.00E+00	8.26E-04	2583.957161

2020	Annual	Mon-Sun	2270004065	Chippers/S	D	25	Lawn and Ga	U	P	NHH	P	Sacrament	SV	SAC	4.25E-01	5.41E-01	4.96E-01	6.56E-06	2.24E-05	4.15E-05	5.44E-03	6.90E-08	1.55E-06	0.00E+00	5.92E-07	1.85384342
2020	Annual	Mon-Sun	2270004065	Chippers/S	D	120	Lawn and Ga	U	P	NHH	P	Sacrament	SV	SAC	1.17E+01	1.49E+01	5.16E+01	3.81E-04	3.45E-03	3.16E-03	5.66E-01	6.64E-06	1.86E-04	0.00E+00	3.44E-05	190.3396464
2020	Annual	Mon-Sun	2270004065	Chippers/S	D	175	Lawn and Ga	U	P	NHH	P	Sacrament	SV	SAC	8.02E-01	1.02E+00	6.12E+00	3.41E-05	3.56E-04	2.78E-04	6.73E-02	7.57E-07	1.32E-05	0.00E+00	3.08E-06	22.54800804
2020	Annual	Mon-Sun	2270004065	Chippers/S	D	250	Lawn and Ga	U	N	NHH	P	Sacrament	SV	SAC	1.89E-01	2.40E-01	2.42E+00	1.05E-05	4.99E-05	9.44E-05	2.67E-02	3.01E-07	2.93E-06	0.00E+00	9.49E-07	8.928775765
2020	Annual	Mon-Sun	2270004065	Chippers/S	D	500	Lawn and Ga	U	N	NHH	P	Sacrament	SV	SAC	1.75E+00	2.22E+00	2.48E+01	1.04E-04	4.99E-04	8.71E-04	2.75E-01	2.69E-06	2.89E-05	0.00E+00	9.36E-06	91.73355951
2020	Annual	Mon-Sun	2270004065	Chippers/S	D	750	Lawn and Ga	U	N	NHH	P	Sacrament	SV	SAC	1.98E+00	2.52E+00	6.79E+01	2.86E-04	1.36E-03	2.43E-03	7.50E-01	7.54E-06	7.99E-05	0.00E+00	2.58E-05	250.7015507
2020	Annual	Mon-Sun	2270004065	Chippers/S	D	1000	Lawn and Ga	U	N	NHH	P	Sacrament	SV	SAC	3.77E+00	4.80E+00	1.84E+02	8.67E-04	3.90E-03	1.29E-02	2.03E+00	2.04E-05	2.88E-04	0.00E+00	7.82E-05	679.613056
2020	Annual	Mon-Sun	2270004070	Commercia	D	15	Lawn and Ga	U	N	NHH	NP	Sacrament	SV	SAC	2.29E+01	6.71E+01	2.95E+01	3.36E-04	1.98E-03	2.36E-03	3.24E-01	5.04E-06	9.22E-05	0.00E+00	3.03E-05	109.8039782
2020	Annual	Mon-Sun	2270004070	Commercia	D	25	Lawn and Ga	U	N	NHH	NP	Sacrament	SV	SAC	4.31E+02	1.26E+03	8.31E+02	1.10E-02	3.76E-02	6.96E-02	9.12E+00	1.16E-04	2.60E-03	0.00E+00	9.93E-04	3108.091693
2020	Annual	Mon-Sun	2270004075	Other Lawr	D	15	Lawn and Ga	U	N	NHH	NP	Sacrament	SV	SAC	3.30E-01	3.92E-01	2.18E-01	2.48E-06	1.46E-05	1.74E-05	2.39E-03	3.72E-08	6.82E-07	0.00E+00	2.24E-07	0.811914629
2020	Annual	Mon-Sun	2270004075	Other Lawr	D	25	Lawn and Ga	U	N	NHH	NP	Sacrament	SV	SAC	4.72E-02	5.60E-02	4.15E-02	5.50E-07	1.88E-06	3.47E-06	4.56E-04	5.78E-09	1.30E-07	0.00E+00	4.96E-08	0.155261314

Table 15. OFFROAD Emissions 2030

Lawn and Garden Summary - 2030		
		Source
Total Lawn & Garden Emissions (MTCO2e)	28,518	
DU Elk Grove	70,033	Scale Factor
DU Sac County	1,109,396	SACOG 2016 RTP/SCS
Elk Grove % of Total	6.3%	
Elk Grove Emissions (MTCO2e)	1,800.25	

Construction Equipment Summary - 2030		
		Source
Total Const. Equipment Emissions (MTCO2e)	399,321	
Elk Grove Houses Constructed	509	Scale Factor
Sac County Houses Constructed	15,790	Extrapolation from SACOG RTP/SCS
Elk Grove % of Total	3.2%	
Elk Grove Emissions (MTCO2e)	12,885	

total ag -

CY	Season	AvgDays	Code	Equipment	Fuel	MaxHP	Class	C/R	Pre	Hand	Port	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust	CO Exhaust	NOX Exhau	CO2 Exhau	SO2 Exhau	PM Exhaus	N2O Exhau	CH4 Exhau	Total Annual County (MTCO2e)
2030	Annual	Mon-Sun	2260002006	Tampers/R	G2	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.06E+02	5.29E+01	1.07E+01	6.73E-04	2.88E-02	5.25E-04	5.51E-02	2.27E-06	4.62E-04	8.24E-05	4.18E-05	19.40218005
2030	Annual	Mon-Sun	2260002009	Plate Comp	G2	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	9.10E+00	5.14E+00	1.04E+00	6.51E-05	2.80E-03	5.07E-05	5.35E-03	2.20E-07	4.49E-05	7.98E-06	4.05E-06	1.883487257
2030	Annual	Mon-Sun	2260004010	Lawn Mow	G2	15	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	2.14E+03	1.34E+03	1.52E+02	1.71E-02	3.08E-01	4.60E-03	9.13E-01	3.76E-05	2.88E-03	1.18E-03	1.07E-03	323.3036851
2030	Annual	Mon-Sun	2260004010	Lawn Mow	G2	15	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	1.61E+04	6.82E+02	8.30E+01	6.83E-03	1.97E-01	1.84E-03	4.65E-01	1.92E-05	1.19E-03	5.23E-04	4.25E-04	162.7848282
2030	Annual	Mon-Sun	2260004020	Chainsaws	G2	2	Lawn and Ga	C	N	HH	NP	Sacramento	SV	SAC	3.83E+03	3.04E+03	1.81E+02	1.51E-01	2.74E-01	2.40E-03	7.40E-01	3.05E-05	4.31E-04	1.23E-03	9.41E-03	343.7847047
2030	Annual	Mon-Sun	2260004020	Chainsaws	G2	2	Lawn and Ga	R	N	HH	NP	Sacramento	SV	SAC	4.31E+04	5.79E+02	2.64E+01	8.42E-03	5.22E-02	4.59E-04	1.41E-01	5.81E-06	8.24E-05	2.34E-04	5.23E-04	53.73436376
2030	Annual	Mon-Sun	2260004020	Chainsaws	G2	15	Lawn and Ga	C	N	HH	NP	Sacramento	SV	SAC	2.70E+03	2.14E+03	3.08E+02	2.58E-01	4.66E-01	4.08E-03	1.26E+00	5.19E-05	7.34E-04	1.38E-03	1.60E-02	578.906566
2030	Annual	Mon-Sun	2260004020	Chainsaws	G2	15	Lawn and Ga	R	N	HH	NP	Sacramento	SV	SAC	3.04E+04	4.08E+02	4.50E+01	1.43E-02	8.89E-02	7.82E-04	2.40E-01	9.89E-06	1.40E-04	2.64E-04	8.91E-04	90.25817481
2030	Annual	Mon-Sun	2260004021	Chainsaws	G2	15	Lawn and Ga	C	P	HH	NP	Sacramento	SV	SAC	3.36E+03	2.66E+03	3.84E+02	3.21E-01	5.81E-01	5.08E-03	1.57E+00	6.46E-05	9.14E-04	1.72E-03	2.00E-02	720.5374394
2030	Annual	Mon-Sun	2260004021	Chainsaws	G2	15	Lawn and Ga	R	P	HH	NP	Sacramento	SV	SAC	3.78E+04	5.07E+02	5.63E+01	1.81E-02	1.12E-01	9.67E-04	2.99E-01	1.23E-05	1.74E-04	3.28E-04	1.12E-03	112.4736396
2030	Annual	Mon-Sun	2260004025	Trimmers/I	G2	2	Lawn and Ga	C	N	HH	NP	Sacramento	SV	SAC	1.25E+04	4.15E+03	1.84E+02	9.94E-02	3.27E-01	2.87E-03	8.85E-01	3.65E-05	5.15E-04	1.56E-03	6.18E-03	364.8643898
2030	Annual	Mon-Sun	2260004025	Trimmers/I	G2	2	Lawn and Ga	R	N	HH	NP	Sacramento	SV	SAC	1.39E+05	8.20E+03	3.48E+02	1.55E-01	6.46E-01	5.66E-03	1.75E+00	7.20E-05	1.02E-03	3.09E-03	9.66E-03	696.7501985
2030	Annual	Mon-Sun	2260004030	Leaf Blowe	G2	2	Lawn and Ga	C	N	HH	P	Sacramento	SV	SAC	1.87E+04	1.00E+04	5.35E+02	3.70E-01	8.79E-01	7.70E-03	2.38E+00	9.79E-05	1.38E-03	3.99E-03	2.30E-02	1036.769498
2030	Annual	Mon-Sun	2260004030	Leaf Blowe	G2	2	Lawn and Ga	R	N	HH	P	Sacramento	SV	SAC	4.81E+04	6.33E+02	2.80E+01	8.86E-03	5.54E-02	4.87E-04	1.50E-01	6.17E-06	8.74E-05	2.52E-04	5.50E-04	57.01336602
2030	Annual	Mon-Sun	2260004050	Shredders	G2	15	Lawn and Ga	C	P	NHH	NP	Sacramento	SV	SAC	9.43E+01	3.51E+01	1.54E+01	8.65E-04	4.17E-02	6.74E-04	7.97E-02	3.28E-06	6.68E-04	7.77E-05	5.37E-05	27.59375046
2030	Annual	Mon-Sun	2260004050	Shredders	G2	15	Lawn and Ga	R	P	NHH	NP	Sacramento	SV	SAC	3.36E+03	8.28E+00	3.62E+00	1.75E-04	9.85E-03	1.36E-04	1.88E-02	7.75E-07	1.58E-04	1.69E-05	1.09E-05	6.486896064
2030	Annual	Mon-Sun	2260004070	Commercia	G2	15	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	5.00E+01	1.10E+02	4.49E+01	2.02E-03	1.22E-01	1.53E-03	2.33E-01	9.61E-06	1.09E-04	2.05E-04	1.26E-04	80.35520882
2030	Annual	Mon-Sun	2260004070	Commercia	G2	25	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	2.47E+01	5.41E+01	4.80E+01	2.09E-03	1.35E-01	1.61E-03	2.43E-01	1.00E-05	1.13E-04	1.52E-04	1.30E-04	83.14175387
2030	Annual	Mon-Sun	2260004075	Other Lawn	G2	2	Lawn and Ga	C	N	HH	NP	Sacramento	SV	SAC	2.11E+01	3.97E+00	2.22E-01	1.09E-04	4.03E-04	3.53E-06	1.09E-03	4.49E-08	6.35E-07	1.71E-06	6.77E-06	0.439593625
2030	Annual	Mon-Sun	2260004075	Other Lawn	G2	2	Lawn and Ga	R	N	HH	NP	Sacramento	SV	SAC	6.48E+02	7.63E+00	3.90E-01	1.18E-04	7.75E-04	6.82E-06	2.09E-03	8.63E-08	1.22E-06	3.29E-06	7.35E-06	0.792135157
2030	Annual	Mon-Sun	2260004075	Other Lawn	G2	15	Lawn and Ga	C	N	HH	NP	Sacramento	SV	SAC	9.19E+00	1.73E+00	4.82E-01	2.37E-04	8.77E-04	7.68E-06	2.37E-03	9.77E-08	1.38E-06	1.76E-06	1.47E-05	0.93814664
2030	Annual	Mon-Sun	2260004075	Other Lawn	G2	15	Lawn and Ga	R	N	HH	NP	Sacramento	SV	SAC	2.82E+02	3.32E+00	8.49E-01	2.57E-04	1.69E-03	1.48E-05	4.56E-03	1.88E-07	2.66E-06	3.38E-06	1.60E-05	1.689230071
2030	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.31E+00	2.51E+00	1.46E+00	1.10E-04	4.18E-03	8.19E-05	7.06E-03	2.01E-07	5.92E-05	7.19E-06	6.22E-06	2.4625882
2030	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.96E+00	4.29E+00	6.27E+00	4.86E-04	1.85E-02	3.17E-04	2.95E-02	7.48E-07	2.47E-04	1.90E-05	2.75E-05	10.20541915
2030	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.80E+00	3.01E+00	7.04E+00	9.54E-05	8.02E-03	1.22E-04	5.50E-02	6.68E-07	4.21E-06	9.62E-06	5.39E-06	18.34298019
2030	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.54E+00	1.66E+00	6.29E+00	4.00E-05	2.28E-03	9.37E-05	5.69E-02	5.50E-07	4.41E-06	6.27E-06	2.26E-06	18.92599793
2030	Annual	Mon-Sun	2265002006	Tampers/R	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.89E+00	2.44E+00	1.18E+00	8.87E-05	3.38E-03	6.60E-05	5.72E-03	1.63E-07	4.80E-05	6.32E-06	5.01E-06	1.999966405
2030	Annual	Mon-Sun	2265002009	Plate Comp	G4	5	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.80E+02	8.87E+01	1.61E+01	2.28E-03	3.45E-02	1.03E-03	9.23E-02	3.19E-06	3.01E-05	1.46E-04	1.29E-04	33.12590985
2030	Annual	Mon-Sun	2265002009	Plate Comp	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.91E+02	1.08E+02	4.62E+01	3.48E-03	1.33E-01	2.59E-03	2.24E-01	6.39E-06	1.88E-03	2.62E-04	1.97E-04	78.490151
2030	Annual	Mon-Sun	2265002015	Rollers	G4	5	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.00E+01	4.55E+00	1.23E+00	1.48E-04	2.95E-03	6.68E-05	6.68E-03	2.31E-07	2.18E-06	8.50E-06	8.37E-06	2.369302282
2030	Annual	Mon-Sun	2265002015	Rollers	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.24E+01	2.75E+01	1.50E+01	1.12E-03	4.30E-02	8.34E-04	7.27E-02	2.07E-06	6.09E-04	7.57E-05	6.34E-05	25.36224711
2030	Annual	Mon-Sun	2265002015	Rollers	G4	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.19E+01	1.86E+01	2.20E+01	1.69E-03	6.50E-02	1.10E-03	1.04E-01	2.63E-06	8.68E-04	7.30E-05	9.53E-05	35.86184694
2030	Annual	Mon-Sun	2265002015	Rollers	G4	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.98E+00	3.36E+00	9.38E+00	1.67E-04	1.48E-02	1.95E-04	6.66E-02	8.10E-07	5.10E-06	1.27E-05	9.43E-06	22.26409764
2030	Annual	Mon-Sun	2265002015	Rollers	G4	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.71E+00	6.32E+00	2.87E+01	2.76E-04	1.60E-02	6.35E-04	2.51E-01	2.43E-06	1.94E-05	3.16E-05	1.56E-05	83.55484936
2030	Annual	Mon-Sun	2265002021	Paving Equ	G4	5	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.51E+02	1.17E+02	2.29E+01	3.20E-03	4.95E-02	1.45E-03	1.31E-01	4.52E-06	4.27E-05	2.00E-04	1.81E-04	46.88522823
2030	Annual	Mon-Sun	2265002021	Paving Equ	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.25E+02	2.33E+02	1.34E+02	1.01E-02	3.85E-01	7.52E-03	6.51E-01	1.86E-05	5.46E-03	6.63E-04	5.71E-04	227.153081
2030	Annual	Mon-Sun	2265002021	Paving Equ	G4	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	9.45E+00	5.18E+00	6.76E+00	5.22E-04	2.00E-02	3.40E-04	3.19E-02	8.07E-07	2.67E-04	2.15E-05	2.95E-05	11.01955379
2030	Annual	Mon-Sun	2265002021	Paving Equ	G4	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	7.66E+00	3.68E+00	8.21E+00	8.80E-05	6.11E-03	1.28E-04	6.93E-02	8.43E-07	5.31E-06	1.09E-05	4.98E-06	23.09890996
2030	Annual	Mon-Sun	2265002021	Paving Equ	G4	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.98E+00	9.48E-01	3.39E+00	1.55E-05	7.16E-04	3.56E-05	3.15E-02	3.04E-07	2.44E-06	2.92E-06	8.75E-07	10.46845066
2030	Annual	Mon-Sun	2265002024	Surfacing E	G4	5	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.62E+01	2.53E+01	5.07E+00	7.34E-04	1.07E-02	3.31E-04	2.94E-02	1.01E-06	9.57E-06	4.45E-05	4.15E-05	10.51770852
2030	Annual	Mon-Sun	2265002024	Surfacing E	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.37E+02	1.89E+02	7.24E+01	5.68E-03	2.08E-01	4.23E-03	3.51E-01	1.00E-05	2.94E-03	4.43E-04	3.21E-04	123.3186425
2030	Annual	Mon-Sun	2265002024	Surfacing E	G4	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.88E+00	2.59E+00	2.43E+00	1.95E-04	7.17E-03	1.27E-04	1.14E-02	2.89E-07	9.56E-05	9.21E-06	1.10E-05	3.965608001
2030	Annual	Mon-Sun	2265002027	Signal Boar	G4	5	Construction	U	P	NHH	NP	Sacramento	SV	SAC	5.70E-01	2.03E-01	6.58E-02	8.46E-06	1.51E-04	3.82E-06	3.65E-04	1.26E-08	1.19E-07	4.33E-07	4.79E-07	0.129434583
2030	Annual	Mon-Sun	2265002027	Signal Boar	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.06E+00	3.16E+00	1.87E+00	1.39E-04	5.38E-03	1.04E-04	9.09E-03	2.59E-07	7.62E-05	9.06E-06	7.87E-06	3.166918411
2030	Annual	Mon-Sun	2265002030	Trenchers	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.75E+01	4.46E+01	2.88E+01	2.20E-03	8.25E-02	1.64E-03	1.39E-01	3.98E-06	1.17E-03	1.36E-04	1.25E-04	48.59420682
2030	Annual	Mon-Sun	2265002030	Trenchers	G4	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.91E+01	3.46E+01	4.82E+01	3.79E-03	1.42E-01	2.47E-03	2.27E-01	5.75E-06	1.90E-03	1.50E-04	2.14E-04	78.51098205
2030	Annual	Mon-Sun	2265002030	Trenchers	G4	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.80E+01	1.98E+01	4.44E+01	6.76E-04	5.54E-02	8.53E-04	3.39E-01	4.12E-06	2.59E-05	6.44E-05	3.82E-05	113.1082304
2030	Annual	Mon-Sun	2265002030	Trenchers	G4	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	5.96E+00	6.58E+00	2.73E+01	2.10E-04	1.13E-02	4.94E-04	2.45E-01	2.36E-06	1.89E-05	2.81E-05	1.19E-05	81.33781807
2030	Annual	Mon-Sun	2265002033	Bore/Drill I	G4	15	Construction	U	P	NHH	P	Sacramento	SV	SAC	1.07E+00	3.65E-01	2.81E-01	2.03E-05	8.06E-04	1.51E-05	1.36E-03	3.89E-08	1.14E-05	1.18E-06	1.15E-06	0.473192119
2030	Annual	Mon-Sun	2265002033	Bore/Drill I	G4	25	Construction	U	P	NHH	P	Sacramento	SV	SAC	5.33E+00	1.81E+00	2.59E+00	1.91E-04	7.66E-03	1.25E-04	1.22E-02	3.09E-07	1.02E-04	7.71E-06	1.08E-05	4.210836691
2030	Annual	Mon-Sun	2265002033	Bore/Drill I	G4	50	Construction	U	P	NHH	P	Sacramento	SV	SAC	8.69E-01	2.55E-01	6.56E-01	7.29E-06	4.71E-04	1.10E-05	5.57E-03	6.77E-08	4.26E-07	8.34E-07	4.13E-07	1.854481083
2030	Annual	Mon-Sun	2265002033	Bore/Drill I	G4	120	Construction	U	P	NHH	P	Sacramento	SV	SAC	3.99E+00	1.17E+00	7.46E+00	3.71E-05	1.54E-03	9.28E-05	6.95E-02	6.71E-07	5.38E-06	5.10E-06	2.10E-06	23.07219355
2030	Annual	Mon-Sun	2265002033	Bore/Drill I	G4	175	Construction	U	P	NHH	P	Sacramento	SV	SAC	9.88E-01	2.90E-01	2.61E+00	9.59E-06	7.79E-04	3.54E-05	2.39E-02	2.38E-07	1.91E-06	1.58E-06	5.43E-07	7.949393597
2030	Annual	Mon-Sun	2265002039	Concrete/I	G4	5	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.97E+01	7.01E+00	1.87E+00	2.40E-04	4.29E-03	1.08E-04	1.04E-02	3.58E-07	3.38E-06	1.35E-05	1.36E-05	3.68050252
2030	Annual	Mon-Sun	2265002039	Concrete/I	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	8.85E+01	7.52E+01	5.15E+01	3.85E-03	1.48E-01	2.87E-03	2.50E-01	7.13E-06	2.10E-03	2.34E-04	2.18E-04	86.95491147
2030	Annual	Mon-Sun	2265002039	Concrete/I	G4	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.77E+01	2.35E+01	3.14E+01	2.40E-03	9.27E-02	1.57E-03	1.48E-01	3.74E-06	1.24E-03	9.85E-05	1.36E-04	51.0884235
2030	Annual	Mon-Sun	2265002039	Concrete/I	G4	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.24E+00	5.42E+00	1.50E+01	1.57E-04	1.06E-02	2.32E-04	1.28E-01	1.55E-06	9.78E-06	1.79E-05	8.87E-06	42.53761655
2030	Annual	Mon-Sun	2265002039	Concrete/I	G4	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.86E+00	3.11E+00	1.46E+01	6.45E-05	2.89E-03	1.48E-04	1.36E-01	1.32E-06	1.06E-05	1.09E-05	3.65E-06	45.32893135
2030	Annual	Mon-Sun	2265002042	Cement an	G4	5	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.57E+02	9.01E+01	2.29E+01	2.86E-03	5.36E-02	1.29E-03	1.26E-01	4.35E-06	4.10E-05	1.66E-04	1.62E-04	44.71188223
2030	Annual	Mon-Sun	2265002042	Cement an	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	6.05E+02	1.53E+02	7.03E+01	5.30E-03	2.02E-01	3.94E-03	3.41E-01	9.73E-06	2.86E-03	3.86E-04	3.00E-04	119.3335319
2030	Annual	Mon-Sun	2265002042	Cement an	G4	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.55E+00	6.43E-01	9.53E-01	7.36E-05	2.82E-03	4.79E-05	4.49E-03	1.14E-07	3.76E-05	2.86E-06	4.16E-06	1.550824311
2030	Annual	Mon-Sun	2265002045	Cranes	G4	50	Construction	U	P	NHH	P	Sacramento	SV	SAC	9.88E-01	1.12E+00	2.22E+00	3.42E-05	2.82E-03	4.29E-05	1.69E-02	2.05E-07	1.29E-06	3.42E-06	1.93E-06	5.637082337
2030	Annual	Mon-Sun	2265002045	Cranes	G4	120	Construction	U	P	NHH	P	Sacramento	SV	SAC	1.98E+00	2.25E+00	7.45E+00	5.83E-05	3.14E-03	1.37E-04	6.67E-02	6.45E-07	5.17E-06	8.60E-06	3.30E-06	22.20884025
2030	Annual	Mon-Sun	2265002045	Cranes	G4	175	Construction	U	P	NHH	P	Sacramento	SV	SAC	7.90E-02	8.99E-02	4.82E-01	3.50E-06	1.59E-04	9.61E-06	4.39E-03	4.36E-08	3.49E-07	4.61E-07	1.98E-07	1.458290736
2030	Annual	Mon-Sun	2265002054	Crushing/P	G4	15	Construction	U	P	NHH	P	Sacramento	SV	SAC	9.72E-01	7.70E-01	5.75E-01	4.27E-05	1.65E-03	3.18E-05	2.79E-03	7.95E-08	2.34E-05	2.50E-06	2.42E-06	0.9692478
2030	Annual	Mon-Sun	2265002054	Crushing/P	G4	25	Construction	U	P	NHH	P	Sacramento	SV	SAC	6.37E-01	5.05E-01	6.89E-01	5.26E-05	2.04E-03	3.43E-05	3.25E-03	8.23E-08	2.72E-05	2.13E-06	2.97E-06	1.123191313
2030	Annual	Mon-Sun	2265002054	Crushing/P	G4	120	Construction	U	P	NHH	P	Sacramento	SV	SAC	1.15E+00	7.57E-01	5.76E+00	3.59E-05	1.74E-03	8.68E-05	5.27E-02	5.10E-07	4.09E-06	4.04E-06	2.03E-06	17.51945153
2030	Annual	Mon-Sun	2265002057	Rough Terr	G4	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.95E-01	4.47E-01	1.50E+00	2.31E-05	1.90E-03	2.90E-05	1.14E-02	1.39E-07	8.76E-07	1.81E-06	1.31E-06	3.816035337
2030	Annual	Mon-Sun	2265002057	Rough Terr	G4	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	5.61E+00	6.35E+00	3.24E+01	2.53E-04	1.36E-02	5.94E-04	2.90E-01	2.81E-06	2.25E-05	3.05E-05	1.43E-05	96.58028843
2030	Annual	Mon-Sun	2265002057	Rough Terr	G4	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.98E-01	2.24E-01	1.83E+00	1.32E-05	6.03E-04	3.63E-05	1.66E-02	1.65E-07	1.32E-06	1.44E-06	7.46E-07	5.521754456
2030	Annual	Mon-Sun	2265002060	Rubber Tire	G4	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	9.88E-01	1.39E+00	3.47E+00	5.39E-05	4.74E-03	6.56E-05	2.59E-02	3.14E-07	1.98E-06	4.76E-06	3.05E-06	8.634637807
2030	Annual	Mon-Sun	2265002060	Rubber Tire	G4	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	6.56E+00	9.21E+00	3.43E+01	2.68E-04	1.58E-02	6.27E-04	3.06E-01	2.95E-06	2.37E-05	3.79E-05	1.51E-05	101.6780252
2030	Annual	Mon-Sun	2265002066	Tractors/Lo	G4	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.48E+00	8.29E+00	2.43E+01	1.93E-04	1.23E-02	4.53E-04	2.14E-01	2.07E-06	1.66E-05	3.07E-05	1.09E-05	71.27824054
2030	Annual	Mon-Sun	2265002072	Skid Steer I	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.91E+00	1.67E+00	1.32E+00	1.01E-04	3.80E-03	7.50E-05	6.42E-03	1.83E-07	5.38E-05	5.67E-06	5.70E-06	2.232399187
2030	Annual	Mon-Sun	2265002072	Skid Steer I	G4	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.28E+02	1.12E+02	1.24E+02	9.65E-03	3.66E-01	6.29E-03	5.83E-01	1.48E-05	4.89E-03	4.28E-04	5.46E-04	202.0290999
2030	Annual	Mon-Sun	2265002072	Skid Steer I	G4	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.69E+01	2.29E+01	4.38E+01	4.82E-04	3.43E-02	6.88E-04	3.67E-01	4.46E-06	2.81E-05	6.27E-05	2.72E-05	122.3541481
2030	Annual	Mon-Sun	2265002072	Skid Steer I	G4	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.61E+01	1.37E+01	5.85E+01	2.77E-04	1.32E-02	6.39E-04	5.43E-01	5.24E-06	4.20E-05	4.73E-05	1.57E-05	180.2871593
2030	Annual	Mon-Sun	2265002078	Dumpers/T	G4	5	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.82E+01	7.45E+00	1.00E+00	1.44E-04	2.13E-03	6.49E-05	5.78E-03	2.00E-07	1.89E-06	1.05E-05	8.12E-06	2.088042212
2030	Annual	Mon-Sun	2265002078	Dumpers/T	G4	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.89E+01	1.59E+01	5.72E+00	4.43E-04	1.64E-02	3.29E-04	2.77E-02	7.91E-07	2.33E-04	3.57E-05	2.50E-05	9.751304801
2030	Annual	Mon-Sun	2265002078	Dumpers/T	G4	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	7.21E+00	2.94E+00	2.31E+00	1.83E-04	6.81E-03	1.19E-04	1.09E-02	2.75E-07	9.10E-05	9.46E-06	1.03E-05	3.778711996
2030	Annual	Mon-Sun	2265002078	Dumpers/T	G4	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	7.11E-01	2.48E-01	6.16E-01	3.18E-06	1.36E-04	7.91E-06	5.72E-03	5.53E-08	4.43E-07	6.65E-07	1.80E-07	1.90200829
2030	Annual	Mon-Sun	2265002081	Other Cons	G4	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.77E+00	2.81E+00	1.54E+01	6.03E-05	4.66E-03	1.82E-04	1.41E-01	1.40E-06	1.13E-05	1.16E-05	3.41E-06	46.9143319
2030	Annual	Mon-Sun	2265004010	Lawn Mow	G4	5	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	1.27E+04	7.93E+03	9.46E+02	1.13E-01	2.10E+00	2.88E-02	5.41E+00	1.87E-04	1.71E-02	7.01E-03	6.31E-03	1914.225374
2030	Annual	Mon-Sun	2265004010	Lawn Mow	G4	5	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	2.01E+05	8.53E+03	1.13E+03	8.66E-02	3.01E+00	2.15E-02	5.81E+00	2.01E-04	1.39E-02	6.16E-03	4.83E-03	2026.773461
2030	Annual	Mon-Sun	2265004015	Tillers	G4	5	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	1.31E+03	2.01E+02	2.84E+01	2.53E-03	7.13E-02	6.37E-04	1.52E-01	5.27E-06	4.02E-04	1.65E-04	1.43E-04	53.35053593
2030	Annual	Mon-Sun	2265004015	Tillers	G4	5	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	5.11E+03	2.52E+02	3.62E+01	2.95E-03	9.37E-02	7.39E-04	1.91E-01	6.59E-06	4.76E-04	1.98E-04	1.67E-04	66.53987523
2030	Annual	Mon-Sun	2265004025	Trimmers/I	G4	5	Lawn and Ga	C	P	NHH	NP	Sacramento	SV	SAC	2.31E+03	8.60E+02	2.63E+01	3.42E-03	5.98E-02	1.54E-03	1.47E-01	5.06E-06	4.78E-05	5.24E-04	1.94E-04	55.16261785
2030	Annual	Mon-Sun	2265004025	Trimmers/I	G4	5	Lawn and Ga	R	P	NHH	NP	Sacramento	SV	SAC	1.08E+04	6.35E+02	2.02E+01	2.32E-03	4.98E-02	1.05E-03	1.08E-01	3.73E-06	3.53E-05	3.69E-04	1.31E-04	40.44601193
2030	Annual	Mon-Sun	2265004030	Leaf Blowe	G4	5	Lawn and Ga	C	N	NHH	P	Sacramento	SV	SAC	5.89E+02	1.00E+02	6.61E+00	4.90E-04	1.76E-02	1.22E-04	3.42E-02	1.18E-06	8.02E-05	4.95E-05	2.77E-05	12.03030257
2030	Annual	Mon-Sun	2265004030	Leaf Blowe	G4	5	Lawn and Ga	R	N	NHH	P	Sacramento	SV	SAC	5.07E+02	6.66E+00	4.59E-01	2.66E-05	1.31E-03	6.60E-06	2.27E-03	7.84E-08	4.52E-06	2.94E-06	1.50E-06	0.792738901
2030	Annual	Mon-Sun	2265004040	Rear Engin	G4	15	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	6.94E+03	5.16E+03	1.70E+03	7.91E-02	4.94E+00	5.73E-02	8.35E+00	2.38E-04	3.87E-03	8.31E-03	4.48E-03	2883.269251
2030	Annual	Mon-Sun	2265004040	Rear Engin	G4	15	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	6.08E+03	4.70E+02	1.55E+02	6.13E-03	4.50E-01	4.49E-03	7.61E-01	2.17E-05	3.03E-04	6.98E-04	3.47E-04	261.6313593
2030	Annual	Mon-Sun	2265004040	Rear Engin	G4	25	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	3.17E+01	2.36E+01	1.51E+01	6.79E-04	4.53E-02	5.00E-04	7.21E-02	1.83E-06	3.35E-05	5.36E-05	3.84E-05	24.73333878
2030	Annual	Mon-Sun	2265004040	Rear Engin	G4	25	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	2.74E+01	2.11E+00	1.35E+00	5.29E-05	4.06E-03	3.72E-05	6.46E-03	1.64E-07	2.58E-06	4.34E-06	2.99E-06	2.208671726
2030	Annual	Mon-Sun	2265004045	Front Mow	G4	15	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	3.18E+02	2.36E+02	1.24E+02	5.79E-03	3.61E-01	4.19E-03	6.11E-01	1.74E-05	2.83E-04	4.89E-04	3.28E-04	209.8824266
2030	Annual	Mon-Sun	2265004045	Front Mow	G4	15	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	1.03E+04	7.94E+02	4.17E+02	1.66E-02	1.21E+00	1.21E-02	2.05E+00	5.85E-05	8.18E-04	1.51E-03	9.36E-04	702.4492749
2030	Annual	Mon-Sun	2265004045	Front Mow	G4	25	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	2.49E+02	1.85E+02	1.31E+02	5.89E-03	3.93E-01	4.34E-03	6.26E-01	1.59E-05	2.90E-04	4.44E-04	3.33E-04	214.4204577
2030	Annual	Mon-Sun	2265004045	Front Mow	G4	25	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	8.05E+03	6.22E+02	4.40E+02	1.72E-02	1.32E+00	1.21E-02	2.10E+00	5.33E-05	8.38E-04	1.35E-03	9.74E-04	717.6989155
2030	Annual	Mon-Sun	2265004050	Shredders	G4	5	Lawn and Ga	C	P	NHH	NP	Sacramento	SV	SAC	2.50E+02	9.28E+01	2.52E+01	3.28E-03	5.74E-02	1.48E-03	1.41E-01	4.86E-06	4.58E-05	1.81E-04	1.86E-04	49.96804397
2030	Annual	Mon-Sun	2265004050	Shredders	G4	5	Lawn and Ga	R	P	NHH	NP	Sacramento	SV	SAC	9.29E+03	2.29E+01	7.27E+00	5.50E-04	2.12E-02	2.48E-04	3.47E-02	1.20E-06	1.20E-05	3.64E-05	3.11E-05	12.10912734
2030	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	15	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	1.27E+03	4.48E+02	2.84E+02	1.11E-02	8.28E-01	8.13E-03	1.40E+00	3.99E-05	5.49E-04	9.38E-04	6.28E-04	478.0811584
2030	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	15	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	8.26E+03	3.30E+02	2.09E+02	7.55E-03	6.10E-01	5.56E-03	1.03E+00	2.94E-05	3.75E-04	6.64E-04	4.27E-04	351.9500962
2030	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	25	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	5.02E+02	1.77E+02	1.78E+02	6.89E-03	5.35E-01	4.81E-03	8.53E-01	2.16E-05	3.35E-04	4.59E-04	3.90E-04	290.3409208

2030	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	25	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	3.26E+03	1.30E+02	1.31E+02	4.74E-03	3.95E-01	3.22E-03	6.29E-01	1.59E-05	2.29E-04	3.22E-04	2.68E-04	213.8209213
2030	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	50	Lawn and Ga	U	N	NHH	NP	Sacramento	SV	SAC	7.26E+00	2.07E+00	3.13E+00	3.15E-05	2.10E-03	6.13E-05	2.68E-02	3.26E-07	2.05E-06	5.62E-06	1.78E-06	8.936559394
2030	Annual	Mon-Sun	2265004060	Wood Split	G4	5	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	4.27E+02	1.50E+02	4.40E+01	4.65E-03	1.03E-01	1.18E-03	2.46E-01	8.49E-06	7.21E-04	2.01E-04	2.63E-04	85.66569691
2030	Annual	Mon-Sun	2265004060	Wood Split	G4	5	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	1.07E+04	3.22E+01	1.09E+01	5.30E-04	3.21E-02	1.29E-04	5.25E-02	1.81E-06	9.38E-05	3.00E-05	3.00E-05	17.95483938
2030	Annual	Mon-Sun	2265004065	Chippers/S	G4	15	Lawn and Ga	C	P	NHH	P	Sacramento	SV	SAC	6.02E+00	2.08E+01	1.76E+01	1.38E-03	5.08E-02	1.03E-03	8.46E-02	2.41E-06	7.09E-04	7.40E-05	7.74E-05	29.39952495
2030	Annual	Mon-Sun	2265004065	Chippers/S	G4	15	Lawn and Ga	R	P	NHH	P	Sacramento	SV	SAC	1.08E+01	4.86E-01	4.04E-01	2.38E-05	1.17E-03	1.75E-05	1.97E-03	5.63E-08	1.65E-05	1.47E-06	1.35E-06	0.679725898
2030	Annual	Mon-Sun	2265004065	Chippers/S	G4	25	Lawn and Ga	C	P	NHH	P	Sacramento	SV	SAC	3.42E+01	1.18E+02	1.68E+02	1.36E-02	5.01E-01	8.81E-03	7.86E-01	1.99E-05	6.59E-03	5.24E-04	7.59E-04	272.0435073
2030	Annual	Mon-Sun	2265004065	Chippers/S	G4	25	Lawn and Ga	R	P	NHH	P	Sacramento	SV	SAC	6.09E+01	2.75E+00	3.86E+00	2.32E-04	1.15E-02	1.50E-04	1.83E-02	4.63E-07	1.53E-04	1.04E-05	1.31E-05	6.27166241
2030	Annual	Mon-Sun	2265004070	Commercia	G4	15	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	4.50E+02	9.87E+02	5.27E+02	2.97E-02	1.53E+00	2.13E-02	2.57E+00	7.32E-05	1.44E-03	2.26E-03	1.67E-03	887.1030071
2030	Annual	Mon-Sun	2265004070	Commercia	G4	25	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	2.22E+02	4.86E+02	4.61E+02	2.46E-02	1.38E+00	1.89E-02	2.19E+00	5.54E-05	1.22E-03	1.53E-03	1.38E-03	750.7287687
2030	Annual	Mon-Sun	2265004070	Commercia	G4	50	Lawn and Ga	U	N	NHH	NP	Sacramento	SV	SAC	8.95E+01	1.80E+02	3.01E+02	4.60E-03	4.57E-01	9.72E-03	2.17E+00	2.64E-05	1.66E-04	6.62E-04	2.60E-04	727.5866494
2030	Annual	Mon-Sun	2265004070	Commercia	G4	120	Lawn and Ga	U	N	NHH	NP	Sacramento	SV	SAC	5.91E-01	1.19E+00	2.90E+00	1.30E-05	7.05E-04	7.80E-05	2.69E-02	2.60E-07	2.08E-06	4.94E-06	7.36E-07	8.948707077
2030	Annual	Mon-Sun	2265004075	Other Lawr	G4	5	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	3.95E+02	7.43E+01	1.52E+01	1.35E-03	3.83E-02	3.39E-04	8.16E-02	2.82E-06	2.14E-04	7.41E-05	7.63E-05	28.41010508
2030	Annual	Mon-Sun	2265004075	Other Lawr	G4	5	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	1.21E+04	1.43E+02	3.18E+01	1.80E-03	9.11E-02	4.46E-04	1.57E-01	5.41E-06	3.08E-04	1.16E-04	1.02E-04	53.93254138
2030	Annual	Mon-Sun	2265004075	Other Lawr	G4	15	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	1.76E+02	3.30E+01	1.47E+01	5.82E-04	4.29E-02	4.26E-04	7.25E-02	2.07E-06	2.88E-05	5.76E-05	3.29E-05	24.8381507
2030	Annual	Mon-Sun	2265004075	Other Lawr	G4	15	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	5.38E+03	6.34E+01	2.82E+01	9.77E-04	8.24E-02	7.21E-04	1.39E-01	3.97E-06	4.80E-05	1.03E-04	5.53E-05	47.5802862
2030	Annual	Mon-Sun	2265004075	Other Lawr	G4	25	Lawn and Ga	C	N	NHH	NP	Sacramento	SV	SAC	3.71E+00	6.97E-01	6.80E-01	2.66E-05	2.04E-03	1.86E-05	3.25E-03	8.25E-08	1.29E-06	1.79E-06	1.50E-06	1.107966027
2030	Annual	Mon-Sun	2265004075	Other Lawr	G4	25	Lawn and Ga	R	N	NHH	NP	Sacramento	SV	SAC	1.14E+02	1.35E+00	1.31E+00	4.60E-05	3.95E-03	3.04E-05	6.29E-03	1.59E-07	2.17E-06	3.17E-06	2.60E-06	2.136348059
2030	Annual	Mon-Sun	2265004075	Other Lawr	G4	50	Lawn and Ga	U	N	NHH	NP	Sacramento	SV	SAC	2.69E-01	4.49E-02	9.36E-02	9.23E-07	5.75E-05	1.78E-06	8.10E-04	9.85E-09	6.20E-08	1.42E-07	5.22E-08	0.269961964
2030	Annual	Mon-Sun	2265004075	Other Lawr	G4	120	Lawn and Ga	U	N	NHH	NP	Sacramento	SV	SAC	6.45E-01	1.08E-01	5.81E-01	2.34E-06	9.65E-05	1.49E-05	5.45E-03	5.26E-08	4.22E-07	6.65E-07	1.32E-07	1.810394944
2030	Annual	Mon-Sun	2270002003	Pavers	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	9.44E-01	2.12E+00	1.80E+00	2.39E-05	8.16E-05	1.51E-04	1.98E-02	2.51E-07	5.64E-06	0.00E+00	2.16E-06	6.578111159
2030	Annual	Mon-Sun	2270002003	Pavers	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	5.49E+01	1.25E+02	1.60E+02	2.59E-03	1.65E-02	1.18E-02	1.74E+00	2.25E-05	4.12E-04	0.00E+00	2.34E-04	579.0500719
2030	Annual	Mon-Sun	2270002003	Pavers	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	6.47E+01	1.47E+02	4.63E+02	3.65E-03	3.40E-02	2.21E-02	5.08E+00	5.96E-05	1.09E-03	0.00E+00	3.29E-04	1684.371042
2030	Annual	Mon-Sun	2270002003	Pavers	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.02E+01	9.13E+01	5.33E+02	3.10E-03	3.43E-02	1.47E-02	5.85E+00	6.58E-05	7.67E-04	0.00E+00	2.80E-04	1940.134143
2030	Annual	Mon-Sun	2270002003	Pavers	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	4.84E+00	1.10E+01	9.67E+01	4.89E-04	2.24E-03	2.35E-03	1.07E+00	1.20E-05	8.60E-05	0.00E+00	4.41E-05	354.1591466
2030	Annual	Mon-Sun	2270002003	Pavers	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	4.97E+00	1.13E+01	1.19E+02	5.87E-04	2.73E-03	2.64E-03	1.32E+00	1.29E-05	1.00E-04	0.00E+00	5.30E-05	436.0175359
2030	Annual	Mon-Sun	2270002009	Plate Comp	D	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.03E+01	3.33E+01	6.56E+00	8.36E-05	4.39E-04	5.24E-04	7.18E-02	1.12E-06	2.05E-05	0.00E+00	7.54E-06	23.85520518
2030	Annual	Mon-Sun	2270002015	Rollers	D	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.81E+01	7.25E+01	2.09E+01	2.67E-04	1.40E-03	1.67E-03	2.29E-01	3.56E-06	6.52E-05	0.00E+00	2.41E-05	76.06559683
2030	Annual	Mon-Sun	2270002015	Rollers	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.59E+01	3.03E+01	1.84E+01	2.44E-04	8.33E-04	1.54E-03	2.02E-01	2.57E-06	5.76E-05	0.00E+00	2.20E-05	67.16002283
2030	Annual	Mon-Sun	2270002015	Rollers	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.95E+01	9.48E+01	1.13E+02	1.27E-03	1.04E-02	7.54E-03	1.23E+00	1.59E-05	1.60E-04	0.00E+00	1.15E-04	408.6394294
2030	Annual	Mon-Sun	2270002015	Rollers	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.66E+02	5.09E+02	1.37E+03	7.92E-03	9.61E-02	5.15E-02	1.50E+01	1.76E-04	1.76E-03	0.00E+00	7.15E-04	4974.095454
2030	Annual	Mon-Sun	2270002015	Rollers	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.07E+02	2.05E+02	1.01E+03	4.35E-03	6.23E-02	1.77E-02	1.11E+01	1.24E-04	8.20E-04	0.00E+00	3.93E-04	3665.852844
2030	Annual	Mon-Sun	2270002015	Rollers	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.52E+01	2.90E+01	2.01E+02	7.64E-04	4.30E-03	2.92E-03	2.22E+00	2.50E-05	9.60E-05	0.00E+00	6.89E-05	736.0038549
2030	Annual	Mon-Sun	2270002015	Rollers	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.06E+01	2.04E+01	2.02E+02	7.58E-04	4.14E-03	2.74E-03	2.23E+00	2.19E-05	9.37E-05	0.00E+00	6.84E-05	738.6582912
2030	Annual	Mon-Sun	2270002018	Scrapers	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.45E+00	7.43E+00	3.18E+01	2.52E-04	2.37E-03	1.46E-03	3.48E-01	4.09E-06	6.84E-05	0.00E+00	2.27E-05	115.5562985
2030	Annual	Mon-Sun	2270002018	Scrapers	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.25E+01	6.80E+01	4.58E+02	2.67E-03	3.00E-02	1.17E-02	5.03E+00	5.66E-05	6.05E-04	0.00E+00	2.41E-04	1667.234293
2030	Annual	Mon-Sun	2270002018	Scrapers	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	2.19E+01	6.63E+01	6.28E+02	3.23E-03	1.47E-02	1.41E-02	6.93E+00	7.80E-05	5.16E-04	0.00E+00	2.91E-04	2298.690107
2030	Annual	Mon-Sun	2270002018	Scrapers	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	6.03E+01	1.82E+02	2.65E+03	1.34E-02	6.11E-02	5.45E-02	2.93E+01	2.87E-04	2.07E-03	0.00E+00	1.21E-03	9709.973536
2030	Annual	Mon-Sun	2270002018	Scrapers	D	750	Construction	U	N	NHH	NP	Sacramento	SV	SAC	2.41E+00	7.29E+00	1.83E+02	9.24E-04	4.22E-03	3.83E-03	2.02E+00	2.03E-05	1.44E-04	0.00E+00	8.34E-05	670.7968696
2030	Annual	Mon-Sun	2270002021	Paving Equ	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.64E+00	3.72E+00	2.14E+00	2.83E-05	9.66E-05	1.79E-04	2.35E-02	2.98E-07	6.68E-06	0.00E+00	2.55E-06	7.791504569
2030	Annual	Mon-Sun	2270002021	Paving Equ	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.38E+00	3.16E+00	3.47E+00	5.35E-05	3.53E-04	2.53E-04	3.78E-02	4.89E-07	8.43E-06	0.00E+00	4.82E-06	12.5615254
2030	Annual	Mon-Sun	2270002021	Paving Equ	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.99E+01	4.56E+01	1.13E+02	8.54E-04	8.24E-03	5.23E-03	1.24E+00	1.46E-05	2.50E-04	0.00E+00	7.71E-05	411.5246033
2030	Annual	Mon-Sun	2270002021	Paving Equ	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	9.38E+00	2.14E+01	9.84E+01	5.53E-04	6.29E-03	2.60E-03	1.08E+00	1.22E-05	1.34E-04	0.00E+00	4.99E-05	358.392801
2030	Annual	Mon-Sun	2270002021	Paving Equ	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	2.64E+00	6.04E+00	3.34E+01	1.63E-04	7.60E-04	7.64E-04	3.69E-01	4.15E-06	2.75E-05	0.00E+00	1.47E-05	122.269734
2030	Annual	Mon-Sun	2270002024	Surfacing E	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.26E+00	1.55E+00	1.00E+00	9.99E-06	8.27E-05	6.54E-05	1.09E-02	1.41E-07	1.46E-06	0.00E+00	9.02E-07	3.629364628
2030	Annual	Mon-Sun	2270002024	Surfacing E	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.52E-01	3.10E-01	9.01E-01	4.61E-06	6.07E-05	3.41E-05	9.89E-03	1.16E-07	1.20E-06	0.00E+00	4.16E-07	3.277244381
2030	Annual	Mon-Sun	2270002024	Surfacing E	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.89E-01	2.33E-01	9.07E-01	3.46E-06	5.39E-05	1.65E-05	9.97E-03	1.12E-07	7.67E-07	0.00E+00	3.13E-07	3.305253062
2030	Annual	Mon-Sun	2270002024	Surfacing E	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	3.78E-01	4.66E-01	2.84E+00	9.49E-06	5.88E-05	4.36E-05	3.14E-02	3.53E-07	1.47E-06	0.00E+00	8.57E-07	10.39298136
2030	Annual	Mon-Sun	2270002024	Surfacing E	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	3.15E+00	3.88E+00	3.88E+01	1.28E-04	7.79E-04	5.57E-04	4.29E-01	4.21E-06	1.94E-05	0.00E+00	1.15E-05	142.0501897
2030	Annual	Mon-Sun	2270002024	Surfacing E	D	750	Construction	U	N	NHH	NP	Sacramento	SV	SAC	4.61E-01	5.68E-01	8.90E+00	2.94E-05	1.79E-04	1.30E-04	9.85E-02	9.90E-07	4.48E-06	0.00E+00	2.65E-06	32.62837765
2030	Annual	Mon-Sun	2270002027	Signal Boar	D	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.77E+02	3.64E+02	1.03E+02	1.31E-03	6.86E-03	8.18E-03	1.12E+00	1.75E-05	3.20E-04	0.00E+00	1.18E-04	372.8398768
2030	Annual	Mon-Sun	2270002027	Signal Boar	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	8.81E-01	1.29E+00	2.13E+00	1.62E-05	1.69E-04	1.31E-04	2.34E-02	3.02E-07	1.66E-06	0.00E+00	1.46E-06	7.749611829
2030	Annual	Mon-Sun	2270002027	Signal Boar	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.44E+01	2.11E+01	7.71E+01	3.18E-04	5.14E-03	2.47E-03	8.47E-01	9.94E-06	5.34E-05	0.00E+00	2.87E-05	280.7062825
2030	Annual	Mon-Sun	2270002027	Signal Boar	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	8.93E+00	1.31E+01	9.20E+01	2.80E-04	5.43E-03	1.04E-03	1.01E+00	1.14E-05	4.37E-05	0.00E+00	2.53E-05	335.3049877
2030	Annual	Mon-Sun	2270002027	Signal Boar	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.89E+00	2.77E+00	3.19E+01	9.05E-05	6.45E-04	3.06E-04	3.53E-01	3.97E-06	1.03E-05	0.00E+00	8.17E-06	117.0128939
2030	Annual	Mon-Sun	2270002030	Trenchers	D	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.72E+00	8.00E+00	3.09E+00	3.94E-05	2.06E-04	2.47E-04	3.38E-02	5.26E-07	9.63E-06	0.00E+00	3.55E-06	11.22977691
2030	Annual	Mon-Sun	2270002030	Trenchers	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.97E+00	8.42E+00	1.26E+01	1.67E-04	5.70E-04	1.06E-03	1.39E-01	1.76E-06	3.95E-05	0.00E+00	1.51E-05	46.00539118
2030	Annual	Mon-Sun	2270002030	Trenchers	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.89E+02	3.24E+02	4.90E+02	8.01E-03	4.89E-02	3.60E-02	5.33E+00	6.89E-05	1.36E-03	0.00E+00	7.22E-04	1772.763266
2030	Annual	Mon-Sun	2270002030	Trenchers	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.56E+02	4.40E+02	1.30E+03	1.03E-02	9.39E-02	6.43E-02	1.42E+01	1.67E-04	3.34E-03	0.00E+00	9.29E-04	4726.870351
2030	Annual	Mon-Sun	2270002030	Trenchers	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.81E+01	4.81E+01	3.15E+02	1.83E-03	1.99E-02	9.33E-03	3.46E+00	3.89E-05	4.91E-04	0.00E+00	1.66E-04	1146.602511
2030	Annual	Mon-Sun	2270002030	Trenchers	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	2.52E+00	4.31E+00	4.35E+01	2.17E-04	1.00E-03	1.14E-03	4.80E-01	5.41E-06	4.21E-05	0.00E+00	1.96E-05	159.2607686
2030	Annual	Mon-Sun	2270002030	Trenchers	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	3.21E+00	5.50E+00	7.74E+01	3.75E-04	1.82E-03	1.86E-03	8.55E-01	8.40E-06	7.03E-05	0.00E+00	3.38E-05	283.5856063
2030	Annual	Mon-Sun	2270002030	Trenchers	D	750	Construction	U	N	NHH	NP	Sacramento	SV	SAC	9.21E-02	1.58E-01	4.19E+00	2.03E-05	9.85E-05	1.02E-04	4.63E-02	4.66E-07	3.84E-06	0.00E+00	1.84E-06	15.34743421
2030	Annual	Mon-Sun	2270002033	Bore/Drill F	D	15	Construction	U	P	NHH	P	Sacramento	SV	SAC	6.29E-01	1.40E+00	6.61E-01	8.42E-06	4.42E-05	5.27E-05	7.23E-03	1.13E-07	2.06E-06	0.00E+00	7.60E-07	2.401554126
2030	Annual	Mon-Sun	2270002033	Bore/Drill F	D	25	Construction	U	P	NHH	P	Sacramento	SV	SAC	1.89E+00	4.20E+00	3.05E+00	4.04E-05	1.38E-04	2.56E-04	3.35E-02	4.25E-07	9.55E-06	0.00E+00	3.65E-06	11.13566579
2030	Annual	Mon-Sun	2270002033	Bore/Drill F	D	50	Construction	U	P	NHH	P	Sacramento	SV	SAC	8.24E+00	1.89E+01	2.68E+01	1.80E-04	2.08E-03	1.56E-03	2.93E-01	3.79E-06	6.98E-06	0.00E+00	1.62E-05	97.24610467
2030	Annual	Mon-Sun	2270002033	Bore/Drill F	D	120	Construction	U	P	NHH	P	Sacramento	SV	SAC	2.53E+01	5.80E+01	2.04E+02	7.23E-04	1.35E-02	5.57E-03	2.24E+00	2.62E-05	5.04E-05	0.00E+00	6.53E-05	740.9843879
2030	Annual	Mon-Sun	2270002033	Bore/Drill F	D	175	Construction	U	P	NHH	P	Sacramento	SV	SAC	5.85E+00	1.34E+01	8.60E+01	2.12E-04	5.06E-03	4.65E-04	9.46E-01	1.06E-05	1.76E-05	0.00E+00	1.91E-05	313.4979182
2030	Annual	Mon-Sun	2270002033	Bore/Drill F	D	250	Construction	U	N	NHH	P	Sacramento	SV	SAC	5.03E+00	1.15E+01	9.81E+01	2.43E-04	1.98E-03	5.25E-04	1.09E+00	1.22E-05	1.92E-05	0.00E+00	2.19E-05	359.5670166
2030	Annual	Mon-Sun	2270002033	Bore/Drill F	D	500	Construction	U	N	NHH	P	Sacramento	SV	SAC	1.12E+01	2.57E+01	3.61E+02	8.94E-04	7.08E-03	1.93E-03	4.00E+00	3.92E-05	7.06E-05	0.00E+00	8.06E-05	1324.06034
2030	Annual	Mon-Sun	2270002033	Bore/Drill F	D	750	Construction	U	N	NHH	P	Sacramento	SV	SAC	1.43E+00	3.28E+00	9.10E+01	2.25E-04	1.78E-03	4.87E-04	1.01E+00	1.01E-05	1.78E-05	0.00E+00	2.03E-05	333.5287312
2030	Annual	Mon-Sun	2270002033	Bore/Drill F	D	1000	Construction	U	N	NHH	P	Sacramento	SV	SAC	2.40E+00	5.49E+00	2.30E+02	5.70E-04	4.51E-03	1.06E-02	2.55E+00	2.56E-05	9.51E-05	0.00E+00	5.14E-05	843.4903342
2030	Annual	Mon-Sun	2270002036	Excavators	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.33E+00	8.91E+00	6.67E+00	8.83E-05	3.01E-04	5.58E-04	7.32E-02	9.29E-07	2.08E-05	0.00E+00	7.97E-06	24.30824893
2030	Annual	Mon-Sun	2270002036	Excavators	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	8.76E+01	3.39E+02	3.89E+02	4.50E-03	3.96E-02	2.53E-02	4.24E+00	5.48E-05	2.85E-04	0.00E+00	4.06E-04	1406.88022
2030	Annual	Mon-Sun	2270002036	Excavators	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.38E+02	9.21E+02	3.09E+03	1.80E-02	2.27E-01	9.99E-02	3.39E+01	3.97E-04	2.06E-03	0.00E+00	1.62E-03	11228.73537
2030	Annual	Mon-Sun	2270002036	Excavators	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.59E+02	1.78E+03	9.06E+03	3.75E-02	5.89E-01	9.22E-02	9.96E+01	1.12E-03	4.04E-03	0.00E+00	3.38E-03	33005.94108
2030	Annual	Mon-Sun	2270002036	Excavators	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.87E+02	7.22E+02	5.18E+03	2.05E-02	1.15E-01	4.57E-02	5.73E+01	6.44E-04	1.64E-03	0.00E+00	1.85E-03	18979.49317
2030	Annual	Mon-Sun	2270002036	Excavators	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.35E+02	5.21E+02	5.50E+03	2.17E-02	1.17E-01	4.64E-02	6.08E+01	5.97E-04	1.72E-03	0.00E+00	1.96E-03	20166.5206
2030	Annual	Mon-Sun	2270002036	Excavators	D	750	Construction	U	N	NHH	NP	Sacramento	SV	SAC	7.22E-01	2.79E+00	4.89E+01	1.93E-04	1.04E-03	4.16E-04	5.40E-01	5.43E-06	1.54E-05	0.00E+00	1.74E-05	179.0510597
2030	Annual	Mon-Sun	2270002039	Concrete/I	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.52E-01	4.09E-01	3.06E-01	4.06E-06	1.38E-05	2.56E-05	3.36E-03	4.27E-08	9.58E-07	0.00E+00	3.66E-07	1.116968604
2030	Annual	Mon-Sun	2270002039	Concrete/I	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.20E+00	3.50E+00	4.83E+00	3.81E-05	3.91E-04	3.00E-04	5.29E-02	6.83E-07	3.87E-06	0.00E+00	3.44E-06	17.53339793
2030	Annual	Mon-Sun	2270002039	Concrete/I	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.84E+00	6.10E+00	2.06E+01	8.81E-05	1.38E-03	6.63E-04	2.26E-01	2.65E-06	1.47E-05	0.00E+00	7.95E-06	74.94372954
2030	Annual	Mon-Sun	2270002039	Concrete/I	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.26E-01	2.00E-01	1.46E+00	4.61E-06	8.67E-05	1.66E-05	1.60E-02	1.80E-07	7.17E-07	0.00E+00	4.16E-07	5.30733819
2030	Annual	Mon-Sun	2270002042	Cement an	D	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.22E+01	2.64E+01	7.63E+00	9.72E-05	5.10E-04	6.09E-04	8.35E-02	1.30E-06	2.38E-05	0.00E+00	8.77E-06	27.73258565
2030	Annual	Mon-Sun	2270002042	Cement an	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.89E+00	2.38E+00	1.90E+00	2.52E-05	8.60E-05	1.59E-04	2.09E-02	2.65E-07	5.98E-06	0.00E+00	2.27E-06	6.935395453
2030	Annual	Mon-Sun	2270002045	Cranes	D	50	Construction	U	P	NHH	P	Sacramento	SV	SAC	2.14E+00	7.49E+00	7.97E+00	1.05E-04	8.20E-04	5.50E-04	8.68E-02	1.12E-06	1.15E-05	0.00E+00	9.45E-06	28.83309509
2030	Annual	Mon-Sun	2270002045	Cranes	D	120	Construction	U	P	NHH	P	Sacramento	SV	SAC	2.35E+01	8.22E+01	1.88E+02	1.25E-03	1.38E-02	7.21E-03	2.06E+00	2.42E-05	2.46E-04	0.00E+00	1.12E-04	683.0899578
2030	Annual	Mon-Sun	2270002045	Cranes	D	175	Construction	U	P	NHH	P	Sacramento	SV	SAC	2.35E+01	8.22E+01	3.00E+02	1.47E-03	1.95E-02	5.33E-03	3.30E+00	3.71E-05	2.47E-04	0.00E+00	1.33E-04	1093.973286
2030	Annual	Mon-Sun	2270002045	Cranes	D	250	Construction	U	N	NHH	P	Sacramento	SV	SAC	4.55E+01	1.59E+02	8.08E+02	3.53E-03	1.80E-02	1.18E-02	8.93E+00	1.00E-04	3.86E-04	0.00E+00	3.18E-04	2959.764587
2030	Annual	Mon-Sun	2270002045	Cranes	D	500	Construction	U	N	NHH	P	Sacramento	SV	SAC	1.67E+01	5.84E+01	4.75E+02	2.06E-03	1.01E-02	6.46E-03	5.26E+00	5.16E-05	2.21E-04	0.00E+00	1.86E-04	1741.983096
2030	Annual	Mon-Sun	2270002045	Cranes	D	750	Construction	U	N	NHH	P	Sacramento	SV	SAC	2.99E+00	1.05E+01	1.44E+02	6.22E-04	3.05E-03	1.98E-03	1.59E+00	1.60E-05	6.76E-05	0.00E+00	5.61E-05	526.3034858
2030	Annual	Mon-Sun	2270002045	Cranes	D	9999	Construction	U	N	NHH	P	Sacramento	SV	SAC	3.76E+00	1.32E+01	5.78E+02	2.75E-03	1.25E-02	3.15E-02	6.38E+00	6.42E-05	4.89E-04	0.00E+00	2.49E-04	2115.986362
2030	Annual	Mon-Sun	2270002048	Graders	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	8.81E-01	2.27E+00	2.87E+00	3.57E-05	2.88E-04	1.94E-04	3.13E-02	4.04E-07	3.63E-06	0.00E+00	3.23E-06	10.3893792
2030	Annual	Mon-Sun	2270002048	Graders	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	5.88E+01	1.52E+02	5.18E+02	3.24E-03	3.77E-02	1.90E-02	5.68E+00	6.67E-05	5.90E-04	0.00E+00	2.92E-04	1884.103985
2030	Annual	Mon-Sun	2270002048	Graders	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.01E+02	5.18E+02	2.92E+03	1.34E-02	1.88E-01	4.60E-02	3.21E+01	3.61E-04	2.15E-03	0.00E+00	1.21E-03	10636.70032
2030	Annual	Mon-Sun	2270002048	Graders	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.25E+02	3.22E+02	2.50E+03	1.05E-02	5.59E-02	3.33E-02	2.77E+01	3.11E-04	1.18E-03	0.00E+00	9.50E-04	9165.8415
2030	Annual	Mon-Sun	2270002048	Graders	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	3.52E+00	9.10E+00	9.43E+01	3.94E-04	2.01E-03	1.19E-03	1.04E+00	1.02E-05	4.32E-05	0.00E+00	3.55E-05	345.6450043
2030	Annual	Mon-Sun	2270002048	Graders	D	750	Construction	U	N	NHH	NP	Sacramento	SV	SAC	4.61E-02	1.19E-01	2.61E+00	1.09E-05	5.57E-05	3.33E-05	2.89E-02	2.90E-07	1.20E-06	0.00E+00	9.83E-07	9.563770241
2030	Annual	Mon-Sun	2270002051	Off-Highwa	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.09E+00	2.22E+01	1.26E+02	5.60E-04	8.34E-03	1.37E-03	1.38E+00	1.56E-05	6.10E-05	0.00E+00	5.05E-05	458.8370419
2030	Annual	Mon-Sun	2270002051	Off-Highwa	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	3.02E+01	1.64E+02	1.23E+03	5.21E-03	2.79E-02	1.15E-02	1.36E+01	1.53E-04	4.14E-04	0.00E+00	4.70E-04	4511.079671
2030	Annual	Mon-Sun	2270002051	Off-Highwa	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	4.25E+01	2.30E+02	2.84E+03	1.20E-02	6.09E-02	2.53E-02	3.13E+01	3.08E-04	9.41E-04	0.00E+00	1.08E-03	10388.51945
2030	Annual	Mon-Sun	2270002051	Off-Highwa	D	750	Construction	U	N	NHH	NP	Sacramento	SV	SAC	9.66E+00	5.23E+01	1.04E+03	4.41E-03	2.24E-02	9.42E-03	1.15E+01	1.16E-04	3.49E-04	0.00E+00	3.98E-04	3825.90438
2030	Annual	Mon-Sun	2270002051	Off-Highwa	D	1000	Construction	U	N	NHH	NP	Sacramento	SV	SAC	4.53E+00	2.45E+01	6.92E+02	2.97E-03	1.49E-02	3.57E-02	7.65E+00	7.69E-05	4.55E-04	0.00E+00	2.68E-04	2535.136953
2030	Annual	Mon-Sun	2270002054	Crushing/P	D	50	Construction	U	P	NHH	P	Sacramento	SV	SAC	1.01E+01	2.64E+01	5.31E+01	5.37E-04	4.96E-03	3.42E-03	5.80E-01	7.49E-06	4.44E-05	0.00E+00	4.84E-05	192.3920119
2030	Annual	Mon-Sun	2270002054	Crushing/P	D	120	Construction	U	P	NHH	P	Sacramento	SV	SAC	2.84E+01	7.43E+01	2.81E+02	1.48E-03	2.00E-02	9.28E-03	3.09E+00	3.62E-05	2.09E-04	0.00E+00	1.33E-04	1023.20098
2030	Annual	Mon-Sun	2270002054	Crushing/P	D	175	Construction	U	P	NHH	P	Sacramento	SV	SAC	1.20E+01	3.15E+01	2.39E+02	9.16E-04	1.50E-02	2.78E-03	2.63E+00	2.96E-05	1.20E-04	0.00E+00	8.27E-05	871.4686312
2030	Annual	Mon-Sun	2270002054	Crushing/P	D	250	Construction	U	N	NHH	P	Sacramento	SV	SAC	1.20E+00	3.13E+00	3.46E+01	1.25E-04	7.44E-04	3.38E-04	3.82E-01	4.30E-06	1.18E-05	0.00E+00	1.12E-05	126.7334114
2030	Annual	Mon-Sun	2270002054	Crushing/P	D	500	Construction	U	N	NHH	P	Sacramento	SV	SAC	6.73E+00	1.76E+01	2.98E+02	1.07E-03	6.13E-03	2.76E-03	3.29E+00	3.23E-05	9.98E-05	0.00E+00	9.64E-05	1090.544253
2030	Annual	Mon-Sun	2270002054	Crushing/P	D	750	Construction	U	N	NHH	P	Sacramento	SV	SAC	7.68E-02	2.01E-01	5.35E+00	1.92E-05	1.10E-04	4.98E-05	5.91E-02	5.95E-07	1.78E-06	0.00E+00	1.73E-06	19.59634273
2030	Annual	Mon-Sun	2270002054	Crushing/P	D	9999	Construction	U	N	NHH	P	Sacramento	SV	SAC	7.68E-02	2.01E-01	1.19E+01	4.54E-05	2.45E-04	5.99E-04	1.31E-01	1.32E-06	7.61E-06	0.00E+00	4.10E-06	43.52448554
2030	Annual	Mon-Sun	2270002057	Rough Terr	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	6.98E+00	2.16E+01	3.35E+01	3.53E-04	3.24E-03	2.16E-03	3.66E-01	4.73E-06	2.52E-05	0.00E+00	3.18E-05	121.3880882
2030	Annual	Mon-Sun	2270002057	Rough Terr	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.34E+02	1.04E+03	2.94E+03	1.59E-02	2.12E-01	9.50E-02	3.23E+01	3.79E-04	1.97E-03	0.00E+00	1.44E-03	10709.91172
2030	Annual	Mon-Sun	2270002057	Rough Terr	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.28E+01	1.33E+02	7.53E+02	2.93E-03	4.79E-02	7.82E-03	8.28E+00	9.31E-05	3.45E-04	0.00E+00	2.64E-04	2743.000705
2030	Annual	Mon-Sun	2270002057	Rough Terr	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	2.39E+00	7.40E+00	5.71E+01	2.13E-04	1.25E-03	5.16E-04	6.32E-01	7.11E-06	1.85E-05	0.00E+00	1.92E-05	209.2963611
2030	Annual	Mon-Sun	2270002057	Rough Terr	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.57E+00	4.87E+00	5.64E+01	2.09E-04	1.18E-03	4.87E-04	6.24E-01	6.13E-06	1.81E-05	0.00E+00	1.89E-05	206.8452013
2030	Annual	Mon-Sun	2270002060	Rubber Tire	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	8.81E-01	2.31E+00	1.78E+00	2.36E-05	8.05E-05	1.49E-04	1.95E-02	2.48E-07	5.57E-06	0.00E+00	2.13E-06	6.49288615

2030	Annual	Mon-Sun	2270002060	Rubber Tir	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.71E+01	4.54E+01	6.48E+01	7.88E-04	6.44E-03	4.35E-03	7.06E-01	9.12E-06	7.81E-05	0.00E+00	7.11E-05	234.3561022
2030	Annual	Mon-Sun	2270002060	Rubber Tir	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	4.65E+02	1.23E+03	3.31E+03	2.03E-02	2.40E-01	1.20E-01	3.63E+01	4.26E-04	3.61E-03	0.00E+00	1.83E-03	12033.59281
2030	Annual	Mon-Sun	2270002060	Rubber Tir	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.62E+02	6.95E+02	3.36E+03	1.51E-02	2.15E-01	5.12E-02	3.69E+01	4.15E-04	2.35E-03	0.00E+00	1.36E-03	12234.91389
2030	Annual	Mon-Sun	2270002060	Rubber Tir	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	2.61E+02	6.91E+02	4.65E+03	1.90E-02	1.03E-01	5.93E-02	5.14E+01	5.79E-04	2.04E-03	0.00E+00	1.72E-03	17048.20131
2030	Annual	Mon-Sun	2270002060	Rubber Tir	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.09E+02	2.88E+02	3.08E+03	1.25E-02	6.50E-02	3.71E-02	3.41E+01	3.34E-04	1.31E-03	0.00E+00	1.13E-03	11287.17595
2030	Annual	Mon-Sun	2270002060	Rubber Tir	D	750	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.86E+00	4.92E+00	1.08E+02	4.39E-04	2.28E-03	1.32E-03	1.19E+00	1.20E-05	4.64E-05	0.00E+00	3.96E-05	395.7726662
2030	Annual	Mon-Sun	2270002060	Rubber Tir	D	1000	Construction	U	N	NHH	NP	Sacramento	SV	SAC	2.00E-01	5.28E-01	1.42E+01	5.93E-05	3.03E-04	7.51E-04	1.57E-01	1.58E-06	1.08E-05	0.00E+00	5.35E-06	51.95910903
2030	Annual	Mon-Sun	2270002063	Rubber Tir	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	6.29E-01	2.78E+00	1.64E+01	1.26E-04	1.11E-03	6.45E-04	1.80E-01	2.02E-06	3.54E-05	0.00E+00	1.14E-05	59.59885682
2030	Annual	Mon-Sun	2270002063	Rubber Tir	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.54E+01	6.81E+01	5.65E+02	3.69E-03	1.45E-02	2.01E-02	6.24E+00	7.02E-05	7.62E-04	0.00E+00	3.33E-04	2068.689065
2030	Annual	Mon-Sun	2270002063	Rubber Tir	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	2.37E+01	1.05E+02	1.26E+03	7.87E-03	3.42E-02	4.05E-02	1.39E+01	1.36E-04	1.56E-03	0.00E+00	7.10E-04	4594.908835
2030	Annual	Mon-Sun	2270002063	Rubber Tir	D	750	Construction	U	N	NHH	NP	Sacramento	SV	SAC	2.04E+00	9.02E+00	1.63E+02	1.02E-03	4.43E-03	5.37E-03	1.80E+00	1.81E-05	2.05E-04	0.00E+00	9.23E-05	595.5354212
2030	Annual	Mon-Sun	2270002063	Rubber Tir	D	1000	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.38E-01	6.09E-01	1.63E+01	1.07E-04	4.65E-04	1.17E-03	1.80E-01	1.81E-06	2.63E-05	0.00E+00	9.69E-06	59.75768551
2030	Annual	Mon-Sun	2270002066	Tractors/Lo	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.77E+01	4.58E+01	3.31E+01	4.38E-04	1.50E-03	2.77E-03	3.63E-01	4.61E-06	1.03E-04	0.00E+00	3.95E-05	120.6297423
2030	Annual	Mon-Sun	2270002066	Tractors/Lo	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.06E+02	2.78E+02	3.86E+02	4.00E-03	3.68E-02	2.44E-02	4.21E+00	5.44E-05	2.45E-04	0.00E+00	3.61E-04	1397.375575
2030	Annual	Mon-Sun	2270002066	Tractors/Lo	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.42E+03	3.71E+03	8.75E+03	4.60E-02	6.26E-01	2.74E-01	9.60E+01	1.13E-03	5.09E-03	0.00E+00	4.15E-03	31821.57759
2030	Annual	Mon-Sun	2270002066	Tractors/Lo	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.06E+02	2.77E+02	1.28E+03	4.77E-03	8.09E-02	1.20E-02	1.40E+01	1.58E-04	5.05E-04	0.00E+00	4.31E-04	4653.029848
2030	Annual	Mon-Sun	2270002066	Tractors/Lo	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	3.42E+01	8.97E+01	6.96E+02	2.48E-03	1.51E-02	5.67E-03	7.69E+00	8.65E-05	2.00E-04	0.00E+00	2.24E-04	2549.012755
2030	Annual	Mon-Sun	2270002066	Tractors/Lo	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	5.52E+01	1.45E+02	2.25E+03	8.02E-03	4.68E-02	1.77E-02	2.49E+01	2.80E-04	6.41E-04	0.00E+00	7.24E-04	8261.08583
2030	Annual	Mon-Sun	2270002066	Tractors/Lo	D	750	Construction	U	N	NHH	NP	Sacramento	SV	SAC	9.29E+00	2.43E+01	5.69E+02	2.02E-03	1.18E-02	4.51E-03	6.29E+00	7.07E-05	1.62E-04	0.00E+00	1.83E-04	2083.542549
2030	Annual	Mon-Sun	2270002069	Crawler Tra	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	8.81E-01	2.49E+00	2.85E+00	4.55E-05	3.05E-04	2.08E-04	3.10E-02	4.00E-07	6.36E-06	0.00E+00	4.10E-06	10.29187102
2030	Annual	Mon-Sun	2270002069	Crawler Tra	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	5.00E+02	1.41E+03	4.24E+03	3.32E-02	3.17E-01	1.92E-01	4.65E+01	5.45E-04	8.68E-03	0.00E+00	3.00E-03	15416.23591
2030	Annual	Mon-Sun	2270002069	Crawler Tra	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.69E+02	4.78E+02	2.64E+03	1.51E-02	1.73E-01	6.46E-02	2.90E+01	3.26E-04	3.33E-03	0.00E+00	1.36E-03	9602.307749
2030	Annual	Mon-Sun	2270002069	Crawler Tra	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.45E+02	4.11E+02	3.09E+03	1.57E-02	7.25E-02	6.64E-02	3.41E+01	3.84E-04	2.45E-03	0.00E+00	1.42E-03	11310.58657
2030	Annual	Mon-Sun	2270002069	Crawler Tra	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	9.96E+01	2.82E+02	3.30E+03	1.65E-02	7.70E-02	6.54E-02	3.65E+01	3.58E-04	2.48E-03	0.00E+00	1.49E-03	12094.16671
2030	Annual	Mon-Sun	2270002069	Crawler Tra	D	750	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.23E+00	3.47E+00	7.30E+01	3.65E-04	1.70E-03	1.47E-03	8.06E-01	8.11E-06	5.53E-05	0.00E+00	3.30E-05	267.3466275
2030	Annual	Mon-Sun	2270002069	Crawler Tra	D	1000	Construction	U	N	NHH	NP	Sacramento	SV	SAC	1.23E+00	3.47E+00	1.03E+02	5.34E-04	2.46E-03	6.22E-03	1.14E+00	1.15E-05	1.14E-04	0.00E+00	4.82E-05	378.2614395
2030	Annual	Mon-Sun	2270002072	Skid Steer L	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.21E+02	2.76E+02	1.73E+02	2.30E-03	7.84E-03	1.45E-02	1.90E+00	2.42E-05	5.44E-04	0.00E+00	2.07E-04	632.3010744
2030	Annual	Mon-Sun	2270002072	Skid Steer L	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.10E+03	2.54E+03	2.97E+03	2.35E-02	2.50E-01	1.79E-01	3.24E+01	4.19E-04	1.08E-03	0.00E+00	2.12E-03	10760.07649
2030	Annual	Mon-Sun	2270002072	Skid Steer L	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	5.74E+02	1.33E+03	2.59E+03	1.07E-02	1.77E-01	7.41E-02	2.85E+01	3.34E-04	8.59E-04	0.00E+00	9.68E-04	9439.184081
2030	Annual	Mon-Sun	2270002075	Off-Highwa	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	6.29E-02	1.91E-01	8.16E-01	8.16E-06	6.20E-05	4.66E-05	8.93E-03	1.05E-07	2.77E-06	0.00E+00	7.37E-07	2.962308141
2030	Annual	Mon-Sun	2270002075	Off-Highwa	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	7.70E+01	2.33E+02	1.38E+03	1.00E-02	9.18E-02	5.14E-02	1.52E+01	1.71E-04	2.80E-03	0.00E+00	9.04E-04	5037.317157
2030	Annual	Mon-Sun	2270002075	Off-Highwa	D	250	Construction	U	N	NHH	NP	Sacramento	SV	SAC	7.27E+01	2.20E+02	1.30E+03	7.96E-03	3.25E-02	4.35E-02	1.44E+01	1.62E-04	1.63E-03	0.00E+00	7.19E-04	4760.101313
2030	Annual	Mon-Sun	2270002075	Off-Highwa	D	750	Construction	U	N	NHH	NP	Sacramento	SV	SAC	7.71E+00	2.33E+01	6.00E+02	3.55E-03	1.58E-02	1.86E-02	6.63E+00	6.66E-05	7.05E-04	0.00E+00	3.20E-04	2197.186893
2030	Annual	Mon-Sun	2270002075	Off-Highwa	D	1000	Construction	U	N	NHH	NP	Sacramento	SV	SAC	8.14E-01	2.46E+00	9.08E+01	5.61E-04	2.48E-03	6.30E-03	1.00E+00	1.01E-05	1.38E-04	0.00E+00	5.06E-05	332.1728072
2030	Annual	Mon-Sun	2270002078	Dumpers/T	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.51E+00	2.74E+00	9.51E-01	1.26E-05	4.30E-05	7.96E-05	1.04E-02	1.32E-07	2.97E-06	0.00E+00	1.14E-06	3.467661076
2030	Annual	Mon-Sun	2270002081	Other Cons	D	15	Construction	U	P	NHH	NP	Sacramento	SV	SAC	2.08E+01	3.94E+01	1.82E+01	2.32E-04	1.21E-03	1.45E-03	1.99E-01	3.10E-06	5.67E-05	0.00E+00	2.09E-05	66.07384844
2030	Annual	Mon-Sun	2270002081	Other Cons	D	25	Construction	U	P	NHH	NP	Sacramento	SV	SAC	3.52E+00	6.67E+00	4.01E+00	5.31E-05	1.81E-04	3.36E-04	4.40E-02	5.59E-07	1.25E-05	0.00E+00	4.79E-06	14.61980392
2030	Annual	Mon-Sun	2270002081	Other Cons	D	50	Construction	U	P	NHH	NP	Sacramento	SV	SAC	5.41E+00	1.04E+01	1.32E+01	1.09E-04	1.12E-03	8.13E-04	1.45E-01	1.87E-06	7.82E-06	0.00E+00	9.88E-06	48.01225827
2030	Annual	Mon-Sun	2270002081	Other Cons	D	120	Construction	U	P	NHH	NP	Sacramento	SV	SAC	8.93E+00	1.71E+01	6.29E+01	2.74E-04	4.30E-03	1.92E-03	6.90E-01	8.10E-06	3.34E-05	0.00E+00	2.47E-05	228.8122155
2030	Annual	Mon-Sun	2270002081	Other Cons	D	175	Construction	U	P	NHH	NP	Sacramento	SV	SAC	1.23E+01	2.36E+01	1.14E+02	3.58E-04	6.91E-03	1.02E-03	1.26E+00	1.41E-05	4.31E-05	0.00E+00	3.23E-05	415.9212511
2030	Annual	Mon-Sun	2270002081	Other Cons	D	500	Construction	U	N	NHH	NP	Sacramento	SV	SAC	2.86E+01	5.48E+01	6.29E+02	1.89E-03	1.26E-02	4.80E-03	6.95E+00	6.83E-05	1.75E-04	0.00E+00	1.71E-04	2304.514562
2030	Annual	Mon-Sun	2270004030	Leaf Blowe	D	15	Lawn and Ga	U	N	NHH	P	Sacramento	SV	SAC	4.30E-01	1.41E-01	1.94E-02	2.20E-07	1.30E-06	1.55E-06	2.13E-04	3.31E-09	6.06E-08	0.00E+00	1.99E-08	0.070572127
2030	Annual	Mon-Sun	2270004030	Leaf Blowe	D	120	Lawn and Ga	U	N	NHH	P	Sacramento	SV	SAC	3.76E-01	1.24E-01	2.73E-01	6.62E-07	1.66E-05	8.29E-06	3.01E-03	3.53E-08	1.39E-07	0.00E+00	5.98E-08	0.996246522
2030	Annual	Mon-Sun	2270004030	Leaf Blowe	D	250	Lawn and Ga	U	N	NHH	P	Sacramento	SV	SAC	1.08E-01	3.53E-02	1.60E-01	2.63E-07	2.95E-06	1.44E-06	1.77E-03	1.99E-08	4.32E-08	0.00E+00	2.38E-08	0.586784605
2030	Annual	Mon-Sun	2270004055	Lawn & Ga	D	15	Lawn and Ga	U	N	NHH	NP	Sacramento	SV	SAC	1.04E+03	1.55E+03	6.56E+02	7.45E-03	4.38E-02	5.23E-02	7.18E+00	1.12E-04	2.05E-03	0.00E+00	6.72E-04	2383.746858
2030	Annual	Mon-Sun	2270004055	Lawn & Ga	D	25	Lawn and Ga	U	N	NHH	NP	Sacramento	SV	SAC	8.12E+02	1.21E+03	7.87E+02	1.04E-02	3.56E-02	6.59E-02	8.64E+00	1.10E-04	2.46E-03	0.00E+00	9.41E-04	2870.709107
2030	Annual	Mon-Sun	2270004065	Chippers/S	D	25	Lawn and Ga	U	P	NHH	P	Sacramento	SV	SAC	4.84E-01	6.16E-01	5.65E-01	7.48E-06	2.55E-05	4.73E-05	6.20E-03	7.87E-08	1.77E-06	0.00E+00	6.75E-07	2.059572041
2030	Annual	Mon-Sun	2270004065	Chippers/S	D	120	Lawn and Ga	U	P	NHH	P	Sacramento	SV	SAC	1.33E+01	1.70E+01	5.87E+01	2.27E-04	3.86E-03	1.87E-03	6.45E-01	7.56E-06	4.08E-05	0.00E+00	2.05E-05	213.6519217
2030	Annual	Mon-Sun	2270004065	Chippers/S	D	175	Lawn and Ga	U	P	NHH	P	Sacramento	SV	SAC	9.14E-01	1.16E+00	6.97E+00	2.00E-05	4.06E-04	7.92E-05	7.67E-02	8.63E-07	3.34E-06	0.00E+00	1.80E-06	25.4031224
2030	Annual	Mon-Sun	2270004065	Chippers/S	D	250	Lawn and Ga	U	N	NHH	P	Sacramento	SV	SAC	2.15E-01	2.74E-01	2.75E+00	7.35E-06	5.49E-05	2.67E-05	3.04E-02	3.43E-07	8.97E-07	0.00E+00	6.63E-07	10.08604885
2030	Annual	Mon-Sun	2270004065	Chippers/S	D	500	Lawn and Ga	U	N	NHH	P	Sacramento	SV	SAC	1.99E+00	2.53E+00	2.83E+01	7.51E-05	5.49E-04	2.59E-04	3.13E-01	3.07E-06	9.09E-06	0.00E+00	6.78E-06	103.6618969
2030	Annual	Mon-Sun	2270004065	Chippers/S	D	750	Lawn and Ga	U	N	NHH	P	Sacramento	SV	SAC	2.26E+00	2.88E+00	7.73E+01	2.06E-04	1.50E-03	7.17E-04	8.55E-01	8.60E-06	2.50E-05	0.00E+00	1.85E-05	283.2804433
2030	Annual	Mon-Sun	2270004065	Chippers/S	D	1000	Lawn and Ga	U	N	NHH	P	Sacramento	SV	SAC	4.30E+00	5.47E+00	2.09E+02	5.68E-04	4.07E-03	1.02E-02	2.32E+00	2.33E-05	1.22E-04	0.00E+00	5.12E-05	767.1076429
2030	Annual	Mon-Sun	2270004070	Commercia	D	15	Lawn and Ga	U	N	NHH	NP	Sacramento	SV	SAC	2.61E+01	7.64E+01	3.37E+01	3.82E-04	2.25E-03	2.69E-03	3.69E-01	5.74E-06	1.05E-04	0.00E+00	3.45E-05	122.4190506
2030	Annual	Mon-Sun	2270004070	Commercia	D	25	Lawn and Ga	U	N	NHH	NP	Sacramento	SV	SAC	4.91E+02	1.44E+03	9.47E+02	1.25E-02	4.28E-02	7.93E-02	1.04E+01	1.32E-04	2.96E-03	0.00E+00	1.13E-03	3453.01074
2030	Annual	Mon-Sun	2270004075	Other Lawn	D	15	Lawn and Ga	U	N	NHH	NP	Sacramento	SV	SAC	3.76E-01	4.46E-01	2.49E-01	2.83E-06	1.66E-05	1.99E-05	2.73E-03	4.24E-08	7.77E-07	0.00E+00	2.55E-07	0.905193191
2030	Annual	Mon-Sun	2270004075	Other Lawn	D	25	Lawn and Ga	U	N	NHH	NP	Sacramento	SV	SAC	5.38E-02	6.38E-02	4.73E-02	6.27E-07	2.14E-06	3.96E-06	5.19E-04	6.59E-09	1.48E-07	0.00E+00	5.65E-08	0.172491313

Table 16. OFFROAD Emissions 2035

Lawn and Garden Summary - 2030		
		Source
Total Lawn	40,194	
DU Elk Gro	75,752	Scale Factor
DU Sac Cou	1,188,347	SACOG 2016 RTP/SCS
Elk Grove %	6.4%	
Elk Grove E	2,562.16	

Construction Equipment Summary - 2030		
		Source
Total Const	426,800	
Elk Grove I	551	Scale Factor
Sac County	15,790	Extrapolation from SACOG RTP/SCS
Elk Grove %	3.5%	
Elk Grove E	14,896	

CY	Season	AvgDays	Code	Equipment	Fuel	MaxHP	Class	C/R	Pre	Hand	Port	County	Air Basin	Air Dist.	Population	Activity	Consumpti	ROG Exhau	CO Exhaust	NOX Exhau	CO2 Exhau	SO2 Exhau	PM Exhaus	N2O Exhau	CH4 Exhau	Total Annual County (MTCO2e)
2035	Annual	Mon-Sun	2.26E+09	Tampers/R	G2	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	9.70E+01	4.84E+01	9.76E+00	6.15E-04	2.64E-02	4.79E-04	5.04E-02	2.08E-06	4.22E-04	7.53E-05	3.82E-05	20.73883352
2035	Annual	Mon-Sun	2.26E+09	Plate Comp	G2	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	8.32E+00	4.70E+00	9.47E-01	5.96E-05	2.56E-03	4.64E-05	4.89E-03	2.02E-07	4.10E-05	7.31E-06	3.70E-06	2.012962998
2035	Annual	Mon-Sun	2.26E+09	Lawn Mow	G2	15	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	2.28E+03	1.43E+03	1.61E+02	1.82E-02	3.28E-01	4.90E-03	9.72E-01	4.00E-05	3.07E-03	1.26E-03	1.13E-03	433.0362803
2035	Annual	Mon-Sun	2.26E+09	Lawn Mow	G2	15	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	1.71E+04	7.26E+02	8.83E+01	7.24E-03	2.10E-01	1.91E-03	4.95E-01	2.04E-05	1.27E-03	5.52E-04	4.50E-04	208.4973751
2035	Annual	Mon-Sun	2.26E+09	Chainsaws	G2	2	Lawn and (	C	N	HH	NP	Sacramento	SV	SAC	4.08E+03	3.23E+03	1.93E+02	1.61E-01	2.91E-01	2.55E-03	7.88E-01	3.24E-05	4.59E-04	1.31E-03	1.00E-02	1151.932474
2035	Annual	Mon-Sun	2.26E+09	Chainsaws	G2	2	Lawn and (	R	N	HH	NP	Sacramento	SV	SAC	4.59E+04	6.16E+02	2.81E+01	8.95E-03	5.55E-02	4.86E-04	1.50E-01	6.18E-06	8.74E-05	2.49E-04	5.56E-04	100.8111272
2035	Annual	Mon-Sun	2.26E+09	Chainsaws	G2	15	Lawn and (	C	N	HH	NP	Sacramento	SV	SAC	2.87E+03	2.28E+03	3.28E+02	2.74E-01	4.96E-01	4.35E-03	1.34E+00	5.53E-05	7.81E-04	1.47E-03	1.71E-02	1954.731245
2035	Annual	Mon-Sun	2.26E+09	Chainsaws	G2	15	Lawn and (	R	N	HH	NP	Sacramento	SV	SAC	3.23E+04	4.34E+02	4.79E+01	1.52E-02	9.46E-02	8.28E-04	2.56E-01	1.05E-05	1.49E-04	2.81E-04	9.47E-04	170.3527086
2035	Annual	Mon-Sun	2.26E+09	Chainsaws	G2	15	Lawn and (	C	P	HH	NP	Sacramento	SV	SAC	3.58E+03	2.83E+03	4.08E+02	3.42E-01	6.18E-01	5.41E-03	1.67E+00	6.88E-05	9.72E-04	1.83E-03	2.12E-02	2432.959737
2035	Annual	Mon-Sun	2.26E+09	Chainsaws	G2	15	Lawn and (	R	P	HH	NP	Sacramento	SV	SAC	4.02E+04	5.40E+02	5.96E+01	1.90E-02	1.18E-01	1.03E-03	3.18E-01	1.31E-05	1.85E-04	3.49E-04	1.18E-03	212.0399439
2035	Annual	Mon-Sun	2.26E+09	Trimmers/I	G2	2	Lawn and (	C	N	HH	NP	Sacramento	SV	SAC	1.33E+04	4.42E+03	1.96E+02	1.06E-01	3.48E-01	3.05E-03	9.42E-01	3.88E-05	5.48E-04	1.66E-03	6.58E-03	904.4485255
2035	Annual	Mon-Sun	2.26E+09	Trimmers/I	G2	2	Lawn and (	R	N	HH	NP	Sacramento	SV	SAC	1.48E+05	8.73E+03	3.70E+02	1.65E-01	6.88E-01	6.02E-03	1.86E+00	7.66E-05	1.08E-03	3.28E-03	1.03E-02	1548.169321
2035	Annual	Mon-Sun	2.26E+09	Leaf Blowe	G2	2	Lawn and (	C	N	HH	P	Sacramento	SV	SAC	1.99E+04	1.07E+04	5.70E+02	3.93E-01	9.35E-01	8.19E-03	2.53E+00	1.04E-04	1.47E-03	4.25E-03	2.44E-02	3022.022574
2035	Annual	Mon-Sun	2.26E+09	Leaf Blowe	G2	2	Lawn and (	R	N	HH	P	Sacramento	SV	SAC	5.12E+04	6.73E+02	2.98E+01	9.41E-03	5.89E-02	5.16E-04	1.59E-01	6.56E-06	9.27E-05	2.68E-04	5.85E-04	106.548492
2035	Annual	Mon-Sun	2.26E+09	Shredders	G2	15	Lawn and (	C	P	NHH	NP	Sacramento	SV	SAC	1.00E+02	3.73E+01	1.64E+01	9.20E-04	4.43E-02	7.17E-04	8.48E-02	3.49E-06	7.11E-04	8.27E-05	5.72E-05	33.85371089
2035	Annual	Mon-Sun	2.26E+09	Shredders	G2	15	Lawn and (	R	P	NHH	NP	Sacramento	SV	SAC	3.57E+03	8.81E+00	3.85E+00	1.86E-04	1.05E-02	1.45E-04	2.00E-02	8.25E-07	1.68E-04	1.80E-05	1.16E-05	7.80996041
2035	Annual	Mon-Sun	2.26E+09	Commercia	G2	15	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	5.32E+01	1.17E+02	4.77E+01	2.15E-03	1.30E-01	1.63E-03	2.48E-01	1.02E-05	1.16E-04	2.18E-04	1.34E-04	96.0065041
2035	Annual	Mon-Sun	2.26E+09	Commercia	G2	25	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	2.63E+01	5.76E+01	5.11E+01	2.23E-03	1.44E-01	1.72E-03	2.59E-01	1.07E-05	1.21E-04	1.61E-04	1.38E-04	99.33460911
2035	Annual	Mon-Sun	2.26E+09	Other Lawı	G2	2	Lawn and (	C	N	HH	NP	Sacramento	SV	SAC	2.25E+01	4.23E+00	2.36E-01	1.16E-04	4.29E-04	3.76E-06	1.16E-03	4.78E-08	6.75E-07	1.82E-06	7.20E-06	1.033034364
2035	Annual	Mon-Sun	2.26E+09	Other Lawı	G2	2	Lawn and (	R	N	HH	NP	Sacramento	SV	SAC	6.89E+02	8.12E+00	4.15E-01	1.26E-04	8.25E-04	7.22E-06	2.23E-03	9.18E-08	1.30E-06	3.50E-06	7.80E-06	1.454950695
2035	Annual	Mon-Sun	2.26E+09	Other Lawı	G2	15	Lawn and (	C	N	HH	NP	Sacramento	SV	SAC	9.79E+00	1.84E+00	5.13E-01	2.52E-04	9.34E-04	8.18E-06	2.52E-03	1.04E-07	1.47E-06	1.87E-06	1.57E-05	2.228050078
2035	Annual	Mon-Sun	2.26E+09	Other Lawı	G2	15	Lawn and (	R	N	HH	NP	Sacramento	SV	SAC	3.00E+02	3.53E+00	9.03E-01	2.73E-04	1.80E-03	1.57E-05	4.85E-03	2.00E-07	2.82E-06	3.59E-06	1.70E-05	3.129912839
2035	Annual	Mon-Sun	2.27E+09	Asphalt Pa	G4	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.11E+00	2.30E+00	1.33E+00	1.01E-04	3.82E-03	7.49E-05	6.46E-03	1.84E-07	5.41E-05	6.57E-06	5.69E-06	2.698074637
2035	Annual	Mon-Sun	2.27E+09	Asphalt Pa	G4	25	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	3.62E+00	3.93E+00	5.73E+00	4.44E-04	1.69E-02	2.89E-04	2.70E-02	6.84E-07	2.26E-04	1.74E-05	2.51E-05	11.30211884
2035	Annual	Mon-Sun	2.27E+09	Asphalt Pa	G4	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.80E+00	3.01E+00	7.05E+00	9.54E-05	8.07E-03	1.20E-04	5.50E-02	6.68E-07	4.21E-06	9.58E-06	5.39E-06	18.76585827
2035	Annual	Mon-Sun	2.27E+09	Asphalt Pa	G4	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.54E+00	1.66E+00	6.29E+00	3.98E-05	2.30E-03	9.28E-05	5.69E-02	5.50E-07	4.41E-06	6.26E-06	2.25E-06	19.1026712
2035	Annual	Mon-Sun	2.27E+09	Tampers/R	G4	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	4.47E+00	2.23E+00	1.08E+00	7.99E-05	3.09E-03	5.95E-05	5.23E-03	1.49E-07	4.39E-05	5.73E-06	4.52E-06	2.182124179
2035	Annual	Mon-Sun	2.27E+09	Plate Comp	G4	5	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.64E+02	8.11E+01	1.47E+01	2.08E-03	3.16E-02	9.38E-04	8.44E-02	2.92E-06	2.75E-05	1.33E-04	1.18E-04	39.50980256
2035	Annual	Mon-Sun	2.27E+09	Plate Comp	G4	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.74E+02	9.84E+01	4.22E+01	3.17E-03	1.21E-01	2.36E-03	2.05E-01	5.84E-06	1.72E-03	2.39E-04	1.79E-04	85.8361274
2035	Annual	Mon-Sun	2.27E+09	Rollers	G4	5	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.83E+01	4.16E+00	1.12E+00	1.36E-04	2.69E-03	6.12E-05	6.11E-03	2.11E-07	1.99E-06	7.78E-06	7.67E-06	2.768650052
2035	Annual	Mon-Sun	2.27E+09	Rollers	G4	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.96E+01	2.52E+01	1.37E+01	1.03E-03	3.93E-02	7.64E-04	6.65E-02	1.90E-06	5.57E-04	6.93E-05	5.81E-05	27.74887457
2035	Annual	Mon-Sun	2.27E+09	Rollers	G4	25	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.00E+01	1.70E+01	2.01E+01	1.54E-03	5.95E-02	1.01E-03	9.47E-02	2.40E-06	7.94E-04	6.68E-05	8.74E-05	39.65000296
2035	Annual	Mon-Sun	2.27E+09	Rollers	G4	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.98E+00	3.36E+00	9.33E+00	1.53E-04	1.46E-02	1.76E-04	6.66E-02	8.10E-07	5.10E-06	1.23E-05	8.67E-06	22.9334826
2035	Annual	Mon-Sun	2.27E+09	Rollers	G4	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	3.71E+00	6.32E+00	2.86E+01	2.40E-04	1.55E-02	5.65E-04	2.51E-01	2.43E-06	1.94E-05	3.03E-05	1.36E-05	84.5886087
2035	Annual	Mon-Sun	2.27E+09	Paving Equ	G4	5	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.30E+02	1.07E+02	2.09E+01	2.92E-03	4.54E-02	1.32E-03	1.20E-01	4.13E-06	3.90E-05	1.82E-04	1.65E-04	55.84911813
2035	Annual	Mon-Sun	2.27E+09	Paving Equ	G4	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	3.89E+02	2.13E+02	1.23E+02	9.20E-03	3.52E-01	6.85E-03	5.96E-01	1.70E-05	4.99E-03	6.05E-04	5.20E-04	248.4903
2035	Annual	Mon-Sun	2.27E+09	Paving Equ	G4	25	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	8.64E+00	4.74E+00	6.18E+00	4.75E-04	1.83E-02	3.09E-04	2.91E-02	7.38E-07	2.44E-04	1.96E-05	2.69E-05	12.18228603
2035	Annual	Mon-Sun	2.27E+09	Paving Equ	G4	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	7.66E+00	3.68E+00	8.21E+00	8.78E-05	6.08E-03	1.28E-04	6.93E-02	8.43E-07	5.31E-06	1.09E-05	4.96E-06	23.48824081
2035	Annual	Mon-Sun	2.27E+09	Paving Equ	G4	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.98E+00	9.48E-01	3.39E+00	1.54E-05	7.11E-04	3.55E-05	3.15E-02	3.04E-07	2.44E-06	2.91E-06	8.72E-07	10.53680715
2035	Annual	Mon-Sun	2.27E+09	Surfacing E	G4	5	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	4.22E+01	2.31E+01	4.64E+00	6.70E-04	9.79E-03	3.03E-04	2.68E-02	9.27E-07	8.75E-06	4.07E-05	3.79E-05	12.5904173
2035	Annual	Mon-Sun	2.27E+09	Surfacing E	G4	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.25E+02	1.73E+02	6.62E+01	5.19E-03	1.90E-01	3.87E-03	3.21E-01	9.15E-06	2.69E-03	4.05E-04	2.94E-04	135.8043236
2035	Annual	Mon-Sun	2.27E+09	Surfacing E	G4	25	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.72E+00	2.37E+00	2.22E+00	1.78E-04	6.55E-03	1.16E-04	1.04E-02	2.64E-07	8.75E-05	8.43E-06	1.01E-05	4.417048393
2035	Annual	Mon-Sun	2.27E+09	Signal Boaı	G4	5	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	5.21E-01	1.86E-01	6.02E-02	7.72E-06	1.39E-04	3.49E-06	3.34E-04	1.15E-08	1.09E-07	3.96E-07	4.37E-07	0.152621855
2035	Annual	Mon-Sun	2.27E+09	Signal Boaı	G4	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	3.71E+00	2.89E+00	1.71E+00	1.28E-04	4.92E-03	9.49E-05	8.31E-03	2.37E-07	6.97E-05	8.30E-06	7.21E-06	3.462025894
2035	Annual	Mon-Sun	2.27E+09	Trenchers	G4	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	3.43E+01	4.08E+01	2.63E+01	2.01E-03	7.54E-02	1.50E-03	1.28E-01	3.64E-06	1.07E-03	1.25E-04	1.14E-04	53.37226932
2035	Annual	Mon-Sun	2.27E+09	Trenchers	G4	25	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.66E+01	3.16E+01	4.41E+01	3.46E-03	1.30E-01	2.26E-03	2.07E-01	5.26E-06	1.74E-03	1.37E-04	1.96E-04	87.14829719
2035	Annual	Mon-Sun	2.27E+09	Trenchers	G4	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.80E+01	1.98E+01	4.42E+01	6.25E-04	5.45E-02	7.76E-04	3.39E-01	4.12E-06	2.59E-05	6.22E-05	3.54E-05	115.8365138
2035	Annual	Mon-Sun	2.27E+09	Trenchers	G4	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	5.96E+00	6.58E+00	2.72E+01	1.84E-04	1.09E-02	4.30E-04	2.45E-01	2.36E-06	1.89E-05	2.69E-05	1.04E-05	82.12674047
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	G4	15	Constructi	U	P	NHH	P	Sacramento	SV	SAC	9.81E-01	3.33E-01	2.57E-01	1.84E-05	7.37E-04	1.37E-05	1.25E-03	3.56E-08	1.05E-05	1.08E-06	1.04E-06	0.514324358
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	G4	25	Constructi	U	P	NHH	P	Sacramento	SV	SAC	4.87E+00	1.66E+00	2.36E+00	1.74E-04	7.00E-03	1.13E-04	1.12E-02	2.83E-07	9.35E-05	7.03E-06	9.84E-06	4.621608581
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	G4	50	Constructi	U	P	NHH	P	Sacramento	SV	SAC	8.69E-01	2.55E-01	6.55E-01	6.85E-06	4.63E-04	1.01E-05	5.57E-03	6.77E-08	4.26E-07	8.11E-07	3.88E-07	1.884449793
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	G4	120	Constructi	U	P	NHH	P	Sacramento	SV	SAC	3.99E+00	1.17E+00	7.45E+00	3.29E-05	1.48E-03	7.62E-05	6.95E-02	6.71E-07	5.38E-06	4.83E-06	1.86E-06	23.21359844
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	G4	175	Constructi	U	P	NHH	P	Sacramento	SV	SAC	9.88E-01	2.90E-01	2.61E+00	8.85E-06	7.78E-04	2.87E-05	2.39E-02	2.38E-07	1.91E-06	1.50E-06	5.01E-07	7.987498382
2035	Annual	Mon-Sun	2.27E+09	Concrete/I	G4	5	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.80E+01	6.41E+00	1.71E+00	2.19E-04	3.93E-03	9.89E-05	9.47E-03	3.27E-07	3.09E-06	1.23E-05	1.24E-05	4.336923426
2035	Annual	Mon-Sun	2.27E+09	Concrete/I	G4	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	8.09E+01	6.88E+01	4.71E+01	3.53E-03	1.35E-01	2.63E-03	2.29E-01	6.52E-06	1.92E-03	2.14E-04	2.00E-04	95.18129276
2035	Annual	Mon-Sun	2.27E+09	Concrete/I	G4	25	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.53E+01	2.15E+01	2.87E+01	2.20E-03	8.48E-02	1.44E-03	1.35E-01	3.42E-06	1.13E-03	9.02E-05	1.25E-04	56.49485748
2035	Annual	Mon-Sun	2.27E+09	Concrete/I	G4	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	3.24E+00	5.42E+00	1.50E+01	1.57E-04	1.06E-02	2.32E-04	1.28E-01	1.55E-06	9.78E-06	1.79E-05	8.87E-06	43.23400443
2035	Annual	Mon-Sun	2.27E+09	Concrete/I	G4	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.86E+00	3.11E+00	1.46E+01	6.45E-05	2.89E-03	1.48E-04	1.36E-01	1.32E-06	1.06E-05	1.09E-05	3.65E-06	45.61512035
2035	Annual	Mon-Sun	2.27E+09	Cement an	G4	5	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	3.27E+02	8.24E+01	2.09E+01	2.62E-03	4.88E-02	1.18E-03	1.15E-01	3.97E-06	3.75E-05	1.52E-04	1.48E-04	52.51854963
2035	Annual	Mon-Sun	2.27E+09	Cement an	G4	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	5.53E+02	1.40E+02	6.42E+01	4.65E-03	1.84E-01	3.46E-03	3.12E-01	8.90E-06	2.62E-03	3.45E-04	2.63E-04	129.5929738

2035	Annual	Mon-Sun	2.27E+09	Cement an	G4	25	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	2.33E+00	5.88E-01	8.70E-01	6.46E-05	2.58E-03	4.21E-05	4.10E-03	1.04E-07	3.44E-05	2.55E-06	3.65E-06	1.702905314
2035	Annual	Mon-Sun	2.27E+09	Cranes	G4	50	Constructic	U	P	NHH	P	Sacramento	SV	SAC	9.88E-01	1.12E+00	2.21E+00	3.16E-05	2.77E-03	3.90E-05	1.69E-02	2.05E-07	1.29E-06	3.31E-06	1.79E-06	5.774926352
2035	Annual	Mon-Sun	2.27E+09	Cranes	G4	120	Constructic	U	P	NHH	P	Sacramento	SV	SAC	1.98E+00	2.25E+00	7.43E+00	5.09E-05	3.04E-03	1.19E-04	6.67E-02	6.45E-07	5.17E-06	8.22E-06	2.88E-06	22.42734003
2035	Annual	Mon-Sun	2.27E+09	Cranes	G4	175	Constructic	U	P	NHH	P	Sacramento	SV	SAC	7.90E-02	8.99E-02	4.82E-01	3.31E-06	1.58E-04	8.17E-06	4.39E-03	4.36E-08	3.49E-07	4.38E-07	1.87E-07	1.472653163
2035	Annual	Mon-Sun	2.27E+09	Crushing/P	G4	15	Constructic	U	P	NHH	P	Sacramento	SV	SAC	8.89E-01	7.04E-01	5.25E-01	3.92E-05	1.51E-03	2.92E-05	2.55E-03	7.27E-08	2.14E-05	2.29E-06	2.22E-06	1.060240211
2035	Annual	Mon-Sun	2.27E+09	Crushing/P	G4	25	Constructic	U	P	NHH	P	Sacramento	SV	SAC	5.82E-01	4.61E-01	6.31E-01	4.82E-05	1.86E-03	3.14E-05	2.97E-03	7.53E-08	2.49E-05	1.95E-06	2.73E-06	1.241020281
2035	Annual	Mon-Sun	2.27E+09	Crushing/P	G4	120	Constructic	U	P	NHH	P	Sacramento	SV	SAC	1.15E+00	7.57E-01	5.75E+00	3.16E-05	1.68E-03	7.37E-05	5.27E-02	5.10E-07	4.09E-06	3.85E-06	1.79E-06	17.65569252
2035	Annual	Mon-Sun	2.27E+09	Rough Terr	G4	50	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	3.95E-01	4.47E-01	1.50E+00	2.14E-05	1.87E-03	2.64E-05	1.14E-02	1.39E-07	8.76E-07	1.75E-06	1.21E-06	3.909421506
2035	Annual	Mon-Sun	2.27E+09	Rough Terr	G4	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	5.61E+00	6.35E+00	3.23E+01	2.21E-04	1.32E-02	5.18E-04	2.90E-01	2.81E-06	2.25E-05	2.92E-05	1.25E-05	97.53155064
2035	Annual	Mon-Sun	2.27E+09	Rough Terr	G4	175	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.98E-01	2.24E-01	1.82E+00	1.25E-05	5.99E-04	3.09E-05	1.66E-02	1.65E-07	1.32E-06	1.36E-06	7.06E-07	5.576126341
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	G4	50	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	9.88E-01	1.39E+00	3.46E+00	5.18E-05	4.68E-03	6.17E-05	2.59E-02	3.14E-07	1.98E-06	4.66E-06	2.93E-06	8.862573546
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	G4	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	6.56E+00	9.21E+00	3.43E+01	2.51E-04	1.55E-02	5.87E-04	3.06E-01	2.95E-06	2.37E-05	3.71E-05	1.42E-05	102.7747352
2035	Annual	Mon-Sun	2.27E+09	Tractors/Lc	G4	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	3.48E+00	8.29E+00	2.43E+01	1.94E-04	1.24E-02	4.55E-04	2.14E-01	2.07E-06	1.66E-05	3.08E-05	1.10E-05	72.14006403
2035	Annual	Mon-Sun	2.27E+09	Skid Steer	G4	15	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.75E+00	1.53E+00	1.21E+00	9.19E-05	3.47E-03	6.84E-05	5.87E-03	1.67E-07	4.92E-05	5.18E-06	5.20E-06	2.449254209
2035	Annual	Mon-Sun	2.27E+09	Skid Steer	G4	25	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.17E+02	1.02E+02	1.13E+02	8.81E-03	3.35E-01	5.74E-03	5.33E-01	1.35E-05	4.47E-03	3.91E-04	4.98E-04	223.8282651
2035	Annual	Mon-Sun	2.27E+09	Skid Steer	G4	50	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	2.69E+01	2.29E+01	4.38E+01	4.82E-04	3.43E-02	6.88E-04	3.67E-01	4.46E-06	2.81E-05	6.27E-05	2.72E-05	124.4919839
2035	Annual	Mon-Sun	2.27E+09	Skid Steer	G4	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.61E+01	1.37E+01	5.85E+01	2.77E-04	1.32E-02	6.38E-04	5.43E-01	5.24E-06	4.20E-05	4.73E-05	1.57E-05	181.516017
2035	Annual	Mon-Sun	2.27E+09	Dumpers/T	G4	5	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.67E+01	6.81E+00	9.15E-01	1.32E-04	1.93E-03	5.95E-05	5.29E-03	1.83E-07	1.72E-06	9.65E-06	7.45E-06	2.494570317
2035	Annual	Mon-Sun	2.27E+09	Dumpers/T	G4	15	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	3.56E+01	1.45E+01	5.23E+00	3.92E-04	1.50E-02	2.92E-04	2.54E-02	7.23E-07	2.13E-04	3.21E-05	2.22E-05	10.64438377
2035	Annual	Mon-Sun	2.27E+09	Dumpers/T	G4	25	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	6.59E+00	2.69E+00	2.11E+00	1.62E-04	6.23E-03	1.06E-04	9.93E-03	2.52E-07	8.32E-05	8.50E-06	9.16E-06	4.170008875
2035	Annual	Mon-Sun	2.27E+09	Dumpers/T	G4	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	7.11E-01	2.48E-01	6.15E-01	2.82E-06	1.31E-04	6.53E-06	5.72E-03	5.53E-08	4.43E-07	6.30E-07	1.59E-07	1.914003003
2035	Annual	Mon-Sun	2.27E+09	Other Con:	G4	175	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	2.77E+00	2.81E+00	1.54E+01	6.03E-05	4.66E-03	1.82E-04	1.41E-01	1.40E-06	1.13E-05	1.16E-05	3.41E-06	47.18172637
2035	Annual	Mon-Sun	2.27E+09	Lawn Mow	G4	5	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	1.35E+04	8.44E+03	1.01E+03	1.20E-01	2.23E+00	3.07E-02	5.76E+00	1.99E-04	1.82E-02	7.46E-03	6.71E-03	2563.933218
2035	Annual	Mon-Sun	2.27E+09	Lawn Mow	G4	5	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	2.14E+05	9.08E+03	1.20E+03	9.19E-02	3.21E+00	2.28E-02	6.19E+00	2.14E-04	1.48E-02	6.54E-03	5.13E-03	2559.339864
2035	Annual	Mon-Sun	2.27E+09	Tillers	G4	5	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	1.40E+03	2.14E+02	3.02E+01	2.69E-03	7.59E-02	6.78E-04	1.62E-01	5.60E-06	4.28E-04	1.76E-04	1.52E-04	68.72839757
2035	Annual	Mon-Sun	2.27E+09	Tillers	G4	5	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	5.44E+03	2.68E+02	3.85E+01	3.13E-03	1.00E-01	7.84E-04	2.03E-01	7.01E-06	5.05E-04	2.10E-04	1.77E-04	84.71557072
2035	Annual	Mon-Sun	2.27E+09	Trimmers/	G4	5	Lawn and (	C	P	NHH	NP	Sacramento	SV	SAC	2.46E+03	9.15E+02	2.80E+01	3.64E-03	6.37E-02	1.64E-03	1.56E-01	5.38E-06	5.08E-05	5.58E-04	2.06E-04	74.86345701
2035	Annual	Mon-Sun	2.27E+09	Trimmers/	G4	5	Lawn and (	R	P	NHH	NP	Sacramento	SV	SAC	1.15E+04	6.75E+02	2.16E+01	2.46E-03	5.32E-02	1.11E-03	1.15E-01	3.97E-06	3.75E-05	3.92E-04	1.39E-04	53.94708412
2035	Annual	Mon-Sun	2.27E+09	Leaf Blowe	G4	5	Lawn and (	C	N	NHH	P	Sacramento	SV	SAC	6.27E+02	1.07E+02	7.03E+00	5.21E-04	1.88E-02	1.29E-04	3.64E-02	1.26E-06	8.53E-05	5.26E-05	2.95E-05	15.11485554
2035	Annual	Mon-Sun	2.27E+09	Leaf Blowe	G4	5	Lawn and (	R	N	NHH	P	Sacramento	SV	SAC	5.39E+02	7.09E+00	4.88E-01	2.80E-05	1.39E-03	6.81E-06	2.42E-03	8.34E-08	4.81E-06	3.09E-06	1.58E-06	0.967403264
2035	Annual	Mon-Sun	2.27E+09	Rear Engin	G4	15	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	7.38E+03	5.49E+03	1.81E+03	8.42E-02	5.25E+00	6.10E-02	8.89E+00	2.53E-04	4.12E-03	8.85E-03	4.76E-03	3442.217042
2035	Annual	Mon-Sun	2.27E+09	Rear Engin	G4	15	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	6.48E+03	5.00E+02	1.64E+02	6.53E-03	4.79E-01	4.78E-03	8.10E-01	2.31E-05	3.23E-04	7.43E-04	3.69E-04	307.4210057
2035	Annual	Mon-Sun	2.27E+09	Rear Engin	G4	25	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	3.38E+01	2.51E+01	1.61E+01	7.23E-04	4.82E-02	5.32E-04	7.67E-02	1.95E-06	3.56E-05	5.71E-05	4.09E-05	29.5290275
2035	Annual	Mon-Sun	2.27E+09	Rear Engin	G4	25	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	2.91E+01	2.25E+00	1.44E+00	5.64E-05	4.32E-03	3.96E-05	6.88E-03	1.74E-07	2.74E-06	4.62E-06	3.19E-06	2.600682301
2035	Annual	Mon-Sun	2.27E+09	Front Mow	G4	15	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	3.38E+02	2.52E+02	1.32E+02	6.16E-03	3.85E-01	4.46E-03	6.50E-01	1.85E-05	3.02E-04	5.20E-04	3.49E-04	250.7134972
2035	Annual	Mon-Sun	2.27E+09	Front Mow	G4	15	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	1.09E+04	8.45E+02	4.44E+02	1.76E-02	1.29E+00	1.29E-02	2.18E+00	6.23E-05	8.71E-04	1.61E-03	9.97E-04	825.7676267
2035	Annual	Mon-Sun	2.27E+09	Front Mow	G4	25	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	2.65E+02	1.97E+02	1.40E+02	6.27E-03	4.18E-01	4.62E-03	6.66E-01	1.69E-05	3.09E-04	4.73E-04	3.55E-04	256.0212057
2035	Annual	Mon-Sun	2.27E+09	Front Mow	G4	25	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	8.57E+03	6.62E+02	4.68E+02	1.83E-02	1.40E+00	1.29E-02	2.24E+00	5.67E-05	8.92E-04	1.44E-03	1.04E-03	845.1490279
2035	Annual	Mon-Sun	2.27E+09	Shredders	G4	5	Lawn and (	C	P	NHH	NP	Sacramento	SV	SAC	2.66E+02	9.88E+01	2.68E+01	3.49E-03	6.11E-02	1.58E-03	1.50E-01	5.17E-06	4.88E-05	1.93E-04	1.98E-04	68.68702901
2035	Annual	Mon-Sun	2.27E+09	Shredders	G4	5	Lawn and (	R	P	NHH	NP	Sacramento	SV	SAC	9.88E+03	2.44E+01	7.73E+00	5.85E-04	2.26E-02	2.64E-04	3.69E-02	1.27E-06	1.20E-05	3.88E-05	3.31E-05	15.48310588
2035	Annual	Mon-Sun	2.27E+09	Lawn & Ga	G4	15	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	1.35E+03	4.77E+02	3.03E+02	1.18E-02	8.81E-01	8.65E-03	1.49E+00	4.25E-05	5.85E-04	9.99E-04	6.69E-04	561.2428996
2035	Annual	Mon-Sun	2.27E+09	Lawn & Ga	G4	15	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	8.79E+03	3.52E+02	2.23E+02	8.03E-03	6.50E-01	5.92E-03	1.10E+00	3.13E-05	3.99E-04	7.07E-04	4.54E-04	410.201135
2035	Annual	Mon-Sun	2.27E+09	Lawn & Ga	G4	25	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	5.34E+02	1.88E+02	1.90E+02	7.33E-03	5.70E-01	5.12E-03	9.08E-01	2.30E-05	3.56E-04	4.89E-04	4.15E-04	341.5356562
2035	Annual	Mon-Sun	2.27E+09	Lawn & Ga	G4	25	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	3.47E+03	1.39E+02	1.40E+02	5.05E-03	4.20E-01	3.43E-03	6.70E-01	1.70E-05	2.43E-04	3.42E-04	2.86E-04	249.9588314
2035	Annual	Mon-Sun	2.27E+09	Lawn & Ga	G4	50	Lawn and (	U	N	NHH	NP	Sacramento	SV	SAC	7.73E+00	2.20E+00	3.33E+00	3.35E-05	2.24E-03	6.50E-05	2.85E-02	3.47E-07	2.18E-06	5.97E-06	1.89E-06	9.658824653
2035	Annual	Mon-Sun	2.27E+09	Wood Split	G4	5	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	4.55E+02	1.60E+02	4.68E+01	4.95E-03	1.09E-01	1.26E-03	2.62E-01	9.03E-06	7.68E-04	2.14E-04	2.80E-04	113.1252978
2035	Annual	Mon-Sun	2.27E+09	Wood Split	G4	5	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	1.14E+04	3.42E+01	1.16E+01	5.58E-04	3.41E-02	1.33E-04	5.59E-02	1.93E-06	9.98E-05	3.15E-05	3.15E-05	21.57574977
2035	Annual	Mon-Sun	2.27E+09	Chippers/S	G4	15	Lawn and (	C	P	NHH	P	Sacramento	SV	SAC	6.41E+00	2.22E+01	1.87E+01	1.47E-03	5.41E-02	1.09E-03	9.00E-02	2.57E-06	7.54E-04	7.87E-05	8.23E-05	37.74720182
2035	Annual	Mon-Sun	2.27E+09	Chippers/S	G4	15	Lawn and (	R	P	NHH	P	Sacramento	SV	SAC	1.14E+01	5.17E-01	4.30E-01	2.51E-05	1.24E-03	1.87E-05	2.10E-03	5.99E-08	1.76E-05	1.56E-06	1.42E-06	0.83481191
2035	Annual	Mon-Sun	2.27E+09	Chippers/S	G4	25	Lawn and (	C	P	NHH	P	Sacramento	SV	SAC	3.64E+01	1.26E+02	1.79E+02	1.45E-02	5.34E-01	9.38E-03	8.36E-01	2.12E-05	7.01E-03	5.57E-04	8.08E-04	352.9027739
2035	Annual	Mon-Sun	2.27E+09	Chippers/S	G4	25	Lawn and (	R	P	NHH	P	Sacramento	SV	SAC	6.48E+01	2.93E+00	4.10E+00	2.46E-04	1.22E-02	1.60E-04	1.95E-02	4.93E-07	1.63E-04	1.10E-05	1.39E-05	7.76488778
2035	Annual	Mon-Sun	2.27E+09	Commercia	G4	15	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	4.79E+02	1.05E+03	5.60E+02	3.16E-02	1.63E+00	2.26E-02	2.73E+00	7.79E-05	1.53E-03	2.41E-03	1.78E-03	1083.916811
2035	Annual	Mon-Sun	2.27E+09	Commercia	G4	25	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	2.36E+02	5.17E+02	4.90E+02	2.61E-02	1.47E+00	2.02E-02	2.33E+00	5.90E-05	1.30E-03	1.63E-03	1.47E-03	914.4500512
2035	Annual	Mon-Sun	2.27E+09	Commercia	G4	50	Lawn and (	U	N	NHH	NP	Sacramento	SV	SAC	9.52E+01	1.91E+02	3.20E+02	4.87E-03	4.82E-01	1.03E-02	2.31E+00	2.81E-05	1.77E-04	7.02E-04	2.75E-04	795.8325996
2035	Annual	Mon-Sun	2.27E+09	Commercia	G4	120	Lawn and (	U	N	NHH	NP	Sacramento	SV	SAC	6.29E-01	1.26E+00	3.09E+00	1.39E-05	7.50E-04	8.30E-05	2.86E-02	2.76E-07	2.21E-06	5.25E-06	7.83E-07	9.584679647
2035	Annual	Mon-Sun	2.27E+09	Other Lawı	G4	5	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	4.21E+02	7.91E+01	1.62E+01	1.44E-03	4.07E-02	3.61E-04	8.68E-02	3.00E-06	2.28E-04	7.89E-05	8.12E-05	36.60474285
2035	Annual	Mon-Sun	2.27E+09	Other Lawı	G4	5	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	1.29E+04	1.52E+02	3.38E+01	1.90E-03	9.68E-02	4.61E-04	1.67E-01	5.76E-06	3.28E-04	1.22E-04	1.07E-04	65.79161273
2035	Annual	Mon-Sun	2.27E+09	Other Lawı	G4	15	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	1.87E+02	3.51E+01	1.57E+01	6.19E-04	4.56E-02	4.53E-04	7.71E-02	2.20E-06	3.06E-05	6.13E-05	3.50E-05	29.18210121
2035	Annual	Mon-Sun	2.27E+09	Other Lawı	G4	15	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	5.73E+03	6.75E+01	3.00E+01	1.03E-03	8.76E-02	7.58E-04	1.48E-01	4.23E-06	5.11E-05	1.09E-04	5.80E-05	55.17247713
2035	Annual	Mon-Sun	2.27E+09	Other Lawı	G4	25	Lawn and (	C	N	NHH	NP	Sacramento	SV	SAC	3.95E+00	7.42E-01	7.24E-01	2.83E-05	2.17E-03	1.98E-05	3.46E-03	8.78E-08	1.37E-06	1.91E-06	1.60E-06	1.304552896
2035	Annual	Mon-Sun	2.27E+09	Other Lawı	G4	25	Lawn and (	R	N	NHH	NP	Sacramento	SV	SAC	1.22E+02	1.43E+00	1.40E+00	4.82E-05	4.20E-03	3.21E-05	6.69E-03	1.70E-07	2.31E-06	3.36E-06	2.73E-06	2.487035012
2035	Annual	Mon-Sun	2.27E+09	Other Lawı	G4	50	Lawn and (	U	N	NHH	NP	Sacramento	SV	SAC	2.86E-01	4.78E-02	9.96E-02	9.65E-07	6.09E-05	1.86E-06	8.62E-04	1.05E-08	6.60E-08	1.50E-07	5.46E-08	0.291556433
2035	Annual	Mon-Sun	2.27E+09	Other Lawı	G4	120	Lawn and (	U	N	NHH	NP	Sacramento	SV	SAC	6.87E-01	1.15E-01	6.18E-01	2.39E-06	1.01E-04	1.55E-05	5.79E-03	5.60E-08	4.49E-07	7.02E-07	1.35E-07	1.937125746
2035	Annual	Mon-Sun	2.27E+09	Pavers	D	25	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.00E+00	2.26E+00	1.91E+00	2.54E-05	8.66E-05	1.60E-04	2.10E-02	2.67E-07	5.99E-06	0.00E+00	2.29E-06	7.16195866
2035	Annual	Mon-Sun	2.27E+09	Pavers	D	50	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	5.82E+01	1.32E+02	1.69E+02	2.26E-03	1.71E-02	1.15E-02	1.85E+00	2.39E-05	2.50E-04	0.00E+00	2.04E-04	629.0674109
2035	Annual	Mon-Sun	2.27E+09	Pavers	D	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	6.87E+01	1.56E+02	4.91E+02	3.21E-03	3.57E-02	1.88E-02	5.38E+00	6.31E-05	6.63E-04	0.00E+00	2.89E-04	1806.66884
2035	Annual	Mon-Sun	2.27E+09	Pavers	D	175	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	4.27E+01	9.67E+01	5.64E+02	2.67E-03	3.62E-02	9.71E-03	6.20E+00	6.98E-05	4.77E-04	0.00E+00	2.41E-04	2073.907555
2035	Annual	Mon-Sun	2.27E+09	Pavers	D	250	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	5.14E+00	1.17E+01	1.02E+02	4.41E-04	2.30E-03	1.54E-03	1.13E+00	1.27E-05	5.56E-05	0.00E+00	3.98E-05	378.2721444
2035	Annual	Mon-Sun	2.27E+09	Pavers	D	500	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	5.28E+00	1.20E+01	1.26E+02	5.35E-04	2.73E-03	1.77E-03	1.39E+00	1.37E-05	6.57E-05	0.00E+00	4.83E-05	465.6593225
2035	Annual	Mon-Sun	2.27E+09	Plate Comp	D	15	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	2.15E+01	3.54E+01	6.97E+00	8.88E-05	4.66E-04	5.56E-04	7.62E-02	1.19E-06	2.17E-05	0.00E+00	8.01E-06	25.94971953
2035	Annual	Mon-Sun	2.27E+09	Rollers	D	15	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	4.04E+01	7.70E+01	2.22E+01	2.83E-04	1.48E-03	1.77E-03	2.43E-01	3.78E-06	6.93E-05	0.00E+00	2.55E-05	82.74426683
2035	Annual	Mon-Sun	2.27E+09	Rollers	D	25	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.69E+01	3.22E+01	1.96E+01	2.59E-04	8.84E-04	1.64E-03	2.15E-01	2.72E-06	6.11E-05	0.00E+00	2.34E-05	73.12090116
2035	Annual	Mon-Sun	2.27E+09	Rollers	D	50	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	5.26E+01	1.01E+02	1.20E+02	1.17E-03	1.08E-02	7.54E-03	1.31E+00	1.69E-05	8.98E-05	0.00E+00	1.05E-04	441.5094819
2035	Annual	Mon-Sun	2.27E+09	Rollers	D	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	2.82E+02	5.40E+02	1.45E+03	7.25E-03	1.02E-01	4.62E-02	1.59E+01	1.87E-04	1.00E-03	0.00E+00	6.54E-04	5325.865997
2035	Annual	Mon-Sun	2.27E+09	Rollers	D	175	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.13E+02	2.17E+02	1.07E+03	3.80E-03	6.62E-02	1.08E-02	1.17E+01	1.32E-04	4.93E-04	0.00E+00	3.43E-04	3914.245973

2035	Annual	Mon-Sun	2.27E+09	Rollers	D	250	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	1.61E+01	3.08E+01	2.13E+02	7.18E-04	4.53E-03	1.93E-03	2.36E+00	2.65E-05	6.74E-05	0.00E+00	6.48E-05	785.6131143
2035	Annual	Mon-Sun	2.27E+09	Rollers	D	500	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	1.13E+01	2.16E+01	2.14E+02	7.17E-04	4.36E-03	1.84E-03	2.36E+00	2.32E-05	6.66E-05	0.00E+00	6.47E-05	788.4279703
2035	Annual	Mon-Sun	2.27E+09	Scrapers	D	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.60E+00	7.86E+00	3.37E+01	2.26E-04	2.49E-03	1.26E-03	3.69E-01	4.33E-06	4.17E-05	0.00E+00	2.04E-05	123.9447991
2035	Annual	Mon-Sun	2.27E+09	Scrapers	D	175	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.38E+01	7.20E+01	4.85E+02	2.35E-03	3.17E-02	7.73E-03	5.33E+00	5.99E-05	3.78E-04	0.00E+00	2.12E-04	1781.851469
2035	Annual	Mon-Sun	2.27E+09	Scrapers	D	250	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	2.32E+01	7.02E+01	6.65E+02	2.96E-03	1.52E-02	9.28E-03	7.34E+00	8.26E-05	3.38E-04	0.00E+00	2.67E-04	2454.948403
2035	Annual	Mon-Sun	2.27E+09	Scrapers	D	500	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	6.40E+01	1.93E+02	2.81E+03	1.24E-02	6.13E-02	3.68E-02	3.10E+01	3.04E-04	1.37E-03	0.00E+00	1.12E-03	10369.15737
2035	Annual	Mon-Sun	2.27E+09	Scrapers	D	750	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	2.56E+00	7.73E+00	1.94E+02	8.55E-04	4.24E-03	2.58E-03	2.14E+00	2.15E-05	9.54E-05	0.00E+00	7.71E-05	716.3404499
2035	Annual	Mon-Sun	2.27E+09	Paving Equ	D	25	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.74E+00	3.95E+00	2.27E+00	3.00E-05	1.03E-04	1.90E-04	2.49E-02	3.16E-07	7.09E-06	0.00E+00	2.71E-06	8.483047499
2035	Annual	Mon-Sun	2.27E+09	Paving Equ	D	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.47E+00	3.35E+00	3.68E+00	4.69E-05	3.65E-04	2.48E-04	4.01E-02	5.18E-07	4.98E-06	0.00E+00	4.23E-06	13.64112792
2035	Annual	Mon-Sun	2.27E+09	Paving Equ	D	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.12E+01	4.83E+01	1.20E+02	7.56E-04	8.69E-03	4.47E-03	1.32E+00	1.54E-05	1.49E-04	0.00E+00	6.82E-05	441.5001555
2035	Annual	Mon-Sun	2.27E+09	Paving Equ	D	175	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	9.95E+00	2.27E+01	1.04E+02	4.76E-04	6.66E-03	1.68E-03	1.15E+00	1.29E-05	8.10E-05	0.00E+00	4.30E-05	383.2279929
2035	Annual	Mon-Sun	2.27E+09	Paving Equ	D	250	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	2.81E+00	6.40E+00	3.54E+01	1.46E-04	7.85E-04	4.93E-04	3.91E-01	4.40E-06	1.72E-05	0.00E+00	1.32E-05	130.6364456
2035	Annual	Mon-Sun	2.27E+09	Surfacing E	D	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.34E+00	1.64E+00	1.06E+00	8.96E-06	8.61E-05	6.51E-05	1.16E-02	1.50E-07	8.51E-07	0.00E+00	8.09E-07	3.907407704
2035	Annual	Mon-Sun	2.27E+09	Surfacing E	D	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.67E-01	3.29E-01	9.54E-01	4.19E-06	6.42E-05	3.06E-05	1.05E-02	1.23E-07	7.10E-07	0.00E+00	3.78E-07	3.501276845
2035	Annual	Mon-Sun	2.27E+09	Surfacing E	D	175	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.00E-01	2.47E-01	9.61E-01	3.03E-06	5.71E-05	1.06E-05	1.06E-02	1.19E-07	4.72E-07	0.00E+00	2.73E-07	3.522826464
2035	Annual	Mon-Sun	2.27E+09	Surfacing E	D	250	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	4.01E-01	4.93E-01	3.00E+00	8.75E-06	6.14E-05	2.91E-05	3.32E-02	3.74E-07	9.83E-07	0.00E+00	7.89E-07	11.07216127
2035	Annual	Mon-Sun	2.27E+09	Surfacing E	D	500	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	3.34E+00	4.11E+00	4.11E+01	1.19E-04	8.14E-04	3.77E-04	4.54E-01	4.46E-06	1.32E-05	0.00E+00	1.07E-05	151.3277834
2035	Annual	Mon-Sun	2.27E+09	Surfacing E	D	750	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	4.89E-01	6.02E-01	9.43E+00	2.73E-05	1.87E-04	8.78E-05	1.04E-01	1.05E-06	3.04E-06	0.00E+00	2.46E-06	34.7595948
2035	Annual	Mon-Sun	2.27E+09	Signal Boar	D	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.88E+02	3.87E+02	1.09E+02	1.39E-03	7.28E-03	8.69E-03	1.19E+00	1.85E-05	3.39E-04	0.00E+00	1.25E-04	405.5754981
2035	Annual	Mon-Sun	2.27E+09	Signal Boar	D	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	9.35E-01	1.37E+00	2.26E+00	1.56E-05	1.78E-04	1.35E-04	2.48E-02	3.21E-07	8.93E-07	0.00E+00	1.41E-06	8.334823713
2035	Annual	Mon-Sun	2.27E+09	Signal Boar	D	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.53E+01	2.24E+01	8.18E+01	3.04E-04	5.45E-03	2.35E-03	8.99E-01	1.05E-05	2.87E-05	0.00E+00	2.74E-05	300.0808117
2035	Annual	Mon-Sun	2.27E+09	Signal Boar	D	175	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	9.48E+00	1.39E+01	9.76E+01	2.61E-04	5.76E-03	7.03E-04	1.07E+00	1.21E-05	2.70E-05	0.00E+00	2.35E-05	357.7273632
2035	Annual	Mon-Sun	2.27E+09	Signal Boar	D	250	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	2.00E+00	2.94E+00	3.39E+01	8.86E-05	6.85E-04	2.19E-04	3.75E-01	4.22E-06	7.75E-06	0.00E+00	8.00E-06	124.8255301
2035	Annual	Mon-Sun	2.27E+09	Trenchers	D	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	5.01E+00	8.49E+00	3.28E+00	4.18E-05	2.19E-04	2.62E-04	3.59E-02	5.59E-07	1.02E-05	0.00E+00	3.77E-06	12.21576322
2035	Annual	Mon-Sun	2.27E+09	Trenchers	D	25	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	5.28E+00	8.94E+00	1.34E+01	1.77E-04	6.05E-04	1.12E-03	1.47E-01	1.87E-06	4.19E-05	0.00E+00	1.60E-05	50.0886602
2035	Annual	Mon-Sun	2.27E+09	Trenchers	D	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.01E+02	3.44E+02	5.18E+02	6.78E-03	5.03E-02	3.53E-02	5.65E+00	7.30E-05	8.41E-04	0.00E+00	6.12E-04	1924.453266
2035	Annual	Mon-Sun	2.27E+09	Trenchers	D	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.72E+02	4.66E+02	1.38E+03	8.85E-03	9.86E-02	5.45E-02	1.51E+01	1.77E-04	2.05E-03	0.00E+00	7.98E-04	5068.065768
2035	Annual	Mon-Sun	2.27E+09	Trenchers	D	175	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.98E+01	5.10E+01	3.33E+02	1.56E-03	2.10E-02	6.24E-03	3.66E+00	4.12E-05	3.11E-04	0.00E+00	1.41E-04	1225.30835
2035	Annual	Mon-Sun	2.27E+09	Trenchers	D	250	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	2.67E+00	4.57E+00	4.60E+01	1.94E-04	1.03E-03	7.60E-04	5.09E-01	5.73E-06	2.80E-05	0.00E+00	1.75E-05	170.0491931
2035	Annual	Mon-Sun	2.27E+09	Trenchers	D	500	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	3.41E+00	5.83E+00	8.20E+01	3.40E-04	1.80E-03	1.26E-03	9.06E-01	8.89E-06	4.74E-05	0.00E+00	3.07E-05	302.7587384
2035	Annual	Mon-Sun	2.27E+09	Trenchers	D	750	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	9.78E-02	1.67E-01	4.44E+00	1.84E-05	9.72E-05	6.92E-05	4.90E-02	4.93E-07	2.58E-06	0.00E+00	1.66E-06	16.38520589
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	D	15	Constructi	U	P	NHH	P	Sacramento	SV	SAC	6.68E-01	1.49E+00	7.01E-01	8.94E-06	4.69E-05	5.60E-05	7.68E-03	1.19E-07	2.19E-06	0.00E+00	8.06E-07	2.612413281
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	D	25	Constructi	U	P	NHH	P	Sacramento	SV	SAC	2.00E+00	4.46E+00	3.24E+00	4.29E-05	1.47E-04	2.71E-04	3.56E-02	4.52E-07	1.01E-05	0.00E+00	3.87E-06	12.12402629
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	D	50	Constructi	U	P	NHH	P	Sacramento	SV	SAC	8.75E+00	2.01E+01	2.84E+01	1.91E-04	2.21E-03	1.65E-03	3.11E-01	4.02E-06	7.32E-06	0.00E+00	1.72E-05	104.5021953
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	D	120	Constructi	U	P	NHH	P	Sacramento	SV	SAC	2.68E+01	6.16E+01	2.16E+02	7.66E-04	1.43E-02	5.89E-03	2.37E+00	2.78E-05	5.31E-05	0.00E+00	6.91E-05	791.3984839
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	D	175	Constructi	U	P	NHH	P	Sacramento	SV	SAC	6.21E+00	1.42E+01	9.12E+01	2.24E-04	5.37E-03	4.82E-04	1.00E+00	1.13E-05	1.86E-05	0.00E+00	2.02E-05	334.1192012
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	D	250	Constructi	U	N	NHH	P	Sacramento	SV	SAC	5.34E+00	1.23E+01	1.04E+02	2.57E-04	2.10E-03	5.53E-04	1.15E+00	1.30E-05	2.03E-05	0.00E+00	2.32E-05	383.2193645
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	D	500	Constructi	U	N	NHH	P	Sacramento	SV	SAC	1.19E+01	2.73E+01	3.83E+02	9.47E-04	7.51E-03	2.04E-03	4.24E+00	4.16E-05	7.49E-05	0.00E+00	8.55E-05	1411.156685
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	D	750	Constructi	U	N	NHH	P	Sacramento	SV	SAC	1.52E+00	3.48E+00	9.65E+01	2.39E-04	1.89E-03	5.13E-04	1.07E+00	1.07E-05	1.89E-05	0.00E+00	2.15E-05	355.4681997
2035	Annual	Mon-Sun	2.27E+09	Bore/Drill I	D	1000	Constructi	U	N	NHH	P	Sacramento	SV	SAC	2.54E+00	5.82E+00	2.44E+02	6.03E-04	4.78E-03	1.13E-02	2.70E+00	2.72E-05	1.00E-04	0.00E+00	5.44E-05	898.9744874
2035	Annual	Mon-Sun	2.27E+09	Excavators	D	25	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.47E+00	9.46E+00	7.08E+00	9.37E-05	3.20E-04	5.92E-04	7.77E-02	9.86E-07	2.21E-05	0.00E+00	8.46E-06	26.46576078
2035	Annual	Mon-Sun	2.27E+09	Excavators	D	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	9.30E+01	3.59E+02	4.12E+02	4.52E-03	4.18E-02	2.63E-02	4.49E+00	5.80E-05	1.94E-04	0.00E+00	4.08E-04	1522.466386
2035	Annual	Mon-Sun	2.27E+09	Excavators	D	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.53E+02	9.76E+02	3.27E+03	1.79E-02	2.40E-01	9.79E-02	3.59E+01	4.21E-04	1.39E-03	0.00E+00	1.62E-03	12023.62724
2035	Annual	Mon-Sun	2.27E+09	Excavators	D	175	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	4.87E+02	1.88E+03	9.60E+03	3.67E-02	6.24E-01	6.78E-02	1.06E+02	1.19E-03	2.95E-03	0.00E+00	3.32E-03	35229.51337
2035	Annual	Mon-Sun	2.27E+09	Excavators	D	250	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	1.98E+02	7.65E+02	5.49E+03	2.09E-02	1.22E-01	3.65E-02	6.07E+01	6.83E-04	1.41E-03	0.00E+00	1.88E-03	20257.04733
2035	Annual	Mon-Sun	2.27E+09	Excavators	D	500	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	1.43E+02	5.52E+02	5.83E+03	2.22E-02	1.24E-01	3.83E-02	6.45E+01	6.33E-04	1.49E-03	0.00E+00	2.00E-03	21523.97298
2035	Annual	Mon-Sun	2.27E+09	Excavators	D	750	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	7.66E-01	2.96E+00	5.18E+01	1.97E-04	1.10E-03	3.41E-04	5.72E-01	5.76E-06	1.33E-05	0.00E+00	1.78E-05	191.1032804
2035	Annual	Mon-Sun	2.27E+09	Concrete/I	D	25	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.67E-01	4.34E-01	3.25E-01	4.31E-06	1.47E-05	2.72E-05	3.57E-03	4.53E-08	1.02E-06	0.00E+00	3.89E-07	1.216106765
2035	Annual	Mon-Sun	2.27E+09	Concrete/I	D	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.34E+00	3.72E+00	5.12E+00	3.71E-05	4.12E-04	3.07E-04	5.61E-02	7.25E-07	2.09E-06	0.00E+00	3.35E-06	18.87073669
2035	Annual	Mon-Sun	2.27E+09	Concrete/I	D	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	4.07E+00	6.48E+00	2.19E+01	8.46E-05	1.47E-03	6.30E-04	2.40E-01	2.82E-06	7.95E-06	0.00E+00	7.63E-06	80.14121023
2035	Annual	Mon-Sun	2.27E+09	Concrete/I	D	175	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	1.34E-01	2.12E-01	1.55E+00	4.30E-06	9.20E-05	1.12E-05	1.70E-02	1.91E-07	4.41E-07	0.00E+00	3.88E-07	5.663427751
2035	Annual	Mon-Sun	2.27E+09	Cement an	D	15	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	3.41E+01	2.81E+01	8.10E+00	1.03E-04	5.41E-04	6.46E-04	8.86E-02	1.38E-06	2.52E-05	0.00E+00	9.31E-06	30.16753032
2035	Annual	Mon-Sun	2.27E+09	Cement an	D	25	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	3.07E+00	2.53E+00	2.02E+00	2.67E-05	9.13E-05	1.69E-04	2.22E-02	2.81E-07	6.31E-06	0.00E+00	2.41E-06	7.55095025
2035	Annual	Mon-Sun	2.27E+09	Cranes	D	50	Constructi	U	P	NHH	P	Sacramento	SV	SAC	2.27E+00	7.95E+00	8.45E+00	9.74E-05	8.58E-04	5.51E-04	9.21E-02	1.19E-06	6.47E-06	0.00E+00	8.78E-06	31.26886746
2035	Annual	Mon-Sun	2.27E+09	Cranes	D	120	Constructi	U	P	NHH	P	Sacramento	SV	SAC	2.49E+01	8.72E+01	1.99E+02	1.15E-03	1.46E-02	6.45E-03	2.19E+00	2.56E-05	1.39E-04	0.00E+00	1.04E-04	732.7734288
2035	Annual	Mon-Sun	2.27E+09	Cranes	D	175	Constructi	U	P	NHH	P	Sacramento	SV	SAC	2.49E+01	8.72E+01	3.19E+02	1.31E-03	2.07E-02	3.20E-03	3.50E+00	3.94E-05	1.48E-04	0.00E+00	1.18E-04	1169.72959
2035	Annual	Mon-Sun	2.27E+09	Cranes	D	250	Constructi	U	N	NHH	P	Sacramento	SV	SAC	4.83E+01	1.69E+02	8.57E+02	3.39E-03	1.91E-02	7.74E-03	9.47E+00	1.07E-04	2.80E-04	0.00E+00	3.06E-04	3163.906701
2035	Annual	Mon-Sun	2.27E+09	Cranes	D	500	Constructi	U	N	NHH	P	Sacramento	SV	SAC	1.77E+01	6.20E+01	5.04E+02	1.99E-03	1.07E-02	4.34E-03	5.58E+00	5.47E-05	1.63E-04	0.00E+00	1.79E-04	1862.098968
2035	Annual	Mon-Sun	2.27E+09	Cranes	D	750	Constructi	U	N	NHH	P	Sacramento	SV	SAC	3.18E+00	1.11E+01	1.52E+02	6.01E-04	3.22E-03	1.33E-03	1.68E+00	1.69E-05	4.94E-05	0.00E+00	5.42E-05	562.59547
2035	Annual	Mon-Sun	2.27E+09	Cranes	D	9999	Constructi	U	N	NHH	P	Sacramento	SV	SAC	3.99E+00	1.40E+01	6.13E+02	2.50E-03	1.30E-02	3.12E-02	6.77E+00	6.81E-05	3.81E-04	0.00E+00	2.26E-04	2262.340139
2035	Annual	Mon-Sun	2.27E+09	Graders	D	50	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	9.35E-01	2.41E+00	3.04E+00	3.46E-05	3.02E-04	1.96E-04	3.31E-02	4.28E-07	2.22E-06	0.00E+00	3.12E-06	11.23428614
2035	Annual	Mon-Sun	2.27E+09	Graders	D	120	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	6.24E+01	1.61E+02	5.48E+02	3.10E-03	3.99E-02	1.76E-02	6.01E+00	7.05E-05	3.69E-04	0.00E+00	2.80E-04	2015.061151
2035	Annual	Mon-Sun	2.27E+09	Graders	D	175	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	2.13E+02	5.48E+02	3.09E+03	1.23E-02	1.99E-01	3.03E-02	3.40E+01	3.82E-04	1.38E-03	0.00E+00	1.11E-03	11339.25889
2035	Annual	Mon-Sun	2.27E+09	Graders	D	250	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	1.32E+02	3.40E+02	2.65E+03	1.01E-02	5.86E-02	2.33E-02	2.93E+01	3.29E-04	8.43E-04	0.00E+00	9.11E-04	9767.999329
2035	Annual	Mon-Sun	2.27E+09	Graders	D	500	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	3.74E+00	9.62E+00	9.98E+01	3.79E-04	2.10E-03	8.43E-04	1.10E+00	1.08E-05	3.12E-05	0.00E+00	3.42E-05	368.3419674
2035	Annual	Mon-Sun	2.27E+09	Graders	D	750	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	4.89E-02	1.26E-01	2.76E+00	1.05E-05	5.82E-05	2.36E-05	3.05E-02	3.07E-07	8.68E-07	0.00E+00	9.47E-07	10.19181265
2035	Annual	Mon-Sun	2.27E+09	Off-Highwa	D	175	Constructi	U	P	NHH	NP	Sacramento	SV	SAC	4.34E+00	2.35E+01	1.34E+02	5.46E-04	8.84E-03	9.81E-04	1.47E+00	1.65E-05	4.34E-05	0.00E+00	4.92E-05	490.1306031
2035	Annual	Mon-Sun	2.27E+09	Off-Highwa	D	250	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	3.21E+01	1.73E+02	1.31E+03	5.29E-03	2.96E-02	8.97E-03	1.44E+01	1.62E-04	3.48E-04	0.00E+00	4.78E-04	4818.44568
2035	Annual	Mon-Sun	2.27E+09	Off-Highwa	D	500	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	4.51E+01	2.44E+02	3.01E+03	1.22E-02	6.46E-02	2.04E-02	3.32E+01	3.26E-04	8.01E-04	0.00E+00	1.10E-03	11096.34736
2035	Annual	Mon-Sun	2.27E+09	Off-Highwa	D	750	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	1.03E+01	5.54E+01	1.11E+03	4.49E-03	2.38E-02	7.51E-03	1.22E+01	1.23E-04	2.95E-04	0.00E+00	4.05E-04	4086.58446
2035	Annual	Mon-Sun	2.27E+09	Off-Highwa	D	1000	Constructi	U	N	NHH	NP	Sacramento	SV	SAC	4.81E+00	2.60E+01	7.33E+02	2.99E-03	1.58E-02	3.66E-02	8.11E+00	8.15E-05	4.07E-04	0.00E+00	2.70E-04	2707.927194
2035	Annual	Mon-Sun	2.27E+09	Crushing/P	D	50	Constructi	U	P	NHH	P	Sacramento	SV	SAC	1.07E+01	2.80E+01	5.63E+01	5.28E-04	5.22E-03	3.51E-03	6.15E-01	7.95E-06	2.52E-05	0.00E+00	4.77E-05	207.9212169
2035	Annual	Mon-Sun	2.27E+09	Crushing/P	D	120	Constructi	U	P	NHH	P	Sacramento	SV	SAC	3.01E+01	7.89E+01	2.99E+02	1.44E-03	2.11E-02	8.83E-03	3.28E+00	3.84E-05	1.18E-04	0.00E+00	1.30E-04	1096.13769
2035	Annual	Mon-Sun	2.27E+09	Crushing/P	D	175	Constructi	U	P	NHH	P	Sacramento	SV	SAC	1.28E+01	3.34E+01	2.54E+02	8.66E-04	1.59E-02	1.88E-03	2.79E+00	3.14E-05	7.58E-05	0.00E+00	7.81E-05	931.0675803
2035	Annual	Mon-Sun	2.27E+09	Crushing/P	D	250	Constructi	U	N	NHH	P	Sacramento	SV	SAC	1.27E+00	3.32E+00	3.67E+01	1.23E-04	7.89E-04	2.44E-04	4.06E-01	4.57E-06	9.01E-06	0.00E+00	1.11E-05	135.3878948

2035	Annual	Mon-Sun	2.27E+09	Crushing/P	D	500	Constructic	U	N	NHH	P	Sacramento	SV	SAC	7.15E+00	1.87E+01	3.16E+02	1.06E-03	6.50E-03	2.08E-03	3.49E+00	3.43E-05	7.75E-05	0.00E+00	9.57E-05	1165.018868
2035	Annual	Mon-Sun	2.27E+09	Crushing/P	D	750	Constructic	U	N	NHH	P	Sacramento	SV	SAC	8.15E-02	2.13E-01	5.68E+00	1.91E-05	1.17E-04	3.74E-05	6.28E-02	6.31E-07	1.39E-06	0.00E+00	1.72E-06	20.93448388
2035	Annual	Mon-Sun	2.27E+09	Crushing/P	D	9999	Constructic	U	N	NHH	P	Sacramento	SV	SAC	8.15E-02	2.13E-01	1.26E+01	4.36E-05	2.60E-04	6.09E-04	1.39E-01	1.40E-06	6.49E-06	0.00E+00	3.93E-06	46.50388448
2035	Annual	Mon-Sun	2.27E+09	Rough Terr	D	50	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	7.41E+00	2.29E+01	3.56E+01	3.56E-04	3.42E-03	2.23E-03	3.88E-01	5.02E-06	1.56E-05	0.00E+00	3.21E-05	131.2743948
2035	Annual	Mon-Sun	2.27E+09	Rough Terr	D	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	3.55E+02	1.10E+03	3.12E+03	1.58E-02	2.24E-01	9.23E-02	3.43E+01	4.02E-04	1.23E-03	0.00E+00	1.43E-03	11472.55592
2035	Annual	Mon-Sun	2.27E+09	Rough Terr	D	175	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	4.55E+01	1.41E+02	7.99E+02	2.85E-03	5.09E-02	5.63E-03	8.78E+00	9.88E-05	2.35E-04	0.00E+00	2.57E-04	2929.787854
2035	Annual	Mon-Sun	2.27E+09	Rough Terr	D	250	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	2.54E+00	7.85E+00	6.06E+01	2.14E-04	1.32E-03	3.94E-04	6.70E-01	7.54E-06	1.49E-05	0.00E+00	1.93E-05	223.5323773
2035	Annual	Mon-Sun	2.27E+09	Rough Terr	D	500	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	1.67E+00	5.17E+00	5.99E+01	2.11E-04	1.25E-03	3.87E-04	6.62E-01	6.50E-06	1.47E-05	0.00E+00	1.91E-05	220.9149063
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	25	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	9.35E-01	2.45E+00	1.89E+00	2.50E-05	8.54E-05	1.58E-04	2.08E-02	2.63E-07	5.91E-06	0.00E+00	2.26E-06	7.06916597
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	50	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.82E+01	4.81E+01	6.86E+01	7.58E-04	6.75E-03	4.39E-03	7.48E-01	9.67E-06	4.74E-05	0.00E+00	6.84E-05	253.5961236
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	4.94E+02	1.31E+03	3.51E+03	1.94E-02	2.54E-01	1.11E-01	3.84E+01	4.51E-04	2.24E-03	0.00E+00	1.75E-03	12884.64981
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	175	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	2.78E+02	7.36E+02	3.56E+03	1.38E-02	2.28E-01	3.32E-02	3.91E+01	4.40E-04	1.52E-03	0.00E+00	1.25E-03	13058.75562
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	250	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	2.77E+02	7.32E+02	4.93E+03	1.84E-02	1.08E-01	4.18E-02	5.45E+01	6.13E-04	1.50E-03	0.00E+00	1.66E-03	18190.89534
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	500	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	1.15E+02	3.05E+02	3.26E+03	1.21E-02	6.84E-02	2.65E-02	3.61E+01	3.54E-04	9.78E-04	0.00E+00	1.09E-03	12043.45847
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	750	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	1.97E+00	5.22E+00	1.14E+02	4.26E-04	2.40E-03	9.38E-04	1.27E+00	1.27E-05	3.45E-05	0.00E+00	3.84E-05	422.2924572
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	1000	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	2.12E-01	5.60E-01	1.50E+01	5.67E-05	3.16E-04	7.55E-04	1.66E-01	1.67E-06	8.84E-06	0.00E+00	5.12E-06	55.44568097
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	175	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	6.68E-01	2.94E+00	1.74E+01	1.08E-04	1.17E-03	4.52E-04	1.90E-01	2.14E-06	2.39E-05	0.00E+00	9.76E-06	63.90537108
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	250	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	1.64E+01	7.21E+01	5.99E+02	3.33E-03	1.47E-02	1.40E-02	6.61E+00	7.44E-05	5.37E-04	0.00E+00	3.00E-04	2215.427365
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	500	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	2.52E+01	1.11E+02	1.33E+03	7.21E-03	3.30E-02	2.87E-02	1.47E+01	1.44E-04	1.11E-03	0.00E+00	6.51E-04	4919.657949
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	750	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	2.17E+00	9.55E+00	1.72E+02	9.36E-04	4.28E-03	3.78E-03	1.90E+00	1.91E-05	1.46E-04	0.00E+00	8.45E-05	637.6341738
2035	Annual	Mon-Sun	2.27E+09	Rubber Tir	D	1000	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	1.47E-01	6.46E-01	1.73E+01	9.67E-05	4.41E-04	1.08E-03	1.91E-01	1.92E-06	2.03E-05	0.00E+00	8.73E-06	64.0000995
2035	Annual	Mon-Sun	2.27E+09	Tractors/Lc	D	25	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.88E+01	4.86E+01	3.51E+01	4.65E-04	1.59E-03	2.94E-03	3.86E-01	4.89E-06	1.10E-04	0.00E+00	4.20E-05	131.3364049
2035	Annual	Mon-Sun	2.27E+09	Tractors/Lc	D	50	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.13E+02	2.94E+02	4.08E+02	4.04E-03	3.88E-02	2.55E-02	4.46E+00	5.76E-05	1.77E-04	0.00E+00	3.65E-04	1508.043647
2035	Annual	Mon-Sun	2.27E+09	Tractors/Lc	D	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.51E+03	3.93E+03	9.26E+03	4.62E-02	6.62E-01	2.72E-01	1.02E+02	1.19E-03	3.68E-03	0.00E+00	4.17E-03	34018.74759
2035	Annual	Mon-Sun	2.27E+09	Tractors/Lc	D	175	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.12E+02	2.94E+02	1.35E+03	4.70E-03	8.57E-02	9.11E-03	1.49E+01	1.67E-04	3.93E-04	0.00E+00	4.24E-04	4959.72047
2035	Annual	Mon-Sun	2.27E+09	Tractors/Lc	D	250	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	3.63E+01	9.49E+01	7.37E+02	2.54E-03	1.60E-02	4.75E-03	8.14E+00	9.16E-05	1.80E-04	0.00E+00	2.29E-04	2716.8875
2035	Annual	Mon-Sun	2.27E+09	Tractors/Lc	D	500	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	5.86E+01	1.53E+02	2.39E+03	8.23E-03	4.95E-02	1.51E-02	2.64E+01	2.97E-04	5.81E-04	0.00E+00	7.43E-04	8805.125472
2035	Annual	Mon-Sun	2.27E+09	Tractors/Lc	D	750	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	9.86E+00	2.58E+01	6.02E+02	2.08E-03	1.25E-02	3.83E-03	6.66E+00	7.49E-05	1.47E-04	0.00E+00	1.87E-04	2220.756565
2035	Annual	Mon-Sun	2.27E+09	Crawler Tra	D	50	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	9.35E-01	2.64E+00	3.01E+00	4.09E-05	3.17E-04	2.05E-04	3.28E-02	4.24E-07	3.86E-06	0.00E+00	3.69E-06	11.17709753
2035	Annual	Mon-Sun	2.27E+09	Crawler Tra	D	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	5.30E+02	1.50E+03	4.49E+03	2.99E-02	3.33E-01	1.66E-01	4.92E+01	5.77E-04	5.27E-03	0.00E+00	2.70E-03	16525.04815
2035	Annual	Mon-Sun	2.27E+09	Crawler Tra	D	175	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.80E+02	5.06E+02	2.79E+03	1.34E-02	1.83E-01	4.29E-02	3.07E+01	3.45E-04	2.09E-03	0.00E+00	1.21E-03	10256.15685
2035	Annual	Mon-Sun	2.27E+09	Crawler Tra	D	250	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	1.54E+02	4.35E+02	3.27E+03	1.46E-02	7.52E-02	4.43E-02	3.61E+01	4.06E-04	1.66E-03	0.00E+00	1.32E-03	12073.3958
2035	Annual	Mon-Sun	2.27E+09	Crawler Tra	D	500	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	1.06E+02	2.98E+02	3.49E+03	1.54E-02	7.79E-02	4.47E-02	3.86E+01	3.79E-04	1.70E-03	0.00E+00	1.39E-03	12908.71398
2035	Annual	Mon-Sun	2.27E+09	Crawler Tra	D	750	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	1.30E+00	3.68E+00	7.72E+01	3.41E-04	1.72E-03	9.99E-04	8.54E-01	8.58E-06	3.78E-05	0.00E+00	3.08E-05	285.3540386
2035	Annual	Mon-Sun	2.27E+09	Crawler Tra	D	1000	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	1.30E+00	3.67E+00	1.09E+02	4.93E-04	2.46E-03	5.93E-03	1.21E+00	1.21E-05	8.75E-05	0.00E+00	4.44E-05	403.7997314
2035	Annual	Mon-Sun	2.27E+09	Skid Steer	D	25	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.28E+02	2.93E+02	1.84E+02	2.44E-03	8.32E-03	1.54E-02	2.02E+00	2.56E-05	5.76E-04	0.00E+00	2.20E-04	688.4217425
2035	Annual	Mon-Sun	2.27E+09	Skid Steer	D	50	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.16E+03	2.70E+03	3.14E+03	2.49E-02	2.66E-01	1.87E-01	3.44E+01	4.44E-04	9.16E-04	0.00E+00	2.25E-03	11581.73205
2035	Annual	Mon-Sun	2.27E+09	Skid Steer	D	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	6.09E+02	1.41E+03	2.75E+03	1.12E-02	1.88E-01	7.66E-02	3.02E+01	3.54E-04	7.52E-04	0.00E+00	1.01E-03	10084.77344
2035	Annual	Mon-Sun	2.27E+09	Off-Highwa	D	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	6.68E-02	2.02E-01	8.64E-01	6.98E-06	6.49E-05	3.92E-05	9.46E-03	1.11E-07	1.79E-06	0.00E+00	6.30E-07	3.187261863
2035	Annual	Mon-Sun	2.27E+09	Off-Highwa	D	175	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	8.17E+01	2.47E+02	1.47E+03	8.54E-03	9.69E-02	3.56E-02	1.61E+01	1.81E-04	1.86E-03	0.00E+00	7.71E-04	5396.967454
2035	Annual	Mon-Sun	2.27E+09	Off-Highwa	D	250	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	7.72E+01	2.34E+02	1.38E+03	7.18E-03	3.30E-02	2.99E-02	1.52E+01	1.71E-04	1.14E-03	0.00E+00	6.48E-04	5094.197279
2035	Annual	Mon-Sun	2.27E+09	Off-Highwa	D	750	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	8.18E+00	2.47E+01	6.36E+02	3.24E-03	1.53E-02	1.29E-02	7.02E+00	7.06E-05	4.97E-04	0.00E+00	2.92E-04	2350.939015
2035	Annual	Mon-Sun	2.27E+09	Off-Highwa	D	1000	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	8.64E-01	2.61E+00	9.61E+01	5.04E-04	2.37E-03	5.82E-03	1.06E+00	1.07E-05	1.06E-04	0.00E+00	4.55E-05	355.5088633
2035	Annual	Mon-Sun	2.27E+09	Dumpers/T	D	25	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.60E+00	2.91E+00	1.01E+00	1.34E-05	4.56E-05	8.45E-05	1.11E-02	1.41E-07	3.16E-06	0.00E+00	1.21E-06	3.775439348
2035	Annual	Mon-Sun	2.27E+09	Other Con	D	15	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	2.21E+01	4.18E+01	1.93E+01	2.46E-04	1.29E-03	1.54E-03	2.11E-01	3.29E-06	6.02E-05	0.00E+00	2.22E-05	71.87524403
2035	Annual	Mon-Sun	2.27E+09	Other Con	D	25	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	3.74E+00	7.08E+00	4.26E+00	5.64E-05	1.92E-04	3.56E-04	4.67E-02	5.93E-07	1.33E-05	0.00E+00	5.09E-06	15.91740552
2035	Annual	Mon-Sun	2.27E+09	Other Con	D	50	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	5.74E+00	1.10E+01	1.40E+01	1.11E-04	1.18E-03	8.44E-04	1.53E-01	1.98E-06	5.09E-06	0.00E+00	9.99E-06	51.6804724
2035	Annual	Mon-Sun	2.27E+09	Other Con	D	120	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	9.48E+00	1.81E+01	6.67E+01	2.75E-04	4.55E-03	1.90E-03	7.32E-01	8.59E-06	2.20E-05	0.00E+00	2.48E-05	244.5088953
2035	Annual	Mon-Sun	2.27E+09	Other Con	D	175	Constructic	U	P	NHH	NP	Sacramento	SV	SAC	1.31E+01	2.50E+01	1.21E+02	3.51E-04	7.33E-03	7.84E-04	1.33E+00	1.50E-05	3.13E-05	0.00E+00	3.17E-05	443.4073668
2035	Annual	Mon-Sun	2.27E+09	Other Con	D	500	Constructic	U	N	NHH	NP	Sacramento	SV	SAC	3.04E+01	5.81E+01	6.67E+02	1.92E-03	1.34E-02	4.03E-03	7.37E+00	7.24E-05	1.49E-04	0.00E+00	1.73E-04	2456.680932
2035	Annual	Mon-Sun	2.27E+09	Leaf Blowe	D	15	Lawn and (	U	N	NHH	P	Sacramento	SV	SAC	4.58E-01	1.50E-01	2.07E-02	2.35E-07	1.38E-06	1.65E-06	2.26E-04	3.52E-09	6.44E-08	0.00E+00	2.12E-08	0.076764284
2035	Annual	Mon-Sun	2.27E+09	Leaf Blowe	D	120	Lawn and (	U	N	NHH	P	Sacramento	SV	SAC	4.01E-01	1.32E-01	2.91E-01	6.22E-07	1.77E-05	7.94E-06	3.20E-03	3.75E-08	7.71E-08	0.00E+00	5.61E-08	1.064541899
2035	Annual	Mon-Sun	2.27E+09	Leaf Blowe	D	250	Lawn and (	U	N	NHH	P	Sacramento	SV	SAC	1.14E-01	3.76E-02	1.70E-01	2.60E-07	3.14E-06	1.05E-06	1.89E-03	2.12E-08	3.40E-08	0.00E+00	2.35E-08	0.626282804
2035	Annual	Mon-Sun	2.27E+09	Lawn & Ga	D	15	Lawn and (	U	N	NHH	NP	Sacramento	SV	SAC	1.10E+03	1.65E+03	6.98E+02	7.92E-03	4.67E-02	5.57E-02	7.64E+00	1.19E-04	2.18E-03	0.00E+00	7.15E-04	2592.902704
2035	Annual	Mon-Sun	2.27E+09	Lawn & Ga	D	25	Lawn and (	U	N	NHH	NP	Sacramento	SV	SAC	8.64E+02	1.29E+03	8.38E+02	1.11E-02	3.79E-02	7.01E-02	9.20E+00	1.17E-04	2.62E-03	0.00E+00	1.00E-03	3133.590805
2035	Annual	Mon-Sun	2.27E+09	Chippers/S	D	25	Lawn and (	U	P	NHH	P	Sacramento	SV	SAC	5.15E-01	6.56E-01	6.01E-01	7.96E-06	2.72E-05	5.03E-05	6.60E-03	8.37E-08	1.88E-06	0.00E+00	7.18E-07	2.248175062
2035	Annual	Mon-Sun	2.27E+09	Chippers/S	D	120	Lawn and (	U	P	NHH	P	Sacramento	SV	SAC	1.42E+01	1.81E+01	6.24E+01	2.17E-04	4.10E-03	1.78E-03	6.86E-01	8.05E-06	2.17E-05	0.00E+00	1.96E-05	228.8869033
2035	Annual	Mon-Sun	2.27E+09	Chippers/S	D	175	Lawn and (	U	P	NHH	P	Sacramento	SV	SAC	9.73E-01	1.24E+00	7.42E+00	1.86E-05	4.32E-04	5.33E-05	8.16E-02	9.18E-07	2.07E-06	0.00E+00	1.68E-06	27.16375101
2035	Annual	Mon-Sun	2.27E+09	Chippers/S	D	250	Lawn and (	U	N	NHH	P	Sacramento	SV	SAC	2.29E-01	2.92E-01	2.93E+00	7.21E-06	5.84E-05	1.90E-05	3.24E-02	3.65E-07	6.72E-07	0.00E+00	6.51E-07	10.78415285
2035	Annual	Mon-Sun	2.27E+09	Chippers/S	D	500	Lawn and (	U	N	NHH	P	Sacramento	SV	SAC	2.12E+00	2.70E+00	3.01E+01	7.41E-05	5.85E-04	1.93E-04	3.33E-01	3.27E-06	6.90E-06	0.00E+00	6.68E-06	110.8370432
2035	Annual	Mon-Sun	2.27E+09	Chippers/S	D	750	Lawn and (	U	N	NHH	P	Sacramento	SV	SAC	2.40E+00	3.06E+00	8.22E+01	2.02E-04	1.60E-03	5.29E-04	9.10E-01	9.15E-06	1.89E-05	0.00E+00	1.83E-05	302.8879635
2035	Annual	Mon-Sun	2.27E+09	Chippers/S	D	1000	Lawn and (	U	N	NHH	P	Sacramento	SV	SAC	4.58E+00	5.82E+00	2.23E+02	5.50E-04	4.33E-03	1.04E-02	2.46E+00	2.48E-05	1.02E-04	0.00E+00	4.97E-05	820.2103378
2035	Annual	Mon-Sun	2.27E+09	Commercia	D	15	Lawn and (	U	N	NHH	NP	Sacramento	SV	SAC	2.78E+01	8.14E+01	3.58E+01	4.07E-04	2.40E-03	2.86E-03	3.92E-01	6.11E-06	1.12E-04	0.00E+00	3.67E-05	133.1603908
2035	Annual	Mon-Sun	2.27E+09	Commercia	D	25	Lawn and (	U	N	NHH	NP	Sacramento	SV	SAC	5.23E+02	1.53E+03	1.01E+03	1.33E-02	4.56E-02	8.43E-02	1.11E+01	1.40E-04	3.15E-03	0.00E+00	1.20E-03	3769.21521
2035	Annual	Mon-Sun	2.27E+09	Other Lawı	D	15	Lawn and (	U	N	NHH	NP	Sacramento	SV	SAC	4.01E-01	4.75E-01	2.65E-01	3.01E-06	1.77E-05	2.12E-05	2.90E-03	4.52E-08	8.27E-07	0.00E+00	2.72E-07	0.984616955
2035	Annual	Mon-Sun	2.27E+09	Other Lawı	D	25	Lawn and (	U	N	NHH	NP	Sacramento	SV	SAC	5.72E-02	6.79E-02	5.03E-02	6.67E-07	2.28E-06	4.21E-06	5.53E-04	7.01E-09	1.57E-07	0.00E+00	6.02E-08	0.188286985

Table 17. OFFROAD Emissions 2040

Lawn and Garden Summary - 2050		
		Source
Total Lawn & Garden Emissions (MTCO2e)	42,740	
DU Elk Grove	93,423	Scale Factor
DU Sac County	1,425,199	SACOG 2016 RTP/SCS
Elk Grove % of Total	6.6%	
Elk Grove Emissions (MTCO2e)	2,802	

Construction Equipment Summary - 2050		
		Source
Total Const. Equipment Emissions (MTCO2e)	450,322	
Elk Grove Houses Constructed	626	Scale Factor
Sac County Houses Constructed	15,790	Extrapolation from SACOG RTP/SCS
Elk Grove % of Total	4.0%	
Elk Grove Emissions (MTCO2e)	17,846	

total ag -

CY	Season	AvgDays	Code	Equipment	Fuel	MaxHP	Class	C/R	Pre	Hand	Port	County	Air Basin	Air Dist.	Population	Activity	Consumpti	ROG Exhau	CO Exhaust	NOX Exhau	CO2 Exhau	SO2 Exhau	PM Exhaus	N2O Exhau	CH4 Exhau	Annual County Total (MTCO2e)
2040	Annual	Mon-Sun	2260002006	Tampers/R	G2	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	9.37E+01	4.68E+01	9.43E+00	5.94E-04	2.55E-02	4.63E-04	4.87E-02	2.01E-06	4.08E-04	7.28E-05	3.69E-05	20.04292647
2040	Annual	Mon-Sun	2260002009	Plate Comp	G2	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	8.04E+00	4.54E+00	9.16E-01	5.76E-05	2.47E-03	4.49E-05	4.73E-03	1.95E-07	3.96E-05	7.06E-06	3.58E-06	1.945439643
2040	Annual	Mon-Sun	2260004010	Lawn Mow	G2	15	Lawn and Ga	C	N	NHH	NP	Sacrament	SV	SAC	2.42E+03	1.52E+03	1.71E+02	1.94E-02	3.48E-01	5.21E-03	1.03E+00	4.26E-05	3.26E-03	1.34E-03	1.21E-03	460.4582836
2040	Annual	Mon-Sun	2260004010	Lawn Mow	G2	15	Lawn and Ga	R	N	NHH	NP	Sacrament	SV	SAC	1.82E+04	7.72E+02	9.39E+01	7.68E-03	2.23E-01	2.02E-03	5.26E-01	2.17E-05	1.35E-03	5.85E-04	4.77E-04	221.5539513
2040	Annual	Mon-Sun	2260004020	Chainsaws	G2	2	Lawn and Ga	C	N	HH	NP	Sacrament	SV	SAC	4.34E+03	3.44E+03	2.05E+02	1.71E-01	3.10E-01	2.71E-03	8.38E-01	3.45E-05	4.88E-04	1.39E-03	1.07E-02	1224.876804
2040	Annual	Mon-Sun	2260004020	Chainsaws	G2	2	Lawn and Ga	R	N	HH	NP	Sacrament	SV	SAC	4.88E+04	6.55E+02	2.99E+01	9.49E-03	5.91E-02	5.17E-04	1.60E-01	6.57E-06	9.29E-05	2.65E-04	5.90E-04	107.0392683
2040	Annual	Mon-Sun	2260004020	Chainsaws	G2	15	Lawn and Ga	C	N	HH	NP	Sacrament	SV	SAC	3.05E+03	2.42E+03	3.49E+02	2.92E-01	5.28E-01	4.62E-03	1.43E+00	5.88E-05	8.31E-04	1.57E-03	1.81E-02	2078.511716
2040	Annual	Mon-Sun	2260004020	Chainsaws	G2	15	Lawn and Ga	R	N	HH	NP	Sacrament	SV	SAC	3.44E+04	4.61E+02	5.09E+01	1.62E-02	1.01E-01	8.81E-04	2.72E-01	1.12E-05	1.58E-04	2.99E-04	1.00E-03	180.8752435
2040	Annual	Mon-Sun	2260004021	Chainsaws	G2	15	Lawn and Ga	C	P	HH	NP	Sacrament	SV	SAC	3.80E+03	3.01E+03	4.34E+02	3.63E-01	6.57E-01	5.75E-03	1.78E+00	7.31E-05	1.03E-03	1.95E-03	2.26E-02	2587.024129
2040	Annual	Mon-Sun	2260004021	Chainsaws	G2	15	Lawn and Ga	R	P	HH	NP	Sacrament	SV	SAC	4.28E+04	5.74E+02	6.34E+01	2.01E-02	1.25E-01	1.10E-03	3.38E-01	1.39E-05	1.97E-04	3.72E-04	1.25E-03	225.1277104
2040	Annual	Mon-Sun	2260004025	Trimmers/I	G2	2	Lawn and Ga	C	N	HH	NP	Sacrament	SV	SAC	1.41E+04	4.70E+03	2.09E+02	1.13E-01	3.71E-01	3.24E-03	1.00E+00	4.12E-05	5.83E-04	1.77E-03	6.99E-03	961.7482086
2040	Annual	Mon-Sun	2260004025	Trimmers/I	G2	2	Lawn and Ga	R	N	HH	NP	Sacrament	SV	SAC	1.58E+05	9.28E+03	3.94E+02	1.76E-01	7.31E-01	6.41E-03	1.98E+00	8.14E-05	1.15E-03	3.49E-03	1.09E-02	1647.882332
2040	Annual	Mon-Sun	2260004030	Leaf Blowe	G2	2	Lawn and Ga	C	N	HH	P	Sacrament	SV	SAC	2.11E+04	1.14E+04	6.06E+02	4.18E-01	9.95E-01	8.71E-03	2.69E+00	1.11E-04	1.57E-03	4.52E-03	2.60E-02	3213.448623
2040	Annual	Mon-Sun	2260004030	Leaf Blowe	G2	2	Lawn and Ga	R	N	HH	P	Sacrament	SV	SAC	5.44E+04	7.16E+02	3.17E+01	9.97E-03	6.27E-02	5.49E-04	1.69E-01	6.98E-06	9.86E-05	2.85E-04	6.20E-04	113.1337298
2040	Annual	Mon-Sun	2260004050	Shredders	G2	15	Lawn and Ga	C	P	NHH	NP	Sacrament	SV	SAC	1.07E+02	3.97E+01	1.74E+01	9.78E-04	4.72E-02	7.63E-04	9.01E-02	3.71E-06	7.56E-04	8.80E-05	6.08E-05	35.99745188
2040	Annual	Mon-Sun	2260004050	Shredders	G2	15	Lawn and Ga	R	P	NHH	NP	Sacrament	SV	SAC	3.80E+03	9.37E+00	4.10E+00	1.98E-04	1.11E-02	1.54E-04	2.13E-02	8.77E-07	1.78E-04	1.91E-05	1.23E-05	8.30442368
2040	Annual	Mon-Sun	2260004070	Commercia	G2	15	Lawn and Ga	C	N	NHH	NP	Sacrament	SV	SAC	5.66E+01	1.24E+02	5.08E+01	2.29E-03	1.38E-01	1.73E-03	2.64E-01	1.09E-05	1.23E-04	2.32E-04	1.42E-04	102.0858625
2040	Annual	Mon-Sun	2260004070	Commercia	G2	25	Lawn and Ga	C	N	NHH	NP	Sacrament	SV	SAC	2.79E+01	6.12E+01	5.43E+01	2.37E-03	1.53E-01	1.83E-03	2.75E-01	1.13E-05	1.28E-04	1.72E-04	1.47E-04	105.6246918
2040	Annual	Mon-Sun	2260004075	Other Lawr	G2	2	Lawn and Ga	C	N	HH	NP	Sacrament	SV	SAC	2.39E+01	4.49E+00	2.51E-01	1.23E-04	4.56E-04	4.00E-06	1.23E-03	5.08E-08	7.18E-07	1.94E-06	7.66E-06	1.098562959
2040	Annual	Mon-Sun	2260004075	Other Lawr	G2	2	Lawn and Ga	R	N	HH	NP	Sacrament	SV	SAC	7.33E+02	8.63E+00	4.41E-01	1.33E-04	8.77E-04	7.68E-06	2.37E-03	9.76E-08	1.38E-06	3.72E-06	8.27E-06	1.545050482
2040	Annual	Mon-Sun	2260004075	Other Lawr	G2	15	Lawn and Ga	C	N	HH	NP	Sacrament	SV	SAC	1.04E+01	1.96E+00	5.46E-01	2.68E-04	9.93E-04	8.70E-06	2.68E-03	1.11E-07	1.56E-06	1.99E-06	1.67E-05	2.369384756
2040	Annual	Mon-Sun	2260004075	Other Lawr	G2	15	Lawn and Ga	R	N	HH	NP	Sacrament	SV	SAC	3.19E+02	3.76E+00	9.60E-01	2.90E-04	1.91E-03	1.67E-05	5.16E-03	2.12E-07	3.00E-06	3.82E-06	1.80E-05	3.323686787
2040	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.04E+00	2.22E+00	1.29E+00	9.72E-05	3.69E-03	7.24E-05	6.24E-03	1.78E-07	5.23E-05	6.35E-06	5.50E-06	2.607612415
2040	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.50E+00	3.80E+00	5.54E+00	4.29E-04	1.64E-02	2.80E-04	2.61E-02	6.61E-07	2.19E-04	1.68E-05	2.43E-05	10.92318866
2040	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.80E+00	3.01E+00	7.06E+00	9.59E-05	8.14E-03	1.21E-04	5.50E-02	6.68E-07	4.21E-06	9.59E-06	5.42E-06	18.7686154
2040	Annual	Mon-Sun	2265002003	Asphalt Pa	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.54E+00	1.66E+00	6.29E+00	4.01E-05	2.32E-03	9.34E-05	5.69E-02	5.50E-07	4.41E-06	6.28E-06	2.27E-06	19.10408135
2040	Annual	Mon-Sun	2265002006	Tampers/R	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	4.32E+00	2.16E+00	1.04E+00	7.83E-05	2.99E-03	5.83E-05	5.06E-03	1.44E-07	4.24E-05	5.58E-06	4.43E-06	2.114821122
2040	Annual	Mon-Sun	2265002009	Plate Comp	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.59E+02	7.84E+01	1.42E+01	2.01E-03	3.05E-02	9.07E-04	8.16E-02	2.82E-06	2.66E-05	1.29E-04	1.14E-04	38.1889608
2040	Annual	Mon-Sun	2265002009	Plate Comp	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.68E+02	9.51E+01	4.08E+01	3.06E-03	1.17E-01	2.28E-03	1.98E-01	5.65E-06	1.66E-03	2.31E-04	1.73E-04	82.92888057
2040	Annual	Mon-Sun	2265002015	Rollers	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.77E+01	4.02E+00	1.09E+00	1.31E-04	2.60E-03	5.92E-05	5.91E-03	2.04E-07	1.93E-06	7.52E-06	7.41E-06	2.675499575
2040	Annual	Mon-Sun	2265002015	Rollers	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.86E+01	2.43E+01	1.32E+01	9.92E-04	3.80E-02	7.39E-04	6.42E-02	1.83E-06	5.39E-04	6.70E-05	5.61E-05	26.8187976
2040	Annual	Mon-Sun	2265002015	Rollers	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.93E+01	1.64E+01	1.94E+01	1.49E-03	5.75E-02	9.73E-04	9.15E-02	2.32E-06	7.67E-04	6.46E-05	8.45E-05	38.32109201
2040	Annual	Mon-Sun	2265002015	Rollers	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.98E+00	3.36E+00	9.34E+00	1.54E-04	1.46E-02	1.73E-04	6.66E-02	8.10E-07	5.10E-06	1.22E-05	8.68E-06	22.93357306
2040	Annual	Mon-Sun	2265002015	Rollers	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.71E+00	6.32E+00	2.86E+01	2.40E-04	1.56E-02	5.63E-04	2.51E-01	2.43E-06	1.94E-05	3.03E-05	1.36E-05	84.58863719
2040	Annual	Mon-Sun	2265002021	Paving Equ	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.22E+02	1.04E+02	2.02E+01	2.83E-03	4.38E-02	1.28E-03	1.16E-01	4.00E-06	3.77E-05	1.76E-04	1.60E-04	53.98274979
2040	Annual	Mon-Sun	2265002021	Paving Equ	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.76E+02	2.06E+02	1.19E+02	8.87E-03	3.40E-01	6.61E-03	5.76E-01	1.64E-05	4.83E-03	5.84E-04	5.02E-04	240.064774
2040	Annual	Mon-Sun	2265002021	Paving Equ	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	8.35E+00	4.58E+00	5.97E+00	4.58E-04	1.77E-02	2.99E-04	2.81E-02	7.13E-07	2.36E-04	1.90E-05	2.59E-05	11.76910767
2040	Annual	Mon-Sun	2265002021	Paving Equ	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	7.66E+00	3.68E+00	8.21E+00	8.79E-05	6.10E-03	1.28E-04	6.93E-02	8.43E-07	5.31E-06	1.09E-05	4.97E-06	23.489123
2040	Annual	Mon-Sun	2265002021	Paving Equ	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.98E+00	9.48E-01	3.39E+00	1.55E-05	7.14E-04	3.56E-05	3.15E-02	3.04E-07	2.44E-06	2.92E-06	8.74E-07	10.53701038
2040	Annual	Mon-Sun	2265002024	Surfacing E	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	4.08E+01	2.24E+01	4.48E+00	6.48E-04	9.45E-03	2.93E-04	2.59E-02	8.96E-07	8.46E-06	3.93E-05	3.66E-05	12.16920139
2040	Annual	Mon-Sun	2265002024	Surfacing E	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.21E+02	1.67E+02	6.40E+01	5.02E-03	1.84E-01	3.74E-03	3.10E-01	8.84E-06	2.60E-03	3.91E-04	2.84E-04	131.2448566
2040	Annual	Mon-Sun	2265002024	Surfacing E	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.66E+00	2.29E+00	2.14E+00	1.72E-04	6.33E-03	1.12E-04	1.01E-02	2.56E-07	8.45E-05	8.14E-06	9.74E-06	4.268748496
2040	Annual	Mon-Sun	2265002027	Signal Boar	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	5.04E-01	1.79E-01	5.82E-02	7.47E-06	1.34E-04	3.37E-06	3.23E-04	1.11E-08	1.05E-07	3.82E-07	4.22E-07	0.147521188
2040	Annual	Mon-Sun	2265002027	Signal Boar	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.58E+00	2.79E+00	1.65E+00	1.23E-04	4.75E-03	9.18E-05	8.03E-03	2.29E-07	6.73E-05	8.02E-06	6.97E-06	3.346013772
2040	Annual	Mon-Sun	2265002030	Trenchers	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.31E+01	3.94E+01	2.54E+01	1.95E-03	7.29E-02	1.45E-03	1.23E-01	3.51E-06	1.03E-03	1.20E-04	1.10E-04	51.58187427
2040	Annual	Mon-Sun	2265002030	Trenchers	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.57E+01	3.06E+01	4.26E+01	3.35E-03	1.26E-01	2.18E-03	2.01E-01	5.08E-06	1.68E-03	1.33E-04	1.89E-04	84.22497403
2040	Annual	Mon-Sun	2265002030	Trenchers	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.80E+01	1.98E+01	4.42E+01	6.26E-04	5.45E-02	7.68E-04	3.39E-01	4.12E-06	2.59E-05	6.20E-05	3.54E-05	115.8363771
2040	Annual	Mon-Sun	2265002030	Trenchers	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	5.96E+00	6.58E+00	2.72E+01	1.84E-04	1.09E-02	4.28E-04	2.45E-01	2.36E-06	1.89E-05	2.69E-05	1.04E-05	82.12657312
2040	Annual	Mon-Sun	2265002033	Bore/Drill F	G4	15	Construction	U	P	NHH	P	Sacrament	SV	SAC	9.48E-01	3.22E-01	2.48E-01	1.81E-05	7.13E-04	1.35E-05	1.21E-03	3.44E-08	1.01E-05	1.05E-06	1.02E-06	0.498641666
2040	Annual	Mon-Sun	2265002033	Bore/Drill F	G4	25	Construction	U	P	NHH	P	Sacrament	SV	SAC	4.71E+00	1.60E+00	2.29E+00	1.71E-04	6.77E-03	1.11E-04	1.08E-02	2.73E-07	9.04E-05	6.86E-06	9.67E-06	4.481139379
2040	Annual	Mon-Sun	2265002033	Bore/Drill F	G4	50	Construction	U	P	NHH	P	Sacrament	SV	SAC	8.69E-01	2.55E-01	6.55E-01	6.85E-06	4.64E-04	1.01E-05	5.57E-03	6.77E-08	4.26E-07	8.10E-07	3.88E-07	1.884445362
2040	Annual	Mon-Sun	2265002033	Bore/Drill F	G4	120	Construction	U	P	NHH	P	Sacrament	SV	SAC	3.99E+00	1.17E+00	7.45E+00	3.29E-05	1.48E-03	7.57E-05	6.95E-02	6.71E-07	5.38E-06	4.82E-06	1.86E-06	23.21350347
2040	Annual	Mon-Sun	2265002033	Bore/Drill F	G4	175	Construction	U	P	NHH	P	Sacrament	SV	SAC	9.88E-01	2.90E-01	2.61E+00	8.86E-06	7.78E-04	2.85E-05	2.39E-02	2.38E-07	1.91E-06	1.49E-06	5.01E-07	7.987469838
2040	Annual	Mon-Sun	2265002039	Concrete/I	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.74E+01	6.20E+00	1.65E+00	2.12E-04	3.79E-03	9.56E-05	9.15E-03	3.16E-07	2.98E-06	1.19E-05	1.20E-05	4.191983207
2040	Annual	Mon-Sun	2265002039	Concrete/I	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	7.82E+01	6.65E+01	4.55E+01	3.41E-03	1.31E-01	2.54E-03	2.21E-01	6.30E-06	1.85E-03	2.07E-04	1.93E-04	91.99104044
2040	Annual	Mon-Sun	2265002039	Concrete/I	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.45E+01	2.08E+01	2.77E+01	2.13E-03	8.19E-02	1.39E-03	1.31E-01	3.31E-06	1.09E-03	8.72E-05	1.20E-04	54.60135942
2040	Annual	Mon-Sun	2265002039	Concrete/I	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.24E+00	5.42E+00	1.50E+01	1.57E-04	1.06E-02	2.32E-04	1.28E-01	1.55E-06	9.78E-06	1.79E-05	8.87E-06	43.23400452
2040	Annual	Mon-Sun	2265002039	Concrete/I	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.86E+00	3.11E+00	1.46E+01	6.45E-05	2.89E-03	1.48E-04	1.36E-01	1.32E-06	1.06E-05	1.09E-05	3.65E-06	45.61512035
2040	Annual	Mon-Sun	2265002042	Cement an	G4	5	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.16E+02	7.96E+01	2.02E+01	2.53E-03	4.72E-02	1.14E-03	1.11E-01	3.84E-06	3.63E-05	1.47E-04	1.43E-04	50.75077401
2040	Annual	Mon-Sun	2265002042	Cement an	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	5.35E+02	1.35E+02	6.21E+01	4.56E-03	1.78E-01	3.40E-03	3.02E-01	8.60E-06	2.53E-03	3.36E-04	2.58E-04	125.5977932
2040	Annual	Mon-Sun	2265002042	Cement an	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.25E+00	5.68E-01	8.41E-01	6.34E-05	2.49E-03	4.13E-05	3.97E-03	1.00E-07	3.32E-05	2.49E-06	3.58E-06	1.650501852
2040	Annual	Mon-Sun	2265002045	Cranes	G4	50	Construction	U	P	NHH	P	Sacrament	SV	SAC	9.88E-01	1.12E+00	2.21E+00	3.16E-05	2.78E-03	3.86E-05	1.69E-02	2.05E-07	1.29E-06	3.30E-06	1.79E-06	5.774917917
2040	Annual	Mon-Sun	2265002045	Cranes	G4	120	Construction	U	P	NHH	P	Sacrament	SV	SAC	1.98E+00	2.25E+00	7.43E+00	5.09E-05	3.05E-03	1.19E-04	6.67E-02	6.45E-07	5.17E-06	8.21E-06	2.88E-06	22.42729133
2040	Annual	Mon-Sun	2265002045	Cranes	G4	175	Construction	U	P	NHH	P	Sacrament	SV	SAC	7.90E-02	8.99E-02	4.82E-01	3.31E-06	1.58E-04	8.11E-06	4.39E-03	4.36E-08	3.49E-07	4.38E-07	1.87E-07	1.472651459
2040	Annual	Mon-Sun	2265002054	Crushing/P	G4	15	Construction	U	P	NHH	P	Sacrament	SV	SAC	8.59E-01	6.81E-01	5.08E-01	3.79E-05	1.46E-03	2.82E-05	2.46E-03	7.03E-08	2.07E-05	2.21E-06	2.14E-06	1.024709708
2040	Annual	Mon-Sun	2265002054	Crushing/P	G4	25	Construction	U	P	NHH	P	Sacrament	SV	SAC	5.63E-01	4.46E-01	6.09E-01	4.66E-05	1.80E-03	3.04E-05	2.87E-03	7.28E-08	2.41E-05	1.89E-06	2.64E-06	1.199433765
2040	Annual	Mon-Sun	2265002054	Crushing/P	G4	120	Construction	U	P	NHH	P	Sacrament	SV	SAC	1.15E+00	7.57E-01	5.75E+00	3.16E-05	1.68E-03	7.33E-05	5.27E-02	5.10E-07	4.09E-06	3.84E-06	1.79E-06	17.65564589
2040	Annual	Mon-Sun	2265002057	Rough Terr	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.95E-01	4.47E-01	1.50E+00	2.14E-05	1.88E-03	2.61E-05	1.14E-02	1.39E-07	8.76E-07	1.74E-06	1.21E-06	3.909428524
2040	Annual	Mon-Sun	2265002057	Rough Terr	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	5.61E+00	6.35E+00	3.23E+01	2.21E-04	1.32E-02	5.16E-04	2.90E-01	2.81E-06	2.25E-05	2.92E-05	1.25E-05	97.53138428
2040	Annual	Mon-Sun	2265002057	Rough Terr	G4	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.98E-01	2.24E-01	1.82E+00	1.25E-05	5.99E-04	3.06E-05	1.66E-02	1.65E-07	1.32E-06	1.36E-06	7.06E-07	5.5761251
2040	Annual	Mon-Sun	2265002060	Rubber Tire	G4	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	9.88E-01	1.39E+00	3.48E+00	5.26E-05	4.77E-03	6.22E-05	2.59E-02	3.14E-07	1.98E-06	4.68E-06	2.97E-06	8.86659852
2040	Annual	Mon-Sun	2265002060	Rubber Tire	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	6.56E+00	9.21E+00	3.43E+01	2.55E-04	1.58E-02	5.96E-04	3.06E-01	2.95E-06	2.37E-05	3.74E-05	1.44E-05	102.7981594
2040	Annual	Mon-Sun	2265002066	Tractors/Lc	G4	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.48E+00	8.29E+00	2.43E+01	1.94E-04	1.24E-02	4.53E-04	2.14E-01	2.07E-06	1.66E-05	3.07E-05	1.09E-05	72.13673759
2040	Annual	Mon-Sun	2265002072	Skid Steer I	G4	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.69E+00	1.48E+00	1.17E+00	8.89E-05	3.36E-03	6.62E-05	5.68E-03	1.62E-07	4.76E-05	5.01E-06	5.03E-06	2.367086466
2040	Annual	Mon-Sun	2265002072	Skid Steer I	G4	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.13E+02	9.87E+01	1.09E+02	8.52E-03	3.23E-01	5.55E-03	5.15E-01	1.31E-05	4.32E-03	3.78E-04	4.82E-04	216.3194875

2040	Annual	Mon-Sun	2265002072	Skid Steer L	G4	50	Construction U	P	NHH	NP	Sacrament	SV	SAC	2.69E+01	2.29E+01	4.38E+01	4.82E-04	3.43E-02	6.88E-04	3.67E-01	4.46E-06	2.81E-05	6.27E-05	2.72E-05	124.492104
2040	Annual	Mon-Sun	2265002072	Skid Steer L	G4	120	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.61E+01	1.37E+01	5.85E+01	2.77E-04	1.32E-02	6.39E-04	5.43E-01	5.24E-06	4.20E-05	4.73E-05	1.57E-05	181.5160808
2040	Annual	Mon-Sun	2265002078	Dumpers/T	G4	5	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.61E+01	6.58E+00	8.84E-01	1.27E-04	1.87E-03	5.75E-05	5.11E-03	1.76E-07	1.67E-06	9.33E-06	7.21E-06	2.41110901
2040	Annual	Mon-Sun	2265002078	Dumpers/T	G4	15	Construction U	P	NHH	NP	Sacrament	SV	SAC	3.44E+01	1.40E+01	5.05E+00	3.84E-04	1.45E-02	2.86E-04	2.45E-02	6.99E-07	2.06E-04	3.13E-05	2.17E-05	10.31609653
2040	Annual	Mon-Sun	2265002078	Dumpers/T	G4	25	Construction U	P	NHH	NP	Sacrament	SV	SAC	6.37E+00	2.60E+00	2.04E+00	1.59E-04	6.02E-03	1.03E-04	9.59E-03	2.43E-07	8.04E-05	8.27E-06	8.98E-06	4.041686762
2040	Annual	Mon-Sun	2265002078	Dumpers/T	G4	120	Construction U	P	NHH	NP	Sacrament	SV	SAC	7.11E-01	2.48E-01	6.15E-01	2.82E-06	1.31E-04	6.49E-06	5.72E-03	5.53E-08	4.43E-07	6.29E-07	1.59E-07	1.913991276
2040	Annual	Mon-Sun	2265002081	Other Cons	G4	175	Construction U	P	NHH	NP	Sacrament	SV	SAC	2.77E+00	2.81E+00	1.54E+01	6.03E-05	4.66E-03	1.82E-04	1.41E-01	1.40E-06	1.13E-05	1.16E-05	3.41E-06	47.18173766
2040	Annual	Mon-Sun	2265004010	Lawn Mow	G4	5	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	1.43E+04	8.98E+03	1.07E+03	1.28E-01	2.37E+00	3.26E-02	6.12E+00	2.11E-04	1.93E-02	7.93E-03	7.14E-03	2726.294559
2040	Annual	Mon-Sun	2265004010	Lawn Mow	G4	5	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	2.27E+05	9.65E+03	1.27E+03	9.79E-02	3.40E+00	2.43E-02	6.58E+00	2.27E-04	1.57E-02	6.96E-03	5.47E-03	2722.283912
2040	Annual	Mon-Sun	2265004015	Tillers	G4	5	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	1.49E+03	2.28E+02	3.22E+01	2.86E-03	8.07E-02	7.21E-04	1.73E-01	5.96E-06	4.55E-04	1.87E-04	1.62E-04	73.08318745
2040	Annual	Mon-Sun	2265004015	Tillers	G4	5	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	5.78E+03	2.85E+02	4.10E+01	3.34E-03	1.06E-01	8.35E-04	2.16E-01	7.45E-06	5.38E-04	2.24E-04	1.89E-04	90.11121485
2040	Annual	Mon-Sun	2265004025	Trimmers/I	G4	5	Lawn and Ga C	P	NHH	NP	Sacrament	SV	SAC	2.62E+03	9.73E+02	2.97E+01	3.87E-03	6.77E-02	1.75E-03	1.66E-01	5.72E-06	5.40E-05	5.93E-04	2.19E-04	79.60542997
2040	Annual	Mon-Sun	2265004025	Trimmers/I	G4	5	Lawn and Ga R	P	NHH	NP	Sacrament	SV	SAC	1.22E+04	7.18E+02	2.29E+01	2.62E-03	5.65E-02	1.18E-03	1.22E-01	4.23E-06	3.99E-05	4.17E-04	1.48E-04	57.38619895
2040	Annual	Mon-Sun	2265004030	Leaf Blowe	G4	5	Lawn and Ga C	N	NHH	P	Sacrament	SV	SAC	6.67E+02	1.13E+02	7.48E+00	5.54E-04	2.00E-02	1.38E-04	3.87E-02	1.34E-06	9.07E-05	5.60E-05	3.13E-05	16.0722225
2040	Annual	Mon-Sun	2265004030	Leaf Blowe	G4	5	Lawn and Ga R	N	NHH	P	Sacrament	SV	SAC	5.73E+02	7.54E+00	5.19E-01	2.97E-05	1.48E-03	7.20E-06	2.57E-03	8.87E-08	5.11E-06	3.28E-06	1.68E-06	1.028274346
2040	Annual	Mon-Sun	2265004040	Rear Engin	G4	15	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	7.85E+03	5.84E+03	1.92E+03	8.96E-02	5.59E+00	6.48E-02	9.45E+00	2.69E-04	4.38E-03	9.41E-03	5.07E-03	3660.193361
2040	Annual	Mon-Sun	2265004040	Rear Engin	G4	15	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	6.89E+03	5.32E+02	1.75E+02	6.94E-03	5.09E-01	5.08E-03	8.61E-01	2.45E-05	3.43E-04	7.90E-04	3.93E-04	326.8789258
2040	Annual	Mon-Sun	2265004040	Rear Engin	G4	25	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	3.59E+01	2.67E+01	1.71E+01	7.68E-04	5.12E-02	5.66E-04	8.16E-02	2.07E-06	3.79E-05	6.07E-05	4.35E-05	31.39892766
2040	Annual	Mon-Sun	2265004040	Rear Engin	G4	25	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	3.10E+01	2.39E+00	1.53E+00	5.99E-05	4.59E-03	4.21E-05	7.32E-03	1.85E-07	2.91E-06	4.92E-06	3.39E-06	2.765299396
2040	Annual	Mon-Sun	2265004045	Front Mow	G4	15	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	3.60E+02	2.68E+02	1.41E+02	6.55E-03	4.09E-01	4.75E-03	6.91E-01	1.97E-05	3.21E-04	5.53E-04	3.71E-04	266.5897839
2040	Annual	Mon-Sun	2265004045	Front Mow	G4	15	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	1.16E+04	8.99E+02	4.72E+02	1.87E-02	1.37E+00	1.37E-02	2.32E+00	6.62E-05	9.26E-04	1.71E-03	1.06E-03	878.0342406
2040	Annual	Mon-Sun	2265004045	Front Mow	G4	25	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	2.82E+02	2.10E+02	1.48E+02	6.67E-03	4.45E-01	4.91E-03	7.08E-01	1.79E-05	3.29E-04	5.03E-04	3.77E-04	272.2335365
2040	Annual	Mon-Sun	2265004045	Front Mow	G4	25	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	9.11E+03	7.04E+02	4.97E+02	1.95E-02	1.49E+00	1.37E-02	2.38E+00	6.03E-05	9.48E-04	1.53E-03	1.10E-03	898.6449705
2040	Annual	Mon-Sun	2265004050	Shredders	G4	5	Lawn and Ga C	P	NHH	NP	Sacrament	SV	SAC	2.83E+02	1.05E+02	2.85E+01	3.72E-03	6.50E-02	1.68E-03	1.59E-01	5.50E-06	5.19E-05	2.05E-04	2.10E-04	73.03770274
2040	Annual	Mon-Sun	2265004050	Shredders	G4	5	Lawn and Ga R	P	NHH	NP	Sacrament	SV	SAC	1.05E+04	2.59E+01	8.22E+00	6.22E-04	2.40E-02	2.81E-04	3.92E-02	1.36E-06	1.28E-05	4.12E-05	3.52E-05	16.46310735
2040	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	15	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	1.44E+03	5.07E+02	3.22E+02	1.26E-02	9.37E-01	9.20E-03	1.58E+00	4.52E-05	6.22E-04	1.06E-03	7.11E-04	596.7825925
2040	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	15	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	9.35E+03	3.74E+02	2.37E+02	8.54E-03	6.91E-01	6.29E-03	1.17E+00	3.33E-05	4.25E-04	7.52E-04	4.83E-04	436.1698834
2040	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	25	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	5.68E+02	2.00E+02	2.02E+02	7.80E-03	6.06E-01	5.45E-03	9.65E-01	2.45E-05	3.79E-04	5.20E-04	4.41E-04	363.1628132
2040	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	25	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	3.69E+03	1.47E+02	1.49E+02	5.37E-03	4.47E-01	3.65E-03	7.12E-01	1.80E-05	2.59E-04	3.64E-04	3.04E-04	265.7835808
2040	Annual	Mon-Sun	2265004055	Lawn & Ga	G4	50	Lawn and Ga U	N	NHH	NP	Sacrament	SV	SAC	8.21E+00	2.34E+00	3.54E+00	3.56E-05	2.38E-03	6.92E-05	3.03E-02	3.68E-07	2.32E-06	6.35E-06	2.01E-06	10.27049337
2040	Annual	Mon-Sun	2265004060	Wood Split	G4	5	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	4.83E+02	1.70E+02	4.98E+01	5.26E-03	1.16E-01	1.34E-03	2.78E-01	9.60E-06	8.16E-04	2.27E-04	2.98E-04	120.2914091
2040	Annual	Mon-Sun	2265004060	Wood Split	G4	5	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	1.21E+04	3.64E+01	1.23E+01	5.92E-04	3.63E-02	1.41E-04	5.95E-02	2.05E-06	1.06E-04	3.34E-05	3.35E-05	22.93633799
2040	Annual	Mon-Sun	2265004065	Chippers/S	G4	15	Lawn and Ga C	P	NHH	P	Sacrament	SV	SAC	6.81E+00	2.36E+01	1.99E+01	1.57E-03	5.75E-02	1.16E-03	9.57E-02	2.73E-06	8.02E-04	8.37E-05	8.75E-05	40.13743179
2040	Annual	Mon-Sun	2265004065	Chippers/S	G4	15	Lawn and Ga R	P	NHH	P	Sacrament	SV	SAC	1.22E+01	5.50E-01	4.57E-01	2.67E-05	1.32E-03	1.99E-05	2.23E-03	6.37E-08	1.87E-05	1.66E-06	1.51E-06	0.887531678
2040	Annual	Mon-Sun	2265004065	Chippers/S	G4	25	Lawn and Ga C	P	NHH	P	Sacrament	SV	SAC	3.87E+01	1.34E+02	1.91E+02	1.54E-02	5.67E-01	9.97E-03	8.89E-01	2.25E-05	7.45E-03	5.93E-04	8.59E-04	375.2492982
2040	Annual	Mon-Sun	2265004065	Chippers/S	G4	25	Lawn and Ga R	P	NHH	P	Sacrament	SV	SAC	6.89E+01	3.11E+00	4.36E+00	2.61E-04	1.30E-02	1.70E-04	2.07E-02	5.24E-07	1.73E-04	1.17E-05	1.48E-05	8.255207168
2040	Annual	Mon-Sun	2265004070	Commercia	G4	15	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	5.10E+02	1.12E+03	5.96E+02	3.36E-02	1.73E+00	2.41E-02	2.91E+00	8.29E-05	1.62E-03	2.56E-03	1.90E-03	1152.552433
2040	Annual	Mon-Sun	2265004070	Commercia	G4	25	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	2.51E+02	5.50E+02	5.21E+02	2.78E-02	1.56E+00	2.14E-02	2.47E+00	6.27E-05	1.38E-03	1.73E-03	1.57E-03	972.3548333
2040	Annual	Mon-Sun	2265004070	Commercia	G4	50	Lawn and Ga U	N	NHH	NP	Sacrament	SV	SAC	1.01E+02	2.03E+02	3.41E+02	5.19E-03	5.15E-01	1.10E-02	2.46E+00	2.99E-05	1.88E-04	7.48E-04	2.93E-04	846.3236856
2040	Annual	Mon-Sun	2265004070	Commercia	G4	120	Lawn and Ga U	N	NHH	NP	Sacrament	SV	SAC	6.69E-01	1.34E+00	3.29E+00	1.47E-05	7.98E-04	8.83E-05	3.04E-02	2.94E-07	2.36E-06	5.59E-06	8.32E-07	10.19160752
2040	Annual	Mon-Sun	2265004075	Other Lawr	G4	5	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	4.47E+02	8.41E+01	1.72E+01	1.53E-03	4.33E-02	3.84E-04	9.23E-02	3.19E-06	2.43E-04	8.39E-05	8.63E-05	38.92373901
2040	Annual	Mon-Sun	2265004075	Other Lawr	G4	5	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	1.37E+04	1.62E+02	3.59E+01	2.01E-03	1.03E-01	4.87E-04	1.77E-01	6.13E-06	3.48E-04	1.30E-04	1.14E-04	69.93404459
2040	Annual	Mon-Sun	2265004075	Other Lawr	G4	15	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	1.99E+02	3.73E+01	1.67E+01	6.59E-04	4.85E-02	4.82E-04	8.20E-02	2.34E-06	3.26E-05	6.51E-05	3.73E-05	31.03019918
2040	Annual	Mon-Sun	2265004075	Other Lawr	G4	15	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	6.09E+03	7.17E+01	3.19E+01	1.09E-03	9.32E-02	8.04E-04	1.58E-01	4.49E-06	5.43E-05	1.16E-04	6.15E-05	58.64956629
2040	Annual	Mon-Sun	2265004075	Other Lawr	G4	25	Lawn and Ga C	N	NHH	NP	Sacrament	SV	SAC	4.20E+00	7.89E-01	7.70E-01	3.01E-05	2.31E-03	2.11E-05	3.68E-03	9.33E-08	1.46E-06	2.03E-06	1.70E-06	1.387168515
2040	Annual	Mon-Sun	2265004075	Other Lawr	G4	25	Lawn and Ga R	N	NHH	NP	Sacrament	SV	SAC	1.29E+02	1.53E+00	1.49E+00	5.11E-05	4.47E-03	3.40E-05	7.12E-03	1.80E-07	2.45E-06	3.56E-06	2.89E-06	2.643730892
2040	Annual	Mon-Sun	2265004075	Other Lawr	G4	50	Lawn and Ga U	N	NHH	NP	Sacrament	SV	SAC	3.04E-01	5.08E-02	1.06E-01	1.02E-06	6.46E-05	1.97E-06	9.16E-04	1.11E-08	7.02E-08	1.59E-07	5.80E-08	0.310013246
2040	Annual	Mon-Sun	2265004075	Other Lawr	G4	120	Lawn and Ga U	N	NHH	NP	Sacrament	SV	SAC	7.30E-01	1.22E-01	6.57E-01	2.54E-06	1.07E-04	1.65E-05	6.16E-03	5.95E-08	4.77E-07	7.46E-07	1.43E-07	2.059772537
2040	Annual	Mon-Sun	2270002003	Pavers	D	25	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.06E+00	2.39E+00	2.03E+00	2.68E-05	9.16E-05	1.70E-04	2.22E-02	2.82E-07	6.34E-06	0.00E+00	2.42E-06	7.576626835
2040	Annual	Mon-Sun	2270002003	Pavers	D	50	Construction U	P	NHH	NP	Sacrament	SV	SAC	6.16E+01	1.39E+02	1.79E+02	2.12E-03	1.78E-02	1.16E-02	1.95E+00	2.52E-05	1.63E-04	0.00E+00	1.92E-04	662.2552726
2040	Annual	Mon-Sun	2270002003	Pavers	D	120	Construction U	P	NHH	NP	Sacrament	SV	SAC	7.26E+01	1.64E+02	5.18E+02	3.03E-03	3.76E-02	1.73E-02	5.68E+00	6.66E-05	4.36E-04	0.00E+00	2.73E-04	1905.104711
2040	Annual	Mon-Sun	2270002003	Pavers	D	175	Construction U	P	NHH	NP	Sacrament	SV	SAC	4.51E+01	1.02E+02	5.96E+02	2.46E-03	3.82E-02	6.74E-03	6.55E+00	7.37E-05	3.22E-04	0.00E+00	2.22E-04	2187.266865
2040	Annual	Mon-Sun	2270002003	Pavers	D	250	Construction U	N	NHH	NP	Sacrament	SV	SAC	5.44E+00	1.23E+01	1.08E+02	4.21E-04	2.40E-03	1.11E-03	1.20E+00	1.34E-05	3.98E-05	0.00E+00	3.80E-05	399.1222238
2040	Annual	Mon-Sun	2270002003	Pavers	D	500	Construction U	N	NHH	NP	Sacrament	SV	SAC	5.58E+00	1.26E+01	1.33E+02	5.15E-04	2.81E-03	1.29E-03	1.47E+00	1.44E-05	4.78E-05	0.00E+00	4.64E-05	491.3577548
2040	Annual	Mon-Sun	2270002009	Plate Comp	D	15	Construction U	P	NHH	NP	Sacrament	SV	SAC	2.28E+01	3.74E+01	7.37E+00	9.39E-05	4.93E-04	5.88E-04	8.07E-02	1.26E-06	2.30E-05	0.00E+00	8.47E-06	27.45216852
2040	Annual	Mon-Sun	2270002015	Rollers	D	15	Construction U	P	NHH	NP	Sacrament	SV	SAC	4.27E+01	8.15E+01	2.35E+01	2.99E-04	1.57E-03	1.87E-03	2.57E-01	4.00E-06	7.33E-05	0.00E+00	2.70E-05	87.53501018
2040	Annual	Mon-Sun	2270002015	Rollers	D	25	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.79E+01	3.41E+01	2.07E+01	2.74E-04	9.35E-04	1.73E-03	2.27E-01	2.88E-06	6.47E-05	0.00E+00	2.47E-05	77.35448989
2040	Annual	Mon-Sun	2270002015	Rollers	D	50	Construction U	P	NHH	NP	Sacrament	SV	SAC	5.56E+01	1.06E+02	1.26E+02	1.14E-03	1.14E-02	7.79E-03	1.38E+00	1.78E-05	5.85E-05	0.00E+00	1.03E-04	465.972872
2040	Annual	Mon-Sun	2270002015	Rollers	D	120	Construction U	P	NHH	NP	Sacrament	SV	SAC	2.99E+02	5.71E+02	1.53E+03	7.11E-03	1.07E-01	4.52E-02	1.68E+01	1.97E-04	6.41E-04	0.00E+00	6.41E-04	5625.36878
2040	Annual	Mon-Sun	2270002015	Rollers	D	175	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.20E+02	2.30E+02	1.13E+03	3.68E-03	6.99E-02	8.15E-03	1.24E+01	1.40E-04	3.47E-04	0.00E+00	3.32E-04	4134.890344
2040	Annual	Mon-Sun	2270002015	Rollers	D	250	Construction U	N	NHH	NP	Sacrament	SV	SAC	1.70E+01	3.26E+01	2.25E+02	7.25E-04	4.79E-03	1.53E-03	2.49E+00	2.80E-05	5.65E-05	0.00E+00	6.54E-05	830.171051
2040	Annual	Mon-Sun	2270002015	Rollers	D	500	Construction U	N	NHH	NP	Sacrament	SV	SAC	1.19E+01	2.28E+01	2.26E+02	7.27E-04	4.61E-03	1.50E-03	2.50E+00	2.45E-05	5.65E-05	0.00E+00	6.56E-05	833.1684474
2040	Annual	Mon-Sun	2270002018	Scrapers	D	120	Construction U	P	NHH	NP	Sacrament	SV	SAC	2.76E+00	8.30E+00	3.55E+01	2.17E-04	2.63E-03	1.18E-03	3.89E-01	4.57E-06	2.81E-05	0.00E+00	1.96E-05	130.670474
2040	Annual	Mon-Sun	2270002018	Scrapers	D	175	Construction U	P	NHH	NP	Sacrament	SV	SAC	2.52E+01	7.60E+01	5.12E+02	2.20E-03	3.35E-02	5.45E-03	5.62E+00	6.33E-05	2.61E-04	0.00E+00	1.98E-04	1878.790742
2040	Annual	Mon-Sun	2270002018	Scrapers	D	250	Construction U	N	NHH	NP	Sacrament	SV	SAC	2.46E+01	7.41E+01	7.01E+02	2.87E-03	1.58E-02	6.82E-03	7.75E+00	8.72E-05	2.49E-04	0.00E+00	2.59E-04	2589.537564
2040	Annual	Mon-Sun	2270002018	Scrapers	D	500	Construction U	N	NHH	NP	Sacrament	SV	SAC	6.77E+01	2.04E+02	2.96E+03	1.20E-02	6.34E-02	2.74E-02	3.27E+01	3.21E-04	1.03E-03	0.00E+00	1.09E-03	10938.25503
2040	Annual	Mon-Sun	2270002018	Scrapers	D	750	Construction U	N	NHH	NP	Sacrament	SV	SAC	2.71E+00	8.16E+00	2.05E+02	8.33E-04	4.38E-03	1.91E-03	2.26E+00	2.27E-05	7.15E-05	0.00E+00	7.51E-05	755.6532492
2040	Annual	Mon-Sun	2270002021	Paving Equ	D	25	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.84E+00	4.18E+00	2.40E+00	3.18E-05	1.08E-04	2.01E-04	2.63E-02	3.34E-07	7.50E-06	0.00E+00	2.87E-06	8.974203764
2040	Annual	Mon-Sun	2270002021	Paving Equ	D	50	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.55E+00	3.54E+00	3.88E+00	4.40E-05	3.81E-04	2.51E-04	4.24E-02	5.48E-07	3.17E-06	0.00E+00	3.97E-06	14.37247556
2040	Annual	Mon-Sun	2270002021	Paving Equ	D	120	Construction U	P	NHH	NP	Sacrament	SV	SAC	2.24E+01	5.11E+01	1.27E+02	7.14E-04	9.16E-03	4.13E-03	1.39E+00	1.63E-05	9.60E-05	0.00E+00	6.44E-05	465.9460607
2040	Annual	Mon-Sun	2270002021	Paving Equ	D	175	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.05E+01	2.40E+01	1.10E+02	4.38E-04	7.04E-03	1.15E-03	1.21E+00	1.36E-05	5.44E-05	0.00E+00	3.95E-05	404.5096896
2040	Annual	Mon-Sun	2270002021	Paving Equ	D	250	Construction U	N	NHH	NP	Sacrament	SV	SAC	2.97E+00	6.76E+00	3.74E+01	1.41E-04	8.20E-04	3.54E-04	4.13E-01	4.65E-06	1.25E-05	0.00E+00	1.27E-05	137.9595635
2040	Annual	Mon-Sun	2270002024	Surfacing E	D	50	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.41E+00	1.74E+00	1.12E+00	8.52E-06	9.01E-05	6.71E-05	1.22E-02	1.58E-07	5.61E-07	0.00E+00	7.69E-07	4.120345186
2040	Annual	Mon-Sun	2270002024	Surfacing E	D	120	Construction U	P	NHH	NP	Sacrament	SV	SAC	2.83E-01	3.47E-01	1.01E+00	4.03E-06	6.77E-05	2.96E-05	1.11E-02	1.30E-07	4.69E-07	0.00E+00	3.64E-07	3.69575664
2040	Annual	Mon-Sun	2270002024	Surfacing E	D	175	Construction U	P	NHH	NP	Sacrament	SV	SAC	2.12E-01	2.61E-01	1.01E+00	2.87E-06	6.04E-05	7.81E-06	1.12E-02	1.26E-07	3.38E-07	0.00E+00	2.59E-07	3.718974614
2040	Annual	Mon-Sun	2270002024	Surfacing E	D	250	Construction U	N	NHH	NP	Sacrament	SV	SAC	4.24E-01	5.21E-01	3.17E+00	8.70E-06	6.47E-05	2.29E-05	3.51E-02	3.95E-07	8.09E-07	0.00E+00	7.85E-07	11.69265994
2040	Annual	Mon-Sun	2270002024	Surfacing E	D	500	Construction U	N	NHH	NP	Sacrament	SV	SAC	3.53E+00	4.34E+00	4.34E+01	1.19E-04	8.57E-04	3.03E-04	4.80E-01	4.71E-06	1.09E-05	0.00E+00	1.07E-05	159.8133054
2040	Annual	Mon-Sun	2270002024	Surfacing E	D	750	Construction U	N	NHH	NP	Sacrament	SV	SAC	5.17E-01	6.36E-01	9.96E+00	2.73E-05	1.97E-04	7.01E-05	1.10E-01	1.11E-06	2.52E-06	0.00E+00	2.46E-06	36.70855862
2040	Annual	Mon-Sun	2270002027	Signal Boar	D	15	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.99E+02	4.09E+02	1.15E+02	1.47E-03	7.70E-03	9.19E-03	1.26E+00	1.96E-05	3.59E-04	0.00E+00	1.32E-04	429.0578473
2040	Annual	Mon-Sun	2270002027	Signal Boar	D	50	Construction U	P	NHH	NP	Sacrament	SV	SAC	9.89E-01	1.45E+00	2.40E+00	1.65E-05	1.88E-04	1.40E-04	2.62E-02	3.39E-07	6.71E-07	0.00E+00	1.48E-06	8.817219585
2040	Annual	Mon-Sun	2270002027	Signal Boar	D	120	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.62E+01	2.37E+01	8.66E+01	3.15E-04	5.77E-03	2.39E-03	9.51E-01	1.12E-05	2.27E-05	0.00E+00	2.84E-05	317.4024792
2040	Annual	Mon-Sun	2270002027	Signal Boar	D	175	Construction U	P	NHH	NP	Sacrament	SV	SAC	1.00E+01	1.47E+01	1.03E+02	2.63E-04	6.10E-03	5.93E-04	1.14E+00	1.28E-05	2.21E-05	0.00E+00	2.37E-05	378.3345669
2040	Annual	Mon-Sun	2270002027	Signal Boar	D	250	Construction U	N	NHH	NP	Sacrament	SV	SAC	2.12E+00	3.11E+00	3.58E+01	9.08E-05	7.25E-04	1.97E-04	3.97E-01	4.46E-06	7.12E-06	0.00E+00	8.19E-06	132.0293587
2040	Annual	Mon-Sun	2270002030	Trenchers	D	15	Construction U	P	NHH	NP	Sacrament	SV	SAC	5.30E+00	8.98E+00	3.47E+00	4.42E-05	2.32E-04	2.77E-04	3.80E-02	5.91E-07	1.08E-05	0.00E+00	3.99E-06	12.92303796
2040	Annual	Mon-Sun	2270002030	Trenchers	D	25	Construction U	P	NHH	NP	Sacrament	SV	SAC	5.58E+00	9.46E+00	1.42E+01	1.88E-04	6.40E-04	1.19E-03	1.56E-01	1.97E-06	4.43E-05	0.00E+00	1.69E-05	52.98871373
2040	Annual	Mon-Sun	2270002030	Trenchers	D	50	Construction U	P	NHH	NP	Sacrament	SV	SAC	2.12E+02	3.63E+02	5.47E+02	6.29E-03	5.23E-02	3.54E-02	5.96E+00	7.71E-05	5.48E-04	0.00E+00	5.67E-04	2024.22164
2040	Annual	Mon-Sun	2270002030	Trenchers	D	120	Construction U	P	NHH	NP	Sacrament	SV	SAC	2.88E+02	4.91E+02	1.45E+03	8.23E-03	1.04E-01	4.96E-02	1.59E+01	1.87E-04	1.35E-03	0.00E+00	7.42E-04	5340.079923
2040	Annual	Mon-Sun	2270002030	Trenchers	D	175	Construction U	P	NHH	NP	Sacrament	SV	SAC	3.15E+01	5.38E+01	3.52E+02	1.42E-03	2.22E-02	4.35E-03	3.87E+00	4.35E-05	2.09E-04	0.00E+00	1.28E-04	1291.376523
2040	Annual	Mon-Sun	2270002030	Trenchers	D	250	Construction U	N	NHH	NP	Sacrament	SV	SAC	2.83E+00	4.82E+00	4.86E+01	1.83E-04	1.07E-03	5.43E-04	5.37E-01	6.04E-06	1.98E-05	0.00E+00	1.65E-05	179.2953298

2040	Annual	Mon-Sun	2270002030	Trenchers	D	500	Construction	U	N	NHH	NP	Sacrament	SV	SAC	3.60E+00	6.15E+00	8.65E+01	3.22E-04	1.82E-03	9.14E-04	9.56E-01	9.39E-06	3.40E-05	0.00E+00	2.91E-05	319.2454987
2040	Annual	Mon-Sun	2270002030	Trenchers	D	750	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.03E-01	1.77E-01	4.68E+00	1.75E-05	9.85E-05	5.01E-05	5.18E-02	5.20E-07	1.85E-06	0.00E+00	1.58E-06	17.27738721
2040	Annual	Mon-Sun	2270002033	Bore/Drill F	D	15	Construction	U	P	NHH	P	Sacrament	SV	SAC	7.07E-01	1.57E+00	7.42E-01	9.45E-06	4.96E-05	5.92E-05	8.12E-03	1.26E-07	2.31E-06	0.00E+00	8.53E-07	2.763668303
2040	Annual	Mon-Sun	2270002033	Bore/Drill F	D	25	Construction	U	P	NHH	P	Sacrament	SV	SAC	2.12E+00	4.71E+00	3.43E+00	4.54E-05	1.55E-04	2.87E-04	3.76E-02	4.78E-07	1.07E-05	0.00E+00	4.10E-06	12.82598809
2040	Annual	Mon-Sun	2270002033	Bore/Drill F	D	50	Construction	U	P	NHH	P	Sacrament	SV	SAC	9.26E+00	2.12E+01	3.00E+01	2.02E-04	2.33E-03	1.75E-03	3.29E-01	4.25E-06	7.74E-06	0.00E+00	1.82E-05	110.3988909
2040	Annual	Mon-Sun	2270002033	Bore/Drill F	D	120	Construction	U	P	NHH	P	Sacrament	SV	SAC	2.84E+01	6.50E+01	2.28E+02	8.10E-04	1.51E-02	6.22E-03	2.51E+00	2.94E-05	5.61E-05	0.00E+00	7.31E-05	836.0499733
2040	Annual	Mon-Sun	2270002033	Bore/Drill F	D	175	Construction	U	P	NHH	P	Sacrament	SV	SAC	6.57E+00	1.50E+01	9.64E+01	2.37E-04	5.67E-03	5.09E-04	1.06E+00	1.19E-05	1.97E-05	0.00E+00	2.14E-05	352.9701502
2040	Annual	Mon-Sun	2270002033	Bore/Drill F	D	250	Construction	U	N	NHH	P	Sacrament	SV	SAC	5.65E+00	1.29E+01	1.10E+02	2.72E-04	2.22E-03	5.84E-04	1.22E+00	1.37E-05	2.15E-05	0.00E+00	2.45E-05	404.8404449
2040	Annual	Mon-Sun	2270002033	Bore/Drill F	D	500	Construction	U	N	NHH	P	Sacrament	SV	SAC	1.26E+01	2.88E+01	4.05E+02	1.00E-03	7.93E-03	2.15E-03	4.48E+00	4.40E-05	7.91E-05	0.00E+00	9.03E-05	1490.774101
2040	Annual	Mon-Sun	2270002033	Bore/Drill F	D	750	Construction	U	N	NHH	P	Sacrament	SV	SAC	1.60E+00	3.67E+00	1.02E+02	2.52E-04	2.00E-03	5.42E-04	1.13E+00	1.13E-05	1.99E-05	0.00E+00	2.28E-05	375.5239419
2040	Annual	Mon-Sun	2270002033	Bore/Drill F	D	1000	Construction	U	N	NHH	P	Sacrament	SV	SAC	2.69E+00	6.15E+00	2.58E+02	6.38E-04	5.05E-03	1.19E-02	2.85E+00	2.87E-05	1.06E-04	0.00E+00	5.75E-05	949.6947725
2040	Annual	Mon-Sun	2270002036	Excavators	D	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.61E+00	1.00E+01	7.49E+00	9.91E-05	3.38E-04	6.27E-04	8.22E-02	1.04E-06	2.34E-05	0.00E+00	8.95E-06	27.99808797
2040	Annual	Mon-Sun	2270002036	Excavators	D	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	9.84E+01	3.80E+02	4.35E+02	4.74E-03	4.41E-02	2.75E-02	4.74E+00	6.13E-05	1.61E-04	0.00E+00	4.27E-04	1608.377906
2040	Annual	Mon-Sun	2270002036	Excavators	D	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.67E+02	1.03E+03	3.46E+03	1.87E-02	2.54E-01	1.01E-01	3.79E+01	4.45E-04	1.19E-03	0.00E+00	1.68E-03	12702.30376
2040	Annual	Mon-Sun	2270002036	Excavators	D	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	5.16E+02	1.99E+03	1.01E+04	3.79E-02	6.60E-01	6.12E-02	1.11E+02	1.25E-03	2.59E-03	0.00E+00	3.42E-03	37217.0341
2040	Annual	Mon-Sun	2270002036	Excavators	D	250	Construction	U	N	NHH	NP	Sacrament	SV	SAC	2.10E+02	8.09E+02	5.80E+03	2.17E-02	1.29E-01	3.40E-02	6.41E+01	7.21E-04	1.33E-03	0.00E+00	1.96E-03	21401.18812
2040	Annual	Mon-Sun	2270002036	Excavators	D	500	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.51E+02	5.83E+02	6.16E+03	2.30E-02	1.31E-01	3.61E-02	6.81E+01	6.69E-04	1.41E-03	0.00E+00	2.08E-03	22739.73831
2040	Annual	Mon-Sun	2270002036	Excavators	D	750	Construction	U	N	NHH	NP	Sacrament	SV	SAC	8.10E-01	3.13E+00	5.47E+01	2.04E-04	1.16E-03	3.20E-04	6.05E-01	6.08E-06	1.26E-05	0.00E+00	1.84E-05	201.8976182
2040	Annual	Mon-Sun	2270002039	Concrete/I	D	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.83E-01	4.59E-01	3.44E-01	4.56E-06	1.55E-05	2.88E-05	3.78E-03	4.79E-08	1.08E-06	0.00E+00	4.11E-07	1.286517241
2040	Annual	Mon-Sun	2270002039	Concrete/I	D	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.47E+00	3.93E+00	5.42E+00	3.91E-05	4.36E-04	3.19E-04	5.94E-02	7.67E-07	1.56E-06	0.00E+00	3.52E-06	19.9618894
2040	Annual	Mon-Sun	2270002039	Concrete/I	D	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	4.31E+00	6.85E+00	2.31E+01	8.74E-05	1.55E-03	6.41E-04	2.54E-01	2.98E-06	6.21E-06	0.00E+00	7.89E-06	84.76489111
2040	Annual	Mon-Sun	2270002039	Concrete/I	D	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.41E-01	2.25E-01	1.63E+00	4.32E-06	9.74E-05	9.41E-06	1.80E-02	2.02E-07	3.55E-07	0.00E+00	3.90E-07	5.989536169
2040	Annual	Mon-Sun	2270002042	Cement an	D	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.61E+01	2.97E+01	8.57E+00	1.09E-04	5.73E-04	6.84E-04	9.38E-02	1.46E-06	2.67E-05	0.00E+00	9.85E-06	31.91418902
2040	Annual	Mon-Sun	2270002042	Cement an	D	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.25E+00	2.67E+00	2.14E+00	2.83E-05	9.65E-05	1.79E-04	2.34E-02	2.98E-07	6.68E-06	0.00E+00	2.55E-06	7.988137055
2040	Annual	Mon-Sun	2270002045	Cranes	D	50	Construction	U	P	NHH	P	Sacrament	SV	SAC	2.40E+00	8.41E+00	8.94E+00	9.73E-05	9.03E-04	5.70E-04	9.74E-02	1.26E-06	4.23E-06	0.00E+00	8.78E-06	33.02138966
2040	Annual	Mon-Sun	2270002045	Cranes	D	120	Construction	U	P	NHH	P	Sacrament	SV	SAC	2.64E+01	9.23E+01	2.11E+02	1.15E-03	1.54E-02	6.31E-03	2.31E+00	2.71E-05	8.94E-05	0.00E+00	1.04E-04	774.3317259
2040	Annual	Mon-Sun	2270002045	Cranes	D	175	Construction	U	P	NHH	P	Sacrament	SV	SAC	2.64E+01	9.23E+01	3.37E+02	1.29E-03	2.19E-02	2.42E-03	3.70E+00	4.17E-05	1.05E-04	0.00E+00	1.16E-04	1236.208643
2040	Annual	Mon-Sun	2270002045	Cranes	D	250	Construction	U	N	NHH	P	Sacrament	SV	SAC	5.11E+01	1.79E+02	9.06E+02	3.44E-03	2.02E-02	6.08E-03	1.00E+01	1.13E-04	2.34E-04	0.00E+00	3.10E-04	3344.654124
2040	Annual	Mon-Sun	2270002045	Cranes	D	500	Construction	U	N	NHH	P	Sacrament	SV	SAC	1.87E+01	6.55E+01	5.33E+02	2.02E-03	1.13E-02	3.53E-03	5.90E+00	5.79E-05	1.37E-04	0.00E+00	1.83E-04	1968.526137
2040	Annual	Mon-Sun	2270002045	Cranes	D	750	Construction	U	N	NHH	P	Sacrament	SV	SAC	3.36E+00	1.18E+01	1.61E+02	6.11E-04	3.41E-03	1.07E-03	1.78E+00	1.79E-05	4.15E-05	0.00E+00	5.52E-05	594.7478001
2040	Annual	Mon-Sun	2270002045	Cranes	D	9999	Construction	U	N	NHH	P	Sacrament	SV	SAC	4.22E+00	1.48E+01	6.48E+02	2.50E-03	1.37E-02	3.19E-02	7.16E+00	7.20E-05	3.47E-04	0.00E+00	2.26E-04	2391.260937
2040	Annual	Mon-Sun	2270002048	Graders	D	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	9.89E-01	2.54E+00	3.20E+00	3.47E-05	3.17E-04	2.03E-04	3.49E-02	4.52E-07	1.65E-06	0.00E+00	3.13E-06	11.84157826
2040	Annual	Mon-Sun	2270002048	Graders	D	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	6.60E+01	1.69E+02	5.78E+02	3.11E-03	4.20E-02	1.74E-02	6.34E+00	7.44E-05	2.77E-04	0.00E+00	2.81E-04	2125.386904
2040	Annual	Mon-Sun	2270002048	Graders	D	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.25E+02	5.79E+02	3.26E+03	1.22E-02	2.10E-01	2.40E-02	3.58E+01	4.03E-04	1.09E-03	0.00E+00	1.10E-03	11960.74824
2040	Annual	Mon-Sun	2270002048	Graders	D	250	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.40E+02	3.59E+02	2.79E+03	1.03E-02	6.16E-02	1.96E-02	3.09E+01	3.47E-04	7.34E-04	0.00E+00	9.27E-04	10305.90841
2040	Annual	Mon-Sun	2270002048	Graders	D	500	Construction	U	N	NHH	NP	Sacrament	SV	SAC	3.96E+00	1.02E+01	1.05E+02	3.87E-04	2.21E-03	7.20E-04	1.16E+00	1.14E-05	2.75E-05	0.00E+00	3.49E-05	388.6347097
2040	Annual	Mon-Sun	2270002048	Graders	D	750	Construction	U	N	NHH	NP	Sacrament	SV	SAC	5.17E-02	1.33E-01	2.91E+00	1.07E-05	6.12E-05	2.01E-05	3.22E-02	3.24E-07	7.63E-07	0.00E+00	9.66E-07	10.75328479
2040	Annual	Mon-Sun	2270002051	Off-Highwa	D	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	4.59E+00	2.48E+01	1.41E+02	5.61E-04	9.35E-03	8.69E-04	1.55E+00	1.74E-05	3.74E-05	0.00E+00	5.07E-05	517.8655096
2040	Annual	Mon-Sun	2270002051	Off-Highwa	D	250	Construction	U	N	NHH	NP	Sacrament	SV	SAC	3.39E+01	1.83E+02	1.38E+03	5.49E-03	3.13E-02	8.21E-03	1.52E+01	1.72E-04	3.25E-04	0.00E+00	4.95E-04	5091.470665
2040	Annual	Mon-Sun	2270002051	Off-Highwa	D	500	Construction	U	N	NHH	NP	Sacrament	SV	SAC	4.78E+01	2.58E+02	3.18E+03	1.26E-02	6.83E-02	1.89E-02	3.51E+01	3.45E-04	7.49E-04	0.00E+00	1.14E-03	11725.13085
2040	Annual	Mon-Sun	2270002051	Off-Highwa	D	750	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.08E+01	5.86E+01	1.17E+03	4.66E-03	2.51E-02	6.96E-03	1.29E+01	1.30E-04	2.76E-04	0.00E+00	4.20E-04	4318.153312
2040	Annual	Mon-Sun	2270002051	Off-Highwa	D	1000	Construction	U	N	NHH	NP	Sacrament	SV	SAC	5.09E+00	2.75E+01	7.75E+02	3.09E-03	1.67E-02	3.82E-02	8.57E+00	8.61E-05	3.99E-04	0.00E+00	2.79E-04	2861.304718
2040	Annual	Mon-Sun	2270002054	Crushing/P	D	50	Construction	U	P	NHH	P	Sacrament	SV	SAC	1.13E+01	2.96E+01	5.96E+01	5.60E-04	5.54E-03	3.66E-03	6.51E-01	8.41E-06	1.99E-05	0.00E+00	5.05E-05	219.9670997
2040	Annual	Mon-Sun	2270002054	Crushing/P	D	120	Construction	U	P	NHH	P	Sacrament	SV	SAC	3.19E+01	8.34E+01	3.16E+02	1.50E-03	2.24E-02	9.01E-03	3.47E+00	4.07E-05	9.75E-05	0.00E+00	1.35E-04	1159.438173
2040	Annual	Mon-Sun	2270002054	Crushing/P	D	175	Construction	U	P	NHH	P	Sacrament	SV	SAC	1.35E+01	3.53E+01	2.69E+02	8.84E-04	1.69E-02	1.59E-03	2.95E+00	3.32E-05	6.35E-05	0.00E+00	7.97E-05	984.7185919
2040	Annual	Mon-Sun	2270002054	Crushing/P	D	250	Construction	U	N	NHH	P	Sacrament	SV	SAC	1.34E+00	3.52E+00	3.88E+01	1.28E-04	8.36E-04	2.21E-04	4.29E-01	4.83E-06	8.37E-06	0.00E+00	1.15E-05	143.2036402
2040	Annual	Mon-Sun	2270002054	Crushing/P	D	500	Construction	U	N	NHH	P	Sacrament	SV	SAC	7.56E+00	1.98E+01	3.34E+02	1.10E-03	6.89E-03	1.90E-03	3.70E+00	3.63E-05	7.20E-05	0.00E+00	9.91E-05	1232.275096
2040	Annual	Mon-Sun	2270002054	Crushing/P	D	750	Construction	U	N	NHH	P	Sacrament	SV	SAC	8.62E-02	2.26E-01	6.00E+00	1.97E-05	1.24E-04	3.42E-05	6.64E-02	6.68E-07	1.29E-06	0.00E+00	1.78E-06	22.14333046
2040	Annual	Mon-Sun	2270002054	Crushing/P	D	9999	Construction	U	N	NHH	P	Sacrament	SV	SAC	8.62E-02	2.26E-01	1.33E+01	4.43E-05	2.75E-04	6.38E-04	1.47E-01	1.48E-06	6.27E-06	0.00E+00	4.00E-06	49.18241565
2040	Annual	Mon-Sun	2270002057	Rough Terr	D	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	7.84E+00	2.43E+01	3.76E+01	3.75E-04	3.62E-03	2.33E-03	4.10E-01	5.30E-06	1.28E-05	0.00E+00	3.39E-05	138.8264269
2040	Annual	Mon-Sun	2270002057	Rough Terr	D	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.76E+02	1.16E+03	3.30E+03	1.65E-02	2.37E-01	9.48E-02	3.62E+01	4.25E-04	1.05E-03	0.00E+00	1.49E-03	12131.40132
2040	Annual	Mon-Sun	2270002057	Rough Terr	D	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	4.81E+01	1.49E+02	8.45E+02	2.92E-03	5.38E-02	4.96E-03	9.29E+00	1.04E-04	2.03E-04	0.00E+00	2.63E-04	3097.777835
2040	Annual	Mon-Sun	2270002057	Rough Terr	D	250	Construction	U	N	NHH	NP	Sacrament	SV	SAC	2.68E+00	8.30E+00	6.41E+01	2.22E-04	1.40E-03	3.65E-04	7.09E-01	7.97E-06	1.41E-05	0.00E+00	2.00E-05	236.3675635
2040	Annual	Mon-Sun	2270002057	Rough Terr	D	500	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.77E+00	5.46E+00	6.33E+01	2.19E-04	1.32E-03	3.61E-04	7.00E-01	6.87E-06	1.39E-05	0.00E+00	1.98E-05	233.6000006
2040	Annual	Mon-Sun	2270002060	Rubber Tire	D	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	9.89E-01	2.60E+00	2.00E+00	2.65E-05	9.04E-05	1.67E-04	2.20E-02	2.79E-07	6.25E-06	0.00E+00	2.39E-06	7.47846168
2040	Annual	Mon-Sun	2270002060	Rubber Tire	D	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.92E+01	5.08E+01	7.24E+01	7.58E-04	7.09E-03	4.56E-03	7.90E-01	1.02E-05	3.45E-05	0.00E+00	6.84E-05	267.4997554
2040	Annual	Mon-Sun	2270002060	Rubber Tire	D	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	5.22E+02	1.38E+03	3.70E+03	1.94E-02	2.68E-01	1.10E-01	4.06E+01	4.76E-04	1.62E-03	0.00E+00	1.75E-03	13599.92682
2040	Annual	Mon-Sun	2270002060	Rubber Tire	D	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.94E+02	7.78E+02	3.76E+03	1.37E-02	2.41E-01	2.66E-02	4.13E+01	4.65E-04	1.17E-03	0.00E+00	1.24E-03	13784.93685
2040	Annual	Mon-Sun	2270002060	Rubber Tire	D	250	Construction	U	N	NHH	NP	Sacrament	SV	SAC	2.93E+02	7.73E+02	5.21E+03	1.88E-02	1.14E-01	3.51E-02	5.76E+01	6.48E-04	1.33E-03	0.00E+00	1.70E-03	19207.48208
2040	Annual	Mon-Sun	2270002060	Rubber Tire	D	500	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.22E+02	3.22E+02	3.45E+03	1.24E-02	7.22E-02	2.27E-02	3.81E+01	3.74E-04	8.74E-04	0.00E+00	1.12E-03	12716.77121
2040	Annual	Mon-Sun	2270002060	Rubber Tire	D	750	Construction	U	N	NHH	NP	Sacrament	SV	SAC	2.09E+00	5.51E+00	1.21E+02	4.37E-04	2.53E-03	8.01E-04	1.34E+00	1.34E-05	3.07E-05	0.00E+00	3.94E-05	445.9000699
2040	Annual	Mon-Sun	2270002060	Rubber Tire	D	1000	Construction	U	N	NHH	NP	Sacrament	SV	SAC	2.24E-01	5.91E-01	1.59E+01	5.75E-05	3.32E-04	7.79E-04	1.75E-01	1.76E-06	8.27E-06	0.00E+00	5.19E-06	58.54034255
2040	Annual	Mon-Sun	2270002063	Rubber Tire	D	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	7.07E-01	3.11E+00	1.83E+01	9.74E-05	1.23E-03	3.20E-04	2.01E-01	2.26E-06	1.63E-05	0.00E+00	8.79E-06	67.32709509
2040	Annual	Mon-Sun	2270002063	Rubber Tire	D	250	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.73E+01	7.61E+01	6.32E+02	3.12E-03	1.51E-02	9.97E-03	6.98E+00	7.85E-05	3.83E-04	0.00E+00	2.81E-04	2335.497185
2040	Annual	Mon-Sun	2270002063	Rubber Tire	D	500	Construction	U	N	NHH	NP	Sacrament	SV	SAC	2.66E+01	1.17E+02	1.40E+03	6.81E-03	3.27E-02	2.07E-02	1.55E+01	1.52E-04	8.05E-04	0.00E+00	6.15E-04	5186.98369
2040	Annual	Mon-Sun	2270002063	Rubber Tire	D	750	Construction	U	N	NHH	NP	Sacrament	SV	SAC	2.29E+00	1.01E+01	1.82E+02	8.84E-04	4.24E-03	2.72E-03	2.01E+00	2.02E-05	1.05E-04	0.00E+00	7.98E-05	672.2766646
2040	Annual	Mon-Sun	2270002063	Rubber Tire	D	1000	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.55E-01	6.82E-01	1.82E+01	9.04E-05	4.32E-04	1.03E-03	2.02E-01	2.03E-06	1.62E-05	0.00E+00	8.16E-06	67.46759438
2040	Annual	Mon-Sun	2270002066	Tractors/Lc	D	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.99E+01	5.15E+01	3.71E+01	4.92E-04	1.68E-03	3.11E-03	4.08E-01	5.17E-06	1.16E-04	0.00E+00	4.44E-05	138.9405847
2040	Annual	Mon-Sun	2270002066	Tractors/Lc	D	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.19E+02	3.10E+02	4.31E+02	4.21E-03	4.10E-02	2.67E-02	4.71E+00	6.08E-05	1.51E-04	0.00E+00	3.80E-04	1591.766336
2040	Annual	Mon-Sun	2270002066	Tractors/Lc	D	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.59E+03	4.15E+03	9.78E+03	4.80E-02	6.99E-01	2.80E-01	1.07E+02	1.26E-03	3.18E-03	0.00E+00	4.33E-03	35911.05671
2040	Annual	Mon-Sun	2270002066	Tractors/Lc	D	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.19E+02	3.10E+02	1.43E+03	4.85E-03	9.05E-02	8.44E-03	1.57E+01	1.77E-04	3.54E-04	0.00E+00	4.38E-04	5235.665104
2040	Annual	Mon-Sun	2270002066	Tractors/Lc	D	250	Construction	U	N	NHH	NP	Sacrament	SV	SAC	3.84E+01	1.00E+02	7.78E+02	2.65E-03	1.69E-02	4.50E-03	8.60E+00	9.68E-05	1.74E-04	0.00E+00	2.39E-04	2868.226616
2040	Annual	Mon-Sun	2270002066	Tractors/Lc	D	500	Construction	U	N	NHH	NP	Sacrament	SV	SAC	6.20E+01	1.62E+02	2.52E+03	8.58E-03	5.23E-02	1.46E-02	2.79E+01	3.14E-04	5.64E-04	0.00E+00	7.74E-04	9295.646893
2040	Annual	Mon-Sun	2270002066	Tractors/Lc	D	750	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.04E+01	2.72E+01	6.36E+02	2.16E-03	1.32E-02	3.67E-03	7.03E+00	7.91E-05	1.42E-04	0.00E+00	1.95E-04	2344.469845
2040	Annual	Mon-Sun	2270002069	Crawler Tra	D	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	9.89E-01	2.78E+00	3.17E+00	3.97E-05	3.31E-04	2.08E-04	3.45E-02	4.47E-07	2.60E-06	0.00E+00	3.59E-06	11.75461223
2040	Annual	Mon-Sun	2270002069	Crawler Tra	D	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	5.61E+02	1.58E+03	4.73E+03	2.89E-02	3.50E-01	1.56E-01	5.18E+01	6.08E-04	3.58E-03	0.00E+00	2.61E-03	17397.62358
2040	Annual	Mon-Sun	2270002069	Crawler Tra	D	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.90E+02	5.34E+02	2.94E+03	1.26E-02	1.93E-01	3.07E-02	3.23E+01	3.64E-04	1.45E-03	0.00E+00	1.14E-03	10798.86593
2040	Annual	Mon-Sun	2270002069	Crawler Tra	D	250	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.63E+02	4.59E+02	3.44E+03	1.42E-02	7.82E-02	3.30E-02	3.81E+01	4.28E-04	1.25E-03	0.00E+00	1.28E-03	12716.65374
2040	Annual	Mon-Sun	2270002069	Crawler Tra	D	500	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.12E+02	3.14E+02	3.68E+03	1.51E-02	7.97E-02	3.38E-02	4.07E+01	4.00E-04	1.29E-03	0.00E+00	1.36E-03	13597.197
2040	Annual	Mon-Sun	2270002069	Crawler Tra	D	750	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.38E+00	3.88E+00	8.14E+01	3.34E-04	1.76E-03	7.53E-04	9.00E-01	9.05E-06	2.87E-05	0.00E+00	3.01E-05	300.5724645
2040	Annual	Mon-Sun	2270002069	Crawler Tra	D	1000	Construction	U	N	NHH	NP	Sacrament	SV	SAC	1.38E+00	3.87E+00	1.15E+02	4.78E-04	2.51E-03	5.94E-03	1.27E+00	1.28E-05	7.37E-05	0.00E+00	4.31E-05	425.3011082
2040	Annual	Mon-Sun	2270002072	Skid Steer L	D	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.36E+02	3.10E+02	1.95E+02	2.58E-03	8.80E-03	1.63E-02	2.14E+00	2.71E-05	6.09E-04	0.00E+00	2.33E-04	728.280246
2040	Annual	Mon-Sun	2270002072	Skid Steer L	D	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.23E+03	2.85E+03	3.32E+03	2.63E-02	2.81E-01	1.98E-01	3.63E+01	4.70E-04	9.41E-04	0.00E+00	2.38E-03	12237.48697
2040	Annual	Mon-Sun	2270002072	Skid Steer L	D	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	6.45E+02	1.49E+03	2.90E+03	1.18E-02	1.99E-01	8.06E-02	3.19E+01	3.74E-04	7.80E-04	0.00E+00	1.07E-03	10655.39933
2040	Annual	Mon-Sun	2270002075	Off-Highwa	D	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	7.07E-02	2.13E-01	9.11E-01	6.37E-06	6.81E-05	3.47E-05	9.98E-03	1.17E-07	1.18E-06	0.00E+00	5.75E-07	3.356345873
2040	Annual	Mon-Sun	2270002075	Off-Highwa	D	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	8.64E+01	2.61E+02	1.55E+03	7.69E-03	1.02E-01	2.50E-02	1.70E+01	1.91E-04	1.26E-03	0.00E+00	6.94E-04	5686.117509
2040	Annual	Mon-Sun	2270002075	Off-Highwa	D	250	Construction	U	N	NHH	NP	Sacrament	SV	SAC	8.17E+01	2.46E+02	1.45E+03	6.71E-03	3.39E-02	2.12E-02	1.61E+01	1.81E-04	8.04E-04	0.00E+00	6.05E-04	5370.161547
2040	Annual	Mon-Sun	2270002075	Off-Highwa	D	750	Construction	U	N	NHH	NP	Sacrament	SV	SAC	8.65E+00	2.61E+01	6.71E+02	3.06E-03	1.52E-02	9.28E-03	7.41E+00	7.45E-05	3.55E-04	0.00E+00	2.76E-04	2478.575217
2040	Annual	Mon-Sun	2270002075	Off-Highwa	D	1000	Construction	U	N	NHH	NP	Sacrament	SV	SAC	9.14E-01	2.75E+00	1.01E+02	4.71E-04	2.33E-03	5.61E-03	1.12E+00	1.13E-05	8.42E-05	0.00E+00	4.25E-05	374.7628409

2040	Annual	Mon-Sun	2270002078	Dumpers/T	D	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.70E+00	3.08E+00	1.07E+00	1.41E-05	4.83E-05	8.94E-05	1.17E-02	1.49E-07	3.34E-06	0.00E+00	1.28E-06	3.994029352
2040	Annual	Mon-Sun	2270002081	Other Cons	D	15	Construction	U	P	NHH	NP	Sacrament	SV	SAC	2.34E+01	4.42E+01	2.04E+01	2.60E-04	1.36E-03	1.63E-03	2.23E-01	3.48E-06	6.36E-05	0.00E+00	2.35E-05	76.03670128
2040	Annual	Mon-Sun	2270002081	Other Cons	D	25	Construction	U	P	NHH	NP	Sacrament	SV	SAC	3.96E+00	7.49E+00	4.50E+00	5.96E-05	2.04E-04	3.77E-04	4.94E-02	6.27E-07	1.41E-05	0.00E+00	5.38E-06	16.83899647
2040	Annual	Mon-Sun	2270002081	Other Cons	D	50	Construction	U	P	NHH	NP	Sacrament	SV	SAC	6.08E+00	1.16E+01	1.48E+01	1.17E-04	1.25E-03	8.84E-04	1.62E-01	2.10E-06	4.35E-06	0.00E+00	1.05E-05	54.63790902
2040	Annual	Mon-Sun	2270002081	Other Cons	D	120	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.00E+01	1.92E+01	7.05E+01	2.87E-04	4.82E-03	1.96E-03	7.74E-01	9.08E-06	1.94E-05	0.00E+00	2.59E-05	258.4825816
2040	Annual	Mon-Sun	2270002081	Other Cons	D	175	Construction	U	P	NHH	NP	Sacrament	SV	SAC	1.38E+01	2.64E+01	1.28E+02	3.61E-04	7.75E-03	7.19E-04	1.41E+00	1.58E-05	2.81E-05	0.00E+00	3.26E-05	468.7191919
2040	Annual	Mon-Sun	2270002081	Other Cons	D	500	Construction	U	N	NHH	NP	Sacrament	SV	SAC	3.21E+01	6.14E+01	7.05E+02	1.99E-03	1.41E-02	3.88E-03	7.80E+00	7.65E-05	1.44E-04	0.00E+00	1.80E-04	2597.066805
2040	Annual	Mon-Sun	2270004030	Leaf Blowe	D	15	Lawn and Ga	U	N	NHH	P	Sacrament	SV	SAC	4.87E-01	1.60E-01	2.20E-02	2.49E-07	1.47E-06	1.75E-06	2.41E-04	3.74E-09	6.85E-08	0.00E+00	2.25E-08	0.081625165
2040	Annual	Mon-Sun	2270004030	Leaf Blowe	D	120	Lawn and Ga	U	N	NHH	P	Sacrament	SV	SAC	4.26E-01	1.40E-01	3.09E-01	6.46E-07	1.88E-05	8.14E-06	3.40E-03	3.99E-08	6.02E-08	0.00E+00	5.83E-08	1.131830156
2040	Annual	Mon-Sun	2270004030	Leaf Blowe	D	250	Lawn and Ga	U	N	NHH	P	Sacrament	SV	SAC	1.22E-01	4.00E-02	1.81E-01	2.68E-07	3.34E-06	9.46E-07	2.00E-03	2.26E-08	3.16E-08	0.00E+00	2.42E-08	0.665876643
2040	Annual	Mon-Sun	2270004055	Lawn & Ga	D	15	Lawn and Ga	U	N	NHH	NP	Sacrament	SV	SAC	1.17E+03	1.75E+03	7.42E+02	8.43E-03	4.96E-02	5.92E-02	8.13E+00	1.26E-04	2.31E-03	0.00E+00	7.60E-04	2757.09015
2040	Annual	Mon-Sun	2270004055	Lawn & Ga	D	25	Lawn and Ga	U	N	NHH	NP	Sacrament	SV	SAC	9.19E+02	1.37E+03	8.91E+02	1.18E-02	4.03E-02	7.46E-02	9.78E+00	1.24E-04	2.79E-03	0.00E+00	1.06E-03	3332.016221
2040	Annual	Mon-Sun	2270004065	Chippers/S	D	25	Lawn and Ga	U	P	NHH	P	Sacrament	SV	SAC	5.48E-01	6.97E-01	6.39E-01	8.47E-06	2.89E-05	5.35E-05	7.02E-03	8.90E-08	2.00E-06	0.00E+00	7.64E-07	2.390534142
2040	Annual	Mon-Sun	2270004065	Chippers/S	D	120	Lawn and Ga	U	P	NHH	P	Sacrament	SV	SAC	1.51E+01	1.92E+01	6.64E+01	2.24E-04	4.36E-03	1.82E-03	7.29E-01	8.56E-06	1.67E-05	0.00E+00	2.02E-05	243.3274374
2040	Annual	Mon-Sun	2270004065	Chippers/S	D	175	Lawn and Ga	U	P	NHH	P	Sacrament	SV	SAC	1.03E+00	1.32E+00	7.88E+00	1.87E-05	4.59E-04	4.48E-05	8.68E-02	9.76E-07	1.65E-06	0.00E+00	1.69E-06	28.87492328
2040	Annual	Mon-Sun	2270004065	Chippers/S	D	250	Lawn and Ga	U	N	NHH	P	Sacrament	SV	SAC	2.43E-01	3.10E-01	3.11E+00	7.35E-06	6.21E-05	1.70E-05	3.44E-02	3.88E-07	6.07E-07	0.00E+00	6.63E-07	11.46448697
2040	Annual	Mon-Sun	2270004065	Chippers/S	D	500	Lawn and Ga	U	N	NHH	P	Sacrament	SV	SAC	2.25E+00	2.87E+00	3.20E+01	7.55E-05	6.22E-04	1.75E-04	3.54E-01	3.48E-06	6.24E-06	0.00E+00	6.81E-06	117.8294706
2040	Annual	Mon-Sun	2270004065	Chippers/S	D	750	Lawn and Ga	U	N	NHH	P	Sacrament	SV	SAC	2.56E+00	3.25E+00	8.74E+01	2.06E-04	1.70E-03	4.77E-04	9.68E-01	9.73E-06	1.70E-05	0.00E+00	1.86E-05	321.99648
2040	Annual	Mon-Sun	2270004065	Chippers/S	D	1000	Lawn and Ga	U	N	NHH	P	Sacrament	SV	SAC	4.87E+00	6.19E+00	2.37E+02	5.60E-04	4.60E-03	1.09E-02	2.62E+00	2.63E-05	9.79E-05	0.00E+00	5.06E-05	871.95217
2040	Annual	Mon-Sun	2270004070	Commercia	D	15	Lawn and Ga	U	N	NHH	NP	Sacrament	SV	SAC	2.96E+01	8.65E+01	3.81E+01	4.33E-04	2.55E-03	3.04E-03	4.17E-01	6.49E-06	1.19E-04	0.00E+00	3.90E-05	141.592382
2040	Annual	Mon-Sun	2270004070	Commercia	D	25	Lawn and Ga	U	N	NHH	NP	Sacrament	SV	SAC	5.56E+02	1.63E+03	1.07E+03	1.42E-02	4.84E-02	8.97E-02	1.18E+01	1.49E-04	3.35E-03	0.00E+00	1.28E-03	4007.887962
2040	Annual	Mon-Sun	2270004075	Other Lawr	D	15	Lawn and Ga	U	N	NHH	NP	Sacrament	SV	SAC	4.26E-01	5.05E-01	2.82E-01	3.20E-06	1.88E-05	2.25E-05	3.09E-03	4.80E-08	8.79E-07	0.00E+00	2.89E-07	1.04696504
2040	Annual	Mon-Sun	2270004075	Other Lawr	D	25	Lawn and Ga	U	N	NHH	NP	Sacrament	SV	SAC	6.08E-02	7.22E-02	5.35E-02	7.09E-07	2.42E-06	4.48E-06	5.88E-04	7.46E-09	1.67E-07	0.00E+00	6.40E-08	0.200209683

Attachment 2

GHG Reduction Measures

Measure Number	Measure Name	GHG Reductions (MTCO2e/year) 2020	2030	2050
BE-1	Promote energy conservation	1,876	4,340	11,393
BE-2	Building Stock: Residential Appliances in Existing Development	4,487	10,134	19,250
BE-3	Building Stock: Nonresidential Appliances in Existing Development	912	2,116	5,642
BE-4	CALGreen Tier 1 - New Construction	1,174	9,244	25,574
BE-5	Zero Net Energy - New Construction	-	29,930	163,902
BE-6	CALGreen Tier 1 - Existing Buildings	3,972	8,511	34,043
BE-7	Solar PV in All Residential and Commercial Development	5,488	13,459	44,544
BE-8	SMUD Offset Program for Electricity Use	12,193	19,846	33,167
BE-9	Increase Tree Planting	620	1,505	3,275
RC-1	Waste Reduction	5,272	10,169	16,957
RC-2	Composting	3,208	6,791	9,713
TACM-1	Local Goods	4,388	7,008	9,935
TACM-2	Transit Oriented Development	3,189	6,963	14,613
TACM-3	Intra-City Transportation Demand Management	5,485	9,344	24,838
TACM-4	Pedestrian & Bicycle Travel	3,299	4,265	5,533
TACM-5	Affordable Housing	12,028	16,018	21,193
TACM-6	Vehicle Miles Traveled Limits	26,526	18,539	24,525
TACM-7	Traffic Calming Measures	274	292	828
TACM-8	Tier 4 Final Construction Equipment	-	644	892
TACM-9	Electric Vehicle Charging Stations	316	794	689
	Total	**94,710**	**179,913**	**470,508**
	Target Reduction	(381,953)	84,368	846,264
		(476,663)	(95,545)	375,756

BE-1.	BE-1.	Promote energy conservation
BE-1.	Reduction Measure:	Promote energy conservation by residents and businesses in existing structures in close coordination with other agencies and local energy providers, including the Sacramento Municipal Utility District (SMUD) and Pacific Gas and Electric (PG&E).
BE-1.	Location in GPU	NR-6-1
BE-1.	Action Items:	• Work closely with SMUD, PG&E, and other private partners to support widespread social marketing and prepare tools to encourage conservation and greater efficiency in energy behaviors. • Partner with the Elk Grove Chamber of Commerce, and utility providers to launch an energy efficiency program for local businesses that promotes cost-effective business behaviors. • Support PG&E and SMUD in-home monitoring program participation through smart grid programs and advocate for pilot neighborhood competitions throughout Elk Grove. • Leverage resources from PG&E and SMUD to support enhanced local education to local businesses on the nonresidential energy use disclosure program (AB 1103) and programs for energy monitoring, such as the Energy Star Portfolio Manager. • Provide educational materials to encourage participation in energy monitoring programs at large multi-tenant commercial developments through SMUD and PG&E programs or via the Energy Start Portfolio Manager.
BE-1.	2020 Reductions (MTCO2e):	1,876
BE-1.	2030 Reductions (MTCO2e):	4,340
BE-1.	2050 Reductions (MTCO2e)	11,393
BE-1.	Target Indicators	15% household and business participation in conservation programs, and 15% household participation in monitoring programs that are supported by the smart grid.
BE-1.	Methodology and Sources:	Based on a 2011 Residential Behavior Profile and findings for the Sacramento identified by ICF, assumed participation rates in outreach programs and in-home monitoring programs calculated for existing households. Energy reductions based on case studies and SMUD reports on smart grid efficacy. ICF GHG Reduction Measure Analysis for SMUD. April 2011. Bonneville Power Administration (BPA). 2011. Residential Behavior Based Energy Efficiency Program Profiles 2011. http://www.bpa.gov/Energy/n/pdf/BBEE_Res_Profiles_Dec_2011.pdf SMUD Smart Grid Activities 2010 Presentation

Energy/GHG Summary

	2020	2030	2050
Residential energy Savings (kWh)	3,538,576	9,436,201	24,770,029
Residential energy Savings (Therms)	166,586	444,228	1,166,099
Nonresidential energy Savings (kWh)	536,061	1,429,496	3,752,426
Nonresidential energy Savings (Therms)	1,184	3,156	8,285
Residential Electricity Emissions Reduction (MTCO2e)	853.65	1,701.38	4,466.12
Residential natural gas emissions reduction (MTCO2e)	886.65	2,364.40	6,206.55
Nonresidential electricity emissions reduction (MTCO2e)	129.32	257.74	676.57
Nonresidential natural gas emissions reduction (MTCO2e)	6.30	16.80	44.10
Residential Total (MTCO2e)	1,740.30	4,065.78	10,672.67
Nonresidential Total (MTCO2e)	135.62	274.54	720.67
Electricity Emissions Reduction (MTCO2e)	**983**	**1,959**	**5,143**
Natural Gas Emissions Reduction (MTCO2e)	**893**	**2,381**	**6,251**

Assumptions

	2020	2030	2050
Target DU participation rate in outreach programs	15%	25%	35%
Target DU participation rate in monitoring programs	15%	25%	35%
Target businesses participation rate in outreach programs	15%	25%	35%

Implementation

	2020	2030	2050
Outreach - reduction per DU (kWh)	89	89	89
Outreach - reduction per DU (therms)	4	4	4
Outreach - number of DU	52,783	52,783	52,783
Monitoring - reduction per DU (kWh)	358	358	358
Monitoring - reduction per DU (therms)	17	17	17
Monitoring - number of DU	52,783	52,783	52,783
Outreach - reduction per business (kWh)	410	410	410
Outreach - reduction per business (therms)	9	9	9
Outreach - number of businesses	8,710	8,710	8,710

Workspace

RESIDENTIAL QUANTIFICATION

		2013
Baseline	Residential electricity use (kWh)	471,810,070
	Residential natural gas use (therms)	22,211,400
	Number of DU	52,783
	kWh/DU	8,939
	Therms/DU	421

		2020	2030	2050
Participation	Target household participation rate in outreach programs	15%	25%	35%
	Target household participation rate in monitoring programs	15%	25%	35%

		2020	2030	2050	
Assumed Savings per Participant	Percent savings per DU from aggressive outreach	1%	1%	1%	< BPA
	Percent savings per DU from in-home monitoring	4%	4%	4%	< SMUD source (energy savings only, transmission credited elsewhere)

		2020	2030	2050
Per Household Savings	OUTREACH - Electricity Savings per DU (kWh)	89.39	89.39	89.39
	OUTREACH - Natural Gas Savings per DU (therms)	4.21	4.21	4.21
	MONITORING - Electricity Savings per DU (kWh)	357.55	357.55	357.55
	MONITORING - Natural Gas Savings per DU (therms)	16.83	16.83	16.83

2020	2030	2050

Total Savings	OUTREACH - subtotal electricity savings (kWh)	707,715	1,179,525	1,651,335
	OUTREACH - subtotal natural gas savings (therms)	33,317	55,529	77,740
	MONITORING - subtotal electricity savings (kWh)	2,830,860	4,718,101	6,605,341
	MONITORING - subtotal natural gas savings (therms)	133,268	222,114	310,960
	TOTAL ELECTRICITY SAVINGS per year (kWh)	**3,538,576**	**5,897,626**	**8,256,676**
	TOTAL ELECTRICITY SAVINGS cumulative (kWh)	**3,538,576**	**9,436,201**	**24,770,029**
	TOTAL NATURAL GAS SAVINGS PER YEAR (therms)	**166,586**	**277,643**	**388,700**
	TOTAL NATURAL GAS SAVINGS CUMULATIVE (therms)	**166,586**	**444,228**	**1,166,099**

NONRESIDENTIAL QUANTIFICATION

		2013	
Baseline	Nonresidential electricity use (kWh)	357,373,889	
	Nonresidential natural gas use (therms)	7,736,910	
	Number of businesses	8,710	< 2013 estimate from Elk Grove Jobs Report from City, 2013
	kWh/business	41,030	
	Therms/business	888	

		2020	2030	2050
Participation	OUTREACH - Electricity Savings per business (kWh)	15%	25%	35%
	OUTREACH - Natural Gas Savings per business (therms)	15%	25%	35%

		2020	2030	2050
Assumed Savings per Participant	Percent savings per business from aggressive outreach	1%	1%	1%

		2020	2030	2050
Per Business Savings	OUTREACH - Electricity Savings per business (kWh)	410.30	410.30	410.30
	OUTREACH - Natural Gas Savings per business (therms)	8.88	8.88	8.88

		2020	2030	2050
Total Savings	Total electricity savings per year (kWh)	536,061	893,435	1,250,809
	Total electricity savings cumulative (kWh)	536,061	1,429,496	3,752,426
	Total natural gas savings per year (therms)	1,184	1,973	2,762
	Total natural gas savings cumulative (therms)	1,184	3,156	8,285

BE-2.	BE-2.	**Building Stock: Residential Appliances in Existing Development**
BE-2.	Reduction Measure:	Support residential upgrades to more energy-efficient, cost-saving appliances for existing homes, leveraging regional and state resources to target indoor and outdoor appliances and equipment in existing homes.
BE-2.	Location in GPU	Policy NR-6-2
BE-2.	Action Items:	• Educate City residents about rebate offerings for appliances and equipment for Energy Star and other qualified appliances, including those offered by utility providers, the California Energy Commission, and the Sacramento Metropolitan Air Quality Management District. • Work with SMUD and Sacramento County to conduct targeted mailings to homeowners with pools to promote financial incentives for upgrades of residential pool pumps to more efficient, variable-speed pumps. Pool owners will be identified with County assessors parcel data and GIS files. • Identify opportunities to partner with other Sacramento communities to pursue bulk procurement of discounted variable-speed pool pumps in order to offer efficient pumps at affordable rates to residents. • Promote free utility assessments of appliances and heating, ventilation, and air conditioning units in partnership with SMUD and PG&E. Opportunities likely exist in the community's older suburbs, and City staff may leverage efforts with existing resources, such as the City's Home Repair and Rehabilitation Program. • Partner with SMUD to promote SMUD's multi-family prescriptive rebates for multi-family improvements to appliances, lighting, and other equipment upgrades.
BE-2.	2020 Reductions (MTCO2e):	4,487
BE-2.	2030 Reductions (MTCO2e):	10,134
BE-2.	2050 Reductions (MTCO2e)	19,250
BE-2.	Target indicators:	10% single-family household participation in energy efficient appliance programs 5% multi-family household participation in energy efficient appliance programs 10% of single-family households to install in solar hot water heaters 5% of multi-family households to install solar hot water heaters 15% of single-family households to upgrade pool pumps 5% of multi-family developments to upgrade pool pumps
BE-2.	Methodology and Sources:	Calculation assesses impact of appliance upgrades for existing development only. Reductions for each category of appliance upgrades were calculated using single-family and multi-family household electricity from CAPCOA Table BE 4-2 for climate zone 12 and applied to baseline electricity usage per household to render reductions by household. A target utilization rate of 50% was applied to all participating household and total reductions to reflect the likelihood that not all appliances, internal to the CAPCOA assumption, will be retrofitted in the participating homes. Solar hot water heater reductions calculated based on the amount of natural gas offset on average in comparison to conventional water heaters in climate zone 12. Pool pump savings calculated using the 2010 Residential Appliance Saturation Study, assuming the average amount of electricity used per household on pool pumps. Usage data for PG&E service territory was used, usage data was not available to unavailability of SMUD territory or climate zone 12 information. as the use is not climate dependent, so usage in PG&E's service territory was used as a proxy. Information provided by the City of Elk Grove was used to calculate the average annual number of pool permits issued since incorporation. This estimate of the number of pools was combined with the target participation rates and the CEC source below for reductions from retrofitting a conventional pump to a variable speed drive pool pump. CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. http://capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf. California Energy Commission (2007). Draft Residential Swimming Pool Report. http://www.energy.ca.gov/title24/2008standards/prerulemaking/documents/2007-02-26-27_workshop/supporting/PGE-DRAFT_REPORT_RESIDENTIAL_SWIMMING_POOL.PDF

Energy/GHG Summary

	2020	2030	2050
Residential energy Savings (kWh)	1,629,704	3,909,321	7,756,409
Residential energy Savings (Therms)	769,195	1,771,607	3,353,904
Nonresidential energy Savings (kWh)			
Nonresidential energy Savings (Therms)			
Electricity Emissions Reduction (MTCO2e)	**393**	**705**	**1,399**
Natural Gas Emissions Reduction (MTCO2e)	**4,094**	**9,429**	**17,851**

Assumptions

	2020	2030	2050	
Target single-family household participation rate in energy efficient appliance program (% of all homes)	10%	15%	25%	< % of all homes
Target multi-family household participation rate in energy efficient appliance program (% of all homes)	5%	10%	20%	< % of all homes
Appliance utilization rate	70%	70%	70%	

Target single-family household participation rate in solar hot water program (% of all homes)	10%	13%	20%	< % of all homes
Target multi-family household participation rate in solar hot water program (% of all homes)	5%	7%	15%	< % of all homes
Target single-family household participation rate in pool pump program (% of homes with pools)	15%	18%	30%	< % of homes with pools
Target multi-family household participation rate in pool pump program (% of homes with pools)	5%	6%	10%	< % of homes with pools

Implementation

	2020	2030	2050
1. APPLIANCES - reduction per SFH (kWh)	883,795	1,325,692	2,209,487
1. APPLIANCES - reduction per MFH (kWh)	74,191	148,382	296,765
1. APPLIANCES - number of SFH	4,708	7,062	11,771
1. APPLIANCES - number of MFH	285	570	1,140
2. SOLAR HOT WATER - reduction per household (therms)	154	154	154
2. SOLAR HOT WATER - number of SFH participants	4,708	6,121	9,416
2. SOLAR HOT WATER - number of SFH participants	285	399	855
3. POOLS - reduction per HH (kWh)	1,300	1,300	1,300
3. POOLS - number of SFH	500	600	1,000
3. POOLS - number of MFH	15	18	30

Energy Efficiency Appliances

		2013	
Baseline	Residential electricity use (kWh)	471,810,070	
	Residential natural gas use (therms)	22,211,400	
	Number of DU	52,783	
	kWh/DU	8,939	
	Therms/DU	421	
	Number of SFH	47,082	< Utilizes the percent of HH as SFH in 2013 using 2013 ACS
	Number of MFH	5,701	< Utilizes the percent of HH as MFH in 2013 using 2013 ACS

		2020	2030	2050	
Participation	Percent of Single Family Homes	10%	15%	25%	< Arbitrary
	NUMBER of SFHs	4,708	7,062	11,771	< Utilizes the percent of HH as SFH in 2020 using 2013 ACS
	Percent of Multi-Family Homes	5%	10%	20%	< Arbitrary
	NUMBER of MFHs	285	570	1,140	< Utilizes the percent of HH as MFH in 2020 using 2013 ACS

		Single Family	Multi Family	
Assumed % Savings	Total EnergyStar Savings (% total kWh reduction)	3.00%	4.16%	< CAPCOA Table BE 4-2. CZ 12
	Utilization rate	70.00%	70.00%	

		2020	2030	2050
Total Savings	APPLIANCE - kWh/SFH	883,795	1,325,692	2,209,487
	APPLIANCE - kWh/MFH	74,191	148,382	296,765
	TOTAL per year kWh	**957,986**	**1,474,074**	**2,506,251**
	TOTAL cumulative kWh	**957,986**	**2,432,060**	**4,938,311**

CAPCOA Table BE 4-2
Climate Zone 12

	Refrigerator	Clothes Washer	Dishwasher	Ceiling Fan	TOTAL
Multi-family	2.89%	0.03%	0.11%	1.13%	**4.16%**
Single-family	1.76%	0.51%	0.13%	0.60%	**3.00%**
Townhouse	2.53%	0.32%	0.13%	0.93%	

Solar Hot Water Heaters

		2013
	Residential electricity use (kWh)	471,810,070
	Residential natural gas use (therms)	22,211,400

Baseline	Number of DU	52,783
	kWh/DU	8,939
	Therms/DU	421
	Number of SFH	47,082 < Utilizes the percent of HH as SFH in 2013 using 2013 ACS
	Number of MFH	5,701 < Utilizes the percent of HH as MFH in 2013 using 2013 ACS

		2020	2030	2050
Participation	Percent of homes with conventional water heater	73%	73%	73%
	Percent of SFH participating	10%	13%	20%
	Percent of MFH participating	5%	7%	15%
	Number of SFH participating	4,708	6,121	9,416
	Number of MFH participating	285	399	855

		2020	2030	2050
Assumed % Savings	Average water heating therms per year	173	173	173
	Average energy produced by residential SHW system	130	130	130
	Percent of water heating therms offset with SHW system	75%	75%	75%
	CZ 12 therms per year from conventional water heater (therms)	205	205	205

California Solar Energy Industries Association. January 2009, The Value Proposition of Solar Water Heating in California. http://calseia.org/wp-content/uploads/2009/01/calseiareport_ swh-value-proposition1.pdf

		2020	2030	2050
Total Savings	Savings per participant (therms per home[SFH or MFH])	154	154	154
	SFH savings (Therms)	725,287	941,060	1,450,574
	MFH savings (Therms)	43,908	61,352	131,723
	TOTAL per year Therms	**769,195**	**1,002,413**	**1,582,297**
	TOTAL cumulative Therms	**769,195**	**1,771,607**	**3,353,904**

2010 California Residential Appliance Saturation Survey
http://www.energy.ca.gov/2010publications/CEC-200-2010-004/CEC-200-2010-004-V2.PDF

	Climate Zone 12			
	All Homes		Homes with gas data	
	UEC	Sat	UEC	Sat
All Household UEC	303	1098 homes	305	1035 homes
Primary Heat	85	87%	85	93%
Auxiliary Heat	31	0%	32	0%
Conventional Gas water heat	205	73%	205	78%
Dryer	25	51%	25	54%
Range/oven	35	82%	35	86%
Pool heater	246	6%	246	7%
Spa heater	60	6%	62	6%
misc.	25	12%	25	13%

Source:

Pool Pumps

		2013
Baseline	Residential electricity use (kWh)	471,810,070
	Residential natural gas use (therms)	22,211,400
	Number of DU	52,783
	kWh/DU	8,939
	Number of SFH	421
	Number of MFH	47,082
	Percent of homes that are SFH	89%
	Percent of homes that are MSFH	11%
	Number of pool permits issued July 2000 - Dec 21 2005	3,630
	SFH Pools	3,332
	MFH Pools	298

Table 2-27: Gas UECs for Forecast Zones 10-13

	Zone 10				Zone 11				Zone 12				Zone 13			
	All Homes		Homes w/Gas Data		All Homes		Homes w/Gas Data		All Homes		Homes w/Gas Data		All Homes		Homes w/Gas Data	
	UEC	Sat	UEC	Sat	UEC	Sat	UEC	Sat	UEC	Sat	UEC	Sat	UEC	Sat	UEC	Sat
All Household UEC	390	3206 homes	402	2347 homes	273	1576 homes	274	1366 homes	303	1098 homes	305	1036 homes	295	3886 homes	305	2924 homes
Primary Heat	173	0.83	179	0.94	62	0.75	63	0.86	85	0.87	85	0.93	98	0.73	100	0.94
Auxiliary Heat	64	0.02	69	0.00	30	0.01	30	0.01	31	0.00	32	0.00	44	0.00	56	0.00
Conv. Gas Water Heat	179	0.83	181	0.92	228	0.63	228	0.73	205	0.73	205	0.78	178	0.69	178	0.88
Solar Water Heat w/Gas Backup	143	0.00	143	0.00	203	0.00	203	0.00	200	0.00	200	0.00	141	0.00	140	0.00
Dryer	26	0.57	26	0.63	28	0.29	27	0.33	25	0.51	25	0.54	24	0.41	25	0.54
Range/Oven	34	0.77	33	0.84	40	0.74	40	0.84	35	0.82	35	0.86	31	0.58	32	0.73
Pool Heat	212	0.06	209	0.07	227	0.03	229	0.03	246	0.06	246	0.07	185	0.04	185	0.05
Spa Heat	48	0.07	48	0.09	96	0.02	97	0.02	60	0.06	62	0.06	49	0.07	50	0.09
Miscellaneous	23	0.14	23	0.16	31	0.06	31	0.07	25	0.12	25	0.13	21	0.15	21	0.18

Source: 2010 California Residential Appliance Saturation Survey

		2020		
Participation	Target single-family household participation rate in pool pump program (% of homes with pools)	15%	18%	30%
	Target multi-family household participation rate in pool pump program (% of homes with pools)	5%	6%	10%
	Number of SFH pumps replaced	500	600	1,000
	Number of MFH pumps replaced	15	18	30

		2020	2030	2050	
Assumed % Savings	Percent Electricity Reduction for VSD Pool Pump	40%	40%	40%	< PG&E
	PG&E territory, average kWh /year from pool pump (RASS)	3250	3250	3250	http://www.energy.ca.gov/title24/2008standards/prerulemaking/documents/2007-02-26-27_workshop/supporting/PGE-
	kWh Savings per pump replaced	1,300	1,300	1,300	

		2020	2030	2050
Total Savings	SFH savings (kWh)	651,053	781,003	1,300,806
	MFH savings (kWh)	20,666	24,539	40,031
	TOTAL per year kWh	**671,719**	**805,542**	**1,340,837**
	TOTAL cumulative kWh	**671,719**	**1,477,261**	**2,818,098**

Pool Pump data is here

Year	Pool permits issued
2003	545
2004	752
2005	678
2006	407
2007	206
2008	114
2009	78
2010	58
2011	66
Mean	**320**
2003-2005 mean	**660**

Date incorporated	July 2000
Years from incorporation though 2005	5.5

Table 2-8: Electric UECs by Electric Utility

	PG&E		SDG&E		SCE		LADWP	
	UEC	Saturation	UEC	Saturation	UEC	Saturation	UEC	Saturation
All Household	6,458	7390 homes	5,970	3882 homes	6,444	10514 homes	5,538	2670 homes
Conv. Heat	1,032	0.05	353	0.03	371	0.03	169	0.02
Heat Pump	818	0.01	483	0.02	508	0.01	228	0.00
Aux. Heat	267	0.02	98	0.01	141	0.01	66	0.00
Furnace Fan	245	0.65	133	0.62	143	0.66	99	0.48
Attic Ceiling Fan	104	0.15	118	0.13	156	0.15	139	0.10
Central Air Conditioning	709	0.44	493	0.43	883	0.58	699	0.41
Room AC	221	0.11	107	0.13	238	0.18	152	0.24
Evap. Cooler	458	0.06	494	0.02	716	0.07	345	0.03
Water Heat	2,680	0.09	2,149	0.07	2,143	0.05	1,737	0.05
Solar Water Heat	1,897	0.00	2,231	0.00	1,838	0.00	.	0.00
Dryer	648	0.46	587	0.28	693	0.19	639	0.15
Clothes Washer	88	0.83	110	0.78	119	0.82	107	0.59
Dishwasher	71	0.73	76	0.71	77	0.68	73	0.49
First Refrigerator	774	1.00	725	1.00	784	1.00	766	1.00
Second Refrigerator	1,226	0.25	1,188	0.20	1,174	0.26	1,344	0.18
Freezer	959	0.22	898	0.15	914	0.16	964	0.12
Pool Pump	3,250	0.09	3,794	0.12	3,442	0.11	4,360	0.08
Spa	274	0.08	283	0.13	294	0.10	381	0.04
Outdoor Lighting	319	0.67	345	0.67	348	0.66	423	0.50
Range/Oven	251	0.58	271	0.51	282	0.32	255	0.27
TV	672	1.00	620	1.00	735	1.00	696	1.00
Spa Electric Heat	1,056	0.06	956	0.06	951	0.04	1,003	0.01
Microwave	119	0.93	117	0.94	128	0.93	123	0.88
Home Office	82	0.19	83	0.25	80	0.21	85	0.20
PC	593	0.86	638	0.87	618	0.85	625	0.80
Well Pump	547	0.08	513	0.01	594	0.02	428	0.01
Miscellaneous	1,798		1,835		1,909		1,740	

Source: *2010 California Residential Appliance Saturation Survey*

Table 2-8: Electric UECs by Electric Utility	
	PG&E kWh/year
Pool Pump	3250

BE-3.	BE-3.	**Building Stock: Nonresidential Appliances in Existing Development**
BE-3.	Reduction Measure:	Equip businesses in Elk Grove to reduce operational expenses and maximize energy efficiency through the use of energy-efficient and cost-effective indoor and outdoor appliances and equipment.
BE-3.	Location in GPU	Policy NR-6-2
BE-3.	Action Items:	• Work with SMUD and PG&E to promote free appliance improvements and rebate programs, including rebates for lighting, motors, office equipment, and heating and cooling systems. • Integrate materials on energy efficiency resources and opportunities into the City's economic development resources. • Create a standardized tenant improvement checklist and informational materials to encourage the installation of Energy Star and energy-efficient appliances through the tenant-improvement process. • Partner with SMUD and PG&E to promote the optimization of information technology systems in office complexes to reduce energy expenses and equipment maintenance costs, including plug load sensors, server virtualization, the use of remote desktops, and more. • Encourage energy-intense uses to incorporate energy management practices in business operations. • Promote SMUD's custom and prescriptive lighting standards and rebates for qualifying commercial lighting systems, and support outreach efforts through targeted mailings or direct outreach to the business community through the Chamber of Commerce and other networks. • Continue to connect businesses and residents with programs that provide free or low-cost energy efficiency audits and retrofits. • Conduct public outreach to inform residents about energy usage and energy costs. • Partner with local energy providers to develop a pilot program to demonstrate energy efficient upgrades in existing municipal buildings.
BE-3.	2020 Reductions (MTCO2e):	912
BE-3.	2030 Reductions (MTCO2e):	2,116
BE-3.	2050 Reductions (MTCO2e):	5,642
BE-3.	Target Indicators	5% participation of businesses participating in appliance upgrades by 2020, 10% by 2030, and 25% by 2050.
BE-3.	Methodology and Sources:	Nonresidential electricity and natural gas use was assessed by end use using the 2007 California Commercial End-use Survey. Energy savings by end use function calculated based on case studies. A target utilization rate was applied to reflect the likelihood that not all efficiency measures would take place in participating businesses. Reductions only include savings for end-uses associated with nonresidential appliances An estimated number of square feet per employee was calculated based on an assumption of 400 square feet per employee. Participation rates were assumed based on regional assessments prepared by SMUD in a 2011 analysis for SMUD. Itron, Inc. California Commercial End-use Survey - Results Page. (2007) <http://capabilities.itron.com/CeusWeb/Chart.aspx> Brown, Rich, Sam Borgeson, Jon Koomey, and Peter Biermayer. 2008. U.S. Building-Sector Energy Efficiency Potential. Ernest Orlando Lawrence Berkeley National Laboratory, University of California. http://enduse.lbl.gov/info/LBNL-1096E.pdf ICF GHG Reduction Measure Analysis for SMUD. April 2011.

Energy/GHG Summary

Residential energy Savings (kWh)
Residential energy Savings (Therms)
Nonresidential energy Savings (kWh)
Nonresidential energy Savings (Therms)
Electricity Emissions Reduction (MTCO2e)
Natural Gas Emissions Reduction (MTCO2e)

Assumptions

Target participation rate in appliance program

Implementation

kWh saved per participating business
Therms saved per participating business
kWh saved per participating sq-ft
Therms saved per participating sq-ft
Target Appliance Utilization Rate

Baseline	Number of jobs
	Square feet per employee
	square feet
	Nonresidential electricity use (kWh)
	Nonresidential natural gas use (therms)
	Number of businesses
	kWh/business
	Therms/business in 2005
	sq-ft per business

Participation	Target participation rate
	Number of business participating
	Sq-ft participating

CEUS - Electricity	Heating
	Cooling
	Ventilation
	Water Heating
	Cooking
	Refrigeration
	Exterior Lighting
	Interior Lighting
	Office Equipment
	Miscellaneous
	Process
	Motors
	Air Compressor
	Segment Total

CEUS - Natural Gas	Heating
	Cooling
	Water Heating
	Cooking
	Miscellaneous
	Process
	Segment Total

Percent Electricity Savings (appliance end uses only)	Water heating
	Cooking
	Refrigeration
	Exterior Lighting
	Interior Lighting
	Office equip.
	Motors
	Air Compressor

Percent Natural Savings (appliance end uses only)	Water Heating

Total Electricity Savings (kWh)	Water heating
	Cooking
	Refrigeration
	Exterior Lighting
	Interior Lighting
	Office equip.
	Motors
	Air Compressor
	TOTAL ELECTRICITY SAVED per year (kWh)
	TOTAL ELECTRICITY SAVED cumulative (kWh)

Total Natural Gas Savings (therms)	Water Heating
	TOTAL NATURAL GAS SAVED per year (therms)
	TOTAL NATURAL GAS SAVED cumulative (therms)

Savings per participant	kWh saved per participating business
	Therms saved per participating business
	kWh saved per participating sq-ft
	Therms saved per participating sq-ft

2020	2030	2050
3,384,152	10,152,456	27,073,216
17,872	53,617	142,978
816	**1,831**	**4,881**
95	**285**	**761**

2020	2030	2050
5%	10%	25%

2020	2030	2050
7,771	7,771	7,771
41	41	41
3.72	3.72	3.72
0.02	0.02	0.02
50%	75%	275%

2013	2020	2030	2050	
45,463	51,704	68,632	102,765	ICF Report is here
400	400	400	400	< Chris at City of Elk Grove
18,185,200	20,681,600	27,452,800	41,106,000	
357,373,889	389,752,845	477,577,068	654,662,618	
7,736,910	8,437,893	10,339,230	14,173,016	
8,710				
41,030				
888				
2,088				

	5%	10%	25%
	436	871	2,178
	909,260	1,818,520	4,546,300

% Electricity Use by End Use	
3%	3%
15%	15%
14%	14%
1%	1%
4%	4%
11%	11%
6%	6%
26%	26%
9%	9%
6%	6%
0%	0%
4%	4%
1%	1%
100%	100%

% Natural Gas Use by End Use		
44%	44%	
0%	0%	
31%	31%	
18%	18%	< No LBNL reductions
3%	3%	
5%	5%	
100%	100%	

11%	11%	<< Brown et al. 2008
32%	32%	<< Brown et al. 2008
38%	38%	<< Brown et al. 2008
25%	25%	<< Brown et al. 2008
25%	25%	<< Brown et al. 2008
43%	43%	<< Brown et al. 2008
35%	35%	<< Brown et al. 2008
35%	35%	<< Brown et al. 2008

15%	15%

2020	2030	2050
21,621	43,242	108,106
200,129	400,259	1,000,647
719,751	1,439,502	3,598,755
276,965	553,930	1,384,824
1,170,399	2,340,799	5,851,997
713,854	1,427,709	3,569,272
231,400	462,799	1,156,998
50,032	100,065	250,162
3,384,152	**6,768,304**	**16,920,760**
3,384,152	**10,152,456**	**27,073,216**

17,872	35,745	89,361
17,872	**35,745**	**89,361**
17,872	**53,617**	**142,978**

7,771	7,771	7,771
41	41	41

3.72	3.72	3.72
0.02	0.02	0.02

BE-4.	BE-4.	CALGreen Tier 1 - New Construction
BE-4.	Reduction Measure:	Adopt CALGreen Tier 1 standards to require all new construction to achieve a 15 percent improvement over minimum Title 24 CALGreen energy requirement by 2020.
BE-4.	Location in GPU	Policy NR-6-1; Policy NR-6-2; Policy NR-6-3; SD-2-1; SD-2-2
BE-4.	Action Items:	• Require all new development to achieve Tier 1 of Title 24, Part 11 green building standards until the next Title 24 update becomes effective. • Analyze future Title 24 updates released by the California Energy Commission (CEC) and require the level of efficiency above minimum standards necessary to achieve the energy reduction potential outlined in this Plan. • Partner with local energy provider(s) to develop a pilot program to demonstrate energy-efficient techniques and products in new municipal buildings. • Support the use of innovative and alternative building materials and designs to improve efficiency, encouraging voluntary action such as compliance with Leadership in Energy and Environmental Design (LEED) or Build It Green (BIG) GreenPoint rating systems. • Update the City's website and proactively work with applicants to make compliance with the energy efficiency standards as effective and efficient as possible. • Partner with SMUD to promote SMUD's Savings By Design program, which provides cash incentives and technical assistance to help new commercial projects maximize energy efficiency. • Collaborate with the Northern California Chapter of the US Green Building Council, SMUD, and PG&E to provide local training and workshops for energy efficiency and green building training. • Continue to enforce zoning provisions that require outdoor lighting fixtures in parking areas to be energy efficient.
BE-4.	2020 Reductions (MTCO2e):	1,174
BE-4.	2030 Reductions (MTCO2e):	9,244
BE-4.	2050 Reductions (MTCO2e):	25,574
BE-4.	Target Indicator:	Adoption of Tier 1 standards 100% participation of new residential development from 2020-2030 to comply with Tier 1 standards. 100% participation of new commercial development from 2020-2034 to comply withTier 1 standards.

CalGreen Tier 1 For New Buildings

This calculates the reductions in energy usage solely due to the green building ordinance in 2020.
This calculations assumes energy efficiency gains under this measure only apply to commercial/industrial and residential uses. Agricultural energy uses do no apply.

Residential		2013	2020	2030	2050
Forecast energy usage (no leg. reduction, w/o 2016 code)					
	Electricity (kWh)	471,810,070	524,356,520	632,105,092	843,222,401
	Natural Gas (therms)	22,211,400	24,685,129	29,757,608	39,696,376
New Energy Use Only (w/o 2016 code)					
	Electricity (kWh)		52,546,450	160,295,022	371,412,331
	Natural Gas (therms)		2,473,729	7,546,208	17,484,976
New Energy Use Only (w/ 2016 code)					
	Electricity (kWh)		28,375,083	86,559,312	200,562,659
	Natural Gas (therms)		1,781,085	5,433,270	12,589,183
Percent Reduction due to CalGreen Tier 1 from Title 24 Standards for buildings by milestone year			15%	15%	15%
Adjusted energy use from buildings built through years:		2013-2017	2018-2019	2020-2029	2030-2050
	Electricity (kWh)	20,267,916	6,891,092	49,456,595	96,902,845
	Natural Gas (therms)	1,272,203	432,549	3,104,357	6,082,526
Cumulative energy use from new buildings					
	Electricity (kWh)		27,159,008	76,615,602	173,518,447
	Natural Gas (therms)		1,704,753	4,809,110	10,891,636
Energy Reductions from Baseline			2020	2030	2050
	Electricity (kWh)		1,216,075	9,943,709	27,044,211
	Natural Gas (therms)		76,332	624,160	1,697,547
Emissions Reductions (MTCO2e)					
	Electricity		293.37	1,792.88	4,876.16
	Natural Gas		406.28	3,322.09	9,035.18
	Total		**699.64**	**5,114.97**	**13,911.34**
Commercial		2013	2020	2030	2050
Forecast energy usage (no leg. reduction, w/o 2016 code)					
	Electricity (kWh)	357,373,889	406,432,914	539,499,918	807,811,357
	Natural Gas (therms)	7,736,910	8,799,006	11,679,819	17,488,585
New Energy Use Only (w/o 2016 code)					
	Electricity (kWh)		49,059,025	182,126,029	450,437,468
	Natural Gas (therms)		1,062,096	3,942,909	9,751,675
New Energy Use Only (w/ 2016 code)					
	Electricity (kWh)		46,606,073	173,019,727	427,915,594
	Natural Gas (therms)		1,008,991	3,745,763	9,264,092
Percent Reduction due to CalGreen Tier 1 from Title 24 Standards			10%	10%	10%
Adjusted Energy Use from buildings built through years:		2013-2017	2018-2019	2020-2029	2030-2050
	Electricity (kWh)	33,290,052	11,984,419	113,772,288	229,406,280
	Natural Gas (therms)	720,708	259,455	2,463,095	4,966,495
Cumulative Energy Use from New Buildings					
	Electricity (kWh)		45,274,471	159,046,760	388,453,040
	Natural Gas (therms)		980,163	3,443,258	8,409,753
Energy Reductions from Baseline					
	Electricity (kWh)		1,331,602	13,972,967	39,462,554
	Natural Gas (therms)		28,828	302,506	854,338
Emissions Reductions (MTCO2e)					
	Electricity		321.24	2,519.37	7,115.23
	Natural Gas		153.44	1,610.08	4,547.21
	Total		**474.67**	**4,129**	**11,662**
Commercial and Residential					
Emissions Reductions (MTCO2e)			**1,174.32**	**9,244**	**25,574**

BE-5.	BE-5.	Zero Net Energy - New Construction
BE-5.	Reduction Measure:	Adopt green building standards to require all new construction to achieve zero net energy by 2030 for residential and 2035 for commercial.
BE-5.	Location in GPU	Policy NR-6-1; NR-6-2; NR-6-3; SD-2-1; SD-2-2
BE-5.	Action Items:	• Analyze future Title 24 updates released by the California Energy Commission (CEC) and ZNE requirements. • Update the City's website and proactively work with applicants to make compliance with the energy efficiency standards as effective and efficient as possible.
BE-5.	2020 Reductions (MTCO2e):	-
BE-5.	2030 Reductions (MTCO2e):	29,930
BE-5.	2050 Reductions (MTCO2e):	163,902
BE-5.	Target Indicator:	Adoption of ZNE standards 100% participation of new residential development from 2030-2050 to comply with ZNE standards. 100% participation of new commercial development from 2035-2050 to comply with ZNE standards.

Zero Net Energy For New Buildings

This calculates the reductions in energy usage solely due to the zero net energy standard in 2030 and 2050. This calculations assumes energy efficiency gains under this measure only apply to commercial/industrial and residential uses. Agricultural energy uses do no apply.

Residential		2013	2020	2030	2050
Forecast energy usage (no leg. reduction, w/o 2016 code)					
	Electricity (kWh)	471,810,070	524,356,520	632,105,092	843,222,401
	Natural Gas (therms)	22,211,400	24,685,129	29,757,608	39,696,376
New Energy Use Only (w/o 2016 code)					
	Electricity (kWh)		52,546,450	160,295,022	371,412,331
	Natural Gas (therms)		2,473,729	7,546,208	17,484,976
New Energy Use Only (w/ 2016 code)					
	Electricity (kWh)		28,375,083	86,559,312	200,562,659
	Natural Gas (therms)		1,781,085	5,433,270	12,589,183
Percent Reduction due to ZNE from Title 24 Standards for buildings by milestone year			0%	100%	100%
Adjusted energy use from buildings built through years:		2013-2017	2018-2019	2020-2029	2036-2050
	Electricity (kWh)	20,267,916	8,107,167	0	0
	Natural Gas (therms)	1,272,203	508,881	0	0
Cumulative energy use from new buildings					
	Electricity (kWh)			28,375,083	28,375,083
	Natural Gas (therms)			1,781,085	1,781,085
Energy Reductions from Baseline				2030	2050
	Electricity (kWh)			58,184,228.93	172,187,575.83
	Natural Gas (therms)			3,652,184.82	10,808,098.05
Emissions Reductions (MTCO2e)					
	Electricity			10,490.81	31,045.98
	Natural Gas			19,438.72	57,526.02
	Total			**29,929.53**	**88,572.00**
Commercial					
Forecast energy usage (no leg. reduction, w/o 2016 code)					
	Electricity (kWh)	357,373,889	406,432,914	539,499,918	807,811,357
	Natural Gas (therms)	7,736,910	8,799,006	11,679,819	17,488,585
New Energy Use Only (w/o 2016 code)					
	Electricity (kWh)		49,059,025	182,126,029	450,437,468
	Natural Gas (therms)		1,062,096	3,942,909	9,751,675
New Energy Use Only (w/ 2016 code)					
	Electricity (kWh)		46,606,073	173,019,727	427,915,594
	Natural Gas (therms)		1,008,991	3,745,763	9,264,092
Percent Reduction due to ZNE from Title 24 Standards			0%	0%	100%
Adjusted Energy Use from buildings built through years:		2013-2017	2018-2019	2020-2029	2036-2050
	Electricity (kWh)	33290052.49	13316021	126413653.6	0
	Natural Gas (therms)	720707.7741	288283.1096	2736772.581	0
Cumulative Energy Use from New Buildings					
	Electricity (kWh)				173,019,727
	Natural Gas (therms)				3,745,763
Energy Reductions from Baseline					
	Electricity (kWh)				254,895,867
	Natural Gas (therms)				5,518,328
Emissions Reductions (MTCO2e)					
	Electricity				45,958.56
	Natural Gas				29,371.26
	Total				**75,330**
Commercial and Residential					
Emissions Reductions (MTCO2e)				**29,930**	**163,902**

BE-6.	BE-6.	CALGreen Tier 1 - Existing Buildings
BE-6.	Reduction Measure:	Adopt CALGreen Tier 1 standards to require existing buildings to achieve a 15 percent improvement over minimum Title 24 CALGreen energy requirement.
BE-6.	Location in GPU	Policy NR-6-1; Policy NR-6-2; Policy NR-6-3; SD-2-1; SD-2-2
BE-6.	Action Items:	• Require all major remodels to achieve Tier 1 of Title 24, Part 11 green building standards until the next Title 24 update becomes effective. • Analyze future Title 24 updates released by the California Energy Commission (CEC) and require the level of efficiency above minimum standards necessary to achieve the energy reduction potential outlined in this Plan. • Partner with local energy provider(s) to develop a pilot program to demonstrate energy-efficient techniques and products in new municipal buildings. • Support the use of innovative and alternative building materials and designs to improve efficiency, encouraging voluntary action such as compliance with Leadership in Energy and Environmental Design (LEED) or Build It Green (BIG) GreenPoint rating systems. • Update the City's website and proactively work with applicants to make compliance with the energy efficiency standards as effective and efficient as possible. • Partner with SMUD to promote SMUD's Savings By Design program, which provides cash incentives and technical assistance to help new commercial projects maximize energy efficiency. • Collaborate with the Northern California Chapter of the US Green Building Council, SMUD, and PG&E to provide local training and workshops for energy efficiency and green building training. • Continue to enforce zoning provisions that require outdoor lighting fixtures in parking areas to be energy efficient.
BE-6.	2020 Reductions (MTCO2e):	3,972
BE-6.	2030 Reductions (MTCO2e):	8,511
BE-6.	2050 Reductions (MTCO2e):	34,043
BE-6.	Target Indicator:	Adoption of Tier 1 standards 2% participation of existing development from 2021-2029 to comply with Tier 1 standards 5% participation of existing development from 2030-2049 to comply with Tier 1 standards 20% participation of existing development from 2050-forward to comply with Tier 1 standards

CalGreen Tier 1 For Existing Buildings

	2013	2020	2030	2050
From Inventory Demographics Assumptions (Unincorporated County)				
Households (HH)	52,783	58,095	70,033	93,423
Population	163,093	181,257	218,503	291,481
Jobs	45,463	51,704	68,632	102,765
Participation Rates				
Participation rate of existing buildings becoming retrofitted to meet CalGreen Tier 1 standards under this measure				
Residential		2%	5%	20%
Commercial		2%	5%	20%
Residential	2013	2020	2030	2050
Forecast energy usage (w/o CalGreen Tier 1)				
Electricity (kWh)	471,810,070			
Natural Gas (therms)	22,211,400			
Participating Existing Energy Use Only (w/o CalGreen Tier 1)				
Electricity (kWh)		9,436,201	23,590,504	94,362,014
Natural Gas (therms)		444,228	1,110,570	4,442,280
Percent Reduction from Existing Electricity Use by upgrading to CalGreen Tier 1		51%	51%	51%
Percent Reduction from Existing Natural Gas Use by upgrading to CalGreen Tier 1		51%	51%	51%
Existing Energy Use Only (w/ CalGreen Tier 1)				
Electricity (kWh)		4,623,739	11,559,347	46,237,387
Natural Gas (therms)		217,672	544,179	2,176,717
Energy Reductions				
Electricity (kWh)		4,812,463	12,031,157	48,124,627
Natural Gas (therms)		226,556	566,391	2,265,563
Emissions Reductions (MTCO2e)				
Electricity		1,161	2,169	8,677
Natural Gas		1,206	3,015	12,058
Total		**2,367**	**5,184**	**20,735**
Commercial				
Forecast energy usage (w/o CalGreen Tier 1)				
Electricity (kWh)	357,373,889			
Natural Gas (therms)	7,736,910			
Participating Existing Energy Use Only (w/o CalGreen Tier 1)				
Electricity (kWh)		7,147,478	17,868,694	71,474,778
Natural Gas (therms)		154,738	386,846	1,547,382
Percent Reduction from Existing Electricity Use by upgrading to CalGreen Tier 1		37%	37%	37%
Percent Reduction from Existing Natural Gas Use by upgrading to CalGreen Tier 1		37%	37%	37%
New Energy Use Only (w/ CalGreen Tier 1)				
Electricity (kWh)		2,644,567	6,611,417	26,445,668
Natural Gas (therms)		57,253	143,133	572,531
Energy Reductions				
Electricity (kWh)		4,502,911	11,257,278	45,029,110
Natural Gas (therms)		97,485	243,713	974,851
Emissions Reductions (MTCO2e)				
Electricity		1,086	2,030	8,119
Natural Gas		519	1,297	5,189
Total		**1,605**	**3,327**	**13,308**
Total Residential and Commercial Emissions Reductions (MTCO2e)		**3,972**	**8,511**	**34,043**

BE-7.	BE-7.	Solar PV in All Residential and Commercial Development
BE-7.	Reduction Measure:	Promote voluntary installations of on-site solar photovoltaics in new and existing development, and revise standards to facilitate the transition to solar water heaters and solar photovoltaics in new development.
BE-7.	Location in GPU	Policy NR-6-6; Policy NR-6-5
BE-7.	Action Items:	• Promote innovative private development projects in Elk Grove that have constructed SolarSmart Home projects. • Partner with private developers and SMUD to encourage new developments to achieve certification through SMUD's SolarSmart Homes program, with standards including installation of a rooftop solar photovoltaic system, roofing with a radiant barrier, a 90 percent efficiency furnace, and high-efficiency air conditioning systems. • Work with SMUD and private developers to prepare locally-specific preapproved single-family plans for the SolarSmart Home program. • Support implementation of the Homebuyer Solar Option for all subdivision projects, and encourage developers of new medium- and high-density residential projects to supply 20 percent of projected electricity use of each building from renewable resources. • Continue to issue photovoltaic system permits at no charge upon SMUD's approval, and consider expanding this permitting incentive to apply to solar water heaters as well. • Facilitate building siting for solar access and setbacks to allow for small-lot development. • Update the Citywide Design Guidelines and the Zoning Code to remove impediments to the installation of renewable energy facilities and provide solar-ready building guidelines. • Encourage use of battery storage for solar produced during the day to be used during peak hours to reduce demand from the grid.
BE-7.	2020 Reductions (MTCO2e):	5,488
BE-7.	2030 Reductions (MTCO2e):	13,459
BE-7.	2050 Reductions (MTCO2e):	44,544
BE-7.	Target Indicators:	Approximately 3,100 homes to install solar PV systems by 2020, 7,000 homes by 2030, 14,500 by 2050 Approximately 550 businesses to install solar PV systems by 2020, 1,300 businesses by 2030, and 3,200 by 2050

Energy/GHG Summary

	2020	2030	2050
Residential energy Savings (kWh)	19,340,358	62,894,646	205,357,028
Residential energy Savings (Therms)	-	-	-
Nonresidential energy Savings (kWh)	3,408,984	11,749,190	41,695,368
Nonresidential energy Savings (Therms)	-	-	-
Residential Emissions Reduction (MTCO2e)	4,665.67	11,340.11	37,026.54
Nonresidential Emissions Reduction (MTCO2e)	822.38	2,118.42	7,517.81
Electricity Emissions Reduction (MTCO2e)	**5,488**	**13,459**	**44,544**
Natural Gas Emissions Reduction (MTCO2e)	**-**	**-**	**-**

Assumptions

	2020	2030	2050
Participation by existing homes	5%	10%	20%
Participation by existing businesses	5%	10%	20%
Participation by new homes	35%	37%	40%
Total numbers of homes with solar	3,151	7,096	14,718
Total number of businesses with solar	555	1,357	3,295
Participation of new businesses	10%	15%	30%

Implementation

2020	2035

Average annual kWh/PV system	6,138	

Solar Installed since 2005 - From SMUD

		2020
kWh savings	*Number of rooftop solar installations - Sacramento County*	*247*
	Proportion of rooftop solar in Elk Grove	
	Average Annual kWh (ICF source)	*4,519*
	Total kWh produced by installed solar PV	*1,116,193*
	MTCO2e	*216.79*

Existing homes

		2020	2030	2050	
kWh savings	2013 Residential Electricity Use	471,810,070			
	Existing 2013 Single Family homes	47,082			
	Average electricity use per home	10,020.94			
	Participation rate	5%	10%	20%	
	Participating homes	2,354.12	4,708.24	9,416.49	
	Average annual kWh/PV system	6,138	6,138	6,138	<PV Watts calculator
	Total kWh produced by solar PV	**14,449,600**	**28,899,199**	**57,798,398**	
	Cumulative kWh produced by solar PV	**14,449,600**	**43,348,799**	**144,495,996**	

Existing Businesses

		2020	2030	2050
kWh savings	2013 Nonresidential electricity use	357,373,889		
	Existing number of businesses	8,710		
	Participating rate for businesses	5%	10%	20%
	Total number of businesses participating	435.50	871.00	1,742.00
	Average annual kWh/PV system	6,138	6,138	6,138
	Total kWh produced by solar PV	**2,673,099**	**5,346,198**	**10,692,396**
	Cumulative kWh produced by solar PV	2,673,099	8,019,297	26,730,990

New Homes - Homebuyer Solar Option

		2020	2030	2050
kWh savings	New Homes	5,312	11,938	17,671
	Participation rate	15%	20%	30%
	Average annual kWh/PV system	6,138	6,138	6,138
	Total number of homes participating	797	2,388	5,301
	Total kWh produced by solar PV	**4,890,758**	**14,655,089**	**32,539,379**
	Cumuliatve kWh produced by solar PV	4,890,758	19,545,847	60,861,032

Table 2: Expected Annual TDV Energy of Reference Solar Energy System

Climate Zone	Expected Annual kWh	Expected Annual TDV Energy
CZ01	2927	43596
CZ02	3303	48686
CZ03	3735	52314
CZ04	3809	54135
CZ05	3887	54289
CZ06	3921	55388
CZ07	3837	61446
CZ08	3883	54577
CZ09	3723	52270
CZ10	3737	52572
CZ11	3802	56055
CZ12	3942	56627
CZ13	3987	53539
CZ14	4262	57345
CZ15	4164	55408
CZ16	3712	55960

Notes:

1. AC rating as calculated: 2.071760 kW, figures in table are scaled to 2 kW AC.
2. Calculations performed with Solar Offset Program Calculator version 1.0.
3. Calculated solar energy system composed of the most commonly used PV module and inverter in NSHP as of June 28, 2010.
4. TDV multipliers from the 2008 Building Energy Efficiency Standards for Residential and Nonresidential Buildings.

0.043372

New Businesses

		2020	2030	2050
kWh savings	Number of businesses in 2013	8,710		
	Number of jobs	45,463		
	2013 jobs/business	5.2		
	Forecast jobs	6,241	16,928	27,013
	Forecasted new businesses	1,196	3,243	5,175
	2013 kWh	357,373,889		
	2013 kWh/business	41,030.30		76,982.92
	Assumed percent of new business subject to PV regulation	10%	15%	30%
	Number of new businesses participating	119.57	486.47	1,552.58
	solar PV percent kWh reduction	15%	15%	15%
	Total kWh produced by solar PV	**735,885**	**2,994,008**	**9,555,426**
	Cumulative kWh produced by solar PV	735,885	3,729,893	14,964,378

BE-8.	BE-8.	SMUD Offset Program for Electricity Use
BE-8.	Reduction measure:	Encourage participation in SMUD's offsite renewable energy programs, which allow building renters and owners to opt into cleaner electricity sources.
BE-8.	Location in GPU	Policy NR-6-6
BE-8.	Action Items:	• Promote participation in SMUD's Greenergy program, which allows all electricity customers to pay low monthly fees to meet electricity needs from either 50% or 100% renewable sources. • Promote participation in SMUD's SolarShares program, which allows all account holders to pay a fixed monthly fee to purchase solar electricity produced on a local solar farm. • Update the City's website and materials for residents and businesses to promote SMUD's affordable green electricity source options. • Work closely with SMUD to conduct local outreach, events, and promotions for SMUD's clean energy programs.
BE-8.	2020 Reductions (MTCO2e):	12,193
BE-8.	2030 Reductions (MTCO2e):	19,846
BE-8.	2050 Reductions (MTCO2e):	33,167
BE-8.	Target Indicators:	15% participation in Greenenergy by 2020 20% participation in Greenenergy by 2030
BE-8.	Methodology and Sources:	SMUD allows customers to opt into the Greenergy program in order to achieve up to a 100% renewable energy mix. To ensure that the renewable credit goes toward participating customers, SMUD retains the Renewable Energy Credits for this program. Based on existing Greenenergy Trends identified by ICF, assumes an existing regional customer participation rate of 9% in the SMUD territory. Assumes an equivalent participation rate in Elk Grove. City will support up to a 15% market penetration for local participation in the Greenenergy program. This measure assumes the incremental benefit for participating customers to exceed the minimum Renewable Portfolio Standards energy mix assumed in the adjusted forecast. Greenenergy provides option for participants to receive either 50% or 100% renewable energy, depending on the monthly payment. Measure assumes an average 75% renewable energy mix, to account for participation across both program options. ICF GHG Reduction Measure Analysis for SMUD. April 2011. SMUD. 2010. Greenenergy label. http://www.energy.ca.gov/sb1305/labels/2010_labels/SMUD_PCL.pdf. SMUD. 2012. Greenenergy Program. https://www.smud.org/en/residential/environment/greenergy/.

Energy/GHG Summary

	2020	2030	2050
Total electricity Savings (kWh)	50,544,537	110,072,236	183,950,407
	-	-	-
Nonresidential energy Savings (kWh)	-	-	-
Nonresidential energy Savings (Therms)			
Electricity Emissions Reduction (MTCO2e)	**12,193.38**	**19,846.38**	**33,166.86**
	-	**-**	**-**

Assumptions

	2020	2030	2050	
Market penetration for Greenenergy:	15%	20%	20%	9.1 current participation rate
Forecast Electricity Mix - Renewable Portfolio Standard:	33%	50%	50%	
Greenenergy Opt-In Option 1: Renewable Electricity Mix:	50%	50%	50%	
Greenenergy Opt-In Option 2: Renewable Electricity Mix:	100%	100%	100%	
Average Greenenergy Opt-In Renewable Electricity Mix:	75%	75%	75%	
Additional Renewable Electricity Credit in Addition to Renewable Portfolio Standard:	42%	40%	40%	
Target Market Penetration for Greenenergy in Elk Grove:	15%	20%	30%	

Reductions from other measures

		2020	2030	2050
	BE-1 (kWh) - Existing	4,074,636	10,865,697	28,522,455
	BE-2 (kWh) - Existing	1,629,704	3,909,321	7,756,409

	BE-3 (kWh) - Existing	3,384,152	10,152,456	27,073,216
	BE-4 (kWh) - New	46,490,546	168,990,469	-
	BE-5 (kWh) - Existing	9,315,374	23,288,434	93,153,737
	BE-6 (kWh) - Existing and New	22,749,342	74,643,836	247,052,396
	Total	87,643,755	291,850,213	403,558,214

Greenenergy

		2020	2030	2050	
	Total kWh - Res + NonRes	802,294,243	744,096,236	923,477,133	
	Current Penetration	9%	9%	9%	
kWh savings	Market penetration	15%	20%	20%	<ICF 2011
	Forecasted RPS Electricity Mix	33%	50%	50%	
	Opt-In RPS Allocation mix #1	50%	50%	50%	
	Opt-In RPS Allocation mix #2	100%	100%	100%	
	Average of Opt-In RPS Allocations	75%	75%	75%	
	Additional percent of RPS through Greenenergy	42%	40%	40%	<ICF
	New kWh produced from renewables	**50,544,537**	**59,527,699**	**73,878,171**	
	Cumulative kWh produced from renewables	**50,544,537**	**110,072,236**	**183,950,407**	

SolarShares

		2020	2035	
	Total kWh produced by solar PV	111,205	127,417	
kWh savings				<ICF 2011
				<ICF

Features of a SolarSmart Home®

A **state-of-the-art rooftop solar electricity system** generates much of the energy you will use. And, when your system makes more electricity than you use, you'll see a credit right on your SMUD bill.
A **radiant barrier in the roof** lowers the need for air conditioning by reflecting away heat that would otherwise enter the attic.
A 90% **efficient furnace** that converts natural gas into heat for your home.
A **high-efficiency** (14 SEER/ 12 EER) **air conditioning** system that remains efficient even in extreme conditions. You save even on the hottest days.
Energy-efficient **Compact Fluorescent Lighting** (CFLs).
ENERGY STAR® windows that keep your home cooler in the summer and warmer in winter, giving you maximum comfort.
Third-party certification and **SMUD quality assurance inspections** to ensure better built homes. You can be confident that the energy efficiency features are properly installed and operating as designed.

Current electricity mix:
http://www.energy.ca.gov/sb1305/labels/2010_labels/SMUD_PCL.pdf
https://www.smud.org/en/residential/environment/greenergy/

Here is the Green Energy mix: https://www.smud.org/en/residential/environment/greenergy/documents/PowerContentLabel.pdf

SMUD and the City of Sacramento and Sacramento County are working together to make it easier to build homes on vacant lots in many of the City's and County's older neighborhoods. There are six plans available that comply with SMUD's Home of the Future Program or with SMUD's SolarSmart Home® program. The SolarSmart Home® Pre-Approved Infill Plans use up to 60% less energy than a typical single-family home while the Home of the Future Infill Plans use up to 85% less energy over a typical Title 24 compliant home. A number of tax credits and other incentive programs are available to offset some of the improvement costs for these programs.

https://www.smud.org/en/residential/environment/solar-for-your-home/solarsmart-homes/

The 1-MW system was subscribed to the desired level within
six months of program inception. Little paid marketing was
necessary—media stories and word of mouth were sufficient
to produce this level of demand. Approximately 700
customers were sufficient to fully subscribe the system, and
there is a persistent waiting list of approximately 60
customers. The current mix by customer size is about 27%

BE-9.	BE-9.	Increase City Tree Planting
BE-9.	Reduction measure:	Continue planting an average of 2,500 trees per year with assistance from the Sacramento Tree Foundation.
BE-9.	Location in GPU	Policy NR-2-2; NR-2-3; NR-2-4
BE-9.	Action Items:	• Work with the Sacramento Tree Foundation to organize tree plantings and determine areas that could benefit from shade coverage.
BE-9.	2020 Reductions (MTCO2e):	620
BE-9.	2030 Reductions (MTCO2e):	1,505
BE-9.	2050 Reductions (MTCO2e):	3,275
BE-9.	Target Indicators:	Plant an average of 2,500 trees per year

Increase City Tree Planting

	2005	2020	2030	2050
Annual Tree Planting Targets starting in 2005	2500			
Annual Tree Planting Targets starting in 2020		17,500	42,500	92,500
Total number of Trees Planted since 2004	5000			
Feasibility Test				
Average Tree Canopy Area of mature tree (sqft)	50			
Total Acres of Planted Tree Canopy (Acres)	3874	20.09	48.78	106.18
Total undeveloped acres in the City (Acres)	12,255	8,650	3,499	813
Percent Coverage by new trees		0.23%	1.39%	13.07%
Default Annual CO2 accumulation per tree for Miscellaneous Trees (MT CO2e/tree/year) (From Appendix A of CalEEMod v2016.3.1)	0.0354			
Annual Sequestration from Planted Trees (MTCO2e/year)		620	1,505	3,275

sq ft/acre 43560

RC-1.	RC-1.	Waste Reduction
RC-1.	Reduction Measure:	The City shall facilitate recycling, reduction in the amount of waste, and re-use of materials to reduce the amount of solid waste generated in Elk Grove.
RC-1.	Location in GPU	Policy CIF-1.1; CIF-1.2; CIF-1.3
RC-1.	Measure Description:	The City of Elk Grove has already implemented several waste reduction programs for residents and businesses within Elk Grove. The City will continue to identify local and regional programs as they become available to increase the the portion of waste diverted from the landfill. The community of Elk Grove currently diverts 75% of their waste through recycling, composting, and greenwaste pickup. Residents of Elk Grove are able to dispose of green waste, recyclable materials, and e-waste along with their normal garbage through the City's curbside pick up program. The City also hosts composting workshops for residents interested in converting their food scraps and yard waste into nutrient-rich soil. Businesses within Elk Grove may have their food waste and grease picked up for a fee. The City has also created a business recycling ordinance, requiring businesses to provide appropriate recycling facilities and training for employees.
RC-1.	Action Items:	• Continue to provide curbside greenwaste opportunities for residents and businesses • Expand the types of material accepted for curbside recycling • Encourage and create incentives for the use of recycled concrete in all base material utilized in City and private road construction. • Where required or desired, storage and/or recycling centers should be incorporated into the initial site planning for non-residential developments.
RC-1.	2020 Reductions (MTCO2e):	5,272
RC-1.	2030 Reductions (MTCO2e):	10,169
RC-1.	2050 Reductions (MTCO2e):	16,957
RC-1.	Target Indicators:	Achieve an 85% diversion rate by 2050.
RC-1.	Methodology and Sources:	In 2013, the City of Elk Grove reported a 75% diversion rate for solid waste. The measure calculates the reduction in emissions that will result from achieving an 85% diversion rate. Through the enactment of AB 341, CalRecyle is tasked with implementing a plan to achieve a policy goal of 75% diversion of the solid waste generated to be source-reduced, recycled or composted by 2020. This will be achieved through statewide improvements to to recycling infrastructure, an increase in services for organics, and mandatory recycling requirements for commercial uses. CalRecycle. Jurisdiction Profile, http://www.calrecycle.ca.gov/Profiles/Juris, accessed January 2018. CalRecycle (2012). California's New Goal: 75% Recycling. http://www.calrecycle.ca.gov/75percent/Plan.pdf.

Waste Reductions

	2013	2020	2030	2050
2013 Reported Diversion Rate for the City of Elk Grove	75.00%	75.00%	75.00%	75.00%
Diversion Target Assumed Under Measure Implementation	75.00%	80.00%	83.00%	85.00%
Emissions Reductions	0	5,272	10,169	16,957

	Tons	Emissions	MTCO2e/Ton
Waste disposed	80,850	23,720	0.29338281
	2020	2030	2050
BAU Disposed Waste Emissions:	26,362	31,779	42,393
Business-as-usual tonnage	89,854	108,318	144,496
Baseline diversion rate:	75.00%	75.00%	75.00%
Target diversion rate	80.00%	83.00%	85.00%
Additional tonnage diverted through measure	17,971	34,662	57,798
Emissions Reductions	5,272	10,169	16,957

-0.0298083

RC-2.	RC-2:	Reduce Organic Waste
RC-2.	Reduction measure:	Target reduction of disposal of organic waste, consistent with statewide goals of 50 percent of 2014 levels in 2020 and 75 percent of 2014 levels in 2025, using alternatives such as composting, anaerobic digestion, and biomass energy.
RC-2.	Location in GPU	Policy CIF-1.1; CIF-1.2
RC-2.	Measure Description:	Reduce organic waste through the development of a compost program for both food and green (yards) waste.
RC-2.	Action Items:	• Create a curbside compost pick up program for residents. • Provide information on compostable materials on the City website. • Provide businesses with a means to collect or drop off organic waste.
RC-2.	2020 Reductions (MTCO2e):	3,208
RC-2.	2030 Reductions (MTCO2e):	7,506
RC-2.	2050 Reductions (MTCO2e):	9,713
RC-2.	Target Indicators:	50 percent of food waste and 80 percent of green waste composed by 2020 for both residential and commercial/municipal waste.

	2017	2020	2030	2050
Generation of Organic Waste In Elk Grove (Ascent Adjusted)				
Disposal	87,271	84,664	102,062	136,149
Commercial/Municipal				
Percentage of Disposal that is Commercial/Municipal ˟	51%	51%	51%	51%
Commercial Disposal	44,610	43,178.80	52,051.50	69,436.22
Percentage of Commercial/Municipal Disposal that is Organic ˟†	56%	56%	56%	56%
Commercial/Municipal Organic Disposal	24,981.60	24,180	29,149	38,884
Residential				
*Percentage of Disposal that is Residential**	49%	49%	49%	49%
Residential Disposal	42,661	41,485.52	50,010.26	66,713.23
*Percentage of Residential Disposal that is Organic**	47%	47%	47%	47%
Residential Organic Disposal	20,018	19,498	23,505	31,355

˟ Based on 2017 Commercial Streams Export from CalRecycle Waste Characterization Web Tool

*Based on 2016 Residential Streams Export from CalRecycle Waste Characterization Web Tool

† This is a conservative assumption because the success of the 75% diversion target would most likely reduce the number of landfilled recyclables and increase the percentage of overall organics per ton of disposal. However, the BAU forecast is also conservative because it assumes the percent organics does not change.

Commercial/Municipal Compost

	2020	2030	2050
Tons to Be Landfilled, Which Will Be Composted Instead			
AB 1826's Commercial Organic Waste Disposal Limit	12,491	12,491	12,491
Tons Composted Instead of Landfilled	11,689	16,658	26,393

Organic Breakdown	Residential	Commercial
Food	49%	43%
Green	8%	8%
Lumber	2%	1%
Paper	40%	47%
Manure	0.01%	0.2%

	2020	**2030**	**2050**
Percent of organics composted under RC-2			
Food	50%	85%	85%
Green	80%	100%	100%
Composted Commercial/Municipal Tons			
Food	2,513	6,959	9,647
Green	761	1,550	2,149

Residential Compost

Percent of organics composted under RC-2			
Food	50%	85%	85%
Green	80%	100%	100%
Composted Residential Tons			
Food	4,808	10,658	13,145
Green	1,295	2,111	2,603
TOTAL ORGANICS COMPOSTED INSTEAD OF LANDFILLED under RC-2			
Food	7,322	17,617	22,792
Green	2,056	3,660	4,752
Total	9,378	21,278	27,544
Emissions reductions per ton of food waste composted instead of landfilled (MTCH4/ton)	0.01565818	0.01565818	0.0156582
Emissions reductions per ton of green waste composted instead of landfilled (MTCH4/ton)	0.00665873	0.00665873	0.0066587
Emissions reductions from food waste composted instead of landfilled (MTCH4)	115	276	357
Emissions reductions from green waste composted instead of landfilled (MTCH4)	14	24	32
Emissions reductions from food waste composted instead of landfilled (MTCO2e)	2,866	6,896	8,922
Emissions reductions from green waste composted instead of landfilled (MTCO2e)	342	609	791
Total Emissions Reduction (MTCO2e)	3,208	7,506	9,713

TACM-1.	TACM-1.	Local Goods
TACM-1.	Reduction Measure:	Promote policies, programs and services that support the local movement of goods in order to reduce the need for travel.
TACM-1.	Location in GPU	Policy MOB-3.5; MOB-6.4; MOB-7.8
TACM-1.	Measure Description:	Promoting commerce between local businesses and residents reduces the amount of travel required to meet the service needs of residents. Elk Grove's Think Shop Live campaign and the Fantastic Fridays program encourages participating businesses to host events and provide incentives or discounts to residents to shop at local and independently owned stores on the second weekend of every month. Elk Grove also has a weekly Farmer's Market, where residents can purchase food and produce from local farmers and reduce the distance that their food must travel. Co benefits Shopping locally increases the tax revenues that the City receives and can help to fund other emissions reduction programs
TACM-1.	Action Items:	• Support efforts that encourage Elk Grove residents and businesses to buy goods and services locally. • Support strategies to increase business-to-business commerce in Elk Grove. • Create a program to recognize employers that contribute to the quality of life in the community. • Actively promote revitalization and strong sales in Old Town Elk Grove, and along major commercial thoroughfares. • Assist local merchants and business organizations interested in forming mutual benefit organizations such as merchants associations and business improvement districts. • Support strategies to increase business-to-business commerce in Elk Grove.
TACM-1.	2020 Reductions (MTCO2e):	4,388
TACM-1.	2030 Reductions (MTCO2e):	7,008
TACM-1.	2050 Reductions (MTCO2e):	9,935
TACM-1.	Target Indicators	Divert 10% of local VMT to alternative modes through increased business serving local residents.
TACM-1.	Methodology and Sources:	Quantifies the benefit of reduced heavy trucking VMT, based on a case study identifying a relationship between a 10% increase in local production and consumption supporting a 30% reduction in local heavy trucking VMT. Measure quantifies the impact on local trucking VMT using data from EMFAC 2007, which identifies that heavy data trucks contribute 20% of VMT in Sacramento County. Sources Table 9 [http://www.leopold.iastate.edu/pubs/staff/ppp/food_mil.pdf] EMFAC 2007.

	2020	2030	2050
Total Emissions Reduction (Metric Tons CO2e)	4,388	7,008	9,935

	2020	2030	2050
Total VMT attributed to Trucking/Shipping in Elk Grove	52,852,761	75,909,436	122,022,785
Percentage Reduction in VMT with Measure Applied:	20%	30%	30%
Total Reduction in VMT:	10,570,552	22,772,831	36,606,836
CO2 (g)	4,336,361,188	6,956,464,598	9,879,046,827
CH4 (g)	208,450	237,926	262,777
N2O (g)	173,338	169,509	184,309
CO2 (MT)	4,336.36	6,956.46	9,879.05
CH4 (MT)	0.21	0.24	0.26
N2O (MT)	0.17	0.17	0.18
MTCO2e	4,388	7,008	9,935

mt/g 0.000001

-The conventional system of transporting food used four to 17 times more fuel than the Iowa-based Regional and local systems, depending on the system and truck type. The same conventional system released from five to 17 times more CO2 from the burning of this fuel than the Iowa-based regional and local systems.

'-Growing and transporting 10 percent more of the produce for Iowa consumption in an Iowa-based Regional or local food system would result in an annual savings ranging from 280 to 346 thousand gallons of fuel and an annual reduction in CO2 emissions ranging from 6.7 to 7.9 million pounds, depending on the system and truck type. (Source: http://www.leopold.iastate.edu/research/marketing_files/food/Food_Facts_0409.pdf) (Source: http://www.leopold.iastate.edu/pubs/staff/ppp/food_mil.pdf Table 9)

TACM-2.	TACM-2.	Transit Oriented Development
TACM-2.	Reduction Measure:	Support higher density, compact, residential development along transit by placing high density residential or mixed-use sites near transit opportunities.
TACM-2.	Location in GPU	Policy NR-4-6
TACM-2.	Measure Description:	This measure would ensure that new development is directed towards areas in close to existing or proposed transit or bike thoroughfares in order to decrease Elk Grove's dependency on single-occupancy vehicle trips. The measure would also allow new developments within transit oriented areas to be built at higher densities and encourage a mix of commercial and residential uses.
TACM-2.	Action Items:	• Identify and designate opportunity areas. • Change General Plan and zoning maps
TACM-2.	2020 Reductions (MTCO2e):	3,189
TACM-2.	2030 Reductions (MTCO2e):	6,963
TACM-2.	2050 Reductions (MTCO2e):	14,613
TACM-2.	Target Indicators:	Increase citywide density by 58% by 2020, 119% by 2030, and 176% by 2050.
TACM-2.	Methodology and Sources:	The performance of this measure is related to the elasticity of increased density and reduced travel associated with the increased mixture of uses. Case studies support a range of reductions for vehicle miles traveled based on every 100% increase in density and increase in convenience to jobs access. CAPCOA identifies a range of VMT reduction potential for increased density of to 30%. To calculate the net increase in density in the City between 2005 and the target years, calculates the increased density through population and employees per acre. Per every 100% increase in density, assumes a constrained 5% reduction for city-wide VMT due to co-location of homes and other uses, and a 0.5% reduction in new VMT associated with density for jobs, work commutes, and shopping. Sources CAPCOA. 2010. Quantifying Greenhouse Mitigation Measures. A resource for local governments to assess emission reductions from greenhouse gas mitigation measures. Climate Change Action Plan: Addressing Greenhouse Gas Emissions Under the California Environmental Quality Act; Draft Staff Report, June 30, 2009. San Joaquin Valley Air Pollution Control District. CCAP Transportation Emission Guidebook. ONL (2004), Transportation Energy Book, Oak Ridge National Lab, Dept. of Energy (http://cta.ornl.gov/data/index.shtml. TIAX Results of 2005 Literature Search Conducted by Tax on behalf of SMAQMD, as cited in CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, January 2008. California Air Pollution Control Officers Association. (Appendix B)

Emissions Reduction

	2020	2030	2050
Emissions Reduction (MT CO2e)	3,189	6,963	14,613

Transportation-Related Reductions

	2020	2030	2050
Percentage decrease in VMT per 100% increase in density (Citywide)	0.05	0.05	0.05
Percentage increase density (Citywide) :	0.58	1.19	1.76
Percentage decrease in VMT (Citywide) for increased density:	0.0291	0.0596	0.0882
Annual Citywide decrease in VMT for increased density:	7,683,091	22,627,272	53,842,486
CO2 (g)	3,151,836,890.05	6,912,000,352.35	14,530,412,926.54
CH4 (g)	151,509.40	236,405.55	386,501.32
N2O (g)	125,988.70	168,425.54	271,087.39
CO2 (MT)	3,152	6,912	14,530
CH4 (MT)	0	0	0
N2O (MT)	0	0	0
MTCO2e	3,189.47	6,963.25	14,613.07
VMT from new development	68,464,119	226,942,525	
VMT attributed to shopping and commuting	21,976,982	72,848,551	
Percentage decrease in VMT for mixed-use and jobs-housing balance	0.50%	0.50%	
Annual decrease in new local shopping and commute VMT for increased mixed-use and jobs-housing:	109,885	364,243	
Total VMT Reduction for increased density and convenience to services	4,333,082	16,389,463	
Percentage decrease in VMT (Citywide) for mixed-used and jobs-housing concentration:		0.18%	

mt/g	0.000001

TACM-3.	TACM-3.	**Intra-City Transportation Demand Management**
TACM-3.	Reduction Measure:	The City shall continue to implement strategies and policies that reduce the demand for personal motor vehicle travel for intra-City (local) trips.
TACM-3.	Location in GPU	Policy NR-4-5
TACM-3.	Measure Description:	The City of Elk Grove Transit Services has a Transportation Demand Management Program (TDM) to promote and encourage the use of alternative transportation within the City of Elk Grove. The City is developing partnerships with public and private employers within the City to work together in addressing local transportation and air quality issues. The goal of the program is to make Elk Grove a better place to live, work and shop by promoting innovative solutions to parking, commuting and air quality problems. Services provided include: • Ridematching (Carpool/Vanpools/Bicycling) • Emergency Ride Home with a taxi or rental car • Promotion of alternative transportation (Walking, biking, public transit or ridesharing) to all residents • Promote Sacramento Region 511 and other regional alternative transportation programs • Manage and maintain the Elk Grove/South Sacramento Commuter Club • Outreach to employers about alternative transportation • Technical assistance to Employer Transportation - Coordinators and employers in preparing a trip reduction plan or developing a transportation demand management program • Perform Travel Training. We will teach you how to ride public transit, use bicycle and pedestrian trails in the City, to telecommute or rideshare in a car or van • Promotion of Best Workplaces for Commuters The program aims to reduce local commute traffic by 20%, which is equivalent to each person taking alternative transportation modes once a week. More information can be found on the City's website at http://www.e-tran.org/commuter-alternatives.asp
TACM-3.	Action Items:	• Implement policies and actions in the Mobility Element which seek to encourage non-vehicular transportation alternatives in Elk Grove. • The City will support positive incentives such as carpool and vanpool parking, bus turnouts, and pedestrian-friendly project designs to promote the use of transportation alternatives. • The City shall participate in the preparation and implementation of a Congestion Management Plan (CMP) consistent with legal requirements which gives priority to air quality goals, alternatives to automobile travel, and the development of demand reduction measures over additional road capacity. • Implement the requirements for designated carpool and vanpool parking for all new office developments and update standards to meet VMT reduction targets. • Facilitate SACOG's partnership with community and employer organizations that is intended to support proactive and innovative transportation demand management programs covering all parts of the urbanized area, to offer a variety of choices to driving alone. (MTP Policy 22) • Continue to implement Trip Reduction programs for businesses with 100 or more employees • Consider expanding the standards for Trip Reduction Permits. • Create a standard for shopping center carpool parking spaces near store entries to encourage multiple occupant vehicle visitors.
TACM-3.	2020 Reductions (MTCO2e):	5,485
TACM-3.	2030 Reductions (MTCO2e):	9,344
TACM-3.	2050 Reductions (MTCO2e):	24,838
TACM-3.	Target indicators:	Implementation of the City's Transportation Demand Management Program to achieve a 15% reduction in local road VMT.
TACM-3.	Methods:	The literature supports a 30% reduction in overall VMT through the implementation of a local TDM program. Assumes only VMT on local roads will be effected by TDM program. Effectiveness of a TDM program will be incremental with the full VMT reduction potential being reached by 2025. Source: Victoria Transport Policy Institute (VTPI), Transportation Management Programs, http://www.vtpi.org/tdm/tdm42.htm

	2013	2020	2030	2050
Percent Reduction in Local Road VMT:	0%	5%	8%	15%
Total Local Road VMT:	206,622,120	264,263,806	379,547,179	610,113,925
Reduction in Local Road VMT:	-	13,213,190	30,363,774	91,517,089
CO2 (g)	-	5,420,451,485	9,275,286,130	24,697,617,067
CH4 (g)	-	260,562.14	317,235.09	656,943.58
N2O (g)	-	216,672.26	226,012.01	460,772.35
CO2 (MT)	-	5,420	9,275	24,698
CH4 (MT)	-	0.261	0.317	0.657
N2O (MT)	-	0.2167	0.2260	0.4608
MTCO2e	-	5,485	9,344	24,838
	-			

mt/g	0.000001

TACM-4.	TACM-4.	Pedestrian & Bicycle Travel
TACM-4.	Reduction Measure:	Provide for safe and convenient pedestrian and bicycle travel through implementation of the Bicycle and Pedestrian Master Plan and increased bicycle parking standards.
TACM-4.	Location in GPU	Policy NR-4-4; PT-2-4; MOB-1.5; MOB-3.1; MOB-3.7; MOB-3.9; MOB-3.15; MOB-3.16; MOB-3.17; MOB-4.2; MOB-4.3; MOB-4.4; MOB-4.5; HTH-1.3
TACM-4.	Measure Description:	The City's bicycle and pedestrian master plan was completed in 2004 and details the City's anticipated future bikeways and bike and pedestrian facility improvements.
TACM-4.	Action Items:	• Commercial parking standards will be revised to require a ratio of one bicycle parking space per 20 vehicle parking spaces. Multi-family parking standards will be revised to require one long-term bicycle storage space per unit. Storage options may include a multitude of options that provide secured storage. • Standards will be revised to require the provision of bicycle support facilities (lockers, shower rooms, etc.) for appropriate development. • New multi-family development developed by the target years will be characterized by internal and off-site pedestrian and bicycle connections that are in excess of those called for in the Bicycle and Pedestrian Master Plan. • Ensure that applications for new office and mixed-use development analyze the project's connection and orientation to pedestrian paths, bicycle paths, and existing transit stops within 1/2 mile of the project site. To the extent feasible, the project should be oriented toward an existing transit, bicycle, or pedestrian corridor with minimum setbacks. Exceptions may be considered for site-specific project constraints or projects that support equivalent pedestrian, bicycle, or alternative transportation through other methods. • Require applications for new office and mixed-use development to minimize setbacks from the street and provide pedestrian pathways. City staff shall work with project applicants to ensure that entrance locations and parking lot designs encourage pedestrian access and safety, using design features such as clearly marked and shaded pedestrian pathways between transit facilities and building entrances. • Encourage pedestrian-oriented plazas, walkways, bike trails, bike lanes, and street furniture and connections to other community areas. • Promote pedestrian convenience and recreational opportunities through development conditions requiring sidewalks, walking paths, or hiking trails connecting various land uses and including safety amenities such as lighting and signage.
TACM-4.	2020 Reductions (MTCO2e):	3,299
TACM-4.	2030 Reductions (MTCO2e):	4,265
TACM-4.	2050 Reductions (MTCO2e):	5,533
TACM-4.	Target Indicators:	Pedestrian design to be integrated into new development Bicycle parking in all new multi-family and nonresidential development Completion of the projects in the Bicycle Plan

Pedestrian Infrastructure Reductions

	2020	2030	2050
Percent Completion of Pedestrian Master Plan	75%	100%	100%
Legislative Adjusted BAU On-Road Transportation Emissions	541,455	524,978	681,001
Percent VMT Reduction due to Bicycle Network Improvements	0.50%	0.50%	0.50%
Annual GHG Reductions	2,030	2,625	3,405

Source: CAPCOA SDT-1

Bicycle Infrastructure Reductions

	2020	2030	2050
Percent Completion of Planned Bike Lanes	75%	100%	100%
Planned new Class I bike lanes (mi)	36.00	36.00	36.00
Planned new Class II bike lanes (mi)	73.90	73.90	73.90
Planned new Class III bike lanes (mi)	28.50	28.50	28.50
Total new bike lanes completed	103.80	138.40	138.40
Legislative Adjusted BAU On-Road Transportation Emissions	541,455	524,978	681,001
Percent VMT Reduction due to Bicycle Network Improvements	0.31%	0.31%	0.31%
Annual GHG Reductions	1,269.04	1,640.56	2,128.13

Source: CAPCOA SDT-5 (this calculations assumes half of CAPCOA's suggested vmt reduction due to rural context. Also assumes this SDT-5 is combined with other bicycle measures, as a

TACM-5.	TACM-5.	Affordable housing
TACM-5.	Reduction Measure:	Continue to promote and require the development of affordable housing in Elk Grove.
TACM-5.	Location in GPU	Policy H-2-1
TACM-5.	Measure Description:	A significant amount of evidence points to the fact that lower-income households and senior citizens own fewer vehicles and drive less. Furthermore, affordable housing ensures an equitable and just community in which people of all income levels can live in Elk Grove. By constructing and maintaining affordable housing near transit and alternative transportation modes, VMT can be reduced while still allowing mobility of lower-income households.
TACM-5.	Action Items:	• Provide for affordable housing development in Elk Grove consistent with the goals and actions of the Housing Element, as well as SACOG's Regional Housing Needs Allocation.
TACM-5.	2020 Reductions (MTCO2e):	12,027.80
TACM-5.	2030 Reductions (MTCO2e):	16,017.64
TACM-5.	2050 Reductions (MTCO2e):	21,193.24
TACM-5.	Target indicators:	Approximately 3,000 new housing units that are below market rate by 2020, and 4,000 homes that are below market rate by 2030.
TACM-5.	Methods:	CAPCOA provides a 4% reduction in vehicle trips for each deed-restricted BMR unit. Thus, the total reduction is as follows: estimates 2,950 new affordable housing units by 2020. These units will constitute 19% of total new housing units in Elk Grove. Assuming a constant percentage of new units, affordable housing will result in a 1% decrease in VMT (4% * 19%). CAPCOA. 2010. Quantifying Greenhouse Mitigation Measures. A resource for local governments to assess emission reductions from greenhouse gas mitigation measures. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, January 2008. California Air Pollution Control Officers Association. (Appendix B MSG-21) Nelson/Nygaard Consulting Associates, Creating Low-Traffic Developments: Adjusting Site-Level Vehicle Trip Generation Using URBEMIS, 2005.

VMT and Emissions Reductions

	2020	2030	2050	
Number of new units that are BMR	2,950	2,268	3,357	2020 BMR based on SACOG RHNA
Total Unit Growth	5,312	11,938	17,671	5170
% of new units that are BMR	56%	19%	19%	0.511605
Percentage decrease in VMT for below market rate housing:	0.02	0.01	0.01	
Annual Decrease in VMT	28,973,724	12,965,075	19,069,733	
CO2 (g)	11,885,900,636	3,960,468,729	5,146,327,973	
CH4 (g)	571,358	135,457	136,890	
N2O (g)	475,116	96,505	96,013	
CO2 (MT)	11,886	3,960	5,146	
CH4 (MT)	0.57	0.14	0.14	
N2O (MT)	0.48	0.10	0.10	
MTCO2e	12,028	16,018	21,193	
mt/g	0.000001			

TACM-6.	TACM-6:	**Vehicle Miles Traveled Limits**
TACM-6.	Reduction Measure:	Any new land use plans, amendments to such plans, and other discretionary development proposals (referred to as "development projects") are required to demonstrate a 15 percent reduction in VMT from existing (2015) conditions.
TACM-6.	Location in GPU	Policy MOB-1.1; NR-4-3
TACM-6.	Action Items:	• Development projects shall demonstrate that the VMT produced by the project at buildout is equal to or less than the VMT limit of the project's General Plan land use designation, as shown in **Table 6 3**, which incorporates the 15 percent reduction from 2015 conditions. • Development projects located within the existing (2017) City limits shall demonstrate that cumulative VMT would be equal to or less than the established citywide limit of 5,565,587 VMT (total daily VMT), which incorporates the 15 percent reduction from 2015 conditions • Development projects located in Study Areas shall demonstrate that cumulative VMT within the applicable Study Area would be equal to or less than the established limit shown in Table 6-4, which incorporates the 15 percent reduction from 2015 conditions.
TACM-6.	2020 Reductions (MTCO2e):	26,526
TACM-6.	2030 Reductions (MTCO2e):	18,539
TACM-6.	2050 Reductions (MTCO2e):	24,525
TACM-6.	Target Indicators:	All projects after 2020 must demonstrate compliance with 15% VMT reduction requirement.

	2020	2030	2050
New VMT	425,995,966	401,622,223	602,433,334
15% Reduction in VMT	63,899,395	60,243,333	90,365,000
CO2 (g)	26,213,470,168	18,402,658,006	24,386,704,170
CH4 (g)	1,260,087	629,411	648,673.46
N2O (g)	1,047,834	448,420	454,972
CO2 (MT)	26,213	18,403	24,387
CH4 (MT)	1.26	0.63	0.65
N2O (MT)	1.05	0.45	0.45
MTCO2e	26,526	18,539	24,525

mt/g	0.000001

TACM-7.	TACM-7:	Traffic Calming Measures
TACM-7.	Reduction Measure:	Increase the number of streets and intersections that have traffic calming measures.
TACM-7.	Location in GPU	N/A
TACM-7.	Measure Description:	Adding traffic calming measures such as marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, bulb out, crosswalks, encourages people to walk or bike instead of using a vehicle, which results in a reduction in VMT.
TACM-7.	Action Items:	• Install a variety of traffic calming measures on streets and intersections.
TACM-7.	2020 Reductions (MTCO2e):	274.26
TACM-7.	2030 Reductions (MTCO2e):	292.00
TACM-7.	2050 Reductions (MTCO2e):	827.94
TACM-7.	Target Indicators:	25% of streets and 25% of intersections would feature traffic calming measures by 2020.

	2013	2020	2030	2050
Local VMT	206,622,120	264,263,806	379,547,179	610,113,925

CAPCOA SDT-2 Percent reduction in VMT

	% of streets with improvements			
	25%	50%	75%	100%
% of intersections with improvements	% VMT Reduction			
25%	0.25%	0.25%	0.50%	0.50%
50%	0.25%	0.50%	0.50%	0.75%
75%	0.50%	0.50%	0.75%	0.75%
100%	0.50%	0.75%	0.75%	1%

		2020	2030	2050
Percent of intersections in Elk Grove with improvements		25%	25%	50%
Percent of streets in Elk Grove with improvements		25%	25%	50%
Percent Reduction in VMT under T-2.1		0.25%	0.25%	0.50%
Annual VMT reduced under T-2.1		660,660	948,868	3,050,570
CO2 (g)		271,022,574.24	289,852,691.57	823,253,902.24
CH4 (g)		13,028.11	9,913.60	21,898.12
N2O (g)		10,833.61	7,062.88	15,359.08
CO2 (MT)		271.02	289.85	823.25
CH4 (MT)		0.01	0.01	0.02
N2O (MT)		0.01	0.01	0.02
MTCO2e		274.26	292.00	827.94
mt/g	0.000001			

TACM-8.	TACM-8:	Tier 4 Final Construction Equipment
TACM-8.	Reduction measure:	Require all construction equipment used in Elk Grove to achieve EPA-rated Tier 4 Final diesel engine standards by 2030 and encourage the use of electrified equipment where feasible.
TACM-8.	Location in GPU	Policy NR-4-8
TACM-8.	Action Items:	• Work with Sacramento Metropolitan Air Quality Management District to ensure grading permits are not issued until project applicants verify construction will use Tier 4 Final diesel engines where applicable.
TACM-8.	2020 Reductions (MTCO2e):	-
TACM-8.	2030 Reductions (MTCO2e):	644
TACM-8.	2050 Reductions (MTCO2e):	892
TACM-8.	Target Indicators:	100% of diesel equipment used in construction is EPA-rated Tier 4 Final by 2030.

	2020	2030	2050
Off-road Construction and Mining Emissions (MTCO2e)	25,176	12,885	17,846
Percent of equipment that are Tier 4 Final	No change	100%	100%
Average percent improvement in fuel efficiency with Tier 4 equipment	5%	5%	5%
GHG Reductions (MTCO2e)	-	644	892

TACM-9.	TACM-9:	Install EV Charging Stations
TACM-9.	Reduction measure:	Increase the number of EV charging stations available for public charging at commercial and civic buildings.
TACM-9.	Location in GPU	Policy MOB-7.9
TACM-9.	Measure Description:	
TACM-9.	Action Items:	• Work with businesses and multi-unit developments to site EV charging stations. • Install EV charging stations at municipal facilities.
TACM-9.	2020 Reductions (MTCO2e):	316
TACM-9.	2030 Reductions (MTCO2e):	794
TACM-9.	2050 Reductions (MTCO2e):	689
TACM-9.	Target Indicators:	Install 50 EV chargers by 2020, 100 by 2030.

EV Charger Emission Reduction Calculation

2017 Number of charging stations in Elk Grove 14

2020

Number of Chargers	50	
Number of Connections per Charge	2	
Average Charging hours per Connection per day	3	
Number of hours of charge per year for all chargers (h/year)	102,200	
Average Efficiency of EV LDV (kWh/100-mi) (1)	34	<-for MY2015-2018
Average Efficiency of Gasoline LDV in 2020 (mpg)	29	<-informational purposes only
GHG Emissions per kWh in Sacramento in 2020 (MTCO2e/kWh)	0.00024	
GHG Emissions per mi for average gasoline LDV (gCO2/mi)	291	
Emissions reductions per EV mi (kg CO2/mi)	0.21	

Percent Breakdown of Charger Types	Type of EV Charger	Charger Power (kW or kWh/h) (2)	Charged amount (kWh)	Equivalent VMT (mi)	EV emissions (MT CO2e)	Equivalent Gasoline emissions (MT CO2e)	Emissions reductions (MT CO2e)	Emissions reductions per hour of charge (kg CO2e/h)
0%	Level 1	1.4	-	-	-	-	-	-
50%	Level 2 (low)	3.3	168,630	501,457	41	146	105	1
50%	Level 2 (high)	6.6	337,260	1,002,914	81	292	211	2
0%	DC Fast Charging	45	-	-	-	-	-	-
0%	Tesla Wall Connect	11.5	-	-	-	-	-	-
0%	Tesla Supercharger	120	-	-	-	-	-	-
			Total VMT	1,504,371		Total Reductions	316	

2030

Number of Chargers	100	
Number of Connections per Charge	2	
Average Charging hours per Connection per day	3	
Number of hours of charge per year for all chargers (h/year)	204,400	
Average Efficiency of EV LDV (kWh/100-mi) (1)	34	<-for MY2015-2018
Average Efficiency of Gasoline LDV in 2020 (mpg)	42	<-informational purposes only
GHG Emissions per kWh in Sacramento in 2030 (MTCO2e/kWh)	0.00018	
GHG Emissions per mi for average gasoline LDV (gCO2/mi)	325	
Emissions reductions per EV mi (kg CO2/mi)	0.26	

Percent Breakdown of Charger Types	Type of EV Charger	Charger Power (kW or kWh/h) (2)	Charged amount (kWh)	Equivalent VMT (mi)	EV emissions (MT CO2e)	Equivalent Gasoline emissions (MT CO2e)	Emissions reductions (MT CO2e)	Emissions reductions per hour of charge (kg CO2e/h)
0%	Level 1	1.4	-	-	-	-	-	-
50%	Level 2 (low)	3.3	337,260	1,002,914	61	326	265	1
50%	Level 2 (high)	6.6	674,520	2,005,828	122	651	529	3
0%	DC Fast Charging	45	-	-	-	-	-	-
0%	Tesla Wall Connect	11.5	-	-	-	-	-	-
0%	Tesla Supercharger	120	-	-	-	-	-	-
			Total VMT	3,008,742		Total Reductions	794	

2050

Number of Chargers	200	
Number of Connections per Charge	2	
Average Charging hours per Connection per day	3	
Number of hours of charge per year for all chargers (h/year)	408,800	
Average Efficiency of EV LDV (kWh/100-mi) (1)	34	<-for MY2015-2018
Average Efficiency of Gasoline LDV in 2020 (mpg)	48	<-informational purposes only
GHG Emissions per kWh in Sacramento in 2050 (MTCO2e/kWh)	0.00018	
GHG Emissions per mi for average gasoline LDV (gCO2/mi)	175	
Emissions reductions per EV mi (kg CO2/mi)	0.11	

Percent Breakdown of Charger Types	Type of EV Charger	Charger Power (kW or kWh/h) (2)	Charged amount (kWh)	Equivalent VMT (mi)	EV emissions (MT CO2e)	Equivalent Gasoline emissions (MT CO2e)	Emissions reductions (MT CO2e)	Emissions reductions per hour of charge (kg CO2e/h)
0%	Level 1	1.4	-	-	-	-	-	-
50%	Level 2 (low)	3.3	674,520	2,005,828	122	351	230	1
50%	Level 2 (high)	6.6	1,349,040	4,011,656	243	703	460	1
0%	DC Fast Charging	45	-	-	-	-	-	-
0%	Tesla Wall Connect	11.5	-	-	-	-	-	-
0%	Tesla Supercharger	120	-	-	-	-	-	-
			Total VMT	6,017,485		Total Reductions	689	

Source:
(1) https://www.driveclean.ca.gov/pev/Charging.php
(2) http://www.fueleconomy.gov/feg/download.shtml

Emission Factors

Sector	Subsector	Source	Units	2013	2020	2030	2035	2050	Source
Residential	Electricity	SMUD	$MTCO_2e$/kWh	0.000240	0.000241	0.00018	0.00018	0.00018	2013: Pers. Comm. Dimitri Antoniou, June 28, 2016 2020: based on 2009 PUP of SMUD at 29% renewables 2030/2050: assumed 50% renewable
Residential	Natural Gas	PG&E	$MTCO_2e$/therm	0.005322					
Nonresidential	Electricity	SMUD	$MTCO_2e$/kWh	0.000240	0.000241	0.00018	0.00018	0.00018	2013: Pers. Comm. Dimitri Antoniou, June 28, 2016 2020: based on 2009 PUP of SMUD at 29% renewables 2030/2050: assumed 50% renewable
Nonresidential	Natural Gas	PG&E	$MTCO_2e$/therm	0.005322					
Transportation	On-Road	CARB EMFAC	$MTCO_2e$/VMT	0.000490					
Off-Road Equipme	Construction/Mining Equipment	MBI 2013							
Off-Road Equipme	Lawn/Garden Equipment	MBI 2013	MTCO2e/du	0.047909491					
Solid Waste	Municipal Solid Waste	CARB Landfill Model	$MTCO_2e$/ton	0.296272					
Solid Waste	Alternative Daily Cover	CARB Landfill Model	$MTCO_2e$/ton	0.246253					
Solid Waste	Landfills								
Water	Indirect Water	SMUD	$MTCO_2e$/kWh	0.000240	0.00024124	0.00018	0.00018	0.00018	2020: based on 2009 PUP of SMUD at 29% renewables 2030/2050: assumed 50% renewable
Wastewater	Indirect Wastewater	SMUD	$MTCO_2e$/kWh	0.000240	0.00024124	0.00018	0.00018	0.00018	2020: based on 2009 PUP of SMUD at 29% renewables 2030/2050: assumed 50% renewable
Wastewater	Fugitive								
Agriculture	Agriculture Equipment	MBI 2013	MTCO2e/acre	0.293072824					
Agriculture	Livestock								
Agriculture	Fertilizer	ICLEI US Community Protocol	$MTCO_2e$/acre	0.176829					
	Electricity	eGRID 2012	MT CH4/kWh	1.41158E-08					
	Electricity	eGRID 2012	MT N2O/kWh	2.57187E-09					

On-Road Vehicle Emission Factors

Year	CO2 (g/mi)	CH4 (g/mi)	N2O (g/mi)
2013	484.6539914	0.038390373	0.034721657
2020	410.2303345	0.019719851	0.016398179
2030	305.4721072	0.010447815	0.007443475
2040	275.2640092	0.007830538	0.005534158
2050	269.8689109	0.007178371	0.005034823

APPENDIX E:
NOISE MODELING DATA

Traffic Noise Spreadsheet Calculator

	Roadway Segments			Exisitng		Distance to Directional Centerline, (feet)		Future		Distance to Directional Centerline, (feet)		Lanes per direction						
												Exisitng	Future	Change in # of Lanes	Exisitng	Future	Change in Noise Level	Substamtial Noise Level Increase?
Number	Name	From	To	ADT	(mph)	Near	Far	ADT	(mph)	Near	Far			-	$(dBA)_{5,6,7}$	$(dBA)_{5,6,7}$	dBA	
1	**Big Horn Blvd**	Franklin Blvd	Bruceville Rd	18500	45	50	110	19500	45	50	110	2	2	-	69.5	69.7	0.2	No
2		Bruceville Rd	Laguna Blvd	20830	45	50	110	33900	45	50	110	2	2	-	70.0	72.1	2.1	Yes
3		Laguna Blvd	Elk Grove Blvd	15500	40	50	80	38500	40	50	80	2	2	-	67.9	71.9	4.0	Yes
4		Elk Grove Blvd	Lotz Pkwy	11390	45	45	85	34100	45	45	85	2	2	-	68.1	72.8	4.8	Yes
5		Lotz Pkwy	Whitelock Pkwy	6500	45	50	90	31100	45	50	90	2	2	-	65.3	72.1	6.8	Yes
6		Whitelock Pkwy	Bilby Rd	0	0	50	110	28700	45	50	110	2	2	-		71.4		Yes
7		Bilby Rd	Kammerer Rd	0	0	50	110	29800	45	50	110	2	2	-		71.6		Yes
8		Kammerer Rd	Eschinger Rd	0	0	50	110	35300	45	50	110	1	1	-		72.3		Yes
9	**Bilby Rd**	Franklin Blvd	Willard Pkwy	8220	30	45	56	10600	30	45	56	1	1	-	63.4	64.5	1.1	No
10		Willard Pkwy	Bruceville Rd	6830	55	45	56	13600	55	45	56	1	1	-	68.9	71.9	3.0	Yes
11		Bruceville Rd	Big Horn Blvd	280	55	45	56	6400	55	45	56	2	2	-	55.0	68.6	13.6	Yes
12		Big Horn Blvd	Lotz Pkwy	0	0	0	0	7600	55	50	110			-		68.0		Yes
13		Lotz Pkwy	Promenade Pkwy	0	0	0	0	7400	55	50	110			-		67.9		Yes
14	**Bond Rd**	SR 99	E Stockton Blvd	31110	45	65	150	44800	45	65	150	3	3	-	70.6	72.1	1.6	Yes
15		E Stockton Blvd	Elk Crest Dr	31000	45	50	95	54100	45	50	95	2	2	-	72.0	74.4	2.4	Yes
16		Elk Crest Dr	Elk Grove Florin Rd	30890	45	25	75	43800	45	25	75	2	2	-	74.4	75.9	1.5	Yes
17		Elk Grove Florin Rd	Waterman Rd	25830	45	40	80	41200	45	40	80	2	2	-	72.1	74.1	2.0	Yes
18		Waterman Rd	Bradshaw Rd	17940	45	40	85	32000	45	40	85	1	1	-	70.4	72.9	2.5	Yes
19		Bradshaw Rd	Bader Rd	12560	45	95	101	16300	45	95	101	1	1	-	66.3	67.4	1.1	No
20		Bader Rd	Grant Line Rd	6390	45	95	101	10200	45	95	101	1	2	1	63.4	65.4	2.0	No
21	**Bradshaw Rd**	Vintage Park Dr	Calvine Rd	19940	55	50	110	38300	55	40	80	1	2	1	72.2	76.1	3.9	Yes
22		Calvine Rd	Sheldon Rd	10670	55	110	112	37200	55	40	80	1	2	1	67.4	76.0	8.6	Yes
23		Sheldon Rd	Bond Rd	11890	55	100	112	39800	55	40	80	1	2	1	68.0	76.3	8.2	Yes
24		Bond Rd	Elk Grove Blvd	9440	55	100	112	39400	55	40	80	1	2	1	67.0	76.2	9.2	Yes
25		Elk Grove Blvd	Grant Line Rd	6000	55	90	102	37500	55	40	80	2	2	-	65.5	76.0	10.5	Yes
26	**Bruceville Rd**	Damascus Dr	Sheldon Rd	17500	40	60	126	37800	40	60	126	2	3	1	67.3	70.6	3.3	Yes
27		Sheldon Rd	Big Horn Blvd	26000	45	100	112	60100	45	100	112	2	3	1	69.1	72.8	3.6	Yes
28		Big Horn Blvd	Laguna Blvd	25500	40	60	100	51500	40	100	112	2	2	-	69.2	70.8	1.6	Yes
29		Laguna Blvd	Elk Grove Blvd	23780	40	50	120	38000	40	60	100	2	2	-	69.2	71.0	1.8	Yes
30		Elk Grove Blvd	Whitelock Pkwy	19440	40	50	120	41100	40	60	100	1	2	1	68.3	71.3	3.0	Yes
31		Whitelock Pkwy	Bilby Rd	8170	45	65	76	29800	45	60	100	1	2	1	65.9	71.2	5.3	Yes
32		Bilby Rd	Kammerer Rd	7330	55	55	66	27700	55	60	100	1	2	1	68.4	73.2	4.8	Yes
33		Kammerer Rd	Eschinger Rd	2280	55	55	66	34900	55	60	100	2	3	1	63.3	74.2	10.9	Yes
34	**Calvine Rd**	Power Inn Rd	Elk Grove Florin Rd	31830	45	50	125	60000	45	50	125	2	3	1	71.7	74.5	2.8	Yes
35		Elk Grove Florin Rd	Waterman Rd	28220	45	60	130	51600	45	50	125	2	2	-	70.6	73.8	3.2	Yes
36		Waterman Rd	Bradshaw Rd	22610	45	70	130	34300	45	70	130	2	2	-	69.2	71.0	1.8	Yes
37		Bradshaw Rd	Vineyard Rd	11110	55	55	110	29300	55	55	110	1	2	1	69.3	73.6	4.2	Yes
38		Vineyard Rd	Excelsior Rd	11110	55	90	101	26500	55	55	110	1	2	1	68.2	73.1	4.9	Yes
39		Excelsior Rd	Grant Line Rd	4830	55	65	76	22500	55	55	110	1	2	1	65.9	72.4	6.5	Yes
40	**Center Parkway**	Laguna Village	Bruceville Rd	11830	40	60	110	22100	40	60	110	1	2	1	65.8	68.5	2.7	Yes
41	**E. Stockton Blvd**	Grant Line Rd	Elk Grove Florin Rd	8330	40	90	101	27900	40	55	110	3	3	-	63.3	69.7	6.4	Yes
42	**Elk Grove Blvd**	I-5	Harbour Point Dr	26440	45	90	150	35400	45	90	150	3	3	-	68.9	70.2	1.3	No
43		Harbour Point Dr	Four Winds Dr	30670	50	100	165	40400	50	100	165	3	3	-	70.3	71.5	1.2	No
44		Four Winds Dr	Franklin Blvd	40890	50	125	185	49200	50	125	185	3	3	-	70.8	71.6	0.8	No
45		Franklin Blvd	Bruceville Rd	33060	50	70	135	42400	50	70	135	3	3	-	72.0	73.0	1.1	No
46		Bruceville Rd	Big Horn Blvd	33330	50	60	125	53500	50	60	125	3	3	-	72.6	74.6	2.1	Yes
47		Big Horn Blvd	Laguna Springs Dr	36780	50	125	190	51800	50	125	190	3	3	-	70.3	71.8	1.5	Yes
48		Laguna Springs Dr	Auto Center Dr	37440	50	50	135	55600	50	50	135	3	3	-	73.5	75.2	1.7	Yes
49		Auto Center Dr	SR 99	39560	50	50	150	59700	50	50	150	3	3	-	73.6	75.4	1.8	Yes
50		SR 99	rald Vista Dr / E Stockton	40440	50	65	130	64700	50	65	130	2	2	-	73.1	75.1	2.0	Yes

Traffic Noise Spreadsheet Calculator

	Roadway Segments			Exisitng		Distance to Directional Centerline, (feet)		Future		Distance to Directional Centerline, (feet)		Lanes per direction			Exisitng	Future	Change in Noise Level	Substamtial Noise Level Increase?
												Exisitng	Future	Change in # of Lanes				
Number	Name	From	To	ADT	(mph)	Near	Far	ADT	(mph)	Near	Far			-	$(dBA)_{5,6,7}$	$(dBA)_{5,6,7}$	dBA	
51		Emerald Vista Dr / E Stockton	Elk Grove Florin Rd	29890	35	50	95	48400	35	50	95	1	1	-	69.2	71.3	2.1	Yes
52		Elk Grove Florin Rd	Waterman Rd	14280	25	50	75	19700	25	50	75	1	2	1	63.8	65.2	1.4	No
53		Waterman Rd	Bradshaw Rd	10610	35	50	80	16800	35	50	80	1	2	1	64.9	66.9	2.0	No
54		Bradshaw Rd	Grant Line Rd	4110	40	110	121	8100	40	110	121	2	3	1	59.4	62.4	2.9	No
55	**Elk Grove Florin Rd**	Vintage Park Dr	Calvine Rd	30220	45	70	140	53000	45	70	140	2	3	1	70.3	72.8	2.4	Yes
56		Calvine Rd	Sheldon Rd	28720	45	50	110	56400	45	50	110	2	2	-	71.4	74.3	2.9	Yes
57		Sheldon Rd	Bond Rd	24720	45	65	120	41200	45	65	120	2	2	-	69.9	72.1	2.2	Yes
58		Bond Rd	Elk Grove Blvd	19440	35	40	82	35800	35	40	82	1	2	1	68.2	70.8	2.7	Yes
59		Elk Grove Blvd	E Stockton Blvd	16490	35	40	60	19300	35	40	60			-	67.9	68.6	0.7	No
60	**Eschinger Rd**	Willard Pkwy	Bruceville Rd	0	0	60	72	19400	45	40	60			-		71.3		Yes
61		Bruceville Rd	Big Horn Blvd	0	0	60	72	25900	45	40	60			-		72.5		Yes
62		Big Horn Blvd	Lotz Pkwy	0	0	60	72	31900	45	40	60			-		73.4		Yes
63		Lotz Pkwy	Promenade Pkwy	0	0	60	72	33600	45	40	60	1	1	-		73.7		Yes
64	**Excelsior Rd**	Gerber Rd	Calvine Rd	6110	45	110	121	19300	45	110	121	1	1	-	62.5	67.4	5.0	Yes
65		Calvine Rd	Sheldon Rd	5110	45	75	110	16300	45	75	110	3	3	-	62.8	67.8	5.0	Yes
66	**Franklin Blvd**	Sims Rd	Big Horn Blvd	30000	45	70	130	41200	45	70	130	2	2	-	70.4	71.8	1.4	No
67		Big Horn Blvd	Laguna Blvd	28110	45	65	125	35400	45	65	125	2	2	-	70.4	71.4	1.0	No
68		Laguna Blvd	Elk Grove Blvd	20670	45	65	125	31900	45	65	125	1	1	-	69.0	70.9	1.9	Yes
69		Elk Grove Blvd	Whitelock Pkwy	20780	45	130	175	34200	45	130	175	1	1	-	66.6	68.8	2.2	Yes
70		Whitelock Pkwy	Bilby Rd	0	0	65	140	2200	45	65	140	1	1	-		59.1		No
71		Bilby Rd	Hood Franklin Rd	0	0	65	125	3900	45	65	125	1	1	-		61.8		Yes
72		Hood Franklin Rd	Lambert Rd	0	0	65	125	1800	45	65	125	1	2	1		58.4		No
73	**Grant Line Rd**	Sloughhouse Rd	Calvine Rd	19670	55	70	82	40500	55	65	125	1	2	1	71.7	74.3	2.6	Yes
74		Calvine Rd	Sheldon Rd	16060	55	100	112	33500	55	50	95	1	2	1	69.4	74.6	5.3	Yes
75		Sheldon Rd	Wilton Rd	18830	55	70	85	36600	55	50	95	1	2	1	71.4	75.0	3.6	Yes
76		Wilton Rd	Bond Rd	17220	55	75	86	37600	55	50	95	1	2	1	70.9	75.1	4.3	Yes
77		Bond Rd	Elk Grove Blvd	12000	55	90	102	29400	55	50	95	1	4	3	68.5	74.1	5.5	Yes
78		Elk Grove Blvd	Bradshaw Rd	8220	55	110	122	25200	55	110	122	1	4	3	66.1	70.9	4.9	Yes
79		Bradshaw Rd	Mosher Rd	13890	55	95	107	63300	55	95	107	1	4	3	68.9	75.5	6.6	Yes
80		Mosher Rd	Waterman Rd	14890	55	95	107	66800	55	95	107	2	4	2	69.2	75.8	6.5	Yes
81		Waterman Rd	E. Stockton / Survey Rd	19330	55	95	107	100000	55	95	107	3	4	1	70.4	77.5	7.1	Yes
82		E. Stockton / Survey Rd	SR 99	23940	55	75	175	110700	55	75	175	2	2	-	71.1	77.8	6.7	Yes
83	**Harbour Point Dr**	Elk Grove Blvd	Laguna Blvd	11610	45	65	110	17900	45	65	110	1	2	1	66.7	68.6	1.9	Yes
84	**Hood Franklin Rd**	I-5	Franklin Blvd	6900	55	80	92	46800	55	80	92	1	3	2	66.6	74.9	8.3	Yes
85	**Kammerer Rd**	Franklin Blvd	Willard Pkwy	0	0	40	52	44500	55	70	150	1	3	2		74.2		Yes
86		Willard Pkwy	Bruceville Rd	0	0	40	52	50800	55	70	150	1	3	2		74.8		Yes
87		Bruceville Rd	Big Horn Blvd	0	0	40	52	62000	55	70	150	1	3	2		75.7		Yes
88		Big Horn Blvd	Lotz Pkwy	7610	55	50	62	72000	55	70	150	3	3	-	68.9	76.3	7.4	Yes
89		Lotz Pkwy	Promenade Pkwy	7670	55	70	150	68600	55	70	150	3	3	-	66.6	76.1	9.5	Yes
90		Promenade Pkwy	SR 99	12890	55	70	150	92300	55	70	150	3	3	-	68.8	77.4	8.5	Yes
91	**Laguna Blvd**	SR 99	Franklin Blvd	31500	45	65	130	37600	45	65	125	3	3	-	70.8	71.6	0.8	No
92		Franklin Blvd	Bruceville Rd	29220	45	65	125	32800	45	65	125	3	3	-	70.5	71.0	0.5	No
93		Bruceville Rd	Big Horn Blvd	29330	45	60	125	28000	45	65	125	3	3	-	70.8	70.4	-0.4	No
94		Big Horn Blvd	Laguna Springs Dr	36280	45	65	150	53700	45	65	125	3	3	-	71.2	73.2	2.0	Yes
95		Laguna Springs Dr	SR 99	35440	45	65	150	66100	45	65	125	2	2	-	71.1	74.1	3.0	Yes
96	**Laguna Springs Dr**	Laguna Blvd	Laguna Palms Wy	12000	35	55	105	15900	35	55	105	1	1	-	64.8	66.0	1.2	No
97		Laguna Palms Wy	Elk Grove Blvd	12000	35	50	75	13200	35	50	75	2	2	-	65.6	66.0	0.4	No
98		Elk Grove Blvd	Lotz Pkwy	4610	35	55	95	26700	35	55	95	2	2	-	60.8	68.4	7.6	Yes
99	**Lent Ranch Pkwy**	Kammerer Rd	Promenade Pkwy	110	35	50	95	13200	35	50	95	1	1	-	44.8	65.6	20.8	Yes
100	**Lewis Stein Rd**	Sheldon Rd	Big Horn Blvd	10720	35	45	80	14000	35	45	80	2	2	-	65.3	66.4	1.2	No

Traffic Noise Spreadsheet Calculator

Number	Roadway Segments			Exisitng		Distance to Directional Centerline, (feet)		Future		Distance to Directional Centerline, (feet)		Lanes per direction						
												Exisitng	Future	Change in # of Lanes	Exisitng	Future	Change in Noise Level	Substamtial Noise Level Increase?
Number	Name	From	To	ADT	(mph)	Near	Far	ADT	(mph)	Near	Far			-	$(dBA)_{5,6,7}$	$(dBA)_{5,6,7}$	dBA	
101	**Lotz Pkwy**	Big Horn Blvd	Laguna Springs Dr	3000	35	60	100	15500	35	60	100	2	2	-	58.6	65.7	7.1	Yes
102		Laguna Springs Dr	Whitelock Pkwy	670	35	52	68	17000	35	52	68		3	3	53.1	67.2	14.0	Yes
103		Whitelock Pkwy	Promenade Pkwy	0	0	52	68	44200	35	52	68		2	2		71.3		Yes
104		Promenade Pkwy	Bilby Rd	0	0	52	68	28900	35	52	68		2	2		69.5		Yes
105		Bilby Rd	Kammerer Rd	0	0	52	68	22200	35	52	68		2	2		68.3		Yes
106		Kammerer Rd	Eschinger Rd	0	0	52	68	39000	35	52	68	1	1	-		70.8		Yes
107	**Mosher**	Grant Line Rd	Waterman Rd	2000	50	50	62	7600	50	50	62	2	2	-	62.0	67.8	5.8	Yes
108	**Power Inn Rd**	Calvine Rd	Sheldon Rd	13440	35	50	90	19500	35	50	90	2	2	-	65.8	67.4	1.6	Yes
109	**Promenade Pkwy**	Lotz Pkwy	Bilby Rd	0	0	50	90	17800	45	50	90		3	3		69.6		Yes
110		Bilby Rd	Kammerer Rd	5280	45	45	130	27800	45	65	125	1	1	-	64.2	70.3	6.1	Yes
111		Kammerer Rd	Eschinger Rd	0	0	45	130	16000	45	65	125	0	3	3		67.9		Yes
112	**Sheldon Rd**	Bruceville Rd	Lewis Stein Rd	18720	45	65	125	37700	45	65	125	2	3	1	68.6	71.7	3.0	Yes
113		Lewis Stein Rd	SR 99	25940	45	50	135	47400	45	65	125	3	3	-	70.7	72.6	1.9	Yes
114		SR 99	E. Stockton Blvd	34170	45	75	130	58900	45	65	125	3	3	-	70.8	73.6	2.8	Yes
115		E. Stockton Blvd	Power Inn Rd	30670	45	60	125	51900	45	65	125	2	2	-	71.0	73.0	2.1	Yes
116		Power Inn Rd	Elk Grove Florin Rd	22500	45	65	115	43900	45	65	115	2	2	-	69.5	72.4	2.9	Yes
117		Elk Grove Florin Rd	Waterman Rd	11780	45	90	102	21700	45	90	102	1	1	-	66.1	68.8	2.7	Yes
118		Waterman Rd	Bradshaw Rd	7110	45	50	62	19400	45	50	62	1	1	-	66.3	70.7	4.4	Yes
119		Bradshaw Rd	Bader Rd	6390	45	50	62	14500	45	50	62	1	1	-	65.8	69.4	3.6	Yes
120		Bader Rd	Dillard Oaks Ct	5610	45	60	72	14500	45	60	72	1	1	-	64.5	68.7	4.1	Yes
121		Excelsior Rd	Grant Line Rd	6670	45	60	72	22900	45	60	72	1	1	-	65.3	70.6	5.4	Yes
122	**Waterman Rd**	Vintage Park Dr	Calvine Rd	9220	55	50	95	30400	55	50	95	1	1	-	69.0	74.2	5.2	Yes
123		Calvine Rd	Sheldon Rd	10060	55	52	64	17500	55	52	64	1	1	-	70.0	72.4	2.4	Yes
124		Sheldon Rd	Bond Rd	9940	55	130	142	20900	55	130	142	1	1	-	66.2	69.4	3.2	Yes
125		Bond Rd	Elk Grove Blvd	11560	55	50	62	23300	55	50	62	2	2	-	70.7	73.8	3.0	Yes
126		Elk Grove Blvd	Grant Line Rd	7110	55	65	110	25600	55	65	110	2	2	-	66.9	72.5	5.6	Yes
127	**Whitelock Pkwy**	Franklin Blvd	Bruceville Rd	14000	40	55	100	8800	40	55	100	2	2	-	66.9	64.9	-2.0	No
128		Bruceville Rd	Big Horn Blvd	7440	40	70	125	8900	40	70	125	2	2	-	63.1	63.9	0.8	No
129		Big Horn Blvd	Lotz Pkwy	5190	40	70	82	15400	40	70	82	2	2	-	62.3	67.0	4.7	Yes
130		Lotz Pkwy	SR 99	0	0	65	77	50400	40	65	77	2	2	-		72.5		Yes
131	**Willard Pkwy**	Whitelock Pkwy	Bilby	6940	50	70	140	31600	50	70	140	2	2	-	65.1	71.7	6.6	Yes
132		Bilby Rd	Kammerer Rd	1280	50	65	125	21100	50	65	125	2	2	-	58.2	70.3	12.2	Yes
133	**Wilton Rd**	Grant Line Rd	Leisure Oak Ln	9940	55	70	82	14800	55	70	82	2	2	-	68.7	70.5	1.7	Yes
	SR-99	Calvine Rd	Sheldon Rd	104500	65	90	190	202800	65	90	190	2	2	-	78.8	81.7	2.9	Yes
		Sheldon Rd	Bond Rd	96500	65	120	220	196300	65	120	220	2	2	-	77.4	80.5	3.1	Yes
		Bond Rd	Elk Grove Blvd	81300	65	136	210	177700	65	136	210	2	2	-	76.4	79.8	3.4	Yes
		Elk Grove Blvd	Whitelock Pkwy	71500	65	95	175	157900	65	95	175	2	2	-	77.2	80.6	3.4	Yes
		Whitelock Pkwy	Grant Line Rd	71500	65	560	690	132700	65	560	690	2	2	-	70.1	72.8	2.7	Yes
		Grant Line Rd	Eschinger Rd	76900	65	160	260	131900	65	160	260	2	2	-	75.4	77.7	2.3	Yes
	I-5	Cosumnes River Blvd	Laguna Blvd	95600	65	2650	2750	155200	65	2650	2750	2	2	-	65.0	67.1	2.1	Yes
		Laguna Blvd	Elk Grove Blvd	76700	65	170	295	130700	65	170	295	2	2	-	75.0	77.3	2.3	Yes
		Elk Grove Blvd	Hood Franklin Rd	64000	65	190	320	113200	65	190	320	2	2	-	73.8	76.3	2.5	Yes
		Hood Franklin Rd	Twin Cities Rd	53000	65	2626	2750	81600	65	2626	2750	2	2	-	62.5	64.3	1.9	Yes

Traffic Noise Spreadsheet Calculator

Project: Elk Grove GPU_Existing

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

Number	Name	From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet)4 Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	Ldn, (dBA)5,6,7	Distance to Contour, (feet)3 70 dBA	65 dBA	60 dBA	55 dBA
	Segment Description and Location			Input										Output				
#REF!																		
1		Franklin Blvd	Bruceville Rd	18,500	45	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.5	66	209	662	2093
2		Bruceville Rd	Laguna Blvd	20,830	45	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.0	75	236	745	2357
3		Laguna Blvd	Elk Grove Blvd	15,500	40	50	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.9	39	124	393	1243
4	Big Horn Blvd	Elk Grove Blvd	Lotz Pkwy	11,390	45	45	85	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.1	40	126	397	1256
5		Lotz Pkwy	Whitelock Pkwy	6,500	45	50	90	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.3	23	71	225	712
6		Whitelock Pkwy	Bilby Rd	-	-	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
7		Bilby Rd	Kammerer Rd	-	-	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
8		Kammerer Rd	Eschinger Rd	-	-	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
9		Franklin Blvd	Willard Pkwy	8,220	30	45	56	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	63.4	11	35	110	347
10		Willard Pkwy	Bruceville Rd	6,830	55	45	56	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.9	39	123	390	1232
11	Bilby Rd	Bruceville Rd	Big Horn Blvd	280	55	45	56	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	55.0	2	5	16	51
12		Big Horn Blvd	Lotz Pkwy	-	-			86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
13		Lotz Pkwy	Promenade Pkwy	-	-			86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
14		SR 99	E Stockton Blvd	31,110	45	65	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.6	112	355	1124	3553
15		E Stockton Blvd	Elk Crest Dr	31,000	45	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.0	108	342	1082	3421
16		Elk Crest Dr	Elk Grove Florin Rd	30,890	45	25	75	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.4	118	374	1183	3742
17	Bond Rd	Elk Grove Florin Rd	Waterman Rd	25,830	45	40	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.1	91	287	909	2874
18		Waterman Rd	Bradshaw Rd	17,940	45	40	85	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.4	64	202	638	2017
19		Bradshaw Rd	Bader Rd	12,560	45	95	101	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.3	42	132	417	1318
20		Bader Rd	Grant Line Rd	6,390	45	95	101	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	63.4	21	67	212	671
21		Vintage Park Dr	Calvine Rd	19,940	55	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.2	122	386	1220	3856
22		Calvine Rd	Sheldon Rd	10,670	55	110	112	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.4	60	191	605	1913
23	Bradshaw Rd	Sheldon Rd	Bond Rd	11,890	55	100	112	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.0	68	214	675	2135
24		Bond Rd	Elk Grove Blvd	9,440	55	100	112	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.0	54	170	536	1695
25		Elk Grove Blvd	Grant Line Rd	6,000	55	90	102	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.5	34	108	341	1078
26		Damascus Dr	Sheldon Rd	17,500	40	60	126	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.3	46	146	462	1461
27		Sheldon Rd	Big Horn Blvd	26,000	45	100	112	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.1	86	273	864	2732
28		Big Horn Blvd	Laguna Blvd	25,500	40	60	100	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.2	65	206	650	2055
29	Bruceville Rd	Laguna Blvd	Elk Grove Blvd	23,780	40	50	120	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.2	64	204	644	2037
30		Elk Grove Blvd	Whitelock Pkwy	19,440	40	50	120	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.3	53	166	526	1665
31		Whitelock Pkwy	Bilby Rd	8,170	45	65	76	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.9	27	86	272	860
32		Bilby Rd	Kammerer Rd	7,330	55	55	66	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.4	42	132	417	1320
33		Kammerer Rd	Eschinger Rd	2,280	55	55	66	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	63.3	13	41	130	410
34		Power Inn Rd	Elk Grove Florin Rd	31,830	45	50	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.7	117	370	1169	3696
35		Elk Grove Florin Rd	Waterman Rd	28,220	45	60	130	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.6	101	318	1007	3184
36	Calvine Rd	Waterman Rd	Bradshaw Rd	22,610	45	70	130	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.2	79	249	786	2486
37		Bradshaw Rd	Vineyard Rd	11,110	55	55	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.3	67	211	668	2113
38		Vineyard Rd	Excelsior Rd	11,110	55	90	101	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.2	63	200	631	1995
39		Excelsior Rd	Grant Line Rd	4,830	55	65	76	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.9	27	87	275	869
40	Center Parkway	Laguna Village	Bruceville Rd	11,830	40	60	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.8	31	97	305	966
41	E. Stockton Blvd	Grant Line Rd	Elk Grove Florin Rd	8,330	40	90	101	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	63.3	21	65	206	651
42		I-5	Harbour Point Dr	26,440	45	90	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.9	91	286	906	2865
43		Harbour Point Dr	Four Winds Dr	30,670	50	100	165	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.3	138	438	1385	4380
44		Four Winds Dr	Franklin Blvd	40,890	50	125	185	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.8	182	577	1825	5770
45		Franklin Blvd	Bruceville Rd	33,060	50	70	135	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.0	153	483	1526	4826
46		Bruceville Rd	Big Horn Blvd	33,330	50	60	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.6	156	493	1558	4928
47		Big Horn Blvd	Laguna Springs Dr	36,780	50	125	190	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.3	165	520	1646	5204
48	Elk Grove Blvd	Laguna Springs Dr	Auto Center Dr	37,440	50	50	135	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.5	185	584	1845	5835
49		Auto Center Dr	SR 99	39,560	50	50	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.6	200	632	2000	6324
50		SR 99	nerald Vista Dr / E Stockton Bl	40,440	50	65	130	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.1	188	594	1878	5938

Traffic Noise Spreadsheet Calculator

Project: Elk Grove GPU_Existing

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

		Segment Description and Location		Input										Output				
					Speed	Distance to Directional Centerline, (feet)4		Traffic Distribution Characteristics						Ldn,	Distance to Contour, (feet)3			
Number	Name	From	To	ADT	(mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	(dBA)5,6,7	70 dBA	65 dBA	60 dBA	55 dBA
#REF!																		
51		nerald Vista Dr / E Stockton Bl	Elk Grove Florin Rd	29,890	35	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.2	57	180	569	1800
52		Elk Grove Florin Rd	Waterman Rd	14,280	25	50	75	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	63.8	15	46	146	462
53		Waterman Rd	Bradshaw Rd	10,610	35	50	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	64.9	20	62	197	624
54		Bradshaw Rd	Grant Line Rd	4,110	40	110	121	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	59.4	10	32	102	321
55	Elk Grove Florin Rd	Vintage Park Dr	Calvine Rd	30,220	45	70	140	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.3	106	336	1063	3362
56		Calvine Rd	Sheldon Rd	28,720	45	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.4	103	325	1028	3250
57		Sheldon Rd	Bond Rd	24,720	45	65	120	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.9	86	272	859	2716
58		Bond Rd	Elk Grove Blvd	19,440	35	40	82	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.2	37	119	375	1185
59		Elk Grove Blvd	E Stockton Blvd	16,490	35	40	60	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.9	30	96	305	963
60	Eschinger Rd	Willard Pkwy	Bruceville Rd	-	-	60	72	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
61		Bruceville Rd	Big Horn Blvd	-	-	60	72	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
62		Big Horn Blvd	Lotz Pkwy	-	-	60	72	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
63		Lotz Pkwy	Promenade Pkwy	-	-	60	72	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
64	Excelsior Rd	Gerber Rd	Calvine Rd	6,110	45	110	121	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	62.5	20	64	203	642
65		Calvine Rd	Sheldon Rd	5,110	45	75	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	62.8	17	55	173	546
66	Franklin Blvd	Sims Rd	Big Horn Blvd	30,000	45	70	130	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.4	104	330	1043	3299
67		Big Horn Blvd	Laguna Blvd	28,110	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.4	98	311	983	3108
68		Laguna Blvd	Elk Grove Blvd	20,670	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.0	72	229	723	2285
69		Elk Grove Blvd	Whitelock Pkwy	20,780	45	130	175	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.6	70	220	697	2204
70		Whitelock Pkwy	Bilby Rd	-	-	65	140	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
71		Bilby Rd	Hood Franklin Rd	-	-	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
72		Hood Franklin Rd	Lambert Rd	-	-	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
73	Grant Line Rd	Sloughhouse Rd	Calvine Rd	19,670	55	70	82	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.7	112	354	1119	3538
74		Calvine Rd	Sheldon Rd	16,060	55	100	112	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.4	91	288	912	2884
75		Sheldon Rd	Wilton Rd	18,830	55	70	85	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.4	107	339	1073	3392
76		Wilton Rd	Bond Rd	17,220	55	75	86	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.9	98	309	979	3095
77		Bond Rd	Elk Grove Blvd	12,000	55	90	102	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.5	68	216	682	2156
78		Elk Grove Blvd	Bradshaw Rd	8,220	55	110	122	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.1	47	148	467	1476
79		Bradshaw Rd	Mosher Rd	13,890	55	95	107	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.9	79	249	789	2495
80		Mosher Rd	Waterman Rd	14,890	55	95	107	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.2	85	267	846	2674
81		Waterman Rd	E. Stockton / Survey Rd	19,330	55	95	107	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.4	110	347	1098	3472
82		E. Stockton / Survey Rd	SR 99	23,940	55	75	175	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.1	148	468	1481	4683
83	Harbour Point Dr	Elk Grove Blvd	Laguna Blvd	11,610	45	65	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.7	40	126	399	1260
84	Hood Franklin Rd	I-5	Franklin Blvd	6,900	55	80	92	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.6	39	124	392	1240
85	Kammerer Rd	Franklin Blvd	Willard Pkwy	-	-	40	52	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
86		Willard Pkwy	Bruceville Rd	-	-	40	52	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
87		Bruceville Rd	Big Horn Blvd	-	-	40	52	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
88		Big Horn Blvd	Lotz Pkwy	7,610	55	50	62	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.9	43	137	434	1372
89		Lotz Pkwy	Promenade Pkwy	7,670	55	70	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.6	47	148	467	1476
90		Promenade Pkwy	SR 99	12,890	55	70	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.8	78	248	785	2481
91	Laguna Blvd	SR 99	Franklin Blvd	31,500	45	65	130	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.8	111	350	1108	3505
92		Franklin Blvd	Bruceville Rd	29,220	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.5	102	323	1022	3231
93		Bruceville Rd	Big Horn Blvd	29,330	45	60	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.8	104	329	1039	3286
94		Big Horn Blvd	Laguna Springs Dr	36,280	45	65	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.2	131	414	1310	4143
95		Laguna Springs Dr	SR 99	35,440	45	65	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.1	128	405	1280	4047
96	Laguna Springs Dr	Laguna Blvd	Laguna Palms Wy	12,000	35	55	105	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	64.8	23	72	229	723
97		Laguna Palms Wy	Elk Grove Blvd	12,000	35	50	75	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.6	22	70	222	701
98		Elk Grove Blvd	Lotz Pkwy	4,610	35	55	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	60.8	9	27	87	274
99	Lent Ranch Pkwy	Kammerer Rd	Promenade Pkwy	110	35	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	44.8		1	2	7
100	Lewis Stein Rd	Sheldon Rd	Big Horn Blvd	10,720	35	45	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.3	20	64	202	639

Traffic Noise Spreadsheet Calculator

Project: Elk Grove GPU_Existing

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

Number	Name	From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet)[4] Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	Ldn, (dBA)[5,6,7]	Distance to Contour, (feet)[3] 70 dBA	65 dBA	60 dBA	55 dBA
#REF!																		
101	Lotz Pkwy	Big Horn Blvd	Laguna Springs Dr	3,000	35	60	100	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	58.6	6	18	56	177
102		Laguna Springs Dr	Whitelock Pkwy	670	35	52	68	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	53.1	1	4	12	39
103		Whitelock Pkwy	Promenade Pkwy	-	-	52	68	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
104		Promenade Pkwy	Bilby Rd	-	-	52	68	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
105		Bilby Rd	Kammerer Rd	-	-	52	68	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
106		Kammerer Rd	Eschinger Rd	-	-	52	68	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
107	Mosher	Grant Line Rd	Waterman Rd	2,000	50	50	62	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	62.0	9	28	88	278
108	Power Inn Rd	Calvine Rd	Sheldon Rd	13,440	35	50	90	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.8	25	80	254	803
109	Promenade Pkwy	Lotz Pkwy	Bilby Rd	-	-	50	90	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
110		Bilby Rd	Kammerer Rd	5,280	45	45	130	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	64.2	20	63	200	634
111		Kammerer Rd	Eschinger Rd	-	-	45	130	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
112	Sheldon Rd	Bruceville Rd	Lewis Stein Rd	18,720	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.6	65	207	654	2070
113		Lewis Stein Rd	SR 99	25,940	45	50	135	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.7	97	306	969	3064
114		SR 99	E. Stockton Blvd	34,170	45	75	130	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.8	118	372	1177	3721
115		E. Stockton Blvd	Power Inn Rd	30,670	45	60	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.0	109	344	1087	3436
116		Power Inn Rd	Elk Grove Florin Rd	22,500	45	65	115	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.5	78	246	777	2457
117		Elk Grove Florin Rd	Waterman Rd	11,780	45	90	102	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.1	39	124	392	1238
118		Waterman Rd	Bradshaw Rd	7,110	45	50	62	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.3	24	75	237	750
119		Bradshaw Rd	Bader Rd	6,390	45	50	62	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.8	21	67	213	674
120		Bader Rd	Dillard Oaks Ct	5,610	45	60	72	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	64.5	19	59	187	591
121		Excelsior Rd	Grant Line Rd	6,670	45	60	72	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.3	22	70	222	703
122	Waterman Rd	Vintage Park Dr	Calvine Rd	9,220	55	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.0	55	174	550	1739
123		Calvine Rd	Sheldon Rd	10,060	55	52	64	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.0	57	181	573	1813
124		Sheldon Rd	Bond Rd	9,940	55	130	142	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.2	56	178	564	1784
125		Bond Rd	Elk Grove Blvd	11,560	55	50	62	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.7	66	208	659	2085
126		Elk Grove Blvd	Grant Line Rd	7,110	55	65	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.9	42	132	417	1319
127	Whitelock Pkwy	Franklin Blvd	Bruceville Rd	14,000	40	55	100	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.9	36	114	361	1142
128		Bruceville Rd	Big Horn Blvd	7,440	40	70	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	63.1	19	61	191	605
129		Big Horn Blvd	Lotz Pkwy	5,190	40	70	82	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	62.3	13	41	128	406
130		Lotz Pkwy	SR 99	-	-	65	77	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%					
131	Willard Pkwy	Whitelock Pkwy	Bilby	6,940	50	70	140	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.1	32	102	322	1019
132		Bilby Rd	Kammerer Rd	1,280	50	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	58.2	6	19	59	187
133	Wilton Rd	Grant Line Rd	Leisure Oak Ln	9,940	55	70	82	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.7	57	179	565	1788
134	SR-99	Calvine Rd	Sheldon Rd	104,500	65	90	190	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	78.8	1000	3162	9999	31620
135		Sheldon Rd	Bond Rd	96,500	65	120	220	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	77.4	902	2854	9024	28536
136		Bond Rd	Elk Grove Blvd	81,300	65	136	210	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	76.4	744	2352	7438	23522
137		Elk Grove Blvd	Whitelock Pkwy	71,500	65	95	175	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	77.2	669	2116	6691	21158
138		Whitelock Pkwy	Grant Line Rd	71,500	65	560	690	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	70.1	643	2032	6425	20318
139		Grant Line Rd	Eschinger Rd	76,900	65	160	260	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	75.4	708	2238	7077	22378
140	I-5	Cosumnes River Blvd	Laguna Blvd	95,600	65	2650	2750	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	65.0	855	2702	8546	27024
141		Laguna Blvd	Elk Grove Blvd	76,700	65	170	295	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	75.0	712	2251	7117	22506
142		Elk Grove Blvd	Hood Franklin Rd	64,000	65	190	320	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	73.8	592	1871	5915	18706
143		Hood Franklin Rd	Twin Cities Rd	53,000	65	2626	2750	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	62.5	474	1498	4738	14983

Column groups: Segment Description and Location (Number, Name, From, To); Input (ADT through % Night; Traffic Distribution Characteristics: % Auto through % Night); Output (Ldn and Distance to Contour).

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator

Project: Elk Grove GPU_Future

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

Number	Name	Segment Description and Location From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet)[4] Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	Ldn, (dBA)[5,6,7]	Distance to Contour, (feet)[3] 70 dBA	65 dBA	60 dBA	55 dBA
					Input									Output				
#REF!																		
1		Franklin Blvd	Bruceville Rd	19,500	45	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.7	70	221	698	2207
2		Bruceville Rd	Laguna Blvd	33,900	45	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.1	121	384	1213	3836
3		Laguna Blvd	Elk Grove Blvd	38,500	40	50	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.9	98	309	977	3088
4	Big Horn Blvd	Elk Grove Blvd	Lotz Pkwy	34,100	45	45	85	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.8	119	376	1189	3760
5		Lotz Pkwy	Whitelock Pkwy	31,100	45	50	90	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.1	108	340	1077	3404
6		Whitelock Pkwy	Bilby Rd	28,700	45	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.4	103	325	1027	3248
7		Bilby Rd	Kammerer Rd	29,800	45	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.6	107	337	1066	3372
8		Kammerer Rd	Eschinger Rd	35,300	45	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.3	126	399	1263	3995
9		Franklin Blvd	Willard Pkwy	10,600	30	45	56	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	64.5	14	45	141	447
10		Willard Pkwy	Bruceville Rd	13,600	55	45	56	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.9	78	245	776	2453
11	Bilby Rd	Bruceville Rd	Big Horn Blvd	6,400	55	45	56	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.6	37	115	365	1154
12		Big Horn Blvd	Lotz Pkwy	7,600	55	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.0	46	147	465	1470
13		Lotz Pkwy	Promenade Pkwy	7,400	55	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.9	45	143	453	1431
14		SR 99	E Stockton Blvd	44,800	45	65	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.1	162	512	1618	5116
15		E Stockton Blvd	Elk Crest Dr	54,100	45	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.4	189	597	1888	5970
16		Elk Crest Dr	Elk Grove Florin Rd	43,800	45	25	75	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	75.9	168	531	1678	5305
17	Bond Rd	Elk Grove Florin Rd	Waterman Rd	41,200	45	40	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.1	145	458	1450	4584
18		Waterman Rd	Bradshaw Rd	32,000	45	40	85	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.9	114	360	1138	3598
19		Bradshaw Rd	Bader Rd	16,300	45	95	101	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.4	54	171	541	1711
20		Bader Rd	Grant Line Rd	10,200	45	95	101	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.4	34	107	339	1070
21		Vintage Park Dr	Calvine Rd	38,300	55	40	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	76.1	230	728	2303	7283
22		Calvine Rd	Sheldon Rd	37,200	55	40	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	76.0	224	707	2237	7074
23	Bradshaw Rd	Sheldon Rd	Bond Rd	39,800	55	40	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	76.3	239	757	2393	7569
24		Bond Rd	Elk Grove Blvd	39,400	55	40	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	76.2	237	749	2369	7492
25		Elk Grove Blvd	Grant Line Rd	37,500	55	40	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	76.0	226	713	2255	7131
26		Damascus Dr	Sheldon Rd	37,800	40	60	126	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.6	100	316	998	3155
27		Sheldon Rd	Big Horn Blvd	60,100	45	100	112	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.8	200	631	1997	6315
28		Big Horn Blvd	Laguna Blvd	51,500	40	100	112	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.8	127	403	1273	4026
29	Bruceville Rd	Laguna Blvd	Elk Grove Blvd	38,000	40	60	100	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.0	97	306	969	3063
30		Elk Grove Blvd	Whitelock Pkwy	41,100	40	60	100	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.3	105	331	1048	3313
31		Whitelock Pkwy	Bilby Rd	29,800	45	60	100	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.2	102	323	1021	3229
32		Bilby Rd	Kammerer Rd	27,700	55	60	100	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.2	162	513	1622	5129
33		Kammerer Rd	Eschinger Rd	34,900	55	60	100	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.2	204	646	2044	6462
34		Power Inn Rd	Elk Grove Florin Rd	60,000	45	50	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.5	220	697	2203	6966
35		Elk Grove Florin Rd	Waterman Rd	51,600	45	50	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.8	189	599	1895	5991
36	Calvine Rd	Waterman Rd	Bradshaw Rd	34,300	45	70	130	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.0	119	377	1193	3772
37		Bradshaw Rd	Vineyard Rd	29,300	55	55	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.6	176	557	1762	5572
38		Vineyard Rd	Excelsior Rd	26,500	55	55	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.1	159	504	1594	5039
39		Excelsior Rd	Grant Line Rd	22,500	55	55	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.4	135	428	1353	4279
40	Center Parkway	Laguna Village	Bruceville Rd	22,100	40	60	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.5	57	180	571	1805
41	E. Stockton Blvd	Grant Line Rd	Elk Grove Florin Rd	27,900	40	55	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.7	73	231	730	2310
42		I-5	Harbour Point Dr	35,400	45	90	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.2	121	384	1213	3835
43		Harbour Point Dr	Four Winds Dr	40,400	50	100	165	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.5	182	577	1824	5769
44		Four Winds Dr	Franklin Blvd	49,200	50	125	185	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.6	220	694	2195	6942
45		Franklin Blvd	Bruceville Rd	42,400	50	70	135	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.0	196	619	1957	6189
46		Bruceville Rd	Big Horn Blvd	53,500	50	60	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.6	250	791	2502	7910
47		Big Horn Blvd	Laguna Springs Dr	51,800	50	125	190	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.8	232	733	2317	7329
48	Elk Grove Blvd	Laguna Springs Dr	Auto Center Dr	55,600	50	50	135	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	75.2	274	867	2740	8666
49		Auto Center Dr	SR 99	59,700	50	50	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	75.4	302	954	3018	9543
50		SR 99	nerald Vista Dr / E Stockton Bl	64,700	50	65	130	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	75.1	300	950	3004	9500

Traffic Noise Spreadsheet Calculator

Project: Elk Grove GPU_Future

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

Number	Name	Segment Description and Location: From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet)4: Near	Far	Traffic Distribution Characteristics: % Auto	% Medium	% Heavy	% Day	% Eve	% Night	Ldn, (dBA)5,6,7	Distance to Contour, (feet)3: 70 dBA	65 dBA	60 dBA	55 dBA
#REF!																		
51		nerald Vista Dr / E Stockton Bl	Elk Grove Florin Rd	48,400	35	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.3	92	291	922	2915
52		Elk Grove Florin Rd	Waterman Rd	19,700	25	50	75	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.2	20	64	202	637
53		Waterman Rd	Bradshaw Rd	16,800	35	50	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.9	31	99	313	988
54		Bradshaw Rd	Grant Line Rd	8,100	40	110	121	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	62.4	20	63	200	633
55	Elk Grove Florin Rd	Vintage Park Dr	Calvine Rd	53,000	45	70	140	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.8	186	590	1865	5897
56		Calvine Rd	Sheldon Rd	56,400	45	50	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.3	202	638	2018	6382
57		Sheldon Rd	Bond Rd	41,200	45	65	120	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.1	143	453	1431	4527
58		Bond Rd	Elk Grove Blvd	35,800	35	40	82	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.8	69	218	690	2183
59		Elk Grove Blvd	E Stockton Blvd	19,300	35	40	60	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.6	36	113	357	1128
60	Eschinger Rd	Willard Pkwy	Bruceville Rd	19,400	45	40	60	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.3	66	208	657	2077
61		Bruceville Rd	Big Horn Blvd	25,900	45	40	60	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.5	88	277	877	2773
62		Big Horn Blvd	Lotz Pkwy	31,900	45	40	60	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.4	108	342	1080	3415
63		Lotz Pkwy	Promenade Pkwy	33,600	45	40	60	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.7	114	360	1138	3597
64	Excelsior Rd	Gerber Rd	Calvine Rd	19,300	45	110	121	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.4	64	203	641	2027
65		Calvine Rd	Sheldon Rd	16,300	45	75	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.8	55	174	551	1741
66	Franklin Blvd	Sims Rd	Big Horn Blvd	41,200	45	70	130	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.8	143	453	1433	4531
67		Big Horn Blvd	Laguna Blvd	35,400	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.4	124	391	1238	3914
68		Laguna Blvd	Elk Grove Blvd	31,900	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.9	112	353	1115	3527
69		Elk Grove Blvd	Whitelock Pkwy	34,200	45	130	175	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.8	115	363	1147	3627
70		Whitelock Pkwy	Bilby Rd	2,200	45	65	140	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	59.1	8	25	78	248
71		Bilby Rd	Hood Franklin Rd	3,900	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	61.8	14	43	136	431
72		Hood Franklin Rd	Lambert Rd	1,800	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	58.4	6	20	63	199
73	Grant Line Rd	Sloughhouse Rd	Calvine Rd	40,500	55	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.3	242	765	2420	7653
74		Calvine Rd	Sheldon Rd	33,500	55	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.6	200	632	1998	6318
75		Sheldon Rd	Wilton Rd	36,600	55	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	75.0	218	690	2183	6903
76		Wilton Rd	Bond Rd	37,600	55	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	75.1	224	709	2242	7091
77		Bond Rd	Elk Grove Blvd	29,400	55	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.1	175	554	1753	5545
78		Elk Grove Blvd	Bradshaw Rd	25,200	55	110	122	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.9	143	452	1431	4524
79		Bradshaw Rd	Mosher Rd	63,300	55	95	107	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	75.5	360	1137	3595	11369
80		Mosher Rd	Waterman Rd	66,800	55	95	107	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	75.8	379	1200	3794	11998
81		Waterman Rd	E. Stockton / Survey Rd	100,000	55	95	107	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	77.5	568	1796	5680	17961
82		E. Stockton / Survey Rd	SR 99	110,700	55	75	175	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	77.8	685	2166	6848	21655
83	Harbour Point Dr	Elk Grove Blvd	Laguna Blvd	17,900	45	65	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.6	61	194	614	1943
84	Hood Franklin Rd	I-5	Franklin Blvd	46,800	55	80	92	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.9	266	841	2660	8411
85	Kammerer Rd	Franklin Blvd	Willard Pkwy	44,500	55	70	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.2	271	856	2708	8565
86		Willard Pkwy	Bruceville Rd	50,800	55	70	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.8	309	978	3092	9777
87		Bruceville Rd	Big Horn Blvd	62,000	55	70	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	75.7	377	1193	3773	11933
88		Big Horn Blvd	Lotz Pkwy	72,000	55	70	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	76.3	438	1386	4382	13857
89		Lotz Pkwy	Promenade Pkwy	68,600	55	70	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	76.1	418	1320	4175	13203
90		Promenade Pkwy	SR 99	92,300	55	70	150	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	77.4	562	1776	5618	17764
91	Laguna Blvd	SR 99	Franklin Blvd	37,600	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.6	131	416	1315	4157
92		Franklin Blvd	Bruceville Rd	32,800	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.0	115	363	1147	3626
93		Bruceville Rd	Big Horn Blvd	28,000	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.4	98	310	979	3096
94		Big Horn Blvd	Laguna Springs Dr	53,700	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.2	188	594	1877	5937
95		Laguna Springs Dr	SR 99	66,100	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.1	231	731	2311	7308
96	Laguna Springs Dr	Laguna Blvd	Laguna Palms Wy	15,900	35	55	105	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.0	30	96	303	958
97		Laguna Palms Wy	Elk Grove Blvd	13,200	35	50	75	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.0	24	77	244	771
98		Elk Grove Blvd	Lotz Pkwy	26,700	35	55	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.4	50	159	502	1586
99	Lent Ranch Pkwy	Kammerer Rd	Promenade Pkwy	13,200	35	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.6	25	79	251	795
100	Lewis Stein Rd	Sheldon Rd	Big Horn Blvd	14,000	35	45	80	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	66.4	26	83	264	835

Traffic Noise Spreadsheet Calculator

Project: Elk Grove GPU_Future

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

Number	Name	From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet)4 Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	Ldn, (dBA)5,6,7	Distance to Contour, (feet)3 70 dBA	65 dBA	60 dBA	55 dBA
#REF!																		
101	Lotz Pkwy	Big Horn Blvd	Laguna Springs Dr	15,500	35	60	100	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	65.7	29	92	290	916
102		Laguna Springs Dr	Whitelock Pkwy	17,000	35	52	68	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.2	31	98	311	982
103		Whitelock Pkwy	Promenade Pkwy	44,200	35	52	68	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.3	81	255	807	2553
104		Promenade Pkwy	Bilby Rd	28,900	35	52	68	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.5	53	167	528	1669
105		Bilby Rd	Kammerer Rd	22,200	35	52	68	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.3	41	128	406	1282
106		Kammerer Rd	Eschinger Rd	39,000	35	52	68	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.8	71	225	712	2253
107	Mosher	Grant Line Rd	Waterman Rd	7,600	50	50	62	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.8	33	106	335	1058
108	Power Inn Rd	Calvine Rd	Sheldon Rd	19,500	35	50	90	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.4	37	116	368	1165
109	Promenade Pkwy	Lotz Pkwy	Bilby Rd	17,800	45	50	90	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.6	62	195	616	1948
110		Bilby Rd	Kammerer Rd	27,800	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.3	97	307	972	3074
111		Kammerer Rd	Eschinger Rd	16,000	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.9	56	177	559	1769
112	Sheldon Rd	Bruceville Rd	Lewis Stein Rd	37,700	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.7	132	417	1318	4168
113		Lewis Stein Rd	SR 99	47,400	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.6	166	524	1657	5240
114		SR 99	E. Stockton Blvd	58,900	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.6	206	651	2059	6512
115		E. Stockton Blvd	Power Inn Rd	51,900	45	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.0	181	574	1815	5738
116		Power Inn Rd	Elk Grove Florin Rd	43,900	45	65	115	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.4	152	479	1516	4794
117		Elk Grove Florin Rd	Waterman Rd	21,700	45	90	102	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.8	72	228	721	2281
118		Waterman Rd	Bradshaw Rd	19,400	45	50	62	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.7	65	205	647	2047
119		Bradshaw Rd	Bader Rd	14,500	45	50	62	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.4	48	153	484	1530
120		Bader Rd	Dillard Oaks Ct	14,500	45	60	72	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	68.7	48	153	483	1527
121		Excelsior Rd	Grant Line Rd	22,900	45	60	72	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.6	76	241	763	2412
122	Waterman Rd	Vintage Park Dr	Calvine Rd	30,400	55	50	95	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	74.2	181	573	1813	5733
123		Calvine Rd	Sheldon Rd	17,500	55	52	64	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.4	100	315	998	3154
124		Sheldon Rd	Bond Rd	20,900	55	130	142	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	69.4	119	375	1186	3751
125		Bond Rd	Elk Grove Blvd	23,300	55	50	62	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	73.8	133	420	1329	4202
126		Elk Grove Blvd	Grant Line Rd	25,600	55	65	110	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.5	150	475	1502	4749
127	Whitelock Pkwy	Franklin Blvd	Bruceville Rd	8,800	40	55	100	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	64.9	23	72	227	718
128		Bruceville Rd	Big Horn Blvd	8,900	40	70	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	63.9	23	72	229	724
129		Big Horn Blvd	Lotz Pkwy	15,400	40	70	82	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	67.0	38	121	381	1206
130		Lotz Pkwy	SR 99	50,400	40	65	77	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	72.5	125	395	1248	3948
131	Willard Pkwy	Whitelock Pkwy	Bilby	31,600	50	70	140	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	71.7	147	464	1467	4640
132		Bilby Rd	Kammerer Rd	21,100	50	65	125	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.3	97	308	973	3078
133	Wilton Rd	Grant Line Rd	Leisure Oak Ln	14,800	55	70	82	86.2%	12.8%	1.0%	73.0%	22.0%	5.0%	70.5	84	266	842	2662
134	SR-99	Calvine Rd	Sheldon Rd	202,800	65	90	190	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	81.7	1941	6136	19405	61365
		Sheldon Rd	Bond Rd	196,300	65	120	220	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	80.5	1836	5805	18356	58048
		Bond Rd	Elk Grove Blvd	177,700	65	136	210	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	79.8	1626	5141	16258	51413
		Elk Grove Blvd	Whitelock Pkwy	157,900	65	95	175	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	80.6	1478	4673	14776	46726
		Whitelock Pkwy	Grant Line Rd	132,700	65	560	690	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	72.8	1192	3771	11925	37710
		Grant Line Rd	Eschinger Rd	131,900	65	160	260	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	77.7	1214	3838	12138	38383
	I-5	Cosumnes River Blvd	Laguna Blvd	155,200	65	2650	2750	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	67.1	1387	4387	13874	43872
		Laguna Blvd	Elk Grove Blvd	130,700	65	170	295	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	77.3	1213	3835	12128	38352
		Elk Grove Blvd	Hood Franklin Rd	113,200	65	190	320	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	76.3	1046	3309	10463	33087
		Hood Franklin Rd	Twin Cities Rd	81,600	65	2626	2750	86.8%	12.2%	1.0%	73.0%	22.0%	5.0%	64.3	730	2307	7295	23069

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Citation #	Citations	
1	Caltrans Technical Noise Supplement. 2009 (November). Table (5-11), Pg 5-60.	Caltrans Technical Noise Supplement. 2013 (September). Table (4-2), Pg 4-17.
2	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-26), Pg 5-60.	Caltrans Technical Noise Supplement. 2013 (September). Equation (4-5), Pg 4-17.
3	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-16), Pg 2-32.	FHWA 2004 TNM Version 2.5
4	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-11), Pg 5-47, 48.	FHWA 2004 TNM Version 2.5
5	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-26), Pg 2-55, 56.	Caltrans Technical Noise Supplement. 2013 (September). Equation (2-23), Pg 2-51, 52.
6	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-27), Pg 2-57.	Caltrans Technical Noise Supplement. 2013 (September). Equation (2-24), Pg 2-53.
7	Caltrans Technical Noise Supplement. 2009 (November). Pg 2-53.	Caltrans Technical Noise Supplement. 2013 (September). Pg 2-57.
8	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-7), Pg 5-45.	FHWA 2004 TNM Version 2.5
9	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-8), Pg 5-45.	FHWA 2004 TNM Version 2.5
10	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-9), Pg 5-45.	FHWA 2004 TNM Version 2.5
11	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-13), Pg 5-49.	FHWA 2004 TNM Version 2.5
12	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-14), Pg 5-49.	FHWA 2004 TNM Version 2.5
13	Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (16), Pg 67	
14	Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (20), Pg 69	
15	Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (18), Pg 69	

References

California Department of Transportation (Caltrans). 2009 (November). Technical Noise Supplement. Available: http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf. Accessed August 17, 2017.

California Department of Transportation (Caltrans). 2013 (September). Technical Noise Supplement. Available: http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013A.pdf. Accessed August 17, 2017.

Federal Highway Administration. 2004. Traffic Noise Model Version 2.5. Available: https://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25/. Accessed August 17, 2017.

Federal Transit Administration
Noise Impact Assessment Spreadsheet

version: 7/3/2007

Project:	FTA Example 5-1, Part 1

Receiver Parameters	
Receiver:	Receiver 1
Land Use Category:	2. Residential
Existing Noise (Measured or Generic Value):	70 dBA

Noise Source Parameters	
Number of Noise Sources:	4

Noise Source Parameters		Source 1
	Source Type:	Fixed Guideway
	Specific Source:	Diesel Electric Locomotive
Daytime hrs	Avg. Number of Locos/train	1
	Speed (mph)	50
	Avg. Number of Events/hr	1.06
Nighttime hrs	Avg. Number of Locos/train	1
	Speed (mph)	50
	Avg. Number of Events/hr	1.78
Distance	Distance from Source to Receiver (ft)	75
	Number of Intervening Rows of Buildings	
Adjustments		

Noise Source Parameters		Source 2
	Source Type:	Fixed Guideway
	Specific Source:	Rail Car
Daytime hrs	Avg. Number of Rail Cars/train	80
	Speed (mph)	50
	Avg. Number of Events/hr	0.5
Nighttime hrs	Avg. Number of Rail Cars/train	80
	Speed (mph)	50
	Avg. Number of Events/hr	1.4
Distance	Distance from Source to Receiver (ft)	75
	Number of Intervening Rows of Buildings	
Adjustments	Noise Barrier?	Yes
	Jointed Track?	No
	Embedded Track?	No
	Aerial Structure?	No

Project Results Summary

Existing Ldn:	70 dBA
Total Project Ldn:	67 dBA
Total Noise Exposure:	72 dBA
Increase:	2 dB
Impact?:	Moderate

Distance to Impact Contours

Dist to Mod. Impact Contour:	---
Dist to Sev. Impact Contour:	---

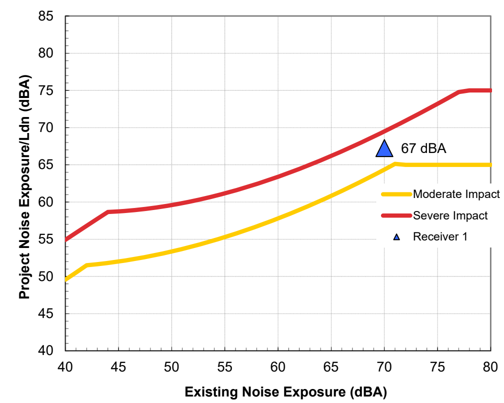
Source 1 Results

Leq(day):	54.0 dBA
Leq(night):	56.3 dBA
Ldn:	62.4 dBA

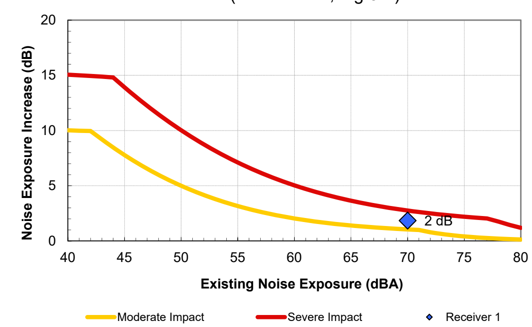
Source 2 Results

Leq(day):	54.8 dBA
Leq(night):	59.3 dBA
Ldn:	65.2 dBA
Incremental Ldn (Src 1-2):	67.1 dBA

Noise Impact Criteria
(FTA Manual, Fig 3-1)



Increase in Cumulative Noise Levels Allowed
(FTA Manual, Fig 3-2)



Noise Source Parameters		Source 3
	Source Type:	Fixed Guideway
	Specific Source:	Diesel Electric Locomotive
Daytime hrs	Avg. Number of Locos/train	1
	Speed	45
	Avg. Number of Events/hr	0.8
Nighttime hrs	Avg. Number of Locos/train	
	Speed	
	Avg. Number of Events/hr	
Distance	Distance from Source to Receiver (ft)	75
	Number of Intervening Rows of Buildings	
Adjustments		

Source 3 Results

Leq(day):	53.2 dBA
Leq(night):	0.0 dBA
Ldn:	51.2 dBA
Incremental Ldn (Src 1-3):	67.2 dBA

Noise Source Parameters		Source 4
	Source Type:	Fixed Guideway
	Specific Source:	Rail Transit Vehicle
Daytime hrs	Avg. Number of Transit Vehicles/train	8
	Speed (mph)	45
	Avg. Number of Events/hr	0.8
Nighttime hrs	Avg. Number of Transit Vehicles/train	
	Speed (mph)	
	Avg. Number of Events/hr	
Distance	Distance from Source to Receiver (ft)	75
	Number of Intervening Rows of Buildings	
Adjustments	Noise Barrier?	No
	Jointed Track?	No
	Embedded Track?	No
	Aerial Structure?	No

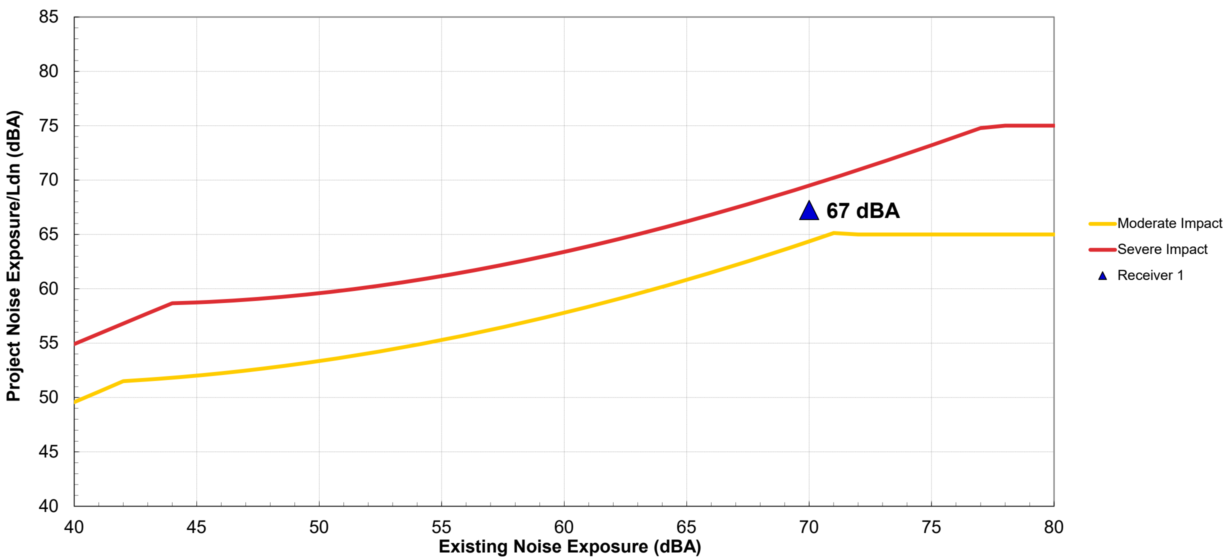
Source 4 Results

Leq(day):	50.9 dBA
Leq(night):	0.0 dBA
Ldn:	48.9 dBA
Incremental Ldn (Src 1-4):	67.2 dBA

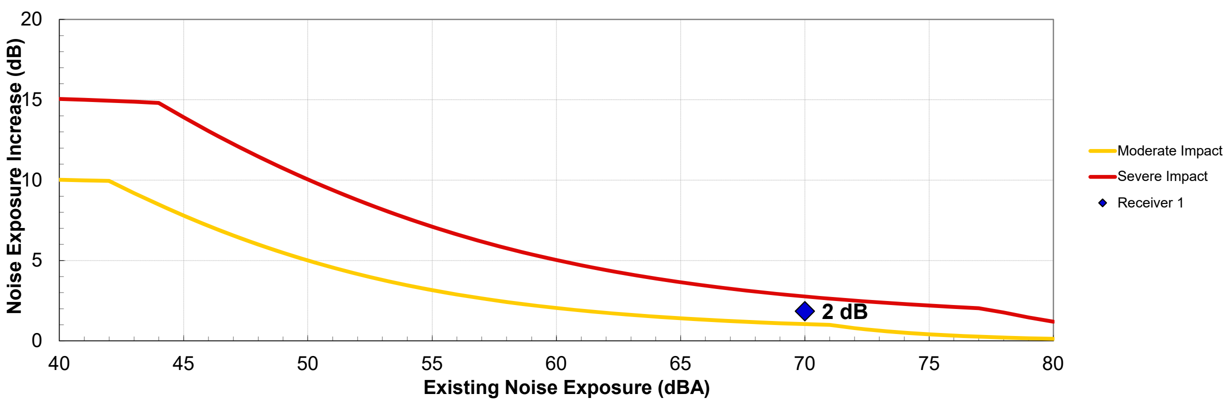
Project: FTA Example 5-1, Part 1
Receiver: Receiver 1

				Noise Criteria		
Source	**Distance**	**Project Ldn**	**Existing Ldn**	**Mod. Impact**	**Sev. Impact**	**Impact?**
1 Diesel Electric Locomotive	75 ft	62.4 dBA	70 dBA	64 dBA	69 dBA	None
2 Rail Car	75 ft	65.2 dBA	70 dBA	64 dBA	69 dBA	Moderate Impact
3 Diesel Electric Locomotive	75 ft	51.2 dBA	70 dBA	64 dBA	69 dBA	None
4 Rail Transit Vehicle	75 ft	48.9 dBA	70 dBA	64 dBA	69 dBA	None
5 --	ft		70 dBA	64 dBA	69 dBA	
6 --	ft		70 dBA	64 dBA	69 dBA	
Combined Sources		**67 dBA**	**70 dBA**	**64 dBA**	**69 dBA**	**Moderate Impact**

Noise Impact Criteria
(FTA Manual, Fig 3-1)



Increase in Cumulative Noise Levels Allowed
(FTA Manual, Fig 3-2)



Federal Transit Administration
Noise Impact Assessment Spreadsheet

version: 7/3/2007

Project:	FTA Example 5-1, Part 1

Receiver Parameters	
Receiver:	Receiver 1
Land Use Category:	2. Residential
Existing Noise (Measured or Generic Value):	60 dBA

Noise Source Parameters	
Number of Noise Sources:	2

Noise Source Parameters		Source 1
	Source Type:	Fixed Guideway
	Specific Source:	Diesel Electric Locomotive
Daytime hrs	Avg. Number of Locos/train	2
	Speed (mph)	45
	Avg. Number of Events/hr	0.5
Nighttime hrs	Avg. Number of Locos/train	1
	Speed (mph)	50
	Avg. Number of Events/hr	1.4
Distance	Distance from Source to Receiver (ft)	175
	Number of Intervening Rows of Buildings	
Adjustments		

Noise Source Parameters		Source 2
	Source Type:	Fixed Guideway
	Specific Source:	Rail Car
Daytime hrs	Avg. Number of Rail Cars/train	80
	Speed (mph)	45
	Avg. Number of Events/hr	0.5
Nighttime hrs	Avg. Number of Rail Cars/train	80
	Speed (mph)	50
	Avg. Number of Events/hr	1.4
Distance	Distance from Source to Receiver (ft)	175
	Number of Intervening Rows of Buildings	1
Adjustments	Noise Barrier?	Yes
	Jointed Track?	No
	Embedded Track?	No
	Aerial Structure?	No

Project Results Summary

Existing Ldn:	60 dBA
Total Project Ldn:	59 dBA
Total Noise Exposure:	62 dBA
Increase:	2 dB
Impact?:	Moderate

Distance to Impact Contours

Dist to Mod. Impact Contour (Sources 1+2):	296 ft
Dist to Sev. Impact Contour (Sources 1+2):	125 ft

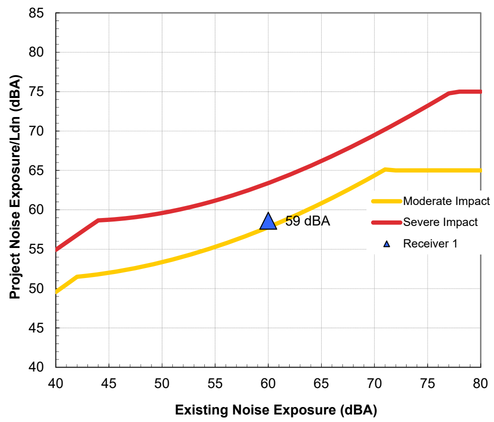
Source 1 Results

Leq(day):	48.7 dBA
Leq(night):	49.7 dBA
Ldn:	56.0 dBA

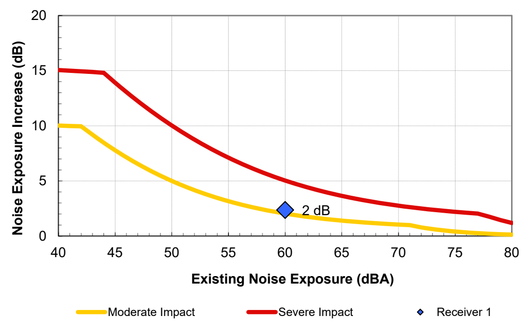
Source 2 Results

Leq(day):	43.8 dBA
Leq(night):	49.2 dBA
Ldn:	55.2 dBA
Incremental Ldn (Src 1-2):	58.6 dBA

Noise Impact Criteria
(FTA Manual, Fig 3-1)

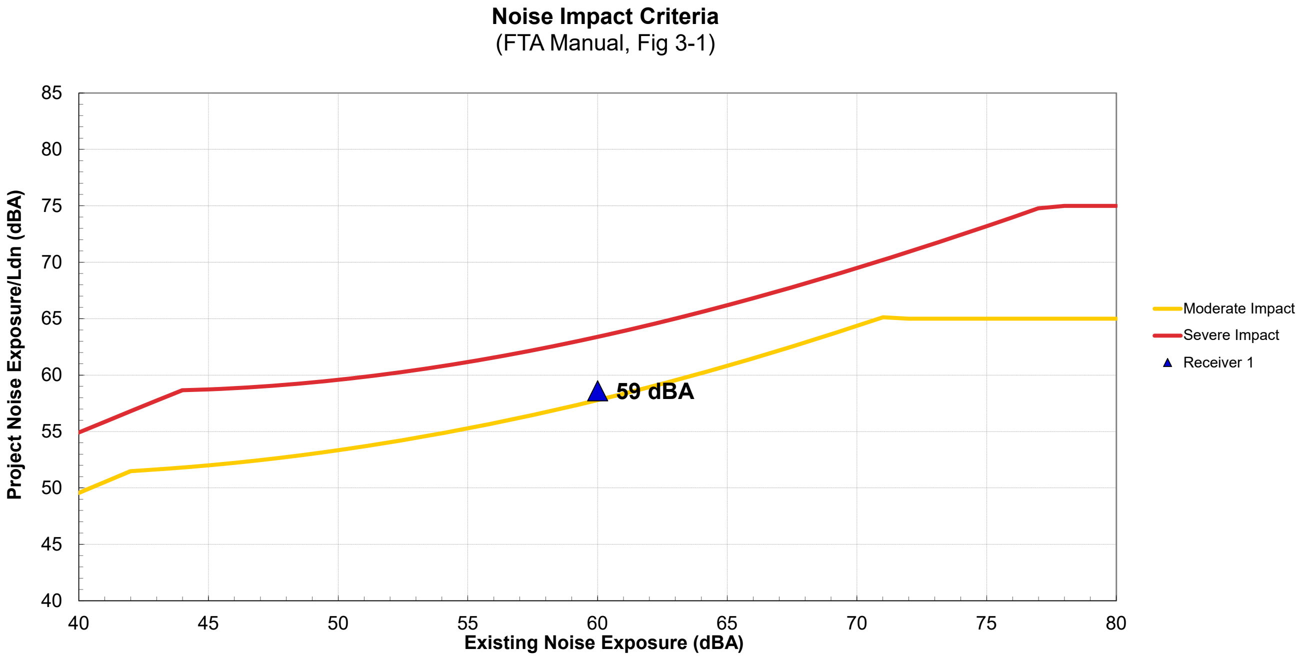


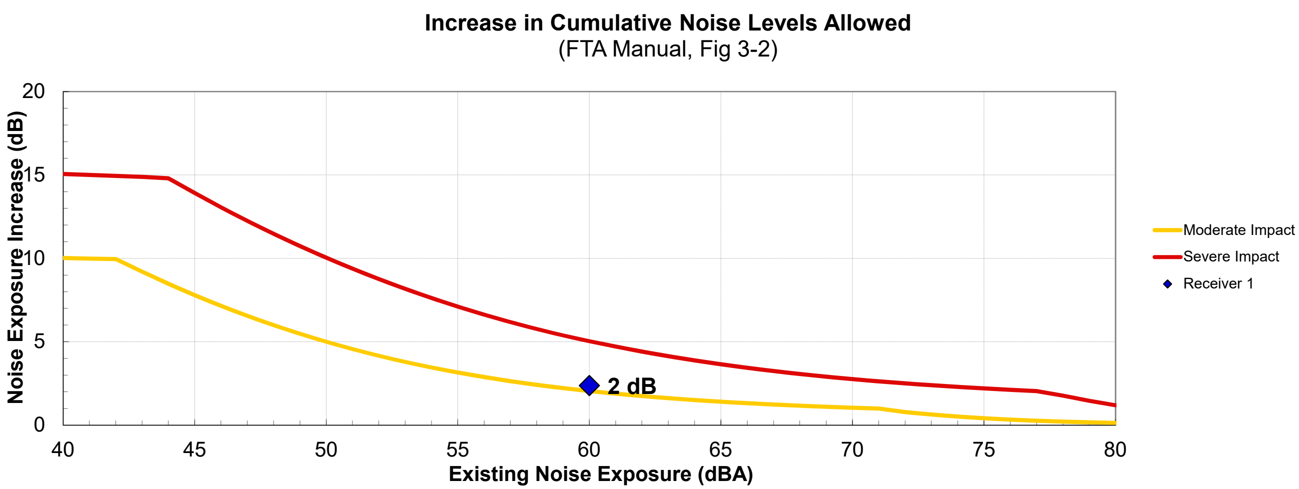
Increase in Cumulative Noise Levels Allowed
(FTA Manual, Fig 3-2)



Project: FTA Example 5-1, Part 1
Receiver: Receiver 1

	Source	Distance	Project Ldn	Existing Ldn	Noise Criteria Mod. Impact	Sev. Impact	Impact?
1	Diesel Electric Locomotive	175 ft	56.0 dBA	60 dBA	58 dBA	63 dBA	None
2	Rail Car	175 ft	55.2 dBA	60 dBA	58 dBA	63 dBA	None
3	--	175 ft		60 dBA	58 dBA	63 dBA	
4	--	ft		60 dBA	58 dBA	63 dBA	
5	--	ft		60 dBA	58 dBA	63 dBA	
6	--	ft		60 dBA	58 dBA	63 dBA	
	Combined Sources		**59 dBA**	**60 dBA**	**58 dBA**	**63 dBA**	**Moderate Impact**


Noise Impact Criteria
(FTA Manual, Fig 3-1)
Project Noise Exposure/Ldn (dBA)
Existing Noise Exposure (dBA)
59 dBA
Moderate Impact
Severe Impact
Receiver 1
85
80
75
70
65
60
55
50
45
40
40
45
50
55
60
65
70
75
80


Increase in Cumulative Noise Levels Allowed
(FTA Manual, Fig 3-2)
Noise Exposure Increase (dB)
Existing Noise Exposure (dBA)
2 dB
Moderate Impact
Severe Impact
Receiver 1
20
15
10
5
0
40
45
50
55
60
65
70
75
80

Construction Source Noise Prediction Model

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	2,027	55.0
Residence 1	25	93.2
Residence 2	100	81.1

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Excavator	85	0.4
Dozer	85	0.4
Dump Truck	84	0.4
Front End Loader	80	0.4
Grader	85	0.4

Ground Type	HARD
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Excavator	81.0
Dozer	81.0
Dump Truck	80.0
Front End Loader	76.0
Grader	81.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
87.2

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Construction Source Noise Prediction Model

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	3,018	55.0
Residence 1	25	96.6
Residence 2	100	84.6

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Excavator	85	0.4
Dozer	85	0.4
Dump Truck	84	0.4
Front End Loader	80	0.4
Grader	85	0.4
Impact Pile Driver	95	0.2

Ground Type	HARD
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Excavator	81.0
Dozer	81.0
Dump Truck	80.0
Front End Loader	76.0
Grader	81.0
Impact Pile Driver	88.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)

90.6

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Equipment Description	Acoustical Usage Factor (%)	Spec 721.560 Lmax @ 50ft (dBA slow)	Actual Measured Lmax @ 50ft (dBA slow)	No. of Actual Data Samples (count)	Spec 721.560 LmaxCalc	Spec 721.560 Leq	Distance	Actual Measured LmaxCalc	Actual Measured Leq
Auger Drill Rig	20	85	84	36	79.0	72.0	100	78.0	71.0
Backhoe	40	80	78	372	74.0	70.0	100	72.0	68.0
Bar Bender	20	80	na	0	74.0	67.0	100		
Blasting	na	94	na	0	88.0		100		
Boring Jack Power Unit	50	80	83	1	74.0	71.0	100	77.0	74.0
Chain Saw	20	85	84	46	79.0	72.0	100	78.0	71.0
Clam Shovel (dropping)	20	93	87	4	87.0	80.0	100	81.0	74.0
Compactor (ground)	20	80	83	57	74.0	67.0	100	77.0	70.0
Compressor (air)	40	80	78	18	74.0	70.0	100	72.0	68.0
Concrete Batch Plant	15	83	na	0	77.0	68.7	100		
Concrete Mixer Truck	40	85	79	40	79.0	75.0	100	73.0	69.0
Concrete Pump Truck	20	82	81	30	76.0	69.0	100	75.0	68.0
Concrete Saw	20	90	90	55	84.0	77.0	100	84.0	77.0
Crane	16	85	81	405	79.0	71.0	100	75.0	67.0
Dozer	40	85	82	55	79.0	75.0	100	76.0	72.0
Drill Rig Truck	20	84	79	22	78.0	71.0	100	73.0	66.0
Drum Mixer	50	80	80	1	74.0	71.0	100	74.0	71.0
Dump Truck	40	84	76	31	78.0	74.0	100	70.0	66.0
Excavator	40	85	81	170	79.0	75.0	100	75.0	71.0
Flat Bed Truck	40	84	74	4	78.0	74.0	100	68.0	64.0
Front End Loader	40	80	79	96	74.0	70.0	100	73.0	69.0
Generator	50	82	81	19	76.0	73.0	100	75.0	72.0
Generator (<25KVA, VMS si	50	70	73	74	64.0	61.0	100	67.0	64.0
Gradall	40	85	83	70	79.0	75.0	100	77.0	73.0
Grader	40	85	na	0	79.0	75.0	100		
Grapple (on Backhoe)	40	85	87	1	79.0	75.0	100	81.0	77.0
Horizontal Boring Hydr. Jac	25	80	82	6	74.0	68.0	100	76.0	70.0
Hydra Break Ram	10	90	na	0	84.0	74.0	100		
Impact Pile Driver	20	95	101	11	89.0	82.0	100	95.0	88.0
Jackhammer	20	85	89	133	79.0	72.0	100	83.0	76.0
Man Lift	20	85	75	23	79.0	72.0	100	69.0	62.0
Mounted Impact Hammer (	20	90	90	212	84.0	77.0	100	84.0	77.0

Equipment Description	Acoustical Usage Factor (%)	Spec 721.560 Lmax @ 50ft (dBA slow)	Actual Measured Lmax @ 50ft (dBA slow)	No. of Actual Data Samples (count)	Spec 721.560 LmaxCalc	Spec 721.560 Leq	Distance	Actual Measured LmaxCalc	Actual Measured Leq
Pavement Scarafier	20	85	90	2	79.0	72.0	100	84.0	77.0
Paver	50	85	77	9	79.0	76.0	100	71.0	68.0
Pickup Truck	40	55	75	1	49.0	45.0	100	69.0	65.0
Pneumatic Tools	50	85	85	90	79.0	76.0	100	79.0	76.0
Pumps	50	77	81	17	71.0	68.0	100	75.0	72.0
Refrigerator Unit	100	82	73	3	76.0	76.0	100	67.0	67.0
Rivit Buster/chipping gun	20	85	79	19	79.0	72.0	100	73.0	66.0
Rock Drill	20	85	81	3	79.0	72.0	100	75.0	68.0
Roller	20	85	80	16	79.0	72.0	100	74.0	67.0
Sand Blasting (Single Nozzle	20	85	96	9	79.0	72.0	100	90.0	83.0
Scraper	40	85	84	12	79.0	75.0	100	78.0	74.0
Shears (on backhoe)	40	85	96	5	79.0	75.0	100	90.0	86.0
Slurry Plant	100	78	78	1	72.0	72.0	100	72.0	72.0
Slurry Trenching Machine	50	82	80	75	76.0	73.0	100	74.0	71.0
Soil Mix Drill Rig	50	80	na	0	74.0	71.0	100		
Tractor	40	84	na	0	78.0	74.0	100		
Vacuum Excavator (Vac-tru	40	85	85	149	79.0	75.0	100	79.0	75.0
Vacuum Street Sweeper	10	80	82	19	74.0	64.0	100	76.0	66.0
Ventilation Fan	100	85	79	13	79.0	79.0	100	73.0	73.0
Vibrating Hopper	50	85	87	1	79.0	76.0	100	81.0	78.0
Vibratory Concrete Mixer	20	80	80	1	74.0	67.0	100	74.0	67.0
Vibratory Pile Driver	20	95	101	44	89.0	82.0	100	95.0	88.0
Warning Horn	5	85	83	12	79.0	66.0	100	77.0	64.0
Welder / Torch	40	73	74	5	67.0	63.0	100	68.0	64.0

Source:
FHWA Roadway Construction Noise Model, January 2006. Table 9.1
U.S. Department of Transportation
CA/T Construction Spec. 721.560

Distance Propagation Calculations for Stationary Sources of Ground Vibration

ASCENT ENVIRONMENTAL

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

STEP 1: Determine units in which to perform calculation.
— If vibration decibels (VdB), then use Table A and proceed to Steps 2A and 3A.
— If peak particle velocity (PPV), then use Table B and proceed to Steps 2B and 3B.

STEP 2A: Identify the vibration source and enter the reference vibration level (VdB) and distance.

STEP 3A: Select the distance to the receiver.

Table A. Propagation of vibration decibels (VdB) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (VdB)	@	distance (ft)	vibration level (VdB)	@	distance (ft)
Impact pile driver	112	@	25	79.6	@	300
sonic pile driving	104	@	25	78.6	@	175

STEP 2B: Identify the vibration source and enter the reference peak particle velocity (PPV) and distance.

STEP 3B: Select the distance to the receiver.

Table B. Propagation of peak particle velocity (PPV) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (PPV)	@	distance (ft)	vibration level (PPV)	@	distance (ft)
Impact pile driver	1.518	@	25	0.190	@	100
sonic pile driving	0.734	@	25	0.197	@	60

Notes:
Computation of propagated vibration levels is based on the equations presented on pg. 12-11 of FTA 2006. Estimates of attenuated vibration levels do not account for reductions from intervening underground barriers or other underground structures of any type, or changes in soil type.

Sources:
Federal Transit Association (FTA). 2006 (May). Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. Washington, D.C. Available: <http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf>. Accessed: September 24, 2010.

Distance Propagation Calculations for Stationary Sources of Ground Vibration

ASCENT ENVIRONMENTAL

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

STEP 1: Determine units in which to perform calculation.

— If vibration decibels (VdB), then use Table A and proceed to Steps 2A and 3A.
— If peak particle velocity (PPV), then use Table B and proceed to Steps 2B and 3B.

STEP 2A: Identify the vibration source and enter the reference vibration level (VdB) and distance.

STEP 3A: Select the distance to the receiver.

Table A. Propagation of vibration decibels (VdB) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (VdB)	@	distance (ft)	vibration level (VdB)	@	distance (ft)
Impact pile driver	112	@	25	79.6	@	300
sonic pile driving	104	@	25	78.6	@	175

STEP 2B: Identify the vibration source and enter the reference peak particle velocity (PPV) and distance.

STEP 3B: Select the distance to the receiver.

Table B. Propagation of peak particle velocity (PPV) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (PPV)	@	distance (ft)	vibration level (PPV)	@	distance (ft)
Impact pile driver	1.518	@	25	0.190	@	100
sonic pile driving	0.734	@	25	0.197	@	60

Notes:
Computation of propagated vibration levels is based on the equations presented on pg. 12-11 of FTA 2006. Estimates of attenuated vibration levels do not account for reductions from intervening underground barriers or other underground structures of any type, or changes in soil type.

Sources:
Federal Transit Association (FTA). 2006 (May). Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. Washington, D.C. Available: <http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf>. Accessed: September 24, 2010.

APPENDIX F: TRAFFIC

Roadway Segment LOS

- Existing Conditions
- General Plan Update Conditions

GIS Segment ID	Roadway	ID	From	To	ADT	Number of Travel Lanes	Median (Y/N)	Posted Speed	Classification	Lanes	Median/TWLTL	Posted Speed	C or Better	D	E	LOS	V/C Ratio
Existing Roadway Segment LOS																	
115	Bader	1	Sheldon Rd	Bond Rd	6,060	2	N	45	2no45	2	No	45	9,800	17,700	18,900	C or Better	0.32
61	Big Horn Blvd	2	Franklin Blvd	Bruceville Rd	18,500	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.49
59		3	Bruceville Rd	Laguna Blvd	20,830	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.55
46		4	Laguna Blvd	Elk Grove Blvd	15,500	4	Y	40	4yes40	4	Yes	40	18,000	35,300	37,900	C or Better	0.41
43		5	Elk Grove Blvd	Lotz Pkwy	11,390	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.30
29		6	Lotz Pkwy	Whitelock Pkwy	6,500	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.17
501		7	Whitelock Pkwy	Bilby Rd	-	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	-
502		8	Bilby Rd	Kammerer Rd	-	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	-
503		9	Kammerer Rd	Eschinger Rd	-	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	-
26	Bilby Rd	10	Franklin Blvd	Willard Pkwy	8,220	2	N	30	2no30	2	No	30	5,600	14,600	18,900	D	0.43
22		11	Willard Pkwy	Bruceville Rd	6,830	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.36
23		12	Bruceville Rd	Big Horn Blvd	280	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.01
514		13	Big Horn Blvd	Lotz Pkwy	-	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	-
515		14	Lotz Pkwy	Promenade Pkwy	-	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	-
153	Bond Rd	15	SR 99	E Stockton Blvd	31,110	6	Y	45	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.57
148		16	E Stockton Blvd	Elk Crest Dr	31,000	5	Y	45	5yes45	5	Yes	45	26,700	45,600	46,100	D	0.67
145		17	Elk Crest Dr	Elk Grove Florin Rd	30,890	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.82
97		18	Elk Grove Florin Rd	Waterman Rd	25,830	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.68
98		19	Waterman Rd	Bradshaw Rd	17,940	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.47
104		20	Bradshaw Rd	Bader Rd	12,560	2	N	45	2no45	2	No	45	9,800	17,700	18,900	D	0.66
105		21	Bader Rd	Grant Line Rd	6,390	2	N	45	2no45	2	No	45	9,800	17,700	18,900	C or Better	0.34
124	Bradshaw Rd	22	Vintage Park Dr	Calvine Rd	19,940	2	Y	55	2yes55	2	Yes	55	13,200	19,600	19,900	F	1.00
125		23	Calvine Rd	Sheldon Rd	10,670	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.56
114		24	Sheldon Rd	Bond Rd	11,890	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.63
103		25	Bond Rd	Elk Grove Blvd	9,440	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.50
11		26	Elk Grove Blvd	Grant Line Rd	6,000	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.32
62	Bruceville Rd	27	Damascus Dr	Sheldon Rd	17,500	4	Y	40	4yes40	4	Yes	40	18,000	35,300	37,900	C or Better	0.46
60		28	Sheldon Rd	Big Horn Blvd	26,000	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.69
58		29	Big Horn Blvd	Laguna Blvd	25,500	4	Y	40	4yes40	4	Yes	40	18,000	35,300	37,900	D	0.67
53		30	Laguna Blvd	Elk Grove Blvd	23,780	6	Y	40	6yes40	6	Yes	40	26,700	51,500	54,300	C or Better	0.44
49		31	Elk Grove Blvd	Whitelock Pkwy	19,440	4	Y	40	4yes40	4	Yes	40	18,000	35,300	37,900	D	0.51
21		32	Whitelock Pkwy	Bilby Rd	8,170	2	N	45	2no45	2	No	45	9,800	17,700	18,900	C or Better	0.43
20		33	Bilby Rd	Kammerer Rd	7,330	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.39
19		34	Kammerer Rd	Eschinger Rd	2,280	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.12
129	Calvine Rd	35	Power Inn Rd	Elk Grove Florin Rd	31,830	5	Y	45	5yes45	5	Yes	45	26,700	45,600	46,100	D	0.69
131		36	Elk Grove Florin Rd	Waterman Rd	28,220	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.74
130		37	Waterman Rd	Bradshaw Rd	22,610	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.60
123		38	Bradshaw Rd	Vineyard Rd	11,110	4	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.59
154		39	Vineyard Rd	Excelsior Rd	11,110	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.59
122		40	Excelsior Rd	Grant Line Rd	4,830	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.26
63	Center Parkway	41	Laguna Village	Bruceville Rd	11,830	4	Y	40	4yes40	4	Yes	40	18,000	35,300	37,900	C or Better	0.31
14	E. Stockton Blvd	42	Grant Line Rd	Elk Grove Florin Rd	8,330	2	N	40	2no40	2	No	40	8,400	16,600	18,900	C or Better	0.44
76	Elk Grove Blvd	43	I-5	Harbour Point Dr	26,440	6	Y	45	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.49
74		44	Harbour Point Dr	Four Winds Dr	30,670	6	Y	50	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.56
72		45	Four Winds Dr	Franklin Blvd	40,890	6	Y	50	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.75
55		46	Franklin Blvd	Bruceville Rd	33,060	6	Y	50	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.61
48		47	Bruceville Rd	Big Horn Blvd	33,330	6	Y	50	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.61
45		48	Big Horn Blvd	Laguna Springs Dr	36,780	6	Y	50	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.68
81		49	Laguna Springs Dr	Auto Center Dr	37,440	6	Y	50	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.69
82		50	Auto Center Dr	SR 99	39,560	6	Y	50	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.73
84		51	SR 99	Emerald Vista Dr / E Stockton Blvd	40,440	6	Y	50	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.74
92		52	Emerald Vista Dr / E Stockton Blvd	Elk Grove Florin Rd	29,890	4	Y	35	4yes35	4	Yes	35	14,700	33,300	37,900	D	0.79
94		53	Elk Grove Florin Rd	Waterman Rd	14,280	2	Y	25	2yes25	2	Yes	25	4,400	14,300	19,900	D	0.72
102		54	Waterman Rd	Bradshaw Rd	10,610	2	Y	35	2yes35	2	Yes	35	7,400	16,500	19,900	D	0.53
9		55	Bradshaw Rd	Grant Line Rd	4,110	2	N	40	2no40	2	No	40	8,400	16,600	18,900	C or Better	0.22
128	Elk Grove Florin Rd	56	Vintage Park Dr	Calvine Rd	30,220	5	Y	45	5yes45	5	Yes	45	26,700	45,600	46,100	D	0.66
132		57	Calvine Rd	Sheldon Rd	28,720	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.76
99		58	Sheldon Rd	Bond Rd	24,720	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.65
95		59	Bond Rd	Elk Grove Blvd	19,440	4	Y	35	4yes35	4	Yes	35	14,700	33,300	37,900	D	0.51
156		60	Elk Grove Blvd	E Stockton Blvd	16,490	2	N	35	2no35	2	No	35	7,000	15,700	18,900	E	0.87

Existing Roadway Segment LOS																	
GIS Segment ID	Roadway	ID	From	To	ADT	Number of Travel Lanes	Median (Y/N)	Posted Speed	Classification	Lanes	Median/TWLTL	Posted Speed	C or Better	D	E	LOS	V/C Ratio
508	Eschinger Rd	61	Willard Pkwy	Bruceville Rd	710	2	Y	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.04
509		62	Bruceville Rd	Big Horn Blvd	710	2	Y	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.04
510		63	Big Horn Blvd	Lotz Pkwy	710	2	Y	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.04
511		64	Lotz Pkwy	Promenade Pkwy	710	2	Y	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.04
121	Excelsior Rd	65	Gerber Rd	Calvine Rd	6,110	2	N	45	2no45	2	No	45	9,800	17,700	18,900	C or Better	0.32
120		66	Calvine Rd	Sheldon Rd	5,110	2	N	45	2no45	2	No	45	9,800	17,700	18,900	C or Better	0.27
66	Franklin Blvd	67	Sims Rd	Big Horn Blvd	30,000	6	Y	45	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.55
64		68	Big Horn Blvd	Laguna Blvd	28,110	5	Y	45	5yes45	5	Yes	45	26,700	45,600	46,100	D	0.61
68		69	Laguna Blvd	Elk Grove Blvd	20,670	6	Y	45	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.38
101		70	Elk Grove Blvd	Whitelock Pkwy	20,780	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.55
516		71	Whitelock Pkwy	Bilby Rd	1,010	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	0.01
517		72	Bilby Rd	Hood Franklin Rd	5,660	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	0.05
518		73	Hood Franklin Rd	Lambert Rd	1,660	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	0.02
119	Grant Line Rd	74	Sloughhouse Rd	Calvine Rd	19,670	2	N	55	2no55	2	No	55	12,500	18,600	18,900	F	1.04
118		75	Calvine Rd	Sheldon Rd	16,060	2	N	55	2no55	2	No	55	12,500	18,600	18,900	D	0.85
109		76	Sheldon Rd	Wilton Rd	18,830	2	N	55	2no55	2	No	55	12,500	18,600	18,900	E	1.00
107		77	Wilton Rd	Bond Rd	17,220	2	N	55	2no55	2	No	55	12,500	18,600	18,900	D	0.91
10		78	Bond Rd	Elk Grove Blvd	12,000	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.63
1		79	Elk Grove Blvd	Bradshaw Rd	8,220	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.43
2		80	Bradshaw Rd	Mosher Rd	13,890	2	N	55	2no55	2	No	55	12,500	18,600	18,900	D	0.73
3		81	Mosher Rd	Waterman Rd	14,890	2	N	55	2no55	2	No	55	12,500	18,600	18,900	D	0.79
4		82	Waterman Rd	E. Stockton / Survey Rd	19,330	4	Y	55	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.51
5		83	E. Stockton / Survey Rd	SR 99	23,940	6	Y	55	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.44
79	Harbour Point Dr	84	Elk Grove Blvd	Laguna Blvd	11,610	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.31
157	Hood Franklin Rd	85	I-5	Franklin Blvd	6,900	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.37
519	Kammerer Rd	86	Franklin Blvd	Willard Pkwy	7,610	2	Y	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.40
520		87	Willard Pkwy	Bruceville Rd	7,610	2	Y	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.40
521		88	Bruceville Rd	Big Horn Blvd	7,610	2	Y	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.40
18		89	Big Horn Blvd	Lotz Pkwy	7,610	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.40
8		90	Lotz Pkwy	Promenade Pkwy	7,670	6	Y	55	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.14
7		91	Promenade Pkwy	SR 99	12,890	6	Y	55	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.24
71	Laguna Blvd	92	SR 99	Franklin Blvd	31,500	6	Y	45	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.58
57		93	Franklin Blvd	Bruceville Rd	29,220	6	Y	45	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.54
54		94	Bruceville Rd	Big Horn Blvd	29,330	6	Y	45	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.54
90		95	Big Horn Blvd	Laguna Springs Dr	36,280	8	Y	45	8yes55M	8	Yes	55	57,600	64,800	72,000	C or Better	0.50
151		96	Laguna Springs Dr	SR 99	35,440	7	Y	45	7yes45	7	Yes	45	44,800	59,400	63,200	C or Better	0.56
155	Laguna Springs Dr	97	Laguna Blvd	Laguna Palms Wy	12,000	4	Y	35	4yes35	4	Yes	35	14,700	33,300	37,900	C or Better	0.32
89		98	Laguna Palms Wy	Elk Grove Blvd	12,000	2	Y	35	2yes35	2	Yes	35	7,400	16,500	19,900	D	0.60
34		99	Elk Grove Blvd	Lotz Pkwy	4,610	4	Y	35	4yes35	4	Yes	35	14,700	33,300	37,900	C or Better	0.12
17	Lent Ranch Pkwy	100	Kammerer Rd	Promenade Pkwy	110	4	Y	35	4yes35	4	Yes	35	14,700	33,300	37,900	C or Better	0.00
143	Lewis Stein Rd	101	Sheldon Rd	Big Horn Blvd	10,720	2	Y	35	2yes35	2	Yes	35	7,400	16,500	19,900	D	0.54
31	Lotz Pkwy	102	Big Horn Blvd	Laguna Springs Dr	3,000	4	Y	35	4yes35	4	Yes	35	14,700	33,300	37,900	C or Better	0.08
33		103	Laguna Springs Dr	Whitelock Pkwy	670	4	Y	35	4yes35	4	Yes	35	14,700	33,300	37,900	C or Better	0.02
504		104	Whitelock Pkwy	Promenade Pkwy	-	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	-
505		105	Promenade Pkwy	Bilby Rd	-	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	-
506		106	Bilby Rd	Kammerer Rd	-	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	-
507		107	Kammerer Rd	Eschinger Rd	-	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	-
13	Mosher	108	Grant Line Rd	Waterman Rd	2,000	2	N	50	2yes55	2	Yes	55	13,200	19,600	19,900	C or Better	0.10
522	Pleasant Grove School Rd	109	Bader Rd	Grant Line Rd		2	N	45	2no45	2	No	45	9,800	17,700	18,900	C or Better	-
136	Power Inn Rd	110	Calvine Rd	Sheldon Rd	13,440	4	Y	35	4yes35	4	Yes	35	14,700	33,300	37,900	C or Better	0.35
512	Promenade Pkwy	111	Lotz Pkwy	Bilby Rd	5,000	2	Y	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.26
16		112	Bilby Rd	Kammerer Rd	5,280	6	Y	45	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.10
513		113	Kammerer Rd	Eschinger Rd	-	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	-
142	Sheldon Rd	114	Bruceville Rd	Lewis Stein Rd	18,720	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.49
141		115	Lewis Stein Rd	SR 99	25,940	6	Y	45	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.48
139		116	SR 99	E. Stockton Blvd	34,170	6	Y	45	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.63
137		117	E. Stockton Blvd	Power Inn Rd	30,670	6	Y	45	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.56
134		118	Power Inn Rd	Elk Grove Florin Rd	22,500	4	Y	45	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.59
111		119	Elk Grove Florin Rd	Waterman Rd	11,780	2	N	45	2no45	2	No	45	9,800	17,700	18,900	D	0.62

Existing Roadway Segment LOS																	
GIS Segment ID	Roadway	ID	From	To	ADT	Number of Travel Lanes	Median (Y/N)	Posted Speed	Classification	Lanes	Median/TWLTL	Posted Speed	C or Better	D	E	LOS	V/C Ratio
113		120	Waterman Rd	Bradshaw Rd	7,110	2	N	45	2no45	2	No	45	9,800	17,700	18,900	C or Better	0.38
116		121	Bradshaw Rd	Bader Rd	6,390	2	N	45	2no45	2	No	45	9,800	17,700	18,900	C or Better	0.34
117		122	Bader Rd	Dillard Oaks Ct	5,610	2	N	45	2no45	2	No	45	9,800	17,700	18,900	C or Better	0.30
110		123	Excelsior Rd	Grant Line Rd	6,670	2	N	45	2no45	2	No	45	9,800	17,700	18,900	C or Better	0.35
127	Waterman Rd	124	Vintage Park Dr	Calvine Rd	9,220	2	Y	55	2yes55	2	Yes	55	13,200	19,600	19,900	C or Better	0.46
126		125	Calvine Rd	Sheldon Rd	10,060	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.53
112		126	Sheldon Rd	Bond Rd	9,940	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.53
96		127	Bond Rd	Elk Grove Blvd	11,560	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.61
12		128	Elk Grove Blvd	Grant Line Rd	7,110	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.38
100	Whitelock Pkwy	129	Franklin Blvd	Bruceville Rd	14,000	4	Y	40	4yes40	4	Yes	40	18,000	35,300	37,900	C or Better	0.37
27		130	Bruceville Rd	Big Horn Blvd	7,440	4	Y	40	4yes40	4	Yes	40	18,000	35,300	37,900	C or Better	0.20
158		131	Big Horn Blvd	Lotz Pkwy	5,190	2	N	40	2no40	2	No	40	8,400	16,600	18,900	C or Better	0.27
500		132	Lotz Pkwy	SR 99	-	6	Y	55	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	-
24	Willard Pkwy	133	Whitelock Pkwy	Bilby	6,940	4	Y	50	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.18
25		134	Bilby Rd	Kammerer Rd	1,280	2	Y	50	2yes45	2	Yes	45	10,300	18,600	19,900	C or Better	0.06
108	Wilton Rd	135	Grant Line Rd	Leisure Oak Ln	9,940	2	N	55	2no55	2	No	55	12,500	18,600	18,900	C or Better	0.53
532	SR-99	136	Calvine Rd	Sheldon Rd	104,475	4			4Fwy	4			61,600	74,400	80,000	F	1.31
523		137	Sheldon Rd	Bond Rd	96,525	4			4Fwy	4			61,600	74,400	80,000	F	1.21
524		138	Bond Rd	Elk Grove Blvd	81,280	4			4Fwy	4			61,600	74,400	80,000	F	1.02
525		139	Elk Grove Blvd	Whitelock Pkwy	71,500	4			4Fwy	4			61,600	74,400	80,000	D	0.89
526		140	Whitelock Pkwy	Grant Line Rd	71,500	4			4Fwy	4			61,600	74,400	80,000	D	0.89
527		141	Grant Line Rd	Eschinger Rd	76,900	4			4Fwy	4			61,600	74,400	80,000	E	0.96
528	I-5	142	Cosumnes River Blvd	Laguna Blvd	95,600	6			6Fwy	6			92,400	111,600	120,000	D	0.80
529		143	Laguna Blvd	Elk Grove Blvd	76,700	4			4Fwy	4			61,600	74,400	80,000	E	0.96
530		144	Elk Grove Blvd	Hood Franklin Rd	64,000	4			4Fwy	4			61,600	74,400	80,000	D	0.80
531		145	Hood Franklin Rd	Twin Cities Rd	53,000	4			4Fwy	4			61,600	74,400	80,000	C or Better	0.66

GIS Segment ID	Roadway	ID	From	To	Forecast	Classification	Lanes	Median/TWLTL	Speed	Volume Threshold by LOS			LOS	V/C Ratio
										C or Better	D	E		
115	Bader	1	Sheldon Rd	Bond Rd	9,000	2no45	2	No	45	9,800	17,700	18,900	C or Better	0.48
61		2	Franklin Blvd	Bruceville Rd	19,500	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.51
59		3	Bruceville Rd	Laguna Blvd	33,900	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.89
46		4	Laguna Blvd	Elk Grove Blvd	38,500	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.02
43	Big Horn Blvd	5	Elk Grove Blvd	Lotz Pkwy	34,100	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.90
29		6	Lotz Pkwy	Whitelock Pkwy	31,100	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.82
501		7	Whitelock Pkwy	Bilby Rd	28,700	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.76
502		8	Bilby Rd	Kammerer Rd	29,800	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.79
503		9	Kammerer Rd	Eschinger Rd	35,300	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.65
26		10	Franklin Blvd	Willard Pkwy	10,600	2yes30	2	Yes	30	5,900	15,400	19,900	D	0.53
22		11	Willard Pkwy	Bruceville Rd	13,600	2yes45	2	Yes	45	10,300	18,600	19,900	D	0.68
23	Bilby Rd	12	Bruceville Rd	Big Horn Blvd	6,400	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.17
514		13	Big Horn Blvd	Lotz Pkwy	7,600	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.20
515		14	Lotz Pkwy	Promenade Pkwy	7,400	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.20
153		15	SR 99	E Stockton Blvd	44,800	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.83
148		16	E Stockton Blvd	Elk Crest Dr	54,100	6yes45	6	Yes	45	31,900	54,000	54,300	E	1.00
145		17	Elk Crest Dr	Elk Grove Florin Rd	43,800	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.16
97	Bond Rd	18	Elk Grove Florin Rd	Waterman Rd	41,200	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.09
98		19	Waterman Rd	Bradshaw Rd	32,000	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.84
104		20	Bradshaw Rd	Bader Rd	16,300	2no45	2	No	45	9,800	17,700	18,900	D	0.86
105		21	Bader Rd	Grant Line Rd	10,200	2no45	2	No	45	9,800	17,700	18,900	D	0.54
124		22	Vintage Park Dr	Calvine Rd	38,300	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.01
125		23	Calvine Rd	Sheldon Rd	37,200	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.98
114	Bradshaw Rd	24	Sheldon Rd	Bond Rd	39,800	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.05
103		25	Bond Rd	Elk Grove Blvd	39,400	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.04
11		26	Elk Grove Blvd	Grant Line Rd	37,500	4yes45	4	Yes	45	21,400	37,200	37,900	E	0.99
62		27	Damascus Dr	Sheldon Rd	37,800	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.70
60		28	Sheldon Rd	Big Horn Blvd	60,100	6yes45	6	Yes	45	31,900	54,000	54,300	F	1.11
58		29	Big Horn Blvd	Laguna Blvd	51,500	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.95
53	Bruceville Rd	30	Laguna Blvd	Elk Grove Blvd	38,000	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.00
49		31	Elk Grove Blvd	Whitelock Pkwy	41,100	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.08
21		32	Whitelock Pkwy	Bilby Rd	29,800	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.79
20		33	Bilby Rd	Kammerer Rd	27,700	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.73
19		34	Kammerer Rd	Eschinger Rd	34,900	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.92
129		35	Power Inn Rd	Elk Grove Florin Rd	60,000	6yes45	6	Yes	45	31,900	54,000	54,300	F	1.10
131		36	Elk Grove Florin Rd	Waterman Rd	51,600	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.95
130	Calvine Rd	37	Waterman Rd	Bradshaw Rd	34,300	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.91
123		38	Bradshaw Rd	Vineyard Rd	29,300	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.77
154		39	Vineyard Rd	Excelsior Rd	26,500	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.70
122		40	Excelsior Rd	Grant Line Rd	22,500	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.59
63	Center Parkway	41	Laguna Village	Bruceville Rd	22,100	6yes40	6	Yes	40	26,700	51,500	54,300	C or Better	0.41
14	E. Stockton Blvd	42	Grant Line Rd	Elk Grove Florin Rd	27,900	2no40	2	No	40	8,400	16,600	18,900	F	1.48
76		43	I-5	Harbour Point Dr	35,400	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.65
74		44	Harbour Point Dr	Four Winds Dr	40,400	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.74
72		45	Four Winds Dr	Franklin Blvd	49,200	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.91
55		46	Franklin Blvd	Bruceville Rd	42,400	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.78
48		47	Bruceville Rd	Big Horn Blvd	53,500	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.99
45		48	Big Horn Blvd	Laguna Springs Dr	51,800	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.95
81	Elk Grove Blvd	49	Laguna Springs Dr	Auto Center Dr	55,600	6yes45	6	Yes	45	31,900	54,000	54,300	F	1.02
82		50	Auto Center Dr	SR 99	59,700	6yes45	6	Yes	45	31,900	54,000	54,300	F	1.10

General Plan Update Roadway Segment LOS

GIS Segment ID	Roadway	ID	From	To	Forecast	Classification	Lanes	Median/TWLTL	Speed	Volume Threshold by LOS			LOS	V/C Ratio
										C or Better	D	E		
84		51	SR 99	Emerald Vista Dr / E Stockton Blvd	64,700	6yes45	6	Yes	45	31,900	54,000	54,300	F	1.19
92		52	Emerald Vista Dr / E Stockton Blvd	Elk Grove Florin Rd	48,400	4yes35	4	Yes	35	14,700	33,300	37,900	F	1.28
94		53	Elk Grove Florin Rd	Waterman Rd	19,700	2yes25	2	Yes	25	4,400	14,300	19,900	E	0.99
102		54	Waterman Rd	Bradshaw Rd	16,800	2yes35	2	Yes	35	7,400	16,500	19,900	E	0.84
9		55	Bradshaw Rd	Grant Line Rd	8,100	2yes35	2	Yes	35	7,400	16,500	19,900	D	0.41
128	Elk Grove Florin Rd	56	Vintage Park Dr	Calvine Rd	53,000	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.98
132		57	Calvine Rd	Sheldon Rd	56,400	6yes45	6	Yes	45	31,900	54,000	54,300	F	1.04
99		58	Sheldon Rd	Bond Rd	41,200	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.09
95		59	Bond Rd	Elk Grove Blvd	35,800	4yes35	4	Yes	35	14,700	33,300	37,900	E	0.94
156		60	Elk Grove Blvd	E Stockton Blvd	19,300	2no35	2	No	35	7,000	15,700	18,900	F	1.02
508	Eschinger Rd	61	Willard Pkwy	Bruceville Rd	19,400	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.51
509		62	Bruceville Rd	Big Horn Blvd	25,900	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.68
510		63	Big Horn Blvd	Lotz Pkwy	31,900	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.84
511		64	Lotz Pkwy	Promenade Pkwy	33,600	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.62
121	Excelsior Rd	65	Gerber Rd	Calvine Rd	19,300	2no45	2	No	45	9,800	17,700	18,900	F	1.02
120		66	Calvine Rd	Sheldon Rd	16,300	2no45	2	No	45	9,800	17,700	18,900	D	0.86
66	Franklin Blvd	67	Sims Rd	Big Horn Blvd	41,200	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.09
64		68	Big Horn Blvd	Laguna Blvd	35,400	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.93
68		69	Laguna Blvd	Elk Grove Blvd	31,900	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.84
101		70	Elk Grove Blvd	Whitelock Pkwy	34,200	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.90
516		71	Whitelock Pkwy	Bilby Rd	2,200	2yes55	2	Yes	55	13,200	19,600	19,900	C or Better	0.11
517		72	Bilby Rd	Hood Franklin Rd	3,900	2yes55	2	Yes	55	13,200	19,600	19,900	C or Better	0.20
518		73	Hood Franklin Rd	Lambert Rd	1,800	2yes55	2	Yes	55	13,200	19,600	19,900	C or Better	0.09
119	Grant Line Rd	74	Sloughhouse Rd	Calvine Rd	40,500	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.07
118		75	Calvine Rd	Sheldon Rd	33,500	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.88
109		76	Sheldon Rd	Wilton Rd	36,600	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.97
107		77	Wilton Rd	Bond Rd	37,600	4yes45	4	Yes	45	21,400	37,200	37,900	E	0.99
10		78	Bond Rd	Elk Grove Blvd	29,400	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.78
1		79	Elk Grove Blvd	Bradshaw Rd	25,200	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.66
2		80	Bradshaw Rd	Mosher Rd	63,300	8yes55H	8	Yes	55	64,000	72,000	80,000	C or Better	0.79
3		81	Mosher Rd	Waterman Rd	66,800	8yes55H	8	Yes	55	64,000	72,000	80,000	D	0.84
4		82	Waterman Rd	E. Stockton / Survey Rd	100,000	8yes55H	8	Yes	55	64,000	72,000	80,000	F	1.25
5		83	E. Stockton / Survey Rd	SR 99	110,700	8yes55H	8	Yes	55	64,000	72,000	80,000	F	1.38
79	Harbour Point Dr	84	Elk Grove Blvd	Laguna Blvd	17,900	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.47
157	Hood Franklin Rd	85	I-5	Franklin Blvd	46,800	4exp55	4	Yes	55	57,600	64,800	72,000	C or Better	0.65
519	Kammerer Rd	86	Franklin Blvd	Willard Pkwy	48,200	4exp55	4	Yes	55	57,600	64,800	72,000	C or Better	0.67
520		87	Willard Pkwy	Bruceville Rd	54,500	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	0.50
521		88	Bruceville Rd	Big Horn Blvd	65,700	6exp55	6	Yes	55	86,400	97,200	108,000	C or Better	0.61
18		89	Big Horn Blvd	Lotz Pkwy	72,000	8yes55H	8	Yes	55	64,000	72,000	80,000	D	0.90
8		90	Lotz Pkwy	Promenade Pkwy	68,600	8yes55H	8	Yes	55	64,000	72,000	80,000	D	0.86
7		91	Promenade Pkwy	SR 99	92,300	8yes55H	8	Yes	55	64,000	72,000	80,000	F	1.15
71	Laguna Blvd	92	SR 99	Franklin Blvd	37,600	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.69
57		93	Franklin Blvd	Bruceville Rd	32,800	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.60
54		94	Bruceville Rd	Big Horn Blvd	28,000	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.52
90		95	Big Horn Blvd	Laguna Springs Dr	53,700	8yes55M	8	Yes	55	57,600	64,800	72,000	C or Better	0.75
151		96	Laguna Springs Dr	SR 99	66,100	7yes45	7	Yes	45	44,800	59,400	63,200	F	1.05
155	Laguna Springs Dr	97	Laguna Blvd	Laguna Palms Wy	15,900	4yes35	4	Yes	35	14,700	33,300	37,900	D	0.42
89		98	Laguna Palms Wy	Elk Grove Blvd	13,200	2yes35	2	Yes	35	7,400	16,500	19,900	D	0.66
34		99	Elk Grove Blvd	Lotz Pkwy	26,700	4yes35	4	Yes	35	14,700	33,300	37,900	D	0.70
17	Lent Ranch Pkwy	100	Kammerer Rd	Promenade Pkwy	13,200	4yes35	4	Yes	35	14,700	33,300	37,900	C or Better	0.35

General Plan Update Roadway Segment LOS														
GIS Segment ID	Roadway	ID	From	To	Forecast	Classification	Lanes	Median/TWLTL	Speed	Volume Threshold by LOS			LOS	V/C Ratio
										C or Better	D	E		
143	Lewis Stein Rd	101	Sheldon Rd	Big Horn Blvd	14,000	2yes35	2	Yes	35	7,400	16,500	19,900	D	0.70
31	Lotz Pkwy	102	Big Horn Blvd	Laguna Springs Dr	15,500	4yes35	4	Yes	35	14,700	33,300	37,900	D	0.41
33		103	Laguna Springs Dr	Whitelock Pkwy	17,000	4yes35	4	Yes	35	14,700	33,300	37,900	D	0.45
504		104	Whitelock Pkwy	Promenade Pkwy	44,200	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.81
505		105	Promenade Pkwy	Bilby Rd	28,900	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.76
506		106	Bilby Rd	Kammerer Rd	22,200	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.59
507		107	Kammerer Rd	Eschinger Rd	39,000	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.72
13	Mosher	108	Grant Line Rd	Waterman Rd	7,600	2yes55	2	Yes	55	13,200	19,600	19,900	C or Better	0.38
522	Pleasant Grove School Rd	109	Bader Rd	Grant Line Rd	4,700	2no35	2	No	35	7,000	15,700	18,900	C or Better	0.25
136	Power Inn Rd	110	Calvine Rd	Sheldon Rd	19,500	4yes35	4	Yes	35	14,700	33,300	37,900	D	0.51
512	Promenade Pkwy	111	Lotz Pkwy	Bilby Rd	17,800	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.47
16		112	Bilby Rd	Kammerer Rd	27,800	6yes45	6	Yes	45	31,900	54,000	54,300	C or Better	0.51
513		113	Kammerer Rd	Eschinger Rd	16,000	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.42
142	Sheldon Rd	114	Bruceville Rd	Lewis Stein Rd	37,700	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.69
141		115	Lewis Stein Rd	SR 99	47,400	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.87
139		116	SR 99	E. Stockton Blvd	58,900	6yes45	6	Yes	45	31,900	54,000	54,300	F	1.08
137		117	E. Stockton Blvd	Power Inn Rd	51,900	6yes45	6	Yes	45	31,900	54,000	54,300	D	0.96
134		118	Power Inn Rd	Elk Grove Florin Rd	43,900	4yes45	4	Yes	45	21,400	37,200	37,900	F	1.16
111		119	Elk Grove Florin Rd	Waterman Rd	21,700	2no45	2	No	45	9,800	17,700	18,900	F	1.15
113		120	Waterman Rd	Bradshaw Rd	19,400	2no45	2	No	45	9,800	17,700	18,900	F	1.03
116		121	Bradshaw Rd	Bader Rd	14,500	2no45	2	No	45	9,800	17,700	18,900	D	0.77
117		122	Bader Rd	Dillard Oaks Ct	14,500	2no45	2	No	45	9,800	17,700	18,900	D	0.77
110		123	Excelsior Rd	Grant Line Rd	22,900	2no45	2	No	45	9,800	17,700	18,900	F	1.21
127	Waterman Rd	124	Vintage Park Dr	Calvine Rd	30,400	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.80
126		125	Calvine Rd	Sheldon Rd	17,500	2no55	2	No	55	12,500	18,600	18,900	D	0.93
112		126	Sheldon Rd	Bond Rd	20,900	2no55	2	No	55	12,500	18,600	18,900	F	1.11
96		127	Bond Rd	Elk Grove Blvd	23,300	2no55	2	No	55	12,500	18,600	18,900	F	1.23
12		128	Elk Grove Blvd	Grant Line Rd	25,600	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.68
100	Whitelock Pkwy	129	Franklin Blvd	Bruceville Rd	8,800	4yes40	4	Yes	40	18,000	35,300	37,900	C or Better	0.23
27		130	Bruceville Rd	Big Horn Blvd	8,900	4yes40	4	Yes	40	18,000	35,300	37,900	C or Better	0.23
158		131	Big Horn Blvd	Lotz Pkwy	15,400	4yes40	4	Yes	40	18,000	35,300	37,900	C or Better	0.41
500		132	Lotz Pkwy	SR 99	50,400	4yes40	4	Yes	40	18,000	35,300	37,900	F	1.33
24	Willard Pkwy	133	Whitelock Pkwy	Bilby	31,600	4yes45	4	Yes	45	21,400	37,200	37,900	D	0.83
25		134	Bilby Rd	Kammerer Rd	21,100	4yes45	4	Yes	45	21,400	37,200	37,900	C or Better	0.56
108	Wilton Rd	135	Grant Line Rd	Leisure Oak Ln	14,800	2no55	2	No	55	12,500	18,600	18,900	D	0.78
532	SR-99	136	Calvine Rd	Sheldon Rd	156,400	4Fwy	4			61,600	74,400	80,000	F	1.96
523		137	Sheldon Rd	Bond Rd	154,000	4Fwy	4			61,600	74,400	80,000	F	1.93
524		138	Bond Rd	Elk Grove Blvd	140,100	4Fwy	4			61,600	74,400	80,000	F	1.75
525		139	Elk Grove Blvd	Whitelock Pkwy	126,300	4Fwy	4			61,600	74,400	80,000	F	1.58
526		140	Whitelock Pkwy	Grant Line Rd	107,200	4Fwy	4			61,600	74,400	80,000	F	1.34
527		141	Grant Line Rd	Eschinger Rd	131,900	4Fwy	4			61,600	74,400	80,000	F	1.65
528	I-5	142	Cosumnes River Blvd	Laguna Blvd	155,200	6Fwy	6			92,400	111,600	120,000	F	1.29
529		143	Laguna Blvd	Elk Grove Blvd	130,700	4Fwy	4			61,600	74,400	80,000	F	1.63
530		144	Elk Grove Blvd	Hood Franklin Rd	113,200	4Fwy	4			61,600	74,400	80,000	F	1.42
531		145	Hood Franklin Rd	Twin Cities Rd	81,600	4Fwy	4			61,600	74,400	80,000	F	1.02

Intersection LOS

- Existing Conditions

- General Plan Update Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	374	683	140	276	944	245	277	1078	333	181	506	375
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	416	759	78	307	1049	205	308	1198	194	201	562	235
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	432	1281	565	340	1187	521	341	1243	554	235	1133	500
Arrive On Green	0.13	0.37	0.37	0.10	0.34	0.34	0.10	0.35	0.35	0.07	0.32	0.32
Sat Flow, veh/h	3408	3505	1546	3408	3505	1539	3408	3505	1563	3408	3505	1545
Grp Volume(v), veh/h	416	759	78	307	1049	205	308	1198	194	201	562	235
Grp Sat Flow(s),veh/h/ln	1704	1752	1546	1704	1752	1539	1704	1752	1563	1704	1752	1545
Q Serve(g_s), s	23.9	34.6	6.7	17.6	55.7	20.0	17.6	66.1	18.0	11.5	25.5	23.9
Cycle Q Clear(g_c), s	23.9	34.6	6.7	17.6	55.7	20.0	17.6	66.1	18.0	11.5	25.5	23.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	432	1281	565	340	1187	521	341	1243	554	235	1133	500
V/C Ratio(X)	0.96	0.59	0.14	0.90	0.88	0.39	0.90	0.96	0.35	0.85	0.50	0.47
Avail Cap(c_a), veh/h	432	1281	565	432	1244	546	432	1244	555	432	1244	548
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	85.7	50.7	41.8	87.8	61.6	49.8	87.8	62.4	46.9	90.8	53.8	53.2
Incr Delay (d2), s/veh	33.5	0.9	0.2	16.6	7.9	0.7	16.7	17.8	0.8	3.4	0.7	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.3	16.9	2.9	9.1	28.3	8.6	9.1	35.2	7.9	5.6	12.4	10.4
LnGrp Delay(d),s/veh	119.2	51.6	42.0	104.4	69.4	50.5	104.5	80.2	47.7	94.3	54.5	54.7
LnGrp LOS	F	D	D	F	E	D	F	F	D	F	D	D
Approach Vol, veh/h		1253			1561			1700			998	
Approach Delay, s/veh		73.4			73.8			80.9			62.5	
Approach LOS		E			E			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.3	69.2	30.5	72.3	19.1	75.3	25.2	77.6
Change Period (Y+Rc), s	5.5	* 5.4	5.5	5.5	5.5	* 5.4	5.5	5.5
Max Green Setting (Gmax), s	25.0	* 70	25.0	70.0	25.0	* 70	25.0	70.0
Max Q Clear Time (g_c+I1), s	19.6	27.5	25.9	57.7	13.5	68.1	19.6	36.6
Green Ext Time (p_c), s	0.1	33.8	0.0	9.1	0.1	1.8	0.1	23.8

Intersection Summary	
HCM 2010 Ctrl Delay	73.9
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	212	1045	101	180	934	38	100	154	224	76	216	239
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	249	1229	66	212	1099	43	118	181	232	89	254	256
Adj No. of Lanes	1	2	1	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	269	1346	583	233	1247	49	140	210	270	109	222	224
Arrive On Green	0.15	0.38	0.38	0.13	0.36	0.36	0.08	0.29	0.29	0.06	0.27	0.27
Sat Flow, veh/h	1757	3505	1519	1757	3433	134	1757	736	943	1757	829	836
Grp Volume(v), veh/h	249	1229	66	212	561	581	118	0	413	89	0	510
Grp Sat Flow(s),veh/h/ln	1757	1752	1519	1757	1752	1815	1757	0	1678	1757	0	1665
Q Serve(g_s), s	20.9	49.7	4.2	17.8	44.8	44.8	9.9	0.0	34.8	7.5	0.0	40.0
Cycle Q Clear(g_c), s	20.9	49.7	4.2	17.8	44.8	44.8	9.9	0.0	34.8	7.5	0.0	40.0
Prop In Lane	1.00		1.00	1.00		0.07	1.00		0.56	1.00		0.50
Lane Grp Cap(c), veh/h	269	1346	583	233	637	660	140	0	480	109	0	446
V/C Ratio(X)	0.92	0.91	0.11	0.91	0.88	0.88	0.84	0.00	0.86	0.82	0.00	1.14
Avail Cap(c_a), veh/h	294	1642	711	294	821	850	306	0	480	294	0	446
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	62.4	43.7	29.6	63.9	44.5	44.5	67.8	0.0	50.5	69.2	0.0	54.7
Incr Delay (d2), s/veh	30.8	6.5	0.0	23.9	7.6	7.4	5.1	0.0	14.0	5.5	0.0	88.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.5	25.3	1.8	10.2	23.0	23.8	5.0	0.0	18.0	3.8	0.0	29.3
LnGrp Delay(d),s/veh	93.1	50.1	29.7	87.8	52.2	52.0	73.0	0.0	64.5	74.8	0.0	143.1
LnGrp LOS	F	D	C	F	D	D	E		E	E		F
Approach Vol, veh/h		1544			1354			531			599	
Approach Delay, s/veh		56.2			57.6			66.4			133.0	
Approach LOS		E			E			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.4	59.4	17.4	45.2	24.3	62.5	14.7	47.9
Change Period (Y+Rc), s	4.5	* 5.1	5.5	* 5.2	4.5	5.1	* 5.4	* 5.2
Max Green Setting (Gmax), s	25.0	* 70	26.0	* 40	25.0	70.0	* 25	* 40
Max Q Clear Time (g_c+I1), s	22.9	46.8	11.9	42.0	19.8	51.7	9.5	36.8
Green Ext Time (p_c), s	0.0	6.0	0.1	0.0	0.0	5.7	0.0	0.8

Intersection Summary		
HCM 2010 Ctrl Delay		69.4
HCM 2010 LOS		E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	431	410	33	95	530	220	33	519	45	152	280	245
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	479	456	11	106	589	100	37	577	46	169	311	58
Adj No. of Lanes	2	2	1	2	2	1	2	2	0	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	573	1173	524	177	766	343	75	718	57	255	951	420
Arrive On Green	0.17	0.33	0.33	0.05	0.22	0.22	0.02	0.22	0.22	0.07	0.27	0.27
Sat Flow, veh/h	3408	3505	1567	3408	3505	1568	3408	3285	261	3408	3505	1546
Grp Volume(v), veh/h	479	456	11	106	589	100	37	307	316	169	311	58
Grp Sat Flow(s),veh/h/ln	1704	1752	1567	1704	1752	1568	1704	1752	1794	1704	1752	1546
Q Serve(g_s), s	9.7	7.1	0.3	2.2	11.2	3.8	0.8	11.8	11.9	3.4	5.1	2.0
Cycle Q Clear(g_c), s	9.7	7.1	0.3	2.2	11.2	3.8	0.8	11.8	11.9	3.4	5.1	2.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.15	1.00		1.00
Lane Grp Cap(c), veh/h	573	1173	524	177	766	343	75	383	392	255	951	420
V/C Ratio(X)	0.84	0.39	0.02	0.60	0.77	0.29	0.50	0.80	0.81	0.66	0.33	0.14
Avail Cap(c_a), veh/h	1196	3443	1539	1196	3443	1540	1196	1722	1762	1196	3443	1519
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	18.1	15.9	33.1	26.1	23.2	34.5	26.4	26.4	32.1	20.8	19.6
Incr Delay (d2), s/veh	1.3	0.1	0.0	1.2	0.6	0.2	1.9	1.5	1.5	1.1	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	3.4	0.1	1.0	5.5	1.6	0.4	5.9	6.0	1.7	2.4	0.9
LnGrp Delay(d),s/veh	29.9	18.2	15.9	34.3	26.8	23.4	36.4	27.9	27.9	33.2	20.8	19.7
LnGrp LOS	C	B	B	C	C	C	D	C	C	C	C	B
Approach Vol, veh/h		946			795			660			538	
Approach Delay, s/veh		24.1			27.3			28.4			24.6	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.5	21.1	7.1	25.6	9.2	29.4	10.8	21.9
Change Period (Y+Rc), s	5.5	* 5.5	5.5	6.3	5.5	* 5.5	5.5	* 6.3
Max Green Setting (Gmax), s	25.0	* 70	25.0	70.0	25.0	* 70	25.0	* 70
Max Q Clear Time (g_c+I1), s	11.7	13.2	2.8	7.1	4.2	9.1	5.4	13.9
Green Ext Time (p_c), s	0.3	2.2	0.0	1.5	0.1	2.2	0.1	1.5

Intersection Summary	
HCM 2010 Ctrl Delay	26.0
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	17.9
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	147	228	43	0	15	152	25	0	43	271	14	0	4	72	40
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	155	240	45	0	16	160	26	0	45	285	15	0	4	76	42
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	22.1	12.7	17.8	11.4
HCM LOS	C	B	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	13%	35%	8%	3%
Vol Thru, %	83%	55%	79%	62%
Vol Right, %	4%	10%	13%	34%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	328	418	192	116
LT Vol	43	147	15	4
Through Vol	271	228	152	72
RT Vol	14	43	25	40
Lane Flow Rate	345	440	202	122
Geometry Grp	1	1	1	1
Degree of Util (X)	0.593	0.709	0.353	0.222
Departure Headway (Hd)	6.183	5.931	6.293	6.537
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	587	612	572	549
Service Time	4.202	3.931	4.327	4.567
HCM Lane V/C Ratio	0.588	0.719	0.353	0.222
HCM Control Delay	17.8	22.1	12.7	11.4
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	3.9	5.8	1.6	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	224	0	23	0	0	0	33	799	0	0	595	168
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1861	1900	0	1863	0	1792	1810	0	0	1792	1863
Adj Flow Rate, veh/h	257	0	0	0	0	0	38	918	0	0	684	160
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	1
Peak Hour Factor	0.87	0.92	0.87	0.92	0.92	0.92	0.87	0.87	0.92	0.92	0.87	0.87
Percent Heavy Veh, %	2	2	2	0	2	0	6	5	0	0	6	2
Cap, veh/h	327	0	0	0	4	0	44	1023	0	0	815	720
Arrive On Green	0.18	0.00	0.00	0.00	0.00	0.00	0.03	0.57	0.00	0.00	0.45	0.45
Sat Flow, veh/h	1772	0	0	0	1863	0	1707	1810	0	0	1792	1583
Grp Volume(v), veh/h	257	0	0	0	0	0	38	918	0	0	684	160
Grp Sat Flow(s),veh/h/ln	1772	0	0	0	1863	0	1707	1810	0	0	1792	1583
Q Serve(g_s), s	5.9	0.0	0.0	0.0	0.0	0.0	0.9	19.0	0.0	0.0	14.3	2.6
Cycle Q Clear(g_c), s	5.9	0.0	0.0	0.0	0.0	0.0	0.9	19.0	0.0	0.0	14.3	2.6
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	327	0	0	0	4	0	44	1023	0	0	815	720
V/C Ratio(X)	0.78	0.00	0.00	0.00	0.00	0.00	0.87	0.90	0.00	0.00	0.84	0.22
Avail Cap(c_a), veh/h	1673	0	0	0	879	0	1007	2989	0	0	2961	2615
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	0.0	0.0	0.0	0.0	0.0	20.6	8.1	0.0	0.0	10.2	7.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	0.0	0.0	0.0	17.3	1.2	0.0	0.0	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.0	0.0	0.0	0.0	0.6	9.5	0.0	0.0	7.0	1.1
LnGrp Delay(d),s/veh	18.0	0.0	0.0	0.0	0.0	0.0	37.9	9.3	0.0	0.0	11.1	7.1
LnGrp LOS	B						D	A			B	A
Approach Vol, veh/h		257			0			956			844	
Approach Delay, s/veh		18.0			0.0			10.5			10.3	
Approach LOS		B						B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	4.7	24.4		0.0		29.0		13.3
Change Period (Y+Rc), s	* 3.6	5.1		3.5		5.1		5.5
Max Green Setting (Gmax), s	* 25	70.0		20.0		70.0		40.0
Max Q Clear Time (g_c+I1), s	2.9	16.3		0.0		21.0		7.9
Green Ext Time (p_c), s	0.0	3.0		0.0		3.0		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	11.4
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	285	202	364	274	139	202	906	369	123	296	7
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	22	331	7	423	319	28	235	1053	273	143	344	2
Adj No. of Lanes	2	2	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	76	431	190	481	1218	371	301	1668	737	204	1569	701
Arrive On Green	0.02	0.12	0.12	0.14	0.24	0.24	0.06	0.32	0.32	0.06	0.45	0.45
Sat Flow, veh/h	3408	3505	1546	3408	5036	1533	3408	3505	1548	3408	3505	1567
Grp Volume(v), veh/h	22	331	7	423	319	28	235	1053	273	143	344	2
Grp Sat Flow(s),veh/h/ln	1704	1752	1546	1704	1679	1533	1704	1752	1548	1704	1752	1567
Q Serve(g_s), s	0.7	10.1	0.4	13.4	5.6	1.6	7.5	28.2	15.0	4.5	6.6	0.1
Cycle Q Clear(g_c), s	0.7	10.1	0.4	13.4	5.6	1.6	7.5	28.2	15.0	4.5	6.6	0.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	76	431	190	481	1218	371	301	1668	737	204	1569	701
V/C Ratio(X)	0.29	0.77	0.04	0.88	0.26	0.08	0.78	0.63	0.37	0.70	0.22	0.00
Avail Cap(c_a), veh/h	511	621	274	511	1218	371	511	1668	737	511	1569	701
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.58	0.58	0.58	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.9	46.7	42.5	46.3	33.8	32.2	50.7	29.2	24.7	50.7	18.6	16.8
Incr Delay (d2), s/veh	0.8	1.9	0.0	14.7	0.0	0.0	1.0	1.1	0.8	1.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	5.0	0.2	7.3	2.6	0.7	3.6	13.9	6.6	2.2	3.3	0.0
LnGrp Delay(d),s/veh	53.7	48.6	42.5	61.1	33.8	32.2	51.7	30.3	25.6	52.4	18.9	16.8
LnGrp LOS	D	D	D	E	C	C	D	C	C	D	B	B
Approach Vol, veh/h		360			770			1561			489	
Approach Delay, s/veh		48.8			48.7			32.7			28.7	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.2	54.7	7.9	32.1	12.1	57.9	21.0	19.0
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	16.5	35.5	16.5	19.5	16.5	35.5	16.5	19.5
Max Q Clear Time (g_c+I1), s	9.5	8.6	2.7	7.6	6.5	30.2	15.4	12.1
Green Ext Time (p_c), s	0.2	7.7	0.0	2.3	0.2	3.2	0.1	0.9

Intersection Summary		
HCM 2010 Ctrl Delay		37.8
HCM 2010 LOS		D

Notes
User approved pedestrian interval to be less than phase max green.

7: Lewis Stien Rd/Jocelyn Way & Sheldon Rd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)		2.2	0.3	2.9	0.0	0.0	0.0	0.0	3.2	3.0	0.4	0.4
Total Delay (hr)	0.0	0.0	1.5	0.0	0.0	0.7	0.7	0.0	0.1	0.4	0.1	0.8
Total Del/Veh (s)		42.3	25.5	6.3	33.7	48.4	11.3	4.7	38.6	34.4	35.9	24.0
Stop Delay (hr)	0.0	0.0	1.1	0.0	0.0	0.6	0.4	0.0	0.1	0.3	0.1	0.7
Stop Del/Veh (s)		39.7	18.6	4.1	31.7	43.1	7.3	1.4	36.8	31.1	31.9	20.6
Total Stops	0	2	123	9	1	46	72	4	9	29	7	103
Stop/Veh		1.00	0.59	0.56	1.00	0.88	0.33	0.29	0.82	0.72	0.70	0.86
Travel Dist (mi)	0.1	0.3	39.5	3.0	0.2	13.5	54.8	3.8	1.4	5.0	1.2	15.6
Travel Time (hr)	0.0	0.0	2.5	0.1	0.0	1.1	2.1	0.1	0.2	0.6	0.1	1.4
Avg Speed (mph)	9	9	16	24	13	12	26	28	8	9	9	11
Fuel Used (gal)	0.0	0.0	0.6	0.1	0.0	0.2	1.1	0.1	0.0	0.1	0.0	0.3
Fuel Eff. (mpg)	73.5	67.0	61.3	56.6	70.7	55.9	51.5	60.2	63.2	50.9	45.2	60.1
HC Emissions (g)	0	0	18	2	0	7	30	3	0	4	1	7
CO Emissions (g)	2	7	644	87	2	221	1017	82	21	116	29	273
NOx Emissions (g)	0	0	55	7	0	21	101	9	1	10	3	20
Vehicles Entered	0	2	204	15	1	47	211	13	10	37	9	115
Vehicles Exited	0	2	198	16	1	47	209	13	11	38	10	114
Hourly Exit Rate	0	8	792	64	4	188	836	52	44	152	40	456
Input Volume	1	7	815	61	3	197	883	57	47	151	34	450
% of Volume	0	114	97	105	133	95	95	91	94	101	118	101
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	0	10	0	0	4	9	1	1	2	1	5

7: Lewis Stien Rd/Jocelyn Way & Sheldon Rd Performance by movement

Movement	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	3.8	0.6	3.7	0.6
Total Delay (hr)	0.5	0.1	0.0	5.0
Total Del/Veh (s)	44.3	46.8	5.8	24.0
Stop Delay (hr)	0.4	0.1	0.0	4.0
Stop Del/Veh (s)	40.9	42.3	5.0	19.3
Total Stops	33	8	3	449
Stop/Veh	0.85	0.80	0.75	0.60
Travel Dist (mi)	4.1	1.0	0.4	144.1
Travel Time (hr)	0.7	0.2	0.0	9.2
Avg Speed (mph)	7	6	19	16
Fuel Used (gal)	0.1	0.0	0.0	2.6
Fuel Eff. (mpg)	47.7	56.1	82.3	55.5
HC Emissions (g)	3	1	0	75
CO Emissions (g)	96	23	7	2627
NOx Emissions (g)	7	2	0	237
Vehicles Entered	37	9	4	714
Vehicles Exited	38	10	4	711
Hourly Exit Rate	152	40	16	2844
Input Volume	152	40	15	2913
% of Volume	100	100	107	98
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0
Density (ft/veh)				484
Occupancy (veh)	2	1	0	36

8: SR 99 SB Off/W Stockton Blvd & Sheldon Rd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.8	0.7	0.1	0.5	0.0	0.0	0.0	0.4	0.1	0.8	3.8	0.6
Total Delay (hr)	0.0	0.1	2.8	0.1	1.5	0.6	0.1	0.6	0.0	0.2	0.6	0.2
Total Del/Veh (s)	44.0	50.6	27.4	8.1	44.8	9.0	4.0	40.5	40.8	15.7	46.7	46.1
Stop Delay (hr)	0.0	0.1	2.0	0.1	1.3	0.4	0.0	0.6	0.0	0.2	0.6	0.2
Stop Del/Veh (s)	41.3	46.1	19.3	4.9	39.8	5.8	2.2	37.9	39.1	14.9	43.0	42.3
Total Stops	1	4	212	23	98	64	22	43	3	42	41	12
Stop/Veh	1.00	1.00	0.57	0.58	0.84	0.28	0.41	0.80	0.75	0.84	0.85	0.80
Travel Dist (mi)	0.2	1.0	93.4	10.2	18.6	38.3	9.1	17.6	1.0	16.1	6.2	1.8
Travel Time (hr)	0.0	0.1	5.4	0.4	2.0	1.6	0.4	1.3	0.1	0.9	0.9	0.3
Avg Speed (mph)	9	11	17	24	9	24	24	13	12	18	7	7
Fuel Used (gal)	0.0	0.0	2.0	0.2	0.3	0.7	0.1	0.3	0.0	0.3	0.1	0.0
Fuel Eff. (mpg)	53.1	59.0	46.6	49.5	60.4	53.0	69.8	58.8	68.0	56.9	52.6	44.6
HC Emissions (g)	0	0	66	6	8	20	4	6	0	5	4	2
CO Emissions (g)	5	21	2522	271	298	635	115	125	3	102	104	38
NOx Emissions (g)	0	1	213	20	25	68	12	17	0	14	9	4
Vehicles Entered	1	4	358	38	107	222	53	50	3	46	45	14
Vehicles Exited	1	4	349	38	105	218	52	50	3	46	47	14
Hourly Exit Rate	4	16	1396	152	420	872	208	200	12	184	188	56
Input Volume	3	20	1431	161	428	925	216	199	13	183	175	53
% of Volume	133	80	98	94	98	94	96	101	92	101	107	106
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	0	22	2	8	6	1	5	0	4	3	1

8: SR 99 SB Off/W Stockton Blvd & Sheldon Rd Performance by movement

Movement	SBR	All
Denied Delay (hr)	0.0	0.1
Denied Del/Veh (s)	0.9	0.3
Total Delay (hr)	0.0	6.8
Total Del/Veh (s)	29.8	24.7
Stop Delay (hr)	0.0	5.4
Stop Del/Veh (s)	27.8	19.7
Total Stops	3	568
Stop/Veh	1.00	0.57
Travel Dist (mi)	0.4	213.9
Travel Time (hr)	0.0	13.4
Avg Speed (mph)	10	16
Fuel Used (gal)	0.0	4.2
Fuel Eff. (mpg)	69.0	51.5
HC Emissions (g)	0	120
CO Emissions (g)	4	4245
NOx Emissions (g)	0	385
Vehicles Entered	3	944
Vehicles Exited	3	930
Hourly Exit Rate	12	3720
Input Volume	14	3821
% of Volume	86	97
Denied Entry Before	0	0
Denied Entry After	0	0
Density (ft/veh)		426
Occupancy (veh)	0	53

9: SR 99 NB Off & Sheldon Rd Performance by movement

Movement	EBT	EBR	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.4	0.0
Total Delay (hr)	0.7	0.1	0.6	0.3	0.4	0.2	2.2
Total Del/Veh (s)	6.8	2.6	5.7	7.7	41.8	16.8	7.7
Stop Delay (hr)	0.2	0.0	0.2	0.2	0.3	0.2	1.1
Stop Del/Veh (s)	2.3	0.1	1.8	3.7	38.7	15.0	3.8
Total Stops	59	0	50	36	25	42	212
Stop/Veh	0.16	0.00	0.14	0.25	0.81	0.82	0.20
Travel Dist (mi)	62.3	16.8	55.5	23.1	8.1	13.6	179.4
Travel Time (hr)	2.4	0.7	2.1	1.1	0.6	0.7	7.5
Avg Speed (mph)	26	24	27	21	13	20	24
Fuel Used (gal)	1.5	0.3	1.3	0.4	0.1	0.3	3.8
Fuel Eff. (mpg)	42.7	62.6	42.8	61.9	55.4	52.7	47.2
HC Emissions (g)	48	10	40	13	4	7	122
CO Emissions (g)	1861	428	1616	504	104	177	4690
NOx Emissions (g)	165	32	145	43	11	20	415
Vehicles Entered	351	92	352	142	28	48	1013
Vehicles Exited	347	93	352	140	30	49	1011
Hourly Exit Rate	1388	372	1408	560	120	196	4044
Input Volume	1411	378	1464	610	105	189	4157
% of Volume	98	98	96	92	114	104	97
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							340
Occupancy (veh)	9	3	8	4	2	3	30

10: E Stockton Blvd & Sheldon Rd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	3.6	0.8	3.6	3.6
Total Delay (hr)	0.0	0.8	1.7	0.0	0.0	0.3	3.6	0.0	0.5	0.3	0.1	0.0
Total Del/Veh (s)	22.6	44.7	18.1	4.6		43.5	29.6	11.6	46.4	33.6	10.2	56.3
Stop Delay (hr)	0.0	0.7	1.1	0.0	0.0	0.3	2.3	0.0	0.4	0.2	0.1	0.0
Stop Del/Veh (s)	21.0	39.9	12.3	3.0		35.6	18.7	3.8	42.9	27.9	8.7	54.0
Total Stops	1	53	152	8	0	23	258	4	31	19	21	2
Stop/Veh	1.00	0.87	0.46	0.47		0.88	0.59	0.50	0.86	0.68	0.72	1.00
Travel Dist (mi)	0.1	8.8	49.3	2.4	0.1	6.5	113.7	2.0	3.8	3.0	3.2	0.2
Travel Time (hr)	0.0	1.0	3.0	0.1	0.0	0.5	6.7	0.1	0.6	0.3	0.2	0.0
Avg Speed (mph)	10	8	17	23	11	13	17	22	6	9	16	5
Fuel Used (gal)	0.0	0.2	0.9	0.0	0.0	0.1	2.3	0.0	0.1	0.1	0.0	0.0
Fuel Eff. (mpg)	89.1	58.0	52.8	57.5	55.1	47.4	49.1	49.4	50.9	45.8	67.2	58.2
HC Emissions (g)	0	5	27	2	0	3	75	2	2	2	2	0
CO Emissions (g)	1	172	926	58	2	135	2854	70	117	66	82	3
NOx Emissions (g)	0	16	89	5	0	11	249	7	6	5	6	0
Vehicles Entered	1	56	323	16	0	24	416	7	34	27	28	2
Vehicles Exited	0	54	314	16	0	23	405	7	35	28	28	2
Hourly Exit Rate	0	216	1256	64	0	92	1620	28	140	112	112	8
Input Volume	2	223	1308	66	2	100	1724	28	138	108	113	8
% of Volume	0	97	96	97	0	92	94	100	101	104	99	100
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	4	12	0	0	2	27	0	2	1	1	0

10: E Stockton Blvd & Sheldon Rd Performance by movement

Movement	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.1
Denied Del/Veh (s)	0.2	0.3	0.3
Total Delay (hr)	0.1	0.4	7.7
Total Del/Veh (s)	42.0	23.7	26.7
Stop Delay (hr)	0.1	0.3	5.6
Stop Del/Veh (s)	38.5	22.4	19.3
Total Stops	9	47	628
Stop/Veh	0.75	0.84	0.60
Travel Dist (mi)	1.0	5.0	198.9
Travel Time (hr)	0.2	0.6	13.4
Avg Speed (mph)	6	9	15
Fuel Used (gal)	0.0	0.1	3.9
Fuel Eff. (mpg)	54.2	55.1	50.8
HC Emissions (g)	0	3	123
CO Emissions (g)	15	93	4593
NOx Emissions (g)	1	8	404
Vehicles Entered	10	53	997
Vehicles Exited	11	54	977
Hourly Exit Rate	44	216	3908
Input Volume	41	210	4071
% of Volume	107	103	96
Denied Entry Before	0	0	0
Denied Entry After	0	0	0
Density (ft/veh)			296
Occupancy (veh)	1	2	53

11: Garity Dr/Power Inn Rd & Sheldon Rd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)		0.0	0.0	0.0			1.1	2.5	4.0	0.3	4.2	2.6
Total Delay (hr)	0.0	3.4	0.8	0.0	0.0	0.0	2.5	0.2	0.1	0.4	0.0	0.0
Total Del/Veh (s)		84.1	15.2	6.4			29.7	11.0	47.8	35.5	10.0	26.4
Stop Delay (hr)	0.0	3.0	0.5	0.0	0.0	0.0	1.8	0.1	0.1	0.3	0.0	0.0
Stop Del/Veh (s)		74.1	9.3	2.2			21.2	6.4	45.3	32.5	9.0	26.0
Total Stops	0	158	68	10	0	0	196	35	7	26	3	1
Stop/Veh		1.07	0.35	0.45			0.65	0.62	0.88	0.70	0.75	1.00
Travel Dist (mi)	0.1	36.4	53.1	6.0	0.1	0.1	60.2	11.2	0.8	3.5	0.5	0.1
Travel Time (hr)	0.0	4.5	2.2	0.2	0.0	0.0	4.1	0.6	0.1	0.5	0.0	0.0
Avg Speed (mph)	6	8	24	28	7	12	15	22	6	7	14	8
Fuel Used (gal)	0.0	0.7	1.2	0.1	0.0	0.0	1.0	0.2	0.0	0.1	0.0	0.0
Fuel Eff. (mpg)	57.8	52.5	46.1	53.2	89.0	98.2	63.1	68.2	54.1	40.4	35.6	69.1
HC Emissions (g)	0	18	31	4	0	0	26	6	0	2	1	0
CO Emissions (g)	1	626	1049	127	1	0	936	193	9	49	16	1
NOx Emissions (g)	0	59	111	13	0	0	80	18	1	6	2	0
Vehicles Entered	0	132	190	22	0	0	293	55	7	33	4	1
Vehicles Exited	0	120	189	22	0	0	286	54	8	35	4	1
Hourly Exit Rate	0	480	756	88	0	0	1144	216	32	140	16	4
Input Volume	2	538	795	97	2	1	1190	228	34	127	18	3
% of Volume	0	89	95	91	0	0	96	95	94	110	89	133
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	18	9	1	0	0	16	2	1	2	0	0

11: Garity Dr/Power Inn Rd & Sheldon Rd Performance by movement

Movement	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.1	0.3
Denied Del/Veh (s)	4.1	1.3	1.5	1.0
Total Delay (hr)	0.5	0.1	2.4	10.5
Total Del/Veh (s)	46.6	27.0	50.1	37.8
Stop Delay (hr)	0.5	0.1	2.1	8.5
Stop Del/Veh (s)	43.0	23.2	43.5	30.8
Total Stops	34	10	144	692
Stop/Veh	0.89	0.62	0.84	0.70
Travel Dist (mi)	4.9	2.1	21.6	200.5
Travel Time (hr)	0.7	0.2	3.2	16.4
Avg Speed (mph)	7	12	7	12
Fuel Used (gal)	0.1	0.0	0.4	3.7
Fuel Eff. (mpg)	52.7	60.6	57.9	54.3
HC Emissions (g)	3	2	10	102
CO Emissions (g)	93	49	314	3464
NOx Emissions (g)	7	5	25	327
Vehicles Entered	36	15	161	949
Vehicles Exited	36	16	153	924
Hourly Exit Rate	144	64	612	3696
Input Volume	143	53	628	3859
% of Volume	101	121	97	96
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	1	1
Density (ft/veh)				264
Occupancy (veh)	3	1	13	65

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	421	369	170	80	275	90	165	1026	74	75	614	416
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	453	397	37	86	296	8	177	1103	29	81	660	236
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	3	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	537	863	381	161	477	210	252	1381	617	159	1846	575
Arrive On Green	0.16	0.25	0.25	0.05	0.14	0.14	0.07	0.39	0.39	0.05	0.37	0.37
Sat Flow, veh/h	3408	3505	1546	3408	3505	1544	3408	3505	1567	3408	5036	1568
Grp Volume(v), veh/h	453	397	37	86	296	8	177	1103	29	81	660	236
Grp Sat Flow(s),veh/h/ln	1704	1752	1546	1704	1752	1544	1704	1752	1567	1704	1679	1568
Q Serve(g_s), s	12.2	9.1	1.8	2.3	7.5	0.4	4.8	26.4	1.1	2.2	9.0	10.6
Cycle Q Clear(g_c), s	12.2	9.1	1.8	2.3	7.5	0.4	4.8	26.4	1.1	2.2	9.0	10.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	537	863	381	161	477	210	252	1381	617	159	1846	575
V/C Ratio(X)	0.84	0.46	0.10	0.53	0.62	0.04	0.70	0.80	0.05	0.51	0.36	0.41
Avail Cap(c_a), veh/h	900	1850	816	900	1850	815	900	1850	827	900	2659	828
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.8	30.3	27.6	44.1	38.6	35.5	42.8	25.4	17.7	44.1	21.9	22.4
Incr Delay (d2), s/veh	1.5	0.1	0.0	1.0	0.5	0.0	1.3	1.3	0.0	0.9	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	4.4	0.7	1.1	3.7	0.2	2.3	13.0	0.5	1.1	4.2	4.6
LnGrp Delay(d),s/veh	40.3	30.5	27.6	45.1	39.1	35.6	44.2	26.7	17.7	45.0	21.9	22.5
LnGrp LOS	D	C	C	D	D	D	D	C	B	D	C	C
Approach Vol, veh/h		887			390			1309			977	
Approach Delay, s/veh		35.4			40.4			28.9			24.0	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	41.0	21.2	19.2	10.7	43.6	10.8	29.6
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	25.0	50.0	25.0	50.0	25.0	50.0	25.0	50.0
Max Q Clear Time (g_c+I1), s	6.8	12.6	14.2	9.5	4.2	28.4	4.3	11.1
Green Ext Time (p_c), s	0.3	10.5	0.7	3.0	0.1	8.9	0.1	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.4
HCM 2010 LOS	C

Intersection	
Intersection Delay, s/veh	64.7
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	82	330	105	0	19	201	9	0	106	320	38	0	43	298	92
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	88	355	113	0	20	216	10	0	114	344	41	0	46	320	99
Number of Lanes	0	0	1	1	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	63.4	30.1	74.6	74.1
HCM LOS	F	D	F	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	23%	20%	0%	8%	10%
Vol Thru, %	69%	80%	0%	88%	69%
Vol Right, %	8%	0%	100%	4%	21%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	464	412	105	229	433
LT Vol	106	82	0	19	43
Through Vol	320	330	0	201	298
RT Vol	38	0	105	9	92
Lane Flow Rate	499	443	113	246	466
Geometry Grp	2	7	7	5	2
Degree of Util (X)	1	1	0.261	0.666	1
Departure Headway (Hd)	8.751	9.128	8.328	9.738	8.647
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	419	399	434	374	424
Service Time	6.774	6.846	6.047	7.738	6.67
HCM Lane V/C Ratio	1.191	1.11	0.26	0.658	1.099
HCM Control Delay	74.6	76	14	30.1	74.1
HCM Lane LOS	F	F	B	D	F
HCM 95th-tile Q	12.4	12.1	1	4.6	12.5

Intersection	
Intersection Delay, s/veh	77.4
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	176	177	50	0	185	161	14	0	6	380	28	0	16	330	53
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	180	181	51	0	189	164	14	0	6	388	29	0	16	337	54
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	78.4	74.9	78.2	78
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	44%	51%	4%
Vol Thru, %	92%	44%	45%	83%
Vol Right, %	7%	12%	4%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	414	403	360	399
LT Vol	6	176	185	16
Through Vol	380	177	161	330
RT Vol	28	50	14	53
Lane Flow Rate	422	411	367	407
Geometry Grp	1	1	1	1
Degree of Util (X)	1	1	0.984	1
Departure Headway (Hd)	9.569	9.62	9.644	9.535
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	384	382	375	383
Service Time	7.569	7.62	7.728	7.535
HCM Lane V/C Ratio	1.099	1.076	0.979	1.063
HCM Control Delay	78.2	78.4	74.9	78
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	11.9	11.8	11.3	11.9

Intersection	
Intersection Delay, s/veh	14.9
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	30	154	34	0	25	213	25	0	42	198	50	0	15	167	87
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	32	164	36	0	27	227	27	0	45	211	53	0	16	178	93
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.8	15.2	15.8	14.7
HCM LOS	B	C	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	14%	10%	6%
Vol Thru, %	68%	71%	81%	62%
Vol Right, %	17%	16%	10%	32%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	290	218	263	269
LT Vol	42	30	25	15
Through Vol	198	154	213	167
RT Vol	50	34	25	87
Lane Flow Rate	309	232	280	286
Geometry Grp	1	1	1	1
Degree of Util (X)	0.526	0.41	0.488	0.483
Departure Headway (Hd)	6.133	6.37	6.283	6.081
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	586	564	574	592
Service Time	4.182	4.427	4.337	4.132
HCM Lane V/C Ratio	0.527	0.411	0.488	0.483
HCM Control Delay	15.8	13.8	15.2	14.7
HCM Lane LOS	C	B	C	B
HCM 95th-tile Q	3.1	2	2.7	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰		↱		↑		↰	↑			↑	↱
Volume (veh/h)	81	0	138	0	0	0	290	761	0	0	527	96
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	0	1845	0	1863	0	1863	1810	0	0	1810	1863
Adj Flow Rate, veh/h	88	0	49	0	0	0	315	827	0	0	573	0
Adj No. of Lanes	1	0	1	0	1	0	1	1	0	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	0	3	0	2	0	2	5	0	0	5	2
Cap, veh/h	114	0	0	0	3	0	394	1419	0	0	890	778
Arrive On Green	0.06	0.00	0.00	0.00	0.00	0.00	0.22	0.78	0.00	0.00	0.49	0.00
Sat Flow, veh/h	1792	88		0	-83824	0	1774	1810	0	0	1810	1583
Grp Volume(v), veh/h	88	34.2		0	0	0	315	827	0	0	573	0
Grp Sat Flow(s),veh/h/ln	1792	C		0	1863	0	1774	1810	0	0	1810	1583
Q Serve(g_s), s	3.2			0.0	0.0	0.0	10.9	11.8	0.0	0.0	15.3	0.0
Cycle Q Clear(g_c), s	3.2			0.0	0.0	0.0	10.9	11.8	0.0	0.0	15.3	0.0
Prop In Lane	1.00			0.00		0.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	114			0	3	0	394	1419	0	0	890	778
V/C Ratio(X)	0.77			0.00	0.00	0.00	0.80	0.58	0.00	0.00	0.64	0.00
Avail Cap(c_a), veh/h	687			0	515	0	1089	2500	0	0	2500	2187
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	30.0			0.0	0.0	0.0	24.0	2.8	0.0	0.0	12.3	0.0
Incr Delay (d2), s/veh	4.1			0.0	0.0	0.0	5.3	0.4	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7			0.0	0.0	0.0	5.9	5.9	0.0	0.0	7.8	0.0
LnGrp Delay(d),s/veh	34.2			0.0	0.0	0.0	29.2	3.2	0.0	0.0	13.1	0.0
LnGrp LOS	C						C	A			B	
Approach Vol, veh/h					0			1142			573	
Approach Delay, s/veh					0.0			10.4			13.1	
Approach LOS								B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6		
Phs Duration (G+Y+Rc), s	19.1	37.3	8.7	0.0		56.4		
Change Period (Y+Rc), s	4.6	5.3	4.6	4.5		5.3		
Max Green Setting (Gmax), s	40.0	90.0	25.0	18.0		90.0		
Max Q Clear Time (g_c+I1), s	12.9	17.3	5.2	0.0		13.8		
Green Ext Time (p_c), s	1.6	14.7	0.1	0.0		14.7		

Intersection Summary			
HCM 2010 Ctrl Delay			12.4
HCM 2010 LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	45	15	175	315	60	475	90	925	275	175	925	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	49	16	11	342	65	195	98	1005	173	190	1005	57
Adj No. of Lanes	2	2	1	2	1	1	1	3	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	118	408	174	410	373	307	123	2576	786	254	1808	782
Arrive On Green	0.03	0.12	0.12	0.12	0.20	0.20	0.07	0.51	0.51	0.07	0.52	0.52
Sat Flow, veh/h	3408	3505	1495	3408	1845	1518	1757	5036	1537	3408	3505	1516
Grp Volume(v), veh/h	49	16	11	342	65	195	98	1005	173	190	1005	57
Grp Sat Flow(s),veh/h/ln	1704	1752	1495	1704	1845	1518	1757	1679	1537	1704	1752	1516
Q Serve(g_s), s	1.6	0.5	0.7	11.2	3.3	13.4	6.3	13.9	7.1	6.2	22.2	2.2
Cycle Q Clear(g_c), s	1.6	0.5	0.7	11.2	3.3	13.4	6.3	13.9	7.1	6.2	22.2	2.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	118	408	174	410	373	307	123	2576	786	254	1808	782
V/C Ratio(X)	0.42	0.04	0.06	0.83	0.17	0.64	0.80	0.39	0.22	0.75	0.56	0.07
Avail Cap(c_a), veh/h	748	1230	525	748	648	533	385	3094	944	748	2153	931
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.9	44.7	44.8	49.0	37.6	41.6	52.2	17.0	15.3	51.7	18.7	13.9
Incr Delay (d2), s/veh	0.9	0.0	0.1	1.7	0.1	0.8	4.4	0.0	0.1	1.7	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.2	0.3	5.4	1.7	5.7	3.2	6.4	3.0	3.0	10.6	0.9
LnGrp Delay(d),s/veh	54.7	44.7	44.9	50.7	37.7	42.4	56.6	17.0	15.4	53.4	18.8	13.9
LnGrp LOS	D	D	D	D	D	D	E	B	B	D	B	B
Approach Vol, veh/h		76			602			1276			1252	
Approach Delay, s/veh		51.2			46.6			19.8			23.8	
Approach LOS		D			D			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.1	63.8	18.3	18.8	12.6	64.3	8.5	28.5				
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5				
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0				
Max Q Clear Time (g_c+I1), s	8.2	15.9	13.2	2.7	8.3	24.2	3.6	15.4				
Green Ext Time (p_c), s	0.3	39.1	0.5	0.8	0.1	34.6	0.1	0.8				
Intersection Summary												
HCM 2010 Ctrl Delay			27.2									
HCM 2010 LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	415	400	200	100	400	275	400	950	170	225	400	40
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	451	435	33	109	435	34	435	1033	76	245	435	35
Adj No. of Lanes	2	2	1	1	2	1	2	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	524	730	316	136	462	198	496	1537	673	314	1264	101
Arrive On Green	0.15	0.21	0.21	0.08	0.13	0.13	0.15	0.44	0.44	0.06	0.26	0.26
Sat Flow, veh/h	3408	3505	1519	1757	3505	1501	3408	3505	1535	3408	3281	263
Grp Volume(v), veh/h	451	435	33	109	435	34	435	1033	76	245	232	238
Grp Sat Flow(s),veh/h/ln	1704	1752	1519	1757	1752	1501	1704	1752	1535	1704	1752	1791
Q Serve(g_s), s	14.2	12.3	1.9	6.7	13.5	2.2	13.8	25.8	3.2	7.8	11.8	11.9
Cycle Q Clear(g_c), s	14.2	12.3	1.9	6.7	13.5	2.2	13.8	25.8	3.2	7.8	11.8	11.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.15
Lane Grp Cap(c), veh/h	524	730	316	136	462	198	496	1537	673	314	675	690
V/C Ratio(X)	0.86	0.60	0.10	0.80	0.94	0.17	0.88	0.67	0.11	0.78	0.34	0.35
Avail Cap(c_a), veh/h	694	730	316	278	462	198	539	1537	673	539	675	690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.79	0.79	0.79
Uniform Delay (d), s/veh	45.4	39.4	35.2	49.9	47.3	42.4	46.0	24.6	18.2	50.5	29.5	29.5
Incr Delay (d2), s/veh	6.8	0.9	0.1	4.1	27.4	0.2	13.5	2.4	0.3	1.3	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	6.1	0.8	3.4	8.3	0.9	7.4	13.0	1.4	3.7	5.9	6.1
LnGrp Delay(d),s/veh	52.2	40.3	35.3	54.0	74.8	42.6	59.5	26.9	18.6	51.8	30.6	30.6
LnGrp LOS	D	D	D	D	E	D	E	C	B	D	C	C
Approach Vol, veh/h		919			578			1544			715	
Approach Delay, s/veh		46.0			69.0			35.7			37.8	
Approach LOS		D			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.6	47.9	21.5	20.0	14.7	53.7	13.1	28.4
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	17.4	35.5	22.4	14.5	17.4	35.5	17.4	19.5
Max Q Clear Time (g_c+I1), s	15.8	13.9	16.2	15.5	9.8	27.8	8.7	14.3
Green Ext Time (p_c), s	0.2	18.2	0.7	0.0	0.4	7.0	0.1	3.8

Intersection Summary		
HCM 2010 Ctrl Delay		43.7
HCM 2010 LOS		D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	1	2	302	1	351	0	670	94	170	486	1
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1881	1900	1900	1795	1900	1810	1827	1900
Adj Flow Rate, veh/h	1	1	0	328	1	59	0	728	99	185	528	1
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	2	0	0	0	6	6	5	4	4
Cap, veh/h	2	69	0	359	6	366	2	718	98	211	1137	2
Arrive On Green	0.00	0.04	0.00	0.20	0.24	0.24	0.00	0.46	0.46	0.12	0.62	0.62
Sat Flow, veh/h	1810	1900	0	1774	26	1543	1810	1547	210	1723	1823	3
Grp Volume(v), veh/h	1	1	0	328	0	60	0	0	827	185	0	529
Grp Sat Flow(s),veh/h/ln	1810	1900	0	1774	0	1569	1810	0	1757	1723	0	1826
Q Serve(g_s), s	0.1	0.1	0.0	21.7	0.0	3.6	0.0	0.0	55.7	12.7	0.0	18.4
Cycle Q Clear(g_c), s	0.1	0.1	0.0	21.7	0.0	3.6	0.0	0.0	55.7	12.7	0.0	18.4
Prop In Lane	1.00		0.00	1.00		0.98	1.00		0.12	1.00		0.00
Lane Grp Cap(c), veh/h	2	69	0	359	0	372	2	0	815	211	0	1140
V/C Ratio(X)	0.40	0.01	0.00	0.91	0.00	0.16	0.00	0.00	1.01	0.88	0.00	0.46
Avail Cap(c_a), veh/h	234	245	0	451	0	379	234	0	815	223	0	1140
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.59	0.73	0.00	0.73
Uniform Delay (d), s/veh	59.9	55.7	0.0	46.9	0.0	36.3	0.0	0.0	32.2	51.8	0.0	11.9
Incr Delay (d2), s/veh	81.9	0.1	0.0	20.2	0.0	0.2	0.0	0.0	27.7	22.9	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	12.7	0.0	1.6	0.0	0.0	33.2	7.4	0.0	9.6
LnGrp Delay(d),s/veh	141.7	55.8	0.0	67.0	0.0	36.5	0.0	0.0	59.9	74.6	0.0	12.9
LnGrp LOS	F	E		E		D			F	E		B
Approach Vol, veh/h		2			388			827			714	
Approach Delay, s/veh		98.8			62.3			59.9			28.9	
Approach LOS		F			E			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	0.0	80.9	28.8	10.4	19.2	61.7	4.7	34.5
Change Period (Y+Rc), s	4.5	6.0	4.5	* 6	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	15.5	39.0	30.5	* 16	15.5	39.0	15.5	29.0
Max Q Clear Time (g_c+I1), s	0.0	20.4	23.7	2.1	14.7	57.7	2.1	5.6
Green Ext Time (p_c), s	0.0	9.3	0.5	0.2	0.0	0.0	0.0	0.2

Intersection Summary		
HCM 2010 Ctrl Delay		49.0
HCM 2010 LOS		D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	121	642	150	117	1425	140	663	68	208	24	16	150
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	132	698	58	127	1549	106	721	74	66	26	17	2
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	188	2322	708	183	2314	705	784	1042	454	43	169	136
Arrive On Green	0.06	0.46	0.46	0.05	0.46	0.46	0.23	0.30	0.30	0.02	0.09	0.09
Sat Flow, veh/h	3408	5036	1535	3408	5036	1535	3408	3505	1528	1757	1845	1481
Grp Volume(v), veh/h	132	698	58	127	1549	106	721	74	66	26	17	2
Grp Sat Flow(s),veh/h/ln	1704	1679	1535	1704	1679	1535	1704	1752	1528	1757	1845	1481
Q Serve(g_s), s	4.5	10.2	2.5	4.3	28.3	4.7	24.4	1.8	3.7	1.7	1.0	0.1
Cycle Q Clear(g_c), s	4.5	10.2	2.5	4.3	28.3	4.7	24.4	1.8	3.7	1.7	1.0	0.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	188	2322	708	183	2314	705	784	1042	454	43	169	136
V/C Ratio(X)	0.70	0.30	0.08	0.69	0.67	0.15	0.92	0.07	0.15	0.61	0.10	0.01
Avail Cap(c_a), veh/h	722	2987	911	722	2987	911	1069	1042	454	551	422	339
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.8	19.9	17.8	54.9	24.9	18.5	44.4	29.8	30.4	57.0	49.1	48.7
Incr Delay (d2), s/veh	1.8	0.1	0.0	1.8	0.4	0.1	8.5	0.0	0.1	5.1	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	4.7	1.1	2.1	13.1	2.0	12.4	0.9	1.6	0.9	0.5	0.1
LnGrp Delay(d),s/veh	56.5	20.0	17.9	56.6	25.3	18.6	52.9	29.8	30.5	62.1	49.2	48.8
LnGrp LOS	E	B	B	E	C	B	D	C	C	E	D	D
Approach Vol, veh/h		888			1782			861			45	
Approach Delay, s/veh		25.3			27.1			49.2			56.7	
Approach LOS		C			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	59.7	31.7	15.4	10.9	59.9	7.5	39.7
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	25.0	70.0	37.0	27.0	25.0	70.0	37.0	27.0
Max Q Clear Time (g_c+I1), s	6.5	30.3	26.4	3.0	6.3	12.2	3.7	5.7
Green Ext Time (p_c), s	0.1	23.9	0.8	0.1	0.1	29.0	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	32.3
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	53	768	25	270	1582	73	104	6	371	28	3	17
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.96	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	58	835	10	293	1720	38	113	7	37	30	3	0
Adj No. of Lanes	2	3	1	2	3	1	1	1	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	140	2484	758	367	2820	861	142	42	221	50	409	183
Arrive On Green	0.04	0.49	0.49	0.11	0.56	0.56	0.08	0.17	0.17	0.03	0.12	0.00
Sat Flow, veh/h	3408	5036	1536	3408	5036	1538	1757	248	1309	1757	3505	1568
Grp Volume(v), veh/h	58	835	10	293	1720	38	113	0	44	30	3	0
Grp Sat Flow(s),veh/h/ln	1704	1679	1536	1704	1679	1538	1757	0	1556	1757	1752	1568
Q Serve(g_s), s	1.6	9.6	0.3	8.0	21.8	1.1	6.0	0.0	2.3	1.6	0.1	0.0
Cycle Q Clear(g_c), s	1.6	9.6	0.3	8.0	21.8	1.1	6.0	0.0	2.3	1.6	0.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.84	1.00		1.00
Lane Grp Cap(c), veh/h	140	2484	758	367	2820	861	142	0	262	50	409	183
V/C Ratio(X)	0.41	0.34	0.01	0.80	0.61	0.04	0.80	0.00	0.17	0.59	0.01	0.00
Avail Cap(c_a), veh/h	891	3685	1124	891	3685	1125	459	0	651	643	1465	656
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.7	14.7	12.4	41.7	14.1	9.5	43.2	0.0	34.0	45.9	37.4	0.0
Incr Delay (d2), s/veh	0.7	0.1	0.0	1.5	0.2	0.0	3.8	0.0	0.1	4.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	4.4	0.1	3.9	10.1	0.5	3.1	0.0	1.0	0.8	0.0	0.0
LnGrp Delay(d),s/veh	45.5	14.8	12.4	43.2	14.3	9.5	47.1	0.0	34.1	50.0	37.4	0.0
LnGrp LOS	D	B	B	D	B	A	D		C	D	D	
Approach Vol, veh/h		903			2051			157			33	
Approach Delay, s/veh		16.7			18.3			43.4			48.9	
Approach LOS		B			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	59.4	12.2	15.7	14.8	53.0	7.2	20.6
Change Period (Y+Rc), s	4.5	5.8	4.5	4.5	4.5	5.8	4.5	4.5
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	35.0	40.0
Max Q Clear Time (g_c+I1), s	3.6	23.8	8.0	2.1	10.0	11.6	3.6	4.3
Green Ext Time (p_c), s	0.0	29.7	0.1	0.1	0.3	34.2	0.0	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	19.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	391	678	65	127	933	125	340	725	186	162	795	449
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	425	737	23	138	1014	64	370	788	106	176	864	290
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	465	2207	673	180	1787	543	413	1473	447	219	836	363
Arrive On Green	0.14	0.44	0.44	0.05	0.35	0.35	0.12	0.29	0.29	0.06	0.24	0.24
Sat Flow, veh/h	3408	5036	1535	3408	5036	1531	3408	5036	1528	3408	3505	1523
Grp Volume(v), veh/h	425	737	23	138	1014	64	370	788	106	176	864	290
Grp Sat Flow(s),veh/h/ln	1704	1679	1535	1704	1679	1531	1704	1679	1528	1704	1752	1523
Q Serve(g_s), s	20.6	16.1	1.4	6.7	27.3	4.7	17.9	22.0	8.8	8.5	40.0	30.0
Cycle Q Clear(g_c), s	20.6	16.1	1.4	6.7	27.3	4.7	17.9	22.0	8.8	8.5	40.0	30.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	465	2207	673	180	1787	543	413	1473	447	219	836	363
V/C Ratio(X)	0.91	0.33	0.03	0.77	0.57	0.12	0.90	0.54	0.24	0.80	1.03	0.80
Avail Cap(c_a), veh/h	508	2207	673	508	2103	639	508	1473	447	508	836	363
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	71.4	31.0	26.8	78.4	43.7	36.4	72.6	49.8	45.1	77.4	63.8	60.0
Incr Delay (d2), s/veh	19.2	0.0	0.0	2.5	0.1	0.0	14.4	0.2	0.1	2.6	40.0	11.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.0	7.5	0.6	3.2	12.7	2.0	9.3	10.2	3.7	4.1	23.9	13.7
LnGrp Delay(d),s/veh	90.7	31.0	26.9	80.9	43.8	36.4	87.1	50.0	45.2	80.0	103.8	71.0
LnGrp LOS	F	C	C	F	D	D	F	D	D	E	F	E
Approach Vol, veh/h		1185			1216			1264			1330	
Approach Delay, s/veh		52.3			47.6			60.4			93.5	
Approach LOS		D			D			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.8	46.0	15.4	79.5	17.8	55.0	29.4	65.5
Change Period (Y+Rc), s	6.5	6.0	6.5	6.0	7.0	* 6	6.5	6.0
Max Green Setting (Gmax), s	25.0	40.0	25.0	70.0	25.0	* 40	25.0	70.0
Max Q Clear Time (g_c+I1), s	19.9	42.0	8.7	18.1	10.5	24.0	22.6	29.3
Green Ext Time (p_c), s	0.4	0.0	0.2	39.5	0.2	13.9	0.2	30.2

Intersection Summary	
HCM 2010 Ctrl Delay	64.2
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	360	1016	162	240	608	124	245	1034	200	139	598	135
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	391	1104	114	261	661	46	266	1124	150	151	650	75
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	484	2050	624	340	1838	559	337	1400	424	214	1311	361
Arrive On Green	0.14	0.41	0.41	0.10	0.36	0.36	0.10	0.28	0.28	0.06	0.24	0.24
Sat Flow, veh/h	3408	5036	1534	3408	5036	1532	3408	5036	1526	3514	5534	1522
Grp Volume(v), veh/h	391	1104	114	261	661	46	266	1124	150	151	650	75
Grp Sat Flow(s),veh/h/ln	1704	1679	1534	1704	1679	1532	1704	1679	1526	1757	1845	1522
Q Serve(g_s), s	16.3	24.3	7.0	10.9	14.0	2.9	11.2	30.3	11.5	6.2	14.8	5.8
Cycle Q Clear(g_c), s	16.3	24.3	7.0	10.9	14.0	2.9	11.2	30.3	11.5	6.2	14.8	5.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	484	2050	624	340	1838	559	337	1400	424	214	1311	361
V/C Ratio(X)	0.81	0.54	0.18	0.77	0.36	0.08	0.79	0.80	0.35	0.70	0.50	0.21
Avail Cap(c_a), veh/h	933	2411	734	933	2411	733	583	1400	424	601	1514	417
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.8	32.9	27.8	64.1	33.9	30.4	64.4	49.0	42.2	67.3	48.2	44.8
Incr Delay (d2), s/veh	1.2	0.1	0.1	1.4	0.0	0.0	1.6	3.2	0.2	1.6	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	11.3	2.9	5.2	6.5	1.2	5.3	14.5	4.9	3.0	7.6	2.4
LnGrp Delay(d),s/veh	62.0	33.0	27.8	65.5	34.0	30.4	66.0	52.3	42.4	68.9	48.3	44.9
LnGrp LOS	E	C	C	E	C	C	E	D	D	E	D	D
Approach Vol, veh/h		1609			968			1540			876	
Approach Delay, s/veh		39.7			42.3			53.7			51.6	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.3	58.9	20.4	40.6	20.1	65.0	14.4	46.7
Change Period (Y+Rc), s	5.5	5.5	6.0	* 6	5.5	5.5	5.5	6.0
Max Green Setting (Gmax), s	40.0	70.0	25.0	* 40	40.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	18.3	16.0	13.2	16.8	12.9	26.3	8.2	32.3
Green Ext Time (p_c), s	2.5	37.3	1.3	17.7	1.7	32.1	0.8	7.0

Intersection Summary	
HCM 2010 Ctrl Delay	46.6
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	132	1219	50	204	1189	229	75	238	333	258	173	198
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	143	1325	50	222	1292	123	82	259	148	280	188	35
Adj No. of Lanes	2	4	0	2	4	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	199	2922	110	279	3084	746	133	663	287	335	871	379
Arrive On Green	0.06	0.46	0.46	0.08	0.49	0.49	0.04	0.19	0.19	0.10	0.25	0.25
Sat Flow, veh/h	3408	6318	238	3408	6346	1536	3408	3505	1516	3408	3505	1524
Grp Volume(v), veh/h	143	998	377	222	1292	123	82	259	148	280	188	35
Grp Sat Flow(s),veh/h/ln	1704	1586	1797	1704	1586	1536	1704	1752	1516	1704	1752	1524
Q Serve(g_s), s	4.9	17.1	17.2	7.7	15.8	5.4	2.8	7.8	10.5	9.7	5.1	2.1
Cycle Q Clear(g_c), s	4.9	17.1	17.2	7.7	15.8	5.4	2.8	7.8	10.5	9.7	5.1	2.1
Prop In Lane	1.00		0.13	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	199	2201	831	279	3084	746	133	663	287	335	871	379
V/C Ratio(X)	0.72	0.45	0.45	0.80	0.42	0.16	0.62	0.39	0.52	0.84	0.22	0.09
Avail Cap(c_a), veh/h	381	2201	831	381	3084	746	381	1066	461	381	1066	463
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.5	21.9	21.9	54.1	19.9	17.2	56.8	42.6	43.7	53.2	35.8	34.7
Incr Delay (d2), s/veh	1.8	0.7	1.8	5.6	0.4	0.5	1.7	0.1	0.5	12.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	7.6	8.9	3.8	7.0	2.4	1.4	3.8	4.5	5.1	2.5	0.9
LnGrp Delay(d),s/veh	57.4	22.6	23.7	59.7	20.3	17.7	58.5	42.7	44.3	65.3	35.9	34.7
LnGrp LOS	E	C	C	E	C	B	E	D	D	E	D	C
Approach Vol, veh/h		1518			1637			489			503	
Approach Delay, s/veh		26.2			25.5			45.8			52.2	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.6	63.8	9.3	35.3	14.4	61.0	16.4	28.2
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	13.4	36.5	13.4	36.5	13.4	36.5	13.4	36.5
Max Q Clear Time (g_c+I1), s	6.9	17.8	4.8	7.1	9.7	19.2	11.7	12.5
Green Ext Time (p_c), s	0.1	18.0	0.1	4.8	0.1	16.7	0.1	4.6

Intersection Summary	
HCM 2010 Ctrl Delay	31.4
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

25: Laguna Springs Dr/W Stockton Blvd & Laguna Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	2.0	0.3	0.5	0.0	0.0	0.0	3.5	0.5	0.9	3.6	0.2	0.2
Total Delay (hr)	1.1	3.2	0.9	1.9	1.4	0.0	0.3	0.1	0.2	0.3	0.3	0.1
Total Del/Veh (s)	55.7	32.9	43.9	50.8	20.6	3.6	49.5	45.4	11.0	41.9	39.9	10.5
Stop Delay (hr)	0.9	2.3	0.7	1.6	1.0	0.0	0.3	0.1	0.1	0.3	0.3	0.1
Stop Del/Veh (s)	49.3	22.9	33.6	44.4	14.7	3.3	46.5	41.8	9.5	39.2	35.4	8.8
Total Stops	65	233	64	112	111	4	21	4	35	19	19	32
Stop/Veh	0.94	0.66	0.83	0.85	0.46	0.40	0.88	0.67	0.65	0.76	0.70	0.80
Travel Dist (mi)	9.2	50.0	10.7	17.3	33.1	1.4	2.6	0.6	6.2	3.0	3.4	5.3
Travel Time (hr)	1.4	4.4	1.3	2.5	2.2	0.1	0.4	0.1	0.4	0.4	0.4	0.3
Avg Speed (mph)	7	11	8	7	15	24	6	7	16	8	9	17
Fuel Used (gal)	0.2	0.9	0.2	0.4	0.7	0.0	0.1	0.0	0.1	0.1	0.1	0.1
Fuel Eff. (mpg)	53.1	57.6	68.9	48.0	48.2	44.9	44.3	44.4	65.5	55.3	53.8	64.3
HC Emissions (g)	6	31	5	13	25	1	2	0	3	3	2	3
CO Emissions (g)	217	1183	176	456	1042	60	57	10	127	83	76	95
NOx Emissions (g)	16	90	13	38	82	4	4	1	10	7	6	8
Vehicles Entered	64	349	75	122	236	10	23	5	53	21	24	38
Vehicles Exited	66	327	70	124	225	10	22	6	53	23	26	39
Hourly Exit Rate	264	1308	280	496	900	40	88	24	212	92	104	156
Input Volume	265	1396	307	495	961	37	86	22	202	87	95	141
% of Volume	100	94	91	100	94	108	102	109	105	106	109	111
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	5	17	5	10	9	0	2	0	2	2	2	1

25: Laguna Springs Dr/W Stockton Blvd & Laguna Blvd Performance by movement

Movement	All
Denied Delay (hr)	0.1
Denied Del/Veh (s)	0.5
Total Delay (hr)	9.8
Total Del/Veh (s)	33.3
Stop Delay (hr)	7.7
Stop Del/Veh (s)	26.2
Total Stops	719
Stop/Veh	0.68
Travel Dist (mi)	142.8
Travel Time (hr)	13.9
Avg Speed (mph)	10
Fuel Used (gal)	2.6
Fuel Eff. (mpg)	54.1
HC Emissions (g)	94
CO Emissions (g)	3582
NOx Emissions (g)	279
Vehicles Entered	1020
Vehicles Exited	991
Hourly Exit Rate	3964
Input Volume	4094
% of Volume	97
Denied Entry Before	0
Denied Entry After	0
Density (ft/veh)	270
Occupancy (veh)	55

26: Laguna Blvd & SR 99 SB Ramps Performance by movement

Movement	EBT	EBR	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.5	1.6	0.3
Total Delay (hr)	0.9	0.0	0.6	0.0	1.0	1.1	3.7
Total Del/Veh (s)	8.2	5.0	9.0	2.9	32.9	27.6	13.8
Stop Delay (hr)	0.3	0.0	0.3	0.0	0.9	0.9	2.4
Stop Del/Veh (s)	2.8	0.2	5.0	0.1	28.9	22.3	9.1
Total Stops	46	0	58	0	71	112	287
Stop/Veh	0.12	0.00	0.24	0.00	0.66	0.76	0.30
Travel Dist (mi)	59.9	2.0	46.7	9.2	32.4	45.7	195.9
Travel Time (hr)	2.4	0.1	1.7	0.3	2.1	2.8	9.4
Avg Speed (mph)	25	28	27	34	15	17	21
Fuel Used (gal)	1.6	0.1	0.9	0.1	0.6	0.8	4.0
Fuel Eff. (mpg)	38.6	31.6	54.5	69.3	54.8	60.2	49.5
HC Emissions (g)	63	3	27	4	10	16	124
CO Emissions (g)	2696	141	1043	180	241	360	4660
NOx Emissions (g)	210	9	94	13	29	46	403
Vehicles Entered	389	14	234	55	97	137	926
Vehicles Exited	390	14	230	55	102	138	929
Hourly Exit Rate	1560	56	920	220	408	552	3716
Input Volume	1631	54	946	228	398	546	3803
% of Volume	96	104	97	96	103	101	98
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							358
Occupancy (veh)	10	0	7	1	8	11	37

27: SR 99 NB Off & Bond Rd Performance by movement

Movement	EBT	EBR	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	1.0	0.3	0.1
Total Delay (hr)	1.0	0.2	0.6	0.1	0.4	0.4	2.7
Total Del/Veh (s)	10.6	3.9	8.3	4.6	36.1	28.9	10.2
Stop Delay (hr)	0.5	0.0	0.3	0.0	0.4	0.3	1.5
Stop Del/Veh (s)	5.4	0.1	3.8	0.1	32.6	25.7	5.7
Total Stops	98	0	49	0	31	38	216
Stop/Veh	0.29	0.00	0.19	0.00	0.72	0.78	0.22
Travel Dist (mi)	65.9	28.8	48.6	20.0	12.5	14.8	190.5
Travel Time (hr)	2.6	0.9	1.7	0.6	0.9	0.9	7.6
Avg Speed (mph)	26	31	28	33	14	16	25
Fuel Used (gal)	1.2	0.4	1.0	0.4	0.2	0.3	3.6
Fuel Eff. (mpg)	53.2	67.9	47.0	45.2	65.7	55.3	53.0
HC Emissions (g)	38	15	34	14	3	6	109
CO Emissions (g)	1498	565	1401	622	73	122	4281
NOx Emissions (g)	132	44	120	52	8	16	373
Vehicles Entered	326	166	246	107	38	44	927
Vehicles Exited	325	168	249	107	40	46	935
Hourly Exit Rate	1300	672	996	428	160	184	3740
Input Volume	1337	691	1027	442	148	174	3819
% of Volume	97	97	97	97	108	106	98
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							380
Occupancy (veh)	10	4	7	2	3	4	30

28: E Stockton Blvd & Bond Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.3	4.0	0.4	0.1	0.1
Total Delay (hr)	0.4	2.6	0.0	0.3	2.2	0.1	0.2	0.2	0.0	0.1	0.1	0.0
Total Del/Veh (s)	54.6	28.3	3.7	50.7	23.3	7.2	43.6	46.5	15.2	38.4	45.8	11.0
Stop Delay (hr)	0.4	1.6	0.0	0.2	1.5	0.0	0.2	0.2	0.0	0.0	0.1	0.0
Stop Del/Veh (s)	50.0	17.2	2.7	46.0	15.5	2.9	40.0	39.9	13.5	35.6	40.7	10.9
Total Stops	24	174	14	16	163	21	15	13	6	4	6	8
Stop/Veh	0.83	0.53	0.47	0.84	0.48	0.51	0.79	0.76	0.75	0.80	0.67	0.80
Travel Dist (mi)	4.7	57.8	5.2	2.2	43.2	5.2	1.4	1.3	0.6	0.6	1.0	1.3
Travel Time (hr)	0.6	3.9	0.2	0.3	3.2	0.3	0.3	0.3	0.1	0.1	0.1	0.1
Avg Speed (mph)	8	15	28	7	14	20	5	5	10	9	7	17
Fuel Used (gal)	0.1	1.0	0.1	0.0	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Eff. (mpg)	51.7	57.0	64.1	51.3	50.2	59.0	47.0	38.1	35.9	65.4	54.5	77.6
HC Emissions (g)	3	31	3	1	29	4	1	1	1	0	0	1
CO Emissions (g)	131	1058	121	53	1243	151	29	31	21	15	21	19
NOx Emissions (g)	9	103	9	4	97	12	2	3	2	1	1	2
Vehicles Entered	25	318	29	17	330	40	17	16	7	5	8	10
Vehicles Exited	28	304	29	18	325	41	18	17	7	5	8	10
Hourly Exit Rate	112	1216	116	72	1300	164	72	68	28	20	32	40
Input Volume	101	1291	120	65	1365	161	72	67	30	23	30	32
% of Volume	111	94	97	111	95	102	100	101	93	87	107	125
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	2	16	1	1	13	1	1	1	0	0	1	0

28: E Stockton Blvd & Bond Rd Performance by movement

Movement	All
Denied Delay (hr)	0.0
Denied Del/Veh (s)	0.1
Total Delay (hr)	6.3
Total Del/Veh (s)	26.5
Stop Delay (hr)	4.3
Stop Del/Veh (s)	18.3
Total Stops	464
Stop/Veh	0.55
Travel Dist (mi)	124.4
Travel Time (hr)	9.4
Avg Speed (mph)	13
Fuel Used (gal)	2.3
Fuel Eff. (mpg)	54.1
HC Emissions (g)	76
CO Emissions (g)	2893
NOx Emissions (g)	245
Vehicles Entered	822
Vehicles Exited	810
Hourly Exit Rate	3240
Input Volume	3357
% of Volume	97
Denied Entry Before	0
Denied Entry After	0
Density (ft/veh)	299
Occupancy (veh)	37

29: Elk Crest Rd & Bond Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Denied Del/Veh (s)	0.0	0.0	0.0	2.5	1.7	2.8	0.1	0.1	0.1	0.1	0.1	1.0
Total Delay (hr)	0.4	1.1	0.0	0.4	1.6	0.0	0.2	0.0	0.2	0.0	0.0	4.0
Total Del/Veh (s)	73.2	12.5	11.3	63.6	14.5	9.0	55.6	47.2	46.9	47.1	17.6	18.3
Stop Delay (hr)	0.4	0.3	0.0	0.4	0.8	0.0	0.2	0.0	0.2	0.0	0.0	2.3
Stop Del/Veh (s)	66.0	3.3	5.3	58.4	7.3	4.1	53.5	45.3	45.0	45.3	17.5	10.7
Total Stops	20	62	1	21	138	6	12	2	11	2	3	278
Stop/Veh	0.91	0.20	0.50	0.91	0.36	0.43	0.86	0.67	0.79	0.67	1.00	0.35
Travel Dist (mi)	2.6	40.2	0.2	2.9	49.4	1.7	0.6	0.1	0.6	0.1	0.2	98.7
Travel Time (hr)	0.5	2.0	0.0	0.5	2.8	0.1	0.2	0.0	0.2	0.0	0.0	6.5
Avg Speed (mph)	5	20	16	6	19	19	2	2	3	3	7	16
Fuel Used (gal)	0.1	0.9	0.0	0.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	1.9
Fuel Eff. (mpg)	45.0	44.4	69.1	49.5	58.1	64.2	34.7	57.5	34.9	58.8	83.7	50.8
HC Emissions (g)	2	30	0	2	26	1	1	0	1	0	0	63
CO Emissions (g)	64	1087	4	69	1095	34	16	1	15	1	1	2386
NOx Emissions (g)	6	107	0	5	86	3	2	0	1	0	0	210
Vehicles Entered	19	296	2	22	380	13	13	3	13	3	3	767
Vehicles Exited	19	298	2	22	370	13	14	3	13	3	3	760
Hourly Exit Rate	76	1192	8	88	1480	52	56	12	52	12	12	3040
Input Volume	87	1251	5	87	1526	54	54	11	54	11	11	3151
% of Volume	87	95	160	101	97	96	104	109	96	109	109	96
Denied Entry Before	0	0	0	0	1	0	0	0	0	0	0	1
Denied Entry After	0	0	0	0	1	0	0	0	0	0	0	1
Density (ft/veh)												254
Occupancy (veh)	2	8	0	2	11	0	1	0	1	0	0	25

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	452	567	100	366	919	322	212	637	188	187	572	387
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	471	591	38	381	957	158	221	664	95	195	596	186
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	513	1432	641	427	1333	589	268	900	403	242	873	385
Arrive On Green	0.15	0.41	0.41	0.13	0.38	0.38	0.08	0.26	0.26	0.07	0.25	0.25
Sat Flow, veh/h	3408	3505	1568	3408	3505	1548	3408	3505	1568	3408	3505	1545
Grp Volume(v), veh/h	471	591	38	381	957	158	221	664	95	195	596	186
Grp Sat Flow(s),veh/h/ln	1704	1752	1568	1704	1752	1548	1704	1752	1568	1704	1752	1545
Q Serve(g_s), s	21.3	18.7	2.3	17.2	36.4	11.0	10.0	27.1	7.5	8.8	24.0	16.1
Cycle Q Clear(g_c), s	21.3	18.7	2.3	17.2	36.4	11.0	10.0	27.1	7.5	8.8	24.0	16.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	513	1432	641	427	1333	589	268	900	403	242	873	385
V/C Ratio(X)	0.92	0.41	0.06	0.89	0.72	0.27	0.82	0.74	0.24	0.81	0.68	0.48
Avail Cap(c_a), veh/h	545	1571	703	545	1571	694	545	900	403	545	1010	445
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.4	32.9	28.0	67.3	41.3	33.4	70.9	53.2	45.9	71.5	53.1	50.1
Incr Delay (d2), s/veh	19.4	0.3	0.1	12.3	1.7	0.4	2.4	3.6	0.5	2.4	2.1	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.4	9.1	1.0	8.8	17.9	4.8	4.8	13.6	3.3	4.2	11.9	7.0
LnGrp Delay(d),s/veh	84.9	33.2	28.1	79.5	43.0	33.8	73.3	56.9	46.4	73.9	55.2	51.7
LnGrp LOS	F	C	C	E	D	C	E	E	D	E	E	D
Approach Vol, veh/h		1100			1496			980			977	
Approach Delay, s/veh		55.1			51.3			59.6			58.3	
Approach LOS		E			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.9	44.4	29.5	65.4	15.7	45.6	25.1	69.8
Change Period (Y+Rc), s	4.6	5.5	6.0	* 6	4.6	5.5	5.5	6.0
Max Green Setting (Gmax), s	25.0	45.0	25.0	* 70	25.0	40.0	25.0	70.0
Max Q Clear Time (g_c+I1), s	12.0	26.0	23.3	38.4	10.8	29.1	19.2	20.7
Green Ext Time (p_c), s	0.3	12.9	0.2	21.1	0.3	8.3	0.4	27.7

Intersection Summary	
HCM 2010 Ctrl Delay	55.5
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	86	620	271	51	940	179	378	200	55	160	153	119
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1863	1881	1863	1881	1792	1863	1845	1881	1881
Adj Flow Rate, veh/h	99	713	134	59	1080	119	434	230	6	184	176	0
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	1	1	2	1	2	1	6	2	3	1	1
Cap, veh/h	164	1865	834	139	1841	815	514	546	254	257	314	140
Arrive On Green	0.05	0.52	0.52	0.04	0.52	0.52	0.15	0.16	0.16	0.08	0.09	0.00
Sat Flow, veh/h	3510	3574	1599	3442	3574	1581	3476	3406	1583	3408	3574	1599
Grp Volume(v), veh/h	99	713	134	59	1080	119	434	230	6	184	176	0
Grp Sat Flow(s),veh/h/ln	1755	1787	1599	1721	1787	1581	1738	1703	1583	1704	1787	1599
Q Serve(g_s), s	2.8	11.9	4.4	1.7	21.0	3.9	12.1	6.1	0.3	5.3	4.7	0.0
Cycle Q Clear(g_c), s	2.8	11.9	4.4	1.7	21.0	3.9	12.1	6.1	0.3	5.3	4.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	164	1865	834	139	1841	815	514	546	254	257	314	140
V/C Ratio(X)	0.60	0.38	0.16	0.43	0.59	0.15	0.84	0.42	0.02	0.72	0.56	0.00
Avail Cap(c_a), veh/h	879	2505	1121	862	2505	1108	870	1364	634	853	1432	640
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	46.7	14.3	12.5	46.8	16.8	12.7	41.4	37.8	35.3	45.1	43.7	0.0
Incr Delay (d2), s/veh	1.3	0.2	0.1	0.8	0.4	0.1	1.5	0.2	0.0	1.4	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	5.9	2.0	0.8	10.5	1.7	6.0	2.9	0.1	2.5	2.3	0.0
LnGrp Delay(d),s/veh	48.0	14.5	12.6	47.6	17.2	12.8	42.9	37.9	35.4	46.5	44.3	0.0
LnGrp LOS	D	B	B	D	B	B	D	D	D	D	D	
Approach Vol, veh/h		946			1258			670			360	
Approach Delay, s/veh		17.7			18.2			41.1			45.4	
Approach LOS		B			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	57.0	19.4	14.3	8.6	57.6	12.1	21.5
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	4.8	23.0	14.1	6.7	3.7	13.9	7.3	8.1
Green Ext Time (p_c), s	0.1	28.5	0.6	1.5	0.1	31.4	0.3	1.5

Intersection Summary			
HCM 2010 Ctrl Delay			25.9
HCM 2010 LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	190	322	134	78	476	172	173	329	84	194	288	313
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	232	393	35	95	580	183	211	401	86	237	351	53
Adj No. of Lanes	2	2	1	1	2	0	2	2	0	2	2	1
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	318	1356	594	122	953	300	295	616	131	322	780	343
Arrive On Green	0.09	0.39	0.39	0.07	0.36	0.36	0.09	0.21	0.21	0.09	0.22	0.22
Sat Flow, veh/h	3408	3505	1537	1757	2624	826	3408	2870	610	3408	3505	1540
Grp Volume(v), veh/h	232	393	35	95	387	376	211	243	244	237	351	53
Grp Sat Flow(s),veh/h/ln	1704	1752	1537	1757	1752	1698	1704	1752	1728	1704	1752	1540
Q Serve(g_s), s	5.7	6.7	1.2	4.6	15.5	15.6	5.2	10.9	11.1	5.8	7.5	2.4
Cycle Q Clear(g_c), s	5.7	6.7	1.2	4.6	15.5	15.6	5.2	10.9	11.1	5.8	7.5	2.4
Prop In Lane	1.00		1.00	1.00		0.49	1.00		0.35	1.00		1.00
Lane Grp Cap(c), veh/h	318	1356	594	122	636	617	295	376	371	322	780	343
V/C Ratio(X)	0.73	0.29	0.06	0.78	0.61	0.61	0.72	0.65	0.66	0.74	0.45	0.15
Avail Cap(c_a), veh/h	989	2848	1249	510	1424	1380	989	814	802	989	1628	715
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.0	18.2	16.6	39.4	22.4	22.4	38.3	30.9	30.9	37.9	28.9	27.0
Incr Delay (d2), s/veh	1.2	0.2	0.1	4.0	1.3	1.4	1.2	0.7	0.7	1.2	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	3.3	0.5	2.4	7.8	7.6	2.5	5.3	5.4	2.8	3.6	1.0
LnGrp Delay(d),s/veh	39.2	18.4	16.6	43.4	23.8	23.8	39.5	31.6	31.7	39.2	29.1	27.0
LnGrp LOS	D	B	B	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		660			858			698			641	
Approach Delay, s/veh		25.6			26.0			34.0			32.6	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	36.8	12.7	24.0	10.6	38.8	12.0	24.7
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	7.7	17.6	7.8	13.1	6.6	8.7	7.2	9.5
Green Ext Time (p_c), s	0.4	13.7	0.3	2.9	0.1	14.0	0.3	2.9

Intersection Summary			
HCM 2010 Ctrl Delay			29.4
HCM 2010 LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	356	222	0	0	333	49	0	0	0	20	0	376
Future Volume (veh/h)	356	222	0	0	333	49	0	0	0	20	0	376
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	0	0	1845	1900	1900	1845	1900	1900	1845	1845
Adj Flow Rate, veh/h	414	258	0	0	387	54	0	0	0	23	0	437
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3	3	3	3
Cap, veh/h	447	278	0	0	416	58	0	2	0	297	0	900
Arrive On Green	0.41	0.41	0.00	0.00	0.26	0.26	0.00	0.00	0.00	0.17	0.00	0.17
Sat Flow, veh/h	1102	687	0	0	1585	221	0	1845	0	1757	0	1568
Grp Volume(v), veh/h	672	0	0	0	0	441	0	0	0	23	0	437
Grp Sat Flow(s),veh/h/ln	1790	0	0	0	0	1806	0	1845	0	1757	0	1568
Q Serve(g_s), s	38.1	0.0	0.0	0.0	0.0	25.4	0.0	0.0	0.0	1.2	0.0	17.5
Cycle Q Clear(g_c), s	38.1	0.0	0.0	0.0	0.0	25.4	0.0	0.0	0.0	1.2	0.0	17.5
Prop In Lane	0.62		0.00	0.00		0.12	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	725	0	0	0	0	474	0	2	0	297	0	900
V/C Ratio(X)	0.93	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.08	0.00	0.49
Avail Cap(c_a), veh/h	925	0	0	0	0	509	0	87	0	297	0	900
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.2	0.0	0.0	0.0	0.0	38.3	0.0	0.0	0.0	37.2	0.0	13.4
Incr Delay (d2), s/veh	12.4	0.0	0.0	0.0	0.0	22.9	0.0	0.0	0.0	0.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.2	0.0	0.0	0.0	0.0	15.6	0.0	0.0	0.0	0.6	0.0	12.8
LnGrp Delay(d),s/veh	42.6	0.0	0.0	0.0	0.0	61.2	0.0	0.0	0.0	37.3	0.0	13.7
LnGrp LOS	D					E				D		B
Approach Vol, veh/h		672			441			0			460	
Approach Delay, s/veh		42.6			61.2			0.0			14.9	
Approach LOS		D			E						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		48.9		0.0		33.7		23.8
Change Period (Y+Rc), s		5.8		4.6		5.8		5.8
Max Green Setting (Gmax), s		55.0		5.0		30.0		18.0
Max Q Clear Time (g_c+I1), s		40.1		0.0		27.4		19.5
Green Ext Time (p_c), s		3.0		0.0		0.5		0.0

Intersection Summary			
HCM 2010 Ctrl Delay			39.7
HCM 2010 LOS			D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	194	2	9	4	4	5	11	679	0	6	428	366
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1369	1900	1900	1776	1900	1624	1776	1863
Adj Flow Rate, veh/h	220	2	0	5	5	0	12	772	0	7	486	0
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0	0	0	0	0	7	7	17	7	2
Cap, veh/h	273	2	245	8	8	0	27	880	0	14	877	782
Arrive On Green	0.15	0.15	0.00	0.01	0.01	0.00	0.01	0.50	0.00	0.01	0.49	0.00
Sat Flow, veh/h	1794	16	1615	668	668	0	1810	1776	0	1547	1776	1583
Grp Volume(v), veh/h	222	0	0	10	0	0	12	772	0	7	486	0
Grp Sat Flow(s),veh/h/ln	1810	0	1615	1336	0	0	1810	1776	0	1547	1776	1583
Q Serve(g_s), s	8.7	0.0	0.0	0.5	0.0	0.0	0.5	28.5	0.0	0.3	14.0	0.0
Cycle Q Clear(g_c), s	8.7	0.0	0.0	0.5	0.0	0.0	0.5	28.5	0.0	0.3	14.0	0.0
Prop In Lane	0.99		1.00	0.50		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	275	0	245	17	0	0	27	880	0	14	877	782
V/C Ratio(X)	0.81	0.00	0.00	0.60	0.00	0.00	0.45	0.88	0.00	0.50	0.55	0.00
Avail Cap(c_a), veh/h	617	0	550	218	0	0	616	1694	0	527	1694	1510
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.1	0.0	0.0	36.1	0.0	0.0	35.9	16.5	0.0	36.2	13.0	0.0
Incr Delay (d2), s/veh	2.1	0.0	0.0	11.9	0.0	0.0	4.3	1.2	0.0	9.9	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	0.0	0.3	0.0	0.0	0.3	14.0	0.0	0.2	6.8	0.0
LnGrp Delay(d),s/veh	32.2	0.0	0.0	48.0	0.0	0.0	40.2	17.7	0.0	46.1	13.2	0.0
LnGrp LOS	C			D			D	B		D	B	
Approach Vol, veh/h		222			10			784			493	
Approach Delay, s/veh		32.2			48.0			18.0			13.6	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.1	42.2		17.2	7.0	42.4		6.9
Change Period (Y+Rc), s	6.0	6.0		6.0	* 6.3	6.0		6.0
Max Green Setting (Gmax), s	25.0	70.0		25.0	* 25	70.0		12.0
Max Q Clear Time (g_c+I1), s	2.5	16.0		10.7	2.3	30.5		2.5
Green Ext Time (p_c), s	0.0	5.9		0.6	0.0	5.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.9
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	2	2	18	38	2
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	2	2	20	41	2
Pedestrians		10			10	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		1			1	
Right turn flare (veh)						
Median type					Raised	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	104	93	95	10	0	
vC1, stage 1 conf vol	93	93	0			
vC2, stage 2 conf vol	11	0	95			
vCu, unblocked vol	104	93	95	10	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)	6.1	5.5	5.5			
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	100	100	100	98	97	
cM capacity (veh/h)	785	716	716	1060	1617	

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2	SB 3
Volume Total	2	1	22	21	21	2
Volume Left	1	0	0	21	21	0
Volume Right	0	0	20	0	0	2
cSH	756	716	1011	1617	1617	1700
Volume to Capacity	0.00	0.00	0.02	0.03	0.03	0.00
Queue Length 95th (ft)	0	0	2	2	2	0
Control Delay (s)	9.8	10.0	8.6	7.3	7.3	0.0
Lane LOS	A	B	A	A	A	
Approach Delay (s)	9.9		8.6	6.9		
Approach LOS	A		A			

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	10.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	40	0	0	20	1961	2	0	466	0	0	0
Conflicting Peds, #/hr	0	0	10	0	0	10	0	0	10	0	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	225	-	-	-	-	0	-	-	400	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	5	43	0	0	22	2132	2	0	507	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	22	0	0	53	0	0	86	86	32
Stage 1	-	-	-	-	-	-	64	64	-
Stage 2	-	-	-	-	-	-	22	22	-
Critical Hdwy	4.13	-	-	4.16	-	-	6.645	6.545	6.945
Critical Hdwy Stg 1	-	-	-	-	-	-	5.845	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.445	5.545	-
Follow-up Hdwy	2.227	-	-	2.23	-	-	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	1587	-	-	1544	-	0	908	802	1032
Stage 1	-	-	-	-	-	0	949	839	-
Stage 2	-	-	-	-	-	0	998	875	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	1574	-	-	1544	-	-	890	0	1023
Mov Cap-2 Maneuver	-	-	-	-	-	-	890	0	-
Stage 1	-	-	-	-	-	-	938	0	-
Stage 2	-	-	-	-	-	-	990	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.8	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT
Capacity (veh/h)	890	1023	1574	-	-	1544	-
HCM Lane V/C Ratio	0.002	0.495	0.003	-	-	-	-
HCM Control Delay (s)	9.1	11.9	7.3	-	-	0	-
HCM Lane LOS	A	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0	2.8	0	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	63	358	85	122	1359	173	357	78	75	259	80	265
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	66	373	39	127	1416	85	372	81	6	270	83	21
Adj No. of Lanes	2	3	1	2	3	1	2	1	1	2	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	143	2692	837	189	2761	848	441	200	167	339	145	122
Arrive On Green	0.04	0.53	0.53	0.06	0.55	0.55	0.13	0.11	0.11	0.10	0.08	0.08
Sat Flow, veh/h	3408	5036	1566	3408	5036	1547	3408	1845	1546	3408	1845	1556
Grp Volume(v), veh/h	66	373	39	127	1416	85	372	81	6	270	83	21
Grp Sat Flow(s),veh/h/ln	1704	1679	1566	1704	1679	1547	1704	1845	1546	1704	1845	1556
Q Serve(g_s), s	1.9	3.7	1.2	3.7	17.7	2.6	10.7	4.1	0.3	7.7	4.3	1.3
Cycle Q Clear(g_c), s	1.9	3.7	1.2	3.7	17.7	2.6	10.7	4.1	0.3	7.7	4.3	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	143	2692	837	189	2761	848	441	200	167	339	145	122
V/C Ratio(X)	0.46	0.14	0.05	0.67	0.51	0.10	0.84	0.41	0.04	0.80	0.57	0.17
Avail Cap(c_a), veh/h	627	2692	837	457	2761	848	627	323	271	627	323	272
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.8	11.7	11.1	46.3	14.2	10.8	42.5	41.6	39.9	44.0	44.5	43.1
Incr Delay (d2), s/veh	0.9	0.1	0.1	1.5	0.7	0.2	5.1	1.0	0.1	1.6	2.7	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.8	0.5	1.8	8.3	1.2	5.3	2.1	0.2	3.7	2.3	0.6
LnGrp Delay(d),s/veh	47.7	11.8	11.2	47.9	14.9	11.0	47.7	42.6	40.0	45.7	47.1	43.5
LnGrp LOS	D	B	B	D	B	B	D	D	D	D	D	D
Approach Vol, veh/h		478			1628			459			374	
Approach Delay, s/veh		16.7			17.3			46.7			45.9	
Approach LOS		B			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	60.3	17.5	13.3	10.2	59.0	14.6	16.3
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	18.4	25.5	18.4	17.5	13.4	30.5	18.4	17.5
Max Q Clear Time (g_c+I1), s	3.9	19.7	12.7	6.3	5.7	5.7	9.7	6.1
Green Ext Time (p_c), s	0.0	4.6	0.3	0.5	0.1	14.0	0.2	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	25.4
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑			↑↑↑	↱		↑		↰↰		↱
Volume (veh/h)	57	1309	0	0	1751	425	0	0	0	557	0	127
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	0	0	1845	1845	0	1845	0	1845	0	1845
Adj Flow Rate, veh/h	61	1393	0	0	1863	303	0	0	0	593	0	15
Adj No. of Lanes	1	3	0	0	3	1	0	1	0	2	0	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	0	0	3	3	0	3	0	3	0	3
Cap, veh/h	78	3701	0	0	3246	1008	0	2	0	559	0	0
Arrive On Green	0.04	0.74	0.00	0.00	0.64	0.64	0.00	0.00	0.00	0.16	0.00	0.00
Sat Flow, veh/h	1757	5202	0	0	5202	1564	0	-84854	0	3408	593	
Grp Volume(v), veh/h	61	1393	0	0	1863	303	0	0	0	593	97.0	
Grp Sat Flow(s),veh/h/ln	1757	1679	0	0	1679	1564	0	1845	0	1704	F	
Q Serve(g_s), s	3.4	10.1	0.0	0.0	20.9	8.5	0.0	0.0	0.0	16.4		
Cycle Q Clear(g_c), s	3.4	10.1	0.0	0.0	20.9	8.5	0.0	0.0	0.0	16.4		
Prop In Lane	1.00		0.00	0.00		1.00	0.00		0.00	1.00		
Lane Grp Cap(c), veh/h	78	3701	0	0	3246	1008	0	2	0	559		
V/C Ratio(X)	0.78	0.38	0.00	0.00	0.57	0.30	0.00	0.00	0.00	1.06		
Avail Cap(c_a), veh/h	200	3701	0	0	3246	1008	0	469	0	559		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.64	0.64	0.00	0.00	0.00	1.00		
Uniform Delay (d), s/veh	47.3	4.9	0.0	0.0	10.0	7.8	0.0	0.0	0.0	41.8		
Incr Delay (d2), s/veh	6.2	0.3	0.0	0.0	0.5	0.5	0.0	0.0	0.0	55.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.8	4.7	0.0	0.0	9.6	3.8	0.0	0.0	0.0	12.0		
LnGrp Delay(d),s/veh	53.5	5.1	0.0	0.0	10.5	8.3	0.0	0.0	0.0	97.0		
LnGrp LOS	D	A			B	A				F		
Approach Vol, veh/h		1454			2166			0				
Approach Delay, s/veh		7.2			10.2			0.0				
Approach LOS		A			B							

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6		
Phs Duration (G+Y+Rc), s	9.0	70.0	21.0	0.0		79.0		
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6		5.5		
Max Green Setting (Gmax), s	11.4	27.5	16.4	25.4		43.5		
Max Q Clear Time (g_c+I1), s	5.4	22.9	18.4	0.0		12.1		
Green Ext Time (p_c), s	0.0	4.5	0.0	0.0		27.9		

Intersection Summary		
HCM 2010 Ctrl Delay		21.4
HCM 2010 LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	132	1043	586	50	916	323	836	484	144	288	174	207
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	143	1134	430	54	996	142	909	526	30	313	189	1
Adj No. of Lanes	2	3	2	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	213	2103	1438	119	1963	598	988	1344	407	383	450	132
Arrive On Green	0.06	0.42	0.42	0.03	0.39	0.39	0.29	0.27	0.27	0.11	0.09	0.09
Sat Flow, veh/h	3408	5036	2700	3408	5036	1533	3408	5036	1525	3408	5036	1479
Grp Volume(v), veh/h	143	1134	430	54	996	142	909	526	30	313	189	1
Grp Sat Flow(s),veh/h/ln	1704	1679	1350	1704	1679	1533	1704	1679	1525	1704	1679	1479
Q Serve(g_s), s	4.9	20.3	10.7	1.9	18.1	7.5	31.0	10.3	1.8	10.8	4.3	0.1
Cycle Q Clear(g_c), s	4.9	20.3	10.7	1.9	18.1	7.5	31.0	10.3	1.8	10.8	4.3	0.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	213	2103	1438	119	1963	598	988	1344	407	383	450	132
V/C Ratio(X)	0.67	0.54	0.30	0.46	0.51	0.24	0.92	0.39	0.07	0.82	0.42	0.01
Avail Cap(c_a), veh/h	494	2103	1438	494	1963	598	1034	1406	426	494	609	179
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.76	0.76	0.76	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.0	26.3	15.8	56.8	27.8	24.6	41.2	36.0	32.9	52.0	51.7	49.8
Incr Delay (d2), s/veh	1.0	0.8	0.4	1.0	0.9	0.9	12.1	0.1	0.0	6.3	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	9.5	4.0	0.9	8.6	3.3	16.2	4.8	0.7	5.4	2.0	0.0
LnGrp Delay(d),s/veh	56.1	27.0	16.2	57.8	28.8	25.6	53.4	36.1	32.9	58.4	51.9	49.8
LnGrp LOS	E	C	B	E	C	C	D	D	C	E	D	D
Approach Vol, veh/h		1707			1192			1465			503	
Approach Delay, s/veh		26.7			29.7			46.8			55.9	
Approach LOS		C			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	52.3	39.4	16.2	8.8	55.6	18.1	37.5
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	17.4	31.5	36.4	14.5	17.4	31.5	17.4	33.5
Max Q Clear Time (g_c+I1), s	6.9	20.1	33.0	6.3	3.9	22.3	12.8	12.3
Green Ext Time (p_c), s	0.6	11.1	1.8	4.5	0.2	8.9	0.7	8.4

Intersection Summary		
HCM 2010 Ctrl Delay		36.5
HCM 2010 LOS		D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	27	1779	77	43	1120	9	85	14	64	10	13	22
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	31	2022	86	49	1273	10	97	16	1	11	15	0
Adj No. of Lanes	1	3	0	1	3	0	1	1	0	1	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	47	3477	147	63	3665	29	122	152	9	22	59	50
Arrive On Green	0.03	0.70	0.70	0.07	1.00	1.00	0.07	0.09	0.09	0.01	0.03	0.00
Sat Flow, veh/h	1757	4954	210	1757	5154	40	1757	1715	107	1757	1845	1568
Grp Volume(v), veh/h	31	1368	740	49	829	454	97	0	17	11	15	0
Grp Sat Flow(s),veh/h/ln	1757	1679	1807	1757	1679	1837	1757	0	1823	1757	1845	1568
Q Serve(g_s), s	2.1	24.6	24.8	3.3	0.0	0.0	6.5	0.0	1.0	0.7	1.0	0.0
Cycle Q Clear(g_c), s	2.1	24.6	24.8	3.3	0.0	0.0	6.5	0.0	1.0	0.7	1.0	0.0
Prop In Lane	1.00		0.12	1.00		0.02	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	47	2356	1268	63	2387	1306	122	0	161	22	59	50
V/C Ratio(X)	0.66	0.58	0.58	0.77	0.35	0.35	0.79	0.00	0.11	0.49	0.26	0.00
Avail Cap(c_a), veh/h	299	2356	1268	299	2387	1306	299	0	234	299	237	201
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.93	0.93	0.93	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	57.8	9.0	9.0	55.2	0.0	0.0	55.0	0.0	50.3	58.8	56.7	0.0
Incr Delay (d2), s/veh	5.7	1.1	2.0	6.8	0.4	0.7	4.3	0.0	0.1	6.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	11.6	12.8	1.7	0.1	0.2	3.3	0.0	0.5	0.4	0.5	0.0
LnGrp Delay(d),s/veh	63.5	10.1	11.0	62.0	0.4	0.7	59.3	0.0	50.4	64.8	57.6	0.0
LnGrp LOS	E	B	B	E	A	A	E		D	E	E	
Approach Vol, veh/h		2139			1332			114			26	
Approach Delay, s/veh		11.2			2.7			58.0			60.6	
Approach LOS		B			A			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	89.7	13.0	8.4	7.8	90.8	6.1	15.2
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	20.4	44.5	20.4	15.4	20.4	44.5	20.4	15.4
Max Q Clear Time (g_c+I1), s	5.3	26.8	8.5	3.0	4.1	2.0	2.7	3.0
Green Ext Time (p_c), s	0.1	16.6	0.2	0.0	0.0	36.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	9.9
HCM 2010 LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	270	1237	137	232	667	142	132	502	249	197	301	110
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	293	1345	82	252	725	53	143	546	97	214	327	32
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	366	2337	713	334	2291	698	215	1004	275	294	1130	310
Arrive On Green	0.21	0.93	0.93	0.03	0.15	0.15	0.06	0.18	0.18	0.08	0.20	0.20
Sat Flow, veh/h	3408	5036	1535	3408	5036	1535	3514	5534	1514	3514	5534	1518
Grp Volume(v), veh/h	293	1345	82	252	725	53	143	546	97	214	327	32
Grp Sat Flow(s),veh/h/ln	1704	1679	1535	1704	1679	1535	1757	1845	1514	1757	1845	1518
Q Serve(g_s), s	9.8	4.9	0.5	8.8	15.4	3.6	4.8	10.8	6.7	7.1	6.0	2.1
Cycle Q Clear(g_c), s	9.8	4.9	0.5	8.8	15.4	3.6	4.8	10.8	6.7	7.1	6.0	2.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	366	2337	713	334	2291	698	215	1004	275	294	1130	310
V/C Ratio(X)	0.80	0.58	0.12	0.75	0.32	0.08	0.67	0.54	0.35	0.73	0.29	0.10
Avail Cap(c_a), veh/h	579	2337	713	579	2291	698	597	1130	309	597	1130	310
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.74	0.74	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.9	2.5	2.3	56.6	34.3	29.3	55.1	44.6	42.9	53.6	40.4	38.8
Incr Delay (d2), s/veh	1.3	0.8	0.2	1.2	0.3	0.2	1.3	0.2	0.3	1.3	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	2.1	0.2	4.2	7.2	1.6	2.4	5.5	2.8	3.5	3.1	0.9
LnGrp Delay(d),s/veh	47.2	3.2	2.6	57.8	34.7	29.5	56.4	44.8	43.2	54.9	40.4	38.9
LnGrp LOS	D	A	A	E	C	C	E	D	D	D	D	D
Approach Vol, veh/h		1720			1030			786			573	
Approach Delay, s/veh		10.7			40.1			46.7			45.8	
Approach LOS		B			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.5	60.6	11.9	30.0	16.4	61.7	14.7	27.3
Change Period (Y+Rc), s	4.6	6.0	4.6	5.5	4.6	* 6	4.6	5.5
Max Green Setting (Gmax), s	20.4	34.0	20.4	24.5	20.4	* 35	20.4	24.5
Max Q Clear Time (g_c+I1), s	11.8	17.4	6.8	8.0	10.8	6.9	9.1	12.8
Green Ext Time (p_c), s	1.1	15.8	0.6	10.3	1.0	25.5	0.9	7.9

Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	12	1611	45	59	1034	167	35	10	42	172	7	32
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1900	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	13	1751	24	64	1124	171	38	11	0	193	0	1
Adj No. of Lanes	1	3	1	1	3	0	0	1	1	2	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	26	2979	898	83	2700	410	89	26	102	354	0	150
Arrive On Green	0.00	0.20	0.20	0.09	1.00	1.00	0.06	0.06	0.00	0.10	0.00	0.10
Sat Flow, veh/h	1757	5036	1519	1757	4391	668	1377	399	1568	3514	0	1487
Grp Volume(v), veh/h	13	1751	24	64	859	436	49	0	0	193	0	1
Grp Sat Flow(s),veh/h/ln	1757	1679	1519	1757	1679	1702	1776	0	1568	1757	0	1487
Q Serve(g_s), s	0.9	37.9	1.5	4.3	0.0	0.0	3.2	0.0	0.0	6.3	0.0	0.1
Cycle Q Clear(g_c), s	0.9	37.9	1.5	4.3	0.0	0.0	3.2	0.0	0.0	6.3	0.0	0.1
Prop In Lane	1.00		1.00	1.00		0.39	0.78		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	26	2979	898	83	2064	1046	115	0	102	354	0	150
V/C Ratio(X)	0.51	0.59	0.03	0.77	0.42	0.42	0.43	0.00	0.00	0.55	0.00	0.01
Avail Cap(c_a), veh/h	224	2979	898	240	2064	1046	391	0	345	773	0	327
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.74	0.74	0.89	0.89	0.89	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	59.3	35.0	20.3	53.7	0.0	0.0	54.0	0.0	0.0	51.3	0.0	48.6
Incr Delay (d2), s/veh	10.9	0.6	0.0	12.6	0.5	1.1	2.5	0.0	0.0	1.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	17.8	0.7	2.4	0.2	0.3	1.6	0.0	0.0	3.1	0.0	0.0
LnGrp Delay(d),s/veh	70.2	35.6	20.4	66.4	0.5	1.1	56.5	0.0	0.0	52.6	0.0	48.6
LnGrp LOS	E	D	C	E	A	A	E			D		D
Approach Vol, veh/h		1788			1359			49			194	
Approach Delay, s/veh		35.7			3.8			56.5			52.6	
Approach LOS		D			A			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.5	80.5		13.4	11.3	77.7		17.7
Change Period (Y+Rc), s	6.7	6.7		5.6	5.6	6.7		5.6
Max Green Setting (Gmax), s	15.3	27.3		26.4	16.4	27.3		26.4
Max Q Clear Time (g_c+I1), s	2.9	2.0		5.2	6.3	39.9		8.3
Green Ext Time (p_c), s	0.0	22.2		0.2	0.1	0.0		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	24.2
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	188	1400	216	115	1021	172	186	260	258	157	227	120
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	204	1522	160	125	1110	108	202	283	21	171	247	8
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	271	2722	831	189	2601	794	270	582	251	237	548	236
Arrive On Green	0.16	1.00	1.00	0.06	0.52	0.52	0.08	0.17	0.17	0.07	0.16	0.16
Sat Flow, veh/h	3408	5036	1537	3408	5036	1537	3408	3505	1511	3408	3505	1509
Grp Volume(v), veh/h	204	1522	160	125	1110	108	202	283	21	171	247	8
Grp Sat Flow(s),veh/h/ln	1704	1679	1537	1704	1679	1537	1704	1752	1511	1704	1752	1509
Q Serve(g_s), s	6.9	0.0	0.0	4.3	16.4	4.4	7.0	8.8	1.4	5.9	7.7	0.5
Cycle Q Clear(g_c), s	6.9	0.0	0.0	4.3	16.4	4.4	7.0	8.8	1.4	5.9	7.7	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	271	2722	831	189	2601	794	270	582	251	237	548	236
V/C Ratio(X)	0.75	0.56	0.19	0.66	0.43	0.14	0.75	0.49	0.08	0.72	0.45	0.03
Avail Cap(c_a), veh/h	494	2722	831	494	2601	794	494	803	346	494	803	346
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.75	0.75	0.75	1.00	1.00	1.00	0.97	0.97	0.97	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.3	0.0	0.0	55.6	18.0	15.1	54.1	45.4	42.3	54.7	45.9	42.9
Incr Delay (d2), s/veh	1.2	0.6	0.4	1.5	0.5	0.4	1.5	0.2	0.1	1.5	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.2	0.1	2.1	7.7	1.9	3.3	4.3	0.6	2.8	3.7	0.2
LnGrp Delay(d),s/veh	50.5	0.6	0.4	57.1	18.5	15.4	55.6	45.6	42.4	56.2	46.1	42.9
LnGrp LOS	D	A	A	E	B	B	E	D	D	E	D	D
Approach Vol, veh/h		1886			1343			506			426	
Approach Delay, s/veh		6.0			21.9			49.5			50.1	
Approach LOS		A			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	67.5	14.1	24.3	11.2	70.4	13.0	25.4
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	17.4	37.5	17.4	27.5	17.4	37.5	17.4	27.5
Max Q Clear Time (g_c+I1), s	8.9	18.4	9.0	9.7	6.3	2.0	7.9	10.8
Green Ext Time (p_c), s	0.7	18.8	0.6	5.6	0.4	34.7	0.5	5.4

Intersection Summary	
HCM 2010 Ctrl Delay	20.9
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

44: Laguna Springs Dr & Elk Grove Blvd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	3.0	2.0	0.3	2.0		0.0	0.0	0.0	3.3	0.5	0.6	3.9
Total Delay (hr)	0.0	0.4	2.1	0.1	0.0	1.0	1.2	0.1	0.5	0.4	0.4	0.1
Total Del/Veh (s)	33.8	51.7	19.0	6.9		57.5	12.0	11.3	50.9	46.4	18.8	55.2
Stop Delay (hr)	0.0	0.4	1.3	0.0	0.0	0.9	0.7	0.1	0.5	0.3	0.4	0.1
Stop Del/Veh (s)	31.0	45.6	11.5	2.9		53.5	6.5	6.4	46.7	40.8	17.3	52.0
Total Stops	1	26	170	22	0	52	87	9	34	24	59	8
Stop/Veh	0.50	0.84	0.42	0.39		0.84	0.24	0.30	0.89	0.80	0.80	0.89
Travel Dist (mi)	0.3	5.9	80.6	11.4	0.1	9.6	58.6	4.9	6.0	5.0	12.2	1.7
Travel Time (hr)	0.0	0.6	4.0	0.5	0.0	1.3	2.9	0.3	0.8	0.5	0.8	0.2
Avg Speed (mph)	10	10	20	26	7	7	20	18	8	9	15	9
Fuel Used (gal)	0.0	0.1	1.2	0.2	0.0	0.2	1.1	0.1	0.1	0.1	0.2	0.0
Fuel Eff. (mpg)	80.8	63.1	69.9	72.0	58.5	55.7	54.1	66.3	52.2	50.4	60.0	53.6
HC Emissions (g)	0	2	36	7	0	4	31	2	3	3	5	0
CO Emissions (g)	3	85	1361	266	1	148	972	61	119	96	199	22
NOx Emissions (g)	0	6	114	20	0	13	106	7	9	9	16	1
Vehicles Entered	1	28	383	54	0	57	348	29	36	30	73	8
Vehicles Exited	1	28	397	55	0	56	351	29	33	29	69	8
Hourly Exit Rate	4	112	1588	220	0	224	1404	116	132	116	276	32
Input Volume	4	107	1549	218	2	231	1399	119	140	124	282	37
% of Volume	100	105	103	101	0	97	100	97	94	94	98	86
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	2	16	2	0	5	12	1	3	2	3	1

44: Laguna Springs Dr & Elk Grove Blvd Performance by movement

Movement	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.2
Denied Del/Veh (s)	0.5	3.7	0.5
Total Delay (hr)	0.5	0.1	7.0
Total Del/Veh (s)	49.5	16.3	22.0
Stop Delay (hr)	0.4	0.1	5.2
Stop Del/Veh (s)	43.7	14.3	16.3
Total Stops	30	16	538
Stop/Veh	0.86	0.84	0.47
Travel Dist (mi)	6.7	3.7	206.7
Travel Time (hr)	0.7	0.2	12.9
Avg Speed (mph)	10	18	16
Fuel Used (gal)	0.1	0.1	3.4
Fuel Eff. (mpg)	58.0	68.2	61.5
HC Emissions (g)	3	2	99
CO Emissions (g)	103	58	3494
NOx Emissions (g)	9	5	316
Vehicles Entered	34	19	1100
Vehicles Exited	31	18	1105
Hourly Exit Rate	124	72	4420
Input Volume	127	73	4412
% of Volume	98	99	100
Denied Entry Before	0	0	0
Denied Entry After	0	0	0
Density (ft/veh)			322
Occupancy (veh)	3	1	51

45: Auto Center Dr & Elk Grove Blvd Performance by movement

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.2
Total Delay (hr)	0.3	2.5	0.3	0.1	1.4	1.1	0.0	0.4	0.1	0.1	0.2	0.0
Total Del/Veh (s)	49.0	21.0	22.8	49.0	52.1	9.0	5.2	53.1	49.3	18.2	54.8	58.5
Stop Delay (hr)	0.3	1.6	0.2	0.1	1.2	0.6	0.0	0.4	0.1	0.1	0.2	0.0
Stop Del/Veh (s)	42.8	13.4	15.2	44.1	46.3	5.1	3.2	50.4	46.6	17.2	53.2	56.1
Total Stops	21	163	18	10	84	103	0	22	3	26	11	3
Stop/Veh	0.95	0.38	0.43	0.91	0.88	0.24	0.00	0.88	0.75	0.90	0.92	1.00
Travel Dist (mi)	3.6	67.4	6.6	1.7	14.9	65.1	0.2	1.7	0.3	2.1	0.3	0.1
Travel Time (hr)	0.4	4.5	0.5	0.2	1.9	3.2	0.0	0.4	0.1	0.2	0.2	0.1
Avg Speed (mph)	8	15	13	8	8	20	21	4	4	8	2	2
Fuel Used (gal)	0.1	1.4	0.1	0.0	0.3	1.4	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Eff. (mpg)	55.4	48.3	58.9	53.2	44.9	46.4	61.0	37.1	54.3	51.6	34.4	36.5
HC Emissions (g)	1	42	3	1	11	44	0	1	0	1	0	0
CO Emissions (g)	62	1372	96	33	376	1575	2	31	3	29	5	1
NOx Emissions (g)	6	145	11	2	34	149	0	3	0	3	0	0
Vehicles Entered	22	413	40	11	93	420	1	24	4	29	12	3
Vehicles Exited	20	411	40	10	87	424	1	23	3	28	11	3
Hourly Exit Rate	80	1644	160	40	348	1696	4	92	12	112	44	12
Input Volume	82	1635	157	48	387	1702	4	98	16	113	48	10
% of Volume	98	101	102	83	90	100	100	94	75	99	92	120
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	2	18	2	1	8	13	0	2	0	1	1	0

45: Auto Center Dr & Elk Grove Blvd Performance by movement

Movement	SBR	All
Denied Delay (hr)	0.0	0.0
Denied Del/Veh (s)	0.1	0.0
Total Delay (hr)	0.1	6.5
Total Del/Veh (s)	22.1	21.1
Stop Delay (hr)	0.1	4.8
Stop Del/Veh (s)	21.7	15.6
Total Stops	8	472
Stop/Veh	0.89	0.42
Travel Dist (mi)	0.2	164.1
Travel Time (hr)	0.1	11.9
Avg Speed (mph)	4	14
Fuel Used (gal)	0.0	3.4
Fuel Eff. (mpg)	40.6	47.6
HC Emissions (g)	0	105
CO Emissions (g)	5	3592
NOx Emissions (g)	1	355
Vehicles Entered	9	1081
Vehicles Exited	8	1069
Hourly Exit Rate	32	4276
Input Volume	34	4334
% of Volume	94	99
Denied Entry Before	0	0
Denied Entry After	0	0
Density (ft/veh)		182
Occupancy (veh)	0	48

46: Elk Grove Blvd & SR 99 SB Off Performance by movement

Movement	EBT	EBR	WBU	WBL	WBT	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.0	0.4	0.4	0.2
Total Delay (hr)	2.1	0.5	0.0	0.4	0.9	1.6	2.3	7.7
Total Del/Veh (s)	17.6	24.3	48.3	50.0	11.2	38.8	31.9	22.8
Stop Delay (hr)	1.1	0.2	0.0	0.3	0.6	1.2	1.7	5.2
Stop Del/Veh (s)	8.7	12.8	45.1	47.2	7.7	31.2	23.3	15.3
Total Stops	149	33	1	22	98	116	248	667
Stop/Veh	0.34	0.49	1.00	0.85	0.34	0.81	0.95	0.55
Travel Dist (mi)	66.5	10.4	0.1	1.8	22.0	33.9	60.8	195.4
Travel Time (hr)	4.1	0.8	0.0	0.4	1.5	2.6	4.3	13.9
Avg Speed (mph)	16	12	5	4	14	13	14	14
Fuel Used (gal)	1.3	0.2	0.0	0.0	0.3	0.6	0.9	3.3
Fuel Eff. (mpg)	50.7	56.8	60.2	56.0	63.1	60.0	68.0	58.6
HC Emissions (g)	39	6	0	1	8	16	22	92
CO Emissions (g)	1258	175	1	23	219	461	689	2827
NOx Emissions (g)	135	19	0	2	26	48	70	302
Vehicles Entered	427	66	1	23	273	139	251	1180
Vehicles Exited	416	63	1	25	283	131	242	1161
Hourly Exit Rate	1664	252	4	100	1132	524	968	4644
Input Volume	1710	261	4	101	1140	561	1002	4779
% of Volume	97	97	100	99	99	93	97	97
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0
Density (ft/veh)								175
Occupancy (veh)	16	3	0	2	6	10	17	55

47: Elk Grove Blvd Performance by movement

Movement	EBT	WBT	WBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Delay (hr)	0.4	0.3	0.1	0.9
Total Del/Veh (s)	2.7	3.4	6.0	3.3
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.2	0.1	0.1
Total Stops	7	4	0	11
Stop/Veh	0.01	0.01	0.00	0.01
Travel Dist (mi)	48.2	56.9	15.7	120.8
Travel Time (hr)	2.0	2.0	0.7	4.7
Avg Speed (mph)	24	28	23	26
Fuel Used (gal)	1.3	1.2	0.3	2.8
Fuel Eff. (mpg)	38.1	46.2	51.5	43.2
HC Emissions (g)	42	39	10	91
CO Emissions (g)	1568	1326	344	3237
NOx Emissions (g)	150	133	33	315
Vehicles Entered	548	299	86	933
Vehicles Exited	545	298	86	929
Hourly Exit Rate	2180	1192	344	3716
Input Volume	2275	1246	346	3867
% of Volume	96	96	99	96
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0
Density (ft/veh)				283
Occupancy (veh)	8	8	3	19

48: E Stockton Blvd & SR 99 NB Off Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	1.6	0.3	0.4	0.1	0.1	0.1	3.3	0.3	0.1	0.1	0.1	0.0
Total Delay (hr)	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	0.1	0.1	0.6
Total Del/Veh (s)	17.4	12.0	12.0	33.4	25.2	5.6	30.8	19.1	12.2	30.9	32.8	24.0
Stop Delay (hr)	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.1	0.1	0.4
Stop Del/Veh (s)	15.3	9.8	10.9	32.2	23.6	5.5	27.1	14.5	10.2	25.2	26.3	15.9
Total Stops	49	1	2	2	2	6	33	53	2	18	14	64
Stop/Veh	0.64	0.50	0.67	1.00	1.00	1.00	0.85	0.62	0.67	1.06	1.00	0.74
Travel Dist (mi)	17.8	0.4	0.7	0.0	0.0	0.1	5.3	12.0	0.4	2.1	1.7	10.6
Travel Time (hr)	1.1	0.0	0.0	0.0	0.0	0.0	0.5	0.8	0.0	0.2	0.2	1.0
Avg Speed (mph)	16	17	18	2	2	7	10	15	17	9	9	11
Fuel Used (gal)	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.3
Fuel Eff. (mpg)	61.8	72.9	72.7	43.9	37.5	81.4	55.0	62.5	76.7	43.0	41.6	41.9
HC Emissions (g)	5	0	0	0	0	0	4	7	0	2	1	8
CO Emissions (g)	121	1	2	0	0	1	123	227	6	61	52	298
NOx Emissions (g)	16	0	0	0	0	0	10	19	0	6	5	27
Vehicles Entered	71	2	3	2	2	6	37	84	3	17	13	83
Vehicles Exited	71	2	3	2	2	6	37	83	3	16	13	83
Hourly Exit Rate	284	8	12	8	8	24	148	332	12	64	52	332
Input Volume	296	6	12	9	7	27	153	331	12	65	61	355
% of Volume	96	133	100	89	114	89	97	100	100	98	85	94
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	4	0	0	0	0	0	2	3	0	1	1	4

48: E Stockton Blvd & SR 99 NB Off Performance by movement

Movement	SBR	All
Denied Delay (hr)	0.0	0.1
Denied Del/Veh (s)	0.0	0.6
Total Delay (hr)	0.3	2.4
Total Del/Veh (s)	8.2	18.0
Stop Delay (hr)	0.1	1.7
Stop Del/Veh (s)	2.7	13.0
Total Stops	71	317
Stop/Veh	0.49	0.66
Travel Dist (mi)	18.2	69.5
Travel Time (hr)	1.1	5.2
Avg Speed (mph)	16	14
Fuel Used (gal)	0.3	1.3
Fuel Eff. (mpg)	53.6	54.1
HC Emissions (g)	12	39
CO Emissions (g)	442	1336
NOx Emissions (g)	40	124
Vehicles Entered	142	465
Vehicles Exited	143	464
Hourly Exit Rate	572	1856
Input Volume	589	1923
% of Volume	97	97
Denied Entry Before	0	0
Denied Entry After	0	0
Density (ft/veh)		349
Occupancy (veh)	5	20

49: E Stockton Blvd/Emerald Vista Dr & Elk Grove Blvd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	1.8	2.5	0.9	2.4	0.0	0.0	0.0	
Total Delay (hr)	0.0	0.6	2.3	0.4	0.0	0.4	2.7	0.4	1.4	0.7	0.4	0.0
Total Del/Veh (s)	53.0	59.2	25.4	6.9	59.4	62.3	34.8	28.8	52.3	43.9	38.8	
Stop Delay (hr)	0.0	0.6	1.8	0.0	0.0	0.3	2.0	0.3	1.2	0.6	0.4	0.0
Stop Del/Veh (s)	48.8	54.6	19.9	0.0	55.0	56.4	26.7	22.1	47.1	36.3	33.4	
Total Stops	2	32	163	4	2	21	181	34	75	36	31	0
Stop/Veh	1.00	0.84	0.49	0.02	1.00	0.95	0.66	0.69	0.79	0.65	0.79	
Travel Dist (mi)	0.4	6.4	55.0	34.0	0.3	4.3	53.8	9.7	11.6	6.3	4.9	0.0
Travel Time (hr)	0.0	0.8	3.9	1.5	0.0	0.5	4.3	0.8	1.8	0.9	0.6	0.0
Avg Speed (mph)	9	8	14	23	7	8	13	14	6	7	8	5
Fuel Used (gal)	0.0	0.1	0.9	0.4	0.0	0.1	0.9	0.2	0.3	0.1	0.1	0.0
Fuel Eff. (mpg)	68.6	52.1	58.0	81.7	63.0	56.8	58.9	63.3	44.5	46.2	49.6	40.9
HC Emissions (g)	0	3	23	12	0	2	21	4	9	5	3	0
CO Emissions (g)	3	76	583	332	3	55	679	134	325	179	116	0
NOx Emissions (g)	0	8	71	37	0	4	67	12	29	16	10	0
Vehicles Entered	2	35	317	192	2	21	264	48	88	52	37	0
Vehicles Exited	2	34	311	191	2	20	255	46	89	52	36	0
Hourly Exit Rate	8	136	1244	764	8	80	1020	184	356	208	144	0
Input Volume	10	133	1320	812	6	80	1057	189	362	211	146	2
% of Volume	80	102	94	94	133	100	96	97	98	99	99	0
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	3	16	6	0	2	17	3	7	4	2	0

49: E Stockton Blvd/Emerald Vista Dr & Elk Grove Blvd Performance by movement

Movement	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.2
Denied Del/Veh (s)	3.3	0.7	0.3	0.5
Total Delay (hr)	0.9	0.4	0.1	10.7
Total Del/Veh (s)	56.0	43.7	10.3	31.2
Stop Delay (hr)	0.8	0.4	0.1	8.6
Stop Del/Veh (s)	52.2	40.1	9.5	25.1
Total Stops	49	29	30	689
Stop/Veh	0.88	0.81	0.75	0.56
Travel Dist (mi)	5.3	3.4	4.0	199.6
Travel Time (hr)	1.1	0.6	0.3	17.3
Avg Speed (mph)	5	6	13	12
Fuel Used (gal)	0.1	0.1	0.1	3.4
Fuel Eff. (mpg)	42.5	47.6	55.2	58.6
HC Emissions (g)	4	2	2	89
CO Emissions (g)	96	47	40	2667
NOx Emissions (g)	10	5	5	274
Vehicles Entered	53	34	40	1185
Vehicles Exited	52	34	39	1163
Hourly Exit Rate	208	136	156	4652
Input Volume	199	133	162	4822
% of Volume	105	102	96	96
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0
Density (ft/veh)				185
Occupancy (veh)	4	2	1	68

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	373	396	220	147	476	37	372	458	83	60	352	305
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.89	1.00		0.96	1.00		0.89
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	414	440	42	163	529	37	413	509	82	67	391	83
Adj No. of Lanes	2	2	1	1	2	0	2	2	0	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	486	930	396	195	769	54	485	1178	189	86	551	415
Arrive On Green	0.14	0.27	0.27	0.11	0.23	0.23	0.14	0.39	0.39	0.05	0.30	0.30
Sat Flow, veh/h	3408	3505	1492	1757	3294	230	3408	3005	482	1757	1845	1390
Grp Volume(v), veh/h	414	440	42	163	281	285	413	296	295	67	391	83
Grp Sat Flow(s),veh/h/ln	1704	1752	1492	1757	1752	1771	1704	1752	1734	1757	1845	1390
Q Serve(g_s), s	11.9	10.6	2.1	9.2	14.7	14.8	11.9	12.4	12.6	3.8	19.0	4.5
Cycle Q Clear(g_c), s	11.9	10.6	2.1	9.2	14.7	14.8	11.9	12.4	12.6	3.8	19.0	4.5
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.28	1.00		1.00
Lane Grp Cap(c), veh/h	486	930	396	195	409	413	485	687	680	86	551	415
V/C Ratio(X)	0.85	0.47	0.11	0.84	0.69	0.69	0.85	0.43	0.43	0.78	0.71	0.20
Avail Cap(c_a), veh/h	847	1393	593	436	697	704	847	697	689	436	733	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	31.1	27.9	43.9	35.2	35.2	42.1	22.4	22.4	47.3	31.4	26.3
Incr Delay (d2), s/veh	1.7	0.1	0.0	3.6	0.8	0.8	1.7	0.2	0.2	5.5	1.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	5.2	0.9	4.6	7.2	7.3	5.7	6.0	6.0	2.0	9.8	1.7
LnGrp Delay(d),s/veh	43.7	31.2	28.0	47.5	36.0	36.0	43.8	22.5	22.6	52.8	32.5	26.4
LnGrp LOS	D	C	C	D	D	D	D	C	C	D	C	C
Approach Vol, veh/h		896			729			1004			541	
Approach Delay, s/veh		36.8			38.6			31.3			34.1	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	28.1	18.9	34.6	15.7	31.3	9.5	44.0
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	25.0	40.0	25.0	40.0	25.0	40.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	13.9	16.8	13.9	21.0	11.2	12.6	5.8	14.6
Green Ext Time (p_c), s	0.4	4.6	0.4	2.9	0.1	4.8	0.0	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	35.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	71	331	114	70	462	242	106	215	34	162	229	89
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1863	1881	1900	1863	1881	1845	1845	1792	1881	1827	1900
Adj Flow Rate, veh/h	84	389	60	82	544	189	125	253	1	191	269	0
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	1	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.77
Percent Heavy Veh, %	3	2	1	0	2	1	3	3	6	1	4	0
Cap, veh/h	111	688	591	108	681	524	161	572	248	238	373	330
Arrive On Green	0.06	0.37	0.37	0.06	0.37	0.37	0.09	0.16	0.16	0.13	0.20	0.00
Sat Flow, veh/h	1757	1863	1598	1810	1863	1433	1757	3505	1519	1792	1827	1615
Grp Volume(v), veh/h	84	389	60	82	544	189	125	253	1	191	269	0
Grp Sat Flow(s),veh/h/ln	1757	1863	1598	1810	1863	1433	1757	1752	1519	1792	1827	1615
Q Serve(g_s), s	3.1	11.1	1.6	3.0	17.5	6.4	4.7	4.4	0.0	6.9	9.2	0.0
Cycle Q Clear(g_c), s	3.1	11.1	1.6	3.0	17.5	6.4	4.7	4.4	0.0	6.9	9.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	111	688	591	108	681	524	161	572	248	238	373	330
V/C Ratio(X)	0.76	0.57	0.10	0.76	0.80	0.36	0.78	0.44	0.00	0.80	0.72	0.00
Avail Cap(c_a), veh/h	919	1671	1433	947	1671	1285	656	2095	908	669	1092	966
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.8	16.8	13.8	31.0	19.0	15.5	29.7	25.2	23.4	28.2	24.8	0.0
Incr Delay (d2), s/veh	9.9	0.3	0.0	4.2	0.8	0.2	3.0	0.2	0.0	2.4	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	5.8	0.7	1.6	9.1	2.6	2.4	2.1	0.0	3.6	4.7	0.0
LnGrp Delay(d),s/veh	40.7	17.1	13.8	35.2	19.8	15.7	32.8	25.4	23.4	30.6	25.8	0.0
LnGrp LOS	D	B	B	D	B	B	C	C	C	C	C	
Approach Vol, veh/h		533			815			379			460	
Approach Delay, s/veh		20.4			20.4			27.9			27.8	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	29.1	10.7	18.3	8.6	29.3	13.5	15.5
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	35.0	60.0	25.0	40.0	35.0	60.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	5.1	19.5	6.7	11.2	5.0	13.1	8.9	6.4
Green Ext Time (p_c), s	0.2	4.8	0.1	2.1	0.1	4.8	0.2	2.1

Intersection Summary			
HCM 2010 Ctrl Delay			23.3
HCM 2010 LOS			C

Intersection	
Intersection Delay, s/veh	21.7
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	118	182	66	0	8	96	22	0	62	237	25	0	54	239	96
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	124	192	69	0	8	101	23	0	65	249	26	0	57	252	101
Number of Lanes	0	0	1	1	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	21.3	13.6	20.9	25.5
HCM LOS	C	B	C	D

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	19%	39%	0%	6%	14%
Vol Thru, %	73%	61%	0%	76%	61%
Vol Right, %	8%	0%	100%	17%	25%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	324	300	66	126	389
LT Vol	62	118	0	8	54
Through Vol	237	182	0	96	239
RT Vol	25	0	66	22	96
Lane Flow Rate	341	316	69	133	409
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.635	0.658	0.127	0.282	0.734
Departure Headway (Hd)	6.706	7.501	6.581	7.658	6.452
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	535	480	541	472	557
Service Time	4.797	5.287	4.366	5.658	4.537
HCM Lane V/C Ratio	0.637	0.658	0.128	0.282	0.734
HCM Control Delay	20.9	23.7	10.3	13.6	25.5
HCM Lane LOS	C	C	B	B	D
HCM 95th-tile Q	4.4	4.7	0.4	1.1	6.2

Intersection	
Intersection Delay, s/veh	28.6
Intersection LOS	D

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	217	5	0	4	473	0	292	139
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	40	2	25	9	2	8	3
Mvmt Flow	0	236	5	0	4	514	0	317	151
Number of Lanes	0	1	1	0	0	1	0	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	17.8	45.9	15
HCM LOS	C	E	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	1%	100%	0%	0%	0%
Vol Thru, %	99%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	477	217	5	292	139
LT Vol	4	217	0	0	0
Through Vol	473	0	0	292	0
RT Vol	0	0	5	0	139
Lane Flow Rate	518	236	5	317	151
Geometry Grp	4	7	7	7	7
Degree of Util (X)	0.919	0.502	0.011	0.565	0.235
Departure Headway (Hd)	6.379	7.656	7.124	6.408	5.608
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	565	469	500	559	636
Service Time	4.44	5.43	4.898	4.182	3.381
HCM Lane V/C Ratio	0.917	0.503	0.01	0.567	0.237
HCM Control Delay	45.9	18	10	17.3	10.1
HCM Lane LOS	E	C	A	C	B
HCM 95th-tile Q	11.3	2.8	0	3.5	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	63	62	82	57	46	33	119	1055	60	54	683	72
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	68	67	5	62	50	1	129	1147	31	59	742	74
Adj No. of Lanes	1	1	1	2	1	1	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	90	231	187	138	210	170	165	2112	915	78	1775	177
Arrive On Green	0.05	0.12	0.12	0.04	0.11	0.11	0.09	0.60	0.60	0.04	0.55	0.55
Sat Flow, veh/h	1757	1845	1499	3408	1845	1494	1757	3505	1519	1757	3208	320
Grp Volume(v), veh/h	68	67	5	62	50	1	129	1147	31	59	405	411
Grp Sat Flow(s),veh/h/ln	1757	1845	1499	1704	1845	1494	1757	1752	1519	1757	1752	1776
Q Serve(g_s), s	3.9	3.4	0.3	1.8	2.5	0.1	7.4	19.9	0.9	3.4	13.8	13.8
Cycle Q Clear(g_c), s	3.9	3.4	0.3	1.8	2.5	0.1	7.4	19.9	0.9	3.4	13.8	13.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	90	231	187	138	210	170	165	2112	915	78	969	982
V/C Ratio(X)	0.75	0.29	0.03	0.45	0.24	0.01	0.78	0.54	0.03	0.76	0.42	0.42
Avail Cap(c_a), veh/h	427	718	583	829	718	582	427	2387	1035	427	1194	1210
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.1	40.8	39.5	48.2	41.5	40.4	45.5	12.1	8.3	48.6	13.3	13.3
Incr Delay (d2), s/veh	4.7	0.3	0.0	0.9	0.2	0.0	3.1	0.1	0.0	5.5	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.7	0.1	0.9	1.3	0.0	3.7	9.6	0.4	1.8	6.7	6.8
LnGrp Delay(d),s/veh	52.8	41.1	39.5	49.1	41.7	40.4	48.6	12.1	8.3	54.1	13.5	13.5
LnGrp LOS	D	D	D	D	D	D	D	B	A	D	B	B
Approach Vol, veh/h		140			113			1307			875	
Approach Delay, s/veh		46.7			45.7			15.7			16.2	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.2	62.3	9.9	16.3	9.2	67.4	8.7	17.4
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	9.4	15.8	5.9	4.5	5.4	21.9	3.8	5.4
Green Ext Time (p_c), s	0.5	41.0	0.2	0.7	0.2	37.4	0.3	0.7

Intersection Summary		
HCM 2010 Ctrl Delay		19.0
HCM 2010 LOS		B

Intersection	
Intersection Delay, s/veh	12.1
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	17	255	18	0	13	80	8	0	18	5	16	0	26	16	4
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	26	386	27	0	20	121	12	0	27	8	24	0	39	24	6
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	14	9.2	8.9	9.3
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	46%	100%	0%	100%	0%	57%
Vol Thru, %	13%	0%	93%	0%	91%	35%
Vol Right, %	41%	0%	7%	0%	9%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	17	273	13	88	46
LT Vol	18	17	0	13	0	26
Through Vol	5	0	255	0	80	16
RT Vol	16	0	18	0	8	4
Lane Flow Rate	59	26	414	20	133	70
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.088	0.04	0.574	0.032	0.194	0.107
Departure Headway (Hd)	5.338	5.541	4.992	5.796	5.227	5.531
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	667	644	720	615	683	644
Service Time	3.409	3.289	2.739	3.557	2.988	3.6
HCM Lane V/C Ratio	0.088	0.04	0.575	0.033	0.195	0.109
HCM Control Delay	8.9	8.5	14.3	8.8	9.3	9.3
HCM Lane LOS	A	A	B	A	A	A
HCM 95th-tile Q	0.3	0.1	3.7	0.1	0.7	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	108	74	25	5	50	15	12	411	7	3	324	73
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	117	80	6	5	54	1	13	447	7	3	352	67
Adj No. of Lanes	1	1	1	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	153	429	354	12	281	229	28	1339	21	7	1074	202
Arrive On Green	0.09	0.23	0.23	0.01	0.15	0.15	0.02	0.38	0.38	0.00	0.37	0.37
Sat Flow, veh/h	1757	1845	1522	1757	1845	1508	1757	3530	55	1757	2925	550
Grp Volume(v), veh/h	117	80	6	5	54	1	13	222	232	3	209	210
Grp Sat Flow(s),veh/h/ln	1757	1845	1522	1757	1845	1508	1757	1752	1832	1757	1752	1722
Q Serve(g_s), s	3.9	2.1	0.2	0.2	1.5	0.0	0.4	5.4	5.4	0.1	5.2	5.3
Cycle Q Clear(g_c), s	3.9	2.1	0.2	0.2	1.5	0.0	0.4	5.4	5.4	0.1	5.2	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.03	1.00		0.32
Lane Grp Cap(c), veh/h	153	429	354	12	281	229	28	665	695	7	644	632
V/C Ratio(X)	0.76	0.19	0.02	0.43	0.19	0.00	0.46	0.33	0.33	0.42	0.32	0.33
Avail Cap(c_a), veh/h	726	1220	1007	726	1220	997	726	2029	2121	726	2029	1993
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	18.6	17.9	29.9	22.4	21.7	29.5	13.3	13.3	30.0	13.7	13.8
Incr Delay (d2), s/veh	3.0	0.1	0.0	8.9	0.1	0.0	4.2	0.1	0.1	13.9	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.1	0.1	0.1	0.8	0.0	0.2	2.6	2.7	0.1	2.5	2.5
LnGrp Delay(d),s/veh	29.9	18.7	17.9	38.8	22.5	21.7	33.7	13.4	13.4	44.0	13.9	13.9
LnGrp LOS	C	B	B	D	C	C	C	B	B	D	B	B
Approach Vol, veh/h		203			60			467			422	
Approach Delay, s/veh		25.2			23.9			14.0			14.1	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.3	27.5	10.9	14.8	6.5	28.2	6.0	19.7
Change Period (Y+Rc), s	6.3	5.3	5.6	5.6	6.3	5.3	5.6	* 5.6
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	* 40
Max Q Clear Time (g_c+I1), s	2.4	7.3	5.9	3.5	2.1	7.4	2.2	4.1
Green Ext Time (p_c), s	0.0	14.0	0.2	0.6	0.0	14.0	0.0	0.6

Intersection Summary			
HCM 2010 Ctrl Delay			16.5
HCM 2010 LOS			B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	113	0	10	0	0	0	4	320	0	0	319	35
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1900	0	1845	0	1845	1845	0	0	1845	1900
Adj Flow Rate, veh/h	123	0	0	0	0	0	4	348	0	0	347	33
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	0	3	0	3	3	0	0	3	3
Cap, veh/h	224	0	0	0	5	0	10	2105	0	0	1450	137
Arrive On Green	0.13	0.00	0.00	0.00	0.00	0.00	0.01	0.60	0.00	0.00	0.45	0.45
Sat Flow, veh/h	1757	0	0	0	1845	0	1757	3597	0	0	3318	305
Grp Volume(v), veh/h	123	0	0	0	0	0	4	348	0	0	187	193
Grp Sat Flow(s),veh/h/ln	1757	0	0	0	1845	0	1757	1752	0	0	1752	1778
Q Serve(g_s), s	2.4	0.0	0.0	0.0	0.0	0.0	0.1	1.6	0.0	0.0	2.4	2.4
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.0	0.0	0.0	0.1	1.6	0.0	0.0	2.4	2.4
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.00	0.00		0.17
Lane Grp Cap(c), veh/h	224	0	0	0	5	0	10	2105	0	0	788	799
V/C Ratio(X)	0.55	0.00	0.00	0.00	0.00	0.00	0.42	0.17	0.00	0.00	0.24	0.24
Avail Cap(c_a), veh/h	1207	0	0	0	1267	0	1207	6740	0	0	3370	3419
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	0.0	0.0	0.0	0.0	18.0	3.2	0.0	0.0	6.2	6.2
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.0	0.0	0.0	10.4	0.0	0.0	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	0.0	0.0	0.0	0.1	0.8	0.0	0.0	1.2	1.2
LnGrp Delay(d),s/veh	15.7	0.0	0.0	0.0	0.0	0.0	28.5	3.2	0.0	0.0	6.2	6.2
LnGrp LOS	B						C	A			A	A
Approach Vol, veh/h		123			0			352			380	
Approach Delay, s/veh		15.7			0.0			3.5			6.2	
Approach LOS		B						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	5.5	21.7		0.0		27.2		9.2
Change Period (Y+Rc), s	5.3	5.3		4.6		5.3		4.6
Max Green Setting (Gmax), s	25.0	70.0		25.0		70.0		25.0
Max Q Clear Time (g_c+I1), s	2.1	4.4		0.0		3.6		4.4
Green Ext Time (p_c), s	0.0	11.5		0.0		11.5		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	6.5
HCM 2010 LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	159	65	7	52	19	40	22	121	45	63	209	47
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	173	71	6	57	21	3	24	132	10	68	227	38
Adj No. of Lanes	1	1	0	2	1	2	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	223	395	33	176	296	573	48	840	365	194	805	132
Arrive On Green	0.13	0.24	0.24	0.05	0.16	0.16	0.03	0.24	0.24	0.06	0.27	0.27
Sat Flow, veh/h	1757	1673	141	3408	1845	2589	1757	3505	1523	3408	2992	491
Grp Volume(v), veh/h	173	0	77	57	21	3	24	132	10	68	131	134
Grp Sat Flow(s),veh/h/ln	1757	0	1815	1704	1845	1295	1757	1752	1523	1704	1752	1731
Q Serve(g_s), s	5.6	0.0	2.0	0.9	0.6	0.1	0.8	1.7	0.3	1.1	3.5	3.6
Cycle Q Clear(g_c), s	5.6	0.0	2.0	0.9	0.6	0.1	0.8	1.7	0.3	1.1	3.5	3.6
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		0.28
Lane Grp Cap(c), veh/h	223	0	429	176	296	573	48	840	365	194	472	466
V/C Ratio(X)	0.77	0.00	0.18	0.32	0.07	0.01	0.50	0.16	0.03	0.35	0.28	0.29
Avail Cap(c_a), veh/h	748	0	1236	1451	1256	1921	748	4178	1815	2321	2089	2063
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.8	0.0	17.9	26.9	20.9	18.0	28.2	17.6	17.1	26.6	17.0	17.0
Incr Delay (d2), s/veh	2.2	0.0	0.1	0.4	0.0	0.0	2.9	0.0	0.0	0.4	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	1.0	0.5	0.3	0.0	0.4	0.8	0.1	0.5	1.7	1.7
LnGrp Delay(d),s/veh	27.0	0.0	18.0	27.3	21.0	18.0	31.0	17.7	17.1	27.0	17.1	17.1
LnGrp LOS	C		B	C	C	B	C	B	B	C	B	B
Approach Vol, veh/h		250			81			166			333	
Approach Delay, s/veh		24.2			25.3			19.6			19.1	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.9	21.1	13.1	16.6	9.7	19.4	8.6	21.1
Change Period (Y+Rc), s	6.3	5.3	5.6	* 7.2	6.3	5.3	5.6	7.2
Max Green Setting (Gmax), s	25.0	70.0	25.0	* 40	40.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	2.8	5.6	7.6	2.6	3.1	3.7	2.9	4.0
Green Ext Time (p_c), s	0.1	5.4	0.3	0.3	0.4	5.5	0.1	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	21.3
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	167	202	8	16	146	148	5	15	6	151	15	71
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	182	220	4	17	159	33	5	16	0	164	16	13
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	364	1065	464	72	764	331	23	451	202	330	767	333
Arrive On Green	0.11	0.30	0.30	0.02	0.22	0.22	0.01	0.13	0.00	0.10	0.22	0.22
Sat Flow, veh/h	3408	3505	1528	3408	3505	1520	3408	3505	1568	3408	3505	1520
Grp Volume(v), veh/h	182	220	4	17	159	33	5	16	0	164	16	13
Grp Sat Flow(s),veh/h/ln	1704	1752	1528	1704	1752	1520	1704	1752	1568	1704	1752	1520
Q Serve(g_s), s	2.4	2.3	0.1	0.2	1.8	0.8	0.1	0.2	0.0	2.2	0.2	0.3
Cycle Q Clear(g_c), s	2.4	2.3	0.1	0.2	1.8	0.8	0.1	0.2	0.0	2.2	0.2	0.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	364	1065	464	72	764	331	23	451	202	330	767	333
V/C Ratio(X)	0.50	0.21	0.01	0.24	0.21	0.10	0.22	0.04	0.00	0.50	0.02	0.04
Avail Cap(c_a), veh/h	2460	4336	1891	1757	4336	1881	1757	2891	1293	2460	2891	1254
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	12.5	11.8	23.4	15.5	15.2	24.0	18.5	0.0	20.8	14.9	14.9
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.6	0.0	0.0	1.8	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.1	0.0	0.1	0.9	0.4	0.0	0.1	0.0	1.0	0.1	0.1
LnGrp Delay(d),s/veh	20.8	12.6	11.8	24.0	15.6	15.2	25.7	18.5	0.0	21.2	14.9	14.9
LnGrp LOS	C	B	B	C	B	B	C	B		C	B	B
Approach Vol, veh/h		406			209			21			193	
Approach Delay, s/veh		16.3			16.2			20.2			20.3	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	15.9	10.8	15.2	11.0	11.5	6.6	19.3
Change Period (Y+Rc), s	6.3	5.3	5.6	4.6	6.3	5.3	5.6	4.6
Max Green Setting (Gmax), s	25.0	40.0	35.0	60.0	35.0	40.0	25.0	60.0
Max Q Clear Time (g_c+I1), s	2.1	2.3	4.4	3.8	4.2	2.2	2.2	4.3
Green Ext Time (p_c), s	0.0	0.3	1.2	3.3	1.1	0.3	0.0	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	53	6	4	6	15	16	34	102	7	12	136	129
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	58	7	4	7	16	17	37	111	8	13	148	140
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	201	928	404	32	755	327	143	915	398	57	827	359
Arrive On Green	0.06	0.26	0.26	0.01	0.22	0.22	0.04	0.26	0.26	0.02	0.24	0.24
Sat Flow, veh/h	3408	3505	1525	3408	3505	1520	3408	3505	1525	3408	3505	1522
Grp Volume(v), veh/h	58	7	4	7	16	17	37	111	8	13	148	140
Grp Sat Flow(s),veh/h/ln	1704	1752	1525	1704	1752	1520	1704	1752	1525	1704	1752	1522
Q Serve(g_s), s	0.7	0.1	0.1	0.1	0.1	0.4	0.4	1.0	0.2	0.2	1.4	3.2
Cycle Q Clear(g_c), s	0.7	0.1	0.1	0.1	0.1	0.4	0.4	1.0	0.2	0.2	1.4	3.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	201	928	404	32	755	327	143	915	398	57	827	359
V/C Ratio(X)	0.29	0.01	0.01	0.22	0.02	0.05	0.26	0.12	0.02	0.23	0.18	0.39
Avail Cap(c_a), veh/h	3318	3412	1485	3318	3412	1480	5807	5972	2598	2074	5972	2594
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.5	11.1	11.1	20.2	12.7	12.8	19.1	11.6	11.3	19.9	12.5	13.2
Incr Delay (d2), s/veh	0.3	0.0	0.0	1.3	0.0	0.0	0.4	0.0	0.0	0.7	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.0	0.1	0.2	0.2	0.5	0.1	0.1	0.7	1.4
LnGrp Delay(d),s/veh	18.8	11.1	11.1	21.5	12.7	12.8	19.4	11.6	11.3	20.7	12.6	13.5
LnGrp LOS	B	B	B	C	B	B	B	B	B	C	B	B
Approach Vol, veh/h		69			40			156			301	
Approach Delay, s/veh		17.6			14.3			13.4			13.3	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.3	14.3	7.0	13.4	5.3	15.3	5.0	15.5
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	70.0	70.0	40.0	40.0	25.0	70.0	40.0	40.0
Max Q Clear Time (g_c+I1), s	2.4	5.2	2.7	2.4	2.2	3.0	2.1	2.1
Green Ext Time (p_c), s	0.1	1.3	0.1	0.1	0.0	1.3	0.0	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	13.9
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	185	0	746	57	510	69	478	262	0
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1845	0	1845	1845	1845	1845	1845	1845	1845	1845	0
Adj Flow Rate, veh/h	0	0	0	226	0	486	70	622	13	583	320	0
Adj No. of Lanes	0	1	0	1	0	2	1	2	1	2	1	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	0	3	0	3	3	3	3	3	3	3	3	0
Cap, veh/h	0	2	0	268	0	1203	91	1532	685	686	1082	0
Arrive On Green	0.00	0.00	0.00	0.15	0.00	0.19	0.05	0.44	0.44	0.20	0.59	0.00
Sat Flow, veh/h	0	-33012	0	1757	0	3067	1757	3505	1567	3408	1845	0
Grp Volume(v), veh/h	0	0	0	226	0	486	70	622	13	583	320	0
Grp Sat Flow(s),veh/h/ln	0	1845	0	1757	0	1533	1757	1752	1567	1704	1845	0
Q Serve(g_s), s	0.0	0.0	0.0	10.5	0.0	9.7	3.3	10.2	0.4	13.8	7.3	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	10.5	0.0	9.7	3.3	10.2	0.4	13.8	7.3	0.0
Prop In Lane	0.00		0.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	0	2	0	268	0	1203	91	1532	685	686	1082	0
V/C Ratio(X)	0.00	0.00	0.00	0.84	0.00	0.40	0.77	0.41	0.02	0.85	0.30	0.00
Avail Cap(c_a), veh/h	0	748	0	524	0	2095	838	2927	1309	2440	1552	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	34.5	0.0	18.7	39.2	16.2	13.4	32.2	8.7	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.8	0.0	0.1	5.0	0.1	0.0	1.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	5.3	0.0	4.1	1.7	4.9	0.2	6.6	3.7	0.0
LnGrp Delay(d),s/veh	0.0	0.0	0.0	37.3	0.0	18.8	44.2	16.2	13.4	33.4	8.7	0.0
LnGrp LOS				D		B	D	B	B	C	A	
Approach Vol, veh/h		0			712			705			903	
Approach Delay, s/veh		0.0			24.6			18.9			24.7	
Approach LOS					C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s		20.2	21.5	42.1	17.4	2.8	8.9	54.7
Change Period (Y+Rc), s		4.6	4.6	5.5	4.6	* 4.6	4.6	* 5.5
Max Green Setting (Gmax), s		40.0	60.0	70.0	25.0	* 34	40.0	* 71
Max Q Clear Time (g_c+I1), s		11.7	15.8	12.2	12.5	0.0	5.3	9.3
Green Ext Time (p_c), s		3.9	1.1	24.4	0.4	0.0	0.1	25.0

Intersection Summary		
HCM 2010 Ctrl Delay		22.9
HCM 2010 LOS		C

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	481	237	37	57	117	52	54	240	172	89	206	327
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	523	258	14	62	127	5	59	261	22	97	224	167
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	659	1160	506	171	658	285	167	837	364	208	879	686
Arrive On Green	0.19	0.33	0.33	0.05	0.19	0.19	0.05	0.24	0.24	0.06	0.25	0.25
Sat Flow, veh/h	3408	3505	1530	3408	3505	1516	3408	3505	1523	3408	3505	1524
Grp Volume(v), veh/h	523	258	14	62	127	5	59	261	22	97	224	167
Grp Sat Flow(s),veh/h/ln	1704	1752	1530	1704	1752	1516	1704	1752	1523	1704	1752	1524
Q Serve(g_s), s	10.1	3.7	0.4	1.2	2.1	0.2	1.2	4.2	0.8	1.9	3.5	4.7
Cycle Q Clear(g_c), s	10.1	3.7	0.4	1.2	2.1	0.2	1.2	4.2	0.8	1.9	3.5	4.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	659	1160	506	171	658	285	167	837	364	208	879	686
V/C Ratio(X)	0.79	0.22	0.03	0.36	0.19	0.02	0.35	0.31	0.06	0.47	0.25	0.24
Avail Cap(c_a), veh/h	1230	2023	883	1230	2023	875	1230	3541	1538	1230	3541	1843
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	16.7	15.7	31.8	23.7	22.9	31.9	21.7	20.4	31.4	20.8	12.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.5	0.1	0.0	0.5	0.1	0.0	0.6	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	1.8	0.2	0.6	1.0	0.1	0.6	2.0	0.3	0.9	1.7	2.0
LnGrp Delay(d),s/veh	27.5	16.8	15.7	32.3	23.8	22.9	32.4	21.8	20.4	32.0	20.8	12.1
LnGrp LOS	C	B	B	C	C	C	C	C	C	C	C	B
Approach Vol, veh/h		795			194			342			488	
Approach Delay, s/veh		23.8			26.5			23.5			20.1	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	22.7	19.0	17.9	10.5	21.8	9.1	27.8
Change Period (Y+Rc), s	6.3	5.3	5.6	4.9	6.3	5.3	5.6	4.9
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	3.2	6.7	12.1	4.1	3.9	6.2	3.2	5.7
Green Ext Time (p_c), s	0.2	6.9	1.3	3.3	0.5	6.9	0.3	3.2

Intersection Summary		
HCM 2010 Ctrl Delay		23.0
HCM 2010 LOS		C

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	42	3	0	105	75	0	0	0	96	0	83
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	255	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	5	0	0	6	0	0	0	0	1	0	4
Mvmt Flow	0	43	3	0	108	77	0	0	0	99	0	86

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	108	0	-	43	0	0	151	151	108
Stage 1	-	-	-	-	-	-	108	108	-
Stage 2	-	-	-	-	-	-	43	43	-
Critical Hdwy	4.1	-	-	4.1	-	-	6.41	6.5	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	5.41	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.41	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.509	4	3.336
Pot Cap-1 Maneuver	1495	-	0	1579	-	0	843	744	940
Stage 1	-	-	0	-	-	0	919	810	-
Stage 2	-	-	0	-	-	0	982	863	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1495	-	-	1579	-	-	843	0	940
Mov Cap-2 Maneuver	-	-	-	-	-	-	843	0	-
Stage 1	-	-	-	-	-	-	919	0	-
Stage 2	-	-	-	-	-	-	982	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	1495	-	1579	-	843	940
HCM Lane V/C Ratio	-	-	-	-	0.117	0.091
HCM Control Delay (s)	0	-	0	-	9.8	9.2
HCM Lane LOS	A	-	A	-	A	A
HCM 95th %tile Q(veh)	0	-	0	-	0.4	0.3

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	121	17	0	148	396	32	0	32	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	285	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	0	2	12	0	2	2	13	0	9	0	0	0
Mvmt Flow	0	155	22	0	190	508	41	0	41	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	190	0	-	155	0	0	345	345	155
Stage 1	-	-	-	-	-	-	155	155	-
Stage 2	-	-	-	-	-	-	190	190	-
Critical Hdwy	4.1	-	-	4.1	-	-	6.53	6.5	6.29
Critical Hdwy Stg 1	-	-	-	-	-	-	5.53	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.53	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.617	4	3.381
Pot Cap-1 Maneuver	1396	-	0	1438	-	0	630	581	873
Stage 1	-	-	0	-	-	0	847	773	-
Stage 2	-	-	0	-	-	0	817	747	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1396	-	-	1438	-	-	630	0	873
Mov Cap-2 Maneuver	-	-	-	-	-	-	630	0	-
Stage 1	-	-	-	-	-	-	847	0	-
Stage 2	-	-	-	-	-	-	817	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBL	WBT
Capacity (veh/h)	630	873	1396	-	1438	-
HCM Lane V/C Ratio	0.065	0.047	-	-	-	-
HCM Control Delay (s)	11.1	9.3	0	-	0	-
HCM Lane LOS	B	A	A	-	A	-
HCM 95th %tile Q(veh)	0.2	0.1	0	-	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	261	171	253	174	129	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6	4.6	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1531	1752	3505	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1531	1752	3505	1845	1568
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	307	201	298	205	152	195
RTOR Reduction (vph)	0	149	0	0	0	160
Lane Group Flow (vph)	307	52	298	205	152	35
Confl. Peds. (#/hr)		2				
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	6		7 5	5 7 8	8	
Permitted Phases		6				8
Actuated Green, G (s)	20.8	20.8	27.6	47.7	14.5	14.5
Effective Green, g (s)	20.8	20.8	23.0	42.1	14.5	14.5
Actuated g/C Ratio	0.26	0.26	0.29	0.53	0.18	0.18
Clearance Time (s)	5.6	5.6			5.7	5.7
Vehicle Extension (s)	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	456	399	504	1849	335	284
v/s Ratio Prot	c0.18		c0.17	0.06	c0.08	
v/s Ratio Perm		0.03				0.02
v/c Ratio	0.67	0.13	0.59	0.11	0.45	0.12
Uniform Delay, d1	26.5	22.6	24.4	9.5	29.1	27.3
Progression Factor	1.00	1.00	1.10	1.19	1.00	1.00
Incremental Delay, d2	3.1	0.1	1.1	0.0	0.4	0.1
Delay (s)	29.5	22.6	27.9	11.2	29.5	27.4
Level of Service	C	C	C	B	C	C
Approach Delay (s)	26.8			21.1	28.3	
Approach LOS	C			C	C	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	22.9
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations							
Volume (vph)	14	405	48	49	1	273	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	5.7			5.6	4.6
Lane Util. Factor	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00	1.00
Frt	1.00	0.85	0.93			1.00	1.00
Flt Protected	0.95	1.00	1.00			0.95	1.00
Satd. Flow (prot)	1752	1547	1719			1752	1845
Flt Permitted	0.95	1.00	1.00			0.95	1.00
Satd. Flow (perm)	1752	1547	1719			1752	1845
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	17	494	59	60	1	333	17
RTOR Reduction (vph)	0	428	32	0	0	0	0
Lane Group Flow (vph)	17	66	87	0	0	334	17
Confl. Peds. (#/hr)		2					
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	Perm	NA		Prot	Prot	NA
Protected Phases	2		4		3 1	3 1	1 3 4
Permitted Phases		2					
Actuated Green, G (s)	10.6	10.6	14.0			36.9	56.5
Effective Green, g (s)	10.6	10.6	14.0			32.3	50.9
Actuated g/C Ratio	0.13	0.13	0.18			0.40	0.64
Clearance Time (s)	7.0	7.0	5.7				
Vehicle Extension (s)	2.0	2.0	2.0				
Lane Grp Cap (vph)	232	205	301			709	1176
v/s Ratio Prot	0.01		c0.05			c0.19	0.01
v/s Ratio Perm		c0.04					
v/c Ratio	0.07	0.32	0.29			0.47	0.01
Uniform Delay, d1	30.3	31.3	28.6			17.5	5.3
Progression Factor	1.00	1.00	1.00			1.63	1.02
Incremental Delay, d2	0.0	0.3	0.2			0.2	0.0
Delay (s)	30.3	31.7	28.8			28.6	5.4
Level of Service	C	C	C			C	A
Approach Delay (s)	31.6		28.8				27.5
Approach LOS	C		C				C

Intersection Summary			
HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	22.9
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	194	6	232	2	5	1	121	111	2	6	214	129
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1845	1900	1900	1845	1900	1900	1845	1845
Adj Flow Rate, veh/h	231	7	225	2	6	0	144	132	2	7	255	43
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	1
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	357	21	288	186	523	0	321	272	4	56	815	700
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.00	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	704	52	714	309	1298	0	551	609	8	12	1826	1568
Grp Volume(v), veh/h	463	0	0	8	0	0	278	0	0	262	0	43
Grp Sat Flow(s),veh/h/ln	1469	0	0	1607	0	0	1168	0	0	1839	0	1568
Q Serve(g_s), s	19.0	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	0.0	0.0	1.1
Cycle Q Clear(g_c), s	20.0	0.0	0.0	0.2	0.0	0.0	15.8	0.0	0.0	6.7	0.0	1.1
Prop In Lane	0.50		0.49	0.25		0.00	0.52		0.01	0.03		1.00
Lane Grp Cap(c), veh/h	666	0	0	709	0	0	596	0	0	871	0	700
V/C Ratio(X)	0.70	0.00	0.00	0.01	0.00	0.00	0.47	0.00	0.00	0.30	0.00	0.06
Avail Cap(c_a), veh/h	977	0	0	939	0	0	823	0	0	931	0	751
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	0.0	0.0	13.1	0.0	0.0	16.4	0.0	0.0	13.0	0.0	11.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	0.0	0.0	0.1	0.0	0.0	4.5	0.0	0.0	3.5	0.0	0.5
LnGrp Delay(d),s/veh	19.4	0.0	0.0	13.1	0.0	0.0	17.4	0.0	0.0	13.4	0.0	11.6
LnGrp LOS	B			B			B			B		B
Approach Vol, veh/h		463			8			278			305	
Approach Delay, s/veh		19.4			13.1			17.4			13.1	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		38.1		34.9		38.1		34.9
Change Period (Y+Rc), s		5.5		5.5		5.5		5.5
Max Green Setting (Gmax), s		35.0		40.0		45.0		45.0
Max Q Clear Time (g_c+I1), s		8.7		2.2		17.8		22.0
Green Ext Time (p_c), s		14.5		9.2		14.8		7.4

Intersection Summary		
HCM 2010 Ctrl Delay		17.0
HCM 2010 LOS		B

Intersection	
Int Delay, s/veh	10

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	55	154	45	42	387	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	1	4	10	1	2
Mvmt Flow	61	171	50	47	430	46

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	979	73	0	0	97	0
Stage 1	73	-	-	-	-	-
Stage 2	906	-	-	-	-	-
Critical Hdwy	6.4	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	280	992	-	-	1503	-
Stage 1	955	-	-	-	-	-
Stage 2	398	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	198	992	-	-	1503	-
Mov Cap-2 Maneuver	198	-	-	-	-	-
Stage 1	955	-	-	-	-	-
Stage 2	281	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.2	0	7.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	483	1503	-
HCM Lane V/C Ratio	-	-	0.481	0.286	-
HCM Control Delay (s)	-	-	19.2	8.4	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	2.6	1.2	-

69: Kammerer Rd & Lent Ranch Pkwy Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	2.5	0.1	0.0	0.0		0.1
Total Delay (hr)	0.0	0.1	0.1	0.0	0.0	0.2
Total Del/Veh (s)	3.7	4.1	4.7	1.1		4.3
Stop Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	3.6	2.4	2.9	0.2		2.6
Total Stops	1	12	7	0	0	20
Stop/Veh	1.00	0.10	0.12	0.00		0.11
Travel Dist (mi)	0.2	32.6	19.8	0.2	0.1	52.9
Travel Time (hr)	0.0	0.7	0.5	0.0	0.0	1.3
Avg Speed (mph)	37	44	38	40	22	42
Fuel Used (gal)	0.0	0.7	0.4	0.0	0.0	1.1
Fuel Eff. (mpg)	85.5	49.7	47.1	78.1	91.0	48.9
HC Emissions (g)	0	30	13	0	0	43
CO Emissions (g)	2	853	322	3	0	1180
NOx Emissions (g)	0	95	47	0	0	143
Vehicles Entered	1	115	55	1	0	172
Vehicles Exited	1	115	54	1	0	171
Hourly Exit Rate	4	460	216	4	0	684
Input Volume	2	469	224	1	2	698
% of Volume	200	98	96	400	0	98
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0
Density (ft/veh)						3558
Occupancy (veh)	0	3	2	0	0	5

70: Kammerer Rd & Promenade Pkwy Performance by movement

Movement	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)		0.0		0.0	0.0		4.5	0.6	0.1		0.2
Total Delay (hr)	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.5	0.0	0.0	0.8
Total Del/Veh (s)		4.1		4.3	4.1		5.5	39.4	28.5		9.9
Stop Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.6
Stop Del/Veh (s)		1.7		1.4	0.2		5.8	36.0	25.1		6.9
Total Stops	0	19	0	7	0	0	5	38	1	0	70
Stop/Veh		0.16		0.12	0.00		1.00	0.79	1.00		0.23
Travel Dist (mi)	0.2	40.6	0.0	8.2	10.3	0.0	0.5	5.7	0.1	0.1	65.6
Travel Time (hr)	0.0	1.0	0.0	0.3	0.4	0.0	0.0	0.7	0.0	0.0	2.5
Avg Speed (mph)	18	39	6	31	25	4	19	8	10	28	27
Fuel Used (gal)	0.0	0.9	0.0	0.2	0.2	0.0	0.0	0.1	0.0	0.0	1.4
Fuel Eff. (mpg)	83.4	45.0	50.4	38.7	51.6	73.0	90.0	44.8	110.1	107.7	45.3
HC Emissions (g)	0	31	0	9	11	0	0	7	0	0	58
CO Emissions (g)	1	717	1	367	372	0	3	212	1	0	1673
NOx Emissions (g)	0	107	0	29	30	0	0	18	0	0	184
Vehicles Entered	0	115	0	55	72	0	5	44	1	0	292
Vehicles Exited	0	115	0	55	72	0	5	45	1	0	293
Hourly Exit Rate	0	460	0	220	288	0	20	180	4	0	1172
Input Volume	2	469	1	224	313	2	20	164	2	1	1198
% of Volume	0	98	0	98	92	0	100	110	200	0	98
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)											2303
Occupancy (veh)	0	4	0	1	2	0	0	3	0	0	10

71: Kammerer Rd/Grant Line Rd & SR 99 SB Ramps Performance by movement

Movement	EBT	EBR	WBT	WBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.1	1.8	0.1
Total Delay (hr)	0.3	0.0	0.3	0.2	0.2	0.0	0.0	1.1
Total Del/Veh (s)	7.9	3.0	9.3	6.2	10.6	9.2	4.8	7.7
Stop Delay (hr)	0.1	0.0	0.1	0.0	0.2	0.0	0.0	0.5
Stop Del/Veh (s)	3.6	1.8	3.8	0.1	8.2	5.7	3.9	3.4
Total Stops	43	21	41	0	47	0	11	163
Stop/Veh	0.35	0.49	0.35	0.00	0.61	0.00	0.69	0.33
Travel Dist (mi)	19.1	6.7	20.0	18.9	25.8	0.3	5.6	96.3
Travel Time (hr)	0.8	0.3	0.8	0.8	1.0	0.0	0.2	3.8
Avg Speed (mph)	25	25	25	24	25	27	28	25
Fuel Used (gal)	0.5	0.1	0.4	0.3	0.6	0.0	0.1	2.0
Fuel Eff. (mpg)	42.4	53.5	45.1	61.4	46.5	71.1	44.9	47.9
HC Emissions (g)	23	6	21	17	16	0	3	86
CO Emissions (g)	748	198	773	541	324	2	73	2659
NOx Emissions (g)	67	17	63	48	47	0	9	251
Vehicles Entered	123	42	113	110	72	1	16	477
Vehicles Exited	122	42	112	110	73	1	16	476
Hourly Exit Rate	488	168	448	440	292	4	64	1904
Input Volume	493	161	471	453	294	3	68	1943
% of Volume	99	104	95	97	99	133	94	98
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0
Density (ft/veh)								819
Occupancy (veh)	3	1	3	3	4	0	1	15

72: SR 99 NB Ramps & Grant Line Rd Performance by movement

Movement	EBT	EBR	WBT	WBR	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.3		0.5	0.1
Total Delay (hr)	0.5	0.0	0.6	0.1	0.2	0.0	0.4	1.8
Total Del/Veh (s)	9.9	3.6	11.3	5.7	17.9		8.5	10.0
Stop Delay (hr)	0.2	0.0	0.2	0.0	0.2	0.0	0.2	0.9
Stop Del/Veh (s)	4.9	0.3	3.9	1.3	15.1		5.6	5.1
Total Stops	57	0	51	15	29	0	99	251
Stop/Veh	0.32	0.00	0.28	0.29	0.63		0.66	0.40
Travel Dist (mi)	31.2	3.5	28.9	8.1	17.7	0.1	58.5	147.9
Travel Time (hr)	1.3	0.1	1.3	0.4	0.8	0.0	2.2	6.1
Avg Speed (mph)	24	26	22	22	23	20	27	24
Fuel Used (gal)	0.9	0.1	0.8	0.2	0.3	0.0	1.1	3.3
Fuel Eff. (mpg)	36.5	47.3	36.8	46.5	55.5	70.4	53.6	44.9
HC Emissions (g)	43	4	38	10	9	0	32	137
CO Emissions (g)	1506	148	1324	358	190	0	668	4195
NOx Emissions (g)	124	12	115	30	28	0	95	403
Vehicles Entered	175	20	181	51	43	0	141	611
Vehicles Exited	176	20	180	50	42	0	142	610
Hourly Exit Rate	704	80	720	200	168	0	568	2440
Input Volume	709	78	744	200	180	2	565	2478
% of Volume	99	103	97	100	93	0	101	98
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0
Density (ft/veh)								646
Occupancy (veh)	5	1	5	1	3	0	9	24

73: Survey Rd/E Stockton Blvd & Grant Line Rd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	3.0	2.6	2.5	3.1	0.3	3.9	3.7	0.6
Total Delay (hr)	0.0	0.9	1.0	0.0	0.1	0.1	1.8	0.4	0.2	0.1	0.0	0.2
Total Del/Veh (s)	37.9	42.2	16.4	3.9	42.9	49.0	37.0	33.8	38.2	37.7	12.1	40.6
Stop Delay (hr)	0.0	0.8	0.7	0.0	0.1	0.1	1.1	0.3	0.2	0.1	0.0	0.2
Stop Del/Veh (s)	35.1	37.8	11.0	2.6	40.9	45.6	22.1	22.7	35.2	33.8	11.0	37.0
Total Stops	2	61	95	16	5	10	120	37	18	7	4	16
Stop/Veh	0.67	0.82	0.43	0.46	0.83	0.91	0.69	0.79	0.82	0.78	0.80	0.84
Travel Dist (mi)	0.4	11.1	33.3	5.3	1.0	1.9	29.3	7.7	2.5	1.0	0.5	3.3
Travel Time (hr)	0.0	1.3	1.9	0.2	0.1	0.2	2.5	0.7	0.3	0.1	0.0	0.3
Avg Speed (mph)	9	9	17	24	10	9	13	12	8	8	14	11
Fuel Used (gal)	0.0	0.3	0.9	0.1	0.0	0.0	0.5	0.1	0.1	0.0	0.0	0.1
Fuel Eff. (mpg)	36.9	41.4	36.5	43.0	47.6	59.5	56.4	58.6	48.7	52.2	54.8	55.5
HC Emissions (g)	0	13	46	6	1	1	24	7	2	1	1	2
CO Emissions (g)	15	450	1572	258	33	60	776	170	56	21	20	69
NOx Emissions (g)	1	34	131	18	2	4	62	15	6	2	3	5
Vehicles Entered	3	70	211	34	5	11	166	44	21	9	5	18
Vehicles Exited	3	69	212	34	5	10	164	43	21	8	5	18
Hourly Exit Rate	12	276	848	136	20	40	656	172	84	32	20	72
Input Volume	9	278	856	131	22	40	672	180	89	37	16	71
% of Volume	133	99	99	104	91	100	98	96	94	86	125	101
Denied Entry Before	0	0	0	0	0	0	1	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	1	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	5	8	1	0	1	9	3	1	1	0	1

73: Survey Rd/E Stockton Blvd & Grant Line Rd Performance by movement

Movement	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.2
Denied Del/Veh (s)	0.5	3.7	1.3
Total Delay (hr)	0.1	0.2	5.2
Total Del/Veh (s)	42.0	14.5	27.7
Stop Delay (hr)	0.1	0.2	3.8
Stop Del/Veh (s)	35.3	12.2	20.2
Total Stops	6	39	436
Stop/Veh	0.86	0.85	0.64
Travel Dist (mi)	1.3	8.2	106.7
Travel Time (hr)	0.1	0.5	8.3
Avg Speed (mph)	11	18	13
Fuel Used (gal)	0.0	0.1	2.3
Fuel Eff. (mpg)	34.0	56.1	45.6
HC Emissions (g)	2	6	112
CO Emissions (g)	44	199	3743
NOx Emissions (g)	5	16	303
Vehicles Entered	7	45	649
Vehicles Exited	7	44	643
Hourly Exit Rate	28	176	2572
Input Volume	26	173	2600
% of Volume	108	102	99
Denied Entry Before	0	0	1
Denied Entry After	0	0	1
Density (ft/veh)			387
Occupancy (veh)	0	2	32

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	173	734	1	1	626	6	1	1	0	7	0	242
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1743	1807	1900	1900	1810	1624	1900	1900	1900	1900	1473	1712
Adj Flow Rate, veh/h	182	773	1	1	659	2	1	1	0	7	0	21
Adj No. of Lanes	2	2	0	1	2	1	0	1	0	0	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	9	5	5	0	5	17	0	0	0	0	0	11
Cap, veh/h	441	1617	2	4	1117	448	4	4	0	64	0	117
Arrive On Green	0.14	0.46	0.46	0.00	0.32	0.32	0.00	0.00	0.00	0.05	0.00	0.05
Sat Flow, veh/h	3221	3519	5	1810	3438	1380	927	927	0	1403	0	2561
Grp Volume(v), veh/h	182	377	397	1	659	2	2	0	0	7	0	21
Grp Sat Flow(s),veh/h/ln	1610	1717	1807	1810	1719	1380	1854	0	0	1403	0	1280
Q Serve(g_s), s	2.4	7.0	7.0	0.0	7.4	0.0	0.0	0.0	0.0	0.2	0.0	0.4
Cycle Q Clear(g_c), s	2.4	7.0	7.0	0.0	7.4	0.0	0.0	0.0	0.0	0.2	0.0	0.4
Prop In Lane	1.00		0.00	1.00		1.00	0.50		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	441	789	830	4	1117	448	7	0	0	64	0	117
V/C Ratio(X)	0.41	0.48	0.48	0.26	0.59	0.00	0.28	0.00	0.00	0.11	0.00	0.18
Avail Cap(c_a), veh/h	1742	2229	2345	979	4462	1792	1002	0	0	759	0	1385
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.3	8.6	8.6	23.0	13.0	10.6	23.0	0.0	0.0	21.2	0.0	21.2
Incr Delay (d2), s/veh	0.2	0.2	0.2	12.2	0.2	0.0	7.7	0.0	0.0	0.3	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	3.3	3.5	0.0	3.5	0.0	0.0	0.0	0.0	0.1	0.0	0.1
LnGrp Delay(d),s/veh	18.5	8.8	8.8	35.2	13.2	10.6	30.7	0.0	0.0	21.4	0.0	21.5
LnGrp LOS	B	A	A	D	B	B	C			C		C
Approach Vol, veh/h		956			662			2			28	
Approach Delay, s/veh		10.7			13.2			30.7			21.5	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.9	21.0		6.2	4.7	27.2		8.1
Change Period (Y+Rc), s	4.6	6.0		6.0	4.6	6.0		6.0
Max Green Setting (Gmax), s	25.0	60.0		25.0	25.0	60.0		25.0
Max Q Clear Time (g_c+I1), s	4.4	9.4		2.0	2.0	9.0		2.4
Green Ext Time (p_c), s	0.3	5.6		0.0	0.0	5.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	11.9
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	28	713	526	32	36	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	0	6	9	3	1
Mvmt Flow	30	775	572	35	39	103

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	572	0	-	0	1408	572
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	836	-
Critical Hdwy	4.16	-	-	-	6.43	6.21
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.254	-	-	-	3.527	3.309
Pot Cap-1 Maneuver	981	-	-	-	152	522
Stage 1	-	-	-	-	563	-
Stage 2	-	-	-	-	424	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	981	-	-	-	144	522
Mov Cap-2 Maneuver	-	-	-	-	144	-
Stage 1	-	-	-	-	563	-
Stage 2	-	-	-	-	401	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	27
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	981	-	-	-	303
HCM Lane V/C Ratio	0.031	-	-	-	0.47
HCM Control Delay (s)	8.8	0	-	-	27
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	2.4

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	274	475	287	3	2	232
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	3	10	8	0	0	7
Mvmt Flow	295	511	309	3	2	249

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	312	0	-	0	1410	310
Stage 1	-	-	-	-	310	-
Stage 2	-	-	-	-	1100	-
Critical Hdwy	4.13	-	-	-	6.4	6.27
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.363
Pot Cap-1 Maneuver	1243	-	-	-	154	719
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	322	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1243	-	-	-	103	719
Mov Cap-2 Maneuver	-	-	-	-	103	-
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	215	-

Approach	EB	WB	SB
HCM Control Delay, s	3.2	0	13.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1243	-	-	-	684
HCM Lane V/C Ratio	0.237	-	-	-	0.368
HCM Control Delay (s)	8.8	0	-	-	13.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.9	-	-	-	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	500	921	273	420	801	112	404	645	163	271	947	314
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	510	940	169	429	817	66	412	658	57	277	966	184
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	417	1138	498	417	1138	496	417	1244	545	309	1134	497
Arrive On Green	0.12	0.32	0.32	0.12	0.32	0.32	0.12	0.35	0.35	0.09	0.32	0.32
Sat Flow, veh/h	3408	3505	1532	3408	3505	1526	3408	3505	1536	3408	3505	1536
Grp Volume(v), veh/h	510	940	169	429	817	66	412	658	57	277	966	184
Grp Sat Flow(s),veh/h/ln	1704	1752	1532	1704	1752	1526	1704	1752	1536	1704	1752	1536
Q Serve(g_s), s	25.0	50.6	17.1	25.0	42.0	6.2	24.7	30.5	5.1	16.4	52.6	18.8
Cycle Q Clear(g_c), s	25.0	50.6	17.1	25.0	42.0	6.2	24.7	30.5	5.1	16.4	52.6	18.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	417	1138	498	417	1138	496	417	1244	545	309	1134	497
V/C Ratio(X)	1.22	0.83	0.34	1.03	0.72	0.13	0.99	0.53	0.10	0.90	0.85	0.37
Avail Cap(c_a), veh/h	417	1200	525	417	1200	522	417	1244	545	417	1200	526
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	89.7	63.7	52.4	89.7	60.8	48.7	89.6	52.4	44.2	92.0	64.6	53.1
Incr Delay (d2), s/veh	120.4	5.0	0.6	51.8	2.2	0.2	40.8	0.8	0.2	14.6	6.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.7	25.3	7.3	14.7	20.7	2.7	14.0	14.9	2.2	8.4	26.5	8.1
LnGrp Delay(d),s/veh	210.1	68.6	53.0	141.5	63.0	48.9	130.4	53.1	44.3	106.5	71.1	54.1
LnGrp LOS	F	E	D	F	E	D	F	D	D	F	E	D
Approach Vol, veh/h		1619			1312			1127			1427	
Approach Delay, s/veh		111.6			88.0			80.9			75.8	
Approach LOS		F			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.5	71.5	30.5	71.9	24.1	78.0	30.5	71.9
Change Period (Y+Rc), s	5.5	* 5.4	5.5	5.5	5.5	* 5.4	5.5	5.5
Max Green Setting (Gmax), s	25.0	* 70	25.0	70.0	25.0	* 70	25.0	70.0
Max Q Clear Time (g_c+I1), s	26.7	54.6	27.0	44.0	18.4	32.5	27.0	52.6
Green Ext Time (p_c), s	0.0	11.5	0.0	19.0	0.1	27.1	0.0	13.8

Intersection Summary	
HCM 2010 Ctrl Delay	90.3
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	209	673	137	282	1058	38	92	175	84	40	147	119
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	225	724	51	303	1138	40	99	188	80	43	158	110
Adj No. of Lanes	1	2	1	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	259	1164	520	336	1298	46	126	276	118	54	185	129
Arrive On Green	0.15	0.33	0.33	0.19	0.38	0.38	0.07	0.22	0.22	0.03	0.18	0.18
Sat Flow, veh/h	1757	3505	1566	1757	3451	121	1757	1229	523	1757	1014	706
Grp Volume(v), veh/h	225	724	51	303	578	600	99	0	268	43	0	268
Grp Sat Flow(s),veh/h/ln	1757	1752	1566	1757	1752	1820	1757	0	1752	1757	0	1720
Q Serve(g_s), s	11.4	15.9	2.1	15.4	28.0	28.0	5.1	0.0	12.8	2.2	0.0	13.8
Cycle Q Clear(g_c), s	11.4	15.9	2.1	15.4	28.0	28.0	5.1	0.0	12.8	2.2	0.0	13.8
Prop In Lane	1.00		1.00	1.00		0.07	1.00		0.30	1.00		0.41
Lane Grp Cap(c), veh/h	259	1164	520	336	659	684	126	0	394	54	0	314
V/C Ratio(X)	0.87	0.62	0.10	0.90	0.88	0.88	0.78	0.00	0.68	0.80	0.00	0.85
Avail Cap(c_a), veh/h	481	2687	1200	481	1343	1395	500	0	768	481	0	753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.1	25.7	21.1	36.1	26.5	26.5	41.7	0.0	32.4	44.0	0.0	36.2
Incr Delay (d2), s/veh	3.5	0.2	0.0	12.3	1.5	1.5	4.0	0.0	0.8	9.4	0.0	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	7.7	0.9	8.6	13.8	14.3	2.6	0.0	6.3	1.2	0.0	6.8
LnGrp Delay(d),s/veh	41.5	25.9	21.1	48.3	28.0	28.0	45.6	0.0	33.2	53.4	0.0	38.8
LnGrp LOS	D	C	C	D	C	C	D		C	D		D
Approach Vol, veh/h		1000			1481			367			311	
Approach Delay, s/veh		29.2			32.2			36.5			40.8	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	39.4	12.1	21.8	22.0	35.4	8.2	25.7
Change Period (Y+Rc), s	4.5	* 5.1	5.5	* 5.2	4.5	5.1	* 5.4	* 5.2
Max Green Setting (Gmax), s	25.0	* 70	26.0	* 40	25.0	70.0	* 25	* 40
Max Q Clear Time (g_c+I1), s	13.4	30.0	7.1	15.8	17.4	17.9	4.2	14.8
Green Ext Time (p_c), s	0.1	4.3	0.1	0.9	0.1	4.3	0.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	32.6
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	152	452	27	45	515	63	47	296	53	197	504	612
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	155	461	9	46	526	15	48	302	46	201	514	314
Adj No. of Lanes	2	2	1	2	2	1	2	2	0	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	253	904	404	93	740	331	96	658	99	309	973	430
Arrive On Green	0.07	0.26	0.26	0.03	0.21	0.21	0.03	0.22	0.22	0.09	0.28	0.28
Sat Flow, veh/h	3408	3505	1568	3408	3505	1568	3408	3055	461	3408	3505	1548
Grp Volume(v), veh/h	155	461	9	46	526	15	48	172	176	201	514	314
Grp Sat Flow(s),veh/h/ln	1704	1752	1568	1704	1752	1568	1704	1752	1763	1704	1752	1548
Q Serve(g_s), s	2.5	6.3	0.2	0.7	7.8	0.4	0.8	4.8	4.9	3.2	6.9	10.3
Cycle Q Clear(g_c), s	2.5	6.3	0.2	0.7	7.8	0.4	0.8	4.8	4.9	3.2	6.9	10.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	253	904	404	93	740	331	96	377	379	309	973	430
V/C Ratio(X)	0.61	0.51	0.02	0.49	0.71	0.05	0.50	0.46	0.46	0.65	0.53	0.73
Avail Cap(c_a), veh/h	1528	4400	1968	1528	4400	1968	1528	2200	2214	1528	4400	1943
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	17.7	15.4	26.7	20.4	17.5	26.7	19.0	19.1	24.5	17.1	18.3
Incr Delay (d2), s/veh	0.9	0.2	0.0	1.5	0.5	0.0	1.5	0.3	0.3	0.9	0.2	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	3.0	0.1	0.4	3.8	0.2	0.4	2.3	2.4	1.5	3.4	4.4
LnGrp Delay(d),s/veh	25.9	17.8	15.4	28.2	20.9	17.5	28.2	19.4	19.4	25.4	17.2	19.2
LnGrp LOS	C	B	B	C	C	B	C	B	B	C	B	B
Approach Vol, veh/h		625			587			396			1029	
Approach Delay, s/veh		19.8			21.4			20.4			19.4	
Approach LOS		B			C			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	17.3	7.1	21.8	7.0	19.9	10.5	18.3
Change Period (Y+Rc), s	5.5	* 5.5	5.5	6.3	5.5	* 5.5	5.5	* 6.3
Max Green Setting (Gmax), s	25.0	* 70	25.0	70.0	25.0	* 70	25.0	* 70
Max Q Clear Time (g_c+I1), s	4.5	9.8	2.8	12.3	2.7	8.3	5.2	6.9
Green Ext Time (p_c), s	0.1	2.0	0.0	1.6	0.0	2.0	0.1	1.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.1
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	18.1
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	33	128	54	0	12	255	3	0	37	63	11
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	35	138	58	0	13	274	3	0	40	68	12
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	13.5	15.6	11.5
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	33%	15%	4%	4%
Vol Thru, %	57%	60%	94%	63%
Vol Right, %	10%	25%	1%	32%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	111	215	270	445
LT Vol	37	33	12	20
Through Vol	63	128	255	282
RT Vol	11	54	3	143
Lane Flow Rate	119	231	290	478
Geometry Grp	1	1	1	1
Degree of Util (X)	0.22	0.404	0.506	0.743
Departure Headway (Hd)	6.627	6.296	6.279	5.721
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	542	573	575	636
Service Time	4.661	4.317	4.299	3.721
HCM Lane V/C Ratio	0.22	0.403	0.504	0.752
HCM Control Delay	11.5	13.5	15.6	23.4
HCM Lane LOS	B	B	C	C
HCM 95th-tile Q	0.8	1.9	2.8	6.6

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	20	282	143
Peak Hour Factor	0.93	0.93	0.93	0.93
Heavy Vehicles, %	3	3	3	3
Mvmt Flow	0	22	303	154
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	23.4
HCM LOS	C

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	119	0	28	0	0	0	20	449	0	0	919	265
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	0	1863	0	1863	1900	0	0	1900	1900
Adj Flow Rate, veh/h	123	0	0	0	0	0	21	463	0	0	947	161
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	1
Peak Hour Factor	0.97	0.92	0.97	0.92	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97
Percent Heavy Veh, %	2	2	2	0	2	0	2	0	0	0	0	0
Cap, veh/h	163	0	0	0	4	0	28	1245	0	0	1050	893
Arrive On Green	0.09	0.00	0.00	0.00	0.00	0.00	0.02	0.66	0.00	0.00	0.55	0.55
Sat Flow, veh/h	1810	0	0	0	1863	0	1774	1900	0	0	1900	1615
Grp Volume(v), veh/h	123	0	0	0	0	0	21	463	0	0	947	161
Grp Sat Flow(s),veh/h/ln	1810	0	0	0	1863	0	1774	1900	0	0	1900	1615
Q Serve(g_s), s	2.8	0.0	0.0	0.0	0.0	0.0	0.5	4.6	0.0	0.0	18.5	2.1
Cycle Q Clear(g_c), s	2.8	0.0	0.0	0.0	0.0	0.0	0.5	4.6	0.0	0.0	18.5	2.1
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	163	0	0	0	4	0	28	1245	0	0	1050	893
V/C Ratio(X)	0.76	0.00	0.00	0.00	0.00	0.00	0.76	0.37	0.00	0.00	0.90	0.18
Avail Cap(c_a), veh/h	1742	0	0	0	897	0	1068	3201	0	0	3201	2721
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	18.5	0.0	0.0	0.0	0.0	0.0	20.4	3.3	0.0	0.0	8.3	4.6
Incr Delay (d2), s/veh	2.7	0.0	0.0	0.0	0.0	0.0	14.7	0.1	0.0	0.0	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.0	0.0	0.0	0.3	2.3	0.0	0.0	9.8	0.9
LnGrp Delay(d),s/veh	21.1	0.0	0.0	0.0	0.0	0.0	35.1	3.3	0.0	0.0	9.5	4.6
LnGrp LOS	C						D	A			A	A
Approach Vol, veh/h		123			0			484			1108	
Approach Delay, s/veh		21.1			0.0			4.7			8.8	
Approach LOS		C						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	4.2	28.1		0.0		32.3		9.2
Change Period (Y+Rc), s	* 3.6	5.1		3.5		5.1		5.5
Max Green Setting (Gmax), s	* 25	70.0		20.0		70.0		40.0
Max Q Clear Time (g_c+I1), s	2.5	20.5		0.0		6.6		4.8
Green Ext Time (p_c), s	0.0	2.5		0.0		2.5		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	8.5
HCM 2010 LOS	A

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	248	212	570	388	128	249	510	319	213	799	26
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	19	264	19	606	413	41	265	543	104	227	850	8
Adj No. of Lanes	2	2	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	67	334	146	582	1242	381	325	1636	721	286	1595	712
Arrive On Green	0.02	0.10	0.10	0.17	0.25	0.25	0.06	0.31	0.31	0.08	0.46	0.46
Sat Flow, veh/h	3408	3505	1537	3408	5036	1546	3408	3505	1545	3408	3505	1565
Grp Volume(v), veh/h	19	264	19	606	413	41	265	543	104	227	850	8
Grp Sat Flow(s),veh/h/ln	1704	1752	1537	1704	1679	1546	1704	1752	1545	1704	1752	1565
Q Serve(g_s), s	0.7	8.8	1.4	20.5	8.1	2.5	9.2	14.3	5.8	7.8	20.9	0.3
Cycle Q Clear(g_c), s	0.7	8.8	1.4	20.5	8.1	2.5	9.2	14.3	5.8	7.8	20.9	0.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	67	334	146	582	1242	381	325	1636	721	286	1595	712
V/C Ratio(X)	0.29	0.79	0.13	1.04	0.33	0.11	0.82	0.33	0.14	0.79	0.53	0.01
Avail Cap(c_a), veh/h	469	453	199	582	1242	381	469	1636	721	469	1595	712
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.84	0.84	0.84	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.0	53.1	49.7	49.8	37.1	35.0	55.1	26.9	24.0	54.0	23.5	17.9
Incr Delay (d2), s/veh	0.9	4.5	0.1	48.3	0.1	0.0	3.9	0.5	0.4	1.9	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	4.5	0.6	13.5	3.8	1.1	4.5	7.0	2.6	3.8	10.4	0.2
LnGrp Delay(d),s/veh	58.9	57.6	49.9	98.1	37.2	35.0	59.1	27.4	24.3	55.9	24.8	17.9
LnGrp LOS	E	E	D	F	D	D	E	C	C	E	C	B
Approach Vol, veh/h		302			1060			912			1085	
Approach Delay, s/veh		57.2			71.9			36.2			31.2	
Approach LOS		E			E			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.9	60.1	7.8	35.1	15.6	61.5	26.0	16.9
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	16.5	45.5	16.5	19.5	16.5	45.5	20.5	15.5
Max Q Clear Time (g_c+I1), s	11.2	22.9	2.7	10.1	9.8	16.3	22.5	10.8
Green Ext Time (p_c), s	0.2	6.7	0.0	2.2	0.2	7.1	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	47.8
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

7: Lewis Stien Rd/Jocelyn Way & Sheldon Rd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Denied Del/Veh (s)		3.2	0.4	2.9	0.0	0.0	0.0	0.0	3.2	3.1	0.9	0.5
Total Delay (hr)	0.0	0.0	1.3	0.1	0.0	1.6	0.8	0.0	0.3	1.0	0.2	0.3
Total Del/Veh (s)		41.8	29.2	10.7	84.4	60.6	9.3	5.3	43.8	46.1	42.8	12.6
Stop Delay (hr)	0.0	0.0	1.0	0.1	0.0	1.3	0.4	0.0	0.2	0.9	0.2	0.3
Stop Del/Veh (s)		39.8	22.3	8.3	74.3	51.4	4.8	1.1	39.6	40.8	36.8	10.3
Total Stops	0	3	104	28	1	81	69	4	17	68	12	73
Stop/Veh		0.75	0.63	0.64	1.00	0.86	0.21	0.27	0.81	0.85	0.80	0.81
Travel Dist (mi)	0.0	0.6	31.3	8.2	0.3	24.0	79.7	4.3	2.5	9.9	2.0	11.8
Travel Time (hr)	0.0	0.1	2.1	0.4	0.0	2.3	3.0	0.2	0.4	1.4	0.2	0.8
Avg Speed (mph)	10	9	15	21	10	10	27	28	7	7	8	16
Fuel Used (gal)	0.0	0.0	0.5	0.1	0.0	0.5	1.6	0.1	0.0	0.2	0.0	0.2
Fuel Eff. (mpg)	66.0	71.3	62.1	62.6	60.2	52.6	49.8	52.3	52.7	50.3	51.0	66.8
HC Emissions (g)	0	0	14	5	0	14	47	3	1	5	1	5
CO Emissions (g)	1	13	532	193	4	469	1685	85	54	204	44	206
NOx Emissions (g)	0	1	44	13	0	44	164	9	4	16	4	15
Vehicles Entered	0	3	162	43	1	85	320	15	18	72	14	87
Vehicles Exited	0	4	151	41	1	87	318	15	20	76	15	87
Hourly Exit Rate	0	16	604	164	4	348	1272	60	80	304	60	348
Input Volume	1	14	666	174	6	349	1326	65	83	302	55	348
% of Volume	0	114	91	94	67	100	96	92	96	101	109	100
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	0	9	2	0	9	12	1	1	5	1	3

7: Lewis Stien Rd/Jocelyn Way & Sheldon Rd Performance by movement

Movement	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.2
Denied Del/Veh (s)	3.9	0.5	3.4	0.7
Total Delay (hr)	0.3	0.2	0.0	6.2
Total Del/Veh (s)	46.7	53.4	9.9	25.0
Stop Delay (hr)	0.3	0.1	0.0	5.0
Stop Del/Veh (s)	43.9	48.6	9.0	19.9
Total Stops	18	10	4	492
Stop/Veh	0.82	0.91	0.80	0.55
Travel Dist (mi)	2.2	1.1	0.5	178.6
Travel Time (hr)	0.4	0.2	0.0	11.5
Avg Speed (mph)	6	6	15	16
Fuel Used (gal)	0.0	0.0	0.0	3.3
Fuel Eff. (mpg)	54.5	48.2	52.1	53.7
HC Emissions (g)	1	1	1	98
CO Emissions (g)	47	28	16	3581
NOx Emissions (g)	3	2	2	321
Vehicles Entered	20	10	5	855
Vehicles Exited	20	11	5	851
Hourly Exit Rate	80	44	20	3404
Input Volume	78	38	17	3522
% of Volume	103	116	118	97
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0
Density (ft/veh)				387
Occupancy (veh)	1	1	0	45

8: SR 99 SB Off/W Stockton Blvd & Sheldon Rd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)		0.7	0.1	0.8	0.0	0.0	0.0	0.5	0.2	0.7	3.9	0.4
Total Delay (hr)	0.0	0.2	2.1	0.1	1.3	1.2	0.0	1.4	0.1	0.4	0.3	0.2
Total Del/Veh (s)		48.0	27.7	8.0	51.2	13.6	4.8	42.6	41.9	13.7	46.4	52.0
Stop Delay (hr)	0.0	0.2	1.6	0.1	1.2	0.7	0.0	1.3	0.1	0.3	0.3	0.2
Stop Del/Veh (s)		44.1	20.8	4.8	46.1	8.0	1.8	38.8	39.6	12.3	43.5	47.7
Total Stops	0	11	151	26	70	107	9	89	5	78	22	10
Stop/Veh		0.85	0.55	0.60	0.78	0.33	0.32	0.76	0.71	0.76	0.81	0.83
Travel Dist (mi)	0.0	3.0	67.4	10.5	14.3	54.6	4.6	35.8	2.2	33.1	3.3	1.5
Travel Time (hr)	0.0	0.3	4.0	0.4	1.7	2.7	0.2	2.9	0.2	1.8	0.5	0.2
Avg Speed (mph)	14	11	17	24	8	20	23	13	13	19	7	7
Fuel Used (gal)	0.0	0.1	1.4	0.2	0.3	1.0	0.1	0.7	0.0	0.6	0.1	0.0
Fuel Eff. (mpg)	48.8	58.5	48.4	49.1	53.8	54.3	59.7	52.3	47.9	57.5	50.6	50.7
HC Emissions (g)	0	2	46	6	7	27	2	11	1	10	1	1
CO Emissions (g)	0	83	1807	278	265	937	71	256	15	229	48	27
NOx Emissions (g)	0	6	150	21	21	97	7	34	2	31	4	3
Vehicles Entered	0	12	268	41	82	316	27	102	6	95	24	11
Vehicles Exited	0	12	260	42	86	307	27	107	7	95	25	12
Hourly Exit Rate	0	48	1040	168	344	1228	108	428	28	380	100	48
Input Volume	1	50	1123	169	341	1307	109	411	25	377	97	45
% of Volume	0	96	93	99	101	94	99	104	112	101	103	107
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	1	16	2	7	11	1	11	1	7	2	1

8: SR 99 SB Off/W Stockton Blvd & Sheldon Rd Performance by movement

Movement	SBR	All
Denied Delay (hr)	0.0	0.1
Denied Del/Veh (s)	0.5	0.3
Total Delay (hr)	0.1	7.4
Total Del/Veh (s)	30.0	25.4
Stop Delay (hr)	0.1	5.9
Stop Del/Veh (s)	28.1	20.4
Total Stops	6	584
Stop/Veh	0.86	0.56
Travel Dist (mi)	0.9	231.2
Travel Time (hr)	0.1	14.9
Avg Speed (mph)	10	16
Fuel Used (gal)	0.0	4.4
Fuel Eff. (mpg)	65.8	52.3
HC Emissions (g)	1	116
CO Emissions (g)	19	4037
NOx Emissions (g)	2	379
Vehicles Entered	7	991
Vehicles Exited	7	987
Hourly Exit Rate	28	3948
Input Volume	28	4083
% of Volume	100	97
Denied Entry Before	0	0
Denied Entry After	0	0
Density (ft/veh)		383
Occupancy (veh)	0	59

9: SR 99 NB Off & Sheldon Rd Performance by movement

Movement	EBT	EBR	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.5	0.1
Total Delay (hr)	0.8	0.1	0.8	0.1	0.7	0.5	3.0
Total Del/Veh (s)	9.1	2.3	7.9	6.9	45.9	20.8	11.1
Stop Delay (hr)	0.4	0.0	0.4	0.1	0.7	0.5	2.0
Stop Del/Veh (s)	4.4	0.2	3.8	5.1	42.4	18.2	7.3
Total Stops	86	0	93	16	46	73	314
Stop/Veh	0.28	0.00	0.24	0.29	0.82	0.82	0.32
Travel Dist (mi)	53.2	14.0	58.1	8.7	13.8	23.7	171.5
Travel Time (hr)	2.3	0.6	2.4	0.4	1.1	1.3	8.1
Avg Speed (mph)	23	24	24	21	12	18	21
Fuel Used (gal)	1.2	0.2	1.3	0.2	0.2	0.4	3.5
Fuel Eff. (mpg)	44.9	61.1	46.1	53.0	55.9	55.6	48.8
HC Emissions (g)	41	9	38	6	5	9	109
CO Emissions (g)	1635	394	1504	249	159	253	4194
NOx Emissions (g)	137	28	135	19	16	26	362
Vehicles Entered	302	78	374	54	49	84	941
Vehicles Exited	304	79	373	54	52	85	947
Hourly Exit Rate	1216	316	1492	216	208	340	3788
Input Volume	1261	336	1558	230	199	334	3918
% of Volume	96	94	96	94	105	102	97
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							315
Occupancy (veh)	9	2	10	2	5	5	33

10: E Stockton Blvd & Sheldon Rd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.8	3.5	3.0
Total Delay (hr)	0.0	0.3	1.7	0.1	0.0	0.4	1.8	0.0	0.5	0.1	0.2	0.0
Total Del/Veh (s)	50.6	54.2	18.2	6.3	26.1	50.0	19.7	4.0	47.2	30.1	13.8	43.5
Stop Delay (hr)	0.0	0.3	1.1	0.0	0.0	0.4	1.2	0.0	0.5	0.1	0.2	0.0
Stop Del/Veh (s)	48.7	50.8	11.7	3.3	23.0	42.9	12.9	1.4	44.0	25.5	12.3	41.6
Total Stops	2	17	147	15	1	27	134	1	33	9	35	2
Stop/Veh	1.00	0.85	0.43	0.41	1.00	0.90	0.41	0.33	0.82	0.56	0.69	1.00
Travel Dist (mi)	0.3	2.8	49.7	5.3	0.2	7.5	87.2	0.7	4.0	1.6	5.4	0.2
Travel Time (hr)	0.0	0.4	3.1	0.3	0.0	0.6	4.1	0.0	0.7	0.2	0.4	0.0
Avg Speed (mph)	7	7	16	21	13	12	21	28	6	9	14	5
Fuel Used (gal)	0.0	0.0	1.0	0.1	0.0	0.1	1.8	0.0	0.1	0.0	0.1	0.0
Fuel Eff. (mpg)	57.1	55.6	49.1	59.4	55.3	49.8	47.3	65.8	52.1	56.7	61.6	53.1
HC Emissions (g)	0	2	31	4	0	4	58	0	3	1	3	0
CO Emissions (g)	6	67	1117	138	2	149	2153	14	121	29	125	3
NOx Emissions (g)	0	5	105	12	0	13	195	1	7	2	9	0
Vehicles Entered	2	18	333	36	1	27	317	2	36	15	49	2
Vehicles Exited	2	19	319	36	1	30	314	3	37	15	49	2
Hourly Exit Rate	8	76	1276	144	4	120	1256	12	148	60	196	8
Input Volume	8	72	1361	153	3	114	1331	9	142	58	208	10
% of Volume	100	106	94	94	133	105	94	133	104	103	94	80
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	2	12	1	0	3	16	0	3	1	2	0

10: E Stockton Blvd & Sheldon Rd Performance by movement

Movement	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.1
Denied Del/Veh (s)	0.2	0.3	0.4
Total Delay (hr)	0.4	0.4	6.1
Total Del/Veh (s)	42.8	20.5	22.2
Stop Delay (hr)	0.4	0.4	4.5
Stop Del/Veh (s)	38.3	18.9	16.7
Total Stops	26	64	513
Stop/Veh	0.76	0.81	0.52
Travel Dist (mi)	2.9	7.1	174.8
Travel Time (hr)	0.5	0.8	11.2
Avg Speed (mph)	6	9	16
Fuel Used (gal)	0.1	0.1	3.6
Fuel Eff. (mpg)	41.7	55.1	49.2
HC Emissions (g)	2	3	110
CO Emissions (g)	66	114	4104
NOx Emissions (g)	6	10	365
Vehicles Entered	31	76	945
Vehicles Exited	33	76	936
Hourly Exit Rate	132	304	3744
Input Volume	132	307	3908
% of Volume	100	99	96
Denied Entry Before	0	0	0
Denied Entry After	0	0	0
Density (ft/veh)			356
Occupancy (veh)	2	3	44

11: Garity Dr/Power Inn Rd & Sheldon Rd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	3.0	2.3	0.6	2.4	4.0	0.1	4.1	2.0
Total Delay (hr)	0.0	1.4	1.7	0.0	0.0	0.1	1.7	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	39.6	52.9	20.8	8.2	85.9	54.8	22.8	6.4	53.4	41.2	13.4	26.0
Stop Delay (hr)	0.0	1.2	1.0	0.0	0.0	0.1	1.2	0.0	0.1	0.0	0.0	0.0
Stop Del/Veh (s)	36.0	46.5	12.2	2.0	80.6	49.8	15.9	4.2	51.8	39.4	13.5	25.1
Total Stops	1	81	115	2	1	5	146	15	7	2	4	1
Stop/Veh	0.50	0.88	0.39	0.40	1.00	0.83	0.55	0.52	0.88	1.00	1.00	1.00
Travel Dist (mi)	0.3	22.5	78.3	1.4	0.2	1.2	53.4	5.9	0.8	0.2	0.4	0.1
Travel Time (hr)	0.0	2.0	3.8	0.1	0.0	0.1	3.1	0.3	0.2	0.0	0.0	0.0
Avg Speed (mph)	11	11	21	27	8	9	18	25	5	6	12	8
Fuel Used (gal)	0.0	0.4	1.6	0.0	0.0	0.0	0.8	0.1	0.0	0.0	0.0	0.0
Fuel Eff. (mpg)	63.7	50.0	47.8	42.4	73.4	52.3	64.0	65.8	43.6	62.6	76.9	59.2
HC Emissions (g)	0	13	47	2	0	0	24	2	0	0	0	0
CO Emissions (g)	5	449	1580	48	4	14	808	94	8	1	2	2
NOx Emissions (g)	0	42	165	5	0	1	75	8	1	0	0	0
Vehicles Entered	1	81	284	5	1	6	261	29	8	2	4	1
Vehicles Exited	1	87	281	5	1	6	247	28	8	2	4	1
Hourly Exit Rate	4	348	1124	20	4	24	988	112	32	8	16	4
Input Volume	7	352	1201	23	6	22	1064	110	27	8	15	2
% of Volume	57	99	94	87	67	109	93	102	119	100	107	200
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	8	15	0	0	0	12	1	1	0	0	0

11: Garity Dr/Power Inn Rd & Sheldon Rd Performance by movement

Movement	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	3.2	0.4	0.4	0.6
Total Delay (hr)	0.7	0.0	0.4	6.2
Total Del/Veh (s)	43.3	32.3	13.6	25.7
Stop Delay (hr)	0.6	0.0	0.3	4.6
Stop Del/Veh (s)	40.0	29.3	11.5	19.3
Total Stops	47	1	71	499
Stop/Veh	0.84	0.50	0.76	0.58
Travel Dist (mi)	7.0	0.3	12.5	184.5
Travel Time (hr)	1.0	0.0	0.8	11.4
Avg Speed (mph)	8	10	15	16
Fuel Used (gal)	0.1	0.0	0.2	3.4
Fuel Eff. (mpg)	58.6	77.9	65.0	53.9
HC Emissions (g)	3	0	6	98
CO Emissions (g)	89	2	226	3330
NOx Emissions (g)	8	0	17	322
Vehicles Entered	51	2	90	826
Vehicles Exited	54	2	90	817
Hourly Exit Rate	216	8	360	3268
Input Volume	200	9	358	3404
% of Volume	108	89	101	96
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0
Density (ft/veh)				378
Occupancy (veh)	4	0	3	45

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	408	393	136	101	441	81	92	569	79	147	917	439
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	425	409	42	105	459	14	96	593	20	153	955	290
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	3	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	521	1028	460	187	685	306	183	980	438	233	1482	461
Arrive On Green	0.15	0.29	0.29	0.05	0.20	0.20	0.05	0.28	0.28	0.07	0.29	0.29
Sat Flow, veh/h	3408	3505	1566	3408	3505	1568	3408	3505	1568	3408	5036	1566
Grp Volume(v), veh/h	425	409	42	105	459	14	96	593	20	153	955	290
Grp Sat Flow(s),veh/h/ln	1704	1752	1566	1704	1752	1568	1704	1752	1568	1704	1679	1566
Q Serve(g_s), s	10.0	7.7	1.6	2.5	10.1	0.6	2.3	12.2	0.8	3.6	13.7	13.3
Cycle Q Clear(g_c), s	10.0	7.7	1.6	2.5	10.1	0.6	2.3	12.2	0.8	3.6	13.7	13.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	521	1028	460	187	685	306	183	980	438	233	1482	461
V/C Ratio(X)	0.82	0.40	0.09	0.56	0.67	0.05	0.52	0.61	0.05	0.66	0.64	0.63
Avail Cap(c_a), veh/h	1027	2112	944	1027	2112	945	1027	2112	945	1027	3035	944
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.0	23.4	21.3	38.2	30.9	27.1	38.2	25.9	21.8	37.7	25.5	25.4
Incr Delay (d2), s/veh	1.2	0.1	0.0	1.0	0.4	0.0	0.9	0.2	0.0	1.2	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	3.8	0.7	1.2	4.9	0.3	1.1	5.9	0.3	1.7	6.4	5.8
LnGrp Delay(d),s/veh	35.2	23.5	21.3	39.2	31.3	27.1	39.1	26.2	21.8	38.9	25.7	25.9
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		876			578			709			1398	
Approach Delay, s/veh		29.1			32.7			27.8			27.2	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	30.7	19.0	22.5	12.0	29.5	10.9	30.6
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	25.0	50.0	25.0	50.0	25.0	50.0	25.0	50.0
Max Q Clear Time (g_c+I1), s	4.3	15.7	12.0	12.1	5.6	14.2	4.5	9.7
Green Ext Time (p_c), s	0.1	8.6	0.7	3.9	0.2	8.7	0.1	3.9

Intersection Summary		
HCM 2010 Ctrl Delay		28.7
HCM 2010 LOS		C

Intersection	
Intersection Delay, s/veh	72.8
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	116	253	178	0	19	348	9	0	110	233	20
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	123	269	189	0	20	370	10	0	117	248	21
Number of Lanes	0	0	1	1	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	60	78.9	78.6
HCM LOS	F	F	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	30%	31%	0%	5%	2%
Vol Thru, %	64%	69%	0%	93%	66%
Vol Right, %	6%	0%	100%	2%	32%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	363	369	178	376	522
LT Vol	110	116	0	19	11
Through Vol	233	253	0	348	345
RT Vol	20	0	178	9	166
Lane Flow Rate	386	393	189	400	555
Geometry Grp	2	7	7	5	2
Degree of Util (X)	1	1	0.476	1	1
Departure Headway (Hd)	9.673	9.905	9.048	9.741	9.459
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	378	369	401	376	389
Service Time	7.673	7.605	6.748	7.741	7.459
HCM Lane V/C Ratio	1.021	1.065	0.471	1.064	1.427
HCM Control Delay	78.6	79.4	19.7	78.9	77.7
HCM Lane LOS	F	F	C	F	F
HCM 95th-tile Q	11.8	11.7	2.5	11.8	11.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	11	345	166
Peak Hour Factor	0.94	0.94	0.94	0.94
Heavy Vehicles, %	3	3	3	3
Mvmt Flow	0	12	367	177
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	77.7
HCM LOS	F

Lane

Intersection	
Intersection Delay, s/veh	51.3
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	77	172	33	0	86	249	17	0	23	299	37
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	79	176	34	0	88	254	17	0	23	305	38
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	30.6	44.4	44.6
HCM LOS	D	E	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	27%	24%	2%
Vol Thru, %	83%	61%	71%	80%
Vol Right, %	10%	12%	5%	18%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	359	282	352	509
LT Vol	23	77	86	10
Through Vol	299	172	249	408
RT Vol	37	33	17	91
Lane Flow Rate	366	288	359	519
Geometry Grp	1	1	1	1
Degree of Util (X)	0.855	0.705	0.85	1
Departure Headway (Hd)	8.398	8.824	8.521	8.262
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	429	409	424	441
Service Time	6.472	6.903	6.59	6.262
HCM Lane V/C Ratio	0.853	0.704	0.847	1.177
HCM Control Delay	44.6	30.6	44.4	72.2
HCM Lane LOS	E	D	E	F
HCM 95th-tile Q	8.4	5.3	8.3	12.8

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	10	408	91
Peak Hour Factor	0.98	0.98	0.98	0.98
Heavy Vehicles, %	3	3	3	3
Mvmt Flow	0	10	416	93
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	72.2
HCM LOS	F

Lane

Intersection	
Intersection Delay, s/veh	14.4
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	55	148	25	0	51	259	22	1	18	105	23
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	57	153	26	0	53	267	23	1	19	108	24
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	13	15.9	11.6
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	12%	24%	15%	10%
Vol Thru, %	72%	65%	78%	65%
Vol Right, %	16%	11%	7%	25%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	147	228	332	312
LT Vol	18	55	51	31
Through Vol	106	148	259	204
RT Vol	23	25	22	77
Lane Flow Rate	152	235	342	322
Geometry Grp	1	1	1	1
Degree of Util (X)	0.267	0.391	0.552	0.519
Departure Headway (Hd)	6.333	6.101	5.801	5.809
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	571	595	616	614
Service Time	4.333	4.101	3.899	3.908
HCM Lane V/C Ratio	0.266	0.395	0.555	0.524
HCM Control Delay	11.6	13	15.9	15.1
HCM Lane LOS	B	B	C	C
HCM 95th-tile Q	1.1	1.8	3.4	3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	31	204	77
Peak Hour Factor	0.97	0.97	0.97	0.97
Heavy Vehicles, %	3	3	3	3
Mvmt Flow	0	32	210	79
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	15.1
HCM LOS	C

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰		↱		↑		↰	↑			↑	↱
Volume (veh/h)	37	0	273	0	0	0	145	461	0	0	811	131
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	0	1900	0	1863	0	1863	1863	0	0	1881	1900
Adj Flow Rate, veh/h	38	0	70	0	0	0	148	470	0	0	828	0
Adj No. of Lanes	1	0	1	0	1	0	1	1	0	0	1	1
Peak Hour Factor	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	2	0	2	2	0	0	1	0
Cap, veh/h	72	0	0	0	3	0	205	1461	0	0	1105	948
Arrive On Green	0.04	0.00	0.00	0.00	0.00	0.00	0.12	0.78	0.00	0.00	0.59	0.00
Sat Flow, veh/h	1810	38		0	-83824	0	1774	1863	0	0	1881	1615
Grp Volume(v), veh/h	38	28.7		0	0	0	148	470	0	0	828	0
Grp Sat Flow(s),veh/h/ln	1810	C		0	1863	0	1774	1863	0	0	1881	1615
Q Serve(g_s), s	1.2			0.0	0.0	0.0	4.5	4.1	0.0	0.0	18.3	0.0
Cycle Q Clear(g_c), s	1.2			0.0	0.0	0.0	4.5	4.1	0.0	0.0	18.3	0.0
Prop In Lane	1.00			0.00		0.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	72			0	3	0	205	1461	0	0	1105	948
V/C Ratio(X)	0.53			0.00	0.00	0.00	0.72	0.32	0.00	0.00	0.75	0.00
Avail Cap(c_a), veh/h	803			0	595	0	1260	2976	0	0	3005	2580
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	26.5			0.0	0.0	0.0	24.0	1.7	0.0	0.0	8.6	0.0
Incr Delay (d2), s/veh	2.2			0.0	0.0	0.0	6.7	0.1	0.0	0.0	1.0	0.0
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6			0.0	0.0	0.0	2.6	2.0	0.0	0.0	9.5	0.0
LnGrp Delay(d),s/veh	28.7			0.0	0.0	0.0	30.7	1.9	0.0	0.0	9.6	0.0
LnGrp LOS	C						C	A			A	
Approach Vol, veh/h					0			618			828	
Approach Delay, s/veh					0.0			8.8			9.6	
Approach LOS								A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6		
Phs Duration (G+Y+Rc), s	11.1	38.4	6.8	0.0		49.5		
Change Period (Y+Rc), s	4.6	5.3	4.6	4.5		5.3		
Max Green Setting (Gmax), s	40.0	90.0	25.0	18.0		90.0		
Max Q Clear Time (g_c+I1), s	6.5	20.3	3.2	0.0		6.1		
Green Ext Time (p_c), s	0.7	12.8	0.0	0.0		12.9		

Intersection Summary			
HCM 2010 Ctrl Delay			9.8
HCM 2010 LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	45	15	35	315	60	190	80	615	275	575	1235	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	49	16	0	342	65	20	87	668	104	625	1342	67
Adj No. of Lanes	2	2	1	2	1	1	1	3	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	110	386	173	402	361	297	109	2107	642	666	1934	837
Arrive On Green	0.03	0.11	0.00	0.12	0.20	0.20	0.06	0.42	0.42	0.20	0.55	0.55
Sat Flow, veh/h	3408	3505	1568	3408	1845	1517	1757	5036	1534	3408	3505	1517
Grp Volume(v), veh/h	49	16	0	342	65	20	87	668	104	625	1342	67
Grp Sat Flow(s),veh/h/ln	1704	1752	1568	1704	1845	1517	1757	1679	1534	1704	1752	1517
Q Serve(g_s), s	1.8	0.5	0.0	12.6	3.8	1.4	6.3	11.4	5.4	23.1	35.6	2.6
Cycle Q Clear(g_c), s	1.8	0.5	0.0	12.6	3.8	1.4	6.3	11.4	5.4	23.1	35.6	2.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	110	386	173	402	361	297	109	2107	642	666	1934	837
V/C Ratio(X)	0.45	0.04	0.00	0.85	0.18	0.07	0.80	0.32	0.16	0.94	0.69	0.08
Avail Cap(c_a), veh/h	666	1096	490	666	577	474	343	2756	840	666	1934	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.8	50.9	0.0	55.3	42.9	41.9	59.2	24.9	23.2	50.7	20.8	13.4
Incr Delay (d2), s/veh	1.1	0.0	0.0	2.6	0.1	0.0	4.9	0.0	0.0	20.8	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.3	0.0	6.1	1.9	0.6	3.2	5.3	2.3	12.8	17.4	1.1
LnGrp Delay(d),s/veh	61.8	50.9	0.0	57.9	42.9	41.9	64.1	25.0	23.2	71.5	21.7	13.5
LnGrp LOS	E	D		E	D	D	E	C	C	E	C	B
Approach Vol, veh/h		65			427			859			2034	
Approach Delay, s/veh		59.1			54.9			28.7			36.8	
Approach LOS		E			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	29.6	59.0	19.7	19.6	12.5	76.1	8.7	30.6
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	25.1	13.4	14.6	2.5	8.3	37.6	3.8	5.8
Green Ext Time (p_c), s	0.0	40.2	0.5	0.8	0.1	26.7	0.1	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	37.4
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	275	460	200	140	815	225	250	400	200	350	775	50
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	299	500	26	152	886	129	272	435	72	380	842	50
Adj No. of Lanes	2	2	1	1	2	1	2	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	360	582	251	179	570	245	334	1528	669	435	1563	93
Arrive On Green	0.11	0.17	0.17	0.10	0.16	0.16	0.10	0.44	0.44	0.17	0.62	0.62
Sat Flow, veh/h	3408	3505	1511	1757	3505	1510	3408	3505	1535	3408	3358	199
Grp Volume(v), veh/h	299	500	26	152	886	129	272	435	72	380	439	453
Grp Sat Flow(s),veh/h/ln	1704	1752	1511	1757	1752	1510	1704	1752	1535	1704	1752	1805
Q Serve(g_s), s	10.3	16.6	1.8	10.2	19.5	9.4	9.4	9.6	3.3	13.0	17.2	17.2
Cycle Q Clear(g_c), s	10.3	16.6	1.8	10.2	19.5	9.4	9.4	9.6	3.3	13.0	17.2	17.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	360	582	251	179	570	245	334	1528	669	435	816	840
V/C Ratio(X)	0.83	0.86	0.10	0.85	1.56	0.53	0.81	0.28	0.11	0.87	0.54	0.54
Avail Cap(c_a), veh/h	494	582	251	255	570	245	494	1528	669	494	816	840
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.65	0.65	0.65
Uniform Delay (d), s/veh	52.6	48.7	42.4	53.0	50.2	46.0	53.1	21.8	20.0	48.9	15.5	15.5
Incr Delay (d2), s/veh	6.2	11.7	0.1	12.2	258.6	1.0	3.9	0.5	0.3	9.3	1.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	9.0	0.7	5.5	29.9	4.0	4.6	4.8	1.5	6.7	8.5	8.8
LnGrp Delay(d),s/veh	58.8	60.4	42.5	65.2	308.8	47.0	57.0	22.3	20.4	58.1	17.2	17.1
LnGrp LOS	E	E	D	E	F	D	E	C	C	E	B	B
Approach Vol, veh/h		825			1167			779			1272	
Approach Delay, s/veh		59.2			248.2			34.2			29.4	
Approach LOS		E			F			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.4	61.4	17.3	25.0	19.9	57.8	16.8	25.4
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	17.4	45.5	17.4	19.5	17.4	45.5	17.4	19.5
Max Q Clear Time (g_c+I1), s	11.4	19.2	12.3	21.5	15.0	11.6	12.2	18.6
Green Ext Time (p_c), s	0.4	19.4	0.4	0.0	0.3	23.4	0.1	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	99.6
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	8	12	152	1	172	12	438	178	363	702	1
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1881	1863	1900	1900	1873	1900	1863	1881	1900
Adj Flow Rate, veh/h	4	8	1	157	1	23	12	452	173	374	724	1
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	1	0	0	0	2	2	2	1	1
Cap, veh/h	9	48	6	185	8	194	25	601	230	403	1275	2
Arrive On Green	0.01	0.03	0.03	0.10	0.13	0.13	0.01	0.47	0.47	0.23	0.68	0.68
Sat Flow, veh/h	1810	1650	206	1792	66	1527	1810	1291	494	1774	1878	3
Grp Volume(v), veh/h	4	0	9	157	0	24	12	0	625	374	0	725
Grp Sat Flow(s),veh/h/ln	1810	0	1856	1792	0	1593	1810	0	1785	1774	0	1881
Q Serve(g_s), s	0.3	0.0	0.6	10.3	0.0	1.6	0.8	0.0	34.5	24.8	0.0	24.2
Cycle Q Clear(g_c), s	0.3	0.0	0.6	10.3	0.0	1.6	0.8	0.0	34.5	24.8	0.0	24.2
Prop In Lane	1.00		0.11	1.00		0.96	1.00		0.28	1.00		0.00
Lane Grp Cap(c), veh/h	9	0	54	185	0	203	25	0	831	403	0	1277
V/C Ratio(X)	0.43	0.00	0.17	0.85	0.00	0.12	0.48	0.00	0.75	0.93	0.00	0.57
Avail Cap(c_a), veh/h	234	0	240	231	0	203	234	0	831	451	0	1277
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.85	0.00	0.85	0.67	0.00	0.67
Uniform Delay (d), s/veh	59.5	0.0	56.8	52.9	0.0	46.4	58.8	0.0	26.3	45.4	0.0	10.1
Incr Delay (d2), s/veh	27.6	0.0	1.4	20.9	0.0	0.3	11.8	0.0	5.3	18.2	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.3	6.2	0.0	0.7	0.5	0.0	18.2	14.2	0.0	12.9
LnGrp Delay(d),s/veh	87.1	0.0	58.3	73.8	0.0	46.7	70.6	0.0	31.7	63.6	0.0	11.3
LnGrp LOS	F		E	E		D	E		C	E		B
Approach Vol, veh/h		13			181			637			1099	
Approach Delay, s/veh		67.1			70.2			32.4			29.1	
Approach LOS		E			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	87.5	16.9	9.5	31.7	61.9	5.1	21.3
Change Period (Y+Rc), s	4.5	6.0	4.5	* 6	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	15.5	54.0	15.5	* 16	30.5	39.0	15.5	14.0
Max Q Clear Time (g_c+I1), s	2.8	26.2	12.3	2.6	26.8	36.5	2.3	3.6
Green Ext Time (p_c), s	0.0	11.0	0.1	0.0	0.4	1.8	0.0	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	34.3
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	85	1690	380	295	605	90	135	30	285	155	65	165
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	92	1837	328	321	658	52	147	33	0	168	71	12
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	143	2605	795	381	2957	903	205	334	150	196	271	221
Arrive On Green	0.04	0.52	0.52	0.11	0.59	0.59	0.06	0.10	0.00	0.11	0.15	0.15
Sat Flow, veh/h	3408	5036	1537	3408	5036	1538	3408	3505	1568	1757	1845	1506
Grp Volume(v), veh/h	92	1837	328	321	658	52	147	33	0	168	71	12
Grp Sat Flow(s),veh/h/ln	1704	1679	1537	1704	1679	1538	1704	1752	1568	1757	1845	1506
Q Serve(g_s), s	3.1	32.7	15.4	10.9	7.3	1.7	5.0	1.0	0.0	11.1	4.0	0.8
Cycle Q Clear(g_c), s	3.1	32.7	15.4	10.9	7.3	1.7	5.0	1.0	0.0	11.1	4.0	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	143	2605	795	381	2957	903	205	334	150	196	271	221
V/C Ratio(X)	0.64	0.71	0.41	0.84	0.22	0.06	0.72	0.10	0.00	0.86	0.26	0.05
Avail Cap(c_a), veh/h	723	2991	913	723	2991	914	1070	803	359	552	423	345
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.6	21.6	17.5	51.3	11.6	10.4	54.4	48.7	0.0	51.4	44.6	43.2
Incr Delay (d2), s/veh	1.8	0.6	0.3	2.0	0.0	0.0	1.8	0.1	0.0	4.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	15.3	6.6	5.2	3.4	0.7	2.4	0.5	0.0	5.6	2.1	0.3
LnGrp Delay(d),s/veh	57.4	22.3	17.8	53.3	11.6	10.4	56.2	48.8	0.0	55.5	44.8	43.3
LnGrp LOS	E	C	B	D	B	B	E	D		E	D	D
Approach Vol, veh/h		2257			1031			180			251	
Approach Delay, s/veh		23.0			24.5			54.8			51.9	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	74.7	11.7	21.9	17.8	66.5	17.8	15.8
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	25.0	70.0	37.0	27.0	25.0	70.0	37.0	27.0
Max Q Clear Time (g_c+I1), s	5.1	9.3	7.0	6.0	12.9	34.7	13.1	3.0
Green Ext Time (p_c), s	0.1	37.9	0.2	0.3	0.3	26.3	0.1	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	26.9
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	2000	75	260	950	100	40	10	220	120	40	60
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.95	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	43	2174	42	283	1033	74	43	11	1	130	43	0
Adj No. of Lanes	2	3	1	2	3	1	1	1	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	108	2743	837	342	3089	944	56	175	16	156	570	255
Arrive On Green	0.03	0.54	0.54	0.10	0.61	0.61	0.03	0.11	0.11	0.09	0.16	0.00
Sat Flow, veh/h	3408	5036	1538	3408	5036	1539	1757	1658	151	1757	3505	1568
Grp Volume(v), veh/h	43	2174	42	283	1033	74	43	0	12	130	43	0
Grp Sat Flow(s),veh/h/ln	1704	1679	1538	1704	1679	1539	1757	0	1809	1757	1752	1568
Q Serve(g_s), s	1.5	41.6	1.5	9.8	12.0	2.3	2.9	0.0	0.7	8.7	1.2	0.0
Cycle Q Clear(g_c), s	1.5	41.6	1.5	9.8	12.0	2.3	2.9	0.0	0.7	8.7	1.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	108	2743	837	342	3089	944	56	0	191	156	570	255
V/C Ratio(X)	0.40	0.79	0.05	0.83	0.33	0.08	0.77	0.00	0.06	0.83	0.08	0.00
Avail Cap(c_a), veh/h	709	2934	896	709	3089	944	366	0	602	512	1167	522
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	57.0	21.9	12.8	53.0	11.3	9.4	57.7	0.0	48.4	53.8	42.6	0.0
Incr Delay (d2), s/veh	0.9	1.5	0.0	2.0	0.1	0.0	8.1	0.0	0.1	4.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	19.5	0.7	4.7	5.6	1.0	1.5	0.0	0.4	4.4	0.6	0.0
LnGrp Delay(d),s/veh	57.9	23.4	12.8	55.0	11.4	9.5	65.8	0.0	48.5	58.1	42.7	0.0
LnGrp LOS	E	C	B	D	B	A	E		D	E	D	
Approach Vol, veh/h		2259			1390			55			173	
Approach Delay, s/veh		23.8			20.1			62.1			54.3	
Approach LOS		C			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	79.5	8.3	24.0	16.6	71.2	15.2	17.2
Change Period (Y+Rc), s	4.5	5.8	4.5	4.5	4.5	5.8	4.5	4.5
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	35.0	40.0
Max Q Clear Time (g_c+I1), s	3.5	14.0	4.9	3.2	11.8	43.6	10.7	2.7
Green Ext Time (p_c), s	0.0	44.8	0.0	0.1	0.3	21.9	0.1	0.1

Intersection Summary		
HCM 2010 Ctrl Delay		24.4
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	595	1310	245	285	755	125	335	385	186	360	630	340
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	647	1424	183	310	821	71	364	418	29	391	685	146
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	491	2062	628	352	1857	565	405	1077	325	431	786	341
Arrive On Green	0.14	0.41	0.41	0.10	0.37	0.37	0.12	0.21	0.21	0.13	0.22	0.22
Sat Flow, veh/h	3408	5036	1534	3408	5036	1532	3408	5036	1520	3408	3505	1521
Grp Volume(v), veh/h	647	1424	183	310	821	71	364	418	29	391	685	146
Grp Sat Flow(s),veh/h/ln	1704	1679	1534	1704	1679	1532	1704	1679	1520	1704	1752	1521
Q Serve(g_s), s	25.0	40.4	13.9	15.6	21.3	5.3	18.3	12.3	2.7	19.6	32.7	14.3
Cycle Q Clear(g_c), s	25.0	40.4	13.9	15.6	21.3	5.3	18.3	12.3	2.7	19.6	32.7	14.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	491	2062	628	352	1857	565	405	1077	325	431	786	341
V/C Ratio(X)	1.32	0.69	0.29	0.88	0.44	0.13	0.90	0.39	0.09	0.91	0.87	0.43
Avail Cap(c_a), veh/h	491	2062	628	491	2032	618	491	1161	350	491	808	351
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	74.3	42.2	34.4	76.7	41.3	36.3	75.4	58.5	54.7	74.8	64.9	57.7
Incr Delay (d2), s/veh	156.8	0.8	0.1	10.2	0.1	0.0	15.5	0.1	0.0	18.0	9.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.4	18.9	5.9	7.9	9.9	2.3	9.5	5.7	1.1	10.4	16.9	6.1
LnGrp Delay(d),s/veh	231.1	43.0	34.4	86.9	41.4	36.3	90.9	58.6	54.7	92.8	74.4	58.1
LnGrp LOS	F	D	C	F	D	D	F	E	D	F	E	E
Approach Vol, veh/h		2254			1202			811			1222	
Approach Delay, s/veh		96.3			52.8			72.9			78.3	
Approach LOS		F			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.1	44.9	24.4	77.1	28.9	43.1	31.5	70.0
Change Period (Y+Rc), s	6.5	6.0	6.5	6.0	7.0	* 6	6.5	6.0
Max Green Setting (Gmax), s	25.0	40.0	25.0	70.0	25.0	* 40	25.0	70.0
Max Q Clear Time (g_c+I1), s	20.3	34.7	17.6	42.4	21.6	14.3	27.0	23.3
Green Ext Time (p_c), s	0.3	4.2	0.4	26.1	0.3	15.1	0.0	40.6

Intersection Summary		
HCM 2010 Ctrl Delay		79.3
HCM 2010 LOS		E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	150	820	260	320	1155	150	170	830	180	130	965	375
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	163	891	157	348	1255	112	185	902	120	141	1049	287
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	227	2020	615	432	2323	708	247	1351	409	200	1381	380
Arrive On Green	0.07	0.40	0.40	0.13	0.46	0.46	0.07	0.27	0.27	0.06	0.25	0.25
Sat Flow, veh/h	3408	5036	1533	3408	5036	1535	3408	5036	1526	3514	5534	1524
Grp Volume(v), veh/h	163	891	157	348	1255	112	185	902	120	141	1049	287
Grp Sat Flow(s),veh/h/ln	1704	1679	1533	1704	1679	1535	1704	1679	1526	1757	1845	1524
Q Serve(g_s), s	7.2	19.7	10.5	15.2	27.4	6.5	8.2	24.5	9.6	6.0	26.9	26.7
Cycle Q Clear(g_c), s	7.2	19.7	10.5	15.2	27.4	6.5	8.2	24.5	9.6	6.0	26.9	26.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	227	2020	615	432	2323	708	247	1351	409	200	1381	380
V/C Ratio(X)	0.72	0.44	0.26	0.80	0.54	0.16	0.75	0.67	0.29	0.70	0.76	0.75
Avail Cap(c_a), veh/h	890	2301	701	890	2323	708	556	1351	409	573	1445	398
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	70.1	33.4	30.6	65.0	29.6	24.0	69.7	50.0	44.5	71.0	53.2	53.1
Incr Delay (d2), s/veh	1.6	0.1	0.1	1.4	0.1	0.0	1.7	1.0	0.1	1.7	2.0	6.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	9.2	4.5	7.2	12.7	2.8	3.9	11.5	4.1	3.0	14.0	11.9
LnGrp Delay(d),s/veh	71.7	33.4	30.7	66.4	29.7	24.0	71.4	51.0	44.7	72.7	55.2	59.8
LnGrp LOS	E	C	C	E	C	C	E	D	D	E	E	E
Approach Vol, veh/h		1211			1715			1207			1477	
Approach Delay, s/veh		38.2			36.8			53.5			57.8	
Approach LOS		D			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.7	76.2	17.1	44.2	24.9	66.9	14.2	47.1
Change Period (Y+Rc), s	5.5	5.5	6.0	* 6	5.5	5.5	5.5	6.0
Max Green Setting (Gmax), s	40.0	70.0	25.0	* 40	40.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	9.2	29.4	10.2	28.9	17.2	21.7	8.0	26.5
Green Ext Time (p_c), s	1.0	35.0	0.9	9.4	2.2	39.7	0.7	12.3

Intersection Summary	
HCM 2010 Ctrl Delay	46.2
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	200	880	95	350	1400	275	65	855	220	230	805	150
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	217	957	92	380	1522	186	71	929	169	250	875	109
Adj No. of Lanes	2	4	0	2	4	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	264	2396	228	426	2868	694	110	893	388	297	1085	473
Arrive On Green	0.08	0.40	0.40	0.13	0.45	0.45	0.03	0.25	0.25	0.09	0.31	0.31
Sat Flow, veh/h	3408	5926	564	3408	6346	1535	3408	3505	1524	3408	3505	1529
Grp Volume(v), veh/h	217	767	282	380	1522	186	71	929	169	250	875	109
Grp Sat Flow(s),veh/h/ln	1704	1586	1730	1704	1586	1535	1704	1752	1524	1704	1752	1529
Q Serve(g_s), s	9.8	18.0	18.2	17.2	27.1	11.9	3.2	40.0	14.6	11.3	36.1	8.3
Cycle Q Clear(g_c), s	9.8	18.0	18.2	17.2	27.1	11.9	3.2	40.0	14.6	11.3	36.1	8.3
Prop In Lane	1.00		0.33	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	264	1924	700	426	2868	694	110	893	388	297	1085	473
V/C Ratio(X)	0.82	0.40	0.40	0.89	0.53	0.27	0.64	1.04	0.44	0.84	0.81	0.23
Avail Cap(c_a), veh/h	543	2122	771	543	2868	694	543	893	388	543	1085	473
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	71.4	33.2	33.3	67.6	31.0	26.8	75.1	58.5	49.0	70.6	49.9	40.3
Incr Delay (d2), s/veh	2.5	0.0	0.1	12.4	0.1	0.1	2.3	41.1	0.3	2.5	4.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	7.9	8.7	8.9	11.9	5.0	1.6	24.4	6.2	5.4	18.1	3.5
LnGrp Delay(d),s/veh	73.8	33.3	33.4	80.0	31.1	26.9	77.4	99.6	49.3	73.1	54.1	40.4
LnGrp LOS	E	C	C	F	C	C	E	F	D	E	D	D
Approach Vol, veh/h		1266			2088			1169			1234	
Approach Delay, s/veh		40.3			39.6			91.0			56.7	
Approach LOS		D			D			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.7	76.5	9.7	54.1	24.2	69.0	18.3	45.5
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	11.8	29.1	5.2	38.1	19.2	20.2	13.3	42.0
Green Ext Time (p_c), s	0.3	37.4	0.1	1.8	0.4	43.2	0.4	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		53.9
HCM 2010 LOS		D

Notes

User approved pedestrian interval to be less than phase max green.

25: Laguna Springs Dr/W Stockton Blvd & Laguna Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	2.2	0.3	0.4	0.0	0.0	0.0	2.9	1.0	1.3	3.1	0.2	0.3
Total Delay (hr)	0.7	2.1	0.2	1.0	2.3	0.0	1.3	0.3	0.7	0.4	1.3	1.1
Total Del/Veh (s)	46.2	25.2	26.4	53.3	20.1	4.1	56.3	47.1	18.3	50.1	70.2	51.4
Stop Delay (hr)	0.6	1.4	0.1	0.9	1.1	0.0	1.2	0.2	0.6	0.4	1.1	1.0
Stop Del/Veh (s)	41.4	17.1	19.4	47.1	9.7	2.3	50.3	41.1	15.5	45.7	62.8	47.3
Total Stops	45	168	18	55	161	9	91	18	95	27	67	70
Stop/Veh	0.85	0.55	0.69	0.82	0.40	0.29	1.06	0.86	0.70	0.87	1.03	0.92
Travel Dist (mi)	6.8	42.1	3.6	8.6	55.5	4.3	11.0	2.7	17.4	4.2	8.5	9.7
Travel Time (hr)	0.9	3.1	0.3	1.3	3.7	0.2	1.8	0.4	1.4	0.6	1.5	1.4
Avg Speed (mph)	8	14	12	7	15	23	6	8	13	7	6	7
Fuel Used (gal)	0.1	0.7	0.1	0.2	1.2	0.1	0.2	0.0	0.3	0.1	0.2	0.2
Fuel Eff. (mpg)	57.9	58.9	63.5	44.8	44.5	49.1	50.6	55.5	63.0	47.9	47.7	52.9
HC Emissions (g)	4	27	2	7	43	4	7	2	9	3	6	6
CO Emissions (g)	178	1043	78	263	1491	203	249	59	334	125	212	224
NOx Emissions (g)	11	80	6	22	147	12	19	4	26	9	15	17
Vehicles Entered	47	290	24	60	393	30	83	20	132	30	62	71
Vehicles Exited	48	295	25	61	398	30	82	19	128	30	56	67
Hourly Exit Rate	192	1180	100	244	1592	120	328	76	512	120	224	268
Input Volume	190	1158	98	245	1603	120	326	87	516	120	250	272
% of Volume	101	102	102	100	99	100	101	87	99	100	90	99
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	4	12	1	5	15	1	7	1	5	2	6	6

25: Laguna Springs Dr/W Stockton Blvd & Laguna Blvd Performance by movement

Movement	All
Denied Delay (hr)	0.2
Denied Del/Veh (s)	0.6
Total Delay (hr)	11.4
Total Del/Veh (s)	31.5
Stop Delay (hr)	8.7
Stop Del/Veh (s)	24.2
Total Stops	824
Stop/Veh	0.63
Travel Dist (mi)	174.3
Travel Time (hr)	16.6
Avg Speed (mph)	11
Fuel Used (gal)	3.4
Fuel Eff. (mpg)	51.2
HC Emissions (g)	121
CO Emissions (g)	4459
NOx Emissions (g)	368
Vehicles Entered	1242
Vehicles Exited	1239
Hourly Exit Rate	4956
Input Volume	4985
% of Volume	99
Denied Entry Before	0
Denied Entry After	0
Density (ft/veh)	233
Occupancy (veh)	65

26: Laguna Blvd & SR 99 SB Ramps Performance by movement

Movement	EBT	EBR	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.7	1.7	0.3
Total Delay (hr)	2.3	0.1	1.8	0.2	0.9	1.7	7.0
Total Del/Veh (s)	19.2	6.1	19.8	7.1	26.9	32.9	20.6
Stop Delay (hr)	1.5	0.0	0.9	0.0	0.7	1.2	4.3
Stop Del/Veh (s)	12.2	0.2	10.0	0.1	21.7	23.9	12.8
Total Stops	171	0	155	0	76	138	540
Stop/Veh	0.40	0.00	0.48	0.00	0.63	0.73	0.44
Travel Dist (mi)	62.3	5.4	61.2	19.2	38.3	58.9	245.4
Travel Time (hr)	3.9	0.2	3.3	0.7	2.3	3.9	14.4
Avg Speed (mph)	16	26	19	26	17	15	17
Fuel Used (gal)	1.5	0.2	1.2	0.4	0.7	1.0	4.8
Fuel Eff. (mpg)	41.1	33.6	53.1	54.7	56.6	60.2	50.7
HC Emissions (g)	61	8	43	12	13	22	160
CO Emissions (g)	2480	366	1580	483	323	477	5709
NOx Emissions (g)	195	25	136	40	39	61	497
Vehicles Entered	413	40	309	113	114	177	1166
Vehicles Exited	411	40	310	115	114	173	1163
Hourly Exit Rate	1644	160	1240	460	456	692	4652
Input Volume	1631	163	1262	489	462	707	4714
% of Volume	101	98	98	94	99	98	99
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							234
Occupancy (veh)	16	1	13	3	9	15	57

27: SR 99 NB Off & Bond Rd Performance by movement

Movement	EBT	EBR	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.8	0.6	0.1
Total Delay (hr)	1.3	0.6	1.6	0.2	1.4	0.9	6.0
Total Del/Veh (s)	16.4	8.9	16.5	8.4	44.8	51.1	18.8
Stop Delay (hr)	0.7	0.0	0.7	0.0	1.1	0.8	3.3
Stop Del/Veh (s)	8.9	0.1	7.0	0.1	37.5	43.3	10.3
Total Stops	132	6	126	0	93	56	413
Stop/Veh	0.47	0.02	0.37	0.00	0.85	0.85	0.36
Travel Dist (mi)	55.9	42.5	65.4	19.2	33.5	20.1	236.6
Travel Time (hr)	2.6	1.7	3.1	0.7	2.6	1.7	12.4
Avg Speed (mph)	21	25	21	27	13	12	19
Fuel Used (gal)	1.1	0.8	1.4	0.5	0.6	0.4	4.7
Fuel Eff. (mpg)	51.8	54.3	48.3	37.1	56.4	53.1	50.3
HC Emissions (g)	36	28	50	20	13	7	153
CO Emissions (g)	1513	972	1903	855	281	137	5662
NOx Emissions (g)	119	89	165	65	33	17	488
Vehicles Entered	279	246	337	105	101	61	1129
Vehicles Exited	267	245	320	101	101	61	1095
Hourly Exit Rate	1068	980	1280	404	404	244	4380
Input Volume	1115	978	1342	408	408	245	4496
% of Volume	96	100	95	99	99	100	97
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							234
Occupancy (veh)	11	7	12	3	10	7	49

28: E Stockton Blvd & Bond Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.4	3.7	0.5	0.3	0.2
Total Delay (hr)	0.4	2.3	0.0	0.2	3.5	0.0	0.5	0.1	0.1	0.7	0.4	0.1
Total Del/Veh (s)	54.8	26.3	4.0	53.5	31.8	7.6	54.5	56.4	19.3	57.5	62.8	19.2
Stop Delay (hr)	0.4	1.3	0.0	0.2	2.4	0.0	0.4	0.1	0.1	0.6	0.3	0.1
Stop Del/Veh (s)	49.6	15.0	2.7	48.2	22.3	3.3	50.1	48.7	17.1	51.4	53.7	17.6
Total Stops	22	151	7	10	218	3	27	7	14	39	19	23
Stop/Veh	0.85	0.48	0.41	0.83	0.55	0.50	0.87	0.88	0.88	0.95	0.90	0.85
Travel Dist (mi)	4.3	53.4	3.0	1.3	48.3	0.8	2.4	0.6	1.3	5.1	2.7	3.4
Travel Time (hr)	0.5	3.6	0.1	0.2	4.6	0.0	0.6	0.1	0.2	0.8	0.4	0.3
Avg Speed (mph)	8	15	27	6	11	21	4	4	9	6	6	13
Fuel Used (gal)	0.1	1.1	0.0	0.0	1.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1
Fuel Eff. (mpg)	51.9	50.8	63.2	62.7	47.2	50.3	45.1	40.2	54.7	49.0	50.5	63.6
HC Emissions (g)	3	34	2	1	37	1	2	0	1	3	1	2
CO Emissions (g)	137	1222	91	27	1263	29	58	13	40	144	68	85
NOx Emissions (g)	9	110	6	2	113	2	5	1	4	9	4	6
Vehicles Entered	23	289	16	10	368	6	31	8	16	39	21	26
Vehicles Exited	25	303	17	11	388	6	29	8	16	37	18	26
Hourly Exit Rate	100	1212	68	44	1552	24	116	32	64	148	72	104
Input Volume	92	1197	71	43	1517	27	125	33	71	163	82	109
% of Volume	109	101	96	102	102	89	93	97	90	91	88	95
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	2	14	0	1	18	0	2	1	1	3	2	1

28: E Stockton Blvd & Bond Rd Performance by movement

Movement	All
Denied Delay (hr)	0.0
Denied Del/Veh (s)	0.1
Total Delay (hr)	8.2
Total Del/Veh (s)	32.3
Stop Delay (hr)	5.9
Stop Del/Veh (s)	23.3
Total Stops	540
Stop/Veh	0.59
Travel Dist (mi)	126.5
Travel Time (hr)	11.4
Avg Speed (mph)	11
Fuel Used (gal)	2.5
Fuel Eff. (mpg)	49.8
HC Emissions (g)	86
CO Emissions (g)	3177
NOx Emissions (g)	271
Vehicles Entered	853
Vehicles Exited	884
Hourly Exit Rate	3536
Input Volume	3530
% of Volume	100
Denied Entry Before	0
Denied Entry After	0
Density (ft/veh)	245
Occupancy (veh)	46

29: Elk Crest Rd & Bond Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Denied Del/Veh (s)	0.0	0.0	0.0	2.3	1.6	2.5	0.1	0.1	0.1	0.1	0.1	0.9
Total Delay (hr)	0.5	2.4	0.0	0.5	1.5	0.0	0.2	0.1	0.2	0.0	0.0	5.5
Total Del/Veh (s)	75.1	26.3	11.4	63.0	14.1	7.6	54.1	62.6	53.6	53.7	14.1	24.0
Stop Delay (hr)	0.4	1.2	0.0	0.4	0.8	0.0	0.2	0.1	0.2	0.0	0.0	3.4
Stop Del/Veh (s)	65.6	13.0	4.8	58.1	7.3	3.3	52.1	60.4	51.5	51.5	14.0	14.7
Total Stops	24	197	1	22	131	6	11	3	12	2	3	412
Stop/Veh	1.00	0.59	0.50	0.85	0.34	0.43	0.79	1.00	0.86	0.67	1.00	0.50
Travel Dist (mi)	2.8	43.9	0.2	3.0	49.8	1.8	0.5	0.1	0.7	0.1	0.2	103.0
Travel Time (hr)	0.6	3.5	0.0	0.6	2.8	0.1	0.2	0.1	0.2	0.1	0.0	8.2
Avg Speed (mph)	5	13	15	6	19	20	2	2	3	3	8	13
Fuel Used (gal)	0.1	0.9	0.0	0.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	2.0
Fuel Eff. (mpg)	47.6	47.7	68.2	52.4	56.2	62.5	28.3	44.2	38.8	50.8	76.6	51.6
HC Emissions (g)	2	26	0	2	32	1	1	0	1	0	0	64
CO Emissions (g)	63	857	3	72	1208	34	17	1	15	1	1	2271
NOx Emissions (g)	6	86	0	5	99	4	2	0	1	0	0	204
Vehicles Entered	21	332	2	23	385	14	12	3	13	3	3	811
Vehicles Exited	22	302	2	25	368	13	13	3	14	3	3	768
Hourly Exit Rate	88	1208	8	100	1472	52	52	12	56	12	12	3072
Input Volume	87	1338	5	87	1522	54	54	11	54	11	11	3234
% of Volume	101	90	160	115	97	96	96	109	104	109	109	95
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	1	0	0	0	0	0	0	1
Density (ft/veh)												202
Occupancy (veh)	2	14	0	2	11	0	1	0	1	0	0	32

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	399	881	142	215	760	144	348	518	149	305	712	424
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	420	927	86	226	800	46	366	545	62	321	749	247
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	462	1459	650	271	1251	558	411	928	415	366	882	389
Arrive On Green	0.14	0.42	0.42	0.08	0.36	0.36	0.12	0.26	0.26	0.11	0.25	0.25
Sat Flow, veh/h	3408	3505	1561	3408	3505	1563	3408	3505	1568	3408	3505	1546
Grp Volume(v), veh/h	420	927	86	226	800	46	366	545	62	321	749	247
Grp Sat Flow(s),veh/h/ln	1704	1752	1561	1704	1752	1563	1704	1752	1568	1704	1752	1546
Q Serve(g_s), s	19.8	34.3	5.6	10.7	31.0	3.2	17.3	22.1	4.9	15.2	33.2	23.2
Cycle Q Clear(g_c), s	19.8	34.3	5.6	10.7	31.0	3.2	17.3	22.1	4.9	15.2	33.2	23.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	462	1459	650	271	1251	558	411	928	415	366	882	389
V/C Ratio(X)	0.91	0.64	0.13	0.83	0.64	0.08	0.89	0.59	0.15	0.88	0.85	0.64
Avail Cap(c_a), veh/h	522	1503	669	522	1503	670	522	928	415	522	966	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.6	37.8	29.4	74.1	43.7	34.8	70.7	52.3	46.0	71.8	58.1	54.4
Incr Delay (d2), s/veh	17.5	1.1	0.2	2.6	1.0	0.1	12.8	1.3	0.3	8.8	7.4	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.5	16.8	2.4	5.1	15.2	1.4	8.9	10.9	2.2	7.6	17.0	10.4
LnGrp Delay(d),s/veh	87.0	38.9	29.6	76.7	44.8	34.9	83.6	53.6	46.2	80.6	65.6	58.1
LnGrp LOS	F	D	C	E	D	C	F	D	D	F	E	E
Approach Vol, veh/h		1433			1072			973			1317	
Approach Delay, s/veh		52.5			51.1			64.4			67.9	
Approach LOS		D			D			E			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.3	46.6	28.1	64.3	22.1	48.7	18.5	73.9				
Change Period (Y+Rc), s	4.6	5.5	6.0	* 6	4.6	5.5	5.5	6.0				
Max Green Setting (Gmax), s	25.0	45.0	25.0	* 70	25.0	40.0	25.0	70.0				
Max Q Clear Time (g_c+I1), s	19.3	35.2	21.8	33.0	17.2	24.1	12.7	36.3				
Green Ext Time (p_c), s	0.4	5.9	0.3	25.2	0.4	11.6	0.3	23.7				
Intersection Summary												
HCM 2010 Ctrl Delay			58.8									
HCM 2010 LOS			E									

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱
Volume (veh/h)	56	723	258	47	648	73	215	197	54	136	315	125
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1881	1881	1863	1881	1863	1900
Adj Flow Rate, veh/h	61	786	120	51	704	25	234	214	9	148	342	15
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	2	1	2	0
Cap, veh/h	164	1668	746	150	1654	739	329	610	270	241	514	234
Arrive On Green	0.05	0.46	0.46	0.04	0.46	0.46	0.09	0.17	0.17	0.07	0.15	0.15
Sat Flow, veh/h	3510	3610	1615	3510	3610	1613	3476	3574	1583	3476	3539	1612
Grp Volume(v), veh/h	61	786	120	51	704	25	234	214	9	148	342	15
Grp Sat Flow(s),veh/h/ln	1755	1805	1615	1755	1805	1613	1738	1787	1583	1738	1770	1612
Q Serve(g_s), s	1.3	11.8	3.4	1.1	10.4	0.7	5.2	4.2	0.4	3.3	7.2	0.6
Cycle Q Clear(g_c), s	1.3	11.8	3.4	1.1	10.4	0.7	5.2	4.2	0.4	3.3	7.2	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	164	1668	746	150	1654	739	329	610	270	241	514	234
V/C Ratio(X)	0.37	0.47	0.16	0.34	0.43	0.03	0.71	0.35	0.03	0.61	0.67	0.06
Avail Cap(c_a), veh/h	1110	3196	1430	1110	3196	1428	1099	1808	801	1099	1790	815
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.6	14.6	12.4	36.8	14.4	11.8	34.7	28.9	27.4	35.8	32.0	29.2
Incr Delay (d2), s/veh	0.5	0.3	0.1	0.5	0.2	0.0	1.1	0.1	0.0	1.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	6.0	1.5	0.5	5.2	0.3	2.5	2.1	0.2	1.6	3.6	0.3
LnGrp Delay(d),s/veh	37.1	14.9	12.5	37.3	14.7	11.8	35.8	29.1	27.4	36.7	32.5	29.2
LnGrp LOS	D	B	B	D	B	B	D	C	C	D	C	C
Approach Vol, veh/h		967			780			457			505	
Approach Delay, s/veh		16.0			16.1			32.5			33.7	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	41.7	12.1	17.0	8.0	42.0	10.1	19.0
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	3.3	12.4	7.2	9.2	3.1	13.8	5.3	6.2
Green Ext Time (p_c), s	0.1	22.9	0.4	2.1	0.1	22.7	0.2	2.1

Intersection Summary	
HCM 2010 Ctrl Delay	22.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	128	318	78	107	396	36	53	235	50	30	331	178
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	138	342	16	115	426	35	57	253	43	32	356	32
Adj No. of Lanes	2	2	1	1	2	0	2	2	0	2	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	282	1046	467	149	986	81	183	586	98	121	619	277
Arrive On Green	0.08	0.30	0.30	0.08	0.30	0.30	0.05	0.20	0.20	0.04	0.18	0.18
Sat Flow, veh/h	3408	3505	1566	1757	3281	269	3408	3005	504	3408	3505	1565
Grp Volume(v), veh/h	138	342	16	115	227	234	57	146	150	32	356	32
Grp Sat Flow(s),veh/h/ln	1704	1752	1566	1757	1752	1797	1704	1752	1756	1704	1752	1565
Q Serve(g_s), s	2.0	4.0	0.4	3.4	5.4	5.5	0.8	3.8	3.9	0.5	4.9	0.9
Cycle Q Clear(g_c), s	2.0	4.0	0.4	3.4	5.4	5.5	0.8	3.8	3.9	0.5	4.9	0.9
Prop In Lane	1.00		1.00	1.00		0.15	1.00		0.29	1.00		1.00
Lane Grp Cap(c), veh/h	282	1046	467	149	527	540	183	342	342	121	619	277
V/C Ratio(X)	0.49	0.33	0.03	0.77	0.43	0.43	0.31	0.43	0.44	0.26	0.57	0.12
Avail Cap(c_a), veh/h	1629	4690	2096	840	2345	2405	1629	1340	1343	1629	2680	1197
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.9	14.3	13.0	23.4	14.7	14.7	23.8	18.5	18.5	24.6	19.7	18.1
Incr Delay (d2), s/veh	0.5	0.3	0.0	3.2	0.8	0.8	0.4	0.3	0.3	0.4	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.9	0.2	1.8	2.7	2.8	0.4	1.9	1.9	0.2	2.4	0.4
LnGrp Delay(d),s/veh	23.4	14.5	13.1	26.6	15.5	15.5	24.2	18.8	18.9	25.0	20.0	18.2
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	C	B
Approach Vol, veh/h		496			576			353			420	
Approach Delay, s/veh		17.0			17.7			19.7			20.3	
Approach LOS		B			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	21.2	6.5	15.7	9.0	21.1	7.4	14.7
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	4.0	7.5	2.5	5.9	5.4	6.0	2.8	6.9
Green Ext Time (p_c), s	0.2	8.1	0.0	2.2	0.1	8.1	0.1	2.2

Intersection Summary	
HCM 2010 Ctrl Delay	18.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	246	0	0	311	17	0	0	0	20	0	255
Future Volume (veh/h)	148	246	0	0	311	17	0	0	0	20	0	255
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	0	0	1845	1900	1900	1845	1900	1900	1845	1845
Adj Flow Rate, veh/h	163	270	0	0	342	18	0	0	0	22	0	280
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3	3	3	3
Cap, veh/h	199	330	0	0	424	22	0	3	0	283	0	712
Arrive On Green	0.29	0.29	0.00	0.00	0.24	0.24	0.00	0.00	0.00	0.16	0.00	0.16
Sat Flow, veh/h	682	1129	0	0	1737	91	0	1845	0	1757	0	1568
Grp Volume(v), veh/h	433	0	0	0	0	360	0	0	0	22	0	280
Grp Sat Flow(s),veh/h/ln	1811	0	0	0	0	1829	0	1845	0	1757	0	1568
Q Serve(g_s), s	12.8	0.0	0.0	0.0	0.0	10.7	0.0	0.0	0.0	0.6	0.0	6.8
Cycle Q Clear(g_c), s	12.8	0.0	0.0	0.0	0.0	10.7	0.0	0.0	0.0	0.6	0.0	6.8
Prop In Lane	0.38		0.00	0.00		0.05	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	530	0	0	0	0	446	0	3	0	283	0	712
V/C Ratio(X)	0.82	0.00	0.00	0.00	0.00	0.81	0.00	0.00	0.00	0.08	0.00	0.39
Avail Cap(c_a), veh/h	1730	0	0	0	0	953	0	160	0	549	0	949
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	0.0	0.0	0.0	0.0	20.5	0.0	0.0	0.0	20.5	0.0	10.4
Incr Delay (d2), s/veh	2.4	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	0.0	0.0	0.0	0.0	5.7	0.0	0.0	0.0	0.3	0.0	4.4
LnGrp Delay(d),s/veh	21.3	0.0	0.0	0.0	0.0	23.1	0.0	0.0	0.0	20.6	0.0	10.7
LnGrp LOS	C					C				C		B
Approach Vol, veh/h		433			360			0			302	
Approach Delay, s/veh		21.3			23.1			0.0			11.4	
Approach LOS		C			C						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		22.6		0.0		19.8		15.1
Change Period (Y+Rc), s		5.8		4.6		5.8		5.8
Max Green Setting (Gmax), s		55.0		5.0		30.0		18.0
Max Q Clear Time (g_c+I1), s		14.8		0.0		12.7		8.8
Green Ext Time (p_c), s		2.1		0.0		1.4		0.5

Intersection Summary			
HCM 2010 Ctrl Delay			19.2
HCM 2010 LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	218	14	7	2	7	4	4	418	3	8	590	237
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1667	1900	1767	1900	1900	1855	1900	1900	1881	1900
Adj Flow Rate, veh/h	227	15	0	2	7	0	4	435	3	8	615	0
Adj No. of Lanes	0	1	1	0	1	0	1	1	0	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	14	14	14	14	0	2	2	0	1	0
Cap, veh/h	289	19	241	5	16	0	10	721	5	19	757	650
Arrive On Green	0.17	0.17	0.00	0.01	0.01	0.00	0.01	0.39	0.39	0.01	0.40	0.00
Sat Flow, veh/h	1702	112	1417	388	1359	0	1810	1840	13	1810	1881	1615
Grp Volume(v), veh/h	242	0	0	9	0	0	4	0	438	8	615	0
Grp Sat Flow(s),veh/h/ln	1815	0	1417	1747	0	0	1810	0	1852	1810	1881	1615
Q Serve(g_s), s	7.5	0.0	0.0	0.3	0.0	0.0	0.1	0.0	11.0	0.3	17.0	0.0
Cycle Q Clear(g_c), s	7.5	0.0	0.0	0.3	0.0	0.0	0.1	0.0	11.0	0.3	17.0	0.0
Prop In Lane	0.94		1.00	0.22		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	308	0	241	20	0	0	10	0	726	19	757	650
V/C Ratio(X)	0.78	0.00	0.00	0.44	0.00	0.00	0.41	0.00	0.60	0.42	0.81	0.00
Avail Cap(c_a), veh/h	777	0	606	359	0	0	774	0	2219	774	2254	1935
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.2	0.0	0.0	28.7	0.0	0.0	29.0	0.0	14.1	28.7	15.5	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	5.5	0.0	0.0	10.0	0.0	0.3	5.5	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	0.0	0.2	0.0	0.0	0.1	0.0	5.7	0.2	8.9	0.0
LnGrp Delay(d),s/veh	24.9	0.0	0.0	34.2	0.0	0.0	38.9	0.0	14.4	34.3	16.3	0.0
LnGrp LOS	C			C			D		B	C	B	
Approach Vol, veh/h		242			9			442			623	
Approach Delay, s/veh		24.9			34.2			14.7			16.6	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.3	29.5		15.9	6.9	28.9		6.7
Change Period (Y+Rc), s	6.0	6.0		6.0	* 6.3	6.0		6.0
Max Green Setting (Gmax), s	25.0	70.0		25.0	* 25	70.0		12.0
Max Q Clear Time (g_c+I1), s	2.1	19.0		9.5	2.3	13.0		2.3
Green Ext Time (p_c), s	0.0	4.5		0.7	0.0	4.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	17.6
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	11	5	97	1403	6
Sign Control		Stop	Stop		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	12	5	102	1477	6
Pedestrians		10			10	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		1			1	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2979	2967	2970	10	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2979	2967	2970	10	0	
tC, single (s)	7.1	6.7	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.2	4.0	3.3	2.2	
p0 queue free %	0	0	0	90	10	
cM capacity (veh/h)	0	1	1	1065	1636	

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	4	8	107	985	499
Volume Left	0	0	0	985	492
Volume Right	0	0	102	0	6
cSH	1	1	28	1636	1636
Volume to Capacity	3.20	6.41	3.86	0.90	0.90
Queue Length 95th (ft)	Err	Err	Err	390	390
Control Delay (s)	Err	Err	Err	22.3	22.3
Lane LOS	F	F	F	C	C
Approach Delay (s)	Err		9999.0	22.3	
Approach LOS	F		F		

Intersection Summary			
Average Delay	763.0		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	1417	0	0	101	518	1	0	216	0	0	0
Conflicting Peds, #/hr	0	0	10	0	0	10	0	0	10	0	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	225	-	-	-	-	0	-	-	400	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	29	0	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	7	1461	0	0	104	534	1	0	223	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	104	0	0	1471	0	0	1589	1589	740
Stage 1	-	-	-	-	-	-	1485	1485	-
Stage 2	-	-	-	-	-	-	104	104	-
Critical Hdwy	4.39	-	-	4.1	-	-	6.6	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	5.8	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.5	-
Follow-up Hdwy	2.461	-	-	2.2	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1335	-	-	464	-	0	110	109	364
Stage 1	-	-	-	-	-	0	178	190	-
Stage 2	-	-	-	-	-	0	925	813	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	1324	-	-	464	-	-	108	0	361
Mov Cap-2 Maneuver	-	-	-	-	-	-	108	0	-
Stage 1	-	-	-	-	-	-	176	0	-
Stage 2	-	-	-	-	-	-	917	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	29.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT
Capacity (veh/h)	108	361	1324	-	-	464	-
HCM Lane V/C Ratio	0.01	0.617	0.005	-	-	-	-
HCM Control Delay (s)	38.7	29.8	7.7	-	-	0	-
HCM Lane LOS	E	D	A	-	-	A	-
HCM 95th %tile Q(veh)	0	3.9	0	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	201	1230	190	141	442	168	142	93	137	347	99	140
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	209	1281	116	147	460	72	148	97	12	361	103	21
Adj No. of Lanes	2	3	1	2	3	1	2	1	1	2	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	277	2649	814	212	2553	785	214	153	130	432	271	229
Arrive On Green	0.08	0.53	0.53	0.06	0.51	0.51	0.06	0.08	0.08	0.13	0.15	0.15
Sat Flow, veh/h	3408	5036	1548	3408	5036	1548	3408	1845	1562	3408	1845	1558
Grp Volume(v), veh/h	209	1281	116	147	460	72	148	97	12	361	103	21
Grp Sat Flow(s),veh/h/ln	1704	1679	1548	1704	1679	1548	1704	1845	1562	1704	1845	1558
Q Serve(g_s), s	6.0	16.2	3.8	4.2	5.0	2.4	4.3	5.1	0.7	10.3	5.0	1.2
Cycle Q Clear(g_c), s	6.0	16.2	3.8	4.2	5.0	2.4	4.3	5.1	0.7	10.3	5.0	1.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	277	2649	814	212	2553	785	214	153	130	432	271	229
V/C Ratio(X)	0.76	0.48	0.14	0.69	0.18	0.09	0.69	0.63	0.09	0.84	0.38	0.09
Avail Cap(c_a), veh/h	525	2649	814	525	2553	785	729	341	289	729	341	288
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.0	15.1	12.1	46.0	13.4	12.7	45.9	44.4	42.4	42.7	38.5	36.9
Incr Delay (d2), s/veh	1.6	0.6	0.4	1.5	0.2	0.2	1.5	3.2	0.2	1.7	0.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	7.6	1.7	2.0	2.3	1.1	2.1	2.7	0.3	5.0	2.6	0.5
LnGrp Delay(d),s/veh	46.6	15.7	12.5	47.5	13.5	13.0	47.4	47.5	42.6	44.3	39.2	37.0
LnGrp LOS	D	B	B	D	B	B	D	D	D	D	D	D
Approach Vol, veh/h		1606			679			257			485	
Approach Delay, s/veh		19.5			20.8			47.2			42.9	
Approach LOS		B			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.7	56.2	10.9	20.2	10.8	58.1	17.3	13.8
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	15.4	24.5	21.4	18.5	15.4	24.5	21.4	18.5
Max Q Clear Time (g_c+I1), s	8.0	7.0	6.3	7.0	6.2	18.2	12.3	7.1
Green Ext Time (p_c), s	0.1	11.1	0.1	0.6	0.1	5.0	0.3	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	25.9
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑			↑↑↑	↱		↑		↰↰		↱
Volume (veh/h)	97	1912	0	0	1042	346	0	0	0	285	0	53
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	0	0	1845	1845	0	1845	0	1845	0	1845
Adj Flow Rate, veh/h	101	1992	0	0	1085	190	0	0	0	297	0	6
Adj No. of Lanes	1	3	0	0	3	1	0	1	0	2	0	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	0	0	3	3	0	3	0	3	0	3
Cap, veh/h	127	3982	0	0	3387	1054	0	2	0	369	0	0
Arrive On Green	0.07	0.79	0.00	0.00	0.67	0.67	0.00	0.00	0.00	0.11	0.00	0.00
Sat Flow, veh/h	1757	5202	0	0	5202	1567	0	-84854	0	3408	297	
Grp Volume(v), veh/h	101	1992	0	0	1085	190	0	0	0	297	45.1	
Grp Sat Flow(s),veh/h/ln	1757	1679	0	0	1679	1567	0	1845	0	1704	D	
Q Serve(g_s), s	5.7	13.7	0.0	0.0	9.0	4.5	0.0	0.0	0.0	8.5		
Cycle Q Clear(g_c), s	5.7	13.7	0.0	0.0	9.0	4.5	0.0	0.0	0.0	8.5		
Prop In Lane	1.00		0.00	0.00		1.00	0.00		0.00	1.00		
Lane Grp Cap(c), veh/h	127	3982	0	0	3387	1054	0	2	0	369		
V/C Ratio(X)	0.80	0.50	0.00	0.00	0.32	0.18	0.00	0.00	0.00	0.81		
Avail Cap(c_a), veh/h	218	3982	0	0	3387	1054	0	303	0	866		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.82	0.82	0.00	0.00	0.00	1.00		
Uniform Delay (d), s/veh	45.7	3.6	0.0	0.0	6.8	6.1	0.0	0.0	0.0	43.6		
Incr Delay (d2), s/veh	4.2	0.5	0.0	0.0	0.2	0.3	0.0	0.0	0.0	1.6		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	2.9	6.4	0.0	0.0	4.2	2.0	0.0	0.0	0.0	4.1		
LnGrp Delay(d),s/veh	49.9	4.1	0.0	0.0	7.0	6.4	0.0	0.0	0.0	45.1		
LnGrp LOS	D	A			A	A				D		
Approach Vol, veh/h		2093			1275			0				
Approach Delay, s/veh		6.3			6.9			0.0				
Approach LOS		A			A							

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6		
Phs Duration (G+Y+Rc), s	11.8	72.8	15.4	0.0		84.6		
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6		5.5		
Max Green Setting (Gmax), s	12.4	26.5	25.4	16.4		43.5		
Max Q Clear Time (g_c+I1), s	7.7	11.0	10.5	0.0		15.7		
Green Ext Time (p_c), s	0.0	14.3	0.3	0.0		24.2		

Intersection Summary			
HCM 2010 Ctrl Delay			9.7
HCM 2010 LOS			A

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	187	1320	537	77	772	273	467	257	85	347	379	242
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	203	1435	404	84	839	98	508	279	14	377	412	18
Adj No. of Lanes	2	3	2	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	277	2397	1643	139	2192	668	613	935	281	441	681	203
Arrive On Green	0.08	0.48	0.48	0.04	0.44	0.44	0.18	0.19	0.19	0.13	0.14	0.14
Sat Flow, veh/h	3408	5036	2703	3408	5036	1535	3408	5036	1515	3408	5036	1503
Grp Volume(v), veh/h	203	1435	404	84	839	98	508	279	14	377	412	18
Grp Sat Flow(s),veh/h/ln	1704	1679	1352	1704	1679	1535	1704	1679	1515	1704	1679	1503
Q Serve(g_s), s	7.0	25.1	8.3	2.9	13.5	4.6	17.2	5.7	0.9	13.0	9.2	1.3
Cycle Q Clear(g_c), s	7.0	25.1	8.3	2.9	13.5	4.6	17.2	5.7	0.9	13.0	9.2	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	277	2397	1643	139	2192	668	613	935	281	441	681	203
V/C Ratio(X)	0.73	0.60	0.25	0.60	0.38	0.15	0.83	0.30	0.05	0.86	0.61	0.09
Avail Cap(c_a), veh/h	494	2397	1643	494	2192	668	863	1406	423	494	860	257
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.81	0.81	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.8	23.0	11.0	56.6	23.0	20.4	47.4	42.1	40.2	51.1	48.9	45.4
Incr Delay (d2), s/veh	1.1	0.9	0.3	1.6	0.5	0.5	3.3	0.1	0.0	11.6	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	11.8	3.2	1.4	6.4	2.0	8.4	2.7	0.4	6.8	4.3	0.5
LnGrp Delay(d),s/veh	55.0	23.9	11.3	58.2	23.5	20.9	50.7	42.2	40.2	62.7	49.2	45.5
LnGrp LOS	D	C	B	E	C	C	D	D	D	E	D	D
Approach Vol, veh/h		2042			1021			801			807	
Approach Delay, s/veh		24.5			26.1			47.6			55.4	
Approach LOS		C			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.4	57.7	26.2	21.7	9.5	62.6	20.1	27.8
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	17.4	31.5	30.4	20.5	17.4	31.5	17.4	33.5
Max Q Clear Time (g_c+I1), s	9.0	15.5	19.2	11.2	4.9	27.1	15.0	7.7
Green Ext Time (p_c), s	0.8	15.5	2.3	5.0	0.3	4.4	0.5	9.6

Intersection Summary	
HCM 2010 Ctrl Delay	34.2
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	66	1503	113	84	1281	10	141	24	49	43	30	62
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	69	1566	113	88	1334	10	147	25	4	45	31	1
Adj No. of Lanes	1	3	0	1	3	0	1	1	0	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	89	3039	219	112	3340	25	176	166	27	58	75	63
Arrive On Green	0.05	0.63	0.63	0.08	0.86	0.86	0.10	0.11	0.11	0.03	0.04	0.04
Sat Flow, veh/h	1757	4786	345	1757	5156	39	1757	1544	247	1757	1845	1568
Grp Volume(v), veh/h	69	1098	581	88	869	475	147	0	29	45	31	1
Grp Sat Flow(s),veh/h/ln	1757	1679	1774	1757	1679	1838	1757	0	1791	1757	1845	1568
Q Serve(g_s), s	4.7	21.3	21.3	5.9	6.6	6.6	9.9	0.0	1.8	3.0	2.0	0.1
Cycle Q Clear(g_c), s	4.7	21.3	21.3	5.9	6.6	6.6	9.9	0.0	1.8	3.0	2.0	0.1
Prop In Lane	1.00		0.19	1.00		0.02	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	89	2132	1127	112	2175	1191	176	0	192	58	75	63
V/C Ratio(X)	0.77	0.52	0.52	0.79	0.40	0.40	0.84	0.00	0.15	0.77	0.42	0.02
Avail Cap(c_a), veh/h	343	2132	1127	299	2175	1191	299	0	230	299	237	201
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.78	0.78	0.78	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.3	11.9	11.9	54.1	3.4	3.4	53.0	0.0	48.6	57.6	56.2	55.3
Incr Delay (d2), s/veh	5.2	0.9	1.7	3.6	0.4	0.8	4.0	0.0	0.1	7.8	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	10.0	10.9	3.0	3.0	3.5	5.0	0.0	0.9	1.6	1.0	0.0
LnGrp Delay(d),s/veh	61.5	12.8	13.6	57.7	3.8	4.2	57.0	0.0	48.7	65.3	57.6	55.3
LnGrp LOS	E	B	B	E	A	A	E		D	E	E	E
Approach Vol, veh/h		1748			1432			176			77	
Approach Delay, s/veh		15.0			7.2			55.6			62.1	
Approach LOS		B			A			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.2	81.7	16.6	9.5	10.7	83.2	8.6	17.5
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	20.4	44.5	20.4	15.4	23.4	41.5	20.4	15.4
Max Q Clear Time (g_c+I1), s	7.9	23.3	11.9	4.0	6.7	8.6	5.0	3.8
Green Ext Time (p_c), s	0.2	18.6	0.2	0.1	0.1	27.2	0.1	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.9
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	318	1058	123	449	1084	223	118	348	183	256	723	224
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.96	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	346	1150	37	488	1178	115	128	378	65	278	786	60
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	444	1965	598	579	2164	659	193	930	254	349	1175	323
Arrive On Green	0.04	0.13	0.13	0.34	0.86	0.86	0.06	0.17	0.17	0.10	0.21	0.21
Sat Flow, veh/h	3408	5036	1533	3408	5036	1534	3514	5534	1512	3514	5534	1519
Grp Volume(v), veh/h	346	1150	37	488	1178	115	128	378	65	278	786	60
Grp Sat Flow(s),veh/h/ln	1704	1679	1533	1704	1679	1534	1757	1845	1512	1757	1845	1519
Q Serve(g_s), s	12.1	25.8	2.5	15.9	7.4	1.5	4.3	7.3	4.5	9.3	15.6	3.9
Cycle Q Clear(g_c), s	12.1	25.8	2.5	15.9	7.4	1.5	4.3	7.3	4.5	9.3	15.6	3.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	444	1965	598	579	2164	659	193	930	254	349	1175	323
V/C Ratio(X)	0.78	0.59	0.06	0.84	0.54	0.17	0.66	0.41	0.26	0.80	0.67	0.19
Avail Cap(c_a), veh/h	721	1965	598	863	2164	659	451	1130	309	451	1175	323
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	0.76	0.76	0.76	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.7	43.1	33.0	38.1	5.3	4.9	55.6	44.6	43.4	52.9	43.4	38.8
Incr Delay (d2), s/veh	0.9	1.0	0.2	2.4	0.8	0.4	1.4	0.1	0.2	5.6	1.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	12.2	1.1	7.6	3.4	0.7	2.1	3.8	1.9	4.8	8.1	1.6
LnGrp Delay(d),s/veh	56.6	44.1	33.1	40.6	6.1	5.3	57.1	44.7	43.6	58.5	44.6	38.9
LnGrp LOS	E	D	C	D	A	A	E	D	D	E	D	D
Approach Vol, veh/h		1533			1781			571			1124	
Approach Delay, s/veh		46.7			15.5			47.3			47.7	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.2	57.6	11.2	31.0	25.0	52.8	16.5	25.7
Change Period (Y+Rc), s	4.6	6.0	4.6	5.5	4.6	* 6	4.6	5.5
Max Green Setting (Gmax), s	25.4	34.0	15.4	24.5	30.4	* 30	15.4	24.5
Max Q Clear Time (g_c+I1), s	14.1	9.4	6.3	17.6	17.9	27.8	11.3	9.3
Green Ext Time (p_c), s	1.6	23.6	0.4	5.8	2.5	1.7	0.6	9.9

Intersection Summary		
HCM 2010 Ctrl Delay		35.9
HCM 2010 LOS		D

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	1409	31	26	1833	118	18	6	47	54	7	9
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.91	1.00		0.92
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1900	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	15	1532	33	28	1992	120	20	7	25	65	0	6
Adj No. of Lanes	1	3	1	1	3	0	0	1	1	2	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	29	3375	1019	44	3248	195	70	24	76	196	0	80
Arrive On Green	0.03	1.00	1.00	0.05	1.00	1.00	0.05	0.05	0.05	0.06	0.00	0.06
Sat Flow, veh/h	1757	5036	1521	1757	4849	291	1318	461	1432	3514	0	1438
Grp Volume(v), veh/h	15	1532	33	28	1376	736	27	0	25	65	0	6
Grp Sat Flow(s),veh/h/ln	1757	1679	1521	1757	1679	1783	1779	0	1432	1757	0	1438
Q Serve(g_s), s	1.0	0.0	0.0	1.9	0.0	0.0	1.8	0.0	2.0	2.1	0.0	0.5
Cycle Q Clear(g_c), s	1.0	0.0	0.0	1.9	0.0	0.0	1.8	0.0	2.0	2.1	0.0	0.5
Prop In Lane	1.00		1.00	1.00		0.16	0.74		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	29	3375	1019	44	2249	1194	94	0	76	196	0	80
V/C Ratio(X)	0.52	0.45	0.03	0.63	0.61	0.62	0.29	0.00	0.33	0.33	0.00	0.07
Avail Cap(c_a), veh/h	122	3375	1019	357	2249	1194	273	0	220	539	0	221
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.70	0.70	0.75	0.75	0.75	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.6	0.0	0.0	56.4	0.0	0.0	54.6	0.0	54.8	54.5	0.0	53.7
Incr Delay (d2), s/veh	9.8	0.3	0.0	10.6	0.9	1.8	1.7	0.0	2.5	1.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.1	0.0	1.0	0.3	0.6	0.9	0.0	0.9	1.1	0.0	0.2
LnGrp Delay(d),s/veh	67.4	0.3	0.0	67.0	0.9	1.8	56.3	0.0	57.3	55.5	0.0	54.1
LnGrp LOS	E	A	A	E	A	A	E		E	E		D
Approach Vol, veh/h		1580			2140			52			71	
Approach Delay, s/veh		0.9			2.1			56.8			55.4	
Approach LOS		A			A			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.7	87.1		11.9	8.6	87.1		12.3
Change Period (Y+Rc), s	6.7	6.7		5.6	5.6	6.7		5.6
Max Green Setting (Gmax), s	8.3	50.3		18.4	24.4	35.3		18.4
Max Q Clear Time (g_c+I1), s	3.0	2.0		4.0	3.9	2.0		4.1
Green Ext Time (p_c), s	0.0	43.5		0.2	0.1	30.9		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	3.4
HCM 2010 LOS	A

Notes
User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	199	1220	75	302	1574	197	78	92	188	183	225	199
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.95	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	216	1326	37	328	1711	160	85	100	8	199	245	18
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	287	2589	790	408	2767	845	138	419	179	267	552	238
Arrive On Green	0.17	1.00	1.00	0.12	0.55	0.55	0.04	0.12	0.12	0.08	0.16	0.16
Sat Flow, veh/h	3408	5036	1537	3408	5036	1538	3408	3505	1497	3408	3505	1509
Grp Volume(v), veh/h	216	1326	37	328	1711	160	85	100	8	199	245	18
Grp Sat Flow(s),veh/h/ln	1704	1679	1537	1704	1679	1538	1704	1752	1497	1704	1752	1509
Q Serve(g_s), s	7.2	0.0	0.0	11.2	27.8	6.3	2.9	3.1	0.6	6.9	7.6	1.2
Cycle Q Clear(g_c), s	7.2	0.0	0.0	11.2	27.8	6.3	2.9	3.1	0.6	6.9	7.6	1.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	287	2589	790	408	2767	845	138	419	179	267	552	238
V/C Ratio(X)	0.75	0.51	0.05	0.80	0.62	0.19	0.61	0.24	0.04	0.74	0.44	0.08
Avail Cap(c_a), veh/h	579	2589	790	579	2767	845	494	803	343	494	803	346
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	1.00	1.00	1.00	0.99	0.99	0.99	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.7	0.0	0.0	51.5	18.5	13.6	56.6	47.9	46.8	54.1	45.8	43.1
Incr Delay (d2), s/veh	1.4	0.7	0.1	3.5	1.0	0.5	1.6	0.1	0.0	1.6	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.2	0.0	5.5	13.1	2.8	1.4	1.5	0.2	3.3	3.7	0.5
LnGrp Delay(d),s/veh	50.0	0.7	0.1	55.0	19.5	14.1	58.3	48.0	46.8	55.7	46.0	43.2
LnGrp LOS	D	A	A	D	B	B	E	D	D	E	D	D
Approach Vol, veh/h		1579			2199			193			462	
Approach Delay, s/veh		7.4			24.4			52.5			50.1	
Approach LOS		A			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.7	71.4	9.5	24.4	19.0	67.2	14.0	19.8
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	20.4	34.5	17.4	27.5	20.4	34.5	17.4	27.5
Max Q Clear Time (g_c+I1), s	9.2	29.8	4.9	9.6	13.2	2.0	8.9	5.1
Green Ext Time (p_c), s	0.9	4.7	0.2	3.5	1.1	32.2	0.6	3.9

Intersection Summary	
HCM 2010 Ctrl Delay	22.2
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

44: Laguna Springs Dr & Elk Grove Blvd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	2.0	2.2	0.2	2.0	0.0	0.0	0.0	3.6	0.3	0.5	3.6	0.8
Total Delay (hr)	0.0	0.4	1.5	0.0	0.5	1.9	0.1	0.2	0.3	0.1	0.5	0.2
Total Del/Veh (s)	48.1	51.6	14.4	3.7	53.6	13.1	14.6	52.7	49.0	16.8	51.0	44.7
Stop Delay (hr)	0.0	0.4	0.9	0.0	0.5	0.9	0.1	0.2	0.2	0.1	0.4	0.2
Stop Del/Veh (s)	45.4	46.7	8.2	1.6	49.2	6.4	7.5	49.5	43.9	16.1	47.2	39.6
Total Stops	1	23	137	2	28	100	7	14	15	28	30	16
Stop/Veh	1.00	0.85	0.36	0.40	0.85	0.19	0.28	0.88	0.79	0.88	0.88	0.84
Travel Dist (mi)	0.2	5.2	75.5	1.0	4.8	85.5	4.1	2.7	3.0	5.3	6.5	3.7
Travel Time (hr)	0.0	0.5	3.2	0.0	0.7	4.5	0.2	0.3	0.3	0.3	0.7	0.3
Avg Speed (mph)	9	10	24	30	7	19	16	8	9	16	9	11
Fuel Used (gal)	0.0	0.1	1.1	0.0	0.1	1.9	0.1	0.0	0.1	0.1	0.1	0.1
Fuel Eff. (mpg)	78.6	63.4	66.2	63.6	51.2	45.8	50.9	62.1	49.6	66.2	61.6	59.0
HC Emissions (g)	0	2	32	1	4	54	2	1	2	3	2	2
CO Emissions (g)	2	77	1180	29	120	1666	56	53	56	93	90	48
NOx Emissions (g)	0	6	105	2	11	193	7	4	5	9	7	5
Vehicles Entered	1	25	360	5	29	519	24	16	18	31	33	18
Vehicles Exited	1	26	368	5	31	506	24	15	18	31	30	17
Hourly Exit Rate	4	104	1472	20	124	2024	96	60	72	124	120	68
Input Volume	5	99	1444	23	120	2051	96	64	67	126	133	70
% of Volume	80	105	102	87	103	99	100	94	107	98	90	97
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	2	13	0	3	18	1	1	1	1	3	1

44: Laguna Springs Dr & Elk Grove Blvd Performance by movement

Movement	SBR	All
Denied Delay (hr)	0.0	0.1
Denied Del/Veh (s)	3.6	0.4
Total Delay (hr)	0.2	6.0
Total Del/Veh (s)	19.6	18.7
Stop Delay (hr)	0.2	4.1
Stop Del/Veh (s)	18.0	12.7
Total Stops	29	430
Stop/Veh	0.85	0.37
Travel Dist (mi)	6.6	203.9
Travel Time (hr)	0.4	11.7
Avg Speed (mph)	16	18
Fuel Used (gal)	0.1	3.7
Fuel Eff. (mpg)	57.6	54.5
HC Emissions (g)	3	107
CO Emissions (g)	92	3560
NOx Emissions (g)	9	362
Vehicles Entered	33	1112
Vehicles Exited	32	1104
Hourly Exit Rate	128	4416
Input Volume	134	4432
% of Volume	96	100
Denied Entry Before	0	0
Denied Entry After	0	0
Density (ft/veh)		353
Occupancy (veh)	2	46

45: Auto Center Dr & Elk Grove Blvd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.3
Total Delay (hr)	0.0	0.5	2.2	0.1	0.2	0.8	3.1	0.0	0.5	0.1	0.7	0.6
Total Del/Veh (s)		47.8	19.7	16.3	48.2	50.1	19.3	18.3	51.4	62.9	39.9	48.2
Stop Delay (hr)	0.0	0.4	1.5	0.1	0.2	0.7	1.8	0.0	0.5	0.1	0.7	0.6
Stop Del/Veh (s)		42.2	13.7	11.1	43.8	44.6	11.3	10.8	48.2	58.7	38.3	46.1
Total Stops	0	29	141	7	13	42	229	1	32	7	58	40
Stop/Veh		0.81	0.36	0.39	0.76	0.78	0.40	0.50	0.89	1.00	0.89	0.83
Travel Dist (mi)	0.0	5.3	61.7	2.8	2.4	7.7	83.7	0.3	2.5	0.5	4.4	1.3
Travel Time (hr)	0.0	0.7	4.0	0.2	0.3	1.0	5.8	0.0	0.6	0.1	0.9	0.7
Avg Speed (mph)	7	8	15	15	7	7	14	13	4	4	5	2
Fuel Used (gal)	0.0	0.1	1.2	0.0	0.1	0.2	1.8	0.0	0.1	0.0	0.1	0.0
Fuel Eff. (mpg)	59.8	46.8	49.4	57.4	45.8	47.6	47.3	69.3	35.7	36.8	42.8	27.4
HC Emissions (g)	0	3	38	2	1	5	54	0	2	0	3	1
CO Emissions (g)	1	101	1251	44	49	181	1696	2	51	10	82	28
NOx Emissions (g)	0	10	129	5	4	16	183	0	5	1	8	3
Vehicles Entered	0	32	379	17	15	48	552	2	35	7	62	46
Vehicles Exited	0	33	384	17	16	51	563	2	32	7	60	45
Hourly Exit Rate	0	132	1536	68	64	204	2252	8	128	28	240	180
Input Volume	1	124	1512	66	60	198	2192	7	148	27	250	197
% of Volume	0	106	102	103	107	103	103	114	86	104	96	91
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	3	16	1	1	4	23	0	2	1	4	3

45: Auto Center Dr & Elk Grove Blvd Performance by movement

Movement	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0
Denied Del/Veh (s)	0.3	0.5	0.1
Total Delay (hr)	0.0	0.3	9.1
Total Del/Veh (s)	54.4	29.5	25.4
Stop Delay (hr)	0.0	0.3	6.9
Stop Del/Veh (s)	52.3	29.3	19.2
Total Stops	3	27	629
Stop/Veh	1.00	0.84	0.49
Travel Dist (mi)	0.1	0.9	173.7
Travel Time (hr)	0.0	0.3	14.9
Avg Speed (mph)	2	3	12
Fuel Used (gal)	0.0	0.0	3.7
Fuel Eff. (mpg)	31.6	30.5	47.4
HC Emissions (g)	0	1	109
CO Emissions (g)	1	15	3511
NOx Emissions (g)	0	2	366
Vehicles Entered	3	32	1230
Vehicles Exited	3	30	1243
Hourly Exit Rate	12	120	4972
Input Volume	13	127	4922
% of Volume	92	94	101
Denied Entry Before	0	0	0
Denied Entry After	0	0	0
Density (ft/veh)			146
Occupancy (veh)	0	1	59

46: Elk Grove Blvd & SR 99 SB Off Performance by movement

Movement	EBT	EBR	WBU	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.0		0.0	0.0	0.5		0.5	0.2
Total Delay (hr)	3.3	0.4	0.0	0.4	1.2	2.3	0.0	3.8	11.4
Total Del/Veh (s)	25.0	29.4		54.8	11.9	45.5		47.1	29.7
Stop Delay (hr)	2.0	0.3	0.0	0.4	0.8	1.7	0.0	2.9	8.1
Stop Del/Veh (s)	15.3	18.7		51.9	8.0	35.0		35.4	21.1
Total Stops	200	25	0	24	122	161	0	306	838
Stop/Veh	0.42	0.51		0.86	0.34	0.89		1.05	0.61
Travel Dist (mi)	72.6	7.5	0.0	2.0	27.4	41.5	0.0	66.2	217.2
Travel Time (hr)	5.5	0.7	0.0	0.5	2.0	3.6	0.0	6.0	18.3
Avg Speed (mph)	13	11	5	4	14	12	14	11	12
Fuel Used (gal)	1.4	0.1	0.0	0.0	0.5	0.7	0.0	1.1	3.9
Fuel Eff. (mpg)	50.2	55.4	71.7	51.1	59.9	60.0	96.1	61.0	56.4
HC Emissions (g)	44	4	0	1	11	19	0	27	105
CO Emissions (g)	1431	113	0	28	284	565	0	773	3195
NOx Emissions (g)	149	12	0	2	36	59	0	81	339
Vehicles Entered	457	47	0	25	340	171	0	274	1314
Vehicles Exited	454	46	0	27	351	163	0	265	1306
Hourly Exit Rate	1816	184	0	108	1404	652	0	1060	5224
Input Volume	1833	184	2	97	1376	679	1	1081	5253
% of Volume	99	100	0	111	102	96	0	98	99
Denied Entry Before	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0
Density (ft/veh)									132
Occupancy (veh)	22	3	0	2	8	14	0	24	73

47: Elk Grove Blvd Performance by movement

Movement	EBT	WBT	WBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Delay (hr)	0.6	0.4	0.1	1.1
Total Del/Veh (s)	3.6	3.8	5.9	3.8
Stop Delay (hr)	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.1	0.2	0.1	0.1
Total Stops	12	8	0	20
Stop/Veh	0.02	0.02	0.00	0.02
Travel Dist (mi)	54.4	69.6	12.5	136.5
Travel Time (hr)	2.4	2.5	0.5	5.5
Avg Speed (mph)	23	27	23	25
Fuel Used (gal)	1.4	1.5	0.2	3.1
Fuel Eff. (mpg)	39.2	45.7	54.0	43.4
HC Emissions (g)	48	49	7	103
CO Emissions (g)	1729	1627	240	3595
NOx Emissions (g)	170	167	24	361
Vehicles Entered	617	366	68	1051
Vehicles Exited	616	365	68	1049
Hourly Exit Rate	2464	1460	272	4196
Input Volume	2515	1476	278	4269
% of Volume	98	99	98	98
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0
Density (ft/veh)				244
Occupancy (veh)	10	10	2	22

48: E Stockton Blvd & SR 99 NB Off Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	1.9	0.6	0.5	0.5	0.1	0.1	3.6	0.3	0.2	0.1	0.0	0.1
Total Delay (hr)	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.1	0.4	0.9
Total Del/Veh (s)	20.4	22.3	11.7	28.5	27.8	4.9	33.1	22.2	10.2	39.1	39.1	30.1
Stop Delay (hr)	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.1	0.3	0.6
Stop Del/Veh (s)	18.1	19.5	10.7	27.3	26.1	4.9	29.7	17.7	8.6	32.0	31.0	20.6
Total Stops	53	3	3	3	5	13	29	38	2	14	42	89
Stop/Veh	0.67	0.75	0.75	0.75	0.83	0.87	0.88	0.68	0.67	1.17	1.11	0.86
Travel Dist (mi)	18.4	0.9	1.0	0.1	0.1	0.3	4.5	7.8	0.5	1.5	4.6	12.7
Travel Time (hr)	1.2	0.1	0.1	0.0	0.1	0.0	0.5	0.6	0.0	0.2	0.6	1.3
Avg Speed (mph)	15	15	18	2	2	7	10	14	19	7	8	10
Fuel Used (gal)	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.3
Fuel Eff. (mpg)	55.4	68.1	73.7	33.7	35.6	82.0	55.7	59.7	78.8	47.8	44.1	39.8
HC Emissions (g)	5	0	0	0	0	0	2	4	0	1	3	10
CO Emissions (g)	125	3	3	1	2	2	91	151	6	30	120	332
NOx Emissions (g)	17	0	0	0	0	0	7	13	0	3	12	34
Vehicles Entered	73	4	4	4	6	15	31	54	3	11	36	98
Vehicles Exited	75	4	4	4	5	14	31	54	3	11	36	97
Hourly Exit Rate	300	16	16	16	20	56	124	216	12	44	144	388
Input Volume	303	15	15	14	24	55	124	220	13	44	147	417
% of Volume	99	107	107	114	83	102	100	98	92	100	98	93
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	5	0	0	0	0	0	2	2	0	1	2	5

48: E Stockton Blvd & SR 99 NB Off Performance by movement

Movement	SBR	All
Denied Delay (hr)	0.0	0.1
Denied Del/Veh (s)	0.0	0.6
Total Delay (hr)	0.4	3.1
Total Del/Veh (s)	9.2	21.0
Stop Delay (hr)	0.1	2.2
Stop Del/Veh (s)	3.0	15.2
Total Stops	90	384
Stop/Veh	0.51	0.72
Travel Dist (mi)	21.9	74.2
Travel Time (hr)	1.4	6.1
Avg Speed (mph)	15	12
Fuel Used (gal)	0.4	1.4
Fuel Eff. (mpg)	57.2	52.2
HC Emissions (g)	13	40
CO Emissions (g)	483	1350
NOx Emissions (g)	45	131
Vehicles Entered	170	509
Vehicles Exited	169	507
Hourly Exit Rate	676	2028
Input Volume	680	2071
% of Volume	99	98
Denied Entry Before	0	0
Denied Entry After	0	0
Density (ft/veh)		294
Occupancy (veh)	6	24

49: E Stockton Blvd/Emerald Vista Dr & Elk Grove Blvd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	2.3	2.3	0.8	2.4	0.0	0.0	0.0	3.4
Total Delay (hr)	0.1	0.6	2.3	0.8	0.0	0.4	2.7	0.2	1.5	0.4	0.4	0.7
Total Del/Veh (s)	60.4	57.2	24.0	11.6	66.3	61.7	30.9	21.2	51.6	47.5	34.9	49.8
Stop Delay (hr)	0.1	0.6	1.7	0.0	0.0	0.4	2.0	0.1	1.3	0.3	0.3	0.7
Stop Del/Veh (s)	56.2	52.4	18.1	0.4	62.0	55.6	23.1	15.7	46.5	40.9	30.8	46.2
Total Stops	4	32	170	21	1	25	198	21	82	19	30	44
Stop/Veh	1.00	0.80	0.50	0.08	1.00	0.96	0.62	0.64	0.80	0.70	0.81	0.81
Travel Dist (mi)	0.7	6.5	57.3	44.7	0.2	4.8	62.2	6.5	12.4	3.2	4.6	5.1
Travel Time (hr)	0.1	0.8	3.9	2.3	0.0	0.6	4.6	0.4	1.9	0.5	0.6	1.0
Avg Speed (mph)	8	8	15	19	8	8	14	16	6	7	8	5
Fuel Used (gal)	0.0	0.1	1.0	0.6	0.0	0.1	1.0	0.1	0.3	0.1	0.1	0.1
Fuel Eff. (mpg)	65.5	52.6	58.7	79.2	68.8	57.4	59.5	58.4	44.0	41.4	45.2	45.6
HC Emissions (g)	0	3	25	17	0	2	27	4	8	4	4	3
CO Emissions (g)	10	79	694	477	2	55	774	109	324	113	138	90
NOx Emissions (g)	1	9	79	55	0	5	81	11	28	10	11	9
Vehicles Entered	4	36	325	251	1	24	304	32	94	25	35	50
Vehicles Exited	4	36	324	251	1	24	298	31	93	25	35	50
Hourly Exit Rate	16	144	1296	1004	4	96	1192	124	372	100	140	200
Input Volume	17	144	1318	1036	5	91	1200	121	383	103	136	197
% of Volume	94	100	98	97	80	105	99	102	97	97	103	102
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	3	16	9	0	2	18	2	8	2	2	4

49: E Stockton Blvd/Emerald Vista Dr & Elk Grove Blvd Performance by movement

Movement	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.2
Denied Del/Veh (s)	0.7	0.3	0.5
Total Delay (hr)	0.5	0.1	10.8
Total Del/Veh (s)	46.6	12.2	29.4
Stop Delay (hr)	0.5	0.1	8.2
Stop Del/Veh (s)	43.0	11.5	22.4
Total Stops	32	32	711
Stop/Veh	0.80	0.80	0.54
Travel Dist (mi)	3.7	3.9	215.9
Travel Time (hr)	0.7	0.3	17.8
Avg Speed (mph)	6	12	12
Fuel Used (gal)	0.1	0.1	3.6
Fuel Eff. (mpg)	48.7	53.8	59.3
HC Emissions (g)	2	2	101
CO Emissions (g)	47	50	2961
NOx Emissions (g)	5	6	309
Vehicles Entered	37	38	1256
Vehicles Exited	37	39	1248
Hourly Exit Rate	148	156	4992
Input Volume	145	153	5049
% of Volume	102	102	99
Denied Entry Before	0	0	0
Denied Entry After	0	0	0
Density (ft/veh)			179
Occupancy (veh)	3	1	71

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	330	634	283	116	538	72	240	317	78	119	303	323
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	344	660	122	121	560	68	250	330	65	124	316	70
Adj No. of Lanes	2	2	1	1	2	0	2	2	0	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	443	1125	493	154	875	106	345	735	143	158	444	370
Arrive On Green	0.13	0.32	0.32	0.09	0.28	0.28	0.10	0.25	0.25	0.09	0.24	0.24
Sat Flow, veh/h	3408	3505	1536	1757	3139	380	3408	2914	566	1757	1845	1539
Grp Volume(v), veh/h	344	660	122	121	312	316	250	197	198	124	316	70
Grp Sat Flow(s),veh/h/ln	1704	1752	1536	1757	1752	1767	1704	1752	1728	1757	1845	1539
Q Serve(g_s), s	7.2	11.6	4.3	5.0	11.5	11.6	5.2	7.0	7.2	5.1	11.6	2.7
Cycle Q Clear(g_c), s	7.2	11.6	4.3	5.0	11.5	11.6	5.2	7.0	7.2	5.1	11.6	2.7
Prop In Lane	1.00		1.00	1.00		0.22	1.00		0.33	1.00		1.00
Lane Grp Cap(c), veh/h	443	1125	493	154	489	493	345	442	436	158	444	370
V/C Ratio(X)	0.78	0.59	0.25	0.78	0.64	0.64	0.72	0.45	0.46	0.79	0.71	0.19
Avail Cap(c_a), veh/h	1155	1901	833	596	951	958	1155	951	937	596	1001	835
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.1	20.9	18.5	33.0	23.3	23.4	32.1	23.2	23.3	32.9	25.7	22.3
Incr Delay (d2), s/veh	1.1	0.2	0.1	3.3	0.5	0.5	1.1	0.3	0.3	3.3	0.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	5.6	1.8	2.6	5.6	5.7	2.5	3.4	3.4	2.6	6.0	1.1
LnGrp Delay(d),s/veh	32.2	21.1	18.6	36.2	23.8	23.9	33.2	23.5	23.6	36.1	26.5	22.4
LnGrp LOS	C	C	B	D	C	C	C	C	C	D	C	C
Approach Vol, veh/h		1126			749			645			510	
Approach Delay, s/veh		24.2			25.9			27.3			28.3	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.2	25.2	12.1	22.3	11.1	28.3	11.2	23.2
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	25.0	40.0	25.0	40.0	25.0	40.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	9.2	13.6	7.2	13.6	7.0	13.6	7.1	9.2
Green Ext Time (p_c), s	0.4	6.6	0.3	2.1	0.1	6.6	0.1	2.1

Intersection Summary	
HCM 2010 Ctrl Delay	26.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	101	424	104	90	398	138	159	244	77	221	219	79
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1881	1863	1900	1900	1863	1881	1900	1863	1845
Adj Flow Rate, veh/h	106	446	56	95	419	82	167	257	8	233	231	15
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	1	2	0	0	2	1	0	2	3
Cap, veh/h	142	632	533	124	603	457	212	572	253	284	375	308
Arrive On Green	0.08	0.33	0.33	0.07	0.32	0.32	0.12	0.16	0.16	0.16	0.20	0.20
Sat Flow, veh/h	1810	1900	1602	1792	1863	1413	1810	3539	1564	1810	1863	1529
Grp Volume(v), veh/h	106	446	56	95	419	82	167	257	8	233	231	15
Grp Sat Flow(s),veh/h/ln	1810	1900	1602	1792	1863	1413	1810	1770	1564	1810	1863	1529
Q Serve(g_s), s	3.8	13.5	1.6	3.4	12.9	2.7	5.9	4.3	0.3	8.2	7.5	0.5
Cycle Q Clear(g_c), s	3.8	13.5	1.6	3.4	12.9	2.7	5.9	4.3	0.3	8.2	7.5	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	142	632	533	124	603	457	212	572	253	284	375	308
V/C Ratio(X)	0.74	0.71	0.11	0.76	0.70	0.18	0.79	0.45	0.03	0.82	0.62	0.05
Avail Cap(c_a), veh/h	961	1730	1458	951	1696	1286	686	2148	949	686	1130	928
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.7	19.2	15.2	30.1	19.5	16.0	28.3	25.0	23.3	26.9	24.0	21.2
Incr Delay (d2), s/veh	7.5	0.5	0.0	3.6	0.5	0.1	2.5	0.2	0.0	2.3	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	7.2	0.7	1.8	6.7	1.1	3.1	2.1	0.1	4.3	3.9	0.2
LnGrp Delay(d),s/veh	37.2	19.7	15.2	33.8	20.0	16.1	30.8	25.2	23.3	29.2	24.6	21.3
LnGrp LOS	D	B	B	C	C	B	C	C	C	C	C	C
Approach Vol, veh/h		608			596			432			479	
Approach Delay, s/veh		22.3			21.7			27.3			26.7	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.8	25.9	12.3	17.9	9.2	26.5	14.9	15.3
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	35.0	60.0	25.0	40.0	35.0	60.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	5.8	14.9	7.9	9.5	5.4	15.5	10.2	6.3
Green Ext Time (p_c), s	0.3	4.2	0.2	2.0	0.1	4.2	0.3	2.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.2
HCM 2010 LOS	C

Intersection	
Intersection Delay, s/veh	18
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	90	135	12	0	11	186	13	0	34	213	9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	97	145	13	0	12	200	14	0	37	229	10
Number of Lanes	0	0	1	1	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	17	15.2	16.2
HCM LOS	C	C	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	13%	40%	0%	5%	3%
Vol Thru, %	83%	60%	0%	89%	61%
Vol Right, %	4%	0%	100%	6%	36%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	256	225	12	210	375
LT Vol	34	90	0	11	13
Through Vol	213	135	0	186	228
RT Vol	9	0	12	13	134
Lane Flow Rate	275	242	13	226	403
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.503	0.499	0.023	0.433	0.683
Departure Headway (Hd)	6.574	7.42	6.497	6.91	6.099
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	545	484	548	519	589
Service Time	4.646	5.192	4.269	4.988	4.163
HCM Lane V/C Ratio	0.505	0.5	0.024	0.435	0.684
HCM Control Delay	16.2	17.4	9.4	15.2	21.4
HCM Lane LOS	C	C	A	C	C
HCM 95th-tile Q	2.8	2.7	0.1	2.2	5.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	13	228	134
Peak Hour Factor	0.93	0.93	0.93	0.93
Heavy Vehicles, %	3	3	3	3
Mvmt Flow	0	14	245	144
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	21.4
HCM LOS	C

Lane

Intersection	
Intersection Delay, s/veh	14.2
Intersection LOS	B

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	125	3	0	6	293	0	401	210
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	2	0	2	2	2	0
Mvmt Flow	0	136	3	0	7	318	0	436	228
Number of Lanes	0	1	1	0	0	1	0	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	12.6	13.9	14.7
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	2%	100%	0%	0%	0%
Vol Thru, %	98%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	299	125	3	401	210
LT Vol	6	125	0	0	0
Through Vol	293	0	0	401	0
RT Vol	0	0	3	0	210
Lane Flow Rate	325	136	3	436	228
Geometry Grp	4	7	7	7	7
Degree of Util (X)	0.493	0.275	0.005	0.648	0.292
Departure Headway (Hd)	5.567	7.279	6.058	5.351	4.611
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	650	497	594	667	767
Service Time	3.567	4.979	3.758	3.149	2.408
HCM Lane V/C Ratio	0.5	0.274	0.005	0.654	0.297
HCM Control Delay	13.9	12.7	8.8	17.6	9.3
HCM Lane LOS	B	B	A	C	A
HCM 95th-tile Q	2.7	1.1	0	4.7	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	72	46	105	60	62	34	96	683	57	53	1055	63
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	78	50	106	65	67	11	104	742	20	58	1147	67
Adj No. of Lanes	1	1	1	2	1	1	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	103	271	222	135	236	192	135	2077	900	76	1880	110
Arrive On Green	0.06	0.15	0.15	0.04	0.13	0.13	0.08	0.59	0.59	0.04	0.56	0.56
Sat Flow, veh/h	1757	1845	1506	3408	1845	1500	1757	3505	1519	1757	3359	196
Grp Volume(v), veh/h	78	50	106	65	67	11	104	742	20	58	598	616
Grp Sat Flow(s),veh/h/ln	1757	1845	1506	1704	1845	1500	1757	1752	1519	1757	1752	1802
Q Serve(g_s), s	4.8	2.6	7.0	2.0	3.6	0.7	6.3	11.9	0.6	3.6	24.9	24.9
Cycle Q Clear(g_c), s	4.8	2.6	7.0	2.0	3.6	0.7	6.3	11.9	0.6	3.6	24.9	24.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	103	271	222	135	236	192	135	2077	900	76	981	1009
V/C Ratio(X)	0.76	0.18	0.48	0.48	0.28	0.06	0.77	0.36	0.02	0.76	0.61	0.61
Avail Cap(c_a), veh/h	403	677	553	782	677	551	403	2252	976	403	1126	1158
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.5	40.7	42.6	51.2	43.0	41.7	49.4	11.5	9.2	51.5	16.0	16.0
Incr Delay (d2), s/veh	4.3	0.1	0.6	1.0	0.2	0.0	3.5	0.0	0.0	5.6	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	1.3	2.9	1.0	1.8	0.3	3.2	5.8	0.2	1.8	12.1	12.4
LnGrp Delay(d),s/veh	54.8	40.8	43.2	52.2	43.2	41.8	52.9	11.5	9.2	57.2	16.4	16.4
LnGrp LOS	D	D	D	D	D	D	D	B	A	E	B	B
Approach Vol, veh/h		234			143			866			1272	
Approach Delay, s/veh		46.6			47.2			16.4			18.3	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.9	66.5	11.0	18.6	9.3	70.1	8.9	20.6
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	8.3	26.9	6.8	5.6	5.6	13.9	4.0	9.0
Green Ext Time (p_c), s	0.4	34.1	0.3	0.9	0.2	41.8	0.3	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	21.9
HCM 2010 LOS	C

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	17	127	19	0	16	146	5	0	14	9	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	18	135	20	0	17	155	5	0	15	10	7
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	8.7	8.8	8.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	47%	100%	0%	100%	0%	20%
Vol Thru, %	30%	0%	87%	0%	97%	43%
Vol Right, %	23%	0%	13%	0%	3%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	30	17	146	16	151	49
LT Vol	14	17	0	16	0	10
Through Vol	9	0	127	0	146	21
RT Vol	7	0	19	0	5	18
Lane Flow Rate	32	18	155	17	161	52
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.043	0.027	0.207	0.026	0.217	0.067
Departure Headway (Hd)	4.815	5.401	4.808	5.397	4.872	4.656
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	745	664	749	665	739	771
Service Time	2.835	3.12	2.526	3.114	2.589	2.675
HCM Lane V/C Ratio	0.043	0.027	0.207	0.026	0.218	0.067
HCM Control Delay	8.1	8.3	8.8	8.3	8.9	8
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.8	0.1	0.8	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	10	21	18
Peak Hour Factor	0.94	0.94	0.94	0.94
Heavy Vehicles, %	3	3	3	3
Mvmt Flow	0	11	22	19
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	8
HCM LOS	A

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	66	45	15	4	41	12	13	278	7	5	478	113
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	72	49	9	4	45	6	14	302	8	5	520	116
Adj No. of Lanes	1	1	1	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	100	363	299	9	268	219	30	1494	39	12	1183	262
Arrive On Green	0.06	0.20	0.20	0.01	0.15	0.15	0.02	0.43	0.43	0.01	0.42	0.42
Sat Flow, veh/h	1757	1845	1517	1757	1845	1506	1757	3485	92	1757	2831	628
Grp Volume(v), veh/h	72	49	9	4	45	6	14	151	159	5	321	315
Grp Sat Flow(s),veh/h/ln	1757	1845	1517	1757	1845	1506	1757	1752	1824	1757	1752	1706
Q Serve(g_s), s	2.5	1.4	0.3	0.1	1.3	0.2	0.5	3.4	3.4	0.2	8.2	8.3
Cycle Q Clear(g_c), s	2.5	1.4	0.3	0.1	1.3	0.2	0.5	3.4	3.4	0.2	8.2	8.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.05	1.00		0.37
Lane Grp Cap(c), veh/h	100	363	299	9	268	219	30	751	782	12	733	713
V/C Ratio(X)	0.72	0.13	0.03	0.42	0.17	0.03	0.46	0.20	0.20	0.43	0.44	0.44
Avail Cap(c_a), veh/h	698	1173	964	698	1173	957	698	1950	2030	698	1950	1898
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.2	20.8	20.4	31.2	23.5	23.1	30.6	11.2	11.2	31.1	13.0	13.1
Incr Delay (d2), s/veh	3.6	0.1	0.0	10.8	0.1	0.0	4.0	0.0	0.0	8.9	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.7	0.1	0.1	0.7	0.1	0.3	1.7	1.7	0.1	4.0	3.9
LnGrp Delay(d),s/veh	32.8	20.9	20.4	42.0	23.7	23.1	34.7	11.3	11.3	40.1	13.2	13.2
LnGrp LOS	C	C	C	D	C	C	C	B	B	D	B	B
Approach Vol, veh/h		130			55			324			641	
Approach Delay, s/veh		27.5			24.9			12.3			13.4	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	31.6	9.2	14.8	6.7	32.3	5.9	18.0
Change Period (Y+Rc), s	6.3	5.3	5.6	5.6	6.3	5.3	5.6	* 5.6
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	* 40
Max Q Clear Time (g_c+I1), s	2.5	10.3	4.5	3.3	2.2	5.4	2.1	3.4
Green Ext Time (p_c), s	0.0	15.9	0.1	0.4	0.0	16.1	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	15.2
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	46	0	4	0	0	0	6	252	0	0	440	58
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1900	0	1845	0	1845	1845	0	0	1845	1900
Adj Flow Rate, veh/h	50	0	0	0	0	0	7	274	0	0	478	58
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	0	3	0	3	3	0	0	3	3
Cap, veh/h	151	0	0	0	5	0	16	2285	0	0	1575	190
Arrive On Green	0.09	0.00	0.00	0.00	0.00	0.00	0.01	0.65	0.00	0.00	0.50	0.50
Sat Flow, veh/h	1757	0	0	0	1845	0	1757	3597	0	0	3228	379
Grp Volume(v), veh/h	50	0	0	0	0	0	7	274	0	0	266	270
Grp Sat Flow(s),veh/h/ln	1757	0	0	0	1845	0	1757	1752	0	0	1752	1762
Q Serve(g_s), s	1.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	0.0	0.0	3.4	3.4
Cycle Q Clear(g_c), s	1.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	0.0	0.0	3.4	3.4
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.00	0.00		0.21
Lane Grp Cap(c), veh/h	151	0	0	0	5	0	16	2285	0	0	880	885
V/C Ratio(X)	0.33	0.00	0.00	0.00	0.00	0.00	0.43	0.12	0.00	0.00	0.30	0.31
Avail Cap(c_a), veh/h	1164	0	0	0	1222	0	1164	6501	0	0	3251	3269
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	16.2	0.0	0.0	0.0	0.0	0.0	18.6	2.5	0.0	0.0	5.5	5.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	1.6	1.7
LnGrp Delay(d),s/veh	16.7	0.0	0.0	0.0	0.0	0.0	24.9	2.5	0.0	0.0	5.6	5.6
LnGrp LOS	B						C	A			A	A
Approach Vol, veh/h		50			0			281			536	
Approach Delay, s/veh		16.7			0.0			3.0			5.6	
Approach LOS		B						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	5.7	24.2		0.0		29.9		7.8
Change Period (Y+Rc), s	5.3	5.3		4.6		5.3		4.6
Max Green Setting (Gmax), s	25.0	70.0		25.0		70.0		25.0
Max Q Clear Time (g_c+I1), s	2.1	5.4		0.0		3.1		3.0
Green Ext Time (p_c), s	0.0	13.2		0.0		13.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	5.4
HCM 2010 LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	44	18	2	62	23	48	30	166	62	88	291	65
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.94	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	48	20	0	67	25	6	33	180	22	96	316	61
Adj No. of Lanes	1	1	0	2	1	2	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	82	301	0	194	320	639	63	1012	441	232	937	178
Arrive On Green	0.05	0.16	0.00	0.06	0.17	0.17	0.04	0.29	0.29	0.07	0.32	0.32
Sat Flow, veh/h	1757	1845	0	3408	1845	2598	1757	3505	1527	3408	2917	554
Grp Volume(v), veh/h	48	20	0	67	25	6	33	180	22	96	188	189
Grp Sat Flow(s),veh/h/ln	1757	1845	0	1704	1845	1299	1757	1752	1527	1704	1752	1719
Q Serve(g_s), s	1.5	0.5	0.0	1.1	0.7	0.1	1.1	2.2	0.6	1.6	4.7	4.8
Cycle Q Clear(g_c), s	1.5	0.5	0.0	1.1	0.7	0.1	1.1	2.2	0.6	1.6	4.7	4.8
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		0.32
Lane Grp Cap(c), veh/h	82	301	0	194	320	639	63	1012	441	232	563	552
V/C Ratio(X)	0.59	0.07	0.00	0.34	0.08	0.01	0.53	0.18	0.05	0.41	0.33	0.34
Avail Cap(c_a), veh/h	761	1279	0	1477	1279	1990	761	4254	1854	2364	2127	2086
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	20.4	0.0	26.2	20.0	16.6	27.3	15.4	14.8	25.8	14.9	14.9
Incr Delay (d2), s/veh	2.5	0.0	0.0	0.4	0.0	0.0	2.5	0.0	0.0	0.4	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.3	0.0	0.5	0.3	0.0	0.6	1.1	0.3	0.7	2.3	2.3
LnGrp Delay(d),s/veh	29.4	20.5	0.0	26.5	20.0	16.6	29.9	15.4	14.8	26.2	15.0	15.1
LnGrp LOS	C	C		C	C	B	C	B	B	C	B	B
Approach Vol, veh/h		68			98			235			473	
Approach Delay, s/veh		26.8			24.3			17.4			17.3	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	23.8	8.3	17.2	10.2	22.0	8.9	16.6
Change Period (Y+Rc), s	6.3	5.3	5.6	* 7.2	6.3	5.3	5.6	7.2
Max Green Setting (Gmax), s	25.0	70.0	25.0	* 40	40.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	3.1	6.8	3.5	2.7	3.6	4.2	3.1	2.5
Green Ext Time (p_c), s	0.1	8.1	0.1	0.2	0.6	8.1	0.1	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	18.8
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	201	66	5	6	124	42	8	15	16	12	15	261
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	218	72	2	7	135	10	9	16	2	13	16	24
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	447	1118	488	32	692	299	40	499	214	57	516	222
Arrive On Green	0.13	0.32	0.32	0.01	0.20	0.20	0.01	0.14	0.14	0.02	0.15	0.15
Sat Flow, veh/h	3408	3505	1529	3408	3505	1517	3408	3505	1505	3408	3505	1506
Grp Volume(v), veh/h	218	72	2	7	135	10	9	16	2	13	16	24
Grp Sat Flow(s),veh/h/ln	1704	1752	1529	1704	1752	1517	1704	1752	1505	1704	1752	1506
Q Serve(g_s), s	2.5	0.6	0.0	0.1	1.4	0.2	0.1	0.2	0.0	0.2	0.2	0.6
Cycle Q Clear(g_c), s	2.5	0.6	0.0	0.1	1.4	0.2	0.1	0.2	0.0	0.2	0.2	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	447	1118	488	32	692	299	40	499	214	57	516	222
V/C Ratio(X)	0.49	0.06	0.00	0.22	0.20	0.03	0.22	0.03	0.01	0.23	0.03	0.11
Avail Cap(c_a), veh/h	2804	4943	2157	2003	4943	2140	2003	3296	1415	2804	3296	1416
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	10.1	9.9	20.9	14.3	13.8	20.8	15.7	15.7	20.6	15.5	15.7
Incr Delay (d2), s/veh	0.3	0.0	0.0	1.3	0.1	0.0	1.0	0.0	0.0	0.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.3	0.0	0.0	0.7	0.1	0.1	0.1	0.0	0.1	0.1	0.2
LnGrp Delay(d),s/veh	17.5	10.1	9.9	22.2	14.3	13.8	21.8	15.7	15.7	21.4	15.5	15.8
LnGrp LOS	B	B	A	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h		292			152			27			53	
Approach Delay, s/veh		15.6			14.6			17.8			17.1	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	11.6	11.2	13.0	7.0	11.4	6.0	18.2
Change Period (Y+Rc), s	6.3	5.3	5.6	4.6	6.3	5.3	5.6	4.6
Max Green Setting (Gmax), s	25.0	40.0	35.0	60.0	35.0	40.0	25.0	60.0
Max Q Clear Time (g_c+I1), s	2.1	2.6	4.5	3.4	2.2	2.2	2.1	2.6
Green Ext Time (p_c), s	0.0	0.3	1.5	1.7	0.0	0.3	0.0	1.7

Intersection Summary	
HCM 2010 Ctrl Delay	15.6
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	86	9	6	6	15	16	29	87	6	5	57	54
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	95	10	5	7	16	15	32	96	7	5	63	40
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	303	874	390	32	596	265	132	573	253	23	462	206
Arrive On Green	0.09	0.25	0.25	0.01	0.17	0.17	0.04	0.16	0.16	0.01	0.13	0.13
Sat Flow, veh/h	3408	3505	1566	3408	3505	1562	3408	3505	1547	3408	3505	1568
Grp Volume(v), veh/h	95	10	5	7	16	15	32	96	7	5	63	40
Grp Sat Flow(s),veh/h/ln	1704	1752	1566	1704	1752	1562	1704	1752	1547	1704	1752	1568
Q Serve(g_s), s	0.8	0.1	0.1	0.1	0.1	0.3	0.3	0.8	0.1	0.0	0.5	0.7
Cycle Q Clear(g_c), s	0.8	0.1	0.1	0.1	0.1	0.3	0.3	0.8	0.1	0.0	0.5	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	303	874	390	32	596	265	132	573	253	23	462	206
V/C Ratio(X)	0.31	0.01	0.01	0.22	0.03	0.06	0.24	0.17	0.03	0.22	0.14	0.19
Avail Cap(c_a), veh/h	4230	4350	1944	4230	4350	1939	7402	7612	3360	2644	7612	3405
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.8	9.1	9.1	15.8	11.2	11.2	15.0	11.6	11.3	15.9	12.4	12.5
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.2	0.0	0.0	0.4	0.1	0.0	1.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.1	0.0	0.2	0.3
LnGrp Delay(d),s/veh	14.0	9.1	9.1	17.1	11.2	11.2	15.4	11.6	11.3	17.6	12.4	12.6
LnGrp LOS	B	A	A	B	B	B	B	B	B	B	B	B
Approach Vol, veh/h		110			38			135			108	
Approach Delay, s/veh		13.3			12.3			12.5			12.7	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.8	8.8	7.5	10.1	4.8	9.9	4.9	12.6
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	70.0	70.0	40.0	40.0	25.0	70.0	40.0	40.0
Max Q Clear Time (g_c+I1), s	2.3	2.7	2.8	2.3	2.0	2.8	2.1	2.1
Green Ext Time (p_c), s	0.1	0.7	0.2	0.1	0.0	0.7	0.0	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.8
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	66	0	308	2	302	84	545	404	0
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1845	0	1845	1845	1845	1845	1845	1845	1845	1845	0
Adj Flow Rate, veh/h	0	0	0	73	0	104	2	332	19	599	444	0
Adj No. of Lanes	0	1	0	1	0	2	1	2	1	2	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	3	0	3	3	3	3	3	3	3	3	0
Cap, veh/h	0	3	0	105	0	937	5	1552	694	750	1218	0
Arrive On Green	0.00	0.00	0.00	0.06	0.00	0.08	0.00	0.44	0.44	0.22	0.66	0.00
Sat Flow, veh/h	0	-61593	0	1757	0	3020	1757	3505	1567	3408	1845	0
Grp Volume(v), veh/h	0	0	0	73	0	104	2	332	19	599	444	0
Grp Sat Flow(s),veh/h/ln	0	1845	0	1757	0	1510	1757	1752	1567	1704	1845	0
Q Serve(g_s), s	0.0	0.0	0.0	2.3	0.0	1.4	0.1	3.4	0.4	9.6	6.2	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.3	0.0	1.4	0.1	3.4	0.4	9.6	6.2	0.0
Prop In Lane	0.00		0.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	0	3	0	105	0	937	5	1552	694	750	1218	0
V/C Ratio(X)	0.00	0.00	0.00	0.69	0.00	0.11	0.42	0.21	0.03	0.80	0.36	0.00
Avail Cap(c_a), veh/h	0	1089	0	763	0	2789	1221	4262	1905	3552	2259	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	26.5	0.0	14.5	28.7	9.9	9.0	21.2	4.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	3.1	0.0	0.0	19.9	0.0	0.0	0.8	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	1.2	0.0	0.6	0.1	1.6	0.2	4.6	3.1	0.0
LnGrp Delay(d),s/veh	0.0	0.0	0.0	29.6	0.0	14.5	48.6	9.9	9.1	22.0	4.4	0.0
LnGrp LOS				C		B	D	A	A	C	A	
Approach Vol, veh/h		0			177			353			1043	
Approach Delay, s/veh		0.0			20.8			10.1			14.5	
Approach LOS					C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s		9.3	17.3	31.0	8.0	1.3	4.8	43.5
Change Period (Y+Rc), s		4.6	4.6	5.5	4.6	* 4.6	4.6	* 5.5
Max Green Setting (Gmax), s		40.0	60.0	70.0	25.0	* 34	40.0	* 71
Max Q Clear Time (g_c+I1), s		3.4	11.6	5.4	4.3	0.0	2.1	8.2
Green Ext Time (p_c), s		0.7	1.1	20.1	0.1	0.0	0.0	19.9

Intersection Summary	
HCM 2010 Ctrl Delay	14.2
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	321	192	37	130	231	43	125	244	50	82	400	472
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	349	209	7	141	251	5	136	265	12	89	435	359
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	452	923	401	244	709	307	231	1225	535	178	1170	719
Arrive On Green	0.13	0.26	0.26	0.07	0.20	0.20	0.07	0.35	0.35	0.05	0.33	0.33
Sat Flow, veh/h	3408	3505	1525	3408	3505	1518	3408	3505	1531	3408	3505	1530
Grp Volume(v), veh/h	349	209	7	141	251	5	136	265	12	89	435	359
Grp Sat Flow(s),veh/h/ln	1704	1752	1525	1704	1752	1518	1704	1752	1531	1704	1752	1530
Q Serve(g_s), s	8.3	3.9	0.3	3.4	5.2	0.2	3.3	4.5	0.4	2.1	7.9	13.7
Cycle Q Clear(g_c), s	8.3	3.9	0.3	3.4	5.2	0.2	3.3	4.5	0.4	2.1	7.9	13.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	452	923	401	244	709	307	231	1225	535	178	1170	719
V/C Ratio(X)	0.77	0.23	0.02	0.58	0.35	0.02	0.59	0.22	0.02	0.50	0.37	0.50
Avail Cap(c_a), veh/h	1016	1671	727	1016	1671	724	1016	2925	1278	1016	2925	1485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.2	24.2	22.9	37.7	28.7	26.8	38.0	19.2	17.9	38.7	21.2	15.6
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.8	0.1	0.0	0.9	0.0	0.0	0.8	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	1.9	0.1	1.6	2.5	0.1	1.6	2.1	0.2	1.0	3.8	5.8
LnGrp Delay(d),s/veh	36.2	24.3	22.9	38.5	28.9	26.8	38.9	19.2	17.9	39.5	21.3	15.8
LnGrp LOS	D	C	C	D	C	C	D	B	B	D	C	B
Approach Vol, veh/h		565			397			413			883	
Approach Delay, s/veh		31.6			32.3			25.7			20.9	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	33.3	16.7	21.9	10.7	34.6	11.6	27.0
Change Period (Y+Rc), s	6.3	5.3	5.6	4.9	6.3	5.3	5.6	4.9
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	5.3	15.7	10.3	7.2	4.1	6.5	5.4	5.9
Green Ext Time (p_c), s	0.7	11.2	0.8	3.9	0.4	11.4	0.9	3.9

Intersection Summary		
HCM 2010 Ctrl Delay		26.5
HCM 2010 LOS		C

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	98	13	0	27	21	0	0	0	258	0	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	255	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	8	0	0	4	0	0	0	0	0	0	3
Mvmt Flow	0	111	15	0	31	24	0	0	0	293	0	44

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	31	0	-	111	0	0	142	142	31
Stage 1	-	-	-	-	-	-	31	31	-
Stage 2	-	-	-	-	-	-	111	111	-
Critical Hdwy	4.1	-	-	4.1	-	-	6.4	6.5	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.327
Pot Cap-1 Maneuver	1595	-	0	1492	-	0	856	753	1040
Stage 1	-	-	0	-	-	0	997	873	-
Stage 2	-	-	0	-	-	0	919	807	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1595	-	-	1492	-	-	856	0	1040
Mov Cap-2 Maneuver	-	-	-	-	-	-	856	0	-
Stage 1	-	-	-	-	-	-	997	0	-
Stage 2	-	-	-	-	-	-	919	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	1595	-	1492	-	856	1040
HCM Lane V/C Ratio	-	-	-	-	0.343	0.043
HCM Control Delay (s)	0	-	0	-	11.4	8.6
HCM Lane LOS	A	-	A	-	B	A
HCM 95th %tile Q(veh)	0	-	0	-	1.5	0.1

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	313	43	0	43	99	5	0	90	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	285	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	2	0	0	1	20	0	1	0	0	0
Mvmt Flow	0	360	49	0	49	114	6	0	103	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	49	0	-	360	0	0	409	409	360
Stage 1	-	-	-	-	-	-	360	360	-
Stage 2	-	-	-	-	-	-	49	49	-
Critical Hdwy	4.1	-	-	4.1	-	-	6.6	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	5.6	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.6	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.68	4	3.309
Pot Cap-1 Maneuver	1571	-	0	1210	-	0	566	535	687
Stage 1	-	-	0	-	-	0	668	630	-
Stage 2	-	-	0	-	-	0	929	858	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1571	-	-	1210	-	-	566	0	687
Mov Cap-2 Maneuver	-	-	-	-	-	-	566	0	-
Stage 1	-	-	-	-	-	-	668	0	-
Stage 2	-	-	-	-	-	-	929	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBL	WBT
Capacity (veh/h)	566	687	1571	-	1210	-
HCM Lane V/C Ratio	0.01	0.151	-	-	-	-
HCM Control Delay (s)	11.4	11.2	0	-	0	-
HCM Lane LOS	B	B	A	-	A	-
HCM 95th %tile Q(veh)	0	0.5	0	-	0	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	259	219	90	105	111	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6	4.6	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1532	1752	3505	1845	1534
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1532	1752	3505	1845	1534
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	291	246	101	118	125	73
RTOR Reduction (vph)	0	184	0	0	0	59
Lane Group Flow (vph)	291	62	101	118	125	14
Confl. Peds. (#/hr)						1
Confl. Bikes (#/hr)		2				
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	6		7 5	5 7 8	8	
Permitted Phases		6				8
Actuated Green, G (s)	18.8	18.8	24.1	44.1	14.4	14.4
Effective Green, g (s)	18.8	18.8	19.5	38.5	14.4	14.4
Actuated g/C Ratio	0.25	0.25	0.26	0.52	0.19	0.19
Clearance Time (s)	5.6	5.6			5.7	5.7
Vehicle Extension (s)	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	443	388	460	1818	358	297
v/s Ratio Prot	c0.17		c0.06	0.03	c0.07	
v/s Ratio Perm		0.04				0.01
v/c Ratio	0.66	0.16	0.22	0.06	0.35	0.05
Uniform Delay, d1	24.8	21.6	21.4	8.9	25.8	24.3
Progression Factor	1.00	1.00	1.07	1.33	1.00	1.00
Incremental Delay, d2	2.7	0.1	0.1	0.0	0.2	0.0
Delay (s)	27.5	21.6	22.9	11.8	26.1	24.3
Level of Service	C	C	C	B	C	C
Approach Delay (s)	24.8			16.9	25.4	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	74.2	Sum of lost time (s)	22.9
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations							
Volume (vph)	29	169	22	19	2	301	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	5.7			5.6	4.6
Lane Util. Factor	1.00	1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00	1.00
Frt	1.00	0.85	0.94			1.00	1.00
Flt Protected	0.95	1.00	1.00			0.95	1.00
Satd. Flow (prot)	1752	1548	1731			1752	1845
Flt Permitted	0.95	1.00	1.00			0.95	1.00
Satd. Flow (perm)	1752	1548	1731			1752	1845
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	31	182	24	20	2	324	31
RTOR Reduction (vph)	0	158	18	0	0	0	0
Lane Group Flow (vph)	31	24	26	0	0	326	31
Confl. Peds. (#/hr)		1					
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	Perm	NA		Prot	Prot	NA
Protected Phases	2		4		3 1	3 1	1 3 4
Permitted Phases		2					
Actuated Green, G (s)	9.9	9.9	9.1			36.9	51.6
Effective Green, g (s)	9.9	9.9	9.1			32.3	46.0
Actuated g/C Ratio	0.13	0.13	0.12			0.44	0.62
Clearance Time (s)	7.0	7.0	5.7				
Vehicle Extension (s)	2.0	2.0	2.0				
Lane Grp Cap (vph)	233	206	212			762	1143
v/s Ratio Prot	c0.02		c0.02			c0.19	0.02
v/s Ratio Perm		0.02					
v/c Ratio	0.13	0.12	0.12			0.43	0.03
Uniform Delay, d1	28.4	28.3	29.0			14.5	5.5
Progression Factor	1.00	1.00	1.00			1.48	1.09
Incremental Delay, d2	0.1	0.1	0.1			0.1	0.0
Delay (s)	28.5	28.4	29.1			21.7	5.9
Level of Service	C	C	C			C	A
Approach Delay (s)	28.4		29.1				20.3
Approach LOS	C		C				C

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	74.2	Sum of lost time (s)	22.9
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	109	6	108	3	3	4	191	205	1	15	141	105
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	118	7	68	3	3	1	208	223	1	16	153	54
Adj No. of Lanes	1	1	0	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	156	23	221	7	241	108	265	1298	581	35	840	376
Arrive On Green	0.09	0.15	0.15	0.00	0.07	0.07	0.15	0.37	0.37	0.02	0.24	0.24
Sat Flow, veh/h	1757	148	1442	1757	3505	1568	1757	3505	1568	1757	3505	1568
Grp Volume(v), veh/h	118	0	75	3	3	1	208	223	1	16	153	54
Grp Sat Flow(s),veh/h/ln	1757	0	1590	1757	1752	1568	1757	1752	1568	1757	1752	1568
Q Serve(g_s), s	3.2	0.0	2.0	0.1	0.0	0.0	5.6	2.1	0.0	0.4	1.7	1.3
Cycle Q Clear(g_c), s	3.2	0.0	2.0	0.1	0.0	0.0	5.6	2.1	0.0	0.4	1.7	1.3
Prop In Lane	1.00		0.91	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	156	0	244	7	241	108	265	1298	581	35	840	376
V/C Ratio(X)	0.76	0.00	0.31	0.42	0.01	0.01	0.79	0.17	0.00	0.46	0.18	0.14
Avail Cap(c_a), veh/h	596	0	931	235	1332	596	415	1908	854	235	1548	693
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.7	0.0	18.3	24.2	21.1	21.1	19.9	10.3	9.7	23.6	14.7	14.6
Incr Delay (d2), s/veh	7.2	0.0	0.3	34.4	0.0	0.0	5.1	0.1	0.0	8.9	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.9	0.1	0.0	0.0	3.0	1.0	0.0	0.3	0.8	0.6
LnGrp Delay(d),s/veh	28.9	0.0	18.6	58.6	21.1	21.1	25.1	10.4	9.7	32.5	14.9	14.9
LnGrp LOS	C		B	E	C	C	C	B	A	C	B	B
Approach Vol, veh/h		193			7			432			223	
Approach Delay, s/veh		24.9			37.2			17.5			16.2	
Approach LOS		C			D			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.8	17.2	9.8	8.9	6.5	23.5	5.7	13.0				
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	11.5	21.5	16.5	18.5	6.5	26.5	6.5	28.5				
Max Q Clear Time (g_c+I1), s	7.6	3.7	5.2	2.0	2.4	4.1	2.1	4.0				
Green Ext Time (p_c), s	0.3	8.0	0.2	0.7	0.0	9.3	0.0	0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			19.0									
HCM 2010 LOS			B									

Intersection	
Int Delay, s/veh	10.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	58	365	47	61	226	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	1	7
Mvmt Flow	62	392	51	66	243	66

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	635	83	0	0	116	0
Stage 1	83	-	-	-	-	-
Stage 2	552	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.11	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.209	-
Pot Cap-1 Maneuver	446	982	-	-	1479	-
Stage 1	945	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	370	982	-	-	1479	-
Mov Cap-2 Maneuver	370	-	-	-	-	-
Stage 1	945	-	-	-	-	-
Stage 2	482	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.3	0	6.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	800	1479	-
HCM Lane V/C Ratio	-	-	0.569	0.164	-
HCM Control Delay (s)	-	-	15.3	7.9	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	3.6	0.6	-

69: Kammerer Rd & Lent Ranch Pkwy Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)		0.1	0.0	0.0		0.1	0.0
Total Delay (hr)	0.0	0.1	0.2	0.0	0.0	0.0	0.2
Total Del/Veh (s)		3.7	4.7	1.0		2.5	4.3
Stop Delay (hr)	0.0	0.0	0.1	0.0	0.0	0.0	0.1
Stop Del/Veh (s)		2.2	2.4	0.2		3.1	2.3
Total Stops	0	8	12	0	0	3	23
Stop/Veh		0.10	0.10	0.00		1.00	0.12
Travel Dist (mi)	0.1	21.3	40.8	0.4	0.0	0.4	63.0
Travel Time (hr)	0.0	0.5	1.1	0.0	0.0	0.0	1.6
Avg Speed (mph)	37	45	38	41	22	25	40
Fuel Used (gal)	0.0	0.3	0.7	0.0	0.0	0.0	1.1
Fuel Eff. (mpg)	85.0	62.2	57.9	84.1	136.7	92.2	59.6
HC Emissions (g)	0	9	14	0	0	0	22
CO Emissions (g)	1	329	477	3	0	1	811
NOx Emissions (g)	0	37	64	0	0	0	101
Vehicles Entered	0	75	113	1	0	2	191
Vehicles Exited	0	75	112	1	0	3	191
Hourly Exit Rate	0	300	448	4	0	12	764
Input Volume	1	302	457	4	1	9	774
% of Volume	0	99	98	100	0	133	99
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							2864
Occupancy (veh)	0	2	4	0	0	0	6

70: Kammerer Rd & Promenade Pkwy Performance by movement

Movement	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)		0.0	0.0	0.0	0.0	4.4		4.4	0.7	0.1	3.2	0.3
Total Delay (hr)	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.8	0.0	0.0	1.1
Total Del/Veh (s)		4.4	46.3	4.7	3.6	45.2		4.7	38.9	27.1	2.5	12.5
Stop Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.9
Stop Del/Veh (s)		2.3	44.8	1.9	0.2	43.6		4.9	34.8	23.4	2.7	9.5
Total Stops	0	14	2	18	0	1	0	5	56	1	2	99
Stop/Veh		0.18	0.67	0.16	0.00	1.00		1.00	0.79	1.00	0.67	0.30
Travel Dist (mi)	0.0	26.7	0.3	16.4	8.1	0.1	0.0	0.5	8.3	0.1	0.3	61.0
Travel Time (hr)	0.0	0.7	0.0	0.5	0.3	0.0	0.0	0.0	1.0	0.0	0.0	2.7
Avg Speed (mph)	16	38	7	31	26	6	4	19	8	12	27	23
Fuel Used (gal)	0.0	0.5	0.0	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1
Fuel Eff. (mpg)	84.1	57.8	64.6	48.9	67.2	84.1	65.8	104.3	56.5	116.5	103.8	56.4
HC Emissions (g)	0	8	0	10	4	0	0	0	5	0	0	27
CO Emissions (g)	0	241	7	521	216	0	0	2	253	1	3	1244
NOx Emissions (g)	0	37	0	36	13	0	0	0	15	0	0	103
Vehicles Entered	0	75	2	109	56	1	0	5	65	1	3	317
Vehicles Exited	0	75	2	110	57	1	0	5	64	1	3	318
Hourly Exit Rate	0	300	8	440	228	4	0	20	256	4	12	1272
Input Volume	1	302	10	447	240	4	2	20	260	3	10	1299
% of Volume	0	99	80	98	95	100	0	100	98	133	120	98
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												2121
Occupancy (veh)	0	3	0	2	1	0	0	0	4	0	0	11

71: Kammerer Rd/Grant Line Rd & SR 99 SB Ramps Performance by movement

Movement	EBT	EBR	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	1.1	0.1
Total Delay (hr)	0.2	0.0	0.3	0.3	0.3	0.0	1.1
Total Del/Veh (s)	6.0	2.9	7.7	6.8	14.9	5.9	7.5
Stop Delay (hr)	0.1	0.0	0.1	0.0	0.2	0.0	0.5
Stop Del/Veh (s)	2.5	1.7	3.1	0.1	12.5	4.9	3.3
Total Stops	31	16	51	0	44	16	158
Stop/Veh	0.29	0.40	0.34	0.00	0.70	0.73	0.30
Travel Dist (mi)	16.3	6.3	26.3	23.0	21.1	7.4	100.3
Travel Time (hr)	0.6	0.3	1.0	1.0	0.9	0.3	4.0
Avg Speed (mph)	26	24	28	24	23	28	25
Fuel Used (gal)	0.3	0.1	0.5	0.3	0.3	0.1	1.7
Fuel Eff. (mpg)	48.1	58.5	52.1	68.8	69.7	60.8	58.7
HC Emissions (g)	12	3	15	12	7	3	51
CO Emissions (g)	585	175	821	546	168	69	2364
NOx Emissions (g)	39	11	54	39	21	8	172
Vehicles Entered	105	40	147	133	59	21	505
Vehicles Exited	104	40	147	135	60	21	507
Hourly Exit Rate	416	160	588	540	240	84	2028
Input Volume	427	156	612	567	232	85	2079
% of Volume	97	103	96	95	103	99	98
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							788
Occupancy (veh)	3	1	4	4	4	1	16

72: SR 99 NB Ramps & Grant Line Rd Performance by movement

Movement	EBT	EBR	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.5	0.1
Total Delay (hr)	0.3	0.0	0.8	0.1	0.2	0.3	1.7
Total Del/Veh (s)	7.1	3.4	11.9	6.7	13.0	7.0	9.1
Stop Delay (hr)	0.1	0.0	0.3	0.0	0.1	0.2	0.7
Stop Del/Veh (s)	3.4	0.2	4.1	1.9	10.5	4.5	4.1
Total Stops	42	0	92	30	27	87	278
Stop/Veh	0.30	0.00	0.37	0.41	0.61	0.66	0.42
Travel Dist (mi)	24.7	4.0	38.6	11.6	16.9	51.4	147.2
Travel Time (hr)	0.9	0.2	1.8	0.6	0.7	1.9	6.0
Avg Speed (mph)	27	26	21	21	25	28	25
Fuel Used (gal)	0.5	0.1	0.9	0.2	0.2	0.7	2.6
Fuel Eff. (mpg)	49.0	68.0	44.7	53.3	70.9	70.1	56.3
HC Emissions (g)	17	3	27	7	4	13	70
CO Emissions (g)	916	124	1344	344	100	345	3172
NOx Emissions (g)	58	8	93	25	13	44	242
Vehicles Entered	140	24	243	73	41	124	645
Vehicles Exited	137	23	239	71	42	125	637
Hourly Exit Rate	548	92	956	284	168	500	2548
Input Volume	566	93	1009	304	170	522	2664
% of Volume	97	99	95	93	99	96	96
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0
Density (ft/veh)							652
Occupancy (veh)	4	1	7	2	3	7	24

73: Survey Rd/E Stockton Blvd & Grant Line Rd Performance by movement

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	2.0	2.8	2.2	3.0	0.5	3.8	3.5	0.9
Total Delay (hr)	0.1	0.7	1.0	0.0	0.0	0.2	2.3	0.3	0.6	0.2	0.1	0.4
Total Del/Veh (s)	46.5	45.0	20.1	3.8	52.0	51.0	39.8	36.7	43.7	38.7	19.4	41.6
Stop Delay (hr)	0.1	0.7	0.7	0.0	0.0	0.2	1.4	0.2	0.6	0.1	0.1	0.3
Stop Del/Veh (s)	44.4	41.3	14.7	2.6	49.2	46.8	25.4	26.0	39.4	33.7	17.0	37.3
Total Stops	5	48	86	16	2	13	144	20	43	12	10	24
Stop/Veh	0.83	0.81	0.48	0.48	1.00	0.87	0.71	0.74	0.83	0.86	0.91	0.77
Travel Dist (mi)	0.9	8.6	26.8	5.1	0.3	2.5	34.2	4.6	5.8	1.5	1.3	5.2
Travel Time (hr)	0.1	1.0	1.7	0.2	0.0	0.3	3.0	0.4	0.9	0.2	0.1	0.5
Avg Speed (mph)	8	8	16	24	8	9	12	11	7	8	11	10
Fuel Used (gal)	0.0	0.2	0.5	0.1	0.0	0.0	0.5	0.1	0.1	0.0	0.0	0.1
Fuel Eff. (mpg)	52.4	47.2	51.1	51.9	62.3	62.9	65.1	71.6	53.4	47.1	59.0	68.9
HC Emissions (g)	0	6	18	4	0	1	15	2	2	1	1	2
CO Emissions (g)	30	280	928	222	8	75	762	71	86	30	24	83
NOx Emissions (g)	1	17	60	13	0	4	46	5	7	2	2	5
Vehicles Entered	6	54	170	32	2	14	194	26	50	13	11	28
Vehicles Exited	6	55	173	32	2	14	193	25	49	12	11	28
Hourly Exit Rate	24	220	692	128	8	56	772	100	196	48	44	112
Input Volume	24	231	696	137	7	55	794	106	200	52	39	118
% of Volume	100	95	99	93	114	102	97	94	98	92	113	95
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0
Density (ft/veh)												
Occupancy (veh)	0	4	7	1	0	1	12	2	3	1	0	2

73: Survey Rd/E Stockton Blvd & Grant Line Rd Performance by movement

Movement	SBT	SBR	All
Denied Delay (hr)	0.0	0.1	0.3
Denied Del/Veh (s)	1.0	3.5	1.4
Total Delay (hr)	0.1	0.4	6.4
Total Del/Veh (s)	47.2	21.6	32.1
Stop Delay (hr)	0.1	0.4	4.9
Stop Del/Veh (s)	39.5	18.5	24.8
Total Stops	7	61	491
Stop/Veh	0.88	0.84	0.69
Travel Dist (mi)	1.5	12.8	111.0
Travel Time (hr)	0.1	0.9	9.6
Avg Speed (mph)	10	15	12
Fuel Used (gal)	0.0	0.2	1.9
Fuel Eff. (mpg)	58.5	63.4	57.8
HC Emissions (g)	1	5	58
CO Emissions (g)	26	233	2859
NOx Emissions (g)	2	16	181
Vehicles Entered	8	70	678
Vehicles Exited	8	68	676
Hourly Exit Rate	32	272	2704
Input Volume	31	295	2785
% of Volume	103	92	97
Denied Entry Before	0	0	0
Denied Entry After	0	0	0
Density (ft/veh)			334
Occupancy (veh)	1	3	37

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	227	617	0	0	672	4	0	0	0	14	1	245
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1845	1900	1900	1827	1900	1900	1900	1900	1900	1680	1863
Adj Flow Rate, veh/h	247	671	0	0	730	1	0	0	0	15	1	14
Adj No. of Lanes	2	2	0	1	2	1	0	1	0	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	3	3	0	4	0	0	0	0	0	0	2
Cap, veh/h	538	2279	0	5	1288	599	0	5	0	75	5	138
Arrive On Green	0.16	0.65	0.00	0.00	0.37	0.37	0.00	0.00	0.00	0.05	0.05	0.05
Sat Flow, veh/h	3281	3597	0	1810	3471	1615	0	1900	0	1504	100	2787
Grp Volume(v), veh/h	247	671	0	0	730	1	0	0	0	16	0	14
Grp Sat Flow(s),veh/h/ln	1640	1752	0	1810	1736	1615	0	1900	0	1604	0	1393
Q Serve(g_s), s	2.7	3.3	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.4	0.0	0.2
Cycle Q Clear(g_c), s	2.7	3.3	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.4	0.0	0.2
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.94		1.00
Lane Grp Cap(c), veh/h	538	2279	0	5	1288	599	0	5	0	80	0	138
V/C Ratio(X)	0.46	0.29	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.20	0.00	0.10
Avail Cap(c_a), veh/h	2052	5262	0	1132	5211	2425	0	1189	0	1004	0	1743
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.1	3.0	0.0	0.0	10.0	7.9	0.0	0.0	0.0	18.2	0.0	18.1
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	1.6	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.2	0.0	0.1
LnGrp Delay(d),s/veh	15.3	3.1	0.0	0.0	10.2	7.9	0.0	0.0	0.0	18.7	0.0	18.3
LnGrp LOS	B	A			B	A				B		B
Approach Vol, veh/h		918			731			0			30	
Approach Delay, s/veh		6.4			10.1			0.0			18.5	
Approach LOS		A			B						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.1	20.8		0.0	0.0	32.0		8.0
Change Period (Y+Rc), s	4.6	6.0		6.0	4.6	6.0		6.0
Max Green Setting (Gmax), s	25.0	60.0		25.0	25.0	60.0		25.0
Max Q Clear Time (g_c+I1), s	4.7	8.7		0.0	0.0	5.3		2.4
Green Ext Time (p_c), s	0.4	6.1		0.0	0.0	6.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	69	562	624	29	16	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	1	3	2	3	6	0
Mvmt Flow	71	579	643	30	16	61

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	643	0	-	0	1365	643
Stage 1	-	-	-	-	643	-
Stage 2	-	-	-	-	722	-
Critical Hdwy	4.11	-	-	-	6.46	6.2
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	2.209	-	-	-	3.554	3.3
Pot Cap-1 Maneuver	947	-	-	-	159	477
Stage 1	-	-	-	-	516	-
Stage 2	-	-	-	-	474	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	947	-	-	-	141	477
Mov Cap-2 Maneuver	-	-	-	-	141	-
Stage 1	-	-	-	-	516	-
Stage 2	-	-	-	-	421	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	20
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	947	-	-	-	316
HCM Lane V/C Ratio	0.075	-	-	-	0.245
HCM Control Delay (s)	9.1	0	-	-	20
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	244	306	389	10	2	248
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	4	3	3	0	0	2
Mvmt Flow	257	322	409	11	2	261

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	420	0	-	0	1251	415
Stage 1	-	-	-	-	415	-
Stage 2	-	-	-	-	836	-
Critical Hdwy	4.14	-	-	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.236	-	-	-	3.5	3.318
Pot Cap-1 Maneuver	1128	-	-	-	192	637
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	429	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1128	-	-	-	139	637
Mov Cap-2 Maneuver	-	-	-	-	139	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	310	-

Approach	EB	WB	SB
HCM Control Delay, s	4.1	0	15
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1128	-	-	-	619
HCM Lane V/C Ratio	0.228	-	-	-	0.425
HCM Control Delay (s)	9.1	0	-	-	15
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.9	-	-	-	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	430	1370	150	750	1870	260	290	1640	770	200	870	390
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	478	1522	89	833	2078	222	322	1822	680	222	967	251
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	388	1372	421	646	1754	536	366	1688	524	176	1408	432
Arrive On Green	0.11	0.27	0.27	0.19	0.35	0.35	0.11	0.34	0.34	0.05	0.28	0.28
Sat Flow, veh/h	3408	5036	1544	3408	5036	1539	3408	5036	1562	3408	5036	1545
Grp Volume(v), veh/h	478	1522	89	833	2078	222	322	1822	680	222	967	251
Grp Sat Flow(s),veh/h/ln	1704	1679	1544	1704	1679	1539	1704	1679	1562	1704	1679	1545
Q Serve(g_s), s	16.5	39.5	6.5	27.5	50.5	15.9	13.5	48.6	48.6	7.5	24.8	20.3
Cycle Q Clear(g_c), s	16.5	39.5	6.5	27.5	50.5	15.9	13.5	48.6	48.6	7.5	24.8	20.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	388	1372	421	646	1754	536	366	1688	524	176	1408	432
V/C Ratio(X)	1.23	1.11	0.21	1.29	1.18	0.41	0.88	1.08	1.30	1.26	0.69	0.58
Avail Cap(c_a), veh/h	388	1372	421	646	1754	536	400	1688	524	176	1408	432
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.3	52.8	40.7	58.8	47.2	36.0	63.8	48.2	48.2	68.8	46.6	44.9
Incr Delay (d2), s/veh	125.2	60.1	0.4	141.3	89.3	0.8	17.6	46.8	147.9	154.2	1.8	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.5	25.9	2.8	25.6	37.9	6.9	7.2	29.8	42.5	7.3	11.8	9.0
LnGrp Delay(d),s/veh	189.4	112.9	41.1	200.1	136.5	36.7	81.4	95.0	196.1	223.0	48.4	47.9
LnGrp LOS	F	F	D	F	F	D	F	F	F	F	D	D
Approach Vol, veh/h		2089			3133			2824			1440	
Approach Delay, s/veh		127.3			146.4			117.8			75.2	
Approach LOS		F			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.1	45.9	22.0	56.0	13.0	54.0	33.0	45.0
Change Period (Y+Rc), s	5.5	* 5.4	5.5	5.5	5.5	* 5.4	5.5	5.5
Max Green Setting (Gmax), s	17.0	* 39	16.5	50.5	7.5	* 49	27.5	39.5
Max Q Clear Time (g_c+I1), s	15.5	26.8	18.5	52.5	9.5	50.6	29.5	41.5
Green Ext Time (p_c), s	0.0	12.2	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	122.9
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	650	1770	120	190	1730	90	140	530	240	100	450	860
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	765	2082	88	224	2035	104	165	624	250	118	529	987
Adj No. of Lanes	2	3	1	2	3	1	1	2	1	1	2	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	465	1950	596	170	1514	461	111	1224	548	139	1278	557
Arrive On Green	0.14	0.39	0.39	0.05	0.30	0.30	0.06	0.35	0.35	0.08	0.36	0.36
Sat Flow, veh/h	3408	5036	1538	3408	5036	1533	1757	3505	1568	1757	3505	1526
Grp Volume(v), veh/h	765	2082	88	224	2035	104	165	624	250	118	529	987
Grp Sat Flow(s),veh/h/ln	1704	1679	1538	1704	1679	1533	1757	1752	1568	1757	1752	1526
Q Serve(g_s), s	20.5	58.2	5.6	7.5	45.2	7.7	9.5	21.2	18.6	10.0	17.0	54.8
Cycle Q Clear(g_c), s	20.5	58.2	5.6	7.5	45.2	7.7	9.5	21.2	18.6	10.0	17.0	54.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	465	1950	596	170	1514	461	111	1224	548	139	1278	557
V/C Ratio(X)	1.65	1.07	0.15	1.32	1.34	0.23	1.49	0.51	0.46	0.85	0.41	1.77
Avail Cap(c_a), veh/h	465	1950	596	170	1514	461	111	1224	548	214	1278	557
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.9	46.0	29.9	71.4	52.5	39.4	70.4	38.7	37.9	68.3	35.7	47.8
Incr Delay (d2), s/veh	300.1	41.2	0.0	177.9	159.2	0.1	260.3	0.1	0.2	10.9	0.1	355.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	29.0	34.3	2.4	7.7	43.2	3.3	12.6	10.3	8.1	5.3	8.2	78.0
LnGrp Delay(d),s/veh	365.0	87.3	30.0	249.3	211.7	39.5	330.7	38.9	38.1	79.2	35.8	403.1
LnGrp LOS	F	F	C	F	F	D	F	D	D	E	D	F
Approach Vol, veh/h		2935			2363			1039			1634	
Approach Delay, s/veh		157.9			207.7			85.0			260.8	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.0	50.3	15.0	60.0	12.0	63.3	17.3	57.7
Change Period (Y+Rc), s	4.5	* 5.1	5.5	* 5.2	4.5	5.1	* 5.4	* 5.2
Max Green Setting (Gmax), s	20.5	* 45	9.5	* 55	7.5	57.9	* 18	* 46
Max Q Clear Time (g_c+I1), s	22.5	47.2	11.5	56.8	9.5	60.2	12.0	23.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	184.3
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	450	1030	130	100	1070	290	160	1250	50	410	870	260
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	500	1144	118	111	1189	178	178	1389	52	456	967	75
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	424	1630	507	156	1235	384	225	1231	543	400	1411	623
Arrive On Green	0.12	0.32	0.32	0.05	0.25	0.25	0.07	0.35	0.35	0.12	0.40	0.40
Sat Flow, veh/h	3408	5036	1567	3408	5036	1568	3408	3505	1545	3408	3505	1547
Grp Volume(v), veh/h	500	1144	118	111	1189	178	178	1389	52	456	967	75
Grp Sat Flow(s),veh/h/ln	1704	1679	1567	1704	1679	1568	1704	1752	1545	1704	1752	1547
Q Serve(g_s), s	17.5	28.0	7.8	4.5	32.8	13.6	7.2	49.4	3.2	16.5	32.0	4.3
Cycle Q Clear(g_c), s	17.5	28.0	7.8	4.5	32.8	13.6	7.2	49.4	3.2	16.5	32.0	4.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	424	1630	507	156	1235	384	225	1231	543	400	1411	623
V/C Ratio(X)	1.18	0.70	0.23	0.71	0.96	0.46	0.79	1.13	0.10	1.14	0.69	0.12
Avail Cap(c_a), veh/h	424	1630	507	216	1235	384	308	1231	543	400	1411	623
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.6	41.6	34.8	66.2	52.5	45.2	64.8	45.7	30.7	62.1	34.7	26.4
Incr Delay (d2), s/veh	102.7	1.2	0.1	3.0	17.3	0.3	6.4	68.7	0.0	89.3	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.2	13.1	3.4	2.2	17.2	5.9	3.6	35.5	1.4	12.7	15.7	1.8
LnGrp Delay(d),s/veh	164.3	42.8	34.9	69.2	69.8	45.5	71.2	114.4	30.7	151.4	35.8	26.4
LnGrp LOS	F	D	C	E	E	D	E	F	C	F	D	C
Approach Vol, veh/h		1762			1478			1619			1498	
Approach Delay, s/veh		76.7			66.8			107.0			70.6	
Approach LOS		E			E			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.0	40.0	14.8	62.9	11.9	51.1	22.0	55.7
Change Period (Y+Rc), s	5.5	* 5.5	5.5	6.3	5.5	* 5.5	5.5	* 6.3
Max Green Setting (Gmax), s	17.5	* 35	12.7	52.5	8.9	* 43	16.5	* 49
Max Q Clear Time (g_c+I1), s	19.5	34.8	9.2	34.0	6.5	30.0	18.5	51.4
Green Ext Time (p_c), s	0.0	0.0	0.0	5.7	0.0	5.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	80.7
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	160	750	170	30	610	110	260	600	30	100	470	60
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	168	789	179	32	642	116	274	632	32	105	495	63
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	183	962	430	41	680	304	293	704	36	140	509	65
Arrive On Green	0.10	0.27	0.27	0.02	0.19	0.19	0.17	0.40	0.40	0.08	0.32	0.32
Sat Flow, veh/h	1757	3505	1568	1757	3505	1568	1757	1741	88	1757	1604	204
Grp Volume(v), veh/h	168	789	179	32	642	116	274	0	664	105	0	558
Grp Sat Flow(s),veh/h/ln	1757	1752	1568	1757	1752	1568	1757	0	1829	1757	0	1809
Q Serve(g_s), s	9.5	21.1	9.4	1.8	18.1	6.4	15.4	0.0	33.9	5.9	0.0	30.5
Cycle Q Clear(g_c), s	9.5	21.1	9.4	1.8	18.1	6.4	15.4	0.0	33.9	5.9	0.0	30.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.05	1.00		0.11
Lane Grp Cap(c), veh/h	183	962	430	41	680	304	293	0	740	140	0	573
V/C Ratio(X)	0.92	0.82	0.42	0.77	0.94	0.38	0.93	0.00	0.90	0.75	0.00	0.97
Avail Cap(c_a), veh/h	183	962	430	112	680	304	293	0	740	258	0	573
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.4	34.0	29.7	48.6	39.8	35.1	41.1	0.0	27.8	45.0	0.0	33.7
Incr Delay (d2), s/veh	44.3	7.8	2.9	25.6	23.3	3.6	35.5	0.0	13.8	7.8	0.0	30.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	11.2	4.4	1.2	10.9	3.1	10.3	0.0	19.8	3.1	0.0	20.1
LnGrp Delay(d),s/veh	88.6	41.8	32.7	74.2	63.0	38.7	76.6	0.0	41.6	52.9	0.0	64.5
LnGrp LOS	F	D	C	E	E	D	E		D	D		E
Approach Vol, veh/h		1136			790			938			663	
Approach Delay, s/veh		47.3			59.9			51.8			62.7	
Approach LOS		D			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	33.0	22.0	37.0	16.0	25.0	13.3	45.7
Change Period (Y+Rc), s	5.6	5.6	5.3	5.3	5.6	5.6	5.3	5.3
Max Green Setting (Gmax), s	6.4	23.4	16.7	31.7	10.4	19.4	14.7	33.7
Max Q Clear Time (g_c+I1), s	3.8	23.1	17.4	32.5	11.5	20.1	7.9	35.9
Green Ext Time (p_c), s	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	54.2
HCM 2010 LOS	D

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	240	770	630	1210	970	180
Number	3	18	1	6	2	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1681	1792	1810	1792	1863
Adj Flow Rate, veh/h	276	859	724	1391	1115	174
Adj No. of Lanes	1	2	2	2	2	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	1	13	6	5	6	2
Cap, veh/h	335	471	800	2289	1275	593
Arrive On Green	0.19	0.19	0.24	0.67	0.37	0.37
Sat Flow, veh/h	1792	2515	3312	3529	3495	1583
Grp Volume(v), veh/h	276	859	724	1391	1115	174
Grp Sat Flow(s),veh/h/ln	1792	1258	1656	1719	1703	1583
Q Serve(g_s), s	10.7	13.5	15.3	16.4	22.0	5.6
Cycle Q Clear(g_c), s	10.7	13.5	15.3	16.4	22.0	5.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	335	471	800	2289	1275	593
V/C Ratio(X)	0.82	1.82	0.91	0.61	0.87	0.29
Avail Cap(c_a), veh/h	335	471	845	2427	1365	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.2	29.3	26.5	6.8	21.0	15.9
Incr Delay (d2), s/veh	14.2	379.0	12.3	0.3	5.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	29.5	8.3	7.6	11.3	2.4
LnGrp Delay(d),s/veh	42.4	408.3	38.8	7.0	26.9	16.0
LnGrp LOS	D	F	D	A	C	B
Approach Vol, veh/h	1135			2115	1289	
Approach Delay, s/veh	319.3			17.9	25.4	
Approach LOS	F			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	21.0	32.1				53.1		19.0
Change Period (Y+Rc), s	* 3.6	5.1				5.1		5.5
Max Green Setting (Gmax), s	* 18	28.9				50.9		13.5
Max Q Clear Time (g_c+I1), s	17.3	24.0				18.4		15.5
Green Ext Time (p_c), s	0.1	3.0				6.9		0.0

Intersection Summary			
HCM 2010 Ctrl Delay			95.4
HCM 2010 LOS			F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	600	300	720	550	530	640	1070	930	180	560	20
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	35	698	121	837	640	482	744	1244	925	209	651	17
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	89	1040	320	529	1691	516	482	2189	673	176	1738	541
Arrive On Green	0.03	0.21	0.21	0.16	0.34	0.34	0.05	0.14	0.14	0.05	0.35	0.35
Sat Flow, veh/h	3408	5036	1547	3408	5036	1537	3408	5036	1548	3408	5036	1567
Grp Volume(v), veh/h	35	698	121	837	640	482	744	1244	925	209	651	17
Grp Sat Flow(s),veh/h/ln	1704	1679	1547	1704	1679	1537	1704	1679	1548	1704	1679	1567
Q Serve(g_s), s	1.5	18.5	9.8	22.5	14.0	44.0	20.5	33.4	63.0	7.5	14.1	1.0
Cycle Q Clear(g_c), s	1.5	18.5	9.8	22.5	14.0	44.0	20.5	33.4	63.0	7.5	14.1	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	89	1040	320	529	1691	516	482	2189	673	176	1738	541
V/C Ratio(X)	0.39	0.67	0.38	1.58	0.38	0.93	1.54	0.57	1.37	1.19	0.37	0.03
Avail Cap(c_a), veh/h	153	1181	363	529	1737	530	482	2189	673	176	1738	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.09	0.09	0.09	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.5	53.0	49.5	61.3	36.7	46.6	69.1	49.4	62.1	68.8	35.7	31.4
Incr Delay (d2), s/veh	1.1	0.9	0.3	271.1	0.1	23.1	245.8	0.1	169.2	126.5	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	8.7	4.2	30.5	6.5	22.0	26.1	15.6	58.7	6.6	6.6	0.5
LnGrp Delay(d),s/veh	70.5	53.8	49.8	332.4	36.7	69.7	314.9	49.5	231.3	195.3	36.3	31.5
LnGrp LOS	E	D	D	F	D	E	F	D	F	F	D	C
Approach Vol, veh/h		854			1959			2913			877	
Approach Delay, s/veh		54.0			171.1			175.0			74.1	
Approach LOS		D			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.0	55.5	9.3	54.2	13.0	68.5	28.0	35.5
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	20.5	46.0	6.5	50.0	7.5	59.0	22.5	34.0
Max Q Clear Time (g_c+I1), s	22.5	16.1	3.5	46.0	9.5	65.0	24.5	20.5
Green Ext Time (p_c), s	0.0	14.9	0.0	2.7	0.0	0.0	0.0	6.4

Intersection Summary	
HCM 2010 Ctrl Delay	144.8
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

SimTraffic Post-Processor | **Elk Grove General Plan Update**
Average Results from 10 Runs | **Cumulative Conditions**
Volume and Delay by Movement | **AM Peak Hour**

Intersection 7 | **Jocelyn Wy-Lewis Stein Rd/Sheldon Rd** | **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	250	238	95.2%	99.9	31.6	F
	Through	80	72	90.2%	102.9	36.0	F
	Right Turn	420	385	91.6%	99.8	39.5	F
	Subtotal	750	695	92.7%	100.4	36.2	F
SB	Left Turn	390	372	95.3%	120.9	47.2	F
	Through	200	195	97.3%	103.3	47.4	F
	Right Turn	40	38	94.8%	58.7	38.1	E
	Subtotal	630	604	95.9%	111.4	46.3	F
EB	Left Turn	50	48	95.7%	132.4	39.1	F
	Through	1,590	1,334	83.9%	132.4	22.0	F
	Right Turn	110	117	106.4%	13.0	7.5	B
	Subtotal	1,750	1,499	85.7%	123.3	21.5	F
WB	Left Turn	380	231	60.7%	238.3	58.6	F
	Through	1,640	1,440	87.8%	17.9	1.7	B
	Right Turn	290	257	88.7%	9.6	1.2	A
	Subtotal	2,310	1,928	83.5%	43.3	8.3	D
Total		5,440	4,727	86.9%	85.3	9.9	F

Intersection 8 | **SR 99 SB Ramps/Sheldon Rd** | **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	220	221	100.5%	36.0	5.1	D
	Through						
	Right Turn	620	588	94.9%	28.4	4.2	C
	Subtotal	840	810	96.4%	30.6	3.2	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn	10	6	55.2%	37.2	41.7	D
	Through	2,050	1,797	87.7%	23.6	4.3	C
	Right Turn	360	299	83.1%	14.5	1.6	B
	Subtotal	2,420	2,102	86.8%	22.4	4.0	C
WB	Left Turn	640	536	83.8%	59.9	14.9	E
	Through	1,990	1,727	86.8%	5.1	0.3	A
	Right Turn						
	Subtotal	2,630	2,263	86.0%	18.2	4.2	B
Total		5,890	5,174	87.8%	21.8	2.6	C

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Elk Grove General Plan Update
Cumulative Conditions
AM Peak Hour

Intersection 9 **SR 99 NB Ramps/Sheldon Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	560	493	88.1%	136.5	29.3	F
	Through						
	Right Turn	660	585	88.7%	103.6	23.8	F
	Subtotal	1,220	1,078	88.4%	118.8	25.3	F
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	2,090	1,782	85.3%	36.6	5.7	D
	Right Turn	580	505	87.1%	5.0	0.3	A
	Subtotal	2,670	2,287	85.7%	29.6	4.5	C
WB	Left Turn						
	Through	2,070	1,844	89.1%	9.5	1.4	A
	Right Turn	870	735	84.4%	18.4	1.7	B
	Subtotal	2,940	2,579	87.7%	12.0	1.0	B
Total		6,830	5,944	87.0%	38.2	5.3	D

Intersection 10 **E Stockton Blvd/Sheldon Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	350	302	86.3%	109.0	40.0	F
	Through	110	114	104.0%	48.9	17.7	D
	Right Turn	160	150	93.8%	31.6	8.1	C
	Subtotal	620	567	91.4%	77.2	28.3	E
SB	Left Turn	20	17	84.6%	68.9	19.6	E
	Through	170	178	104.6%	61.1	10.1	E
	Right Turn	430	336	78.1%	163.7	43.7	F
	Subtotal	620	531	85.6%	127.1	26.4	F
EB	Left Turn	580	423	73.0%	128.7	26.2	F
	Through	1,840	1,626	88.4%	26.0	2.0	C
	Right Turn	280	254	90.7%	12.0	2.2	B
	Subtotal	2,700	2,303	85.3%	43.5	6.0	D
WB	Left Turn	110	109	99.4%	83.5	32.9	F
	Through	2,220	1,947	87.7%	46.7	5.1	D
	Right Turn	40	35	87.4%	32.8	8.7	C
	Subtotal	2,370	2,092	88.3%	48.5	5.0	D
Total		6,310	5,492	87.0%	56.9	5.4	E

Intersection 11 **Power Inn Rd-Garity Dr/Sheldon Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	40	42	105.8%	72.1	14.9	E
	Through	140	125	89.1%	64.1	8.0	E
	Right Turn	30	29	98.1%	15.1	7.6	B
	Subtotal	210	197	93.6%	58.5	6.7	E
SB	Left Turn	200	212	105.8%	84.3	15.3	F
	Through	80	71	89.2%	55.3	12.7	E
	Right Turn	770	686	89.0%	122.4	30.9	F
	Subtotal	1,050	969	92.2%	109.5	23.7	F
EB	Left Turn	770	658	85.4%	36.5	2.5	D
	Through	1,190	1,048	88.1%	30.1	3.1	C
	Right Turn	100	88	88.0%	10.3	1.4	B
	Subtotal	2,060	1,794	87.1%	31.5	2.0	C
WB	Left Turn	40	31	78.2%	101.9	26.5	F
	Through	1,520	1,372	90.3%	106.7	15.5	F
	Right Turn	220	184	83.6%	94.1	15.8	F
	Subtotal	1,780	1,587	89.2%	105.2	15.2	F
Total		5,100	4,546	89.1%	74.9	5.9	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	800	640	180	90	520	110	180	1650	90	100	1150	880
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	860	688	48	97	559	29	194	1774	46	108	1237	735
Adj No. of Lanes	2	2	1	2	2	1	2	3	1	2	3	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	686	1262	557	142	702	310	191	1882	585	141	1808	563
Arrive On Green	0.20	0.36	0.36	0.04	0.20	0.20	0.06	0.37	0.37	0.04	0.36	0.36
Sat Flow, veh/h	3408	3505	1547	3408	3505	1546	3408	5036	1567	3408	5036	1568
Grp Volume(v), veh/h	860	688	48	97	559	29	194	1774	46	108	1237	735
Grp Sat Flow(s),veh/h/ln	1704	1752	1547	1704	1752	1546	1704	1679	1567	1704	1679	1568
Q Serve(g_s), s	27.7	21.5	2.8	3.9	20.9	2.1	7.7	46.9	2.6	4.3	28.7	49.4
Cycle Q Clear(g_c), s	27.7	21.5	2.8	3.9	20.9	2.1	7.7	46.9	2.6	4.3	28.7	49.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	686	1262	557	142	702	310	191	1882	585	141	1808	563
V/C Ratio(X)	1.25	0.55	0.09	0.68	0.80	0.09	1.02	0.94	0.08	0.76	0.68	1.31
Avail Cap(c_a), veh/h	686	1381	609	211	892	393	191	1882	585	141	1808	563
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.9	35.1	29.1	65.0	52.3	44.8	64.9	41.7	27.8	65.3	37.5	44.1
Incr Delay (d2), s/veh	125.7	0.1	0.0	2.1	3.0	0.0	69.6	10.1	0.0	19.8	0.9	150.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.9	10.4	1.2	1.9	10.4	0.9	5.4	23.4	1.1	2.4	13.4	44.8
LnGrp Delay(d),s/veh	180.6	35.2	29.1	67.1	55.4	44.9	134.7	51.8	27.8	85.1	38.4	194.0
LnGrp LOS	F	D	C	E	E	D	F	D	C	F	D	F
Approach Vol, veh/h		1596			685			2014			2080	
Approach Delay, s/veh		113.4			56.6			59.2			95.8	
Approach LOS		F			E			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	55.7	34.0	33.9	12.0	57.7	12.0	55.8
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	7.7	49.4	27.7	35.0	5.7	51.4	8.5	54.2
Max Q Clear Time (g_c+I1), s	9.7	51.4	29.7	22.9	6.3	48.9	5.9	23.5
Green Ext Time (p_c), s	0.0	0.0	0.0	4.5	0.0	2.4	0.0	6.1

Intersection Summary			
HCM 2010 Ctrl Delay			84.4
HCM 2010 LOS			F

MOVEMENT SUMMARY

Site: 13 [Waterman Road/Sheldon Road-AM]

Bradshaw Road/Sheldon Road Intersection Improvements
2035 Volumes (3% per year growth)
AM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Bradshaw Road											
3	L2	204	3.0	1.446	229.3	LOS F	97.5	2495.2	1.00	4.42	7.9
8	T1	622	3.0	1.446	229.3	LOS F	97.5	2495.2	1.00	4.42	7.9
18	R2	51	3.0	1.446	229.3	LOS F	97.5	2495.2	1.00	4.42	7.8
Approach		878	3.0	1.446	229.3	LOS F	97.5	2495.2	1.00	4.42	7.9
East: Sheldon Road											
1	L2	31	3.0	0.789	29.9	LOS D	6.3	160.4	0.86	1.05	25.4
6	T1	398	3.0	0.789	29.9	LOS D	6.3	160.4	0.86	1.05	25.3
16	R2	20	3.0	0.789	29.9	LOS D	6.3	160.4	0.86	1.05	24.8
Approach		449	3.0	0.789	29.9	LOS D	6.3	160.4	0.86	1.05	25.3
North: Bradshaw Road											
7	L2	112	3.0	1.020	67.6	LOS F	21.8	558.8	1.00	1.82	17.8
4	T1	510	3.0	1.020	67.6	LOS F	21.8	558.8	1.00	1.82	17.8
14	R2	61	3.0	0.097	6.8	LOS A	0.3	8.2	0.51	0.48	33.1
Approach		684	3.0	1.020	62.2	LOS F	21.8	558.8	0.96	1.70	18.5
West: Sheldon Road											
5	L2	102	3.0	1.511	258.6	LOS F	102.7	2628.1	1.00	4.66	7.1
2	T1	602	3.0	1.511	258.6	LOS F	102.7	2628.1	1.00	4.66	7.1
12	R2	153	3.0	1.511	258.6	LOS F	102.7	2628.1	1.00	4.66	7.1
Approach		857	3.0	1.511	258.6	LOS F	102.7	2628.1	1.00	4.66	7.1
All Vehicles		2867	3.0	1.511	167.0	LOS F	102.7	2628.1	0.97	3.31	10.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 14 [Bradshaw Road/Sheldon Road_AM]

Bradshaw Road/Sheldon Road Intersection Improvements
2035 Volumes (3% per year growth)
AM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Bradshaw Road											
3	L2	143	3.0	1.023	64.1	LOS F	26.1	668.1	1.00	1.80	18.3
8	T1	1255	3.0	1.023	64.1	LOS F	26.1	668.1	1.00	1.80	18.3
18	R2	41	3.0	1.023	64.1	LOS F	26.1	668.1	1.00	1.80	18.1
Approach		1439	3.0	1.023	64.1	LOS F	26.1	668.1	1.00	1.80	18.3
East: Sheldon Road											
1	L2	204	3.0	1.304	184.6	LOS F	41.9	1073.0	1.00	3.40	9.3
6	T1	265	3.0	1.304	184.6	LOS F	41.9	1073.0	1.00	3.40	9.3
16	R2	20	3.0	1.304	184.6	LOS F	41.9	1073.0	1.00	3.40	9.2
Approach		490	3.0	1.304	184.6	LOS F	41.9	1073.0	1.00	3.40	9.3
North: Bradshaw Road											
7	L2	20	3.0	0.974	53.8	LOS F	17.5	447.1	1.00	1.57	20.1
4	T1	1184	3.0	0.974	53.8	LOS F	17.5	447.1	1.00	1.57	20.0
14	R2	71	3.0	0.974	53.8	LOS F	17.5	447.1	1.00	1.57	19.6
Approach		1276	3.0	0.974	53.8	LOS F	17.5	447.1	1.00	1.57	20.0
West: Sheldon Road											
5	L2	194	3.0	1.638	321.7	LOS F	89.0	2277.5	1.00	5.07	6.0
2	T1	480	3.0	1.638	321.7	LOS F	89.0	2277.5	1.00	5.07	6.0
12	R2	61	3.0	0.160	12.0	LOS B	0.4	10.6	0.69	0.69	30.7
Approach		735	3.0	1.638	295.8	LOS F	89.0	2277.5	0.97	4.71	6.4
All Vehicles		3939	3.0	1.638	119.0	LOS F	89.0	2277.5	1.00	2.46	12.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	470	60	40	330	100	60	470	60	80	320	100
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	43	500	64	43	351	106	64	500	64	85	340	106
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	67	495	63	67	420	127	82	612	78	109	536	167
Arrive On Green	0.04	0.31	0.31	0.04	0.31	0.31	0.05	0.38	0.38	0.06	0.40	0.40
Sat Flow, veh/h	1757	1603	205	1757	1361	411	1757	1603	205	1757	1350	421
Grp Volume(v), veh/h	43	0	564	43	0	457	64	0	564	85	0	446
Grp Sat Flow(s),veh/h/ln	1757	0	1808	1757	0	1772	1757	0	1808	1757	0	1770
Q Serve(g_s), s	2.0	0.0	25.6	2.0	0.0	19.9	3.0	0.0	23.2	4.0	0.0	16.8
Cycle Q Clear(g_c), s	2.0	0.0	25.6	2.0	0.0	19.9	3.0	0.0	23.2	4.0	0.0	16.8
Prop In Lane	1.00		0.11	1.00		0.23	1.00		0.11	1.00		0.24
Lane Grp Cap(c), veh/h	67	0	558	67	0	547	82	0	691	109	0	703
V/C Ratio(X)	0.65	0.00	1.01	0.65	0.00	0.84	0.78	0.00	0.82	0.78	0.00	0.63
Avail Cap(c_a), veh/h	161	0	558	161	0	547	163	0	691	163	0	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.4	0.0	28.7	39.4	0.0	26.7	39.1	0.0	23.0	38.4	0.0	20.1
Incr Delay (d2), s/veh	10.0	0.0	40.8	10.0	0.0	10.9	14.8	0.0	10.3	13.0	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	19.0	1.2	0.0	11.3	1.8	0.0	13.6	2.3	0.0	9.0
LnGrp Delay(d),s/veh	49.4	0.0	69.6	49.4	0.0	37.6	53.9	0.0	33.3	51.4	0.0	24.5
LnGrp LOS	D		F	D		D	D		C	D		C
Approach Vol, veh/h		607			500			628			531	
Approach Delay, s/veh		68.1			38.6			35.4			28.8	
Approach LOS		E			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	36.0	7.5	30.0	8.2	37.3	7.5	30.0
Change Period (Y+Rc), s	4.3	4.3	4.4	4.4	4.3	4.3	4.4	4.4
Max Green Setting (Gmax), s	7.7	31.7	7.6	25.6	7.7	31.7	7.6	25.6
Max Q Clear Time (g_c+I1), s	6.0	25.2	4.0	27.6	5.0	18.8	4.0	21.9
Green Ext Time (p_c), s	0.0	3.1	0.0	0.0	0.0	4.9	0.0	2.0

Intersection Summary		
HCM 2010 Ctrl Delay		43.3
HCM 2010 LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	190	0	880	0	0	0	910	790	0	0	590	110
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	0	1845	0	1863	0	1863	1810	0	0	1810	1863
Adj Flow Rate, veh/h	207	0	856	0	0	0	989	859	0	0	641	0
Adj No. of Lanes	1	0	1	0	1	0	1	2	0	0	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	0	3	0	2	0	2	5	0	0	5	2
Cap, veh/h	217	0	0	0	1	0	995	2755	0	0	702	324
Arrive On Green	0.12	0.00	0.00	0.00	0.00	0.00	0.56	0.80	0.00	0.00	0.20	0.00
Sat Flow, veh/h	1792	207		0	-83824	0	1774	3529	0	0	3529	1583
Grp Volume(v), veh/h	207	103.6		0	0	0	989	859	0	0	641	0
Grp Sat Flow(s),veh/h/ln	1792	F		0	1863	0	1774	1719	0	0	1719	1583
Q Serve(g_s), s	14.6			0.0	0.0	0.0	70.4	8.4	0.0	0.0	23.2	0.0
Cycle Q Clear(g_c), s	14.6			0.0	0.0	0.0	70.4	8.4	0.0	0.0	23.2	0.0
Prop In Lane	1.00			0.00		0.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	217			0	1	0	995	2755	0	0	702	324
V/C Ratio(X)	0.96			0.00	0.00	0.00	0.99	0.31	0.00	0.00	0.91	0.00
Avail Cap(c_a), veh/h	217			0	263	0	995	2760	0	0	708	326
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	55.6			0.0	0.0	0.0	27.7	3.4	0.0	0.0	49.5	0.0
Incr Delay (d2), s/veh	48.0			0.0	0.0	0.0	27.0	0.1	0.0	0.0	16.2	0.0
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.1			0.0	0.0	0.0	41.8	4.0	0.0	0.0	12.6	0.0
LnGrp Delay(d),s/veh	103.6			0.0	0.0	0.0	54.8	3.4	0.0	0.0	65.7	0.0
LnGrp LOS	F						D	A			E	
Approach Vol, veh/h					0			1848			641	
Approach Delay, s/veh					0.0			30.9			65.7	
Approach LOS								C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6		
Phs Duration (G+Y+Rc), s	76.0	31.3	20.0	0.0		107.3		
Change Period (Y+Rc), s	4.6	5.3	4.6	4.5		5.3		
Max Green Setting (Gmax), s	71.4	26.2	15.4	18.0		102.2		
Max Q Clear Time (g_c+I1), s	72.4	25.2	16.6	0.0		10.4		
Green Ext Time (p_c), s	0.0	0.8	0.0	0.0		15.9		

Intersection Summary			
HCM 2010 Ctrl Delay			44.8
HCM 2010 LOS			D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	40	190	330	80	490	100	1150	290	220	940	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.98	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	65	43	28	359	87	212	109	1250	189	239	1022	74
Adj No. of Lanes	2	2	1	2	1	1	1	3	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	160	484	208	440	406	335	138	1990	606	317	1436	619
Arrive On Green	0.05	0.14	0.14	0.13	0.22	0.22	0.08	0.40	0.40	0.09	0.41	0.41
Sat Flow, veh/h	3408	3505	1504	3408	1845	1520	1757	5036	1533	3408	3505	1511
Grp Volume(v), veh/h	65	43	28	359	87	212	109	1250	189	239	1022	74
Grp Sat Flow(s),veh/h/ln	1704	1752	1504	1704	1845	1520	1757	1679	1533	1704	1752	1511
Q Serve(g_s), s	1.5	0.9	1.3	8.5	3.2	10.4	5.0	16.5	7.0	5.6	20.0	2.5
Cycle Q Clear(g_c), s	1.5	0.9	1.3	8.5	3.2	10.4	5.0	16.5	7.0	5.6	20.0	2.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	160	484	208	440	406	335	138	1990	606	317	1436	619
V/C Ratio(X)	0.41	0.09	0.13	0.82	0.21	0.63	0.79	0.63	0.31	0.75	0.71	0.12
Avail Cap(c_a), veh/h	306	1488	638	521	899	741	166	2046	623	360	1462	630
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.2	31.0	31.2	35.0	26.3	29.1	37.3	20.1	17.2	36.5	20.3	15.1
Incr Delay (d2), s/veh	0.6	0.0	0.1	7.2	0.1	0.7	15.7	0.4	0.1	6.3	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.4	0.6	4.4	1.6	4.4	3.0	7.7	3.0	2.9	9.9	1.0
LnGrp Delay(d),s/veh	38.8	31.0	31.3	42.1	26.4	29.9	53.0	20.5	17.3	42.8	21.6	15.1
LnGrp LOS	D	C	C	D	C	C	D	C	B	D	C	B
Approach Vol, veh/h		136			658			1548			1335	
Approach Delay, s/veh		34.8			36.1			22.4			25.1	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.3	38.1	15.2	16.9	11.1	39.3	8.5	23.6
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	8.7	33.5	12.6	35.0	7.8	34.4	7.4	40.2
Max Q Clear Time (g_c+I1), s	7.6	18.5	10.5	3.3	7.0	22.0	3.5	12.4
Green Ext Time (p_c), s	0.1	14.0	0.2	1.3	0.0	11.6	0.0	1.3

Intersection Summary		
HCM 2010 Ctrl Delay		26.3
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	490	580	240	160	560	660	440	1640	180	410	1030	50
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	533	630	77	174	609	452	478	1783	87	446	1120	46
Adj No. of Lanes	2	2	1	2	2	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	456	1269	554	221	1027	448	512	1615	490	385	1427	433
Arrive On Green	0.13	0.36	0.36	0.06	0.29	0.29	0.15	0.32	0.32	0.23	0.57	0.57
Sat Flow, veh/h	3408	3505	1532	3408	3505	1528	3408	5036	1529	3408	5036	1527
Grp Volume(v), veh/h	533	630	77	174	609	452	478	1783	87	446	1120	46
Grp Sat Flow(s),veh/h/ln	1704	1752	1532	1704	1752	1528	1704	1679	1529	1704	1679	1527
Q Serve(g_s), s	19.4	20.3	4.9	7.3	21.6	42.5	20.1	46.5	5.9	16.4	25.2	2.0
Cycle Q Clear(g_c), s	19.4	20.3	4.9	7.3	21.6	42.5	20.1	46.5	5.9	16.4	25.2	2.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	456	1269	554	221	1027	448	512	1615	490	385	1427	433
V/C Ratio(X)	1.17	0.50	0.14	0.79	0.59	1.01	0.93	1.10	0.18	1.16	0.78	0.11
Avail Cap(c_a), veh/h	456	1269	554	301	1027	448	512	1615	490	385	1427	433
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.11	0.11	0.11
Uniform Delay (d), s/veh	62.8	36.0	31.1	66.8	43.8	51.3	60.9	49.3	35.5	56.1	27.9	22.9
Incr Delay (d2), s/veh	97.3	0.1	0.0	6.3	0.6	44.9	23.9	56.6	0.8	74.2	0.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.3	9.8	2.1	3.6	10.5	23.6	11.2	30.0	2.6	11.6	11.6	0.8
LnGrp Delay(d),s/veh	160.1	36.1	31.1	73.1	44.5	96.2	84.8	105.9	36.3	130.3	28.4	23.0
LnGrp LOS	F	D	C	E	D	F	F	F	D	F	C	C
Approach Vol, veh/h		1240			1235			2348			1612	
Approach Delay, s/veh		89.1			67.5			99.0			56.5	
Approach LOS		F			E			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.4	46.6	24.0	48.0	21.0	52.0	14.0	58.0
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	21.8	41.1	19.4	42.5	16.4	46.5	12.8	49.1
Max Q Clear Time (g_c+I1), s	22.1	27.2	21.4	44.5	18.4	48.5	9.3	22.3
Green Ext Time (p_c), s	0.0	13.9	0.0	0.0	0.0	0.0	0.1	20.0

Intersection Summary			
HCM 2010 Ctrl Delay			80.4
HCM 2010 LOS			F

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	20	20	470	20	440	0	1010	280	250	880	20
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1863	1882	1900	1900	1792	1810	1810	1829	1900
Adj Flow Rate, veh/h	22	22	20	511	22	155	0	1098	301	272	957	22
Adj No. of Lanes	1	1	0	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	2	0	0	0	6	5	5	4	4
Cap, veh/h	36	40	36	420	52	364	1	1487	672	247	2118	49
Arrive On Green	0.02	0.04	0.04	0.24	0.26	0.26	0.00	0.44	0.44	0.14	0.61	0.61
Sat Flow, veh/h	1810	918	835	1774	199	1400	1810	3406	1538	1723	3472	80
Grp Volume(v), veh/h	22	0	42	511	0	177	0	1098	301	272	479	500
Grp Sat Flow(s),veh/h/ln	1810	0	1753	1774	0	1599	1810	1703	1538	1723	1737	1814
Q Serve(g_s), s	1.8	0.0	3.5	35.5	0.0	13.8	0.0	40.2	20.6	21.5	22.3	22.3
Cycle Q Clear(g_c), s	1.8	0.0	3.5	35.5	0.0	13.8	0.0	40.2	20.6	21.5	22.3	22.3
Prop In Lane	1.00		0.48	1.00		0.88	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	36	0	76	420	0	416	1	1487	672	247	1060	1107
V/C Ratio(X)	0.61	0.00	0.55	1.22	0.00	0.43	0.00	0.74	0.45	1.10	0.45	0.45
Avail Cap(c_a), veh/h	90	0	234	420	0	496	90	1487	672	247	1060	1107
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.78	0.78	0.42	0.42	0.42
Uniform Delay (d), s/veh	72.9	0.0	70.3	57.3	0.0	46.2	0.0	35.1	29.6	64.3	15.7	15.7
Incr Delay (d2), s/veh	15.3	0.0	6.2	117.6	0.0	0.7	0.0	2.6	1.7	67.8	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	1.8	31.1	0.0	6.2	0.0	19.4	9.1	14.9	10.8	11.3
LnGrp Delay(d),s/veh	88.2	0.0	76.5	174.9	0.0	46.9	0.0	37.7	31.3	132.1	16.3	16.3
LnGrp LOS	F		E	F		D		D	C	F	B	B
Approach Vol, veh/h		64			688			1399			1251	
Approach Delay, s/veh		80.6			142.0			36.3			41.5	
Approach LOS		F			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	0.0	97.5	40.0	12.5	26.0	71.5	7.5	45.0
Change Period (Y+Rc), s	4.5	6.0	4.5	* 6	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	7.5	67.5	35.5	* 20	21.5	53.5	7.5	46.5
Max Q Clear Time (g_c+I1), s	0.0	24.3	37.5	5.5	23.5	42.2	3.8	15.8
Green Ext Time (p_c), s	0.0	24.6	0.0	1.0	0.0	9.2	0.0	1.3

Intersection Summary		
HCM 2010 Ctrl Delay		60.4
HCM 2010 LOS		E

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	160	660	290	180	1440	180	1150	100	240	50	20	170
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	174	717	210	196	1565	150	1250	109	101	54	22	24
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	192	1572	477	247	1653	502	1257	1504	658	69	184	148
Arrive On Green	0.06	0.31	0.31	0.07	0.33	0.33	0.37	0.43	0.43	0.04	0.10	0.10
Sat Flow, veh/h	3408	5036	1529	3408	5036	1530	3408	3505	1534	1757	1845	1486
Grp Volume(v), veh/h	174	717	210	196	1565	150	1250	109	101	54	22	24
Grp Sat Flow(s),veh/h/ln	1704	1679	1529	1704	1679	1530	1704	1752	1534	1757	1845	1486
Q Serve(g_s), s	6.7	15.0	14.4	7.4	39.8	9.6	48.0	2.4	5.3	4.0	1.4	1.9
Cycle Q Clear(g_c), s	6.7	15.0	14.4	7.4	39.8	9.6	48.0	2.4	5.3	4.0	1.4	1.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	192	1572	477	247	1653	502	1257	1504	658	69	184	148
V/C Ratio(X)	0.91	0.46	0.44	0.79	0.95	0.30	0.99	0.07	0.15	0.78	0.12	0.16
Avail Cap(c_a), veh/h	192	1572	477	374	1684	512	1257	1848	809	137	436	351
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.6	36.2	36.0	59.9	43.0	32.8	41.3	22.1	22.9	62.5	53.8	54.1
Incr Delay (d2), s/veh	38.8	0.2	0.6	3.4	11.6	0.3	24.0	0.0	0.1	6.9	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	7.0	6.2	3.6	20.2	4.1	26.8	1.2	2.3	2.1	0.7	0.8
LnGrp Delay(d),s/veh	100.4	36.4	36.6	63.2	54.6	33.2	65.3	22.1	23.0	69.4	54.0	54.3
LnGrp LOS	F	D	D	E	D	C	E	C	C	E	D	D
Approach Vol, veh/h		1101			1911			1460			100	
Approach Delay, s/veh		46.6			53.8			59.1			62.4	
Approach LOS		D			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	48.6	53.0	17.7	14.1	46.5	9.8	60.9
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	7.4	43.9	48.4	31.0	14.4	36.9	10.2	69.2
Max Q Clear Time (g_c+I1), s	8.7	41.8	50.0	3.9	9.4	17.0	6.0	7.3
Green Ext Time (p_c), s	0.0	1.3	0.0	0.8	0.1	15.6	0.0	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	53.9
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	780	40	280	1600	130	140	20	390	40	20	30
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	87	848	26	304	1739	100	152	22	58	43	22	0
Adj No. of Lanes	2	3	1	2	3	1	1	1	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	196	1858	565	396	2154	656	188	90	238	70	485	217
Arrive On Green	0.06	0.37	0.37	0.12	0.43	0.43	0.11	0.21	0.21	0.04	0.14	0.00
Sat Flow, veh/h	3408	5036	1532	3408	5036	1534	1757	439	1157	1757	3505	1568
Grp Volume(v), veh/h	87	848	26	304	1739	100	152	0	80	43	22	0
Grp Sat Flow(s),veh/h/ln	1704	1679	1532	1704	1679	1534	1757	0	1596	1757	1752	1568
Q Serve(g_s), s	1.8	9.2	0.8	6.2	21.6	2.9	6.1	0.0	3.0	1.7	0.4	0.0
Cycle Q Clear(g_c), s	1.8	9.2	0.8	6.2	21.6	2.9	6.1	0.0	3.0	1.7	0.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.73	1.00		1.00
Lane Grp Cap(c), veh/h	196	1858	565	396	2154	656	188	0	328	70	485	217
V/C Ratio(X)	0.44	0.46	0.05	0.77	0.81	0.15	0.81	0.00	0.24	0.61	0.05	0.00
Avail Cap(c_a), veh/h	357	1897	577	566	2206	672	216	0	764	184	1614	722
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.7	17.2	14.5	30.7	17.9	12.6	31.3	0.0	23.8	33.8	26.8	0.0
Incr Delay (d2), s/veh	0.6	0.2	0.0	2.2	2.3	0.1	15.5	0.0	0.1	3.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	4.3	0.3	3.0	10.4	1.2	3.7	0.0	1.3	0.9	0.2	0.0
LnGrp Delay(d),s/veh	33.3	17.3	14.6	32.9	20.2	12.7	46.8	0.0	24.0	37.0	26.8	0.0
LnGrp LOS	C	B	B	C	C	B	D		C	D	C	
Approach Vol, veh/h		961			2143			232			65	
Approach Delay, s/veh		18.7			21.7			38.9			33.5	
Approach LOS		B			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	36.5	12.2	14.4	12.8	32.2	7.4	19.2
Change Period (Y+Rc), s	4.5	5.8	4.5	4.5	4.5	5.8	4.5	4.5
Max Green Setting (Gmax), s	7.5	31.4	8.8	33.0	11.9	27.0	7.5	34.3
Max Q Clear Time (g_c+I1), s	3.8	23.6	8.1	2.4	8.2	11.2	3.7	5.0
Green Ext Time (p_c), s	0.0	7.0	0.0	0.3	0.1	13.4	0.0	0.3

Intersection Summary			
HCM 2010 Ctrl Delay			22.2
HCM 2010 LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	410	770	80	140	1070	140	350	830	200	180	810	460
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	446	837	39	152	1163	80	380	902	121	196	880	302
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	464	1766	537	203	1380	418	398	1117	487	246	975	425
Arrive On Green	0.14	0.35	0.35	0.06	0.27	0.27	0.12	0.32	0.32	0.07	0.28	0.28
Sat Flow, veh/h	3408	5036	1531	3408	5036	1526	3408	3505	1529	3408	3505	1526
Grp Volume(v), veh/h	446	837	39	152	1163	80	380	902	121	196	880	302
Grp Sat Flow(s),veh/h/ln	1704	1679	1531	1704	1679	1526	1704	1752	1529	1704	1752	1526
Q Serve(g_s), s	16.7	16.6	2.2	5.6	28.0	5.2	14.2	30.3	7.5	7.3	31.1	22.9
Cycle Q Clear(g_c), s	16.7	16.6	2.2	5.6	28.0	5.2	14.2	30.3	7.5	7.3	31.1	22.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	464	1766	537	203	1380	418	398	1117	487	246	975	425
V/C Ratio(X)	0.96	0.47	0.07	0.75	0.84	0.19	0.95	0.81	0.25	0.80	0.90	0.71
Avail Cap(c_a), veh/h	464	1766	537	279	1431	434	398	1117	487	265	982	428
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.1	32.5	27.8	59.4	44.0	35.7	56.4	40.1	32.4	58.6	44.7	41.7
Incr Delay (d2), s/veh	31.5	0.1	0.0	4.1	4.3	0.1	33.2	4.2	0.1	12.9	11.1	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.9	7.7	0.9	2.8	13.6	2.2	8.5	15.3	3.2	3.9	16.5	10.2
LnGrp Delay(d),s/veh	86.6	32.5	27.8	63.6	48.3	35.8	89.6	44.3	32.5	71.5	55.7	46.3
LnGrp LOS	F	C	C	E	D	D	F	D	C	E	E	D
Approach Vol, veh/h		1322			1395			1403			1378	
Approach Delay, s/veh		50.6			49.2			55.5			55.9	
Approach LOS		D			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.5	41.7	14.2	51.0	16.3	46.9	24.0	41.2
Change Period (Y+Rc), s	6.5	6.0	6.5	6.0	7.0	* 6	6.5	6.0
Max Green Setting (Gmax), s	15.0	36.0	10.5	43.5	10.0	* 41	17.5	36.5
Max Q Clear Time (g_c+I1), s	16.2	33.1	7.6	18.6	9.3	32.3	18.7	30.0
Green Ext Time (p_c), s	0.0	2.6	0.1	22.7	0.0	7.8	0.0	5.2

Intersection Summary			
HCM 2010 Ctrl Delay			52.9
HCM 2010 LOS			D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	500	1150	200	250	620	150	260	1530	210	170	1170	270
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	543	1250	155	272	674	74	283	1663	161	185	1272	221
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	388	1459	442	299	1326	402	282	1481	648	153	1336	584
Arrive On Green	0.11	0.29	0.29	0.09	0.26	0.26	0.08	0.42	0.42	0.04	0.38	0.38
Sat Flow, veh/h	3408	5036	1527	3408	5036	1525	3408	3505	1534	3408	3505	1533
Grp Volume(v), veh/h	543	1250	155	272	674	74	283	1663	161	185	1272	221
Grp Sat Flow(s),veh/h/ln	1704	1679	1527	1704	1679	1525	1704	1752	1534	1704	1752	1533
Q Serve(g_s), s	16.5	34.0	11.6	11.5	16.5	5.4	12.0	61.2	9.8	6.5	51.1	15.1
Cycle Q Clear(g_c), s	16.5	34.0	11.6	11.5	16.5	5.4	12.0	61.2	9.8	6.5	51.1	15.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	388	1459	442	299	1326	402	282	1481	648	153	1336	584
V/C Ratio(X)	1.40	0.86	0.35	0.91	0.51	0.18	1.00	1.12	0.25	1.21	0.95	0.38
Avail Cap(c_a), veh/h	388	1470	446	299	1338	405	282	1481	648	153	1343	587
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.2	48.6	40.7	65.5	45.4	41.3	66.4	41.8	27.0	69.2	43.5	32.4
Incr Delay (d2), s/veh	194.5	5.0	0.2	29.5	0.1	0.1	54.2	64.8	0.1	140.1	14.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.2	16.4	4.9	6.6	7.7	2.3	7.7	42.7	4.2	6.0	27.4	6.4
LnGrp Delay(d),s/veh	258.7	53.6	40.9	95.0	45.5	41.4	120.6	106.6	27.1	209.3	58.0	32.6
LnGrp LOS	F	D	D	F	D	D	F	F	C	F	E	C
Approach Vol, veh/h		1948			1020			2107			1678	
Approach Delay, s/veh		109.8			58.4			102.4			71.4	
Approach LOS		F			E			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	43.7	18.0	61.2	18.2	47.5	12.0	67.2
Change Period (Y+Rc), s	5.5	5.5	6.0	* 6	5.5	5.5	5.5	6.0
Max Green Setting (Gmax), s	16.5	38.5	12.0	* 56	12.7	42.3	6.5	61.0
Max Q Clear Time (g_c+I1), s	18.5	18.5	14.0	53.1	13.5	36.0	8.5	63.2
Green Ext Time (p_c), s	0.0	17.7	0.0	2.1	0.0	6.0	0.0	0.0

Intersection Summary			
HCM 2010 Ctrl Delay			90.2
HCM 2010 LOS			F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	150	1280	90	320	1200	370	110	1020	350	520	620	210
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	163	1391	94	348	1304	276	120	1109	166	565	674	48
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	202	1490	100	338	1430	434	171	1136	496	583	1559	683
Arrive On Green	0.06	0.24	0.24	0.10	0.28	0.28	0.05	0.32	0.32	0.17	0.44	0.44
Sat Flow, veh/h	3408	6105	412	3408	5036	1527	3408	3505	1530	3408	3505	1535
Grp Volume(v), veh/h	163	1084	401	348	1304	276	120	1109	166	565	674	48
Grp Sat Flow(s),veh/h/ln	1704	1586	1758	1704	1679	1527	1704	1752	1530	1704	1752	1535
Q Serve(g_s), s	5.9	27.9	28.0	12.4	31.3	19.7	4.3	39.1	10.3	20.6	16.5	2.2
Cycle Q Clear(g_c), s	5.9	27.9	28.0	12.4	31.3	19.7	4.3	39.1	10.3	20.6	16.5	2.2
Prop In Lane	1.00		0.23	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	202	1161	429	338	1430	434	171	1136	496	583	1559	683
V/C Ratio(X)	0.81	0.93	0.94	1.03	0.91	0.64	0.70	0.98	0.33	0.97	0.43	0.07
Avail Cap(c_a), veh/h	202	1161	429	338	1430	434	256	1136	496	583	1559	683
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.1	46.3	46.3	56.3	43.2	39.1	58.4	41.8	32.0	51.5	23.8	19.9
Incr Delay (d2), s/veh	19.7	14.6	30.0	56.7	10.3	7.0	1.9	21.1	0.1	29.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	13.8	17.2	8.5	15.9	9.2	2.1	22.3	4.4	12.0	8.0	1.0
LnGrp Delay(d),s/veh	77.8	60.8	76.3	113.0	53.6	46.1	60.4	62.9	32.2	80.6	23.9	19.9
LnGrp LOS	E	E	E	F	D	D	E	E	C	F	C	B
Approach Vol, veh/h		1648			1928			1395			1287	
Approach Delay, s/veh		66.3			63.2			59.0			48.7	
Approach LOS		E			E			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	41.0	10.9	61.1	17.0	36.0	26.0	46.0
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	7.4	35.5	9.4	52.5	12.4	30.5	21.4	40.5
Max Q Clear Time (g_c+I1), s	7.9	33.3	6.3	18.5	14.4	30.0	22.6	41.1
Green Ext Time (p_c), s	0.0	2.2	0.0	25.2	0.0	0.5	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	60.1
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

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Intersection 25 **W Stockton Blvd-Laguna Springs Dr/Laguna Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	90	79	88.3%	44.1	7.0	D
	Through	70	71	100.9%	39.1	9.8	D
	Right Turn	300	298	99.4%	14.1	1.6	B
	Subtotal	460	448	97.4%	23.4	2.4	C
SB	Left Turn	120	110	91.7%	54.0	14.4	D
	Through	100	98	98.3%	33.2	5.0	C
	Right Turn	150	153	101.8%	10.7	3.3	B
	Subtotal	370	361	97.6%	30.3	5.6	C
EB	Left Turn	300	270	90.2%	50.9	10.5	D
	Through	1,470	1,316	89.5%	69.0	24.2	E
	Right Turn	320	314	98.2%	13.4	2.3	B
	Subtotal	2,090	1,900	90.9%	57.4	18.4	E
WB	Left Turn	630	609	96.7%	57.9	14.9	E
	Through	930	883	94.9%	23.0	2.3	C
	Right Turn	50	44	87.6%	7.5	2.5	A
	Subtotal	1,610	1,536	95.4%	36.6	6.3	D
Total		4,530	4,245	93.7%	43.9	10.2	D

Intersection 26 **SR 99 SB Ramps/Laguna Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	400	390	97.4%	25.2	5.4	C
	Through						
	Right Turn	520	524	100.7%	25.0	5.7	C
	Subtotal	920	913	99.3%	25.1	5.1	C
EB	Left Turn						
	Through	1,570	1,406	89.6%	22.9	15.4	C
	Right Turn	320	293	91.7%	9.8	5.0	A
	Subtotal	1,890	1,699	89.9%	20.7	13.6	C
WB	Left Turn						
	Through	1,090	1,018	93.4%	14.0	2.3	B
	Right Turn	230	202	88.0%	5.3	0.9	A
	Subtotal	1,320	1,220	92.4%	12.6	1.9	B
Total		4,130	3,833	92.8%	19.0	6.3	B

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Elk Grove General Plan Update
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Intersection 27 **SR 99 NB Ramps/Bond Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	150	148	98.6%	18.7	2.8	B
	Through						
	Right Turn	310	300	96.7%	25.0	13.3	C
	Subtotal	460	448	97.4%	23.0	9.6	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	1,320	1,079	81.7%	49.3	51.7	D
	Right Turn	650	573	88.2%	16.0	16.1	B
	Subtotal	1,970	1,652	83.9%	37.8	39.6	D
WB	Left Turn						
	Through	1,170	1,069	91.4%	12.3	2.4	B
	Right Turn	420	342	81.4%	4.8	0.7	A
	Subtotal	1,590	1,411	88.8%	10.5	1.8	B
Total		4,020	3,511	87.3%	24.1	18.1	C

Intersection 28 **E Stockton Blvd/Bond Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	230	216	93.9%	61.4	14.7	E
	Through	160	152	94.8%	64.2	16.2	E
	Right Turn	80	70	87.9%	22.9	14.9	C
	Subtotal	470	438	93.2%	56.0	16.0	E
SB	Left Turn	190	189	99.4%	56.8	5.6	E
	Through	120	128	107.0%	64.4	7.5	E
	Right Turn	40	39	96.6%	11.7	4.5	B
	Subtotal	350	356	101.7%	54.9	5.7	D
EB	Left Turn	190	171	90.1%	70.9	7.3	E
	Through	1,200	915	76.2%	124.1	45.2	F
	Right Turn	240	216	89.9%	10.7	5.7	B
	Subtotal	1,630	1,302	79.9%	98.7	34.5	F
WB	Left Turn	130	117	90.3%	73.2	35.5	E
	Through	1,320	1,173	88.8%	23.9	2.5	C
	Right Turn	360	305	84.7%	11.6	1.3	B
	Subtotal	1,810	1,595	88.1%	25.4	5.2	C
Total		4,260	3,691	86.6%	57.2	10.3	E

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

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Intersection 29 **Elk Crest Rd/Bond Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	250	231	92.4%	121.7	41.8	F
	Through	30	31	101.8%	98.3	43.1	F
	Right Turn	10	10	95.7%	83.0	74.8	F
	Subtotal	290	271	93.5%	117.6	42.8	F
SB	Left Turn	90	89	99.4%	60.5	6.5	E
	Through	20	23	114.1%	50.9	20.7	D
	Right Turn	140	139	99.6%	36.2	8.9	D
	Subtotal	250	252	100.7%	46.3	6.7	D
EB	Left Turn	310	235	75.9%	90.6	22.0	F
	Through	1,250	1,000	80.0%	19.2	3.4	B
	Right Turn	10	6	55.2%	12.0	19.7	B
	Subtotal	1,570	1,241	79.0%	33.2	5.4	C
WB	Left Turn	90	84	93.2%	128.9	21.2	F
	Through	1,480	1,271	85.9%	119.6	24.2	F
	Right Turn	120	94	78.5%	146.6	28.7	F
	Subtotal	1,690	1,449	85.8%	122.0	23.6	F
Total		3,800	3,213	84.6%	81.4	14.4	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	590	580	110	560	1260	340	230	1050	260	200	1070	400
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	615	604	49	583	1312	177	240	1094	170	208	1115	200
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	515	1055	472	637	1168	516	220	1057	473	211	1048	462
Arrive On Green	0.15	0.30	0.30	0.19	0.33	0.33	0.06	0.30	0.30	0.06	0.30	0.30
Sat Flow, veh/h	3408	3505	1568	3408	3505	1548	3408	3505	1568	3408	3505	1545
Grp Volume(v), veh/h	615	604	49	583	1312	177	240	1094	170	208	1115	200
Grp Sat Flow(s),veh/h/ln	1704	1752	1568	1704	1752	1548	1704	1752	1568	1704	1752	1545
Q Serve(g_s), s	22.0	21.2	3.3	24.4	48.5	12.5	9.4	43.9	12.4	8.9	43.5	15.2
Cycle Q Clear(g_c), s	22.0	21.2	3.3	24.4	48.5	12.5	9.4	43.9	12.4	8.9	43.5	15.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	515	1055	472	637	1168	516	220	1057	473	211	1048	462
V/C Ratio(X)	1.19	0.57	0.10	0.92	1.12	0.34	1.09	1.03	0.36	0.99	1.06	0.43
Avail Cap(c_a), veh/h	515	1055	472	796	1168	516	220	1057	473	211	1048	462
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.8	42.9	36.7	58.0	48.5	36.5	68.1	50.8	39.8	68.2	51.0	41.1
Incr Delay (d2), s/veh	104.9	1.0	0.2	11.8	67.0	0.7	86.7	37.0	0.8	57.9	46.5	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.8	10.4	1.4	12.5	34.2	5.5	7.1	26.6	5.5	5.9	27.7	6.6
LnGrp Delay(d),s/veh	166.7	44.0	36.9	69.8	115.5	37.2	154.8	87.8	40.6	126.1	97.5	42.2
LnGrp LOS	F	D	D	E	F	D	F	F	D	F	F	D
Approach Vol, veh/h		1268			2072			1504			1523	
Approach Delay, s/veh		103.2			95.9			93.1			94.2	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	49.0	28.0	54.5	13.6	49.4	32.7	49.8
Change Period (Y+Rc), s	4.6	5.5	6.0	* 6	4.6	5.5	5.5	6.0
Max Green Setting (Gmax), s	9.4	43.5	22.0	* 49	9.0	43.9	34.0	36.5
Max Q Clear Time (g_c+I1), s	11.4	45.5	24.0	50.5	10.9	45.9	26.4	23.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.8	11.9

Intersection Summary		
HCM 2010 Ctrl Delay		96.3
HCM 2010 LOS		F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	100	880	280	70	1310	250	430	470	70	170	490	130
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1863	1881	1863	1881	1792	1863	1845	1881	1881
Adj Flow Rate, veh/h	115	1011	145	80	1506	200	494	540	23	195	563	12
Adj No. of Lanes	2	2	1	2	2	1	2	1	1	1	1	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	1	1	2	1	2	1	6	2	3	1	1
Cap, veh/h	162	1413	632	123	1375	608	485	561	495	195	534	453
Arrive On Green	0.05	0.40	0.40	0.04	0.38	0.38	0.14	0.31	0.31	0.11	0.28	0.28
Sat Flow, veh/h	3510	3574	1599	3442	3574	1579	3476	1792	1583	1757	1881	1596
Grp Volume(v), veh/h	115	1011	145	80	1506	200	494	540	23	195	563	12
Grp Sat Flow(s),veh/h/ln	1755	1787	1599	1721	1787	1579	1738	1792	1583	1757	1881	1596
Q Serve(g_s), s	4.5	33.2	8.4	3.2	53.5	12.4	19.4	41.2	1.4	15.4	39.5	0.8
Cycle Q Clear(g_c), s	4.5	33.2	8.4	3.2	53.5	12.4	19.4	41.2	1.4	15.4	39.5	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	162	1413	632	123	1375	608	485	561	495	195	534	453
V/C Ratio(X)	0.71	0.72	0.23	0.65	1.09	0.33	1.02	0.96	0.05	1.00	1.05	0.03
Avail Cap(c_a), veh/h	187	1413	632	183	1375	608	485	561	495	195	534	453
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.4	35.4	28.0	66.2	42.8	30.1	59.8	47.0	33.3	61.8	49.8	35.9
Incr Delay (d2), s/veh	7.5	1.9	0.3	2.2	54.5	0.4	45.6	28.6	0.0	65.0	53.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	16.7	3.8	1.6	36.8	5.5	12.4	24.9	0.6	11.0	28.5	0.3
LnGrp Delay(d),s/veh	72.8	37.4	28.2	68.3	97.3	30.6	105.4	75.6	33.3	126.9	103.5	35.9
LnGrp LOS	E	D	C	E	F	C	F	E	C	F	F	D
Approach Vol, veh/h		1271			1786			1057			770	
Approach Delay, s/veh		39.5			88.5			88.6			108.4	
Approach LOS		D			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	59.0	24.0	45.0	9.6	60.5	20.0	49.0
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	7.4	53.5	19.4	39.5	7.4	53.5	15.4	43.5
Max Q Clear Time (g_c+I1), s	6.5	55.5	21.4	41.5	5.2	35.2	17.4	43.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	17.1	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	78.9
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	420	420	220	140	500	180	280	1140	110	200	980	480
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	512	512	140	171	610	193	341	1390	118	244	1195	256
Adj No. of Lanes	2	2	1	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	496	1013	443	195	892	398	350	1338	591	253	1238	548
Arrive On Green	0.15	0.29	0.29	0.11	0.25	0.25	0.10	0.38	0.38	0.07	0.35	0.35
Sat Flow, veh/h	3408	3505	1532	1757	3505	1566	3408	3505	1548	3408	3505	1551
Grp Volume(v), veh/h	512	512	140	171	610	193	341	1390	118	244	1195	256
Grp Sat Flow(s),veh/h/ln	1704	1752	1532	1757	1752	1566	1704	1752	1548	1704	1752	1551
Q Serve(g_s), s	20.4	17.0	10.0	13.4	22.0	14.7	14.0	53.5	7.2	10.0	46.9	17.9
Cycle Q Clear(g_c), s	20.4	17.0	10.0	13.4	22.0	14.7	14.0	53.5	7.2	10.0	46.9	17.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	496	1013	443	195	892	398	350	1338	591	253	1238	548
V/C Ratio(X)	1.03	0.51	0.32	0.88	0.68	0.48	0.97	1.04	0.20	0.96	0.97	0.47
Avail Cap(c_a), veh/h	496	1038	454	306	1138	508	350	1338	591	253	1238	548
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.9	41.5	39.0	61.4	47.2	44.4	62.7	43.3	29.0	64.7	44.5	35.1
Incr Delay (d2), s/veh	48.9	0.6	0.6	10.5	1.5	1.3	40.8	35.4	0.1	46.4	17.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.9	8.3	4.3	7.1	10.9	6.5	8.6	32.4	3.1	6.3	25.8	7.7
LnGrp Delay(d),s/veh	108.8	42.0	39.6	71.8	48.7	45.7	103.5	78.7	29.1	111.1	62.3	35.4
LnGrp LOS	F	D	D	E	D	D	F	F	C	F	E	D
Approach Vol, veh/h		1164			974			1849			1695	
Approach Delay, s/veh		71.1			52.2			80.1			65.2	
Approach LOS		E			D			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.0	41.2	15.0	59.0	20.2	46.0	19.0	55.0
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	20.4	45.5	10.4	53.5	24.4	41.5	14.4	49.5
Max Q Clear Time (g_c+I1), s	22.4	24.0	12.0	55.5	15.4	19.0	16.0	48.9
Green Ext Time (p_c), s	0.0	11.6	0.0	0.0	0.1	11.9	0.0	0.5

Intersection Summary		
HCM 2010 Ctrl Delay		69.0
HCM 2010 LOS		E

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	480	240	350	80	30	430
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1900	1845	1900
Adj Flow Rate, veh/h	558	279	407	93	35	500
Adj No. of Lanes	1	1	1	0	0	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	3	3	3	3	0	0
Cap, veh/h	463	1019	351	80	35	503
Arrive On Green	0.26	0.55	0.24	0.24	0.34	0.34
Sat Flow, veh/h	1757	1845	1454	332	103	1473
Grp Volume(v), veh/h	558	279	0	500	536	0
Grp Sat Flow(s),veh/h/ln	1757	1845	0	1786	1579	0
Q Serve(g_s), s	23.7	7.2	0.0	21.7	30.5	0.0
Cycle Q Clear(g_c), s	23.7	7.2	0.0	21.7	30.5	0.0
Prop In Lane	1.00			0.19	0.07	0.93
Lane Grp Cap(c), veh/h	463	1019	0	431	539	0
V/C Ratio(X)	1.21	0.27	0.00	1.16	0.99	0.00
Avail Cap(c_a), veh/h	463	1019	0	431	539	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.2	10.6	0.0	34.2	29.6	0.0
Incr Delay (d2), s/veh	111.7	0.7	0.0	95.4	37.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.8	3.8	0.0	22.1	18.8	0.0
LnGrp Delay(d),s/veh	144.8	11.3	0.0	129.5	66.9	0.0
LnGrp LOS	F	B		F	E	
Approach Vol, veh/h		837	500		536	
Approach Delay, s/veh		100.3	129.5		66.9	
Approach LOS		F	F		E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		54.0		36.0	28.0	26.0		
Change Period (Y+Rc), s		4.3		5.3	4.3	4.3		
Max Green Setting (Gmax), s		49.7		30.7	23.7	21.7		
Max Q Clear Time (g_c+I1), s		9.2		32.5	25.7	23.7		
Green Ext Time (p_c), s		5.0		0.0	0.0	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	98.6
HCM 2010 LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	230	20	30	10	20	20	50	1130	10	10	950	370
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1492	1900	1900	1776	1900	1624	1776	1863
Adj Flow Rate, veh/h	277	0	0	11	23	17	57	1284	11	11	1080	0
Adj No. of Lanes	2	0	1	0	1	0	1	2	1	1	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0	0	0	0	0	7	0	17	7	2
Cap, veh/h	331	0	148	13	28	20	74	2227	1066	20	1127	1005
Arrive On Green	0.09	0.00	0.00	0.04	0.04	0.04	0.04	0.66	0.66	0.01	0.63	0.00
Sat Flow, veh/h	3619	0	1615	301	629	465	1810	3374	1615	1547	1776	1583
Grp Volume(v), veh/h	277	0	0	51	0	0	57	1284	11	11	1080	0
Grp Sat Flow(s),veh/h/ln	1810	0	1615	1395	0	0	1810	1687	1615	1547	1776	1583
Q Serve(g_s), s	9.5	0.0	0.0	4.6	0.0	0.0	3.9	26.4	0.3	0.9	71.8	0.0
Cycle Q Clear(g_c), s	9.5	0.0	0.0	4.6	0.0	0.0	3.9	26.4	0.3	0.9	71.8	0.0
Prop In Lane	1.00		1.00	0.22		0.33	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	331	0	148	61	0	0	74	2227	1066	20	1127	1005
V/C Ratio(X)	0.84	0.00	0.00	0.83	0.00	0.00	0.77	0.58	0.01	0.56	0.96	0.00
Avail Cap(c_a), veh/h	343	0	153	165	0	0	86	2227	1066	70	1165	1039
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	56.6	0.0	0.0	60.0	0.0	0.0	60.1	11.8	7.4	62.1	21.6	0.0
Incr Delay (d2), s/veh	15.1	0.0	0.0	10.5	0.0	0.0	25.7	0.2	0.0	9.0	16.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	0.0	1.9	0.0	0.0	2.5	12.2	0.1	0.4	40.1	0.0
LnGrp Delay(d),s/veh	71.6	0.0	0.0	70.5	0.0	0.0	85.8	12.0	7.4	71.1	38.4	0.0
LnGrp LOS	E			E			F	B	A	E	D	
Approach Vol, veh/h		277			51			1352			1091	
Approach Delay, s/veh		71.6			70.5			15.1			38.7	
Approach LOS		E			E			B			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.1	86.3		17.6	7.9	89.5		11.5
Change Period (Y+Rc), s	6.0	6.0		6.0	* 6.3	6.0		6.0
Max Green Setting (Gmax), s	6.0	83.0		12.0	* 5.7	83.0		15.0
Max Q Clear Time (g_c+I1), s	5.9	73.8		11.5	2.9	28.4		6.6
Green Ext Time (p_c), s	0.0	6.5		0.0	0.0	20.0		0.1

Intersection Summary		
HCM 2010 Ctrl Delay		31.1
HCM 2010 LOS		C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	20	20	20	30	360	20
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	22	22	22	0	391	22
Adj No. of Lanes	0	3	2	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	1185	2265	158	70	496	228
Arrive On Green	0.67	0.67	0.04	0.00	0.15	0.15
Sat Flow, veh/h	1757	3523	3597	1568	3408	1568
Grp Volume(v), veh/h	22	22	22	0	391	22
Grp Sat Flow(s),veh/h/ln	1757	1679	1752	1568	1704	1568
Q Serve(g_s), s	0.4	0.2	0.6	0.0	11.1	1.2
Cycle Q Clear(g_c), s	0.4	0.2	0.6	0.0	11.1	1.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	1185	2265	158	70	496	228
V/C Ratio(X)	0.02	0.01	0.14	0.00	0.79	0.10
Avail Cap(c_a), veh/h	1185	2265	866	387	1639	754
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.85	0.00	1.00	1.00
Uniform Delay (d), s/veh	5.4	5.3	45.9	0.0	41.3	37.0
Incr Delay (d2), s/veh	0.0	0.0	0.3	0.0	2.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.1	0.3	0.0	5.4	0.5
LnGrp Delay(d),s/veh	5.4	5.3	46.2	0.0	44.1	37.2
LnGrp LOS	A	A	D		D	D
Approach Vol, veh/h		44	22		413	
Approach Delay, s/veh		5.4	46.2		43.7	
Approach LOS		A	D		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		71.8		19.4		8.8		
Change Period (Y+Rc), s		4.3		4.9		4.3		
Max Green Setting (Gmax), s		13.7		48.1		24.7		
Max Q Clear Time (g_c+I1), s		2.4		13.1		2.6		
Green Ext Time (p_c), s		0.1		1.5		0.1		

Intersection Summary	
HCM 2010 Ctrl Delay	40.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	360	0	0	30	2060	20	0	480	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1845	1845	0	0	1845	1845	1900	1845	1845			
Adj Flow Rate, veh/h	22	391	0	0	33	0	0	0	546			
Adj No. of Lanes	1	3	0	0	2	1	0	1	2			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	40	3411	0	0	2256	959	0	418	689			
Arrive On Green	0.01	0.22	0.00	0.00	0.61	0.00	0.00	0.00	0.23			
Sat Flow, veh/h	1757	5202	0	0	3689	1568	0	1845	3043			
Grp Volume(v), veh/h	22	391	0	0	33	0	0	0	546			
Grp Sat Flow(s),veh/h/ln	1757	1679	0	0	1845	1568	0	1845	1521			
Q Serve(g_s), s	1.2	6.2	0.0	0.0	0.4	0.0	0.0	0.0	16.9			
Cycle Q Clear(g_c), s	1.2	6.2	0.0	0.0	0.4	0.0	0.0	0.0	16.9			
Prop In Lane	1.00		0.00	0.00		1.00	0.00		1.00			
Lane Grp Cap(c), veh/h	40	3411	0	0	2256	959	0	418	689			
V/C Ratio(X)	0.55	0.11	0.00	0.00	0.01	0.00	0.00	0.00	0.79			
Avail Cap(c_a), veh/h	135	3411	0	0	2256	959	0	714	1177			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.81	0.81	0.00	0.00	0.69	0.00	0.00	0.00	1.00			
Uniform Delay (d), s/veh	49.1	14.9	0.0	0.0	7.6	0.0	0.0	0.0	36.4			
Incr Delay (d2), s/veh	9.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.7	2.9	0.0	0.0	0.2	0.0	0.0	0.0	7.3			
LnGrp Delay(d),s/veh	58.2	15.0	0.0	0.0	7.6	0.0	0.0	0.0	38.5			
LnGrp LOS	E	B			A				D			
Approach Vol, veh/h		413			33			546				
Approach Delay, s/veh		17.3			7.6			38.5				
Approach LOS		B			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		72.0			6.6	65.5		28.0
Change Period (Y+Rc), s		4.3			4.3	4.3		5.3
Max Green Setting (Gmax), s		51.7			7.7	39.7		38.7
Max Q Clear Time (g_c+I1), s		8.2			3.2	2.4		18.9
Green Ext Time (p_c), s		2.8			0.0	2.8		2.2

Intersection Summary	
HCM 2010 Ctrl Delay	28.7
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	550	210	200	1420	690	390	160	150	430	100	280
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	83	573	169	208	1479	624	406	167	84	448	104	37
Adj No. of Lanes	2	3	1	2	3	1	2	1	1	2	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	153	2241	697	275	2420	744	474	224	188	514	246	208
Arrive On Green	0.09	0.89	0.89	0.08	0.48	0.48	0.14	0.12	0.12	0.15	0.13	0.13
Sat Flow, veh/h	3408	5036	1566	3408	5036	1547	3408	1845	1549	3408	1845	1561
Grp Volume(v), veh/h	83	573	169	208	1479	624	406	167	84	448	104	37
Grp Sat Flow(s),veh/h/ln	1704	1679	1566	1704	1679	1547	1704	1845	1549	1704	1845	1561
Q Serve(g_s), s	2.3	1.6	1.5	6.0	21.6	35.1	11.6	8.7	5.0	12.8	5.2	2.1
Cycle Q Clear(g_c), s	2.3	1.6	1.5	6.0	21.6	35.1	11.6	8.7	5.0	12.8	5.2	2.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	153	2241	697	275	2420	744	474	224	188	514	246	208
V/C Ratio(X)	0.54	0.26	0.24	0.76	0.61	0.84	0.86	0.75	0.45	0.87	0.42	0.18
Avail Cap(c_a), veh/h	627	2241	697	457	2420	744	627	323	271	627	323	273
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.5	3.1	3.1	45.0	19.1	22.6	42.1	42.4	40.8	41.5	39.8	38.5
Incr Delay (d2), s/veh	1.1	0.3	0.8	1.6	1.2	11.0	7.1	4.3	1.2	9.6	0.9	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.7	0.8	2.9	10.3	17.2	5.9	4.7	2.2	6.7	2.7	0.9
LnGrp Delay(d),s/veh	45.6	3.4	3.9	46.6	20.3	33.6	49.2	46.7	42.0	51.1	40.7	38.8
LnGrp LOS	D	A	A	D	C	C	D	D	D	D	D	D
Approach Vol, veh/h		825			2311			657			589	
Approach Delay, s/veh		7.8			26.2			47.7			48.5	
Approach LOS		A			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	53.6	18.5	18.8	12.7	50.0	19.7	17.6
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	18.4	25.5	18.4	17.5	13.4	30.5	18.4	17.5
Max Q Clear Time (g_c+I1), s	4.3	37.1	13.6	7.2	8.0	3.6	14.8	10.7
Green Ext Time (p_c), s	0.1	0.0	0.3	1.1	0.1	20.0	0.2	0.8

Intersection Summary		
HCM 2010 Ctrl Delay		29.0
HCM 2010 LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	1510	2200	480	680	140
Number	1	6	2	12	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	74	1606	2340	362	723	29
Adj No. of Lanes	1	3	3	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	96	3129	2524	782	798	367
Arrive On Green	0.05	0.62	0.50	0.50	0.23	0.23
Sat Flow, veh/h	1757	5202	5202	1560	3408	1568
Grp Volume(v), veh/h	74	1606	2340	362	723	29
Grp Sat Flow(s),veh/h/ln	1757	1679	1679	1560	1704	1568
Q Serve(g_s), s	2.9	12.4	30.3	10.5	14.4	1.0
Cycle Q Clear(g_c), s	2.9	12.4	30.3	10.5	14.4	1.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	96	3129	2524	782	798	367
V/C Ratio(X)	0.77	0.51	0.93	0.46	0.91	0.08
Avail Cap(c_a), veh/h	286	3129	2524	782	798	367
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.09	0.09	1.00	1.00
Uniform Delay (d), s/veh	32.7	7.4	16.3	11.3	26.0	20.9
Incr Delay (d2), s/veh	4.9	0.6	0.8	0.2	13.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	5.8	14.1	4.6	8.2	0.4
LnGrp Delay(d),s/veh	37.6	8.0	17.1	11.5	39.6	20.9
LnGrp LOS	D	A	B	B	D	C
Approach Vol, veh/h		1680	2702		752	
Approach Delay, s/veh		9.3	16.3		38.9	
Approach LOS		A	B		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.4	40.6				49.0		21.0
Change Period (Y+Rc), s	4.6	5.5				5.5		4.6
Max Green Setting (Gmax), s	11.4	27.5				43.5		16.4
Max Q Clear Time (g_c+I1), s	4.9	32.3				14.4		16.4
Green Ext Time (p_c), s	0.0	0.0				28.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	150	1490	760	120	1350	340	1210	880	220	300	350	220
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	163	1620	619	130	1467	161	1315	957	112	326	380	15
Adj No. of Lanes	2	3	2	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	235	1763	1263	196	1705	518	1034	1080	471	395	424	181
Arrive On Green	0.07	0.35	0.35	0.06	0.34	0.34	0.30	0.31	0.31	0.12	0.12	0.12
Sat Flow, veh/h	3408	5036	2695	3408	5036	1530	3408	3505	1529	3408	3505	1497
Grp Volume(v), veh/h	163	1620	619	130	1467	161	1315	957	112	326	380	15
Grp Sat Flow(s),veh/h/ln	1704	1679	1347	1704	1679	1530	1704	1752	1529	1704	1752	1497
Q Serve(g_s), s	5.6	37.0	19.1	4.5	32.6	9.3	36.4	31.2	6.6	11.2	12.8	1.1
Cycle Q Clear(g_c), s	5.6	37.0	19.1	4.5	32.6	9.3	36.4	31.2	6.6	11.2	12.8	1.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	235	1763	1263	196	1705	518	1034	1080	471	395	424	181
V/C Ratio(X)	0.69	0.92	0.49	0.66	0.86	0.31	1.27	0.89	0.24	0.82	0.90	0.08
Avail Cap(c_a), veh/h	494	1763	1263	494	1705	518	1034	1080	471	494	424	181
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.73	0.73	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.6	37.4	22.2	55.4	37.0	29.3	41.8	39.5	31.0	51.8	52.0	46.8
Incr Delay (d2), s/veh	1.0	7.0	1.0	1.4	5.9	1.6	130.0	8.7	0.1	7.3	20.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	18.3	7.2	2.2	16.0	4.2	35.8	16.3	2.8	5.7	7.4	0.4
LnGrp Delay(d),s/veh	55.6	44.4	23.2	56.9	43.0	30.9	171.8	48.2	31.1	59.2	72.8	46.9
LnGrp LOS	E	D	C	E	D	C	F	D	C	E	E	D
Approach Vol, veh/h		2402			1758			2384			721	
Approach Delay, s/veh		39.7			42.9			115.6			66.1	
Approach LOS		D			D			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.9	46.1	41.0	20.0	11.5	47.5	18.5	42.5
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	17.4	31.5	36.4	14.5	17.4	31.5	17.4	33.5
Max Q Clear Time (g_c+I1), s	7.6	34.6	38.4	14.8	6.5	39.0	13.2	33.2
Green Ext Time (p_c), s	0.7	0.0	0.0	0.0	0.5	0.0	0.7	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	68.0
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	2260	80	50	1500	20	100	20	140	40	30	40
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	45	2568	89	57	1705	23	114	23	87	45	34	20
Adj No. of Lanes	1	3	0	1	3	0	1	1	0	1	1	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	58	3336	115	74	3462	47	141	32	122	58	54	32
Arrive On Green	0.03	0.67	0.67	0.08	1.00	1.00	0.08	0.10	0.10	0.03	0.05	0.05
Sat Flow, veh/h	1757	4999	172	1757	5121	69	1757	332	1256	1757	1083	637
Grp Volume(v), veh/h	45	1718	939	57	1118	610	114	0	110	45	0	54
Grp Sat Flow(s),veh/h/ln	1757	1679	1814	1757	1679	1832	1757	0	1588	1757	0	1720
Q Serve(g_s), s	3.1	41.9	42.8	3.8	0.0	0.0	7.7	0.0	8.1	3.0	0.0	3.7
Cycle Q Clear(g_c), s	3.1	41.9	42.8	3.8	0.0	0.0	7.7	0.0	8.1	3.0	0.0	3.7
Prop In Lane	1.00		0.09	1.00		0.04	1.00		0.79	1.00		0.37
Lane Grp Cap(c), veh/h	58	2240	1210	74	2270	1239	141	0	154	58	0	85
V/C Ratio(X)	0.77	0.77	0.78	0.77	0.49	0.49	0.81	0.00	0.72	0.77	0.00	0.63
Avail Cap(c_a), veh/h	299	2240	1210	299	2270	1239	299	0	204	299	0	221
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.77	0.77	0.77	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.6	13.6	13.8	54.4	0.0	0.0	54.3	0.0	52.6	57.6	0.0	55.9
Incr Delay (d2), s/veh	7.9	2.6	4.9	4.9	0.6	1.1	4.1	0.0	4.4	7.8	0.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	19.9	22.8	1.9	0.2	0.4	3.9	0.0	3.7	1.6	0.0	1.8
LnGrp Delay(d),s/veh	65.5	16.2	18.7	59.3	0.6	1.1	58.4	0.0	57.0	65.3	0.0	58.8
LnGrp LOS	E	B	B	E	A	A	E		E	E		E
Approach Vol, veh/h		2702			1785			224			99	
Approach Delay, s/veh		17.9			2.6			57.7			61.8	
Approach LOS		B			A			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	85.6	14.2	10.6	8.6	86.6	8.6	16.2
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	20.4	44.5	20.4	15.4	20.4	44.5	20.4	15.4
Max Q Clear Time (g_c+I1), s	5.8	44.8	9.7	5.7	5.1	2.0	5.0	10.1
Green Ext Time (p_c), s	0.1	0.0	0.2	0.3	0.1	41.1	0.1	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	15.0
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	280	1830	140	290	990	220	150	1040	260	360	770	210
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	304	1989	85	315	1076	138	163	1130	109	391	837	140
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	324	1831	557	267	1748	531	220	1608	444	334	1787	494
Arrive On Green	0.19	0.73	0.73	0.08	0.35	0.35	0.06	0.29	0.29	0.09	0.32	0.32
Sat Flow, veh/h	3408	5036	1532	3408	5036	1531	3514	5534	1527	3514	5534	1530
Grp Volume(v), veh/h	304	1989	85	315	1076	138	163	1130	109	391	837	140
Grp Sat Flow(s),veh/h/ln	1704	1679	1532	1704	1679	1531	1757	1845	1527	1757	1845	1530
Q Serve(g_s), s	10.6	43.6	2.0	9.4	21.3	7.8	5.5	21.8	6.5	11.4	14.5	8.2
Cycle Q Clear(g_c), s	10.6	43.6	2.0	9.4	21.3	7.8	5.5	21.8	6.5	11.4	14.5	8.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	324	1831	557	267	1748	531	220	1608	444	334	1787	494
V/C Ratio(X)	0.94	1.09	0.15	1.18	0.62	0.26	0.74	0.70	0.25	1.17	0.47	0.28
Avail Cap(c_a), veh/h	324	1831	557	267	1748	531	246	1637	452	334	1787	494
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.44	0.44	0.44	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	16.4	10.7	55.3	32.5	28.1	55.3	38.0	32.5	54.3	32.4	30.3
Incr Delay (d2), s/veh	19.6	43.6	0.3	104.1	1.1	0.8	8.3	1.1	0.1	104.4	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	26.7	0.9	8.3	10.0	3.4	2.9	11.3	2.8	10.4	7.4	3.5
LnGrp Delay(d),s/veh	67.9	59.9	10.9	159.4	33.6	28.9	63.6	39.1	32.6	158.7	32.5	30.4
LnGrp LOS	E	F	B	F	C	C	E	D	C	F	C	C
Approach Vol, veh/h		2378			1529			1402			1368	
Approach Delay, s/veh		59.2			59.1			41.4			68.3	
Approach LOS		E			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	47.6	12.1	44.2	14.0	49.6	16.0	40.4
Change Period (Y+Rc), s	4.6	6.0	4.6	5.5	4.6	* 6	4.6	5.5
Max Green Setting (Gmax), s	11.4	41.0	8.4	38.5	9.4	* 44	11.4	35.5
Max Q Clear Time (g_c+I1), s	12.6	23.3	7.5	16.5	11.4	45.6	13.4	23.8
Green Ext Time (p_c), s	0.0	17.6	0.1	20.6	0.0	0.0	0.0	11.0

Intersection Summary	
HCM 2010 Ctrl Delay	57.3
HCM 2010 LOS	E

Notes
User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	2200	50	90	1480	210	50	30	70	200	10	50
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.94	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1900	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	33	2391	29	98	1609	217	54	33	30	225	0	20
Adj No. of Lanes	1	3	1	1	3	0	0	1	1	2	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	49	2686	809	123	2532	340	101	61	134	388	0	165
Arrive On Green	0.02	0.36	0.36	0.14	1.00	1.00	0.09	0.09	0.09	0.11	0.00	0.11
Sat Flow, veh/h	1757	5036	1517	1757	4472	601	1110	679	1480	3514	0	1492
Grp Volume(v), veh/h	33	2391	29	98	1207	619	87	0	30	225	0	20
Grp Sat Flow(s),veh/h/ln	1757	1679	1517	1757	1679	1715	1789	0	1480	1757	0	1492
Q Serve(g_s), s	2.2	53.7	1.5	6.5	0.0	0.0	5.6	0.0	2.3	7.3	0.0	1.5
Cycle Q Clear(g_c), s	2.2	53.7	1.5	6.5	0.0	0.0	5.6	0.0	2.3	7.3	0.0	1.5
Prop In Lane	1.00		1.00	1.00		0.35	0.62		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	49	2686	809	123	1901	971	162	0	134	388	0	165
V/C Ratio(X)	0.68	0.89	0.04	0.80	0.63	0.64	0.54	0.00	0.22	0.58	0.00	0.12
Avail Cap(c_a), veh/h	224	2686	809	240	1901	971	394	0	326	773	0	328
HCM Platoon Ratio	0.67	0.67	0.67	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.48	0.48	0.48	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.3	35.2	18.5	50.8	0.0	0.0	52.2	0.0	50.6	50.7	0.0	48.1
Incr Delay (d2), s/veh	1.5	0.5	0.0	5.7	0.8	1.5	2.7	0.0	0.8	1.4	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	25.1	0.6	3.3	0.2	0.4	2.9	0.0	1.0	3.6	0.0	0.6
LnGrp Delay(d),s/veh	59.8	35.7	18.5	56.5	0.8	1.5	54.9	0.0	51.5	52.1	0.0	48.5
LnGrp LOS	E	D	B	E	A	A	D		D	D		D
Approach Vol, veh/h		2453			1924			117			245	
Approach Delay, s/veh		35.9			3.9			54.0			51.8	
Approach LOS		D			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	74.6		16.5	14.0	70.7		18.9
Change Period (Y+Rc), s	6.7	6.7		5.6	5.6	6.7		5.6
Max Green Setting (Gmax), s	15.3	27.3		26.4	16.4	27.3		26.4
Max Q Clear Time (g_c+I1), s	4.2	2.0		7.6	8.5	55.7		9.3
Green Ext Time (p_c), s	0.1	24.7		0.6	0.2	0.0		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	24.1
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	200	1810	550	160	1300	420	450	990	290	340	770	130
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	217	1967	523	174	1413	378	489	1076	56	370	837	19
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	269	1909	581	182	1780	541	494	1037	452	352	891	387
Arrive On Green	0.16	0.76	0.76	0.05	0.35	0.35	0.14	0.30	0.30	0.10	0.25	0.25
Sat Flow, veh/h	3408	5036	1532	3408	5036	1531	3408	3505	1528	3408	3505	1524
Grp Volume(v), veh/h	217	1967	523	174	1413	378	489	1076	56	370	837	19
Grp Sat Flow(s),veh/h/ln	1704	1679	1532	1704	1679	1531	1704	1752	1528	1704	1752	1524
Q Serve(g_s), s	7.4	45.5	31.2	6.1	30.3	25.4	17.2	35.5	3.2	12.4	28.1	1.1
Cycle Q Clear(g_c), s	7.4	45.5	31.2	6.1	30.3	25.4	17.2	35.5	3.2	12.4	28.1	1.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	269	1909	581	182	1780	541	494	1037	452	352	891	387
V/C Ratio(X)	0.81	1.03	0.90	0.96	0.79	0.70	0.99	1.04	0.12	1.05	0.94	0.05
Avail Cap(c_a), veh/h	295	1909	581	182	1780	541	494	1037	452	352	891	387
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.16	0.16	0.16	1.00	1.00	1.00	0.61	0.61	0.61	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.6	14.5	12.8	56.7	34.9	33.3	51.2	42.3	30.9	53.8	43.8	33.8
Incr Delay (d2), s/veh	2.2	17.5	4.0	53.8	3.7	7.3	28.8	32.3	0.0	61.8	17.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	22.9	13.3	4.2	14.6	11.9	10.1	21.8	1.4	8.8	15.7	0.5
LnGrp Delay(d),s/veh	51.8	32.0	16.8	110.5	38.6	40.6	80.0	74.5	30.9	115.6	61.0	33.8
LnGrp LOS	D	F	B	F	D	D	F	F	C	F	E	C
Approach Vol, veh/h		2707			1965			1621			1226	
Approach Delay, s/veh		30.6			45.4			74.7			77.1	
Approach LOS		C			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	47.9	22.0	36.0	11.0	51.0	17.0	41.0
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	10.4	41.5	17.4	30.5	6.4	45.5	12.4	35.5
Max Q Clear Time (g_c+I1), s	9.4	32.3	19.2	30.1	8.1	47.5	14.4	37.5
Green Ext Time (p_c), s	0.1	9.2	0.0	0.4	0.0	0.0	0.0	0.0

Intersection Summary			
HCM 2010 Ctrl Delay			51.5
HCM 2010 LOS			D

Notes
User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	770	600	230	190	710	50	390	530	90	100	450	600
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.93	1.00		0.96	1.00		0.83
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	856	667	54	211	789	52	433	589	90	111	500	411
Adj No. of Lanes	2	2	1	1	2	0	1	1	0	1	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	797	1133	485	232	735	48	411	576	88	103	688	463
Arrive On Green	0.23	0.32	0.32	0.13	0.22	0.22	0.23	0.37	0.37	0.06	0.20	0.20
Sat Flow, veh/h	3408	3505	1502	1757	3321	219	1757	1553	237	1757	3505	1307
Grp Volume(v), veh/h	856	667	54	211	416	425	433	0	679	111	500	411
Grp Sat Flow(s),veh/h/ln	1704	1752	1502	1757	1752	1787	1757	0	1790	1757	1752	1307
Q Serve(g_s), s	37.4	25.5	4.0	19.0	35.4	35.4	37.4	0.0	59.4	9.4	21.4	31.4
Cycle Q Clear(g_c), s	37.4	25.5	4.0	19.0	35.4	35.4	37.4	0.0	59.4	9.4	21.4	31.4
Prop In Lane	1.00		1.00	1.00		0.12	1.00		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	797	1133	485	232	388	395	411	0	664	103	688	463
V/C Ratio(X)	1.07	0.59	0.11	0.91	1.07	1.07	1.05	0.00	1.02	1.08	0.73	0.89
Avail Cap(c_a), veh/h	797	1133	485	323	388	395	411	0	664	103	688	463
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.3	45.3	38.0	68.5	62.3	62.3	61.3	0.0	50.3	75.3	60.3	52.2
Incr Delay (d2), s/veh	53.8	0.6	0.0	19.5	66.7	66.5	59.5	0.0	40.6	110.4	3.4	17.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.5	12.4	1.7	10.5	24.3	24.8	24.9	0.0	36.8	7.7	10.7	19.6
LnGrp Delay(d),s/veh	115.1	45.8	38.0	88.0	129.0	128.8	120.8	0.0	90.9	185.9	63.7	70.1
LnGrp LOS	F	D	D	F	F	F	F		F	F	E	E
Approach Vol, veh/h		1577			1052			1112			1022	
Approach Delay, s/veh		83.2			120.7			102.5			79.5	
Approach LOS		F			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	42.0	40.0	42.0	36.0	25.7	56.3	14.0	64.0
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	37.4	35.4	37.4	31.4	29.4	43.4	9.4	57.4
Max Q Clear Time (g_c+I1), s	39.4	37.4	39.4	33.4	21.0	27.5	11.4	61.4
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.1	6.6	0.0	0.0

Intersection Summary			
HCM 2010 Ctrl Delay			95.2
HCM 2010 LOS			F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	380	330	230	750	310	230	470	80	180	700	120
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1863	1881	1900	1863	1881	1845	1845	1792	1881	1827	1900
Adj Flow Rate, veh/h	94	447	314	271	882	269	271	553	55	212	824	40
Adj No. of Lanes	1	1	1	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.77
Percent Heavy Veh, %	3	2	1	0	2	1	3	3	6	1	4	0
Cap, veh/h	119	552	473	179	1160	470	300	1086	471	242	951	441
Arrive On Green	0.07	0.30	0.30	0.10	0.33	0.33	0.17	0.31	0.31	0.13	0.27	0.27
Sat Flow, veh/h	1757	1863	1597	1810	3539	1435	1757	3505	1522	1792	3471	1610
Grp Volume(v), veh/h	94	447	314	271	882	269	271	553	55	212	824	40
Grp Sat Flow(s),veh/h/ln	1757	1863	1597	1810	1770	1435	1757	1752	1522	1792	1736	1610
Q Serve(g_s), s	6.1	25.6	19.8	11.4	25.7	17.8	17.4	14.9	3.0	13.4	26.0	2.1
Cycle Q Clear(g_c), s	6.1	25.6	19.8	11.4	25.7	17.8	17.4	14.9	3.0	13.4	26.0	2.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	119	552	473	179	1160	470	300	1086	471	242	951	441
V/C Ratio(X)	0.79	0.81	0.66	1.51	0.76	0.57	0.90	0.51	0.12	0.88	0.87	0.09
Avail Cap(c_a), veh/h	266	703	603	179	1160	470	419	1170	508	365	1038	481
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.8	37.5	35.4	51.8	34.6	32.0	46.7	32.5	28.4	48.8	39.8	31.1
Incr Delay (d2), s/veh	11.0	4.4	0.9	256.5	2.7	1.1	14.7	0.1	0.0	10.3	6.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	13.8	8.8	18.5	12.9	7.2	9.7	7.2	1.2	7.3	13.4	1.0
LnGrp Delay(d),s/veh	63.9	41.8	36.3	308.3	37.3	33.1	61.4	32.7	28.5	59.1	46.6	31.1
LnGrp LOS	E	D	D	F	D	C	E	C	C	E	D	C
Approach Vol, veh/h		855			1422			879			1076	
Approach Delay, s/veh		42.2			88.1			41.3			48.5	
Approach LOS		D			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.4	42.3	24.2	36.1	16.0	38.7	20.1	40.2
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	17.4	37.4	27.4	34.4	11.4	43.4	23.4	38.4
Max Q Clear Time (g_c+I1), s	8.1	27.7	19.4	28.0	13.4	27.6	15.4	16.9
Green Ext Time (p_c), s	0.1	5.3	0.3	3.5	0.0	6.5	0.2	6.8

Intersection Summary		
HCM 2010 Ctrl Delay		59.1
HCM 2010 LOS		E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	130	200	120	20	200	120	220	1260	40	90	1210	150
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1900	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	137	211	126	21	211	126	232	1326	42	95	1274	158
Adj No. of Lanes	1	2	1	0	1	1	1	2	0	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	202	403	179	25	251	235	258	1775	56	118	1514	677
Arrive On Green	0.12	0.12	0.12	0.15	0.15	0.15	0.15	0.51	0.51	0.07	0.43	0.43
Sat Flow, veh/h	1757	3505	1556	166	1670	1568	1757	3468	110	1757	3505	1568
Grp Volume(v), veh/h	137	211	126	232	0	126	232	669	699	95	1274	158
Grp Sat Flow(s),veh/h/ln	1757	1752	1556	1836	0	1568	1757	1752	1825	1757	1752	1568
Q Serve(g_s), s	9.2	7.0	9.6	15.1	0.0	9.1	16.0	37.1	37.2	6.6	39.9	7.8
Cycle Q Clear(g_c), s	9.2	7.0	9.6	15.1	0.0	9.1	16.0	37.1	37.2	6.6	39.9	7.8
Prop In Lane	1.00		1.00	0.09		1.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	202	403	179	275	0	235	258	897	934	118	1514	677
V/C Ratio(X)	0.68	0.52	0.70	0.84	0.00	0.54	0.90	0.75	0.75	0.81	0.84	0.23
Avail Cap(c_a), veh/h	391	780	346	454	0	387	286	897	934	143	1514	677
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.3	51.3	52.4	50.9	0.0	48.3	51.6	23.7	23.7	56.6	31.2	22.1
Incr Delay (d2), s/veh	3.9	1.1	5.0	7.4	0.0	1.9	27.2	5.6	5.4	23.8	5.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	3.4	4.4	8.2	0.0	4.1	9.7	19.3	20.0	4.0	20.5	3.5
LnGrp Delay(d),s/veh	56.2	52.3	57.4	58.3	0.0	50.2	78.8	29.3	29.2	80.4	37.0	22.9
LnGrp LOS	E	D	E	E		D	E	C	C	F	D	C
Approach Vol, veh/h		474			358			1600			1527	
Approach Delay, s/veh		54.8			55.4			36.5			38.3	
Approach LOS		D			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.3	68.0		18.8	23.1	58.2		23.1
Change Period (Y+Rc), s	5.0	5.0		4.6	5.0	5.0		4.6
Max Green Setting (Gmax), s	10.0	63.0		27.4	20.0	53.0		30.4
Max Q Clear Time (g_c+I1), s	8.6	39.2		11.6	18.0	41.9		17.1
Green Ext Time (p_c), s	0.0	18.3		1.9	0.1	9.6		1.3

Intersection Summary	
HCM 2010 Ctrl Delay	41.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	230	30	60	40	60	10	20	950	20	10	790	200
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1896	1357	1900	1863	1900	1520	1745	1900	1863	1759	1845
Adj Flow Rate, veh/h	250	33	0	43	65	11	22	1033	22	11	859	0
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	40	2	2	2	25	9	9	2	8	3
Cap, veh/h	291	38	210	55	84	14	100	1528	33	105	1506	707
Arrive On Green	0.18	0.18	0.00	0.08	0.08	0.08	0.07	0.46	0.46	0.06	0.45	0.00
Sat Flow, veh/h	1604	212	1154	651	984	166	1448	3320	71	1774	3343	1568
Grp Volume(v), veh/h	283	0	0	119	0	0	22	516	539	11	859	0
Grp Sat Flow(s),veh/h/ln	1815	0	1154	1801	0	0	1448	1658	1733	1774	1671	1568
Q Serve(g_s), s	15.8	0.0	0.0	6.8	0.0	0.0	1.5	25.5	25.5	0.6	19.9	0.0
Cycle Q Clear(g_c), s	15.8	0.0	0.0	6.8	0.0	0.0	1.5	25.5	25.5	0.6	19.9	0.0
Prop In Lane	0.88		1.00	0.36		0.09	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	210	153	0	0	100	763	798	105	1506	707
V/C Ratio(X)	0.86	0.00	0.00	0.78	0.00	0.00	0.22	0.68	0.68	0.10	0.57	0.00
Avail Cap(c_a), veh/h	530	0	337	389	0	0	100	763	798	105	1506	707
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.5	0.0	0.0	46.9	0.0	0.0	46.1	22.1	22.1	46.6	21.3	0.0
Incr Delay (d2), s/veh	7.9	0.0	0.0	8.2	0.0	0.0	5.1	4.8	4.6	2.0	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	0.0	3.7	0.0	0.0	0.7	12.6	13.1	0.4	9.5	0.0
LnGrp Delay(d),s/veh	49.4	0.0	0.0	55.2	0.0	0.0	51.2	26.9	26.7	48.6	22.8	0.0
LnGrp LOS	D			E			D	C	C	D	C	
Approach Vol, veh/h		283			119			1077			870	
Approach Delay, s/veh		49.4			55.2			27.3			23.2	
Approach LOS		D			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	54.0		24.4	13.0	53.0		14.3
Change Period (Y+Rc), s	* 5.8	* 5.8		5.4	* 5.8	* 5.8		5.4
Max Green Setting (Gmax), s	* 6.2	* 48		30.6	* 7.2	* 47		22.6
Max Q Clear Time (g_c+I1), s	2.6	27.5		17.8	3.5	21.9		8.8
Green Ext Time (p_c), s	0.0	11.6		1.2	0.0	13.0		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	90	90	110	60	50	130	1450	120	70	1220	90
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	87	98	14	120	65	19	141	1576	96	76	1326	94
Adj No. of Lanes	1	1	1	2	1	1	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	113	242	197	190	227	184	173	2091	906	99	1837	130
Arrive On Green	0.06	0.13	0.13	0.06	0.12	0.12	0.10	0.60	0.60	0.06	0.55	0.55
Sat Flow, veh/h	1757	1845	1501	3408	1845	1498	1757	3505	1519	1757	3313	234
Grp Volume(v), veh/h	87	98	14	120	65	19	141	1576	96	76	700	720
Grp Sat Flow(s),veh/h/ln	1757	1845	1501	1704	1845	1498	1757	1752	1519	1757	1752	1794
Q Serve(g_s), s	5.9	5.9	1.0	4.2	3.9	1.4	9.5	39.8	3.3	5.2	35.8	36.1
Cycle Q Clear(g_c), s	5.9	5.9	1.0	4.2	3.9	1.4	9.5	39.8	3.3	5.2	35.8	36.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	113	242	197	190	227	184	173	2091	906	99	972	995
V/C Ratio(X)	0.77	0.40	0.07	0.63	0.29	0.10	0.81	0.75	0.11	0.77	0.72	0.72
Avail Cap(c_a), veh/h	364	611	497	705	611	496	364	2091	906	364	1015	1040
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.7	48.1	46.0	55.8	48.2	47.1	53.4	17.9	10.5	56.2	20.0	20.0
Incr Delay (d2), s/veh	4.2	0.4	0.1	1.3	0.3	0.1	3.5	1.4	0.0	4.6	2.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	3.0	0.4	2.0	2.0	0.6	4.8	19.5	1.4	2.6	17.8	18.4
LnGrp Delay(d),s/veh	59.8	48.5	46.1	57.1	48.4	47.1	56.9	19.3	10.5	60.8	22.0	22.1
LnGrp LOS	E	D	D	E	D	D	E	B	B	E	C	C
Approach Vol, veh/h		199			204			1813			1496	
Approach Delay, s/veh		53.3			53.4			21.7			24.0	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.5	72.5	12.4	19.5	11.4	77.6	11.3	20.5
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	11.5	38.1	7.9	5.9	7.2	41.8	6.2	7.9
Green Ext Time (p_c), s	0.5	28.9	0.3	1.0	0.2	27.6	0.7	1.0

Intersection Summary		
HCM 2010 Ctrl Delay		26.1
HCM 2010 LOS		C

Intersection	
Intersection Delay, s/veh	31.7
Intersection LOS	D

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	20	300	40	0	70	110	20	0	50	30	110
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	30	455	61	0	106	167	30	0	76	45	167
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	53.9	14.1	17.9
HCM LOS	F	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	26%	100%	0%	100%	0%	55%
Vol Thru, %	16%	0%	88%	0%	85%	27%
Vol Right, %	58%	0%	12%	0%	15%	18%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	190	20	340	70	130	110
LT Vol	50	20	0	70	0	60
Through Vol	30	0	300	0	110	30
RT Vol	110	0	40	0	20	20
Lane Flow Rate	288	30	515	106	197	167
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.546	0.062	0.964	0.231	0.394	0.348
Departure Headway (Hd)	6.822	7.333	6.737	7.834	7.208	7.507
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	527	487	536	456	496	477
Service Time	4.902	5.105	4.508	5.626	5	5.604
HCM Lane V/C Ratio	0.546	0.062	0.961	0.232	0.397	0.35
HCM Control Delay	17.9	10.6	56.4	13	14.7	14.6
HCM Lane LOS	C	B	F	B	B	B
HCM 95th-tile Q	3.3	0.2	12.7	0.9	1.9	1.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	60	30	20
Peak Hour Factor	0.66	0.66	0.66	0.66
Heavy Vehicles, %	3	3	3	3
Mvmt Flow	0	91	45	30
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	14.6
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	190	110	110	20	70	30	60	1350	20	20	1140	160
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.95	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	207	120	99	22	76	18	65	1467	21	22	1239	162
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	234	786	341	37	392	167	85	1966	28	37	1642	214
Arrive On Green	0.13	0.22	0.22	0.02	0.11	0.11	0.05	0.56	0.56	0.02	0.53	0.53
Sat Flow, veh/h	1757	3505	1521	1757	3505	1493	1757	3536	51	1757	3106	404
Grp Volume(v), veh/h	207	120	99	22	76	18	65	726	762	22	696	705
Grp Sat Flow(s),veh/h/ln	1757	1752	1521	1757	1752	1493	1757	1752	1835	1757	1752	1757
Q Serve(g_s), s	14.9	3.5	6.9	1.6	2.5	1.4	4.7	40.4	40.5	1.6	39.9	40.5
Cycle Q Clear(g_c), s	14.9	3.5	6.9	1.6	2.5	1.4	4.7	40.4	40.5	1.6	39.9	40.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.03	1.00		0.23
Lane Grp Cap(c), veh/h	234	786	341	37	392	167	85	974	1020	37	926	929
V/C Ratio(X)	0.88	0.15	0.29	0.59	0.19	0.11	0.76	0.75	0.75	0.59	0.75	0.76
Avail Cap(c_a), veh/h	342	1092	474	342	1092	465	342	974	1020	342	955	958
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.7	40.0	41.3	62.3	51.7	51.2	60.4	21.6	21.6	62.3	23.7	23.8
Incr Delay (d2), s/veh	12.8	0.0	0.2	5.5	0.1	0.1	5.2	2.8	2.7	5.5	2.9	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.1	1.7	2.9	0.8	1.2	0.6	2.4	20.1	21.1	0.8	19.9	20.4
LnGrp Delay(d),s/veh	67.5	40.0	41.5	67.7	51.8	51.3	65.5	24.4	24.4	67.7	26.5	26.9
LnGrp LOS	E	D	D	E	D	D	E	C	C	E	C	C
Approach Vol, veh/h		426			116			1553			1423	
Approach Delay, s/veh		53.7			54.8			26.1			27.3	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.5	73.2	22.7	20.0	9.0	76.7	8.3	34.4
Change Period (Y+Rc), s	6.3	5.3	5.6	5.6	6.3	5.3	5.6	* 5.6
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	* 40
Max Q Clear Time (g_c+I1), s	6.7	42.5	16.9	4.5	3.6	42.5	3.6	8.9
Green Ext Time (p_c), s	0.2	25.3	0.3	1.2	0.0	26.9	0.0	1.2

Intersection Summary	
HCM 2010 Ctrl Delay	30.9
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	130	10	80	10	10	10	100	1420	10	10	1260	50
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1900	1900	1863	1900	1845	1845	1900	1900	1845	1900
Adj Flow Rate, veh/h	141	11	76	11	11	11	109	1543	11	11	1370	49
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	151	12	81	17	17	17	137	2487	18	39	1900	68
Arrive On Green	0.15	0.15	0.15	0.03	0.03	0.03	0.08	0.70	0.70	0.57	0.57	0.57
Sat Flow, veh/h	1032	81	556	577	577	577	1757	3567	25	9	3328	119
Grp Volume(v), veh/h	228	0	0	33	0	0	109	758	796	747	0	683
Grp Sat Flow(s),veh/h/ln	1669	0	0	1732	0	0	1757	1753	1840	1802	0	1653
Q Serve(g_s), s	14.8	0.0	0.0	2.1	0.0	0.0	6.7	25.2	25.2	0.0	0.0	33.0
Cycle Q Clear(g_c), s	14.8	0.0	0.0	2.1	0.0	0.0	6.7	25.2	25.2	31.9	0.0	33.0
Prop In Lane	0.62		0.33	0.33		0.33	1.00		0.01	0.01		0.07
Lane Grp Cap(c), veh/h	244	0	0	50	0	0	137	1222	1283	1062	0	944
V/C Ratio(X)	0.93	0.00	0.00	0.66	0.00	0.00	0.80	0.62	0.62	0.70	0.00	0.72
Avail Cap(c_a), veh/h	244	0	0	396	0	0	402	1222	1283	1183	0	1060
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.1	0.0	0.0	52.5	0.0	0.0	49.5	8.8	8.8	16.9	0.0	17.1
Incr Delay (d2), s/veh	39.5	0.0	0.0	5.4	0.0	0.0	4.0	0.7	0.7	1.3	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	0.0	0.0	1.1	0.0	0.0	3.4	12.2	12.9	16.6	0.0	15.4
LnGrp Delay(d),s/veh	85.6	0.0	0.0	57.8	0.0	0.0	53.5	9.5	9.5	18.2	0.0	18.9
LnGrp LOS	F			E			D	A	A	B		B
Approach Vol, veh/h		228			33			1663			1430	
Approach Delay, s/veh		85.6			57.8			12.4			18.5	
Approach LOS		F			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	13.8	67.7		20.0		81.5		7.8
Change Period (Y+Rc), s	5.3	5.3		4.0		5.3		4.6
Max Green Setting (Gmax), s	25.0	70.0		16.0		70.0		25.0
Max Q Clear Time (g_c+I1), s	8.7	35.0		16.8		27.2		4.1
Green Ext Time (p_c), s	0.2	27.3		0.0		41.6		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	20.4
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	220	380	20	350	100	180	40	1120	290	250	1000	90
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.95	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	239	413	20	380	109	156	43	1217	276	272	1087	85
Adj No. of Lanes	1	1	0	2	1	2	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	258	419	20	425	403	849	56	1361	595	341	1499	117
Arrive On Green	0.15	0.24	0.24	0.12	0.22	0.22	0.03	0.39	0.39	0.10	0.46	0.46
Sat Flow, veh/h	1757	1742	84	3408	1845	2620	1757	3505	1533	3408	3284	257
Grp Volume(v), veh/h	239	0	433	380	109	156	43	1217	276	272	580	592
Grp Sat Flow(s),veh/h/ln	1757	0	1827	1704	1845	1310	1757	1752	1533	1704	1752	1788
Q Serve(g_s), s	22.4	0.0	39.3	18.3	8.2	7.2	4.0	54.2	22.4	13.0	44.7	44.8
Cycle Q Clear(g_c), s	22.4	0.0	39.3	18.3	8.2	7.2	4.0	54.2	22.4	13.0	44.7	44.8
Prop In Lane	1.00		0.05	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	258	0	439	425	403	849	56	1361	595	341	800	816
V/C Ratio(X)	0.93	0.00	0.99	0.89	0.27	0.18	0.77	0.89	0.46	0.80	0.72	0.73
Avail Cap(c_a), veh/h	264	0	439	512	443	906	264	1474	645	819	800	816
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	70.2	0.0	63.0	71.8	54.0	41.1	80.0	47.7	38.0	73.3	36.8	36.8
Incr Delay (d2), s/veh	35.5	0.0	39.2	14.4	0.1	0.0	7.8	6.7	0.2	1.6	2.9	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.4	0.0	24.6	9.5	4.2	2.6	2.1	27.5	9.5	6.2	22.2	22.7
LnGrp Delay(d),s/veh	105.6	0.0	102.2	86.1	54.2	41.1	87.8	54.4	38.2	74.9	39.6	39.6
LnGrp LOS	F		F	F	D	D	F	D	D	E	D	D
Approach Vol, veh/h		672			645			1536			1444	
Approach Delay, s/veh		103.4			69.8			52.4			46.3	
Approach LOS		F			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.6	81.3	30.0	43.6	23.0	69.9	26.4	47.2
Change Period (Y+Rc), s	6.3	5.3	5.6	* 7.2	6.3	5.3	5.6	7.2
Max Green Setting (Gmax), s	25.0	70.0	25.0	* 40	40.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	6.0	46.8	24.4	10.2	15.0	56.2	20.3	41.3
Green Ext Time (p_c), s	0.1	22.0	0.0	2.2	1.7	8.5	0.5	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	60.9
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	210	710	120	40	330	270	30	1170	100	220	1070	90
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	228	772	125	43	359	165	33	1272	102	239	1163	34
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	327	1121	489	112	900	391	97	1243	543	338	1491	653
Arrive On Green	0.10	0.32	0.32	0.03	0.26	0.26	0.03	0.35	0.35	0.10	0.43	0.43
Sat Flow, veh/h	3408	3505	1529	3408	3505	1525	3408	3505	1531	3408	3505	1534
Grp Volume(v), veh/h	228	772	125	43	359	165	33	1272	102	239	1163	34
Grp Sat Flow(s),veh/h/ln	1704	1752	1529	1704	1752	1525	1704	1752	1531	1704	1752	1534
Q Serve(g_s), s	7.3	21.7	6.8	1.4	9.6	10.2	1.1	40.0	5.2	7.7	32.2	1.5
Cycle Q Clear(g_c), s	7.3	21.7	6.8	1.4	9.6	10.2	1.1	40.0	5.2	7.7	32.2	1.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	327	1121	489	112	900	391	97	1243	543	338	1491	653
V/C Ratio(X)	0.70	0.69	0.26	0.38	0.40	0.42	0.34	1.02	0.19	0.71	0.78	0.05
Avail Cap(c_a), veh/h	1058	1865	814	756	1865	811	756	1243	543	1058	1491	653
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.4	33.5	28.4	53.4	34.7	34.9	53.7	36.4	25.2	49.2	27.9	19.0
Incr Delay (d2), s/veh	1.0	0.3	0.1	0.8	0.1	0.3	0.8	31.6	0.1	1.0	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	10.6	2.9	0.7	4.7	4.3	0.5	24.6	2.2	3.7	16.0	0.6
LnGrp Delay(d),s/veh	50.4	33.7	28.5	54.2	34.8	35.2	54.5	67.9	25.2	50.2	30.3	19.0
LnGrp LOS	D	C	C	D	C	D	D	F	C	D	C	B
Approach Vol, veh/h		1125			567			1407			1436	
Approach Delay, s/veh		36.5			36.4			64.5			33.4	
Approach LOS		D			D			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	53.3	16.4	33.6	17.5	45.3	9.3	40.7
Change Period (Y+Rc), s	6.3	5.3	5.6	4.6	6.3	5.3	5.6	4.6
Max Green Setting (Gmax), s	25.0	40.0	35.0	60.0	35.0	40.0	25.0	60.0
Max Q Clear Time (g_c+I1), s	3.1	34.2	9.3	12.2	9.7	42.0	3.4	23.7
Green Ext Time (p_c), s	0.1	5.7	1.5	13.3	1.5	0.0	0.2	12.4

Intersection Summary	
HCM 2010 Ctrl Delay	44.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	500	290	20	20	220	550	50	120	20	230	150	450
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	543	315	22	22	239	598	54	130	22	250	163	489
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	609	1626	712	72	1073	468	112	996	434	307	1196	522
Arrive On Green	0.18	0.46	0.46	0.02	0.31	0.31	0.03	0.28	0.28	0.09	0.34	0.34
Sat Flow, veh/h	3408	3505	1535	3408	3505	1528	3408	3505	1527	3408	3505	1531
Grp Volume(v), veh/h	543	315	22	22	239	598	54	130	22	250	163	489
Grp Sat Flow(s),veh/h/ln	1704	1752	1535	1704	1752	1528	1704	1752	1527	1704	1752	1531
Q Serve(g_s), s	20.3	6.9	1.0	0.8	6.6	40.0	2.0	3.6	1.4	9.4	4.2	40.4
Cycle Q Clear(g_c), s	20.3	6.9	1.0	0.8	6.6	40.0	2.0	3.6	1.4	9.4	4.2	40.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	609	1626	712	72	1073	468	112	996	434	307	1196	522
V/C Ratio(X)	0.89	0.19	0.03	0.31	0.22	1.28	0.48	0.13	0.05	0.81	0.14	0.94
Avail Cap(c_a), veh/h	1044	1626	712	1044	1073	468	1827	1879	818	652	1879	820
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	20.6	19.0	63.0	33.7	45.3	62.1	34.8	34.0	58.3	29.7	41.6
Incr Delay (d2), s/veh	2.7	0.0	0.0	0.9	0.0	140.5	1.2	0.0	0.0	2.0	0.0	9.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	3.3	0.4	0.4	3.2	35.1	1.0	1.8	0.6	4.5	2.0	18.4
LnGrp Delay(d),s/veh	55.1	20.6	19.1	63.9	33.8	185.8	63.3	34.8	34.0	60.3	29.7	51.3
LnGrp LOS	E	C	B	E	C	F	E	C	C	E	C	D
Approach Vol, veh/h		880			859			206			902	
Approach Delay, s/veh		41.9			140.4			42.2			49.9	
Approach LOS		D			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	49.2	27.9	44.6	16.4	41.7	7.3	65.2
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	70.0	70.0	40.0	40.0	25.0	70.0	40.0	40.0
Max Q Clear Time (g_c+I1), s	4.0	42.4	22.3	42.0	11.4	5.6	2.8	8.9
Green Ext Time (p_c), s	0.1	2.2	1.0	0.0	0.4	2.2	0.0	3.8

Intersection Summary	
HCM 2010 Ctrl Delay	74.2
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	200	0	760	70	1430	80	500	830	0
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1845	0	1845	1845	1845	1845	1845	1845	1845	1845	0
Adj Flow Rate, veh/h	0	0	0	244	0	503	85	1744	27	610	1012	0
Adj No. of Lanes	0	1	0	1	0	3	1	2	1	2	1	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	0	3	0	3	3	3	3	3	3	3	3	0
Cap, veh/h	0	2	0	255	0	1527	106	1871	836	623	1210	0
Arrive On Green	0.00	0.00	0.00	0.15	0.00	0.15	0.06	0.53	0.53	0.18	0.66	0.00
Sat Flow, veh/h	0	-84854	0	1757	0	4598	1757	3505	1567	3408	1845	0
Grp Volume(v), veh/h	0	0	0	244	0	503	85	1744	27	610	1012	0
Grp Sat Flow(s),veh/h/ln	0	1845	0	1757	0	1533	1757	1752	1567	1704	1845	0
Q Serve(g_s), s	0.0	0.0	0.0	14.6	0.0	8.8	5.1	49.0	0.9	18.9	44.4	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	14.6	0.0	8.8	5.1	49.0	0.9	18.9	44.4	0.0
Prop In Lane	0.00		0.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	0	2	0	255	0	1527	106	1871	836	623	1210	0
V/C Ratio(X)	0.00	0.00	0.00	0.96	0.00	0.33	0.80	0.93	0.03	0.98	0.84	0.00
Avail Cap(c_a), veh/h	0	615	0	255	0	3216	106	1871	836	623	1216	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	45.1	0.0	26.9	49.3	23.0	11.7	43.2	13.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	44.2	0.0	0.0	32.3	9.0	0.0	30.7	4.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	10.2	0.0	3.7	3.4	25.8	0.4	11.5	23.9	0.0
LnGrp Delay(d),s/veh	0.0	0.0	0.0	89.3	0.0	27.0	81.5	31.9	11.7	73.8	18.8	0.0
LnGrp LOS				F		C	F	C	B	E	B	
Approach Vol, veh/h		0			747			1856			1622	
Approach Delay, s/veh		0.0			47.3			33.9			39.5	
Approach LOS					D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s		20.0	24.0	62.2	20.0	0.0	11.0	75.2
Change Period (Y+Rc), s		4.6	4.6	5.5	4.6	* 4.6	4.6	* 5.5
Max Green Setting (Gmax), s		54.4	19.4	56.5	15.4	* 35	6.4	* 70
Max Q Clear Time (g_c+I1), s		10.8	20.9	51.0	16.6	0.0	7.1	46.4
Green Ext Time (p_c), s		4.5	0.0	5.5	0.0	0.0	0.0	23.3

Intersection Summary	
HCM 2010 Ctrl Delay	38.4
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	550	680	90	80	270	110	130	790	380	180	790	370
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	598	739	72	87	293	68	141	859	248	196	859	214
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	606	1050	458	141	572	247	202	1489	652	263	1552	958
Arrive On Green	0.18	0.30	0.30	0.04	0.16	0.16	0.06	0.42	0.42	0.08	0.44	0.44
Sat Flow, veh/h	3408	3505	1528	3408	3505	1511	3408	3505	1534	3408	3505	1535
Grp Volume(v), veh/h	598	739	72	87	293	68	141	859	248	196	859	214
Grp Sat Flow(s),veh/h/ln	1704	1752	1528	1704	1752	1511	1704	1752	1534	1704	1752	1535
Q Serve(g_s), s	24.6	26.3	4.9	3.5	10.7	5.5	5.7	26.3	15.6	7.9	25.4	8.6
Cycle Q Clear(g_c), s	24.6	26.3	4.9	3.5	10.7	5.5	5.7	26.3	15.6	7.9	25.4	8.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	606	1050	458	141	572	247	202	1489	652	263	1552	958
V/C Ratio(X)	0.99	0.70	0.16	0.62	0.51	0.28	0.70	0.58	0.38	0.75	0.55	0.22
Avail Cap(c_a), veh/h	606	1050	458	606	997	430	606	1744	764	606	1744	1043
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.7	43.7	36.2	66.3	53.7	51.6	64.9	30.8	27.7	63.6	28.9	11.8
Incr Delay (d2), s/veh	33.1	1.8	0.1	1.6	0.3	0.2	1.6	0.1	0.1	1.6	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.3	13.0	2.1	1.7	5.2	2.3	2.7	12.7	6.6	3.8	12.3	3.7
LnGrp Delay(d),s/veh	90.8	45.5	36.3	68.0	54.0	51.8	66.6	30.9	27.9	65.1	29.1	11.8
LnGrp LOS	F	D	D	E	D	D	E	C	C	E	C	B
Approach Vol, veh/h		1409			448			1248			1269	
Approach Delay, s/veh		64.3			56.4			34.4			31.7	
Approach LOS		E			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.6	67.6	30.6	27.9	17.1	65.1	11.4	47.0
Change Period (Y+Rc), s	6.3	5.3	5.6	4.9	6.3	5.3	5.6	4.9
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	7.7	27.4	26.6	12.7	9.9	28.3	5.5	28.3
Green Ext Time (p_c), s	0.7	32.0	0.0	4.8	0.9	31.5	0.5	6.2

Intersection Summary			
HCM 2010 Ctrl Delay			45.5
HCM 2010 LOS			D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	60	20	0	220	170	0	0	0	1030	0	100
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1832	1900	0	1792	1900				1881	0	1827
Adj Flow Rate, veh/h	0	62	0	0	227	0				1062	0	103
Adj No. of Lanes	0	1	0	0	1	1				1	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97				0.97	0.97	0.97
Percent Heavy Veh, %	0	5	5	0	6	0				1	0	4
Cap, veh/h	0	375	0	0	367	330				1140	0	988
Arrive On Green	0.00	0.20	0.00	0.00	0.20	0.00				0.64	0.00	0.64
Sat Flow, veh/h	0	1832	0	0	1792	1615				1792	0	1553
Grp Volume(v), veh/h	0	62	0	0	227	0				1062	0	103
Grp Sat Flow(s),veh/h/ln	0	1832	0	0	1792	1615				1792	0	1553
Q Serve(g_s), s	0.0	2.0	0.0	0.0	8.1	0.0				37.3	0.0	1.8
Cycle Q Clear(g_c), s	0.0	2.0	0.0	0.0	8.1	0.0				37.3	0.0	1.8
Prop In Lane	0.00		0.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	375	0	0	367	330				1140	0	988
V/C Ratio(X)	0.00	0.17	0.00	0.00	0.62	0.00				0.93	0.00	0.10
Avail Cap(c_a), veh/h	0	375	0	0	367	330				3166	0	2744
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	23.1	0.0	0.0	25.5	0.0				11.4	0.0	5.0
Incr Delay (d2), s/veh	0.0	1.0	0.0	0.0	7.6	0.0				4.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	0.0	0.0	4.8	0.0				19.3	0.0	0.8
LnGrp Delay(d),s/veh	0.0	24.0	0.0	0.0	33.1	0.0				15.5	0.0	5.0
LnGrp LOS		C			C					B		A
Approach Vol, veh/h		62			227						1165	
Approach Delay, s/veh		24.0			33.1						14.6	
Approach LOS		C			C						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		20.0		50.4		20.0		
Change Period (Y+Rc), s		* 5.6		* 5.6		* 5.6		
Max Green Setting (Gmax), s		* 14		* 1.2E2		* 14		
Max Q Clear Time (g_c+I1), s		4.0		39.3		10.1		
Green Ext Time (p_c), s		0.9		5.5		0.5		

Intersection Summary	
HCM 2010 Ctrl Delay	17.9
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1060	30	0	340	410	50	0	450	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1863	1696	0	1863	1863	1681	0	1743			
Adj Flow Rate, veh/h	0	1359	0	0	436	0	64	0	577			
Adj No. of Lanes	0	2	1	0	2	1	1	0	1			
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78			
Percent Heavy Veh, %	0	2	12	0	2	2	13	0	9			
Cap, veh/h	0	1537	626	0	1537	688	650	0	601			
Arrive On Green	0.00	0.43	0.00	0.00	0.43	0.00	0.41	0.00	0.41			
Sat Flow, veh/h	0	3632	1442	0	3632	1583	1601	0	1482			
Grp Volume(v), veh/h	0	1359	0	0	436	0	64	0	577			
Grp Sat Flow(s),veh/h/ln	0	1770	1442	0	1770	1583	1601	0	1482			
Q Serve(g_s), s	0.0	24.7	0.0	0.0	5.6	0.0	1.7	0.0	26.5			
Cycle Q Clear(g_c), s	0.0	24.7	0.0	0.0	5.6	0.0	1.7	0.0	26.5			
Prop In Lane	0.00		1.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1537	626	0	1537	688	650	0	601			
V/C Ratio(X)	0.00	0.88	0.00	0.00	0.28	0.00	0.10	0.00	0.96			
Avail Cap(c_a), veh/h	0	1537	626	0	1537	688	650	0	601			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	18.2	0.0	0.0	12.8	0.0	12.9	0.0	20.2			
Incr Delay (d2), s/veh	0.0	7.8	0.0	0.0	0.5	0.0	0.1	0.0	26.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	13.6	0.0	0.0	2.8	0.0	0.8	0.0	15.2			
LnGrp Delay(d),s/veh	0.0	26.0	0.0	0.0	13.2	0.0	12.9	0.0	47.2			
LnGrp LOS		C			B		B		D			
Approach Vol, veh/h		1359			436			641				
Approach Delay, s/veh		26.0			13.2			43.8				
Approach LOS		C			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		36.0				36.0		34.0
Change Period (Y+Rc), s		* 5.6				* 5.6		5.6
Max Green Setting (Gmax), s		* 30				* 30		28.4
Max Q Clear Time (g_c+I1), s		26.7				7.6		28.5
Green Ext Time (p_c), s		3.0				12.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	28.4
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	360	190	270	1090	980	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6	4.6	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1544	1752	3505	1845	1568
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1544	1752	3505	1845	1568
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	424	224	318	1282	1153	212
RTOR Reduction (vph)	0	105	0	0	0	48
Lane Group Flow (vph)	424	119	318	1282	1153	164
Confl. Peds. (#/hr)		2				
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	6		7 5	5 7 8	8	
Permitted Phases		6				8
Actuated Green, G (s)	37.7	37.7	18.4	99.4	75.4	75.4
Effective Green, g (s)	37.7	37.7	13.8	93.8	75.4	75.4
Actuated g/C Ratio	0.25	0.25	0.09	0.63	0.51	0.51
Clearance Time (s)	5.6	5.6			5.7	5.7
Vehicle Extension (s)	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	445	392	162	2215	937	796
v/s Ratio Prot	c0.24		c0.18	0.37	c0.63	
v/s Ratio Perm		0.08				0.10
v/c Ratio	0.95	0.30	1.96	0.58	1.23	0.21
Uniform Delay, d1	54.5	44.7	67.3	15.8	36.5	20.1
Progression Factor	1.00	1.00	1.12	0.67	1.00	1.00
Incremental Delay, d2	30.5	0.2	444.4	0.1	113.1	0.0
Delay (s)	85.0	44.9	519.8	10.8	149.6	20.1
Level of Service	F	D	F	B	F	C
Approach Delay (s)	71.1			112.0	129.5	
Approach LOS	E			F	F	

Intersection Summary			
HCM 2000 Control Delay	111.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	148.4	Sum of lost time (s)	22.9
Intersection Capacity Utilization	101.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations							
Volume (vph)	50	530	820	60	10	350	810
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	5.7			5.6	4.6
Lane Util. Factor	1.00	1.00	0.95			1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00	1.00
Frt	1.00	0.85	0.99			1.00	1.00
Flt Protected	0.95	1.00	1.00			0.95	1.00
Satd. Flow (prot)	1752	1546	3469			1752	3505
Flt Permitted	0.95	1.00	1.00			0.95	1.00
Satd. Flow (perm)	1752	1546	3469			1752	3505
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	61	646	1000	73	12	427	988
RTOR Reduction (vph)	0	331	3	0	0	0	0
Lane Group Flow (vph)	61	315	1070	0	0	439	988
Confl. Peds. (#/hr)		2					
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	Perm	NA		Prot	Prot	NA
Protected Phases	2		4		3 1	3 1	1 3 4
Permitted Phases		2					
Actuated Green, G (s)	32.2	32.2	56.0			41.9	103.5
Effective Green, g (s)	32.2	32.2	56.0			37.3	97.9
Actuated g/C Ratio	0.22	0.22	0.38			0.25	0.66
Clearance Time (s)	7.0	7.0	5.7				
Vehicle Extension (s)	2.0	2.0	2.0				
Lane Grp Cap (vph)	380	335	1309			440	2312
v/s Ratio Prot	0.03		c0.31			c0.25	0.28
v/s Ratio Perm		c0.20					
v/c Ratio	0.16	0.94	0.82			1.00	0.43
Uniform Delay, d1	47.1	57.1	41.6			55.5	12.0
Progression Factor	1.00	1.00	1.00			1.40	0.49
Incremental Delay, d2	0.1	33.0	3.9			12.2	0.0
Delay (s)	47.2	90.2	45.5			89.8	5.9
Level of Service	D	F	D			F	A
Approach Delay (s)	86.4		45.5				31.7
Approach LOS	F		D				C

Intersection Summary			
HCM 2000 Control Delay	48.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	148.4	Sum of lost time (s)	22.9
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	460	200	250	50	90	40	140	820	70	80	820	310
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	548	238	247	60	107	47	167	976	83	95	976	258
Adj No. of Lanes	1	1	1	2	2	1	1	2	1	2	2	1
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	575	683	573	124	279	124	186	1274	570	146	1052	471
Arrive On Green	0.33	0.37	0.37	0.04	0.08	0.08	0.11	0.36	0.36	0.04	0.30	0.30
Sat Flow, veh/h	1757	1845	1547	3408	3505	1562	1757	3505	1568	3408	3505	1568
Grp Volume(v), veh/h	548	238	247	60	107	47	167	976	83	95	976	258
Grp Sat Flow(s),veh/h/ln	1757	1845	1547	1704	1752	1562	1757	1752	1568	1704	1752	1568
Q Serve(g_s), s	35.9	11.0	14.1	2.0	3.4	3.4	11.1	28.9	4.2	3.2	31.8	16.2
Cycle Q Clear(g_c), s	35.9	11.0	14.1	2.0	3.4	3.4	11.1	28.9	4.2	3.2	31.8	16.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	575	683	573	124	279	124	186	1274	570	146	1052	471
V/C Ratio(X)	0.95	0.35	0.43	0.48	0.38	0.38	0.90	0.77	0.15	0.65	0.93	0.55
Avail Cap(c_a), veh/h	604	760	637	304	550	245	186	1274	570	217	1086	486
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	26.8	27.8	55.7	51.5	51.4	52.0	33.1	25.2	55.5	40.0	34.5
Incr Delay (d2), s/veh	24.9	0.1	0.2	2.9	0.3	0.7	38.2	3.2	0.2	4.8	13.5	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.3	5.6	6.0	1.0	1.7	1.5	7.4	14.5	1.9	1.6	17.3	7.3
LnGrp Delay(d),s/veh	63.6	26.9	28.0	58.5	51.8	52.2	90.2	36.2	25.4	60.3	53.5	36.4
LnGrp LOS	E	C	C	E	D	D	F	D	C	E	D	D
Approach Vol, veh/h		1033			214			1226			1329	
Approach Delay, s/veh		46.7			53.8			42.9			50.6	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	40.9	44.1	14.9	10.6	48.3	9.8	49.1
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	12.5	36.5	40.5	18.5	7.5	41.5	10.5	48.5
Max Q Clear Time (g_c+I1), s	13.1	33.8	37.9	5.4	5.2	30.9	4.0	16.1
Green Ext Time (p_c), s	0.0	1.6	0.6	3.8	0.1	10.5	0.1	5.3

Intersection Summary	
HCM 2010 Ctrl Delay	47.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	120	1860	250	320	1470	270	260	780	520	430	660	90
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1900	1863	1881	1863	1827	1727	1881	1863	1863
Adj Flow Rate, veh/h	130	2022	272	356	1598	300	283	867	578	478	733	98
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.90	0.92	0.90	0.92	0.90	0.90	0.90	0.90	0.92
Percent Heavy Veh, %	2	2	2	0	2	1	2	4	10	1	2	2
Cap, veh/h	173	1493	465	407	1815	571	337	974	407	482	1136	508
Arrive On Green	0.05	0.29	0.29	0.12	0.36	0.36	0.10	0.28	0.28	0.14	0.32	0.32
Sat Flow, veh/h	3304	5085	1583	3510	5085	1599	3442	3471	1449	3476	3539	1583
Grp Volume(v), veh/h	130	2022	272	356	1598	300	283	867	578	478	733	98
Grp Sat Flow(s),veh/h/ln	1652	1695	1583	1755	1695	1599	1721	1736	1449	1738	1770	1583
Q Serve(g_s), s	5.7	43.4	21.7	14.8	43.6	22.0	12.0	35.4	41.5	20.3	26.2	6.6
Cycle Q Clear(g_c), s	5.7	43.4	21.7	14.8	43.6	22.0	12.0	35.4	41.5	20.3	26.2	6.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	173	1493	465	407	1815	571	337	974	407	482	1136	508
V/C Ratio(X)	0.75	1.35	0.59	0.88	0.88	0.53	0.84	0.89	1.42	0.99	0.65	0.19
Avail Cap(c_a), veh/h	219	1493	465	470	1815	571	500	974	407	482	1136	508
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.1	52.3	44.6	64.4	44.6	37.7	65.6	51.1	53.2	63.7	43.0	36.4
Incr Delay (d2), s/veh	10.3	164.1	5.3	15.2	6.5	3.4	8.0	10.3	203.7	39.0	1.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	43.0	10.2	8.0	21.5	10.2	6.1	18.4	39.7	12.4	13.0	2.9
LnGrp Delay(d),s/veh	79.5	216.4	49.9	79.6	51.2	41.1	73.6	61.4	257.0	102.7	44.3	36.5
LnGrp LOS	E	F	D	E	D	D	E	E	F	F	D	D
Approach Vol, veh/h		2424			2254			1728			1309	
Approach Delay, s/veh		190.3			54.3			128.8			65.0	
Approach LOS		F			D			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.3	49.6	21.0	54.0	14.0	59.0	27.0	48.0
Change Period (Y+Rc), s	* 6.2	* 6.2	6.5	6.5	* 6.2	* 6.2	6.5	6.5
Max Green Setting (Gmax), s	* 20	* 43	21.5	40.5	* 9.8	* 53	20.5	41.5
Max Q Clear Time (g_c+I1), s	16.8	45.4	14.0	28.2	7.7	45.6	22.3	43.5
Green Ext Time (p_c), s	0.4	0.0	0.5	9.0	0.1	7.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	115.6
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Elk Grove General Plan Update
Cumulative Conditions
AM Peak Hour

Intersection 69 **Lent Ranch Pkwy/Kammerer Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	20	18	90.2%	34.5	22.9	C
	Through						
	Right Turn	370	366	99.0%	20.0	1.9	B
	Subtotal	390	384	98.5%	20.7	1.8	C
EB	Left Turn	540	481	89.1%	85.3	19.3	F
	Through	2,430	2,097	86.3%	48.2	23.7	D
	Right Turn						
	Subtotal	2,970	2,578	86.8%	55.1	20.2	E
WB	Left Turn						
	Through	2,370	1,953	82.4%	39.7	6.6	D
	Right Turn	20	18	92.1%	8.3	4.7	A
	Subtotal	2,390	1,971	82.5%	39.4	6.6	D
Total		5,750	4,933	85.8%	45.7	8.5	D

Intersection 70 **Promenade Pkwy/Kammerer Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	790	730	92.4%	114.4	31.1	F
	Through	410	350	85.5%	99.9	20.2	F
	Right Turn	390	290	74.2%	131.3	50.8	F
	Subtotal	1,590	1,370	86.1%	113.6	23.0	F
SB	Left Turn	1,110	749	67.4%	169.5	24.8	F
	Through	90	87	96.5%	68.6	10.6	E
	Right Turn	20	21	103.4%	8.8	3.7	A
	Subtotal	1,220	856	70.2%	155.1	20.0	F
EB	Left Turn	20	17	84.6%	113.1	24.7	F
	Through	2,020	1,394	69.0%	173.0	35.0	F
	Right Turn	440	226	51.3%	246.7	81.9	F
	Subtotal	2,480	1,636	66.0%	181.5	38.9	F
NW	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		5,290	3,862	73.0%	150.7	15.9	F

SimTraffic Post-Processor **Elk Grove General Plan Update**
Average Results from 10 Runs **Cumulative Conditions**
Volume and Delay by Movement **AM Peak Hour**

Intersection 71 **SR 99 SB Ramps/Kammerer Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	840	655	78.0%	120.0	34.6	F
	Through	20	18	90.2%	103.1	54.8	F
	Right Turn	530	468	88.3%	77.4	25.8	E
	Subtotal	1,390	1,141	82.1%	101.8	30.2	F
EB	Left Turn						
	Through	3,010	1,892	62.9%	107.4	15.8	F
	Right Turn	510	316	61.9%	10.8	2.8	B
	Subtotal	3,520	2,208	62.7%	93.8	15.0	F
WB	Left Turn						
	Through	2,830	2,081	73.5%	69.0	21.2	E
	Right Turn	620	450	72.6%	16.3	6.0	B
	Subtotal	3,450	2,531	73.4%	59.7	18.6	E
Total		8,360	5,880	70.3%	79.8	8.2	E

Intersection 72 **SR 99 NB Ramps/Grant Line Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	200	205	102.5%	37.0	4.1	D
	Through	20	19	95.9%	31.3	12.7	C
	Right Turn	800	750	93.8%	85.9	16.8	F
	Subtotal	1,020	974	95.5%	74.5	12.9	E
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	3,290	2,031	61.7%	121.1	8.1	F
	Right Turn	560	309	55.3%	79.9	13.3	E
	Subtotal	3,850	2,341	60.8%	115.6	8.9	F
WB	Left Turn						
	Through	3,250	2,411	74.2%	17.1	7.0	B
	Right Turn	920	656	71.3%	4.9	0.5	A
	Subtotal	4,170	3,067	73.5%	14.5	5.5	B
Total		9,040	6,382	70.6%	60.7	4.1	E

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Elk Grove General Plan Update
Cumulative Conditions
AM Peak Hour

Intersection 73 **E Stockton Blvd/Grant Line Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	150	112	74.4%	246.3	31.6	F
	Through	50	41	82.7%	235.2	45.2	F
	Right Turn	30	23	76.5%	195.3	36.4	F
	Subtotal	230	176	76.5%	236.8	30.0	F
SB	Left Turn	180	132	73.5%	110.0	15.4	F
	Through	50	41	81.2%	115.6	16.0	F
	Right Turn	550	439	79.8%	98.5	6.4	F
	Subtotal	780	612	78.5%	101.7	6.7	F
EB	Left Turn	580	232	40.0%	368.9	21.2	F
	Through	3,260	2,382	73.1%	89.5	3.6	F
	Right Turn	250	174	69.5%	19.5	2.3	B
	Subtotal	4,090	2,788	68.2%	108.4	2.4	F
WB	Left Turn	130	78	59.9%	330.0	31.9	F
	Through	3,460	2,529	73.1%	189.0	19.1	F
	Right Turn	390	249	63.8%	263.8	35.0	F
	Subtotal	3,980	2,856	71.8%	199.1	19.0	F
Total		9,080	6,431	70.8%	151.5	7.7	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	650	1700	1150	20	2650	20	510	130	110	10	300	820
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1743	1810	950	1900	1810	1624	1900	1900	1900	1473	1900	1712
Adj Flow Rate, veh/h	684	1789	1211	21	2789	17	537	137	116	11	316	629
Adj No. of Lanes	2	4	1	2	4	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	9	5	100	0	5	17	0	0	0	29	0	11
Cap, veh/h	357	2667	486	103	2160	479	610	1075	481	157	656	426
Arrive On Green	0.11	0.43	0.43	0.03	0.35	0.35	0.17	0.30	0.30	0.06	0.18	0.18
Sat Flow, veh/h	3221	6225	807	3510	6225	1380	3510	3610	1615	2721	3610	1455
Grp Volume(v), veh/h	684	1789	1211	21	2789	17	537	137	116	11	316	629
Grp Sat Flow(s),veh/h/ln	1610	1556	807	1755	1556	1380	1755	1805	1615	1361	1805	1455
Q Serve(g_s), s	13.4	27.9	51.9	0.7	42.0	1.0	18.1	3.4	6.6	0.5	9.5	22.0
Cycle Q Clear(g_c), s	13.4	27.9	51.9	0.7	42.0	1.0	18.1	3.4	6.6	0.5	9.5	22.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	357	2667	486	103	2160	479	610	1075	481	157	656	426
V/C Ratio(X)	1.92	0.67	2.49	0.20	1.29	0.04	0.88	0.13	0.24	0.07	0.48	1.48
Avail Cap(c_a), veh/h	357	2667	486	203	2160	479	1015	1491	667	157	656	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.8	27.7	24.1	57.4	39.5	26.1	48.8	31.0	32.2	53.9	44.4	42.8
Incr Delay (d2), s/veh	423.5	1.4	676.8	0.4	134.6	0.1	2.8	0.0	0.1	0.1	0.2	227.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	26.9	12.2	107.5	0.3	38.2	0.4	9.0	1.7	2.9	0.2	4.8	41.0
LnGrp Delay(d),s/veh	477.3	29.1	700.8	57.7	174.1	26.3	51.5	31.0	32.3	54.0	44.6	270.3
LnGrp LOS	F	C	F	E	F	C	D	C	C	D	D	F
Approach Vol, veh/h		3684			2827			790			956	
Approach Delay, s/veh		333.1			172.4			45.1			193.2	
Approach LOS		F			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	48.0	13.0	42.0	8.1	57.9	27.0	28.0
Change Period (Y+Rc), s	4.6	6.0	6.0	6.0	4.6	6.0	6.0	6.0
Max Green Setting (Gmax), s	13.4	42.0	7.0	50.0	7.0	48.4	35.0	22.0
Max Q Clear Time (g_c+I1), s	15.4	44.0	2.5	8.6	2.7	53.9	20.1	24.0
Green Ext Time (p_c), s	0.0	0.0	0.0	3.2	0.0	0.0	1.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	234.3
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	60	1760	2740	150	80	120
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1900	1792	1743	1866	1900
Adj Flow Rate, veh/h	65	1913	2978	163	87	130
Adj No. of Lanes	1	4	4	1	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	0	6	9	0	0
Cap, veh/h	82	4732	3816	917	102	153
Arrive On Green	0.05	0.72	0.62	0.62	0.15	0.15
Sat Flow, veh/h	1707	6802	6417	1482	662	989
Grp Volume(v), veh/h	65	1913	2978	163	218	0
Grp Sat Flow(s),veh/h/ln	1707	1634	1542	1482	1659	0
Q Serve(g_s), s	3.7	11.3	35.1	4.6	12.6	0.0
Cycle Q Clear(g_c), s	3.7	11.3	35.1	4.6	12.6	0.0
Prop In Lane	1.00			1.00	0.40	0.60
Lane Grp Cap(c), veh/h	82	4732	3816	917	256	0
V/C Ratio(X)	0.79	0.40	0.78	0.18	0.85	0.00
Avail Cap(c_a), veh/h	111	4732	3816	917	700	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	46.4	5.3	13.9	8.0	40.6	0.0
Incr Delay (d2), s/veh	23.2	0.3	1.6	0.4	7.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	5.1	15.1	2.0	6.3	0.0
LnGrp Delay(d),s/veh	69.6	5.6	15.5	8.5	48.4	0.0
LnGrp LOS	E	A	B	A	D	
Approach Vol, veh/h		1978	3141		218	
Approach Delay, s/veh		7.7	15.1		48.4	
Approach LOS		A	B		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		77.0		21.6	10.4	66.6		
Change Period (Y+Rc), s		* 5.6		6.4	* 5.6	* 5.6		
Max Green Setting (Gmax), s		* 71		41.6	* 6.4	* 59		
Max Q Clear Time (g_c+I1), s		13.3		14.6	5.7	37.1		
Green Ext Time (p_c), s		56.7		0.6	0.0	22.1		

Intersection Summary		
HCM 2010 Ctrl Delay		13.7
HCM 2010 LOS		B

Notes
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	840	900	180	40	830	20	450	570	90	20	230	1080
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1727	1863	1863	1759	1900	1863	1863	1863	1900	1863	1776
Adj Flow Rate, veh/h	903	968	196	43	892	22	489	620	98	22	250	1161
Adj No. of Lanes	2	3	1	1	4	1	1	1	1	1	2	1
Peak Hour Factor	0.93	0.93	0.92	0.92	0.93	0.93	0.92	0.92	0.92	0.93	0.92	0.93
Percent Heavy Veh, %	3	10	2	2	8	0	2	2	2	0	2	7
Cap, veh/h	518	1852	622	55	1646	439	136	720	612	36	1168	728
Arrive On Green	0.15	0.39	0.39	0.03	0.27	0.27	0.08	0.39	0.39	0.02	0.33	0.33
Sat Flow, veh/h	3408	4715	1583	1774	6052	1615	1774	1863	1583	1810	3539	1509
Grp Volume(v), veh/h	903	968	196	43	892	22	489	620	98	22	250	1161
Grp Sat Flow(s),veh/h/ln	1704	1572	1583	1774	1513	1615	1774	1863	1583	1810	1770	1509
Q Serve(g_s), s	22.8	23.5	12.9	3.6	18.9	1.5	11.5	45.9	6.1	1.8	7.6	49.5
Cycle Q Clear(g_c), s	22.8	23.5	12.9	3.6	18.9	1.5	11.5	45.9	6.1	1.8	7.6	49.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	518	1852	622	55	1646	439	136	720	612	36	1168	728
V/C Ratio(X)	1.74	0.52	0.32	0.78	0.54	0.05	3.60	0.86	0.16	0.61	0.21	1.60
Avail Cap(c_a), veh/h	518	1852	622	104	1646	439	136	720	612	78	1168	728
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.6	34.8	31.6	72.1	46.6	40.3	69.3	42.3	30.1	72.9	36.2	38.8
Incr Delay (d2), s/veh	342.3	1.1	1.3	20.2	1.3	0.2	1185.9	10.4	0.1	15.3	0.1	274.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	35.4	10.4	5.8	2.1	8.0	0.7	50.4	25.7	2.7	1.1	3.8	85.5
LnGrp Delay(d),s/veh	405.9	35.9	32.9	92.4	47.9	40.5	1255.2	52.7	30.2	88.2	36.3	313.5
LnGrp LOS	F	D	C	F	D	D	F	D	C	F	D	F
Approach Vol, veh/h		2067			957			1207			1433	
Approach Delay, s/veh		197.3			49.7			538.0			261.7	
Approach LOS		F			D			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	65.1	18.0	56.0	29.0	47.0	9.5	64.5
Change Period (Y+Rc), s	* 6.2	* 6.2	6.5	6.5	* 6.2	* 6.2	6.5	6.5
Max Green Setting (Gmax), s	* 8.8	* 55	11.5	49.5	* 23	* 41	6.5	54.5
Max Q Clear Time (g_c+I1), s	5.6	25.5	13.5	51.5	24.8	20.9	3.8	47.9
Green Ext Time (p_c), s	0.0	15.4	0.0	0.0	0.0	12.3	0.0	5.2

Intersection Summary			
HCM 2010 Ctrl Delay			261.2
HCM 2010 LOS			F

Notes
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	550	140	1100	330	460	90	700	960	130	520	10
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	22	598	41	1196	359	384	98	761	466	141	565	2
Adj No. of Lanes	2	2	1	2	2	1	2	2	2	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	67	1034	463	760	1776	795	140	975	768	157	1034	440
Arrive On Green	0.02	0.29	0.29	0.23	0.50	0.50	0.04	0.28	0.28	0.04	0.28	0.28
Sat Flow, veh/h	3304	3539	1583	3304	3539	1583	3304	3539	2787	3548	3725	1583
Grp Volume(v), veh/h	22	598	41	1196	359	384	98	761	466	141	565	2
Grp Sat Flow(s),veh/h/ln	1652	1770	1583	1652	1770	1583	1652	1770	1393	1774	1863	1583
Q Serve(g_s), s	0.9	20.8	2.7	33.2	8.1	23.0	4.2	28.7	21.0	5.7	18.6	0.1
Cycle Q Clear(g_c), s	0.9	20.8	2.7	33.2	8.1	23.0	4.2	28.7	21.0	5.7	18.6	0.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	67	1034	463	760	1776	795	140	975	768	157	1034	440
V/C Ratio(X)	0.33	0.58	0.09	1.57	0.20	0.48	0.70	0.78	0.61	0.90	0.55	0.00
Avail Cap(c_a), veh/h	142	1034	463	760	1776	795	146	1113	876	157	1171	498
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.8	43.5	37.1	55.6	19.9	23.6	68.2	48.3	45.5	68.7	44.4	37.7
Incr Delay (d2), s/veh	2.8	2.4	0.4	264.8	0.3	2.1	13.2	3.2	1.0	43.1	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	10.5	1.2	43.0	4.1	10.5	2.2	14.4	8.2	3.7	9.6	0.1
LnGrp Delay(d),s/veh	72.6	45.9	37.5	320.4	20.2	25.7	81.5	51.5	46.5	111.8	44.9	37.7
LnGrp LOS	E	D	D	F	C	C	F	D	D	F	D	D
Approach Vol, veh/h		661			1939			1325			708	
Approach Delay, s/veh		46.2			206.5			51.9			58.2	
Approach LOS		D			F			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.0	48.0	11.7	45.7	8.7	78.3	12.0	45.4
Change Period (Y+Rc), s	* 5.8	* 5.8	5.6	5.6	* 5.8	* 5.8	5.6	5.6
Max Green Setting (Gmax), s	* 33	* 42	6.4	45.4	* 6.2	* 69	6.4	45.4
Max Q Clear Time (g_c+I1), s	35.2	22.8	6.2	20.6	2.9	25.0	7.7	30.7
Green Ext Time (p_c), s	0.0	7.6	0.0	12.5	0.0	9.6	0.0	9.1

Intersection Summary	
HCM 2010 Ctrl Delay	116.7
HCM 2010 LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	100	100	30	20	50	40	20	1210	20	90	1150	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1900	1788	1863	1900	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	109	109	33	22	54	43	22	1315	22	98	1250	54
Adj No. of Lanes	1	1	0	1	1	0	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	143	219	66	42	97	77	82	1640	734	199	1765	790
Arrive On Green	0.08	0.16	0.16	0.02	0.10	0.10	0.02	0.46	0.46	0.06	0.50	0.50
Sat Flow, veh/h	1703	1374	416	1703	962	766	3304	3539	1583	3304	3539	1583
Grp Volume(v), veh/h	109	0	142	22	0	97	22	1315	22	98	1250	54
Grp Sat Flow(s),veh/h/ln	1703	0	1789	1703	0	1728	1652	1770	1583	1652	1770	1583
Q Serve(g_s), s	4.5	0.0	5.2	0.9	0.0	3.8	0.5	22.6	0.5	2.0	19.5	1.3
Cycle Q Clear(g_c), s	4.5	0.0	5.2	0.9	0.0	3.8	0.5	22.6	0.5	2.0	19.5	1.3
Prop In Lane	1.00		0.23	1.00		0.44	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	143	0	286	42	0	173	82	1640	734	199	1765	790
V/C Ratio(X)	0.76	0.00	0.50	0.52	0.00	0.56	0.27	0.80	0.03	0.49	0.71	0.07
Avail Cap(c_a), veh/h	1282	0	1950	158	0	742	325	1640	734	325	1765	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.9	0.0	27.3	34.3	0.0	30.5	34.1	16.3	10.4	32.4	13.8	9.3
Incr Delay (d2), s/veh	8.1	0.0	1.3	9.6	0.0	2.8	1.7	4.2	0.1	1.9	2.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	2.6	0.5	0.0	1.9	0.2	11.9	0.2	1.0	10.0	0.6
LnGrp Delay(d),s/veh	40.0	0.0	28.7	43.9	0.0	33.3	35.8	20.6	10.5	34.3	16.3	9.4
LnGrp LOS	D		C	D		C	D	C	B	C	B	A
Approach Vol, veh/h		251			119			1359			1402	
Approach Delay, s/veh		33.6			35.3			20.6			17.3	
Approach LOS		C			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	38.0	7.2	16.8	6.8	40.5	11.4	12.5
Change Period (Y+Rc), s	* 5	* 5	5.4	5.4	* 5	* 5	5.4	5.4
Max Green Setting (Gmax), s	* 7	* 33	6.6	77.6	* 7	* 33	53.6	30.6
Max Q Clear Time (g_c+I1), s	4.0	24.6	2.9	7.2	2.5	21.5	6.5	5.8
Green Ext Time (p_c), s	0.1	7.6	0.0	1.6	0.0	10.2	0.3	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	20.7
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	120	60	10	50	540	30	1160	20	510	1190	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	22	130	65	11	54	587	33	1261	22	554	1293	22
Adj No. of Lanes	1	2	1	1	1	1	2	2	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	35	1069	478	21	548	466	85	1205	539	591	2511	782
Arrive On Green	0.02	0.30	0.30	0.01	0.29	0.29	0.03	0.34	0.34	0.18	0.49	0.49
Sat Flow, veh/h	1703	3539	1583	1703	1863	1583	3304	3539	1583	3304	5085	1583
Grp Volume(v), veh/h	22	130	65	11	54	587	33	1261	22	554	1293	22
Grp Sat Flow(s),veh/h/ln	1703	1770	1583	1703	1863	1583	1652	1770	1583	1652	1695	1583
Q Serve(g_s), s	1.8	3.8	4.2	0.9	3.0	41.8	1.4	48.4	1.3	23.5	24.5	1.0
Cycle Q Clear(g_c), s	1.8	3.8	4.2	0.9	3.0	41.8	1.4	48.4	1.3	23.5	24.5	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	35	1069	478	21	548	466	85	1205	539	591	2511	782
V/C Ratio(X)	0.63	0.12	0.14	0.52	0.10	1.26	0.39	1.05	0.04	0.94	0.51	0.03
Avail Cap(c_a), veh/h	70	1069	478	70	548	466	149	1205	539	591	2511	782
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.1	35.9	36.1	69.8	36.5	50.2	68.1	46.9	31.3	57.6	24.4	18.5
Incr Delay (d2), s/veh	17.4	0.1	0.1	18.5	0.1	133.6	2.9	38.8	0.1	22.9	0.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.8	1.9	0.5	1.6	35.6	0.7	30.1	0.6	12.6	11.7	0.5
LnGrp Delay(d),s/veh	86.5	36.0	36.2	88.2	36.5	183.7	71.0	85.7	31.5	80.5	25.2	18.5
LnGrp LOS	F	D	D	F	D	F	E	F	C	F	C	B
Approach Vol, veh/h		217			652			1316			1869	
Approach Delay, s/veh		41.2			169.9			84.4			41.5	
Approach LOS		D			F			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.0	54.0	8.0	49.1	9.2	75.8	9.1	48.0
Change Period (Y+Rc), s	5.6	5.6	* 6.2	* 6.2	5.6	5.6	* 6.2	* 6.2
Max Green Setting (Gmax), s	25.4	48.4	* 5.8	* 42	6.4	67.4	* 5.8	* 42
Max Q Clear Time (g_c+I1), s	25.5	50.4	2.9	6.2	3.4	26.5	3.8	43.8
Green Ext Time (p_c), s	0.0	0.0	0.0	4.0	0.0	29.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	76.1
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	200	120	60	50	80	90	880	120	210	940	70
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	98	217	130	65	54	87	98	957	130	228	1022	76
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	154	1228	549	138	1210	541	154	1155	517	213	1219	545
Arrive On Green	0.05	0.35	0.35	0.04	0.34	0.34	0.05	0.33	0.33	0.06	0.34	0.34
Sat Flow, veh/h	3304	3539	1583	3304	3539	1583	3304	3539	1583	3304	3539	1583
Grp Volume(v), veh/h	98	217	130	65	54	87	98	957	130	228	1022	76
Grp Sat Flow(s),veh/h/ln	1652	1770	1583	1652	1770	1583	1652	1770	1583	1652	1770	1583
Q Serve(g_s), s	2.9	4.3	5.9	1.9	1.0	3.8	2.9	25.1	6.1	6.5	26.8	3.3
Cycle Q Clear(g_c), s	2.9	4.3	5.9	1.9	1.0	3.8	2.9	25.1	6.1	6.5	26.8	3.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	154	1228	549	138	1210	541	154	1155	517	213	1219	545
V/C Ratio(X)	0.64	0.18	0.24	0.47	0.04	0.16	0.64	0.83	0.25	1.07	0.84	0.14
Avail Cap(c_a), veh/h	210	1228	549	210	1210	541	279	1249	559	213	1219	545
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	22.9	23.4	47.1	22.1	23.0	47.1	31.3	24.9	47.0	30.4	22.7
Incr Delay (d2), s/veh	4.3	0.3	1.0	2.5	0.1	0.6	4.3	4.5	0.3	80.7	5.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	2.2	2.7	0.9	0.5	1.8	1.4	13.0	2.7	5.3	14.0	1.5
LnGrp Delay(d),s/veh	51.5	23.2	24.4	49.6	22.2	23.7	51.5	35.8	25.1	127.8	35.7	22.8
LnGrp LOS	D	C	C	D	C	C	D	D	C	F	D	C
Approach Vol, veh/h		445			206			1185			1326	
Approach Delay, s/veh		29.8			31.5			35.9			50.8	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.8	40.5	10.2	40.1	10.3	40.0	12.0	38.3
Change Period (Y+Rc), s	5.6	5.6	* 5.5	* 5.5	5.6	5.6	* 5.5	* 5.5
Max Green Setting (Gmax), s	6.4	34.4	* 8.5	* 34	6.4	34.4	* 6.5	* 36
Max Q Clear Time (g_c+I1), s	3.9	7.9	4.9	28.8	4.9	5.8	8.5	27.1
Green Ext Time (p_c), s	0.0	2.4	0.1	4.1	0.0	2.4	0.0	5.7

Intersection Summary	
HCM 2010 Ctrl Delay	41.0
HCM 2010 LOS	D

Notes
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	130	210	10	20	290	80	10	690	20	90	500	270
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	141	228	11	22	315	87	11	750	22	98	543	293
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	206	1416	633	61	1261	564	35	1045	468	156	1174	525
Arrive On Green	0.06	0.40	0.40	0.02	0.36	0.36	0.01	0.30	0.30	0.05	0.33	0.33
Sat Flow, veh/h	3304	3539	1583	3304	3539	1583	3304	3539	1583	3304	3539	1583
Grp Volume(v), veh/h	141	228	11	22	315	87	11	750	22	98	543	293
Grp Sat Flow(s),veh/h/ln	1652	1770	1583	1652	1770	1583	1652	1770	1583	1652	1770	1583
Q Serve(g_s), s	3.9	3.9	0.4	0.6	5.9	3.5	0.3	17.8	0.9	2.7	11.4	14.2
Cycle Q Clear(g_c), s	3.9	3.9	0.4	0.6	5.9	3.5	0.3	17.8	0.9	2.7	11.4	14.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	206	1416	633	61	1261	564	35	1045	468	156	1174	525
V/C Ratio(X)	0.68	0.16	0.02	0.36	0.25	0.15	0.31	0.72	0.05	0.63	0.46	0.56
Avail Cap(c_a), veh/h	296	1416	633	226	1261	564	226	1261	564	261	1299	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.0	18.0	17.0	45.5	21.3	20.6	46.0	29.5	23.6	43.9	24.7	25.7
Incr Delay (d2), s/veh	4.0	0.2	0.1	3.5	0.5	0.6	5.0	1.6	0.0	4.2	0.3	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	1.9	0.2	0.3	3.0	1.6	0.2	8.9	0.4	1.3	5.6	6.3
LnGrp Delay(d),s/veh	47.0	18.3	17.0	48.9	21.8	21.1	51.0	31.1	23.6	48.0	25.0	26.6
LnGrp LOS	D	B	B	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		380			424			783			934	
Approach Delay, s/veh		28.9			23.1			31.2			27.9	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.3	43.1	6.6	36.7	11.5	39.0	10.0	33.3
Change Period (Y+Rc), s	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Max Green Setting (Gmax), s	6.4	35.4	6.4	34.4	8.4	33.4	7.4	33.4
Max Q Clear Time (g_c+I1), s	2.6	5.9	2.3	16.2	5.9	7.9	4.7	19.8
Green Ext Time (p_c), s	0.0	4.0	0.0	9.5	0.1	3.9	0.1	7.9

Intersection Summary			
HCM 2010 Ctrl Delay			28.3
HCM 2010 LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	330	1860	300	480	1470	400	350	690	530	230	490	230
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	359	2022	326	522	1598	435	380	750	576	250	533	250
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	238	1387	621	326	1482	663	262	1036	463	178	941	421
Arrive On Green	0.07	0.39	0.39	0.10	0.42	0.42	0.08	0.29	0.29	0.05	0.27	0.27
Sat Flow, veh/h	3304	3539	1583	3304	3539	1583	3304	3539	1583	3304	3539	1583
Grp Volume(v), veh/h	359	2022	326	522	1598	435	380	750	576	250	533	250
Grp Sat Flow(s),veh/h/ln	1652	1770	1583	1652	1770	1583	1652	1770	1583	1652	1770	1583
Q Serve(g_s), s	10.8	58.8	23.6	14.8	62.8	33.0	11.9	28.5	43.9	8.1	19.5	20.6
Cycle Q Clear(g_c), s	10.8	58.8	23.6	14.8	62.8	33.0	11.9	28.5	43.9	8.1	19.5	20.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	238	1387	621	326	1482	663	262	1036	463	178	941	421
V/C Ratio(X)	1.51	1.46	0.53	1.60	1.08	0.66	1.45	0.72	1.24	1.40	0.57	0.59
Avail Cap(c_a), veh/h	238	1387	621	326	1482	663	262	1036	463	178	946	423
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.6	45.6	34.9	67.6	43.6	34.9	69.1	47.6	53.0	70.9	47.6	48.0
Incr Delay (d2), s/veh	249.7	209.9	3.2	284.6	47.7	5.0	222.5	2.5	126.5	210.7	0.8	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.2	69.2	10.9	19.6	40.5	15.3	13.5	14.3	35.5	8.9	9.7	9.3
LnGrp Delay(d),s/veh	319.3	255.5	38.1	352.2	91.3	40.0	291.6	50.1	179.6	281.7	48.4	50.2
LnGrp LOS	F	F	D	F	F	D	F	D	F	F	D	D
Approach Vol, veh/h		2707			2555			1706			1033	
Approach Delay, s/veh		237.8			135.8			147.6			105.3	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	65.0	18.0	46.0	17.0	69.0	14.0	50.0
Change Period (Y+Rc), s	6.2	6.2	* 6.1	* 6.1	6.2	6.2	5.9	* 6.1
Max Green Setting (Gmax), s	14.8	58.8	* 12	* 40	10.8	62.8	8.1	* 44
Max Q Clear Time (g_c+I1), s	16.8	60.8	13.9	22.6	12.8	64.8	10.1	45.9
Green Ext Time (p_c), s	0.0	0.0	0.0	10.7	0.0	0.0	0.0	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		168.9
HCM 2010 LOS		F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	140	2160	420	450	2070	230	550	700	560	100	410	110
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	152	2348	457	489	2250	250	598	761	609	109	446	120
Adj No. of Lanes	2	4	1	2	4	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	183	2363	584	395	2773	685	285	1035	463	155	896	401
Arrive On Green	0.06	0.37	0.37	0.12	0.43	0.43	0.09	0.29	0.29	0.05	0.25	0.25
Sat Flow, veh/h	3304	6408	1583	3304	6408	1583	3304	3539	1583	3304	3539	1583
Grp Volume(v), veh/h	152	2348	457	489	2250	250	598	761	609	109	446	120
Grp Sat Flow(s),veh/h/ln	1652	1602	1583	1652	1602	1583	1652	1770	1583	1652	1770	1583
Q Serve(g_s), s	6.4	51.3	36.0	16.8	43.1	14.9	12.1	27.2	41.1	4.6	15.1	8.6
Cycle Q Clear(g_c), s	6.4	51.3	36.0	16.8	43.1	14.9	12.1	27.2	41.1	4.6	15.1	8.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	183	2363	584	395	2773	685	285	1035	463	155	896	401
V/C Ratio(X)	0.83	0.99	0.78	1.24	0.81	0.36	2.10	0.73	1.31	0.70	0.50	0.30
Avail Cap(c_a), veh/h	183	2363	584	395	2773	685	285	1035	463	261	1010	452
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.7	44.2	39.3	61.8	34.8	26.8	64.2	44.8	49.7	66.0	44.8	42.4
Incr Delay (d2), s/veh	25.9	17.1	10.1	126.9	2.7	1.5	507.4	2.8	156.3	5.8	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	25.5	17.3	14.6	19.6	6.8	25.5	13.7	38.0	2.2	7.4	3.8
LnGrp Delay(d),s/veh	91.6	61.3	49.4	188.7	37.5	28.3	571.5	47.5	206.0	71.7	45.2	42.8
LnGrp LOS	F	E	D	F	D	C	F	D	F	E	D	D
Approach Vol, veh/h		2957			2989			1968			675	
Approach Delay, s/veh		61.0			61.5			255.8			49.1	
Approach LOS		E			E			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.0	58.0	18.0	41.5	14.0	67.0	12.5	47.0
Change Period (Y+Rc), s	6.2	6.2	* 5.9	* 5.9	6.2	6.2	* 5.9	* 5.9
Max Green Setting (Gmax), s	16.8	51.8	* 12	* 40	7.8	60.8	* 11	* 41
Max Q Clear Time (g_c+I1), s	18.8	53.3	14.1	17.1	8.4	45.1	6.6	43.1
Green Ext Time (p_c), s	0.0	0.0	0.0	11.5	0.0	15.6	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	104.9
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	610	1810	300	800	1890	130	420	1210	470	290	1380	330
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	622	1847	196	816	1929	85	429	1235	371	296	1408	201
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	482	1546	470	623	1754	532	341	1354	412	308	1306	396
Arrive On Green	0.14	0.31	0.31	0.18	0.35	0.35	0.10	0.27	0.27	0.09	0.26	0.26
Sat Flow, veh/h	3408	5036	1531	3408	5036	1527	3408	5036	1531	3408	5036	1528
Grp Volume(v), veh/h	622	1847	196	816	1929	85	429	1235	371	296	1408	201
Grp Sat Flow(s),veh/h/ln	1704	1679	1531	1704	1679	1527	1704	1679	1531	1704	1679	1528
Q Serve(g_s), s	20.5	44.5	14.8	26.5	50.5	5.6	14.5	34.4	33.9	12.5	37.6	16.3
Cycle Q Clear(g_c), s	20.5	44.5	14.8	26.5	50.5	5.6	14.5	34.4	33.9	12.5	37.6	16.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	482	1546	470	623	1754	532	341	1354	412	308	1306	396
V/C Ratio(X)	1.29	1.20	0.42	1.31	1.10	0.16	1.26	0.91	0.90	0.96	1.08	0.51
Avail Cap(c_a), veh/h	482	1546	470	623	1754	532	341	1354	412	308	1306	396
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.3	50.3	39.9	59.3	47.2	32.6	65.3	51.3	51.1	65.7	53.7	45.8
Incr Delay (d2), s/veh	145.8	94.4	0.9	150.8	54.3	0.2	138.1	9.9	23.2	40.5	48.9	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	19.4	34.1	6.3	25.5	32.2	2.4	13.4	17.3	17.0	7.7	23.3	7.1
LnGrp Delay(d),s/veh	208.0	144.7	40.8	210.1	101.5	32.8	203.3	61.2	74.4	106.2	102.6	47.9
LnGrp LOS	F	F	D	F	F	C	F	E	E	F	F	D
Approach Vol, veh/h		2665			2830			2035			1905	
Approach Delay, s/veh		151.8			130.8			93.6			97.4	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	43.0	26.0	56.0	18.6	44.4	32.0	50.0
Change Period (Y+Rc), s	5.5	* 5.4	5.5	5.5	5.5	* 5.4	5.5	5.5
Max Green Setting (Gmax), s	14.5	* 38	20.5	50.5	13.1	* 39	26.5	44.5
Max Q Clear Time (g_c+I1), s	16.5	39.6	22.5	52.5	14.5	36.4	28.5	46.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	122.0
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	570	1550	160	300	2080	50	120	370	100	80	500	610
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	613	1667	76	323	2237	53	129	398	98	86	538	638
Adj No. of Lanes	2	3	1	2	3	1	1	2	1	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	533	2265	705	365	2017	620	111	872	390	106	858	384
Arrive On Green	0.16	0.45	0.45	0.11	0.40	0.40	0.06	0.25	0.25	0.06	0.24	0.24
Sat Flow, veh/h	3408	5036	1567	3408	5036	1547	1757	3505	1568	1757	3505	1568
Grp Volume(v), veh/h	613	1667	76	323	2237	53	129	398	98	86	538	638
Grp Sat Flow(s),veh/h/ln	1704	1679	1567	1704	1679	1547	1757	1752	1568	1757	1752	1568
Q Serve(g_s), s	23.5	40.9	4.2	14.0	60.2	3.2	9.5	14.5	7.5	7.3	20.6	36.8
Cycle Q Clear(g_c), s	23.5	40.9	4.2	14.0	60.2	3.2	9.5	14.5	7.5	7.3	20.6	36.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	533	2265	705	365	2017	620	111	872	390	106	858	384
V/C Ratio(X)	1.15	0.74	0.11	0.88	1.11	0.09	1.16	0.46	0.25	0.82	0.63	1.66
Avail Cap(c_a), veh/h	533	2265	705	401	2017	620	111	872	390	173	858	384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.4	34.0	23.9	66.2	45.0	28.0	70.4	47.9	45.3	69.8	50.6	56.7
Incr Delay (d2), s/veh	87.6	1.1	0.0	18.0	56.9	0.0	135.4	0.1	0.1	5.6	1.1	309.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.5	19.2	1.8	7.6	38.5	1.4	8.8	7.0	3.3	3.7	10.1	48.9
LnGrp Delay(d),s/veh	151.0	35.1	23.9	84.2	101.9	28.0	205.8	48.0	45.4	75.4	51.7	365.9
LnGrp LOS	F	D	C	F	F	C	F	D	D	E	D	F
Approach Vol, veh/h		2356			2613			625			1262	
Approach Delay, s/veh		64.9			98.3			80.1			212.2	
Approach LOS		E			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.0	65.3	15.0	42.0	20.6	72.7	14.4	42.6
Change Period (Y+Rc), s	4.5	* 5.1	5.5	* 5.2	4.5	5.1	* 5.4	* 5.2
Max Green Setting (Gmax), s	23.5	* 60	9.5	* 37	17.7	65.7	* 15	* 32
Max Q Clear Time (g_c+I1), s	25.5	62.2	11.5	38.8	16.0	42.9	9.3	16.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.1	14.3	0.0	2.2

Intersection Summary		
HCM 2010 Ctrl Delay		106.1
HCM 2010 LOS		F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	170	1120	150	50	1480	180	130	930	60	390	1200	630
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	173	1143	134	51	1510	135	133	949	53	398	1224	333
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	198	1711	533	89	1550	483	166	1060	474	415	1315	581
Arrive On Green	0.06	0.34	0.34	0.03	0.31	0.31	0.05	0.30	0.30	0.12	0.38	0.38
Sat Flow, veh/h	3408	5036	1568	3408	5036	1568	3408	3505	1568	3408	3505	1548
Grp Volume(v), veh/h	173	1143	134	51	1510	135	133	949	53	398	1224	333
Grp Sat Flow(s),veh/h/ln	1704	1679	1568	1704	1679	1568	1704	1752	1568	1704	1752	1548
Q Serve(g_s), s	5.5	21.0	6.7	1.6	32.2	7.1	4.2	28.1	2.6	12.6	36.4	18.6
Cycle Q Clear(g_c), s	5.5	21.0	6.7	1.6	32.2	7.1	4.2	28.1	2.6	12.6	36.4	18.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	198	1711	533	89	1550	483	166	1060	474	415	1315	581
V/C Ratio(X)	0.87	0.67	0.25	0.57	0.97	0.28	0.80	0.90	0.11	0.96	0.93	0.57
Avail Cap(c_a), veh/h	198	1711	533	157	1550	483	166	1130	506	415	1363	602
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.7	30.6	25.9	52.2	37.1	28.4	51.1	36.2	27.3	47.4	32.5	27.0
Incr Delay (d2), s/veh	31.3	0.8	0.1	2.2	17.0	0.1	21.8	8.6	0.0	33.7	11.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	9.9	2.9	0.8	17.3	3.1	2.5	14.8	1.1	7.9	19.5	8.1
LnGrp Delay(d),s/veh	82.0	31.4	26.0	54.4	54.1	28.6	72.9	44.9	27.4	81.1	43.6	27.7
LnGrp LOS	F	C	C	D	D	C	E	D	C	F	D	C
Approach Vol, veh/h		1450			1696			1135			1955	
Approach Delay, s/veh		37.0			52.1			47.3			48.5	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.8	38.9	10.8	47.0	8.3	42.4	18.7	39.1
Change Period (Y+Rc), s	5.5	* 5.5	5.5	6.3	5.5	* 5.5	5.5	* 6.3
Max Green Setting (Gmax), s	6.3	* 33	5.3	42.2	5.0	* 35	13.2	* 35
Max Q Clear Time (g_c+I1), s	7.5	34.2	6.2	38.4	3.6	23.0	14.6	30.1
Green Ext Time (p_c), s	0.0	0.0	0.0	2.3	0.0	5.9	0.0	2.7

Intersection Summary			
HCM 2010 Ctrl Delay			46.6
HCM 2010 LOS			D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	870	260	30	1100	190	190	410	30	160	650	160
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	65	935	280	32	1183	204	204	441	32	172	699	172
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	1	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	52	1043	467	40	1020	456	157	684	50	196	607	149
Arrive On Green	0.03	0.30	0.30	0.02	0.29	0.29	0.09	0.40	0.40	0.11	0.42	0.42
Sat Flow, veh/h	1757	3505	1568	1757	3505	1568	1757	1700	123	1757	1431	352
Grp Volume(v), veh/h	65	935	280	32	1183	204	204	0	473	172	0	871
Grp Sat Flow(s),veh/h/ln	1757	1752	1568	1757	1752	1568	1757	0	1823	1757	0	1783
Q Serve(g_s), s	4.0	34.4	20.6	2.4	39.2	14.3	12.0	0.0	28.2	13.0	0.0	57.2
Cycle Q Clear(g_c), s	4.0	34.4	20.6	2.4	39.2	14.3	12.0	0.0	28.2	13.0	0.0	57.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		0.20
Lane Grp Cap(c), veh/h	52	1043	467	40	1020	456	157	0	733	196	0	757
V/C Ratio(X)	1.25	0.90	0.60	0.79	1.16	0.45	1.30	0.00	0.64	0.88	0.00	1.15
Avail Cap(c_a), veh/h	52	1043	467	52	1020	456	157	0	733	209	0	757
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	65.3	45.3	40.4	65.5	47.8	38.9	61.3	0.0	32.5	58.9	0.0	38.8
Incr Delay (d2), s/veh	205.0	10.2	2.1	45.0	83.0	0.7	175.1	0.0	2.0	30.8	0.0	82.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	18.1	9.2	1.7	30.6	6.3	13.4	0.0	14.6	8.0	0.0	45.4
LnGrp Delay(d),s/veh	270.4	55.5	42.6	110.4	130.8	39.6	236.4	0.0	34.4	89.8	0.0	121.4
LnGrp LOS	F	E	D	F	F	D	F		C	F		F
Approach Vol, veh/h		1280			1419			677			1043	
Approach Delay, s/veh		63.6			117.2			95.3			116.2	
Approach LOS		E			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	63.4	7.1	45.2	16.0	66.4	8.0	44.3
Change Period (Y+Rc), s	4.0	9.2	4.0	5.1	4.0	* 9.2	4.0	* 5.1
Max Green Setting (Gmax), s	16.0	48.8	4.0	38.9	12.0	* 57	4.0	* 39
Max Q Clear Time (g_c+I1), s	15.0	30.2	4.4	36.4	14.0	59.2	6.0	41.2
Green Ext Time (p_c), s	0.0	8.7	0.0	2.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	98.1
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	130	990	1160	930	1370	280
Number	3	18	1	6	2	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1863	1900	1900	1900
Adj Flow Rate, veh/h	134	992	1196	959	1412	177
Adj No. of Lanes	1	2	2	2	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	2	0	0	0
Cap, veh/h	236	370	1190	2820	1463	654
Arrive On Green	0.13	0.13	0.35	0.78	0.41	0.41
Sat Flow, veh/h	1810	2842	3442	3705	3705	1615
Grp Volume(v), veh/h	134	992	1196	959	1412	177
Grp Sat Flow(s),veh/h/ln	1810	1421	1721	1805	1805	1615
Q Serve(g_s), s	8.3	15.6	41.4	9.5	45.7	8.8
Cycle Q Clear(g_c), s	8.3	15.6	41.4	9.5	45.7	8.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	236	370	1190	2820	1463	654
V/C Ratio(X)	0.57	2.68	1.00	0.34	0.97	0.27
Avail Cap(c_a), veh/h	236	370	1190	2829	1472	658
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	52.1	39.2	3.9	34.8	23.8
Incr Delay (d2), s/veh	2.0	762.8	27.3	0.0	15.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	45.4	24.0	4.7	25.9	3.9
LnGrp Delay(d),s/veh	50.9	814.9	66.4	3.9	50.5	23.9
LnGrp LOS	D	F	F	A	D	C
Approach Vol, veh/h	1126			2155	1589	
Approach Delay, s/veh	724.0			38.6	47.6	
Approach LOS	F			D	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	45.0	53.6				98.6		21.1
Change Period (Y+Rc), s	* 3.6	5.1				5.1		5.5
Max Green Setting (Gmax), s	* 41	48.8				93.8		15.6
Max Q Clear Time (g_c+I1), s	43.4	47.7				11.5		17.6
Green Ext Time (p_c), s	0.0	0.8				6.4		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		200.0
HCM 2010 LOS		F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	570	400	1010	720	310	340	760	790	470	1130	40
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	32	606	219	1074	766	235	362	809	605	500	1202	23
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	85	955	293	693	1854	570	378	1788	548	341	1733	538
Arrive On Green	0.02	0.19	0.19	0.20	0.37	0.37	0.04	0.12	0.12	0.10	0.34	0.34
Sat Flow, veh/h	3408	5036	1543	3408	5036	1547	3408	5036	1544	3408	5036	1564
Grp Volume(v), veh/h	32	606	219	1074	766	235	362	809	605	500	1202	23
Grp Sat Flow(s),veh/h/ln	1704	1679	1543	1704	1679	1547	1704	1679	1544	1704	1679	1564
Q Serve(g_s), s	1.3	16.1	19.4	29.5	16.4	16.4	15.4	21.7	51.5	14.5	29.8	1.4
Cycle Q Clear(g_c), s	1.3	16.1	19.4	29.5	16.4	16.4	15.4	21.7	51.5	14.5	29.8	1.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	955	293	693	1854	570	378	1788	548	341	1733	538
V/C Ratio(X)	0.38	0.63	0.75	1.55	0.41	0.41	0.96	0.45	1.10	1.47	0.69	0.04
Avail Cap(c_a), veh/h	118	1181	362	693	2032	624	378	1788	548	341	1733	538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.6	54.1	55.5	57.8	34.1	34.1	69.5	50.9	64.0	65.3	41.0	31.7
Incr Delay (d2), s/veh	1.0	0.3	4.8	254.1	0.1	0.2	16.9	0.3	56.0	225.6	2.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	7.5	8.7	38.3	7.6	7.1	8.2	10.2	30.6	17.5	14.2	0.6
LnGrp Delay(d),s/veh	70.6	54.5	60.3	311.9	34.2	34.3	86.4	51.1	120.0	290.9	43.3	31.8
LnGrp LOS	E	D	E	F	C	C	F	D	F	F	D	C
Approach Vol, veh/h		857			2075			1776			1725	
Approach Delay, s/veh		56.5			177.9			81.8			114.9	
Approach LOS		E			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.6	55.4	9.1	58.9	20.0	57.0	35.0	33.0
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	16.1	43.4	5.0	58.5	14.5	45.0	29.5	34.0
Max Q Clear Time (g_c+I1), s	17.4	31.8	3.3	18.4	16.5	53.5	31.5	21.4
Green Ext Time (p_c), s	0.0	7.9	0.0	8.7	0.0	0.0	0.0	5.9

Intersection Summary			
HCM 2010 Ctrl Delay			118.3
HCM 2010 LOS			F

Notes

User approved pedestrian interval to be less than phase max green.

Intersection 7 **Jocelyn Wy-Lewis Stein Rd/Sheldon Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	500	359	71.8%	255.2	28.5	F
	Through	100	66	65.5%	239.0	32.1	F
	Right Turn	480	357	74.4%	201.0	28.2	F
	Subtotal	1,080	781	72.3%	229.3	28.5	F
SB	Left Turn	260	200	77.0%	297.7	113.7	F
	Through	110	85	77.3%	160.7	91.4	F
	Right Turn	50	41	82.4%	124.5	88.1	F
	Subtotal	420	326	77.7%	239.3	104.2	F
EB	Left Turn	80	60	75.0%	141.7	26.8	F
	Through	1,620	1,314	81.1%	152.3	15.5	F
	Right Turn	230	206	89.6%	24.3	8.4	C
	Subtotal	1,930	1,581	81.9%	135.2	14.6	F
WB	Left Turn	390	372	95.3%	69.7	13.9	E
	Through	1,770	1,711	96.7%	18.7	2.1	B
	Right Turn	250	223	89.2%	10.3	1.4	B
	Subtotal	2,410	2,306	95.7%	26.2	3.5	C
Total		5,840	4,994	85.5%	105.8	7.6	F

Intersection 8 **SR 99 SB Ramps/Sheldon Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	380	371	97.6%	51.0	4.5	D
	Through						
	Right Turn	840	820	97.6%	63.1	14.9	E
	Subtotal	1,220	1,191	97.6%	59.5	11.1	E
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn	10	11	110.4%	69.1	43.4	E
	Through	1,940	1,560	80.4%	33.1	8.9	C
	Right Turn	550	435	79.2%	18.3	5.7	B
	Subtotal	2,500	2,006	80.2%	30.2	8.3	C
WB	Left Turn	570	481	84.4%	70.0	14.4	E
	Through	2,120	1,935	91.3%	10.7	0.6	B
	Right Turn						
	Subtotal	2,690	2,416	89.8%	22.7	4.0	C
Total		6,410	5,613	87.6%	33.2	4.4	C

Intersection 9 **SR 99 NB Ramps/Sheldon Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	610	574	94.2%	100.2	24.0	F
	Through						
	Right Turn	570	526	92.2%	62.6	12.9	E
	Subtotal	1,180	1,100	93.2%	82.3	18.2	F
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	2,170	1,819	83.8%	41.4	18.8	D
	Right Turn	610	472	77.4%	4.4	0.6	A
	Subtotal	2,780	2,291	82.4%	33.9	15.4	C
WB	Left Turn						
	Through	2,080	1,937	93.1%	12.9	2.7	B
	Right Turn	640	569	88.8%	16.2	2.3	B
	Subtotal	2,720	2,505	92.1%	13.7	2.0	B
Total		6,680	5,896	88.3%	34.3	7.2	C

Intersection 10 **E Stockton Blvd/Sheldon Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	440	375	85.3%	176.9	65.8	F
	Through	150	132	88.1%	99.5	59.9	F
	Right Turn	200	177	88.3%	85.8	55.1	F
	Subtotal	790	684	86.6%	139.1	63.0	F
SB	Left Turn	20	21	103.0%	70.7	20.3	E
	Through	200	206	103.0%	45.2	8.2	D
	Right Turn	550	443	80.6%	141.3	51.2	F
	Subtotal	770	670	87.0%	108.6	34.8	F
EB	Left Turn	310	254	82.0%	100.8	29.5	F
	Through	1,950	1,702	87.3%	45.5	11.4	D
	Right Turn	390	326	83.7%	23.4	5.5	C
	Subtotal	2,650	2,282	86.1%	48.7	9.1	D
WB	Left Turn	120	102	85.3%	192.1	64.7	F
	Through	1,810	1,683	93.0%	81.3	36.5	F
	Right Turn	20	23	114.1%	51.2	44.3	D
	Subtotal	1,950	1,808	92.7%	87.4	36.4	F
Total		6,160	5,445	88.4%	80.2	17.0	F

Intersection 11 **Power Inn Rd-Garity Dr/Sheldon Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	40	45	112.2%	72.2	20.6	E
	Through	50	48	96.4%	48.3	9.0	D
	Right Turn	50	50	100.1%	25.3	3.7	C
	Subtotal	140	143	102.3%	48.3	8.3	D
SB	Left Turn	200	187	93.3%	70.4	10.3	E
	Through	40	40	100.3%	47.5	13.8	D
	Right Turn	380	358	94.3%	29.2	5.2	C
	Subtotal	620	585	94.4%	43.8	3.9	D
EB	Left Turn	450	381	84.6%	37.2	5.7	D
	Through	1,650	1,428	86.6%	35.1	4.1	D
	Right Turn	30	22	73.6%	17.8	3.7	B
	Subtotal	2,130	1,831	86.0%	35.4	3.8	D
WB	Left Turn	50	49	97.2%	73.0	11.1	E
	Through	1,470	1,468	99.9%	39.3	6.7	D
	Right Turn	240	226	94.0%	24.3	3.7	C
	Subtotal	1,760	1,742	99.0%	38.3	6.1	D
Total		4,650	4,302	92.5%	38.1	3.3	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	850	660	150	120	850	100	110	1120	90	170	1450	810
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	885	688	56	125	885	34	115	1167	32	177	1510	677
Adj No. of Lanes	2	2	1	2	2	1	2	3	1	2	3	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	722	1413	632	170	846	378	134	1551	483	222	1681	523
Arrive On Green	0.21	0.40	0.40	0.05	0.24	0.24	0.04	0.31	0.31	0.07	0.33	0.33
Sat Flow, veh/h	3408	3505	1567	3408	3505	1568	3408	5036	1568	3408	5036	1567
Grp Volume(v), veh/h	885	688	56	125	885	34	115	1167	32	177	1510	677
Grp Sat Flow(s),veh/h/ln	1704	1752	1567	1704	1752	1568	1704	1679	1568	1704	1679	1567
Q Serve(g_s), s	30.7	21.1	3.2	5.2	35.0	2.4	4.9	30.3	2.1	7.4	41.4	48.4
Cycle Q Clear(g_c), s	30.7	21.1	3.2	5.2	35.0	2.4	4.9	30.3	2.1	7.4	41.4	48.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	722	1413	632	170	846	378	134	1551	483	222	1681	523
V/C Ratio(X)	1.23	0.49	0.09	0.73	1.05	0.09	0.86	0.75	0.07	0.80	0.90	1.29
Avail Cap(c_a), veh/h	722	1413	632	235	846	378	134	1551	483	237	1681	523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.2	32.1	26.8	67.9	55.0	42.6	69.2	45.2	35.4	66.8	46.0	48.3
Incr Delay (d2), s/veh	114.0	0.1	0.0	3.9	43.7	0.0	37.8	1.9	0.0	14.7	6.7	146.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.9	10.2	1.4	2.6	22.1	1.1	3.0	14.3	0.9	3.9	20.2	42.1
LnGrp Delay(d),s/veh	171.1	32.2	26.8	71.9	98.7	42.7	107.0	47.1	35.5	81.5	52.7	194.6
LnGrp LOS	F	C	C	E	F	D	F	D	D	F	D	F
Approach Vol, veh/h		1629			1044			1314			2364	
Approach Delay, s/veh		107.5			93.6			52.0			95.5	
Approach LOS		F			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	54.7	37.0	41.3	15.7	51.0	13.5	64.8
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Max Green Setting (Gmax), s	5.7	48.4	30.7	35.0	10.1	44.0	10.0	55.7
Max Q Clear Time (g_c+I1), s	6.9	50.4	32.7	37.0	9.4	32.3	7.2	23.1
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	9.5	0.0	8.5

Intersection Summary		
HCM 2010 Ctrl Delay		89.3
HCM 2010 LOS		F

MOVEMENT SUMMARY

Site: 13 [Waterman Road/Sheldon Road_PM]

Bradshaw Road/Sheldon Road Intersection Improvements
2035 Volumes (3% per year growth)
AM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Bradshaw Road											
3	L2	133	3.0	0.908	38.5	LOS E	13.1	335.1	1.00	1.32	23.0
8	T1	490	3.0	0.908	38.5	LOS E	13.1	335.1	1.00	1.32	23.0
18	R2	31	3.0	0.908	38.5	LOS E	13.1	335.1	1.00	1.32	22.5
Approach		653	3.0	0.908	38.5	LOS E	13.1	335.1	1.00	1.32	22.9
East: Sheldon Road											
1	L2	31	3.0	0.422	13.7	LOS B	1.8	46.0	0.67	0.71	30.8
6	T1	173	3.0	0.422	13.7	LOS B	1.8	46.0	0.67	0.71	30.7
16	R2	20	3.0	0.422	13.7	LOS B	1.8	46.0	0.67	0.71	30.0
Approach		224	3.0	0.422	13.7	LOS B	1.8	46.0	0.67	0.71	30.7
North: Bradshaw Road											
7	L2	31	3.0	0.882	32.9	LOS D	12.4	316.6	0.98	1.22	24.6
4	T1	653	3.0	0.882	32.9	LOS D	12.4	316.6	0.98	1.22	24.6
14	R2	184	3.0	0.229	7.0	LOS A	0.9	22.4	0.44	0.37	33.1
Approach		867	3.0	0.882	27.4	LOS D	12.4	316.6	0.87	1.04	25.9
West: Sheldon Road											
5	L2	133	3.0	1.669	329.3	LOS F	121.6	3114.2	1.00	5.18	5.8
2	T1	500	3.0	1.669	329.3	LOS F	121.6	3114.2	1.00	5.18	5.8
12	R2	245	3.0	1.669	329.3	LOS F	121.6	3114.2	1.00	5.18	5.8
Approach		878	3.0	1.669	329.3	LOS F	121.6	3114.2	1.00	5.18	5.8
All Vehicles		2622	3.0	1.669	130.0	LOS F	121.6	3114.2	0.93	2.47	11.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 14 [Bradshaw Road/Sheldon Road-PM]

Bradshaw Road/Sheldon Road Intersection Improvements
2035 Volumes (3% per year growth)
AM Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Bradshaw Road											
3	L2	41	3.0	0.924	42.2	LOS E	13.8	354.3	1.00	1.37	22.3
8	T1	1194	3.0	0.924	42.2	LOS E	13.8	354.3	1.00	1.37	22.3
18	R2	51	3.0	0.924	42.2	LOS E	13.8	354.3	1.00	1.37	21.9
Approach		1286	3.0	0.924	42.2	LOS E	13.8	354.3	1.00	1.37	22.3
East: Sheldon Road											
1	L2	92	3.0	2.002	480.7	LOS F	142.2	3641.4	1.00	6.32	4.2
6	T1	735	3.0	2.002	480.7	LOS F	142.2	3641.4	1.00	6.32	4.2
16	R2	31	3.0	2.002	480.7	LOS F	142.2	3641.4	1.00	6.32	4.2
Approach		857	3.0	2.002	480.7	LOS F	142.2	3641.4	1.00	6.32	4.2
North: Bradshaw Road											
7	L2	20	3.0	1.098	87.6	LOS F	38.0	973.8	1.00	2.30	15.5
4	T1	1378	3.0	1.098	87.6	LOS F	38.0	973.8	1.00	2.30	15.4
14	R2	112	3.0	1.098	87.6	LOS F	38.0	973.8	1.00	2.30	15.2
Approach		1510	3.0	1.098	87.6	LOS F	38.0	973.8	1.00	2.30	15.4
West: Sheldon Road											
5	L2	92	3.0	1.300	178.4	LOS F	46.4	1187.6	1.00	3.56	9.6
2	T1	459	3.0	1.300	178.4	LOS F	46.4	1187.6	1.00	3.56	9.6
12	R2	61	3.0	0.155	11.5	LOS B	0.4	10.3	0.68	0.68	30.9
Approach		612	3.0	1.300	161.7	LOS F	46.4	1187.6	0.97	3.27	10.3
All Vehicles		4265	3.0	2.002	163.5	LOS F	142.2	3641.4	1.00	2.97	10.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	450	40	70	720	50	60	290	40	120	440	90
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	72	464	41	72	742	52	62	299	41	124	454	93
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	99	492	43	99	515	36	91	468	64	150	487	100
Arrive On Green	0.06	0.29	0.29	0.06	0.30	0.30	0.05	0.29	0.29	0.09	0.33	0.33
Sat Flow, veh/h	1757	1671	148	1757	1704	119	1757	1588	218	1757	1486	304
Grp Volume(v), veh/h	72	0	505	72	0	794	62	0	340	124	0	547
Grp Sat Flow(s),veh/h/ln	1757	0	1819	1757	0	1824	1757	0	1806	1757	0	1791
Q Serve(g_s), s	2.6	0.0	17.5	2.6	0.0	19.5	2.2	0.0	10.6	4.5	0.0	19.1
Cycle Q Clear(g_c), s	2.6	0.0	17.5	2.6	0.0	19.5	2.2	0.0	10.6	4.5	0.0	19.1
Prop In Lane	1.00		0.08	1.00		0.07	1.00		0.12	1.00		0.17
Lane Grp Cap(c), veh/h	99	0	536	99	0	551	91	0	532	150	0	587
V/C Ratio(X)	0.73	0.00	0.94	0.73	0.00	1.44	0.68	0.00	0.64	0.83	0.00	0.93
Avail Cap(c_a), veh/h	150	0	536	136	0	551	150	0	532	150	0	587
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.0	0.0	22.2	30.0	0.0	22.5	30.1	0.0	19.8	29.0	0.0	21.0
Incr Delay (d2), s/veh	9.8	0.0	25.4	11.7	0.0	208.5	8.5	0.0	5.8	30.4	0.0	23.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	12.5	1.6	0.0	41.6	1.3	0.0	6.0	3.4	0.0	13.3
LnGrp Delay(d),s/veh	39.8	0.0	47.7	41.7	0.0	231.0	38.6	0.0	25.6	59.4	0.0	44.7
LnGrp LOS	D		D	D		F	D		C	E		D
Approach Vol, veh/h		577			866			402			671	
Approach Delay, s/veh		46.7			215.3			27.6			47.4	
Approach LOS		D			F			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.8	23.3	8.0	23.4	7.7	25.4	7.5	23.9
Change Period (Y+Rc), s	4.3	4.3	4.4	4.4	4.3	4.3	3.9	* 4.4
Max Green Setting (Gmax), s	5.5	19.0	5.0	19.0	5.5	19.0	5.5	* 19
Max Q Clear Time (g_c+I1), s	6.5	12.6	4.6	19.5	4.2	21.1	4.6	21.5
Green Ext Time (p_c), s	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		101.8
HCM 2010 LOS		F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	120	0	940	0	0	0	770	540	0	0	830	300
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	0	1900	0	1863	0	1863	1863	0	0	1881	1900
Adj Flow Rate, veh/h	122	0	750	0	0	0	786	551	0	0	847	0
Adj No. of Lanes	1	0	1	0	1	0	1	2	0	0	2	1
Peak Hour Factor	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	2	0	2	2	0	0	1	0
Cap, veh/h	150	0	0	0	2	0	849	2915	0	0	1078	487
Arrive On Green	0.08	0.00	0.00	0.00	0.00	0.00	0.48	0.82	0.00	0.00	0.30	0.00
Sat Flow, veh/h	1810	122		0	-83824	0	1774	3632	0	0	3668	1615
Grp Volume(v), veh/h	122	65.1		0	0	0	786	551	0	0	847	0
Grp Sat Flow(s),veh/h/ln	1810	E		0	1863	0	1774	1770	0	0	1787	1615
Q Serve(g_s), s	7.0			0.0	0.0	0.0	44.0	3.4	0.0	0.0	23.0	0.0
Cycle Q Clear(g_c), s	7.0			0.0	0.0	0.0	44.0	3.4	0.0	0.0	23.0	0.0
Prop In Lane	1.00			0.00		0.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	150			0	2	0	849	2915	0	0	1078	487
V/C Ratio(X)	0.81			0.00	0.00	0.00	0.93	0.19	0.00	0.00	0.79	0.00
Avail Cap(c_a), veh/h	181			0	316	0	1094	3572	0	0	1248	564
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	47.8			0.0	0.0	0.0	25.9	2.0	0.0	0.0	33.9	0.0
Incr Delay (d2), s/veh	17.3			0.0	0.0	0.0	11.9	0.0	0.0	0.0	3.0	0.0
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2			0.0	0.0	0.0	24.2	1.6	0.0	0.0	11.7	0.0
LnGrp Delay(d),s/veh	65.1			0.0	0.0	0.0	37.7	2.0	0.0	0.0	36.8	0.0
LnGrp LOS	E						D	A			D	
Approach Vol, veh/h					0			1337			847	
Approach Delay, s/veh					0.0			23.0			36.8	
Approach LOS								C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4		6		
Phs Duration (G+Y+Rc), s	55.3	37.3	13.4	0.0		92.6		
Change Period (Y+Rc), s	4.6	5.3	4.6	4.5		5.3		
Max Green Setting (Gmax), s	65.4	37.0	10.6	18.0		107.0		
Max Q Clear Time (g_c+I1), s	46.0	25.0	9.0	0.0		5.4		
Green Ext Time (p_c), s	4.8	7.0	0.0	0.0		14.0		

Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	30	50	330	80	200	90	650	290	590	1320	130
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	65	33	16	359	87	30	98	707	120	641	1435	105
Adj No. of Lanes	2	2	1	2	1	1	1	3	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	139	426	182	421	377	310	123	1774	539	711	1721	744
Arrive On Green	0.04	0.12	0.12	0.12	0.20	0.20	0.07	0.35	0.35	0.21	0.49	0.49
Sat Flow, veh/h	3408	3505	1497	3408	1845	1518	1757	5036	1531	3408	3505	1515
Grp Volume(v), veh/h	65	33	16	359	87	30	98	707	120	641	1435	105
Grp Sat Flow(s),veh/h/ln	1704	1752	1497	1704	1845	1518	1757	1679	1531	1704	1752	1515
Q Serve(g_s), s	1.9	0.9	1.0	10.7	4.1	1.7	5.7	11.0	5.7	19.1	36.7	3.9
Cycle Q Clear(g_c), s	1.9	0.9	1.0	10.7	4.1	1.7	5.7	11.0	5.7	19.1	36.7	3.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	139	426	182	421	377	310	123	1774	539	711	1721	744
V/C Ratio(X)	0.47	0.08	0.09	0.85	0.23	0.10	0.80	0.40	0.22	0.90	0.83	0.14
Avail Cap(c_a), veh/h	242	1178	503	458	737	606	133	1774	539	835	1780	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	40.6	40.6	44.7	34.6	33.6	47.7	25.4	23.7	40.2	22.8	14.5
Incr Delay (d2), s/veh	0.9	0.0	0.1	12.6	0.1	0.0	23.7	0.1	0.1	10.7	3.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.4	0.4	5.8	2.1	0.7	3.6	5.1	2.4	10.0	18.5	1.6
LnGrp Delay(d),s/veh	49.8	40.6	40.7	57.3	34.7	33.7	71.4	25.5	23.8	50.8	26.1	14.5
LnGrp LOS	D	D	D	E	C	C	E	C	C	D	C	B
Approach Vol, veh/h		114			476			925			2181	
Approach Delay, s/veh		45.8			51.7			30.1			32.8	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.3	42.2	17.5	18.2	11.9	56.7	8.8	26.8
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	25.5	35.3	14.0	35.0	7.9	52.9	7.4	41.6
Max Q Clear Time (g_c+I1), s	21.1	13.0	12.7	3.0	7.7	38.7	3.9	6.1
Green Ext Time (p_c), s	0.7	19.9	0.1	1.1	0.0	12.4	0.0	1.2

Intersection Summary		
HCM 2010 Ctrl Delay		34.9
HCM 2010 LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	290	610	210	150	960	490	280	1050	260	620	1480	60
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	315	663	37	163	1043	417	304	1141	138	674	1609	61
Adj No. of Lanes	2	2	1	2	2	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	338	1208	527	210	1076	469	338	1254	379	700	1789	544
Arrive On Green	0.10	0.34	0.34	0.06	0.31	0.31	0.10	0.25	0.25	0.07	0.12	0.12
Sat Flow, veh/h	3408	3505	1531	3408	3505	1529	3408	5036	1524	3408	5036	1531
Grp Volume(v), veh/h	315	663	37	163	1043	417	304	1141	138	674	1609	61
Grp Sat Flow(s),veh/h/ln	1704	1752	1531	1704	1752	1529	1704	1679	1524	1704	1679	1531
Q Serve(g_s), s	13.3	22.2	2.4	6.8	42.6	37.7	12.8	31.9	10.8	28.6	45.7	5.2
Cycle Q Clear(g_c), s	13.3	22.2	2.4	6.8	42.6	37.7	12.8	31.9	10.8	28.6	45.7	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	338	1208	527	210	1076	469	338	1254	379	700	1789	544
V/C Ratio(X)	0.93	0.55	0.07	0.78	0.97	0.89	0.90	0.91	0.36	0.96	0.90	0.11
Avail Cap(c_a), veh/h	338	1208	527	289	1076	469	338	1254	379	700	1789	544
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.09	0.09	0.09
Uniform Delay (d), s/veh	64.8	38.4	31.9	67.0	49.6	47.9	64.6	52.9	45.0	67.0	61.5	43.6
Incr Delay (d2), s/veh	31.2	0.3	0.0	5.6	20.3	18.0	24.7	11.3	2.7	4.4	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	10.8	1.0	3.4	23.6	18.3	7.2	16.1	4.8	13.9	21.4	2.2
LnGrp Delay(d),s/veh	96.0	38.7	31.9	72.6	69.9	65.9	89.3	64.2	47.7	71.4	62.2	43.6
LnGrp LOS	F	D	C	E	E	E	F	E	D	E	E	D
Approach Vol, veh/h		1015			1623			1583			2344	
Approach Delay, s/veh		56.2			69.1			67.6			64.4	
Approach LOS		E			E			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	57.0	19.0	50.0	34.4	41.6	13.5	55.5
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	14.4	51.5	14.4	44.5	29.8	36.1	12.3	46.6
Max Q Clear Time (g_c+I1), s	14.8	47.7	15.3	44.6	30.6	33.9	8.8	24.2
Green Ext Time (p_c), s	0.0	3.8	0.0	0.0	0.0	2.2	0.1	20.4

Intersection Summary	
HCM 2010 Ctrl Delay	65.1
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	20	30	340	20	180	30	790	360	410	970	20
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1881	1866	1900	1900	1863	1900	1863	1882	1900
Adj Flow Rate, veh/h	21	21	20	351	21	32	31	814	360	423	1000	21
Adj No. of Lanes	1	1	0	1	1	0	1	2	1	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	1	0	0	0	2	0	2	1	1
Cap, veh/h	35	34	32	334	137	209	234	1133	515	559	1809	38
Arrive On Green	0.02	0.04	0.04	0.19	0.21	0.21	0.13	0.32	0.32	0.31	0.51	0.51
Sat Flow, veh/h	1810	888	845	1792	668	1018	1810	3539	1610	1774	3581	75
Grp Volume(v), veh/h	21	0	41	351	0	53	31	814	360	423	499	522
Grp Sat Flow(s),veh/h/ln	1810	0	1733	1792	0	1687	1810	1770	1610	1774	1787	1868
Q Serve(g_s), s	1.7	0.0	3.5	28.0	0.0	3.9	2.3	30.5	25.5	32.2	28.8	28.8
Cycle Q Clear(g_c), s	1.7	0.0	3.5	28.0	0.0	3.9	2.3	30.5	25.5	32.2	28.8	28.8
Prop In Lane	1.00		0.49	1.00		0.60	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	35	0	67	334	0	347	234	1133	515	559	903	944
V/C Ratio(X)	0.60	0.00	0.62	1.05	0.00	0.15	0.13	0.72	0.70	0.76	0.55	0.55
Avail Cap(c_a), veh/h	71	0	231	334	0	457	234	1133	515	559	903	944
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.88	0.88	0.88	0.41	0.41	0.41
Uniform Delay (d), s/veh	73.0	0.0	71.0	61.0	0.0	48.9	57.8	45.0	33.7	46.2	25.5	25.5
Incr Delay (d2), s/veh	15.1	0.0	8.9	62.8	0.0	0.2	0.2	3.5	6.8	2.5	1.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	1.8	19.7	0.0	1.8	1.2	15.5	12.3	16.1	14.4	15.0
LnGrp Delay(d),s/veh	88.1	0.0	79.9	123.8	0.0	49.1	58.0	48.5	40.5	48.7	26.5	26.4
LnGrp LOS	F		E	F		D	E	D	D	D	C	C
Approach Vol, veh/h		62			404			1205			1444	
Approach Delay, s/veh		82.7			114.0			46.3			33.0	
Approach LOS		F			F			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.9	81.8	32.5	11.8	51.7	54.0	7.4	36.9
Change Period (Y+Rc), s	4.5	6.0	4.5	* 6	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	6.7	75.8	28.0	* 20	34.5	48.0	5.9	40.6
Max Q Clear Time (g_c+I1), s	4.3	30.8	30.0	5.5	34.2	32.5	3.7	5.9
Green Ext Time (p_c), s	0.4	7.9	0.0	0.3	0.1	6.2	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	49.6
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	110	1700	700	340	620	130	180	40	340	210	90	200
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.95	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	120	1848	676	370	674	95	196	43	60	228	98	50
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	176	2187	666	426	2557	780	256	420	179	256	351	289
Arrive On Green	0.05	0.43	0.43	0.13	0.51	0.51	0.08	0.12	0.12	0.15	0.19	0.19
Sat Flow, veh/h	3408	5036	1535	3408	5036	1537	3408	3505	1497	1757	1845	1516
Grp Volume(v), veh/h	120	1848	676	370	674	95	196	43	60	228	98	50
Grp Sat Flow(s),veh/h/ln	1704	1679	1535	1704	1679	1537	1704	1752	1497	1757	1845	1516
Q Serve(g_s), s	3.8	36.2	47.9	11.8	8.4	3.6	6.2	1.2	4.1	14.1	5.0	3.0
Cycle Q Clear(g_c), s	3.8	36.2	47.9	11.8	8.4	3.6	6.2	1.2	4.1	14.1	5.0	3.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	176	2187	666	426	2557	780	256	420	179	256	351	289
V/C Ratio(X)	0.68	0.84	1.01	0.87	0.26	0.12	0.76	0.10	0.33	0.89	0.28	0.17
Avail Cap(c_a), veh/h	278	2187	666	445	2557	780	399	985	421	277	594	488
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.4	27.9	31.2	47.4	15.4	14.2	50.0	43.2	44.5	46.2	38.2	37.4
Incr Delay (d2), s/veh	1.7	3.2	38.5	15.2	0.1	0.1	1.8	0.1	0.8	25.4	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	17.3	27.4	6.5	3.9	1.5	3.0	0.6	1.7	8.6	2.6	1.3
LnGrp Delay(d),s/veh	53.1	31.1	69.7	62.6	15.5	14.3	51.8	43.3	45.3	71.7	38.3	37.5
LnGrp LOS	D	C	F	E	B	B	D	D	D	E	D	D
Approach Vol, veh/h		2644			1139			299			376	
Approach Delay, s/veh		42.0			30.7			49.3			58.4	
Approach LOS		D			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.3	61.5	12.9	25.6	18.4	53.4	20.7	17.8
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	9.0	53.3	12.9	35.5	14.4	47.9	17.4	31.0
Max Q Clear Time (g_c+I1), s	5.8	10.4	8.2	7.0	13.8	49.9	16.1	6.1
Green Ext Time (p_c), s	0.0	33.5	0.1	0.7	0.0	0.0	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	41.0
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	2010	100	270	1040	140	50	20	230	180	50	90
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.95	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	65	2185	69	293	1130	117	54	22	12	196	54	0
Adj No. of Lanes	2	3	1	2	3	1	1	1	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	127	2526	771	346	2849	870	69	118	64	222	681	304
Arrive On Green	0.04	0.50	0.50	0.10	0.57	0.57	0.04	0.11	0.11	0.13	0.19	0.00
Sat Flow, veh/h	3408	5036	1537	3408	5036	1538	1757	1101	601	1757	3505	1568
Grp Volume(v), veh/h	65	2185	69	293	1130	117	54	0	34	196	54	0
Grp Sat Flow(s),veh/h/ln	1704	1679	1537	1704	1679	1538	1757	0	1702	1757	1752	1568
Q Serve(g_s), s	2.2	45.2	2.8	10.0	14.8	4.2	3.6	0.0	2.2	13.0	1.5	0.0
Cycle Q Clear(g_c), s	2.2	45.2	2.8	10.0	14.8	4.2	3.6	0.0	2.2	13.0	1.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.35	1.00		1.00
Lane Grp Cap(c), veh/h	127	2526	771	346	2849	870	69	0	182	222	681	304
V/C Ratio(X)	0.51	0.87	0.09	0.85	0.40	0.13	0.78	0.00	0.19	0.88	0.08	0.00
Avail Cap(c_a), veh/h	190	2569	784	360	2849	870	147	0	461	236	1127	504
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	55.8	25.9	15.4	52.2	14.4	12.1	56.3	0.0	48.1	50.7	39.0	0.0
Incr Delay (d2), s/veh	1.2	3.3	0.0	15.3	0.1	0.1	6.9	0.0	0.2	27.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	21.6	1.2	5.5	6.8	1.8	1.9	0.0	1.0	8.0	0.7	0.0
LnGrp Delay(d),s/veh	57.0	29.3	15.4	67.5	14.5	12.1	63.2	0.0	48.3	78.1	39.0	0.0
LnGrp LOS	E	C	B	E	B	B	E		D	E	D	
Approach Vol, veh/h		2319			1540			88			250	
Approach Delay, s/veh		29.6			24.4			57.4			69.6	
Approach LOS		C			C			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	72.7	9.2	27.5	16.5	65.1	19.5	17.1
Change Period (Y+Rc), s	4.5	5.8	4.5	4.5	4.5	5.8	4.5	4.5
Max Green Setting (Gmax), s	6.6	66.2	9.9	38.0	12.5	60.3	15.9	32.0
Max Q Clear Time (g_c+I1), s	4.2	16.8	5.6	3.5	12.0	47.2	15.0	4.2
Green Ext Time (p_c), s	0.0	41.7	0.0	0.2	0.0	12.1	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	30.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	610	1440	260	300	850	140	430	400	200	370	640	350
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	663	1565	200	326	924	87	467	435	44	402	696	156
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	602	1709	519	354	1342	407	430	903	393	393	878	382
Arrive On Green	0.18	0.34	0.34	0.10	0.27	0.27	0.13	0.26	0.26	0.12	0.25	0.25
Sat Flow, veh/h	3408	5036	1531	3408	5036	1525	3408	3505	1525	3408	3505	1524
Grp Volume(v), veh/h	663	1565	200	326	924	87	467	435	44	402	696	156
Grp Sat Flow(s),veh/h/ln	1704	1679	1531	1704	1679	1525	1704	1752	1525	1704	1752	1524
Q Serve(g_s), s	24.5	41.3	13.8	13.1	22.9	6.2	17.5	14.6	3.1	16.0	25.8	11.9
Cycle Q Clear(g_c), s	24.5	41.3	13.8	13.1	22.9	6.2	17.5	14.6	3.1	16.0	25.8	11.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	602	1709	519	354	1342	407	430	903	393	393	878	382
V/C Ratio(X)	1.10	0.92	0.39	0.92	0.69	0.21	1.09	0.48	0.11	1.02	0.79	0.41
Avail Cap(c_a), veh/h	602	1710	520	354	1343	407	430	940	409	393	910	396
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.1	43.9	34.8	61.6	45.7	39.6	60.6	43.6	39.4	61.4	48.6	43.4
Incr Delay (d2), s/veh	67.6	8.0	0.2	28.3	1.3	0.1	68.6	0.1	0.0	51.3	4.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.1	20.4	5.8	7.6	10.8	2.6	12.3	7.1	1.3	10.3	13.0	5.0
LnGrp Delay(d),s/veh	124.7	51.9	35.0	89.9	46.9	39.7	129.2	43.8	39.4	112.6	52.9	43.7
LnGrp LOS	F	D	C	F	D	D	F	D	D	F	D	D
Approach Vol, veh/h		2428			1337			946			1254	
Approach Delay, s/veh		70.4			57.0			85.7			70.9	
Approach LOS		E			E			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.0	40.7	20.9	53.1	23.0	41.7	31.0	43.0
Change Period (Y+Rc), s	6.5	6.0	6.5	6.0	7.0	* 6	6.5	6.0
Max Green Setting (Gmax), s	17.5	36.0	14.4	47.1	16.0	* 37	24.5	37.0
Max Q Clear Time (g_c+I1), s	19.5	27.8	15.1	43.3	18.0	16.6	26.5	24.9
Green Ext Time (p_c), s	0.0	6.4	0.0	3.7	0.0	13.3	0.0	11.9

Intersection Summary		
HCM 2010 Ctrl Delay		69.9
HCM 2010 LOS		E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	300	830	270	330	1170	170	200	1400	190	160	1460	530
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	326	902	167	359	1272	134	217	1522	131	174	1587	455
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	293	1332	403	316	1366	414	211	1530	670	176	1482	649
Arrive On Green	0.09	0.26	0.26	0.09	0.27	0.27	0.06	0.44	0.44	0.05	0.42	0.42
Sat Flow, veh/h	3408	5036	1525	3408	5036	1526	3408	3505	1535	3408	3505	1534
Grp Volume(v), veh/h	326	902	167	359	1272	134	217	1522	131	174	1587	455
Grp Sat Flow(s),veh/h/ln	1704	1679	1525	1704	1679	1526	1704	1752	1535	1704	1752	1534
Q Serve(g_s), s	12.5	23.3	13.2	13.5	35.8	10.2	9.0	62.9	7.7	7.4	61.5	35.4
Cycle Q Clear(g_c), s	12.5	23.3	13.2	13.5	35.8	10.2	9.0	62.9	7.7	7.4	61.5	35.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	293	1332	403	316	1366	414	211	1530	670	176	1482	649
V/C Ratio(X)	1.11	0.68	0.41	1.14	0.93	0.32	1.03	0.99	0.20	0.99	1.07	0.70
Avail Cap(c_a), veh/h	293	1333	404	316	1367	414	211	1530	670	176	1482	649
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.5	47.9	44.2	66.0	51.7	42.3	68.2	40.8	25.2	68.9	42.0	34.5
Incr Delay (d2), s/veh	86.5	1.1	0.3	92.3	11.3	0.2	69.8	21.7	0.1	64.8	45.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	11.0	5.6	10.4	18.0	4.3	6.3	35.1	3.2	5.1	38.9	15.4
LnGrp Delay(d),s/veh	153.0	49.1	44.4	158.2	63.0	42.5	138.1	62.5	25.3	133.7	87.0	37.3
LnGrp LOS	F	D	D	F	E	D	F	E	C	F	F	D
Approach Vol, veh/h		1395			1765			1870			2216	
Approach Delay, s/veh		72.8			80.8			68.7			80.4	
Approach LOS		E			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	45.0	15.0	67.5	19.0	44.0	13.0	69.5
Change Period (Y+Rc), s	5.5	5.5	6.0	* 6	5.5	5.5	5.5	6.0
Max Green Setting (Gmax), s	12.5	39.5	9.0	* 62	13.5	38.5	7.5	63.0
Max Q Clear Time (g_c+I1), s	14.5	37.8	11.0	63.5	15.5	25.3	9.4	64.9
Green Ext Time (p_c), s	0.0	1.6	0.0	0.0	0.0	12.5	0.0	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		76.0
HCM 2010 LOS		E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	210	890	120	360	1410	480	120	1350	280	450	1260	160
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	228	967	119	391	1533	409	130	1467	234	489	1370	120
Adj No. of Lanes	2	4	0	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	259	1335	162	434	1427	433	173	1320	577	441	1595	699
Arrive On Green	0.08	0.23	0.23	0.13	0.28	0.28	0.05	0.38	0.38	0.13	0.46	0.46
Sat Flow, veh/h	3408	5756	699	3408	5036	1527	3408	3505	1532	3408	3505	1535
Grp Volume(v), veh/h	228	797	289	391	1533	409	130	1467	234	489	1370	120
Grp Sat Flow(s),veh/h/ln	1704	1586	1696	1704	1679	1527	1704	1752	1532	1704	1752	1535
Q Serve(g_s), s	9.9	23.2	23.6	17.0	42.5	39.3	5.6	56.5	16.9	19.4	52.4	6.9
Cycle Q Clear(g_c), s	9.9	23.2	23.6	17.0	42.5	39.3	5.6	56.5	16.9	19.4	52.4	6.9
Prop In Lane	1.00		0.41	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	259	1104	394	434	1427	433	173	1320	577	441	1595	699
V/C Ratio(X)	0.88	0.72	0.73	0.90	1.07	0.95	0.75	1.11	0.41	1.11	0.86	0.17
Avail Cap(c_a), veh/h	259	1104	394	464	1427	433	191	1320	577	441	1595	699
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.6	53.1	53.3	64.5	53.8	52.6	70.2	46.8	34.4	65.3	36.6	24.2
Incr Delay (d2), s/veh	26.6	2.0	6.1	18.9	46.6	29.5	11.7	61.2	0.2	76.0	4.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	10.4	11.7	9.1	25.8	20.1	3.0	38.5	7.1	13.8	26.4	2.9
LnGrp Delay(d),s/veh	95.3	55.2	59.4	83.4	100.3	82.1	81.9	107.9	34.6	141.3	41.3	24.2
LnGrp LOS	F	E	E	F	F	F	F	F	C	F	D	C
Approach Vol, veh/h		1314			2333			1831			1979	
Approach Delay, s/veh		63.1			94.3			96.7			65.0	
Approach LOS		E			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	48.0	12.2	73.8	23.7	40.3	24.0	62.0
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	11.4	42.5	8.4	67.5	20.4	33.5	19.4	56.5
Max Q Clear Time (g_c+I1), s	11.9	44.5	7.6	54.4	19.0	25.6	21.4	58.5
Green Ext Time (p_c), s	0.0	0.0	0.0	12.8	0.1	7.7	0.0	0.0

Intersection Summary			
HCM 2010 Ctrl Delay			81.6
HCM 2010 LOS			F

Notes

User approved pedestrian interval to be less than phase max green.

Intersection 25 **W Stockton Blvd-Laguna Springs Dr/Laguna Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	350	350	100.0%	56.9	9.0	E
	Through	110	114	103.7%	35.3	7.2	D
	Right Turn	700	684	97.8%	17.1	3.2	B
	Subtotal	1,160	1,149	99.0%	31.2	3.8	C
SB	Left Turn	130	123	94.3%	46.0	11.0	D
	Through	270	277	102.8%	40.0	3.3	D
	Right Turn	300	303	101.0%	38.7	9.0	D
	Subtotal	700	703	100.4%	40.7	4.5	D
EB	Left Turn	210	202	96.2%	89.0	31.9	F
	Through	1,140	1,119	98.2%	37.1	5.5	D
	Right Turn	120	108	90.2%	6.2	1.7	A
	Subtotal	1,470	1,429	97.2%	42.4	6.4	D
WB	Left Turn	350	325	92.8%	32.6	3.0	C
	Through	1,590	1,514	95.2%	20.3	3.3	C
	Right Turn	140	142	101.7%	3.8	0.7	A
	Subtotal	2,080	1,981	95.2%	21.2	2.7	C
Total		5,410	5,262	97.3%	31.8	2.4	C

Intersection 26 **SR 99 SB Ramps/Laguna Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	460	457	99.4%	23.9	1.9	C
	Through						
	Right Turn	660	668	101.2%	23.9	4.7	C
	Subtotal	1,120	1,125	100.5%	23.8	3.3	C
EB	Left Turn						
	Through	1,560	1,491	95.6%	31.9	5.9	C
	Right Turn	410	411	100.3%	9.7	1.5	A
	Subtotal	1,970	1,902	96.6%	27.1	5.0	C
WB	Left Turn						
	Through	1,420	1,345	94.7%	18.2	1.2	B
	Right Turn	500	461	92.2%	10.0	0.6	A
	Subtotal	1,920	1,806	94.1%	16.1	1.0	B
Total		5,010	4,834	96.5%	22.3	2.8	C

Intersection 27 **SR 99 NB Ramps/Bond Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	430	428	99.4%	32.6	7.3	C
	Through						
	Right Turn	420	399	95.1%	49.1	16.2	D
	Subtotal	850	827	97.3%	40.6	11.5	D
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	1,110	1,022	92.0%	29.9	14.8	C
	Right Turn	910	858	94.3%	15.3	1.6	B
	Subtotal	2,020	1,879	93.0%	23.2	7.9	C
WB	Left Turn						
	Through	1,490	1,437	96.4%	26.2	2.2	C
	Right Turn	390	375	96.1%	12.2	1.5	B
	Subtotal	1,880	1,812	96.4%	23.4	2.0	C
Total		4,750	4,518	95.1%	26.5	5.3	C

Intersection 28 **E Stockton Blvd/Bond Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	280	301	107.5%	43.3	4.8	D
	Through	90	91	101.4%	46.9	4.4	D
	Right Turn	140	131	93.6%	12.3	3.7	B
	Subtotal	510	523	102.6%	36.2	3.6	D
SB	Left Turn	390	368	94.3%	98.3	24.3	F
	Through	180	180	100.0%	104.3	25.3	F
	Right Turn	110	104	94.3%	22.2	10.1	C
	Subtotal	680	651	95.8%	88.0	22.6	F
EB	Left Turn	150	123	82.2%	78.2	15.1	E
	Through	1,180	955	81.0%	105.2	34.8	F
	Right Turn	200	185	92.7%	10.6	2.9	B
	Subtotal	1,530	1,264	82.6%	88.6	28.0	F
WB	Left Turn	100	96	96.4%	79.0	43.8	E
	Through	1,490	1,345	90.3%	30.5	8.1	C
	Right Turn	210	198	94.3%	13.3	3.2	B
	Subtotal	1,800	1,639	91.1%	31.6	9.1	C
Total		4,520	4,078	90.2%	58.6	10.3	E

Intersection 29 **Elk Crest Rd/Bond Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	60	63	104.3%	56.9	13.4	E
	Through	20	22	110.4%	42.1	17.8	D
	Right Turn	10	14	136.2%	24.3	13.5	C
	Subtotal	90	98	109.2%	50.6	8.7	D
SB	Left Turn	120	128	106.4%	44.1	6.8	D
	Through	30	30	99.4%	67.9	23.6	E
	Right Turn	250	268	107.2%	42.4	16.0	D
	Subtotal	400	425	106.4%	44.9	13.1	D
EB	Left Turn	270	246	91.2%	58.7	14.7	E
	Through	1,320	1,097	83.1%	22.2	3.1	C
	Right Turn	130	112	86.1%	16.3	2.8	B
	Subtotal	1,720	1,455	84.6%	28.0	5.0	C
WB	Left Turn	90	89	99.0%	84.6	18.4	F
	Through	1,480	1,299	87.8%	83.3	17.4	F
	Right Turn	120	103	86.2%	73.0	20.3	E
	Subtotal	1,690	1,492	88.3%	82.6	17.5	F
Total		3,900	3,471	89.0%	54.1	7.5	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	440	1190	160	360	920	160	370	940	320	320	1080	450
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	463	1253	105	379	968	62	389	989	242	337	1137	275
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	469	1139	507	364	1019	454	385	1098	491	361	1074	474
Arrive On Green	0.14	0.33	0.33	0.11	0.29	0.29	0.11	0.31	0.31	0.11	0.31	0.31
Sat Flow, veh/h	3408	3505	1559	3408	3505	1561	3408	3505	1568	3408	3505	1547
Grp Volume(v), veh/h	463	1253	105	379	968	62	389	989	242	337	1137	275
Grp Sat Flow(s),veh/h/ln	1704	1752	1559	1704	1752	1561	1704	1752	1568	1704	1752	1547
Q Serve(g_s), s	19.7	47.2	7.1	15.5	39.3	4.3	16.4	39.2	18.2	14.2	44.5	21.8
Cycle Q Clear(g_c), s	19.7	47.2	7.1	15.5	39.3	4.3	16.4	39.2	18.2	14.2	44.5	21.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	469	1139	507	364	1019	454	385	1098	491	361	1074	474
V/C Ratio(X)	0.99	1.10	0.21	1.04	0.95	0.14	1.01	0.90	0.49	0.93	1.06	0.58
Avail Cap(c_a), veh/h	469	1139	507	364	1026	457	385	1098	491	361	1074	474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.5	49.0	35.5	64.9	50.5	38.0	64.4	47.7	40.5	64.4	50.4	42.5
Incr Delay (d2), s/veh	37.8	58.3	0.3	58.4	17.6	0.2	48.5	10.5	1.3	30.2	44.3	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.7	32.0	3.1	10.2	21.4	1.9	10.3	20.6	8.1	8.3	28.1	9.6
LnGrp Delay(d),s/veh	100.2	107.3	35.8	123.3	68.0	38.3	113.0	58.2	41.8	94.5	94.7	44.9
LnGrp LOS	F	F	D	F	E	D	F	E	D	F	F	D
Approach Vol, veh/h		1821			1409			1620			1749	
Approach Delay, s/veh		101.4			81.6			68.9			86.8	
Approach LOS		F			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	50.0	26.0	48.2	20.0	51.0	21.0	53.2
Change Period (Y+Rc), s	4.6	5.5	6.0	* 6	4.6	5.5	5.5	6.0
Max Green Setting (Gmax), s	16.4	44.5	20.0	* 43	15.4	45.5	15.5	47.0
Max Q Clear Time (g_c+I1), s	18.4	46.5	21.7	41.3	16.2	41.2	17.5	49.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.9	0.0	4.2	0.0	0.0

Intersection Summary			
HCM 2010 Ctrl Delay			85.3
HCM 2010 LOS			F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	1120	280	60	990	110	250	450	70	170	550	140
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1881	1881	1863	1881	1863	1900
Adj Flow Rate, veh/h	76	1217	144	65	1076	66	272	489	26	185	598	31
Adj No. of Lanes	2	2	1	2	2	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	2	1	2	0
Cap, veh/h	121	1398	626	118	1394	623	254	599	504	202	539	467
Arrive On Green	0.03	0.39	0.39	0.03	0.39	0.39	0.14	0.32	0.32	0.11	0.29	0.29
Sat Flow, veh/h	3510	3610	1615	3510	3610	1612	1792	1881	1583	1792	1863	1613
Grp Volume(v), veh/h	76	1217	144	65	1076	66	272	489	26	185	598	31
Grp Sat Flow(s),veh/h/ln	1755	1805	1615	1755	1805	1612	1792	1881	1583	1792	1863	1613
Q Serve(g_s), s	2.9	42.6	8.2	2.5	35.6	3.6	19.4	32.7	1.6	14.0	39.5	1.9
Cycle Q Clear(g_c), s	2.9	42.6	8.2	2.5	35.6	3.6	19.4	32.7	1.6	14.0	39.5	1.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	121	1398	626	118	1394	623	254	599	504	202	539	467
V/C Ratio(X)	0.63	0.87	0.23	0.55	0.77	0.11	1.07	0.82	0.05	0.92	1.11	0.07
Avail Cap(c_a), veh/h	190	1414	633	190	1414	632	254	599	504	202	539	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.1	38.7	28.1	65.0	36.6	26.8	58.6	42.9	32.2	59.9	48.5	35.2
Incr Delay (d2), s/veh	2.0	6.3	0.3	1.5	2.8	0.1	75.8	8.0	0.0	39.9	72.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	22.4	3.7	1.2	18.3	1.6	14.9	18.3	0.7	9.2	31.1	0.8
LnGrp Delay(d),s/veh	67.0	45.0	28.4	66.5	39.5	26.9	134.4	50.9	32.3	99.8	121.0	35.2
LnGrp LOS	E	D	C	E	D	C	F	D	C	F	F	D
Approach Vol, veh/h		1437			1207			787			814	
Approach Delay, s/veh		44.5			40.3			79.1			113.0	
Approach LOS		D			D			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	58.3	24.0	45.0	9.2	58.4	20.0	49.0
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	7.4	53.5	19.4	39.5	7.4	53.5	15.4	43.5
Max Q Clear Time (g_c+I1), s	4.9	37.6	21.4	41.5	4.5	44.6	16.0	34.7
Green Ext Time (p_c), s	0.0	14.3	0.0	0.0	0.0	8.3	0.0	2.8

Intersection Summary		
HCM 2010 Ctrl Delay		62.8
HCM 2010 LOS		E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	360	360	200	130	510	40	170	890	110	40	1090	440
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	387	387	147	140	548	39	183	957	107	43	1172	314
Adj No. of Lanes	2	2	1	1	2	1	2	2	1	2	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	448	976	436	167	850	380	241	1486	665	109	1350	603
Arrive On Green	0.13	0.28	0.28	0.10	0.24	0.24	0.07	0.42	0.42	0.03	0.39	0.39
Sat Flow, veh/h	3408	3505	1566	1757	3505	1568	3408	3505	1568	3408	3505	1567
Grp Volume(v), veh/h	387	387	147	140	548	39	183	957	107	43	1172	314
Grp Sat Flow(s),veh/h/ln	1704	1752	1566	1757	1752	1568	1704	1752	1568	1704	1752	1567
Q Serve(g_s), s	13.2	10.6	8.9	9.3	16.6	2.3	6.2	25.6	5.0	1.5	36.6	18.3
Cycle Q Clear(g_c), s	13.2	10.6	8.9	9.3	16.6	2.3	6.2	25.6	5.0	1.5	36.6	18.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	448	976	436	167	850	380	241	1486	665	109	1350	603
V/C Ratio(X)	0.86	0.40	0.34	0.84	0.65	0.10	0.76	0.64	0.16	0.39	0.87	0.52
Avail Cap(c_a), veh/h	587	1227	548	362	1346	602	414	1582	708	299	1464	654
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	34.7	34.1	52.7	40.3	34.9	54.1	27.1	21.1	56.2	33.7	28.0
Incr Delay (d2), s/veh	8.4	0.4	0.6	4.2	1.2	0.2	1.9	0.6	0.0	0.9	5.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	5.2	3.9	4.7	8.2	1.0	3.0	12.5	2.2	0.7	18.7	8.0
LnGrp Delay(d),s/veh	58.9	35.1	34.7	56.9	41.5	35.0	55.9	27.7	21.2	57.1	38.8	28.3
LnGrp LOS	E	D	C	E	D	D	E	C	C	E	D	C
Approach Vol, veh/h		921			727			1247			1529	
Approach Delay, s/veh		45.0			44.1			31.2			37.1	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.2	34.2	8.4	55.7	15.9	38.5	13.0	51.1
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	20.4	45.5	10.4	53.5	24.4	41.5	14.4	49.5
Max Q Clear Time (g_c+I1), s	15.2	18.6	3.5	27.6	11.3	12.6	8.2	38.6
Green Ext Time (p_c), s	0.4	10.0	0.0	11.6	0.1	10.3	0.1	7.0

Intersection Summary	
HCM 2010 Ctrl Delay	38.3
HCM 2010 LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	220	260	360	30	40	350
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1900	1845	1900
Adj Flow Rate, veh/h	242	286	396	33	44	385
Adj No. of Lanes	1	1	1	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	3	3	0	0
Cap, veh/h	286	1088	632	53	48	420
Arrive On Green	0.16	0.59	0.38	0.38	0.30	0.30
Sat Flow, veh/h	1757	1845	1680	140	162	1420
Grp Volume(v), veh/h	242	286	0	429	430	0
Grp Sat Flow(s),veh/h/ln	1757	1845	0	1820	1586	0
Q Serve(g_s), s	11.3	6.3	0.0	16.2	22.1	0.0
Cycle Q Clear(g_c), s	11.3	6.3	0.0	16.2	22.1	0.0
Prop In Lane	1.00			0.08	0.10	0.90
Lane Grp Cap(c), veh/h	286	1088	0	685	469	0
V/C Ratio(X)	0.85	0.26	0.00	0.63	0.92	0.00
Avail Cap(c_a), veh/h	494	1088	0	685	578	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.2	8.4	0.0	21.4	28.6	0.0
Incr Delay (d2), s/veh	6.9	0.6	0.0	4.3	17.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	3.4	0.0	8.9	11.9	0.0
LnGrp Delay(d),s/veh	41.1	9.0	0.0	25.7	45.9	0.0
LnGrp LOS	D	A		C	D	
Approach Vol, veh/h		528	429		430	
Approach Delay, s/veh		23.7	25.7		45.9	
Approach LOS		C	C		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		54.0		30.2	18.0	36.0		
Change Period (Y+Rc), s		4.3		5.3	4.3	4.3		
Max Green Setting (Gmax), s		49.7		30.7	23.7	21.7		
Max Q Clear Time (g_c+I1), s		8.3		24.1	13.3	18.2		
Green Ext Time (p_c), s		4.4		0.9	0.5	1.3		

Intersection Summary		
HCM 2010 Ctrl Delay		31.2
HCM 2010 LOS		C

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	230	30	40	20	20	10	30	880	10	20	900	290
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1667	1900	1798	1900	1900	1863	1138	1900	1881	1900
Adj Flow Rate, veh/h	262	0	0	21	21	6	31	917	10	21	938	0
Adj No. of Lanes	2	0	1	0	1	0	1	2	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	14	14	14	14	0	2	67	0	1	0
Cap, veh/h	344	0	134	31	31	9	56	1929	526	42	1018	874
Arrive On Green	0.09	0.00	0.00	0.04	0.04	0.04	0.03	0.54	0.54	0.02	0.54	0.00
Sat Flow, veh/h	3619	0	1417	754	754	215	1810	3539	966	1810	1881	1615
Grp Volume(v), veh/h	262	0	0	48	0	0	31	917	10	21	938	0
Grp Sat Flow(s),veh/h/ln	1810	0	1417	1723	0	0	1810	1770	966	1810	1881	1615
Q Serve(g_s), s	5.8	0.0	0.0	2.3	0.0	0.0	1.4	13.0	0.4	0.9	37.4	0.0
Cycle Q Clear(g_c), s	5.8	0.0	0.0	2.3	0.0	0.0	1.4	13.0	0.4	0.9	37.4	0.0
Prop In Lane	1.00		1.00	0.44		0.12	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	344	0	134	70	0	0	56	1929	526	42	1018	874
V/C Ratio(X)	0.76	0.00	0.00	0.69	0.00	0.00	0.55	0.48	0.02	0.50	0.92	0.00
Avail Cap(c_a), veh/h	353	0	138	315	0	0	132	2029	554	126	1078	926
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.2	0.0	0.0	38.8	0.0	0.0	39.2	11.5	8.6	39.6	17.2	0.0
Incr Delay (d2), s/veh	8.2	0.0	0.0	4.4	0.0	0.0	3.2	0.1	0.0	3.4	11.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	0.0	1.2	0.0	0.0	0.7	6.4	0.1	0.5	22.6	0.0
LnGrp Delay(d),s/veh	44.4	0.0	0.0	43.2	0.0	0.0	42.3	11.5	8.6	43.0	29.1	0.0
LnGrp LOS	D			D			D	B	A	D	C	
Approach Vol, veh/h		262			48			958			959	
Approach Delay, s/veh		44.4			43.2			12.5			29.4	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.5	50.3		13.8	8.2	50.7		9.3
Change Period (Y+Rc), s	6.0	6.0		6.0	* 6.3	6.0		6.0
Max Green Setting (Gmax), s	6.0	47.0		8.0	* 5.7	47.0		15.0
Max Q Clear Time (g_c+I1), s	3.4	39.4		7.8	2.9	15.0		4.3
Green Ext Time (p_c), s	0.0	4.9		0.0	0.0	11.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	24.2
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	30	30	410	1560	20
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1676	1900	1881	1900	1900
Adj Flow Rate, veh/h	11	32	32	0	1642	21
Adj No. of Lanes	0	3	2	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	18	18	0	1	0	0
Cap, veh/h	336	1086	183	81	1790	824
Arrive On Green	0.30	0.30	0.05	0.00	0.51	0.51
Sat Flow, veh/h	1102	3718	3705	1599	3510	1615
Grp Volume(v), veh/h	16	27	32	0	1642	21
Grp Sat Flow(s),veh/h/ln	1620	1525	1805	1599	1755	1615
Q Serve(g_s), s	0.7	0.6	0.8	0.0	43.1	0.6
Cycle Q Clear(g_c), s	0.7	0.6	0.8	0.0	43.1	0.6
Prop In Lane	0.68			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	493	928	183	81	1790	824
V/C Ratio(X)	0.03	0.03	0.18	0.00	0.92	0.03
Avail Cap(c_a), veh/h	493	928	783	347	2004	922
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.91	0.00	1.00	1.00
Uniform Delay (d), s/veh	24.4	24.4	45.5	0.0	22.6	12.2
Incr Delay (d2), s/veh	0.1	0.1	0.4	0.0	6.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.3	0.4	0.0	22.4	0.3
LnGrp Delay(d),s/veh	24.6	24.5	45.9	0.0	29.3	12.2
LnGrp LOS	C	C	D		C	B
Approach Vol, veh/h		43	32		1663	
Approach Delay, s/veh		24.5	45.9		29.1	
Approach LOS		C	D		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		34.7		55.9		9.4		
Change Period (Y+Rc), s		4.3		4.9		4.3		
Max Green Setting (Gmax), s		7.7		57.1		21.7		
Max Q Clear Time (g_c+I1), s		2.7		45.1		2.8		
Green Ext Time (p_c), s		0.0		5.9		0.1		

Intersection Summary	
HCM 2010 Ctrl Delay	29.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	1570	0	0	420	1100	20	0	230	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.96			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1473	1900	0	0	1892	1900	1900	1900	1900			
Adj Flow Rate, veh/h	21	1619	0	0	433	0	0	0	259			
Adj No. of Lanes	1	3	0	0	2	1	0	1	2			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	29	0	0	0	1	0	0	0	0			
Cap, veh/h	70	3975	0	0	2548	1087	0	262	426			
Arrive On Green	0.02	0.25	0.00	0.00	0.67	0.00	0.00	0.00	0.14			
Sat Flow, veh/h	1403	5358	0	0	3784	1615	0	1900	3097			
Grp Volume(v), veh/h	21	1619	0	0	433	0	0	0	259			
Grp Sat Flow(s),veh/h/ln	1403	1729	0	0	1892	1615	0	1900	1549			
Q Serve(g_s), s	1.5	26.0	0.0	0.0	4.2	0.0	0.0	0.0	7.9			
Cycle Q Clear(g_c), s	1.5	26.0	0.0	0.0	4.2	0.0	0.0	0.0	7.9			
Prop In Lane	1.00		0.00	0.00		1.00	0.00		1.00			
Lane Grp Cap(c), veh/h	70	3975	0	0	2548	1087	0	262	426			
V/C Ratio(X)	0.30	0.41	0.00	0.00	0.17	0.00	0.00	0.00	0.61			
Avail Cap(c_a), veh/h	108	3975	0	0	2548	1087	0	640	1044			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.44	0.44	0.00	0.00	0.78	0.00	0.00	0.00	1.00			
Uniform Delay (d), s/veh	47.4	18.4	0.0	0.0	6.0	0.0	0.0	0.0	40.6			
Incr Delay (d2), s/veh	1.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	1.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.6	12.5	0.0	0.0	2.2	0.0	0.0	0.0	3.5			
LnGrp Delay(d),s/veh	48.5	18.6	0.0	0.0	6.1	0.0	0.0	0.0	42.0			
LnGrp LOS	D	B			A				D			
Approach Vol, veh/h		1640			433			259				
Approach Delay, s/veh		19.0			6.1			42.0				
Approach LOS		B			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		80.9			9.3	71.6		19.1
Change Period (Y+Rc), s		4.3			4.3	4.3		5.3
Max Green Setting (Gmax), s		56.7			7.7	44.7		33.7
Max Q Clear Time (g_c+I1), s		28.0			3.5	6.2		9.9
Green Ext Time (p_c), s		17.1			0.0	20.1		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	19.1
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	220	1280	300	220	1020	330	310	120	210	660	160	190
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	229	1333	230	229	1062	241	323	125	88	688	167	73
Adj No. of Lanes	2	3	1	2	3	1	2	1	1	2	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	292	2018	620	297	2025	623	394	177	150	729	359	303
Arrive On Green	0.17	0.80	0.80	0.09	0.40	0.40	0.12	0.10	0.10	0.21	0.19	0.19
Sat Flow, veh/h	3408	5036	1547	3408	5036	1548	3408	1845	1563	3408	1845	1561
Grp Volume(v), veh/h	229	1333	230	229	1062	241	323	125	88	688	167	73
Grp Sat Flow(s),veh/h/ln	1704	1679	1547	1704	1679	1548	1704	1845	1563	1704	1845	1561
Q Serve(g_s), s	6.4	11.2	4.2	6.6	16.0	11.0	9.3	6.6	5.4	19.9	8.0	4.0
Cycle Q Clear(g_c), s	6.4	11.2	4.2	6.6	16.0	11.0	9.3	6.6	5.4	19.9	8.0	4.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	292	2018	620	297	2025	623	394	177	150	729	359	303
V/C Ratio(X)	0.78	0.66	0.37	0.77	0.52	0.39	0.82	0.71	0.59	0.94	0.47	0.24
Avail Cap(c_a), veh/h	525	2018	620	525	2025	623	729	341	289	729	359	303
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.5	7.1	6.4	44.7	22.6	21.2	43.2	43.8	43.3	38.7	35.7	34.0
Incr Delay (d2), s/veh	1.6	1.6	1.6	1.6	1.0	1.8	1.6	3.8	2.7	20.4	0.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	5.2	1.9	3.2	7.6	5.0	4.4	3.5	2.4	11.4	4.2	1.7
LnGrp Delay(d),s/veh	42.2	8.6	7.9	46.3	23.6	23.0	44.8	47.6	46.0	59.1	36.4	34.3
LnGrp LOS	D	A	A	D	C	C	D	D	D	E	D	C
Approach Vol, veh/h		1792			1532			536			928	
Approach Delay, s/veh		12.8			26.9			45.7			53.1	
Approach LOS		B			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.2	45.7	16.2	24.9	13.3	45.6	26.0	15.1
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	15.4	24.5	21.4	18.5	15.4	24.5	21.4	18.5
Max Q Clear Time (g_c+I1), s	8.4	18.0	11.3	10.0	8.6	13.2	21.9	8.6
Green Ext Time (p_c), s	0.2	6.0	0.3	1.1	0.2	9.9	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	28.8
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	110	2110	1480	420	340	70
Number	1	6	2	12	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	115	2198	1542	268	354	24
Adj No. of Lanes	1	3	3	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	145	3731	3021	939	447	206
Arrive On Green	0.08	0.74	0.60	0.60	0.13	0.13
Sat Flow, veh/h	1757	5202	5202	1565	3408	1568
Grp Volume(v), veh/h	115	2198	1542	268	354	24
Grp Sat Flow(s),veh/h/ln	1757	1679	1679	1565	1704	1568
Q Serve(g_s), s	5.1	15.9	13.9	6.5	8.0	1.1
Cycle Q Clear(g_c), s	5.1	15.9	13.9	6.5	8.0	1.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	145	3731	3021	939	447	206
V/C Ratio(X)	0.79	0.59	0.51	0.29	0.79	0.12
Avail Cap(c_a), veh/h	276	3731	3021	939	1096	504
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.48	0.48	1.00	1.00
Uniform Delay (d), s/veh	35.6	4.7	9.1	7.6	33.3	30.3
Incr Delay (d2), s/veh	3.6	0.7	0.3	0.4	1.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	7.4	6.5	2.9	3.8	0.5
LnGrp Delay(d),s/veh	39.2	5.4	9.4	8.0	34.5	30.4
LnGrp LOS	D	A	A	A	C	C
Approach Vol, veh/h		2313	1810		378	
Approach Delay, s/veh		7.1	9.2		34.2	
Approach LOS		A	A		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.1	52.9				64.0		15.0
Change Period (Y+Rc), s	4.6	5.5				5.5		4.6
Max Green Setting (Gmax), s	12.4	26.5				43.5		25.4
Max Q Clear Time (g_c+I1), s	7.1	15.9				17.9		10.0
Green Ext Time (p_c), s	0.0	10.3				24.4		0.4

Intersection Summary			
HCM 2010 Ctrl Delay			10.2
HCM 2010 LOS			B

Notes
User approved pedestrian interval to be less than phase max green.

HCM 2010 Signalized Intersection Summary — Cumulative Conditions
39: Franklin Blvd & Elk Grove Blvd — Timing Plan: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	200	1700	740	100	1250	290	640	550	190	360	450	260
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	217	1848	624	109	1359	116	696	598	129	391	489	38
Adj No. of Lanes	2	3	2	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	292	1936	1387	171	1757	534	782	927	403	452	587	253
Arrive On Green	0.09	0.38	0.38	0.05	0.35	0.35	0.23	0.26	0.26	0.13	0.17	0.17
Sat Flow, veh/h	3408	5036	2656	3408	5036	1531	3408	3505	1525	3408	3505	1512
Grp Volume(v), veh/h	217	1848	624	109	1359	116	696	598	129	391	489	38
Grp Sat Flow(s),veh/h/ln	1704	1679	1328	1704	1679	1531	1704	1752	1525	1704	1752	1512
Q Serve(g_s), s	7.5	42.8	17.8	3.8	28.9	6.4	23.7	18.2	8.2	13.5	16.2	2.6
Cycle Q Clear(g_c), s	7.5	42.8	17.8	3.8	28.9	6.4	23.7	18.2	8.2	13.5	16.2	2.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	292	1936	1387	171	1757	534	782	927	403	452	587	253
V/C Ratio(X)	0.74	0.95	0.45	0.64	0.77	0.22	0.89	0.65	0.32	0.86	0.83	0.15
Avail Cap(c_a), veh/h	494	1936	1387	494	1757	534	863	978	426	494	599	258
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.74	0.74	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.6	35.9	18.3	55.9	34.8	27.5	44.8	39.1	35.5	51.0	48.3	42.6
Incr Delay (d2), s/veh	1.1	9.8	0.8	1.5	3.4	0.9	9.9	1.0	0.2	12.9	9.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	21.6	6.6	1.8	13.9	2.8	12.2	8.9	3.5	7.2	8.5	1.1
LnGrp Delay(d),s/veh	54.6	45.7	19.1	57.4	38.2	28.5	54.7	40.1	35.6	63.9	57.3	42.7
LnGrp LOS	D	D	B	E	D	C	D	D	D	E	E	D
Approach Vol, veh/h		2689			1584			1423			918	
Approach Delay, s/veh		40.3			38.8			46.9			59.5	
Approach LOS		D			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.9	47.4	32.1	25.6	10.6	51.6	20.5	37.2
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	17.4	31.5	30.4	20.5	17.4	31.5	17.4	33.5
Max Q Clear Time (g_c+I1), s	9.5	30.9	25.7	18.2	5.8	44.8	15.5	20.2
Green Ext Time (p_c), s	0.8	0.6	1.8	1.9	0.4	0.0	0.4	9.3

Intersection Summary	
HCM 2010 Ctrl Delay	44.0
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↱		↰	↱	
Volume (veh/h)	80	1850	120	110	1760	40	160	30	70	60	40	80
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	83	1927	120	115	1833	42	167	31	26	62	42	19
Adj No. of Lanes	1	3	0	1	3	0	1	1	0	1	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	104	2995	186	137	3229	74	193	106	89	79	61	28
Arrive On Green	0.06	0.62	0.62	0.16	1.00	1.00	0.11	0.12	0.12	0.04	0.05	0.05
Sat Flow, veh/h	1757	4840	300	1757	5065	116	1757	913	766	1757	1204	545
Grp Volume(v), veh/h	83	1334	713	115	1215	660	167	0	57	62	0	61
Grp Sat Flow(s),veh/h/ln	1757	1679	1783	1757	1679	1824	1757	0	1679	1757	0	1749
Q Serve(g_s), s	6.3	33.9	34.3	8.6	0.0	0.0	12.6	0.0	4.2	4.7	0.0	4.6
Cycle Q Clear(g_c), s	6.3	33.9	34.3	8.6	0.0	0.0	12.6	0.0	4.2	4.7	0.0	4.6
Prop In Lane	1.00		0.17	1.00		0.06	1.00		0.46	1.00		0.31
Lane Grp Cap(c), veh/h	104	2077	1103	137	2140	1163	193	0	194	79	0	88
V/C Ratio(X)	0.80	0.64	0.65	0.84	0.57	0.57	0.86	0.00	0.29	0.79	0.00	0.69
Avail Cap(c_a), veh/h	135	2077	1103	161	2140	1163	278	0	428	96	0	264
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.26	0.26	0.26	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	62.7	16.3	16.3	56.2	0.0	0.0	59.1	0.0	54.7	63.8	0.0	63.0
Incr Delay (d2), s/veh	17.0	1.5	2.9	7.9	0.3	0.5	12.9	0.0	0.3	23.2	0.0	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	16.0	17.7	4.5	0.1	0.2	6.8	0.0	2.0	2.8	0.0	2.3
LnGrp Delay(d),s/veh	79.8	17.8	19.3	64.1	0.3	0.5	72.0	0.0	55.0	87.0	0.0	66.6
LnGrp LOS	E	B	B	E	A	A	E		D	F		E
Approach Vol, veh/h		2130			1990			224			123	
Approach Delay, s/veh		20.7			4.1			67.7			76.9	
Approach LOS		C			A			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.1	89.0	19.4	11.4	12.6	91.6	10.7	20.2
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	12.4	61.5	21.4	20.4	10.4	63.5	7.4	34.4
Max Q Clear Time (g_c+I1), s	10.6	36.3	14.6	6.6	8.3	2.0	6.7	6.2
Green Ext Time (p_c), s	0.1	24.1	0.2	0.2	0.0	55.5	0.0	0.3

Intersection Summary		
HCM 2010 Ctrl Delay		17.2
HCM 2010 LOS		B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	410	1380	140	490	1610	370	130	780	240	310	1180	240
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	446	1500	55	533	1750	275	141	848	127	337	1283	78
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	465	1753	533	566	1902	579	190	1439	397	349	1689	466
Arrive On Green	0.27	0.70	0.70	0.11	0.25	0.25	0.05	0.26	0.26	0.10	0.31	0.31
Sat Flow, veh/h	3408	5036	1531	3408	5036	1532	3514	5534	1525	3514	5534	1528
Grp Volume(v), veh/h	446	1500	55	533	1750	275	141	848	127	337	1283	78
Grp Sat Flow(s),veh/h/ln	1704	1679	1531	1704	1679	1532	1757	1845	1525	1757	1845	1528
Q Serve(g_s), s	17.4	30.2	1.6	21.0	45.7	20.6	5.3	18.1	9.1	12.9	28.3	5.0
Cycle Q Clear(g_c), s	17.4	30.2	1.6	21.0	45.7	20.6	5.3	18.1	9.1	12.9	28.3	5.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	465	1753	533	566	1902	579	190	1439	397	349	1689	466
V/C Ratio(X)	0.96	0.86	0.10	0.94	0.92	0.48	0.74	0.59	0.32	0.97	0.76	0.17
Avail Cap(c_a), veh/h	465	1753	533	566	1902	579	193	1455	401	349	1701	470
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.62	0.62	0.62	0.26	0.26	0.26	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.7	18.0	13.6	59.4	48.4	39.1	62.9	43.6	40.3	60.6	42.4	34.3
Incr Delay (d2), s/veh	23.3	3.6	0.2	8.9	2.6	0.7	12.4	0.4	0.2	38.9	1.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.6	14.0	0.7	10.6	21.7	8.8	2.9	9.2	3.8	8.2	14.7	2.1
LnGrp Delay(d),s/veh	72.0	21.5	13.9	68.2	51.0	39.8	75.4	44.1	40.5	99.5	44.2	34.4
LnGrp LOS	E	C	B	E	D	D	E	D	D	F	D	C
Approach Vol, veh/h		2001			2558			1116			1698	
Approach Delay, s/veh		32.6			53.4			47.6			54.8	
Approach LOS		C			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.0	57.1	11.9	46.7	27.0	53.1	18.0	40.6
Change Period (Y+Rc), s	4.6	6.0	4.6	5.5	4.6	* 6	4.6	5.5
Max Green Setting (Gmax), s	18.4	47.0	7.4	41.5	22.4	* 44	13.4	35.5
Max Q Clear Time (g_c+I1), s	19.4	47.7	7.3	30.3	23.0	32.2	14.9	20.1
Green Ext Time (p_c), s	0.0	0.0	0.0	10.9	0.0	11.2	0.0	14.9

Intersection Summary		
HCM 2010 Ctrl Delay		47.2
HCM 2010 LOS		D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	1850	50	40	2500	150	30	20	90	90	20	20
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.95	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1900	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	33	2011	53	43	2717	155	33	22	72	114	0	18
Adj No. of Lanes	1	3	1	1	3	0	0	1	1	2	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	46	3088	932	55	2972	166	102	68	141	304	0	128
Arrive On Green	0.02	0.41	0.41	0.04	0.81	0.81	0.09	0.09	0.09	0.09	0.00	0.09
Sat Flow, veh/h	1757	5036	1519	1757	4871	272	1075	716	1483	3514	0	1477
Grp Volume(v), veh/h	33	2011	53	43	1855	1017	55	0	72	114	0	18
Grp Sat Flow(s),veh/h/ln	1757	1679	1519	1757	1679	1786	1791	0	1483	1757	0	1477
Q Serve(g_s), s	2.5	43.4	2.8	3.3	53.1	59.7	3.9	0.0	6.2	4.1	0.0	1.5
Cycle Q Clear(g_c), s	2.5	43.4	2.8	3.3	53.1	59.7	3.9	0.0	6.2	4.1	0.0	1.5
Prop In Lane	1.00		1.00	1.00		0.15	0.60		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	46	3088	932	55	2048	1090	170	0	141	304	0	128
V/C Ratio(X)	0.71	0.65	0.06	0.78	0.91	0.93	0.32	0.00	0.51	0.37	0.00	0.14
Avail Cap(c_a), veh/h	69	3088	932	83	2048	1090	417	0	345	895	0	376
HCM Platoon Ratio	0.67	0.67	0.67	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.35	0.35	0.35	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	65.8	28.2	16.2	64.2	10.0	10.6	57.0	0.0	58.1	58.2	0.0	57.0
Incr Delay (d2), s/veh	7.0	0.4	0.0	2.5	0.7	2.0	1.1	0.0	2.9	0.8	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	20.3	1.2	1.6	24.0	29.0	2.0	0.0	2.7	2.0	0.0	0.6
LnGrp Delay(d),s/veh	72.8	28.5	16.3	66.7	10.7	12.6	58.1	0.0	61.0	59.0	0.0	57.5
LnGrp LOS	E	C	B	E	B	B	E		E	E		E
Approach Vol, veh/h		2097			2915			127			132	
Approach Delay, s/veh		28.9			12.2			59.7			58.8	
Approach LOS		C			B			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.2	89.1		18.4	9.8	89.5		17.3
Change Period (Y+Rc), s	6.7	6.7		5.6	5.6	6.7		5.6
Max Green Setting (Gmax), s	5.3	39.3		31.4	6.4	39.3		34.4
Max Q Clear Time (g_c+I1), s	4.5	61.7		8.2	5.3	45.4		6.1
Green Ext Time (p_c), s	0.0	0.0		0.7	0.0	0.0		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	21.2
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	210	1500	310	340	1980	360	430	670	210	330	800	210
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	228	1630	292	370	2152	337	467	728	32	359	870	30
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	237	1847	562	389	2070	631	439	896	390	389	844	367
Arrive On Green	0.02	0.12	0.12	0.11	0.41	0.41	0.13	0.26	0.26	0.11	0.24	0.24
Sat Flow, veh/h	3408	5036	1532	3408	5036	1534	3408	3505	1524	3408	3505	1523
Grp Volume(v), veh/h	228	1630	292	370	2152	337	467	728	32	359	870	30
Grp Sat Flow(s),veh/h/ln	1704	1679	1532	1704	1679	1534	1704	1752	1524	1704	1752	1523
Q Serve(g_s), s	9.0	43.0	24.1	14.6	55.5	22.4	17.4	26.3	2.2	14.1	32.5	2.1
Cycle Q Clear(g_c), s	9.0	43.0	24.1	14.6	55.5	22.4	17.4	26.3	2.2	14.1	32.5	2.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	237	1847	562	389	2070	631	439	896	390	389	844	367
V/C Ratio(X)	0.96	0.88	0.52	0.95	1.04	0.53	1.06	0.81	0.08	0.92	1.03	0.08
Avail Cap(c_a), veh/h	237	1847	562	389	2070	631	439	896	390	389	844	367
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.72	0.72	0.72	1.00	1.00	1.00	0.77	0.77	0.77	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.8	56.5	48.2	59.4	39.8	30.0	58.8	47.2	38.2	59.2	51.3	39.7
Incr Delay (d2), s/veh	38.8	4.8	2.5	33.0	30.9	3.2	55.6	4.2	0.0	26.9	39.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	20.9	10.7	8.7	31.6	10.1	11.6	13.3	0.9	8.1	20.3	0.9
LnGrp Delay(d),s/veh	104.6	61.3	50.7	92.4	70.7	33.2	114.4	51.4	38.2	86.1	90.5	39.7
LnGrp LOS	F	E	D	F	F	C	F	D	D	F	F	D
Approach Vol, veh/h		2150			2859			1227			1259	
Approach Delay, s/veh		64.5			69.1			75.0			88.0	
Approach LOS		E			E			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	61.0	22.0	38.0	20.0	55.0	20.0	40.0
Change Period (Y+Rc), s	4.6	5.5	4.6	5.5	4.6	5.5	4.6	5.5
Max Green Setting (Gmax), s	9.4	55.5	17.4	32.5	15.4	49.5	15.4	34.5
Max Q Clear Time (g_c+I1), s	11.0	57.5	19.4	34.5	16.6	45.0	16.1	28.3
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	4.5	0.0	5.5

Intersection Summary	
HCM 2010 Ctrl Delay	71.9
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Intersection 44 **Laguna Springs Dr/Elk Grove Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	530	481	90.8%	63.7	6.8	E
	Through	240	219	91.2%	64.8	12.5	E
	Right Turn	420	373	88.8%	70.9	43.9	E
	Subtotal	1,190	1,073	90.2%	66.4	12.2	E
SB	Left Turn	170	135	79.4%	102.3	31.0	F
	Through	200	175	87.4%	91.0	19.6	F
	Right Turn	140	123	87.5%	67.6	24.4	E
	Subtotal	510	432	84.8%	88.0	17.3	F
EB	Left Turn	120	84	69.9%	153.9	39.5	F
	Through	1,700	938	55.2%	193.8	31.4	F
	Right Turn	280	153	54.5%	158.6	33.5	F
	Subtotal	2,100	1,174	55.9%	186.5	30.9	F
WB	Left Turn	520	416	80.0%	67.7	5.2	E
	Through	2,150	1,658	77.1%	27.5	3.5	C
	Right Turn	100	70	69.6%	30.5	7.6	C
	Subtotal	2,770	2,144	77.4%	35.5	2.5	D
Total		6,570	4,824	73.4%	83.5	8.2	F

Intersection 45 **Auto Center Dr/Elk Grove Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	230	213	92.8%	69.3	17.9	E
	Through	50	38	75.8%	203.3	36.1	F
	Right Turn	520	357	68.7%	197.3	33.0	F
	Subtotal	800	609	76.1%	152.6	26.3	F
SB	Left Turn	210	124	58.9%	296.1	36.9	F
	Through	30	17	55.2%	290.1	66.9	F
	Right Turn	150	102	67.7%	259.0	42.8	F
	Subtotal	390	242	62.0%	278.7	38.6	F
EB	Left Turn	160	121	75.7%	191.7	33.3	F
	Through	1,930	1,200	62.2%	151.5	12.5	F
	Right Turn	140	74	53.1%	172.7	18.6	F
	Subtotal	2,230	1,396	62.6%	156.3	13.2	F
WB	Left Turn	390	287	73.7%	80.9	11.5	F
	Through	2,390	1,946	81.4%	33.4	3.8	C
	Right Turn	10	6	58.9%	40.3	25.6	D
	Subtotal	2,790	2,239	80.3%	39.5	3.9	D
Total		6,210	4,486	72.2%	103.8	4.8	F

SimTraffic Post-Processor **Elk Grove General Plan Update**
Average Results from 10 Runs **Cumulative Conditions**
Volume and Delay by Movement **PM Peak Hour**

Intersection 46 **SR 99 SB Ramps/Elk Grove Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	670	593	88.5%	54.6	16.3	D
	Through	20	18	92.0%	47.4	11.1	D
	Right Turn	1,080	975	90.3%	91.7	20.3	F
	Subtotal	1,770	1,586	89.6%	77.4	17.0	E
EB	Left Turn						
	Through	2,510	1,562	62.2%	85.4	6.1	F
	Right Turn	270	159	58.7%	78.3	8.9	E
	Subtotal	2,780	1,721	61.9%	84.7	6.2	F
WB	Left Turn	580	327	56.3%	167.5	15.4	F
	Through	1,900	1,245	65.5%	18.6	5.1	B
	Right Turn						
	Subtotal	2,480	1,571	63.4%	49.8	5.1	D
Total		7,030	4,878	69.4%	70.8	4.6	E

Intersection 47 **SR 99 NB Ramps/Elk Grove Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	3,190	2,150	67.4%	7.4	2.8	A
	Right Turn						
	Subtotal	3,190	2,150	67.4%	7.4	2.8	A
WB	Left Turn						
	Through	2,480	1,609	64.9%	55.2	31.9	E
	Right Turn	280	203	72.5%	19.0	12.3	B
	Subtotal	2,760	1,812	65.7%	51.2	29.6	D
Total		5,950	3,962	66.6%	26.8	12.7	C

Intersection 48 **E Stockton Blvd/SR 99 NB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	260	218	83.9%	117.0	45.8	F
	Through	330	303	91.9%	78.6	33.7	E
	Right Turn	30	26	88.3%	86.2	65.7	F
	Subtotal	620	548	88.4%	94.7	34.7	F
SB	Left Turn	210	126	59.9%	75.7	18.3	E
	Through	590	359	60.8%	49.8	17.7	D
	Right Turn	1,470	883	60.1%	28.8	4.6	C
	Subtotal	2,270	1,368	60.3%	38.8	8.0	D
EB	Left Turn	590	382	64.8%	195.8	69.6	F
	Through	30	20	65.0%	249.5	111.0	F
	Right Turn	120	73	60.7%	243.1	98.3	F
	Subtotal	740	475	64.2%	204.7	74.0	F
WB	Left Turn	30	29	95.7%	47.1	10.8	D
	Through	40	41	103.0%	50.2	10.3	D
	Right Turn	70	73	104.6%	26.5	12.4	C
	Subtotal	140	143	102.3%	38.0	6.3	D
Total		3,770	2,534	67.2%	80.3	17.0	F

Intersection 49 **Emerald Vista Dr-E Stockton Blvd/Elk Grove Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	380	276	72.6%	95.9	56.8	F
	Through	270	192	71.1%	103.2	13.8	F
	Right Turn	380	295	77.7%	99.6	16.4	F
	Subtotal	1,030	763	74.1%	97.7	17.7	F
SB	Left Turn	200	75	37.7%	355.8	35.7	F
	Through	700	320	45.7%	341.6	44.3	F
	Right Turn	570	343	60.2%	208.3	41.7	F
	Subtotal	1,470	739	50.3%	281.5	41.9	F
EB	Left Turn	390	217	55.8%	218.9	54.2	F
	Through	1,230	881	71.7%	32.5	5.9	C
	Right Turn	1,460	980	67.1%	31.2	20.4	C
	Subtotal	3,080	2,078	67.5%	51.2	10.7	D
WB	Left Turn	110	76	68.9%	270.3	67.2	F
	Through	1,790	1,263	70.5%	233.0	31.6	F
	Right Turn	130	92	70.5%	193.9	29.8	F
	Subtotal	2,030	1,430	70.4%	232.5	31.3	F
Total		7,610	5,011	65.8%	143.2	13.5	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	600	870	300	140	710	140	250	400	110	130	340	790
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	625	906	139	146	740	139	260	417	99	135	354	557
Adj No. of Lanes	2	2	1	1	2	0	1	1	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	682	1285	564	171	776	146	285	470	111	124	827	515
Arrive On Green	0.20	0.37	0.37	0.10	0.26	0.26	0.16	0.33	0.33	0.07	0.24	0.24
Sat Flow, veh/h	3408	3505	1538	1757	2939	552	1757	1435	341	1757	3505	1538
Grp Volume(v), veh/h	625	906	139	146	441	438	260	0	516	135	354	557
Grp Sat Flow(s),veh/h/ln	1704	1752	1538	1757	1752	1738	1757	0	1776	1757	1752	1538
Q Serve(g_s), s	23.9	29.4	8.4	10.9	33.0	33.0	19.4	0.0	36.7	9.4	11.4	31.4
Cycle Q Clear(g_c), s	23.9	29.4	8.4	10.9	33.0	33.0	19.4	0.0	36.7	9.4	11.4	31.4
Prop In Lane	1.00		1.00	1.00		0.32	1.00		0.19	1.00		1.00
Lane Grp Cap(c), veh/h	682	1285	564	171	463	459	285	0	581	124	827	515
V/C Ratio(X)	0.92	0.70	0.25	0.85	0.95	0.95	0.91	0.00	0.89	1.09	0.43	1.08
Avail Cap(c_a), veh/h	957	1285	564	388	466	462	493	0	765	124	827	515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.2	36.0	29.3	59.2	48.2	48.2	54.9	0.0	42.5	61.9	43.2	44.5
Incr Delay (d2), s/veh	8.6	1.5	0.1	4.6	29.8	30.0	7.3	0.0	8.4	106.5	0.1	63.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	14.5	3.6	5.5	19.8	19.6	10.0	0.0	19.3	8.2	5.6	27.9
LnGrp Delay(d),s/veh	60.8	37.5	29.4	63.8	78.0	78.2	62.1	0.0	50.9	168.4	43.4	107.8
LnGrp LOS	E	D	C	E	E	E	E		D	F	D	F
Approach Vol, veh/h		1670			1025			776			1046	
Approach Delay, s/veh		45.5			76.1			54.7			93.8	
Approach LOS		D			E			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.2	39.8	26.2	36.0	17.5	53.4	14.0	48.2
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	37.4	35.4	37.4	31.4	29.4	43.4	9.4	57.4
Max Q Clear Time (g_c+I1), s	25.9	35.0	21.4	33.4	12.9	31.4	11.4	38.7
Green Ext Time (p_c), s	0.7	0.2	0.2	0.0	0.1	6.9	0.0	3.5

Intersection Summary			
HCM 2010 Ctrl Delay			65.2
HCM 2010 LOS			E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	120	620	280	140	500	150	380	630	180	240	480	90
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1881	1863	1900	1900	1863	1881	1900	1863	1845
Adj Flow Rate, veh/h	126	653	242	147	526	95	400	663	116	253	505	27
Adj No. of Lanes	1	1	1	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	1	2	0	0	2	1	0	2	3
Cap, veh/h	153	662	559	164	1258	509	398	911	408	280	679	296
Arrive On Green	0.08	0.35	0.35	0.09	0.36	0.36	0.22	0.26	0.26	0.15	0.19	0.19
Sat Flow, veh/h	1810	1900	1602	1792	3539	1431	1810	3539	1586	1810	3539	1543
Grp Volume(v), veh/h	126	653	242	147	526	95	400	663	116	253	505	27
Grp Sat Flow(s),veh/h/ln	1810	1900	1602	1792	1770	1431	1810	1770	1586	1810	1770	1543
Q Serve(g_s), s	8.5	42.5	14.4	10.1	14.0	5.7	27.4	21.3	7.3	17.1	16.7	1.8
Cycle Q Clear(g_c), s	8.5	42.5	14.4	10.1	14.0	5.7	27.4	21.3	7.3	17.1	16.7	1.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	153	662	559	164	1258	509	398	911	408	280	679	296
V/C Ratio(X)	0.82	0.99	0.43	0.90	0.42	0.19	1.00	0.73	0.28	0.90	0.74	0.09
Avail Cap(c_a), veh/h	253	662	559	164	1258	509	398	1092	489	340	978	427
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.0	40.2	31.1	56.0	30.4	27.7	48.5	42.2	37.0	51.7	47.4	41.4
Incr Delay (d2), s/veh	10.4	31.2	0.2	40.8	0.1	0.1	46.2	1.5	0.1	21.4	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	28.1	6.4	6.9	6.9	2.3	18.7	10.6	3.2	10.2	8.3	0.8
LnGrp Delay(d),s/veh	66.4	71.4	31.3	96.8	30.4	27.8	94.7	43.7	37.2	73.1	48.3	41.4
LnGrp LOS	E	E	C	F	C	C	F	D	D	E	D	D
Approach Vol, veh/h		1021			768			1179			785	
Approach Delay, s/veh		61.3			42.8			60.4			56.0	
Approach LOS		E			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.1	48.9	32.0	28.5	16.0	48.0	23.9	36.6
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	17.4	37.4	27.4	34.4	11.4	43.4	23.4	38.4
Max Q Clear Time (g_c+I1), s	10.5	16.0	29.4	18.7	12.1	44.5	19.1	23.3
Green Ext Time (p_c), s	0.2	6.5	0.0	5.1	0.0	0.0	0.2	5.0

Intersection Summary	
HCM 2010 Ctrl Delay	56.1
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	130	190	140	30	220	60	130	1120	20	90	1170	150
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1900	1845	1845	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	140	204	151	32	237	65	140	1204	22	97	1258	161
Adj No. of Lanes	1	2	1	0	1	1	1	2	0	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	216	431	193	37	271	258	166	1725	32	119	1623	726
Arrive On Green	0.12	0.12	0.12	0.17	0.17	0.17	0.09	0.49	0.49	0.07	0.46	0.46
Sat Flow, veh/h	1757	3505	1568	218	1616	1543	1757	3521	64	1757	3505	1568
Grp Volume(v), veh/h	140	204	151	269	0	65	140	599	627	97	1258	161
Grp Sat Flow(s),veh/h/ln	1757	1752	1568	1834	0	1543	1757	1752	1833	1757	1752	1568
Q Serve(g_s), s	9.8	7.0	12.0	18.4	0.0	4.7	10.1	34.1	34.1	7.0	38.7	7.9
Cycle Q Clear(g_c), s	9.8	7.0	12.0	18.4	0.0	4.7	10.1	34.1	34.1	7.0	38.7	7.9
Prop In Lane	1.00		1.00	0.12		1.00	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	216	431	193	307	0	258	166	859	898	119	1623	726
V/C Ratio(X)	0.65	0.47	0.78	0.88	0.00	0.25	0.84	0.70	0.70	0.81	0.77	0.22
Avail Cap(c_a), veh/h	374	747	334	429	0	361	273	859	898	137	1623	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.7	52.5	54.7	52.2	0.0	46.5	57.3	25.4	25.4	59.1	28.9	20.7
Incr Delay (d2), s/veh	3.2	0.8	6.8	13.8	0.0	0.5	11.6	4.7	4.5	27.0	3.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	3.4	5.6	10.5	0.0	2.0	5.4	17.6	18.4	4.3	19.5	3.5
LnGrp Delay(d),s/veh	57.0	53.3	61.5	66.0	0.0	47.0	68.9	30.1	29.9	86.1	32.6	21.4
LnGrp LOS	E	D	E	E		D	E	C	C	F	C	C
Approach Vol, veh/h		495			334			1366			1516	
Approach Delay, s/veh		56.9			62.3			34.0			34.8	
Approach LOS		E			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.7	68.0		20.4	17.2	64.6		26.4
Change Period (Y+Rc), s	5.0	5.0		4.6	5.0	5.0		4.9
Max Green Setting (Gmax), s	10.0	63.0		27.4	20.0	53.0		30.1
Max Q Clear Time (g_c+I1), s	9.0	36.1		14.0	12.1	40.7		20.4
Green Ext Time (p_c), s	0.0	19.0		1.8	0.2	10.2		1.1

Intersection Summary			
HCM 2010 Ctrl Delay			39.9
HCM 2010 LOS			D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	150	50	20	20	30	10	50	760	40	10	700	230
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1891	1900	1900	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	163	54	0	22	33	11	54	826	43	11	761	0
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	0	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	2	2	2	0	2	2	2	2	0
Cap, veh/h	200	66	236	29	44	15	136	2158	112	0	1749	798
Arrive On Green	0.15	0.15	0.00	0.05	0.05	0.05	0.08	0.63	0.63	0.00	0.49	0.00
Sat Flow, veh/h	1369	453	1615	594	890	297	1810	3423	178	0	3539	1615
Grp Volume(v), veh/h	217	0	0	66	0	0	54	427	442	0	761	0
Grp Sat Flow(s),veh/h/ln	1822	0	1615	1781	0	0	1810	1770	1831	0	1770	1615
Q Serve(g_s), s	11.0	0.0	0.0	3.5	0.0	0.0	2.7	11.2	11.2	0.0	13.2	0.0
Cycle Q Clear(g_c), s	11.0	0.0	0.0	3.5	0.0	0.0	2.7	11.2	11.2	0.0	13.2	0.0
Prop In Lane	0.75		1.00	0.33		0.17	1.00		0.10	0.00		1.00
Lane Grp Cap(c), veh/h	267	0	236	88	0	0	136	1116	1154	0	1749	798
V/C Ratio(X)	0.81	0.00	0.00	0.75	0.00	0.00	0.40	0.38	0.38	0.00	0.44	0.00
Avail Cap(c_a), veh/h	584	0	518	421	0	0	136	1116	1154	0	1749	798
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	39.5	0.0	0.0	44.8	0.0	0.0	42.1	8.6	8.6	0.0	15.6	0.0
Incr Delay (d2), s/veh	5.9	0.0	0.0	12.1	0.0	0.0	8.4	1.0	1.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.0	0.0	2.0	0.0	0.0	1.7	5.8	6.0	0.0	6.6	0.0
LnGrp Delay(d),s/veh	45.4	0.0	0.0	56.9	0.0	0.0	50.5	9.6	9.6	0.0	16.3	0.0
LnGrp LOS	D			E			D	A	A		B	
Approach Vol, veh/h		217			66			923			761	
Approach Delay, s/veh		45.4			56.9			12.0			16.3	
Approach LOS		D			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	0.0	66.0		19.4	13.0	53.0		10.1
Change Period (Y+Rc), s	* 5.8	* 5.8		5.4	* 5.8	* 5.8		5.4
Max Green Setting (Gmax), s	* 6.2	* 48		30.6	* 7.2	* 47		22.6
Max Q Clear Time (g_c+I1), s	0.0	13.2		13.0	4.7	15.2		5.5
Green Ext Time (p_c), s	0.0	11.9		1.0	0.0	11.5		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	18.9
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	60	110	120	80	50	100	1170	110	70	1520	80
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	98	65	112	130	87	28	109	1272	78	76	1652	86
Adj No. of Lanes	1	1	1	2	1	1	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	125	268	219	202	246	200	138	2040	884	99	1895	98
Arrive On Green	0.07	0.15	0.15	0.06	0.13	0.13	0.08	0.58	0.58	0.06	0.56	0.56
Sat Flow, veh/h	1757	1845	1506	3408	1845	1502	1757	3505	1518	1757	3384	175
Grp Volume(v), veh/h	98	65	112	130	87	28	109	1272	78	76	850	888
Grp Sat Flow(s),veh/h/ln	1757	1845	1506	1704	1845	1502	1757	1752	1518	1757	1752	1807
Q Serve(g_s), s	6.7	3.8	8.4	4.6	5.3	2.0	7.5	29.3	2.8	5.2	51.0	52.2
Cycle Q Clear(g_c), s	6.7	3.8	8.4	4.6	5.3	2.0	7.5	29.3	2.8	5.2	51.0	52.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	125	268	219	202	246	200	138	2040	884	99	981	1012
V/C Ratio(X)	0.78	0.24	0.51	0.64	0.35	0.14	0.79	0.62	0.09	0.77	0.87	0.88
Avail Cap(c_a), veh/h	357	601	490	693	601	489	357	2040	884	357	998	1029
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.1	46.5	48.5	56.5	48.5	47.0	55.6	16.8	11.3	57.2	23.1	23.4
Incr Delay (d2), s/veh	4.0	0.2	0.7	1.3	0.3	0.1	3.8	0.4	0.0	4.6	7.7	8.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	2.0	3.6	2.2	2.7	0.9	3.8	14.3	1.2	2.7	26.7	28.2
LnGrp Delay(d),s/veh	60.1	46.7	49.2	57.8	48.8	47.2	59.4	17.3	11.3	61.8	30.8	31.7
LnGrp LOS	E	D	D	E	D	D	E	B	B	E	C	C
Approach Vol, veh/h		275			245			1459			1814	
Approach Delay, s/veh		52.5			53.4			20.1			32.5	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.2	74.3	13.4	21.0	11.5	77.0	11.9	22.5
Change Period (Y+Rc), s	4.6	5.5	4.6	4.6	4.6	5.5	4.6	4.6
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	9.5	54.2	8.7	7.3	7.2	31.3	6.6	10.4
Green Ext Time (p_c), s	0.4	14.6	0.3	1.1	0.2	37.8	0.8	1.1

Intersection Summary		
HCM 2010 Ctrl Delay		30.5
HCM 2010 LOS		C

Intersection	
Intersection Delay, s/veh	11.3
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	30	180	30	0	120	200	40	0	50	30	80
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	32	191	32	0	128	213	43	0	53	32	85
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	11.6	11.7	10.7
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	31%	100%	0%	100%	0%	42%
Vol Thru, %	19%	0%	86%	0%	83%	33%
Vol Right, %	50%	0%	14%	0%	17%	25%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	160	30	210	120	240	120
LT Vol	50	30	0	120	0	50
Through Vol	30	0	180	0	200	40
RT Vol	80	0	30	0	40	30
Lane Flow Rate	170	32	223	128	255	128
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.266	0.057	0.364	0.223	0.402	0.209
Departure Headway (Hd)	5.628	6.468	5.86	6.298	5.673	5.883
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	637	553	614	571	633	609
Service Time	3.675	4.21	3.601	4.035	3.41	3.932
HCM Lane V/C Ratio	0.267	0.058	0.363	0.224	0.403	0.21
HCM Control Delay	10.7	9.6	11.9	10.8	12.2	10.5
HCM Lane LOS	B	A	B	B	B	B
HCM 95th-tile Q	1.1	0.2	1.7	0.8	1.9	0.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	50	40	30
Peak Hour Factor	0.94	0.94	0.94	0.94
Heavy Vehicles, %	3	3	3	3
Mvmt Flow	0	53	43	32
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	10.5
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	150	70	110	20	80	20	100	1130	20	20	1220	210
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.95	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	163	76	113	22	87	15	109	1228	22	22	1326	221
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	190	700	303	37	395	168	137	2039	37	37	1565	258
Arrive On Green	0.11	0.20	0.20	0.02	0.11	0.11	0.08	0.58	0.58	0.02	0.52	0.52
Sat Flow, veh/h	1757	3505	1518	1757	3505	1493	1757	3521	63	1757	2997	494
Grp Volume(v), veh/h	163	76	113	22	87	15	109	611	639	22	769	778
Grp Sat Flow(s),veh/h/ln	1757	1752	1518	1757	1752	1493	1757	1752	1832	1757	1752	1738
Q Serve(g_s), s	11.6	2.3	8.2	1.6	2.9	1.1	7.8	28.7	28.8	1.6	47.7	49.4
Cycle Q Clear(g_c), s	11.6	2.3	8.2	1.6	2.9	1.1	7.8	28.7	28.8	1.6	47.7	49.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.03	1.00		0.28
Lane Grp Cap(c), veh/h	190	700	303	37	395	168	137	1015	1061	37	915	908
V/C Ratio(X)	0.86	0.11	0.37	0.59	0.22	0.09	0.79	0.60	0.60	0.59	0.84	0.86
Avail Cap(c_a), veh/h	344	1099	476	344	1099	468	344	1015	1061	344	961	953
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.9	41.8	44.1	61.9	51.5	50.7	57.8	17.4	17.4	61.9	25.9	26.4
Incr Delay (d2), s/veh	4.2	0.0	0.3	5.4	0.1	0.1	3.9	0.7	0.7	5.4	6.0	7.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	1.1	3.5	0.8	1.4	0.5	3.9	14.1	14.8	0.8	24.4	25.4
LnGrp Delay(d),s/veh	60.1	41.8	44.4	67.3	51.6	50.8	61.7	18.1	18.1	67.3	32.0	33.5
LnGrp LOS	E	D	D	E	D	D	E	B	B	E	C	C
Approach Vol, veh/h		352			124			1359			1569	
Approach Delay, s/veh		51.1			54.3			21.6			33.2	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.3	71.9	19.4	20.0	9.0	79.2	8.3	31.1
Change Period (Y+Rc), s	6.3	5.3	5.6	5.6	6.3	5.3	5.6	* 5.6
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	* 40
Max Q Clear Time (g_c+I1), s	9.8	51.4	13.6	4.9	3.6	30.8	3.6	10.2
Green Ext Time (p_c), s	0.4	15.2	0.2	1.0	0.0	37.7	0.0	0.9

Intersection Summary			
HCM 2010 Ctrl Delay			31.2
HCM 2010 LOS			C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	10	50	10	10	10	110	1250	10	10	1370	70
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1846	1900	1900	1863	1900	1845	1845	1900	1900	1845	1900
Adj Flow Rate, veh/h	65	11	50	11	11	11	120	1359	11	11	1489	71
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	0	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	3	3	3	3
Cap, veh/h	87	15	67	17	17	17	150	2624	21	40	1979	94
Arrive On Green	0.10	0.10	0.10	0.03	0.03	0.03	0.09	0.74	0.74	0.60	0.60	0.60
Sat Flow, veh/h	850	144	654	577	577	577	1757	3563	29	8	3294	156
Grp Volume(v), veh/h	126	0	0	33	0	0	120	668	702	823	0	748
Grp Sat Flow(s),veh/h/ln	1647	0	0	1732	0	0	1757	1753	1840	1814	0	1645
Q Serve(g_s), s	7.8	0.0	0.0	2.0	0.0	0.0	7.0	17.1	17.1	0.0	0.0	34.9
Cycle Q Clear(g_c), s	7.8	0.0	0.0	2.0	0.0	0.0	7.0	17.1	17.1	33.8	0.0	34.9
Prop In Lane	0.52		0.40	0.33		0.33	1.00		0.02	0.01		0.09
Lane Grp Cap(c), veh/h	168	0	0	51	0	0	150	1290	1354	1124	0	988
V/C Ratio(X)	0.75	0.00	0.00	0.65	0.00	0.00	0.80	0.52	0.52	0.73	0.00	0.76
Avail Cap(c_a), veh/h	251	0	0	412	0	0	418	1290	1354	1240	0	1097
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.8	0.0	0.0	50.4	0.0	0.0	47.2	5.9	5.9	15.1	0.0	15.3
Incr Delay (d2), s/veh	6.7	0.0	0.0	5.0	0.0	0.0	3.8	0.2	0.2	1.7	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	0.0	1.0	0.0	0.0	3.6	8.2	8.6	17.7	0.0	16.4
LnGrp Delay(d),s/veh	52.5	0.0	0.0	55.5	0.0	0.0	50.9	6.1	6.1	16.8	0.0	17.6
LnGrp LOS	D			E			D	A	A	B		B
Approach Vol, veh/h		126			33			1490			1571	
Approach Delay, s/veh		52.5			55.5			9.7			17.2	
Approach LOS		D			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	14.2	68.4		14.7		82.6		7.7
Change Period (Y+Rc), s	5.3	5.3		4.0		5.3		4.6
Max Green Setting (Gmax), s	25.0	70.0		16.0		70.0		25.0
Max Q Clear Time (g_c+I1), s	9.0	36.9		9.8		19.1		4.0
Green Ext Time (p_c), s	0.2	26.1		0.3		49.1		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	15.5
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	150	20	410	220	290	40	1000	350	200	1100	130
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	98	163	20	446	239	269	43	1087	335	217	1196	131
Adj No. of Lanes	1	1	0	2	1	2	1	2	1	2	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	120	279	34	495	463	893	56	1521	666	288	1544	169
Arrive On Green	0.07	0.17	0.17	0.15	0.25	0.25	0.03	0.43	0.43	0.08	0.49	0.49
Sat Flow, veh/h	1757	1605	197	3408	1845	2631	1757	3505	1535	3408	3175	347
Grp Volume(v), veh/h	98	0	183	446	239	269	43	1087	335	217	659	668
Grp Sat Flow(s),veh/h/ln	1757	0	1801	1704	1845	1315	1757	1752	1535	1704	1752	1769
Q Serve(g_s), s	8.3	0.0	14.0	19.3	16.7	11.4	3.6	38.2	23.7	9.4	46.4	46.9
Cycle Q Clear(g_c), s	8.3	0.0	14.0	19.3	16.7	11.4	3.6	38.2	23.7	9.4	46.4	46.9
Prop In Lane	1.00		0.11	1.00		1.00	1.00		1.00	1.00		0.20
Lane Grp Cap(c), veh/h	120	0	313	495	463	893	56	1521	666	288	852	861
V/C Ratio(X)	0.82	0.00	0.58	0.90	0.52	0.30	0.76	0.71	0.50	0.75	0.77	0.78
Avail Cap(c_a), veh/h	292	0	480	567	491	934	292	1633	715	908	852	861
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.1	0.0	57.1	63.1	48.4	37.0	72.1	34.9	30.8	67.2	31.7	31.8
Incr Delay (d2), s/veh	5.1	0.0	0.6	14.9	0.3	0.1	7.8	1.1	0.2	1.5	4.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	7.1	10.1	8.6	4.1	1.9	18.7	10.1	4.5	23.5	23.8
LnGrp Delay(d),s/veh	74.2	0.0	57.7	78.1	48.8	37.0	79.9	36.0	31.0	68.7	35.8	36.0
LnGrp LOS	E		E	E	D	D	E	D	C	E	D	D
Approach Vol, veh/h		281			954			1465			1544	
Approach Delay, s/veh		63.5			59.1			36.2			40.5	
Approach LOS		E			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	78.4	15.8	44.9	19.0	70.5	27.4	33.3
Change Period (Y+Rc), s	6.3	5.3	5.6	* 7.2	6.3	5.3	5.6	7.2
Max Green Setting (Gmax), s	25.0	70.0	25.0	* 40	40.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	5.6	48.9	10.3	18.7	11.4	40.2	21.3	16.0
Green Ext Time (p_c), s	0.1	20.2	0.1	2.6	1.3	25.0	0.5	2.7

Intersection Summary	
HCM 2010 Ctrl Delay	44.7
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	220	260	40	70	510	140	80	1080	60	90	1120	300
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	239	283	40	76	554	116	87	1174	50	98	1217	66
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	348	1122	490	145	913	397	151	1329	581	169	1348	590
Arrive On Green	0.10	0.32	0.32	0.04	0.26	0.26	0.04	0.38	0.38	0.05	0.38	0.38
Sat Flow, veh/h	3408	3505	1529	3408	3505	1525	3408	3505	1532	3408	3505	1533
Grp Volume(v), veh/h	239	283	40	76	554	116	87	1174	50	98	1217	66
Grp Sat Flow(s),veh/h/ln	1704	1752	1529	1704	1752	1525	1704	1752	1532	1704	1752	1533
Q Serve(g_s), s	7.1	6.2	1.9	2.3	14.5	6.4	2.6	32.7	2.2	2.9	34.2	2.9
Cycle Q Clear(g_c), s	7.1	6.2	1.9	2.3	14.5	6.4	2.6	32.7	2.2	2.9	34.2	2.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	348	1122	490	145	913	397	151	1329	581	169	1348	590
V/C Ratio(X)	0.69	0.25	0.08	0.52	0.61	0.29	0.58	0.88	0.09	0.58	0.90	0.11
Avail Cap(c_a), veh/h	1141	2011	877	815	2011	875	815	1340	586	1141	1348	590
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.3	26.3	24.8	49.0	34.0	30.9	49.0	30.3	20.8	48.6	30.3	20.7
Incr Delay (d2), s/veh	0.9	0.0	0.0	1.1	0.2	0.1	1.3	7.0	0.0	1.2	8.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	3.0	0.8	1.1	7.0	2.7	1.3	17.1	0.9	1.4	18.2	1.2
LnGrp Delay(d),s/veh	46.2	26.3	24.8	50.1	34.2	31.1	50.3	37.3	20.9	49.8	38.9	20.7
LnGrp LOS	D	C	C	D	C	C	D	D	C	D	D	C
Approach Vol, veh/h		562			746			1311			1381	
Approach Delay, s/veh		34.7			35.3			37.5			38.8	
Approach LOS		C			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	45.5	16.3	31.9	11.5	45.0	10.1	38.1
Change Period (Y+Rc), s	6.3	5.3	5.6	4.6	6.3	5.3	5.6	4.6
Max Green Setting (Gmax), s	25.0	40.0	35.0	60.0	35.0	40.0	25.0	60.0
Max Q Clear Time (g_c+I1), s	4.6	36.2	9.1	16.5	4.9	34.7	4.3	8.2
Green Ext Time (p_c), s	0.4	3.7	1.6	8.4	0.6	5.0	0.4	8.6

Intersection Summary	
HCM 2010 Ctrl Delay	37.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	400	230	20	20	370	400	40	100	20	240	70	470
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	440	253	20	22	407	437	44	110	22	264	77	497
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	516	1530	684	76	1077	481	115	968	427	333	1192	533
Arrive On Green	0.15	0.44	0.44	0.02	0.31	0.31	0.03	0.28	0.28	0.10	0.34	0.34
Sat Flow, veh/h	3408	3505	1567	3408	3505	1565	3408	3505	1548	3408	3505	1568
Grp Volume(v), veh/h	440	253	20	22	407	437	44	110	22	264	77	497
Grp Sat Flow(s),veh/h/ln	1704	1752	1567	1704	1752	1565	1704	1752	1548	1704	1752	1568
Q Serve(g_s), s	13.8	4.8	0.8	0.7	10.0	29.5	1.4	2.6	1.1	8.3	1.6	33.7
Cycle Q Clear(g_c), s	13.8	4.8	0.8	0.7	10.0	29.5	1.4	2.6	1.1	8.3	1.6	33.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	516	1530	684	76	1077	481	115	968	427	333	1192	533
V/C Ratio(X)	0.85	0.17	0.03	0.29	0.38	0.91	0.38	0.11	0.05	0.79	0.06	0.93
Avail Cap(c_a), veh/h	1240	1530	684	1240	1275	569	2170	2232	986	775	2232	999
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.4	18.8	17.7	52.9	29.8	36.6	52.0	29.7	29.2	48.5	24.5	35.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	0.8	0.1	15.4	0.8	0.0	0.0	1.6	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	2.3	0.3	0.3	4.9	14.8	0.7	1.3	0.5	4.0	0.8	15.1
LnGrp Delay(d),s/veh	47.0	18.8	17.7	53.7	29.9	52.0	52.8	29.8	29.2	50.1	24.5	38.4
LnGrp LOS	D	B	B	D	C	D	D	C	C	D	C	D
Approach Vol, veh/h		713			866			176			838	
Approach Delay, s/veh		36.2			41.7			35.4			40.8	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	42.0	21.2	38.4	15.3	34.9	7.0	52.6
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	70.0	70.0	40.0	40.0	25.0	70.0	40.0	40.0
Max Q Clear Time (g_c+I1), s	3.4	35.7	15.8	31.5	10.3	4.6	2.7	6.8
Green Ext Time (p_c), s	0.1	1.7	0.8	2.0	0.4	1.7	0.0	3.9

Intersection Summary	
HCM 2010 Ctrl Delay	39.5
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	80	0	320	20	1040	100	650	780	0
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1845	0	1845	1845	1845	1845	1845	1845	1845	1845	0
Adj Flow Rate, veh/h	0	0	0	88	0	118	22	1143	37	714	857	0
Adj No. of Lanes	0	1	0	1	0	3	1	2	1	2	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	3	0	3	3	3	3	3	3	3	3	0
Cap, veh/h	0	2	0	112	0	1381	39	2018	902	792	1450	0
Arrive On Green	0.00	0.00	0.00	0.06	0.00	0.06	0.02	0.58	0.58	0.23	0.79	0.00
Sat Flow, veh/h	0	-84854	0	1757	0	4501	1757	3505	1567	3408	1845	0
Grp Volume(v), veh/h	0	0	0	88	0	118	22	1143	37	714	857	0
Grp Sat Flow(s),veh/h/ln	0	1845	0	1757	0	1500	1757	1752	1567	1704	1845	0
Q Serve(g_s), s	0.0	0.0	0.0	5.7	0.0	2.2	1.4	23.6	1.2	23.4	21.3	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	5.7	0.0	2.2	1.4	23.6	1.2	23.4	21.3	0.0
Prop In Lane	0.00		0.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	0	2	0	112	0	1381	39	2018	902	792	1450	0
V/C Ratio(X)	0.00	0.00	0.00	0.79	0.00	0.09	0.57	0.57	0.04	0.90	0.59	0.00
Avail Cap(c_a), veh/h	0	546	0	390	0	3566	618	2120	948	1780	1450	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	53.0	0.0	29.2	55.6	15.3	10.6	42.8	4.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	4.5	0.0	0.0	4.8	0.2	0.0	1.6	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	2.9	0.0	0.9	0.7	11.3	0.5	11.2	10.9	0.0
LnGrp Delay(d),s/veh	0.0	0.0	0.0	57.5	0.0	29.2	60.5	15.5	10.6	44.4	5.3	0.0
LnGrp LOS				E		C	E	B	B	D	A	
Approach Vol, veh/h		0			206			1202			1571	
Approach Delay, s/veh		0.0			41.3			16.2			23.1	
Approach LOS					D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s		11.9	31.3	71.6	11.9	0.0	7.1	95.8
Change Period (Y+Rc), s		4.6	4.6	5.5	4.6	* 4.6	4.6	* 5.5
Max Green Setting (Gmax), s		63.1	60.0	69.5	25.5	* 34	40.4	* 90
Max Q Clear Time (g_c+I1), s		4.2	25.4	25.6	7.7	0.0	3.4	23.3
Green Ext Time (p_c), s		1.0	1.3	40.5	0.1	0.0	0.0	60.3

Intersection Summary		
HCM 2010 Ctrl Delay		21.6
HCM 2010 LOS		C

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	360	360	120	240	510	120	200	800	80	130	920	580
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	391	391	97	261	554	88	217	870	45	141	1000	476
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	442	890	387	331	776	337	279	1567	686	197	1483	852
Arrive On Green	0.13	0.25	0.25	0.10	0.22	0.22	0.08	0.45	0.45	0.06	0.42	0.42
Sat Flow, veh/h	3408	3505	1524	3408	3505	1521	3408	3505	1535	3408	3505	1534
Grp Volume(v), veh/h	391	391	97	261	554	88	217	870	45	141	1000	476
Grp Sat Flow(s),veh/h/ln	1704	1752	1524	1704	1752	1521	1704	1752	1535	1704	1752	1534
Q Serve(g_s), s	17.3	14.4	7.8	11.5	22.4	7.3	9.6	28.0	2.6	6.2	35.4	30.9
Cycle Q Clear(g_c), s	17.3	14.4	7.8	11.5	22.4	7.3	9.6	28.0	2.6	6.2	35.4	30.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	442	890	387	331	776	337	279	1567	686	197	1483	852
V/C Ratio(X)	0.89	0.44	0.25	0.79	0.71	0.26	0.78	0.56	0.07	0.72	0.67	0.56
Avail Cap(c_a), veh/h	555	913	397	555	913	396	555	1598	700	555	1598	903
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.7	48.1	45.6	67.8	55.3	49.4	69.1	31.2	24.2	71.1	35.8	22.3
Incr Delay (d2), s/veh	11.7	0.1	0.1	1.6	1.6	0.2	1.8	0.2	0.0	1.8	0.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	7.0	3.3	5.5	11.0	3.1	4.6	13.6	1.1	3.0	17.2	13.1
LnGrp Delay(d),s/veh	77.4	48.2	45.8	69.4	56.8	49.5	70.9	31.4	24.2	72.9	36.5	22.6
LnGrp LOS	E	D	D	E	E	D	E	C	C	E	D	C
Approach Vol, veh/h		879			903			1132			1617	
Approach Delay, s/veh		60.9			59.8			38.7			35.6	
Approach LOS		E			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.9	70.3	25.5	38.9	15.2	74.0	20.5	43.9
Change Period (Y+Rc), s	6.3	5.3	5.6	4.9	6.3	5.3	5.6	4.9
Max Green Setting (Gmax), s	25.0	70.0	25.0	40.0	25.0	70.0	25.0	40.0
Max Q Clear Time (g_c+I1), s	11.6	37.4	19.3	24.4	8.2	30.0	13.5	16.4
Green Ext Time (p_c), s	1.0	27.6	0.6	6.8	0.6	32.7	1.4	8.4

Intersection Summary	
HCM 2010 Ctrl Delay	46.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	110	30	0	130	90	0	0	0	1320	0	50
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1788	1900	0	1827	1900				1900	0	1845
Adj Flow Rate, veh/h	0	125	0	0	148	0				1500	0	57
Adj No. of Lanes	0	1	0	0	1	1				1	0	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	0	8	8	0	4	0				0	0	3
Cap, veh/h	0	172	0	0	175	155				1501	0	1300
Arrive On Green	0.00	0.10	0.00	0.00	0.10	0.00				0.83	0.00	0.83
Sat Flow, veh/h	0	1788	0	0	1827	1615				1810	0	1568
Grp Volume(v), veh/h	0	125	0	0	148	0				1500	0	57
Grp Sat Flow(s),veh/h/ln	0	1788	0	0	1827	1615				1810	0	1568
Q Serve(g_s), s	0.0	10.2	0.0	0.0	12.0	0.0				124.1	0.0	1.0
Cycle Q Clear(g_c), s	0.0	10.2	0.0	0.0	12.0	0.0				124.1	0.0	1.0
Prop In Lane	0.00		0.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	172	0	0	175	155				1501	0	1300
V/C Ratio(X)	0.00	0.73	0.00	0.00	0.84	0.00				1.00	0.00	0.04
Avail Cap(c_a), veh/h	0	172	0	0	175	155				1501	0	1300
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	65.9	0.0	0.0	66.7	0.0				12.8	0.0	2.3
Incr Delay (d2), s/veh	0.0	23.6	0.0	0.0	29.5	0.0				23.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.2	0.0	0.0	7.5	0.0				69.6	0.0	0.4
LnGrp Delay(d),s/veh	0.0	89.5	0.0	0.0	96.2	0.0				35.9	0.0	2.3
LnGrp LOS		F			F					D		A
Approach Vol, veh/h		125			148						1557	
Approach Delay, s/veh		89.5			96.2						34.7	
Approach LOS		F			F						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		20.0		130.0		20.0		
Change Period (Y+Rc), s		* 5.6		* 5.6		* 5.6		
Max Green Setting (Gmax), s		* 14		* 1.2E2		* 14		
Max Q Clear Time (g_c+I1), s		12.2		126.1		14.0		
Green Ext Time (p_c), s		0.3		0.0		0.1		

Intersection Summary	
HCM 2010 Ctrl Delay	43.4
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1370	60	0	210	110	10	0	440	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1900	1863	0	1900	1881	1583	0	1881			
Adj Flow Rate, veh/h	0	1575	0	0	241	0	11	0	506			
Adj No. of Lanes	0	2	1	0	2	1	1	0	1			
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87			
Percent Heavy Veh, %	0	0	2	0	0	1	20	0	1			
Cap, veh/h	0	1714	752	0	1714	759	528	0	560			
Arrive On Green	0.00	0.47	0.00	0.00	0.47	0.00	0.35	0.00	0.35			
Sat Flow, veh/h	0	3705	1583	0	3705	1599	1508	0	1599			
Grp Volume(v), veh/h	0	1575	0	0	241	0	11	0	506			
Grp Sat Flow(s),veh/h/ln	0	1805	1583	0	1805	1599	1508	0	1599			
Q Serve(g_s), s	0.0	26.0	0.0	0.0	2.4	0.0	0.3	0.0	19.3			
Cycle Q Clear(g_c), s	0.0	26.0	0.0	0.0	2.4	0.0	0.3	0.0	19.3			
Prop In Lane	0.00		1.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1714	752	0	1714	759	528	0	560			
V/C Ratio(X)	0.00	0.92	0.00	0.00	0.14	0.00	0.02	0.00	0.90			
Avail Cap(c_a), veh/h	0	1714	752	0	1714	759	669	0	709			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	15.7	0.0	0.0	9.5	0.0	13.6	0.0	19.8			
Incr Delay (d2), s/veh	0.0	9.4	0.0	0.0	0.2	0.0	0.0	0.0	12.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	15.2	0.0	0.0	1.2	0.0	0.1	0.0	10.4			
LnGrp Delay(d),s/veh	0.0	25.1	0.0	0.0	9.6	0.0	13.6	0.0	32.6			
LnGrp LOS		C			A		B		C			
Approach Vol, veh/h		1575			241			517				
Approach Delay, s/veh		25.1			9.6			32.2				
Approach LOS		C			A			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		36.0				36.0		28.0
Change Period (Y+Rc), s		* 5.6				* 5.6		5.6
Max Green Setting (Gmax), s		* 30				* 30		28.4
Max Q Clear Time (g_c+I1), s		28.0				4.4		21.3
Green Ext Time (p_c), s		2.0				14.0		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	25.1
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	330	230	100	950	950	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6	4.6	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1546	1752	3505	1845	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1546	1752	3505	1845	1531
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	371	258	112	1067	1067	135
RTOR Reduction (vph)	0	142	0	0	0	32
Lane Group Flow (vph)	371	116	112	1067	1067	103
Confl. Peds. (#/hr)						1
Confl. Bikes (#/hr)		2				
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	6		7 5	5 7 8	8	
Permitted Phases		6				8
Actuated Green, G (s)	34.1	34.1	18.8	99.8	75.4	75.4
Effective Green, g (s)	34.1	34.1	14.2	94.2	75.4	75.4
Actuated g/C Ratio	0.23	0.23	0.10	0.65	0.52	0.52
Clearance Time (s)	5.6	5.6			5.7	5.7
Vehicle Extension (s)	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	411	363	171	2273	958	795
v/s Ratio Prot	c0.21		c0.06	0.30	c0.58	
v/s Ratio Perm		0.07				0.07
v/c Ratio	0.90	0.32	0.65	0.47	1.11	0.13
Uniform Delay, d1	53.9	45.9	63.1	12.9	34.9	18.0
Progression Factor	1.00	1.00	1.33	0.40	1.00	1.00
Incremental Delay, d2	22.1	0.2	6.0	0.0	65.6	0.0
Delay (s)	76.1	46.1	89.7	5.2	100.5	18.0
Level of Service	E	D	F	A	F	B
Approach Delay (s)	63.8			13.2	91.2	
Approach LOS	E			B	F	

Intersection Summary			
HCM 2000 Control Delay	54.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	145.2	Sum of lost time (s)	22.9
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations							
Volume (vph)	40	280	760	40	10	390	780
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	5.7			5.6	4.6
Lane Util. Factor	1.00	1.00	0.95			1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00	1.00
Frt	1.00	0.85	0.99			1.00	1.00
Flt Protected	0.95	1.00	1.00			0.95	1.00
Satd. Flow (prot)	1752	1547	3479			1752	3505
Flt Permitted	0.95	1.00	1.00			0.95	1.00
Satd. Flow (perm)	1752	1547	3479			1752	3505
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	43	301	817	43	11	419	839
RTOR Reduction (vph)	0	274	2	0	0	0	0
Lane Group Flow (vph)	43	27	858	0	0	430	839
Confl. Peds. (#/hr)		1					
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	Perm	NA		Prot	Prot	NA
Protected Phases	2		4		3 1	3 1	1 3 4
Permitted Phases		2					
Actuated Green, G (s)	13.1	13.1	68.4			45.4	119.4
Effective Green, g (s)	13.1	13.1	68.4			40.8	113.8
Actuated g/C Ratio	0.09	0.09	0.47			0.28	0.78
Clearance Time (s)	7.0	7.0	5.7				
Vehicle Extension (s)	2.0	2.0	2.0				
Lane Grp Cap (vph)	158	139	1638			492	2747
v/s Ratio Prot	c0.02		c0.25			c0.25	0.24
v/s Ratio Perm		0.02					
v/c Ratio	0.27	0.20	0.52			0.87	0.31
Uniform Delay, d1	61.6	61.2	27.0			49.7	4.5
Progression Factor	1.00	1.00	1.00			1.45	0.63
Incremental Delay, d2	0.3	0.3	0.1			4.4	0.0
Delay (s)	61.9	61.4	27.1			76.3	2.8
Level of Service	E	E	C			E	A
Approach Delay (s)	61.5		27.1				27.7
Approach LOS	E		C				C

Intersection Summary			
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	145.2	Sum of lost time (s)	22.9
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	310	80	120	40	170	80	210	830	60	40	770	340
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	337	87	81	43	185	84	228	902	65	43	837	310
Adj No. of Lanes	1	1	1	2	1	1	1	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	379	579	492	115	243	207	207	1441	644	115	1146	513
Arrive On Green	0.22	0.31	0.31	0.03	0.13	0.13	0.12	0.41	0.41	0.03	0.33	0.33
Sat Flow, veh/h	1757	1845	1568	3408	1845	1568	1757	3505	1568	3408	3505	1568
Grp Volume(v), veh/h	337	87	81	43	185	84	228	902	65	43	837	310
Grp Sat Flow(s),veh/h/ln	1757	1845	1568	1704	1845	1568	1757	1752	1568	1704	1752	1568
Q Serve(g_s), s	19.7	3.6	4.0	1.3	10.3	5.2	12.5	21.6	2.7	1.3	22.4	17.6
Cycle Q Clear(g_c), s	19.7	3.6	4.0	1.3	10.3	5.2	12.5	21.6	2.7	1.3	22.4	17.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	379	579	492	115	243	207	207	1441	644	115	1146	513
V/C Ratio(X)	0.89	0.15	0.16	0.37	0.76	0.41	1.10	0.63	0.10	0.37	0.73	0.60
Avail Cap(c_a), veh/h	671	844	717	338	322	274	207	1441	644	241	1207	540
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.3	26.2	26.3	50.1	44.4	42.2	46.7	24.8	19.2	50.1	31.5	29.9
Incr Delay (d2), s/veh	7.3	0.0	0.1	2.0	4.9	0.5	92.0	1.1	0.1	2.0	2.6	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	1.8	1.7	0.6	5.6	2.3	11.3	10.6	1.2	0.6	11.2	8.0
LnGrp Delay(d),s/veh	47.6	26.2	26.4	52.1	49.3	42.7	138.7	25.9	19.3	52.1	34.1	32.4
LnGrp LOS	D	C	C	D	D	D	F	C	B	D	C	C
Approach Vol, veh/h		505			312			1195			1190	
Approach Delay, s/veh		40.5			47.9			47.0			34.3	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	40.2	28.4	19.5	9.1	49.1	9.1	38.7
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	12.5	36.5	40.5	18.5	7.5	41.5	10.5	48.5
Max Q Clear Time (g_c+I1), s	14.5	24.4	21.7	12.3	3.3	23.6	3.3	6.0
Green Ext Time (p_c), s	0.0	10.3	1.1	1.7	0.0	17.7	0.0	4.1

Intersection Summary			
HCM 2010 Ctrl Delay			41.4
HCM 2010 LOS			D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	100	1490	240	510	1680	490	220	640	400	310	660	140
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1900	1863	1900	1863	1900	1900	1881	1776	1863
Adj Flow Rate, veh/h	109	1620	261	548	1826	527	239	688	430	333	710	152
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.93	0.92	0.93	0.92	0.93	0.93	0.93	0.93	0.92
Percent Heavy Veh, %	2	2	2	0	2	0	2	0	0	1	7	2
Cap, veh/h	153	1504	468	480	1964	624	294	1013	453	388	1034	485
Arrive On Green	0.05	0.30	0.30	0.14	0.39	0.39	0.09	0.28	0.28	0.11	0.31	0.31
Sat Flow, veh/h	3304	5085	1583	3510	5085	1615	3442	3610	1615	3476	3374	1583
Grp Volume(v), veh/h	109	1620	261	548	1826	527	239	688	430	333	710	152
Grp Sat Flow(s),veh/h/ln	1652	1695	1583	1755	1695	1615	1721	1805	1615	1738	1687	1583
Q Serve(g_s), s	4.7	42.8	20.1	19.8	49.8	43.0	9.9	24.5	37.8	13.6	26.8	10.7
Cycle Q Clear(g_c), s	4.7	42.8	20.1	19.8	49.8	43.0	9.9	24.5	37.8	13.6	26.8	10.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	153	1504	468	480	1964	624	294	1013	453	388	1034	485
V/C Ratio(X)	0.71	1.08	0.56	1.14	0.93	0.84	0.81	0.68	0.95	0.86	0.69	0.31
Avail Cap(c_a), veh/h	224	1504	468	480	1964	624	511	1035	463	492	1034	485
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.1	51.0	43.0	62.5	42.5	40.5	65.0	46.3	51.1	63.2	44.1	38.5
Incr Delay (d2), s/veh	6.0	47.1	4.7	85.9	9.4	13.2	5.4	1.8	29.0	11.8	1.9	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	26.5	9.4	15.3	25.0	21.4	4.9	12.5	20.5	7.2	12.7	4.7
LnGrp Delay(d),s/veh	74.1	98.1	47.7	148.4	51.9	53.7	70.4	48.1	80.1	75.0	46.0	38.9
LnGrp LOS	E	F	D	F	D	D	E	D	F	E	D	D
Approach Vol, veh/h		1990			2901			1357			1195	
Approach Delay, s/veh		90.2			70.5			62.1			53.2	
Approach LOS		F			E			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.0	49.0	18.9	50.9	12.9	62.1	22.6	47.1
Change Period (Y+Rc), s	* 6.2	* 6.2	6.5	6.5	* 6.2	* 6.2	6.5	6.5
Max Green Setting (Gmax), s	* 20	* 43	21.5	40.5	* 9.8	* 53	20.5	41.5
Max Q Clear Time (g_c+I1), s	21.8	44.8	11.9	28.8	6.7	51.8	15.6	39.8
Green Ext Time (p_c), s	0.0	0.0	0.5	7.8	0.1	1.0	0.5	0.8

Intersection Summary			
HCM 2010 Ctrl Delay			71.4
HCM 2010 LOS			E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection 69 **Lent Ranch Pkwy/Kammerer Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	20	19	95.9%	25.0	10.5	C
	Through						
	Right Turn	540	526	97.3%	29.0	10.8	C
	Subtotal	560	545	97.3%	29.0	10.5	C
EB	Left Turn	450	432	95.9%	69.6	12.0	E
	Through	2,260	2,277	100.8%	25.6	2.2	C
	Right Turn						
	Subtotal	2,710	2,709	100.0%	32.7	3.7	C
WB	Left Turn						
	Through	2,150	1,754	81.6%	45.3	5.4	D
	Right Turn	20	18	92.1%	11.3	3.8	B
	Subtotal	2,170	1,772	81.7%	45.0	5.4	D
	Total	5,440	5,026	92.4%	36.7	3.6	D

Intersection 70 **Promenade Pkwy/Kammerer Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	430	448	104.1%	57.6	2.6	E
	Through	160	155	97.1%	61.0	10.1	E
	Right Turn	300	260	86.7%	37.4	27.9	D
	Subtotal	890	863	97.0%	51.3	9.9	D
SB	Left Turn	1,410	1,065	75.5%	141.8	27.5	F
	Through	310	302	97.3%	58.1	8.4	E
	Right Turn	20	19	95.9%	15.1	7.8	B
	Subtotal	1,740	1,386	79.7%	121.7	20.7	F
EB	Left Turn	20	17	86.5%	81.1	20.9	F
	Through	1,650	1,442	87.4%	87.3	12.4	F
	Right Turn	630	586	93.0%	62.3	7.0	E
	Subtotal	2,300	2,045	88.9%	80.1	10.4	F
NW	Left Turn						
	Through						
	Right Turn						
	Subtotal						
	Total	4,930	4,295	87.1%	87.8	12.1	F

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Elk Grove General Plan Update
Cumulative Conditions
PM Peak Hour

Intersection 71 **SR 99 SB Ramps/Kammerer Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	820	617	75.2%	112.7	32.6	F
	Through						
	Right Turn	590	541	91.8%	56.2	18.5	E
	Subtotal	1,410	1,158	82.2%	86.3	26.0	F
EB	Left Turn						
	Through	3,120	2,439	78.2%	51.7	7.4	D
	Right Turn	240	220	91.8%	3.8	0.5	A
	Subtotal	3,360	2,660	79.2%	47.8	6.9	D
WB	Left Turn						
	Through	2,730	1,965	72.0%	25.4	3.3	C
	Right Turn	770	490	63.7%	8.2	0.7	A
	Subtotal	3,500	2,455	70.2%	21.9	2.9	C
Total		8,270	6,274	75.9%	44.6	6.3	D

Intersection 72 **SR 99 NB Ramps/Grant Line Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	470	452	96.2%	37.4	3.3	D
	Through						
	Right Turn	740	714	96.5%	51.1	7.1	D
	Subtotal	1,210	1,166	96.4%	45.7	5.0	D
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	3,410	2,494	73.1%	74.5	6.7	E
	Right Turn	530	447	84.4%	31.5	9.3	C
	Subtotal	3,940	2,941	74.6%	67.9	7.0	E
WB	Left Turn						
	Through	3,030	2,007	66.2%	10.1	0.6	B
	Right Turn	1,070	716	66.9%	6.0	0.5	A
	Subtotal	4,100	2,722	66.4%	9.0	0.5	A
Total		9,250	6,830	73.8%	40.7	2.7	D

SimTraffic Post-Processor | **Elk Grove General Plan Update**
Average Results from 10 Runs | **Cumulative Conditions**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 73 **E Stockton Blvd/Grant Line Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	300	206	68.7%	253.5	31.1	F
	Through	70	52	74.1%	251.8	49.1	F
	Right Turn	90	67	74.4%	258.0	46.4	F
	Subtotal	460	325	70.6%	253.6	35.5	F
SB	Left Turn	320	243	75.9%	81.2	12.4	F
	Through	40	32	79.9%	110.4	35.1	F
	Right Turn	690	523	75.9%	59.6	4.4	E
	Subtotal	1,050	798	76.0%	68.6	5.5	E
EB	Left Turn	680	253	37.2%	359.0	18.3	F
	Through	3,280	2,772	84.5%	58.7	5.7	E
	Right Turn	190	168	88.3%	12.3	1.7	B
	Subtotal	4,150	3,193	76.9%	79.9	5.2	E
WB	Left Turn	90	59	65.6%	245.1	29.8	F
	Through	3,080	1,980	64.3%	271.8	11.4	F
	Right Turn	250	135	54.0%	291.4	23.6	F
	Subtotal	3,420	2,174	63.6%	272.2	12.0	F
Total		9,080	6,489	71.5%	151.5	3.2	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	830	2420	480	130	1760	10	890	210	260	30	150	780
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1776	1845	1900	1900	1827	1900	1900	1900	1900	1667	1900	1863
Adj Flow Rate, veh/h	902	2630	522	141	1913	8	967	228	283	33	163	596
Adj No. of Lanes	2	4	1	2	4	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	3	0	0	4	0	0	0	0	14	0	2
Cap, veh/h	836	3106	1173	190	1816	467	832	856	383	160	187	486
Arrive On Green	0.25	0.49	0.49	0.05	0.29	0.29	0.24	0.24	0.24	0.05	0.05	0.05
Sat Flow, veh/h	3281	6346	1615	3510	6285	1615	3510	3610	1615	3079	3610	1583
Grp Volume(v), veh/h	902	2630	522	141	1913	8	967	228	283	33	163	596
Grp Sat Flow(s),veh/h/ln	1640	1586	1615	1755	1571	1615	1755	1805	1615	1540	1805	1583
Q Serve(g_s), s	34.4	48.8	17.6	5.3	39.0	0.5	32.0	6.9	21.9	1.4	6.1	7.0
Cycle Q Clear(g_c), s	34.4	48.8	17.6	5.3	39.0	0.5	32.0	6.9	21.9	1.4	6.1	7.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	836	3106	1173	190	1816	467	832	856	383	160	187	486
V/C Ratio(X)	1.08	0.85	0.44	0.74	1.05	0.02	1.16	0.27	0.74	0.21	0.87	1.23
Avail Cap(c_a), veh/h	836	3106	1173	203	1816	467	832	856	383	160	187	486
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.3	30.0	7.5	62.9	48.0	34.3	51.5	41.9	47.6	61.3	63.6	46.8
Incr Delay (d2), s/veh	54.7	3.1	1.2	10.9	36.9	0.1	86.1	0.1	6.6	0.2	31.9	119.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.9	22.0	8.2	2.9	21.5	0.2	25.4	3.5	10.4	0.6	3.9	34.1
LnGrp Delay(d),s/veh	105.0	33.1	8.7	73.8	84.9	34.4	137.6	42.0	54.2	61.6	95.5	166.3
LnGrp LOS	F	C	A	E	F	C	F	D	D	E	F	F
Approach Vol, veh/h		4054			2062			1478			792	
Approach Delay, s/veh		45.9			83.9			106.9			147.4	
Approach LOS		D			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.0	45.0	13.0	38.0	11.9	72.1	38.0	13.0
Change Period (Y+Rc), s	4.6	6.0	6.0	6.0	4.6	6.0	6.0	6.0
Max Green Setting (Gmax), s	34.4	39.0	7.0	32.0	7.8	65.6	32.0	7.0
Max Q Clear Time (g_c+I1), s	36.4	41.0	3.4	23.9	7.3	50.8	34.0	9.0
Green Ext Time (p_c), s	0.0	0.0	0.0	2.3	0.0	14.1	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	75.6
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	90	2620	1810	90	120	90
Number	5	2	6	16	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1845	1863	1845	1837	1900
Adj Flow Rate, veh/h	93	2701	1866	93	124	93
Adj No. of Lanes	1	4	4	1	0	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	3	2	3	0	0
Cap, veh/h	116	4597	3862	945	146	109
Arrive On Green	0.06	0.72	0.60	0.60	0.15	0.15
Sat Flow, veh/h	1792	6604	6669	1568	947	710
Grp Volume(v), veh/h	93	2701	1866	93	218	0
Grp Sat Flow(s),veh/h/ln	1792	1586	1602	1568	1664	0
Q Serve(g_s), s	5.0	20.1	16.1	2.5	12.6	0.0
Cycle Q Clear(g_c), s	5.0	20.1	16.1	2.5	12.6	0.0
Prop In Lane	1.00			1.00	0.57	0.43
Lane Grp Cap(c), veh/h	116	4597	3862	945	256	0
V/C Ratio(X)	0.80	0.59	0.48	0.10	0.85	0.00
Avail Cap(c_a), veh/h	116	4597	3862	945	702	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.5	6.5	11.0	8.3	40.6	0.0
Incr Delay (d2), s/veh	31.4	0.6	0.4	0.2	7.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	8.8	7.1	1.1	6.3	0.0
LnGrp Delay(d),s/veh	76.8	7.1	11.4	8.5	48.4	0.0
LnGrp LOS	E	A	B	A	D	
Approach Vol, veh/h		2794	1959		218	
Approach Delay, s/veh		9.4	11.3		48.4	
Approach LOS		A	B		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		77.0		21.6	12.0	65.0		
Change Period (Y+Rc), s		* 5.6		6.4	* 5.6	* 5.6		
Max Green Setting (Gmax), s		* 71		41.6	* 6.4	* 59		
Max Q Clear Time (g_c+I1), s		22.1		14.6	7.0	18.1		
Green Ext Time (p_c), s		47.4		0.6	0.0	40.0		

Intersection Summary			
HCM 2010 Ctrl Delay			11.8
HCM 2010 LOS			B

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1020	800	430	60	670	20	250	250	40	20	400	910
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1845	1863	1863	1845	1900	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	1074	842	467	65	705	21	272	272	43	21	435	958
Adj No. of Lanes	2	3	1	1	4	1	1	1	1	1	2	1
Peak Hour Factor	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.95	0.92	0.95
Percent Heavy Veh, %	4	3	2	2	3	0	2	2	2	0	2	2
Cap, veh/h	513	1902	598	82	1726	439	136	721	613	35	1168	763
Arrive On Green	0.15	0.38	0.38	0.05	0.27	0.27	0.08	0.39	0.39	0.02	0.33	0.33
Sat Flow, veh/h	3375	5036	1583	1774	6346	1615	1774	1863	1583	1810	3539	1583
Grp Volume(v), veh/h	1074	842	467	65	705	21	272	272	43	21	435	958
Grp Sat Flow(s),veh/h/ln	1688	1679	1583	1774	1586	1615	1774	1863	1583	1810	1770	1583
Q Serve(g_s), s	22.8	18.7	39.1	5.4	13.6	1.4	11.5	15.7	2.6	1.7	14.1	49.5
Cycle Q Clear(g_c), s	22.8	18.7	39.1	5.4	13.6	1.4	11.5	15.7	2.6	1.7	14.1	49.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	513	1902	598	82	1726	439	136	721	613	35	1168	763
V/C Ratio(X)	2.09	0.44	0.78	0.79	0.41	0.05	2.00	0.38	0.07	0.60	0.37	1.26
Avail Cap(c_a), veh/h	513	1902	598	104	1726	439	136	721	613	78	1168	763
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.6	34.9	41.2	70.8	44.7	40.3	69.3	33.0	28.9	73.0	38.4	38.8
Incr Delay (d2), s/veh	498.6	0.7	9.8	26.5	0.7	0.2	475.0	0.3	0.0	15.1	0.2	125.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	46.1	8.8	18.7	3.3	6.1	0.7	23.6	8.1	1.1	1.0	6.9	58.1
LnGrp Delay(d),s/veh	562.2	35.6	51.0	97.3	45.4	40.5	544.3	33.3	29.0	88.1	38.6	164.3
LnGrp LOS	F	D	D	F	D	D	F	C	C	F	D	F
Approach Vol, veh/h		2383			791			587			1414	
Approach Delay, s/veh		276.0			49.6			269.7			124.5	
Approach LOS		F			D			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.2	62.8	18.0	56.0	29.0	47.0	9.4	64.6
Change Period (Y+Rc), s	* 6.2	* 6.2	6.5	6.5	* 6.2	* 6.2	6.5	6.5
Max Green Setting (Gmax), s	* 8.8	* 55	11.5	49.5	* 23	* 41	6.5	54.5
Max Q Clear Time (g_c+I1), s	7.4	41.1	13.5	51.5	24.8	15.6	3.7	17.7
Green Ext Time (p_c), s	0.0	8.9	0.0	0.0	0.0	12.9	0.0	10.6

Intersection Summary	
HCM 2010 Ctrl Delay	199.3
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	370	90	1010	480	400	150	660	1010	260	520	20
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	11	402	98	1098	522	435	163	717	1098	283	565	22
Adj No. of Lanes	2	2	1	2	2	1	2	3	1	2	2	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	996	445	731	1736	776	141	1539	830	147	1071	843
Arrive On Green	0.01	0.28	0.28	0.22	0.49	0.49	0.04	0.30	0.30	0.04	0.30	0.30
Sat Flow, veh/h	3304	3539	1583	3304	3539	1583	3304	5085	1583	3442	3539	2787
Grp Volume(v), veh/h	11	402	98	1098	522	435	163	717	1098	283	565	22
Grp Sat Flow(s),veh/h/ln	1652	1770	1583	1652	1770	1583	1652	1695	1583	1721	1770	1393
Q Serve(g_s), s	0.5	13.8	7.1	33.2	13.2	29.0	6.4	17.2	45.4	6.4	19.9	0.8
Cycle Q Clear(g_c), s	0.5	13.8	7.1	33.2	13.2	29.0	6.4	17.2	45.4	6.4	19.9	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	40	996	445	731	1736	776	141	1539	830	147	1071	843
V/C Ratio(X)	0.27	0.40	0.22	1.50	0.30	0.56	1.16	0.47	1.32	1.93	0.53	0.03
Avail Cap(c_a), veh/h	137	996	445	731	1736	776	141	1539	830	147	1071	843
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	73.4	43.7	41.3	58.4	22.8	26.9	71.8	42.5	35.7	71.8	43.4	36.8
Incr Delay (d2), s/veh	3.5	1.2	1.1	232.8	0.4	2.9	123.9	0.2	153.9	441.3	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	6.9	3.3	38.8	6.6	13.2	5.3	8.1	69.7	12.0	9.8	0.3
LnGrp Delay(d),s/veh	77.0	44.9	42.4	291.2	23.3	29.8	195.7	42.7	189.6	513.1	43.9	36.8
LnGrp LOS	E	D	D	F	C	C	F	D	F	F	D	D
Approach Vol, veh/h		511			2055			1978			870	
Approach Delay, s/veh		45.1			167.8			136.9			196.3	
Approach LOS		D			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.0	48.0	12.0	51.0	7.6	79.4	12.0	51.0
Change Period (Y+Rc), s	* 5.8	* 5.8	5.6	5.6	* 5.8	* 5.8	5.6	5.6
Max Green Setting (Gmax), s	* 33	* 42	6.4	45.4	* 6.2	* 69	6.4	45.4
Max Q Clear Time (g_c+I1), s	35.2	15.8	8.4	21.9	2.5	31.0	8.4	47.4
Green Ext Time (p_c), s	0.0	8.8	0.0	16.1	0.0	9.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	149.5
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	50	20	20	60	90	20	1130	20	80	1110	100
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1900	1788	1863	1900	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	65	54	22	22	65	98	22	1228	22	87	1207	109
Adj No. of Lanes	1	1	0	1	1	0	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	207	84	42	93	140	82	1635	731	190	1751	783
Arrive On Green	0.05	0.16	0.16	0.02	0.14	0.14	0.02	0.46	0.46	0.06	0.49	0.49
Sat Flow, veh/h	1703	1259	513	1703	672	1013	3304	3539	1583	3304	3539	1583
Grp Volume(v), veh/h	65	0	76	22	0	163	22	1228	22	87	1207	109
Grp Sat Flow(s),veh/h/ln	1703	0	1772	1703	0	1684	1652	1770	1583	1652	1770	1583
Q Serve(g_s), s	2.7	0.0	2.7	0.9	0.0	6.6	0.5	20.4	0.5	1.8	18.7	2.7
Cycle Q Clear(g_c), s	2.7	0.0	2.7	0.9	0.0	6.6	0.5	20.4	0.5	1.8	18.7	2.7
Prop In Lane	1.00		0.29	1.00		0.60	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	86	0	292	42	0	233	82	1635	731	190	1751	783
V/C Ratio(X)	0.75	0.00	0.26	0.52	0.00	0.70	0.27	0.75	0.03	0.46	0.69	0.14
Avail Cap(c_a), veh/h	1278	0	1925	157	0	721	324	1635	731	324	1751	783
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	0.0	26.0	34.4	0.0	29.3	34.2	15.8	10.5	32.6	13.8	9.8
Incr Delay (d2), s/veh	12.3	0.0	0.5	9.6	0.0	3.8	1.7	3.2	0.1	1.7	2.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	1.3	0.5	0.0	3.3	0.2	10.6	0.3	0.9	9.6	1.2
LnGrp Delay(d),s/veh	45.8	0.0	26.5	44.0	0.0	33.1	35.9	19.1	10.6	34.3	16.1	10.2
LnGrp LOS	D		C	D		C	D	B	B	C	B	B
Approach Vol, veh/h		141			185			1272			1403	
Approach Delay, s/veh		35.4			34.4			19.2			16.8	
Approach LOS		D			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	38.0	7.2	17.2	6.8	40.3	9.0	15.3
Change Period (Y+Rc), s	* 5	* 5	5.4	5.4	* 5	* 5	5.4	5.4
Max Green Setting (Gmax), s	* 7	* 33	6.6	77.6	* 7	* 33	53.6	30.6
Max Q Clear Time (g_c+I1), s	3.8	22.4	2.9	4.7	2.5	20.7	4.7	8.6
Green Ext Time (p_c), s	0.1	9.2	0.0	1.6	0.0	10.6	0.2	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	19.8
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	70	40	20	80	520	50	1240	10	440	1130	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	22	76	43	22	87	565	54	1348	11	478	1228	22
Adj No. of Lanes	1	1	1	1	1	1	2	2	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	35	556	473	35	556	473	104	1245	557	531	2447	762
Arrive On Green	0.02	0.30	0.30	0.02	0.30	0.30	0.03	0.35	0.35	0.16	0.48	0.48
Sat Flow, veh/h	1703	1863	1583	1703	1863	1583	3304	3539	1583	3304	5085	1583
Grp Volume(v), veh/h	22	76	43	22	87	565	54	1348	11	478	1228	22
Grp Sat Flow(s),veh/h/ln	1703	1863	1583	1703	1863	1583	1652	1770	1583	1652	1695	1583
Q Serve(g_s), s	1.8	4.2	2.7	1.8	4.8	41.8	2.3	49.3	0.6	19.9	23.1	1.0
Cycle Q Clear(g_c), s	1.8	4.2	2.7	1.8	4.8	41.8	2.3	49.3	0.6	19.9	23.1	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	35	556	473	35	556	473	104	1245	557	531	2447	762
V/C Ratio(X)	0.63	0.14	0.09	0.63	0.16	1.20	0.52	1.08	0.02	0.90	0.50	0.03
Avail Cap(c_a), veh/h	71	556	473	71	556	473	151	1245	557	599	2447	762
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.1	35.9	35.4	68.1	36.2	49.1	66.8	45.4	29.6	57.7	24.8	19.1
Incr Delay (d2), s/veh	17.1	0.1	0.1	17.1	0.1	107.2	4.0	51.1	0.1	15.4	0.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	2.2	1.2	1.0	2.5	32.3	1.1	32.9	0.3	10.2	11.0	0.5
LnGrp Delay(d),s/veh	85.2	36.0	35.5	85.2	36.3	156.3	70.8	96.5	29.7	73.1	25.6	19.2
LnGrp LOS	F	D	D	F	D	F	E	F	C	E	C	B
Approach Vol, veh/h		141			674			1413			1728	
Approach Delay, s/veh		43.6			138.5			95.0			38.6	
Approach LOS		D			F			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.1	54.9	9.1	48.0	10.0	73.0	9.1	48.0
Change Period (Y+Rc), s	5.6	5.6	* 6.2	* 6.2	5.6	5.6	* 6.2	* 6.2
Max Green Setting (Gmax), s	25.4	48.4	* 5.8	* 42	6.4	67.4	* 5.8	* 42
Max Q Clear Time (g_c+I1), s	21.9	51.3	3.8	6.2	4.3	25.1	3.8	43.8
Green Ext Time (p_c), s	0.6	0.0	0.0	3.5	0.0	30.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	76.0
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	60	100	90	120	150	150	940	60	80	850	90
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	76	65	109	98	130	163	163	1022	65	87	924	98
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	145	1214	543	154	1224	548	226	1216	544	150	1135	508
Arrive On Green	0.04	0.34	0.34	0.05	0.35	0.35	0.07	0.34	0.34	0.05	0.32	0.32
Sat Flow, veh/h	3304	3539	1583	3304	3539	1583	3304	3539	1583	3304	3539	1583
Grp Volume(v), veh/h	76	65	109	98	130	163	163	1022	65	87	924	98
Grp Sat Flow(s),veh/h/ln	1652	1770	1583	1652	1770	1583	1652	1770	1583	1652	1770	1583
Q Serve(g_s), s	2.3	1.2	4.9	2.9	2.5	7.5	4.8	26.7	2.8	2.6	24.1	4.5
Cycle Q Clear(g_c), s	2.3	1.2	4.9	2.9	2.5	7.5	4.8	26.7	2.8	2.6	24.1	4.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	145	1214	543	154	1224	548	226	1216	544	150	1135	508
V/C Ratio(X)	0.52	0.05	0.20	0.64	0.11	0.30	0.72	0.84	0.12	0.58	0.81	0.19
Avail Cap(c_a), veh/h	211	1214	543	211	1224	548	280	1253	561	214	1182	529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.9	22.0	23.2	47.0	22.3	23.9	45.8	30.4	22.5	46.9	31.3	24.7
Incr Delay (d2), s/veh	2.9	0.1	0.8	4.3	0.2	1.4	6.8	5.2	0.1	3.5	4.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.6	2.2	1.4	1.3	3.5	2.4	13.9	1.2	1.3	12.4	2.0
LnGrp Delay(d),s/veh	49.8	22.1	24.1	51.3	22.4	25.3	52.6	35.6	22.6	50.4	35.7	24.9
LnGrp LOS	D	C	C	D	C	C	D	D	C	D	D	C
Approach Vol, veh/h		250			391			1250			1109	
Approach Delay, s/veh		31.4			30.9			37.1			35.9	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.3	40.0	12.3	37.6	10.0	40.3	10.1	39.9
Change Period (Y+Rc), s	5.6	5.6	* 5.5	* 5.5	5.6	5.6	* 5.5	* 5.5
Max Green Setting (Gmax), s	6.4	34.4	* 8.5	* 34	6.4	34.4	* 6.5	* 36
Max Q Clear Time (g_c+I1), s	4.9	6.9	6.8	26.1	4.3	9.5	4.6	28.7
Green Ext Time (p_c), s	0.0	2.1	0.1	6.1	0.0	2.1	0.0	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	35.4
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	250	270	10	30	180	80	10	580	30	90	650	130
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	272	293	11	33	196	87	11	630	33	98	707	141
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	350	718	321	87	436	195	36	1529	684	162	1664	744
Arrive On Green	0.11	0.20	0.20	0.03	0.12	0.12	0.01	0.43	0.43	0.05	0.47	0.47
Sat Flow, veh/h	3304	3539	1583	3304	3539	1583	3304	3539	1583	3304	3539	1583
Grp Volume(v), veh/h	272	293	11	33	196	87	11	630	33	98	707	141
Grp Sat Flow(s),veh/h/ln	1652	1770	1583	1652	1770	1583	1652	1770	1583	1652	1770	1583
Q Serve(g_s), s	6.2	5.6	0.4	0.8	4.0	3.9	0.3	9.5	0.9	2.2	10.2	4.0
Cycle Q Clear(g_c), s	6.2	5.6	0.4	0.8	4.0	3.9	0.3	9.5	0.9	2.2	10.2	4.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	350	718	321	87	436	195	36	1529	684	162	1664	744
V/C Ratio(X)	0.78	0.41	0.03	0.38	0.45	0.45	0.31	0.41	0.05	0.61	0.42	0.19
Avail Cap(c_a), veh/h	359	1621	725	274	1529	684	274	1529	684	316	1664	744
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.7	26.8	24.7	37.0	31.5	31.4	37.9	15.2	12.7	36.0	13.6	11.9
Incr Delay (d2), s/veh	10.1	0.4	0.0	2.7	0.7	1.6	4.7	0.8	0.1	3.6	0.8	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	2.8	0.2	0.4	2.0	1.8	0.1	4.8	0.4	1.1	5.1	1.8
LnGrp Delay(d),s/veh	43.7	27.1	24.8	39.7	32.2	33.0	42.6	16.0	12.9	39.6	14.4	12.5
LnGrp LOS	D	C	C	D	C	C	D	B	B	D	B	B
Approach Vol, veh/h		576			316			674			946	
Approach Delay, s/veh		34.9			33.2			16.3			16.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	21.3	6.4	41.9	13.8	15.1	9.4	39.0
Change Period (Y+Rc), s	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Max Green Setting (Gmax), s	6.4	35.4	6.4	34.4	8.4	33.4	7.4	33.4
Max Q Clear Time (g_c+I1), s	2.8	7.6	2.3	12.2	8.2	6.0	4.2	11.5
Green Ext Time (p_c), s	0.0	3.6	0.0	10.3	0.0	3.5	0.1	10.2

Intersection Summary			
HCM 2010 Ctrl Delay			22.8
HCM 2010 LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	240	1540	290	410	1730	330	300	540	420	400	600	300
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	261	1674	315	446	1880	359	326	587	457	435	652	326
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	305	1974	615	349	2042	636	242	991	443	248	991	443
Arrive On Green	0.09	0.39	0.39	0.11	0.40	0.40	0.07	0.28	0.28	0.08	0.28	0.28
Sat Flow, veh/h	3304	5085	1583	3304	5085	1583	3304	3539	1583	3304	3539	1583
Grp Volume(v), veh/h	261	1674	315	446	1880	359	326	587	457	435	652	326
Grp Sat Flow(s),veh/h/ln	1652	1695	1583	1652	1695	1583	1652	1770	1583	1652	1770	1583
Q Serve(g_s), s	11.3	43.5	22.0	15.3	50.9	25.4	10.6	20.8	40.6	10.9	23.6	27.1
Cycle Q Clear(g_c), s	11.3	43.5	22.0	15.3	50.9	25.4	10.6	20.8	40.6	10.9	23.6	27.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	305	1974	615	349	2042	636	242	991	443	248	991	443
V/C Ratio(X)	0.86	0.85	0.51	1.28	0.92	0.56	1.35	0.59	1.03	1.75	0.66	0.74
Avail Cap(c_a), veh/h	326	1974	615	349	2042	636	242	991	443	248	998	447
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.9	40.4	33.9	64.8	41.2	33.6	67.2	45.1	52.2	67.1	46.1	47.3
Incr Delay (d2), s/veh	18.7	4.7	3.0	146.0	8.3	3.6	182.2	0.9	50.9	354.3	1.6	6.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	21.2	10.1	14.0	25.4	11.8	10.9	10.2	24.0	17.2	11.7	12.6
LnGrp Delay(d),s/veh	83.6	45.2	36.9	210.9	49.5	37.2	249.4	46.0	103.1	421.3	47.6	53.5
LnGrp LOS	F	D	D	F	D	D	F	D	F	F	D	D
Approach Vol, veh/h		2250			2685			1370			1413	
Approach Delay, s/veh		48.5			74.7			113.4			164.0	
Approach LOS		D			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	62.0	16.0	46.0	19.1	63.9	16.0	46.0
Change Period (Y+Rc), s	5.7	5.7	* 5.4	* 5.4	5.7	5.7	* 5.1	* 5.4
Max Green Setting (Gmax), s	15.3	56.3	* 11	* 41	14.3	57.3	* 11	* 41
Max Q Clear Time (g_c+I1), s	17.3	45.5	12.6	29.1	13.3	52.9	12.9	42.6
Green Ext Time (p_c), s	0.0	10.5	0.0	7.8	0.1	4.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	90.3
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	170	2000	510	460	1930	110	450	510	430	190	590	210
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1788	1863	1863	1788	1863	1863	1788	1863	1863	1788	1863	1863
Adj Flow Rate, veh/h	185	2174	554	500	2098	120	489	554	467	207	641	228
Adj No. of Lanes	2	4	1	2	4	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	227	2039	504	444	2459	608	439	1100	492	253	905	405
Arrive On Green	0.07	0.32	0.32	0.13	0.38	0.38	0.13	0.31	0.31	0.08	0.26	0.26
Sat Flow, veh/h	3304	6408	1583	3304	6408	1583	3304	3539	1583	3304	3539	1583
Grp Volume(v), veh/h	185	2174	554	500	2098	120	489	554	467	207	641	228
Grp Sat Flow(s),veh/h/ln	1652	1602	1583	1652	1602	1583	1652	1770	1583	1652	1770	1583
Q Serve(g_s), s	8.1	46.9	46.9	19.8	44.2	7.4	19.6	18.8	42.5	9.1	24.3	18.5
Cycle Q Clear(g_c), s	8.1	46.9	46.9	19.8	44.2	7.4	19.6	18.8	42.5	9.1	24.3	18.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	227	2039	504	444	2459	608	439	1100	492	253	905	405
V/C Ratio(X)	0.81	1.07	1.10	1.13	0.85	0.20	1.11	0.50	0.95	0.82	0.71	0.56
Avail Cap(c_a), veh/h	231	2039	504	444	2459	608	439	1107	495	309	968	433
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.7	50.2	50.2	63.8	41.6	30.3	63.9	41.5	49.6	67.1	49.9	47.7
Incr Delay (d2), s/veh	19.3	40.3	70.0	82.0	4.0	0.7	77.3	0.4	27.9	13.4	2.2	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	26.4	30.3	14.1	20.2	3.4	13.6	9.3	22.4	4.6	12.1	8.3
LnGrp Delay(d),s/veh	87.0	90.5	120.2	145.7	45.6	31.0	141.2	41.9	77.6	80.4	52.1	49.2
LnGrp LOS	F	F	F	F	D	C	F	D	E	F	D	D
Approach Vol, veh/h		2913			2718			1510			1076	
Approach Delay, s/veh		95.9			63.4			85.1			56.9	
Approach LOS		F			E			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.0	53.1	25.0	43.3	16.3	62.8	16.9	51.4
Change Period (Y+Rc), s	6.2	6.2	* 5.4	5.6	6.2	6.2	5.6	* 5.6
Max Green Setting (Gmax), s	19.8	46.9	* 20	40.3	10.3	56.4	13.8	* 46
Max Q Clear Time (g_c+I1), s	21.8	48.9	21.6	26.3	10.1	46.2	11.1	44.5
Green Ext Time (p_c), s	0.0	0.0	0.0	8.4	0.0	10.1	0.2	1.3

Intersection Summary			
HCM 2010 Ctrl Delay			78.1
HCM 2010 LOS			E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Base Year Model Validation

ELK GROVE GENERAL PLAN UPDATE
AM VALIDATION

ID	Road	Segment	Count Total	A Node	B Node	ID (EB or NB)	Model Volume Total	Model / Count	Percent Deviation	Max Percent Deviation	Within Deviaton	Model - Count	Difference Squared
1	Grant Line Rd	Bradshaw Rd to Elk Grove Blvd	770	3904	17513	03904-17513	796	1.03	0.034	0.41	Yes	26	675
2	Grant Line Rd	Mosher Rd to Bradshaw Rd	1,290	8160	17466	08160-17466	1,412	1.09	0.095	0.325	Yes	122	14,968
3	Grant Line Rd	Watermand Rd to Mosher Rd	1,370	3903	17466	03903-17466	1,498	1.09	0.093	0.325	Yes	128	16,370
4	Grant Line Rd	E. Stockton Blvd/Survey Rd to Waterman Rd	1,750	3902	3903	03902-03903	2,017	1.15	0.153	0.286	Yes	267	71,500
5	Grant Line Rd	SR99 NB Ramps to E. Stockton Blvd/Survey Rd	2,080	3902	5639	03902-05639	2,331	1.12	0.121	0.275	Yes	251	62,931
6	Grant Line Rd	SR 99 SB Ramps to SR99 NB Ramps	1,610	1730	5638	01730-05638	1,636	1.02	0.016	0.303	Yes	26	677
7	Grant Line Rd	Promenade Pkwy to SR99 SB Ramps	1,120	1200	5638	01200-05638	908	0.81	0.189	0.359	Yes	-212	44,875
8	Grant Line Rd	Lent Ranch Pkwy to Promenade Pkwy	660	3941	14301	03941-14301	686	1.04	0.039	0.44	Yes	26	671
9	Elk Grove Blvd	Bradshaw Rd to Grant Line Rd	380	2374	17145	02374-17145	478	1.26	0.258	0.52	Yes	98	9,579
10	Grant Line Rd	Elk Grove Blvd to Bond Rd	1,130	3905	17140	03905-17140	1,258	1.11	0.114	0.34	Yes	128	16,468
11	Bradshaw Rd	Grant Line Rd to Elk Grove Blvd	570	3904	6658	03904-06658	602	1.06	0.056	0.475	Yes	32	1,011
12	Waterman Rd	Grant Line Rd to Elk Grove Blvd	600	3903	14509	03903-14509	637	1.06	0.062	0.475	Yes	37	1,400
13	Mosher Rd	Grant Line Rd to Sonoma Creek Dr	190	17466	17519	17466-17519	196	1.03	0.030	0.63	Yes	6	33
14	E. Stockton Blvd	Grant Line Rd to Elkmont Way	720	3902	17523	03902-17523	596	0.83	0.172	0.44	Yes	-124	15,409
16	Promenade Pkwy	Kammerer Rd to South Mall Entrance	460	14301	15656	14301-15656	221	0.48	0.520	0.52	Yes	-239	57,173
18	Kammerer Rd	Bruceville Rd to Lent Ranch Pkwy	650	3939	12373	03939-12373	686	1.06	0.056	0.44	Yes	36	1,303
19	Bruceville Rd	Eschinger Rd to Kammerer Rd	180	3939	3944	03939-03944	168	0.93	0.067	0.63	Yes	-12	144
20	Bruceville Rd	Kammerer Rd to Bilby Rd	650	3938	3939	03938-03939	619	0.95	0.047	0.44	Yes	-31	947
21	Bruceville Rd	Bilby Rd to Whitelock Rd	700	3938	16093	03938-16093	576	0.82	0.177	0.44	Yes	-124	15,435
22	Bilby Rd	Willard Pkwy to Bruceville Rd	710	7058	16000	07058-16000	561	0.79	0.210	0.44	Yes	-149	22,253
24	Willard Pkwy	Bilby Rd (East) to Bilby Rd (West)	730	7058	17528	07058-17528	579	0.79	0.206	0.44	Yes	-151	22,712
25	Willard Pkwy	Epoch Dr to Bilby Rd (East)	130	17529	17530	17529-17530	91	0.70	0.298	0.63	Yes	-39	1,499
26	Bilby Rd	Stovall Dr to Willard Pkwy	850	17528	17531	17528-17531	631	0.74	0.257	0.41	Yes	-219	47,837
27	Whitelock Rd	Bruceville Rd to Big Horn Blvd	650	2314	16098	02314-16098	107	0.16	0.835	0.44	No	-543	294,734
29	Big Horn Blvd	Whitelock Rd to Denali Cir/Lotz Pkwy	590	13660	16104	13660-16104	186	0.32	0.685	0.475	No	-404	163,248
30	Denali Cir	Partington Cir/Winkle Cir to Big Horn Blvd (South)	180	13660	17536	13660-17536	81	0.45	0.548	0.63	Yes	-99	9,725
31	Lotz Pkwy	Big Horn Blvd to Laguna Springs Dr/Wolf Pack Ln	300	13660	14294	13660-14294	185	0.62	0.383	0.575	Yes	-115	13,201
33	Lotz Pkwy	Laguna Springs Dr/Wolf Pack Ln to Auto City Dr	60	13658	17486	13658-17486	508	8.46	7.463	0.683	No	448	200,500
34	Laguna Springs Dr	Lotz Pkwy to Elk Grove Blvd	450	13658	17487	13658-17487	620	1.38	0.377	0.52	Yes	170	28,766
35	Big Horn Blvd	Denali Cir/Lotz Pkwy to Denali Cir	700	6085	13660	06085-13660	197	0.28	0.718	0.44	No	-503	252,776
36	Denali Cir	Philta Way/Joebar Cir to Big Horn Blvd (North)	110	16147	16148	16147-16148	170	1.55	0.546	0.683	Yes	60	3,606
37	Big Horn Blvd	Denali Cir to Civic Center Dr	800	16105	16150	16105-16150	428	0.53	0.465	0.41	No	-372	138,486
38	Civic Center Dr	Big Horn Blvd to Johnston Rd	110	16106	16214	16106-16214	52	0.47	0.531	0.683	Yes	-58	3,414
39	Civic Center Dr	Wymark Dr to Big Horn Blvd	350	16155	16202	16155-16202	162	0.46	0.538	0.575	Yes	-188	35,464
41	Civic Center Dr	Bruceville Rd to Wymark Dr	340	17485	16203	17485-16203	155	0.46	0.544	0.575	Yes	-185	34,233
42	Wymark Dr	Civic Center Dr to Elk Grove Blvd	140	16155	16156	16155-16156	183	1.31	0.307	0.63	Yes	43	1,841
43	Big Horn Blvd	Civic Center Dr to Elk Grove Blvd	1,100	3928	16106	03928-16106	643	0.58	0.415	0.359	No	-457	208,670
44	Elk Grove Blvd	Wymark Dr to Big Horn Blvd	3,090	3928	16158	03928-16158	3,043	0.98	0.015	0.241	Yes	-47	2,209
45	Elk Grove Blvd	Big Horn Blvd to Laguna Springs Dr	3,060	3928	17488	03928-17488	2,712	0.89	0.114	0.241	Yes	-348	121,067
46	Big Horn Blvd	Elk Grove Blvd to Laguna Blvd	1,080	3928	16809	03928-16809	1,308	1.21	0.211	0.359	Yes	228	52,011
47	Wymark Dr	Elk Grove Blvd to Dreyfus Way/Mansell Way	400	16158	16159	16158-16159	266	0.67	0.334	0.52	Yes	-134	17,879
48	Elk Grove Blvd	Bruceville Rd to Wymark Dr	2,740	3927	6652	03927-06652	2,910	1.06	0.062	0.252	Yes	170	28,981
49	Bruceville Rd	Whitelock Rd to Civic Center Dr	1,710	6051	16192	06051-16192	1,605	0.94	0.062	0.294	Yes	-105	11,109
50	Backer Ranch Rd	Bruceville Rd to Elk Grove Blvd	360	16211	16210	16211-16210	232	0.64	0.355	0.575	Yes	-128	16,360
51	Bruceville Rd	Elk Grove Blvd to Laguna Blvd	1,750	3927	16215	03927-16215	1,781	1.02	0.018	0.286	Yes	31	949
52	Elk Grove Blvd	Backer Ranch Rd to Bruceville Rd	2,790	16213	16216	16213-16216	2,667	0.96	0.044	0.248	Yes	-123	15,140

ELK GROVE GENERAL PLAN UPDATE

AM VALIDATION

ID	Road	Segment	Count Total	A Node	B Node	ID (EB or NB)	Model Volume Total	Model / Count	Percent Deviation	Max Percent Deviation	Within Deviaton	Model - Count	Difference Squared
53	Bruceville Rd	Elk Grove Blvd to Laguna Blvd	1,960	3927	16353	03927-16353	1,950	0.99	0.005	0.28	Yes	-10	110
54	Laguna Blvd	Bruceville Rd to Big Horn Blvd	2,560	4056	6648	04056-06648	2,986	1.17	0.166	0.255	Yes	426	181,199
55	Elk Grove Blvd	Franklin Blvd to Backer Ranch Rd	2,930	3924	17479	03924-17479	2,560	0.87	0.126	0.244	Yes	-370	137,222
56	Backer Ranch Rd	Elk Grove Blvd to Nugget Market	90	16216	17539	16216-17539	173	1.92	0.922	0.683	No	83	6,882
57	Laguna Blvd	Franklin Blvd to Bruceville Rd	3,700	4055	16360	04055-16360	3,170	0.86	0.143	0.229	Yes	-530	280,794
58	Bruceville Rd	Laguna Blvd to Big Horn Blvd	2,310	4056	6647	04056-06647	2,456	1.06	0.063	0.265	Yes	146	21,356
59	Big Horn Blvd	Bruceville Rd to Laguna Blvd	1,400	4040	13671	04040-13671	899	0.64	0.358	0.313	No	-501	251,131
60	Bruceville Rd	Big Horn Blvd to Sheldon Rd	2,320	3918	4040	03918-04040	2,858	1.23	0.232	0.265	Yes	538	289,853
61	Big Horn Blvd	Franklin Blvd to Bruceville Rd	1,590	4036	16673	04036-16673	861	0.54	0.459	0.303	No	-729	531,729
62	Bruceville Rd	Sheldon Rd to Damascus Dr	1,480	3918	8393	03918-08393	1,830	1.24	0.236	0.313	Yes	350	122,405
63	Center Parkway	Laguna Village to Bruceville Rd	990	3918	13664	03918-13664	1,237	1.25	0.249	0.38	Yes	247	60,801
64	Franklin Blvd	Laguna Blvd to Big Horn Blvd	2,650	4055	16643	04055-16643	3,095	1.17	0.168	0.252	Yes	445	198,150
65	Big Horn Blvd	Bramblewood Way to Franklin Blvd	480	4036	16625	04036-16625	136	0.28	0.716	0.52	No	-344	118,223
66	Franklin Blvd	Big Horn Blvd/Dwight Rd to Sims Rd	2,640	3916	4036	03916-04036	2,844	1.08	0.077	0.252	Yes	204	41,626
67	Laguna Blvd	Dwight Rd/Babson Rd to Franklin Blvd	2,940	5927	16389	05927-16389	3,917	1.33	0.332	0.244	No	977	954,155
68	Franklin Blvd	Elk Grove Blvd to Laguna Blvd	2,020	3924	16602	03924-16602	3,025	1.50	0.497	0.275	No	1,005	1,009,142
69	Dwight Rd	Laguna Blvd to Dwight Rd	180	16389	17541	16389-17541	176	0.98	0.025	0.63	Yes	-4	20
70	Babson Dr	Renwick Ave to Laguna Blvd	780	16389	16390	16389-16390	599	0.77	0.233	0.41	Yes	-181	32,911
71	Laguna Blvd	Harbour Point Dr to Dwight Rd/Babson Dr	2,550	6348	17721	06348-17721	2,946	1.16	0.155	0.255	Yes	396	156,903
72	Elk Grove Blvd	Four Winds Dr to Franklin Blvd	3,870	3924	5929	03924-05929	3,019	0.78	0.220	0.224	Yes	-851	724,063
73	Four Winds Dr	Elk Grove Blvd to Lakepoint Drive	1,170	16494	17548	16494-17548	555	0.47	0.526	0.34	No	-615	378,588
74	Elk Grove Blvd	Harbour Point Dr to Four Winds Dr	2,770	6346	6347	06346-06347	2,465	0.89	0.110	0.248	Yes	-305	92,971
75	W Taron Dr	W Taron Ct/Riparian Dr to Elk Grove Blvd	770	16538	16539	16538-16539	240	0.31	0.688	0.41	No	-530	280,893
76	Elk Grove Blvd	I-5 NB Ramps to Harbour Point Dr/W Taron Dr	2,490	5012	6347	05012-06347	2,277	0.91	0.086	0.26	Yes	-213	45,500
79	Harbour Point Dr	Elk Grove Blvd to Laguna Blvd	1,040	6348	17722	06348-17722	1,013	0.97	0.026	0.359	Yes	-27	738
81	Elk Grove Blvd	Laguna Springs Dr to Auto Center Dr	3,150	13656	14303	13656-14303	2,991	0.95	0.050	0.241	Yes	-159	25,134
82	Elk Grove Blvd	Auto Center Dr to SR-99 SB Ramps	3,330	3929	5643	03929-05643	3,270	0.98	0.018	0.235	Yes	-60	3,603
83	Elk Grove Blvd	SR-99 SB Ramps to SR-99 NB On-Ramp	3,130	5643	14905	05643-14905	3,425	1.09	0.094	0.241	Yes	295	87,300
84	Elk Grove Blvd	SR-99 NB On-Ramp to Emerald Vista Dr/E Stockton Blvd	3,310	3930	5642	03930-05642	3,530	1.07	0.067	0.235	Yes	220	48,605
85	E Stockton Blvd	SR-99 NB Ramps to Elk Grove Blvd	1,520	3930	17568	03930-17568	726	0.48	0.522	0.303	No	-794	630,657
86	E Stockton Blvd	Valley Oak Ln to SR-99 NB Ramps	780	8159	14299	08159-14299	684	0.88	0.123	0.41	Yes	-96	9,175
87	Emeral Vista Dr	Elk Grove Blvd to Banff Visa Drive	880	3930	17162	03930-17162	280	0.32	0.682	0.38	No	-600	359,756
89	Laguna Springs Dr	Elk Grove Blvd to Laguna Blvd	810	4057	16823	04057-16823	1,184	1.46	0.462	0.41	No	374	140,163
90	Laguna Blvd	Big Horn Blvd to Laguna Springs Dr	3,394	4057	4267	04057-04267	4,318	1.27	0.272	0.235	No	924	853,198
91	W Stockton Blvd	Laguna Blvd to Dunisch Rd	600	4057	16797	04057-16797	562	0.94	0.063	0.475	Yes	-38	1,440
92	Elk Grove Blvd	Emerald Vista Dr/E Stockton Blvd to Elk Grove Florin Rd	2,550	2680	3930	02680-03930	2,629	1.03	0.031	0.255	Yes	79	6,268
93	Elk Grove Florin Rd	Elk Grove Blvd to Sierra St	1,630	3932	17260	03932-17260	1,676	1.03	0.028	0.294	Yes	46	2,111
94	Elk Grove Blvd	Elk Grove Florin Rd to Waterman Rd	1,180	3932	17341	03932-17341	967	0.82	0.180	0.34	Yes	-213	45,163
95	Elk Grove Florin Rd	Elk Grove Blvd to Bond Rd	1,790	3932	17260	03932-17260	1,725	0.96	0.036	0.286	Yes	-65	4,224
96	Waterman Rd	Elk Grove Blvd to Bond Rd	1,050	3933	17502	03933-17502	1,057	1.01	0.007	0.359	Yes	7	48
97	Bond Rd	Elk Grove Florin Rd to Waterman Rd	2,460	2368	17501	02368-17501	2,528	1.03	0.028	0.26	Yes	68	4,688
98	Bond Rd	Waterman Rd to Bradshaw Rd	1,810	2348	17299	02348-17299	1,487	0.82	0.179	0.286	Yes	-323	104,603
99	Elk Grove Florin Rd	Bond Rd to Sheldon Rd	2,310	2368	16824	02368-16824	2,421	1.05	0.048	0.265	Yes	111	12,337
100	Whitelock Rd	Franklin Blvd/Willard Pkwy to Bruceville Rd	1,350	17695	16044	17695-16044	626	0.46	0.536	0.325	No	-724	524,094
101	Franklin Blvd	Whitelock Rd to Elk Grove Blvd	2,120	17689	16297	17689-16297	1,500	0.71	0.293	0.275	No	-620	384,985
102	Elk Grove Blvd	Waterman Rd to Bradshaw Rd	950	3933	17456	03933-17456	907	0.95	0.046	0.38	Yes	-43	1,883

ELK GROVE GENERAL PLAN UPDATE

AM VALIDATION

ID	Road	Segment	Count Total	A Node	B Node	ID (EB or NB)	Model Volume Total	Model / Count	Percent Deviation	Max Percent Deviation	Within Deviaton	Model - Count	Difference Squared
103	Bradshaw Rd	Elk Grove Blvd to Bond Rd	930	2374	17317	02374-17317	1,012	1.09	0.088	0.38	Yes	82	6,695
104	Bond Rd	Bradshaw Rd to Bader RD	1,310	2347	17101	02347-17101	1,043	0.80	0.204	0.325	Yes	-267	71,272
105	Bond Rd	Bader Rd to Grant Line Rd	610	17101	17110	17101-17110	613	1.00	0.004	0.475	Yes	3	7
106	Wrangler Dr	Grant Line Rd to Canter Dr	20	17084	17086	17084-17086	12	0.62	0.383	0.683	Yes	-8	59
107	Grant Line Rd	Bond Rd to Wilton Rd	1,620	2346	17074	02346-17074	1,841	1.14	0.136	0.303	Yes	221	48,841
108	Wilton Rd	Grant Line Rd to Leisure Oak Ln	920	3906	14366	03906-14366	586	0.64	0.363	0.38	Yes	-334	111,556
109	Grant Line Rd	Wilton Rd to Sheldon Rd	1,700	3906	17070	03906-17070	1,841	1.08	0.083	0.294	Yes	141	19,933
110	Sheldon Rd	Excelsior Rd to Grant Line Rd	610	3907	3923	03907-03923	387	0.63	0.365	0.475	Yes	-223	49,663
111	Sheldon Rd	Elk Grove Florin Rd to Waterman Rd	940	3922	16987	03922-16987	1,264	1.34	0.344	0.38	Yes	324	104,669
112	Waterman Rd	Bond Rd to Sheldon Rd	1,230	2348	8155	02348-08155	1,058	0.86	0.139	0.34	Yes	-172	29,433
113	Sheldon Rd	Waterman Rd to Bradshaw Rd	630	4054	8151	04054-08151	977	1.55	0.551	0.44	No	347	120,576
114	Bradshaw Rd	Bond Rd to Sheldon Rd	1,230	2347	8150	02347-08150	1,106	0.90	0.101	0.34	Yes	-124	15,374
115	Bader Rd	Bond Rd to Sheldon Rd	660	17100	17101	17100-17101	662	1.00	0.003	0.44	Yes	2	3
116	Sheldon Rd	Bradshaw Rd to bader Rd	570	4066	17013	04066-17013	554	0.97	0.028	0.475	Yes	-16	247
117	Sheldon Rd	Bader Rd to Dillard Oaks Ct	480	17013	17507	17013-17507	347	0.72	0.276	0.52	Yes	-133	17,566
118	Grant Line Rd	Sheldon Rd to Calvine Rd	1,460	3907	17067	03907-17067	1,710	1.17	0.171	0.313	Yes	250	62,424
119	Grant Line Rd	Calvine Rd to Sloughhouse Rd	1,790	3908	3909	03908-03909	2,059	1.15	0.151	0.286	Yes	269	72,622
120	Excelsior Rd	Corfu Dr to Calvine Rd	460	3914	17018	03914-17018	472	1.03	0.026	0.52	Yes	12	142
121	Excelsior Rd	Calvine Rd to Silent Wings Way	560	3914	17553	03914-17553	444	0.79	0.207	0.475	Yes	-116	13,501
122	Calvine Rd	Excelsior Rd to Grant Line Rd	440	3914	17509	03914-17509	380	0.86	0.137	0.52	Yes	-60	3,625
123	Calvine Rd	Bradshaw Rd to Excelsior Rd	1,030	3913	8094	03913-08094	757	0.73	0.265	0.359	Yes	-273	74,506
124	Bradshaw Rd	Calvine Rd to Knightview Ct	1,810	4066	8395	04066-08395	1,812	1.00	0.001	0.286	Yes	2	6
125	Bradshaw Rd	Sheldon Rd to Calvine Rd	990	4066	8395	04066-08395	1,235	1.25	0.248	0.38	Yes	245	60,259
126	Waterman Rd	Sheldon Rd to Calvine Rd	910	4054	8365	04054-08365	1,002	1.10	0.101	0.38	Yes	92	8,516
127	Waterman Rd	Calvine Rd to Tamerton Way	930	5940	17557	05940-17557	802	0.86	0.138	0.38	Yes	-128	16,396
128	Elk Grove Florin Rd	Calvine Rd to Robbins Rd	2,730	3912	17558	03912-17558	2,565	0.94	0.060	0.252	Yes	-165	27,171
129	Calvine Rd	Vintage Park Dr to Elk Grove Florin Rd	2,750	3912	8095	03912-08095	2,448	0.89	0.110	0.248	Yes	-302	91,319
130	Calvine Rd	Waterman Rd to Bradshaw Rd	2,090	5940	16999	05940-16999	1,298	0.62	0.379	0.275	No	-792	627,984
131	Calvine Rd	Elk Grove Florin Rd to Waterman Rd	2,630	3912	17504	03912-17504	1,579	0.60	0.400	0.252	No	-1,051	1,105,547
132	Elk Grove Florin Rd	Sheldon Rd to Calvine Rd	2,600	3922	16942	03922-16942	2,398	0.92	0.078	0.255	Yes	-202	40,877
133	Bader Rd	Sheldon Rd to Mix Ln	520	17013	17015	17013-17015	562	1.08	0.081	0.475	Yes	42	1,753
134	Sheldon Rd	Garrity Dr/Power Inn Rd to Elk Grove Florin Rd	1,950	4703	4705	04703-04705	2,210	1.13	0.133	0.28	Yes	260	67,479
135	Garrity Dr	Alberton Pl to Sheldon Rd	290	4703	17559	04703-17559	52	0.18	0.819	0.575	No	-238	56,423
136	Power Inn Rd	Sheldon Rd to Vista Brooks Dr/Villenueve Dr	1,510	4703	16921	04703-16921	1,165	0.77	0.228	0.303	Yes	-345	119,009
137	Sheldon Rd	E Stockton Blvd to Garrity Dr/Power Inn Rd	2,870	3920	17506	03920-17506	2,097	0.73	0.269	0.248	No	-773	598,079
138	E Stockton Blvd	Sheldon Rd to E Stockton Blvd	540	17506	17572	17506-17572	468	0.87	0.133	0.475	Yes	-72	5,148
139	Sheldon Rd	SR-99 NB Ramps to E Stockton Blvd	3,190	3902	5652	03902-05652	2,177	0.68	0.317	0.241	No	-1,013	1,025,212
141	Sheldon Rd	Lewist Stein Rd/Jocelyn Way to SR-99 NB Ramps	2,230	3919	5653	03919-05653	1,751	0.79	0.215	0.27	Yes	-479	229,608
142	Sheldon Rd	Bruceville Rd to Lewis Stein Rd/Jocelyn Way	1,520	3918	3931	03918-03931	805	0.53	0.470	0.303	No	-715	510,727
143	Lewis Stein Rd	W Stockton Blvd to Sheldon Rd	820	3913	13667	03913-13667	858	1.05	0.047	0.41	Yes	38	1,469
144	Jocelyn Way	Sheldon Rd to Praline Way	270	3919	17560	03919-17560	383	1.42	0.419	0.575	Yes	113	12,811
145	Bond Rd	Elk Crest Dr to Elk Grove Florin Rd	2,710	17150	17561	17150-17561	3,132	1.16	0.156	0.252	Yes	422	177,898
147	Elk Crest Dr	Bond Rd to Elk Grove Marketplace	210	17561	17565	17561-17565	230	1.10	0.095	0.63	Yes	20	399
148	Bond Rd	E Stockton Blvd to Elk Crest Dr	3,157	5648	17561	05648-17561	3,725	1.18	0.180	0.241	Yes	568	323,141
149	E Stockton Blvd	Banff Vista Dr to Bond Rd	350	5648	14296	05648-14296	245	0.70	0.300	0.575	Yes	-105	10,996
150	E Stockton Blvd	Bond Rd to Sheldon Rd	440	5648	14296	05648-14296	814	1.85	0.849	0.52	No	374	139,572

ELK GROVE GENERAL PLAN UPDATE

AM VALIDATION

ID	Road	Segment	Count Total	A Node	B Node	ID (EB or NB)	Model Volume Total	Model / Count	Percent Deviation	Max Percent Deviation	Within Deviaton	Model - Count	Difference Squared
151	Bond Rd	Laguna Springs Dr to SR-99 Ramps	4,500	4057	5649	04057-05649	4,904	1.09	0.090	0.209	Yes	404	162,991
153	Bond Rd	SR-99 NB Ramps to E Stockton Blvd	2,740	9308	9310	09308-09310	3,192	1.16	0.165	0.252	Yes	452	204,180
154	Calvine Rd	Vineyard Rd to Excelsior Rd	1,030	5925	17510	05925-17510	579	0.56	0.438	0.359	No	-451	203,647
155	Laguna Springs Dr	Laguna Palms Way to Laguna Blvd	810	6651	17567	06651-17567	1,109	1.37	0.369	0.41	Yes	299	89,261
156	Elk Grove Florin Rd	Elk Grove Blvd to E Stockton Blvd	1,632	3932	17651	03932-17651	1,118	0.68	0.315	0.294	No	-514	264,699
157	Hood Franklin Rd	I-5 NB Ramps to Franklin Blvd	697	3937	5008	03937-05008	993	1.42	0.424	0.44	Yes	296	87,498
158	Whitelock Rd	Big Horn Blvd to W Stockton Blvd	669	13661	16113	13661-16113	133	0.20	0.801	0.44	No	-536	287,446
			201,239				**192,129**	**Total**					

145	**Total Count**
114	**Links Within Deviation**
31	**Links Outside Deviation**
0.95	**Model/Count Ratio**
79%	**Percent within Caltrans Deviation (>75%)**
26%	**Percent Root Mean Square Error (<40%)**
0.94	**Correlation Coefficeint (>0.88)**

ELK GROVE GENERAL PLAN UPDATE

PM VALIDATION

ID	Road	Segment	Count Total	A Node	B Node	ID	Model Volume Total	Model / Count	Percent Deviation	Max Percent Deviation	Within Deviaton	Model - Count	Difference Squared
1	Grant Line Rd	Bradshaw Rd to Elk Grove Blvd	710	3904	17513	03904-17513	720	1.01	0.014	0.44	Yes	10	100
2	Grant Line Rd	Mosher Rd to Bradshaw Rd	1210	8160	17466	08160-17466	1,349	1.12	0.115	0.34	Yes	139	19,451
3	Grant Line Rd	Watermand Rd to Mosher Rd	1310	3903	17466	03903-17466	1,458	1.11	0.113	0.325	Yes	148	21,834
4	Grant Line Rd	E. Stockton Blvd/Survey Rd to Waterman Rd	1730	3902	17629	03902-17629	2,012	1.16	0.163	0.294	Yes	282	79,568
5	Grant Line Rd	SR99 NB Ramps to E. Stockton Blvd/Survey Rd	2230	3902	9980	03902-09980	2,244	1.01	0.006	0.27	Yes	14	202
6	Grant Line Rd	SR 99 SB Ramps to SR99 NB Ramps	1730	5639	5638	05639-05638	1,586	0.92	0.083	0.294	Yes	-144	20,734
7	Grant Line Rd	Promenade Pkwy to SR99 SB Ramps	1200	5638	14301	05638-14301	848	0.71	0.293	0.34	Yes	-352	123,858
8	Grant Line Rd	Lent Ranch Pkwy to Promenade Pkwy	720	3941	14301	03941-14301	623	0.87	0.134	0.44	Yes	-97	9,331
9	Elk Grove Blvd	Bradshaw Rd to Grant Line Rd	360	2374	17145	02374-17145	413	1.15	0.148	0.575	Yes	53	2,840
10	Grant Line Rd	Elk Grove Blvd to Bond Rd	1030	3905	17140	03905-17140	1,118	1.09	0.086	0.359	Yes	88	7,798
11	Bradshaw Rd	Grant Line Rd to Elk Grove Blvd	510	3904	6658	03904-06658	618	1.21	0.212	0.475	Yes	108	11,708
12	Waterman Rd	Grant Line Rd to Elk Grove Blvd	680	3903	17628	03903-17628	696	1.02	0.024	0.44	Yes	16	262
13	Mosher Rd	Grant Line Rd to Sonoma Creek Dr	170	17466	17519	17466-17519	197	1.16	0.156	0.63	Yes	27	708
14	E. Stockton Blvd	Grant Line Rd to Elkmont Way	780	3902	17523	03902-17523	565	0.72	0.276	0.41	Yes	-215	46,234
16	Promenade Pkwy	Kammerer Rd to South Mall Entrance	490	14301	17837	14301-17837	223	0.46	0.544	0.52	No	-267	71,147
18	Kammerer Rd	Bruceville Rd to Lent Ranch Pkwy	720	17518	17859	17518-17859	624	0.87	0.133	0.44	Yes	-96	9,220
19	Bruceville Rd	Eschinger Rd to Kammerer Rd	230	3939	3944	03939-03944	118	0.51	0.487	0.63	Yes	-112	12,524
20	Bruceville Rd	Kammerer Rd to Bilby Rd	670	3939	17742	03939-17742	615	0.92	0.082	0.44	Yes	-55	3,044
21	Bruceville Rd	Bilby Rd to Whitelock Rd	670	3938	17735	03938-17735	616	0.92	0.081	0.44	Yes	-54	2,960
22	Bilby Rd	Willard Pkwy to Bruceville Rd	520	7058	16000	07058-16000	495	0.95	0.048	0.475	Yes	-25	618
24	Willard Pkwy	Bilby Rd (East) to Bilby Rd (West)	520	7058	17528	07058-17528	453	0.87	0.129	0.475	Yes	-67	4,480
25	Willard Pkwy	Epoch Dr to Bilby Rd (East)	100	17530	17529	17530-17529	73	0.73	0.266	0.683	Yes	-27	705
26	Bilby Rd	Stovall Dr to Willard Pkwy	630	17528	17531	17528-17531	472	0.75	0.250	0.44	Yes	-158	24,827
27	Whitelock Rd	Bruceville Rd to Big Horn Blvd	690	6051	15676	06051-15676	121	0.17	0.825	0.44	No	-569	324,270
29	Big Horn Blvd	Whitelock Rd to Denali Cir/Lotz Pkwy	580	13660	16104	13660-16104	193	0.33	0.667	0.475	No	-387	149,490
30	Denali Cir	Partington Cir/Winkle Cir to Big Horn Blvd (South)	180	13660	17536	13660-17536	91	0.51	0.492	0.63	Yes	-89	7,842
31	Lotz Pkwy	Big Horn Blvd to Laguna Springs Dr/Wolf Pack Ln	240	13660	14294	13660-14294	160	0.67	0.334	0.63	Yes	-80	6,418
33	Lotz Pkwy	Laguna Springs Dr/Wolf Pack Ln to Auto City Dr	60	13658	17486	13658-17486	515	8.58	7.583	0.683	No	455	206,980
34	Laguna Springs Dr	Lotz Pkwy to Elk Grove Blvd	380	13658	17487	13658-17487	681	1.79	0.791	0.52	No	301	90,382
35	Big Horn Blvd	Denali Cir/Lotz Pkwy to Denali Cir	700	6085	13660	06085-13660	140	0.20	0.800	0.44	No	-560	313,587
36	Denali Cir	Philta Way/Joebar Cir to Big Horn Blvd (North)	110	16147	16148	16147-16148	164	1.50	0.495	0.683	Yes	54	2,967
37	Big Horn Blvd	Denali Cir to Civic Center Dr	800	16105	16150	16105-16150	370	0.46	0.537	0.41	No	-430	184,648
38	Civic Center Dr	Big Horn Blvd to Johnston Rd	110	16106	16214	16106-16214	54	0.49	0.507	0.683	Yes	-56	3,108
39	Civic Center Dr	Wymark Dr to Big Horn Blvd	300	16155	16202	16155-16202	170	0.57	0.432	0.575	Yes	-130	16,807
41	Civic Center Dr	Bruceville Rd to Wymark Dr	320	17485	16203	17485-16203	165	0.52	0.485	0.575	Yes	-155	24,054
42	Wymark Dr	Civic Center Dr to Elk Grove Blvd	110	16155	16156	16155-16156	182	1.66	0.657	0.683	Yes	72	5,222
43	Big Horn Blvd	Civic Center Dr to Elk Grove Blvd	950	3928	16106	03928-16106	591	0.62	0.378	0.38	Yes	-359	128,947
44	Elk Grove Blvd	Wymark Dr to Big Horn Blvd	3380	3928	16158	03928-16158	3,087	0.91	0.087	0.235	Yes	-293	85,726
45	Elk Grove Blvd	Big Horn Blvd to Laguna Springs Dr	3560	3928	17488	03928-17488	2,824	0.79	0.207	0.229	Yes	-736	542,262
46	Big Horn Blvd	Elk Grove Blvd to Laguna Blvd	1710	3928	17673	03928-17673	1,417	0.83	0.172	0.294	Yes	-293	86,025
47	Wymark Dr	Elk Grove Blvd to Dreyfus Way/Mansell Way	210	16158	16159	16158-16159	299	1.42	0.424	0.63	Yes	89	7,945
48	Elk Grove Blvd	Bruceville Rd to Wymark Dr	3260	3927	17674	03927-17674	2,915	0.89	0.106	0.235	Yes	-345	119,029
49	Bruceville Rd	Whitelock Rd to Civic Center Dr	1790	6051	16192	06051-16192	1,625	0.91	0.092	0.286	Yes	-165	27,329
50	Backer Ranch Rd	Bruceville Rd to Elk Grove Blvd	430	16211	16210	16211-16210	239	0.56	0.443	0.52	Yes	-191	36,328

ELK GROVE GENERAL PLAN UPDATE

PM VALIDATION

ID	Road	Segment	Count Total	A Node	B Node	ID	Model Volume Total	Model / Count	Percent Deviation	Max Percent Deviation	Within Deviaton	Model - Count	Difference Squared
51	Bruceville Rd	Civic Center Dr to Elk Grove Blvd	1940	16215	17679	16215-17679	1,791	0.92	0.077	0.28	Yes	-149	22,097
52	Elk Grove Blvd	Backer Ranch Rd to Bruceville Rd	2920	16216	17691	16216-17691	2,710	0.93	0.072	0.244	Yes	-210	43,891
53	Bruceville Rd	Elk Grove Blvd to Laguna Blvd	2320	3927	16353	03927-16353	2,017	0.87	0.131	0.265	Yes	-303	91,683
54	Laguna Blvd	Bruceville Rd to Big Horn Blvd	2720	4056	6648	04056-06648	3,089	1.14	0.136	0.252	Yes	369	136,002
55	Elk Grove Blvd	Franklin Blvd to Backer Ranch Rd	3020	16216	3926	16216-03926	2,578	0.85	0.146	0.241	Yes	-442	195,083
56	Backer Ranch Rd	Elk Grove Blvd to Nugget Market	230	16216	17539	16216-17539	176	0.76	0.237	0.63	Yes	-54	2,964
57	Laguna Blvd	Franklin Blvd to Bruceville Rd	3700	4055	16360	04055-16360	3,163	0.85	0.145	0.229	Yes	-537	288,698
58	Bruceville Rd	Laguna Blvd to Big Horn Blvd	2910	4056	6647	04056-06647	2,460	0.85	0.155	0.244	Yes	-450	202,625
59	Big Horn Blvd	Bruceville Rd to Laguna Blvd	2350	4040	13671	04040-13671	957	0.41	0.593	0.265	No	-1,393	1,939,806
60	Bruceville Rd	Big Horn Blvd to Sheldon Rd	2360	3918	4040	03918-04040	2,896	1.23	0.227	0.265	Yes	536	287,175
61	Big Horn Blvd	Franklin Blvd to Bruceville Rd	1740	4036	16673	04036-16673	914	0.53	0.475	0.294	No	-826	682,982
62	Bruceville Rd	Sheldon Rd to Damascus Dr	1670	3918	8393	03918-08393	1,917	1.15	0.148	0.294	Yes	247	60,855
63	Center Parkway	Laguna Village to Bruceville Rd	1140	3918	13664	03918-13664	1,078	0.95	0.054	0.34	Yes	-62	3,795
64	Franklin Blvd	Laguna Blvd to Big Horn Blvd	2410	4055	16643	04055-16643	3,014	1.25	0.251	0.26	Yes	604	364,695
65	Big Horn Blvd	Bramblewood Way to Franklin Blvd	330	16625	4036	16625-04036	143	0.43	0.565	0.575	Yes	-187	34,819
66	Franklin Blvd	Big Horn Blvd/Dwight Rd to Sims Rd	2760	4036	3916	04036-03916	2,715	0.98	0.016	0.248	Yes	-45	2,066
67	Laguna Blvd	Dwight Rd/Babson Rd to Franklin Blvd	3540	16389	5927	16389-05927	3,566	1.01	0.007	0.229	Yes	26	677
68	Franklin Blvd	Elk Grove Blvd to Laguna Blvd	2020	3924	16602	03924-16602	2,986	1.48	0.478	0.275	No	966	933,559
69	Dwight Rd	Laguna Blvd to Dwight Rd	370	16389	17541	16389-17541	149	0.40	0.597	0.575	No	-221	48,737
70	Babson Dr	Renwick Ave to Laguna Blvd	650	16390	16389	16390-16389	636	0.98	0.021	0.44	Yes	-14	192
71	Laguna Blvd	Harbour Point Dr to Dwight Rd/Babson Dr	3120	6348	17721	06348-17721	2,475	0.79	0.207	0.241	Yes	-645	415,531
72	Elk Grove Blvd	Four Winds Dr to Franklin Blvd	3490	5929	3924	05929-03924	2,875	0.82	0.176	0.235	Yes	-615	378,166
73	Four Winds Dr	Elk Grove Blvd to Lakepoint Drive	780	5929	17548	05929-17548	580	0.74	0.257	0.41	Yes	-200	40,156
74	Elk Grove Blvd	Harbour Point Dr to Four Winds Dr	2750	6347	17709	06347-17709	2,288	0.83	0.168	0.248	Yes	-462	213,544
75	W Taron Dr	W Taron Ct/Riparian Dr to Elk Grove Blvd	760	16539	16538	16539-16538	224	0.30	0.705	0.41	No	-536	286,762
76	Elk Grove Blvd	I-5 NB Ramps to Harbour Point Dr/W Taron Dr	2270	5012	6347	05012-06347	2,087	0.92	0.080	0.265	Yes	-183	33,357
79	Harbour Point Dr	Elk Grove Blvd to Laguna Blvd	1050	6348	17722	06348-17722	852	0.81	0.189	0.359	Yes	-198	39,381
81	Elk Grove Blvd	Laguna Springs Dr to Auto Center Dr	3590	13656	14303	13656-14303	3,122	0.87	0.130	0.229	Yes	-468	219,382
82	Elk Grove Blvd	Auto Center Dr to SR-99 SB Ramps	3790	3929	5643	03929-05643	3,369	0.89	0.111	0.224	Yes	-421	177,407
83	Elk Grove Blvd	SR-99 SB Ramps to SR-99 NB On-Ramp	3830	5643	14905	05643-14905	3,625	0.95	0.054	0.224	Yes	-205	42,144
84	Elk Grove Blvd	SR-99 NB On-Ramp to Emerald Vista Dr/E Stockton Blvd	3970	5642	3930	05642-03930	3,726	0.94	0.062	0.224	Yes	-244	59,657
85	E Stockton Blvd	SR-99 NB Ramps to Elk Grove Blvd	1810	17568	3930	17568-03930	785	0.43	0.566	0.286	No	-1,025	1,049,978
86	E Stockton Blvd	Valley Oak Ln to SR-99 NB Ramps	770	14299	17652	14299-17652	640	0.83	0.168	0.41	Yes	-130	16,800
87	Emerald Vista Dr	Elk Grove Blvd to Banff Visa Drive	790	3930	17162	03930-17162	304	0.39	0.615	0.41	No	-486	235,987
89	Laguna Springs Dr	Elk Grove Blvd to Laguna Blvd	1350	4057	16823	04057-16823	1,201	0.89	0.110	0.325	Yes	-149	22,225
90	Laguna Blvd	Big Horn Blvd to Laguna Springs Dr	5105	4267	17672	04267-17672	4,406	0.86	0.137	0.199	Yes	-699	487,996
91	W Stockton Blvd	Laguna Blvd to Dunisch Rd	570	4057	16797	04057-16797	705	1.24	0.237	0.475	Yes	135	18,258
92	Elk Grove Blvd	Emerald Vista Dr/E Stockton Blvd to Elk Grove Florin Rd	2830	3930	17650	03930-17650	2,612	0.92	0.077	0.248	Yes	-218	47,676
93	Elk Grove Florin Rd	Elk Grove Blvd to Sierra St	1330	3932	17260	03932-17260	1,610	1.21	0.211	0.325	Yes	280	78,383
94	Elk Grove Blvd	Elk Grove Florin Rd to Waterman Rd	1390	3932	17654	03932-17654	1,004	0.72	0.277	0.313	Yes	-386	148,706
95	Elk Grove Florin Rd	Elk Grove Blvd to Bond Rd	1710	3932	17260	03932-17260	1,644	0.96	0.038	0.294	Yes	-66	4,318
96	Waterman Rd	Elk Grove Blvd to Bond Rd	1030	3933	17502	03933-17502	1,110	1.08	0.078	0.359	Yes	80	6,441
97	Bond Rd	Elk Grove Florin Rd to Waterman Rd	2190	2368	17501	02368-17501	2,416	1.10	0.103	0.27	Yes	226	51,045
98	Bond Rd	Waterman Rd to Bradshaw Rd	1420	2348	17620	02348-17620	1,294	0.91	0.089	0.313	Yes	-126	15,861

ELK GROVE GENERAL PLAN UPDATE

PM VALIDATION

ID	Road	Segment	Count Total	A Node	B Node	ID	Model Volume Total	Model / Count	Percent Deviation	Max Percent Deviation	Within Deviaton	Model - Count	Difference Squared
99	Elk Grove Florin Rd	Bond Rd to Sheldon Rd	2140	2368	16824	02368-16824	2,317	1.08	0.083	0.27	Yes	177	31,363
100	Whitelock Pkwy	Franklin Blvd/Willard Pkwy to Bruceville Rd	1170	17695	16044	17695-16044	635	0.54	0.457	0.34	No	-535	286,230
101	Franklin Blvd	Whitelock Rd to Elk Grove Blvd	1620	17689	16297	17689-16297	1,845	1.14	0.139	0.303	Yes	225	50,537
102	Elk Grove Blvd	Waterman Rd to Bradshaw Rd	960	3933	17624	03933-17624	893	0.93	0.070	0.38	Yes	-67	4,481
103	Bradshaw Rd	Elk Grove Blvd to Bond Rd	770	2374	17610	02374-17610	1,007	1.31	0.308	0.41	Yes	237	56,404
104	Bond Rd	Bradshaw Rd to Bader Rd	950	2347	17606	02347-17606	909	0.96	0.043	0.38	Yes	-41	1,661
105	Bond Rd	Bader Rd to Grant Line Rd	540	17101	17110	17101-17110	555	1.03	0.028	0.475	Yes	15	221
106	Wrangler Dr	Grant Line Rd to Canter Dr	40	17084	17874	17084-17874	14	0.35	0.652	0.683	Yes	-26	681
107	Grant Line Rd	Bond Rd to Wilton Rd	1480	17084	2346	17084-02346	1,633	1.10	0.103	0.313	Yes	153	23,405
108	Wilton Rd	Grant Line Rd to Leisure Oak Ln	870	3906	14366	03906-14366	572	0.66	0.342	0.41	Yes	-298	88,581
109	Grant Line Rd	Wilton Rd to Sheldon Rd	1690	3906	17608	03906-17608	1,623	0.96	0.040	0.294	Yes	-67	4,482
110	Sheldon Rd	Excelsior Rd to Grant Line Rd	590	3923	3907	03923-03907	408	0.69	0.309	0.475	Yes	-182	33,232
111	Sheldon Rd	Elk Grove Florin Rd to Waterman Rd	1180	3922	16987	03922-16987	1,204	1.02	0.021	0.34	Yes	24	586
112	Waterman Rd	Bond Rd to Sheldon Rd	900	2348	8155	02348-08155	1,019	1.13	0.132	0.38	Yes	119	14,117
113	Sheldon Rd	Waterman Rd to Bradshaw Rd	650	4054	17614	04054-17614	965	1.48	0.484	0.44	No	315	99,034
114	Bradshaw Rd	Bond Rd to Sheldon Rd	910	2347	17605	02347-17605	960	1.06	0.055	0.38	Yes	50	2,525
115	Bader Rd	Bond Rd to Sheldon Rd	430	17101	17100	17101-17100	565	1.31	0.313	0.52	Yes	135	18,170
116	Sheldon Rd	Bradshaw Rd to Bader Rd	580	4066	17592	04066-17592	501	0.86	0.136	0.475	Yes	-79	6,215
117	Sheldon Rd	Bader Rd to Dillard Oaks Ct	530	17013	17507	17013-17507	315	0.59	0.406	0.475	Yes	-215	46,393
118	Grant Line Rd	Sheldon Rd to Calvine Rd	1430	3907	17067	03907-17067	1,539	1.08	0.076	0.313	Yes	109	11,782
119	Grant Line Rd	Calvine Rd to Sloughhouse Rd	1750	3908	3909	03908-03909	1,839	1.05	0.051	0.286	Yes	89	7,943
120	Excelsior Rd	Corfu Dr to Calvine Rd	460	17018	3914	17018-03914	365	0.79	0.207	0.52	Yes	-95	9,084
121	Excelsior Rd	Calvine Rd to Silent Wings Way	540	3914	17553	03914-17553	330	0.61	0.390	0.475	Yes	-210	44,288
122	Calvine Rd	Excelsior Rd to Grant Line Rd	430	3914	17583	03914-17583	333	0.77	0.225	0.52	Yes	-97	9,395
123	Calvine Rd	Bradshaw Rd to Excelsior Rd	970	3913	17585	03913-17585	688	0.71	0.291	0.38	Yes	-282	79,578
124	Bradshaw Rd	Calvine Rd to Knightview Ct	1780	3913	6663	03913-06663	1,640	0.92	0.079	0.286	Yes	-140	19,699
125	Bradshaw Rd	Sheldon Rd to Calvine Rd	930	4066	8395	04066-08395	1,186	1.28	0.275	0.38	Yes	256	65,554
126	Waterman Rd	Sheldon Rd to Calvine Rd	900	4054	8365	04054-08365	942	1.05	0.047	0.38	Yes	42	1,786
127	Waterman Rd	Calvine Rd to Tamerton Way	730	5940	17557	05940-17557	834	1.14	0.142	0.44	Yes	104	10,752
128	Elk Grove Florin Rd	Calvine Rd to Robbins Rd	2710	3912	17558	03912-17558	2,563	0.95	0.054	0.252	Yes	-147	21,512
129	Calvine Rd	Vintage Park Dr to Elk Grove Florin Rd	2980	3912	17636	03912-17636	2,349	0.79	0.212	0.244	Yes	-631	397,794
130	Calvine Rd	Waterman Rd to Bradshaw Rd	1980	5940	16999	05940-16999	1,146	0.58	0.421	0.28	No	-834	694,967
131	Calvine Rd	Elk Grove Florin Rd to Waterman Rd	2450	3912	17635	03912-17635	1,511	0.62	0.383	0.26	No	-939	882,343
132	Elk Grove Florin Rd	Sheldon Rd to Calvine Rd	2570	3922	16942	03922-16942	2,259	0.88	0.121	0.255	Yes	-311	96,926
133	Bader Rd	Sheldon Rd to Mix Ln	490	17013	17590	17013-17590	469	0.96	0.043	0.52	Yes	-21	450
134	Sheldon Rd	Garrity Dr/Power Inn Rd to Elk Grove Florin Rd	2100	4703	17645	04703-17645	2,224	1.06	0.059	0.275	Yes	124	15,490
135	Garrity Dr	Alberton Pl to Sheldon Rd	90	17559	4703	17559-04703	62	0.69	0.314	0.683	Yes	-28	798
136	Power Inn Rd	Sheldon Rd to Vista Brooks Dr/Villenueve Dr	910	4703	16921	04703-16921	1,026	1.13	0.128	0.38	Yes	116	13,508
137	Sheldon Rd	E Stockton Blvd to Garrity Dr/Power Inn Rd	2650	17506	4703	17506-04703	2,372	0.90	0.105	0.252	Yes	-278	77,048
138	E Stockton Blvd	Sheldon Rd to E Stockton Blvd	520	17506	17572	17506-17572	320	0.62	0.384	0.475	Yes	-200	39,915
139	Sheldon Rd	SR-99 NB Ramps to E Stockton Blvd	2960	5652	3920	05652-03920	2,471	0.83	0.165	0.244	Yes	-489	238,930
141	Sheldon Rd	Lewist Stein Rd/Jocelyn Way to SR-99 NB Ramps	2440	3919	17660	03919-17660	1,901	0.78	0.221	0.26	Yes	-539	290,706
142	Sheldon Rd	Bruceville Rd to Lewis Stein Rd/Jocelyn Way	1850	3918	3931	03918-03931	976	0.53	0.472	0.286	No	-874	763,453
143	Lewis Stein Rd	W Stockton Blvd to Sheldon Rd	1110	13667	17659	13667-17659	769	0.69	0.307	0.359	Yes	-341	116,056

ELK GROVE GENERAL PLAN UPDATE

PM VALIDATION

ID	Road	Segment	Count Total	A Node	B Node	ID	Model Volume Total	Model / Count	Percent Deviation	Max Percent Deviation	Within Deviaton	Model - Count	Difference Squared
144	Jocelyn Way	Sheldon Rd to Praline Way	230	3919	17560	03919-17560	372	1.62	0.618	0.63	Yes	142	20,207
145	Bond Rd	Elk Crest Dr to Elk Grove Florin Rd	2850	17561	17150	17561-17150	3,105	1.09	0.089	0.248	Yes	255	64,793
147	Elk Crest Dr	Bond Rd to Elk Grove Marketplace	210	17561	17565	17561-17565	297	1.41	0.413	0.63	Yes	87	7,505
148	Bond Rd	E Stockton Blvd to Elk Crest Dr	4534	5648	17561	05648-17561	3,737	0.82	0.176	0.209	Yes	-797	635,243
149	E Stockton Blvd	Banff Vista Dr to Bond Rd	390	17566	14296	17566-14296	272	0.70	0.302	0.52	Yes	-118	13,904
150	E Stockton Blvd	Bond Rd to Sheldon Rd	590	5648	13670	05648-13670	750	1.27	0.271	0.475	Yes	160	25,558
151	Bond Rd	Laguna Springs Dr to SR-99 Ramps	5067	4057	5649	04057-05649	5,013	0.99	0.011	0.199	Yes	-54	2,881
153	Bond Rd	SR-99 NB Ramps to E Stockton Blvd	2860	9308	9310	09308-09310	3,310	1.16	0.157	0.248	Yes	450	202,763
154	Calvine Rd	Vineyard Rd to Excelsior Rd	970	5925	17510	05925-17510	503	0.52	0.482	0.38	No	-467	218,539
155	Laguna Springs Dr	Laguna Palms Way to Laguna Blvd	1350	4057	16823	04057-16823	1,128	0.84	0.165	0.325	Yes	-222	49,504
156	Elk Grove Florin Rd	Elk Grove Blvd to E Stockton Blvd	1337	3932	17651	03932-17651	1,243	0.93	0.070	0.325	Yes	-94	8,800
157	Hood Franklin Rd	I-5 NB Ramps to Franklin Blvd	545	5008	17702	05008-17702	997	1.83	0.829	0.475	No	452	203,905
158	Whitelock Rd	Big Horn Blvd to W Stockton Blvd	266	13661	16113	13661-16113	133	0.50	0.501	0.575	Yes	-133	17,727
			208,514				188,966	**Total**					
			145					**Total Count**					
			124					**Links Within Deviation**					
			21					**Links Outside Deviation**					
			0.91					**Model/Count Ratio**					
			86%					**Percent within Caltrans Deviation (>75%)**					
			25%					**Percent Root Mean Square Error (<40%)**					
			0.96					**Correlation Coefficeint (>0.88)**					