



February 14, 2020

Sacramento Area Sewer District
Yadira Lewis, PE
10060 Goethe Road
Sacramento, California 95827

**RE: California Northstate University Hospital Medical Campus in Elk Grove
Technical Memo Revision 1 to Laguna Stonelake Level 1 Sewer Study (Sanitary Sewer Master Plan)**

Dear Ms. Lewis:

This Technical Memo (TM) is a revision to the original "Sanitary Sewer Master Plan" (Master Plan) dated January 19, 2020 for the Laguna Stonelake subdivision. Parcels at the northwest corner of the subdivision were designated as office, commercial and industrial for master planning purposes with an equivalent single-family dwelling unit (ESD) density of approximately 5 ESDs per acre. Some of those parcels are proposed to be developed into hospital and other facilities changing an average density of that same area to 25.3 ESDs per acre. Because of the proposed increase in density from this area, this TM reevaluates sewer demand to identify deficiencies that the existing sewer system will experience and upgrades needed downstream on the new proposed facilities.

The Master Plan layout of the system is provided in Appendix A. The layout of the proposed hospital campus is provided as **Exhibit A**. The parcels that currently incorporate the proposed campus are listed in in **Table 1**, below. There are four developed parcels that are not part of the campus that are listed in Table 2. The associate ESD are provided in Table 1 based on the data provided in Exhibit A. The ESDs for the parcels in **Table 2** are calculated based on an assumed 6 ESD/acre as explained further in this study. The total parcel area and ESDs were used to calculate the ESD density stated above.

Table 1: CNU Medical Campus Parcels

Assessor Parcel	Area (ac)	ESD
132-0460-076	8.97	31.8
132-2160-001	7.76	206.7
132-2160-002	0.82	0
132-2480-001	1.20	0
132-2480-002	1.17	440.0
132-2480-003	0.63	67.4
132-2480-004	0.91	0
132-2480-005	0.80	0
132-2480-007	0.76	0
132-2480-009	0.52	0
132-2480-010	0.67	20.6
132-2480-011	0.67	0
ROW	1.03	0
TOTAL	25.91	766.5

Table 2: Non-Campus Parcel in Campus area

Assessor Parcel	Area (ac)	ESD*
132-0460-100	1.56	9.4
132-2160-104	0.83	5.0
132-2480-006	1.11	6.7
132-2480-008	0.60	3.6
TOTAL	4.10	24.7

* ESDs calculated by multiplying area acreage by 6 ESDs per acre.

Project and Study Characteristics

As reported by the Master Plan, Laguna Stonelake is a mixed-use development of 414 acres with 1,503 single family homes, 463 multi-family units and 94 acres of commercial, school and park spaces. The total ESDs and peak wet weather flow calculated to be generated from the subdivision was 2302 ESDs and 1.8 mgd, respectively. This information is provided on the Master Sewer Plan layout in Appendix A.

The California Northstate University Medical Campus (Campus) is proposed to be situated on parcels northwest of what is now West Taron Drive. These parcels connect to the most upstream sewer main infrastructure that is 8-inch in size. Campus area flows are conducted to sewer mains in Riparian Drive where it flows downstream through 8, 10 and 15-inch collector pipe before transitioning to an 18-inch trunk system near the intersection of Riparian and East Taron Drive. The trunk wastewater then flows to a pump station at the intersection of Elk Grove Blvd. and East Taron Drive where it is pumped north through a 10-inch and 12-inch force main to a Regional San interceptor at the intersection of the Union Pacific Railroad tracks and Laguna Blvd.

Due to the increased ESD density of the Campus, demand on the above infrastructure will increase. Utilizing SASD current standards, the expected additional sewer demand from the proposed Campus and existing commercial properties northeast of West Taron Drive can be calculated. **Exhibit B** shows the original peak wet weather demand estimates from the Master Plan and the new demand calculations.

Assumptions

During a preliminary review of the new flow demands with SASD staff, Wood Rodgers was told that analysis of the capacity and impact to the existing pump station at Elk Grove Blvd. and East Taron Drive would be unnecessary. Therefore, this Tech Memo only assesses impacts to the collector pipe and trunk in Riparian Drive and East Taron Drive.

Calculations

In order to calculate the new demand on the existing sewer infrastructure due to the proposed Campus, the peak wet weather flows reported in the Master Plan down Riparian Drive are combined with flows calculated from the acreage and ESD shown in Tables 1 & 2, above. More specifically, the Master Plan flow data is shown in the table that is included in the subdivision system layout provided in Appendix A. The Master Plan demand from the Campus area backed out by subtracting it from the demand reported by the Master Plan at the various manhole nodes in Riparian Drive. The new demand from the proposed Campus is then added to those same nodes. The resultant demand is used to determine pipe sizes needed to safely conduct the flow per SASD's standards. Regardless of the new pipe size, the pipe slope is maintained at the minimum allowable slope for the original pipe size.

Exhibit C is a table showing the calculated peak wet weather flow from the Campus area and the resultant flows in the system downstream from the Campus. The table also provides the required pipe sizes needed to safely conduct the new demands. The pipe slopes used to identify minimum new pipe sizes were conservatively assumed to be SASD's standard minimum pipe slope for the pipe sizes shown in the Master Plan layout in Appendix A.

Findings

The resulting changes to the collector system need to safely serve the Campus area is provided in Exhibit B. Exhibit C provides the detailed calculation supporting the information in Exhibit B. The analysis shows that the existing collector system in Riparian Drive must be upsized as shown in Exhibit C. Since the existing sewer trunk still has additional capacity with the added demand, no changes are need.

Respectfully Submitted,
WOOD RODGERS, INC.

Jim Fletter, PE
Senior Engineer

Attachments: Exhibit A – Proposed CNU Medical Campus Layout
Exhibit B – Sanitary Sewer Infrastructure Sizing
Exhibit C – Sanitary Sewer Analysis
Appendix A – Master Sewer Plan

*Reference: Sanitary Sewer Master Plan, Laguna Stonelake dated January 19, 2000
prepared by Wood Rodgers Inc.*

DEVELOPMENT/ESD/PARCEL OVERLAY

CNU MEDICAL CAMPUS

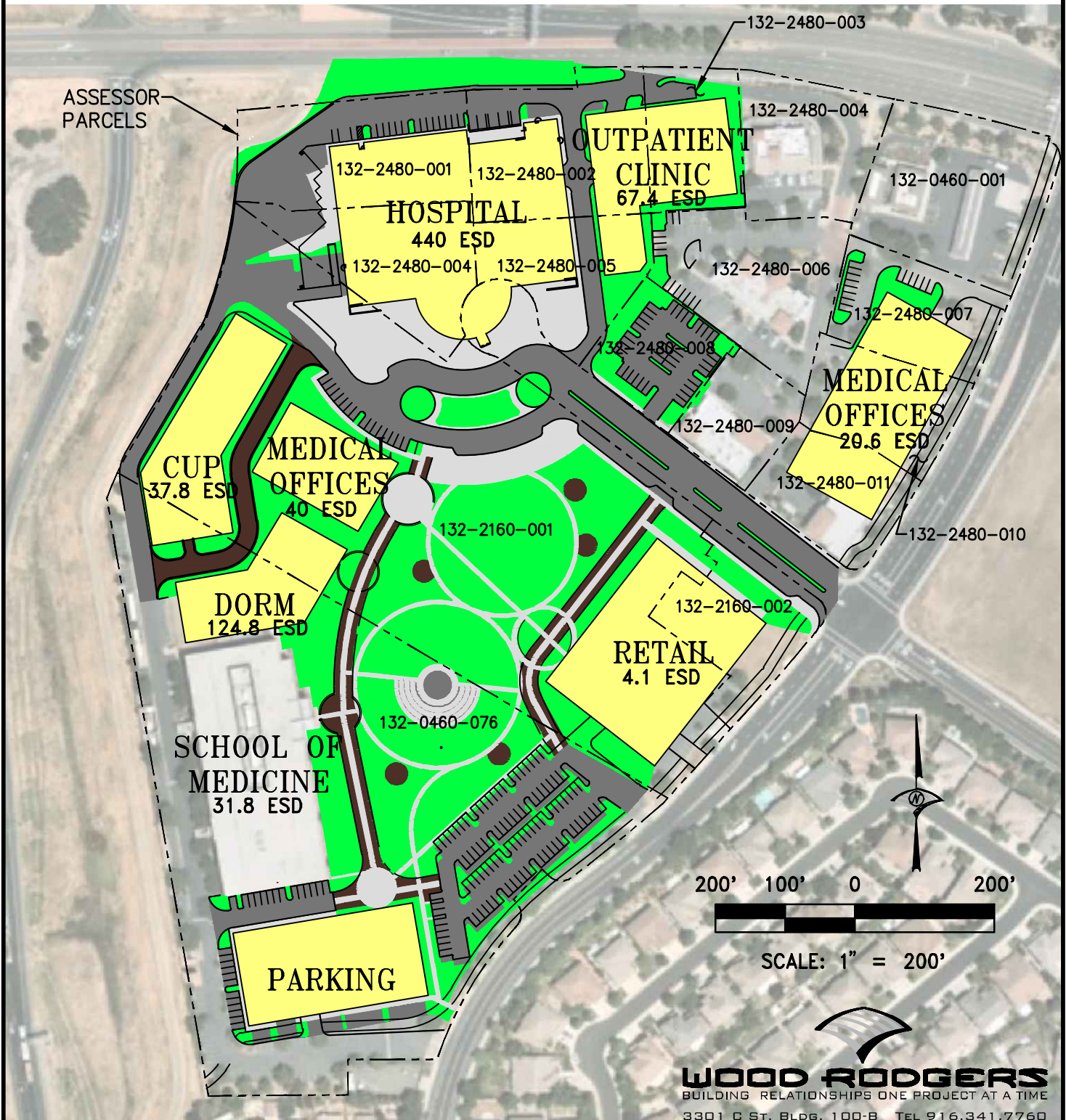
CALIFORNIA NORTHSTATE UNIVERSITY

ELK GROVE

CALIFORNIA

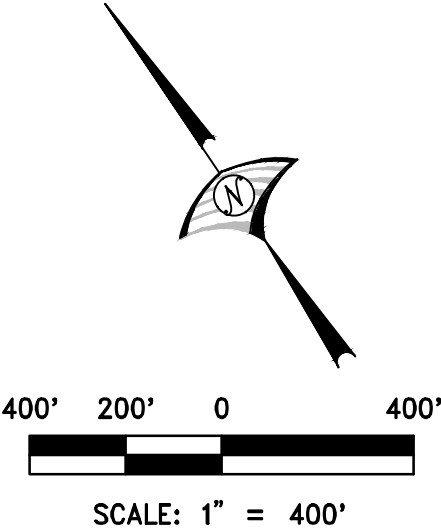
FEBRUARY 2020

EXHIBIT A



SANITARY SEWER INFRASTRUCTURE SIZING
CNU MEDICAL CAMPUS
CALIFORNIA NORTHSTATE UNIVERSITY

ELK GROVE CALIFORNIA
FEBRUARY 2020



XX"S NEW PIPE
XX"S EXISTING PIPE

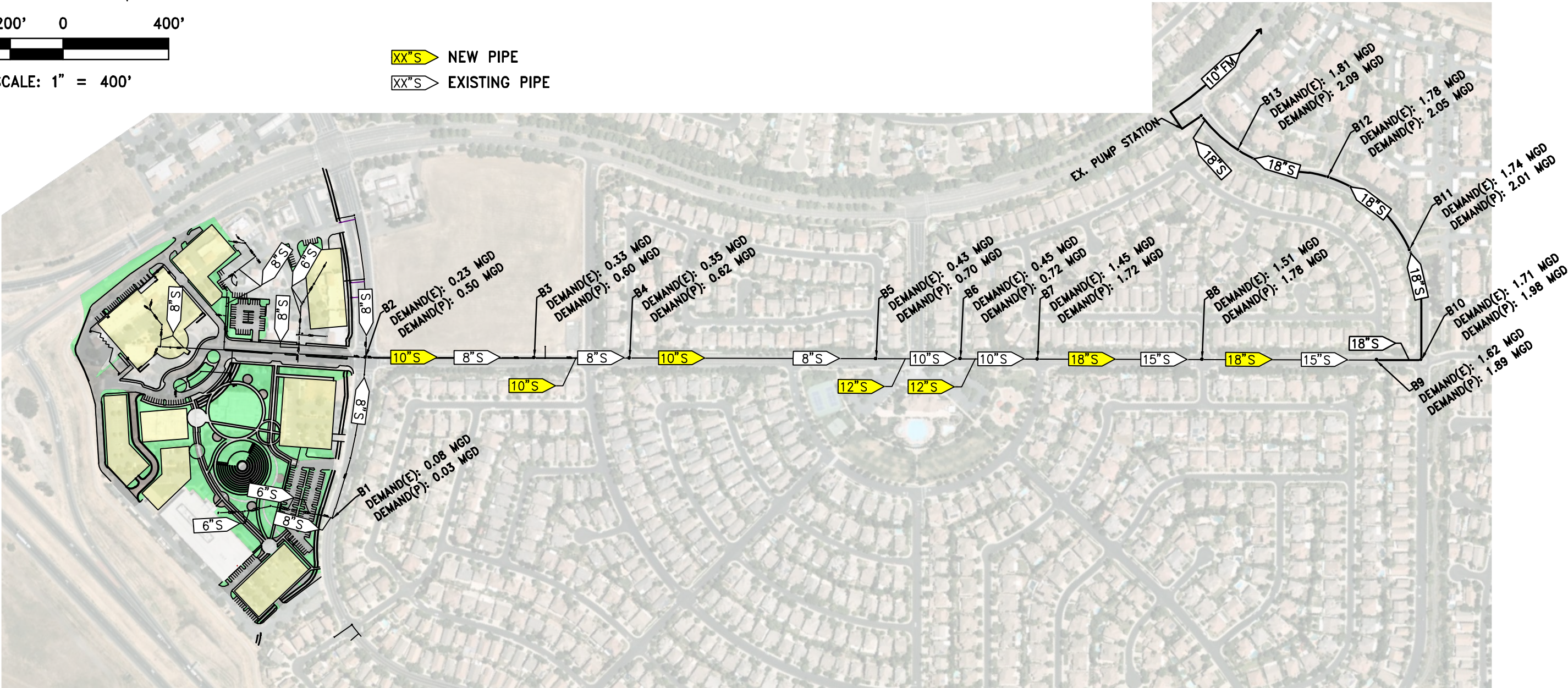


EXHIBIT C

CNU Medical Campus Sanitary Sewer Analysis															
Campus Demands							Peak Wet Weather Flow (mgd)				Pipe Data				
Node	Area ¹	ESDs ²	ADWF ³	PF ³	I/I ³	PWWF ³	Original	Existing Campus Area Subtraction	Proposed Campus Area Addition	Resultant PWWF ⁴	Existing Slopes (ft/ft)	Existing Diameter (in)	Required Diameter (in)	New Velocity (fps)	New Hydraulic Depth d/D
B1	8.96	31.8	0.01	2.1	0.01	0.03	0.08	0.08	0.03	0.03	0.0035	8	8	1.20	0.19
B2	21.04	759.3	0.24	1.8	0.03	0.46	0.23	0.23	0.50	0.50	0.0035	8	10	2.48	0.55
B3							0.33	0.23	0.50	0.60	0.0035	8	12	2.60	0.46
B4							0.35	0.23	0.50	0.62	0.0035	8	12	2.62	0.47
B5							0.43	0.23	0.50	0.70	0.0025	10	12	2.38	0.56
B6							0.45	0.23	0.50	0.72	0.0025	10	12	2.39	0.57
B7							1.45	0.23	0.50	1.72	0.0015	15	18	2.46	0.59
B8							1.51	0.23	0.50	1.78	0.0015	15	18	2.48	0.60
B9							1.62	0.23	0.50	1.89	0.0012	18	18	2.29	0.68
B10							1.71	0.23	0.50	1.98	0.0012	18	18	2.31	0.70
B11							1.74	0.23	0.50	2.01	0.0012	18	18	2.32	0.71
B12							1.78	0.23	0.50	2.05	0.0012	18	18	2.32	0.72
B13							1.82	0.23	0.50	2.09	0.0012	18	18	2.33	0.73

Notes

- 1 Acreage of all commercial parcels northeast of West Taron Drive
- 2 ESDs of medical campus building as identified in Exhibit A plus remaining parcel areas multiplied by 6 ESDs per acre
- 3 Average dry weather flow, dry weather peaking factor, inflow/infiltration and peak wet weather flow calculated per SASD Standards section 201.2
- 4 Calculation: Original - Existing Campus + Proposed Campus

APPENDIX A

2000 MASTER SEWER PLAN, LAGUNA STONELAKES (SEWER LAYOUT E`XHIBIT)

