NOTE:
REFER TO VOLUME 2 HYDROLOGY STANDARDS OF THE CITY/COUNTY DRAINAGE MANUAL FOR ASSUMPTIONS MADE IN DERIVING THIS FIGURE.
NOTE: Design runoff for multiple family development shall be based on the following formula:

\[ Q_m = Q_r + \frac{(Q_c - Q_r)(I - 50)}{40} \]

Where:
- RD-7 \( I = 60 \)
- RD-10 \( I = 70 \)
- RD-20 \( I = 80 \)
- RD-30 \( I = 90 \)

Source: County of Sacramento Master Drainage Plan, Part 1, County-wide Hydrology, Nolte and Assoc.
NOTE: Design runoff for multiple family development shall be based on the following formula:

\[ Q_m = Q_r + (Q_c - Q_r)(I - 50)/40 \]

Where:
- RD-7: I = 60
- RD-10: I = 70
- RD-20: I = 80
- RD-30: I = 90

Source: County of Sacramento Master Drainage Plan, Part 1, County-wide Hydrology, Nolte and Assoc.
NOTE:
REFER TO VOLUME 2 HYDROLOGY STANDARDS OF THE CITY/COUNTY DRAINAGE MANUAL FOR ASSUMPTIONS MADE IN DERIVING THIS FIGURE.

CITY OF ELK GROVE - PUBLIC WORKS

10-YEAR PEAK FLOW
SACRAMENTO METHOD
RAINFALL ZONE 2, 80-640 ACRES

DATE: 09/22/2007
NOT TO SCALE

APPROVED BY: CITY ENGINEER
DATE: 10/24/2018
DRAWING NUMBER: SD - 2
NOTE:
REFER TO VOLUME 2 HYDROLOGY STANDARDS OF THE CITY/COUNTY DRAINAGE MANUAL FOR ASSUMPTIONS MADE IN DERIVING THIS FIGURE.

100-YEAR PEAK FLOW
SACRAMENTO METHOD
RAINFALL ZONE 2, <80 ACRES

CITY OF ELK GROVE - PUBLIC WORKS

DATE: 09/22/2007
APPROVED: 10/24/2018
DRAWING NUMBER: SD - 3
NOTE:
REFER TO VOLUME 2 HYDROLOGY STANDARDS OF THE CITY/COUNTY DRAINAGE MANUAL FOR ASSUMPTIONS MADE IN DERIVING THIS FIGURE.

100-YEAR PEAK FLOW
SACRAMENTO METHOD
RAINFALL ZONE 2, 80-640 ACRES
\[ H_L = K \frac{V_i^2}{2g} \]

- \( V_i \) = Velocity of flow in lateral in f.p.s.
- \( g \) = Acceleration due to gravity, 32 ft/sec/sec
- \( H_L \) = Feet of head loss in Jct. due to change in direction of lateral flow
- \( K \) = Factor from graph

Degree of Angle "A" Between Lateral & Outlet

Factor K
NOTES

1. GEOTECTILE FABRIC, PER CITY OF ELK GROVE STANDARD SPECIFICATIONS.

2. IF SUBGRADE IS WITHIN 12" OF TOP OF PIPE, BACKFILL MATERIAL TO BE CLASS 2 AGGREGATE BASE, OR CDF PER SPECIFICATIONS.

3. INITIAL BACKFILL TO BE PLACED IN AN 18" LOOSE LIFT, COMPACTED TO 12".

4. TRENCH DAMS TO BE INSTALLED EVERY MANHOLE RUN.

5. CDF BACKFILL AROUND MANHOLES TO BE INSTALLED PER SPECIFICATIONS.

TYPE "C"
STORM DRAIN TRENCH DETAIL FOR SHALLOW COVER
FOR USE WITH PVC PIPE ONLY
RCP CLASS IV OR V TO BE BACKFILLED PER NOTE 2

*FABRIC WILL BE REQUIRED WHEN WATER OR SOIL STABILITY CONDITIONS ARE OBSERVED, PER THE DIRECTION OF CITY GEOTECHNICAL STAFF.
GENERAL NOTES:

1. INITIAL BACKFILL MATERIAL SHALL BE THOROUGHLY COMPACTED AROUND PIPE BY SHOVEL SLICING OR TAMPPING.

2. SEE SECTION 19 "TRENCH EXCAVATION, BEDDING AND BACKFILL."

3. MINIMUM DEPTH OF BEDDING MATERIAL SHALL BE 1-1/2 INCHES BELOW THE PIPE BELL.

4. FOR ROCKY OR FOR UNSTABLE BEDDING CONDITIONS, SECTION 19-1.07 OF THE STANDARD CONSTRUCTION SPECIFICATIONS SHALL APPLY.

5. IF MINIMUM WIDTH CANNOT BE ACHIEVED, CONTROL DENSITY FILL PER SECTION 50-15 SHALL BE USED IN LIEU OF 3/4" CRUSHED AGGREGATE AT NO EXTRA COST.

CAST IN PLACE CONCRETE PIPE (CIPCP)

CLASS 'B-2' CONCRETE PER SECTION 50-5

FILTER FABRIC

4" FOR 12" - 48" PIPES
6" FOR PIPES > 54"

COVER LESS THAN 12"

RIGID PIPE

REINFORCED CONCRETE PIPE C-76

FILTER FABRIC

3/4" CRUSHED AGGREGATE TYPE 'B' FOR 12" PIPES OR LARGER. SEE NOTE 5.
4" FOR 12" - 48" PIPES
6" FOR PIPES > 54"

FLEXIBLE PIPE

PVC - C900, C905
CORRUGATED ALUMINUM AND STEEL,
RIBBED ALUMINUM AND STEEL,
ACRYLONITRILE-BUTADIENE-STYRENE (ABS)

* NATIVE MATERIAL MAY BE USED

12" - 3/4" CRUSHED ROCK TYPE B*

6" CURING LAYER

FILTER FABRIC
NOTES:

1. TOP OF DAM TO EXTEND INTO INTERMEDIATE BACKFILL 12" MINIMUM OR TOP OF GROUND WATER HGL.

FILL VOID WITH FLEXIBLE MATERIAL OR EXPANDABLE FOAM TO FORM A WATER TIGHT SEAL

UNDISTURBED EARTH

TRENCH WALL

CONDUCTOR PIPE OR CORE-BORE

CENTER STORM DRAIN

CDF (CONTROLLED DENSITY FILL)
NOTES:

1. On all pipes up to 30" I.D. use flexible compression gasket or boot connector conforming to ASTM C-923. Connection shall be water and soil tight. For pipes greater than 30" I.D., base may be cast-in-place and a water stop conforming to ASTM C-923 shall be used.

2. Sump shall be 1'-0" deep, measured from invert of outfall pipe. Sump not required if outfall pipe is 24" I.D. or larger.

3. Riser sections, cones, and adjusting rings shall conform to ASTM C-478.

4. All joints shall be made with preformed plastic joint sealing compound. Following installation grout all interior and exterior joints.

5. Concentric components shall be used unless otherwise specified on the plans.

6. Precast manholes shall be sized to provide the following: the annular space on the inside of the manhole barrel between cored pipe connection holes shall be a minimum of 10 inches, if the connection hole is cast monolithically with the manhole barrel, the measurement shall be taken from the finished concrete connection.

7. See Section 39, Construction Specifications, "Manholes".

8. Cone for manholes greater than 60" diameter shall be individually designed.
STANDARD 24" FRAME AND COVER.
SEE NOTES ON SD-7.

1'-6" MAX. FOR 24" OPENING
2'-0" MAX. FOR 36" OPENING

CONCRETE COLLAR.
SEE SD-7.

NOTE
REMOVE CONCRETE IN MANHOLE OPENING AND CONSTRUCT RISER BASE WHILE CONCRETE IS STILL WORKABLE.

PLACE RISER SECTION AFTER CONCRETE HAS SET.

SEE SECTION 39, "MANHOLES," AND SECTION 36, CAST-IN-PLACE CONCRETE PIPE.

VARIABLE

VARIABLE 48" MIN

TYPE A
CAST-IN-PLACE PIPE ONLY
NOTES:

1. CONCRETE SHALL BE CLASS "A" IN CONFORMANCE WITH ARTICLE 50-5 "PORTLAND CEMENT CONCRETE."

2. SEE SECTION 39, "MANHOLES."
NOTES:

1. ALL CASTINGS TO CONFORM TO ASTM A48, CLASS 35B.
2. FRAME AND COVER TO MEET H-20 LOAD SPECIFICATIONS.
3. MACHINED HORIZONTAL AND VERTICAL BEARING SURFACES NOT TO EXCEED 1/64" TOLERANCE.
4. FRAME AND COVER SHALL HAVE A COATING OF BLACK BITUMINOUS MATERIAL.
5. LOCKING COVER TYPE FRAME AND COVERS SHALL BE USED IN EASEMENT AREAS UNLESS OTHERWISE APPROVED.

GRID PATTERN
MANUFACTURE

REQUIRED LETTERING "STORM DRAIN"

4- 1" \( \varphi \) HOLE EQUALLY SPACED

10°30' 30'
MACHINED SURFACES

MACHINED SURFACES
COVER
FRAME

1 1/8"
5/8"
1 3/4"

SECTION THROUGH CENTER OF PICK HOLE

1-1/4" x 1" BLIND PICK HOLE

5/8" TYP.

STORM DRAIN

FRAME
COVER

25 5/16" + 1/64
1 1/4" x 1"
1 1/8"

SECTION B-B

26 3/8" 25 3/8" + 1/64
1 1/8"

SECTION A-A

23 7/8" + 1/16" 25" 1/16" 31 1/2" MIN

SET WEIGHT

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>FRAME</td>
<td>140 LBS</td>
</tr>
<tr>
<td>COVER</td>
<td>130 LBS</td>
</tr>
<tr>
<td>TOTAL</td>
<td>270 LBS</td>
</tr>
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</table>

CITY OF ELK GROVE - PUBLIC WORKS
GREY CAST IRON
STANDARD 24" MANHOLE
FRAME & COVER

APPROVED BY:

DATE: 09/22/2017
NOT TO SCALE
REVISION BY APPROVED DATE

SD - 9
NOTES:

1. ALL CASTINGS TO CONFORM TO ASTM A48, CLASS 35B.

2. FRAME AND COVER TO MEET H-20 LOAD SPECIFICATIONS.

3. MACHINED HORIZONTAL AND VERTICAL BEARING SURFACES NOT TO EXCEED 1/64" TOLERANCE.

4. FRAME AND COVER SHALL HAVE A COATING OF BLACK BITUMINOUS PAINT.

5. LOCKING COVER TYPE FRAME AND COVERS SHALL BE USED WHEN SPECIFIED IN CONTRACT DOCUMENTS.

6. H20 RATED SLOTTED GRATE OR GRATE TYPE MANHOLE COVER MAY BE SUBSTITUTED FOR COVER WHEN SPECIFIED IN CONTRACT DOCUMENTS OR UPON APPROVAL OF DIRECTOR.

7. COVER SHALL BE "STORM DRAIN" STAMPED.
NOTES:

1. MANHOLE COVER SHALL FIT FRAME SHOWN ON STANDARD DRAWING SD-9.

2. SEATING SURFACES SHALL BE MACHINED AS SHOWN IN DETAIL ON STANDARD DRAWING SD-9.

3. THIS COVER MAY BE USED ONLY WITH APPROVAL OF THE CITY ENGINEER.

4. GALVANIZE AFTER FABRICATION.
NOTES

1. TO BE USED ON TYPE 1A AND TYPE 2 CURB AND GUTTER WHERE INLETS ARE AT DETACHED SIDEWALKS.
NOTES

1. STANDARD DEPRESSION FOR INLET IS 1-1/2" AND LIP OF GUTTER MUST BE SET BACK 3" FROM GUTTER FLOW LINE.
2. FRAME AND GRATE SHALL CONFORM TO STANDARD DRAWINGS SD-14 AND SD-15.
3. OPEN-BACK HOOD SHALL BE H-20 RATED.
5. AN EDGING TOOL SHALL BE USED ON ALL EDGES WHERE THE CONCRETE SIDEWALK AND CURB MEET THE TOP OF THE HOOD.
6. ALL EXPOSED PARTS TO BE HOT DIP GALVANIZED PER ASTM A123, AFTER FABRICATION.
7. SEE SD-12.1 FOR INSTALLATION OF INLETS AT DETACHED SIDEWALKS.
8. INCREASE SIDEWALK THICKNESS TO 8" IN ORDER TO ANCHOR CAST IRON HOOD AND INLET WALL. WIDTH TO BE 6" MINIMUM.
9. WHEN MORE THAN ONE GRATE IS PROPOSED, STD DWG SD-16 FOR SUPPORT ASSEMBLY.
NOTES

1. STANDARD DEPRESSION FOR INLET IS 1-1/2".
2. FRAME AND GRATE SHALL CONFORM TO STANDARD DRAWINGS SD-14 AND SD-15.
3. OPEN-BACK HOOD SHALL BE H-20 RATED.
4. ALL EXPOSED EDGES SHALL HAVE A 1/8" R (MINIMUM).
5. AN EDGING TOOL SHALL BE USED ON ALL EDGES WHERE THE CONCRETE SIDEWALK AND CURB MEET THE TOP OF THE HOOD.
6. ALL EXPOSED PARTS TO BE HOT DIP GALVANIZED PER ASTM A123, AFTER FABRICATION.
NOTES:

1. OMIT 1/2" FRAME ANCHORS OVER CENTER SUPPORT ASSEMBLY WHEN MULTIPLE FRAMES ARE USED.

2. MATERIAL: ASTM A36 MILD STEEL


4. ALL EXPOSED PARTS TO BE HOT DIP GALVANIZED PER ASTM A123, AFTER FABRICATION.
NOTES:

1. DIMENSIONS TO CENTERLINE OF BARS UNLESS OTHERWISE NOTED.

2. ALL EXPOSED PARTS TO BE HOT DIP GALVANIZED PER ASTM A123, AFTER FABRICATION.
NOTES:

1. OMIT 1/2" FRAME ANCHORS OVER CENTER SUPPORT.

2. L=57 INCHES FOR CURB OPENING CATCH BASIN WITH GRATING(S) AND DEBRIS SKIMMER (STANDARD PLAN 301).

3. ALL EXPOSED PARTS TO BE HOT DIP GALVANIZED PER ASTM A123, AFTER FABRICATION.
NOTES:

1. TO BE USED ONLY IN TYPE 2 CURB AND GUTTER WITH 2" DEPRESSION. USE IN TYPE 1A CURB AND GUTTER ONLY UPON APPROVAL OF THE CITY ENGINEER. SEE KEYNOTE 1.
2. FACE ANGLE SHALL BE CAST INTO STRUCTURE CONTINUOUS FOR THE FULL LENGTH "W".
3. ALL EXPOSED METAL PARTS TO BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
4. WHEN CURB INLET OPENING HEIGHT (H) EXCEEDS 6" INSTALL 1" Ø STEEL PROTECTION BAR.
5. INSTALL ADDITIONAL BARS AT 3-1/2" CLEAR SPACING ABOVE FIRST BAR WHEN OPENING EXCEEDS 13".
6. WHEN CURB INLET OPENING LENGTH EXCEEDS 8' INSTALL 1" Ø STEEL SUPPORT BOLTS, SPACED AT NOT MORE THAN 5' O.C.

KEYNOTES:
1. ALTERNATE ANGLE IRON SIZE, DEPRESSION DEPTH, AND SLAB THICKNESS MAY BE USED UPON APPROVAL OF THE CITY ENGINEER.
NOTES:

1. PROVIDE 1/4" x 18" GALVANIZED CHAIN WELD TO COVER AND EYE BOLT.

2. PROVIDE END OR SIDE OPENINGS AS SHOWN ON PLANS OR CROSS SECTION.

3. TOP OF WALLS TO BE FINISHED TO A FLAT PLANE TO PROVIDE EVEN BEARING FOR PLATE COVER.

4. ALL METALS SHALL BE HOT DIP GALVANIZED PER ASTM A123.
NOTES:

1. STANDARD DEPRESSION FOR INLET IS 1 1/2".
2. FRAME AND GRATE SHALL CONFORM TO STANDARD DRAWINGS SD-14 AND SD-15.
3. OPEN BACK CAST IRON HOOD SHALL BE H-20 RATED, 3 1/2" THICK AND CONFORM TO STANDARD DRAWING SD-12.
4. ALL EXPOSED EDGES SHALL HAVE A 1/8" RADIUS (MINIMUM).
5. AN EDGING TOOL SHALL BE USED ON ALL EDGES WHERE THE CONCRETE SIDEWALK AND CURB MEET THE TOP OF THE HOOD.
6. EXPOSED SURFACES OF THE GRATES, FRAMES, AND HOODS WITH THE PARTS ASSEMBLED DISASSEMBLED SHALL BE PAINTED WITH COMMERCIAL QUALITY ASPHALTUM PAINT AFTER TESTING AND ASSEMBLY.
7. THE MINIMUM PIPE SIZE IS 12" IF THE INLET DEPTH IS GREATER THAN 4', THE MINIMUM PIPE SIZE SHALL BE 15".
8. THE MANHOLE FRAME AND COVER SHALL BE PER STANDARD DRAWING SD-10.1 AND SD-10.2.
MIN. WEIGHT OF PRECAST REINFORCED CONCRETE COVER IS 80 LBS.

#4 REBAR @ 12" O.C. E.W., ADD 2-#4 ON 4 SIDES OF MANHOLE FRAME. MINIMUM 1" CLEAR COVER ALL DIRECTIONS

FRAME AND COVER PER STD. DWG. SD-9

LIP OF GUTTER TO CURB FACE 3' TO TOP BACK OF CURB

PLAN

NOTE:

1. CURB INLET ASSEMBLY MAY BE PRECAST CONCRETE OR FORMED AND CAST-IN-PLACE P.O.C.

2. ALL METAL SHALL BE HOT DIP GALVANIZED PER ASTM A123.

3. SEE STANDARD DRAWING SD - 17 FOR FACE PLATE ASSEMBLY.
GUTTER TRANSITION ELEVATION

GUTTER TRANSITION PLAN

CURB INLET DETAIL

NOTES:

1. CURB INLET ASSEMBLY MAY BE PRECAST CONCRETE, OR FORMED AND CAST-IN-PLACE P.C.C.

2. ALL METAL SHALL BE HOT DIPPED GALVANIZED ASTM A123.

3. ALL CASTINGS TO CONFORM TO ASTM A4B, CLASS 35B

4. FRAME AND COVER TO MEET H-20 LOAD SPECIFICATIONS.

5. BEARING SURFACES ARE MACHINE BEVELED TO ASSURE A CLOSE, NON ROCKING SURFACE.

6. FRAME AND COVER SHALL HAVE A COATING OF BLACK BITUMINOUS MATERIAL CONFORMING TO ASTM 48-30.

7. SEE ARTICLE 50-31 "SEWER AND STORM DRAIN CASTINGS" OF SECTION 50, CONSTRUCTION SPECIFICATIONS.

8. INSTALL "NO DUMPING, DRAINS TO CREEK" PLACARD ON TOP OF CURB.

WEIGHT
CAST IRON COVER 91 LBS
CAST IRON FRAME RING 52 LBS
MODIFIED TYPE J INLET

SECTION A-A
TYPE 1A CURB AND GUTTER

SECTION B-B
TRANSITION FROM TYPE 1A TO TYPE 2 CURB AND GUTTER

NOTES:
1. STANDARD DEPRESSION FOR INLET IS 1\".
2. FRAME AND GATE SHALL CONFORM TO STANDARD DRAWINGS SD-14 AND SD-15.
3. OPEN BOUND CAST IRON HOOD SHALL BE H-20 RATED, 2\" THICK AND CONFORM TO STANDARD DRAWING SD-12.
4. ALL EXPOSED EDGES SHALL HAVE A 1/2" RADIUS (MINIMUM).
5. AN EDGING TOOL SHALL BE USED ON ALL EDGES WHERE THE CONCRETE SIDEWALK AND CURB MEET THE TOP OF THE HOOD.
6. EXPOSED SURFACES OF THE GATES, FRAMES, AND HOODS WITH THE PARTS ASSEMBLED DISASSEMBLED SHALL BE PAINTED WITH COMMERCIAL QUALITY ASPHALTUM PAINT AFTER TESTING AND ASSEMBLY.
7. THE MINIMUM PIPE SIZE IS 12" IF THE INLET DEPTH IS GREATER THAN 4', THE MINIMUM PIPE SIZE SHALL BE 15".
PIPE CONNECTION PER STANDARD DRAWING SD-23

EXISTING GROUND

COVER AS SPECIFIED ON PLANS

FLOW

FLARED END SECTION

3:1 SLOPE OR FLATTER

L

NOTES
1. USE 2-PIECE ELBOW AT BOTH ENDS OF RISER. ELBOWS SHALL CONFORM TO STANDARD DRAWING SD-22.
2. TO BE USED ONLY WITH THE SPECIFIC APPROVAL OF THE CITY ENGINEER.
3. PIPE MATERIAL TO BE CMP.

<table>
<thead>
<tr>
<th>RISER DIAMETER, D</th>
<th>LENGTH OF HORIZONTAL PIPE, L</th>
</tr>
</thead>
<tbody>
<tr>
<td>15&quot;</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td>1'-6&quot;</td>
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<tr>
<td>21&quot;</td>
<td>1'-6&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>1'-6&quot;</td>
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<tr>
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<td>2'-0&quot;</td>
</tr>
<tr>
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</tr>
<tr>
<td>42&quot;</td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td>48&quot;</td>
<td>4'-0&quot;</td>
</tr>
</tbody>
</table>
OPENING LENGTH L, AS SPECIFIED ON PLANS

2'-0" MIN.

1" CLEAR

OPENING LENGTH L, AS SPECIFIED ON PLANS

2'-0" MIN.

1" CLEAR

2"X2" MINIMUM ACCESS DOOR

OPENING LENGTH L, AS SPECIFIED ON PLANS

2'-0" MIN.

1" CLEAR

OPENING LENGTH L, AS SPECIFIED ON PLANS

2'-0" MIN.

1" CLEAR

2'-0" HEAVY DUTY BUTT HINGES GALVANIZED (WITH BRASS PIN)
FILLET WELDED TO COVER AND FRAME. IF WELDING GALVANIZED
SURFACES: PRIOR TO WELDING ON ANY METAL, CONSULT ANSI/
ASC Z-49.1, SAFETY IN WELDING, CUTTING AND ALLIED PROCESSES.
WHICH CONTAINS INFORMATION ON PERSONAL PROTECTION, THE
GENERAL WELDING AREA,
VENTILATION, AND FIRE PREVENTION
APPLY ZINC-RICH PAINT TO THE
WELDED AREAS IN ACCORDANCE
WITH THE PAINT MANUFACTURER'S
INSTRUCTIONS.

PLAN
42" DIAMETER TO 72" DIAMETER
C.M.P. INLET

PLAN
24" DIAMETER TO 36" DIAMETER
C.M.P. INLET

5/16" RAISED PATTERN FLOOR PLATE, GALVANIZED, ALL STEEL
EDGES SMOOTH AND CHAMFERED

5/16" RAISED PATTERN FLOOR PLATE, GALVANIZED, ALL STEEL
EDGES SMOOTH AND CHAMFERED
NOTES:

1. LOCATIONS, HEIGHTS, AND LENGTH OF OPENINGS SHALL BE AS SHOW ON THE PLANS.

2. AREA OF OPENING SHALL NOT BE LESS THAN AREA OF OUTFALL PIPE.

3. OUTFALL PIPE TO BE CUT FLUSH WITH INSIDE OF RISER.

4. NOT TO BE USED AS A JUNCTION STRUCTURE.

5. DIAMETER OF RISER PIPE SHALL BE AT LEAST ONE SIZE LARGER THAN OUTFALL PIPE.

6. TO BE USED ONLY WITH THE SPECIFIC APPROVAL OF THE CITY ENGINEER.

<table>
<thead>
<tr>
<th>RISER DIAMETER, D</th>
<th>H, MAX.</th>
<th>HEIGHT T, MAX.</th>
<th>GAGES (MINIMUM)</th>
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<tr>
<td>24&quot;</td>
<td>4'</td>
<td>8&quot;</td>
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<td>72&quot;</td>
<td>10'</td>
<td>18&quot;</td>
<td>0.109&quot;</td>
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FITTING SIZES

<table>
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<tr>
<th>DIAM (IN)</th>
<th>A (FT)</th>
<th>E (FT)</th>
<th>F (FT)</th>
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<td>4</td>
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</tr>
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<td>1</td>
<td>4</td>
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</tr>
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<td>3</td>
<td>10</td>
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</tr>
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<tr>
<td>96</td>
<td>3</td>
<td>16</td>
<td>12</td>
</tr>
</tbody>
</table>

NOTES

1. TO USE TABLE, REFER TO DIAGRAM AND SELECT LETTER REPRESENTING DESIRED DIMENSION, THEN ENTER TABLE AT CORRECT PIPE DIMENSION AND READ DIMENSION IN COLUMN UNDER APPROPRIATE LETTER HEADING.

2. DIMENSIONS ON TABLE ALLOW FOR USE OF STANDARD 12 INCH WIDE BAND COUPLER ON SIZES 15 INCH THROUGH 54 INCH AND 24 INCH WIDE BAND ON 60 INCH AND LARGER SIZES.

3. FOR PIPE-ARCH FITTINGS, CHOOSE PIPE DIAMETER EQUAL TO OR GREATER THAN ARCH SPAN. (EXAMPLE: 35 INCH X 24 INCH PIPE-ARCH; USE DIMENSIONS FOR 36 INCH PIPE).

4. STRUCTURAL REINFORCEMENT MAY BE REQUIRED ON SOME LARGER SIZES.
1. CONCRETE PIPE TO CONCRETE PIPE WITHOUT STANDARD JOINT

2. CAST-IN-PLACE OR PRE-CAST CONCRETE PIPE TO CSP

3. CONCRETE PIPE, C.M.P. INTO EXISTING PIPE OR STRUCTURE

4. PIPES OF DISSIMILAR METALS
NOTES:

1. TO HELP CREATE A FLEXIBLE, WATERTIGHT JOINT, DO NOT PLACE MORTAR AROUND THE CONNECTOR ON THE OUTSIDE OF THE STRUCTURE OR AROUND THE TOP HALF OF THE CONNECTOR ON THE INSIDE WHEN COMPLETING THE INVERT WORK.

2. RESILIENT CONNECTORS SHALL BE A FLEXIBLE COMPRESSION GASKET OR BOOT CONNECTOR PER SECTION 39-2.01 "PRECAST CONCRETE STORM DRAIN MANHOLES" OF THE CITY OF ELK GROVE CONSTRUCTION SPECIFICATIONS.

3. ALL CONNECTORS SHALL MEET OR EXCEED THE REQUIREMENTS OF A.S.T.M. C-923.
NOTES:

1. BOTTOM TRANSITION 25' MINIMUM APRON LENGTH WITH NO RAMP.

2. WEEP HOLES AND JOINTS AS REQUIRED FOR ALL LINED CHANNEL SECTIONS.

3. LOW SIDE OF CHANNEL TO BE OPPOSITE RAMP.

4. SIDE SLOPE LINING MAY BE USED AT RAMP LOCATIONS TO INCREASE SLOPE TO MAXIMUM 1:1. TOP OF SLOPE GREATER THAN 3:1 MUST BE FENCED.
NOTES:

1. USE CLASS "B" CONCRETE.

2. 6" x 6" - W6 x W6 WWF THROUGHOUT CONCRETE.

3. ADD ENERGY DISSIPATION FEATURES SUCH AS COBBLES, RIP-RAPS, OR MOLDED CONCRETE AT END OF APRON.
NOTES:

1. USE CLASS "B" CONCRETE OR GROUTED COBBLES AS SPECIFIED.

2. 6" x 6" - W6 x W6 WWF THROUGHOUT CONCRETE.

3. ON LINED CHANNELS APRON SHALL CONNECT TO SIDE LINING.

4. B = DITCH BOTTOM WIDTH OR AS SHOWN ON PLANS.

5. D = DITCH WATER DEPTH PLUS ONE FOOT OF FREEBOARD.

6. ADD ENERGY DISSIPATION FEATURES SUCH AS COBBLES, RIP-RAP, OR MOLDED CONCRETE AT END OF APRON.

ADD ENERGY DISSIPATION FEATURES SUCH AS COBBLES, RIP-RAP, OR MOLDED CONCRETE AT END OF APRON.
SIDE VIEW

BAR "A" @ 6" OC

BAR "A" @ 6" OC

SYMMETRICAL ABOUT CENTER LINE

TOP VIEW

SIDE BAR LENGTH AND ANGLE WILL BE DETERMINED BY WING WALL DESIGN

<table>
<thead>
<tr>
<th>PIPE DIA. (IN)</th>
<th>PIPE OD (IN)</th>
<th>QUANTITY</th>
<th>BAR &quot;A&quot; SIZE (IN)</th>
<th>H (IN)</th>
<th>W (IN)</th>
<th>L (IN)</th>
<th>S (IN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>30</td>
<td>11</td>
<td>3/8x2 1/2</td>
<td>46</td>
<td>48</td>
<td>40</td>
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<tr>
<td>27</td>
<td>33.5</td>
<td>11</td>
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<td>50</td>
<td>48</td>
<td>42</td>
<td>19</td>
</tr>
<tr>
<td>30</td>
<td>37</td>
<td>11</td>
<td>3/8x2 1/2</td>
<td>53</td>
<td>48</td>
<td>46</td>
<td>21</td>
</tr>
<tr>
<td>33</td>
<td>40.5</td>
<td>11</td>
<td>3/8x2 1/2</td>
<td>57</td>
<td>48</td>
<td>52</td>
<td>24</td>
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<tr>
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<td>44</td>
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<td>3/8x2 1/2</td>
<td>60</td>
<td>60</td>
<td>52</td>
<td>24</td>
</tr>
</tbody>
</table>

*INCLUDES OUTSIDE FRAME

TRASH RACK
24"-36" PIPE
(SHEET 1 OF 4)
SIDE VIEW

BAR "A" @ 6" OC

ACCESS GATE
SEE SD-28.3

4" MAX (TYP)

2" DIA. SCH 80 SEAMLESS STEEL PIPE

SYMMETRICAL ABOUT CENTER LINE

SIDE BAR LENGTH AND ANGLE WILL BE DETERMINED BY WING WALL DESIGN

TOP VIEW

12"

24"

W/2

ADDITIONAL HINGE REQUIRED ON TRASH RACK FOR 60" AND 72" PIPE

3"x 1½"x ¼" C10 CHANNEL BAR

NOTE:
SEE SECTION 9-17 FOR DESIGN REQUIREMENTS

CITY OF ELK GROVE - PUBLIC WORKS

APPROVED BY:

DRAWING NUMBER

SD - 28.2
NOTES:

SEE STANDARD DRAWINGS SD-29.1 AND SD-29.2 FOR PIPE HEADWALL DETAILS.

MATERIAL TO CONFORM TO ASTM DESIGNATION A-36. GALVANIZE ALL EXPOSED FERROUS PARTS AFTER FABRICATION.

ALL FILLET WELDS TO BE 3/16".

ALL STEEL SHALL CONFORM TO SECTION 75 OF THE STATE SPECIFICATIONS AND ASTM A36, A575 AND A576.

GATE HINGES TO BE COATED TO RESIST CORROSION.

*INCLUDES OUTSIDE FRAME

<table>
<thead>
<tr>
<th>PIPE DIAM (IN)</th>
<th>PIPE OD (IN)</th>
<th>QUANTITY</th>
<th>BAR &quot;A&quot; SIZE (IN)</th>
<th>H (IN)</th>
<th>W (IN)</th>
<th>L (IN)</th>
<th>S (IN)</th>
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<tbody>
<tr>
<td>42</td>
<td>51</td>
<td>15</td>
<td>3/8x2 1/2</td>
<td>67</td>
<td>72</td>
<td>60</td>
<td>47-3/4</td>
</tr>
<tr>
<td>48</td>
<td>58</td>
<td>17</td>
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<td>74</td>
<td>84</td>
<td>70</td>
<td>47-3/4</td>
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<td>47-3/4</td>
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<tr>
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<td>72</td>
<td>23</td>
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<td>88</td>
<td>120</td>
<td>80</td>
<td>47-3/4</td>
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<tr>
<td>72</td>
<td>86</td>
<td>27</td>
<td>3/8x2 1/2</td>
<td>102</td>
<td>144</td>
<td>96</td>
<td>47-3/4</td>
</tr>
</tbody>
</table>

TRASH RACK FRAME

DETAIL E

1/2" ROLLED STEEL HANDLE WELDED TO GATE FRAME

DRILL 1/2" DIAM HOLE FOR HEAVY DUTY PAD LOCK

TYP ALL WELDS

BAR "A" @ 5 1/2" OC

ACCESS GATE DETAIL
NOTES:

1. SEE STANDARD DRAWINGS SD-29.1 AND SD-29.2 FOR PIPE HEADWALL DETAILS.

2. MATERIAL TO CONFORM TO ASTM DESIGNATION A-36. GALVANIZE ALL EXPOSED FERROUS PARTS AFTER FABRICATION.

3. ALL FILLET WELDS TO BE $\frac{3}{16}$".

4. ALL STEEL SHALL CONFORM TO SECTION 75 OF THE STATE SPECIFICATIONS AND ASTM A36, A575 AND A576.
SIDE ELEVATION

VARIABLES PER SITE CONDITIONS

PLAN

SECTION A-A

SEE NOTE 1

SEE NOTE 2

NOTE

SEE DWG SD-28 FOR EMBEDMENT OF TRASH RACK COMPONENTS PRIOR TO POURING CONCRETE

CITY OF ELK GROVE - PUBLIC WORKS

INLET PIPE HEADWALL
WINGWALL STRUCTURE
(SHEET 1 OF 2)

DATE: 09/22/2007
NOT TO SCALE

CITY ENGINEER
APPROVED BY:

DATE: 10/24/2018

DRAWING NUMBER
SD - 29.1
**HEADWALL DIMENSIONS**

<table>
<thead>
<tr>
<th>PIPE DIA</th>
<th>PIPE OD</th>
<th>W</th>
<th>H_{mn}</th>
<th>T</th>
<th>L_{mn}</th>
</tr>
</thead>
<tbody>
<tr>
<td>24&quot;</td>
<td>30°</td>
<td>4'-6&quot;</td>
<td>4'-8&quot;</td>
<td>8&quot;</td>
<td>2'-9&quot;</td>
</tr>
<tr>
<td>27&quot;</td>
<td>33.5</td>
<td>4'-6&quot;</td>
<td>4'-10&quot;</td>
<td>8&quot;</td>
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<tr>
<td>30&quot;</td>
<td>37°</td>
<td>4'-6&quot;</td>
<td>5'-3&quot;</td>
<td>8&quot;</td>
<td>3'-3&quot;</td>
</tr>
<tr>
<td>33&quot;</td>
<td>40.5°</td>
<td>4'-6&quot;</td>
<td>5'-9&quot;</td>
<td>8&quot;</td>
<td>3'-6&quot;</td>
</tr>
<tr>
<td>36&quot;</td>
<td>44°</td>
<td>5'-6&quot;</td>
<td>5'-9&quot;</td>
<td>8&quot;</td>
<td>3'-9&quot;</td>
</tr>
<tr>
<td>42&quot;</td>
<td>51°</td>
<td>6'-6&quot;</td>
<td>6'-6&quot;</td>
<td>8&quot;</td>
<td>4'-3&quot;</td>
</tr>
<tr>
<td>48&quot;</td>
<td>58°</td>
<td>7'-6&quot;</td>
<td>7'-5&quot;</td>
<td>10&quot;</td>
<td>5'-3&quot;</td>
</tr>
<tr>
<td>54&quot;</td>
<td>65°</td>
<td>9'-6&quot;</td>
<td>7'-7&quot;</td>
<td>10&quot;</td>
<td>5'-9&quot;</td>
</tr>
<tr>
<td>60&quot;</td>
<td>72°</td>
<td>10'-6&quot;</td>
<td>8'-3&quot;</td>
<td>10&quot;</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>72&quot;</td>
<td>86°</td>
<td>12'-6&quot;</td>
<td>9'-8&quot;</td>
<td>10&quot;</td>
<td>7'-3&quot;</td>
</tr>
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</table>

**NOTES**

1. PLACE #5 REBAR ON DIAGONALS @ 4" FROM PIPE OD.
2. PIPE CONNECTIONS SHALL CONFORM TO ASTM C-923. UNITS SHALL INCLUDE A WATER STOP.
3. CHAMFER ALL EXPOSED EDGES ¾".
4. ALL STEEL MINIMUM 2" FROM CONCRETE EDGES.
5. ALL LAP SPLICES MINIMUM 12".

**REINFORCING STEEL DIMENSIONS AND DATA**

<table>
<thead>
<tr>
<th></th>
<th>A BAR</th>
<th>B BAR</th>
<th>C BAR</th>
<th>D BAR</th>
<th>E BAR</th>
<th>WINGWALL TOP BAR</th>
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</thead>
<tbody>
<tr>
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<td>#4@12&quot;OC</td>
<td>#4@12&quot;OC</td>
<td>#4@12&quot;OC</td>
<td>#4@12&quot;OC</td>
<td>#4</td>
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<tr>
<td>7' &lt; H ≤ 8'</td>
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<td>#4@12&quot;OC EF</td>
<td>#4@12&quot;OC EF</td>
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<td>#4@12&quot;OC EF</td>
<td>#4</td>
</tr>
<tr>
<td>8' &lt; H ≤ 10'</td>
<td>#5@12&quot;OC EF</td>
<td>#5@6&quot;OC EF</td>
<td>#5@12&quot;OC EF</td>
<td>#5@12&quot;OC EF</td>
<td>#5@12&quot;OC EF</td>
<td>#5</td>
</tr>
</tbody>
</table>
PLANT VIEW

2" WEEP HOLES AT 10' CENTERS

CONTRACTION JOINT AT 10' CENTERS

EXPANSION JOINT AT 50' CENTERS

TYPICAL BOTTOM LINING

OPTION 1

3:1 OR VAR.

1'-6"

4" POURED-IN-PLACE CONCRETE

6" X 6" - W6XW6 WWF

FILTER FABRIC

INVERT

3:1 OR VAR.

1'-0"

VARIABLE 6' MIN

CROSS SLOPE VAR. (3' MIN.)

NATIVE OR OTHER BACKFILL SELECT

90% RELATIVE COMPACTION

DATE: 09/22/2007

CITY OF ELK GROVE - PUBLIC WORKS

LINED CHANNEL SECTION

(SHEET 1 OF 2)

APPROVED BY:
CITY ENGINEER

DATE: 10/24/2018

DRAWING NUMBER
SD - 30.1
OPTION 2
NATIVE OR OTHER SELECT BACKFILL 90% RELATIVE COMPACTION

WEEP HOLE SHALL BE CENTERED IN A MINIMUM OF 1 C.F. OF 3/4" CRUSHED ROCK CONFORMING TO SECTION 50 "CLEAN CRUSHED ROCK", TYPE B. ROCK SHALL BE WRAPPED IN FABRIC CONFORMING TO SECTION 50 "GEOTEXTILE FABRIC". HOLE SHALL BE 2" DIAMETER PIPE CUT TO FIT FLUSH WITH CHANNEL FACE. (TYPICAL)

OPTION 1

VAR.

CUTOFF WALL
TO BE PLACED ALONG ENTIRE END OF LINED SECTION AT BEGINNING AND AT END OF LINING

6"X6"-W6XW6 WWF

1:1 OR VAR.

4" POURED-IN-PLACE CONCRETE

6"X6"-W6XW6 WWF

18" 6"

TYPICAL FULL LINING

SEE JOINT DETAIL

6" CHAIN LINK FENCE

ALTERNATE FOR LINING TO R/W

3" POURED-IN-PLACE CONCRETE OR AIR-BLOWN MORTAR

INVERT

1'-0" VARIABLE 6' MIN

1:1 OR VAR.

CROSS SLOPE VAR. (3' MIN.)

6"X6"-W6XW6 WWF

CONSTRUCTION JOINT

SD - 30.2
NOTES:

1. ALL UTILITY CROSSINGS OF EXISTING STREAMS SHALL BE AT LEAST 30" BELOW EXISTING CHANNEL SIDES AND BOTTOMS. DEEPER PLACEMENT MAY BE REQUIRED IF FUTURE CHANNEL IMPROVEMENTS ARE ANTICIPATED.

2. THE CUT SHALL BE SEALED AS SHOWN WITH GROUTED COBBLES OR CLASS B CONCRETE TO A WIDTH OF 1 FOOT EACH SIDE OF THE UTILITY TRENCH. ALL NATURAL STREAMS, AS SHOWN ON THE NATURAL STREAMS PLAN, SHALL UTILIZED GROUTED COBBLES.

3. CONSTRUCTION IS TO CONFORM TO SECTION 44 OF THE CITY OF ELK GROVE CONSTRUCTION SPECIFICATIONS WITH CUT OFF WALLS CONFORMING TO STANDARD DRAWING SD-30.