City of San Diego
Standard Drawings
For
Public Works Construction
2018 Edition

Prepared by
Public Works Department
Project Implementation Division
Standards and Contract Documents Section
INTRODUCTION

These "Standard Drawings for Public Works Construction 2018 Edition" (Standard Drawings) have been prepared and adopted by the City of San Diego. They are for use in concert with the “2018 WHITEBOOK – City of San Diego Standard Specifications for Public Works Construction” and the 2018 Edition of the “GREENBOOK - Standard Specifications for Public Works Construction”. The Standard Drawings include some San Diego Regional Standard Drawings that have been adopted by the City of San Diego.

The electronic copy of the Standard Drawings is available for download from the City's website: http://www.sandiego.gov/publicworks/edocref/standarddraw/

Updates to the Standard Drawings will be posted to this website as they are adopted by the City of San Diego: http://www.sandiego.gov/publicworks/edocref/standarddraw/updates.shtml

Users of the Standard Drawings are encouraged to submit corrections and proposed changes and additions to the Standards Drawings to Public Works Department, Standards and Contract Documents Section at engineering@sandiego.gov.

The Standard Drawings has discontinued the use of dual units and adopted U.S. Standard Measures, also referred to as Customary System Units or English Units. The 2018 Greenbook continues to have U.S. Customary System Units followed by International System of Units also referred to SI or metric units in parenthesis.
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<td>FLG</td>
<td>Flanged</td>
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<tr>
<td></td>
<td></td>
<td>FT</td>
<td>Feet</td>
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<td>GA</td>
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<td>Abbreviation</td>
<td>Description</td>
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<td>--------------------------------------------</td>
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</tr>
<tr>
<td>GAL</td>
<td>Gallon</td>
<td>PO</td>
<td>Push on</td>
</tr>
<tr>
<td>GALV</td>
<td>Galvanized</td>
<td>PPB</td>
<td>Pedestrian Push Button</td>
</tr>
<tr>
<td>GFI</td>
<td>Ground Fault Interrupter</td>
<td>PSF</td>
<td>Pound per square foot</td>
</tr>
<tr>
<td>GR</td>
<td>Grade</td>
<td>PSI</td>
<td>pound per square inch</td>
</tr>
<tr>
<td>H</td>
<td>High or height</td>
<td>PUD</td>
<td>Public Utilities Department</td>
</tr>
<tr>
<td>HEX</td>
<td>Hexagonal</td>
<td>PVC</td>
<td>Polyvinyl Chloride</td>
</tr>
<tr>
<td>HORIZ</td>
<td>Horizontal</td>
<td>R</td>
<td>Radius</td>
</tr>
<tr>
<td>HPS</td>
<td>High pressure sodium (Light)</td>
<td>RCV</td>
<td>Remote Control Valve</td>
</tr>
<tr>
<td>HT</td>
<td>Height</td>
<td>R/W</td>
<td>Right-of-way, Recycled water</td>
</tr>
<tr>
<td>INCL</td>
<td>Included</td>
<td>REINF</td>
<td>Reinforced or reinforcement</td>
</tr>
<tr>
<td>ID</td>
<td>Inside diameter or Identification Joint</td>
<td>ROW</td>
<td>Right of Way</td>
</tr>
<tr>
<td>JT</td>
<td>Joint</td>
<td>RPDA</td>
<td>Reduced pressure detector assembly</td>
</tr>
<tr>
<td>LAP</td>
<td>Overlap</td>
<td>RWGV</td>
<td>Resilient wedge gate valve</td>
</tr>
<tr>
<td>LBS</td>
<td>Pounds</td>
<td>RW</td>
<td>Recycled water</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
<td>S</td>
<td>Slope or second</td>
</tr>
<tr>
<td>LOL</td>
<td>Layout line</td>
<td>SH</td>
<td>Schedule</td>
</tr>
<tr>
<td>MAX</td>
<td>Maximum</td>
<td>SCRW</td>
<td>Steel cylinder rod wrapped</td>
</tr>
<tr>
<td>MJ</td>
<td>Mechanical Joint</td>
<td>SD</td>
<td>Storm drain</td>
</tr>
<tr>
<td>MIN</td>
<td>Minimum</td>
<td>SE</td>
<td>Sand Equivalent</td>
</tr>
<tr>
<td>MTC</td>
<td>Micro-Trench Conduit</td>
<td>SI</td>
<td>International System of Units (Metric)</td>
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<tr>
<td>MVL</td>
<td>Mercury vapor light</td>
<td>SQFT</td>
<td>Square foot</td>
</tr>
<tr>
<td>OC</td>
<td>On center</td>
<td>SSPWC</td>
<td>Standard Specification for Public Works Construction</td>
</tr>
<tr>
<td>OD</td>
<td>Outside diameter</td>
<td>STD</td>
<td>Standard</td>
</tr>
<tr>
<td>OS&amp;Y</td>
<td>Outside Screw and Yolk Gate Valve</td>
<td>STR</td>
<td>Straight</td>
</tr>
<tr>
<td>PC</td>
<td>Point of curvature</td>
<td>TOT</td>
<td>Total</td>
</tr>
<tr>
<td>PCC</td>
<td>Point of compound curvature</td>
<td>TYP</td>
<td>Typical</td>
</tr>
<tr>
<td>PCF</td>
<td>Pounds per cubic foot</td>
<td>VERT</td>
<td>Vertical</td>
</tr>
<tr>
<td>PCR</td>
<td>Point of curb return</td>
<td>W</td>
<td>Water, Wider or width</td>
</tr>
<tr>
<td>PL</td>
<td>Property line or Place</td>
<td>W/</td>
<td>With</td>
</tr>
</tbody>
</table>
ABBREVIATIONS AND SYMBOLS

WWF  Welded wire fabric

@     At
%     Percent
,     Feet or minutes
,,    Inches or seconds
1     Number
/     Per or (between words)
°     Degree
ø     Diameter
P     Property line
C     Centerline
--->  Direction of Travel
CHAPTER 1
CONCRETE STRUCTURES
STRUCTURE EXCAVATION & BACKFILL

LEGEND
- Structure Excavation
- Structure Backfill
- Ditch & Channel Excavation
- Roadway Excavation
- Roadway Embankment

NOTES:
Subgrade shall be lowest subgrade as defined in the standard specifications.

MONOLITHIC CONCRETE SLOPE PAVING: RIPRAP

EXCAVATION
- Original Ground
- Ditch & Channel Excavation

BACKFILL
- Original Ground
- Embankment

TOP LIMIT OF STRUCTURE EXCAVATION AND BACKFILL IS ORIGINAL GROUND IF CHANNEL IS NOT EXCAVATED.
Structure Excavation & Backfill

Legend
- Structure Excavation
- Structure Backfill
- Ditch & Channel Excavation
- Roadway Excavation
- Roadway Embankment

Note:
Subgrade shall be lowest subgrade as defined in the standard specifications.
FOR RETAINING WALL (6' MAXIMUM HEIGHT) / LEVEL BACKFILL
REFER TO DEVELOPMENT SERVICES DEPARTMENT INFORMATION
BULLETIN NO. 221. (WWW.SANDIEGO.GOV / DEVELOPMENT-SERVICES)

FOR RETAINING WALL (5' MAXIMUM HEIGHT) / SLOPING BACKFILL
REFER TO DEVELOPMENT SERVICES DEPARTMENT INFORMATION
BULLETIN NO. 222. (WWW.SANDIEGO.GOV / DEVELOPMENT-SERVICES)

FOR MASONRY FENCES (6' MAXIMUM HEIGHT)
REFER TO DEVELOPMENT SERVICES DEPARTMENT INFORMATION
BULLETIN NO. 223. (WWW.SANDIEGO.GOV / DEVELOPMENT-SERVICES)

REFERENCES:
THIS DRAWING IS TO BE USED IN CONJUNCTION WITH SAN DIEGO
REGIONAL STANDARD DRAWINGS C-1 THROUGH C-6 AND C-9 THROUGH
C-15, AND CITY OF SAN DIEGO STANDARD DRAWING SDC-108.
REFERENCES:

THIS DRAWING IS TO BE USED IN CONJUNCTION WITH SAN DIEGO REGIONAL STANDARD DRAWINGS C-1 THROUGH C-6 AND C-9 THROUGH C-15, AND CITY OF SAN DIEGO STANDARD DRAWING SDC-108.

DESIGN CONDITIONS:

WALLS ARE TO BE USED FOR THE LOADING CONDITIONS SHOWN FOR EACH TYPE WALL. DESIGN H SHALL NOT BE EXCEEDED. FOOTING DESIGN IS REQUIRED EXCEPT AS SHOWN OTHERWISE OR WHEN FOUND UNNECESSARY BY THE ENGINEER. SPECIAL FOOTING DESIGN IS REQUIRED WHERE FOUNDATION MATERIAL IS INCAPABLE OF SUPPORTING LOAD PRESSURE LISTED IN TABLE.

DESIGN CONDITIONS:

REINFORCED CONCRETE:

Fc=1,200 psi Fc'=3,000 psi
Fs=20,000 psi n=10

REINFORCED MASONRY:

F'm=600 psi Fm=200 psi
Fs=20,000 psi n=50

EARTH=120 psi AND EQUIVALENT FLUID PRESSURE=36 psi PER FOOT OF HEIGHT.

WALLS SHOWN FOR 1/2:1 UNLIMITED SLOPING SURCHARHGE ARE DESIGNED IN ACCORDANCE WITH RANKINE'S FORMULA FOR UNLIMITED SLOPING SURCHARGE WITH A $=42$.

REINFORCEMENT:

INTERMEDIATE GRADE, HARD GRADE, OR RAIL STEEL DEFORMATION SHALL CONFORM TO ASTM A615, A6161, A617. BARS SHALL LAP 40 DIAMETERS, WHERE SPACED, UNLESS OTHERWISE SHOWN ON THE PLANS. BENDS SHALL CONFORM TO THE MANUAL OF STANDARD PRACTICE, A.C.I. BACKING FOR HOOKS IS FOUR DIAMETERS. ALL BAR EMBEDMENTS ARE CLEAR DISTANCES TO OUTSIDE OF BAR. SPACING FOR PARALLEL BARS IS CENTER TO CENTER BARS.

MASONRY:

ALL REINFORCED MASONRY RETAINING WALLS SHALL BE CONSTRUCTED OF REGULAR OR LIGHT WEIGHT STANDARD UNITS CONFORMING TO THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION."

JOINTS:

VERTICAL CONTROL JOINTS SHALL BE PLACED AT 32' INTERVALS MAXIMUM. JOINTS SHALL BE DESIGNED TO RESIST SHEAR AND OTHER LATERAL FORCES WHILE PERMITTING LONGITUDINAL MOVEMENT. VERTICAL EXPANSION JOINTS SHALL BE PLACED AT 96' INTERVALS MAXIMUM.

CONCRETE:

FOOTING CONCRETE SHALL BE 560-C-3250, USING TYPE B AGGREGATE WHEN PLACING CONDITIONS PERMIT.

BACKFILL:

NO BACKFILL MATERIAL SHALL BE PLACED AGAINST MASONRY RETAINING WALLS UNTIL GROUT HAS REACHED DESIGN STRENGTH OR UNTIL GROUT HAS CURED FOR A MINIMUM OF 28 DAYS. COMPACTATION OF BACKFILL MATERIAL BY JETTING OR PONDING WITH WATER WILL NOT BE PERMITTED. EACH LAYER OF BACKFILL SHALL BE MOISTENED AS DIRECTED BY THE ENGINEER AND THOROUGHLY TAMPED, ROLLED OR OTHERWISE COMPACTED UNTIL THE RELATIVE COMPACTING IS NOT LESS THAN 90%.

FENCING:

SAFETY FENCING SHALL BE INSTALLED AT THE TOP OF WALL GREATER THAN 4' HIGH WHEN AREA BEHIND THE WALL IS ACCESSIBLE TO THE PUBLIC OR MAINTENANCE CREWS.

INSPECTIONS:

CALL FOR INSPECTIONS AS FOLLOWS:

A. WHEN THE FOOTING HAS BEEN FORMED, WITH THE STEEL TIED SECURELY IN FINAL POSITION, AND IS READY FOR THE CONCRETE TO BE PLACED.
B. WHERE CLEANOUT HOLES ARE NOT PROVIDED:
   (1) AFTER THE BLOCKS HAVE BEEN Laid UP TO A HEIGHT OF 4' OR FULL HEIGHT FOR WALLS UP TO 5', WITH STEEL IN PLACE BUT BEFORE THE GROUT IS Poured.
   (2) AFTER THE FIRST LIFT IS PROPERLY GROUNTED, THE BLOCKS HAVE BEEN Laid UP TO THE TOP OF THE WALL, WITH THE STEEL TIED SECURELY IN PLACE BUT BEFORE THE UPPER LIFT IS GROUNTED.
C. WHERE CLEANOUT HOLES ARE PROVIDED:
   (1) AFTER THE BLOCKS HAVE BEEN Laid UP TO THE TOP OF THE WALL, WITH THE STEEL TIED SECURELY IN PLACE, BUT BEFORE GROUNTING.
D. AFTER GROUNTING IS COMPLETE AND AFTER ROCK OR RUBBLE WALL DRAINS ARE IN PLACE BUT BEFORE EARTH BACKFILL IS PLACED.
E. FINAL INSPECTION WHEN ALL WORK HAS BEEN COMPLETED.

CONCRETE GROUT AND MORTAR MIXES:

CONCRETE GROUT SHALL ATTAIN A MINIMUM COMpressive STRENGTH OF 2,000 PSI IN 28 DAYS AND MORTAR SHALL ATTAIN 1,800 PSI IN 28 DAYS.

ALL CELLS SHALL BE FILLED WITH GROUT. ROD OR VIBRATE CONSOLIDATION. BRING GROUT WITHIN 10 MINUTES OF POURING TO ENSURE GROUT TO A POINT 2" FROM THE TOP OF MASONRY UNITS WHEN GROUNTING OF SECOND LIFT IS TO BE CONTINUED AT ANOTHER TIME.

MORTAR KEY:

TO ENSURE PROPER BONDING BETWEEN THE FOOTING AND THE FIRST COURSE OF BLOCK, A MORTAR KEY SHALL BE FORMED BY EMBEDDING A FLAT 2 X 4 FLUSH WITH AND AT THE TOP OF THE FRESHLY POURED FOOTING. THE 2 X 4 SHOULD BE REMOVED AFTER THE CONCRETE HAS STARTED TO HARDEN (APPROXIMATELY 1 HOUR), A MORTAR KEY MAY BE OMITTED IF THE FIRST COURSE OF BLOCK IS SET INTO THE FRESH CONCRETE WHEN THE FOOTING IS POURED, AND A GOOD BOND IS OBTAINED.

WALL DRAINS:

WALL DRAINS SHALL BE PROVIDED IN ACCORDANCE WITH STANDARD DRAWING SDC-108.

DRAINAGE DITCHES:

BROW DITCHES WILL BE REQUIRED ON SLOPED BACKFILLS. PER SDD-106 TYPE A WITH THE MASONRY WALL HEIGHTS ABOVE DITCH TO BE AT A MINIMUM OF 1'. THE BROW DITCH WILL LEAD TO A WALL DRAIN DETAIL AS SHOWN ON C-14.

SOIL:

ALL FOOTINGS SHALL EXTEND AT LEAST 12" INTO UNDISTURBED NATURAL SOIL OR APPROVED COMPACTED FILL. SOIL SHOULD BE DAMPENED PRIOR TO PLACING CONCRETE IN FOOTINGS.

CABLE RAILING:

USE CALTRANS STANDARD PLAN B11-47.
NO SURCHARGE LOADS WITHIN THIS AREA FOR LEVEL BACKFILL DESIGN

TYPICAL SECTION
LEVEL BACKFILL

TYPICAL SECTION
SLOPED BACKFILL

LINE OF UNDISTURBED NATURAL SOIL

FILTER MATERIAL, 1" MAX. CRUSHED AGGREGATE.

FILTER MATERIAL WRAPPED IN GEOTEXTILE FILTER FABRIC

4" DIA. DRAIN WITH 1/4" GALV. WIRE MESH SCREEN, 8" ON CENTER, OR ONE HORIZONTAL ROW OF OPEN HEAD JOINTS.

4 1/4" 8" BLOCK WALL
5 1/4" 12" BLOCK WALL

MORTAR OR CAST IN PLACE CONCRETE

FINISHED GROUND

VERTICAL REINFORCEMENT
CGROUT FILLED BLOCK CELLS
HORIZONTAL REINFORCEMENT THRU BOND BEAM BLOCK

TOP OF FOOTING

2" X 4" (NOMINAL) KEY

KEY DETAIL

NOTES:
1. ALL MASONRY RETAINING WALLS SHALL BE CONSTRUCTED WITH CAP, KEY AND DRAINAGE DETAILS AS SHOWN.
2. 4" DIAMETER DRAIN MAY BE FORMED BY PLACING A BLOCK ON ITS SIDE.
3. ALL MASONRY WALLS SHALL BE WATERPROOFED WITH COAL TAR EMULSION SYSTEM AS APPROVED BY THE CITY.
4. FOR MORE INFORMATION SEE SDC-107.
5. IF H IS GREATER THAN 6 FT, THE RETAINING WALL WILL NEED TO BE ENGINEERED AND DESIGNED.
6. H=HEIGHT. SEE PLANS FOR HEIGHT AND FOOTING DETAILS.
SEE SDC-107 AND SDC-108 FOR DRAWINGS C-7 AND C-8
SEE SDC-107 AND SDC-108 FOR DRAWINGS C-7 AND C-8
### Dimensions and Reinforcing Steel

<table>
<thead>
<tr>
<th></th>
<th>3'-8&quot;</th>
<th>5'-4&quot;</th>
<th>8'-0&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>H (Max)</td>
<td>3'-8&quot;</td>
<td>5'-4&quot;</td>
<td>8'-0&quot;</td>
</tr>
<tr>
<td>T (Min)</td>
<td>0'-8&quot;</td>
<td>0'-10&quot;</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>W (Min)</td>
<td>2'-1&quot;</td>
<td>3'-1&quot;</td>
<td>4'-3&quot;</td>
</tr>
<tr>
<td>R</td>
<td>0'-9&quot;</td>
<td>1'-2&quot;</td>
<td>1'-5&quot;</td>
</tr>
<tr>
<td>S</td>
<td>0'-8 1/2&quot;</td>
<td>1'-1/2&quot;</td>
<td>1'-7 1/2&quot;</td>
</tr>
<tr>
<td>K</td>
<td>0'-8&quot;</td>
<td>0'-8&quot;</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>A Bars</td>
<td>#4 @ 32&quot;</td>
<td>#4 @ 32&quot;</td>
<td>#4 @ 32&quot;</td>
</tr>
<tr>
<td>B Bars</td>
<td></td>
<td>#4 @ 32&quot;</td>
<td>#4 @ 32&quot;</td>
</tr>
<tr>
<td>C Bars</td>
<td></td>
<td></td>
<td>#7 @ 16&quot;</td>
</tr>
<tr>
<td>D Bars</td>
<td>#4 @ 32&quot;</td>
<td>#4 @ 16&quot;</td>
<td>#4 @ 16&quot;</td>
</tr>
<tr>
<td>E Bars</td>
<td>#4 total 5</td>
<td>#4 total 5</td>
<td>#4 total 6</td>
</tr>
<tr>
<td>Max Toe Pressure</td>
<td>774 psf</td>
<td>1,030 psf</td>
<td>1,660 psf</td>
</tr>
</tbody>
</table>

### Notes:
1. See C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

---

**San Diego Regional Standard Drawing**

**Masonry Retaining Wall Type 5**

*(Level Backfill)*

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*Recommended by the San Diego Regional Standards Committee*

*Drawing Number C-05*

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*See SDC-107 and SDC-108 for drawings C-7 and C-8*
1. SEE C-7 AND C-8 FOR ADDITIONAL NOTES AND DETAILS.
2. FILL ALL BLOCK CELLS WITH GROUT.
TYPE-A WALL
(APPLICABLE FOR ALL TYPES OF BACKFILL LOADINGS)

TYPE-B WALL

TYPE-C WALL

THERE SHALL BE NO LOADINGS EXTENDING ABOVE TOP OF WALL WITHIN A DISTANCE EQUAL TO HEIGHT OF THE WALL.

EXPANSION JOINT @ 30'-0"± CENTERS (MAX) AND/OR @ EACH STEP.

ELEVATION

<table>
<thead>
<tr>
<th>WALL TYPE</th>
<th>HEIGHT</th>
<th>BASE</th>
<th>CONCRETE CF/FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1'-6&quot;</td>
<td>1'-0&quot;</td>
<td>1.50 cu ft.</td>
</tr>
<tr>
<td></td>
<td>2'-0&quot;</td>
<td>1'-0&quot;</td>
<td>2.00 cu ft.</td>
</tr>
<tr>
<td>B</td>
<td>3'-0&quot;</td>
<td>2'-4&quot;</td>
<td>4.99 cu ft.</td>
</tr>
<tr>
<td></td>
<td>4'-0&quot;</td>
<td>2'-10&quot;</td>
<td>7.66 cu ft.</td>
</tr>
<tr>
<td></td>
<td>5'-0&quot;</td>
<td>3'-4&quot;</td>
<td>10.82 cu ft.</td>
</tr>
<tr>
<td></td>
<td>6'-0&quot;</td>
<td>3'-10&quot;</td>
<td>14.49 cu ft.</td>
</tr>
<tr>
<td>C</td>
<td>3'-0&quot;</td>
<td>1'-6&quot;</td>
<td>3.75 cu ft.</td>
</tr>
<tr>
<td></td>
<td>4'-0&quot;</td>
<td>2'-0&quot;</td>
<td>6.00 cu ft.</td>
</tr>
<tr>
<td></td>
<td>5'-0&quot;</td>
<td>2'-6&quot;</td>
<td>8.75 cu ft.</td>
</tr>
<tr>
<td></td>
<td>6'-0&quot;</td>
<td>3'-0&quot;</td>
<td>12.00 cu ft.</td>
</tr>
</tbody>
</table>

NOTE:
SEE C-10 FOR SECTION A-A, NOTES AND DETAILS.
CONCRETE
CONCRETE SHALL BE 560-C-3250.

DESIGN CONDITIONS
WALLS ARE TO BE USED FOR THE LOADING CONDITIONS SHOWN FOR EACH TYPE WALL. DESIGN MAY BE EXCEEDED BY SIX INCHES BEFORE GOING TO NEXT SIZE.

DESIGN DATA
FC = 1200 PSI
FC = 3000 PSI
EARTH = 120 PCF
AND EQUIVALENT FLUID PRESSURE = 36 PSF PER FOOT OF HEIGHT

WALLS SHOWN FOR 1-1/2:1 UNLIMITED SLOPING SURCHARGE ARE DESIGNED IN ACCORDANCE WITH RANKINE’S FORMULA FOR UNLIMITED SLOPING SURCHARGE WITH $\phi = 42^\circ$.

NOTE: MAXIMUM TOE PRESSURE UNDER WALL FOOTING = 1-1/2 TONS/SQ. FT. SPECIAL DESIGN REQUIRED WHERE FOOTING MATERIAL IS INCAPABLE OF SUPPORTING THIS PRESSURE.

EXCAVATION AND BACKFILL
COMPACTION OF BACKFILL MATERIAL BY JETTING OR PONDING WITH WATER WILL NOT BE PERMITTED.

EACH LAYER OF BACKFILL SHALL BE MOISTENED AS DIRECTED BY THE ENGINEER AND THOROUGHLY TAMMED, ROLLED OR OTHERWISE COMPACTED UNTIL THE RELATIVE COMPACTION IS NOT LESS THAN 90 PERCENT.

NO BACKFILL MATERIAL SHALL BE DEPOSITED AGAINST CONCRETE RETAINING WALLS UNTIL THE CONCRETE HAS DEVELOPED A STRENGTH OF 2,500 PSI IN COMPRESSION AS DETERMINED BY TEST CYLINDERS, OR UNTIL 28 DAYS AFTER WALL HAS BEEN PLACED.

TOP EXTENSION IF SPECIFIED
FILLER MATERIAL: 1” MAX CRUSHED AGGREGATE 4 CU. FT. MIN AT EACH DRAIN.
4” DIA. DRAINS WITH 1/4” GALV. WIRE MESH SCREEN, 8” ABOVE OUTSIDE GROUND SURFACE, SLOPE 1/2” PER FT. LOCATE DRAINS @ 15’-0” CENTER TO CENTER OR AS DIRECTED BY THE ENGINEER.

TYPICAL DRAINAGE
WHEN H IS GREATER THAN 4’-0”

1/2” EXPANSION JOINT, FILL WITH PREMOLDED EXPANSION JOINT FILLER. LOCATE JOINTS AT APPROX. 30’-0” CENTERS OR AS DIRECTED BY THE ENGINEER.

WATER STOP, USE ONLY WHEN WATERTIGHT JOINT IS REQUIRED, SEE WATER STOP DETAIL.

SECTION A-A

EMBEDMENT 2-3/8” MIN

3/8” DIA.

SPLIT PERMITTED

RUBBER WATERSTOP
USE ONLY WHEN WATERTIGHT JOINT IS REQUIRED.
Number above bars indicates distance from top of footing to upper end of bars.

ELEVATION

NOTES:
1. FOR SPREAD FOOTING SECTION SEE C-11B
2. FOR TYPICAL LAYOUT EXAMPLE SEE C-11C
3. FOR 4ST PILE FOOTING SECTION SEE C-11C
4. FOR TABLE OF REINFORCING STEEL DIMENSIONS AND DATA SEE C-11D
NOTES:
1. FOR DETAILS NOT SHOWN AND DRAINAGE NOTES SEE "RETAINING WALL DETAILS NO.1".
   STANDARD DRAWINGS C-13A TO C-13D.

2. QUANTITIES APPLY TO DESIGN H PORTION AND EXCLUDE THE ADDED PORTION ABOVE "GUTTER ELEVATION".
TYPICAL LAYOUT EXAMPLE

FOR JOINTS REQUIRED, SEE DETAILS 3-3 AND 3-4, DRAWING C-15

45T PILE FOOTING SECTION
H=24’ THRU H=30’

45T PILE FOOTING SECTION
H=4’ THRU H=22’
<table>
<thead>
<tr>
<th>Design</th>
<th>H</th>
<th>4'</th>
<th>6'</th>
<th>8'</th>
<th>10'</th>
<th>12'</th>
<th>14'</th>
<th>16'</th>
<th>18'</th>
<th>20'</th>
<th>22'</th>
<th>24'</th>
<th>26'</th>
<th>28'</th>
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<tbody>
<tr>
<td>W</td>
<td></td>
<td>3'-2&quot;</td>
<td>4'-2&quot;</td>
<td>5'-2&quot;</td>
<td>6'-2&quot;</td>
<td>7'-2&quot;</td>
<td>8'-0&quot;</td>
<td>9'-0&quot;</td>
<td>10'-0&quot;</td>
<td>11'-0&quot;</td>
<td>12'-0&quot;</td>
<td>13'-3&quot;</td>
<td>14'-3&quot;</td>
<td>15'-3&quot;</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>1'-0&quot;</td>
<td>1'-4&quot;</td>
<td>1'-8&quot;</td>
<td>2'-0&quot;</td>
<td>2'-4&quot;</td>
<td>2'-8&quot;</td>
<td>3'-0&quot;</td>
<td>3'-4&quot;</td>
<td>3'-8&quot;</td>
<td>4'-0&quot;</td>
<td>4'-4&quot;</td>
<td>4'-8&quot;</td>
<td>5'-1&quot;</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>2'-2&quot;</td>
<td>2'-10&quot;</td>
<td>3'-6&quot;</td>
<td>4'-2&quot;</td>
<td>4'-10&quot;</td>
<td>5'-4&quot;</td>
<td>6'-0&quot;</td>
<td>6'-8&quot;</td>
<td>7'-4&quot;</td>
<td>8'-0&quot;</td>
<td>8'-10&quot;</td>
<td>9'-6&quot;</td>
<td>10'-2&quot;</td>
</tr>
<tr>
<td>F Spread Ftg.</td>
<td></td>
<td>1'-2&quot;</td>
<td>1'-2&quot;</td>
<td>1'-2&quot;</td>
<td>1'-2&quot;</td>
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Note: Reinforcement detailed is to be placed in addition to that shown for spread footing. All piles not shown, see Pile Layout on plans. *For pile footing Design H=4’ use same footing dimensions as Design H=6’ **Denotes a bundle of 2 bars
SPREAD FOOTING SECTION

Place concrete in toe against undisturbed material, except as permitted by the Engineer.

NOTES:
Design H may be exceeded by 6" before going to the next size. Footing key is required except when found unnecessary by Engineer. Special footing design is required where foundation material is incapable of supporting toe pressure loads listed in table.

Design Data:
f = 1300 psi  f'c= 3250 psi  f's = 24,000 psi  n = 10  earth 120 pcf

Case I - Equivalent fluid pressure= 36 psf max for determination of toe pressure. 27 psf min for determination of heel pressure.

Case II - Earth pressure determined from Rankine's formula with 0 = 33°-42°.

NOTE:
Reinforcement detailed is to be placed in addition to that shown for spread footing. All piles not shown. see Pile Layout on plans.
### Table of Reinforcing Steel Dimensions and Data

<table>
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<tr>
<th>Design H</th>
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<th>C</th>
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**Note:** Quantities apply to Design H option and exclude the added portion above.

**Graphic Information:**

- **45T Pile Footing Section**
- **4 bars 8"**
- **Construction joint**
- **Dwgs C-15**
- **Tab H=5"**

**Designer:** Kercheval
**Date:** 12/75

**San Diego Regional Standard Drawing**

**Recommended by the San Diego Regional Standards Committee**

**C-12B**
**DESIGN AND DRAINAGE**

Backfill sufficiently to prevent ponding. To be done after removal of wall forms and before backfilling behind wall.

Place concrete in toe against undisturbed material except as permitted by the Engineer.

**STEM WIDTH AT BASE OF HAUNCH**

Dimensions (1), (2), and (3) to be as shown elsewhere in the project plans.

(4) Stem width at base of haunch to be determined as shown.

**20’ VC AT TOP OF WALL SLOPE CHANGE**

Where shown on the plans.

**FOOTING STEP**

Layout line.

**DETAIL OF DESIGN LOADING CASES**

CASE I Level + 2’ surcharge

CASE II 2:1 unlimited slope

CASE III 1-1/2:1 limited slope (7’-0” max height) + 2’ surcharge

NOTE: Surcharge limits shown apply to retaining walls Type 1 and 3.
ELEVATION

RETURN WALL TYPE A
Use where H=8' or less

ELEVATION

RETURN WALL TYPE B
Use where H=10' or more on offset walls

ELEVATION

RETURN WALL TYPE C
Use where H=10' or more on straight walls
PLAN OF WALL WITH DETAIL 3–4
(see C-15)

1-1/2" Premolded expansion joint filler

#4 Waterstop

PLAN OF WALL WITH EXPANSION JOINT ONLY

Vertical LOL

Stem as constructed

Offset as follows:
H 4"=1/4"
H 6"=3/8"
H 8"=1/2"
H 10"=5/8"
H 12"=3/4"
H 14"=1"
H 16"=1-1/4"
H 18"=1-1/2"
H 20"=1-3/4"
H 22"=2"
H 24"=2-1/4"
H 26" thru 36"=2-1/2"

APPROX. WALL OFFSET VALUES
Not required for wall Types 3 and 4.
Values for offsetting forms to be determined by the Engineer.

NOTES

Design Conditions:
Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting toe pressure listed in table. Return wall not required unless shown elsewhere.

Design Data:
fc = 1300 psi  f'c = 3250 psi  fs = 24,000 psi
n = 10  earth = 120 pcf
2" Surcharge:
Equivalent fluid pressure =
36 pcf maximum for determination of toe pressure.
27 pcf minimum for determination of heel pressure.

Earth pressures for 2:1 unlimited slope, 1-1/2:1 slope, and 1-1/2:1 unlimited slope, determined from Rankine's formula with \( \theta = 33^\circ - 42^\circ \).
REINFORCED CONCRETE
RETAINING WALL DETAILS No. 2
ELEVATION

SECTION

WEEP HOLE AND PERVERSIVE BACKFILL
DETAIL 3–1

NOTES

A. 4" diameter drain @ 25' max center to center (9' c–c for Type 3 and 9'–3" c–c for Type 4 Retaining Walls). For walls adjacent to sidewalks or curbs, provide 4" cast iron or asbestos cement pipe under the sidewalk to discharge thru curb face. Exposed wall drains shall be located 3" ± above finished grade.

B. 6" square aluminum or galvanized steel wire 4 mesh hardware cloth. (Min wire diameter 0.03") Anchor firmly to backface.

C. One cubic foot pervious backfill material in a burlap sack, securely tied.

D. Pervious backfill material continuous behind retaining wall.

WALL EXPANSION JOINT
DETAIL 3–4

WATERSTOP
DETAIL 3–6

Joint may be formed with 1/8" hardboard and cut back to the root of the chamfer on the exposed face.

3/4" Chamfer

SECTION

DETAIL A

WEAKENED PLANES
DETAIL 3–2

1-1/2" Chamfer

1/8"

SECTION

WALL EXPANSION JOINTS
AND WEAKENED PLANES
DETAIL 3–3

Top of wall

Detail 3–4

Detail 3–1

Detail 3–2

Detail 3–4

Top of footing

Tap of footing

96' max

1" min

24' max

Waterstop to have 5 or more pairs of raised ribs to provide 0.1 sq in min rib cross-section area on each half of the water stop. Height of ribs to be 3/32" min.

Holes will be permitted in the outer 1/2" of the web for wire, rings etc.

Tie web to #3 reinforcing bars @ 12" max intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the engineer.
CHAPTER 2
DRAINAGE SYSTEM
NOTES

1. RIP RAP PER SDD-104 & STANDARD SPECIAL PROVISIONS

2. METAL BEAM GUARD RAIL SHALL HAVE W/6 x 9 STEEL POST

3. SIDEWALK, CURB, PAVEMENT AND HEADWALL'S SHALL BE TIED WITH #4 BARS 18" OC HORIZONTAL AND VERTICAL

4. CONCRETE JOINTS PER SDG-109 AND G-10

SHEET 1 OF 2
NOTES

1. HEADWALL LENGTH (L) PER D-30, D-31
NOTES:

1. FACE ANGLE SHALL BE CAST INTO STRUCTURE CONTINUOUS FOR THE FULL LENGHT "L".
2. EXPOSED METAL PARTS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
3. WHEN CURB INLET OPENING HEIGHT (H) EXCEEDS 8" INSTALL 1" Ø STEEL PROTECTION BAR.
4. INSTALL ADDITIONAL BARS AT 3 1/2" CLEAR SPACING ABOVE FIRST BAR WHEN OPENING EXCEEDS 16".
5. WHEN CURB INLET OPENING LENGTH EXCEEDS 8' INSTALL 1" Ø STEEL SUPPORT BOLTS, SPACED AT NOT MORE THAN 5' OC.
SLOTTED DRAIN CONNECTIONS TO STANDARD INLETS

NOTES

1. EITHER FIELD JOINT WITH A PLIABLE MIXTURE OF SAND, PORTLAND CEMENT EMULSIFIED ASPHALT (MIXTURE OF 1 PART PORTLAND CEMENT, 3.5 PARTS SAND, AND 1 1/2 PARTS SS-1 EMULSIFIED ASPHALT) OR CONTINUOUS WELD.

2. SEE D-18 FOR ADDITIONAL NOTES AND DETAILS

3. SLOTTED DRAIN INSTALLATIONS SHALL BE ENCASED WITH 6 INCH CONC 520-C-2500 ALL AROUND AND SHALL BE POURED MONOLITHICALLY WITH THE CURB AND GUTTER.
NOTES
1. PLANS SHALL SPECIFY:
   A) ROCK CLASS AND THICKNESS (T).
   B) FILTER BLANKET MATERIAL, NUMBER OF LAYERS AND THICKNESS
2. RIP RAP SHALL BE EITHER QUARRY STONE OR BROKEN CONCRETE (IF SHOWN ON THE PLANS), COBBLES ARE NOT ACCEPTABLE.
3. RIP RAP SHALL BE PLACED OVER A GEOTEXILE FILTER FABRIC. FILTER BLANKET MATERIAL SHALL BE PLACED UNDER THE FABRIC WHEN SPECIFIED.
4. SEE WHITE BOOK FOR SELECTION OF FILTER MATERIAL.
5. RIP RAP ENERGY DISSIPATORS SHALL BE DESIGNATED AS EITHER TYPE 1 OR TYPE 2. TYPE 1 SHALL BE WITH CONCRETE SILL; TYPE 2 SHALL BE WITHOUT SILL.
6. FOR STRUCTURAL DETAILS, SEE D-42 FOR PIPELINE SIZES FROM 18" TO 30" AND SEE D-43 FOR PIPELINE SIZES FROM 36" TO 72".
7. FOR RIP RAP SELECTION SEE TABLE 200-1.7 OF THE WHITEBOOK.
NOTES

SEE TABLE ON SHEET 2 FOR DIMENSIONS, SEE NOTES ON SHEET 2.
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### NOTES

1. DESIGN EQUIVALENT FLUID PRESSURE (EARTH LOADING) = 60 pcfs MAXIMUM OUTLET VELOCITY = 35 ft / s
2. CONCRETE SHALL BE 560-C-3250
3. REINFORCING SHALL CONFORM TO ASTM DESIGNATION A615 AND MAY BE GRADE 40 OR 60. REINFORCING SHALL BE PLACED WITH 2" CLEAR CONCRETE COVER UNLESS NOTED OTHERWISE. SPLICES SHALL NOT BE PERMITTED EXCEPT AS INDICATED ON THE PLANS.
4. FOR PIPE GRADES NOT EXCEEDING 20%, INLET BOX MAY BE OMITTED.
5. IF INLET BOX IS OMITTED, CONSTRUCT PIPE COLLAR AS SHOWN.
6. UNLESS NOTED OTHERWISE, ALL REINFORCING BAR BENDS SHALL BE FABRICATED WITH STANDARD HOOKS. FOR STRUCTURAL DETAILS, SEE D-42 FOR PIPELINE SIZES FROM 18" TO 30" AND SEE D-43 FOR PIPELINE SIZES FROM 36" TO 72".
7. 5' HIGH CHAIN LINK FENCING, EMBED POST 18" DEEP IN WALLS AND ENCASE WITH CLASS B MORTAR.
8. IN SANDY AND SILTY SOIL:
   A) RIP RAP AND AGGREGATE BASE CUTOFF WALL REQUIRED AT THE END OF ROCK APRON.
   B) FILTER CLOTH (POLYFILTER X OR EQUIVALENT) SHALL BE INSTALLED ON NATIVE SOIL BASE, MINIMUM OF 1' OVERLAPS AT JOINTS.
9. RIP RAP AND SUBBASE CLASSIFICATION SHALL BE AS SHOWN ON PLANS.
10. FOR RIP RAP SELECTION SEE TABLE 200-1.7 OF THE WHITEBOOK.
NOTES:

1. LONGITUDINAL SLOPE OF LINED DITCH SHALL BE 2% MINIMUM.

2. OVER SLOPE DOWN DITCHES SHALL EMPLOY 6" THICKENED EDGE SECTION AT BOTH SIDES OF DITCH.

3. STUCCO NETTING SHALL BE GALVANIZED AND SHALL HAVE 1 1/2" COVER.

LEGEND ON PLANS
MINOR DRAINAGE CHANNEL

NOTES:

1. CLAY PIPE MAY BE SUBSTITUTED FOR PLASTIC PIPE AT WEEP HOLES.

2. WEAKENED PLANE JOINTS SHALL BE PLACED EVERY 12' TO 15'. EXPANSION JOINTS SHALL BE PLACED AT ALL CHANGES OF SECTION AND AT ENDS OF CURVES.


4. FOR BOTTOM WIDTHS GREATER THAN 8' SEE SDD-108.

5. REINFORCEMENT SHOWN IS MINIMUM.

6. CHANNEL FENCING IS REQUIRED. UNLESS OTHERWISE SHOWN ON THE PLANS A CHAIN LINK FENCE (PER SDM-112 AND SDM-114) 6' IN HEIGHT, WITH A TOP RAIL SET AT 6' INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES, INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE AT THE END OF THE CHANNEL. ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS. TWO 10' GATES OR ONE 20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND MAY BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.

560-C-3250 CONCRETE OR AIR PLACED CONCRETE, REINFORCED WITH 6" X 6" - 10 / 10 GAGE w.w.f.
NOTES
1. CLAY PIPE MAY BE SUBSTITUTED FOR PLASTIC PIPE AT WEEP HOLES.
2. WEAKENED PLANE JOINTS SHALL BE PLACED EVERY 12' TO 15'. EXPANSION JOINTS SHALL BE PLACED AT ALL CHANGES OF SECTION AND AT ENDS OF CURVES.
4. REINFORCEMENT SHOWN IS MINIMUM.
5. CHANNEL FENCING IS REQUIRED PER SDM-112 OR SDM-114. UNLESS OTHERWISE SHOWN ON THE PLANS, A CHAIN LINK FENCE 6' IN HEIGHT, WITH A TOP RAIL SET AT 6' INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES, INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE AT THE END OF THE CHANNEL. ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS. TWO 10' GATES OR ONE 20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND MAY BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.

LEGEND ON PLANS

CITY OF SAN DIEGO - STANDARD DRAWING

MAJOR DRAINAGE CHANNEL

RECOMMENDED BY THE CITY
OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.C. 56618 DATE 9/10/18

DRAWING NUMBER: SDD-108

REVISION BY APPROVED DATE
ORIGINAL* KA J. NAGELVOORST 03/12
UPDATED RB J. NAGELVOORST 10/16
UPDATED HM J. NAGELVOORST 02/16
REDAFTED CD J. NAGELVOORST 09/18

560-C-3250 CONCRETE OR AIR
PLACED CONCRETE,
REINFORCED WITH
6" X 6" - 10/10 GAGE w.w.f.

TYPICAL SECTION

THE CHANNEL FENCING IS REQUIRED PER SDM-112 OR SDM-114. UNLESS OTHERWISE SHOWN ON THE PLANS, A CHAIN LINK FENCE 6' IN HEIGHT, WITH A TOP RAIL SET AT 6' INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES, INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE AT THE END OF THE CHANNEL. ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS. TWO 10' GATES OR ONE 20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND MAY BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.

NOTES
1. CLAY PIPE MAY BE SUBSTITUTED FOR PLASTIC PIPE AT WEEP HOLES.
2. WEAKENED PLANE JOINTS SHALL BE PLACED EVERY 12' TO 15'. EXPANSION JOINTS SHALL BE PLACED AT ALL CHANGES OF SECTION AND AT ENDS OF CURVES.
4. REINFORCEMENT SHOWN IS MINIMUM.
5. CHANNEL FENCING IS REQUIRED PER SDM-112 OR SDM-114. UNLESS OTHERWISE SHOWN ON THE PLANS, A CHAIN LINK FENCE 6' IN HEIGHT, WITH A TOP RAIL SET AT 6' INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES, INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE AT THE END OF THE CHANNEL. ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS. TWO 10' GATES OR ONE 20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND MAY BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.
NOTES:
1. THE FOLLOWING SHALL BE REQUIRED:
   A. LOW FLOW CHANNEL
   B. FILTER BLANKET
   C. CUTOFF WALL
   D. FENCE

2. CHANNEL FENCING IS REQUIRED PER DRAWING SDM-112 OR SDM-114. UNLESS OTHERWISE SHOWN ON THE PLANS, A CHAIN LINK FENCE 6’ HEIGHT, WITH A TOP RAIL SET AT 6” INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES, INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE AT THE END OF THE CHANNEL. ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500’ MAXIMUM INTERVALS. TWO 10’ GATES OR ONE 20’ GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000’ INTERVALS AND MAY BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4’ GATES.
1. (*) INDICATES MINIMUM RELATIVE COMPACTION.

2. BEDDING MATERIAL SHALL BE SAND, CRUSHED AGGREGATE, OR NATIVE FREE-DRAINING GRANULAR MATERIAL. 100% SHALL PASS NO. 4 SIEVE AND HAVE A SAND EQUIVALENT OF NOT LESS THAN 30.
EXTEND ALL LONGITUDINAL BARS IN BOX WALLS 2'-0" INTO WINGS, EXCEPT WHERE EXPANSION JOINT OCCURS.

**NOTE:**
WHERE 1 1/2:1 SURCHARGE EXCEEDS 5', USE TYPE 2 RETAINING WALL.

"ANGLE OF FLARE"

TOE OF SLOPE
ELEV "a"

R=4/B (OMIT IF "ANGLE OF FLARE" IS LESS THAN 30°)

PLAN

3 - #4

#4 @ 12"

3-#4

DETAIL X

DETAIL Y

SEC B-B

WHERE DESIGN "H" EXCEEDS 9' OR LENGTH OF WING WALL EXCEEDS 1.5 "H" PLACE 1/2 EXP JT

JOINT FILTER AT JUNCTION BOX WALL

WINGWALL "H"

3'-0" MIN

END ELEVATION

ELEV. "a"

MAY BE VARIED BY ENGINEER TO SUIT CONDITIONS IN THE FIELD.

TYPE "A"

TYPE "B"

END ELEVATION

"L"

3'-0" MIN

PARAPET

SLOPE VARIES 1/12:1 OR FLATTER

MATCH GROUND LINE

MATCH GROUND LINE

5'-0" MAX

2'-0"

#4 @ 12"

1'-0"

1'-6" MAX

2'-0"

#4 @ 18"

1'-0"

NOTE:
CHANNEL FENCING IS REQUIRED PER SDM-112 OR SDM-114. UNLESS OTHERWISE SHOWN ON THE PLANS, A CHAIN LINK FENCE 6' IN HEIGHT, WITH A TOP RAIL SET AT 6" INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES, INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE AT THE END OF THE CHANNEL.

ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS. TWO 10' GATES OR ONE 20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND SHALL BEPLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.
5' MAX FOR 1 1/2:1 FILL SLOPES, UNLIMITED FOR FLATTER THAN 1 1/2:1

GUTTER OR SHOULDER

"c" BARS

#4 @ 36"

2" CL

3" HOLE 15' OC 1' ABOVE OUTSIDE GROUND

VERTICAL UNLESS ADJACENT TO BATTERED SECTION, THEN MATCH

"d" BARS

VERTICAL

MATCH PARAPET

FILL SLOPE

#4 ALONG TOP OF WALL

TYPICAL SECTION

H=4'-0" THRU 12'-0"

BOX CULVERT WINGWALL
TYPICAL SECTION
H=13'-0" THRU 16'-0"

BOX CULVERT WINGWALL
FIGURES AT TOP OF "c" BARS
INDICATE DISTANCE TO UPPER END OF "c" BARS.

"c" BARS
SHORT "c" BARS

TYPICAL LAYOUT EXAMPLE 1
NOTES:

1. UNIT STRESSES: $f_t = 20,000$ PSI, $f_s = 1,200$ PSI, $n=10$
   MAXIMUM TOE PRESSURE = 1 1/2 TONS/SQ. FT.
   ELEVATIONS, LENGTH AND ANGLE OF FLARE OF WINGS MAY BE VARIED BY THE ENGINEER TO SUIT CONDITIONS
   ENCOUNTERED IN THE FIELD.

2. WALLS DESIGNED FOR 2'-0" LIVE LOAD SURCHARGE, 1 1/2:1 SLOPING SURCHARGE NOT TO EXCEED 5'-0" IN ELEVATION
   PLUS 2'-0" LIVE LOAD SURCHARGE, OR UNLIMITED 2:1 SURCHARGE. DIMENSIONS "H", "L", "M", "N", ELEVATION "A" AND
   "ANGLE OF FLARE" (AS APPLY) ARE SHOWN ON THE PLANS.

3. WALL HEIGHT MAY BE EXCEEDED BY 6" BEFORE GOING TO NEXT GREATER "H". ELIMINATE CUTOFF WALL IF ADJACENT
   CHANNEL IS PAVED AND SKEW IS 20' MAXIMUM.
**REINFORCED CONCRETE WINGWALLS - US**

<table>
<thead>
<tr>
<th>&quot;H&quot;</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
<th>9'</th>
<th>10'</th>
<th>11'</th>
<th>12'</th>
<th>13'</th>
<th>14'</th>
<th>15'</th>
<th>16'</th>
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<tbody>
<tr>
<td>W</td>
<td>3'-2&quot;</td>
<td>3'-8&quot;</td>
<td>4'-2&quot;</td>
<td>4'-8&quot;</td>
<td>5'-2&quot;</td>
<td>5'-8&quot;</td>
<td>6'-2&quot;</td>
<td>6'-8&quot;</td>
<td>7'-2&quot;</td>
<td>7'-8&quot;</td>
<td>8'-2&quot;</td>
<td>8'-8&quot;</td>
<td>9'-2&quot;</td>
</tr>
<tr>
<td>C</td>
<td>1'-0&quot;</td>
<td>1'-2&quot;</td>
<td>1'-4&quot;</td>
<td>1'-6&quot;</td>
<td>1'-8&quot;</td>
<td>1'-10&quot;</td>
<td>2'-0&quot;</td>
<td>2'-2&quot;</td>
<td>2'-4&quot;</td>
<td>2'-6&quot;</td>
<td>2'-8&quot;</td>
<td>2'-10&quot;</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>B</td>
<td>2'-2&quot;</td>
<td>2'-6&quot;</td>
<td>2'-10&quot;</td>
<td>3'-2&quot;</td>
<td>3'-6&quot;</td>
<td>3'-10&quot;</td>
<td>4'-2&quot;</td>
<td>4'-6&quot;</td>
<td>4'-10&quot;</td>
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<td>6'-2&quot;</td>
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</tbody>
</table>

**Batter**

- None
- 1'-2"
- 1/2 : 12

**"c" Bars**

- #4@24
- #4@18
- #5@20
- #5@14
- #5@10
- #5@7
- #6@7 1/2"
- #7@8
- #7@6
- #9@15
- #10@15
- #10@13
- #10@11

**"d" Bars**

- #4@24
- #4@18
- #5@20
- #5@14
- #5@10
- #6@14
- #7@15
- #8@16
- #7@12
- #8@15
- #9@15
- #10@13

**Conc C\(\gamma_{lf}\)**

- 0.32
- 0.38
- 0.44
- 0.49
- 0.55
- 0.61
- 0.67
- 0.73
- 0.79
- 1.02
- 1.10
- 1.18
- 1.26

**Reinf #/lf**

- 13
- 16
- 19
- 25
- 30
- 37
- 49
- 62
- 76
- 73
- 90
- 104
- 125

**NOTE:** Quantities do not include that portion above the design "H" limit.
NOTES

1. WAllS DESIGNED FOR 2' SURCHAGE; EARTH DENSITY=120 PCF;EQUIVALENT FLUID PRESSURE = 36 PCF

2. VARY "D" OF WARPED WALL UNIFORMLY FROM THAT CUTOFF WALL TO THAT AT CULVERT, FOR MAXIMUM "H" >12' (3.66)

3. WHERE ABRASION IS ANTICIPATED INCREASE APRON THICKNESS TO 7" MINIMUM TO PROVIDE 2" MINIMUM REINFORCEMENT COVERAGE.

4. DIMENSIONS "L", "W", "H", "N", ELEVATION "a", "ANGLE OF FLARE", AND END "SLOPE (AS APPLY) ARE SHOWN ON THE PLANS.

5. CONCRETE SHALL BE 560-C-3250.

6. CHANNEL FENCING IS REQUIRED PER SDM-112 OR SDM-114. UNLESS OTHERWISE SHOWN ON THE PLANS, A CHAIN LINK FENCE 6' IN HEIGHT, WITH A TOP RAIL SET AT 6' INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES, INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE AT THE END OF THE CHANNEL. ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS. TWO 10' GATES OR ON 20' GATE FOR VEHICULAR ACCES ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.

ALTERNATIVE WARPED WINGWALL
USE WHERE ADDITIONAL PROTECTION TO TOE OF EMBANKMENT IS REQUIRED
### WALL DIMENSIONS AND REINFORCING

<table>
<thead>
<tr>
<th>Element Slope</th>
<th>&quot;H&quot;</th>
<th>8' or less</th>
<th>10'</th>
<th>12'</th>
<th>14'</th>
<th>16'</th>
<th>18'</th>
<th>20'</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4:1</td>
<td>Front face reinf</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
</tr>
<tr>
<td></td>
<td>Rear face reinf</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
</tr>
<tr>
<td>3/4:1</td>
<td>Front face reinf</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
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<td>Rear face reinf</td>
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<td>Rear face reinf</td>
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<td>#5@12</td>
<td>#5@12</td>
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</table>

### STIFFENING BEAM DIMENSIONS AND REINFORCING

<table>
<thead>
<tr>
<th>&quot;H&quot; max</th>
<th>12'</th>
<th>14'</th>
<th>16'</th>
<th>18'</th>
<th>20'</th>
<th>25'</th>
<th>30'</th>
<th>35'</th>
<th>40' or more</th>
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<tbody>
<tr>
<td>6'</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>7-1/2&quot;</td>
<td>8&quot;</td>
<td>9-1/2&quot;</td>
<td>11&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8'</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>7-1/2&quot;</td>
<td>8&quot;</td>
<td>9-1/2&quot;</td>
<td>11&quot;</td>
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<td></td>
</tr>
<tr>
<td>10'</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>7-1/2&quot;</td>
<td>8&quot;</td>
<td>9-1/2&quot;</td>
<td>11&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12'</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>7-1/2&quot;</td>
<td>8&quot;</td>
<td>9-1/2&quot;</td>
<td>11&quot;</td>
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</tr>
</tbody>
</table>

- No beam. Place 2-#6 in each face along top of wall.
- "A"=1'-6"
- "B"=9"
- "A"=1'-6"
- "B"=1'-0"
- "A"=1'-10"
- "B"=1'-0"
- "A"=2'-0"
- "B"=1'-0"
- "A"=1'-6"
- "B"=1'-0"
**Plan**

**Skewed Connection**

**Plan**

**Perpendicular Connection**

**Section A-A**

**Section B-B**

**Notes**

1. The end of connecting pipe shall not project into the waterway of the larger pipe.
2. The larger pipe shall not be less than 24" ID.
3. The OD of smaller pipe shall not be more than 2/3 the size of the larger pipe ID.
4. Concrete shall be 470-C-2000.

**Legend on Plans**

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**Concrete Lug**

CITY OF SAN DIEGO – STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: P.E. 56633

DRAWING NUMBER: SDD-113

9/10/18
NOTES:

1. CONCRETE SHALL BE 560-C-3250 UNLESS OTHERWISE NOTED.

2. REINFORCING STEEL SHALL COMPLY WITH THIS DRAWING UNLESS OTHERWISE SPECIFIED.

3. REINFORCING STEEL SHALL BE INTERMEDIATE GRADE DEFORMED BARS CONFORMING TO LATEST ASTM SPECIFICATIONS.

4. BENDS SHALL BE IN ACCORDANCE WITH LATEST ACI CODE.

5. MINIMUM SPLICE LENGTH FOR REINFORCING SHALL BE 30 DIAMETERS.

6. FLOOR SHALL HAVE A WOOD TROWEL FINISH AND, EXCEPT WHERE USED AS JUNCTION BOXES, SHALL HAVE A MINIMUM SLOPE OF 1:12 TOWARD THE OUTLET.

7. DEPTH (V) IS MEASURED FROM THE TOP OF THE STRUCTURE TO THE FLOWLINE OF THE BOX.

8. WALL THICKNESS AND REINFORCING STEEL REQUIRED MAY BE DECREASED IN ACCORDANCE WITH TABLE LOCATED ON SHEET 2.

9. WALL THICKNESS SHALL BE STEPPED ON THE OUTSIDE OF THE BOX.

10. WHEN THE STRUCTURE DEPTH (V) EXCEEDS 4', STEPS SHALL BE CAST INTO THE WALL AT 15" INTERVALS FROM 15" ABOVE FLOOR TO WITHIN 12" OF TOP OF STRUCTURE. PLACE STEPS IN WALL WITHOUT PIPE OPENING, OTHERWISE OVER OPENING OF SMALLEST DIAMETER.

11. ALTERNATE STEP MAY BE AN APPROVED STEEL REINFORCED POLYPROPYLENE STEP.

12. UPON APPROVAL OF THE ENGINEER, AS DEFINED BY SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, THE USE OF PRECAST STORM STRUCTURES IS ACCEPTABLE AS AN ALTERNATE TO CAST-IN-PLACE. PRECAST UNITS SHALL CONFORM TO ASTM STANDARDS AND BE MANUFACTURED IN A PERMANENT FACILITY DESIGNED FOR THAT PURPOSE.

13. TYPICAL REINFORCEMENT LAP SHALL BE 30 TIMES THE BAR DIAMETER MINIMUM. DIMENSION T SHALL BE 6" MINIMUM.

14. MARK EVERY STORM DRAIN INLET WITHIN THE PROJECT BOUNDARIES WITH ADHESIVE DECAL-DISCS ON EXISTING INLETS OR AN IMBEDDED CONCRETE STAMP ON NEW INLETS.

15. ON CURB INLETS, PLACE MARKER ON TOP OF THE INLET ROOF. ON CATCH BASIN, IMPRINT STAMP NEXT TO INLET GRATE.

16. NO RECYCLED WATER SHALL ENTER INTO STORM DRAIN.
<table>
<thead>
<tr>
<th>MAXIMUM SPAN X OR Y</th>
<th>DEPTH V</th>
<th>THICKNESS</th>
<th>HOR. &amp; FLR. REINF.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-0&quot; TO 4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>6&quot;</td>
<td>#4 18&quot;</td>
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<td>4'-1&quot; TO 7'-0&quot;</td>
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<td>#4 12&quot;</td>
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<td>7'-0&quot; TO 8'-0&quot;</td>
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<td>#4 8&quot;</td>
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<td>3'-0&quot; TO 4'-0&quot;</td>
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<td>5'-1&quot; TO 6'-0&quot;</td>
<td>8&quot;</td>
<td>#4 8&quot;</td>
<td></td>
</tr>
<tr>
<td>6'-1&quot; TO 8'-0&quot;</td>
<td>8&quot;</td>
<td>#4 6&quot;</td>
<td></td>
</tr>
<tr>
<td>3'-0&quot; TO 4'-0&quot;</td>
<td>12'-1&quot; TO 16'-0&quot;</td>
<td>8&quot;</td>
<td>#4 8&quot;</td>
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<td>#4 6&quot;</td>
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<td>#4 6&quot;</td>
<td></td>
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<tr>
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<td>#5 8&quot;</td>
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<td>8&quot;</td>
<td>#4 12&quot;</td>
<td></td>
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<tr>
<td>3'-0&quot; TO 4'-0&quot;</td>
<td>16'-1&quot; TO 20'-0&quot;</td>
<td>10&quot;</td>
<td>#4 8&quot;</td>
</tr>
<tr>
<td>4'-1&quot; TO 5'-0&quot;</td>
<td>10&quot;</td>
<td>#4 12&quot;</td>
<td></td>
</tr>
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<td>#4 6&quot;</td>
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<td>#5 8&quot;</td>
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<td>#4 12&quot;</td>
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<td>3'-0&quot; TO 4'-0&quot;</td>
<td>20'-1&quot; TO 24'-0&quot;</td>
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<td>#4 8&quot;</td>
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<td>#4 12&quot;</td>
<td></td>
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<td>#4 6&quot;</td>
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<td>7'-1&quot; TO 8'-0&quot;</td>
<td>12&quot;</td>
<td>#5 8&quot;</td>
<td></td>
</tr>
</tbody>
</table>
NOTES

2. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A RADIUS OF 1/2".
3. WHEN V EXCEEDS 4', STEPS SHALL BE INSTALLED.
4. CONCRETE GUTTER TO MATCH ADJACENT GUTTERS.
5. AN EXPANSION JOINT SHALL BE PLACED AT THE ENDS OF THE INLET WHERE THE CURB IS TO ADJOIN PER G-10.
6. PROVIDE 1/4" TOOLED GROOVE IN TOP SLAB IN LINE WITH BACK OF ADJACENT CURB.
7. SURFACE OF TOP SLAB BE SIDEWALK FINISHED TO DRAIN TOWARD STREET AT A SLOPE OF 1/4" PER FOOT.
8. ELEVATION SHALL BE SHOWN ON THE PLANS WHERE INDICATED "O" SYMBOL.
9. SEE SDD-102 AND SDD-114 FOR ADDITIONAL NOTES AND DETAILS.
NOTEs


2. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A RADIUS OF 1/2".

3. WHEN V EXCEEDS 4', STEPS SHALL BE INSTALLED.

4. CONCRETE GUTTER TO MATCH ADJACENT GUTTERS.

5. AN EXPANSION JOINT SHALL BE PLACED AT THE ENDS OF THE INLET WHERE THE CURB IS TO ADJOIN PER G-10.

6. PROVIDE 1/4" TOOLED GROOVE IN TOP SLAB IN LINE WITH BACK OF ADJACENT CURB.

7. SURFACE OF TOP SLAB SHALL BE SIDEWALK FINISHED TO DRAIN TOWARD STREET AT A SLOPE OF 1/4" PER FOOT.

8. ELEVATION SHALL BE SHOWN ON THE PLANS WHERE INDICATED "O" SYMBOL.

9. SEE SDD-102 AND SDD-114 FOR ADDITIONAL NOTES AND DETAILS.
CURB INLET - TYPE C

PLAN

SECTION A-A

TRANSITION TO NORMAL CURB
HEIGHT IN 10' ON BOTH SIDES
UNLESS OTHERWISE NOTED.

10" UNLESS
OTHERWISE SHOWN

OPTIONAL
CONSTRUCTION
JOINT 6" MIN
ABOVE INVERT

#4 @6"

ELEV
SHOWN
ON PLANS
12:1

CURB LINE

1'9"

3'6"

T

T

2'0"

3 1/2"

AT GRATE

V

#4 @6"

Rounded pipe ends
See drawing D-61

LEGEND ON PLANS

SHEET 1 OF 2

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY
OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: P. C. 56283
DATE:

CURB INLET - TYPE C

DRAWING NUMBER:

SDD-117
NOTES

2. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A RADIUS OF 1/2".
3. WHEN V EXCEEDS 4', STEPS SHALL BE INSTALLED.
4. CONCRETE GUTTER TO MATCH ADJACENT GUTTERS.
5. AN EXPANSION JOINT SHALL BE PLACED AT THE ENDS OF THE INLET WHERE THE CURB IS TO ADJOIN PER G-10.
6. PROVIDE 1/4" TOOLED GROOVE IN TOP SLAB IN LINE WITH BACK OF ADJACENT CURB.
7. SURFACE OF TOP SLAB SHALL BE SIDEWALK FINISHED TO DRAIN TOWARD STREET AT A SLOPE OF 1/4" PER FOOT.
8. WHERE INLET IS TO BE CONSTRUCTED ON GRADE AND D-03B CONCRETE APRON IS REQUIRED, LIFT DOWN-GRADE END OF GRAVE.
9. SEE SDD-102 AND SDD-114 FOR ADDITIONAL NOTES AND DETAILS.
10. ELEVATION SHALL BE SHOWN ON PLANS WHERE INDICATED BY "O" SYMBOL.
11. DIAMETER D SHALL BE 24" MAXIMUM. FOR LARGER DIAMETER PIPES THIS DRAWING MUST BE MODIFIED.
NOTES

1. DIMENSION SHOWN BECOMES 2'-0" WHEN OPENING ON BOTH SIDES. ADJUST MANHOLE AS REQUIRED.

2. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A RADIUS OF 1/2"

3. WHEN V EXCEEDS 4', STEPS SHALL BE INSTALLED.

4. CONCRETE GUTTER TO MATCH ADJACENT GUTTERS.

5. AN EXPANSION JOINT SHALL BE PLACED AT THE ENDS OF THE INLET WHERE THE CURB IS TO ADJOIN PER G-10.

6. PROVIDE 1/4" TOOLED GROOVE IN TOP SLAB IN LINE WITH BACK OF ADJACENT CURB.

7. MAINTAIN 1 1/2" CLEAR SPACING BETWEEN REINFORCING AND SURFACE UNLESS OTHERWISE NOTED.

8. SEE SDD-114 FOR ADDITIONAL NOTES AND DETAILS.
NOTES

1. WHEN V EXCEEDS 4', STEPS SHALL BE INSTALLED.
2. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A RADIUS OF 1/2".
3. CONSTRUCT OPENINGS ON BOTH SIDES UNLESS OTHERWISE SHOWN ON PLANS.
4. MAINTAIN 1-1/2" CLEAR SPACING BETWEEN REINFORCING AND SURFACE.
5. INSTALL 1" STEEL PROTECTION BAR.
6. DIAMETER "D" SHALL BE 18" MAX, FOR LARGER DIAMETER PIPES THIS DRAWING MUST BE MODIFIED.
7. SEE SDD-114 FOR ADDITIONAL NOTES AND DETAILS.

PLAN

SECTION A-A

SECTION B-B

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

CITY OF SAN DIEGO - STANDARD DRAWING

DRAWING NUMBER

CATCH BASIN - TYPE F

SDD-119

COORDINATOR P.E. 56229

DATE 9/10/18

REVISION BY APPROVED DATE

ORIGINAL R. NAGELVOORT 09/12
UPATED R. NAGELVOORT 10/15
UPATED H. NAGELVOORT 03/16
REDRAFTED R. NAGELVOORT 09/18
NOTES
1. CURB AND APRON TO BE MONOLITHIC POUR.
2. USE OF FALSE HEADER AT VALLEYS AND SLOPE BREAK LINE IS OPTIONAL.
3. EXTEND VERTICAL STEEL FROM INLET STRUCTURE INTO CONCRETE APRON AS SHOWN ON SECTION B-B OF D-03A.
4. CONCRETE SHALL BE 520-C-2500.

SAN DIEGO REGIONAL STANDARD DRAWING
CONCRETE APRON FOR TYPE C CURB INLET

FOR DRAWING D-3A SEE DRAWING SDD-117
NOTES

1. SEE D–11A AND D–11B FOR ADDITIONAL NOTES AND DETAILS.
2. CONCRETE BASE SHALL BE 560–C–3250.
3. ALL PRECAST COMPONENTS SHALL BE REINFORCED WITH 1/4” DIAMETER STEEL, WOUND SPIRALLY ON 4’ CENTERS.
4. ALL JOINTS SHALL BE SET IN CLASS C MORTAR.
5. MAINTAIN 1–1/2” CLEAR SPACING BETWEEN REINFORCING AND CONCRETE SURFACE UNLESS OTHERWISE NOTED.
6. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A 1/2” RADIUS.
7. MANHOLE COVER TO BE MARKED “STORM DRAIN”.
8. MODIFICATIONS TO “Y” DIMENSION IS REQUIRED IF PIPE (D2) EXCEEDS 39”.
9. IF CONSTRUCTED ADJACENT TO SIDEWALK, TOP OF MANHOLE AND SLAB TO MATCH SIDEWALK SLOPE AND FINISH.
NOTES

1. SEE D-11A & D-11B FOR ADDITIONAL NOTES AND DETAILS.
2. ALL JOINTS SHALL BE SET IN CLASS C MORTAR.
3. ALL PRECAST COMPONENTS SHALL BE REINFORCED WITH 1/4" DIAMETER STEEL WOUND SPIRALLY ON 4" CENTERS.
4. MAINTAIN 1-1/2" CLEAR SPACING BETWEEN REINFORCING AND CONCRETE SURFACE.
5. CONCRETE BASE SHALL BE 560-C-3250.
6. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A 1/2" RADIUS.
7. MANHOLE COVER TO BE MARKED "STORM DRAIN".
8. MODIFICATIONS TO "Y" DIMENSION REQUIRED IF PIPE (D2) EXCEEDS 39".
9. IF CONSTRUCTED ADJACENT TO SIDEWALK, TOP OF MANHOLE TO MATCH SIDEWALK SLOPE.

FOR DRAWINGS D-11A AND D-11B, SEE DRAWING SDD-114
NOTE
HOT-DIP GALVANIZE ALL PARTS AFTER FABRICATION.
NOTES
1. HOT-DIP GALVANIZE ALL PARTS AFTER FABRICATION.
2. DIMENSIONS ARE TO CENTERLINE OF BARS UNLESS OTHERWISE NOTED.
3. NOT TO BE USED IN PEDESTRIAN AREAS.
4. WEIGHT: 200 POUNDS +/-.
NOTES
1. ALL COMPONENTS SHALL BE GALVANIZED.
2. INLET AND OUTLET PIPES SHALL BE SET AT FACTORY AND POSITIONED AS SHOWN ON PLANS.
3. SEE D–17B FOR LADDER AND STEP DETAILS.
4. SEE D–17A FOR ADDITIONAL GRATE DETAILS.
5. GRATE TO BE PROVIDED WHEN SPECIFIED.
6. GRATE DETAIL SHALL BE AS SHOWN ON D–17A UNLESS OTHERWISE APPROVED BY AGENCY.
PROVIDE CROSS BARS
OPTIONAL SPACING
4" OR 6"

SEE DETAIL A
2" CLR

3" x 3/8" BARS
L 3" x 2-1/2" x 3/8"
3"
3"

GRATE DETAILS

L 3" x 2-1/2" x 3/8"
OR L 3" x 3" x 3/8"
2-1/2"
OR 3"
1/4" CLR
1/4" (TYP)

STANDARD END FINISH
LUG 3/4" Ø x 1 1/2"
1" Ø HOLE IN PIPE
TO RECEIVE LUG

ALTERNATIVE CAST NODULAR IRON GRATE
OR CAST STEEL GRATE

DETAIL A

1/4" FILLET
2" MIN.
1/2"

SECTION B-B

3/8" Ø CROSS BARS MAY BE FILLET WELDED,
RESISTANCE WELDED OR ELECTROFORGED TO
BEARING BARS.

CROSS BAR DETAIL
ALTERNATIVE CAST NODULAR
IRON GRATE OR CAST STEEL GRATE

CROSS BAR DETAIL TYPE
WELDED STEEL GRATE

GRATE BAR SPACING TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>NO. OF BARS</th>
<th>CLEAR BAR SPACING</th>
<th>X</th>
<th>4&quot; SPACING</th>
<th>6&quot; SPACING</th>
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</thead>
<tbody>
<tr>
<td>WELDED STEEL</td>
<td>15</td>
<td>2&quot;</td>
<td>9/16&quot;</td>
<td>3-3/4&quot;</td>
<td>5-3/4&quot;</td>
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<tr>
<td>CAST</td>
<td>13</td>
<td>2&quot;</td>
<td>2-1/8&quot;</td>
<td>3-3/4&quot;</td>
<td>5-3/4&quot;</td>
</tr>
</tbody>
</table>

SAN DIEGO REGIONAL STANDARD DRAWING

CORRUGATED STEEL PIPE INLETS,
DETAILS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER D-17A
GRIND ALL EXPOSED CORNERS 1/4" RADIUS

7/8" Ø HOLE IN BRACKET

6" x 1/4" x 6" PLATE WASHER WITH 7/8" Ø HOLE

BRACKETS @ 10' OC MAX 4-1/2" x 1/4" BENT PLATE 5/8" Ø HOLES IN BRACKET AND RAIL FOR 1/2" Ø BOLTS

2 HOLES SLOTTED 5/8" x 1" FOR 1/2" Ø BOLTS

2 HOLES 5/8" Ø FOR 1/2" Ø BOLTS

Splice Plate
2-1/2" x 3/8" x 10"

SIDE VIEW

2-1/2" x 3/8" RAILS

3/4" OR 1" Ø GALVANIZED STEEL RUNGS

FRONT VIEW

1" Ø HOLES IN PIPE

3/4" Ø BOLT

2" x 3/16" x 2" PLATE WASHER

HEX NUT 1/2"

7"

LADDER DETAIL
H=5' OR GREATER

3/4" Ø GALVANIZED STEEL STEP

5/8" Ø HOLES FOR 1/2" Ø BOLTS

PLATE

2-1/2" x 3/8" x 1"

NOTE
SEE NOTE 3 ON D-16 FOR LADDER REQUIREMENTS.

STEP DETAIL
H=3'-6" TO 4'-11"

SAN DIEGO REGIONAL STANDARD DRAWING
CORRUGATED STEEL PIPE INLETS, DETAILS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E 19246 Date

DRAWING NUMBER D-17B

Revision By Approved Date
ORIGINAL Kercheval 12/75
Reformatted T. Stanton 04/06
Edited T. Stanton 02/09
Edited S.S. T. Regello 03/11
Edited T.R. T. Regello 10/15
NOTES

1. AC SPILLWAY MAY BE USED WHEN FILL IS 10' OR LESS, AND WHERE FILL SLOPE IS 1-1/2:1 OR FLATTER.
2. USE 10' MIN LENGTH OF GUTTER TRANSITION ON EACH SIDE OF DOWNDRAIN IN SAG CONDITION.
3. CROSS SECTIONAL AREA OF DITCH (SECTION B-B) MAY BE TRAPEZOIDAL OR SEMI-CIRCULAR; SEMI-CIRCULAR SECTIONAL AREA MUST PROVIDE AN EQUAL FLOW CAPACITY AS TRAPEZOIDAL.
NOTES
1. DOWNDRAIN FLUME MAY BE USED WHERE
FILL SLOPE IS 1-1/2:1 OR FLATTER.
2. USE 10' MIN LENGTH OF GUTTER TRANSITION ON
EACH SIDE OF DOWNDRAIN IN SAG CONDITION.
3. ALL METAL PARTS TO BE GALVANIZED AFTER FABRICATION.
The diagram contains several annotations and dimensions indicating a plan and section of a curb outlet. The plan shows dimensions such as "6" and "3", and the section A-A includes notes on anchor details and construction joint dimensions. The notes section includes the following points:

1. CONCRETE SHALL BE 560-C-3250.
2. D = INSIDE DIAMETER OF PIPE OR DEPTH OF CHANNEL.
3. SECTION TO BE SLOPED LATERALLY WITH TOP CONFORMING TO THE GRADES OF THE EXISTING SIDEWALK AND CURB.
4. MANHOLE FRAME AND COVER MAY BE DELETED WITH OPEN CHANNEL.
5. TROWEL FINISH TOP SURFACE AND REPRODUCE MARKINGS OF EXISTING SIDEWALK AND CURB.
6. TROWEL FINISH FLOOR OF OUTLET.
7. PROVIDE 1/4" TOOLED GROOVE IN TOP SLAB IN LINE WITH BACK OF ADJACENT CURB.

The legend on plans includes symbols for "CURB" and "CURB LINE."
NOTES
1. PIPE SHALL BE ONE CONTINUOUS LENGTH FROM PROPERTY LINE TO CURB LINE.
2. MULTIPLE PIPES TO BE SET A MINIMUM DISTANCE OF D/2 APART (3 MAX).
3. CONCRETE SHALL BE 520-C-2500.
4. PIPE SHALL BE CIRCULAR RIGID PLASTIC OR APPROVED EQUAL.
5. CORING OF EXISTING CURB MAY BE USED AS AN ALTERNATIVE.
6. PROVIDE 1/4" TOOLED GROOVE IN TOP SLAB IN LINE WITH BACK OF ADJACENT CURB.

APPROVED DRAIN PIPE SIZES

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>CURB HEIGHT AT CURB FACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>6&quot; TO 8&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>10&quot;</td>
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</table>

DRAIN SHALL NOT BE CONSTRUCTED WITHIN THE HATCHED AREA BLOCK CORNER
NOTES
1. A TYPE I CATCH BASIN IS SPECIFIED FOR LARGE DIAMETER PIPES OR FOR HEAVY TRAFFIC LOADS (NOTES EXTRA STEEL REINFORCEMENT IN UPPER CORNERS).
2. SEE D-11A & D-11B FOR ADDITIONAL NOTES AND DETAILS.
3. WHEN V EXCEEDS 4', STEPS SHALL BE INSTALLED PER D-11A.
SECTION, SINGLE & DOUBLE HEADWALLS

<table>
<thead>
<tr>
<th>D</th>
<th>H</th>
<th>SINGLE</th>
<th></th>
<th>DOUBLE</th>
<th></th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>STEEL (POUNDS)</td>
<td>CONCRETE (C.Y.)</td>
<td>L</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2'-8&quot;</td>
<td>5'</td>
<td>35</td>
<td>0.60</td>
<td>8'</td>
</tr>
<tr>
<td>15&quot;</td>
<td>2'-11&quot;</td>
<td>6'</td>
<td>40</td>
<td>0.75</td>
<td>9'-6&quot;</td>
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<tr>
<td>18&quot;</td>
<td>3'-2&quot;</td>
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<td>50</td>
<td>0.91</td>
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<tr>
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<td>3'-5&quot;</td>
<td>7'-6&quot;</td>
<td>60</td>
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<td>24&quot;</td>
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<td>75</td>
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<td>27&quot;</td>
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<td>85</td>
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<tr>
<td>30&quot;</td>
<td>4'-2&quot;</td>
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<td>85</td>
<td>1.52</td>
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<tr>
<td>33&quot;</td>
<td>4'-5&quot;</td>
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<td>100</td>
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<td>36&quot;</td>
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<td>39&quot;</td>
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<tr>
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<td>17'</td>
<td>190</td>
<td>3.31</td>
<td>23'-6&quot;</td>
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</table>

NOTES
1. CONCRETE SHALL BE 560-C-3250.
2. ALL REINFORCING SHALL BE #4 BARS, ALL VERTICAL AND HORIZONTAL TIE BARS @ 18" MAXIMUM SPACING.
3. EXPOSED CORNERS SHALL BE 3/4" CHAMFERED.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING
STRAIGHT HEADWALL - TYPE A [CIRCULAR PIPE]
S/2 (1' MIN) 3/4" CHAMFER

ELEVATION - DOUBLE HEADWALL

ELEVATION - SINGLE HEADWALL

FLOWLINE ELEVATION SHOWN ON PLANS

SECTION, SINGLE & DOUBLE HEADWALLS

<table>
<thead>
<tr>
<th>C.S.P. ARCH SIZE (INCHES)</th>
<th>SINGLE</th>
<th>DOUBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H (FT/IN)</td>
<td>L (FT/IN)</td>
</tr>
<tr>
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<td>2'-7&quot;</td>
<td>5'-6&quot;</td>
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<td>24x18</td>
<td>3'-2&quot;</td>
<td>7'-6&quot;</td>
</tr>
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<td>28x20</td>
<td>3'-4&quot;</td>
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<td>35x24</td>
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<td>42x29</td>
<td>4'-1&quot;</td>
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<td>57x38</td>
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<td>17'</td>
</tr>
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<td>64x43</td>
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<td>19'</td>
</tr>
<tr>
<td>71x47</td>
<td>5'-7&quot;</td>
<td>21'</td>
</tr>
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</table>

NOTES
1. CONCRETE SHALL BE 560-C-3250.
2. ALL REINFORCING SHALL BE #4 BARS. ALL VERTICAL AND HORIZONTAL TIE BARS @ 18" MAXIMUM SPACING.
3. EXPOSED CORNERS SHALL BE 3/4" CHAMFERED.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING
STRAIGHT HEADWALL - TYPE A
(CORRUGATED STEEL PIPE - ARCH)

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-31
NOTES

1. CONCRETE SHALL BE 560-C-3250.
2. EXPOSED CORNERS SHALL BE 3/4" CHAMFERED.
DOUBLE PIPE ELEVATION

SECTION A–A

SINGLE PIPE ELEVATION

3/4" CHAMFER

<table>
<thead>
<tr>
<th>CSP Arch Size</th>
<th>A</th>
<th>B</th>
<th>H</th>
<th>L</th>
<th>Concrete (C.Y.)</th>
<th>L</th>
<th>Concrete (C.Y.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18&quot; x 11&quot;</td>
<td>2'</td>
<td>1-2'</td>
<td>3'-11&quot;</td>
<td>6'</td>
<td>0.83</td>
<td>7'-3&quot;</td>
<td>0.97</td>
</tr>
<tr>
<td>21&quot; x 15&quot;</td>
<td>2'</td>
<td>1-4&quot;</td>
<td>4'-3&quot;</td>
<td>7'</td>
<td>1.08</td>
<td>9'-8&quot;</td>
<td>1.46</td>
</tr>
<tr>
<td>24&quot; x 18&quot;</td>
<td>2'</td>
<td>1-6&quot;</td>
<td>4'-6&quot;</td>
<td>8'</td>
<td>1.41</td>
<td>11'-6&quot;</td>
<td>1.98</td>
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<tr>
<td>28&quot; x 20&quot;</td>
<td>2'-6&quot;</td>
<td>1-8&quot;</td>
<td>5'-2&quot;</td>
<td>9'</td>
<td>1.97</td>
<td>12'-6&quot;</td>
<td>2.66</td>
</tr>
<tr>
<td>35&quot; x 24&quot;</td>
<td>2'-6&quot;</td>
<td>2'</td>
<td>5'-6&quot;</td>
<td>10'</td>
<td>2.56</td>
<td>14'-5&quot;</td>
<td>3.60</td>
</tr>
</tbody>
</table>

NOTES
1. CONCRETE SHALL BE 560–C–3250.
2. EXPOSED CORNERS SHALL BE 3/4" CHAMFERED.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

STRAIGHT HEADWALL - TYPE B
(CORRUGATED STEEL PIPE - ARCH)
**NOTES**

1. CONCRETE SHALL BE 560-C-3250.
2. EXPOSED CORNERS SHALL BE 3/4" CHAMFERED.
3. MULTIPLE PIPES SHALL BE SET A DISTANCE OF D/2,
   WITH A 1" MIN BETWEEN OUTSIDE DIAMETERS OF PIPES.
4. TOP OF HEADWALL SHALL BE PLACED APPROXIMATELY PARALLEL
   TO PROFILE GRADE WHEN THE GRADE IS 3% OR MORE.
5. SKEWED PIPES: DIMENSION W SHALL BE INCREASED IN WIDTH
   OR LENGTH DUE TO SKEW OR MULTIPLE PIPES.
6. USE ALTERNATE DETAIL C FOR PIPE WALL THICKNESS GREATER THAN 3".

**LEGEND ON PLANS**

---

**WING AND U TYPE HEADWALLS**
**FOR 18" TO 36" PIPES**

**SAN DIEGO REGIONAL STANDARD DRAWING**

**RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE**
NOTE
SEE D-35B FOR DIMENSION TABLE AND GENERAL NOTES.

SAN DIEGO REGIONAL STANDARD DRAWING
WING AND U TYPE HEADWALLS
FOR 42" TO 84" PIPE

Revised By Approved Date
ORIGINAL Kercheval 12/75
Reformatted T. Stanton 04/06
Edited T. Stanton 02/09
Edited S.S. T. Regello 03/11
Edited R.R. T. Regello 10/15

LEGEND ON PLANS

= 12 = 6
### TABLE OF DIMENSIONS AND QUANTITIES
FOR HEADWALLS SHOWN ON D-35A

**NOTE:** DIMENSIONS E AND L APPLY TO WING TYPE ONLY.

<table>
<thead>
<tr>
<th># OF PIPE</th>
<th>DIMENSIONS</th>
<th>SINGLE PIPE</th>
<th>DOUBLE PIPE</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42&quot;</td>
<td>3'</td>
<td>7</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>48&quot;</td>
<td>4'</td>
<td>6&quot;</td>
<td>2'--6&quot;</td>
</tr>
<tr>
<td>54&quot;</td>
<td>5'</td>
<td>4&quot;</td>
<td>7/8&quot;</td>
</tr>
<tr>
<td>60&quot;</td>
<td>6&quot;</td>
<td>3&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>66&quot;</td>
<td>7'</td>
<td>2 1/2&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>72&quot;</td>
<td>8&quot;</td>
<td>1 3/8&quot;</td>
<td>4&quot;--6&quot;</td>
</tr>
<tr>
<td>78&quot;</td>
<td>9&quot;</td>
<td>5&quot;</td>
<td>7&quot;--6&quot;</td>
</tr>
<tr>
<td>84&quot;</td>
<td>9&quot;</td>
<td>10 3/4&quot;</td>
<td>5&quot;--8&quot;</td>
</tr>
</tbody>
</table>

**NOTES**

1. SKEWED PIPES: DIMENSION W TO BE INCREASED TO TAKE CARE OF INCREASED WIDTH OR LENGTH DUE TO SKEWOF MULTIPLE PIPES.
2. TOP OF HEADWALL SHALL BE PLACED APPROXIMATELY PARALLEL TO PROFILE GRADE WHEN THE GRADE IS 3% OR MORE.
3. CONCRETE SHALL BE 560–C–3250.
4. EXPOSED CORNERS SHALL BE 3/4" CHAMFERED.
5. MULTIPLE PIPES SHALL BE SET A DISTANCE OF D/2, WITH A 1’ MINIMUM, BETWEEN OUTSIDE DIAMETERS OF PIPES.
6. USE ALTERNATE DETAIL C FOR PIPE WALL THICKNESS GREATER THAN 3".

---

**LEGEND ON PLANS**

- [ ]
- [ ]

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**SAN DIEGO REGIONAL STANDARD DRAWING**

**WING AND U TYPE HEADWALLS**

**FOR 42" TO 84" PIPE**

**RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE**

**DRAWING NUMBER** D-35B

**Chairperson R.C.E 19248 Date**
## ELEVATION

### Section

<table>
<thead>
<tr>
<th>D</th>
<th>H</th>
<th>L/2</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>3'-4''</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STEEL (LBS)</td>
</tr>
<tr>
<td>12''</td>
<td>2'-8''</td>
<td>2'-6''</td>
<td>50</td>
</tr>
<tr>
<td>15''</td>
<td>2'-11''</td>
<td>3'</td>
<td>55</td>
</tr>
<tr>
<td>18''</td>
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<td>39''</td>
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<td>42''</td>
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<td>45''</td>
<td>5'-5''</td>
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<td>48''</td>
<td>5'-8''</td>
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<tr>
<td>51''</td>
<td>5'-11''</td>
<td>8'</td>
<td>—</td>
</tr>
<tr>
<td>54''</td>
<td>6'-2''</td>
<td>8'-6''</td>
<td>—</td>
</tr>
</tbody>
</table>

### Notes
1. Concrete shall be 560-C-3250.
2. All reinforcing steel shall be #4 bars. All vertical and horizontal tie bars shall have 18" maximum spacing.
3. When multiple pipes are used, the distance between pipes shall be D/2 (1' min). The dimension L/2 is from the center of the pipe to the end of the headwall as shown.
4. Exposed corners shall be 3/4" chamfered.

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**Legend on Plans**

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**Recommended by the San Diego Regional Standards Committee**

**Revision By Approved Date**
- ORIGINAL Kercheval 12/75
- Reformatted T. Stanton 04/06
- Edited T. Stanton 02/09
- Edited S.S. T. Regello 03/11
- Edited T.R. T. Regello 10/15

**San Diego Regional Standard Drawing**

**L Type Headwalls (Circular Pipes)**

**Drawing Number** D-36

Chairperson: R.C.E. 19246 Date 10/17/2015
### CSP Arch Size

<table>
<thead>
<tr>
<th>CSP Arch Size</th>
<th>H</th>
<th>L/2</th>
<th>LENGTH OF W</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>3'-4&quot;</td>
</tr>
<tr>
<td>18&quot;x11&quot;</td>
<td>2'-7&quot;</td>
<td>2'-9&quot;</td>
<td>50</td>
</tr>
<tr>
<td>21&quot;x15&quot;</td>
<td>2'-11&quot;</td>
<td>3'-3&quot;</td>
<td>60</td>
</tr>
<tr>
<td>24&quot;x18&quot;</td>
<td>3'-2&quot;</td>
<td>3'-9&quot;</td>
<td>60</td>
</tr>
<tr>
<td>28&quot;x20&quot;</td>
<td>3'-4&quot;</td>
<td>4'-3&quot;</td>
<td>70</td>
</tr>
<tr>
<td>35&quot;x24&quot;</td>
<td>3'-8&quot;</td>
<td>5'-3&quot;</td>
<td>100</td>
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<tr>
<td>42&quot;x29&quot;</td>
<td>4'-1&quot;</td>
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<td>115</td>
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<td>49&quot;x33&quot;</td>
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<td>7'-3&quot;</td>
<td>130</td>
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<tr>
<td>57&quot;x38&quot;</td>
<td>4'-10&quot;</td>
<td>8'-6&quot;</td>
<td>145</td>
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<td>64&quot;x43&quot;</td>
<td>5'-3&quot;</td>
<td>9'-6&quot;</td>
<td>185</td>
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<tr>
<td>71&quot;x47&quot;</td>
<td>5'-7&quot;</td>
<td>10'-6&quot;</td>
<td>200</td>
</tr>
</tbody>
</table>

**NOTES**

1. CONCRETE SHALL BE 560–C–3250.
2. ALL REINFORCING STEEL SHALL BE #4 BARS. ALL VERTICAL AND HORIZONTAL TIE BARS SHALL HAVE 18" MAXIMUM SPACING.
4. EXPOSED CORNERS SHALL BE 3/4" CHAMFERED.

**LEGEND ON PLANS**

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**L TYPE HEADWALLS**

(CORRUGATED STEEL PIPE - ARCH)

**D-37**
NOTES
1. USE A CURTAIN WALL AT THE END OF A CULVERT INSTEAD OF A HEADWALL WHEN IT IS LIKELY THAT THE CULVERT WILL BE EXTENDED IN THE NEAR FUTURE, OR WHEN A HEADWALL IS NOT NEEDED TO RETAIN THE PIPE BACKFILL.
2. CONCRETE SHALL BE 560-C-5250.
3. KEEP THE PIPE-END CLEAR OF OBSTRUCTIONS TO PERMIT EASY PLACING OF CULVERT EXTENSION.
NOTES
1. WHEN MORE THAN ONE PIPE IS USED THE PROFILE VIEW SHOWN SHALL HOLD THE DISTANCE ACROSS ALL PIPE OPENINGS. SECTION A–A AND B–B SHALL BE FROM THE OUTERMOST PIPE. THE DISTANCE BETWEEN PIPES SHALL BE D/2 FOR ROUND AND SPAN/3 FOR ARCH PIPE (1’ MINIMUM).
2. CULVERT SHALL BE CUT OFF EVEN WITH APRON SURFACE WHEN REQUIRED BY THE AGENCY.
3. USE INLET APRON ONLY WHERE A FLARED END SECTION CANNOT BE UTILIZED.
4. PLACE WEEP HOLES WHEN REQUIRED BY AGENCY.

LEGEND ON PLANS

SECTION B–B

SECTION C–C
NOTES
1. PLACE REINFORCING, AS NOTED, AT CENTER OF WALL (OR SLAB).
2. MATCH LOCATION OF REINFORCING WITH THAT IN HEADWALL, END SILL AND FOUNDATION SLAB.
3. ALL REINFORCING SHALL BE PLACED WITH 2" CONCRETE COVER, UNLESS NOTED OTHERWISE.
2" (TYP)

SEE SECTION A-A ON D-43B

#5 @ 12" (OUTSIDE FACE)
#4 @ 12" (INSIDE FACE)

#4 @ 10" (OUTSIDE FACE)
#4 @ 10" (INSIDE FACE)
SEE SECTION D-D AND NOTE 1 ON D-43C

HEADWALL ELEVATION

SYMETRICAL ABOUT CENTERLINE

SEE SECTION D-D ON D-43C

#4 @ 10" (OUTSIDE FACE ONLY)

#5 @ 12" EACH FACE

END SILL ELEVATION

#4 @ 10" (OUTSIDE FACE ONLY)

San Diego Regional Standard Drawing

Concrete Energy Dissipater
[Reinforcement]
36" To 72" Diameter Pipe

Revision | By | Approved | Date
--- | --- | --- | ---
ORIGINAL | Kercheval | 12/75
Reformatted | T. Stanton | 04/06
Edited | T. Stanton | 02/09
Edited | S.S. T. Regello | 03/11
Edited | T.R. T. Regello | 10/15

Chairperson R.C.E. 19246 Date
Drawing Number D-43A

Recommended by the San Diego Regional Standards Committee
NOTES
1. MATCH LOCATION OF SIDEWALL REINFORCING.
2. DOWELS WITH SAME SIZE AND SPACING AS WALL REINFORCING MAY
   BE USED IN LIEU OF CONTINUOUS BARS AT CONTRACTOR'S OPTION.
3. MATCH LOCATION OF HEADWALL OR END SILL REINFORCING.

<table>
<thead>
<tr>
<th>PIPE # (IN.)</th>
<th>36&quot;</th>
<th>42&quot;</th>
<th>48&quot;</th>
<th>54&quot;</th>
<th>60&quot;</th>
<th>72&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>A BAR</td>
<td># 5 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#7 @ 12&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B BAR</td>
<td># 5 @ 12&quot;</td>
<td></td>
<td>#6 @ 12&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C BAR</td>
<td># 4 @ 12&quot;</td>
<td></td>
<td>#5 @ 12&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D BAR</td>
<td># 4 @ 12&quot;</td>
<td>#5 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td></td>
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<tr>
<td>E BAR</td>
<td># 4 @ 12&quot;</td>
<td></td>
<td>#5 @ 12&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F BAR</td>
<td># 4 @ 9&quot;</td>
<td>#5 @ 9&quot;</td>
<td>#6 @ 9&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G BAR</td>
<td># 7</td>
<td></td>
<td># 11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PLAN

5-#4 @ 12"
3-#8, STRAIGHT
2-#4, STRAIGHT, @ 12"
2-#4 @ ±12"
1/2 EXP. JOINT FILLER
WALL SLOPE TO MATCH CHANNEL
#4 "@ 12"
3-#9
2-#4 @12"

HEADWALL OR ENDWALL
5-#4 @ 12"
4 J@ 12", BACKFACE
#4 @ 18", FRONT FACE
#4 @ 18", STRAIGHT, BOTH FACES
"SLOPE" OF FILL OR CHANNEL
3-#9/1
#4 @ 18" STRAIGHT BACKFACE
#4 J@ 18" FRONT FACE, BEND 2"-6" INTO WALL OR APRON
CUTOFF WALL

2-#4 IF ALTERNATIVE BOTTOM IS USED
ALTERNATIVE BOTTOM OF CUTOFF WALL

TYPICAL FOR MAXIMUM H > 10'
TYPICAL FOR MAXIMUM H ≤ 10'

END ELEVATION

NOTE
SEE NOTES ON D-44D.

IF AT UPSTREAM END, FILLET IS NOT SHOWN

SAN DIEGO REGIONAL STANDARD DRAWING
PIECE CULVERT - HEADWALLS, ENDWALLS & WARPED WINGWALLS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date
NOTES

1. RCP IS SHOWN. WHEN USING METAL PIPE ELIMINATE THE EXPANSION JOINT AND USE HOOK BOLTS @ 19"± SPACING (SIZE AND LENGTH PROVIDED BY MANUFACTURER).

2. WHERE ABASION IS ANTICIPATED, INCREASE APRON THICKNESS TO 7" MINIMUM TO PROVIDE 2" MINIMUM REINFORCEMENT COVERAGE.
ALTERNATIVE WARPED WINGWALL

USE WHERE ADDITIONAL PROTECTION TO TOE OF EMBANKMENT IS REQUIRED. IF AT UPSTREAM END, FILLET IS NOT SHOWN.
### Warped Wingwalls (All Measurements in Feet and/or Inches Unless Otherwise Noted)

#### Wall Dimensions and Reinforcing

<table>
<thead>
<tr>
<th>Element Slope</th>
<th>H</th>
<th>8' or Less</th>
<th>10'</th>
<th>12'</th>
<th>14'</th>
<th>16'</th>
<th>18'</th>
<th>20'</th>
<th>25'</th>
<th>30'</th>
<th>35'</th>
<th>40' or More</th>
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<td>1/4:1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Front Face Reinforced</td>
<td>#4012</td>
<td>#40 7</td>
<td>#50 7</td>
<td>#50 5</td>
<td>#50 6</td>
<td>#70 7</td>
<td>#70 6</td>
<td>#90 7</td>
<td>#90 6</td>
<td>#15 7</td>
<td>#15 6</td>
<td></td>
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<tr>
<td>Rear Face Reinforced</td>
<td>#4012</td>
<td>#40 7</td>
<td>#50 7</td>
<td>#50 5</td>
<td>#50 6</td>
<td>#70 7</td>
<td>#70 6</td>
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<td>#15 7</td>
<td>#15 6</td>
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<tr>
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<td>#40 6</td>
<td>#40 7</td>
<td>#40 6</td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

1. Walls designed for 2' surcharge; earth density = 120 #/cf; equivalent fluid pressure = 36 #/cf.
2. Vary "D" at warped wall uniformly from that at cutoff wall to that at culvert, for maximum H > 12'.
3. Dimensions "L", "W", "H", "m", "n", "elevation a", "angle of flare", and end "slope" (as apply) are shown on the plans.
4. All exposed concrete edges shall be chamfered 3/4".
NOTE
THE ROUNDED AREAS MAY BE BUILT UP OF CEMENT MORTAR OR Poured IN PLACE WITH THE DRAINAGE STRUCTURE.

R = INSIDE DIAMETER OF PIPE

\[ R = \frac{10}{6} \]
NOTES
1. PIPE COLLAR DOES NOT HAVE TO BE FINISHED IF COVERED.
2. CONCRETE SHALL BE 560-C-3250.
3. AN INTERNAL FORM SHALL BE USED WHERE GAP EXCEEDS 3" BUT IS NOT MORE THAN 6".

FINISH SMOOTH WITH CLASS C MORTAR
CUT PIPE END
NOTES
1. THICKNESS AND WALL DEPTH SHALL BE AS SHOWN ON PLAN.
2. REINFORCING IN CUTOFF WALL SHALL BE THE SAME AS THAT REQUIRED IN CHANNEL.
3. CONCRETE SHALL BE 560-C-3250.
1. CONCRETE SHALL BE 560–C–3250.
2. PIPE SHALL CONNECT TO CHANNEL AS HIGH AS POSSIBLE AND
   NOT BE CONSTRUCTED DIRECTLY ABOVE A WEEP HOLE.
3. THE MAXIMUM ANGLE OF CONNECTION IS 60° DOWNSTREAM. IN NO
   CASE SHALL THE PIPE ANGLE UPSTREAM.
4. INSTALL 6 x 6–W1.4 x W1.4 WWR IN CONCRETE AROUND PIPE.

LEGEND ON PLANS

---

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE TO CHANNEL CONNECTION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson: [Name]  R.E. 19246  Date: 12/17/2015

DRAWING NUMBER  D-73
**Spans up to 5' (All Measurements in Feet and/or Inches Unless Noted Otherwise)**

| Span | 2'  | 3'  | 4'  | 5'  | 2'  | 3'  | 4'  | 5'  | 2'  | 3'  | 4'  | 5'  |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **Strength Classification** | A   | A   | A   | B   | A   | A   | B   | A   | B   | A   | B   | A   | B   |
| Max Fill Over Top | 66  | 38  | 38  | 66  | 28  | 28  | 37  | 28  | 37  | 50  | 12  | 27  | 12  |
| Top Slab | T₁ | 6   | 6   | 6   | 1/4 | 6   | 6   | 1/4 | 6   | 6   | 1/4 | 6   | 6   |
| Bottom Slab | T₂ | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6   |
| Sidewalls | T₃ | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6   |
| **Concrete Size Bar #** | 4   | 4   | 5   | 5   | 5   | 5   | 6   | 5   | 5   | 5   | 5   | 6   | 6   |
| **Spacing** | 3/12 | 3/12 | 3/12 | 3/12 | 4   | 5   | 4/12 | 5   | 4/12 | 5   | 4   | 4/12 | 5   |
| **Length** | 3/2 | 3/2 | 3/2 | 3/2 | 4   | 5   | 4/2 | 5   | 4/2 | 5   | 4   | 5/2 | 4   |
| **Dist. Top Slab No. Of** | 2   | 2   | 3   | 3   | 2   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   |
| **Bars** | 2   | 2   | 2   | 2   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   |
| **Spacers Number** | 12  | 12  | 12  | 12  | 12  | 12  | 12  | 12  | 12  | 12  | 12  | 12  | 12  |
| **Concrete: C.Y. Per Lin. Ft.** | 17  | 18  | 23  | 27  | 31  | 29  | 33  | 36  | 40  | 43  | 32  | 37  | 41  |
| **Reinforcing Lbs. Per Lin. Ft.** | 27  | 29  | 34  | 36  | 46  | 44  | 45  | 47  | 48  | 52  | 64  | 57  | 56  |

**NOTE**

For Boxes of Height Less Than That Shown in Table, Use Next Greater Table Height Slabs, Wall Dimensions and Reinforcing Steel. Make Changes to Bar Lengths and Number of Spacers and Quantities as Necessary.
## San Diego Regional Standard Drawing

### Single Box Culvert Details No. 1

#### Spans 6' (All measurements in feet and/or inches unless noted otherwise)

<table>
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<tr>
<th>Span</th>
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<th>5'</th>
<th>6'</th>
<th>7'</th>
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<tr>
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<td>1/8</td>
<td>1/4</td>
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<tr>
<td><strong>Bottom Slab</strong></td>
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#### Note

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel. Make changes to bar lengths and number of spacers and quantities as necessary.
### SPAN 7’ (ALL MEASUREMENTS IN FEET AND/OR INCHES UNLESS NOTED OTHERWISE)

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**NOTE**

For boxes of height less than that shown in table, use next greater table. Height slabs, wall dimensions and reinforcing steel make changes to bar lengths and number of spacers and quantities as necessary.
### Span 8' (All Measurements in Feet and/or Inches Unless Noted Otherwise)

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<td>125</td>
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</table>

**NOTE**

For boxes of height less than that shown in table, use next greater table slabs, wall dimensions and reinforcing steel. Make changes to bar lengths and number of spacers and quantities as necessary.
SPAN 10' (ALL MEASUREMENTS IN FEET AND/OR INCHES UNLESS NOTED OTHERWISE)

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<th>7'</th>
<th>8'</th>
<th>9'</th>
<th>10'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>9</td>
<td>18</td>
<td>9</td>
<td>18</td>
<td>9</td>
<td>18</td>
<td>8</td>
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<tr>
<td>TOPL SLAB</td>
<td>T1</td>
<td>8</td>
<td>9</td>
<td>1/2</td>
<td>8</td>
<td>1/2</td>
<td>9</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>8</td>
<td>3/4</td>
<td>10</td>
<td>1/2</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>7</td>
<td>1/4</td>
<td>9</td>
<td>1/2</td>
<td>7</td>
<td>1/4</td>
</tr>
</tbody>
</table>

**SINGLES BOX CULVERT**

**CONCRETE**

| SIZE BAR # | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| SPACING | 11 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 |

**REINFORCING STEEL**

| SIZE BAR # | 5 | 6 | 6 | 5 | 6 | 5 | 6 | 5 | 6 | 5 | 6 | 5 | 6 | 5 | 6 | 5 | 6 | 5 | 6 |
| SPACING | 10 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 | 11 | 8 |
| LENGTH | 2-8 | 3-4 | 2-8 | 3-4 | 2-8 | 3-4 | 2-8 | 3-4 | 2-8 | 3-4 | 2-8 | 3-4 | 2-8 | 3-4 | 2-8 | 3-4 | 2-8 | 3-4 |

**SPACER NUMBER**

- **TOP SLAB-NO. OF BARS** | 9 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
- **BOTTOM SLAB-NO. OF BARS** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
- **SPACING** | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
- **SPACERS** | 32 | 34 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |

**CONCRETE:**

- **C.Y. PER LIN. FT.** | 75 | 94 | 82 | 108 | 86 | 108 | 92 | 115 | 97 | 121 | 150 | 106 | 126 | 157 | 118 | 132 | 165 |
- **REINFORCING LBS. PER LIN. FT.** | 143 | 221 | 148 | 228 | 154 | 235 | 160 | 244 | 164 | 250 | 265 | 170 | 259 | 273 | 178 | 267 | 281 |

**NOTE**

FOR BOXES OF HEIGHT LESS THAN THAT SHOWN IN TABLE, USE NEXT GREATER TABLE HEIGHT SLABS, WALL DIMENSIONS AND REINFORCING STEEL. MAKE CHANGES TO BAR LENGTHS AND NUMBER OF SPACERS AND QUANTITIES AS NECESSARY.
**SPAN 12’ (ALL MEASUREMENTS IN FEET AND/OR INCHES UNLESS NOTED OTHERWISE)**

<table>
<thead>
<tr>
<th>SPAN</th>
<th>12’</th>
</tr>
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<tbody>
<tr>
<td></td>
<td><strong>HEIGHT</strong></td>
</tr>
<tr>
<td></td>
<td>STRENGTH CLASSIFICATION</td>
</tr>
<tr>
<td></td>
<td>MAX FILL OVER TOP</td>
</tr>
<tr>
<td></td>
<td>TOP SLAB</td>
</tr>
<tr>
<td></td>
<td>SIDEWALKS</td>
</tr>
</tbody>
</table>

**CONC.**

|          | “a” | SIZE BAR # | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
|          | SPACING | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 8 | 11 | 10 | 8 |
|          | LENGTH | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 | 11-311-6 |

|          | “b” | SIZE BAR # | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
|          | SPACING | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 8 | 11 | 10 | 8 |
|          | DIMENSION “x” | 2-8 | 3 | 2-8 | 3 | 2-8 | 3 | 2-8 | 3 | 2-8 | 3 | 2-8 | 3 |
|          | LENGTH | 4-10 | 5-7 | 4-10 | 5-7 | 4-10 | 5-7 | 4-10 | 5-7 | 4-10 | 5-7 | 4-10 | 5-7 |

|          | “c” | SIZE BAR # | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
|          | SPACING | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 8 | 11 | 10 | 8 |
|          | DIMENSION “y” | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 |
|          | LENGTH | 10-21 | 10-4 | 12-1 | 4-12 | 2-12 | 4-12 | 2-12 | 4-12 | 2-12 | 4-12 | 2-12 | 4-12 |

|          | “d” | SIZE BAR # | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
|          | SPACING | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 8 | 11 | 10 | 8 |
|          | DIMENSION “z” | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 | 3-9 |
|          | LENGTH | 5-11 | 6-5 | 5-11 | 6-5 | 5-11 | 6-5 | 5-11 | 6-5 | 5-11 | 6-5 | 5-11 | 6-5 |

| “d” | TOP SLAB-NO. OF | 10 | 8 | 10 | 8 | 10 | 8 | 10 | 8 | 10 | 8 | 10 | 8 |
|      | BOTTOM SLAB-NO. OF | 6 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| “e” | BARS SPACING | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
|      | SPACERS TOTAL NUMBER | 36 | 44 | 44 | 44 | 44 | 48 | 48 | 52 |

**REINFORCING STEEL**

**NOTE**

For boxes of height less than that shown in Table, use next greater table height slabs, wall dimensions and reinforcing steel. Make changes to bar lengths and number of spacers and quantities as necessary.
TYPICAL SECTIONS 2' THRU 6' SPANS

FOR COVER LESS THAN 2' PROVIDE #4 @ 18" EA WAY & ADJUST QUANTITIES

#4 SPACERS

PROVIDE PAVING NOTCH WHEN TOP IS EXPOSED AND WHERE PCC PAVEMENT OR APPROACH SLAB IS USED

3/4" MIN FILLETS

#4 SPACER BARS @ 18" MAX

OPTIONAL CONSTRUCTION JOINTS

#4 SPACERS

TYPICAL SECTIONS 7' THRU 12' SPANS

FOR COVER LESS THAN 2' PROVIDE #4 @ 18" EA WAY & ADJUST QUANTITIES

#4 SPACERS @ 18"

CONSTRUCTION JOINT

PROVIDE PAVING NOTCH WHEN TOP IS EXPOSED AND WHERE PCC PAVEMENT OR APPROACH SLAB IS USED

#5 "a" Bars

OPTIONAL CONSTRUCTION JOINT

#4 SPACERS

2" CLR

"C1" BARS

#4 SPACERS @ 18"

ALTERNATIVE INVERTS

( WHEN SPECIFIED ON PLANS )

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT DETAILS NO.2

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-76G

Revision By Approved Date

ORIGINAL Kercheval 12/75

Reviewed T. Stanton 04/06

Edited S.S. T. Regello 03/11

Edited T.R. T. Regello 10/15
SPAN 4' (ALL MEASUREMENTS IN FEET AND/OR INCHES UNLESS NOTED OTHERWISE)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2'</th>
<th>4'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>6 1/2</td>
<td>6 1/2</td>
</tr>
<tr>
<td>TOP SLAB</td>
<td>T1</td>
<td>6 7/16</td>
</tr>
<tr>
<td>BOTTOM SLAB</td>
<td>T2</td>
<td>6 7/16</td>
</tr>
<tr>
<td>SIDEWALLS</td>
<td>T3</td>
<td>6 7/16</td>
</tr>
</tbody>
</table>

NOTE

FOR BOXES OF HEIGHT LESS THAN THAT SHOWN IN TABLE, USE NEXT GREATER TABLE HEIGHT SLABS, WALL DIMENSIONS AND REINFORCING STEEL. MAKE CHANGES TO BAR LENGTHS AND NUMBER OF SPACERS AND QUANTITIES AS NECESSARY. NUMBER OF "d" BARS IN TABLE IS SLAB TOTAL FOR BOTH CELLS.
## Span 5' (All Measurements in Feet and/or Inches Unless Noted Otherwise)

<table>
<thead>
<tr>
<th>Span</th>
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<th>3'</th>
<th>5'</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Strength Classification</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Max Fill Over Top</td>
<td>6</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>6</td>
<td>3/4</td>
<td>7</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>6</td>
<td>1/2</td>
<td>8</td>
</tr>
<tr>
<td>sidewalls</td>
<td>T3</td>
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<td>5</td>
</tr>
<tr>
<td></td>
<td>Size Bar #</td>
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<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Spacing</td>
<td>10</td>
<td>8</td>
<td>1/2</td>
</tr>
<tr>
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<td>Length</td>
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</tr>
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<td>Size Bar #</td>
<td>5</td>
<td>5</td>
<td>5</td>
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<tr>
<td></td>
<td>Spacing</td>
<td>10</td>
<td>8</td>
<td>1/2</td>
</tr>
<tr>
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<td>Spacing</td>
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<td>8</td>
<td>1/2</td>
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<td></td>
<td>Length</td>
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<td>5-6</td>
<td>5-6</td>
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<tr>
<td>&quot;d&quot; Dist Bars</td>
<td>Top Slab-Tot. No.</td>
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<td>6</td>
</tr>
<tr>
<td></td>
<td>Bottom Slab-Tot. No.</td>
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</tr>
<tr>
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<td>Size Bar #</td>
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<tr>
<td></td>
<td>Spacing</td>
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<td>Spacers</td>
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<tr>
<td>Concrete: C.Y. Per Lin. Ft.</td>
<td>0.58</td>
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<td>0.63</td>
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<tr>
<td>Reinforcing Lbs. Per Lin. Ft.</td>
<td>99</td>
<td>100</td>
<td>109</td>
<td>103</td>
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</tbody>
</table>

### Note

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel. Make changes to bar lengths and number of spacers and quantities as necessary. Number of "d" bars in table is slab total for both cells.
<table>
<thead>
<tr>
<th>SPAN</th>
<th>3'</th>
<th>4'</th>
<th>6'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>4</td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T_1</td>
<td>7/4</td>
<td>8/4</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T_2</td>
<td>7/4</td>
<td>9/4</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T_3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>CONC. SIZE BAR # 6</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>SPACING</td>
<td>9/2</td>
<td>11</td>
<td>9/2</td>
</tr>
<tr>
<td>CONC. SIZE BAR # 6</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>SPACING</td>
<td>9/2</td>
<td>11</td>
<td>9/2</td>
</tr>
<tr>
<td>LENGTH</td>
<td>13-6</td>
<td>13-6</td>
<td>13-6</td>
</tr>
<tr>
<td>CONC. SIZE BAR # 6</td>
<td>4</td>
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<td>6</td>
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<tr>
<td>SPACING</td>
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<td>11</td>
<td>9/2</td>
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<tr>
<td>LENGTH</td>
<td>6-6</td>
<td>6-6</td>
<td>6-6</td>
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<tr>
<td>&quot;d&quot; DIST BARS TOT. NO.</td>
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<td>&quot;e&quot; BARS SPACING</td>
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<td>CONCRETE: C.Y. PER LIN. FT.</td>
<td>0.77</td>
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<tr>
<td>REINFORCING LBS. PER LIN. FT.</td>
<td>121</td>
<td>119</td>
<td>147</td>
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</tbody>
</table>

**NOTE**

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel. Make changes to bar lengths and number of spacers and quantities as necessary. Number of "d" bars in table is slab total for both cells.
<table>
<thead>
<tr>
<th>SPAN</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
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<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>3</td>
<td>4</td>
<td>25</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>TOP SLAB</td>
<td>T1</td>
<td>8 1/2</td>
<td>9 1/2</td>
<td>12</td>
<td>8 1/2</td>
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<tr>
<td>BOTTOM SLAB</td>
<td>T2</td>
<td>7 1/2</td>
<td>10 1/2</td>
<td>12</td>
<td>3/4</td>
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<tr>
<td>SIDEWALLS</td>
<td>T3</td>
<td>6</td>
<td>6</td>
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</tbody>
</table>

**NOTE**

For boxes of height less than that shown in Table, use next greater table height slabs, wall dimensions and reinforcing steel.

Make changes to bar lengths and number of spacers and quantities as necessary. Number of "d" bars in Table is slab total for both cells.
### SPAN 10’ (ALL MEASUREMENTS IN FEET AND/OR INCHES UNLESS NOTED OTHERWISE)

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<th>7’</th>
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<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
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<td>STRENGTH CLASSIFICATION</td>
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<td>CONC</td>
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<tr>
<td>BOTTOM SLAB T2</td>
<td>8</td>
<td>1/4</td>
<td>13</td>
<td>1/2</td>
<td>16</td>
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<tr>
<td>SIDEWALLS T3</td>
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</tr>
</tbody>
</table>

### NOTE

For boxes of height less than that shown in table, use next greater table height slab, wall dimensions and reinforcing steel. Make changes to bar lengths and number of spacers and quantities as necessary. Number of “a” bars in table is slab total for both cells.
SPAN 12' (ALL MEASUREMENTS IN FEET AND/OR INCHES UNLESS NOTED OTHERWISE)

<table>
<thead>
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<th>SPAN</th>
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<th>8'</th>
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<th>12'</th>
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</thead>
<tbody>
<tr>
<td>HEIGHT</td>
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<td>T</td>
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<td>U</td>
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<td>V</td>
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<tr>
<td>W</td>
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<td>Z</td>
<td></td>
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<td></td>
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</tbody>
</table>

NOTE

FOR BOXES OF HEIGHT LESS THAN THAT SHOWN IN TABLE, USE NEXT GREATER TABLE HEIGHT SLABS, WALL DIMENSIONS AND REINFORCING STEEL. MAKE CHANGES TO BAR LENGTHS AND NUMBER OF SPACERS AND QUANTITIES AS NECESSARY. NUMBER OF "d" BARS IN TABLE IS SLAB TOTAL FOR BOTH CELLS.
TYPICAL SECTION
(SHOWING REINFORCEMENT FOR INTERIOR WALLS 8" AND OVER)

③ FOR REINFORCEMENT CLEARANCE, EXCEPT AT BOTTOM, SEE "MISCELLANEOUS DETAILS," ON D-81A AND D-81B.

"FLAT INVERT" ALTERNATIVE
(WHEN SPECIFIED)
## SPAN 4' (ALL MEASUREMENTS IN FEET AND/OR INCHES UNLESS NOTED OTHERWISE)

<table>
<thead>
<tr>
<th></th>
<th>2'</th>
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<th>4'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEIGHT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength Classification</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Max Fill Over Top</td>
<td>10 24 38</td>
<td>10 24 38</td>
<td>10 24 38</td>
</tr>
<tr>
<td><strong>SPAN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>6 1/4 6 1/4 7 1/4</td>
<td>6 1/4 6 1/4 7 1/4</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>6 7 8 1/4</td>
<td>6 7 8 1/4</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>6 6 6 6</td>
<td>6 6 6 6</td>
</tr>
</tbody>
</table>

### REINFORCEMENT STEEL

<table>
<thead>
<tr>
<th></th>
<th>2'</th>
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<th>4'</th>
</tr>
</thead>
<tbody>
<tr>
<td>“a” Bar #</td>
<td>5 4 5</td>
<td>5 4 5</td>
<td>5 4 5</td>
</tr>
<tr>
<td>Spacing</td>
<td>11 1 1/2 13</td>
<td>11 1 1/2 13</td>
<td>11 1 1/2 13</td>
</tr>
<tr>
<td>“b” Bar #</td>
<td>5 6 6</td>
<td>5 6 6</td>
<td>5 6 6</td>
</tr>
<tr>
<td>Spacing</td>
<td>11 1 1/2 13</td>
<td>11 1 1/2 13</td>
<td>11 1 1/2 13</td>
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<td>Length</td>
<td>14-2 14-3 14-3</td>
<td>14-2 14-3 14-3</td>
<td>14-2 14-3 14-3</td>
</tr>
<tr>
<td>“c” or “b1” Bar #</td>
<td>4 5 6</td>
<td>4 5 6</td>
<td>4 5 6</td>
</tr>
<tr>
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<td>11 1 1/2 13</td>
</tr>
<tr>
<td>Length</td>
<td>9 9 9</td>
<td>9 9 9</td>
<td>9 9 9</td>
</tr>
<tr>
<td>“b” Dist</td>
<td>15 15 15</td>
<td>15 15 15</td>
<td>15 15 15</td>
</tr>
<tr>
<td>Top Slab-Tot. #</td>
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<td>9 9 9</td>
<td>9 9 9</td>
</tr>
<tr>
<td>Bottom Slab-Tot. #</td>
<td>9 9 9</td>
<td>9 9 9</td>
<td>9 9 9</td>
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<tr>
<td>Size Bar #</td>
<td>4 4 4</td>
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</tr>
<tr>
<td>Spacing</td>
<td>18 18 18</td>
<td>18 18 18</td>
<td>18 18 18</td>
</tr>
</tbody>
</table>

### NOTE

For boxes of height less than that shown in Table, use next greater table height slabs, wall dimensions and reinforcing steel. Make changes to bar lengths and number of spacers and quantities as necessary. Number of “d” bars in Table is slab total for all cells.
### Span 5' (All Measurements in Feet and/or Inches Unless Otherwise Noted)

<table>
<thead>
<tr>
<th></th>
<th>2'</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Span</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td><strong>Max Fill Over Top</strong></td>
<td>8</td>
<td>17</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td><strong>Top Slab</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bottom Slab</strong></td>
<td>6/1/4</td>
<td>7/1/4</td>
<td>8/1/2</td>
<td>6/1/4</td>
</tr>
<tr>
<td><strong>Sidewalls</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

### Reinforcing Steel

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size Bar #</strong></td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
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<tr>
<td><strong>Spacing</strong></td>
<td>11/2</td>
<td>1/2</td>
<td>1</td>
<td>1/2</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>17-9</td>
<td>17-8</td>
<td>17-9</td>
<td>17-8</td>
</tr>
</tbody>
</table>

### Remarks

**Note:**

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel. Make changes to bar lengths and number of spacers and quantities as necessary. Number of "d" bars in table is slab total for all cells.
<table>
<thead>
<tr>
<th>SPAN 6’ (ALL MEASUREMENTS IN FEET AND/OR INCHES UNLESS NOTED OTHERWISE)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPAN</strong></td>
</tr>
<tr>
<td><strong>HEIGHT</strong></td>
</tr>
<tr>
<td><strong>STRENGTH CLASSIFICATION</strong></td>
</tr>
<tr>
<td><strong>MAX FILL OVER TOP</strong></td>
</tr>
<tr>
<td><strong>TOP SLAB</strong></td>
</tr>
<tr>
<td><strong>LENGTH</strong></td>
</tr>
<tr>
<td><strong>SIDEWAYS</strong></td>
</tr>
<tr>
<td><strong>LENGTH</strong></td>
</tr>
<tr>
<td><strong>REINFORCING STEEL</strong></td>
</tr>
<tr>
<td><strong>SIZE BAR #</strong></td>
</tr>
<tr>
<td><strong>SPACING</strong></td>
</tr>
<tr>
<td><strong>LENGTH</strong></td>
</tr>
<tr>
<td><strong>SIZE BAR #</strong></td>
</tr>
<tr>
<td><strong>SPACING</strong></td>
</tr>
<tr>
<td><strong>LENGTH</strong></td>
</tr>
<tr>
<td><strong>SIZE BAR #</strong></td>
</tr>
<tr>
<td><strong>SPACING</strong></td>
</tr>
<tr>
<td><strong>LENGTH</strong></td>
</tr>
<tr>
<td><strong>TOP SLAB-TOT. #</strong></td>
</tr>
<tr>
<td><strong>BOTTOM SLAB-TOT. #</strong></td>
</tr>
<tr>
<td><strong>SIZE BAR #</strong></td>
</tr>
<tr>
<td><strong>SPACING</strong></td>
</tr>
<tr>
<td><strong>SPACERS NUMBER</strong></td>
</tr>
<tr>
<td><strong>CONCRETE, C.Y. PER LIN. FT</strong></td>
</tr>
<tr>
<td><strong>REINFORCING LBS. PER LIN. FT</strong></td>
</tr>
</tbody>
</table>

**NOTE**

FOR BOXES OF HEIGHT LESS THAN THAT SHOWN IN TABLE, USE NEXT GREATER TABLE HEIGHT SLABS, WALL DIMENSIONS AND REINFORCING STEEL. MAKE CHANGES TO BAR LENGTHS AND NUMBER OF SPACERS AND QUANTITIES AS NEEDED. NUMBER OF "d" BARS IN TABLE IS SLAB TOTAL FOR ALL CELLS.
<table>
<thead>
<tr>
<th>SPAN (in ft)</th>
<th>HEIGHT</th>
<th>SPAN 8&quot; (ALL MEASUREMENTS IN FEET AND/OR INCHES UNLESS NOTED OTHERWISE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**
For boxes of height less than that shown in Table use next greater table height slabs. Wall dimensions and reinforcing steel make changes to bar lengths and number of spacers and quantities as necessary. Number of "d" bars in Table S is total for all cells.
### SPAN 10' (ALL MEASUREMENTS IN FEET AND/OR INCHES UNLESS NOTED OTHERWISE)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>10'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>2</td>
<td>11</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>TOP SLAB</td>
<td>T1</td>
<td>9</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>BOTTOM SLAB</td>
<td>T2</td>
<td>7 1/2</td>
<td>10 3/4</td>
<td>13</td>
</tr>
<tr>
<td>SIDEWALLS</td>
<td>T3</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

### CONCRETE:
- **HEIGHT** A
- **BEAMS** B
- **WALLS** C
- **SPACING** D

| "a" | SIZE BAR # | 6 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 5 | 7 | 7 | 5 | 7 | 7 | 5 | 7 | 7 |
| "b" | SIZE BAR # | 6 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 5 | 7 | 7 | 5 | 7 | 7 | 5 | 7 | 7 |
| "c" | SIZE BAR # | 6 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 7 | 5 | 7 | 7 | 5 | 7 | 7 | 5 | 7 | 7 |

| SPACING | 10 1/2 | 13 | 10 | 10 1/2 | 13 | 10 | 10 1/2 | 13 | 10 | 10 1/2 | 13 | 10 | 10 1/2 | 13 | 10 | 10 1/2 | 13 | 10 |
| LENGTH | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 | 32-10 |

### REINFORCING:
- **HEIGHT** A
- **BEAMS** B
- **WALLS** C
- **SPACING** D

| "a" | SIZE BAR # | 4 | 4 | 5 | 6 | 4 | 6 | 7 | 4 | 6 | 7 | 5 | 6 | 8 | 5 | 6 | 8 | 5 | 6 | 8 |
| "b" | SIZE BAR # | 4 | 4 | 5 | 6 | 4 | 6 | 7 | 4 | 6 | 7 | 5 | 6 | 8 | 5 | 6 | 8 | 5 | 6 | 8 |

### CONCRETE:
- **HEIGHT** A
- **BEAMS** B
- **WALLS** C
- **SPACING** D

| SPACING | 68 | 68 | 72 | 76 | 94 | 102 |
| CONCRETE: C.Y. PER LIN. FT | 1.98 | 2.40 | 2.82 | 2.66 | 2.48 | 2.39 | 2.13 | 2.55 | 3.03 | 2.34 | 2.77 | 3.23 | 3.78 | 2.68 | 3.15 | 3.73 | 4.22 |
| REINFORCING LBS. PER LIN. FT | 358 | 372 | 470 | 359 | 379 | 482 | 367 | 391 | 502 | 377 | 402 | 514 | 590 | 421 | 453 | 577 | 632 |

### NOTE
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel. Make changes to bar lengths and number of spacers and quantities as necessary. Number of "a" bars in table is slab total for all cells.
### SPAN 12’ (ALL MEASUREMENTS IN FEET AND/OR INCHES UNLESS NOTED OTHERWISE)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>6’</th>
<th>7’</th>
<th>8’</th>
<th>9’</th>
<th>10’</th>
<th>12’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>2</td>
<td>10</td>
<td>18</td>
<td>2</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>TOP SLAB</td>
<td>T1</td>
<td>10</td>
<td>1/4</td>
<td>11</td>
<td>1/2</td>
<td>14</td>
</tr>
<tr>
<td>BOTTOM SLAB</td>
<td>T2</td>
<td>8</td>
<td>1/4</td>
<td>12</td>
<td>1/4</td>
<td>12</td>
</tr>
<tr>
<td>SIDEWALLS</td>
<td>T3</td>
<td>6</td>
<td>6</td>
<td>7/2</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>“a”</td>
<td>SPACING</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>“b”</td>
<td>SPACING</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>“c”</td>
<td>SPACING</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
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<td>SPACING</td>
<td>7</td>
<td>7</td>
<td>7</td>
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<td>7</td>
</tr>
<tr>
<td>“e”</td>
<td>SPACING</td>
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<td>SPACING</td>
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<td>“k”</td>
<td>SPACING</td>
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<td>“m”</td>
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<td>7</td>
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<td>“n”</td>
<td>SPACING</td>
<td>7</td>
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<td>7</td>
</tr>
<tr>
<td>SPACERS NUMBER</td>
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<td>80</td>
<td>84</td>
<td>104</td>
<td>110</td>
<td>116</td>
</tr>
</tbody>
</table>

### NOTE

FOR BOXES OF HEIGHT LESS THAN THAT SHOWN IN TABLE, USE NEXT GREATER TABLE HEIGHT SLABS, WALL DIMENSIONS AND REINFORCING STEEL. MAKE CHANGES TO BAR LENGTHS AND NUMBER OF SPACERS AND QUANTITIES AS NECESSARY. NUMBER OF “d” BARS IN TABLE IS SLAB TOTAL FOR ALL CELLS.
FOR COVER LESS THAN 2’, EXTEND c BARS FULL LENGTH, TOP SLAB ONLY. PROVIDE ADDITIONAL #4 @ 18”± AND ADJUST QUANTITIES

PROVIDE PAVING NOTCH WHEN TOP IS EXPOSED AND WHERE PCC PAVEMENT OR APPROACH SLAB IS USED

TYPICAL SECTION

© FOR REINFORCEMENT CLEARANCE, EXCEPT AT BOTTOM, SEE "MISCELLANEOUS DETAILS" ON D-81A AND D-81B.

FLAT INVERT ALTERNATIVE
(WHEN SPECIFIED)

NOTES
1. SPACERS SHALL BE #4 @ 18” OC IN TOP SLAB AND SIDEWALL MATS.
2. REMAINING #4 SPACERS SHALL BE QUALITALLY DISTRIBUTED IN BOTTOM SLAB MATS.
GENERAL NOTES

QUANTITIES: Quantities are for the sloped invert slab and do not include splices in the longitudinal bars, nor temperature reinforcement for exposed top culvert, nor concrete or reinforcement for parapets or cutoff walls.

SPECIAL COVERAGE: Box standard plans are not to be used for culverts in a corrosive environment or where there is a severe abrasive flow condition.

DESIGNATION: Show on plans as span x height-strength classification x length (e.g. 4 x 4-A x 60”), followed by alternatives.

ALTERNATIVES: Invert will be sloped unless "Trapezoidal Invert", "Flat Invert" or "V-Invert" is included in designation. Ends of culvert will be rounded unless "Square Ends" are designated. Parapets will be as shown unless " ft. parapet" is designated in plans. Such designations may be different for inlet and outlet ends.

REINFORCEMENT PLACEMENT: Main Reinforcement is positioned transverse or, for curved culverts, radial. When radial, reinforcing spacing is measured along C/L.

CONSTRUCTION NOTES

CONCRETE: Bottom slab & walls shall be Class 560-B-3250. Top slab shall be Class 560-C-3250.

EXPANSION JOINTS: Bottom Slab - No expansion joints shall be placed.
Top Slab and Walls - When cover is less than span length, place 1/2" expansion joint filler at 50’ centers outside the paved roadway lines and place weakened plane joints per Detail A of Weakened Planes Detail 3-2 of C-15 at 30’ centers under paved roadway lines. When cover depth is greater than span length, place 1/2" expansion joint filler at 30’ centers and additional 1/2" expansion joints at locations of change of foundation character as directed by the Engineer.

CONSTRUCTION LOADS: Not permitted until concrete has reached a strength of 3,000 psi or age of 28 days. Whenever occurs first, and falsework plans have been submitted by the Contractor to the Engineer and approved.

CONSTRUCTION JOINTS: Temporary joints may be permitted if normal (or radial) to C/L of RCB. Otherwise, the Contractor is to submit a proposal for consideration.

SPECIFICATIONS


Sections designed for culvert in a trench on hard foundation or culvert unremedied on yielding foundation. Special design will be required for culverts on piles or rock foundations.

LOADING

LIVE LOAD: For legal highway loads, use HS20-44 or alternative with 30% impact for all cover depths with no impact on invert.

COVER LESS THAN 2": Wheel load distribution on the top slab is E=0.175S+3.2” longitudinally and concentrated along the span. Wheel load distribution on the invert slab is 7.5” longitudinally and uniformly over the breadth of the culvert.

COVER 2” OR MORE: Wheel loads distributed uniformly over a square, the sides of which are 1.75 times the depth of cover, but not less than 9’ on the top slab, or 7.5” on the invert slab when such areas from several wheel concentrations overlap. The total load shall be considered as uniformly distributed over the area defined by the outside limits of the individual areas, but the overall longitudinal dimension shall not exceed the total length of the supporting slab. Neglect live load, on single spans when cover is more than 8’ and exceeds span, and on multiple spans when cover exceeds distance between exterior walls.

DEAD LOAD: Earth load of 120 pcf and an equivalent fluid pressure of 36 pcf, reduced to 84 pcf and 25 pcf respectively for clear spans of 20’ or less.

UNIT STRESSES: Fp = 20,000 psi, N = 10
Ft = 1,200 psi

Reinforcement embedment is 1-1/2 dia. clear, min 1” and in 1/4” increments, except as noted.

Distribution “d” bars expressed as a percent of main positive reinforcement.

Classification “A” top slab = 500 FSP, max. 50% (unless traffic longitudinal)
Classification “B” to “E”: Top and bottom slabs #4 @ 18” max.

USE OF STANDARD DRAWING

"Strength Classification," as symbolized by the letters ("A", "B", "C" or "D") at the top of the data table is merely a convenient designation for a particular structural section for a culvert of any given opening. It is dictated by the cover or depth of fill over the top slab.

SAN DIEGO REGIONAL STANDARD DRAWING

BOX CULVERT

MISCELLANEOUS DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Revision | By | Approved | Date
--- | --- | --- | ---
ORIGINAL | Kercheval | 12/75 |
Reviewed | T. Stetson | 04/08 |
Edited | S.S. T. Regello | 03/11 |
Edited | T.R. T. Regello | 10/15 |

LIVE LOAD & R.C.B. DIRECTIONAL TERMINOLOGY

C/L RCB

LONGITUDINAL

TRANSVERSE

BREADTH

LATERAL

TRAFFIC

D-81A

Chapman R.C.E 19246 Date
PARAPET DETAILS FOR SINGLE SPAN CULVERTS

PARAPET DETAILS FOR MULTIPLE SPAN CULVERTS

PARAPET DETAIL FOR SKewed CULVERTS W/O WINGWALLS

COVER SLAB
REMOVE PARAPET AND HOOPS FLUSH

EXISTING CONSTRUCTION

NEW CONSTRUCTION

PLACE AN EXPANSION JOINT PER G-10 A MINIMUM 2S OR 2H FROM JOINING

COVER: 1' AND GREATER

CULVERT EXTENSION
20° SKewed MAXIMUM

COVER: EXPOSED TOP AND LESS THAN 1’
NOTES
1. FENCE FABRIC SHALL BE 2" mesh, 9 GAGE GALVANIZED STEEL WIRE, PLACED ON THE UPSTREAM SIDE OF THE POSTS AND TENSION CABLES.
2. TENSION CABLE SHALL BE 5/16" Ø STEEL @ 18" OC, SECURED AT ENDS WITH CABLE CLAMPS. SECURE FENCE TO CABLE WITH 12 GAGE GALVANIZED STEEL WIRE LOOPED @ 6" OC.
3. POSTS SHALL BE 3" STEEL PIPE, 5.79 LBS./FT. FILL WITH MORTAR AFTER PLACING.
4. FENCE FABRIC SHALL BE SECURED TO POSTS WITH 9 GAGE WIRE CLIPS @ 9" OC.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING
DEBRIS FENCE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19248 Date
CHAPTER 3
ELECTRICAL
SYSTEM
ARM LENGTH 8' MAX. FOR CONCRETE OR FIBERGLASS, 12' FOR TYPE 15 UNLESS NOTED OTHERWISE.

POLE TOP

POLE TOP

MOUNTING HEIGHT

DIRECT BURIAL FOUNDATION

ANCHOR BASE FOUNDATION

SELECT SAND, 95%
MINIMUM RELATIVE
COMPACtion

UNDISTURBED EARTH

CORE 5" DIA.
12" HIGH MIN
HAND HOLE TO
FACE STREET

SLOPE 30:1

FINISH GRADE

560-C-3250 PCC ANCHOR BASE
SQUARE OR ROUND, ADD 1' TO EACH
DIMENSION FOR LOOSE SOIL OR SOFT
CLAY CONDITIONS.

ANCHOR BOLTS (4 REQ.) 1"x 36"x 4" HOOK,
GALV. USE TWO LEVELING NUTS WITH
WASHERS (ALL GALV.) ON EACH BOLT.

FINISHED GRADE
FOR CONCRETE
POLE

FINISHED GRADE FOR
STEEL AND FIBERGLASS
STANDARDS. PROVIDE
ANCHOR BOLT NUT
COVERS.

1/4" MINIMUM
BOLT CLEARANCE.

3-1/4"
MODEL 336 CABINET

BASE ADAPTOR PLAN VIEW

VENT OPENINGS WITH FILTER, BOTH SIDES.

4 1/2" NUTS WELDED TO ADAPTER

1' LIP TYPICAL, TOP LIP SHADED

DOOR OPENING 32' x 22'

VENT HOOD

24"

35"

20"

20"

20"

170 CONTROLLER

POWER DISTR. ASSY.

OUTPUT FILE

INPUT FILE

BASE ADAPTER

23 1/4"

8"

24"

35"
NOTES:

1. LOOP DIAMETER = 6' TYP
2. DEPTH OF CUT = 3 1/8" MIN
3. NO LOOPS SHALL BE CUT INTO BRIDGE DECKS

MODIFIED TYPE E LIMIT LINE / CROSSWALK DETECTOR
NOTES:

1. FRONT-LINE LOOPS SHALL BE INSTALLED AT THE LIMIT LINE OR CROSSWALK ACTING AS LIMIT LINE.

2. ALL FRONT-LINE LOOPS SHALL BE TYPE E MODIFIED LOOPS PER SHEET 1.

3. LOOPS INSTALLED IN LANE NEAREST EDGE OF ROADWAY SHALL BE INSTALLED IN CENTER OF LANE IF C ≤ 12', OR 6' FROM THE LANE STRIPE IF C > 12'.

4. BICYCLE LOOPS INSTALLED ON THE MAJOR LEGS (RECALL PHASE) OF AN INTERSECTION SHALL BE LOCATED 44' FROM THE LIMIT LINE OR CROSSWALK ACTING AS LIMIT LINE.

5. BICYCLE LOOPS INSTALLED ON THE MINOR LEGS (NON-RECALL PHASE) OF AN INTERSECTION SHALL BE LOCATED AT THE LIMIT LINE OR CROSSWALK ACTING AS THE LIMIT LINE.

6. CONTRACTOR SHALL LAY OUT LOCATION OF ALL LOOPS AND HOMERUN LINES AND RECEIVE APPROVAL OF THE CITY OF SAN DIEGO INSPECTOR PRIOR TO INSTALLATION.

7. LOOP STUB-OUT SHALL BE LOCATED AND MARKED ON CURB FACE PRIOR TO STREET OVERLAY.

8. EDGE OF STUB-OUT LOCATION SHALL BE SAWCUT WITH HAND SAW PRIOR TO JACKHAMMERING.

9. DIMENSIONS OF STUB-OUT SAWCUT NOT TO EXCEED 10" ALONG CURB (CENTERED ON STUB-OUT) AND 10" FROM EDGE OF GUTTER.
USE WITH TYPE A2 LUMINAIRE (SIDEWALK)

USE WITH TYPE A1 LUMINAIRE (STREETSIDE)

FINIAL

TWIN ARM ASSEMBLY WITH 2-7/8" DIA. X 3" TENONS

SUPPORT

SPIRE

SUPPORT

SUPPORT

POLE COLLAR

11 GA. 9" BASE DIAMETER, STEEL FLUTED TAPERED POLE
0.14'/FT. TAPER

(4) 1-1/4" SLOTS ACCEPTING:
(4) 1" x 36" F1554 GALVANIZED ANCHOR BOLTS

1" A36 STEEL PLATE

12" DIA. BOLT CIRCLE

BASE PLATE DETAIL

POLE BASE FOUNDATION
31" DIAMETER X 5'-0" DEPTH, MINIMUM
CONFIRM WITH PROJECT STRUCTURAL ENGINEER

APPLY SILICONE SEALANT AT INSTALLATION

BASE COLLAR

UPPER BASE SECTION WITH REMOVABLE ACCESS DOOR

LOWER BASE SECTION

NOTES
REFER TO APPROVED MATERIALS LIST FOR
STREET LIGHTING FOR SPECIFICATION
REFERENCE, MANUFACTURERS, AND NOTES.
USE WITH TYPE AP LUMINAIRE

2 5/8 DIAMETER X 3" TENON

11 GA. 5 3/4" BASE DIAMETER, STEEL FLUTED TAPERED POLE 0.14"/FT. TAPER

(4) 1-1/4" SLOTS ACCEPTING:
(4) 3/4" X 24" F1954, GALVANIZED ANCHOR BOLTS

9" SQ.

1" A36 STEEL PLATE

9" DIAMETER BOLT CIRCLE

BASE PLATE DETAIL

POLE BASE FOUNDATION
31" DIAMETER X 4'-0" DEPTH, MINIMUM CONFIRM WITH PROJECT STRUCTURAL ENGINEER

APPLY SILICONE SEALANT AT INSTALLATION

BASE COLLAR

UPPER BASE SECTION WITH REMOVABLE ACCESS DOOR

LOWER BASE SECTION

20" DIA.

14'-0" POLE HEIGHT

3'-4 5/8"
NOTES

1. REFER TO APPROVED MATERIALS LIST FOR STREET LIGHTING FOR SPECIFICATION REFERENCE, MANUFACTURERS, AND NOTES.

2. PAINT DUNNEWDARDS FOR COLOR MATCH SUBMIT SAMPLES
USE WITH TYPE C LUMINAIRE

11 GA., 5-3/4" BASE DIAMETER, STEEL FLUTED TAPERED POLE WITH 2-7/8" DIA. X 3" TENON, 0.14'/FT. TAPER

(4) 1-1/4" SLOTS ACCEPTING:
(4) 3/4" x 24" F1554 GALVANIZED ANCHOR BOLTS

1" A36 STEEL PLATE
9" SQ.
9" DIA. BOLT CIRCLE

BASE PLATE DETAIL

POLE BASE FOUNDATION
26" DIAMETER x 4'-0" DEPTH, MINIMUM CONFIRM WITH PROJECT STRUCTURAL ENGINEER

APPLY SILICONE SEALANT AT INSTALLATION

BASE COLLAR

UPPER BASE SECTION WITH REMOVABLE ACCESS DOOR

LOWER BASE SECTION

NOTES
REFER TO APPROVED MATERIALS LIST FOR STREET LIGHTING FOR SPECIFICATION REFERENCE, MANUFACTURERS, AND NOTES.
USE WITH TYPE C LUMINAIRE

SUPPORT

SUPPORT

POLE COLLAR

11 GA., 9" BASE DIAMETER, STEEL FLUTED TAPERED POLE WITH 2-7/8" DIA. x 3" TENON, 0.14'/FT. TAPER

(4) 1-1/4" SLOTS ACCEPTING:
(4) 1" x 36" F1554 GALVANIZED ANCHOR BOLTS

1" A36 STEEL PLATE

12" DIA. BOLT CIRCLE

BASE PLATE DETAIL

POLE BASE FOUNDATION
31" DIAMETER x 4'-6" DEPTH MINIMUM
CONFIRM WITH PROJECT STRUCTURAL ENGINEER

APPLY SILICONE SEALANT AT INSTALLATION

BASE COLLAR

UPPER BASE SECTION WITH REMOVABLE ACCESS DOOR

LOWER BASE SECTION

NOTES
REFER TO APPROVED MATERIALS LIST FOR STREET LIGHTING FOR SPECIFICATION REFERENCE, MANUFACTURERS, AND NOTES.
Pole Base Foundation

24" Diameter x 5'-0" Depth, Minimum. Confirm with Project Structural Engineer.

NOTES
Refer to approved materials list for street lighting for specification reference, manufacturers, and notes.
4" DIA. x 6-1/2" OPEN TOP TENON

USE WITH TYPE T LUMINAIRE.

15 A. 120 V. GFI RECEPTACLE WITH WEATHERPROOF COVER (LOCATED IN-LINE WITH HANDHOLE)

7 GA., 8-3/4" FLAT-TO-FLAT STEEL OCTAGONAL TAPERED POLE 0.14"/FT. TAPER

(4) 1 1/4" SLOTS ACCEPTING:
(4) 1" x 36" F1554 GALVANIZED ANCHOR BOLTS

1" A36 STEEL PLATE
12" DIA. BOLT CIRCLE

BASE PLATE DETAIL

POLE BASE FOUNDATION
31" DIAMETER X 5'-0" DEPTH, MINIMUM.
CONFIRM WITH PROJECT STRUCTURAL ENGINEER

APPLY SILICONE SEALANT AT INSTALLATION

WB21 SPLIT CAST IRON BASE WITH REMOVABLE ACCESS DOOR

NOTES
REFER TO APPROVED MATERIALS LIST FOR STREET LIGHTING FOR SPECIFICATION REFERENCE, MANUFACTURERS, AND NOTES.
STEEL CONDUIT

NON-METALLIC CONDUIT

DIRECT BURIAL FOUNDATION

ATTACH GROUND WIRE UNDER ANCHOR NUT

1/2" RIGID STEEL CONDUIT

ANCHOR BASE FOUNDATION

3/4" X 8' COPPER COVERED STEEL GROUND ROD.

ALTERNATE GROUND: 15' NO. 4 STRANDED COPPER WIRE, COILED.

APPROVED NON-METALLIC CONDUIT.

STEEL CONDUIT

ANCHOR RODS

DETAIL A

SAN DIEGO REGIONAL STANDARD DRAWING

GROUNDING OF CONCRETE LIGHTING STANDARDS

Revised by the San Diego Regional Standards Committee

Chairperson R.C.E. 19246 Date

Drawing Number E-02

Revision By Approved Date
ORIGINAL Kercheval 12/75
Delete Metric D. Gerschofer 06/12
Reviewed D. Gerschofer 12/15
NOTE: CONCRETE SHALL BE CLASS 560-C-3250
CHAPTER 4
GENERAL SURFACE IMPROVEMENTS
SECTION A-A

NOTE
1. BROOM FINISH PARALLEL WITH TRAFFIC.
COLD MILLING & ASPHALT CONCRETE OVERLAY - TYPE A
(6' EDGE COLD MILL)

NOTE:
SEE SHEET 2 FOR FULL WIDTH COLD MILLING & ASPHALT CONCRETE OVERLAY - TYPE B
FULL WIDTH COLD MILLING OF EXISTING PAVEMENT & INSTALL FULL WIDTH ASPHALT CONCRETE OVERLAY

1 3/4" MIN BELOW LIP OF GUTTER

EXISTING PAVING

TYPICAL FULL WIDTH COLD MILLING & ASPHALT CONCRETE OVERLAY PAVEMENT DETAIL

EX. CONC. CURB & GUTTER

FULL WIDTH COLD MILLING OF EXISTING PAVEMENT & INSTALL FULL WIDTH ASPHALT CONCRETE OVERLAY

AC 1/4" ABOVE LIP OF GUTTER

EXISTING PAVING

SIDEWALK Curb Line

PROPERTY LINE

EXISTING CURB & GUTTER

EXISTING PAVING
NOTES:

1. ANY STREET TRENCH 7 FEET IN WIDTH OR GREATER AND LONGER THAN 100 FEET IN OVERALL LENGTH SHALL BE RECONSTRUCTED WITH THE PAVEMENT SECTION FOR THE STREET CLASSIFICATION PER SCHEDULE "J" (SDG-113).

2. ASPHALT TRENCH CAPS IN STREETS NOT RECEIVING A FULL WIDTH OVERLAY PRIOR TO ACCEPTANCE SHALL BE MILLED AS SHOWN AND RESURFACED WITH 1/2" TYPE III CLASS C2 ASPHALT NO LESS THAN 30 CALENDAR DAYS AFTER INITIAL ASPHALT PLACEMENT.

3. IF THE STREET IS NOT PLANNING TO DO CURB TO CURB SLURRY SEAL OR RESURFACING, IT MUST COMPLETE FINAL STREET RESTORATION WITHIN 60 DAYS AFTER THE INITIAL EXCAVATION.

4. WHEN DIRECTED BY CITY ENGINEER OR SHOWN ON THE PLANS, CONCRETE PER SDG-108 (NOTE #5) MAY BE PLACED; A 1/8" - 1/4" WEARING SURFACING OF TYPE III CLASS F ASPHALT CONCRETE WILL BE REQUIRED.
NOTES:

1. CONCRETE PAVEMENT RESTORATION SHALL EXTEND BEYOND THE EDGE OF THE TRENCH CUT TO THE NEAREST JOINT (FULL WIDTH OF CONCRETE PANEL, JOINT TO JOINT AROUND THE PERIMETER OF THE EXCAVATION).

   FOR CONCRETE PAVEMENT WITH EXISTING TRENCH CUT PATCHES, CONCRETE PAVEMENT RESTORATION SHALL INCLUDE THE EXISTING TRENCH CUT PATCHES, IF THOSE PATCHES ARE WITHIN 4 FEET OF THE PROPOSED CONCRETE PANEL.

2. PRIOR TO PLACING CONCRETE, PAVEMENT EDGES SHALL BE TRIMMED TO NEAT HORIZONTAL AND VERTICAL LINES.

3. UNLESS OTHERWISE SPECIFIED, CONCRETE TRENCH COVER SHALL BE A MINIMUM OF 5 1/2" FOR ALLEYS, 7" FOR LOCAL THROUGH FOUR LANE COLLECTOR STREETS AND 9" THICK FOR ALL MAJOR OR GREATER STREET CLASSIFICATIONS.

4. ANY STREET TRENCH 7'-0" IN WIDTH OR GREATER AND LONGER THAN 100'-0" IN LENGTH SHALL BE RECONSTRUCTED WITH THE PAVEMENT SECTION FOR THE STREET CLASSIFICATION PER SCHEDULE "J" (SDG-113). STREET TRENCH SECTIONS 7'-0" IN WIDTH OR GREATER BUT LESS THAN 100'-0" IN OVERALL LENGTH SHALL BE RESURFACED TO A THICKNESS OF 1" GREATER THAN REQUIRED BY NOTE 3 ABOVE.

5. 560-C-3250 CONCRETE TREATED WITH A MINIMUM 2% CALCIUM CHLORIDE SOLUTION IN ACCORDANCE WITH 201-1 OR 650-CW-4000 (W/O CC) CONCRETE MAY BE OPENED TO TRAFFIC 3 DAYS AFTER IT IS PLACED. 650-CW-4000 CONCRETE TREATED IN SAME MANNER (W/CC) MAY BE OPENED TO TRAFFIC 24 HOURS AFTER IT IS PLACED. CONCRETE SPECIFIED BY ALTERNATE CLASS OR OTHERWISE CONTAINING FLY ASH IS NOT ALLOWED.

6. IN FOUR-LANE MAJOR OR GREATER STREETS, AN APPROVED SET ACCELERATING ADMIXTURE SUCH AS CALCIUM CHLORIDE, SHALL BE USED IN THE CONCRETE.
NOTES

1. EXPANSION JOINTS PER G-10*: — AT CURB RETURNS, ADJACENT TO STRUCTURES AND AT 45’ INTERVALS, SEE G-10.

2. WEAKENED PLANE JOINTS — — AT MID POINT OF CURB RETURN, WHEN REQUIRED, AND AT 15’ INTERVALS FROM PCR’S ABSENT A CURB RAMP, SEE G-10.

3. TOOL ED JOINTS ——— 1/4” GROOVES WITH 1/4” RADIUS EDGES AT 5’ INTERVALS.

4. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK SCORING (GROOVES) PATTERN SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.
G CURB PROFILE - INLET TRANSITION
NOTES:

1. CONCRETE SHALL BE 520-C-2500.

2. COLOR & PATTERN OF COLORED STAMPED CONCRETE SHALL BE SHOWN ON PLANS.

3. CONCRETE COLOR SHALL BE INTEGRATED THROUGHOUT.

4. SEE SDG-109 AND G-10 FOR JOINT DETAILS.
**DETAILED LOCATION OF TYPE "I" CATCH BASIN WITH GRATE PER D-29**

ANCHOR GRATE WITH M-4 BOLTS. ALL GRATES SHALL BE ANCHORED.

TYPE G-4 GRATE PER D-15

1.5" SAW CUT

3' STUB OUT 18" CMPC-14 GA FROM CATCH BASIN

TYPICAL FOR ALL 18" SLOTTED CMPC

SAW CUT AC FOR TRENCH EDGE

LIMIT OF CONCRETE BEDDING

CONCRETE BEDDING 420-C-2000

18" SLOTTED CMPC-14 GA WITH 6" HIGH SLOT

EXISTING PAVEMENT

0"-1"

6"

3"

3' SAW CUT AC FOR REMOVAL

CONCRETE BARRIER

SAME Cutter FOR TRENCH EDGE

CONCRETE BARRIER

SAME Cutter FOR TRENCH EDGE
SCHEDULE "J" PAVEMENT

THE FOLLOWING TABLES ARE TO BE USED TO DETERMINE THE SCHEDULE "J" PAVEMENT DESIGN SECTIONS FOR STREETS, ALLEYS, PARKING LOTS FOR PUBLIC FACILITIES, DRIVEWAYS, AND EASEMENTS, INCLUDING PUBLIC ACCESS EASEMENTS. THESE DESIGNS SHALL BE USED IN THE PUBLIC RIGHT-OF-WAY, OR PRIVATE PROPERTY IN THE AREAS WHERE PUBLIC EASEMENTS ARE GRANTED.

1. RESISTANCE VALUES (R-VALUES) WILL BE DETERMINED FROM SAMPLES TAKEN FROM THE 12" MATERIAL LOCATED IMMEDIATELY BELOW THE FIRST LAYER OF SUBBASE, BASE OR PAVEMENT. THIS 12" SECTION SHALL REPRESENT THE TOP 36 INCHES OF UNIFORM SOILS BELOW THE SUBBASE, OR PAVEMENT. IF A LOWER BEARING SOIL IS ENCOUNTERED IN THIS 36" SECTION, THE R-VALUE WILL BE DETERMINED FROM THE LOWEST BEARING SOIL. DETERMINATION OF THE R-VALUE SHALL BE IN ACCORDANCE WITH CALTRANS TEST METHODS 301-F AND 301-G.

2. AVERAGE DAILY TRAFFIC (ADT) IS THE MAXIMUM AVERAGE ANNUAL ADT EXPECTED AT BUILDOUT. FUNCTION SHALL ALSO BE CONSIDERED WHEN DETERMINING THE MINIMUM SCHEDULE "J" PAVEMENT SECTION PER THE ENGINEER.

3. RIGID PAVEMENTS: THE DESIGN THICKNESS SHOWN IN THE TABLES ARE BASED ON A MODIFIED PORTLAND CEMENT ASSOCIATION (PCA) DESIGN. PROJECTS REQUIRING CALTRANS REVIEW SHOULD UTILIZE THE DESIGN METHODS PRESCRIBED IN THE CALTRANS HIGHWAY DESIGN MANUAL.

4. CONCRETE PAVEMENT SHALL BE CONSTRUCTED IN STREETS ON GRADES GREATER THAN 12.0 PERCENT AND IN ALLEYS AND IN ALLEY INTERSECTIONS. THE PAVEMENT SHALL BE CLASS 560-B-3250 CONCRETE WITH A MINIMUM MODULES OF RUPTURE (MOR) OF 600.

5. NEW PAVEMENT, LESS THAN 6' IN WIDTH, SHALL BE PAVED WITH PORTLAND CEMENT CONCRETE PAVEMENT SECTION NOTED IN SCHEDULE "J" FOR THE STREET CLASSIFICATION PLUS A 1/8" TO 1/4" CLASS F ASPHALT CONCRETE CAP. AN EQUIVALENT SECTION OF LEAN CONCRETE SHALL BE SUBSTITUTED FOR ANY REQUIRED CTB SUBBASE.

6. PERSONNEL FROM THE CITY'S ENGINEERING LABORATORY WILL DESIGNATE WHERE A PRIVATE LABORATORY SHALL SAMPLE FOR R-VALUES.
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<th>MAX ADT</th>
<th>MAX TRAFFIC INDEX</th>
<th>&quot;R&quot; VALUE</th>
<th>STANDARD SECTIONS</th>
<th>CONCRETE M.O.R. 600 MIN</th>
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IND.) | 5000    | 9.5              |           | 3.0      | 8.5      | 7.5       | --       | 9.0       |
<p>| COLLECTOR (NO FRT)    | 7500    | 8.0              |           | 3.0      | 6.5      | 7.0       | --       | 8.0       |
| COLLECTOR             | 15000   | 9.0              |           | 3.0      | 7.5      | 7.5       | --       | 8.5       |
| MAJOR (4-LANE)        | 30000   | 10.5             |           | 3.0      | 10.0     | 8.0       | --       | 10.5      |
| MAJOR (6-LANE)        | 40000   | 11.0             |           | 3.5      | 10.5     | 8.0       | --       | 11.0      |
| PRIMARY ARTERIAL      | 50000   | 11.5             |           | 3.5      | 11.5     | 8.0       | --       | 11.5      |
| EXPRESSWAY             | 60000   | 12.0             |           | 3.5      | 11.5     | 8.5       | --       | 12.0      |
| EXPRESSWAY             | 80000   | 12.5             |           | 4.0      | 12.0     | 8.5       | --       | 12.5      |
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NOTES:

1. ALL STAMP / IMPRESSION (STREET NAME, CONTRACTOR, NAME AND / OR DATE) LOCATIONS AND ORIENTATIONS SHALL BE PRE-APPROVED BY THE ENGINEER.

2. SINGLE STAMP / IMPRESSION SHALL BE PLACED AS CLOSE TO ITS ORIGINAL LOCATION AS CONSTRUCTION ALLOWS.

3. MULTIPLE STAMPS / IMPRESSIONS (EXISTING AND / OR NEW) SHALL BE EVENLY SPACED ALONG THE NEWLY CONSTRUCTED SIDEWALK.

4. EXISTING STAMP / IMPRESSION SHALL BE SAWCUT TO NO LESS THAN 2" FROM STAMP LETTERING OR SYMBOL.
NOTES:

1. CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED, HAVE A MAXIMUM SLUMP OF 4 INCHES. FLY ASH MEETING THE REQUIREMENTS OF 201-1.2.5.3 MAY BE ADDED (NOT AS A SUBSTITUTE) TO THE MINIMUM CEMENT REQUIREMENTS. SLURRY COMBINED GRADING SHALL MEET REQUIREMENTS OF 201-1.3.2 (A) GRADING D.

2. BALL DROP TEST PER ASTM D6024 SHALL BE PERFORMED ON SLURRY AND ACHIEVE A MAXIMUM INDENTATION DIAMETER OF 3" PRIOR TO PLACEMENT OF ASPHALT CONCRETE. SLURRY PLACED IN NARROW TRENCHES WHERE BALL DROP TEST CANNOT BE PERFORMED SHALL BE CURED A MINIMUM OF 48 HOURS PRIOR TO PLACEMENT OF ASPHALT CONCRETE. PERMANENT RESURFACING SHALL BE COMPLETED IN NO MORE THAN 7 DAYS AFTER PLACEMENT OF CEMENT SLURRY.

3. DURING PLACEMENT, CONCAVE SLURRY SURFACE WITH A SHOVEL TO 1/2"- 1" DEPTH.

4. CUTS SHALL BE STRAIGHT. EXISTING A.C. PAVEMENT WILL NOT REQUIRE SAWCUTTING WHEN USING ROCKWHEEL FOR EXCAVATION PROVIDED THAT A SMOOTH SURFACE IS PRODUCED.

5. TRENCH SHALL BE MILLED TO A DEPTH OF 4" AND A MINIMUM OF 18" WIDE OR 12" WIDER THAN TRENCH WIDTH, WHICHEVER IS GREATER, AND RESURFACED WITH 1/2" TYPE III CLASS C2 ASPHALT.

6. WHEN PCC TRENCH RESURFACING IS DIRECTED BY CITY ENGINEER, SHOWN ON THE PLANS, OR REQUIRED FOR A PCC SURFaced STREET, FOR ASPHALT STREETS SEE SDG-107 (NOTE #3) AND FOR CONCRETE SURFACED STREETS SEE SDG-108.

7. FOR DRY UTILITIES (ELECTRICAL, COMMUNICATION, GAS, ETC.) SEE SDG-119.

8. TRENCH LOCATION SHALL BE 36 INCHES MINIMUM AND 72 INCHES MAXIMUM FROM LIP OF GUTTER, AND AT LEAST 36 INCHES CLEAR FROM ANY CITY UNDERGROUND FACILITIES. NO NARROW TRENCH IN BIKE LANES.
NOTES:

1. CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED, HAVE A MAXIMUM SLUMP OF 4 INCHES, AND MAY CONTAIN 30% MAXIMUM 3/8" ROCK.

2. CONCRETE SHALL BE PLACED AND FINISHED IN ACCORDANCE WITH 306-6. CONCRETE MAY BE PLACED IMMEDIATELY FOLLOWING SLURRY BACKFILL.

3. CONCRETE TRENCH COVER SHALL BE A MINIMUM OF 5 1/2" THICK IN ALLEY OR LOCAL RESIDENTIAL STREETS AND 7" THICK IN ALL OTHER STREETS. SEE NOTE #5 IN SDG-108 FOR CONCRETE CLASS OPTIONS AND CURING REQUIREMENTS.

4. EXISTING CONCRETE PAVEMENT WILL REQUIRE SAWCUTTING.

5. FOR ELECTRICAL SUPPLY CABLES, SEE CALIFORNIA PUBLIC UTILITY COMMISSION GENERAL ORDER NO. 128, RULE 33.4 CLEARANCES AND DEPTHS.

6. FOR DRY UTILITIES (ELECTRICAL, COMMUNICATION, GAS, ETC.) SEE SDG-119.
NOTES:

1. FOR TRENCHES GREATER THAN 6", AND LESS THAN 7'-0" IN WIDTH

2. RESURFACING PER SDG-107 TYPE 1 & SDG-108

3. ANY CITY UTILITY CROSSING THE TRENCH LINE SHOULD NOT BE ENCASED IN SLURRY, IF ENCOUNTERED IT SHOULD BE SLEEVED WITH PVC.

4. WARNING TAPE SHALL BE INSTALLED ABOVE THE CONDUITS PER SDM-105.

5. CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED, HAVE A MAXIMUM SLUMP OF 4 INCHES. FLY ASH MEETING THE REQUIREMENTS OF 201-1.2.5.3 MAY BE ADDED (NOT AS A SUBSTITUTE) TO THE MINIMUM CEMENT REQUIREMENTS. SLURRY COMBINED GRADING SHALL MEET REQUIREMENTS OF 201-1.3.2 GRADING D.

6. BALL DROP TEST PER ASTM D 6024 SHALL BE PERFORMED ON SLURRY AND ACHIEVE A MAXIMUM INDENTATION DIAMETER OF 3 INCHES PRIOR TO PLACEMENT OF ASPHALT CONCRETE. SLURRY PLACED IN NARROW TRENCHES WHERE BALL DROP TEST CANNOT BE PERFORMED SHALL BE CURED A MINIMUM OF 48 HOURS PRIOR TO PLACEMENT OF ASPHALT CONCRETE.
NOTES

1. CURB RAMPS SHALL BE INSTALLED AS SHOWN ON THE PLANS.
2. D = DISTANCE SHOWN ON PLANS.
3. R = RADIUS SHOWN ON PLANS 3’ MINIMUM.
4. O = ELEVATIONS SHOWN ON PLANS (TOP OF CURB AND GUTTER ELEV.).
5. —— —— = 1/2” EXPANSION JOINTS.
6. CONSTRUCTION OF ALLEY APRON INCLUDES THE ADJACENT 6” CURB.
7. REFER TO CURB RAMP DETAIL, SDG-137.
NOTES:

1. CONCRETE SHALL BE 560-C-3250, OR ITS EQUIVALENT ALTERNATE CLASS.

2. ADJUST TRANSVERSE JOINT INTERVAL TO MATCH JOINTS IN ADJACENT EXISTING IMPROVEMENTS. IN NO CASE SHALL SPACING BE GREATER THAN 15'.

3. SEE STANDARD DRAWING G-10 FOR JOINT DETAILS.

4. WEAKENED LONGITUDINAL JOINTS SHALL BE SAWCUT 2 INCHES DEEP WITHIN 24 HOURS, OR AS DIRECTED BY THE ENGINEER.

5. JOINTS SHALL NOT BE CONSTRUCTED ALONG THE CENTER OF THE ALLEY.
NOTES:

1. CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED, AND HAVE A MAXIMUM SLUMP OF 4 INCHES. FLY ASH MEETING THE REQUIREMENTS OF 201-1.2.5.3 MAY BE ADDED (NOT AS A SUBSTITUTE) TO THE MINIMUM CEMENT REQUIREMENTS. SLURRY COMBINED GRADING SHALL MEET REQUIREMENTS OF 201-1.3.2 GRADING D. CEMENT SLURRY BACKFILL SHALL BE 100-D-100.

2. SLURRY SHALL BE CURED A MINIMUM OF 48 HOURS PRIOR TO PLACEMENT OF CLASS II BASE AND ASPHALT CONCRETE. RESURFACING SHALL BE COMPLETED IN NO MORE THAN 7 DAYS AFTER PLACEMENT OF CEMENT SLURRY.

3. ALL ASPHALT STREET RESURFACING SHALL EXTEND A MINIMUM OF 6 INCHES BEYOND EDGE OF POTHOLES, AS SHOWN. ASPHALT THICKNESS TO EQUAL EXISTING AC PAVEMENT PLUS 1 INCH (4 INCHES MINIMUM TO 9 INCHES MAXIMUM). COMBINED ASPHALT PLUS BASE SHALL BE 18 INCHES MINIMUM.

4. IF UTILITY IS ENCOUNTERED, AS LISTED BELOW, PLACE BEDDING A MINIMUM OF 6 INCHES ABOVE UTILITY.
   A. WATER UTILITY: SE 50 SAND
   B. SEWER UTILITY: 3/8" MAXIMUM AGGREGATE
   C. DRY UTILITY: SE 50 SAND

5. FOR PCC SURFACED STREETS, SEE SDG-108 FOR RESURFACING.

6. POTHOLING IN BIKE LANES SHALL BE APPROVED BY THE CITY. IF APPROVED, THE ENTIRE WIDTH OF THE BIKE LANE SHALL BE RESURFACED, AT A MINIMUM LENGTH OF 6 FEET.

7. TEMPORARY RESURFACING IS ALLOWED IF CONSTRUCTION WILL BE PERFORMED WITHIN 60 DAYS AFTER POTHOLING WORK, IF POTHOLES IS WITHIN THE NEW UTILITY TRENCH LIMITS, AND IF APPROVED BY THE CITY. MATERIAL FOR TEMPORARY RESURFACING SHALL BE APPROVED BY THE CITY. SEE NOTE 3 FOR LIMITS AND DEPTH.

8. PAVEMENT CORES SHALL NOT BE GREATER THAN 24 INCHES IN DIAMETER, AND SHALL NOT BE SPACEDCloSER THAN 3 FEET BETWEEN CORES, EDGE TO EDGE.

9. SEE SHEET 2 FOR TYPE B - KEYHOLE METHOD.
NOTES:

1. PAVEMENT CORE TO BE REINSTATED SHALL BE A MINIMUM OF 4 INCHES THICK AND SHALL NOT CONTAIN JOINTS OR CRACKS WHICH MAY CAUSE IT TO BREAK AND SPALL. OTHERWISE, TYPE "A" PER SHEET 1 SHALL BE USED AS DIRECTED BY CITY ENGINEER.

2. CUT, REMOVE, AND REINSTATE PAVEMENT CORE, FLUSH WITH EXISTING PAVEMENT. THE REMOVED PAVEMENT CORE/PLUG WITH ASPHALT AND CONCRETE BASE SHALL BE UTILIZED AND REINSTALLED IN GOOD CONDITION.

3. BONDING MATERIAL SHALL BE AS SPECIFIED PER CITY APPROVED MATERIALS LIST.

4. CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED, AND HAVE A MAXIMUM SLUMP OF 4 INCHES. FLY ASH MEETING THE REQUIREMENTS OF 201-1.2.5.3 MAY BE ADDED (NOT AS A SUBSTITUTE) TO THE MINIMUM CEMENT REQUIREMENTS. SLURRY COMBINED GRADING SHALL MEET REQUIREMENTS OF 201-1.3.2 GRADING D. CEMENT SLURRY BACKFILL SHALL BE 100-D-100.

5. SLURRY SHALL BE CURED A MINIMUM OF 48 HOURS PRIOR TO PLACEMENT OF CLASS II BASE AND ASPHALT CONCRETE. RESURFACING SHALL BE COMPLETED IN NO MORE THAN 7 DAYS AFTER PLACEMENT OF CEMENT SLURRY.

6. IF UTILITY IS ENCOUNTERED, AS LISTED BELOW, PLACE BEDDING A MINIMUM OF 6 INCHES ABOVE UTILITY.
   A. WATER UTILITY: SE 50 SAND
   B. SEWER UTILITY: 3/8" MAXIMUM AGGREGATE
   C. DRY UTILITY: SE 50 SAND

7. FOR CONCRETE SURFACED STREETS, SEE SDG-108 FOR RESURFACING.

8. POTHOLING IN BIKE LANES SHALL BE APPROVED BY THE CITY.

9. PAVEMENT CORES SHALL NOT BE GREATER THAN 24 INCHES IN DIAMETER, AND SHALL NOT BE SPACED CLOSER THAN 3 FEET BETWEEN CORES, EDGE TO EDGE.
1. The detectable warning tile shall be slip resistant and shall consist of an inline pattern of raised truncated domes. The tile shall be placed where the domes are in line with the direction of travel.

2. Color: The detectable warning tile shall be yellow conforming to Federal Standards 595C Table IV, Color No. 33538.

3. Material: Cast-in-place stainless steel is the required material for the detectable warning tile, unless otherwise shown on plans.

Exception: Cast-in-place detectable warning tile of composite material may be used on residential areas only. When residential areas are within the boundary of a mix-use or other non-residential zones, stainless steel is required at curb ramps.

4. Detectable warning tile products shall be per the city's approved materials list.

5. No voids shall be allowed below the detectable warning tiles.

6. Provide a ¼" deep tooled joint with ¼" radius edges around the perimeter of the detectable warning tiles.
NOTES:

1. **TWO CURB RAMPS ARE REQUIRED AT EACH SIDEWALK CORNER FOR NEW CONSTRUCTION OF ENTIRE INTERSECTION, EACH CURB RAMP SHALL CONNECT THE PEDESTRIAN ACCESS ROUTE AT EACH PEDESTRIAN STREET CROSSING. IN ALTERATIONS WHERE EXISTING PHYSICAL CONSTRAINTS PREVENT TWO CURB RAMPS FROM BEING INSTALLED AT A STREET CORNER, A SINGLE PEDESTRIAN CURB RAMP IS PERMITTED. SEE DETAIL A AND B ON SDG-132.**

2. **IN AN IDEAL CONDITION WHERE THE CURB RETURN AND INTERSECTION ARE LEVEL AND THE CURB HEIGHT IS 6":**
   
   A. **IF THE RIGHT-OF-WAY (ROW) LIMITS ARE 10'-0" OR MORE (MEASURED FACE OF CURB TO PROPERTY LINE), A TYPE A OR TYPE B CURB RAMP SHALL BE USED.**
   
   B. **IF THE ROW LIMITS ARE LESS THAN 10'-0" BUT NOT LESS THAN 8'-0", A TYPE C2 CURB RAMP SHALL BE USED.**
   
   C. **IF THE ROW LIMITS ARE LESS THAN 8'-0", A TYPE C1 CURB RAMP SHALL BE USED.**
   
   D. **A TYPE D CURB RAMP SHALL BE USED AT ALLEY CORNERS.**
   
   E. **CASE A AND CASE B CURB RAMPS SHALL BE USED AT SIDEWALKS WITH PARKWAYS BETWEEN THE SIDEWALK AND THE CURB.**
   
   F. **A CASE C CURB RAMP SHALL BE USED AT RESTRICTED ROW LIMITS (LESS THAN 8'-0") TO ACCOMMODATE MULTI-DIRECTIONAL ACCESS IF IT IS TECHNICALLY INFEASIBLE TO USE A STANDARD CURB RAMP OR TWO DIRECTIONAL CURB RAMPS.**

3. **OPPOSING CURB RAMPS AT A SINGLE CROSSING SHALL LINE UP. ALIGN THE CURB RAMP WITH THE CROSSWALK SO THERE IS A STRAIGHT PATH OF TRAVEL FROM THE TOP OF THE RAMP TO THE CURB RAMP ON THE OTHER SIDE, TO THE MAXIMUM EXTENT FEASIBLE.**

4. **PULL BOXES, MANHOLES, VAULTS, AND OTHER UTILITIES SHALL BE RELOCATED OR INCORPORATED INTO THE CURB RAMP AREA PROVIDED THAT THE ACCESS COVER IS STABLE, FIRM, SLIP RESISTANT, AND FLUSH OR ADJUSTED TO GRADE. COORDINATE THE WORK WITH THE ENGINEER.**

5. **UTILITY POLES MAY BE INCORPORATED INTO THE FLARES OF THE CURB RAMP PROVIDED THAT THE REQUIRED ACCESSIBLE ROUTE WIDTH IS COMPLIANT.**


   **THIS REQUIREMENT DOES NOT APPLY TO CURB RAMP FLARES. THE SLOPE OF THE FLARES WITHIN THE PEDESTRIAN CIRCULATION ROUTE SHALL BE DESIGNED TO MEET THE 10% MAXIMUM SLOPE REQUIREMENT TO THE BEST EXTENT FEASIBLE WITHOUT EXCEEDING 10 LINEAR FEET.**

7. **GRADE BREAKS AT THE TOP AND BOTTOM OF THE RAMPS AND CURB RAMPS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. GRADE BREAKS SHALL NOT BE PERMITTED ON THE SURFACE OF RAMP RUNS AND TURNING SPACES. SURFACE SLOPES THAT MEET AT GRADE BREAKS SHALL BE FLUSH.**

8. **PROVIDE A 1/4" DEEP TOOLED JOINT WITH 1/4" RADIUS EDGES AS SHOWN ON DRAWINGS.**

9. **INSTALL A 1/4" EXPANSION JOINT FILLER BETWEEN THE NEW CURB RAMP GUTTER AND THE EXISTING SIDEWALK.**

10. **PONDING IS NOT ALLOWED WITHIN THE CURB RAMP LIMITS, AND THE DRAINAGE PATTERN SHALL NOT BE ALTERED.**

11. **THE ADJUSTMENT OF THE CROSS SLOPE AT THE RAMP OPENING SHALL NOT CAUSE GUTTER TRICKLE FLOW TO SPILL ONTO TRAVELED LANES OR PONDING ANYWHERE.**

12. **TRANSITIONS FROM RAMPS TO WALKS AND SIDEWALK GUTTER OR STREET SURFACE SHALL BE FLUSH AND FREE OF ABRUPT CHANGES. PAVEMENT AT THE STREET SURFACE SHALL BE MILLED TO ACHIEVE FLUSH CONDITION.**

13. **THE REMOVAL OF EXISTING PAVEMENT, CONCRETE CURB, GUTTER, SIDEWALK, AND EXISTING CURB RAMP FOR THE INSTALLATION OF A NEW CURB RAMP SHALL COMPLY WITH SDG-156.**
NOTES:

14. DIAGONAL OR CORNER TYPE CURB RAMPS WITH RETURNED CURBS OR OTHER WELL-DEFINED EDGES SHALL HAVE THE EDGES PARALLEL TO THE DIRECTION OF PEDESTRIAN FLOW. DIAGONAL CURB RAMPS WITH FLARED SIDES SHALL HAVE A SEGMENT OF CURB 24" LONG MINIMUM LOCATED ON EACH SIDE OF THE CURB RAMP AND WITHIN THE MARKED CROSSING.


16. CURB RAMP AND FORM WORK SLOPES SHALL BE CHECKED WITH A DIGITAL LEVEL OF AN APPROPRIATE LENGTH. NO PORTION OF A RAMP RUN SHALL EXCEED THE MAXIMUM SLOPE REQUIREMENT.

17. THE COUNTER SLOPE WITHIN 48" OF THE CURB RAMP SHALL BE 5% MAXIMUM. IN ALTERATIONS IF THE COUNTER SLOPE OF 5% MAXIMUM CANNOT BE ACHIEVED, THEN ADJUST THE SLOPE OR ELEVATION OF THE RAMP SO THE COMBINED COUNTER SLOPE AND RAMP SLOPE DOES NOT EXCEEDS 13.3%.

18. THE SLOPE OF THE RAMP SHALL BE UNIFORM ALONG EACH RAMP RUN.

19. THE CROSS SLOPE OF THE RAMP SHALL BE MEASURED PERPENDICULARLY TO THE PATH OR DIRECTION OF TRAVEL.

20. ANY DEVIATION FROM THESE PROVISIONS REQUIRES PRIOR APPROVAL FROM THE ENGINEER.

21. FOR RESIDENTIAL USE, CONCRETE SHALL BE 520-C-2500. FOR COMMERCIAL USE, CONCRETE SHALL BE 560-C-3250.
DETAIL A
TWO CURB RAMP CORNER INSTALLATION

PROPERTY LINE

LANDING

SIDEWALK

CROSSWALK IF PROVIDED

DETAIL B
ONE CURB RAMP CORNER INSTALLATION

PROPERTY LINE

LANDING

SIDEWALK

CROSSWALK IF PROVIDED

PROVIDE 2'-0" OF CURB WITHIN THE CROSSWALK (TYPICAL AT BOTH ENDS OF FLARED SIDE)

LEGEND:
TOOLED JOINT
"T" INTERSECTION

PLAN - TYPE A

LEGEND:

- TOOLED JOINT

SEE SHEET 2 FOR: PLAN - TYPE B, SECTION A-A AND NOTES.
NOTES:

1. **6" WIDE RETAINING CURB MAY BE OMITTED IF THE GROUND SURFACE WILL BE AT THE SAME ELEVATION AS THE CURB RAMP SURFACE.**

2. **PEDESTRIAN BARRICADE PER SDE-103 SHALL BE REQUIRED AT AREAS WHERE PEDESTRIAN CROSSING CANNOT BE FEASIBLY PROVIDED.**

---

**LEGEND:**

- TOOLED JOINT

---

**CITY OF SAN DIEGO - STANDARD DRAWING**

**RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE**

**COORDINATOR:** R.E.E. 55503

**DATE:** 9/4/18

**DRAWING NUMBER:** SDG-133

---

**CURB RAMPS - TYPE A AND B**
PLAN - TYPE C1

SEE SHEETS 2 TO 4 FOR: TYPE C1, SECTION A-A, TYPE C-2, SECTION B-B AND NOTES.
PLAN - TYPE C1

SECTION A-A

LEGEND:

TOOLED JOINT

SEE SHEET 4 FOR NOTES.
PLAN - TYPE C2

LEGEND:

TOOLED JOINT

SEE SHEET 4 FOR: SECTION B-B AND NOTES.

CITY OF SAN DIEGO - STANDARD DRAWING

CURB RAMPS - TYPE C1 AND C2

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: P.E. 56623 DATE 9/4/18

DRAWING NUMBER

SDG-135
NOTES:

1. TYPE C1 CURB RAMP SHALL ONLY BE USED WHERE INADEQUATE RIGHT OF WAY EXISTS. TYPE C1 SHALL BE USED WHEN X<8' AND ONLY WITH PRIOR APPROVAL FROM THE ENGINEER. X=DISTANCE FROM FACE OF CURB TO PROPERTY LINE.

2. GRADE BREAK AT THE TOP AND BOTTOM OF RAMP RUNS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN.
CROSSWALK (IF PROVIDED)

DOUBLE TYPE C1

PLAN - TYPE C1 (MODIFIED)

LEGEND:

- TOOLED JOINT

CITY OF SAN DIEGO - STANDARD DRAWING

CURB RAMPS - TYPE C1 AND C2

MORE DETAILS

SDG-136
Curb Ramps - Type C1 and C2

More Details

Type A/ C2 Combination

LEGEND:

Tooled Joint

SDG-136

City of San Diego - Standard Drawing

Recommended by the City of San Diego Standards Committee

Coordinators: R.C.E. 56523

9/4/18

Revision

BY

Approved

Date

Original

J. Nagelvoort

02/18

Redrafted

J. Nagelvoort

09/18

City of San Diego - Standard Drawing

Recommended by the City of San Diego Standards Committee

Coordinator: R.C.E. 56523

9/4/18

Drawing Number

SDG-136
NOTES:

1. CASE A THROUGH C MAY BE USED ONLY WITH APPROVAL OF THE ENGINEER.

2. TRANSITION AREA REQUIRED IF EXISTING SIDEWALK HAS A CROSS SLOPE THAT EXCEEDS 2%.

3. IF FLARE CANNOT BE PROVIDED DUE TO SITE CONSTRAINTS, WIDEN CURB RAMP WIDTH TO 4'-2" AND PROVIDE A 6" WIDE RETAINING CURB. RAMP WIDTH TO BE 4' MIN IF RAMP HAS FLARES ON BOTH SIDES.
NOTES:

1. WHERE THE ISLAND OR CUT-THROUGH LENGTH IS 8 FT OR MORE, THE DETECTABLE WARNINGS SHALL BE 36 INCHES IN DEPTH EXTENDING THE FULL WIDTH OF THE PEDESTRIAN PATH OR CUT-THROUGH, LESS 2 INCHES MAXIMUM ON EACH SIDE.

2. WHERE THE ISLAND OR CUT-THROUGH LENGTH IS LESS THAN 8 FT, THE DETECTABLE WARNINGS SHALL BE 24 INCHES. IF THE ISLAND IS LESS THAN 6 FT, DETECTABLE WARNINGS ARE NOT REQUIRED.

3. DETECTABLE WARNINGS SHALL BE PLACED AT THE EDGES OF THE PEDESTRIAN ISLAND OR CUT-THROUGH MEDIAN, EXCEPT FOR RAISED ISLANDS WHERE THE PLACEMENT SHALL COMPLY WITH THE REQUIREMENTS OF THE CURB RAMPS.

4. THE MINIMUM PASSAGEWAY WIDTH SHALL BE 5'-4". THE MINIMUM ISLAND CURB RAMP WIDTH SHALL BE 5'-0".

5. PASSAGEWAY GRADE SHALL SLOPE AT 1.5% TO DRAIN.
NOTE: PROVIDE PROTECTIVE RAILING TYPE A TO PREVENT PEDESTRIAN ACCESS AT THE BACK OF CURB RAMP.

NOTE: PROVIDE PROTECTIVE RAILING TYPE B TO PREVENT PEDESTRIAN ACCESS AT SIDE OF CURB RAMP.

NOTES:
1. POSTS TO BE SET 12" BEHIND THE FACE OF CURB.
2. IN EXISTING SIDEWALK AREA SET POSTS INTO 4" CORE BORING.
3. POSTS SHALL BE WRAPPED IN 6 MIL VISQUEEN PLASTIC PRIOR TO POURING CONCRETE OR GROUTING.
4. HORIZONTAL 1-3/4" GALVANIZED STEEL SQUARE POST TO BE MOUNTED ON THE SIDE OF THE BREAK-AWAY POSTS, OPPOSITE TO THE RAMP.
NOTES:

1. PEDESTRIAN BARRICADES SHALL BE INSTALLED AT CONTROLLED AND UNCONTROLLED INTERSECTIONS ON CLASSIFIED STREETS. (COLLECTOR STREET, MAJOR ARTERIAL OR PRIMARY ARTERIAL STREETS AS IDENTIFIED IN THE ADOPTED COMMUNITY PLAN).

2. THE BARRICADE SHALL NOT ENCROACH ONTO THE PEDESTRIAN ACCESS ROUTE AREA.

3. IF THE BARRICADE IS INSTALLED ALONG A SIDEWALK, IT SHALL NOT REDUCE THE PEDESTRIAN ACCESS ROUTE AREA TO LESS THAN 4'-0" WIDE.

4. POSTS TO BE SET 1'-6" BEHIND FACE OF CURB UNLESS OTHERWISE SPECIFIED.

5. IN EXISTING SIDEWALK AREA SET POSTS INTO 4" CORE BORING, PACK WITH GROUT.

6. INSTALL (2) R49 SIGNS (BACK TO BACK) ON ALUMINUM SHEETING CENTERED BETWEEN POSTS.
NOTES:
1. CONCRETE SHALL BE 520-C-2500.
2. SEE SDG-109 AND G-10 FOR JOINT DETAILS.
3. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND / OR DATE) SHALL BE PRESERVED PER SDG-115.
NOTES:

1. CONCRETE SHALL BE 520-C-2500.

2. SEE JOINT DETAIL DRAWING SDG-109 AND G-10.

3. ON THE SIDE OF OF SUPER ELEVATED CURVES THE GUTTER SHALL BE SLOPED TO MATCH CROSS SECTION GRADE OF THE ROADWAY.

4. PLACE EXPANSION JOINTS AT CURB RETURNS ADJACENT TO STRUCTURES AND AT NO GREATER THAN 45' INTERVALS.

5. PLACE WEAKENED PLANE JOINTS AT DRIVEWAYS AND AT 15' INTERVALS FROM POINT OF CURB RETURN.

6. ALL HISTORICAL STAMPS / IMPRESSIONS SHALL BE PRESERVED PER SDG-115.
NOTES:

1. CONCRETE SHALL BE 520-C-2500.

2. SEE JOINT DETAIL DRAWINGS SDG-109 AND G-10.

3. EXTRUDED TYPE B-3 CURB SHALL BE ANCHORED TO EXISTING PAVEMENT.

4. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND / OR DATE) SHALL BE PRESERVED PER SDG-115.

LEGEND ON PLANS

TYPE B-2 CURB AND GUTTER

TYPE B-1, B-3, B-4 CURB
NOTES:
1. CONCRETE SHALL BE 520-C-2500.
2. SEE JOINT DETAIL DRAWINGS SDG-109 AND G-10.
3. SIDEWALK SHALL MAINTAIN A MINIMUM CLEAR WIDTH OF 4' OF TRAVEL FROM ANY OBSTRUCTION.
4. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND/OR DATE) SHALL BE PRESERVED PER SDG-115.
5. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

LEGEND ON PLANS

C.D.

J. NAEGELVOORT
9/18

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.C. 56603
DATE: 9/4/18

CITY OF SAN DIEGO - STANDARD DRAWING

SDG-155

SIDEWALK - TYPICAL SECTIONS

REVISED: BY: APPROVED: DATE:

ORIG: RA J. NAEGELVOORT 09/2

UPDATED: BY: J. NAEGELVOORT 10/15

UPDATED: HM J. NAEGELVOORT 03/16

REDRAFTED: CO J. NAEGELVOORT 09/18
NOTES:

1. SIDEWALK CROSS SLOPE SHALL BE 1.5%.

2. WHEN DISTANCE FROM "AREA TO BE REMOVED" TO EXISTING JOINT, EDGE OR SCORE MARK IS LESS THAN MINIMUM SHOWN, "AREA TO BE REMOVED" SHALL BE EXTENDED TO JOINT, EDGE OR SCORE MARK.

3. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED PER SDG-115.

4. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.
NOTES:
1. CONCRETE SHALL BE 560-C-3250.
2. WEAKENED PLANE JOINTS.
3. TYPICAL FLOWLINES.
4. ELEVATIONS TO BE SHOWN ON PLANS.
5. RETURN SEGMENTS TO BE 7" THICK.
6. CURB BETWEEN POINT OF CURB RETURNS (CONC) SHALL BE A MONOLITHIC POUR WITH THE CROSS GUTTER.
7. IN ALL CASES SUBGRADE SHALL BE COMPACTED TO 95% MIN RELATIVE COMPACTION TO A DEPTH OF 12"
8. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED PER SDG-115.

LEGEND ON PLANS

- CONC
- RADIUS
- SEE NOTE 4
- CONTACT JOINTS PER G-10 WHEN SEPARATE POURS ARE MADE

PLAN

SECTION A-A

10'
UNLESS OTHERWISE SHOWN ON PLANS
1/2" R TYPICAL

TOP OF PAVING

7"
1.5%
1.5%
NOTES:
1. CROSS GUTTER TO BE CONSTRUCTED WHERE THE DRAINAGE IS CARRIED ACROSS STREET.
2. MINIMUM ALLOWABLE CROSS GUTTER SLOPE IS 0.5%.
3. CONCRETE SHALL BE 560-C-3250.
4. IN ALL CASES SUBGRADE SHALL BE COMPACTED TO 95% MIN RELATIVE COMPACTION TO A DEPTH OF 12".
5. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED PER SDG-115.
NOTES:

1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.

2. CONCRETE SHALL BE 520-C-2500 FOR RESIDENTIAL USE; 560-C-3250 FOR COMMERCIAL USE.

3. SEE STANDARD DRAWINGS SDG-164 AND G-15 FOR WIDTH AND LOCATION REQUIREMENTS.

4. SEE SDG-151 AND G-10 FOR CURB AND JOINT DETAILS.

5. DRIVEWAY SHALL BE CONTINUOUS POUR FROM BACK OF CURB TO PROPERTY LINE.

6. METER BOXES SHALL NOT BE LOCATED WITHIN DRIVEWAY.

7. DRIVEWAY IN EXCESS OF 150' IN LENGTH FROM CURB FACE SHALL HAVE 7 1/2" MINIMUM CONCRETE THICKNESS.

8. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED PER SDG-115.

9. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.
NOTES:

1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.
2. FOR RESIDENTIAL USE, CONCRETE SHALL BE 520-C-2500; FOR COMMERCIAL USE, CONCRETE SHALL BE 560-C-3250.
3. SEE STANDARD DRAWINGS SDG-164 AND G-15 FOR WIDTH AND LOCATION REQUIREMENTS.
4. DRIVEWAY RAMP TO EXTEND TO 10' FROM CURB FACE OR TO RIGHT-OF-WAY, WHICHEVER IS LESS.(FOR COMMERCIAL USE ONLY).
5. PLACE EXPANSION JOINT AT RIGHT-OF-WAY OR 10', WHICHEVER IS LESS.
6. SEE SDG-151 AND G-10 FOR CURB AND JOINT DETAILS.
7. DIMENSIONS SHOWN REFLECT A 6" CURB HEIGHT.
8. METER BOXES SHALL NOT BE LOCATED WITHIN DRIVEWAY.
9. DRIVEWAY IN EXCESS OF 150' IN LENGTH FROM CURB FACE SHALL HAVE 7 1/2" MINIMUM CONCRETE THICKNESS.
10. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED PER SDG-115.
11. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

CITY OF SAN DIEGO – STANDARD DRAWING
CONCRETE DRIVEWAY
(CONTIGUOUS SIDEWALK)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
COORDINATOR: R.L. R. COOPER
DATE: 9/4/18
DRAWING NUMBER: SDG-159

REVISION | BY | APPROVED | DATE
--- | --- | --- | ---
ORIGINAL* | KA | J. NAGELVOORT | 01/12
UPDATED | FC | J. NAGELVOORT | 10/15
UPDATED | FC | J. NAGELVOORT | 02/16
REDErafted | CD | J. NAGELVOORT | 09/18
NOTES:

1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.

2. CONCRETE SHALL BE 520-C-2500.

3. SEE STANDARD DRAWINGS SDG-164 AND G-15 FOR WIDTH AND LOCATION REQUIREMENTS.

4. SEE SDG-151 AND G-10 FOR CURB AND JOINT DETAILS.

5. DRIVEWAY SHALL BE CONTINUOUS POUR FROM BACK OF CURB TO PROPERTY LINE.

6. METER BOXES SHALL NOT BE LOCATED WITHIN DRIVEWAY.

7. DRIVEWAY IN EXCESS OF 150' IN LENGTH FROM CURB FACE SHALL HAVE 7" MINIMUM CONCRETE THICKNESS.

8. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, DATE) SHALL BE PRESERVED PER SDG-115.

9. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.
NOTES:

1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.
2. CONCRETE SHALL BE 520-C-2500.
3. SEE STANDARD DRAWING SDG-164 FOR WIDTH AND LOCATION REQUIREMENTS.
4. DRIVEWAY RAMP TO EXTEND TO 10' FROM CURB FACE OR TO PROPERTY LINE WHICHEVER IS LESS. (FOR COMMERCIAL DRIVEWAYS ONLY)
5. SEE SDG-151 AND G-10 FOR CURB AND JOINT DETAILS.
6. METER BOXES SHALL NOT BE LOCATED WITHIN DRIVEWAY.
7. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED PER SDG-115.
8. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ADJACENT PROPERTIES.
CONCRETE DRIVEWAY
(FOR CONFINED RIGHT-OF-WAY)

NOTES:

1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.

2. CONCRETE SHALL BE 520-C-2500 FOR RESIDENTIAL USE; 560-C-3250 FOR COMMERCIAL USE.

3. SEE STANDARD DRAWING SDG-164 FOR WIDTH AND LOCATION REQUIREMENTS.

4. SEE SDG-151 AND G-10 FOR CURB AND JOINT DETAILS.

5. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED PER SDG-115.

6. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.
NOTES:

1. CONCRETE SHALL NOT BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED AND APPROVED BY THE RESIDENT ENGINEER.

2. CONCRETE SHALL BE 560-C-3250.

3. SEE STANDARD DRAWING SDG-164 FOR WIDTH AND LOCATION REQUIREMENTS.

4. SEE SDG-151 AND G-10 FOR CURB AND JOINT DETAILS.

5. METER BOXES SHALL NOT BE LOCATED WITHIN DRIVEWAY. SEE WS-03.

6. DRIVEWAY IN EXCESS OF 150' IN LENGTH FROM CURB FACE SHALL BE A MINIMUM OF 7" PCC.

7. DRIVEWAY SHALL BE CONTINUOUS POUR FROM BACK OF CURB TO PROPERTY LINE.

8. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED PER SDG-115.

9. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.
NOTES:

1. CURB OPENINGS, EXCEPT FOR JOINT-USE DRIVEWAYS AND DRIVEWAYS ON LOTS HAVING 21' - FRONTAGE OR LESS, SHALL BE LOCATED AT LEAST 3' FROM THE SIDE PROPERTY LINE EXTENDED.

2. NOT MORE THAN 40% OF THE PROPERTY FRONTAGE ON RESIDENTIAL LOTS, NOR 60% OF THE PROPERTY FRONTAGE ON COMMERCIAL LOTS MAY BE ALLOCATED FOR DRIVEWAY CURB OPENINGS, EXCEPT THAT LOTS HAVING FRONTAGE OF LESS THAN 45' ARE ENTITLED TO ONE 12' DRIVEWAY, (18' CURB OPENING).

3. ALL DRIVEWAYS AND CURB OPENINGS SHALL BE A MINIMUM OF 3' FROM ANY OBSTRUCTION, i.e., POLES, HYDRANTS, ETC.

4. NO PORTION OF ANY DRIVEWAY SHALL BE ALLOWED ACROSS A LINE EXTENDING NORMAL TO THE ROADWAY FROM THE FRONT OF THE PROPERTY, CORNER OF THE PROPERTY, EXCEPT THAT JOINT-USE DRIVEWAYS MAY BE PERMITTED IN SPECIAL INSTANCES WHERE WRITTEN APPROVAL OF BOTH PROPERTY OWNERS IS FILED WITH THE CITY.
NOTES:

1. PAVEMENT CUTS SHALL BE STRAIGHT AND CLEAN. SPALLS AND POTHOLES WITHIN 12 INCHES OF THE MICRO-TRENCH SHALL BE REPAIRED PRIOR TO TENCING TO FACILITATE STRAIGHT PAVEMENT CUTS.

2. INSTALL 1 INCH WIDE (FOLDED) WARNING/IDENTIFICATION TAPE PER SDM-105.

3. TRENCH LOCATION SHALL BE AT EDGE OF CURB AND GUTTER. NO MICRO-TRENCHES ALONG MEDIAN CURBS SHALL BE ALLOWED. THE LOCATION OF MICRO-TRENCH IN RELATION TO THE CURB SHALL NOT DEViate ALONG ITS ALIGNMENT UNLESS OTHERWISE APPROVED BY THE CITY.

4. WHERE THERE IS NO EXPOSED OR VISIBLE CONCRETE GUTTER, THE NEW CONDUIT SHALL BE INSTALLED IN A NARROW TRENCH PER SDG-117.

5. FIRST INSTALLED CONDUIT SHALL BE PLACED AT A DEPTH OF 18 INCHES WITHIN THE CONDUIT ZONE. THE CONDUIT ZONE SHALL BE 3 INCHES FROM BOTTOM OF GUTTER THROUGH 18 INCHES FROM LIP OF GUTTER. ADDITIONAL CONDUIT(S) SHALL BE INSTALLED WITHIN CONDUIT ZONE, UNLESS OTHERWISE APPROVED BY THE CITY.


7. AT STREET INTERSECTIONS, CONDUIT SHALL BE INSTALLED IN NARROW TRENCH PER SDG-117 WITH PAVEMENT RESURFACING AND ANY OTHER REQUIREMENTS PER CITY REGULATIONS, OR USE TUNNELING PER CITY STANDARDS.

8. BACKFILL/BEDDING BELOW ASPHALT BASED SEALANT SHALL BE DRY SAND (SE 50 OR BETTER). ONCE PLACED, SAND SHALL BE THOROUGHLY CONSOLIDATED BY FLOODING.
NOTES:
1. DIKES SHALL BE PLACED ON A 2" SECTION OF A.C. SURFACING, EXTENDING THROUGHOUT THE WIDTH OF THE DIKE.
2. PC-70-10 GRADE ASPHALT TO BE USED FOR ALL DIKES.
3. SHAPE AND COMPACT DIKES WITH AN EXTRUSION MACHINE OR OTHER EQUIPMENT CAPABLE OF SHAPING AND COMPACTING THE MATERIAL TO THE REQUIRED CROSS-SECTION.

APPROX. DIKE QUANTITIES

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<th>TYPE</th>
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LEGEND ON PLANS
EXPANSION JOINT

EXPANSION JOINT FILLER MATERIAL

1/8" R

1/2" (PAVEMENT)
1/4" MIN - 1/2" MAX (SIDEWALK)

CONTACT JOINT

1/8" R

1/2" (#4) x 24" SMOOTH, CREASED OR OILED BAR, 30" ON CENTER

WEAKENED PLANE JOINT

CURB AND SIDEWALK

1/8" R

1/4"

WEAKENED PLANE JOINT

GUTTER AND CONCRETE PAVEMENT

1/8"

1/4"

KEYED JOINT

1-5/8"

1-1/2"
REQUIREMENT 1
No portion of any curb opening shall be permitted within 6' of the intersection of the prolonged property lines and the curb shown by arc A.

REQUIREMENT 2
No portion of any curb opening shall be permitted in the curb return where the radius of curb is 25' or less, as shown by arc B.

REQUIREMENT 3
On all curb returns where the radius is more than 25', curb openings may encroach upon each end of the return a distance equal to 12.5% (or 1/8) of the total length of the arc on the curb return, thus leaving at least 75% (or 3/4) of the length of arc on the return face free from driveway encroachment, provided requirement 1 is met.

REQUIREMENT 4
No portion of any curb opening shall be permitted in the curb return where a separate turning movement is provided, as shown by arc C.
NOTES:
1. CONCRETE SHALL BE 560-C-3250.
2. SEE STANDARD DRAWING G-10 FOR JOINT DETAILS.
3. ADJUST 15" INTERVAL BETWEEN TRANSVERSE JOINTS TO MATCH ADJACENT EXISTING IMPROVEMENTS.

THICKNESS SHOWN ON PLANS
1/2" R
CONTACT JOINT
20" MAX.
10" MIN.
PAVEMENT WIDTH = 40' OR LESS
SECTION

WEAKENED PLANE JOINTS
CONTACT JOINTS
TRANVERSE CONTACT JOINTS SHALL BE CONSTRUCTED AT END OF POUR
EXPANSION JOINTS SHALL BE CONSTRUCTED AT LOCATIONS SHOWN ON PLANS.

PLAN
THICKNESS SHOWN ON PLANS

SECTION

WEAKENED PLANE JOINTS

CONTACT JOINTS

TRANSVERSE CONTACT JOINTS SHALL BE CONSTRUCTED AT END OF POUR

EXPANSION JOINTS SHALL BE CONSTRUCTED AT LOCATIONS SHOWN ON PLANS.

PLAN

NOTES:
1. CONCRETE SHALL BE 560–C–3250.
2. SEE STANDARD DRAWING G–10 FOR JOINT DETAILS.
3. ADJUST 15’ INTERVAL BETWEEN TRANSVERSE JOINTS TO MATCH ADJACENT EXISTING IMPROVEMENTS.
NOTES
1. TRENCH RESURFACING SHALL BE DONE ACCORDING TO AGENCY'S REQUIREMENTS.
2. THE SAND USED FOR THE SLURRY BACKFILL SHALL MEET THE REQUIREMENTS (SUBSECTION 400-3.2) LISTED IN THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. SLURRY SHALL CURE FOR SEVEN DAYS PRIOR TO TRENCH RESURFACING.
3. SLURRY BACKFILL SHALL NOT BE USED WHERE IT WILL IMPEDE SUBSURFACE DRAINAGE.
CHAPTER 5
SPRINKLER
IRRIGATION
SYSTEMS
NOTES:
1. FITTINGS SHALL BE PVC SCH 40.
2. NIPPLES AND RISERS SHALL BE PVC SCH 80.
3. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS.
4. CLOSE NIPPLES SHALL NOT BE USED.
5. NO FIXED RISERS IN RIGHT-OF-WAY OR WITHIN 10' OF VEHICULAR OR PEDESTRIAN TRAFFIC.
6. ANTI-DRAIN VALVES SHALL BE INSTALLED UNDER ALL HEADS.
NOTES:

1. FITTINGS SHALL BE PVC SCH 40.
2. NIPPLES AND RISERS SHALL BE PVC SCH 80.
3. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS.
4. CLOSE NIPPLES SHALL NOT BE USED.
5. ANTI-DRAIN VALVES SHALL BE INSTALLED UNDER OR IN ALL HEADS.
6. NO FIXED RISERS ALLOWED IN RIGHT-OF-WAY OR WITHIN 10' OF VEHICULAR OR PEDESTRIAN TRAFFIC.
NOTES:

1. FITTINGS SHALL BE PVC SCH 40.
2. NIPPLES AND RISERS SHALL BE PVC SCH 80.
3. TEFON TAPE SHALL BE USED ON THREADED CONNECTIONS.
4. CLOSE NIPPLES SHALL NOT BE USED.
5. ANTI-DRAIN VALVES SHALL BE INSTALLED UNDER OR IN ALL HEADS.
6. LATERAL DEPTH SHALL BE 18" WHEN 12" POP-UP BODIES ARE USED.
NOTES:

1. FOR BUBBLER LOCATION, REFER TO TREE PLANTING AND STAKING DRAWING.

2. EACH TREE SHALL HAVE A 2" POP-UP HEAD WITH BUBBLER NOZZLE PER SDI-103, AND A FIXED BUBBLER NOZZLE IN A PERFORATED PIPE.

3. NIPPLES AND RISERS SHALL BE PVC SCH 80.

4. FITTINGS SHALL BE PVC SCH 40.

5. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS.

6. CLOSE NIPPLES SHALL NOT BE USED.

7. ANTI-DRAIN VALVES SHALL BE INSTALLED UNDER ALL HEADS.
NOTES:

1. QUICK COUPLING VALVES SHALL BE SET FLUSH IN LAWN AND PER MULCH DEPTH ABOVE FINISH GRADE IN SHRUB / GROUNDCOVER AREAS.

2. CLOSE NIPPLES SHALL NOT BE USED.

3. NIPPLES, COUPLINGS, AND ELBOWS SIZE SHALL BE 1" RED BRASS.

4. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS.

5. UPON PROJECT ACCEPTANCE, THE CONTRACTOR SHALL PROVIDE TWO SETS OF APPROPRIATE QUICK COUPLER VALVE KEY WITH 1" BRASS BALL VALVE AND SWIVEL ADAPTER INCLUDED IN THE ASSEMBLY.
**NOTES:**

1. GLOBE VALVES SHALL BE FURNISHED WITH A STANDARD BRONZE CROSS HANDLE, CENTERED IN PIPE SLEEVE.

2. VALVES SHALL BE INSTALLED WITHIN 12" OF HARDSCAPE.

3. GLOBE VALVES SHALL BE FURNISHED WITH A REMOVABLE BONNET AND PACKING GLAND NUT.

4. CLOSE NIPPLES SHALL NOT BE USED.

5. LOCKING CAP SHALL BE MOUNTED FLUSH WITH FINISHED GRADE IN TURF AREAS AND ABOVE FINISHED GRADE IN SHRUB AREAS, PER DEPTH OF MULCH.

6. PROVIDE APPROPRIATE LOCKING CAP KEY AND VALVE KEY TO OPERATE VALVE AT DEPTH.

7. LOCATE OUTSIDE OF TURF WHEN POSSIBLE.

8. TEFOLON TAPE SHALL BE USED ON ALL THREADED CONNECTIONS.

9. WHEN INSTALLED AS MAINLINE ISOLATION VALVE, NIPPLES AND FITTINGS MAY BE SCH 80 PVC.
NOTES

1. GLOBE VALVES SHALL BE FURNISHED WITH A STANDARD BRONZE CROSS HANDLE, CENTERED IN PIPE SLEEVE.
2. VALVE SHALL BE INSTALLED WITHIN 12" OF HARDSCAPE.
3. GLOBE VALVES SHALL BE FURNISHED WITH A REMOVABLE BONNET AND PACKING GLAND NUT.
4. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS.
5. VALVE BOX SHALL BE MOUNTED FLUSH WITH FINISH GRADE IN TURF AREAS AND PER MULCH DEPTH IN SHRUB AREAS.
6. LOCATE OUTSIDE OF TURF WHEN POSSIBLE.
7. GATE VALVE SHALL BE USED ONLY ON LOOPED MAINLINE.
8. VALVE BOX SHALL BE SET PERPENDICULAR TO HARDSCAPE.
9. PROVIDE TWO VALVE KEYS TO OPERATE VALVE AT DEPTH.

LEGEND ON PLANS

GATE VALVE
GLOBE VALVE
NOTES:

1. BACKFILL MATERIAL SHALL BE COMPACTED TO A RELATIVE COMPACTION OF 90% MINIMUM.

2. PIPE SHALL LAY FREE IN THE TRENCH WITH NO INDUCED STRAIN AND WITH SUFFICIENT ALLOWANCE FOR EXPANSION AND CONTRACTION.

3. PVC PIPE UNDER PAVEMENT SHALL BE INSTALLED IN A SCH 40 PVC SLEEVE TWICE THE DIAMETER OF THE PIPE (2" MINIMUM SIZE) AND EXTEND 12" MINIMUM BEYOND THE EDGE OF PAVEMENT.

4. THE LETTER "W" SHALL BE STAMPED OR CHISELED ON THE IMPROVEMENT (CURB/SIDEWALK) DIRECTLY ABOVE THE PRESSURE PIPELINE SLEEVE.

5. NO PVC PRESSURE PIPELINE SHALL BE INSTALLED WITHIN 3' OF ANY UTILITY, UNLESS OTHERWISE SPECIFIED.
NOTES:

1. SPLICING SHALL BE MADE IN VALVE BOXES AND PULL BOXES ONLY. SEE STANDARD DRAWING SDI-115 FOR SPLICE / SOLDERING NOTES.

2. SPLICES SHALL BE SOLDERED WITH A PROPERLY SET MECHANICAL SPOEICE CONNECTOR, ENTIRELY ENCLOSED IN SELF-CURING RESIN AND SHALL BE COMPLETELY WATER-PROOF.

3. SEAL CONDUIT OPENINGS WITH ELECTRICAL CONDUIT SEALANT AS APPROVED BY THE ENGINEER.

4. PVC CONDUIT SHALL BE 1" MINIMUM.

5. VALVE / CONTROLLER IDENTIFICATION SHALL BE LABELED OUTSIDE ON THE VALVE BOX LID AND TAGGED INSIDE THE BOX ON THE VALVE.

6. KNOCK OUTS SHALL NOT BE ENLARGED.

7. INSTALL ONLY ONE VALVE PER BOX.

8. VALVE BOXES SHALL BE SET PERPENDICULAR TO HARDSCAPE, ABOVE FINISHED GRADE IN SHRUB / GROUNDCOVER AREAS, PER MULCH DEPTH. IF NECESSARY TO BE SET IN TURF, VALVE BOXES SHALL BE SET FLUSH WITH FINISHED GRADE.

9. CLOSE NIPPLES SHALL NOT BE USED.

10. NIPPLES, ELBOWS, AND FITTINGS SHALL BE THREADED RED BRASS, FROM COUPLING THROUGH THE MASTER VALVE. PIPE AND FITTINGS DOWNSTREAM SHALL BE SCH 80 PVC.

11. TEF-LON TAPE SHALL BE USED ON THREADED CONNECTOR.
CONCRETE VALVE BOX

FLOW SENSOR CENTERED IN BOX

CONCRETE RECTANGULAR VALVE BOX WITH CAST IRON, SELF-LOCKING LID. PAINT "FS" AND CONTROLLER I.D. LETTER ON LID.

FINISHED GRADE

MULCH DEPTH, PER PLAN

45 DEGREE PVC ELL, SCH 80 TO ACHIEVE MAINLINE DEPTH ON DOWNSTREAM SIDE OF FLOW SENSOR.

MAINLINE TO SYSTEM

ELBOW WITH CONCRETE BLOCK 9" x 9" x 9"

SCH 80 PVC LENGTH 5X PIPE DIAMETER

3/8" PEA GRAVEL 4" MIN DEPTH

FLOW

1" MIN BETWEEN TOP OF PIPE AND VALVE BOX KNOCK OUTS (BOTH SIDES)

SCH 80 PVC MAINLINE FROM MASTER VALVE 10 X PIPE DIAMETER W/NO FITTING

COMPACT SOIL AROUND VALVE BOX 1" MIN

FLOW SENSOR

CONTROL WIRE 24" LEAD LENGTH (COILED WITH WEATHERPROOF PLASTIC I.D. TAG)

4" MIN

2" MIN

1" MIN PVC CONDUIT FOR FLOW SENSOR DATA CABLE TO CONTROLLER.

LEGEND ON PLANS

FS

NOTES:

1. SPLICE SHALL BE SOLDERED WITH A PROPERLY SET MECHANICAL SPLICE CONNECTOR, ENTIRELY ENCLOSED IN SELF-CURING RESIN AND SHALL BE COMPLETELY WATER-PROOF.

2. SEAL CONDUIT OPENINGS WITH ELECTRICAL SEALANT.

3. KNOCK OUTS SHALL NOT BE ENLARGED.

4. INSTALL ONLY ONE FLOW SENSOR PER BOX.

5. VALVE BOXES SHALL BE SET PERPENDICULAR TO HARDSCAPE PER MULCH DEPTH IN SHRUB / GROUNDCOVER AREAS. IF NECESSARY TO BE SET IN TURF, VALVE BOXES SHALL BE SET FLUSH WITH FINISHED GRADE.

CITY OF SAN DIEGO - STANDARD DRAWING

FLOW SENSOR

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR P.C.E. 56623 DATE 9/4/18

DRAWING NUMBER SDI-112

REVISION BY APPROVED DATE

ORIGINATOR RH J. NAGELVOORT 07/12

REDAFTED CD J. NAGELVOORT 09/18
CONCRETE RECTANGULAR VALVE BOX WITH HINGED CAST IRON, SELF-LOCKING, LID, IMPRINTED W/ RCV AND CONTROLLER ID LETTER ON LID.

FINISHED GRADE

MULCH DEPTH, PER PLAN

1" MIN CLEARANCE BETWEEN TOP OF PIPE AND VALVE BOX KNOCK OUTS (BOTH SIDES)

15" PVC PIPE AND ELBOW, SCH 40

3" MIN

CONTROL WIRES 24" LEAD LENGTH (COILED WITH VALVE ID TAG)

3/8" PEA GRAVEL 4" MIN DEPTH

RED BRASS FROM ISOLATION VALVE

COMPACT SOIL AROUND VALVE BOX

NIPPLE, ELBOW AND RISER FROM MANIFOLD TEE OR ELBOW, AS SHOWN / NOTED ON SDI-126 UNLESS OTHERWISE SPECIFIED.

SIDEWALK OR MOW CURB

A R O U N D  V A L V E  B O X

COM P A C T  S O I L

15"

S C H  8 0


LEGEND ON PLANS

\[ \text{RCV} \]

NOTES:

1. SPLICING SHALL BE MADE IN VALVE BOXES AND PULL BOXES ONLY. SEE SDI-115 FOR SPLICING / SOLDERING NOTES.

2. SPLICES SHALL BE SOLDERED WITH A PROPERLY SET MECHANICAL SPLICE CONNECTOR, ENTIRELY ENCLOSED IN SELF-CURING RESIN AND SHALL BE COMPLETELY WATER-PROOF.

3. KNOCK OUTS SHALL NOT BE ENLARGED.

4. INSTALL ONLY ONE VALVE PER BOX.

5. VALVE BOXES SHALL BE SET PERPENDICULAR TO HARDSCAPE, ABOVE FINISHED GRADE IN SHRUB / GROUND COVER AREAS, PER MULCH DEPTH. IF NECESSARY TO BE SET IN TURF, VALVE BOXES SHALL BE SET FLUSH WITH FINISHED GRADE.

6. CLOSE NIPPLES SHALL NOT BE USED.

7. NIPPLES, ELBOWS, AND FITTINGS SHALL BE THREADED RED BRASS FROM ISOLATION VALVE THROUGH THE VALVE, UNLESS OTHERWISE SPECIFIED.

8. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS.

CONCRETE VALVE BOX WITH LOCKING TOP AS APPROVED BY THE ENGINEER

VALVE CENTERED IN BOX

UNMORTARED STANDARD BRICKS (4) FOUNDATION ON COMPACTED SUBGRADE (USE 6 BRICKS FOR OVERSIZED BOXES)

PLAN

ELEVATION
NOTES:

1. INSTALL PULL BOXES AS SHOWN ON PLANS AND AT EACH END OF PIPE SLEEVES RUNNING UNDER PAVEMENT.

2. PULL BOX COVER SHALL BE PERMANENTLY MARKED "ELECTRIC".

3. CONDUCTORS FOR EACH CONTROLLER CLOCK SHALL BE HARNESSSED SEPARATELY AND AT SUFFICIENT INTERVALS TO MAINTAIN A DEFINITE BUNDLE.

4. SPLICES SHALL ONLY BE MADE IN PULL BOXES, WITH A PROPERLY SET MECHANICAL SPLICE CONNECTOR, SOLDERED WITH METALLIC ALLOY, ENTIRELY ENCLOSED IN SELF-CURING RESIN AND SHALL BE COMPLETELY WATER-PROOF.

5. SPARE WIRE ENDS SHALL BE INSULATED IN THE SAME MANNER AS WIRE SPLICES.

6. MINIMUM SIZE PULL BOX SHALL BE AS SHOWN ABOVE. LARGER BOXES MAY BE NECESSARY TO MEET 4" CLEARANCE REQUIRED.

7. NO SPLICES SHALL BE PERMITTED ON WIRE RUNS OF LESS THAN 300'.

8. THE LETTER "E" SHALL BE STAMPED OR CHISELED ON THE IMPROVEMENT (CURB-SIDEWALK) DIRECTLY ABOVE THE CONTROL WIRE.

9. BEDDING MATERIAL SHALL BE SE 50 PLASTER OR MORTAR SAND.
NOTES:

1. PROVIDE SOLENOID ADAPTOR TO SUPPORT SOLAR CLOCK FUNCTION ON VALVE.
2. MAXIMUM RUN OF CONTROL WIRE TO REMOTE CONTROL VALVE (RCV) IS 1500' UNLESS OTHERWISE SPECIFIED.
3. SEAL CONDUIT OPENINGS WITH ELECTRICAL SEALANT.
NOTES:

1. ALL CONTROLLER ASSEMBLIES AND OPTIONS SHALL BE COMPLETELY PRE-ASSEMBLED IN A STAINLESS STEEL ENCLOSURE.

2. CONTROL WIRE CONDUIT SHALL BE TWICE THE DIAMETER OF THE WIRE BUNDLE, 2" MINIMUM.

3. PROVIDE SEPARATE CIRCUIT BREAKER FOR CONTROLLER(S) AT ELECTRICAL CONTROL PANEL AND LABEL.

4. SEAL CONDUIT OPENINGS WITH ELECTRICAL SEALANT, AS APPROVED BY THE ENGINEER.
NOTES:

1. CONTROL WIRE CONDUIT SHALL BE TWICE THE DIAMETER OF THE WIRE BUNDLE, 2" MINIMUM.

2. PROVIDE SEPARATE CIRCUIT BREAKERS FOR CONTROLLER(S) AT ELECTRICAL CONTROL PANEL, AND LABEL.

3. PROVIDE RAIN SENSOR AND INSTALL IN AN APPROVED LOCATION.
NOTES:

1. BEDDING MATERIAL SHALL BE SE 50 PLASTER OR MORTAR SAND.

2. WIRES WHICH RUN UNDER PAVED AREAS SHALL BE INSTALLED IN PVC PIPE SLEEVES TWICE THE DIAMETER OF THE WIRE BUNDLE (2" MINIMUM SIZE), EXTENDING 12" MINIMUM BEYOND EDGE OF PAVEMENT. INSTALL ELECTRICAL PULL BOX AT EACH END OF PIPE SLEEVES PER SDI-115.

3. THE LETTER E SHALL BE STAMPED OR CHISELED ON THE IMPROVEMENT (CURB-SIDEWALK) DIRECTLY ABOVE THE CONTROL WIRE / CABLE.

4. WHEN CONTROL WIRING CANNOT BE INSTALLED IN A PIPE TRENCH, IT SHALL BE INSTALLED A MINIMUM 18" BELOW FINISH GRADE BUNDLED WITH PLASTIC TAPE.
NOTE:
STABILIZERS SHALL BE PLACED NO GREATER THAN 10' APART, AT EACH RISER AND AT ALL FITTINGS.
NOTE:
SWING JOINTS SHALL BE USED AT EACH CHANGE OF GRADE.
PLASTIC RCV RECTANGULAR VALVE BOX FOR CONTROL VALVES.

NOTES:

1. PVC PIPE USED IN MANIFOLD ASSEMBLIES SHALL BE THE SAME CLASS AS SPECIFIED FOR THE MAINLINE.

2. VALVE BOXES SHALL BE HEAT BRANDED WITH CONTROLLER AND VALVE IDENTIFICATION.
NOTES:

1. ALL PIPES, NIPPLES, AND FITTINGS AFTER MALE ADAPTER SHALL BE RED BRASS.

2. VALVE AND CONTROLLER IDENTIFICATION SHALL BE LABELED OUTSIDE ON THE VALVE BOX LID AND TAGGED INSIDE THE BOX ON THE VALVE.

3. TEFLOX TAPE SHALL BE USED ON THREADED CONNECTIONS.
NOTES:

1. WIRE SPLICING SHALL BE MADE IN VALVE BOXES AND PULL BOXES ONLY. SEE SDI-115 FOR SPLICING NOTES.

2. SPARE WIRES TERMINATING IN VALVE BOXES SHALL HAVE THEIR ENDS INSULATED, THE SAME AS FOR A SPLICING CONNECTION.

3. WHEN TWO OR MORE VALVES ARE INSTALLED IN THE SAME LOCATION, SEE REMOTE CONTROL VALVE MANIFOLD ASSEMBLY, SDI-125 AND SDI-126.

4. VALVE / CONTROLLER IDENTIFICATION SHALL BE PERMANENTLY Labeled EXTERNALLY ON THE VALVE BOX AND INTERNALLY, WITH A PERMANENT IDENTIFICATION TAG ATTACHED TO THE VALVE.

5. KNOCK OUTS SHALL NOT BE ENLARGED UNLESS APPROVED BY THE ENGINEER.

6. INSTALL ONLY ONE VALVE ASSEMBLY PER BOX.

7. VALVE BOXES SHALL BE SET PERPENDICULAR TO HARDSCAPE, A MAXIMUM 12 INCHES FROM EDGE OF HARDSCAPE, 2" ABOVE FINISHED GRADE IN SHRUB / GROUND COVER AREAS, PER MULCH DEPTH. IF NECESSARY TO BE SET IN TURF, VALVE BOXES SHALL BE SET FLUSH WITH FINISHED GRADE.

8. CLOSE NIPPLES SHALL NOT BE USED.

9. FILTER SHALL BE INSTALLED TO ALLOW FOR MAINTENANCE ACCESS.

10. TEFLOn TAPE SHALL BE USED ON THREADED CONNECTIONS.
MULCH DEPTH PER PLAN

FINISHED GRADE

3" MIN CLEAR

AIR / VACUUM RELIEF VALVE
PER LEGEND

1/2" PVC COUPLING (TXT)

6" ROUND VALVE BOX
WITH LOCKING LID

1/2" SCH 80 RISER
(LENGTH AS REQUIRED)

STANDARD BRICK SUPPORTS (3)

3/8" PEA GRAVEL
4" MIN DEPTH

LATERAL P.V.C. PIPING PER LEGEND

PLUMBED TO PVC

MULCH DEPTH PER PLAN

FINISHED GRADE

3" MIN CLEAR

Dripper line

1" CLEAR BETWEEN TOP OF PIPE AND VALVE BOX KNOCK OUTS (BOTH SIDES)

1" MIN CLEAR

AIR / VACUUM RELIEF VALVE
PER LEGEND

6" ROUND VALVE BOX
WITH LOCKING LID

BARBED SxSxT TEE

STANDARD BRICK SUPPORTS (3)

3/8" PEA GRAVEL
4" MIN DEPTH

LEGEND ON PLANS

NOTES:
1. INSTALL AIR / VACUUM RELIEF VALVE AT HIGH POINT(S) IN VALVE CIRCUIT.
2. HEAT-BRAND VALVE BOX LID "AR".
3. VALVE SHALL BE CENTERED IN BOX.
4. TEFLOM TAPE SHALL BE USED ON THREADED CONNECTIONS.
NOTES:
1. INSTALL FLUSH VALVE(S) AT THE LOWEST POINTS IN THE VALVE CIRCUIT
2. HEAT BRAND VALVE BOX LIDS "FV".
3. VALVE SHALL BE CENTERED IN BOX.

PLUMBING TO PVC

- 6" ROUND VALVE BOX W/ LOCKING LID
- LINE FLUSHING VALVE PER LEGEND
- 1" MIN CLEAR BELOW
- STANDARD BRICK SUPPORTS (3)
- 3/8" PEA GRAVEL SUMP (1 CUBIC FOOT)

PLUMBING TO DRIPPER LINE

- 6" ROUND VALVE BOX W/ LOCKING LID
- LINE FLUSHING VALVE PER LEGEND
- 1" MIN CLEAR BELOW
- STANDARD BRICK SUPPORTS (3)
- 3/8" PEA GRAVEL SUMP (1 CUBIC FOOT)
CHAPTER 6
LANDSCAPING
NOTES
1. DOUBLE STAKE 15 GAL. AND LARGER TREES. SINGLE STAKE TREES SMALLER THAN 15 GAL.
2. FOR SINGLE STAKED TREES, PLACE STAKE ON WINDWARD SIDE OF TREE.
3. LOCATE STAKES OUTSIDE OF ROOTBALL.
4. PROVIDE MINIMUM DISTANCE FROM OTHER OBJECTS AS FOLLOWS:
   - 20' TRAFFIC SIGNALS, 12' STREET LIGHTS, 10' FIRE HYDRANTS, SEWER LINES AND SDG&E FOR PAD MOUNTED EQUIPMENT,
   - AND 5' UNDERGROUND SDG&E ELECTRIC AND GAS LINES.

DOBUT DO NOT REMOVE SIDE GROWTH ALONG TRUNK, PRUNE ONLY AS DIRECTED BY ENGINEER.

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DO NOT REMOVE SIDE GROWTH ALONG TRUNK, PRUNE ONLY AS DIRECTED BY ENGINEER.
SHRUB PLANTING - SLOPES

- Chamfer as needed to eliminate soil sloughing. 1:1 max slope.
- Depth of rootball
- Top of rootball 1" above finished grade
- 2" mulch, 3" clear from trunk
- 4" high berm, firmly compacted
- Plant tablets buried, max 3" deep
- Scarify bottom and edges of plant pit
- Backfill
- Plant pit edges of scarify bottom and edges of plant pit
- Mins 2 x ball width

SHRUB PLANTING - LEVEL GROUND

- Equal triangular spacing (EQ) required between plants as shown on plans
- Distance from edge of planter to center of plant to be 1/2 the specified ground cover spacing (EQ)
- Edge of planting area

GROUND COVER SPACING
NOTES

1. REBAR SHALL BE CONTINUOUS WITH 12" OVERLAP WHERE SPliced.

2. CONCRETE SHALL BE CLASS 520-C-2500 AND SAME COLOR AS ADJACENT CONCRETE AND HAVE A SMOOTH TROWEL FINISH.

3. INSTALL WEAKENED PLANE JOINTS AT EACH FENCE POST.

4. INSTALL EXPANSION JOINTS WHERE THE MOWING STRIP ABUTS CONCRETE IMPROVEMENT AND AT LOCATION APPROVED BY ENGINEER.
NOTES:

1. CONCRETE TO BE REMOVED FOR EACH TREE PLANTING SHALL BE SAW CUT FULL DEPTH.

2. BOLTS, NUTS AND WASHERS SHALL BE GRADE 316 STAINLESS STEEL. GRATE FRAME SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. ALL GRATES SHALL BE REMOVABLE & FASTENERS SHALL BE ACCESSIBLE TO MAINTENANCE.

3. GRATES SHALL BE MINIMUM 40 SQUARE FEET IN SIZE, AND 2 SEPARATE PIECES, UNLESS OTHERWISE SPECIFIED ON THE PLANS. SLOT OPENINGS IN GRATE DESIGN SHALL HAVE 3/8" MAXIMUM WIDTH. GRATE DESIGNS AND INSTALLATION SHALL BE IN ACCORDANCE WITH CURRENT ADA STANDARDS AND THE LATEST EDITION OF THE CALIFORNIA BUILDING CODE, WITH A MINIMUM UNIFORM LIVE LOAD OF 250 POUNDS PER SQUARE FOOT IN SIDEWALKS.

4. IMMEDIATE NOTIFICATION SHALL BE GIVEN TO THE ENGINEER OF ANY BELOW GRADE IMPROVEMENTS EN countered.

5. SET GRATE IN FRAME PRIOR TO PLACEMENT OF PAVEMENT. ANY WARPED OR NON-FLUSH FITTING GRATES SHALL BE REPLACED.

6. TREE SHALL BE CENTERED IN GRATE OPENING. GRATES SHALL HAVE A PERMANENT SLIP RESISTANT FINISH.

7. ADJACENT SIDEWALK SHALL HAVE A MINIMUM CLEARANCE WIDTH OF 4' FROM THE EDGE OF GRATE.

8. GRATE SHALL BE UNIFORM WITH ADJACENT GRADE.

9. PROVIDE MINIMUM DISTANCE FROM OTHER OBJECTS AS FOLLOWS: 12' STREET LIGHTS, 10' FIRE HYDRANTS, 10' SEWER LINES, AND 20' TRAFFIC SIGNALS.

10. SUBMIT GRATE DESIGN FOR APPROVAL.

SECTION A-A (CONCRETE SUPPORTS)
NOTES:

1. USE MONOLITHIC PLACEMENT FOR NEW CONSTRUCTION.
2. POLE PADS SHALL DRAIN AT 1.5% MINIMUM IN SAME DIRECTION AS SIDEWALK.
3. CONCRETE PAD SHALL BE THE SAME AS SPECIFIED FOR SIDEWALK.
4. LOCATE LIGHT POLES OUTSIDE OF TURF AREAS AND AWAY FROM TREES AS APPROVED BY THE ENGINEER UNLESS SPECIFIED OTHERWISE.
5. PULL BOX WITH BOLT-DOWN LID MINIMUM 6" FROM ALL EDGES (POLYMER EDGED BOX WITH BRICK FOUNDATION).
6. IRRIGATION HEAD SHALL BE CLEAR OF CONCRETE WALK OR PAD PER SECTION 801-5.5.2 OF THE WHITEBOOK.
NOTE:

1. ROOT BARRIER SHALL BE INSTALLED ADJACENT TO THE IMPROVEMENT AND NOT AROUND THE ROOTBALL.

2. ROOT BARRIER REQUIRED WHEN TREE TRUNK IS WITHIN 10' OF HARDSCAPE, WALLS, BUILDINGS, BROW DITCHES, OR OTHER IMPROVEMENTS.

3. FOR ROOT BARRIER INSTALLATION WITH THE TREE GRATES SEE SDL-104.
NOTES:

1. TIE PALM FRONDS TOGETHER WITH BIODEGRADABLE SISAL TWINE. TWINE SHALL BE REMOVED AFTER 90 DAYS OF TRANSPLANTING UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

2. PALM TRUNKS SHALL BE SKINNED, TRIMMED, AND VERTICAL.

3. STEM DIAMETER REQUIREMENT APPLIES ONLY TO PHOENIX SPECIES.
HOE DEPTH
PLANTING
6" 12"
BACKFILL
PLANT
FIRMLY COMPACTED
FINISH GRADE AT ROOTBALL

4" HIGH BERM
PLANTING HOLE DEPTH
12"

FILTER FABRIC

PIPE TO EXTEND INTO
THE GRAVEL SUMP
3/4" GRAVEL SUMP AT
BOTTOM OF PERFORATED
DRAIN PIPE

FINISH GRADE

FLAT, BLACK SLOTTED
GRATE (FASTEN TO
PIPE WITH STAINLESS
STEEL SCREWS (2))

DUCT TAPE OVER
HOLES WITHIN 6" OF
FINISHED GRADE

4" PVC RIGID PERFORATED PIPE
WRAPPED IN FILTER FABRIC FOR
ENTIRE LENGTH

DETAIL - A
BREATHER TUBE

3/4" GRAVEL SUMP AT
BOTTOM OF PERFORATED
DRAIN PIPE

FINISH GRADE

CITY OF SAN DIEGO - STANDARD DRAWING

PALM TREE PLANTING

SDL-107

RECOMMENDED BY THE CITY
OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR P.E. 56923 DATE

9/4/18

REVISION BY APPROVED DATE

ORIGINAL KA J. NAGELVOORT 09/12
REFRAINED CD J. NAGELVOORT 09/18
\[ Y = 2.25W \left(\frac{X}{L}\right)^2 \]

- **L** = LENGTH OF TRANSITION
- **W** = MAXIMUM OFFSET DISTANCE
- **X** = DISTANCE ALONG BASELINE
- **Y** = OFFSET FROM BASELINE

### Distance X

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**Note:**

To determine offset distance for any length of transition use the formula \( Y = 2.25W\left(\frac{X}{L}\right)^2 \) for the portions AB' and C'D' which are parabolic curves. The portion B'C' is a tangent. When the baseline is curved, the offsets are applied to the curved baseline, and B'C' is no longer a tangent.
NOTES

1. LETTER STYLE: FUTURA BOLD CONDENSED

2. LETTER SIZE: 6" 5" 2 1/2"

3. CITY SEAL: 4"

4. BACKGROUND: TYPE IV PRISMATIC SHEETING

5. ELECTRO CUT BLUE OVER WHITE

6. .065 ALUMINUM

7. MOUNTED TO TELSPAR WITH 3/8" DRIVE RIVETS

8. 4" TALL BY 1 1/4" SQ. CHANNEL SPACER HELD WITH VHB 4950 TAPE

9. CONTACT CITY OF SAN DIEGO SIGN SHOP, (619) 527-7528 FOR A LIST OF APPROVED VENDORS FOR CITY SEAL.
PERMANENT STREET NAME SIGNS

GENERAL:
STREET NAME SIGN ASSEMBLY FOR POST TOP MOUNTING SHALL CONSIST OF NAME BLADE UNITS, 24" LONG 1 1/2" SQUARE TELESPAR EXTENSION AND DRIVE RIVETS. ALL AS INDICATED ON THE STANDARD DRAWINGS AND/ OR SPECIFIED IN THESE NOTES. ASSEMBLIES SHALL BE MOUNTED TO 1 3/4" SQUARE TELESPAR POSTS.

NAME BLADE UNITS:
NAME BLADE UNITS SHALL BE SINGLE FACED AND MADE FROM 10" WIDE (TOP TO BOTTOM) ALUMINUM SHEET STOCK, MILL FLAT, 6061-T6 OR 5052 ALLOY, .063 THICK. ENDS OF BLADE SHALL BE PERPENDICULAR TO TOP BOTTOM EDGES. EDGES SHALL BE FREE OF SHARP BURRS. EACH BLADE SHALL BE DRILLED WITH TWO 7/16" HOLES, ONE AT TOP AND AT BOTTOM EDGE OF SIGN. HOLES TO BE CENTERED ON BLADE AND 1/2" FROM EDGE. BLADE SHALL BE COVERED WITH TYPE IV PRISMATIC WHITE REFLECTIVE SHEETING.

LETTERING:
STREET NAME SHALL BE CUT FROM BLUE E.C. FILM MATERIAL AND APPLIED OVER THE WHITE BACKGROUND, CREATING A SIGN WITH A BLUE BACKGROUND AND WHITE LETTERING. TYPE FONT SHALL BE FUTURA BOLD CONDENSED. LETTERING HEIGHT OF STREET NAME SHALL BE 6" FOR FIRST LETTER AND 5" FOR THE REST OF THE NAME. STREET AND BLOCK NUMBER SUFFIX SHALL BE 2 1/2" FUTURA BOLD CONDENSED. LAYOUT TO BE AS SHOWN ON SHEET 1 OF 4 ON THE STANDARD DRAWING.

MOUNTING OF SIGN:
EACH NAME BLADE SHALL BE MOUNTED TO THE 1 1/2" TELESPAR EXTENSION WITH A 3/8" DRIVE RIVET. EACH STREET NAME SHALL BE MOUNTED BACK TO BACK WITH THE TELESPAR SANDWICHED IN BETWEEN AND THE ENDS FASTENED TOGETHER WITH VHB DOUBLE STICK TAPE. A SQUARE CHANNEL SPACER IS REQUIRED ON BLADES SHORTER THAN 36". THE EXTENSION IS TO BE PLACED INSIDE THE 1 3/4" TELESPAR POST AND FASTENED WITH A DRIVE RIVET.
STREET NAME SIGN STANDARDS

SUFFIX AND PREFIX ABBREVIATIONS:

AVENUE AVE
STREET ST
COURT CT
DRIVE DR
ROAD RD
BOULEVARD BLVD
TERRACE TER
MOUNTAIN MTN
MOUNT MT
POINT PT
CAMINITO CMTO
CAMINO CAM
RANCHO RCHO

SPELL OUT "FIRST AVE THROUGH TWELFTH AVE"
THEN: 13TH ST - 14TH ST ETC.

NOTE:
FOR A COMPLETE LIST OF SUFFIX AND PREFIX ABBREVIATIONS REFER TO THE OFFICIAL USPS ABBREVIATION.
<table>
<thead>
<tr>
<th>CURB &amp; SIDEWALK</th>
<th>SIDEWALK WIDTH</th>
<th>SETBACK</th>
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</thead>
<tbody>
<tr>
<td>CONTIGUOUS</td>
<td>6' OR LESS</td>
<td>SIDEWALK WIDTH</td>
</tr>
<tr>
<td></td>
<td>MORE THAN 6'</td>
<td>2' - 6&quot;</td>
</tr>
<tr>
<td>SEPARATE</td>
<td>2' - 6&quot;</td>
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</tbody>
</table>

SLOPE TO 1/4" ABOVE GRADE

10" DIAMETER FOOTING OF 520-C-2500 CONCRETE

LOCATION NOTES

1. ALONG MAJOR OR PRIMARY STREETS THERE SHALL BE 2 SIGN INSTALLATIONS PER INTERSECTION PLACED ON OPPOSITE CORNERS

2. ALONG A COLLECTOR OR LOCAL STREETS THERE SHALL BE ONE SIGN INSTALLATION PER INTERSECTION

STREET NAME SIGN LOCATION

(NUMBERS INDICATE PRIORITY OF LOCATION SELECTION WHEN THERE IS A CONFLICT WITH OTHER IMPROVEMENTS)
NOTES

1. ALL DIMENSIONS ARE TYPICAL UNLESS OTHERWISE NOTED.
2. THE LOCATION OF UTILITIES AS SHOWN BY THE STANDARD DRAWING SHALL IN NO WAY VIOLATE EXISTING CODES OR REGULATIONS APPLICABLE TO INDIVIDUAL UTILITIES.
3. INSTALLATION OF SEWER OR WATER UTILITIES ARE NOT PERMITTED IN THE JOINT TRENCHES SHOWN ABOVE.
4. MINIMUM DEPTH OF GAS PIPE MAY, SUBJECT TO GAS COMPANY INSPECTORS APPROVAL, BE REDUCED TO 24" WHERE NECESSARY TO CLEAR STRUCTURE CROSSINGS.
5. DEPTH AND WIDTH OF TRENCH VARIES.
6. CATV MAIN OR TRUCK LINE CONDUIT REQUIRED ALONG ALL STREETS, EXCEPT CUL-DE-SAC STREETS LESS THAN 1000' IN LENGTH WHICH MAY BE SERVED BY FEEDER LINES ONLY.
7. CATV 1 1/2" FEEDER CONDUIT SHALL RUN ACROSS STREETS WITH EACH POWER SERVICE LINE AND CAPPED AT EDGE OF SIDEWALK.
8. ALL CATV TERMINALS AND CONDUITS SHALL BE TERMINATED AT GENERALLY ACCEPTED LOCATIONS AND MARKED. A MAP SHALL BE FILED WITH THE CITY SHOWING THE LOCATIONS OF THE CATV SYSTEM.
9. IN NO CASE SHALL CATV CONDUITS BE PLACED WITHIN 12" OF GAS LINES, ALSO CONDUITS SHALL NOT BE PLACED DIRECTLY OVER GAS LINES.
10. CATV CONDUIT MAY BE PLACED WITH THE TELCO CONDUIT PROVIDED THE TELCO MINIMUM DEPTH IS HELD.
11. TRAFFIC SIGNAL CONDUIT SHALL BE PLACED WHERE STREET LIGHT CONDUIT IS SHOWN.

2. GALVANIZING SHALL BE PER ASTM A653. POSTS & SLEEVES SHALL HAVE 7/16" DIA. HOLES SPACED 1" O.C. 1/8" & +/- 1/8" & SHALL HAVE NO MORE VARIATION IN STRAIGHTNESS THAN 1/16" IN 3'. POSTS SHALL BE SQUARE WITHIN +/- 0.014", HAVE TWIST NO GREATER THAN 0.62" IN 3' AND HAVE CORNER RADIUS OF 5/32" +/- 1/64".

3. THE SIGNS SHALL BE MOUNTED ON POSTS IN ACCORDANCE WITH SECTION 56, "SIGNS" OF THE STATE STANDARD SPECIFICATIONS. ALL FASTENING HARDWARE IS TO BE PROVIDED BY THE CONTRACTOR.

4. MAXIMUM SIGN SIZE 5.2 SQ. FT.

5. TO AVOID CONCRETE INTRUSION IN THE POST HOLES, ALL METAL IN CONTACT WITH CONCRETE SHALL BE WRAPPED IN 10 MIL POLYETHYLENE WRAPPING TAPE WITH EACH WRAP OF TAPE TO OVERLAP THE PREVIOUS WRAP BY 1/3 THE WIDTH OF THE TAPE (INCLUDING THE BOTTOM).

NOTES

10" MINIMUM DIAMETER FOOTING CONCRETE 520-C-2500

FINISH: ELECTRO-GALVANIZE ASTM-B-633 TYPE III SCI

RIVET SPECIFICATION
DIMENSION: 3/8" DIA. SHANK 7/8" DIA. HEAD
GRIP RANGE: 200-356

1 3/4" X 1 3/4" 12 GAUGE POST

2" +/-

3/8" RIVET TYP.

2" X 2" 12 GAUGE ANCHOR POST

2 1/4" X 2 1/4" -12 GAUGE ANCHOR POST

MAXIMUM 8' 1/4" TO CENTER OF SIGN

6' (UNLESS OTHERWISE SHOWN ON PLANS)

3" 7'

32" 12" 18"

EXISTING GRADE

B E W R A P P E D  I N  1 0  M I L  P O L Y E T H Y L E N E

IN CONTACT WITH CONCRETE SHALL

SHOWN ON PLANS

MAXIMUM 8' 1/4" TO CENTER OF SIGN

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

CITY OF SAN DIEGO - STANDARD DRAWING
NOTES:

1. TRENCH MARKER TAPE SHALL BE 6" WIDE AND CONSIST OF A MINIMUM 5.0 MIL, FIVE-Ply 100% VIRGIN POLYETHYLENE WHICH IS ACID, ALKALINE, AND CORROSION RESISTANT. ELONGATION PROPERTIES AND TENSIILE STRENGTH OF NOT LESS THAN 7,800 PSI SHALL BE IN ACCORDANCE WITH ASTM D882-80A. THE TRENCH MARKER TAPE FOR WATER LINES SHALL HAVE A MINIMUM 20 GAUGE SOLID ALUMINUM FOIL CORE, ADHERED TO A 2.55 MIL POLYETHYLENE BACKING.

2. TAPE SHALL BE INSTALLED ABOVE THE PIPE AS SPECIFIED AND RUN CONTINUOUSLY ALONG THE LENGTH OF THE PIPE AND ALL RELATED APPURTENANCES.

A. BLUE WITH "CAUTION POTABLE WATER LINE BURIED BELOW" FOR WATER MAINLINES AND OVER PIPE SLEEVES.

B. PURPLE WITH "CAUTION RECYCLED/RECLAIMED WATER LINE BURIED BELOW" FOR RECYCLED WATER AND IRRIGATION MAINLINES.

C. RED WITH "CAUTION ELECTRIC LINE BURIED BELOW" FOR ELECTRICAL LINES, INCLUDING, BUT NOT LIMITED TO, 110/220V POWER TO IRRIGATION CONTROLLERS AND PUMPS, TRAFFIC SIGNALS AND STREETLIGHTS, COMMUNICATION CABLES AND IRRIGATION DIRECT BURIAL CONTROL WIRES TO REMOTE CONTROL VALVES.

D. GREEN WITH "CAUTION SEWER LINE BURIED BELOW" FOR SEWER MAINLINES AND OVER PIPE SLEEVES.

E. GREEN WITH "CAUTION STORM DRAIN LINE BURIED BELOW" FOR STORM DRAIN MAINLINES AND OVER PIPE SLEEVES.

3. ELECTRICALLY BOND WATER SERVICE TAPE AND WATER MAIN TAPE TOGETHER. TAPE SHALL EXTEND WITHIN METER BOX ITSELF TO ALLOW MARKOUT BY CONTINUITY TESTER.
NOTES:
1. INSTALL DRINKING FOUNTAINS SO THAT RIGHT HAND SIDE FACES PREVAILING WIND.
2. HAND FORM A CONCRETE BOWL AT BOTTOM OF YARD BOX TO FACILITATE SAND CLEAN OUT.
3. PERFORATED DRAIN PIPE AND TRENCH SHALL DRAIN AWAY FROM FOUNTAIN.
4. USE RED BRASS BUSHING REDUCERS TO ADAPT TO FEED PIPE.
5. LOCATE DRINKING FOUNTAINS IN AN ALCOVE OR AT AREAS OUTSIDE THE PATH-OF-TRAVEL OTHERWISE PROVIDE PROTECTIVE RAILING PER SDM-108.
6. NO WATER PONDING IS ALLOWED IN LANDING AND ALCOVE AREAS.
NOTES:

1. UNLESS LOCATED IN AN ALCOVE, WING WALLS OR PROTECTIVE RAILINGS ARE REQUIRED ON BOTH SIDES OF DRINKING FOUNTAINS THAT PROJECT INTO THE PATH OF TRAVEL.

2. HANDRAILS AND GUARDRAILS MATERIAL & FINISH:
   A. PIPE RAILINGS SHALL BE HOT DIPPED GALVANIZED OR AUSTENITIC (NON-CORROSIVE) STAINLESS STEEL.
   B. PIPE RAILINGS SHALL BE SEAMLESS STEEL, ASTM A53 GRADE B.

3. THE LANDING SHALL BE PAVED WITH A SOLID AND STABLE MATERIAL WITH A SLIP-RESISTANT FINISH.

LEGEND ON PLANS

CITY OF SAN DIEGO – STANDARD DRAWING

DUAL HEIGHT DRINKING FOUNTAIN
NON-ALCOVE (FOR EXISTING STRUCTURES)
NOTES:
SIDEWALK SHALL HAVE A MINIMUM OF FOUR (4) FOOT CLEAR (PATH) PASSING PEDESTALS, PULLBOXES AND OTHER STRUCTURES.
NOTES:

1. AT CATCH BASIN LOCATIONS, JOINT TRENCH SHALL BE 7' MINIMUM FROM BACK OF CURB TO INSIDE WALL OF TRENCH.

2. SEWER AND RECLAIMED WATER MAINS AND LATERALS SHALL BE DESIGNED TO CROSS UNDER POTABLE WATER MAINS WITH A MINIMUM VERTICAL SEPARATION OF 12'.

3. SEWER AND RECLAIMED WATER MAINS SHALL MAINTAIN A 10' MINIMUM HORIZONTAL SEPARATION FROM ANY POTABLE WATER.
NOTES:

1. ALL FOOTINGS SHALL BE 520-C-2500 CONCRETE.

2. THE FOLLOWING ITEMS SHALL BE FURNISHED AND INSTALLED ONLY WHEN SHOWN ON THE PLANS OR CALLED FOR IN THE SPECIAL PROVISIONS:
   A. BARBED WIRE
   B. EXTENSION ARM

3. CHAIN LINK FENCE SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION UNLESS SPECIFICALLY NOTED ON THIS DRAWING.

4. CHAIN LINK FENCE AND ALL FITTINGS SHALL BE 22 MIL PRESSURE-BONDED, OR 7 MIL THERMALLY-FUSED VINYL COATED, OVER 9 GAUGE ALUMINIZED STEEL CORE FABRIC, PRIOR TO COATING. POSTS AND RAILS SHALL BE GALVANIZED STEEL PVC VINYL BONDED, 10-14 MIL (COLOR SHALL MATCH FABRIC).

5. CHAIN LINK FABRIC SHALL HAVE KNUCKLED FINISH ON TOP EDGE.

6. THE FOLLOWING SHALL BE NOTED ON PLANS OR SPECIFICATIONS:
   A. COLOR OF FENCE AND FITTINGS
   B. MATERIAL AND FITTING STEEL CLASS: 1 OR 1A
   C. WIRE CLASS: 1 OR 1A

7. SEE M-20 FOR ADDITIONAL DETAILS.
**M-1 Detail**

COVER TO FRAME

- DRILL AND TAP FOR 0.625" X 20 PENTA BOLT S/S UNC THREAD, 1.50" DEEP C BORE 1.625" DIA X 0.625" DEEP
- DRILL ALL THE WAY UP TO THE END
- DIA A
- FRAME
- DRILL ALL THE WAY UP TO THE END
- LIFTS WEDGE ANCHORS

**M-3A Detail**

INNER COVER TO OUTER COVER

- DRILL AND TAP FOR 0.625" X 20 PENTA BOLT S/S UNC THREAD, 1.50" DEEP C BORE 1.625" DIA X 0.625" DEEP
- 22.69" DIA
- INNER COVER
- SEE O-RING GROOVE DETAIL
- OUTTER COVER
- DRILL ALL THE WAY UP TO THE END

**M-3B Detail**

OUTTER COVER TO FRAME

- DRILL AND TAP FOR 0.625" X 20 PENTA BOLT S/S UNC THREAD, 1.50" DEEP C BORE 1.625" DIA X 0.625" DEEP
- LIFTS WEDGE ANCHORS
- OUTTER COVER
- FRAME
- DRILL ALL THE WAY UP TO THE END
- 36" DIA (REF)
- 36.32" DIA

**Notes:**

1. 0.625" X 20 PENTA BOLT S/S UNC THREAD, 316 STAINLESS STEEL SOCKET HEAD CAP SCREW AND 1.50" OD x 0.687" ID x 0.078 THICK 316 STAINLESS STEEL WASHER.

2. 0.25" NEOPRENE O-RING GASKET SHALL BE GLUED INTO MACHINED GROOVE. GLUE SHALL MEET THE REQUIREMENTS OF MIL-M-81288 (AMEND. 1)

3. BOLTDOWN PATTERNS:
   - M-1 DETAIL (24" COVER & FRAME):
     INSTALL TWO (2) BOLTS AT 180 DEGREES.
   - M-3A DETAIL (CONCENTRIC COVERS):
     BETWEEN INNER AND OUTER COVERS INSTALL TWO (2) BOLTS AT 180 DEGREES.
   - M-3B DETAIL (OUTTER COVER & FRAME):
     BETWEEN OUTER COVER & FRAME INSTALL FOUR (4) BOLTS AT 90 DEGREES.
     FOR M-1 AND M-3 OUTER COVER FRAME DRILL
     4 HOLES FOR 0.375"X16 STAINLESS STEEL WEDGE ANCHORS 3.75" IN LENGTH AT 90 DEGREES.
DISTANCE BETWEEN GATE POSTS IS EQUAL TO GATE LENGTH SHOWN ON PLANS

Fittings

Gate Frame

Length of Gate Leaf

Truss Rods

Intermediate Member

Truss Rods

Hinge

Post Top

Gate Post

Repeate Opposite Side

Latch

Stretcher Bar

Fastener

Plunger Bar

Gate Stop

10" Diameter Stop Footing

Omit if Roadway is Concrete

Half Elevation Double Swing Gate

Chain Link Vehicular Gate

NOTES:

1. All footings shall be 520-C-2500 concrete.

2. Extension post shall be furnished and installed only when shown on the plans or called for in the special provisions.

3. Chain link fence shall conform to the standard specifications for public works construction unless specifically noted on the drawing.

4. Chain link fabric shall have knuckled finish on top edge.

Legend on Plans

Chain Link Gate
NOTES
1. GATES THAT ARE ACCESSIBLE TO AND USABLE BY PERSONS WITH DISABILITIES SHALL BE PROVIDED WITH AT LEAST ONE INTERNATIONAL SYMBOL OF ACCESSIBILITY SIGN AS SHOWN ABOVE.

2. THE RUNNING AND CROSS SLOPE WITHIN THE LEVEL MANEUVERING CLEARANCE AREA SHALL BE 1.5% AND DESIGNED TO PREVENT WATER FROM ACCUMULATING WITHIN THE ENTIRE SURFACE.

3. IF THE GATE IS NOT SELF - CLOSING, PROVIDE ACCEPTABLE GATE HARDWARE ON BOTH SIDES.

4. PROVIDE 3/8" DIAMETER TENSION ROD AND TIGHTENER FOR GATES THAT ARE OVER 3' IN WIDTH.

5. IF PROVIDED, TIE FABRIC TOP AND FRAME WITH 11 GAUGE WIRE.

6. LATCHING AND LOCKING GATES THAT ARE HAND OPERATED SHALL BE OPERABLE WITH A SINGLE EFFORT NOT TO EXCEED 5-POUND PRESSURE.

7. THE SYMBOL CONTRAST ON SIGN SHALL BE LIGHT ON DARK OR DARK ON LIGHT.

8. MOUNTING HEIGHT - THE SIGN SHALL BE INSTALLED ON THE FENCE / WALL ADJACENT TO THE LATCH OUTSIDE OF THE DOOR. IT SHALL BE MOUNTED TO THE CENTERLINE OF THE ACCEPTED GATE HARDWARE. MOUNTING LOCATION SHALL BE DETERMINED SO THAT A PERSON MAY APPROACH WITHIN 3' OF SIGNAGE WITHOUT ENCOUNTERING PROTRUDING OBJECTS OR STANDING WITHIN THE SWING DOOR.

9. LANDING & APPROACH SPACE SHALL COMPLY WITH CURRENT CBC TITLE 24 AND ADA / ADAS.

CHAIN LINK PEDESTRIAN GATE
NOTES:

1. (W) THE WIDTH OF THE RAMPS THAT ARE PART OF THE MEAN OF EGRESS WILL ALSO HAVE TO MEET THE ADDITIONAL CODE REQUIREMENTS.

2. THE WIDTH AT THE BOTTOM LANDING SHALL BE AS WIDE AS THE RAMP.

3. SPECIFY THE LEAST POSSIBLE SLOPE BELOW THE MAXIMUM TO PROVIDE A CONSTRUCTION TOLERANCE AND TO OFFER BETTER USABILITY.

SEE ADDITIONAL NOTES ON SHEET 3
NOTE:
The height of the handrail shall be consistent at each ramp run.
RAMP:
1. ANY WALKING SURFACE THAT IS PART OF AN ACCESSIBLE ROUTE WITH THE SLOPE GREATER THAN 5% SHALL BE CONSIDERED A PEDESTRIAN RAMP AND MUST COMPLY WITH THE PEDESTRIAN RAMP STANDARDS.
2. THE LEAST POSSIBLE SLOPE SHALL BE USED WITHOUT EXCEEDING 7.7%, PER CITY OF SAN DIEGO ACCESS MEMO.
3. THE RUNNING SLOPE SHALL BE UNIFORM ALONG EACH RAMP SEGMENT.
4. CROSS SLOPE SHALL NOT EXCEED 1.5%.
5. LANDINGS SHALL HAVE A 1.5% SLOPE IN BOTH DIRECTIONS.
6. WALKING SURFACE MUST BE STABLE, FIRM, AND SLIP RESISTANT. CONCRETE SHALL HAVE A MEDIUM BROOM TRANSVERSE FINISH.
7. LANDINGS MUST BE DESIGNED TO PREVENT PONDING.
8. WHERE THE CHANGE OF SLOPE OCCURS, GRADE BREAKS MUST BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUNS TO PREVENT CROSS SLOPE ISSUES.

HANDRAIL:
1. HANDRAILS ARE REQUIRED ON BOTH SIDES OF A PEDESTRIAN RAMP.
   EXCEPTIONS:
   a. Ramps at exterior door landings that rise less than 6 inches or have less than 72 inches length. However, level landings shall be provided at the top and bottom.
   b. Ramps immediately adjacent to seating in assembly areas.
2. HANDRAILS SHALL BE CONTINUOUS FOR THE FULL LENGTH OF THE RAMP RUN PLUS THE EXTENSION.
3. INSIDE HANDRAILS AT "U" SHAPED AND "L" SHAPED RAMPS SHALL BE CONTINUOUS.
4. HANDRAILS SHALL EXTEND 12 INCHES MINIMUM BEYOND THE TOP, INTERMEDIATE AND BOTTOM OF EACH RAMP SEGMENT IN THE DIRECTION OF THE RAMP RUN, THE HANDRAIL EXTENTION SHALL BE PARALLEL TO THE LANDING SURFACE.
6. END OF HANDRAIL EXTENSION SHALL BE TURNED TO THE WALL, FLOOR OR POST.
7. END OF HANDRAIL EXTENSION SHALL BE TURNED TO THE FLOOR WHEN EXTENSION IS PROTRUDING PERPENDICULAR INTO PATH OF TRAVEL.
8. TOP GRIPPING SURFACE OF THE HANDRAIL SHALL BE UNIFORM IN HEIGHT. THE GRIPPING SURFACE SHALL BE CONTINUOUS AND SMOOTH (NO SHARP CORNERS).
9. THE GRIPPING PORTION SHALL BE 4 INCHES MIN TO 6-1/4 INCHES MAX PERIMETER DIMENSION, 1-1/4 INCHES TO 2-1/4 INCHES IN CROSS SECTIONAL NOMINAL DIMENSION OR SHAPED WITH EQUIVALENT GRIPPING SURFACE.
10. DESIGN AND SHOP DRAWINGS SHALL BE APPROVED BY THE CITY ENGINEER AND ACCESS COMPLIANCE OFFICER PRIOR TO FABRICATION.
11. ADJACENT WALL OR OTHER SURFACES SHALL BE FREE OF ANY SHARP OR ABRASIVE ELEMENT (SMOOTH FINISH).
13. PROVIDE A CONTINUOUS GUIDE CURB OR GUIDE RAIL IF POSTS ARE INSTALLED ON THE RAMP SURFACE OR IF THE FINISH SURFACE IS GREATER THAN 4 INCHES HIGHER THAN THE ADJACENT GROUND SURFACE.
14. FOR HANDRAIL AND GUARDRAIL MATERIAL, FINISHES AND ADDITIONAL DETAILS, SEE RELATED DETAIL DRAWINGS.
GENERAL NOTES:

1. ALL MARKED CROSSWALKS SHALL HAVE CONTINENTAL MARKINGS UNLESS APPROVED OTHERWISE.

2. MARKED CROSSWALK LOCATIONS CONSISTING OF BRICK PAVERS OR OTHER DECORATIVE PAVING SHALL BE PROVIDED WITH A LIMIT LINE ONLY.

3. SIGNALIZED INTERSECTIONS SHALL BE PROVIDED WITH A MARKED CROSSWALK ACROSS EACH LEG WHERE PEDESTRIANS ARE PERMITTED TO CROSS.

4. CONTINENTAL CROSSWALK MARKINGS SHALL BE ALIGNED PARALLEL TO THE DIRECTION OF VEHICULAR TRAVEL.

5. LIMIT LINES SHALL BE INSTALLED A MINIMUM OF 4 FEET IN ADVANCE OF MARKED CROSSWALKS FOR THE APPROACH LANES AT ALL CONTROLLED CROSSINGS.

6. MARKED CROSSWALKS SHOULD BE A MINIMUM OF 10 FEET IN WIDTH. PLACEMENT OF CONTINENTAL CROSSWALKS SHALL COMPLY WITH ACCESSIBILITY REGULATIONS PER THE MOST RECENT VERSION OF AMERICANS WITH DISABILITIES ACT (ADA) STANDARDS.

7. THE CROSSWALK BETWEEN A DUAL RAMP CORNER AND A SINGLE RAMP CORNER SHALL BE AT LEAST 10 FEET WIDE AND SATISFY THE MINIMUM OF 2 FEET BEYOND THE FLARE REQUIREMENT FOR THE SINGLE RAMP.

8. CONTINENTAL CROSSWALK BARS SHALL BE UNIFORM WITHIN THE SAME CROSSING. NO PARTIAL BARS SHALL BE INSTALLED.

9. A CROSSWALK BAR SHALL BE CENTERED IN THE CENTER OF THE CROSSING.

10. CROSSWALK MARKINGS SHALL BE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (CA-MUTCD) RETROREFLECTIVITY COMPLIANT AND SKID RESISTANT.
ON-STREET PARKING REQUIREMENTS:
1. WHERE ON-STREET PARKING IS PROVIDED ON THE BLOCK PERIMETER AND THE PARKING IS MARKED OR METERED, ACCESSIBLE PARKING SPACES SHALL BE PROVIDED IN ACCORDANCE WITH TABLE BELOW. WHERE PARKING PAY STATIONS ARE PROVIDED AND THE PARKING IS NOT MARKED, EACH 20'-0" FEET OF BLOCK PERIMETER WHERE PARKING IS PERMITTED SHALL BE COUNTED AS ONE PARKING SPACE.

2. MINIMUM REQUIRED PARKING RATIO FOR ACCESSIBLE PARKING SPACES.

<table>
<thead>
<tr>
<th>TOTAL NUMBER OF MARKED OR METERED PARKING SPACES ON THE BLOCK PERIMETER</th>
<th>MINIMUM REQUIRED NUMBER OF ACCESSIBLE PARKING SPACES</th>
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<tr>
<td>1-25</td>
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<tr>
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</table>

NOTES:
1. METERED PARKING INCLUDES PARKING METERED BY PAY STATIONS. WHERE PARKING ON PART OF THE BLOCK PERIMETER IS ALTERED, THE MINIMUM NUMBER OF ACCESSIBLE PARKING SPACES REQUIRED IS BASED ON THE TOTAL NUMBER OF MARKED OR METERED PARKING SPACES ON THE BLOCK PERIMETER.

2. VAN PARKING SPACE IS NOT REQUIRED ON-STREET.

3. REVERSE ANGLED PARKING SHALL FOLLOW THE SAME REQUIREMENTS AS STANDARD ANGLED PARKING.

OFF-STREET PARKING REQUIREMENTS:
1. WHERE PARKING IS PROVIDED ON EACH FACILITY (LOT OR STRUCTURE), ACCESSIBLE PARKING SPACES SHALL BE PROVIDED.

2. PARKING SPACES USED EXCLUSIVELY FOR BUSES, TRUCKS, OTHER DELIVERY VEHICLES, OR VEHICULAR IMPOUND SHALL NOT BE REQUIRED TO COMPLY WITH THE ACCESSIBLE PARKING RATIO IF THE LOTS ACCESS BY THE PUBLIC ARE PROVIDED WITH A PASSENGER DROP-OFF AND LOADING ZONE COMPLYING WITH PASSENGER LOADING ZONE STANDARDS. SEE SDM-117 SHEET 9.

A. MINIMUM REQUIRED PARKING RATIO FOR ACCESSIBLE PARKING SPACES

<table>
<thead>
<tr>
<th>TOTAL NUMBER OF PARKING SPACES PROVIDED IN PARKING FACILITY</th>
<th>MINIMUM NUMBER OF REQUIRED ACCESSIBLE PARKING SPACES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-25</td>
<td>1</td>
</tr>
<tr>
<td>26-50</td>
<td>2</td>
</tr>
<tr>
<td>51-75</td>
<td>3</td>
</tr>
<tr>
<td>76-100</td>
<td>4</td>
</tr>
<tr>
<td>101-150</td>
<td>5</td>
</tr>
<tr>
<td>151-200</td>
<td>6</td>
</tr>
<tr>
<td>201-300</td>
<td>7</td>
</tr>
<tr>
<td>301-400</td>
<td>8</td>
</tr>
<tr>
<td>401-500</td>
<td>9</td>
</tr>
<tr>
<td>501-1000</td>
<td>2% OF TOTAL</td>
</tr>
<tr>
<td>1,001 AND OVER</td>
<td>20, PLUS 1 FOR EACH 100, OR FRACTION THEREOF, OVER 1000</td>
</tr>
</tbody>
</table>

EXCEPTIONS:
1. 10% OF THE TOTAL NUMBER OF PARKING SPACES AT OUTPATIENT UNITS AND FACILITIES SHALL BE ACCESSIBLE.

2. 20% OF THE TOTAL NUMBER OF PARKING SPACES AT UNITS AND FACILITIES SPECIALIZING IN TREATMENT OR SERVICES FOR PERSONS WITH MOBILITY IMPAIRMENTS SHALL BE ACCESSIBLE.

B. THE REQUIRED PARKING RATIO FOR ACCESSIBLE PARKING STALLS IS PROVIDED FOR EACH PARKING LOT ON THE SITE.

C. AT LEAST ONE VAN PARKING SPACE IS REQUIRED FOR EVERY SIX OR FRACTION OF SIX PARKING SPACES.

D. IN BUILDINGS OR FACILITIES WITH MULTIPLE ACCESSIBLE ENTRANCES WITH ADJACENT PARKING SPACES SHALL BE DISPERSED AND LOCATED CLOSEST TO THE ACCESSIBLE ENTRANCES. A VAN ACCESSIBLE SPACE SHALL BE PROVIDED AT EACH LOCATION.

3. VERTICAL CLEARANCE - PARKING SPACES FOR VANS AND THEIR ADJACENT ACCESS AISLE AND VEHICULAR ROUTES SERVING THEM SHALL PROVIDE A VERTICAL CLEARANCE OF 8'-2" MINIMUM.
4. THE SURFACE OF THE ENTIRE AREA OF THE ACCESSIBLE PARKING SPACE(S) AND ACCESS AISLE(S) SHALL HAVE A SLOPE OF 1.5% IN ANY DIRECTION.

A. GUTTERS AND SWALES SHALL NOT BE INCLUDED IN THE OVERALL DIMENSIONS OF THE ACCESSIBLE PARKING SPACES AND ACCESS AISLES, UNLESS SLOPE AND CROSS SLOPE IS 1.5% MAXIMUM.

B. THE SURFACE SLOPE OF THE AREA IMMEDIATELY SURROUNDING THE ACCESSIBLE PARKING SPACE SHALL BE 1.5% FOR A WIDTH OF 4'-0".

C. ADEQUATE DRAINAGE SHALL BE PROVIDED SO THAT WATER DOES NOT ACCUMULATE WITHIN THE ACCESSIBLE PARKING SPACE AND ACCESS AISLE.

D. THE GUTTER SLOPE AT THE OPENING OF THE CURB RAMPS SERVING THE ACCESS AISLES SHALL BE 1.5%.

5. ACCESS AISLES (LOADING AND UNLOADING AREAS) SHALL BE PROVIDED FOR SINGLE AND DOUBLE ACCESSIBLE PARKING SPACES.

A. THE ACCESS AISLE SHALL BE CONNECTED TO AN ACCESSIBLE ROUTE.

B. FOR REGULAR ACCESSIBLE SPACE, THE ACCESS AISLE SHALL BE ON EITHER SIDE OF THE VEHICLE WHEN THE VEHICLE IS GOING FORWARD INTO THE PARKING SPACE.


D. THE CURB RAMP MAY NOT ENCROACH INTO THE REQUIRED DIMENSIONS FOR THE ACCESSIBLE PARKING SPACE AND ACCESS AISLE.

E. CURB RAMPS SERVING THE ACCESS AISLES SHALL COMPLY WITH THE APPLICABLE CURB RAMP STANDARDS.

6. A WHEEL STOP SHALL BE REQUIRED IF THE WIDTH OF THE SIDEWALK OR WALKWAY IS LESS THAN 6'-0". A WHEEL STOP SHALL NOT BE INSTALLED AT ON-STREET PARKING.

7. PARKING SPACES AND ACCESS AISLES SHALL BE DESIGNED SUCH THAT A PEDESTRIAN IS NOT REQUIRED TO TRAVEL BEHIND A PARKING SPACE OTHER THAN TO PASS BEHIND THE PARKING SPACE FOR THEIR PARKED VEHICLE.

8. SIGNAGE:

A. PAVEMENT PARKING SIGNS SUCH AS THE INTERNATIONAL SYMBOL OF ACCESSIBILITY (ISA) AND "NO PARKING" AT THE ACCESS AISLES SHALL BE PLACED SO THAT THEY ARE VISIBLE TO TRAFFIC ENFORCEMENT OFFICIALS WHEN THE VEHICLE IS PARKED PROPERLY. SEE DETAIL ON SDM-117 SHEET 5.

B. WHEN POSTED WITHIN THE CIRCULATION PATH, THE SIGN SHALL BE MOUNTED 7'-0" MINIMUM ABOVE THE FINISH FLOOR TO THE BOTTOM OF THE SIGN PER SDM-104.

IF INSTALLED ON A WALL, THE SIGN MAY BE CENTERED ON THE WALL AT THE INTERIOR END OF THE PARKING SPACE 5'-0" ABOVE GRADE TO THE BOTTOM OF THE SIGN.

C. A TOW AWAY SIGN SHALL BE INSTALLED AND VISIBLE AT EACH ENTRANCE TO THE OFF STREET PARKING FACILITY OR IMMEDIATELY ADJACENT TO THE ACCESSIBLE PARKING SPACE.


10. REVERSE ANGLED PARKING SHALL FOLLOW THE SAME REQUIREMENTS AS STANDARD ANGLED PARKING.
PASSenger Drop-off and Loading Zone (On-Street and Off-Street):

1. Where provided, at least one accessible passenger drop-off and loading zone shall be accessible.

2. An accessible passenger drop-off and loading zone shall be provided in every continuous 100 linear feet of loading space, or fraction thereof.

3. Vehicle pull-up space - passenger drop-off and loading zones shall provide a vehicular pull-up space 8'-0" wide minimum and 20'-0" long minimum.

4. Access aisle - passenger drop-off and loading zones shall be provided with access aisles adjacent and parallel to the vehicle pull-up space.
   A. Access aisle shall be 5'-0" wide minimum and extend the full length of the vehicle pull-up space.
   B. Access aisles shall connect directly to an accessible route and shall not overlap the vehicular way.
   C. Access aisles shall be marked as required for all access aisles.

5. Vehicle pull-up spaces and access aisles serving them shall be at the same level as the vehicle pull-up spaces they serve. Any changes in elevation shall be served by a curb ramp(s).

6. Vehicle pull-up space and access aisle slopes shall be 1.5% in any direction. Adequate drainage shall be provided so that water does not pond in the access aisle.

7. Off-street vehicle pull-up space and access aisle slopes shall be 1.5% in any direction.

8. On-street vehicle pull-up space and access aisle running slope may follow the existing slope of the street cross slope shall be 1.5% maximum at the access aisle, except that at the pull-up space the 1.5% cross slope will be required to the maximum extent feasible.

H. Adequate drainage shall be provided so that water does not pond in the access aisle.

5. A minimum of 9'-6" vertical clearance shall be provided at accessible passenger drop-off and loading zones and along at least one vehicle access route to such areas from site entrance(s) and exit(s).

6. Passenger loading zones shall be identified by a reflectorized sign posted immediately adjacent to and visible from the passenger drop-off and loading zone stating "Passenger Loading Zone Only".
   A. When located in a path of travel, the sign shall be mounted per SDM-104.

7. Parking facilities that provide valet parking services shall provide at least one accessible passenger loading zone.
KEY NOTES:

1. 18'-0" LONG MIN. TO EDGE OF GUTTER OR 18'-0" LONG MIN. TO THE EDGE OF CURB IF GUTTER HAS 2% MAX SLOPE.

2. 4" HATCHED DIAGONAL LINES AT 3'-0" MAX. ON-CENTER PAINTED A CONTRASTING COLOR WITH THE PARKING SURFACE (WHITE ON ASPHALT, BLUE ON CONCRETE).

3. ACCESS AISLE WIDTH: 5'-0" MINIMUM FOR VAN AND REGULAR SPACE. IN EXISTING CONDITIONS, AN 8'-0" ACCESS AISLE AND 9'-0" VAN SPACE SHALL BE PERMITTED.

4. "NO PARKING" SIGN SEE DETAIL ON SDM-117 SHEET 5

NOTE:
SEE SHEETS 1 AND 2 FOR ACCESSIBLE PARKING NOTES.

ACCESSIBLE PARKING (OFF-STREET)
1. The ISA shall be painted white on a blue background. The color blue shall match FS 15090 in the Federal Standard 595C. A border may be provided inside or outside of the minimum required ISA dimension.

2. The location of the ISA shall be visible to a traffic enforcement officer when the vehicle is stationed in the parking space.

International Symbol of Accessibility (ISA) Pavement Marking

Notes:
1. The ISA shall be painted white on a blue background. The color blue shall match FS 15090 in the Federal Standard 595C. A border may be provided inside or outside of the minimum required ISA dimension.

2. The location of the ISA shall be visible to a traffic enforcement officer when the vehicle is stationed in the parking space.

International Symbol of Accessibility (ISA) Pavement Marking

Notes:
1. The words "NO PARKING" shall be located at the end of the access aisle so that it is visible to traffic enforcement officials.

2. The letters shall be no less than 12" high and painted in white letters on a blue background. The color blue shall match FS 15090 in the Federal Standard 595C.

"NO PARKING" Pavement Marking

Notes:
NOTES:

1. SIGN POST: SEE SDM-104 FOR "BREAK-AWAY SIGN POST".

2. SIGNS SHALL BE CONSTRUCTED ON MINIMUM 1/16" THICK ALUMINUM.

3. COLORS:

   PARKING SIGNS:
   BACKGROUND - BLUE (RETROREFLECTIVE)
   BORDER, TEXT, AND SYMBOL - WHITE (RETROREFLECTIVE)

   TOW AWAY SIGN:
   BACKGROUND - WHITE (RETROREFLECTIVE)
   BORDER AND LEGEND - BLACK

4. FONTS: SAN SERIF CLEARVIEW, 1" MIN LETTER HEIGHT

5. THE BOTTOM OF THE LOWEST SIGN SHALL BE AT LEAST 7'-0" OR HIGHER TO THE WALKING SURFACE OR 5'-0" IF INSTALLED ON A WALL.

6. SEE SHEET 2 FOR ADDITIONAL NOTES.

ACCESSIBLE PARKING (SIGNS)

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR - R.E. 56293
DATE: 9/17/18

DRAWING NUMBER: SDM-117

REVISION   BY   APPROVED   DATE
ORIGINAL   KA J. NAGELVOORT   07/12
UPDATED   FC J. NAGELVOORT   02/16
UPDATED   FC J. NAGELVOORT   09/18
**KEY NOTES:**

1. 18'-0" LONG MIN TO EDGE OF GUTTER OR 18'-0" LONG MIN TO THE EDGE OF CURB IF GUTTER HAS 2% MAX SLOPE.
2. 4" HATCHED DIAGONAL LINES AT 3'-0" MAX ON-CENTER PAINTED A CONTRASTING COLOR WITH THE PARKING SURFACE (WHITE ON ASPHALT, BLUE ON CONCRETE).
3. "NO PARKING" SIGN
4. "NO PARKING" SIGN
5. DIMENSION IS BASED OFF THE CITY'S TRAFFIC ENGINEERING AND OPERATIONS ANGLE PARKING GUIDELINES AND THE LENGTH SHALL VARY BASED ON THE ANGLE AND TYPE OF STREET. THE DIMENSION SHALL BE TAKEN FROM FACE OF CURB, NOT EDGE OF GUTTER.

**NOTES:**

1. NO ACCESSIBLE PARKING SPACE OR ACCESS AISLE SHALL BE WITHIN 15'-0" OF A FIRE HYDRANT.
2. IN THE RED CURB CLEARANCE TABLE, THE MINIMUM RED CURB LENGTH FOR A 90° ANGLED PARKING SPACE VARIES BASED ON LOCATION, SIGHT VISIBILITY, AND OTHER FACTORS. CONTACT THE CITY'S TRAFFIC ENGINEERING AND OPERATIONS DIVISION FOR ASSISTANCE.
3. SEE SHEETS 1 AND 2 FOR ADDITIONAL NOTES.

**RED CURB CLEARANCE TABLE**

<table>
<thead>
<tr>
<th>ANGLE</th>
<th>MINIMUM RED CURB/CLEARANCE FROM INTERSECTION/DRIVEWAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>39'50'</td>
<td>20'-0&quot;</td>
</tr>
<tr>
<td>45'</td>
<td>18'-0&quot;</td>
</tr>
<tr>
<td>50'</td>
<td>15'-0&quot;</td>
</tr>
<tr>
<td>55'</td>
<td>13'-0&quot;</td>
</tr>
<tr>
<td>60'</td>
<td>11'-0&quot;</td>
</tr>
<tr>
<td>90'</td>
<td>6'0&quot; MIN. TO 10'-0&quot; MAX.</td>
</tr>
</tbody>
</table>

**ACCESSIBLE PARKING (ON-STREET)**
NOTES:

1. SEE SHEETS 1 THROUGH 3 OF SDM-117 FOR ACCESSIBLE PARKING NOTES.

2. AN ACCESS AISLE IS NOT REQUIRED WHERE THE WIDTH OF THE ADJACENT SIDEWALK OR THE AVAILABLE ROW IS LESS THAN 10'-0". WHEN AN ACCESS AISLE IS NOT PROVIDED, PARKING SHALL BE LOCATED AT THE END OF THE BLOCK FACE.

3. THE WIDTH OF THE ACCESSIBLE SPACE SHALL BE THE SAME WIDTH AS THE ADJACENT MARKED REGULAR SPACE. IF THE WIDTH OF THE REGULAR SPACE(S) IS NOT MARKED, THEN THE WIDTH OF THE ACCESSIBLE SPACE SHALL BE 8'-0" MIN. TO 9'-0" MAX. WITHOUT REDUCING THE WIDTH OF THE TRAFFIC LANE.

4. INCLUDE THE FOLLOWING INFORMATION ON THE STRIPING PLAN OR DETAIL:
   A. TOTAL NUMBER OF EXISTING ON-STREET PARKING SPACES
   B. TOTAL NUMBER OF EXISTING ON-STREET ACCESSIBLE PARKING SPACES
   C. TOTAL NUMBER OF NEW ON-STREET PARKING SPACES
   D. TOTAL NUMBER OF REQUIRED ON-STREET ACCESSIBLE PARKING SPACES BLOCK PERIMETER
   E. TOTAL NUMBER OF ON-STREET ACCESSIBLE PARKING SPACES PROVIDED

ON-STREET PARALLEL PARKING

PARALLEL PARKING AT END OF BLOCK FACE

PARALLEL PARKING AT MID-BLOCK FACE

ON-STREET PARALLEL PARKING
NOTES:
1. IF THE GUTTER SLOPE IS GREATER THAN 2%, THE ACCESS AISLE AND PULL-UP SPACE WIDTH SHALL BEGIN FROM THE GUTTER EDGE INSTEAD OF FLOWLINE.
2. SEE SHEET 3 FOR ADDITIONAL NOTES.

KEY NOTES:
1. ACCESSIBLE PASSENGER DROP-OFF AND LOADING ZONE SIGN (1'-8" X 1'-6") - BLACK LETTERING ON WHITE BACKGROUND.
2. 6" WHITE PAINTED CURB AND CURB FACE (STENCILED WITH 4" BLACK SANS SERIF CLEARVIEW, 3" MIN "PASSENGER LOADING ZONE").
3. 4" WIDTH WHITE STRIPING AT 3'-0" O.C. AND 45° TO CURB FACE.
4. VEHICLE ACCESS AISLE
   A. OFF-STREET - SLOPES SHALL NOT EXCEED 1.5% IN ANY DIRECTION.
   B. ON-STREET - CROSS SLOPE SHALL NOT EXCEED 1.5%. THE RUNNING SLOPE MAY FOLLOW THE EXISTING SLOPE OF THE STREET.
5. CURB RAMP
6. DETECTABLE WARNING TILE PER SDG-130
7. THE SLOPE OF THE GUTTER WITHIN THE ACCESS AISLE SHALL NOT EXCEED 5%.
8. VEHICLE PULL-UP SPACE SHALL MEASURE 20'-0" X 8'-0".
   A. OFF-STREET PULL-UP SPACE - SLOPES SHALL NOT EXCEED 1.5% IN ANY DIRECTION.
   B. ON-STREET PULL-UP SPACE - CROSS SLOPE SHALL BE 1.5% IF FEASIBLE (OTHERWISE TO THE MAXIMUM EXTENT). THE RUNNING SLOPE MAY FOLLOW THE EXISTING SLOPE OF THE STREET.
9. 4'-0" X 5'-0" LEVEL LANDING
10. PROTECTIVE RAILING PER SDG-140
11. ALL DEVIATION FROM THIS STANDARD MAY BE ALLOWED PROVIDED THE DESIGN AND/OR DOCUMENTATION WAS REVIEWED BY THE CITY REPRESENTATIVE.
1. "X", THE TOP OF GRIPPING SURFACE OF HANDRAILS SHALL BE THE SAME HEIGHT VERTICALLY ABOVE WALKING SURFACES, STAIR NOSINGS, AND LANDING SURFACES. HANDRAILS SHALL BE AT A CONSISTENT HEIGHT ABOVE WALKING SURFACES, STAIR NOSINGS, AND LANDING SURFACES. SPECIFY ONE HEIGHT DIMENSION BETWEEN 34" AND 38".

2. BOTTOM AND TOP LANDINGS SHALL BE AS WIDE AS THE WIDTH OF THE STAIR, 48" MINIMUM.
RAILING NOTES

1. 1/4" EXPANSION JOINTS @ 16' ON CENTER.
2. WELD AND GRIND SMOOTH ALL CONNECTIONS.
3. ALL RAILING TO BE HOT DIP GALVANIZED AFTER FABICATION.
4. PIPE SHALL BE SEAMLESS STEEL ASTM A53 GRADE B.
5. INSTALL HANDRAILS ON BOTH SIDES.
6. STAIRS AND LANDINGS THAT ARE OPEN ON ONE OR BOTH SIDES AND MORE THAN 30" ABOVE THE ADJACENT GROUND SHALL BE PROVIDED WITH GUARDRAIL.
SECTION B-B

NOTES
1. BROOM FINISH ON TREADS, TROWEL FINISH ON ALL OTHER EXPOSED SURFACES.
2. 1/4" PER 1' SLOPE ON TREADS FOR DRAINAGE.

SECTION A-A
CONCRETE STEPS
### Elevation

<table>
<thead>
<tr>
<th>Description</th>
<th>Min. Size in Inches</th>
<th>Min. Weight Per Lin Ft in Lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Post</td>
<td>2.375 IN OD</td>
<td>3.65LBS</td>
</tr>
<tr>
<td>Terminal Post</td>
<td>2.875 IN OD</td>
<td>5.79LBS</td>
</tr>
<tr>
<td>Top Rail</td>
<td>1.660 IN OD</td>
<td>2.27LBS</td>
</tr>
<tr>
<td>Bracing</td>
<td>1.660 IN OD</td>
<td>2.27LBS</td>
</tr>
<tr>
<td>Gate Frame</td>
<td>1.660 IN OD</td>
<td>2.27LBS</td>
</tr>
</tbody>
</table>

### Note:
1. Chain Link fabric shall be erected on the interior side of the courts.
2. Chain Link fabric shall have knuckled finish on top edge.

### Caution:
This standard drawing is not to be used if any wind screen is to be applied to the fence.

---

**Description:**

- **Top Rail**: TIES @ 14"
- **Terminal Post**: TIES @ 18" OD
- **Bracing**: LATCH (WITH LOCKING DEVICE)
- **Gate Frame**: STRETCHER BAR
- **Select Fill**: EDGE BEAM*
- **Reinforcing**: TENSION WIRE
- **Existing Slab**: 13 1/2" SQUARE OR 15" CIRCULAR 520-C-2500 CONCRETE FOOTING

*For edge beam, slab, and select fill details, see plans.
POST KNOCKOUT PLAN DETAIL
SECTION A-A

NOTES:

1. THIS STANDARD DRAWING SHALL BE USED WHEN GUARDRAIL IS INSTALLED ADJACENT TO CURB, GUTTER, AND SIDEWALK. THE POST KNOCKOUT DETAIL DOES NOT APPLY WHEN GUARDRAIL IS INSTALLED IN A PARKWAY.

2. SEE CALTRANS STANDARD PLANS FOR ADDITIONAL GUARDRAIL DETAILS.
NOTES

1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 35B.
   Cover 147 lbs – 171 lbs.
3. Machine all matching surfaces and seats of frame and cover to prevent rocking.
4. Imported frames and covers shall have the country of origin marked in compliance with federal regulations.

© FOR MARK
Sewer Projects Sewer
Storm Drain Projects Storm Drain
Water Projects Water
NOTES
1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 30.
2. Frame and cover for use in non-traffic area only.
   Cover 95 lbs – 110 lbs.
4. Imported frames and covers shall have the country of origin marked in compliance with federal regulations.

<table>
<thead>
<tr>
<th>FOR</th>
<th>MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewer Projects</td>
<td>Sewer</td>
</tr>
<tr>
<td>Storm Drain Projects</td>
<td>Storm Drain</td>
</tr>
<tr>
<td>Water Projects</td>
<td>Water</td>
</tr>
</tbody>
</table>

SAN DIEGO REGIONAL STANDARD DRAWING

24" MANHOLE FRAME AND COVER
LIGHT DUTY
NOTES
1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 35B.
   Outer Cover 285 lbs – 330 lbs.
   Inner Cover 147 lbs – 171 lbs.
3. Machine all matching surfaces and seats of frame and cover to prevent rocking.
4. Imported frames and covers shall have the country of origin marked in compliance with federal regulations.
Notes:
1. Posts to be structural grade redwood or pressure treated (with wood preservative) Douglas Fir, surfaced four sides; cross pieces to be 2"x8" select grade Douglas Fir, surfaced four sides.
2. All exposed portions of barricades shall be painted with two coats of white exterior enamel over prime coat.
3. Connections shall be made with 3/8" x 6" galvanized lag screws with one (1) washer each.
4. Reflector sign fasteners to be 3/8" x 1 1/2" galvanized lag screws.
5. Reflector signs—California Type N. Size 18" x 18"—Yellow with nine (9) 3 1/4" reflectors (center mount).
   a. Reflectors shall be red for use on dead end streets, in all other cases they shall be yellow.
   b. Reflector material shall be plastic or other approved reflectorized material.
6. 6' long hat section metal post per Caltrans Std. Plan A74-A optional for guard post.

LEGEND ON PLANS

Barricade
Guard Post

SAN DIEGO REGIONAL STANDARD DRAWING

GUARD POST AND BARRICADE
SLOPE SURFACE OF GROUT PAD TO DRAIN AWAY FROM COVER, AND TO MEET EXISTING GRADE.

ALTERNATION LOCATION OF MONUMENT, TIE DISTANCES SHOWN ON FINAL SUBDIVISION MAP IF ALTERNATE LOCATION IS USED
SEE ADDITIONAL STREET SURVEY MONUMENT NOTES ON M-10B

BRICK SUPPORT ALL AROUND ON 2" SAND BASED

TYPICAL MONUMENT
SECTION IN PAVED AREA
RISER RING WELDED TO EXISTING RING

2" min

1 1/4"

C.I.

3.5" MIN CONCRETE ENCASEMENT

RISER RING WELDED IN PLACE

AC PAVEMENT
CI FRAME

1/4"

PCC PAVEMENT

GROUT AROUND BOX

3" MIN

1/4"

PAVEMENT

10 1/4" DIA

PRECAST CONCRETE PIPE BOX

8" DIA

560-C-3250 CONCRETE

36"

BRICK SUPPORT ALL AROUND ON 2" SAND BASE.

TYPICAL MONUMENT
SECTION IN PAVED AREA

24" MIN

1/2" DIA LIFT HOLE

CI

12" MIN RADIUS CONCRETE ENCASEMENT

6" THICK GROUT PAD

SLOPE SURFACE OF GROUT PAD TO DRAIN AWAY FROM COVER, AND TO MEET EXISTING GRADE.

PLAN—IN UNPAVED AREA

ALTERNATION LOCATION OF MONUMENT. TIE DISTANCES SHOWN ON FINAL SUB-DIVISION MAP IF ALTERNATE LOCATION IS USED. SEE ADDITIONAL STREET SURVEY MONUMENT NOTES ON M-10B

LOCATION OF STREET SURVEY MONUMENT

SAN DIEGO REGIONAL STANDARD DRAWING

STREET SURVEY MONUMENT
OVERLAY ADJUSTMENT

NEW

T. Stanton

10/15

12/17/2015

Chairperson R.C.E. 19246

DRAWING NUMBER M-10B
NOTES

1. COVER AND FRAME TO BE CAST INTEGRALLY WITH PIPE BOX.
2. MONUMENT BASE MAY BE CAST IN PLACE OR PRECAST.
3. FORM AND TAPER EXPOSED UPPER 6" OF CAST-IN-PLACE BASE TO A TOP DIAMETER OF 5". (PRECAST BASE SHALL BE SAN BACKFILLED)
4. MONUMENT MARKER SHALL BE A DOMED BRASS, 3" IN DIAMETER.
5. MONUMENT LOCATION:
   A) SET ON ALL CENTERLINE INTERSECTIONS UNLESS ACTUAL LOCATION IS MODIFIED BY THE AGENCY AND SHOWN IN MODIFIED LOCATION ON MAP. WHEN CENTERLINE INTERSECTIO IS IMPRACTICAL, OFFSET 5' ON CENTERLINE OF MAJOR STREET, (SEE DETAIL AT RIGHT). IF NEITHER CENTERLINE CAN BE OCCUPIED, TWO MONUMENTS WILL BE SET IN LINE AROUND THE FRONT ON THE PERIMETER OF A 10' DIAMETER CIRCLE, WHOSE CENTER IS THE POINT.
   B) SET ON CENTERLINE AT INTERVALS NOT EXCEEDING 1000' ON STRAIGHT RUNS.
   C) SET ON CENTERLINE AT POINTS OF CURVATURE.
   D) SET ON CENTER AT CENTER POINTS OF CUL-DE-SACS.
   E) SET ON CENTERLINE WHEN CENTER POINT OF CUL-DE-SAC IS OFFSET FROM CENTERLINE.
   F) THESE STANDARDS MAY BE MODIFIED AT THE DISCRETION OF THE THE AGENCY IN CASES WHERE STRICT COMPLIANCE THEREWITH RESULTS IN MORE MONUMENTS THAN IT CONSIDERS NECESSARY. THE FOLLOWING TECHNIQUE FOR REDUCING THE NUMBER OF MONUMENTS WILL BE ROUTINE.
   G) SUBSTITUTION OF ONE MONUMENT ON THE "POINT OF INTERSECTION" FOR MONUMENTS AT THE "BEGINNING OF CURVE" AND THE "ENDING OF CURVE" WHEN THE "POINT OF INTERSECTION" FALLS WITHIN THE PAVEMENT AREA.
   H) DELETION OF ANY MONUMENT OTHERWISE REQUIRED BY THESE STANDARDS WHEN ITS POSITION CAN BE DETERMINED BY TURNING ONE ANGLE FROM A POINT ON A STRAIGHT LINE BETWEEN TWO OTHER MONUMENTS, PROVIDING SUCH POINT IS NOT MORE THAN 300' FROM THE POINT ON WHICH THE DELETED MONUMENT WOULD HAVE BEEN PLACED.
   I) FOR RAISING STREET SURVEY MONUMENT TO FINISH GRADE, RISER RING IS TO BE WELDED TO EXISTING RING AND BROUGHT TO SURFACE. ENCASE RISER RING IN FAST SETTING CONCRETE WITH A MINIMUM OF 3.5" THICKNESS. CONCRETE MUST OBTAIN 1600 PSI BEFORE TRAFFIC USE, AND HAVE A MINIMUM STRENGTH OF 3200 PSI.
NOTES
1. Material—Brass A.S.T.M. B-16. All machine tolerances ±1/64" machine finish.
2. May be installed in fresh concrete at time of installation of concrete structure.
3. Location—in most stable, permanent location in vicinity, such as in base for street light standard or traffic signal (behind sidewalk), in curb (not near joint, on curve or near trees), on top of drainage headwall, in foundation for building
LEGEND

MEAN HIGH WATER = Mean of all high water in San Diego Bay.
MEAN HIGHER WATER = Mean of all higher water in San Diego Bay.

Bay charts and topography up to the mean high tide based on zero at the mean lower low water.

SOURCE

Data based on U.S.C. & G. "Sea level Datum of 1929".
FOUND MONUMENTS

Found monuments must denote the character of the monument, how it is identified and the record, or no record as applicable.

SET MONUMENTS – Criteria for Locating and Character

On subdivision boundaries, permanent monuments are required; and must be shown on the map at intervals as specified by the local agency. The location of such points that are unacceptable or will be destroyed by construction may be established by ties to permanent reference monuments shown on the final map.

A permanent monument shall be no less substantial than the following:

a. An iron pipe of minimum two inch diameter not less than 2' in length placed upright in the ground so that the top of said pipe is flush with the surface. Said pipe shall be filled with a metal or cement plug at least three inches in depth and centered with a metal tack and disc; or

b. A metal plug with tack and disc set flush with the surface in portland cement concrete sidewalk, curb or pavement; or other monument satisfactory to the City Engineer or County Surveyor. The metal plug shall be anchored 1" deep in sidewalk.

Lot corners and points of curves along street and alley right of way lines where portland cement concrete sidewalks, curbs or pavement exist, or will be constructed as part of the subdivision requirements, shall be identified with tack and disc set flush with the surface along an extension of the lot line at an approved offset, to be measured radially or at right angles to the right of way line in said sidewalk, curb pavement. In case the sideline of the lot is not radial or at right angles to the right of way line a disc shall be set along an extension of the sideline at an offset to be measured radially or at right angles to the right of way line. Where no such concrete work exists, and none will be required to be constructed, all lot corners, angle points and points of curve shall be marked with a monument no less substantial than a one-half inch steel rod or pipe, 18" long, set flush with the surface.

LEGEND

- Fd 2" Iron Pipe Marked RCE XXXX or per Map XXX unless otherwise noted
- Fd Street Survey Monument Stamped RCE XXXX or LS XXXX
- Set 2" x 24" Iron Pipe Marked RCE XXXX or LS XXXX
- Set Lead and Disc Stamped RCE XXXX or LS XXXX
- Set ½" x 18" Iron Pipe Marked RCE XXXX or LS XXXX
- Set Street Survey Monument Stamped RCE XXXX or LS XXXX per Standard Drawing M-10

The addition of other symbols is permissible where such will result in a clearer map.

The following notes should be used in the legend where applicable.

Unless otherwise shown on this map:

1. All lot corners except as described below will be monumented by a ½" by 18" iron pin stamped (RCE or LS number).

2. Lot corners along the sideline of dedicated street right of way will be monumented by a disc stamped (RCE or LS number), set along an extension of the lot line at an offset of ___ in the (curb, sidewalk). The offset shall be measured radially, or at right angles, to the right of way line. (See example below.)

3. All points of curve of the sidelines of dedicated streets will be monumented by a disc stamped (RCE or LS number), set at an offset of ___ in the (curb, sidewalk). The offset shall be measured radially.

EXAMPLE OF OFFSET DISCS
1 Gram = 15.4324 grains
1 Gram = 0.0353 oz.
1 Kg. = 2.2046 lb.
1 Kg. = 0.0011 ton
1 Ton (met) = 1.1023 ton

1 Grain = 0.0648 g.
1 Ounce = 28.3495 g.
1 Pound = 0.4536 kg.
1 Ton = 907.1848 kg.

1 Sq. cm. = 0.1550 sq. in.
1 Sq. m. = 10.7639 sq. ft.
1 Sq. m. = 1.1960 sq. yd.
1 Hectare = 2.4710 acres
1 Sq. km. = 0.3861 sq. mile
1 Sq. km. = 247.10 acres

1 Sq. in. = 6.4516 sq. cm.
1 Sq. ft. = 0.0929 sq. m.
1 Sq. yd. = 0.8361 sq. m.
1 Acre = 0.4047 hectare
1 Sq. mile = 2.5900 sq. km.
1 Acre = 0.0040 sq. km.

1 Cu. cm. = 0.0610 cu. in.
1 Cu. m. = 35.3134 cu. ft.
1 Cu. m. = 1.3079 cu. yd.

1 Cu. in. = 16.3872 cu. cm.
1 Cu. ft. = 0.0283 cu. m.
1 Cu. yd. = 0.7646 cu. m.

1 Liter = 61.0250 cu. in.
1 Liter = 0.0353 cu. ft.
1 Liter = 0.2642 gal. (U.S)
1 Liter = 0.0284 Bu.

1 Cu. in. = 0.0164 liter
1 Cu. ft. = 28.3162 liters
1 Gal. = 3.7853 liters
1 Bu. = 35.2383 liters

1 MM. = 0.0394 in.
1 CM. = 0.3937 in.
1 Meter = 3.2808 ft.
1 Meter = 1.0936 yd.
1 Km. = 0.6214 mile

1 In. = 25.4000 mm.
1 In. = 2.5400 cm.
1 Ft. = 0.3048 m.
1 Yd. = 0.9144 m.
1 Mile = 1.6093 km.

MULTIPLE PREFIX
1000000 mega
1000 kilo
100 hecto
10 deka

MULTIPLE PREFIX
1/10 deci
1/100 centi
1/1000 milli
1/1000000 micro

TEMPERATURE

Degrees Fahrenheit = 9/5 (Degrees Celsius) + 32

Degrees Centigrade = 5/9 (Degrees Fahrenheit - 32)
1/4" Steel Plate welded to top (burrs removed).

1/2" Expansion Joint
Back of curb or joint in walk

Concrete to be same as walk

4" Diameter Steel Pipe

5" Diameter Steel Pipe Sleeve

18" Diameter

NOTES
1. Chain to be 1/4” proof coil chain galvanized steel. Weld four links to post and three links to pipe sleeve.
2. All metal to be hot-dip galvanized after fabrication.
Horizontal brace with truss rod may be used as an alternate to a diagonal brace.

END AND CORNER POST ASSEMBLY

Line posts at 1000’max. intervals braced and trussed in both directions.

LINE POST BRACING

Gate post

Gate panel

Length as specified

Gate

8’ Max.

Vertical stay

Latch post

Diagonal brace or horizontal brace with truss rods

GATE ASSEMBLY

Portland cement concrete
SIDEWALK NEXT TO CURB

SIDEWALK NEXT TO PROPERTY LINE

SIDEWALK NEXT TO CURB AND PROPERTY LINE

NOTES
1. Sidewalk shall have a minimum of 4' clear area (path, not including curb) passing pedestals, pullboxes and other structures.

CHAPTER 8
RECYCLED WATER SYSTEMS
NOTES:

1. (*) INDICATES MINIMUM RELATIVE COMPACtion. IT SHALL BE 95% MIN IN THE TOP FOOT.

2. MINIMUM COVER: 4' FOR RECYCLED WATER MAIN.

3. RECYCLE WATER PIPE SHALL BE PURPLE COLOR CODED INTEGRALLY STAMPED OR MARKED AS "CAUTION - RECYCLED WATER - DO NOT DRINK".

4. WARNING / IDENTIFICATION METAL TAPE SHALL BE PLACED AT 4' BELOW TRENCH CAP AND 12" BELOW FINISH GRADE IN UNIMPROVED STREETS.

5. THE TERM RECLAIMED WATER IS THE SAME AS THE TERM RECYCLED WATER.

6. 1' SAND CUSHION OR A 6" MINIMUM SAND CUSHION WITH 1" NEOPRENE PAD SHALL BE PLACED FOR ALL CROSSINGS UTILITIES WHEN VERTICAL CLEARANCE IS 1' OR LESS. THE NEOPRENE PAD SHALL BE PLACED ON THE MOST FRAGILE UTILITY.
IN STALLATION AND MARKING

2” RECYCLED WATER SERVICE

NOTES:
1. INSTALL CORPORATION STOP WITH KEY IN THE SIDE POSITION.
2. SET TOP OF METER BOX FLUSH WITH SIDEALK, CURB, OR FINISH GRADE.
3. LOCATE METER BOX AS SHOWN ON WS-03.
4. INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.
5. WATER LATERALS INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS.
6. SILVER SOLDER JOINTS SHALL NOT BE USED.
7. ON STEEL MAINS, USE WELD ON COUPLINGS. ON DUCTILE IRON, MAINS, USE DUCTILE IRON SERVICE SADDLES.
8. TOP TAPS ARE NOT PERMITTED, AND ANY GLUE JOINTS SHALL BE BEVELED PRIOR TO ASSEMBLY.
9. NO RECYCLED WATER SHALL ENTER INTO THE STORM DRAIN.
10. FOR STEEL AND DI MAINS, INSTALL DIELECTRIC UNION AFTER CORPORATION STOP.
11. WAX TAPE FROM MAIN TO 3” PAST DIELECTRIC UNION, INCLUDING SADDLE.

ITEM NO. | SIZE AND DESCRIPTION |
---|---|
1 | SIZE x 2” BRONZE SERVICE SADDLE (DOUBLE STRAP) |
2 | RECYCLED WATER MAIN |
3 | 2” BRONZE CORPORATION STOP |
4 | 2” x REQUIRED LENGTH COPPER PIPE TYPE “K” SOFT/RIGID OR UNLESS OTHERWISE SPECIFIED. |
5 | 3/8” ROCK, 4” TO 6” DEEP |
6 | 2” BRONZE ANGLE METER STOP WITH LOCKWING |
7 | WATER METER FURNISHED AND INSTALLED BY THE CITY |
8 | METER BOX WITH LID, 17"x 30" |
9 | CUSTOMER SHUT-OFF VALVE (LOCKABLE) |
10 | 2” COPPER DIELECTRIC UNION. REQUIRED FOR STEEL OR DI MAINS. |
NOTES:

1. FOR ALL RECYCLED WATER SERVICE READING LID OF METER BOX SHALL BE PAINTED WITH PURPLE PANTONE #522 FOR ALL RECYCLED WATER SERVICE.

2. METER AND VALVES SHALL BE LABELED OR TAGGED TO INDICATE RECYCLED WATER.
NOTES:

1. PROVIDE HEXAGON TYPE VALVE STEM EXTENSION IF DEPTH TO VALVE NUT EXCEEDS 2'. SEE SDRW-106.

2. USE FOR H10 LOADING OR LESS.

3. TYPE 1 INSTALLATION APPLIES TO VALVES WITHIN ROADWAYS. TYPE 2 INSTALLATION APPLIES TO VALVES OUTSIDE ROADWAYS.
NOTES:

1. PROVIDE RECYCLED WATER VALVE KEY EXTENSION FOR ALL VALVES.
2. THE SURFACE OF THE VALVE WELL COVER SHALL MATCH THE STREET CROSS SLOPE AND PROFILE.
3. VALVE BOX AND COVER BASED ON SOUTH BAY FOUNDRY #1208N OR APPROVED EQUAL.
4. TYPE 1 INSTALLATION APPLIES TO VALVES WITHIN ROADWAYS.
   TYPE 2 INSTALLATION APPLIES TO VALVES OUTSIDE ROADWAYS.
5. SEE SDRW-106 FOR VALVE STEM EXTENSION.
CAST IRON COVER
WEIGHT = 15 lb

PLACE FOUNDRY STAMP ON INSIDE SURFACE OF COVER

CAST IRON VALVE WELL COVER
WEIGHT = 20 lb MIN

NOTE
COVER SHALL BE COLORED PURPLE W/ RED DOT
FINISH GRADE

25' MAX
8' MIN

VARIES

2' MIN

1/8" FLAT PLATE CENTERING GUIDE

2" AWWA HEXAGONAL OPERATING NUT

1 1/4" DIA STEEL SHAFT EXTENSION, MACHINED TO MATCH NUT

1/8"

1/8"

8" ID x 1/4" THICK WALL STEEL CASING (VALVE WELL)

ADAPTOR TO FIT AWWA SQUARE NUT

RECYCLED WATER VALVE
KEY EXTENSION
WE ARE CONSERVING OUR MOST VALUABLE RESOURCE
BY IRRIGATING OUR LANDSCAPE
WITH RECYCLED WATER

RECYCLED WATER
AQUA REICLADA

DO NOT DRINK
NO TOME EL AQUA

RECYCLED WATER IRRIGATION ADVISORY SIGN
Recycled Process Water
DO NOT DRINK

SIZE:
4" HIGH x 8" WIDE

COLORS:
BACKGROUND: WHITE
LETTERS: PANTONE 522 PURPLE
CIRCLE/SLASH: DARK RED OVER WATER GLASS
WATER GLASS: PANTONE 522 PURPLE
1/4" WIDE BORDER: PANTONE 522 PURPLE
HOLES: 1/8" AT CORNERS

RECYCLED WATER PROCESS SIGN
Recycled Irrigation Water
DO NOT DRINK

SIZE:
COLORS:
4" HIGH x 8" WIDE

BACKGROUND:
WHITE
LETTERS:
PANTONE 522 PURPLE
CIRCLE/SLASH:
DARK RED WATER TAP
WATER TAP:
PANTONE 522 PURPLE
1/4" WIDE BORDER:
PANTONE 522 PURPLE
HOLES:
1/8" AT CORNERS

RECYCLED WATER SIGN FOR IRRIGATION
Recycled Water used for Toilet and Urinal Flushing

SIZE:
4" HIGH x 8" WIDE

COLORS:
BACKGROUND: WHITE
LETTERS: PANTONE 522 PURPLE
CIRCLE/SLASH: DARK RED OVER WATER GLASS
WATER GLASS: PANTONE 522 PURPLE
1/4" WIDE BORDER: PANTONE 522 PURPLE
HOLES: 1/8" AT CORNERS

RECYCLED WATER SIGN FOR TOILET & URINAL FLUSHING
NOTES:

1. RECYCLE WATER IRRIGATION VALVE BOX COVERS SHALL BE COLOR CODED PANTONE #522

2. TEFLOM SHALL BE USED ON THREADED CONNECTIONS
NOTE:

RECYCLE WATER IRRIGATION VALVE BOX COVER
NOTE:
ALL RECYCLED METERS, AIR/VACUUM RELIEF VALVES, VALVES, PRESSURE REDUCING VALVES, PUMPS, PUMP CONTROL VALVES, ETC., SHALL BE TAGGED OR LABELED INDICATING THAT THE DEVICES ARE ON RECYCLED WATER SYSTEM AND COLOR CODED PANTONE #522. 12" MINIMUM CLEARANCE BETWEEN GROUND AND WATER CONTROL DEVICES.
NOTE:
ALL RECYCLED WATER IRRIGATION BOX COVERS AND LIDS SHALL BE COLOR CODED PANTONE #522
ATTENTION
Controller Unit for
Recycled Water

ATENCIÓN
Unidad Controladora
de Agua Recuperada

CONTROLLER BOX PURPLE (PANTONE #522) MARKER
DECAL-SHOWN AFFIXED TO BOX EXTERIOR; PREFERABLY,
AFFIX TO INTERIOR OF BOX

NOTES:
RECYCLED WATER IRRIGATION SYSTEM CONTROLLER BOX SHALL BE COLOR CODED PANTONE #522
RECYCLED WATER
DO NOT DRINK

AVISO,
AGUA IMPURA
NO TOMAR

FRONT

BACK

SAMPLE WARNING TAG. BACKGROUND PURPLE (PANTONE #522)
WITH BLACK LETTERING.
NOTE:

1. NEW CONSTRUCTION - ALL QUICK COUPLING VALVES SHALL HAVE NON-POTABLE LOCKING PURPLE THERMOPLASTIC RUBBER COVERS.

2. RETROFITS - REPLACE ALL EXISTING QUICK COUPLING VALVES WITH NON-POTABLE LOCKING PURPLE THERMOPLASTIC RUBBER COVERS.

3. TEFILON SHALL BE USED ON THREADED CONNECTIONS.

TYPE A (#4 ROD)
NOTE:
QUICK COUPLING VALVE SHALL BE OF A TYPE APPROVED FOR RECLAIMED WATER USE, AND COLOR DESIGNATED AS SUCH WITH PURPLE-COLORED LID.

1.- 1" QUICK COUPLING VALVE WITH PURPLE-COLORED LID (SEE LEGEND AND SPECIFICATIONS)
2.- FLUSH IN TURF AREAS, 2" IN SHRUB AND GROUND COVER AREAS.
3.- RED BRASS NIPPLE, 6" LENGTH MIN
4.- RED BRASS COUPLING, EXTEND ½" ABOVE TOP OF CONCRETE THRUST BLOCK
5.- RED BRASS NIPPLE, LENGTH AS REQUIRED
6.- UNDISTURBED OR 90% COMPACTED SUBGRADE
7.- RED BRASS ELL
8.- RED BRASS NIPPLE, 8" LENGTH MIN
9.- RED BRASS STREET ELL
10.- PVC ELL OR TEE ON MAINLINE PIPE
11.- SCHEDULE 80 PVC NIPPLE, 4" LENGTH MIN

TYPE B (KICK BLOCK)
CROSS CONNECTION CONTROL
TEST STATION

BRICK SUPPORTS ON
COMPACTED UNDISTURBED
SUBGRADE (MIN OF FOUR
PER BOX)

PVC SCHEDULE
40 SOLVENT
WELD FITTINGS

BALL VALVE
WITH 3/4"
FEMALE THREAD

MAIN
LINE

3/8" DIAMETER
PEA GRAVEL SUMP
(MIN 1/2 CU FT)

PURPLE COLOR
VALVE BOX AND
LID

SDRW-116
NOTES:

①- TEE SIZE TO MATCH EXISTING PIPE

②- REDUCER TO 2" DIAMETER PIPE, IF TEE IS LARGER THAN 2" DIAMETER
 INCREASER TO 2" DIAMETER PIPE, IF TEE IS SMALLER THAN 2" DIAMETER

③- 2" BRASS BALL VALVE

④- 1 1/2" FIRE HOSE CONNECTION, MIN. 4" HORIZ.
 CLEARANCE 6" TO 14" ABOVE EXISTING GROUND

⑤- 1 1/2" CAP

⑥- MISCELLANEOUS NIPPLES AS REQUIRED

⑦- INSTALL BRASS BALL VALVE SIZE TO MATCH EXIST PIPE

⑧- INSTALL UNION SIZE TO MATCH EXISTING PIPE
CHAPTER 9
SEWER SYSTEM
(A) SDR - 35 OR PIPE STIFFNESS OF 46 PSI PER ASTM D2412
(B) SDR - 35 IF SOIL REPORT SUBSTANTIATES THE ASSUMPTIONS IN NOTE 1, OTHERWISE USE SDR-26, IN LIEU OF THE SOIL REPORT

NOTE:
1. THIS STANDARD DRAWING SHALL BE USED ONLY WHERE EXISTING SOIL CONDITIONS ARE STABLE. STABLE SOIL IS DEFINED AS STANDARD PENETRATION TEST BLOW COUNT EQUAL TO OR GREATER THAN 13 BLOWS PER FOOT OR SHEAR STRENGTH GREATER THAN 750 PSF. OBTAINED FROM UNCONFINED COMPRESSION TEST.

2. STANDARD DESIGN ASSUMPTION: $K = 0.110$, $D = 1.0$, $E' = 750$ psi

$W_c = \text{PRISM LOAD} \times W = 125 \text{ LB/FT}^3$


4. INSTALLATIONS IN GROUND WATER SHALL REQUIRE A SPECIAL DESIGN.

5. DESIGN REF.: ASCE MANUALS AND REPORTS ON ENGINEERING PRACTICE - NO. 60 "GRAVITY SANITARY SEWER DESIGN AND CONSTRUCTION."
NOTES:

1. RISER AND CLEANOUT PLUG SHALL BE SAME DIAMETER AS SEWER LATERAL.

2. CLEANOUT SHALL BE PLACED INSIDE A STANDARD CLEANOUT BOX.

3. INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.

4. LATERALS ARE NOT ALLOWED IN DRIVEWAYS.

5. CONCRETE PAD SHALL BE 4-INCH DEEP AND 6-INCH AROUND CLEANOUT BOX.
NOTES:

1. RISER AND CLEANOUT PLUG SHALL BE SAME DIAMETER AS SEWER LATERAL.
2. CLEANOUT SHALL BE LOCATED WITHIN CITY RIGHT OF WAY, BEHIND THE SIDEWALK.
3. INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.
NOTES:

1. WHEN BACKWATER DEVICE IS INSTALLED IN THE DRIVEWAY, SEE SHEET 2

2. INSTALL VALVE BOX SO THAT IT IS FLUSH WITH PAVEMENT SURFACE OR 1" ABOVE FINISH GRADE (SOIL SURFACE).

3. PVC BACKWATER DEVICE AND ATTACHED PARTS SHALL BE PER THE CALIFORNIA PLUMBING CODE (CPC).

4. CLEANOUT PLUG (ABS) THREADED.

5. STANDARD 45° BEND.

6. THE BACKWATER DEVICE SHALL BE LOCATED AS CLOSE TO THE STRUCTURE AS REASONABLY POSSIBLE TO MINIMIZE THE DEPTH OF THE BACKWATER DEVICE.
1. THE BOX & COVER IS 10K LOAD RATED.
**NOTES**

1. IN NO CASE SHALL A LATERAL CONNECT TO THE SEWER MAIN DIRECTLY ON TOP OF THE PIPE.

2. ALL JOINTS ON SEWER LATERAL PIPE SHALL BE COMPRESSION TYPE OR APPROVED SOLVENT WELD.

3. LATERAL SHALL EXTEND TO PROPERTY LINE UNLESS SHOWN OTHERWISE ON PLANS

4. DO NOT TAP HOLE AND INSERT LATERAL PIPE DIRECTLY INTO MAIN. ALL CONNECTIONS SHALL BE MADE USING A SADDLE OR WYE CUT IN.

DETAIL SHOWING THE MANNER OF CONNECTING OPPOSITE LATERALS TO A SEWER MAIN. TWO CONNECTIONS SHALL NOT BE MADE IN THE SAME LENGHT OF PIPE.
NOTES:

1. MANHOLE FRAME AND ALL JOINTS SHALL BE SET IN CLASS "C" MORTAR.
2. ALL PRECAST COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C478.
3. VERTICAL WALL OF CONE SHALL BE ON THE UPSTREAM SIDE OF THE MANHOLE.
4. CONCRETE BASE SHALL BE 560-C-3250.
5. APPROVED WATER STOP REQUIRED FOR PLASTIC PIPE CONNECTORS.
6. PRECAST SECTIONS SHALL BE USED WITHIN DIMENSION "A" AS REQUIRED, IN ORDER OF PREFERENCE LISTED:
   A) CONE (NOTCHED FOR PIPE IF DIMENSION "A" IS LESS THAN 3').
   B) 6" TO 18" OF 3' DIAMETER GRADE RINGS AND/OR RISERS.
   C) 5' DIAMETER SHAFT VARIABLE HEIGHT.
7. FLEXIBLE PIPE JOINTS SHALL BE REQUIRED WITHIN 12" OF INSIDE FACE OF MANHOLE, EXCEPT FOR PLASTIC PIPE.
8. ALL PATCHING WITHIN MANHOLE BASE SHALL BE EPOXY MORTAR.
9. PRIOR APPROVAL OF PRECAST BASE IS REQUIRED BY THE ENGINEER.
10. MANHOLES SERVING 18" DIAMETER PIPE AND LARGER SHALL USE PRECAST RISERS LINED WITH WHITE PVC SHEETS IMBEDDED WITH LOCKING EXTENSIONS TO THE CONCRETE WALL. THE BASE AND ALL REMAINING EXPOSED CONCRETE SHALL BE COATED WITH AN APPROVED POLYURETHANE COATING.

LEGEND ON PLANS

CITY OF SAN DIEGO - STANDARD DRAWING

MANHOLE 5' X 3' DIAMETER
NOTES
1. ALL RISER JOINTS SHALL BE EPOXY MORTARED.
2. ALL PRECAST COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C478.
3. VERTICAL WALL OF CONE SHALL BE ON THE UPSTREAM SIDE OF THE MANHOLE.
4. CONCRETE BASE SHALL BE 560-C-3250.
5. APPROVED WATER STOP REQUIRED FOR PLASTIC PIPE CONNECTIONS.
6. PRECAST SECTIONS SHALL BE USED WITHIN DIMENSION "A" AS REQUIRED, IN ORDER OF PREFERENCE LISTED:
   A) CONE (NOTCHED FOR PIPE IF DIMENSION "A" IS LESS THAN 3).
   B) 3" TO 18" OF 3' GRADE RINGS AND RISERS.
   C) 4' DIAMETER SHAFT VARIABLE HEIGHT.
7. FLEXIBLE PIPE JOINTS SHALL BE REQUIRED WITHIN 12" OF INSIDE FACE OF MANHOLE, EXCEPT FOR PLASTIC PIPE.
8. ALL PATCHING WITHIN MANHOLE BASE SHALL BE EPOXY MORTAR.
9. PRIOR APPROVAL OF PRECAST BASE IS REQUIRED BY THE ENGINEER.
NOTES:

1) A RUBBER O-RING OR A FLEXIBLE CONNECTOR (AS SHOWN IN PRECAST MANHOLE BASE TYPE 'B') SHALL BE USED WHEN BREAKING INTO EXISTING MANHOLE

2) FOR MANHOLES REQUIRING COATING AND LINING, SEE SM-07
NOTES

1. SIMILAR POLYVINYL CHLORIDE COMPONENTS MAY BE USED IN ACCORDANCE WITH ASTM STANDARD SPECIFICATION D2241 AND D3139.

2. CONCRETE SLAB SHALL BE 560-C-3250.

3. USE HEAVY DUTY MANHOLE FRAME AND COVER, M-1, IN AREAS SUBJECT TO VEHICULAR TRAFFIC; USE LIGHT DUTY MANHOLE FRAME AND COVER, M-2, IN ALL OTHER LOCATIONS.

4. MINIMUM PIPE PRESSURE CLASS 200.
NOTES

1. FOR TRENCH RESURFACING IN IMPROVED STREETS SEE STANDARD DRAWINGS SDG-107 AND SDG-108.
2. (*) INDICATES MINIMUM RELATIVE COMPACTION.
3. MINIMUM DEPTH OF COVER FROM THE TOP OF PIPE TO FINISH GRADE FOR PVC SDR 35 SEWER MAIN SHALL BE 5'. FOR SHALLOWER DEPTH, SPECIAL DESIGN IS REQUIRED. SEE SDS-101.
4. SEE TYPE A INSTALLATION FOR DETAILS NOT SHOWN FOR TYPES B AND C.
5. FOR PIPE SIZE ENCASEMENT LARGER THAN 15", MAXIMUM SIDEWALL CLEARANCE SHALL BE 12" OR AS SHOWN ON THE PLANS.
6. INSTALL WARNING IDENTIFICATION TAPE PER SDM-105.
7. A 1' SAND CUSSION, OR A 6" MINIMUM SAND CUSHION WITH 1" NEOPRENE PAD, SHALL BE PLACED FOR CROWLING UTILITIES WHEN VERTICAL CLEARANCE IS 1' OR LESS. THE NEOPRENE PAD SHALL BE LACED ON THE MOST FRAGILE UTILITY.
NOTES:
1. ENCASE PIPE TO THE NEAREST FLEXIBLE JOINT.
2. FOR TRENCH RESURFACING IN IMPROVED STREETS, SEE SDG-107 AND SDG-108.
3. CONCRETE ENCASEMENT SHALL BE USED FOR RIGID PIPE ONLY.
4. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW PAVEMENT SECTION, PER SDM-105.
5. (*) INDICATES MINIMUM RELATIVE COMPACTION.

LEGEND ON PLANS
- 95%*
- 90%*
- 1'-0"
- 470-C-2000 CONCRETE
- CONCRETE BLOCK
NOTE
1. FOR TRENCHING IN IMPROVED STREETS SEE SDG-107 AND SDG-108.
2. CONCRETE BACKFILL FOR PVC PIPE CAN BE USED ABOVE THE PIPE BEDDING ZONE.
3. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW PAVEMENT SECTION.
4. (*) INDICATES MINIMUM RELATIVE COMPACTION.

LEGEND ON PLANS

CONCRETE BACKFILL

SDS-113
NOTE
PIPE PROTECTION CAN ONLY BE USED ABOVE THE PIPE BEDDING ZONE FOR PVC PIPE.

LEGEND ON PLANS

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: P.E. 56923

DATE: 9/4/18

DRAWING NUMBER: SDS-114
BLOCKS TO BE LAID TIGHTLY AS POSSIBLE TO DOWNSTREAM SIDE OF NOTCH

8" MIN TRENCH WIDTH 8" MIN

8" X 8" X 16" CONCRETE BLOCK, FILL CORES WITH GROUT

1/2" EXPANSION JOINT MATERIAL OR JUTE AROUND PIPE

#9 WIRE LADDER TYPE REINFORCEMENT IN ALL HORIZONTAL JOINTS

CUTOFF WALL
NOTES:

1. FOR EXISTING PVC PIPE, IT SHALL BE COVERED WITH TAR PAPER, POLYURETHANE BAGGIE OR RUBBER MAT PRIOR TO POURING CONCRETE.

2. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW PAVEMENT SECTION.

3. (*) INDICATES MINIMUM RELATIVE COMPACTION.
TRENCH WIDTH

GROUND LINE

EXISTING UNDERCUT SEWER PIPE

560-C-3250 CONCRETE

A

GREAT LINE

UNDISTURBED SOIL

#4 @ 18" OC

#4 @ 18" OC

MIN CLEARANCE

MIN CLEARANCE

D/4

D/4

PIPE TO BE INSTALLED

2-#5 BARS

TYPICAL SECTION

#5 BARS REQUIRED WHEN CROSSING WATERLINE ONLY

#5 BARS REQUIRED WHEN CROSSING WATERLINE ONLY

OUTSIDE DIAMETER OF PIPE

OUTSIDE DIAMETER OF PIPE

#4 @ 18" OC

#5 BAR

ADDITIONAL #5 BAR
MAX 12" C/C

3"

3"

3"

3"

3"

6"

6"

6"

6"

#5 BAR

NOTES

1. FOR WATER LINE CONSTRUCTION, ENCASEMENT SHALL EXTEND TO FIRST JOINT BEYOND 2' AT BOTH SIDES OF TRENCH OR TO A DISTANCE OF 4', WHICHEVER IS LESS.

2. WHERE CONNECTING TO FLEXIBLE PIPE, JOIN USING TWO COUPLINGS WITH A SHORT PIPE SPOOL (TYPICAL).

3. NO ENCASEMENT IS REQUIRED WHERE THE TRENCH WIDTH IS 24" OR LESS.

4. FOR EXISTING PVC PIPE, IT SHALL BE COVERED WITH TAR PAPER, POLYURETHANE BAGGIE OR RUBBER MAT PRIOR TO POURING CONCRETE.
NOTE:

FOR WATER LINE CONSTRUCTION, PIPE REPAIR SHALL EXTEND TO FIRST JOINT BEYOND 2' AT BOTH SIDES OF TRENCH OR TO A DISTANCE OF 4', WHICHEVER IS LESS.
NOTES:

1. FOR TRENCH RESURFACING IN IMPROVED STREETS SEE SDG-107 AND SDG-108.
2. (*) INDICATES MINIMUM RELATIVE COMPACTION.
3. MINIMUM DEPTH OF COVER FROM THE TOP OF PIPE TO FINISH GRADE FOR PVC SDR 35 SEWER MAIN SHALL BE 5'. FOR SHALLOWER DEPTH, SPECIAL DESIGN IS REQUIRED. SEE SDS-101.
4. INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.
5. 1' SAND CUSHION OR A 6" MIN SAND CUSHION WITH 1" NEOPRENE PAD SHALL BE PLACED FOR ALL CROSSING UTILITIES WHEN VERTICAL CLEARANCE IS 1' OR LESS. THE NEOPRENE PAD SHALL BE PLACED ON THE MOST FRAGILE UTILITY.
NOTES:

1. MANHOLE BASES FOR MAINS 18" AND LARGER SHALL BE COATED PER SM-07.

2. LOWEST POINT ON SHELF SHALL BE EVEN WITH TOP OF PIPE.

3. CAST IN PLACE MANHOLE BASES CAST WITH 560-C-3250 SHALL BE CURED A MINIMUM OF THREE DAYS PRIOR TO STACKING MANHOLE. BASES CAST WITH 660-CW-4000 (WITHOUT CALCIUM CHLORIDE (CC)) OR WITH 560-C-3250 TREATED WITH A MINIMUM OF 2% CC SOLUTION IN ACCORDANCE WITH 201-1 SHALL BE CURED A MINIMUM OF 24 HOURS. THESE CURING REQUIREMENTS APPLY TO MANHOLES WITH A MAXIMUM HEIGHT OF 25'. SHORTER CURING TIMES, DEEPER INSTALLATIONS, AND ALTERNATE CONCRETE MIX DESIGNS REQUIRE ENGINEER'S PRIOR APPROVAL.

4. CONCRETE SPECIFIED BY ALTERNATE CLASS OR OTHERWISE CONTAINING FLY ASH IS NOT ALLOWED FOR USE IN CAST IN PLACE MANHOLES.

5. CONCRETE MIX DESIGNS CONTAINING ACCELERATING ADMIXTURES OTHER THAN CC REQUIRE A BREAK HISTORY AND ENGINEER'S APPROVAL.
NOTES:

1. REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE.

2. CLEANOUTS TO BE INSTALLED AT THE END OF MAINS WHERE INDICATED ON THE PLANS.

3. CLEANOUT PIPE TO BE SAME SIZE AND MATERIAL AS SEWER (MAX DIA. 8").

4. BACKFILL TO TOP OF 45° BEND WITH 3/8" OR 1/2" CRUSHED ROCK.

5. LATERALS SHALL BE SELECTED FROM THE AGENCY’S APPROVED MATERIALS LIST.

6. INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) CLEANOUTS TO BE INSTALLED AT THE END OF MAINS WHERE INDICATED ON THE PLANS
3) CLEANOUT PIPE TO BE SAME SIZE AND MATERIAL AS SEWER MAIN UP TO 8"
4) BACKFILL TO TOP OF 45° BEND WITH 3/4" CRUSHED ROCK
5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12&quot; CI CLEANOUT BOX COVER MARKED 'SEWER' AND AGENCY NAME AS REQUIRED</td>
</tr>
<tr>
<td>2</td>
<td>CONCRETE RING</td>
</tr>
<tr>
<td>3</td>
<td>12&quot; PVC, C–900 x 15&quot; LONG (CLEANOUT BOX)</td>
</tr>
<tr>
<td>4</td>
<td>SIZE x REQUIRED LENGTH PVC PIPE</td>
</tr>
<tr>
<td>5</td>
<td>45° ELBOW</td>
</tr>
<tr>
<td>6</td>
<td>3/4&quot; CRUSHED ROCK PIPE BEDDING</td>
</tr>
<tr>
<td>7</td>
<td>SEWER MAIN</td>
</tr>
<tr>
<td>8</td>
<td>3/4&quot; CRUSHED ROCK SEE NOTE 4</td>
</tr>
<tr>
<td>9</td>
<td>STANDARD WYE BRANCH</td>
</tr>
<tr>
<td>10</td>
<td>INSTALL PLUG AND CONCRETE LUG</td>
</tr>
</tbody>
</table>

SAN DIEGO REGIONAL STANDARD DRAWING

SEWER CLEANOUT

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER SC-01
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) MANHOLES FOR SEWER MAINS 18" AND LARGER SHALL BE COATED AND LINED
3) MANHOLE SHAFT AND CONE SECTIONS, AND GRADE RINGS SHALL HAVE A PVC LINER PLACED
   WITH T-SHAPED SUPPORTS INTEGRALLY CAST INTO THE CONCRETE (OR AGENCY APPROVED
   EQUAL TO PVC LINER)
4) ELASTOMERIC POLYURETHANE COATING SHALL BE APPLIED TO THE INTERIOR OF MANHOLE
   BASES
5) MATERIALS SHALL BE SELECTED FROM THE AGENCY’S APPROVED MATERIALS LIST
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) ALL SALVAGED MATERIAL BECOMES PROPERTY OF AGENCY OF JURISDICTION
3) BACKFILL PER AGENCY'S REQUIREMENT
4) FOR CUTTING & PLUGGING ABANDONED SEWER MAINS SEE WP-03

---

LEGEND ON PLANS

---

SAN DIEGO REGIONAL STANDARD DRAWING

EXISTING MANHOLE ABANDONMENT

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER SM-08
CHAPTER 10
STORM WATER
SYSTEMS
TYPICAL END OF LINE SERVICE OR MAINTENANCE INSTALLATION. INSTALL STANDARD LOCKABLE STORM DRAIN CLEANOUT LID OR APPROVED EQUAL. H20 TRAFFIC RATED.

CONCRETE COLLAR (CLASS C 420-C-2000')

6" MIN. WIDTH

10" MIN DEPTH

INSTALL 1/2" CAST IRON CAP WITH FINGER HOLE IN CENTER

FINISHED SURFACE PER PLANS

8" DEEP

4" ±

11 3/4"

PAVEMENT AREA CLEANOUT - SURFACE

8" Ø MIN PVC LOCKABLE CLEANOUT PLUG, THREADED (ABS), PAINTED BROWN

HIGH WATER LINE

TOP OF BIOFILTRATION AREA

3" ABOVE HIGH WATER LINE

BIOFILTRATION AREA CLEANOUT - SURFACE

INSTALL 45° BENDS

INSTALL 45° BENDS

0.5% MIN

FLOW

8" MIN UNDERDRAIN PER PLANS

PLAN (CLEANOUT - UPSTREAM)

STD WYE BRANCH

FLOW

0.5% MIN.

FLOW

8" MIN UNDERDRAIN PER PLANS

PLAN (CLEANOUT - MIDSTREAM)

PERFORATED UNDERDRAIN PER PLANS

TYP PLANTER BOX OR PERMEABLE PAVEMENT SYSTEM PER PLANS

HORIZONTAL BEND CLEANOUT (SEE DETAIL SHEET 2)

TRANSITION FROM PERFORATED TO SOLID UNDERDRAIN

FLOW

FLOW

CLEANOUT (UPSTREAM END)

CLEANOUT (MIDSTREAM)

SOLID UNDERDRAIN CONNECTED TO NEXT STORM DRAIN JUNCTION

PLAN VIEW - TYPICAL STORM DRAIN CLEANOUT LOCATIONS

NOTE

SEE ADDITIONAL NOTES ON SHEET 2

CITY OF SAN DIEGO - STANDARD DRAWING

CLEANOUT FOR UNDERDRAIN

SDSW-101
NOTES:

1. FOR PERMEABLE PAVEMENT APPLICATIONS, PIPES AND FITTINGS SHALL BE PROPERLY ALIGNED AND MAINTAINED WHILE CONCRETE IS BEING PLACED AND ALLOWED TO HARDEN. JOINTS FOR PIPES AND FITTINGS SHALL BE MADE PRIOR TO PLACING CONCRETE. CONCRETE FOR BEDDING, ENCASEMENT, AND WALL SUPPORT FOR PIPES AND FITTINGS SHALL BE PLACED UNIFORMLY AROUND THE PIPE AND FITTINGS AS SHOWN, AND SHALL BE CLASS 420-C-2000.

2. USE OF SMALLER DEGREE BENDS ONLY ALLOWED PER ENGINEER'S APPROVAL.
**NOTES:**

SEE ADDITIONAL NOTES ON SHEET 2

---

**UNDERDRAIN WITH BOTTOM LINER**

- 90% Compaction or per geotechnical engineer's recommendations
- Impermeable liner per plans
- Washed aggregate storage per specifications
- 10" min. (See note 5)
- 8" min perforated underdrain invert elevation per plans (See detail A)
- 3" min or per plans
- Depth per plans
- Depth per plans
- 8" min perforated underdrain invert elevation per plans
- 6" scarified subgrade or per plans
- 3/8" Ø min. @ 3-1/4" spacing along pipe w/ staggered horiz. rows
- Perforated hole placement

**UNDERDRAIN WITHOUT BOTTOM LINER**

- Impermeable liner per plans, sides only, depth per plans
- 10" min. (See note 5)
- 3" min or per plans
- Depth per plans
- Depth per plans
- Bell
- Pipe O.D.
- Pipe I.D.
- 90°
- 45°
- 45°

**DETAIL A - PERFORATED HOLE PLACEMENT**

- 62x503
- PERFORATED UNDERDRAIN DETAIL

---

**RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE**

06/05/2018

06/05/2018

SDSW-102

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CITY OF SAN DIEGO - STANDARD DRAWING
NOTES:

1. PLACEMENT OF THE UNDERDRAIN SHALL BE PER PLANS, OR AS DIRECTED BY THE ENGINEER. HORIZONTAL LOCATION MAY VARY WITHIN PAVEMENT SECTION AS LONG AS MINIMUM OFFSET DISTANCES AND BOTTOM SLOPES ARE MAINTAINED.

2. PERFORATED PLASTIC PIPE SHALL BE SMOOTH-WALL PVC PLASTIC PIPE OR CORRUGATED PVC PLASTIC PIPE WITH A SMOOTH INTERIOR SURFACE, MADE OF PVC PLASTIC HAVING A CELL CLASSIFICATION OF 12454 OR 13364, AS DEFINED IN ASTM D1784.

3. PIPE, FITTING, AND JOINT DIMENSIONS SHALL BE COMPATIBLE AND MEASURED IN ACCORDANCE WITH ASTM D 2122. FITTING AND JOINT MATERIAL SHALL BE COMPATIBLE WITH THE PIPE MATERIAL.

4. PIPE PENETRATIONS THROUGH IMPERMEABLE BARRIER SHALL BE SEALED ACCORDING TO PLANS.

5. FOR PERMEABLE PAVEMENT UNDERDRAINS, MINIMUM OFFSET TO INSIDE EDGE OF TRENCH SHALL BE 10 INCHES.

6. DEPTH OF PERFORATED PVC PIPE MAY BE ADJUSTED TO TIE INTO THE ADJACENT CONNECTION POINT OF THE DOWNSTREAM DRAINAGE INFRASTRUCTURE, AS NEEDED, PER ENGINEER'S APPROVAL.
6" H SLOT WEIR OPENING ALL FOUR SIDES. SLOT WIDTH AND INLET INVERT ELEVATION ACCORDING TO PLANS AND DESIGN SPECIFICATIONS. (SEE NOTE 3)

PERFORATED UNDERDRAIN (INLET PIPE)

IMPERMEABLE LINER

ATTACH LINER TO STRUCTURE SEE NOTE 2.

CONCRETE THICKNESS (T) PER PLANS (SEE NOTE 4)

NOTES:

1. UTILIZE LINER AND UNDERDRAIN ONLY IF SPECIFIED IN PLANS.

2. ATTACH LINER TO STRUCTURE USING BATTEN AND ANCHOR BOLT CONNECTION PER SDSW-104.

3. MINIMUM 6" HORIZONTAL OFFSET FROM EDGE OF STRUCTURE TO SLOT WEIR OPENING, BOTH SIDES, TO ENSURE STRUCTURAL SUPPORT OF SLAB TOP.

4. THICKNESS OF SUMP VARIES PER PLANS BASED ON ANTI-BUOYANCY REQUIREMENTS.

5. INSIDE CROWN (SOFFIT) ELEVATIONS OF THE INCOMING AND OUTLET STORM DRAINS ARE TO BE MATCHED.

6. BURY STRUCTURE INTO THE SUBGRADE PER PLAN.

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>TOP OF STRUCTURE</td>
</tr>
<tr>
<td>B</td>
<td>INVERT OF UNDERDRAIN</td>
</tr>
<tr>
<td>C</td>
<td>INVERT OF CULVERT - OUT</td>
</tr>
<tr>
<td>D</td>
<td>BOTTOM OF STRUCTURE</td>
</tr>
</tbody>
</table>
NOTES:

1. IRREGULARITIES ON THE CONCRETE SURFACE OF THE EXISTING/PROPOSED SIDEWALK OR EXTENDED CURB, TO WHICH THE GEOMEMBRANE IS TO BE ATTACHED, SHALL BE REMOVED PRIOR TO INSTALLATION.

2. IF IRREGULARITIES (I.E., SHARP PROTRUSIONS EXCEEDING 1/2 INCH FROM SURFACE FACE) CAN NOT BE REMOVED FROM AN EXISTING SAW-CUT OR FORMED STRUCTURE, A PROTECTIVE GEOTEXTILE LAYER SHOULD BE PLACED BETWEEN THE SURFACE AND THE GEOMEMBRANE WITHIN VICINITY OF PROTRUSIONS.

3. REFER TO PLANS FOR VERTICAL DIMENSIONS OF BIOFILTRATION COMPONENTS.

4. SUBMIT GEOTEXTILE MANUFACTURER'S INSTALLATION RECOMMENDATIONS TO ENGINEER FOR APPROVAL.
OUTLET REINFORCING

<table>
<thead>
<tr>
<th>RATIO OF OUTLET ID TO PIPE ID</th>
<th>PIPE CLASS</th>
<th>ANGLE BETWEEN OUTLET AXIS AND MAINLINE AXIS</th>
<th>TYPE OF REINFORCING</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2 AND LESS</td>
<td>ALL</td>
<td>0° to 75</td>
<td>WRAPPER COLLAR</td>
</tr>
<tr>
<td></td>
<td>ALL</td>
<td>75° to 90</td>
<td></td>
</tr>
<tr>
<td>0.2 TO 0.6</td>
<td>UNDER 150</td>
<td>0° to 75</td>
<td>WRAPPER COLLAR</td>
</tr>
<tr>
<td></td>
<td>UNDER 150</td>
<td>75° to 90</td>
<td>WRAPPER COLLAR</td>
</tr>
<tr>
<td></td>
<td>150 AND OVER</td>
<td>0° to 90</td>
<td>WRAPPER WRAPPER</td>
</tr>
<tr>
<td>0.6 TO 1.0</td>
<td>UNDER 150</td>
<td>0° to 90</td>
<td>WRAPPER 1 PL CROTCH</td>
</tr>
<tr>
<td></td>
<td>150 AND OVER</td>
<td>0° to 90</td>
<td>WRAPPER 2 PL CROTCH</td>
</tr>
</tbody>
</table>

NOTES

1. COLLAR OD OR WRAPPER WIDTH SHALL BE EQUAL TO TWICE THE LENGTH OF THE OPENING IN THE MAINLINE PIPE MEASURED ALONG THE PIPE AXIS. THICKNESS SHALL BE EQUAL TO THAT SPECIFIED FOR PIPE SPECIALS.

2. IF A CROTCH PLATE IS REQUIRED, THE OUTLET LENGTH SHALL BE ADJUSTED TO CLEAR THE MAXIMUM LENGTH OF BOLT USED FOR FLANGE.

3. OUTLETS LESS THAN 3" IN DIA. MAY BE INSTALLED WITHOUT COLLARS PROVIDING THAT ROD REINFORCING IS NOT CUT AND OUTLETS ARE WELDED TO RODS.

4. REINFORCING FOR OUTLETS ON PIPE, OTHER THAN SCRW PIPE OR STEEL PIPE, SHALL BE AS SHOWN ON PLANS OR SUBMITTED FOR APPROVAL.

5. NOZZLE FABRICATION DETAILS ARE TYPICAL FOR ALL SIZES OF OUTLETS.

6. REPEAT NOTE 1 FOR SDW-103

7. FLANGES SHALL CONFORM TO AWWA C207 AND DRILLING SHALL MATCH THE ABOVE FLANGE DRILLING.

8. MINIMUM LINING THICKNESS FOR OUTLETS SHALL BE:
   - 1/4" FOR 8" ID AND LESS
   - 1/2" FOR 10" ID 16" ID
   - 3/4" FOR 18" ID AND GREATER

9. COATING THICKNESS FOR OUTLETS SHALL BE:
   - 3/4" FOR 16" ID AND LESS
   - 1 1/4" FOR 18" ID AND GREATER
   SPECIFIED COATING THICKNESS SHALL BE REDUCED BY 50% FOR THE DISTANCE OF ONE BOLT LENGTH BACK FROM THE FLANGE FACE.

10. REINFORCEMENT OF FITTINGS, COLLARS, WRAPPER AND CROTCH PLATE DESIGN SHALL CONFORM TO M-11, LATEST STEEL PIPE GUIDE FOR DESIGN AND INSTALLATION EDITION.
DRILL AND TAP FOR AIR-VALVE SIZE (AIR RELEASE VALVE STATION ONLY)

BOLT HOLES (STUD DIA + 1/8")

SECTION THROUGH COVER

FLANGE OD
BOLT CENTER

12" MIN
(SEE NOTE 2 SDW-101)

STEEL PLATE
1/4" MIN
20" MIN ID

1/2"

3/4" MORTAR LINING

REINFORCING PER
SDW-101

PIPE ID

1/4"

4-1/2"

HANDLE DETAIL (TYPICAL 2 PLACES)

SECTION A-A

SECTION ON PIPE AXIS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PRESSURE RANGE (PSI)</th>
<th>FLANGE ID</th>
<th>FLANGE OD</th>
<th>BOLT CENTER ID</th>
<th>BOLT CENTER OD</th>
<th>NO. OF BOLTS</th>
<th>STUD DIA LENGTH</th>
<th>THICKNESS (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>175</td>
<td>0 - 175</td>
<td>22&quot;</td>
<td>29-1/2&quot;</td>
<td>27-1/4&quot;</td>
<td>20</td>
<td>6&quot; x 1-1/4&quot;</td>
<td>1-3/16&quot;</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>175 - 250</td>
<td>22&quot;</td>
<td>33&quot;</td>
<td>29-1/4&quot;</td>
<td>24</td>
<td>7&quot; x 1-1/2&quot;</td>
<td>1-11/16&quot;</td>
<td></td>
</tr>
<tr>
<td>325</td>
<td>250 - 325</td>
<td>22&quot;</td>
<td>33&quot;</td>
<td>29-1/4&quot;</td>
<td>24</td>
<td>7&quot; x 1-1/2&quot;</td>
<td>1-7/8&quot;</td>
<td></td>
</tr>
</tbody>
</table>

FURNISH: REQUIRED STUD BOLTS W/ FULL LENGTH THREAD & TWO (2) HEX NUTS EACH 1/16" THICK FULL FACE GASKET AND 3/4 INCH DIA STAINLESS STEEL FORCING BOLT ON DC

NOTES:

1. APPLY TWO (2) COATS OF COAL-TAR EPOXY 16 MILS TOTAL (MIN) TO ALL EXPOSED METAL SURFACES. AMERCOAT 78 OR KOP-COAT 300 M OR EQUAL MEETING U.S. PUBLIC HEALTH STANDARDS ARE APPROVED FOR SUCH APPLICATION PER MANUFACTURER'S STANDARDS.

2. DETAILS OF MANHOLES ON PIPELINES LESS THAN 24" DIAMETER SHALL BE SHOWN ON DESIGN DRAWINGS OR SUBMITTED FOR APPROVAL.

3. MANHOLES SHALL BE BEVELED DURING FABRICATION, SO THAT THEY ARE TRUE TO VERTICAL UPON INSTALLATION.

4. ALL WELDS TO CONFORM TO ANSI / AWWA C206 - 91.

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: P.E. 56223
DATE: 9/4/18

CITY OF SAN DIEGO - STANDARD DRAWING

ACCESS MANHOLE

SDW-103
### FIRE HYDRANT INSTALLATION

#### LEGEND ON PLANS

- **PROPERTY LINE**: 4" - 0" MIN  
- **TEER - SIZE X 6" (MJ, MJ, F)**

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6&quot; WET BARREL FIRE HYDRANT</td>
</tr>
<tr>
<td>2</td>
<td>.75&quot; X 3.5&quot; MIN HEX HEAD BREAKAWAY (SHEAR) BOLTS AND NUTS (ASTM A307) SHALL BE 3/4&quot; NC THREAD. HEX HEAD ON TOP OF FLANGES (ALL)</td>
</tr>
<tr>
<td>3</td>
<td>6&quot; CAST IRON BREAKAWAY SPOOL WITH 0.25&quot;-V (SINGLE OR DOUBLE) BREAK OFF GROOVE</td>
</tr>
<tr>
<td>4</td>
<td>4' X 4' X 4&quot; THICK CONCRETE PAD WITH 6&quot; X 12&quot; DEEP THICKENED EDGE AROUND PERIMETER OF CONCRETE PAD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6&quot; CAST IRON EXTENSION NON-GROOVED SPOOL - AS REQUIRED (F, F)</td>
</tr>
<tr>
<td>6</td>
<td>6&quot; LONG RADIUS DI BASE ELBOW (F, PO / MJ)</td>
</tr>
<tr>
<td>7</td>
<td>CONCRETE THRUST BLOCK PER SDW-151.</td>
</tr>
<tr>
<td>8</td>
<td>COLD JOINT STRIP</td>
</tr>
<tr>
<td>9</td>
<td>PIPE - 6&quot; C-900 PVC</td>
</tr>
<tr>
<td>10</td>
<td>GATE WELL WITH CAP PER SDW-153.</td>
</tr>
<tr>
<td>11</td>
<td>6&quot; GATE VALVE (F/ MJ, F)</td>
</tr>
<tr>
<td>12</td>
<td>TEE - SIZE X 6&quot; (MJ, MJ, F)</td>
</tr>
</tbody>
</table>

#### NOTES:

1. NUMBER OF OUTLETS SHALL BE AS SHOWN ON THE PLANS.

2. CONNECT TO BASE OF THE HYDRANT WITH SHEAR BOLTS INSTALLED WITH HEX HEAD ON TOP OF THE FLANGE. (31 / 64" DIAMETER HOLE 2" DEEP IN BOLTS, GALVANIZED AFTER BORING)
3'-0" MIN FROM PROPERTY LINE OR RIGHT OF WAY

3'-0" MIN FROM EDGE OF PAVEMENT

WITH CURB NO SIDEWALK

NO CURB

NON-CONTIGUOUS SIDEWALK

CONTIGUOUS SIDEWALK

FIRE HYDRANT

CONCRETE PAD TYPICAL

COLD JOINT STRIP

SIDEWALK TYPICAL ALTERNATE LOCATION

STREET TYPICAL

3-PORTS

2-PORTS

2-2 1/2" PORTS ONLY

FIRE HYDRANT WITH 6" RUN TYPICAL

PROTECTION POSTS SEE WM-04

NOTE: WHEN REQUIRED, NUMBER OF POSTS AND LOCATION TO BE SHOWN ON THE PLANS.

PORT ORIENTATION

FIRE HYDRANT LOCATIONS AND PORT ORIENTATION

NOTES:

1) LOCATE FIRE HYDRANT AS SHOWN ABOVE OR AS DIRECTED BY THE ENGINEER.

2) FIRE HYDRANTS SHALL BE INSTALLED WITH THE LARGEST PORT PERPENDICULAR TO THE STREET.

3) IF THE CONCRETE SLAB IS TO BE INSTALLED ADJACENT TO A CONCRETE CURB OR SIDEWALK, A COLD JOINT STRIP SHALL BE INSTALLED.

4) CONCRETE APRON SHALL BE REQUIRED WHERE THE FIRE HYDRANT IS INSTALLED IN AN UNPAVED LOCATION. THE APRON SHALL BE 4" THICK 520-C-2500 CONCRETE.

5) WHEN DISTANCE FROM THE FIRE HYDRANT TO THE TOP OR TOE OF THE SLOPE OR WALLS IS LESS THAN 2', SPECIAL HYDRANT INSTALLATION DETAIL SHALL BE SHOWN ON THE PLANS.

6) THE DISTANCE FROM THE FACE OF THE CURB TO THE CENTERLINE OF THE FIRE HYDRANT SHALL BE 2 1/2' MINIMUM.
SHOULDER EDGELINE
MEDIAN
STREET LOCATION
SHEET 3 OF 3

MARKERS - SHALL BE BLUE 2-WAY STIMSONITE LIFELITE 88AB OR EQUAL.
ADHESIVE - AN AMPLE AMOUNT OF 2 (A&B) EPOXY OR EQUAL.
SURFACES - CLEAN AND DRY TO INSTALLATION PER MANUFACTURER'S
RECOMMENDATIONS. INSTALL MARKERS WITH REFLECTIVE SURFACES FACING
ONCOMING VEHICLES AND OFFSET 2" FROM LANE LINES TOWARD
FIRE HYDRANT.

NOTES
1. FIRE DEPARTMENT WILL PROVIDE LOCATION(S) FOR ALL MARKERS IN PRD'S
COMMERCIAL LOTS AND OTHER AREAS OUTSIDE OF PUBLIC RIGHT OF WAY.
2. MARKERS SHALL BE INSTALLED AT THE NEW AND RELOCATED HYDRANTS AND
WITHIN ALL RESURFACING PROJECTS.
3. FOR STREETS WITHOUT LANE LINES OR STREETS WITH RAISED PAVEMENT MARKERS
AND NO PAINTED LANE LINES, INSTALL MARKERS 6" FROM CENTERLINE
OR EXISTING MARKERS.

FIRE HYDRANT MARKERS

CITY OF SAN DIEGO - STANDARD DRAWING
FIRE HYDRANT INSTALLATION

RECOMMENDED BY THE CITY
OF SAN DIEGO STANDARDS COMMITTEE
REVISION BY APPROVED DATE
ORIGINAL KA J. NAGELVOORT 01/12
UPDATED KA J. NAGELVOORT 03/13
UPDATED HM J. NAGELVOORT 03/16
REDRAGHT CD J. NAGELVOORT 06/18

DRAWING NUMBER SDW-104
COORDINATOR R.E. 55203 DATE 9/4/18
DETAIL 'A' SEE NOTE 6

CITY MAINTAINED

PRIVATELY MAINTAINED

24" MAXIMUM SEE NOTE 12

18" TYP

FINISH
GRADE

Curb

FLOW

FLOW

SEE NOTE 5 SEE NOTE 7 SEE NOTE 8

LEGEND ON PLANS

SEE NOTES ON SHEET 2

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>CONCRETE THRUST BLOCK SEE SDW-151</td>
</tr>
<tr>
<td>2</td>
<td>WATER MAIN</td>
</tr>
<tr>
<td>3</td>
<td>GATE WELL WITH CAP SEE SDW-153</td>
</tr>
<tr>
<td>4</td>
<td>SIZE x SIZE MJ/FLG x FLG TEE</td>
</tr>
<tr>
<td>5</td>
<td>FLG x MJ/FLG RWGVS</td>
</tr>
<tr>
<td>6</td>
<td>C-900 PVC PIPE</td>
</tr>
<tr>
<td>7</td>
<td>MJ x FLG 90° BEND</td>
</tr>
<tr>
<td>8</td>
<td>FLANGED DUCTILE IRON PIPE</td>
</tr>
<tr>
<td>9</td>
<td>COLD JOINT STRIP</td>
</tr>
<tr>
<td>10</td>
<td>FLANGED 90° BEND, SEE NOTE 6, SHEET 2 OF 2</td>
</tr>
<tr>
<td>11</td>
<td>FLANGED OS&amp;Y RWGVS WITH HAND WHEEL</td>
</tr>
<tr>
<td>12</td>
<td>APPROVED REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) SEE NOTE 3</td>
</tr>
<tr>
<td>13</td>
<td>CHAIN WITH KNOX LOCK SEE NOTE 3, SHEET 2 OF 2</td>
</tr>
<tr>
<td>14</td>
<td>FLANGED TEE WITH &quot;FDC&quot; SEE NOTE 3, SHEET 2 OF 2</td>
</tr>
<tr>
<td>15</td>
<td>CONCRETE SLAB MINIMUM 4&quot; THICK x 36&quot; WIDE x AS REQUIRED</td>
</tr>
<tr>
<td>16</td>
<td>3/4&quot; BYPASS, METER &amp; RP ASSEMBLY</td>
</tr>
<tr>
<td>17</td>
<td>ADJUSTABLE VALVE SUPPORT</td>
</tr>
<tr>
<td>18</td>
<td>PVC OR DI PIPE SEE NOTE 8, SHEET 2 OF 2</td>
</tr>
<tr>
<td>19</td>
<td>FLANGED ANGLE PRESSURE REDUCING VALVE SEE NOTE 6, SHEET 2 OF 2</td>
</tr>
</tbody>
</table>

SHEET 1 OF 2
NOTES:

1) INSTALL WARNING / IDENTIFICATION TAPE PER SDM-105.

2) LOCATE BACKFLOW PREVENTION ASSEMBLY IN SUCH A MANNER THAT WILL ALLOW THE DEVICE TO BE READILY ACCESSIBLE FOR INSPECTION, REPAIR, AND USE.

3) TAMPER SWITCH, AUTOMATIC RESET, CHAIN WITH KNOX LOCK, AND FIRE DEPARTMENT CONNECTION ("FDC") SHALL BE AS REQUIRED BY THE FIRE DEPARTMENT.

4) BALL VALVE TEST COCKS AND DETECTOR ASSEMBLY SHALL BE PROVIDED AND LOCATED PER THE MANUFACTURES RECOMMENDATIONS AND CITY STANDARDS.

5) INSTALL FIRE SERVICES SO THAT THE DISTANCE BETWEEN THE BOTTOM OF THE RELIEF DIAPHRAGM AND THE CONCRETE SLAB OR FINISH GRADE IS 12" MINIMUM AND 24" MAXIMUM.

6) INSTALL A PRESSURE REDUCING VALVE UPSTREAM OF THE FIRST 90 BEND WHEN SYSTEM STATIC PRESSURE EXCEEDS 150 PSI OR WHEN RECOMMENDED BY THE BACKFLOW MANUFACTURER.

7) INSTALL PIPE AND RELATED APPURTENANCES IN THIS AREA PER THE CITY REQUIREMENTS.

8) INSTALL PIPE AND RELATED APPURTENANCES IN THIS AREA AS REQUIRED BY THE FIRE DEPARTMENT.

9) ABOVE GROUND APPURTENANCES SHALL BE PAINTED AND IDENTIFIED AS CALLED FOR BY THE FIRE DEPARTMENT.

10) TESTING SHALL BE CONDUCTED AS REQUIRED BY THE PUBLIC UTILITIES DEPARTMENT CROSS CONNECTION CONTROL UNIT.

11) CONNECTIONS TO STEEL MAINS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS.

12) ANY OTHER LOCATION OF FIRE SERVICE BACKFLOW, AS SHOWN ON SHEET 1, MUST BE DETERMINED AND APPROVED BY PUBLIC UTILITIES DEPARTMENT, CROSS CONNECTION CONTROL UNIT.
### SCHEDULE

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 WATER MAIN</td>
<td>3&quot; - 8&quot; INCL.</td>
</tr>
<tr>
<td>2 CAST IRON PLUG OR CAP</td>
<td>MAIN SIZE X 2&quot;</td>
</tr>
<tr>
<td>3 BRASS NIPPLE</td>
<td>2&quot; X 8&quot;</td>
</tr>
<tr>
<td>4 BRONZE GATE VALVE WITH</td>
<td>2&quot;</td>
</tr>
<tr>
<td>BRONZE WHEEL-SCREW ENDS</td>
<td>3&quot;</td>
</tr>
<tr>
<td>5 BRASS NIPPLE</td>
<td>AS NEEDED</td>
</tr>
<tr>
<td>6 BRASS 90° EL</td>
<td>2&quot;</td>
</tr>
<tr>
<td>7 BRASS RISER</td>
<td>3&quot; X VARIABLE TO GRADE MINUS 4&quot;</td>
</tr>
<tr>
<td>8 BRASS COUPLING THREAD</td>
<td>2&quot;</td>
</tr>
<tr>
<td>9 BRASS PLUG</td>
<td>3&quot;</td>
</tr>
<tr>
<td>10 STEEL CASING FOR GATE</td>
<td>8&quot; X VARIABLE TO GRADE MINUS 3/4&quot;</td>
</tr>
<tr>
<td>VALVE AND RISER</td>
<td>8&quot; X VARIABLE TO GRADE MINUS 3/4&quot;</td>
</tr>
<tr>
<td>11 GATE WELL CAP AND CAN</td>
<td>8&quot;</td>
</tr>
<tr>
<td>SEE SDW-153</td>
<td>8&quot;</td>
</tr>
</tbody>
</table>

### NOTES

1. SET TO FINISH GRADE
2. PROVIDE CONCRETE PADS.
3. PROVIDE THRUST BLOCKS PER SDW-151.
NOTES:

1. THE PROPOSED WATER SERVICE SHALL BE SECURED IN CENTER OF THE TRENCH.

2. SAND CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED TO ENCASE CONDUITS. TAMPER OR VIBRATORS SHALL BE USED.

3. EXISTING PAVEMENT WILL NOT REQUIRE SAW CUTTING WHEN USING ROCKWHEEL FOR EXCAVATION EXCEPT WHEN THE EXISTING PAVEMENT IS CONCRETE AND TRENCH FINISH IS CONCRETE.

4. CUTS SHALL BE PARALLEL OR PERPENDICULAR TO STREET CENTERLINE, WHEN PRACTICAL.

5. IN MAJOR OR PRIME ARTERIAL STREETS, ON APPROVAL SET ACCELERATING ADMIXTURE, SUCH AS CALCIUM CHLORIDE, MAY BE USED ONLY WITH PRIOR APPROVAL OF THE ENGINEER OTHERWISE THE CONTRACTOR SHALL PROTECT THE TRENCH WITH THE APPROVAL OF THE ENGINEER.

6. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW TRENCH CAP AND 12" BELOW FINISH GRADE IN UNIMPROVED STREETS.
NOTE:
SEE SDW-111 FOR FULL DETAILS OF ABOVE JOINTS

NOTE:
ALL WELDS TO CONFORM TO ASNI / AWWA C206 - 91
1. INSTALL VALVE KEY EXTENSIONS WHEN TOP OF VALVE IS 6' OR MORE BELOW GROUND OR PAVEMENT SURFACE.
2. PAINT ALL FINISHED SURFACES WITH ASPHALT VARNISH.
4. ALL WELDS TO CONFORM TO ANSI / AWWA C206 - 91.
NOTES:

1. (*) INDICATES MINIMUM RELATIVE COMPACTION.

2. MINIMUM COVER: 3' FOR DISTRIBUTION MAINS; 5' FOR TRANSMISSION MAINS.

3. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE: 4" BELOW TRENCH CAP AND 12" BELOW FINISH GRADE IN UNIMPROVED STREETS.

4. 1" SAND CUSHION OR A 6" MINIMUM SAND CUSHION WITH 1" NEOPRENE PAD SHALL BE PLACED FOR ALL CROSSINGS UTILITIES WHEN VERTICAL CLEARANCE IS 1' OR LESS. THE NEOPRENE PAD SHALL BE PLACED ON THE MOST FRAGILE UTILITY.

5. FOR MAINS LARGER THAN 16", TRENCH WIDTH SHALL BE AS SHOWN ON THE PLANS.
FORMED BELL END AND WELDED SPIGOT RING

ITEMS CALL OUT:

1. Maximum field deflection in a joint is 3/8" pull and 3/8" push, the pull to be utilized first.
2. Concrete grout placed in field.
3. Cement mortar placed in field and hand pointed.
4. Tolerance between bell ID and spigot OD to be 1/32" to 1/16" on the diameter.
5. All welds to conform to ANSI / AWWA C206 - 91.
TRENCH DEPTH

90%

TRENCH BACKFILL

95%

12" WARNING TAPE
SEE NOTE 4

6" MIN
8" MAX

4" TO 18" PIPE

BELL
PIPE OD
INVERT ELEVATION

D/4 6" MIN

470-C-2000 CONCRETE

CONCRETE BLOCK

D/4 4" MIN

TRENCH SECTION

SEE NOTES ON SHEET 2

LEGEND ON PLANS

SHEET 1 OF 2

RECOMMENDED BY THE CITY
OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR P.E. 56523 DATE

DRAWING NUMBER

SDW-112

CONCRETE ENCAIMENT FOR WATER MAINS

9/4/18

REVISION BY APPROVED DATE

ORIGINAL CD J. NAGELVOORT 10/16

REDAFTED CD J. NAGELVOORT 06/18
NOTES

1. ENCASE PIPE TO THE NEAREST JOINT.
2. FOR TRENCH RESURFACING IN IMPROVED STREETS, SEE SDG-107 AND SDG-108.
3. CONCRETE ENCASEMENT SHALL BE USED FOR RIGID PIPE ONLY (PVC CANNOT BE CONCRETE ENCASED).
4. INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.
5. (*) INDICATES MINIMUM RELATIVE COMPACTION.
6. PIPE SHALL BE CENTERED IN ENCASEMENT.
7. ENCASEMENT IS FOR 8" AND LARGER PIPE.
8. FOR MAINS LARGER THAN 16", TRENCH WIDTH SHALL BE AS SHOWN ON THE PLANS.
9. CONCRETE SHALL BE Poured AGAINST A SOLID FORM-WORK OR UNDISTURBED EARTH.
10. FOR CLARIFICATION ON WHEN TO USE CONCRETE ENCASEMENT, SEE LATEST WATER DESIGN GUIDELINES AND STANDARDS.
NOTE:
UNLESS OTHERWISE INDICATED ON THE PLANS OR SPECIFIED IN SPECIAL PROVISIONS, COVERS WITH CONCRETE READING LID SHALL BE USED.
NOTES:
1. ANY BACKFLOW PROTECTING A SERVICE USED FOR HUMAN CONSUMPTION SHALL BE LEAD FREE
2. ALL METER/BACKFLOW INSTALLATIONS SHALL BE APPROVED BY PUBLIC UTILITIES DEPARTMENT
3. SERVICE CONNECTIONS ON WATER MAIN SHALL BE 30" APART
4. INSTALL A CASING INCASED IN CONCRETE WHEN THE DISTANCE BETWEEN THE METER BOX AND THE RISER TO THE BFD EXCEEDS 18". NO CONNECTIONS OF ANY KIND PERMITTED IN THIS AREA.
5. SEE SDW-155 FOR ADDITIONAL INFORMATION

2-2" METER AND 2" BACKFLOW INSTALLATION WITH SERVICE AND COFFER BOX
**Configuration Block**

<table>
<thead>
<tr>
<th>Description</th>
<th>Height</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>METER BOX</td>
<td>18&quot;</td>
<td>884 LBS</td>
</tr>
<tr>
<td>PARKWAY COVER STEEL</td>
<td>2&quot;</td>
<td>191 LBS</td>
</tr>
<tr>
<td>PARKWAY COVER STEEL GALVANIZED</td>
<td>2&quot;</td>
<td>182 LBS</td>
</tr>
<tr>
<td>PARKWAY COVER STEEL W/ HOLES</td>
<td>2&quot;</td>
<td>182 LBS</td>
</tr>
<tr>
<td>PARKWAY GRATE</td>
<td>2&quot;</td>
<td>182 LBS</td>
</tr>
</tbody>
</table>

**Diagrams**

- **PARKWAY GRATE**: 18" x 40" METER BOX PARKWAY
- **PARKWAY COVER**: 18" x 40" METER BOX PARKWAY
- **BASE SECTION**: 18" x 40" METER BOX PARKWAY

**Note:**
1. CONCRETE BASE: 5000 PSI

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**City of San Diego - Standard Drawing**

**2" Meter, Backflow and Coffin Box**

**Recommended by the City of San Diego Standards Committee**

**Drawing Number**: SDW-114
NOTES:

1. 8 1/4" FLOOR PLATE SHALL BE CUT OUT OF THE COVER AND THE OPENING SHALL BE FINISHED FOR TIGHT FIT.

2. READ HOLE IN COVER SHALL BE CENTERED OVER EACH METER REGISTER.
NOTES:

1. 3/16" STEEL ENCLOSURE WITH ACCESS DOOR, MISC. HARDWARE, CABINET AND HARDWARE SHOULD BE ZINC RICH EPOXY POWDER PRIMER (2-3 MIL DRY FILM THICKNESS) AND POLYESTER POWDER TOP COAT (2-3 MIL DRY FILM THICKNESS).

2. D AND H CHANGES ONLY WITH APPROVAL OF THE CITY ENGINEER.

3. SEE SDW-159 FOR INSTALLATION OF COMBINATION AIR RELEASE & AIR/VACUUM VALVE.

4. SEE LOCATION DETAILS ON SHEET 2.

5. FOR INSTALLATION IN LOCATIONS SUSCEPTIBLE TO CORROSION, USE OF POLYETHYLENE ENCLOSURES PER APPROVED MATERIALS LIST IS REQUIRED.
1. PROTECTION POSTS SHALL BE INSTALLED AS CALLED FOR ON THE PLANS OR AS DIRECTED BY THE ENGINEER PER WM-04.

2. AIR & VACUUM VALVES & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN THE SPECIFICATIONS.
ITEMS CALL OUT:

1. WATER MAIN

2. FLANGED TAPPING SLEEVE OR TEE (NO SIZE-ON-SIZE TAPS ALLOWED) (4 x 4, 6 x 6, etc.). NO EXTENSIONS ALLOWED.

3. FULL RESILIENT SEAT GATE VALVE. SIZE OF VALVE SHALL MATCH SIZE OF FIRE SERVICE (4" MINIMUM DIAMETER). SEE NOTE #1.

4. 4" OR LARGER DIAMETER OF PIPE (DUCTILE IRON OR PVC PER APPROVED MATERIALS LIST).

5. VALVE WELL PER SDW-153.

6. VALVE WELL COVER PER SDW-153.

NOTES:

1. FOR SMALLER FIRE SERVICE REQUIREMENTS, USE REDUCER AT PROPERTY LINE.

2. FOR CORROSION CONTROL REQUIREMENTS, SEE PUBLIC UTILITIES DEPARTMENT DESIGN GUIDE.
DUAL ABOVE GROUND METER WITH CITY BACKFLOW PREVENTER

ITEMS CALL OUT:
1. 90° FLANGED DUCTILE IRON ELBOW (TYP).
2. FLANGED DUCTILE IRON SPOOL, BOTH ENDS SHALL BE FLANGED (UNI-FLANGE SHALL NOT BE USED).
3. DIAMETER OF TEE SHALL BE EQUAL TO THE DIAMETER OF THE SUPPLY PIPE.

SEE DIMENSIONS AND NOTES ON SHEET 2

SDW-119
<table>
<thead>
<tr>
<th>LETTER CODE</th>
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<th>METER SIZE</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>3&quot;</td>
</tr>
<tr>
<td>A</td>
<td>GATE VALVE</td>
<td>8&quot;</td>
</tr>
<tr>
<td>B</td>
<td>PIPE EXTENSION</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>C</td>
<td>STRAINER *</td>
<td>7&quot;</td>
</tr>
<tr>
<td>D</td>
<td>TURBINE WATER METER *</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>E</td>
<td>COMPOUND METER *</td>
<td>1'-5&quot;</td>
</tr>
<tr>
<td>F</td>
<td>TESTING TEE</td>
<td>11&quot;</td>
</tr>
<tr>
<td>G</td>
<td>90 DEG. ELBOW (SHORT)</td>
<td>5 1/2&quot;</td>
</tr>
<tr>
<td>H</td>
<td>OVERALL SLAB LENGTH *</td>
<td>11'-10&quot;</td>
</tr>
<tr>
<td>I</td>
<td>SLAB TO C/L PIPE</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>J</td>
<td>BACKFLOW *</td>
<td>3'-2&quot;</td>
</tr>
</tbody>
</table>

* INDIVIDUAL DIMENSIONS MAY VARY PER MANUFACTURER OVERALL DIMENSIONS INCREASE WITH USE OF THESE COMPONENTS

NOTES:
1. ALL BURIED DUCTILE IRON PIPE, FITTINGS, VALVES AND APPURTEYNANCES SHALL BE COATED WITH A DIELECTRIC COATING. A LIQUID EPOXY COATING SYSTEM PER AWWA C-210 AT 24 MILS MINIMUM DRY FILM THICKNESS (MDFT), OR A COLD APPLIED THREE-PART SYSTEM PETROLEUM WAX TAPE PER AWWA C-217, OR A 100% POLYURETHANE COATING OF 24 MILS (MDFT) SUITABLE.

2. ANY CHANGES SHALL HAVE PUBLIC UTILITIES DEPARTMENT APPROVAL.

3. PIPING SHALL BE SYMMETRICAL TO SLAB CENTERLINE.

4. SUPPLY PIPE IS ONE COMMERCIAL SIZE LARGER THAN PROPOSED METER.

5. CONCRETE SLAB AND FENCE WILL BE INSTALLED BY CONTRACTOR.

6. CONTACT CORROSION CONTROL SECTION FOR CORROSION REQUIREMENTS.

7. ALL METAL IN CONTACT WITH CONCRETE SHALL BE POLYETHYLENE WRAPPED USING 2" WIDE PLASTIC BACKED ADHESIVE TAPE 8 MILS THICK WITH 1/2" OVERLAP.

8. BACKFLOW SHALL BE INSTALLED IMMEDIATELY DOWNSTREAM FROM METER UNLESS APPROVED BY THE CITY CROSS-CONNECTION SPECIALIST.

9. BACKFLOW PREVENTERS SHALL BE REDUCED PRESSURE PRINCIPLE (RP) ASSEMBLY, (INSTALLED ABOVE GRADE AS CLOSE TO METER AS POSSIBLE) BACKFLOW LOCATION MUST BE APPROVED BY THE CROSS-CONNECTION CONTROL SECTION OF THE PUBLIC UTILITIES DEPARTMENT.

SHEET 2 OF 2
CAUTION
B Buried Cathodic Protection Line Below

CALL 619-515-3525

NOTES:

1. IN PAVED, CITY-OWNED ROADWAYS, THE REPAIR OF THE ROAD SURFACE SHALL BE PER APPLICABLE SDRSD SDG-117 OR SDG-118. IN STATE HIGHWAYS, CONFORM TO APPLICABLE CALTRANS STANDARDS.

2. FOR LOCATION OF TEST STATION, USE REGIONAL STD DWG WS-03. EXACT LOCATION SHALL BE APPROVED BY CORROSION ENGINEER.

3. AT ROADWAYS, USE SDW-129 AND AT UNDEVELOPED AREAS USE SDW-127.

4. FOR INSTALLATION OF DIRECTLY BURIED CABLES & CONDUIT SEE SDW-126.

ITEMS CALL OUT:

1. CABLE AWG #8 COPPER ASTM B3 STRANDED ASTM B8 INSULATION ASTM D1248 TYPE 1, CLASS C, GRADE 5.
2. POLYETHYLENE WARNING TAPE. SEE DETAIL 1.
3. SAND: 50 SIEVE COMPLIES WITH SECTION 200-1.5.

TEST STATION WIRING

APWA BLUE 6" WIDE TAPE WITH WHITE LETTERING CONTINUOUSLY IMPRINTED

SDW-121

AT-GRADE CATHODIC PROTECTION TEST STATION INSTALLATION FOR ROADWAYS

CITY OF SAN DIEGO – STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.E. 56523 DATE: 9/4/18

DRAWING NUMBER: SDW-121

REVISION BY APPROVED DATE

ORIGINAL SM A. OSKOUI 5/03
NOTES SM A. OSKOUI 12/06
UPDATED KA J. NAGELVOORT 01/12
REDRAWN CO J. NAGELVOORT 06/18

CORROSION CONTROL SECTION
NOTES:

1. ALL BOND CABLE SHALL BE INSTALLED AT MINIMUM LENGTH.

2. BOND CABLES SHALL NOT BE INSTALLED ACROSS INSULATING JOINTS.

3. ONE ADDITIONAL CABLE SHALL BE REQUIRED FOR PIPE DIAMETERS FROM 36" TO 48" AND 2 MORE FOR DIAMETERS LARGER THAN 48".

4. WELD BEFORE APPLYING INTERNAL COATING.

BOND CABLE: STRANDED COPPER HMWPE INSULATION. SIZING: FOR PIPE 12" DIAMETER AND LESS - USE AWG#8 (MIN). FOR PIPE DIAMETER GREATER THAN 12" - USE AWG #4 (MIN).
NOTES:

1. WHEREVER POSSIBLE, INSULATING FLANGE ASSEMBLIES SHOULD BE ASSEMBLED PRIOR TO INSTALLATION & TESTED ELECTRICALLY USING GAS ELECTRONIC TOOL OR APPROVED EQUAL TO INSURE THAT THE INSTALLATION IS EFFECTIVE.

2. WRAP FLANGE ASSEMBLY AS SHOWN WITH 3-PART PETROLATUM TAPE PER AWWA C217.

3. INSULATING FLANGE BOLT HOLE DIAMETER SHOULD BE 1/8" BIGGER THAN THE INSULATING SLEEVE OD.

4. RECOMMENDED FLANGE INSTALLATION PROCEDURE:
   - CLEAN & INSPECT PIPE FLANGE FACES, APPLY NON-CONDUCTIVE LUBRICANT TO ALL THREADS.
   - INSTALL THE GASKET, ALIGN FLANGES & GASKETS.
   - USE ALIGNMENT PIN IN TWO DIAMERICALLY OPPOSITE BOLT HOLES.
   - INSERT INSULATING SLEEVES INTO BOLT HOLES.
   - INSERT THE BOLT WITH BOTH INSULATING WASHERS.
   - TIGHTEN TWO DIAMERICALLY OPPOSITE BOLTS TO 30% TOTAL TORQUE.
   - TIGHTEN ALL BOLTS TO 50% AFTER REPLACING TWO ALIGNMENT PINS WITH BOLTS AND TO 100% OF FINAL TORQUE VALUE.

ITEMS CALL OUT:

1. PROTECTIVE COATING: 3-PARTS PETROLATUM AWWA C217 OR APPROVED EQUAL.

2. TAPE: WRAP AROUND 3" WIDE, 0.050" THICK CROSS LINKED POLYOLEFIN. HEAT SHRINKABLE, PRECOATED WITH HOT MELT-ADHESIVE.

3. WASHER: INSULATING EPOXY GLASS

4. GASKET: 1 / 8" THICK EPOXY GLASS INSULATING MATERIALS WITH NEOPRENE SEALING ELEMENT.

5. SLEEVE: INSULATING EPOXY GLASS 1/32" THICK ID=BOLT DIAMETER +1 / 64.

6. WASHER: STEEL, 1 / 8" THICK.
NOTES:

1. MOUNT WIRE TERMINATIONS AT 90 DEGREE ORIENTATION, FOR MORE THAN 4 WIRES, MOUNT WIRE TERMINATIONS 4" BELOW.

2. OFFSET MACHINE SCREW HEAD BY 3/4" FROM PIPE EXTERIOR WALL.

3. TAG WIRE WITH LINE NAME, PIPE SIZE, MATERIALS AND STATION USING SELF-ADHESIVE LABELS. LABELS SHALL BE WRAPPED AROUND THE INSULATION AND ENCASED WITH CLEAR HEAT-SHRINK PER SDW-131.

MATERIALS:

1. SCREW: MACHINE BRASS, ROUND HEAD SLOTTED, 1/4" - 20 T 1 1/2" LONG

2. NUT: BRASS 1/4" 20 THREADS

3. WASHER: BRASS 1/4"

4. WASHER, INSULATION NYLON, 0.719" OD, 0.084" ID, 0.062" THICK NATURAL

5. LUG: OFFSET TONGUE SOLDERNESS, COPPER.

6. WASHER: INSULATING, SHOULDER, NYLON, NATURAL, 0.260" OD, 0.625" OD FLANGE, 0.342" OD SHANK, 0.055" FLANGE THK, 0.270" SHANK THK.

7. CABLE: AWG #8, COPPER ASTM B3, STRANDED ASTM B6, INSULATED ASTM D1248 TYPE 1, CLASS C, GR. 5.

8. PIPE: 4" DIAMETER SCH 40 ASTM A53, GALVANIZED
EXOTHERMIC WELDING OF CABLES AND COATING OF WELDING

CABLE STRAND DETAILS

<table>
<thead>
<tr>
<th>CABLE SIZE</th>
<th>NO. OF STRANDS</th>
<th>NO. OF EXOTHERMIC GROUPS PER CABLE CONNECTION</th>
<th>CABLE STRANDS PER GROUP</th>
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<tbody>
<tr>
<td>8</td>
<td>19</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>19</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

NOTES:

1. CLEAN AREA OF STEEL SURFACE APPROXIMATELY 2" x 2" FOR EACH THERMOWELD CONNECTION. WIRE BRUSH FILE AND SCRAPE TO OBTAIN SSPC-SP-5 WHITE METAL SURFACE FINISH.

2. SELECT PROPER MOLD BASED ON STRUCTURE GEOMETRY, ORIENTATION AND MATERIAL TYPE.

3. STRIP CABLE END AND TWIST TO FIT THERMOWELD MOLD. CABLE SIZES LARGER THAN 6 AWG SHALL BE THERMOWELDED BY TWISTING CONDUCTORS INTO GROUPS APPROXIMATELY NUMBER 6 AWG CABLE SIZE. MINIMUM SPACING BETWEEN WELDS WILL BE DETERMINED BY MOLD GEOMETRY, NOMINALLY 3".

4. HOLD MOLD FIRMLY AGAINST PIPE WITH OPENING AWAY FROM THE OPERATOR. IGNITE WITH FLINT GUN.

5. REMOVE ALL WELD SLAG, SPLATTER, SHARP EDGES AND BURRS WITH CHIP HAMMER AND METAL FILE.

6. TEST STRENGTH OF CONNECTION BY LIGHTLY TAPPING WITH 1 LB HAMMER, AND PULL WITH 5 LB FORCE ON CABLE.

7. WIPE PIPE SURFACE WITH CLEAN, OIL FREE RAGS TO REMOVE ANY LOOSE DUST.

8. PRIME CLEANED SURFACE WITH APPROVED PRIMER.

9. COAT THERMOWELD AND 6" OF CABLE TAIL WITH COMPATIBLE COATING, SUCH THAT ALL CORNERS ARE FILLED. THE COATING SHALL EXTEND FOR AT LEAST 2" AROUND THE THERMOWELD AREA.

10. THERMOWELD CARTRIDGE SIZE SHALL BE COMPATIBLE TO STEEL MATERIALS. MULTIPLE POWDER CARTRIDGE CHARGERS SHALL NOT BE USED. IF A THERMOWELD MUST BE REPEATED, A NEW PIPE SURFACE MUST BE PREPARED AT LEAST 3" FROM THE ORIGINAL WELD ATTEMPT MORE THAN ONE WELD ATTEMPT ON THE SAME SPOT SHALL NOT BE PERMITTED.

11. IN NON-CONCRETE LINED PIPES, ALL EXOTHERMIC WELDS SHALL BE MADE IN A STEEL PAD.

ITEMS CALL OUT:

1. CABLE: AWG SIZE, ASTM B3/B8, ASTM D-1248, TYP1 1, CLASS C, GR.5 INSULATION
2. SLEEVE: ADAPTER
3. APPROVED PRIMER & WELD CAP OR MORTAR OVER WELD LOCATION
NOTES:
1. MATERIAL:
   1. POLYETHYLENE WARNING TAPE, REFER TO DETAIL 1 ON SDW-121.
   2. SAND: 50 SIEVE COMPLIES WITH 200-1.5

2. IN PAVED, CITY-OWNED ROADWAYS, THE REPAIR OF THE ROAD SURFACE SHALL BE PER
   APPLICABLE SDG-117 OR SDG-118. IN STATE HIGHWAYS, CONFORM TO APPLICABLE
   CALTRANS STANDARDS.

3. CLEAN SHARP STONES AND RUBBLE FROM THE BOTTOM OF DITCH.
NOTES:
1. PLACE TWO DECALS, ONE FACING ROADWAY.

2. FILL THE PIPE WITH 50 SIEVE SAND FROM BOTTOM OF CONCRETE FOOTING TO 12" ABOVE GRADE.

3. THIS POST-MOUNTED STATION IS FOR USE ONLY IN AREAS WITH NO VEHICULAR TRAFFIC.

ITEM CALL OUT:
CABLE: AWG #8 COPPER ASTM B3 STRANDED ASTM B8 INSULATION ASTM D 1248 TYPE 1, CLASS C, GR. 5.

FOOTING: CONCRETE 12" DIA., SSPWC 295-C-17.

PIPE: 4" DIAMETER, SCH 40, ASTM A 53 GALVANIZED.

DECAL: SEE SDW-132.

CAP: THREADED 4" DIAMETER GALVANIZED.
TEST BOX COVER ISOMETRIC

TEST BOX COVER PLAN

TEST BOX ISOMETRIC SECTION

NOTES:
1. COVER WEIGHT: 12 LB.
2. BODY WEIGHT: 58 LB.
3. THE COVER SHALL HAVE CASTED MARKING IN 1/2" HIGH RAISED LETTERS.

ITEM CALL OUT:
① COVER: ASTM A 48 CLASS 30.
NOTES:

1. SLOPE CONCRETE PAD AWAY FROM COVER.
2. FOR CONTINUATION OF CABLES, REFER TO SDW-127 OR SDW-130, AS APPLICABLE.

ITEMS CALL OUT:

1. CONCRETE: 2' X 2' X 4" THK. PER SSPWC 330-C-23.
2. REINFORCING FABRIC 4" X 4" GAUGE 10 WIRE.
3. CABLE: REFER TO NOTE 2.

TEST STATION SECTION
NOTES:

1. IN PAVED, CITY OWNED ROADWAYS, THE REPAIR OF THE ROAD SURFACE SHALL BE PER APPLICABLE STANDARD DRAWINGS. IN STATE HIGHWAYS, CONFORM TO APPLICABLE CALTRANS STANDARD.

2. FOR LOCATION, OF TEST STATION, USE REGIONAL STD DWG W15. EXACT LOCATION SHALL BE APPROVED BY CORROSION ENGR.

3. USE APPLICABLE TEST STATION DRAWING FOR UNDEVELOPED AREAS

ITEM CALL OUT:

1. CABLE: AWG #2 COPPER ASTM B3, STRANDED ASTM B8, INSULATED PER ASTM D1248, TYPE 1 CLASS C, GRADE 5.

2. POLYETHYLENE WARNING TAPE PER SDW-121.

3. SAND: 50 SIEVE
WIRE LABEL DETAIL STATION

WIRE LABEL

CPTS# (CATHODIC PROTECTION TEST STATION NUMBERING)
CPTS#1, 2, 3, ......N

LEGEND

PIPE MATERIAL
CCI - COATED CAST IRON
CDI - COATED DUCTILE IRON
SCRC - STEEL CYLINDER REINFORCED CONCRETE
PSCS - PRE-STRESSED CONCRETE-STEEL CYLINDER
RCCP - REINFORCED CONCRETE CYLINDER PIPE (WO STEEL)
SCRW - STEEL CYLINDER REINFORCED ROD WRAPPED
CMLC - CEMENT MORTAR LINED-COATED STEEL CYLINDER
CMLCT - CEMENT MORTAR LINED-COATED-TAPED STEEL CYLINDER
CSTL - COATED STEEL CYLINDER

TYPE OF INSTALLATION
2WTS - 2-WIRE TEST STATION
EXAMPLE: CPTS#1, 2WTS, 180+00, 30, OTAY 2, CSTL

4WIJTS - 4-WIRE INSULATING JOINT TEST STATION
EXAMPLE: CPTS#2, 4WIJTS, 180+00, 30, OTAY 2, CSTL, NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

6WTS - 6-WIRE TEST STATION
EXAMPLE: STRUCTURE#1 - CPTS#3, 6WTS, 180+00, 30, OTAY 2, CSTL NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS
STRUCTURE#2 - CPTS#3, 6WTS, 120+60, 24, MIDCITY, SCRW NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS
STRUCTURE#3 - CPTS#3, 6WTS, 101+25, 54, TROJAN, RCCP, NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

CTS - CURRENT TEST STATION
EXAMPLE: CPTS#10, CTS, 180+00, 200 FT., OTAY 2, CSTL, NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

CSGTS - CASING TEST STATION
EXAMPLE: CPTS#12, CSGTS, 180+00, 30, OTAY 2, CSTL NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

ASTA - ANODE STATION
EXAMPLE: ANODE#1, 2, 3, ......N FOR ANODE WIRES; 30, OTAY 2, CSTL, 180+00, CPTS#6 FOR STRUCTURE WIRE

BSTA - BOND STATION
EXAMPLE: CPTS#18, BSTA, 30, OTAY 2, CSTL, 180+00; 54, OTAY 3, SCRW, 65+20

FXSTA - FOREIGN CROSSING STATION
EXAMPLE: CPTS#4, FXSTA; 30, OTAY 2, CSTL, 180+00; 24 SDGE

NOTES:
1. CABLES SHALL BE TAGGED USING TIMES ROMAN 10 POINT FONT.
2. TEXT SHALL BE PRESENTED IN THE FOLLOWING ORDER:
   * CPTS#
   * TYPE OF INSTALLATION
   * STATIONING
   * FACILITY NAME
   * PIPE MATERIAL
   * WIRE DIRECTIONAL ORIENTATION
     - NORTH
     - SOUTH
     - EAST
     - WEST
3. PLACE SLEEVE AFTER ATTACHMENT OF LABEL TO CABLE.

ITEM CALL OUT:
1. CABLE: AWG ASTM B8 & B3
2. LABEL: FILE FOLDER, SELF ADHESIVE WHITE 2/3" X 3 7/16".
3. SLEEVE: HEAT SHRINK, ADHESIVE LINED POLYOLEFIN, CLEAR THIN WALL TUBING.
NOTES:
1. METER BOX COLLAR AND COVER SHALL BE OF POLYMERIC CONCRETE REINFORCED WITH CONTINUOUS LAYERS OF WOVEN FIBERGLASS.
2. BOX AND COVER SHALL WITHSTAND AASHTO H-20 (ASTM C857).
3. FOR COVER DETAIL WITH DROP IN READER LID, SEE SDW-136.
4. SEE SDW-137 FOR INSTALLATION PROCEDURE.
POLYMER CONCRETE COLLAR
3/16" THICK FIBERGLASS BODY

SECTION A-A

NOTES

1. METER BOX COLLAR AND COVER SHALL BE OF POLYMER CONCRETE REINFORCED WITH CONTINUOUS LAYERS OF WOVEN FIBERGLASS.

2. BOX AND COVER SHALL WITHSTAND AASHTO H-20 (ASTM C857).

3. FOR COVER DETAIL WITH READER LID, SEE SDW-136.

4. SEE SDW-137 FOR INSTALLATION PROCEDURE.
2ND LIFT PIN FOR 2" METER BOX ONLY

LOGO (SD CITY WATER)

LIFT PIN

SECTION A-A

SOLID COVER FOR TRAVELED WAY

NOTES:

1. LID SHALL WITHSTAND AASHTO H-20 (ASTM 857).

2. LID SHALL HAVE NON-SKID SURFACE.
NOTES

1. LID SHALL WITHSTAND AASHTO H-10 (ASTM C857-85).
2. LID SHALL HAVE NON-SKID SURFACE.
3. IF LID IS MANUFACTURED BY CDR, READER SHALL BE 6" X 9".
NOTES:

1. REFER TO SDG-107 NOTE 3 FOR CURING REQUIREMENTS.

2. THIS DRAWING SHALL BE USED IN AREAS SUBJECT TO HEAVY TRAFFIC INCLUDING DRIVeways, PARKING LOTS AND ALLEYS.

3. (*) FOR METER BOX OUTSIDE TRAVEL WAY, USE SAND SE 30.
ITEMS CALL OUT:
1. 1" WATER SERVICE
2. 1" CURB STOP
3. MAIN CONNECTION X MULTIPLE BRANCH CONNECTION
4. BRASS COUPLING OR 45 DEGREE ELBOW
5. BRASS NIPPLE - 4" MIN. LENGTH
6. BRASS 45 DEGREE ELBOW
7. CAST IRON CAP
8. ASBESTOS CEMENT PIPE
9. THRUST BLOCK PER SDW-151

NOTE: NIPPLE LENGTHS TO BE SUFFICIENT TO ALLOW SERVICE CONNECTION TO CLEAR THRUST BLOCK.

<table>
<thead>
<tr>
<th>SERVICE CONNECTION</th>
<th>MAIN CONNECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1 1/4&quot;</td>
</tr>
<tr>
<td>3</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>4</td>
<td>2&quot;</td>
</tr>
<tr>
<td>6</td>
<td>2 1/2&quot;</td>
</tr>
<tr>
<td>8</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>

SECTION A-A

ELEVATION

NOTE: NIPPLE LENGTHS TO BE SUFFICIENT TO ALLOW SERVICE CONNECTION TO CLEAR THRUST BLOCK.
NOTES:

CONTRACTOR SHALL PROVIDE HANDHOLES AS REQUIRED TO COMPLETE THE WORK
### BACKFLOW PREVENTERS

**WET UTILITY ROOM INSTALLATION**

**CITY OF SAN DIEGO - STANDARD DRAWING**

**SDW-141**

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<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CONCRETE THRUST BLOCK. SEE SDW-151</td>
<td>6</td>
<td>APPROVED RPDA</td>
</tr>
<tr>
<td>2</td>
<td>90° DUCTILE IRON FLANGE ELBOW</td>
<td>7</td>
<td>FLANGED OS&amp;Y RWGV WITH HAND WHEEL</td>
</tr>
<tr>
<td>3</td>
<td>FLANGED DUCTILE IRON PIPE (PROPERLY SUPPORTED OR RESTRAINED)</td>
<td>8</td>
<td>BRASS OR COPPER PIPE (PROPERLY SUPPORTED OR RESTRAINED)</td>
</tr>
<tr>
<td>4</td>
<td>12&quot; FLANGED DUCTILE IRON SPOOL</td>
<td>9</td>
<td>UNIONS</td>
</tr>
<tr>
<td>5</td>
<td>APPROVED BACKFLOW ASSEMBLY WITH FLEX COUPLER CONNECTORS FOR SEISMIC REQUIREMENTS</td>
<td>10</td>
<td>APPROVED RP BACKFLOW PREVENTER (ALL Y-STRAINERS OR PRV TO BE INSTALLED DOWNSTREAM OF BACKFLOW ASSEMBLY)</td>
</tr>
</tbody>
</table>

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**ACCESS DOORS OR GATE WITH KNOX BOX**

**WET UTILITY ROOM (WUR)**

(SEE NOTE 1 ON SHEET 2)

**METER BOX & ASSEMBLY PER SDW-149, 150**

**CITY VALVE**

**CITY MAIN**

**POLYETHYLENE FOAM TYP**

**FLOW**

**12" MIN. 24" MAX**

**BUILDING BASEMENT**

**FIRE SERVICE CONNECTION & ASSEMBLY PER SDW-118**

**WATER SERVICE CONNECTION PER SDW-149, SDW-150**

**SITE ISOLATION VALVE**

---

**GATE WITH KNOX BOX**

**ACCESS DOORS OR GATE WITH KNOX BOX**

---

**CONCRETE THRUST BLOCK. SEE SDW-151**

**90° DUCTILE IRON FLANGE ELBOW**

**FLANGED DUCTILE IRON PIPE (PROPERLY SUPPORTED OR RESTRAINED)**

**12" FLANGED DUCTILE IRON SPOOL**

**APPROVED BACKFLOW ASSEMBLY WITH FLEX COUPLER CONNECTORS FOR SEISMIC REQUIREMENTS**

---

**CITIZEN MAIN**

**PRIVATELY MAINTAINED**

**PUBLICLY MAINTAINED**

---

**NOTE 1:**

- SEE SDW-151
- CONCRETE THRUST BLOCK
- SEE SDW-151
- CONCRETE THRUST BLOCK

---

**NOTE 2:**

- SEE SDW-151
- CONCRETE THRUST BLOCK
- SEE SDW-151
- CONCRETE THRUST BLOCK

---

**NOTE 3:**

- SEE SDW-151
- CONCRETE THRUST BLOCK
- SEE SDW-151
- CONCRETE THRUST BLOCK

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**NOTE 4:**

- SEE SDW-151
- CONCRETE THRUST BLOCK
- SEE SDW-151
- CONCRETE THRUST BLOCK

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**NOTE 5:**

- SEE SDW-151
- CONCRETE THRUST BLOCK
- SEE SDW-151
- CONCRETE THRUST BLOCK

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**NOTE 6:**

- SEE SDW-151
- CONCRETE THRUST BLOCK
- SEE SDW-151
- CONCRETE THRUST BLOCK

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**NOTE 7:**

- SEE SDW-151
- CONCRETE THRUST BLOCK
- SEE SDW-151
- CONCRETE THRUST BLOCK

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**NOTE 8:**

- SEE SDW-151
- CONCRETE THRUST BLOCK
- SEE SDW-151
- CONCRETE THRUST BLOCK

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**NOTE 9:**

- SEE SDW-151
- CONCRETE THRUST BLOCK
- SEE SDW-151
- CONCRETE THRUST BLOCK

---

**NOTE 10:**

- SEE SDW-151
- CONCRETE THRUST BLOCK
- SEE SDW-151
- CONCRETE THRUST BLOCK
NOTES:

1. CITY WATER METERS INSTALLED WITHIN WET UTILITY ROOM (WUR), REFER TO SDW-157 FOR SEPARATION OF MAINTENANCE RESPONSIBILITIES.

2. THE WUR MUST BE APPROVED BY THE PUBLIC UTILITIES & DEVELOPMENT SERVICES DEPARTMENTS.

3. THE WUR APPLIES ONLY TO BUILDINGS BUILT AT THE PROPERTY LINE WITH ZERO SETBACK.

4. IN UTILIZING THE WUR OPTION, THE BUILDING OWNER AGREES TO REQUIREMENTS OF SDW-141.

5. PROVIDE ACCESS INTO THE WUR BY STORING KEYS WITHIN A KNOX KEY BOX.

6. WUR's MAY CONTAIN BACKFLOW PREVENTION EQUIPMENT OR CITY WATER METERS (EASEMENT REQUIRED).

7. THE WUR MUST BE DESIGNED AT STREET LEVEL, ADJACENT TO EXTERIOR WALL OF THE BUILDING, AND ALLOW ACCESS FROM STREET LEVEL THROUGH THIS EXTERIOR WALL.

8. ACCESS DOORS OR GATES MUST PROVIDE DRAINAGE FOR FULL DISCHARGES AWAY FROM THE BUILDING.

9. A CONCRETE FLOOR PLAN WITH FLOOR DRAINS MUST PROVIDE DRAINAGE FOR INTERMEDIATE DISCHARGES.

10. MOISTURE BARRIERS SHALL BE APPLIED TO ALL EXPOSED AREAS WITHIN THE WUR TO PREVENT DAMAGE.

11. PROVIDE ADEQUATE CLEARANCE AROUND THE EQUIPMENT TO ALLOW FOR TESTING AND MAINTENANCE.

12. THE WUR MUST BE FIRE RATED FOR ONE HOUR PER THE FIRE & RESCUE DEPARTMENT.

13. IDENTIFY THE TYPE OF EQUIPMENT CONTAINED WITHIN THE WUR WITH APPROPRAITE SIGNAGE.


15. KNOX KEY BOX TO BE INSTALLED ADJACENT TO THE WUR ENTRANCE WITHIN 4 - 6 FEET.

16. ONCE THE KNOX BOX IS INSTALLED, NOTIFY THE PUBLIC UTILITIES DEPARTMENT, CROSS CONNECTION CONTROL UNIT TO LOCK THE KEY BOX.
NOTES:
1. SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE.
2. LOCATE METER BOX PER WS-03.
3. INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.
4. BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS.
5. ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES.
6. CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE PET COCK.
7. FOR BLOW OFF AT END OF MAIN, SEE SDW-106.
8. FOR STEEL AND DI MAINS: INSTALL DIELECTRIC UNION AFTER CORPORATION STOP.
9. WAX TAPE FROM MAIN TO 3" PAST DIELECTRIC UNION, INCLUDING SADDLE.

ITEM NO | SIZE AND DESCRIPTION |
--- | --- |
1 | POLYMER METER BOX WITH LID 17" x 30", SEE NOTE 2 |
2 | 2" CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 7 |
3 | 1/4" PRESSURE PET COCK |
4 | 2" 90° BRONZE MIPT x FIPT ELL |
5 | 2" OVAL METER FLANGE FLG x FIPT, WITH GASKET |
6 | 3/8" ROCK 4" TO 6" DEEP |
7 | 2" BRONZE COMP x FLG ANGLE METER STOP WITH LOCK WING |
8 | 2" x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT |
9 | 90° ELL (NO SWEAT JOINTS ALLOWED) |
10 | 2" BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED) |
11 | BRONZE CORPORATION STOP (INSTALL WITH KEY ON SIDE AND OPEN TAP) |
12 | SIZE x 2" SERVICE SADDLE |
13 | WATER MAIN |
14 | 2" COPPER DIELECTRIC UNION. REQUIRED FOR STEEL OR DI MAINS.
NOTES:

1. SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE.
2. LOCATE METER BOX PER WS-03.
3. INSTALL WARNING / IDENTIFICATION TAPE PER SDW-155.
4. FOR BLOW-OFF INSTALLATION AT END OF MAIN SEE SDW-146.
5. BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECycled WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS.
6. 45° BEND SHALL BE USED FOR MAINS UP TO 30". 90° BEND SHALL BE USED FOR MAINS IN EXCESS OF 30" AS DIRECTED BY THE ENGINEER.
7. CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE PET COCK.
8. FOR STEEL AND DI MAINS, BLOW-OFF PIPE MATERIAL AND COATING SHALL BE THE SAME AS THE MAIN LINE.
9. BOND JOINTS PER SDW-122
10. TANGENTIAL OUTLETS ARE ACCEPTABLE FOR STEEL MAINS.
11. FOR PVC MAINS, DI PIPE SHALL BE COATED PER SPECIFICATIONS.

ITEM
NO
SIZE AND DESCRIPTION

ITEM
NO
SIZE AND DESCRIPTION

1. POLYMER METER BOX WITH LID 17" x 30", SEE NOTE 2
2. 4" OR 6" CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 7
3. 1/4" PRESSURE PET COCK
4. 4" OR 6" FLANGED COMPANION x FIPT
5. 3/8" ROCK 4" TO 6" DEEP
6. 4" OR 6" FLG DI PIPE x REQUIRED LENGTH(MAXIMUM OF 2 SPOOLS)
7. CONCRETE THRUST BLOCK SEE SDW-151
8. 4" OR 6" FLG x MJ/PO 90° BEND

9. USE DUCTILE IRON OR PVC C900
10. VALVE WELL FRAME AND COVER (SEE SDW-153)
11. 4" OR 6" FLG x MJ/FLG RWGV
12. WATER MAIN
13. SIZE x 4" OR 6" MJ/FLG x FLG TEE
14. 4" OR 6" FLANGED 45° BEND
15. 4" OR 6" FLANGED 45° BEND
16. 4" OR 6" x 24" FLG DI SPOOL
**NOTES:**

1. FOR BLOW-OFF INSTALLATION AT END OF MAIN SEE SDW-106 AND SDW-146.
2. BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS.
3. ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED).
4. 45° BEND SHALL BE USED FOR MAINS UP TO 30". 90° BEND SHALL BE USED FOR MAINS IN EXCESS OF 30" AS DIRECTED BY THE ENGINEER.
5. FOR STEEL AND DI MAINS, BLOW-OFF PIPE MATERIAL AND COATINGS SHALL BE THE SAME AS THE MAIN LINE.
6. BOND JOINTS PER SDW-122.
7. TANGENTIAL OUTLETS ARE ACCEPTABLE FOR STEEL MAINS.
8. FOR PVC MAINS, DI PIPE SHALL BE COATED PER SPECIFICATIONS.

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<tbody>
<tr>
<td>1</td>
<td>Gate Well with Cap SEE SDW-153</td>
<td>8</td>
<td>Ductile Iron or C-900 PVC</td>
</tr>
<tr>
<td>2</td>
<td>Galvanized Iron Plug</td>
<td>9</td>
<td>4&quot; or 6&quot; FLG x MJ / FLG RWGV</td>
</tr>
<tr>
<td>3</td>
<td>Galvanized Iron Coupling, Threaded</td>
<td>10</td>
<td>4&quot; or 6&quot; x 24&quot; FLG Di Spool</td>
</tr>
<tr>
<td>4</td>
<td>10&quot; Steel Gate Well with Cap</td>
<td>11</td>
<td>Water Main</td>
</tr>
<tr>
<td>5</td>
<td>4&quot; or 6&quot; FLG Di Pipe x Required Length (Maximum of 2 Spools)</td>
<td>12</td>
<td>Size x 4&quot; or 6 MJ / FLG x FLG Tee</td>
</tr>
<tr>
<td>6</td>
<td>Concrete Thrust Block SEE SDW-151</td>
<td>13</td>
<td>4&quot; or 6&quot; Flanged 45° Bend, See Note 4</td>
</tr>
<tr>
<td>7</td>
<td>Flange x Flange x 90° Bend</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LEGEND ON PLANS**
4" ×
6" ×
NOTES:
1. BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS.
2. FOR 2" BLOW-OFFS ON STEEL MAINS USE WELD ON COUPLINGS. ON DUCTILE IRON MAINS USE DUCTILE IRON.
3. SERVICE SADDLES FOR END OF MAIN DETAIL SEE SDW-106.
4. FOR STEEL AND DI MAINS, INSTALL DIELECTRIC UNION AFTER CORPORATION STOP.
5. WAX TAPE FROM MAIN TO 3" PAST DIELECTRIC UNION, INCLUDING SADDLE.

<table>
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<tbody>
<tr>
<td>1</td>
<td>CONCRETE THRUST BLOCKS SEE SDW-151</td>
<td>9</td>
<td>FLG x MJ/PO ADAPTER (IF REQUIRED)</td>
</tr>
<tr>
<td>2</td>
<td>DI END CAP</td>
<td>10</td>
<td>C-900 PVC PIPE</td>
</tr>
<tr>
<td>3</td>
<td>WATER MAIN</td>
<td>11</td>
<td>FLG x MJ/PO ECCENTRIC DI REDUCER</td>
</tr>
<tr>
<td>4</td>
<td>BRONZE SERVICE CLAMP (DOUBLE STRAP). SIZE x 2&quot; SERVICE SADDLE</td>
<td>12</td>
<td>MAIN SIZE x BLOWOFF SIZE FLANGE MANUFACTURED STEEL TANGENTIAL OUTLET</td>
</tr>
<tr>
<td>5</td>
<td>2&quot; BRONZE MIPT x COMP CORPORATION STOP</td>
<td>13</td>
<td>FLG x MJ/PO BEND (IF REQUIRED)</td>
</tr>
<tr>
<td>6</td>
<td>2&quot; x REQ'D LENGTH COPPER PIPE TYPE &quot;K&quot; RIGID OR SOFT</td>
<td>14</td>
<td>FLG x MJ/PO 90' BEND</td>
</tr>
<tr>
<td>7</td>
<td>GATE WELL WITH CAP SEE SDW-153 &amp; SDW-154</td>
<td>15</td>
<td>FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOL)</td>
</tr>
<tr>
<td>8</td>
<td>FLG x MJ/PO/FLG RWGV</td>
<td>16</td>
<td>2&quot; COPPER DIELECTRIC UNION. REQUIRED FOR STEEL OR DI MAINS.</td>
</tr>
</tbody>
</table>
NOTES:
1. INSTALL CORPORATION STOP WITH KEY IN THE SIDE POSITION.
2. SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB, OR FINISH GRADE.
3. LOCATE METER BOX PER WS-03.
4. INSTALL WARNING / IDENTIFICATION TAPE PER SDM-105.
5. ONLY APPROVED BRASS MECHANICAL COUPLING DEVICES ALLOWED FOR TYPE K COPPER PIPE.
6. ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES.
7. TOP TAPS NOT PERMITTED.
8. FOR STEEL AND DI MAINS, INSTALL DIELECTRIC UNION AFTER CORPORATION STOP.
9. WAX TAPE FROM MAIN TO 3" PAST DIELECTRIC UNION, INCLUDING SADDLE.

ITEM NO | SIZE AND DESCRIPTION
--- | ---
1 | WATER MAIN.
2 | 2" BRONZE CORPORATION STOP.
3 | SIZE x 2" BRONZE SERVICE SADDLE DOUBLE BRONZE STRAP.
4 | 2" x REQUIRED LENGTH COPPER PIPE TYPE "L" SOFT/RIGID.
5 | SE 50 SAND, 4" TO 6" DEEP.
6 | 2" BRONZE ANGLE METER STOP WITH LOCKWING.
7 | WATER METER FURNISHED AND INSTALLED BY THE CITY.
8 | METER BOX LID, #6: 35"x 21"
9 | CUSTOMER SHUT-OFF VALVE (LOCKABLE) FURNISH AND INSTALLED BY THE CITY.
10 | 2" COPPER DIELECTRIC UNION. REQUIRED FOR STEEL OR DI MAINS.
11 | BRASS 90° BEND.
12 | MECHANICAL COUPLING.
NOTES:
1. INSTALL CORPORATION STOP WITH KEY IN THE SIDE POSITION.
2. SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB, OR FINISH GRADE.
3. LOCATE METER BOX PER WS-03.
4. INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.
5. ONLY APPROVED BRASS MECHANICAL COUPLING DEVICES ALLOWED FOR TYPE K COPPER PIPE.
6. ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES.
7. BRONZE PIPE SADDLES ARE REQUIRED FOR ALL TAPS INTO POLYVINYL CHLORIDE (PVC) WATER MAIN. TOP TAPS ARE NOT PERMITTED.
8. FOR STEEL AND DI MAINS, INSTALL DIELECTRIC UNION AFTER CORPORATION STOP.
9. INSTALL WAX TAPE FROM MAIN TO 3" PAST DIELECTRIC UNION, INCLUDING SADDLE.

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<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WATER MAIN</td>
<td>6</td>
<td>WATER METER FURNISHED AND INSTALLED BY THE CITY.</td>
</tr>
<tr>
<td>2</td>
<td>1&quot; BRONZE CORPORATION STOP.</td>
<td>7</td>
<td>METER BOX WITH LID, #37: 28&quot; X 18&quot;</td>
</tr>
<tr>
<td>3</td>
<td>SIZE x 1&quot; BRONZE SERVICE SADDLE DOUBLE BRONZE STRAP</td>
<td>8</td>
<td>CUSTOMER SHUT-OFF VALVE (LOCKABLE) FURNISHED AND INSTALLED BY THE CITY.</td>
</tr>
<tr>
<td>4</td>
<td>USE COPPER TUBING TYPE (K) SOFT FOR 1&quot; SERVICES ONLY. NO INTERMEDIATE JOINTS PERMITTED WITHIN THE FIRST 60' FROM THE MAIN. FOR LENGTHS LONGER THAN 60' USE FLARE JOINT UNION OR LOK-PAC FITTINGS WITH LOCKING CLAMP AND STAINLESS STEEL BOLT ONLY. NO SWEAT JOINTS ARE ALLOWED.</td>
<td>9</td>
<td>SE 50 SAND, 4&quot; TO 6&quot; DEEP.</td>
</tr>
<tr>
<td>5</td>
<td>BRONZE ANGLE METER STOP WITH LOCKWING DEVICE AND METER COUPLING ATTACHED. FURNISH AND INSTALL BRONZE PROPERTY VALVE. USE SPACER FOR METER.</td>
<td>10</td>
<td>1&quot; COPPER DIELECTRIC UNION. REQUIRED FOR STEEL OR DI MAINS.</td>
</tr>
</tbody>
</table>

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RECOMMENDED BY THE CITY OF SAN DIEGO STANDARD DRAWING

CITY OF SAN DIEGO - STANDARD DRAWING

1" WATER SERVICE INSTALLATION

SDW-150
NOTES:

1) THE ANCHOR BLOCKS ON VERTICAL BENDS REQUIRE ENGINEER APPROVAL.

2) A MINIMUM OF 6" OF CONCRETE SHALL BE POURED ON WETTED UNDISTURBED OR COMPACTED SOIL BENEATH EACH INSTALLATION.

3) TEE SHALL BE CONCRETE BLOCKED A MINIMUM OF 6" ON ALL THREE SIDES.

4) USE 12" - 18" LENGTH OF PIPE BETWEEN THE END CAP AND THE LAST JOINT AS A BOND BREAKER ON DEAD END BLOCKING.

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: P.E. 56623 DATE 9/4/18

CONCRETE THRUST AND ANCHOR BLOCK INSTALLATIONS

DRAWING NUMBER SDW-151
**NOTES:**

1) BEARING AREA BASED ON SOIL BEARING VALUE OF 1500 PSF AND 225 PSI LINE PRESSURE AND A MINIMUM OF 36" COVER:
   FOR BEARING = 1000 PSF, 1.5 x AREA SHOWN
   FOR BEARING = 500 PSF, 3.0 x AREA SHOWN

2) ENGINEER SHALL DETERMINE SIZES, REFER TO SPECIFICATIONS FOR THRUST AND ANCHOR BLOCK SIZING.

3) THRUST BLOCKS SHALL BE CENTERED ON THE FITTING SO THAT THE BEARING AREA IS EXACTLY OPPOSITE THE RESULTANT DIRECTION OF THRUST.

4) CONCRETE SHALL BE PLACED SO THAT FITTINGS AND VALVES WILL BE ACCESSIBLE FOR REPAIR OR REPLACEMENT.
NOTES:

1) BEARING AREA "B" MUST BE EQUAL TO OR GREATER THAN THE AREA REQUIRED FOR A 90° ELBOW INSTALLATION.

2) INSTALL SAND BAGS AROUND BUTTERFLY VALVE ACTUATOR TO ISOLATE IT FROM CONCRETE.

3) BFV’S INSTALLED AT CROSSES OR TEES REQUIRE A FLANGED DUCTILE IRON SPOOL TO BE INSTALLED BETWEEN THE FITTING AND VALVE IN ACCORDANCE WITH THE SPECIFICATIONS.
POTABLE WATER

GATE WELL LID

INSIDE GATE WELL LID PAINTED IDENTIFICATION MARKING

<table>
<thead>
<tr>
<th>COLOR</th>
<th>GATE WELL AND LIDS USED FOR:</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED</td>
<td>NORMALLY CLOSED SYSTEM VALVES (NCV)</td>
</tr>
<tr>
<td>WHITE</td>
<td>RESILIENT WEDGE GATE VALVES</td>
</tr>
<tr>
<td>YELLOW</td>
<td>BUTTERFLY VALVES</td>
</tr>
</tbody>
</table>

GATE WELL LID TOP COLOR & CONDITION

<table>
<thead>
<tr>
<th>VALVE CONDITION</th>
<th>BUTTERFLY VALVE</th>
<th>GATE VALVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERMANENTLY CLOSED</td>
<td>RED</td>
<td>RED</td>
</tr>
<tr>
<td>TEMPORARILY CLOSED</td>
<td>YELLOW WIRED DOT</td>
<td>WHITE WIRED DOT</td>
</tr>
<tr>
<td>PERMANENTLY OPEN</td>
<td>YELLOW</td>
<td>WHITE</td>
</tr>
</tbody>
</table>

NOTES:

1) GATE WELL LIDS SHALL BE CAST IRON WITH "CITY OF SAN DIEGO" AND THE WORD "WATER" FOR USE WITH POTABLE WATER SYSTEMS AND "RECYCLED" FOR USE WITH RECYCLED WATER SYSTEMS. LIDS SHALL INCLUDE A 1" LIFTING SLOT
GATE WELL (GATE VALVES)

EXISTING BASE OR OLD CONCRETE PAVEMENT

SET GATE WELL ON VALVE BONNET

GATE WELL (BUTTERFLY VALVES)

TRENCH RESURFACING
PER SDG-107/ SDG-108

FINISH GRADE

LEGEND ON PLANS

SEE ADDITIONAL NOTES ON SHEET 2

SHEET 1 OF 2

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>GATE WELL WITH CAP PER SDW-152</td>
</tr>
<tr>
<td>2</td>
<td>VALVE STEM EXTENSION SEE NOTES 1 &amp; 2</td>
</tr>
<tr>
<td>3</td>
<td>8&quot; OD x 1/8&quot; STEEL CASING x REQUIRED LENGTH</td>
</tr>
<tr>
<td>4</td>
<td>BUTTERFLY VALVE</td>
</tr>
<tr>
<td>5</td>
<td>RESILIENT WEDGE GATE VALVE</td>
</tr>
<tr>
<td>6</td>
<td>WATER MAIN</td>
</tr>
<tr>
<td>7</td>
<td>VALVE WELL FRAME SET TO SLOPE OF STREET</td>
</tr>
<tr>
<td>8</td>
<td>CALDER COUPLING (FOR PVC WELL)</td>
</tr>
<tr>
<td>9</td>
<td>9&quot; X 9&quot; CONCRETE RING</td>
</tr>
</tbody>
</table>
NOTES:

1. VALVES DEEPER THAN 6' REQUIRE A VALVE STEM EXTENSION.

2. EXTENSION STEMS SHALL NOT BE ATTACHED/ BOLTED TO OPERATING NUT.

3. GATE WELL AND CAP SHALL BE SET SO THAT NO MORE THAN TWO 1" ADJUSTMENT RINGS ARE USED.

4. BFV OPERATORS TO BE LOCATED TO THE CURBLINE SIDE OF WATER MAIN.

5. BFV'S INSTALLED AT CROSSES OR TEES REQUIRE A FLANGED DUCTILE IRON SPOOL TO BE INSTALLED BETWEEN THE FITTING AND VALVE IN ACCORDANCE WITH THE SPECIFICATIONS.

6. CAST IRON RISER RING HEIGHT TO MATCH OVERLAY THICKNESS, NO MORE THAN TWO (2) RINGS ARE USED.

7. CONCRETE RING MUST HAVE A DESIGN MIX OF 560-C-3250, AND OBTAIN 3250 PSI BEFORE TRAFFIC USE. SEE SDG-106 NOTE 5 FOR CONCRETE OPTIONS AND CURING REQUIREMENTS.

8. WHEN USING STEEL CASING GATE WELLS, USE NON-METALLIC SPACERS TO PREVENT CONTACT BETWEEN VALVE AND GATEWELL.
NOTES:
1. BYPASS SHALL BE SAME CLASS AS MAINLINE PIPE.
2. THE VALVE SHALL BE THE SAME SIZE AS THE BYPASS PIPE.
3. SEE THE APPROVED WORKING DRAWINGS FOR X AND X₃.

<table>
<thead>
<tr>
<th>MAIN SIZE</th>
<th>BYPASS SIZE</th>
</tr>
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<tbody>
<tr>
<td>16&quot; TRANSMISSION</td>
<td>3&quot;</td>
</tr>
<tr>
<td>&gt; 16&quot; AND &lt;= 36&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>&gt;36&quot;</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>
NOTE:

1) INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.

2) LOCATE BACKFLOW PREVENTION ASSEMBLY IN SUCH A MANNER THAT WILL ALLOW THE ASSEMBLY TO BE READILY ACCESSIBLE FOR INSPECTION AND REPAIR.

3) STRAINERS SHALL NOT BE INSTALLED PRIOR TO THE FIRST SHUT-OFF VALVE.

4) ALL ABOVE GROUND PIPING, UNIONS, ELBOWS, & NIPPLES SHALL BE SOLDERED COPPER OR THREADED BRASS.

5) INSTALL A CASING ENCASED IN CONCRETE WHEN THE DISTANCE BETWEEN THE METER BOX AND THE RISER TO THE ASSEMBLY EXCEEDS 18", REQUIRES APPROVAL.

6) INSTALL A PRESSURE REDUCING VALVE UPSTREAM OF THE FIRST 90 DEGREE ELL WHEN SYSTEM PRESSURE EXCEEDS 150 PSI.

7) TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SPECIFICATIONS PRIOR TO ACCEPTANCE.

8) BACKFLOW PREVENTION ASSEMBLY & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS.

9) PUBLIC UTILITIES DEPARTMENT, CROSS CONNECTION CONTROL UNIT MUST APPROVE LOCATION. SHOW ON PLANS.

10) ALL RISER ELBOWS AND UNDERGROUND PIPING SHALL BE TYPE (L) OR (M) COPPER, OR RED BRASS.

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<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>METER BOX &amp; METER ASSEMBLY PER SDW-149 &amp; SDW-150</td>
<td>8</td>
<td>BALL VALVE &quot;SHUT-OFF&quot;</td>
</tr>
<tr>
<td>2</td>
<td>SCHEDULE 80 PVC, RED BRASS OR COPPER PIPE</td>
<td>9</td>
<td>APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY SIZED TO MATCH METER</td>
</tr>
<tr>
<td>3</td>
<td>CONCRETE THRUST BLOCK PER SDW-151</td>
<td>10</td>
<td>ENCLOSURE SHALL BE INSTALLED LEVEL AND PLUMB. ENCLOSURE IS REQUIRED.</td>
</tr>
<tr>
<td>4</td>
<td>90 DEGREE BRASS ELL SEE NOTES 4 &amp; 6</td>
<td>11</td>
<td>UNIONS SEE NOTE 4</td>
</tr>
<tr>
<td>5</td>
<td>CONCRETE SLAB, MINIMUM 4&quot; THICK x 18&quot; WIDE</td>
<td>12</td>
<td>PRESSURE REDUCING VALVE SEE NOTES 4 &amp; 6</td>
</tr>
<tr>
<td>6</td>
<td>BRASS OR COPPER PIPE SEE NOTE 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3&quot; LONG NIPPLE SEE NOTE 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NOTES:
1) INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.
2) LOCATE BACKFLOW PREVENTION ASSEMBLY IN SUCH A MANNER THAT WILL ALLOW THE ASSEMBLY TO BE READILY ACCESSIBLE FOR INSPECTION AND REPAIR
3) STRAINERS SHALL NOT BE INSTALLED PRIOR TO THE FIRST SHUT-OFF VALVE
4) INSTALL A CASING ENCASED IN CONCRETE WHEN THE DISTANCE BETWEEN THE METER BOX AND THE RISER TO THE ASSEMBLY EXCEEDS 18", REQUIRES APPROVAL.
5) INSTALL A PRESSURE REDUCING VALVE UPSTREAM OF THE BACKFLOW ASSEMBLY WHEN SYSTEM PRESSURE EXCEEDS 150 PSI.
6) TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SPECIFICATIONS PRIOR TO ACCEPTANCE
7) BACKFLOW PREVENTION ASSEMBLY & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS
8) PUBLIC UTILITIES DEPARTMENT CROSS CONNECTION CONTROL UNIT MUST APPROVE LOCATION AS SHOWN ON PLANS.

<table>
<thead>
<tr>
<th>ITEM NO</th>
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<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>METER VAULT &amp; METER ASSEMBLY PER WS-04</td>
<td>8</td>
<td>APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY SIZED TO MATCH METER</td>
</tr>
<tr>
<td>2</td>
<td>MINIMAL SCHEDULE 80 PVC OR DUCTILE IRON PIPE</td>
<td>9</td>
<td>ENCLOSURE SHALL BE INSTALLED LEVEL AND PLUMB. ENCLOSURE IS REQUIRED.</td>
</tr>
<tr>
<td>3</td>
<td>FLG x FLG OR MJ/PO x FLG 90 DEGREE BEND</td>
<td>10</td>
<td>ADJUSTABLE VALVE SUPPORT</td>
</tr>
<tr>
<td>4</td>
<td>CONCRETE THRUST BLOCK PER SDW-151</td>
<td>11</td>
<td>CONCRETE SLAB, MINIMUM 4&quot; THICK x 36&quot; WIDE</td>
</tr>
<tr>
<td>5</td>
<td>FLANGED DUCTILE IRON PIPE</td>
<td>12</td>
<td>FLANGED ANGLE PRESSURE REDUCING VALVE SEE NOTE 5</td>
</tr>
<tr>
<td>6</td>
<td>FLANGED 90 DEGREE BEND, SEE NOTE 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>FLANGED RESILIENT WEDGE GATE VALVE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LEGEND ON PLANS
NOTES:
1. ALL BURIED DUCTILE IRON PIPE, FITTINGS, VALVES AND APPURTENANCES SHALL BE COATED WITH A DIELECTRIC COATING. A LIQUID EPOXY COATING SYSTEM PER AWWA C-210 AT 24 MILS MINIMUM DRY FILM THICKNESS (MDFT), OR A COLD APPLIED THREE-PART SYSTEM PETROLEUM WAX TAPE PER AWWA C-217, OR A 100% POLYURETHANE COATING OF 24 MILS (MDFT) SUITABLE.

2. ANY CHANGES SHALL HAVE PUBLIC UTILITIES DEPARTMENT APPROVAL.

3. PIPING SHALL BE SYMMETRICAL TO SLAB CENTERLINE.

4. SUPPLY PIPE IS ONE COMMERCIAL SIZE LARGER THAN PROPOSED METER.

5. CONCRETE SLAB AND FENCE SHALL BE INSTALLED BY CONTRACTOR.

6. CONTACT CORROSION CONTROL SECTION FOR CORROSION REQUIREMENTS.

7. ALL METAL IN CONTACT WITH CONCRETE SHALL BE POLYETHYLENE WRAPPED USING 2" WIDE PLASTIC BACKED ADHESIVE TAPE 8 MILS THICK WITH 1/2" OVERLAP.

8. BACKFLOW SHALL BE INSTALLED IMMEDIATELY DOWNSTREAM FROM METER UNLESS APPROVED BY THE CITY CROSS-CONNECTION SPECIALIST.

9. BACKFLOW PREVENTERS SHALL BE REDUCED PRESSURE PRINCIPLE (RP) ASSEMBLY. (INSTALLED ABOVE GRADE AS CLOSE TO METER AS POSSIBLE) BACKFLOW LOCATION MUST BE APPROVED BY THE CROSS-CONNECTION CONTROL SECTION OF THE PUBLIC UTILITIES DEPT.

ITEMS CALL OUT:
1. 90° FLANGED DUCTILE IRON ELBOW (TYP).

2. FLANGED DUCTILE IRON SPOOL, BOTH ENDS SHALL BE FLANGED (UNI-FLANGE SHALL NOT BE USED).

3. DIAMETER OF TEE SHALL BE EQUAL TO THE DIAMETER OF THE SUPPLY PIPE.
<table>
<thead>
<tr>
<th>PART DESCRIPTION</th>
<th>3”</th>
<th>4”</th>
<th>6”</th>
<th>8”</th>
<th>10”</th>
</tr>
</thead>
<tbody>
<tr>
<td>A GATE VALVE</td>
<td>8”</td>
<td>9”</td>
<td>10 1/2”</td>
<td>11 1/2”</td>
<td>1’-1”</td>
</tr>
<tr>
<td>B PIPE EXTENSION</td>
<td>1’-0”</td>
<td>1’-0”</td>
<td>1’-0”</td>
<td>1’-0”</td>
<td>1’-0”</td>
</tr>
<tr>
<td>C STRAINER *</td>
<td>7”</td>
<td>9”</td>
<td>9”</td>
<td>10”</td>
<td>1’-0”</td>
</tr>
<tr>
<td>D TURBINE WATER METER *</td>
<td>1-0”</td>
<td>1-2”</td>
<td>1’-6”</td>
<td>1’-9”</td>
<td>2’-2”</td>
</tr>
<tr>
<td>E COMPOUND METER *</td>
<td>1’-5”</td>
<td>2’-0”</td>
<td>2’-5”</td>
<td>3’-1”</td>
<td>4’-7”</td>
</tr>
<tr>
<td>F TESTING TEE</td>
<td>11”</td>
<td>1’-1”</td>
<td>1’-4”</td>
<td>1’-6”</td>
<td>1’-10”</td>
</tr>
<tr>
<td>G 90 DEG. ELBOW (SHORT)</td>
<td>5 1/2”</td>
<td>6 1/2”</td>
<td>8”</td>
<td>9”</td>
<td>11”</td>
</tr>
<tr>
<td>H OVERALL SLAB LENGTH *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I SLAB TO C/ L PIPE</td>
<td>3’-0”</td>
<td>3’-0”</td>
<td>3’-0”</td>
<td>3’-0”</td>
<td>3’-0”</td>
</tr>
</tbody>
</table>

* NOTES:
INDIVIDUAL DIMENSIONS MAY VARY PER MANUFACTURER OVERALL DIMENSIONS INCREASE WITH USE OF THESE COMPONENTS

DIMENSION CHART FOR METER ASSEMBLIES
NOTES:
1. SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE.
2. LOCATE METER BOX PER WS-03.
3. INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.
4. MANUAL AIR VALVE INSTALLATION AT END OF MAIN TO BE SADDLED 24" FROM END CAP.
5. MANUAL AIR VALVE ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS.
6. ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES.
7. CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE RELEASE PET COCK.
8. FOR STEEL AND DI MAINS, INSTALL DIELECTRIC UNION AFTER CORPORATION STOP.
9. INSTALL WAX TAPE FROM MAIN TO 3" PAST DIELECTRIC UNION, INCLUDING SADDLE.

ITEM NO  SIZE AND DESCRIPTION
1  POLYMER METER BOX WITH LID 17" x 30", SEE NOTE 2
2  2" CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 7
3  1/4" PRESSURE PET COCK
4  2" 90° BRONZE MIPT x FIPT ELL
5  2" OVAL METER FLANGE FLG x FIPT, WITH GASKET
6  3/8" ROCK 4" TO 6" DEEP
7  2" BRONZE COMP x FLG ANGLE METER STOP WITH LOCK WING
8  2" x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT

ITEM NO  SIZE AND DESCRIPTION
9  2" 90° BRONZE COMPRESSION ELL
10  2" BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)
11  2" 90° BRONZE FIPT x COMP ELL
12  2" BRONZE MIPT x MIPT CORPORATION STOP
13  SIZE x 2" SERVICE SADDLE
14  WATER MAIN
15  2" COPPER DIELECTRIC UNION. REQUIRED FOR STEEL AND DI MAINS.

NOTE: INSTALL WAX TAPE FROM MAIN TO 3" PAST DIELECTRIC UNION, INCLUDING SADDLE.

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

SDW-158

9/4/18
NOTES:
1. NO DIPS OR LOW SPOTS WILL BE ALLOWED IN INSTALLATION.
2. INSTALL ENCLOSURE PER SDW-117.
3. INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.
4. AIR & VACUUM VALVE INSTALLED FOR THE USE OF POTABLE/RECYCLED WATER SHALL BE SHOWN ON THE PLANS.
5. ON STEEL MAINS USE WELD ON COUPLINGS, ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES.
6. FOR STEEL AND DI MAINS, INSTALL DIELECTRIC UNION AFTER CORPORATION STOP.
7. INSTALL WAX TAPE FROM MAIN TO 3" PAST DIELECTRIC UNION, INCLUDING SADDLE.

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1&quot; OR 2&quot; PVC SCH 80 CLOSE NIPPLE &amp; 2-SCH 80 STREET ELLS &amp; INSECT SCREEN.</td>
</tr>
<tr>
<td>2</td>
<td>APPROVED VALVE ENCLOSURE PER SDW-117.</td>
</tr>
<tr>
<td>3</td>
<td>1&quot; OR 2&quot; AUTOMATIC COMBINATION AIR RELEASE &amp; AIR/ VACUUM VALVE.</td>
</tr>
<tr>
<td>4</td>
<td>8&quot;, OD STEEL GATE CASING WELL WITH CAP PER SDW-153.</td>
</tr>
<tr>
<td>5</td>
<td>COLD JOINT STRIP.</td>
</tr>
<tr>
<td>6</td>
<td>3'-6&quot; X 3'-6&quot; X 6&quot; THICK CONCRETE SLAB. CONCRETE SHALL BE 520-C-2500.</td>
</tr>
<tr>
<td>7</td>
<td>1&quot; OR 2&quot; X 1/2&quot; BLACK FOAM SLEEVE.</td>
</tr>
<tr>
<td>8</td>
<td>BRASS TUBING.</td>
</tr>
<tr>
<td>9</td>
<td>90 DEGREE BRASS ELL (NO SWEAT, NO GLUED JOINTS ALLOWED).</td>
</tr>
<tr>
<td>10</td>
<td>1&quot; OR 2&quot; BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED).</td>
</tr>
<tr>
<td>11</td>
<td>1&quot; OR 2&quot; COMP BALL VALVE THREADED ON BOTH SIDES.</td>
</tr>
<tr>
<td>12</td>
<td>1&quot; OR 2&quot; 90 DEGREE BRONZE FIPT X COMP ELL.</td>
</tr>
<tr>
<td>13</td>
<td>1&quot; OR 2&quot; BRONZE MIPT X MIPT CORPORATION STOP.</td>
</tr>
<tr>
<td>14</td>
<td>SIZE X 1&quot; OR 2&quot; SERVICE SADDLE.</td>
</tr>
<tr>
<td>15</td>
<td>WATER MAIN.</td>
</tr>
<tr>
<td>16</td>
<td>VALVE STEM EXTENSION.</td>
</tr>
<tr>
<td>17</td>
<td>1&quot; OR 2&quot; COPPER DIELECTRIC UNION. REQUIRED FOR STEEL OR DI MAINS.</td>
</tr>
<tr>
<td>18</td>
<td>COPPER TUBING.</td>
</tr>
</tbody>
</table>
NOTES:
1. NO DIPS OR LOW SPOTS WILL BE ALLOWED IN PIPING INSTALLATION.
2. LOCATE ENCLOSURE PER SDW-117.
3. INSTALL WARNING/IDENTIFICATION TAPE PER SDM-105.
4. BREAK-AWAY BOLTS SHALL BE 5/8" x 3" WITH 3/8" HOLE DRILLED IN THE SHAFT OF THE BOLT. INSTALL WITH HEX HEAD ON TOP OF THE FLANGE.
5. AIR & VACUUM VALVES INSTALLED FOR THE USE OF POTABLE/RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN PLANS.
6. FOR STEEL AND DI MAINS, AIR RELEASE PIPE MATERIAL AND COATINGS SHALL BE OF THE SAME MATERIAL AS THE MAIN LINE.
7. BOND JOINTS PER SDW-122.
8. FOR PVC MAINS, DI PIPE SHALL BE COATED PER SPECIFICATIONS.

Legend on Plans

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>4&quot; OR 6&quot; AUTOMATIC COMBINATION AIR RELEASE &amp; AIR/VACUUM VALVE ASSEMBLY</td>
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<tr>
<td>2</td>
<td>BREAK-AWAY BOLTS, SEE NOTE 4</td>
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<tr>
<td>3</td>
<td>4&quot; OR 6&quot; FLANGED 8-BOLT DUCTILE IRON PIPE x REQD LENGTH (MAX OF 2 SPOOL)</td>
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<tr>
<td>4</td>
<td>5/8&quot; x 3&quot; STAINLESS STEEL DROP-IN ANCHORS (3 EA @ 120 APART)</td>
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<td>VALVE ENCLOSURE</td>
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<td>6</td>
<td>42&quot; x 42&quot; x 6&quot; THICK CONCRETE SLAB</td>
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<tr>
<td>7</td>
<td>COLD JOINT STRIP</td>
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<tr>
<td>8</td>
<td>CONCRETE THRUST/ANCHOR BLOCK</td>
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<tr>
<td>9</td>
<td>4&quot; OR 6&quot; FLG x MJ/PO 90 BEND</td>
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<td>10</td>
<td>4&quot; OR 6&quot; C-900 PVC PIPE</td>
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<td>11</td>
<td>GATE WELL WITH CAP PER SDW-153</td>
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<td>12</td>
<td>4&quot; OR 6&quot; FLG x MJ / FLG RWGV</td>
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<td>4&quot; OR 6&quot; FLANGE 90 BEND</td>
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<td>14</td>
<td>SIZE x 4&quot; OR 6&quot; MJ / FLG x FLG TEE</td>
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<tr>
<td>15</td>
<td>WATER MAIN</td>
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</tbody>
</table>
NOTES:

1) REFER TO SPECIFICATIONS FOR PROTECTION OF EXISTING FACILITIES

2) ENCASEMENT SHALL EXTEND TO FIRST JOINT BEYOND BOTH SIDES OF TRENCH [24" MIN 48" MAX OF SUITABLE NATIVE SUPPORT BEYOND EDGE OF TRENCH].

3) CONCRETE ENCASEMENT REQUIRED FOR SEWER MAINS ONLY. CALDER COUPLINGS REQUIRED FOR SEWER LATERALS ONLY. SEWER LATERALS TO BE REPLACED WITH SCH. 80 PVC WITH NO INTERMEDIATE JOINTS.

4) FOR PIPE BEDDING AND TRENCH BACKFILL, SEE OTHER STANDARD DRAWINGS.
NOTES:

1) SLURRY SHALL BE CONTROLLED LOW STRENGTH MATERIAL CLSM (100-E-100)

2) SLURRY SHALL BE PLACED ON FIRMLY COMPACTED BACKFILL
**Item No.** | **Size and Description** | **Item No.** | **Size and Description**  
--- | --- | --- | ---  
1 | EXISTING 2-PORT FIRE HYDRANT | 7 | 2" TEE/90° ELBOW W/ SNAP-JOINT COUPLING(S) (2-GROOVE) W/ DIRECTIONAL SHUT OFF VALVE(S) (NOT SHOWN)  
2 | 2 1/2" PORT TO 2" ADAPTER ELBOW W/ THREADED FITTING | 8 | EXISTING CURB & GUTTER  
3 | 2" PIPE (GROOVED) | 9 | EXISTING ROADWAY  
4 | 2" 90° ELBOW W/ THREADED JOINT FITTINGS | 10 | EXISTING CONCRETE PAD/SIDEWALK  
5 | 2" BACKFLOW PREVENTER (ONE WAY CHECK VALVE) W/ THREADED JOINT FITTINGS |  |  
6 | SNAP-JOINT COUPLING (2-GROOVE) |  |  

**CITY OF SAN DIEGO – STANDARD DRAWING**

**2" FIRE HYDRANT HIGHLINING CONNECTION**

**RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE**

**DRAWING NUMBER** SDW-170

**COORDINATOR** P.E. 56923

**DATE** 9/4/18

**ORIGINAL** KA J. NAGELVOORT 05/12

**UPDATED** KA J. NAGELVOORT 12/12

**REDRIFTED** CD J. NAGELVOORT 09/18

**REVISION BY APPROVED DATE**
### Item No. | Size and Description
--- | ---
1 | Existing 3-Port Fire Hydrant
2 | Port Adapter Elbow w/ Threaded Joint Fitting
3 | Pipe (Grooved)
4 | 90° Elbow w/ Threaded Joint Fittings
5 | 4" Backflow Preventer w/ Threaded Joint Fittings

### Item No. | Size and Description
--- | ---
6 | 4" Shutoff Valve w/ Threaded Joint Fittings
7 | Existing Curb & Gutter
8 | Saw Cut Roadway, Trench, Backfill and Temporary Asphalt Surface
9 | Existing Roadway
10 | Existing Concrete Pad/Sidewalk
CONTRACTOR TO INSTALL UP TO THIS POINT

ITEM NO SIZE AND DESCRIPTION
1 GROOVED 2"x2"x1" TEE W/ SNAP-JOINT COUPLING (2-GROOVE)
2 1" 90° ELBOW W/ THREADED JOINT FITTINGS
3 1" SHUTOFF VALVE W/ THREADED JOINT FITTINGS
4 1" PIPE TO HOSE ADAPTER
5 1" CONNECTION HOSE

ITEM NO SIZE AND DESCRIPTION
6 1" 90° ELBOW TO METER THREADS (ADAPTERS MAY BE REQUIRED)
7 EXISTING WATER METER
8 EXISTING WATER METER BOX
9 EXISTING SERVICE CONNECTION FROM WATER MAIN
10 EXISTING ROADWAY
11 EXISTING CURB & GUTTER
NOTES:

1. THE SLOPE OF THE TEMPORARY ASPHALT OVER DRIVEWAYS SHALL BE FIRM, STABLE, SMOOTH AND SLOPED TO HAVE A GRADUAL TRANSITION TO THE STREET. THE RUNNING SLOPE SHALL NOT EXCEED 8.33%. THE CROSS SLOPE SHALL MATCH THE EXISTING GUTTER SLOPE.

2. THE MINIMUM ASPHALT COVER ON HIGHLINE PIPE SHALL BE 1 INCH.

3. SIDEWALK ASPHALT ON HIGHLINE PIPE SHALL BE ROUTED ABOVE GROUND AND COVERED WITH ADA COMPLIANT CABLE COVER AND RAMP.

<table>
<thead>
<tr>
<th>ITEM NO</th>
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<tr>
<td>1</td>
<td>HIGHLINE PIPING</td>
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<td>EXISTING DRIVEWAY</td>
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<tr>
<td>2</td>
<td>DRAIN PIPING</td>
<td>6</td>
<td>EXISTING CURB &amp; GUTTER</td>
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<td>3</td>
<td>TEMPORARY ASPHALT (COLD MIX)</td>
<td>7</td>
<td>EXISTING SIDEWALK</td>
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<tr>
<td>4</td>
<td>EXISTING ROADWAY</td>
<td>8</td>
<td>HIGHLINE PIPING AND SNAP COUPLING (2 GROOVE)</td>
</tr>
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</table>
1. THE SLOPE OF THE TEMPORARY ASPHALT OVER CURB RAMP TO BE REPLACED AND OTHER ACCESSIBLE ROUTES (SIDEWALKS, WALKWAYS, ETC.) SHALL BE FIRM, STABLE, SMOOTH AND SLOPED TO HAVE A GRADUAL TRANSITION TO THE STREET. THE FINISH CONNECTION AT THE CURB RAMP TO BE REPLACED, OTHER ACCESSIBLE ROUTES AND ROAD SURFACES SHALL BE FLUSH. THE RUNNING SLOPE SHALL BE AS SHOWN ON THE DRAWING ABOVE AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%, WITH NO EXCEPTIONS.

2. THE MINIMUM ASPHALT COVER ON HIGHLINE PIPE SHALL BE 2 INCHES.

3. CURB RAMP UNDERGROUND HIGHLINING CROSSING TO BE USED ONLY WHEN EXISTING CURB RAMP IS BEING REPLACED.

4. COUPLINGS SHALL NOT BE LOCATED IN FRONT OF THE CURB RAMP.

5. HIGHLINING CROSSING THE SIDEWALK ABOVE GROUND SHALL BE COVERED WITH ADA COMPLIANT CABLE COVER AND RAMP.
NOTES:

1. FOR INSTALLATION INSTRUCTIONS AND NOTES, SEE SHEET 5.
2. FOR BUTT STRAP THICKNESS AND WIDTH, SEE TABLE 1, SHEETS 6 & 7.
3. FOR FINAL BUTT STRAP CONNECTION AND MORTAR COATING DETAILS, SEE DETAILS ON SHEET 3.
4. FOR PREPARING SCRW PIPE (C303) FOR BUTT STRAP INSTALLATION, SEE SHEET 4.
NOTES:
1. FOR INSTALLATION INSTRUCTIONS AND NOTES, SEE SHEET 5.
2. FOR BUTT STRAP THICKNESS AND WIDTH, SEE TABLE 1.
3. FOR FINAL MORTAR COATING DETAILS, SEE SHEET 3.
4. CONTRACTOR MAY ALSO USE TWO HAND HOLES ON TOP HALF OF PIPE, PER SECTION A, FOR PIPE DIAMETERS 24 INCHES AND LESS.

SECTION A-A
36" TO 54" DIAMETER PIPE
SEE NOTE 12 ON SHEET 5

SECTION B-B
20" TO 33" DIAMETER PIPE
SEE NOTE 4
SEE NOTE 12 ON SHEET 5
NOTES:

1. FOR INSTALLATION INSTRUCTIONS AND NOTES SEE, SHEET 5.
2. FOR BUTT STRAP THICKNESS AND WIDTH, SEE TABLE 1, SHEETS 6 & 7.
3. OUTSIDE DIAMETER OF STEEL CYLINDER (C200) WITH FILLER BAR SHALL BE OUTSIDE DIAMETER OF SCRW PIPE STEEL CYLINDER (C303) +0" - 1/8".
NOTE 4 ON SHEET 5

4" MIN
10" MIN
16" MAX

EDGE OF CUT

WELD ROD WRAP TO STEEL CYLINDER, SEE SHEET 1 AND NOTE 7. SHEET 5

COIL BACK REMAINING UNDAMAGED ROD WRAP

REINFORCED CEMENT-MORTAR COATING

UNCOIL ROD WRAP OVERLAPPING BUTT STRAP BY 1" MIN, PULL TAUT WELD ROD WRAP TO BUTT STRAP, SEE SHEET 1

NEW PIPE

SCREW PIPE TO REMAIN

SCREW PIPE TO REMOVE

SCREW PIPE TO REMAIN

SCREW PIPE TO REMOVE

CUT PROCEDURE

NOTES

1. SEE SHEET 5 FOR DETAILED INSTALLATION INSTRUCTIONS.
2. SEE SHEETS 1, 2 & 3 FOR BUTT STRAP INSTALLATION.
3. SEE SHEETS 6 & 7 FOR BUTT STRAP DIMENSIONS.
NOTES:

1. DETERMINE THE PIPE DIAMETER, CYLINDER THICKNESS AND PRESSURE RATING OF THE EXISTING PIPELINE. IF THE CYLINDER THICKNESS IS LESS THAN 10 GAGE (0.135”), DO NOT USE THIS DETAIL. THE ENTIRE PIPE SECTION (TO THE NEAREST JOINT) SHOULD BE REMOVED AND REPLACED.

2. DO NOT WELD REINFORCING TO CYLINDER OR CUT REINFORCING WHILE PIPE HAS INTERNAL PRESSURE.

3. FABRICATE THE BUTT STRAP USING THE DIMENSIONS SHOWN ON TABLE 1, SHEETS 6 AND 7. THE BUTT STRAP WIDTH SHOWN ON TABLE 1 IS THE MINIMUM WIDTH. THE WIDTH MAY BE INCREASED TO MEET FIELD CONDITIONS.

4. DETERMINE LENGTH "L" OF PIPE TO BE REMOVED AND MARK ON PIPE.

5. CAUTIOUSLY CHIP OFF 10" TO 16" OF THE MORTAR COATING FROM THE CENTERLINE OF THE CUT MARK FOR THE PIPE THAT WILL REMAIN. THEN CHIP OFF THE MORTAR COATING 4” FROM THE CENTERLINE OF THE CUT MARK FOR THE PIPE THAT WILL BE REMOVED.

6. MARK THE CUT LOCATION ON THE EXPOSED ROD WRAPPED CYLINDER.

7. MAKE A 4" LONG WELD ON ONE CIRCUMFERENTIAL ROD WRAP TO THE STEEL CYLINDER OF THE PIPE TO REMAIN; 6” MAX FROM THE CUT MARK. NOTE THE ROD WRAP HAS TENSION AND CANNOT BE CUT UNTIL IT IS PROPERLY WELDED TO THE STEEL CYLINDER. ALL WELDING SHALL BE PERFORMED USING E60XX WELDING RODS AND THE WELDERS SHALL BE CERTIFIED WELDERS PER ASME BPVC, SECTION IX.

8. AFTER WELDING THE ROD WRAP TO THE STEEL CYLINDER, CUT THE CYLINDER AND ROD WRAP ALONG CUT MARK AND REMOVE PIPE AND ANY ROD NOT STILL CONNECTED TO THE REMAINING PIPE. COIL BACK PORTION OF UNTENSIONED ROD WRAP SO THE BUTT STRAP CAN BE INSTALLED (DO NOT BEND THE RODS).

9. WELD THE BUTT STRAP TO THE CYLINDER, AS SHOWN. PULL TAUT THE REMAINING ROD WRAP AND OVERLAP THE BUTT STRAP BY 1” AND WELD ROD AS SHOWN ON SHEET 1.

10. DRILL AND TAP HOLES FOR AIR TESTING PRIOR TO WELDING. CONTRACTOR SHALL PLUG WELD TAPPED HOLES ON COMPLETION OF SOAP AND AIR TEST. IF INSIDE WELD CANNOT BE PERFORMED DUE TO THE LACK OF ACCESS, AIR TEST HOLES CAN BE OMITTED AND FILLET WELDS SHALL BE TESTED USING PENETRANT TEST.

11. AFTER WELDING AND TESTING OF BUTT STRAP IS COMPLETE, APPLY PORTLAND CEMENT MORTAR LINING USING HAND HOLES. THEN INSTALL HAND HOLE PLUG AND SEAL WELD. APPLY PORTLAND CEMENT MORTAR COATING TO EXTERIOR OF PIPE IN ACCORDANCE WITH AWWA C205/C303 REINFORCED WITH WELDED WIRE FABRIC HELD 3/8” FROM THE STEEL.

12. HAND-HOLES CAN BE OMITTED IF INTERIOR OF PIPE IS ACCESSIBLE THROUGH NEARBY ACCESS MANWAY OR SIMILAR ACCESS POINT.

13. IF t_{fill} IS LESS THAN t_{rod}, THEN WELD SIZE SHALL BE t_{fill}, ELSE WELD SIZE SHALL BE t_{rod}.

14. IF t_{fill} IS LESS THAN t_y THEN WELD SIZE SHALL BE t_{fill}, ELSE WELD SIZE SHALL BE t_{rod}.

15. t_{fill} SHALL NOT BE LESS THAN t_y.

16. PENETrANT TESTING SHALL BE PERFORMED ON THE GROOVE WELD ROOT PASS.
### Buttstrap Table 1

<table>
<thead>
<tr>
<th>Nom Pipe Dia</th>
<th>Max Pressure Class P</th>
<th>C303 (SCRW) Cylinder thickness inches (gauge) ( t_p )</th>
<th>Min Buttstrap Thickness Required inches ( t_{\text{req}} )</th>
<th>Min Buttstrap Total Width inches ( W_{\text{but}} )</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>125</td>
<td>0.06 (16)</td>
<td>not permitted</td>
<td>Connect at nearest joint.</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>175</td>
<td>0.075 (14)</td>
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<tr>
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<td>250</td>
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<tr>
<td>20</td>
<td>325</td>
<td>0.134 (10)</td>
<td>0.3125 (5/16)</td>
<td>16</td>
<td>See Note 3 on sh. 5</td>
</tr>
<tr>
<td>20</td>
<td>400</td>
<td>0.164 (8)</td>
<td>0.4375 (7/16)</td>
<td>16</td>
<td>See Note 3 on sh. 5</td>
</tr>
<tr>
<td>21</td>
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<td>Connect at nearest joint.</td>
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<td>21</td>
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<td>not permitted</td>
<td>Connect at nearest joint.</td>
<td></td>
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<tr>
<td>21</td>
<td>250</td>
<td>0.105 (12)</td>
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<td>Connect at nearest joint.</td>
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<tr>
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<tr>
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<tr>
<td>24</td>
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<td>0.5 (1/2)</td>
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<tr>
<td>27</td>
<td>125</td>
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<td>125</td>
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<td>Connect at nearest joint.</td>
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<td>16</td>
<td>See Note 3 on sh. 5</td>
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<tr>
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<td>400</td>
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<td>0.625 (5/8)</td>
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<td>33</td>
<td>150</td>
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<tr>
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<td>200</td>
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<tr>
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<tr>
<td>36</td>
<td>150</td>
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<td>See Note 3 on sh. 5</td>
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### Buttstrap Table 1 (continued)

<table>
<thead>
<tr>
<th>Nom Pipe Dia Inches D</th>
<th>Max Pressure Class P</th>
<th>C303 (SCRW) Cylinder thickness inches (gauge) ( t_y )</th>
<th>Min Buttstrap Thickness Required inches ( t_{reqd} )</th>
<th>Min Buttstrap Total Width inches ( W_{butt} )</th>
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<td>39</td>
<td>100</td>
<td>0.09 (13)</td>
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NOTES:
1. FOR INSTALLATION INSTRUCTIONS AND NOTES, SEE SHEET 4.
2. FOR WRAPPER PLATE THICKNESS, FLANGE RATINGs, AND OUTLET Ø, SEE TABLES 1 & 2, SHEETS 5 - 8.
3. FOR FINAL MORTAR COATING DETAILS, SEE SECTION A - A.
4. BLIND FLANGE NOT SHOWN FOR CLARITY.
NOTES:
1. FOR INSTALLATION INSTRUCTIONS AND NOTES, SEE SHEET 4.
2. FOR WRAPPER PLATE THICKNESS, FLANGE RATINGS, AND OUTLET Ø, SEE TABLES 1 & 2, SHEETS 5 - 8.
3. WRAP BLIND FLANGE WITH WAX-TAPE PER AWWA C217.

SECTION A - A

CITY OF SAN DIEGO – STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR P.I.C. 56263

DRAWING NUMBER

SDW-176

9/7/18
NOTES:

1. FOR INSTALLATION INSTRUCTIONS AND NOTES, SEE SHEET 4.

2. FOR WRAPPER PLATE THICKNESS, FLANGE RATINGS, AND OUTLET Ø, SEE TABLES 1 & 2, SHEETS 5 - 8.

3. WRAP BLIND FLANGE WITH WAX-TAPE PER AWWA C217.
NOTES:

1. DETERMINE THE PIPE DIAMETER, CYLINDER THICKNESS AND PRESSURE RATING OF THE EXISTING PIPELINE. IF THE CYLINDER THICKNESS IS LESS THAN 10 GAUGE (0.134"), SPECIAL WELDING PROCEDURES SHALL BE SUBMITTED, OR THE ENTIRE PIPE SECTION SHALL BE REMOVED AND REPLACED.

2. FOR LINE STOPS THE CONTRACTOR SHALL SUBMIT CALCULATIONS SHOWING PIPE IS ADEQUATELY ANCHORED FOR THRUST.

3. FABRICATE THE WRAPPER PLATE USING THE DIMENSIONS SHOWN ON TABLES 1 OR 2. FOR THE WRAPPER PLATE DIMENSIONS SHOWN ON TABLES 1 AND 2, A CORRESPONDING ALLOWED MAXIMUM OUTLET Ø IS GIVEN. THE CITY SHALL PROVIDE THE Ø OF OUTLET OR THE OUTLET Ø SHALL BE DETERMINED BY PROJECT REQUIREMENTS.

4. REDUCE THE LIVE PRESSURE INSIDE THE PIPE TO LESS THAN OR EQUAL TO THE MAXIMUM ALLOWABLE INSTALLATION PRESSURE SHOWN ON TABLES 1 AND 2. THE INSTALLATION PRESSURE SHOWN IN TABLES 1 AND 2 IS THE MAXIMUM ALLOWABLE PRESSURE THE PIPE CAN WITHSTAND WHILE THE WRAPPER PLATE IS BEING INSTALLED (NOTE THAT THE MAXIMUM PRESSURE SHOWN IS OPERATING PRESSURE WITHOUT SURGE).


7. WELD ON THE WRAPPER PLATE WITH OUTLET TO THE STEEL CYLINDER. THE LONGITUDINAL AND CIRCUMFERENTIAL WELDS MUST BE COMPLETED PRIOR TO CUTTING THE OUTLET HOLE IN THE CYLINDER.

8. INSTALL THE LINE STOP VALVE, GATE VALVE, OR BFV PER PROJECT REQUIREMENTS.

9. AFTER LINE STOP VALVE IS REMOVED, INSTALL THE BLIND FLANGE AND APPLY WAX-TAPE COATING PER AWWA C217.

10. FOR LINE STOP OUTLETS, A HIGH SOLIDS EPOXY (16 MILS) SHALL BE SHOP APPLIED TO-surfaces NOT COVERED BY THE NON-ASBESTOS GASKET. EPOXY SHALL BE CURED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION PRIOR TO SUBJECTING IT TO IMMERION. EPOXY SHALL BE NSF 61 APPROVED.

FOR NON LINE STOP APPLICATIONS, THE OUTLET NOZZLE SHALL BE LINED WITH CEMENT-MORTAR AND THE DAMAGED MAINLINE LINING SHALL BE REPAIRED PER AWWA C205.

11. PENETRANT TESTING SHALL BE PERFORMED ON THE GROOVE WELD ROOT PASS AND WHERE NOTED.

12. FOR SLIP ON FLANGES DRILL AND TAP HOLES PRIOR TO WELDING, CONTRACTOR SHALL PLUG WELD TAPPED HOLES ON COMPLETION OF SOAP AND AIR TEST.

13. LENGTH OF OUTLET SHALL BE PER LINE STOP VENDOR RECOMMENDATION FOR WRAPPER PLATE OUTLETS. ALL OTHER OUTLET LENGTHS SHALL BE 8" MIN AND 12" MAX OR AS NECESSARY TO ACCOMMODATE THE BFV.

14. ALL GASKETS SHALL BE FULL FACED.

15. CLASS D FLANGES MAY USE RUBBER, COMPRESSED FIBER OR POLYTETRAFLUORETHYLENE GASKETS. CLASS E & F FLANGES MUST USE COMPRESSED FIBER OR POLYTETRAFLUORETHYLENE GASKETS. CLASS F FLANGES HAVE A MAXIMUM ALLOWABLE PRESSURE OF 300 PSI. IF PRESSURE IS HIGHER THAN 300 PSI CONTRACTOR SHALL SUBMIT ALTERNATIVE FLANGE.
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<th>Pressure Class psi P</th>
<th>C303 Steel Cylinder thickness inches (gauge)</th>
<th>Maximum Outlet Diameter For Line Stop inches Dyb</th>
<th>Minimum Line Stop Outlet thickness inches tb</th>
<th>Branch Angle degrees D</th>
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## Line Stop Valve Outlet and Wrapper Plate - Table 1 (continued)

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OUTLET AND COLLAR PLATE DETAIL FOR SCRW PIPE
20" TO 54" DIAMETER

NOTES:
1. DETAILS SHOWN ARE FOR COLLAR PLATES FOR 4", 8" AND 12" DIAMETER OUTLETS. FOR CYLINDER
   THICKNESS, COLLAR PLATE THICKNESS, FLANGE RATINGS, AND OUTLET Ø, SEE TABLES 1, 2 OR 3,
   RESPECTIVELY, SHEETS 5 - 10.
2. FOR INSTALLATION INSTRUCTIONS AND NOTES, SEE SHEET 4.
3. OUTLET FLANGE NOT SHOWN FOR CLARITY.
OUTLET AND COLLAR PLATE DETAIL
FOR SCRW PIPE
20" TO 54" DIAMETER

NOTES:
1. DETAILS SHOWN ARE FOR COLLAR PLATES FOR 4", 8" AND 12" DIAMETER OUTLETS. FOR CYLINDER
THICKNESS, COLLAR PLATE THICKNESS, FLANGE RATINGS, AND OUTLET Ø, SEE TABLES 1, 2 OR 3,
RESPECTIVELY, ON SHEETS 5 - 10.
2. FOR INSTALLATION INSTRUCTIONS AND NOTES, SEE SHEET 4.
NOTES:

1. DETAILS SHOWN ARE FOR COLLAR PLATES FOR 4", 8", AND 12" DIAMETER OUTLETS, FOR CYLINDER THICKNESS, COLLAR PLATE THICKNESS, FLANGE RATINGS, AND OUTLET Ø, SEE TABLES 1, 2 OR 3, RESPECTIVELY, ON SHEETS 5 - 10.

2. FOR INSTALLATION INSTRUCTIONS AND NOTES, SEE SHEET 4.
NOTES:

1. DETERMINE THE PIPE DIAMETER, CYLINDER THICKNESS AND PRESSURE RATING OF THE EXISTING PIPELINE. IF THE CYLINDER THICKNESS IS LESS THAN 10 GAUGE (0.134"), SPECIAL WELDING PROCEDURES SHALL BE SUBMITTED, OR THE ENTIRE PIPE SECTION SHALL BE REMOVED AND REPLACED.

2. FABRICATE THE COLLAR PLATE USING THE DIMENSIONS SHOWN ON TABLES 1, 2 OR 3, SHEETS 5 - 10.


4. WELD THE EXISTING ROD WRAP TO THE STEEL CYLINDER WITHIN 1 INCH OF THE COLLAR PLATE INSTALLATION LOCATION AS SHOWN. WELD ONE ADDITIONAL ROD WRAP ON EITHER SIDE OF THE COLLAR PLATE THAT WILL NOT BE CUT. THE LENGTH OF THE WELDS ALONG ALL REINFORCING RODS SHALL BE A MINIMUM OF 4 INCHES. ALL WELDING SHALL BE PERFORMED USING E60XX WELDING RODS AND THE WELDERS SHALL BE CERTIFIED WELDERS PER ASME BPVC, SECTION IX. NOTE THE ROD WRAP IS IN TENSION AND CANNOT BE CUT UNTIL IT IS PROPERLY WELDED TO THE STEEL CYLINDER. AFTER WELDING THE ROD WRAP TO THE CYLINDER, CUT THE ROD WITHIN 1 INCH OF THE EDGE OF THE COLLAR PLATE INSTALLATION LOCATION.

5. WELD THE COLLAR PLATE / OUTLET ASSEMBLY TO THE STEEL CYLINDER.

6. PENETRANT TESTING SHALL BE PERFORMED ON THE GROOVE WELD ROOT PASS AND WHERE NOTED.

7. FOR SLIP-ON FLANGES, DRILL AND TAP HOLES PRIOR TO WELDING. CONTRACTOR SHALL PLUG WELD TAPPED HOLES ON COMPLETION OF SOAP AND AIR TEST.

8. OUTLET SHALL HAVE A SHOP OR FIELD APPLIED PORTLAND CEMENT MORTAR PER AWWA C205.

9. HIGH SOLIDS EPOXY (16 MILS) SHALL BE SHOP APPLIED TO SURFACES NOT COVERED BY CEMENT-MORTAR. EPOXY SHALL BE CURED IN ACCORDANCE WITH MANUFACTURES RECOMMENDATION PRIOR TO SUBJECTING IT TO IMMERSION. EPOXY SHALL BE NSF 61 APPROVED.

10. ALL GASKETS SHALL BE FULL FACED.

11. CLASS D FLANGES MAY USE RUBBER, COMPRESSED FIBER OR POLYTETRAFLUORETHYLENE GASKETS. CLASS E & F FLANGES MUST USE COMPRESSED FIBER OR POLYTETRAFLUORETHYLENE GASKETS. CLASS F FLANGES HAVE A MAXIMUM ALLOWABLE PRESSURE OF 300 PSI. IF PRESSURE IS HIGHER THAN 300 PSI CONTRACTOR SHALL SUBMIT ALTERNATIVE FLANGE.
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<tr>
<th>Nominal Pipe Diameter Inches</th>
<th>Pressure Class psi</th>
<th>C303 Steel Cylinder OD (inches)</th>
<th>Steel Cylinder OD (gauge)</th>
<th>AWWA C207 Flange Class</th>
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4" outlet with collar

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See note 1 on Sheet 4

NOTE:

1. SEE NOTE 11 ON SHT 4.
### Collar and Outlet Dimensions - Table 1 (continued)

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**NOTE:**

1. SEE NOTE 11 ON SHT 4.

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**OUTLET AND COLLAR PLATE DETAIL FOR SCRW PIPE 20" TO 54" DIAMETER**

**CITY OF SAN DIEGO - STANDARD DRAWING**

**SDW-177**

**DATE:** 9/7/18
## Collar and Outlet Dimensions - Table 2

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### NOTE:

1. SEE NOTE 11 ON SHT 4.
## Collar and Outlet Dimensions - Table 2 (continued)

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**NOTE:**

1. SEE NOTE 11 ON SHT 4.
# Collar and Outlet Dimensions - Table 3

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<th>Pressure Class psi</th>
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<th>Min Collar Width inches W</th>
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**NOTE:**

1. SEE NOTE 11 ON SHEET 4.
## Collar and Outlet Dimensions - Table 3 (continued)

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<th>Nominal Pipe Diameter Inches</th>
<th>Pressure Class psi</th>
<th>C303 Steel Cylinder thickness inches (gauge)</th>
<th>Steel Cylinder OD inches Dy+2ty</th>
<th>AWWA C207 Flange Class</th>
<th>Outlet Diameter inches D_{yb}</th>
<th>Min Outlet Thickness inches t_{o}</th>
<th>Min Collar Width inches W_{collar}</th>
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**NOTE:**

1. See Notes 11 and 12 on SHT 4.
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) SET TOP OF METER BOX 2" ABOVE FINISH GRADE
3) BLOW-OFF ASSEMBLIES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY’S SPECIFICATIONS
4) THE CONSTRUCTION OF A TEMPORARY BLOW-OFF FOR THE USE OF TESTING AND FLUSHING OF NEW MAINS ONLY
5) CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE PET COCK
6) MATERIALS SHALL BE SELECTED FROM THE AGENCY’S APPROVED MATERIALS LIST

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<td>2” 90° BRONZE IRON PIPE THREAD BY COMPRESSION ELL</td>
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<td>2” CAM &amp; GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 5</td>
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<td>2” CLOSE NIPPLE IPT</td>
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<td>3</td>
<td>1/4” PRESSURE PET COCK</td>
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<td>2” COMPRESSION x FIPT BALL VALVE WITH HANDLE</td>
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Revision By Approved Date
ORIGINAL Kercheval 12/75
Add Metric T. Stanton 03/03
Replace W-07 J. Tomasulo 10/04
Delete Metric MR. B. Knoll 03/11
Reviewed MR. B. Knoll 10/15

SAN DIEGO REGIONAL STANDARD DRAWING
TEMPORARY 2” BLOW-OFF INSTALLATION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

FOR DRAWING WT-01 SEE DRAWING SDW-151
NOTES:
1) TYPE "A" AND TYPE "B" PROTECTION POSTS SHALL BE INSTALLED WHERE INDICATED ON THE APPROVED PLANS OR AS DIRECTED BY THE ENGINEER. SDG&E REQUIREMENTS DICTATE IN AREAS OF SDG&E EQUIPMENT
2) CHAIN TO BE 1/4" PROOF COIL CHAIN GALVANIZED STEEL. WELD 4-CHAIN SEGMENT TO POST AND 3-CHAIN SEGMENT TO SLEEVE
3) TYPE "A" AND TYPE "B" PROTECTION POSTS SHALL BE COATED USING SAFETY YELLOW IN ACCORDANCE WITH AGENCY'S STANDARDS
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) WATER AND RECYCLED WATER MAINS AND SEWER LATERALS 4” DIAMETER AND SMALLER SHALL HAVE A SHORT SECTION OF PIPE REMOVED AND PIPE ENDS ENCASED IN CONCRETE
3) EXISTING MAIN TO BE PLUGGED WITH CONCRETE OR PRESSURE GROUTED AT INTERVALS OF ABOUT 200’ OR AS DIRECTED BY THE ENGINEER
4) EXISTING MAINS 16” AND LARGER REQUIRE THE ENTIRE LENGTH OF THE PIPE TO BE FILLED BY PRESSURE GROUTING OR BY BLOWN SAND
5) EXISTING VALVES SHALL BE TURNED TO THE CLOSED POSITION. REMOVE GATE WELL AND REPLACE WITH COMPACTED BACKFILL
6) FOR ABANDONMENT OF MANHOLES SEE SM-08
7) PRIOR AGENCY APPROVAL REQUIRED FOR CUTTING AND PLUGGING

SAN DIEGO REGIONAL STANDARD DRAWING
CUTTING AND PLUGGING ABANDONED WATER, RECYCLED WATER AND SEWER MAINS

Checkperson: R.C.E. 19246 Date: 12/17/2015
DRAWING NUMBER: WP-03
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
3) WALLS SHALL BE REINFORCED CONCRETE OR 8" X 8" X 16" CONCRETE BLOCK, REINforced AND ALL CORES FILLED WITH GROUT SEE SPECIFICATIONS
4) FOR GRADES OVER 50%, SLOPE PROTECTION SHALL ALSO INCLUDE AC PAVING, CONCRETE SLAB OR GUNITE BLANKET PLACED OVER THE PIPELINE ALIGNMENT
5) 4" GUNITE BLANKET WITH 6" SQUARE X 10 GAGE WIRE FABRIC AT THE ENGINEERS DISCRETION
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) FOR USE AS TRENCH BACKFILL STABILIZATION IN TRAVELED AREAS
3) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS
REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND
APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
4) WALLS SHALL BE REINFORCED CONCRETE OR 8" X 8" X 16" CONCRETE BLOCK, REINFORCED
AND ALL CORES FILLED
WITH GROUT SEE SPECIFICATIONS
5) FOR GRADES OVER 50% SEE WP-05/SP-05

Revised By Approved Date
ORIGINAL J. Tomasulo 10/04
Delete Metric MR B. KNOLL 03/11
Reviewed MR B. KNOLL 10/15

SAN DIEGO REGIONAL STANDARD DRAWING

CUT-OFF WALL INSTALLATION IN TRAVELED AREAS
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) STAMP OR CHISEL A 2" HIGH 'W' IN CURB FACE TO IDENTIFY
   POTABLE WATER SERVICE LOCATION
3) STAMP OR CHISEL A 2" HIGH 'RW' IN CURB FACE TO IDENTIFY
   RECYCLED WATER SERVICE LOCATION
4) METER BOXES ARE NOT TO BE INSTALLED IN DRIVEWAYS, SIDEWALKS OR
   WITHIN PAVED ROADWAYS
5) MULTIPLE METER BOXES SHALL BE INSTALLED WITH A MINIMUM OF 9"
   BETWEEN BOXES
6) METER BOX SHALL BE INSTALLED 9" FROM THE BACK OF BERM, CURB, OR
   SIDEWALK (TYP)
7) AN EASEMENT MAY BE NEEDED DEPENDING ON LOCATION OF METER BOX
8) METER BOXES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE
   IDENTIFIED AS DESCRIBED IN AGENCY'S SPECIFICATIONS
9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS
   LIST
FOR DRAWING OF THE METER INSTALLATION SEE WS-04 (SHEET 1 OF 2)

NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) TO BE USED WHERE BOTH DOMESTIC SERVICE AND FIRE PROTECTION ARE INSTALLED ON THE SAME PRIVATE SYSTEM
3) LOCATION OF METER SHALL BE APPROVED BY THE DISTRICT ENGINEER PRIOR TO INSTALLATION IN ACCORDANCE WITH STANDARD DWG WS-06
4) 8" OR 10" METERS TO BE DESIGNED BY AN ENGINEER AND SUBMITTED FOR AGENCY’S APPROVAL AS NEEDED ON A CASE-BY-CASE BASIS
5) JOINT RESTRAINT SHALL BE IN ACCORDANCE WITH AGENCY SPECIFICATIONS
6) METERS SHALL BE FURNISHED AND INSTALLED BY THE AGENCY OF JURISDICTION
7) 4" METER REQUIRES A 48" x 60" VAULT 6" METER REQUIRES A 48" x 72" VAULT
8) IN AREAS WHERE GROUND WATER IS PRESENT THE AGENCY’S ENGINEER MAY REQUIRE A SEALED SUMP TO BE CONSTRUCTED
9) CONNECTIONS TO STEEL WATER MAINS SHALL BE IN ACCORDANCE WITH AGENCY SPECIFICATIONS
10) MATERIALS SHALL BE SELECTED FROM THE AGENCY’S APPROVED MATERIALS LIST

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>2&quot; x REQUIRED LENGTH TYPE &quot;K&quot; COPPER PIPE</td>
<td>11</td>
<td>FRP VAULT WITH HINGED ACCESS DOOR, SEE NOTE 7</td>
</tr>
<tr>
<td>2</td>
<td>2&quot; BRONZE CORPORATION STOP</td>
<td>12</td>
<td>12&quot; DIAMETER x 6&quot; LONG PVC PIPE</td>
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<tr>
<td>3</td>
<td>LINE SIZE x 2&quot; SERVICE SADDLE</td>
<td>13</td>
<td>2&quot; 90° COMPRESSION ELL (TYPICAL)</td>
</tr>
<tr>
<td>4</td>
<td>4&quot; OR 6&quot; PVC PIPE</td>
<td>14</td>
<td>LINE SIZE x 24&quot; LONG FLANGED DUCTILE-IRON SPOOL</td>
</tr>
<tr>
<td>5</td>
<td>4&quot; OR 6&quot; FLG x MJ RWGV MECHANICALLY RESTRAINED, SEE NOTE 5</td>
<td>15</td>
<td>8&quot; GATE WELL. SEE WV-01 &amp; WV-02</td>
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<tr>
<td>6</td>
<td>LINE SIZE x 6&quot; LONG FLG x PE DUCTILE-IRON SPOOL</td>
<td>16</td>
<td>HINGED VAULT ACCESS DOOR</td>
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<tr>
<td>7</td>
<td>2&quot; COMPRESSION, LOCKABLE BALL VALVE</td>
<td>17</td>
<td>ADJUSTABLE PIPE SUPPORT (TYPICAL)</td>
</tr>
<tr>
<td>8</td>
<td>4&quot; OR 6&quot; FLEXIBLE COUPLING</td>
<td>18</td>
<td>6&quot; CLASS &quot;B&quot; CONCRETE FLOOR WITH #3 BARS @ 12&quot; C.C.</td>
</tr>
<tr>
<td>9</td>
<td>LINE SIZE x 30&quot; LONG FLG x PE DUCTILE-IRON SPOOL</td>
<td>19</td>
<td>6&quot; DG BASE COMPACTED TO 90%</td>
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<tr>
<td>10</td>
<td>4&quot; OR 6&quot; FIRELINE METER SEE NOTE 6</td>
<td>20</td>
<td>12&quot; DIAMETER x 12&quot; DEEP, 1&quot; GRAVEL SUMP, SEE NOTE 8</td>
</tr>
</tbody>
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Revision By Approved Date
ORIGINAL J. Tomaszko 10/04
Delete Metric: B. KNOLL 03/11
Reviewed B. KNOLL 10/15

SAN DIEGO REGIONAL STANDARD DRAWING

4" OR 6" FIRELINE/MASTER METER INSTALLATION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER WS-04 (2 OF 2)
NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) EXTENSION STEMS SHALL BE ROUND STEEL TUBING OF SOLID DESIGN (NO PINNED COUPLINGS PERMITTED)
3) VALVES DEEPER THAN 5’ AND 2” AIR VALVES REQUIRE A VALVE STEM EXTENSION OR AS REQUIRED BY THE AGENCY OF JURISDICTION
4) EXTENSION STEMS SHALL NOT BE ATTACHED/BOLTED TO OPERATING NUT OF THE VALVE
5) MATERIALS SHALL BE SELECTED FROM THE AGENCY’S APPROVED MATERIALS LIST