Please adjust this spine guide marks to the final determined number of pages.
City of San Diego
Standard Drawings
For
Public Works Construction
2016 Edition

Prepared by
Public Works Department
Project Implementation Division
Standards and Contract Documents Section
These "Standard Drawings for Public Works Construction 2016 Edition" (Standard Drawings) have been prepared and adopted by the City of San Diego. They are for use in concert with the “2015 WHITEBOOK – Standard Specifications for Public Works Construction” and the 2015 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.


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](http://www.sandiego.gov/publicworks/edocref/standarddraw/updates.shtml)

Users of the Standard Drawings are encouraged to submit corrections and proposed changes to the Standards Drawings to Public Works Department, Standards and Contract Documents Section at [engineering@sandiego.gov](mailto: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 2015 Greenbook continues to have U.S. Customary System Units followed by International System of Units also referred to SI or metric units in parenthesis.
# TABLE OF CONTENTS

**CONCRETE STRUCTURES**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDC-103</td>
<td>Structure Excavation &amp; Backfill (2)</td>
</tr>
<tr>
<td>SDC-105</td>
<td>Masonry Wall</td>
</tr>
<tr>
<td>SDC-107</td>
<td>Retaining Wall Notes</td>
</tr>
<tr>
<td>SDC-108</td>
<td>Retaining Wall Details</td>
</tr>
<tr>
<td>C-1</td>
<td>Masonry Retaining Wall Type 1 (Level Backfill)</td>
</tr>
<tr>
<td>C-2</td>
<td>Masonry Retaining Wall Type 2 (Live Load Surcharge or Slope Backfill)</td>
</tr>
<tr>
<td>C-3</td>
<td>Masonry Retaining Wall Type 3 (Level Backfill)</td>
</tr>
<tr>
<td>C-4</td>
<td>Masonry Retaining Wall Type 4 (Live Load Surcharge or Slope Backfill)</td>
</tr>
<tr>
<td>C-5</td>
<td>Masonry Retaining Wall Type 5 (Level Backfill)</td>
</tr>
<tr>
<td>C-6</td>
<td>Masonry Retaining Wall Type 6 (Live Load Surcharge or Slope Backfill)</td>
</tr>
<tr>
<td>C-9</td>
<td>Gravity Retaining Walls</td>
</tr>
<tr>
<td>C-10</td>
<td>General Notes and Details for Gravity Retaining Walls</td>
</tr>
<tr>
<td>C-11A</td>
<td>Reinforced Concrete Retaining Wall Type 1</td>
</tr>
<tr>
<td>C-11B</td>
<td>Reinforced Concrete Retaining Wall Type 1</td>
</tr>
<tr>
<td>C-11C</td>
<td>Reinforced Concrete Retaining Wall Type 1</td>
</tr>
<tr>
<td>C-11D</td>
<td>Reinforced Concrete Retaining Wall Type 1</td>
</tr>
<tr>
<td>C-12A</td>
<td>Reinforced Concrete Retaining Wall Type 1A</td>
</tr>
<tr>
<td>C-12B</td>
<td>Reinforced Concrete Retaining Wall Type 1A</td>
</tr>
<tr>
<td>C-13A</td>
<td>Reinforced Concrete Retaining Wall Details No. 1</td>
</tr>
<tr>
<td>C-13B</td>
<td>Reinforced Concrete Retaining Wall Details No. 1</td>
</tr>
<tr>
<td>C-13C</td>
<td>Reinforced Concrete Retaining Wall Details No. 1</td>
</tr>
<tr>
<td>C-13D</td>
<td>Reinforced Concrete Retaining Wall Details No. 1</td>
</tr>
<tr>
<td>C-14</td>
<td>Reinforced Concrete Retaining Wall Details No. 2</td>
</tr>
<tr>
<td>C-15</td>
<td>Reinforced Concrete Retaining Wall Details No. 3</td>
</tr>
</tbody>
</table>
DRAINAGE SYSTEM

SDD-101 Typical Ford (2)
SDD-102 Curb Inlet Opening
SDD-103 Slotted Drain Connections to Standard Inlets
SDD-104 Rip Rap Energy Dissipator
SDD-105 Concrete Energy Dissipator (2)
SDD-106 Drainage Ditches
SDD-107 Minor Drainage Channel
SDD-108 Major Drainage Channel
SDD-109 Graded Earth Channel
SDD-110 Pipe Bedding and Trench Backfill for Storm Drains
SDD-111 Box Culvert Wingwall (6)
SDD-112 Box Culvert Warped Wingwall (3)
SDD-113 Concrete Lug
SDD-114 Inlets and Cleanouts Notes and Details (2)
SDD-115 Curb Inlet – Type A
SDD-116 Curb Inlet – Type B
SDD-117 Curb Inlet – Type C
SDD-118 Median Curb Inlet – Type J
SDD-119 Catch Basin – Type F

D-03B Concrete Apron for Type C Curb Inlet
D-09 Storm Drain Cleanout – Type A
D-10 Storm Drain Cleanout – Type B
D-13 Welded Steel Grate Frame
D-15 Drainage Structure Grate
D-16 Corrugated Steel Pipe Inlets Types A and B
D-17A Corrugated Steel Pipe Inlets, Details
D-17B Corrugated Steel Pipe Inlets, Details
D-18 Slotted Corrugated Steel Pipe Drains 12” Through 24”
D-22  Asphalt Concrete Spillway
D-23  Tapered Inlet and Downdrain Flume
D-25  Curb Outlet – Type A
D-27  Sidewalk Underdrain Pipe
D-29  Catch Basin – Type I
D-30  Straight Headwall – Type A [Circular Pipe]
D-31  Straight Headwall – Type A [Corrugated Steel Pipe – Arch]
D-32  Straight Headwall – Type B [Circular Pipe]
D-33  Straight Headwall – Type B [Corrugated Steel Pipe, Arch Pipe]
D-34  Wing and U Type Headwalls for 18” to 36” Pipes
D-35A Wing and U Type Headwalls for 42” to 84” Pipe
D-35B Wing and U Type Headwalls for 42” to 84” Pipe
D-36  L Type Headwalls [Circular Pipes]
D-37  L Type Headwalls [Corrugated Steel Pipe, Arch]
D-38  Curtain Wall
D-39  Inlet Apron for Culverts Up to 42” Diameter
D-42  Concrete Energy Dissipator (Reinforcement) 18” to 30” Diameter Pipe
D-43A Concrete Energy Dissipator (Reinforcement) 36” to 72” Diameter Pipe
D-43B Concrete Energy Dissipator (Reinforcement) 36” to 72” Diameter Pipe
D-43C Concrete Energy Dissipator (Reinforcement) 36” to 72” Diameter Pipe
D-44A Pipe Culvert – Headwalls, Endwalls & Warped Wingwalls
D-44B Pipe Culvert – Headwalls, Endwalls & Warped Wingwalls
D-44C Pipe Culvert – Headwalls, Endwalls & Warped Wingwalls
D-44D Pipe Culvert – Headwalls, Endwalls & Warped Wingwalls
D-61  Rounded Pipe Ends in Drainage Structures
D-62  Pipe Collar
D-72  Cutoff Wall for Drainage Channel
D-73  Pipe to Channel Connection
D-76A Single Box Culvert Details No. 1
D-76B Single box Culvert Details No. 1
D-76C  Single Box Culvert Details No. 1
D-76D  Single Box Culvert Details No. 1
D-76E  Single Box Culvert Details No. 1
D-76F  Single Box Culvert Details No. 1
D-76G  Single Box Culvert Details No. 2
D-77A  Double Box Culvert Details No. 1
D-77B  Double Box Culvert Details No. 1
D-77C  Double Box Culvert Details No. 1
D-77D  Double Box Culvert Details No. 1
D-77E  Double Box Culvert Details No. 1
D-77F  Double Box Culvert Details No. 1
D-77G  Double Box Culvert Details No. 2
D-78A  Triple Box Culvert Details No. 1
D-78B  Triple Box Culvert Details No. 1
D-78C  Triple Box Culvert Details No. 1
D-78D  Triple Box Culvert Details No. 1
D-78E  Triple Box Culvert Details No. 1
D-78F  Triple Box Culvert Details No. 1
D-78G  Triple Box Culvert Details No. 2
D-81A  Box Culvert Miscellaneous Details No. 1
D-81B  Box Culvert Miscellaneous Details No. 2
D-82   Debris Fence

**ELECTRICAL SYSTEM**

SDE-101  Street Lighting Standard
SDE-102  Model 336 Cabinet
SDE-103  Pedestrian Barricade
SDE-104  Type E Modified Loop (2)

E-2     Grounding of Concrete Lighting Standards
E-3     Pedestal for Electrical Equipment
GENERAL SURFACE IMPROVEMENTS

SDG-102  Bus Stop Slab
SDG-106  Cold Milling Asphalt Concrete Pavement Detail
SDG-107  Trench Resurfacing for Asphalt Concrete Surfaced Streets
SDG-108  Trench Resurfacing for PCC Surfaced Streets
SDG-109  Sidewalk Joint Locations
SDG-110  Inlet Transition Profile (2)
SDG-112  Raised Center Median (2)
SDG-113  Pavement Design Standards Schedule “J” (4)
SDG-115  Existing Historical Stamp or Impression Placement
SDG-117  Narrow Trench Resurfacing for Asphalt Concrete Surface Streets
SDG-118  Narrow Trench Resurfacing for PCC Surfaced Streets
SDG-119  Trench Types G, H & I Backfill for Dry Utility
SDG-120  Alley Apron
SDG-130  Detectable Warning Tiles
SDG-131  General Curb Ramp Notes
SDG-132  General Curb Ramp Notes and Supplemental Details
SDG-133  Curb Ramps – Type A and B
SDG-134  Dual Curb Ramps
SDG-135  Curb Ramps – Type C1 and C2
SDG-136  Curb Ramps – Type C1 and C2 More Details
SDG-137  Curb Ramp – Type D
SDG-138  General Curb Ramps
SDG-139  Island and Passageway Details
SDG-140  Curb Ramp Barricade
SDG-150  Curb and Gutter – Separate
SDG-151  Curb and Gutter – Combined
SDG-154  Curb and Gutter – Medians
SDG-155  Sidewalk – Typical Sections
SDG-156  Concrete Curb, Gutter, Sidewalk and Pavement Removal and Replacement
SDG-157  Cross Gutter
SDG-158 Mid-Block Cross Gutter
SDG-159 Concrete Driveway (Contiguous Sidewalk) (2)
SDG-160 Concrete Driveway (Non-Contiguous Sidewalk)
SDG-161 Residential Concrete Driveway (Parkway Less Than 10’ In Depth)
SDG-162 Concrete Driveway (For Confined Right-of-Way)
SDG-163 Commercial Concrete Driveway
SDG-164 Driveway Location and Width Requirements

G-5 Dikes – Asphalt Concrete
G-10 Concrete Joint Details
G-15 Driveway Location – Adjacent to Curb Returns and Street Lines
G-18 Concrete Pavement Width 40’ or Less
G-19 Concrete Pavement Width 40’ to 62’
G-20 Concrete Pavement, Alley Section Width 53’ to 69’
G-21 Concrete Pavement Alley Section, Width 40’ or Less
G-22 Cutoff Wall at End of Pavement
G-23 Cutoff Wall at End of Alley Pavement
G-36 Slurry Backfill

**SPRINKLER IRRIGATION SYSTEMS**

SDI-101 Shrub Spray Head on Fixed Riser
SDI-102 Rotor or Impact Head on Fixed Riser
SDI-103 Rotor, Spray, or Bubbler Pop-up Head
SDI-104 Tree Bubbler Tube
SDI-105 Quick Coupling Valve
SDI-106 Isolation Glove Valve 2” or Smaller
SDI-107 Isolation Glove/Gate Valve 2 1/2” and Larger
SDI-110 Irrigation Trench PVC or Copper Pipe
SDI-111 Master Valve
SDI-112 Flow Sensor
SDI-114 Remote Control Valve
SDI-115 Electrical Pull Box for Direct Burial Control Wires and Splice Notes
SDI-116   Solar Irrigation Controller
SDI-117   Automatic Irrigation Controller Pedestal Mounted
SDI-118   Automatic Irrigation Controller Indoor Wall Mounted
SDI-119   Control Wire Installation
SDI-120   On-Grade Pipe Stabilization Temporary installation
SDI-123   Swing Joint and Pipe Installation on Slopes Above Ground Pipe Installations
SDI-125   Remote Control Valve Manifold Assembly with PVC Pipe (Temporary Systems)
SDI-126   Remote Control Valve Manifold Assembly with Brass Pipe
SDI-127   Remote Control Valve Drip Irrigation
SDI-128   Air / Vacuum Relief Valve
SDI-129   Drip Irrigation Flush Valve (Automatic)

**LANDSCAPING**

SDL-101   Tree Planting and Staking
SDL-102   Shrub Planting/Ground Cover Spacing
SDL-103   Concrete Mowing Strip
SDL-104   Tree Grate
SDL-105   Light Pole Pad in Turf Areas
SDL-106   Root Control Barrier
SDL-107   Palm Tree Planting (2)

**MISCELLANEOUS**

SDM-101   Left Turn Median Transition
SDM-102   Street Name Sign (4)
SDM-103   Joint Trench Locations
SDM-104   Break-Away Sign Post
SDM-105   Warning / Identification Tape Installation
SDM-107   Dual Height Drinking Fountain (New Construction)
SDM-108   Dual Height Drinking Fountain Non-Alcove (For Existing Structures)
SDM-109   Underground Typical Location (New Construction)
SDM-111 Utility Locations in Local and Major Streets Prime Arterials and Expressways
SDM-112 Vinyl Coated Chain Link Fence
SDM-113 Manhole Cover – Locking Device
SDM-114 Chain Link Gate (2)
SDM-115 Pedestrian Ramp and Protective Railing (3).
SDM-116 Continental Crosswalk Markings Layout and Notes (3)
SDM-117 Accessible Parking (8)
SDM-118 Pedestrian Protective Railing & Stair Handrail (3)
SDM-119 Tennis Court Fence Chain Link
SDM-130 Guardrail

M-1 24” Manhole Frame and Cover Heavy Duty
M-2 24” Manhole Frame and Cover Light Duty
M-3 36” Manhole Frame and Two Concentric Covers Heavy Duty
M-9 Guard Post and Barricade
M-10 Street Survey Monument
M-10A Street Survey Monument Overlay Adjustment
M-10B Street Survey Monument Notes
M-11 Bench Mark – Brass Plug
M-12 Datums
M-13 Survey Monuments
M-14 Metric Equivalents
M-16 Demountable Post
M-20 Chain Link Fence Details
M-21 Underground Typical Location Conversion/Replacement/Upgrade
M-45 Break – Away Sign Post

RECYCLED WATER SYSTEMS
SDRW-101 Pipe Bedding and Trench Backfill for Recycled Water Mains
SDRW-102 2” Recycled Water Service Installation and Marking (2)
SDRW-103 Recycled Water Valve and Valve Box (Light Duty)
SDRW-104  Recycled Water Valve and Valve Box (Heavy Duty)
SDRW-105  Recycled Water Valve Well Cover
SDRW-106  Recycled Water Valve Key Extension
SDRW-108  Recycled Water Signs (4)
SDRW-109  Sign / Tag for Recycled Water Irrigation Remote Control Valve
SDRW-110  Sign / Tag for Recycled Water Irrigation Valve
SDRW-111  Sign / Tag for Identification of Recycled Water Control Devices
SDRW-112  Sign / Tag for Recycled Water Irrigation Box Cover / Lid
SDRW-113  Sign / Tag for Recycled Water Automatic Irrigation Controller
SDRW-114  Recycled Water Tag
SDRW-115  Recycled Water Quick Coupling Valve (2)
SDRW-116  Cross Connection Control Test Station
SDRW-120  Threshold Bypass Piping
SDRW-121  Typical Curb Marker Installation Location

SEWER SYSTEM
SDS-101  Permissible Depth of Cover for PVC Pipe
SDS-102  Sewer Lateral Cleanout (In Paved Alley, Side Walk, or Other Areas Subject to Traffic)
SDS-103  Sewer Lateral Cleanout
SDS-104  4” Backwater Device (2)
SDS-105  House Connection (Sewer Lateral)
SDS-106  Manhole 5’ x 3’ Diameter
SDS-107  Manhole – 4’ x 3’ Diameter (For 15” Maximum Diameter Pipe)
SDS-108  Manhole Pipe Connectors
SDS-109  Cleanout – Sewer Force Main
SDS-110  Pipe Bedding and Trench Backfill for Sewers
SDS-112  Concrete Encasement
SDS-113  Concrete Backfill
SDS-114  Concrete Anchor
SDS-115  Cutoff Wall
SDS-116  Concrete Protection for Existing Sewer Pipe
SDS-117 Concrete Support for Undercut Sewer Pipe
SDS-118 House Connection Sewer Repair
SDS-119 Pipe Bedding and Trench Backfill for Sewers in Groundwater
SDS-120 Sewer Manhole Base
SDS-121 Sewer Main Cleanout

SC-01 Sewer Cleanout
SM-07 Manhole Coating and Lining System
SM-08 Existing Manhole Abandonment

WATER SYSTEMS

SDW-101 Typical Outlet for SCRW Pipe Steel Pipe and Pipe Specials
SDW-103 Access Manhole
SDW-104 Fire Hydrant Installation (3)
SDW-105 Backflow Preventer for 4” and Larger Fire Service (2)
SDW-106 Blow-Off Assemblies at the End of PVC and Cast Iron Mains
SDW-107 Narrow Trench for 1” & 2” Water Services
SDW-108 Field Welded Joints
SDW-109 Valve Key Extensions
SDW-110 Pipe Bedding and Trench Backfill for Potable Water Mains
SDW-111 Spigot Ring & Gasket Joint for Welded Steel Pipe
SDW-113 Concrete Water Meter Box for 1 1/2” or 2” Water Meter
SDW-114 2” Meter, Backflow and Coffer Box (3)
SDW-115 Read Hole Cap & Chain Detail (For Metal Meter Vault Covers)
SDW-116 Bonding Strap for Steel and SCRW Pipe
SDW-117 Air and Vacuum Valve Enclosure & Location (2)
SDW-118 Fire Service Connection & Assembly
SDW-119 Dual Above Ground Meter With City Backflow Preventer (2)
SDW-120 Backflow Preventer Reduced Pressure Principle Detector Assembly for Fire Service 3” and Larger
SDW-121  At-Grade Cathodic Protection Test Station Installation for Roadways
SDW-122  Joint Bonding of Non-Welded Pipe Joints & Fittings
SDW-123  Insulating Flange and Mechanical Joints External Protection
SDW-124  Post-Mounted Test Station Wire Termination Detail
SDW-125  Exothermic Welding of Cables and Coating of Welding
SDW-126  Installation of Directly Buried Cables and Conduit
SDW-127  Above Ground Cathodic Protection Test Station Installation for Undeveloped Areas
SDW-128  At-Grade Concrete Test Box
SDW-129  At-Grade Cathodic Protection Test Station Wiring Diagram for Roadways
SDW-130  Insulating Flange Four-Wire Test Station Installation
SDW-131  Wire Identification
SDW-132  Post-Mounted Cathodic Protection Warning Decal
SDW-133  Symbols Cathodic Protection
SDW-134  Polymer Concrete Water Meter Box for 1” Water Service
SDW-135  Polymer Concrete Water Meter Box for 2” Water Service
SDW-136  Meter Box Polymer Concrete Cover (2)
SDW-137  Traffic Rated Cover and Meter Box Installation
SDW-138  Multiple Service Assembly Dead End Main
SDW-139  Split Butt Strap
SDW-141  Backflow Preventers Wet Utility Room Installation (2)
SDW-143  2” Blow-off Installation
SDW-144  4” & 6” Blow-off Installation Type A
SDW-145  4” & 6” Blow-off Installation Type B
SDW-146  Blow-off Installation from End of Main & from Steel Main
SDW-149  2” Water Service Installation
SDW-150  1” Water Service Installation
SDW-151  Concrete Thrust and Anchor Block Installations (3)
SDW-152  Gate Well Identification
SDW-153  Gate Well Cap & Can Installation for Valves 4” and Larger
SDW-154  Water Valve Bypass Details for Mainlines 16” and Larger
SDW-155  Backflow Preventer for 3/4” to 2” Metered Service
SDW-156  Backflow Preventer for 3” and Larger Metered Service
SDW-157  Dual Above Ground Meter with Private Backflow (2)
SDW-158  2” Manual Air Valve
SDW-159  2” Automatic Combination Air Release & Air/Vacuum Valve Installations
SDW-160  4” & 6” Automatic Combination Air Release & Air/Vacuum Valve Installations
SDW-161  Pipe Support for Undercut Sewer Mains or Sewer Laterals
SDW-162  Pipe Support for Undercut AC Water Main
SDW-170  2” Fire Hydrant Highlining Connection
SDW-171  4” Fire Hydrant Highlining Connection
SDW-172  Residential User Highlining Connection
SDW-173  Highlining Crossing & Run at Driveways and Curbs
SDW-174  Highlining Crossing & Run at Curb Ramps

WB-05  Temporary 2” Blow-Off Installation
WM-04  Protection Post Installation
WP-03  Cutting and Plugging Abandoned Water, Recycled Water and Sewer Mains
WP-05  Slope Protection Installations
WP-07  Cut-Off Wall Installation in Traveled Areas
WS-03  Meter Box Locations for Water and Recycled Water Appurtenances
WS-04  4” or 6” Fireline/Master Meter Installation (2)
WV-05  Steel Valve Stem Extension for Valves 2” and Smaller
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>Acrylonitrile – butadiene – styrene</td>
</tr>
<tr>
<td>AC</td>
<td>Asphalt Concrete</td>
</tr>
<tr>
<td>ACI</td>
<td>American Concrete Institute</td>
</tr>
<tr>
<td>ACP</td>
<td>Asbestos Cement Pipe</td>
</tr>
<tr>
<td>ADA</td>
<td>Americans with Disabilities Act</td>
</tr>
<tr>
<td>ADAS</td>
<td>Americans with Disabilities Act Standards</td>
</tr>
<tr>
<td>AGG</td>
<td>Aggregates</td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
</tr>
<tr>
<td>ASCE</td>
<td>American Society of Civil Engineers</td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
</tr>
<tr>
<td>AWWA</td>
<td>American Water Work Association</td>
</tr>
<tr>
<td>CAL/OSHA</td>
<td>California Occupational Safety and Health Administration</td>
</tr>
<tr>
<td>CalTrans</td>
<td>California Department of Transportation</td>
</tr>
<tr>
<td>CATV</td>
<td>Cable/TV</td>
</tr>
<tr>
<td>CC</td>
<td>Calcium Chloride</td>
</tr>
<tr>
<td>C/C</td>
<td>Center to Center</td>
</tr>
<tr>
<td>CF</td>
<td>Cubic Foot</td>
</tr>
<tr>
<td>CFS</td>
<td>Cubic Foot per second</td>
</tr>
<tr>
<td>CL</td>
<td>Center Line</td>
</tr>
<tr>
<td>CLR</td>
<td>Clear</td>
</tr>
<tr>
<td>CLSM</td>
<td>Controlled low strength material</td>
</tr>
<tr>
<td>CONC</td>
<td>Concrete</td>
</tr>
<tr>
<td>CONST</td>
<td>Construct, Construction</td>
</tr>
<tr>
<td>CSP</td>
<td>Corrugated steel pipe</td>
</tr>
<tr>
<td>CTB</td>
<td>Cement treated base</td>
</tr>
<tr>
<td>CV</td>
<td>Check valve</td>
</tr>
<tr>
<td>CY</td>
<td>Cubic Yard</td>
</tr>
<tr>
<td>D</td>
<td>Diameter or Load of Pipe</td>
</tr>
<tr>
<td>DIA</td>
<td>Diameter</td>
</tr>
<tr>
<td>DWG</td>
<td>Drawing</td>
</tr>
<tr>
<td>EA.</td>
<td>Each</td>
</tr>
<tr>
<td>ELEV</td>
<td>Elevation</td>
</tr>
<tr>
<td>EX</td>
<td>Existing</td>
</tr>
<tr>
<td>EXP</td>
<td>Expansion</td>
</tr>
<tr>
<td>F</td>
<td>Fahrenheit or Flange</td>
</tr>
<tr>
<td>FG</td>
<td>Finished grade</td>
</tr>
<tr>
<td>FL</td>
<td>Flow line</td>
</tr>
<tr>
<td>GA</td>
<td>Gauge</td>
</tr>
<tr>
<td>GALV</td>
<td>Galvanized</td>
</tr>
<tr>
<td>GFI</td>
<td>Ground Fault Interrupter</td>
</tr>
<tr>
<td>H</td>
<td>High or height</td>
</tr>
<tr>
<td>HEX</td>
<td>Hexagonal</td>
</tr>
<tr>
<td>HORIZ</td>
<td>Horizontal</td>
</tr>
<tr>
<td>HPS</td>
<td>High pressure sodium (Light)</td>
</tr>
<tr>
<td>HT</td>
<td>Height</td>
</tr>
<tr>
<td>ID</td>
<td>Inside diameter or Identification Joint</td>
</tr>
<tr>
<td>JT</td>
<td>Joint</td>
</tr>
<tr>
<td>LAP</td>
<td>Overlap</td>
</tr>
<tr>
<td>LOL</td>
<td>Layout line</td>
</tr>
<tr>
<td>MAX</td>
<td>Maximum</td>
</tr>
<tr>
<td>MJ</td>
<td>Mechanical Joint</td>
</tr>
<tr>
<td>MIN</td>
<td>Minimum</td>
</tr>
<tr>
<td>MVL</td>
<td>Mercury vapor light</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>OC</td>
<td>On center</td>
</tr>
<tr>
<td>OD</td>
<td>Outside diameter</td>
</tr>
<tr>
<td>PC</td>
<td>Point of curvature</td>
</tr>
<tr>
<td>PCC</td>
<td>Portland cement concrete</td>
</tr>
<tr>
<td>PCC</td>
<td>Point of compound curvature</td>
</tr>
<tr>
<td>PCF</td>
<td>Pounds per cubic foot</td>
</tr>
<tr>
<td>PCR</td>
<td>Point of curb return</td>
</tr>
<tr>
<td>PL</td>
<td>Property line or Place</td>
</tr>
<tr>
<td>PO</td>
<td>Push on</td>
</tr>
<tr>
<td>PPB</td>
<td>Pedestrian Push Button</td>
</tr>
<tr>
<td>PSF</td>
<td>Pound per square foot</td>
</tr>
<tr>
<td>PUD</td>
<td>Public Utilities Department</td>
</tr>
<tr>
<td>PVC</td>
<td>Polyvinyl Chloride</td>
</tr>
<tr>
<td>R</td>
<td>Radius</td>
</tr>
<tr>
<td>RCV</td>
<td>Remote Control Valve</td>
</tr>
<tr>
<td>R/W</td>
<td>Right-of-way, Recycled water</td>
</tr>
<tr>
<td>REINF</td>
<td>Reinforced or reinforcement</td>
</tr>
<tr>
<td>RPDA</td>
<td>Reduced pressure detector assembly</td>
</tr>
<tr>
<td>RWGV</td>
<td>Resilient wedge gate valve</td>
</tr>
<tr>
<td>RW</td>
<td>Recycled water</td>
</tr>
<tr>
<td>S</td>
<td>Slope or second</td>
</tr>
<tr>
<td>SCRW</td>
<td>Steel cylinder rod wrapped</td>
</tr>
<tr>
<td>SD</td>
<td>Storm drain</td>
</tr>
<tr>
<td>SE</td>
<td>Sand Equivalent</td>
</tr>
<tr>
<td>SI</td>
<td>International System of Units (Metric)</td>
</tr>
<tr>
<td>Sqft</td>
<td>Square foot</td>
</tr>
<tr>
<td>STD</td>
<td>Standard</td>
</tr>
<tr>
<td>STR</td>
<td>Straight</td>
</tr>
<tr>
<td>TOT</td>
<td>Total</td>
</tr>
</tbody>
</table>
CHAPTER 1
CONCRETE STRUCTURES
BRIDGE ABUTMENTS & ADJOINING WING WALLS

LEGEND
- STRUCTURE EXCAVATION
- STRUCTURE BACKFILL
- DITCH & CHANNEL EXCAVATION
- ROADWAY EXCAVATION
- ROADWAY EMBANKMENT

NOTE:
SUBGRADE SHALL BE LOWEST SUBGRADE AS DEFINED IN THE STANDARD SPECIFICATIONS.

TOP LIMIT OF STRUCTURE EXCAVATION AND BACKFILL IS ORIGINAL GROUND IF CHANNEL IS NOT EXCAVATED.

ORIGINAL GROUND
SUBGRADE
CONCRETE SLOPE PAVING
CONSTRUCTION JOINT
EMBANKMENT OR ORIGINAL GROUND
CHANNEL OR DITCH EXCAVATION

EXCAVATION
BACKFILL

EMBANKMENT IN PLACE BEFORE STRUCTURE EXCAVATION IS MADE

SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D

EXCAVATION
BACKFILL

GROUND SURFACE AT TIME STRUCTURE EXCAVATION IS MADE

ROADWAY CUT BEFORE BRIDGE CONSTRUCTION

ORIGINAL GROUND
SUBGRADE
CONCRETE SLOPE PAVING
ELEVATION

CONCRETE SLOPE PAVING

EXCAVATION
BACKFILL

SIDE SLOPE OR SUBGRADE
ROADWAY EMBANKMENT

GROUND SURFACE AT TIME STRUCTURE EXCAVATION IS MADE

ROADWAY EXCAVATION
SUBGRADE
SUBGRADE
SUBGRADE
SUBGRADE

ORIGINAL GROUND
ORIGINAL GROUND
ORIGINAL GROUND
ORIGINAL GROUND
ORIGINAL GROUND

SIDE SLOPE OR SUBGRADE
ROADWAY EMBANKMENT

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

REVISION BY APPROVED DATE
ORIGINAL J. CASEY 6-3-83
UPDATED KA J. NAGELVOORT 6/12

CITY OF SAN DIEGO - STANDARD DRAWING

STRUCTURE EXCAVATION & BACKFILL

SDC-103
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)
AFTER THE BLOCKS HAVE BEEN LAID UP TO THE TOP OF THE WALL, WITH THE STEEL TIED SECURELY IN PLACE, BUT BEFORE THE GROUT IS POURED AND...

(2) AFTER THE FIRST LIFT IS PROPERLY GROUTED, 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 GROUTED.

WHERE CLEANOUT HOLES ARE PROVIDED:

WHERE CLEANOUT HOLES ARE PROVIDED:

1. 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 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.

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

3. DRAINAGE DITCHES WILL BE REQUIRED ON SLOPED BACKFILLS 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.

4. 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.

5. CABLE RAILING:

USE CALTRANS STANDARD PLAN B11-47.
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.
### 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'-0&quot;</td>
<td>0'-10&quot;</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>W (min)</td>
<td>2'-4&quot;</td>
<td>3'-6&quot;</td>
<td>5'-4&quot;</td>
</tr>
<tr>
<td>Bars</td>
<td>#4@32&quot;</td>
<td>#4@32&quot;</td>
<td>#4@32&quot;</td>
</tr>
<tr>
<td>Bars</td>
<td></td>
<td>#4@32&quot;</td>
<td>#4@32&quot;</td>
</tr>
<tr>
<td>Bars</td>
<td></td>
<td></td>
<td>#6@16&quot;</td>
</tr>
<tr>
<td>Bars</td>
<td>#4 Total 4</td>
<td>#4 Total 5</td>
<td>#4 Total 6</td>
</tr>
<tr>
<td>max soil pressure</td>
<td>500psf</td>
<td>600psf</td>
<td>800psf</td>
</tr>
</tbody>
</table>

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

---

**MASONRY RETAINING WALL TYPE 1 (LEVEL BACKFILL)**

**SAN DIEGO REGIONAL STANDARD DRAWING**

**RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE**
NOTES:
1. See C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.
MASONRY RETAINING WALL TYPE 3
(LEVEL BACKFILL)

DIMENSIONS AND REINFORCING STEEL

<table>
<thead>
<tr>
<th></th>
<th>3'-8&quot;</th>
<th>5'-4&quot;</th>
<th>6'-0&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>H (max)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T (min)</td>
<td>0'-6&quot;</td>
<td>0'-10&quot;</td>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>W (min)</td>
<td>2'-4&quot;</td>
<td>3'-2&quot;</td>
<td>4'-9&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></td>
<td></td>
</tr>
<tr>
<td>C Bars</td>
<td>#4@32&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D Bars</td>
<td>#4@16&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E Bars</td>
<td>#4 total 4</td>
<td>#4 total 5</td>
<td>#4 total 6</td>
</tr>
</tbody>
</table>

max soil pressure

1100psi
1600psi
2200psi

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

1-1/2:1 sloping backfill or 250 psf live load surcharge

1-1/2:1 sloping backfill or 250 psf live load surcharge

Mortar Cap

#4 total 2

A Bars

2"

#4 total 2

B Bars

2"

2" CLR = 12"

TYPICAL SECTION

over 3'-8"

H=5'-4"

H=3'-8"

ELEVATION

Horizontal rein. not shown

TYPICAL SECTION

3'-8" max

DIMENSIONS AND REINFORCING STEEL

<table>
<thead>
<tr>
<th></th>
<th>H (max)</th>
<th>T (min)</th>
<th>W (min)</th>
<th>#4 Bars</th>
<th>#6 Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5'-4&quot;</td>
<td>0'-10&quot;</td>
<td>3'-0&quot;</td>
<td>#4@16&quot;</td>
<td>#6@16&quot;</td>
</tr>
</tbody>
</table>

Surcharge

K (min)

Toe Press.

Sloping

0'-0" 1'-0" 0'-8"

2700 psf 1900 psf 1700 psf 1430 psf

TYPICAL SECTION

3'-8" max

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 4

(LIVE LOAD SURCHARGE OR SLOPING BACKFILL)
### Dimensions and Reinforcing Steel

<table>
<thead>
<tr>
<th></th>
<th>3'-8&quot; max</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>
</tbody>
</table>
| A Bars   | #4@32"    | #4@32" | #4@32"
| B Bars   |          | #4@32" | #4@32"
| C Bars   |          |        | #7@16"
| D Bars   | #4@32"    | #4@16" | #4@16"
| E Bars   | #4 total 5| #4 total 5| #4 total 6
| Max Toe  | 774 psf   | 1,030 psf | 1,660 psf
| Pressure |           |        |       |

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

---

### Revision History

- **Original**
  - By: Parkinson
  - Date: 2/85

- **Add Metric**
  - By: T. Stanton
  - Date: 03/03

- **Delete Metric**
  - By: T. Shell
  - Date: 03/11

---

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

**San Diego Regional Standard Drawing**

**Masonry Retaining Wall Type 5**

**(Level Backfill)**

**Drawing Number**: C-5
1-1/2:1 sloping backfill or 250 psf live load surcharge

1-1/2:1 sloping backfill or 250 psf live load surcharge

Mortar Cap

H = 3' – 8"

TYPICAL SECTION

over 3' – 8"

ELEVATION

Horizontal reinf. not shown

TYPICAL SECTION

2.000 psf

1,400 psf

NOTES:

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)

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></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></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 H may be exceeded by six inches before going to next size.

DESIGN DATA
\[ \begin{align*}
F_c &= 1200 \text{ psi} \\
F'c &= 3000 \text{ psi} \\
\text{Earth} &= 120 \text{ pcf} \\
\end{align*} \]
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 tamped, 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.

1/2” chamfer

Water stop, use only when watertight joint is required, see water stop detail.

SECTION A–A

Embedment 2-3/8” min

3/8” dia.

3/8”

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.

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

SAN DIEGO REGIONAL STANDARD DRAWING
REINFORCED CONCRETE RETAINING WALL TYPE 1

Revision By Approved Date
ORIGINAL Kercheval 12/75
Add Metric T. Stanton 03/03
Delete Metric S.S. T. Shell 03/11

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Chapman R.C.E. 19246 Date
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 of Reinforcing Steel Dimensions and Data

<table>
<thead>
<tr>
<th>Design 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>
<th>30'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>W</strong></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>
<td>16'-9&quot;</td>
</tr>
<tr>
<td><strong>C</strong></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>
<td>5'-5&quot;</td>
</tr>
<tr>
<td><strong>B</strong></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>
<td>11'-4&quot;</td>
</tr>
<tr>
<td><strong>F Spread Ftg.</strong></td>
<td>1'-2&quot;</td>
<td>1'-2&quot;</td>
<td>1'-2&quot;</td>
<td>1'-2&quot;</td>
<td>1'-3&quot;</td>
<td>1'-3&quot;</td>
<td>1'-4&quot;</td>
<td>1'-4&quot;</td>
<td>1'-6&quot;</td>
<td>1'-8&quot;</td>
<td>1'-11&quot;</td>
<td>2'-2&quot;</td>
<td>2'-4&quot;</td>
<td></td>
</tr>
<tr>
<td>@bars</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>@bars</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>@bars</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>@bars</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Total @bars</td>
<td>6-@7</td>
<td>6-@7</td>
<td>10-@7</td>
<td>10-@7</td>
<td>10-@7</td>
<td>10-@7</td>
<td>6-@7</td>
<td>6-@7</td>
<td>6-@7</td>
<td>6-@7</td>
<td>6-@7</td>
<td>6-@7</td>
<td>6-@7</td>
<td>6-@7</td>
</tr>
<tr>
<td>Total @bars</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
<td>4-@7</td>
</tr>
</tbody>
</table>

**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:
- $f_c = 1300 \text{ psi}$
- $f'c = 3250 \text{ psi}$
- $f_s = 24,000 \text{ psi}$
- $n = 10$
- $\rho = 120 \text{ psf}$

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 $\theta = 33^\circ - 42^\circ$.

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 drainage notes and other details, see "Retaining Wall Details No.1" Drawing C-13A to C-13D.

Numbers above © bars indicate distance from top of footing to upper end of © bars.
Use Reinforcement for H= 6' 8' 10'

Top of Wall

Max. = H=6' 6'-6'' max. 8'-8'' max. 10'-6'' max.

Top of Footing

Top of Wall

Note:
Bar cut-offs may be varied in increments of 6''

Top of Wall

Optional Footing Line

Note: Bar cut-offs may be varied in increments of 6''

Top of Footing

Note: Bar cut-offs may be varied in increments of 6''

Top of Wall

Optional Footing Line

Note: Bar cut-offs may be varied in increments of 6''

Top of Footing

Note: Bar cut-offs may be varied in increments of 6''

Top of Wall

Optional Footing Line

Note: Bar cut-offs may be varied in increments of 6''

Top of Footing

Note: Bar cut-offs may be varied in increments of 6''

Top of Wall

Optional Footing Line

Note: Bar cut-offs may be varied in increments of 6''

Top of Footing

Note: Bar cut-offs may be varied in increments of 6''

Top of Wall

Optional Footing Line

Note: Bar cut-offs may be varied in increments of 6''

TYPICAL LAYOUT EXAMPLE
For joints required, see Details 3-3 and 3-4, Std Dwg C-15

TABLE OF REINFORCING STEEL DIMENSIONS AND DATA

<table>
<thead>
<tr>
<th>Design H</th>
<th>4'</th>
<th>6'</th>
<th>8'</th>
<th>10'</th>
<th>12'</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</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>
</tr>
<tr>
<td>C</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>
</tr>
<tr>
<td>B</td>
<td>2'-2&quot;</td>
<td>2'-6&quot;</td>
<td>3'-6&quot;</td>
<td>4'-2&quot;</td>
<td>4'-10&quot;</td>
</tr>
</tbody>
</table>

| (a) bars | #5@24" | #5@22" | #5@11" | #6@9" | #7@7-1/2" |
| (b) bars | #5@24" | #5@22" | #5@22" | #6@21" | #6@15" |
| Total (a) bars | 6-#6 | 6-#6 | 6-#6 | 10-#7 | 10-#7 |
| Total (b) bars | 4-#7 | 4-#7 | 4-#7 | 4-#7 | 4-#7 |

Case I - Toe Press.
1590psf 1930psf 2240psf 2550psf 2840psf

Case II - Toe Press.
1060psf 1460psf 1860psf 2280psf 2700psf

Spread Steel lbs/ft.
15lb 21lb 27lb 46lb 70lb

Footing Conc CF/ft.
8.6lb 11.8lb 14.9lb 18.1lb 21.3lb

Pile Flg. Steel lbs/ft.
25lb 32lb 38lb 75lb 101lb

Note:
Quantities apply to Design H portion and exclude the added portion above
"Gutter Elevation". *For pile footing Design H=4' use same footing dimensions as Design H=6'.
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.

20' VC AT TOP OF WALL SLOPE CHANGE
Where shown on the plans

2' surcharge

FOOTING STEP

DIMENSIONS 1, 2, and 3 to be as shown elsewhere in the project plans

STEM WIDTH AT BASE OF HAUNCH

NOTE: Surcharge limits shown apply to retaining walls Type 1 and 3
PLAN (For return wall type "A")

PLAN (For return wall type "B")

PLAN (For return wall type "C")

PLAN (For return wall type "D")

REINFORCED CONCRETE RETAINING WALL DETAILS No. 1

SEE DRAWING C-13D FOR DETAIL 3-4
RETURN WALL TYPE A
Use where H=8' or less

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

RETURN WALL TYPE C
Use where H=10' or more on straight walls

RETURN WALL TYPE D
Use where H=6' or less
NOTES

1-1/2" Premolded expansion joint filler

PLAN OF WALL WITH DETAIL 3-4
(see C-15)

PLAN OF WALL WITH EXPANSION JOINT ONLY

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:

\[ fc = 1300 \text{ psi} \quad f'c = 3250 \text{ psi} \quad f_s = 24,000 \text{ psi} \]
\[ n = 10 \quad \text{earth} = 120 \text{ pcf} \]

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 \( \phi = 33' - 42' \).
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

SAN DIEGO REGIOANL STANDARD DRAWING

REINFORCED CONCRETE

RETAINING WALL DETAILS No. 2

GRAIN DETAIL
Sizes to fit standard hubs

RETAINING WALL
FACE OF WALL OUTLET

GUTTER OUTLET

OUTLET DETAIL - SECTION B-B

NOTE
Area of opening to be not less than that of pipe from wall gutter. Make opening transition in wall. Edge opening in curb face to 3/4 minimum radius.

OUTLET DETAIL - SECTION B-B

REINFORCED CONCRETE

RETAINING WALL UTILITY OPENING
Max size of opening (A) = 48" to be used in conjunction with C-13

SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER C-14

Revision By Approved Date

ORIGINAL Kercheval 12/75
Add Metric T. Stanton 03/03
Delete Metric S.S. T. Shell 03/11
NOTES

A. 4" diameter drain Φ 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 sock, securely tied.

D. Pervious backfill material continuous behind retaining wall.

WALL EXPANSION JOINTS
AND WEAKENED PLANES
DETAIL 3–3

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 Φ 12" max intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the engineer.
NOTE:

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
NOTE:
1. HEADWALL LENGTH (L) PER D-30, D-31
NOTES:
1. FACE ANGLE SHALL BE CAST INTO STRUCTURE CONTINUOUS FOR THE FULL LENGTH "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.
NOTES:
1. EITHER FIELD JOINT WITH A PLIABLE MIXTURE OF SAND PORTLAND CEMENT EMLULIFIED ASPHALT (MIXTURE OF 1 PART PORTLAND CEMENT, 3-5 PARTS SAND, AND 1 1/2 PARTS S/S EMLULIFIED ASPHALT) OR CONTINOUS WELD.

2. SEE D-18 FOR ADDITIONAL NOTES AND DETAILS

3. SLOTTED DRAIN INSTALLATIONS SHALL BE ENCASED WITH 6 INCH PCC 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 GEOTEXTILE FILTER FABRIC. FILTER BLANKET MATERIAL SHALL BE PLACED UNDER THE FABRIC WHEN SPECIFIED.

4. SEE CITY SUPPLEMENT 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.
NOTE: RIP RAP NOT SHOWN

2 - #4 REBARS HORIZONTAL AND VERTICAL AROUND FENCE POST (TYPICAL)

SECTION A-A

AGGREGATE CUTOFF WALL

CHANNEL INVERT

MIN THICKNESS FACING CLASS 18" LIGHT CLASS 30"

FILTER CLOTH

AGGREGATE SUBBASE BOTTOM AND SIDES

6" THICK FOR FACING CLASS

9" THICK FOR LIGHT CLASS

SEE TABLE ON SHEET 2 FOR DIMENSIONS
SEE NOTES ON SHEET 2
CONCRETE ENERGY DISSIPATOR DIMENSIONS

<table>
<thead>
<tr>
<th>Pipe Dia (in)</th>
<th>18</th>
<th>24</th>
<th>30</th>
<th>36</th>
<th>42</th>
<th>48</th>
<th>54</th>
<th>60</th>
<th>72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (sq ft)</td>
<td>1.77</td>
<td>3.14</td>
<td>4.91</td>
<td>7.07</td>
<td>9.62</td>
<td>12.57</td>
<td>15.90</td>
<td>19.63</td>
<td>28.27</td>
</tr>
<tr>
<td>Max Q (cfs)</td>
<td>21</td>
<td>38</td>
<td>59</td>
<td>85</td>
<td>115</td>
<td>151</td>
<td>191</td>
<td>236</td>
<td>339</td>
</tr>
</tbody>
</table>
| W           | 5'-6"| 6'-9"| 8'-0"| 9'-3"| 10'-6"| 11'-9"| 13'-0"| 14'-3"| 16'-6"
| H           | 4'-3"| 5'-3"| 6'-3"| 7'-3"| 8'-0"| 9'-0"| 9'-9"| 10'-9"| 12'-3"
| L           | 7'-4"| 9'-0"| 10'-8"| 12'-4"| 14'-0"| 15'-8"| 17'-4"| 19'-0"| 22'-0"
| a           | 3'-3"| 3'-11"| 4'-7"| 5'-3"| 6'-0"| 6'-9"| 7'-4"| 8'-0"| 9'-3"
| b           | 4'-1"| 5'-1"| 6'-1"| 7'-1"| 8'-0"| 8'-11"| 10'-0"| 11'-0"| 12'-9"
| c           | 2'-4"| 2'-10"| 3'-4"| 3'-10"| 4'-5"| 4'-11"| 5'-5"| 5'-11"| 6'-11"
| d           | 0'-11"| 1'-2"| 1'-4"| 1'-7"| 1'-9"| 2'-0"| 2'-2"| 2'-5"| 2'-9"
| e           | 0'-6"| 0'-6"| 0'-8"| 0'-8"| 0'-10"| 0'-10"| 1'-0"| 1'-0"| 1'-3"
| f           | 1'-6"| 2'-0"| 2'-6"| 3'-0"| 3'-0"| 3'-0"| 3'-0"| 3'-0"| 3'-0"
| g           | 2'-1"| 2'-6"| 3'-0"| 3'-6"| 3'-11"| 4'-5"| 4'-11"| 5'-4"| 6'-2"
| Tf          | 8"  |     |     |     |     |     |     |     |     |
| Tb          | 7"  |     |     |     |     |     |     |     |     |
| Tw          | 7"  |     |     |     |     |     |     |     |     |
| Ta          | 7"  |     |     |     |     |     |     |     |     |

NOTES:

1. DESIGN EQUIVALENT FLUID PRESSURE (EARTH LOADING) = 60 pcf MAXIMUM OUTLET VELOCITY = 35 ft/s
2. CONCRETE SHALL BE 660-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. SPICES 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 16" 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.
BROW DITCH

TYPE A

3' 470-C-2000 CONCRETE OR 3' 2500 PSI AIR PLACED CONCRETE WITH 1 1/2" X 1 1/2"
17 GAGE STUCCO NETTING.

BOTTOM MAY BE ROUNDED AT THE OPTION OF THE CONTRACTOR

TYPE B

3' 470-C-2000 CONCRETE OR 3' 2500 PSI AIR PLACED CONCRETE WITH 1 1/2" X 1 1/2"
17 GAGE STUCCO NETTING.

BOTTOM MAY BE ROUNDED AT THE OPTION OF THE CONTRACTOR

TYPE C

3' 470-C-2000 CONCRETE OR 3' 2500 PSI AIR PLACED CONCRETE WITH 1 1/2" X 1 1/2"
17 GAGE STUCCO NETTING.

BOTTOM MAY BE ROUNDED AT THE OPTION OF THE CONTRACTOR

TYPE D

TERRACE DITCH

NOTES:
1. LATERAL 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.
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. CHANNELING 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 50' 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. CHANNELING 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.
SECTION

NOTES:

1. THE FOLLOWING SHALL BE AS REQUIRED:
   A. LOW FLOW CHANNEL
   B. FILTER BLANKET
   C. CUTOFF WALL
   D. FENCE

2. CHANNELING 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.
NOTES:
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.
Note:
Where 1:12:1 surcharge exceeds 5', use Type 2 retaining wall.

Detail X

Extend all longitudinal bars in box walls 2'-0" into wings, except where expansion joint occurs.

Detail Y

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.
W/3
B
C
W
F
FIL L SLOPE
GUT T ER OR SHOULDER
35 DIA
TO BAT T ERED SECTION, THEN MATCH
VERTICAL UNLESS ADJACENT
TO BAT T ERED SECTION, THEN MATCH
"c" BARS
#4 @ 18'
2' CL
SHORT "c"
3" HOLE 15' OC. 1' ABOVE
OUTSIDE GROUND
#4 @ 36'
VERTICAL
"d" BARS
#4 TOTAL 7
9' R
8'
8'
5'
1'-0"
TYPICAL SECTION
H = 4'-0" THRU 12'-0"

5' MAX FOR
1 1/2:1 FILL SLOPES,
UNLIMITED FOR
FLATTER THAN 1 1/2:1
MATCH PARAPET
1'-0"
GUT T ER OR SHOULDER

DESIGN "H"

SHE E T 2 OF 6
OUTSIDE GROUND
3" HOL E 1 5' OC 1' ABOVE

J. NA GE LV OORT
UPDAT ED 2/25/16
REVISION  BY  APPROVED  DATE
ORIGINAL*  KA  J. NA GE LV OORT  09/12
UPDATED  AR  NA GE LV OORT  02/16
COORDINATOR  R.C.E  5823  DATE
CITY OF SAN DIEGO - STANDARD DRAWING
RECOMMENDED BY THE CITY OF SAN DIEGO
STANDARDS COMMITTEE
BOX CULVERT WINGWALL
DRAWING  NUMBER  SDD-111
TYPICAL SECTION
H=13'-0" THRU 16'-0"

MATCH PARAPET

FILL SLOPE

1'-0"

VERTICAL

"c" BARS

"d" BARS

2" CL

3" HOLE 15' O.C., 1' ABOVE OUTSIDE GROUND

SHORT "c" BARS

35 DIA

CONSTRUCTION JOINT

2" CL

9" R

1'-0"

1'-0"

1'-0"

S

W3

B

C

W

#4 TOTAL 7

"c" BARS

#4 @ 18"

#4 @ 36"

2" CL

BATTER 1/2:12

OUTSIDE GROUND 3" HOLE 15' O.C., 1' ABOVE

5' MAX FOR 1-1/2:1 FILL SLOPES, UNLIMITED FOR FLATTER THAN 1 1/2:1

GUTTER OR SHOULDER

FIL L SLOPE

1'-0"

#4 ALONG TOP OF WALL
FIGURES AT TOP OF "c" BARS
INDICATE DISTANCE TO UPPER END OF "c" BARS.

TYPICAL LAYOUT EXAMPLE 1
NOTES:

1. UNIT STRESSES: \( f_0 = 20,000 \text{ PSI}, f = 1,200 \text{ PSI}, n = 10 \)

2. WALLS DESIGNED FOR 2'-0" LIVE LOAD SURCHARGE, 112.1 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>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>3'-2&quot;</td>
<td>3'-6&quot;</td>
<td>4'-2&quot;</td>
<td>4'-6&quot;</td>
<td>5'-2&quot;</td>
<td>5'-6&quot;</td>
<td>6'-2&quot;</td>
<td>6'-6&quot;</td>
<td>7'-2&quot;</td>
<td>7'-6&quot;</td>
<td>8'-2&quot;</td>
<td>8'-6&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>
<td>5'-2&quot;</td>
<td>5'-6&quot;</td>
<td>5'-10&quot;</td>
<td>6'-2&quot;</td>
</tr>
<tr>
<td>F</td>
<td>None</td>
<td>1'-2&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Batter | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" | 1'-0" |

| "c" Bars | #4@24 | #4@16 | #5@20 | #5@14 | #5@14 | #5@7 | #6@7 1/2" | #7@6 | #7@6 | #9@15 | #10@15 | #10@13 | #10@11 |
| "d" Bars | #4@24 | #4@16 | #5@20 | #5@14 | #5@10 | #6@14 | #7@15 | #6@16 | #7@12 | #5@15 | #9@15 | #10@13 | #9@11 |

| Conc. $f_y$ | 0.32 | 0.36 | 0.44 | 0.49 | 0.55 | 0.61 | 0.67 | 0.73 | 0.79 | 1.02 | 1.10 | 1.16 | 1.26 |
| Rain $f_{ai}$ | 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.
TYPICAL WITH STIFFENING BEAM  TYPICAL WITHOUT STIFFENING BEAM

PART LONGITUDINAL SECTION

SHEET 1 OF 3

RECOMMENDED BY THE CITY OF SAN DIEGO
STANDARDS COMMITTEE

COORDINATOR R.C.E 5623  DATE

CITY OF SAN DIEGO – STANDARD DRAWING

DRAWING NUMBER SDD-112
NOTES:

1. WALLS DESIGNED FOR 2' SURCHARGE; EARTH DENSITY = 120 #/CU. FT.; EQUIVALENT FLUID PRESSURE = 36 #/CU. FT.

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.
### WALL DIMENSIONS AND REINFORCING

<table>
<thead>
<tr>
<th>Element Slope</th>
<th>&quot;H&quot;</th>
<th>6&quot; or less</th>
<th>10&quot;</th>
<th>12&quot;</th>
<th>14&quot;</th>
<th>16&quot;</th>
<th>18&quot;</th>
<th>20&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front face rein; Rear face rein</td>
<td>1:4:1</td>
<td>#4@8</td>
<td>#4@10</td>
<td>#5@10</td>
<td>#6@12</td>
<td>#7@12</td>
<td>#8@12</td>
<td>#9@12</td>
</tr>
<tr>
<td>Front face rein; Rear face rein</td>
<td>3:4:1</td>
<td>#4@8</td>
<td>#4@10</td>
<td>#5@10</td>
<td>#6@12</td>
<td>#7@12</td>
<td>#8@12</td>
<td>#9@12</td>
</tr>
<tr>
<td>Front face rein; Rear face rein</td>
<td>1:1:4:1</td>
<td>#4@8</td>
<td>#4@10</td>
<td>#5@10</td>
<td>#6@12</td>
<td>#7@12</td>
<td>#8@12</td>
<td>#9@12</td>
</tr>
<tr>
<td>&quot;D&quot; at Cutoff Wall</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>7-1/2&quot;</td>
<td>8&quot;</td>
<td>9-12&quot;</td>
<td>11&quot;</td>
<td>11&quot;</td>
</tr>
<tr>
<td>&quot;D&quot; at Culvert</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>9-12&quot;</td>
<td>11&quot;</td>
<td>11&quot;</td>
<td>11&quot;</td>
</tr>
</tbody>
</table>

### STIFFENING BEAM DIMENSIONS AND REINFORCING

<table>
<thead>
<tr>
<th>&quot;H&quot;, &quot;L&quot;, max.</th>
<th>12&quot;</th>
<th>14&quot;</th>
<th>16&quot;</th>
<th>18&quot;</th>
<th>20&quot;</th>
<th>25&quot;</th>
<th>30&quot;</th>
<th>35&quot;</th>
<th>40&quot; or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; No beam. Place 2-#6 in each wall along top of wall</td>
<td>&quot;A&quot; = 1'-0&quot;</td>
<td>&quot;A&quot; = 1'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>&quot;B&quot; = 9&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10&quot;</td>
<td>Total 6-#6</td>
<td>&quot;B&quot; = 1'-0&quot;</td>
<td>&quot;A&quot; = 1'-10&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12&quot;</td>
<td>Total 6-#7</td>
<td>&quot;B&quot; = 1'-0&quot;</td>
<td>&quot;A&quot; = 2'-0&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14&quot;</td>
<td>Total 6-#7</td>
<td>&quot;B&quot; = 1'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16&quot;</td>
<td>Total 8-#9</td>
<td>&quot;B&quot; = 1'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.
NOTES:

1. CONCRETE SHALL BE 660-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 SPICE 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 16" 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</th>
<th>DEPTH</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>
</tr>
<tr>
<td>4'-1&quot; TO 7'-0&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>#4 12&quot;</td>
</tr>
<tr>
<td>7'-0&quot; TO 8'-0&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>#4 8&quot;</td>
</tr>
<tr>
<td>3'-0&quot; TO 4'-0&quot;</td>
<td>4'-1&quot;</td>
<td>6&quot;</td>
<td>#4 18&quot;</td>
</tr>
<tr>
<td>4'-1&quot; TO 5'-0&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>#4 12&quot;</td>
</tr>
<tr>
<td>5'-1&quot; TO 6'-0&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>#4 8&quot;</td>
</tr>
<tr>
<td>6'-1&quot; TO 8'-0&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>#4 6&quot;</td>
</tr>
<tr>
<td>3'-0&quot; TO 4'-0&quot;</td>
<td>8&quot;</td>
<td>6&quot;</td>
<td>#4 15&quot;</td>
</tr>
<tr>
<td>4'-1&quot; TO 5'-0&quot;</td>
<td>8&quot;</td>
<td>8&quot;</td>
<td>#4 12&quot;</td>
</tr>
<tr>
<td>5'-1&quot; TO 6'-0&quot;</td>
<td>8&quot;</td>
<td>8&quot;</td>
<td>#4 8&quot;</td>
</tr>
<tr>
<td>6'-1&quot; TO 8'-0&quot;</td>
<td>8&quot;</td>
<td>8&quot;</td>
<td>#4 6&quot;</td>
</tr>
<tr>
<td>3'-0&quot; TO 4'-0&quot;</td>
<td>12&quot;</td>
<td>8&quot;</td>
<td>#4 12&quot;</td>
</tr>
<tr>
<td>4'-1&quot; TO 5'-0&quot;</td>
<td>12&quot;</td>
<td>10&quot;</td>
<td>#4 12&quot;</td>
</tr>
<tr>
<td>5'-1&quot; TO 6'-0&quot;</td>
<td>12&quot;</td>
<td>10&quot;</td>
<td>#4 8&quot;</td>
</tr>
<tr>
<td>6'-1&quot; TO 7'-0&quot;</td>
<td>12&quot;</td>
<td>10&quot;</td>
<td>#4 6&quot;</td>
</tr>
<tr>
<td>7'-1&quot; TO 8'-0&quot;</td>
<td>12&quot;</td>
<td>10&quot;</td>
<td>#4 6&quot;</td>
</tr>
<tr>
<td>3'-0&quot; TO 4'-0&quot;</td>
<td>20'-1&quot;</td>
<td>8&quot;</td>
<td>#4 12&quot;</td>
</tr>
<tr>
<td>4'-1&quot; TO 5'-0&quot;</td>
<td>20'-1&quot;</td>
<td>10&quot;</td>
<td>#4 12&quot;</td>
</tr>
<tr>
<td>5'-1&quot; TO 6'-0&quot;</td>
<td>20'-1&quot;</td>
<td>10&quot;</td>
<td>#4 8&quot;</td>
</tr>
<tr>
<td>6'-1&quot; TO 7'-0&quot;</td>
<td>20'-1&quot;</td>
<td>10&quot;</td>
<td>#4 6&quot;</td>
</tr>
<tr>
<td>7'-1&quot; TO 8'-0&quot;</td>
<td>20'-1&quot;</td>
<td>10&quot;</td>
<td>#4 6&quot;</td>
</tr>
</tbody>
</table>

SHEET 2 OF 2

CITY OF SAN DIEGO - STANDARD DRAWING

INLETS AND CLEANOUTS

NOTES AND DETAILS

SDD-114
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.

SECTION C-C

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

SECTION A-A

LEGEND ON PLANS

LEGEND ON PLANS

GALV. STEEL ANGLE CONTINUOUS AND PROTECTION BAR, SEE SDD-102

SECTION B-B

SLOPE GUTTER 3" OR MATCH EXISTING ROADWAY SURFACE

OPTIONAL CONSTRUCTION JOINT 6" ABOVE INVERT

CURB INLET - TYPE A
NOTES
1. TYPES ARE DESIGNATED AS FOLLOWS: (NO WING)B, (ONE WING)B-1, (TWO WINGS)B-2.
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. ELEVATIONS SHALL BE SHOWN ON THE PLANS WHERE INDICATED BY "O" SYMBOL.
9. SEE SDD-102 AND SDD-114 FOR ADDITIONAL NOTES AND DETAILS.

LEGEND ON PLANS

- #4 AROUND OPENING
- TRANSITION TO NORMAL CURB HEIGHT IN 10' ON BOTH SIDES UNLESS OTHERWISE NOTED
- SEE NOTE 5
- Curb Line
- Edge of Gutter
- Curb Inlet - Type B
- "O" Symbol
- Expansion Joint
- Optional Construction Joint 6" Min Above Invert
- Curb Height in 10' on Transition to Normal
- Cover See Manhole Frame
- Joint 6" Min
- Galv. Steel Angle Continuous and Protect Bar, See SDD-102
- #4 @6"
- #4 @12"
- #4 @12"
- #4 @12"
- 3-Round Pipe Ends See D-61
- 10" Unless Otherwise Shown
- Length Shown on Plans 1 1/2" Clear
- Y Is Determined by Pipe Size 4' Min, 8' Max

SECTION C-C

SECTION A-A
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 PLACE 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-3B CONCRETE APRON IS REQUIRED, LIFT DOWN GRADE END OF GRADE.
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.

SECTION C-C

PLAN

SECTION B-B

SECTION A-A

CURB INLET - TYPE C
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 12"
3. WHEN Y 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.
NOTES
1. Curb and apron to be placed monolithically.
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.
### Plan

**Type** | **Pipe Diameter (D1)** | **X** | **Y** (See Note 8) | **Z**
---|---|---|---|---
A4 | up to 39" | 4' | 4' | 6'
A5 | 42" to 48" | 5' | 4' | 6'
A6 | 51" to 60" | 6' | 4' | 6'
A7 | 63" to 66" | 7' | 4' | 7'
A8 | 69" to 78" | 8' | 4' | 8'

**Notes**

1. See D-11A & 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 radius of 1/2".
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.

### Legend on Plans

- Storm Drain Cleanout - Type A
- Drawing Number D-09

For drawings D-11A and D-11B, see drawing SDD-114
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
Hat 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: 200lbs +/-
Punch 1" hole in CSP. Place pipe so bars of grate will be parallel with main surface flow.

3" x 1/2" bars

Join to CSP

SECTION A-A

DETAIL "B"

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"

3" x 3/8" bars

See Detail A

2" clr

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

Standard end finish

Lug 3/4" dia. x 1 1/2"

1" hole in pipe to receive lug

1/4" (typ)

3/8" dia.

3/8" dia. cross bars may be fillet welded, resistance welded or electroforged to bearing bars.

CROSS BAR DETAIL TYPE

ALTERNATIVE CAST NODULAR IRON GRATE

OR CAST STEEL GRATE

X 3/16"

GRATE DETAILS

3"

2-1/2"

1/2"

SECTION B-B

ALTERNATIVE CAST NODULAR IRON GRATE

OR CAST 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>Y</th>
</tr>
</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>
</tr>
<tr>
<td>Cast</td>
<td>13</td>
<td>2&quot;</td>
<td>2-1/8&quot;</td>
<td>3-3/4&quot;</td>
</tr>
</tbody>
</table>

SAN DIEGO REGIONAL STANDARD DRAWING

CORRUGATED STEEL PIPE INLETS, DETAILS

Revised: 07/26/2012

Chairperson: R.C.E. 19246 Date

Drawing Number: D-17A

Revised by: Kercheval

Approved by: Kercheval

Date: 12/75

Add Metric: T. Stanton 03/03

Reformatted: T. Stanton 04/06

Edited: T. Stanton 02/09

Edited: S.S. T. Regello 03/11

Recommended by the San Diego Regional Standards Committee
Grind all exposed corners 1/4" radius

6" x 1/4" x 6" plate washer with 7/8" dia. hole
Brackets @ 10' OC max 4-1/2" x 1/4"
bent plate 5/8" holes in bracket and rail for 1/2" dia. bolts

2-holes slotted 5/8" x 1"
for 1/2" dia. bolts
2-holes 5/8" for
1/2" dia. bolts

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

SIDE VIEW

1"
dia.
holes in pipe

2" x 3/16" x 2" plate washer

LADDER DETAIL
H=5' or greater

3/4" dia. bolt
Hex-
u nut 1/2"
7"

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

3/4" dia.
galv. steel step
5/8" dia. holes
for 1/2" dia. bolts
2-1/2" x 3/8" x 1'

NOTE
See Note 3 on D-16 for ladder requirements.

SAN DIEGO REGIOIHAL 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
NOTES

1. Drain seams may be constructed by riveting or resistance spot-welding, continuous helical lock seam or helical welding seam at equal centers.

2. Each drain section shall be assembled with standard coupling bands.

3. Cross bar spacer of grate shall be pressure fused or plug welded to bearing bars in such a manner as to develop the strength of the cross bar spacer.

4. Cross bar spacer (Section E–E) may differ from that shown provided section area is equal or greater.

5. Grate material shall be a weldable grade of steel complying to the requirements of ASTM A 36.

6. The maximum variance from a straight line from the extreme top corners of the bearing bar shall be 1/2" in 20'.

7. Installation lengths shall be 10' or multiples thereof.

8. Either field joint sealed with a pliable mixture of sand, portland cement and emulsified asphalt (Mixture of 1 part portland cement, 3 – 5 parts sand and 1–1/2 parts SSI emulsified asphalt), or continuous weld.

SAN DIEGO REGIONAL STANDARD DRAWING

SLOTTED CORRUGATED STEEL PIPE DRAINS

12" THROUGH 24"
NOTES

1. AC spillway may be used when fill is 10' or less, and where fill slope 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.
0.64" galvanized corrugated metal flume -- up to 10' max

PLAN

Top of AC dike

SECTION A-A

Tapered inlet

5/16" x 3/4" slotted holes for galv bolts

TAPERED INLET

Gutter line

Road surface

Base

3" AC-

Slope

3-1/2:1

Anchor

Flume section

Weld

5/16" galv metal band in 3/8" x 1" slotted holes

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.
May be open channel~

Dimensions shown on plans

NAMES
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 curb.
**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>
</tr>
</tbody>
</table>

**SECTION B-B**

- Pipe to be finished flush with curb.
- Gutter

**SECTION A-A**

- Gutter
- Property line
- 2'
- 1-1/2" min
- 6" typ

**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>
</tr>
</tbody>
</table>

**SECTION B-B**

- Pipe to be finished flush with curb.
- Gutter

**SECTION A-A**

- Gutter
- Property line
- 2'
- 1-1/2" min
- 6" typ

**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.
NOTES
1. See D-11A & D-11B for additional notes and details.
2. When V exceeds 4', steps shall be installed per D-11A.

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING
CATCH BASIN - TYPE I

FOR DRAWINGS D-11A AND D-11B, SEE DRAWING SDD-114
### Front Elevation

**Single Headwall**

**Double Headwall**

### Section, Single & Double Headwalls

<table>
<thead>
<tr>
<th>D</th>
<th>H</th>
<th>Single</th>
<th>Double</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Concrete Lbs.</td>
<td>Concrete C.Y.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2'-8&quot;</td>
<td>5'</td>
<td>35</td>
</tr>
<tr>
<td>15&quot;</td>
<td>2'-11&quot;</td>
<td>6'</td>
<td>40</td>
</tr>
<tr>
<td>18&quot;</td>
<td>3'-2&quot;</td>
<td>7'</td>
<td>50</td>
</tr>
<tr>
<td>21&quot;</td>
<td>3'-5&quot;</td>
<td>7'-6&quot;</td>
<td>60</td>
</tr>
<tr>
<td>24&quot;</td>
<td>3'-8&quot;</td>
<td>8'-6&quot;</td>
<td>75</td>
</tr>
<tr>
<td>27&quot;</td>
<td>3'-11&quot;</td>
<td>9'-6&quot;</td>
<td>85</td>
</tr>
<tr>
<td>30&quot;</td>
<td>4'-2&quot;</td>
<td>10'</td>
<td>85</td>
</tr>
<tr>
<td>33&quot;</td>
<td>4'-5&quot;</td>
<td>11'</td>
<td>100</td>
</tr>
<tr>
<td>36&quot;</td>
<td>4'-8&quot;</td>
<td>12'</td>
<td>105</td>
</tr>
<tr>
<td>39&quot;</td>
<td>4'-11&quot;</td>
<td>12'-6&quot;</td>
<td>130</td>
</tr>
<tr>
<td>42&quot;</td>
<td>5'-2&quot;</td>
<td>13'-6&quot;</td>
<td>140</td>
</tr>
<tr>
<td>45&quot;</td>
<td>5'-5&quot;</td>
<td>14'-6&quot;</td>
<td>150</td>
</tr>
<tr>
<td>48&quot;</td>
<td>5'-8&quot;</td>
<td>15'</td>
<td>160</td>
</tr>
<tr>
<td>51&quot;</td>
<td>5'-11&quot;</td>
<td>16'</td>
<td>180</td>
</tr>
<tr>
<td>54&quot;</td>
<td>6'-2&quot;</td>
<td>17'</td>
<td>190</td>
</tr>
</tbody>
</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**

---
ELEVATION - DOUBLE HEADWALL

ELEVATION - SINGLE HEADWALL

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>H ft/in</td>
<td>L ft/in</td>
<td>Steel Lbs.</td>
</tr>
<tr>
<td>18x11</td>
<td>2'-7&quot;</td>
<td>5'-6&quot;</td>
</tr>
<tr>
<td>21x15</td>
<td>2'-11&quot;</td>
<td>6'-6&quot;</td>
</tr>
<tr>
<td>24x18</td>
<td>3'-2&quot;</td>
<td>7'-6&quot;</td>
</tr>
<tr>
<td>28x20</td>
<td>3'-4&quot;</td>
<td>8'-6&quot;</td>
</tr>
<tr>
<td>35x24</td>
<td>3'-8&quot;</td>
<td>10'-6&quot;</td>
</tr>
<tr>
<td>42x29</td>
<td>4'-1&quot;</td>
<td>12'-6&quot;</td>
</tr>
<tr>
<td>49x33</td>
<td>4'-5&quot;</td>
<td>14'-6&quot;</td>
</tr>
<tr>
<td>57x38</td>
<td>4'-10&quot;</td>
<td>17'</td>
</tr>
<tr>
<td>64x43</td>
<td>5'-3&quot;</td>
<td>19'</td>
</tr>
<tr>
<td>71x47</td>
<td>5'-7&quot;</td>
<td>21'</td>
</tr>
</tbody>
</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.
NOTES
1. Concrete shall be 560-C-3250.
2. Exposed corners shall be 3/4" chamfered.
### CSP ARCH SIZE

<table>
<thead>
<tr>
<th>Size</th>
<th>A</th>
<th>B</th>
<th>H</th>
<th>SINGLE L</th>
<th>Concrete CY</th>
<th>DOUBLE L</th>
<th>Concrete CY</th>
</tr>
</thead>
<tbody>
<tr>
<td>18&quot; x 11&quot;</td>
<td>2'</td>
<td>1'2&quot;</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>
</tr>
<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 to be 3/4" chamfered.

### LEGEND ON PLANS

---

**SINGLE PIPE ELEVATION**

**DOUBLE PIPE ELEVATION**

**SECTION A-A**

**3/4" chamfer**

**Rounded pipe ends, see D-61**

**Flowline elev shown 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 to be 3/4" chamfered.
3. Multiple pipes to be set a distance of D/2, with a 1" minimum 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 to be increased in width or length due to skew or multiple pipes.
6. For pipe wall thickness greater than 3" use Alternate Detail C.

LEGEND ON PLANS

---

SAN DIEGO REGIONAL STANDARD DRAWING
WING AND U TYPE HEADWALLS
FOR 18" TO 36" PIPES

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
7/26/2012

DRAWING NUMBER D-34
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

LEGEND ON PLANS

SLOPE 50° 8" 2-#5
See D-61 for rounded pipe end
   Elev shown on plans

ALT DETAIL C

#5 @ 12" (both ways) 8" 6" 2-#5

ALTERNATIVE DETAIL C

#5 @ 12" (both ways) 8" 6" 2-#5

ALTERNATIVE DETAIL C

#5 @ 12" (both ways) 8" 6" 2-#5
# TABLE OF DIMENSIONS AND QUANTITIES FOR HEADWALLS SHOWN ON D-35A

<table>
<thead>
<tr>
<th>Dia of Pipe</th>
<th>Dimensions</th>
<th>Single Pipe</th>
<th>Double Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>W Type</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>U Type</td>
<td>Wing Type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conc. (CY)</td>
<td>Steel (LBS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conc. (CY)</td>
<td>Steel (LBS)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dia of Pipe</th>
<th>Dimensions</th>
<th>Single Pipe</th>
<th>Double Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>42&quot;</td>
<td>3'-7 1/4&quot;</td>
<td>2' 3'</td>
<td>4'</td>
</tr>
<tr>
<td>48&quot;</td>
<td>4'-6&quot;</td>
<td>2'-6&quot; 3'-9&quot;</td>
<td>4'-6&quot;</td>
</tr>
<tr>
<td>54&quot;</td>
<td>5'-4 7/8&quot;</td>
<td>3' 4'-6&quot;</td>
<td>5'</td>
</tr>
<tr>
<td>60&quot;</td>
<td>6'-3 3/4&quot;</td>
<td>3'-6&quot; 5'-3&quot;</td>
<td>5'-6&quot;</td>
</tr>
<tr>
<td>66&quot;</td>
<td>7'-2 1/2&quot;</td>
<td>4' 6&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>72&quot;</td>
<td>8'-1 3/8&quot;</td>
<td>4'-6&quot; 6'-9&quot;</td>
<td>6'-6&quot;</td>
</tr>
<tr>
<td>78&quot;</td>
<td>9' 5' 7'-6&quot;</td>
<td>7' 10&quot;</td>
<td>7'-6&quot;</td>
</tr>
<tr>
<td>84&quot;</td>
<td>9'-10 3/4&quot;</td>
<td>5'-6&quot; 8'-3&quot;</td>
<td>7'-8&quot;</td>
</tr>
</tbody>
</table>

Note: Dimensions E and L apply to wing type only.

**NOTES**

1. Skewed Pipes: Dimension W to be increased to take care of increased width or length due to skew of 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. For pipe wall thickness greater than 3", use Alternate Detail C.

---

**LEGEND ON PLANS**

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**WING AND U TYPE HEADWALLS FOR 42" TO 84" PIPE**

<table>
<thead>
<tr>
<th>Revision</th>
<th>By</th>
<th>Approved</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORIGINAL</td>
<td>Kercheval</td>
<td></td>
<td>12/75</td>
</tr>
<tr>
<td>Add Metric</td>
<td>T. Stanton</td>
<td>03/03</td>
<td></td>
</tr>
<tr>
<td>Reformatted</td>
<td>T. Stanton</td>
<td>04/06</td>
<td></td>
</tr>
<tr>
<td>Edited</td>
<td>T. Stanton</td>
<td>02/09</td>
<td></td>
</tr>
<tr>
<td>Edited</td>
<td>S.S. T. Regello</td>
<td>03/11</td>
<td></td>
</tr>
</tbody>
</table>

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

**DRAWING NUMBER** D-35B
### CORNER STEEL DETAIL

### ELEVATION

### SECTION

#### Dimensions
- 2'-0" 2'-6"
- 2'-8" 2'-9"
- 2'-11" 3'
- 3'-2" 3'-6"
- 3'-5" 3'-9"
- 3'-8" 4'-3"
- 3'-11" 4'-9"
- 4'-2" 5'
- 4'-5" 5'-6"
- 4'-8" 6'
- 4'-11" 6'-3"
- 5'-2" 6'-9"
- 5'-5" 7'-3"
- 5'-8" 7'-6"
- 5'-11" 8'
- 6'-2" 8'-6"

#### Table: Steel and Concrete Volumes

<table>
<thead>
<tr>
<th>D</th>
<th>H</th>
<th>L/2</th>
<th>3'-4&quot; W</th>
<th>4'-10&quot; W</th>
<th>6'-4&quot; W</th>
<th>7'-10&quot; W</th>
<th>9'-4&quot; W</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot;</td>
<td>2'-8&quot;</td>
<td>2'-6&quot;</td>
<td>50</td>
<td>0.79</td>
<td>60</td>
<td>0.98</td>
<td>60</td>
</tr>
<tr>
<td>15&quot;</td>
<td>2'-11&quot;</td>
<td>3'</td>
<td>55</td>
<td>0.91</td>
<td>65</td>
<td>1.11</td>
<td>65</td>
</tr>
<tr>
<td>18&quot;</td>
<td>3'-2&quot;</td>
<td>3'-6&quot;</td>
<td>65</td>
<td>1.04</td>
<td>75</td>
<td>1.25</td>
<td>75</td>
</tr>
<tr>
<td>21&quot;</td>
<td>3'-5&quot;</td>
<td>3'-9&quot;</td>
<td>75</td>
<td>1.15</td>
<td>90</td>
<td>1.36</td>
<td>90</td>
</tr>
<tr>
<td>24&quot;</td>
<td>3'-8&quot;</td>
<td>4'-3&quot;</td>
<td>85</td>
<td>1.29</td>
<td>100</td>
<td>1.51</td>
<td>110</td>
</tr>
<tr>
<td>27&quot;</td>
<td>3'-11&quot;</td>
<td>4'-9&quot;</td>
<td>90</td>
<td>1.44</td>
<td>105</td>
<td>1.67</td>
<td>115</td>
</tr>
<tr>
<td>30&quot;</td>
<td>4'-2&quot;</td>
<td>5'</td>
<td>95</td>
<td>1.55</td>
<td>110</td>
<td>1.80</td>
<td>120</td>
</tr>
<tr>
<td>33&quot;</td>
<td>4'-5&quot;</td>
<td>5'-6&quot;</td>
<td>105</td>
<td>1.71</td>
<td>120</td>
<td>1.97</td>
<td>135</td>
</tr>
<tr>
<td>36&quot;</td>
<td>4'-8&quot;</td>
<td>6'</td>
<td>110</td>
<td>1.88</td>
<td>125</td>
<td>2.15</td>
<td>140</td>
</tr>
<tr>
<td>39&quot;</td>
<td>4'-11&quot;</td>
<td>6'-3&quot;</td>
<td>150</td>
<td>2.28</td>
<td>170</td>
<td>2.56</td>
<td>185</td>
</tr>
<tr>
<td>42&quot;</td>
<td>5'-2&quot;</td>
<td>6'-9&quot;</td>
<td>155</td>
<td>2.42</td>
<td>175</td>
<td>2.76</td>
<td>190</td>
</tr>
<tr>
<td>45&quot;</td>
<td>5'-5&quot;</td>
<td>7'-3&quot;</td>
<td>180</td>
<td>2.97</td>
<td>200</td>
<td>3.27</td>
<td>215</td>
</tr>
<tr>
<td>48&quot;</td>
<td>5'-8&quot;</td>
<td>7'-6&quot;</td>
<td>190</td>
<td>3.13</td>
<td>216</td>
<td>3.44</td>
<td>230</td>
</tr>
<tr>
<td>51&quot;</td>
<td>5'-11&quot;</td>
<td>8'</td>
<td>220</td>
<td>3.67</td>
<td>235</td>
<td>3.99</td>
<td></td>
</tr>
<tr>
<td>54&quot;</td>
<td>6'-2&quot;</td>
<td>8'-6&quot;</td>
<td>235</td>
<td>3.91</td>
<td>250</td>
<td>4.24</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.

---

**Legends on Plans**

---

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

---

**Original: Kercheval 2/75**

---

**Add Metric: T. Stanton 03/03**

---

**Reformatted: T. Stanton 04/06**

---

**Edited: T. Stanton 02/09**

---

**Edited: S.S. T. Regello 03/11**

---

**San Diego Regional Standard Drawing**

---

**L Type Headwalls**

---

**Circular Pipes**

---

**D-36**
### CSP ARCH SIZE | H | L/2 | LENGTH OF W
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>18&quot;x11&quot;</td>
<td>2'-7&quot;</td>
<td>2'-9&quot;</td>
<td>18&quot;x11&quot;</td>
<td>3'-4&quot;</td>
<td>4'-10&quot;</td>
<td>6'-4&quot;</td>
<td>7'-10&quot;</td>
<td>9'-4&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>0.84</td>
<td>60</td>
<td>1.03</td>
<td>70</td>
<td>1.21</td>
<td>80</td>
<td>1.39</td>
<td>90</td>
<td>1.57</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21&quot;x15&quot;</td>
<td>2'-11&quot;</td>
<td>3'-3&quot;</td>
<td>21&quot;x15&quot;</td>
<td>3'-2&quot;</td>
<td>3'-9&quot;</td>
<td>6'-4&quot;</td>
<td>7'-10&quot;</td>
<td>9'-4&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>1.00</td>
<td>65</td>
<td>1.18</td>
<td>75</td>
<td>1.38</td>
<td>90</td>
<td>1.58</td>
<td>100</td>
<td>1.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24&quot;x18&quot;</td>
<td>3'-2&quot;</td>
<td>3'-9&quot;</td>
<td>24&quot;x18&quot;</td>
<td>3'-4&quot;</td>
<td>4'-3&quot;</td>
<td>6'-4&quot;</td>
<td>7'-10&quot;</td>
<td>9'-4&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>1.07</td>
<td>70</td>
<td>1.32</td>
<td>80</td>
<td>1.53</td>
<td>95</td>
<td>1.74</td>
<td>110</td>
<td>1.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28&quot;x20&quot;</td>
<td>3'-4&quot;</td>
<td>4'-3&quot;</td>
<td>28&quot;x20&quot;</td>
<td>3'-8&quot;</td>
<td>4'-6&quot;</td>
<td>6'-4&quot;</td>
<td>7'-10&quot;</td>
<td>9'-4&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>1.26</td>
<td>80</td>
<td>1.47</td>
<td>90</td>
<td>1.68</td>
<td>100</td>
<td>1.90</td>
<td>115</td>
<td>2.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35&quot;x24&quot;</td>
<td>3'-8&quot;</td>
<td>5'-3&quot;</td>
<td>35&quot;x24&quot;</td>
<td>4'-1&quot;</td>
<td>6'-3&quot;</td>
<td>8'-4&quot;</td>
<td>10'-6&quot;</td>
<td>12'-0&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>1.51</td>
<td>110</td>
<td>1.74</td>
<td>120</td>
<td>1.97</td>
<td>140</td>
<td>2.20</td>
<td>155</td>
<td>2.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42&quot;x29&quot;</td>
<td>4'-1&quot;</td>
<td>6'-3&quot;</td>
<td>42&quot;x29&quot;</td>
<td>4'-5&quot;</td>
<td>7'-3&quot;</td>
<td>9'-6&quot;</td>
<td>11'-6&quot;</td>
<td>13'-9&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>115</td>
<td>1.82</td>
<td>130</td>
<td>2.06</td>
<td>140</td>
<td>2.31</td>
<td>155</td>
<td>2.55</td>
<td>170</td>
<td>2.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49&quot;x33&quot;</td>
<td>4'-5&quot;</td>
<td>7'-3&quot;</td>
<td>49&quot;x33&quot;</td>
<td>5'-1&quot;</td>
<td>8'-6&quot;</td>
<td>11'-0&quot;</td>
<td>13'-3&quot;</td>
<td>15'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>130</td>
<td>2.12</td>
<td>145</td>
<td>2.37</td>
<td>155</td>
<td>2.64</td>
<td>170</td>
<td>2.90</td>
<td>185</td>
<td>3.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57&quot;x38&quot;</td>
<td>4'-10&quot;</td>
<td>8'-6&quot;</td>
<td>57&quot;x38&quot;</td>
<td>5'-3&quot;</td>
<td>9'-6&quot;</td>
<td>12'-0&quot;</td>
<td>14'-3&quot;</td>
<td>16'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>145</td>
<td>2.52</td>
<td>160</td>
<td>2.79</td>
<td>175</td>
<td>3.07</td>
<td>190</td>
<td>3.35</td>
<td>205</td>
<td>3.61</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>64&quot;x43&quot;</td>
<td>5'-3&quot;</td>
<td>9'-6&quot;</td>
<td>64&quot;x43&quot;</td>
<td>5'-7&quot;</td>
<td>10'-6&quot;</td>
<td>13'-9&quot;</td>
<td>16'-2&quot;</td>
<td>18'-5&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>185</td>
<td>2.89</td>
<td>200</td>
<td>3.11</td>
<td>215</td>
<td>3.48</td>
<td>235</td>
<td>3.77</td>
<td>250</td>
<td>4.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>71&quot;x47&quot;</td>
<td>5'-7&quot;</td>
<td>10'-6&quot;</td>
<td>71&quot;x47&quot;</td>
<td>6'-1&quot;</td>
<td>12'-0&quot;</td>
<td>14'-3&quot;</td>
<td>16'-6&quot;</td>
<td>18'-9&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td>STEEL (LBS)</td>
<td>CONC. (CY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>3.25</td>
<td>215</td>
<td>3.56</td>
<td>235</td>
<td>3.86</td>
<td>250</td>
<td>4.17</td>
<td>270</td>
<td>4.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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 S/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.

**LEGEND ON PLANS**

---
NOTES
1. A curtain wall shall be used in place of a headwall at culvert ends where extension of the culvert is considered imminent or, no fill is retained.
2. Concrete shall be 560-C-3250.
3. Keep the pipe-end clear of obstructions to permit easy placing of culvert extension.

LEGEND ON PLANS

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot; TO 24&quot;</td>
<td>1'</td>
<td>2'</td>
<td>10&quot;</td>
</tr>
<tr>
<td>21&quot; TO 36&quot;</td>
<td>1'-6&quot;</td>
<td>2'-6&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>39&quot; TO 48&quot;</td>
<td>2'</td>
<td>3'</td>
<td>12&quot;</td>
</tr>
<tr>
<td>51&quot; TO 60&quot;</td>
<td>2'-6&quot;</td>
<td>3'</td>
<td>14&quot;</td>
</tr>
<tr>
<td>63&quot; &amp; LARGER</td>
<td>3'</td>
<td>3'</td>
<td>14&quot;</td>
</tr>
</tbody>
</table>

CURTAIN WALL
NOTES
1. When more than one pipe is used the profile view shown shall hold for 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 (12" minimum).
2. Culvert shall be cut off even with apron surface when required by the Agency.
3. Use Inlet Apron only where a flared and section can not be utilized.
4. Place weep holes when required by the Agency.

LEGEND ON PLANS
- Use Inlet Apron only where a flared and section can not be utilized.
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.
See Section A-A on D-43B

#5 @ 12" (outside face)

#4 @ 12" (inside face)

See Section D-D and Note 1 on D-43C

HEADWALL ELEVATION

Symmetrical about centerline

END SILL ELEVATION

#4 @ 10" (outside face only)

#4 @ 10" (outside face only)

2-#6 ea face

Pipe opening

Symmetrical about centerline

CONCRETE ENERGY DISSIPATER

(REINFORCEMENT)

36" TO 72" DIAMETER PIPE
SECTION A-A

SECTION C-C

SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE ENERGY DISSIPATER [REINFORCEMENT]
36" TO 72" DIAMETER PIPE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER D-43B
Add #4 @ 20” vertical spacing to reinforcing shown (ea. face)

4 – G bars (full ht.)

7’

SECTION D–D

NOTES
1. Match location of sidewall reinforcing.
2. Dowels having same size and spacing as wall reinforcing may be used in lieu of continuous bars at contractors option.
3. Match location of headwall or end sill reinforcing.

### Table: Pipe dia. (in.)

<table>
<thead>
<tr>
<th>Pipe dia. (in.)</th>
<th>36”</th>
<th>42”</th>
<th>48”</th>
<th>54”</th>
<th>60”</th>
<th>72”</th>
</tr>
</thead>
<tbody>
<tr>
<td>A bar</td>
<td>#5 12”</td>
<td>#6 12”</td>
<td>#7 12”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B bar</td>
<td>#5 12”</td>
<td>#6 12”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C bar</td>
<td>#4 12”</td>
<td>#5 12”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D bar</td>
<td>#4 12”</td>
<td>#5 12”</td>
<td>#6 12”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E bar</td>
<td>#4 12”</td>
<td>#5 12”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F bar</td>
<td>#4 9”</td>
<td>#5 9”</td>
<td>#6 9”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G bar</td>
<td>#7</td>
<td>#11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Wall slope to match channel

1/2" exp joint filler

NOTE
Elements parallel to cutoff walls are straight lines.

END ELEVATION

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

If at upstream end, fillet is not shown

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE CULVERT - HEADWALLS, ENDWALLS & WARPED WINGWALLS

Revision By Approved Date
ORIGINAL Kercheval 12/75
Add Metric T. Stanton 03/03
Reformatted T. Stanton 04/06
Edited S.S. T. Regello 03/11

Chairperson R.C.E. 19246 Date

D-44A
FL

Construction joint
#4 @ 18" max

TYPICAL FOR MAXIMUM
H > 10'

#8-str
5-#4 @ 12"

#4 @ 18" max
1½ exp joint filler

4' min on rock

1' Cutoff wall

1/2" exp joint filler

#4 @ 18" max

1 ½ exp joint filler

#4 @ 18" max

Slope apron to match channel

#4 @ 18"

#4 @ 18"

FL

Elev a

FL

#9

Slope apron to match channel

#4 @ 18"

#4 @ 18"

FL

#9

5-#4 @ 12"

3-#8 @ 12"

FL

TYPICAL FOR MAXIMUM
H ≤ 10'

#4 @ 18"

Construction joint

9"

#4 @ 18" max

TYPICAL FOR MAXIMUM
H > 10'

4' min on rock

#4 @ 18" max

1' Cutoff wall

FL

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 abrasion is anticipated, increase apron thickness to 7" minimum to provide 2" minimum reinforcement coverage.

SECTION C–C

FOR TRANSVERSE REINF IN WARPED WINGWALL SEE TABLE ON D-440

D - see table on D-440

1 ½ dia CLR

1 ½ min

#4 Spacers @ 12"

#4 x 5' Dowels @ 12" OC

1 ½ dia CLR

1 ½ min

6"

6"

6"

FL

SAN DIEGO REGIONAL STANDARD DRAWING

PIECE CULVERT - HEADWALLS, ENDWALLS & WARPED WINGWALLS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER D-44B
Slope varies, 1:1
@ headwall to flat @ L/2

#4 Dowels L @ 12" OC
Length varies to match fillet transition, 2" CLR
(for max "H" > 10')

ALTERNATIVE WARPED WINGWALL
Use where additional protection to toe of embankment is required. If at upstream end, fillet is not shown.

1/2" exp joint filler, where H max > 10'
1/2" exp joint filler, where H ≤ 10'

SECTION A–A
SECTION F–F
SECTION B–B
<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>22’</th>
<th>25’</th>
<th>30’</th>
<th>35’</th>
<th>40’ or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4:1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front face rein</td>
<td>#4@12</td>
<td>#4@7</td>
<td>#5@7</td>
<td>#6@5</td>
<td>#7@6</td>
<td>#8@6</td>
<td>#9@6</td>
<td>#10@6</td>
<td>#11@6</td>
<td>#12@6</td>
<td>#13@6</td>
<td>#14@6</td>
<td></td>
</tr>
<tr>
<td>Rear face rein</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>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td></td>
</tr>
<tr>
<td>3/4:1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front face rein</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>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td></td>
</tr>
<tr>
<td>Rear face rein</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>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td></td>
</tr>
<tr>
<td>1-1/4:1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front face rein</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>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td>#4@12</td>
<td></td>
</tr>
<tr>
<td>Rear face rein</td>
<td>#40 8</td>
<td>#40 8</td>
<td>#40 8</td>
<td>#40 5</td>
<td>#40 5</td>
<td>#40 5</td>
<td>#40 5</td>
<td>#40 5</td>
<td>#40 5</td>
<td>#40 5</td>
<td>#40 5</td>
<td>#40 5</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES**

1. Walls designed for 2’ surcharge; earth density = 120 # / cu. ft.; equivalent fluid pressure = 36 #/cu. ft.
2. Vary “D” at warped wall uniformly from that at cutoff wall to that at culvert, for maximum H > 12’.
4. All exposed concrete edges to be chamfered 3/4”.
The rounded areas may be built up of cement mortar or poured in place with the drainage structure.
NOTES
1. Pipe collar does not have to be finished if covered.
2. Concrete shall be 560-C-3250.
3. Where gap exceeds 3" but is not more than 6" an internal form shall be used.
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.
NOTES:
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 a pipe angle upstream.
4. Install 6 x 6–W1.4 x W1.4 WWR in concrete around pipe.
### DETAILS No. 1

**SINGLE BOX CULVERT**

#### SAN DIEGO REGIONAL STANDARD DRAWING

**DRAWING NUMBER** D-76A

**ORIGINAL** 7/26/2002

**R E C O M M E N D A T I O N S BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE**

**Drainage** 6/1/2002

**By Approved Date** 7/26/2002

**Controlled by C.E.** 7/26/2002

#### SINGLE BOX CULVERT

**NOTES**

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

### SPANS UP TO 5’ (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2’</th>
<th>3’</th>
<th>4’</th>
<th>5’</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>1'-6&quot;</td>
<td>2’</td>
<td>3’</td>
<td>4’</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>66</td>
<td>38</td>
<td>38</td>
<td>66</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>6</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Size Bar “a”</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Spacing</td>
<td>3</td>
<td>1/2</td>
<td>3</td>
<td>1/2</td>
</tr>
<tr>
<td>Length</td>
<td>3-2</td>
<td>3-2</td>
<td>4-2</td>
<td>4-2</td>
</tr>
<tr>
<td>Top Slab-No. of</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Bottom Slab-No. of</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Spacers Number</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Concrete: C.Y. per lin. ft.</td>
<td>17</td>
<td>18</td>
<td>23</td>
<td>27</td>
</tr>
<tr>
<td>Reinf. lbs per lin. ft.</td>
<td>27</td>
<td>29</td>
<td>34</td>
<td>36</td>
</tr>
</tbody>
</table>
### SPANS 6' (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2'</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### STRENGTH CLASSIFICATION

<table>
<thead>
<tr>
<th>HEIGHT</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX FILL OVER TOP</td>
<td>T1</td>
<td>T2</td>
<td>T3</td>
<td>T4</td>
<td>T5</td>
<td>T6</td>
<td>T7</td>
</tr>
<tr>
<td>Top Slab</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
<td>1/4</td>
</tr>
<tr>
<td>Strength Classification</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
</tr>
</tbody>
</table>

### MAX FILL OVER TOP

- **Size Bar**: 1/4
- **Spacing**: 7-3' 7-3'
- **Concrete**: 40, 42, 43, 46, 47, 50, 54, 58, 66, 71, 78, 91, 102, 112, 123, 134
- **Reinforcement Steel**: 40, 60, 65, 66, 71, 78, 91, 102, 112, 123, 134

### NOTE

For boxes of height less than that shown in the table, use next greater table height slabs, wall dimensions, and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.
<table>
<thead>
<tr>
<th>SPAN</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAN</td>
<td>3'</td>
<td>4'</td>
<td>5'</td>
<td>6'</td>
<td>7'</td>
</tr>
<tr>
<td>HIGHT CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>15 1/8</td>
<td>17 1/4</td>
<td>16 1/4</td>
<td>18 1/2</td>
<td>20 1/2</td>
</tr>
<tr>
<td>MAX. SLAB</td>
<td>12 1/2</td>
<td>14 1/4</td>
<td>13 1/4</td>
<td>15 1/2</td>
<td>17 1/2</td>
</tr>
<tr>
<td>TOP Slab</td>
<td>6 1/2</td>
<td>8 3/4</td>
<td>7 3/4</td>
<td>9 1/2</td>
<td>11 1/2</td>
</tr>
<tr>
<td>SPACING</td>
<td>7 1/4</td>
<td>8 1/4</td>
<td>7 1/4</td>
<td>8 1/4</td>
<td>7 1/4</td>
</tr>
<tr>
<td>LENGTH</td>
<td>6-10</td>
<td>8-10</td>
<td>7-9</td>
<td>9-11</td>
<td>11-13</td>
</tr>
<tr>
<td>MAX. DIMENSION</td>
<td>1-10</td>
<td>2-3</td>
<td>1-11</td>
<td>2-3</td>
<td>1-11</td>
</tr>
<tr>
<td>SIZE</td>
<td>5-5</td>
<td>6-7</td>
<td>5-5</td>
<td>6-7</td>
<td>5-5</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>SPACING</td>
<td>7 1/4</td>
<td>8 1/4</td>
<td>7 1/4</td>
<td>8 1/4</td>
<td>7 1/4</td>
</tr>
<tr>
<td>LENGTH</td>
<td>6-10</td>
<td>8-10</td>
<td>7-9</td>
<td>9-11</td>
<td>11-13</td>
</tr>
<tr>
<td>MAX. DIMENSION</td>
<td>1-10</td>
<td>2-3</td>
<td>1-11</td>
<td>2-3</td>
<td>1-11</td>
</tr>
<tr>
<td>SIZE</td>
<td>5-5</td>
<td>6-7</td>
<td>5-5</td>
<td>6-7</td>
<td>5-5</td>
</tr>
</tbody>
</table>

**NOTE:**
For boxes of height less than that shown in table, use next greater table height.

**Dimensions and reinforcing steel:**
- Wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

---

**SAN DIEGO REGIONAL STANDARD DRAWING**

**SINGLE BOX CULVERT DETAILS No.1**

**CONCRETE:**
- C.Y. per lin. ft.
- 47 36 51 60 55 64 78 68 84 67 73 69

**REINFORCING STEEL:**
- Lbs per lin. ft.
- 107 130 114 138 118 143 168 150 176 152 168 184
| SPAN | SPAN 8'| (all measurements in feet and/or inches unless otherwise noted) |
|-------|-----------------------------------------------|
| HEIGHT | 3' | 4' | 5' | 6' | 7' | 8' |
| STRENGTH CLASSIFICATION | A | B | A | B | A | B | C | A | B | C |
| MAX FILL OVER TOP | 13 | 31 | 13 | 31 | 13 | 31 | 13 | 31 | 13 | 31 |
| Top Slab | T₁ | 7 1/4 | 9 1/2 | 12 1/4 | 14 1/2 | 16 1/4 | 18 1/2 | 20 1/4 |
| Bottom Slab | T₂ | 7 1/4 | 9 1/2 | 12 1/4 | 14 1/2 | 16 1/4 | 18 1/2 | 20 1/4 |
| Sidewalls | T₃ | 6 1/2 | 7 1/2 | 9 1/2 | 11 1/2 | 13 1/2 | 15 1/2 | 17 1/2 |
| CONC. | | | | | | | |
| Size Bar "a" | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 |
| Spacing | 9 7 | 7 9 | 7 9 | 9 7 | 9 7 | 9 7 | 9 7 | 9 7 |
| Length | 7-7 7-8 7-7 7-8 7-7 7-8 7-7 7-8 7-8 7-8 7-8 7-8 |
| Dimension "X" | 1-6 1-7 1-6 1-7 1-6 1-7 1-6 1-7 1-6 1-7 1-6 1-7 |
| Size Bar "b" | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 |
| Spacing | 9 7 | 9 7 | 9 7 | 9 7 | 9 7 | 9 7 | 9 7 | 9 7 |
| Dimension "Y" | 2 2-5 2 2-5 2 2-5 2 2-5 2 2-5 2 2-5 2 2-5 |
| Length | 3-3 3-4 3-4 3-4 3-4 3-4 3-4 3-4 3-4 3-4 3-4 3-4 |
| Size Bar "c" | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 |
| Spacing | 9 7 | 9 7 | 9 7 | 9 7 | 9 7 | 9 7 | 9 7 | 9 7 |
| Dimension "Y" | 2 2-5 2 2-5 2 2-5 2 2-5 2 2-5 2 2-5 2 2-5 |
| Length | 3-9 4-5 3-9 4-5 3-9 4-5 3-9 4-5 3-9 4-5 3-9 4-5 |
| "d" Top Slab—No. of Bars | 7 5 | 7 5 | 7 5 | 7 5 | 7 5 | 7 5 | 7 5 | 7 5 |
| Bottom Slab—No. of Bars | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 | 5 5 |
| "e" Bars Spacing | 18 18 | 18 18 | 18 18 | 18 18 | 18 18 | 18 18 | 18 18 | 18 18 |
| Spacers Total Number | 28 | 32 | 32 | 36 | 40 | 40 |
| Concrete: C.Y. per lin. ft. | 118 146 | 125 154 | 129 139 | 136 167 | 211 143 | 174 220 | 147 179 | 225 |
| Reinf lbs per lin. ft. | 52 65 | 56 70 | 60 74 | 65 79 | 100 69 | 83 106 | 73 88 | 112 |

**NOTE**

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.
### SPAN 10’ (all measurements in feet and/or inches unless otherwise noted)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>SPAN</th>
<th>SPAN</th>
<th>SPAN</th>
<th>SPAN</th>
<th>SPAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>4’</td>
<td>5’</td>
<td>6’</td>
<td>7’</td>
<td>8’</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</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>
</tr>
<tr>
<td>Top Slab</td>
<td>T₁</td>
<td>8</td>
<td>9</td>
<td>1/2</td>
<td>7/8</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T₂</td>
<td>8</td>
<td>3/4</td>
<td>10</td>
<td>1/2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T₃</td>
<td>7</td>
<td>1/4</td>
<td>9</td>
<td>1/2</td>
</tr>
<tr>
<td>Size Bar *</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Spacing</td>
<td>11</td>
<td>8</td>
<td>11</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Size Bar *</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Spacing</td>
<td>11</td>
<td>8</td>
<td>11</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Dimension &quot;a&quot;</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Width</td>
<td>3-10</td>
<td>3-10</td>
<td>3-10</td>
<td>3-10</td>
<td>3-10</td>
</tr>
<tr>
<td>Size Bar *</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Spacing</td>
<td>11</td>
<td>8</td>
<td>11</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Dimension &quot;y&quot;</td>
<td>2</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Height</td>
<td>6-11</td>
<td>8</td>
<td>6-11</td>
<td>8</td>
<td>6-11</td>
</tr>
<tr>
<td>Size Bar *</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Spacing</td>
<td>11</td>
<td>8</td>
<td>11</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Dimension &quot;y&quot;</td>
<td>2</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Length</td>
<td>4-7</td>
<td>5-8</td>
<td>4-7</td>
<td>5-8</td>
<td>4-7</td>
</tr>
<tr>
<td>&quot;a&quot; Bars</td>
<td>Top Slab—No. of</td>
<td>9</td>
<td>5</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Bottom Slab—No. of</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>&quot;e&quot; Bars</td>
<td>Spacing</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Spacers</td>
<td>Total Number</td>
<td>32</td>
<td>34</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Concrete: C.Y. per lin. ft.</td>
<td>75</td>
<td>94</td>
<td>82</td>
<td>108</td>
<td>92</td>
</tr>
<tr>
<td>Reinf Lbs per lin. ft.</td>
<td>143</td>
<td>221</td>
<td>148</td>
<td>228</td>
<td>154</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, and make necessary changes in bar lengths, number of spacers and quantities.
**SPAN 12’** (all measurements in feet and/or inches unless otherwise noted)

<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>HEIGHT</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>5</td>
<td>16</td>
<td>5</td>
<td>16</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Conc.</td>
<td></td>
<td></td>
<td>Top Slab</td>
<td>T1</td>
<td>8 3/4</td>
<td>11 1/4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sidewalls</td>
<td>T3</td>
<td>7 1/2</td>
<td>10 1/2</td>
</tr>
<tr>
<td>“a”</td>
<td>Size Bar</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Spacing</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>“b”</td>
<td>Size Bar</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Spacing</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Dimension “x”</td>
<td>2-8</td>
<td>3</td>
<td>2-8</td>
<td>3</td>
<td>2-8</td>
</tr>
<tr>
<td></td>
<td>Length</td>
<td>4-10</td>
<td>5-7</td>
<td>4-10</td>
<td>5-7</td>
<td>4-10</td>
</tr>
<tr>
<td>“c”</td>
<td>Size Bar</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Spacing</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Dimension “y”</td>
<td>3-9</td>
<td>3-9</td>
<td>3-9</td>
<td>3-9</td>
<td>3-9</td>
</tr>
<tr>
<td>“d”</td>
<td>Size Bar</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Spacing</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Dimension “z”</td>
<td>3-9</td>
<td>3-9</td>
<td>3-9</td>
<td>3-9</td>
<td>3-9</td>
</tr>
<tr>
<td></td>
<td>Length</td>
<td>5-11</td>
<td>6-5</td>
<td>5-11</td>
<td>6-5</td>
<td>5-11</td>
</tr>
<tr>
<td>“e”</td>
<td>Top Slab-# of</td>
<td>10</td>
<td>6</td>
<td>10</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Bars</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Bottom Slab-# of</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Spacing</td>
<td>36</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Concrete: C.Y. per lin. ft.</td>
<td>99</td>
<td>138</td>
<td>103</td>
<td>144</td>
<td>108</td>
<td>152</td>
</tr>
<tr>
<td>Reinf lbs per lin. ft.</td>
<td>203</td>
<td>293</td>
<td>213</td>
<td>304</td>
<td>218</td>
<td>311</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, and make necessary changes in bar lengths, number of spacers and quantities.
For cover less than 2', provide #4 @ 18" ea way & adjust quantities

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 joint

#4 spacers

Spacing in table

DETAIL "A"

Optional construction joint

#5 "e" Bars

Provide paving notch when top is exposed and where PCC pavement or approach slab is used

#4 spacer bars @ 18" max

Invert elev

3/4" min fillets

#4 spacers

Slope 2:1

Invert elev

2" clr

"C1" Bars

#4 spacers @ 18"

TYPICAL SECTIONS 2' THRU 6' SPANS

TYPICAL SECTIONS 7' THRU 12' SPANS

ALTERNATIVE INVERTS

(When specified)
### SPAN 4′ (all measurements in feet and/or inches unless otherwise noted)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2′</th>
<th>3′</th>
<th>4′</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEIGHT</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
<td><strong>C</strong></td>
</tr>
<tr>
<td><strong>STRENGTH CLASSIFICATION</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
<td><strong>C</strong></td>
</tr>
<tr>
<td><strong>MAX FILL OVER TOP</strong></td>
<td>11</td>
<td>21</td>
<td>32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conc.</th>
<th>Top Slab</th>
<th>Bottom Slab</th>
<th>Sidewalls</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size Bar #2</strong></td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Spacing</strong></td>
<td>11</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>10-3</td>
<td>10-2</td>
<td>10-2</td>
</tr>
<tr>
<td><strong>Size Bar #2</strong></td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>Spacing</strong></td>
<td>11</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>9-4</td>
<td>9-4</td>
<td>9-6</td>
</tr>
<tr>
<td><strong>Size Bar #2</strong></td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>Spacing</strong></td>
<td>11</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>4-6</td>
<td>4-6</td>
<td>4-6</td>
</tr>
<tr>
<td><strong>Size Bar #2</strong></td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Spacing</strong></td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td><strong>Concrete</strong>: C.Y. per lin. ft.</td>
<td>0.47</td>
<td>0.51</td>
<td>0.57</td>
</tr>
<tr>
<td><strong>Reinфор. lbs per lin. ft.</strong></td>
<td>31</td>
<td>74</td>
<td>84</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, and make necessary changes in bar lengths, number of spacers and quantities.

Number of "d" bars in table is slab total for both cells.
### Span 5' (all measurements in feet and/or inches unless otherwise noted)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>2'</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
</tr>
</thead>
<tbody>
<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>6</td>
<td>36</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td><strong>Bottom Slab</strong></td>
<td>T2</td>
<td>6 1/2</td>
<td>8 3/4</td>
<td>10 1/4</td>
</tr>
<tr>
<td><strong>Sidewalls</strong></td>
<td>T3</td>
<td>6 6 6 6</td>
<td>6 6 6 6</td>
<td>6 6 6 6</td>
</tr>
</tbody>
</table>

**Reinforcing Steel**

| **Concrete: C.Y. per lin. ft.** | 0.58 | 0.69 | 0.80 | 0.63 | 0.75 | 0.86 | 0.69 | 0.80 | 0.89 | 0.98 | 0.74 | 0.86 | 0.97 | 1.04 |
| **Reinf: lbs per lin. ft.** | 99 | 100 | 109 | 103 | 104 | 112 | 106 | 109 | 119 | 133 | 109 | 116 | 126 | 148 |

**NOTE**

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.
SPAN 6' (all measurements in feet and/or inches unless otherwise noted)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>4</td>
<td>20</td>
<td>34</td>
<td>4</td>
</tr>
<tr>
<td>Conc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Slab</td>
<td>T₁</td>
<td>7 1/4</td>
<td>8 1/4</td>
<td>10 1/2</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T₂</td>
<td>7 1/4</td>
<td>9 1/2</td>
<td>11 1/2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T₃</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Reinforcing Steel

| Size Bar # | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 4 |
| Spacing | 9 1/2 | 11 | 8 1/2 | 9 1/2 | 11 | 8 1/2 | 9 1/2 | 11 | 8 1/2 | 10 1/2 | 9 1/2 | 11 | 8 1/2 | 10 1/2 | 10 |
| Size Bar # | 5 | 6 | 6 | 5 | 6 | 6 | 5 | 6 | 6 | 7 | 5 | 6 | 6 | 7 |
| Spacing | 9 1/2 | 11 | 8 1/2 | 9 1/2 | 11 | 8 1/2 | 9 1/2 | 11 | 8 1/2 | 10 1/2 | 9 1/2 | 11 | 8 1/2 | 10 1/2 | 12 |
| Spacing | 4 | 6 | 6 | 4 | 6 | 6 | 4 | 6 | 6 | 7 | 4 | 6 | 6 | 7 |
| Length | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 | 6-6 |

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

NOTE

Concrete: C.Y. per lin. ft. | 0.77 | 0.90 | 1.38 | 0.82 | 0.96 | 1.13 | 0.88 | 1.01 | 1.19 | 1.30 | 0.93 | 1.07 | 1.25 | 1.47 |

Reinf. :lbs per lin. ft. | 121 | 119 | 147 | 125 | 124 | 155 | 128 | 131 | 164 | 175 | 129 | 137 | 177 | 201 |
### Double Box Culvert Details No. 1

#### San Diego Regional Standard Drawing

**Span 8’ (all measurements in feet and/or inches unless otherwise noted)**

<table>
<thead>
<tr>
<th>SPAN</th>
<th>HEIGHT</th>
<th>4’</th>
<th>5’</th>
<th>6’</th>
<th>7’</th>
<th>8’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>MAX FILL OVER TOP</td>
<td>3</td>
<td>14</td>
<td>25</td>
<td>3</td>
<td>14</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>
<td>9 1/2</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>7 1/2</td>
<td>10 1/2</td>
<td>12 3/4</td>
<td>7 1/2</td>
<td>10 1/2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>6 6 6 6 6 6 6 6 6 7 7 7 8 7 7 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Steel Reinforcement**

<table>
<thead>
<tr>
<th>SPAN</th>
<th>SIZE BAR</th>
<th>SPACING</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a</td>
<td></td>
<td>18-4</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td></td>
<td>18-4</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td></td>
<td>18-4</td>
</tr>
</tbody>
</table>

**Concrete**

- C.Y. per lin. ft.: 1.05 1.30 1.55 1.14 1.37 1.61 1.19 1.42 1.66 1.32 1.56 1.83 2.14 1.39 1.62 1.99 2.27
- Reinf. lbs per lin. ft.: 169 175 200 172 181 218 173 188 229 185 199 248 299 191 207 284 314

**Note**

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of “d” bars in table is slab total for both cells.
c

.....

::a

~g
_r<
m

(/)><

~CCI
r-o

..... m

mr-

CCCI

c:

0

C)

z

~

:1>

;:ltl

c
c

;:ltl

:1>

z
c

:1>

-1

C/)

:1>
r-

0z

C)

m

;:ltl

0

C)

m

2

z

:1>

en

~

NOTE

1.45
238

6'

2.07
274

48

2.48
324

B
c
17
30
12 3/4 16
13 1/2 16 1/2
6
6
4
4
9 1/2 10
22-2 22-2
7
8
9 1/2 10
21-10 22
21-10 22
7
8
9 1/2 10
10-6 10-6
10
10
10
10
4
5
6 6 1/2
1.51
243

A
2
8 3/4
8 1/4
6
6
11
22-4
6
11
21-7
21-5
6
11
10-6
18
10
4
14

B
17
12 3/4
13 3/4
6 1/2
4
9 1/2
22-4
7
9 1/2
21-11
21-11
7
9 1/2
10-7
10
10
4
6
51
2.18
280
2.64
339

30
16
16 3/4
7
4
10
22-5
8
10
22-3
22-3
8
10
10-7
10
10
6
8

c

8'
B
c
16
29
12 3/4 16
13 1/2 16 1/2
7
7 1/2
4
4
10
10
22-5 22-7
7
8
10
10
22-1 22-4
22-4
22
7
8
10
10
10-7 10-8
10
10
10
10
5
6
8 1/2
6
54
1.68
2.27
2.74
252
278
355
A
2
8 3/4
8 3/4
7
6
11
22-7
6
11
21-10
21-9
6
11
10-7
18
10
4
11

A
2
8 3/4
8 3/4
8
6
11
22-10
6
11
22-1
22
6
11
10-8
18
10
4
7 1/2

10'
B
c
36
16
29
17 1/4
12 3/4 16
18 1/4
13 1/2 16 1/2
8
9
7 1/2
4
4
4
9
10
10
22-10
22-8 22-11
8
7
8
9
10
10
22-9
22-4 22-9
22-9
22-3 22-8
8
7
8
9
10
10
10-9
10-8 10-9
10
10
10
10
10
10
7
6
6
6
7
5 1/2
64
68
3.04 1.92
2.51
3.05
430
279
327
400
D

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make
necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

2.46
310

A
30
2
16 8 3/4
16 1/2 8 1/4
6
6
4
6
10
11
22-2 22-4
8
6
10
11
21-7
22
21-5
22
8
6
10
11
10-6 10-6
10
18
10
10
5
4
10
18

c

7'

5'
B
17
12 3/4
13 1/2
6
4
10
22-2
7
10
21-10
21-10
7
10
10-6
10
10
4
10
48
1.40 2.05
236
254

A
2
8 3/4
8 1/4
6
6
11
22-4
6
11
21-7
21-5
6
11
10-6
18
10
4
18

HEIGHT

STRENGTH CLASSIFICATION
MAX FILL OVER TOP
..; Top Slab
T1
5
Bottom
Slab
T2
(_)
Sidewalls
T3
Size Bar#
"a"
Spacing
Lenqth
Size Bar#
"b"
__,.........._
Spacing
or
a;
., "b1" Length "b"
Vi --...........r- Lenqth "b1"
c:
Size Bar#
""
"c''
-~
Spacing
~
c:
·a;
Length
CkO
"d" Dist Top Slab-Tot. No.
Bars Bottom Slab-Tot. No.
Size Bar#
"e"
Bars Spacing
Spacers Number
g:::l Concrete: C.Y. per lin. ft.
Reinf :lbs per lin. ft.
0

10'

SPAN

SPAN 10' {all measurements in feet and/or inches unless otherwise noted)

D

3.41
476

23-1
23-2
8
9
10-10
10
10
7
5

9

36
17 1/2
18 1/2
10
4
9
23-2
8


### SPAN 12' (all measurements in feet and/or inches unless otherwise noted)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>HEIGHT</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>STRENGTH CLASSIFICATION</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>14</td>
<td>26</td>
<td>2</td>
<td>14</td>
<td>26</td>
<td>2</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>10</td>
<td>14</td>
<td>17 1/2</td>
<td>10</td>
<td>14</td>
<td>17 1/2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T4</td>
<td>6</td>
<td>6</td>
<td>6 1/2</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Size Bar **</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Spacing</td>
<td>9</td>
<td>11 1/2</td>
<td>9</td>
<td>9</td>
<td>11 1/2</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Size Bar **</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Spacing</td>
<td>9</td>
<td>11 1/2</td>
<td>9</td>
<td>9</td>
<td>11 1/2</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Size Bar **</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Spacing</td>
<td>9</td>
<td>11 1/2</td>
<td>9</td>
<td>9</td>
<td>11 1/2</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Length</td>
<td>12-6</td>
<td>12-6</td>
<td>12-7</td>
<td>12-7</td>
<td>12-7</td>
<td>12-7</td>
<td>12-8</td>
</tr>
<tr>
<td>Size Bar **</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Spacing</td>
<td>18</td>
<td>8</td>
<td>8</td>
<td>15</td>
<td>6</td>
<td>8</td>
<td>12</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, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.
For cover less than 2', provide #4 @ 18" eq. way & adjust quantities

Provide paving notch when top is exposed and where PCC pavement or approach slab is used

**TYPICAL SECTION**

(Showing reinforcement for interior walls 8" and over)

- 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)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>4'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2'</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>STRENGTH CLASSIFICATION</td>
<td>A</td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>10</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T₁</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T₂</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T₃</td>
</tr>
<tr>
<td>Conc.</td>
<td></td>
</tr>
<tr>
<td>Size Bar</td>
<td>5</td>
</tr>
<tr>
<td>Spacing</td>
<td>11</td>
</tr>
<tr>
<td>Size Bar</td>
<td>5</td>
</tr>
<tr>
<td>Spacing</td>
<td>11</td>
</tr>
<tr>
<td>Size Bar</td>
<td>4</td>
</tr>
<tr>
<td>Spacing</td>
<td>11</td>
</tr>
<tr>
<td>Bar Spacing</td>
<td>9</td>
</tr>
<tr>
<td>Concrete: C.Y. per lin. ft.</td>
<td>0.67</td>
</tr>
<tr>
<td>Reinf lbs per lin. ft.</td>
<td>122</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, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for all cells.
<table>
<thead>
<tr>
<th>SPAN</th>
<th>2'</th>
<th>3'</th>
<th>4'</th>
<th>5'</th>
</tr>
</thead>
<tbody>
<tr>
<td>2'</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>3'</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>4'</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>5'</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

**Table Notes:**
- For boxes of height less than that shown in the table, use next greater table height slabs, wall dimensions, and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.
- Number of 'd' bars in table is slab total for all cells.
### SPAN 6’ (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>3’</th>
<th>4’</th>
<th>5’</th>
<th>6’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>HEIGHT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength Classification</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAX FILL OVER TOP</td>
<td>3</td>
<td>13</td>
<td>23</td>
<td>3</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td></td>
<td></td>
<td>T2</td>
</tr>
<tr>
<td></td>
<td>7 1/2</td>
<td>1 1/2</td>
<td>8 1/4</td>
<td>7 1/2</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>6</td>
<td>7 3/4</td>
<td>9 1/4</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>“a” Size Bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spacing</td>
<td>13</td>
<td>14</td>
<td>11 1/2</td>
<td>13</td>
</tr>
<tr>
<td>“b” or “b1” Size Bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spacing</td>
<td>13</td>
<td>14</td>
<td>11 1/2</td>
<td>13</td>
</tr>
<tr>
<td>“c” Size Bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spacing</td>
<td>13</td>
<td>14</td>
<td>11 1/2</td>
<td>13</td>
</tr>
<tr>
<td>Strength “d” Dist Bars</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Slab-Tot. No.</td>
<td>18</td>
<td>9</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Bottom Slab-Tot. No.</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>“e” Size Bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bars Spacing</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Spacers Number</td>
<td>40</td>
<td>40</td>
<td></td>
<td>52</td>
</tr>
<tr>
<td>Concrete: C.Y. per lin. ft.</td>
<td>1.05</td>
<td>1.15</td>
<td>1.29</td>
<td>1.12</td>
</tr>
<tr>
<td>Reinf.:lbs per lin. ft.</td>
<td>181</td>
<td>166</td>
<td>196</td>
<td>183</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, and make necessary changes in bar lengths, number of spacers and quantities. Number of “d” bars in table is slab total for all cells.
### SPAN 8' (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>4'</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEIGHT</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<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>2</td>
<td>11</td>
<td>20</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Top Slab</td>
<td>T1</td>
<td>8 1/4</td>
<td>8 1/4</td>
<td>10 1/4</td>
<td>8 1/4</td>
</tr>
<tr>
<td>Bottom Slab</td>
<td>T2</td>
<td>6 1/2</td>
<td>9 1/4</td>
<td>11 1/4</td>
<td>6 1/2</td>
</tr>
<tr>
<td>Sidewalls</td>
<td>T3</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Reinforcement Details

- **Size Bar # a**
  - Spacing: 11 1/2
  - Length: 26-10
- **Size Bar # b**
  - Spacing: 11 1/2
  - Length: 26-10
- **Size Bar # c**
  - Spacing: 11 1/2
  - Length: 26-10

<table>
<thead>
<tr>
<th>Dist Top Slab</th>
<th>Top Slab-Tot. No.</th>
<th>24</th>
<th>12</th>
<th>12</th>
<th>24</th>
<th>12</th>
<th>12</th>
<th>24</th>
<th>12</th>
<th>12</th>
<th>24</th>
<th>12</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom Slab-Tot. No.</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>11 1/2</td>
<td>12</td>
<td>12</td>
<td>11 1/2</td>
<td>12</td>
<td>12</td>
<td>11 1/2</td>
<td>12</td>
<td>12</td>
<td>11 1/2</td>
</tr>
</tbody>
</table>

### Concrete:

- C.Y. per lin. ft: 1.47 | 1.67 | 1.99 | 1.54 | 1.76 | 2.06 | 1.62 | 1.84 | 2.14 | 1.71 | 1.91 | 2.26 | 2.57 | 1.90 | 2.10 | 2.46 | 2.79

### Reinforcement:

- lbs per lin. ft: 261 | 250 | 301 | 266 | 257 | 310 | 267 | 264 | 320 | 276 | 277 | 336 | 409 | 283 | 295 | 347 | 441

#### Note

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for all cells.
### SPAN 10' (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>5'</th>
<th>6'</th>
<th>7'</th>
<th>10'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEIGHT</strong></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td><strong>STRENGTH CLASSIFICATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></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>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

### SAN DIEGO REGIONAL STANDARD DRAWING

**TRIPLE BOX CULVERT DETAILS No. 1**

**NOTE**

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for all cells.
### SPAN 12' (all measurements in feet and/or inches)

<table>
<thead>
<tr>
<th>SPAN</th>
<th>6'</th>
<th>7'</th>
<th>8'</th>
<th>12'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEIGHT</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
<td><strong>C</strong></td>
<td><strong>D</strong></td>
</tr>
<tr>
<td>MAX FILLED OVER TOP</td>
<td>2'</td>
<td>10'</td>
<td>18'</td>
<td>2'</td>
</tr>
</tbody>
</table>

#### Top Slab
- T1: 10'/1/4 | 11'/1/2 | 14'/1 | 10'/1/4 | 11'/1/2 | 14'/1 |
- T2: 8'/1 | 12' | 14'/1/2 | 8'/1 | 12' | 14'/1/2 |

**Size Bar**
- 6'8 | 6'8 | 1/2 | 6'8 | 6'8 | 1/2 |
- Spacing: 12' | 11'1/2 | 12' | 11'1/2 |

**Length**
- 39'-1 | 38'-10 | 39'-3 | 39'-1 | 38'-10 | 39'-5 |

#### Bottom Slab
- T2: 8'/1 | 12' | 14'/1/2 | 8'/1 | 12' | 14'/1/2 |

**Size Bar**
- 6'8 | 6'8 | 1/2 | 6'8 | 6'8 | 1/2 |
- Spacing: 12' | 11'1/2 | 12' | 11'1/2 |

**Length**
- 38'-7 | 38'-9 | 39'-3 | 38'-7 | 38'-9 | 39'-5 |

#### sidewalls
- T2: 6'8 | 6'8 | 1/2 | 6'8 | 6'8 | 1/2 |
- Spacing: 12' | 11'1/2 | 12' | 11'1/2 |

**Length**
- 38'-3 | 38'-7 | 39'-2 | 38'-3 | 38'-7 | 39'-5 |

### NOTE

For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. 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

For reinforcement clearance, except at bottom, see "Miscellaneous Details" on D-81A and D-81B.

1. Spacers shall be #4 @ 18" oc in top slab and sidewall mats.
2. Remaining #4 Spacers shall be equally 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", "Tapered 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 lanes and place weakened plane joints per Detail A of Weakened Planes Detail 3-2 of C-15 at 30± centers under paved roadway lanes. 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, whichever 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 R.C.B. Otherwise, the Contractor is to submit a proposal for consideration.

SPECIAL COVERAGE: 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", "Tapered 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 lanes and place weakened plane joints per Detail A of Weakened Planes Detail 3-2 of C-15 at 30± centers under paved roadway lanes. 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, whichever 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 R.C.B. Otherwise, the Contractor is to submit a proposal for consideration.

SPECIAL COVERAGE: 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", "Tapered 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 lanes and place weakened plane joints per Detail A of Weakened Planes Detail 3-2 of C-15 at 30± centers under paved roadway lanes. 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, whichever 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 R.C.B. Otherwise, the Contractor is to submit a proposal for consideration.

SPECIAL COVERAGE: 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", "Tapered 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 lanes and place weakened plane joints per Detail A of Weakened Planes Detail 3-2 of C-15 at 30± centers under paved roadway lanes. 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, whichever 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 R.C.B. Otherwise, the Contractor is to submit a proposal for consideration.

SPECIAL COVERAGE: 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", "Tapered 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 lanes and place weakened plane joints per Detail A of Weakened Planes Detail 3-2 of C-15 at 30± centers under paved roadway lanes. 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, whichever 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 R.C.B. Otherwise, the Contractor is to submit a proposal for consideration.

SPECIAL COVERAGE: 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", "Tapered 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.
PARAPET DETAILS FOR SINGLE SPAN CULVERTS

Length of Culvert

1"CLR

# 4 bars

# 4 hoops @ 12"

R = T3

"d" bars or spacers

Skew

"t" Bars, 3 total

PART SECTION

PARAPET DETAILS FOR MULTIPLE SPAN CULVERTS

Length of Culvert

1"CLR

"t" Bars, 6 total

Interior wall, (treat exterior walls as above)

PART SECTION

PARAPET DETAIL FOR SKewed CULVERTS W/O WINGWALLS

Cover slab

Remove parapet and hoops flush

Existing construction

New

12"

Cover: 1' AND GREATER

CULVERT EXTENSION

20' SKewed MAXIMUM

COVER: EXPOSED TOP AND LESS THAN 1'

Place an expansion joint per G-10 a minimum 2S or 2H from joining

New construction

New construction

Remove and splice to existing longitudinal rebar in all members

Revision By Approved Date

SAN DIEGO REGIONAL STANDARD DRAWING

ORIGINAL Kercheval 12/75

Add Metric T. Stanton 03/03

Reviewed T. Stanton 04/06

Edited S.S. T. Regello 03/11

DRAWING NUMBER D-81B

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE 7/26/2012
3. 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" dia. steel at 18" OC, secured at ends with cable clamps. Secure fence to cable with 12 gage galvanized steel wire looped at 6" OC.
3. Posts shall be 3" steel pipe, 5.79 lb/ft. Fill with mortar after placing.
4. Fence fabric shall be secured to posts with 9 gage wire clips at 9" OC.
CHAPTER 3
ELECTRICAL SYSTEM
LUMINAIRE

MAST ARM

MIN. 1' OVERHANG

POLE TOP

HAND HOLE TO FACE STREET

SLOPE 30:1

UNDISTURBED EARTH

SELECT SAND, 95% MINIMUM RELATIVE COMPACTION

DIRECT BURIAL FOUNDATION

ANCHOR BASE FOUNDATION

FOR 7500 TO 9500L - 25' + 2'

FOR 10500 TO 22500L - 33' + 1' (CALTRANS TYPE 15)

MOUNTING HEIGHT

EDGE OF PAVEMENT

POLE TOP

CORE 5" DIA.

12" HIGH MIN

HAND HOLE TO FACE STREET

SLOPE 30:1

FINISH GRADE

UNDISTURBED EARTH

SELECT SAND, 95% MINIMUM RELATIVE COMPACTION

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"X38"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

CITY OF SAN DIEGO - STANDARD DRAWING

STREET LIGHTING STANDARD

DRAWING NUMBER SDE-101

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.F 5663
VENT HOOD

DOOR OPENING 32" x 22"

POWER DISTR. ASSY.

OUTPUT

MONITOR

FILE

INPUT FILE

BASE ADAPTER

VENT OPENINGS WITH FILTER, BOTH SIDES.

4 1/2" NUTS WELDED TO ADAPTER

1/2" R

1" UP TYPICAL TOP UP SHADED

BASE ADAPTOR PLAN VIEW

MODEL 336 CABINET

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

CITY OF SAN DIEGO - STANDARD DRAWING

DRAWING NUMBER SDE-102
NOTES:

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

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

3. R49 SIGNS ON ALUMINUM SHEETING CENTERED BETWEEN POSTS.
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

SHEET 1 OF 2
NOTES:
1. ALL FRONT LOOPS SHALL BE MODIFIED TYPE "E" LOOPS
2. FRONT LOOPS SHALL BE INSTALLED IN FRONT OF THE LIMIT LINE OR CROSSWALK ACTING AS A LIMIT LINE

CASE "1"

WHITE CROSSWALK

CASE "2"

YELLOW CROSSWALK

FRONT LOOP REPLACEMENT

TYPE E MODIFIED LOOP
1. 3/4" x 8' copper covered steel ground rod.
2. Alternate Ground: 15' no. 4 stranded copper wire, coiled.
3. Approved non-metallic conduit.
4. Steel conduit.

STEEL CONDUIT
NON-METALLIC CONDUIT

DIRECT BURIAL FOUNDATION

STEEL CONDUIT
NON-METALLIC CONDUIT

ANCHOR BASE FOUNDATION

See Detail A
1 1/2" min. cover for bars and conduits

Galvanized steel conduits. Size and number as required.

1/4" x 2" galvanized steel bars.

10" Diameter, use Sonotube for smooth finish (Class 1)

Permissible to auger hole and pour against soil.

1" galvanized steel conduit for service ground (where required).

NOTE: Concrete shall be class 560-C-3250

SAN DIEGO REGIONAL STANDARD DRAWING

PEDESTAL FOR ELECTRICAL EQUIPMENT

NOTE: Concrete shall be class 560-C-3250
SECTION A-A

NOTE

1. BROOM FINISH PARALLEL WITH TRAFFIC.
TRENCH RESURFACING FOR ASPHALT
CONCRETE SURFACED STREETS

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. 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.

<table>
<thead>
<tr>
<th></th>
<th>TYPE 1</th>
<th>TYPE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIX DESIGN</td>
<td>3/4&quot; TYPE III CLASS B3</td>
<td>3/4&quot; TYPE III CLASS B3 PLUS CLASS II BASE</td>
</tr>
<tr>
<td>ALLEYS</td>
<td>8.0&quot;</td>
<td>ASPHALT THICKNESS TO EQUAL</td>
</tr>
<tr>
<td>LOCAL THROUGH 4 LANE COLLECTORS</td>
<td>10.0&quot;</td>
<td>EXISTING PLUS 1&quot;, MIN 4&quot; TO MAX 9&quot;.</td>
</tr>
<tr>
<td>MAJOR</td>
<td>12.0&quot;</td>
<td>COMBINED ASPHALT PLUS BASE 18&quot; MIN.</td>
</tr>
</tbody>
</table>

TRENCH RESURFACING FOR ASPHALT
CONCRETE SURFACED STREETS

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO
STANDARDS COMMITTEE

COORDINATOR R.C.E. 56523 DATE

REVISION BY APPROVED DATE

ORIGINAL J.P. CASLEY 10/469

UPDATED KA J. NAEGELVOORT 02/12

UPDATED KA J. NAEGELVOORT 04/13

UPDATED MB J. NAEGELVOORT 03/14

UPDATED LS J. NAEGELVOORT 06/16
NOTES

1. EXISTING CONCRETE PAVEMENT SHALL BE REMOVED. CONCRETE PAVEMENT RESTORATION SHALL EXTEND TO THE FULL WIDTH OF THE CONCRETE PANEL (BETWEEN COLD JOINTS OR COLD JOINT TO EDGE OF GUTTER) AROUND THE PERIMETER OF THE EXCAVATION. FOR CONCRETE PAVEMENT WITH EXISTING TRENCH CUT PATCHING, CONCRETE PAVEMENT RESTORATION SHALL INCLUDE, AS PART OF THE RESTORATION, THE EXISTING TRENCH CUT PATCHES IF THOSE PATCHES ARE WITHIN 4 FEET OF THE CONCRETE PANEL TO BE REPLACED.

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 FEET IN WIDTH OR GREATER AND LONGER THAN 100 FEET IN LENGTH SHALL BE RECONSTRUCTED WITH THE PAVEMENT SECTION FOR THE STREET CLASSIFICATION PER SCHEDULE "J" (SDG-113). STREET TRENCH SECTIONS 7 FEET IN WIDTH OR GREATER BUT LESS THAN 100 FEET 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/C CC) CONCRETE MAY BE OPENED TO TRAFFIC 3 DAYS AFTER IT IS PLACED. 650-CW-4000 CONCRETE TREATED IN SAME MANNER (W/C) 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 MIDPOINT OF CURB RETURN, WHEN REQUIRED, AND AT 15' INTERVALS FROM PCR'S ABSENT A CURB RAMP, SEE G-10.

3. TOOLED 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.
CITY OF SAN DIEGO - STANDARD DRAWING

INLET TRANSITION
PROFILE

G CURB PROFILE - INLET TRANSITION

SDG-110
H CURB PROFILE - INLET TRANSITION
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 GRADE PER D-29

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

TYPE "I" CATCH BASIN

18" CMPC-14 GA

10' MAX. WITH ELBOW

SIX 18" SLOTTED DRAIN (CMPC) LENGTH SHOWN ON PLANS

16" SLOT

CONCRETE BARRIER

SAW CUT

TYPE G-4 GRADE PER D-15

1.5"

STUB OUT

3'

18" CMPC-14 GA

FROM CATCH BASIN

TYPICAL FOR ALL 18" SLOTTED CMPC

SAW CUT AC FOR TRENCH EDGE

0'-1'

3'

LIMIT OF PCC BEDDING

18" SLOTTED CMPC-14 GA

WITH 6" HIGH SLOT

PCC BEDDING 420-C-2000

RAISED CENTER MEDIAN

CITY OF SAN DIEGO - STANDARD DRAWING

SDG-112

COORDINATOR R.C.E 56523 DATE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

REVISION BY APPROVED DATE

ORIGINAL J. CASEY 1/8/8

UPDATED KA. NAGELVOORT 2/25/16

UPDATED HM. NAGELVOORT 3/16
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. PORTLAND CEMENT CONCRETE (PCC) 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.
<table>
<thead>
<tr>
<th>STREET CLASSIFICATION</th>
<th>MAX ADT</th>
<th>MAX TRAFFIC INDEX</th>
<th>&quot;R&quot; VALUE</th>
<th>STANDARD SECTIONS A.C. (IN)</th>
<th>CTB (IN)</th>
<th>PCC (IN)</th>
<th>CONCRETE M.O.R. 600 MIN</th>
<th>FULL DEPTH A.C. (IN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUL-DE-SAC</td>
<td>200</td>
<td>5.0</td>
<td></td>
<td>3.0</td>
<td>5.0</td>
<td>6.0</td>
<td></td>
<td>5.0</td>
</tr>
<tr>
<td>LOCAL (L.V.R.)</td>
<td>700</td>
<td>5.5</td>
<td></td>
<td>3.0</td>
<td>5.0</td>
<td>6.5</td>
<td></td>
<td>6.0</td>
</tr>
<tr>
<td>LOCAL (RES.)</td>
<td>1200</td>
<td>6.0</td>
<td></td>
<td>3.0</td>
<td>5.0</td>
<td>6.5</td>
<td></td>
<td>6.0</td>
</tr>
<tr>
<td>LOCAL (RES.)</td>
<td>2200</td>
<td>6.5</td>
<td></td>
<td>3.0</td>
<td>5.0</td>
<td>6.5</td>
<td></td>
<td>6.0</td>
</tr>
<tr>
<td>LOCAL (IND.)</td>
<td>2000</td>
<td>8.5</td>
<td></td>
<td>3.0</td>
<td>7.5</td>
<td>7.5</td>
<td></td>
<td>8.5</td>
</tr>
<tr>
<td>COLLECTOR (RES.)</td>
<td>3500</td>
<td>7.0</td>
<td></td>
<td>3.0</td>
<td>5.0</td>
<td>7.0</td>
<td></td>
<td>6.5</td>
</tr>
<tr>
<td>COLLECTOR (RES.)</td>
<td>5000</td>
<td>7.5</td>
<td></td>
<td>3.0</td>
<td>5.5</td>
<td>7.0</td>
<td></td>
<td>7.5</td>
</tr>
<tr>
<td>COLLECTOR (COMM \IND.)</td>
<td>5000</td>
<td>9.5</td>
<td></td>
<td>3.0</td>
<td>8.5</td>
<td>7.5</td>
<td></td>
<td>9.0</td>
</tr>
<tr>
<td>COLLECTOR (NO FRT)</td>
<td>7500</td>
<td>8.0</td>
<td></td>
<td>3.0</td>
<td>6.5</td>
<td>7.0</td>
<td></td>
<td>8.0</td>
</tr>
<tr>
<td>COLLECTOR</td>
<td>15000</td>
<td>9.0</td>
<td></td>
<td>3.0</td>
<td>7.5</td>
<td>7.5</td>
<td></td>
<td>8.5</td>
</tr>
<tr>
<td>MAJOR (4-LANE)</td>
<td>30000</td>
<td>10.5</td>
<td></td>
<td>3.0</td>
<td>10.0</td>
<td>8.0</td>
<td></td>
<td>10.5</td>
</tr>
<tr>
<td>MAJOR (6-LANE)</td>
<td>40000</td>
<td>11.0</td>
<td></td>
<td>3.5</td>
<td>10.5</td>
<td>8.0</td>
<td></td>
<td>11.0</td>
</tr>
<tr>
<td>PRIMARY ARTERIAL</td>
<td>50000</td>
<td>11.5</td>
<td></td>
<td>3.5</td>
<td>11.5</td>
<td>8.0</td>
<td></td>
<td>11.5</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>60000</td>
<td>12.0</td>
<td></td>
<td>3.5</td>
<td>11.5</td>
<td>8.5</td>
<td></td>
<td>12.0</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>80000</td>
<td>12.5</td>
<td></td>
<td>4.0</td>
<td>12.0</td>
<td>8.5</td>
<td></td>
<td>12.5</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>100000</td>
<td>13.0</td>
<td></td>
<td>4.0</td>
<td>12.5</td>
<td>9.0</td>
<td></td>
<td>13.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STREET CLASSIFICATION</th>
<th>MAX ADT</th>
<th>MAX TRAFFIC INDEX</th>
<th>&quot;R&quot; VALUE</th>
<th>STANDARD SECTIONS A.C. (IN)</th>
<th>CTB (IN)</th>
<th>PCC (IN)</th>
<th>CONCRETE M.O.R. 600 MIN</th>
<th>FULL DEPTH A.C. (IN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUL-DE-SAC</td>
<td>200</td>
<td>5.0</td>
<td></td>
<td>3.0</td>
<td>5.0</td>
<td>6.5</td>
<td></td>
<td>5.0</td>
</tr>
<tr>
<td>LOCAL (L.V.R.)</td>
<td>700</td>
<td>5.5</td>
<td></td>
<td>3.0</td>
<td>5.0</td>
<td>6.5</td>
<td></td>
<td>6.0</td>
</tr>
<tr>
<td>LOCAL (RES.)</td>
<td>1200</td>
<td>6.0</td>
<td></td>
<td>3.0</td>
<td>5.5</td>
<td>7.0</td>
<td></td>
<td>7.0</td>
</tr>
<tr>
<td>LOCAL (RES.)</td>
<td>2200</td>
<td>6.5</td>
<td></td>
<td>3.0</td>
<td>6.0</td>
<td>7.0</td>
<td></td>
<td>7.0</td>
</tr>
<tr>
<td>LOCAL (IND.)</td>
<td>2000</td>
<td>8.5</td>
<td></td>
<td>3.0</td>
<td>9.5</td>
<td>7.5</td>
<td></td>
<td>9.5</td>
</tr>
<tr>
<td>COLLECTOR (RES.)</td>
<td>3500</td>
<td>7.0</td>
<td></td>
<td>3.0</td>
<td>6.5</td>
<td>7.0</td>
<td></td>
<td>8.0</td>
</tr>
<tr>
<td>COLLECTOR (RES.)</td>
<td>5000</td>
<td>7.5</td>
<td></td>
<td>3.0</td>
<td>7.5</td>
<td>7.5</td>
<td></td>
<td>8.5</td>
</tr>
<tr>
<td>COLLECTOR (COMM \IND.)</td>
<td>5000</td>
<td>9.5</td>
<td></td>
<td>3.0</td>
<td>11.0</td>
<td>8.0</td>
<td></td>
<td>11.0</td>
</tr>
<tr>
<td>COLLECTOR (NO FRT)</td>
<td>7500</td>
<td>8.0</td>
<td></td>
<td>3.0</td>
<td>8.5</td>
<td>7.5</td>
<td></td>
<td>9.0</td>
</tr>
<tr>
<td>COLLECTOR</td>
<td>15000</td>
<td>9.0</td>
<td></td>
<td>3.0</td>
<td>10.5</td>
<td>8.0</td>
<td></td>
<td>10.0</td>
</tr>
<tr>
<td>MAJOR (4-LANE)</td>
<td>30000</td>
<td>10.5</td>
<td></td>
<td>3.5</td>
<td>12.5</td>
<td>8.5</td>
<td></td>
<td>12.0</td>
</tr>
<tr>
<td>MAJOR (6-LANE)</td>
<td>40000</td>
<td>11.0</td>
<td></td>
<td>4.0</td>
<td>12.5</td>
<td>8.5</td>
<td></td>
<td>12.5</td>
</tr>
<tr>
<td>PRIMARY ARTERIAL</td>
<td>50000</td>
<td>11.5</td>
<td></td>
<td>4.0</td>
<td>13.5</td>
<td>9.0</td>
<td></td>
<td>13.0</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>60000</td>
<td>12.0</td>
<td></td>
<td>4.5</td>
<td>13.5</td>
<td>9.0</td>
<td></td>
<td>13.5</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>80000</td>
<td>12.5</td>
<td></td>
<td>4.5</td>
<td>14.5</td>
<td>9.5</td>
<td></td>
<td>14.0</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>100000</td>
<td>13.0</td>
<td></td>
<td>5.0</td>
<td>15.0</td>
<td>10.0</td>
<td></td>
<td>15.0</td>
</tr>
<tr>
<td>STREET CLASSIFICATION</td>
<td>MAX ADT</td>
<td>MAX TRAFFIC INDEX</td>
<td>&quot;R&quot; VALUE</td>
<td>STANDARD SECTIONS</td>
<td>CONCRETE M.O.R. 600 MIN</td>
<td>FULL DEPTH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------</td>
<td>-------------------</td>
<td>-----------</td>
<td>-------------------</td>
<td>--------------------------</td>
<td>------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A.C. (IN)</td>
<td>CTR (IN)</td>
<td>A.C. (IN)</td>
<td>FT (IN)</td>
<td>CTR (IN)</td>
</tr>
<tr>
<td>CUL-DE-SAC</td>
<td>200</td>
<td>5.0</td>
<td></td>
<td>3.0</td>
<td>5.0</td>
<td>6.5</td>
<td>-</td>
<td>6.0</td>
</tr>
<tr>
<td>LOCAL (L.V.R.)</td>
<td>700</td>
<td>5.5</td>
<td></td>
<td>3.0</td>
<td>5.5</td>
<td>7.0</td>
<td>-</td>
<td>6.5</td>
</tr>
<tr>
<td>LOCAL (RES.)</td>
<td>1200</td>
<td>6.0</td>
<td></td>
<td>3.0</td>
<td>6.5</td>
<td>7.0</td>
<td>-</td>
<td>7.0</td>
</tr>
<tr>
<td>LOCAL (RES.)</td>
<td>2200</td>
<td>6.5</td>
<td></td>
<td>3.0</td>
<td>7.5</td>
<td>7.0</td>
<td>-</td>
<td>8.0</td>
</tr>
<tr>
<td>LOCAL (IND.)</td>
<td>2000</td>
<td>8.5</td>
<td></td>
<td>3.0</td>
<td>11.5</td>
<td>8.0</td>
<td>-</td>
<td>10.5</td>
</tr>
<tr>
<td>COLLECTOR (RES.)</td>
<td>3500</td>
<td>7.0</td>
<td></td>
<td>3.0</td>
<td>8.5</td>
<td>7.5</td>
<td>-</td>
<td>8.5</td>
</tr>
<tr>
<td>COLLECTOR (RES.)</td>
<td>5000</td>
<td>7.5</td>
<td></td>
<td>3.0</td>
<td>9.5</td>
<td>7.5</td>
<td>-</td>
<td>9.0</td>
</tr>
<tr>
<td>COLLECTOR (COMM./IND.)</td>
<td>5000</td>
<td>9.5</td>
<td></td>
<td>3.5</td>
<td>13.0</td>
<td>8.5</td>
<td>-</td>
<td>12.0</td>
</tr>
<tr>
<td>COLLECTOR (NO FRT)</td>
<td>7500</td>
<td>8.0</td>
<td></td>
<td>3.0</td>
<td>10.5</td>
<td>8.5</td>
<td>-</td>
<td>10.0</td>
</tr>
<tr>
<td>COLLECTOR</td>
<td>15000</td>
<td>9.0</td>
<td></td>
<td>3.5</td>
<td>12.0</td>
<td>8.5</td>
<td>-</td>
<td>11.0</td>
</tr>
<tr>
<td>MAJOR (4-LANE)</td>
<td>30000</td>
<td>10.5</td>
<td></td>
<td>4.0</td>
<td>14.5</td>
<td>8.5</td>
<td>-</td>
<td>13.5</td>
</tr>
<tr>
<td>MAJOR (6-LANE)</td>
<td>40000</td>
<td>11.0</td>
<td></td>
<td>4.5</td>
<td>15.0</td>
<td>9.0</td>
<td>-</td>
<td>14.0</td>
</tr>
<tr>
<td>PRIMARY ARTERIAL</td>
<td>50000</td>
<td>11.5</td>
<td></td>
<td>5.0</td>
<td>15.5</td>
<td>9.0</td>
<td>-</td>
<td>14.5</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>60000</td>
<td>12.0</td>
<td></td>
<td>5.0</td>
<td>16.5</td>
<td>9.5</td>
<td>-</td>
<td>15.0</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>80000</td>
<td>12.5</td>
<td></td>
<td>5.5</td>
<td>17.0</td>
<td>9.5</td>
<td>-</td>
<td>16.0</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>100000</td>
<td>13.0</td>
<td></td>
<td>6.0</td>
<td>17.0</td>
<td>10.0</td>
<td>-</td>
<td>17.0</td>
</tr>
<tr>
<td>STREET CLASSIFICATION</td>
<td>MAX ADT</td>
<td>MAX TRAFFIC INDEX</td>
<td>&quot;R&quot; VALUE</td>
<td>STANDARD SECTIONS</td>
<td>CONCRETE M.O.R. 600 MIN</td>
<td>FULL DEPTH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------</td>
<td>-------------------</td>
<td>-----------</td>
<td>-------------------</td>
<td>--------------------------</td>
<td>-----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A.C. (IN)</td>
<td>CTB (IN)</td>
<td>PCC (IN)</td>
<td>CTB (IN)</td>
<td>A.C. (IN)</td>
</tr>
<tr>
<td>CUL-DE-SAC</td>
<td>200</td>
<td>5.0</td>
<td></td>
<td>3.0</td>
<td>7.0</td>
<td>7.0</td>
<td>—</td>
<td>7.5</td>
</tr>
<tr>
<td>LOCAL (L.V.R.)</td>
<td>700</td>
<td>5.5</td>
<td></td>
<td>3.0</td>
<td>8.0</td>
<td>7.0</td>
<td>—</td>
<td>8.0</td>
</tr>
<tr>
<td>LOCAL (RES.)</td>
<td>1200</td>
<td>6.0</td>
<td></td>
<td>3.0</td>
<td>9.0</td>
<td>7.5</td>
<td>—</td>
<td>8.5</td>
</tr>
<tr>
<td>LOCAL (RES.)</td>
<td>2200</td>
<td>6.5</td>
<td></td>
<td>3.0</td>
<td>10.5</td>
<td>7.5</td>
<td>—</td>
<td>9.0</td>
</tr>
<tr>
<td>LOCAL (IND.)</td>
<td>2000</td>
<td>8.5</td>
<td></td>
<td>4.0</td>
<td>14.5</td>
<td>8.0</td>
<td>5.0</td>
<td>12.5</td>
</tr>
<tr>
<td>COLLECTOR (RES.)</td>
<td>3500</td>
<td>7.0</td>
<td>10.0 TO</td>
<td>3.0</td>
<td>12.0</td>
<td>7.5</td>
<td>—</td>
<td>10.0</td>
</tr>
<tr>
<td>COLLECTOR (RES.)</td>
<td>5000</td>
<td>7.5</td>
<td>19.9</td>
<td>3.5</td>
<td>12.5</td>
<td>8.0</td>
<td>—</td>
<td>11.0</td>
</tr>
<tr>
<td>COLLECTOR (COMM.\IND.)</td>
<td>5000</td>
<td>9.5</td>
<td></td>
<td>4.5</td>
<td>16.5</td>
<td>8.5</td>
<td>5.0</td>
<td>14.0</td>
</tr>
<tr>
<td>COLLECTOR (NO FRT)</td>
<td>7500</td>
<td>8.0</td>
<td></td>
<td>3.5</td>
<td>14.0</td>
<td>8.0</td>
<td>—</td>
<td>11.5</td>
</tr>
<tr>
<td>COLLECTOR</td>
<td>15000</td>
<td>9.0</td>
<td></td>
<td>4.5</td>
<td>15.0</td>
<td>8.0</td>
<td>5.0</td>
<td>13.0</td>
</tr>
<tr>
<td>MAJOR (4-LANE)</td>
<td>30000</td>
<td>10.5</td>
<td></td>
<td>5.5</td>
<td>18.0</td>
<td>8.5</td>
<td>6.0</td>
<td>15.5</td>
</tr>
<tr>
<td>MAJOR (6-LANE)</td>
<td>40000</td>
<td>11.0</td>
<td></td>
<td>6.0</td>
<td>18.5</td>
<td>9.0</td>
<td>6.0</td>
<td>16.5</td>
</tr>
<tr>
<td>PRIMARY ARTERIAL</td>
<td>50000</td>
<td>11.5</td>
<td></td>
<td>6.0</td>
<td>20.0</td>
<td>9.0</td>
<td>6.0</td>
<td>17.5</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>60000</td>
<td>12.0</td>
<td></td>
<td>6.5</td>
<td>20.5</td>
<td>9.0</td>
<td>6.0</td>
<td>18.5</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>80000</td>
<td>12.5</td>
<td></td>
<td>7.0</td>
<td>21.5</td>
<td>9.5</td>
<td>6.0</td>
<td>19.0</td>
</tr>
<tr>
<td>EXPRESSWAY</td>
<td>100000</td>
<td>13.0</td>
<td></td>
<td>7.5</td>
<td>22.5</td>
<td>10.0</td>
<td>6.0</td>
<td>20.0</td>
</tr>
</tbody>
</table>
FORMED OR SAWCUT EDGE ON ALL SIDES

EDGE OF NEW (OR EX) SIDEWALK OR CURB RAMP

BACKFILL & REPLACE EX VEGETATION (TYP)

PCC 520-C-2500

Curb and Gutter

Existing Stamp / Impression

Stamp (Location per Engineer)

Plan View

6" MIN

1.5%

6" MIN

Depth of Stamp / Impression

4" MIN

12" MIN

Section View A-A

SUBGRADE AT 90% RELATIVE COMPACtion TO 12"

Curb and Gutter

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 D 6024 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.

3. CUTS SHALL BE STRAIGHT. EXISTING A.C. PAVEMENT WILL NOT REQUIRE SAWCUTTING WHEN USING ROCKWHEEL FOR EXCAVATION.

4. 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.

5. 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 PCC SURFACED STREETS SEE SDG-106.

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

7. FOR DRY UTILITIES (ELECTRICAL, COMMUNICATION, GAS, ETC.) SEE SDG-119.
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 PORTLAND CEMENT 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. THE DETECTABLE WARNING TILE SHALL BE SLIP-RESISTANT AND CONSIST OF AN INLINE PATTERN OF RAISED TRUNCATED DOMES.

2. COLOR: THE DETECTABLE WARNING TILE SHALL BE YELLOW CONFORMING TO FEDERAL STANDARDS 595C TABLE IV, COLOR NO. 33538.

3. MATERIAL: STAINLESS STEEL IS THE REQUIRED MATERIAL FOR THE DETECTABLE WARNING TILE. THE TYPE OF MATERIAL SELECTED SHALL BE INDICATED ON THE CURB RAMP DRAWINGS.

   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.
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. 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.

3. Pull boxes, manholes, vaults, and other utilities shall be relocated or incorporated onto 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.

4. Utility poles may be incorporated into the flares of the curb ramp provided that the required accessible route width is compliant.

5. The running slope of the curb ramp shall be 5% minimum and 8.33% maximum. If the condition of the street and sidewalk is such that the existing slopes do not allow the installation of the required curb ramp slope, then the ramp length shall be extended to 15 linear feet to catch the required slope even if the required slope is not achieved. Coordinate with the engineer prior to demolition or construction.

6. 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.

7. Provide a 1/4" deep tooled joint with 1/4" radius edges as shown on drawings.

8. Install a 1/4" expansion joint filler between the new curb ramp gutter and the existing sidewalk.

9. Ponding is not allowed within the curb ramp limits, and the drainage pattern shall not be altered.

10. The adjustment of the cross slope at the ramp opening shall not cause gutter trickle flow to spill onto travelled lanes or ponding anywhere.

11. 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.

12. 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.

13. 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.

14. Diagonal curb ramps shall have a clear 4" x 4" minimum turning space beyond the bottom grade break within the width of the pedestrian street crossing and wholly outside the active traffic lanes of the roadway (vehicular and bike lanes).

15. 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.

16. The counter slope within 4' 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 exceed 13.3%.

17. The slope of the ramp shall be uniform along each ramp run.

18. The cross slope shall be measured perpendicular to the path of travel.

19. Any deviation from these provisions requires prior approval from the engineer.
NOTES:
1. 6" wide retaining curb may be omitted if the ground surface will be at the same elevation as the curb ramp surface.

LEGEND:

TOOLED JOINT

PLAN - TYPE A

PLAN - TYPE B

SECTION B-B

CURB RAMPS - TYPE A AND B

CITY OF SAN DIEGO - STANDARD DRAWING

SDG-133
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.

LEGEND:
- TOOLED JOINT
NOTES:
1. CASE A THROUGH C MAY BE USED ONLY WITH APPROVAL OF THE ENGINEER.
2. ABBREVIATIONS:
   ES—EXISTING SIDEWALK
   TA—TRANSITION AREA

LEGEND:
TOOLED JOINT
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.

SECTION A-A
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.

DETAIL A

SECTION A-A
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.

Legend on Plans

<table>
<thead>
<tr>
<th>TYPE</th>
<th>W</th>
<th>*AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>24&quot;</td>
<td>1.34 SQ FT</td>
</tr>
<tr>
<td>H</td>
<td>30&quot;</td>
<td>1.61 SQ FT</td>
</tr>
</tbody>
</table>

* WITH 6" CURB FACE
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.
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

SIDEWALK - TYPICAL SECTIONS

SDG-155
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 CONFORMITY 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 (PCR) 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''.

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

LEGEND ON PLANS

REVISION  BY  APPROVED  DATE
ORIGINAL  KA  NAGELVOORT  06/10
UPDATED  AR  NAGELVOORT  10/15
UPDATED  HM  NAGELVOORT  02/16

CITY OF SAN DIEGO - STANDARD DRAWING

CROSS GUTTER

SDG-157
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.

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

SDG-159
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, WHICHER IS LESS (FOR COMMERCIAL USE ONLY).

5. PLACE EXPANSION JOINT AT RIGHT-OF-WAY OR 10', WHICHER 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.
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.
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 CONFORMITY WITH HISTORIC DESIGN ADJACENT PROPERTIES.
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. DIKES SHALL BE PLACED ON A 2" SECTION OF A.C. SURFACING, EXTENDING THROUGHOUT THE WIDTH OF THE DIKE.
2. PG-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

<table>
<thead>
<tr>
<th>TYPE</th>
<th>REQD PER LIN. FT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.0250 TON</td>
</tr>
<tr>
<td>B</td>
<td>0.0375 TON</td>
</tr>
<tr>
<td>C-6&quot;</td>
<td>0.0375 TON</td>
</tr>
<tr>
<td>C-8&quot;</td>
<td>0.0583 TON</td>
</tr>
<tr>
<td>C-9&quot;</td>
<td>0.0702 TON</td>
</tr>
<tr>
<td>D</td>
<td>0.0062 TON</td>
</tr>
<tr>
<td>E</td>
<td>0.0407 TON</td>
</tr>
<tr>
<td>F</td>
<td>0.0623 TON</td>
</tr>
</tbody>
</table>

LEGEND ON PLANS
EXPANSION JOINT FILLER MATERIAL

1/8" (PAVEMENT)
1/4" MIN - 1/2" MAX (SIDEWALK)

CONTACT JOINT

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

WEAKENED PLANE JOINT
CURB AND SIDEWALK

WEAKENED PLANE JOINT
GUTTER AND CONCRETE PAVEMENT

KEYED JOINT
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 JOINTS

1/2” R

11’ 11’ 20’ MAX 10’ MIN

PAVEMENT WIDTH = 62’ OR LESS, BUT MORE THAN 40’

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. 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. 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 200-1.5.3) 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. TEFLO N 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.

LEGEND ON PLANS
SHOW A NUMBER TO INDICATE TYPE HEAD

CITY OF SAN DIEGO – STANDARD DRAWING
SHRUB SPRAY HEAD ON FIXED RISER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
COORDINATOR R.C.E. 65271 DATE 1/31/2012
DRAWING NUMBER SDI-101
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. NO FIXED RISERS ALLOWED IN RIGHT-OF-WAY OR WITHIN 10' OF VEHICULAR OR PEDESTRIAN TRAFFIC.

REVISION BY APPROVED DATE
ORIGINA RH. NAGELVOORT 09/12

CITY OF SAN DIEGO - STANDARD DRAWING

ROTOR OR IMPACT HEAD
ON FIXED RISER

SDI-102

1/31/2012
NOTES:
1. FITTINGS SHALL BE PVC SCH 40.
2. NIPPLES AND RISERS SHALL BE PVC SCH 80.
3. TEFLON 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. Teflon tape shall be used on threaded connections.

6. Close nipples shall not be used.

7. Anti-drain valves shall be installed under all heads.
QUICK COUPLING VALVE

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.
HINGED LOCKING BRASS CAP, SOLVENT WELDED TO SLEEVE (SHOWN WITH CAP KEY)

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. TEFLON 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.
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.
CONCRETE VALVE BOX UNMORTARED
STANDARD BRICKS (4)
FOUNDATION ON COMPACTED SUBGRADE
(USE 6 BRICKS FOR OVERSIZED BOXES)

PLAN

CONCRETE RECTANGULAR VALVE BOX WITH CAST IRON,
SELF-LOCKING LID, PAINT "MV" AND CONTROLLER ID
LETTER ON LID.

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 SPlice 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 /
GROUND COVER 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. Teflon TAPE SHALL BE USED ON THREADED CONNECTOR.
NOTES:

1. SPLICES 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.

LEGEND ON PLANS:

SDI-112

CITY OF SAN DIEGO – STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR  R.C.E. 86271  DATE  1/31/2012

FLOW SENSOR
NOTES:

1. SPLICING SHALL BE MADE IN VALVE BOXES AND PULL BOXES ONLY. SEE SDI-115 FOR SPLICE / 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 / GROUNDCOVER 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. TEFLON TAPE SHALL BE USED ON THREADED CONNECTIONS.

LEGEND ON PLANS

- RCV
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 HARNESSED 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.
HEAVY-DUTY STAINLESS STEEL ENCLOSURE WITH LIGHT ACCESS THROUGH GRID ON TOP, AND INTERNAL CLAMP FOR COLUMN.

HIGH SECURITY STAINLESS STEEL DISC LOCK

SOLAR IRRIGATION CONTROLLER

GALV STEEL COLUMN PER MANUFACTURER SPECS

RAIN SENSOR ENCLOSED IN STAINLESS STEEL VANDAL RESISTANT ENCLOSURE MOUNT ON POST MIN 30° ABOVE GRADE.

FINISH GRADE

CONCRETE PAD TO SLOPE AWAY FROM CONTROLLER COLUMN

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.

SOLAR IRRIGATION CONTROLLER

CITY OF SAN DIEGO – STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 65271 DATE 1/31/2012

REVISION BY APPROVED DATE

ORIGINAL KA NAGELVOORT CV/12

SDI-116
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.
UV RESISTANT PVC PIPE

FINISHED GRADE

#3 OR #4 REBAR BENT AS SHOWN
OR PRE-BENT STABILIZERS

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.

LEGEND ON PLANS

SWING JOINT AND PIPE INSTALLATION ON SLOPES ABOVE GROUND PIPE INSTALLATIONS
PVC MAINLINE

SCH 40 PVC TEE OR ELL AT TERMINAL END. TYPICAL

MAINLINE DEPTH

TEE UP TO MANIFOLD DEPTH.

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.

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.C.E. 65271 DATE: 1/31/2012

REMOTE CONTROL VALVE MANIFOLD ASSEMBLY WITH PVC PIPE (TEMPORARY SYSTEMS)
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. TEFLOM 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 SPICE / SOLDERING NOTES.

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

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 / GROUNDCOVER 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.

TEFLON TAPE SHALL BE USED ON THREADED CONNECTIONS.
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. TEFLON TAPE SHALL BE USED ON THREADED CONNECTIONS.

LEGEND ON PLANS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 65271 DATE 1/31/2012

CITY OF SAN DIEGO - STANDARD DRAWING

AIR / VACUUM RELIEF VALVE

SDI-128
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.
CHAMFER AS NEEDED TO ELIMINATE SOIL SLOUGHING. 1:1 MAX SLOPE.

TIE STAKES (TYP) 2" DIAM. LODGEPOLE STAKE. MIN 10' LENGTH.

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

2-2" Dia 10' Min Length Lodgepole Stakes and 4 Ties. Top Tree Ties Shall Be 3" Below Top of Stake. Ties Shall Provide Flexibility of Trunk But Not Allow Rubbing of Trunk or Branches Against Stake.

2" - 3" Mulch, 3" Clear from Trunk.

2" - 3" Mulch, 3" Clear from Trunk.

4" High Berm Firmly Compacted.

4" Perforated PVC Breather Tube w/ Black Flat Grate Cap Fastened Stainless Steel Screw (2) Wrapped in Filter Fabric & Extending to the Bottom of Planting Pit.

Scarify Bottom and Edges of Plant Pit.

Backfill.

Plant Tablets Buried, Max 3" Deep.

Top of Root Ball 1" Above Finished Grade.

Undisturbed Native Soil

Tree Bubblers on Up Hill Side of Trunk (SDI-104)

Tree Stakes (TYP) 4" PVC Rigid Perforated Breather Tube

Tree Trunk

Planter Hole

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.

CITY OF SAN DIEGO - STANDARD DRAWING

TREE PLANTING AND STAKING

REVISED BY APPROVED DATE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER SDL-101
SHRUB PLANTING - SLOPES

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

SHRUB PLANTING - LEVEL GROUND

- Ground cover spacing.
- 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).

GROUND COVER SPACING

EDGE OF PLANTING AREA
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 ENCOUNTERED.

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.
A - MONOLITHIC CONCRETE PLACEMENT

B - PAD WHEN ADJACENT TO EXISTING CONCRETE

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.
ROOT BARRIER REQUIRED WITHIN 10' OF TREE TRUNK, SEE NOTE 2

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.
4" HIGH BERM FIRMLY COMPACTED

FINISH GRADE AT ROOTBALL

PLANT BACKFILL

PLANTING HOLE DEPTH

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

PIPE TO EXTEND INTO THE GRAVEL SUMP

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

DETAIL - A BREATHER TUBE

CITY OF SAN DIEGO - STANDARD DRAWING

PALM TREE PLANTING

SDL-107
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

<table>
<thead>
<tr>
<th>L</th>
<th>60'</th>
<th>90'</th>
<th>120'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5'</td>
<td>10'</td>
<td>15'</td>
</tr>
<tr>
<td>5'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
<tr>
<td>10'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
<tr>
<td>15'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
<tr>
<td>20'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
<tr>
<td>25'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
<tr>
<td>30'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
<tr>
<td>35'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
<tr>
<td>40'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
<tr>
<td>45'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
<tr>
<td>50'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
<tr>
<td>55'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
<tr>
<td>60'</td>
<td>2.50'</td>
<td>3.75'</td>
<td>5.00'</td>
</tr>
</tbody>
</table>

### OFFSET Y

<table>
<thead>
<tr>
<th>W</th>
<th>10'</th>
<th>11'</th>
<th>20'</th>
<th>22'</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.16'</td>
<td>0.62'</td>
<td>1.41'</td>
<td>2.50'</td>
<td>3.75'</td>
</tr>
<tr>
<td>0.17'</td>
<td>0.69'</td>
<td>1.55'</td>
<td>2.75'</td>
<td>4.13'</td>
</tr>
<tr>
<td>0.31'</td>
<td>1.25'</td>
<td>2.81'</td>
<td>5.00'</td>
<td>7.50'</td>
</tr>
<tr>
<td>0.34'</td>
<td>1.38'</td>
<td>3.09'</td>
<td>5.50'</td>
<td>8.25'</td>
</tr>
</tbody>
</table>

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.
CURB & SIDEWALK | SIDEWALK WIDTH | SETBACK
---|---|---
CONTIGUOUS 6' OR LESS | SIDEWALK WIDTH | CONTIGUOUS MORE THAN 6' | 2' - 6'' | 2' - 6''
SEPARATE

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.
1. Structural steel tubing used for post & sleeves shall be galvanized 12 gauge cold rolled steel of the nominal dimensions shown here, and meet the requirements of ASTM A653.

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 radii 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).

REFERENCES

- Rivet specification: 3/8" rivet type
- Dimension: 7/8" dia. head
- Grip range: 200-356
- Finish: electro-galvanize ASTM-B-633

NOTES

- 10" minimum diameter footing concrete 520-C-2500
- 1 3/16" x 1 3/4" 12 gauge post
- 2" +/-...
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 TENSILE 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 APPURTEANCES.
   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.

LEGEND ON PLANS
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

DRAWING NUMBER

SDM-108
NOTE:

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.

CITY OF SAN DIEGO - STANDARD DRAWING

UTILITY LOCATIONS IN LOCAL AND MAJOR STREETS, PRIME ARTERIALS AND EXPRESSWAYS

REVISION BY APPROVED DATE

ORIGINAL J. CASEY 09/08

UPDATE K. J. NAGELDOORF 09/12

COORDINATOR R. C. E. 07/27

DATE 1/31/2012

DRAWING NUMBER SDM-111
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 BLACK 22 MIL PRESSURE - BONDED OR 7 MIL THERMALLY - FUSED VINYL COATED OVER 9 GAUGE ALUMINIZ ED 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. SEE M-20 FOR ADDITIONAL DETAILS.
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

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

M-3A DETAIL:
INNER COVER TO OUTER COVER

HOLES LOCATION
FRAMES
INNER COVER
OUTER COVER

LIFTING HOOP
3 EACH @ 120 DEGREES

M-1 COVER AND FRAME
BOLT PLACEMENT
(SEE NOTE 3)

M-3 CONCENTRIC COVERS
AND FRAME BOLT PLACEMENT
(SEE NOTE 3)

NOTES:
1. 0.625" X 20 PENTA BOLT S/S UNC THREAD,
   316 STAINLESS STEEL SOCKET HEAD CAP SCREW AND
   1.50" OD X 0.625" 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-81388 (AMEND: 1)
3. BOLTDOWN PATTERNS:
   M-1 DETAIL (COVER & FRAME):
   INSTALL TWO (2) BOLTS AT 180 DEGREES
   M-3A DETAIL (CONCENTRIC COVERS):
   BETWEEN INNER AND OUTER COVERS INSTALL
   TWO (2) BOLTS AT 90 DEGREES
   M-3B DETAIL (OUTER 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" X 16 STAINLESS STEEL WEDGE
   ANCHORS 3.75" IN LENGTH AT 90 DEGREES.
DISTANCE BETWEEN GATE POSTS IS GATE LENGTH SHOWN ON PLANS

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.

CHAIN LINK VEHICULAR GATE

LEGEND ON PLANS

SHEET 1 OF 2
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 tighten 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.

LEGEND ON PLANS

INTERNATIONAL SYMBOL OF ACCESSIBILITY SIGN (ISA)

SDM-114

CHAIN LINK GATE
LENGTH OF EACH SEGMENT OF RAMP RUN

<table>
<thead>
<tr>
<th>MAX SLOPE</th>
<th>MAXIMUM LENGTH OF EACH RAMP SEGMENT (L)</th>
<th>MAXIMUM RISE BETWEEN LANDINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:13 (7.69%)</td>
<td>32.5'</td>
<td>30'</td>
</tr>
<tr>
<td>1:14 (7.74%)</td>
<td>33'</td>
<td>30'</td>
</tr>
<tr>
<td>1:15 (8.67%)</td>
<td>37.5'</td>
<td>30'</td>
</tr>
<tr>
<td>1:16 (8.25%)</td>
<td>40'</td>
<td>30'</td>
</tr>
<tr>
<td>1:17 (5.55%)</td>
<td>42.5'</td>
<td>30'</td>
</tr>
<tr>
<td>1:18 (6.55%)</td>
<td>45'</td>
<td>30'</td>
</tr>
<tr>
<td>1:19 (6.28%)</td>
<td>47.5'</td>
<td>30'</td>
</tr>
</tbody>
</table>

NOTES:
1. (W) THE WIDTH OF THE RAMPs THAT ARE PART OF THE MÉAN 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
SECTION B-B

NOTE: THE HEIGHT OF THE HANDRAIL SHALL BE CONSISTENT AT EACH RAMP RUN.

SECTION A-A

DETAIL 2 - WHEEL GUIDE IN LIEU OF CURB
CONCRETE SLAB PER SPEC

DETAIL IN LIEU OF SKATE STOPPERS

POST

1 1/2" MIN CLEARANCE

ADJACENT WALL WHERE OCCURS

WHEEL GUIDE RAIL CENTERED AT 3" +/- 1" HIGH

ADJACENT GROUND SURFACE

42" MIN AT HANDRAILS

NOTE: RAMP BASEMENT
SEE RAMP NOTE 6 ON SHEET 3

POST

ADJACENT GROUND SURFACE

3" 1/2" AT THE GRIP

EDGE PROTECTION DETAIL 1

FLOOR MOUNTED

WALL MOUNTED

3/8" REINFORCED CONCRETE CURB

CONCRETE SLAB PER SPEC

DETAIL 1

43" MIN

NOTE: RAMP BASEMENT

WALL 1 1/2" MIN CLEARANCE

60" MIN

60" MIN

SIDE APPROACH LANDING

FRONT APPROACH LANDING

EXTENSION 12" MIN ALONG HORIZONTAL PORTION

CONCRETE SLAB

WALL

34"-38" TYP

PLANS (48" MIN)
SHOWN ON THE RAMP WIDTH AS

42" MIN

60" MIN

RAMP WIDTH AS
SHOWN ON THE PLANS (48" MIN)

SHORT CURB

38"-36" MAX

WALL

60" MIN

60" MIN

RECOMMENDED BY THE CITY OF SAN DIEGO
STANDARDS COMMITTEE

COORDINATOR R.C.E. 56523 DATE

DRAWING NUMBER SDM-115

CHANGES 2/25/16

REVISION BY APPROVED DATE
ORIGINAL SM A. OSKOUI 12/03
UPDATE PC A. OSKOUI 12/06
UPDATE KA NAGEL VOORT 05/12
UPDATE PC NAGEL VOORT 02/16

CITY OF SAN DIEGO - STANDARD DRAWING

PEDESTRIAN RAMP AND
PROTECTIVE RAILING
### 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.**

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 EXTENSION 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).**

12. **A GUARDRAIL 42 INCHES ABOVE FINISHED FLOOR SHALL BE INSTALLED ALONG OPEN EDGES OF THE RAMP AND LANDINGS THAT ARE 30 INCHES OR MORE IN HEIGHT FROM THE ADJACENT GROUND SURFACE AND THE RAMP IS NOT BOUNDED BY A WALL OR FENCE. SEE SDM-118.**

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.
CASE 5 - DUAL AND SINGLE RAMP ORTHOGONAL

CASE 6 - DUAL AND SINGLE RAMP SKewed

LEGEND

CONSTRUCTION LINE
CURB & GUTTER
CROSSWALK BAR (24" WIDE)
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 parking ratio provided that lots accessed by the public are provided with a passenger loading zone complying with passenger loading zone standards. See SDM-117 Sheet 8.

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>501–1,000</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:

A. 10% of the total number of parking spaces at outpatient units and facilities shall be accessible.

B. 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.

C. The required parking ratio for accessible parking stalls is provided for each parking lot on the site.

D. At least one van parking space is required for every 6 or fraction of six parking spaces.

E. 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 access aisle and vehicular routes serving them shall provide a vertical clearance of 98" 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 2% 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 aisle shall be 1.5%.

ACCESSIBLE PARKING NOTES

CITY OF SAN DIEGO – STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.C.E. 56628

SDM-117

2/25/16
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.
   C. For van space, the access aisle shall be placed on the side opposite the driver's side when the vehicle is going forward into the parking space (i.e., passenger side of the vehicle).
   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 appropriate curb ramp standards.

6. In each parking area, a wheel stop shall be provided to prevent vehicles from obstructing the required clear width of adjacent accessible routes.

7. Each accessible parking space shall be located so that persons with disabilities are not compelled to wheel or walk behind parking spaces other than their own.

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 4.
   B. When posted in a path of travel, the sign shall be mounted 80 inches 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 ft above grade. If sign is installed within the circulation areas, install 60 inches above finish floor.
   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.

9. If the accessible route crosses or adjoins the vehicular way and the walking surface is not separated by curbs, railings, or other elements between the pedestrian areas and vehicular areas, the boundary between the areas shall be defined by a 36 inch wide detectable warning tiles. Detectable warning tiles shall be per SDG-130.

10. Passenger Loading Zone:
    A. Where provided, at least one accessible passenger loading zone shall be accessible.
    B. An accessible passenger loading zone shall be provided in every continuous 100 linear feet of loading space, or fraction thereof.
    C. Vehicle pull-up space - passenger loading zones shall provide a vehicular pull-up space 96 inches wide minimum and 20'-0" long minimum.
    D. Access aisle - passenger loading zones shall be provided with access aisles adjacent to the vehicle pull-up space. Access aisles shall connect directly to an accessible route and shall not overlap the vehicular way.
    E. Access aisles shall be marked as required for all access aisles for accessible parking spaces.
    F. 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". When located in a path of travel, the sign shall be mounted per SDM-104.
    G. 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).
    H. 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.
    I. A minimum of 114 inches 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).
    J. Parking facilities that provide valet parking services shall provide at least one accessible passenger loading zone.
DIAGONAL DOUBLE PARKING STALLS

INTERNATIONAL SYMBOL OF ACCESSIBILITY
PAVEMENT SYMBOL SHALL BE PAINTED WHITE ON BLUE BACKGROUND.

BLUE COLOR TO MATCH COLOR A 15090 IN THE FEDERAL STANDARD 595A AS SPECIFIED IN SECTION 522(b) 2.

ISA SYMBOL SHALL BE LOCATED SO THAT IT IS VISIBLE TO TRAFFIC ENFORCEMENT OFFICER WHEN THE VEHICLE IS PARKED IN THE SPACE.

THE WORDS "NO PARKING" SHALL BE PAINTED IN WHITE LETTERS NO LESS THAN 12" HIGH."
TOW-AWAY SIGN

NOTES:
1. SIGN POST: SEE SDM-104 FOR "BREAK-AWAY SIGN POST".
2. SIGNS SHALL BE CONSTRUCTED ON MINIMUM 1/16 INCH 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.
INCLUSION OF THE FOLLOWING INFORMATION ON THE STRIPING/PLAN DETAIL:

A. TOTAL NUMBER OF EXISTING ON-STREET DIAGONAL PARKING SPACES
B. TOTAL NUMBER OF EXISTING ON-STREET DIAGONAL ACCESSIBLE PARKING SPACES
C. TOTAL NUMBER OF NEW ON-STREET DIAGONAL PARKING SPACES
D. TOTAL NUMBER OF NEW ON-STREET DIAGONAL ACCESSIBLE PARKING SPACES
ON STREET ACCESSIBLE PARKING

INCLUDE THE FOLLOWING INFORMATION ON THE STRIPING/PLAN DETAIL:

A. TOTAL NUMBER OF EXISTING ON-STREET DIAGONAL PARKING SPACES
B. TOTAL NUMBER OF EXISTING ON-STREET DIAGONAL ACCESSIBLE PARKING SPACES
C. TOTAL NUMBER OF NEW ON-STREET DIAGONAL PARKING SPACES
D. TOTAL NUMBER OF NEW ON-STREET DIAGONAL ACCESSIBLE PARKING SPACES
ACCESSIBLE PASSENGER DROP-OFF AND LOADING ZONE

1. ACCESSIBLE PASSENGER LOADING ZONE SIGN (16 INCH X 16 INCH - BLACK LETTERING ON WHITE BACKGROUND)

2. 6 INCH WHITE PAINTED CURB AND CURB FACE (STENCILED WITH 4 INCH BLACK GOTHIC SCRIPT, 3 INCH MIN "PASSENGER LOADING ZONE")

3. 4 INCH WIDTH WHITE STRIPING @ 36 INCHES O.C. & 45 DEGREES TO CURB FACE

4. STRIPED AREA SLOPES 1.5% MAX TO GUTTER FL

5. CURB RAMP

6. TRUNCATED DOMES PER SDG-130

7. 5% MAX SLOPE TO GUTTER FL (PER SDG-137) WITH MIN 6 FT TRANSITION TO STANDARD GUTTER HOLL-FL ELEVATION DIFFERENCE CONSTANT (EDGE OF PAVEMENT TO VARY)

8. VEHICLE PULL UP SPACE 20 FT X 8 FT SLOPES NOT TO EXCEED 1.5% MAX.

9. 4 FT X 5 FT ADA LANDING

10. 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.

Pipe Handrail Wall Mounted

Pipe Handrail Post Mounted

NOTES:

Surface of step nosing limit

Handrail, when required

Handrail bracket

1 1/2" Std Pipe TYP

Pipe Guardrail - Post Type

Notes:

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 fabrication.

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.

THE ADJACENT GROUND SHALL BE PROVIDED WITH GUARDRAIL.
NOTES
1. BROOM FINISH ON TREADS, TROWEL FINISH ON ALL OTHER EXPOSED SURFACES.
2. 1/4" PER 1' SLOPE ON TREADS FOR DRAINAGE.
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.
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.
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

SAN DIEGO REGIONAL STANDARD DRAWING
24" MANHOLE FRAME AND COVER
HEAVY DUTY
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.
4. Imported frames and covers shall have the country of origin marked in compliance with federal regulations.
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
Typical Monument Section in Paved Area

- 24" min
- 5" min
- 1/2" dia lift hole
- 6" thick grout pad
- Slope surface of grout pad to drain away from cover, and to meet existing grade.

Plan-in Unpaved Area

- 14"
- 1/4"
- 2" min
- CI

Riser Ring

- AC pavement CI frame
- PCC pavement grout around box

Location of Street Survey Monument

- Alteration location of monument, tie distances shown on final subdivision map if alternate location is used

Typical Monument Section in Paved Area

- 8" dia
- 10 1/4" dia
- Precast concrete pipe box
- 560-C-3250 concrete

Brick support all around on 2" sand baseed

San Diego Regional Standard Drawing

Kercheval 12/75
T. Stanton 03/03
T. Stanton 04/06
D. Gerschiffer 05/12
D. Gerschiffer 02/14

Recommended by the San Diego Regional Standards Committee

Challenges R.E. 19246 Date

Drawing Number M-10
3.5" MIN
CONCRETE
ENCASMENT

RISER RING WELDED TO EXISTING RING

2" min
1/4"
1"

14"

RISER RING

C.I.

36" min

24" MIN

BRICK SUPPORT ALL AROUND ON 2" SAND BASE.

560-C-3250 CONCRETE

TYPICAL MONUMENT
SECTION IN PAVED AREA

ALTERATION LOCATION OF MONUMENT.
TIE DISTANCES SHOWN ON FINAL SUB-
DIVISION MAP IF ALTERNATE LOCATION
IS USED.

LOCATION OF STREET
SURVEY MONUMENT

PLAN-IN UNPAVED AREA

SLOPE SURFACE OF GROUT PAD TO DRAIN AWAY
FROM COVER, AND TO MEET EXISTING GRADE.
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 CETERLINE 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 3250 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 or retaining wall or in concrete pads for transformers, pump stations etc.
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.

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.
### Metric Equivalents

<table>
<thead>
<tr>
<th>1 Gram</th>
<th>15.4324 grains</th>
<th>1 Gram</th>
<th>0.0648 g.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Kg.</td>
<td>2.2046 lb.</td>
<td>1 Ounce</td>
<td>28.3495 g.</td>
</tr>
<tr>
<td>1 Kg.</td>
<td>0.0011 ton</td>
<td>1 Pound</td>
<td>0.4536 kg.</td>
</tr>
<tr>
<td>1 Ton (met)</td>
<td>1.1023 ton</td>
<td>1 Ton</td>
<td>907.1848 kg.</td>
</tr>
</tbody>
</table>

#### Weight

<table>
<thead>
<tr>
<th>1 Sq. cm</th>
<th>0.1550 sq. in.</th>
<th>1 Sq. in.</th>
<th>6.4516 sq. cm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Sq. m</td>
<td>10.7639 sq. ft.</td>
<td>1 Sq. ft.</td>
<td>0.0929 sq. m.</td>
</tr>
<tr>
<td>1 Sq. m</td>
<td>1.1960 sq. yd.</td>
<td>1 Sq. yd.</td>
<td>0.8361 sq. m.</td>
</tr>
<tr>
<td>1 Hectare</td>
<td>2.4710 acres</td>
<td>1 Acre</td>
<td>0.4047 hectare</td>
</tr>
<tr>
<td>1 Sq. km</td>
<td>0.3861 sq. mile</td>
<td>1 Sq. mile</td>
<td>2.5800 sq. km.</td>
</tr>
<tr>
<td>1 Sq. km</td>
<td>247.10 acres</td>
<td>1 Acre</td>
<td>0.0040 sq. km.</td>
</tr>
</tbody>
</table>

#### Area

<table>
<thead>
<tr>
<th>1 Cu. cm</th>
<th>0.0610 cu. in.</th>
<th>1 Cu. in.</th>
<th>16.3872 cu. cm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Cu. m</td>
<td>35.3134 cu. ft.</td>
<td>1 Cu. ft.</td>
<td>0.0283 cu. m.</td>
</tr>
<tr>
<td>1 Cu. m</td>
<td>1.3079 cu. yd.</td>
<td>1 Cu. yd.</td>
<td>0.0746 cu. m.</td>
</tr>
</tbody>
</table>

#### Volume

<table>
<thead>
<tr>
<th>1 Liter</th>
<th>61.0250 cu. in.</th>
<th>1 Cu. in.</th>
<th>0.0164 liter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Liter</td>
<td>0.0353 cu. ft.</td>
<td>1 Cu. ft.</td>
<td>28.3162 liters</td>
</tr>
<tr>
<td>1 Liter</td>
<td>0.2642 gal. (U.S)</td>
<td>1 Gal.</td>
<td>3.7853 liters</td>
</tr>
<tr>
<td>1 Liter</td>
<td>0.0284 Bu.</td>
<td>1 Bu.</td>
<td>35.2383 liters</td>
</tr>
</tbody>
</table>

#### Length

<table>
<thead>
<tr>
<th>1 MM.</th>
<th>0.0394 in.</th>
<th>1 In.</th>
<th>25.4000 mm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CM.</td>
<td>0.3937 in.</td>
<td>1 In.</td>
<td>2.5400 cm.</td>
</tr>
<tr>
<td>1 Meter</td>
<td>3.2808 ft.</td>
<td>1 Ft.</td>
<td>0.3048 m.</td>
</tr>
<tr>
<td>1 Meter</td>
<td>1.0936 yd.</td>
<td>1 Yd.</td>
<td>0.9144 m.</td>
</tr>
<tr>
<td>1 Km.</td>
<td>0.6214 mile</td>
<td>1 Mile</td>
<td>1.6093 km.</td>
</tr>
</tbody>
</table>

#### Temperature

Degrees Fahrenheit = \( \frac{9}{5} \) (Degrees Celsius) + 32

Degrees Centigrade = \( \frac{5}{9} \) (Degrees Fahrenheit - 32)
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 hat-dip galvanized after fabrication.

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

Four Links
Three Links
Make bowl shaped recess in concrete to accommodate three links of chain

1/8"

5" Diameter Steel Pipe Sleeve

HASP DETAIL

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING
DEMENTABLE POST

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19245 Date

DRAWING NUMBER M-16
Horizontal brace with truss rod may be used as an alternate to a diagonal brace.

Line posts at 1000' max. intervals braced and trussed in both directions.

Horizontal brace with 3/8" steel truss rods.

Gate post
1. Sidewalk shall have a minimum of 4’ clear area (path, not including curb) passing pedestals, pullboxes and other structures.


NOTES
NOTES

1. Structural steel tubing used for post & sleeves shall be galvanized 12 gauge cold rolled steel, of the nominal dimensions shown hereon and meet the requirements of ASTM A446 Grade A.

2. Galvanizing shall be per ASTM A525. Posts & sleeves shall have 7/16” dia. holes spaced 1” o.c. ±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 0.062” in 3’ and have corner radii 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.
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.
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 AS SHOWN ON WS-03
4) INSTALL WARNING / IDENTIFICATION TAPE AS SHOWN ON SDRW-101
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 (INSULATING BUSHINGS ARE REQUIRED)
8) TOP TAPS ARE NOT PERMITTED AND ANY GLUE JOINT SHALL BE BEVELED PRIOR TO ASSEMBLY
9) NO RECYCLED WATER SHALL ENTER INTO THE STORM DRAIN

<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>SIZE x 2&quot; BRONZE SERVICE SADDLE (DOUBLE STRAP)</td>
<td>6</td>
<td>2&quot; BRONZE ANGLE METER STOP WITH LOCKWING</td>
</tr>
<tr>
<td>2</td>
<td>RECYCLED WATER MAIN</td>
<td>7</td>
<td>WATER METER FURNISHED AND INSTALLED BY THE CITY</td>
</tr>
<tr>
<td>3</td>
<td>2&quot; BRONZE CORPORATION STOP</td>
<td>8</td>
<td>METER BOX WITH LID, 17&quot; x 30&quot;</td>
</tr>
<tr>
<td>4</td>
<td>2&quot; x REQUIRED LENGTH COPPER PIPE TYPE &quot;K&quot; SOFT/RIGID OR UNLESS OTHERWISE SPECIFIED.</td>
<td>9</td>
<td>CUSTOMER SHUT-OFF VALVE (LOCKABLE)</td>
</tr>
<tr>
<td>5</td>
<td>3/8&quot; ROCK, 4&quot; TO 6&quot; DEEP</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CITY OF SAN DIEGO - STANDARD DRAWING

2" RECYCLED WATER SERVICE INSTALLATION AND MARKING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 52913 DATE

DRAWING NUMBER SDRW-102
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.
1/4" RADIUS  
(both ends of slot)

3/8" radius  
(both ends of slot)

3/4" letters (flush w/height of grid)

Standard diamond pattern tread with 3/32" wide x 3/32" deep grooves

Place foundry stamp on inside surface of cover

Cast iron valve well cover
Weight = 20 lb min

Detail 1

Cover shall be colored purple w/red dot

Detail 2

Recycled water valve well cover

Note

Cast iron cover
Weight = 15 lb

V4-T box
Weight = 60 lb

Revised by approved date
Original BB Nagelvoort 06/13
Original BB Nagelvoort 06/12

City of San Diego - Standard Drawing

Recommended by the city of San Diego Standards Committee
FINISH GRADE

2' MIN

25' MAX

8' MIN

VARIES

1/8" FLAT PLATE CENTERING GUIDE

1 1/4" DIA STEEL SHAFT EXTENSION MACHINED TO MATCH NUT

1/8"

8" ID x 1/4" THICK WALL STEEL CASING (VALVE WELL)

ADAPTOR TO FIT AWWA SQUARE NUT

2" AWWA HEXAGONAL OPERATING NUT

RECYCLED WATER VALVE KEY EXTENSION

SDRW-106
WE ARE CONSERVING OUR MOST VALUABLE RESOURCE BY IRRIGATING OUR LANDSCAPE WITH RECYCLED WATER

RECYCLED WATER AQUA RECLADA
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 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
1/8" WIDE BORDER: PANTONE 522 PURPLE
HOLES: 1/8" AT CORNERS

RECYCLED WATER SIGN FOR TOILET & URINAL FLUSHING
NOTES:
1. RECYCLE WATER IRRIGATION VALVE BOX COVER SHALL BE COLOR CODED PANTONE #522
2. TEFYON SHALL BE USED ON THREADED CONNECTIONS
NOTE:
RECYCLE WATER IRRIGATION VALVE BOX COVER
NOTE:

ALL RECYCLED METERS, AIRWACUUM 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
NOTES:
RECYCLED WATER IRRIGATION SYSTEM CONTROLLER BOX SHALL BE COLOR CODED PANTONE #522

CONTROLLER BOX PURPLE (PANTONE #522) MARKER DECAL-SHOwN AFFIXED TO BOX EXTERIOR; PREFERABLY, AFFIX TO INTERIOR OF BOX
RECYCLED WATER
DO NOT DRINK

AVISO,
AGUA IMPURA
NO TOMAR

FRONT

BACK

SAMPLE WARNING TAG. BACKGROUND PURPLE (PANTONE #522) WITH BLACK LETTERING.
1. NEW CONSTRUCTION - ALL QUICK COUPLING VALVES SHALL HAVE NON-POTABLE LOCKING PURPLE THERMOPLASTIC RUBBER COVERS.

2. RETROFFITS - REPLACE ALL EXISTING QUICK COUPLING VALVES WITH NON-POTABLE LOCKING PURPLE THERMOPLASTIC RUBBER COVERS.

3. TEFOLON 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.
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

36" DIAMETER PEA GRAVEL SUMP (MIN 12 CU FT)

PURPLE COLOR VALVE BOX AND LID

CROSS CONNECTION CONTROL TEST STATION
NOTES:

1- TEE SIZE TO MATCH EXISTING PIPE
2- REDUCER TO 2" DIAMETER PIPE, IF TEE IS LARGER THAN 2" DIAMETER
   INCREASE 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: \( K_B = 110, D_L = 1.0, E' = 750 \text{ psi} \)

3. SEE PIPE BEDDING AND TRENCH BACKFILL DRAWING.

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 WITH CAST IRON LID MARKED "CLEANOUT" OR EQUAL.

3. INSTALL METAL TAPE ON TOP OF NON-METALLIC SEWER PIPE

4. LATERALS ARE NOT ALLOWED IN DRIVEWAYS.
APPROVED MIN 6" ID CONCRETE ROUND ENCLOSURE WITH CONCRETE COVER MARKED "SEWER"

CITY MAINTAINED

PRIVATELY MAINTAINED

MATCH THE EXISTING SURFACE

CLEANOUT PLUG (ABS), THREADED

5" THICK LAYER OF 3/8" MAXIMUM AGGREGATE

STD 45° BEND

TO PROPERTY

STD WYE BRANCH

PIPE BEDDING WITH 36" MAXIMUM AGGREGATE

SECTION A-A

CONNECT TO EX. SEWER LATERAL

EX SEWER MAIN

CONNECT TO EX. SEWER LATERAL

SEWER LATERAL CLEANOUT

S

R

PARKWAY

EX. SEWER LATERAL

CURB

EDGE OF SIDEWALK

GUTTER

EX. SEWER MAIN

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.
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.

5. SEWER LATERAL SHALL HAVE 6" METAL TAPE WITH GREEN LETTERING INDICATING "SEWER" INSTALLED ABOVE THE ALIGNMENT OF THE NON-METALLIC PIPE FROM SEWER MAIN TO PROPERTY LINE.

DETAIL SHOWING THE MANNER OF CONNECTING OPPOSITE LATERALS TO A SEWER MAIN. TWO CONNECTIONS SHALL NOT BE MADE IN THE SAME LENGTH 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 C475.
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

SDS-106
NOTES

1. ALL RISER JOINTS SHALL BE EPOXY MORTARED.

2. ALL PRECAST COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C476.

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.

LEGEND ON PLANS

CITY OF SAN DIEGO – STANDARD DRAWING

MANHOLE 4' X 3' DIAMETER
(FOR 15" MAXIMUM DIAMETER PIPE)
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 SDS-110 AND SDS-106.
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 DEPTHS, 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 SIDE WALL CLEARANCE SHALL BE 12" OR AS SHOWN ON THE PLANS.
6. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW TRENCH CAP AND 12" BELOW FINISH GRADE IN UNIMPROVED STREETS.
7. 1' SAND CUSHION OR A 6" MINIMUM SAND CUSHION WITH 1" NEOPRENE PAD SHALL BE PLACED FOR CROSSINGS UTILITIES WHEN VERTICAL CLEARANCE IS 1' OR LESS. THE NEOPRENE PAD SHALL BE PLACED 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.
5. (*) INDICATES MINIMUM RELATIVE COMPLETION.

CONCRETE ENCASEMENT

470-C-2000 CONCRETE
CONCRETE BLOCK

SECTION
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.
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

BLOCKS TO BE LAID TIGHTLY AS POSSIBLE TO DOWNSTREAM SIDE OF NOTCH

NOTE
PIPE PROTECTION CAN ONLY BE USED ABOVE THE PIPE BEDDING ZONE FOR PVC PIPE

CONCRETE ANCHOR
8" X 8" X 16" CONCRETE BLOCK, FILL CORES WITH GROUT

8" MIN TRENCH WIDTH 8" MIN

PLAN

BLOCKS TO BE LAYED TIGHTLY AS POSSIBLE TO DOWNSTREAM SIDE OF NOTCH

1/2" EXPANSION JOINT MATERIAL OR JUTE AROUND PIPE

#9 WIRE LADDER TYPE REINFORCEMENT IN ALL HORIZONTAL JOINTS

FRONT ELEVATION

SIDE ELEVATION

LEGEND ON PLANS
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
CONCRETE SUPPORT
FOR UNDERCUT SEWER PIPE

1. FOR WATER LINE CONSTRUCTION, ENCASEMENT SHALL EXTEND TO FIRST JOINT BEYOND 2' AT BOTH SIDES OF TRENCH OR TO A DISTANCE OF 4', WHICHER 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.

NOTES

CITY OF SAN DIEGO - STANDARD DRAWING

COORDINATOR R.C.E. 89271 DATE 1/31/2012

CONCRETE SUPPORT
FOR UNDERCUT SEWER PIPE

REVISION BY APPROVED DATE
ORIGINAL RA A. OSKOU 1/26
UPDATED KA 1/26/82

SDS-117

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
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" CRUSHED ROCK.
5. MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST.

LEGEND ON PLANS

SEWER MAIN CLEANOUT
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" IN DIAMETER
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>

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING
SEWER CLEANOUT

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

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
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

MANHOLE COATING AND LINING SYSTEM

FOR DRAWING SM-05 SEE DRAWINGS M-1 THRU M-3
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
CHAPTER 10
WATER SYSTEMS
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>WRAPPER COLLAR</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>1 PL CROTCH</td>
</tr>
<tr>
<td>0.6 TO 1.0</td>
<td>UNDER 150</td>
<td>0° to 90°</td>
<td>1 PL CROTCH</td>
</tr>
<tr>
<td></td>
<td>150 AND OVER</td>
<td>0° to 90°</td>
<td>2 PL CROTCH</td>
</tr>
<tr>
<td>1.0</td>
<td>UNDER 150</td>
<td>0° to 90°</td>
<td>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 SCREW 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. COATINGS 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**

**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>QD (IN)</th>
<th>BOLT CENTER (IN)</th>
<th>NO. OF BOLTS</th>
<th>STUD DIA (IN)</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>
</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>1-15/16&quot;</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>
</tr>
</tbody>
</table>

**FURNISH:**

REaedaST STUD BOLTS W/FULL LENGTH THREAD & TWO (2) HEX NUTS EACH 1/16" THICK FULL FACE GASKET AND 3/4" DIAMETER STAINLESS STEEL FORCE BOLT ON DC

**NOTES:**

1. APPLY TWO (2) COATS OF COAL TAR EPOXY 16 MILS TOTAL (MIN) TO ALL EXPOSED METAL SURFACES. AMEROCLAT 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 C205 - 91.
### FIRE HYDRANT INSTALLATION

<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&quot; X 4&quot; THICK CONCRETE PAD WITH 6&quot; X 12&quot; DEEP THICKENED EDGE AROUND PERIMETER OF CONCRETE PAD</td>
</tr>
<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. (3/16" DIAMETER HOLE 2" DEEP IN BOLTS, GALVANIZED AFTER BORING)
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.

PROTECTION POSTS

PORT ORIENTATION

3-PORTS

2-PORTS

2 2 1/2" PORTS ONLY

3'-0" MIN FROM PROPERTY LINE OR RIGHT OF WAY

3'-0" MIN FROM EDGE OF PAVEMENT

FIRE HYDRANT

CONCRETE PAD

TYPICAL

SIDEWALK TYPICAL

ALTERNATE LOCATION

COLD JOINT STRIP

DRAINAGE CURB TYPICAL

STREET TYPICAL

NOTE:

WHEN REQUIRED NUMBER OF POSTS AND LOCATION TO BE SHOWN ON THE PLANS.

PROTECTION POSTS SEE WM-04

FIRE HYDRANT WITH 6" RUN TYPICAL

3-PORTS 2-PORTS
FIRE HYDRANT MARKERS

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.

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.

FIRE HYDRANT MARKERS

NOTES
### LSTM CHUNK 1

**LEGEND ON PLANS**

- **RP** - Element Reference Point
- **PS** - Property Line

SEE NOTES ON SHEET 2

### ITEM NO | SIZE AND DESCRIPTION
--- | ---
1 | CONCRETE THRUST BLOCK SEE SDW-151
2 | WATER MAIN
3 | GATE WELL WITH CAP SEE SDW-153
4 | SIZE x SIZE MJ/FLG x FLG TEE
5 | FLG x MJ/FLG RWGV
6 | C-900 PVC PIPE
7 | MJ x FLG 90° BEND
8 | FLANGED DUCTILE IRON PIPE
9 | COLD JOINT STRIP
10 | FLANGED 90° BEND SEE NOTE 6 SHEET 2 OF 2
11 | FLANGED OS&Y RWGV WITH HAND WHEEL
12 | APPROVED REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) SEE NOTE 3
13 | CHAIN WITH KNOX LOCK SEE NOTE 3 SHEET 2 OF 2
14 | FLANGED TEE WITH "FDC" SEE NOTE 3 SHEET 2 OF 2
15 | CONCRETE SLAB MINIMUM 4" THICK x 36" WIDE x AS REQUIRED
16 | 3/4" BYPASS METER & RP ASSEMBLY
17 | ADJUSTABLE VALVE SUPPORT
18 | PVC OR DI PIPE SEE NOTE 8 SHEET 2 OF 2
19 | FLANGED ANGLE PRESSURE REDUCING VALVE SEE NOTE 6 SHEET 2 OF 2

### BACKFLOW PREVENTER FOR 4" AND LARGER FIRE SERVICE

**CITY OF SAN DIEGO - STANDARD DRAWING**

**SDW-105**

**COORDINATOR:** R.E. 5023

**DATE:** 2/24/16

**RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE**
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.
NOTES:
1. SET TO FINISH GRADE
2. PROVIDE CONCRETE PADS.
3. PROVIDE THRUST BLOCKS PER SDW-151.

### SCHEDULE

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WATER MAIN 3&quot; - 6&quot; INCL</td>
</tr>
<tr>
<td>2</td>
<td>CAST IRON PLUG OR CAP MAIN SIZE X 2&quot; MAIN SIZE X 3&quot;</td>
</tr>
<tr>
<td>3</td>
<td>BRASS NIPPLE 2&quot; X 6&quot; 3&quot; X 6&quot;</td>
</tr>
<tr>
<td>4</td>
<td>BRONZE GATE VALVE WITH BRONZE WHEEL-SCREW ENDS 2&quot; 3&quot;</td>
</tr>
<tr>
<td>5</td>
<td>BRASS NIPPLE AS NEEDED AS NEEDED</td>
</tr>
<tr>
<td>6</td>
<td>BRASS 30° EL 2&quot; 3&quot;</td>
</tr>
<tr>
<td>7</td>
<td>BRASS RISER 2&quot; X VARIABLE TO GRADE MINUS 4&quot; 3&quot; X VARIABLE TO GRADE MINUS 4&quot;</td>
</tr>
<tr>
<td>8</td>
<td>BRASS COUPLING THREAD 2&quot; 3&quot;</td>
</tr>
<tr>
<td>9</td>
<td>BRASS PLUG 2&quot; 3&quot;</td>
</tr>
<tr>
<td>10</td>
<td>STEEL CASING FOR GATE VALVE AND RISER 8&quot; X VARIABLE TO GRADE MINUS 3/4&quot; 6&quot; X VARIABLE TO GRADE MINUS 3/4&quot;</td>
</tr>
<tr>
<td>11</td>
<td>GATE WELL CAP AND CAN SEE SDW-153 5&quot; 8&quot;</td>
</tr>
</tbody>
</table>
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. TAMMERS 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.
HOLD OR CUT BACK COATING ON SPIGOT END

CONC. GROUT PLACED IN FIELD

3'' NORMAL

5/16'' DIA BAR

WELDED BELL AND SPIGOT RING

FORMED BELL AND WELDED SPIGOT RING

NOTE:
SEE SDW-111 FOR FULL DETAILS OF ABOVE JOINTS

CONCRETE GROUT
CONCRETE MORTAR COATING

2'' X 4'' X 12 GA
PLUS LAP FOR DOUBLE WELD

3'' MIN FLAT

SPACER 1 1/2'' OD

2'' X 4'' X 12 GAGE WIRE MESH

GAP 1/16'' TO 1/32''

LAP = 1 1/2''

SINGLE OUTSIDE WELD
LAP = 5 X PLATE T (1 1/2'' MIN 3'' MAX)

CEMENT MORTAR PLACED IN FIELD AND Hand Pointed

NOTE:
ALL WELDS TO CONFORM TO ANSI/AWWA C206 - 91

FIELD WELDED JOINTS
NOTES:
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.
WELDED BELL AND SPIGOT RINGS

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.
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

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.C.E. 65271 DATE

DRAWING NUMBER SDW-114

2" METER, BACKFLOW AND COFFER BOX
<table>
<thead>
<tr>
<th>DESCRIPTIONS</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>192 LBS</td>
</tr>
<tr>
<td>PARKWAY COVER STEEL W'HOLES</td>
<td>2&quot;</td>
<td>182 LBS</td>
</tr>
<tr>
<td>PARKWAY GRADE</td>
<td>2&quot;</td>
<td>182 LBS</td>
</tr>
</tbody>
</table>

**BASE SECTION**

**NOTE:**
1. CONCRETE BASE: 5000 PSI

**36" x 40" METER BOX PARKWAY**

**2" METER, BACKFLOW AND COFFER BOX**
BOX - TOP VIEW

COVER - TOP VIEW

BOX - END VIEW

STEEL ARMOR (GALVANIZED)
SEE SECTION C-C

1 1/2" R

1 1/4"

1/2"

5/16" FLOOR PLATE (FRAME PAINTED)

ANCHOR BOLT
1/2" x 1" HEX (2)
STAINLESS OR BRASS

2" BEAD
WELD
8" APART

STEEL ARMOR (GALVANIZED)

CROSS-SECTION: COVER, BOX & ANCHOR

SECTION B-B OF COVER

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

2" METER, BACKFLOW AND COFFER BOX

SDW-114
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. REMOVE COATING AND CLEAN APPROXIMATELY 2" AREA TO A BRIGHT METAL SURFACE FOR WELDING.
2. THE EXACT TYPE, SIZE AND NUMBER OF BONDING WIRE / STRAP SHALL BE DETERMINED BY PIPE SIZE AND TYPE.
3. WHERE NOT PROTECTED BY CEMENT MORTAR COATING, THERMITE WELD SHALL BE COVERED WITH COLD APPLIED COAL TAR SOLUTION.
2 1/2" x 2 1/2" x 1/4" ANGLE BRACKETS W/ 5/8" DIA HOLES FOR MOUNTING BOLTS (3 PLACES) WELD TO CYLINDER AS SHOWN

1" X 6" ROUND STEEL LIFTING HANDLE 3/16" WELD TO STEEL COVER

3/16" STEEL COVER CONTINUOUS WELD FROM INSIDE TO CYLINDER

1/2" DIA HOLES (16 PLACES) 2 ROWS – 8 HOLES EACH ROW

3 1/8" X 1 1/8" GALVANIZED STEEL HASP (RIVET TO CYLINDER / ACCESS DOOR) (LOCK WILL BE PROVIDED BY CITY)

3/16" STAINLESS STEEL 3/8" X 2 1/2" ANCHOR BOLT & NUT (3 PLACES) (COAT THREADS WITH ANTI-SEIZE COMPOUND)

4" X 4" GALVANIZED STEEL HINGED (2 PLACES) (RIVET TO CYLINDER & ACCESS DOOR)

ITEMS CALL OUT:

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. 3' X 3' X 4" CONCRETE PAD 520-G-2500.

3. D AND H CHANGES ONLY WITH APPROVAL OF THE CITY ENGINEER.

PIECE THROUGH CONCRETE SHALL BE WRAPPED IN 10 MIL POLYETHENE WRAPPING TAPE WITH EACH WRAP OF TAPE TO OVERLAP THE PREVIOUS WRAP BY 1/3 THE WIDTH OF THE TAPE.

AIR AND VACUUM VALVE ENCLOSURE & LOCATION
NOTES:

a.) PROTECTION POSTS SHALL BE INSTALLED AS CALLED FOR ON THE PLANS OR AS DIRECTED BY THE ENGINEER PER WM-04.

b.) 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.
DIAMETER OF TEE SHALL BE EQUAL TO THE DIAMETER OF THE SUPPLY PIPE.

3. 90° FLANGED DUCTILE IRON ELBOW (TYP).

2. FLANGED DUCTILE IRON SPOOL BOTH ENDS SHALL BE FLANGED (UNI-FLANGE SHALL NOT BE USED).

SEE DIMENSIONS AND NOTES ON SHEET 2

DUAL ABOVE GROUND METER WITH CITY BACKFLOW PREVENTER

SDW-119
## PART DESCRIPTION

<table>
<thead>
<tr>
<th>LETTER CODE</th>
<th>PART DESCRIPTION</th>
<th>METER SIZE</th>
<th>3”</th>
<th>4”</th>
<th>6”</th>
<th>8”</th>
<th>10”</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>GATE VALVE</td>
<td></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</td>
<td>PIPE EXTENSION</td>
<td></td>
<td>1’ – 0”</td>
<td>1’ – 0”</td>
<td>1’ – 6”</td>
<td>2’ – 0”</td>
<td>2’ – 6”</td>
</tr>
<tr>
<td>C</td>
<td>STRAINER *</td>
<td></td>
<td>7”</td>
<td>9”</td>
<td>9”</td>
<td>10”</td>
<td>1’ – 0”</td>
</tr>
<tr>
<td>D</td>
<td>TURBINE WATER METER *</td>
<td></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</td>
<td>COMPOUND METER *</td>
<td></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</td>
<td>TESTING TEE</td>
<td></td>
<td>11”</td>
<td>1’ – 1”</td>
<td>1’ – 4”</td>
<td>1’ – 6”</td>
<td>1’ – 10”</td>
</tr>
<tr>
<td>G</td>
<td>90 DEG. ELBOW (SHORT)</td>
<td></td>
<td>5 1/2”</td>
<td>6 1/2”</td>
<td>6”</td>
<td>9”</td>
<td>11”</td>
</tr>
<tr>
<td>H</td>
<td>OVERALL SLAB LENGTH *</td>
<td></td>
<td>11’ – 10”</td>
<td>12’ – 11”</td>
<td>14’ – 9”</td>
<td>16’ – 3”</td>
<td>16’ – 10”</td>
</tr>
<tr>
<td>I</td>
<td>SLAB TO CL. PIPE</td>
<td></td>
<td>3’ – 0”</td>
<td>3’ – 0”</td>
<td>3’ – 0”</td>
<td>3’ – 0”</td>
<td>3’ – 6”</td>
</tr>
<tr>
<td>J</td>
<td>BACKFLOW *</td>
<td></td>
<td>3’ – 2”</td>
<td>3’ – 4”</td>
<td>4’ – 1/2”</td>
<td>4’ – 4 1/2”</td>
<td>4’ – 7 1/2”</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 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 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 12” 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.

---

**DUAL ABOVE GROUND METER WITH CITY BACKFLOW PREVENTER**

**SDW-119**
NOTES:

1. BACKFLOW PREVENTER ASSEMBLY SHALL BE TESTED UPON INSTALLATION BY A CERTIFIED BACKFLOW ASSEMBLY TESTER. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH WRITTEN TEST RESULTS COMPLETED BY A CERTIFIED BACKFLOW TESTER PRIOR TO BACKFLOW PREVENTER ASSEMBLY'S ACCEPTANCE.

2. ALL PIPE BELOW GRADE SHALL BE WRAPPED AS REQUIRED BY THE SPECIFICATIONS.

3. CONCRETE PAD SHALL BE 2" ABOVE GRADE UNLESS INSTALLED IN LAWN AREA WHERE IT WILL BE AT 1" ABOVE GRADE.

4. VALVE SUPPORTS AS REQUIRED BY SPECIFICATIONS.

5. LOCATION SHALL BE APPROVED BY PUBLIC UTILITIES DEPARTMENT, WATER OPERATIONS DIVISION, METER/BACKFLOW GROUP AND SHOWN ON PLANS.

ITEMS CALL OUT:

1. REDUCED PRESSURE PRINCIPLE DETECTION ASSEMBLY SHALL BE INCLUDED IN THE LATEST EDITION OF THE "APPROVED FOR SERVICE ISOLATION CALIFORNIA PUBLIC WATER SYSTEM" ISSUED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES OFFICE OF DRINKING WATER.

2. 90° FLANGED CAST IRON OR DUCTILE IRON ELBOW (TYP).

3. FLANGED DUCTILE IRON SPOOL, BOTH ENDS SHALL BE FLANGED (UNI-FRANGE SHALL NOT BE USED).

4. 90° DUCTILE IRON FLANGED ELBOW.
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 WILL SECTION 200-1.5.

CAUTION
BURRED CATHODIC PROTECTION LINE BELOW
CALL 619-615-3525

DETAIL 1
BURIED TAPE
CITY OF SAN DIEGO - STANDARD DRAWING

JOINT BONDING OF NON-WELDED PIPE JOINTS & FITTINGS

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.

5. ONLY AT THE APPROVAL OF CITY'S CORROSION ENGINEER.

6. REFER TO SDW-116 FOR SCREW PIPE BOND DETAIL

ITEM CALL OUT:

1. BOND CABLE: AWG #6 STRANDED ASTM B8 COPPER ASTM B3 INSULATED ASTM D248 TYPE 1, CLASS C, GRADE 5.

2. STEEL PLATE: 1/8" THICK WELD TO THE PIPE.

WIRE CONNECTION TO FLANGE BOLT SEE NOTE 5.

DETAIL A
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 1/16" 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 DIAMETRICALLY OPPOSITE BOLT HOLES.
   - INSERT INSULATING SLEEVES INTO BOLT HOLES.
   - INSERT THE BOLT WITH BOTH INSULATING WASHERS.
   - TIGHTEN TWO DIAMETRICALLY 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-PART PETROLATUM AWWA C217 OR APPROVED EQUAL.

2. TAPE: WRAPAROUND 3" WIDE 0.050" THICK. CROSS LINKED POLYOLEFIN. HEAT SHRINKABLE, PRECOATED WITH HOT MELT ADHESIVE.

3. WASHER: INSULATING EPOXY GLASS.

4. GASKET: 1/32" 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.
POST-MOUNTED TEST STATION
WIRE TERMINATION DETAIL

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, 0.713" OD, 0.261" ID, 0.062" THICK NATURAL
5. LUG: OFFSET TONGUE SOLDERNESS COPPER
6. WASHER: INSULATING, SHOULDER, NYLON NATURAL, 0.260" OD, 0.025" OD, FLANGE 0.342" OD SHANK, 0.065" FLANGE THK, 0.070" SHANK THK.
7. CABLE: AWG #8 COPPER ASTM B3 STRANDED ASTM B8, INSULATED ASTM D1246 TYPE 1, CLASS C GR. 5.
8. PIPE: 4" DIAMETER SCH 40 ASTM A53, GALVANIZED

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.

WIRE TERMINATION DETAIL SEE SDW-131

POST-MOUNTED TEST STATION
WIRE TERMINATION DETAIL

EXPLODED VIEW OF WIRE TERMINATION

CITY OF SAN DIEGO - STANDARD DRAWING

RECORD OF CHANGES

REVISION  BY  APPROVED  DATE

ORIGINAL  A. OSKOUI  1/03

UPDATED  KA NAGELVOORT  5/12

UPDATED  HM NAGELVOORT  2/16

SDW-124

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
COORDINATOR / R.E. 5623

2/25/16
DETAIL 1
TYPICAL CONNECTIONS OF NO.6 AWG CABLE AND SMALLER CABLES

DETAIL 2
TYPICAL CONNECTIONS OF NO.4 AWG CABLE

DETAIL 3
TYPICAL CONNECTIONS OF NO.2 AWG CABLE AND LARGER CABLES

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 SIZE LARGER THAN 6 AWG SHALL BE THERMOWELDED BY TWISTING CONDUCTORS INTO GROUPS OF 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.
11. IN NON-CONCRETE LINED PIPES, ALL EXOTHERMIC WELDS SHALL BE MADE IN A STEEL PAD.

ITEMS CALL OUT:
1. CABLE: AWG SIZE, ASTM B388
   ASTM D-1248, TYPE 1, CLASS C, 0.05 IN INSULATION
2. SLEEVE: ADAPTER
3. APPROVED PRIMER & WELD CAP OR MORTAR OVER WELD LOCATION

EXOTHERMIC CONNECTION SECTION

<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>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>19</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>2</td>
<td>3-4</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>3</td>
<td>7-6-6</td>
</tr>
</tbody>
</table>
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:

1. CABLE: AWG #8 COPPER ASTM B3 STRANDED ASTM B8 INSULATION ASTM D 1248 TYPE 1, CLASS C, GR. 5.

2. FOOTING: CONCRETE 12" DIA, SSPWC 295-C-17.

3. PIPE: 4" DIAMETER, SCH 40, ASTM A 53 GALVANIZED.


5. CAP: THREADED 4" DIAMETER GALVANIZED.

POST-MOUNTED TEST STATION

CITY OF SAN DIEGO - STANDARD DRAWING

ABOVE GRADE CATHODIC PROTECTION
TEST STATION INSTALLATION
FOR UNDEVELOPED AREAS

RECOMMENDED BY THE CITY OF SAN DIEGO
STANDARDS COMMITTEE

COORDINATOR R.C.E. 86271 DATE 1/31/2012

DRAWING NUMBER SDW-127
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 eng.

3. Use applicable test station drawing for undeveloped areas.

ITEM CALL OUT:

1. Cable AWG #2, copper ASTM B3, stranded ASTM B8, insulate per ASTM D1248, type 1, class C, grade 5.

2. Polyethylene warning tape per SDW-121.

WIRE LABEL DETAIL STATION

CPTS# (CATHODIC PROTECTION TEST STATION NUMBERING)
CPTS#1, 2, 3, ... N

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 23" X 3 7/8".
3. SLEEVE: HEAT SHRINK, ADHESIVE LINED POLYOLEFIN, CLEAR THIN WALL TUBING.
WARNING

BEFORE DIGGING CALL
619-515-3525

DECAL ELEVATION

NOTES:
1. 1" TEXT BOLD
2. 1/4" TEXT BOLD

ITEM CALL OUT:
1. DECAL: APWA BLUE, WITH WHITE REFLECTIVE LETTERS. DECAL MATERIAL SHALL BE UV RESISTANT PREMIUM GRADE CAST VINYL SHEETING WITH AGGRESSIVE ADHESIVE AND UNDER PROTECTIVE LAMINATE.
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 DROP IN READER LID, SEE SDW-136.

4. SEE SDW-137 FOR INSTALLATION PROCEDURE.
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.
SOLID COVER FOR TRAVELED WAY

NOTES:

1. LID SHALL WITHSTAND AASHTO H-20 (ASTM 857).
2. LID SHALL HAVE NON-SKID SURFACE.
DROP IN COVER (OUTSIDE TRAVELLED WAY)

NOTES:

1. LID SHALL WITHSTAND AASHTO H-10 (ASTM C657-85).
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>5</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>

SHOWN ROTATED 90 DEGREES FOR CLARITY

SERVICE CONNECTION

MAIN CONNECTION

DRILL AND TAP TO STD. THREAD

SECTION A-A

ELEVATION
NOTES:
CONTRACTOR SHALL PROVIDE HANDHOLES AS REQUIRED TO COMPLETE THE WORK
WET UTILITY ROOM (WUR)

(SEE NOTE ON SHEET 2)

CITY VALVE

ACCESS DOORS OR GATE WITH KNOX BOX

METER BOX & ASSEMBLY PER SDW-149, 150

WATER SERVICE CONNECTION & ASSEMBLY PER SDW-118

FIRE SERVICE CONNECTION & ASSEMBLY PER SDW-149, 150

CITY MAIN

BUILDING BASEMENT

POLYETHYLENE FOAM TYP

FLOW

12" MIN

24" MAX

FLOW

SDW-141

WET UTILITY ROOM INSTALLATION

BACKFLOW PREVENTERS

ITEM NO. | SIZE AND DESCRIPTION
---|---
1 | CONCRETE THRUST BLOCK SEE SDW-151
2 | 90° DUCTILE IRON FLANGE ELBOW
3 | FLANGED DUCTILE IRON PIPE (PROPERLY SUPPORTED OR RESTRAINED)
4 | 12" FLANGED DUCTILE IRON SPOOL
5 | APPROVED BACKFLOW ASSEMBLY WITH FLEX COUPLER CONNECTORS FOR SEISMIC REQUIREMENTS
6 | APPROVED RPDA
7 | FLANGED OS&Y RWGV WITH HAND WHEEL
8 | BRASS OR COPPER PIPE (PROPERLY SUPPORTED OR RESTRAINED)
9 | UNIONS
10 | APPROVED RP (ALL Y-STRAINERS OR PRV TO BE INSTALLED DOWNSTREAM OF BACKFLOW ASSEMBLY)

City of San Diego - Standard Drawing

Chung
7/21/15

Recommended by the City of San Diego Standards Committee

Coordinator R.C.E. 56003 Date

Drawing Number SDW-141

Item No. Size and Description

Revision By Approved Date

Original BS NAGELVOORT 10/14

Updated BS NAGELVOORT 07/15
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 APPROPRIATE 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 (INSULATING BUSHINGS ARE REQUIRED)
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

LEGEND ON PLANS

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>POLYMER METER BOX WITH LID 17&quot; x 30&quot;, SEE NOTE 2</td>
</tr>
<tr>
<td>2</td>
<td>2&quot; CAM &amp; GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 7</td>
</tr>
<tr>
<td>3</td>
<td>1/4&quot; PRESSURE PET COCK</td>
</tr>
<tr>
<td>4</td>
<td>2&quot; 90° BRONZE MIPT x FIPT ELL</td>
</tr>
<tr>
<td>5</td>
<td>2&quot; OVAL METER FLANGE FLG x FIPT, WITH GASKET</td>
</tr>
<tr>
<td>6</td>
<td>3/8&quot; ROCK 4&quot; TO 6&quot; DEEP</td>
</tr>
<tr>
<td>7</td>
<td>2&quot; BRONZE COMP x FLG ANGLE METER STOP WITH LOCK WING</td>
</tr>
<tr>
<td>8</td>
<td>2&quot; x REQUIRED LENGTH COPPER PIPE TYPE &quot;K&quot; RIGID OR SOFT</td>
</tr>
<tr>
<td>9</td>
<td>30° ELL (NO SWEAT JOINTS ALLOWED)</td>
</tr>
<tr>
<td>10</td>
<td>2&quot; BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)</td>
</tr>
<tr>
<td>11</td>
<td>BRONZE CORPORATION STOP (INSTALL WITH KEY ON SIDE AND OPEN TAP)</td>
</tr>
<tr>
<td>12</td>
<td>SIZE x 2&quot; SERVICE SADDLE</td>
</tr>
<tr>
<td>13</td>
<td>WATER MAIN</td>
</tr>
</tbody>
</table>

CITY OF SAN DIEGO - STANDARD DRAWING

2" BLOW-OFF INSTALLATION

SDW-143
### 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. 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.

### Table

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Size and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Polymer meter box with lid 17&quot; x 30&quot;, see note 2</td>
</tr>
<tr>
<td>2</td>
<td>4&quot; or 6&quot; cam &amp; groove adapter x MPI with locking dust cap, see note 7</td>
</tr>
<tr>
<td>3</td>
<td>9&quot; pressure pet cock</td>
</tr>
<tr>
<td>4</td>
<td>4&quot; or 6&quot; flanged companion x IPT</td>
</tr>
<tr>
<td>5</td>
<td>36&quot; rock 4&quot; to 6&quot; deep</td>
</tr>
<tr>
<td>6</td>
<td>4&quot; or 6&quot; flg di pipe x required length (maximum of 2 spools)</td>
</tr>
<tr>
<td>7</td>
<td>Concrete thrust block see SDW-151</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Size and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>4&quot; or 6&quot; flg x MUPO 90° bend</td>
</tr>
<tr>
<td>9</td>
<td>Use ductile iron or PVC C900</td>
</tr>
<tr>
<td>10</td>
<td>Valve well frame and cover (see SDW-153)</td>
</tr>
<tr>
<td>11</td>
<td>4&quot; or 6&quot; flg x MUFLG RWGV</td>
</tr>
<tr>
<td>12</td>
<td>Water main</td>
</tr>
<tr>
<td>13</td>
<td>Size x 4&quot; or 6&quot; MUFLG x flg tee</td>
</tr>
<tr>
<td>14</td>
<td>4&quot; or 6&quot; flanged 45° bend</td>
</tr>
<tr>
<td>15</td>
<td>4&quot; or 6&quot; flanged 45° bend</td>
</tr>
<tr>
<td>16</td>
<td>4&quot; or 6&quot; x 24&quot; flg di spool</td>
</tr>
</tbody>
</table>
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

ITEM NO | SIZE AND DESCRIPTION | ITEM NO | SIZE AND DESCRIPTION
--- | --- | --- | ---
1 | GATE WELL WITH CAP SEE SDW-153 | 8 | DUCTILE IRON OR C-900 PVC
2 | GALVANIZED IRON PLUG | 9 | 4" OR 5" FLG x MJ / FLG RWGV
3 | GALVANIZED IRON COUPLING, THREADED | 10 | 4" OR 6" x 24" FLG DI SPOOL
4 | 10" STEEL GATE WELL WITH CAP | 11 | WATER MAIN
5 | 4" OR 6" FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOL(S)) | 12 | SIZE x 4" OR 6 MJ / FLG x FLG TEE
6 | CONCRETE THRUST BLOCK SEE SDW-151 | 13 | 4" OR 6" FLANGED 45° BEND, SEE NOTE 4
7 | FLANGE x FLANGE x 90° BEND |
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 (INSULATING BUSHINGS ARE REQUIRED) FOR END OF MAIN DETAIL SEE SDW-106.

<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 BLOCKS SEE SDW-151</td>
<td>8</td>
<td>FLG x MUPO FLG RAWGV</td>
</tr>
<tr>
<td>2</td>
<td>DI END CAP</td>
<td>9</td>
<td>FLG x MUPO ADAPTER (IF REQUIRED)</td>
</tr>
<tr>
<td>3</td>
<td>WATER MAIN</td>
<td>10</td>
<td>C-300 PVC PIPE</td>
</tr>
<tr>
<td>4</td>
<td>BRONZE SERVICE CLAMP (DOUBLE STRAP), SIZE x 2&quot; SERVICE SADDLE</td>
<td>11</td>
<td>FLG x MUPO ECCENTRIC DI REDUCER</td>
</tr>
<tr>
<td>5</td>
<td>2&quot; BRONZE MIPT x COMP CORPORATION STOP</td>
<td>12</td>
<td>MAIN SIZE x BLOW-OFF SIZE FLANGE MANUFACTURED STEEL TANGENTIAL OUTLET</td>
</tr>
<tr>
<td>6</td>
<td>2&quot; x REQ'D LENGTH COPPER PIPE TYPE 'K' RIGID OR SOFT</td>
<td>13</td>
<td>FLG x MUPO BEND (IF REQUIRED)</td>
</tr>
<tr>
<td>7</td>
<td>GATE WELL WITH CAP SEE SDW-153 &amp; SDW-154</td>
<td>14</td>
<td>FLG x MUPO 30° BEND</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOLs)</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 (INSULATING BUSHINGS ARE REQUIRED)
7) TOP TAPS NOT PERMITTED.

LEGEND ON PLANS

<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>2&quot; BRONZE ANGLE METER STOP WITH LOCKWING</td>
</tr>
<tr>
<td>2</td>
<td>2&quot; BRONZE CORPORATION STOP</td>
<td>7</td>
<td>WATER METER FURNISHED AND INSTALLED BY THE CITY</td>
</tr>
<tr>
<td>3</td>
<td>SIZE x 2&quot; BRONZE SERVICE SADDLE DOUBLE STRAP</td>
<td>8</td>
<td>METER BOX WITH LID, #6.35&quot;x 21&quot;</td>
</tr>
<tr>
<td>4</td>
<td>2&quot; x REQUIRED LENGTH COPPER PIPE TYPE &quot;K&quot; SOFT/RIGID</td>
<td></td>
<td>CUSTOMER SHUT-OFF VALVE (LOCKABLE) FURNISH AND INSTALLED</td>
</tr>
<tr>
<td>5</td>
<td>36&quot; ROCK, 4&quot; TO 6&quot; DEEP</td>
<td></td>
<td>BY THE CITY</td>
</tr>
</tbody>
</table>

2" WATER SERVICE INSTALLATION
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 (INSULATING BUSHINGS ARE REQUIRED)
7) BRONZE PIPE SADDLES ARE REQUIRED FOR ALL TAPS INTO POLYVINYL CHLORIDE (PVC) WATER MAIN, TOP TAPS ARE NOT PERMITTED.
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.
### Valve Support Block

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Dimension &quot;A&quot;</th>
<th>Dimension &quot;B&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>12&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>12&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>13&quot;</td>
<td>14&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>14&quot;</td>
<td>16&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>15&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

Dimension "C" = Trench Width

Plus two times the pipe diameter

### Thrust and Anchor Blocks

#### Minimum Bearing Area in Square Foot

<table>
<thead>
<tr>
<th>Main Size</th>
<th>Tees</th>
<th>90° Bend</th>
<th>45° Bend</th>
<th>22.5° Bend</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>6&quot;</td>
<td>6</td>
<td>10</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>8&quot;</td>
<td>12</td>
<td>16</td>
<td>9</td>
<td>4.5</td>
</tr>
<tr>
<td>10&quot;</td>
<td>17</td>
<td>24</td>
<td>13</td>
<td>6.5</td>
</tr>
<tr>
<td>12&quot;</td>
<td>24</td>
<td>33</td>
<td>19</td>
<td>9.5</td>
</tr>
</tbody>
</table>

### 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) BFVs 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

COLOR  GATE WELL AND LIDS USED FOR:

RED  NORMALLY CLOSED SYSTEM
      VALVES (NCV)

WHITE  RESILIENT WEDGE GATE VALVES

YELLOW  BUTTERFLY VALVES

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 W/RED DOT</td>
<td>WHITE W/RED 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.
### 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. BFVs 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. For 6" C-300 pipe casing, install cast iron riser valve well frame.
7. Cast iron riser ring height to match overlay thickness no more than two 12" rings are used.

### Gate Well Cap & Can Installation for Valves 4" and Larger

<table>
<thead>
<tr>
<th>Item No</th>
<th>Size and Description</th>
</tr>
</thead>
<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>5&quot; OD x 16&quot; Steel Casing x Required Length (optional 8&quot; C 900 x 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>
</tbody>
</table>

---

**Legend on Plans**

- **BFV Typical**
- **See Note 3 & 4**
- **Water Main**
- **Street C**
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 X₁ AND X₂.

<table>
<thead>
<tr>
<th>MAIN SIZE</th>
<th>BYPASS SIZE</th>
</tr>
</thead>
<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>
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.

<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 16&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>LEGEND ON PLANS</td>
</tr>
<tr>
<td>7</td>
<td>3&quot; LONG NIPPLE SEE NOTE 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTES:

18" 10 MAX SEE NOTES 5, 9

6" MIN (TYP) 12 MIN 24 MAX

FLOW

METER BOX

PRIVATELY MAINTAINED

150 PSI.

INSTAL L A PRESSURE REDUCING V ALVE UP STREAM OF THE FIRST 90 DEGREE ELL WHEN SYST EM PRESSURE EXCEEDS 18", REQUIRES APPROVAL.

ENCLOSURE IS REQUIRED.

ENCLOSURE SHALL BE INSTAL L ED LEVEL AND EDGE OF 18" MAX

CITY MAINTAINED

PRIVATELY MAINTAINED

CONCRETE THRUST BLOCK PER SDW-151

90 DEGREE BRASS ELL SEE NOTES 4 & 6

CONCRETE SLAB, MINIMUM 4" THICK X 16" WIDE

BRASS OR COPPER PIPE SEE NOTE 4

3" LONG NIPPLE SEE NOTE 4

PUBLIC UTILITIES DEPARTMENT, CROSS CONNECTION CONTROL UNIT MUST APPROVE LOCATION. SHOW ON PLANS.

ALL RISER ELBOWS AND UNDERGROUND PIPING SHALL BE TYPE (L) OR (M) COPPER, OR RED BRASS.

<table>
<thead>
<tr>
<th>REVISION</th>
<th>APPROVED</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORIGINAL</td>
<td>KA</td>
<td>05/12</td>
</tr>
<tr>
<td>UPDATED</td>
<td>KA</td>
<td>12/12</td>
</tr>
<tr>
<td>UPDATED</td>
<td>FG</td>
<td>08/15</td>
</tr>
<tr>
<td>UPDATED</td>
<td>FG</td>
<td>02/16</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.

LEGEND ON PLANS

SDW-156
NOT TO SCALE

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>LTR. CODE</th>
<th>PART DESCRIPTION</th>
<th>METER SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>GATE VALVE</td>
<td>3&quot; 4&quot; 6&quot; 8&quot; 10&quot;</td>
</tr>
<tr>
<td>B</td>
<td>PIPE EXTENSION</td>
<td>1'-0&quot; 1'-0&quot; 1'-0&quot; 1'-0&quot; 1'-0&quot;</td>
</tr>
<tr>
<td>C</td>
<td>STRAINER *</td>
<td>7&quot; 9&quot; 9&quot; 10&quot; 1'-0&quot;</td>
</tr>
<tr>
<td>D</td>
<td>TURBINE WATER METER *</td>
<td>1'-0&quot; 1'-2&quot; 1'-6&quot; 1'-9&quot; 2'-2&quot;</td>
</tr>
<tr>
<td>E</td>
<td>COMPOUND METER *</td>
<td>1'-5&quot; 2'-0&quot; 2'-5&quot; 3'-1&quot; 4'-7&quot;</td>
</tr>
<tr>
<td>F</td>
<td>TESTING TEE</td>
<td>11&quot; 1'-1&quot; 1'-4&quot; 1'-6&quot; 1'-10&quot;</td>
</tr>
<tr>
<td>G</td>
<td>90 DEG. ELBOW (SHORT)</td>
<td>5 1/2&quot; 6 1/2&quot; 8&quot; 9&quot; 11&quot;</td>
</tr>
<tr>
<td>H</td>
<td>OVERALL SLAB LENGTH *</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>SLAB TO C/L PIPE</td>
<td>3'-0&quot; 3'-0&quot; 3'-0&quot; 3'-0&quot; 3'-0&quot;</td>
</tr>
</tbody>
</table>

* NOTES:
INDIVIDUAL DIMENSIONS MAY VARY PER MANUFACTURER OVERALL DIMENSIONS INCREASE WITH USE OF THESE COMPONENTS

DIMENSION CHART FOR METER ASSEMBLIES
## LEGEND ON PLANS

- **2"**

# 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 (INSULATING BUSHINGS ARE REQUIRED)
7. CAM & GROOVE ADAPTER SHALL BE DRILLED AND TAPPED AS REQUIRED FOR THE PRESSURE RELEASE PET COCK

### 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 | 2" 90° BRONZE COMPRESSION ELL
10 | 2" BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)
11 | 2" 36" BRONZE FIPT x COMP ELL
12 | 2" BRONZE MIPT x MIPT CORPORATION STOP
13 | SIZE x 2" SERVICE SADDLE
14 | WATER MAIN

**REVISION**

<table>
<thead>
<tr>
<th>REVISION BY</th>
<th>APPROVED</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORIGINAL* KA NAGELVOORT</td>
<td>01/12</td>
<td></td>
</tr>
<tr>
<td>UPDATED AR NAGELVOORT</td>
<td>10/15</td>
<td></td>
</tr>
<tr>
<td>UPDATED KM NAGELVOORT</td>
<td>02/16</td>
<td></td>
</tr>
</tbody>
</table>

**CITY OF SAN DIEGO - STANDARD DRAWING**

**2" MANUAL AIR VALVE**

**DRAWING NUMBER**

SDW-158
NOTES:
1. No dips or low spots will be allowed in installation.
2. Locate enclosure per SDW-117.
3. Install warning/identification tape per SDM-105.
4. Air & vacuum 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 (insulating bushings are required).

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>SIZE AND DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>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</td>
</tr>
<tr>
<td>3</td>
<td>2&quot; MIPT X COMPRESSION ADAPTER</td>
</tr>
<tr>
<td>4</td>
<td>2&quot; AUTOMATIC COMBINATION AIR RELEASE &amp; AIR/VACUUM VALVE</td>
</tr>
<tr>
<td>5</td>
<td>12&quot; X 3&quot; STAINLESS STEEL DROP-IN ANCHORS (3 EA @120 APART)</td>
</tr>
<tr>
<td>6</td>
<td>8&quot; X 3/8&quot; STEEL GATE CASING WELL WITH CAP</td>
</tr>
<tr>
<td>7</td>
<td>COLD JOINT STRIP</td>
</tr>
<tr>
<td>8</td>
<td>3&quot;-4&quot; X 2-6&quot; X 6&quot; THICK CONCRETE SLAB</td>
</tr>
<tr>
<td>9</td>
<td>2&quot; X 12&quot; BLACK FOAM SLEEVE</td>
</tr>
<tr>
<td>10</td>
<td>COPPER TUBING</td>
</tr>
<tr>
<td>11</td>
<td>90° ELL (NO SWEAT, NO GLUED JOINTS ALLOWED)</td>
</tr>
<tr>
<td>12</td>
<td>2&quot; BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)</td>
</tr>
<tr>
<td>13</td>
<td>2&quot; COMP BALL BALVE W/TEE HEAD</td>
</tr>
<tr>
<td>14</td>
<td>2&quot; 90° BRONZE FIPT X COMP ELL</td>
</tr>
<tr>
<td>15</td>
<td>2&quot; BRONZE MIPT X MIPT ELL</td>
</tr>
<tr>
<td>16</td>
<td>SIZE X 2&quot; SERVICE SADDLE</td>
</tr>
<tr>
<td>17</td>
<td>WATER MAIN</td>
</tr>
<tr>
<td>18</td>
<td>VALVE STEM EXTENSION</td>
</tr>
</tbody>
</table>

2" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE INSTALLATIONS

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.C.E. 56533

DATE: 2/25/16

DRAWING NUMBER: SDW-159

REVISION BY APPROVED DATE

ORIGINAL KA J. NAGELVOORT 09/12

UPDATED KA J. NAGELVOORT 09/13

UPDATED EB J. NAGELVOORT 09/14

UPDATED AH J. NAGELVOORT 10/16

UPDATED HM J. NAGELVOORT 03/18
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

<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>4&quot; OR 6&quot; AUTOMATIC COMBINATION AIR RELEASE &amp; AIR/VACUUM VALVE ASSEMBLY</td>
<td>10</td>
<td>4&quot; OR 6&quot; C-300 PVC PIPE</td>
</tr>
<tr>
<td>2</td>
<td>BREAK-AWAY BOLTS, SEE NOTE 4</td>
<td>11</td>
<td>GATE WELL WITH CAP PER SDW-103</td>
</tr>
<tr>
<td>3</td>
<td>4&quot; OR 6&quot; FLANGED 6-BOLT DUCTILE IRON PIPE X REG'd LENGTH (MAX OF 2 SPOOLS)</td>
<td>12</td>
<td>4&quot; OR 6&quot; FLG X MJ/FLG RGV</td>
</tr>
<tr>
<td>4</td>
<td>5/8&quot; X 3&quot; STAINLESS STEEL DROP-IN ANCHORS (3 EA @ 120° APART)</td>
<td>13</td>
<td>4&quot; OR 6&quot; FLANGE 30° BEND</td>
</tr>
<tr>
<td>5</td>
<td>VALVE ENCLOSURE</td>
<td>14</td>
<td>SIZE X 4&quot; OR 6&quot; MJ/FLG X FLG TEE</td>
</tr>
<tr>
<td>6</td>
<td>42&quot; X 42&quot; X 6&quot; THICK CONCRETE SLAB</td>
<td>15</td>
<td>WATER MAIN</td>
</tr>
<tr>
<td>7</td>
<td>COLD JOINT STRIP</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>CONCRETE THRUST/ANCHOR BLOCK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>4&quot; OR 6&quot; FLG X MJ/PO 30° BEND</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LEGEND ON PLANS

RECOMMENDED BY THE CITY OF SAN DIEGO
STANDARDS COMMITTEE

CITY OF SAN DIEGO - STANDARD DRAWING

4" & 6" AUTOMATIC COMBINATION
AIR RELEASE & AIR/VACUUM VALVE INSTALLATIONS

4/25/16

ORIGINAL: J. NAGELVOORT
REVISION BY APPROVED DATE
ORIGINAL: J. NAGELVOORT 01/12
UPDATED: J. NAGELVOORT 02/16
UPDATED: J. NAGELVOORT 02/16

SDW-160
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.

LEGEND ON PLANS

CITY OF SAN DIEGO - STANDARD DRAWING

PIECE SUPPORT FOR UNDERCUT SEWER MAINS OR SEWER LATERALS

DRAWING NUMBER SDW-161

COORDINATOR R.C.E. 56523 DATE 2/25/16

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
NOTES:
1) SLURRY SHALL BE CONTROLLED LOW STRENGTH MATERIAL C.S.M (100-E-100)
2) SLURRY SHALL BE PLACED ON FIRMLY COMPACTED BACKFILL.
1. EXISTING 2-PORT FIRE HYDRANT
2. 2" 1/2' PORT TO 2" ADAPTER ELBOW WITH/THREADED FITTING
3. 2" PIPE (GROOVED)
4. 2" 90° ELBOW WITH/THREADED JOINT FITTINGS
5. 2" BACKFLOW PREVENTER (ONE WAY CHECK VALVE) WITH/THREADED JOINT FITTINGS
6. SNAP-JOINT COUPLING (2-GROOVE)
7. 2" 90° ELBOW W/ SNAP-JOINT COUPLING(S) (2-GROOVE) w/DIRECTIONAL SHUT OFF VALVE(S) (NOT SHOWN)
8. EXISTING CURB & GUTTER
9. EXISTING ROADWAY
10. EXISTING CONCRETE PAVEMENT/SIDEBULK
The drawing represents a fire hydrant highlining connection project with the following components:

1. **Existing 3-Port Fire Hydrant**
2. **Port Adapter Elbow with Threaded Joint Fitting**
3. **Pipe (Grooved)**
4. **80' Elbow with Threaded Joint Fittings**
5. **4" Backflow Preventer with Threaded Joint Fittings**
6. **4" Shutoff Valve with 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**

**City of San Diego - Standard Drawing**

**4" Fire Hydrant Highlining Connection**

**Drawing Number**: SDW-171

**Recommended by the City of San Diego Standards Committee**

**Coordinator**: R.C.E. 65271

**Date**: 1/31/2012
GROOVED 2"x2"x 1" TEE W/SNAP-JOINT COUPLING (2-GROOVE)

1" 90' ELBOW W/THREADED JOINT FITTINGS

1" SHUTOFF VALVE W/THREADED JOINT FITTINGS

1" PIPE TO HOSE ADAPTER

1" CONNECTION HOSE

1" 90' ELBOW TO METER THREADS (ADAPTERS MAY BE REQUIRED)

EXISTING WATER METER

EXISTING WATER METER BOX

EXISTING SERVICE CONNECTION FROM WATER MAIN

EXISTING ROADWAY

EXISTING CURB & GUTTER

RESIDENTIAL USER HIGHLINING CONNECTION

CITY OF SAN DIEGO - STANDARD DRAWING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR: R.C.E. 65271

DATE: 1/31/2012

DRAWING NUMBER: SDW-172
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 CROSSING MAY BE ROUTED ABOVE GROUND AND COVERED WITH ADA COMPLIANT CABLE COVER AND RAMP.
NOTES:
1. THE SLOPE OF THE TEMPORARY ASPHALT OVER CURB RAMPS 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 RAMPS, 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.

REVISION BY APPROVED DATE
ORIGINAL JBP NAGELDOORN 02/18

CITY OF SAN DIEGO - STANDARD DRAWING

HIGHLINING CROSSING & RUN AT CURB RAMPS

SDW-174
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

<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>POLYMER METER BOX WITH LID 17&quot; x 30&quot;</td>
<td>6</td>
<td>2&quot; 90° BRONZE IRON PIPE THREAD BY COMPRESSION ELL</td>
</tr>
<tr>
<td>2</td>
<td>2&quot; CAM &amp; GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 5</td>
<td>7</td>
<td>2&quot; CLOSE NIPPLE IPT</td>
</tr>
<tr>
<td>3</td>
<td>1/4&quot; PRESSURE PET COCK</td>
<td>8</td>
<td>2&quot; COMPRESSION x FIPT BALL VALVE WITH HANDLE</td>
</tr>
<tr>
<td>4</td>
<td>2&quot; x REQUIRED LENGTH COPPER PIPE TYPE &quot;K&quot; RIGID OR SOFT</td>
<td>9</td>
<td>3/8&quot; ROCK 6&quot; DEEP</td>
</tr>
<tr>
<td>5</td>
<td>CONCRETE THRUST BLOCK SEE WT-01</td>
<td>10</td>
<td>DI END CAP WITH 2.5&quot; FIPT OUTLET</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11</td>
<td>WATER MAIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>NYLON DIELECTRIC BUSHING (2.5&quot; x 2&quot;)</td>
</tr>
</tbody>
</table>

SAN DIEGO REGIONAL STANDARD DRAWING

TEMPORARY 2" BLOW-OFF INSTALLATION

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-LINK SEGMENT TO POST AND 3-LINK 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
SLOPE PROTECTION INSTALLATIONS

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 ENGINEER'S DISCRETION

LEGEND ON PLANS

SAN DIEGO REGIONAL STANDARD DRAWING

DRAWING NUMBER WP-05
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

SAN DIEGO REGIONAL STANDARD DRAWING

CUT-OFF WALL INSTALLATION IN TRAVELED AREAS

LEGEND ON PLANS

Revision | By | Approved | Date
--- | --- | --- | ---
ORIGINAL | J. Tomasulo | 10/04
Delete Metric | B. KNOLL | 05/11

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Chairperson R.C.E. 19246 Date

DRAWING NUMBER WP-07
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
JOINT RESTRAINT REQUIRED TO THE MAIN LINE SEE NOTE 5

PLAN VIEW

JOINT RESTRAINT REQUIRED TO THE RP DEVICE SEE NOTE 5

SECTION

FROM THE MAIN LINE SEE NOTE 5

TO THE RP DEVICE AS REQUIRED SEE NOTE 5

FOR MATERIAL DESCRIPTIONS AND NOTES SEE WS-04 (2 OF 2)

SAN DIEGO REGIONAL STANDARD DRAWING

4" OR 6" FIRELINE/MASTER METER INSTALLATION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

DRAWING NUMBER WS-04 (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>
</tr>
</thead>
<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>
</tr>
<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></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>LINE SIZE x 6&quot; LONG FLG x PE DUCTILE-IRON SPOOL</td>
<td>15</td>
<td>8&quot; GATE WELL, SEE WV-01 &amp; WV-02</td>
</tr>
<tr>
<td>7</td>
<td>2&quot; COMPRESSION, LOCKABLE BALL VALVE</td>
<td>16</td>
<td>HINGED VAULT ACCESS DOOR</td>
</tr>
<tr>
<td>8</td>
<td>4&quot; OR 6&quot; FLEXIBLE COUPLING</td>
<td>17</td>
<td>ADJUSTABLE PIPE SUPPORT (TYPICAL)</td>
</tr>
<tr>
<td>9</td>
<td>LINE SIZE x 30&quot; LONG FLG x PE DUCTILE-IRON SPOOL</td>
<td>18</td>
<td>6&quot; CLASS &quot;B&quot; CONCRETE FLOOR WITH #3 BARS @ 12&quot; C.C.</td>
</tr>
<tr>
<td>10</td>
<td>4&quot; OR 6&quot; FIRELINE METER SEE NOTE 6</td>
<td>19</td>
<td>6&quot; DG BASE COMPACTED TO 90%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>12&quot; DIAMETER x 12&quot; DEEP, 3&quot; GRAVEL SUMP, SEE NOTE 8</td>
</tr>
</tbody>
</table>

FOR DRAWINGS WV-01 AND WV-02 USE DRAWING SDW-153.
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

SAN DIEGO REGIONAL STANDARD DRAWING

STEEL VALVE STEM EXTENSION FOR VALVES 2" AND SMALLER

DRAWING NUMBER WV-05
Please adjust this spine guide marks to the final determined number of pages.

STANDARD DRAWINGS

For Public Works Construction
2016 Edition

Public Works Department
PROJECT IMPLEMENTATION DIVISION
STANDARDS & CONTRACT
DOCUMENTS SECTION
525 B STREET STE. 750
SAN DIEGO, CA 92101
DOCUMENT NUMBER: PWPI070116-03