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CITY OF SAN DIEGO
PUBLIC WORKS
DEPARTMENT

Standard Drawings for Public Works Construction

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INTRODUCTION

This volume combines some of the San Diego Area Regional Standard Drawings, as developed by the San Diego Regional Standards Committee, with those additional standard drawings which are unique to public work construction in the City of San Diego. The additional drawings can easily be distinguished by their drawing numbers which contain the letters "SD" and are numbered beginning with 100. Drawings marked with (*) in the revision column are regional drawings that have been modified to City standards.

These drawings shall be used in conjunction with the latest edition of the Standard Specifications for Public work Construction (i.e., "The GREENBOOK") and the accompanying City Supplement included in the City's Standard Specifications for Public Works Construction (i.e., "The WHITEBOOK").

The City of San Diego Standard Drawings is usually published every 3 years. However, updates approved for use are posted on the City Website as they become available.

Materials shown on these drawings shall be as specified in the Specifications or the City of San Diego Approved Materials List (AML). If not, a prior approval by the Engineer is required.

These drawings are not to scale and may have not been checked for conformance with the latest California Building Code (CBC) and other safety and environmental statutes. Therefore, they must be used with care and judgment.

COMMENTS

The City of San Diego is committed to the quality of this publication and desires to correct any errors, omissions or ambiguities. If you have any comments e.g., corrections or additions you would like to submit for consideration to be included in the next publication, you are encouraged to submit them to:

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Engineering & Capital Projects Department
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San Diego, CA 92101
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specifications@sandiego.gov

ABBREVIATIONS AND SYMBOLS

The abbreviations herein, together with others in general use, are applicable to these Standard Drawings.

Abbreviation Word or Words

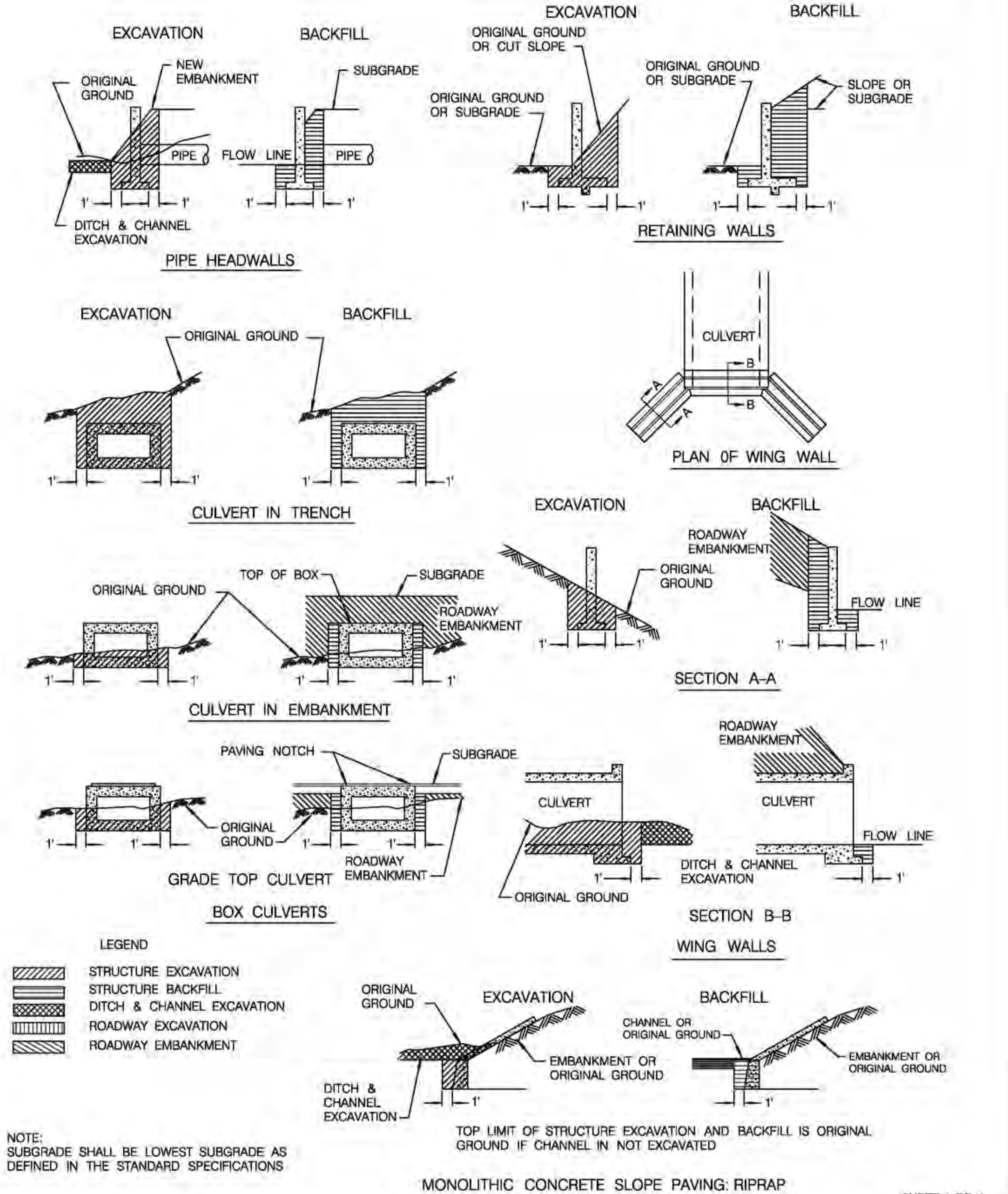
ABS	Acrylonitrile - butadiene - styrene
AC	Asphalt Concrete
ACI	American Concrete Institute
ACP	Asbestos cement pipe
ADA	Americans with Disabilities Act
ADAS	Americans with Disabilities Act Standards
AGG	Aggregates
ANSI	American National Standards Institute
ASCE	American Society of Civil engineers
ASTM	American Society for Testing and Materials
AWWA	American Water Work Association
CAL/OSHA	California Occupational
CalTrans	California Department of Transportation
CATV	Cable/TV
CC	Calcium Chloride
C/C	Center to center
CF	Cubic foot
CFS	Cubic foot per second
CL	Center line
CL R	Clear
CLSM	Controlled low strength material
CONC	Concrete
CONST	Construct, Construction
CSP	Corrugated steel pipe
CTB	Cement treated base
CV	Check valve
CY	Cubic yard
D	Diameter or Load of pipe
DIA	Diameter
DWG	Drawing
EA.	Each
ELEV	Elevation
EX	Existing
EXP	Expansion
F	Fahrenheit or Flange
FG	Finished grade
FL	Flow line
GA	Gauge
GALV	Galvanized
GFI	Ground Fault Interrupter
H	High or height
HEX	Hexagonal
HORIZ	Horizontal
HPS	High pressure sodium (Light)
HT	Height
ID	Inside diameter or Identification
JT	Joint
LAP	Overlap
LOL	Layout line
MAX	Maximum
MJ	Mechanical Joint
MIN	Minimum
MVL	Mercury vapor light
OC	On center
OD	Outside diameter
PC	Point of curvature
PCC	Portland cement concrete
PCC	Point of compound curvature
PCF	Pounds per cubic foot
PCR	Point of curb return
PL	Property line or Place
PO	Push on
PSF	Pound per square foot
PUD	Public Utilities Department
PVC	Polyvinyl chloride
R	Radius
R/W	Right-of-way, Recycled water
REINF	Reinforced or reinforcement
RPDA	Reduced pressure detector assembly
RWGV	Resilient wedge gate valve
RW	Recycled water
S	Slope or second
SCRW	Steel cylinder rod wrapped
SD	Storm drain
SE	Sand Equivalent
SI	International System of Units (Metric)
Sqft	Square foot
STD	Standard
STR	Straight
TOT	Total
TYP	Typical
VERT	Vertical
W	Water, Wider or width
W/	With
WWF	Welded wire fabric

Symbols

@	At
%	Percent
‘	Feet or minutes
“	Inches or seconds
^{1}	Number
/	Per or (between words)
°	Degree
∅	Diameter
PL	Property line
CL	Centerline

CHAPTER 1

CONCRETE STRUCTURES



REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	6-3-83
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

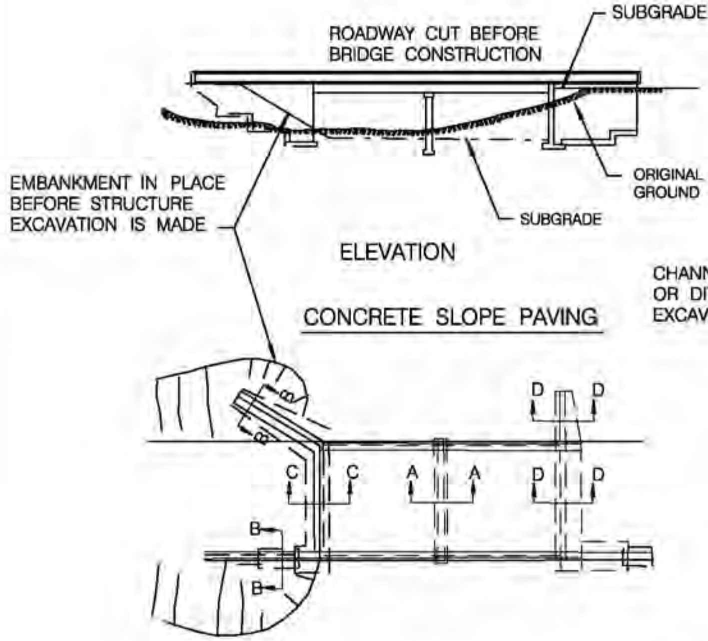
STRUCTURE EXCAVATION & BACKFILL

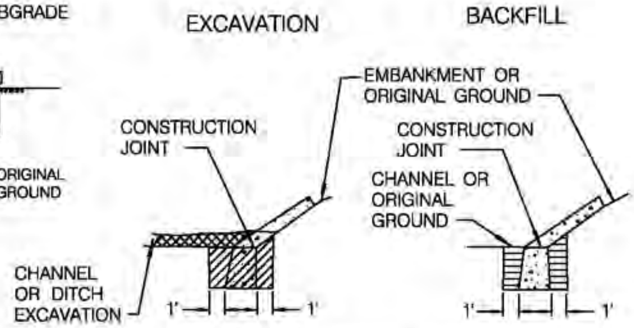
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

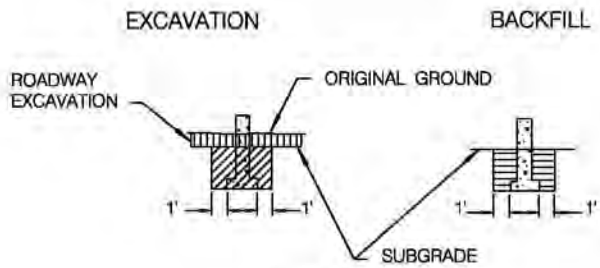
DRAWING NUMBER **SDC-103**





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

CONCRETE SLOPE PAVING



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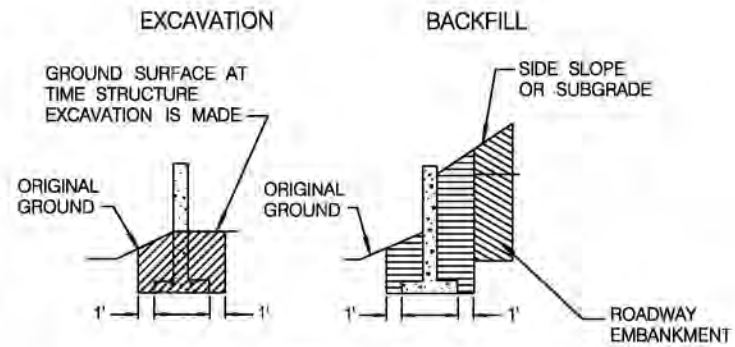

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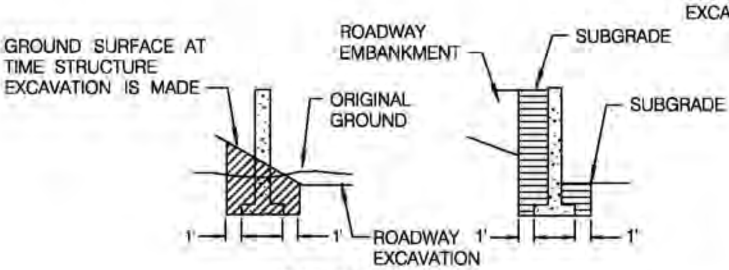

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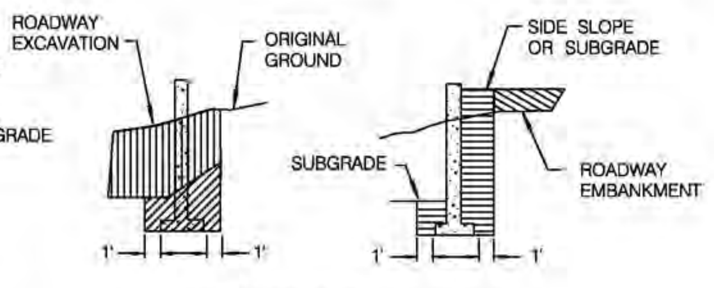


SECTION D–D

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

REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	6-3-83
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

STRUCTURE EXCAVATION & BACKFILL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **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)

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

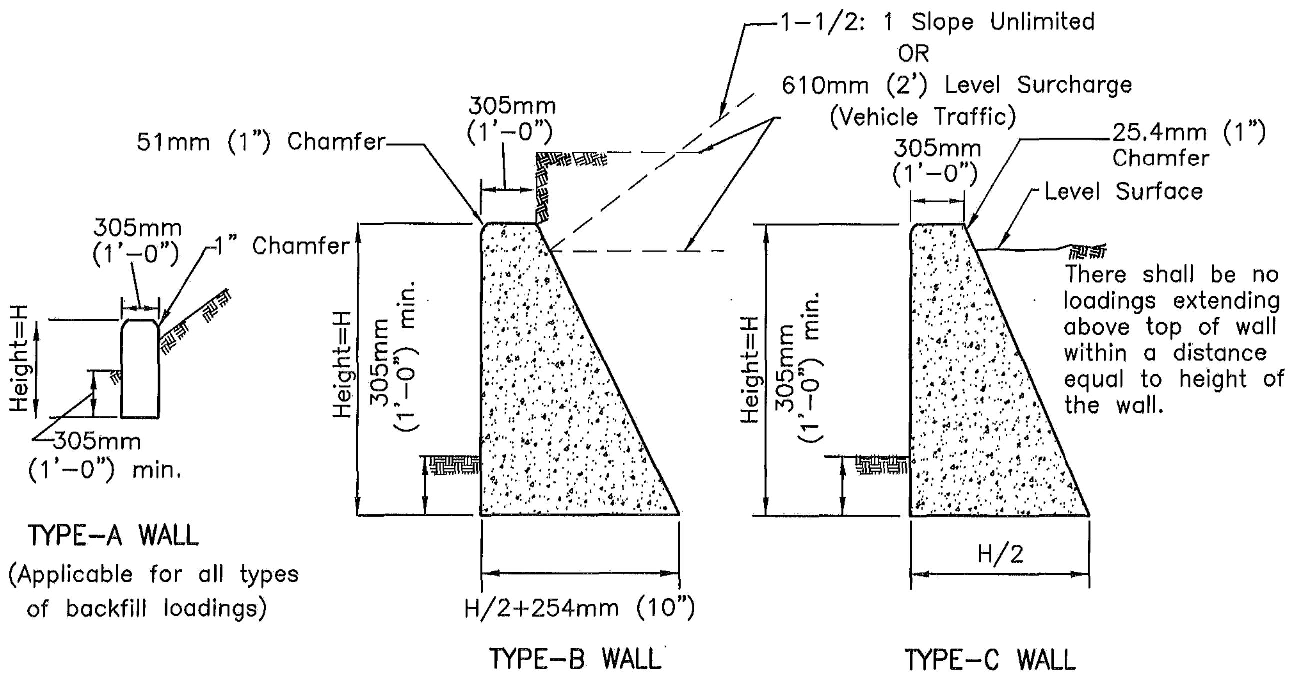
MASONRY WALL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hasle — 1/31/2012

COORDINATOR R.C.E. 65271 DATE

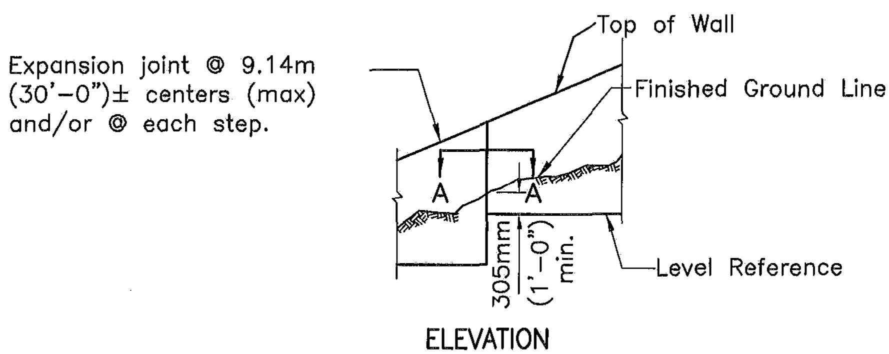
DRAWING NUMBER **SDC-105**



TYPE-A WALL
(Applicable for all types of backfill loadings)

TYPE-B WALL

TYPE-C WALL



ELEVATION

WALL TYPE	HEIGHT	BASE	CONCRETE CU M - CF/FT
A	457mm (1'-6")	305mm (1'-0")	.042 cu m (1.50 cu ft.)
	610mm (2'-0")	305mm (1'-0")	.057 cu m (2.00 cu ft.)
B	914mm (3'-0")	711mm (2'-4")	1.41 cu m (4.99 cu ft.)
	1.22m (4'-0")	864mm (2'-10")	.217 cu m (7.66 cu ft.)
	1.52m (5'-0")	1.02m (3'-4")	.306 cu m (10.82 cu ft.)
	1.83m (6'-0")	1.17m (3'-10")	.410 cu m (14.49 cu ft.)
C	914mm (3'-0")	457mm (1'-6")	.106 cu m (3.75 cu ft.)
	1.22m (4'-0")	610mm (2'-0")	.170 cu m (6.00 cu ft.)
	1.52m (5'-0")	762mm (2'-6")	.248 cu m (8.75 cu ft.)
	1.83m (6'-0")	914mm (3'-0")	.340 cu m (12.00 cu ft.)

NOTE:
See Standard Drawings C-10 for Section A-A, notes and details.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

GRAVITY RETAINING WALLS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER C-9

CONCRETE

Concrete shall be 332 kg/M^3–C–22Mpa (560–C–3250)

DESIGN CONDITIONS

Walls are to be used for the loading conditions shown for each type wall. Design H may be xceeded by six inches before going to next size.

DESIGN DATA

Fc = 8.3 Mpa (1200 psi)
F'c = 20.7 Mpa (3000 psi)
Earth = 1922 kg/cu m (120 pcf)
and equivalent fluid pressure = 176 kg/sq m (36 psf) per 305mm (foot) of height

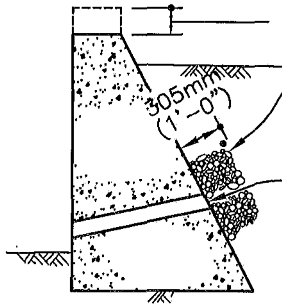
Walls shown for 1–1/2:1 unlimited sloping sucharge are designed in accordance with Rankine's Formula for unlimited sloping surcharge with ø = 33° 13m (42').
Note: Maximum toe pressure under wall footing = 143.6 Kpa (1–1/2 tons/sq. ft.). Special design required where footing material is incapable of supporting 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 17 Mpa (2,500 psi) in compression as determined by test cylinders, or until 28 days after wall has been placed.



Top extension if specified

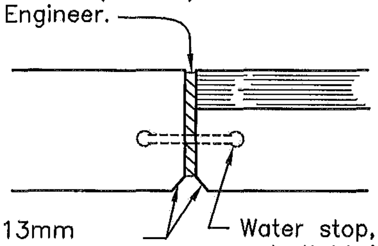
Filler Material: 25.4mm (1") max. crushed aggregate .113 cu m (4 cu. ft.) min at each drain.

102mm (4") dia. drains with 6.35mm (1/4") galv. wire mesh screen, 203mm (8") above outside ground surface, slope 13mm (1/2") per ft. Locate drains @ 4.6m (15'–0") center to center or as directed by the Engineer.

TYPICAL DRAINAGE

WHEN H IS GREATER THAN 1.22m (4'–0")

13mm (1/2") Expansion joint, fill with premolded expansion joint filler. Locate joints at approx. 9.14m (30'–0") centers or as directed by the Engineer.

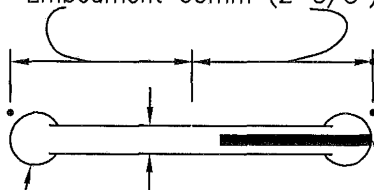


13mm (1/2") chamfer

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

SECTION A–A

Embedment 60mm (2–3/8") min.



9.53mm (3/8") dia.

9.53mm (3/8")

Split permitted

RUBBER WATERSTOP

Use only when watertight joint is required.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

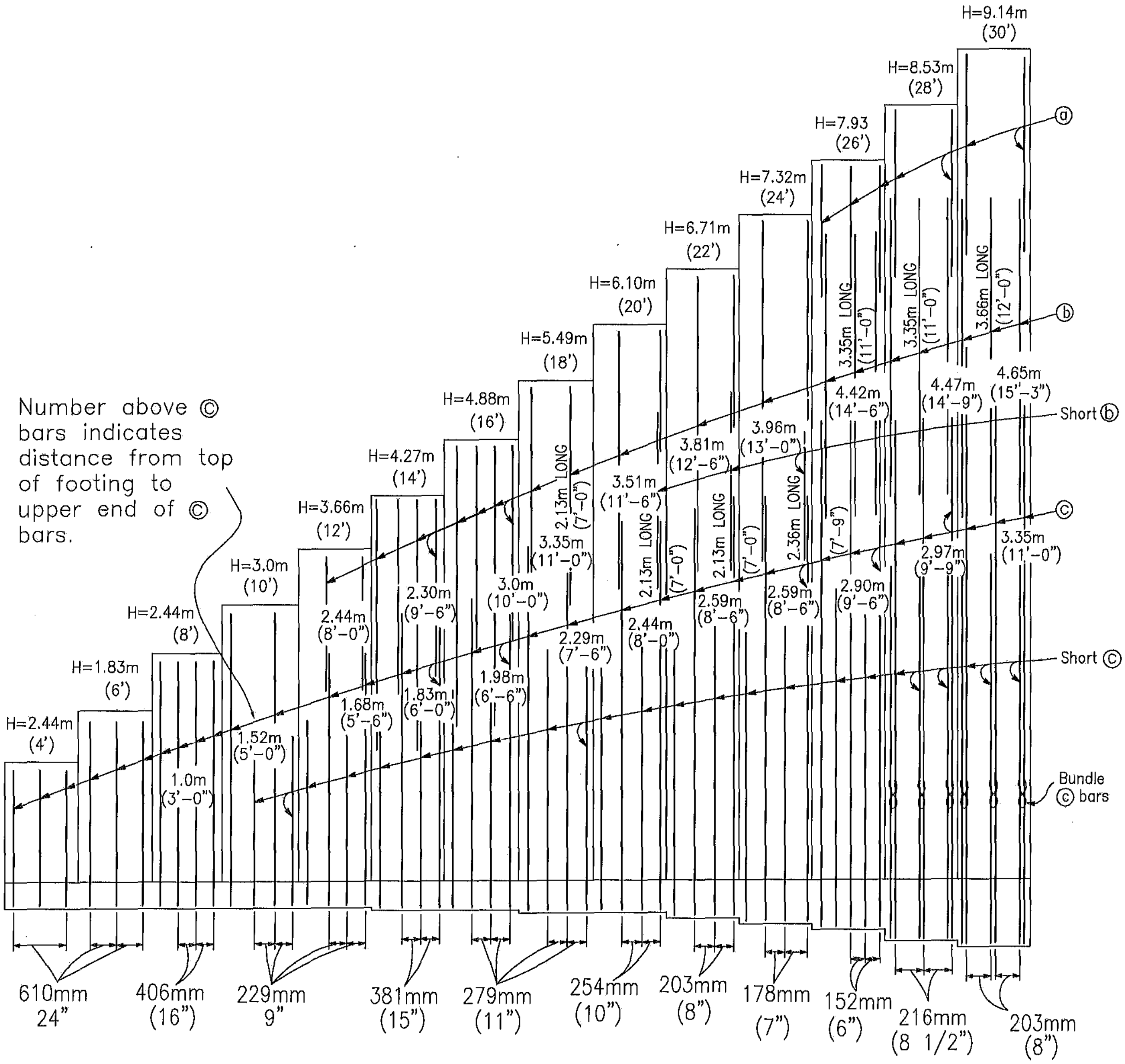
SAN DIEGO REGIONAL STANDARD DRAWING

GENERAL NOTES AND DETAILS FOR GRAVITY RETAINING WALLS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[signature] 3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER C–10



ELEVATION

NOTES:
1. For SPREAD FOOTING SECTION see C-11B
2. For TYPICAL LAYOUT EXAMPLE see C-11C
3. For 45T PILE FOOTING SECTION see C-11C
4. For TABLE OF REINFORCING STEEL DIMENSIONS AND DATA see C-11D

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE RETAINING WALL
TYPE 1

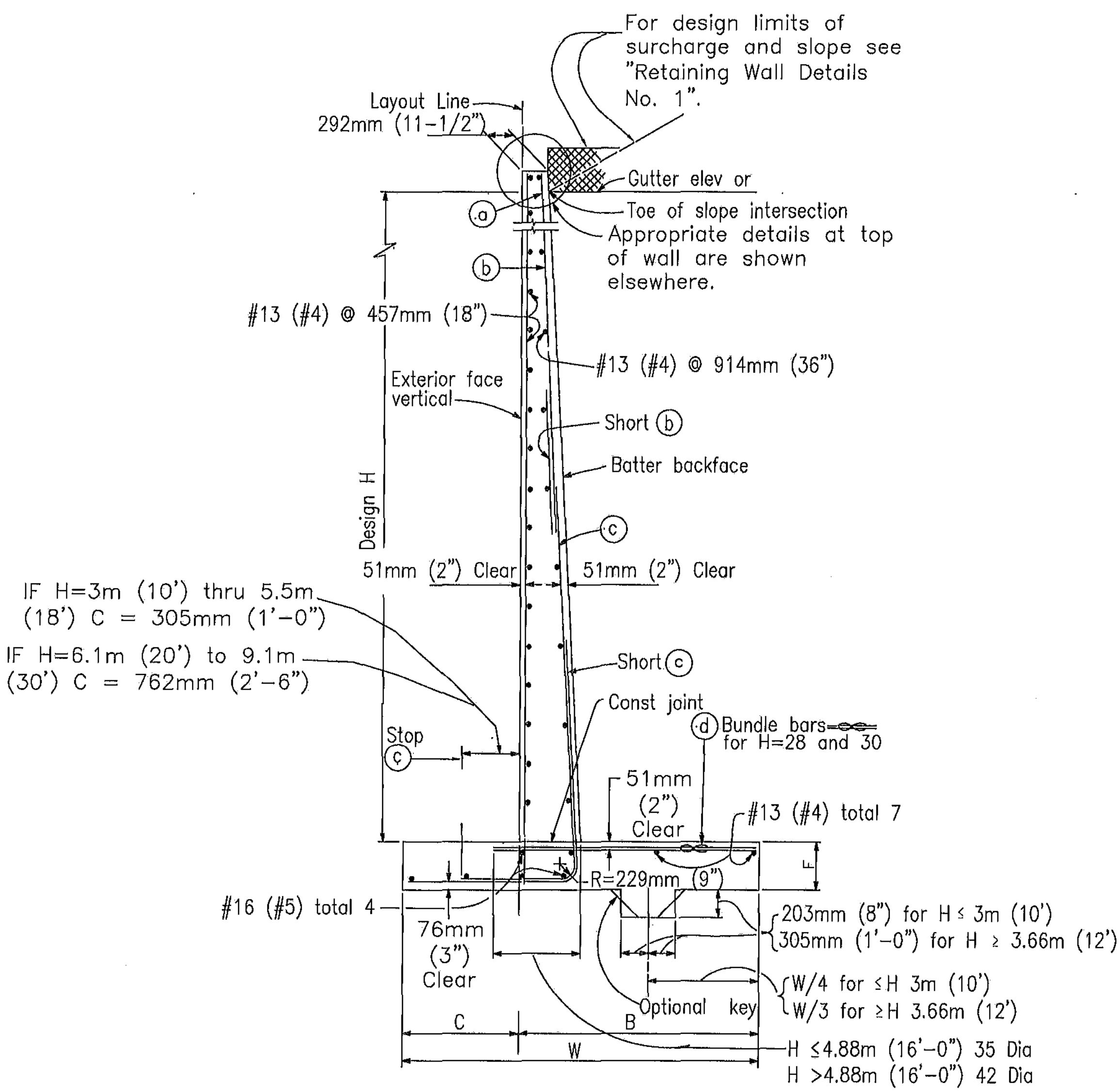
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER C-11A

August 2009

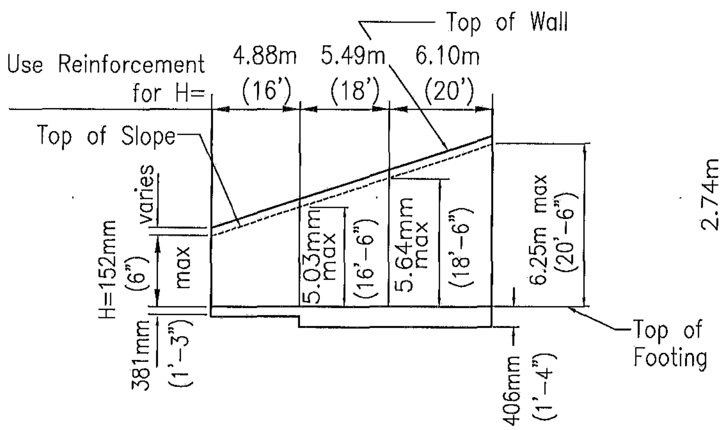


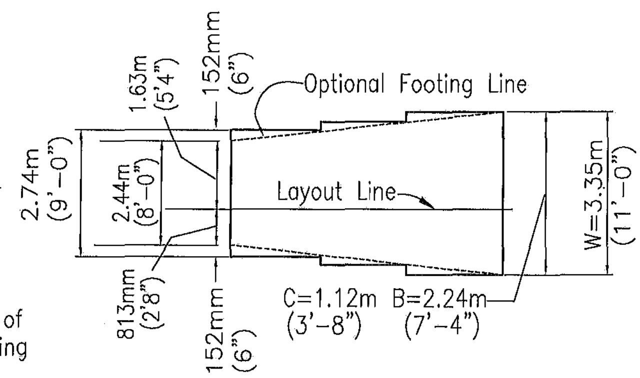
SPREAD FOOTING SECTION

NOTES:

1. For details not shown and drainage notes see "Retaining Wall Details No.1." Standard Drawing C-13.
2. Quantities apply to Design H portion and exclude the added portion above "Gutter Elevation".

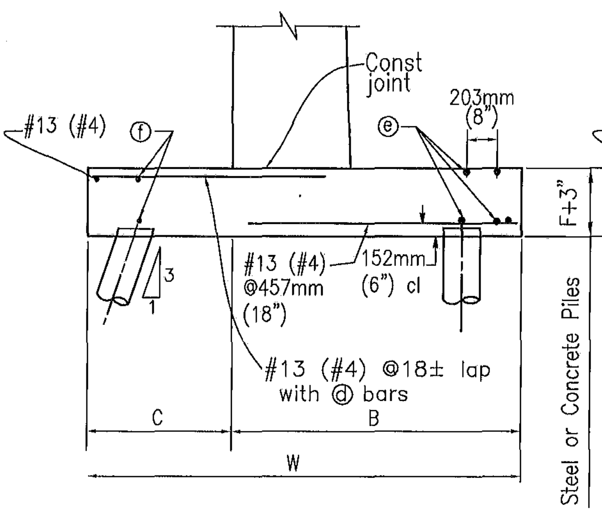
Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	REINFORCED CONCRETE RETAINING WALL TYPE 1	3/01/2003 Chairperson R.C.E. 19246 Date
					DRAWING NUMBER C-11B





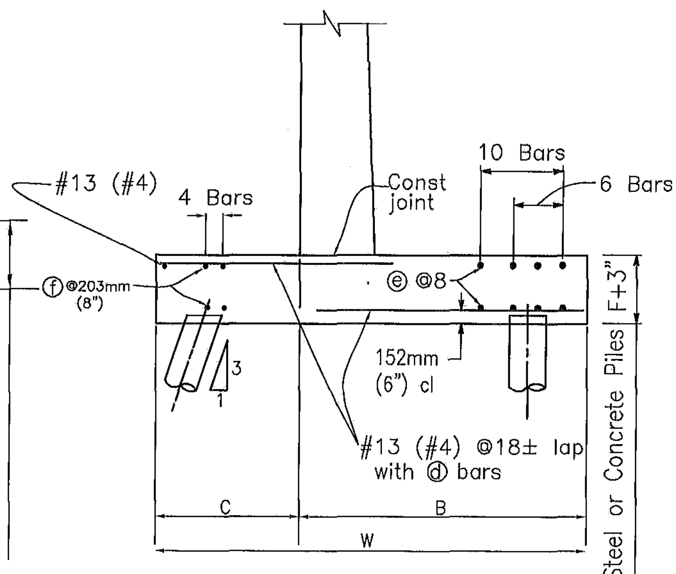
TYPICAL LAYOUT EXAMPLE

For joints required, see Details 3-3 and 3-4, drawing C-15



45T PILE FOOTING SECTION

H=7.32m (24') Thru H=9.14m (30')



45T PILE FOOTING SECTION

H=1.22m (4') Thru H=6.71m (22')

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE RETAINING WALL TYPE 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER C-11C

TABLE OF REINFORCING STEEL DIMENSIONS AND DATA

Design H			4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'
W		Metric	965mm	1.27m	1.58m	1.88m	2.18m	2.44m	2.74m	3.0 m	3.35m	3.66m	4.04m	4.34m	4.65m	5.10m
		U.S.	3'-2"	4'-2"	5'-2"	6'-2"	7'-2"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-3"	14'-3"	15'-3"	16'-9"
C		Metric	305mm	406mm	508mm	610mm	711mm	813mm	1.0 m	1.02m	1.12m	1.22m	1.35m	1.45m	1.55m	1.65m
		U.S.	1'-0"	1'-4"	1'-8"	2'-0"	2'-4"	2'-8"	3'-0"	3'-4"	3'-8"	4'-0"	4'-5"	4'-9"	5'-1"	5'-5"
B		Metric	660mm	864mm	1.07m	1.27m	1.47m	1.63m	1.83m	2.03m	2.24m	2.44m	2.69m	2.90m	3.10m	3.45m
		U.S.	2'-2"	2'-10"	3'-6"	4'-2"	4'-10"	5'-4"	6'-0"	6'-8"	7'-4"	8'-0"	8'-10"	9'-6"	10'-2"	11'-4"
F Spread Ftg.		Metric	356mm	356mm	356mm	356mm	356mm	381mm	381mm	406mm	406mm	457mm	508mm	584mm	660mm	711mm
		U.S.	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-3"	1'-3"	1'-4"	1'-4"	1'-6"	1'-8"	1'-11"	2'-2"	2'-4"
Batter			1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	5/8:12	3/4:12	3/4:12	7/8:12
ⓐbars		Metric	—	—	—	—	—	—	—	—	—	—	—	#13@ 610mm	#19@ 432mm	#19@ 406mm
		U.S.	—	—	—	—	—	—	—	—	—	—	—	#6@24	#6@17	#6@16
ⓑbars		Metric	—	—	—	—	#13@ 457mm	#19@ 762mm	#19@ 559mm	#22@ 559mm	#25@ 508mm	#25@ 406mm	#25@ 356mm	#25@ 305mm	#25@ 13mm	#25@ 203mm
		U.S.	—	—	—	—	#4@18	#6@30	#6@22	#7@22	#8@20	#8@16	#8@14	#8@12	#8@8-1/2	#8@8
ⓒbars		Metric	#16@ 610mm	#16@ 610mm	#16@ 406mm	#16@ 229mm	#19@ 229mm	#29@ 381mm	#29@ 279mm	#32@ 279mm	#36@ 254mm	#36@ 203mm	#36@ 176mm	#36@ 152mm	#32@ 216mm ɣ	#32@ 203mm ɣ
		U.S.	#5@24	#5@24	#5@16	#5@9	#6@9	#9@15	#9@11	#10@11	#11@10	#11@8	#11@7	#11@6	#10@8-1/2ɣ	#10@8 ɣ
ⓓbars		Metric	#16@ 610mm	#16@ 610mm	#13@ 406mm	#13@ 229mm	#16@ 229mm	#25@ 381mm	#25@ 279mm	#32@ 279mm	#32@ 279mm	#32@ 203mm	#32@ 178mm	#32@ 152mm	#29@ 216mm ɣ	#29@ 203mmɣ
		U.S.	#5@24	#5@24	#4@16	#4@9	#5@9	#8@15	#8@11	#10@11	#10@11	#10@8	#10@7	#10@6	#9@8-1/2ɣ	#9@8ɣ
Total ⓔ bars		Metric	6-#19	6-#19	10-#22	10-#22	10-#22	10-#22	6-#22	6-#22	6-#22	6-#22	4-#22	4-#22	4-#22	4-#22
		U.S.	6-#6	6-#6	10-#7	10-#7	10-#7	10-#7	6-#7	6-#7	6-#7	6-#7	4-#7	4-#7	4-#7	4-#7
Total ⓕ bars		Metric				4-#22	4-#22	4-#22	4-#22	4-#22	4-#22	4-#22	2-#22	2-#22	2-#22	2-#22
		U.S.				4-#7	4-#7	4-#7	4-#7	4-#7	4-#7	4-#7	2-#7	2-#7	2-#7	2-#7
2' Level surcharge	Toe Pressure	Metric	77Kpa	91Kpa	105Kpa	110Kpa	134Kpa	158Kpa	168Kpa	191Kpa	206Kpa	220Kpa	235Kpa	254Kpa	273Kpa	297Kpa
		U.S.	1.6k/sf	1.9k/sf	2.2k/sf	2.3k/sf	2.8k/sf	3.3k/sf	3.5k/sf	4.0k/sf	4.3k/sf	4.6k/sf	4.9k/sf	5.3k/sf	5.7k/sf	6.2k/sf
2:1 unlimited slope	Toe Pressure	Metric	53Kpa	72Kpa	96Kpa	120Kpa	129Kpa	158Kpa	172Kpa	201Kpa	225Kpa	263Kpa	282Kpa	311Kpa	340Kpa	359Kpa
		U.S.	1.1k/sf	1.5k/sf	2.0k/sf	2.5k/sf	2.7k/sf	3.3k/sf	3.6k/sf	4.2k/sf	4.7k/sf	5.5k/sf	5.9k/sf	6.5k/sf	7.1k/sf	7.5k/sf
1-1/2:1 limited slope	Toe Pressure	Metric	62Kpa	81Kpa	101Kpa	120Kpa	139Kpa	163Kpa	182Kpa	206Kpa	230Kpa	259Kpa	278Kpa	311Kpa	345Kpa	359Kpa
		U.S.	1.3k/sf	1.7k/sf	2.1k/sf	2.5k/sf	2.9k/sf	3.4k/sf	3.8k/sf	4.3k/sf	4.8k/sf	5.4k/sf	5.8k/sf	6.5k/sf	7.2k/sf	7.5k/sf
Spread Footing	Steel kg/ft.	Metric	7.7kg	9.1kg	12.7kg	16.8kg	23kg	36.3kg	47.6kg	66.7kg	84.8kg	112kg	137kg	185kg	204kg	230kg
	Steel lbs/ft.	U.S.	17lb.	20lb.	28lb.	37lb.	51lb.	80lb.	105lb.	147lb.	187lb.	246lb.	303lb.	407lb.	449lb.	507lb.
	Conc cu m	Metric	.26cu m	.36cu m	.47cu m	.58cu m	.72cu m	.86cu m	1.0cu m	1.2cu m	1.3cu m	1.5cu m	1.8cu m	2.9cu m	2.5cu m	3.0cu m
	Conc cf/ft	U.S.	8.9cu ft	12.5cu ft	16.3cu ft	20.2cu ft	25.4cu ft	30.1cu ft	34.6cu ft	40.1cu ft	45.0cu ft	52.1cu ft	63.3cu ft	77.0cu ft	88.1cu ft	104.8cu ft
Pile ftg.	Steel kg/ft.	Metric	13.2kg	14.5kg	18.6kg	31.8kg	38.1kg	51.3kg	63.5kg	78.0kg	96.2kg	122kg	146kg	194kg	213kg	240kg
	Steel lbs/ft.	U.S.	29lb.	32lb.	41lb.	70lb.	84lb.	113lb.	140lb.	172lb.	212lb.	270lb.	322lb.	427lb.	469lb.	528lb.
	Conc cu m	Metric	.30cu m	.34cu m	.48cu m	.59cu m	.72cu m	.86cu m	.99cu m	1.1cu m	1.3cu m	1.2cu m	1.8cu m	2.3cu m	2.6cu m	3.0cu m
	Conc cf/ft	U.S.	10.2cu ft	12.7cu ft	16.7cu ft	20.8cu ft	25.2cu ft	30.1cu ft	34.8cu ft	40.6cu ft	45.7cu ft	53.1cu ft	64.7cu ft	78.6cu ft	89.9cu ft	107.0cu ft

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'

ɣ Denotes a bundle of 2 bars

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE RETAINING WALL TYPE 1

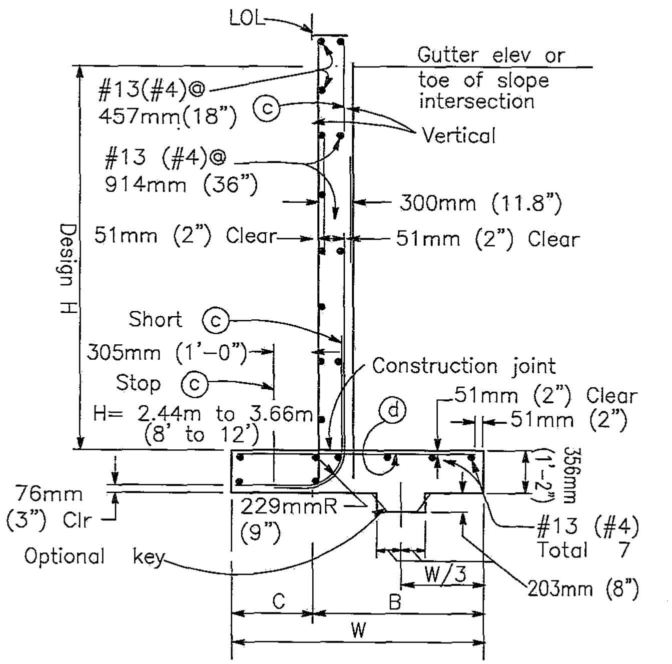
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

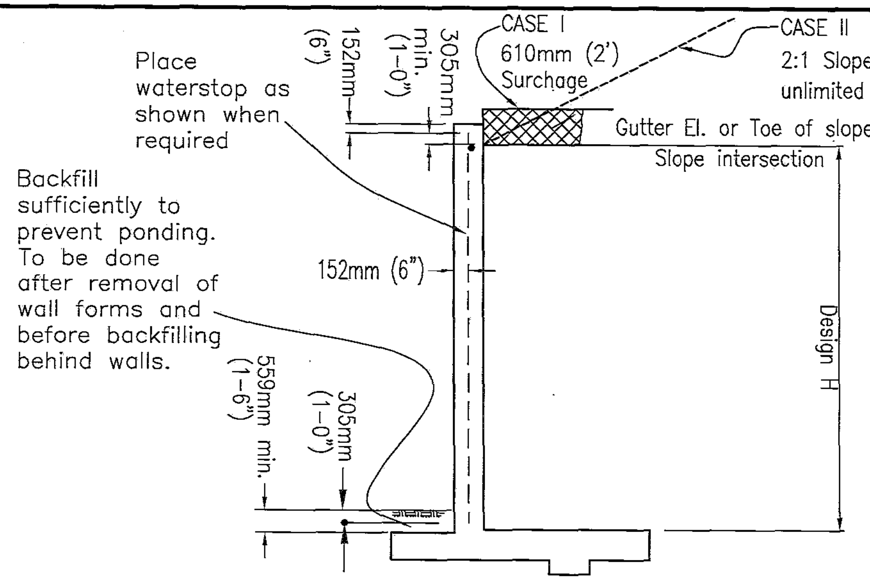
Chairperson R.C.E. 19246 Date

DRAWING NUMBER C-11D

August 2009

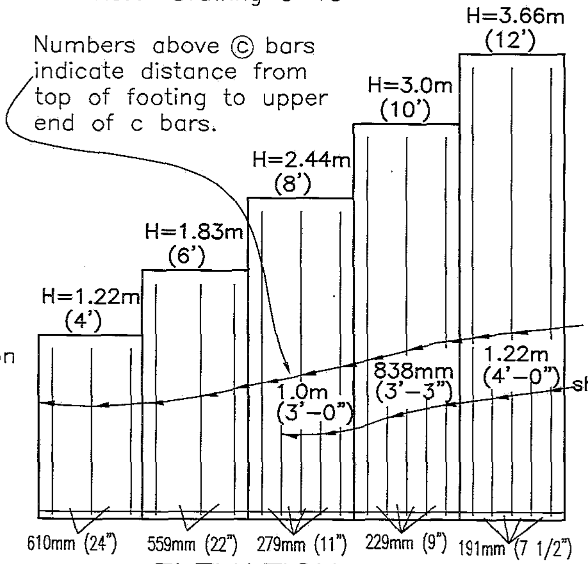


SPREAD FOOTING SECTION



DESIGN

For drainage notes and other details, see "Retaining Wall Details No.1" Drawing C–13



ELEVATION

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

NOTES:

Design H may be exceeded by 152mm (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:
fc = 8.96 Mpa (1300 psi) f'c=22.4 Mpa (3250 psi) fs=165 Mpa (24,000 psi) n= 10 earth 5.75 Kpa (120 pcf)

Case I – Equivalent fluid pressure= 1.7 Kpa (36 psf) max for determination of toe pressure. 1.3 Kpa (27) psf min for determination of heel pressure.

Case II – Earth pressure determined from Rankine's formula with 0 = 33°–12.8m (42').

NOTE:

Reinforcement detailed is to be placed in addition to that shown for spread footing. All piles not shown. see Pile Layout on plans. * For pile footing Design H=1.22m (4') use same footing dimensions as Design H=1.83m (6').

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE RETAINING WALL TYPE 1A

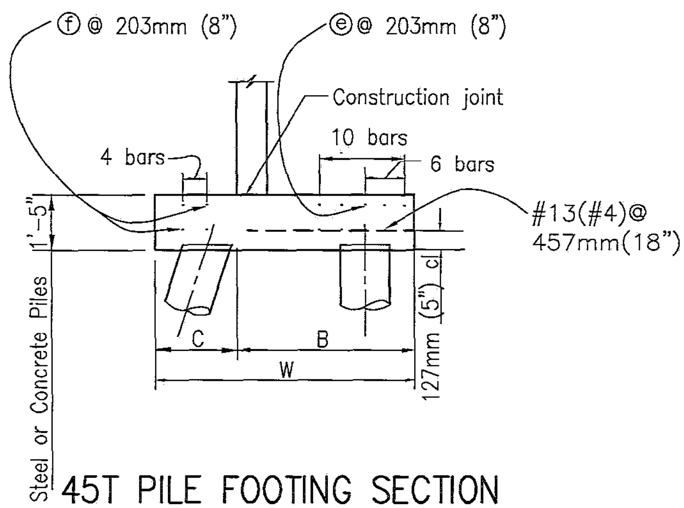
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

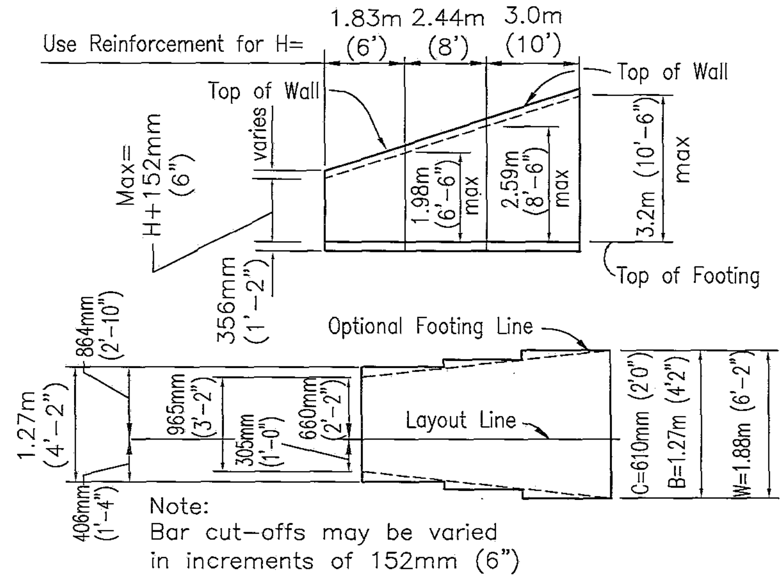
Chairperson R.C.E. 19246 Date

DRAWING NUMBER C-12A

August 2009



45T PILE FOOTING SECTION



Note:
Bar cut-offs may be varied in increments of 152mm (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

Design H		⊛1.22m (4')	1.83m (6')	2.44m (8')	3.0m (10')	3.66m (12')
W		965mm (3'-2")	1.27m (4'-2")	1.57m (5'-2")	1.88m (6'-2")	2.18m (7'-2")
C		305mm (1'-0")	406mm (1'-4")	508mm (1'-8")	610mm (2'-0")	711mm (2'-4")
B		356mm (1'-2")	864mm (2'-10")	1.07m (3'-6")	1.27m (4'-2")	1.47m (4'-10")
ⓒ bars		#16(#5)@610mm(24")	#16(#5)@559mm(22")	#16 (#5)@279mm (11")	#19(#6)@229mm(9")	#22(#7)@191mm(7-1/2")
ⓓ bars		#16(#5)@610mm(24")	#16(#5)@559mm(22")	#16 (#5)@559mm (22")	#22(#7)@457mm(18")	#25 (#8)@15
Total ⓔ bars		6-#19 (#6)	6-#19 (#6)	6-#19 (#6)	10-#22 (#7)	10-#22 (#7)
Total ⓕ bars					4-#22 (#7)	4-#22 (#7)
Case I - Toe Press.		76.1 kg/m^2 (1590psf)	92.4kg/m^2 (1930psf)	107kg/m^2 (2240psf)	122kg/m^2 (2550psf)	136kg/m^2 (2840psf)
Case II - Toe Press.		50.8 kg/m^2 (1060psf)	69.9kg/m^2 (1460psf)	89.1kg/m^2 (1860psf)	109kg/m^2 (2280psf)	129kg/m^2 (2700psf)
Spread Footing	Steel lbs/ft	6.8kg (15lb)	9.52kg (21lb)	12.25kg (27lb)	21.3kg (46lb)	31.8kg (70lb)
	Conc CF/ft	3.9kg (8.6lb)	5.35kg (11.8lb)	6.76kg (14.9lb)	8.21kg (18.1lb)	9.66kg (21.3lb)
Pile Ftg	Steel lbs/ft	11.3kg (25lb)	14.51kg (32lb)	17.24kg (38lb)	34.0kg (75lb)	45.8kg (101lb)
	Conc CF/ft	4.5kg (9.9lb)	5.40kg (11.9lb)	6.94kg (15.3lb)	8.53kg (18.8lb)	10.1kg (22.2lb)

Note:
Quantities apply to Design H portion and exclude the added portion above "Gutter Elevation".

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE RETAINING WALL TYPE 1A

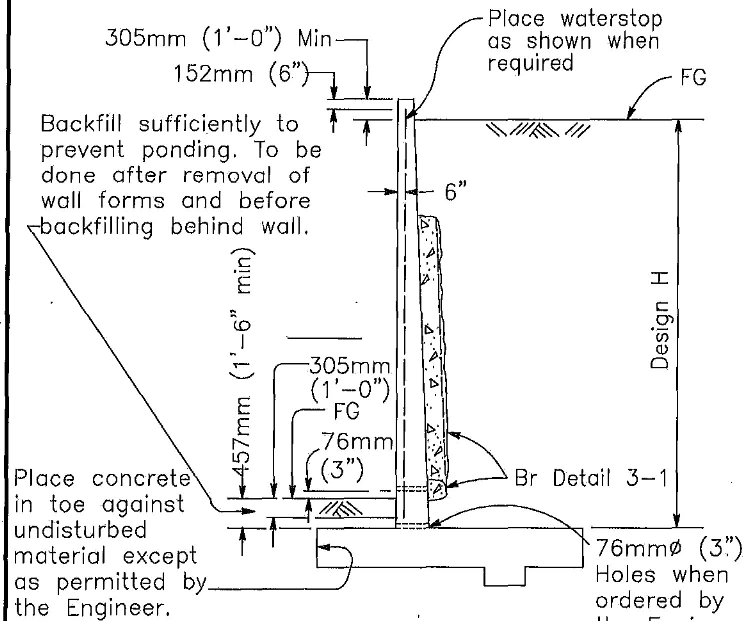
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

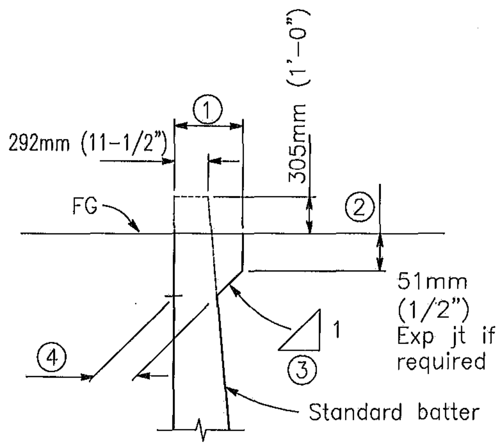
Chairperson R.C.E. 19246 Date

DRAWING NUMBER C-12B

August 2009



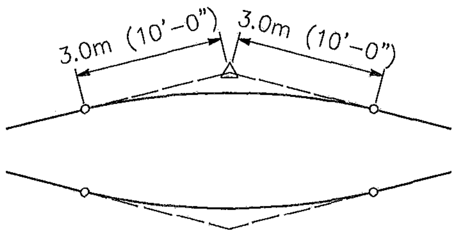
DESIGN AND DRAINAGE



Dimensions ①, ② and ③ to be as shown elsewhere in the Project Plans.

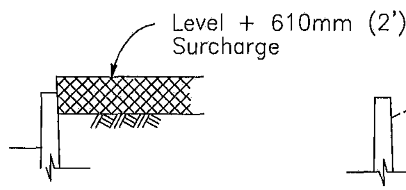
④ Stem width at base of haunch to be determined as shown.

STEM WIDTH AT BASE OF HAUNCH

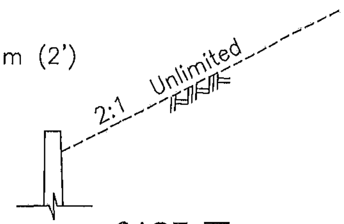


6.1m (20') VC AT TOP OF WALL SLOPE CHANGE

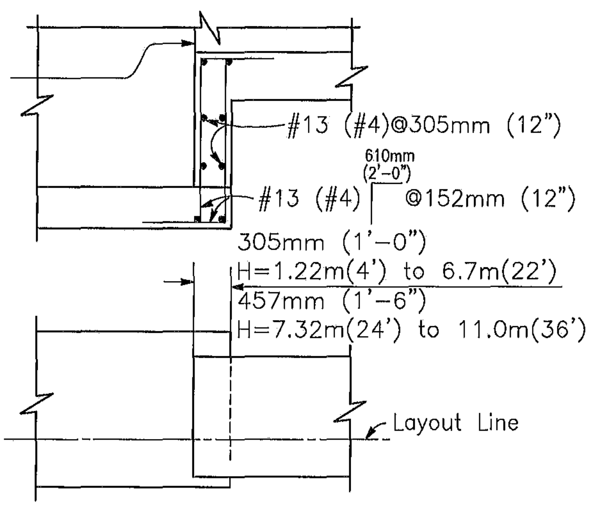
Where shown on the plans



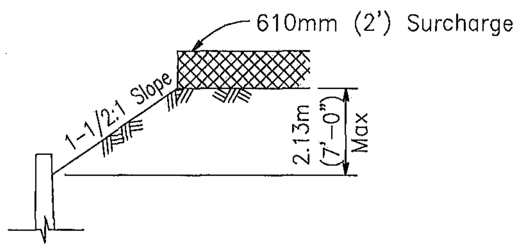
CASE I



CASE II



FOOTING STEP



CASE III

DETAIL OF DESIGN LOADING CASES

CASE I — Level + 610mm (2') Surcharge

CASE II — 2:1 Unlimited Slope

CASE III — 1-1/2:1 Limited Slope (2.13m (7'–0") Max height) + 610mm (2') Surcharge

NOTE: Surcharge Limits Shown Apply To Retaining Walls Type 1 and 3.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE RETAINING WALL DETAILS No. 1

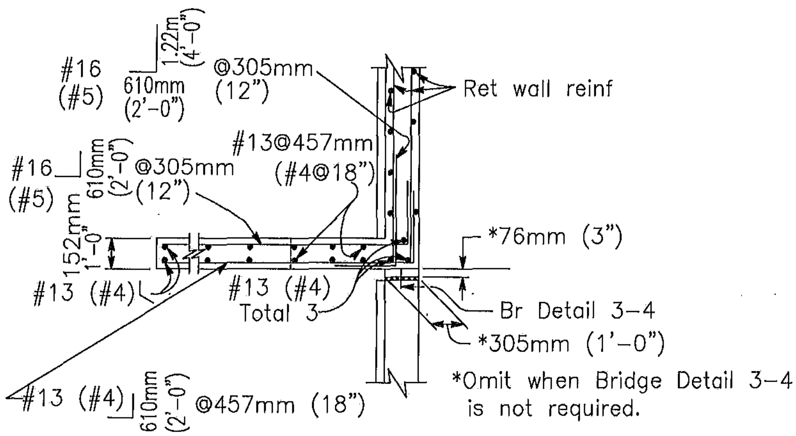
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

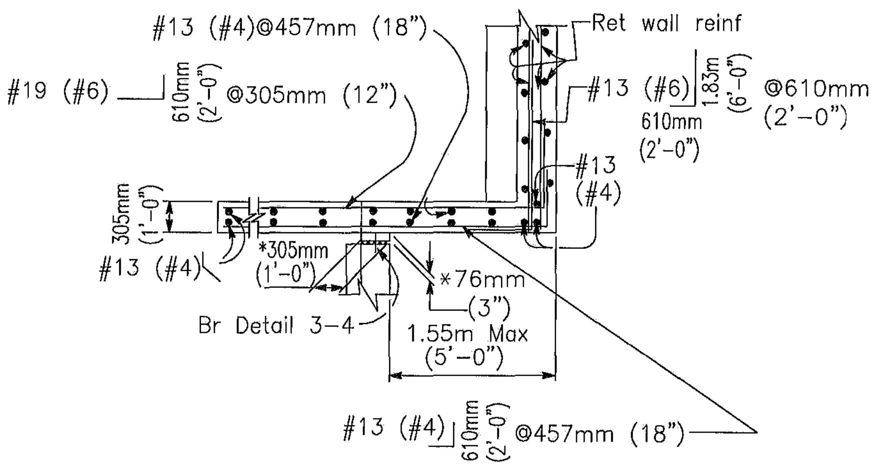
Chairperson R.C.E. 19246 Date

DRAWING NUMBER C-13A

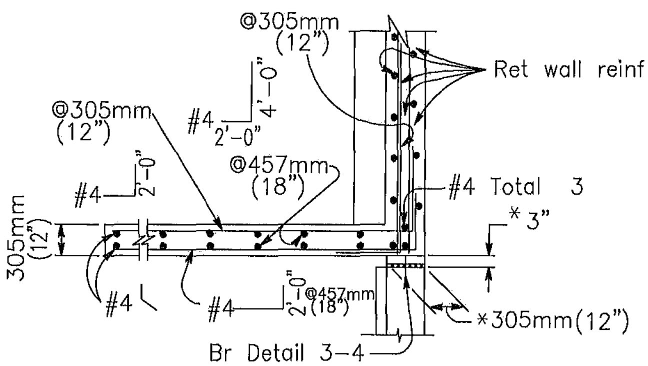
August 2009



PLAN
(For return wall Type "A")

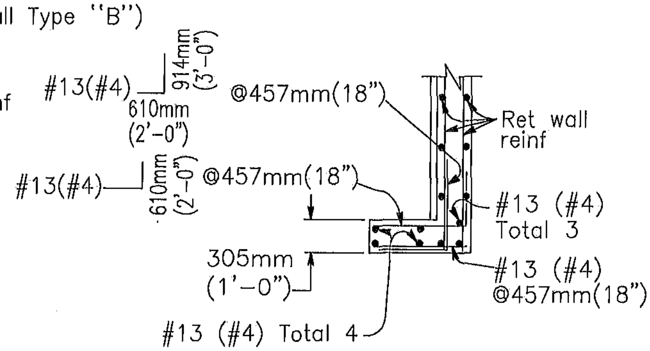


PLAN
(For return wall Type "B")



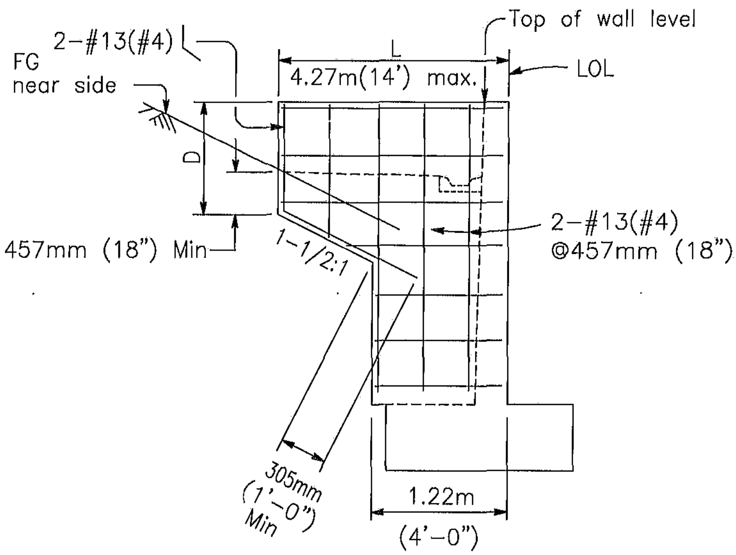
* Omit when Bridge Detail 3-4 is not required.

PLAN
(For return wall Type "C")



PLAN
(For return wall Type "D")

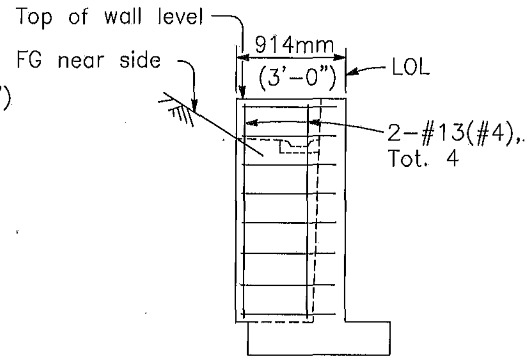
Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	REINFORCED CONCRETE RETAINING WALL DETAILS No. 1	[signature] 3/01/2003 Chairperson R.C.E. 19246 Date
					DRAWING NUMBER C-13B



ELEVATION

RETURN WALL TYPE A

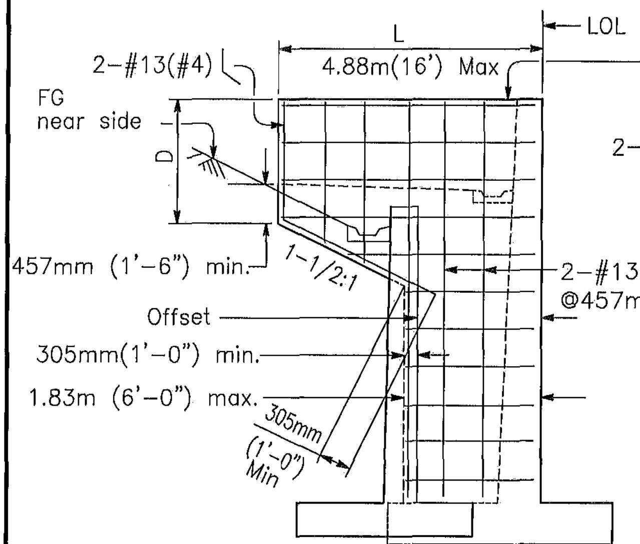
Use where H=2.44m (8') or less



ELEVATION

RETURN WALL TYPE D

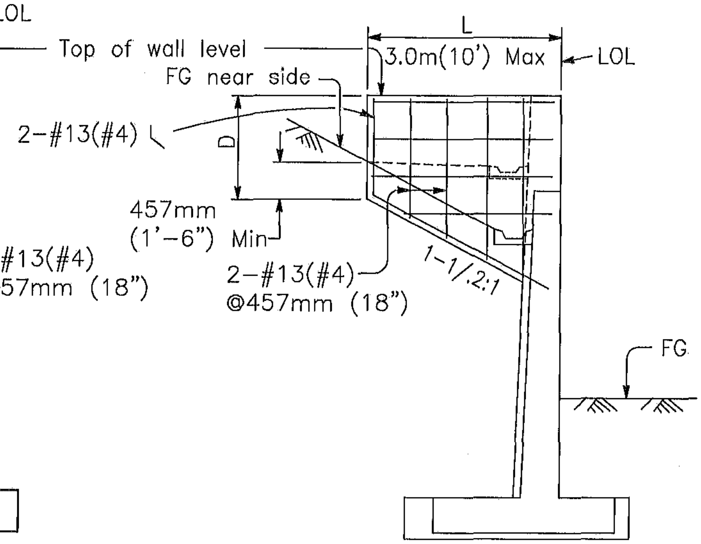
Use where H=1.83m (6') or less



ELEVATION

RETURN WALL TYPE B

Use where H=3.0m (10') or more on offset walls



ELEVATION

RETURN WALL TYPE C

Use where H=3.9m (10') or more on straight walls

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE RETAINING WALL DETAILS No. 1

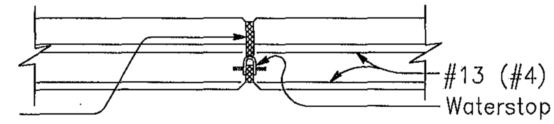
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

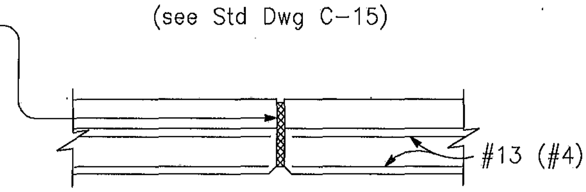
DRAWING NUMBER C-13C

August 2009

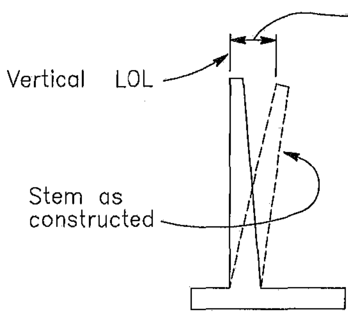


PLAN OF WALL WITH BRIDGE DETAIL 3-4

(see Std Dwg C-15)



PLAN OF WALL WITH EXPANSION JOINT ONLY



Offset as follows:
H 1.22m(4')=6.35mm(1/4")
H 1.88m(6')=9.53mm(3/8")
H 2.44m(8')=13mm(1/2")
H 3.00m(10')=16mm(5/8")
H 3.66m(12')=19mm(3/4")
H 4.27m(14')=25.4mm(1")
H 4.88m(16')=32mm(1-1/4")
H 5.49m(18')=38mm(1-1/2")
H 6.10m(20')=44.5mm(1-3/4")
H 6.71m(22')=51mm(2")
H 7.32m(24')=57mm(2-1/4")
H 7.93m(26') thru 10.97m (36')=63.5mm(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 152mm (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 = 8.96Mpa (1300 psi) f'c = 22.4Mpa (3250) psi fs = 166Mpa (24,000 psi)
n = 10 earth = 1922 kg/cu m (120 pcf)
610mm (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 ø=33°-12.8m(42').

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

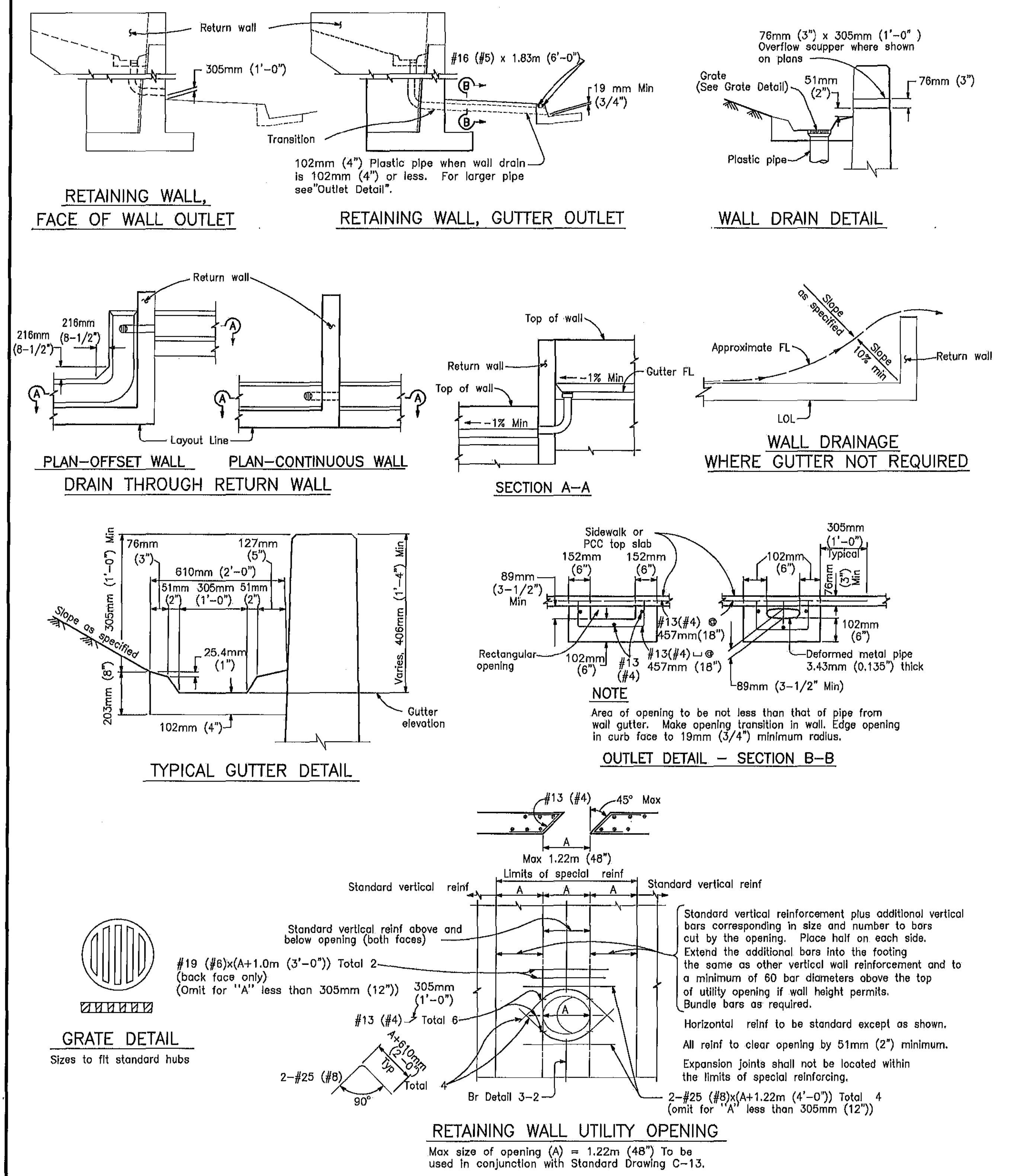
REINFORCED CONCRETE RETAINING WALL DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER C-13D



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

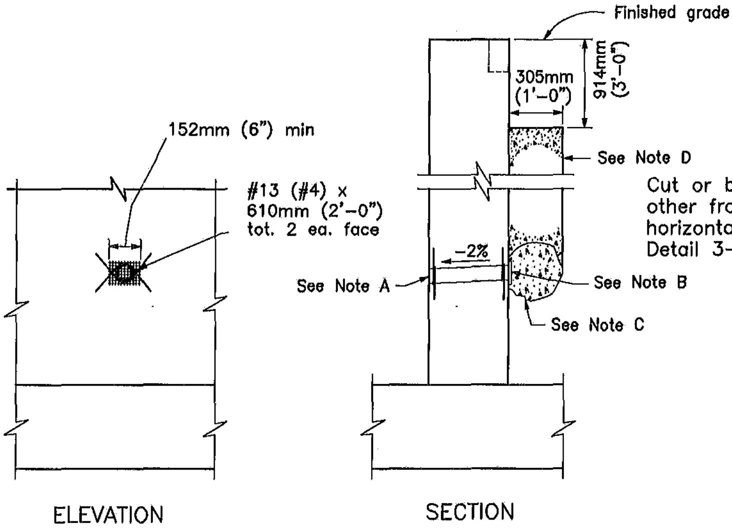
REINFORCED CONCRETE RETAINING WALL DETAILS No. 2

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

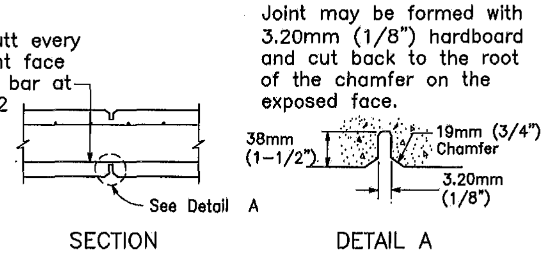
3/01/2003

Chairperson R.C.E. 19246 Date

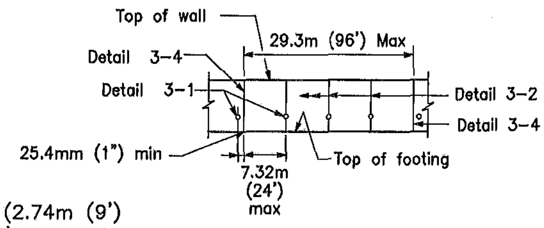
DRAWING NUMBER C-14



WEEP HOLE AND PERVIOUS BACKFILL
DETAIL 3-1



WEAKENED PLANES
DETAIL 3-2



WALL EXPANSION JOINTS
AND WEAKENED PLANES
DETAIL 3-3

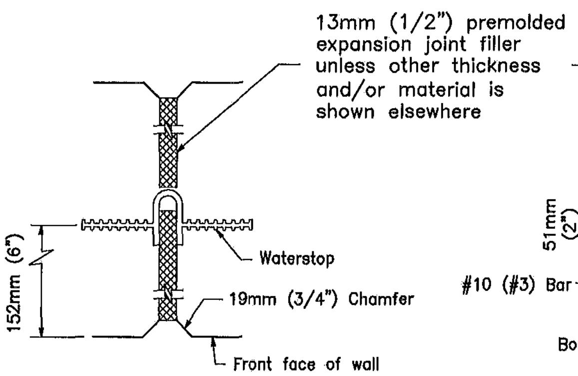
NOTES

A. 102mm (4") diameter drain @ 7.62m (25') max. center to center (2.74m (9') c-c for Type 3 and 2.82m (9'-3") c-c for Type 4 Retaining Walls). For walls adjacent to sidewalks or curbs, provide 102mm (4") cast iron or asbestos cement pipe under the sidewalk to discharge thru curb face. Exposed wall drains shall be located 76mm (3") ± above finished grade.

B. 152mm (6") square aluminum or galvanized steel wire 4 mesh hardware cloth.(Min wire diameter .762mm (0.03")) Anchor firmly to backface.

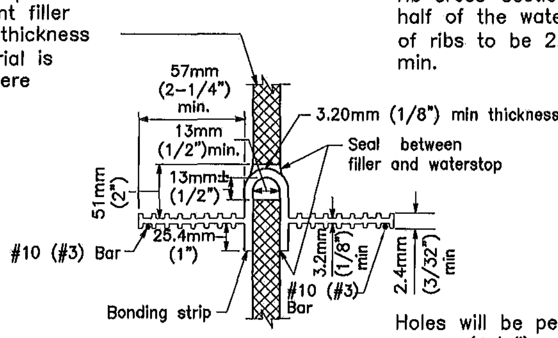
C. .028 Cubic Meter (One cubic foot) pervious backfill material in a burlap sack, securely tied.

D. Pervious backfill material continuous behind retaining wall.



WALL EXPANSION JOINT
DETAIL 3-4

Waterstop to have 5 or more pairs of raised ribs to provide 64.5 sq mm (0.1 sq in) min. rib cross-section area on each half of the water stop. Height of ribs to be 2.38mm (3/32") min.



WATERSTOP
DETAIL 3-6

Holes will be permitted in the outer 13mm (1/2") of the web for wire, rings etc. Tie web to #10 (#3) reinforcing bars @ 305mm (12") max intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the engineer.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE
RETAINING WALL DETAILS No. 3

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

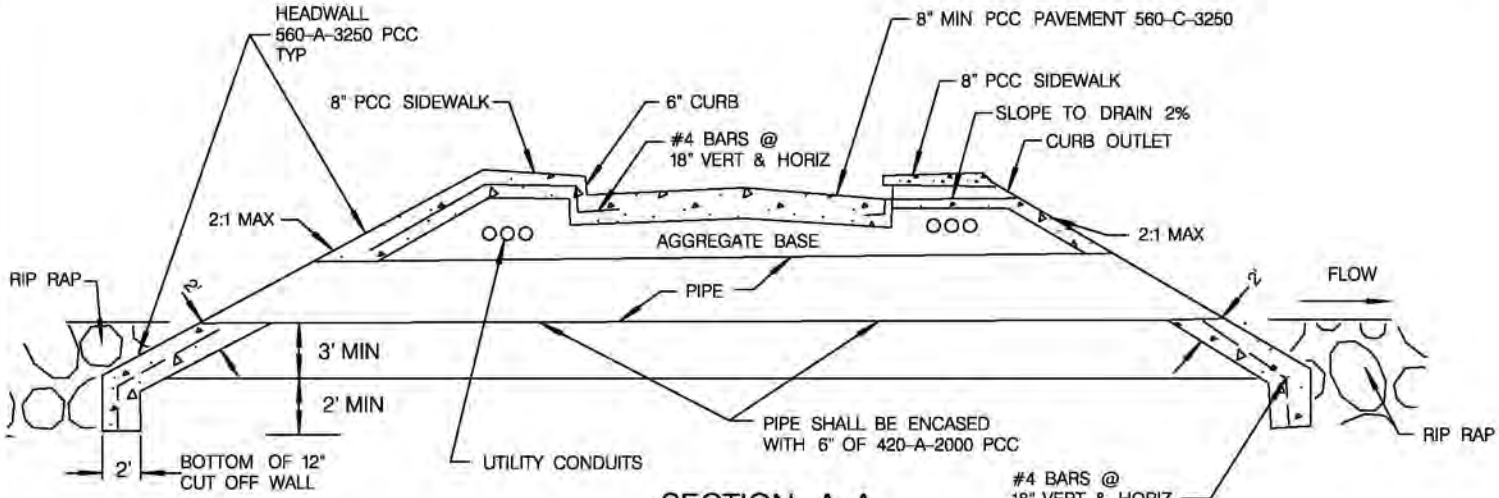
3/01/2003

Chairperson R.C.E. 19246 Date

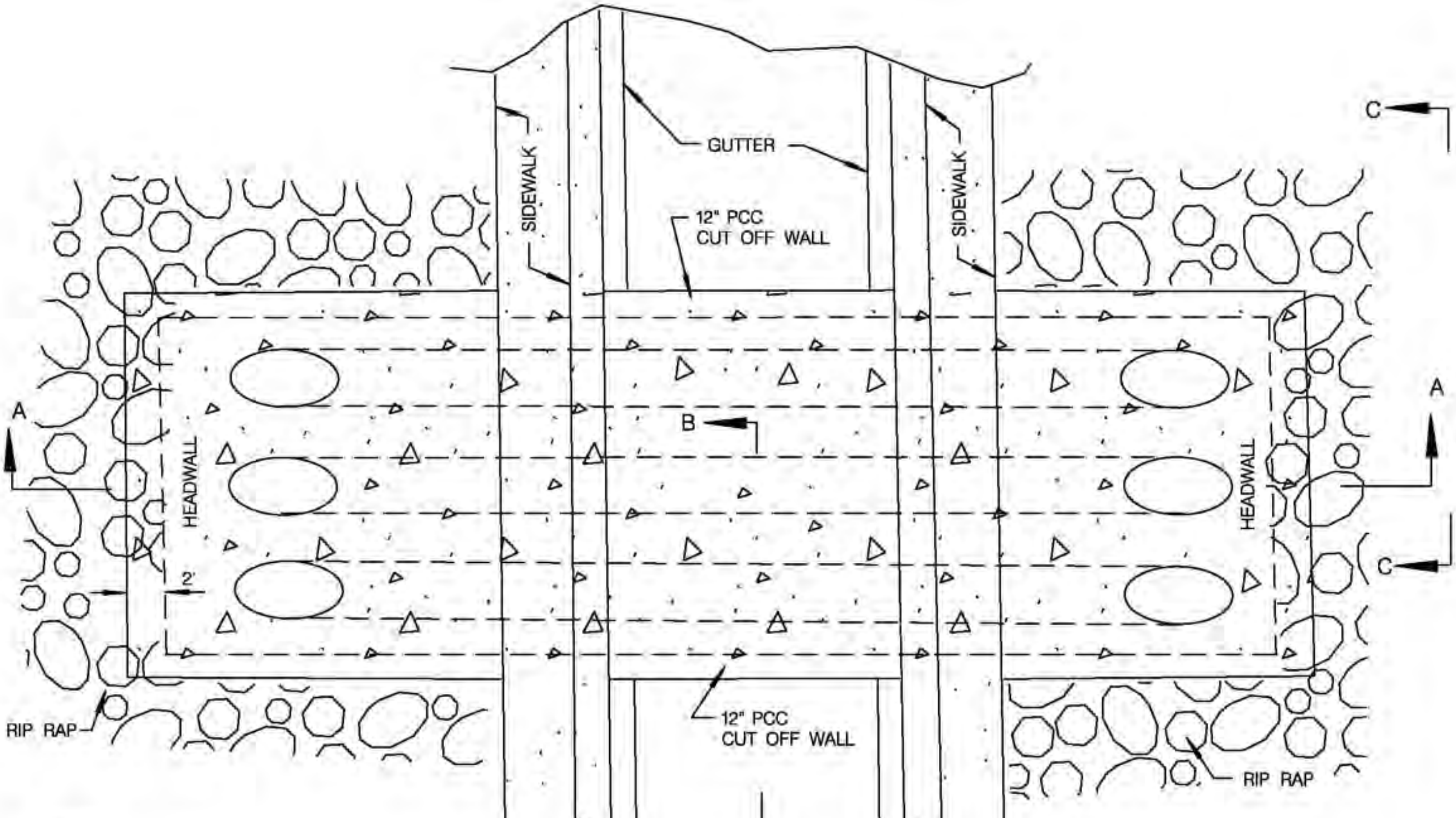
DRAWING NUMBER C-15

CHAPTER 2

DRAINAGE SYSTEM



SECTION A–A



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

PLAN

SHEET 1 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	06/83
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

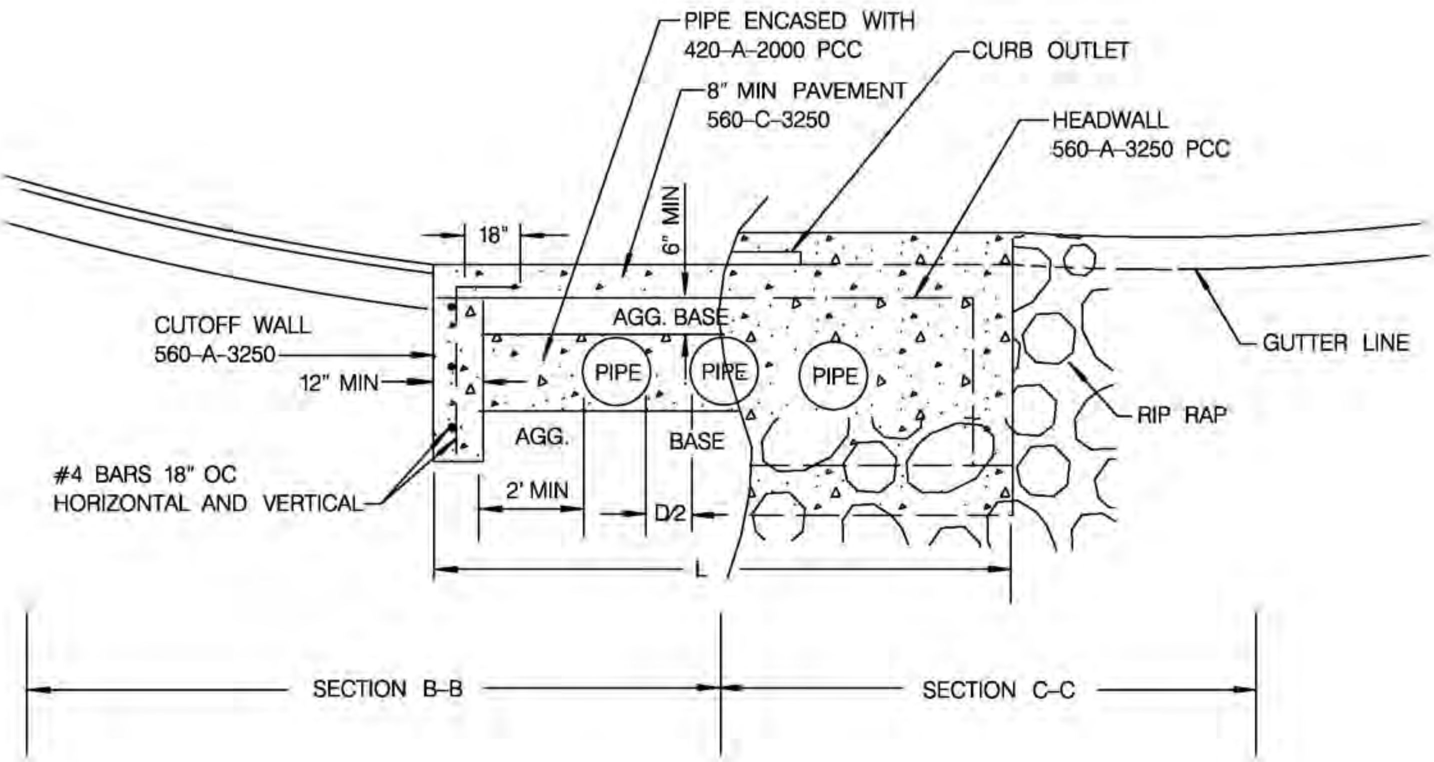
TYPICAL FORD

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-101**



NOTE:

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

SHEET 2 OF 2

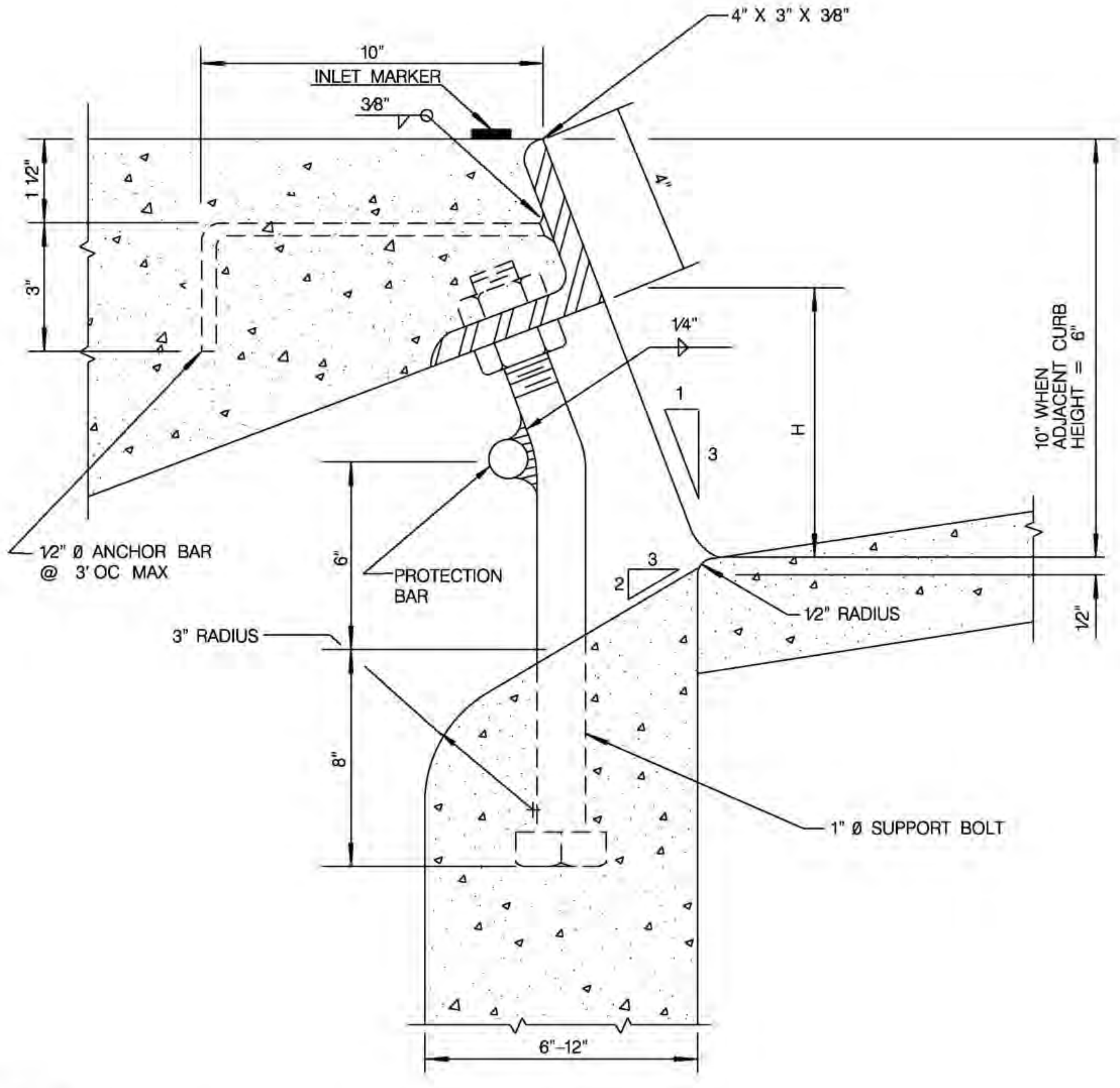
REVISION	BY	APPROVED	DATE	
ORIGINAL		J. CASEY	06/83	CITY OF SAN DIEGO - STANDARD DRAWING
UPDATED	KA	J. NAGELVOORT	01/12	**TYPICAL FORD**

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

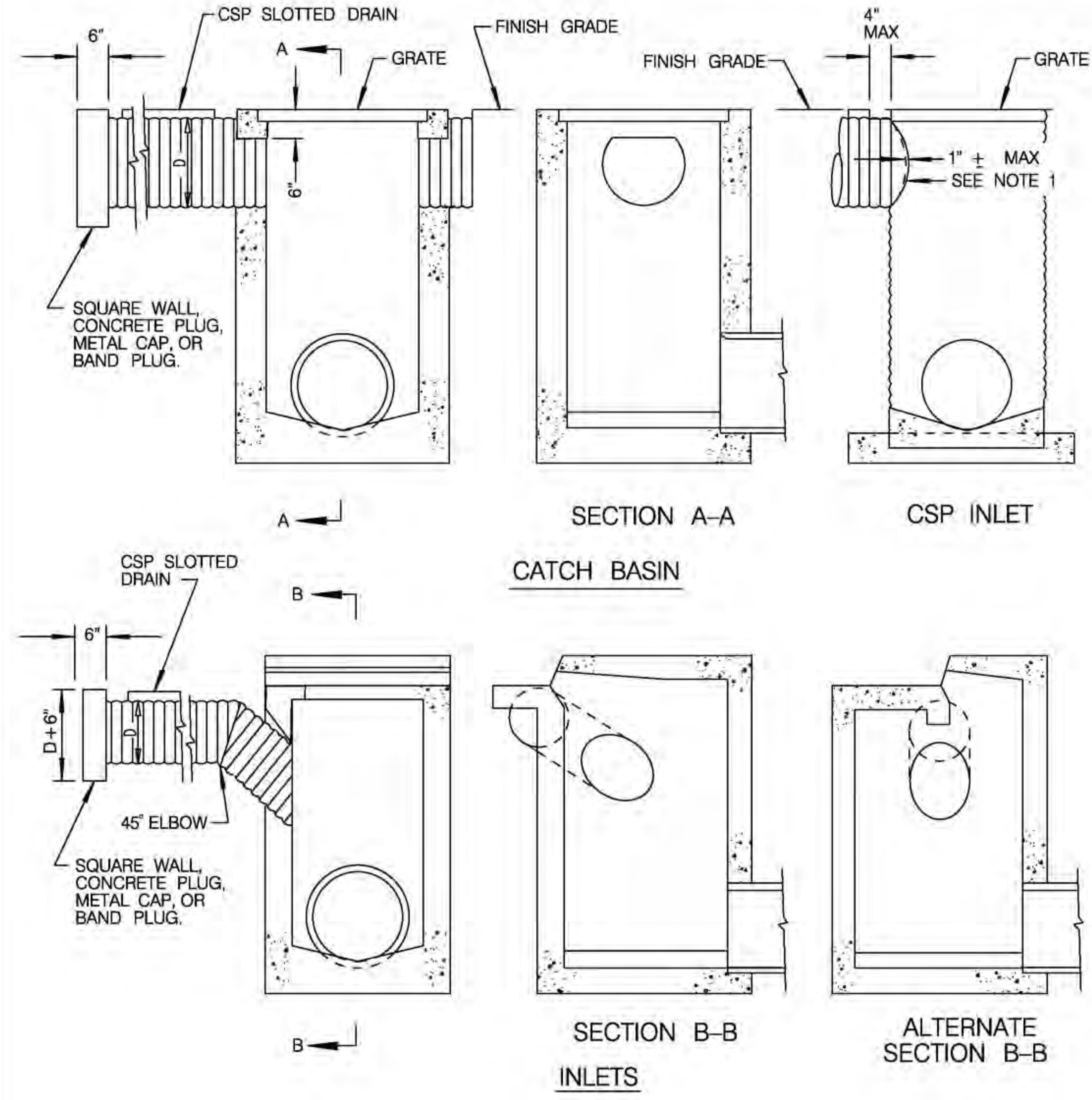
DRAWING NUMBER **SDD-101**



NOTES:

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

REVISION	BY	APPROVED	DATE		
ORIGINAL*	KA	J. NAGELVOORT	01/12	CITY OF SAN DIEGO – STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
					1/31/2012
					COORDINATOR R.C.E. 65271 DATE
				CURB INLET OPENING	DRAWING NUMBER **SDD-102**



NOTES:

1. EITHER FIELD JOINT WITH A PLIABLE MIXTURE OF SAND, PORTLAND CEMENT EMULSIFIED ASPHALT (MIXTURE OF 1 PART PORTLAND CEMENT, 3–5 PARTS SAND, AND 1 1/2 PARTS SSI EMULSIFIED ASPHALT) OR CONTINOUS WELD.
2. 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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

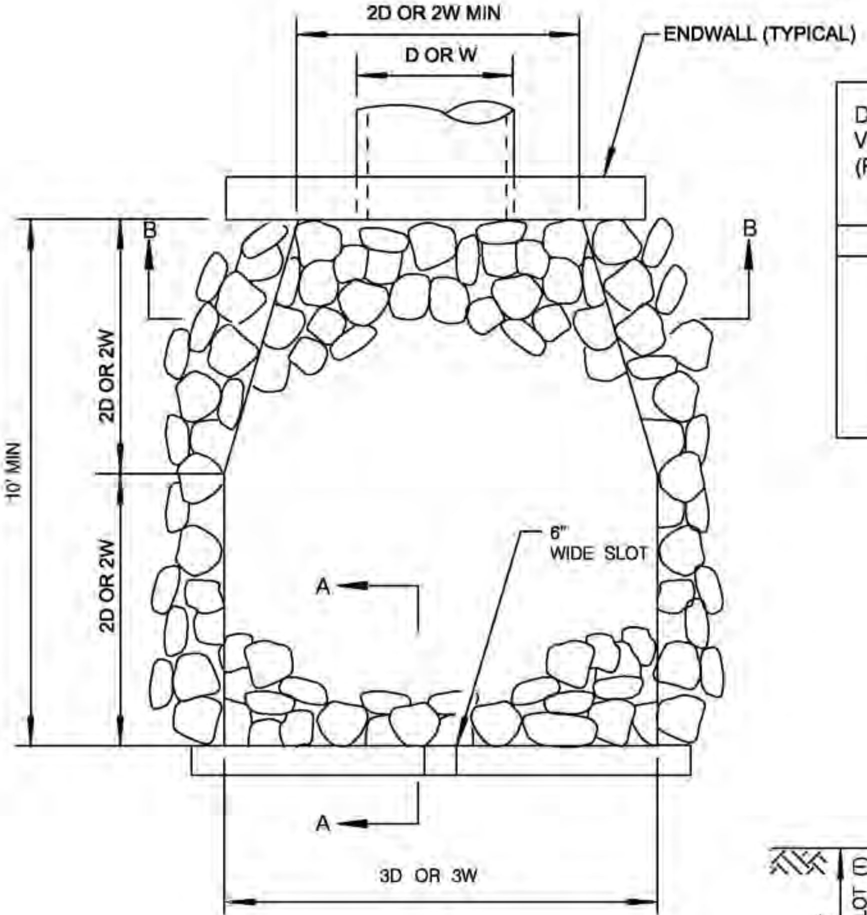
SLOTTED DRAIN CONNECTIONS TO STANDARD INLETS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-103**



PLAN

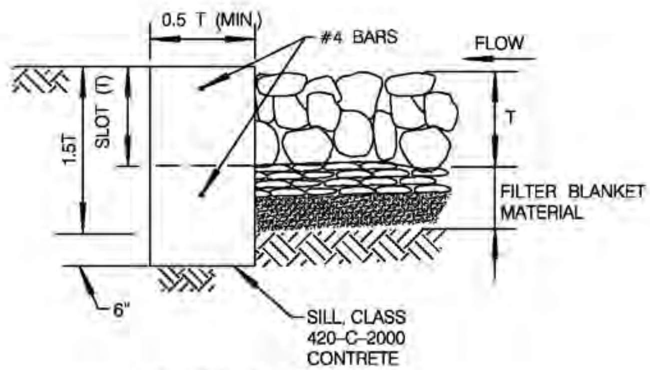
DESIGN VELOCITY (FT/SEC)*	ROCK CLASSIFICATION	T
≥		
6	NO. 2 BACKING	1.1 FT
10	1/4 TON	2.7 FT
12	1/2 TON	3.5 FT
14	1 TON	4.4 FT
16	2 TON	5.4 FT

* OVER 18 fps REQUIRES SPECIAL DESIGN

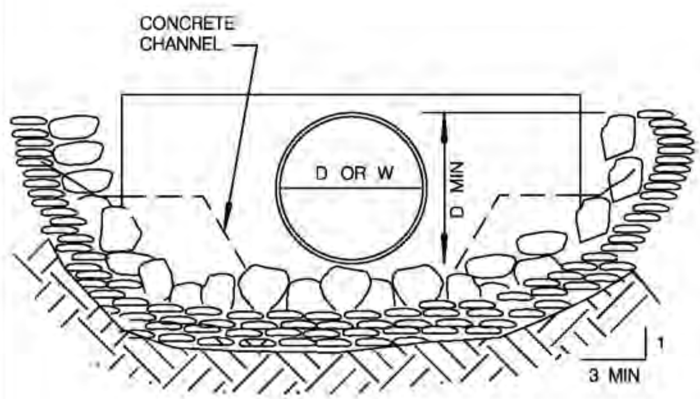
SECTION OF RIP RAP

D = PIPE DIAMETER

W = BOTTOM WIDTH OF CHANNEL



SECTION A–A



SECTION B–B

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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

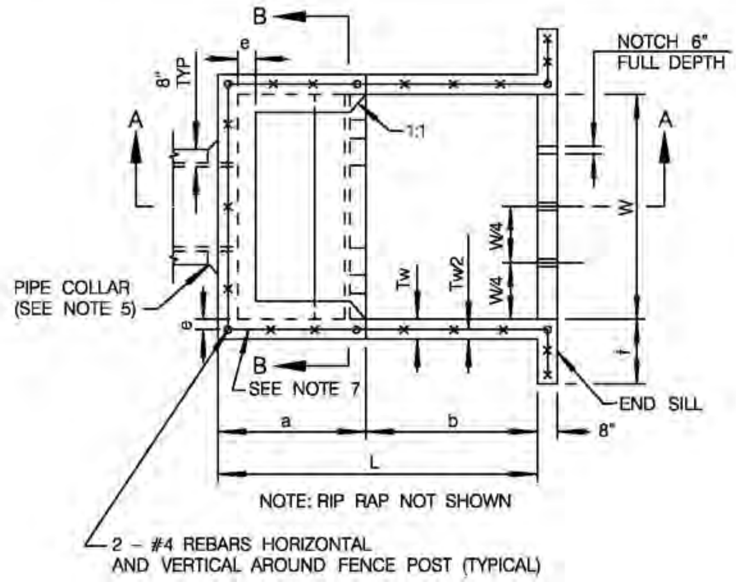
RIP RAP ENERGY DISSIPATOR

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

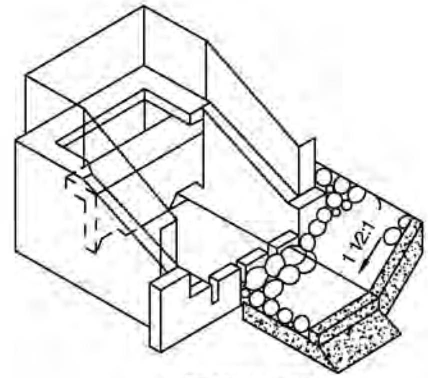
H. Hasle 1/31/2012

COORDINATOR R.C.E. 65271 DATE

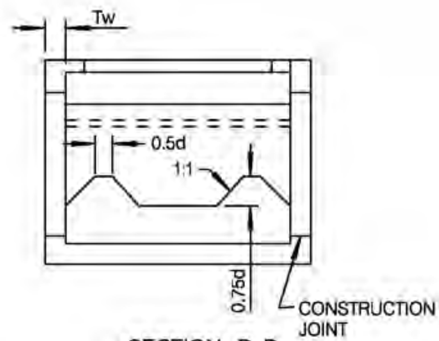
DRAWING NUMBER **SDD-104**



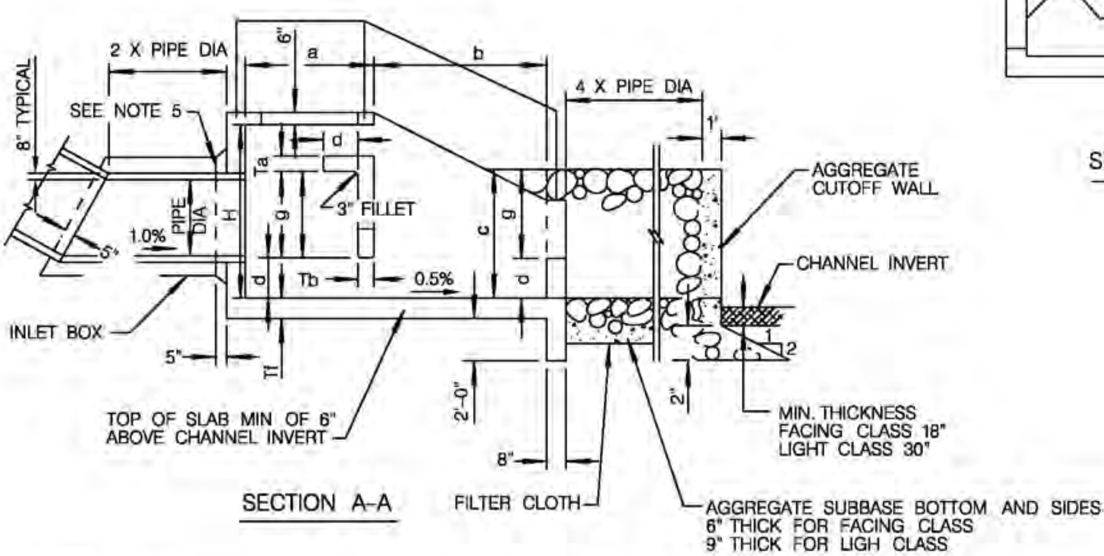
PLAN



PICTORIAL VIEW



SECTION B–B



SECTION A–A

NOTES:

1. DESIGN EQUIVALENT FLUID PRESSURE (EARTH LOADING) = 60 **pcf** MAXIMUM OUTLET VELOCITY = 35 ft/s
2. CONCRETE SHALL BE 560-C-3250
3. REINFORCING SHALL CONFORM TO ASTM DESIGNATION A615 AND MAY BE GRADE 40 OR 60. REINFORCING SHALL BE PLACED WITH 2" CLEAR CONCRETE COVER UNLESS NOTED OTHERWISE. SPLICES SHALL NOT BE PERMITTED EXCEPT AS INDICATED ON THE PLANS.
4. FOR PIPE GRADES NOT EXCEEDING 20%, INLET BOX MAY BE OMITTED.
5. IF INLET BOX IS OMITTED, CONSTRUCT PIPE COLLAR AS SHOWN.
6. UNLESS NOTED OTHERWISE, ALL REINFORCING BAR BENDS SHALL BE FABRICATED WITH STANDARD HOOKS.
7. 5' HIGH CHAIN LINK FENCING, EMBED POST 18" DEEP IN WALLS AND ENCASE WITH CLASS B MORTAR.
8. IN SANDY AND SILTY SOIL:
   A) RIP RAP AND AGGREGATE BASE CUTOFF WALL REQUIRED AT THE END OF ROCK APRON.
   B) FILTER COLTH (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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

CONCRETE ENERGY DISSIPATOR

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-105**

Pipe Dia (in)	18	24	30	36	42	48	54	60	72
Area (sq ft)	1.77	3.14	4.91	7.07	9.62	12.57	15.90	19.63	28.27
Max Q (cfs)	21	38	59	85	115	151	191	236	339
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"			10"		12"			
Tb	7"			9 1/2"		10 1/2"			
Tw	7"			9 1/2"		10 1/2"			
Ta	7"			8"					

DESIGN VELOCITY (FT/SEC)*	ROCK CLASSIFICATION	T (MIN)
≥		
6	NO. 2 BACKING	1.1 FT
10	1/4 TON	2.7 FT
12	1/2 TON	3.5 FT
14	1 TON	4.4 FT
16	2 TON	5.4 FT

* OVER 18 fps REQUIRES SPECIAL DESIGN

SECTION OF RIP RAP

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

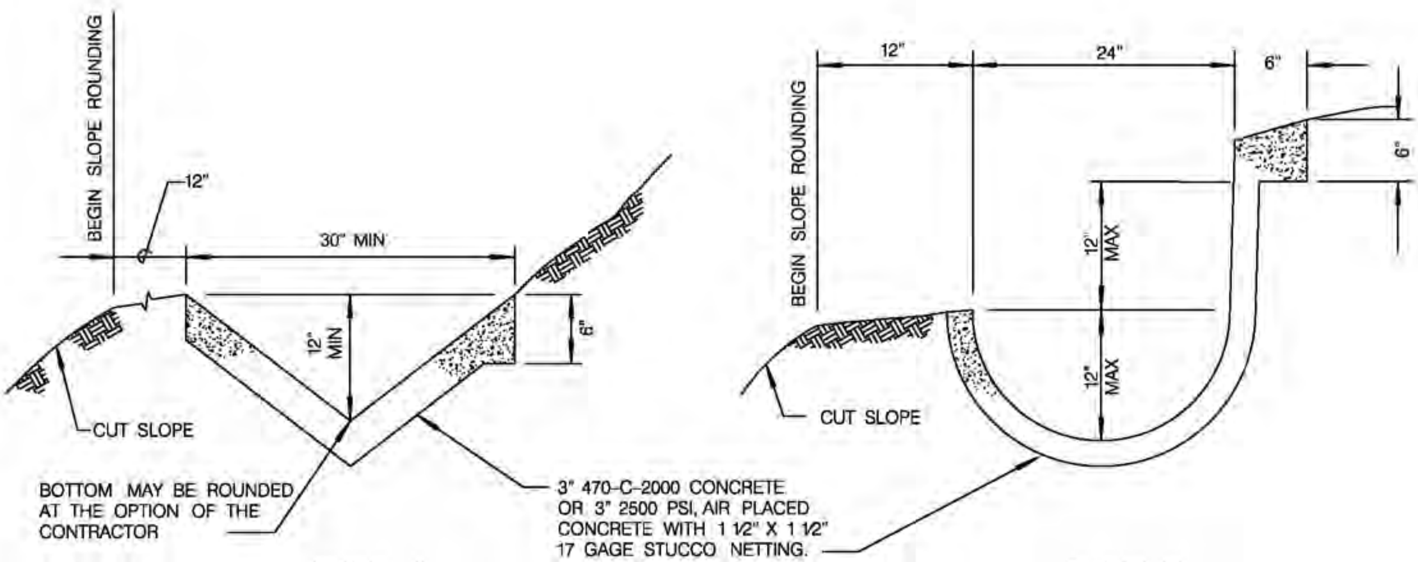
CITY OF SAN DIEGO – STANDARD DRAWING

CONCRETE ENERGY DISSIPATOR

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

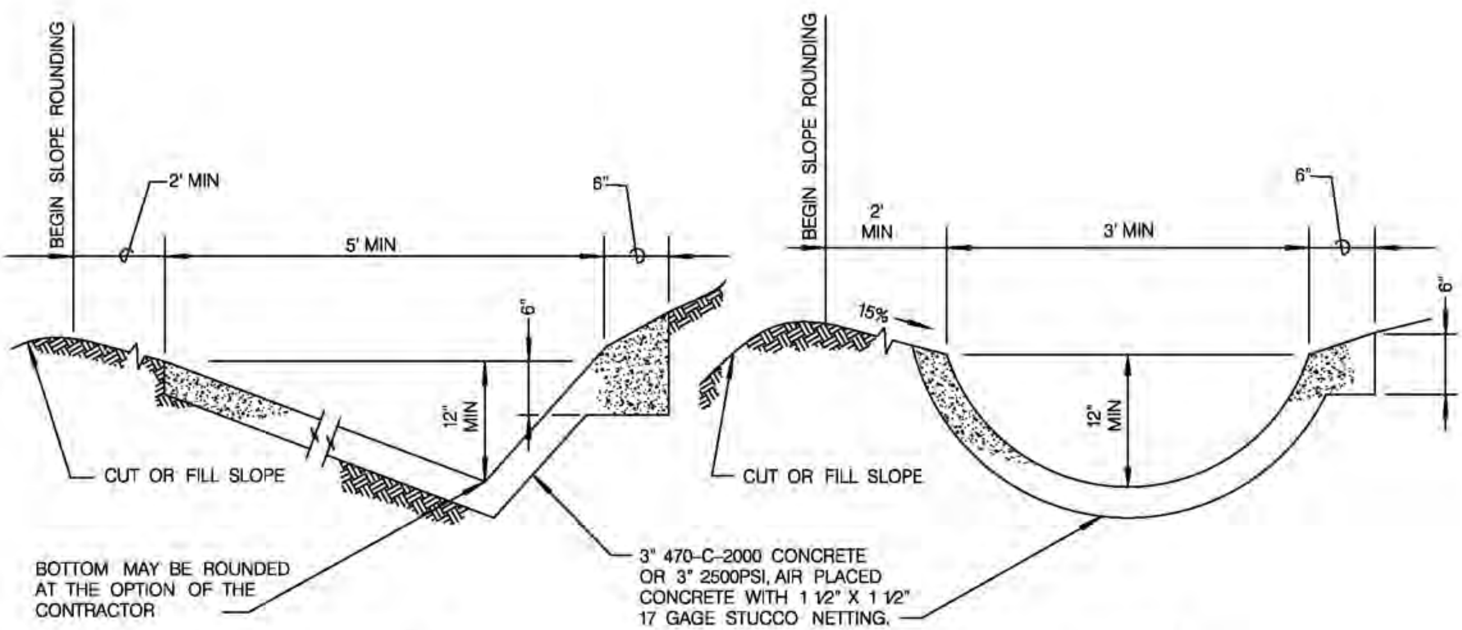
DRAWING NUMBER **SDD-105**



TYPE A

TYPE B

BROW DITCH



TYPE C

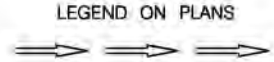
TYPE D

TERRACE DITCH

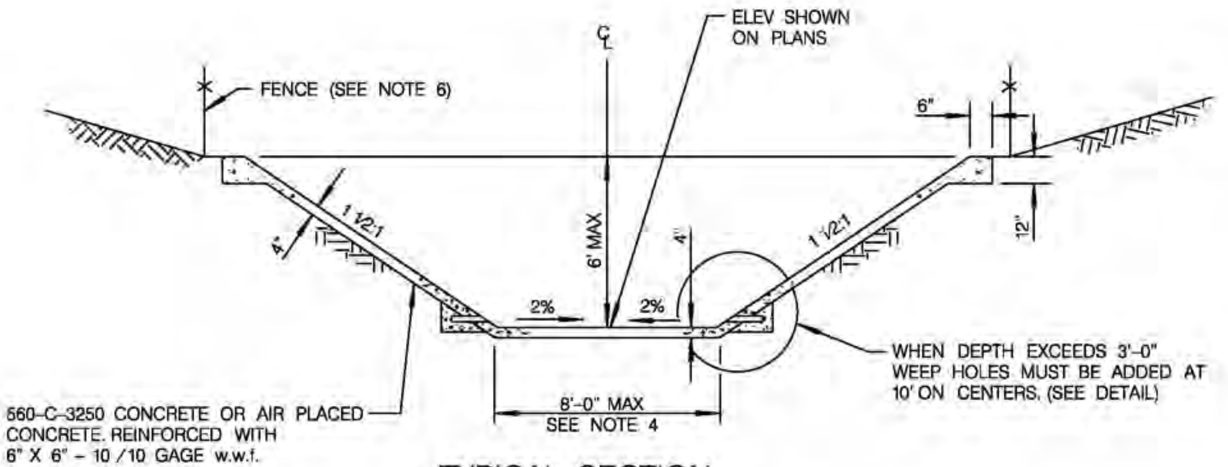
NOTES:

1. LONGITUDINAL SLOPE OF LINED DITCH SHALL BE 2% MINIMUM.
2. OVER SLOPE DOWN DITCHES SHALL EMPLOY 6" THICKENED EDGE SECTION AT BOTH SIDES OF DITCH.
3. STUCCO NETTING SHALL BE GALVANIZED AND SHALL HAVE 1 1/2" COVER.

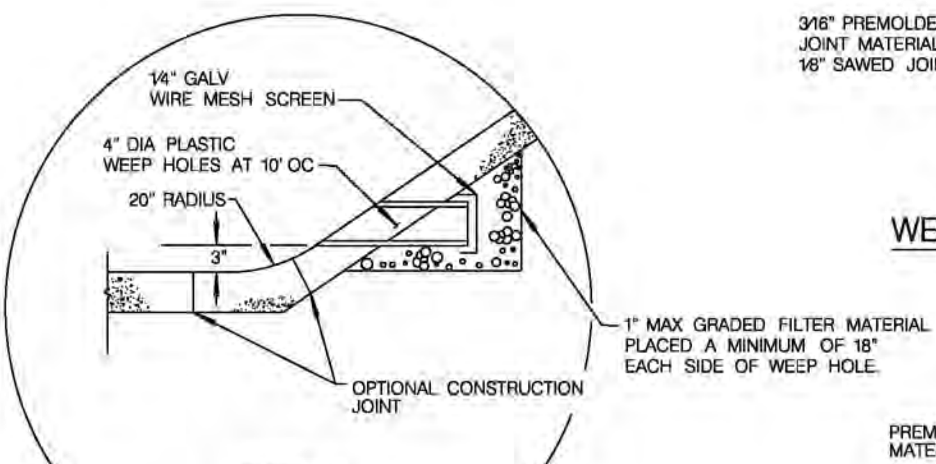
LEGEND ON PLANS



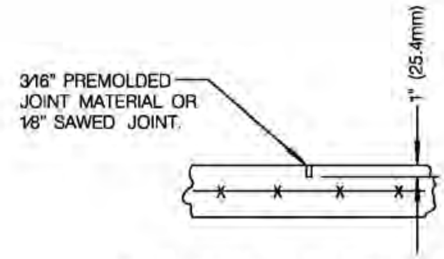
REVISION	BY	APPROVED	DATE		
ORIGINAL*	KA	J. NAGELVOORT	01/12	CITY OF SAN DIEGO - STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE 1/31/2012 COORDINATOR R.C.E. 65271 DATE
				DRAINAGE DITCHES	DRAWING NUMBER **SDD-106**



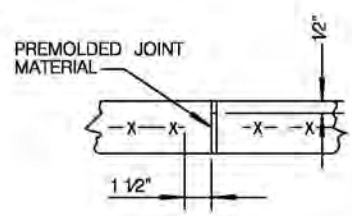
TYPICAL SECTION



DETAIL



WEAKENED PLANE JOINT



EXPANSION JOINT

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.
3. CUTOFF WALLS SHALL BE CONSTRUCTED AT EACH END OF THE CHANNEL ALONG THE FULL WIDTH OF SECTION. SEE D-72.
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 500' MAXIMUM INTERVALS. TWO 10' GATES OR ONE 20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND MAY BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.

LEGEND ON PLANS

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

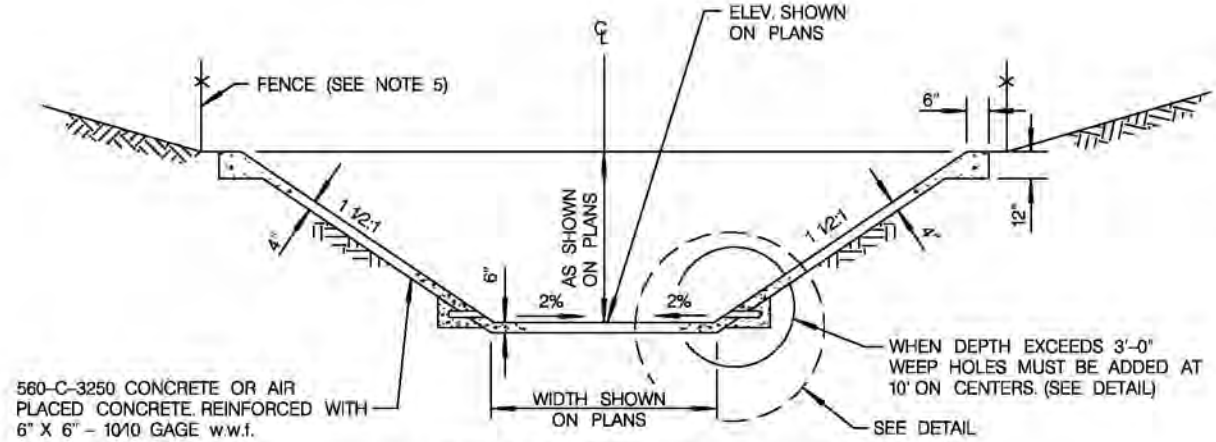
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

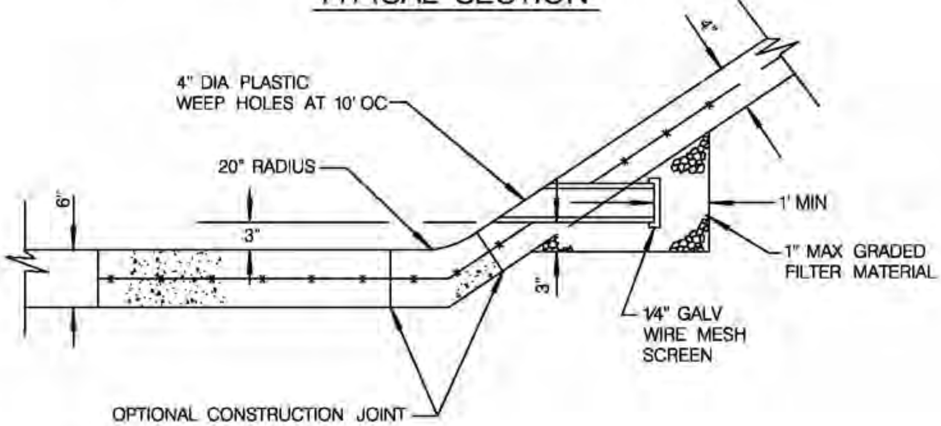
COORDINATOR R.C.E. 65271 DATE

MINOR DRAINAGE CHANNEL

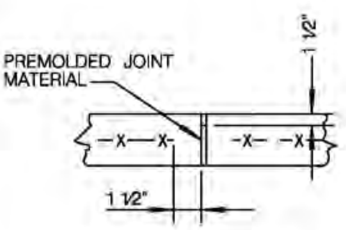
DRAWING NUMBER **SDD-107**



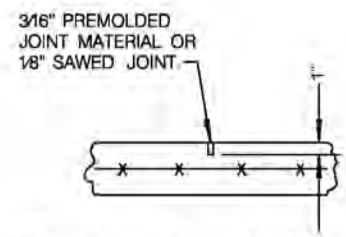
TYPICAL SECTION



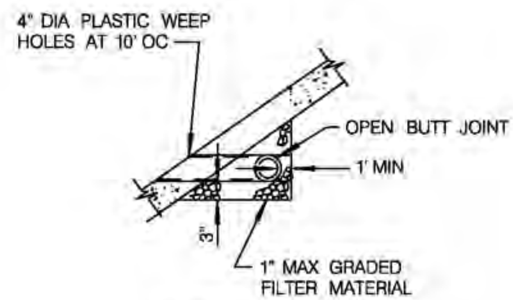
DETAIL



EXPANSION JOINT



WEAKENED PLANE JOINT



ALTERNATE CONTINUOUS DRAIN

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.
3. CUTOFF WALLS SHALL BE CONSTRUCTED AT EACH END OF THE CHANNEL ALONG THE FULL WIDTH OF SECTION.
4. REINFORCEMENT SHOWN IS MINIMUM.
5. CHANNELING FENCING IS REQUIRED. UNLESS OTHERWISE SHOWN ON THE PLANS A CHAIN LINK FENCE 6' IN HEIGHT, WITH A TOP RAIL SET AT 6" INSIDE EASEMENT BOUNDARY LINES SHALL BE CONSTRUCTED ON BOTH SIDES, INCLUDING BOX CULVERTS OR ANY OTHER STRUCTURE AT THE END OF THE CHANNEL. ACCESS POINTS SHALL BE PROVIDED ON BOTH SIDES AT 500' MAXIMUM INTERVALS. TWO 10' GATES OR ONE 20' GATE FOR VEHICULAR ACCESS ARE REQUIRED AT A MAXIMUM OF 1000' INTERVALS AND MAY BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.

LEGEND ON PLANS

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

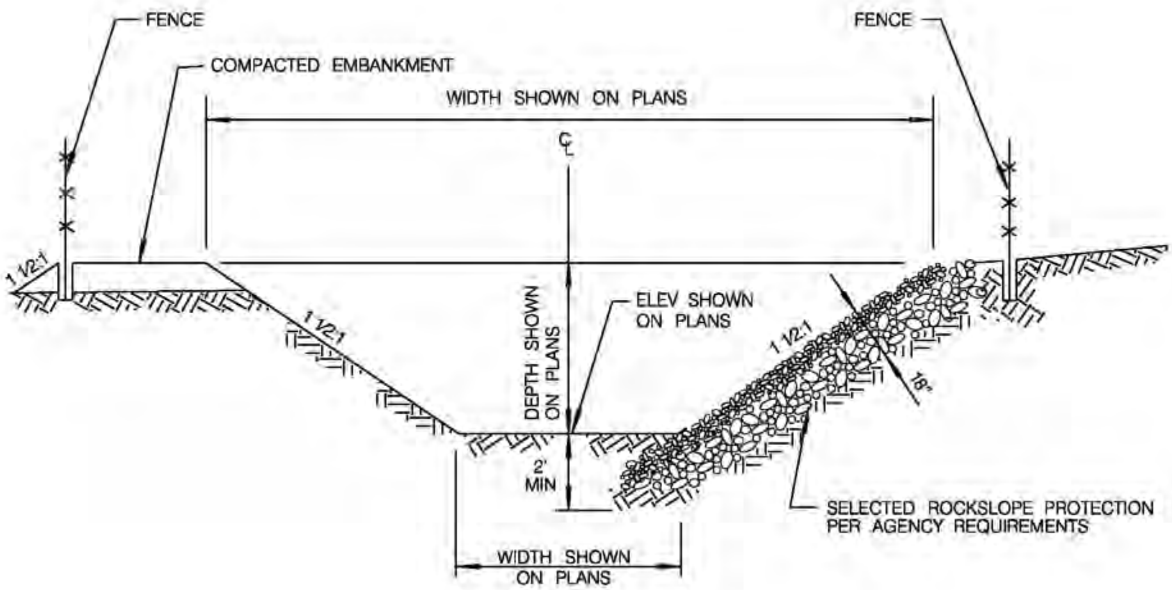
MAJOR DRAINAGE CHANNEL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hoshi 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-108**



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. 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.

LEGEND ON PLANS

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

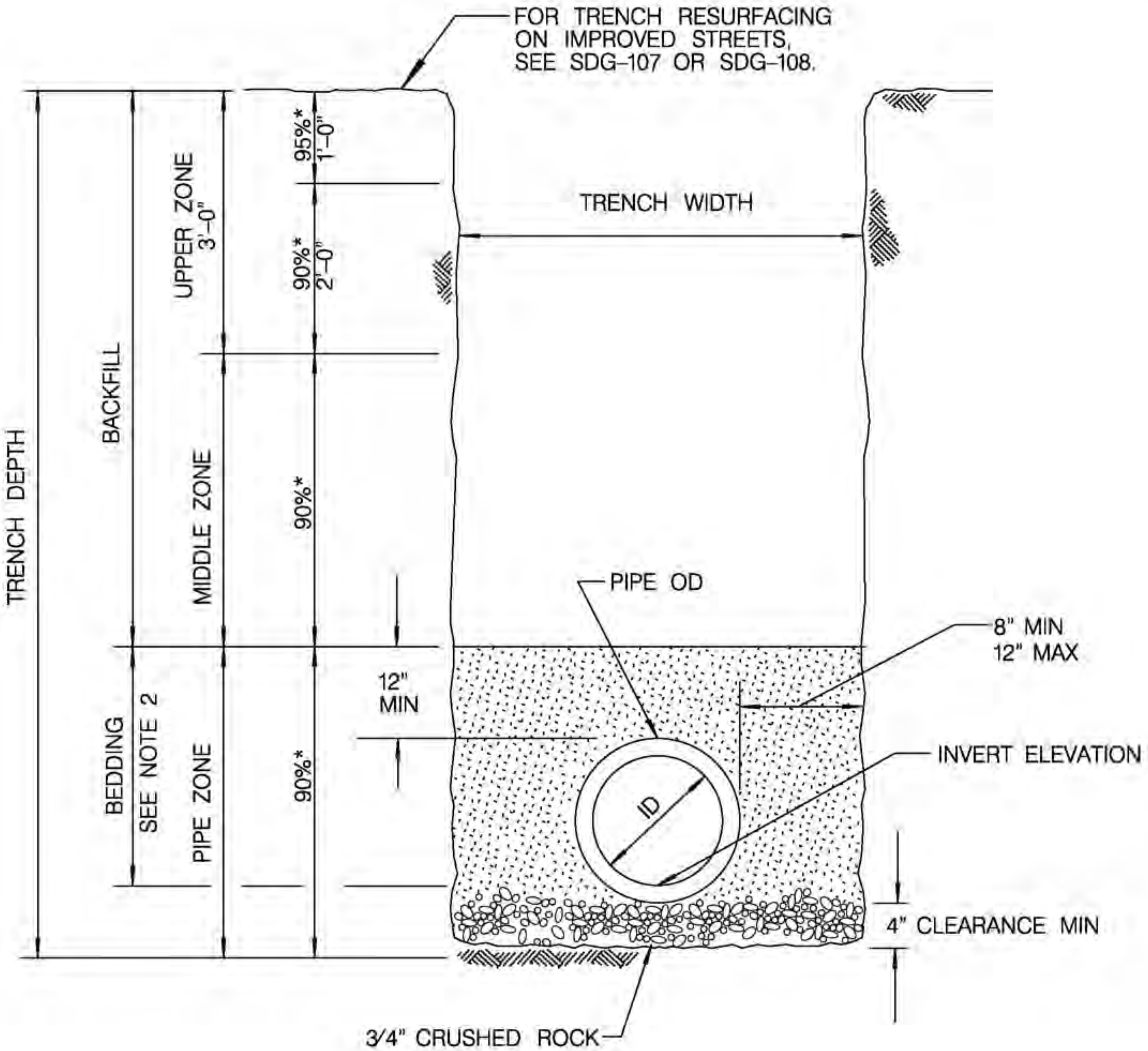
GRADED EARTH CHANNEL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-109**



SECTION

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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

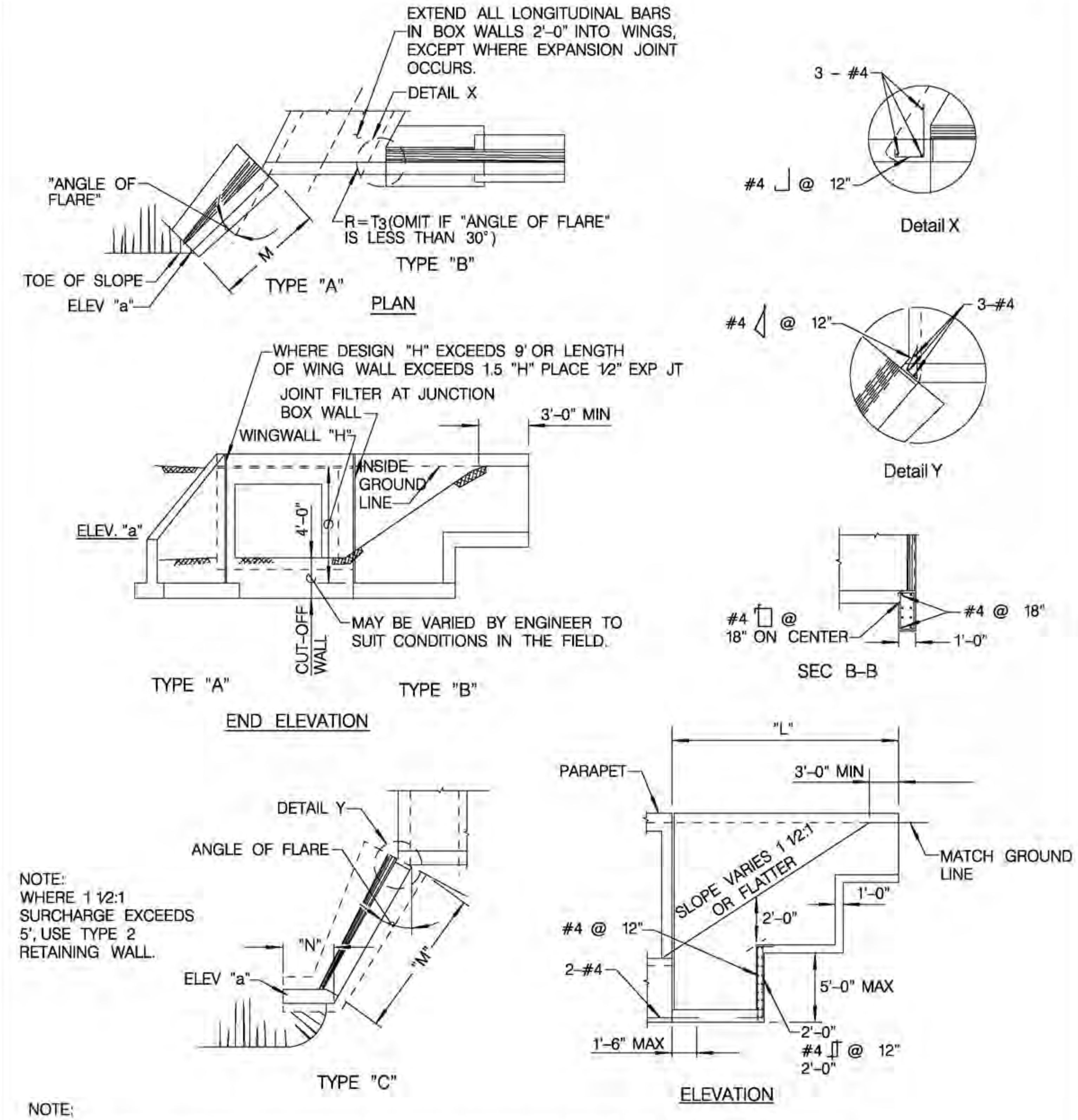
PIPE BEDDING AND TRENCH BACKFILL FOR STORM DRAINS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

[signature] 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-110**



NOTE:

CHANNEL FENCING IS REQUIRED. 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 MXIMUM OF 1000' INTERVALS AND SHALL BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

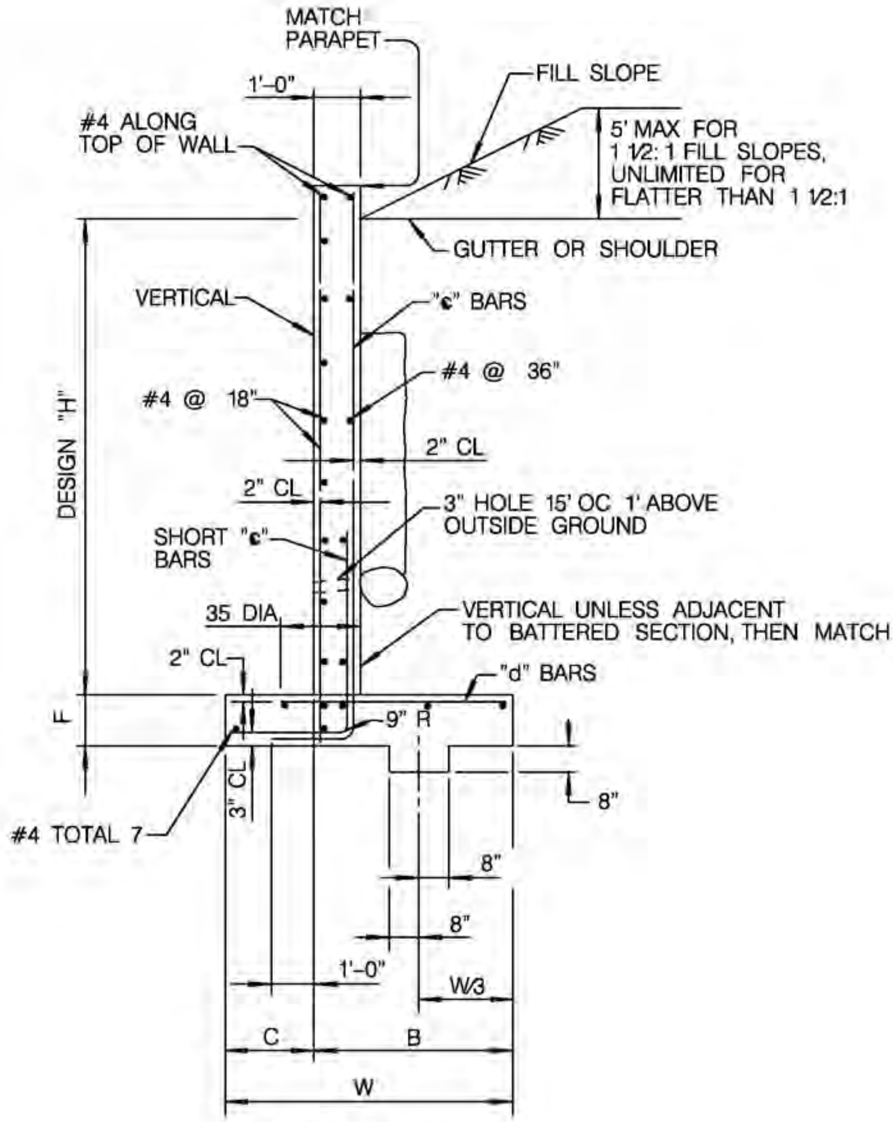
BOX CULVERT WINGWALL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-111**



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

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

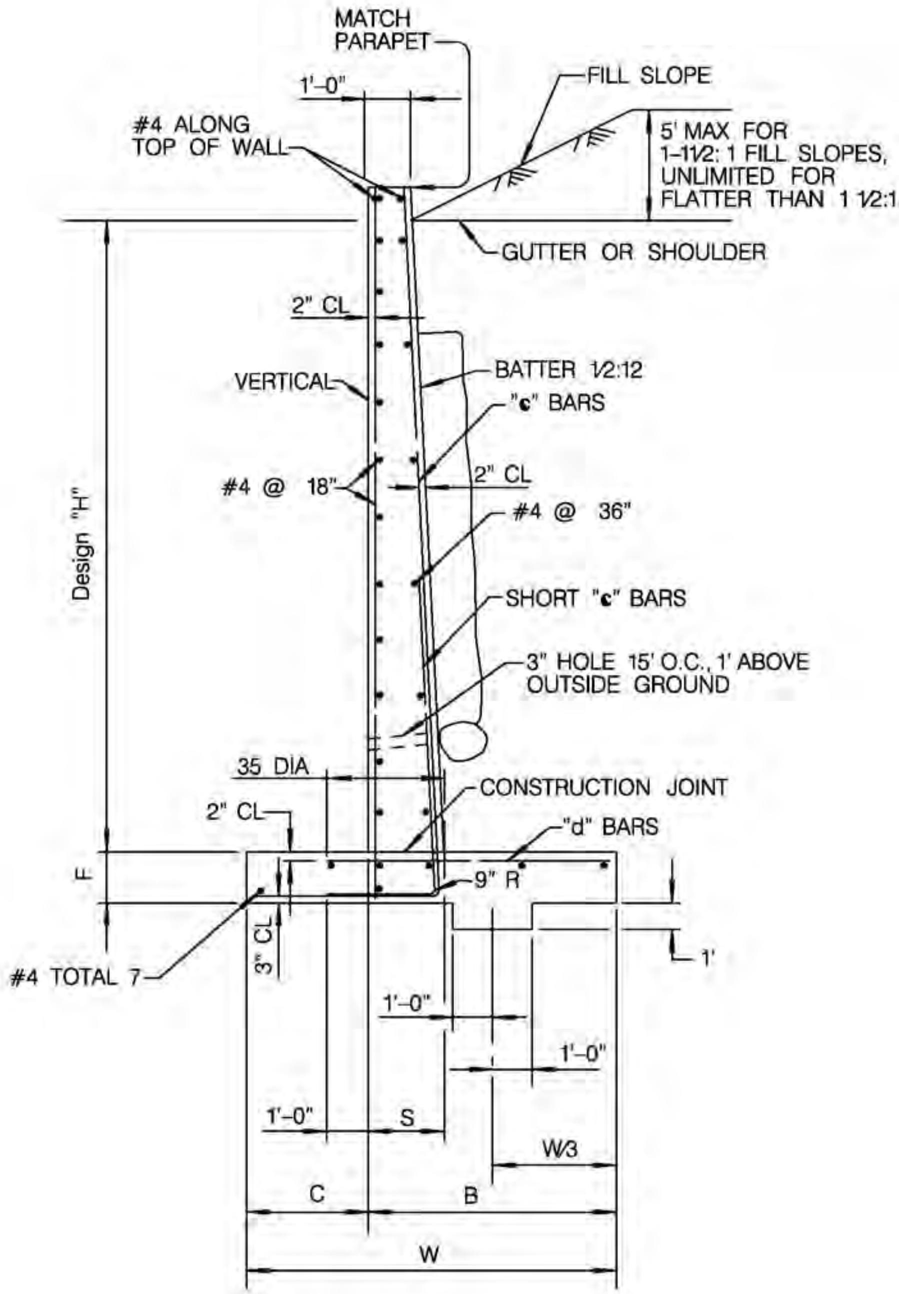
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

BOX CULVERT WINGWALL

DRAWING NUMBER **SDD-111**



TYPICAL SECTION
H=13'-0" THRU 16'-0"

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

BOX CULVERT WINGWALL

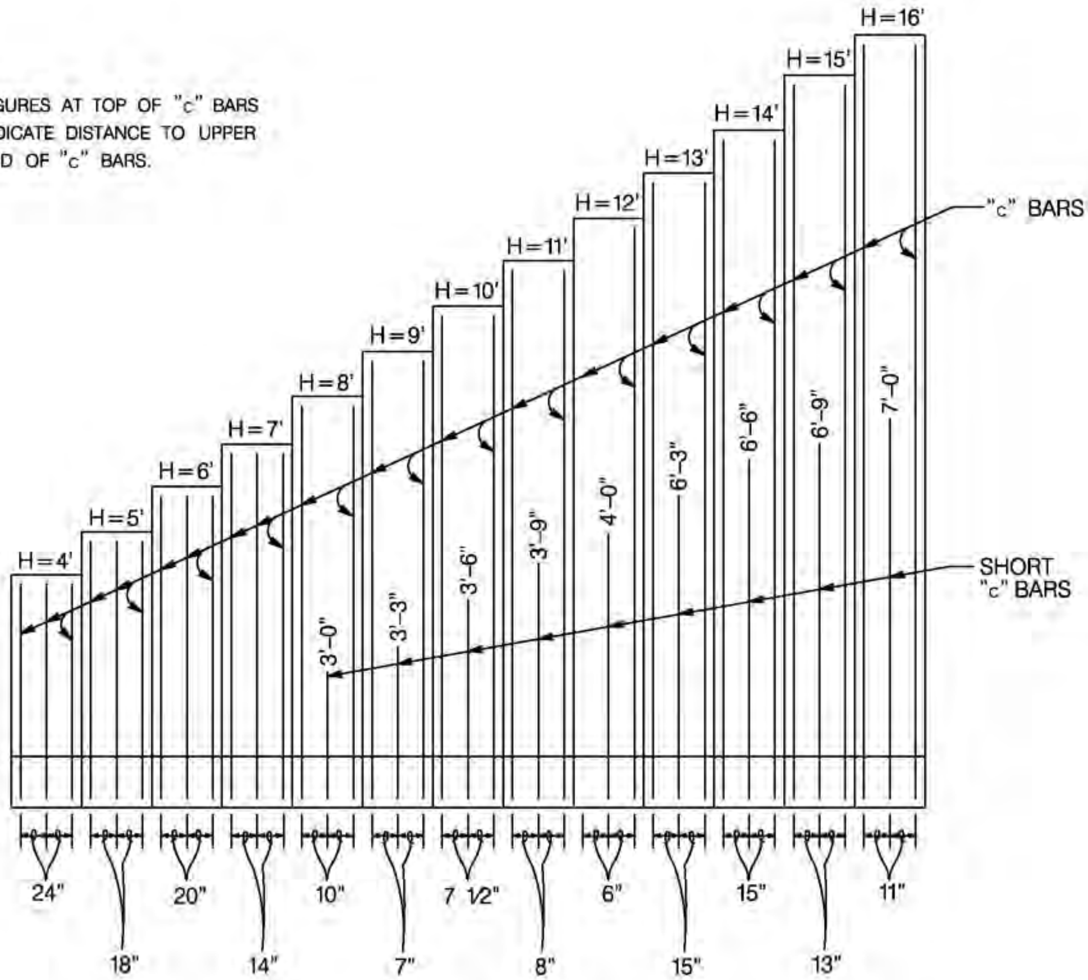
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-111**

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



TYPICAL LAYOUT EXAMPLE 1

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

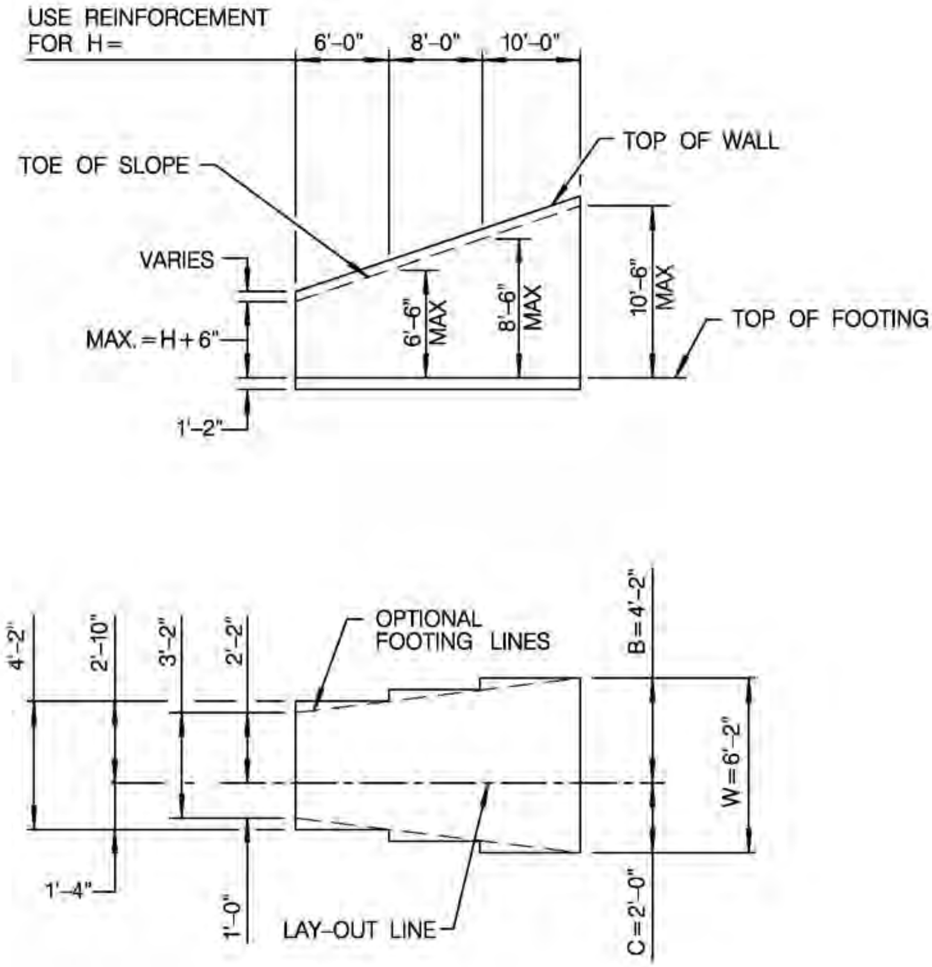
BOX CULVERT WINGWALL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-111**



TYPICAL LAYOUT EXAMPLE 2

NOTES:

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

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

3. WALL HEIGHT MAY BE EXCEEDED BY 6" BEFORE GOING TO NEXT GREATER "H".
   ELIMINATE CUTOFF WALL IF ADJACENT CHANNEL IS PAVED AND SKEW IS 20° MAXIMUM.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

BOX CULVERT WINGWALL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDD-111**

REINFORCED CONCRETE WINGWALLS – US

"H"	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
W	3'-2"	3'-8"	4'-2"	4'-8"	5'-2"	5'-8"	6'-2"	6'-8"	7'-2"	7'-8"	8'-2"	8'-8"	9'-2"
C	1'-0"	1'-2"	1'-4"	1'-6"	1'-8"	1'-10"	2'-0"	2'-2"	2'-4"	2'-6"	2'-8"	2'-10"	3'-0"
B	2'-2"	2'-6"	2'-10"	3'-2"	3'-6"	3'-10"	4'-2"	4'-6"	4'-10"	5'-2"	5'-6"	5'-10"	6'-2"
F	1'-2"												
Batter	None									1/2 : 12			
S	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6 1/2"	1'-7"	1'-7 1/2"	1'-8"
"c" Bars	#4@24	#4@18	#5@20	#5@14	#5@10	#5@7	#6@7 1/2"	#7@8	#7@6	#9@15	#10@15	#10@13	#10@11
"d" Bars	#4@24	#4@18	#5@20	#5@14	#5@10	#6@14	#7@15	#8@16	#7@12	#8@15	#9@15	#10@13	#9@11
Conc cy/lf	0.32	0.38	0.44	0.49	0.55	0.61	0.67	0.73	0.79	1.02	1.10	1.18	1.26
Reinf #/lf	13	16	19	25	30	37	49	62	76	73	90	104	125

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

REVISION	BY	APPROVED	DATE
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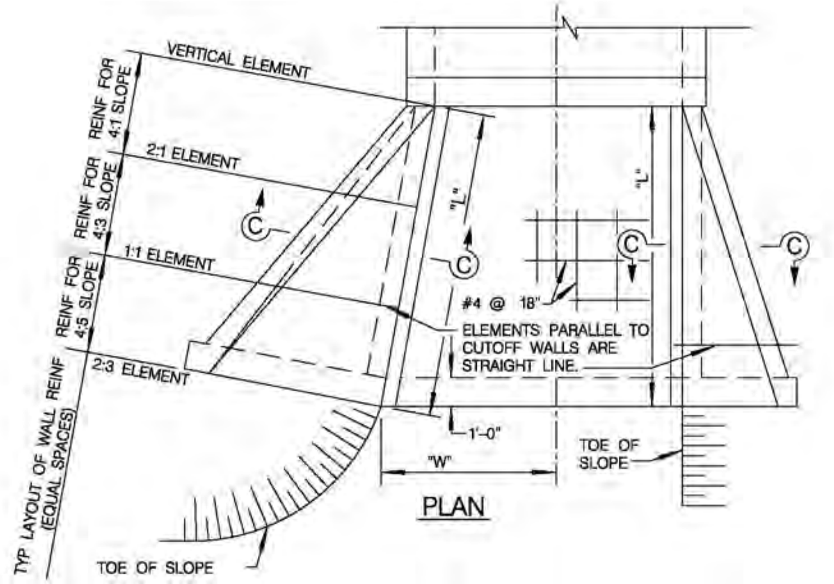
CITY OF SAN DIEGO – STANDARD DRAWING

BOX CULVERT WINGWALL

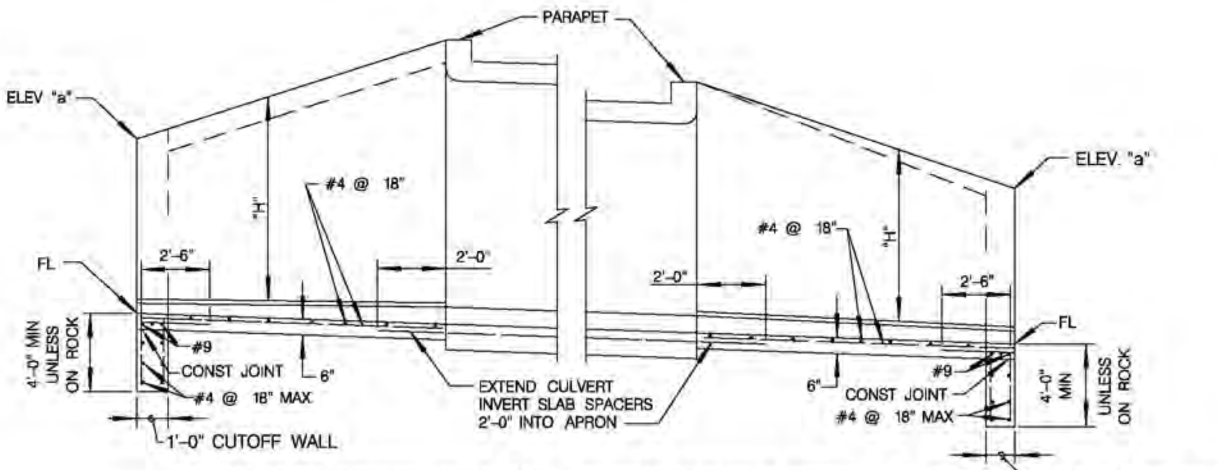
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDD-111**

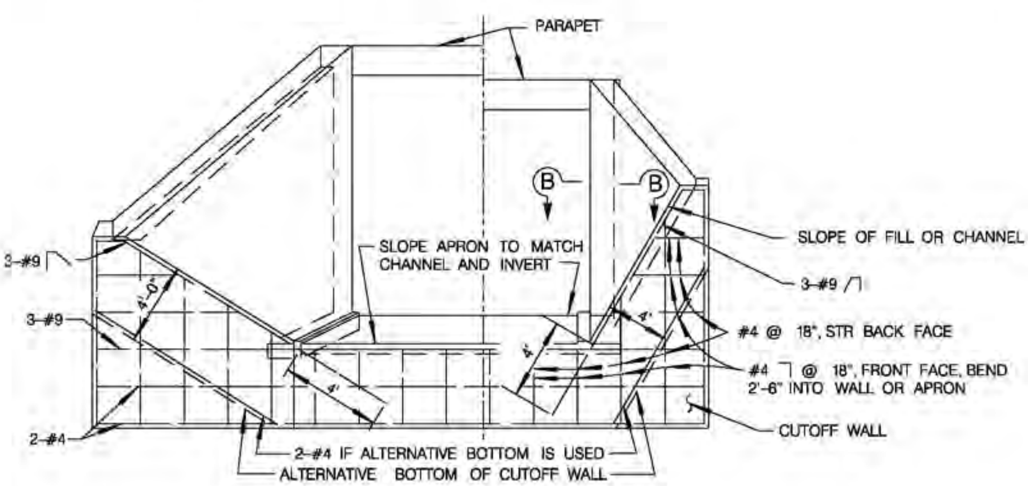


PLAN



TYPICAL WITH STIFFENING BEAM — TYPICAL WITHOUT STIFFENING BEAM

PART LONGITUDAL SECTION



END ELEVATION

SHEET 1 OF 3

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

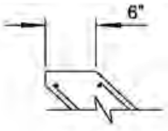
BOX CULVERT WARPED WINGWALL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

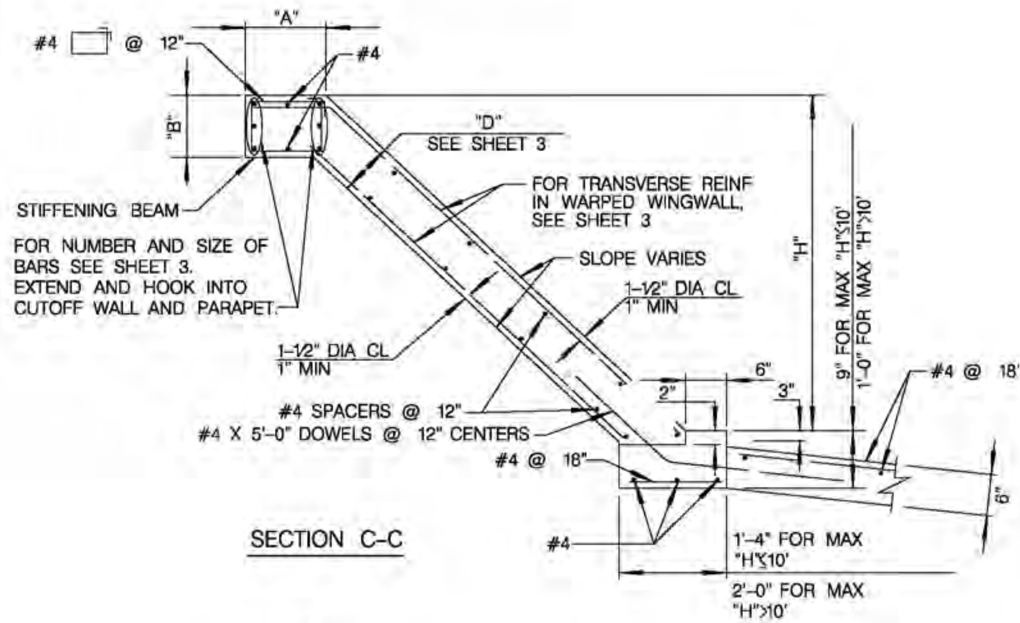
1/31/2012

COORDINATOR R.C.E. 65271 DATE

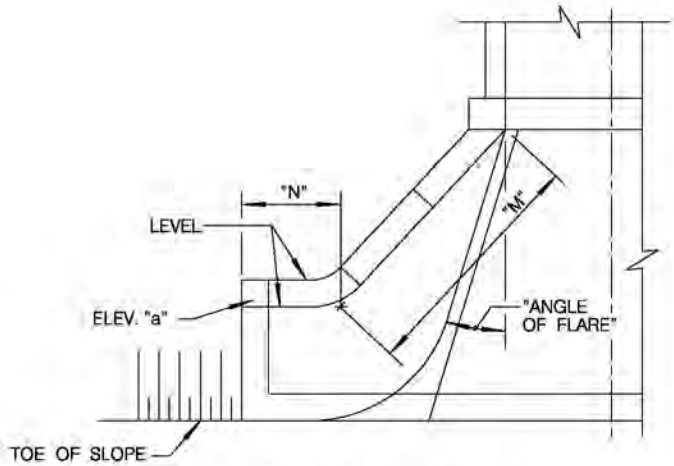
DRAWING NUMBER **SDD-112**



WITHOUT STIFFENING BEAM

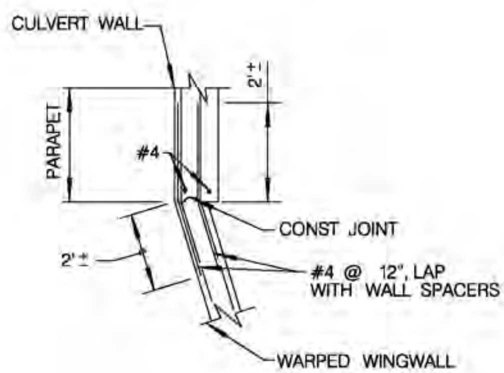


SECTION C-C



ALTERNATIVE WARPED WINGWALL

USE WHERE ADDITIONAL PROTECTION TO TOE OF EMBANKMENT IS REQIRED



SECTION B-B

NOTES:

1. WALLS DESIGNED FOR 2' SURCHAGE; 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. 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 MXIMUM OF 1000' INTERVALS AND BE PLACED ON EITHER SIDE. THE REMAINING ACCESS POINTS SHALL BE 4' GATES.

SHEET 2 OF 3

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

BOX CULVERT WARPED WINGWALL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-112**

WARPED WINGWALLS – U.S. MEASUREMENT TABLE ONLY

WALL DIMENSIONS AND REINFORCING								
Element Slope	"H"	8'or less	10'	12'	14'	16'	18'	20'
1⁄4:1	Front face reinf	#4@12	#4@7	#5@7	#5@5	#6@6	#7@7	#7@6
	Rear face reinf	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12
3⁄4:1	Front face reinf	#4@12	#4@12	#4@12	#4@12	#4@10	#4@8	#4@6
	Rear face reinf	#4@12	#4@12	#4@12	#4@10	#4@7	#4@6	#5@8
1–1⁄4:1	Front face reinf	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12
	Rear face reinf	#4@8	#4@8	#4@5	#5@6	#6@7	#6@6	#7@6
"D" at Cutoff Wall		6"	6"	6"	7–1⁄2"	8"	9–1⁄2"	11"
"D" at Culvert		6"	6"	6"	8"	9–1⁄2"	11"	1'–1"

STIFFENING BEAM DIMENSIONS AND REINFORCING									
"H" max \ "L"	12'	14'	16'	18'	20'	25'	30'	35'	40' or more
6'	No beam. Place 2–#6 in each								
8'	face along top of				"A" = 1'–0"				
10'	wall.							"A" = 1'–6"	
12'				"B" = 9"					
14'		Total 6–#6				"B" = 1'–0"		"A" = 1'–10"	
16'								"B" = 1'–0"	"A" = 2'–0"
18'					Total 6–#7		Total 6–#8	"B" = 1'–6"	
20'								Total 8–#9	

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

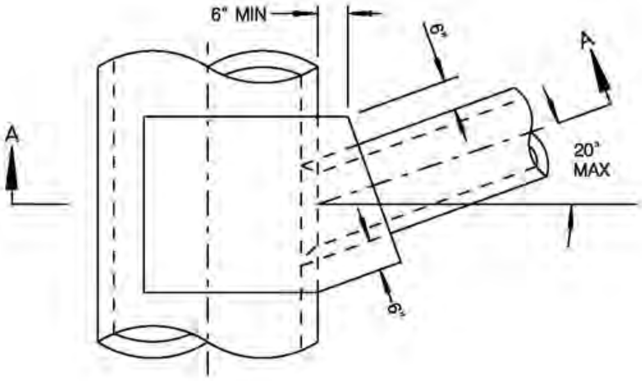
BOX CULVERT WARPED WINGWALL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

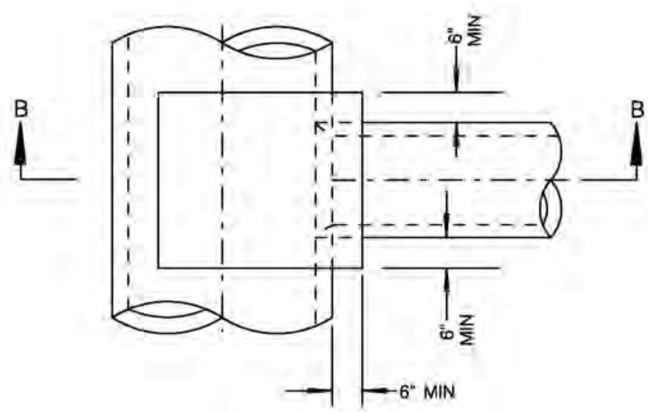
COORDINATOR R.C.E. 65271 1/31/2012 DATE

DRAWING NUMBER **SDD-112**

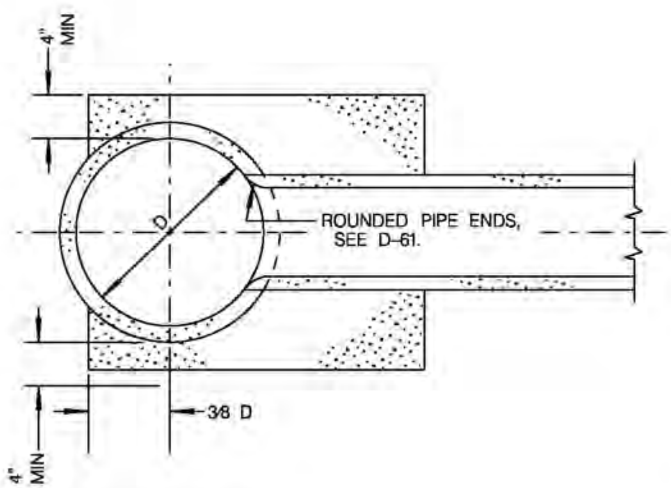
SHEET 3 OF 3



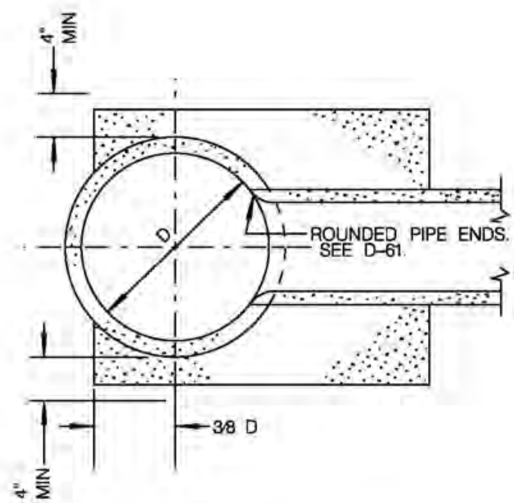
PLAN
SKEWED CONNECTION



PLAN
PERPENDICULAR CONNECTION



SECTION A–A

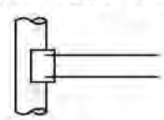


SECTION B–B

NOTES:

1. THE END OF CONNECTING PIPE SHALL NOT PROJECT INTO THE WATERWAY OF THE LARGER PIPE
2. THE LARGER PIPE SHALL NOT BE LESS THAN 24" ID.
3. THE OD OF SMALLER PIPE SHALL NOT BE MORE THAN 2/3 THE SIZE OF THE LARGER PIPE ID.
4. CONCRETE SHALL BE 470-C-2000.

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
UPDATED*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

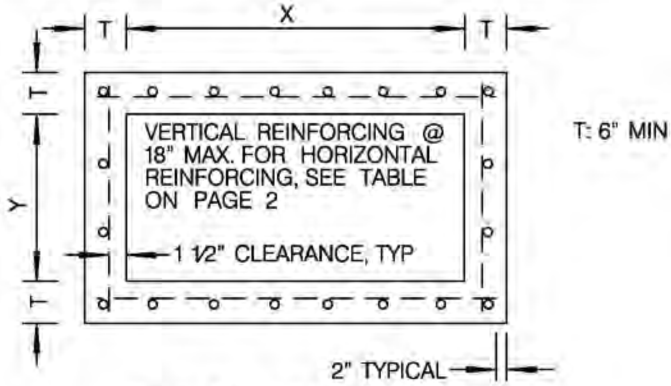
CONCRETE LUG

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

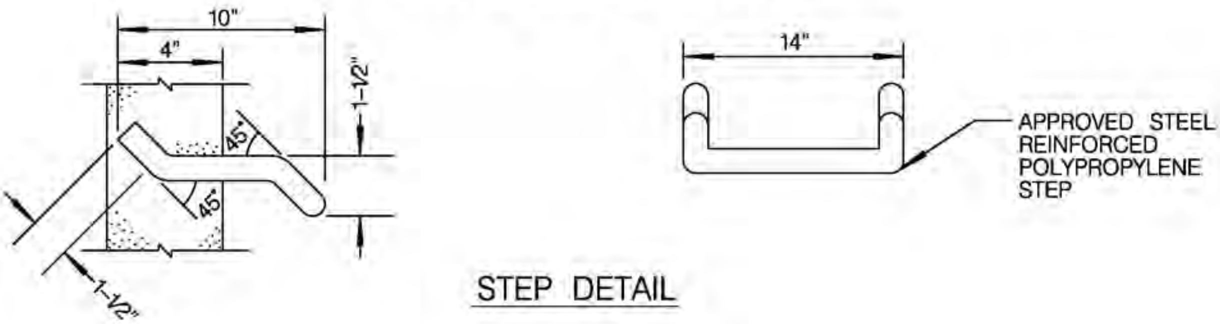
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-113**



TYPICAL BOX SECTION



STEP DETAIL

NOTES:

1. CONCRETE SHALL BE 560-C-3250 UNLESS OTHERWISE NOTED.
2. REINFORCING STEEL SHALL COMPLY WITH THIS DRAWING UNLESS OTHERWISE SPECIFIED.
3. REINFORCING STEEL SHALL BE INTERMEDIATE GRADE DEFORMED BARS CONFORMING TO LATEST ASTM SPECIFICATIONS.
4. BENDS SHALL BE IN ACCORDANCE WITH LATEST ACI CODE.
5. MINIMUM SPLICE LENGTH FOR REINFORCING SHALL BE 30 DIAMETERS.
6. FLOOR SHALL HAVE A WOOD TROWEL FINISH AND, EXCEPT WHERE USED AS JUNCTION BOXES, SHALL HAVE A MINIMUM SLOPE OF 1:12 TOWARD THE OUTLET.
7. DEPTH V IS MEASURED FROM THE TOP OF THE STRUCTURE TO THE FLOWLINE OF THE BOX.
8. WALL THICKNESS AND REINFORCING STEEL REQUIRED MAY BE DECREASED IN ACCORDANCE WITH TABLE ABOVE.
9. WALL THICKNESS SHALL BE STEPPED ON THE OUTSIDE OF THE BOX.
10. WHEN THE STRUCTURE DEPTH V EXCEEDS 4', STEPS SHALL BE CAST INTO THE WALL AT 15" INTERVALS FROM 15" ABOVE FLOOR TO WITHIN 12" OF TOP OF STRUCTURE. PLACE STEPS IN WALL WITHOUT PIPE OPENING, OTHERWISE OVER OPENING OF SMALLEST DIAMETER.
11. ALTERNATE STEP MAY BE AN APPROVED STEEL REINFORCED POLYPROPYLENE STEP.
12. UPON APPROVAL OF THE ENGINEER, AS DEFINED BY SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, THE USE OF PRECAST STORM STRUCTURES IS ACCEPTABLE A 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 IMBEDED 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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

INLETS AND CLEANOUTS

NOTES AND DETAILS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDD-114**

BOX SECTION REINFORCEMENT			
MAXIMUM SPAN X OR Y	DEPTH V	THICKNESS T	HOR. & FLR. REINF.
3'-0" TO 4'-0"	4'-0"	6"	#4 18"
4'-1" TO 7'-0"		6"	#4 12"
7'-0" TO 8'-0"		6"	#4 8"
3'-0" TO 4'-0"	4'-1" TO 8'-0"	6"	#4 18"
4'-1" TO 5'-0"		6"	#4 12"
5'-1" TO 6'-0"		6"	#4 8"
6'-1" TO 8'-0"		6"	#4 6"
3'-0" TO 4'-0"	8'-1" TO 12'-0"	6"	#4 15"
4'-1" TO 5'-0"		8"	#4 12"
5'-1" TO 6'-0"		8"	#4 8"
6'-1" TO 8'-0"		8"	#4 6"
3'-0" TO 4'-0"	12'-1" TO 16'-0"	8"	#4 12"
4'-1" TO 5'-0"		8"	#4 12"
5'-1" TO 6'-0"		8"	#4 8"
6'-1" TO 7'-0"		8"	#4 6"
7'-1" TO 8'-0"		8"	#5 8"
3'-0" TO 4'-0"	16'-1" TO 20'-0"	8"	#4 12"
4'-1" TO 5'-0"		10"	#4 12"
5'-1" TO 6'-0"		10"	#4 8"
6'-1" TO 7'-0"		10"	#4 6"
7'-1" TO 8'-0"		10"	#5 8"
3'-0" TO 4'-0"	20'-1" TO 24'-0"	8"	#4 12"
4'-1" TO 5'-0"		10"	#4 12"
5'-1" TO 6'-0"		10"	#4 8"
6'-1" TO 7'-0"		10"	#4 6"
7'-1" TO 8'-0"		12"	#5 8"

HORIZONTAL REINFORCING

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

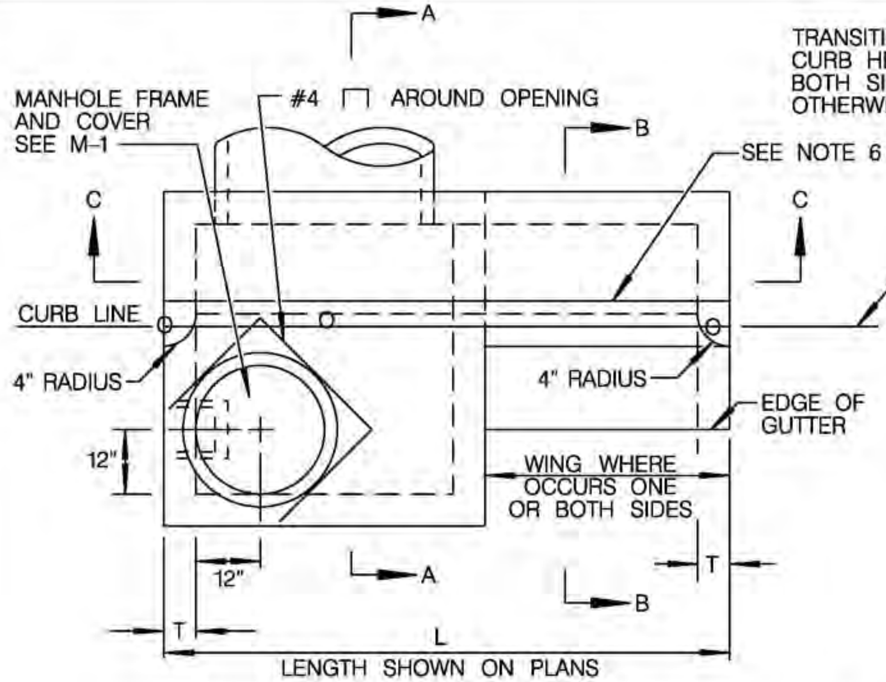
INLETS AND CLEANOUTS
NOTES AND DETAILS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

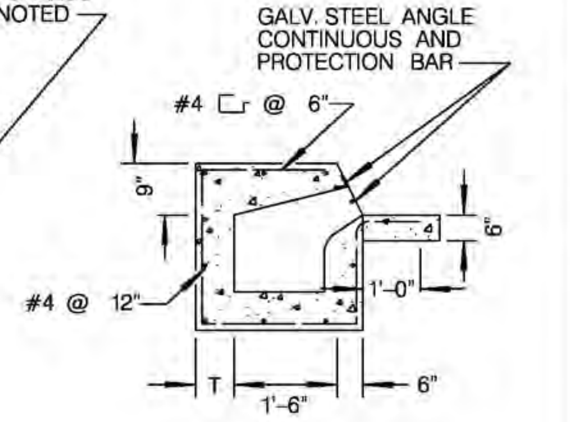
1/31/2012

COORDINATOR R.C.E. 65271 DATE

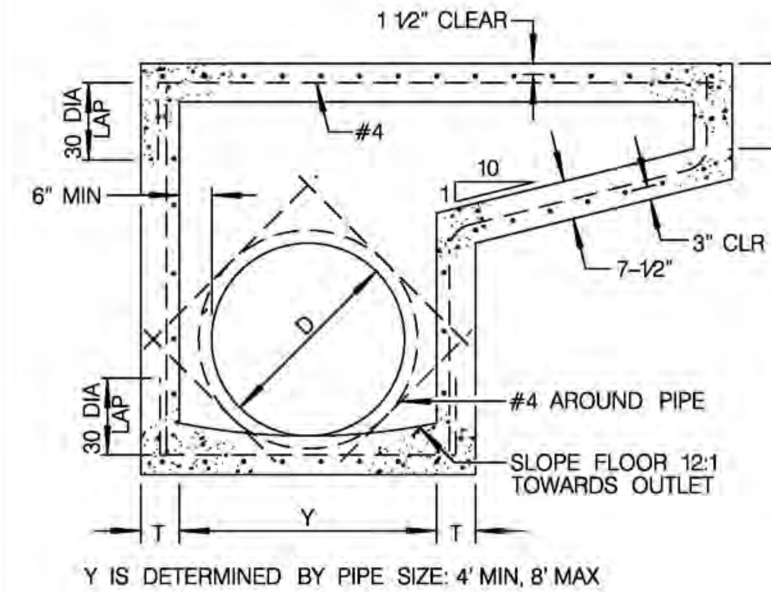
DRAWING NUMBER **SDD-114**



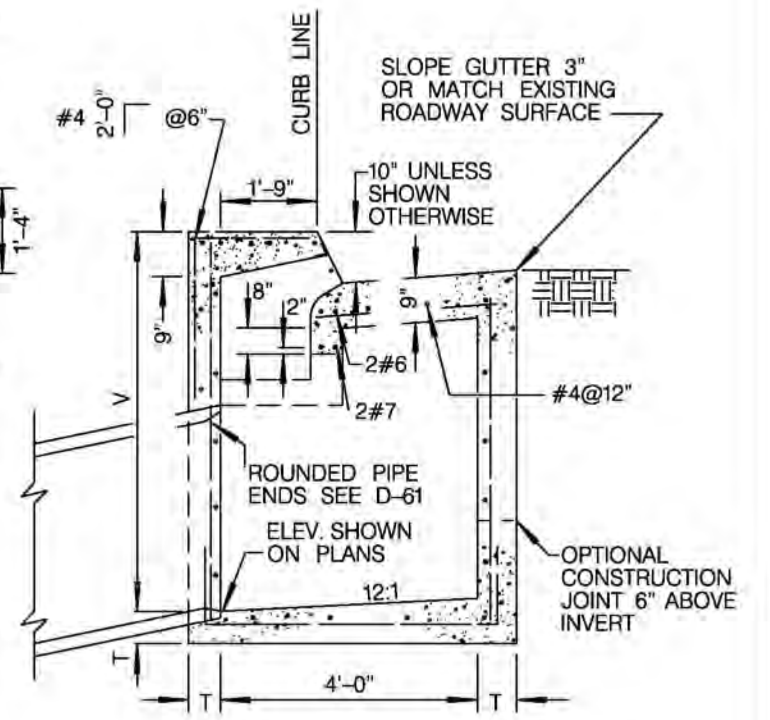
PLAN



SECTION B–B



SECTION C–C

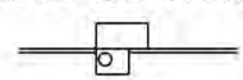


SECTION A–A

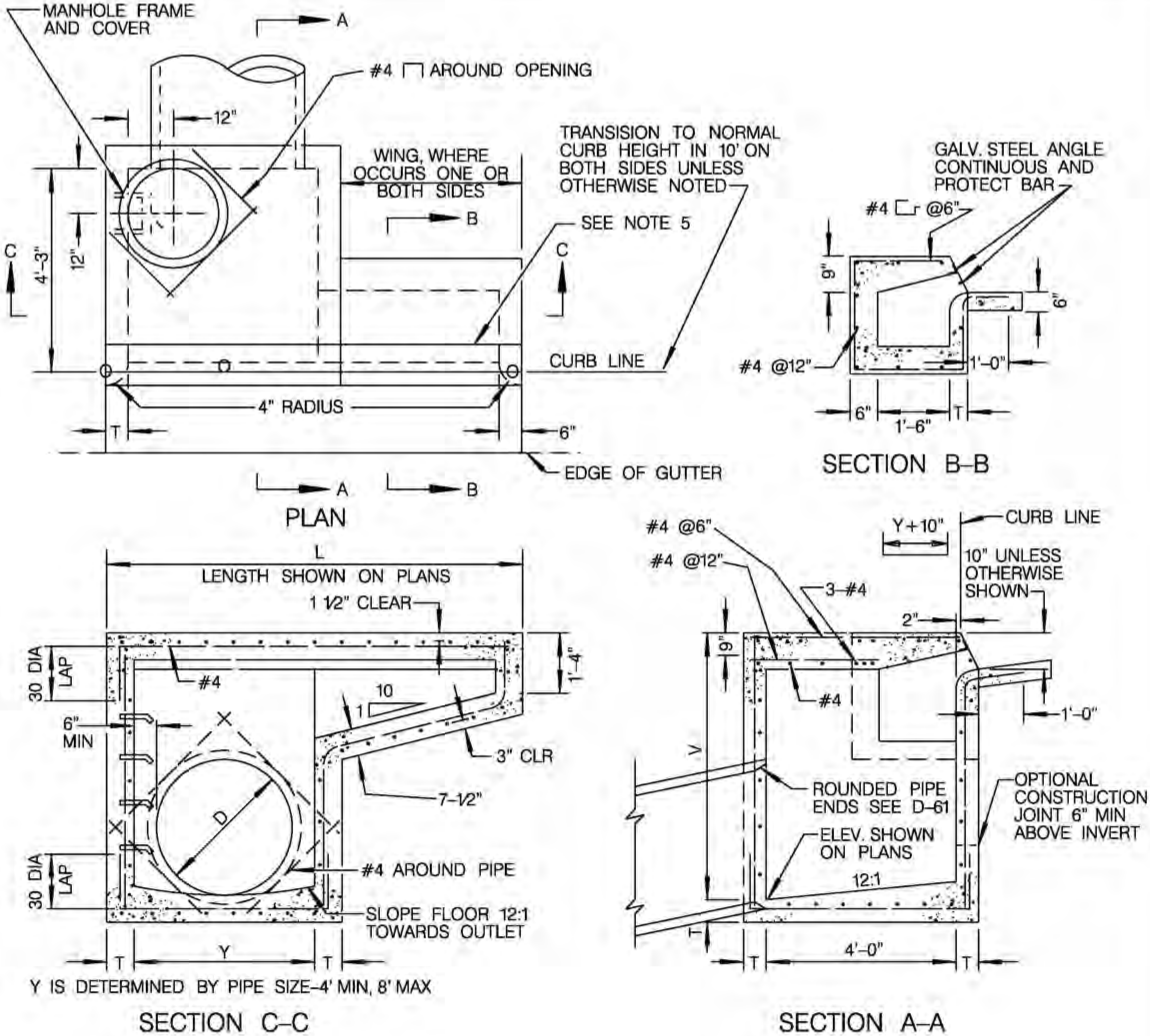
NOTES

1. TYPES ARE DESIGNATED AS FOLLOWS: (NO WING)A, (ONE WING)A-1, (TWO WINGS)A-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.
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. INSTALL INLET MARKER.

LEGEND ON PLANS



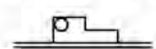
REVISION	BY	APPROVED	DATE		
ORIGINAL*	KA	J. NAGELVOORT	01/12	CITY OF SAN DIEGO – STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE 1/31/2012 COORDINATOR R.C.E. 65271 DATE
				CURB INLET - TYPE A	DRAWING NUMBER **SDD-115**



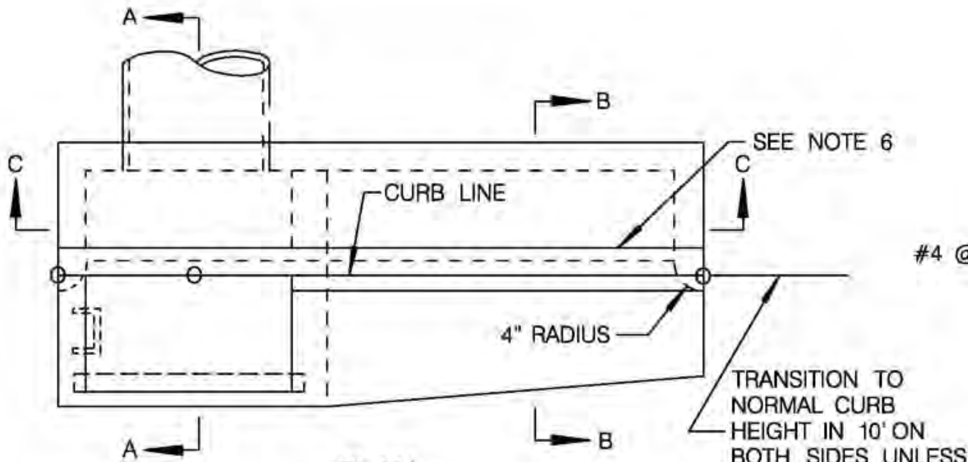
NOTES

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.
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.

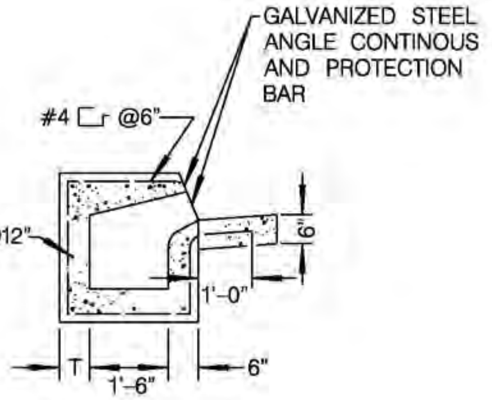
LEGEND ON PLANS



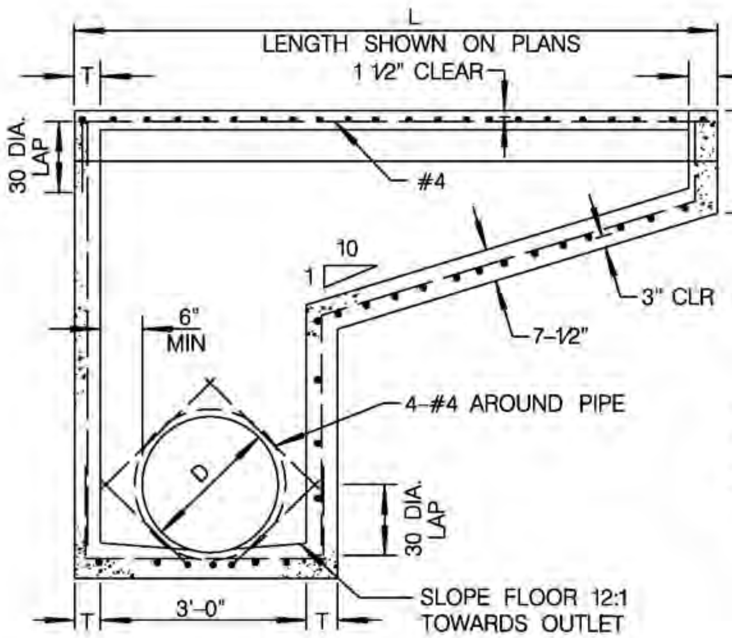
REVISION	BY	APPROVED	DATE		
ORIGINAL*	KA	J. NAGELVOORT	01/12	CITY OF SAN DIEGO - STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE 1/31/2012 COORDINATOR R.C.E. 65271 DATE
				CURB INLET - TYPE B	DRAWING NUMBER **SDD-116**



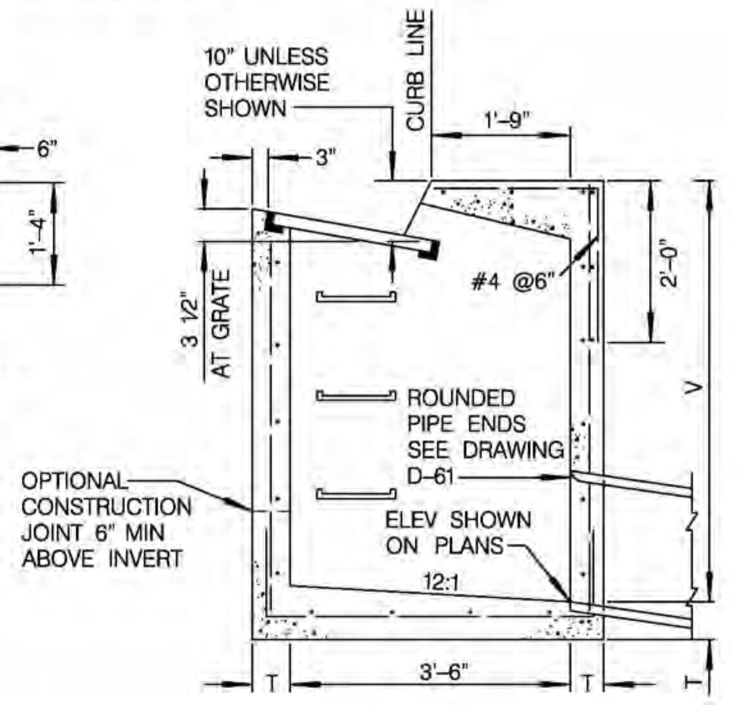
PLAN



SECTION B–B

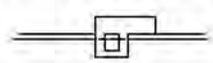


SECTION C–C



SECTION A–A

LEGEND ON PLANS



NOTES

1. TYPES ARE DESIGNATED AS FOLLOWS: (NO WING) C, (ONE WING) C-1, (TWO WINGS) C-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 PLACE AT THE ENDS OF THE INLET WHERE THE CURB IS TO ADJOIN.
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 GRATE.
9. INSTALL INLET MARKER.
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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

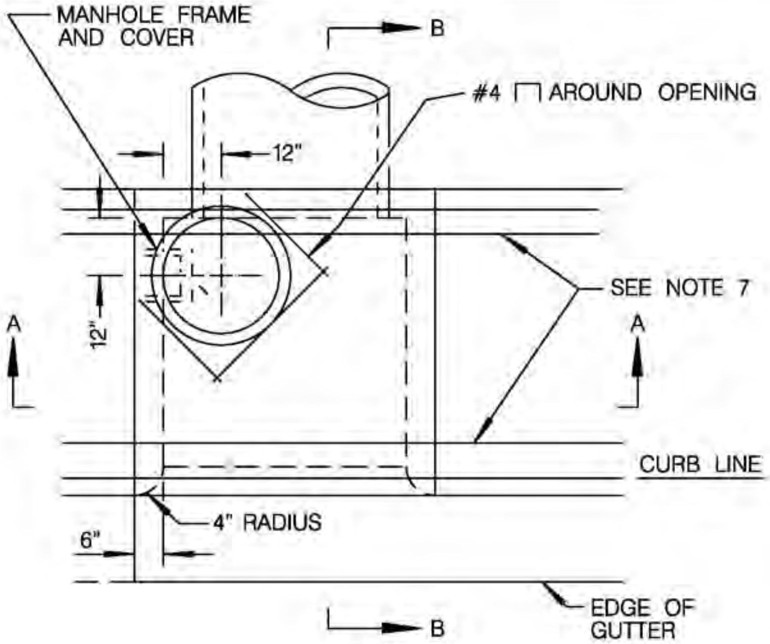
CURB INLET - TYPE C

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

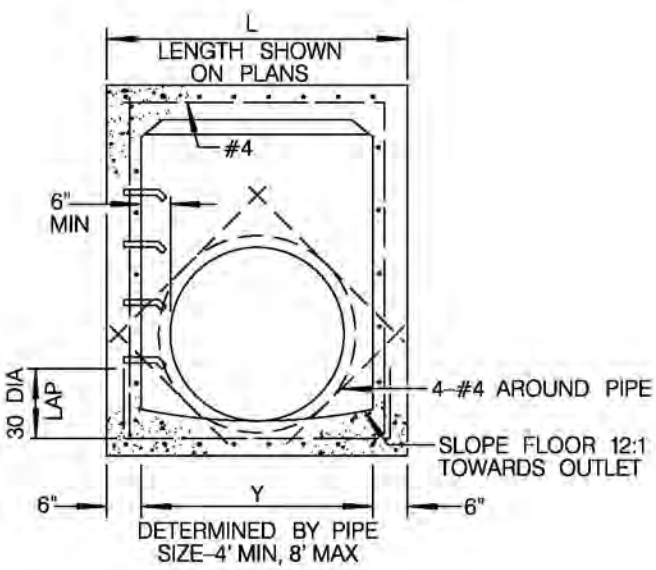
1/31/2012

COORDINATOR R.C.E. 65271 DATE

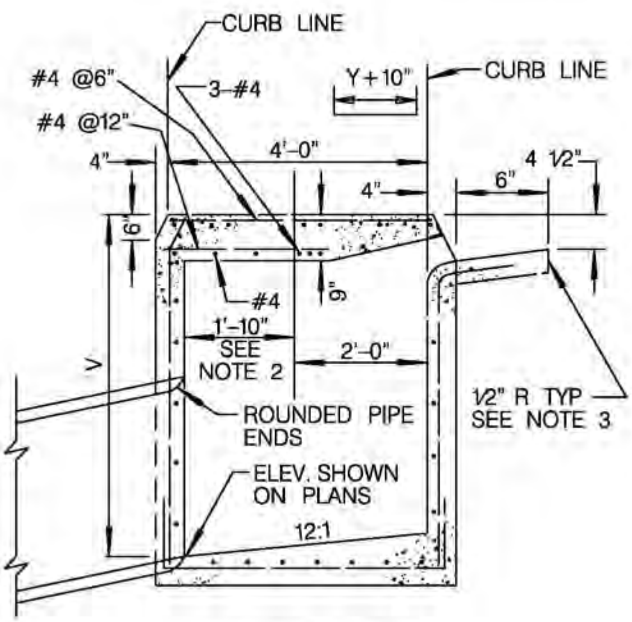
DRAWING NUMBER **SDD-117**



PLAN



SECTION A–A



SECTION B–B

NOTES

1. DIMENSION SHOWN BECOMES 2'-0" WHEN OPENING ON BOTH SIDES. ADJUST MANHOLE AS REQUIRED.
2. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH A RADIUS OF 1/2"
3. WHEN V EXCEEDS 4', STEPS SHALL BE INSTALLED.
4. CONCRETE GUTTER TO MATCH ADJACENT GUTTERS.
5. AN EXPANSION JOINT SHALL BE PLACED AT THE ENDS OF THE INLET WHERE THE CURB IS TO ADJOIN.
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. INSTALL INLET MARKER.

LEGEND ON PLANS

P I

REVISION	BY	APPROVED	DATE
ORIGINAL*	BB	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

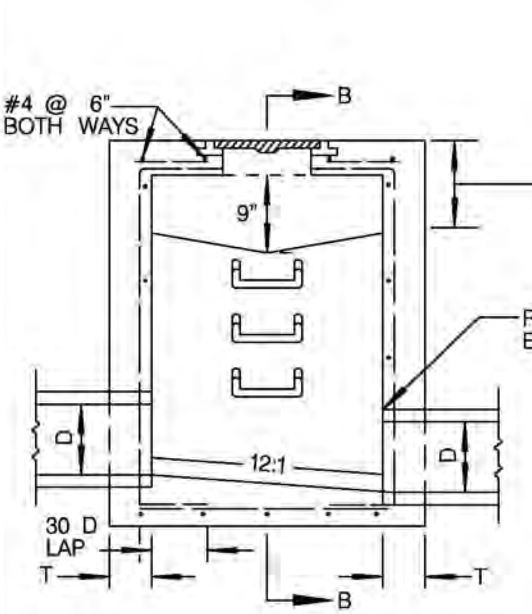
MEDIAN CURB INLET - TYPE J

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

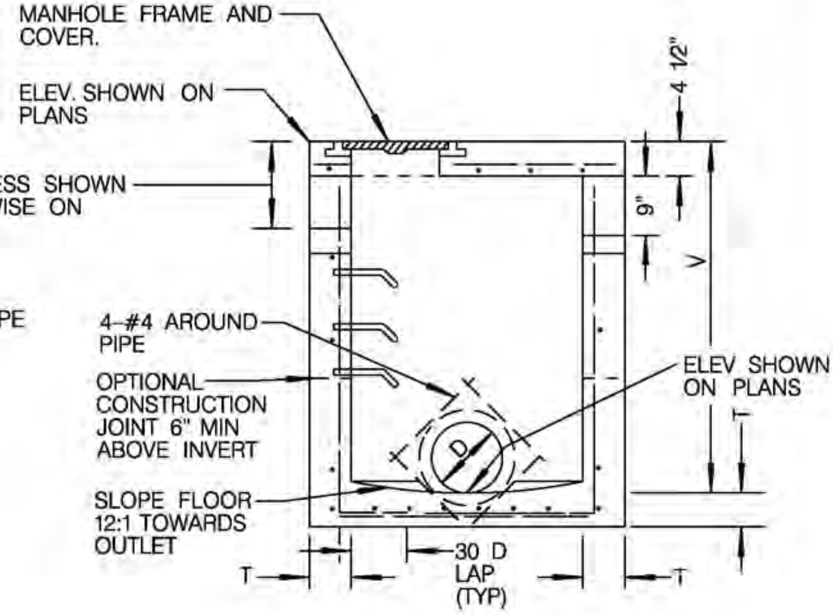
1/31/2012

COORDINATOR R.C.E. 65271 DATE

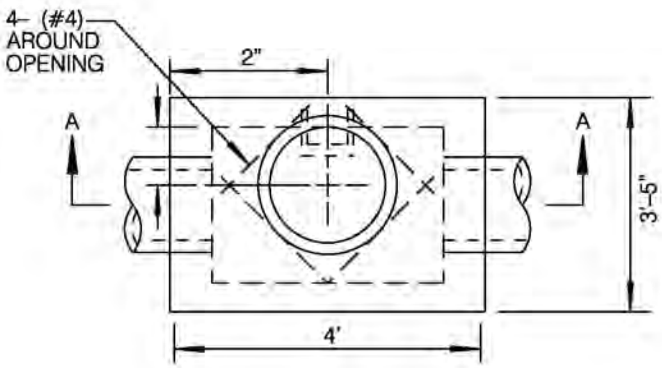
DRAWING NUMBER **SDD-118**



SECTION A–A



SECTION B–B



PLAN

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. INSTALL INLET MARKER.

LEGEND ON PLANS

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

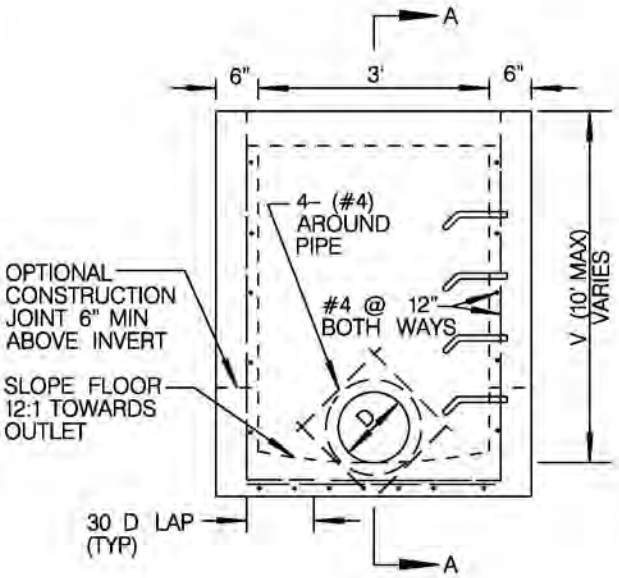
CATCH BASIN - TYPE F

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

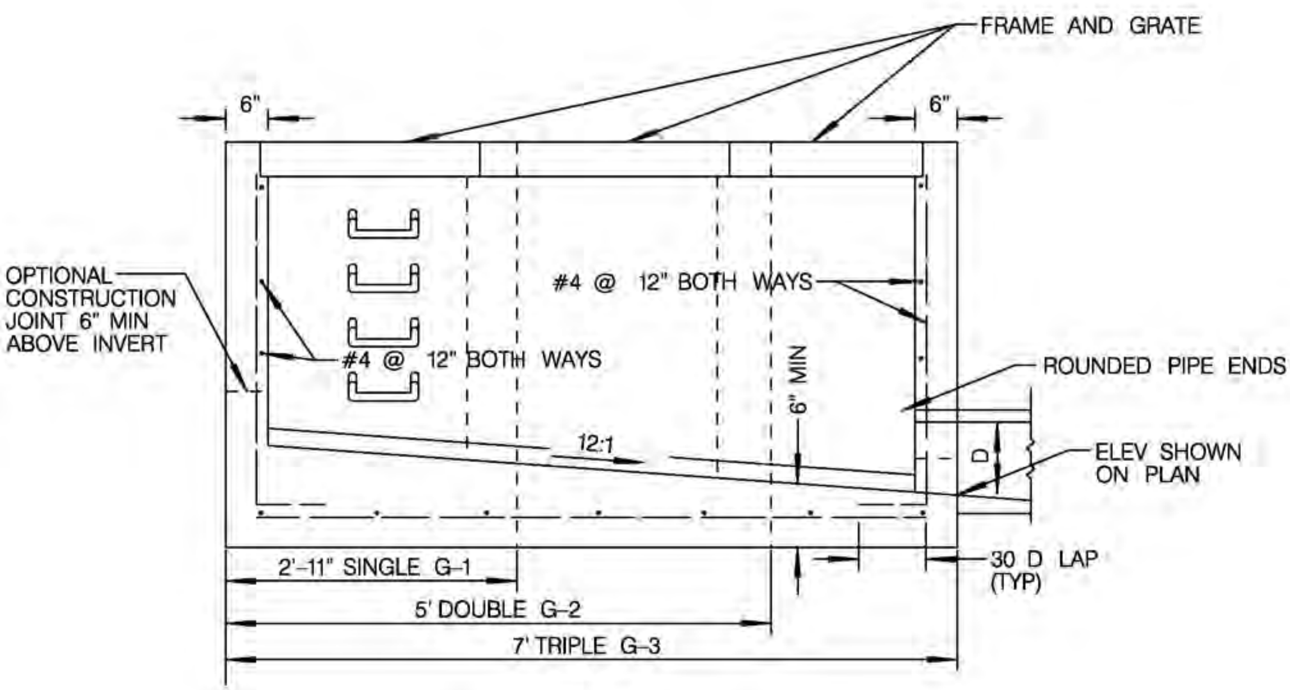
DRAWING NUMBER **SDD-119**



ELEVATION

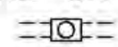
NOTES

1. SEE SDD-114 FOR ADDITIONAL NOTES AND DETAILS.
2. WHEN V EXCEEDS 4', STEPS SHALL BE INSTALLED.
3. MAINTAIN 1 1/2" CLEAR SPACING BETWEEN REINFORCING AND SURFACE.
4. INCREASE IN ALLOWABLE DEPTH SUBJECT TO APPROVAL BY ENGINEER.
5. SECTION A-A SHOWS 3 SIZES AND SHALL NOT IMPLY THAT AN INTERIOR WALL IS TO BE BUILT FOR THE STRUCTURES WITH DOUBLE OR TRIPLE FRAME AND GRATE.
6. EXPOSED EDGES OF CONCRETE SHALL BE ROUNDED WITH RADIUS OF 1/2".
7. DESIGNATE TYPES AS FOLLOWS: SINGLE G-1, DOUBLE G-2 AND TRIPLE G-3.
8. ONLY END BEARING GRATES SHALL BE USED.
9. INSTALL INLET MARKER.



SECTION A-A

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

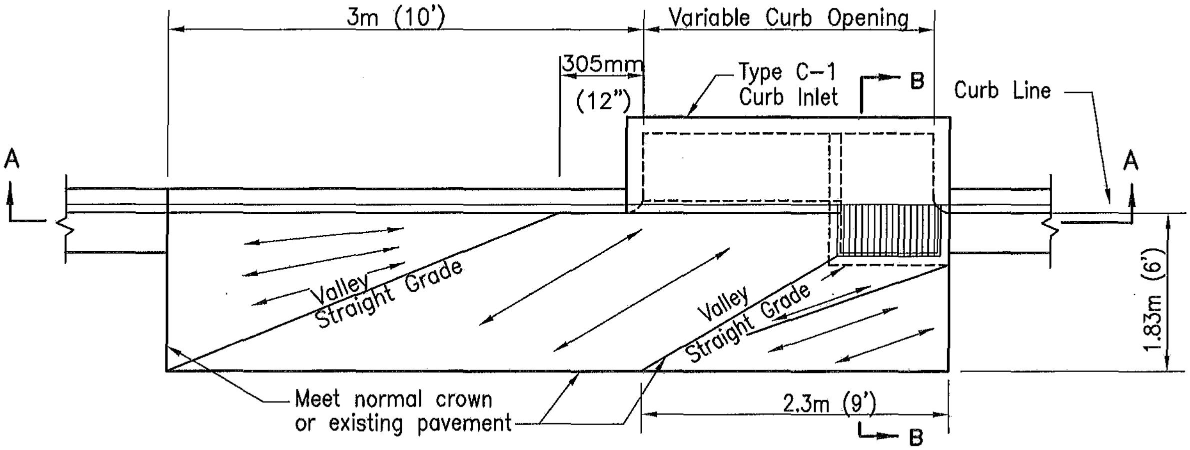
CATCH BASIN - TYPE G

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

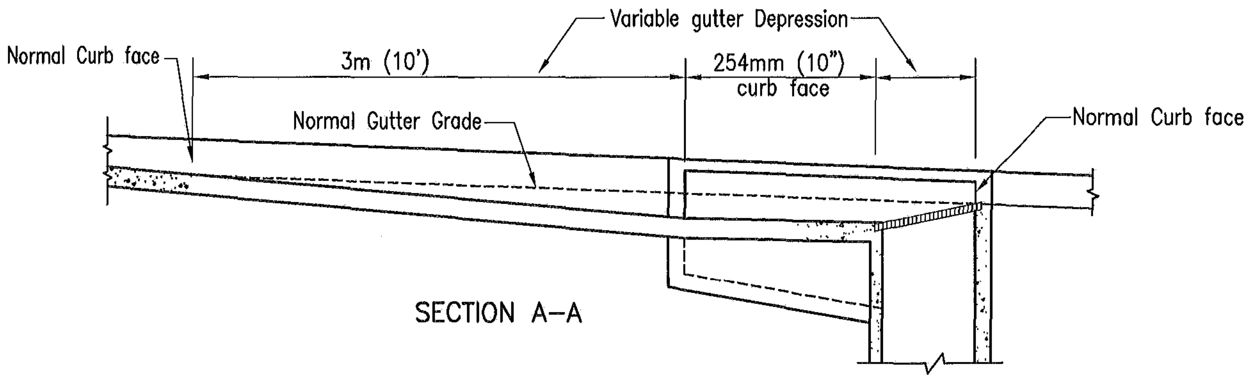
1/31/2012

COORDINATOR R.C.E. 65271 DATE

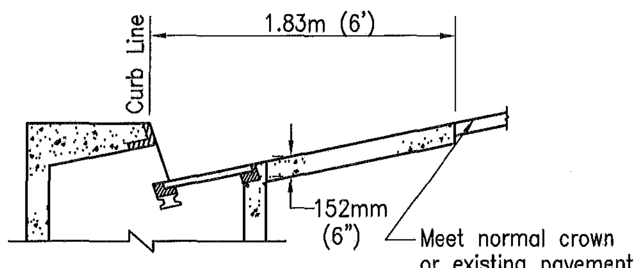
DRAWING NUMBER **SDD-120**



PLAN



SECTION A–A

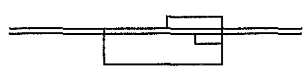


SECTION B–B

NOTES

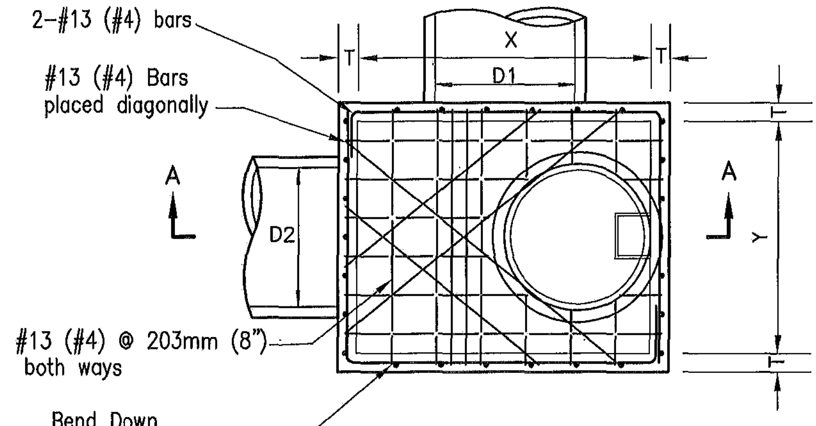
1. Curb and apron to be placed monolithically.
2. Use of false header at valleys and slope break line is optional.
3. Extend vertical steel from inlet structure into concrete apron as shown on Standard Drawing D-3, Section B-B.
4. Screed Direction ⟵⟶
5. Concrete shall be 308kg/M^3-C-17 Mpa(520-C-2500)

LEGEND ON PLANS



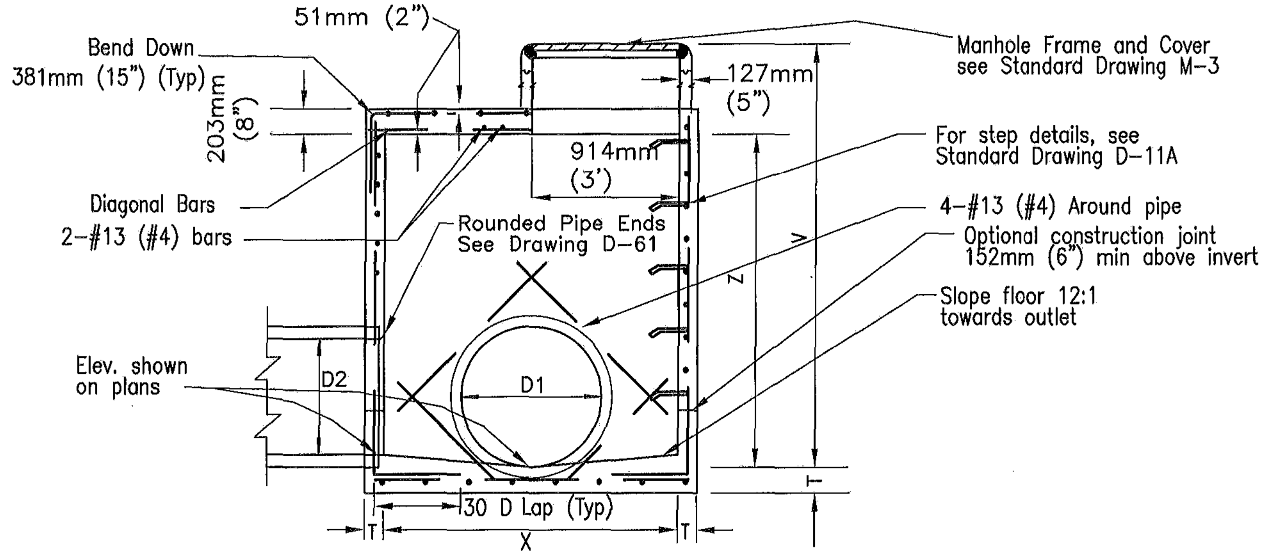
Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	CONCRETE APRON FOR TYPE C CURB INLET	2/26/2009 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		DRAWING NUMBER D-3B
Replaced D-20		T. Stanton	02/09		

August 2009



PLAN

TYPE	PIPE DIAMETER (D1)	X	Y	Z
A 4	up to 991mm (39")	1.22m (4')	1.22m (4')	1.83m (6')
A 5	1.1m (42") to 1.22m (48")	1.52m (5')	1.22m (4')	1.83m (6')
A 6	1.30m (51") to 1.50m (60")	1.83m (6')	1.22m (4')	1.83m (6')
A 7	1.60m (63") to 1.80m (72")	2.13m (7')	1.22m (4')	2.13m (7')
A 8	1.90m (75") to 2.13m (84")	2.44m (8')	1.22m (4')	2.44m (8')

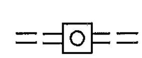


SECTION A-A

NOTES

1. See Standard Drawing D-11 & D-11B for additional notes and details.
2. Concrete base shall be 332kg/M^3-C-22Mpa (560-C-3250)
3. All precast components shall be reinforced with 6mm (1/4") diameter steel, wound spirally on 102mm (4") centers.
4. All joints shall be set in Class C mortar.
5. Maintain 38mm (1-1/2") clear spacing between reinforcing and surface unless otherwise noted.
6. Exposed edges of concrete shall be rounded with a radius of 13mm (1/2").
7. Manhole cover to be designated "Storm Drain".
8. Table applicable only to "in-line" designs. Modifications to "Y" dimension required if pipe (D2) exceeds 991mm (39").

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

STORM DRAIN CLEANOUT – TYPE A

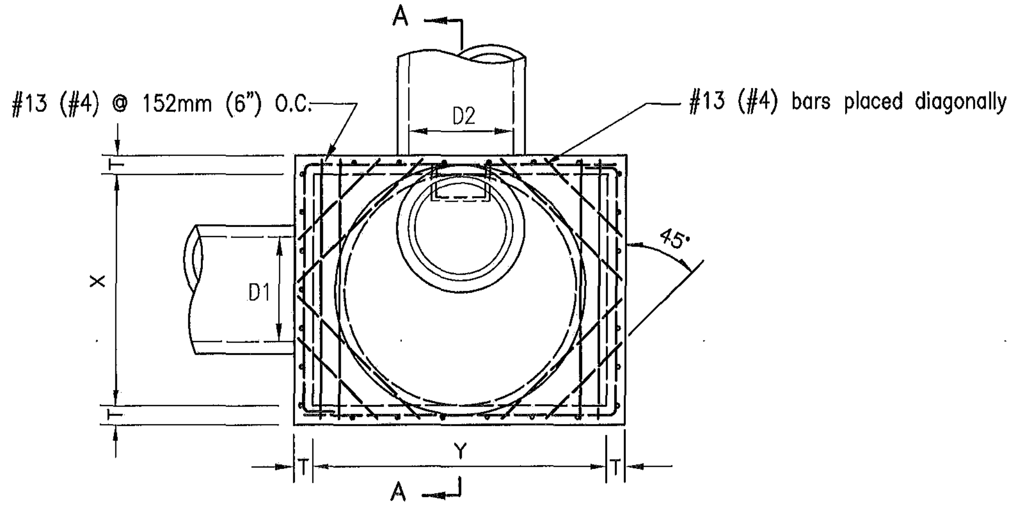
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-9

August 2009

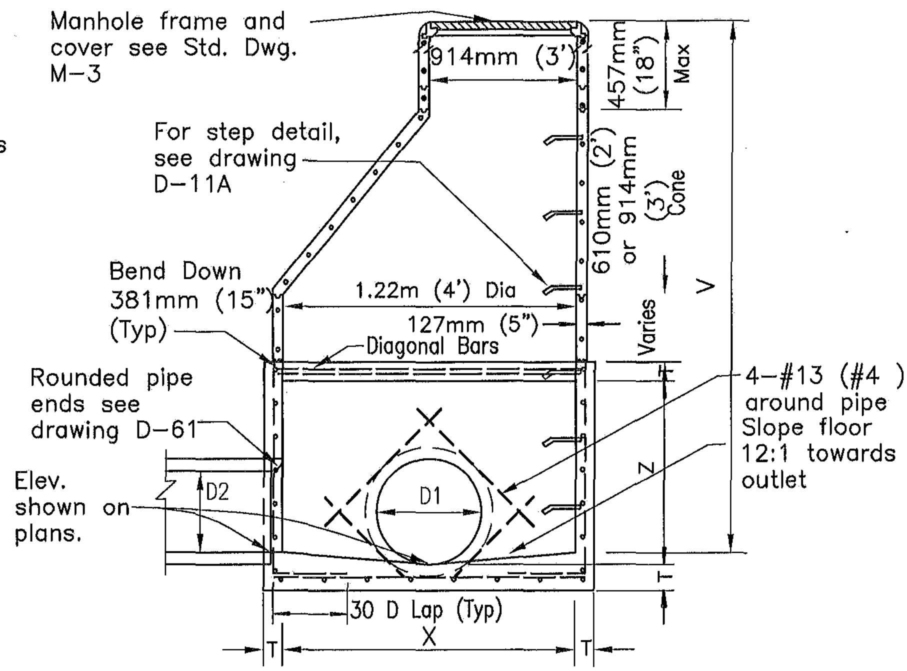


PLAN

TYPE	PIPE DIAMETER (D1)	X	Y	Z
B 5	up to 1.30m (51")	1.53m (5')	1.22m (4')	1.53m (5')
B 6	1.37m (54") to 1.52m (60")	1.83m (6')	1.22m (4')	1.83m (6')
B 7	1.60m (63") to 1.80m (69")	2.13m (7')	1.22m (4')	2.13m (7')
B 8	1.83m (72") to 2.10m (81")	2.44m (8')	1.22m (4')	2.44m (8')
B 9	2.13m (84") to 2.30m (90")	2.74m (9')	1.22m (4')	2.74m (9')

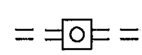
NOTES

1. See Standard Drawing 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 6mm (1/4") diameter steel wound spirally on 102mm (4") centers.
4. Maintain 38mm (1-1/2") clear spacing between reinforcing and surface.
5. Concrete base shall be 332kg/M^3-C-22-Mpa (560-C-3250).
6. Exposed edges of concrete shall be rounded with a radius of 13mm (1/2").
7. Manhole cover to be designated "Storm Drain".
8. Table applicable only to "in-line" designs. Modifications to "Y" dimension required if pipe (D2) exceeds 991mm (39").



SECTION A-A

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

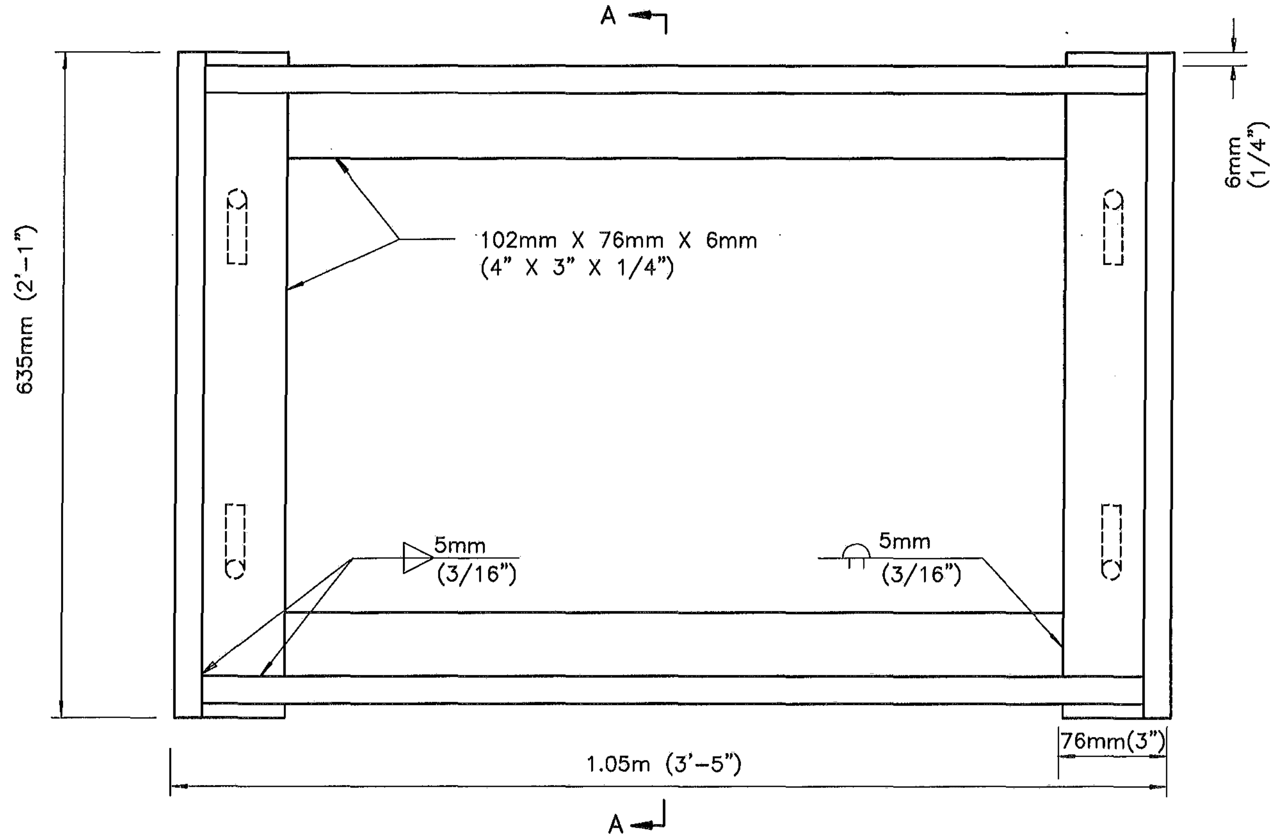
STORM DRAIN CLEANOUT - TYPE B

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

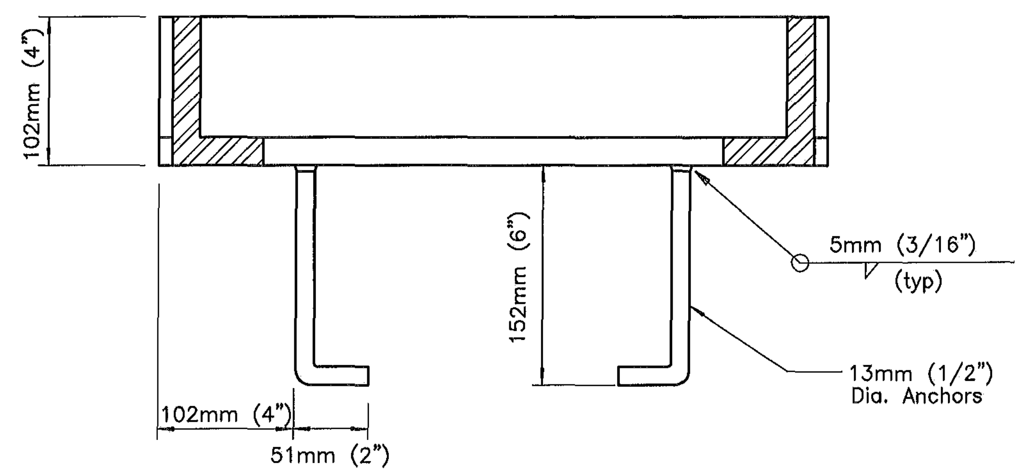
3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-10



PLAN



SECTION A–A

NOTE
Hot dip galvanize all parts after fabrication.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

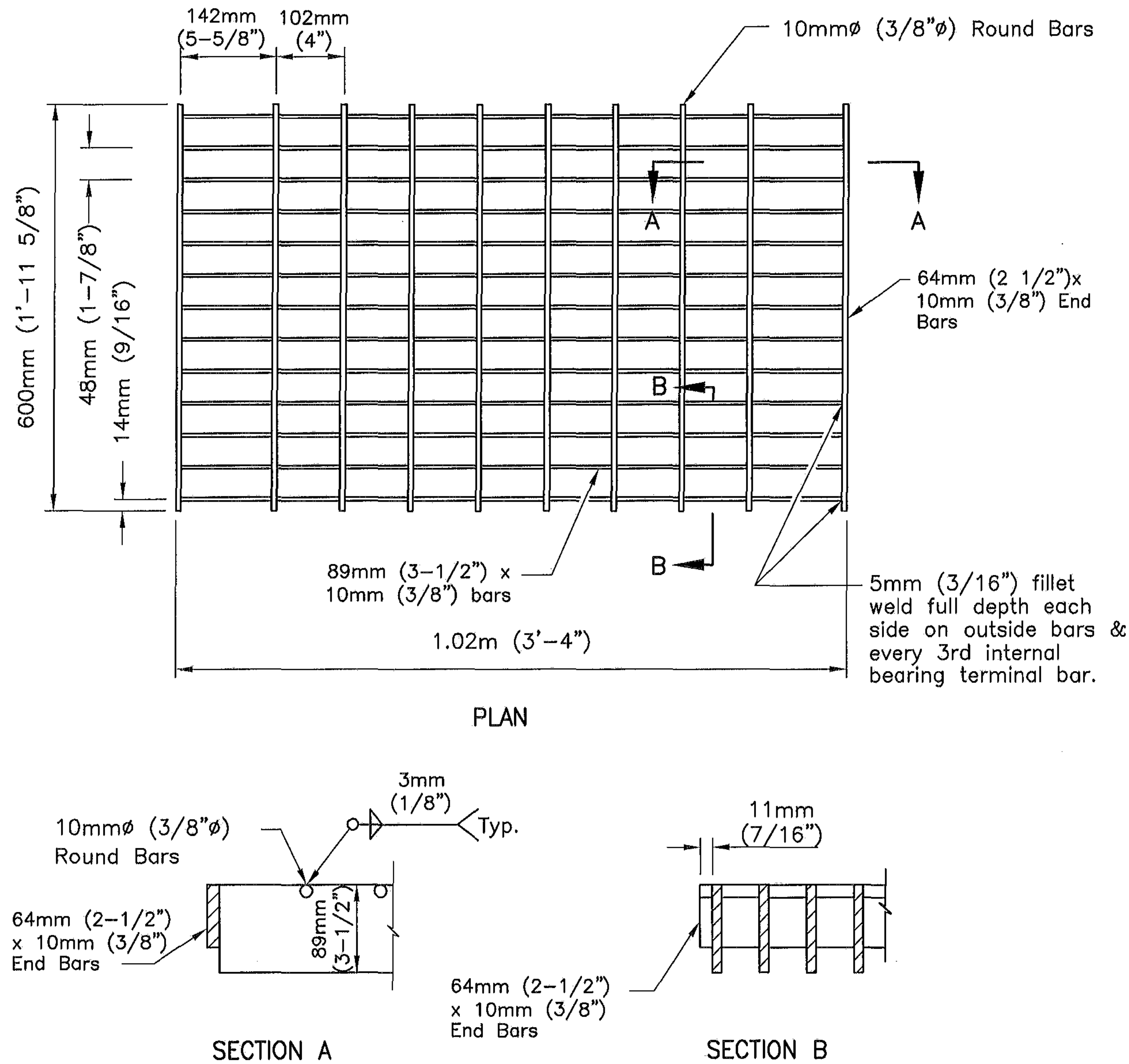
WELDED STEEL GRATE FRAME

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-13



NOTES
1. Hot dip galvanize all parts after fabrication.
2. Dimensions to centerline of bars unless otherwise noted.
3. Not to be used in pedestrian areas.
4. Weight: 90.7kg (200lbs) +/-

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

DRAINAGE STRUCTURE GRATE

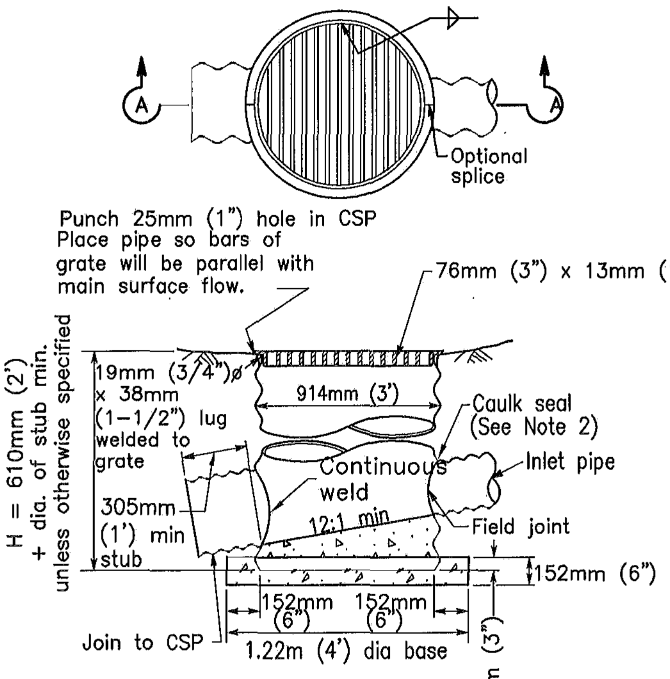
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

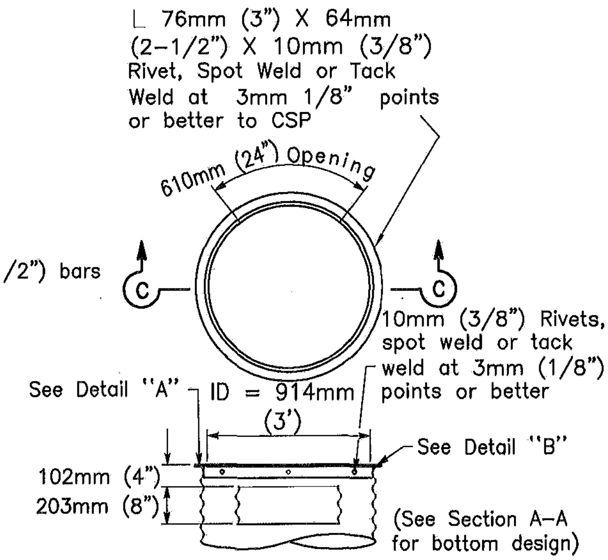
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-15

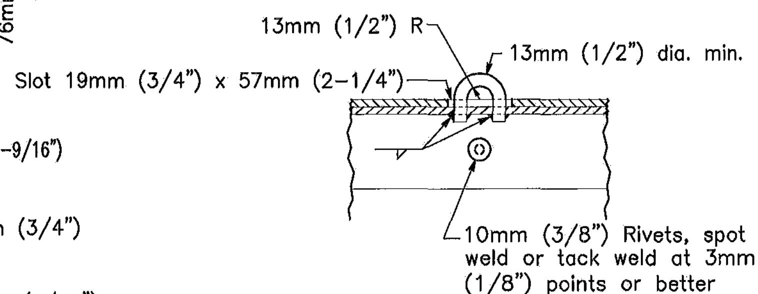
August 2009



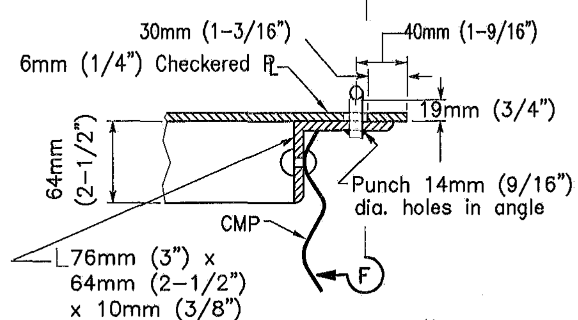
SECTION A-A
TYPE A



SECTION C-C
TYPE B



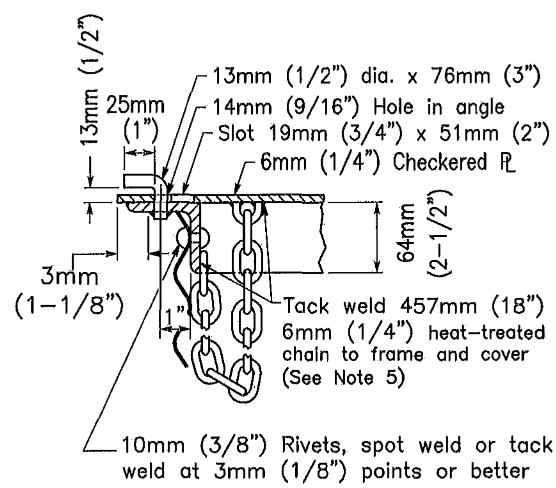
SECTION F-F



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. Ladders and Steps: None required where "H" is 1.10m (3'-6") or less. Where "H" is between 1.10m (3'-6") and 1.50m (4'-11") place one step + 406mm (16") above the floor. If "H " is 1.52m (5') or more install a ladder placing lowest rung 406mm (16") above the floor and the highest rung not more than 356mm (14") below top of inlet. Place single step or ladder in wall with wall opening.
4. See Standard Drawing D-17 for additional details.
5. Grate to be provided when specified.
6. Grate detail shall be as shown on Standard Drawing D-17 unless otherwise approved by Agency.



DETAIL "A"

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

SAN DIEGO REGIONAL STANDARD DRAWING

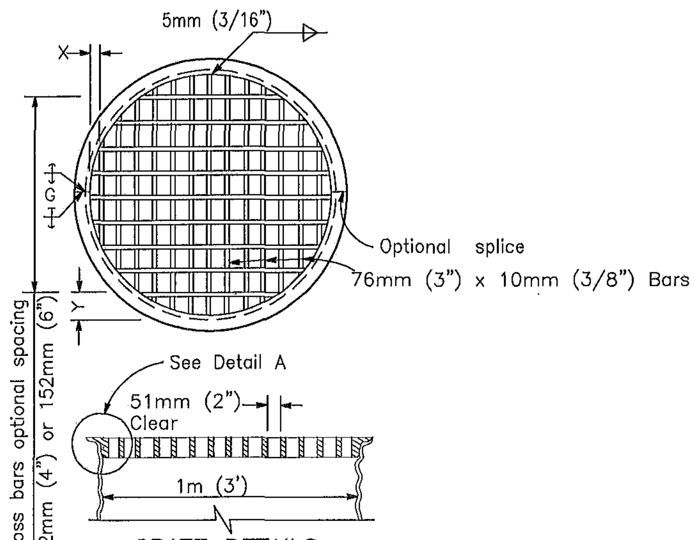
CORRUGATED STEEL PIPE INLETS TYPES A AND B

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

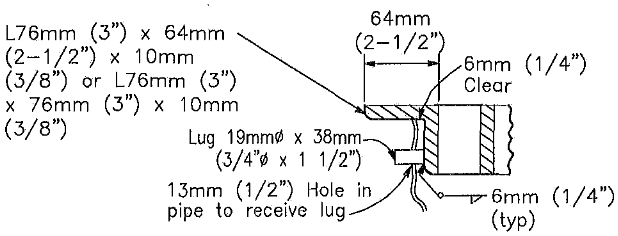
3/01/2003

Chairperson R.C.E. 19246 Date

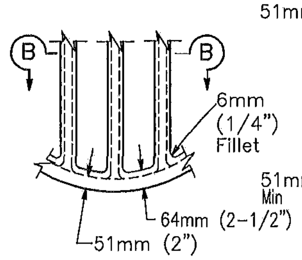
DRAWING NUMBER D-16

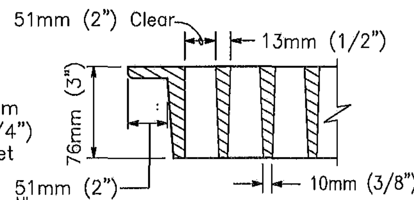


GRATE DETAILS



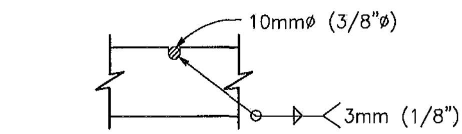
DETAIL A





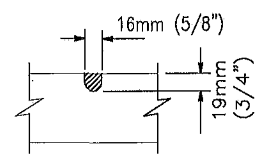
SECTION B–B

ALTERNATIVE CAST NODULAR IRON GRATE OR CAST STEEL GRATE



10mmø (3/8"ø) Cross bars may be fillet welded, resistance welded or electroforged to bearing bars.

CROSS BAR DETAIL TYPE WELDED STEEL GRATE



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

GRATE BAR SPACING TABLE

TYPE	NO. OF BARS	CLEAR BAR SPACING	X	Y	
				102mm (4") SPACING	152mm (6") SPACING
Welded Steel	15	51mm (2")	14mm (9/16")	95mm (3-3/4")	146mm (5-3/4")
Cast	13	51mm (2")	54mm (2-1/8")	95mm (3-3/4")	146mm (5-3/4")

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

CORRUGATED STEEL PIPE INLETS, DETAILS

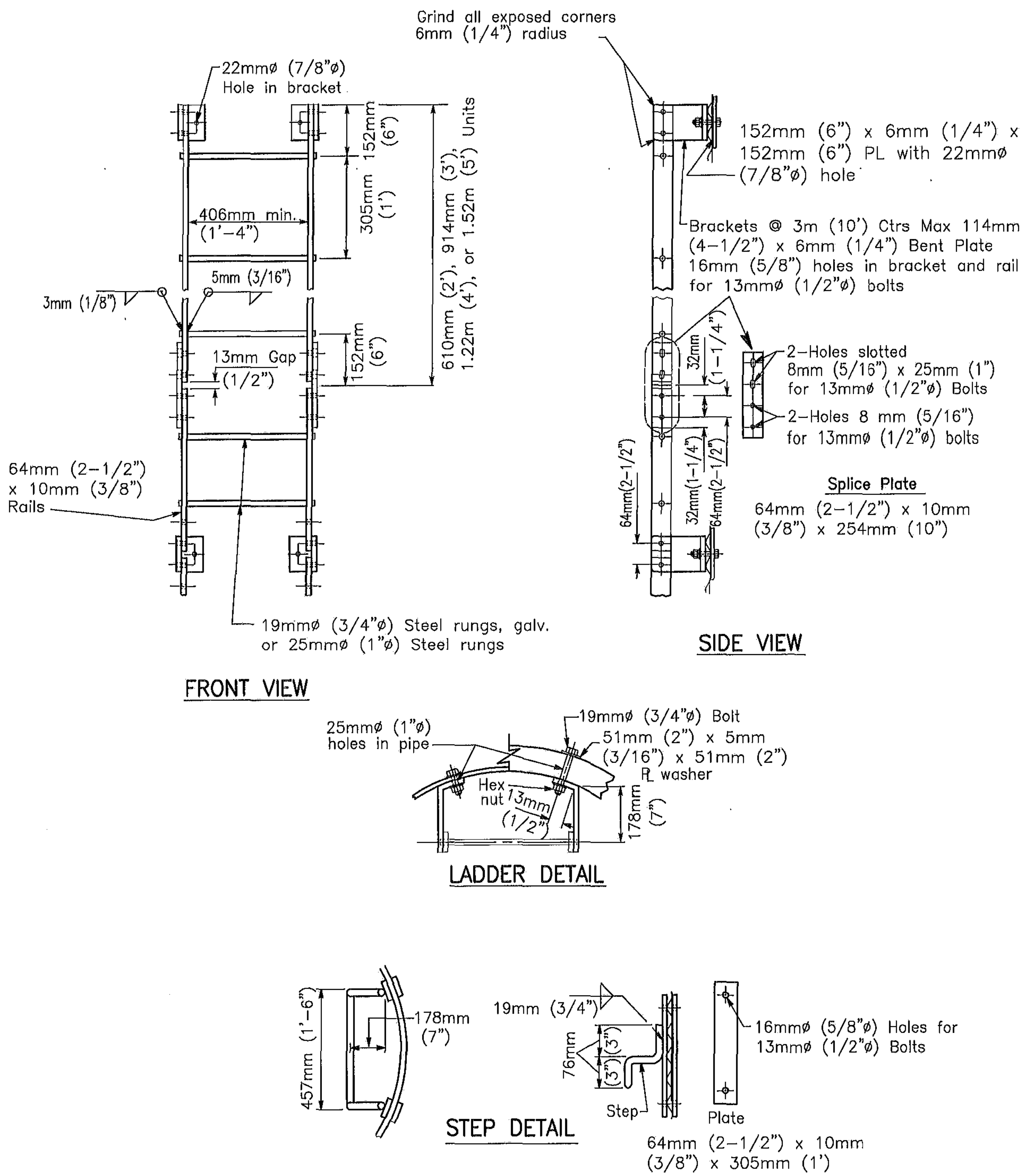
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

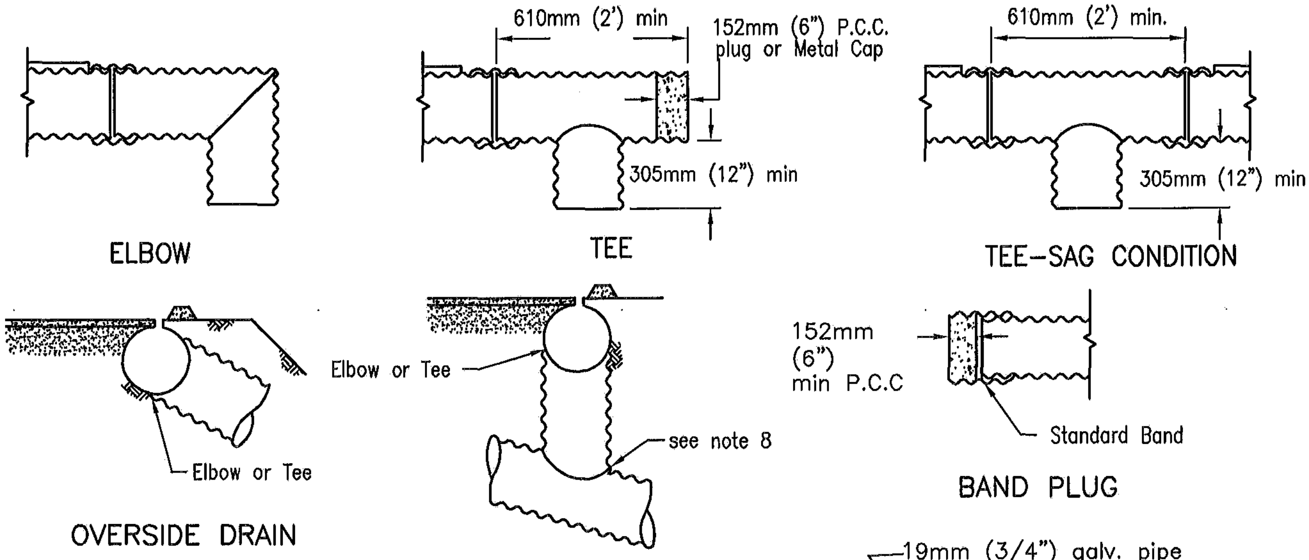
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-17A

August 2009



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75	CORRUGATED STEEL PIPE INLETS, DETAILS	3/01/2003
Add Metric		T. Stanton	03/03		Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		DRAWING NUMBER D-17B
Edited		T. Stanton	02/09		



ELBOW

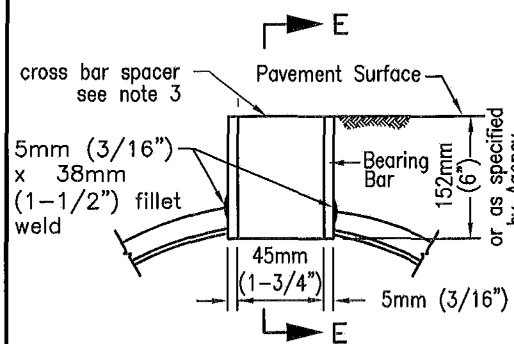
TEE

TEE–SAG CONDITION

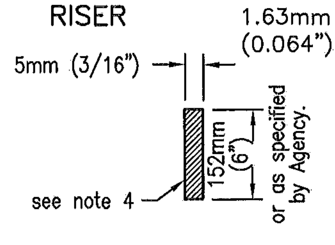
OVERSIDE DRAIN

RISER

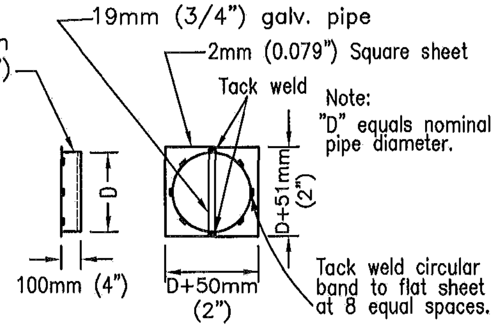
BAND PLUG



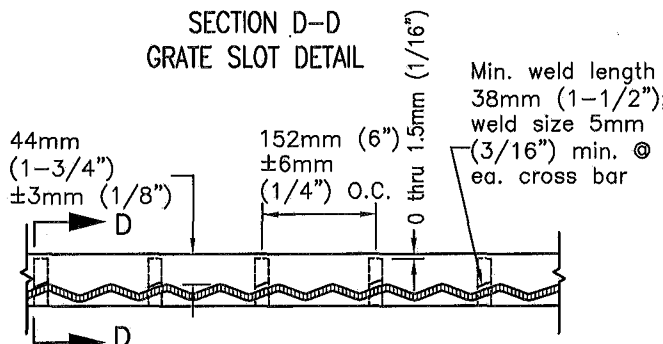
SECTION D–D
GRATE SLOT DETAIL



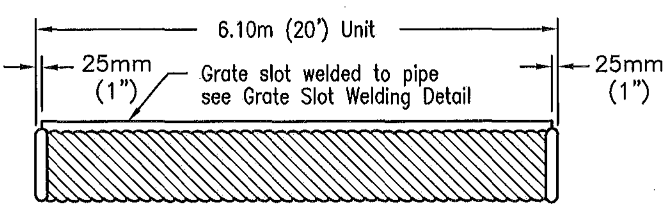
SECTION E–E



METAL CAP DETAIL



GRATE SLOT WELDING DETAIL



GRATE SLOT DRAIN

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 13mm (1/2") in 6.1m (20').
7. Installation lengths shall be 3m (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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

SLOTTED CORRUGATED STEEL

PIPE DRAINS 305mm (12") THROUGH 610mm (24")

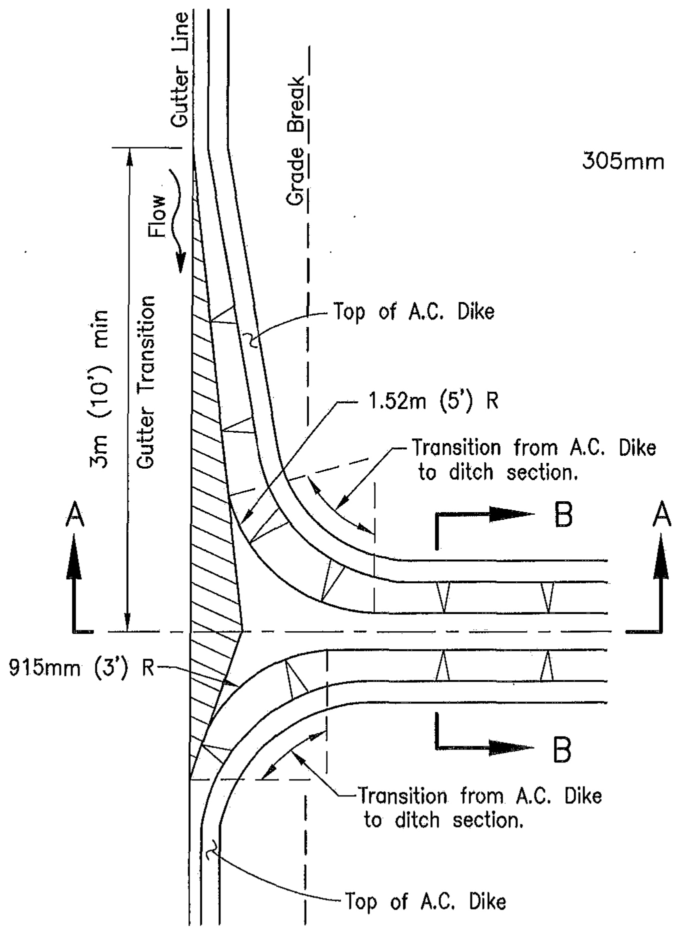
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

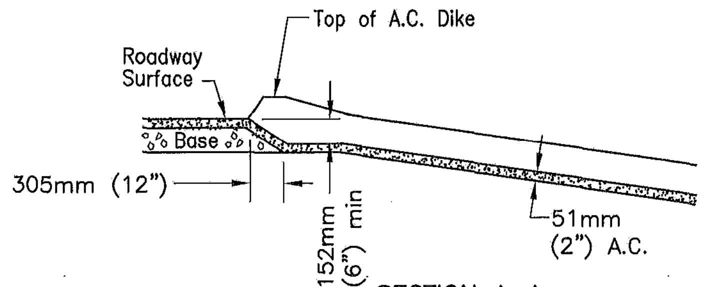
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D–18

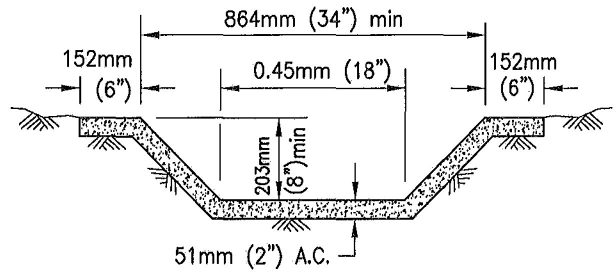
August 2009



PLAN



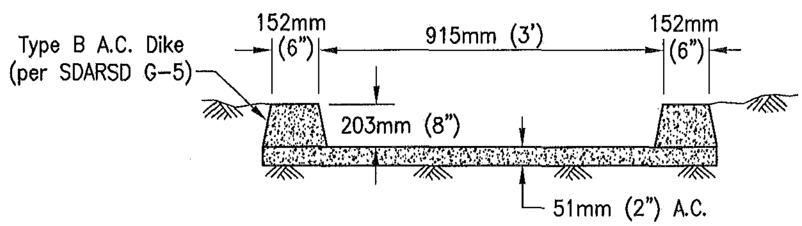
SECTION A–A



NOTE

1. Cross sectional area of ditch may be round or trapezoidal.

SECTION B–B



ALTERNATE SECTION B–B

NOTE

1. A.C. spillway may be used when fill is 3m (10') or less, and where fill slope 1-1/2:1 or flatter.
2. Use 3m (10') min. length of gutter transition on each side of downdrain in sag condition.
3. A round sectional area of equal flow capacity may be used.

LEGEND ON PLANS

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

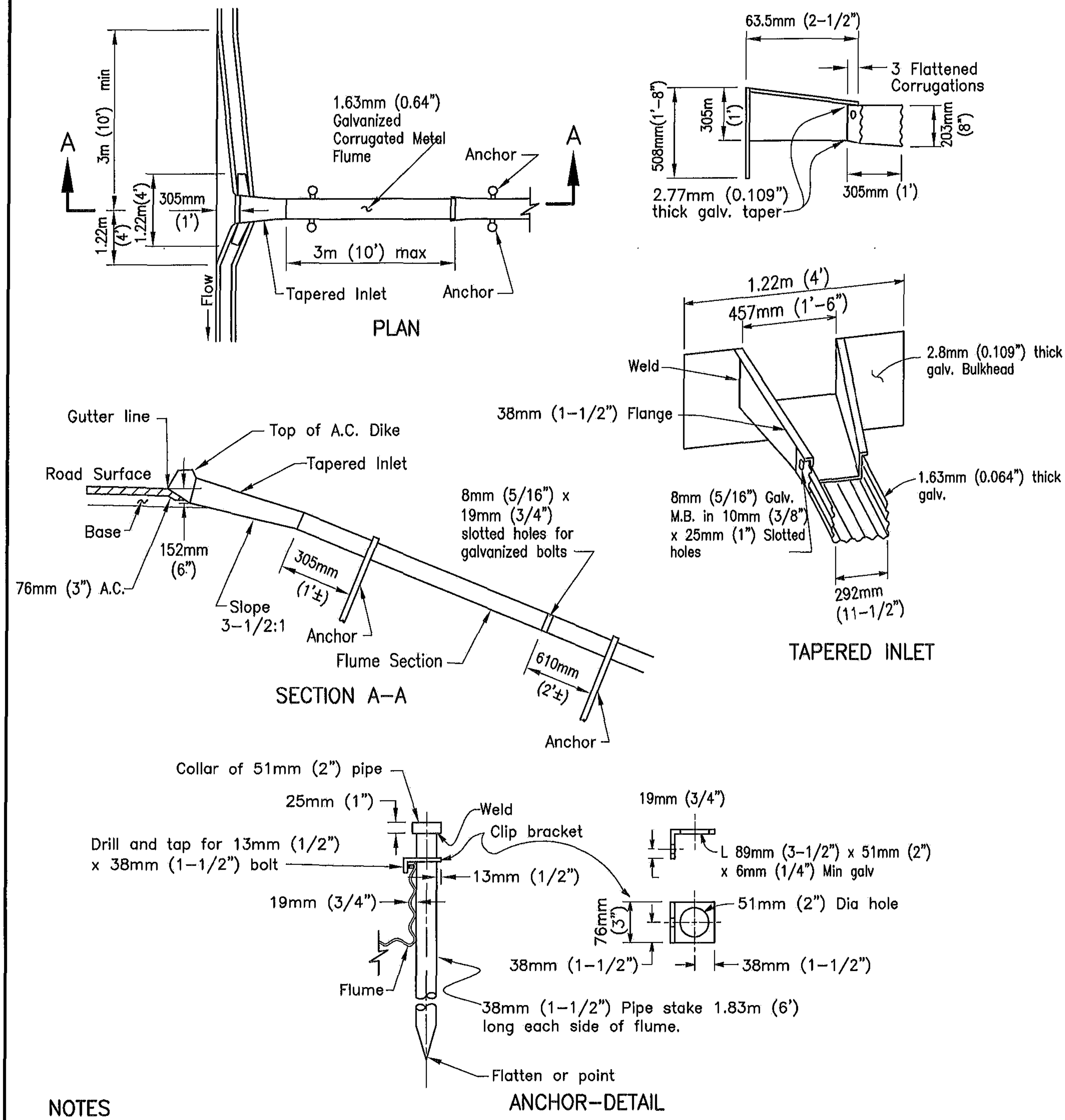
ASPHALT CONCRETE SPILLWAY

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

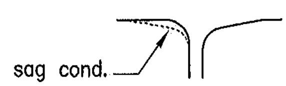
DRAWING NUMBER D–22



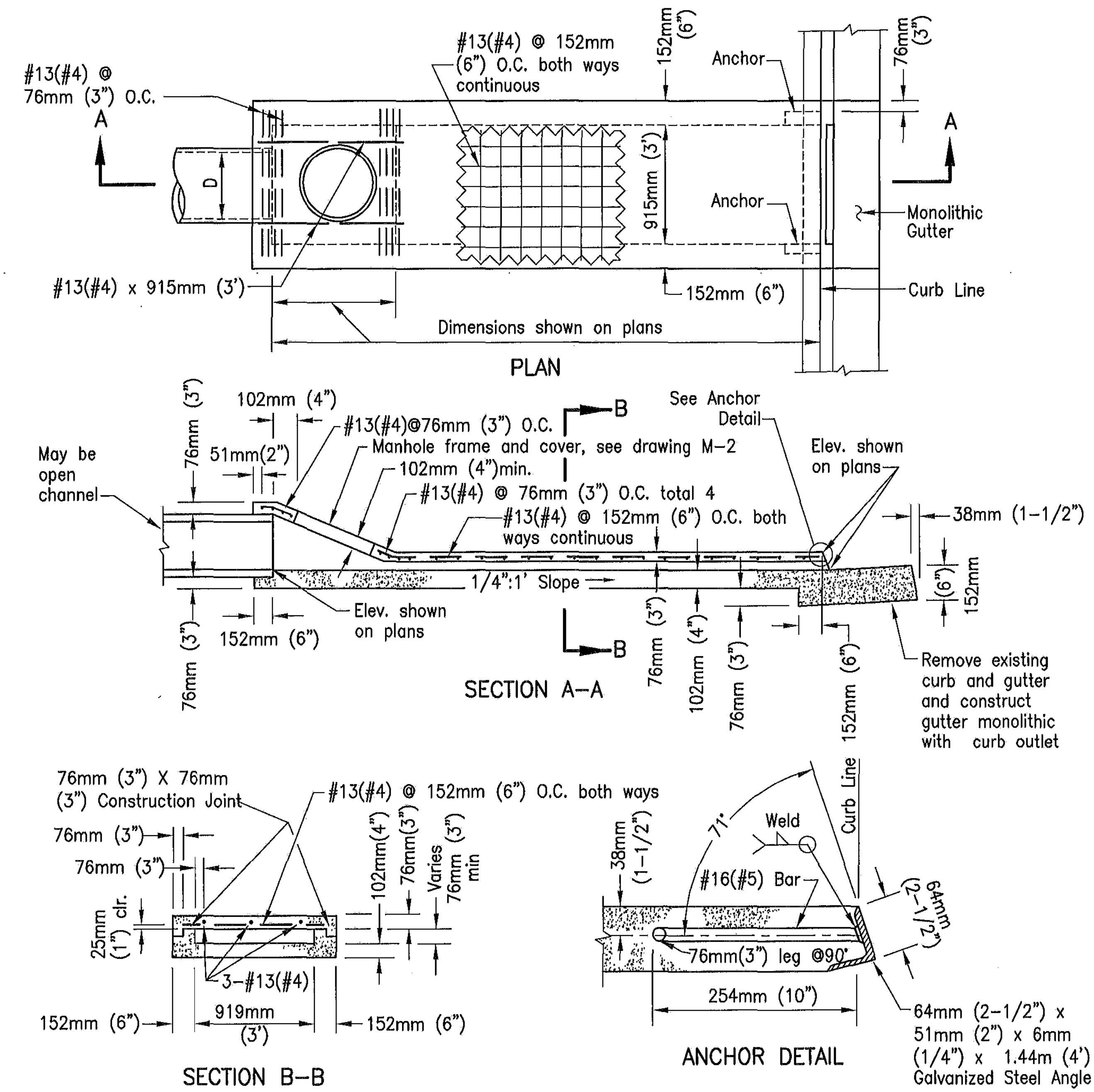
NOTES

1. Downdrain flume may be used where fill slope is 1 1/2:1 or flatter.
2. Use 3m (10') min. length of gutter transition on each side of downdrain in sag condition.
3. All metal parts to be galvanized after fabrication.

LEGEND ON PLANS



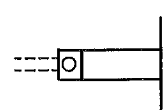
Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	TAPERED INLET AND DOWNDRAIN FLUME	3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		DRAWING NUMBER D-23
Edited		T. Stanton	02/09		



NOTES

1. Concrete shall be 332 kg/M^3–C–22Mpa (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 6mm (1/4") tooled groove in top slab in line with back of curb.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T.Stanton	03/03
Reformatted		T.Stanton	04/06
Revised		T.Stanton	11/08

SAN DIEGO REGIONAL STANDARD DRAWING

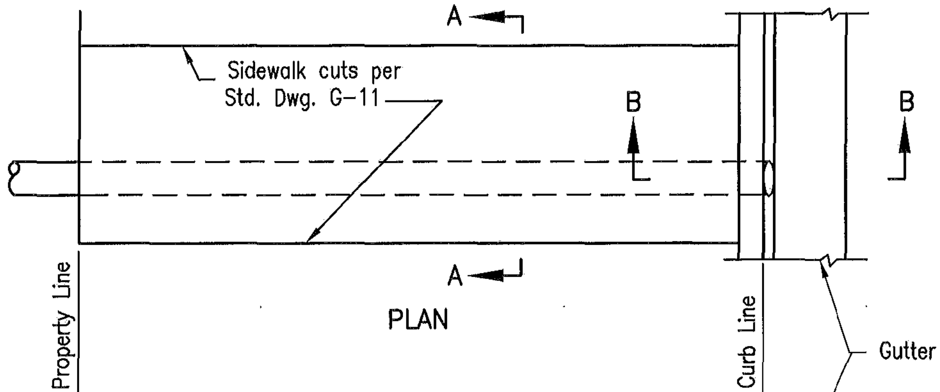
CURB OUTLET – TYPE A

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

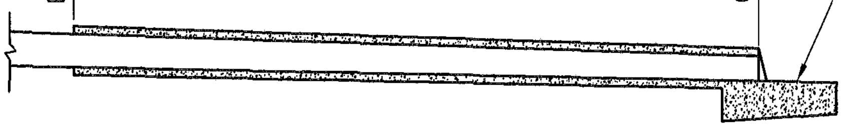
3/01/2003

Chairperson R.C.E. 19246 Date

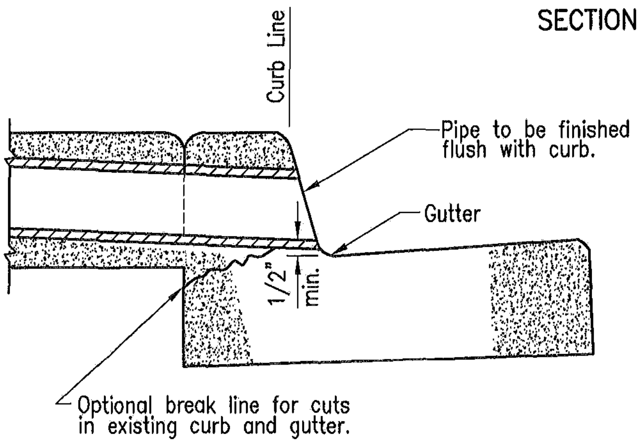
DRAWING NUMBER D-25



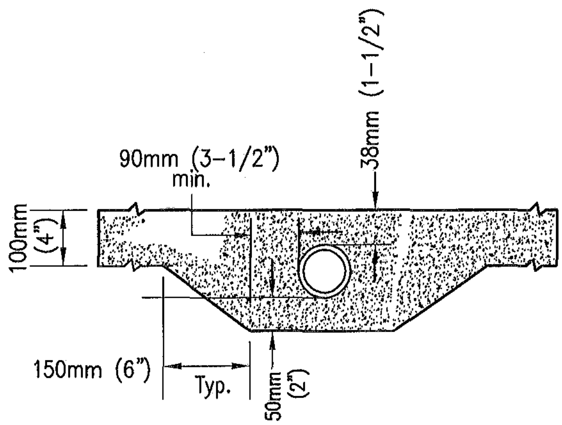
PLAN



SECTION

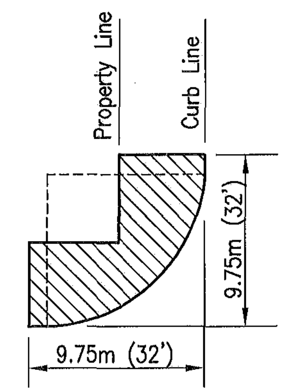


SECTION B-B



SECTION A-A

APPROVED DRAIN PIPE SIZES	
PIPE SIZE	CURB HEIGHT
75mm (3")	150mm (6") to 200mm (8") CURB FACE
100mm (4")	200mm (8") CURB FACE
150mm (6")	250mm (10") CURB FACE



Drain shall not occupy
the hatched area

BLOCK CORNER

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. Concrete shall be 308kg/M^3-C-17 Mpa (520-C-2500)
4. Pipe shall be circular rigid plastic, or approved equal.
5. Coring of existing curb may be used as an alternative.

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

SAN DIEGO REGIONAL STANDARD DRAWING

SIDEWALK UNDERDRAIN PIPE

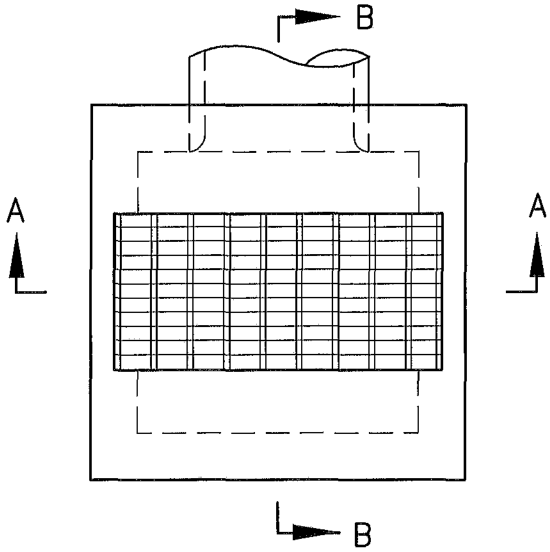
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

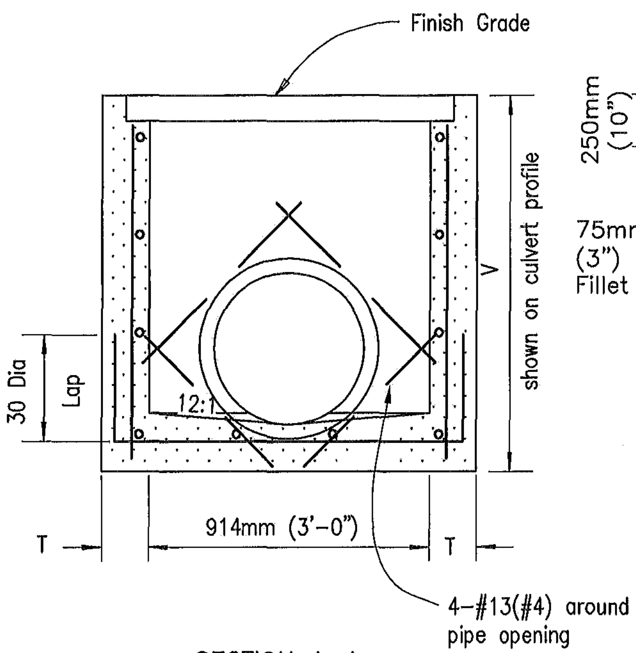
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-27

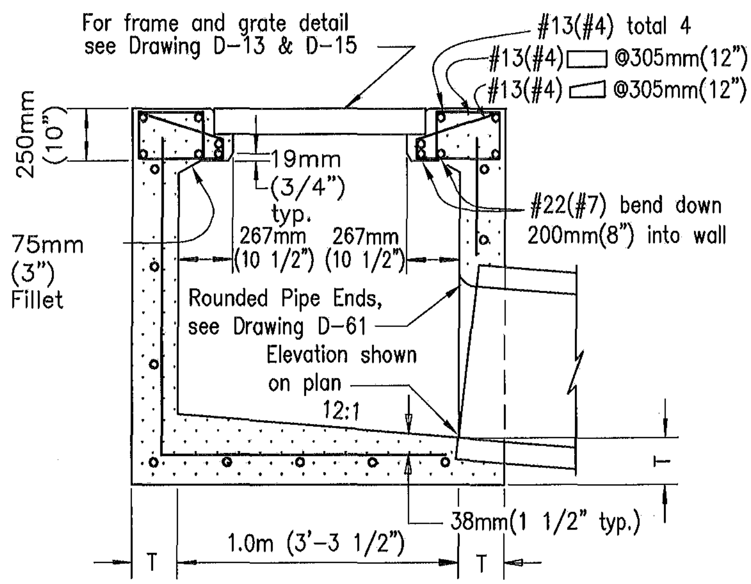
August 2009



PLAN



SECTION A-A

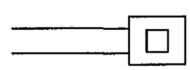


SECTION B-B

NOTES

1. See Standard Drawing D-11 for additional notes and details.
2. When V exceeds 1.2m (4'), steps shall be installed

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Solomon	7/79
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

CATCH BASIN – TYPE I

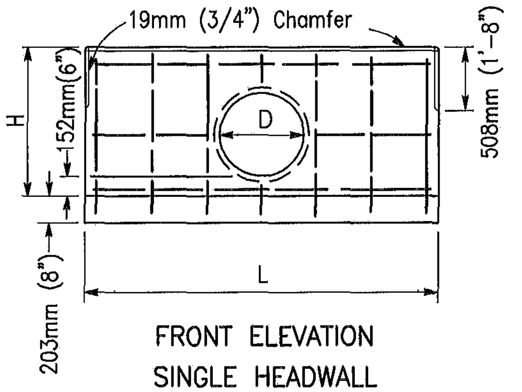
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

[signature] 3/01/2003

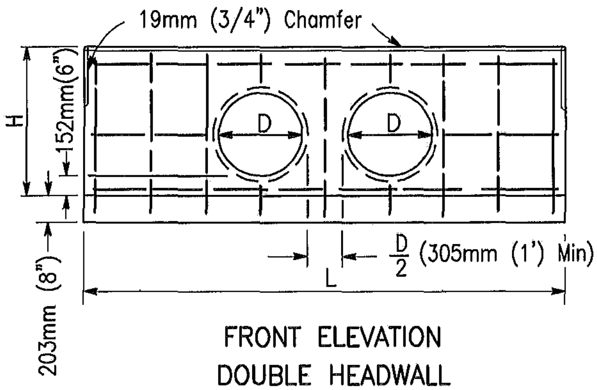
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-29

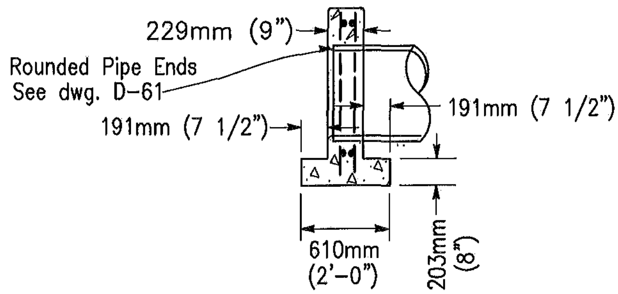
August 2009



FRONT ELEVATION
SINGLE HEADWALL



FRONT ELEVATION
DOUBLE HEADWALL



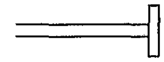
SECTION, SINGLE &
DOUBLE HEADWALLS

D	H	SINGLE						DOUBLE					
		L	Steel kg	Steel Lbs.	Concrete cu m	Concrete C.Y.		L	Steel kg	Steel Lbs.	Concrete cu m	Concrete C.Y.	
300mm(12")	813mm(2'-8")	1.52m (5'-0")	15.9	(35)	0.46	(0.60)		2.44m (8'-0")	22.7	(50)	0.72	(0.94)	
375mm(15")	889mm(2'-11")	1.83m (6'-0")	18.1	(40)	0.57	(0.75)		2.90m (9'-6")	27.2	(60)	0.89	(1.17)	
450mm(18")	965mm(3'-2")	2.13m (7'-0")	22.7	(50)	0.70	(0.91)		3.20m (10'-6")	34.0	(75)	1.03	(1.35)	
525mm(21")	1.04m (3'-5")	2.29m (7'-6")	27.2	(60)	0.78	(1.02)		3.51m (11'-6")	40.8	(90)	1.16	(1.52)	
600mm(24")	1.12m (3'-8")	2.59m (8'-6")	34.0	(75)	0.92	(1.20)		3.81m (12'-6")	45.4	(100)	1.32	(1.72)	
675mm(27")	1.19m (3'-11")	2.90m (9'-6")	38.6	(85)	1.06	(1.39)		4.27m (14'-0")	52.2	(115)	1.53	(2.00)	
750mm(30")	1.27m (4'-2")	3.05m (10'-0")	38.6	(85)	1.16	(1.52)		4.57m (15'-0")	57.2	(126)	1.69	(2.21)	
825mm(33")	1.35m (4'-5")	3.35m (11'-0")	45.4	(100)	1.32	(1.73)		4.88m (16'-0")	59.0	(130)	1.85	(2.42)	
900mm(36")	1.42m (4'-8")	3.65m (12'-0")	47.6	(105)	1.49	(1.95)		5.18m (17'-0")	65.8	(145)	2.03	(2.65)	
975mm(39")	1.50m (4'-11")	3.81m (12'-6")	59.0	(130)	1.60	(2.09)		5.49m (18'-0")	77.1	(170)	2.20	(2.88)	
1050mm (42")	1.57m (5'-2")	4.11m (13'-6")	63.5	(140)	1.79	(2.34)		5.79m (19'-0")	84.0	(185)	2.39	(3.13)	
1150mm (45")	1.65m (5'-5")	4.42m (14'-6")	68.0	(150)	1.99	(2.60)		6.10m (20'-0")	88.5	(195)	2.58	(3.38)	
1225mm (48")	1.73m (5'-8")	4.57m (15'-0")	72.6	(160)	2.10	(2.75)		6.40m (21'-0")	90.7	(200)	2.78	(3.64)	
1300mm (51")	1.80m (5'-11")	4.88m (16'-0")	81.6	(180)	2.32	(3.03)		6.86m (22'-6")	102	(225)	3.07	(4.02)	
1375mm (54")	1.88m (6'-2")	5.18m (17'-0")	86.2	(190)	2.53	(3.31)		7.16m (23'-6")	109	(240)	3.29	(4.30)	

NOTES

1. Concrete shall be 332 kg/M^3 –C–22Mpa (560–C–3250)
2. All reinforcing shall be #13(#4) bars. All vertical and horizontal tie bars @ 457mm (18") maximum spacing.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

STRAIGHT HEADWALL – TYPE A [CIRCULAR PIPE]

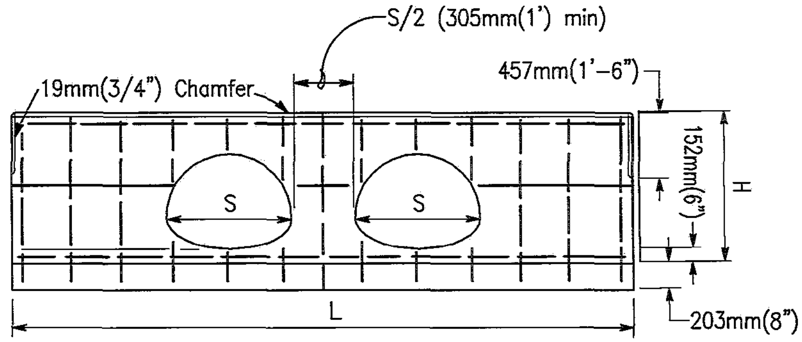
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

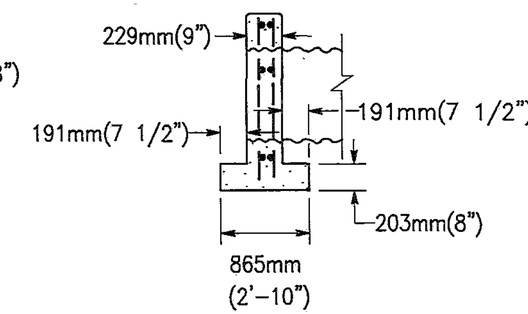
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-30

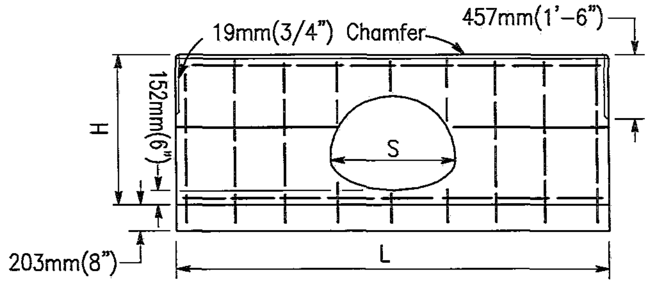
August 2009



ELEVATION - DOUBLE HEADWALL

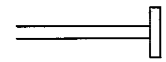


SECTION, SINGLE &
DOUBLE HEADWALLS



ELEVATION - SINGLE HEADWALL

LEGEND ON PLANS



C.S.P. ARCH SIZE		SINGLE								DOUBLE					
		H		L		Steel		Concrete		L		Steel		Concrete	
Metric	(inches)	Metric	(ft/in)	Metric	(ft/in)			cu m	C.Y.	Metric	(ft/in)	kg	Lbs.	cu m	C.Y.
450mmx275mm	(18x11)	787mm	(2–7)	1.68m	(5–6)	16.8	(37)	.490	(0.64)	2.44m	(8'–0")	23.6	(52)	.700	(0.91)
525mmx375mm	(21x15)	889mm	(2–11)	1.98m	(6–6)	20.4	(45)	.612	(0.80)	3.05m	(10'–0")	27.2	(60)	.940	(1.22)
600mmx450mm	(24x18)	965mm	(3–2)	2.29m	(7–6)	22.7	(50)	.734	(0.96)	3.51m	(11'–6")	31.8	(70)	1.11	(1.45)
700mmx500mm	(28x20)	1.02m	(3–4)	2.59m	(8–6)	27.3	(60)	.860	(1.12)	4.12m	(13'–6")	40.9	(90)	1.35	(1.76)
875mmx600mm	(35x24)	1.12m	(3–8)	3.20m	(10–6)	38.6	(85)	1.13	(1.47)	4.72m	(15'–6")	54.5	(120)	1.66	(2.16)
1050mmx725mm	(42x29)	1.24m	(4–1)	3.81m	(12–6)	50.0	(110)	1.34	(1.76)	5.49m	(18'–0")	65.8	(145)	1.97	(2.57)
1225mmx825mm	(49x33)	1.35m	(4–5)	4.42m	(14–6)	59.0	(130)	1.73	(2.26)	6.40m	(21'–0")	77.2	(170)	2.40	(3.13)
1425mmx950mm	(57x38)	1.47m	(4–10)	5.18m	(17–0)	70.4	(155)	2.15	(2.81)	7.47m	(24'–6")	95.3	(210)	2.96	(3.86)
1550mmx1050mm	(64x43)	1.60m	(5–3)	5.79m	(19–0)	79.4	(175)	2.54	(3.31)	8.23m	(27'–0")	104.4	(230)	3.38	(4.42)
1775mmx1175mm	(71x47)	1.70m	(5–7)	6.40m	(21–0)	88.5	(195)	2.92	(3.81)	9.14m	(30'–0")	115.7	(255)	3.90	(5.09)

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

STRAIGHT HEADWALL – TYPE A [C.S.P. –ARCH]

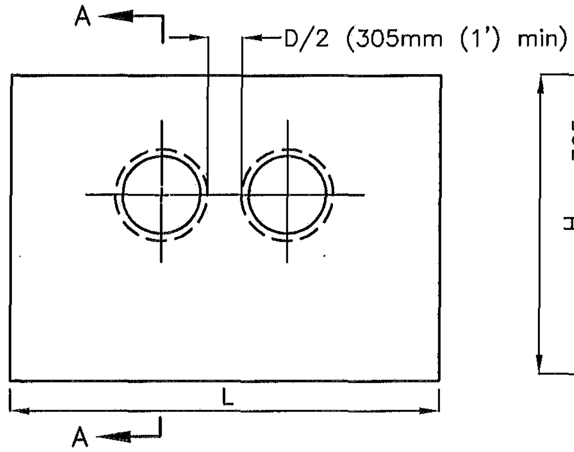
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

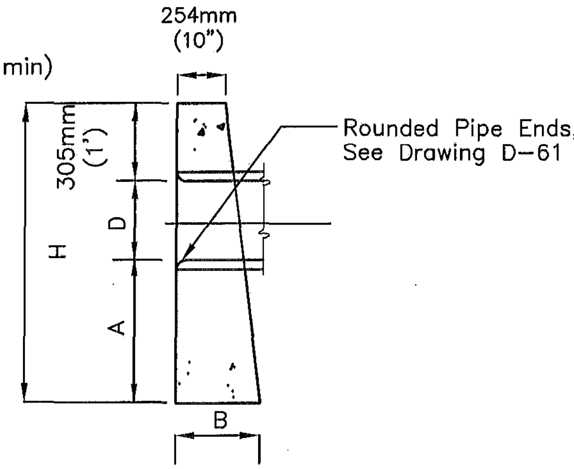
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-31

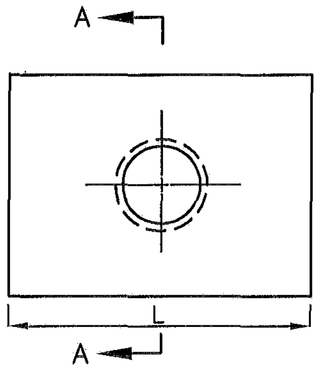
August 2009



DOUBLE PIPE
ELEVATION



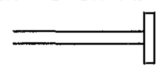
SECTION A–A



SINGLE PIPE
ELEVATION

D mm	D in.	A mm	A ft./in.	B mm	B ft./in.	H m	H ft./in.	SINGLE L m	SINGLE L ft./in.	SINGLE Concrete kg	SINGLE Concrete C.Y.	DOUBLE L m	DOUBLE L ft./in.	DOUBLE Concrete kg	DOUBLE Concrete C.Y.
300	(12")	610	(2'-0")	305	(1'-0")	1.22	(4'-0")	1.22	(4'-0")	.345	(0.45)	1.73	(5'-8")	.475	(.62)
375	(15")	610	(2'-0")	330	(1'-1")	1.30	(4'-3")	1.52	(5'-0")	.482	(0.63)	2.16	(7'-1")	.650	(.85)
450	(18")	610	(2'-0")	356	(1'-2")	1.40	(4'-6")	1.83	(6'-0")	.635	(0.83)	2.59	(8'-6")	.860	(1.12)
600	(24")	762	(2'-6")	432	(1'-5")	1.68	(5'-6")	2.44	(8'-0")	1.18	(1.54)	3.45	(11'-4")	1.60	(2.09)
750	(30")	762	(2'-6")	533	(1'-9")	1.83	(6'-0")	3.05	(10'-0")	1.85	(2.41)	4.32	(14'-2")	2.50	(3.26)
900	(36")	914	(3'-0")	610	(2'-0")	2.13	(7'-0")	3.66	(12'-0")	2.86	(3.74)	5.18	(17'-0")	3.87	(5.05)

LEGEND ON PLANS



NOTES

1. Concrete shall be 332 kg/M^3–C–22Mpa (560–C–3250).
2. Exposed corners shall be chamfered 19mm (3/4").

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

STRAIGHT HEADWALL – TYPE B
[CIRCULAR PIPE]

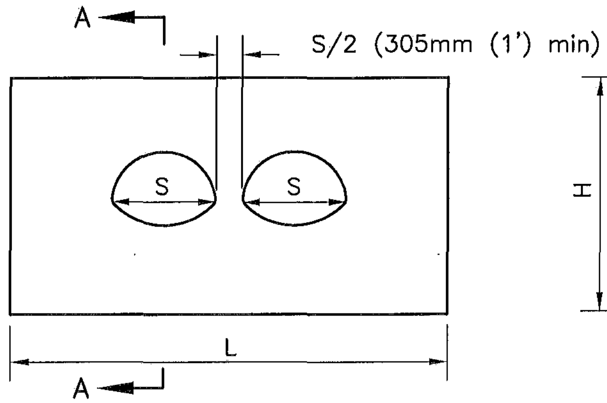
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

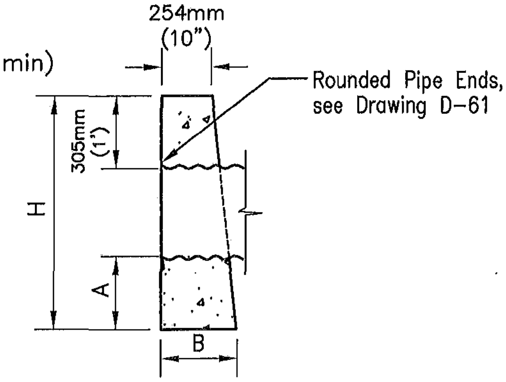
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D–32

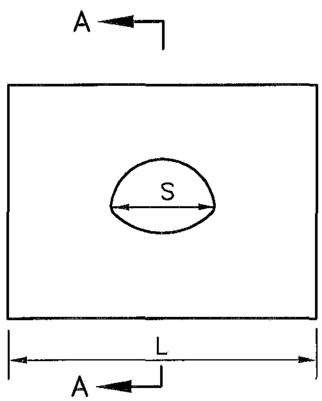
August 2009



DOUBLE PIPE ELEVATION



SECTION A-A



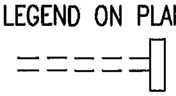
SINGLE PIPE ELEVATION

C.S.P. ARCH SIZE Metric	(inches)	A mm	A ft./in.	B mm	B ft./in.	H m	H ft./in.	SINGLE L m	SINGLE L ft.	SINGLE Concrete cu m	SINGLE Concrete C.Y.	DOUBLE L m	DOUBLE L ft./in.	DOUBLE Concrete cu m	DOUBLE Concrete C.Y.
450mmx275mm	(18x11)	610	(2'-0")	356	(1'-2")	1.19	(3'-11")	1.83	(6')	0.64	(0.83)	2.21	(7'-3")	0.75	(0.97)
525mmx375mm	(21x15)	610	(2'-0")	406	(1'-4")	1.24	(4'-3")	2.13	(7')	0.83	(1.08)	2.95	(9'-8")	1.12	(1.46)
600mmx450mm	(24x18)	610	(2'-0")	457	(1'-6")	1.32	(4'-6")	2.44	(8')	1.08	(1.41)	3.51	(11'-6")	1.52	(1.98)
700mmx500mm	(28x20)	762	(2'-6")	508	(1'-8")	1.52	(5'-2")	2.74	(9')	1.51	(1.97)	3.81	(12'-6")	2.04	(2.66)
875mmx600mm	(35x24)	762	(2'-6")	610	(2'-0")	1.63	(5'-6")	3.05	(10')	1.96	(2.56)	4.37	(14'-5")	2.76	(3.60)

NOTES

1. Concrete shall be 332 kg/M^3 –C–22Mpa (560–C–3250)
2. Exposed corners to be chamfered 19mm (3/4").

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

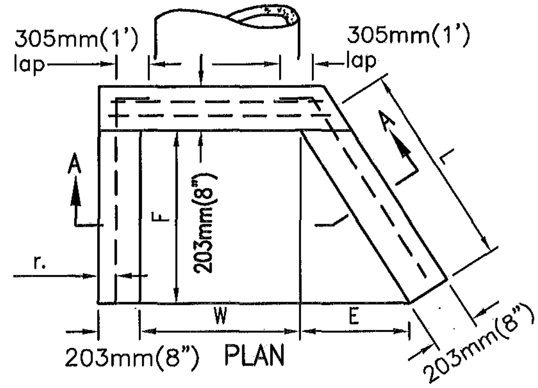
STRAIGHT HEADWALL – TYPE B (C.S.P. – ARCH PIPE)

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

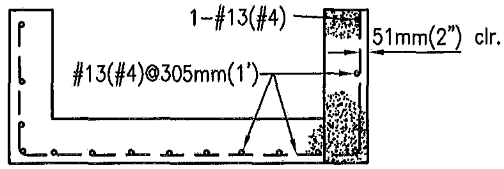
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-33

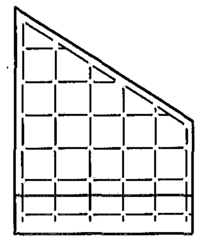


PLAN

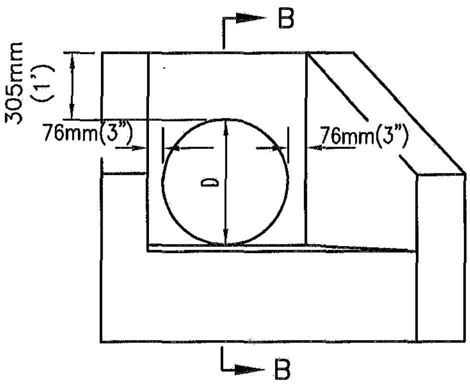
U TYPE WING TYPE



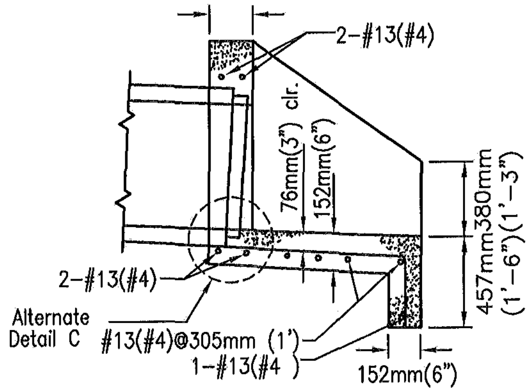
SECTION A-A



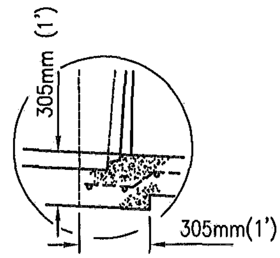
WING WALL REINFORCING



ELEVATION



SECTION B-B



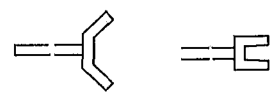
ALT. DETAIL C

	DIA. OF PIPE	DIMENSIONS L	E	F	SINGLE PIPE W	U TYPE CONC.	U TYPE STEEL	WING TYPE CONC.	WING TYPE STEEL	DOUBLE PIPE W	U TYPE CONC.	U TYPE STEEL	WING TYPE CONC.	WING TYPE STEEL
Metric	450mm	689mm	381mm	571mm	610mm	0.43kg	16kg	0.49kg	20kg	AS SHOWN ON PLANS	0.63kg	24kg	0.69kg	28kg
US	18"	2'-3 1/8"	1'-3"	1'-10 1/2"	2'-0"	0.55yd	35lb	0.63yd	43lb		0.82yd	53lb	0.90yd	61lb
Metric	600mm	962mm	533mm	800mm	762mm	0.61kg	22kg	0.72kg	28kg		1.0kg	34kg	1.1kg	39kg
US	24"	3'-1 7/8"	1'-9"	2'-7 1/2"	2'-6"	0.79yd	47lb	0.93yd	60lb		1.22yd	73lb	1.36yd	86lb
Metric	750mm	1.24m	686mm	1.03m	914mm	.81kg	33kg	1.0kg	39kg		1.3kg	50kg	1.5kg	56kg
US	30"	4'-5/8"	2'-3"	3'-4 1/2"	3'-0"	1.05yd	71lb	1.29yd	85lb		1.66yd	109lb	1.92yd	123lb
Metric	900mm	1.51m	838mm	1.26m	1.07m	1.02kg	40kg	1.30kg	52kg		1.70kg	62kg	1.95kg	74kg
US	36"	4'-11 1/2"	2'-9"	4'-1 1/2"	3'-6"	1.33yd	88lb	1.69yd	114lb		2.19yd	136lb	2.55yd	162lb

NOTES:

1. Concrete shall be 332kg/M^3 –C–22Mpa (560–C–3250)
2. Exposed corners to be chamfered 19mm (3/4").
3. Multiple pipes to be set a distance of D/2, with a 305mm(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 76mm (3") use alternate Detail–C.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

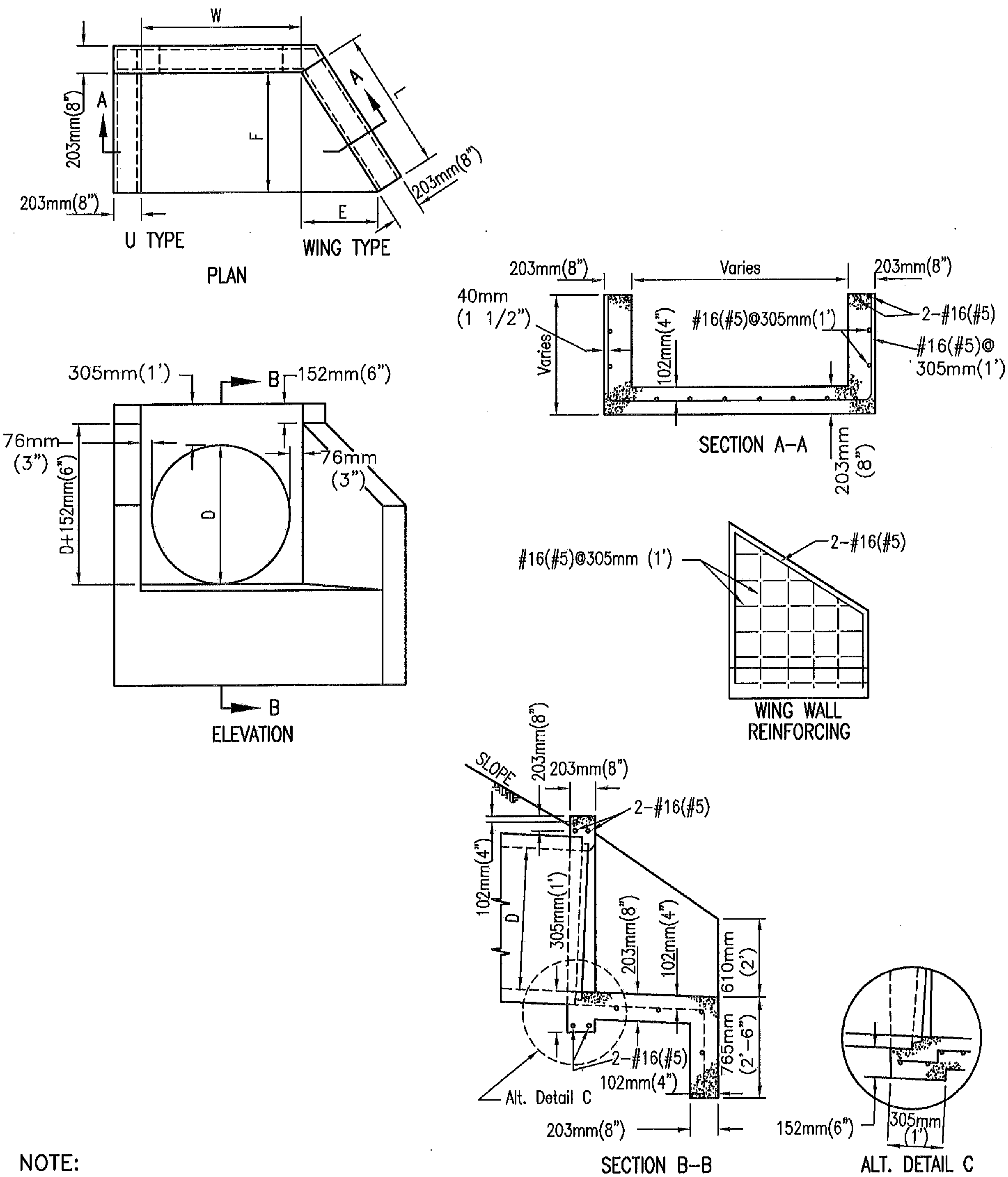
WING AND U TYPE HEADWALLS FOR 450mm (18") TO 900mm (36") PIPES

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-34



NOTE:

For Dimension Table and General Notes, see D-35B

Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	WING AND U TYPE HEADWALLS FOR 1.0m (42") TO 2.0m (84") PIPE	[signature] 3/01/2003 Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		
Edited		T. Stanton	02/09		DRAWING NUMBER D-35A

August 2009

TABLE OF DIMENSIONS AND QUANTITIES FOR DRAWING D-35A

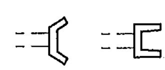
	DIA. OF PIPE	DIMENSIONS			SINGLE PIPE					DOUBLE PIPE				
						U TYPE		WING TYPE			U TYPE		WING TYPE	
		L	E	F	W	CONC.	STEEL	CONC.	STEEL	W	CONC.	STEEL	CONC.	STEEL
						C.Y.	LBS.	C.Y.	LBS.		C.Y.	LBS.	C.Y.	LBS.
Metric	1050mm	1.10m	610mm	914mm	1.22m	1.20 cu m	53.1 kg	1.46 kg	61.3 kg	AS SHOWN ON PLANS	2.1 cu m	86.2 kg	2.5 cu m	97.1 kg
U.S.	42"	3'-7 1/4"	2'-0"	3'-0"	4'-0"	1.57 C.Y.	117lb	1.90 C.Y.	135 lb		2.69 C.Y.	190 lb	3.16 C.Y.	214 lb
Metric	1200mm	1.37m	762mm	1.14m	1.37m	1.51 cu m	70.0 kg	1.90 cu m	84.0 kg		2.62 cu m	115 kg	3.11 cu m	131 kg
U.S.	48"	4'-6"	2'-6"	3'-9"	4'-6"	1.97 C.Y.	153 lb	2.48 C.Y.	184 lb		3.43 C.Y.	252 lb	4.06 C.Y.	288 lb
Metric	1350mm	1.65m	914mm	1.37m	1.52m	1.85 cu m	86.2 kg	2.35 cu m	112 kg		3.25 cu m	145 kg	3.87 cu m	176 kg
U.S.	54"	5'-4 7/8"	3'-0"	4'-6"	5'-0"	2.41 C.Y.	190 lb	3.07 C.Y.	246 lb		4.24 C.Y.	319 lb	5.06 C.Y.	368 lb
Metric	1500mm	1.92m	1.10m	1.60m	1.68m	2.21 cu m	109 kg	2.87 cu m	134 kg		3.40 cu m	175 kg	4.72 cu m	201 kg
U.S.	60"	6'-3 3/4"	3'-6"	5'-3"	5'-6"	2.88 C.Y.	239 lb	3.75 C.Y.	294 lb		5.13 C.Y.	386 lb	6.17 C.Y.	442 lb
Metric	1650mm	2.20m	1.22m	1.83m	1.83m	2.59 cu m	134 kg	3.46 cu m	162 kg		4.65 cu m	206 kg	5.51 cu m	234 kg
U.S.	66"	7'-2 1/2"	4'-0"	6'-0"	6'-0"	3.38 C.Y.	294 lb	4.52 C.Y.	356 lb		6.08 C.Y.	454 lb	7.20 C.Y.	516 lb
Metric	1800mm	2.47m	1.37m	2.06m	1.98m	3.0 cu m	167 kg	4.22 cu m	190 kg		5.44 cu m	237 kg	6.35 cu m	267 kg
U.S.	72"	8'-1 3/8"	4'-6"	6'-9"	6'-6"	3.93 C.Y.	368 lb	5.52 C.Y.	417 lb		7.11 C.Y.	522 lb	8.30 C.Y.	588 lb
Metric	1950mm	2.74m	1.52m	2.29m	2.13m	3.45 cu m	202 kg	5.13 cu m	229 kg		6.27 cu m	270 kg	7.27 cu m	315 kg
U.S.	78"	9'-0"	5'-0"	7'-6"	7'-0"	4.50 C.Y.	444 lb	6.70 C.Y.	503 lb		8.20 C.Y.	595 lb	9.50 lb	693 lb
Metric	2100mm	2.71m	1.68m	2.51m	2.29m	3.99 cu m	245 kg	6.24 cu m	281 kg		7.27 cu m	312 kg	8.26 cu m	357 kg
U.S.	84"	9'-10 3/4"	5'-6"	8'-3"	7'-6"	5.21 C.Y.	540 lb	8.15 C.Y.	619 lb		9.50 C.Y.	687 lb	10.80 C.Y.	786 lb

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. Tops of headwalls, on grade culverts, shall be placed parallel to profile grade when the grades are 3% or more.
3. Concrete shall be 332 kg/M^3-C-22Mpa (560-C-3250).
4. Exposed corners shall chamfered 19mm(3/4").
5. Multiple pipes shall be set a distance of D/2, with a 25mm(1") minimum, between outside diameters of pipes.
6. For pipe wall thickness greater than 76mm(3") use Alternate Detail-C.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

WING AND U TYPE HEADWALLS FOR 1.0 m (42") TO 2.0 m (84") PIPE

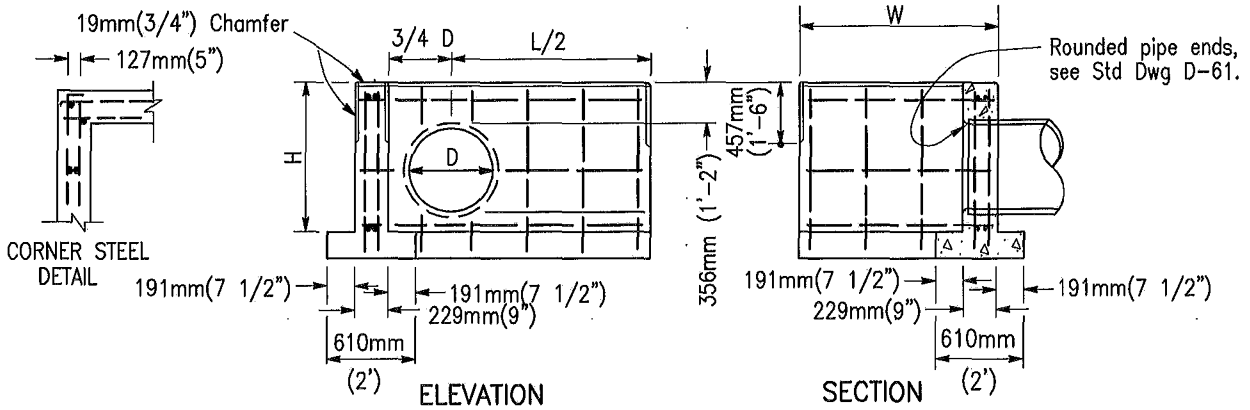
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-35B

August 2009

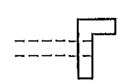


D	H	L/2	LENGTH OF W									
			965mm (3'-4")		1.47m (4'-10")		1.93m (6'-4")		2.39m (7'-10")		2.85m (9'-4")	
			Steel	Conc	Steel	Conc	Steel	Conc	Steel	Conc	Steel	Conc
300mm 12"	813mm 2'-8"	762mm 2'-6"	22.7kg 50lb	0.61cu m 0.79 C.Y.	27.3kg 60lb	.750cu m 0.98 C.Y.	— —	— —	— —	— —	— —	— —
375mm 15"	889mm 2'-11"	914mm 3'-0"	25.0kg 55lb	0.70cu m 0.91 C.Y.	30.0kg 65lb	.850cu m 1.11 C.Y.	— —	— —	— —	— —	— —	— —
450mm 18"	965mm 3'-2"	1.07m 3'-6"	30.0kg 65lb	.796cu m 1.04 C.Y.	34kg 75lb	.956cu m 1.25 C.Y.	— —	— —	— —	— —	— —	— —
525mm 21"	1.04m 3'-5"	1.14m 3'-9"	34.0kg 75lb	.880cu m 1.15 C.Y.	40.9kg 90lb	1.04cu m 1.36 C.Y.	— —	— —	— —	— —	— —	— —
600mm 24"	1.12m 3'-8"	1.30m 4'-3"	38.6kg 85lb	.990cu m 1.29 C.Y.	45.4kg 100lb	1.16cu m 1.51 C.Y.	50.0kg 110lb	1.33cu m 1.74 C.Y.	— —	— —	— —	— —
675mm 27"	1.14m 3'-11"	1.45m 4'-9"	40.9kg 90lb	1.10cu m 1.44 C.Y.	47.7kg 105lb	1.28cu m 1.67 C.Y.	52.2kg 115lb	1.91cu m 1.91 C.Y.	— —	— —	— —	— —
750mm 30"	1.27m 4'-2"	1.52m 5'-0"	43.0kg 95lb	1.19cu m 1.55 C.Y.	50,0kg 110lb	1.38cu m 1.80 C.Y.	54.5kg 120lb	2.05cu m 2.05 C.Y.	61.3kg 135lb	1.75cu m 2.29 C.Y.	— —	— —
825mm 33"	1,35m 4'-5"	1.68m 5'-6"	47.7kg 105lb	1.31cu m 1.71 C.Y.	54.5kg 120lb	1.51cu m 1.97 C.Y.	61.3kg 135lb	2.23cu m 2.23 C.Y.	68.0kg 150lb	1.90cu m 2.48 C.Y.	— —	— —
900mm 36"	1.42m 4'-8"	1.83m 6'-0"	50.0kg 110lb	1.44cu m 1.88 C.Y.	56.7kg 125lb	1.65cu m 2.15 C.Y.	63.5kg 140lb	2.41cu m 2.41 C.Y.	70.3kg 155lb	2.05cu m 2.68 C.Y.	77.2kg 170lb	2.26cu m 2.95 C.Y.
975mm 39"	1.25m 4'-11"	1.90m 6'-3"	— —	— —	68.0kg 150lb	1.75cu m 2.28 C.Y.	77.2kg 170lb	2.56cu m 2.56 C.Y.	84.0kg 185lb	2.18cu m 2.84 C.Y.	90.8kg 200lb	2.39cu m 3.12 C.Y.
1050mm 42"	1.58m 5'-2"	2.06m 6'-9"	— —	— —	70.3kg 155lb	1.85cu m 2.42 C.Y.	79.4kg 175lb	2.76cu m 2.76 C.Y.	86.2kg 190lb	2.34cu m 3.05 C.Y.	95.3kg 210lb	2.56cu m 3.34 C.Y.
1125mm 45"	1.65m 5'-5"	2.21m 7'-3"	— —	— —	— —	— —	81.7kg 180lb	2.97cu m 2.97 C.Y.	90.8kg 200lb	2.50cu m 3.27 C.Y.	97.6kg 215lb	2.73cu m 3.57 C.Y.
1200mm 48"	1.73m 5'-8"	2.29m 7'-6"	— —	— —	— —	— —	86.2kg 190lb	3.13cu m 3.13 C.Y.	98.0kg 216lb	2.63cu m 3.44 C.Y.	105kg 230lb	2.87cu m 3.75 C.Y.
1275mm 51"	1.80m 5'-11"	2.44m 8'-0"	— —	— —	— —	— —	— —	— —	99.8kg 220lb	2.81cu m 3.67 C.Y.	107kg 235lb	3.05cu m 3.99 C.Y.
1350mm 54"	1.88m 6'-2"	2.59m 8'-6"	— —	— —	— —	— —	— —	— —	107kg 235lb	2.99cu m 3.91 C.Y.	114kg 250lb	3.25cu m 4.24 C.Y.

NOTES

1. Concrete shall be 332 kg/M^3 –C–22Mpa (560–C–3250).
2. All reinforcing steel #13(#4) bars. All vertical and horizontal tie bars 457mm(18") maximum spacing.
3. When multiple pipes are used, the distance between pipes shall be D/2 (305mm(1') min.). The dimension L/2 is from the center of the pipe to the end of the headwall as shown.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

L TYPE HEADWALLS CIRCULAR PIPES

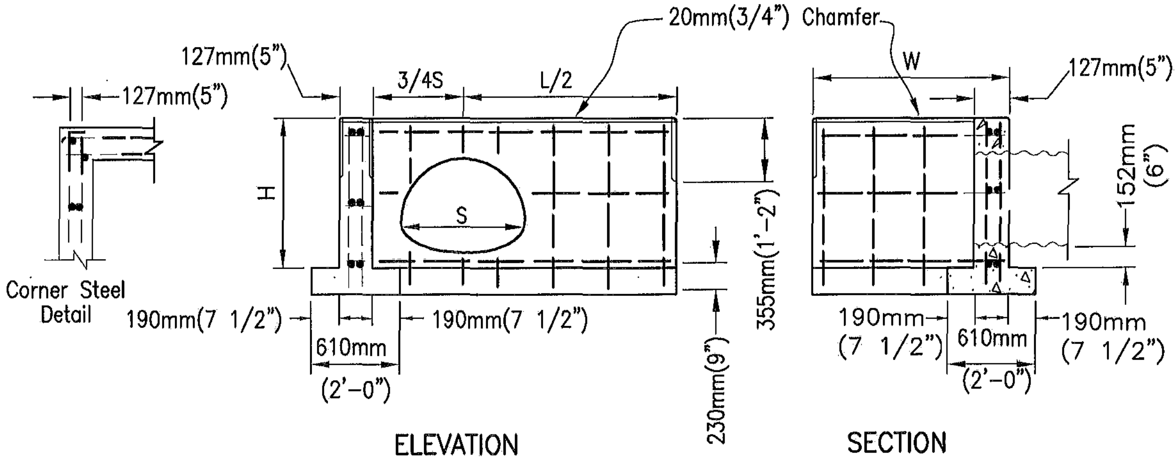
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-36

August 2009

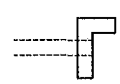


CSP ARCH SIZE		H	L/2	LENGTH OF W									
				1.02m (3'-4")		1.47m (4'-10")		1.93m (6'-4")		2.39m (7'-10")		2.84m (9'-4")	
				Steel	Conc	Steel	Conc	Steel	Conc	Steel	Conc	Steel	Conc
Metric	450mm x 275mm	787mm	838mm	22.7kg	.643cu m	27.3kg	.788cu m	31.8kg	.926cu m	36.3kg	1.07cu m	40.9kg	1.20cu m
U.S.	18"x11"	2'-7"	2'-9"	50lb	0.84 C.Y.	60lb	1.03 C.Y.	70lb	1.21 C.Y.	80lb	1.39 C.Y.	90lb	1.57 C.Y.
Metric	525mm x 375mm	889mm	991mm	27.3kg	.765cu m	29.5kg	.910cu m	34.0kg	1.06cu m	40.9kg	1.21cu m	54.4kg	1.36cu m
U.S.	21"x15"	2'-11"	3'-3"	60lb	1.00 C.Y.	65lb	1.18 C.Y.	75lb	1.38 C.Y.	90lb	1.58 C.Y.	100lb	1.77 C.Y.
Metric	600mm x 450mm	965mm	1.14m	27.3kg	.818cu m	31.8kg	1.00cu m	36.3kg	1.17cu m	43.1kg	1.33cu m	49.9kg	1.49cu m
U.S.	24"x18"	3'-2"	3'-9"	60lb	1.07 C.Y.	70lb	1.32 C.Y.	80lb	1.53 C.Y.	95lb	1.74 C.Y.	110lb	1.94 C.Y.
Metric	700mm x 500mm	1.02m	1.30m	31.8kg	.964cu m	36.3kg	1.13cu m	40.9kg	1.29cu m	45.4kg	1.45cu m	52.2kg	1.62cu m
U.S.	28"x20"	3'-4"	4'-3"	70lb	1.26 C.Y.	80lb	1.47 C.Y.	90lb	1.68 C.Y.	100lb	1.90 C.Y.	115lb	2.11 C.Y.
Metric	875mm x 600mm	1.07m	1.35m	45.36	1.16cu m	49.9kg	1.33cu m	54.5kg	1.51cu m	63.5kg	1.69cu m	70.3kg	1.85cu m
U.S.	35"x24"	3'-8"	5'-3"	100lb	1.51 C.Y.	110lb	1.74 C.Y.	120lb	1.97 C.Y.	140lb	2.20 C.Y.	155lb	2.42 C.Y.
Metric	1050mm x 725mm	1.25m	1.90m	52.2kg	1.40cu m	59.0kg	1.58cu m	63.5kg	1.77cu m	70.3kg	1.95cu m	77.2kg	2.17cu m
U.S.	42"x29"	4'-1"	6'-3"	115lb	1.82 C.Y.	130lb	2.06 C.Y.	140lb	2.31 C.Y.	155lb	2.55 C.Y.	170lb	2.83 C.Y.
Metric	1225mm x 825mm	1.35m	2.21m	59.0kg	1.62cu m	65.8kg	1.82cu m	70.3kg	2.02cu m	77.2kg	2.22cu m	84.0kg	2.41cu m
U.S.	49"x33"	4'-5"	7'-3"	130lb	2.12 C.Y.	145lb	2.37 C.Y.	155lb	2.64 C.Y.	170lb	2.90 C.Y.	185lb	3.15 C.Y.
Metric	1425mm x 950mm	1.47m	2.59m	65.8kg	1.93cu m	75.6kg	2.14cu m	79.4kg	2.35cu m	86.2kg	2.57cu m	93.0kg	2.76cu m
U.S.	57"x38"	4'-10"	8'-6"	145lb	2.52 C.Y.	160lb	2.79 C.Y.	175lb	3.07 C.Y.	190lb	3.35 C.Y.	205lb	3.61 C.Y.
Metric	1550mmx1050mm	1.35m	2.90m	84.0kg	2.21cu m	90.8kg	2.38cu m	97.6kg	2.66cu m	107kg	2.89cu m	114kg	3.11cu m
U.S.	64"x43"	5'-3"	9'-6"	185lb	2.89 C.Y.	200lb	3.11 C.Y.	215lb	3.48 C.Y.	235lb	3.77 C.Y.	250lb	4.06 C.Y.
Metric	1775mmx1175mm	1.45m	3.20m	90.8kg	2.49cu m	97.6kg	2.73cu m	107kg	2.96cu m	114kg	3.19cu m	123kg	3.43cu m
U.S.	71"x47"	5'-7"	10'-6"	200lb	3.25 C.Y.	215lb	3.56 C.Y.	235lb	3.86 C.Y.	250lb	4.17 C.Y.	270lb	4.48 C.Y.

NOTES

1. Concrete shall be 332 kg/M^3 –C–22Mpa (560–C–3250)
2. All reinforcing steel #13 (#4) bars. All vertical and horizontal tie bars 460mm (18") maximum spacing.
3. When multiple pipes are used, the distance between pipes shall be S/2 (305mm (1') min.). The dimension L/2 is from the center of the pipe to the end of the headwall as shown.

LEGEND ON PLANS



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

SAN DIEGO REGIONAL STANDARD DRAWING

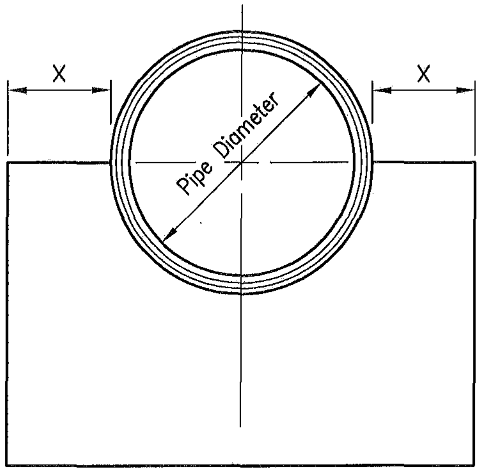
L TYPE HEADWALLS C.S.P. ARCH PIPE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

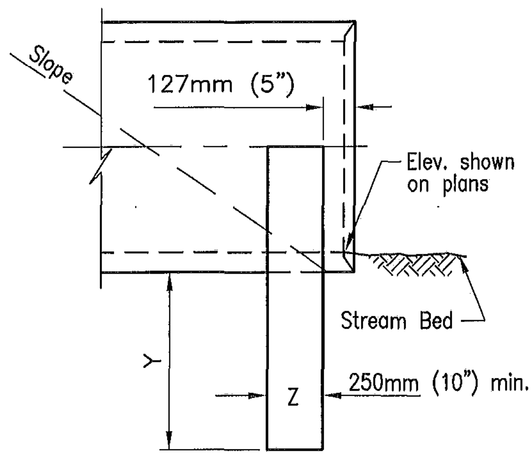
3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-37



FACE ELEVATION



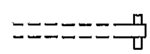
SIDE ELEVATION

PIPE DIAMETER	X	Y	Z
300mm (12") TO 600mm (24")	310mm (1"–0")	610mm (2"–0")	254mm (10")
525mm (21") TO 900mm (36")	457mm (1"–6")	762mm (2"–6")	305mm (12")
975mm (39") TO 1200mm (48")	610mm (2'–0")	914mm (3'–0")	305mm (12")
1275mm (51") TO 1500mm (60")	762mm (2'–6")	914mm (3'–0")	356mm (14")
1575mm (63") & Larger	914mm (3'–0")	914mm (3'–0")	356mm (14")

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 332 kg/M^3 –C–22Mpa (560–C–3250) .
3. Keep the pipe–end clear of obstructions to permit easy placing of culvert extension.

LEGEND ON PLANS



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

SAN DIEGO REGIONAL STANDARD DRAWING

CURTAIN WALL

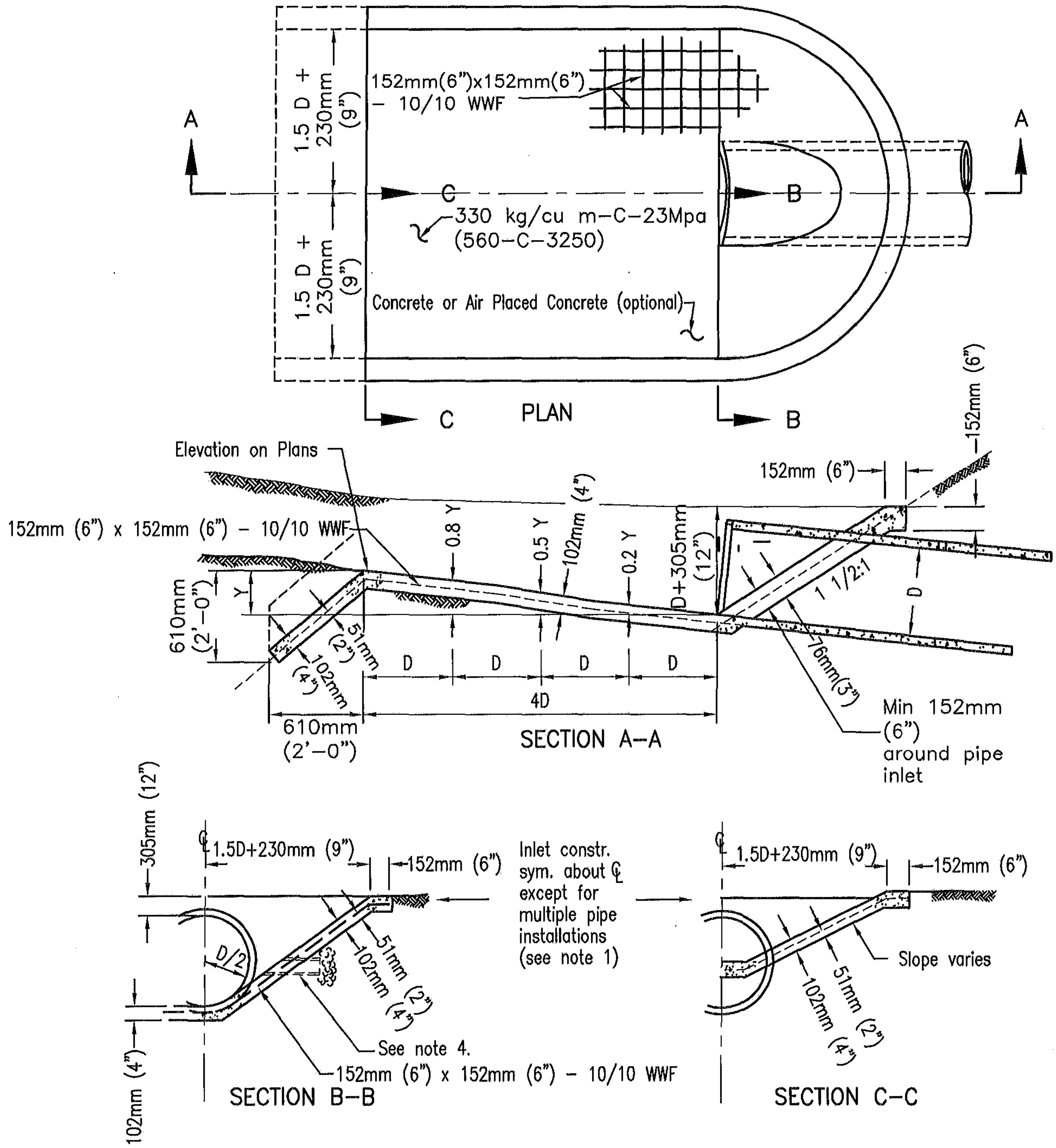
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D–38

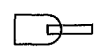
August 2009



NOTES

1. When more than one pipe is used the profile view shown shall hold for the distance across 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. (305mm (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



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

SAN DIEGO REGIONAL STANDARD DRAWING

INLET APRON FOR CULVERTS UP TO 1050mm (42") DIAMETER

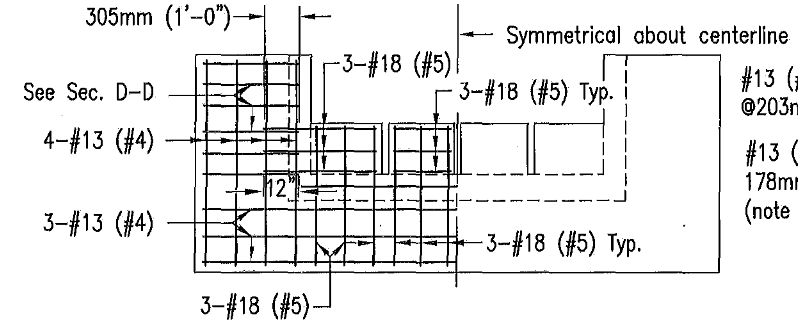
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITEE

3/01/2003

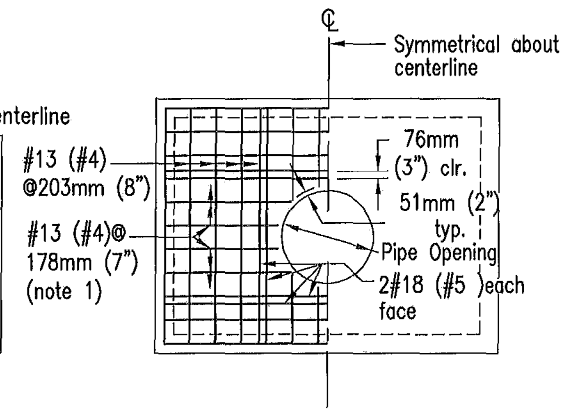
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-39

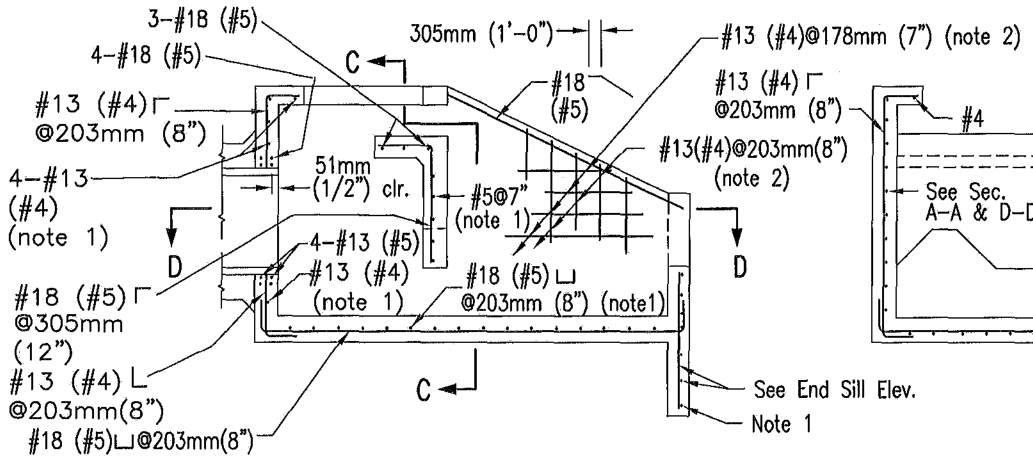
August 2009



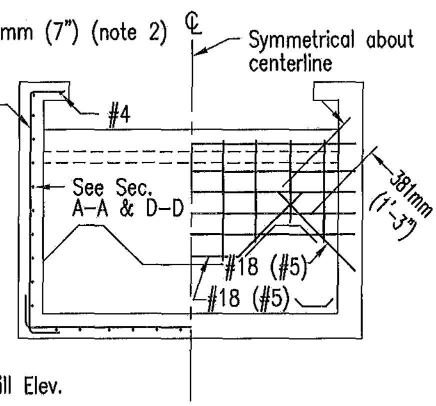
END SILL ELEVATION



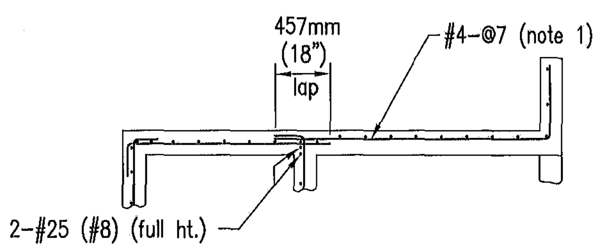
HEADWALL ELEVATION



SECTION A-A



SECTION C-C



SECTION D-D

NOTES

1. Place reinforcing, as noted, at center wall (or slab).
2. Match location of reinforcing with that in headwall, end sill and foundation slab.
3. All reinforcing shall be placed with 51mm (2") concrete cover, unless noted otherwise.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

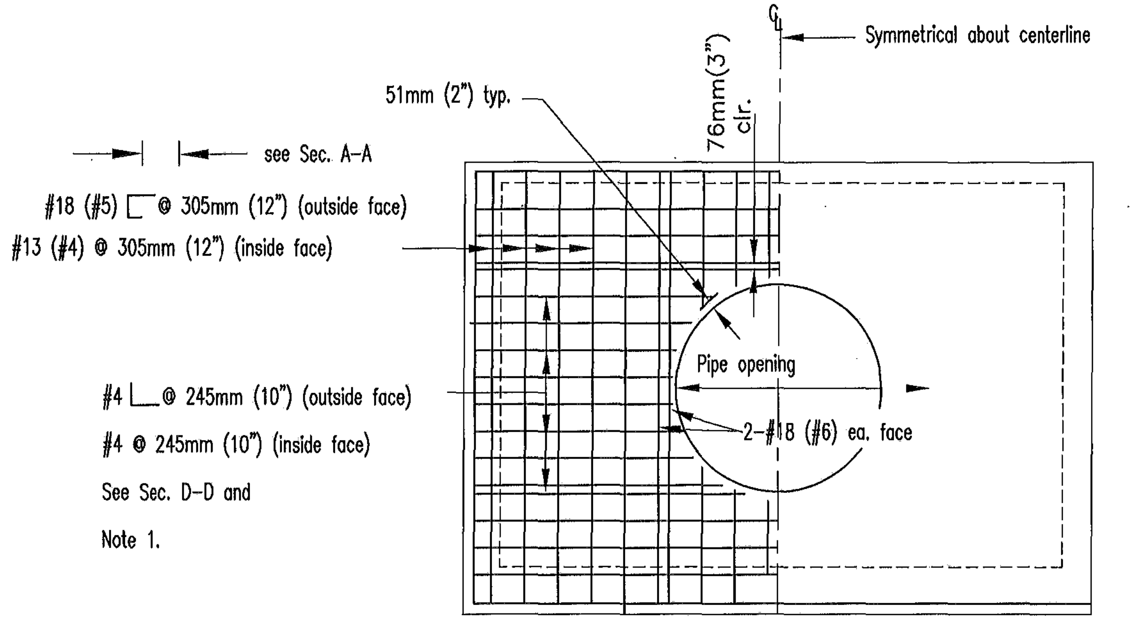
CONCRETE ENERGY DISSIPATER [REINFORCEMENT] 450mm (18") TO 750mm (30") DIAMETER PIPE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

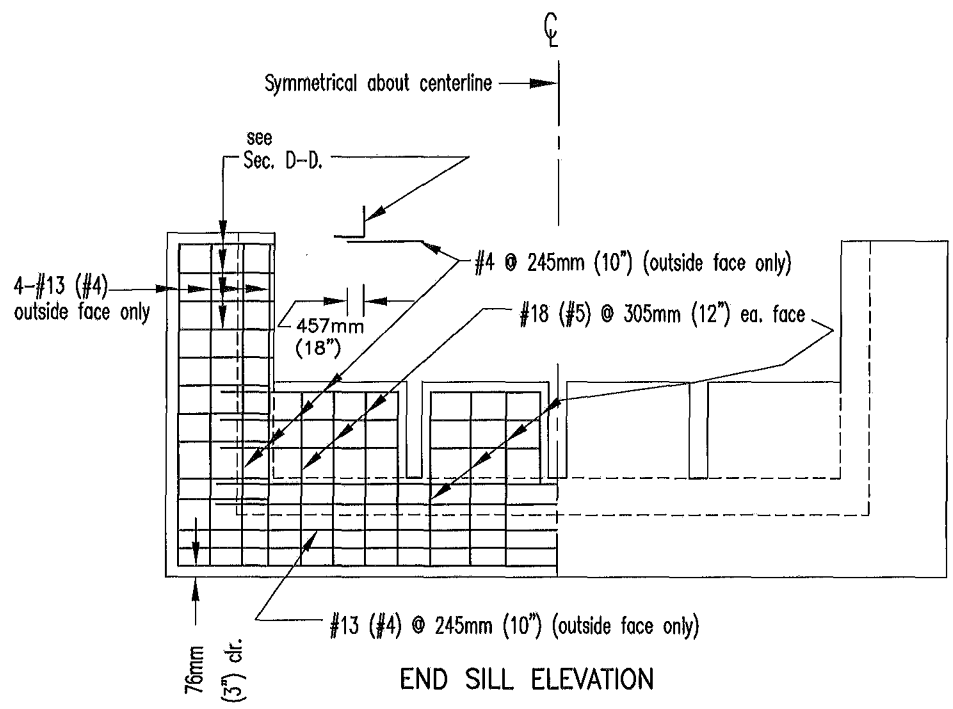
3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-42



HEADWALL ELEVATION



END SILL ELEVATION

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE ENERGY DISSIPATER
[REINFORCEMENT]
900mm (36") TO 1800mm (72") DIAMETER PIPE

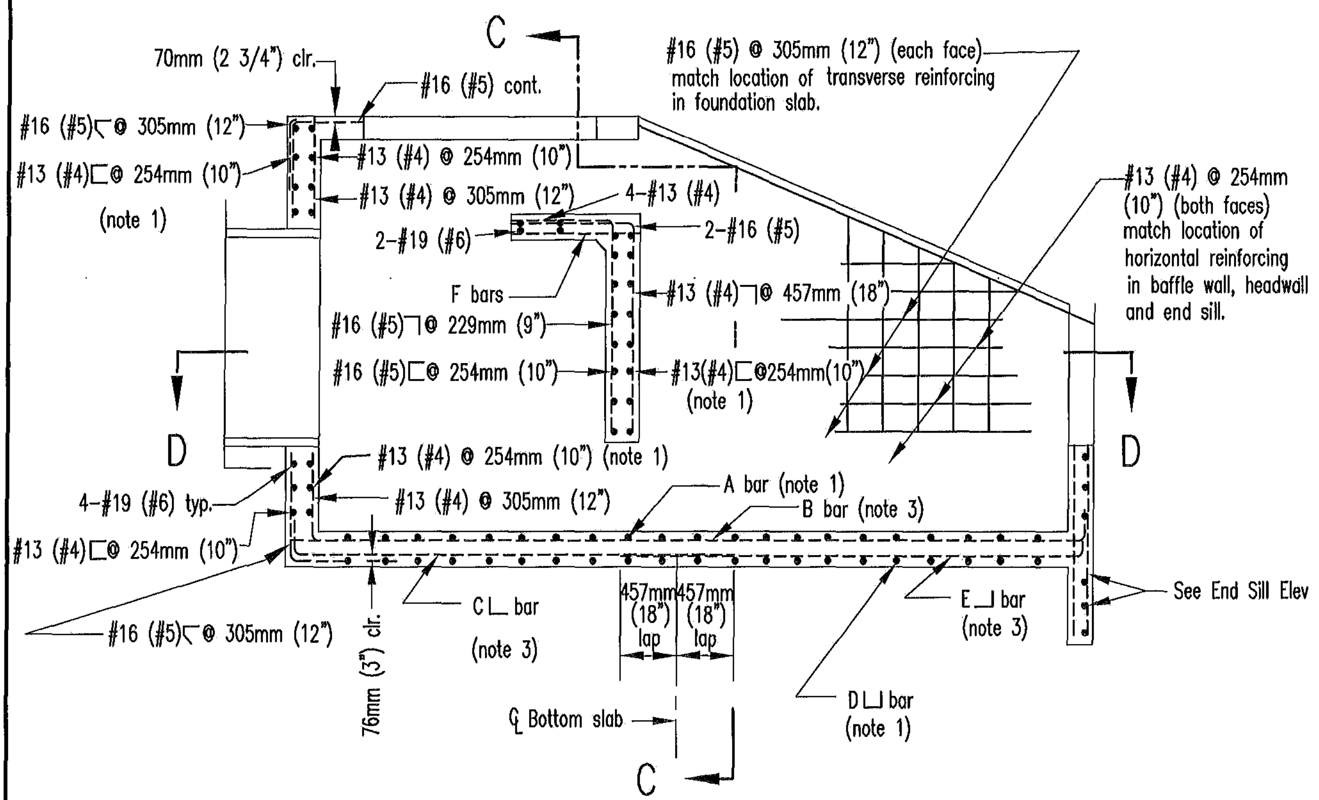
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

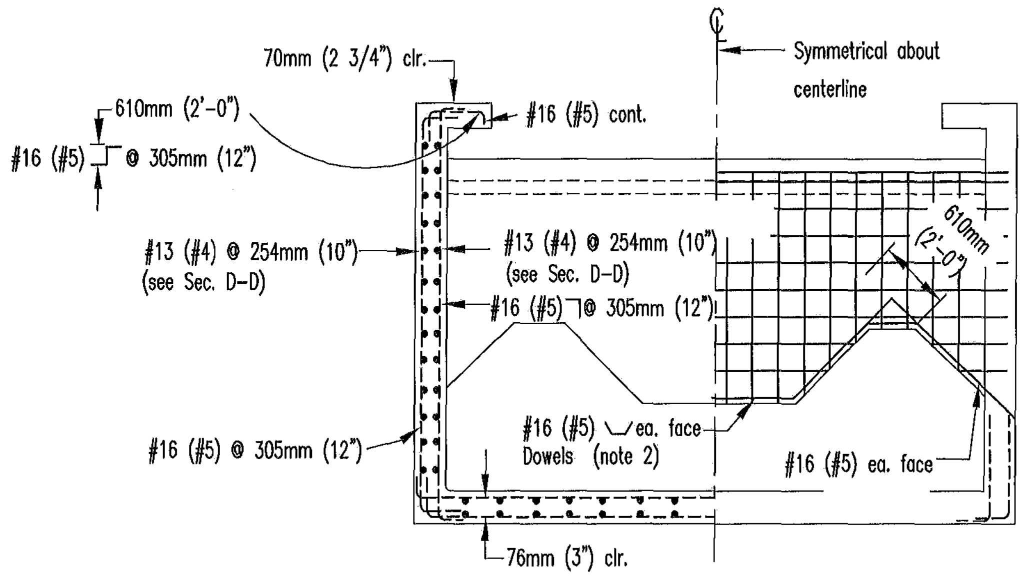
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-43A

August 2009

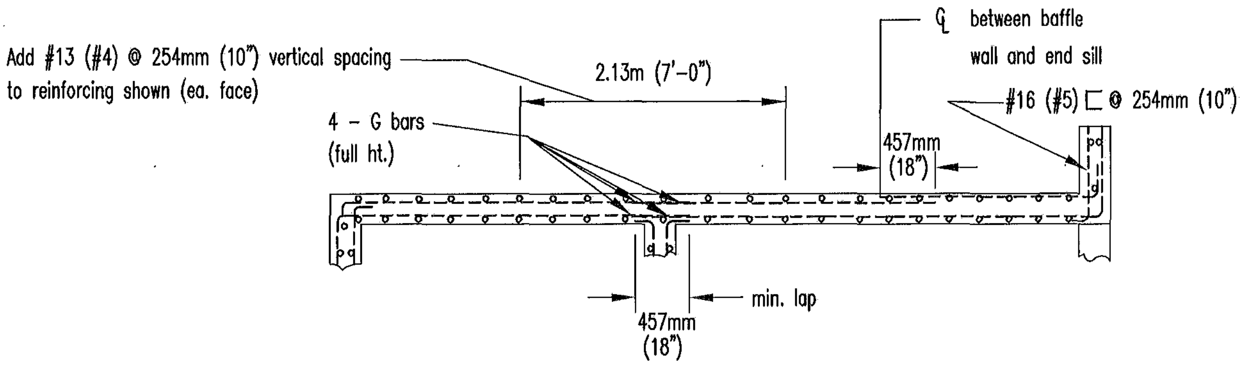


SECTION A-A



SECTION D-D

Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	CONCRETE ENERGY DISSIPATER [REINFORCEMENT] 900mm (36") TO 1800mm (72") DIAMETER PIPE	3/01/2003
Reformatted		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
Edited		T. Stanton	02/09		DRAWING NUMBER D-43B



SECTION D-D

Pipe dia. (in.)	914mm (36")	1.07m (42")	1.22m (48")	1.37m (54")	1.52m (60")	1.83m (72")
A bar	#16 (# 5) @ 305mm (12")		#19 (#6) @ 305mm (12")		#22 (#7) @ 305mm (12")	
B bar	#16 (# 5) @ 305mm (12")		#19 (#6) @ 305mm (12")			
C bar	#13 (# 4) @ 305mm (12")		#16 (#5) @ 305mm (12")			
D bar	#13 (# 4) @ 305mm (12")		#16 (#5) @ 305mm (12")		#19 (#6) @ 305mm (12")	
E bar	#13 (# 4) @ 305mm (12")		#16 (#5) @ 305mm (12")			
F bar	#13 (# 4) @ 229mm (9")		#16 (#5) @ 229mm (9")			#19 (#6) @ 229mm (9")
G bar	#22 (# 7)			#36 (# 11)		

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE ENERGY DISSIPATER [REINFORCEMENT] 900mm (36") TO 1800mm (72") DIAMETER PIPE

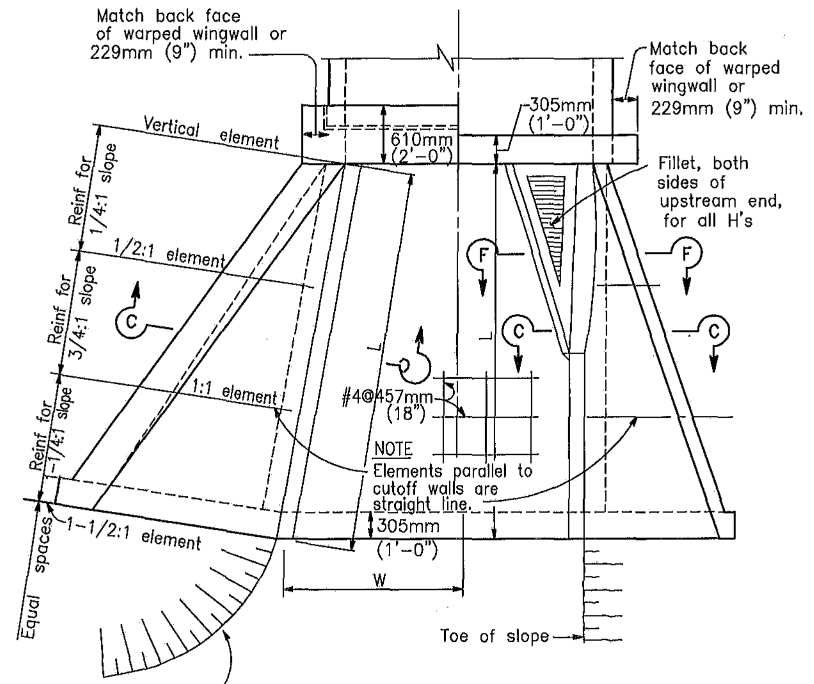
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

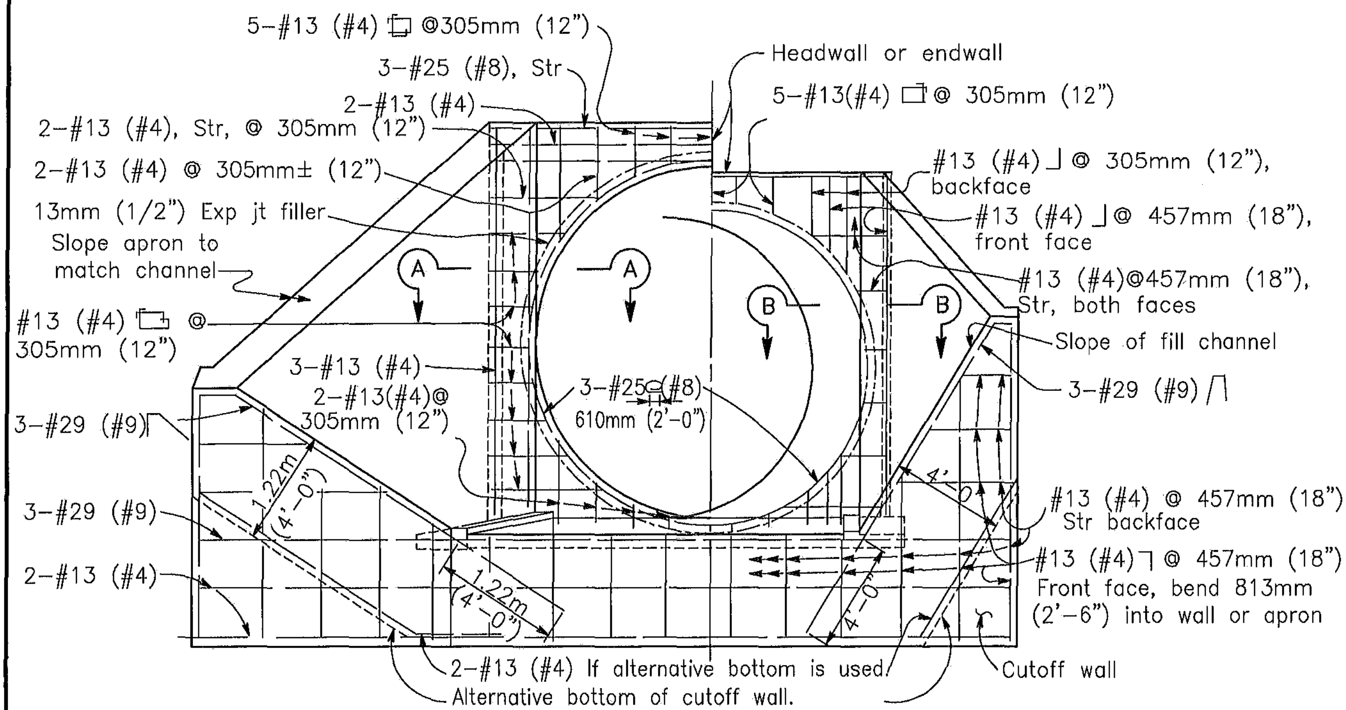
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-43C

August 2009



PLAN



TYPICAL FOR MAXIMUM H >3.05m (10') TYPICAL FOR MAXIMUM H< 3.05m (10')

END ELEVATION

If at upstream end, fillet is not shown

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

SAN DIEGO REGIONAL STANDARD DRAWING

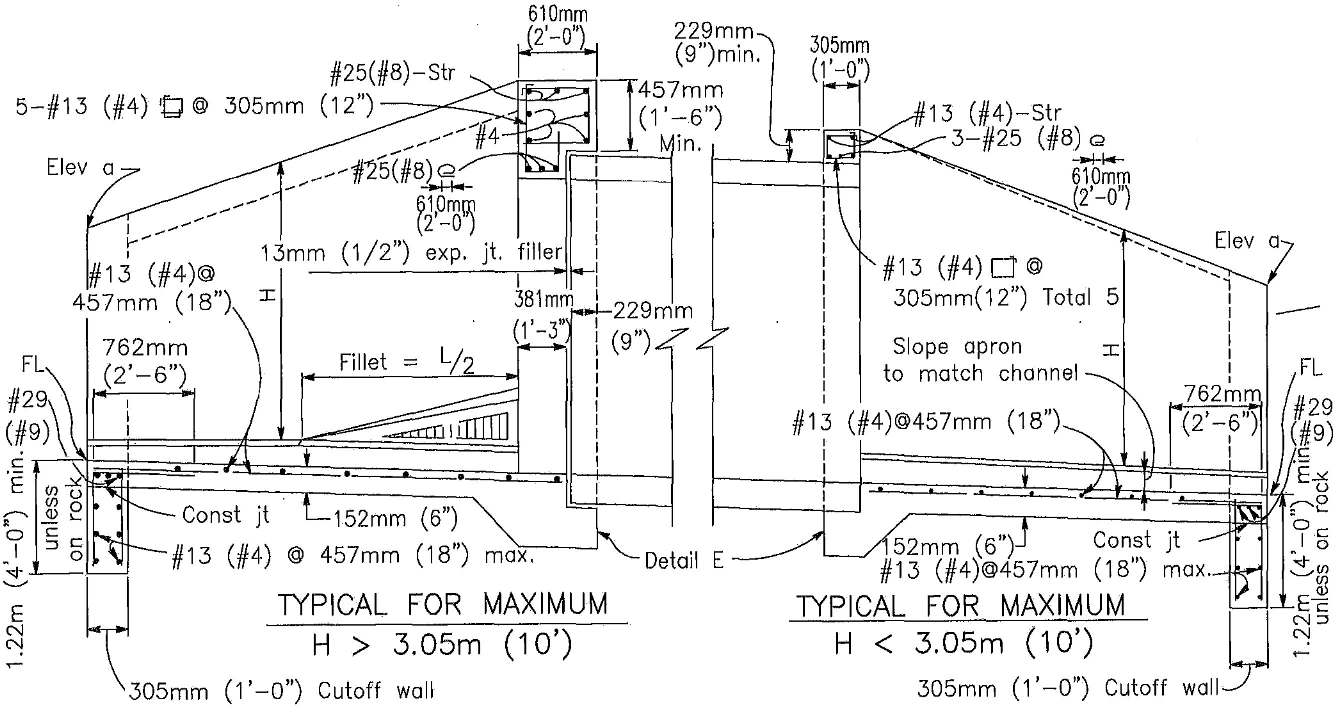
PIPE CULVERT - HEADWALLS, ENDWALLS & WARPED WINGWALLS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

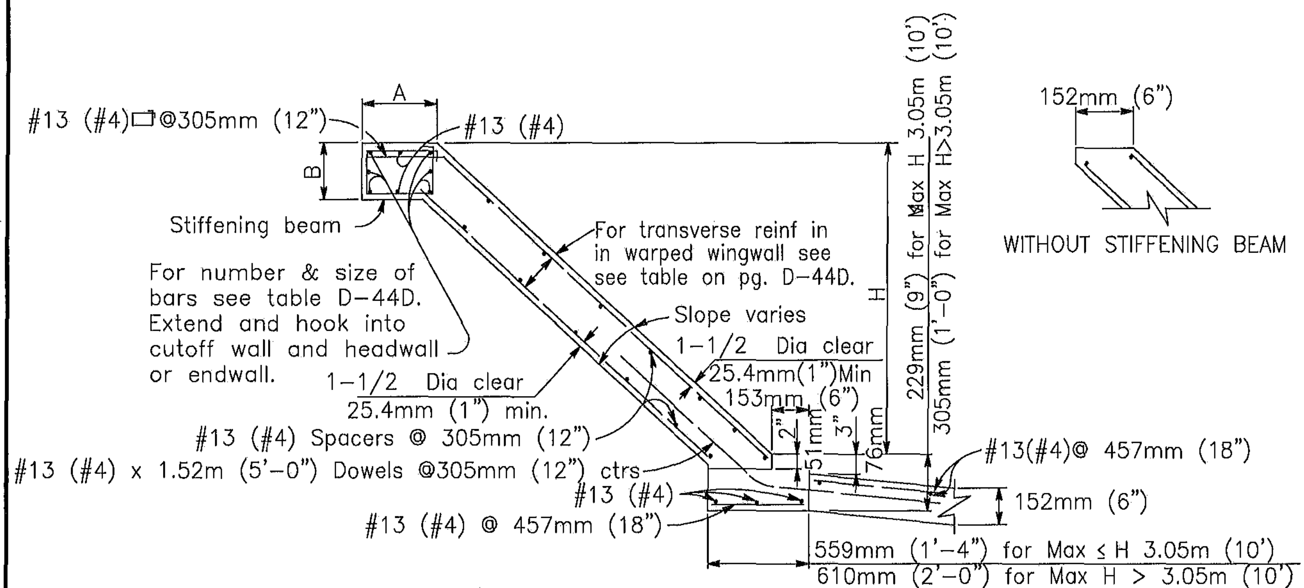
DRAWING NUMBER D-44A



PART LONGITUDINAL SECTION

NOTE

RCP shown. Metal pipe similar except eliminate the expansion joint and use hook bolts @ 483mm(19")± spacing. Size and length provided by manufacturer.



WITHOUT STIFFENING BEAM

SECTION C–C

Where abrasion is anticipated, increase apron thickness to 178mm (7") minimum to provide 51mm (2") minimum reinforcement coverage.

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

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE CULVERT – HEADWALLS, ENDWALLS & WARPED WINGWALLS

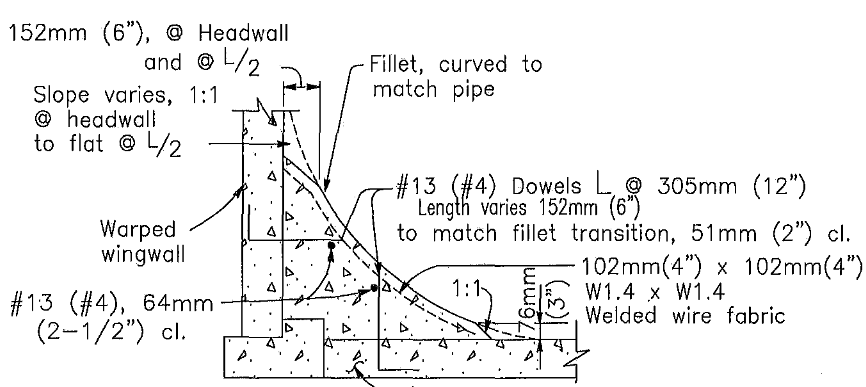
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

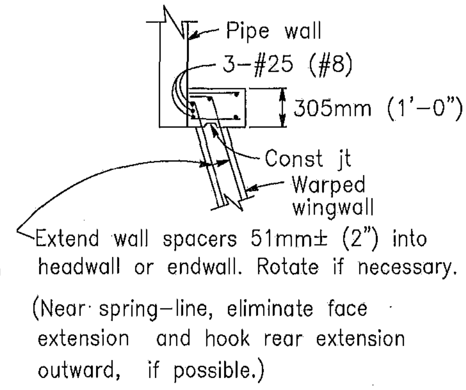
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-44B

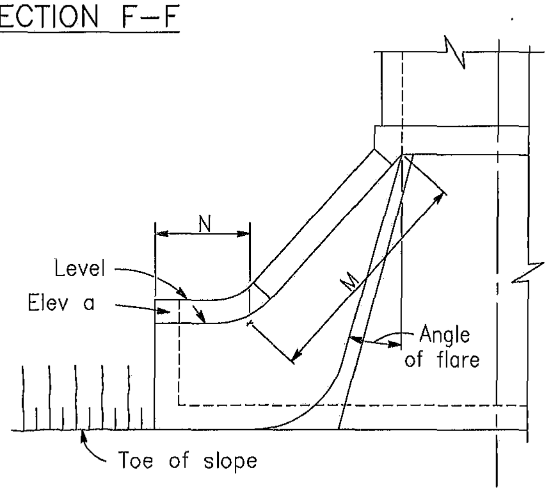
August 2009



SECTION F-F

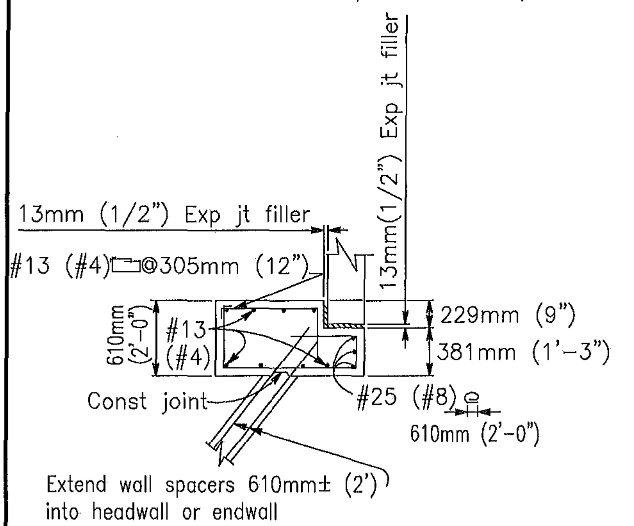


SECTION B-B

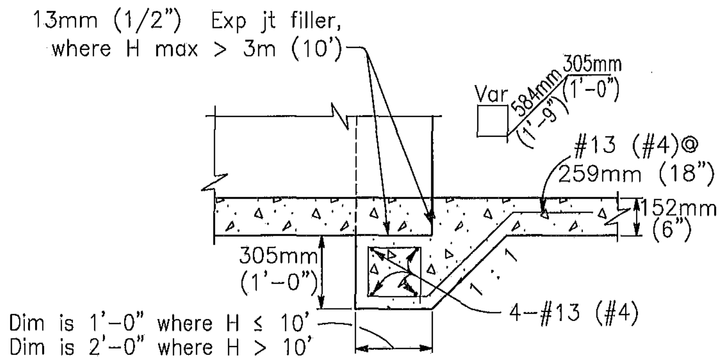


ALTERNATIVE WARPED WINGWALL

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



SECTION A-A



DETAIL E

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

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE CULVERT - HEADWALLS, ENDWALLS & WARPED WINGWALLS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-44C

August 2009

WARPED WINGWALLS – US (All measurements in Feet and/or Inches unless otherwise noted)

WALL DIMENSIONS AND REINFORCING

Element Slope	H	8'or less	10'	12'	14'	16'	18'	20'
1/4:1	Front face reinf	#4@12	#4@ 7	#5@ 7	#5@ 5	#6@ 6	#7@ 7	#7@ 6
	Rear face reinf	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12
3/4:1	Front face reinf	#4@12	#4@12	#4@12	#4@12	#4@10	#4@ 8	#4@ 6
	Rear face reinf	#4@12	#4@12	#4@12	#4@10	#4@ 7	#4@ 6	#5@ 8
1-1/4:1	Front face reinf	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12
	Rear face reinf	#4@ 8	#4@ 8	#4@ 5	#5@ 6	#6@ 7	#6@ 6	#7@ 6
D at Cutoff Wall		6"	6"	6"	7-1/2"	8"	9-1/2"	11"
D at Culvert		6"	6"	6"	8"	9-1/2"	11"	1'-1"

STIFFENING BEAM DIMENSIONS AND REINFORCING

H max \ L	12'	14'	16'	18'	20'	25'	30'	35'	40' or more
6'	No beam. Place 2-#6 in each								
8'	face along top of								
10'	wall.			A= 1'-0"					
12'			B= 9"			A= 1'-6"			
14'		Total 6-#6			B= 1'-0"			A= 1'-10"	
16'				Total 6-#7			B=1'-0"	A=2'-0"	
18'						Total 6-#8		B= 1'-6"	
20'							Total 8-#9		

WARPED WINGWALLS – METRIC (All measurements in Millimeters unless otherwise noted)

WALL DIMENSIONS AND REINFORCING

Element Slope	H	2.44m or less	3.05m	3.66m	4.27	4.88m	5.59m	6.10m
1/4:1	Front face reinf	#13@305	#13@178	#16@178	#16@127	#19@152	#22@178	#22@152
	Rear face reinf	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305
3/4:1	Front face reinf	#13@305	#13@305	#13@305	#13@305	#13@254	#13@203	#13@152
	Rear face reinf	#13@305	#13@305	#13@305	#13@254	#13@178	#13@152	#16@203
1-1/4:1	Front face reinf	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305	#13@305
	Rear face reinf	#13@203	#13@203	#13@127	#16@152	#19@178	#19@152	#22@152
D at Cutoff Wall		152	152	152	191	203	241	279mm
D at Culvert		152	152	152	203	241	279	330

STIFFENING BEAM DIMENSIONS AND REINFORCING

H max \ L	3.66m	3.27m	4.88m	5.49m	6.10m	7.62m	9.14m	10.7m	12m or more
1.83m	No beam. Place 2-#13 in each								
2.43m	face along top of								
3.05m	wall.			A= 305					
3.66m			B= 229			A= 457			
4.27m		Total 6-#19			B= 305			A= 559	
4.88m				Total 6-#22			B=305	A=610	
5.49m						Total 6-#25		B= 457	
6.10m							Total 8-#29		

NOTES:

Walls designed for 610mm (2') surcharge; earth density = 55kg / 0.029 cu m (120 # / cu. ft.); equivalent fluid pressure = 16.4kg / cu m (36 #/cu. ft.) Vary D of warped wall uniformly from that at cutoff wall to that at culvert, for maximum H > 3.65m (12'). Dimensions L, W, H, M.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

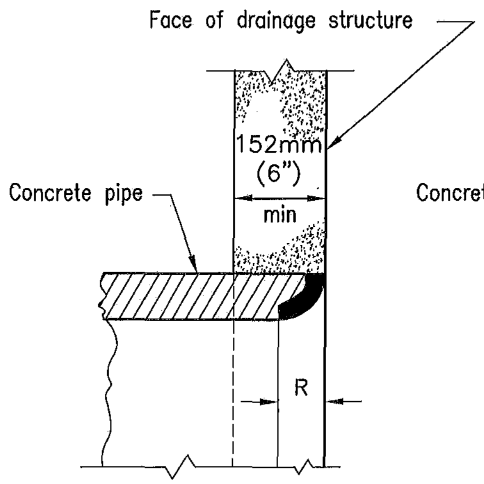
PIPE CULVERT – HEADWALLS, ENDWALLS & WARPED WINGWALLS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

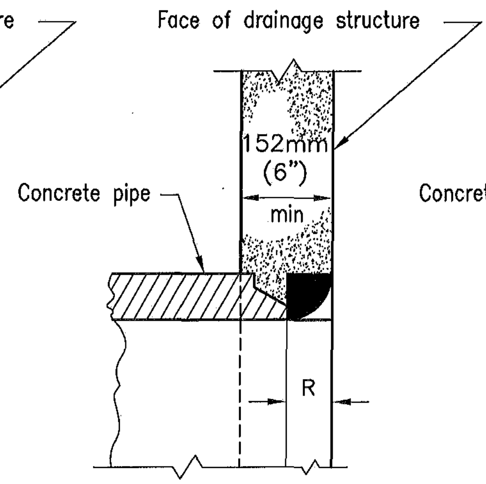
3/01/2003

Chairperson R.C.E. 19246 Date

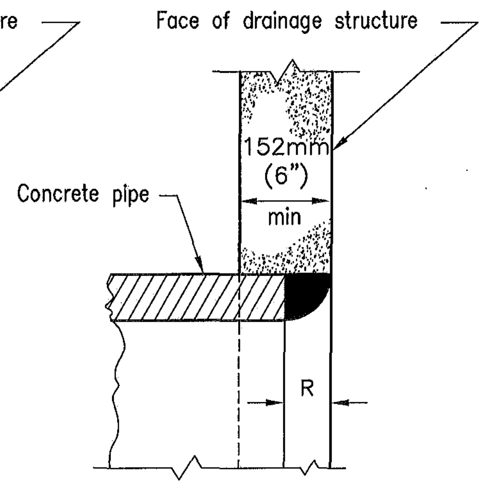
DRAWING NUMBER D-44D



BELL END

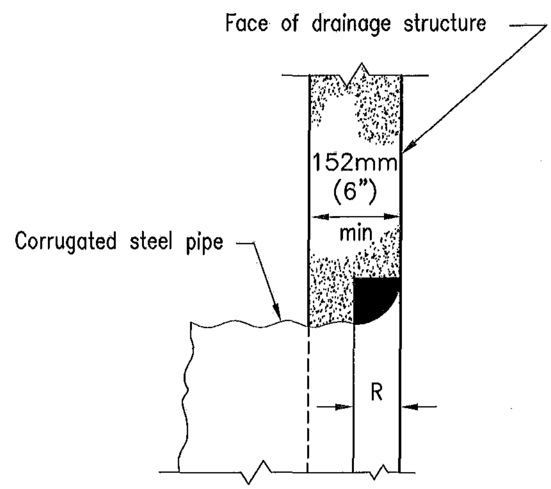


SPIGOT END



CUT END

R = Thickness of pipe



CUT END

$$R = \frac{\text{Inside diameter of pipe}}{10}$$

NOTE

The rounded areas may be built up of cement mortar or poured in place with the drainage structure.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

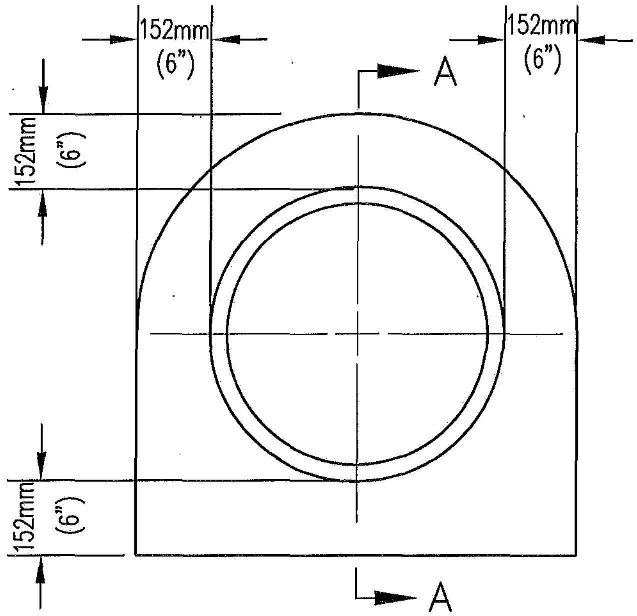
ROUNDED PIPE ENDS IN DRAINAGE STRUCTURES

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

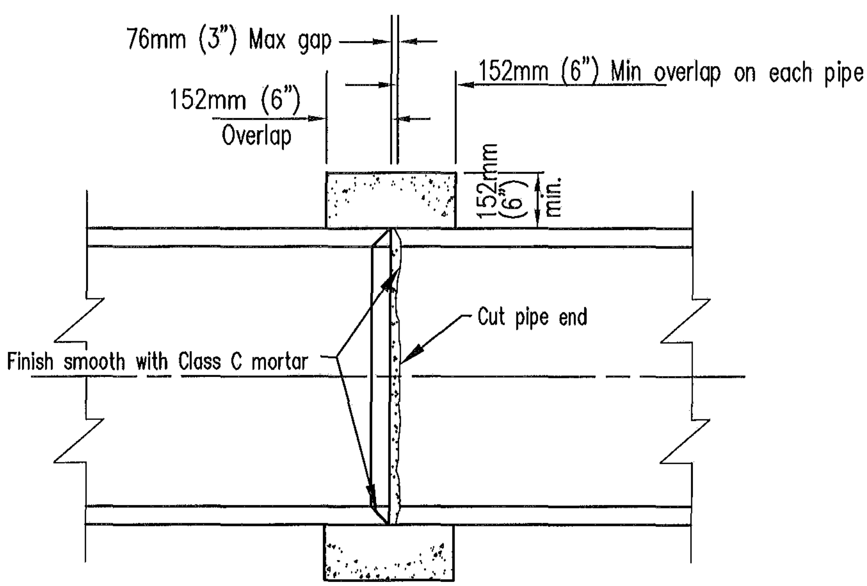
3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-61



ELEVATION

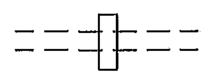


SECTION A–A

NOTES

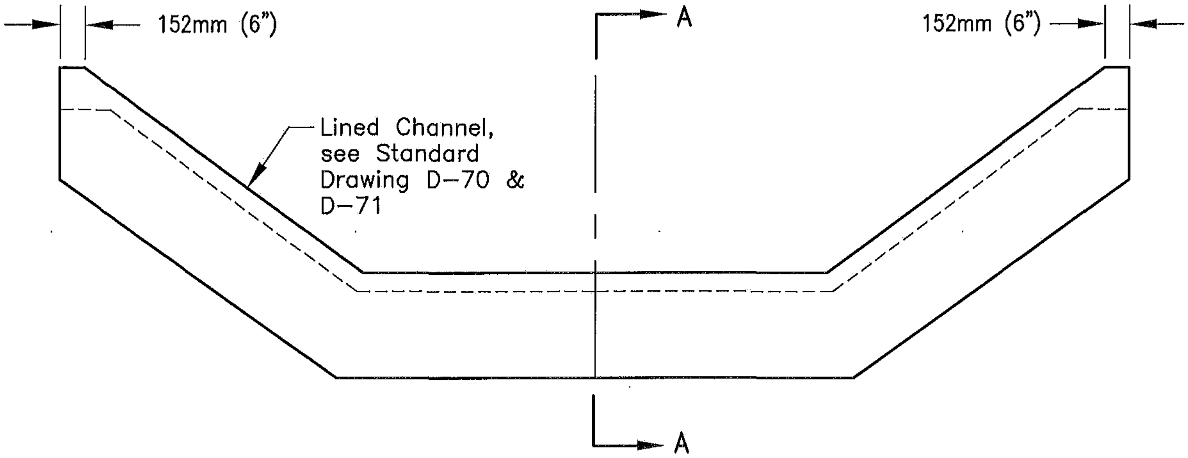
1. Pipe collar does not have to be finished if covered.
2. Concrete shall be 332 kg/M^3 –C–22Mpa (560–C–3250)
3. Where gap exceeds 76mm (3") but is not more than 152mm (6") an internal form shall be used.

LEGEND ON PLANS

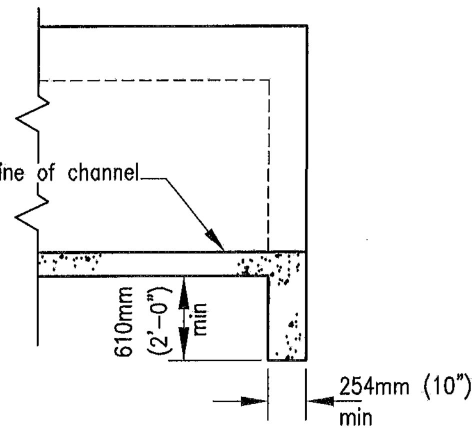


Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	PIPE COLLAR	3/01/2003
Reviewed		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER D–62

August 2009

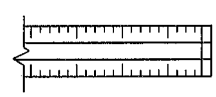


ELEVATION



SECTION A-A

LEGEND ON PLANS



NOTES

1. Thickness and wall depth shall be as shown on plan.
2. Reinforcing in cut off wall shall be the same as that required in channel.
3. Concrete shall be 332 kg/M^3-C-22Mpa (560-C-3250).

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

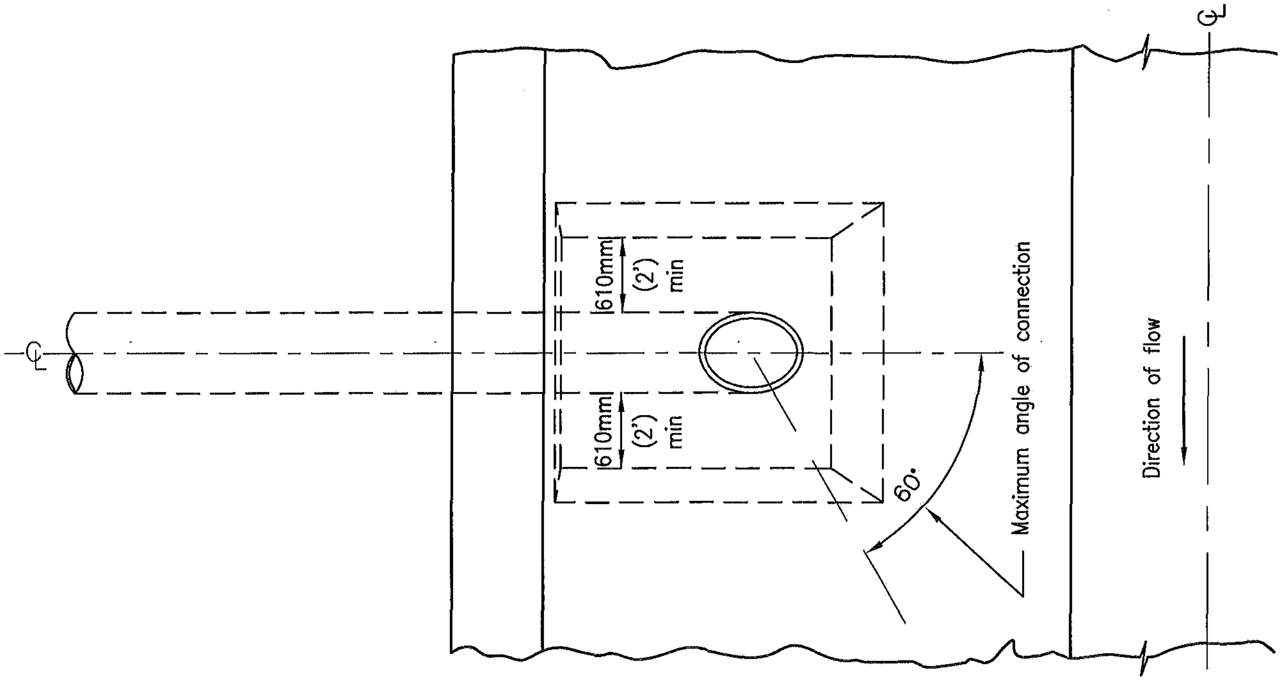
CUTOFF WALL FOR DRAINAGE CHANNEL

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

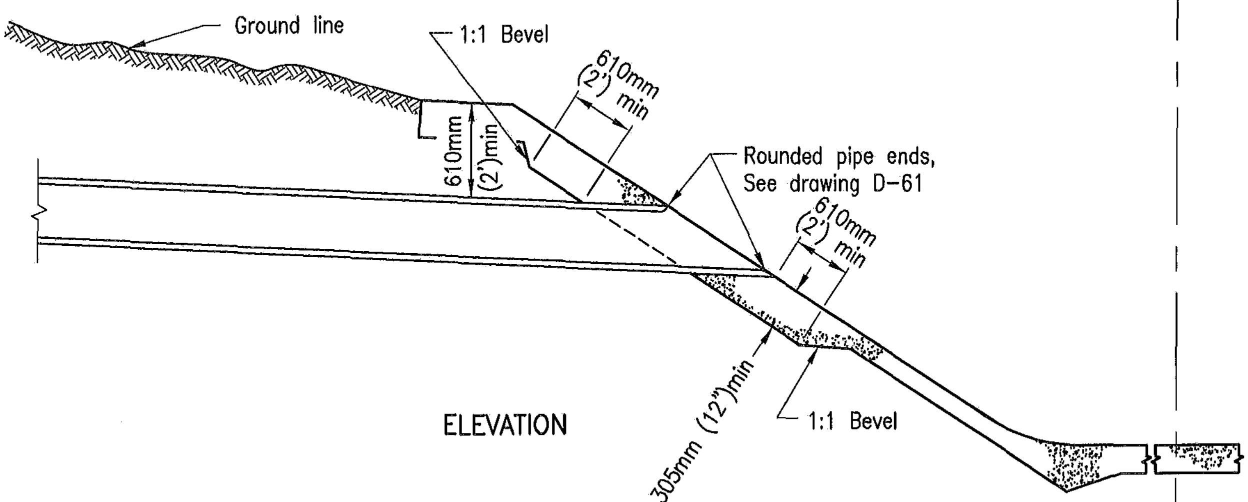
T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-72



PLAN

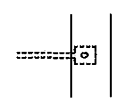


ELEVATION

NOTES:

1. Concrete shall be 332 kg/M^3 –C–22Mpa (560–C–3250).
2. Pipe shall connect to channel as high as possible.
3. The maximum angle of connection is 60° downstream.
   In no case shall a pipe angle upstream.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE TO CHANNEL CONNECTION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-73

METRIC TABLE – SPANS UP TO 1.22M (all measuements in millimeters unless otherwise noted).

SPAN	610		914			1.22m						1.52m											
HEIGHT	457	610	610	914		610	914		1.22m			610		914		1.22m				1.52m			
STRENGTH CLASSIFICATION	A	A	A	A	B	A	A	B	A	B	C	A	B	A	B	A	B	C	D	A	B	C	D
MAX FILL OVER TOP	1.68m		965	965	1.68m	711	711	940	711	940	1.27m	305	686	305	686	279	660	889	1.17m	279	635	889	1.17m
CONC. Top Slab T_1	152	152	159	159	203	178	178	203	178	203	229	191	203	191	203	191	203	241	267	191	203	241	267
CONC. Bottom Slab T_2	152	152	159	159	203	178	178	203	178	203	229	152	203	152	203	152	203	254	273	152	203	254	273
CONC. Sidewalls T_3	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152
Reinforcing Steel "a" Size Bar "	13	13	13	13	16	16	16	16	16	16	19	16	16	16	16	16	16	19	19	16	16	19	19
Reinforcing Steel "a" Spacing	89	89	89	89	102	127	127	114	127	114	127	102	102	102	102	102	102	127	114	102	102	127	114
Reinforcing Steel "a" Length	965	965	1.27m	1.27m	1.3m	1.6m	1.6m	1.6m	1.6m	1.6m	1.57m	1.9m	1.9m	1.9m	1.9m	1.9m	1.9m	1.88m	1.88m	1.9m	1.9m	1.88m	1.88m
Reinforcing Steel "d" Dist. Bars Top Slab–No. of	2	2	3	3	2	3	5	3	3	3	3	7	3	7	3	7	3		3	7	3		3
Reinforcing Steel "d" Dist. Bars Bottom Slab–No. of	2	2	2	2	2	3	3		3		3	3		3		3			3	3	3		3
Reinforcing Steel "e" Bars Spacing	457	457	457	457	311	457	457	457	432	330	241	457	457	457	457	457	432	330	279	457	305	216	165
Reinforcing Steel Spacers Number	12	12	12	12		12	12		14			14		14		14				16			
QUAN. Concrete: cubic meter per lin. ft.	13	13.8	17.6	20.7	23.7	22,2	25.3	27.6	27.6	30.6	32.9	24.5	28.3	27.6	31.2	30.6	33.7	39.0	41.3	32.9	34.5	42.1	43.6
QUAN. Reinf. kg per lin. ft.	12.3	13.2	15.5	16.4	20.9	20.0	20.5	21.4	21.8	23.6	29.0	25.9	25.5	26.8	25.9	27.7	27.3	30.9	34.0	28.6	29.5	35.0	39.5

US TABLE – SPANS UP TO 5' (all measuements in feet and/or inches).

SPAN	2'		3'			4'						5'											
HEIGHT	1'-6"	2'	2'	3'		2'	3'		4'			2'		3'		4'				5'			
STRENGTH CLASSIFICATION	A	A	A	A	B	A	A	B	A	B	C	A	B	A	B	A	B	C	D	A	B	C	D
MAX FILL OVER TOP	66		38	38	66	28	28	37	28	37	50	12	27	12	27	11	26	35	46	11	25	35	46
CONC. Top Slab T_1	6	6	6 1/4	6 1/4	8	7	7	8	7	8	9	7 1/2	8	7 1/2	8	7 1/2	8	9 1/2	10 1/2	7 1/2	8	9 1/2	10 1/2
CONC. Bottom Slab T_2	6	6	6 1/4	6 1/4	8	7	7	8	7	8	9	6	8	6	8	6	8	10	10 3/4	6	8	10	10 3/4
CONC. Sidewalls T_3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel "a" Size Bar "	4	4	4	4	5	5	5	5	5	5	6	5	5	5	5	5	5	6	6	5	5	6	6
Reinforcing Steel "a" Spacing	3 1/2	3 1/2	3 1/2	3 1/2	4	5	5	4 1/2	5	4 1/2	5	4	4	4	4	4	4	5	4 1/2	4	4	5	4 1/2
Reinforcing Steel "a" Length	3–2	3–2	4–2	4–2	4–3	5–3	5–3	5–3	5–3	5–3	5–2	6–3	6–3	6–3	6–3	6–3	6–3	6–2	6–2	6–3	6–3	6–2	6–2
Reinforcing Steel "d" Dist. Bars Top Slab–No. of	2	2	3	3	2	3	5	3	3	3	3	7	3	7	3	7	3		3	7	3		3
Reinforcing Steel "d" Dist. Bars Bottom Slab–No. of	2	2	2	2	2	3	3		3		3	3		3		3			3	3	3		3
Reinforcing Steel "e" Bars Spacing	18	18	18	18	12 1/4	18	18	18	17	13	9 1/2	18	18	18	18	18	17	13	11	18	12	8 1/2	6 1/2
Reinforcing Steel Spacers Number	12	12	12	12		12	12		14			14		14		14				16			
QUAN. Concrete: C.Y. per lin. ft.	17	18	23	27	31	29	33	36	36	40	43	32	37	36	41	40	44	51	54	43	48	55	57
QUAN. Reinf. lbs per lin. ft.	27	29	34	36	46	44	45	47	48	52	64	57	56	59	57	61	60	68	75	63	65	77	87

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.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-76A

August 2009

METRIC TABLE – SPAN 1.88m (all measuements in millimeters unless otherwise noted).

SPAN			1.88m																				
HEIGHT			2'		3'		4'			5'				6'					7'				
STRENGTH CLASSIFICATION			A	B	A	B	A	B	C	A	B	C	D	A	B	C	D	E	A	B	C	D	E
MAX FILL OVER TOP			254	457	254	457	254	457	635	229	457	635	914	229	432	635	914	1.14m	229	432	635	914	1.14m
CONC.	Top Slab	T_1	210	210	210	210	210	210	235	210	210	235	279	210	210	235	279	305	210	210	235	279	305
CONC.	Bottom Slab	T_2	172	203	172	203	172	203	248	184	210	305	286	184	210	267	286	311	184	210	267	286	311
CONC.	Sidewalls	T_3	152	152	152	152	152	152	152	152	152	152	152	152	152	152	159	178	152	152	159	178	197
Reinforcing Steel	"a"	Size Bar "	16	16	16	16	16	16	19	16	16	19	19	16	16	19	22	22	16	16	19	22	22
Reinforcing Steel	"a"	Spacing	102	102	102	102	102	102	127	102	102	127	4 1/2	102	102	127	5 1/2	5	102	102	127	140	127
Reinforcing Steel	"a"	Length	2.21m	2.21m	2.21m	2.21m	2.21m	2.21m	2.18m	2.21m	2.21m	2.18m	2.18m	2.21m	2.21m	2.18m	2.21m	2.26m	2.21m	2.21m	2.18m	2.26m	2.29m
Reinforcing Steel	"d" Dist. Bars	Top Slab–No. of	7	4	7	4	7	4		7	4		4	7	4		4	4	7	4		4	4
Reinforcing Steel	"d" Dist. Bars	Bottom Slab–No. of	4		4		4			4			4	4			4	4	4			4	4
Reinforcing Steel	"e" Bars	Spacing	457	457	457	457	457	457	432	457	394	292	216	432	267	191	152	127	305	191	178	127	114
Reinforcing Steel	Spacers	Number	12		12		14			16				16					18				
QUAN.	Concrete: Cubic Meter per lin. ft.		30.6	32.2	32.9	35.2	36.0	38.3	44.4	44.4	41.3	45.9	50.5	42.9	44.4	49.7	54.3	59.7	45.1	46.7	53.6	59.7	67.3
QUAN.	Reinf. kg per lin. ft.		29.0	28.6	30.0	29.5	31.3	30.4	33.6	31.8	31.8	36.3	41.3	33.2	35.4	41.8	50.8	57.6	36.8	40.9	44.9	57.2	63.1

US TABLE – SPANS 6' (all measuements in feet and/or inches).

SPAN			6'																				
HEIGHT			2'		3'		4'			5'				6'					7'				
STRENGTH CLASSIFICATION			A	B	A	B	A	B	C	A	B	C	D	A	B	C	D	E	A	B	C	D	E
MAX FILL OVER TOP			10	18	10	18	10	18	25	9	18	25	36	9	17	25	36	45	9	17	25	36	45
CONC.	Top Slab	T_1	8 1/4	8 1/4	8 1/4	8 1/4	8 1/4	8 1/4	9 1/4	8 1/4	8 1/4	9 1/4	11	8 1/4	8 1/4	9 1/4	11	12	8 1/4	8 1/4	9 1/4	11	12
CONC.	Bottom Slab	T_2	6 3/4	8	6 3/4	8	6 3/4	8	9 3/4	7 1/4	8 1/4	10	11 1/4	7 1/4	8 1/4	10 1/2	11 1/4	12 1/4	7 1/4	8 1/4	10 1/2	11 1/4	12 1/4
CONC.	Sidewalls	T_3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6 1/4	7	6	6	6 1/4	7	7 3/4
Reinforcing Steel	"a"	Size Bar "	5	5	5	5	5	5	6	5	5	6	6	5	5	6	7	7	5	5	6	7	7
Reinforcing Steel	"a"	Spacing	4	4	4	4	4	4	5	4	4	5	4 1/2	4	4	5	5 1/2	5	4	4	5	5 1/2	5
Reinforcing Steel	"a"	Length	7–3	7–3	7–3	7–3	7–3	7–3	7–2	7–3	7–3	7–2	7–2	7–3	7–3	7–2	7–3	7–5	7–3	7–3	7–2	7–5	7–6
Reinforcing Steel	"d" Dist. Bars	Top Slab–No. of	7	4	7	4	7	4		7	4		4	7	4		4	4	7	4		4	4
Reinforcing Steel	"d" Dist. Bars	Bottom Slab–No. of	4		4		4			4			4	4			4	4	4			4	4
Reinforcing Steel	"e" Bars	Spacing	18	18	18	18	18	18	17	18	15 1/2	11 1/2	8 1/2	17	10 1/2	7 1/2	6	5	12	7 1/2	7	5	4 1/2
Reinforcing Steel	Spacers	Number	12		12		14			16				16					18				
QUAN.	Concrete: C.Y. per lin. ft.		40	42	43	46	47	50	58	52	54	60	66	56	58	65	71	78	59	61	70	78	88
QUAN.	Reinf. lbs per lin. ft.		64	63	66	65	69	67	74	70	70	80	91	73	78	92	112	127	81	90	99	126	139

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.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-76B

August 2009

METRIC TABLE – SPAN 2.13m (all measuements in millimeters unless otherwise noted).
For Imperial table (7' Span) – see drawing D76D

		2.13m												
SPAN		2.13m												
HEIGHT		914		1.22m		1.52m			1.83m			2.14		
STRENGTH CLASSIFICATION		A	B	A	B	A	B	C	A	B	C	A	B	C
MAX FILL OVER TOP		406	660	406	660	406	660	889	406	660	889	406	660	889
CONC.	Top Slab T_1	184	210	184	210	184	210	248	184	210	248	184	210	248
CONC.	Bottom Slab T_2	191	222	191	222	191	222	267	191	222	267	191	222	267
CONC.	Sidewalls T_3	152	178	152	178	152	178	216	152	178	216	152	178	216
Reinforcing Steel "a"	Size Bar "	16	16	16	16	16	16	19	16	16	19	16	16	19
Reinforcing Steel "a"	Spacing	229	178	229	178	229	178	229	229	178	229	229	178	229
Reinforcing Steel "a"	Length	2.03m	2.06m	2.03m	2.06m	2.03m	2.06m	2.08m	2.03m	2.06m	2.08m	2.03m	2.06m	2.08m
Reinforcing Steel "b"	Size Bar "	16	16	16	16	16	16	19	16	16	19	16	16	19
Reinforcing Steel "b"	Spacing	229	178	229	178	229	178	229	229	178	229	229	178	229
Reinforcing Steel "b"	Dimension "X"	381	406	381	406	381	406	508	381	406	508	381	406	508
Reinforcing Steel "b"	Length	940	965	940	965	940	965	1.17m	940	965	1.17m	940	965	1.17m
Reinforcing Steel "c"	Size Bar "	16	16	16	16	16	16	19	16	16	19	16	16	19
Reinforcing Steel "c"	Spacing	229	178	229	178	229	178	229	229	178	229	229	178	229
Reinforcing Steel "c"	Dimension "Y"	559	584	559	584	559	584	686	559	584	686	559	584	686
Reinforcing Steel "c"	Length	1.58m	1.53m	1.58m	1.93m	2.18m	2.24m	2.39m	2.49m	2.24m	2.69m	2.80m	2.85m	3.0m
Reinforcing Steel "c_1"	Size Bar "	16	16	16	16	16	16	19	16	16	19	16	16	19
Reinforcing Steel "c_1"	Spacing	229	178	229	178	229	178	229	229	178	229	229	178	229
Reinforcing Steel "c_1"	Dimension "Y"	559	584	559	584	559	584	686	559	584	686	559	584	686
Reinforcing Steel "c_1"	Length	1.12m	1.17m	1.12m	1.17m	1.12m	1.17m	1.37m	1.12m	1.17m	1.37m	1.12m	1.17m	1.37m
Reinforcing Steel "d" Bars	Top Slab–No. of	7	4	7	4	7	4	4	7	4	4	7	4	4
Reinforcing Steel "d" Bars	Bottom Slab–No. of	4	4	4	4	4	4	4	4	4	4	4	4	4
Reinforcing Steel "e" Bars	Spacing	457	457	457	457	457	457	457	457	457	457	457	457	457
Reinforcing Steel Spacers	Total Number	24		28		28			32			36		
QUAN.	Concrete: cu meters per lin. ft.	36.0	42.9	39.0	45.9	42.1	49.0	59.7	44.4	52.0	64.3	47.4	55.9	68.0
QUAN.	Reinf kg per lin. ft.	48.6	59.0	51.8	62.6	53.6	64.9	76.3	56.7	68.0	80.0	59.9	71.7	83.5

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.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-76C

August 2009

US TABLE – SPAN 7' (all measuements in feet and/or inches unless otherwise noted).
For Metric Table (2.13m Span) – see drawing D76C

		SPAN	7'												
		HEIGHT	3'		4'		5'			6'			7'		
		STRENGTH CLASSIFICATION	A	B	A	B	A	B	C	A	B	C	A	B	C
		MAX FILL OVER TOP	16	26	16	26	16	26	35	16	26	35	16	26	35
CONC.	Top Slab	T_1	7 1/4	8 1/4	7 1/4	8 1/4	7 1/4	8 1/4	9 3/4	7 1/4	8 1/4	9 3/4	7 1/4	8 1/4	9 3/4
CONC.	Bottom Slab	T_2	7 1/2	8 3/4	7 1/2	8 3/4	7 1/2	8 3/4	10 1/2	7 1/2	8 3/4	10 1/2	7 1/2	8 3/4	10 1/2
CONC.	Sidewalls	T_3	6	7	6	7	6	7	8 1/2	6	7	8 1/2	6	7	8 1/2
Reinforcing Steel	"a"	Size Bar "	5	5	5	5	5	5	6	5	5	6	5	5	6
Reinforcing Steel	"a"	Spacing	9	7	9	7	9	7	9	9	7	9	9	7	9
Reinforcing Steel	"a"	Length	6–8	6–9	6–8	6–9	6–8	6–9	6–10	6–8	6–9	6–10	6–8	6–9	6–10
Reinforcing Steel	"b"	Size Bar "	5	5	5	5	5	5	6	5	5	6	5	5	6
Reinforcing Steel	"b"	Spacing	9	7	9	7	9	7	9	9	7	9	9	7	9
Reinforcing Steel	"b"	Dimension "X"	1–3	1–4	1–3	1–4	1–3	1–4	1–8	1–3	1–4	1–8	1–3	1–4	1–8
Reinforcing Steel	"b"	Length	3–1	3–2	3–1	3–2	3–1	3–2	3–10	3–1	3–2	3–10	3–1	3–2	3–10
Reinforcing Steel	"c"	Size Bar "	5	5	5	5	5	5	6	5	5	6	5	5	6
Reinforcing Steel	"c"	Spacing	9	7	9	7	9	7	9	9	7	9	9	7	9
Reinforcing Steel	"c"	Dimension "Y"	1–10	1–11	1–10	1–11	1–10	1–11	2–3	1–10	1–11	2–3	1–10	1–11	2–3
Reinforcing Steel	"c"	Length	5–2	5–4	6–2	6–4	7–2	7–4	7–10	8–2	8–4	8–10	9–2	9–4	9–10
Reinforcing Steel	"c_1"	Size Bar "	5	5	5	5	5	5	6	5	5	6	5	5	6
Reinforcing Steel	"c_1"	Spacing	9	7	9	7	9	7	9	9	7	9	9	7	9
Reinforcing Steel	"c_1"	Dimension "Y"	1–10	1–11	1–10	1–11	1–10	1–11	2–3	1–10	1–11	2–3	1–10	1–11	2–3
Reinforcing Steel	"c_1"	Length	3–8	3–10	3–8	3–10	3–8	3–10	4–6	3–8	3–10	4–6	3–8	3–10	4–6
Reinforcing Steel	"d" Bars	Top Slab–No. of	7	4	7	4	7	4	4	7	4	4	7	4	4
Reinforcing Steel	"d" Bars	Bottom Slab–No. of	4	4	4	4	4	4	4	4	4	4	4	4	4
Reinforcing Steel	"e" Bars	Spacing	18	18	18	18	18	18	18	18	18	18	18	18	18
Reinforcing Steel	Spacers	Total Number	24		28		28			32			36		
QUAN.	Concrete: C.Y. per lin. ft.		47	56	51	60	55	64	78	58	68	84	62	73	89
QUAN.	Reinf lbs per lin. ft.		107	130	114	138	118	143	168	125	150	176	132	158	184

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.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-76D

METRIC TABLE – SPAN 2.44m (all measuements in millimeters unless otherwise noted).
For Imperial table (8' Span) – see drawing D76F

SPAN			2.44m														
HEIGHT			910mm		1.22m		1.52m		1.83m			2.13m			2.44m		
STRENGTH CLASSIFICATION			A	B	A	B	A	B	A	B	C	A	B	C	A	B	C
MAX FILL OVER TOP			4m	6.4m	4m	6.4m	4m	6.4m	4m	6.4m	9.4m	4m	6.4m	9.4m	4m	6.4m	9.4m
CONC.	Top Slab	T_1	184	216	184	216	184	216	184	216	260	184	216	260	184	216	260
CONC.	Bottom Slab	T_2	184	241	184	241	184	241	184	241	292	184	241	292	184	241	292
CONC.	Sidewalls	T_3	165	184	165	184	165	184	165	184	248	165	184	248	165	184	248
Reinforcing Steel	"a"	Size Bar "	16	16	16	16	16	16	16	16	19	16	16	19	16	16	19
		Spacing	229	178	229	178	229	178	229	178	203	229	178	203	229	178	203
		Length	2.31m	2.34m	2.31m	2.34m	2.31m	2.34m	2.31m	2.34m	2.40m	2.31m	2.34m	2.40m	2.31m	2.34m	2.40m
	"b"	Size Bar "	16	16	16	16	16	16	16	16	19	16	16	19	16	16	19
		Spacing	229	178	229	178	229	178	229	178	203	229	178	203	229	178	203
		Dimension "X"	457	483	457	483	457	483	457	483	508	457	483	508	457	483	508
		Length	1.02m	1.04m	1.02m	1.04m	1.02m	1.04m	1.02m	1.04m	1.17m	1.02m	1.04m	1.17m	1.02m	1.04m	1.17m
	"c"	Size Bar "	16	16	16	16	16	16	16	16	19	16	16	19	16	16	19
		Spacing	229	178	229	178	229	178	229	178	203	229	178	203	229	178	203
		Dimension "Y"	610	737	610	737	610	737	610	737	813	610	737	813	610	737	813
		Length	1.02m	1.17m	1.93m	2.08m	2.24m	2.39m	2.54m	2.69m	2.82m	2.84m	3.10m	3.12m	3.15m	3.30m	3.43m
	"c_1"	Size Bar "	16	16	16	16	16	16	16	16	19	16	16	19	16	16	19
		Spacing	9	7	9	7	9	7	9	7	8	9	7	8	9	7	8
		Dimension "Y"	610	737	610	737	610	737	610	737	813	610	686	813	610	737	813
		Length	1.14m	1.35m	1.14m	1.35m	1.14m	1.35m	3–9	1.35m	1.52m	1.14m	1.35m	1.52m	1.14m	1.35m	1.52m
	"d" Bars	Top Slab–No. of	7	5	7	5	7	5	7	5	5	7	5	5	7	5	5
		Bottom Slab–No. of	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	"e" Bars	Spacing	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457
	Spacers	Total Number	28		32		32		36			40			40		
QUAN.	Concrete:	Cubic Meter per lin. ft.	39.8	50.0	42.9	53.6	46.9	56.6	50.0	60.4	76.5	52.8	63.5	81.1	55.9	67.3	85.7
QUAN.	Reinf	kg per lin. ft.	53.6	65.8	56.7	69.9	58.6	63.1	61.7	75.8	95.8	64.9	79.0	99.8	66.7	81.2	102.1

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.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-76E

August 2009

US TABLE – SPAN 8' (all measuements in feet and/or inches unless otherwise noted).
For Metric table (2.44m Span) – see drawing D76E

	SPAN	8'														
	HEIGHT	3'		4'		5'		6'			7'			8'		
	STRENGTH CLASSIFICATION	A	B	A	B	A	B	A	B	C	A	B	C	A	B	C
	MAX FILL OVER TOP	13	21	13	21	13	21	13	21	31	13	21	31	13	21	31
CONC.	Top Slab T_1	7 1/4	8 1/2	7 1/4	8 1/2	7 1/4	8 1/2	7 1/4	8 1/2	10 1/4	7 1/4	8 1/2	10 1/4	7 1/4	8 1/2	10 1/4
CONC.	Bottom Slab T_2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	11 1/2	7 1/4	9 1/2	11 1/2	7 1/4	9 1/2	11 1/2
CONC.	Sidewalls T_3	6 1/2	7 1/2	6 1/2	7 1/2	6 1/2	7 1/2	6 1/2	7 1/2	9 3/4	6 1/2	7 1/2	9 3/4	6 1/2	7 1/2	9 3/4
Reinforcing Steel "a"	Size Bar "	5	5	5	5	5	5	5	5	6	5	5	6	5	5	6
	Spacing	9	7	9	7	9	7	9	7	8	9	7	8	9	7	8
	Length	7–7	7–8	7–7	7–8	7–7	7–8	7–7	7–8	7–10	7–7	7–8	7–10	7–7	7–8	7–10
"b"	Size Bar "	5	5	5	5	5	5	5	5	6	5	5	6	5	5	6
	Spacing	9	7	9	7	9	7	9	7	8	9	7	8	9	7	8
	Dimension "X"	1–6	1–7	1–6	1–7	1–6	1–7	1–6	1–7	1–8	1–6	1–7	1–8	1–6	1–7	1–8
	Length	3–4	3–5	3–4	3–5	3–4	3–5	3–4	3–5	3–10	3–4	3–5	3–10	3–4	3–5	3–10
"c"	Size Bar "	5	5	5	5	5	5	5	5	6	5	5	6	5	5	6
	Spacing	9	7	9	7	9	7	9	7	8	9	7	8	9	7	8
	Dimension "Y"	2–0	2–5	2–0	2–5	2–0	2–5	2–0	2–5	2–8	2–0	2–5	2–8	2–0	2–5	2–8
	Length	3–4	3–10	6–4	6–10	7–4	7–10	8–4	8–10	9–3	9–4	9–10	10–3	10–4	10–10	11–3
"c_1"	Size Bar "	5	5	5	5	5	5	5	5	6	5	5	6	5	5	6
	Spacing	9	7	9	7	9	7	9	7	8	9	7	8	9	7	8
	Dimension "Y"	2–0	2–5	2–0	2–5	2–0	2–5	2–0	2–5	2–8	2–0	2–3	2–8	2–0	2–5	2–8
	Length	3–9	4–5	3–9	4–5	3–9	4–5	3–9	4–5	5–0	3–9	4–5	5–0	3–9	4–5	5–0
"d" Bars	Top Slab–No. of	7	5	7	5	7	5	7	5	5	7	5	5	7	5	5
"d" Bars	Bottom Slab–No. of	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
Spacers	Total Number	28		32		32		36			40			40		
QUAN.	Concrete: C.Y. per lin. ft.	52	65	56	70	60	74	65	79	100	69	83	106	73	88	112
QUAN.	Reinf lbs per lin. ft.	118	146	125	154	129	139	136	167	211	143	174	220	147	179	225

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.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-76F

August 2009

METRIC TABLE – SPAN 3.05m (all measuements in millimeters unless otherwise noted).
For Imperial table (10' Span) – see drawing D76H

SPAN			3.05m																
HEIGHT			1.22m		1.52m		1.83m		2.13m		2.44m			2.74m			3.05m		
STRENGTH CLASSIFICATION			A	B	A	B	A	B	A	B	A	B	C	A	B	C	A	B	C
MAX FILL OVER TOP			2.7m	5.5m	2.7m	5.5m	2.7m	5.5m	2.7m	5.5m	2.4m	5.5m	8.5m	2.4m	5.5m	8.5m	2.4m	5.5m	8.5m
CONC.	Top Slab	T_1	203	241	210	248	210	248	216	248	216	248	311	216	248	311	216	248	311
CONC.	Bottom Slab	T_2	222	267	229	272	229	272	235	279	235	279	337	235	279	337	235	279	337
CONC.	Sidewalls	T_3	184	241	184	241	184	241	184	241	184	241	292	8	241	292	229	241	292
Reinforcing Steel	"a"	Size Bar "	19	19	19	19	19	19	19	19	19	19	22	19	19	22	19	19	22
Reinforcing Steel	"a"	Spacing	279	203	279	203	279	203	279	203	279	203	229	279	203	229	279	203	229
Reinforcing Steel	"a"	Length	2.87m	2.95m	2.87m	2.95m	2.87m	2.95m	2.87m	2.95m	2.87m	2.95m	2.97m	9–6	2.95m	2.97m	2.87m	2.95m	2.97m
Reinforcing Steel	"b"	Size Bar "	16	19	16	19	16	19	16	19	16	19	19	16	19	19	16	19	19
Reinforcing Steel	"b"	Spacing	279	203	279	203	279	203	279	203	279	203	229	279	203	229	279	203	229
Reinforcing Steel	"b"	Dimension "X"	610	610	610	610	610	610	610	610	610	610	782	610	610	782	610	610	782
Reinforcing Steel	"b"	Length	1.17m	1.27m	1.17m	1.27m	1.17m	1.27m	1.17m	1.27m	1.17m	1.27m	1.42m	1.17m	1.27m	1.42m	1.17m	1.27m	1.42m
Reinforcing Steel	"c"	Size Bar "	16	19	16	19	16	19	16	19	16	19	19	16	19	19	16	19	19
Reinforcing Steel	"c"	Spacing	279	203	279	203	279	203	279	203	279	203	229	279	203	229	279	203	229
Reinforcing Steel	"c"	Dimension "Y"	813	1.02m	813	1.02m	813	1.02m	813	1.02m	813	1.02m	1.07m	813	1.02m	1.07m	813	1.02m	1.07m
Reinforcing Steel	"c"	Length	2.11m	2.39m	2.46m	2.69m	2.77m	9–10	10–1	10–10	11–1	11–10	12–3	12–1	12–10	13–3	13–1	13–10	14–3
Reinforcing Steel	"c_1"	Size Bar "	16	19	16	19	16	19	16	19	16	19	19	16	19	19	16	19	19
Reinforcing Steel	"c_1"	Spacing	279	203	279	203	279	203	279	203	279	203	229	279	203	229	279	203	229
Reinforcing Steel	"c_1"	Dimension "Y"	813	1.02m	813	1.02m	813	1.02m	813	1.02m	813	1.02m	1.07m	813	1.02m	1.07m	813	1.02m	1.07m
Reinforcing Steel	"c_1"	Length	1.40m	1.73m	1.40m	1.73m	1.40m	1.73m	1.40m	1.73m	1.40m	1.73m	1.88m	1.40m	1.73m	1.88m	1.40m	1.73m	1.88m
Reinforcing Steel	"d" Bars	Top Slab–No. of	9	5	9	5	9	5	9	5	9	5	5	9	5	5	9	5	5
Reinforcing Steel	"d" Bars	Bottom Slab–No. of	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Reinforcing Steel	"e" Bars	Spacing	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457
Reinforcing Steel	Spacers	Total Number	32		34		36		40		40			44			48		
QUAN.	Concrete: Cu Meter per lin. ft.		57.4	71.9	62.7	85.6	65.8	85.6	70.4	88.0	74.2	92.6	114.7	81.1	96.4	120.1	90.3	101.0	126.2
QUAN.	Reinf kg per lin. ft.		64.9	100	67.2	103.5	69.9	106.6	72.6	110.7	74.4	113.4	120.3	77.2	117.5	123.9	80.8	121.2	127.5

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.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-76G

August 2009

US TABLE – SPAN 10' (all measuements in feet and/or inches unless otherwise noted).
For Metric table (3.05m Span) – see drawing D76G

SPAN			10'																
HEIGHT			4'		5'		6'		7'		8'			9'			10'		
STRENGTH CLASSIFICATION			A	B	A	B	A	B	A	B	A	B	C	A	B	C	A	B	C
MAX FILL OVER TOP			9	18	9	18	9	18	9	18	8	18	28	8	18	28	8	18	28
CONC.	Top Slab	T_1	8	9 1/2	8 1/4	9 3/4	8 1/4	9 3/4	8 1/2	9 3/4	8 1/2	9 3/4	12 1/4	8 1/2	9 3/4	12 1/4	8 1/2	9 3/4	12 1/4
CONC.	Bottom Slab	T_2	8 3/4	10 1/2	9	10 3/4	9	10 3/4	9 1/4	11	9 1/4	11	13 1/4	9 1/4	11	13 1/4	9 1/4	11	13 1/4
CONC.	Sidewalls	T_3	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	7 1/4	9 1/2	11 1/2	8	9 1/2	11 1/2	9	9 1/2	11 1/2
Reinforcing Steel	"a"	Size Bar "	6	6	6	6	6	6	6	6	6	6	7	6	6	7	6	6	7
		Spacing	11	8	11	8	11	8	11	8	11	8	9	11	8	9	11	8	9
		Length	9–5	9–8	9–5	9–8	9–5	9–8	9–5	9–8	9–5	9–8	9–9	9–6	9–8	9–9	9–5	9–8	9–9
	"b"	Size Bar "	5	6	5	6	5	6	5	6	5	6	6	5	6	6	5	6	6
		Spacing	11	8	11	8	11	8	11	8	11	8	9	11	8	9	11	8	9
		Dimension "X"	2–0	2–0	2–0	2–0	2–0	2–0	2–0	2–0	2–0	2–0	2–6	2–0	2–0	2–6	2–0	2–0	2–6
		Length	3–10	4–2	3–10	4–2	3–10	4–2	3–10	4–2	3–10	4–2	4–8	3–10	4–2	4–8	3–10	4–2	4–8
	"c"	Size Bar "	5	6	5	6	5	6	5	6	5	6	6	5	6	6	5	6	6
		Spacing	11	8	11	8	11	8	11	8	11	8	9	11	8	9	11	8	9
		Dimension "Y"	2–8	3–4	2–8	3–4	2–8	3–4	2–8	3–4	2–8	3–4	3–6	2–8	3–4	3–6	2–8	3–4	3–6
		Length	6–11	7–10	8–1	8–10	9–1	9–10	10–1	10–10	11–1	11–10	12–3	12–1	12–10	13–3	13–1	13–10	14–3
	"c_1"	Size Bar "	5	6	5	6	5	6	5	6	5	6	6	5	6	6	5	6	6
		Spacing	11	8	11	8	11	8	11	8	11	8	9	11	8	9	11	8	9
		Dimension "Y"	2–8	3–4	2–8	3–4	2–8	3–4	2–8	3–4	2–8	3–4	3–6	2–8	3–4	3–6	2–8	3–4	3–6
		Length	4–7	5–8	4–7	5–8	4–7	5–8	4–7	5–8	4–7	5–8	6–0	4–7	5–8	6–0	4–7	5–8	6–2
	"d" Bars	Top Slab–No. of	9	5	9	5	9	5	9	5	9	5	5	9	5	5	9	5	5
		Bottom Slab–No. of	5	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	18
	Spacers	Total Number	32		34		36		40		40			44			48		
QUAN.	Concrete: C.Y. per lin. ft.		75	94	82	108	86	108	92	115	97	121	150	106	126	157	118	132	165
QUAN.	Reinf lbs per lin. ft.		143	221	148	228	154	235	160	244	164	250	265	170	259	273	178	267	281

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

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D–76H

METRIC TABLE – SPAN 3.66m (all measuements in millimeters unless otherwise noted).
For Imperial table (12' Span) – see drawing D76J

SPAN		3.66m														
HEIGHT		1.83m		2.13m		2.44m		2.74m			3.05m			3.66m		
STRENGTH CLASSIFICATION		A	B	A	B	A	B	A	B	C	A	B	C	A	B	C
MAX FILL OVER TOP		1.5m	4.9m	1.5m	4.9m	1.5m	4.9m	1.5m	4.9m	7.3m	1.5m	4.9m	7.3m	1.5m	4.9m	7.3m
CONC.	Top Slab T_1	222	286	222	286	222	286	229	286	337	229	286	337	229	286	337
	Bottom Slab T_2	222	311	222	311	222	311	229	311	375	229	311	375	229	311	375
	Sidewalls T_3	191	267	191	267	191	267	203	267	318	229	267	318	229	267	318
Reinforcing Steel "a"	Size Bar "	19	22	19	22	19	22	19	22	22	19	22	22	19	22	22
	Spacing	279	254	279	254	279	254	279	254	203	279	254	203	279	254	203
	Length	3.38m	4.27m	3.38m	4.27m	3.38m	4.27m	3.45m	4.27m	3.56m	3.48m	4.27m	3.56m	3.48m	4.27m	3.56m
"b"	Size Bar "	19	22	19	22	19	22	19	22	22	19	22	22	19	22	22
	Spacing	279	254	279	254	279	254	279	254	203	279	254	203	279	254	203
	Dimension "X"	813	914	813	914	813	914	813	914	914	813	914	914	813	914	914
	Length	1.47m	1.70m	1.47m	1.70m	1.47m	1.70m	1.47m	1.70m	1.70m	1.47m	1.70m	1.70m	1.47m	1.70m	1.70m
"c"	Size Bar "	19	22	19	22	19	22	19	22	22	19	22	22	19	22	22
	Spacing	279	254	279	254	279	254	279	254	203	279	254	203	279	254	203
	Dimension "Y"	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m
	Length	3.10m	3.15m	3.40m	3.45m	3.71m	3.76m	4.01m	4.06m	4.11m	4.32m	4.37m	4.42m	4.93m	4.98m	5.03m
"c_1"	Size Bar "	19	22	19	22	19	22	19	22	22	19	22	22	19	22	22
	Spacing	11	10	11	10	11	10	11	10	8	11	10	8	11	10	8
	Dimension "Y"	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m	1.14m
	Length	1.80m	1.96m	1.80m	1.96m	1.80m	1.98m	1.80m	1.98m	2.03m	1.80m	1.98m	2.03m	1.80m	1.98m	2.03m
"d" Bars	Top Slab–No. of	10	6	10	6	10	6	10	6	6	10	6	6	10	6	6
	Bottom Slab–No. of	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
"e" Bars	Spacing	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457
Spacers	Total Number	36		44		44		44			48			52		
QUAN.	Concrete: cu m per lin. ft.	76.7	105.5	78.8	110.1	82.6	116.3	90.3	120.6	145.3	99.4	126.2	151.4	107.9	136.1	162.9
	Reinf kg per lin. ft.	92.1	133.0	96.7	137.9	98.9	141.1	101.2	143.8	175.6	104.8	147.9	180.1	110.3	154.7	188.3

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.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT
DETAILS No.1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-76I

August 2009

US TABLE – SPAN 12' (all measuements in feet and/or inches unless otherwise noted).
For Metric table (3.66m Span) – see drawing D76I

		SPAN	12'														
		HEIGHT	6'		7'		8'		9'			10'			12'		
		STRENGTH CLASSIFICATION	A	B	A	B	A	B	A	B	C	A	B	C	A	B	C
		MAX FILL OVER TOP	5	16	5	16	5	16	5	16	24	5	16	24	5	16	24
CONC.	Top Slab	T_1	8 3/4	11 1/4	8 3/4	11 1/4	8 3/4	11 1/4	9	11 1/4	13 1/4	9	11 1/4	13 1/4	9	11 1/4	13 1/4
CONC.	Bottom Slab	T_2	8 3/4	12 1/4	8 3/4	12 1/4	8 3/4	12 1/4	9	12 1/4	14 3/4	9	12 1/4	14 3/4	9	12 1/4	14 3/4
CONC.	Sidewalls	T_3	7 1/2	10 1/2	7 1/2	10 1/2	7 1/2	10 1/2	8	10 1/2	12 1/2	9	10 1/2	12 1/2	9	10 1/2	12 1/2
Reinforcing Steel	"a"	Size Bar "	6	7	6	7	6	7	6	7	7	6	7	7	6	7	7
	"a"	Spacing	11	10	11	10	11	10	11	10	8	11	10	8	11	10	8
	"a"	Length	11–3	11–6	11–3	11–6	11–3	11–6	11–4	11–6	11–8	11–5	11–6	11–8	11–5	11–6	11–8
	"b"	Size Bar "	6	7	6	7	6	7	6	7	7	6	7	7	6	7	7
	"b"	Spacing	11	10	11	10	11	10	11	10	8	11	10	8	11	10	8
	"b"	Dimension "X"	2–8	3–0	2–8	3–0	2–8	3–0	2–8	3–0	3–0	2–8	3–0	3–0	2–8	3–0	3–0
	"b"	Length	4–10	5–7	4–10	5–7	4–10	5–7	4–10	5–7	5–7	4–10	5–7	5–7	4–10	5–7	5–7
	"c"	Size Bar "	6	7	6	7	6	7	6	7	7	6	7	7	6	7	7
	"c"	Spacing	11	10	11	10	11	10	11	10	8	11	10	8	11	10	8
	"c"	Dimension "Y"	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9
	"c"	Length	10–2	10–4	11–2	11–4	12–2	12–4	13–2	13–4	13–6	14–2	14–4	14–6	16–2	16–4	16–6
	"c_1"	Size Bar "	6	7	6	7	6	7	6	7	7	6	7	7	6	7	7
	"c_1"	Spacing	11	10	11	10	11	10	11	10	8	11	10	8	11	10	8
	"c_1"	Dimension "Y"	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9	3–9
	"c_1"	Length	5–11	6–5	5–11	6–5	5–11	6–6	5–11	6–6	6–8	5–11	6–6	6–8	5–11	6–6	6–8
	"d" Bars	Top Slab–No. of	10	6	10	6	10	6	10	6	6	10	6	6	10	6	6
	"d" Bars	Bottom Slab–No. of	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	"e" Bars	Spacing	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	Spacers	Total Number	36		44		44		44			48			52		
QUAN.	Concrete: C.Y. per lin. ft.		99	138	103	144	108	152	118	158	190	130	165	198	141	178	213
QUAN.	Reinf lbs per lin. ft.		203	293	213	304	218	311	223	317	387	231	326	397	243	341	415

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.

Revision	By	Approved	Date
ORIGINAL		A.Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

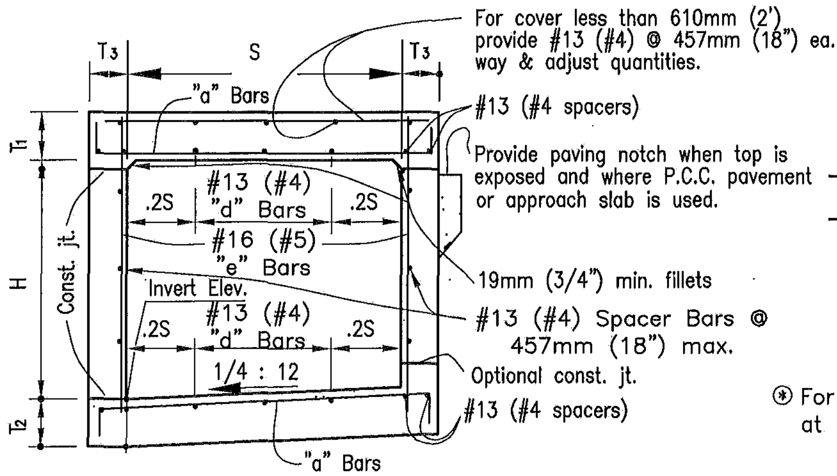
SINGLE BOX CULVERT
DETAILS No.1

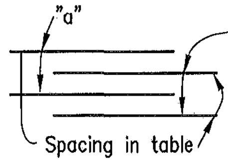
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-76J

August 2009

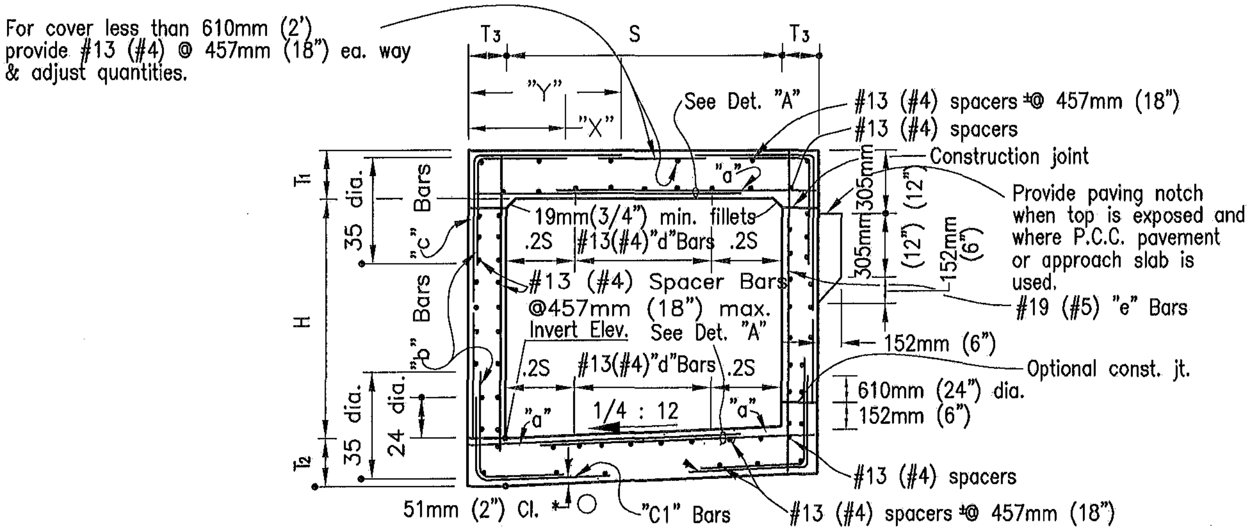




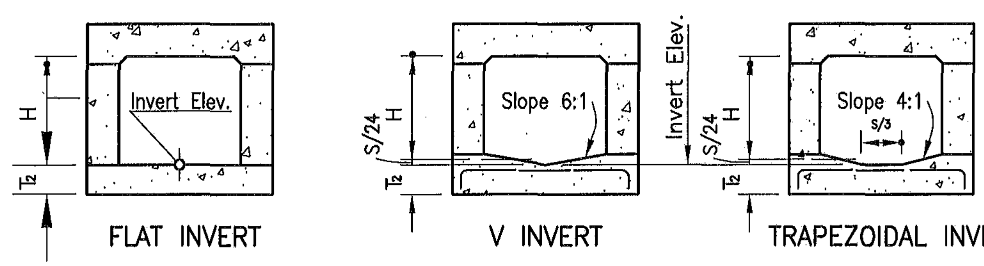
DETAIL "A"

⊛ For reinforcement clearance, except at bottom, see "Miscellaneous Details."

TYPICAL SECTIONS 610mm (2') THRU 1.83m (6') SPANS



TYPICAL SECTIONS 2.13m (7') THRU 3.66m (12') SPANS



ALTERNATIVE INVERTS

(When shown)

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

SINGLE BOX CULVERT DETAILS NO.2

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-76K

August 2009

METRIC TABLE – SPAN 1.22m (all measuements in millimeters unless otherwise noted).
For Imperial table (4' Span) – see drawing D77B

SPAN			1.22m										
HEIGHT			610mm			914mm				1.22m			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			3.35m	6.4m	9.75m	3.35m	7.0m	10.4m	14.0m	3.35m	7.0m	10.4m	14.0m
Conc.	Top Slab	T_1	165	165	184	165	165	191	216	165	165	191	216
Conc.	Bottom Slab	T_2	152	184	216	152	191	216	241	152	191	216	241
Conc.	Sidewalls	T_3	152	152	152	152	152	152	152	152	152	152	152
Reinforcing Steel	"a"	Size Bar#	16	13	13	16	13	13	13	16	13	13	13
Reinforcing Steel	"a"	Spacing	279	279	229	279	267	216	191	279	267	216	191
Reinforcing Steel	"a"	Length	3.12m	3.10m	3.10m	3.12m	3.10m	3.10m	3.10m	3.12m	3.10m	3.10m	3.10m
Reinforcing Steel	"b" or "b_1"	Size Bar#	16	16	16	16	16	16	16	16	16	16	16
Reinforcing Steel	"b" or "b_1"	Spacing	279	279	229	279	267	216	191	279	267	216	191
Reinforcing Steel	"b" or "b_1"	Length "b"	2.84m	2.84m	2.90m	2.84m	2.84m	2.90m	2.92	2.84m	2.84m	2.90m	2.92
Reinforcing Steel	"b" or "b_1"	Length "b_1"	2.84m	9-5	2.90m	2.84m	2.84m	2.90m	2.92	2.84m	2.84m	2.90m	2.92
Reinforcing Steel	"c"	Size Bar#	13	16	16	13	16	16	16	13	16	16	16
Reinforcing Steel	"c"	Spacing	279	279	229	279	267	216	191	279	267	216	191
Reinforcing Steel	"c"	Length	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m	1.37m
Reinforcing Steel	"d" Dist Bars	Top Slab–Tot. No.	10	6	6	10	6	6	6	10	6	6	6
Reinforcing Steel	"d" Dist Bars	Bottom Slab–Tot. No.	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel	"e" Bars	Size Bar#	13	13	13	13	13	13	13	13	13	13	16
Reinforcing Steel	"e" Bars	Spacing	457	457	457	457	457	406	305	457	305	229	254
Reinforcing Steel	Spacers	Number	23			26				29			
Quan.	Concrete: C.Y. per lin. ft.		0.36	0.39	0.44	0.41	0.44	0.48	0.53	0.45	0.48	0.53	0.57
Quan.	Reinf :lbs per lin. ft.		37	34	38	38	36	41	46	40	39	45	50

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-77A

August 2009

US TABLE – SPAN 4' (all measuements in feet and/or inches unless otherwise noted).
For Metric Table (1.22m Span) – see drawing D77A

			SPAN	4'										
			HEIGHT	2'			3'				4'			
			STRENGTH CLASSIFICATION	A	B	C	A	B	C	D	A	B	C	D
			MAX FILL OVER TOP	11	21	32	11	23	34	46	11	23	34	46
Conc.			Top Slab T_1	6 1/2	6 1/2	7 1/4	6 1/2	6 1/2	7 1/2	8 1/2	6 1/2	6 1/2	7 1/2	8 1/2
Conc.			Bottom Slab T_2	6	7 1/4	8 1/2	6	7 1/2	8 1/2	9 1/2	6	7 1/2	8 1/2	9 1/2
Conc.			Sidewalls T_3	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel	"a"		Size Bar #	5	4	4	5	4	4	4	5	4	4	4
Reinforcing Steel	"a"		Spacing	11	11	9	11	10 1/2	8 1/2	7 1/2	11	10 1/2	8 1/2	7 1/2
Reinforcing Steel	"a"		Length	10–3	10–2	10–2	10–3	10–2	10–2	10–2	10–3	10–2	10–2	10–2
Reinforcing Steel	"b" or "b_1"		Size Bar #	5	5	5	5	5	5	5	5	5	5	5
Reinforcing Steel	"b" or "b_1"		Spacing	11	11	9	11	10 1/2	8 1/2	7 1/2	11	10 1/2	8 1/2	7 1/2
Reinforcing Steel	"b" or "b_1"		Length "b"	9–4	9–4	9–6	9–4	9–4	9–6	9–7	9–4	9–4	9–6	9–7
Reinforcing Steel	"b" or "b_1"		Length "b_1"	9–4	9–5	9–6	9–4	9–4	9–6	9–7	9–4	9–4	9–6	9–7
Reinforcing Steel	"c"		Size Bar #	4	5	5	4	5	5	5	4	5	5	5
Reinforcing Steel	"c"		Spacing	11	11	9	11	10 1/2	8 1/2	7 1/2	11	10 1/2	8 1/2	7 1/2
Reinforcing Steel	"c"		Length	4–6	4–6	4–6	4–6	4–6	4–6	4–6	4–6	4–6	4–6	4–6
Reinforcing Steel	"d" Dist Bars		Top Slab–Tot. No.	10	6	6	10	6	6	6	10	6	6	6
Reinforcing Steel	"d" Dist Bars		Bottom Slab–Tot. No.	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel	"e" Bars		Size Bar #	4	4	4	4	4	4	4	4	4	4	5
Reinforcing Steel	"e" Bars		Spacing	18	18	18	18	18	16	12	18	12	9	10
Reinforcing Steel	Spacers		Number	23			26				29			
Quan.			Concrete: C.Y. per lin. ft.	0.47	0.51	0.57	0.53	0.57	0.63	0.69	0.59	0.63	0.69	0.75
Quan.			Reinf :lbs per lin. ft.	81	74	84	84	79	91	101	87	85	99	111

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D–77B

August 2009

METRIC TABLE – SPAN 1.52m (all measuements in millimeters unless otherwise noted).
For Imperial table (5' Span) – see drawing D77D

SPAN			1.52m													
HEIGHT			610mm			914mm			1.22m				1.62m			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			1.83m	11.0m	11.0m	1.83m	7.3m	11.0m	1.83m	7.0m	10.4m	14m	1.83m	7.0m	10.4m	14m
Conc.	Top Slab	T_1	171	197	235	171	197	235	171	197	235	260	171	197	235	260
Conc.	Bottom Slab	T_2	165	222	260	165	222	260	165	222	260	286	165	222	260	286
Conc.	Sidewalls	T_3	152	152	152	152	152	152	152	152	152	152	152	152	152	152
Reinforcing Steel	"a"	Size Bar #	16	13	13	16	13	13	16	13	13	13	16	13	13	13
		Spacing	254	216	254	254	216	254	254	216	254	229	254	216	267	229
		Length	3.73m	3.71m	3.71m	3.73m	3.71m	3.71m	3.73m	3.71m	3.71m	3.71m	3.73m	3.71m	3.71m	3.71m
	"b" or "b_1"	Size Bar #	16	16	19	16	16	19	16	16	19	19	16	16	19	19
		Spacing	254	216	254	254	216	254	254	216	254	229	254	216	267	229
		Length "b"	3.48m	3.51m	3.53m	3.48m	3.51m	3.53m	3.48m	3.51m	3.53m	3.54m	3.48m	3.51m	3.53m	3.54m
		Length "b_1"	3.45m	3.51m	3.53m	3.45m	3.51m	3.53m	3.45m	3.51m	3.53m	3.54m	3.45m	3.51m	3.53m	3.54m
	"c"	Size Bar #	13	16	19	13	16	19	13	16	19	19	13	16	19	19
		Spacing	254	216	254	254	216	254	254	216	254	229	254	216	267	229
		Length	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m	1.68m
	"d" Dist Bars	Top Slab–Tot. No.	12	6	6	12	6	6	12	6	6	6	12	6	6	6
		Bottom Slab–Tot. No.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	"e" Bars	Size Bar #	13	13	13	13	13	13	13	13	13	16	13	13	16	19
		Spacing	457	457	457	457	457	406	457	305	254	267	457	216	229	229
	Spacers	Number	23			26			29				32			
Quan.	Concrete: C.Y. per lin. ft.		0.44	0.53	0.61	0.48	0.57	0.66	0.53	0.61	0.68	0.75	0.57	0.66	0.74	0.80
Quan.	Reinf :lbs per lin. ft.		45	45	49	47	47	51	48	49	54	60	49	53	57	67

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-77C.

August 2009

US TABLE – SPAN 5' (all measuements in feet and/or inches unless otherwise noted).
For Metric Table (1.52m Span) – see drawing D77C

SPAN			5'													
HEIGHT			2'			3'			4'				5'			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			6	36	36	6	24	36	6	23	34	46	6	23	34	46
Conc.	Top Slab	T_1	6 3/4	7 3/4	9 1/4	6 3/4	7 3/4	9 1/4	6 3/4	7 3/4	9 1/4	10 1/4	6 3/4	7 3/4	9 1/4	10 1/4
	Bottom Slab	T_2	6 1/2	8 3/4	10 1/4	6 1/2	8 3/4	10 1/4	6 1/2	8 3/4	10 1/4	11 1/4	6 1/2	8 3/4	10 1/4	11 1/4
	Sidewalls	T_3	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel	"a"	Size Bar #	5	4	4	5	4	4	5	4	4	4	5	4	4	4
		Spacing	10	8 1/2	10	10	8 1/2	10	10	8 1/2	10	9	10	8 1/2	10 1/2	9
		Length	12–3	12–2	12–2	12–3	12–2	12–2	12–3	12–2	12–2	12–2	12–3	12–2	12–2	12–2
	"b" or "b_1"	Size Bar #	5	5	6	5	5	6	5	5	6	6	5	5	6	6
		Spacing	10	8 1/2	10	10	8 1/2	10	10	8 1/2	10	9	10	8 1/2	10 1/2	9
		Length "b"	11–5	11–6	11–7	11–5	11–6	11–7	11–5	11–6	11–7	11–8	11–5	11–6	11–7	11–8
		Length "b_1"	11–4	11–6	11–7	11–4	11–6	11–7	11–4	11–6	11–7	11–8	11–4	11–6	11–7	11–8
	"c"	Size Bar #	4	5	6	4	5	6	4	5	6	6	4	5	6	6
		Spacing	10	8 1/2	10	10	8 1/2	10	10	8 1/2	10	9	10	8 1/2	10 1/2	9
		Length	5–6	5–6	5–6	5–6	5–6	5–6	5–6	5–6	5–6	5–6	5–6	5–6	5–6	5–6
	"d" Dist Bars	Top Slab–Tot. No.	12	6	6	12	6	6	12	6	6	6	12	6	6	6
		Bottom Slab–Tot. No.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	"e" Bars	Size Bar #	4	4	4	4	4	4	4	4	4	5	4	4	5	6
		Spacing	18	18	18	18	18	16	18	12	10	10 1/2	18	8 1/2	9	9
	Spacers	Number	23			26			29				32			
Quan.	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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-77D

August 2009

METRIC TABLE – SPAN 1.83m (all measuements in millimeters unless otherwise noted).
For Imperial table (6' Span) – see drawing D77F

SPAN		1.83m													
HEIGHT		914mm			1.22m			1.52m				1.83m			
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP		1.22m	6.1m	10.4m	1.22m	6.1m	10.4m	1.22m	5.79m	10m	13.1m	1.22m	5.8m	10m	13.1m
Conc.	Top Slab T_1	184	210	267	184	210	267	184	210	267	305	184	210	267	305
Conc.	Bottom Slab T_2	184	241	292	184	241	292	184	241	292	324	184	241	292	324
Conc.	Sidewalls T_3	152	152	152	152	152	152	152	152	152	152	152	152	152	191
Reinforcing Steel "a"	Size Bar #	16	13	13	16	13	13	16	13	13	13	16	13	13	13
Reinforcing Steel "a"	Spacing	241	279	216	241	279	216	241	279	216	267	241	279	216	267
Reinforcing Steel "a"	Length	4.34m	4.32m	4.32m	4.34m	4.32m	4.32m	4.34m	4.32m	4.32m	4.32m	4.34m	4.32m	4.32m	4.47m
Reinforcing Steel "b" or "b_1"	Size Bar #	16	19	19	16	19	19	16	19	19	22	16	19	19	22
Reinforcing Steel "b" or "b_1"	Spacing	241	279	216	241	279	216	241	279	216	267	241	279	216	267
Reinforcing Steel "b" or "b_1"	Length "b"	4.11m	4.11m	4.17m	4.11m	4.11m	4.17m	4.11m	4.11m	4.17m	4.19m	4.11m	4.11m	4.17m	4.32m
Reinforcing Steel "b" or "b_1"	Length "b_1"	4.09m	4.14m	4.17m	4.09m	4.14m	4.17m	4.09m	4.11m	4.17m	4.19m	4.11m	4.11m	4.17m	4.32m
Reinforcing Steel "c"	Size Bar #	13	19	19	13	19	19	13	19	19	22	13	19	19	22
Reinforcing Steel "c"	Spacing	241	279	216	241	279	216	241	279	216	267	241	279	216	267
Reinforcing Steel "c"	Length	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	1.98m	2.03m
Reinforcing Steel "d" Dist Bars	Top Slab–Tot. No.	12	6	6	12	6	6	12	6	6	6	12	6	6	6
Reinforcing Steel "d" Dist Bars	Bottom Slab–Tot. No.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel "e" Bars	Size Bar #	13	13	13	13	13	13	13	13	16	16	13	16	19	19
Reinforcing Steel "e" Bars	Spacing	457	457	406	457	356	216	457	254	241	178	457	279	229	152
Reinforcing Steel Spacers	Number	30			33			36				36			
Quan.	Concrete: cu m per lin. ft.	0.59	0.69	0.83	0..63	0.73	0.86	.67	.77	.91	.99	0.71	.82	.96	1.12
Quan.	Reinf: kgs per lin. ft.	55	54	67	57	56	70	58	59	74	79	59	62	80	91

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-77E

August 2009

US TABLE – SPAN 6' (all measuements in feet and/or inches unless otherwise noted).
For Metric Table (1.83m Span) – see drawing D77E

SPAN			6'													
HEIGHT			3'			4'			5'				6'			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			4	20	34	4	20	34	4	19	33	43	4	19	33	43
Conc.	Top Slab	T_1	7 1/4	8 1/4	10 1/2	7 1/4	8 1/4	10 1/2	7 1/4	8 1/4	10 1/2	12	7 1/4	8 1/4	10 1/2	12
Conc.	Bottom Slab	T_2	7 1/4	9 1/2	11 1/2	7 1/4	9 1/2	11 1/2	7 1/4	9 1/2	11 1/2	12 3/4	7 1/4	9 1/2	11 1/2	12 3/4
Conc.	Sidewalls	T_3	6	6	6	6	6	6	6	6	6	6	6	6	6	7 1/2
Reinforcing Steel	"a"	Size Bar#	5	4	4	5	4	4	5	4	4	4	5	4	4	4
	"a"	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
	"a"	Length	14–3	14–2	14–2	14–3	14–2	14–2	14–3	14–2	14–2	14–2	14–3	14–2	14–2	14–8
	"b" or "b_1"	Size Bar#	5	6	6	5	6	6	5	6	6	7	5	6	6	7
	"b" or "b_1"	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
	"b" or "b_1"	Length "b"	13–6	13–6	13–8	13–6	13–6	13–8	13–6	13–6	13–8	13–9	13–6	13–6	13–8	14–2
	"b" or "b_1"	Length "b_1"	13–5	13–7	13–8	13–5	13–7	13–8	13–5	13–6	13–8	13–9	13–6	13–6	13–8	14–2
	"c"	Size Bar#	4	6	6	4	6	6	4	6	6	7	4	6	6	7
	"c"	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
	"c"	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	6–8
	"d" Dist Bars	Top Slab–Tot. No.	12	6	6	12	6	6	12	6	6	6	12	6	6	6
	"d" Dist Bars	Bottom Slab–Tot. No.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	"e" Bars	Size Bar#	4	4	4	4	4	4	4	4	5	5	4	5	6	6
	"e" Bars	Spacing	18	18	16	18	14	8 1/2	18	10	9 1/2	7	18	11	9	6
	Spacers	Number	30			33			36				36			
Quan.	Concrete: C.Y. per lin. ft.		0.77	0.90	1.08	0.82	0.96	1.13	0.88	1.01	1.19	1.30	0.93	1.07	1.25	1.47
Quan.	Reinf :lbs per lin. ft.		121	119	147	125	124	155	128	131	164	175	129	137	177	201

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-77F

August 2009

METRIC TABLE – SPAN 2.44m (all measuements in millimeters unless otherwise noted).
For Imperial table (8' Span) – see drawing D77H

SPAN			2.44m																
HEIGHT			1.22m			1.52m			1.83m			2.13m				2.44m			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			914mm	4.27m	7.62m	914mm	4.27m	7.62m	914mm	4.27m	7.62m	914mm	4.27m	7.62m	11.3m	914mm	4.27m	7.62m	11.3m
Conc.	Top Slab	T	216	241	305	216	241	305	216	241	305	216	241	311	362	216	241	311	362
Conc.	Bottom Slab	T_2	191	267	324	191	267	324	191	267	324	191	273	13	15	191	273	13	15
Conc.	Sidewalls	T_3	152	152	152	152	152	152	152	152	152	178	178	178	203	178	178	203	216
Reinforcing Steel	"a"	Size Bar #	19	13	13	19	13	13	19	13	13	19	13	13	13	19	13	13	13
Reinforcing Steel	"a"	Spacing	305	241	267	305	241	254	305	241	254	292	241	254	216	292	241	254	216
Reinforcing Steel	"a"	Length	5.59m	5.54m	5.54m	5.59m	5.54m	5.54m	5.59m	5.54m	5.54m	5.66m	5.61m	5.61m	5.69m	5.66m	5.61m	5.69m	5.74m
Reinforcing Steel	"b" or "b_1"	Size Bar #	19	19	22	19	19	22	19	19	22	19	19	22	22	19	19	22	22
Reinforcing Steel	"b" or "b_1"	Spacing	305	241	267	305	241	254	305	241	254	292	241	254	216	292	241	254	216
Reinforcing Steel	"b" or "b_1"	Length "b"	5.36m	5.38m	5.41m	5.36m	5.38m	5.41m	5.36m	5.38m	5.41m	5.44m	5.44m	5.49m	5.61m	5.44m	5.44m	5.56m	5.64m
Reinforcing Steel	"b" or "b_1"	Length "b_1"	5.31m	5.38m	5.41m	5.31m	5.38m	5.41m	5.31m	5.38m	5.41m	5.44m	5.44m	5.49m	5.61m	5.38m	5.46m	5.49m	5.66m
Reinforcing Steel	"c"	Size Bar #	13	19	22	13	19	22	13	19	22	13	19	22	22	13	19	22	22
Reinforcing Steel	"c"	Spacing	305	241	267	305	241	254	305	241	254	292	241	254	216	292	241	254	216
Reinforcing Steel	"c"	Length	2.59m	2.59m	2.59m	2.59m	2.59m	2.59m	2.59m	2.59m	2.59m	2.62m	2.62m	2.62m	2.64m	2.62m	2.62m	2.64m	2.67m
Reinforcing Steel	"d" Dist Bars	Top Slab–Tot. No.	16	8	8	16	8	8	16	8	8	16	8	8	8	16	8	8	8
Reinforcing Steel	"d" Dist Bars	Bottom Slab–Tot. No.	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Reinforcing Steel	"e" Bars	Size Bar #	13	13	16	13	13	16	13	16	19	13	16	19	22	13	16	22	22
Reinforcing Steel	"e" Bars	Spacing	457	457	267	457	305	254	457	292	254	356	241	191	216	292	216	191	229
Reinforcing Steel	Spacers	Number	41			44			44			47			56	50		60	
Quan.	Concrete: cu m per lin. ft.		.83	.99	1.19	0.87	1.05	1.23	0.91	1.09	1.27	1.00	1.19	1.40	1.64	1.06	1.24	1.52	1.73
Quan.	Reinf: kg per lin. ft.		77	79	91	78	82	99	79	85	104	84	90	113	136	87	94	129	142

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING
NUMBER D-77G

August 2009

US TABLE – SPAN 8' (all measuements in feet and/or inches unless otherwise noted).

For Metric Table (2.44m Span) – see drawing D77G

SPAN			8'																
HEIGHT			4'			5'			6'			7'				8'			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			3	14	25	3	14	25	3	14	25	3	14	25	37	3	14	25	37
Conc.	Top Slab	T_1	8 1/2	9 1/2	12	8 1/2	9 1/2	12	8 1/2	9 1/2	12	8 1/2	9 1/2	12 1/4	14 1/4	8 1/2	9 1/2	12 1/4	14 1/4
	Bottom Slab	T_2	7 1/2	10 1/2	12 3/4	7 1/2	10 1/2	12 3/4	7 1/2	10 1/2	12 3/4	7 1/2	10 3/4	13	15	7 1/2	10 3/4	13	15
	Sidewalls	T_3	6	6	6	6	6	6	6	6	6	7	7	7	8	7	7	8	8 1/2
Reinforcing Steel	"a"	Size Bar#	6	4	4	6	4	4	6	4	4	6	4	4	4	6	4	4	4
		Spacing	12	9 1/2	10 1/2	12	9 1/2	10	12	9 1/2	10	11 1/2	9 1/2	10	8 1/2	11 1/2	9 1/2	10	8 1/2
		Length	18–4	18–2	18–2	18–4	18–2	18–2	18–4	18–2	18–2	18–7	18–5	18–5	18–8	18–7	18–5	18–8	18–10
	"b" or "b_1"	Size Bar#	6	6	7	6	6	7	6	6	7	6	6	7	7	6	6	7	7
		Spacing	12	9 1/2	10 1/2	12	9 1/2	10	12	9 1/2	10	11 1/2	9 1/2	10	8 1/2	11 1/2	9 1/2	10	8 1/2
		Length "b"	17–7	17–8	17–9	17–7	17–8	17–9	17–7	17–8	17–9	17–10	17–10	18–0	18–5	17–10	17–10	18–3	18–6
		Length "b_1"	17–5	17–8	17–9	17–5	17–8	17–9	17–5	17–8	17–9	17–10	17–10	18–0	18–5	17–8	17–11	18–0	18–7
	"c"	Size Bar#	4	6	7	4	6	7	4	6	7	4	6	7	7	4	6	7	7
		Spacing	12	9 1/2	10 1/2	12	9 1/2	10	12	9 1/2	10	11 1/2	9 1/2	10	8 1/2	11 1/2	9 1/2	10	8 1/2
		Length	8–6	8–6	8–6	8–6	8–6	8–6	8–6	8–6	8–6	8–7	8–7	8–7	8–8	8–7	8–7	8–8	8–9
	"d" Dist Bars	Top Slab–Tot. No.	16	8	8	16	8	8	16	8	8	16	8	8	8	16	8	8	8
		Bottom Slab–Tot. No.	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	"e" Bars	Size Bar#	4	4	5	4	4	5	4	5	6	4	5	6	7	4	5	7	7
		Spacing	18	18	10 1/2	18	12	10	18	11 1/2	10	14	9 1/2	7 1/2	8 1/2	11 1/2	8 1/2	7 1/2	9
	Spacers	Number	41			44			44			47			56	50		60	
Quan.	Concrete: C.Y. per lin. ft.		1.08	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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-77H

August 2009

METRIC TABLE – SPAN 3.05m (all measuements in millimeters unless otherwise noted).
For Imperial table (10' Span) – see drawing D77J

SPAN			3.05m																
HEIGHT			1.52m			1.83m			2.13m			2.44m				3.05m			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			610mm	5.18m	9.14m	610mm	5.18m	9.14m	610mm	5.18m	9.14m	610mm	4.88m	8.84m	11m	610mm	4.88m	8.84m	11m
Conc.	Top Slab	T	222	324	406	222	324	406	222	324	406	222	324	406	438	222	324	406	445
	Bottom Slab	T_2	210	343	419	210	343	419	210	349	425	222	343	419	464	222	343	419	470
	Sidewalls	T_3	152	152	152	152	152	152	152	165	179	179	179	191	191	203	203	229	254
Reinforcing Steel	"a"	Size Bar #	19	13	13	19	13	13	19	13	13	19	13	13	13	19	13	13	13
		Spacing	279	254	254	279	241	254	279	241	254	279	254	254	229	279	254	254	229
		Length	6.81m	6.76m	6.76m	6.81m	6.76m	6.76m	6.81m	6.81m	6.83m	6.88m	6.83m	6.88m	6.96m	6.96m	6.91m	6.99m	7.06m
	"b" or "b_1"	Size Bar #	19	22	25	19	22	25	19	22	25	19	22	25	25	19	22	25	25
		Spacing	279	254	254	279	241	254	279	241	254	279	254	254	229	279	254	254	229
		Length "b"	6.58m	6.65m	6.71m	6.58m	6.65m	6.71m	6.58m	6.68m	6.78m	6.65m	6.73m	6.81m	6.93m	6.73m	6.81m	6.93m	7.04m
		Length "b_1"	6.53m	6.65m	6.71m	6.53m	6.65m	6.71m	6.53m	6.68m	6.78m	6.63m	6.71m	6.81m	6.93m	6.71m	6.78m	6.91m	7.06m
	"c"	Size Bar #	19	22	25	19	22	25	19	22	25	19	22	25	25	19	22	25	25
		Spacing	279	254	254	279	241	254	279	241	254	279	254	254	229	279	254	254	229
		Length	3.20m	3.20m	3.20m	3.20m	3.20m	3.20m	3.20m	3.23m	3.23m	3.23m	3.23m	3.25m	3.28m	3.25m	3.25m	3.28m	3.30m
	"d" Dist Bars	Top Slab–Tot. No.	10	10	10	10	10	10	18	10	10	18	10	10	10	18	10	10	10
		Bottom Slab–Tot. No.	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	"e" Bars	Size Bar #	13	13	16	13	13	16	13	13	19	13	16	19	22	13	19	19	22
		Spacing	457	254	254	457	152	165	356	152	203	279	216	152	152	191	178	140	127
	Spacers	Number	48			48			51			54			64	68			
Quan.	Concrete: cu m per lin. ft.		1.07	1.57	1.88	1.10	1.58	1.90	1.15	1.67	2.02	1.28	1.74	2.09	2.32	1.47	1.92	2.33	2.61
	Reinf: kg per lin. ft.		107	115	141	108	124	147	110	127	154	114	126	161	195	127	148	181	216

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-77I

August 2009

US TABLE – SPAN 10' (all measuements in feet and/or inches unless otherwise noted).
For Metric Table (3.05m Span) – see drawing D77I

SPAN			10'																
HEIGHT			5'			6'			7'			8'				10'			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			2	17	30	2	17	30	2	17	30	2	16	29	36	2	16	29	36
Conc.	Top Slab	T_1	8 3/4	12 3/4	16	8 3/4	12 3/4	16	8 3/4	12 3/4	16	8 3/4	12 3/4	16	17 1/4	8 3/4	12 3/4	16	17 1/2
Conc.	Bottom Slab	T_2	8 1/4	13 1/2	16 1/2	8 1/4	13 1/2	16 1/2	8 1/4	13 3/4	16 3/4	8 3/4	13 1/2	16 1/2	18 1/4	8 3/4	13 1/2	16 1/2	18 1/2
Conc.	Sidewalls	T_3	6	6	6	6	6	6	6	6 1/2	7	7	7	7 1/2	7 1/2	8	8	9	10
Reinforcing Steel	"a"	Size Bar #	6	4	4	6	4	4	6	4	4	6	4	4	4	6	4	4	4
Reinforcing Steel	"a"	Spacing	11	10	10	11	9 1/2	10	11	9 1/2	10	11	10	10	9	11	10	10	9
Reinforcing Steel	"a"	Length	22–4	22–2	22–2	22–4	22–2	22–2	22–4	22–4	22–5	22–7	22–5	22–7	22–10	22–10	22–8	22–11	23–2
Reinforcing Steel	"b" or "b_1"	Size Bar #	6	7	8	6	7	8	6	7	8	6	7	8	8	6	7	8	8
Reinforcing Steel	"b" or "b_1"	Spacing	11	10	10	11	9 1/2	10	11	9 1/2	10	11	10	10	9	11	10	10	9
Reinforcing Steel	"b" or "b_1"	Length "b"	21–7	21–10	22–0	21–7	21–10	22–0	21–7	21–11	22–3	21–10	22–1	22–4	22–9	22–1	22–4	22–9	23–1
Reinforcing Steel	"b" or "b_1"	Length "b_1"	21–5	21–10	22–0	21–5	21–10	22–0	21–5	21–11	22–3	21–9	22–0	22–4	22–9	22–0	22–3	22–8	23–2
Reinforcing Steel	"c"	Size Bar #	6	7	8	6	7	8	6	7	8	6	7	8	8	6	7	8	8
Reinforcing Steel	"c"	Spacing	11	10	10	11	9 1/2	10	11	9 1/2	10	11	10	10	9	11	10	10	9
Reinforcing Steel	"c"	Length	10–6	10–6	10–6	10–6	10–6	10–6	10–6	10–7	10–7	10–7	10–7	10–8	10–9	10–8	10–8	10–9	10–10
Reinforcing Steel	"d" Dist Bars	Top Slab–Tot. No.	18	10	10	18	10	10	18	10	10	18	10	10	10	18	10	10	10
Reinforcing Steel	"d" Dist Bars	Bottom Slab–Tot. No.	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Reinforcing Steel	"e" Bars	Size Bar #	4	4	5	4	4	5	4	4	6	4	5	6	7	4	6	6	7
Reinforcing Steel	"e" Bars	Spacing	18	10	10	18	6	6 1/2	14	6	8	11	8 1/2	6	6	7 1/2	7	5 1/2	5
Reinforcing Steel	Spacers	Number	48			48			51			54			64	68			
Quan.	Concrete: C.Y. per lin. ft.		1.40	2.05	2.46	1.45	2.07	2.48	1.51	2.18	2.64	1.68	2.27	2.74	3.04	1.92	2.51	3.05	3.41
Quan.	Reinf :lbs per lin. ft.		236	254	310	238	274	324	243	280	339	252	278	355	430	279	327	400	476

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	03/03
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-77J

METRIC TABLE – SPAN 3.66M (all measurements in millimeters unless otherwise noted).
For Imperial Table (12' Span) – See Drawing D–77L

SPAN			3.66m																			
HEIGHT			1.83m			2.13m			2.44m			2.74m				3.05m				3.66m		
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			610mm	4.27m	7.9m	610mm	4.27m	7.9m	610mm	4.27m	7.9m	610mm	4.27m	7.9m	11m	610mm	4.27m	7.9m	11m	610mm	4.27m	7.9m	11m
Conc.	Top Slab	T_1	254	356	445	254	362	445	260	362	451	260	368	451	527	260	368	451	527	260	368	464	540
	Bottom Slab	T_2	235	375	457	235	381	464	248	381	470	254	387	476	540	260	387	476	546	267	387	489	559
	Sidewalls	T_3	152	152	165	178	178	178	203	203	216	229	229	229	254	229	229	241	279	.229	254	279	305
Reinforcing Steel	"a"	Size Bar#	19	13	13	19	13	13	19	13	13	19	13	13	13	19	13	13	13	19	13	13	13
		Spacing	229	292	229	229	292	229	229	279	216	229	279	216	229	229	279	216	229	229	279	216	229
		Length	8.03m	7.98m	8.03m	8.10m	8.05m	8.05m	8.18m	8.13m	8.18m	8.26m	8.20	8.20	8.26m	8.26m	8.20	8.31m	8.36m	8.26m	8.28m	8.36m	8.43m
	"b" or "b_1"	Size Bar#	19	25	25	19	25	25	19	25	25	19	25	25	29	19	25	25	29	19	25	25	29
		Spacing	229	292	229	229	292	229	229	279	216	229	279	216	229	229	279	216	229	229	279	216	229
		Length "b"	7.82m	7.87m	8.00m	7.90m	7.95m	8.03m	7.98m	8.03m	8.15m	8.05m	8.13m	8.18m	8.33m	8.05m	8.13m	8.28m	8.38m	8.05m	8.20	8.36m	8.48m
		Length "b_1"	7.77m	7.87m	8.00m	7.85m	7.98m	8.03m	7.95m	8.05m	8.15m	8.03m	8.13m	8.20	8.33m	8.03m	8.13m	8.28m	8.41m	8.03m	8.20	8.36m	8.51m
	"c"	Size Bar#	16	25	25	16	25	25	16	25	25	16	25	25	29	16	25	25	29	16	25	25	29
		Spacing	229	292	229	229	292	229	229	279	216	229	279	216	229	229	279	216	229	229	279	216	229
		Length	3.81m	3.81m	3.84m	3.84m	3.84m	3.84m	3.86m	3.86m	3.89m	3.89m	3.89m	3.89m	3.91m	3.89m	3.89m	3.91m	3.94m	3.89m	3.91m	3.94m	3.96m
	"d" Dist Bars	Top Slab–Tot. No.	24	10	10	24	10	10	24	10	10	24	10	10	10	24	10	10	10	24	10	10	10
		Bottom Slab–Tot. No.	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	"e" Bars	Size Bar#	13	13	16	13	13	16	13	13	16	13	16	22	25	13	22	25	25	19	22	25	29
		Spacing	457	203	203	381	152	165	305	140	152	229	191	216	203	216	11	216	229	305	203	178	178
	Spacers	Number	52			55			68			68				72				76			
Quan.	Concrete: cu m per lin. ft.		1.41	1.98	2.42	1.51	2.12	2.51	1.67	2.24	2.74	1.82	.57	2.82	3.25	1.90	2.47	2.95	3.43	2.04	2.70	3.29	3.76
	Reinf: kg per lin. ft.		140	144	182	142	150	188	152	165	209	156	170	211	262	159	179	235	264	168	194	257	305

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D–77K

August 2009

US TABLE – SPAN 12' (all measuements in feet and/or inches unless otherwise noted).
For Metric Table (3.66m Span) – see drawing D77K

SPAN			12'																				
HEIGHT			6'			7'			8'			9'				10'				12'			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			2	14	26	2	14	26	2	14	26	2	14	26	36	2	14	26	36	2	14	26	36
Conc.	Top Slab	T_1	10	14	17 1/2	10	14 1/4	17 1/2	10 1/4	14 1/4	17 3/4	10 1/4	14 1/2	17 3/4	20 3/4	10 1/4	14 1/2	17 3/4	20 3/4	10 1/4	14 1/2	18 1/4	21 1/4
	Bottom Slab	T_2	9 1/4	14 3/4	18	9 1/4	15	18 1/4	9 3/4	15	18 1/2	10	15 1/4	18 3/4	21 1/4	10 1/4	15 1/4	18 3/4	21 1/2	10 1/2	15 1/4	19 1/4	22
	Sidewalls	T_3	6	6	6 1/2	7	7	7	8	8	8 1/2	9	9	9	10	9	9	9 1/2	11	9	10	11	12
Reinforcing Steel	"a"	Size Bar#	6	4	4	6	4	4	6	4	4	6	4	4	4	6	4	4	4	6	4	4	4
		Spacing	9	11 1/2	9	9	11 1/2	9	9	11	8 1/2	9	11	8 1/2	9	9	11	8 1/2	9	9	11	8 1/2	9
		Length	26–4	26–2	26–4	26–7	26–5	26–5	26–10	26–8	26–10	27–1	26–11	26–11	27–1	27–1	26–11	27–3	27–5	27–1	27–2	27–5	27–8
	"b" or "b_1"	Size Bar#	6	8	8	6	8	8	6	8	8	6	8	8	9	6	8	8	9	6	8	8	9
		Spacing	9	11 1/2	9	9	11 1/2	9	9	11	8 1/2	9	11	8 1/2	9	9	11	8 1/2	9	9	11	8 1/2	9
		Length "b"	25–8	25–10	26–3	25–11	26–1	26–4	26–2	26–4	26–9	26–5	26–8	26–10	27–4	26–5	26–8	27–2	27–6	26–5	26–11	27–5	27–10
		Length "b_1"	25–6	25–10	26–3	25–9	26–2	26–4	26–1	26–5	26–9	26–4	26–8	26–11	27–4	26–4	26–8	27–2	27–7	26–4	26–11	27–5	27–11
	"c"	Size Bar#	5	8	8	5	8	8	5	8	8	5	8	8	9	5	8	8	9	5	8	8	9
		Spacing	9	11 1/2	9	9	11 1/2	9	9	11	8 1/2	9	11	8 1/2	9	9	11	8 1/2	9	9	11	8 1/2	9
		Length	12–6	12–6	12–7	12–7	12–7	12–7	12–8	12–8	12–9	12–9	12–9	12–9	12–10	12–9	12–9	12–10	12–11	12–9	12–10	12–11	13–0
	"d" Dist Bars	Top Slab–Tot. No.	24	10	10	24	10	10	24	10	10	24	10	10	10	24	10	10	10	24	10	10	10
		Bottom Slab–Tot. No.	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	"e" Bars	Size Bar#	4	4	5	4	4	5	4	4	5	4	5	7	8	4	7	8	8	6	7	8	9
		Spacing	18	8	8	15	6	6 1/2	12	5 1/2	6	9	7 1/2	8 1/2	8	8 1/2	11	8 1/2	9	12	8	7	7
	Spacers	Number	52			55			68			68				72				76			
Quan.	Concrete: C.Y. per lin. ft.		1.84	2.59	3.16	1.97	2.77	3.28	2.19	2.93	3.59	2.38	0.74	3.69	4.25	2.48	3.23	3.86	4.49	2.67	3.53	4.30	4.92
	Reinf :lbs per lin. ft.		309	317	401	316	330	415	336	363	460	345	374	485	578	351	394	519	582	371	427	567	673

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

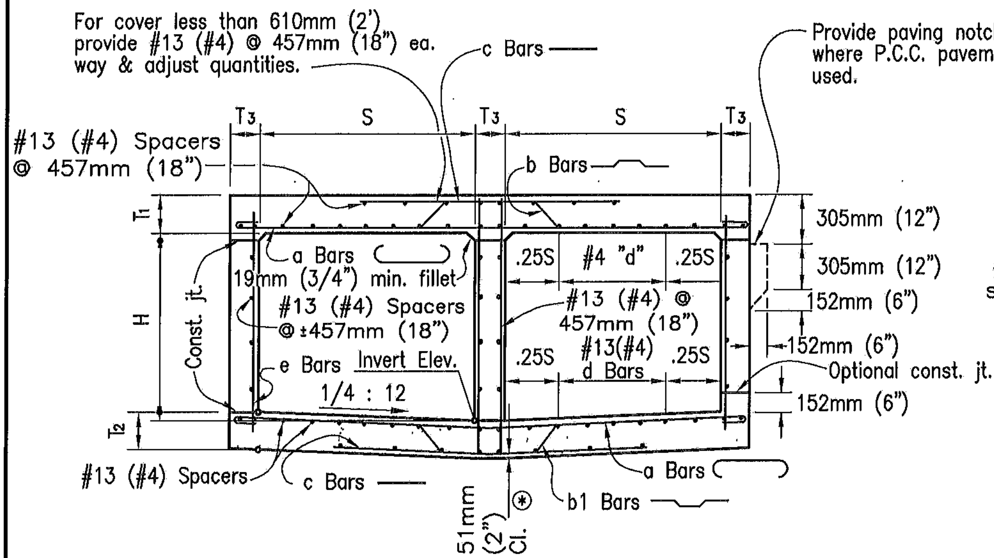
DOUBLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

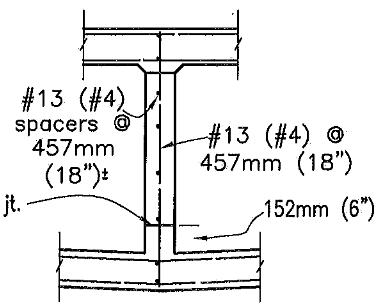
DRAWING NUMBER D-77L

August 2009



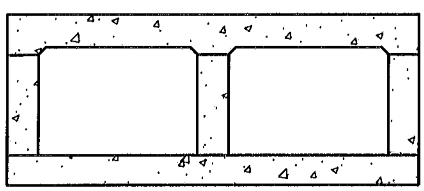
TYPICAL SECTION

(Showing reinforcement for interior walls 203mm (8") and over.)



Reinforcement for interior walls under 203mm (8").

⊛ For reinforcement clearance, except at bottom, see "Miscellaneous Details."



"FLAT INVERT" ALTERNATIVE

(When shown)

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75	DOUBLE BOX CULVERT DETAILS NO. 2	3/01/2003 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03		
Reviewed		T. Stanton	04/06		DRAWING NUMBER D-77M

METRIC TABLE – SPAN 1.22m (all measuements in millimeters unless otherwise noted).
For Imperial table (4' Span) – see drawing D78B

SPAN			1.22m								
HEIGHT			610mm			914mm			1.22m		
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C
MAX FILL OVER TOP			3m	7.3m	11.6m	3m	7.3m	11.6m	3m	7.3m	11.6m
Conc.	Top Slab	T_1	159	159	184	159	159	184	159	159	184
	Bottom Slab	T_2	152	178	210	152	178	210	152	178	210
	Sidewalls	T_3	152	152	152	152	152	152	152	152	152
Reinforcing Steel	"a"	Size Bar#	16	13	16	16	13	16	16	13	16
		Spacing	279	286	330	279	286	330	279	286	330
		Length	4.50m	4.47m	4.50m	4.50m	4.47m	4.50m	4.50m	4.47m	4.50m
	"b" or "b_1"	Size Bar#	16	16	19	16	16	19	16	16	19
		Spacing	279	286	330	279	286	330	279	286	330
		Length "b"	4.32m	4.32m	4.34m	4.32m	4.32m	4.34m	4.32m	4.32m	4.34m
		Length "b_1"	4.27m	4.32m	4.34m	4.27m	4.32m	4.34m	4.27m	4.32m	4.34m
	"c"	Size Bar#	13	16	19	13	16	19	13	16	19
		Spacing	279	286	330	279	286	330	279	286	330
		Length	2.74m	2.74m	2.74m	2.74m	2.74m	2.74m	2.74m	2.74m	2.74m
	"d" Dist Bars	Top Slab–Tot. No.	15	9	9	15	9	9	15	9	9
		Bottom Slab–Tot. No.	9	9	9	9	9	9	9	9	9
	"e" Bars	Size Bar#	13	13	13	13	13	13	13	13	16
		Spacing	457	457	457	457	457	330	457	286	330
	Spacers	Number	34			38			42		
Quan.	Concrete: cu m per lin. ft.		0.51	0.54	0.62	0.57	0.60	0.68	0.63	0.66	0.73
	Reinf: kg per lin. ft.		55	50	60	58	52	63	59	55	67

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-78A

August 2009

US TABLE – SPAN 4' (all measuements in feet and/or inches).
For Metric table (1.22m Span) – see drawing D78A

SPAN				4'								
HEIGHT				2'			3'			4'		
STRENGTH CLASSIFICATION				A	B	C	A	B	C	A	B	C
MAX FILL OVER TOP				10	24	38	10	24	38	10	24	38
Conc.	Top Slab		T_1	6 1/4	6 1/4	7 1/4	6 1/4	6 1/4	7 1/4	6 1/4	6 1/4	7 1/4
Conc.	Bottom Slab		T_2	6	7	8 1/4	6	7	8 1/4	6	7	8 1/4
Conc.	Sidewalls		T_3	6	6	6	6	6	6	6	6	6
Reinforcing Steel	"a"	Size Bar#		5	4	5	5	4	5	5	4	5
Reinforcing Steel	"a"	Spacing		11	11 1/2	13	11	11 1/2	13	11	11 1/2	13
Reinforcing Steel	"a"	Length		14–9	14–8	14–9	14–9	14–8	14–9	14–9	14–8	14–9
Reinforcing Steel	"b" or "b_1"	Size Bar#		5	5	6	5	5	6	5	5	6
Reinforcing Steel	"b" or "b_1"	Spacing		11	11 1/2	13	11	11 1/2	13	11	11 1/2	13
Reinforcing Steel	"b" or "b_1"	Length "b"		14–2	14–2	14–3	14–2	14–2	14–3	14–2	14–2	14–3
Reinforcing Steel	"b" or "b_1"	Length "b_1"		14–0	14–2	14–3	14–0	14–2	14–3	14–0	14–2	14–3
Reinforcing Steel	"c"	Size Bar#		4	5	6	4	5	6	4	5	6
Reinforcing Steel	"c"	Spacing		11	11 1/2	13	11	11 1/2	13	11	11 1/2	13
Reinforcing Steel	"c"	Length		9–0	9–0	9–0	9–0	9–0	9–0	9–0	9–0	9–0
Reinforcing Steel	"d" Dist Bars	Top Slab–Tot. No.		15	9	9	15	9	9	15	9	9
Reinforcing Steel	"d" Dist Bars	Bottom Slab–Tot. No.		9	9	9	9	9	9	9	9	9
Reinforcing Steel	"e" Bars	Size Bar#		4	4	4	4	4	4	4	4	5
Reinforcing Steel	"e" Bars	Spacing		18	18	18	18	18	13	18	11 1/2	13
Reinforcing Steel	Spacers	Number		34			38			42		
Quan.	Concrete: C.Y. per lin. ft.			0.67	0.71	0.81	0.75	0.79	0.89	0.82	0.86	0.96
Quan.	Reinf :lbs per lin. ft.			122	110	133	127	115	138	131	122	147

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D–78B

August 2009

METRIC TABLE – SPAN 1.52m (all measuements in millimeters unless otherwise noted).
For Imperial table (5' Span) – see drawing D78B

SPAN			1.52m													
HEIGHT			610mm			914mm			1.22m				1.52m			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			2.4m	5.2m	7.9m	2.4m	5.2m	7.9m	2.4m	5.2m	7.9m	10.7m	2.4m	5.2m	7.9m	10.7m
Conc.	Top Slab	T_1	171	171	191	171	171	191	171	171	191	216	171	171	191	216
	Bottom Slab	T_2	159	184	216	159	184	216	159	184	216	241	159	191	216	241
	Sidewalls	T_3	152	152	152	152	152	152	152	152	152	152	152	152	152	152
Reinforcing Steel	"a"	Size Bar#	16	13	16	16	13	16	5	4	5	5	5	4	5	5
		Spacing	254	286	330	254	286	330	254	279	330	286	254	279	330	286
		Length	5.41m	5.38m	5.41m	5.41m	5.38m	5.41m	5.41m	5.38m	5.41m	5.41m	5.41m	5.38m	5.41m	5.41m
	"b" or "b_1"	Size Bar#	16	16	19	16	16	19	16	16	19	19	16	16	19	19
		Spacing	254	286	13	254	286	330	254	279	330	286	254	279	330	286
		Length "b"	5.26m	5.26m	5.26m	5.26m	5.26m	5.26m	5.26m	5.26m	5.26m	5.26m	5.26m	5.26m	5.26m	5.31m
		Length "b_1"	5.18m	5.23m	5.28m	5.18m	5.23m	5.28m	5.18m	5.23m	5.28m	5.31m	5.18m	5.23m	5.28m	5.31m
	"c"	Size Bar#	13	16	19	13	16	19	13	16	19	19	13	16	19	19
		Spacing	254	286	330	254	286	330	254	279	330	286	254	279	330	286
		Length	3.35m	3.35m	3.35m	3.35m	3.35m	3.35m	3.35m	3.35m	3.35m	3.35m	3.35m	3.35m	3.35m	3.35m
	"d" Dist Bars	Top Slab–Tot. No.	18	9	9	18	9	9	18	9	9	9	18	9	9	9
		Bottom Slab–Tot. No.	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	"e" Bars	Size Bar#	13	13	13	13	13	13	13	13	13	16	13	13	13	19
		Spacing	457	457	457	457	457	457	457	432	286	286	457	279	102	286
	Spacers	Number	34			38			38				42			
Quan.	Concrete: cu m per lin. ft.		0.63	0.66	0.75	0.69	0.73	0.80	0.74	0.78	0.86	0.94	0.80	0.85	0.92	1.00
	Reinf: kg per lin. ft.		68	57	69	70	59	71	71	62	73	82	73	65	78	87

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-78C

August 2009

US TABLE – SPAN 5' (all measuements in feet and/or inches).
For Metric table (1.52m Span) – see drawing D78C

		SPAN 5'													
HEIGHT		2'			3'			4'				5'			
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP		8	17	26	8	17	26	8	17	26	35	8	17	26	35
Conc.	Top Slab T_1	6 3/4	6 3/4	7 1/2	6 3/4	6 3/4	7 1/2	6 3/4	6 3/4	7 1/2	8 1/2	6 3/4	6 3/4	7 1/2	8 1/2
Conc.	Bottom Slab T_2	6 1/4	7 1/4	8 1/2	6 1/4	7 1/4	8 1/2	6 1/4	7 1/4	8 1/2	9 1/2	6 1/4	7 1/2	8 1/2	9 1/2
Conc.	Sidewalls T_3	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel "a"	Size Bar#	5	4	5	5	4	5	5	4	5	5	5	4	5	5
Reinforcing Steel "a"	Spacing	10	11 1/2	13	10	11 1/2	13	10	11	13	11 1/2	10	11	13	11 1/2
Reinforcing Steel "a"	Length	17-9	17-8	17-9	17-9	17-8	17-9	17-9	17-8	17-9	17-9	17-9	17-8	17-9	17-9
Reinforcing Steel "b" or "b_1"	Size Bar#	5	5	6	5	5	6	5	5	6	6	5	5	6	6
Reinforcing Steel "b" or "b_1"	Spacing	10	11 1/2	13	10	11 1/2	13	10	11	13	11 1/2	10	11	13	11 1/2
Reinforcing Steel "b" or "b_1"	Length "b"	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-5
Reinforcing Steel "b" or "b_1"	Length "b_1"	17-0	17-2	17-4	17-0	17-2	17-4	17-0	17-2	17-4	17-5	17-0	17-2	17-4	17-5
Reinforcing Steel "c"	Size Bar#	4	5	6	4	5	6	4	5	6	6	4	5	6	6
Reinforcing Steel "c"	Spacing	10	11 1/2	13	10	11 1/2	13	10	11	13	11 1/2	10	11	13	11 1/2
Reinforcing Steel "c"	Length	11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0	11-0
Reinforcing Steel "d" Dist Bars	Top Slab-Tot. No.	18	9	9	18	9	9	18	9	9	9	18	9	9	9
Reinforcing Steel "d" Dist Bars	Bottom Slab-Tot. No.	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Reinforcing Steel "e" Bars	Size Bar#	4	4	4	4	4	4	4	4	4	5	4	4	4	6
Reinforcing Steel "e" Bars	Spacing	18	18	18	18	18	18	18	17	11 1/2	11 1/2	18	11	4	11 1/2
Reinforcing Steel Spacers	Number	34			38			38				42			
Quan.	Concrete: C.Y. per lin. ft.	0.82	0.87	0.98	0.90	0.95	1.05	0.97	1.02	1.13	1.23	1.04	1.11	1.20	1.31
Quan.	Reinf :lbs per lin. ft.	150	126	153	155	130	157	157	136	161	181	161	143	171	192

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-78D

August 2009

METRIC TABLE – SPAN 1.83m (all measuements in millimeters unless otherwise noted).
For Imperial table (6' Span) – see drawing D78F

SPAN			1.83m													
HEIGHT			914mm			1.22m			1.52m				1.83m			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			914	3.96m	7.01m	914	3.96m	7.01m	914	3.96m	7.01m	9.14m	914	3.96m	7.01m	9.14m
Conc.	Top Slab	T_1	191	191	210	191	191	210	191	191	210	235	191	191	210	235
	Bottom Slab	T_2	152	197	235	152	197	235	152	203	235	254	152	203	235	260
	Sidewalls	T_3	152	152	152	152	152	152	152	152	152	152	152	152	152	152
Reinforcing Steel	"a"	Size Bar #	16	13	13	16	13	13	16	13	13	13	16	13	13	13
		Spacing	330	356	292	330	356	292	330	356	292	254	330	356	292	254
		Length	6.35m	6.32m	6.32m	6.35m	6.32m	6.32m	6.35m	6.32m	6.32m	6.32m	6.35m	6.32m	6.32m	6.32m
	"b" or "b_1"	Size Bar #	16	19	19	16	19	19	16	19	19	22	16	19	19	22
		Spacing	330	356	292	330	356	292	330	356	292	254	330	356	292	254
		Length "b"	6.17m	6.17m	6.22m	6.17m	6.17m	6.22m	6.17m	6.17m	6.22m	6.25m	6.17m	6.17m	6.22m	6.25m
		Length "b_1"	6.10m	6.15m	6.22m	6.10m	6.15m	6.22m	6.10m	6.15m	6.22m	6.25m	6.10m	6.15m	6.22m	6.27m
	"c"	Size Bar #	13	19	19	13	19	19	13	19	19	22	13	19	19	22
		Spacing	330	356	292	330	356	292	330	356	292	254	330	356	292	254
		Length	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m	3.96m
	"d" Dist Bars	Top Slab–Tot. No.	12	6	6	12	6	6	12	6	6	6	12	6	6	6
		Bottom Slab–Tot. No.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	"e" Bars	Size Bar #	13	13	13	13	13	13	13	13	16	16	13	16	19	19
		Spacing	457	457	457	457	457	292	457	292	305	254	457	203	305	254
	Spacers	Number	30			33			36				36			
Quan.	Concrete: cu m per lin. ft.		0.80	0.88	0.99	0.86	0.94	1.05	0.91	1.00	1.10	1.19	0.97	1.06	1.16	1.25
	Reinf: kgs per lin. ft.		82	76	89	83	77	91	85	80	95	107	87	85	100	113

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-78E

August 2009

US TABLE – SPAN 6' (all measuements in feet and/or inches).

For Metric table (1.83m Span) – see drawing D78E

SPAN			6'													
HEIGHT			3'			4'			5'				6'			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			3	13	23	3	13	23	3	13	23	30	3	13	23	30
Conc.	Top Slab	T_1	7 1/2	7 1/2	8 1/4	7 1/2	7 1/2	8 1/4	7 1/2	7 1/2	8 1/4	9 1/4	7 1/2	7 1/2	8 1/4	9 1/4
Conc.	Bottom Slab	T_2	6	7 3/4	9 1/4	6	7 3/4	9 1/4	6	8	9 1/4	10	6	8	9 1/4	10 1/4
Conc.	Sidewalls	T_3	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel	"a"	Size Bar #	6	5	5	6	5	5	6	5	5	5	6	5	5	5
Reinforcing Steel	"a"	Spacing	13	14	11 1/2	13	14	11 1/2	13	14	11 1/2	10	13	14	11 1/2	10
Reinforcing Steel	"a"	Length	20-10	20-9	20-9	20-10	20-9	20-9	20-10	20-9	20-9	20-9	20-10	20-9	20-9	20-9
Reinforcing Steel	"b" or "b_1"	Size Bar #	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Reinforcing Steel	"b" or "b_1"	Spacing	13	14	11 1/2	13	14	11 1/2	13	14	11 1/2	10	13	14	11 1/2	10
Reinforcing Steel	"b" or "b_1"	Length "b"	20-3	20-3	20-5	20-3	20-3	20-5	20-3	20-3	20-5	20-6	20-3	20-3	20-5	20-6
Reinforcing Steel	"b" or "b_1"	Length "b_1"	20-0	20-2	20-5	20-0	20-2	20-5	20-0	20-2	20-5	20-6	20-0	20-0	20-5	20-7
Reinforcing Steel	"c"	Size Bar #	4	6	6	4	6	6	4	6	6	6	4	6	6	6
Reinforcing Steel	"c"	Spacing	13	14	11 1/2	13	14	11 1/2	13	14	11 1/2	10	13	14	11 1/2	10
Reinforcing Steel	"c"	Length	13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0	13-0
Reinforcing Steel	"d" Dist Bars	Top Slab-Tot. No.	18	9	9	18	9	9	18	9	9	9	18	9	9	9
Reinforcing Steel	"d" Dist Bars	Bottom Slab-Tot. No.	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Reinforcing Steel	"e" Bars	Size Bar #	4	4	4	4	4	4	4	4	5	5	4	4	6	6
Reinforcing Steel	"e" Bars	Spacing	18	18	18	18	18	11 1/2	18	11 1/2	12	10	18	8	12	10
Reinforcing Steel	Spacers	Number	40			40			52				48			
Quan.	Concrete: C.Y. per lin. ft.		1.05	1.15	1.29	1.12	1.23	1.37	1.19	1.32	1.44	1.55	1.27	1.39	1.52	1.64
Quan.	Reinf :lbs per lin. ft.		181	168	196	183	170	200	187	177	209	235	192	187	221	249

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-78F

August 2009

METRIC TABLE – SPAN 2.44m (all measuements in millimeters unless otherwise noted).
For Imperial table (8' Span) – see drawing D78BH

SPAN			2.44m																
HEIGHT			1.22m			1.52m			1.83m			2.13m				2.44m			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			610	3.4m	6.1m	610	3.4m	6.1m	610	3.4m	6.1m	610	3.4m	6.1m	8.5m	610	3.4m	6.1m	8.5m
Conc.	Top Slab	T_1	210	210	260	210	210	260	210	210	260	210	210	260	286	210	210	260	286
Conc.	Bottom Slab	T_2	165	229	279	165	235	279	165	235	279	171	235	11	311	171	235	279	311
Conc.	Sidewalls	T_3	152	152	152	152	152	152	152	152	152	152	152	165	165	178	178	191	216
Reinforcing Steel	"a"	Size Bar#	19	16	16	19	16	16	19	16	16	19	16	16	19	19	16	16	19
Reinforcing Steel	"a"	Spacing	286	305	305	286	305	305	286	305	305	286	305	305	267	286	286	305	267
Reinforcing Steel	"a"	Length	8.18m	8.15m	8.15m	8.18m	8.15m	8.15m	8.18m	8.15m	8.15m	8.18m	8.15m	8.20m	8.33m	8.28m	8.26m	8.31m	8.43m
Reinforcing Steel	"b" or "b_1"	Size Bar#	19	19	22	19	19	22	19	19	22	19	19	22	22	19	19	22	22
Reinforcing Steel	"b" or "b_1"	Spacing	286	305	305	286	305	305	286	305	305	286	305	305	267	286	286	305	267
Reinforcing Steel	"b" or "b_1"	Length "b"	8.05m	8.05m	8.10m	8.05m	8.05m	8.10m	8.05m	8.05m	8.10m	8.05m	8.05m	8.15m	8.31m	8.15m	8.15m	8.26m	8.41m
Reinforcing Steel	"b" or "b_1"	Length "b_1"	12.19m	8.03m	8.10m	12.19m	8.05m	8.10m	12.19m	8.05m	8.10m	7.95m	8.05m	8.15m	8.31m	8.05m	8.15m	8.26m	8.41m
Reinforcing Steel	"c"	Size Bar#	13	19	22	13	19	22	13	19	22	13	19	22	22	13	19	22	22
Reinforcing Steel	"c"	Spacing	286	305	305	286	305	305	286	305	305	286	305	305	267	286	286	305	267
Reinforcing Steel	"c"	Length	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.18m	5.21m	5.26m	5.23m	5.23m	5.26m	5.31m
Reinforcing Steel	"d" Dist Bars	Top Slab–Tot. No.	24	12	12	24	12	12	24	12	12	24	12	12	12	24	12	12	12
Reinforcing Steel	"d" Dist Bars	Bottom Slab–Tot. No.	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Reinforcing Steel	"e" Bars	Size Bar#	13	13	13	13	13	16	13	16	19	13	19	22	22	13	19	22	22
Reinforcing Steel	"e" Bars	Spacing	457	457	305	457	305	305	457	305	305	286	305	305	267	286	286	305	267
Reinforcing Steel	Spacers	Number	58			62			62			66				70			88
Quan.	Concrete: cu m per lin. ft.		1.12	1.28	1.52	1.18	1.35	1.57	1.24	1.41	1.64	1.31	1.46	1.73	1.96	1.45	1.61	1.88	2.13
Quan.	Reinf: kg per lin. ft.		118	113	137	121	117	141	121	120	145	125	126	152	186	128	134	157	200

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-78G

August 2009

US TABLE – SPAN 8' (all measuements in feet and/or inches).
For Metric table (2.44m Span) – see drawing D78G

SPAN			8'															
HEIGHT			4'			5'			6'			7'				8'		
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			2	11	20	2	11	20	2	11	20	2	11	20	28	2	11	20	28
Conc.	Top Slab	T_1	8 1/4	8 1/4	10 1/4	8 1/4	8 1/4	10 1/4	8 1/4	8 1/4	10 1/4	8 1/4	8 1/4	10 1/4	11 1/2	8 1/4	8 1/4	10 1/4	11 1/2
	Bottom Slab	T_2	6 1/2	9	11	6 1/2	9 1/4	11	6 1/2	9 1/4	11	6 3/4	9 1/4	11	12 1/4	6 3/4	9 1/4	11	12 1/4
	Sidewalls	T_3	6	6	6	6	6	6	6	6	6	6	6	6 1/2	6 1/2	7	7	7 1/2	8 1/2
Reinforcing Steel	"a"	Size Bar #	6	5	5	6	5	5	6	5	5	6	5	5	6	6	5	5	6
		Spacing	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	10 1/2	11 1/2	11 1/2	12	10 1/2
		Length	26-10	26-9	26-9	26-10	26-9	26-9	26-10	26-9	26-9	26-10	26-9	26-11	27-4	27-2	27-1	27-3	27-8
	"b" or "b_1"	Size Bar #	6	6	7	6	6	7	6	6	7	6	6	7	7	6	6	7	7
		Spacing	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	10 1/2	11 1/2	11 1/2	12	10 1/2
		Length "b"	26-5	26-5	26-7	26-5	26-5	26-7	26-5	26-5	26-7	26-5	26-5	26-9	27-3	26-9	26-9	27-1	27-7
		Length "b_1"	26-0	26-4	26-7	26-0	26-5	26-7	26-0	26-5	26-7	26-1	26-5	26-9	27-3	26-5	26-9	27-1	27-7
	"c"	Size Bar #	4	6	7	4	6	7	4	6	7	4	6	7	7	4	6	7	7
		Spacing	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	11 1/2	12	12	10 1/2	11 1/2	11 1/2	12	10 1/2
		Length	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-0	17-1	17-3	17-2	17-2	17-3	17-5
	"d" Dist Bars	Top Slab-Tot. No.	24	12	12	24	12	12	24	12	12	24	12	12	12	24	12	12	12
		Bottom Slab-Tot. No.	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	"e" Bars	Size Bar #	4	4	4	4	4	5	4	5	6	4	6	7	7	4	6	7	7
		Spacing	18	18	12	18	12	12	18	12	12	11 1/2	12	12	10 1/2	11 1/2	11 1/2	12	10 1/2
	Spacers	Number	58			62			62			66				70			88
Quan.	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
	Reinf :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 both cells.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-78H

August 2009

METRIC TABLE – SPAN 3.05m (all measuements in millimeters unless otherwise noted).
For Imperial table (10' Span) – see drawing D78BJ

SPAN		3.05m															
HEIGHT		1.52m			1.83m			2.13m			2.44m				3.05m		
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP		610	3.4m	6.1m	610	3.4m	6.1m	610	3.4m	6.1m	610	3.4m	6.1m	28	610	3.4m	6.1m	28
Conc.	Top Slab T_1	229	254	305	229	254	305	229	254	305	229	254	305	362	229	260	318	368
Conc.	Bottom Slab T_2	191	273	330	191	273	13	191	273	330	197	279	330	381	203	279	343	381
Conc.	Sidewalls T_3	152	152	152	152	152	152	152	152	165	178	178	191	216	203	216	229	254
Reinforcing Steel "a"	Size Bar #	19	19	19	19	19	19	19	19	19	19	19	19	22	19	19	19	22
Reinforcing Steel "a"	Spacing	267	330	254	254 1/2	330	254	267	330	254	267	330	254	279	267	330	254	279
Reinforcing Steel "a"	Length	10.01m	10.01m	10.01m	10.01m	10.01m	10.01m	10.01m	10.01m	10.01m	10.11m	10.11m	10.16m	10.26m	10.21m	10.26m	10.31m0	10.41m
Reinforcing Steel "b" or "b_1"	Size Bar #	19	22	22	19	22	22	19	22	22	19	22	22	25	19	22	22	25
Reinforcing Steel "b" or "b_1"	Spacing	267	330	254	254 1/2	330	254	267	330	254	267	330	254	279	267	330	254	279
Reinforcing Steel "b" or "b_1"	Length "b"	9.91m	9.93m	10.01m	9.91m	9.93m	10.01m	9.91m	9.93m	10.06m	10.01m	10.03m	10.16m	10.31m	9.80m	10.19m	10.31m	10.49m
Reinforcing Steel "b" or "b_1"	Length "b_1"	9.80m	9.93m	10.03m	9.80m	9.93m	10.03m	9.80m	9.93m	10.31m	9.91m	10.03m	10.19m	10.31m	10.03m	10.19m	10.31m	10.49m
Reinforcing Steel "c"	Size Bar #	16	22	22	16	22	22	16	22	22	16	22	22	25	16	22	22	25
Reinforcing Steel "c"	Spacing	267	330	254	267	330	254	267	13	254	267	330	254	279	267	330	254	279
Reinforcing Steel "c"	Length	6.40m	6.40m	6.40m	6.40m	6.40m	6.40m	6.40m	6.40m	6.43m	6.45m	6.45m	6.48m	6.53m	6.50m	6.53m	6.55m	6.60m
Reinforcing Steel "d" Dist Bars	Top Slab–Tot. No.	27	15	15	27	15	15	27	15	15	27	15	15	15	27	15	15	15
Reinforcing Steel "d" Dist Bars	Bottom Slab–Tot. No.	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Reinforcing Steel "e" Bars	Size Bar #	13	13	16	13	16	19	13	19	22	13	19	22	25	16	19	25	25
Reinforcing Steel "e" Bars	Spacing	457	330	254	457	330	254	330	330	254	267	305	10	279	267	229	254	229
Reinforcing Steel Spacers	Number	68			68			72			76			94	102			
Quan.	Concrete: cu m per lin. ft.	1.51	1.83	2.16	1.57	1.90	2.22	1.63	1.95	2.32	1.79	2.12	2.47	2.90	2.05	2.43	2.85	3.23
Quan.	Reinf kg per lin. ft.	162	169	213	163	172	219	166	177	228	171	182	233	268	191	205	262	287

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-781

August 2009

US TABLE – SPAN 10' (all measuements in feet and/or inches).
For Metric table (3.05m Span) – see drawing D78I

SPAN			10'															
HEIGHT			5'			6'			7'			8'				10'			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			2	11	20	2	11	20	2	11	20	2	11	20	28	2	11	20	28
Conc.	Top Slab	T_1	9	10	12	9	10	12	9	10	12	9	10	12	14 1/4	9	10 1/4	12 1/2	14 1/2
Conc.	Bottom Slab	T_2	7 1/2	10 3/4	13	7 1/2	10 3/4	13	7 1/2	10 3/4	13	7 3/4	11	13	15	8	11	13 1/2	15
Conc.	Sidewalls	T_3	6	6	6	6	6	6	6	6	6 1/2	7	7	7 1/2	8 1/2	8	8 1/2	9	10
Reinforcing Steel	"a"	Size Bar #	6	6	6	6	6	6	6	6	6	6	6	6	7	6	6	6	7
Reinforcing Steel	"a"	Spacing	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	11	10 1/2	13	10	11
Reinforcing Steel	"a"	Length	32–10	32–10	32–10	32–10	32–10	32–10	32–10	32–10	32–10	33–2	33–2	33–4	33–8	33–6	33–8	33–10	34–2
Reinforcing Steel	"b" or "b_1"	Size Bar #	6	7	7	6	7	7	6	7	7	6	7	7	8	6	7	7	8
Reinforcing Steel	"b" or "b_1"	Spacing	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	11	10 1/2	13	10	11
Reinforcing Steel	"b" or "b_1"	Length "b"	32–6	32–7	32–10	32–6	32–7	32–10	32–6	32–7	33–0	32–10	32–11	33–4	33–11	32–2	33–5	33–11	34–5
Reinforcing Steel	"b" or "b_1"	Length "b_1"	32–2	32–7	32–11	32–2	32–7	32–11	32–2	32–7	33–1	32–6	32–11	33–5	33–11	32–11	33–5	33–11	34–5
Reinforcing Steel	"c"	Size Bar #	5	7	7	5	7	7	5	7	7	5	7	7	8	5	7	7	8
Reinforcing Steel	"c"	Spacing	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	10 1/2	13	10	11	10 1/2	13	10	11
Reinforcing Steel	"c"	Length	21–0	21–0	21–0	21–0	21–0	21–0	21–0	21–0	21–1	21–2	21–2	21–3	21–5	21–4	21–5	21–6	21–8
Reinforcing Steel	"d" Dist Bars	Top Slab–Tot. No.	27	15	15	27	15	15	27	15	15	27	15	15	15	27	15	15	15
Reinforcing Steel	"d" Dist Bars	Bottom Slab–Tot. No.	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Reinforcing Steel	"e" Bars	Size Bar #	4	4	5	4	5	6	4	6	7	4	6	7	8	5	6	8	8
Reinforcing Steel	"e" Bars	Spacing	18	13	10	18	13	10	13	13	10	10 1/2	12	10	11	10 1/2	9	10	9
Reinforcing Steel	Spacers	Number	68			68			72			76			94	102			
Quan.	Concrete: C.Y. per lin. ft.		1.98	2.40	2.82	2.06	2.48	2.90	2.13	2.55	3.03	2.34	2.77	3.23	3.78	2.68	3.18	3.73	4.22
Quan.	Reinf :lbs per lin. ft.		358	372	470	359	379	482	367	391	502	377	402	514	590	421	453	577	632

NOTE:

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

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-78J

August 2009

METRIC TABLE – SPAN 3.66m (all measuements in millimeters unless otherwise noted).
For Imperial table (12' Span) – see drawing D78BJ

SPAN			3.66m																				
HEIGHT			1.83m			2.13m			2.44m			2.74m				3.05m				3.66m			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			610	3m	5.5m	610	3m	5.5m	610	3m	5.5m	2	3.4m	20	9.1m	610	3.4m	20	9.1m	610	3.4m	20	9.1m
Conc.	Top Slab	T_1	260	286	356	260	286	356	260	286	356	260	305	375	451	260	305	375	451	260	305	375	451
	Bottom Slab	T_2	210	305	368	216	305	375	216	305	375	222	318	394	464	222	318	394	464	229	324	400	464
	Sidewalls	T_3	152	152	165	152	152	178	178	178	191	203	203	229	254	203	203	229	267	229	229	267	305
Reinforcing Steel	"a"	Size Bar #	22	19	22	22	19	22	22	19	22	22	19	22	25	22	19	22	25	22	19	22	25
		Spacing	305	11	286	305	279	286	305	279	286	305	267	279	286	305	267	279	286	305	267	279	286
		Length	11.91m	11.84m	11.96m	11.91m	11.84m	12.01m	12.01m	11.94m	12.07m	12.12m	12.04m	12.22m	12.45m	12.12m	12.04m	12.22m	12.50m	12.22m	11.91m	12.37m	12.65m
	"b" or "b_1"	Size Bar #	22	22	25	22	22	25	22	22	25	22	22	25	29	22	22	25	29	22	22	25	29
		Spacing	305	279	286	305	279	286	305	279	286	305	267	279	286	305	267	279	286	305	267	279	286
		Length "b"	11.76m	11.81m	11.96m	11.76m	11.81m	12.01m	11.86m	11.91m	12.07m	11.96m	12.04m	12.24m	12.45m	11.96m	12.04m	12.24m	12.50m	12.07m	11.91m	12.40m	12.65m
		Length "b_1"	11.66m	11.76m	11.94m	11.66m	11.81m	12.01m	11.76m	11.91m	12.07m	11.89m	12.04m	12.24m	12.45m	11.89m	12.04m	12.24m	12.50m	11.99m	11.91m	12.42m	12.65m
	"c"	Size Bar #	19	22	25	19	22	25	19	22	25	19	22	25	29	19	22	25	29	19	22	25	29
		Spacing	305	279	286	305	279	286	305	279	286	305	267	279	286	305	267	279	286	305	267	279	286
		Length	7.62m	7.62m	7.65m	7.62m	7.62m	7.67m	7.67m	7.67m	7.70m	7.72m	7.72m	7.77m	7.82m	7.72m	7.72m	7.77m	7.85m	7.77m	7.77m	7.85m	7.92m
	"d" Dist Bars	Top Slab–Tot. No.	36	15	15	36	15	15	36	15	15	36	15	15	15	36	15	15	15	36	15	15	15
		Bottom Slab–Tot. No.	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	"e" Bars	Size Bar #	13	13	19	13	13	19	13	13	19	13	19	22	25	16	22	25	25	19	22	29	29
		Spacing	457	178	286	305	146	286	305	140	229	254	267	279	286	305	267	279	165	305	229	279	229
	Spacers	Number	76			80			84			104				110				116			
Quan.	Concrete: cu m per lin. ft.		1.99	2.43	2.92	2.06	2.49	3.04	2.20	2.64	3.16	2.39	2.90	3.52	4.17	2.47	2.97	3.61	4.32	2.77	3.27	4.01	4.72
	Reinf kg per lin. ft.		222	229	285	225	234	289	229	239	297	243	264	326	396	249	275	338	426	261	288	360	440

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.

Revision	By Approved	Date
ORIGINAL	Kercheval	12/75
Add Metric	T. Stanton	03/03
Reviewed	T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2008

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-78K

August 2009

US TABLE – SPAN 12' (all measuements in feet and/or inches).
For Metric table (3.66m Span) – see drawing D78I

SPAN			12'																				
HEIGHT			6'			7'			8'			9'				10'				12'			
STRENGTH CLASSIFICATION			A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C	D	A	B	C	D
MAX FILL OVER TOP			2	10	18	2	10	18	2	10	18	2	11	20	30	2	11	20	30	2	11	20	30
Conc.	Top Slab	T_1	10 1/4	11 1/2	14	10 1/4	11 1/2	14	10 1/4	11 1/2	14	10 1/4	12	14 3/4	17 3/4	10 1/4	12	14 3/4	17 3/4	10 1/4	12	14 3/4	17 3/4
	Bottom Slab	T_2	8 1/4	12	14 1/2	8 1/2	12	14 3/4	8 1/2	12	14 3/4	8 3/4	12 1/2	15 1/2	18 1/4	8 3/4	12 1/2	15 1/2	18 1/4	9	12 3/4	15 3/4	18 1/4
	Sidewalls	T_3	6	6	6 1/2	6	6	7	7	7	7 1/2	8	8	9	10	8	8	9	10 1/2	9	9	10 1/2	12
Reinforcing Steel	"a"	Size Bar #	7	6	7	7	6	7	7	6	7	7	6	7	8	7	6	7	8	7	6	7	8
		Spacing	12	11	11 1/2	12	11	11 1/2	12	11	11 1/2	12	10 1/2	11	11 1/2	12	10 1/2	11	11 1/2	12	10 1/2	11	11 1/2
		Length	39–1	38–10	39–3	39–1	38–10	39–5	39–5	39–2	39–7	39–9	39–6	40–1	40–10	39–9	39–6	40–1	41–0	40–1	39–10	40–7	41–6
	"b" or "b_1"	Size Bar #	7	7	8	7	7	8	7	7	8	7	7	8	9	7	7	8	9	7	7	8	9
		Spacing	12	11	11 1/2	12	11	11 1/2	12	11	11 1/2	12	10 1/2	11	11 1/2	12	10 1/2	11	11 1/2	12	10 1/2	11	11 1/2
		Length "b"	38–7	38–9	39–3	38–7	38–9	39–5	38–11	39–1	39–7	39–3	39–6	40–2	40–10	39–3	39–6	40–2	41–0	39–7	39–10	40–8	41–6
		Length "b_1"	38–3	38–7	39–2	38–3	38–9	39–5	38–7	39–1	39–7	39–0	39–6	40–2	40–10	39–0	39–6	40–2	41–0	39–4	39–10	40–9	41–6
	"c"	Size Bar #	6	7	8	6	7	8	6	7	8	6	7	8	9	6	7	8	9	6	7	8	9
		Spacing	12	11	11 1/2	12	11	11 1/2	12	11	11 1/2	12	10 1/2	11	11 1/2	12	10 1/2	11	11 1/2	12	10 1/2	11	11 1/2
		Length	25–0	25–0	25–1	25–0	25–0	25–2	25–2	25–2	25–3	25–4	25–4	25–6	25–8	25–4	25–4	25–6	25–9	25–6	25–6	25–9	26–0
	"d" Dist Bars	Top Slab–Tot. No.	36	15	15	36	15	15	36	15	15	36	15	15	15	36	15	15	15	36	15	15	15
		Bottom Slab–Tot. No.	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	"e" Bars	Size Bar #	4	4	6	4	4	6	4	4	6	4	6	7	8	5	7	8	8	6	7	9	9
		Spacing	18	7	11 1/2	12	5 3/4	11 1/2	12	5 1/2	9	10	10 1/2	11	11 1/2	12	10 1/2	11	6 1/2	12	9	11	9
	Spacers	Number	76			80			84			104				110				116			
Quan.	Concrete: C.Y. per lin. ft.		2.60	3.18	3.82	2.70	3.26	3.98	2.88	3.45	4.13	3.13	3.79	4.61	5.45	3.23	3.89	4.72	5.65	3.62	4.28	5.24	6.18
	Reinf :lbs per lin. ft.		489	505	628	497	516	637	505	527	654	536	582	719	872	548	606	745	939	575	636	793	963

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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	02/09

SAN DIEGO REGIONAL STANDARD DRAWING

TRIPLE BOX CULVERT
DETAILS No. 1

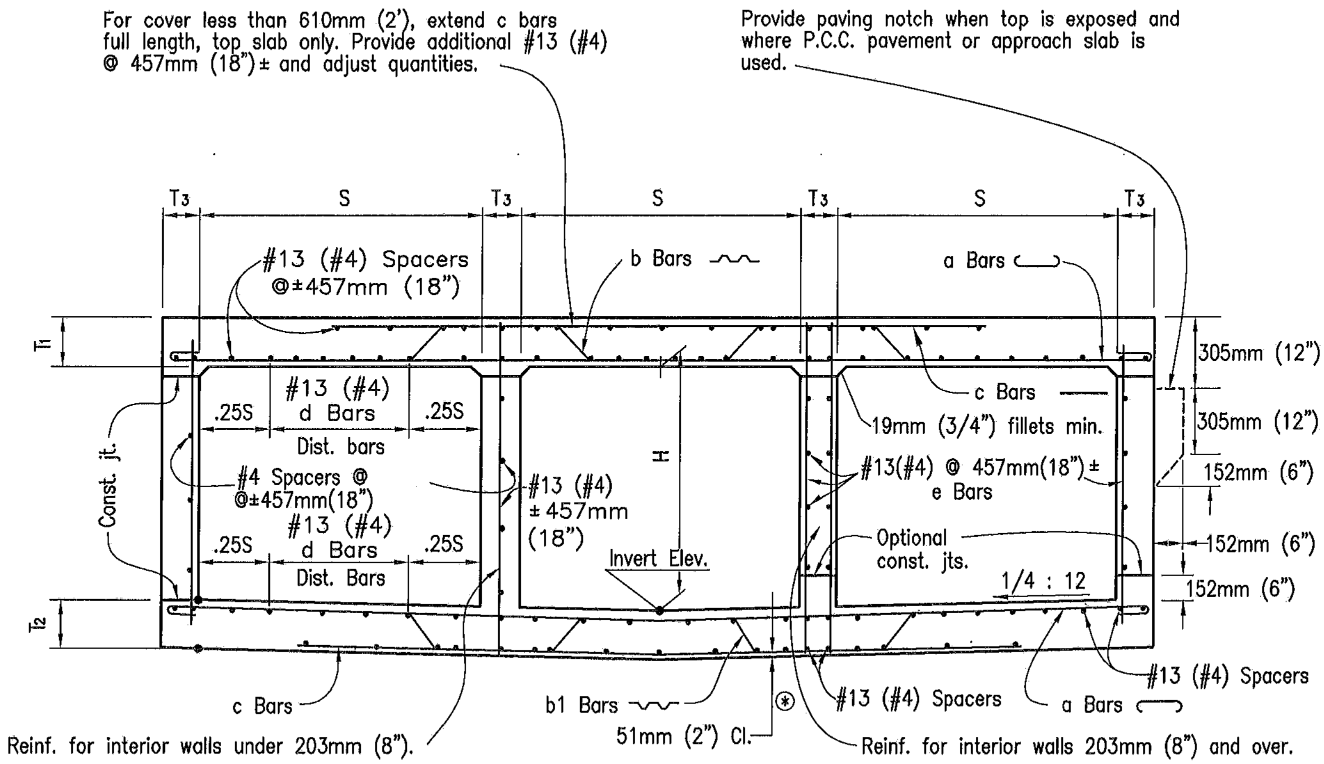
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

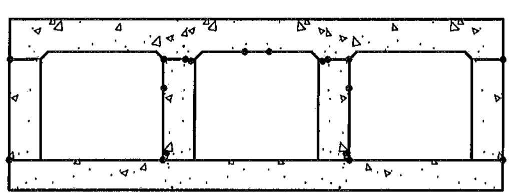
DRAWING NUMBER D-78L

August 2009



TYPICAL SECTION

⊛ For reinforcement clearance, except at bottom, see "Miscellaneous Details."



FLAT INVERT ALTERNATIVE

(When shown)

Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	TRIPLE BOX CULVERT DETAILS NO.2	3/01/2003
Reviewed		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER D-78M

August 2009

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, thus 1.22m x 1.22m-A x 18.3m (4 x 4-A x 60'), followed by alternatives.

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

REINF. PLACEMENT: Main Reinforcement is positioned transverse or, for curved culverts, radial when radial, reinforcing spacing is measured along ℄.

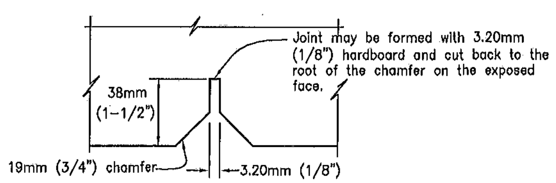
CONSTRUCTION NOTES

CONCRETE: Bottom slab & walls shall be class 332 kg/M^3-B-22Mpa (560-B-3250). Top slab shall be class 332 kg/M^3-C-22Mpa (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 13mm (1/2") expansion joint filler at 15.2m (50')± centers outside the paved roadway lanes and place bridge detail 3-2 at 9.14m (30')± centers under paved roadway lanes.
When cover is more than span

CONSTRUCTION LOADS: Not permitted until concrete has reached a strength of 20.7Mpa (3,000p.s.i.) 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 of R.C.B. otherwise, the Contractor is to submit a proposal for consideration.



BRIDGE DETAIL 3-2
(Portion)
See Standard Drawing C-15

DESIGN NOTES

SPECIFICATIONS
DESIGN: AASHO, dated 1973, with revisions as supplemented by State of California Bridge Planning and Design Manual.

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

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

COVER LESS THAN 610mm (2') - Wheel load distribution on the top slab is E=0.175S+3.2' longitudinally and concentrated along the span. Wheel load distribution on the invert slab is 2.29m (7.5')longitudinally and uniformly over the breath of the culvert.

COVER 610mm (2') OR MORE - Wheel loads distributed uniformly over a square, the sides of which are 1.75 times the depth of cover, but not less longitudinally than E on the top slab, or 2.29m (7.5') on the invert slab when such areas from several wheel concentrations overlap, the total load shall be considered as uniformly distributed over the area defined by the outside limits of the individual areas, but the overall longitudinal dimension shall not exceed the total length of the supporting slab. Neglect live load, on single spans when cover is more than 2.44m (8') and exceeds span, and on multiple spans when cover exceeds distance between exterior walls.

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

UNIT STRESSES: Fs = 138Mpa (20,000 psi), N = 10
Fc = 8.27Mpa (1,200 psi)

Reinforcement embedment is 38mm (1-1/2) dia. clear, min 25.4mm (1") and in 6.35mm (1/4") increments, except as noted.

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

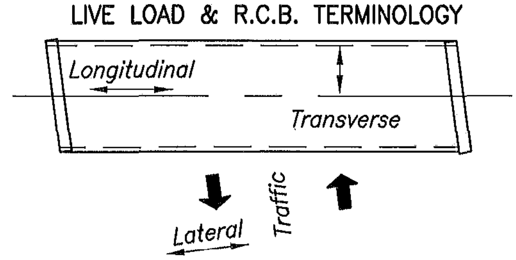
Classification "A" top slab $= \frac{100}{\sqrt{SPAN}}$,max 50%
(unless traffic longitudinal)

Classification "B" to "E": Top and bottom slabs #13 (#4) @ 457mm (18") max.

USE OF STANDARD DRAWING

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

LIVE LOAD & R.C.B. TERMINOLOGY



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

BOX CULVERT
MISCELLANEOUS DETAILS No. 1

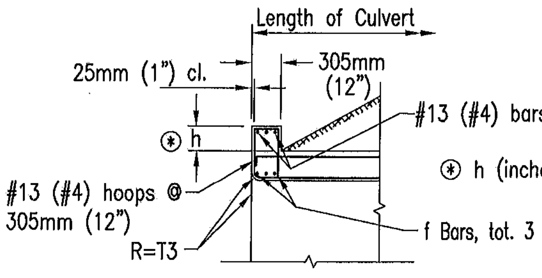
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

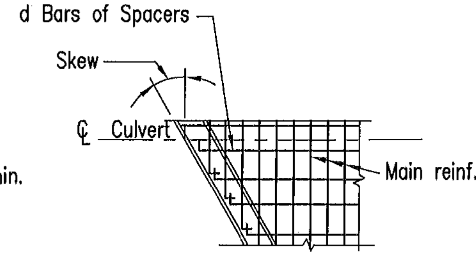
Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-81A

August 2009



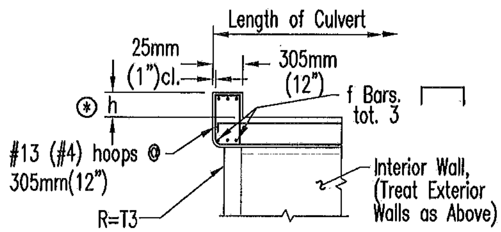
PART SECTION



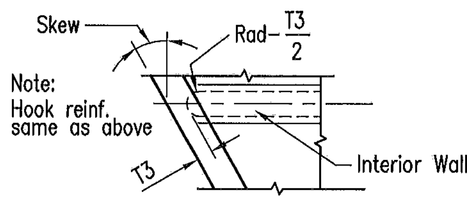
PART PLAN-SKEWED

PARAPET f BAR Nos.	SKEW ANGLE		
SPAN	0° TO 15°	16° TO 30°	31° TO 45°
1.22M (4')	#13 (#4)	#13 (#4)	#13 (#4)
1.83M (6')	#13 (#4)	#13 (#4)	#16 (#5)
2.44M (8')	#13 (#4)	#16 (#5)	#19 (#6)
3.05M (10')	#16 (#5)	#19 (#6)	#22 (#7)
3.66M (12')	#19 (#6)	#22 (#7)	#25 (#8)
4.27M (14')	#22 (#7)	#25 (#8)	#29 (#9)

PARAPET DETAILS FOR SINGLE SPAN CULVERTS

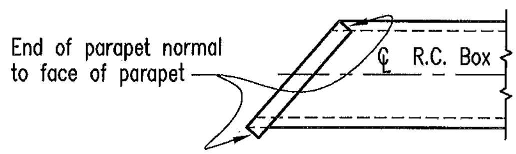


PART SECTION

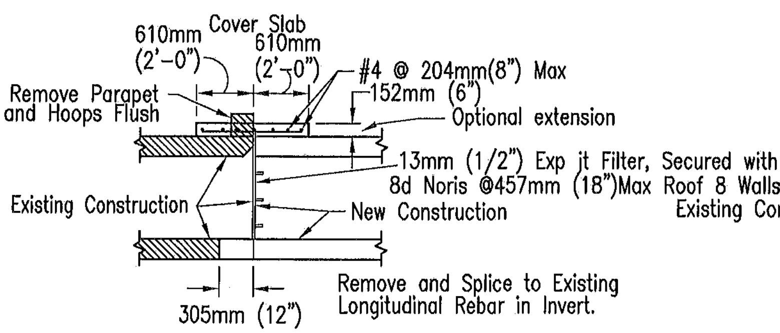


PART PLAN-SKEWED

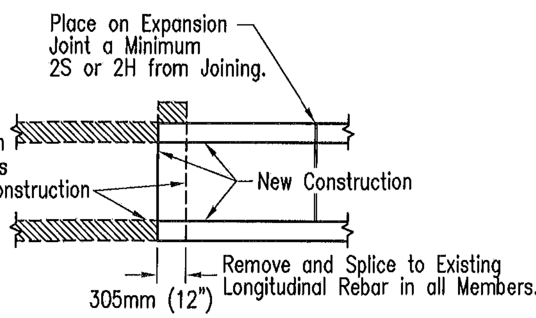
PARAPET DETAILS FOR MULTIPLE SPAN CULVERTS



PAPAPET DETAIL FOR SKEWED CULVERTS W/O WINGWALLS



COVER: 305mm (1') AND GREATER



COVER: EXPOSED TOP AND GREATER

CULVERT EXTENSION
20° SKEW MAXIMUM

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

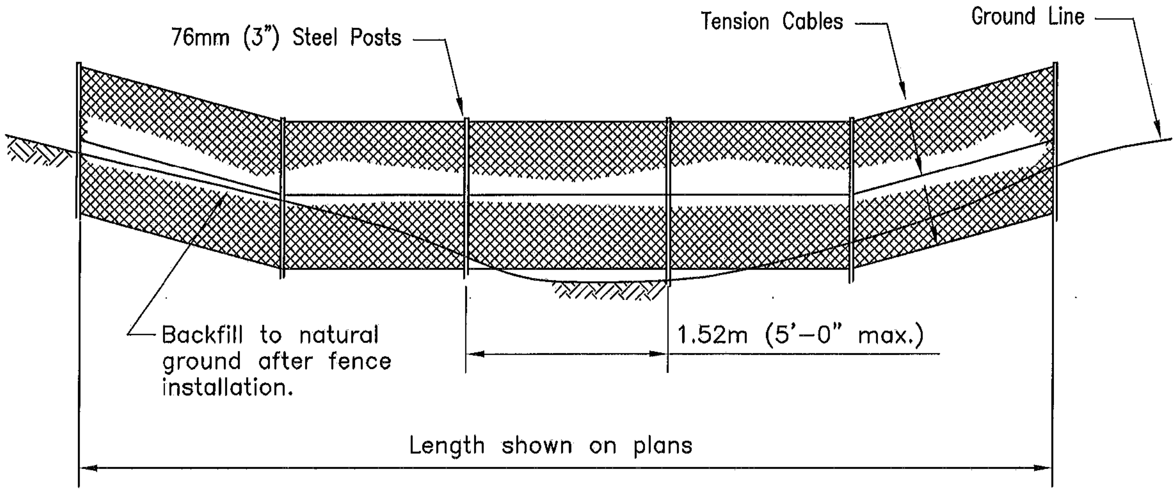
BOX CULVERT MISCELLANEOUS DETAILS NO. 2

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

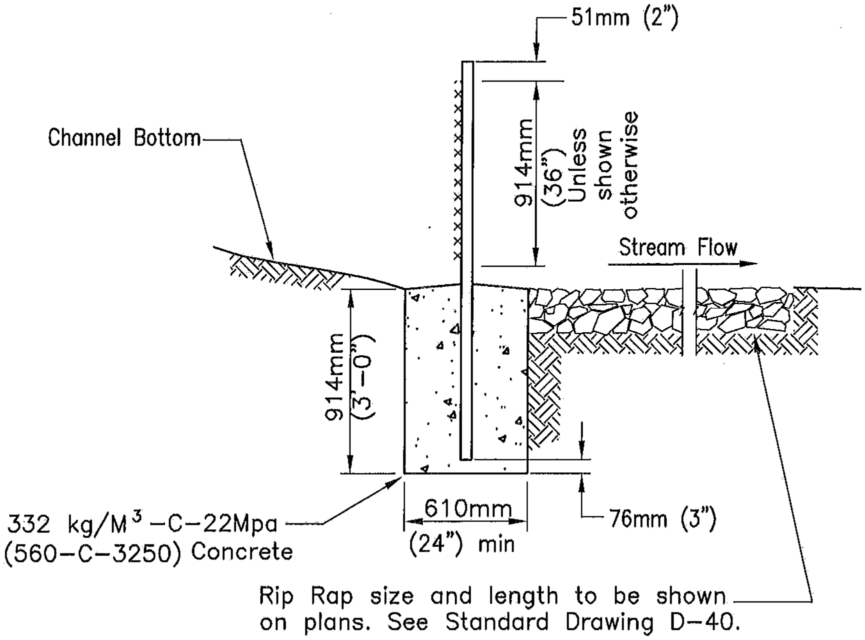
3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-81B



ELEVATION

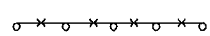


SECTION

NOTES:

1. Fence fabric shall be 51mm (2") mesh, 9 gage galvanized wire, chain link placed on the upstream side of the posts and tension cables.
2. Tension cable shall be 8mmø (5/16") steel at 457mm (18") c/c, secured at ends with cable clamps. Secure fence to cable with No. 12 galvanized steel wire looped at 152mm (6") c/c.
3. Posts shall be 76mmø (3") steel pipe, 2.63kg (5.79 lb/ft). Fill with mortar after placing.
4. Fence fabric shall be secured to posts with 9 gage wire clips at 229mm (9") c/c.

LEGEND ON PLANS

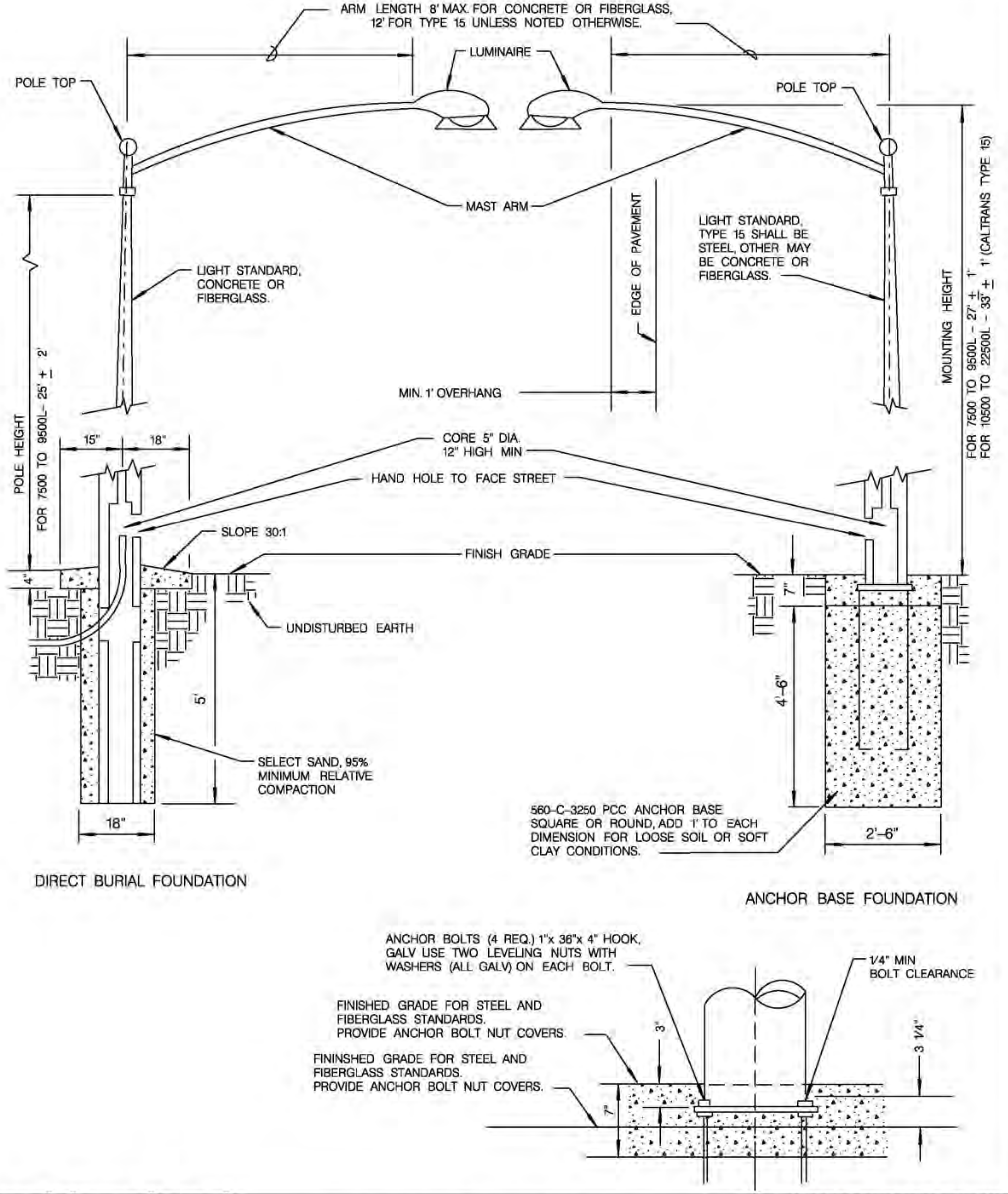


Revision	By	Approved	Date		
ORIGINAL		H. Hecht	10/82	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	DEBRIS FENCE	3/01/2003
Reviewed		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER D–82

August 2009

CHAPTER 3

ELECTRICAL SYSTEM



REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	06/83
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

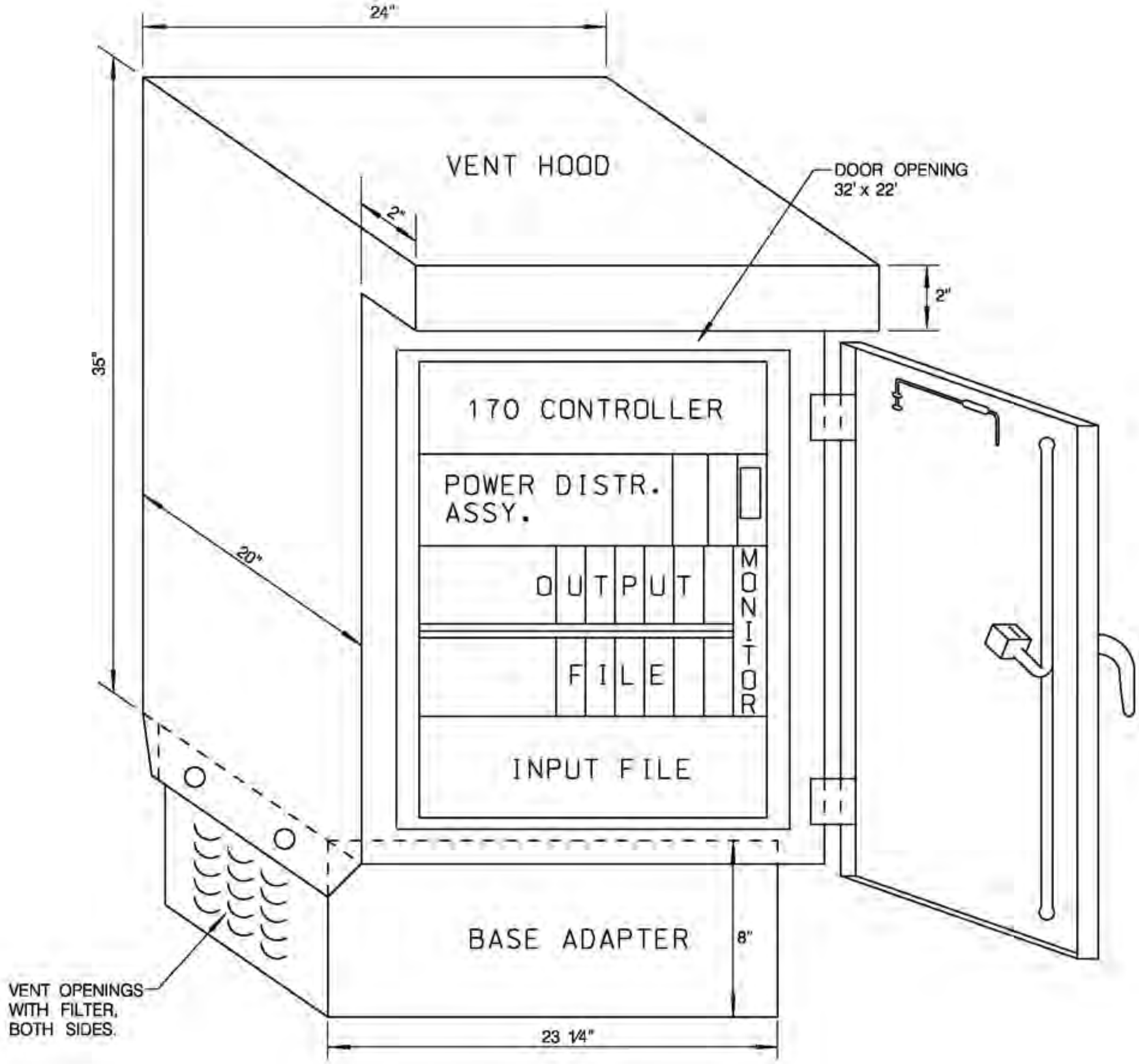
STREET LIGHTING STANDARD

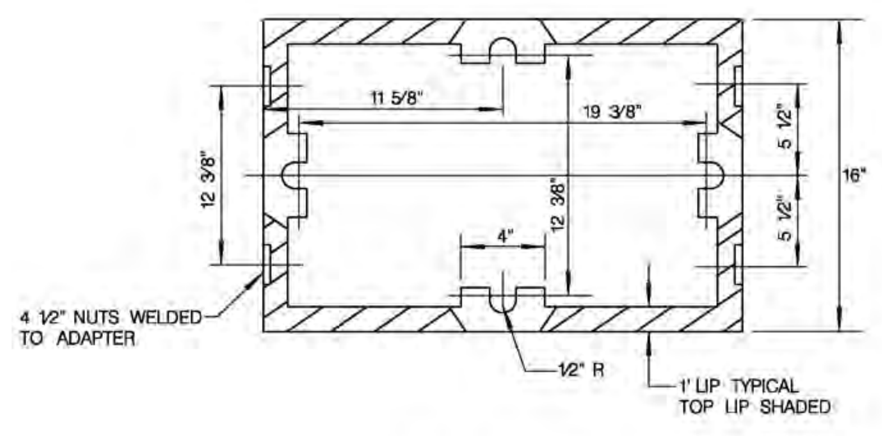
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

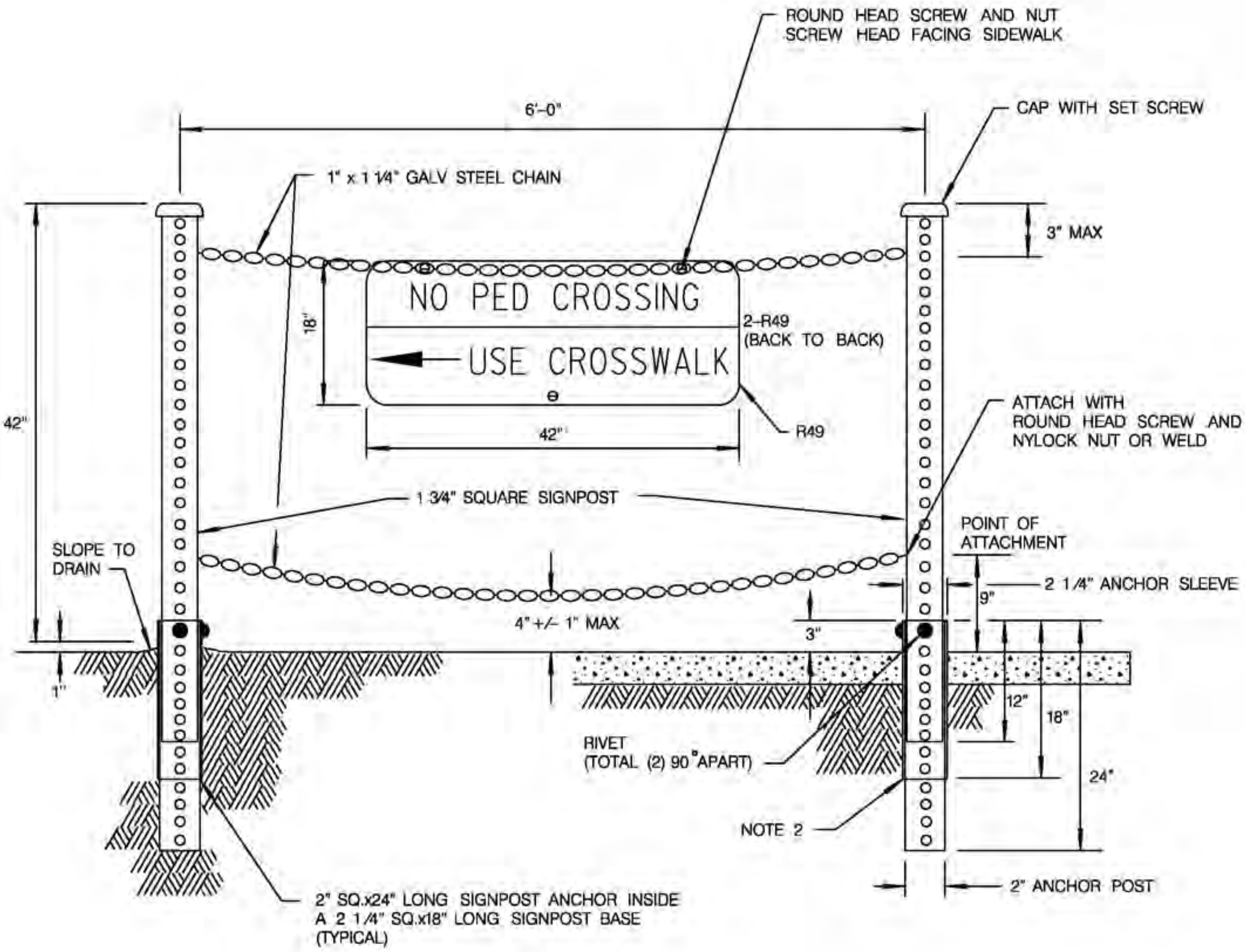
DRAWING NUMBER **SDE-101**





BASE ADAPTOR PLAN VIEW

REVISION	BY	APPROVED	DATE		
ORIGINAL	KA	J. NAGELVOORT	01/12	CITY OF SAN DIEGO - STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE 1/31/2012 COORDINATOR R.C.E. 65271 DATE
				MODEL 336 CABINET	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.

REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	08/86
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

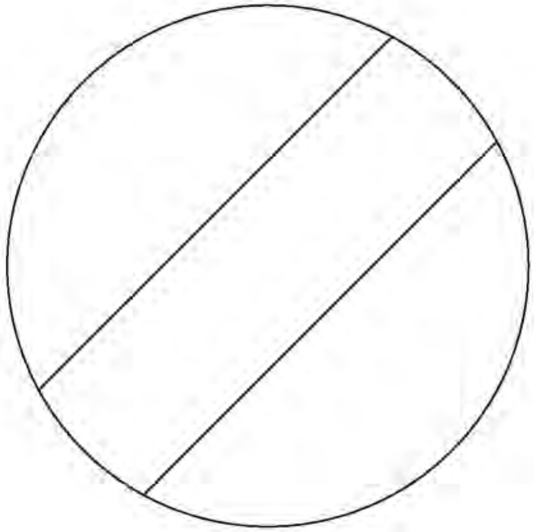
PEDESTRIAN BARRICADE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

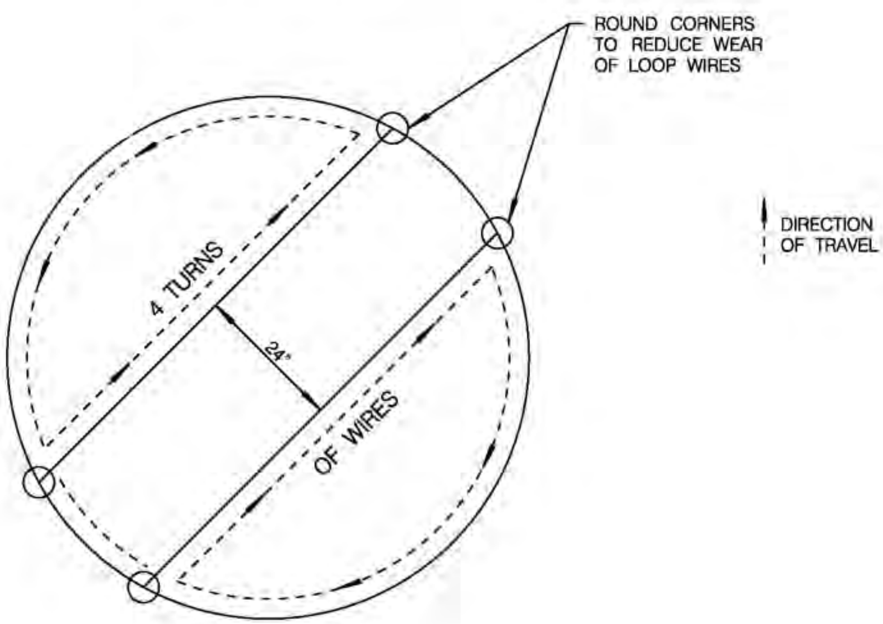
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDE-103**



PLAN DRAWING SYMBOL



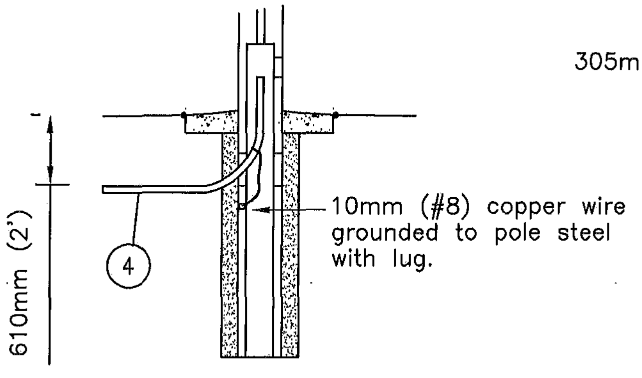
NOTES:

1. LOOP DIAMETER = 6' TYP
2. DEPTH OF CUT = 3 1/8" MIN

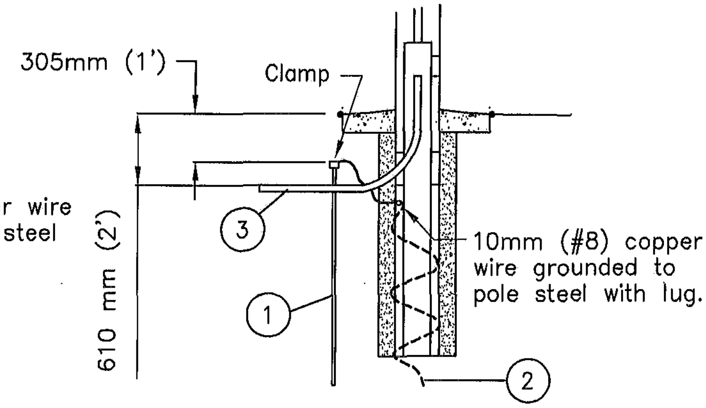
SAWCUT & WINDING DETAIL

MODIFIED TYPE E LIMIT LINE / CROSSWALK DETECTOR

REVISION	BY	APPROVED	DATE		
ORIGINAL	KA	J. NAGELVOORT	01/12	CITY OF SAN DIEGO – STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE H. Haile 1/31/2012 COORDINATOR R.C.E. 65271 DATE
				TYPE E MODIFIED LOOP	DRAWING NUMBER **SDE-104**

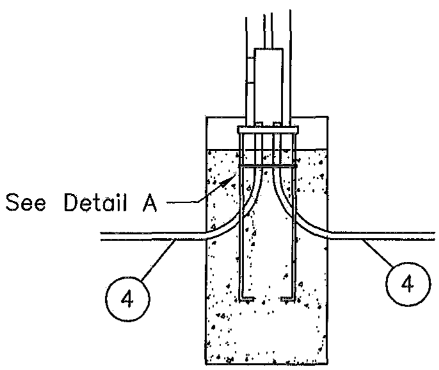


STEEL CONDUIT

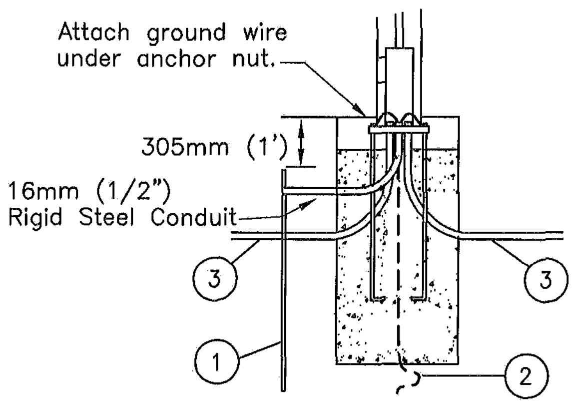


NON–METALLIC CONDUIT

DIRECT BURIAL FOUNDATION



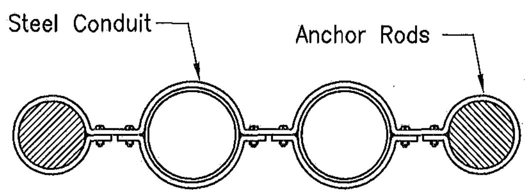
STEEL CONDUIT



NON–METALLIC CONDUIT

ANCHOR BASE FOUNDATION

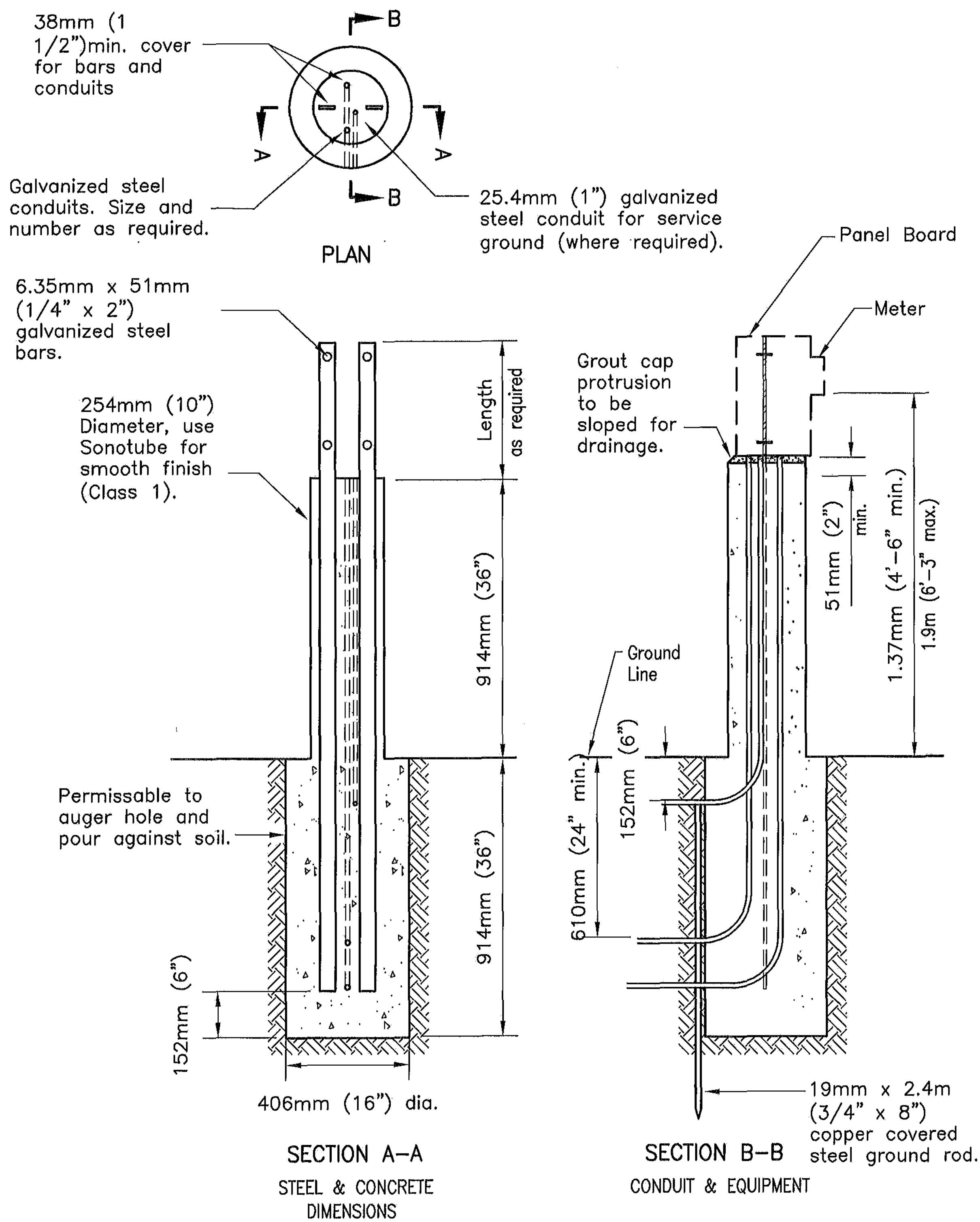
1. 19mm x 2.4m (3/4" x 8') copper covered steel ground rod.
2. Alternate Ground: 4.57m (15') 35mm (no. 4) stranded copper wire, coiled.
3. Approved non–metallic conduit.
4. Steel conduit.



DETAIL A

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75	GROUNDING OF CONCRETE LIGHTING STANDARDS	3/01/2003
Add Metric		T. Stanton	03/03		Chairperson R.C.E. 19246 Date
Reformatted		T. Stanton	04/06		DRAWING NUMBER E–2

August 2009



NOTE: Concrete shall be class 332 kg/M^3 C 22 Mpa (560–C–3250)

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

PEDESTAL FOR ELECTRICAL EQUIPMENT

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

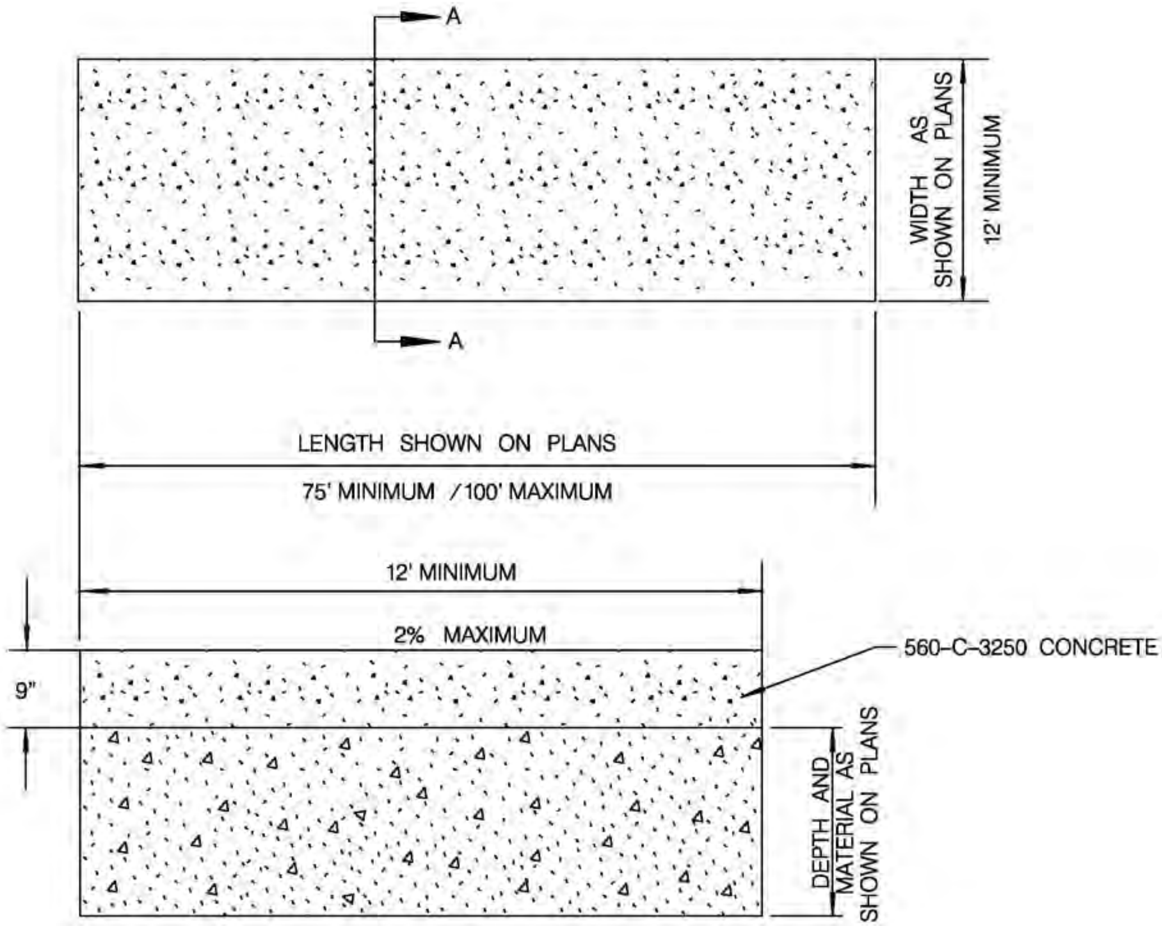
3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER E–33

CHAPTER 4

GENERAL SURFACE IMPROVEMENTS



SECTION A–A

NOTE

1. BROOM FINISH PARALLEL WITH TRAFFIC.

REVISION	BY	APPROVED	DATE
ORIGINAL		G. PARKINSON	05/80
REVISION		J. CASEY	06/83
DRAWNING	LC	A. OSKOUI	06/94
MAX	GP	F. BELOCK	4/96
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

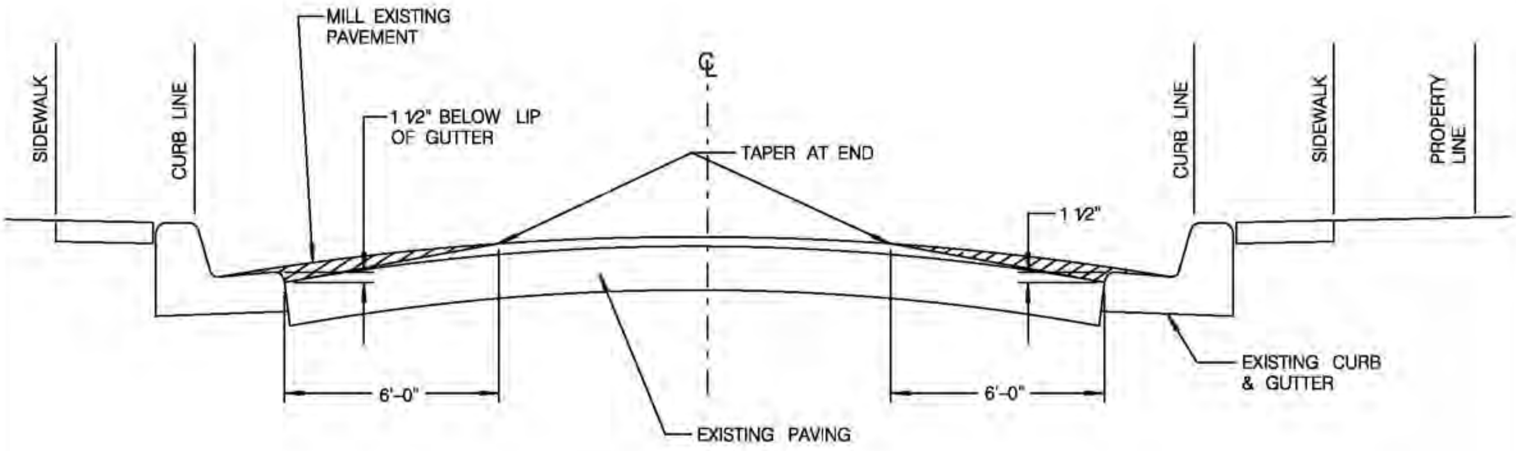
BUS STOP SLAB

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

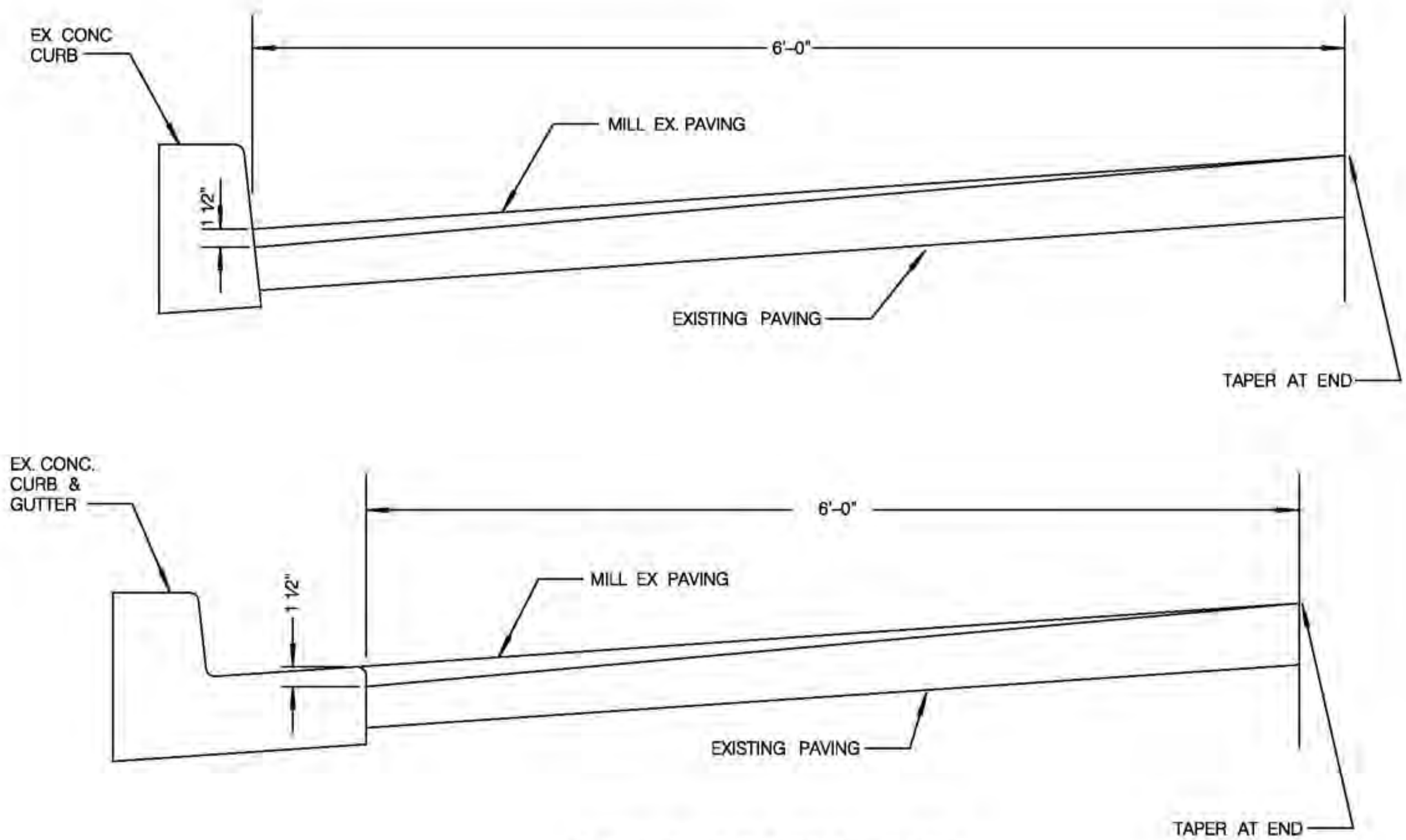
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-102**



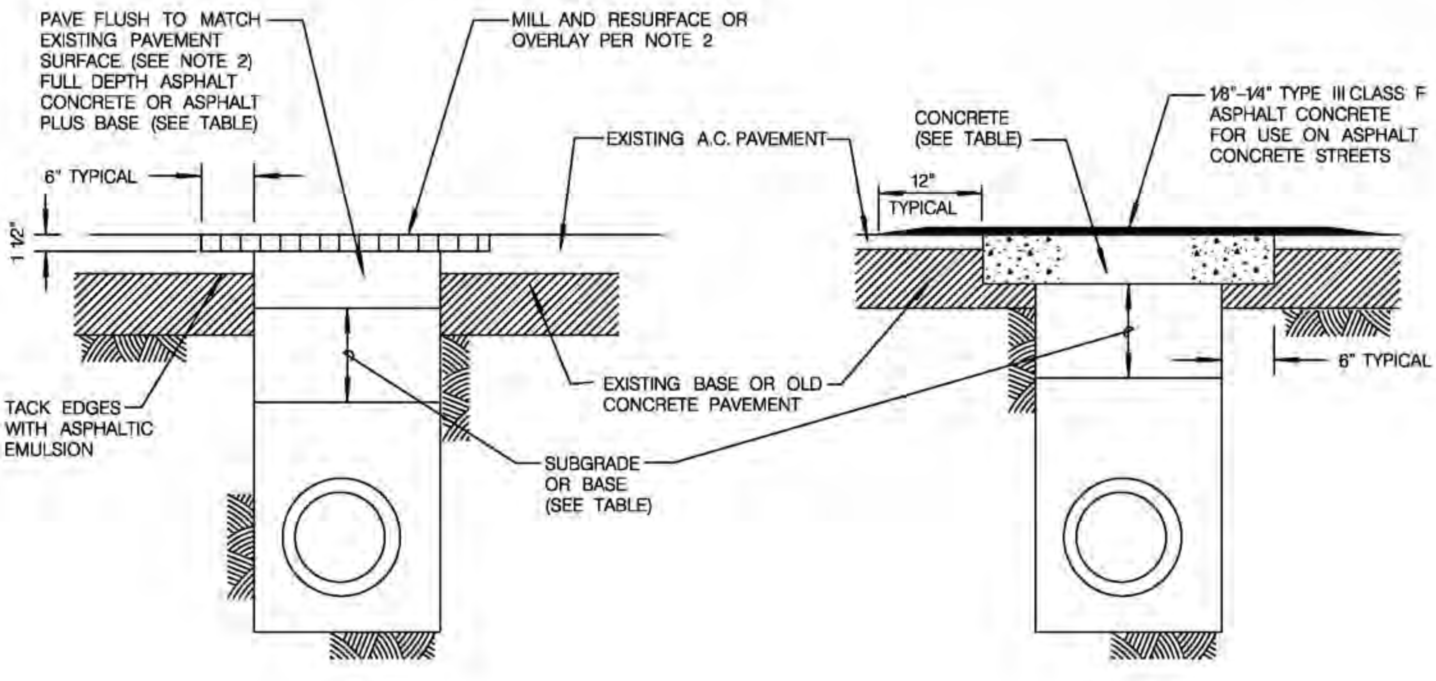
GRINDING & PREPARATION

TYPICAL SECTION



TYPICAL PAVEMENT COLD MILLING

REVISION	BY	APPROVED	DATE		
ORIGINAL	KA	J. NAGELVOORT	01/12	CITY OF SAN DIEGO - STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
				COLD MILLING ASPHALT CONCRETE PAVEMENT DETAIL	1/31/2012 — COORDINATOR R.C.E. 65271 DATE
					DRAWING NUMBER **SDG-106**



TYPE A

TYPE B
(SEE NOTE 4)

	TYPE A		TYPE B
	ASPHALT	ASPHALT PLUS BASE	CONCRETE
MIX DESIGN	3/4" TYPE III CLASS B3	3/4" TYPE III CLASS B3 PLUS CLASS II BASE	560-C-3250
ALLEYS	8.0"	ASPHALT THICKNESS TO EQUAL	5.5"
LOCAL THROUGH 4 LANE COLLECTORS	10.0"	EXISTING PLUS 1", MIN 4" TO MAX. 9"	7.0"
MAJOR	12.0"	COMBINED ASPHALT PLUS BASE 18" MIN.	9.0"

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 DAYS AFTER INITIAL ASPHALT PLACEMENT.
3. 560-C-3250 CONCRETE TREATED WITH A MINIMUM 2% CALCIUM CHLORIDE SOLUTION IN ACCORDANCE WITH 201-1 OR 650-CW-4000 (W/O CC) CONCRETE MAY BE OPENED TO TRAFFIC 3 DAYS AFTER IT IS PLACED. 650-CW-4000 CONCRETE TREATED IN SAME MANNER (W/CC) MAY BE OPENED TO TRAFFIC 24 HOURS AFTER IT IS PLACED. CONCRETE SPECIFIED BY ALTERNATE CLASS OR OTHERWISE CONTAINING FLY ASH IS NOT ALLOWED.
4. USE TYPE "A" UNLESS OTHERWISE SHOWN ON THE PLANS OR AS DIRECTED BY THE CITY ENGINEER.

REVISION	BY	APPROVED	DATE
ORIGINAL		J.P. CASEY	1/24/89
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

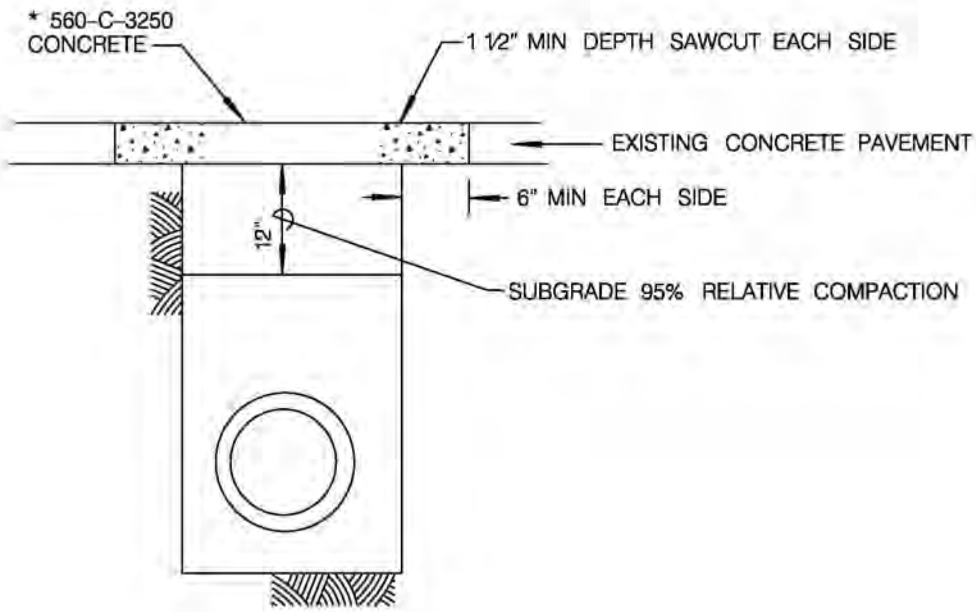
TRENCH RESURFACING FOR ASPHALT CONCRETE SURFACED STREETS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-107**



NOTES

1. EXISTING CONCRETE PAVEMENT SHALL BE REMOVED.

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

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

REVISION	BY	APPROVED	DATE
ORIGINAL		J.CASEY	01/89
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

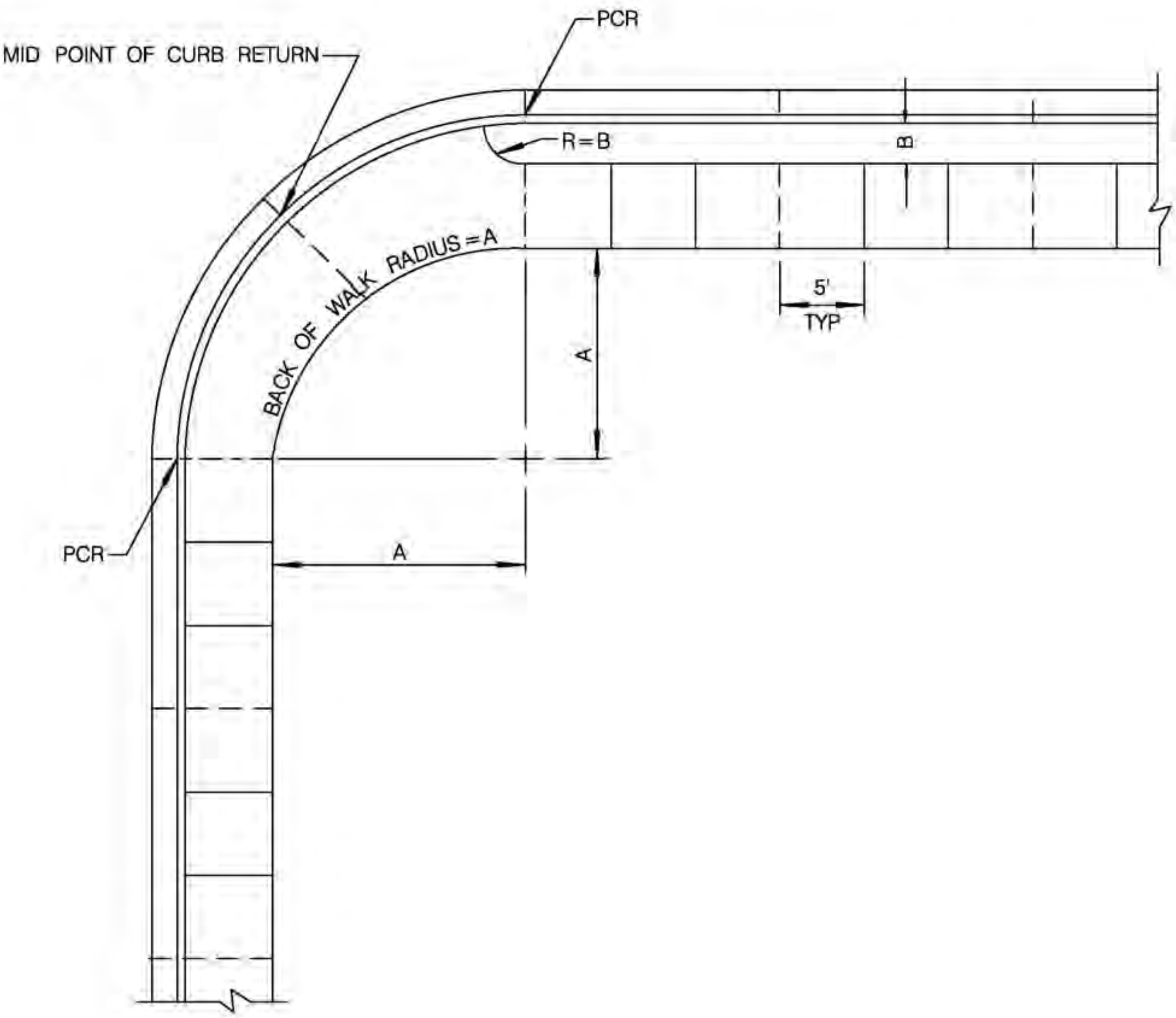
TRENCH RESURFACING FOR PCC SURFACED STREETS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-108**



NOTES

1. EXPANSION JOINTS - - - — AT CURB RETURNS, ADJACENT TO STRUCTURES AND AT 45' INTERVALS.
2. WEAKENDED PLANE JOINTS — — AT MID POINT OF CURB RETURN, WHEN REQUIRED, AND AT 15' INTERVALS FROM PCR'S ABSENT A CURB RAMP.
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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

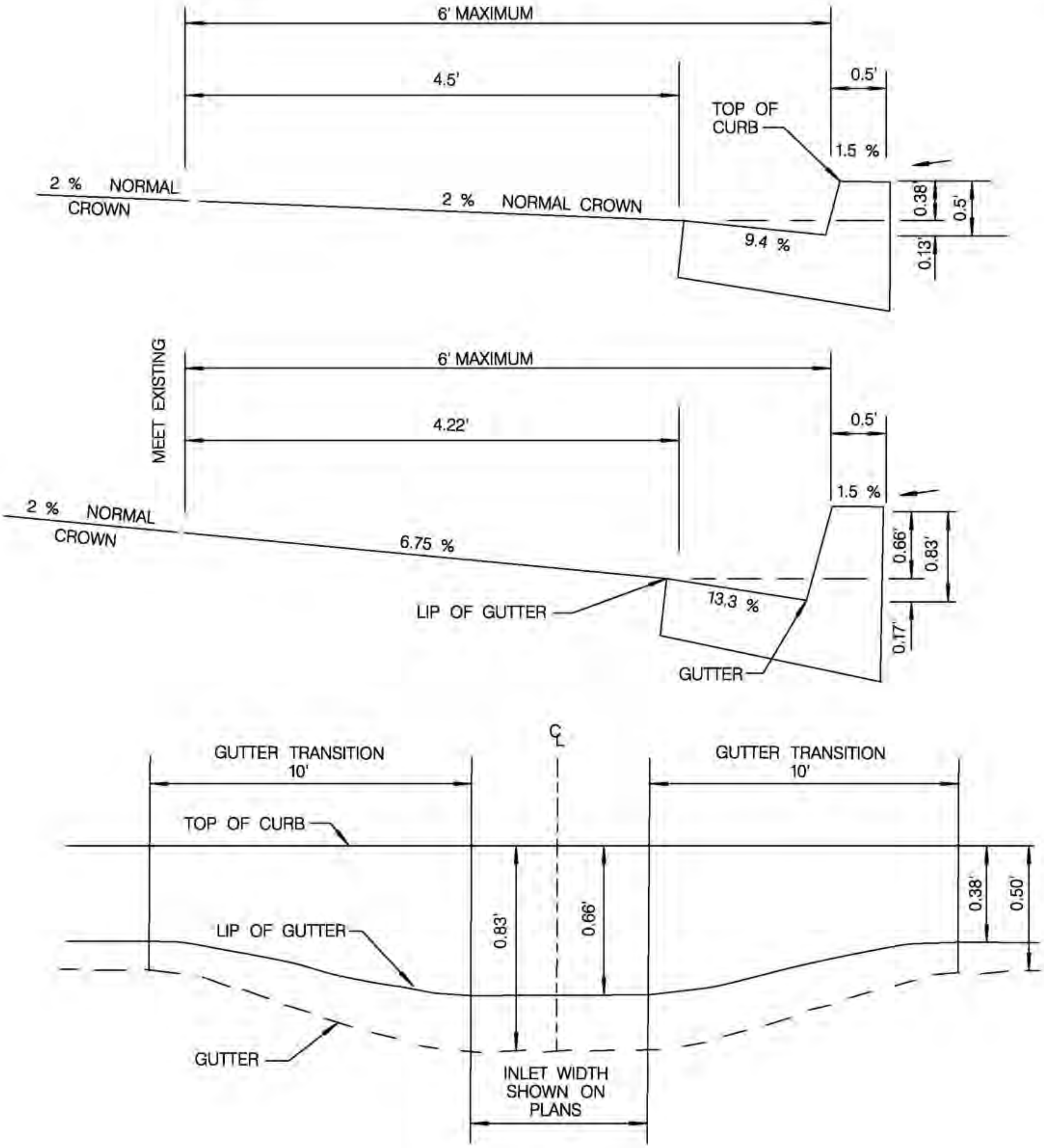
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

SIDEWALK JOINT LOCATIONS

DRAWING NUMBER **SDG-109**



ELEVATION

G CURB PROFILE – INLET TRANSITION

SHEET 1 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	11/88
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

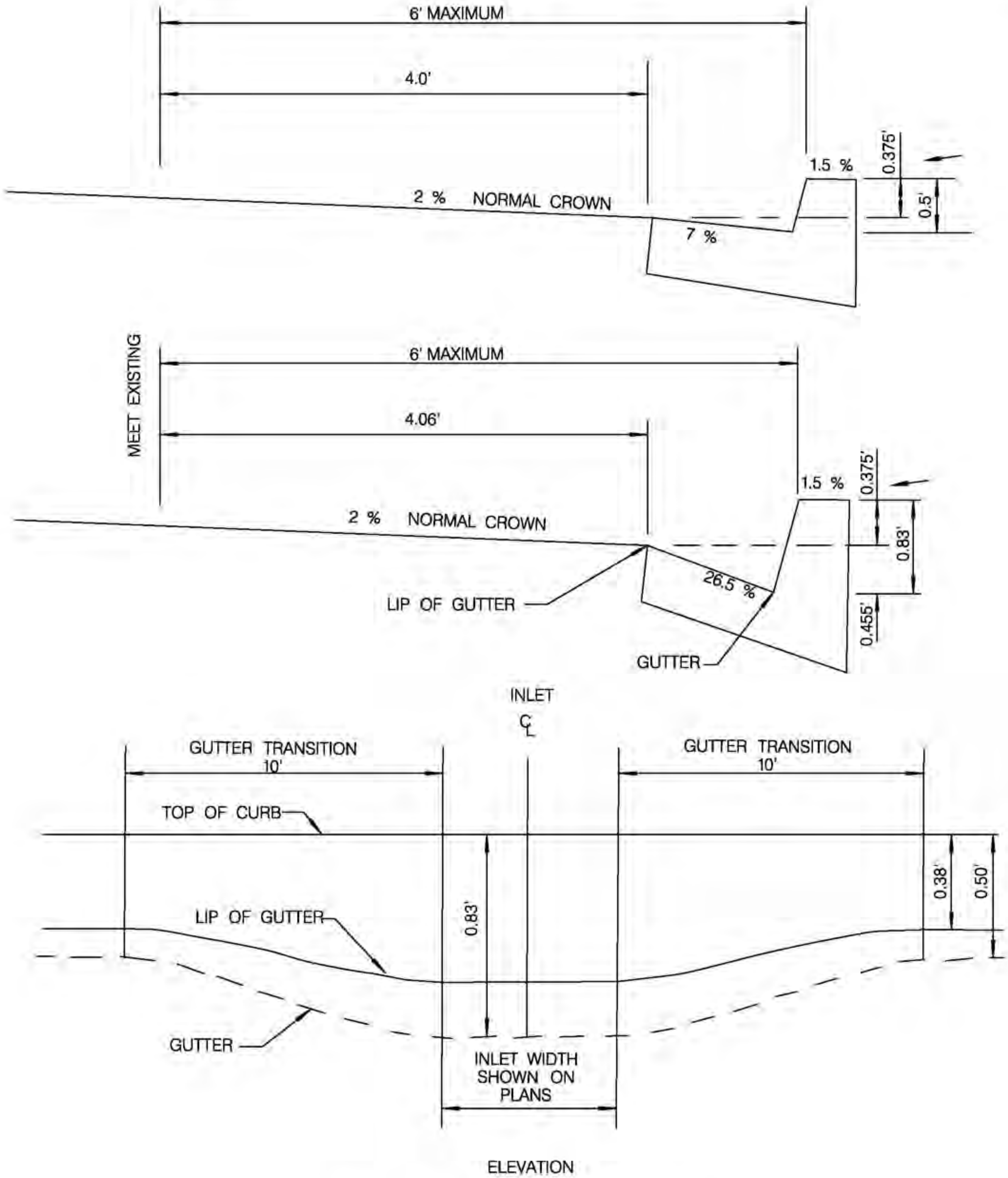
INLET TRANSITION PROFILE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hadi 1/31/2012

COORDINATOR R.C.E. 65271 DATE

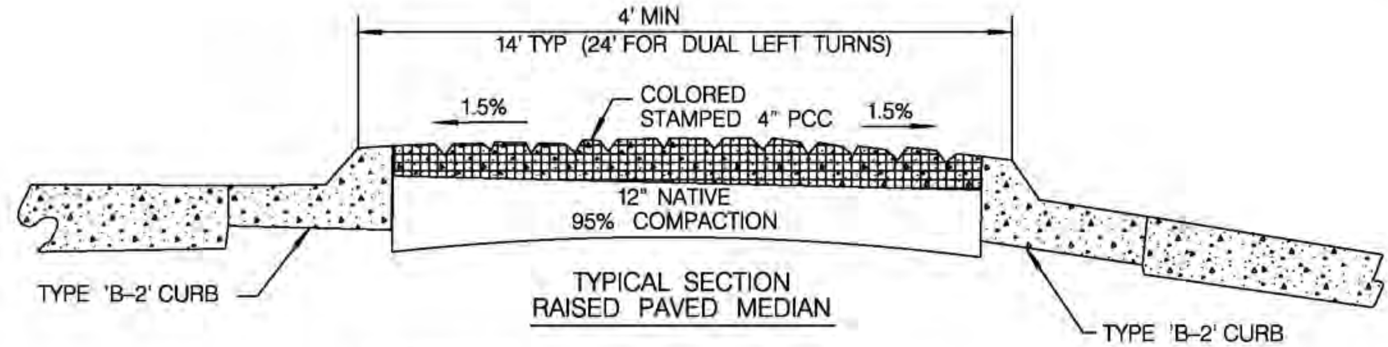
DRAWING NUMBER **SDG-110**



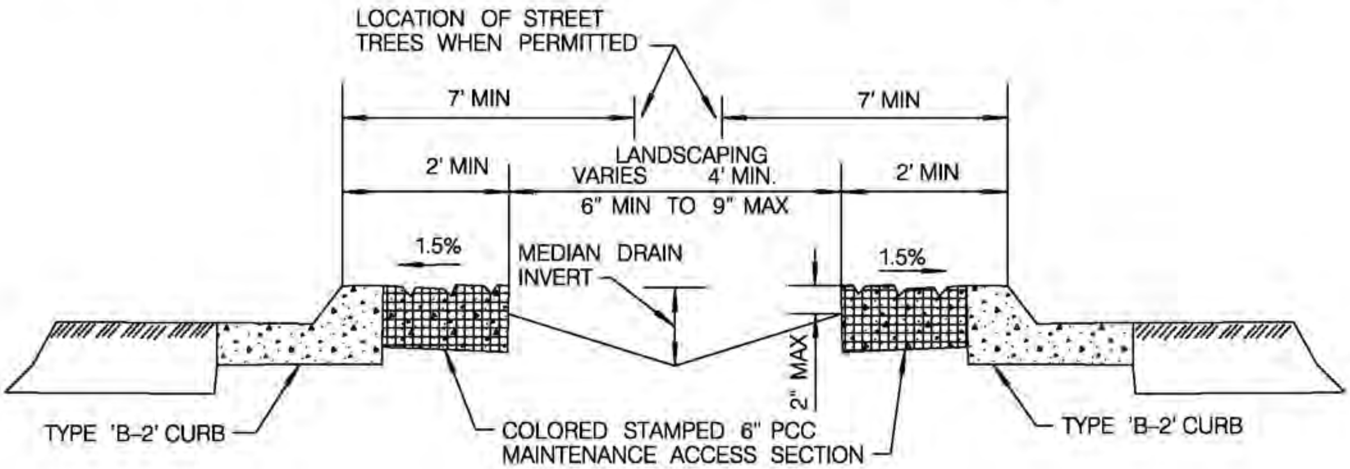
H CURB PROFILE – INLET TRANSITION

SHEET 2 OF 2

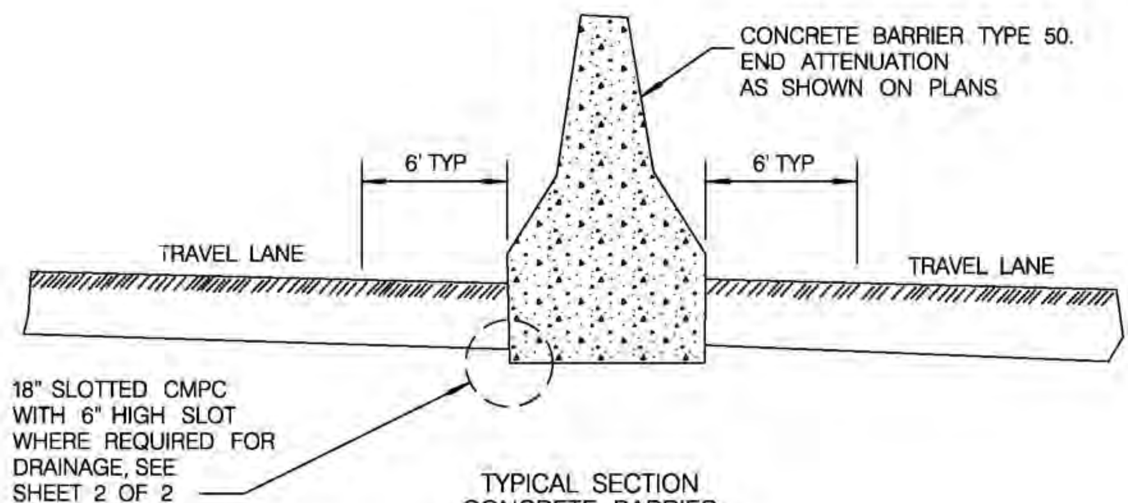
REVISION	BY	APPROVED	DATE	CITY OF SAN DIEGO – STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
ORIGINAL		J. CASEY	11/88		1/31/2012
UPDATED	KA	J. NAGELVOORT	01/12	**INLET TRANSITION PROFILE**	COORDINATOR R.C.E. 65271 DATE
					DRAWING NUMBER **SDG-110**



TYPICAL SECTION
RAISED PAVED MEDIAN



TYPICAL SECTION
LANDSCAPED MEDIAN



TYPICAL SECTION
CONCRETE BARRIER

NOTES:

1. CONCRETE SHALL BE 520-C-2500.

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

3. CONCRETE COLOR SHALL BE INTERGRATED THROUGHOUT.

REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	11/88
UPDATED	KA	J. NAGELVOORT	01/12

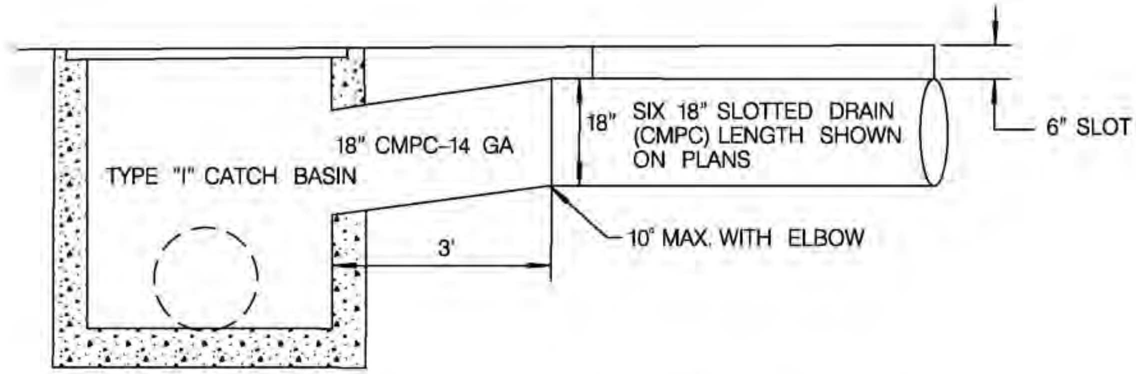
CITY OF SAN DIEGO - STANDARD DRAWING

RAISED CENTER MEDIAN

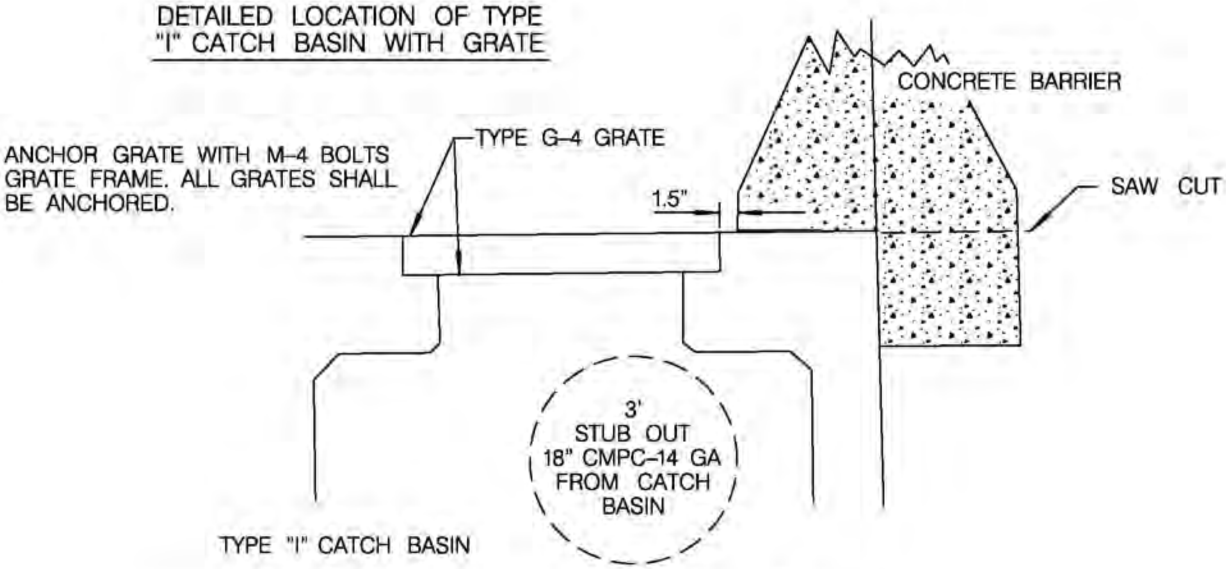
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

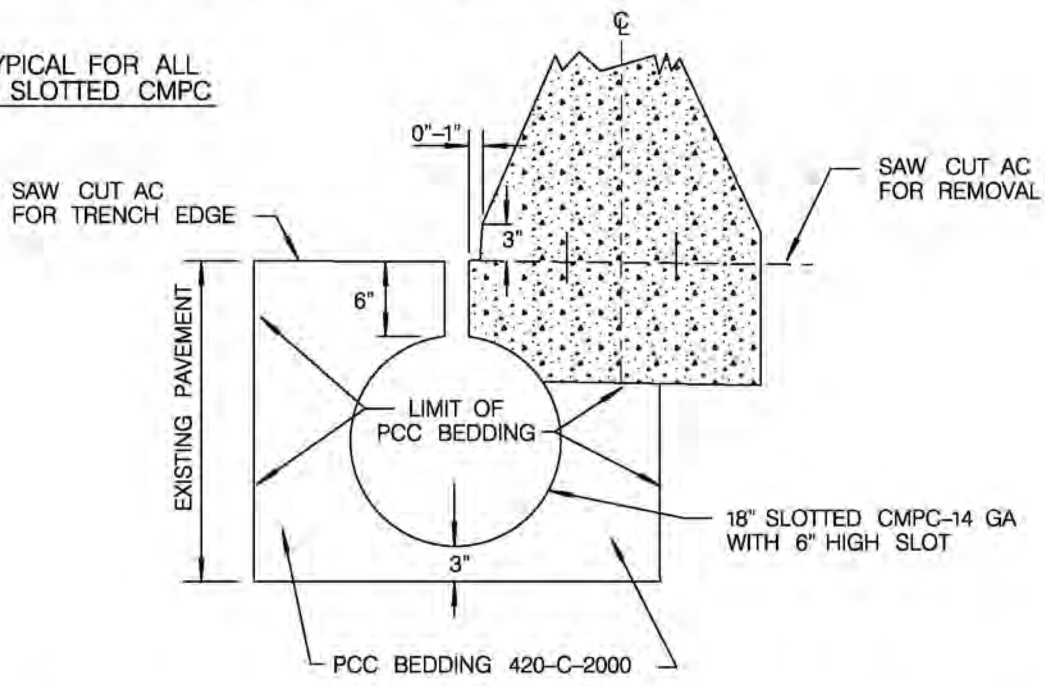
DRAWING NUMBER **SDG-112**



DETAILED LOCATION OF TYPE "I" CATCH BASIN WITH GRATE



TYPICAL FOR ALL 18" SLOTTED CMPC



SHEET 2 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	11/88
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

RAISED CENTER MEDIAN

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Haali 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-112**

SCHEDULE "J" PAVEMENT

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

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

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

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

4. 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.

REVISION	BY	APPROVED	DATE
ORIGINAL		M.ROLLINGER	05/92
NOTES		G. PARKINSON	02/95
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

PAVEMENT DESIGN STANDARDS

SCHEDULE "J"

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-113**

STREET CLASSIFICATION	MAX ADT	MAX TRAFFIC INDEX	"R" VALUE	STANDARD SECTIONS		CONCRETE M.O.R. 600 MIN		FULL DEPTH
				A.C. (IN)	CTB (IN)	PCC (IN)	CTB (IN)	A.C. (IN)
CUL-DE-SAC	200	5.0		3.0	5.0	6.0	—	4.5
LOCAL (L.V.R.)	700	5.5		3.0	5.0	6.5	—	5.0
LOCAL (RES.)	1200	6.0		3.0	5.0	6.5	—	5.5
LOCAL (RES.)	2200	6.5		3.0	5.0	6.5	—	6.0
LOCAL (IND.)	2000	8.5		3.0	7.5	7.5	—	8.5
COLLECTOR (RES.)	3500	7.0	50.0 OR	3.0	5.0	7.0	—	6.5
COLLECTOR (RES.)	5000	7.5	GREATER	3.0	5.5	7.0	—	7.5
COLLECTOR (COMM.\IND.)	5000	9.5		3.0	8.5	7.5	—	9.0
COLLECTOR (NO FRT)	7500	8.0		3.0	6.5	7.0	—	8.0
COLLECTOR	15000	9.0		3.0	7.5	7.5	—	8.5
MAJOR (4-LANE)	30000	10.5		3.0	10.0	8.0	—	10.5
MAJOR (6-LANE)	40000	11.0		3.5	10.5	8.0	—	11.0
PRIMARY ARTERIAL	50000	11.5		3.5	11.5	8.0	—	11.5
EXPRESSWAY	60000	12.0		3.5	11.5	8.5	—	12.0
EXPRESSWAY	80000	12.5		4.0	12.0	8.5	—	12.5
EXPRESSWAY	100000	13.0		4.0	12.5	9.0	—	13.0

STREET CLASSIFICATION	MAX ADT	MAX TRAFFIC INDEX	"R" VALUE	STANDARD SECTIONS		CONCRETE M.O.R. 600 MIN		FULL DEPTH
				A.C. (IN)	CTB (IN)	PCC (IN)	CTB (IN)	A.C. (IN)
CUL-DE-SAC	200	5.0		3.0	5.0	6.5	—	5.0
LOCAL (L.V.R.)	700	5.5		3.0	5.0	6.5	—	6.0
LOCAL (RES.)	1200	6.0		3.0	5.5	7.0	—	6.5
LOCAL (RES.)	2200	6.5		3.0	6.0	7.0	—	7.0
LOCAL (IND.)	2000	8.5		3.0	9.5	7.5	—	9.5
COLLECTOR (RES.)	3500	7.0	40.0 TO	3.0	6.5	7.0	—	8.0
COLLECTOR (RES.)	5000	7.5	49.9	3.0	7.5	7.5	—	8.5
COLLECTOR (COMM.\IND.)	5000	9.5		3.0	11.0	8.0	—	11.0
COLLECTOR (NO FRT)	7500	8.0		3.0	8.5	7.5	—	9.0
COLLECTOR	15000	9.0		3.0	10.5	8.0	—	10.0
MAJOR (4-LANE)	30000	10.5		3.5	12.5	8.5	—	12.0
MAJOR (6-LANE)	40000	11.0		4.0	12.5	8.5	—	12.5
PRIMARY ARTERIAL	50000	11.5		4.0	13.5	9.0	—	13.0
EXPRESSWAY	60000	12.0		4.5	13.5	9.0	—	13.5
EXPRESSWAY	80000	12.5		4.5	14.5	9.5	—	14.0
EXPRESSWAY	100000	13.0		5.0	15.0	10.0	—	15.0

REVISION	BY	APPROVED	DATE
ORIGINAL		M.ROLLINGER	05/92
NOTES		G. PARKINSON	02/95
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

PAVEMENT DESIGN STANDARDS SCHEDULE "J"

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-113**

STREET CLASSIFICATION	MAX ADT	MAX TRAFFIC INDEX	"R" VALUE	STANDARD SECTIONS		CONCRETE M.O.R. 600 MIN		FULL DEPTH
				A.C. (IN)	CTB (IN)	PCC (IN)	CTB (IN)	A.C. (IN)
CUL-DE-SAC	200	5.0	30.0 TO 39.9	3.0	5.0	6.5	—	6.0
LOCAL (L.V.R.)	700	5.5		3.0	5.5	7.0	—	6.5
LOCAL (RES.)	1200	6.0		3.0	6.5	7.0	—	7.0
LOCAL (RES.)	2200	6.5		3.0	7.5	7.0	—	8.0
LOCAL (IND.)	2000	8.5		3.0	11.5	8.0	—	10.5
COLLECTOR (RES.)	3500	7.0		3.0	8.5	7.5	—	8.5
COLLECTOR (RES.)	5000	7.5		3.0	9.5	7.5	—	9.0
COLLECTOR (COMM.\IND.)	5000	9.5		3.5	13.0	8.5	—	12.0
COLLECTOR (NO FRT)	7500	8.0		3.0	10.5	7.5	—	10.0
COLLECTOR	15000	9.0		3.5	12.0	8.0	—	11.0
MAJOR (4-LANE)	30000	10.5		4.0	14.5	8.5	—	13.5
MAJOR (6-LANE)	40000	11.0		4.5	15.0	9.0	—	14.0
PRIMARY ARTERIAL	50000	11.5		5.0	15.5	9.0	—	14.5
EXPRESSWAY	60000	12.0		5.0	16.5	9.5	—	15.0
EXPRESSWAY	80000	12.5		5.5	17.0	9.5	—	16.0
EXPRESSWAY	100000	13.0		6.0	17.0	10.0	—	17.0

STREET CLASSIFICATION	MAX ADT	MAX TRAFFIC INDEX	"R" VALUE	STANDARD SECTIONS		CONCRETE M.O.R. 600 MIN		FULL DEPTH
				A.C. (IN)	CTB (IN)	PCC (IN)	CTB (IN)	A.C. (IN)
CUL-DE-SAC	200	5.0	20.0 TO 29.9	3.0	5.5	7.0	—	6.5
LOCAL (L.V.R.)	700	5.5		3.0	7.0	7.0		7.5
LOCAL (RES.)	1200	6.0		3.0	8.0	7.0	—	8.0
LOCAL (RES.)	2200	6.5		3.0	9.0	7.5	—	8.5
LOCAL (IND.)	2000	8.5		3.5	13.0	8.0	—	11.5
COLLECTOR (RES.)	3500	7.0		3.0	10.0	7.5	—	9.0
COLLECTOR (RES.)	5000	7.5		3.0	11.5	7.5	—	10.0
COLLECTOR (COMM.\IND.)	5000	9.5		4.0	15.0	8.5	—	13.0
COLLECTOR (NO FRT)	7500	8.0		3.5	12.0	8.0	—	11.0
COLLECTOR	15000	9.0		4.0	13.5	8.5	—	12.0
MAJOR (4-LANE)	30000	10.5		5.0	16.0	8.5	5.0	14.5
MAJOR (6-LANE)	40000	11.0		5.0	17.0	8.5	5.0	15.5
PRIMARY ARTERIAL	50000	11.5		5.5	17.5	9.0	5.0	16.0
EXPRESSWAY	60000	12.0		6.0	18.0	9.0	5.0	17.0
EXPRESSWAY	80000	12.5		6.0	19.5	8.5	5.0	17.5
EXPRESSWAY	100000	13.0		6.5	20.0	10.0	5.0	18.5

REVISION	BY	APPROVED	DATE
ORIGINAL		M.ROLLINGER	05/92
NOTES		G. PARKINSON	02/95
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

PAVEMENT DESIGN STANDARDS
SCHEDULE "J"

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDG-113**

STREET CLASSIFICATION	MAX ADT	MAX TRAFFIC INDEX	"R" VALUE	STANDARD SECTIONS		CONCRETE M.O.R. 600 MIN		FULL DEPTH
				A.C. (IN)	CTB (IN)	PCC (IN)	CTB (IN)	A.C. (IN)
CUL-DE-SAC	200	5.0		3.0	7.0	7.0	—	7.5
LOCAL (L.V.R.)	700	5.5		3.0	8.0	7.0	—	8.0
LOCAL (RES.)	1200	6.0		3.0	9.0	7.5	—	8.5
LOCAL (RES.)	2200	6.5		3.0	10.5	7.5	—	9.0
LOCAL (IND.)	2000	8.5		4.0	14.5	8.0	5.0	12.5
COLLECTOR (RES.)	3500	7.0	10.0 TO	3.0	12.0	7.5	—	10.0
COLLECTOR (RES.)	5000	7.5	19.9	3.5	12.5	8.0	—	11.0
COLLECTOR (COMM.\IND.)	5000	9.5		4.5	16.5	8.5	5.0	14.0
COLLECTOR (NO FRT)	7500	8.0		3.5	14.0	8.0	—	11.5
COLLECTOR	15000	9.0		4.5	15.0	8.0	5.0	13.0
MAJOR (4-LANE)	30000	10.5		5.5	18.0	8.5	6.0	15.5
MAJOR (6-LANE)	40000	11.0		6.0	18.5	9.0	6.0	16.5
PRIMARY ARTERIAL	50000	11.5		6.0	20.0	9.0	6.0	17.5
EXPRESSWAY	60000	12.0		6.5	20.5	9.0	6.0	18.5
EXPRESSWAY	80000	12.5		7.0	21.5	9.5	6.0	19.0
EXPRESSWAY	100000	13.0		7.5	22.5	10.0	6.0	20.0

STREET CLASSIFICATION	MAX ADT	MAX TRAFFIC INDEX	"R" VALUE	STANDARD SECTIONS		CONCRETE M.O.R. 600 MIN		FULL DEPTH
				A.C. (IN)	CTB (IN)	PCC (IN)	CTB (IN)	A.C. (IN)
CUL-DE-SAC	200	5.0		3.0	8.0	7.0	—	8.5
LOCAL (L.V.R.)	700	5.5		3.0	9.5	7.5	—	9.0
LOCAL (RES.)	1200	6.0		3.0	10.5	7.5	—	9.5
LOCAL (RES.)	2200	6.5		3.0	12.5	7.5	—	10.5
LOCAL (IND.)	2000	8.5		4.5	16.0	8.0	5.0	14.0
COLLECTOR (RES.)	3500	7.0	0.0 TO	3.5	13.0	7.5	—	11.5
COLLECTOR (RES.)	5000	7.5	9.9	3.5	14.5	8.0	—	12.5
COLLECTOR (COMM.\IND.)	5000	9.5		5.0	18.5	8.5	6.0	15.5
COLLECTOR (NO FRT)	7500	8.0		4.0	15.5	8.0	5.0	13.0
COLLECTOR	15000	9.0		5.0	17.0	8.5	5.0	14.5
MAJOR (4-LANE)	30000	10.5		6.0	20.0	9.0	6.0	17.5
MAJOR (6-LANE)	40000	11.0		6.5	21.0	9.0	6.0	18.5
PRIMARY ARTERIAL	50000	11.5		7.0	22.0	9.0	6.0	19.5
EXPRESSWAY	60000	12.0		7.0	23.0	9.5	6.0	20.5
EXPRESSWAY	80000	12.5		7.5	24.0	10.0	6.0	21.5
EXPRESSWAY	100000	13.0		8.0	25.0	10.5	6.0	22.0

REVISION	BY	APPROVED	DATE
ORIGINAL		M.ROLLINGER	05/92
NOTES		G. PARKINSON	02/95
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

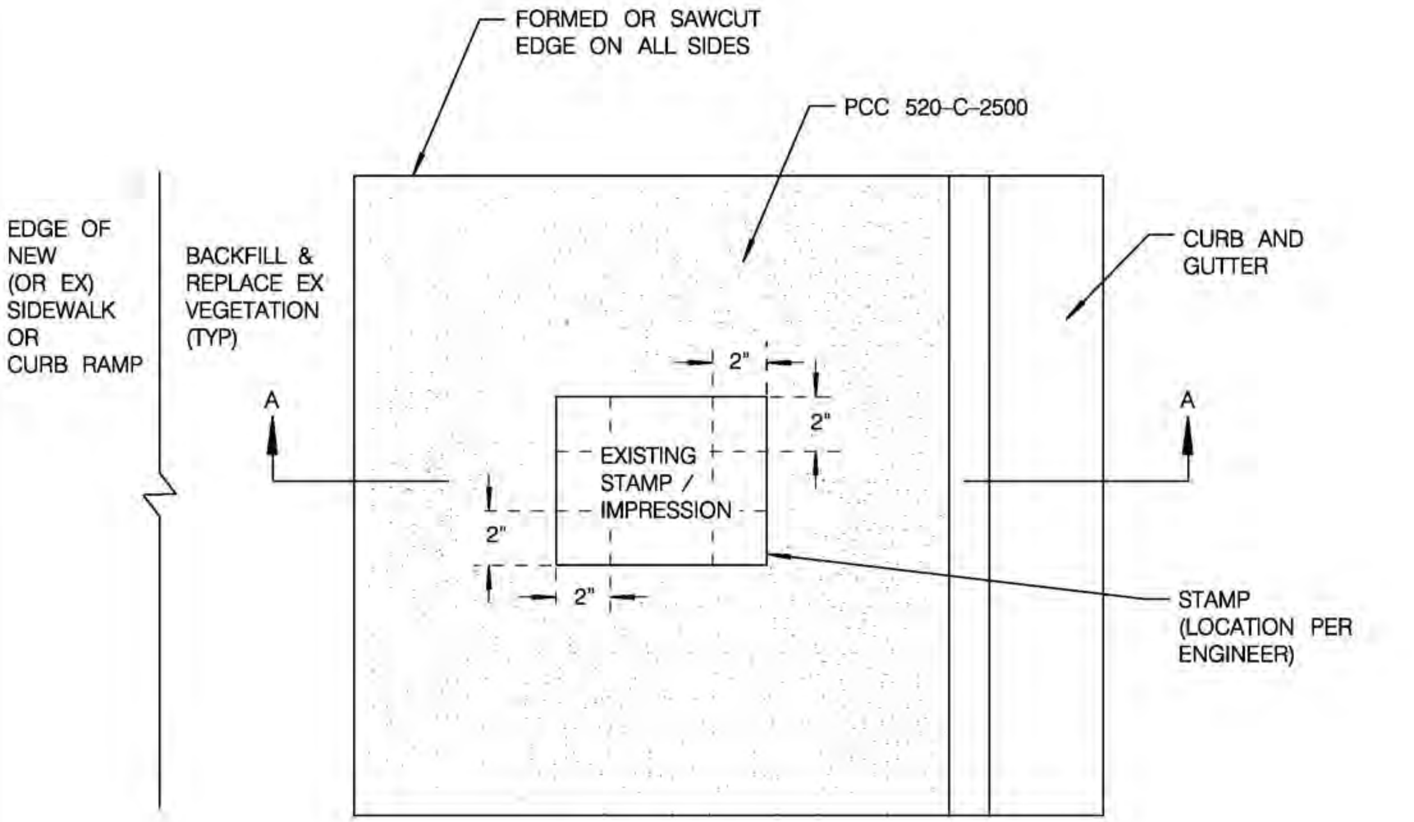
PAVEMENT DESIGN STANDARDS
SCHEDULE "J"

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

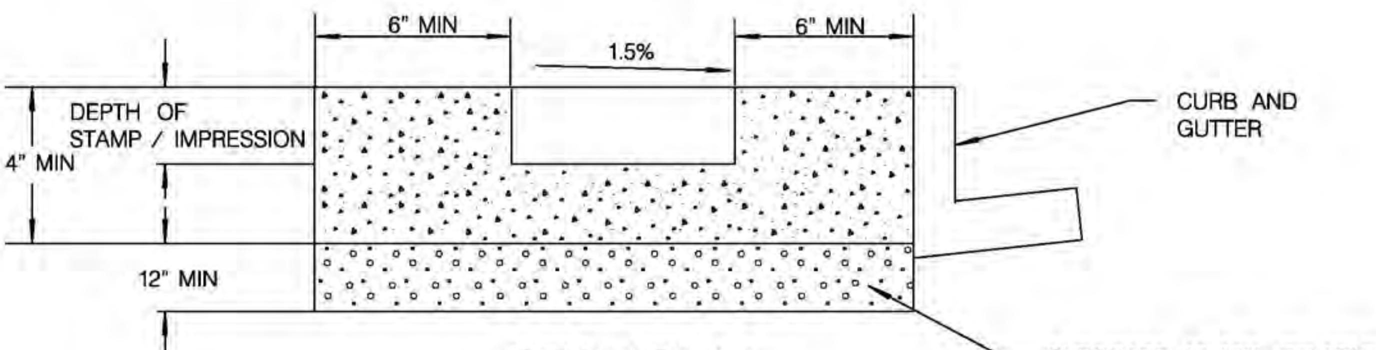
H. Hoshi 1/31/2012

COORDINATOR R.C.E. 85271 DATE

DRAWING NUMBER **SDG-113**



PLAN VIEW



SECTION VIEW A–A

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.

REVISION	BY	APPROVED	DATE
ORIGINAL	NZ	J. SHOAF	8/00
DETAIL	SM	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

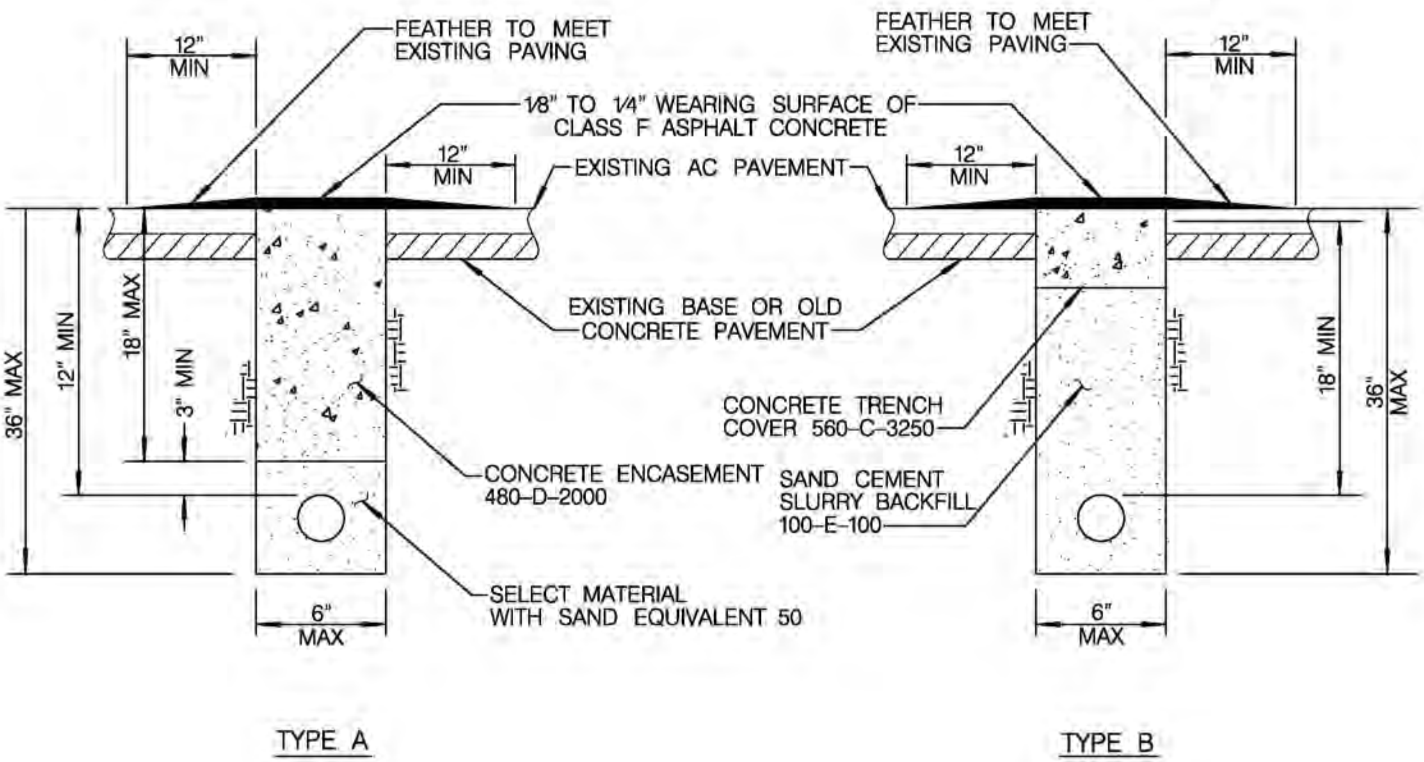
EXISTING HISTORICAL STAMP OR IMPRESSION PLACEMENT

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Haale 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-115**



NOTES:

1. CONCRETE ENCASEMENT OR SAND CEMENT SLURRY BACKFILL SHALL HAVE A MINIMUM SLUMP OF 4".
2. CONCRETE ENCASEMENT AND SAND CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED TO ENCASE CONDUITS. TAMPERS OR VIBRATORS SHALL BE USED.
3. CONCRETE SHALL BE SCREEDED OFF TO MATCH PAVEMENT GRADE AND FLOATED TO ASSURE PROPER EDGE MATCH.
4. A TACK COAT SHALL BE APPLIED TO THE CONCRETE AND EXISTING ASPHALT PAVEMENT PRIOR TO PLACEING THE NEW ASPHALT PAVEMENT WEARING SURFACE.
5. EXISTING A.C. PAVEMENT WILL NOT REQUIRE SAW CUTTING WHEN USING ROCKWHEEL FOR EXCAVATION.
6. CONCRETE TRENCH COVER SHALL BE A MINIMUM 5 1/2" THICK IN ALLEYS OR LOCAL RESIDENTIAL STREETS, AND 7" THICK IN LOCAL THROUGH 4-LANE COLLECTORS AND 9" FOR MAJOR OR GREATER.
7. ALLOW CONCRETE BACKFILL OR CONCRETE TRENCH COVER 7 CALENDAR DAYS MINIMUM. BUT NO LONGER THAN 30 CALENDAR DAYS TO CURE AND DRY BEFORE APPLYING THE ASPHALT CONCRETE WEARING SURFACE.
8. IN MAJOR OR PRIME ARTERIAL STREETS, AN APPROVED SET ACCELERATING ADMIXTURE, SUCH AS CALCIUM CHLORIDE, SHALL BE USED.
9. ONLY TYPE A SHALL BE PERMITTED FOR SUPPLY CABLES OF 750 VOLTS OR LESS. SEE CALIFORNIA PUBLIC UTILITY COMMISSION GENERAL ORDER NO. 128, RULE 33.4 D.(1)(b).

REVISION	BY	APPROVED	DATE
ORIGINAL	NZ	BAHMANIAN	04/86
		A. OSKOUI	12/03
TITLE BLOCK		A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

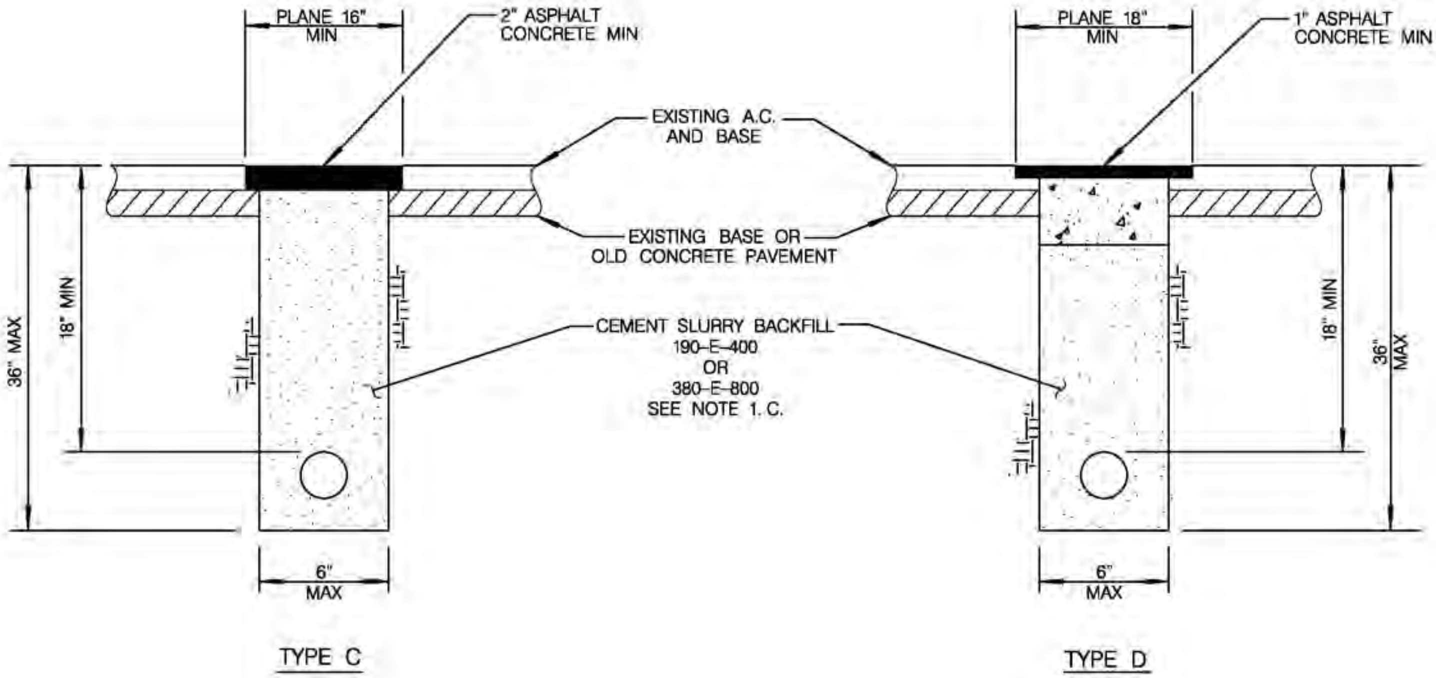
NARROW TRENCHING TYPES A & B BACKFILL & RESURFACING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-116**



NOTES:

1. CEMENT SLURRY BACKFILL:
   A. CEMENT SLURRY BACKFILL SHALL HAVE A MAXIMUM SLUMP OF 4 INCHES.
   B. CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED TO ENCASE CONDUITS.
   C. CEMENT SLURRY BACKFILL SHALL BE AS FOLLOWS:
      ALLEYS AND LOCAL RESIDENTIAL STREETS.....CLASS 190-E-400
      ALL OTHER STREETS...................CLASS 380-E-800

2. A TACK COAT SHALL BE APPLIED TO THE CEMENT SLURRY BACKFILL AND EXISTING ASPHALT PAVEMENT PRIOR TO PLACING THE NEW ASPHALT SURFACE.

3. ASPHALTIC CONCRETE RESURFACING:
   TYPE C
   A. ALLOW CEMENT SLURRY BACKFILL 48 HOURS MINIMUM TO CURE BEFORE RESURFACING, UNLESS APPROVED BY THE ENGINEER.
   B. THICKNESS SHALL MATCH THE EXISTING AC WITH A MINIMUM OF 2".
   C. AC SHALL BE HOT MIX.
   TYPE D
   A. ALLOW CEMENT SLURRY BACKFILL SEVEN DAYS MINIMUM TO CURE BEFORE MILLING.
   B. MILL EXISTING ASPHALT PAVEMENT AND SLURRY BACKFILL, ONE HALF THICKNESS OF EXISTING AC, (1" MINIMUM NOT TO EXCEED 2").
   C. AC SHALL BE HOT MIX.

4. A.C. RESURFACING SHALL BE SEALED OR CHIP SEALED WHEN SPECIFIED.

5. EXISTING A.C. PAVEMENT WILL NOT REQUIRE SAWCUTTING WHEN USING ROCKWHEEL FOR EXCAVATION.

REVISION	BY	APPROVED	DATE
ORIGINAL		BAHMANIAN	04/86
		A. OSKOUI	12/03
TITLE BLOCK		A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

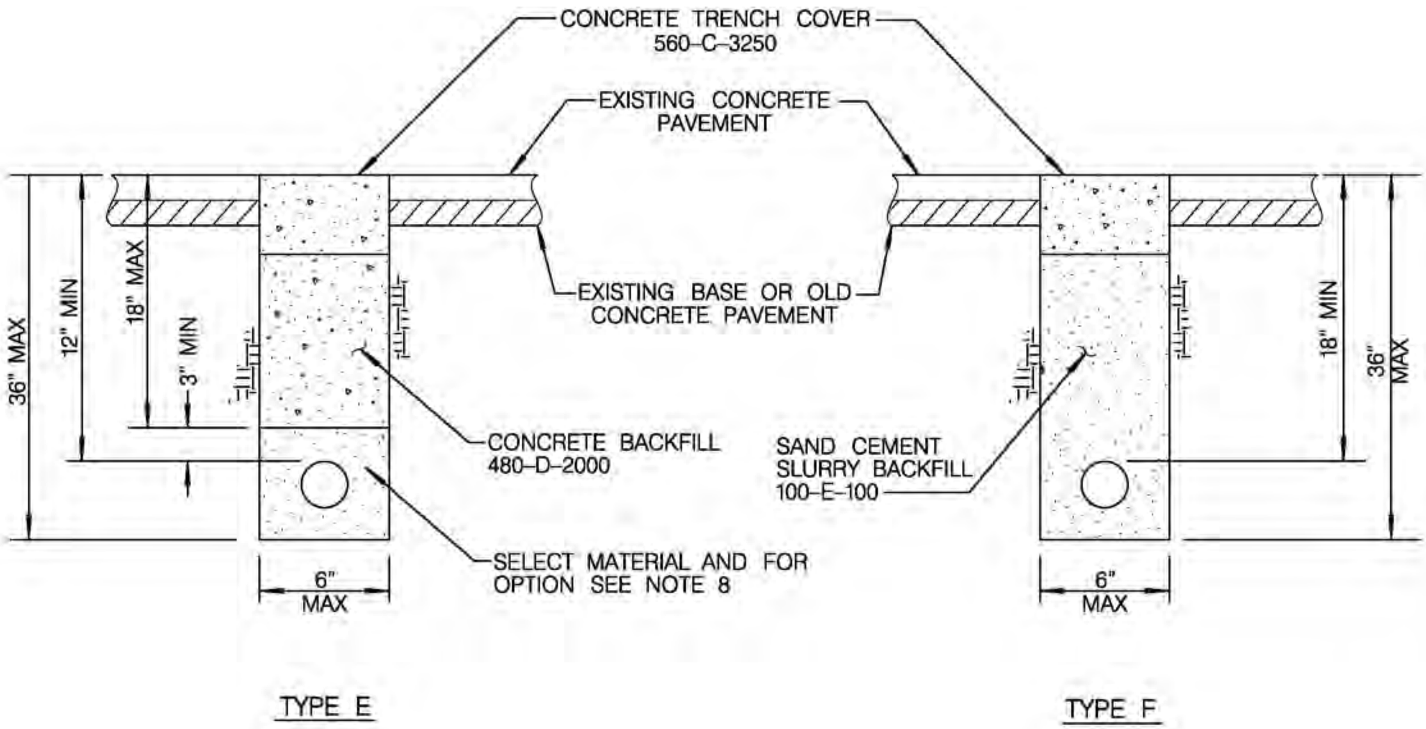
NARROW TRENCHING TYPES C & D
BACKFILL & RESURFACING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-117**



NOTES:

1. CONCRETE SLURRY BACKFILL SHALL HAVE A MAXIMUM SLUMP OF 4".
2. CEMENT SLURRY BACKFILL SHALL BE THOROUGHLY CONSOLIDATED TO ENCASE CONDUITS. TAMPERS OR VIBRATORS SHALL BE USED.
3. CONCRETE SHALL BE SCREEDED OFF TO MATCH EXISTING PAVEMENT GRADE AND FLOATED TO ASSURE PROPER EDGE MATCH.
4. 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.
5. EXISTING CONCRETE PAVEMENT WILL NOT REQUIRE SAWCUTTING WHEN USING ROCKWHEEL FOR EXCAVATION.
6. IN MAJOR OR PRIME ARTERIAL STREETS, AN APPROVED SET ACCELERATING ADMIXTURE, SUCH AS CALCIUM CHLORIDE, MAY BE USED ONLY WITH PRIOR APPROVAL OF THE ENGINEER.
7. ONLY TYPE E SHALL BE PERMITTED FOR SUPPLY CABLES OF 750 VOLTS OR LESS. SEE CALIFORNIA PUBLIC UTILITY COMMISSION GENERAL ORDER NO. 128, RULE 33.4 (1)(b).
8. SELECT MATERIAL WITH A MINIMUM SAND EQUIVALENT OF 50 SHALL BE BACKFILLED TO 3" MINIMUM ABOVE THE CONDUIT. SAND CEMENT SLURRY BACKFILL 100-E-100 MAY BE SUBSTITUTED FOR SELECT MATERIAL.

REVISION	BY	APPROVED	DATE
ORIGINAL		BAHMANIAN	04/86
		A. OSKOUI	12/03
TITLE BLOCK		A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

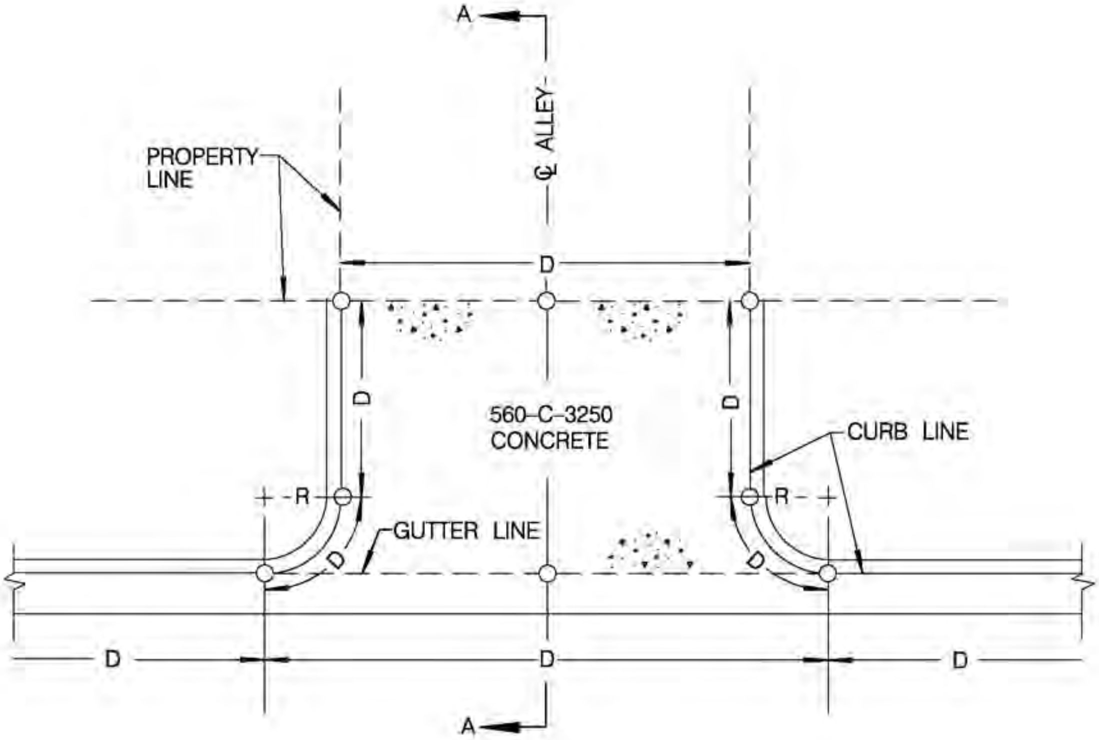
NARROW TRENCHING TYPES E & F
BACKFILL & RESURFACING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

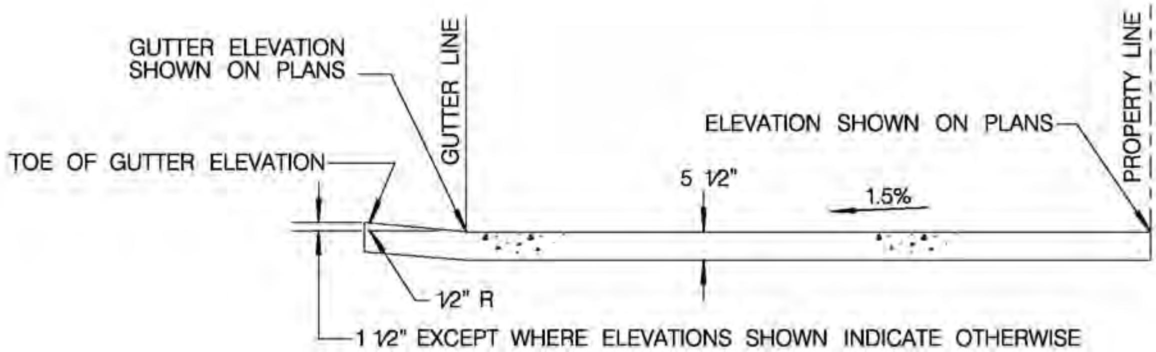
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-118**



PLAN

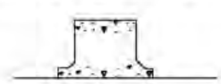


SECTION A–A

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 DETAILS.

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

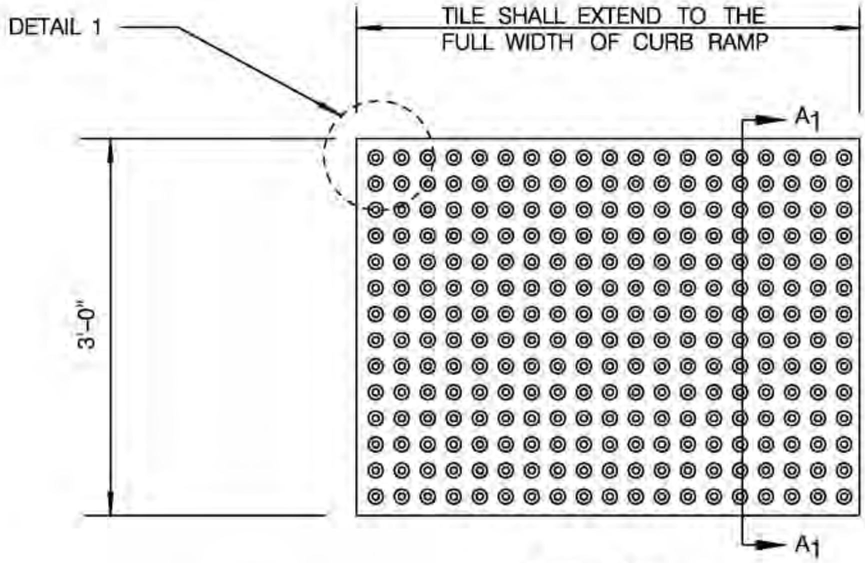
ALLEY APRON

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

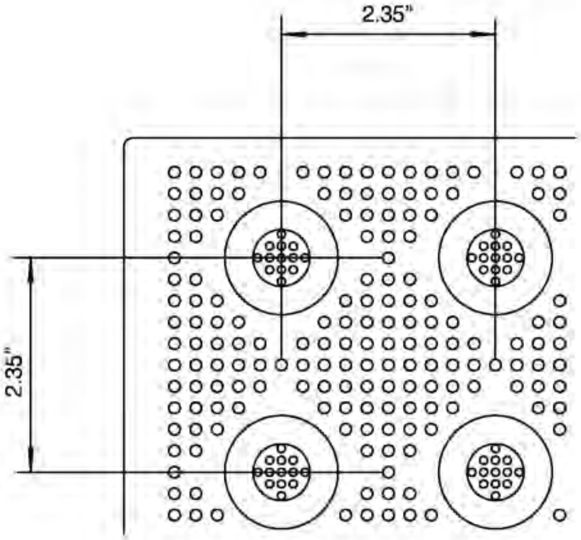
H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-120**



PLAN - TILE

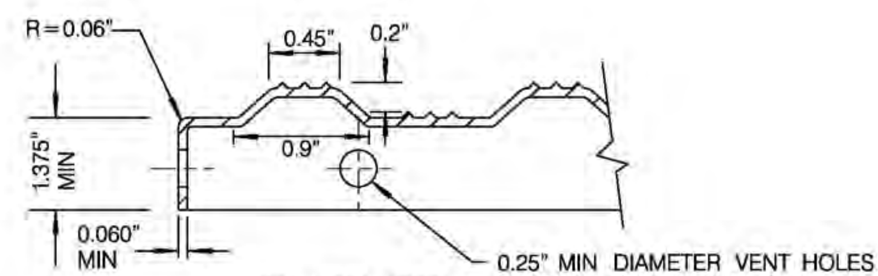


DETAIL 1

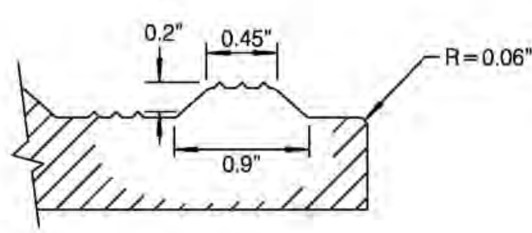
NOTES

1. THE DETECTABLE / TACTILE WARNING TILE SHALL BE SLIP RESISTANT AND CONSIST OF AN INLINE PATTERN OF RAISED TRUNCATED DOMES.

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



STAINLESS STEEL
SECTION A_1-A_1



COMPOSITE
SECTION A_1-A_1

DETECTABLE / TACTILE WARNING TILES

SHEET 1 OF 5

REVISION	BY	APPROVED	DATE
ORIGINAL	FC	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	FC	A. OSKOUI	02/07
UPDATE	FC	A. OSKOUI	12/08
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

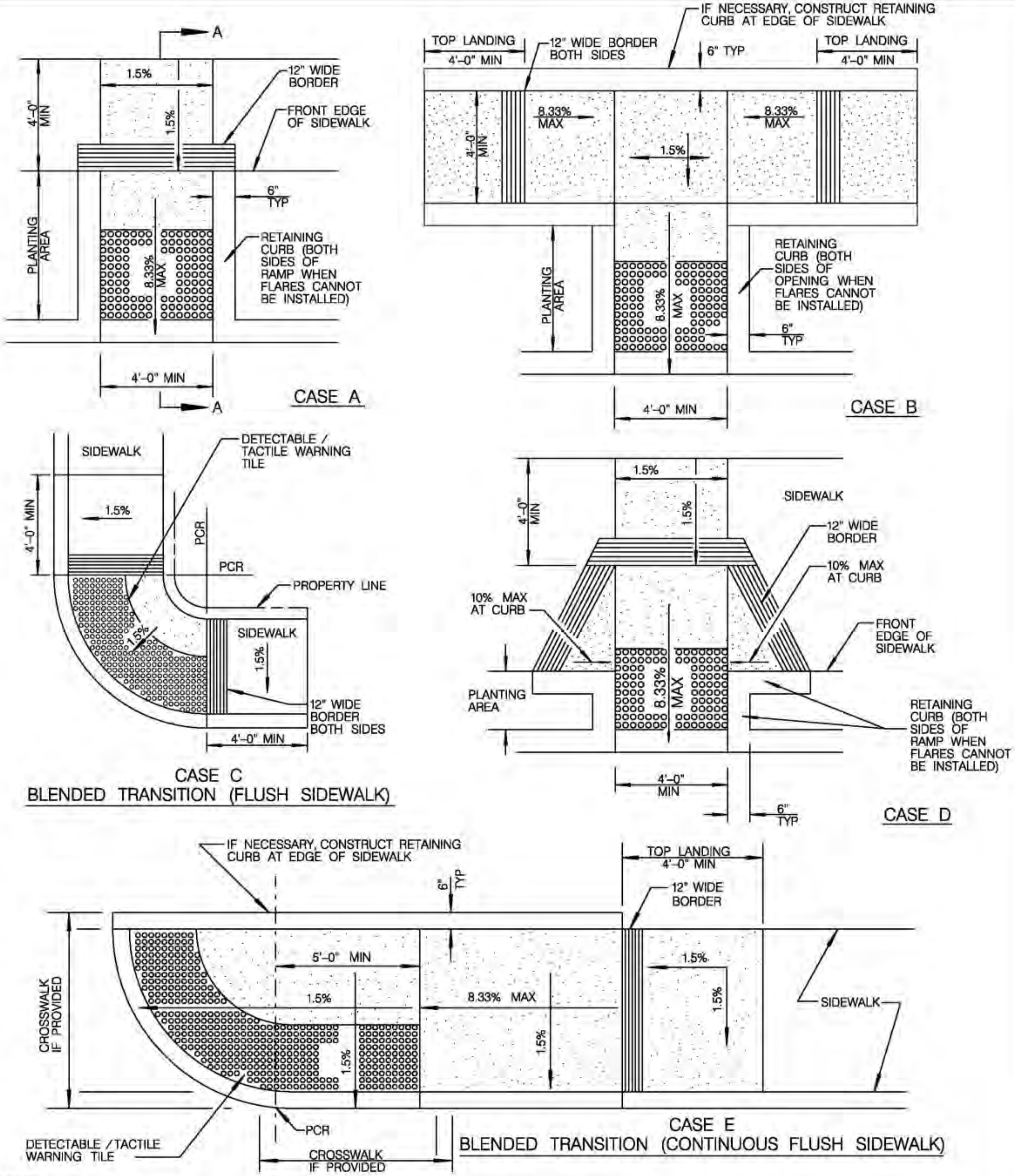
GENERAL CURB RAMP NOTES & SUPPLEMENTAL DETAILS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-130**



NOTE:

CASE A THRU E MAY BE USED ONLY WITH APPROVAL OF THE ENGINEER.

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	FC	A. OSKOUI	12/08
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

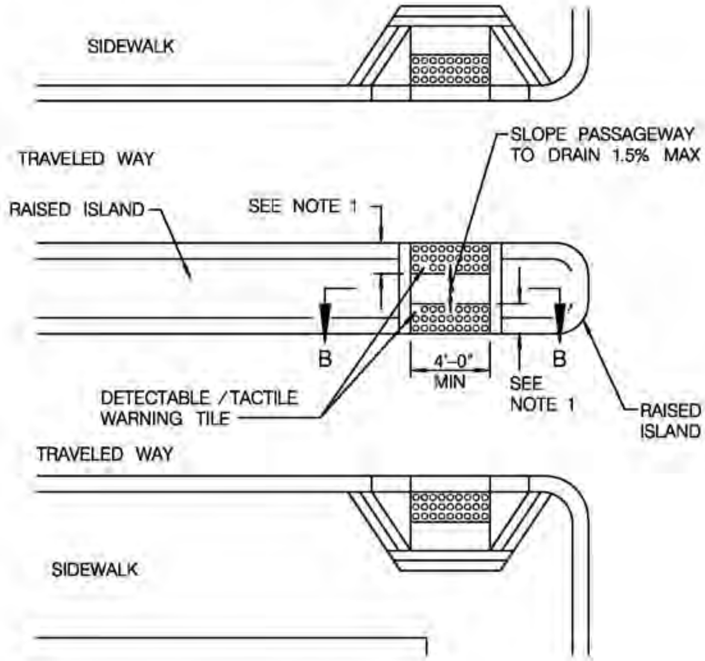
GENERAL CURB RAMP NOTES & SUPPLEMENTAL DETAILS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

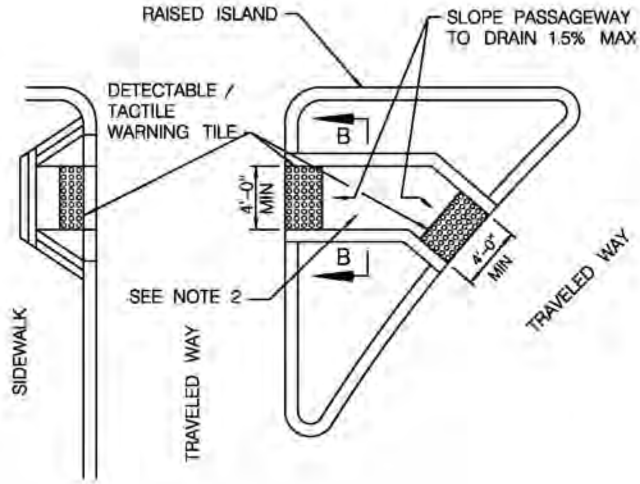
1/31/2012

COORDINATOR R.C.E. 65271 DATE

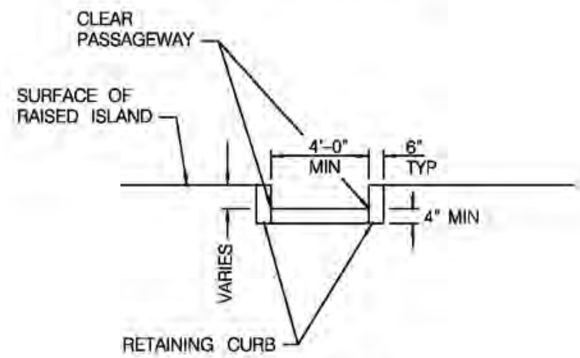
DRAWING NUMBER **SDG-130**



STRAIGHT PASSAGEWAY



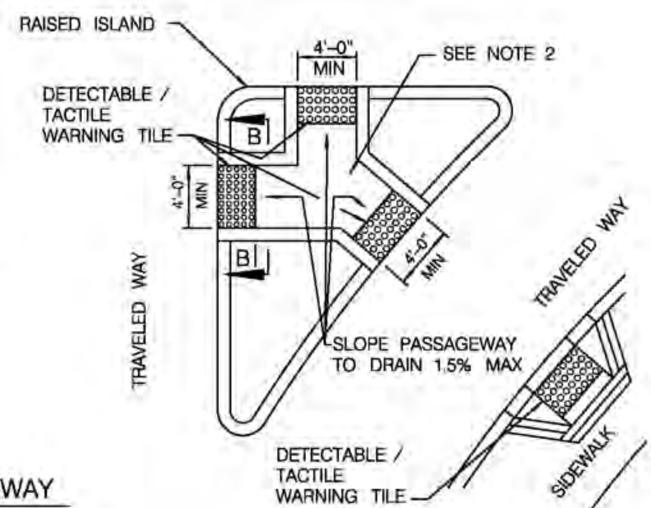
ANGULAR PASSAGEWAY



SECTION B-B

NOTES:

1. WHERE AN ISLAND PASSAGEWAY LENGTH IS LESS THAN OR EQUAL TO 8'-0", THE DETECTABLE / TACTILE WARNING TILE SHALL EXTEND THE FULL WIDTH AND FULL LENGTH OF THE PASSAGEWAY. WHERE AN ISLAND PASSAGEWAY LENGTH IS GREATER THAN 8'-0", A DETECTABLE / TACTILE WARNING TILE SHALL EXTEND THE FULL WIDTH AND 3'-0" DEPTH OF THE PASSAGEWAY LENGTH.
2. THE DETECTABLE / TACTILE WARNING TILES AT FLUSH REFUGE OR PASSAGEWAY SHALL BE IN LINE WITH MEDIAN EDGE.
3. FOR FLUSH ISLAND PASSAGEWAY, DETECTABLE WARNING TILE SHALL BE STAINLESS STEEL OR REPLACEABLE PANELS PLACED ON CONCRETE PASSAGEWAY.



TRIANGULAR PASSAGEWAY

ISLAND PASSAGEWAY

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	FC	A. OSKOUI	12/08
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

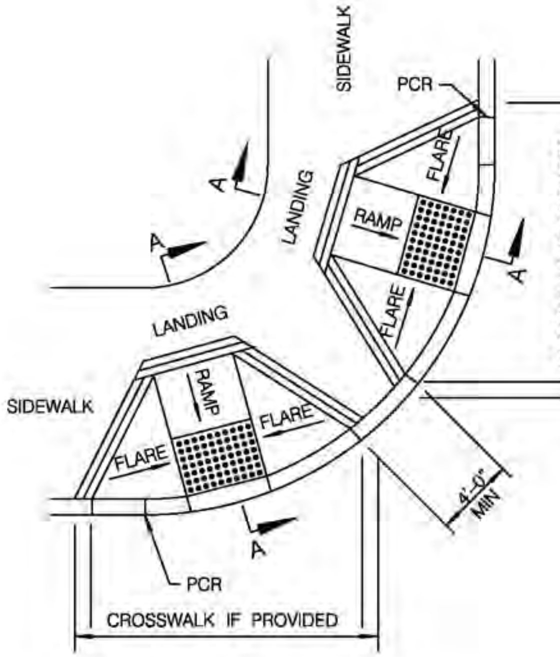
GENERAL CURB RAMP NOTES & SUPPLEMENTAL DETAILS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

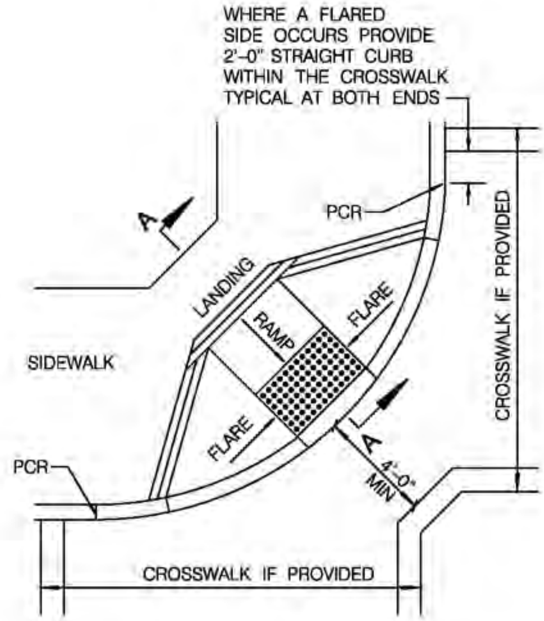
1/31/2012

COORDINATOR R.C.E. 65271 DATE

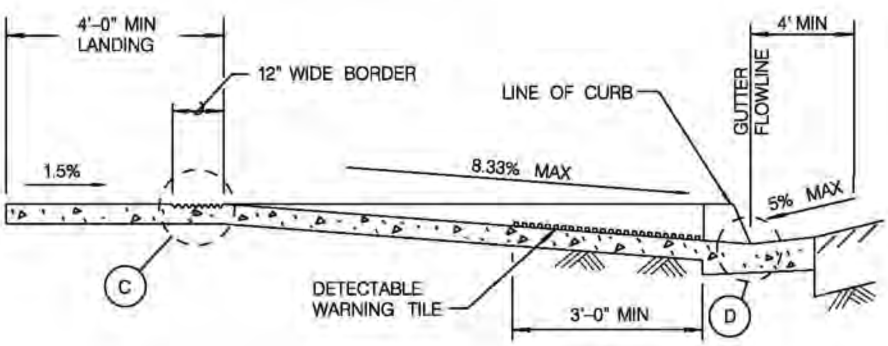
DRAWING NUMBER **SDG-130**



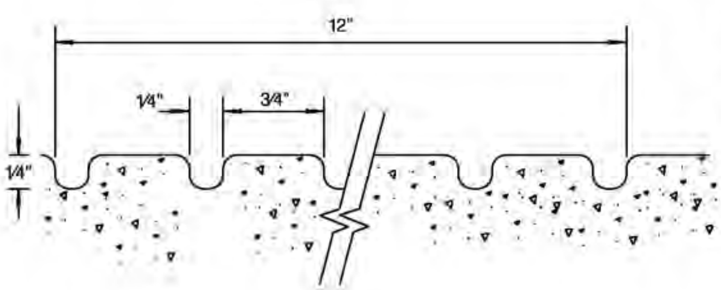
DETAIL A
TWO-RAMP CORNER INSTALLATION



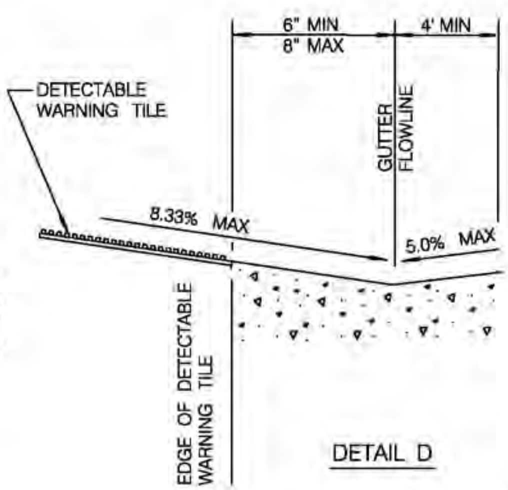
DETAIL B
TYPICAL ONE-RAMP
CORNER INSTALLATION



SECTION A–A



DETAIL C



DETAIL D

SHEET 4 OF 5

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	FC	A. OSKOUI	12/08
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

GENERAL CURB RAMP NOTES & SUPPLEMENTAL DETAILS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-130**

NOTES

1. AS SITE CONDITIONS DICTATE, 2 CURB RAMPS MAY BE USED FOR CORNER INSTALLATIONS SIMILAR TO THOSE SHOWN IN DETAIL A. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO THE APPLICATION OF CASES A THROUGH D SHEET 2 OF 5.

2. WHEN A CURB RAMP IS LOCATED IN THE CENTER OF THE CURB RETURN, CROSSWALK CONFIGURATION SHALL BE SIMILAR TO DETAIL B.

3. CURB RAMP SURFACES (FLARES AND RAMP) SHALL HAVE A MEDIUM TO HEAVY BROOM TEXTURED FINISH, PERPENDICULAR TO THE AXIS OF TRAVEL.

4. THE CURB RAMP SHALL BE OUTLINED WITH A 12" BORDER, WITH 1/4" GROOVES APPROXIMATELY 3/4" ON CENTER. SEE DETAIL C.

5. CURB RAMPS SHALL BE CONCRETE CLASS 520-C-2500.

6. INSTALL 1/4" EXPANSION JOINT FILLER MATERIAL BETWEEN A NEW CURB RAMP AND THE EXISTING SIDEWALKS.

7. TOOLED JOINT - PROVIDE 1/4" DEEP GROOVE WITH 1/4" RADIUS EDGES. GROVE SHALL NOT EXTEND TO BOTTOM CURB OR GUTTER.

8. IF OBSTRUCTIONS SUCH AS INLETS, POLES, FIRE HYDRANT, ETC., ARE ENCOUNTERED, THE RAMP LOCATION(S) MAY BE ADJUSTED ONLY UPON THE EVALUATION & APPROVAL OF THE ENGINEER.

9. TRANSITIONS FROM RAMPS TO WALKS, GUTTERS, OR STREETS SHALL BE FLUSH AND FREE OF ABRUPT CHANGES. THE BUILD-UP ASPHALT AT THE BOTTOM OF THE CURB RAMP BETWEEN THE GUTTER AND THE STREET SHALL BE MILLED TO ACHIEVE THE REQUIRED FLUSH TRANSITION.

10. IF THE 4' 5% MAXIMUM COUNTER SLOPE AT THE BOTTOM OF THE RAMP (AT STREET TRANSITION) CANNOT BE ACHIEVED DUE TO EXISTING CONDITIONS, THE RAMP SLOPE SHALL BE ADJUSTED SO THE SUM OF BOTH SLOPES DOESN'T EXCEED 13.3%.

11. 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 SHALL BE EXTENDED UP TO A MAXIMUM LENGTH OF 15'-0" (LINEAR FEET) TO CATCH THE REQUIRED SLOPE EVEN IF THE REQUIRED SLOPE IS NOT ACHIEVED. COORDINATION WITH ENGINEER IS REQUIRED PRIOR TO ANY DEMOLITION OR CONSTRUCTION.

12. THE REMOVAL OF EXISTING CONCRETE CURB, GUTTER, SIDEWALK, AND PAVEMENT (OR CURB RAMP) FOR A NEW CURB RAMP SHALL COMPLY WITH SDG-156. THE REMOVAL OF ADDITIONAL SIDEWALK PANELS MAY BE REQUIRED TO MEET EXISTING GRADE AND TO COMPLY WITH THE ACCESSIBILITY REGULATIONS.

13. PROVIDE A 2" X 2" KEYWAY BENEATH SAWCUT EDGES OF THE EXISTING SIDEWALK.

14. THE CROSS SLOPE OF THE RAMP SHALL BE 1.5%.

15. WATER PONDING WITHIN THE CURB RAMP LIMITS IS NOT ALLOWED.

16. NO GRADE BREAK IS ALLOWED ALONG THE RAMP SURFACE.

17. IF THE CROSS SLOPE OF THE SIDEWALK ADJACENT TO THE CURB RAMP IS MORE THAN 2%, PROVIDE A MINIMUM 4' TRANSITION.

18. HISTORICAL STAMPS/IMPRESSIONS SHALL BE PRESERVED PER SDG-115.

19. UTILITY PULL BOXES, MANHOLES, VAULTS AND OTHER UTILITY FACILITIES WITHIN THE BOUNDARIES OF THE CURB RAMP SHALL BE RELOCATED OR ADJUSTED TO GRADE PRIOR TO, OR IN CONJUNCTION WITH THE CURB RAMP CONSTRUCTION. COORDINATE WITH THE ENGINEER.

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

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	FC	A. OSKOUI	12/08
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

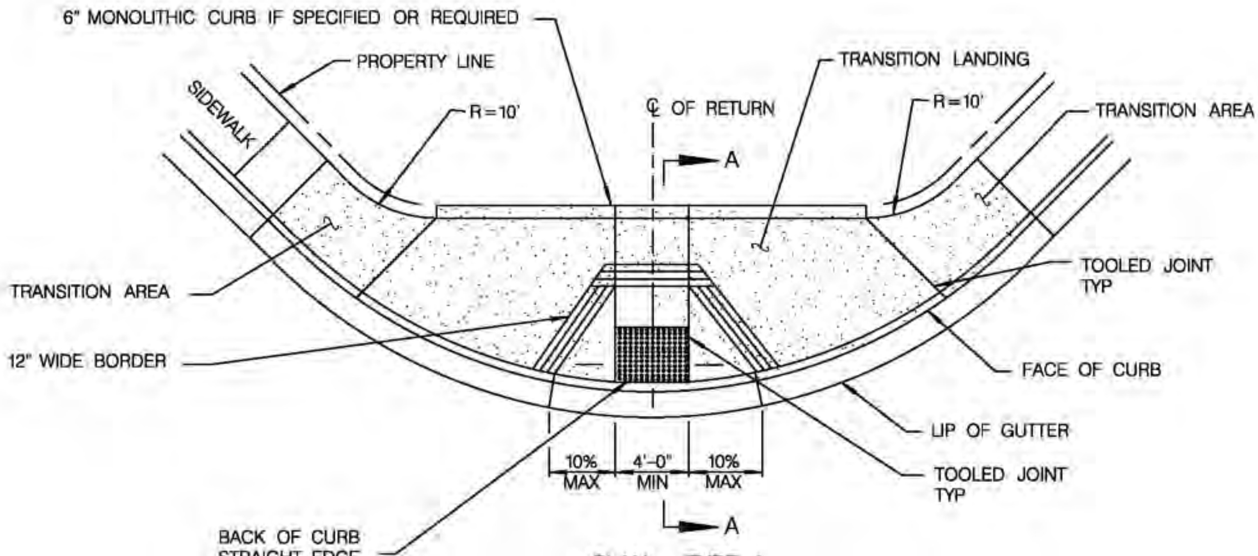
GENERAL CURB RAMP NOTES & SUPPLEMENTAL DETAILS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

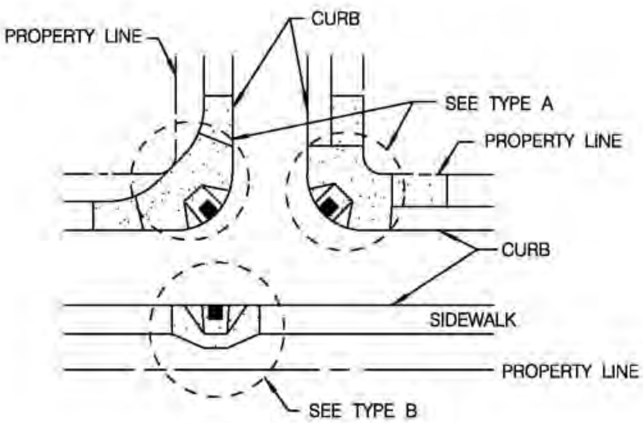
1/31/2012

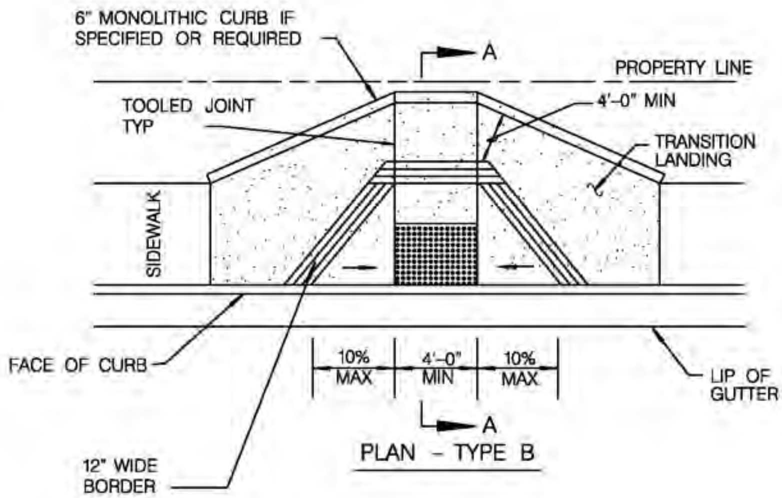
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-130**



PLAN - TYPE A

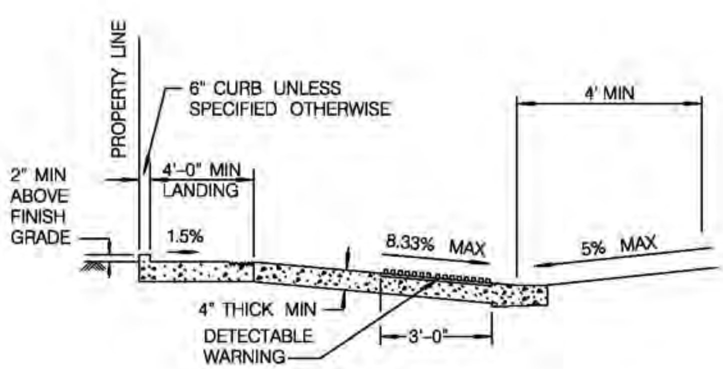




PLAN - TYPE B

NOTE:

1. SEE SDG-130 FOR ADDITIONAL CURB RAMP DETAILS AND INFORMATION.



SECTION A-A

REVISION	BY	APPROVED	DATE
ORIGINAL	FC	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	FC	A. OSKOUI	12/08
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

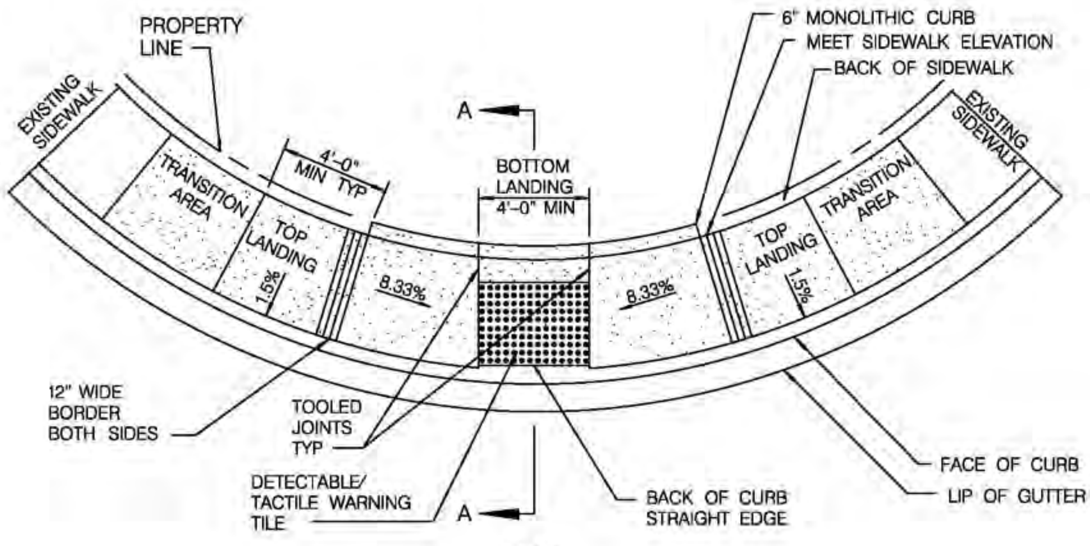
CURB RAMP - TYPES A AND B

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

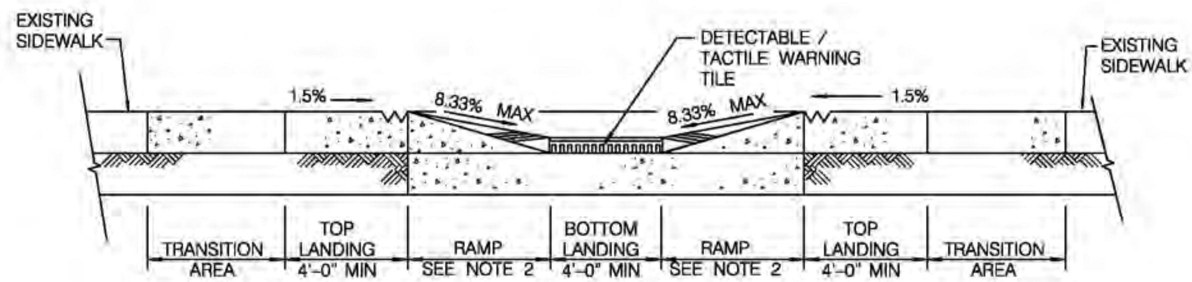
1/31/2012

COORDINATOR R.C.E. 65271 DATE

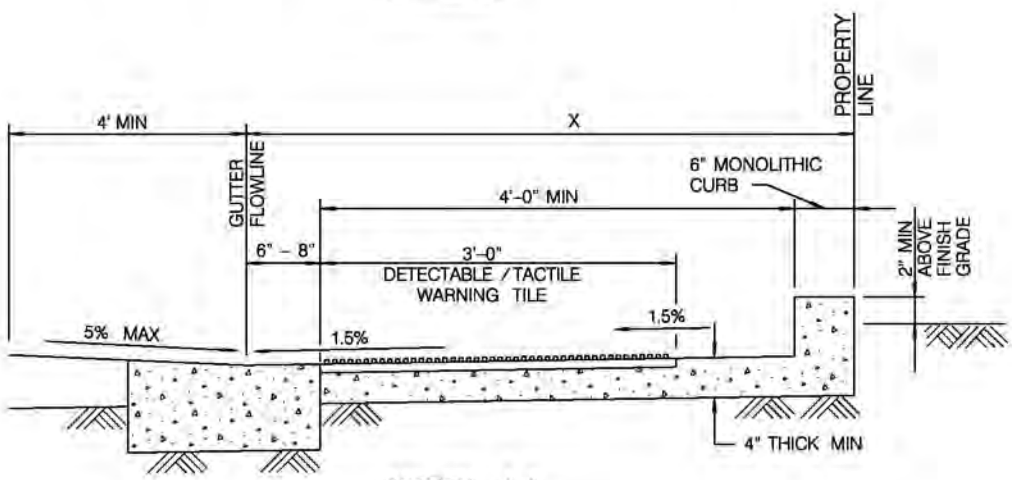
DRAWING NUMBER **SDG-132**



PLAN



ELEVATION



SECTION A–A

NOTES

1. TYPE C1 CURB RAMP SHALL ONLY BE USED TO MITIGATE EXISTING CONDITIONS WHERE INADEQUATE RIGHT OF WAY EXISTS. TYPE C1 SHALL BE USED WHEN X<8'. X=DISTANCE FROM FACE OF CURB TO PROPERTY LINE.

2. SEE SDG–130 FOR ADDITIONAL CURB RAMP DETAILS AND INFORMATION.

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	FC	A. OSKOUI	12/08
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

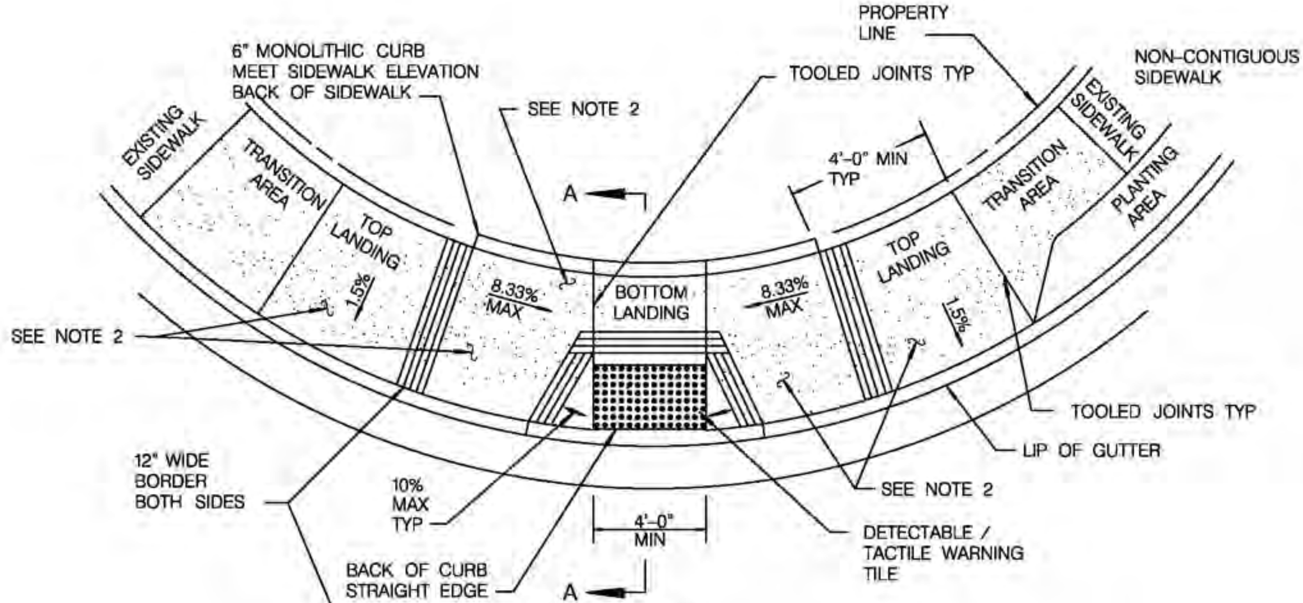
CURB RAMP - TYPE C1

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

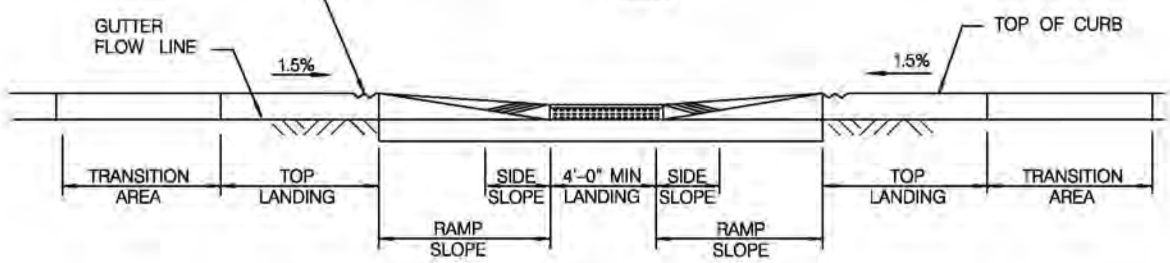
1/31/2012

COORDINATOR R.C.E. 65271 DATE

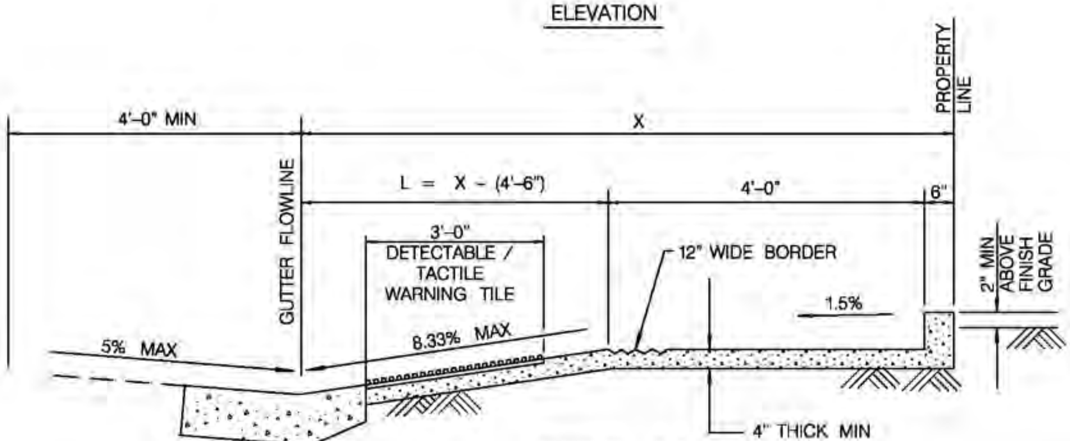
DRAWING NUMBER **SDG-134**



PLAN



ELEVATION



SECTION A-A

NOTES

1. TYPE C2 CURB RAMP SHALL ONLY BE USED TO MITIGATE EXISTING CONDITIONS WHERE INADEQUATE RIGHT OF WAY EXISTS. TYPE C2 SHALL BE USED WHEN X=8' OR 8'<X<10'. X=DISTANCE FROM FACE OF CURB TO PROPERTY LINE.

2. SEE SDG-130 FOR ADDITIONAL CURB RAMP DETAILS AND INFORMATION.

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	FC	A. OSKOUI	12/08
UPDATE	KA	J. NAGELVOORT	01/10

CITY OF SAN DIEGO - STANDARD DRAWING

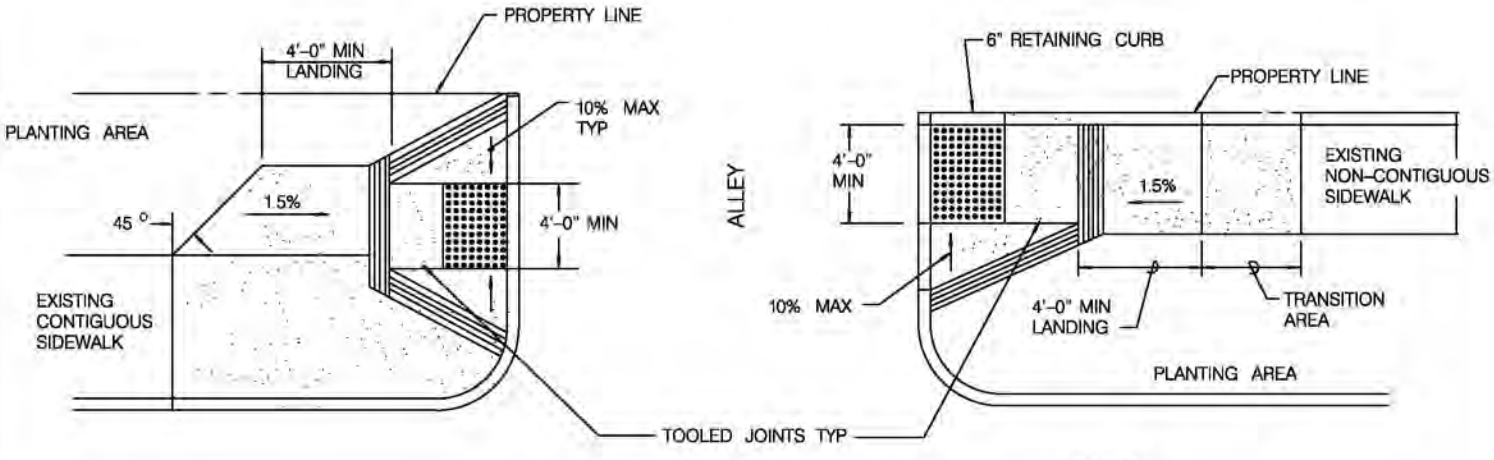
CURB RAMP - TYPE C2

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

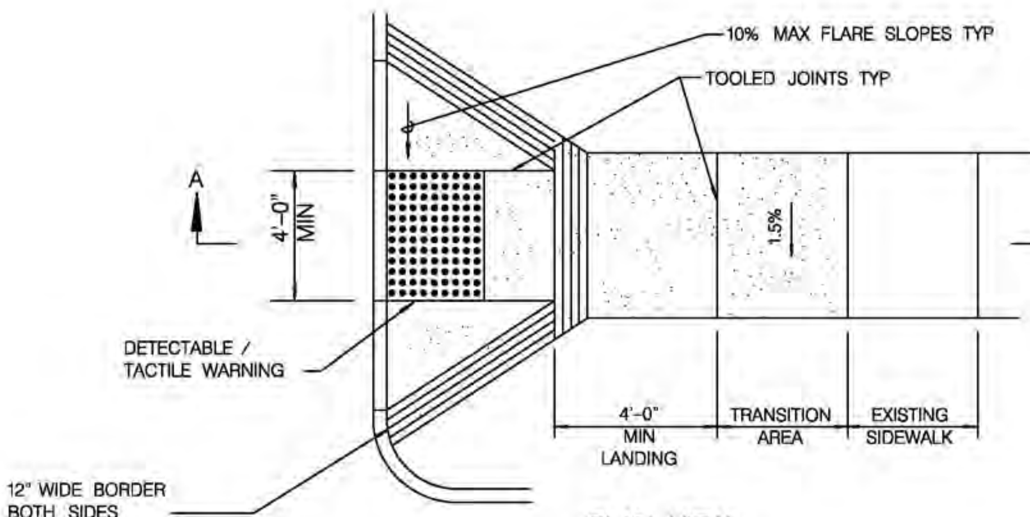
1/31/2012

COORDINATOR R.C.E. 65271 DATE

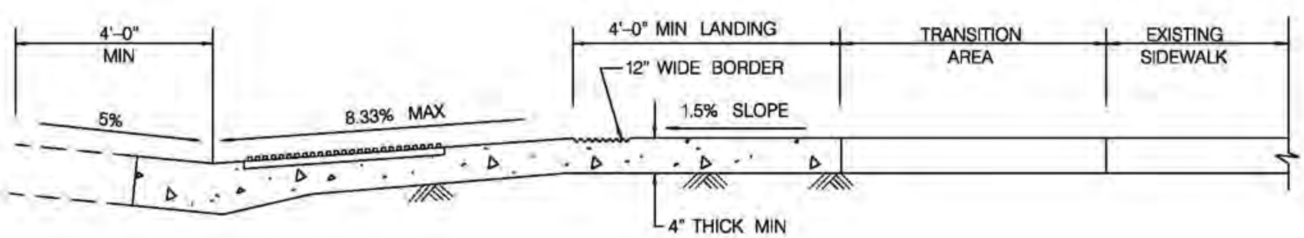
DRAWING NUMBER **SDG-135**



TYPICAL PLAN



PLAN VIEW



SECTION A–A

NOTES:

1. SEE SDG–130 FOR ADDITIONAL CURB RAMP DETAILS AND INFORMATION

REVISION	BY	APPROVED	DATE
ORIGINAL	SM	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	FC	A. OSKOUI	12/08
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

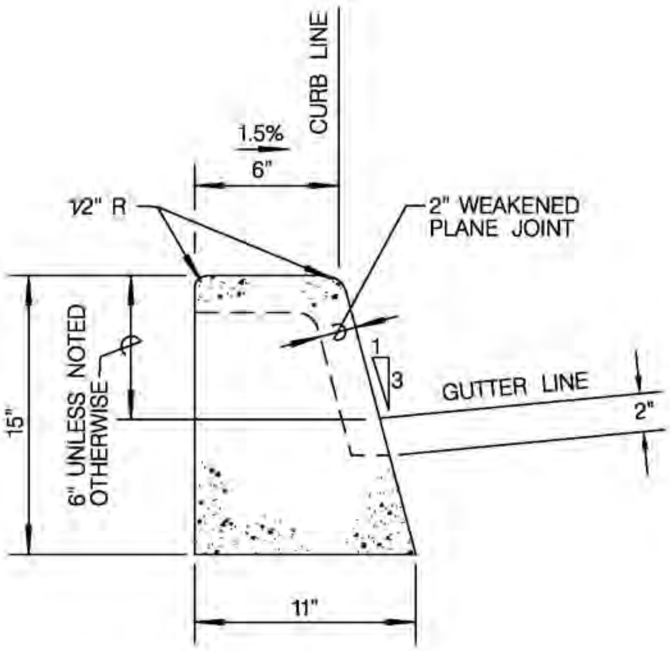
CURB RAMP - TYPE D

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

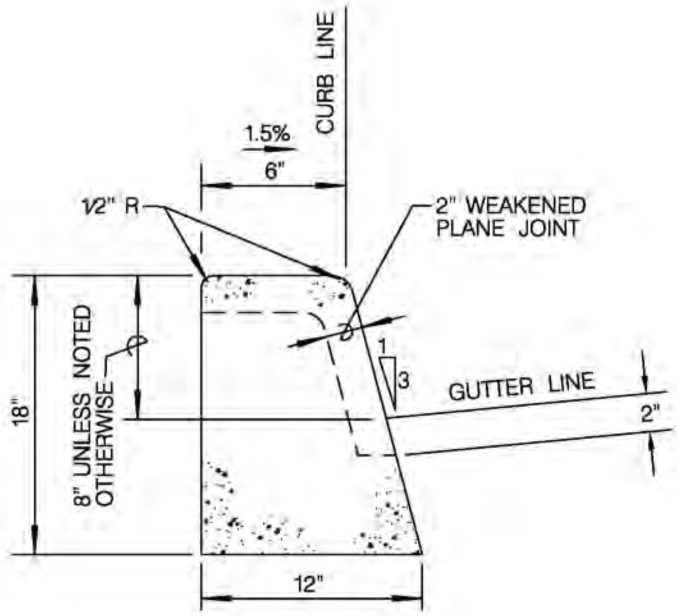
1/31/2012

COORDINATOR R.C.E. 65271 DATE

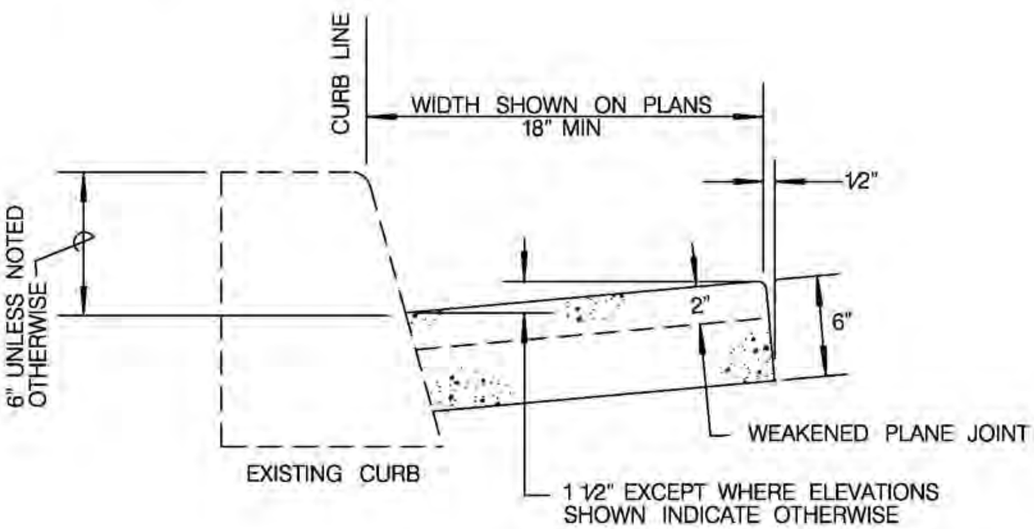
DRAWING NUMBER **SDG-136**



6" CURB
AREA = 0.89 SQ FT



8" CURB
AREA = 1.09 SQ FT



GUTTER

NOTES:

1. CONCRETE SHALL BE 520-C-2500.
2. SEE JOINT DETAILS DRAWINGS.
3. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND / OR DATE) SHALL BE PRESERVED.

LEGEND ON PLANS

6" CURB

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

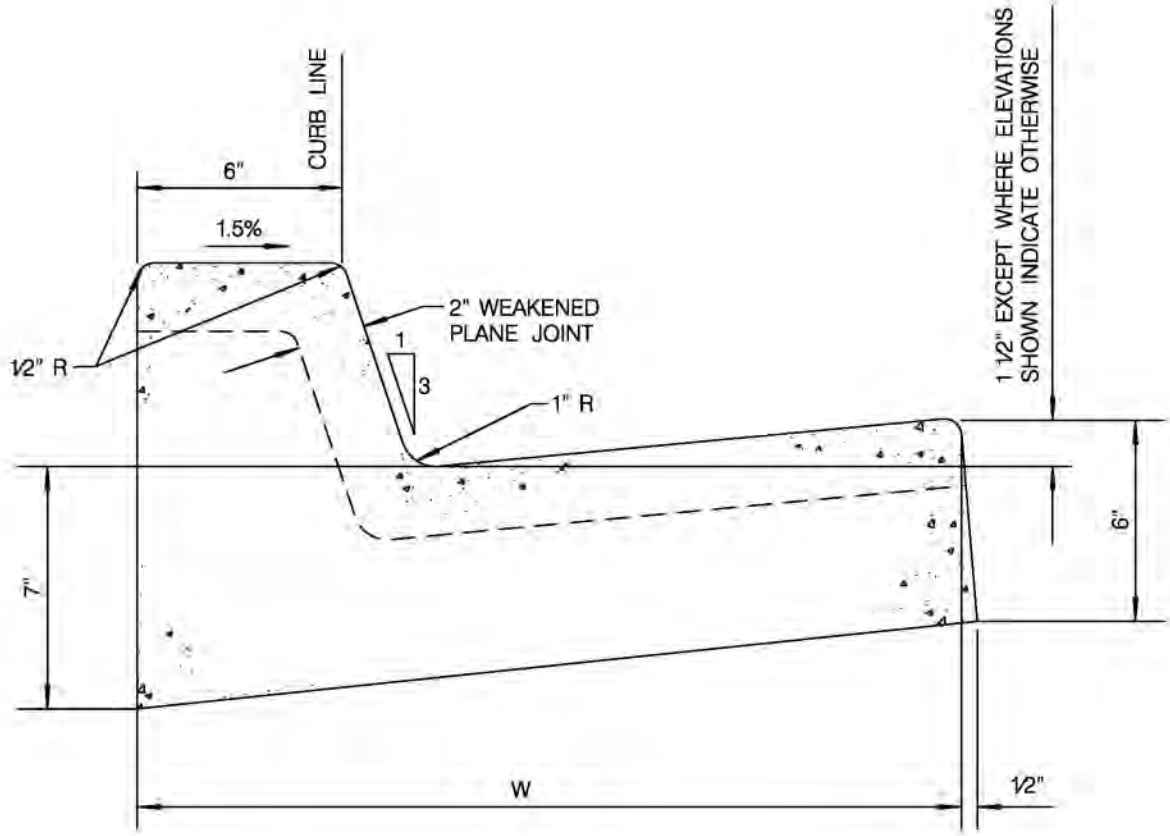
CURB AND GUTTER - SEPARATE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

M. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-150**



TYPE	W	*AREA
G	24"	1.34 SQ FT
H	30"	1.61 SQ FT

* WITH 6" CURB FACE

NOTES:

1. CONCRETE SHALL BE 520-C-2500.
2. SEE JOINT DETAIL DRAWINGS.
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.

LEGEND ON PLANS

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

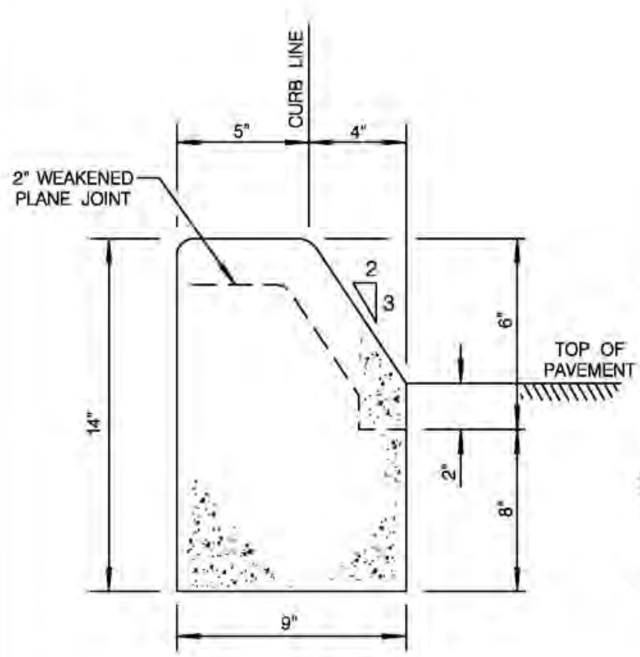
CURB AND GUTTER - COMBINED

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

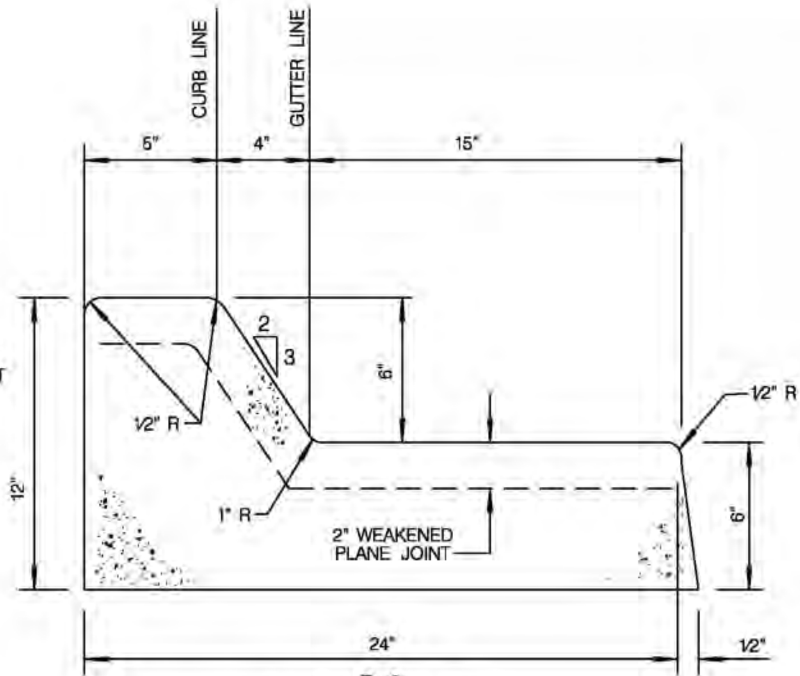
1/31/2012

COORDINATOR R.C.E. 65271 DATE

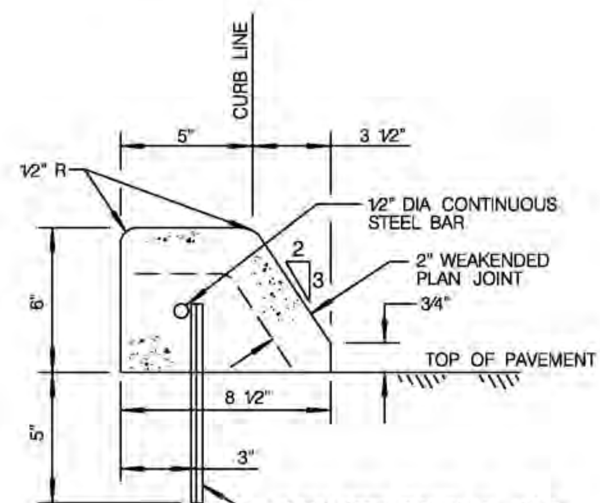
DRAWING NUMBER **SDG-151**



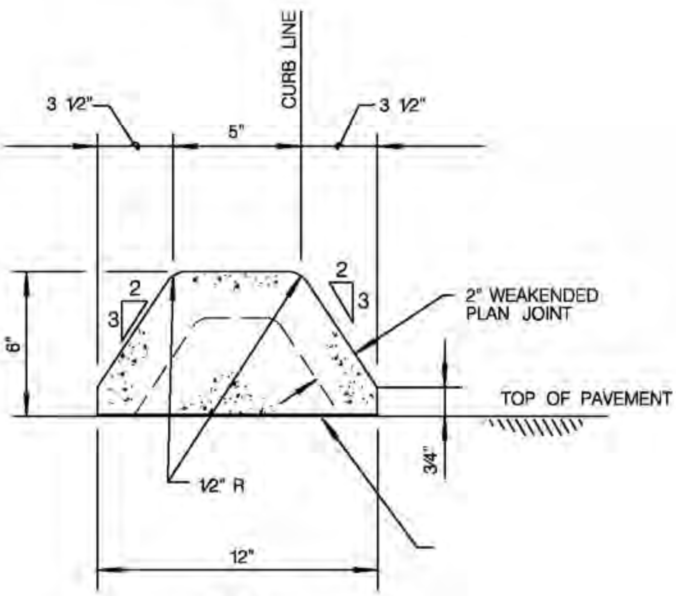
B–1
AREA = 0.79 SQ FT



B–2
AREA = 1.29 SQ FT



B–3
AREA = 0.29 SQ FT



B–4
AREA = 0.35 SQ FT

NOTES:

1. CONCRETE SHALL BE 520–C–2500.
2. SEE JOINT DETAIL DRAWINGS.
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.

LEGEND ON PLANS

TYPE B–2 CURB AND GUTTER

TYPE B–1, B–3, B–4 CURB

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

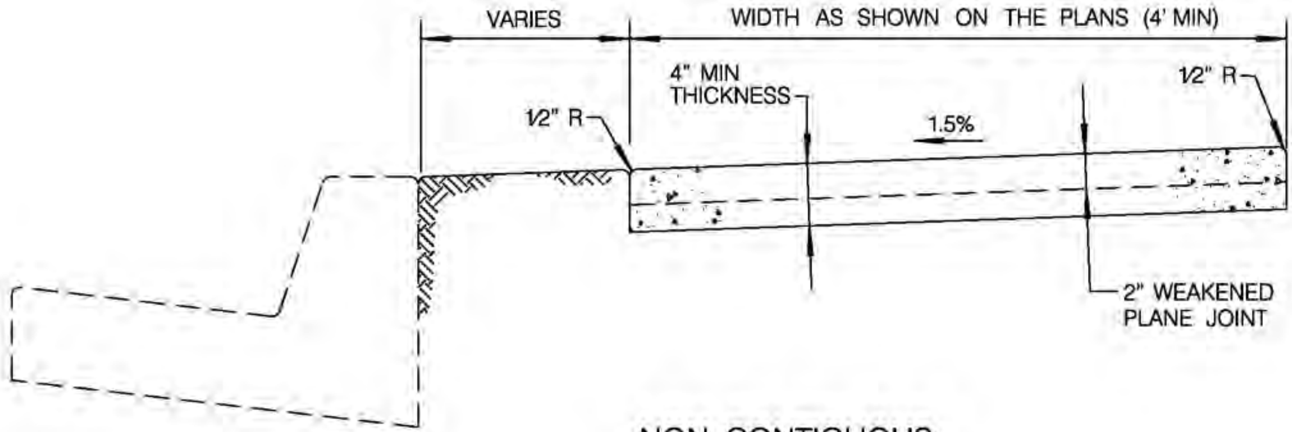
CURB AND GUTTER - MEDIANS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

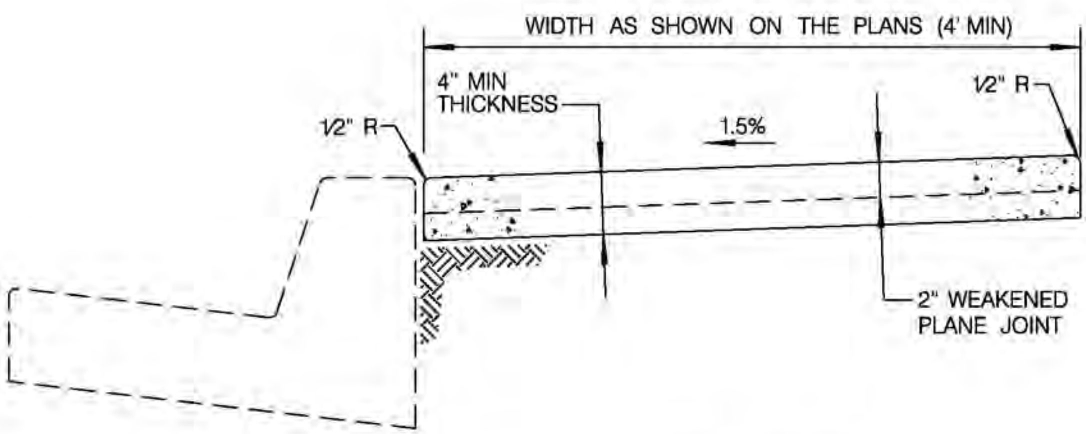
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-154**



NON–CONTIGUOUS

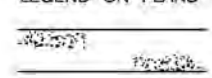


CONTIGUOUS

NOTES:

1. CONCRETE SHALL BE 520–C–2500.
2. SEE JOINT DETAIL DRAWINGS.
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.
5. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

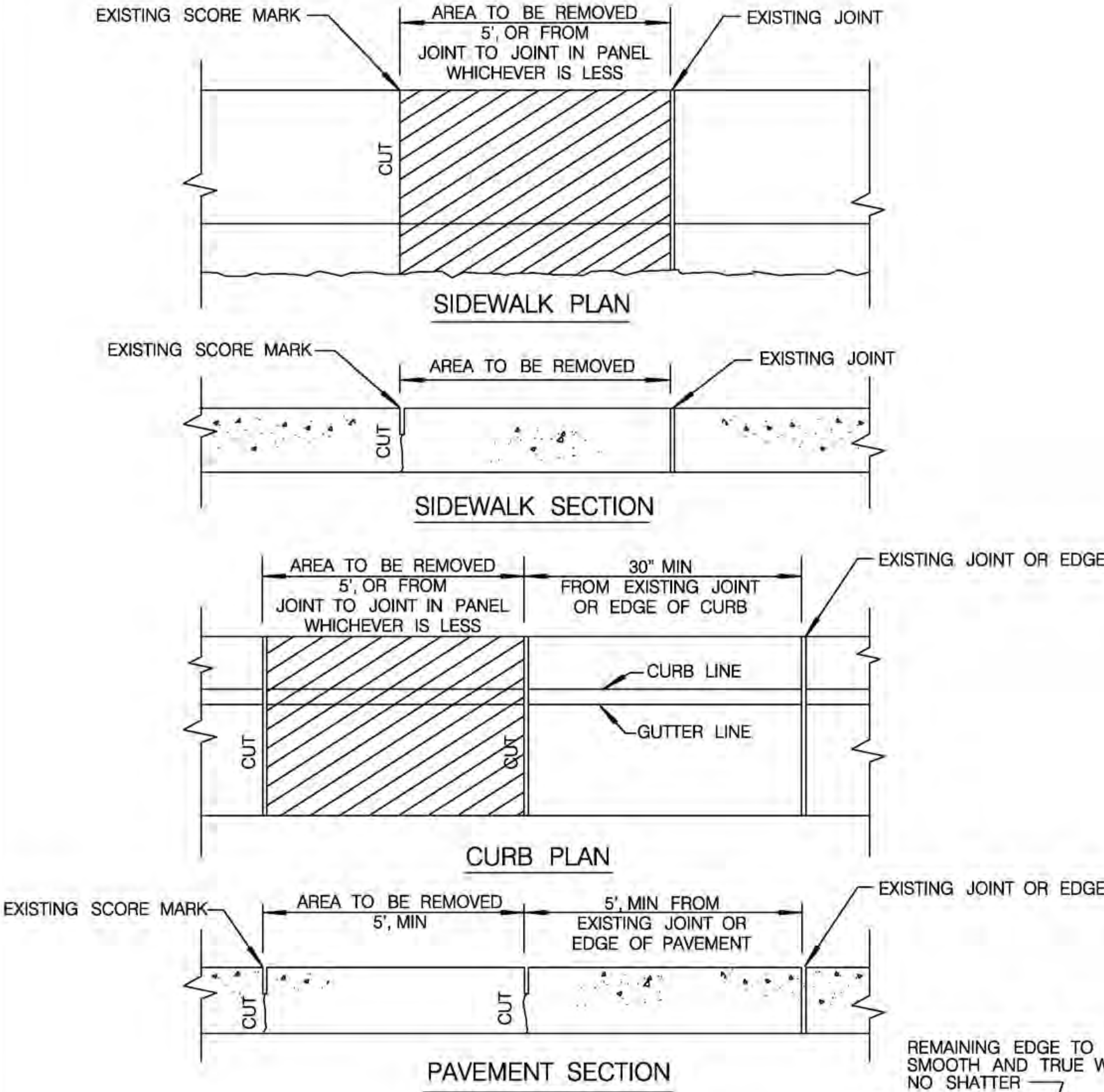
SIDEWALK - TYPICAL SECTIONS

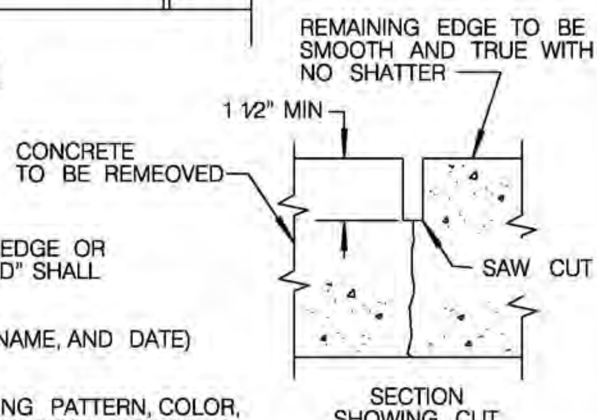
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-155**





NOTES:

1. SIDEWALK CROSS SLOPE SHALL BE 1.5%.
2. WHEN DISTANCE FROM "AREA TO BE REMOVED" TO EXISITNG 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.
4. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

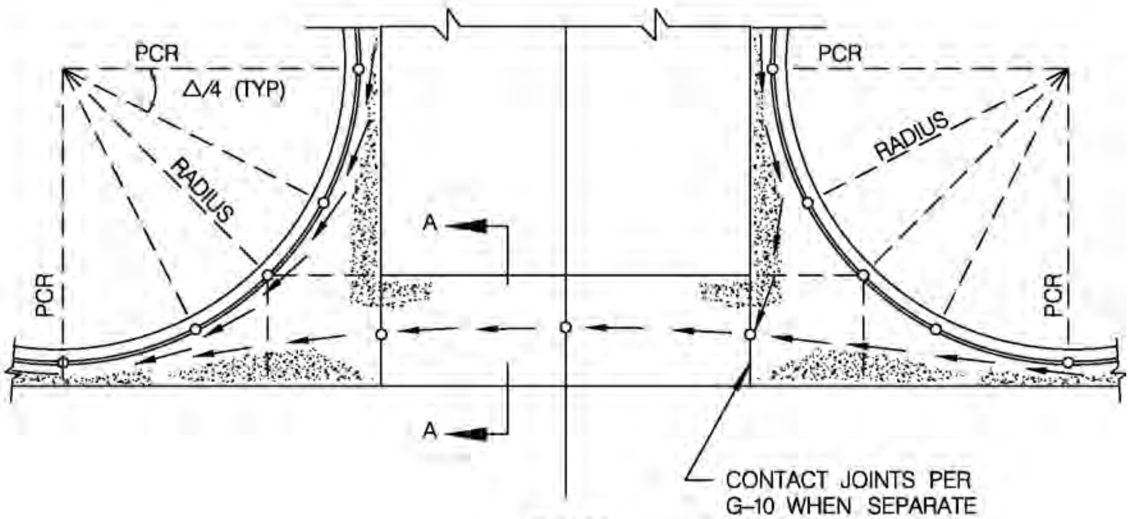
CONCRETE CURB, GUTTER, SIDEWALK AND PAVEMENT REMOVAL AND REPLACEMENT

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

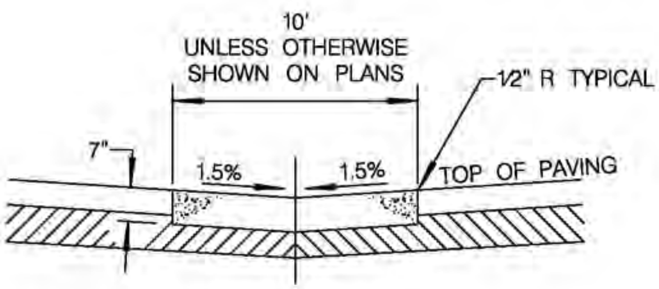
H. Hasli   1/31/2012

COORDINATOR   R.C.E. 65271   DATE

DRAWING NUMBER **SDG-156**



PLAN



SECTION A–A

NOTES:

1. CONCRETE SHALL BE 560–C–3250.
2. — — — — WEAKENED PLANE JOINTS.
3. ← ← TYPICAL FLOWLINES.
4 o = 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"
8. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED.

LEGEND ON PLANS

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

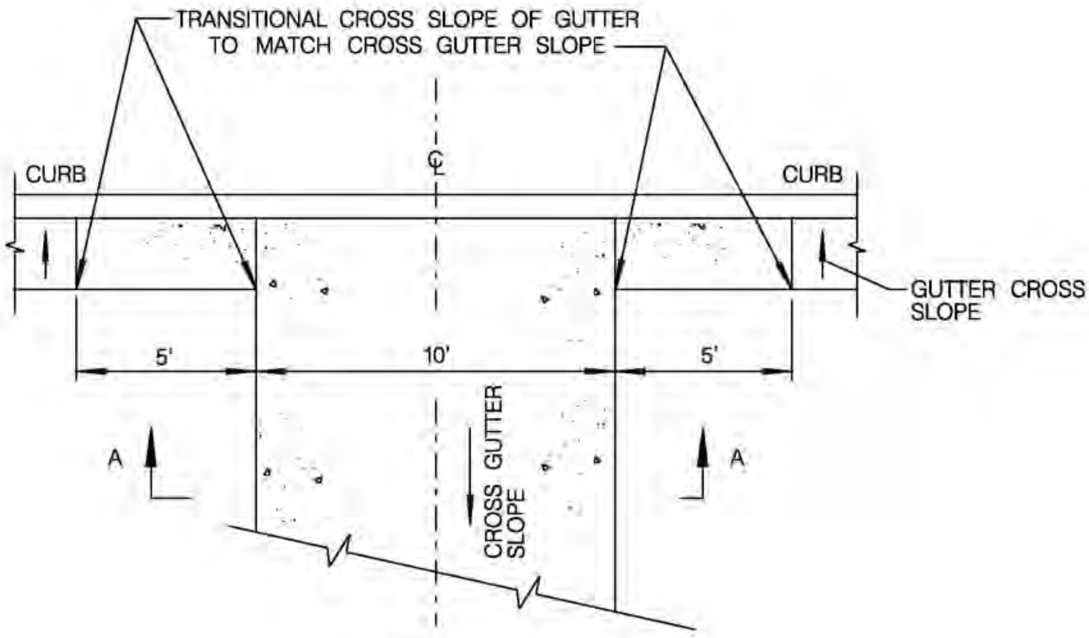
CROSS GUTTER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

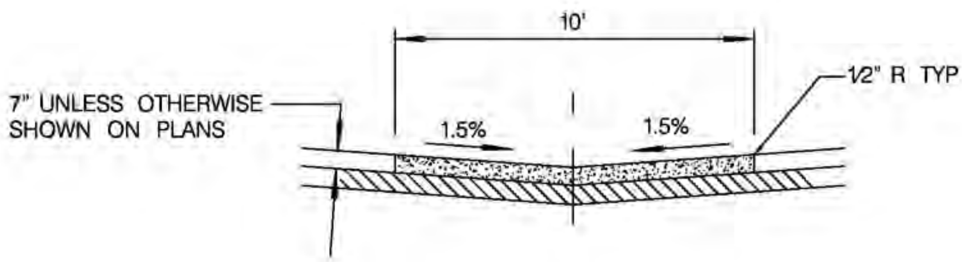
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-157**



PLAN

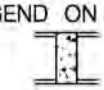


SECTION A–A

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.

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

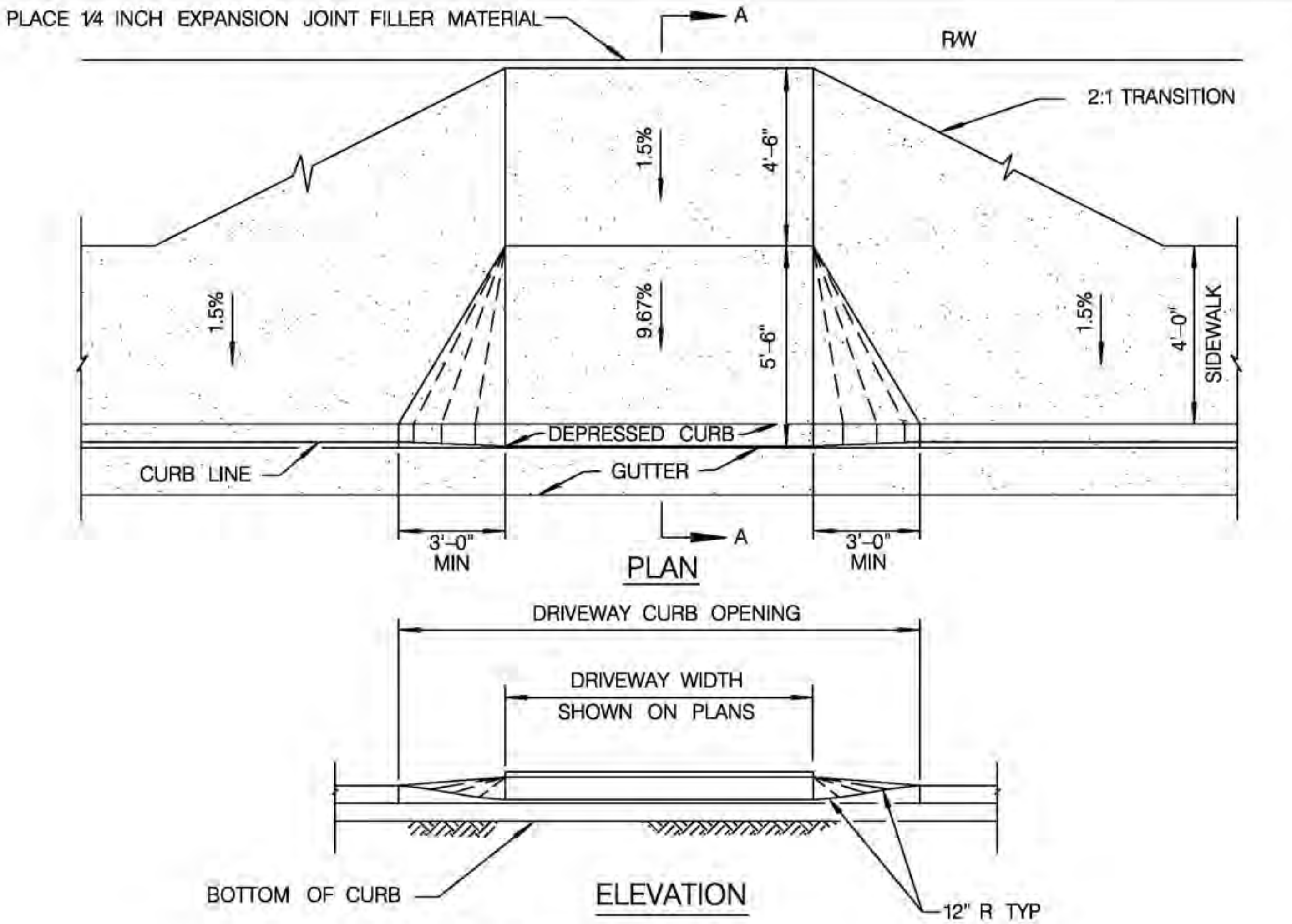
MID-BLOCK CROSS GUTTER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

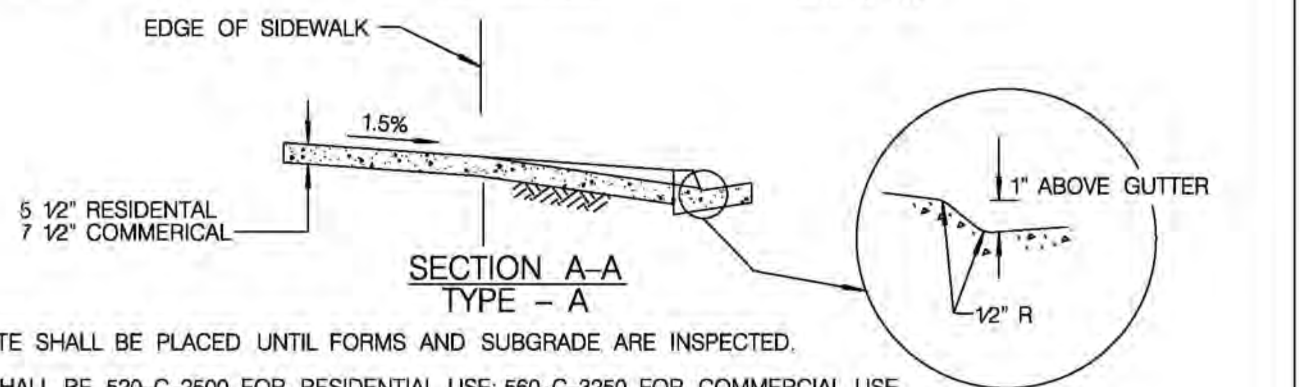
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-158**



PLAN

ELEVATION



SECTION A–A
TYPE – A

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 DETAILS DRAWINGS FOR WIDTH AND LOCATION REQUIREMENTS.
4. SEE DETAILS DRAWINGS 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" PCC THICKNESS MINIMUM.
8. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED.
9. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

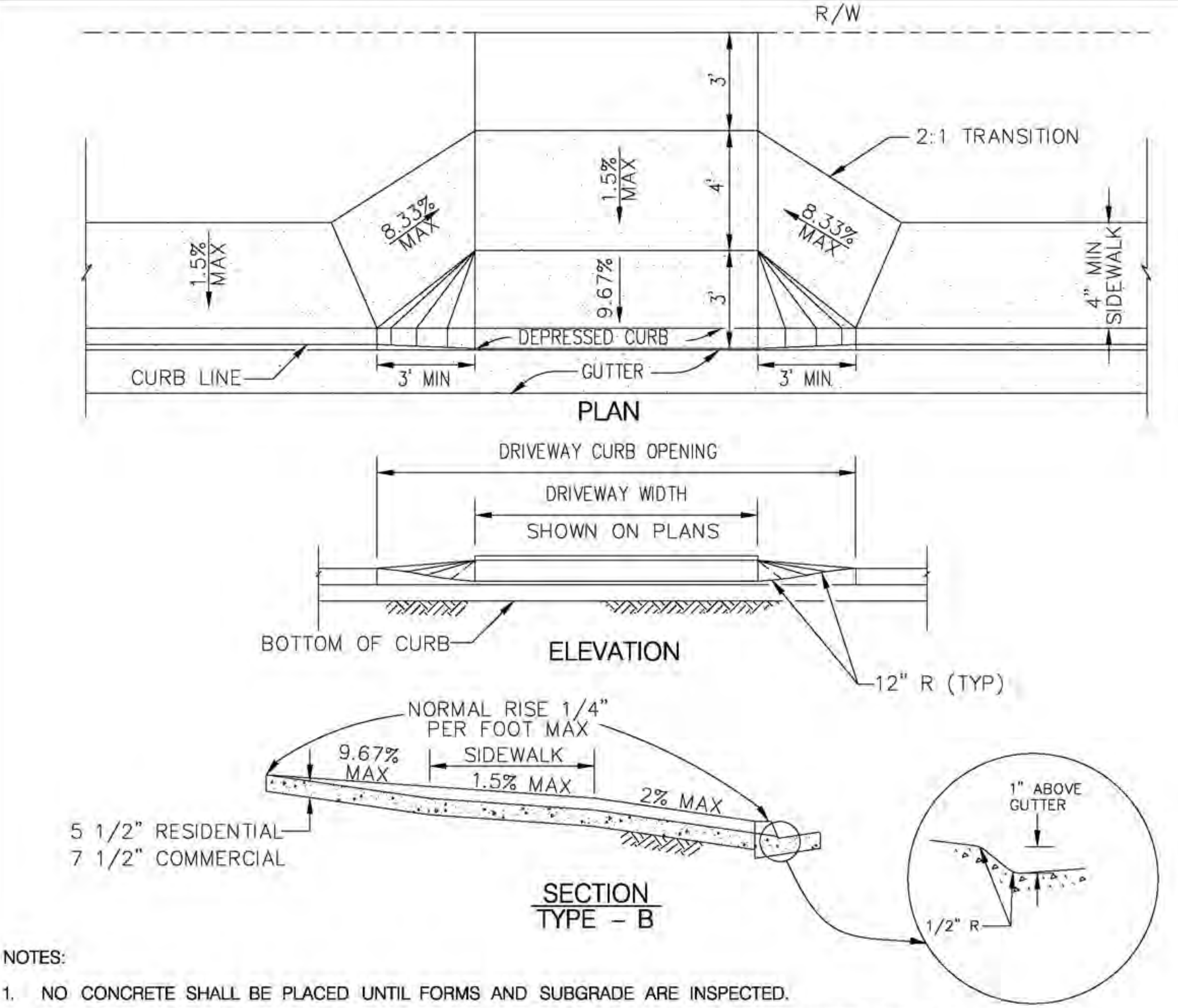
CONCRETE DRIVEWAY (CONTIGUOUS SIDEWALK)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-159**



NOTES:

1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.
2. FOR RESIDENTIAL USE, CONCRETE SHALL BE 520–C–2500; FOR COMMERCIAL USE, CONCRETE SHALL BE 560–C–3250.
3. SEE STANDARD DETAIL DRAWINGS FOR WIDTH AND LOCATION REQUIREMENTS.
4. DRIVEWAY RAMP TO EXTEND TO 10' FROM CURB FACE OR TO RIGHT–OF–WAY, WHICHEVER IS LESS. (FOR COMMERCIAL USE ONLY).
5. PLACE EXPANSION JOINT AT RIGHT–OF–WAY OR 10', WHICHEVER IS LESS.
6. SEE STANDARD DRAWINGS 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" PCC THICKNESS MINIMUM.
10. ALL HISTORICAL STAMPS /IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED.
11. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

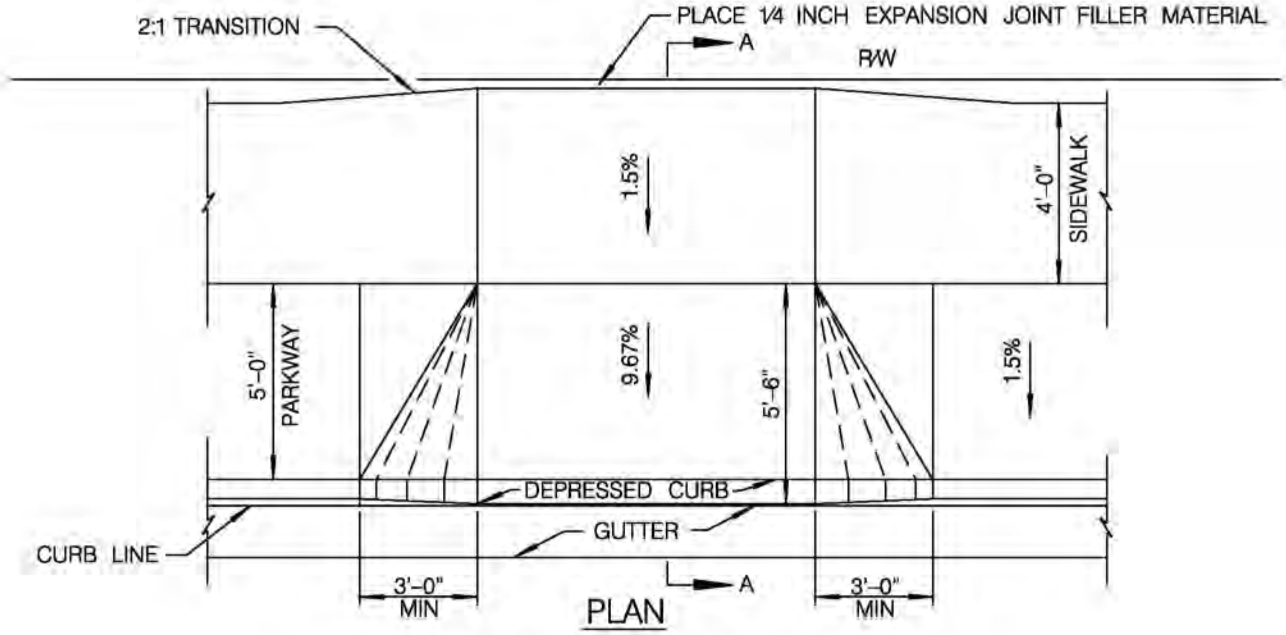
CONCRETE DRIVEWAY (CONTIGUOUS SIDEWALK)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

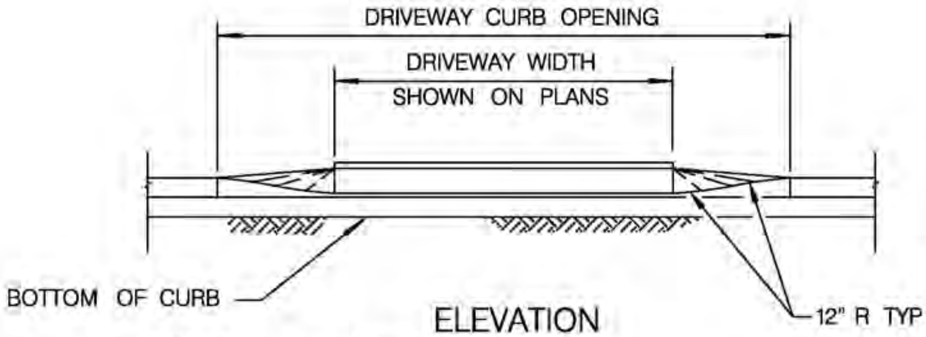
H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

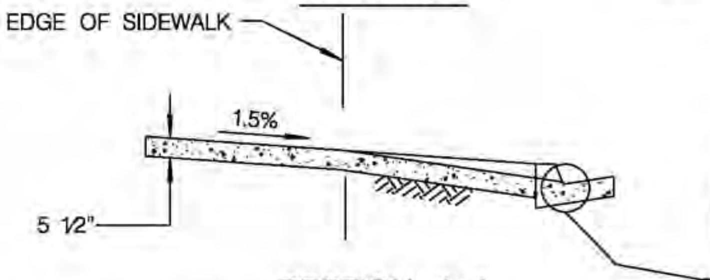
DRAWING NUMBER **SDG-159**

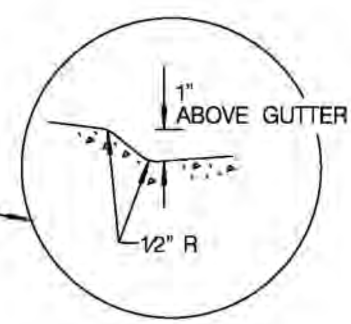


PLAN



ELEVATION





SECTION A–A

NOTES:

1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.
2. CONCRETE SHALL BE 520-C-2500.
3. SEE DETAILS DRAWINGS FOR WIDTH AND LOCATION REQUIREMENTS.
4. SEE DETAILS DRAWINGS 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" PCC THICKNESS MINIMUM.
8. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, DATE) SHALL BE PRESERVED.
9. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

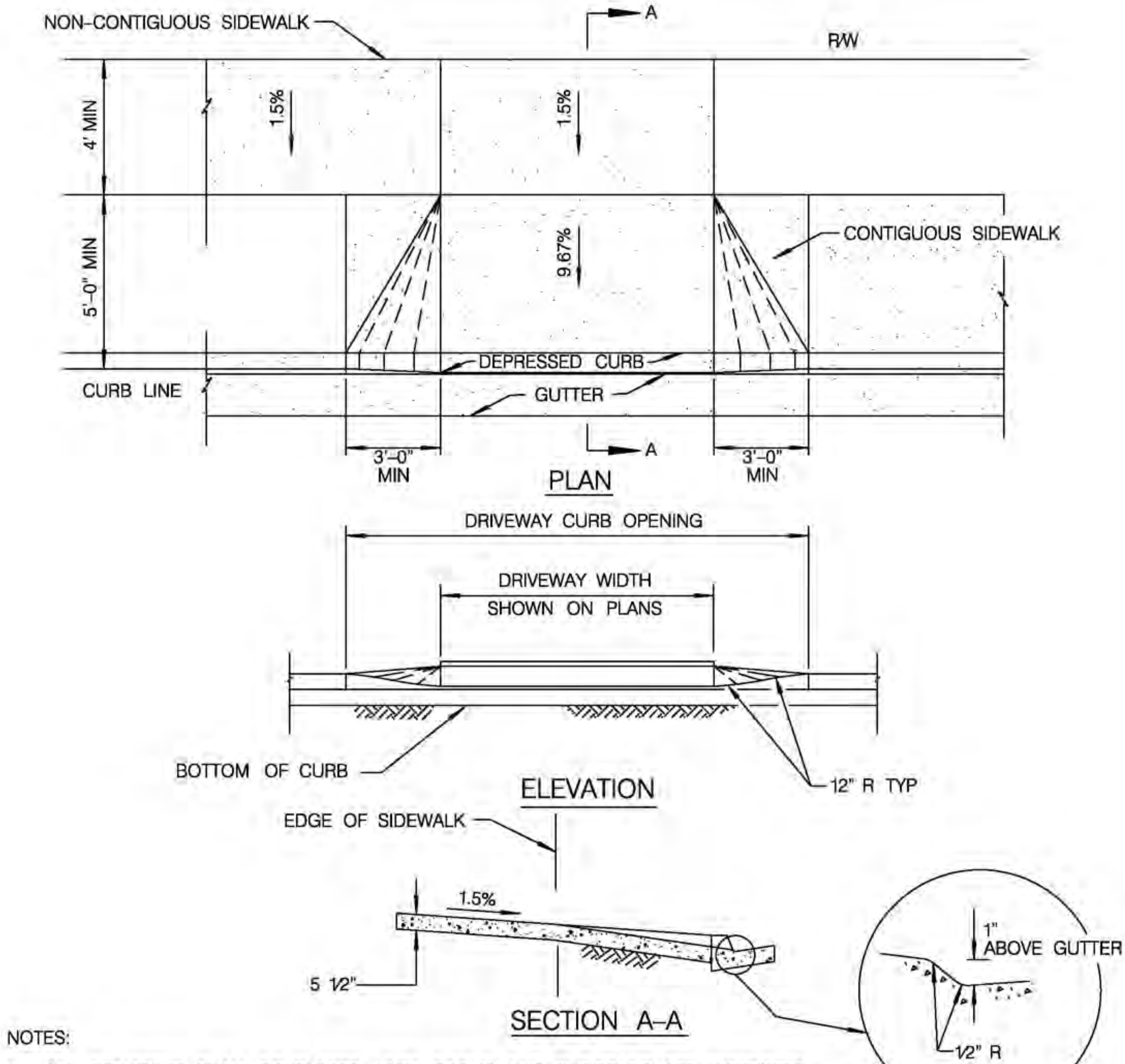
CONCRETE DRIVEWAY (NON-CONTIGUOUS SIDEWALK)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-160**



NOTES:

1. NO CONCRETE SHALL BE PLACED UNTIL FORMS AND SUBGRADE ARE INSPECTED.
2. CONCRETE SHALL BE 520-C-2500.
3. SEE DETAILS DRAWINGS 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 DETAILS DRAWINGS 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.
8. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTER, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ADJACENT PROPERTIES.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

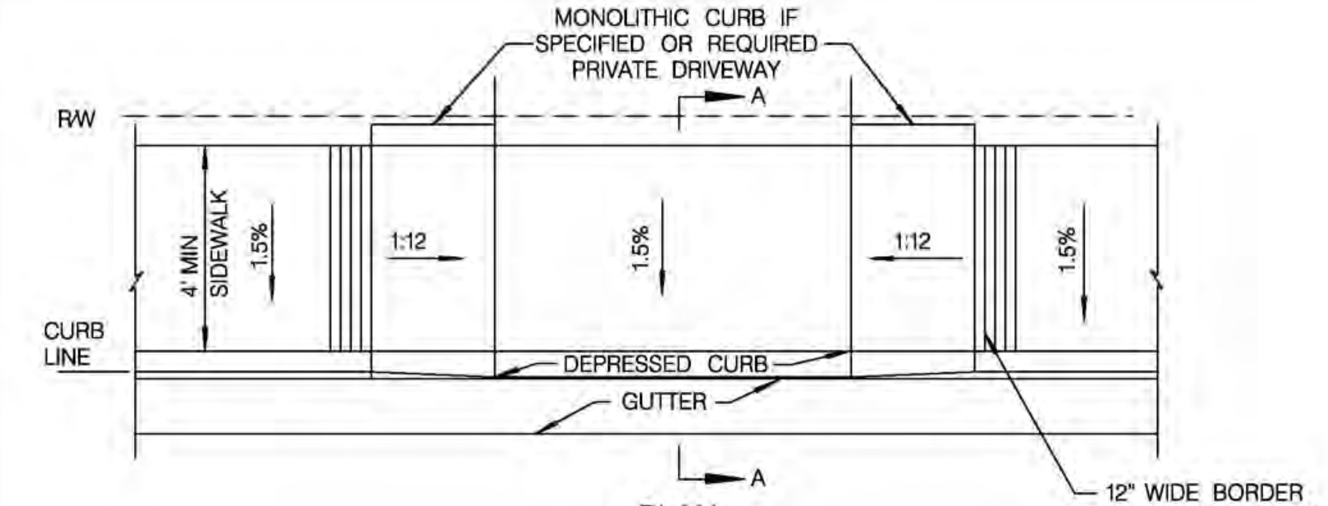
RESIDENTIAL CONCRETE DRIVEWAY (PARKWAY LESS THAN 10' IN DEPTH)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

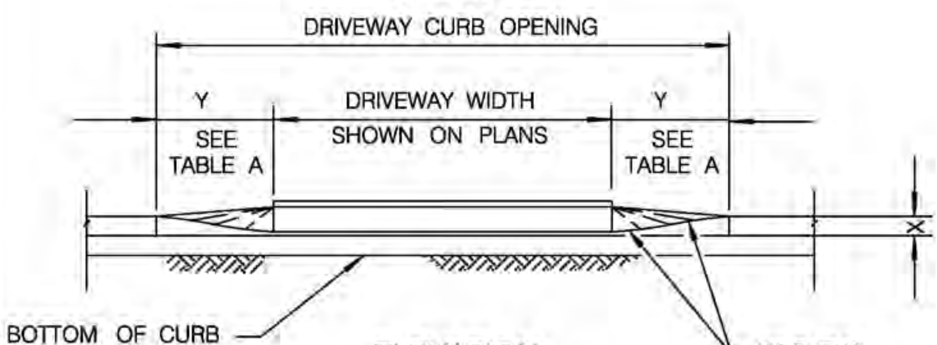
H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-161**

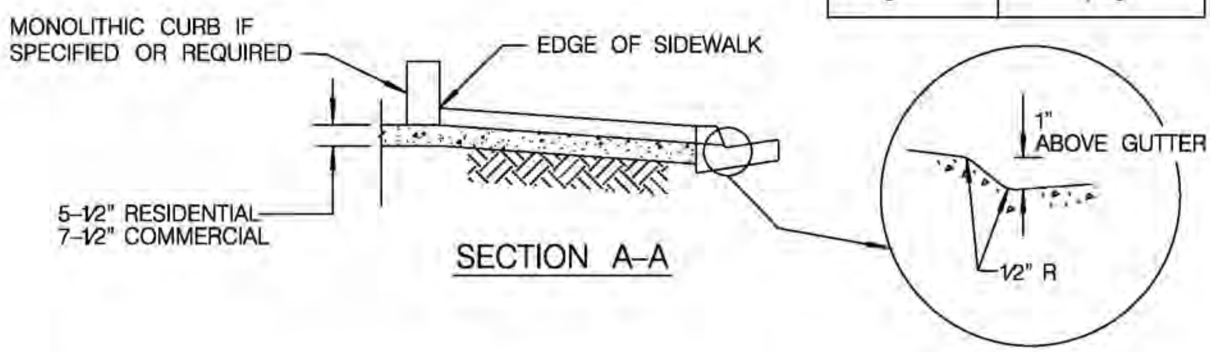


PLAN



ELEVATION

TABLE A	
X	Y
CURB HIEGHT	RAMP LENGTH
1"	0–6"
2"	1'–6"
3"	2'–6"
4"	3'–6"
5"	4'–6"
6"	5'–6"
7"	6'–6"
8"	7'–6"



SECTION A–A

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 DETAILS DRAWING FOR WIDTH AND LOCATION REQUIREMENTS.
4. SEE DETAILS DRAWING FOR CURB AND JOINT DETAILS.
5. ALL HISTORICAL STAMPS / IMPRESSIONS (STREET NAME, CONTRACTOR NAME, AND DATE) SHALL BE PRESERVED.
6. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

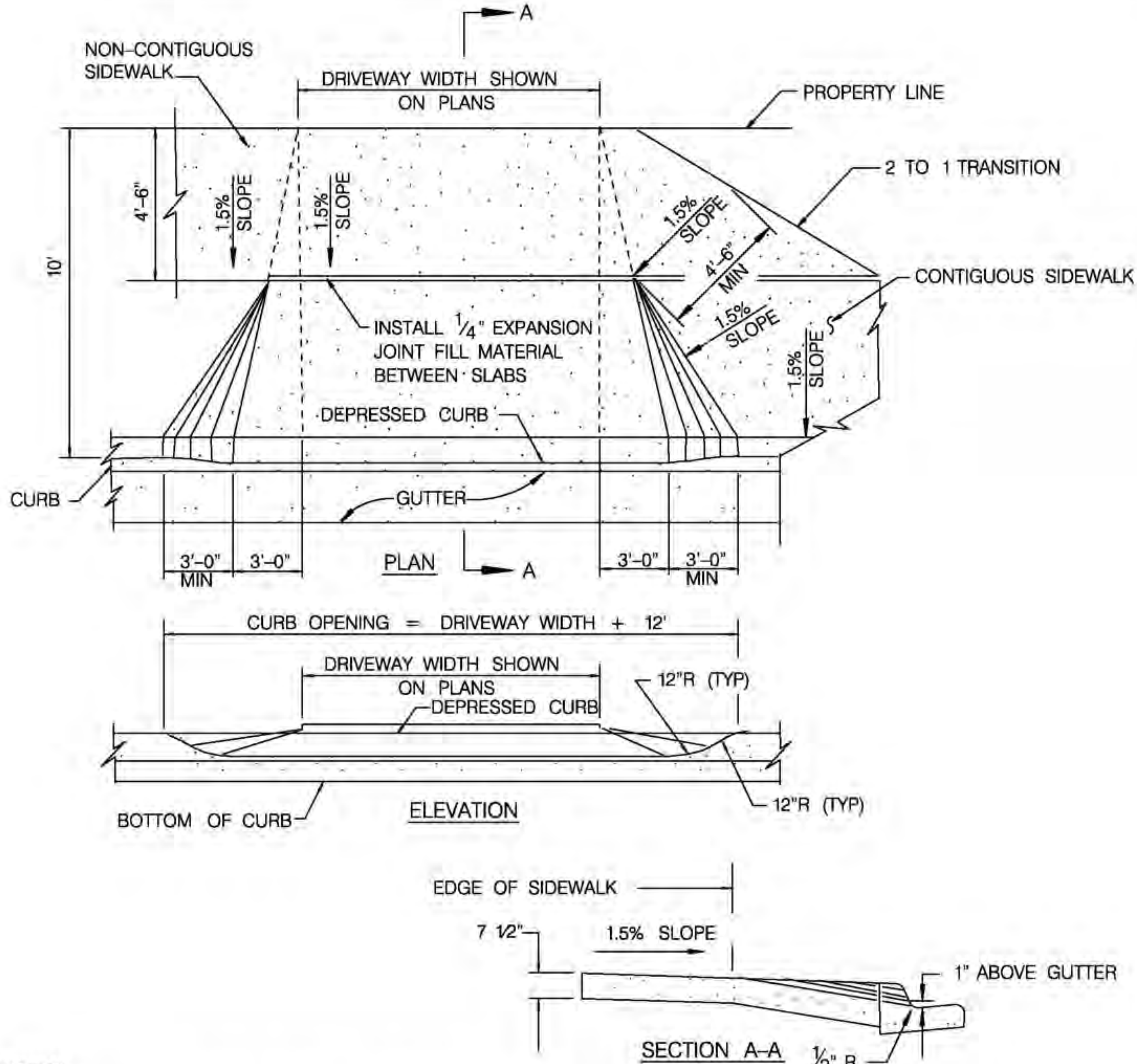
CONCRETE DRIVEWAY (FOR CONFINED RIGHT-OF-WAY)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

[signature] 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-162**



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 DETAILS DRAWINGS FOR WIDTH AND LOCATION REQUIREMENTS.
4. SEE DETAILS DRAWINGS 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.
9. FOR DESIGNATED URBANIZED COMMUNITIES, SIDEWALK DESIGN (SCORING PATTERN, COLOR, TEXTURE) SHALL BE IN CONFORMANCE WITH HISTORIC DESIGN ON ADJACENT PROPERTIES.

LEGEND ON PLANS

REVISION	BY	APPROVED	DATE
ORIGINAL		M.V.R	5/92
NOTES		G.P.	2/95
NOTES	SM	A. OSKOUI	12/03 & 8/06
UPDATE	FC	A. OSKOUI	12/06
REPLACED SDG-114	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

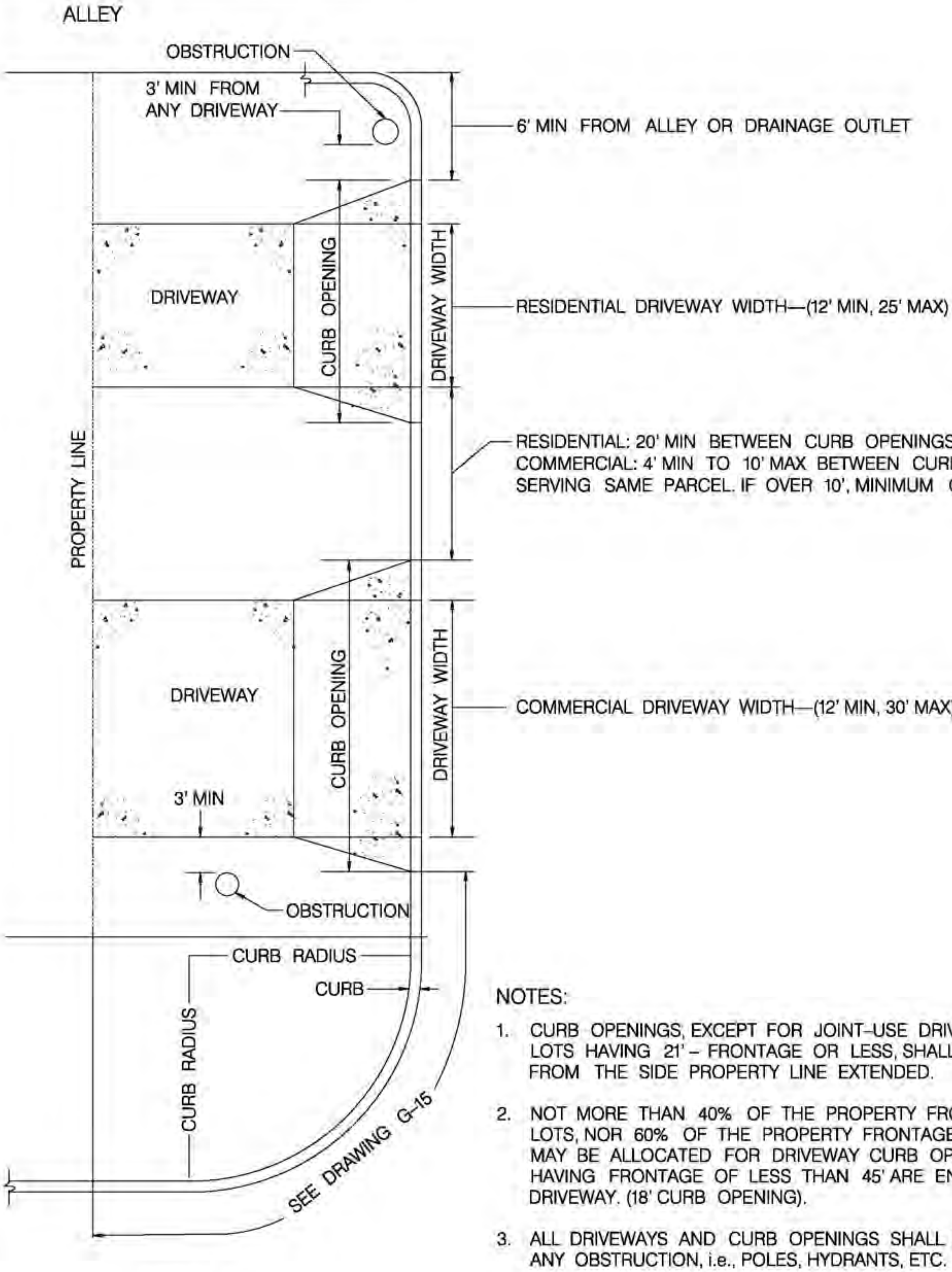
COMMERCIAL CONCRETE DRIVEWAY

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-163**



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.

REVISION	BY	APPROVED	DATE
*ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

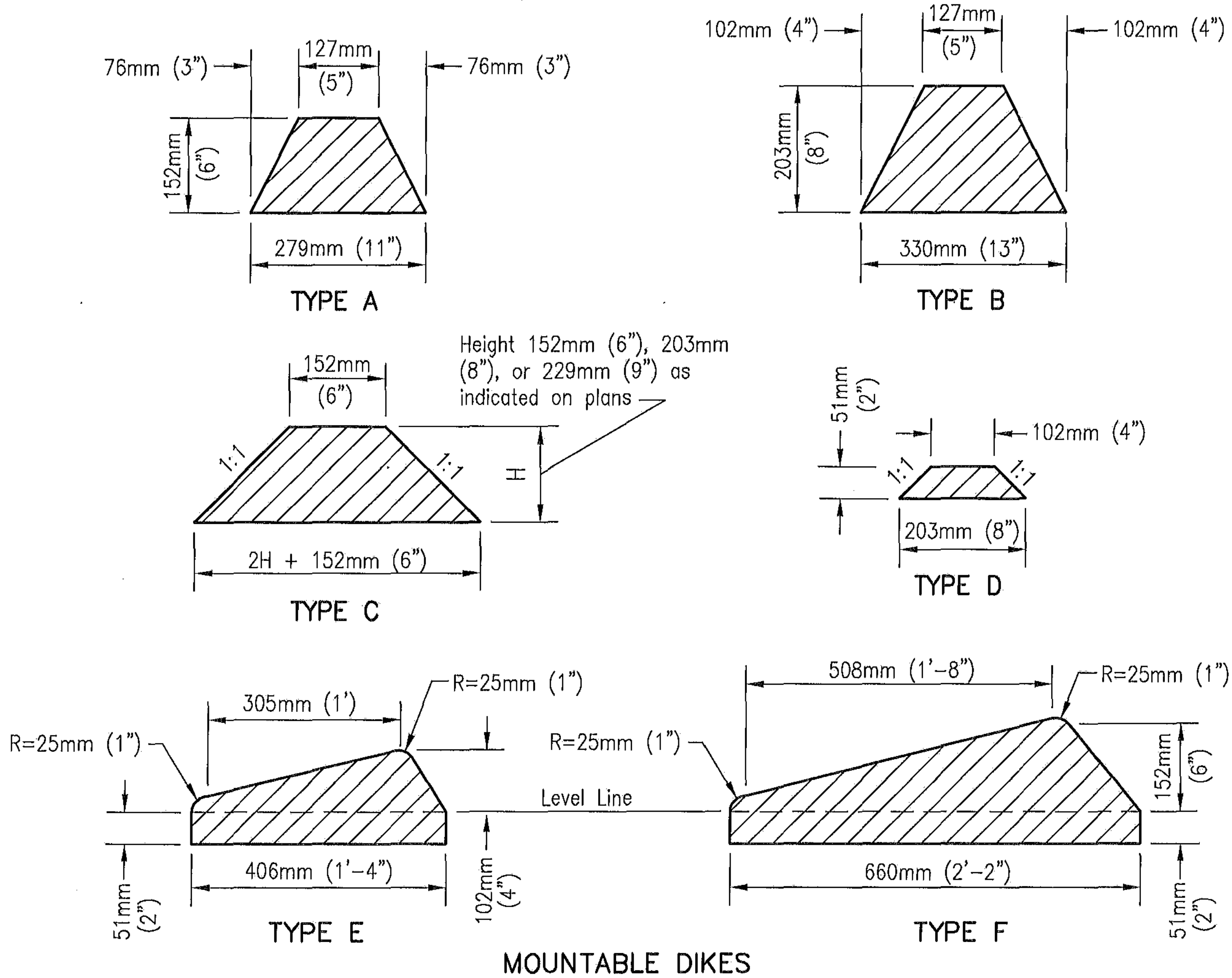
DRIVEWAY LOCATION AND WIDTH REQUIREMENTS

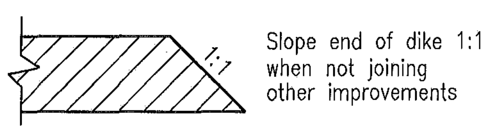
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDG-164**





ALL TYPES – SIDE VIEW

APPROX. DIKE QUANTITIES		
TYPE	REQD PER LIN. FT.	
A	25.4kg	(0.0250 tn.)
B	38.1kg	(0.0375 tn.)
C–152mm (6")	38.1kg	(0.0375 tn.)
C–203mm (8")	59.2kg	(0.0583 tn.)
C–229mm (9")	71.3kg	(0.0702 tn.)
D	6.3kg	(0.0062 tn.)
E	41.4kg	(0.0407 tn.)
F	63.3kg	(0.0623 tn.)

NOTES:

1. Dikes shall be placed on a 51mm (2") of A.C. surfacing, extending throughout the width of the dike.
2. PG–70–10 grade asphalt to be used for all dikes.
3. A.C. dikes may be shaped and compacted with an extrusion machine or other equipment capable of shaping and compacting the material to the required cross section.

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

SAN DIEGO REGIONAL STANDARD DRAWING

DIKES – ASPHALT CONCRETE

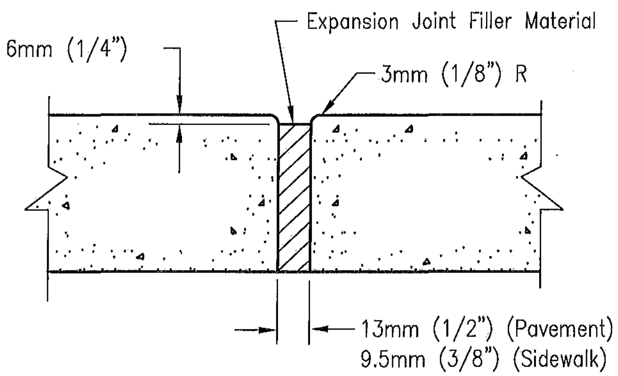
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

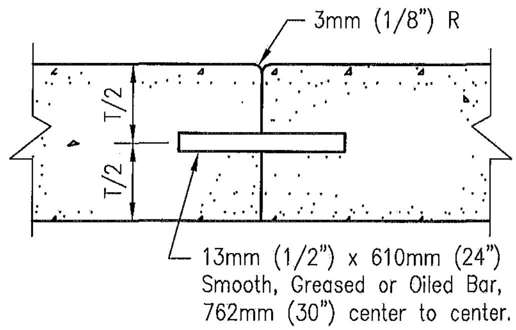
Chairperson R.C.E. 19246 Date

DRAWING NUMBER G–5

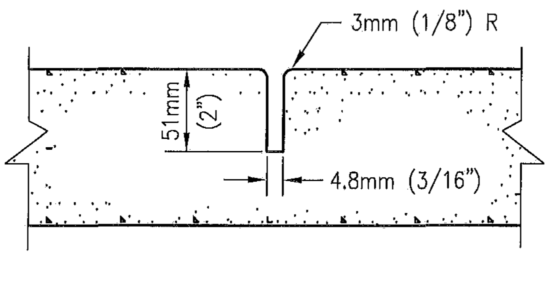
August 2009



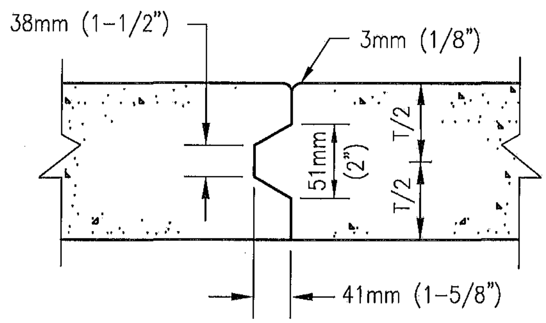
EXPANSION JOINT



CONTACT JOINT



WEAKENED PLANE JOINT
CURB AND SIDEWALK



KEYED JOINT

Revision	By	Approved	Date	
ORIGINAL		Parkinson	2/95	SAN DIEGO REGIONAL STANDARD DRAWING
Add Metric		T. Stanton	03/03	CONCRETE JOINT DETAILS
Reformatted		T. Stanton	04/06	

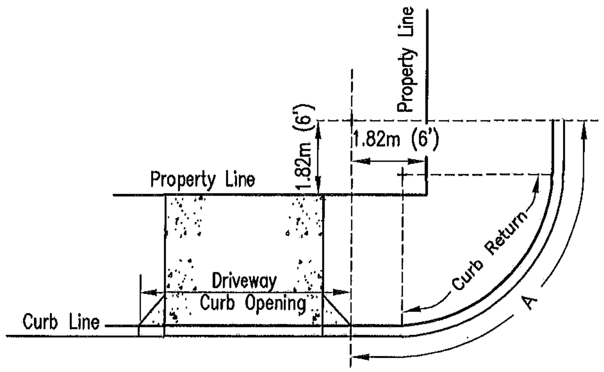
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

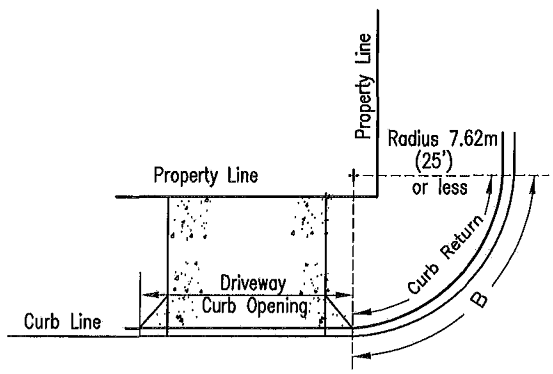
DRAWING NUMBER G-10

August 2009



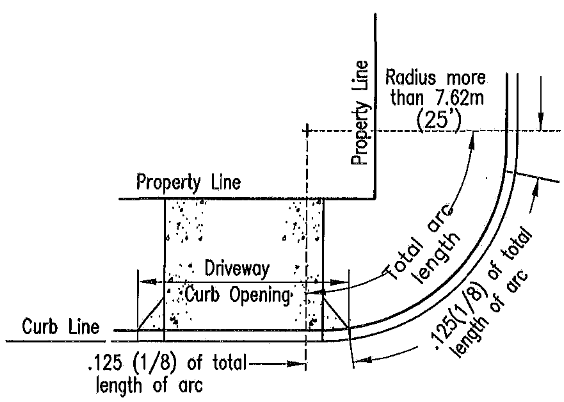
REQUIREMENT 1

No portion of any curb opening shall be permitted within 6' of the intersection of the prolonged property lines and the curb as shown by arc A.



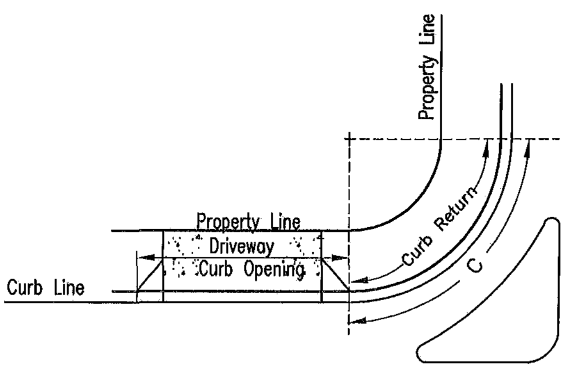
REQUIREMENT 2

No portion of any curb opening shall be permitted in the curb return where the radius of curb is 7.62m (25') or less, as shown by arc B.



REQUIREMENT 3

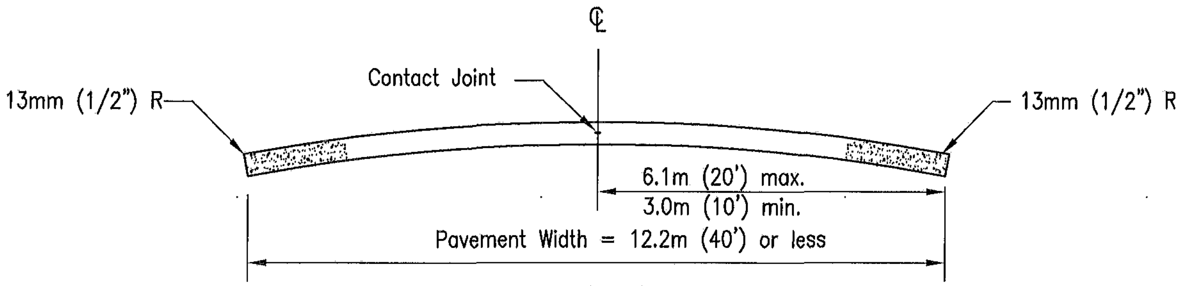
On all curb returns where the radius is more than 25', curb openings may encroach upon each end of the return a distance equal to 12 1/2% or .125 (1/8) of the total length of the arc on the curb return, thus leaving at least 75% of the length of arc on the return face free from driveway encroachment, provided Requirement 1 is met.



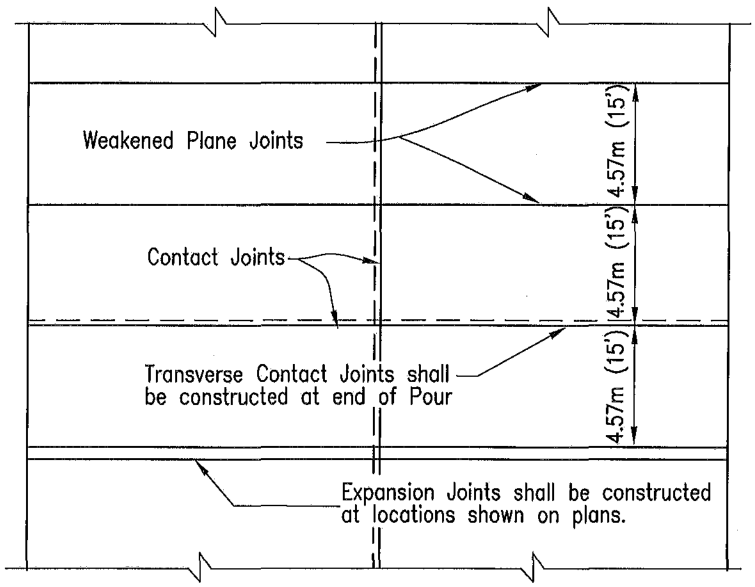
REQUIREMENT 4

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.

Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	DRIVEWAY LOCATION – ADJACENT TO CURB RETURNS AND STREET LINES	T. Stanton 3/01/2003 Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		DRAWING NUMBER G-15



SECTION



PLAN

NOTES:
1. Concrete shall be 332 kg/M^3 C 22 Mpa (560-C-3250).
2. See Standard Drawing G-10 for joint details.
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

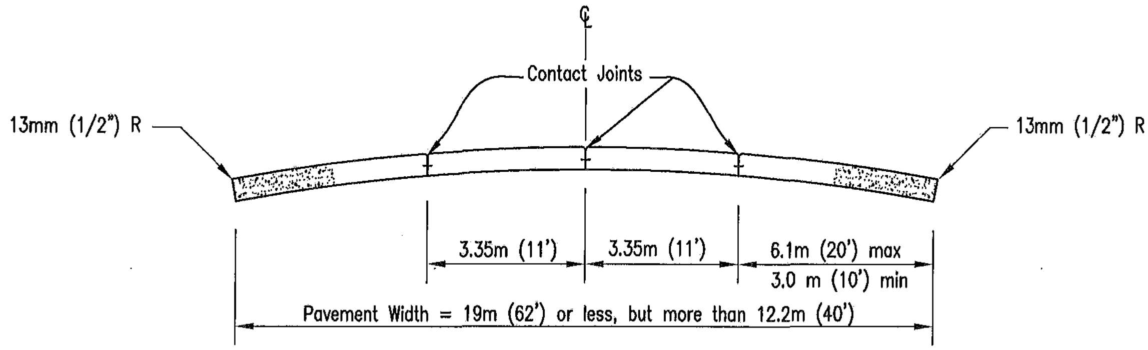
CONCRETE PAVEMENT
WIDTH 12.2m (40') OR LESS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

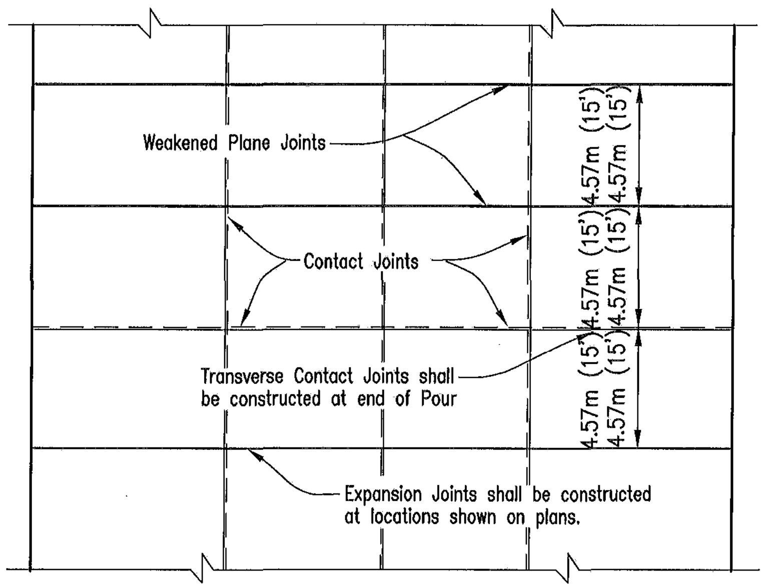
3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER G-18



SECTION



PLAN

NOTES:

1. Concrete shall be 332 kg/M^3 C 22 Mpa (560-C-3250).
2. See Standard Drawing G-10 for joint details.
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE PAVEMENT
WIDTH 12.2m (40') TO 19m (62')

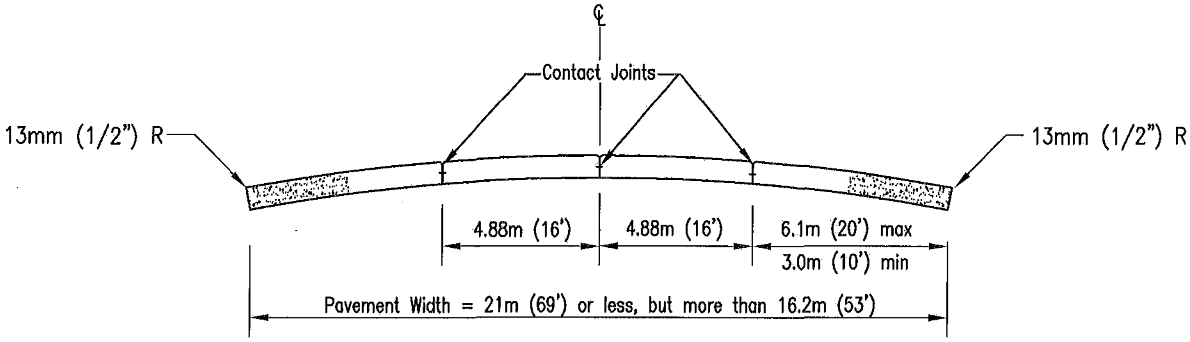
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 3/01/2003

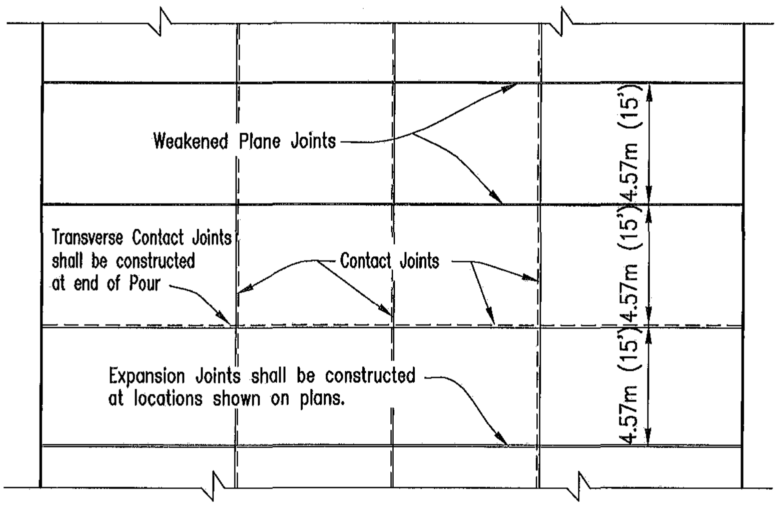
Chairperson R.C.E. 19246 Date

DRAWING NUMBER G-19

August 2009



SECTION



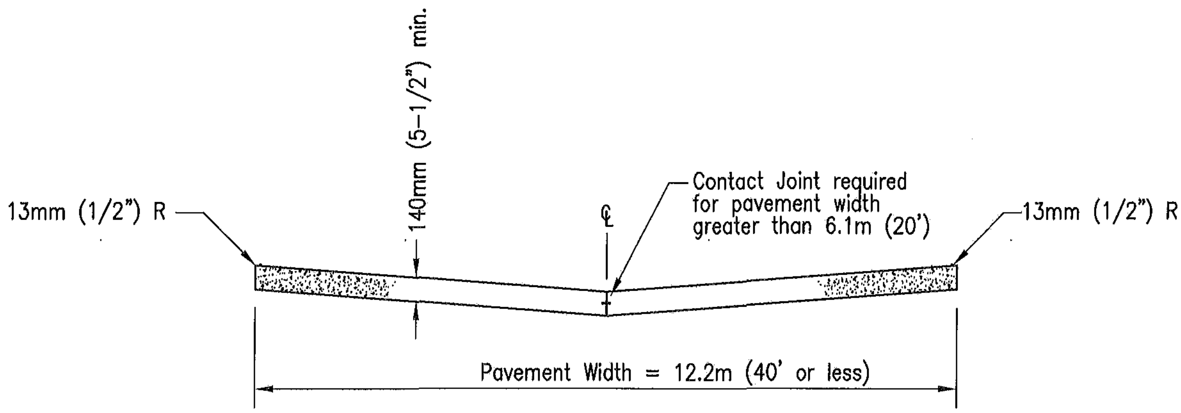
PLAN

NOTES:

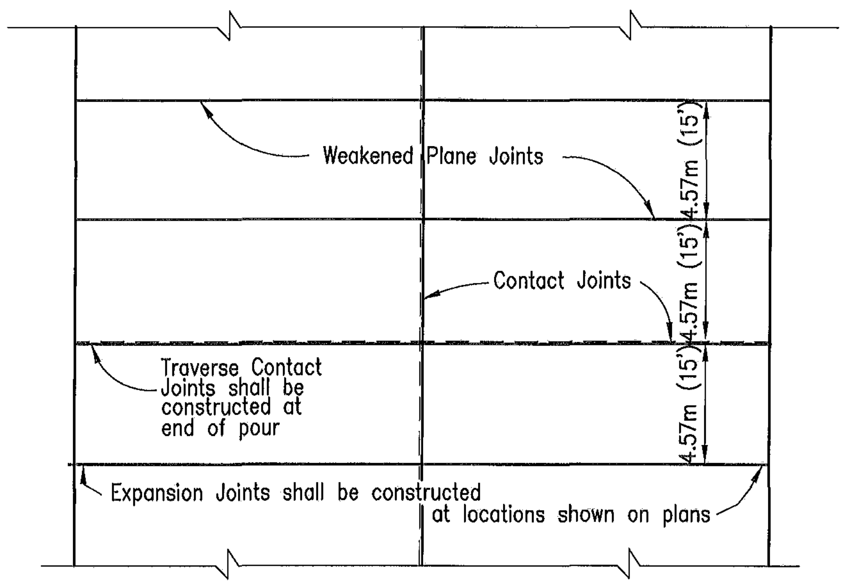
1. Concrete shall be 332 kg/M^3 C 22 Mpa (560-C-3250).
2. See Standard Drawing G-10 for joint details.
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75	CONCRETE PAVEMENT, ALLEY SECTION WIDTH 16.2m (53') TO 21m (69')	3/01/2003
Add Metric		T. Stanton	03/03		Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		DRAWING NUMBER G-20

August 2009



SECTION



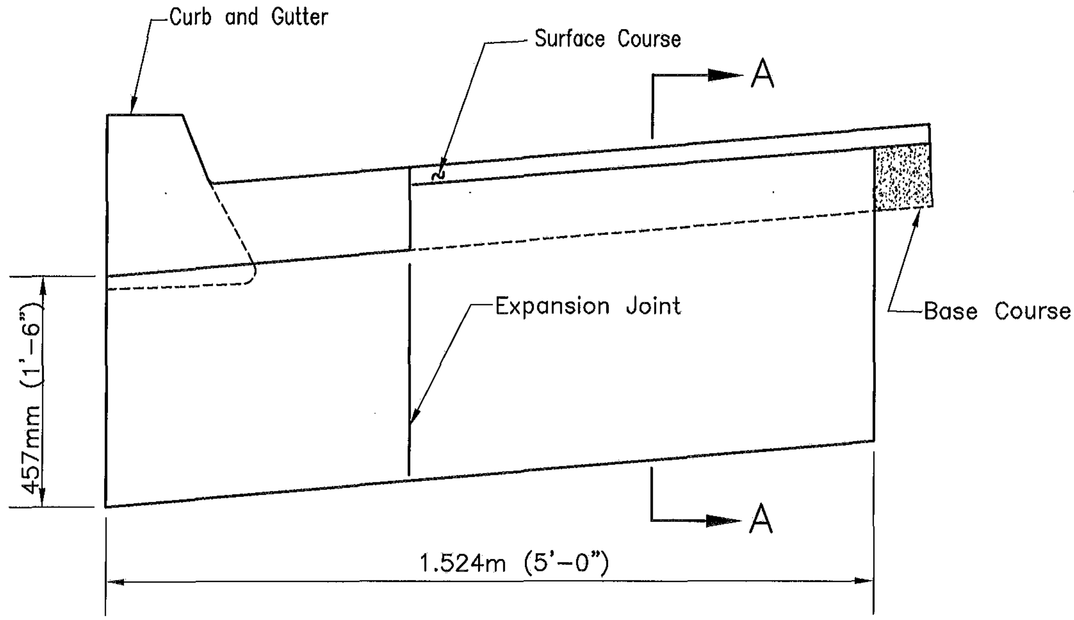
PLAN

NOTES:

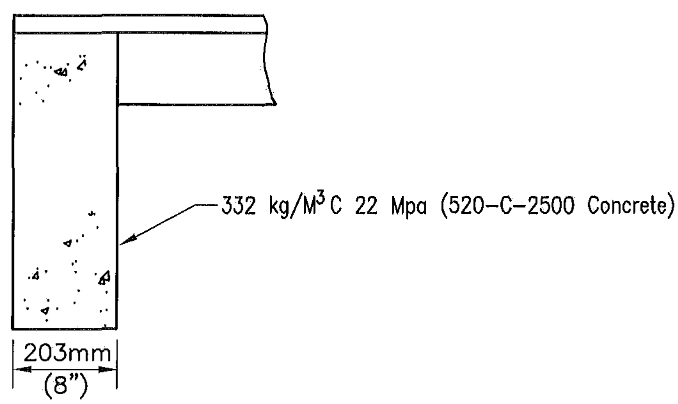
1. Concrete shall be 332 kg/M^3 C 22 Mpa (560-C-3250).
2. See Standard Drawing G-10 for joint details.
3. Adjust 4.57m (15') interval between Transverse Joints to match adjacent existing improvements.

Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	CONCRETE PAVEMENT ALLEY SECTION, WIDTH 12.2m (40') OR LESS	T. Stanton 3/01/2003
Reviewed		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER G-21

August 2009



ELEVATION

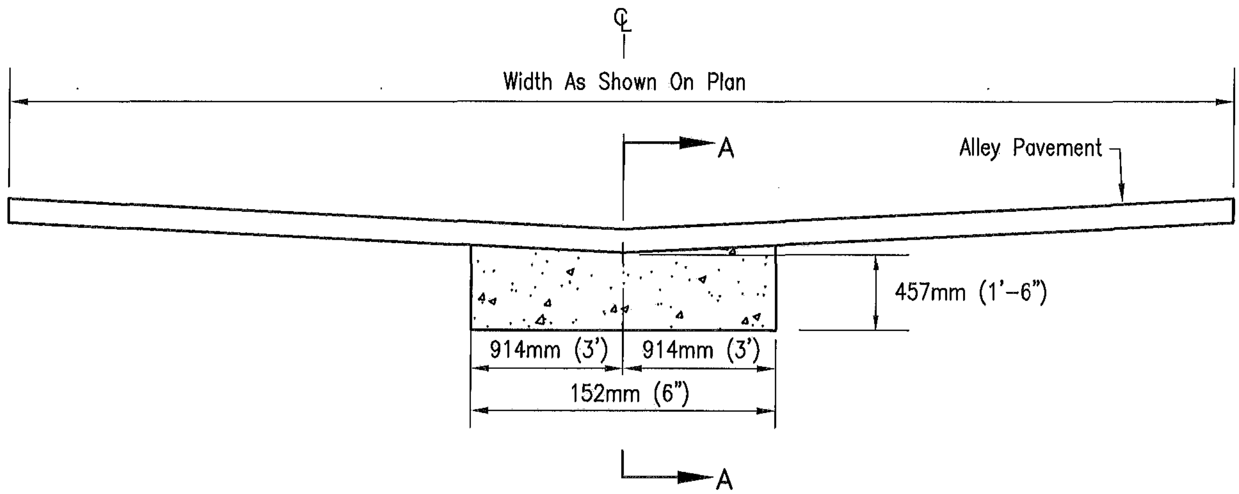


SECTION A-A

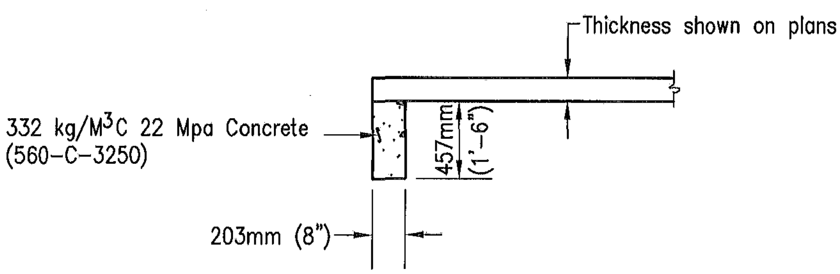
LEGEND ON PLANS

Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	CUTOFF WALL AT END OF PAVEMENT	3/01/2003
Reviewed		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER G-22

August 2009



ELEVATION

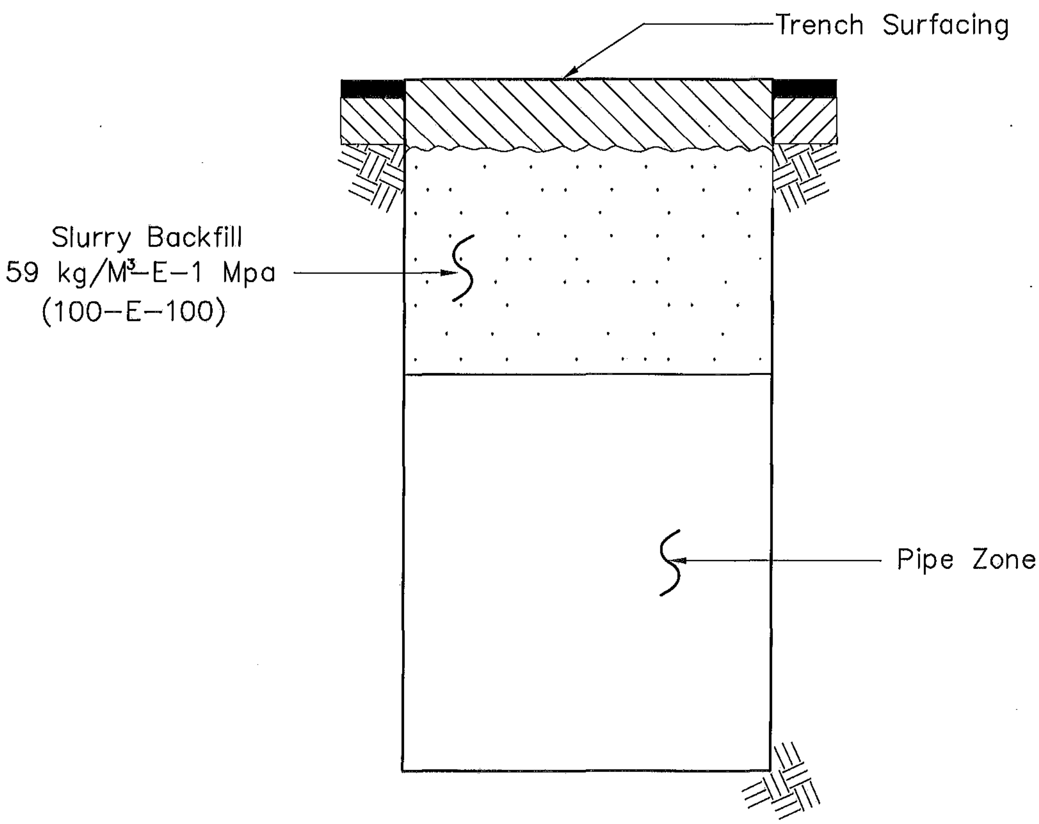


SECTION A-A

LEGEND ON PLANS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Kercheval	12/75		
Add Metric		T. Stanton	03/03	CUTOFF WALL AT END OF ALLEY PAVEMENT	3/01/2003
Reviewed		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER G-23

August 2009



NOTES

1. Trench resurfacing shall be done according to governmental (permitting) agency's requirements.
2. The sand used for the slurry backfill shall meet the requirements for fine aggregate (subsection 400–1.3) listed in the Standard Specifications for Public Works Construction. Slurry must be firm prior to trench resurfacing.
3. Slurry backfill shall not be used where it will impede subsurface drainage.

Revision	By	Approved	Date
ORIGINAL		Parkinson	9/88
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

SLURRY BACKFILL

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

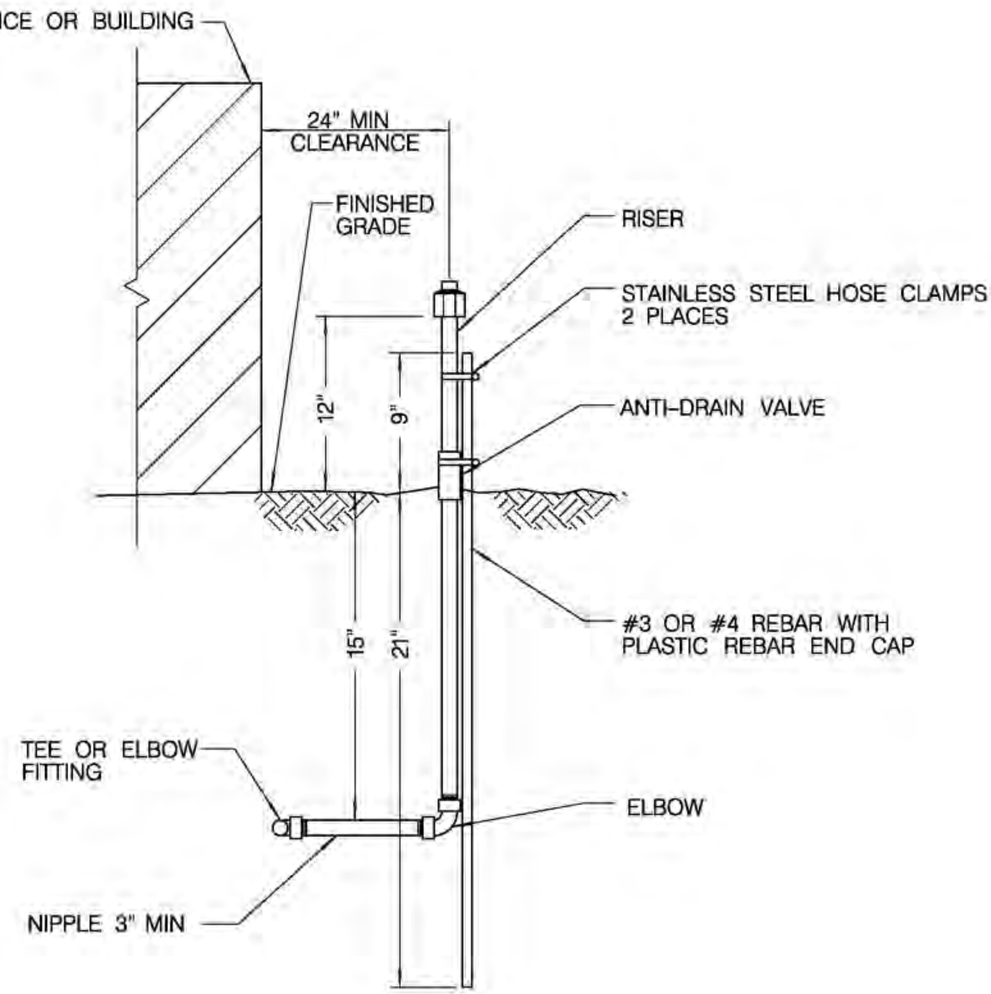
Chairperson R.C.E. 19246 Date

DRAWING NUMBER G–36

August 2009

CHAPTER 5

SPRINKLER IRRIGATION SYSTEMS



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. 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

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

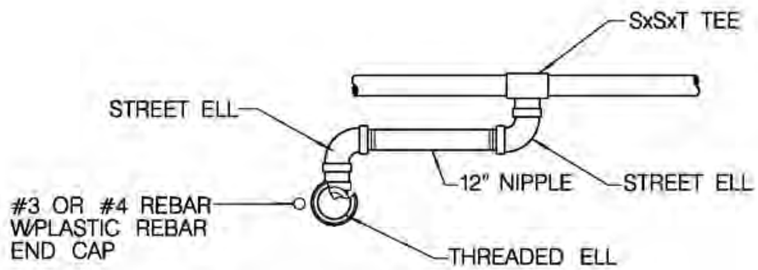
SHRUB SPRAY HEAD ON FIXED RISER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

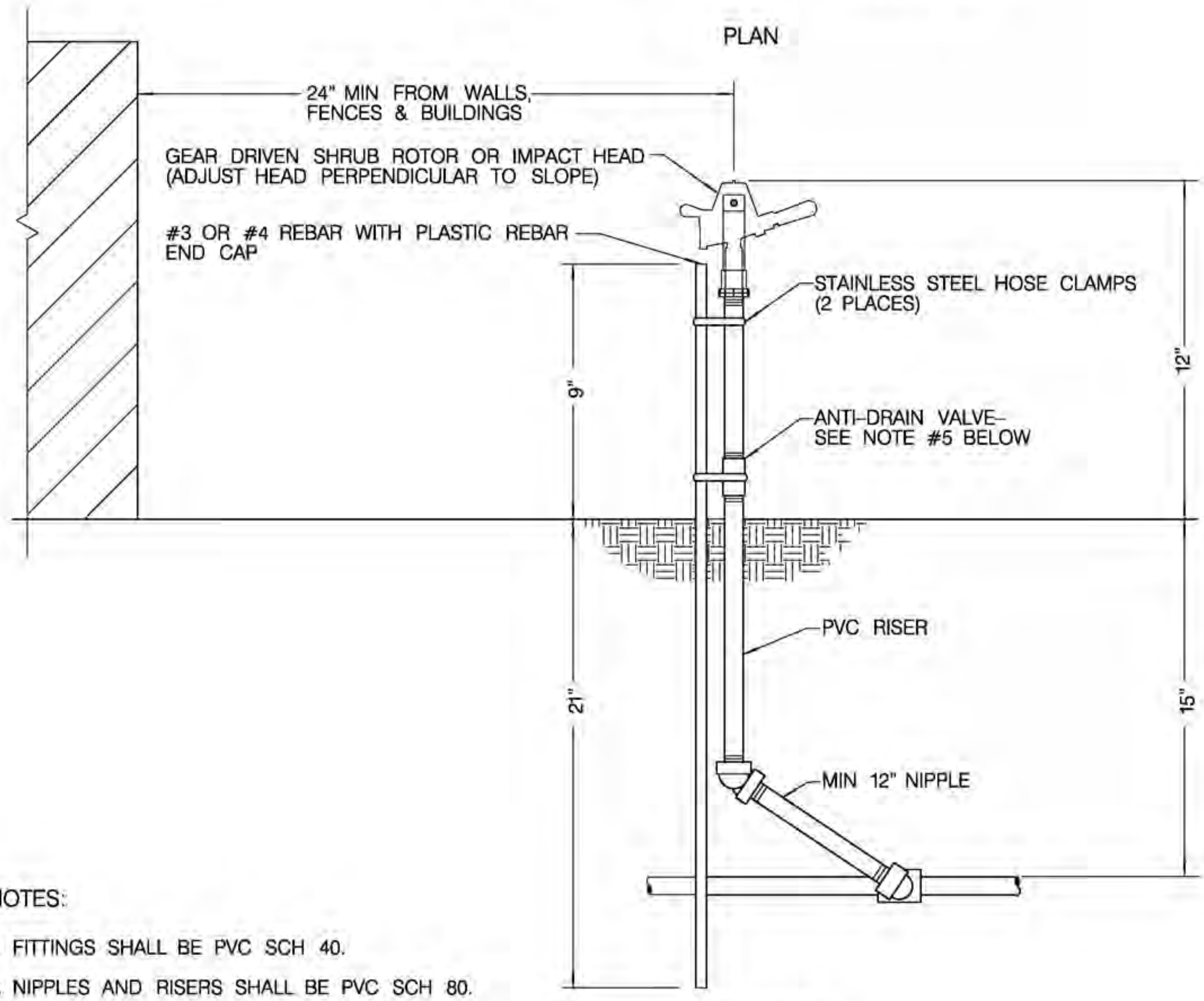
H. Hasli

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

DRAWING NUMBER **SDI-101**



PLAN



ELEVATION

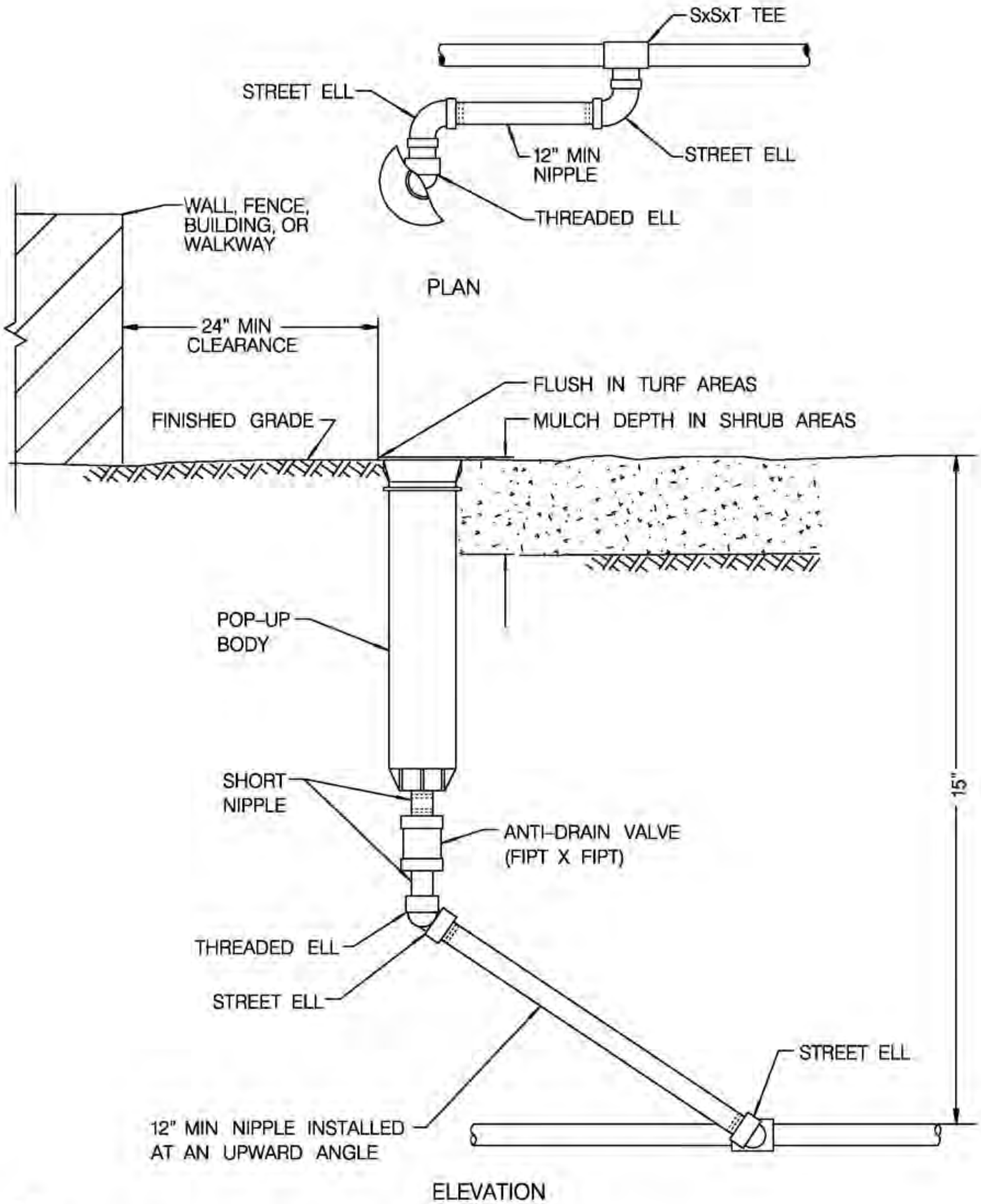
NOTES:

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. NO FIXED RISERS ALLOWED IN RIGHT-OF-WAY OR WITHIN 10' OF VEHICULAR OR PEDESTRIAN TRAFFIC.

LEGEND ON PLANS

SHOW A NUMBER TO INDICATE HEAD TYPE

REVISION	BY	APPROVED	DATE		
ORIGINAL*	RH	J. NAGELVOORT	01/12	CITY OF SAN DIEGO - STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE 1/31/2012 COORDINATOR R.C.E. 65271 DATE
				ROTOR OR IMPACT HEAD ON FIXED RISER	DRAWING NUMBER **SDI-102**



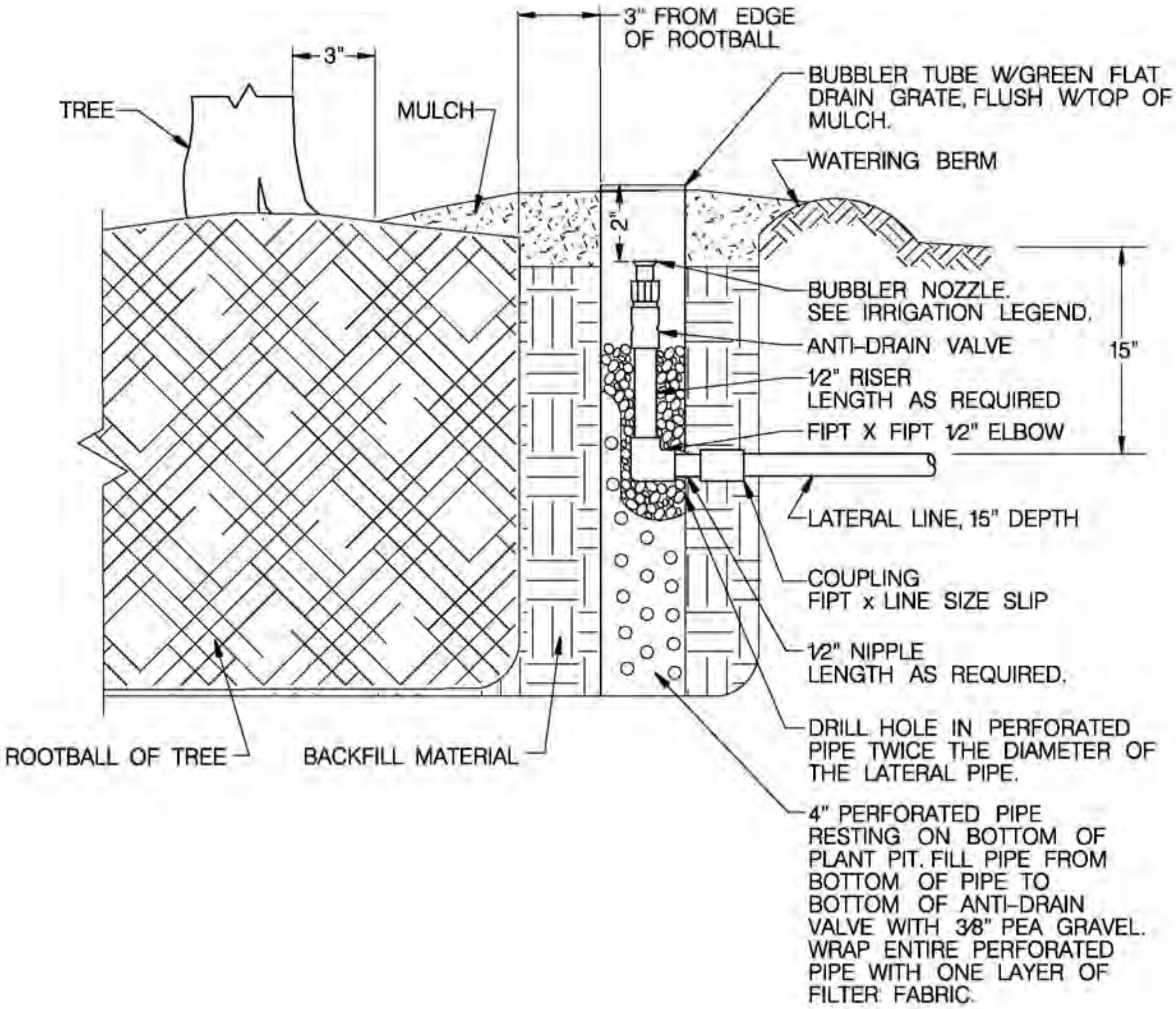
NOTES:

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.

LEGEND ON PLANS

SHOW A NUMBER TO
INDICATE TYPE HEAD

REVISION	BY	APPROVED	DATE	CITY OF SAN DIEGO - STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
ORIGINAL*	RH	J. NAGELVOORT	01/12		1/31/2012
				ROTOR, SPRAY, OR BUBBLER	COORDINATOR R.C.E. 65271 DATE
				POP-UP HEAD	DRAWING NUMBER **SDI-103**



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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

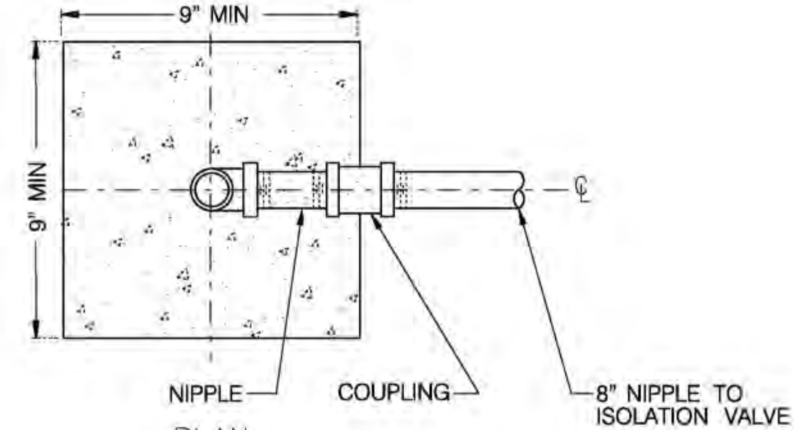
TREE BUBBLER TUBE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

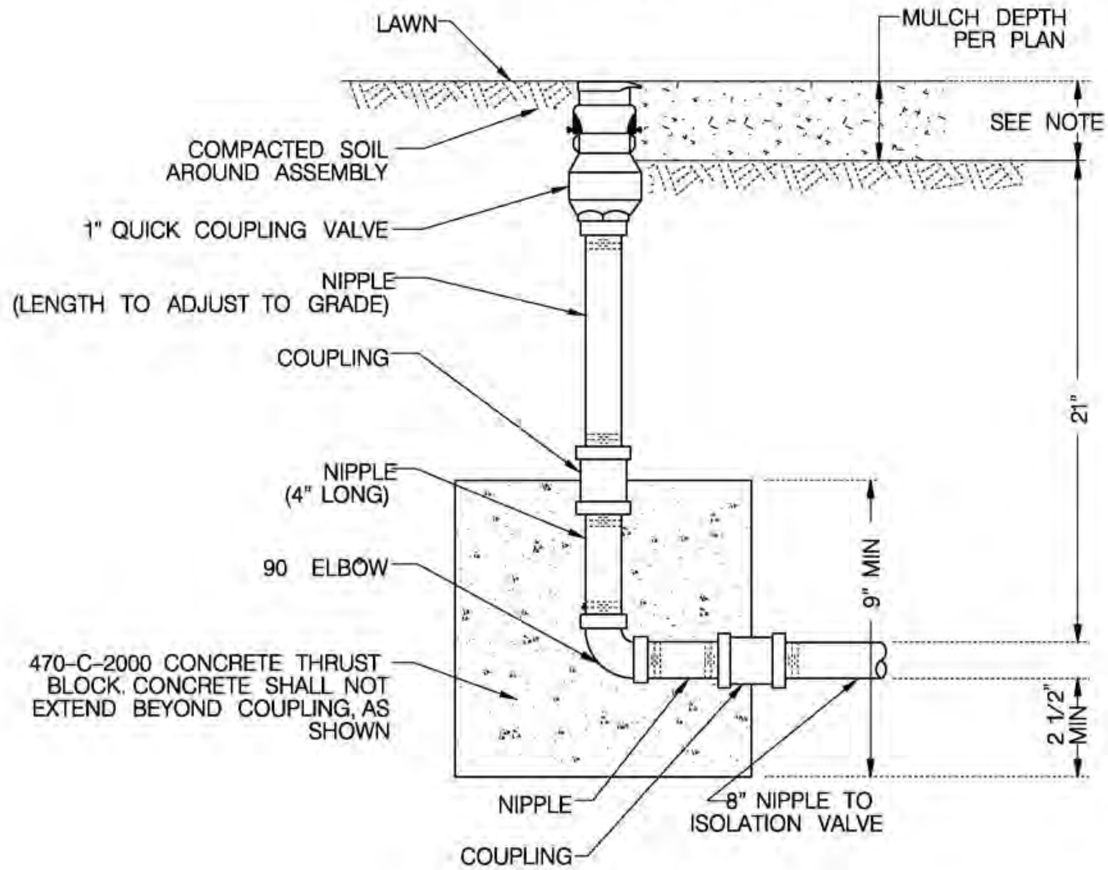
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-104**



PLAN



ELEVATION

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. TEFLON TAPE SHALL BE USED ON THREADED CONNECTIONS.
5. UPON PROJECT ACCEPTANCE, THE CONTRACTOR SHALL PROVIDE TWO SETS OF APPROPRIATE QUICK CUPLER VALVE KEY WITH 1" BRASS BALL VALVE AND SWIVEL ADAPTER INCLUDED IN THE ASSEMBLY.

LEGEND ON PLANS

QCV ●

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

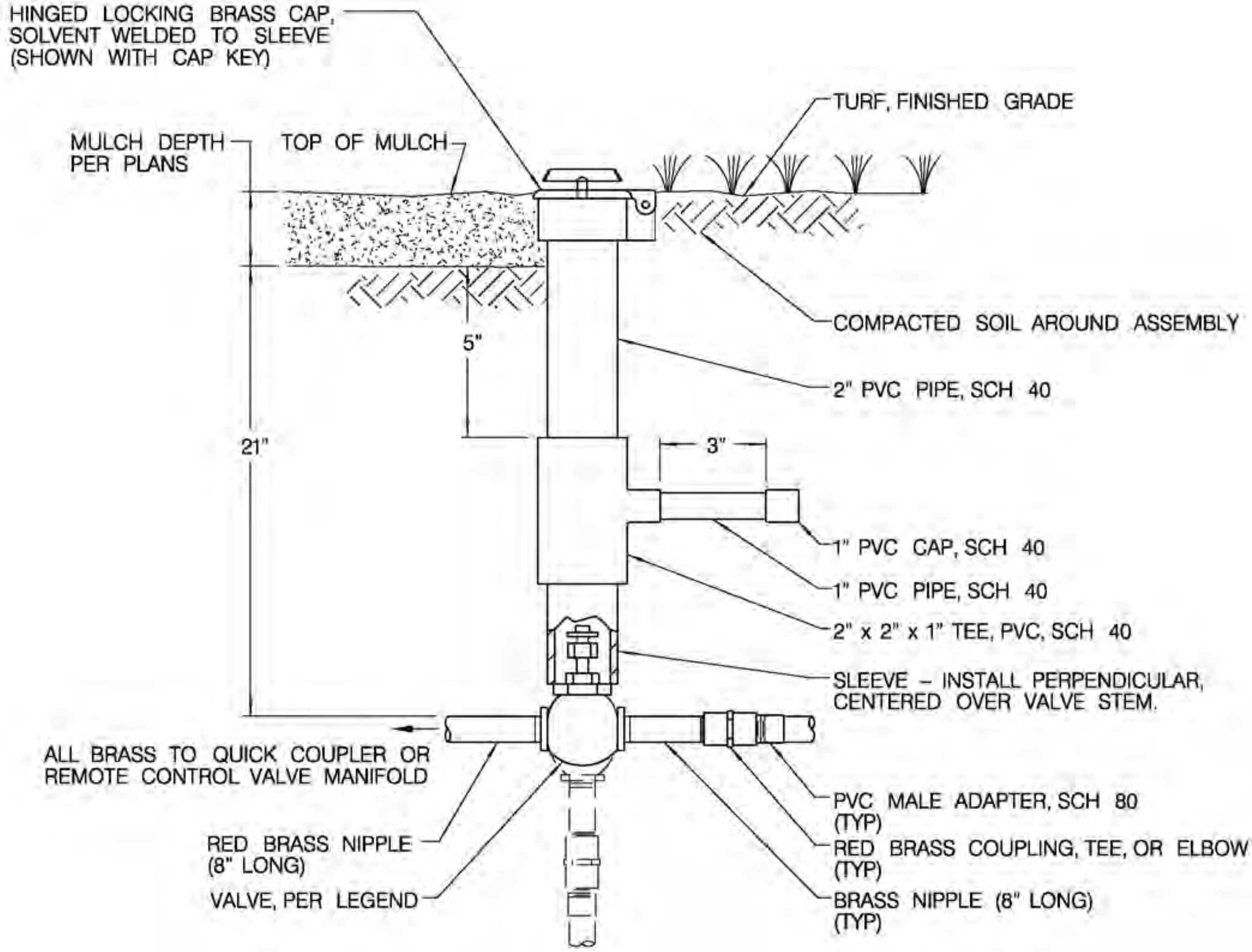
QUICK COUPLING VALVE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-105**



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. TEFLON TAPE SHALL BE USED ON ALL THREADED CONNECTIONS.
9. WHEN INSTALLED AS MAINLINE ISOLATION VALVE, NIPPLES AND FITTINGS MAY BE SCH 80 PVC.

LEGEND


GV

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

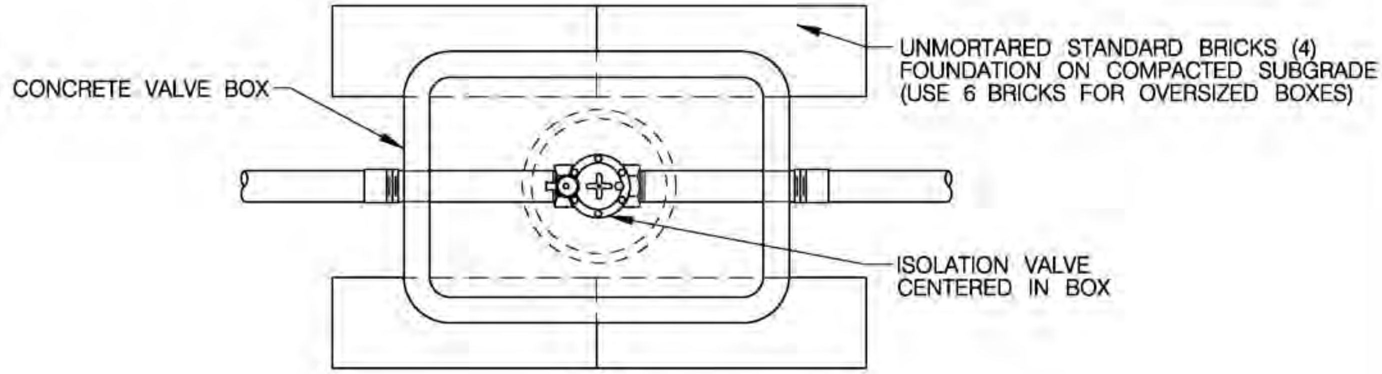
CITY OF SAN DIEGO – STANDARD DRAWING

ISOLATION GLOBE VALVE
2" AND SMALLER

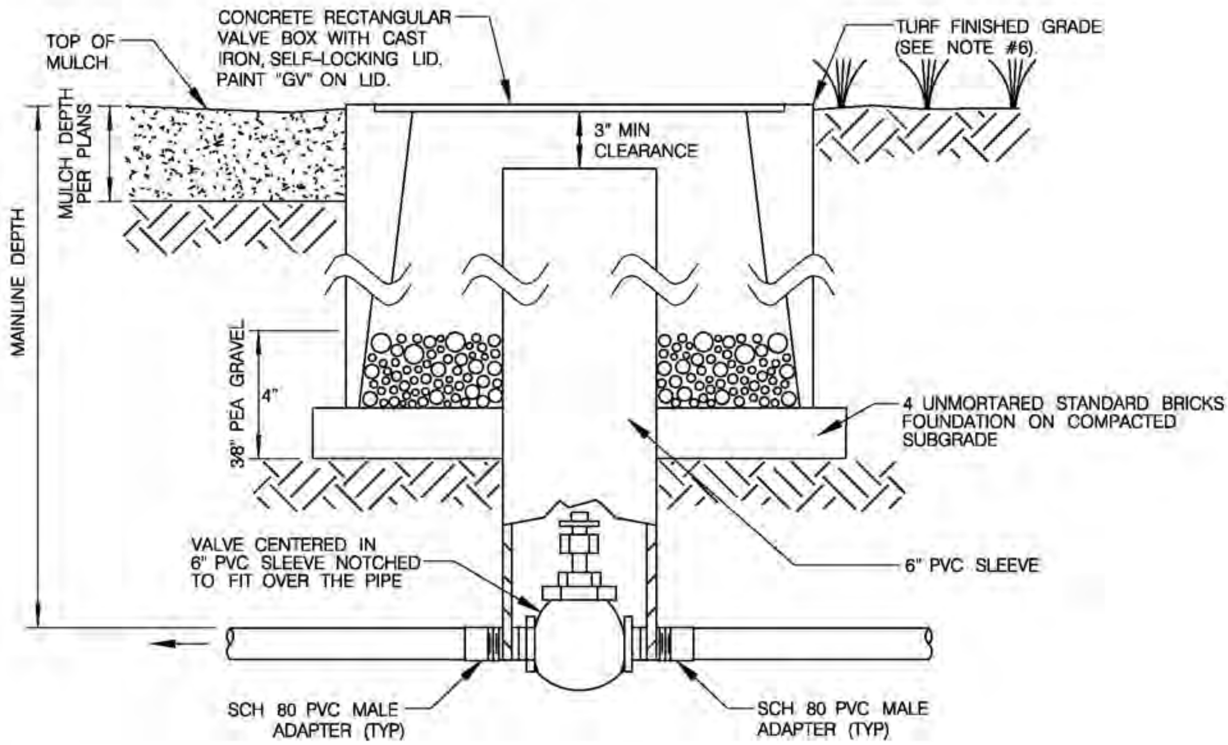
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDI-106**



PLAN



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.

LEGEND ON PLANS

GATE VALVE GLOBE VALVE

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

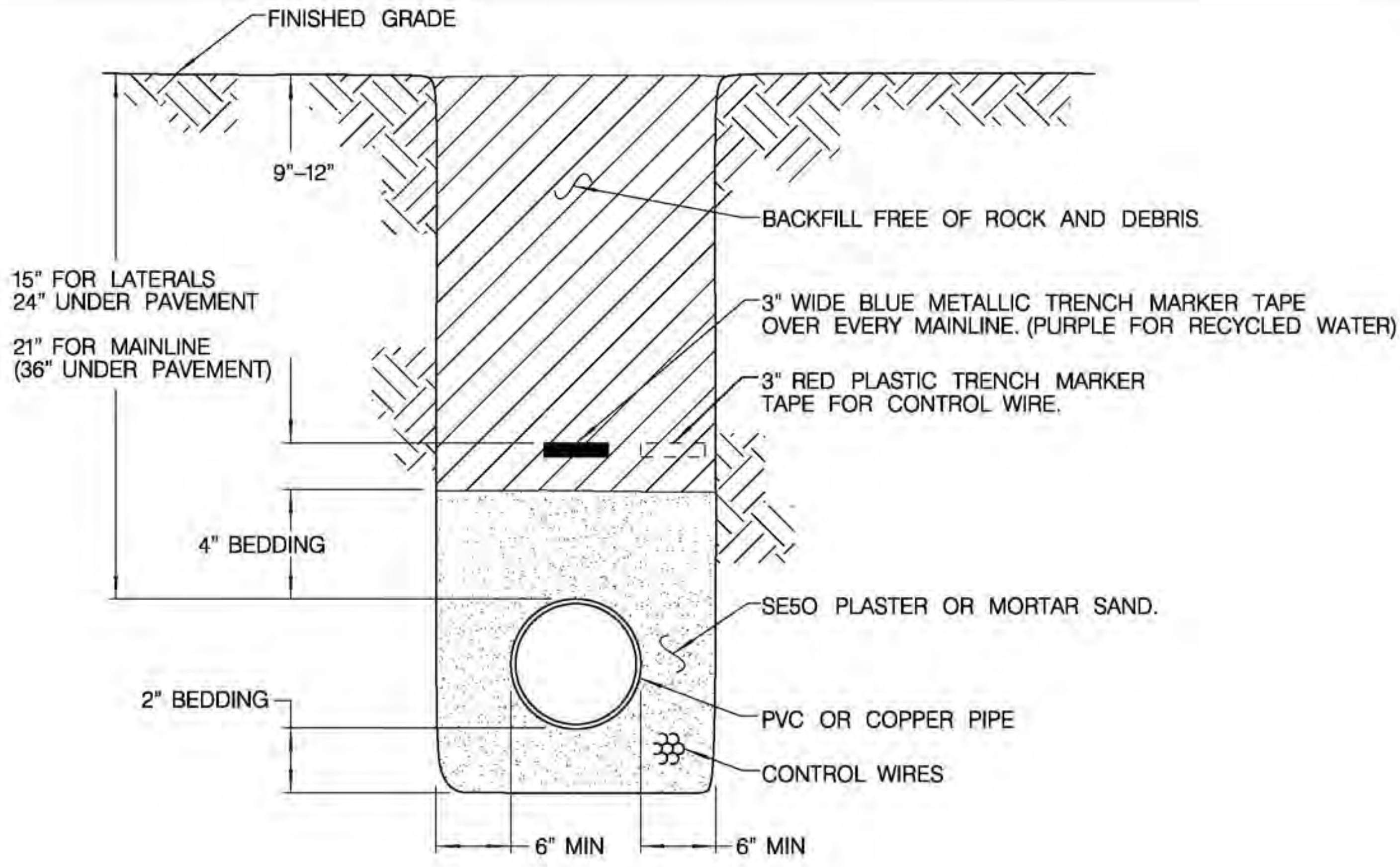
ISOLATION GLOBE/GATE VALVE
2 1/2" AND LARGER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

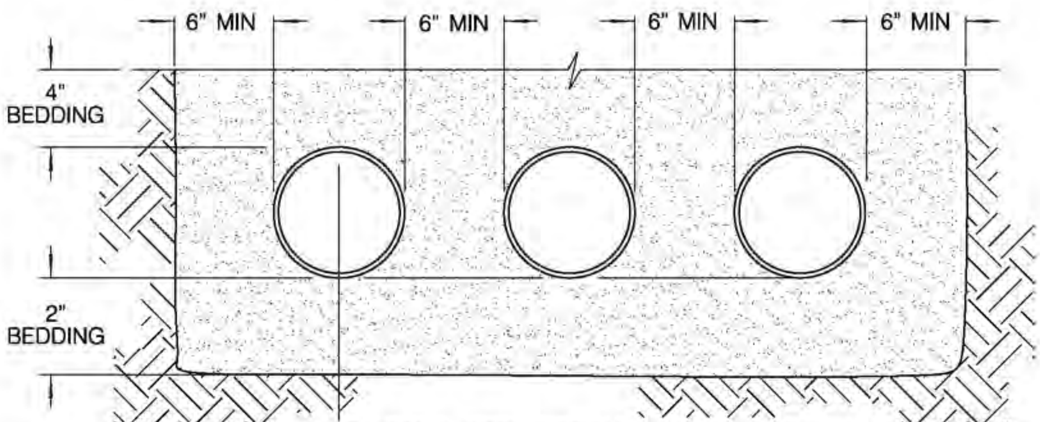
H. Hoole 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-107**



MAINLINE TRENCH

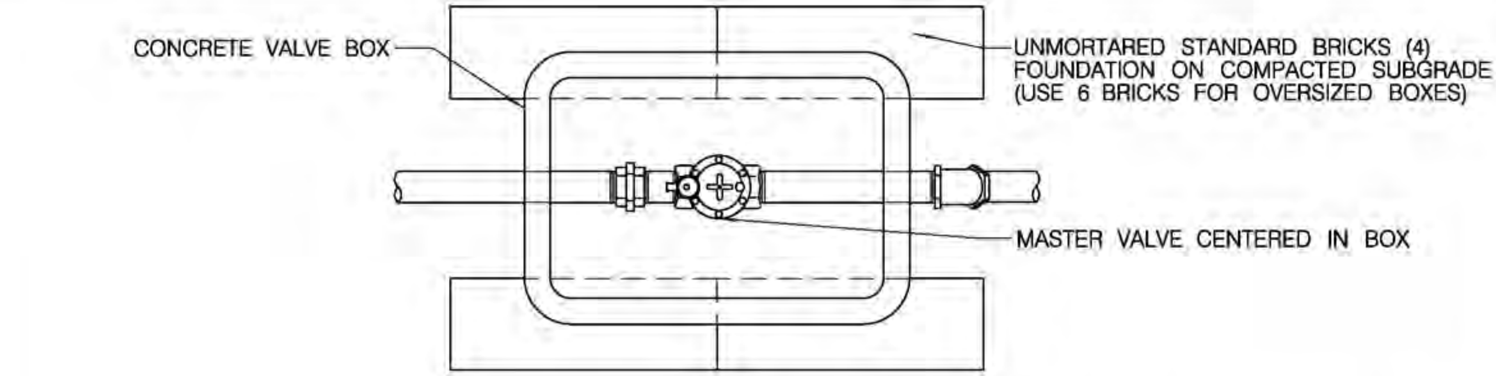


MULTIPLE PIPE INSTALLATION DETAIL

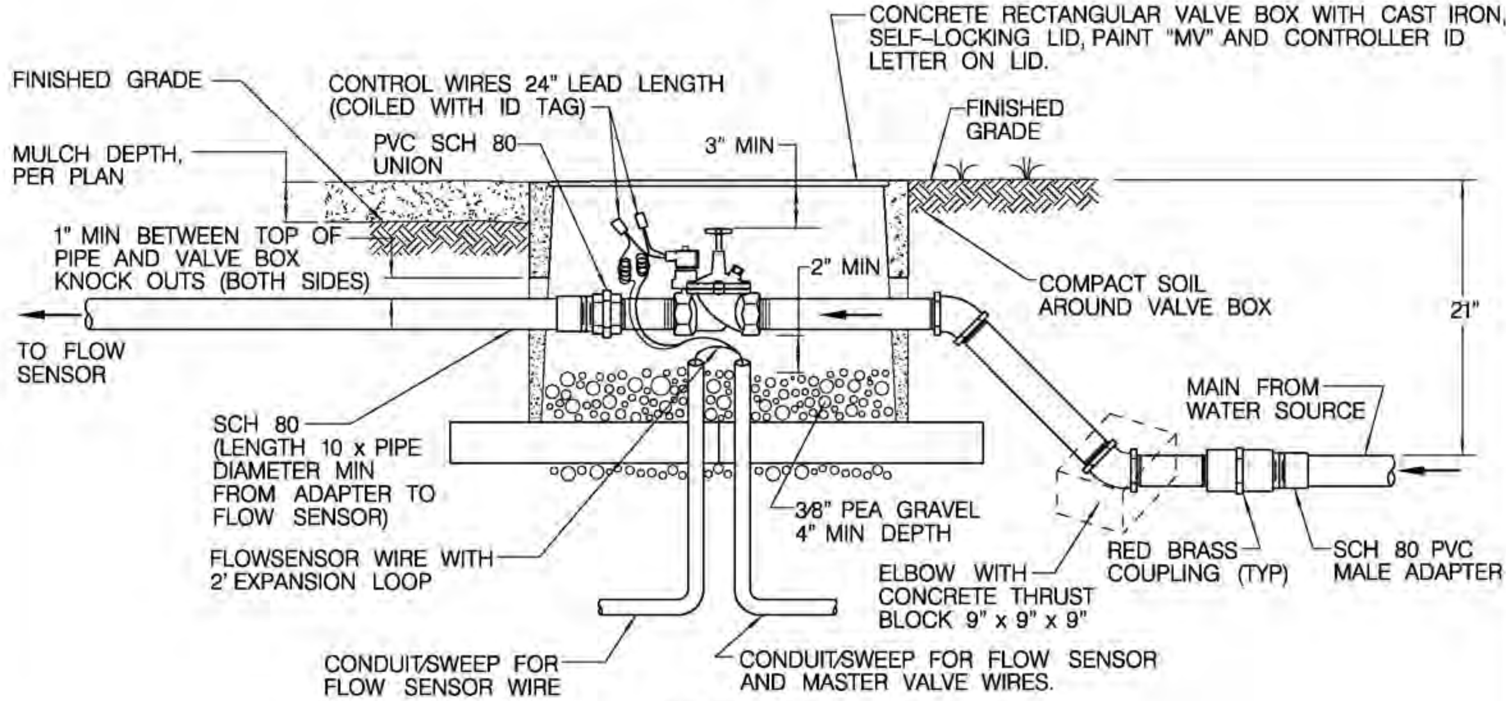
NOTES:

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.

REVISION	BY	APPROVED	DATE		
ORIGINAL*	RH	J. NAGELVOORT	01/12	CITY OF SAN DIEGO – STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE 1/31/2012 COORDINATOR R.C.E. 65271 DATE
				IRRIGATION TRENCH PVC OR COPPER PIPE	DRAWING NUMBER **SDI-110**



PLAN



ELEVATION

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 / GROUNDCOVER AREAS, PER MULCH DEPTH. IF NECESSARY TO BE SET IN TURF, VALVE BOXES SHALL BE SET FLUSH WITH FINISHED GRADE.
9. CLOSE NIPPLES SHALL NOT BE USED.
10. NIPPLES, ELBOWS, AND FITTINGS SHALL BE THREADED RED BRASS, FROM COUPLING THROUGH THE MASTER VALVE. PIPE AND FITTINGS DOWNSTREAM SHALL BE SCH 80 PVC.
11. TEFLON TAPE SHALL BE USED ON THREADED CONNECTOR.

LEGEND ON PLANS

▼ MV

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

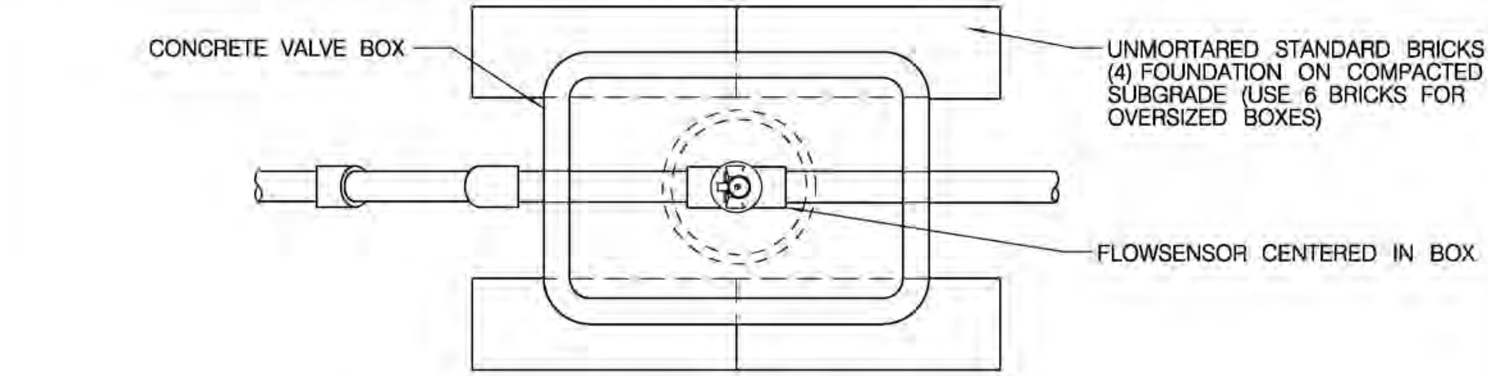
MASTER VALVE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

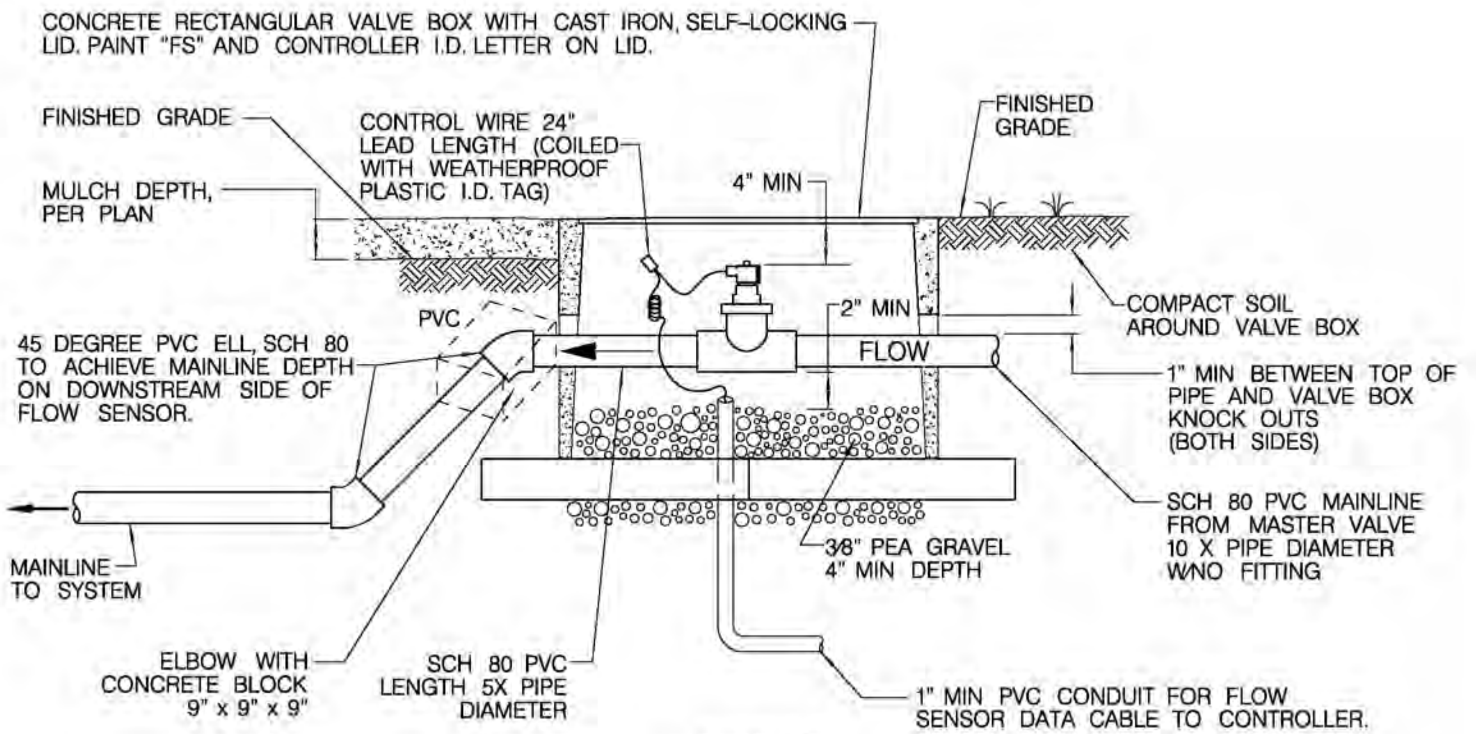
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-111**



PLAN



ELEVATION

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

(F) FS

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

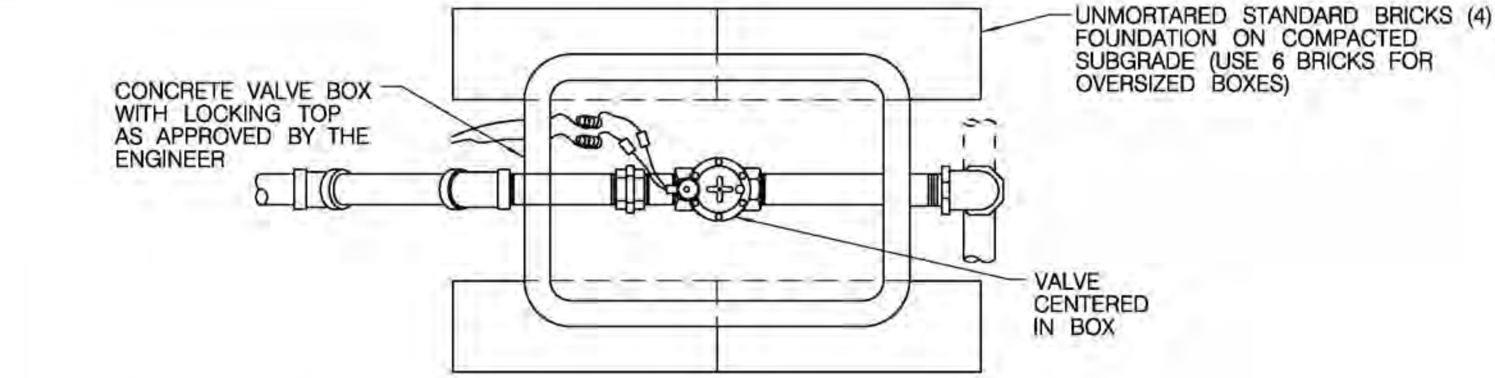
FLOW SENSOR

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

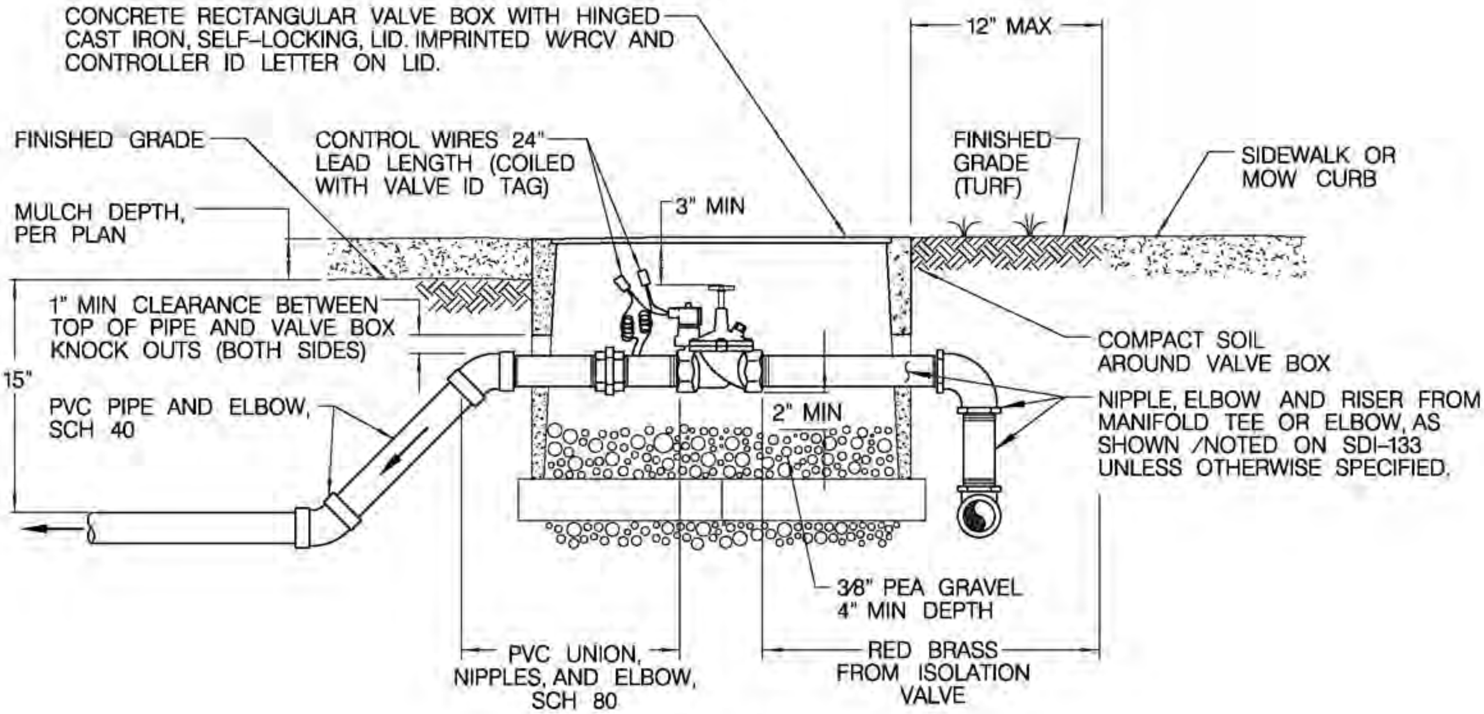
H. Hadi 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-112**



PLAN



ELEVATION

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

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

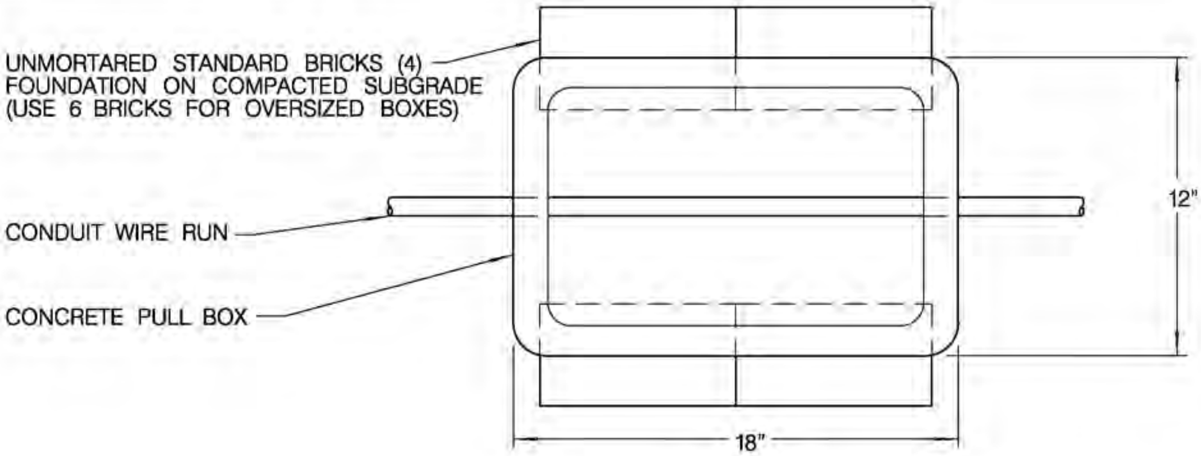
CITY OF SAN DIEGO - STANDARD DRAWING

REMOTE CONTROL VALVE

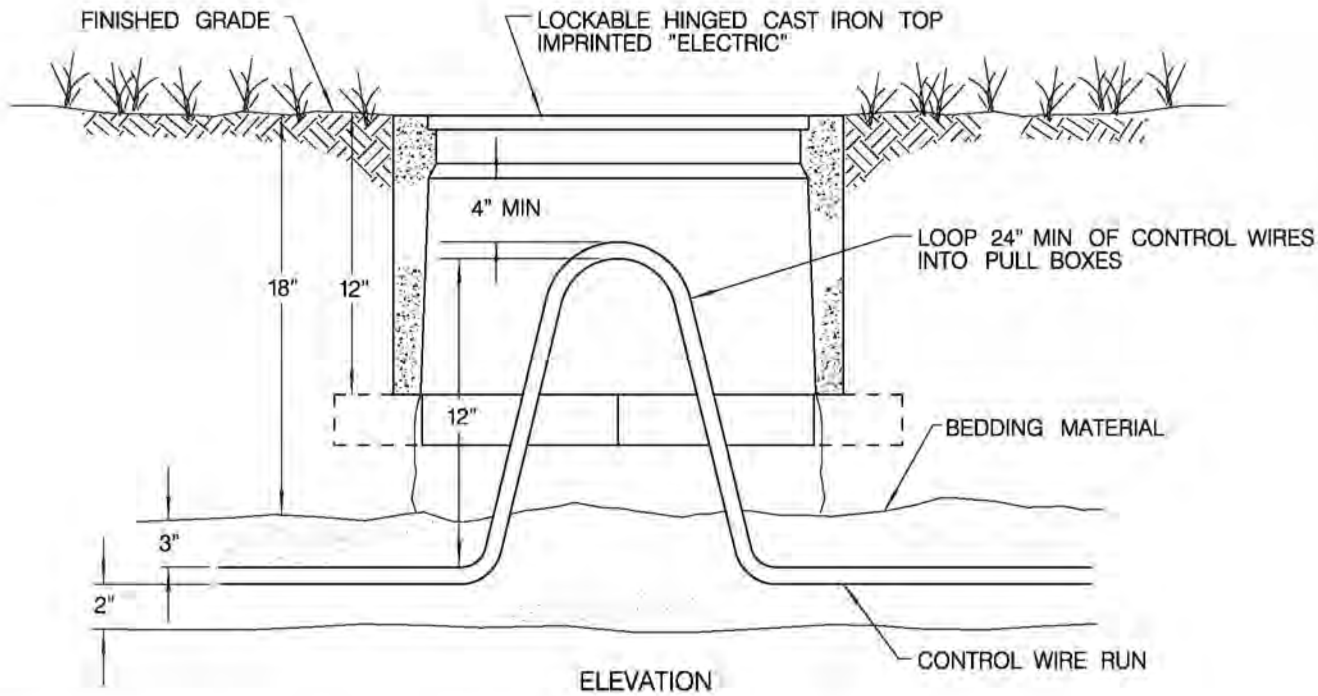
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDI-114**



PLAN VIEW

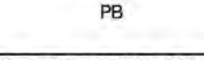


ELEVATION

NOTES:

1. INSTALL PULL BOXES AS SHOWN ON PLANS AND AT EACH END OF CONDUITS. SWEEPS RUNNING UNDER VEHICULAR 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.

LEGEND ON PLANS



PB

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

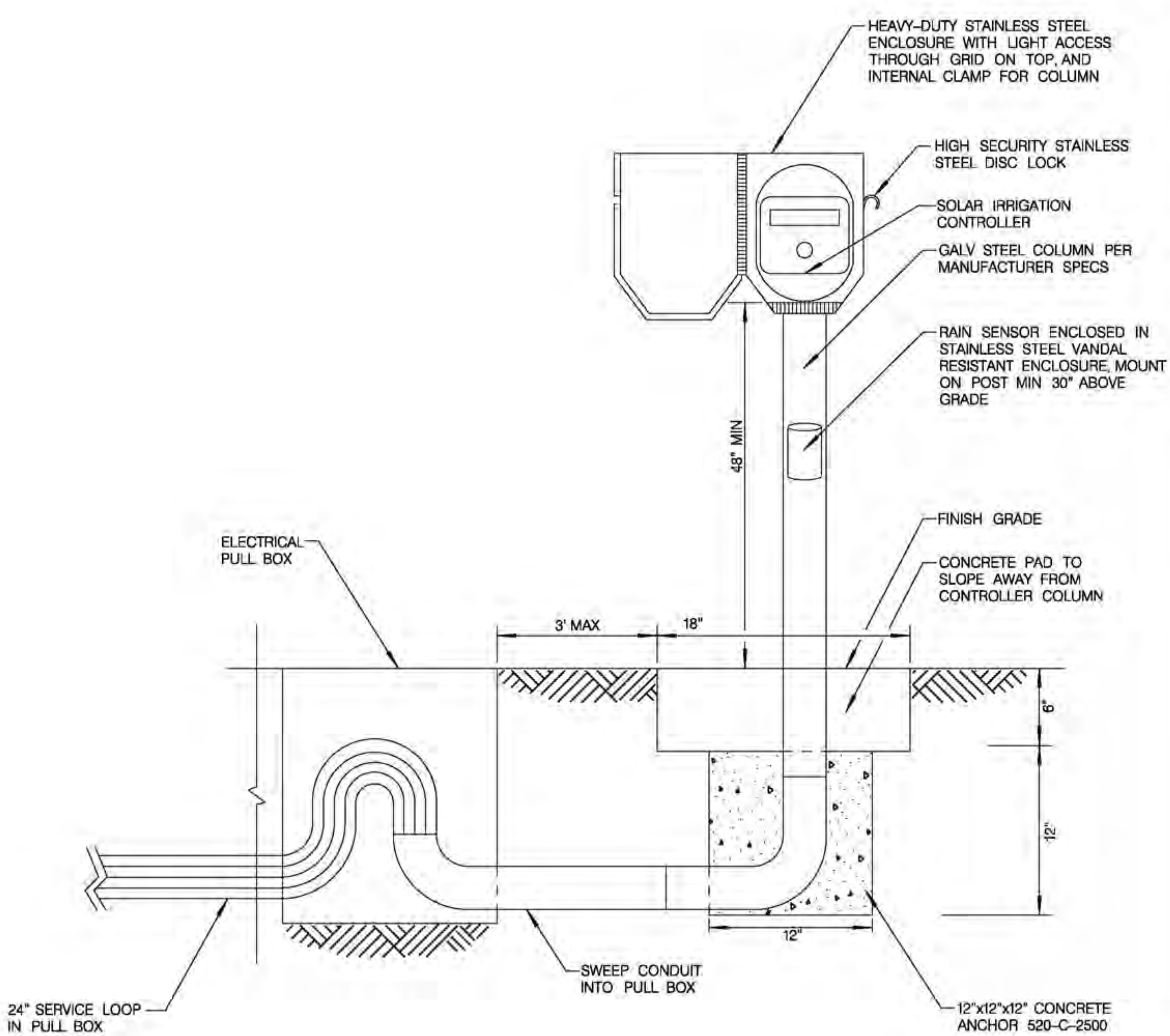
ELECTRICAL PULL BOX
FOR DIRECT BURIAL CONTROL WIRES
AND SPLICING NOTES

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hadi 1/31/2012

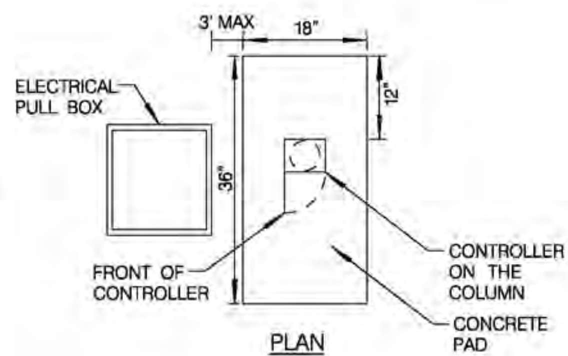
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-115**



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.



PLAN

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

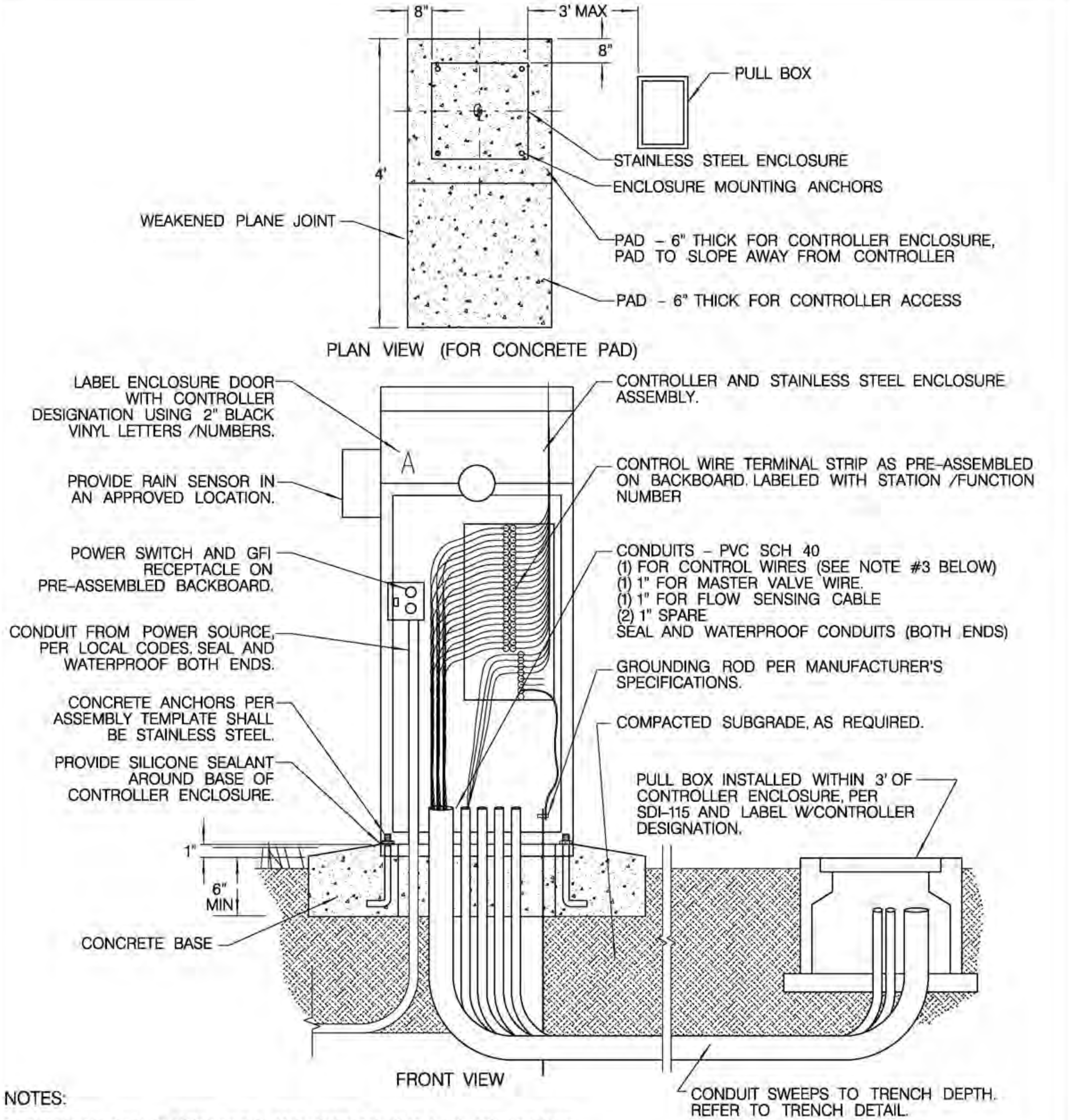
SOLAR IRRIGATION CONTROLLER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **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 CONTOL PANEL AND LABEL.
4. SEAL CONDUIT OPENINGS WITH ELECTRICAL SEALANT, AS APPROVED BY THE ENGINEER.

LEGEND ON PLANS

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

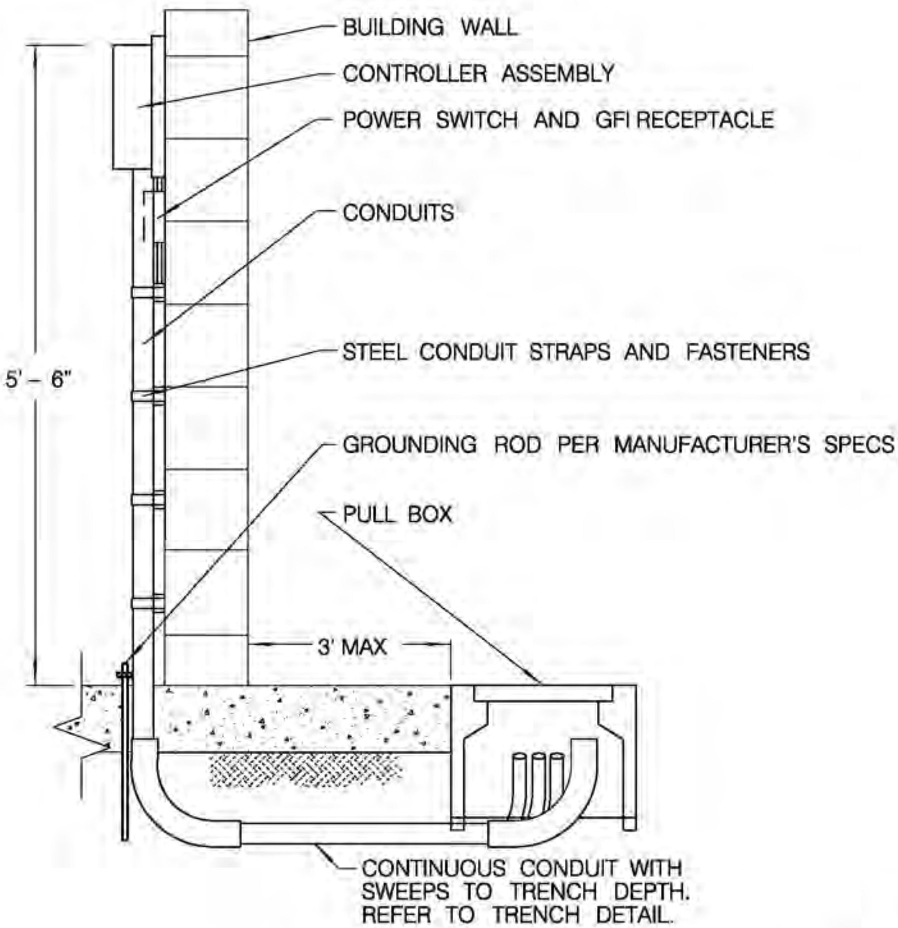
AUTOMATIC IRRIGATION CONTROLLER
PEDESTAL MOUNTED

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

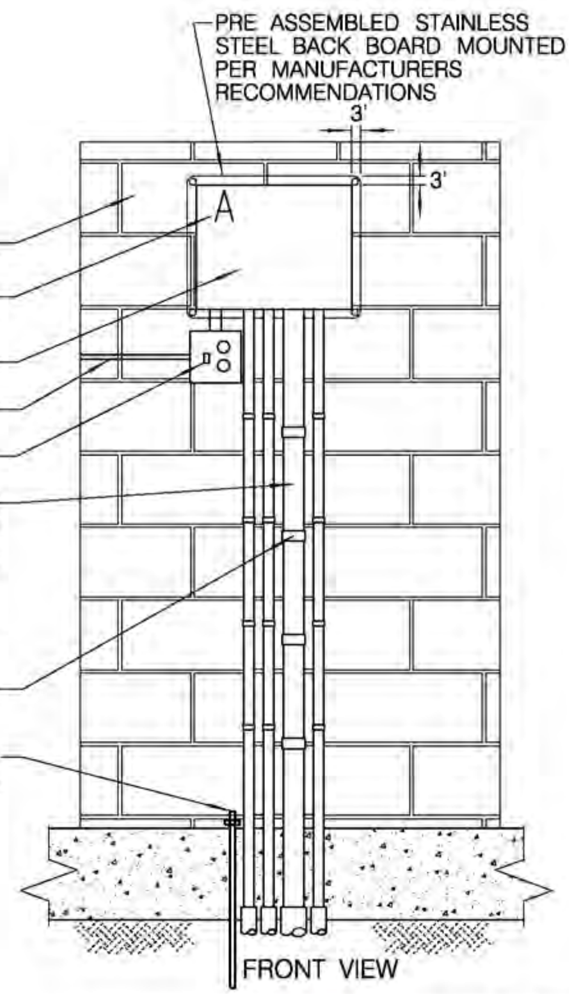
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-117**



SIDE VIEW

LEGEND ON PLANS



FRONT VIEW

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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

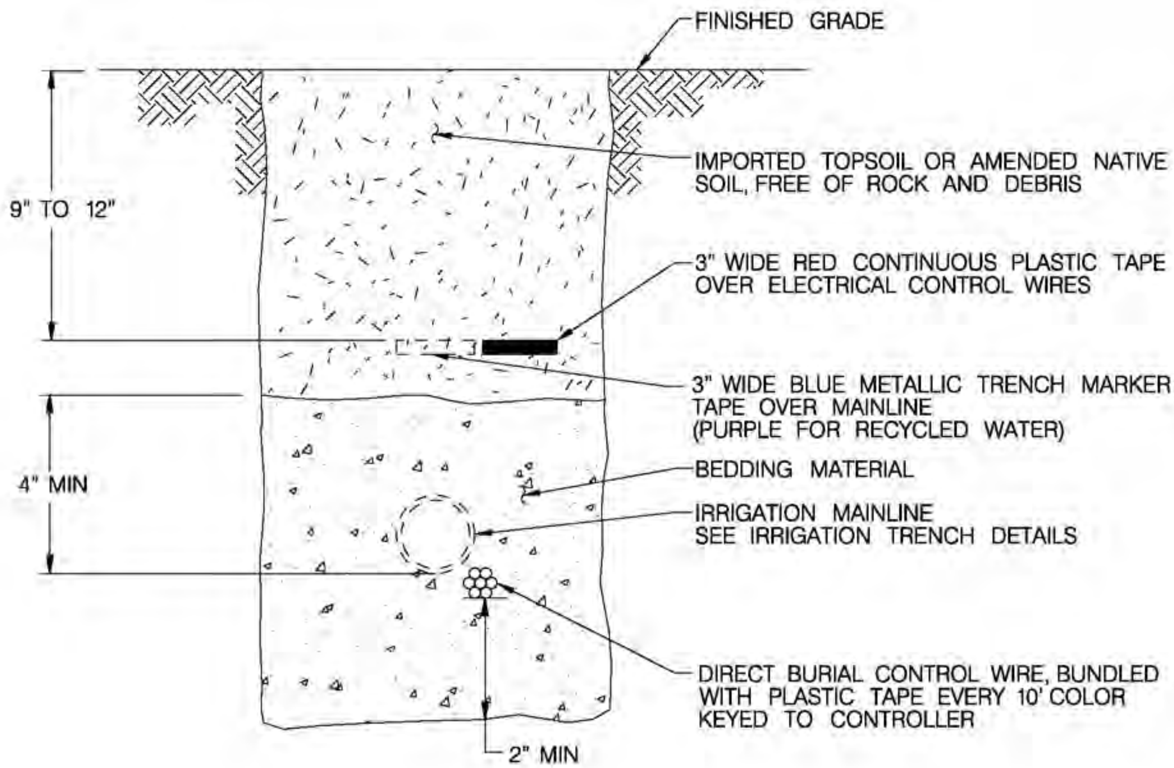
AUTOMATIC IRRIGATION CONTROLLER
INDOOR WALL MOUNTED

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-118**



NOTES:

1. BEDDING MATERIAL SHALL BE SE 50 PLASTER OR MORTAR SAND.
2. WIRES WHICH RUN UNDER PAVED AREAS SHALL BE INSTALLED IN PVC CONDUIT TWICE THE DIAMETER OF THE WIRE BUNDLE (2" MINIMUM SIZE), EXTENDING 12" MINIMUM BEYOND EDGE OF PAVEMENT.
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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

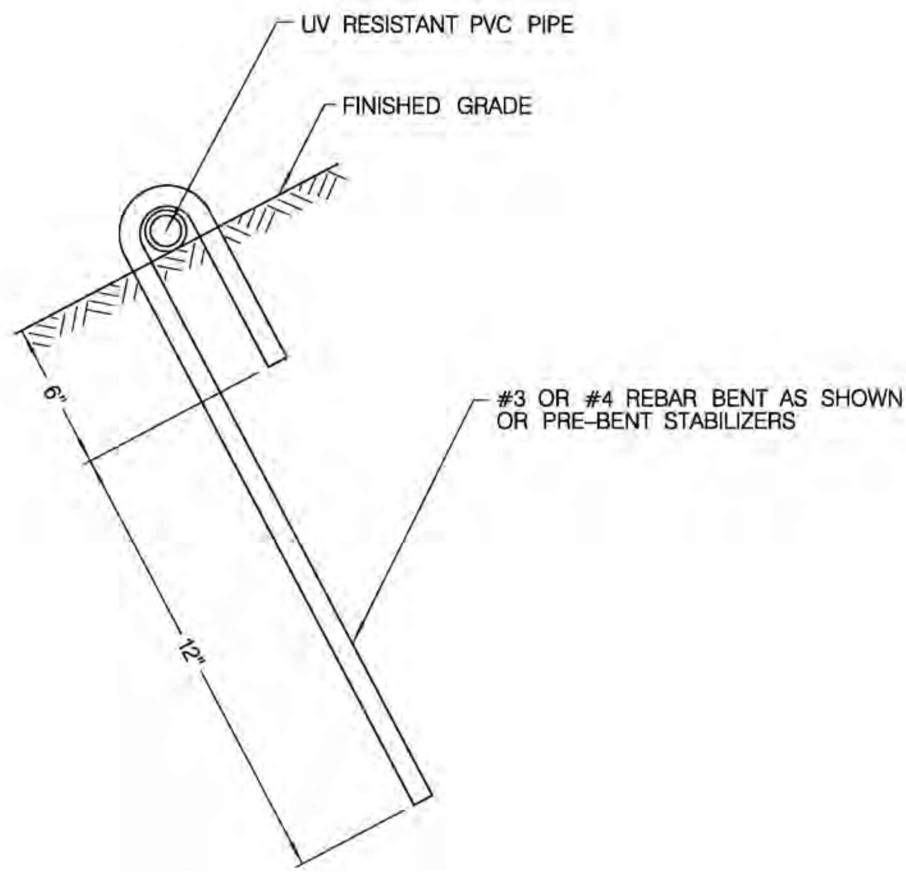
CONTROL WIRE INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-119**



SIDE VIEW

NOTE:

STABILIZERS SHALL BE PLACED NO GREATER THAN 10' APART, AT EACH RISER AND AT ALL FITTINGS.

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

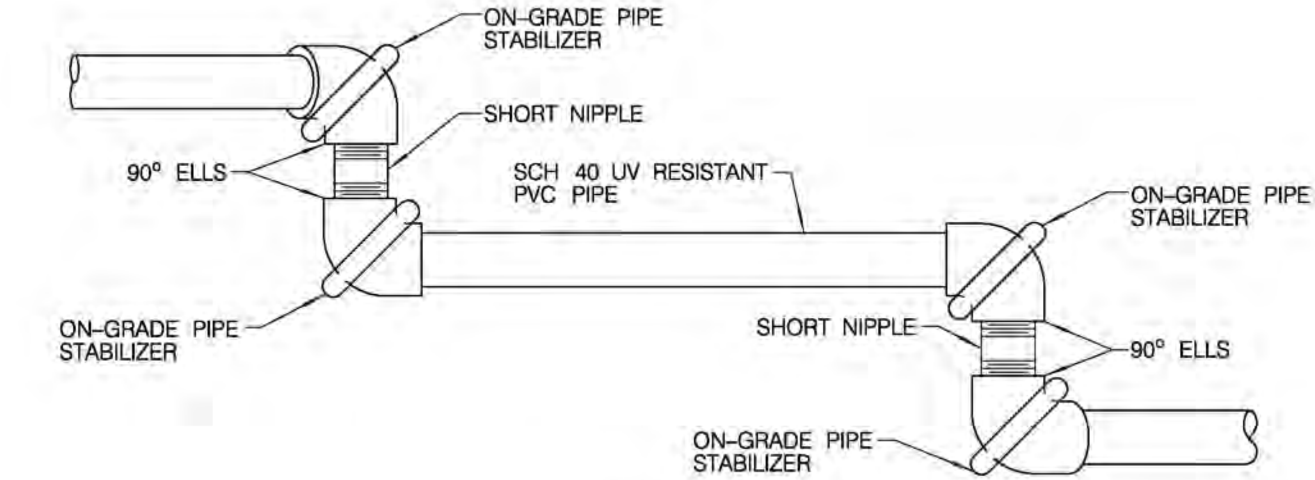
ON-GRADE PIPE STABILIZATION TEMPORARY INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

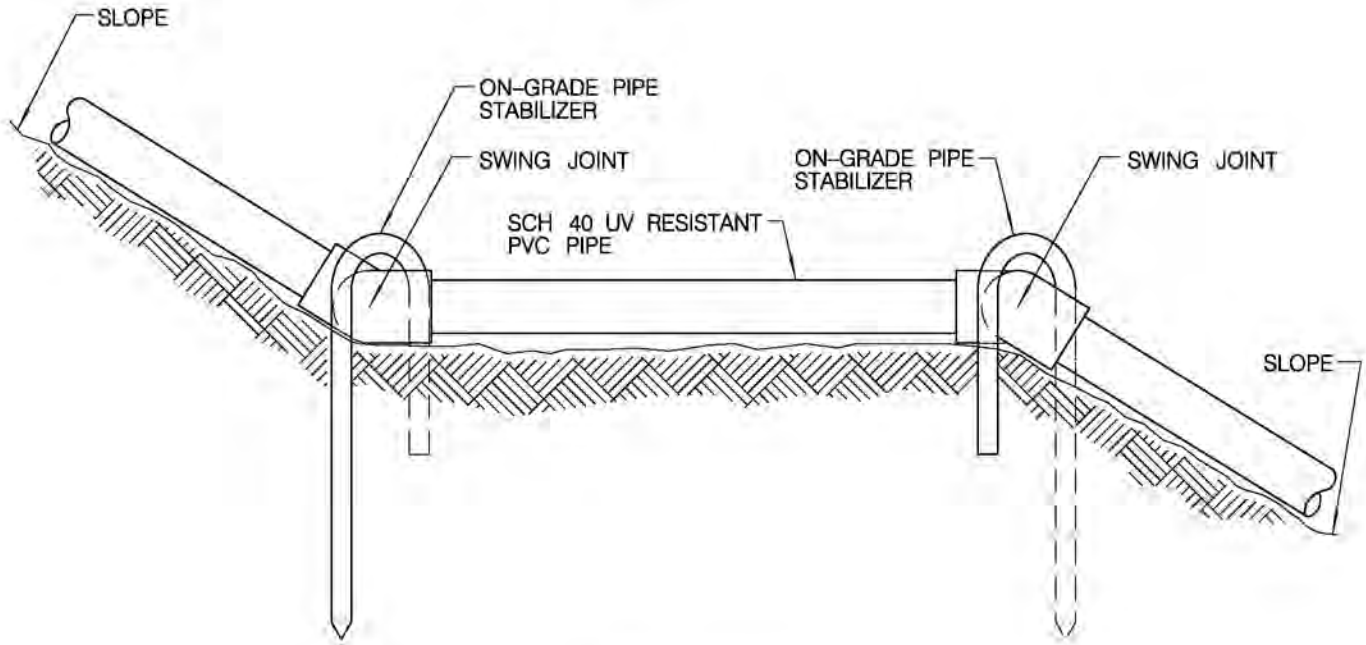
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-120**



PLAN

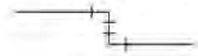


ELEVATION

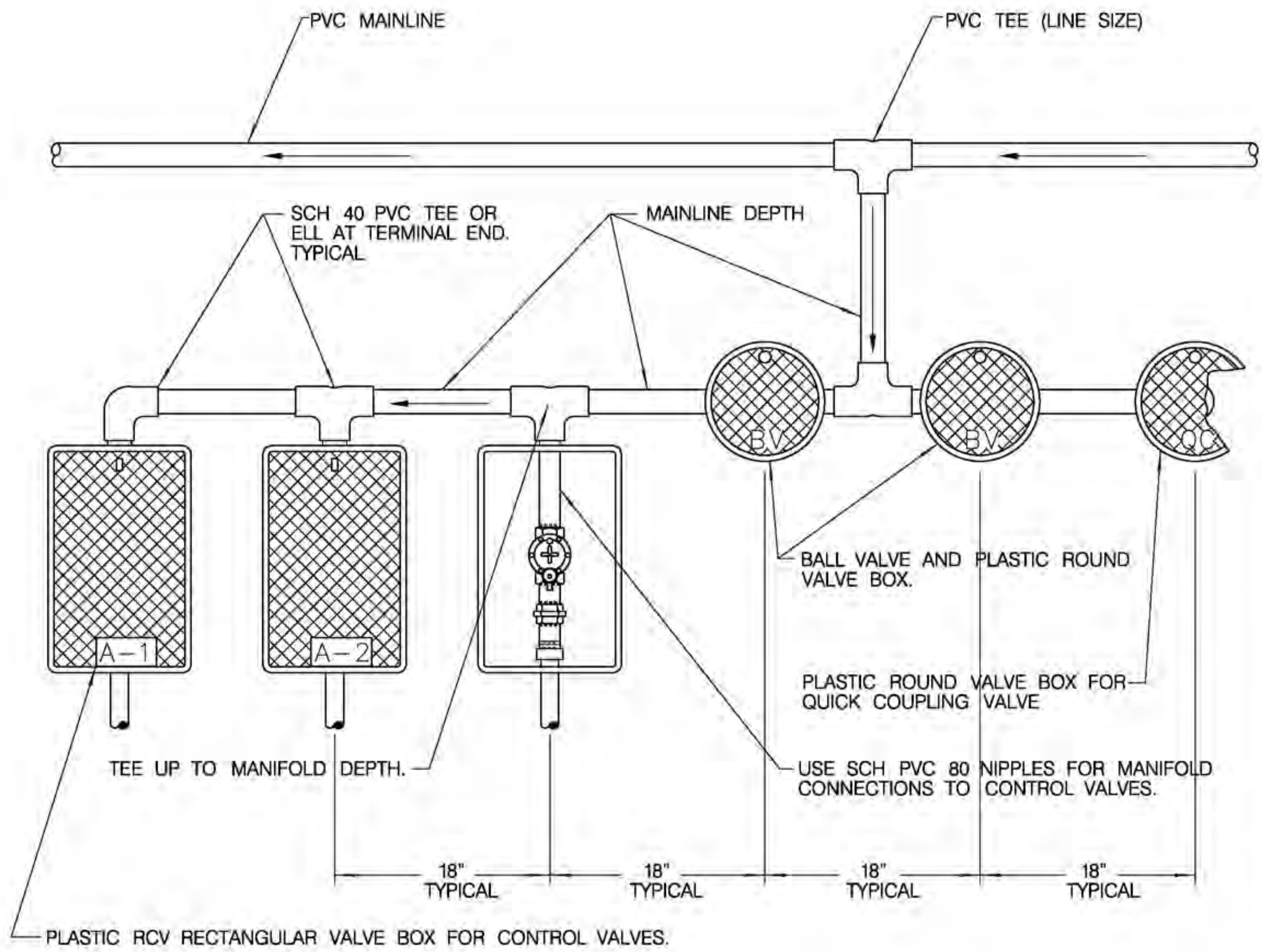
NOTE:

SWING JOINTS SHALL BE USED AT EACH CHANGE OF GRADE.

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE		
ORIGINAL*	RH	J. NAGELVOORT	01/12	CITY OF SAN DIEGO - STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
				SWING JOINT AND PIPE INSTALLATION ON SLOPES ABOVE GROUND PIPE INSTALLATIONS	COORDINATOR R.C.E. 65271 DATE 1/31/2012
					DRAWING NUMBER **SDI-123**



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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

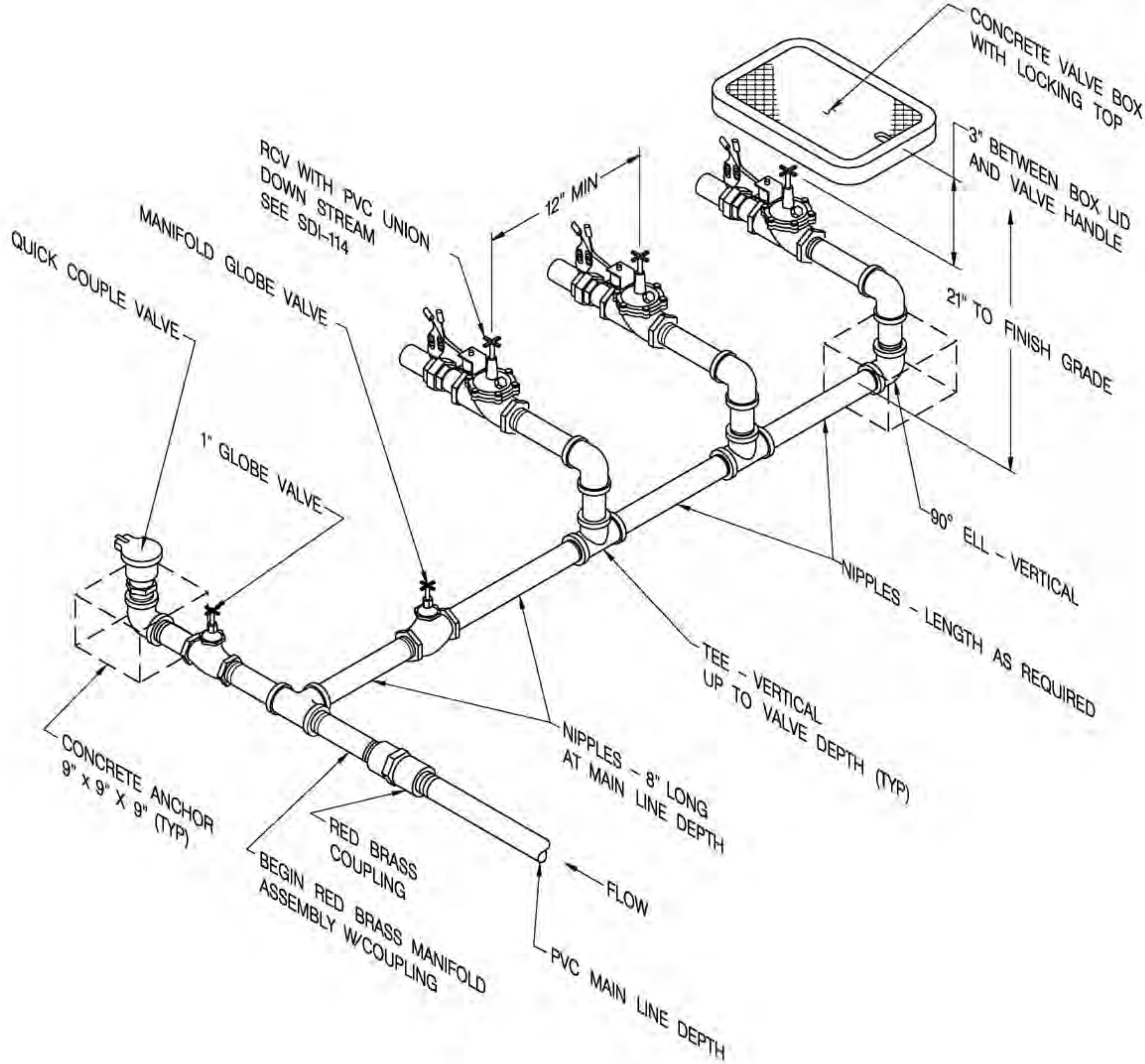
REMOTE CONTROL VALVE MANIFOLD ASSEMBLY WITH PVC PIPE (TEMPORARY SYSTEMS)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-125**



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. TEFLON TAPE SHALL BE USED ON THREADED CONNECTIONS.

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

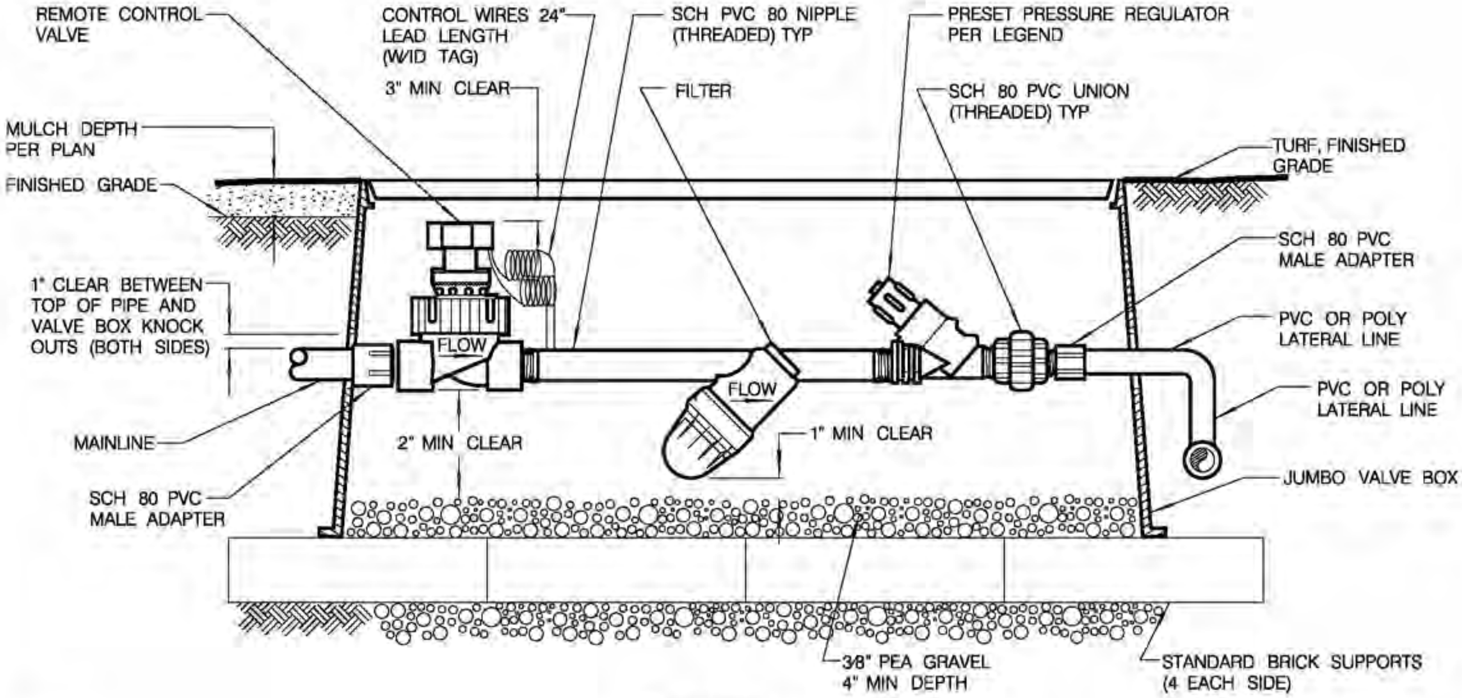
REMOTE CONTROL VALVE
MANIFOLD ASSEMBLY WITH BRASS PIPE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

[signature] 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-126**



ELEVATION

NOTES:

1. WIRE SPLICING SHALL BE MADE IN VALVE BOXES AND PULL BOXES ONLY. SEE SDI-115 FOR SPLICE / SOLDERING NOTES.
2. SPARE WIRES TERMINATING IN VALVE BOXES SHALL HAVE THEIR ENDS INSULATED, THE SAME AS FOR A SPLICE.
3. WHEN TWO OR MORE VALVES ARE INSTALLED IN THE SAME LOCATION, SEE REMOTE CONTROL VALVE MANIFOLD ASSEMBLY.
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.

LEGEND ON PLANS

▽

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

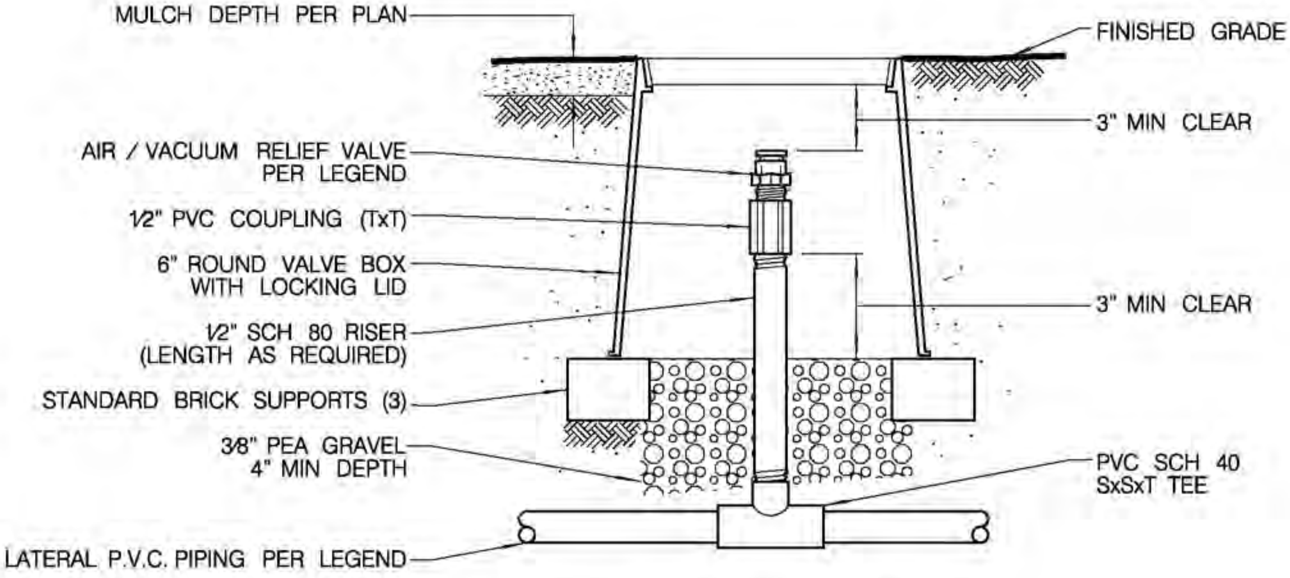
REMOTE CONTROL VALVE
DRIP IRRIGATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

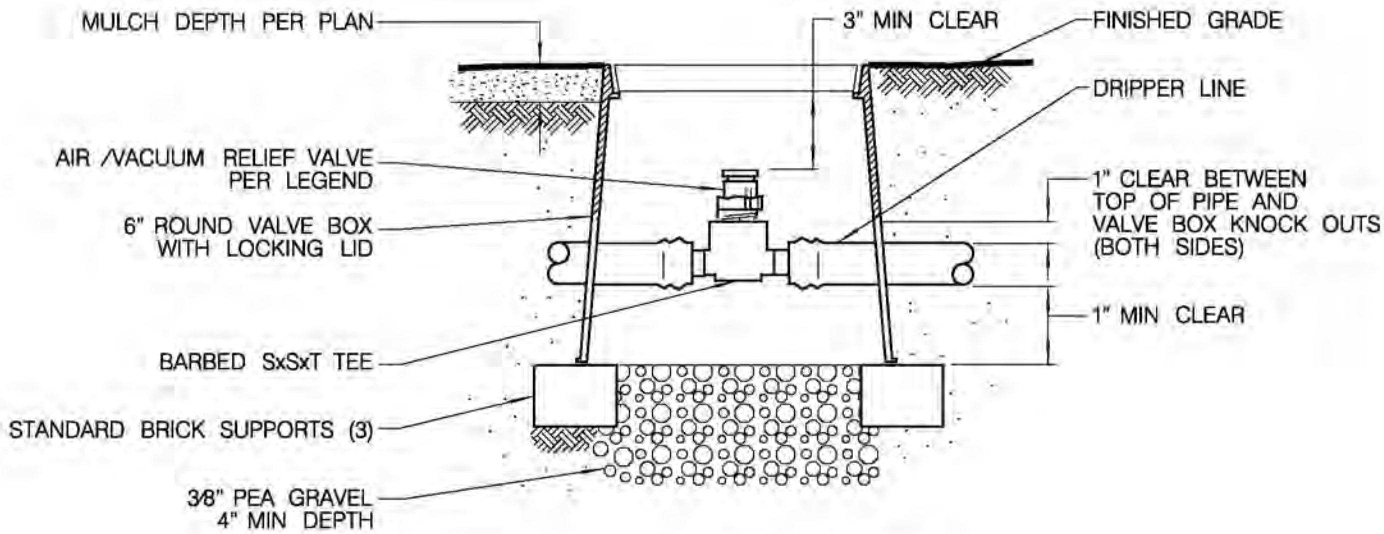
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDI-127**



PLUMBED TO PVC



PLUMBED TO DRIPPER LINE

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

A

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

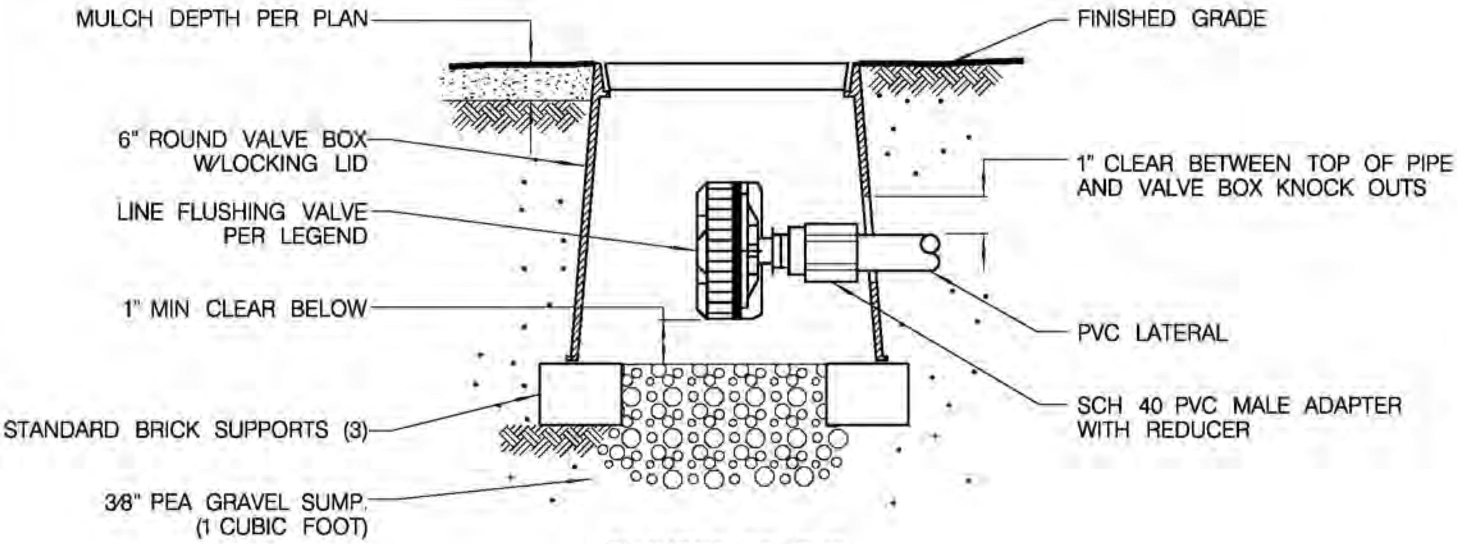
CITY OF SAN DIEGO – STANDARD DRAWING

AIR / VACUUM RELIEF VALVE

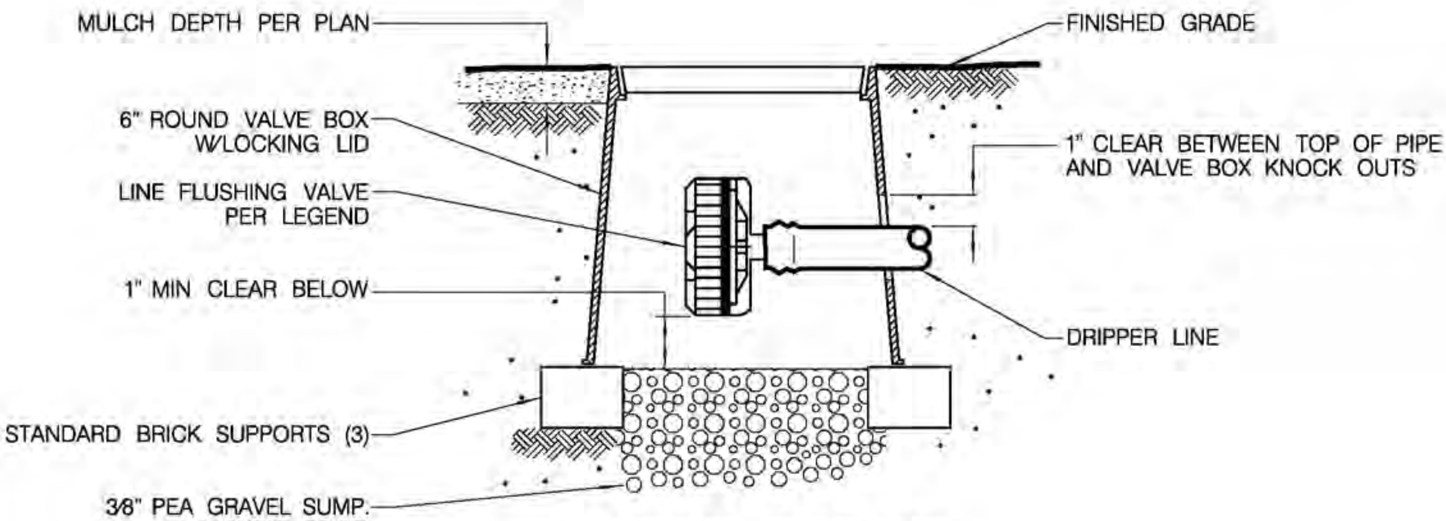
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDI-128**



PLUMBED TO PVC



PLUMBED TO DRIPPER LINE

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.

LEGEND ON PLANS

FV

REVISION	BY	APPROVED	DATE
ORIGINAL*	RH	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

DRIP IRRIGATION
FLUSH VALVE (AUTOMATIC)

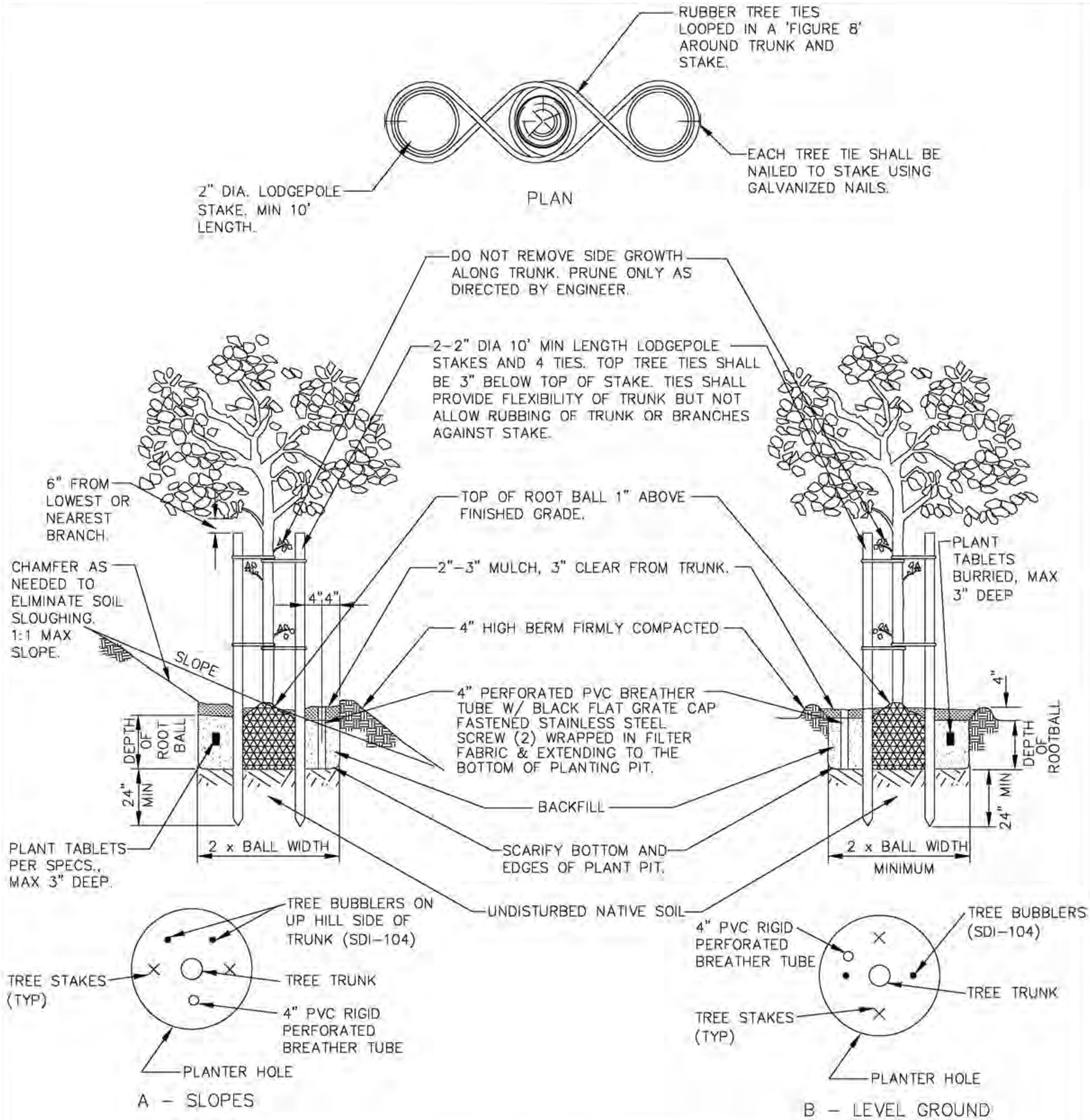
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDI-129**

CHAPTER 6

LANDSCAPING



NOTES

1. DOUBLE STAKE 15 GAL. AND LARGER TREES. SINGLE STAKE TREES SMALLER THAN 15 GAL.
2. FOR SINGLE STAKED TREES, PLACE STAKE ON WINDWARD SIDE OF TREE.
3. LOCATE STAKES OUTSIDE OF ROOTBALL.
4. PROVIDE MINIMUM DISTANCE FROM OTHER OBJECTS AS FOLLOWS: 20' TRAFFIC SIGNALS, 12' STREET LIGHTS, 10' FIRE HYDRANTS, SEWER LINES AND SDG&E FOR PAD MOUNTED EQUIPMENT, AND 5' UNDERGROUND SDG&E ELECTRIC AND GAS LINES.

REVISION	BY	APPROVED	DATE
ORIGINAL*	SG	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

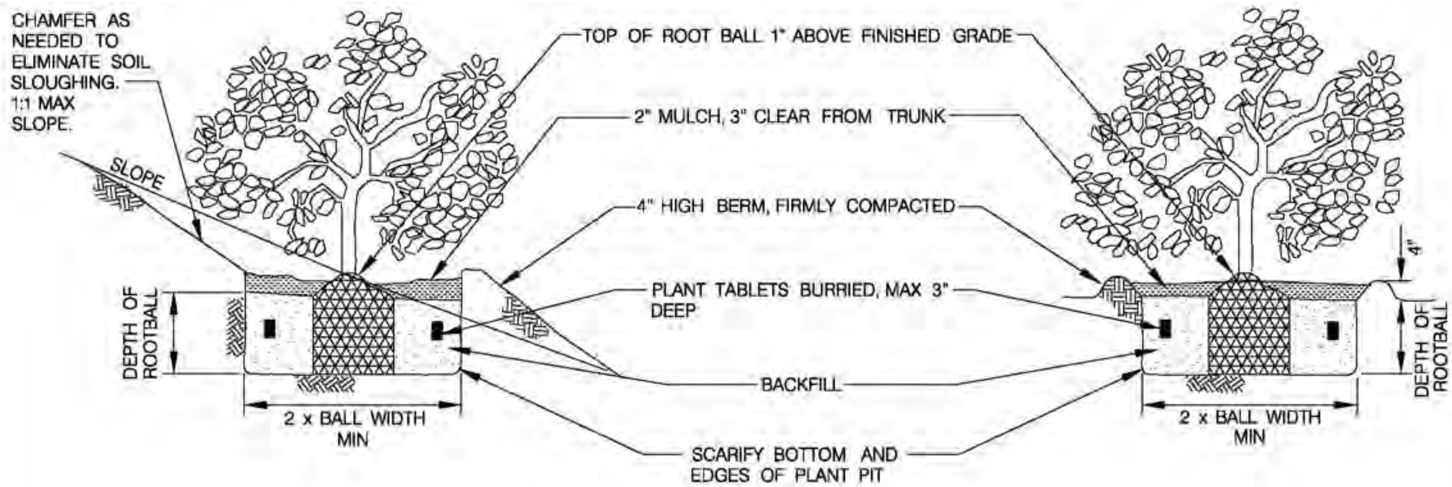
TREE PLANTING AND STAKING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

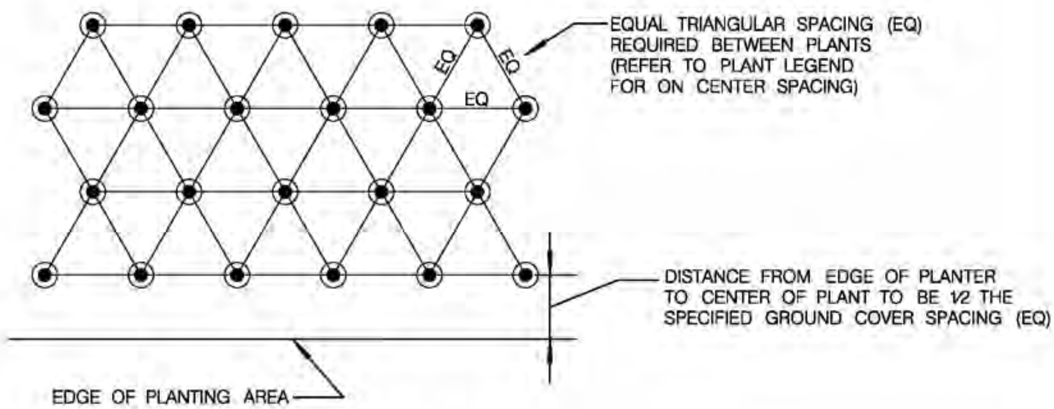
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDL-101**



SHRUB PLANTING – SLOPES

SHRUB PLANTING – LEVEL GROUND



GROUND COVER SPACING

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

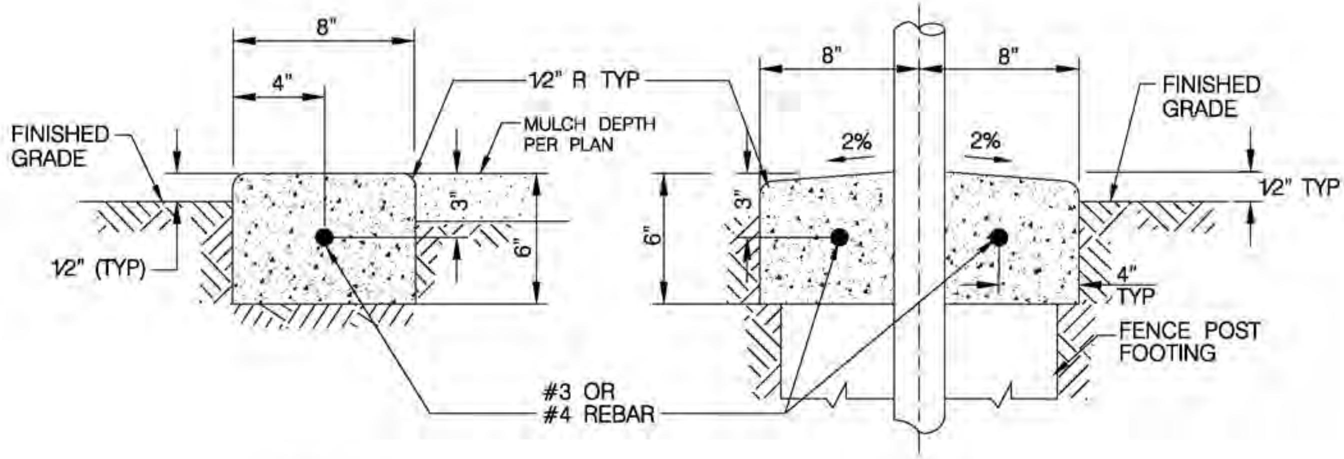
SHRUB PLANTING/GROUND COVER SPACING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDL-102**

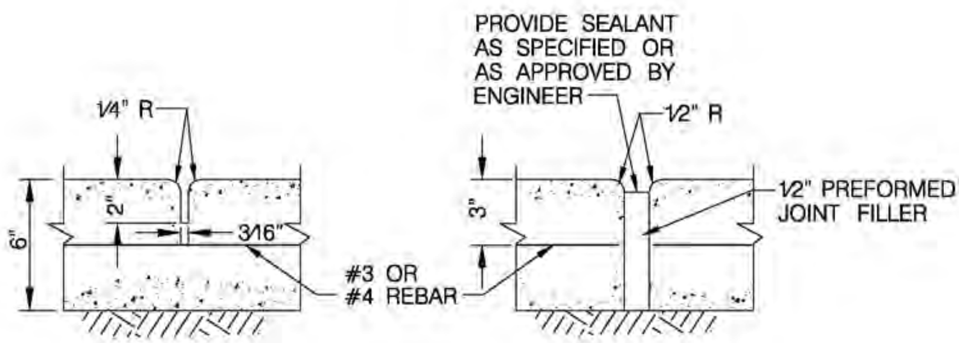


TYPE A

ALL AREAS
EXCEPT UNDER
FENCES

TYPE B

UNDER FENCES



WEAKENED PLANE JOINT
MAX 20' OC

EXPANSION JOINT
MAX 120' OC

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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

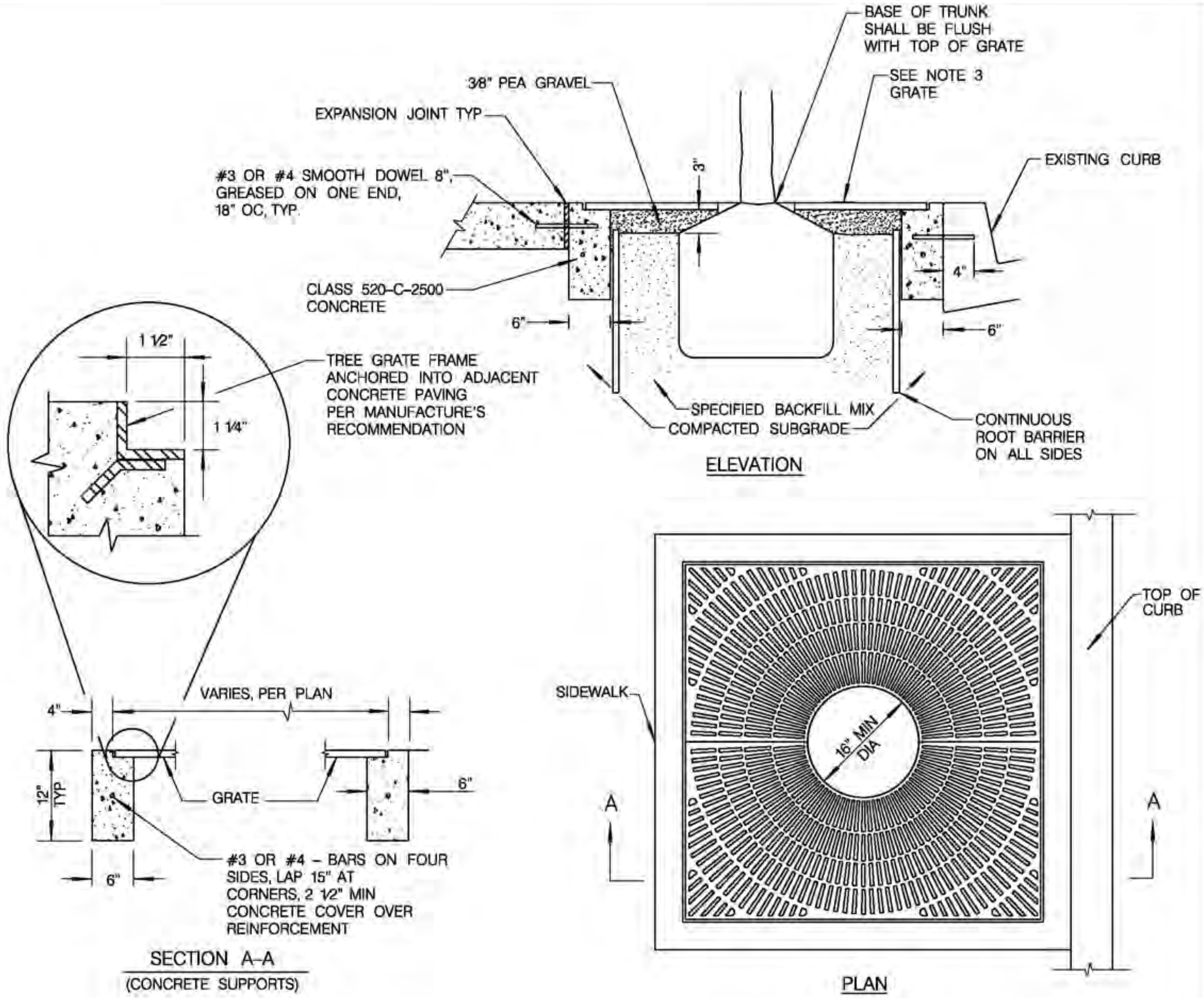
CONCRETE MOWING STRIP

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDL-103**



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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

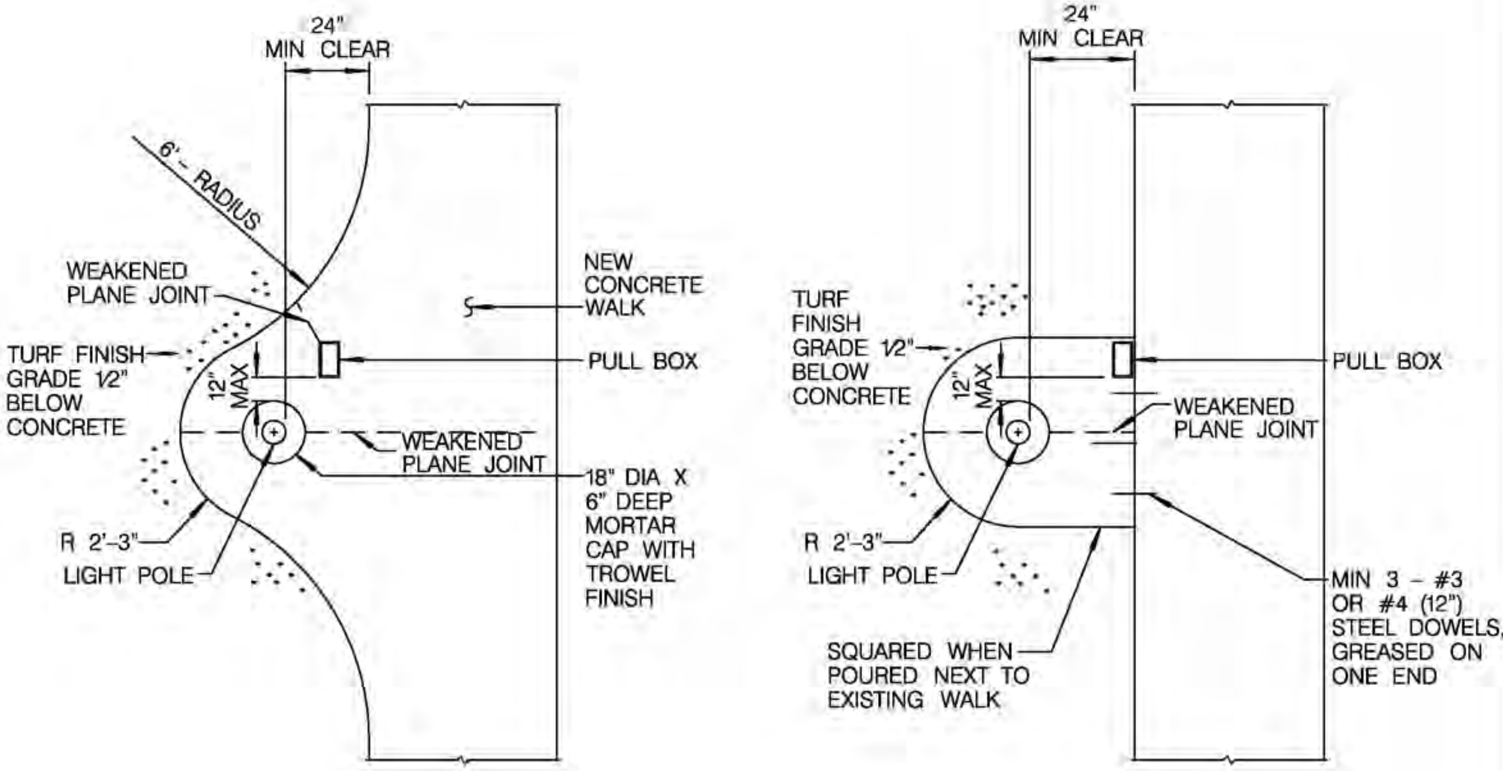
TREE GRATE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDL-104**



MONOLITHIC CONCRETE PLACEMENT

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)

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

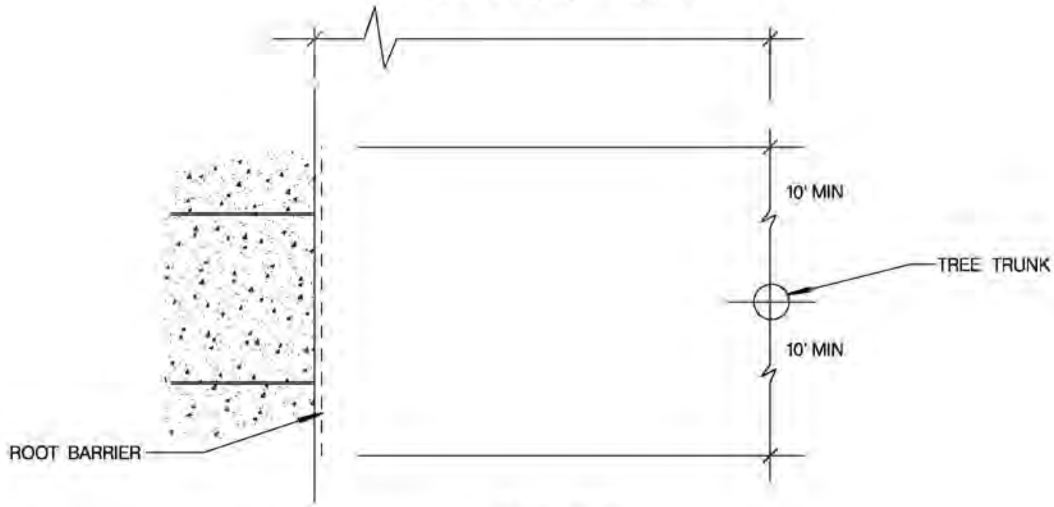
LIGHT POLE PAD IN TURF AREAS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

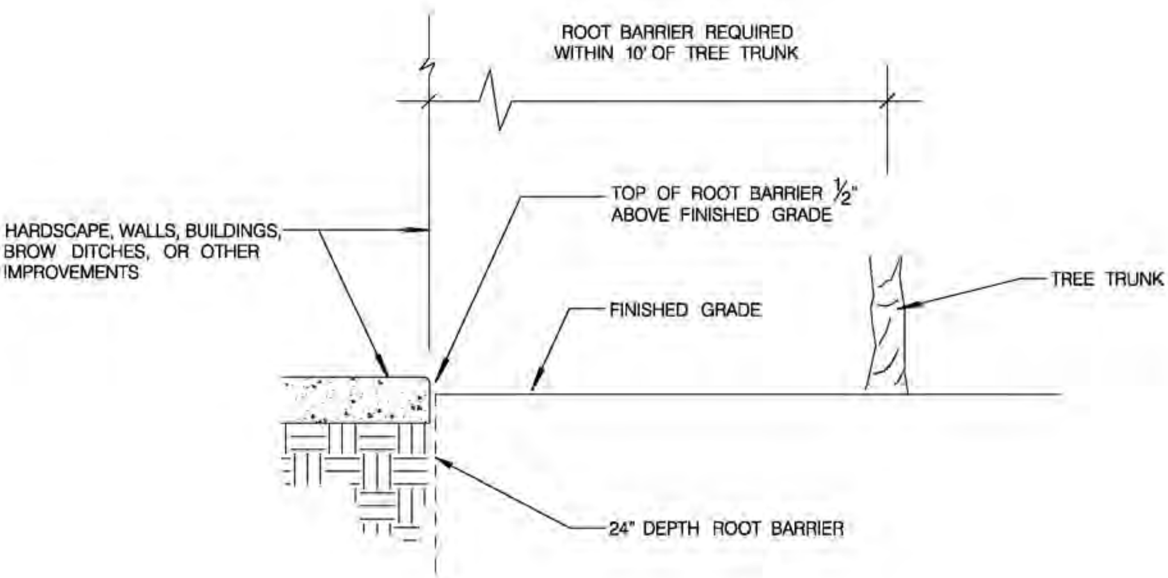
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDL-105**



PLAN VIEW



SECTION

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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

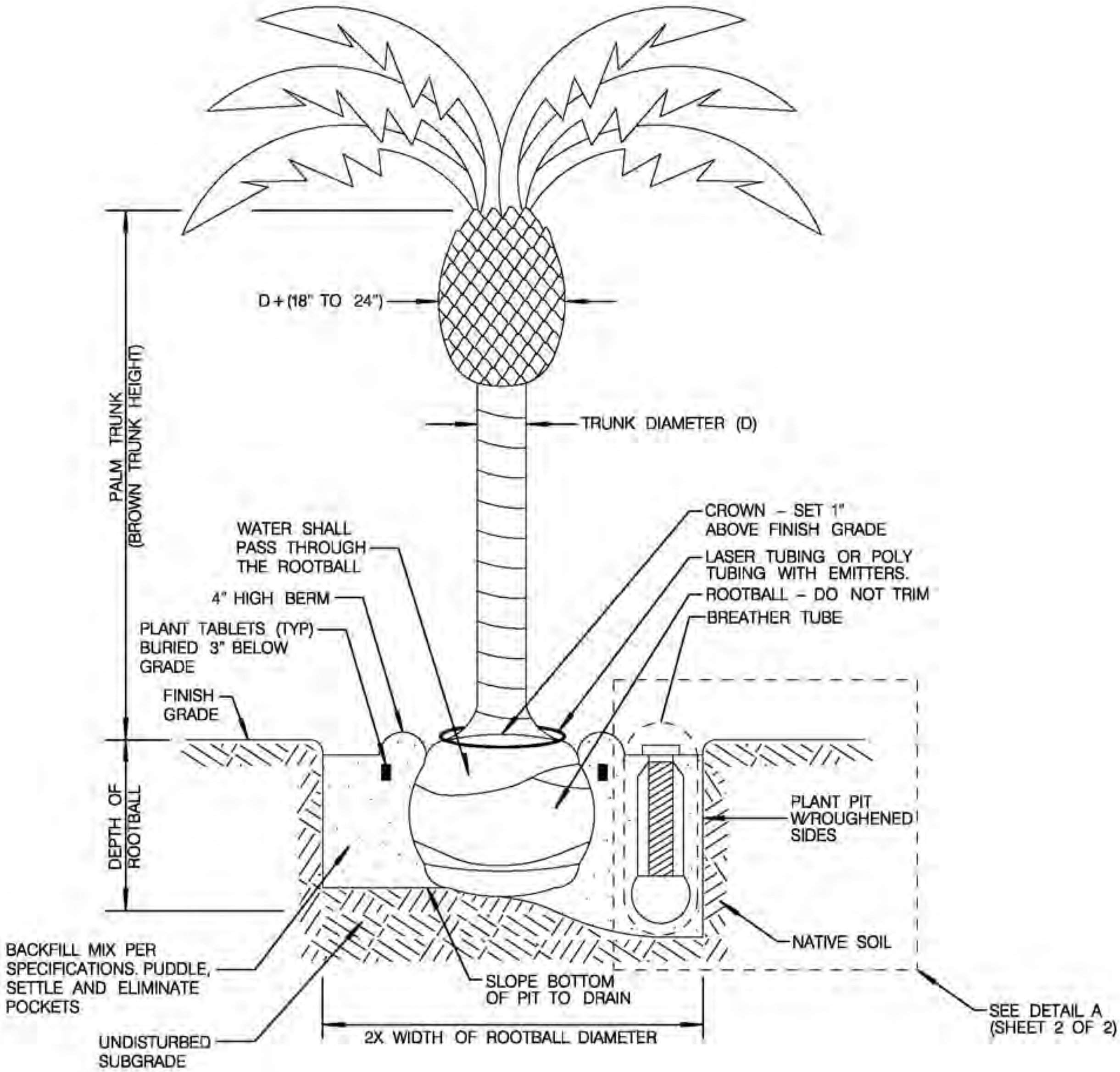
ROOT CONTROL BARRIER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 85271 DATE

DRAWING NUMBER **SDL-106**



NOTES:

1. TIE PALM FRONDS TOGETHER WITH BIODEGRADABLE SISAL TWINE. TWINE SHALL BE REMOVED AFTER 90 DAYS OF TRANSPLANTING UNLESS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. PALM TRUNKS SHALL BE SKINNED, TRIMMED, AND VERTICAL.
3. STEM DIAMETER REQUIREMENT APPLIES ONLY TO PHOENIX SPECIES.

SHEET 1 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

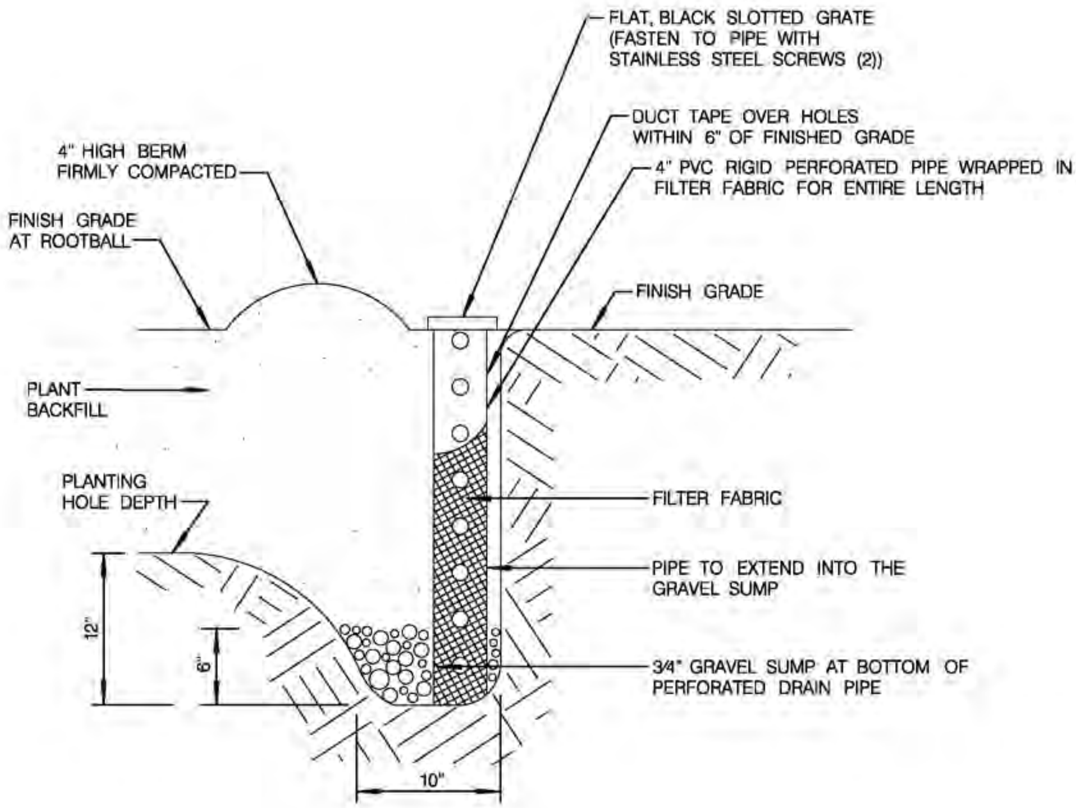
PALM TREE PLANTING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDL-107**



DETAIL – A
BREATHER TUBE

SHEET 2 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

PALM TREE PLANTING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

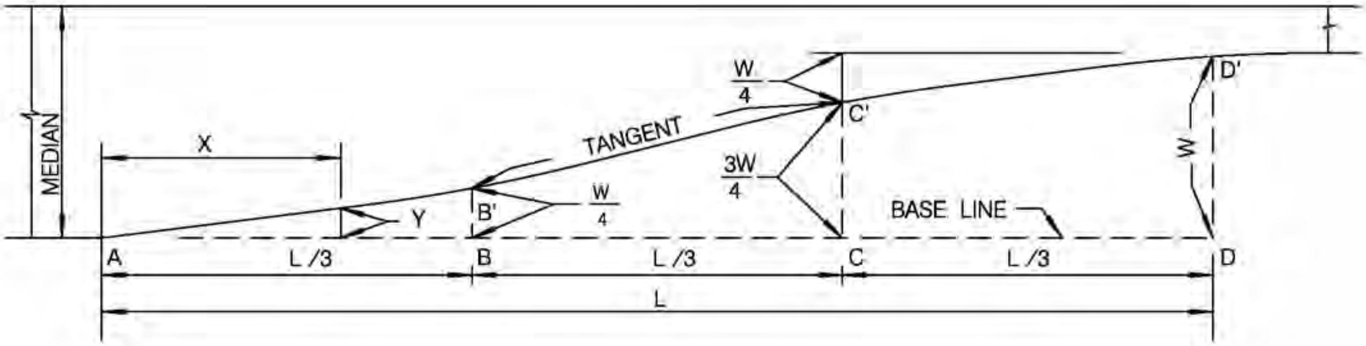
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDL-107**

CHAPTER 7

MISCELLANEOUS



$$Y = 2.25\ W\left(\frac{X}{L}\right)^2$$

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

L	DISTANCE X											
60'	5'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	60'
90'	7.5'	15'	22.5'	30'	37.5'	45'	52.5'	60'	67.5'	75'	82.5'	90'
120'	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	110'	120'
W	**OFFSET Y**											
10'	0.16'	0.62'	1.41'	2.50'	3.75'	5.00'	6.25'	7.50'	8.59'	9.38'	9.84'	10.00'
11'	0.17'	0.69'	1.55'	2.75'	4.13'	5.50'	6.88'	8.25'	9.45'	10.31'	10.83'	11.00'
20'	0.31'	1.25'	2.81'	5.00'	7.50'	10.00'	12.50'	15.00'	17.19'	18.75'	19.69'	20.00'
22'	0.34'	1.38'	3.09'	5.50'	8.25'	11.00'	13.75'	16.50'	18.91'	20.62'	21.66'	22.00'

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 APPILED TO THE CURVED BASELINE, AND B'C' IS NO LONGER A TANGENT.

REVISION	BY	APPROVED	DATE
ORIGINAL	JQ	G. PARKINSON	2/95
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

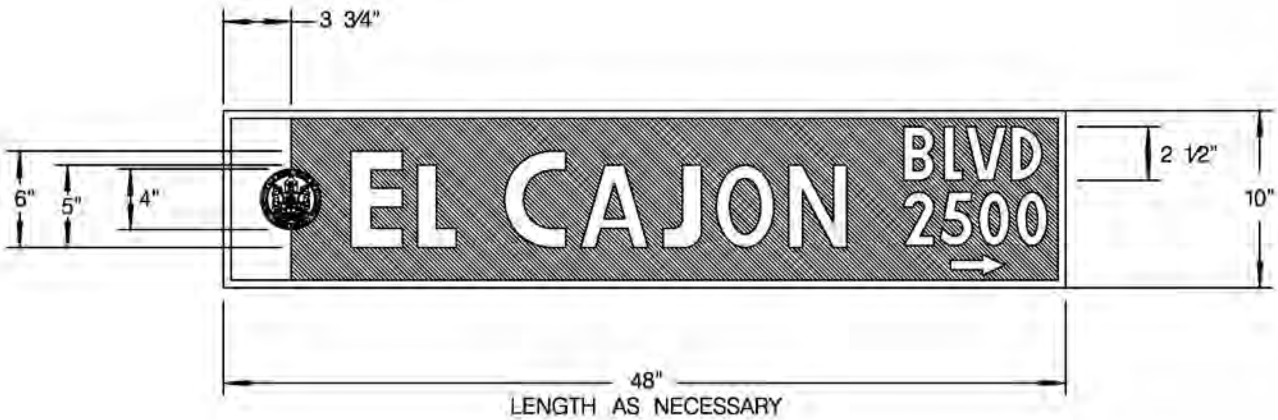
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

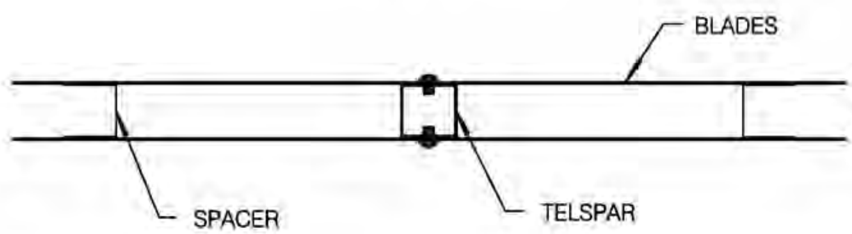
1/31/2012

COORDINATOR R.C.E. 65271 DATE

LEFT TURN MEDIAN TRANSITION

DRAWING NUMBER **SDM-101**





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.

SHEET 1 OF 4

REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	11/8/88
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

STREET NAME SIGN

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-102**

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.

REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	11/88
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

STREET NAME SIGN

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDM-102**

STREET NAME SIGN STANDARDS

SUFFIX AND PREFIX ABBREVIATIONS:

AVENUE	AVE
STREET	ST
COURT	CT
DRIVE	DR
ROAD	RD
BOULDEVARD	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.

REVISION	BY	APPROVED	DATE
ORIGINAL	XX	J.P. CASEY	11/88
REV – 1	TH		7/00
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

STREET NAME SIGN

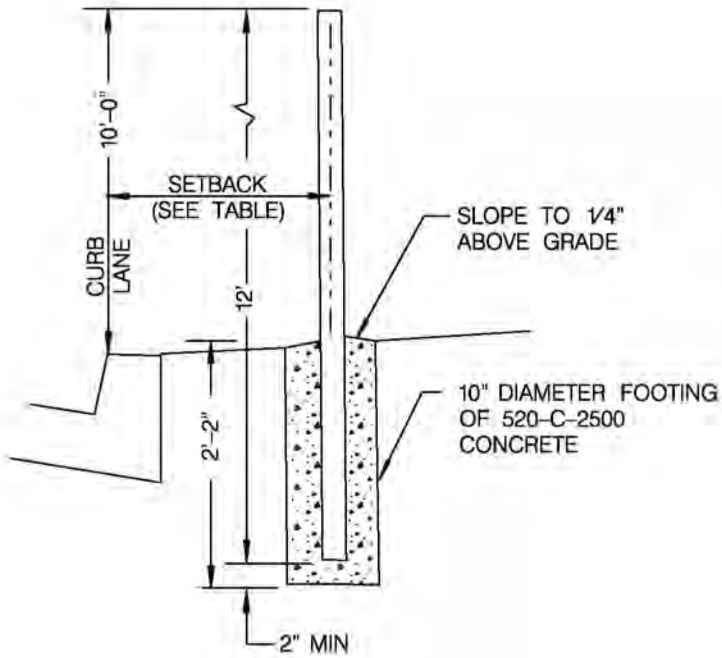
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

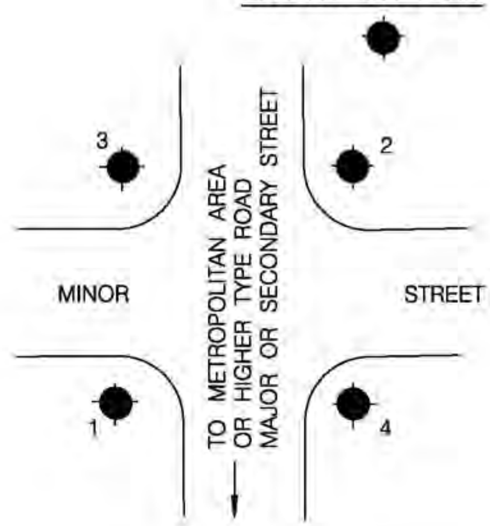
DRAWING NUMBER **SDM-102**

CURB & SIDEWALK	SIDEWALK WIDTH	SETBACK
CONTIGUOUS	6' OR LESS	SIDEWALK WIDTH
CONTIGUOUS	MORE THAN 6'	2' – 6"
SEPARATE	———	2' – 6"



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)

REVISION	BY	APPROVED	DATE
ORIGINAL		J.P. CASEY	1/88
REV. – 1	TH		7/00
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

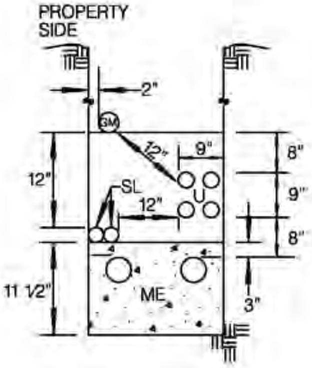
STREET NAME SIGN

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

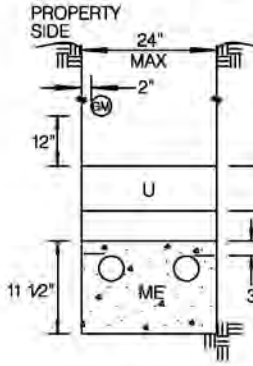
1/31/2012

COORDINATOR R.C.E. 65271 DATE

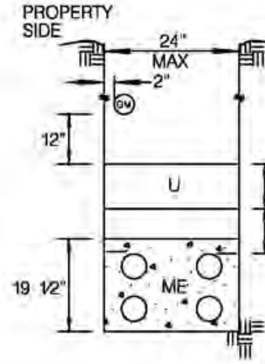
DRAWING NUMBER **SDM-102**



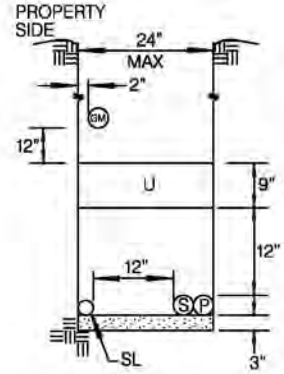
TYPE A



TYPE B



TYPE C



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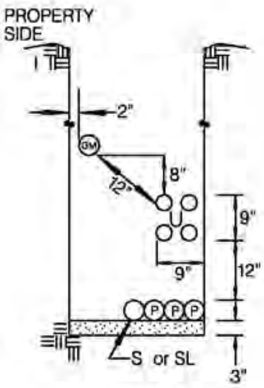
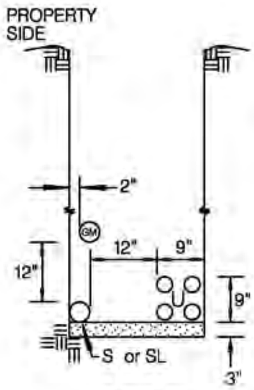
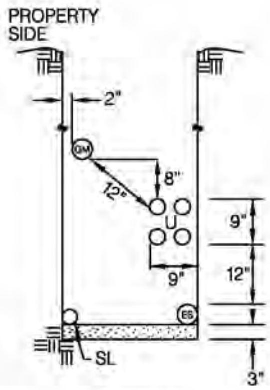


TYPE E



TYPE F



TYPE G
SERVICE TRENCH
ON
PUBLIC PROPERTY

	LEGEND	MINIMUM COVER
GM	GAS MAIN	30"
GS	GAS SERVICE	30"
P	PRIMARY ELECTRIC	42"
S	SECONDARY ELECTRIC	30"
ES	ELECTRIC SERVICE	30"
ME	MULTIPLE ELECTRIC (P, S OR ES IN SPACERS) CONCRETE ENCASED	24"
SL	STREET LIGHT (NOT SERIES)	30"
U	CATV	24"
	TELCO	24"

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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	BY	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

JOINT TRENCH LOCATIONS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-103**

LEGEND:

(1) DUAL – HEIGHT DRINKING FOUNTAIN AS APPROVED BY THE CITY ENGINEER.

(2) 1/2" X 4" LOOP ANCHORS AND 1/2" X 1 1/2" BOLTS AT ALL LOCATIONS OR PER MANUFACTURER'S RECOMMENDATION.

(3) 1 1/4" P.V.C. PIPE WITH SWEEP 90 DEGREE ELBOW CONNECTION TO FOUNTAIN DRAIN.

(4) 9 1/2" X 16" CONCRETE YARD BOX WITH HINGED LOCKING TOP (BROOKS NO. 3HL OR EQUAL) SET ON RED BRICK FOUNDATION.

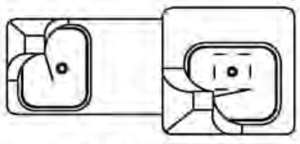
(5) 4" X 40' PERFORATED PLASTIC UNDERDRAIN PIPE, ENCASED IN 3/4" CRUSHED ROCK.

(6) 1" GATE VALVE WITH RED BRASS CROSS HANDLE AND UNION.

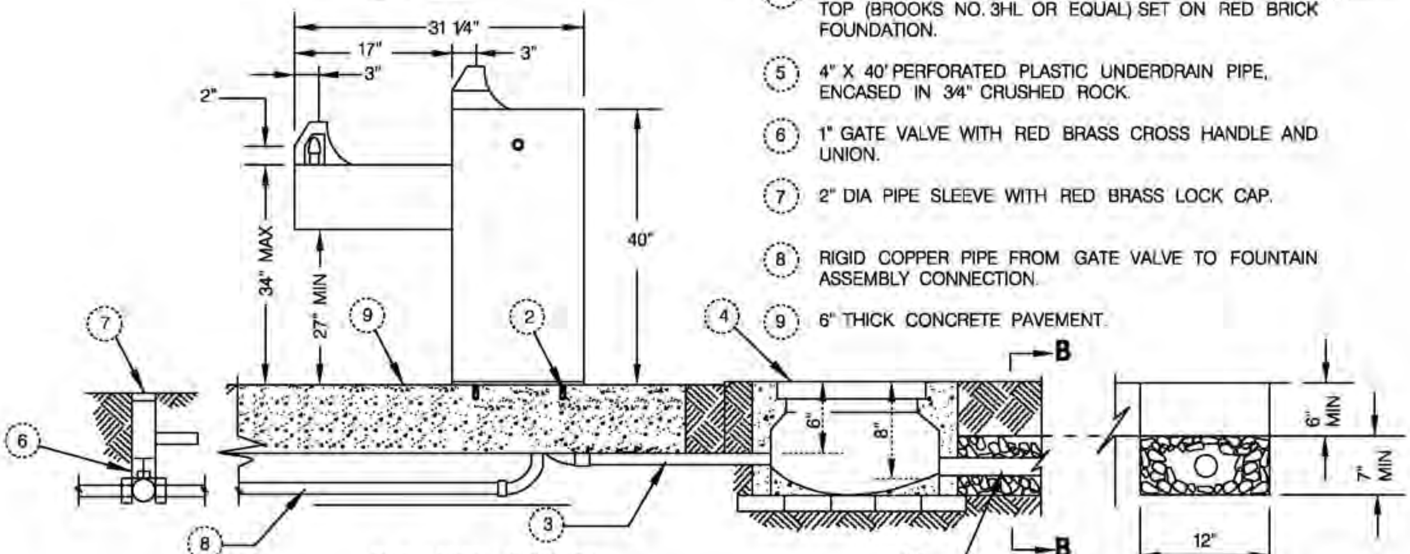
(7) 2" DIA PIPE SLEEVE WITH RED BRASS LOCK CAP.

(8) RIGID COPPER PIPE FROM GATE VALVE TO FOUNTAIN ASSEMBLY CONNECTION.

(9) 6" THICK CONCRETE PAVEMENT.

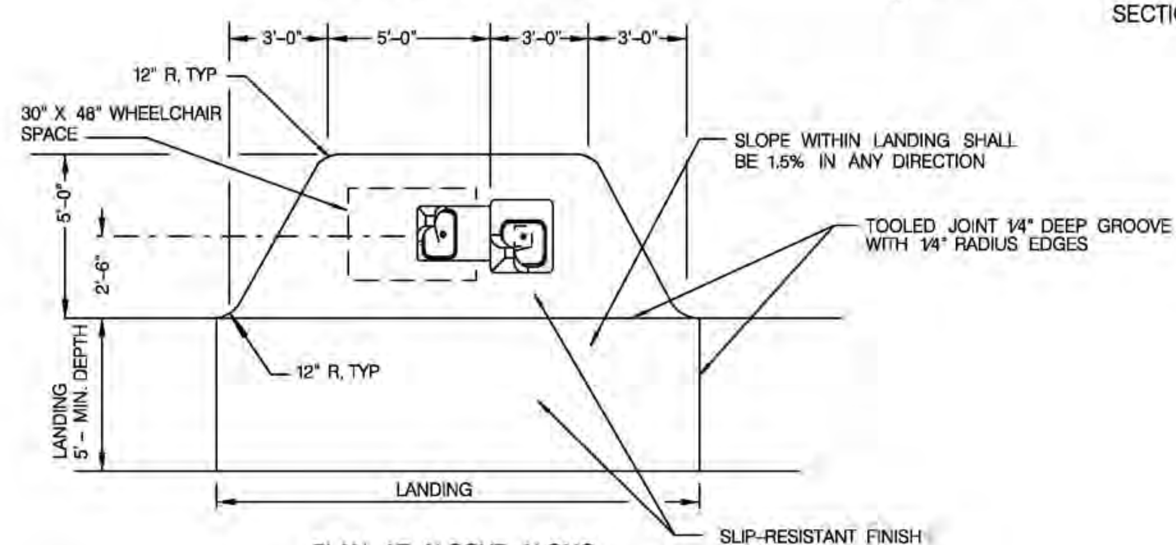


PLAN



ELEVATION /SECTION

SECTION B-B

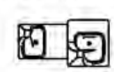


PLAN AT ALCOVE ALONG CONCRETE WALKWAY

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



REVISION	BY	APPROVED	DATE
ORIGINAL	SM	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	FC	A. OSKOUI	12/08
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

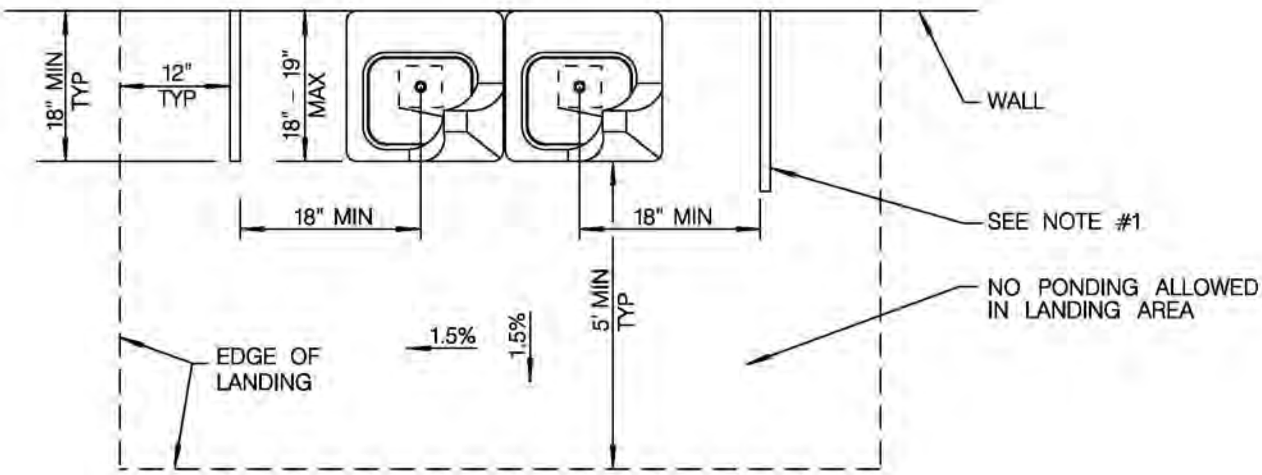
DUAL HEIGHT DRINKING FOUNTAIN (NEW CONSTRUCTION)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

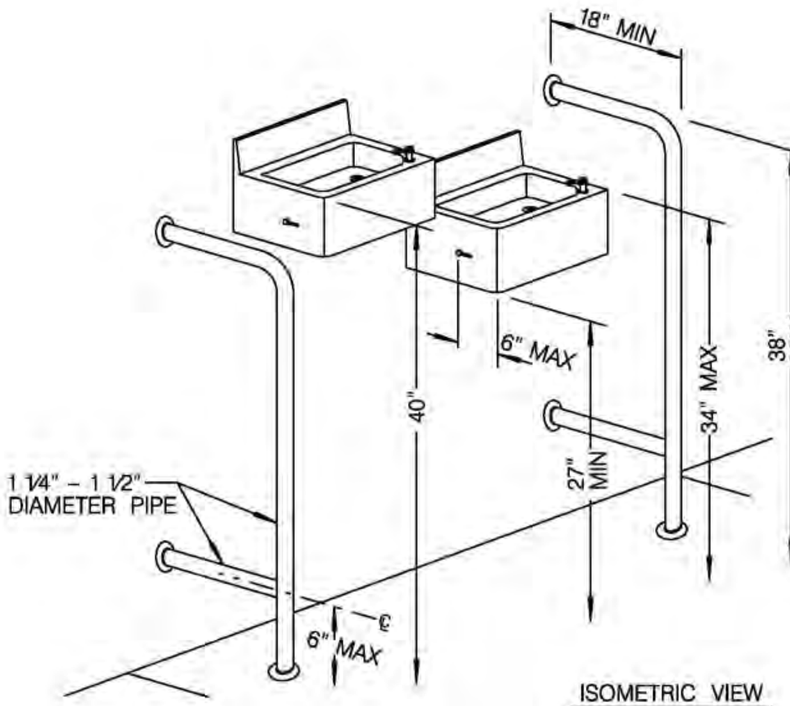
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-107**



PLAN



ISOMETRIC VIEW

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

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	FC	A. OSKOUI	12/08
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

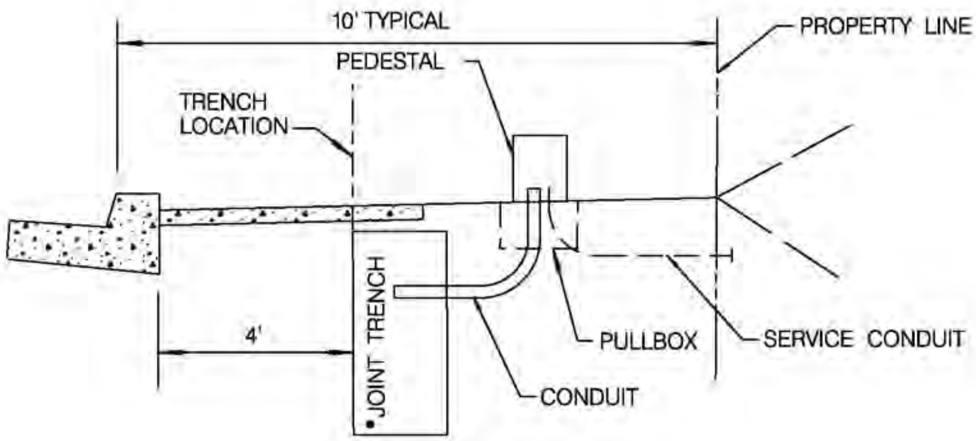
DUAL HEIGHT DRINKING FOUNTAIN NON-ALCOVE (FOR EXISTING STRUCTURES)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

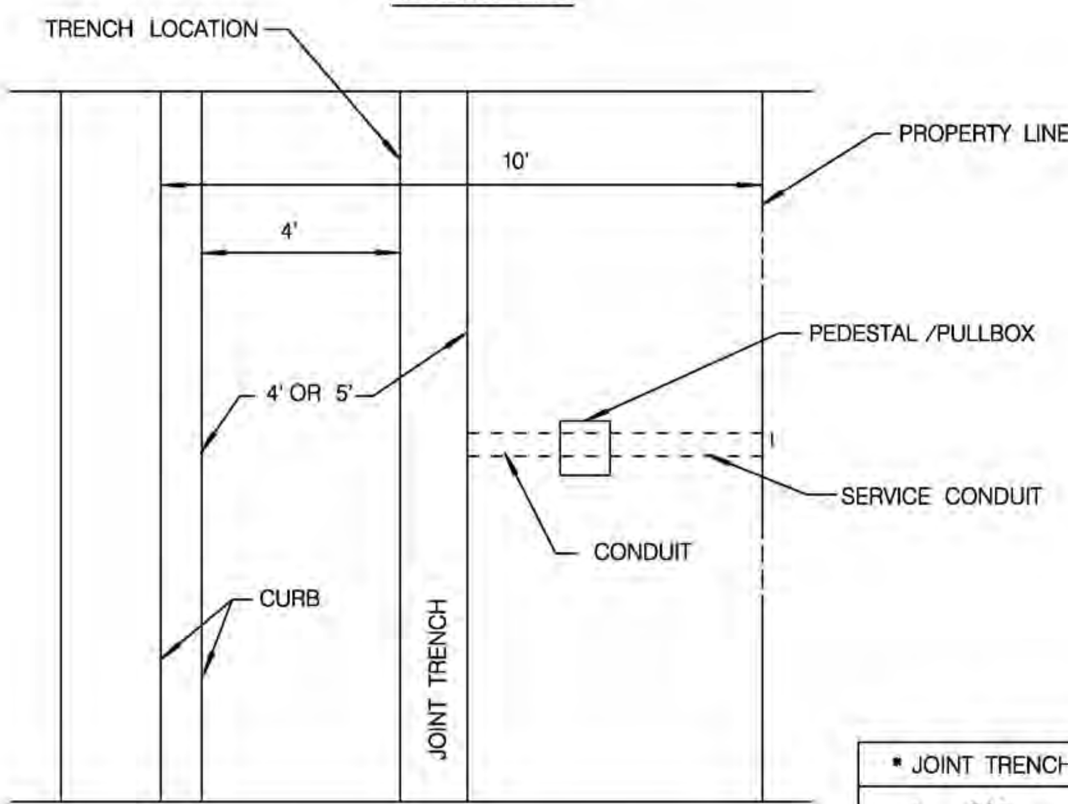
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-108**



SECTION VIEW



PLAN VIEW

* JOINT TRENCH	
1.	GAS
2.	STREET LIGHTS
3.	UNDERGROUND ELECTRIC
4.	TELEPHONE
5.	CATV

NOTE:

SIDEWALK SHALL HAVE A MINIMUM OF 4' CLEAR (PATH) PASSING PEDESTALS, PULLBOXES AND OTHER STRUCTURES.

REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	8/86
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

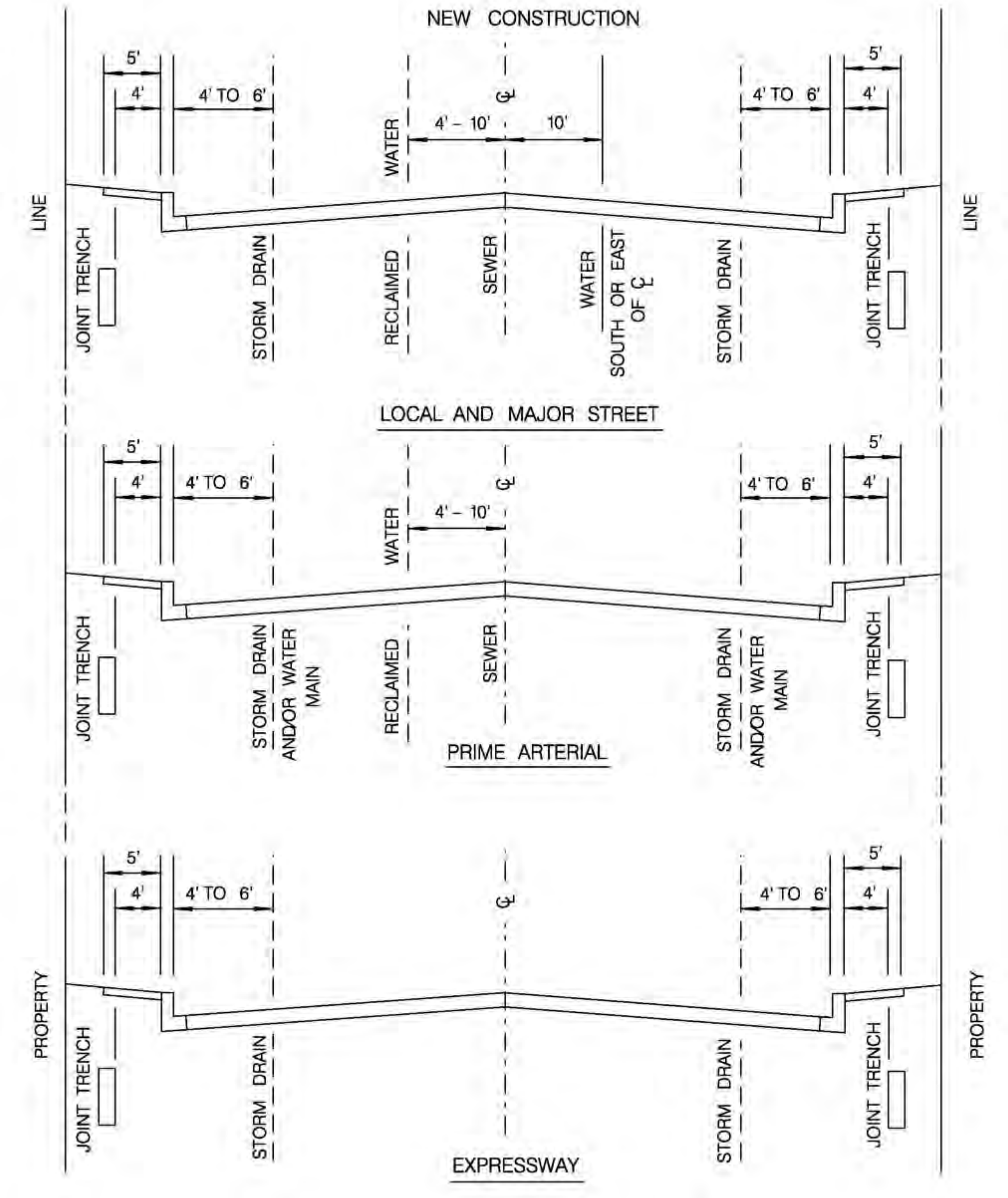
UNDERGROUND TYPICAL LOCATION
NEW CONSTRUCTION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-109**



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.

REVISION	BY	APPROVED	DATE
ORIGINAL		J. CASEY	09/86
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

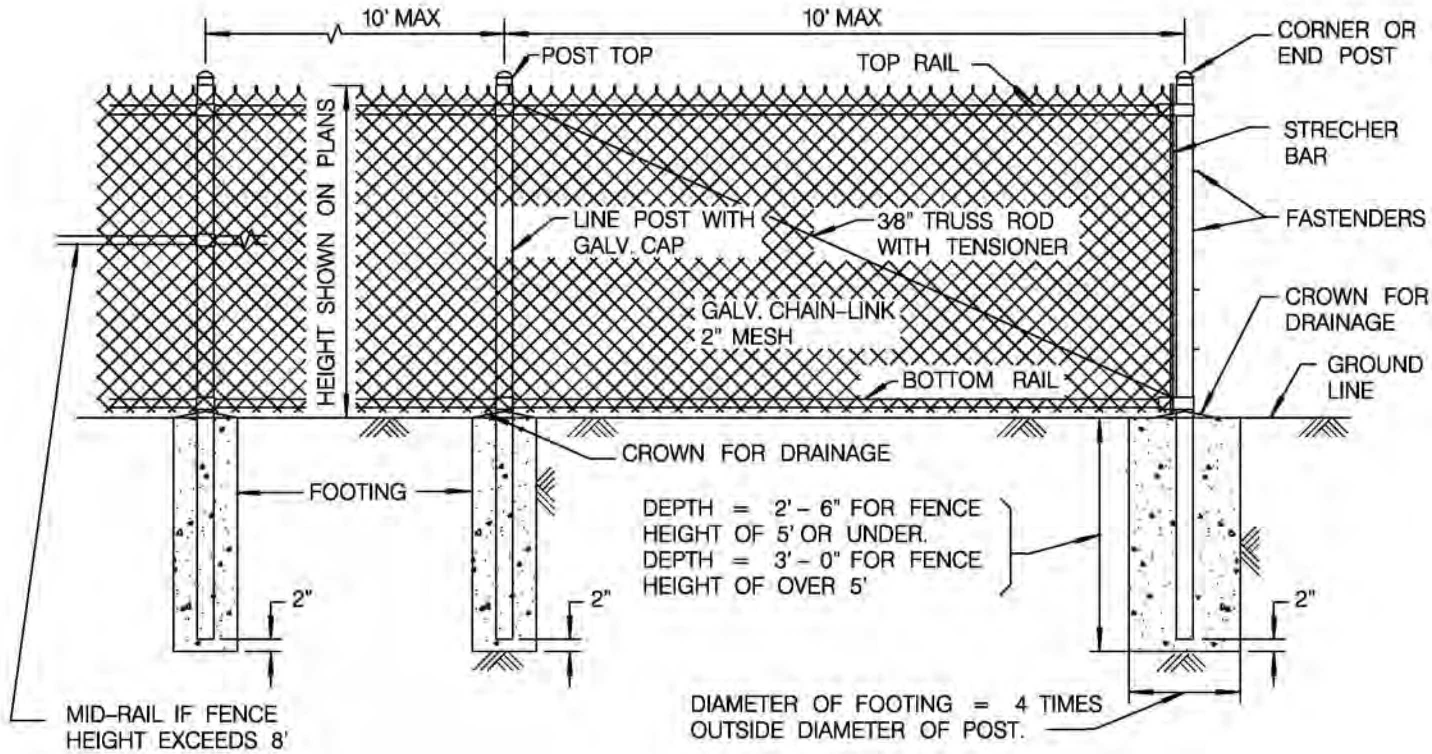
UTILITY LOCATIONS IN LOCAL AND MAJOR STREETS, PRIME ARTERIALS AND EXPRESSWAYS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

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 ALUMINIZED STEEL CORE FABRIC PRIOR TO COATING. POSTS AND RAILS SHALL BE GALVANIZED STEEL PVC VINYL BONDED, 10 – 14 MIL (COLOR SHALL MATCH FABRIC).
5. CHAIN LINK FABRIC SHALL HAVE KNUCKLED FINISH ON TOP EDGE.

LEGEND ON PLANS

—x—O—x—x—x—O—x

REVISION	BY	APPROVED	DATE
ORIGINAL		J.P. CASEY	06/92
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

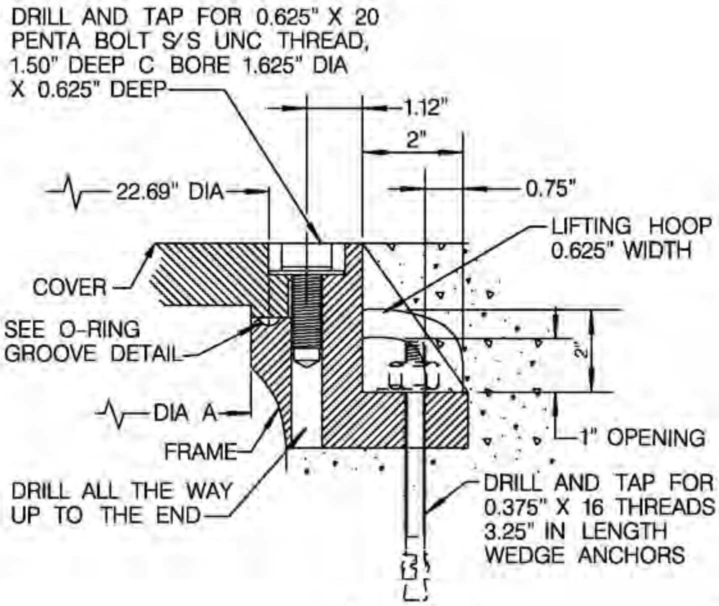
VINYL COATED CHAIN LINK FENCE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

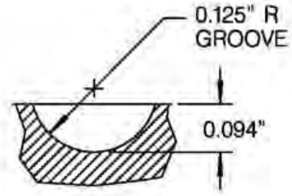
1/31/2012

COORDINATOR R.C.E. 65271 DATE

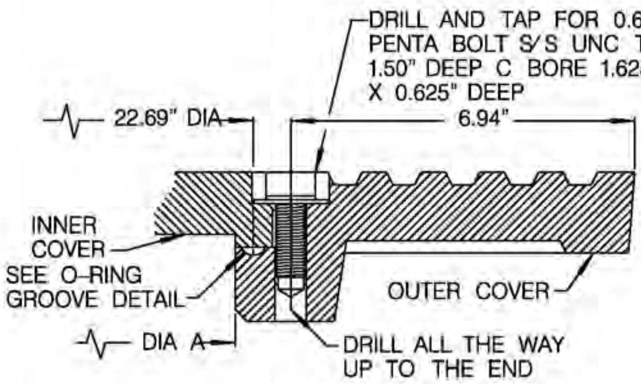
DRAWING NUMBER **SDM-112**



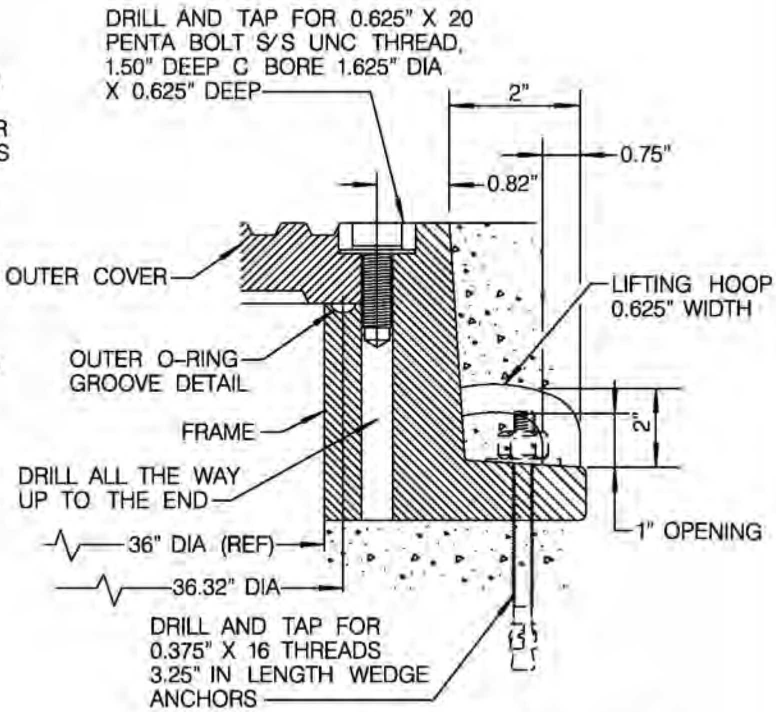
M–1 DETAIL
COVER TO FRAME



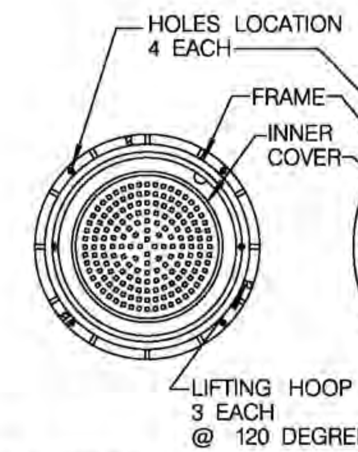
NEOPRENE O–RING
GROOVE DETAIL



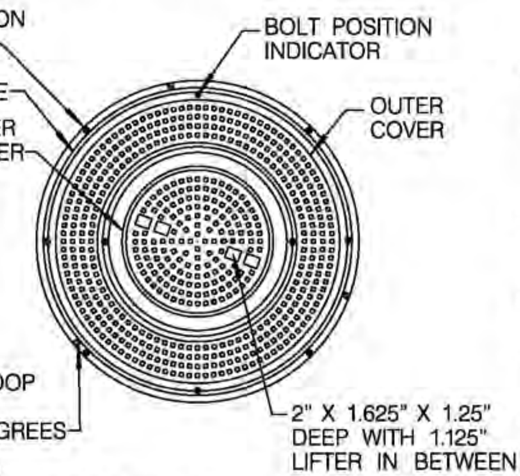
M–3A DETAIL:
INNER COVER TO OUTER COVER



M–3B DETAIL:
OUTER COVER TO FRAME



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 0.687" ID X 0.078 THICK 316 STAINLESS STEEL WASHER.

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

3. BOLTDOWN PATTERNS:
   * M–1 DETAIL (24" COVER & FRAME): INSTALL TWO (2) BOLTS AT 180 DEGREES.
   * M–3A DETAIL (CONCENTRIC COVERS): BETWEEN INNER AND OUTER COVERS INSTALL TWO (2) BOLTS AT 180 DEGREES.
   * M–3B DETAIL (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"x16 STAINLESS STEEL WEDGE ANCHORS 3.75"IN LENGTH AT 90 DEGREES.

REVISION	BY	APPROVED	DATE
ORIGINAL		A. OSKOUI	12/03
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

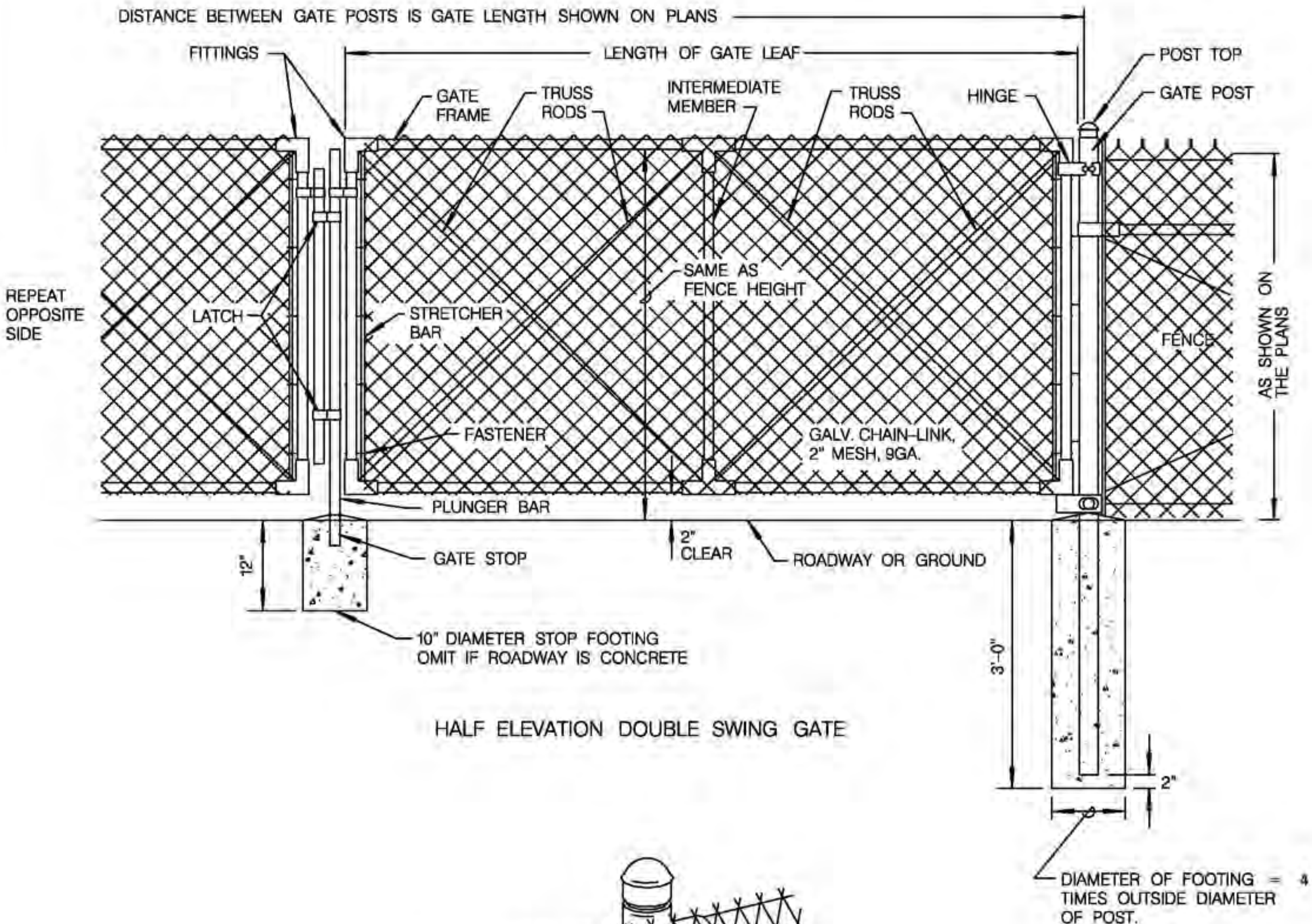
MANHOLE COVER - LOCKING DEVICE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

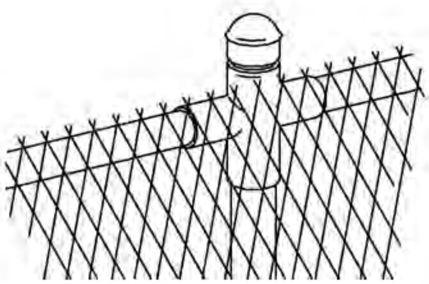
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-113**



HALF ELEVATION DOUBLE SWING GATE

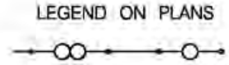


CHAIN LINK VEHICULAR GATE

NOTES:

1. ALL FOOTINGS SHALL BE 520-C-2500 CONCRETE.
2. EXTENSION POST SHALL BE FURNISHED AND INSTALLED ONLY WHEN SHOWN ON THE PLANS OR CALLED FOR IN THE SPECIAL PROVISIONS:
3. CHAIN LINK FENCE SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION UNLESS SPECIFICALLY NOTED ON THE DRAWING.
4. CHAIN LINK FABRIC SHALL HAVE KNUCKLED FINISH ON TOP EDGE.

LEGEND ON PLANS



SHEET 1 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL	SM	A. OSKOUI	12/03
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

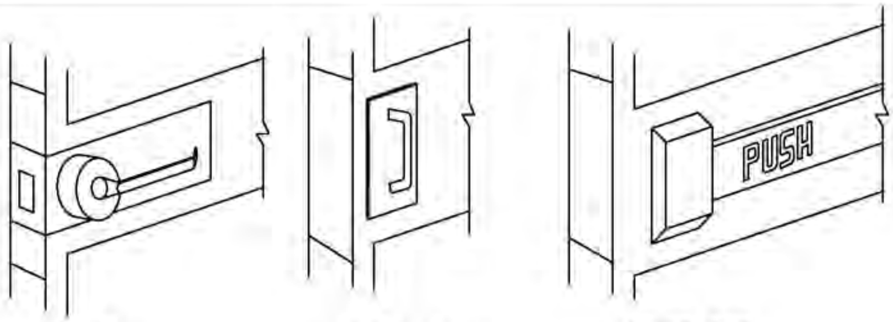
CHAIN LINK GATE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

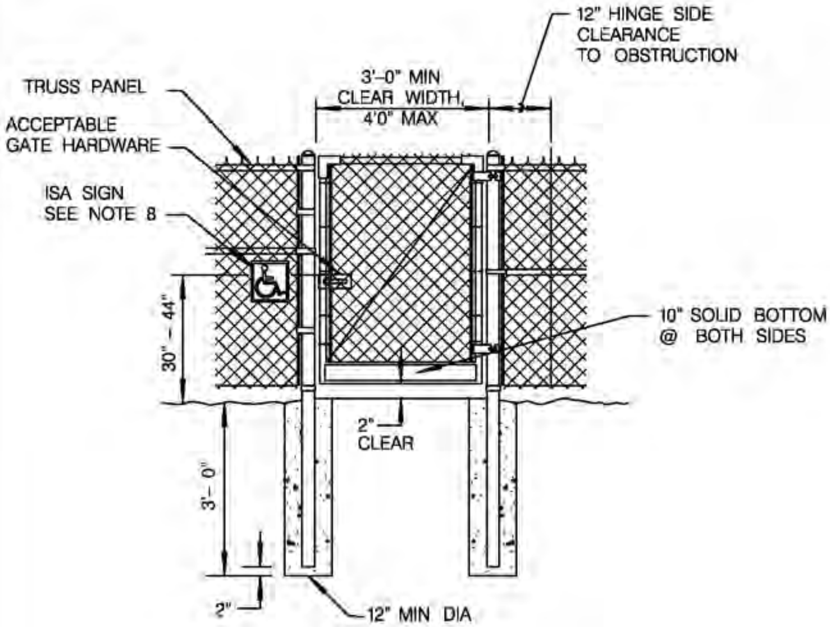
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-114**

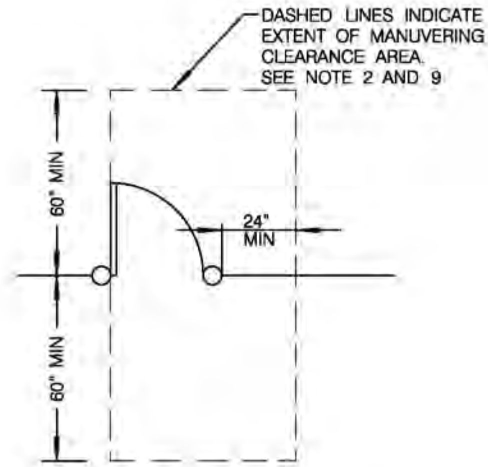


LEVER PUSH / PULL PANIC BAR

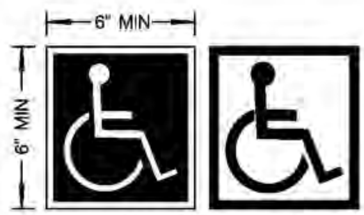
ACCEPTABLE GATE HARDWARE



MOUNTING DETAIL



LEVEL MANEUVERING CLEARANCE



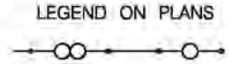
INTERNATIONAL SYMBOL OF ACCESSIBILITY SIGN (ISA)

CHAIN LINK PEDESTRIAN GATE

NOTES

1. GATES THAT ARE ACCESSIBLE TO AND USABLE BY PERSONS WITH DISABILITIES SHALL BE PROVIDED WITH AT LEAST ONE INTERNATIONAL SYMBOL OF ACCESSIBILITY SIGN AS SHOWN ABOVE.
2. THE RUNNING AND CROSS SLOPE WITHIN THE LEVEL MANEUVERING CLEARANCE AREA SHALL BE 1.5% AND DESIGNED TO PREVENT WATER FROM ACCUMULATING WITHIN THE ENTIRE SURFACE.
3. IF THE GATE IS NOT SELF – CLOSING, PROVIDE ACCEPTABLE GATE HARDWARE ON BOTH SIDES.
4. PROVIDE 3/8" DIAMETER TENSION ROD AND TIGHTENER FOR GATES THAT ARE OVER 3' IN WIDTH.
5. IF PROVIDED, TIE FABRIC TOP AND FRAME WITH 11 GAUGE WIRE.
6. LATCHING AND LOCKING GATES THAT ARE HAND OPERATED SHALL BE OPERABLE WITH A SINGLE EFFORT NOT TO EXCEED 5-POUND PRESSURE.
7. THE SYMBOL CONTRAST ON SIGN SHALL BE LIGHT ON DARK OR DARK ON LIGHT.
8. MOUNTING HEIGHT – THE SIGN SHALL BE INSTALLED ON THE FENCE /WALL ADJACENT TO THE LATCH OUTSIDE OF THE DOOR. IT SHALL BE MOUNTED TO THE CENTERLINE OF THE ACCEPTED GATE HARDWARE. MOUNTING LOCATION SHALL BE DETERMINED SO THAT A PERSON MAY APPROACH WITHIN 3" OF SIGNAGE WITHOUT ENCOUNTERING PROTRUDING OBJECTS OR STANDING WITHIN THE SWING DOOR.
9. LANDING & APPROACH SPACE SHALL COMPLY WITH CURRENT CBC TITLE 24 AND ADA /ADAS.

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
ORIGINAL	SM	A. OSKOUI	12/03
ORIGINAL	FC	A. OSKOUI	12/06
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

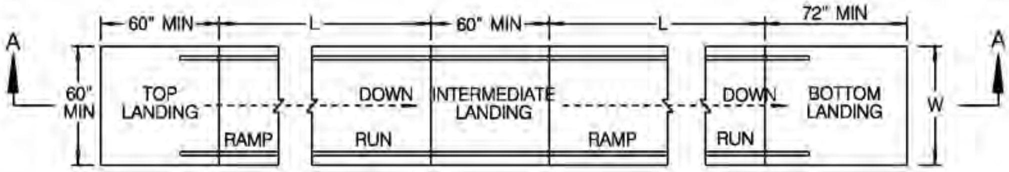
CHAIN LINK GATE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

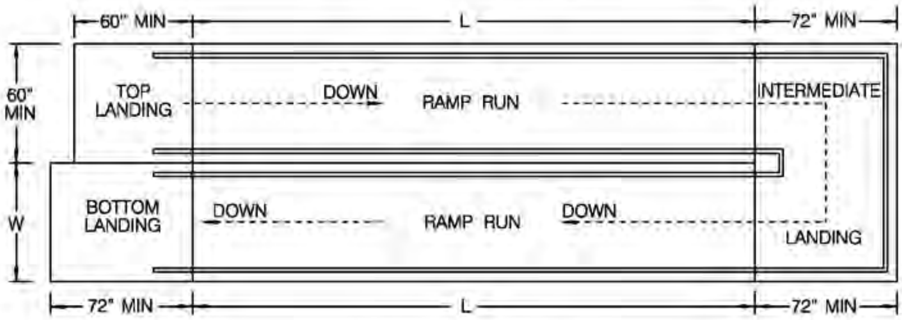
1/31/2012

COORDINATOR R.C.E. 65271 DATE

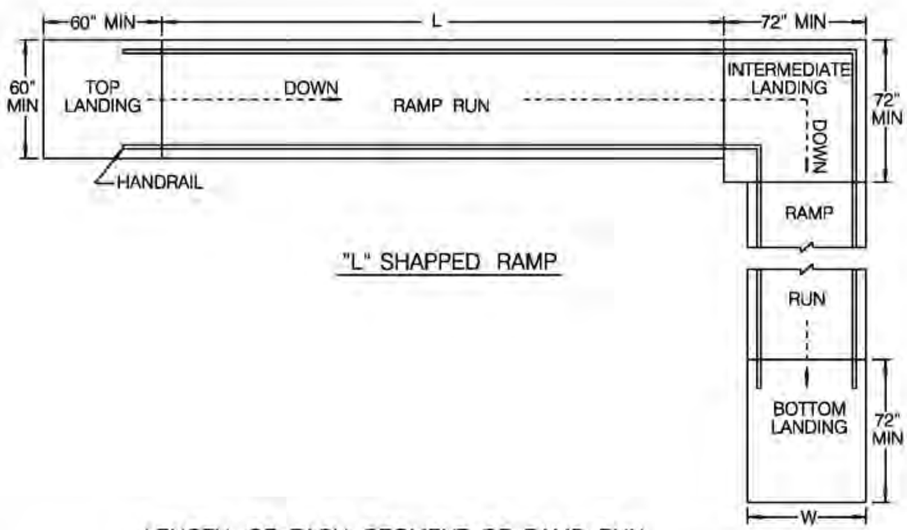
DRAWING NUMBER **SDM-114**



STRAIGHT RUN RAMP



"U" SHAPPED RAMP



"L" SHAPPED RAMP

LENGTH OF EACH SEGMENT OF RAMP RUN

MAX SLOPE	MAXIMUM LENGTH OF EACH RAMP SEGMENT (L)	MAXIMUM RISE BETWEEN LANDINGS
1:15 (6.67%)	37.5'	30"
1:16 (6.25%)	40'	30"
1:17 (5.88%)	42.5'	30"
1:18 (5.55%)	45'	30"
1:19 (5.26%)	47.5'	30"
1:20 (5%)	50'	30"

NOTES:

1. WIDTH OF BOTTOM LANDING (W) TO EXIT SHALL BE AS WIDE AS THE RAMP IF NO CHANGE OF DIRECTION. 60" WIDE MINIMUM, IF CHANGE OF DIRECTION OF 30 DEGREES OR MORE.
2. NO WATER PONDING ALLOWED ON LANDINGS.

REVISION	BY	APPROVED	DATE
ORIGINAL	SM	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

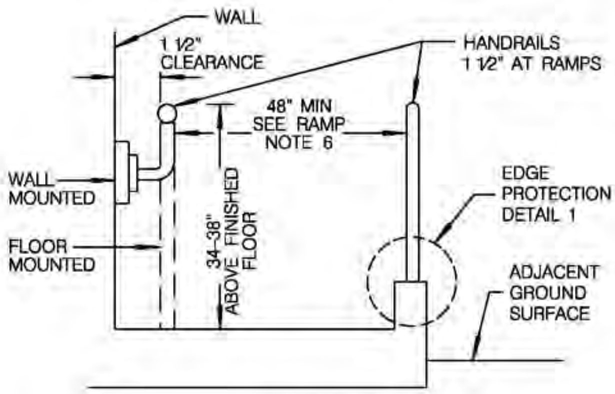
PEDESTRIAN RAMP AND PROTECTIVE RAILING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

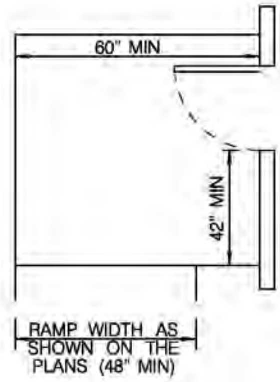
1/31/2012

COORDINATOR R.C.E. 65271 DATE

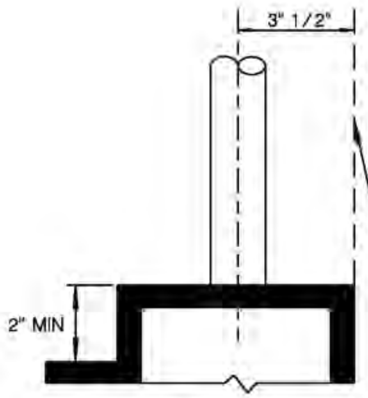
DRAWING NUMBER **SDM-115**



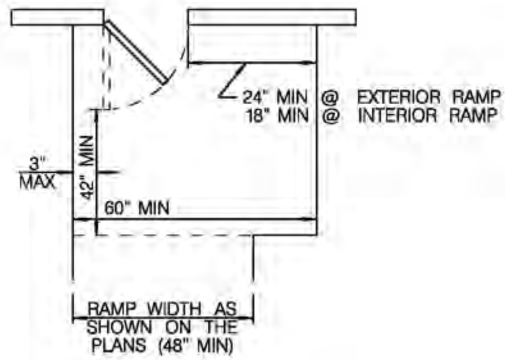
SECTION B–B



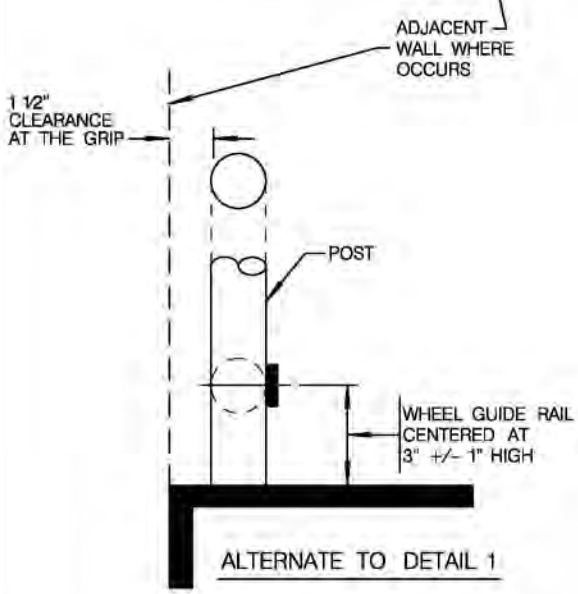
SIDE APPROACH LANDING



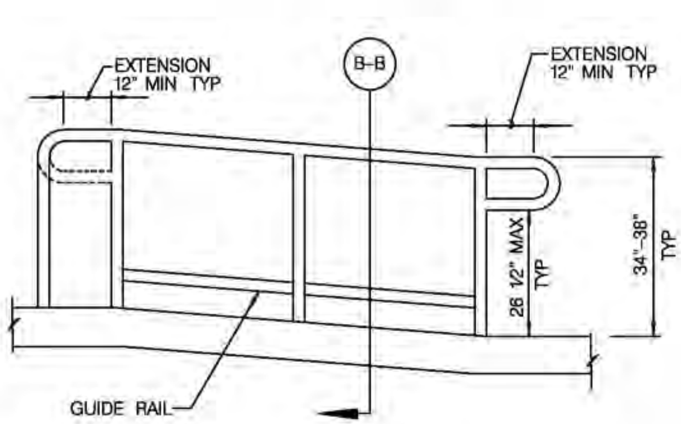
DETAIL 1



FRONT APPROACH LANDING



ALTERNATE TO DETAIL 1



SECTION A–A

SHEET 2 OF 3

REVISION	BY	APPROVED	DATE
ORIGINAL	SM	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

PEDESTRIAN RAMP AND PROTECTIVE RAILING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-115**

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 6.67%, PER CITY OF SAN DIEGO ACCESS MEMO.
3. CROSS SLOPE SHALL NOT EXCEED 1.5%.
4. LANDINGS SHALL HAVE 1.5% SLOPE IN BOTH DIRECTIONS.
5. WALKING SURFACE MUST BE STABLE, FIRM AND SLIP RESISTANT. CONCRETE SHALL HAVE A MEDIUM BROOM TRANSVERSE FINISH.

HANDRAIL:

1. HANDRAILS ARE REQUIRED ON BOTH SIDES OF A PEDESTRIAN RAMP.

   EXCEPTIONS:

   a. RAMPS AT EXTERIOR DOOR LANDINGS THAT RISE LESS THAN 6" OR HAVE LESS THAN 72" LENGTH. HOWEVER LEVEL LANDINGS SHALL BE PROVIDED AT THE TOP AND BOTTOM.

   b. RAMPS IMMEDIATELY ADJACENT TO A SEATING IN ASSEMBLY AREAS.

2. HANDRAILS SHALL BE CONTINUOUS FOR THE FULL LENGTH OF THE RAMP RUN PLUS THE EXTENSION.
3. INSIDE HANDRAILS AT "U" SHAPED AND "L" SHAPED RAMPS SHALL BE CONTINUOUS.
4. HANDRAILS SHALL EXTEND 12" MINIMUM BEYOND THE TOP, INTERMEDIATE AND BOTTOM OF EACH RAMP SEGMENT IN THE DIRECTION OF THE RAMP RUN, THE HANDRAIL EXTENTION SHALL BE PARALLEL TO THE LANDING SURFACE.
5. HANDRAIL EXTENSION SHALL NOT EXTEND INTO THE REQUIRED WIDTH OF AN ADJACENT ROUTE OF TRAVEL. IN EXISTING FACILITIES WHERE THE ENCROACHMENT OF THE EXTENSION IN THE DIRECTION OF THE RAMP CREATES A HAZARD. THE EXTENSION SHALL BE BENT 90 DEGREES TO THE RUN OF THE RAMP.
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 GRIPING SURFACE OF THE HANDRAIL SHALL BE UNIFORM IN HEIGHT. THE GRIPPING SURFACE SHALL BE CONTINUOUS AND SMOOTH (NO SHARP CORNERS).
9. THE GRIPING PORTION SHALL BE 1-1/4" TO 1-1/2" IN CROSS SECTIONAL NOMINAL DIMENSION OR SHAPED WITH EQUIVALENT GRIPING SURFACE. DESIGN AND SHOP DRAWINGS SHALL BE APPROVED BY THE CITY ENGINEER ACCESS COMPLIANCE OFFICER PRIOR TO FABRICATION.
10. ADJACENT WALL OR OTHER SURFACES SHALL BE FREE OF ANY SHARP OR ABRASIVE ELEMENT (SMOOTH FINISH).
11. A GUARDRAIL 42" ABOVE FINISHED FLOOR SHALL BE INSTALLED ALONG OPEN EDGES OF THE RAMP AND LANDINGS THAT ARE 30" OR MORE IN HEIGHT FROM THE ADJACENT GROUND SURFACE AND THE RAMP IS NOT BOUNDED BY A WALL OR FENCE. SEE SDM-118.
12. PROVIDE A CONTINUOUS GUIDE CURB OR GUIDE RAIL IF POSTS ARE INSTALLED ON THE RAMP SURFACE OR IF THE FINISH SURFACE IS $\geq$ 4" HIGHER THAN THE ADJACENT GROUND SURFACE.
13. FOR HANDRAIL AND GUARDRAIL MATERIAL, FINISHES AND ADDITIONAL DETAILS, SEE RELATED DETAIL DRAWINGS.

REVISION	BY	APPROVED	DATE
ORIGINAL	SM	A. OSKOUI	12/03
UPDATE	FC	A. OSKOUI	12/06
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

PEDESTRIAN RAMP AND PROTECTIVE RAILING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDM-115**

PARKING REQUIREMENTS:

1. WHERE PARKING IS PROVIDED ON EACH FACILITY (LOT OR STRUCTURE), ACCESSIBLE PARKING SPACES SHALL BE PROVIDED.

MINIMUM REQUIRED PARKING RATIO FOR ACCESSIBLE PARKING SPACES

TOTAL NUMBER OF PARKING SPACES PROVIDED IN PARKING FACILITY	MINIMUM NUMBER OF REQUIRED ACCESSIBLE PARKING SPACES
1–25	1
26–50	2
51–75	3
76–100	4
101–150	5
151–200	6
201–300	7
301–400	8
401–500	9
501–1,000	2% OF TOTAL
1,001 AN OVER	20, PLUS 1 FOR EACH 100, OR FRACTION THEREOF, OVER 1000

EXCEPTIONS:

i. PARKING SPACES USED EXCLUSIVELY FOR BUSES, TRUCKS, OTHER DELIVERY VEHICLES, LAW ENFORCEMENT 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.

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

iii. 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.

NOTES:

A. THE REQUIRED PARKING RATIO FOR ACCESSIBLE PARKING STALLS IS PROVIDED FOR EACH PARKING LOT ON THE SITE.

B. AT LEAST ONE VAN PARKING SPACE IS REQUIRED FOR EVERY 6 OR FRACTION OF SIX PARKING SPACES. 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.

C. VERTICAL CLEARANCE – PARKING SPACES FOR VANS AND ACCESS AISLE AND VEHICULAR ROUTES SERVING THEM SHALL PROVIDE A VERTICAL CLEARANCE OF 98" MINIMUM.

2. 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 TO BE INCLUDED IN THE OVERALL DIMENSIONS OF THE ACCESSIBLE PARKING SPACES AND ACCESS AISLES.

B. THE SURFACE SLOPE OF THE AREA IMMEDIATELY SURROUNDING THE ACCESSIBLE PARKING SPACE SHALL BE 1.5% FOR A WIDTH OF 4'–0".

C. ADEQUATE DRAINAGE SHALL BE PROVIDED SO THAT WATER DOES NOT ACCUMULATE WITHIN THE ACCESSIBLE PARKING SPACE AND ACCESS AISLE.

D. THE GUTTER SLOPE AT THE OPENING OF THE CURB RAMPS SERVING THE ACCESS AISLES SHALL BE 1.5%.

REVISION	BY	APPROVED	DATE
ORIGINAL	FC	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

ACCESSIBLE PARKING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-117**

3. 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. 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).

C. THE CURB RAMP MAY NOT ENCROACH INTO THE REQUIRED DIMENSIONS FOR THE ACCESSIBLE PARKING SPACE AND ACCESS AISLE.

D. CURB RAMPS SERVING THE ACCESS AISLES SHALL COMPLY WITH THE APPROPRIATE CURB RAMP STANDARDS.

4. IN EACH PARKING AREA, A WHEEL STOP SHALL BE PROVIDED TO PREVENT VEHICLES FROM OBSTRUCTING THE REQUIRED CLEAR WIDTH OF ADJACENT ACCESSIBLE ROUTES.

5. 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.

6. 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.

B. WHEN POSTED IN A PATH OF TRAVEL, THE SIGN SHALL BE MOUNTED 80" PER M-45. SIGNS MAY BE CENTERED ON THE WALL AT THE INTERIOR END OF THE PARKING SPACE 5' ABOVE GRADE.

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.

7. 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" WIDE DETECTABLE WARNING TILES. DETECTABLE WARNING TILES SHALL BE PER SDG-130.

8. 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" 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" AND INCLUDES THE ISA. WHEN LOCATED IN A PATH OF TRAVEL, THE SIGN SHALL BE MOUNTED PER M-45.

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. 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" 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.

REVISION	BY	APPROVED	DATE
ORIGINAL	FC	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

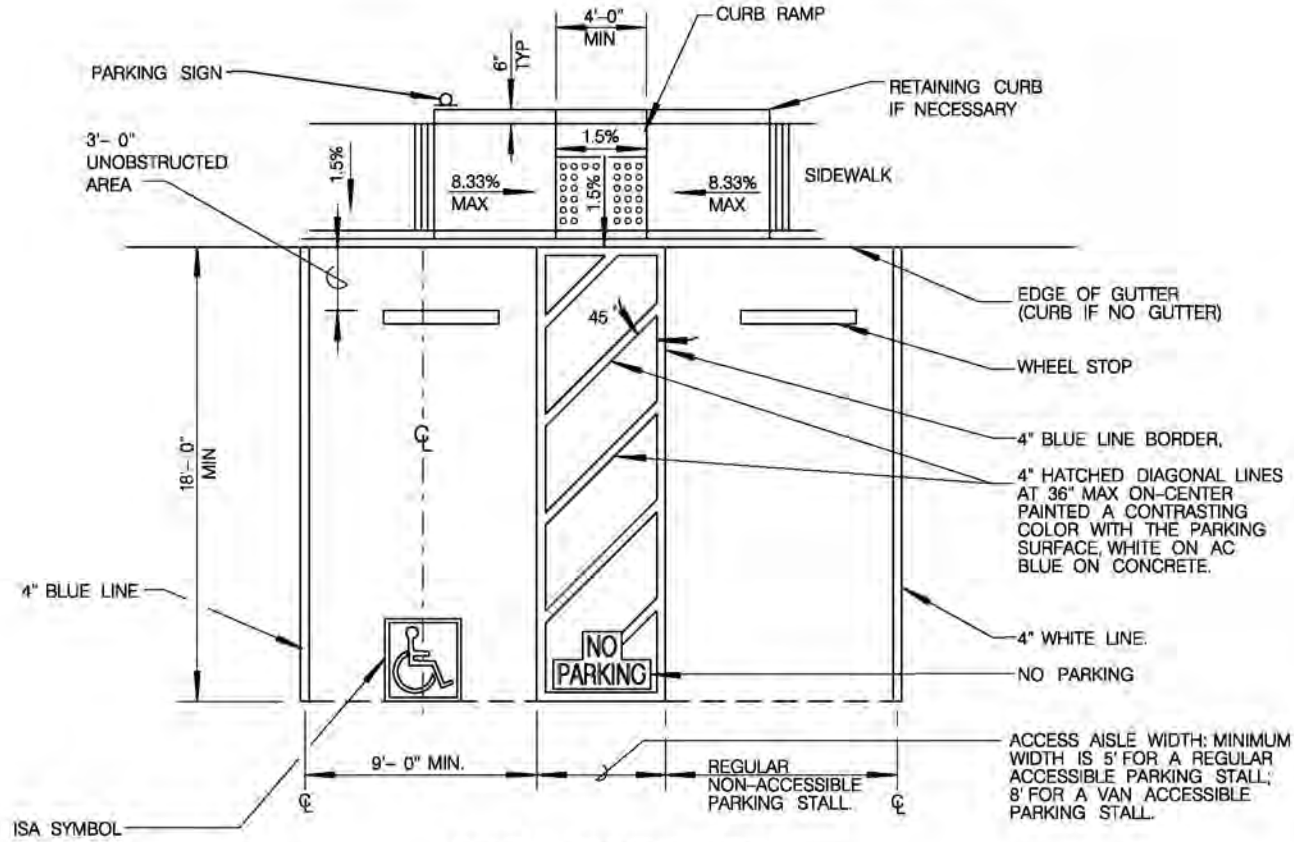
ACCESSIBLE PARKING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

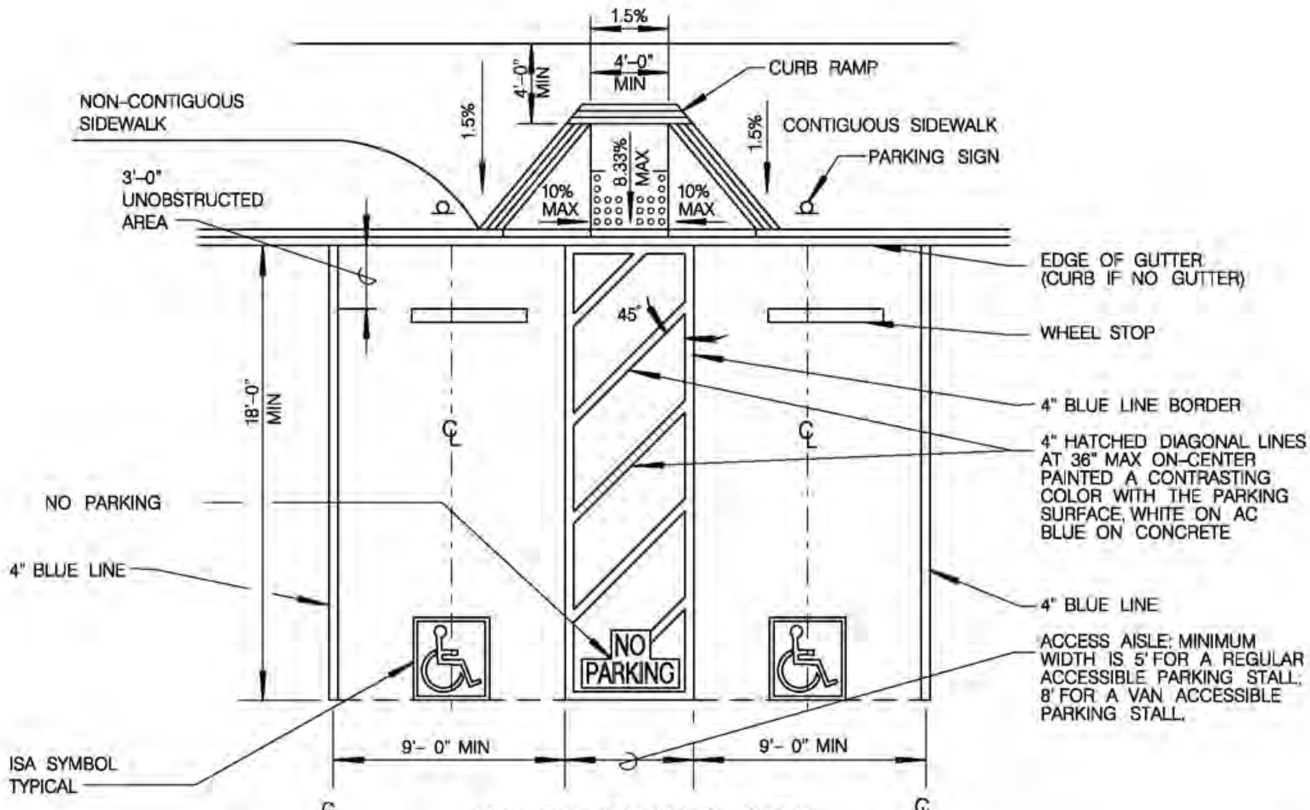
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-117**



SINGLE PARKING STALL



DOUBLE PARKING STALL

REVISION	BY	APPROVED	DATE
ORIGINAL	FC	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

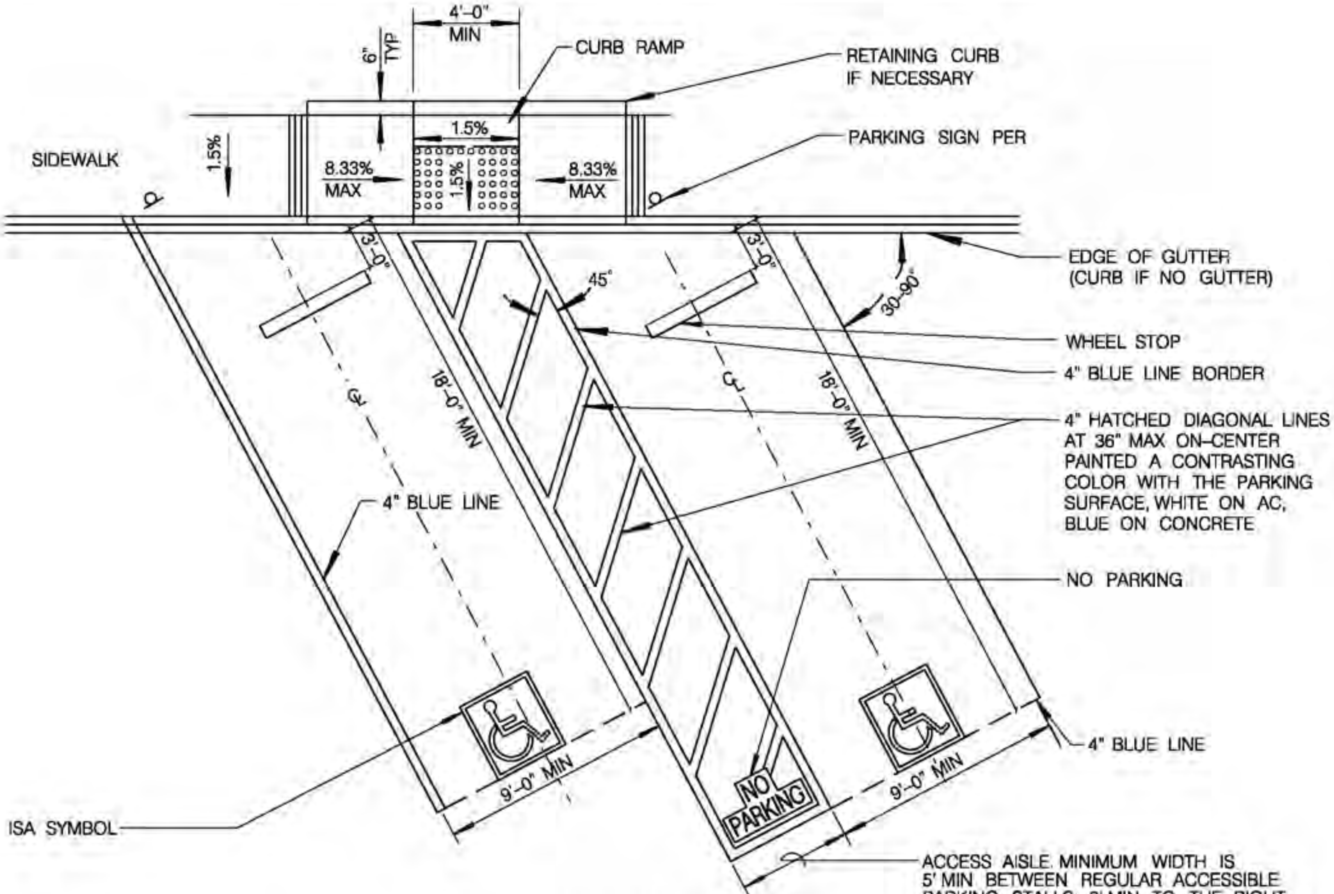
ACCESSIBLE PARKING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

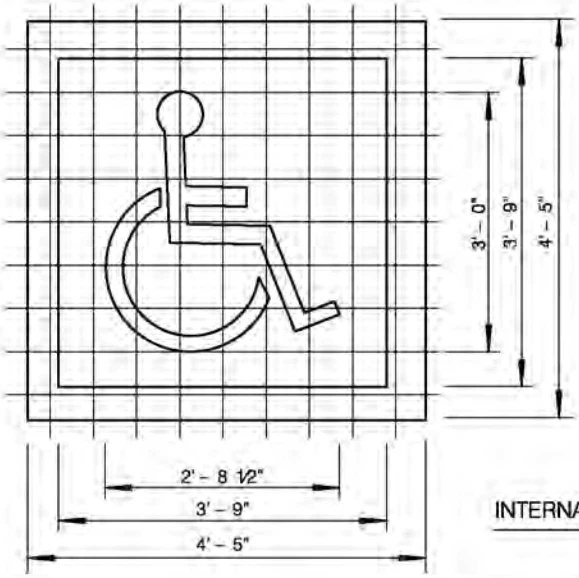
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-117**



DIAGONAL DOUBLE PARKING STALLS



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

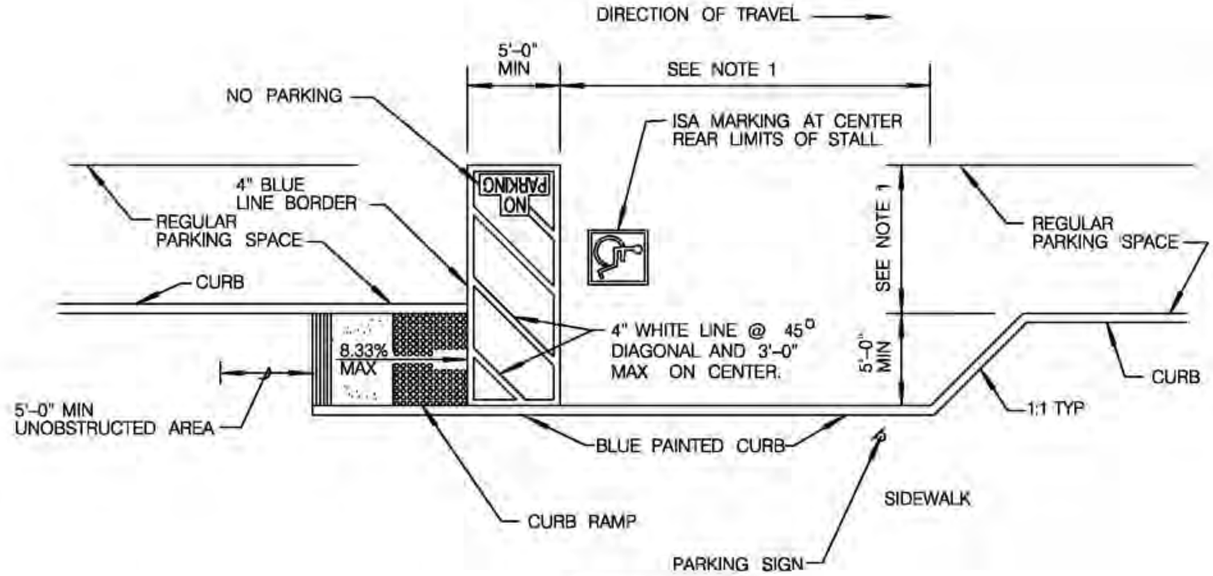
BLUE COLOR TO MATCH COLOR A 15090 IN THE FEDERAL STANDARD 595A AS SPECIFIED IN SECTION 522(B) 2.

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

INTERNATIONAL SYMBOL OF ACCESSIBILITY (ISA)

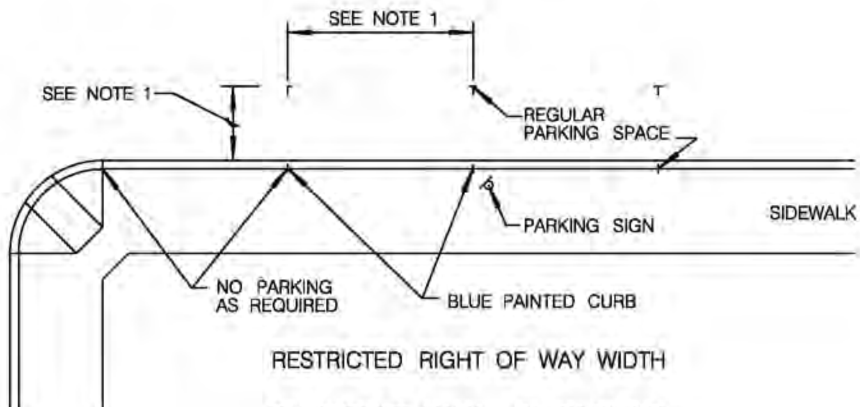
THE WORDS "NO PARKING" SHALL BE PAINTED IN WHITE LETTERS NO LESS THAN 12" HIGH LOCATED AT THE END OF THE ACCESS AISLE SO THAT IT IS VISIBLE TO TRAFFIC ENFORCEMENT OFFICIALS

REVISION	BY	APPROVED	DATE	CITY OF SAN DIEGO - STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
ORIGINAL	KA	J. NAGELVOORT	01/12		1/31/2012
					COORDINATOR R.C.E. 65271 DATE
				ACCESSIBLE PARKING	
					DRAWING NUMBER **SDM-117**



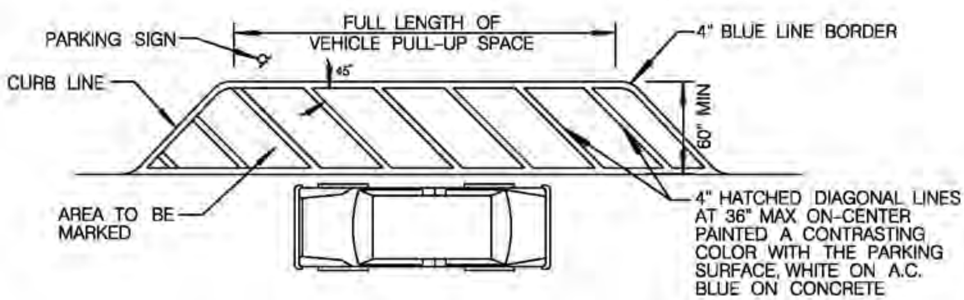
ON-STREET PARKING

WITH LOADING ZONE



RESTRICTED RIGHT OF WAY WIDTH

ON-STREET PARALLEL PARKING



PASSENGER LOADING ZONE

NOTE 1:

ACCESSIBLE ON-STREET PARKING SPACES SHALL NOT BE SMALLER IN LENGTH OR WIDTH THAN THAT SPECIFIED FOR OTHER PARKING SPACES, BUT NOT LESS THAN 20'-0" IN LENGTH AND NOT LESS THAN 8'-0" IN WIDTH.

SHEET 5 OF 7

REVISION	BY	APPROVED	DATE
ORIGINAL	FC	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

ACCESSIBLE PARKING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-117**

SINGLE SIGN

MULTIPLE SIGNS

PARKING SIGNS

NOTES:

1. POST MOUNTED SIGNS, SEE M-45 FOR BREAK-AWAY SIGN POST
2. SIGN SHALL BE CONSTRUCTED OF A MINIMUM 1/16" THICK ALUMINUM
3. COLORS:
   BORDER, TEXT, AND SYMBOL – WHITE (RETROREFLECTIVE)
   BACKROUND – BLUE (RETROREFLECTIVE)
4. FONT SANS-SERIF CLEARVIEW

SHEET 6 OF 7

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

ACCESSIBLE PARKING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-117**

TOW–AWAY SIGN

NOTES:

1. AN ADDITIONAL SIGN SHALL BE POSTED IN A CONSPICUOUS PLACE AT EACH ENTRANCE TO OFF–STREET PARKING FACILITIES, OR IMMEDIATELY TO AND VISIBLE FROM EACH STALL OR SPACE.
2. COLORS – THE SIGN HAS A WHITE REFLECTIVE BACKGROUND WITH NON–REFLECTIVE BLACK BORDER AND TEXT.
3. BLANK SPACES MUST BE FILLED IN WITH APPROPRIATE INFORMATION AS A PERMANENT PART OF THE SIGN AT THE TIME OF FINAL INSPECTION.
4. POST MOUNTED SIGNS, SEE M–45 FOR BREAK AWAY SIGN POST.
5. SIGN SHALL BE CONSTRUCTED OF A MINIMUM 1/16" THICK ALUMINUM.

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

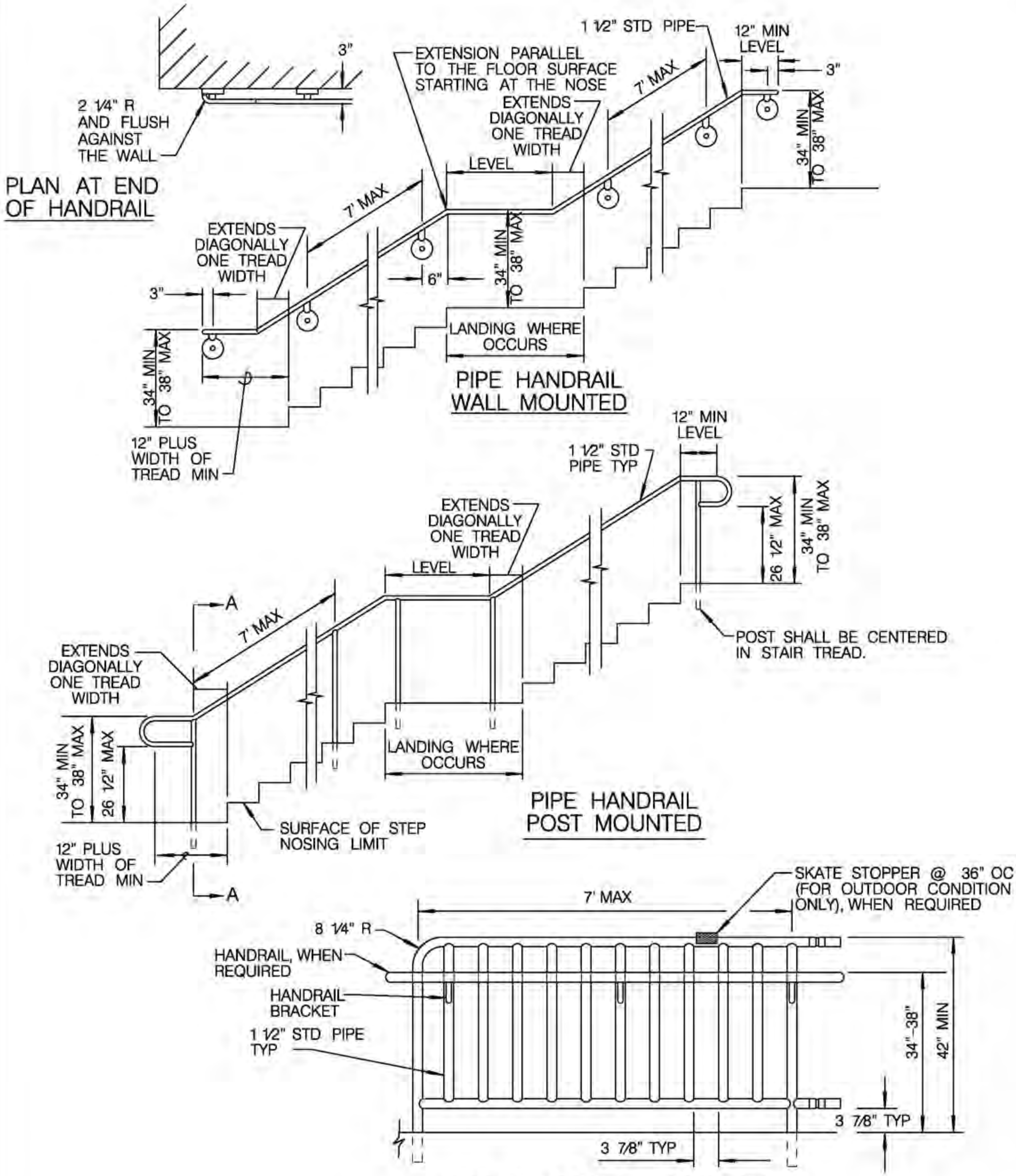
ACCESSIBLE PARKING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-117**



PLAN AT END OF HANDRAIL

PIPE HANDRAIL WALL MOUNTED

PIPE HANDRAIL POST MOUNTED

PIPE GUARDRAIL - POST TYPE

SHEET 1 OF 3

REVISION	BY	APPROVED	DATE
ORIGINAL*	BB	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

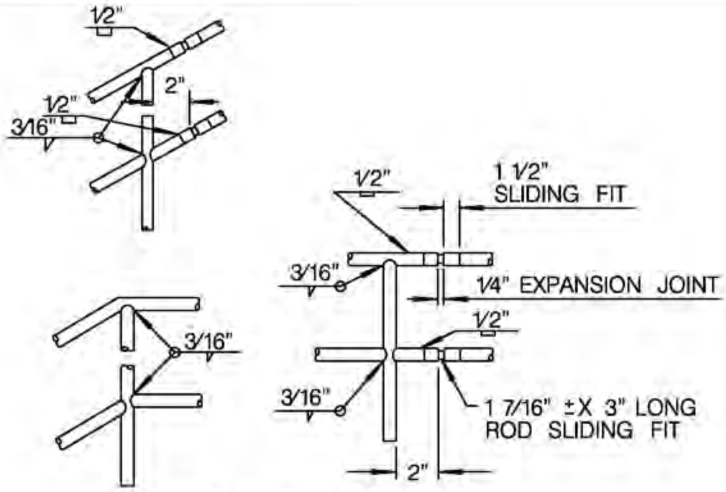
PEDESTRIAN PROTECTIVE RAILING & STAIR HANDRAIL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

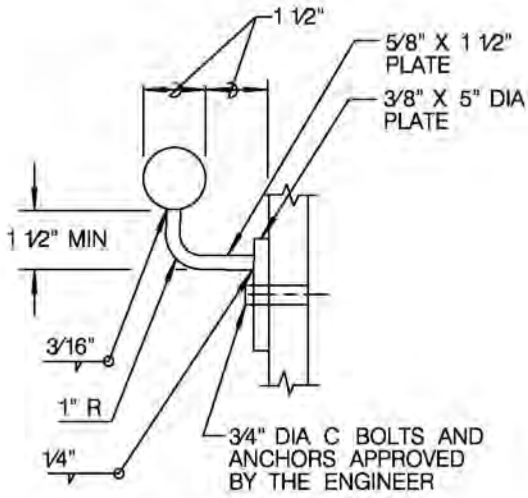
1/31/2012

COORDINATOR R.C.E. 65271 DATE

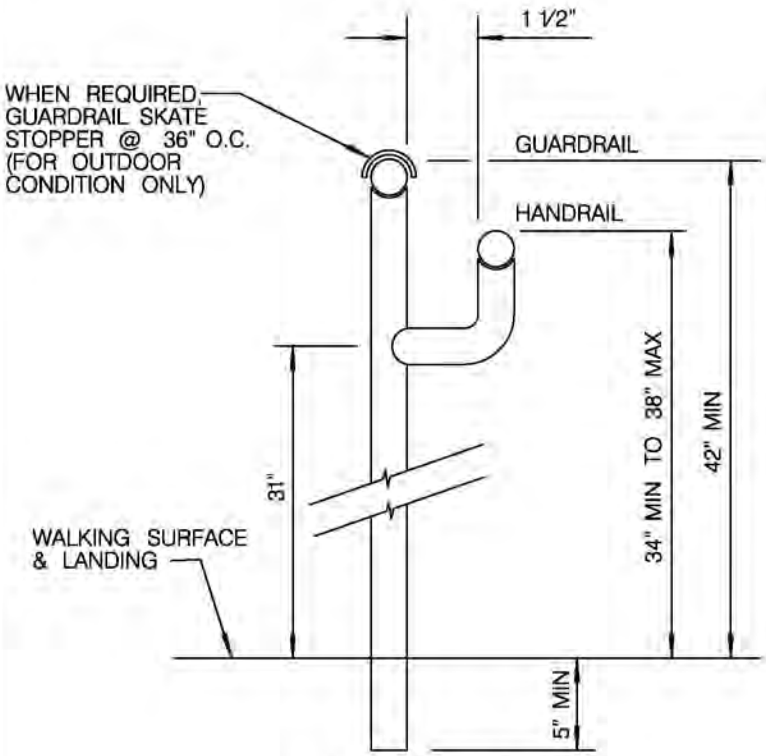
DRAWING NUMBER **SDM-118**



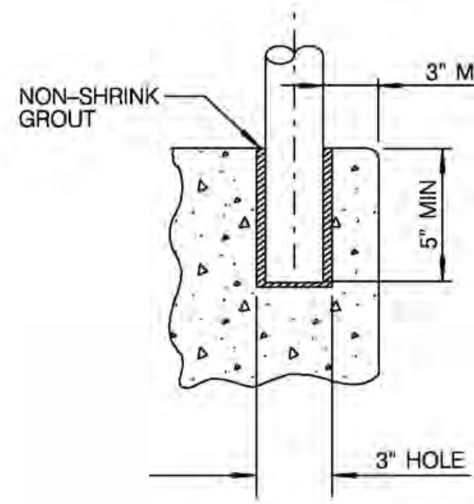
WELDING DETAILS



HANDRAIL BRACKET

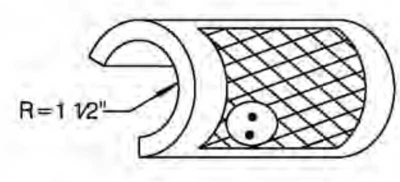


PIPE GUARDRAIL



MOUNTING DETAIL*

*POST SHALL BE GROUTED IN PLACE USING NON-SHRINK GROUT.



ALUMINUM GUARDRAIL SKATE STOPPER

RAILING NOTES

1. 1/4" EXPANSION JOINTS @ 16' CNETERS.
2. WELD AND GRIND SMOOTH ALL CONNECTIONS.
3. ALL RAILING TO BE HOT DIP GALVANIZED AFTER FABICATION.
4. PIPE SHALL BE SEAMLESS STEEL ASTM A53 GRADE B.
5. INSTALL HANDRAILS ON BOTH SIDES.
6. STAIRS AND LANDINGS THAT ARE OPEN ON ONE OR BOTH SIDES AND MORE THAN 30" ABOVE THE ADJACENT GROUND SHALL BE PROVIDED WITH GUARDRAIL.

REVISION	BY	APPROVED	DATE
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

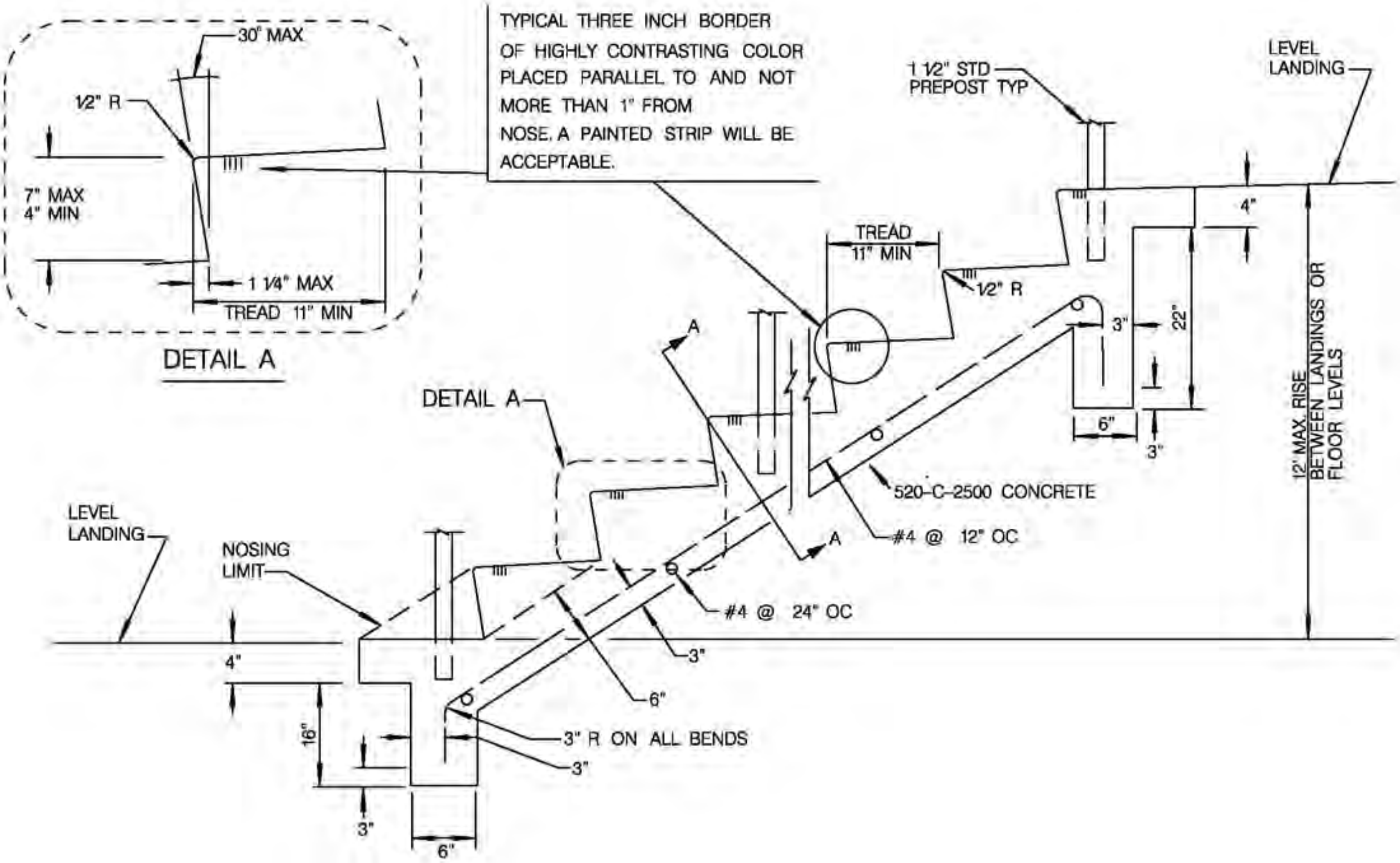
PEDESTRIAN PROTECTIVE RAILING & STAIR HANDRAIL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

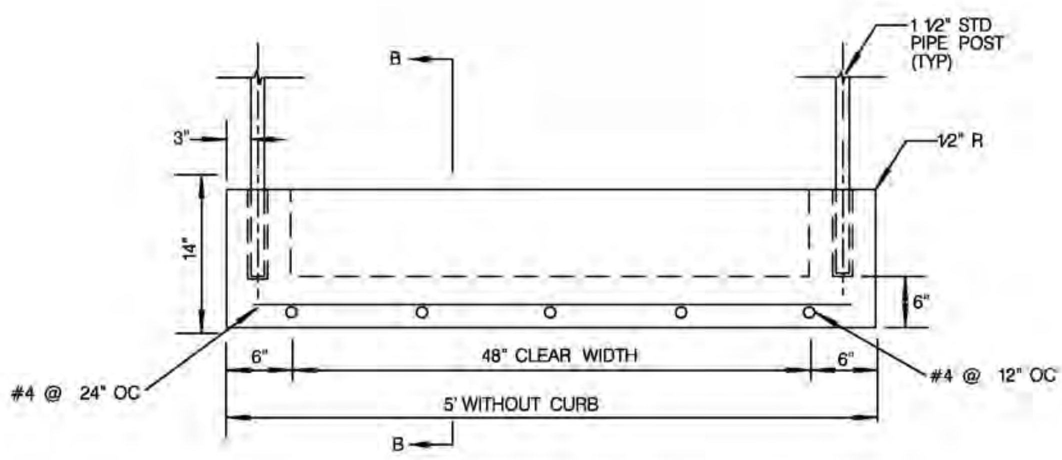
DRAWING NUMBER **SDM-118**



DETAIL A

SECTION B–B

NOTES
1. BROOM FINISH ON TREADS, TROWEL FINISH ON ALL OTHER EXPOSED SURFACES.
2. 1/4" PER 1' SLOPE ON TREADS FOR DRAINAGE.



SECTION A–A
CONCRETE STEPS

SHEET 3 OF 3

REVISION	BY	APPROVED	DATE
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

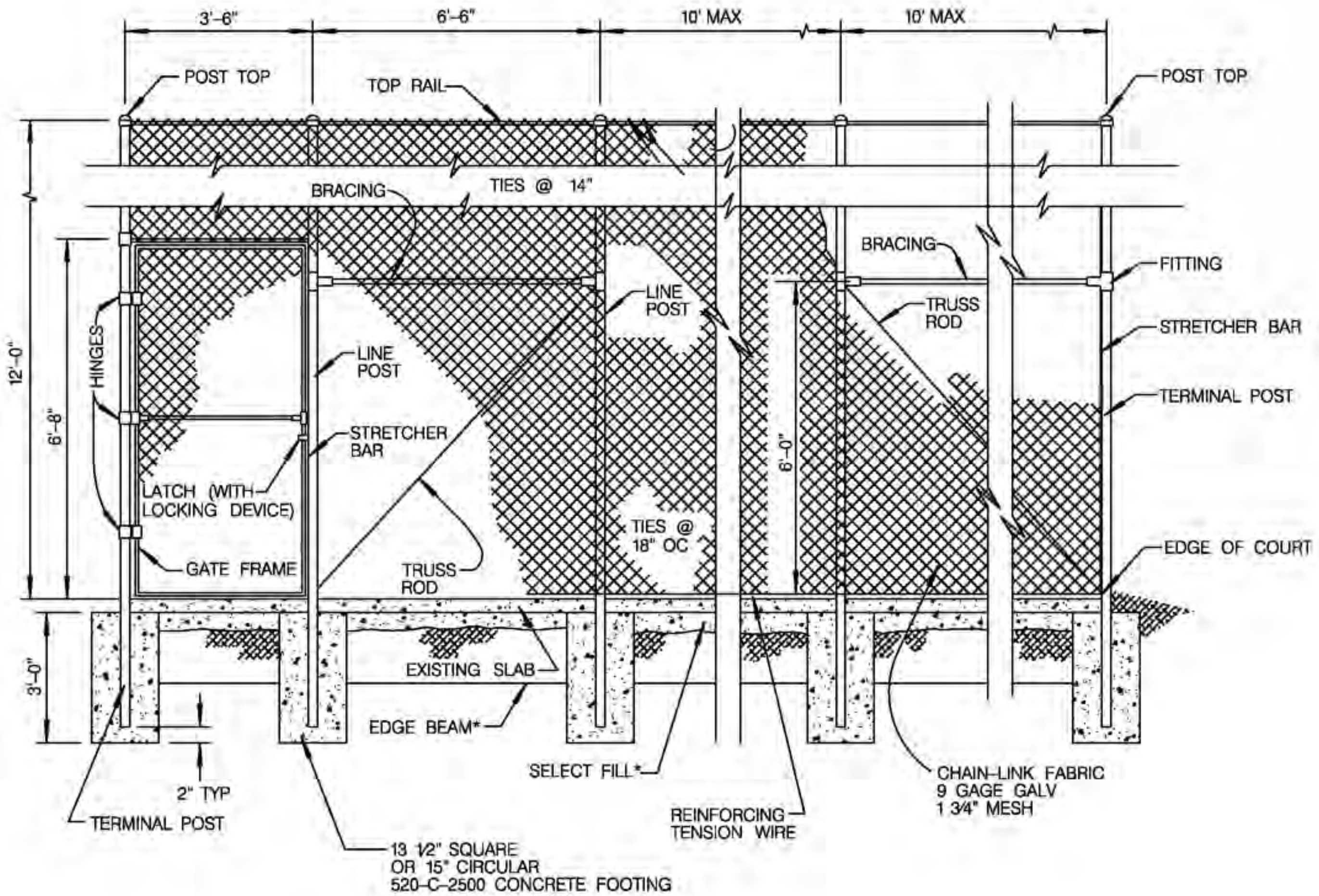
PEDESTRIAN PROTECTIVE RAILING & STAIR HANDRAIL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-118**



* FOR EDGE BEAM, SLAB, AND SELECT FILL DETAILS, SEE PLANS.

ELEVATION

DESCRIPTION	MIN. SIZE IN INCHES	MIN. WEIGHT PER LIN FT IN LBS
Line Post	2.375 IN OD	3.65LBS
Terminal Post	2.875 IN OD	5.79LBS
Top Rail	1.660 IN OD	2.27LBS
Bracing	1.660 IN OD	2.27LBS
Gate Frame	1.660 IN OD	2.27LBS

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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

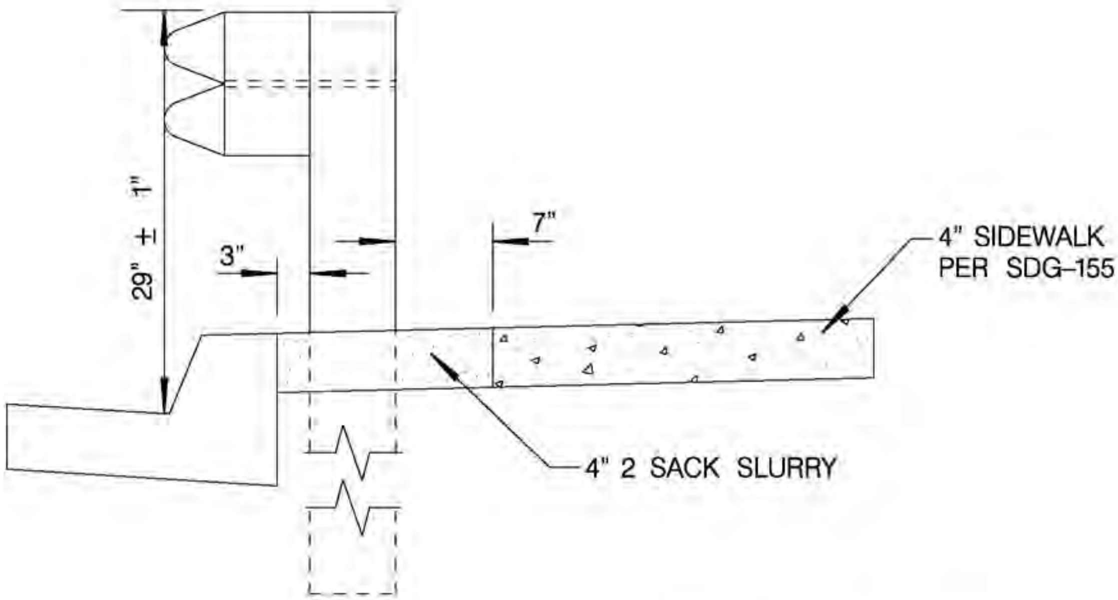
TENNIS COURT FENCE
CHAIN LINK

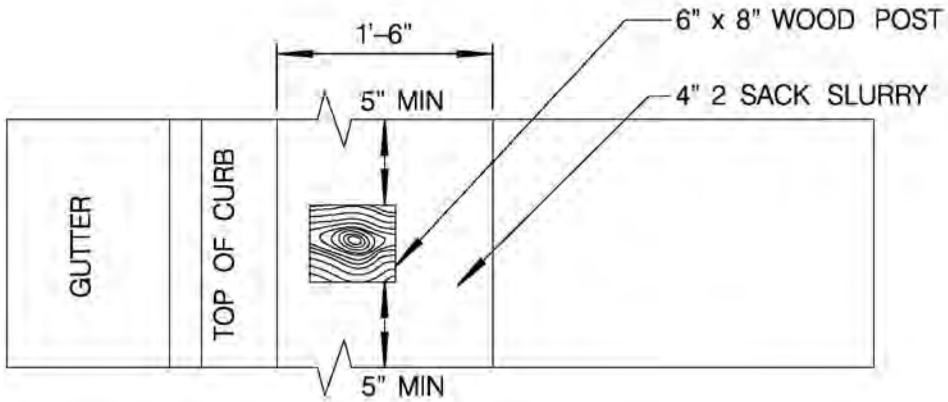
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-119**





POST KNOCKOUT PLAN DETAIL

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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

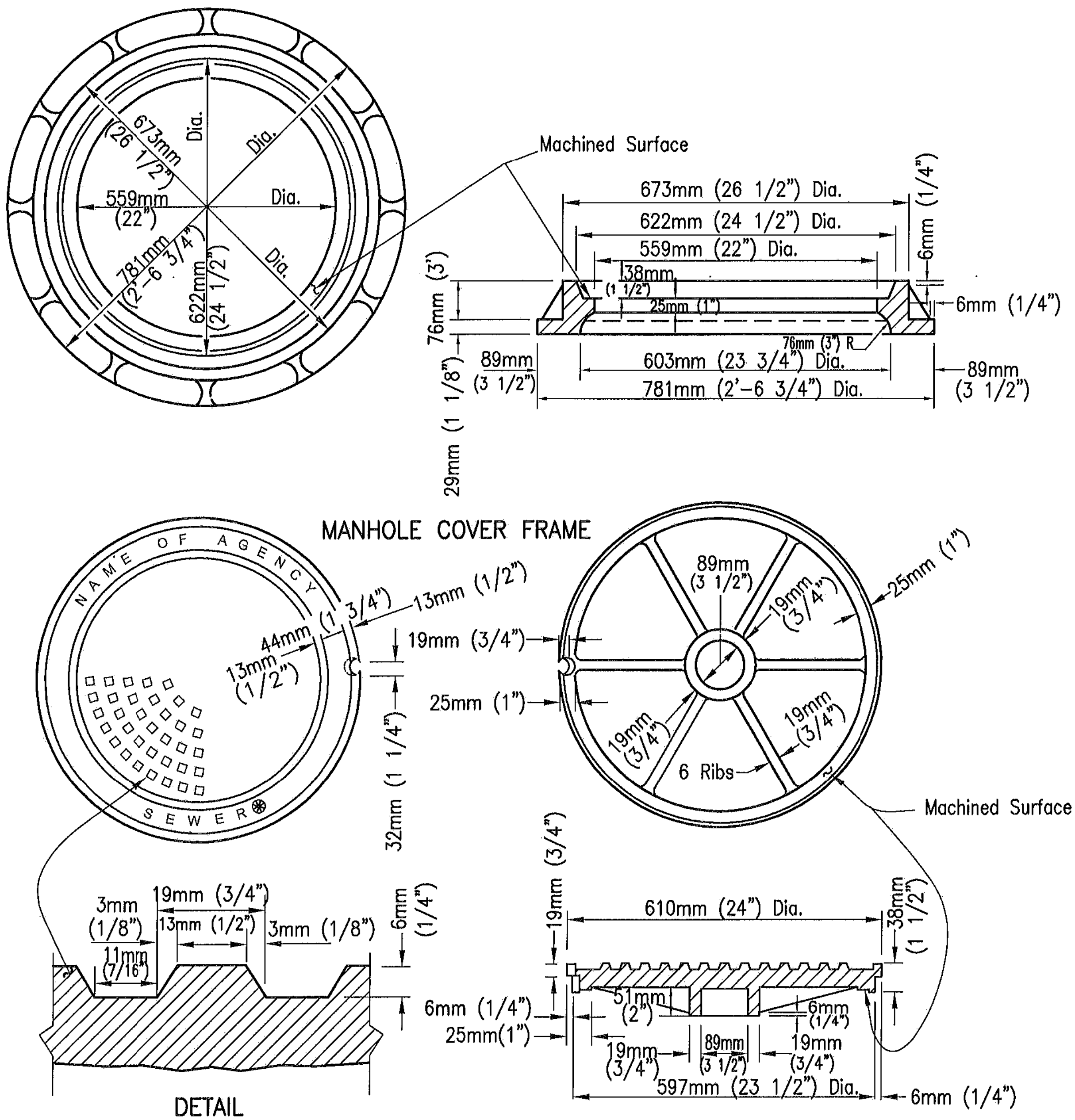
GUARDRAIL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDM-130**



MANHOLE COVER FRAME

DETAIL

MANHOLE COVER

NOTES

1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 35B.
2. Weights: Frame 75.3kg (166) – 87.6kg (193)lbs.
   Cover 67.7kg (147) – 77.6kg (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

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

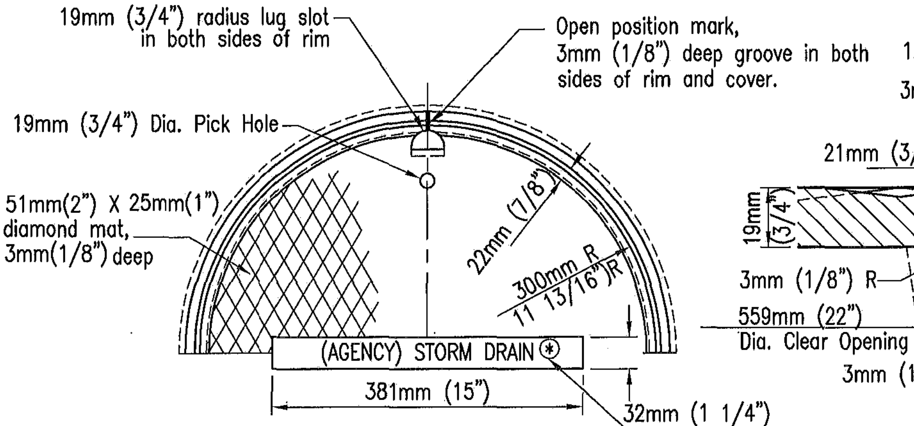
.61m (24") MANHOLE FRAME AND COVER HEAVY DUTY

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

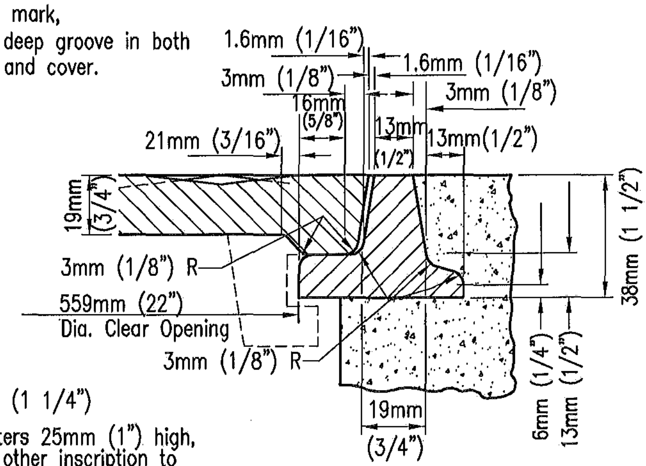
3/01/2003

Chairperson R.C.E. 19246 Date

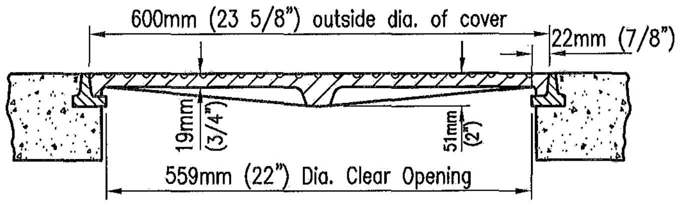
DRAWING NUMBER M-1



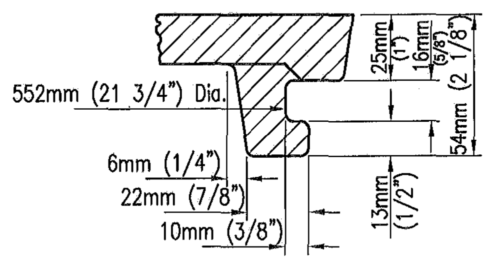
TOP OF FRAME & COVER



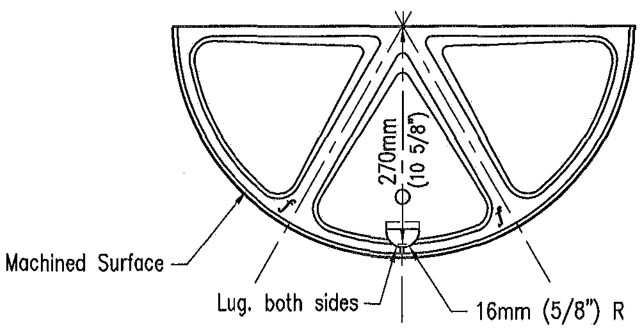
SECTION THROUGH RIM



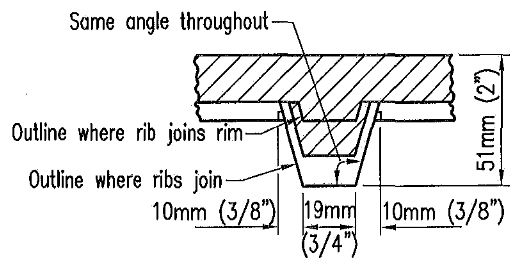
SECTION THROUGH FRAME & COVER



SECTION THROUGH LUG



BOTTOM OF COVER



SECTION THROUGH RIB AT MID RADIUS

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.
3. Weights: Frame 13.2kg (29) - 15kg (33) lbs.
   Cover 43kg (95) - 50kg (110) lbs.
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

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

.61m (24") MANHOLE FRAME AND COVER LIGHT DUTY

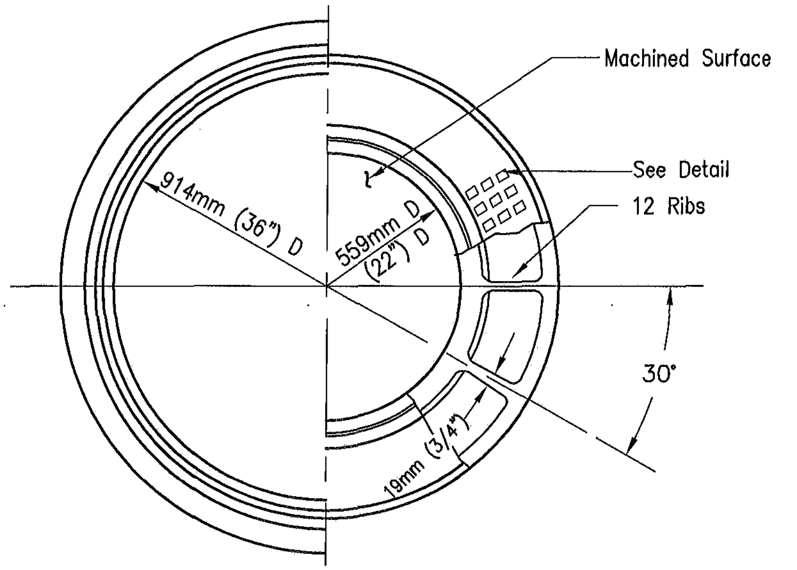
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

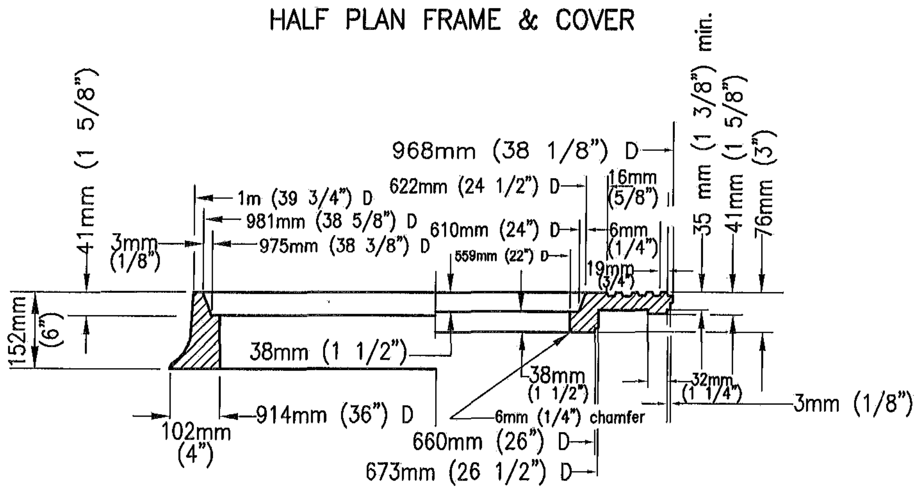
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-2

August 2009



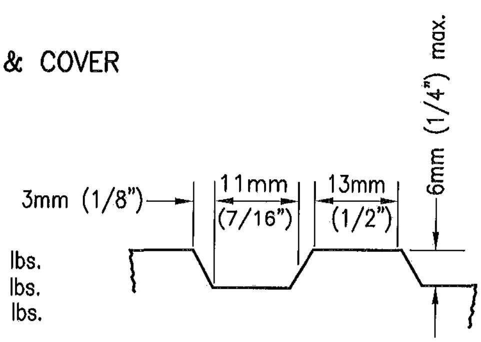
HALF PLAN FRAME & COVER



HALF SECTION FRAME & COVER

NOTES

1. Frame and cover shall be cast iron. Cast iron shall conform to ASTM 48, Class 35B.
2. Weights: Frame 142.4kg (314) - 164.6kg (363) lbs.
   Outer Cover 129.3kg (285) - 149.7kg (330) lbs.
   Inner Cover 66.7kg (147) - 77.5kg (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.



DETAIL

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

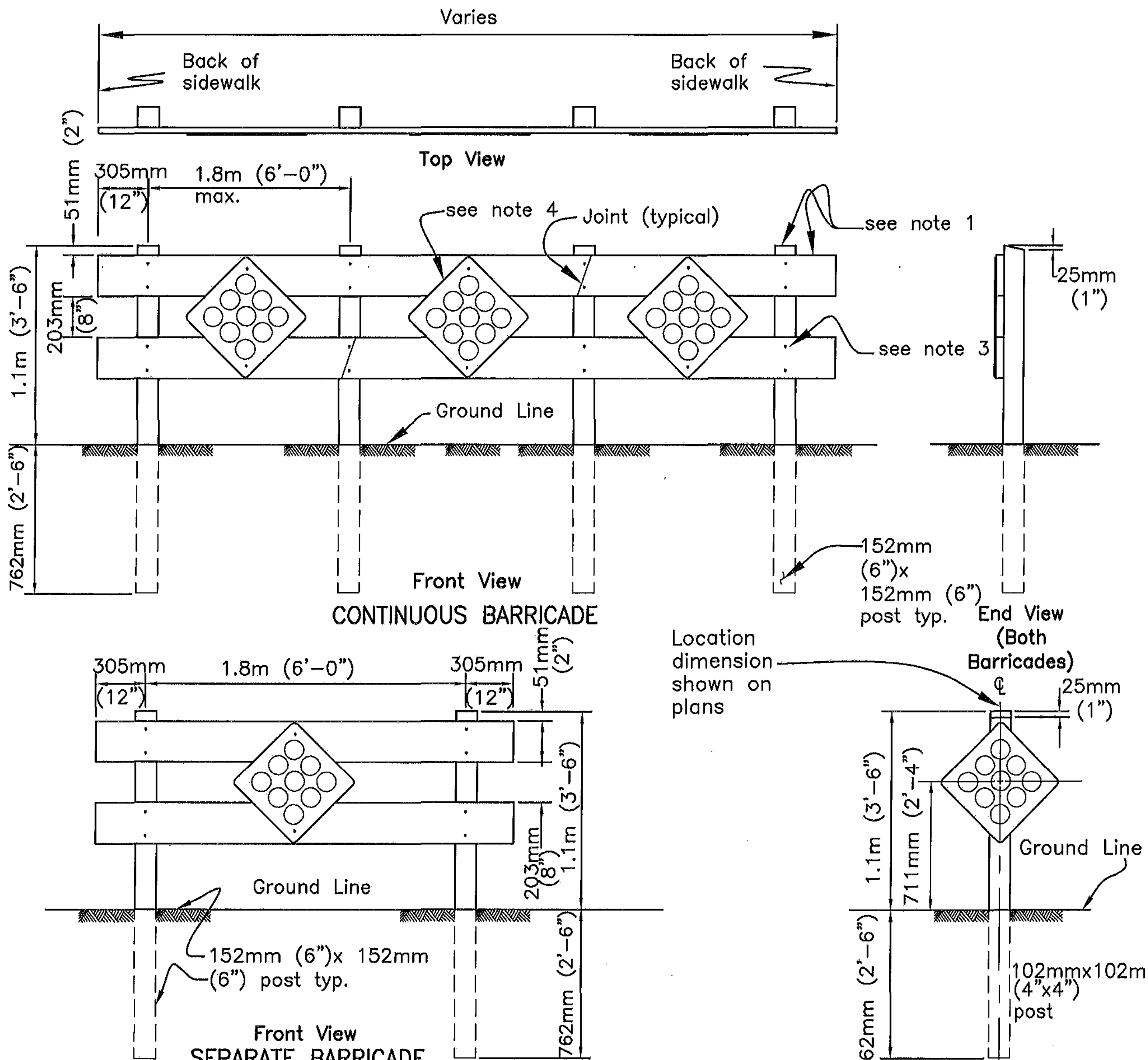
914mm (36") MANHOLE FRAME AND TWO CONCENTRIC COVERS HEAVY DUTY

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-3



Front View GUARD POST

NOTES

1. Posts to be structural grade redwood or pressure treated (with wood preservative) Douglas Fir, surfaced four sides; cross pieces to be 51mm (2")x 203mm (8") 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 10mm (3/8") x 152mm (6") galvanized lag screws with one (1) washer each.
4. Reflector sign fastners to be 10mm (3/8") x 38mm (1 1/2") galvanized lag screws. Reflector signs – California Type N. Size 457mm (18")x457mm (18") – Yellow with nine (9) –83mm (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. Reflector material shall be plastic or other approved reflectorized material.
   b. Sign material shall be aluminum alloy 6061–T6 or 5052–H38, aluminum thickness 1.6mm (0.063").
5. 1.8m (6') long hat section metal post per Caltrans Std. Plan A74–A optional for guard post.

LEGEND ON PLANS

Barricade

Guard Post

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

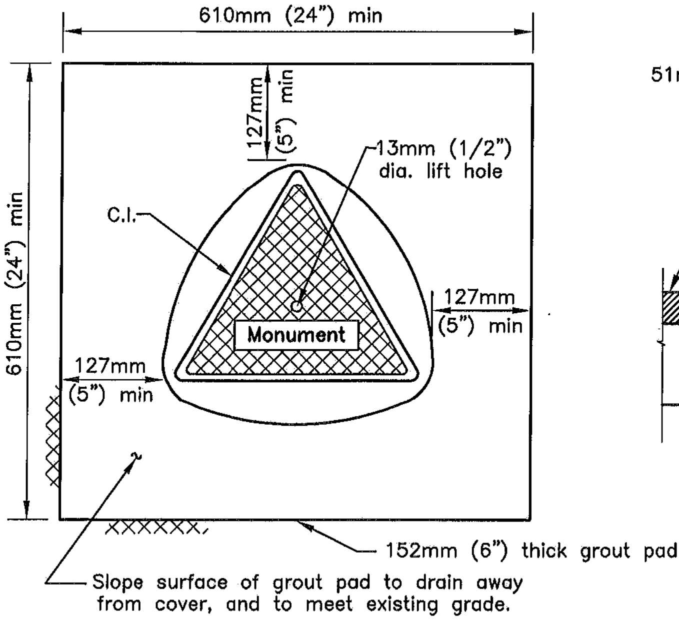
GUARD POST AND BARRICADE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

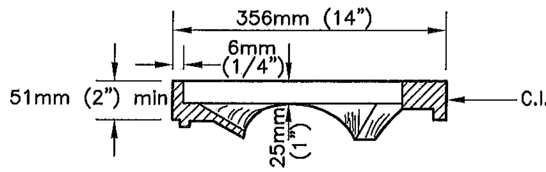
3/01/2003

Chairperson R.C.E. 19246 Date

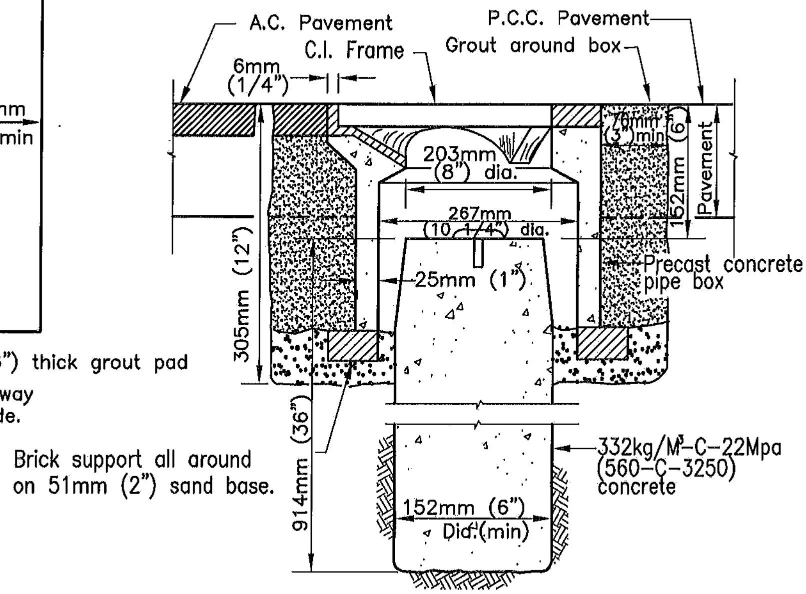
DRAWING NUMBER M-9



PLAN–IN UNPAVED AREA



RISER RING

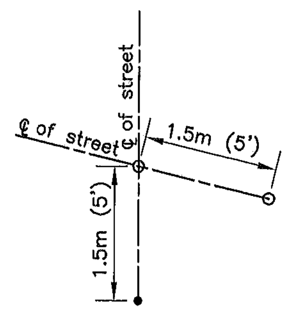


TYPICAL MONUMENT SECTION IN PAVED AREA

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 152mm (6") of cast–in–place base to a top diameter of 127mm (5"). (Precast base shall be sand backfilled).
4. Monument marker shall be a domed brass, 76mm (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 intersection is impractical, offset 1.5m (5') on centerline of major street, (see detail at right). If neither centerline can be occupied, two monuments will be set in line around the front on the perimeter of a 3m (10') diameter circle, whose center is the point.
b) Set on centerline at intervals not exceeding 305m (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 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 91.4m (300') from the point on which the deleted monument would have been placed.



Alteration location of monument. Tie distances shown on final sub–division map if alternate location is used.

LOCATION OF STREET SURVEY MONUMENT

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

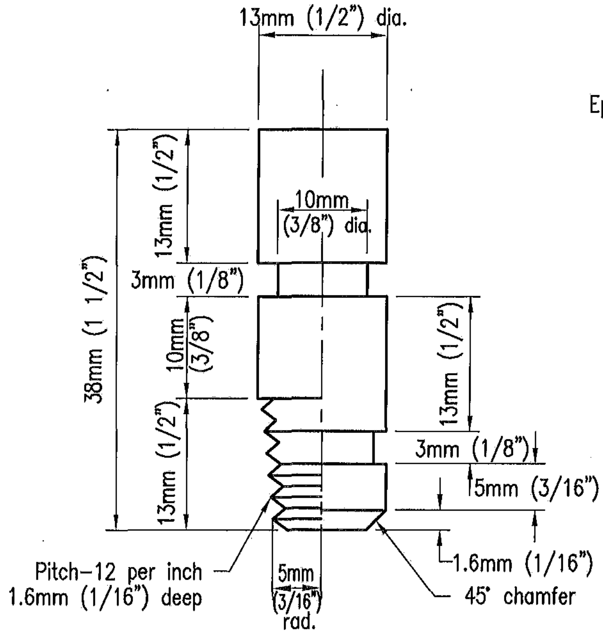
STREET SURVEY MONUMENT

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

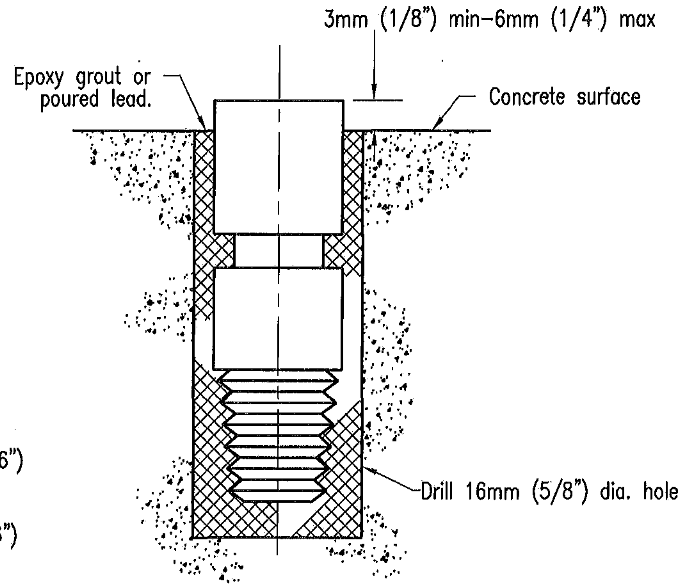
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M–10



TYPE-A TYPE-B

ELEVATION



INSTALLATION IN EXISTING CONCRETE

(Typical for Type A or B)

NOTES

1. Material- Brass A.S.T.M. B-16. All machine tolerances ±.4mm (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.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

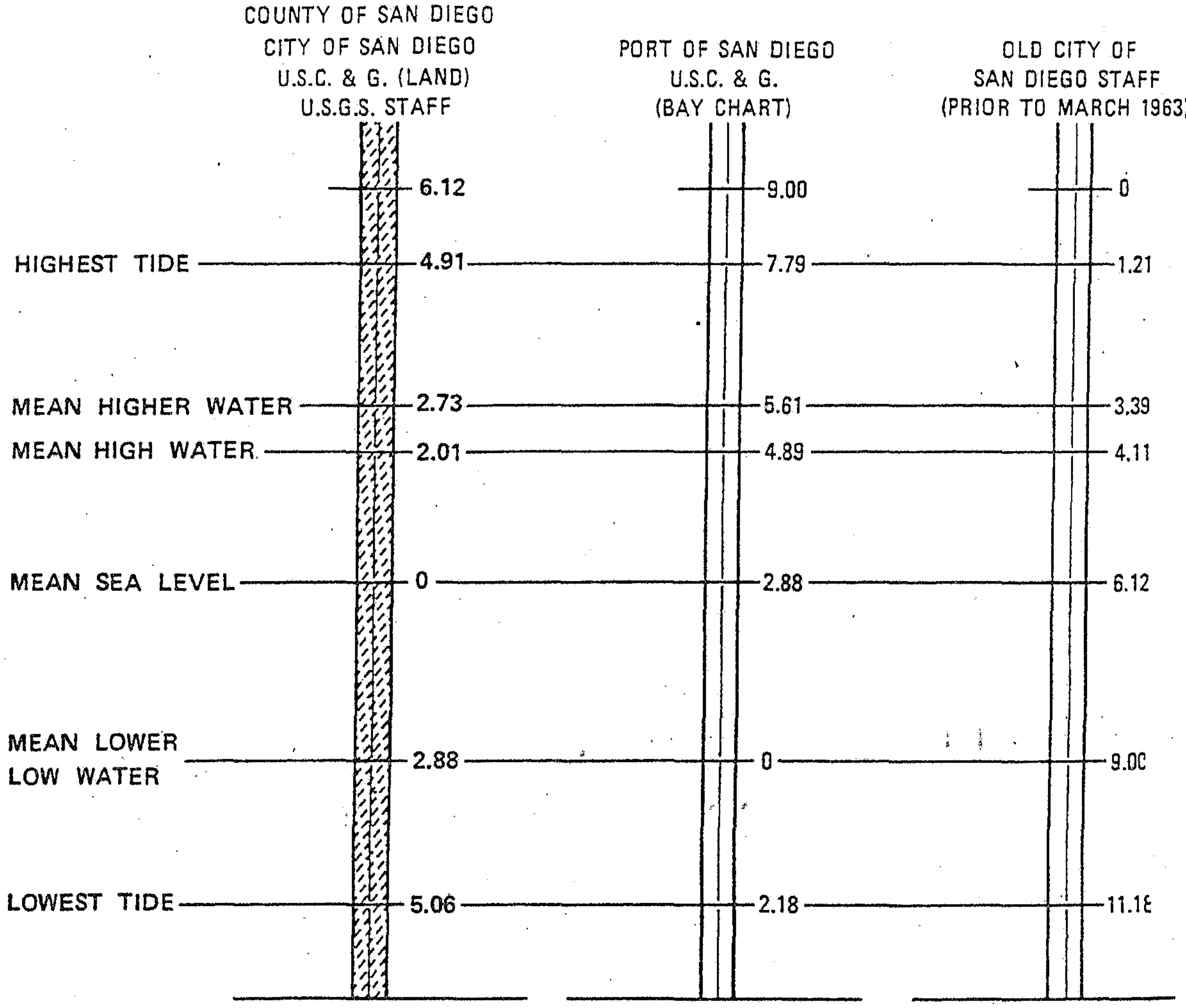
BENCH MARK - BRASS PLUG

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-11



LEGEND

U.S.C. & G.	=	United States Coast and Geodetic Survey.
U.S.G.S.	=	United States Geological Survey.
MEAN HIGH WATER	=	Mean of all high water in San Diego Bay.
MEAN HIGHER WATER	=	Mean of all higher water in San Diego Bay. Bay charts and topography up to the mean high tide based on zero at the mean lower low water.

SOURCE

Data based on U.S.C. & G. "Sea Level Datum of 1929".

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allard A. Kerchval (signature) Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER **M-12**

SAN DIEGO REGIONAL STANDARD DRAWING

DATUMS

Revision	By	Approved	Date

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 inacceptable 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 610mm (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 25mm (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, 457mm (18") long, set flush with the surface.

LEGEND

● Fd 51mm (2") Iron Pipe Marked RCE XXXX or per Map XXX unless otherwise noted

▲ Fd Street Survey Monument Stamped RCE XXXX or LS XXXX

◎ Set 51mm (2") x 610mm (24") Iron Pipe Marked RCE XXXX or LS XXXX

□ Set Lead and Disc Stamped RCE XXXX or LS XXXX

○ Set 13mm (½") x 457mm (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.

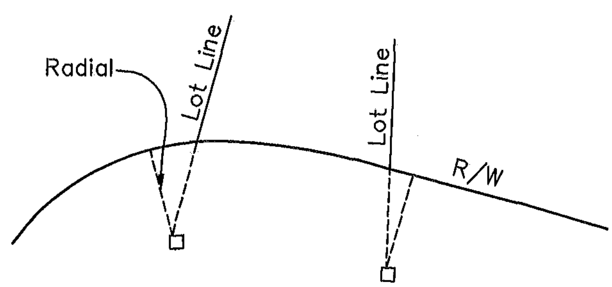
The following notes should be used in the legend where applicable.

Unless otherwise shown on this map:

1. All lot corners except as described below will be monumented by a 13mm (½") by 457mm (18") iron pin stamped (RCE or LS number).

2. Lot corners along the sideline of dedicated street right of way will be monumented by a disc stamped (RCE or LS number), set along an extension of the lot line at an offset of __ in the (curb, sidewalk). The offset shall be measured radially, or at right angles, to the right of way line. (See example below.)

3. All points of curve of the sidelines of dedicated streets will be monumented by a disc stamped (RCE or LS number), set at an offset of __ in the (curb, sidewalk). The offset shall be measured radially.



EXAMPLE OF OFFSET DISCS

Revision	By	Approved	Date		
ORIGINAL		Kercheval	12/75	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Add Metric		T. Stanton	03/03	SURVEY MONUMENTS	3/01/2003
Reviewed		T. Stanton	04/06		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER M–13

WEIGHT

1 Gram = 15.4324 grains		1 Grain = 0.0648 g.	
1 Gram = 0.0353 oz.		1 Once = 28.3495 g.	
1 Kg. = 2.2046 lb.		1 Pound = 0.4536 kg.	
1 Kg. = 0.0011 ton		1 Ton = 907.1848 kg.	
1 Ton (met) = 1.1023 ton		1 Ton = 0.9072 ton (met)	

AREA

1 Sq. cm. = 0.1550 sq. in.	1 Sq. in. = 6.4516 sq. cm.
1 Sq. m. = 10.7639 sq. ft.	1 Sq. ft. = 0.0929 sq. m.
1 Sq. m. = 1.1960 sq. yd.	1 Sq. yd. = 0.8361 sq. m.
1 Hectare = 2.4710 acres	1 Acre = 0.4047 hectare
1 Sq. km. = 0.3861 sq. mile	1 Sq. mile = 2.5900 sq. km.
1 Sq. km. = 247.10 acres	1 Acre = 0.0040 sq. km.

VOLUME

1 Cu. cm. = 0.0610 cu. in.	1 Cu. in. = 16.3872 cu. cm.
1 Cu. m. = 35.3134 cu. ft.	1 Cu. ft. = 0.0283 cu. m.
1 Cu. m. = 1.3079 cu. yd.	1 Cu. yd. = 0.7646 cu. m.

CAPACITY

1 Liter = 61.0250 cu. in.	1 Cu. in. = 0.0164 liter
1 Liter = 0.0353 cu. ft.	1 Cu. ft. = 28.3162 liters
1 Liter = 0.2642 gal. (U.S)	1 Gal. = 3.7853 liters
1 Liter = 0.0284 Bu.	1 Bu. = 35.2383 liters

LENGTH

1 MM. = 0.0394 in.	1 In. = 25.4000 mm.
1 CM. = 0.3937 in.	1 In. = 2.5400 cm.
1 Meter = 3.2808 ft.	1 Ft. = 0.3048 m.
1 Meter = 1.0936 yd.	1 Yd. = 0.9144 m.
1 Km. = 0.6214 mile	1 Mile = 1.6093 km.

METRIC PREFIX

MULTIPLE	PREFIX	MULTIPLE	PREFIX
1000000	mega	1/10	deci
1000	kilo	1/100	centi
100	hecto	1/1000	milli
10	deka	1/1000000	micro

TEMPERATURE

Degrees Fahrenheit = 9/5 (Degrees Celsius) + 32

Degrees Centigrade = 5/9 (Degrees Fahrenheit − 32)

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06
Edited		T. Stanton	08/09

SAN DIEGO REGIONAL STANDARD DRAWING

METRIC EQUIVALENTS

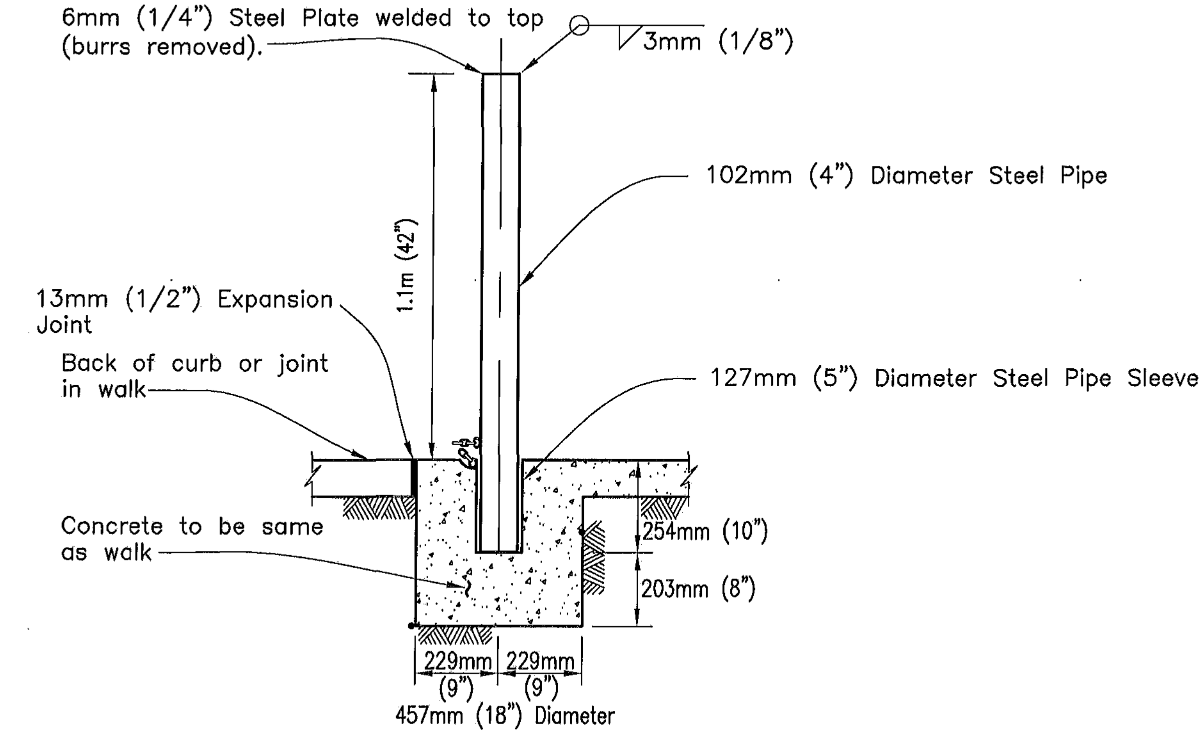
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

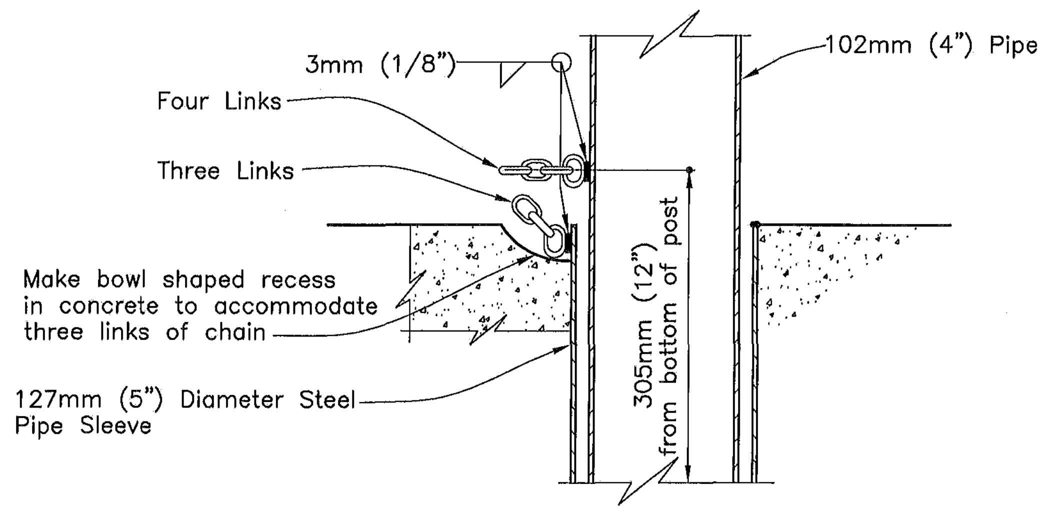
[signature] 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-14

August 2009





HASP DETAIL

NOTES

1. Chain to be 6mm (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.

LEGEND ON PLANS

○

Revision	By	Approved	Date
ORIGINAL		Solomon	7/79
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

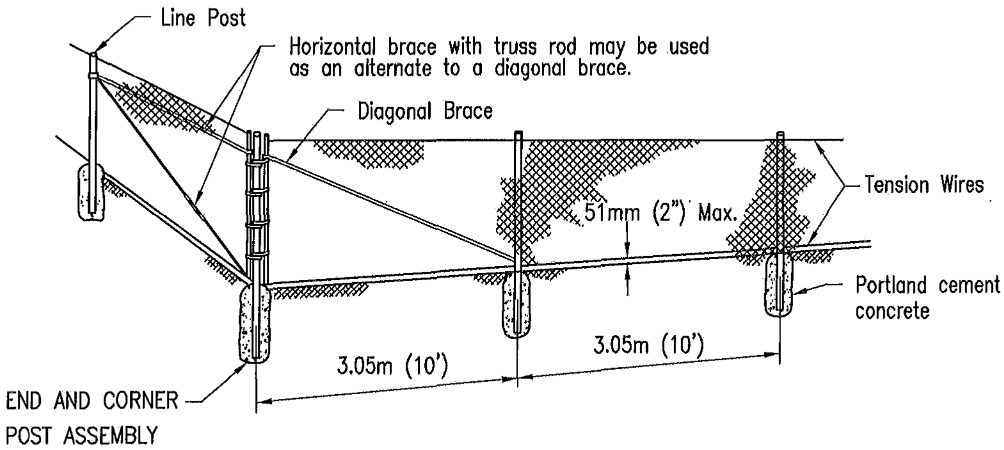
DEMOUNTABLE POST

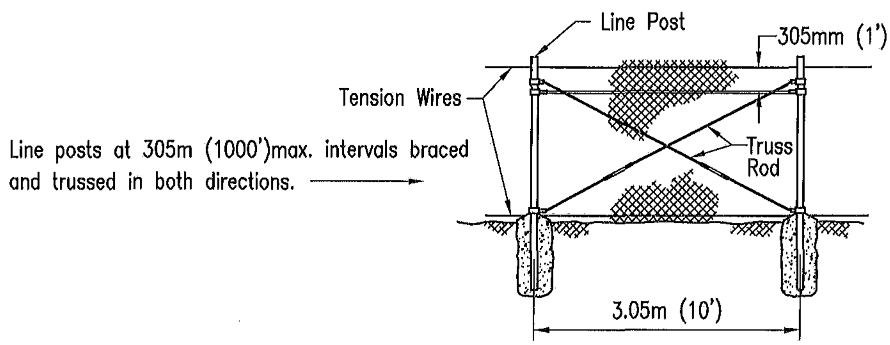
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/01/2003

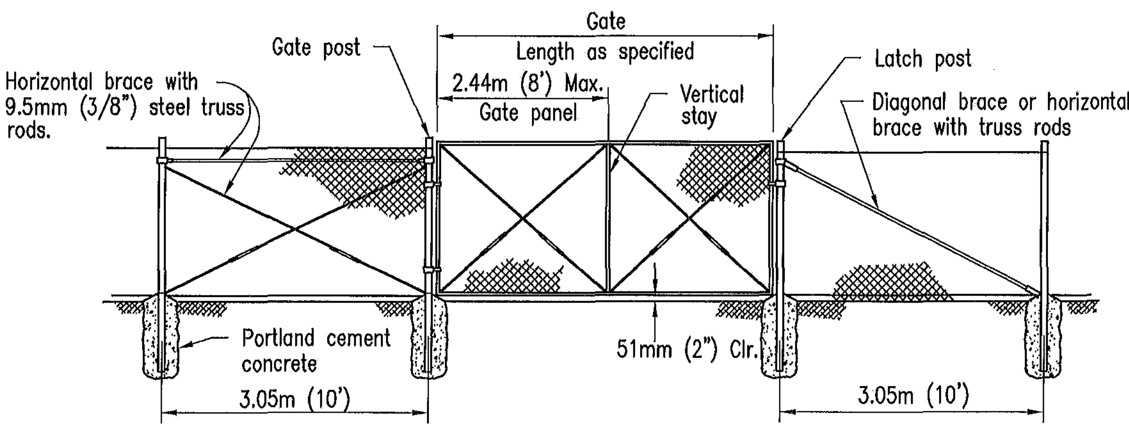
Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-16



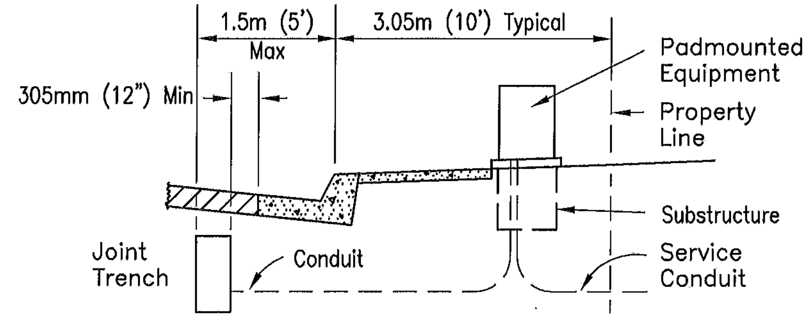


LINE POST BRACING

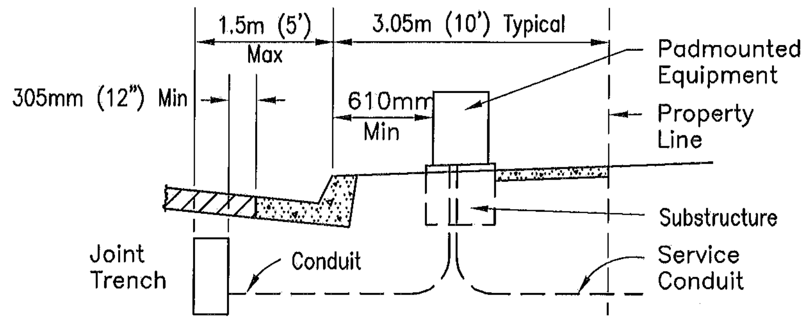


GATE ASSEMBLY

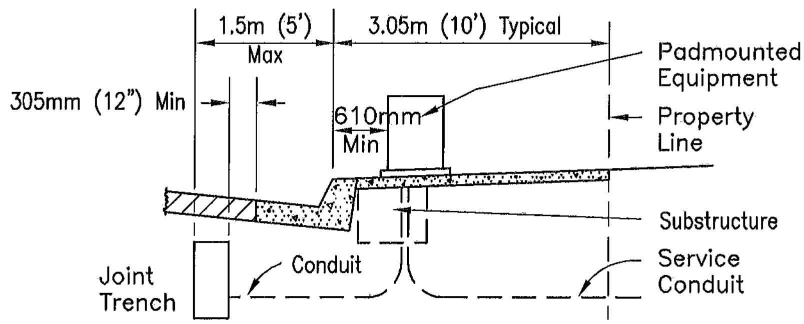
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Bahmanian	4/86	CHAIN LINK FENCE DETAILS	3/01/2003
Add Metric		T. Stanton	03/03		Chairperson R.C.E. 19246 Date
Reviewed		T. Stanton	04/06		DRAWING NUMBER M-20



SIDEWALK NEXT TO CURB



SIDEWALK NEXT TO PROPERTY LINE



SIDEWALK NEXT TO CURB AND PROPERTY LINE

NOTES

1. Sidewalk shall have a minimum of 1.2m (4') clear area (path, not including curb) passing pedestals, pullboxes and other structures.
2. See Standard Drawing M–15 for joint trench.

Revision	By	Approved	Date
ORIGINAL		Parkinson	9/88
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

UNDERGROUND TYPICAL LOCATION
CONVERSION/REPLACEMENT/UPGRADE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

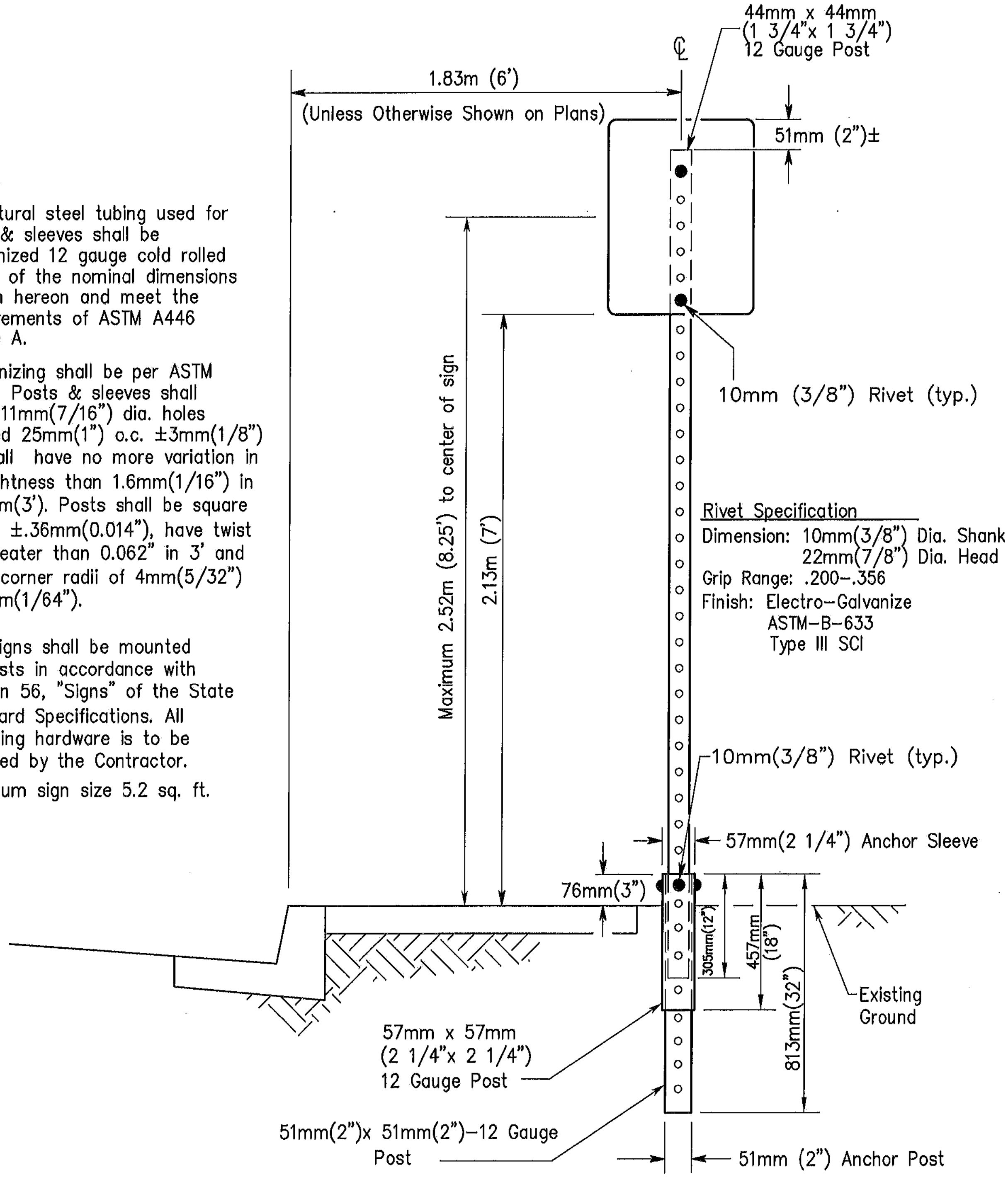
T. Stanton 3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER M–21

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 11mm(7/16") dia. holes spaced 25mm(1") o.c. ±3mm(1/8") & shall have no more variation in straightness than 1.6mm(1/16") in 914mm(3'). Posts shall be square within ±.36mm(0.014"), have twist no greater than 0.062" in 3' and have corner radii of 4mm(5/32") ±.4mm(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.



Revision	By	Approved	Date
ORIGINAL		G.Parkinson	2/95
Add Metric		T. Stanton	03/03
Reviewed		T. Stanton	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

BREAK-AWAY SIGN POST

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

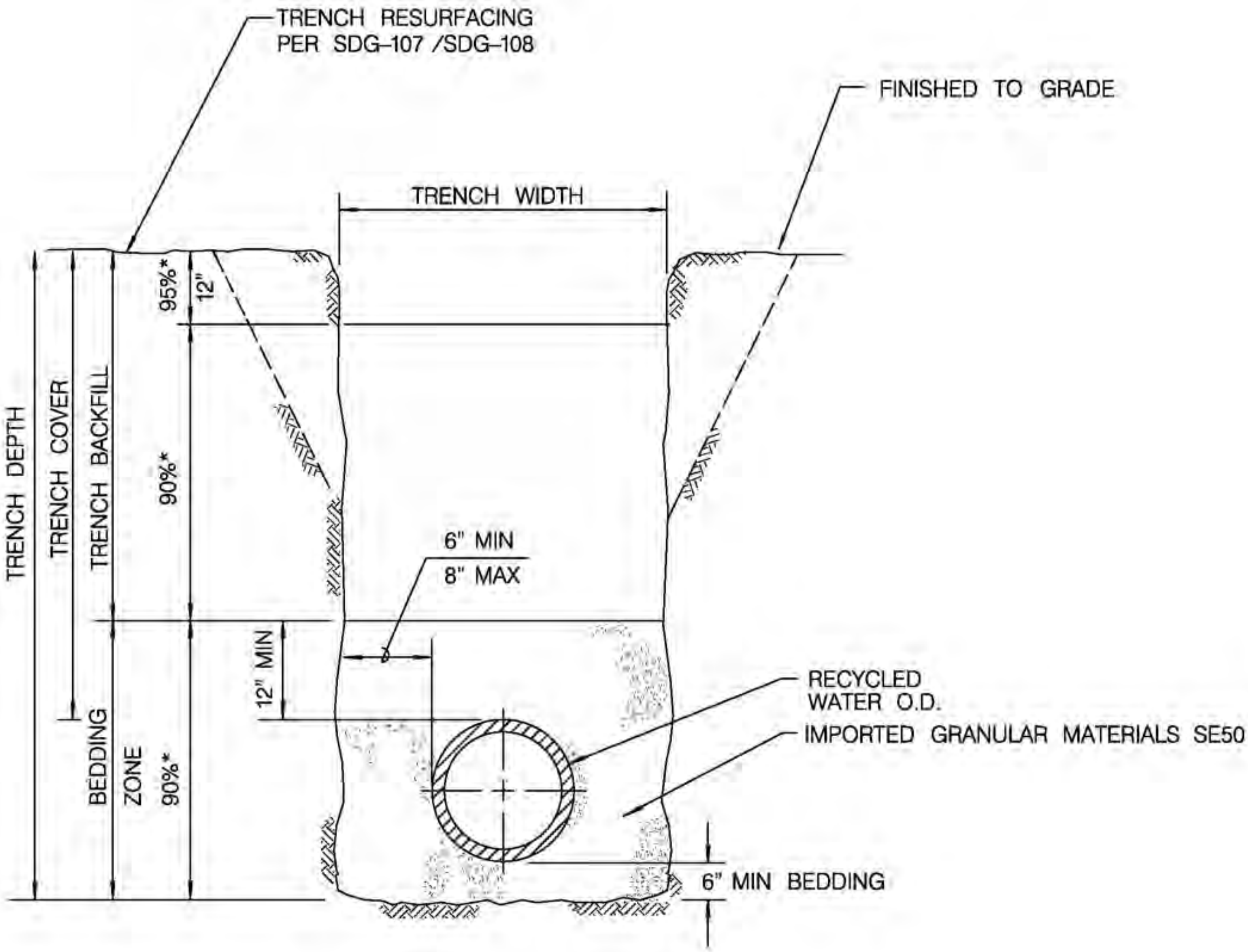
3/01/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER M-45

CHAPTER 8

RECYCLED WATER SYSTEM



TRENCH SECTION

NOTES:

1. (*) INDICATES MINIMUM RELATIVE COMPACTION. IT SHALL BE 95% MIN IN THE TOP FOOT.
2. MINIMUM COVER: 4' FOR RECYCLED WATER MAIN.
3. RECYLE 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.

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

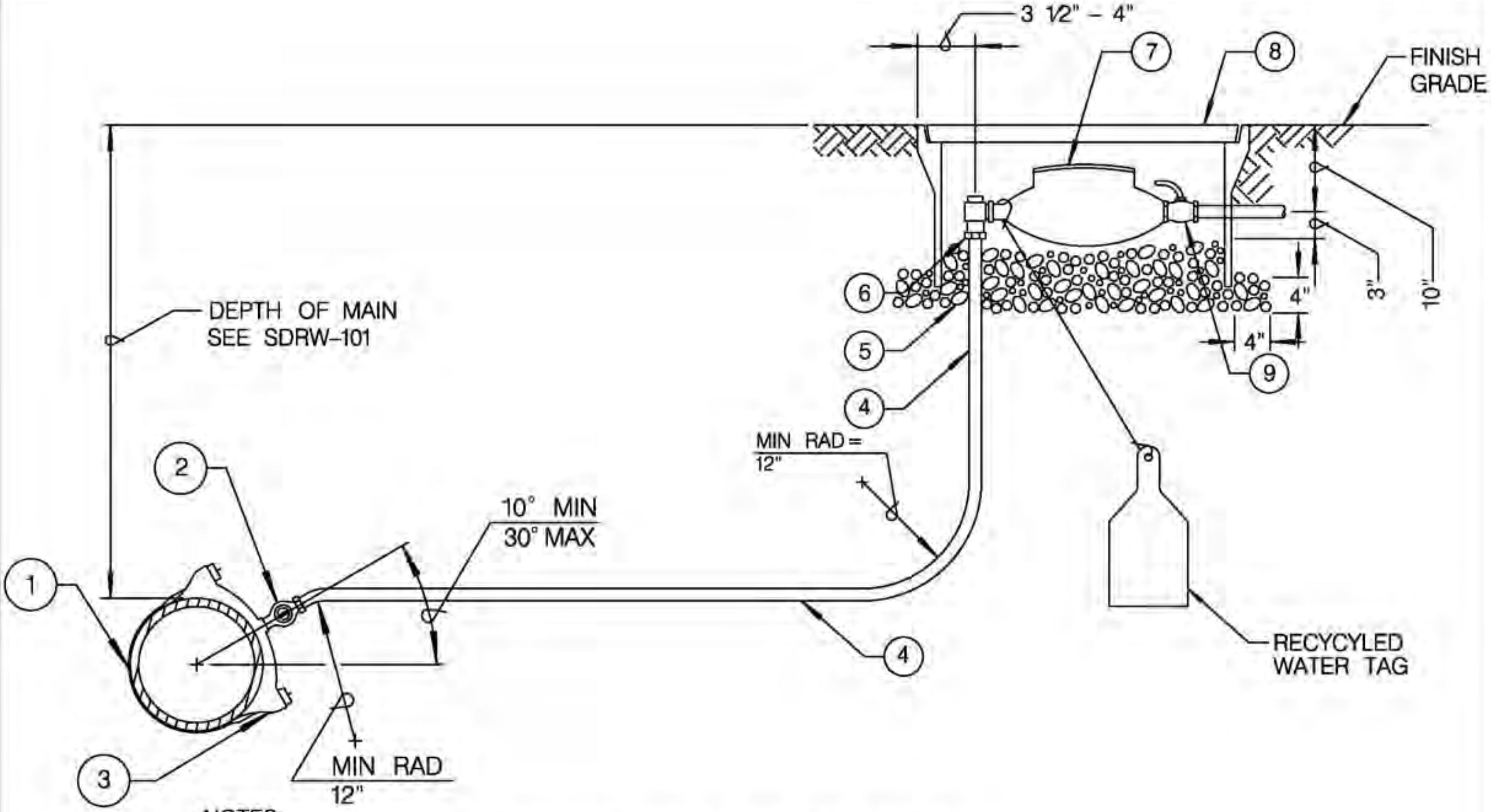
PIPE BEDDING AND TRENCH BACKFILL FOR RECYCLED WATER MAINS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

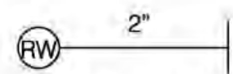
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-101**



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



LEGEND ON PLANS

SHEET 1 OF 2

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	SIZE x 2" BRONZE SERVICE SADDLE (DOUBLE STRAP)	6	2" BRONZE ANGLE METER STOP WITH LOCKWING
2	RECYCLED WATER MAIN	7	WATER METER FURNISHED AND INSTALLED BY THE CITY
3	2" BRONZE CORPORATION STOP	8	METER BOX WITH LID, 17"x 30"
4	2" x REQUIRED LENGTH COPPER PIPE TYPE "K" SOFT/RIGID OR UNLESS OTHERWISE SPECIFIED.	9	CUSTOMER SHUT–OFF VALVE (LOCKABLE)
5	3/8" ROCK, 4" TO 6" DEEP		

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

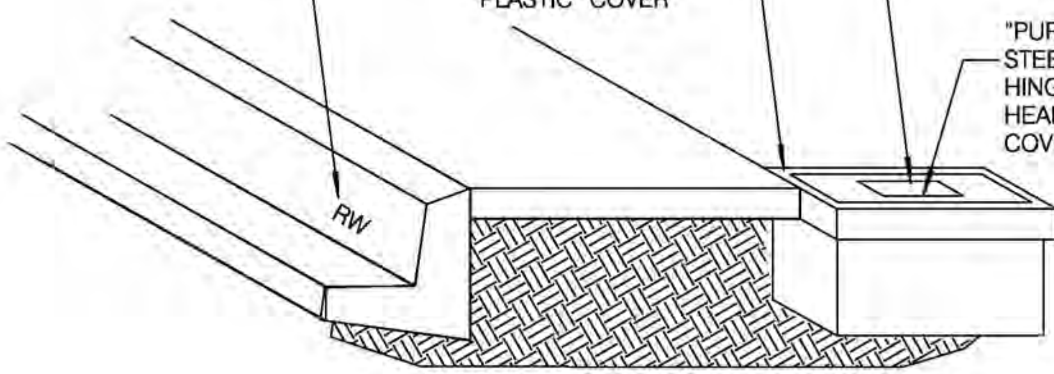
2" RECYCLED WATER SERVICE INSTALLATION AND MARKING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-102**



NOTES:

1. FOR ALL RECYCLED WATER SERVICE READING LID OF METER BOX SHALL BE PAINTED WITH PURPLE PANTONE #512 FOR ALL RECYCLED WATER SERVICE.
2. METER AND VALVES SHALL BE LABELED OR TAGGED TO INDICATE RECYCLED WATER.

SHEET 2 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	A. OSKOUI	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

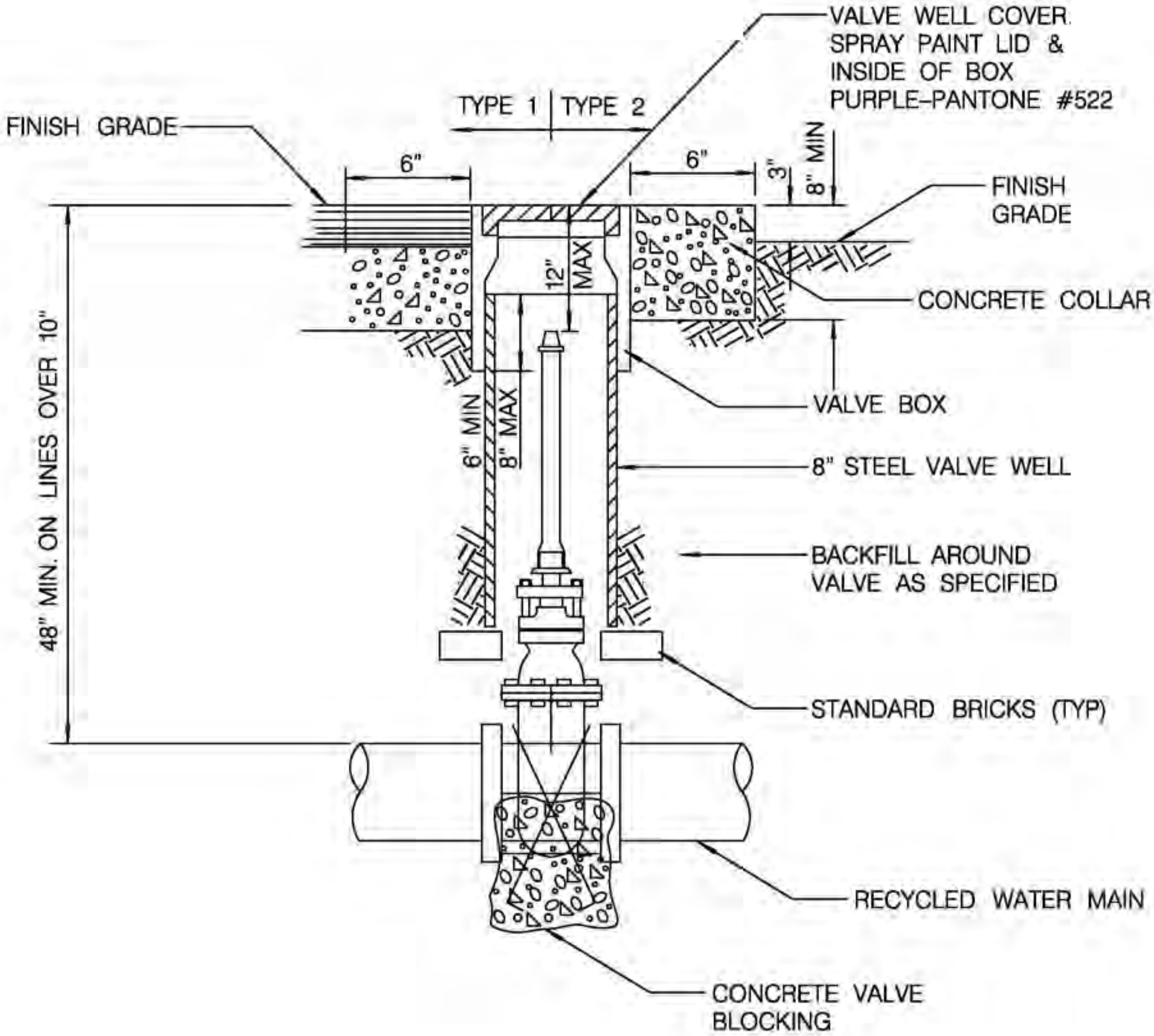
2" RECYCLED WATER SERVICE INSTALLATION AND MARKING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-102**



NOTES:

1. PROVIDE HEXAGON TYPE VALVE STEM EXTENSION IF DEPTH TO VALVE NUT EXCEEDS 2'.
2. USE FOR H10 LOADING OR LESS.
3. TYPE 1 INSTALLATION APPLIES TO VALVES WITHIN ROADWAYS.
   TYPE 1 INSTALLATION APPLIES TO VALVES OUTSIDE ROADWAYS.

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

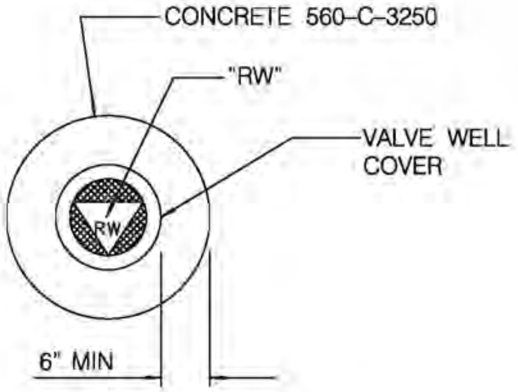
RECYCLED WATER VALVE AND VALVE BOX (LIGHT DUTY)

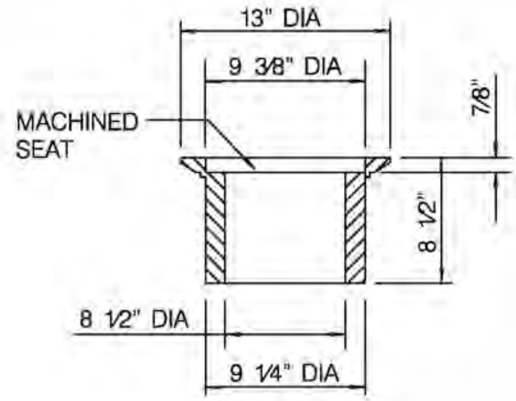
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

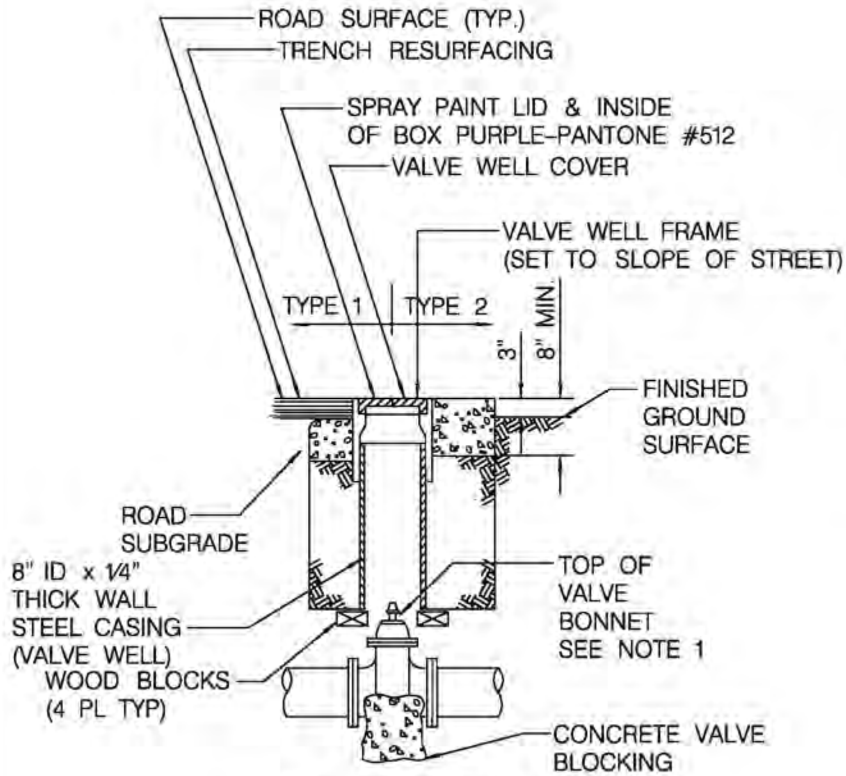
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-103**

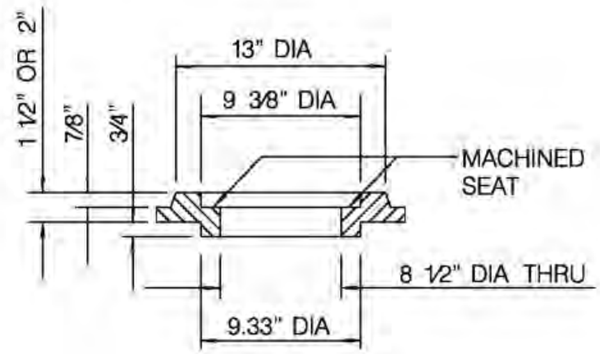




CAST IRON VALVE
WELL FRAME



VALVE WELL & FRAME
FOR NEW INSTALLATIONS



CAST IRON RISER RING
FOR RETROFITTING AND
OVERLAY PROJECTS

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 1 INSTALLATION APPLIES TO VALVES OUTSIDE ROADWAYS.

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

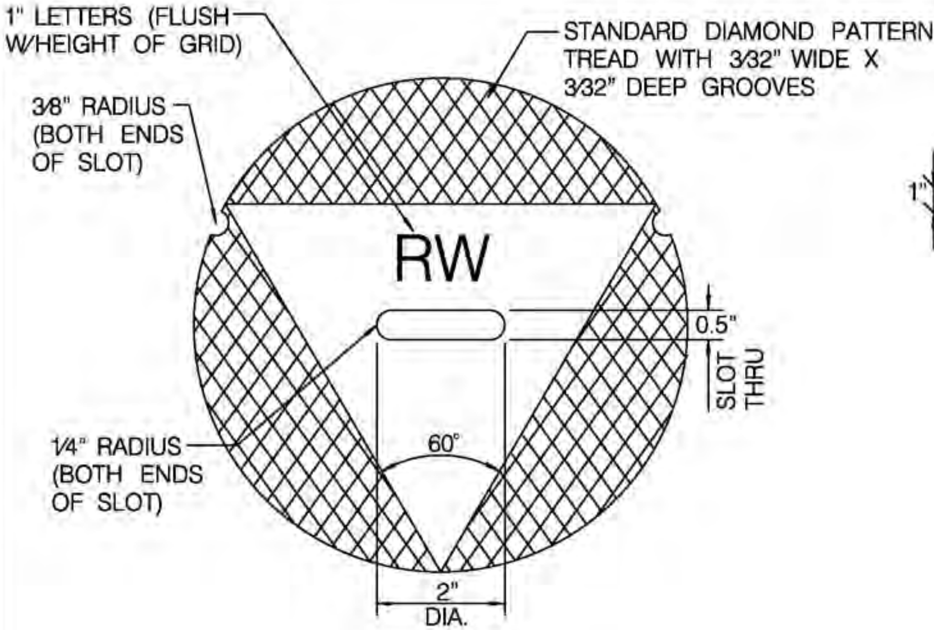
RECYCLED WATER VALVE AND VALVE BOX (HEAVY DUTY)

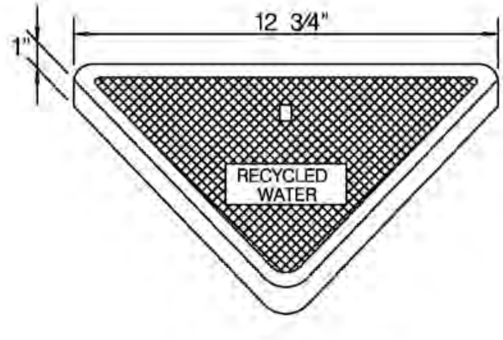
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

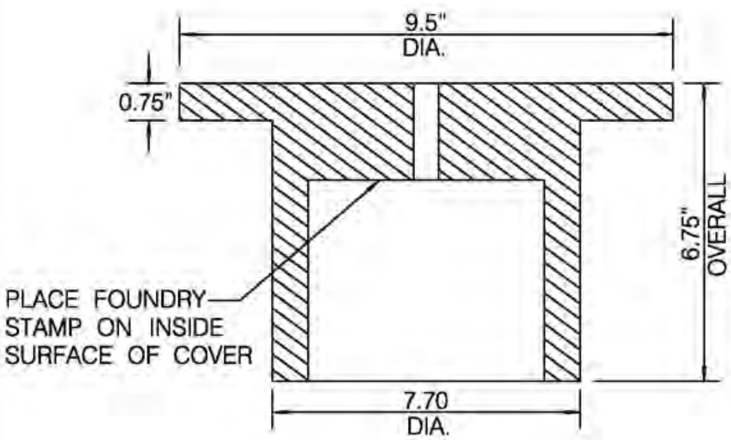
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-104**



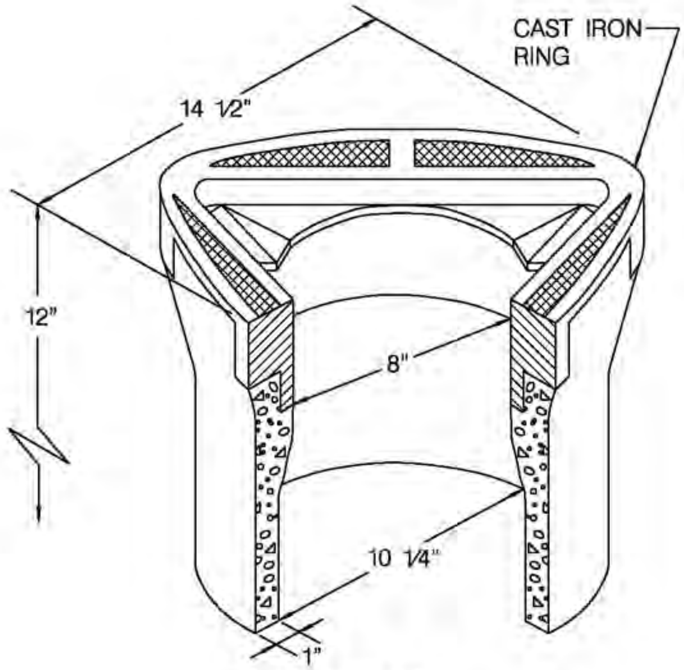


CAST IRON COVER
WEIGHT = 15 lb



CAST IRON VALVE WELL COVER
WEIGHT = 20 lb MIN

DETAIL 1



V4-T BOX
WEIGHT = 60 lb

DETAIL 2

NOTE

COVER SHALL BE COLORED PURPLE W/RED DOT

REVISION	BY	APPROVED	DATE
ORIGINAL	BB	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

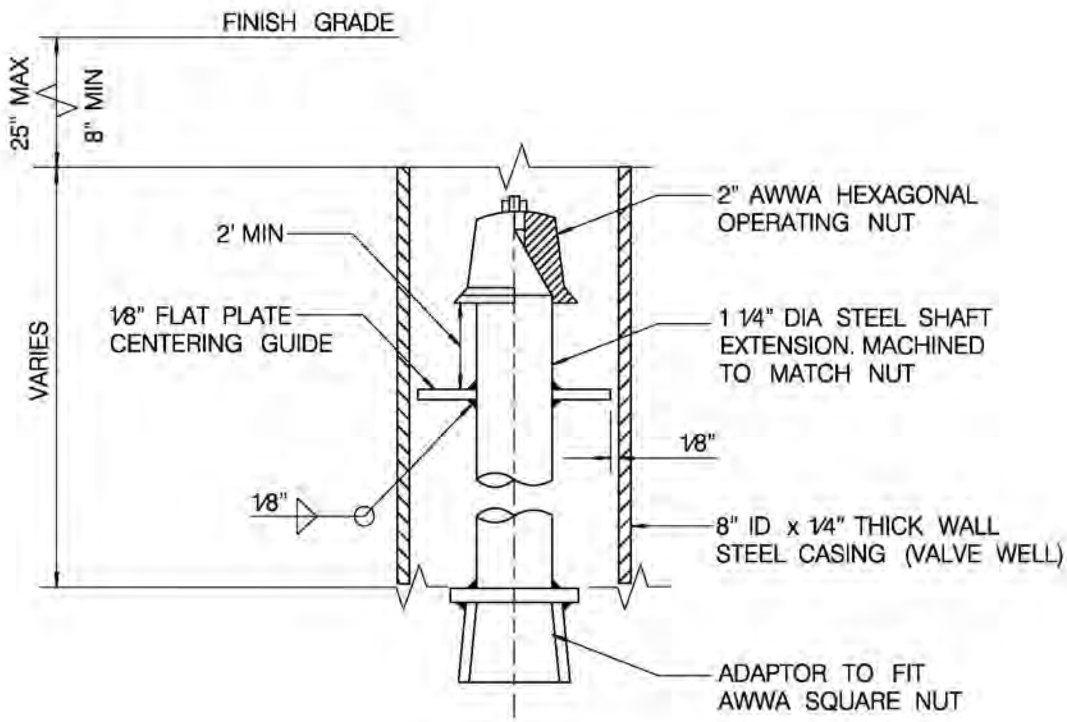
RECYCLED WATER VALVE WELL COVER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-105**



REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

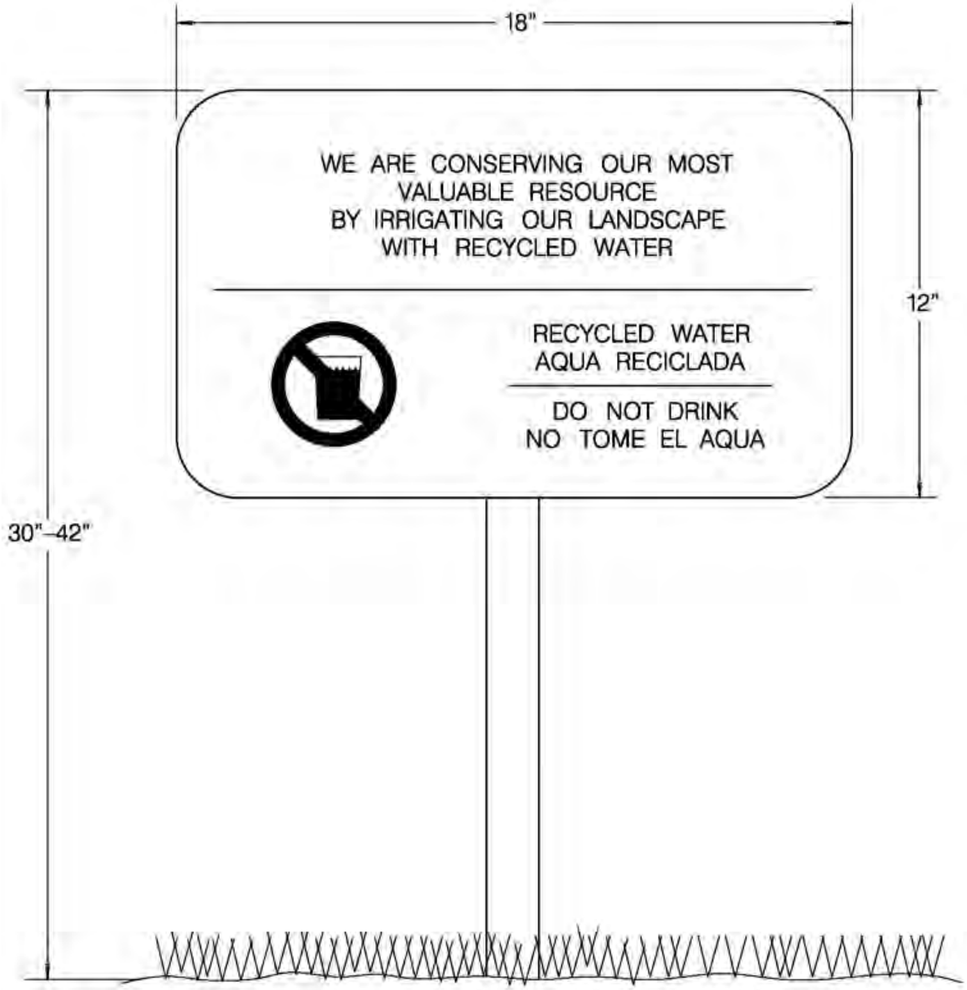
RECYCLED WATER VALVE KEY EXTENSION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-106**



RECYCLED WATER IRRIGATION ADVISORY SIGN

SHEET 1 OF 4

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

RECYCLED WATER SIGNS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDRW-108**

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

SHEET 2 OF 4

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

RECYCLED WATER SIGNS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-108**

SIZE:	4" HIGH x 8" WIDE
COLORS:	
BACKGROUND:	WHITE
LETTERS:	PANTONE 522 PURPLE
CIRCLE/SLASH:	DARK RED WATER TAP
WATER TAP:	PANTONE 522 PURPLE
1/4" WIDE BORDER:	PANTONE 522 PURPLE
HOLES:	1/8" AT CORNERS

RECYCLED WATER SIGN FOR IRRIGATION

REVISION	BY	APPROVED	DATE	CITY OF SAN DIEGO – STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
ORIGINAL	KA	J. NAGELVOORT	01/12		1/31/2012
					COORDINATOR R.C.E. 65271 DATE
				RECYCLED WATER SIGNS	
					DRAWING NUMBER **SDRW-108**

SIZE:	4" HIGH x 8" WIDE
COLORS:	
BACKGROUND:	WHITE
LETTERS:	PANTONE 522 PURPLE
CIRCLE/SLASH:	DARK RED OVER WATER GLASS
WATER GLASS:	PANTONE 522 PURPLE
1/4" WIDE BORDER:	PANTONE 522 PURPLE
HOLES:	1/8" AT CORNERS

RECYCLED WATER SIGN FOR TOILET & URINAL FLUSHING

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

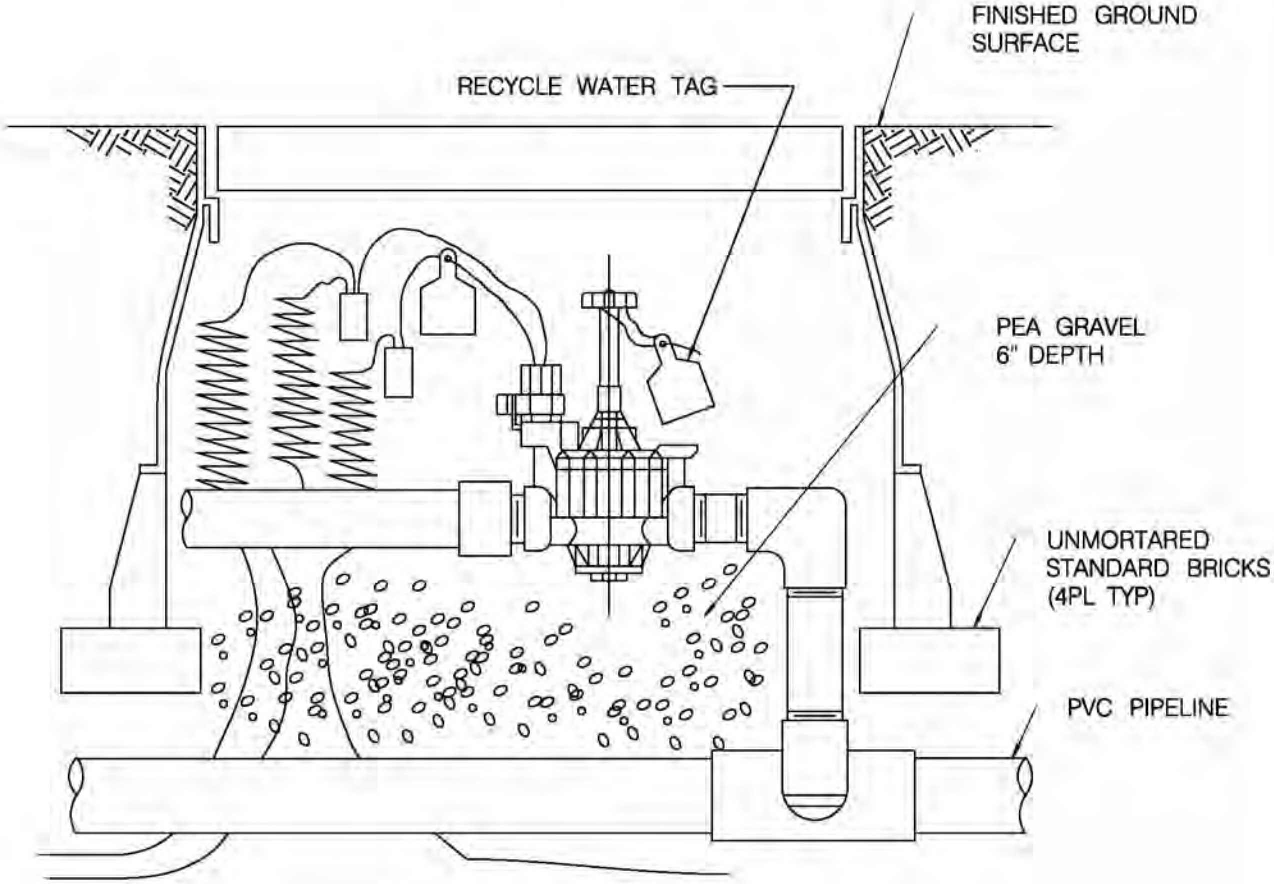
RECYCLED WATER SIGNS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-108**



NOTES:
1. RECYCLE WATER IRRIGATION VALVE BOX COVER SHALL BE COLOR CODED PANTONE #522

2. TEFLON SHALL BE USED ON THREADED CONNECTIONS

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

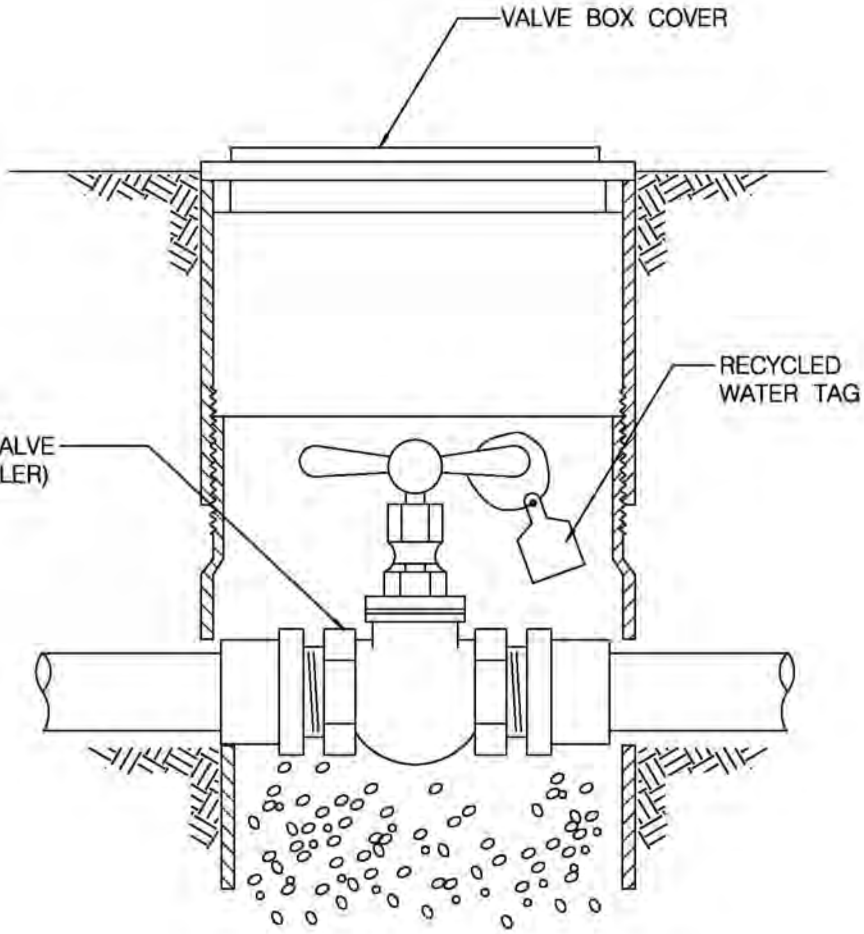
SIGN / TAG FOR RECYCLED WATER IRRIGATION REMOTE CONTROL VALVE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-109**



NOTE:
RECYCLE WATER IRRIGATION VALVE BOX COVER

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

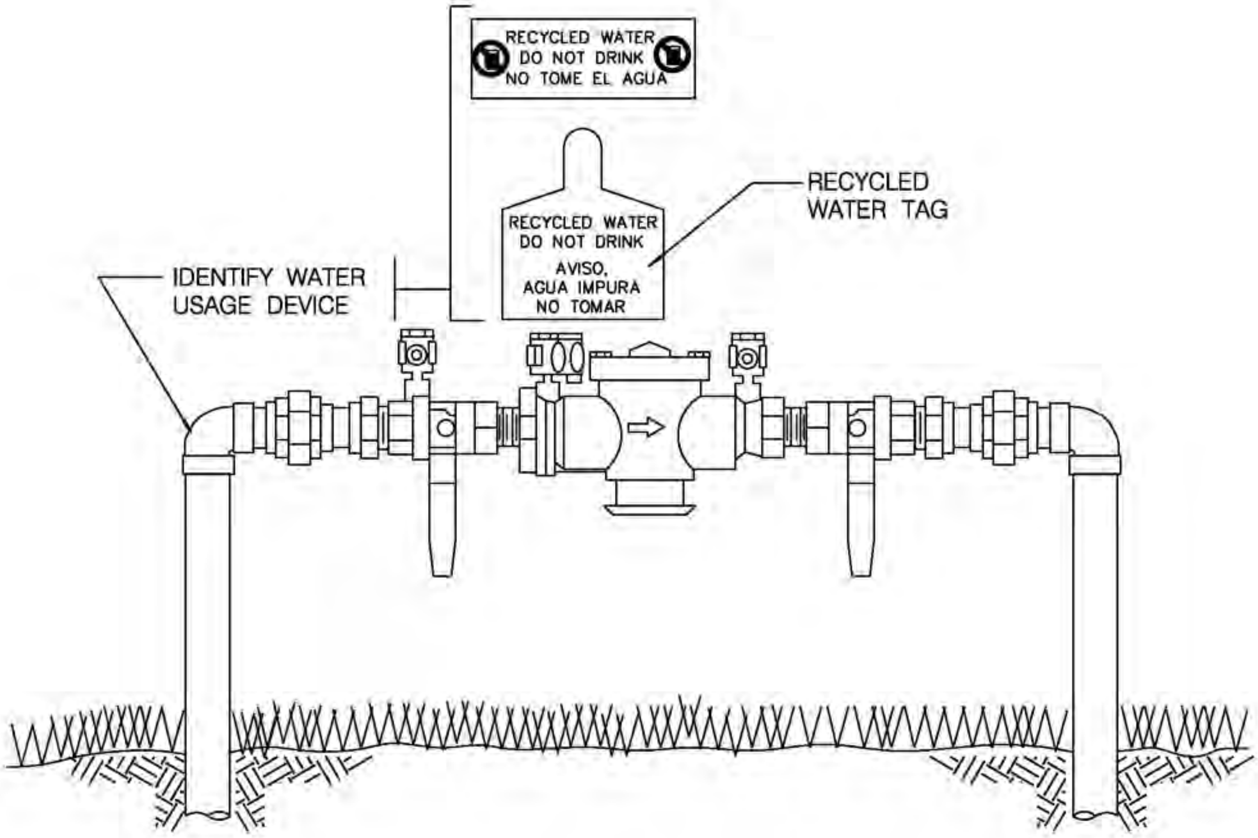
CITY OF SAN DIEGO - STANDARD DRAWING

SIGN / TAG FOR RECYCLED WATER IRRIGATION VALVE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

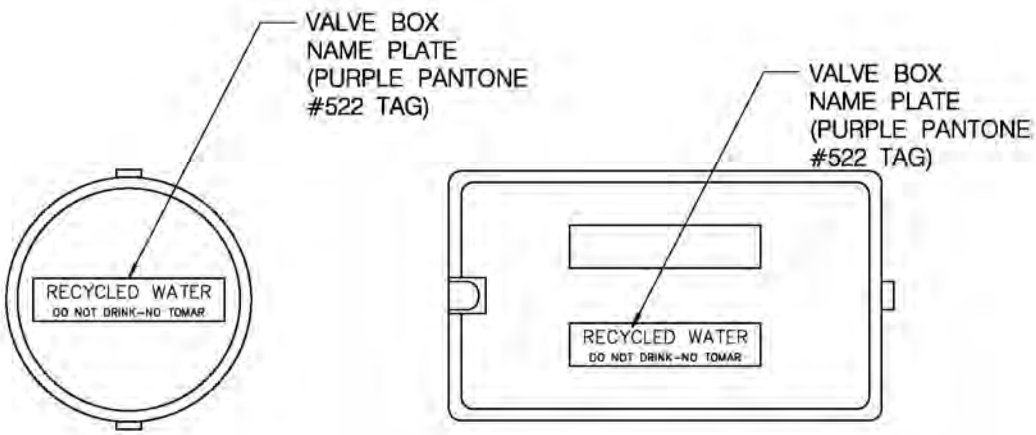
DRAWING NUMBER **SDRW-110**



NOTE:

ALL RECYCLED METERS, AIR/VACUUM RELIEF VALVES, VALVES, PRESSURE REDUCING VALVES, PUMPS, PUMP CONTROL VALVES, ETC., SHALL BE TAGGED OR LABELED INDICATING THAT THE DEVICES ARE ON RECYCLED WATER SYSTEM AND COLOR CODED PANTONE #522.
12" MINIMUM CLEARANCE BETWEEN GROUND AND WATER CONTROL DEVICES.

REVISION	BY	APPROVED	DATE		
ORIGINAL	KA	J. NAGELVOORT	01/12	CITY OF SAN DIEGO – STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
					1/31/2012
				SIGN / TAG FOR IDENTIFICATION OF RECYCLED WATER CONTROL DEVICES	COORDINATOR R.C.E. 65271 DATE
					DRAWING NUMBER **SDRW-111**



NOTE:
ALL RECYCLED WATER IRRIGATION BOX COVERS AND LIDS SHALL BE COLOR CODED PANTONE #522

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

SIGN / TAG FOR RECYCLED WATER IRRIGATION BOX COVER / LID

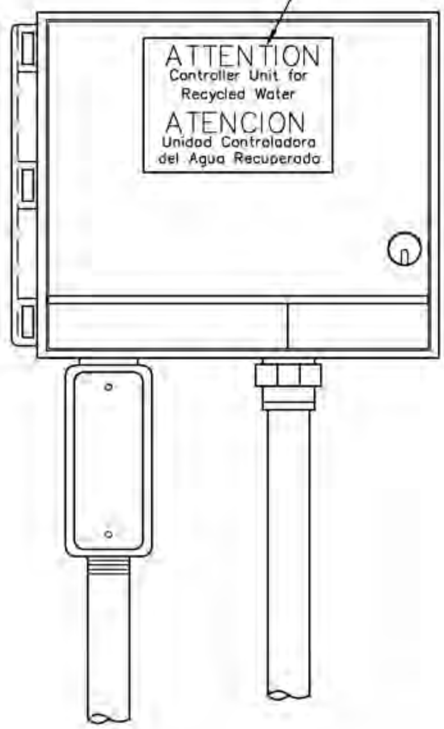
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-112**

CONTROLLER BOX PURPLE (PANTONE #522) MARKER DECAL-SHOWN AFFIXED TO BOX EXTERIOR; PREFERABLY, AFFIX TO INTERIOR OF BOX



NOTES:
RECYCLED WATER IRRIGATION SYSTEM CONTROLLER BOX SHALL BE COLOR CODED PANTONE #522

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

SIGN / TAG FOR RECYCLED WATER AUTOMATIC IRRIGATION CONTROLLER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDRW-113**

FRONT

BACK

SAMPLE WARINING TAG. BACKGROUND PURPLE (PANTONE #522) WITH BLACK LETTERING.

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

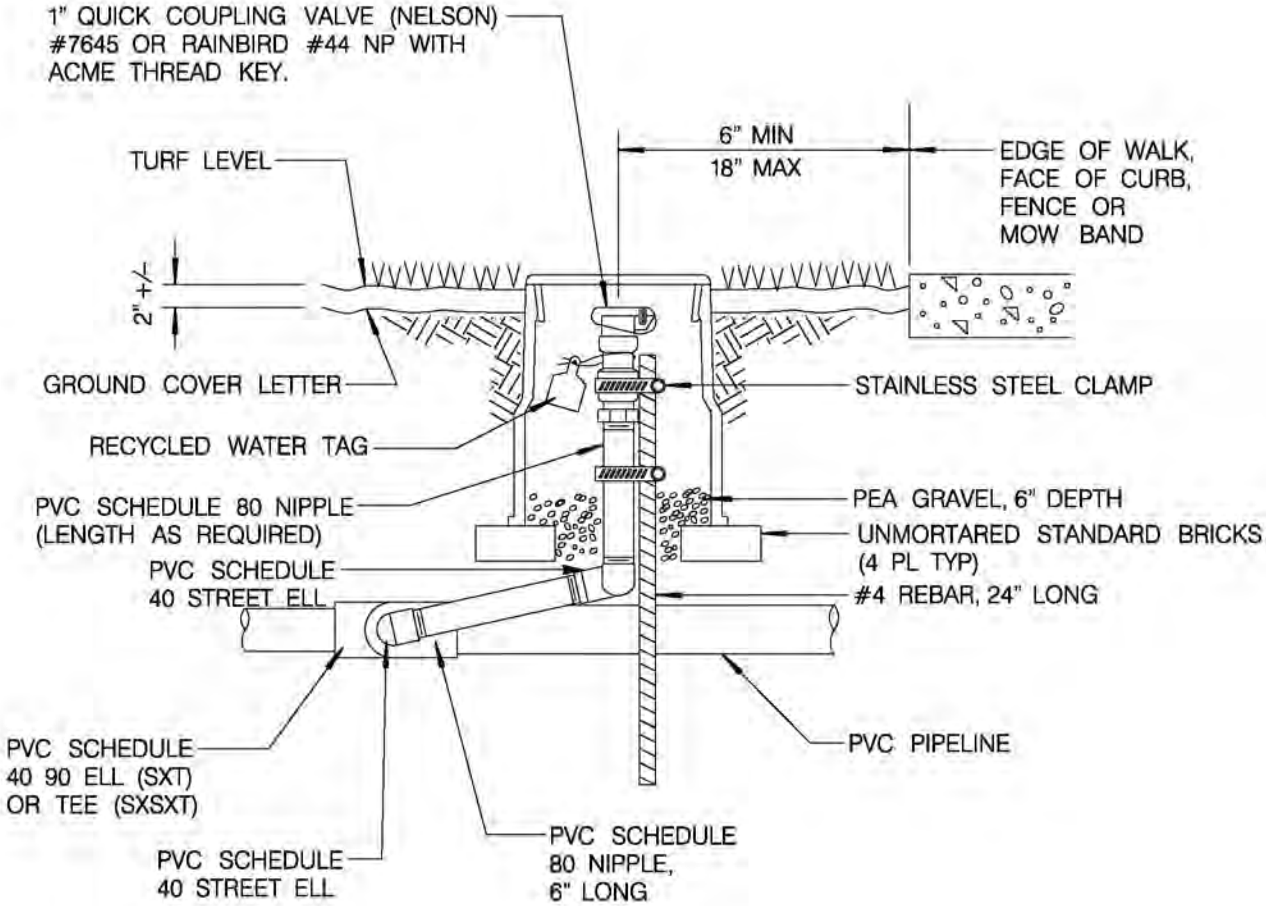
CITY OF SAN DIEGO – STANDARD DRAWING

RECYCLED WATER TAG

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDRW-114**



NOTE:

1. NEW CONSTRUCTION – ALL QUICK COUPLING VALVES SHALL HAVE NON-POTABLE LOCKING PURPLE THERMOPLASTIC RUBBER COVERS.
2. RETROFITS – REPLACE ALL EXISTING QUICK COUPLING VALVES WITH NON-POTABLE LOCKING PURPLE THERMOPLASTIC RUBBER COVERS.
3. TEFLON SHALL BE USED ON THREADED CONNECTIONS.

TYPE A (#4 ROD)

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

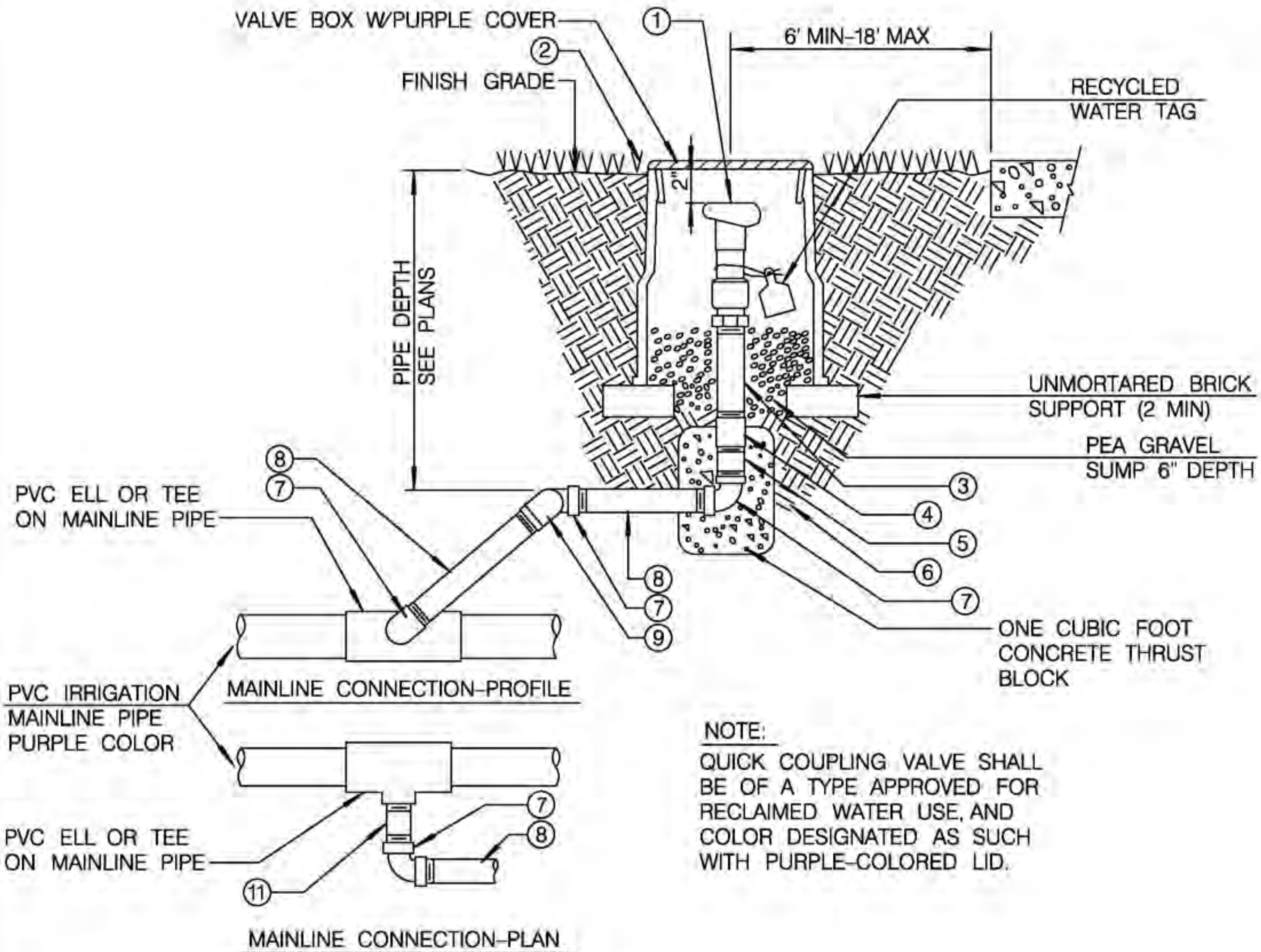
RECYCLED WATER
QUICK COUPLING VALVE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hale 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-115**



NOTE:
QUICK COUPLING VALVE SHALL BE OF A TYPE APPROVED FOR RECLAIMED WATER USE, AND COLOR DESIGNATED AS SUCH WITH PURPLE-COLORED LID.

1- 1" QUICK COUPLING VALVE WITH PURPLE-COLORED LID (SEE LEGEND AND SPECIFICATIONS)

2- FLUSH IN TURF AREAS, 2" IN SHRUB AND GROUND COVER AREAS.

3- RED BRASS NIPPLE, 6" LENGTH MIN

4- RED BRASS COUPLING, EXTEND ½" ABOVE TOP OF CONCRETE THRUST BLOCK

5- RED BRASS NIPPLE, LENGTH AS REQUIRED

6- UNDISTURBED OR 90% COMPACTED SUBGRADE

7- RED BRASS ELL

8- RED BRASS NIPPLE, 8" LENGTH MIN

9- RED BRASS STREET ELL

10- PVC ELL OR TEE ON MAINLINE PIPE

11- SCHEDULE 80 PVC NIPPLE, 4" LENGTH MIN

TYPE B (KICK BLOCK)

SHEET 2 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

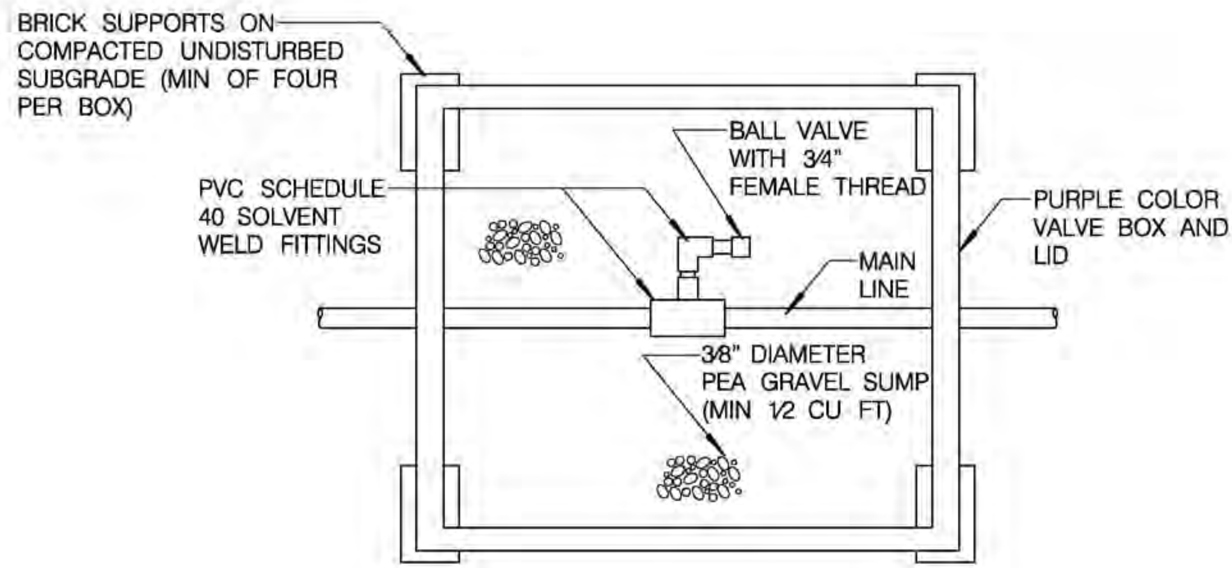
RECYCLED WATER
QUICK COUPLING VALVE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-115**



REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

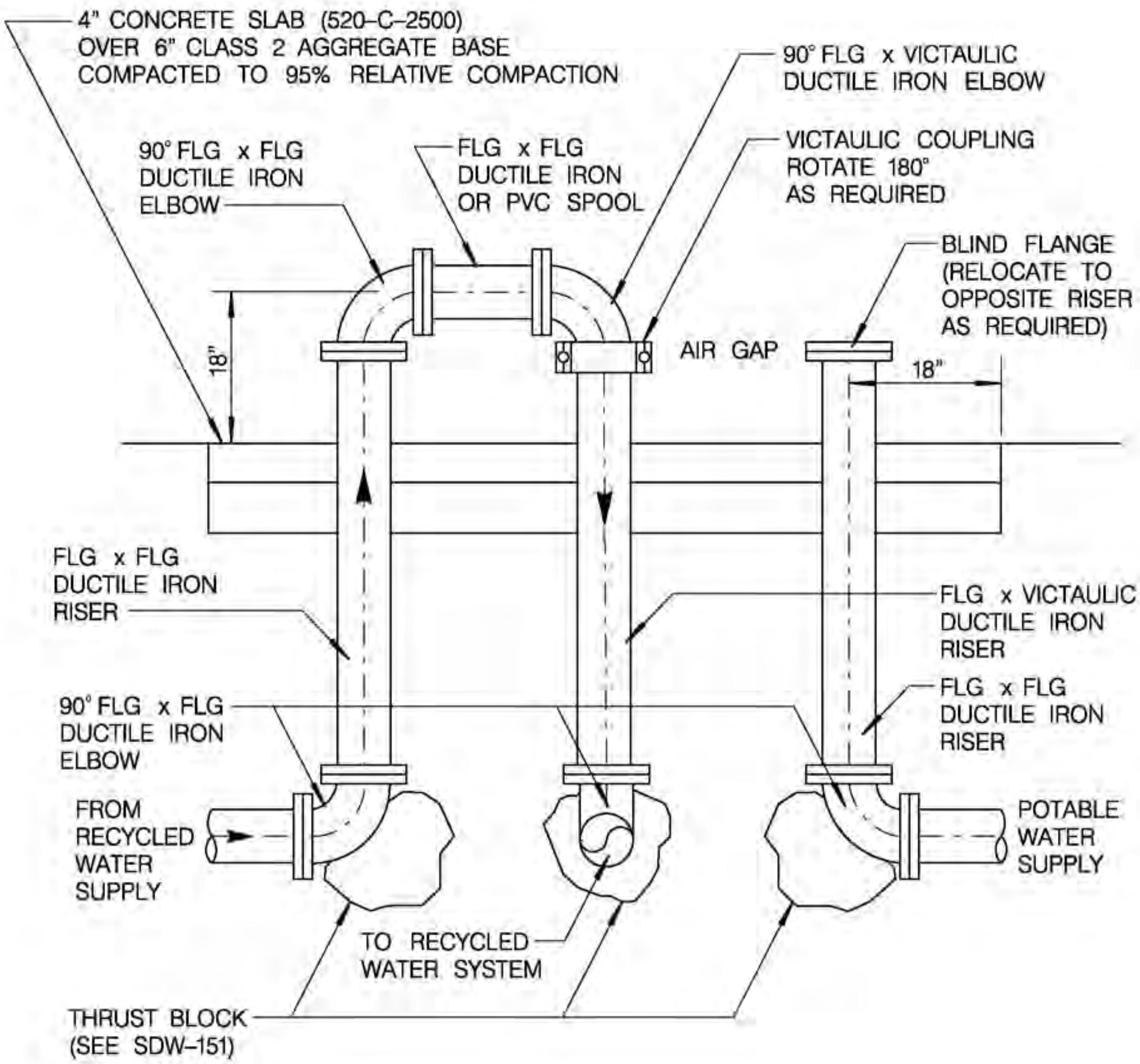
CROSS CONNECTION CONTROL TEST STATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-116**

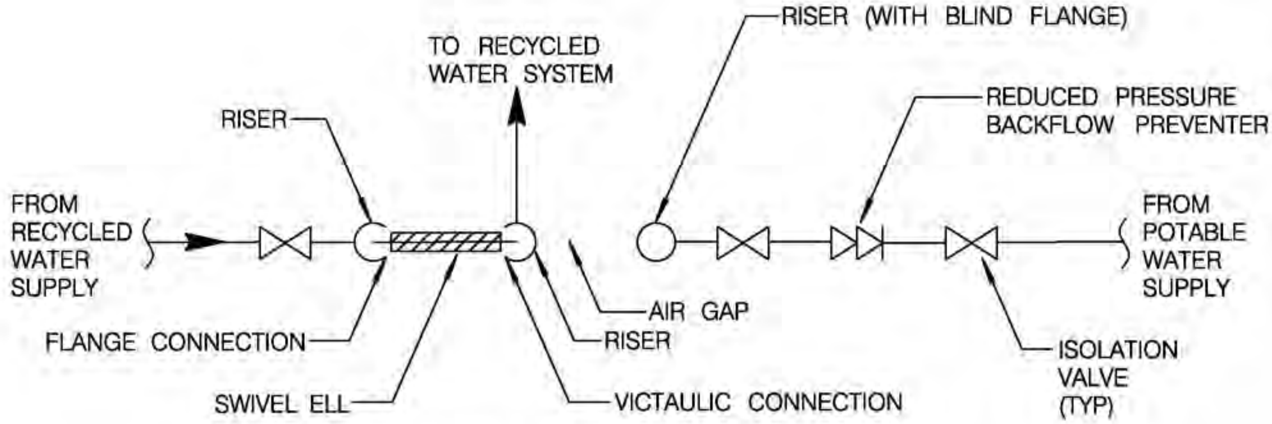


NOTES: SWIVEL ELL SHOWN IN NORMAL POSITION
(SUPPLY FROM RECYCLED WATER SOURCE)

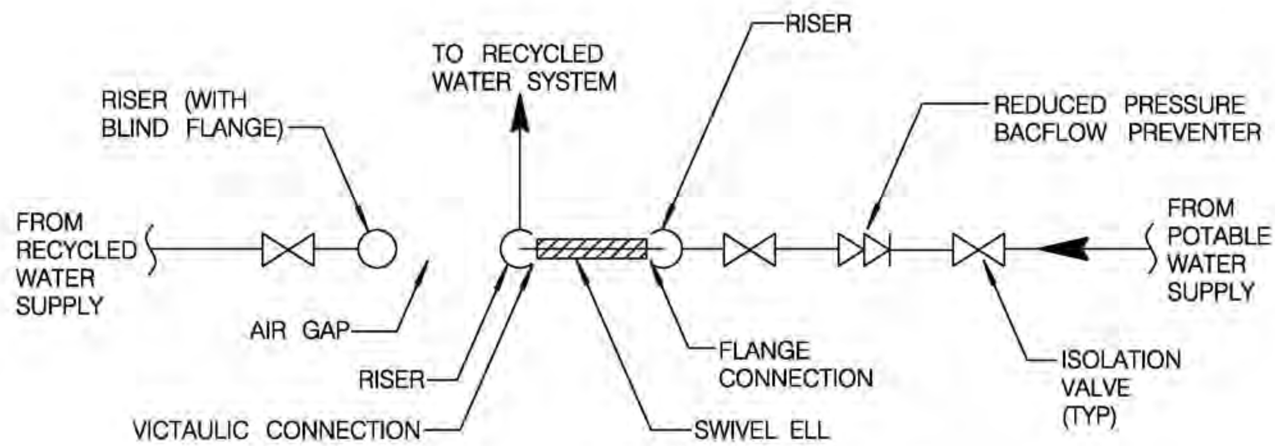
SWIVEL ELL DETAILS

SHEET 1 OF 2

REVISION	BY	APPROVED	DATE		
ORIGINAL	KA	J. NAGELVOORT	01/12	CITY OF SAN DIEGO - STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
					H. Hoshi 1/31/2012
					COORDINATOR R.C.E. 85271 DATE
				SWIVEL ELL	DRAWING NUMBER **SDRW-117**



NORMAL RECYCLED WATER CONNECTION



SHORT-TERM POTABLE SUPPLY CONNECTION DURING
INTERRUPTION OF NORMAL RECYCLED WATER SOURCE

KEY:

- RISER WITH ELBOW
- RISER (WITH BLIND FLANGE)
- ISOLATION VALVE
- SWIVEL ELL
- REDUCED PRESSURE BACKFLOW PREVENTER

SWIVEL ELL SCHEMATIC

SHEET 2 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

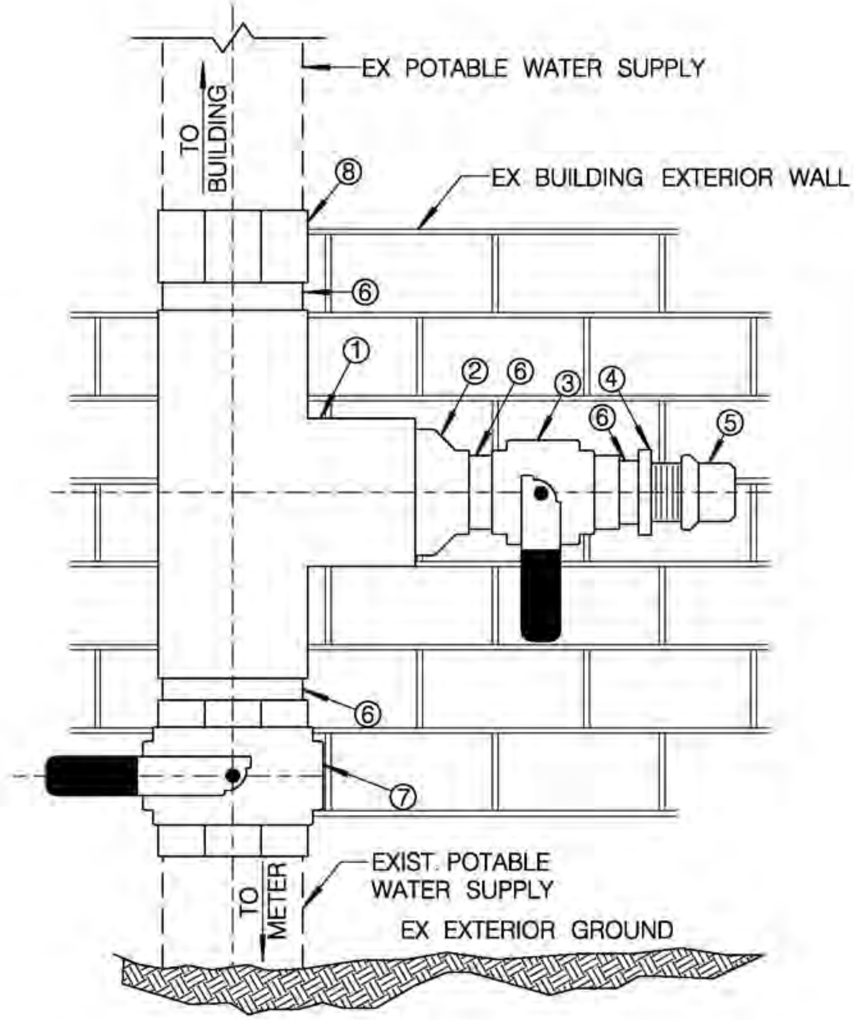
SWIVEL ELL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDRW-117**



NOTES:

1. TEE SIZE TO MATCH EXISTING PIPE
2. REDUCER TO 2" DIAMETER PIPE, IF TEE IS LARGER THAN 2" DIAMETER
   INCREASER TO 2" DIAMETER PIPE, IF TEE IS SMALLER THAN 2" DIAMETER
3. 2" BRASS BALL VALVE
4. 1 1/2" FIRE HOSE CONNECTION, MIN. 4" HORIZ. CLEARANCE 6" TO 14" ABOVE EXISTING GROUND
5. 1 1/2" CAP
6. MISCELLANEOUS NIPPLES AS REQUIRED
7. INSTALL BRASS BALL VALVE SIZE TO MATCH EXIST PIPE
8. INSTALL UNION SIZE TO MATCH EXISTING PIPE

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	A. OSKOUI	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

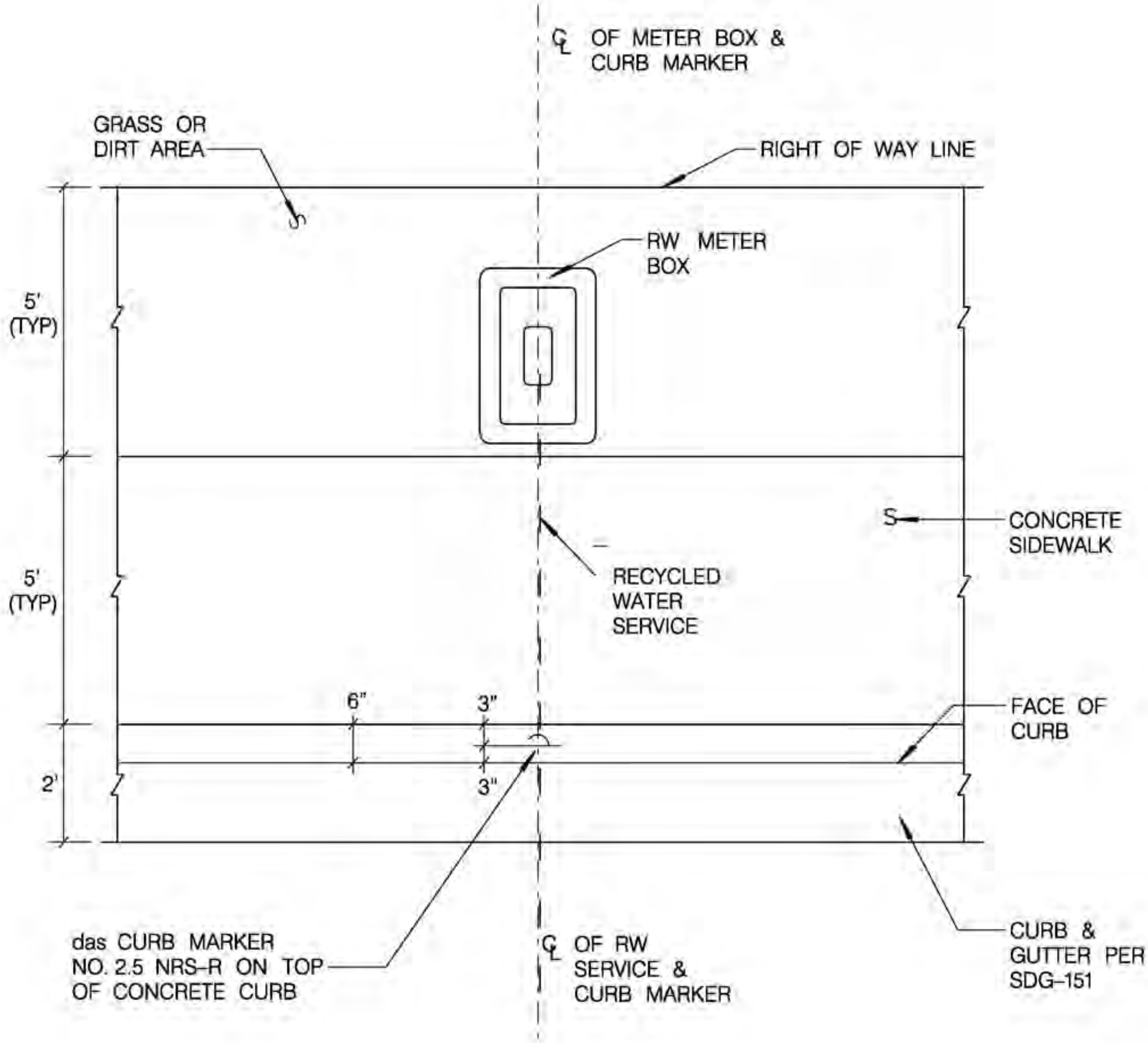
THRESHOLD BYPASS PIPING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

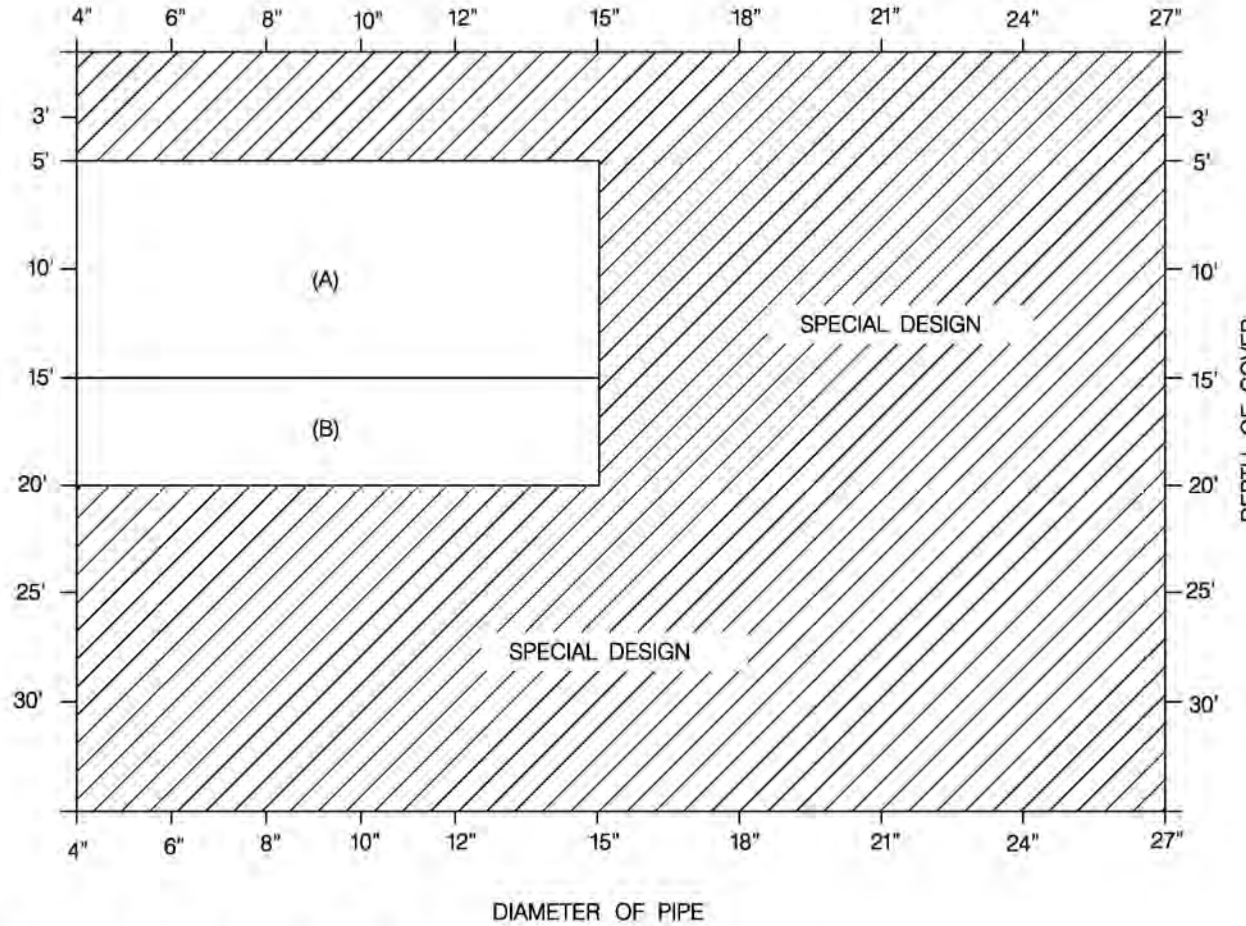
DRAWING NUMBER **SDRW-120**



REVISION	BY	APPROVED	DATE	CITY OF SAN DIEGO – STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE
ORIGINAL	KA	J. NAGELVOORT	01/12		1/31/2012
				TYPICAL CURB MARKER INSTALLATION LOCATION	COORDINATOR R.C.E. 65271 DATE
					DRAWING NUMBER **SDRW-121**

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–18, 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 psi
   W_c = PRISM LOAD @ W = 125 LB/FT ^{3}
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."

REVISION	BY	APPROVED	DATE
ORIGINAL		J. MUELLER	6-15-83
UPDATED		J. CASEY	8-26-88
UPDATED		J. CASEY	11-8-88
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

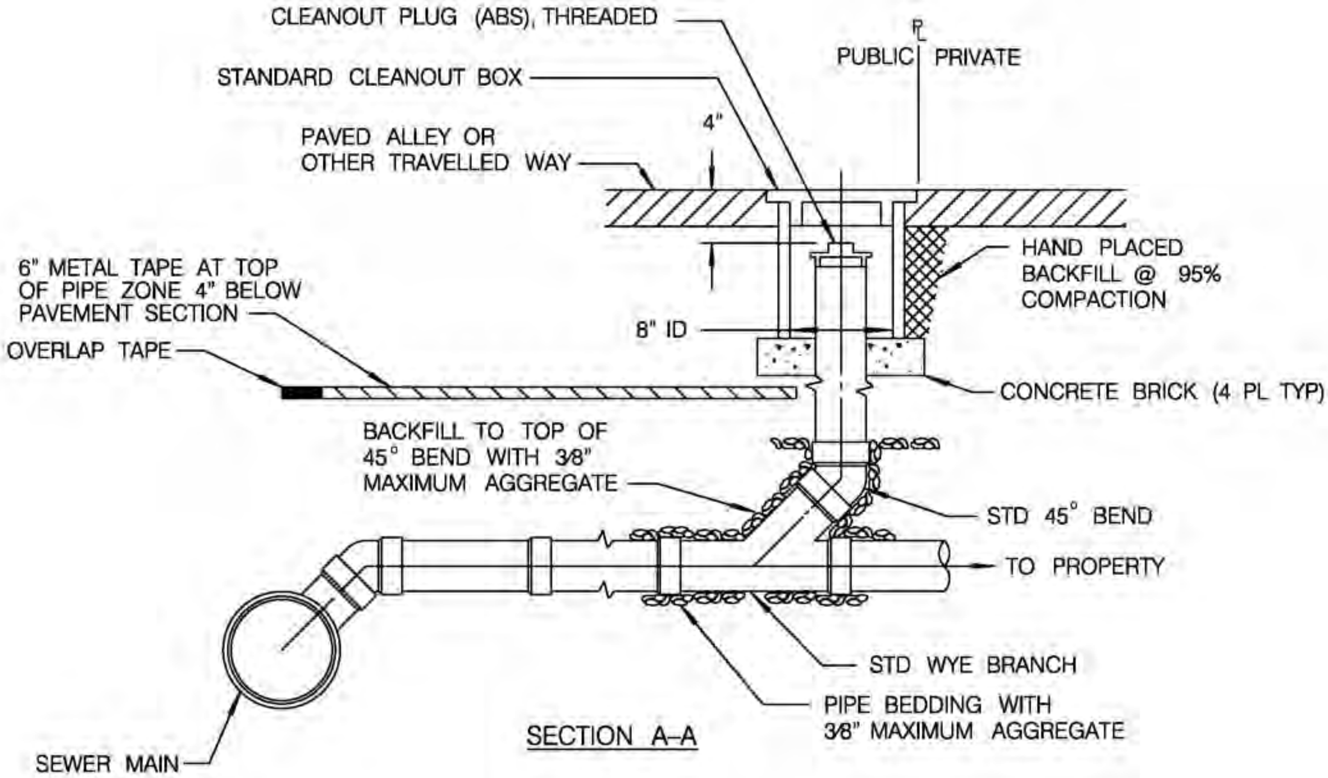
PERMISSIBLE DEPTH OF COVER FOR PVC PIPE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

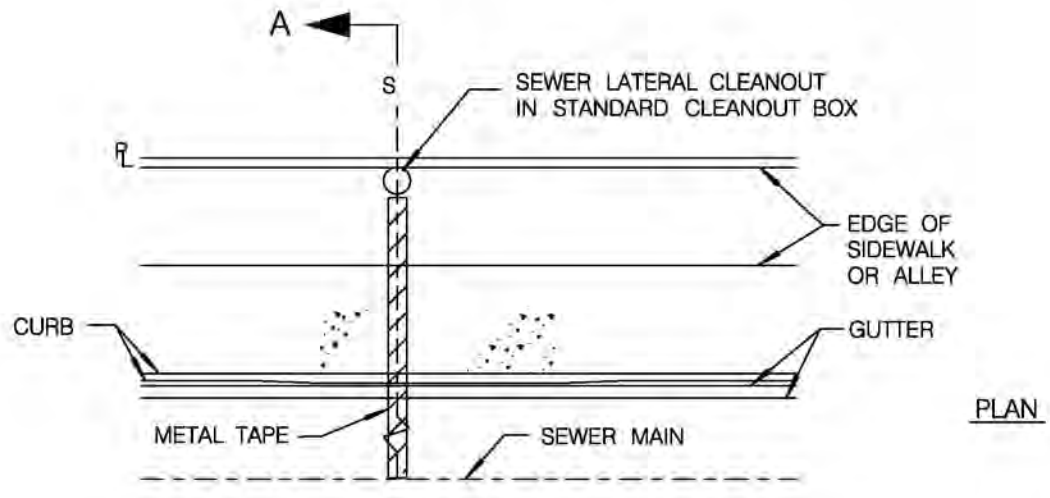
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDS-101**



SECTION A–A



PLAN

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.

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

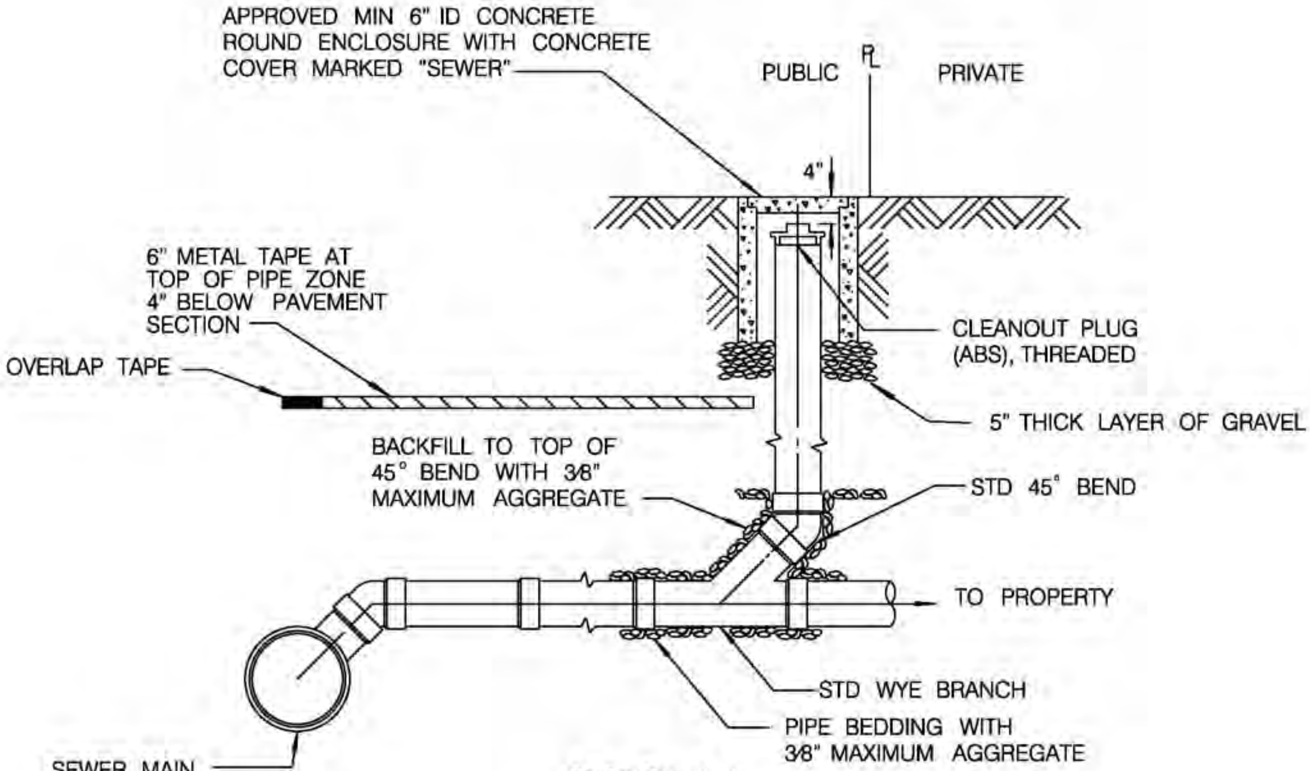
SEWER LATERAL CLEANOUT (IN PAVED ALLEY, SIDEWALK, OR OTHER AREAS SUBJECT TO TRAFFIC)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

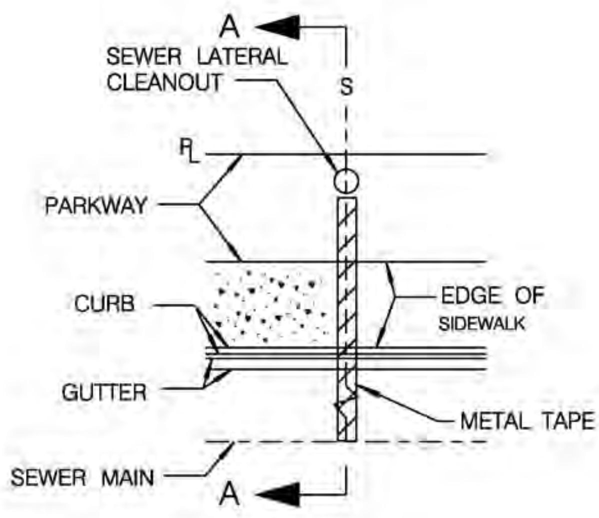
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDS-102**



SECTION A-A



PLAN

NOTES:

1. RISER AND CLEANOUT PLUG SHALL BE SAME DIAMETER AS SEWER LATERAL.
2. CLEANOUT SHALL BE LOCATED WITHIN CITY RIGHT OF WAY, BEHIND THE SIDEWALK.
3. INSTALL METAL TAPE ON TOP OF NON-METALLIC SEWER PIPE.

REVISION	BY	APPROVED	DATE
DETAIL	SS	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

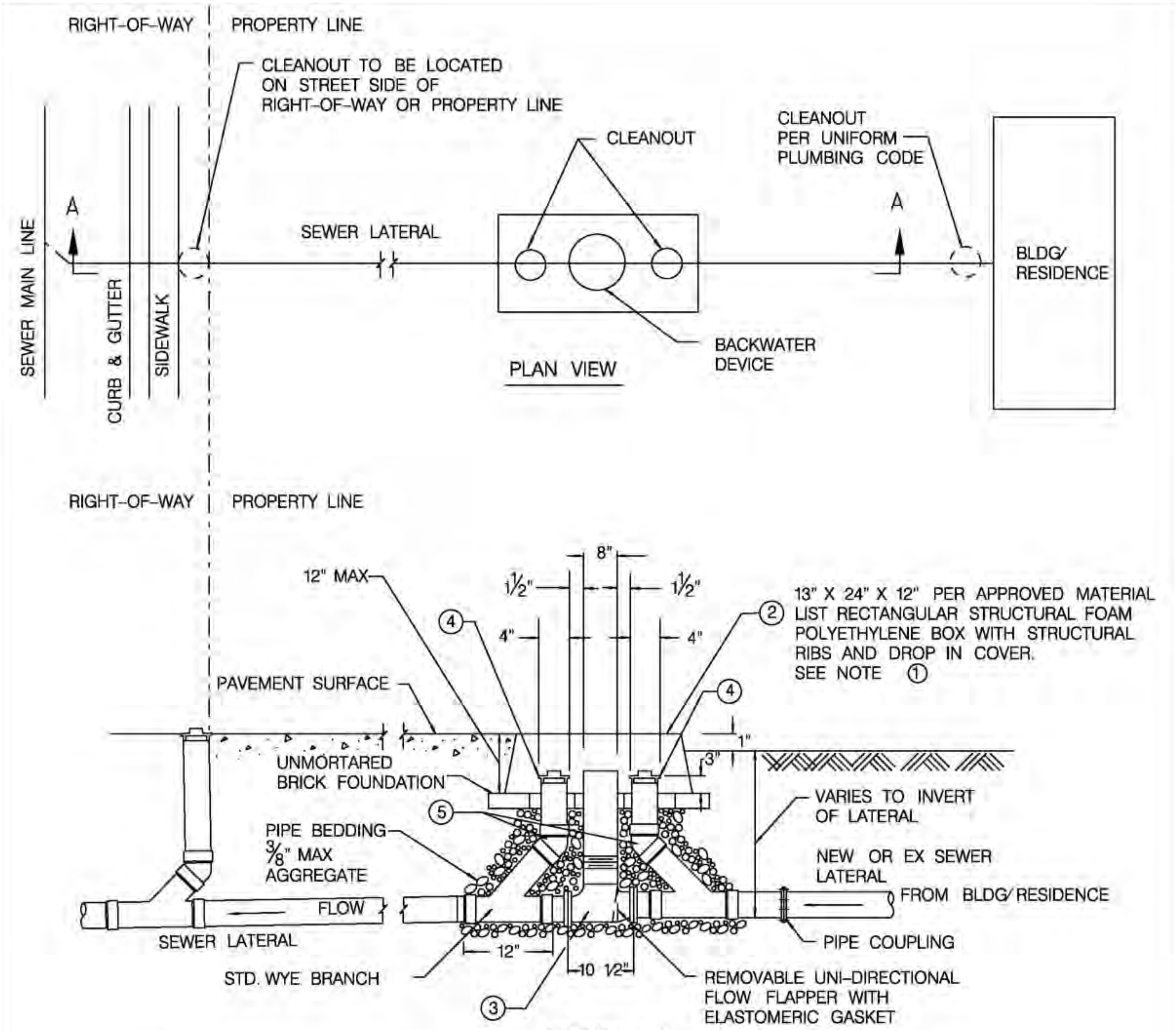
SEWER LATERAL CLEANOUT (OUTSIDE TRAVELED WAY)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDS-103**



SECTION A-A

NOTES:

1. WHEN BACKWATER DEVICE IS INSTALLED IN THE DRIVEWAY, SEE PAGE 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 APPROVED MATERIALS.
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.

REVISION	BY	APPROVED	DATE
DETAIL	CS	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

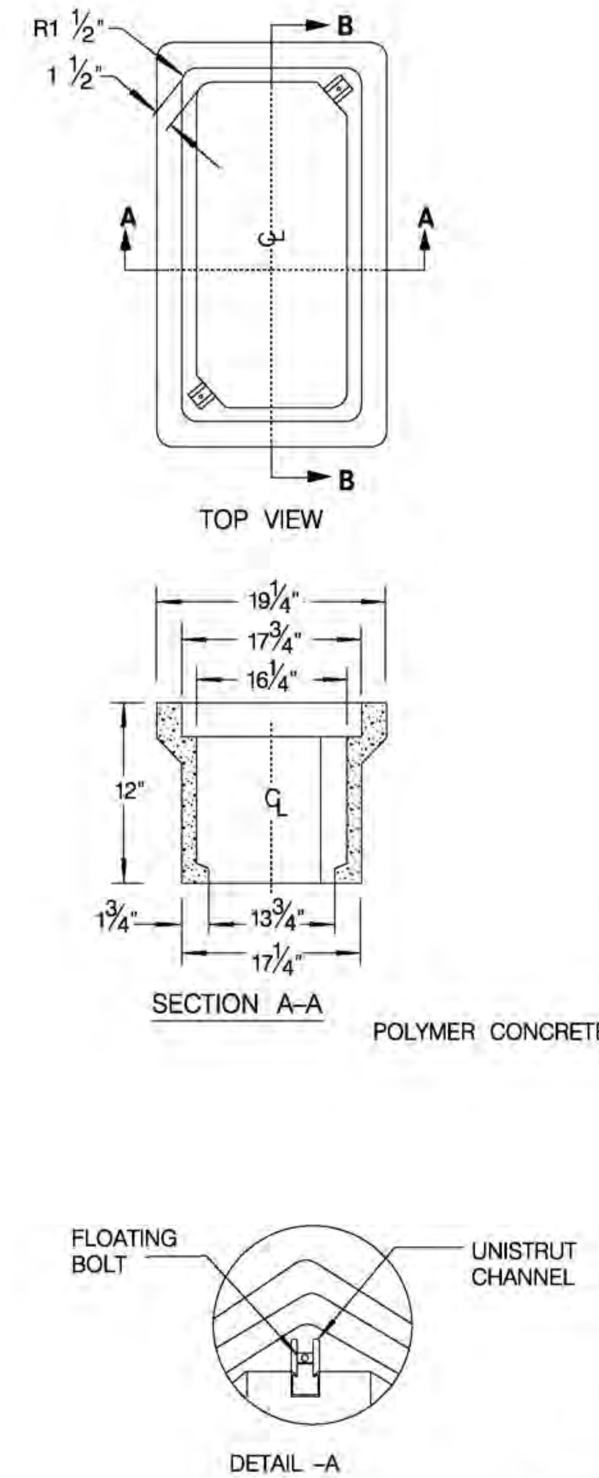
CITY OF SAN DIEGO - STANDARD DRAWING

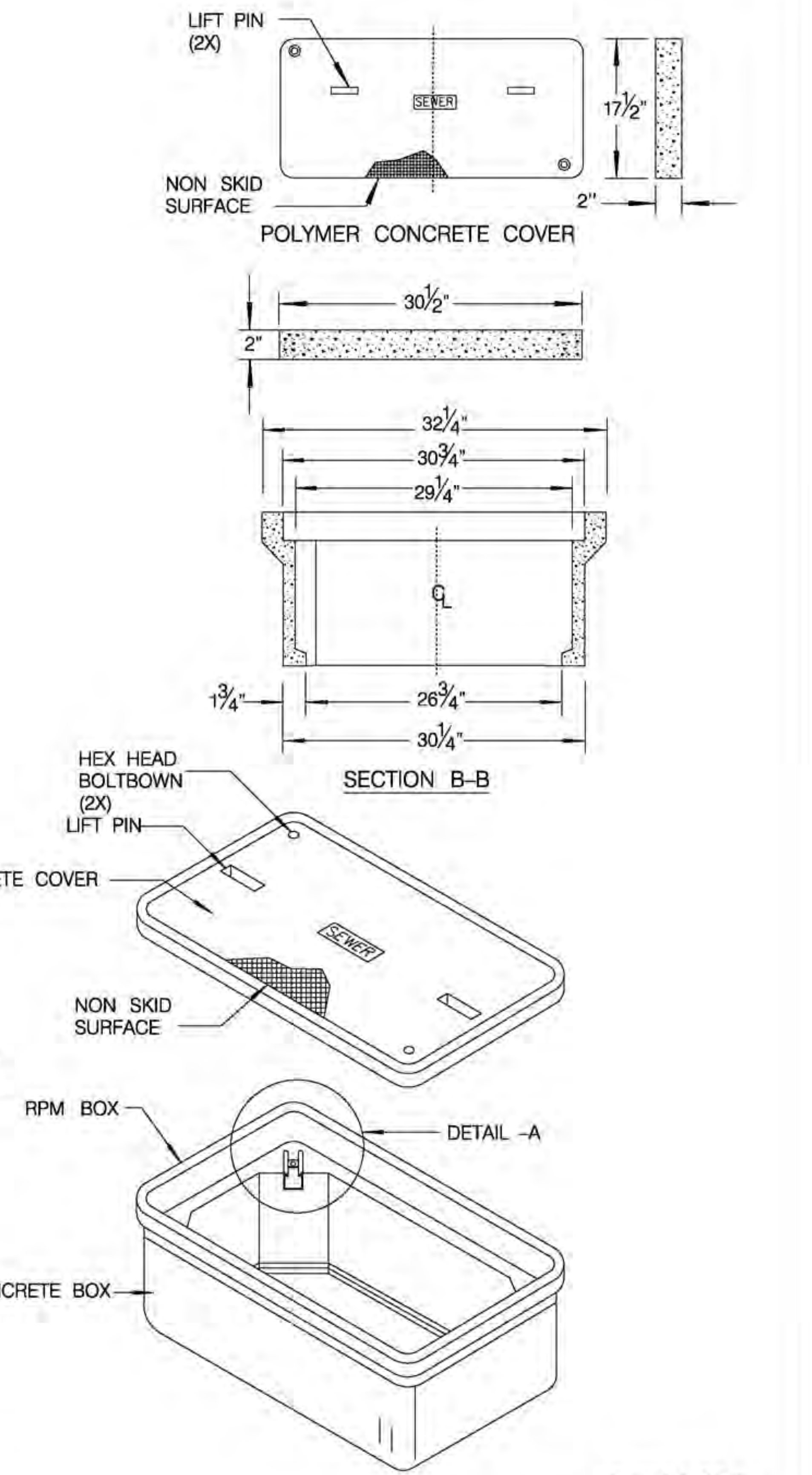
4" BACKWATER DEVICE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDS-104**





NOTE:

1. THE BOX & COVER IS 10K LOAD RATED.

SHEET 2 OF 2

REVISION	BY	APPROVED	DATE
DETAIL	SS	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

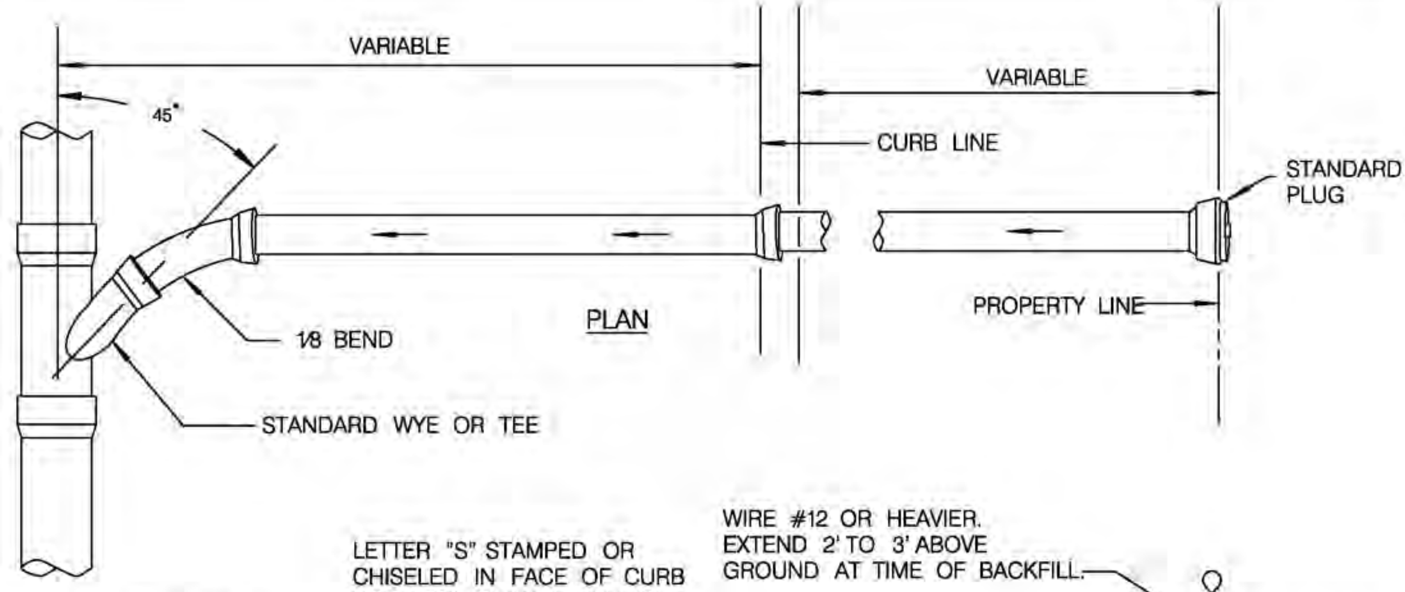
4" BACKWATER DEVICE

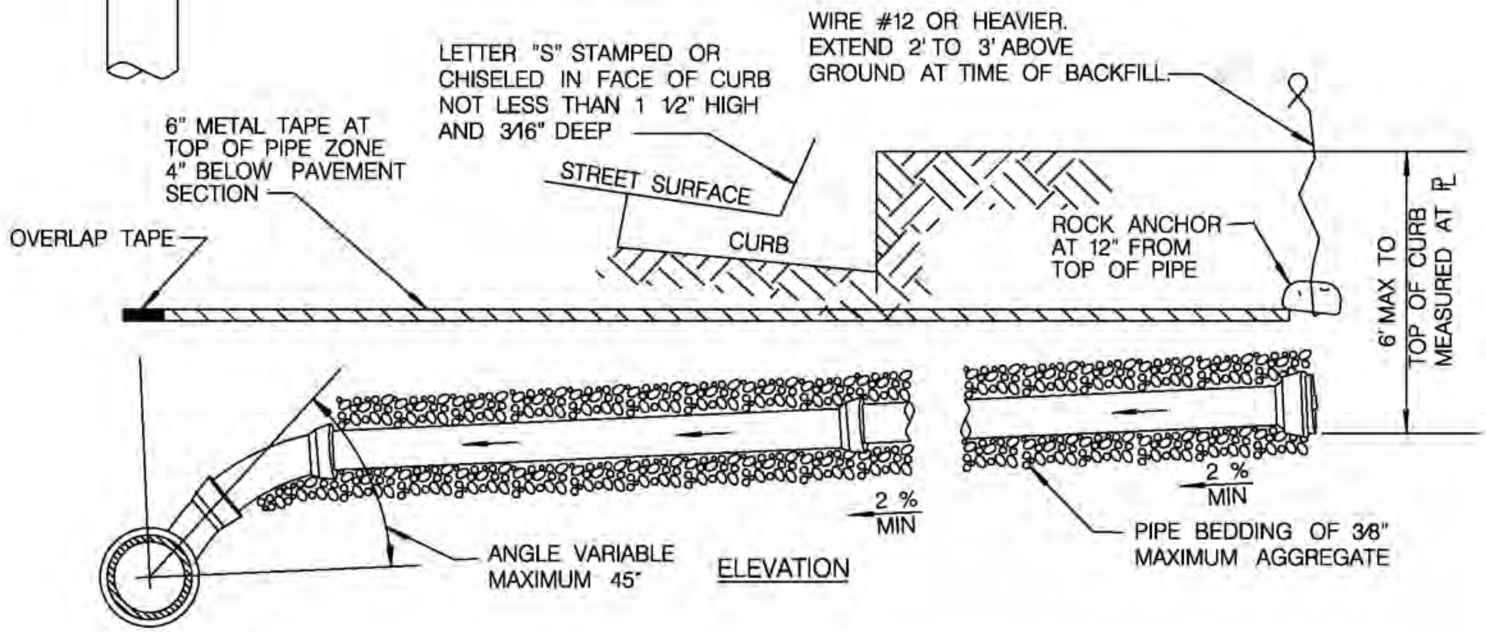
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

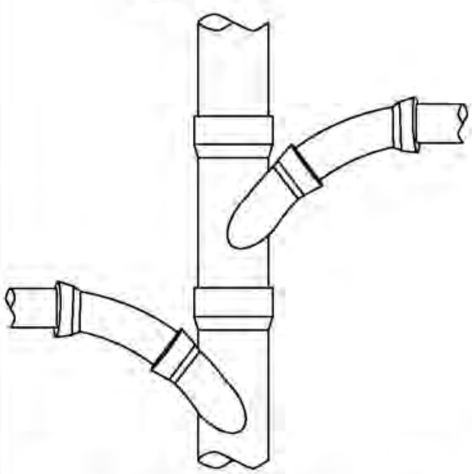
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDS-104**







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

NOTES

1. 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.

LEGENDS ON PLANS

②

REVISION	BY	APPROVED	DATE
DETAIL	JP	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

HOUSE CONNECTION

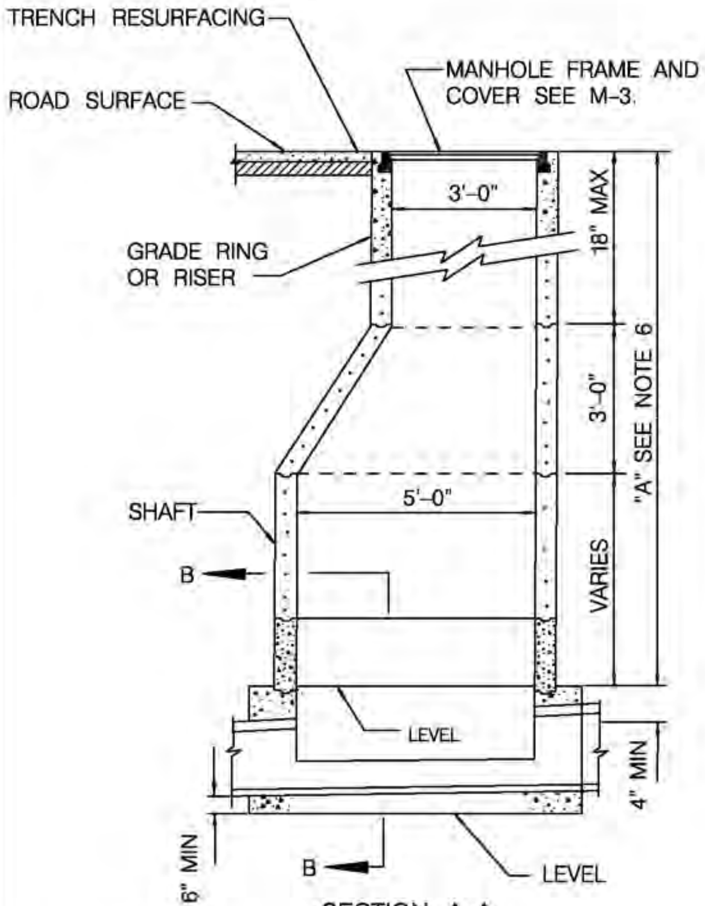
(SEWER LATERAL)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

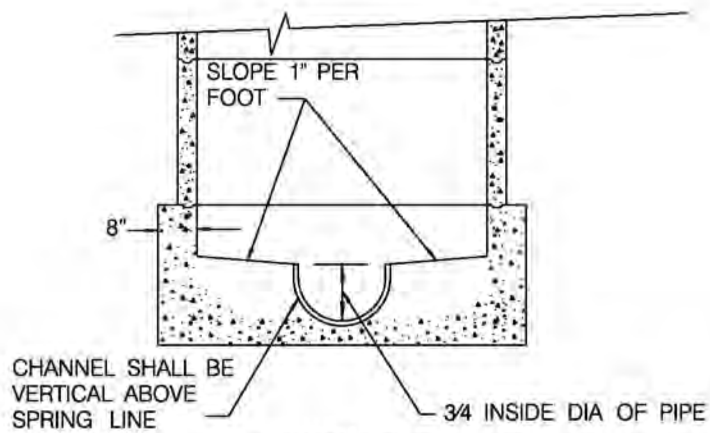
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDS-105**



SECTION A–A

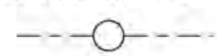


SECTION B–B

NOTES:

1. MANHOLE FRAME AND ALL JOINTS SHALL BE SET IN CLASS "C" MORTAR.
2. ALL PRECAST COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C478.
3. VERTICAL WALL OF CONE SHALL BE ON THE UPSTREAM SIDE OF THE MANHOLE.
4. CONCRETE BASE SHALL BE 560-C-3250.
5. APPROVED WATER STOP REQUIRED FOR PLASTIC PIPE CONNECTORS.
6. PRECAST SECTIONS SHALL BE USED WITHIN DIMENSION "A" AS REQUIRED, IN ORDER OF PREFERENCE LISTED:
   A) CONE (NOTCHED FOR PIPE IF DIMENSION "A" IS LESS THAN 3'.)
   B) 6" TO 18" OF 3' DIAMETER GRADE RINGS AND/OR RISERS.
   C) 5' DIAMETER SHAFT VARIABLE HEIGHT.
7. FLEXIBLE PIPE JOINTS SHALL BE REQUIRED WITHIN 12" OF INSIDE FACE OF MANHOLE, EXCEPT FOR PLASTIC PIPE.
8. ALL PATCHING WITHIN MANHOLE BASE SHALL BE EPOXY MORTAR.
9. PRIOR APPROVAL OF PRECAST BASE IS REQUIRED BY THE ENGINEER.
10. MANHOLES SERVING 18" DIAMETER PIPE AND LARGER SHALL USE PRECAST RISERS LINED WITH WHITE PVC SHEETS IMBEDDED WITH LOCKING EXTENSIONS TO THE CONCRETE WALL, THE BASE AND ALL REMAINING EXPOSED CONCRETE SHALL BE COATED WITH AN APPROVED POLYURETHANE COATING.

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
DETAIL	SS	A. OSKOUI	12/03
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

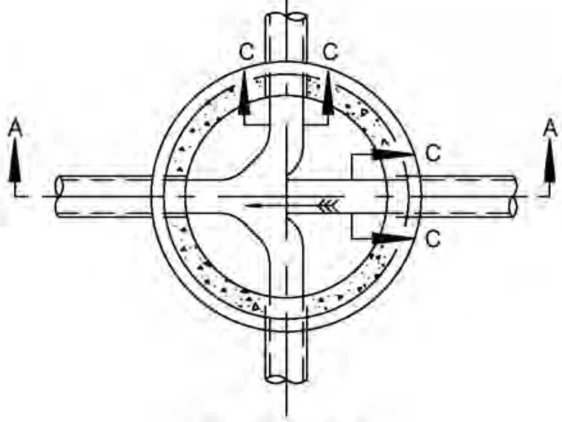
MANHOLE 5' X 3' DIAMETER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

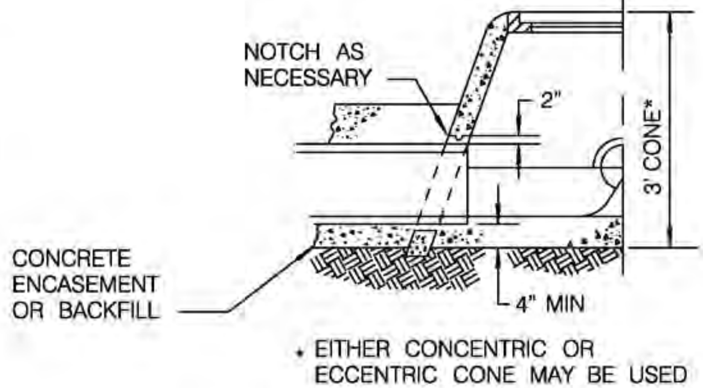
1/31/2012

COORDINATOR R.C.E. 65271 DATE

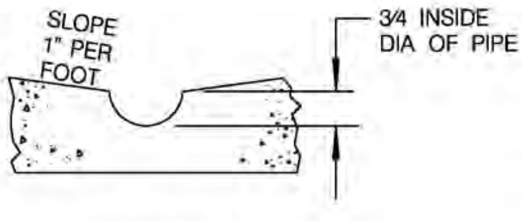
DRAWING NUMBER **SDS-106**



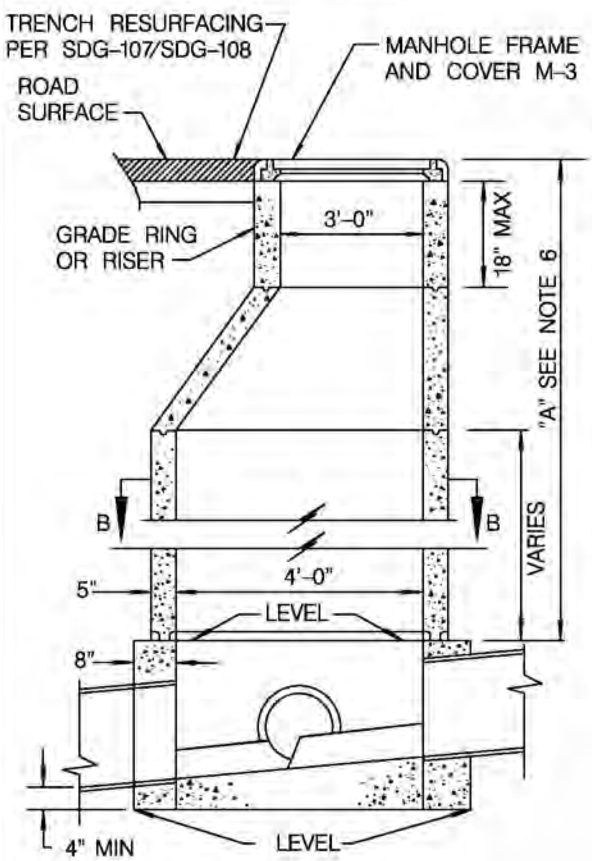
SECTION B–B



HALF SECTION SHALLOW MANHOLE



SECTION C–C

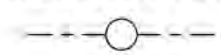


SECTION A–A

NOTES

1. ALL RISER JOINTS SHALL BE EPOXY MORTARED.
2. ALL PRECAST COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C478.
3. VERTICAL WALL OF CONE SHALL BE ON THE UPSTREAM SIDE OF THE MANHOLE.
4. CONCRETE BASE SHALL BE 560–C–3250.
5. APPROVED WATER STOP REQUIRED FOR PLASTIC PIPE CONNECTIONS.
6. PRECAST SECTIONS SHALL BE USED WITHIN DIMENSION "A" AS REQUIRED, IN ORDER OF PREFERENCE LISTED:
   A) CONE (NOTCHED FOR PIPE IF DIMENSION "A" IS LESS THAN 3').
   B) 3" TO 18" OF 3' GRADE RINGS AND RISERS.
   C) 4' DIAMETER SHAFT VARIABLE HEIGHT.
7. FLEXIBLE PIPE JOINTS SHALL BE REQUIRED WITHIN 12" OF INSIDE FACE OF MANHOLE, EXCEPT FOR PLASTIC PIPE.
8. ALL PATCHING WITHIN MANHOLE BASE SHALL BE EPOXY MORTAR.
9. PRIOR APPROVAL OF PRECAST BASE IS REQUIRED BY THE ENGINEER.

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
DETAIL	JP	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

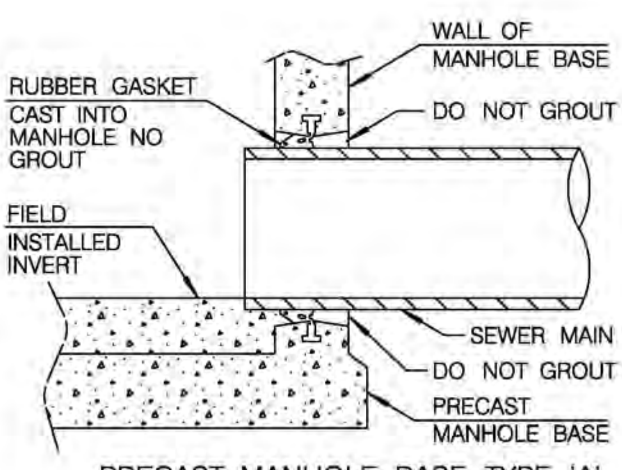
MANHOLE 4' X 3' DIAMETER
(FOR 15" MAXIMUM DIAMETER PIPE)

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

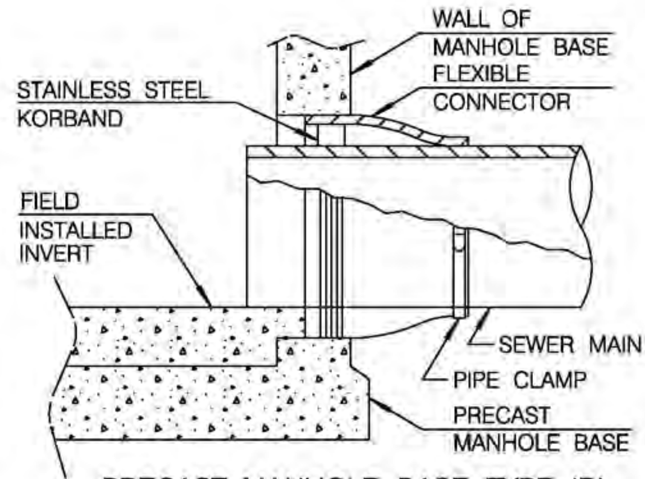
1/31/2012

COORDINATOR R.C.E. 65271 DATE

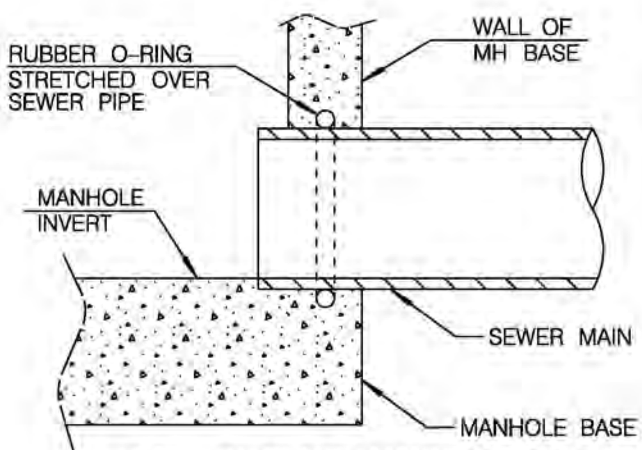
DRAWING NUMBER **SDS-107**



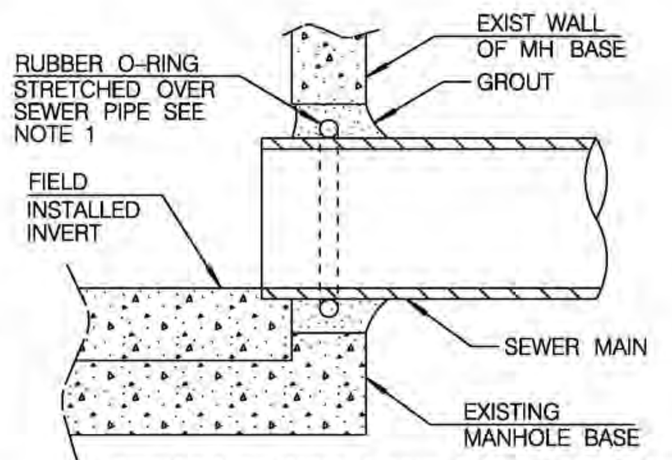
PRECAST MANHOLE BASE TYPE 'A'



PRECAST MANHOLE BASE TYPE 'B'



CAST IN PLACE MANHOLE BASE



BREAKING INTO EXIST MANHOLE BASE

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

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

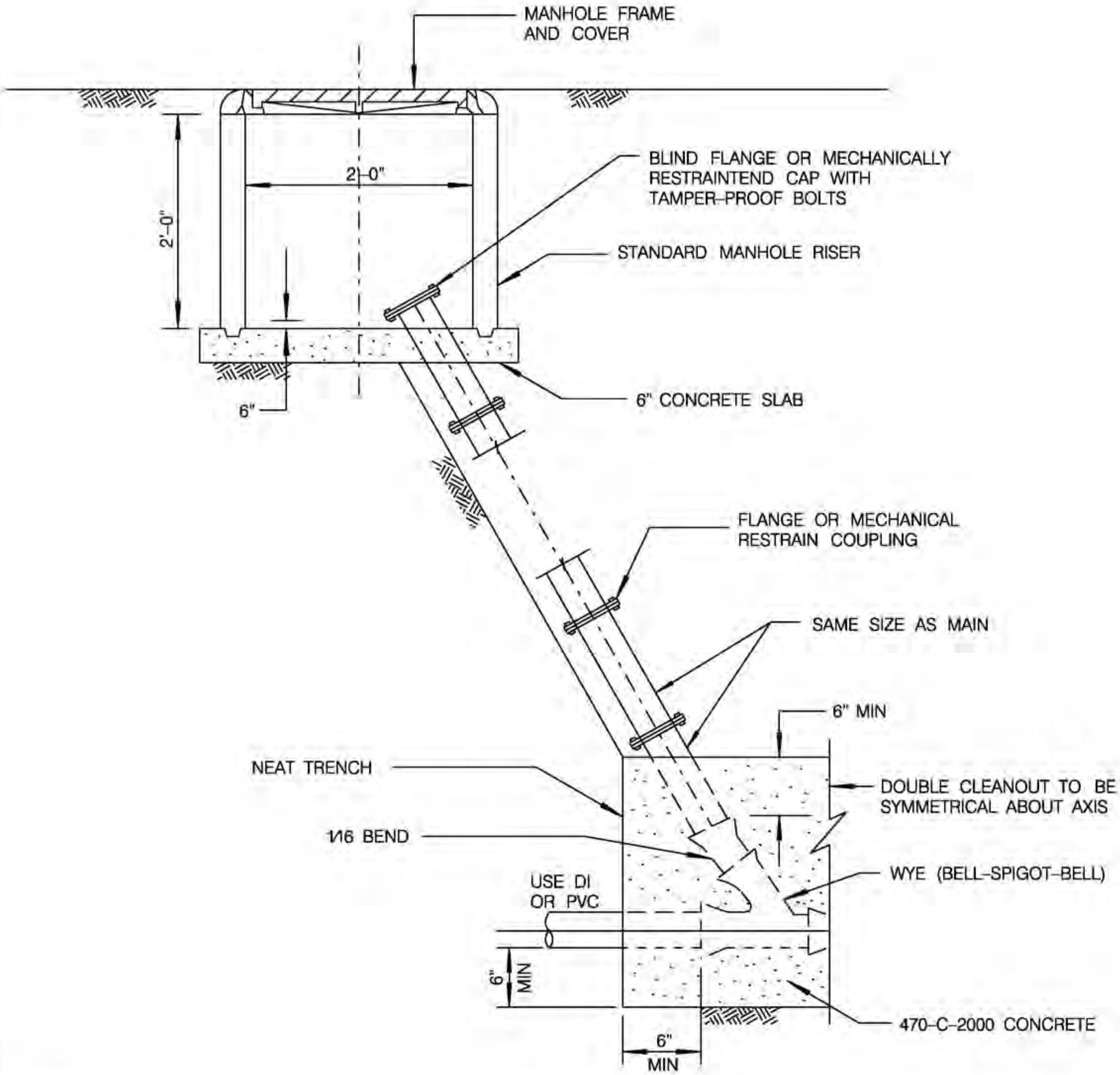
MANHOLE PIPE CONNECTORS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDS-108**



NOTES

1. SIMILAR POLYVINLY 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.

LEGEND ON PLANS

CO

REVISION	BY	APPROVED	DATE
DETAIL	JP	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

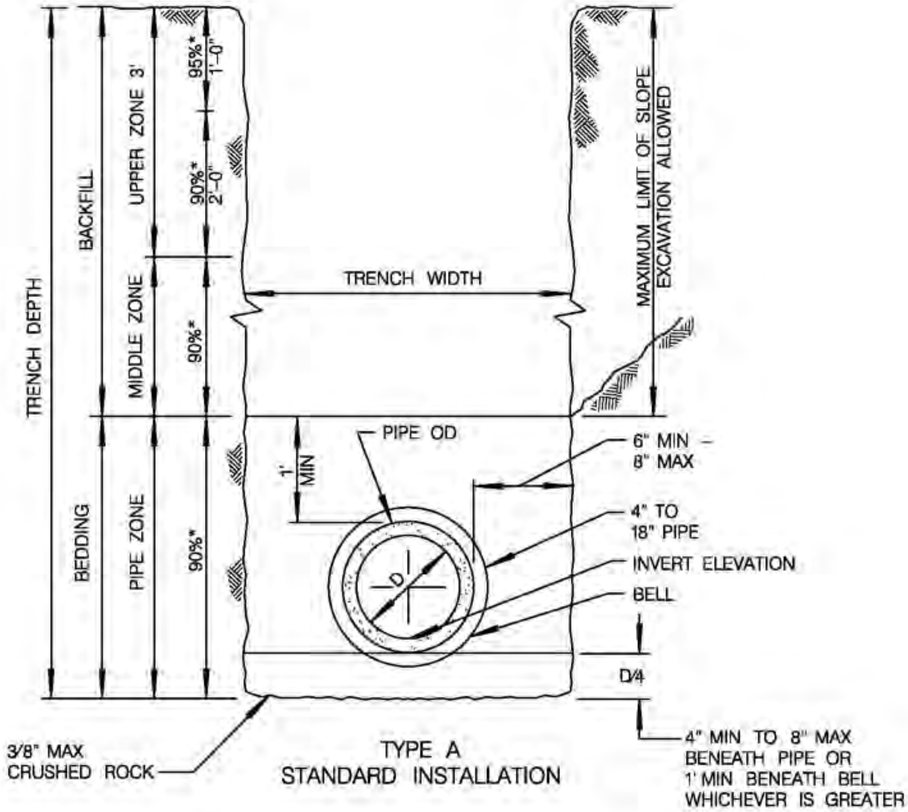
CLEANOUT - SEWER FORCE MAIN

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

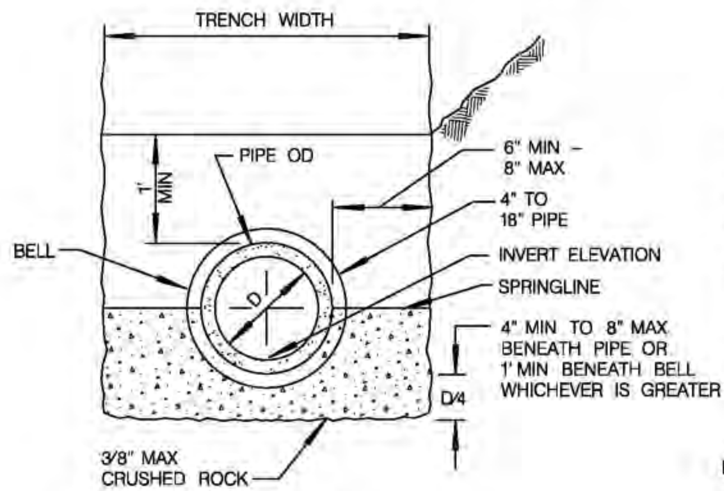
1/31/2012

COORDINATOR R.C.E. 65271 DATE

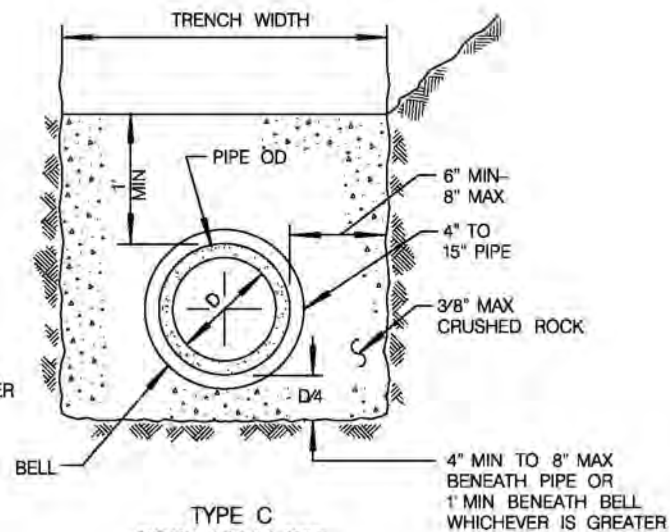
DRAWING NUMBER **SDS-109**



TYPE A
STANDARD INSTALLATION



TYPE B
ROCK TO SPRINGLINE



TYPE C
ROCK ENVELOPE

NOTES

1. FOR TRENCH RESURFACING IN IMPROVED STREETS, SEE STANDARD DRAWINGS SDG-107 AND SDG-108.
2. (*) INDICATES MINIMUM RELATIVE COMPACTION.
3. MINIMUM DEPTH OF COVER FROM THE TOP OF PIPE TO FINISH GRADE FOR PVC SDR 35 SEWER MAIN SHALL BE 5'. FOR SHALLOWER DEPTH, SPECIAL DESIGN IS REQUIRED.
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.

REVISION	BY	APPROVED	DATE
ORIGINAL	RA	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

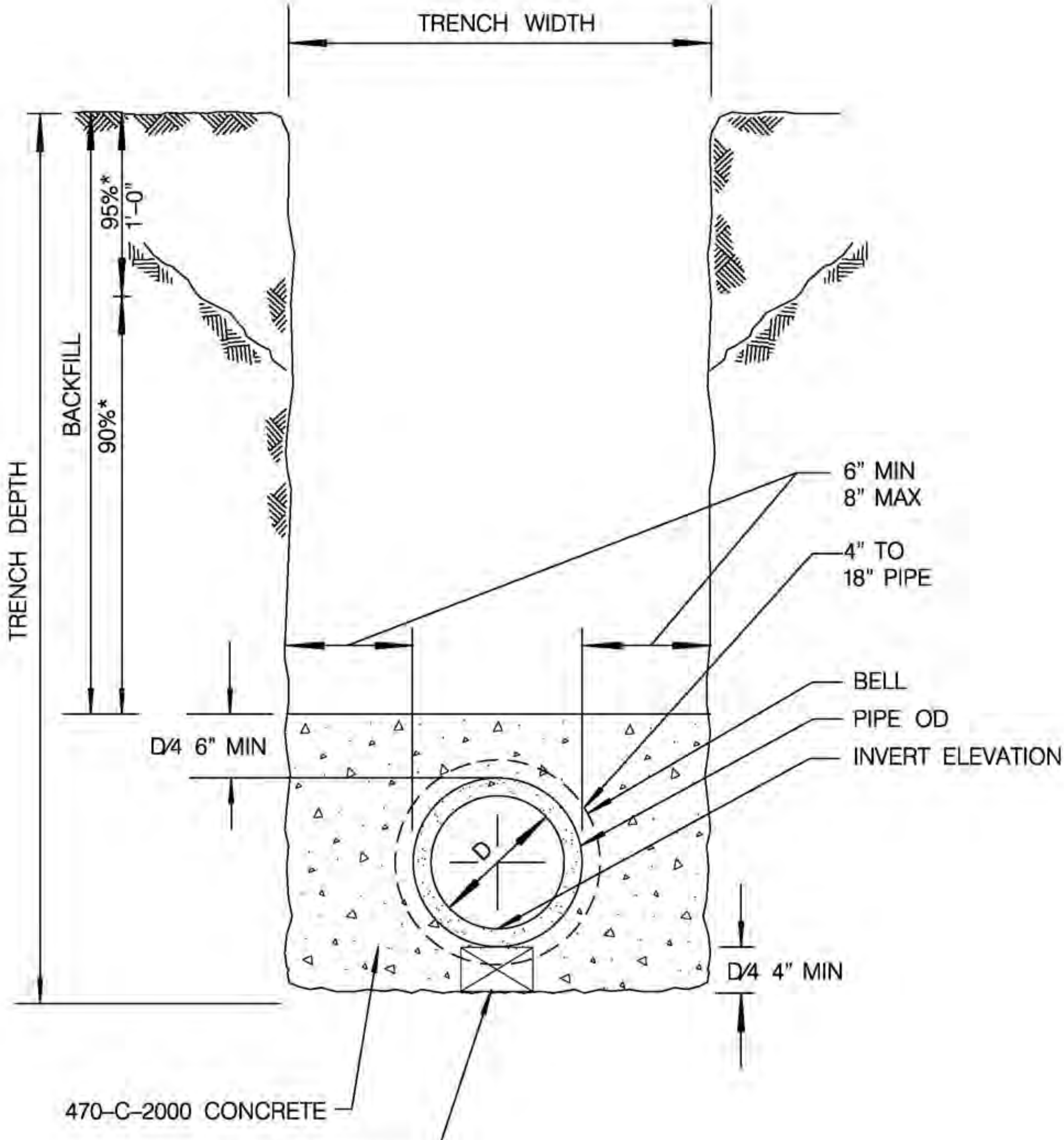
PIPE BEDDING AND TRENCH BACKFILL FOR SEWERS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

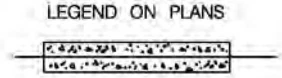
DRAWING NUMBER **SDS-110**



SECTION

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.

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
ORIGINAL	RA	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

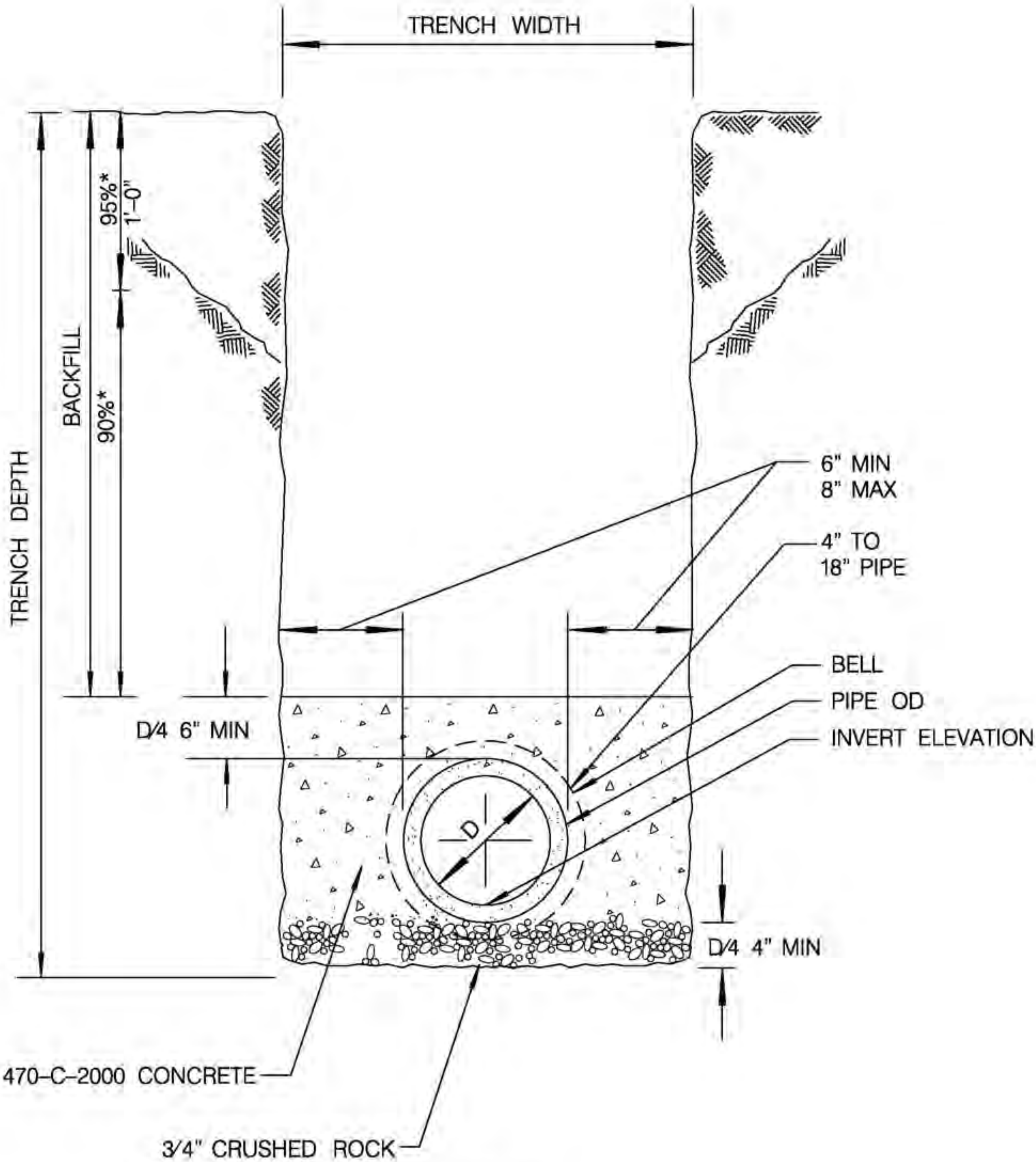
CONCRETE ENCASEMENT

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

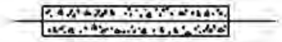
DRAWING NUMBER **SDS-112**



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.

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
ORIGINAL	RA	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

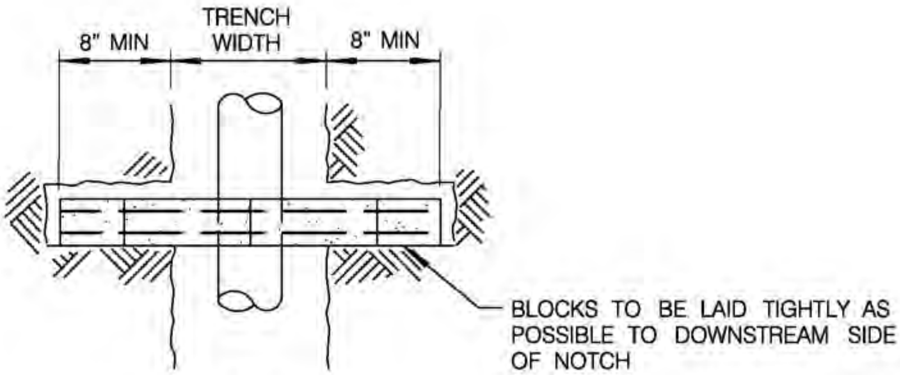
CONCRETE BACKFILL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

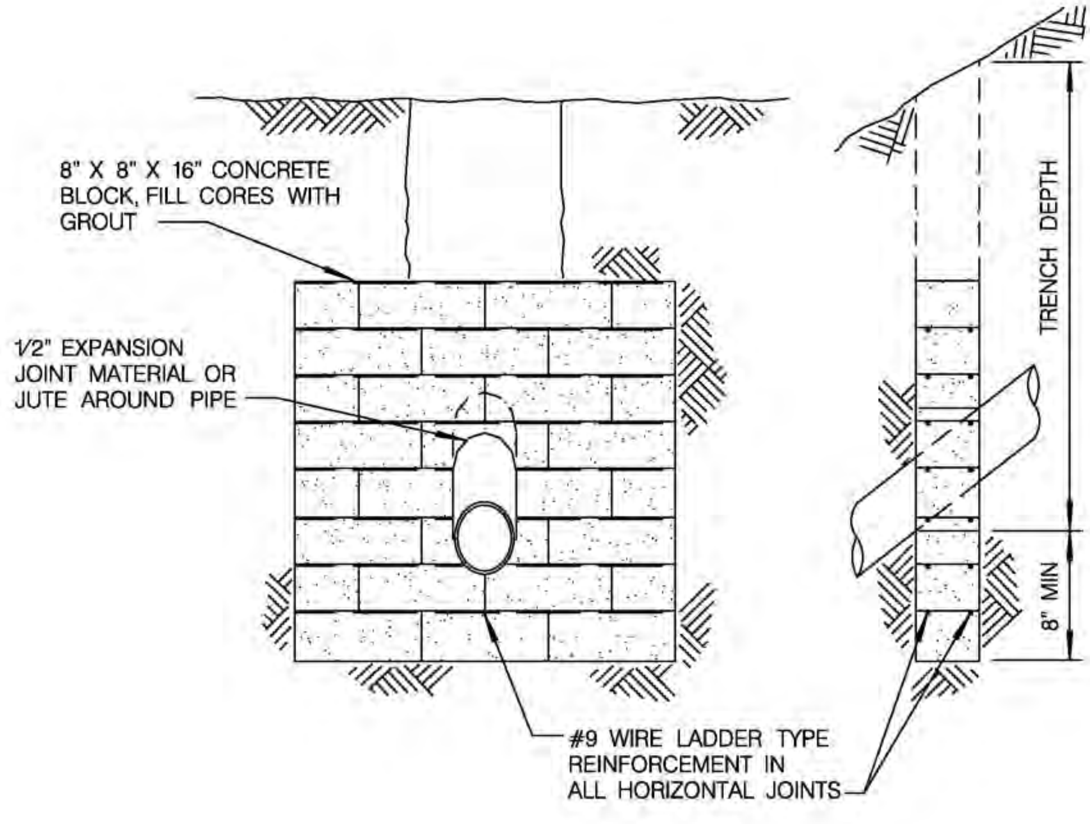
H. Hashi 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDS-113**



PLAN



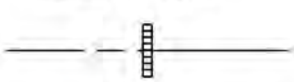
FRONT ELEVATION

SIDE ELEVATION

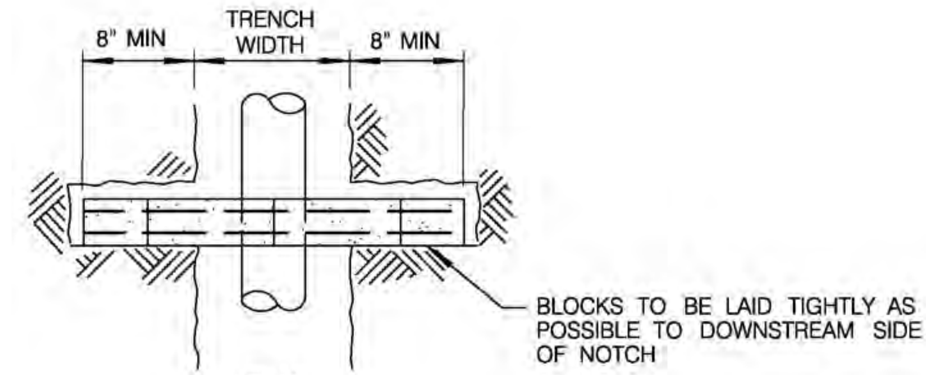
NOTE

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

LEGEND ON PLANS



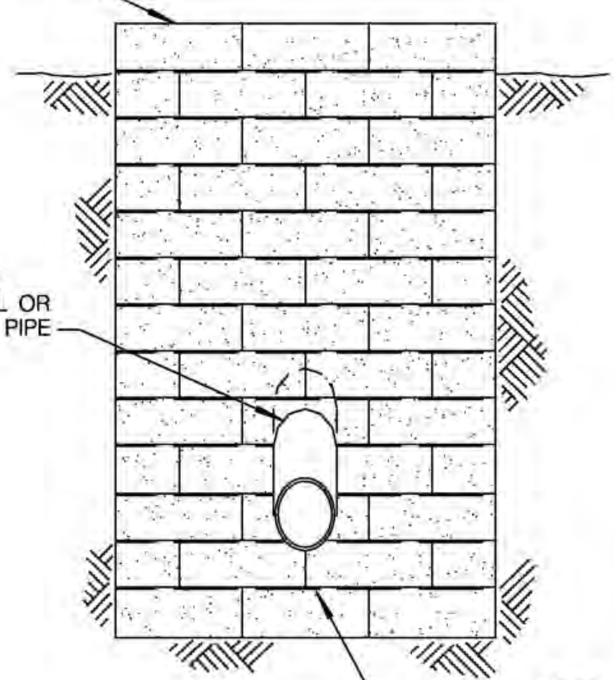
REVISION	BY	APPROVED	DATE		
ORIGINAL	RA	A. OSKOUI	12/06	CITY OF SAN DIEGO – STANDARD DRAWING	RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE 1/31/2012 COORDINATOR R.C.E. 65271 DATE
UPDATED	KA	J. NAGELVOORT	01/12	**CONCRETE ANCHOR**	DRAWING NUMBER **SDS-114**

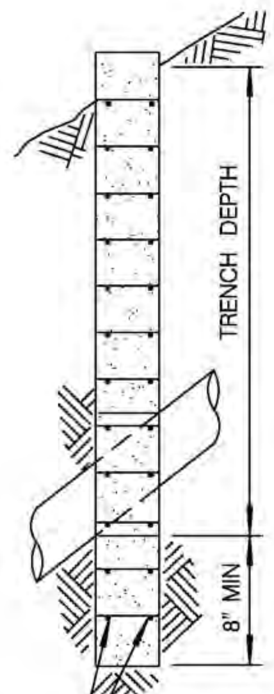


PLAN

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

1/2" EXPANSION JOINT MATERIAL OR JUTE AROUND PIPE



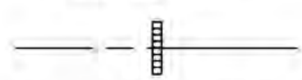


#9 WIRE LADDER TYPE REINFORCEMENT IN ALL HORIZONTAL JOINTS

FRONT ELEVATION

SIDE ELEVATION

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
ORIGINAL	RA	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

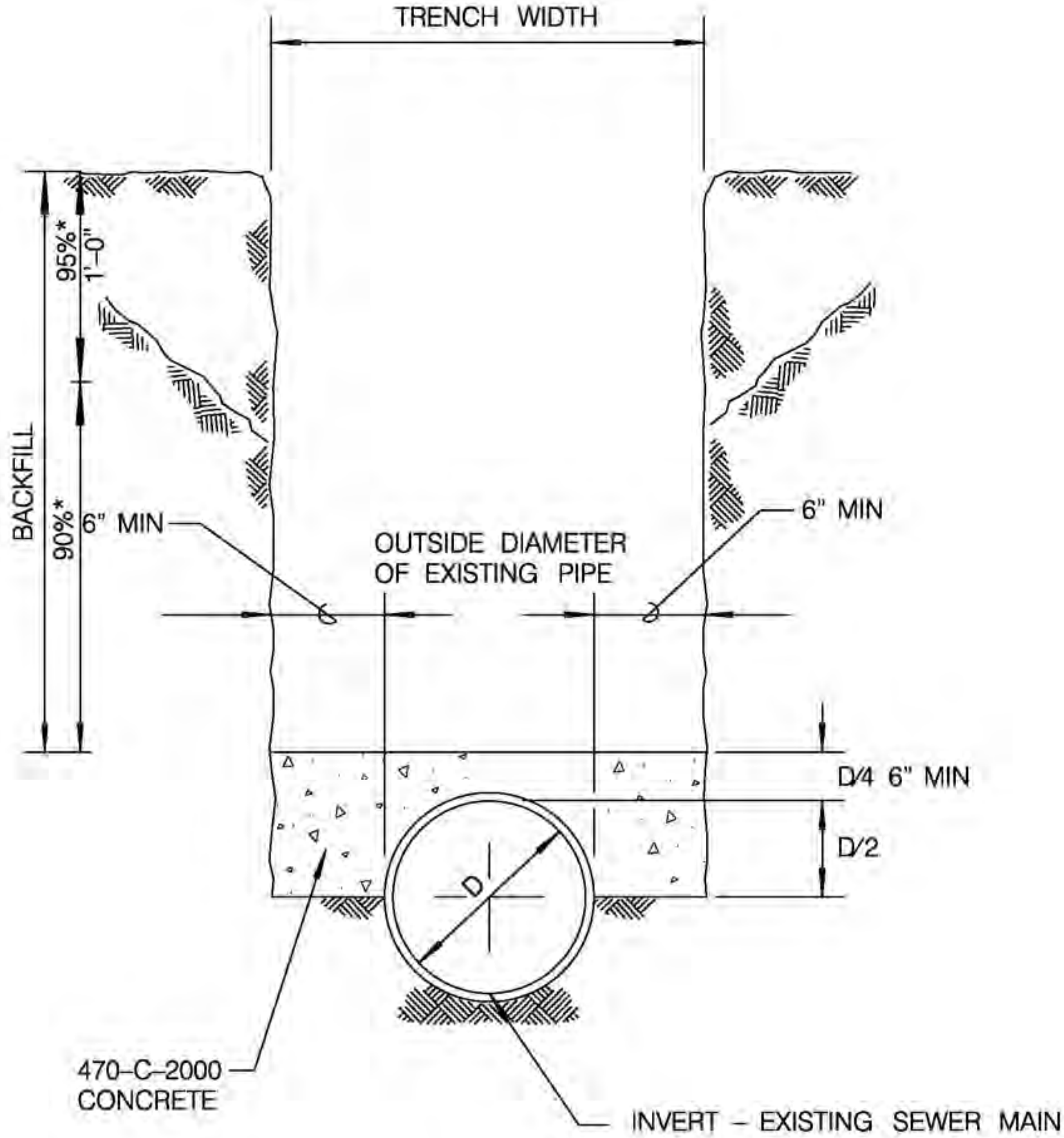
CUTOFF WALL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDS-115**



SECTION

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

REVISION	BY	APPROVED	DATE
ORIGINAL	RA	A. OSKOUI	12/06
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

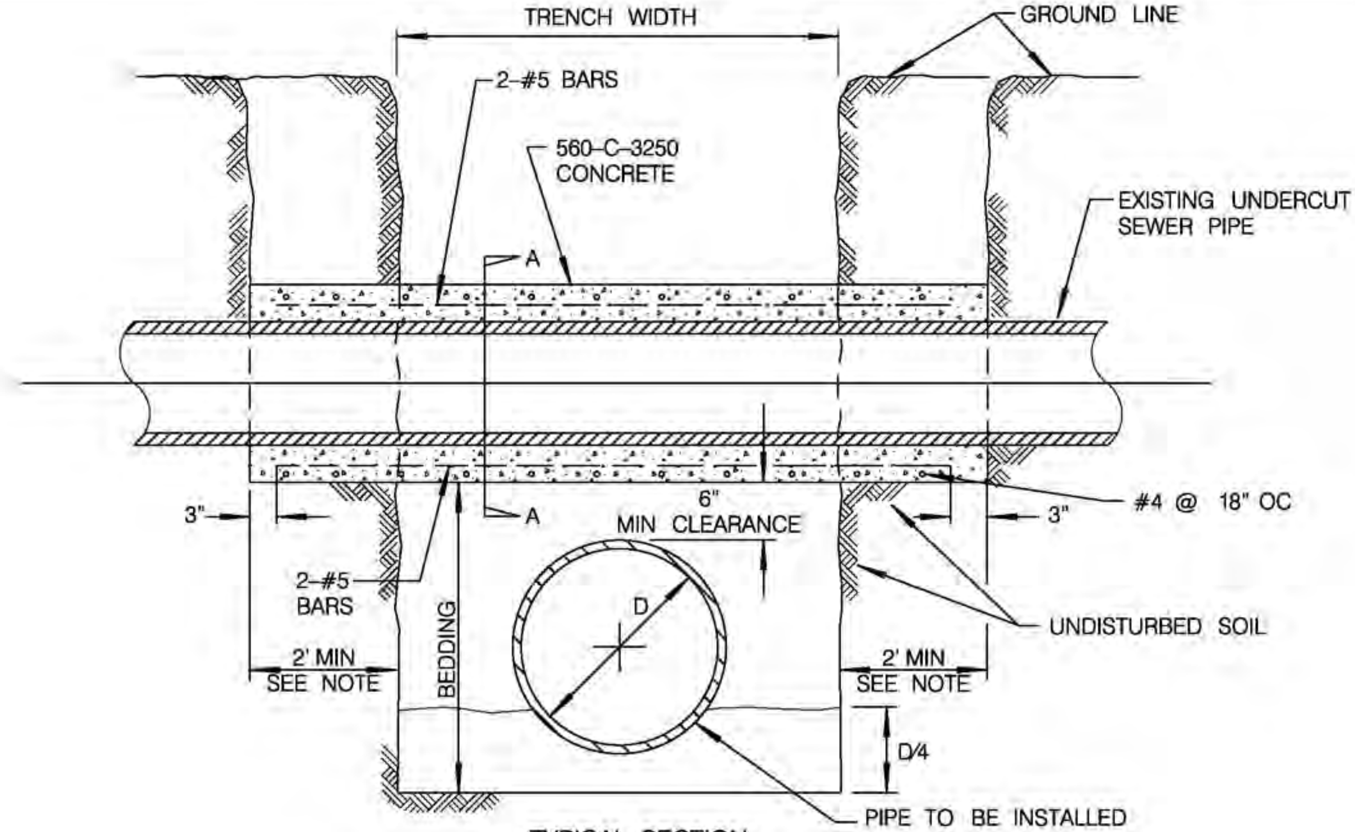
CONCRETE PROTECTION FOR EXISTING SEWER PIPE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

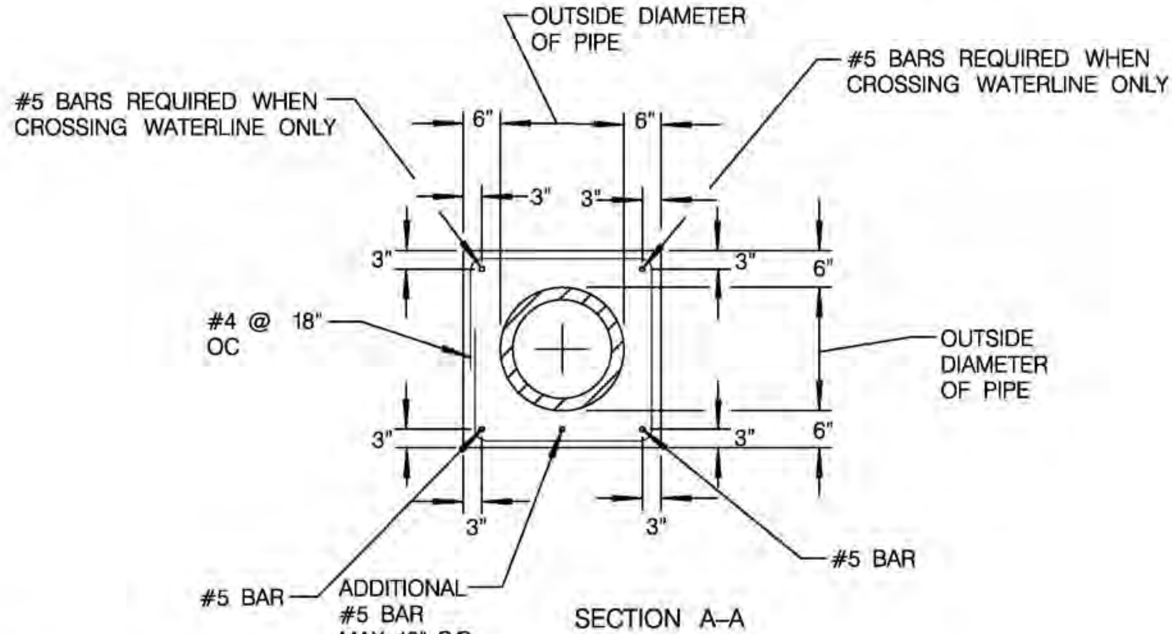
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDS-116**



TYPICAL SECTION



SECTION A–A

NOTES

1. FOR WATER LINE CONSTRUCTION, ENCASEMENT SHALL EXTEND TO FIRST JOINT BEYOND 2' AT BOTH SIDES OF TRENCH OR TO A DISTANCE OF 4', WHICHEVER IS LESS.
2. WHERE CONNECTING TO FLEXIBLE PIPE, JOIN USING TWO COUPLINGS WITH A SHORT PIPE SPOOL (TYPICAL).
3. NO ENCASEMENT IS REQUIRED WHERE THE TRENCH WIDTH IS 24" OR LESS.
4. FOR EXISTING PVC PIPE, IT SHALL BE COVERED WITH TAR PAPER, POLYURETHANE BAGGIE OR RUBBER MAT PRIOR TO POURING CONCRETE.

LEGEND ON PLANS

REVISION	BY	APPROVED	DATE
ORIGINAL	RA	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

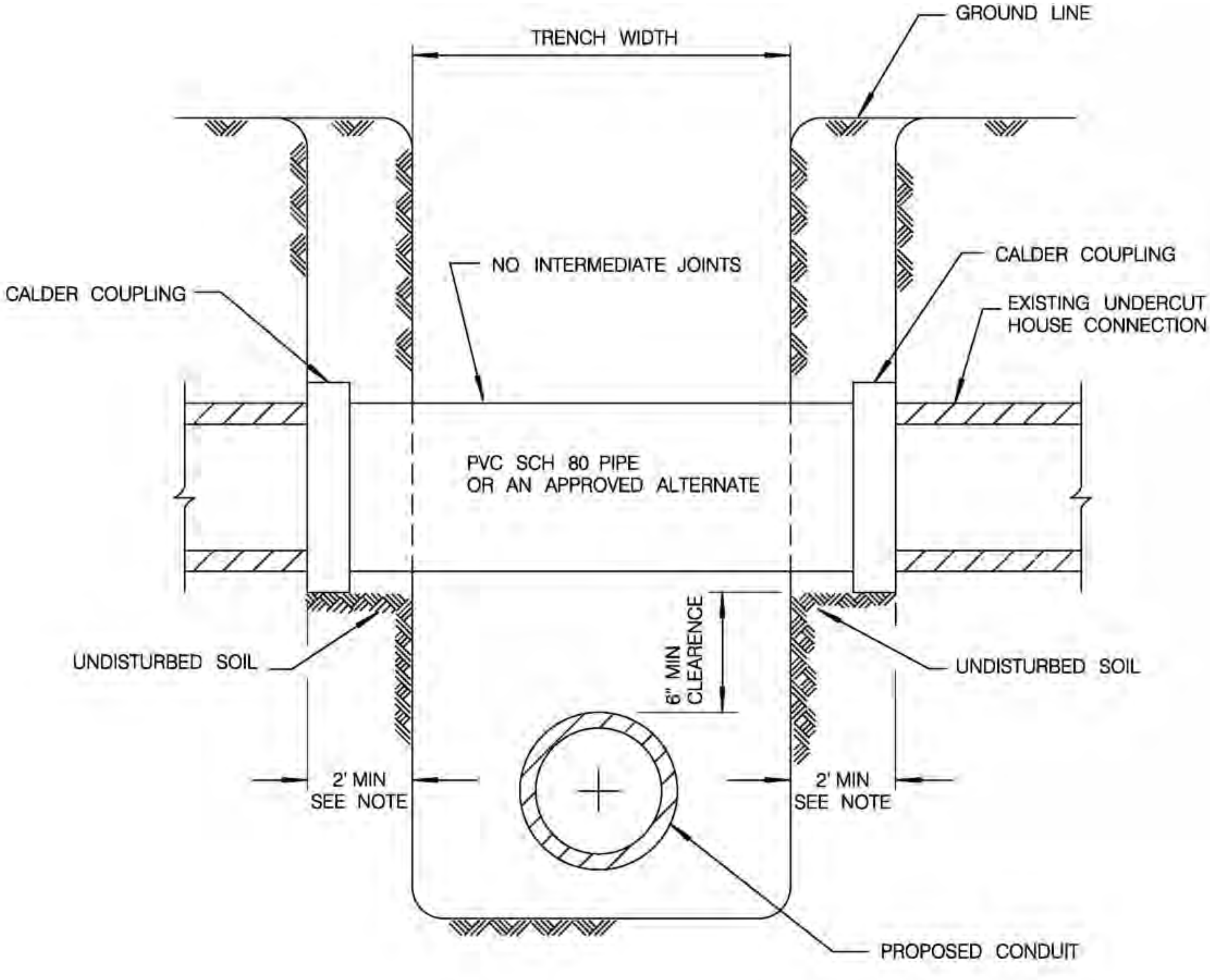
CITY OF SAN DIEGO - STANDARD DRAWING

CONCRETE SUPPORT FOR UNDERCUT SEWER PIPE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDS-117**



SECTION

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.

REVISION	BY	APPROVED	DATE
ORIGINAL	RA	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

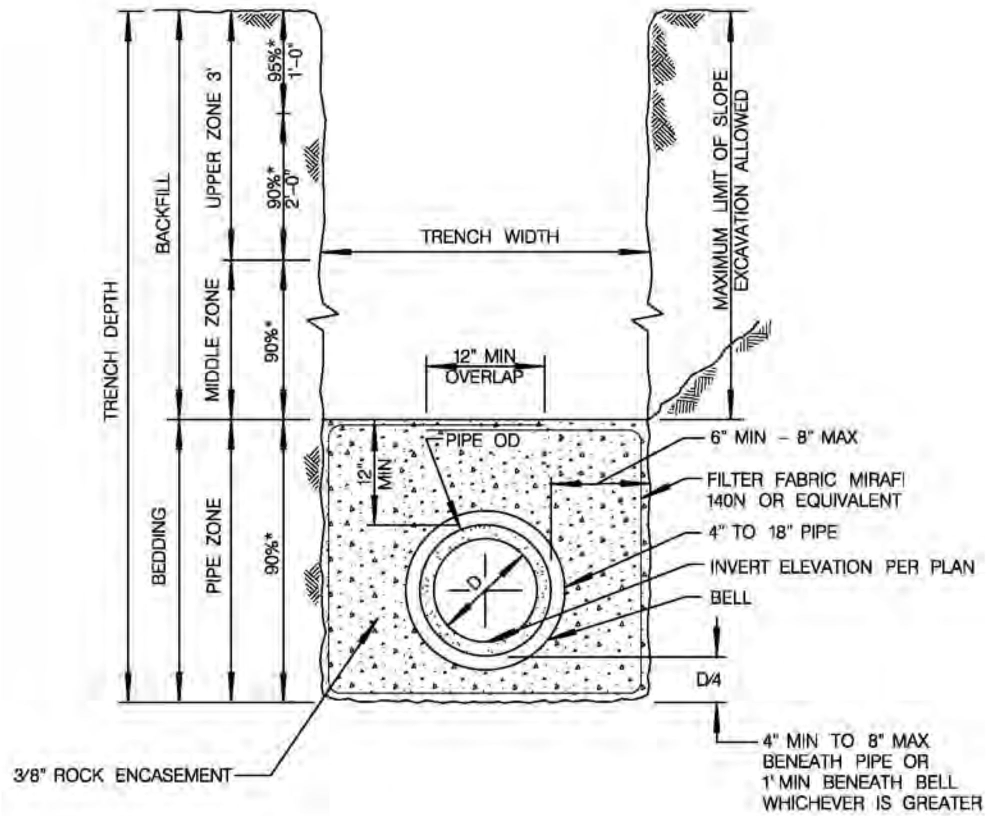
CITY OF SAN DIEGO – STANDARD DRAWING

HOUSE CONNECTION
SEWER REPAIR

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

COORDINATOR R.C.E. 85271 DATE 1/31/2012

DRAWING NUMBER **SDS-118**



NOTES:

1. FOR TRENCH RESURFACING IN IMPROVED STREETS, SEE OTHER STANDARD DRAWINGS.
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.
4. 6" METAL TAPE SHALL BE INSTALLED ABOVE PIPE 4" BELOW TRENCH CAP AND 12" BELOW FINISH GRADE IN UNIMPROVED STREETS.
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.

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

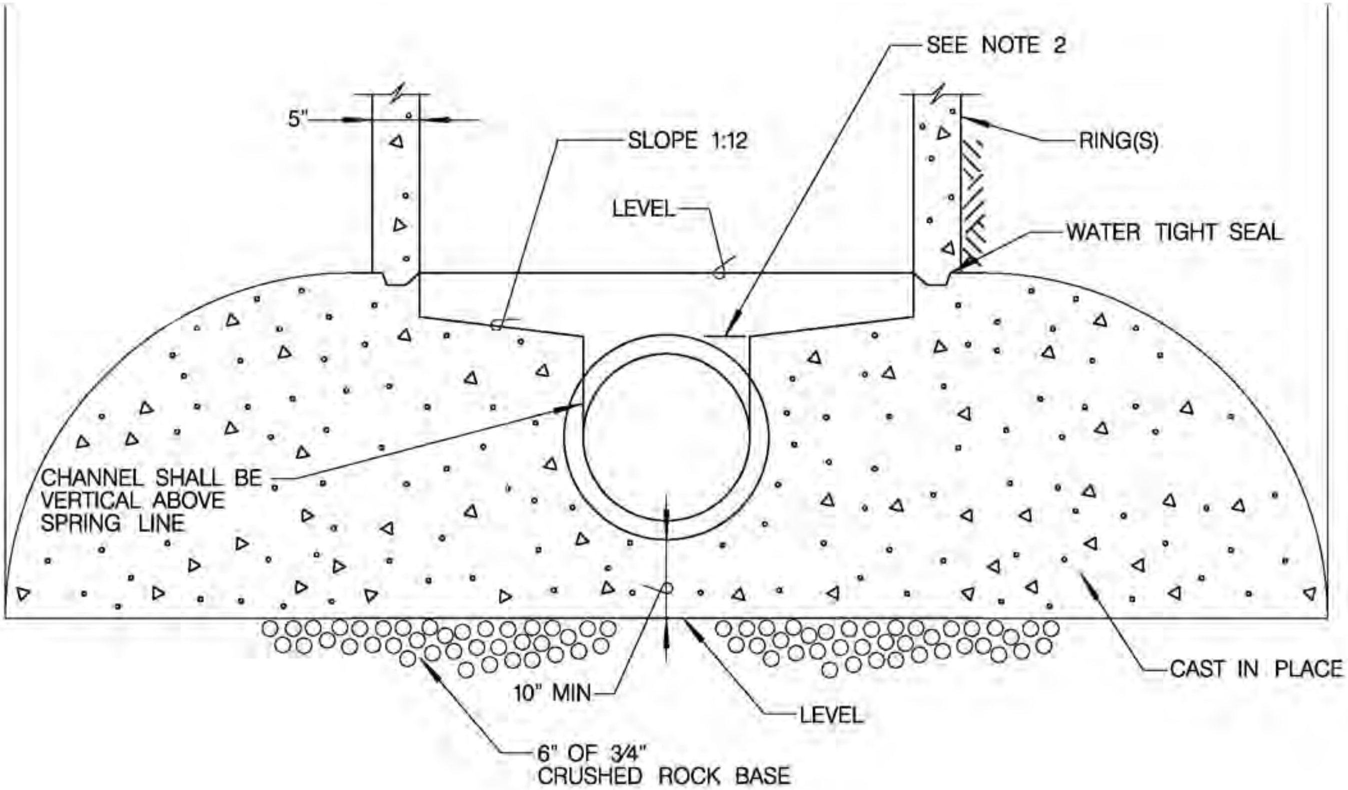
PIPE BEDDING AND TRENCH BACKFILL FOR SEWERS IN GROUNDWATER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDS-119**



NOTES:

1. MANHOLE BASES FOR MAINS 18" AND LARGER SHALL BE COATED.
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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

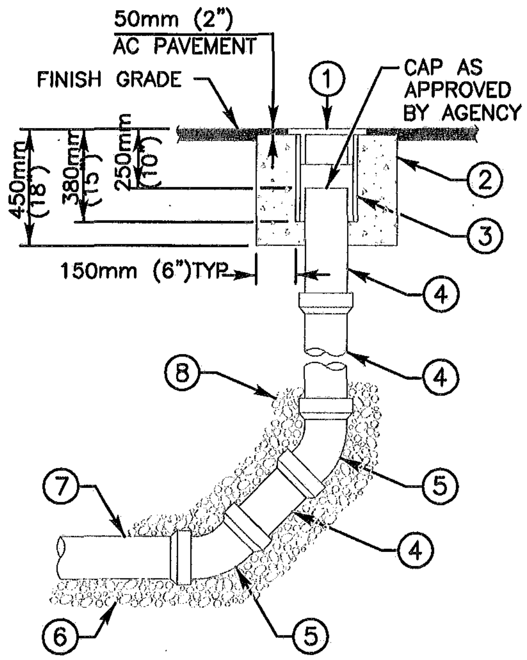
SEWER MANHOLE BASE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

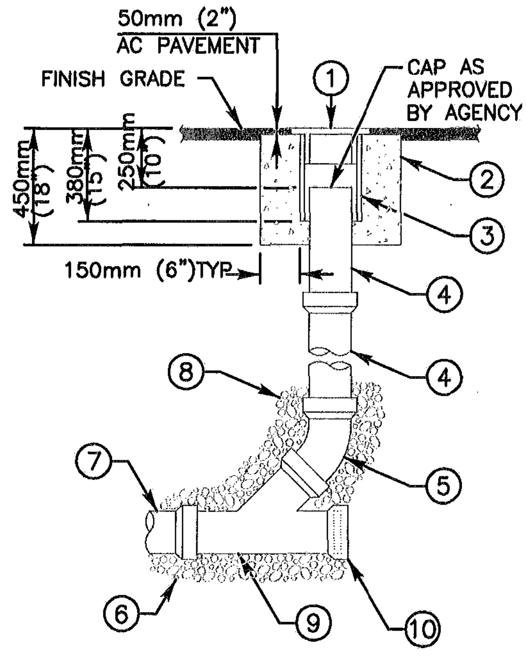
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDS-120**



TYPE A
MAINS FOR 150mm (6")
AND 200mm (8")



TYPE B
SEWER LATERAL
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 200mm (8")
4) BACKFILL TO TOP OF 45° BEND WITH 19mm (3/4") CRUSHED ROCK
5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	300mm (12") CI CLEANOUT BOX COVER MARKED 'SEWER' AND AGENCY NAME AS REQUIRED	5	45° ELBOW
		6	19mm (3/4") CRUSHED ROCK PIPE BEDDING
2	CONCRETE RING	7	SEWER MAIN
3	300mm (12") PVC, C-900 x 380mm (15") LONG (CLEANOUT BOX)	8	19mm (3/4") CRUSHED ROCK SEE NOTE 4
		9	STANDARD WYE BRANCH
4	SIZE x REQUIRED LENGTH PVC PIPE	10	INSTALL PLUG AND CONCRETE LUG

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-03		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

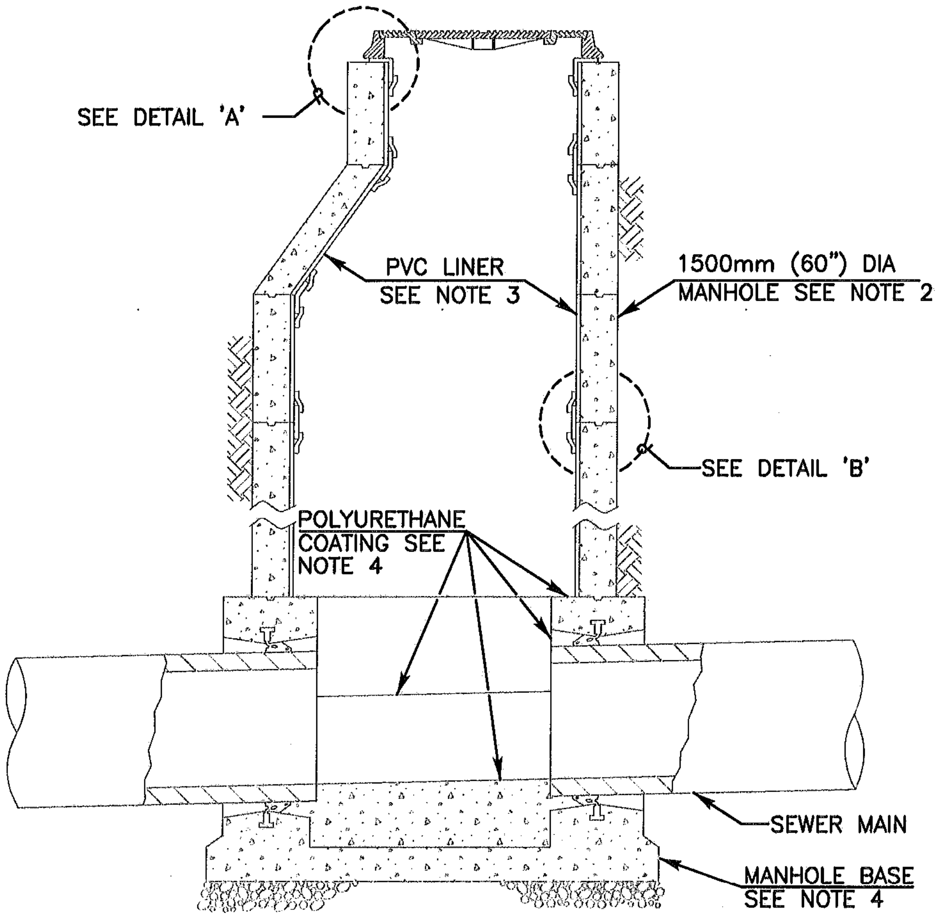
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

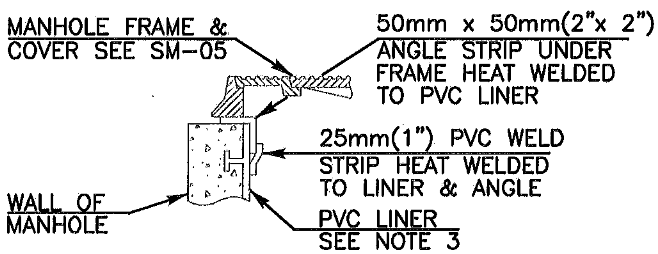
03/24/2005

Chairperson R.C.E. 19246 Date

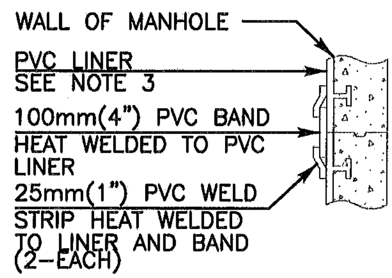
SEWER CLEANOUT

DRAWING NUMBER SC-01





DETAIL "A" MANHOLE
FRAME & COVER



DETAIL "B" MANHOLE
JOINT SECTIONS

NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) MANHOLES FOR SEWER MAINS 450mm(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

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-02		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

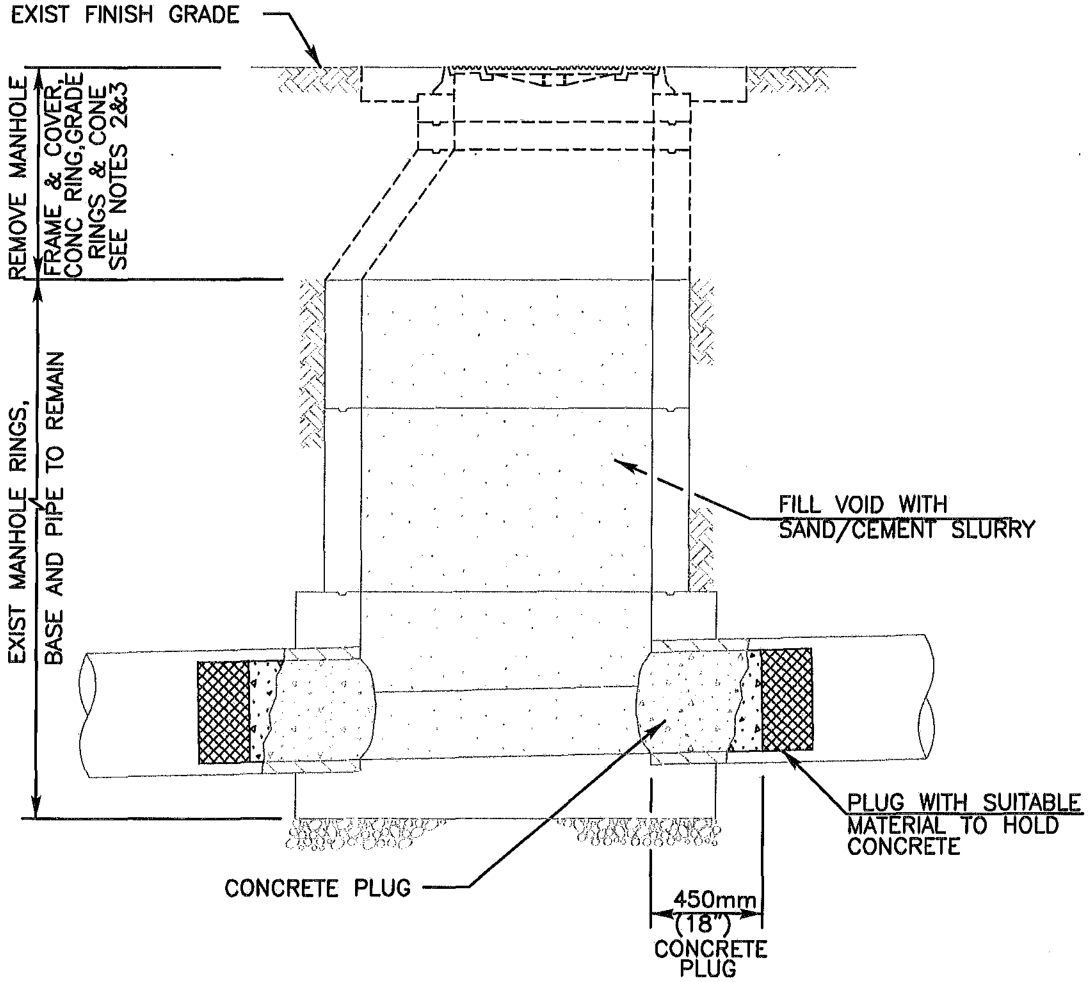
MANHOLE COATING AND
LINING SYSTEM

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

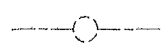
03/24/2005

Chairperson R.C.E. 19246 Date

DRAWING NUMBER SM-07



NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) ALL SALVAGED MATERIAL BECOMES PROPERTY OF AGENCY OF JURISDICTION
3) BACKFILL PER AGENCY'S REQUIREMENT
4) FOR CUTTING & PLUGGING ABANDONED SEWER MAINS SEE WP-03



LEGEND ON PLANS

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-02		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

EXISTING MANHOLE ABANDONMENT

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

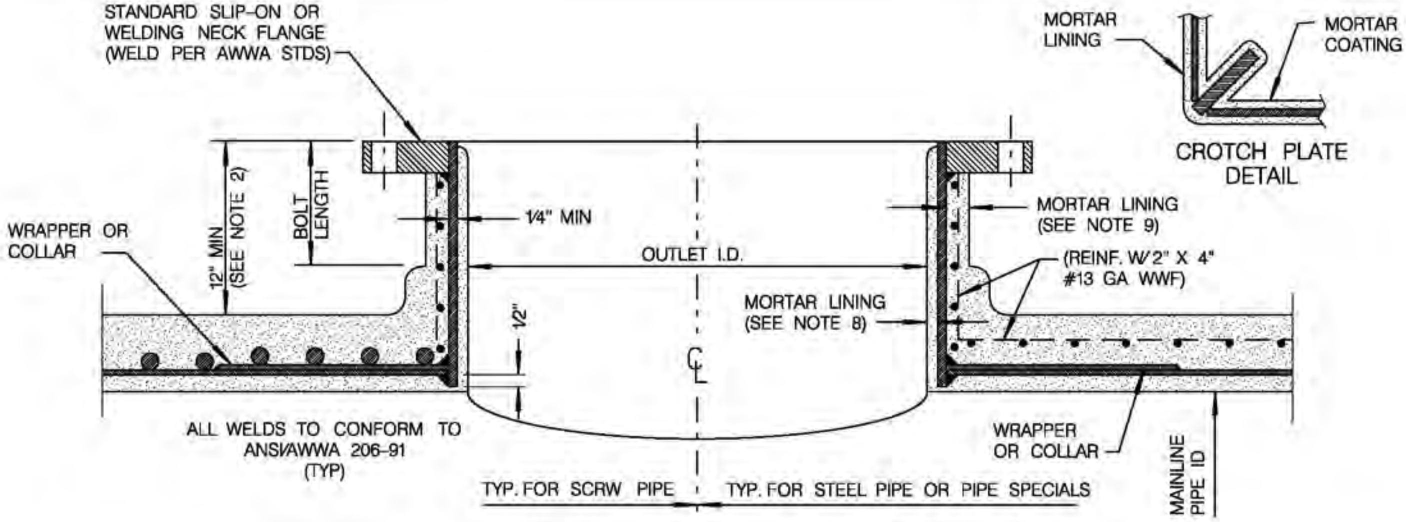
03/24/2005

Chairperson R.C.E. 19246 Date

DRAWING NUMBER SM-08

CHAPTER 10

WATER SYSTEMS



OUTLET REINFORCING			
RATIO OF OUTLET ID TO PIPE ID	PIPE CLASS	ANGLE BETWEEN OUTLET AXIS AND MAINLINE AXIS	TYPE OF REINFORCING
0.2 AND LESS	ALL ALL	0° to 75 75° to 90	WRAPPER COLLAR
0.2 TO 0.6	UNDER 150 UNDER 150 150 AND OVER	0° to 75 75° to 90 0° to 90	WRAPPER COLLAR WRAPPER
0.6 TO 1.0	UNDER 150 150 AND OVER	0° to 90° 0° to 90°	WRAPPER 1 PL CROTCH
1.0	UNDER 150 150 AND OVER	0° to 90° 0° to 90°	WRAPPER 2 PL CROTCH

NOTES

1. COLLAR OD OR WRAPPER WIDTH SHALL BE EQUAL TO TWICE THE LENGTH OF THE OPENING IN THE MAINLINE PIPE MEASURED ALONG THE PIPE AXIS. THICKNESS SHALL BE EQUAL TO THAT SPECIFIED FOR PIPE SPECIALS.
2. IF A CROTCH PLATE IS REQUIRED, THE OUTLET LENGTH SHALL BE ADJUSTED TO CLEAR THE MAXIMUM LENGTH OF BOLT USED FOR FLANGE.
3. OUTLETS LESS THAN 3" IN DIA. MAY BE INSTALLED WITHOUT COLLARS PROVIDING THAT ROD REINFORCING IS NOT CUT AND OUTLETS ARE WELDED TO RODS.
4. REINFORCING FOR OUTLETS ON PIPE, OTHER THAN SCRW PIPE OR STEEL PIPE, SHALL BE AS SHOWN ON PLANS OR SUBMITTED FOR APPROVAL.
5. NOZZLE FABRICATION DETAILS ARE TYPICAL FOR ALL SIZES OF OUTLETS.
6. REPEAT NOTE 1 FOR SDW-103
7. FLANGES SHALL CONFORM TO AWWA C207 AND DRILLING SHALL MATCH THE ABOVE FLANGE DRILLING.
8. MINIMUM LINING THICKNESS FOR OUTLETS SHALL BE:

   1/4" FOR 8" ID AND LESS
   1/2" FOR 10" ID 16" ID
   3/4" FOR 18" ID AND GREATER

9. COATING THICKNESS FOR OUTLETS SHALL BE:

   3/4" FOR 16" ID AND LESS
   1 1/4" FOR 18" ID AND GREATER
   SPECIFIED COATING THICKNESS SHALL BE REDUCED BY 50% FOR THE DISTANCE OF ONE BOLT LENGTH BACK FROM THE FLANGE FACE.

10. REINFORCEMENT OF FITTINGS, COLLARS, WRAPPER AND CROTCH PLATE DESIGN SHALL CONFORM TO M-11, LATEST STEEL PIPE–GUIDE FOR DESIGN AND INSTALLATION EDITION.

REVISION	BY	APPROVED	DATE
ORIGINAL		H. HORN	5-6-80
		J. CASEY	6-3-83
		J. CASEY	8-23-86
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

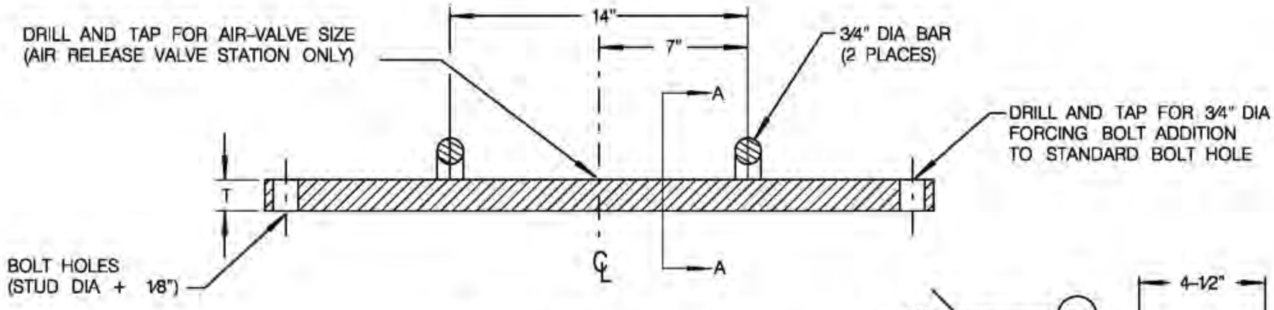
TYPICAL OUTLET FOR SCRW PIPE STEEL PIPE AND PIPE SPECIALS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

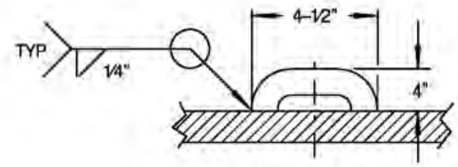
H. Hoole

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

DRAWING NUMBER **SDW-101**

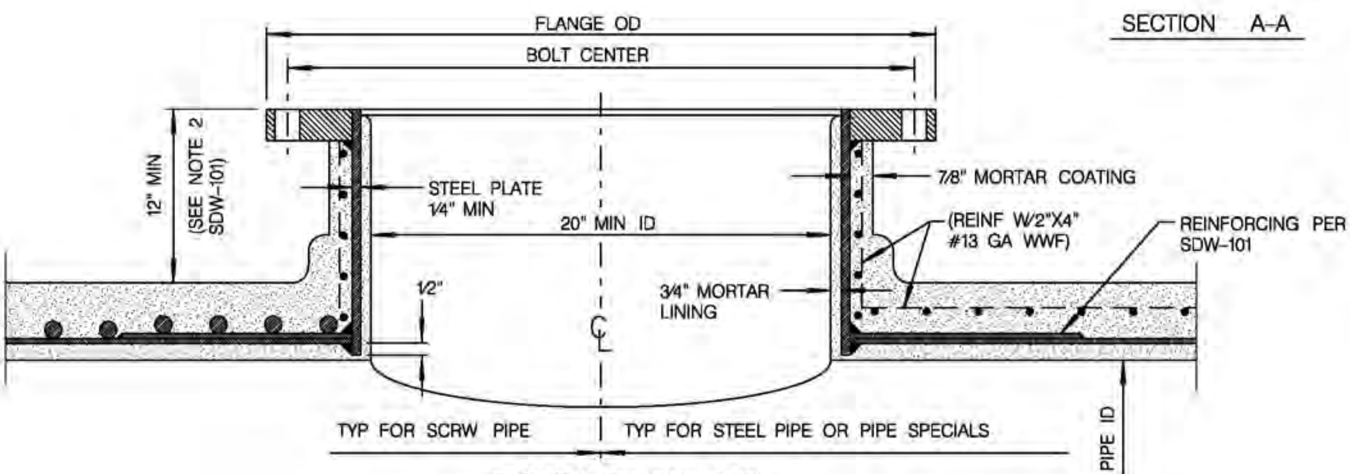


SECTION THROUGH COVER



HANDLE DETAIL
(TYPICAL 2 PLACES)

SECTION A-A



SECTION ON PIPE AXIS

TYPE	PRESSURE RANGE (PSI)	FLANGE ID	FLANGE OD	BOLT CENTER	NO. OF BOLTS	STUD DIA. ℄ LENGTH	THICKNESS (T)
175	0 - 175	22"	29-1/2"	27-1/4"	20	6"x 1-1/4"	1-3/16"
250	175 - 250	22"	33"	29-1/4"	24	7"x 1-1/2"	1-11/16"
325	250 - 325	22"	33"	29-1/4"	24	7"x 1-1/2"	1-7/8"

FURNISH: REQUIRED STUD BOLTS W/FULL LENGTH THREAD & TWO (2) HEX NUTS EACH 1/16" THICK FULL FACE GASKET AND 3/4 INCH DIA STAINLESS STEEL FORCING BOLT ON DC

NOTES:

1. APPLY TWO (2) COATS OF COAL-TAR EPOXY 16 MILS TOTAL (MIN) TO ALL EXPOSED METAL SURFACES. AMERCOAT 78 OR KOP-COAT 300 M OR EQUAL MEETING U.S. PUBLIC HEALTH STANDARDS ARE APPROVED FOR SUCH APPLICATION PER MANUFACTURE'S STANDARDS.
2. DETAILS OF MANHOLES ON PIPELINES LESS THAN 24" DIAMETER SHALL BE SHOWN ON DESIGN DRAWINGS OR SUBMITTED FOR APPROVAL.
3. MANHOLES SHALL BE BEVELED DURING FABRICATION, SO THAT THEY ARE TRUE TO VERTICAL UPON INSTALLATION.
4. ALL WELDS TO CONFORM TO ANSI/AWWA C206 - 91.

REVISION	BY	APPROVED	DATE
ORIGINAL		H. HORN	5-6-80
		J. CASEY	6-3-83
		J. CASEY	8-23-86
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

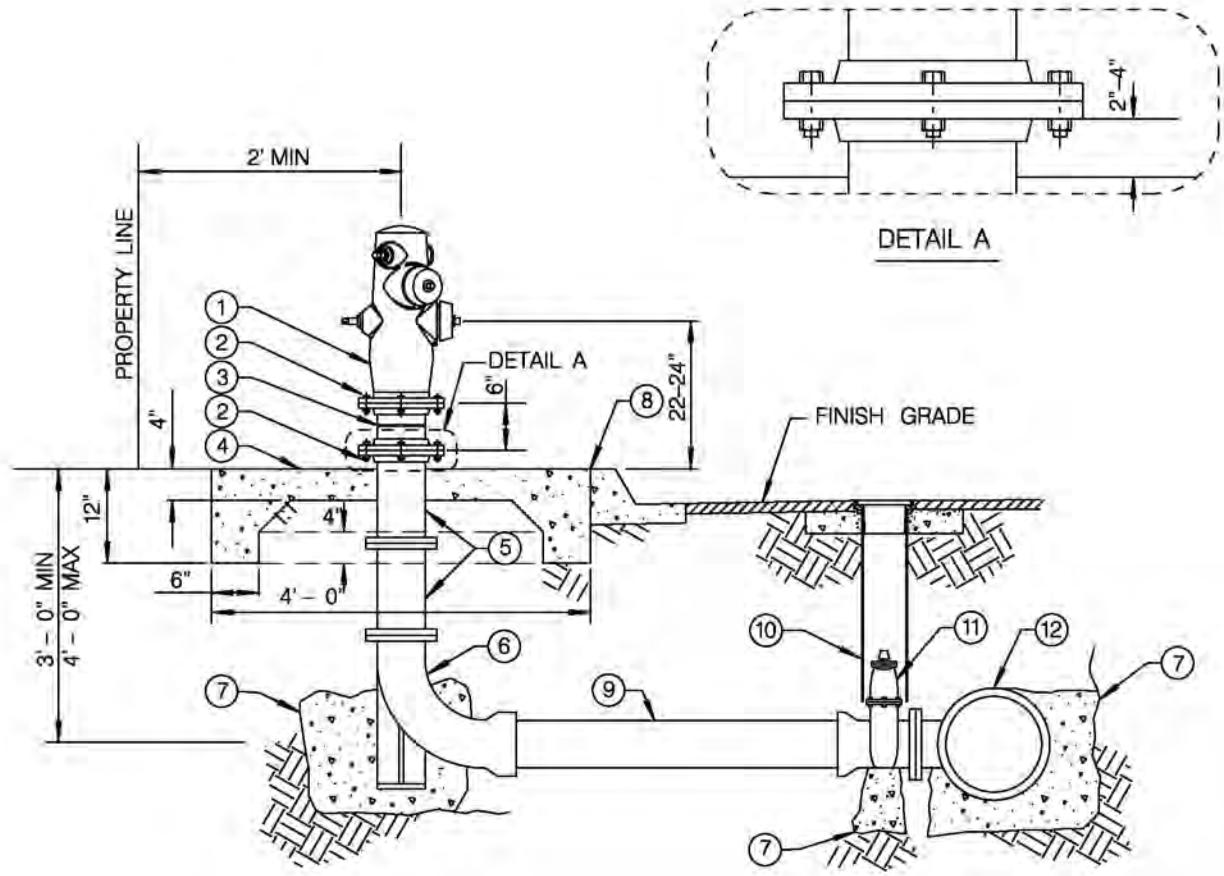
ACCESS MANHOLE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

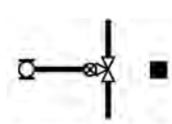
DRAWING NUMBER **SDW-103**



FIRE HYDRANT INSTALLATION

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	6" WET BARREL FIRE HYDRANT	5	6" CAST IRON EXTENSION NON–GROOVED SPOOL – AS REQUIRED (F, F)
2	.75" X 3.5" MIN HEX HEAD BREAKAWAY (SHEAR) BOLTS AND NUTS (ASTM A307) SHALL BE 3/4" NC THREAD. HEX HEAD ON TOP OF FLANGES (ALL)	6	6" LONG RADIUS DI BASE ELBOW (F, PO / MJ)
		7	CONCRETE THRUST BLOCK
3	6" CAST IRON BREAKAWAY SPOOL WITH 0.25"–V (SINGLE OR DOUBLE) BREAK OFF GROOVE	8	COLD JOINT STRIP
		9	PIPE – 6" C–900 PVC
4	4' X 4' X 4" THICK CONCRETE PAD WITH 6" X 12" DEEP THICKENED EDGE AROUND PERIMETER OF CONCRETE PAD	10	GATE WELL WITH CAP
		11	6" GATE VALVE (MJ / PO, F)
		12	TEE – SIZE X 6" (MJ, MJ, F)

NOTES:
1. NUMBER OF OUTLETS SHALL BE AS SHOWN ON THE PLANS.
2. CONNECT TO BASE OF THE HYDRANT WITH SHEAR BOLTS INSTALLED WITH HEX HEAD ON TOP OF THE FLANGE. (31/64" DIAMETER HOLE 2" DEEP IN BOLTS, GALVANIZED AFTER BORING)



LEGEND ON PLANS

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

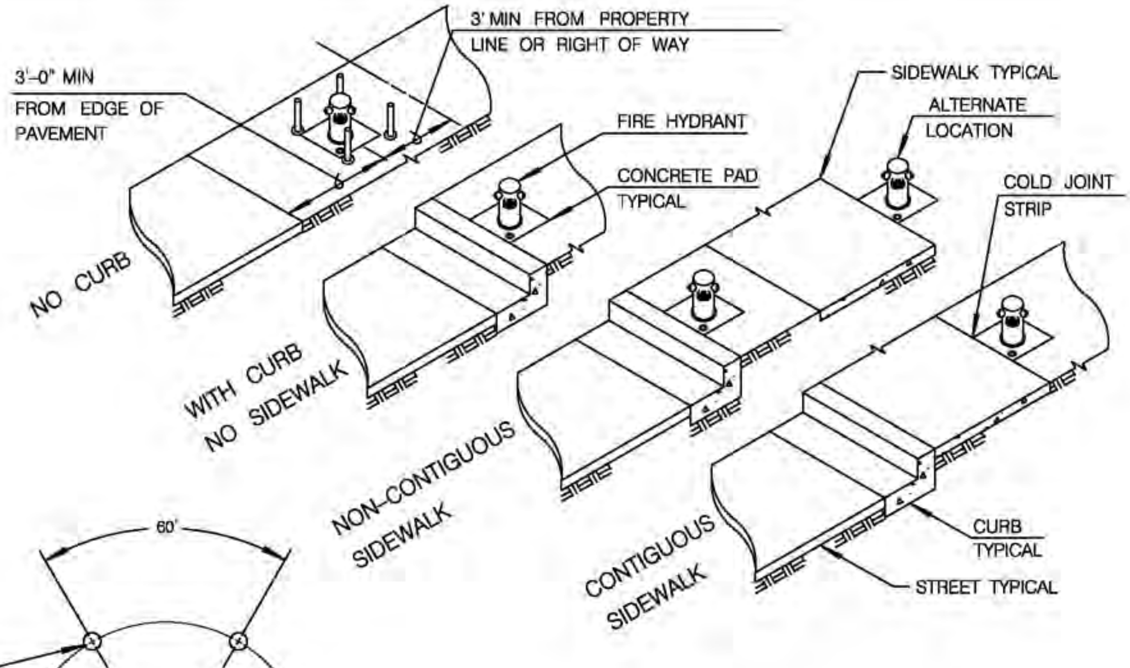
FIRE HYDRANT INSTALLATION

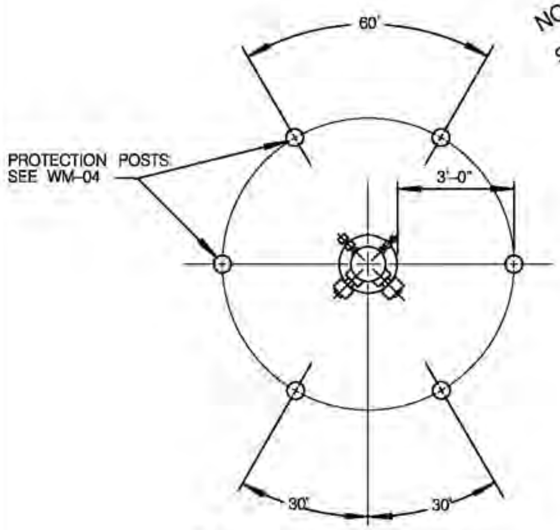
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

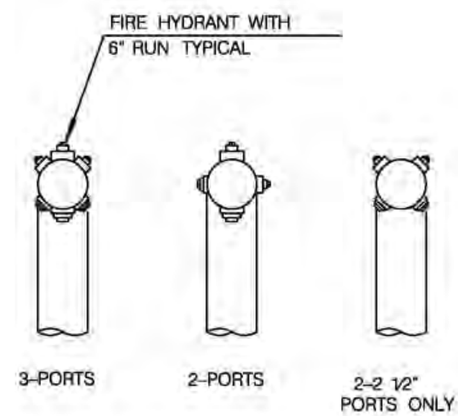
DRAWING NUMBER **SDW-104**





NOTE:

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



PROTECTION POSTS

PORT ORIENTATION

FIRE HYDRANT LOCATIONS AND PORT ORIENTATION

NOTES:

1) LOCATE FIRE HYDRANT AS SHOWN ABOVE OR AS DIRECTED BY THE ENGINEER.

2) FIRE HYDRANTS SHALL BE INSTALLED WITH THE LARGEST PORT PERPENDICULAR TO THE STREET.

3) IF THE CONCRETE SLAB IS TO BE INSTALLED ADJACENT TO A CONCRETE CURB OR SIDEWALK, A COLD JOINT STRIP SHALL BE INSTALLED.

4) CONCRETE APRON SHALL BE REQUIRED WHERE THE FIRE HYDRANT IS INSTALLED IN AN UNPAVED LOCATION. THE APRON SHALL BE 4" THICK 520-C-2500 CONCRETE.

5) WHEN DISTANCE FROM THE FIRE HYDRANT TO THE TOP OR TOE OF THE SLOPE OR WALLS IS LESS THAN 2', SPECIAL HYDRANT INSTALLATION DETAIL SHALL BE SHOWN ON THE PLANS.

6) THE DISTANCE FROM THE FACE OF THE CURB TO THE CENTERLINE OF THE FIRE HYDRANT SHALL BE 2 1/2' MINIMUM.

SHEET 2 OF 3

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

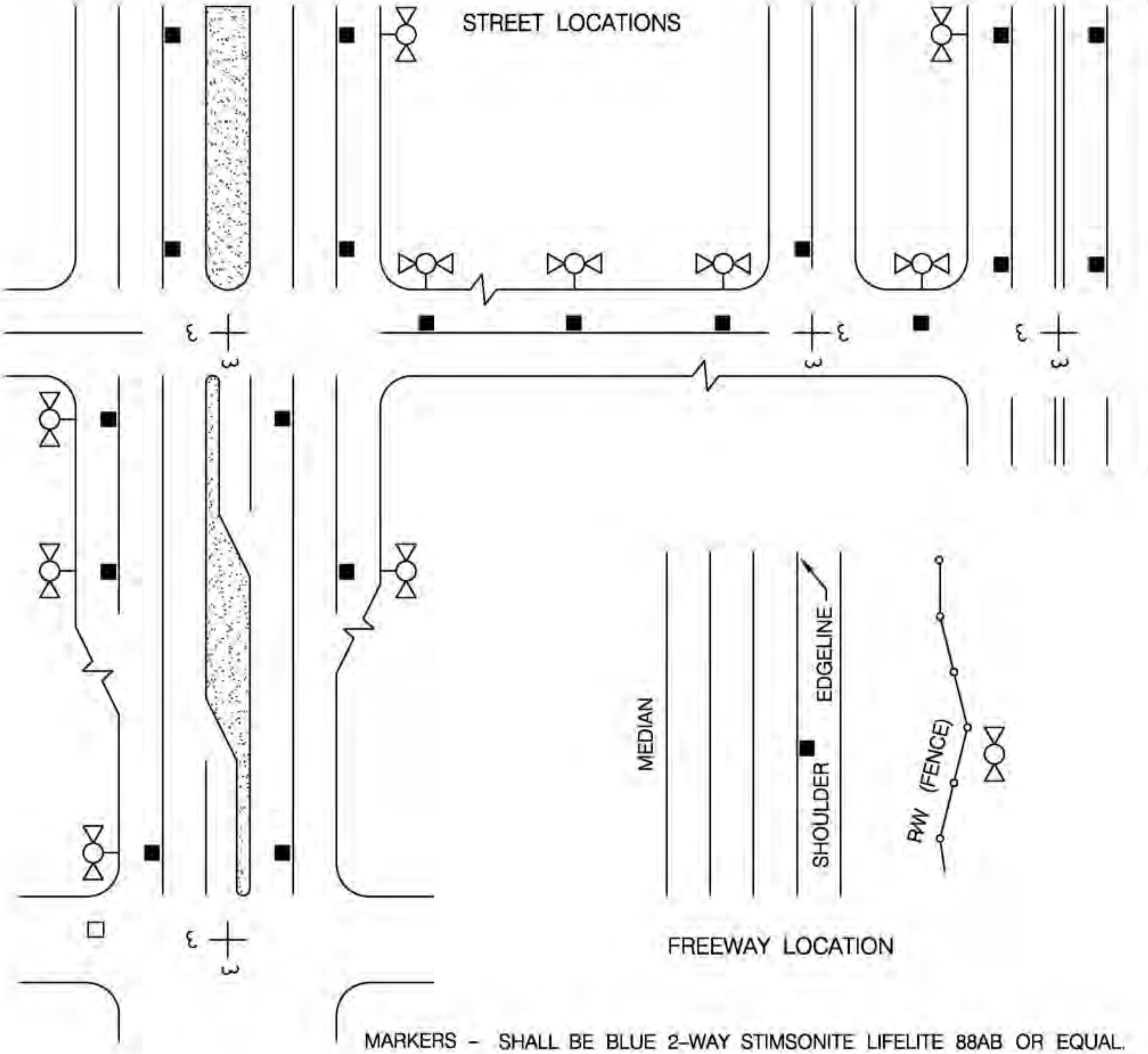
FIRE HYDRANT INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

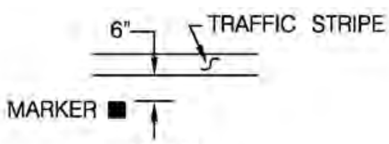
DRAWING NUMBER **SDW-104**



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.



DETAIL

FIRE HYDRANT MARKERS

NOTES

1. FIRE DEPARTMENT WILL PROVIDE LOCATION(S) FOR ALL MARKERS IN PRD'S COMMERCIAL LOTS AND OTHER AREAS OUTSIDE OF PUBLIC RIGHT OF WAY.

2. MARKERS SHALL BE INSTALLED AT THE NEW AND RELOCATED HYDRANTS AND WITHIN ALL RESURFACING PROJECTS.

3. FOR STREETS WITHOUT LANE LINES OR STREETS WITH RAISED PAVEMENT MARKERS AND NO PAINTED LANE LINES, INSTALL MARKERS 6" FROM CENTERLINE OR EXISTING MARKERS.

SHEET 3 OF 3

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

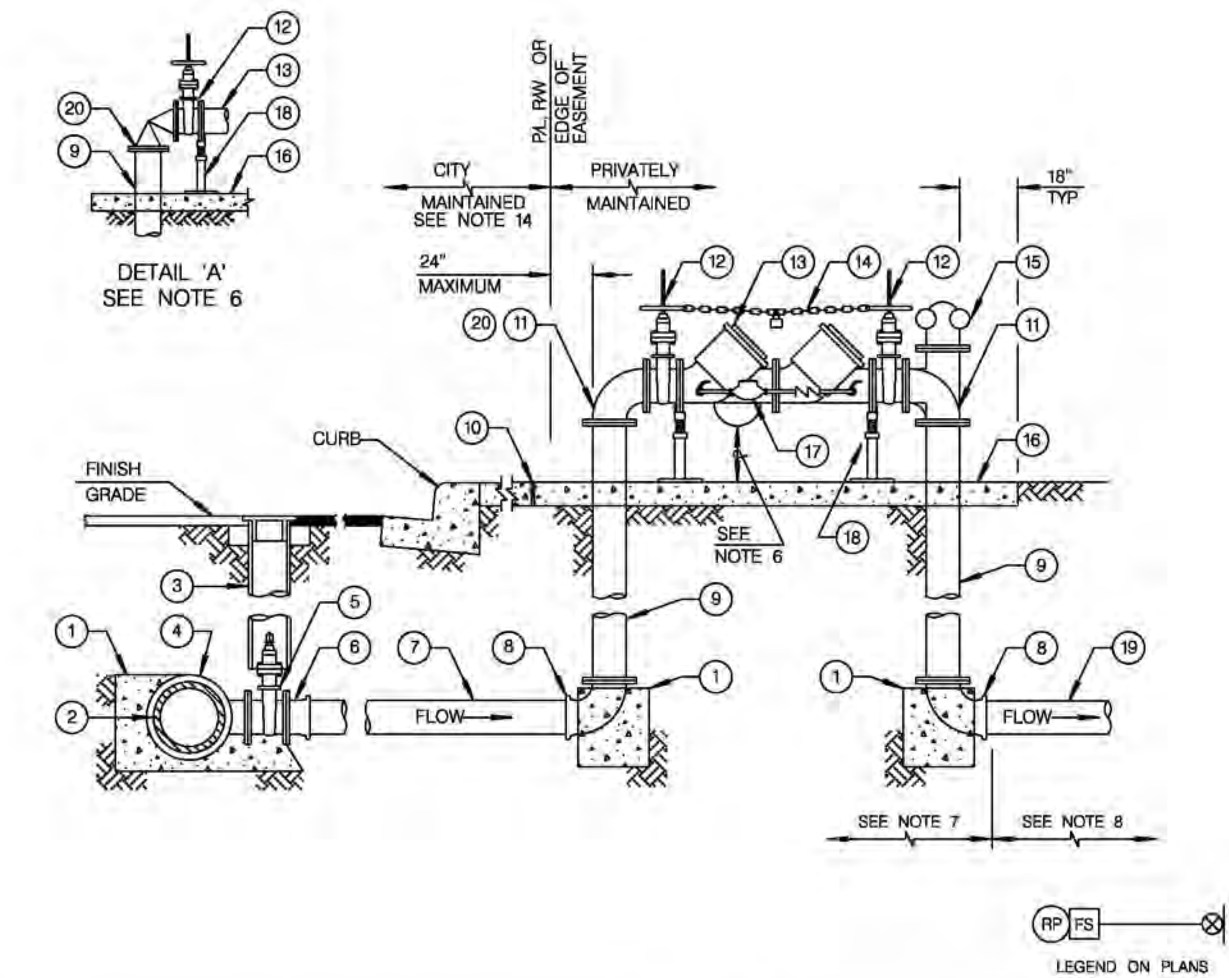
FIRE HYDRANT INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-104**



ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	CONCRETE THRUST BLOCK SEE SDW-151	13	RPDA SEE NOTE 3
2	WATER MAIN	14	CHAIN WITH KNOX LOCK SEE NOTE 3
3	GATE WELL WITH CAP SEE SDW-153 OR SDW-154	15	FLANGED TEE WITH "FDC" SEE NOTE 3
4	SIZE x SIZE MJPO/FLG x FLG TEE	16	CONCRETE SLAB MINIMUM 4" THICK x 36" WIDE x AS REQUIRED
5	FLG x MJPO/FLG RWGV	17	3/4" BYPASS, METER & RP DEVICE
6	FLG x MJPO ADAPTER (IF REQUIRED)	18	ADJUSTABLE VALVE SUPPORT
7	C-900 PVC PIPE	19	PVC OR DI PIPE SEE NOTE 8
8	MJPO x FLG 90° BEND	20	FLANGED ANGLE PRESSURE REDUCING VALVE SEE NOTE 6
9	FLANGED DUCTILE IRON PIPE		
10	COLD JOINT STRIP		
11	FLANGED 90° BEND, SEE NOTE 6		
12	FLANGED OS&Y RWGV WITH HAND WHEEL		

SHEET 1 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

4" AND LARGER FIRE SERVICE INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

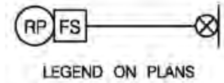
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-105**

NOTES:

1) INSTALL WARNING / IDENTIFICATION TAPE
2) LOCATION OF FIRE SERVICES SHALL BE AS DIRECTED BY THE FIRE DEPARTMENT FIRE SERVICES SHOULD BE LOCATED 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 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 AN ANGLE PRESSURE REDUCING VALVE IN LIEU 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 APPURTENENCES 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 CALLED FOR IN THE SPECIFICATIONS PRIOR TO ACCEPTANCE
11) CONNECTIONS TO STEEL MAINS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS
12) CITY RESPOSIBILITY ENDS AT EDGE OF PROPERTY LINE, RIGHT OF WAY, OR EASEMENT.



LEGEND ON PLANS

SHEET 2 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

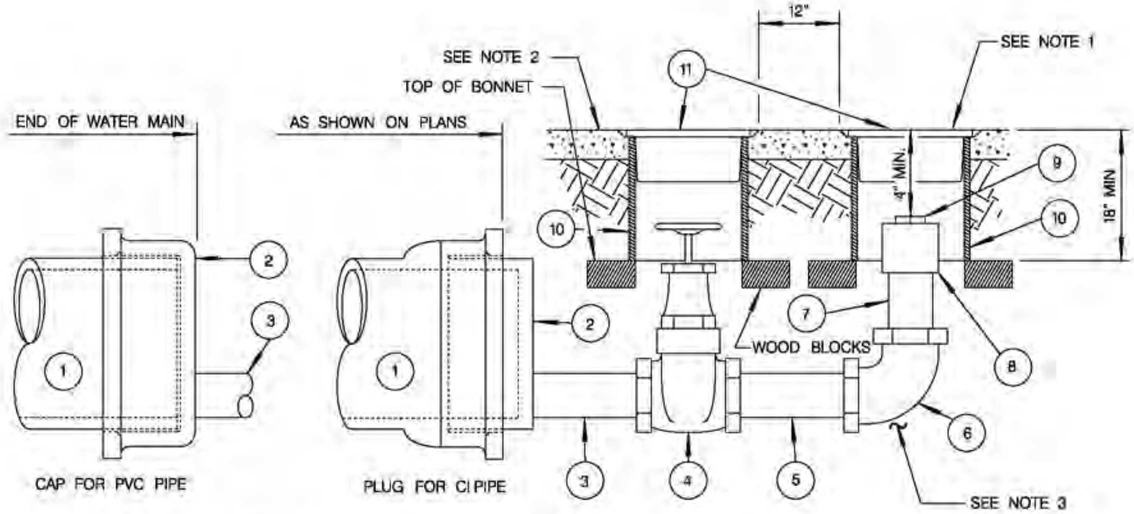
CITY OF SAN DIEGO – STANDARD DRAWING

4" AND LARGER FIRE SERVICE INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

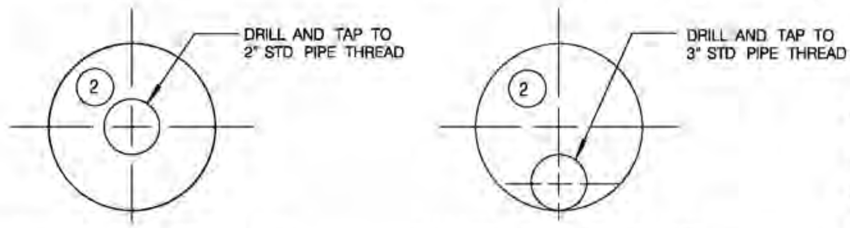
COORDINATOR	R.C.E. 65271	DATE
		1/31/2012

DRAWING NUMBER **SDW-105**



CAP FOR PVC PIPE

PLUG FOR CI PIPE



CONCENTRIC PLUG DRILLED FOR
2" BLOW-OFF FOR 3"-8" MAINS

ECCENTRIC PLUG DRILLED FOR
3" BLOW-OFF FOR 10"-20" MAINS

NOTES:

1. SET TO FINISH GRADE
2. PROVIDE CONCRETE PADS.
3. PROVIDE THRUST BLOCKS.
4. REFER TO OTHER CITY STANDARD DRAWINGS FOR MORE MORE DETAILS.

SCHEDULE

ITEM		SIZE AND DESCRIPTION	
1	WATER MAIN	3" - 8" INCL.	10" - 20" INCL.
2	CAST IRON PLUG OR CAP	MAIN SIZE X 2"	MAIN SIZE X 3"
3	Brass Nipple	2" X 8"	3" X 8"
4	BRONZE GATE VALVE WITH BRONZE WHEEL-SCREW ENDS	2"	3"
5	Brass Nipple	AS NEEDED	AS NEEDED
6	BRASS 90° EL	2"	3"
7	BRASS RISER	2" X VARIABLE TO GRADE MINUS 4"	3" X VARIABLE TO GRADE MINUS 4"
8	BRASS COUPLING THREAD	2"	3"
9	BRASS PLUG	2"	3"
10	STEEL CASING FOR GATE VALVE AND RISER	8" X VARIABLE TO GRADE MINUS 3/4"	8" X VARIABLE TO GRADE MINUS 3/4"
11	CAST IRON VALVE WELL COVER FOR GATE VALVE AND RISER	8"	8"

REVISION	BY	APPROVED	DATE
ORIGINAL		J. MUELLER	3-3-83
		J. CASEY	6-3-83
		J. CASEY	8-26-86
NOTES	AO	F. BELOCK	04-96
NOTES	SM	A. OSKOUI	12-03
NOTES	JS	A. OSKOUI	12-06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

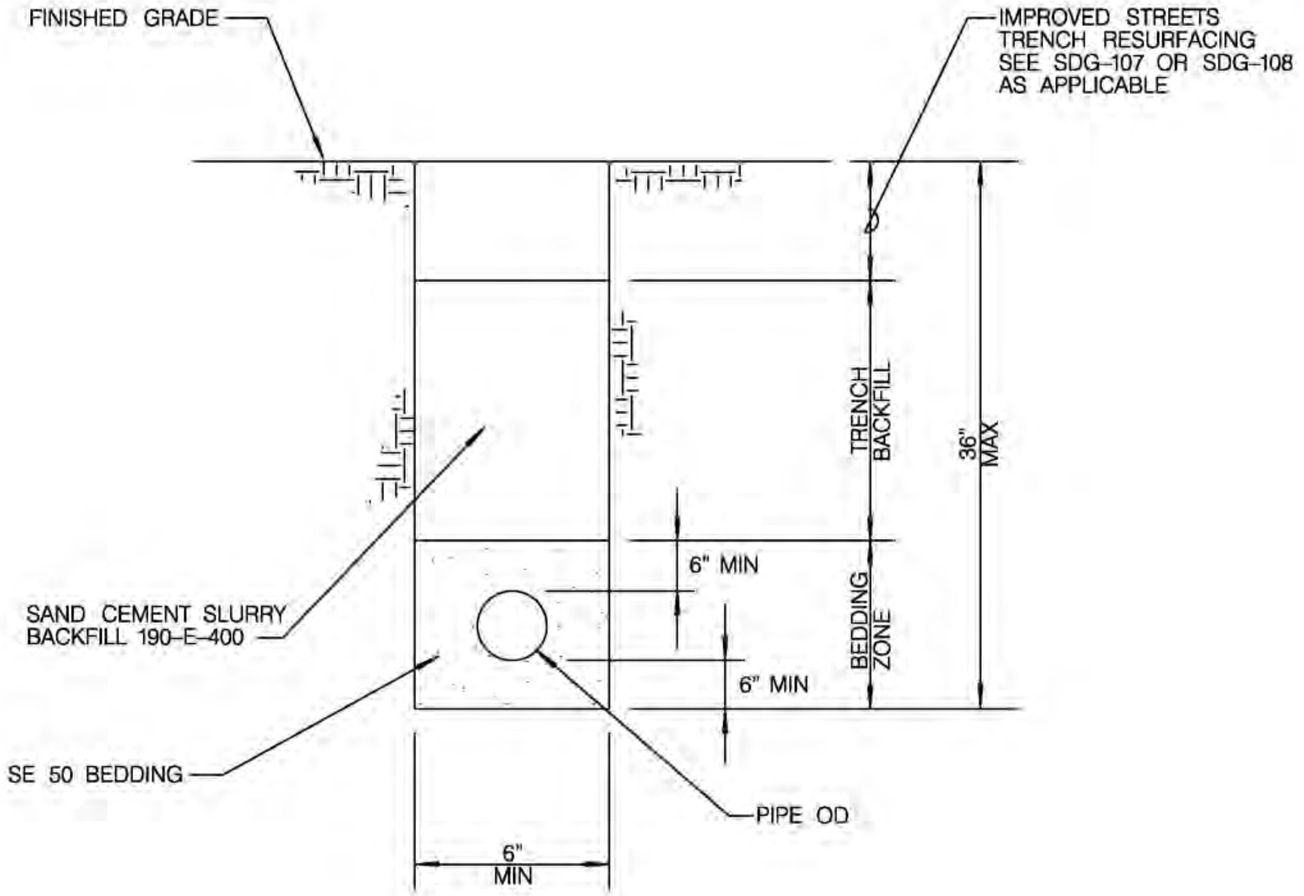
BLOW-OFF ASSEMBLIES AT THE END OF PVC AND CAST IRON MAINS

RECOMMENDED BY THE CITY OF SAN DIEGO REGIONAL STANDARDS COMMITTEE

H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-106**



TRENCH SECTION

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. TAMPERS 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.

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

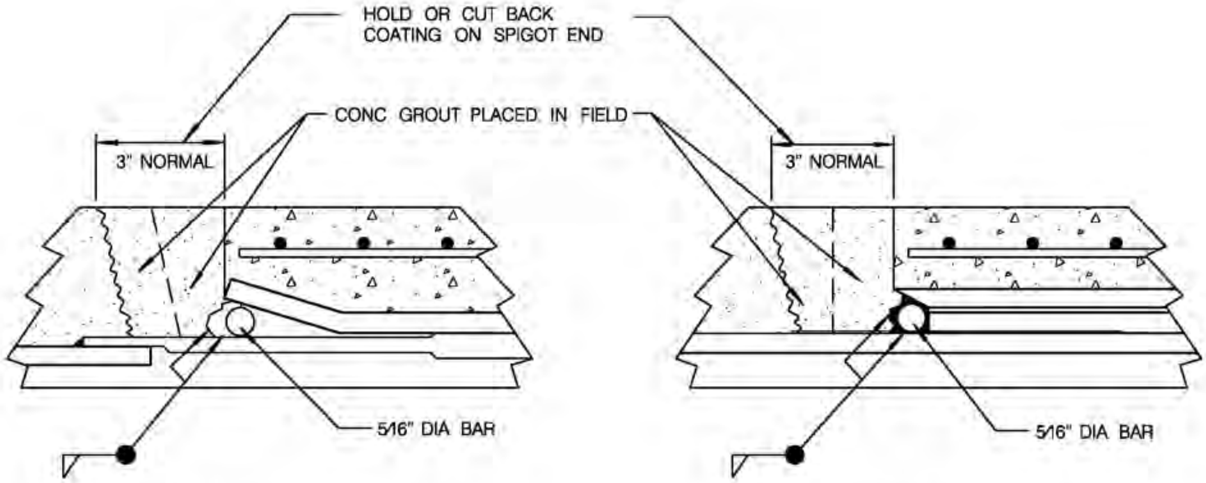
NARROW TRENCH FOR 1" & 2" WATER SERVICES

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-107**

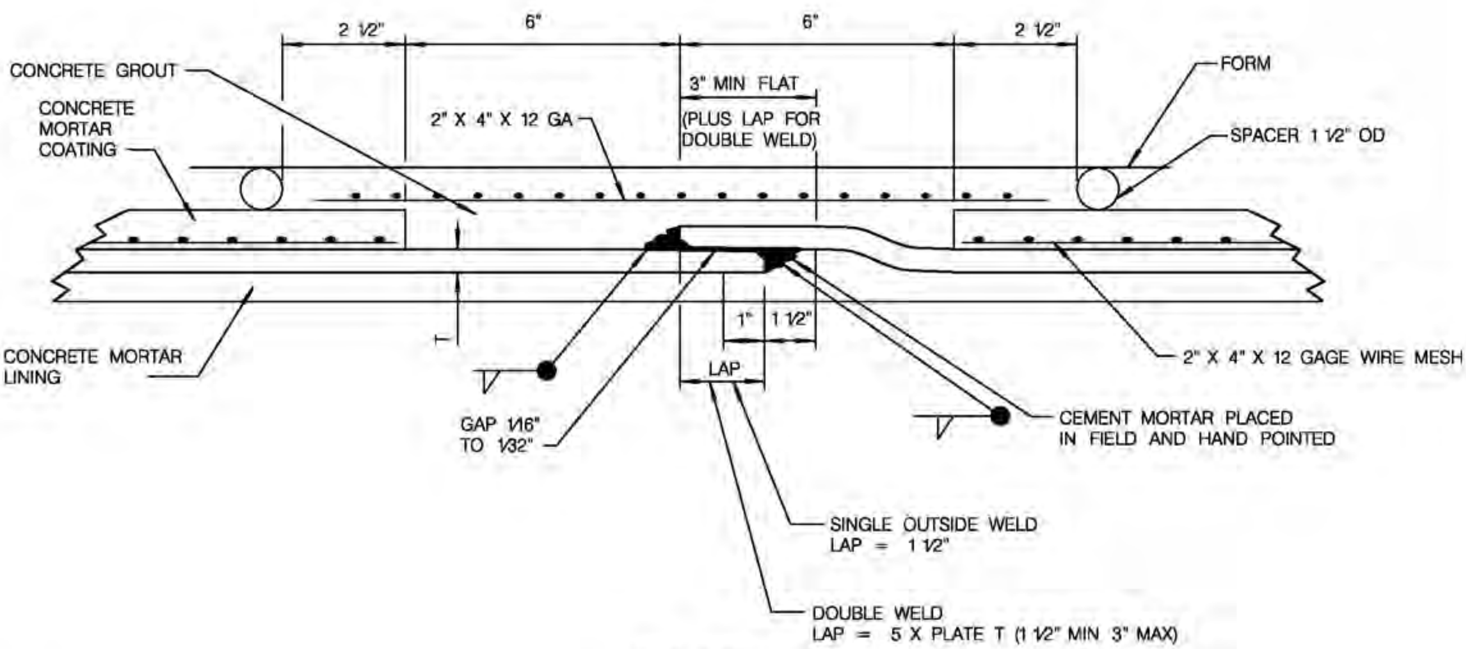


WELDED BELL AND SPIGOT RING

FORMED BELL AND WELDED SPIGOT RING

NOTE:

SEE OTHER STANDARD DRAWINGS FOR FULL DETAILS OF ABOVE JOINTS



SLIP JOINT

NOTE:

ALL WELDS TO CONFORM TO ASNI/AWWA C206 - 91

REVISION	BY	APPROVED	DATE
ORIGINAL		H. HORN	5-6-80
		J. CASEY	6-3-83
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

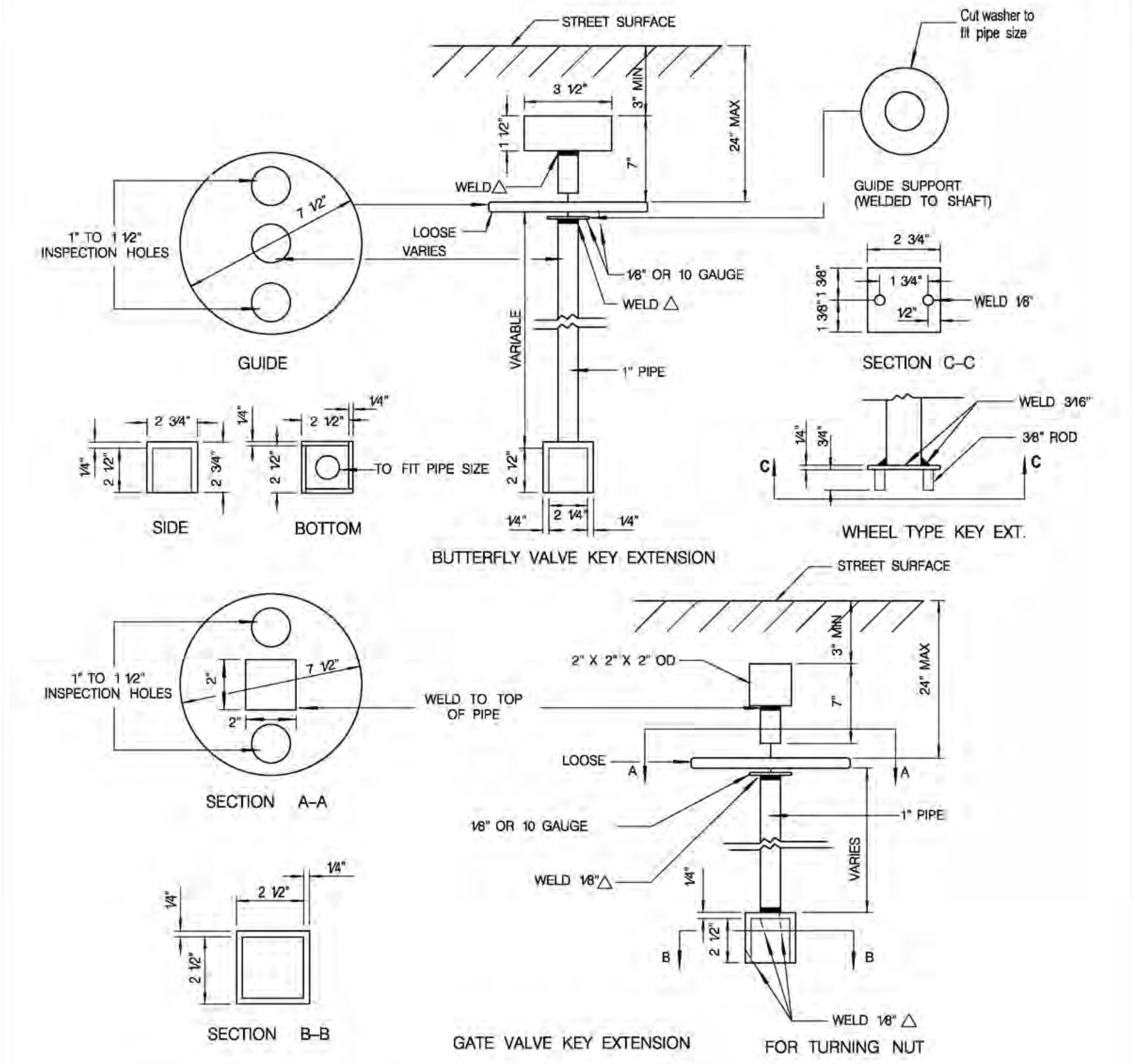
FIELD WELDED JOINTS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

[signature] 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-108**



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.
3. FOR VALVE BOX AND COVER, SEE OTHER DRAWINGS.
4. ALL WELDS TO CONFORM TO ANSI/AWWA C206 – 91.

REVISION	BY	APPROVED	DATE
		J.P. CASEY	6-3-83
		J.P. CASEY	8-22-86
NOTES	AO	A. OSKOUI	12/03
NOTES	JS	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

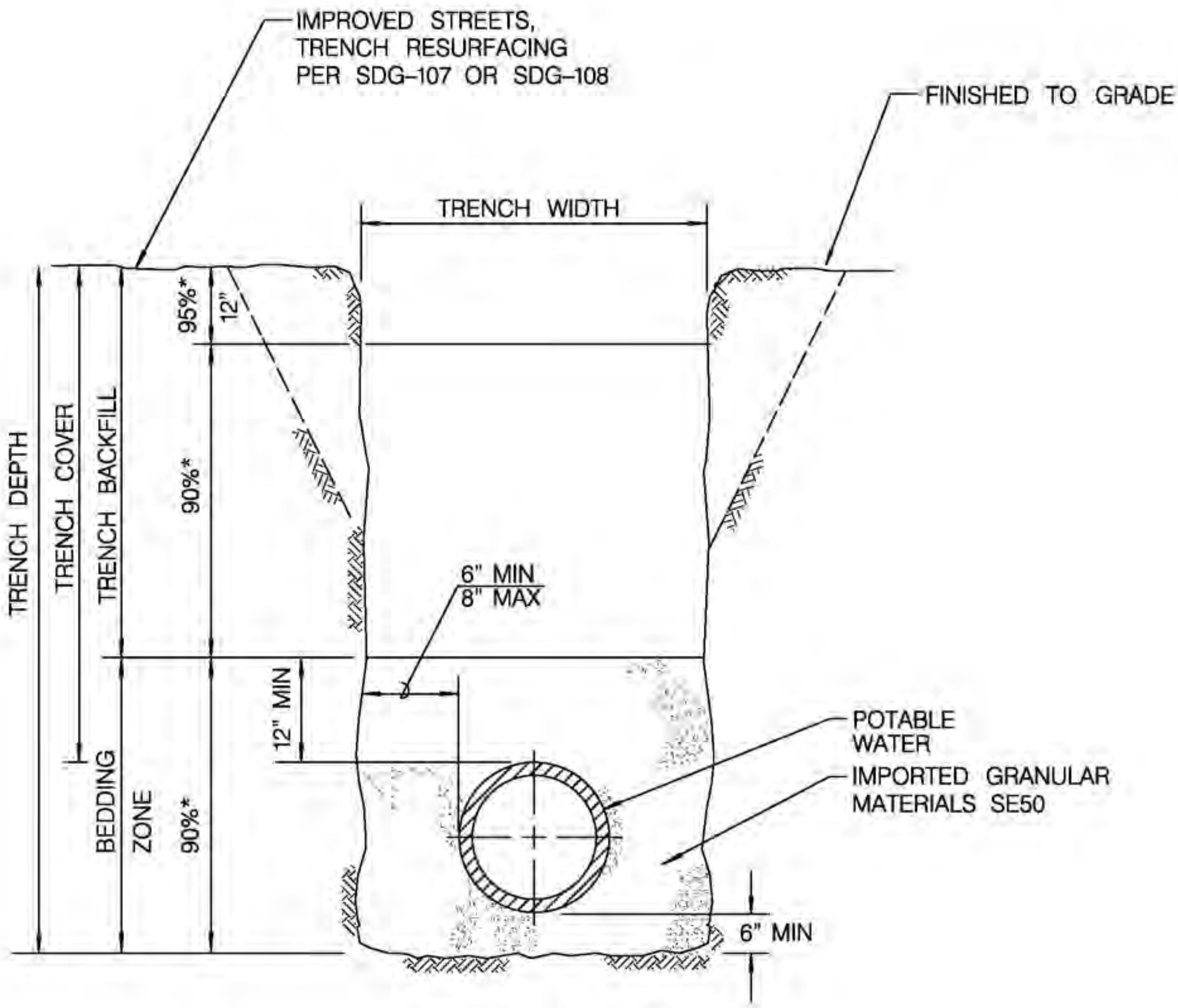
VALVE KEY EXTENSIONS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-109**



TRENCH SECTION

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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

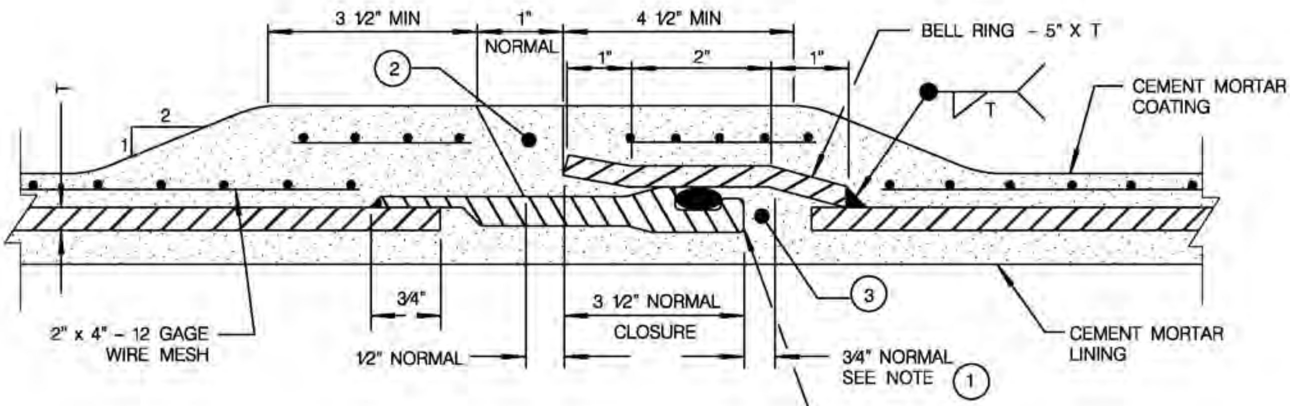
CITY OF SAN DIEGO – STANDARD DRAWING

PIPE BEDDING AND TRENCH BACKFILL FOR POTABLE WATER MAINS

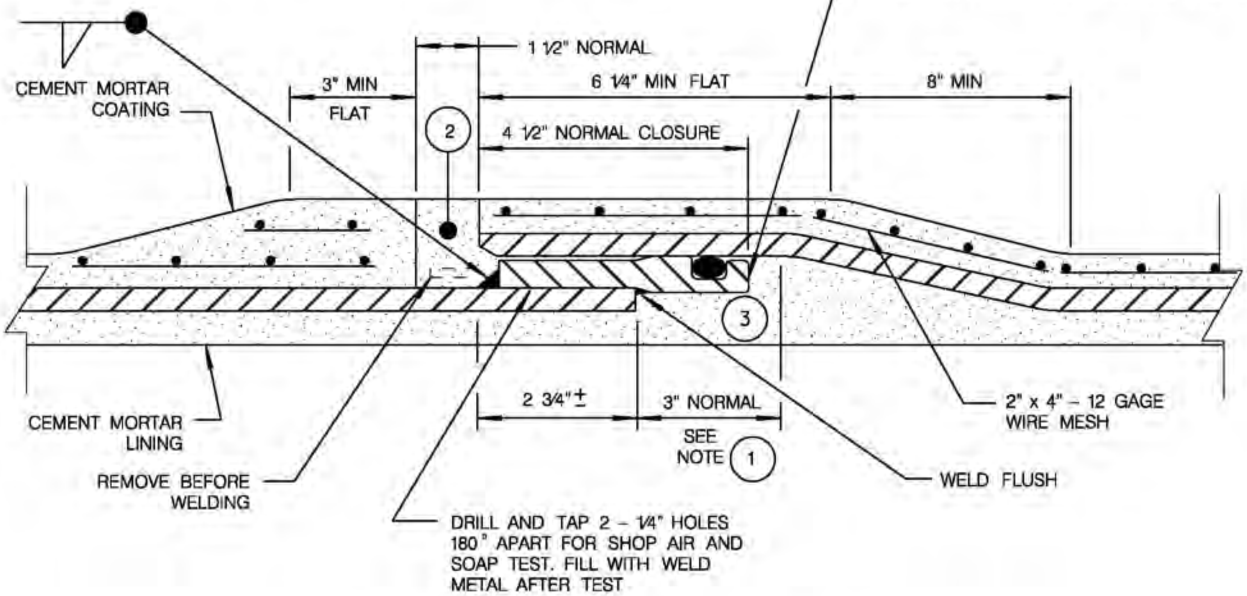
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDW-110**



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.

REVISION	BY	APPROVED	DATE
ORIGINAL		H. HORN	5-6-80
		J. CASEY	5-3-83
NOTES	SM	A. OSKOUI	12/06
NOTES	JS	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

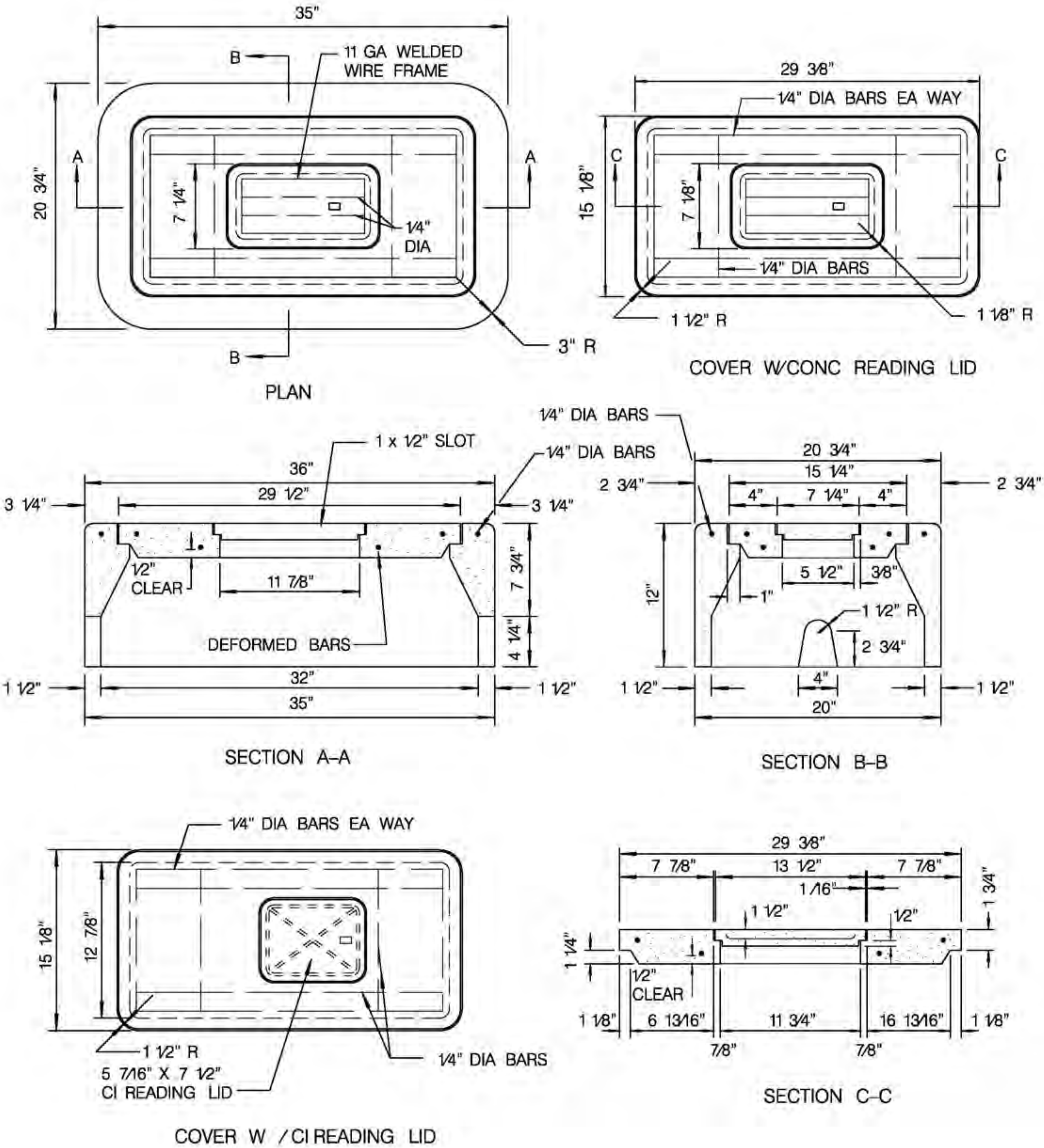
SPIGOT RING & GASKET JOINT FOR WELDED STEEL PIPE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-111**



NOTE:

UNLESS OTHERWISE INDICATED ON THE PLANS OR SPECIFIED IN SPECIAL PROVISIONS, COVERS WITH CONCRETE READING LID SHALL BE USED.

REVISION	BY	APPROVED	DATE
ORIGINAL	XX	H. HOM	5-6-80
		J. CASEY	6-3-83
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

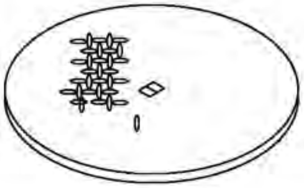
CONCRETE WATER METER BOX FOR 1 1/2" OR 2" WATER METER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

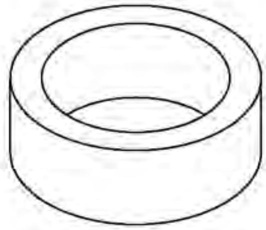
H. Hoale 1/31/2012

COORDINATOR R.C.E. 65271 DATE

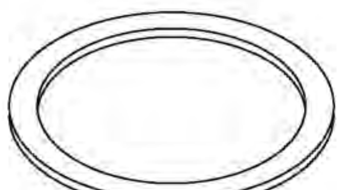
DRAWING NUMBER **SDW-113**



WELD TOP OF CAP TO PIPE

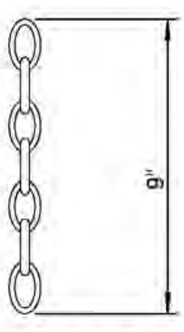


WELD PLATE RING TO UNDERSIDE OF COVER

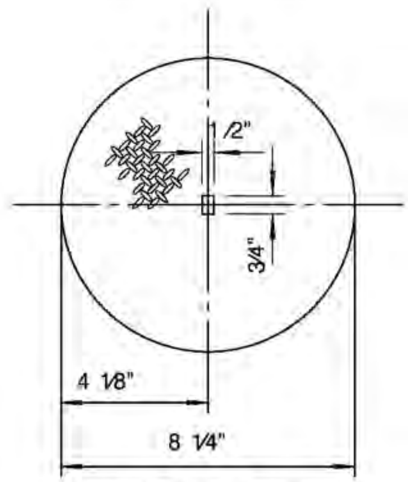


WELD CHAIN TO INSIDE OF CAP'S PIPE AND
TO UNDERSIDE OF COVER

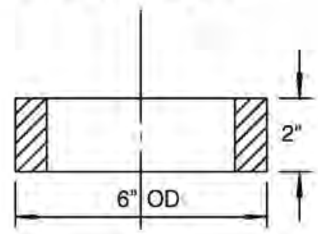
HOT DIPPED GALVANIZED
STEEL CHAIN



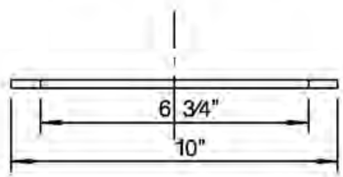
1/4" X 9" CHAIN



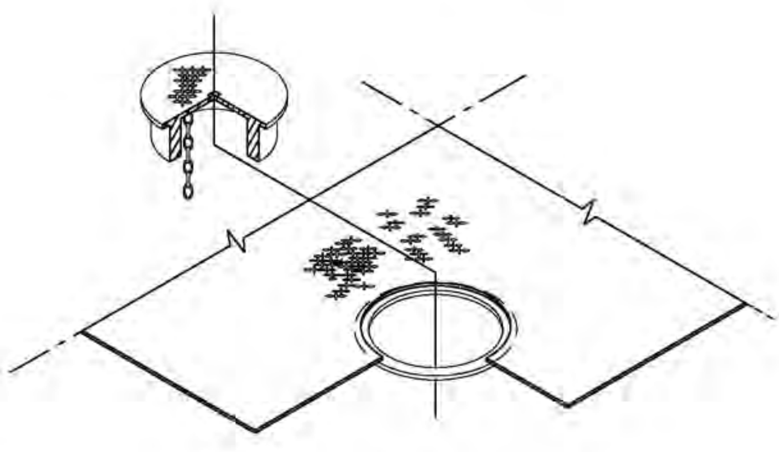
1/4" FLOOR PLATE



3/16" STEEL PIPE



1/8" STEEL PLATE RING



COVER (TYP)

NOTES:

1. 8 1/4" FLOOR PLATE SHALL BE CUT OUT OF THE COVER AND THE OPENING SHALL BE FINISHED FOR TIGHT FIT.

2. READ HOLE IN COVER SHALL BE CENTERED OVER EACH METER REGISTER.

REVISION	BY	APPROVED	DATE
ORIGINAL	XX	T. MUELLER	2-4-86
		J. CASEY	8-22-86
UPDATED	KA	J. NAGELVOORT	01/12

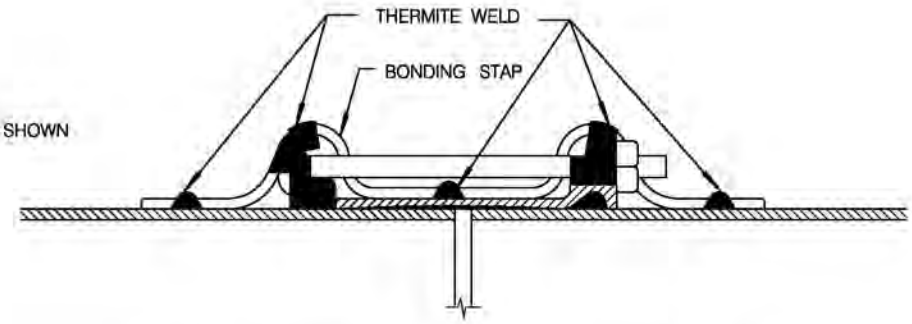
CITY OF SAN DIEGO – STANDARD DRAWING

READ HOLE
CAP & CHAIN DETAIL
(FOR METAL METER VAULT COVERS)

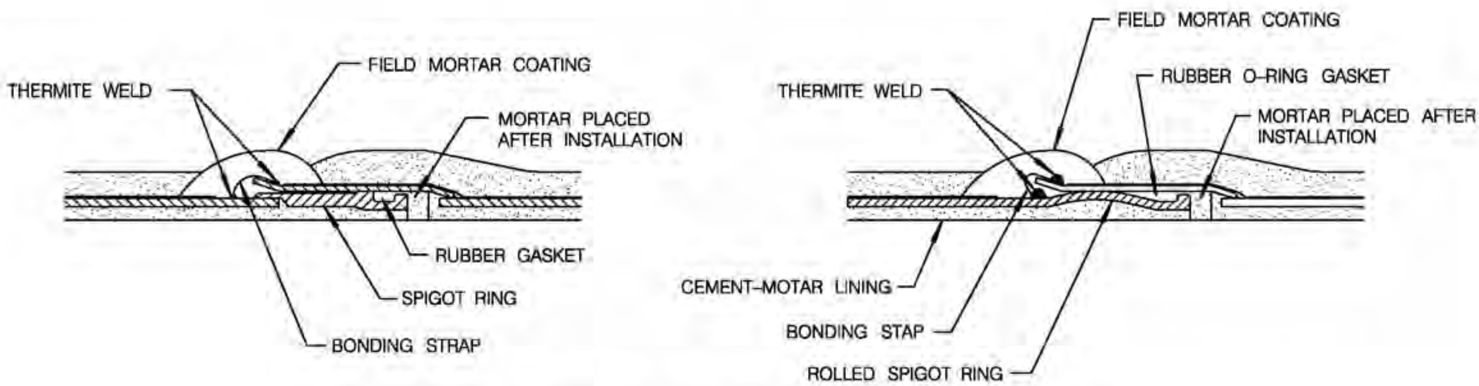
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

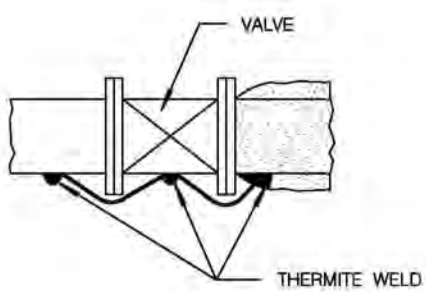
DRAWING NUMBER **SDW-115**



BONDING STRAP INSTALLED ON SLEEVE-TYPE COUPLING



BONDING STRAP FOR BELL AND SPIGOT RUBBER-GASKETED JOINT



BONDING STRAP INSTALLED ON VALVE

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.

REVISION	BY	APPROVED	DATE
ORIGINAL		T. MUELLER	2-12-86
		J. CASEY	8-22-86
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

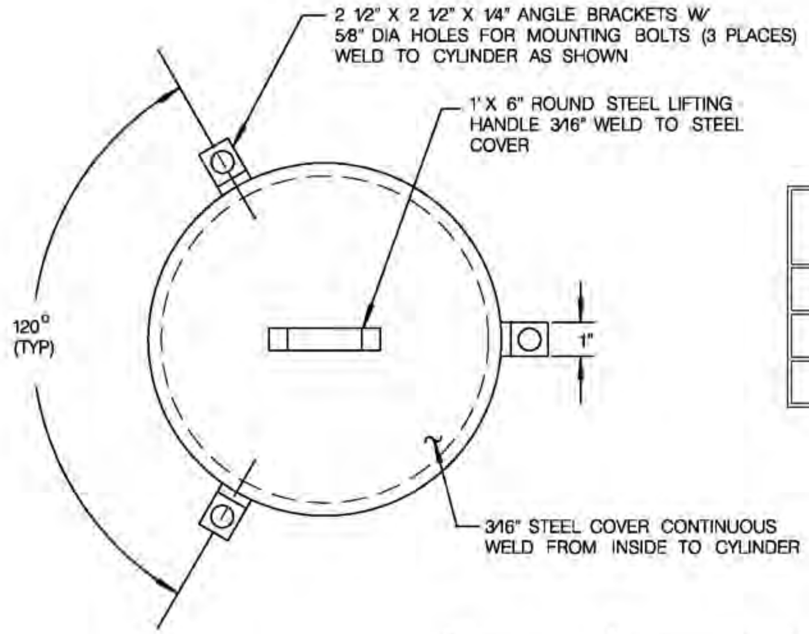
BONDING STRAP FOR STEEL AND SCRW PIPE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

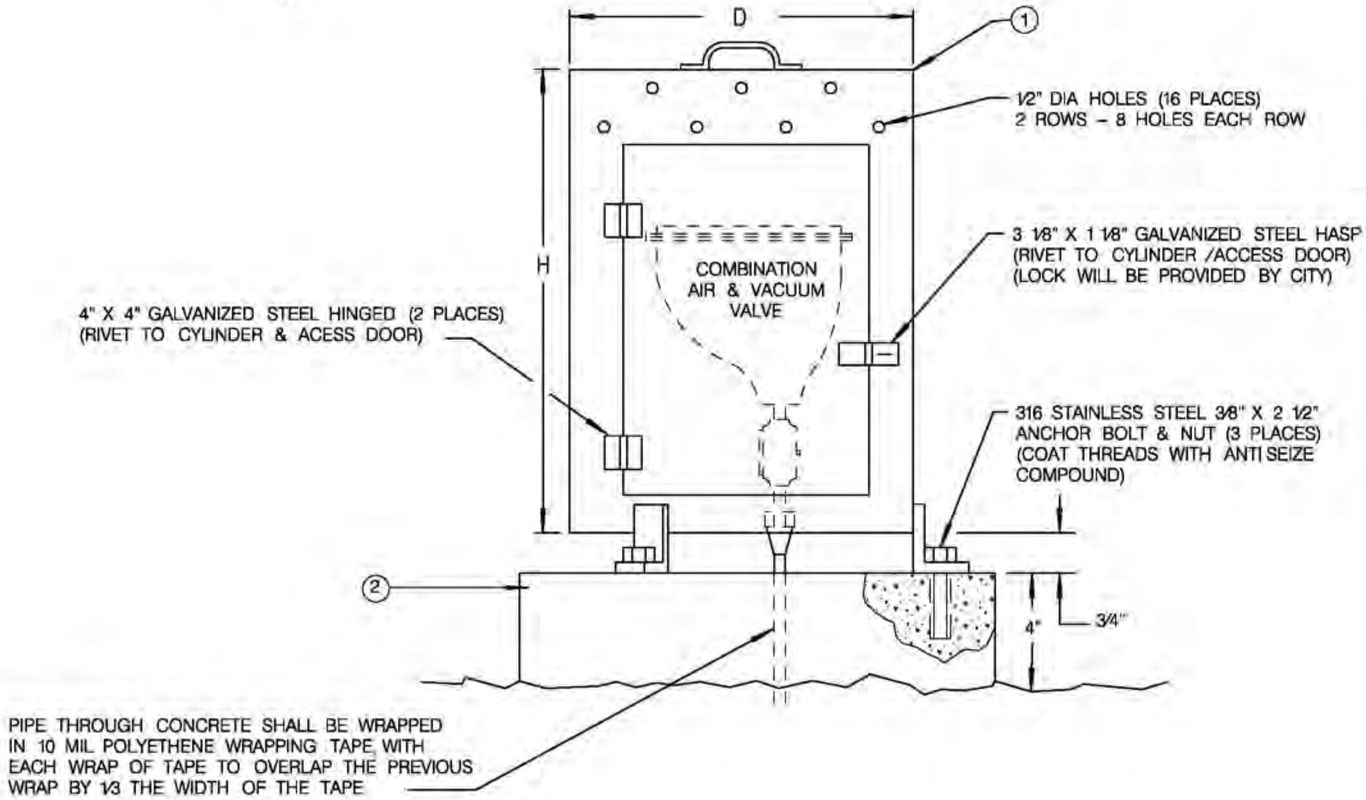
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-116**



③

VALVE SIZE	D	H
1" & 2"	16"	24"
4"	24"	30"
6"	30"	36"



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-C-2500.

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

REVISION	BY	APPROVED	DATE
ORIGINAL		M. ROLLINGER	5-20-92
NOTES	JS	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

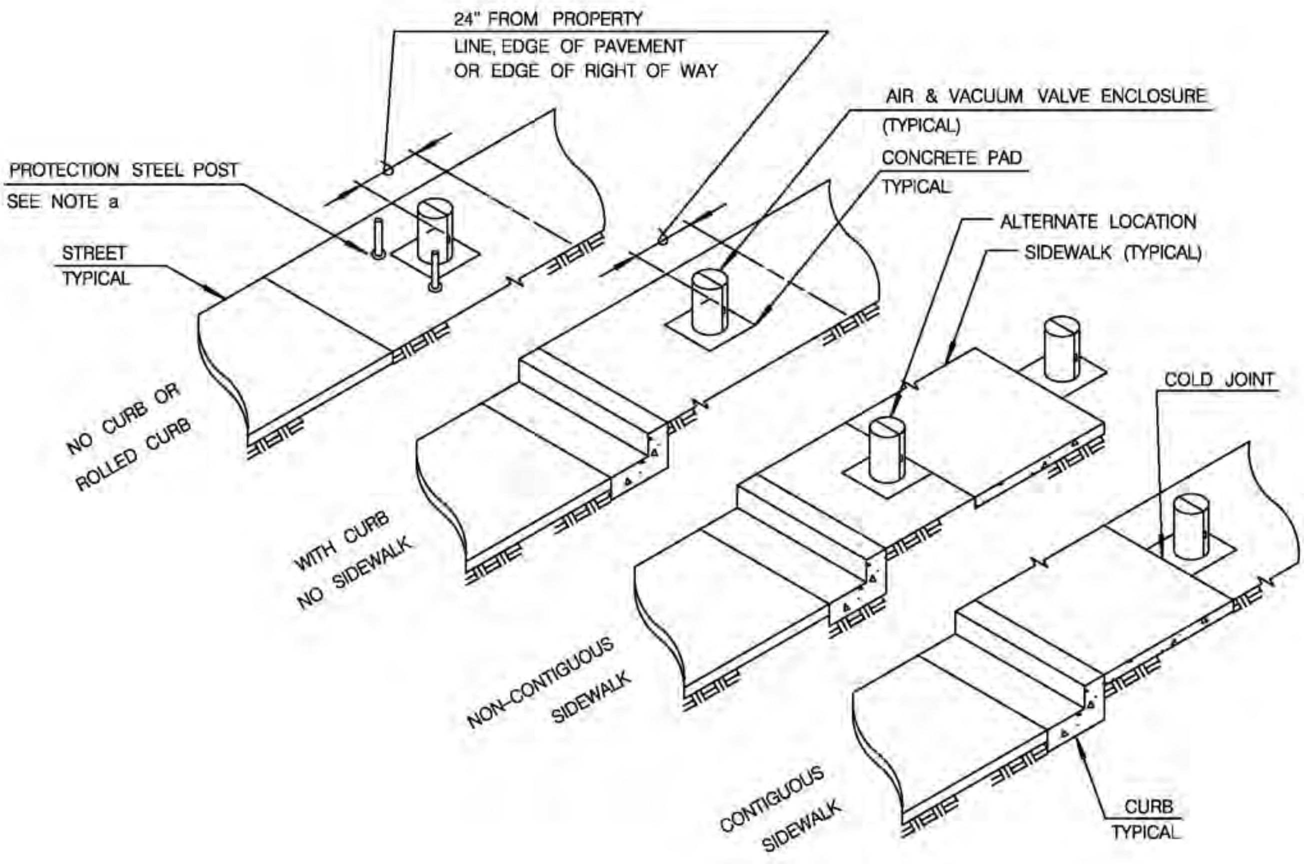
AIR AND VACUUM VALVE ENCLOSURE & LOCATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-117**



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 INDENTIFIED AS DESCRIBED IN THE SPECIFICATIONS.

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

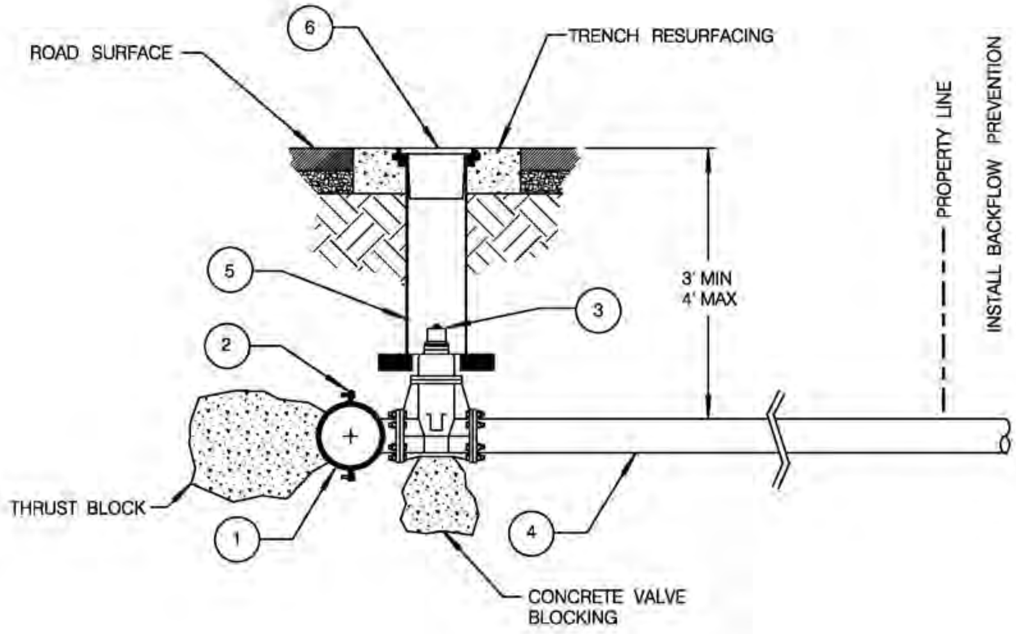
AIR AND VACUUM VALVE ENCLOSURE & LOCATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-117**



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.
6. VALVE WELL COVER.

NOTES:

1. FOR SMALLER FIRE SERVICE REQUIREMENTS, USE REDUCER AT PROPERTY LINE.
2. FOR CORROSION CONTROL REQUIREMENTS, SEE PUBLIC UTILITIES DEPARTMENT DESIGN GUIDE.

REVISION	BY	APPROVED	DATE
ORIGINAL	BB	OSKOUI	10/09
NOTES	AO	F. BELOCK	4/96
NOTES	JS	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

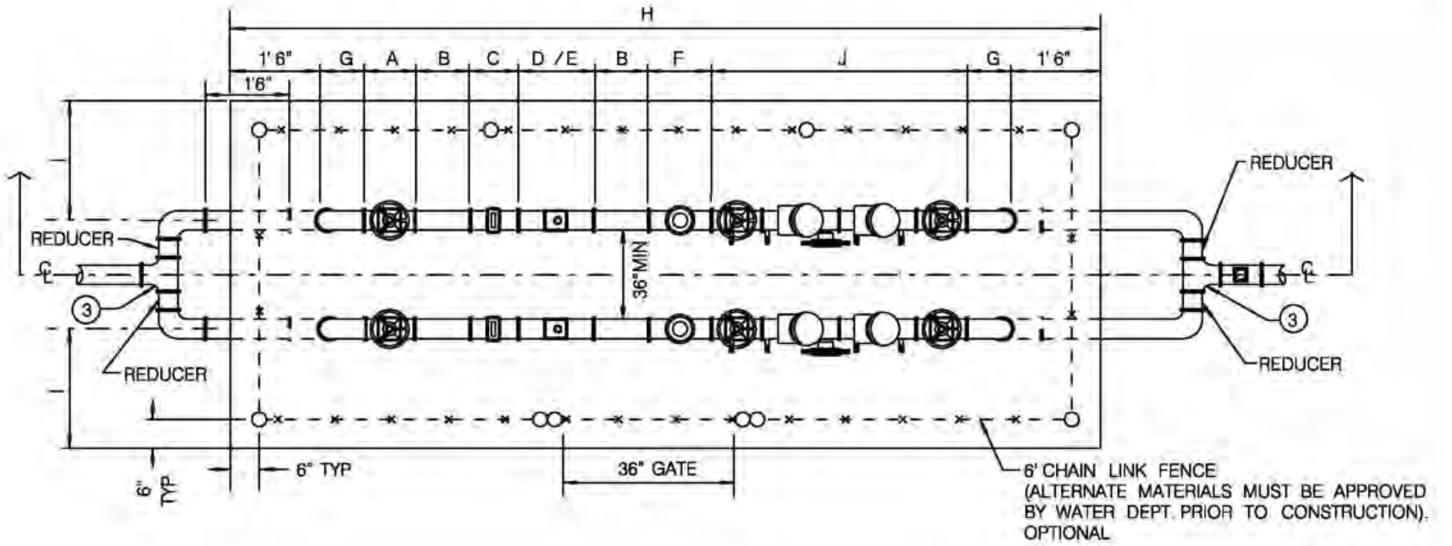
CITY OF SAN DIEGO - STANDARD DRAWING

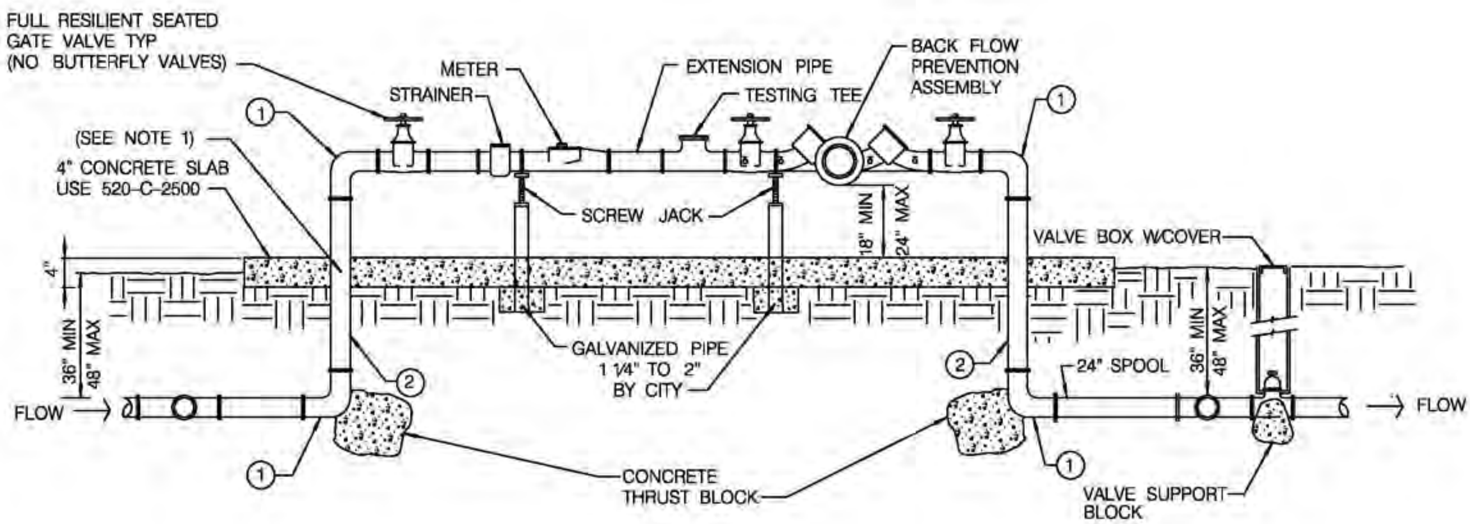
FIRE SERVICE CONNECTION & ASSEMBLY

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDW-118**





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 WILL BE INSTALLED BY CONTRACTOR.

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.

SHEET 1 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL	JC		
REVISION	BM	A. OSKOUI	12/03
NOTES	JS	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

DUAL ABOVE GROUND METER AND BACKFLOW PREVENTION ASSEMBLIES

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-119**

LETTER CODE	METER SIZE / PART DESCRIPTION	3"	4"	6"	8"	10"
A	GATE VALVE	8"	9"	10 1/2"	11 1/2"	1' – 1"
B	PIPE EXTENSION	1' – 0"	1' – 0"	1' – 0"	1' – 0"	1' – 0"
C	STRAINER *	7"	9"	9"	10"	1' – 0"
D	TURBINE WATER METER *	1' – 0"	1' – 2"	1' – 6"	1' – 9"	2' – 2"
E	COMPOUND METER *	1' – 5"	2' – 0"	2' – 5"	3' – 1"	4' – 7"
F	TESTING TEE	11"	1' – 1"	1' – 4"	1' – 6"	1' – 10"
G	90 DEG. ELBOW (SHORT)	5 1/2"	6 1/2"	8"	9"	11"
H	OVERALL SLAB LENGTH *	11' – 10"	12' – 11"	14' – 9"	16' – 3"	18' – 10"
I	SLAB TO C/L PIPE	3' – 0"	3' – 0"	3' – 0"	3' – 0"	3' – 6"
J	BACKFLOW *	3' – 2"	3' – 4"	4' – 1/2"	4' – 4 1/2"	4' – 7 1/2"

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

REVISION	BY	APPROVED	DATE
ORIGINAL	JC		
REVISION	BM	A. OSKOUI	12/03
NOTES	JS	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

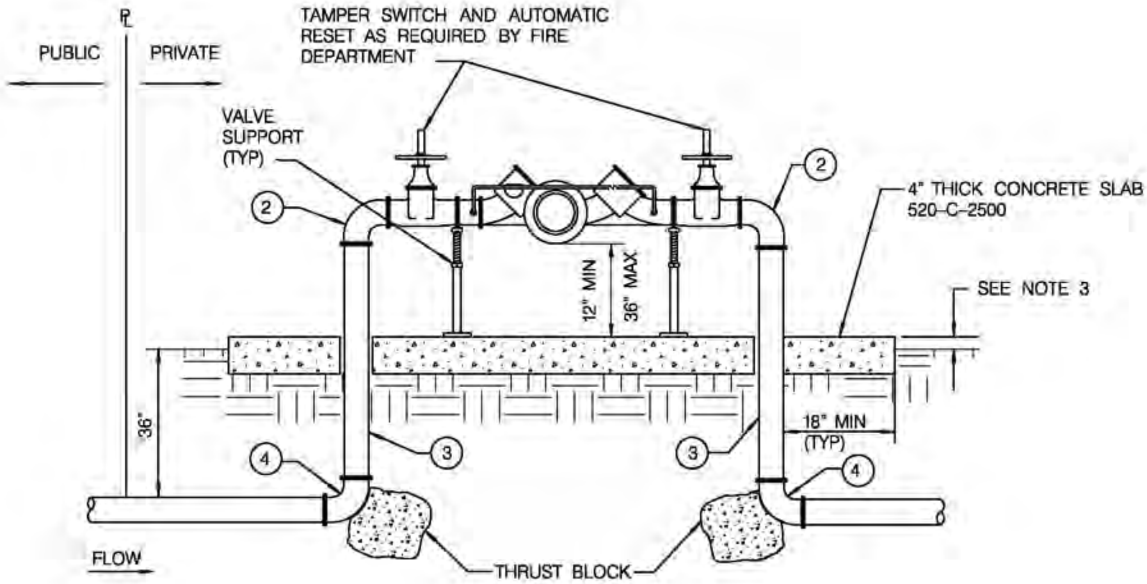
DUAL ABOVE GROUND METER AND BACKFLOW PREVENTION ASSEMBLIES

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

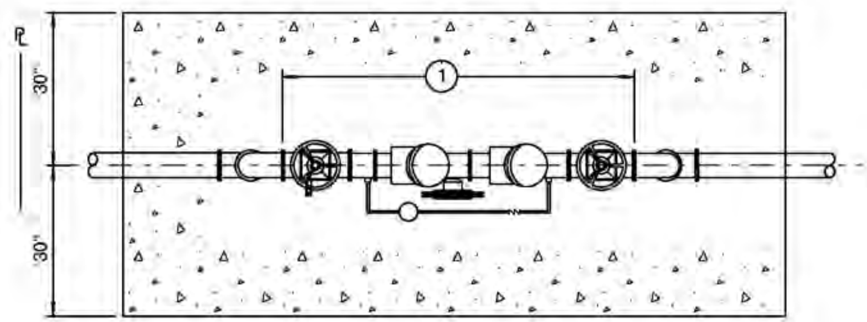
H. Hoshi 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-119**



ELEVATION



PLAN

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 BACK FLOW 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. SLOPE TO DRAIN.
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:

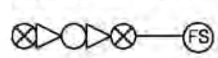
(1) REDUCED PRESSURE PRINCIPLE DETECTION ASSEMBLY SHALL BE INCLUDED IN THE LATEST EDITION OF THE "APPROVED FOR SERVICE ISOLATION CALIFORNIA PUBLIC WATER SYSTEM" ISSUED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES. OFFICE OF DRINKING WATER.

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

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

(4) 90° DUCTILE IRON FLANGED ELBOW.

LEGEND ON PLANS



REVISION	BY	APPROVED	DATE
ORIGINAL	LC	J. NAVARRO	6/00
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

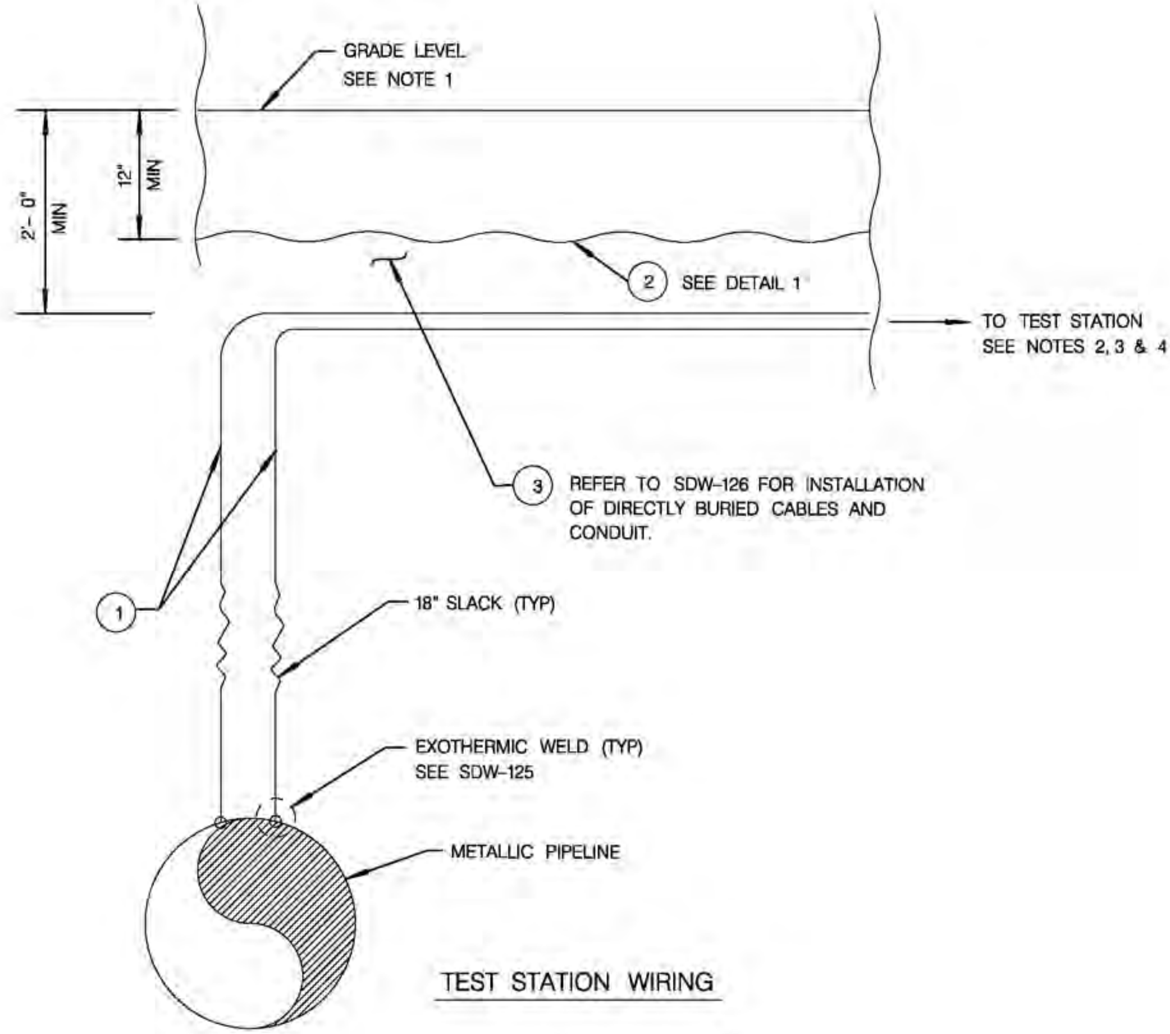
BACKFLOW PREVENTER REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY FOR FIRE SERVICE 3" AND LARGER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

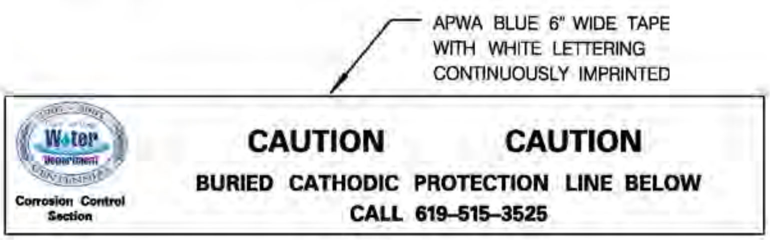
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-120**



TEST STATION WIRING



DETAIL 1
BURIED TAPE

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.

REVISION	BY	APPROVED	DATE
ORIGINAL	BM	A. OSKOUI	12/03
NOTES	BM	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

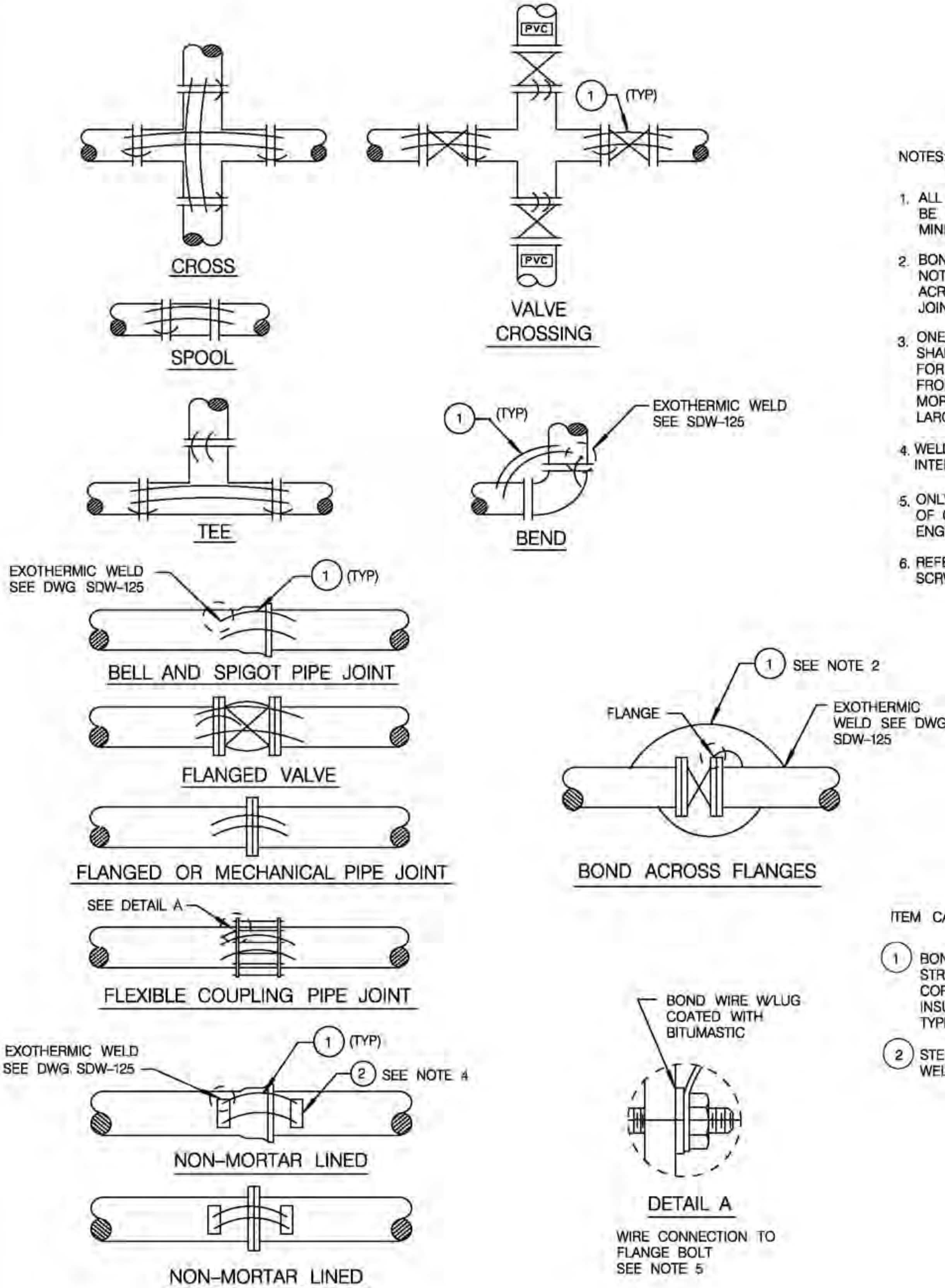
AT-GRADE CATHODIC PROTECTION TEST STATION INSTALLATION FOR ROADWAYS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

[signature] 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-121**



NOTES:

1. ALL BOND CABLE SHALL BE INSTALLED AT MINIMUM LENGTH.
2. BOND CABLES SHALL NOT BE INSTALLED ACROSS INSULATING JOINTS.
3. ONE ADDITONAL 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 SCRW PIPE BOND DETAIL

ITEM CALL OUT:

1 BOND CABLE: AWG #6 STRANDED ASTM B8 COPPER ASTM B3 INSULATED ASTM D1248 TYPE 1, CLASS C, GRADE 5.

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

REVISION	BY	APPROVED	DATE
ORIGINAL	BM	A. OSKOUI	12/03
NOTES	BM	A. OSKOUI	12/06
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

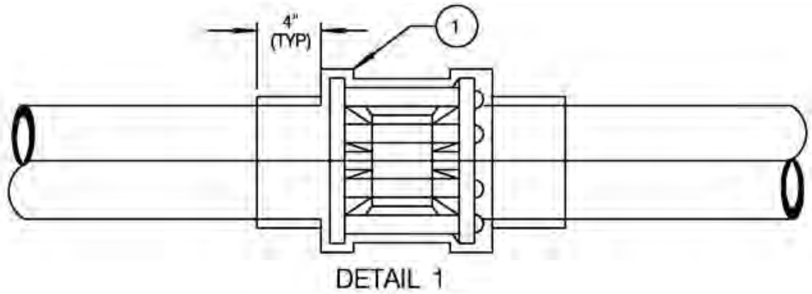
JOINT BONDING OF NON-WELDED PIPE JOINTS & FITTINGS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

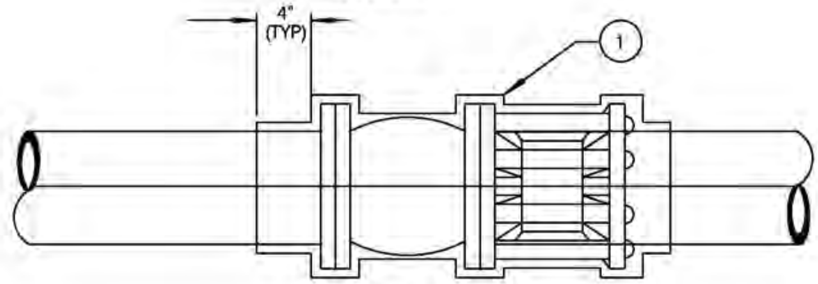
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-122**



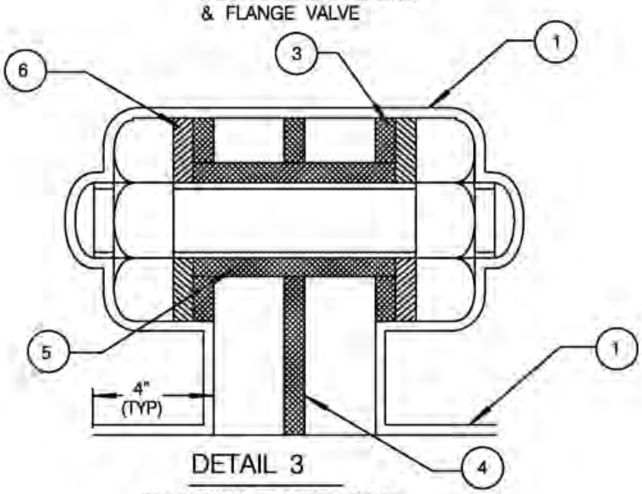
DETAIL 1

MECHANICAL COUPLING



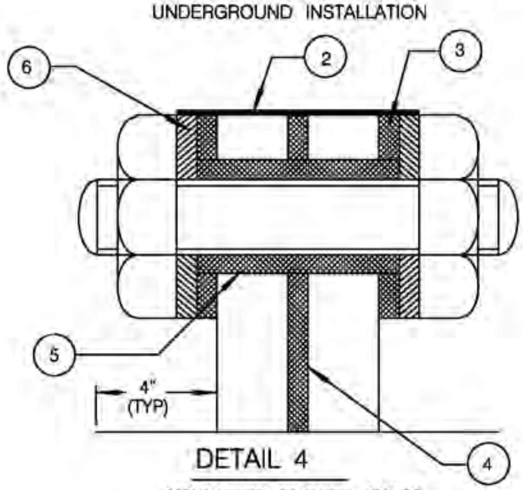
DETAIL 2

MECHANICAL COUPLING & FLANGE VALVE



DETAIL 3

INSULATING FLANGE JOINTS, UNDERGROUND INSTALLATION



DETAIL 4

INSULATING FLANGE JOINTS, ABOVE-GROUND INSTALLATION

NOTES:

1. WHEREVER POSSIBLE, INSULATING FLANGE ASSEMBLIES SHOULD BE ASSEMBLED PRIOR TO INSTALLATION & TESTED ELECTRICALLY USING GAS ELECTRONIC TOOL OR APPROVED EQUAL TO INSURE THAT THE INSTALLATION IS EFFECTIVE.
2. WRAP FLANGE ASSEMBLY AS SHOWN WITH 3-PART PETROLATUM TAPE PER AWWA C217.
3. INSULATING FLANGE BOLT HOLE DIAMETER SHOULD BE 1/8" BIGGER THAN THE INSULATING SLEEVE OD.
4. RECOMMENDED FLANGE INSTALLATION PROCEDURE:
   * CLEAN & INSPECT PIPE FLANGE FACES, APPLY NON-CONDUCTIVE LUBRICANT TO ALL THREADS.
   * INSTALL THE GASKET, ALIGN FLANGES & GASKETS.
   * USE ALIGNMENT PIN IN TWO DIAMETRICALLY OPPOSITE BOLT HOLES.
   * INSERT INSULATING SLEEVES INTO BOLT HOLES.
   * INSERT THE BOLT WITH BOTH INSULATING WASHES.
   * 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-PARTS 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: 1/8" THICK EPOXY GLASS INSULATING MATERIALS WITH NEOPRENE SEALING ELEMENT.
5. SLEEVE: INSULATING EPOXY GLASS. 1/32" THICK. ID = BOLT DIAMETER + 1/64.
6. WASHER: STEEL, 1/8" THICK.

REVISION	BY	APPROVED	DATE
ORIGINAL	BM	A. OSKOUI	12/03
NOTES	BM	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

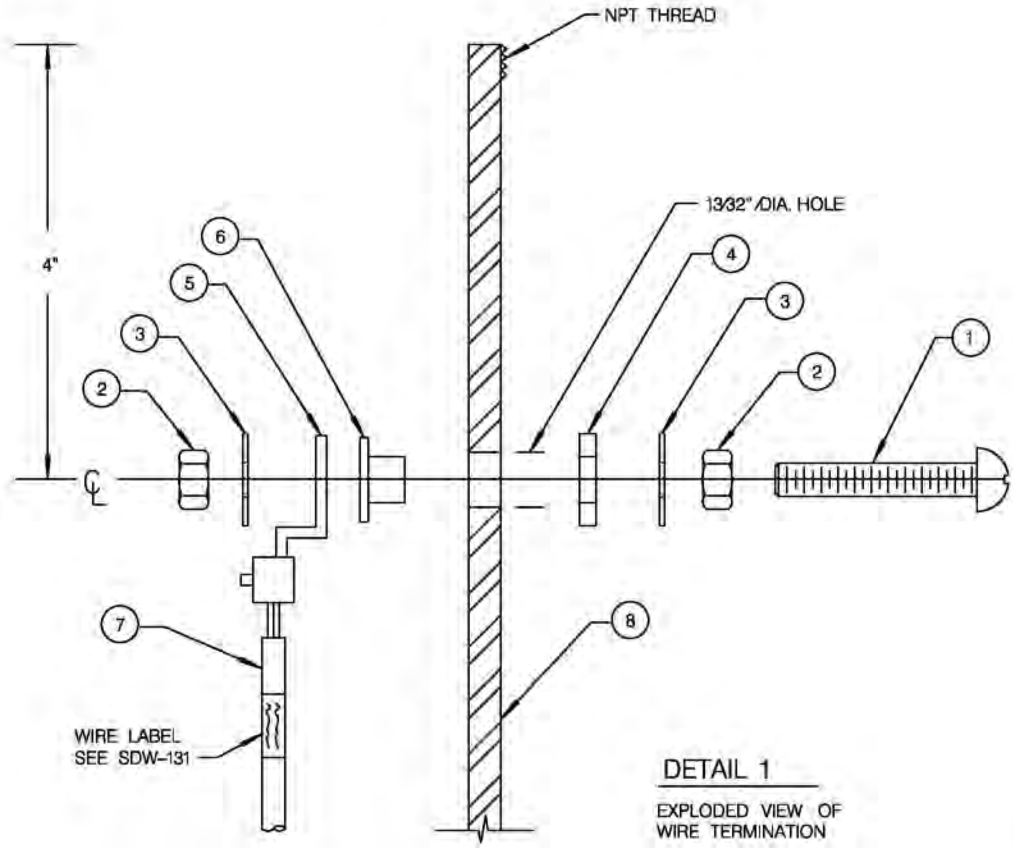
INSULATING FLANGE AND MECHANICAL JOINTS EXTERNAL PROTECTION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

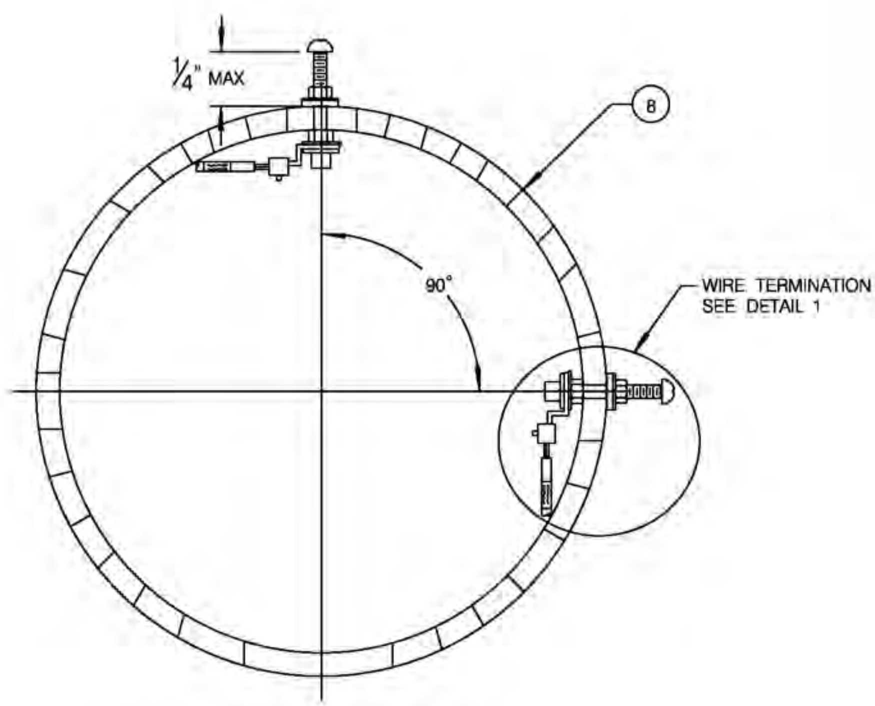
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-123**



DETAIL 1

EXPLODED VIEW OF
WIRE TERMINATION



POST-MOUNTED TEST STATION
WIRE TERMINATION DETAIL

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.

MATERIALS:

1. SCREW: MACHINE BRASS, ROUND HEAD SLOTTED, 1/4" - 20T 1 1/2" LONG
2. NUT: BRASS 1/4" 20 THREADS
3. WASHER: BRASS 1/4"
4. WASHER, INSULATION NYLON, 0.719" OD. 0.281" ID. 0.062" THICK NATURAL
5. LUG: OFFSET TONGUE SOLDERNESS, COPPER.
6. WASHER: INSULATING, SHOULDER, NYLON NATURAL, 0.260" OD. 0.625" OD FLANGE, 0.342" OD SHANK, 0.065" FLANGE THK. 0.270" SHANK THK.
7. CABLE: AWG #8, COPPER ASTM B3, STRANDED ASTM B8, INSULATED ASTM D1248 TYPE 1, CLASS C. GR. 5.
8. PIPE: 4" DIAMETER SCH 40 ASTM A53, GALVANIZED

REVISION	BY	APPROVED	DATE
ORIGINAL		A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

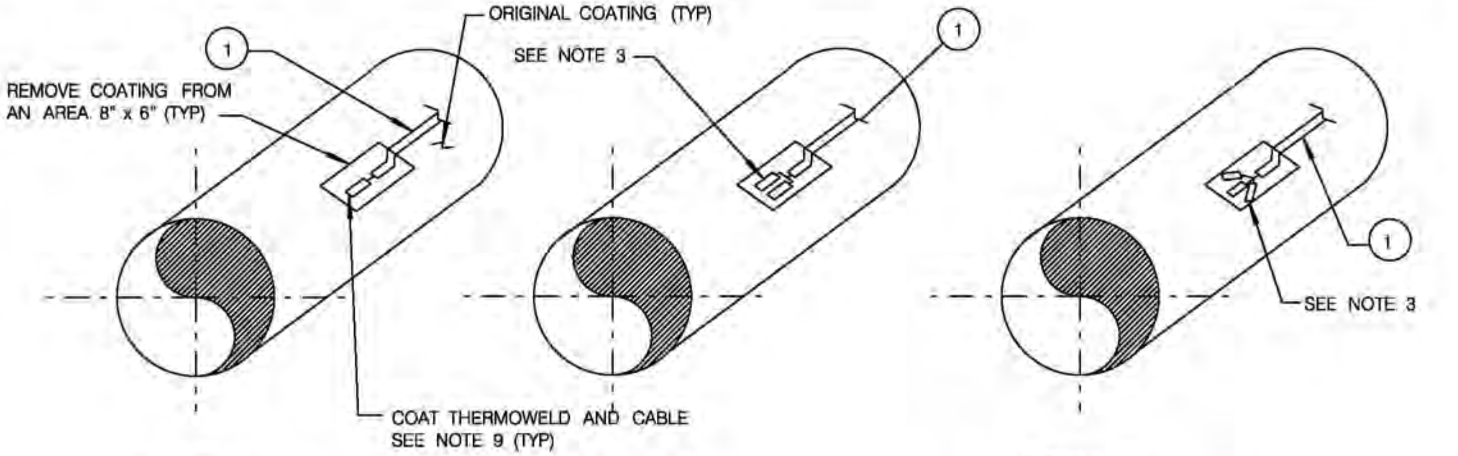
POST - MOUNTED TEST STATION
WIRE TERMINATION DETAIL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hagli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-124**



DETAIL 1

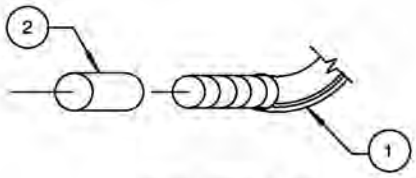
TYPICAL CONNECTIONS OF NO.6 AWG CABLE AND SMALLER CABLES

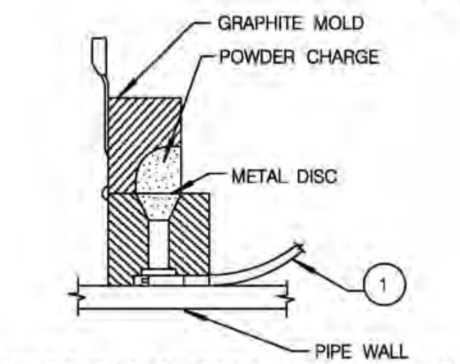
DETAIL 2

TYPICAL CONNECTIONS OF NO.4 AWG CABLE

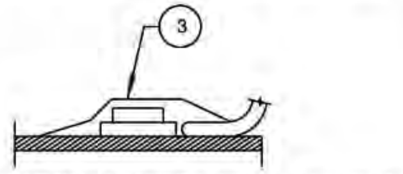
DETAIL 3

TYPICAL CONNECTIONS OF NO.2 AWG CABLE AND LARGER CABLES





EXOTHERMIC CONNECTION DETAIL



EXOTHERMIC CONNECTION SECTION

CABLE STRAND DETAILS			
CABLE SIZE	NO. OF STRANDS	NO.OF EXOTHERMIC GROUPS PER CABLE CONNECTION	CABLE STRANDS PER GROUP
8	19	1	19
6	7	1	7
	19		19
4	7	2	3-4
	19		10-9
2	7	3	3-2-2
	19		7-6-6

NOTES:

1. CLEAN AREA OF STEEL SURFACE APPROXIMATELY 2"x 2" FOR EACH THERMOWELD CONNECTION. WIRE BRUSH FILE AND SCRAPE TO OBTAIN SSPC-SP-5 WHITE METAL SURFACE FINISH.
2. SELECT PROPER MOLD BASED ON STRUCTURE GEOMETRY, ORIENTATION AND MATERIAL TYPE.
3. STRIP CABLE END AND TWIST TO FIT THERMOWELD MOLD. CABLE SIZES LARGER THAN 6 AWG SHALL BE THERMOWELDED BY TWISTING CONDUCTORS INTO GROUPS APPROXIMATELY NUMBER 6 AWG CABLE SIZE. MINIMUM SPACING BETWEEN WELDS WILL BE DETERMINED BY MOLD GEOMETRY, NOMINALLY 3".
4. HOLD MOLD FIRMLY AGAINST PIPE WITH OPENING AWAY FROM THE OPERATOR. IGNITE WITH FLINT GUN.
5. REMOVE ALL WELD SLAG, SPLATTER, SHARP EDGES AND BURRS WITH CHIP HAMMER AND METAL FILE.
6. TEST STRENGTH OF CONNECTION BY LIGHTLY TAPPING WITH 1 LB HAMMER, AND PULL WITH 5 LB FORCE ON CABLE.
7. WIPE PIPE SURFACE WITH CLEAN, OIL FREE RAGS TO REMOVE ANY LOOSE DUST.
8. PRIME CLEANED SURFACE WITH APPROVED PRIMER.
9. COAT THERMOWELD AND 6" OF CABLE TAIL WITH COMPATIBLE COATING, SUCH THAT ALL CORNERS ARE FILLED. THE COATING SHALL EXTEND FOR AT LEAST 2" AROUND THE THERMOWELD AREA.
10. THERMOWELD CARTRIDGE SIZE SHALL BE COMPATIBLE TO STEEL MATERIALS. MULTIPLE POWDER CARTRIDGE CHARGERS SHALL NOT BE USED. IF A THERMOWLED MUST BE REPEATED, A NEW PIPE SURFACE MUST BE PREPARED AT LEAST 3" FROM THE ORIGINAL WELD ATTEMPT. MORE THAN ONE WELD ATTEMPT ON THE SAME SPOT SHALL NOT BE PERMITTED.
11. IN NON-CONCRETE LINED PIPES, ALL EXOTHERMIC WELDS SHALL BE MADE IN A STEEL PAD.

ITEMS CALL OUT:

1 CABLE: AWG SIZE, ASTM B3/B8
ASTM D-1248, TYP1 1, CLASS C, GR.5 INSULATION

2 SLEEVE: ADAPTER

3 APPROVED PRIMER & WELD CAP OR MORTAR OVER WELD LOCATION

REVISION	BY	APPROVED	DATE
ORIGINAL		A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

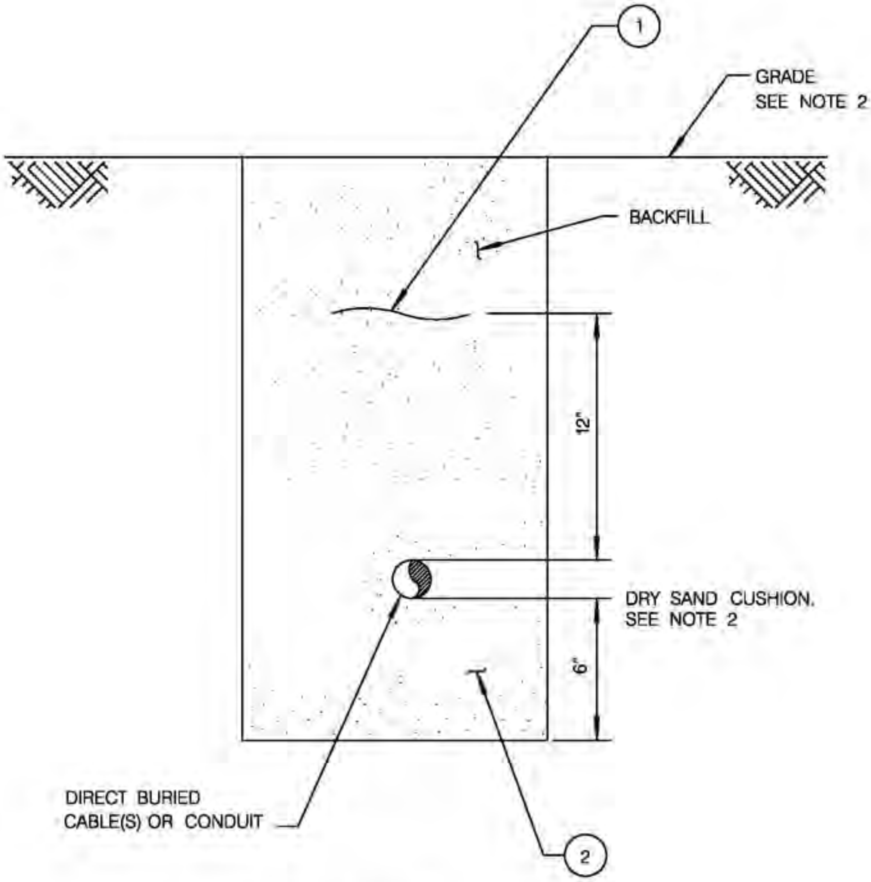
EXOTHERMIC WELDING OF CABLES AND COATING OF WELDING

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

M. Hoole 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-125**



CABLE(S) AND CONDUIT
TRENCH SECTION

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.

REVISION	BY	APPROVED	DATE
ORIGINAL	BM	A. OSKOUI	12/03
NOTES	BM	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

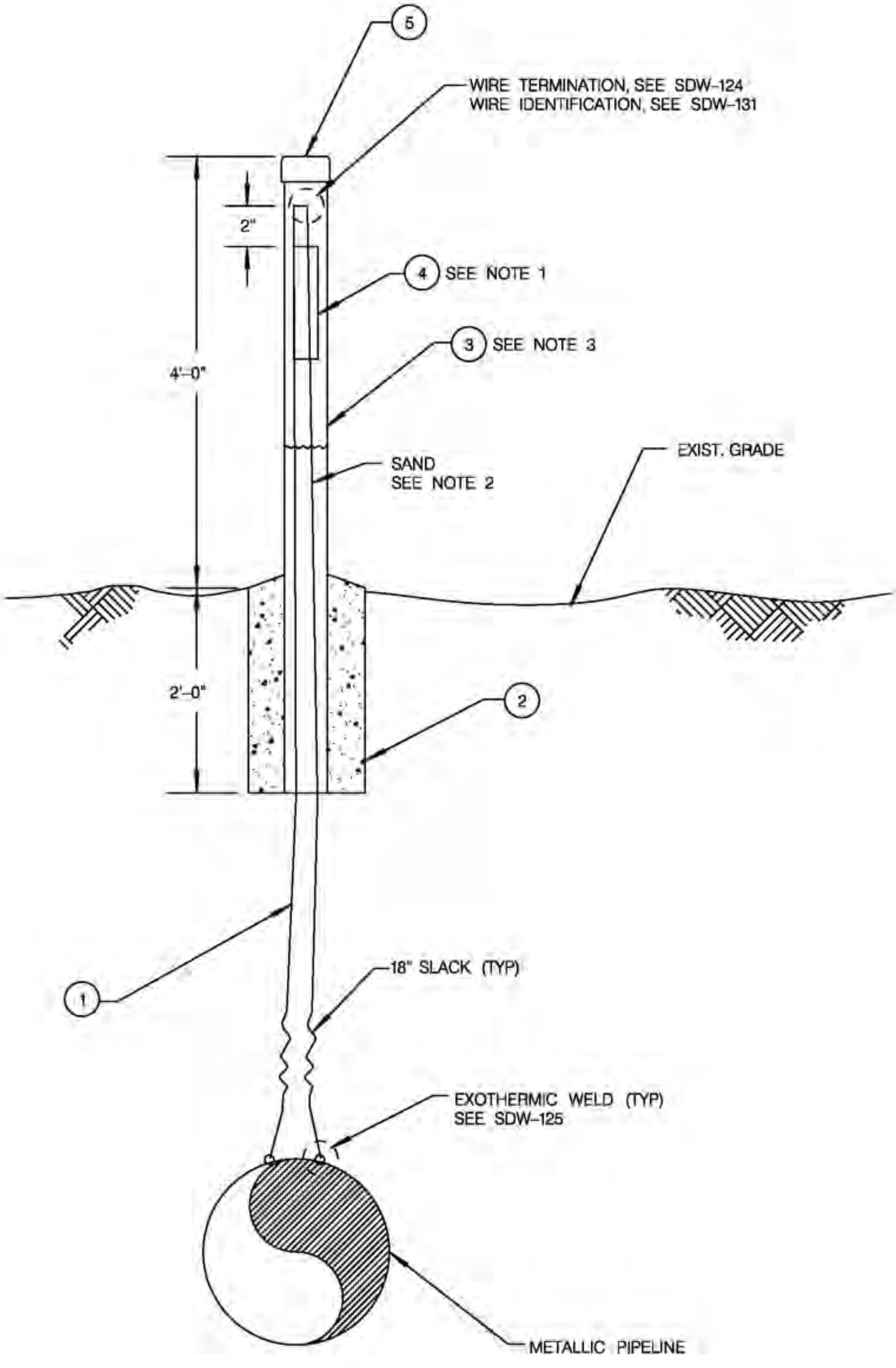
INSTALLATION OF DIRECTLY BURIED CABLES OR CONDUIT

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-126**



POST-MOUNTED TEST STATION

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 TRFFIC.

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.
4. DECAL: SEE SDW-132.
5. CAP: THREADED 4" DIAMETER GALVANIZED.

REVISION	BY	APPROVED	DATE
ORIGINAL	BM	A. OSKOUI	12/03
NOTES	BM	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

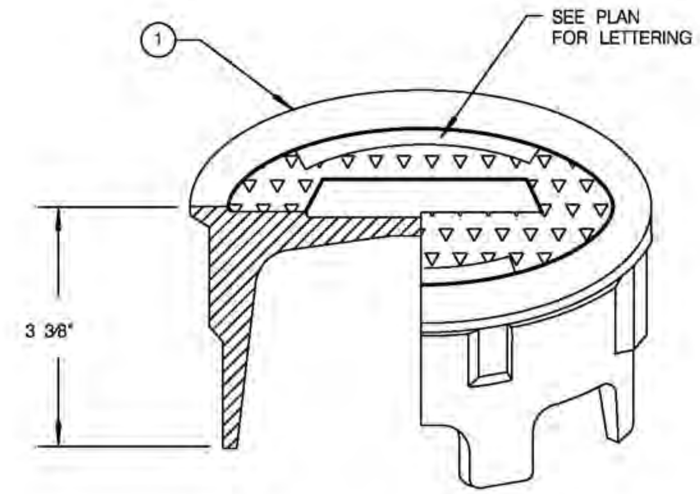
ABOVE GRADE CATHODIC PROTECTION TEST STATION INSTALLATION FOR UNDEVELOPED AREAS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

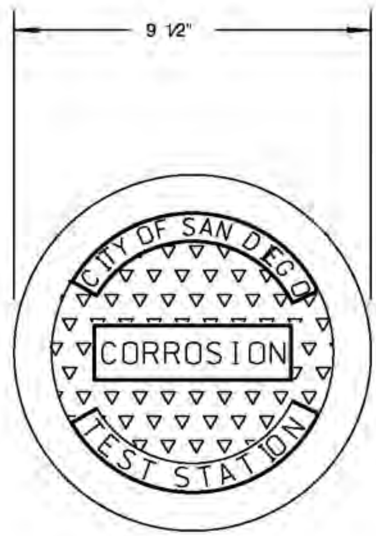
1/31/2012

COORDINATOR R.C.E. 65271 DATE

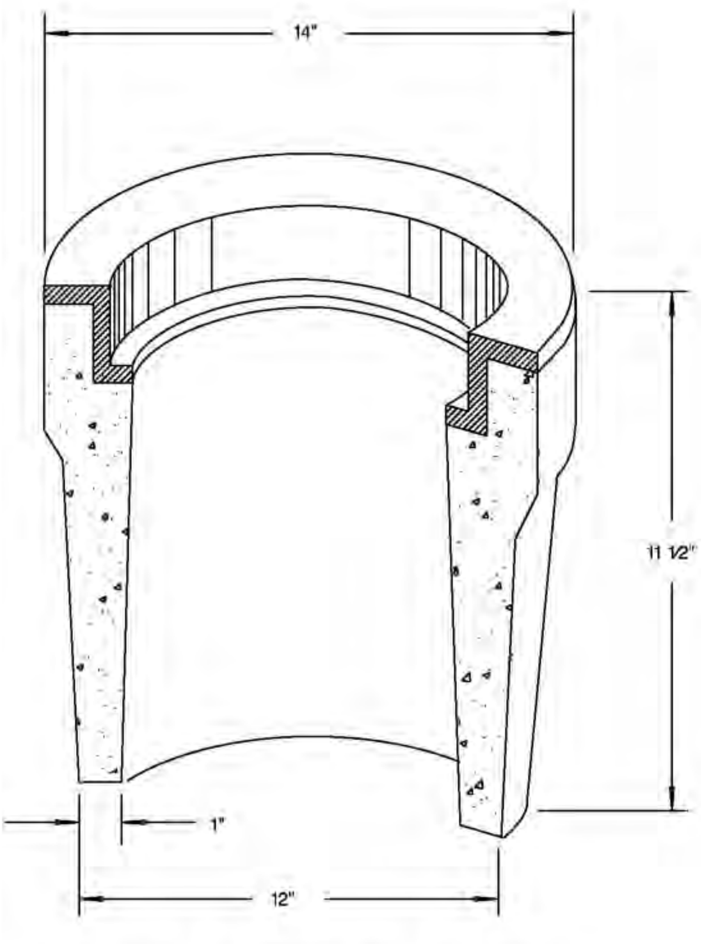
DRAWING NUMBER **SDW-127**



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.

REVISION	BY	APPROVED	DATE
ORIGINAL	BM	A. OSKOUI	12/03
NOTES		A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

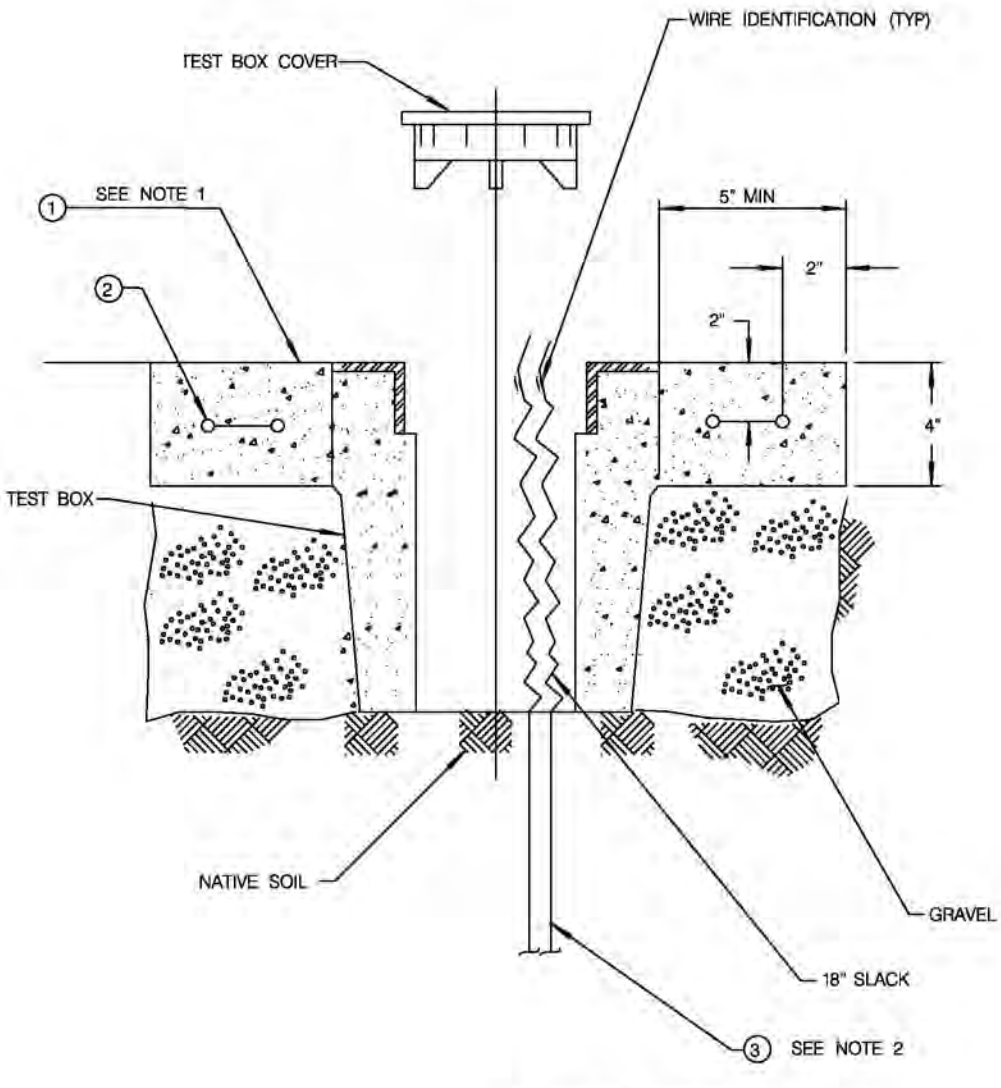
AT - GRADE
CONCRETE TEST BOX

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-128**



TEST STATION SECTION

NOTES:

1. SLOPE CONCRETE PAD AWAY FROM COVER.
2. FOR CONTINUATION OF CABLES.

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.

REVISION	BY	APPROVED	DATE
ORIGINAL		A. OSKOUI	12/03
UPDATE	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

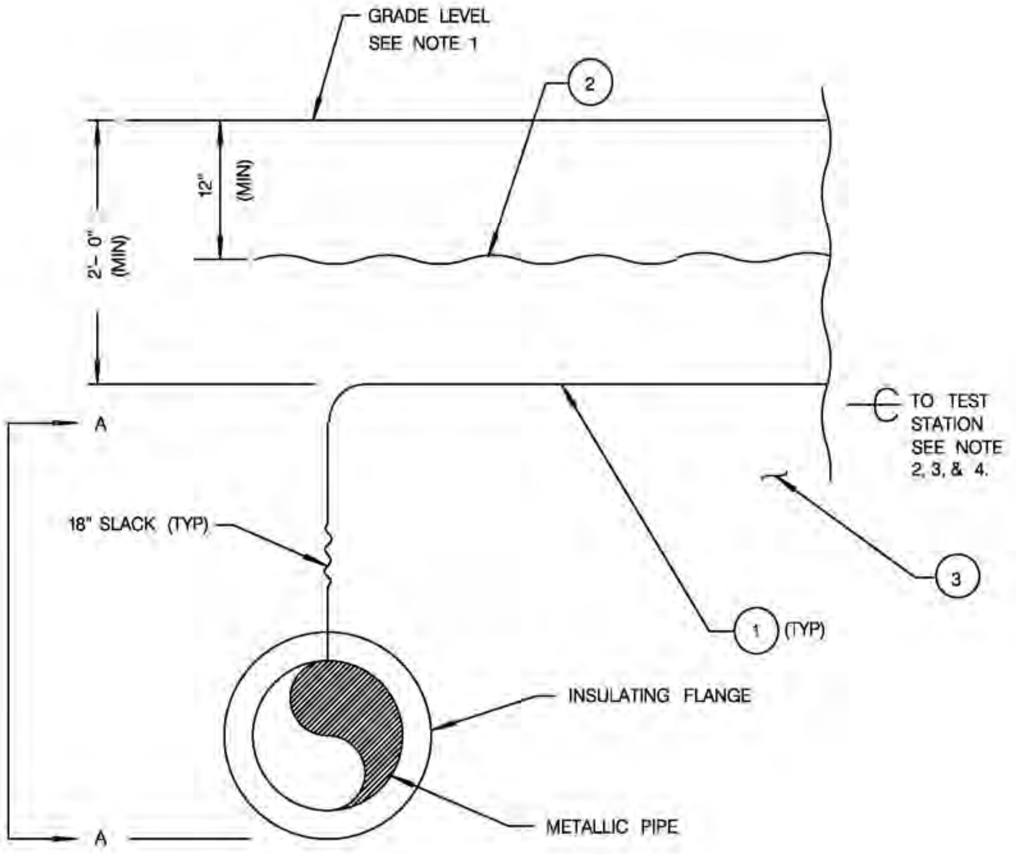
AT - GRADE CATHODIC PROTECTION TEST STATION WIRING DIAGRAM FOR ROADWAYS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

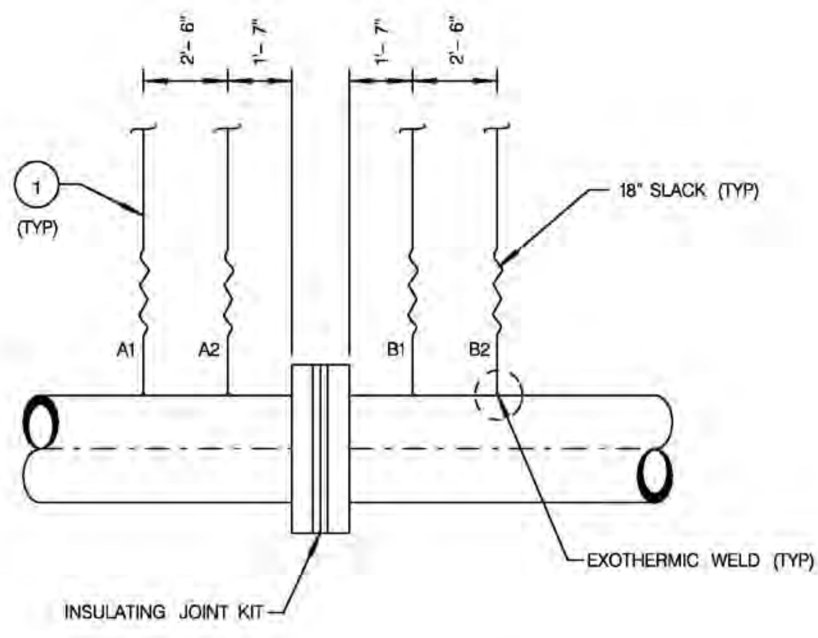
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-129**



SECTION



ELEVATION A – A

NOTES:

1. IN PAVED, CITY OWNED ROADWAYS, THE REPAIR OF THE ROAD SURFACE SHALL BE PER APPLICABLE STANDARD DRAWINGS. IN STATE HIGHWAYS, CONFORM TO APPLICABLE CALTRANS STANDARD.
2. FOR LOCATION, OF TEST STATION, USE REGIONAL STD DWG W15. EXACT LOCATION SHALL BE APPROVED BY CORROSION ENGR.
3. USE APPLICABLE TEST STATION DRAWING FOR UNDEVELOPED AREAS

ITEM CALL OUT:

1. CABLE: AWG #2 COPPER ASTM B3, STRANDED ASTM B8, INSULATED PER ASTM D1248, TYPE 1 CLASS C, GRADE 5.
2. POLYETHYLENE WARNING TAPE.
3. SAND: 50 SIEVE

REVISION	BY	APPROVED	DATE
ORIGINAL		A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

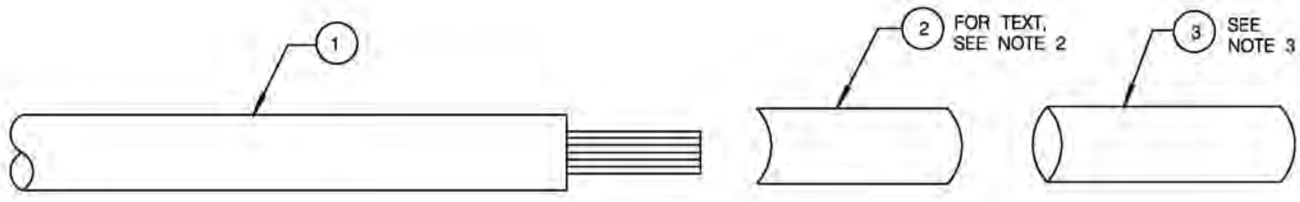
INSULATING FLANGE FOUR - WIRE TEST STATION INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

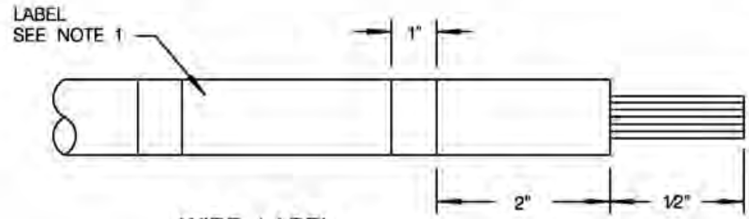
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-130**



WIRE LABEL DETAIL STATION



WIRE LABEL

CPTS# (CATHODIC PROTECTION TEST STATION NUMBERING)

CPTS#1, 2, 3, ...N

LEGEND

PIPE MATERIAL

CCI – COATED CAST IRON
CDI – COATED DUCTILE IRON
SCRC – STEEL CYLINDER REINFORCED CONCRETE
PSCS – PRE-STRESSED CONCRETE-STEEL CYLINDER
RCCP – REINFORCED CONCRETE CYLINDER PIPE (W/O STEEL)
SCRW – STEEL CYLINDER REINFORCED ROD WRAPPED
CMLC – CEMENT MORTAR LINED-COATED STEEL CYLINDER
CMLCT– CEMENT MORTAR LINED-COATED-TAPED STEEL CYLINDER
CSTL – COATED STEEL CYLINDER

TYPE OF INSTALLATION

2WTS – 2-WIRE TEST STATION
EXAMPLE: CPTS#1, 2WTS, 180+00, 30, OTAY 2, CSTL

4WIJTS – 4-WIRE INSULATING JOINT TEST STATION
EXAMPLE: CPTS#2, 4WIJTS, 180+00, 30, OTAY 2, CSTL, NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

6WTS – 6-WIRE TEST STATION
EXAMPLE: STRUCTURE#1 – CPTS#3, 6WTS, 180+00, 30, OTAY 2, CSTL
NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS
STRUCTURE#2 – CPTS#3, 6WTS, 120+60, 24, MIDCITY, SCRW
NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS
STRUCTURE#3 – CPTS#3, 6WTS, 101+25, 54, TROJAN, RCCP,
NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

CTS – CURRENT TEST STATION
EXAMPLE: CPTS#10, CTS, 180+00, 200 FT., OTAY 2, CSTL,
NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

CSGTS – CASING TEST STATION
EXAMPLE: CPTS#12, CSGTS, 180+00, 30, OTAY 2, CSTL
NORTH OR SOUTH OR EAST OR WEST FOR WIRE TAGS

ASTA – ANODE STATION
EXAMPLE: ANODE#1, 2, 3, ...N FOR ANODE WIRES;
30, OTAY 2, CSTL, 180+00, CPTS#6 FOR STRUCTURE WIRE

BSTA – BOND STATION
EXAMPLE: CPTS#18, BSTA, 30, OTAY 2, CSTL, 180+00;
54, OTAY 3, SCRW, 65+20

FXSTA – FOREIGN CROSSING STATION
EXAMPLE: CPTS#4, FXSTA, 30, OTAY 2, CSTL, 180+00; 24 SDGE

NOTES:

1. CABLES SHALL BE TAGGED USING TIMES ROMAN 10 POINT FONT.
2. TEXT SHALL BE PRESENTED IN THE FOLLOWING ORDER:
   * CPTS#
   * TYPE OF INSTALLATION
   * STATIONING
   * FACILITY NAME
   * PIPE MATERIAL
   * WIRE DIRECTIONAL ORIENTATION
     - NORTH
     - SOUTH
     - EAST
     - WEST
3. PLACE SLEEVE AFTER ATTACHMENT OF LABEL TO CABLE.

ITEM CALL OUT:

1 CABLE: AWG ASTM B8 & B3

2 LABEL: FILE FOLDER, SELF ADHESIVE WHITE 2/3" X 3 7/16".

3 SLEEVE: HEAT SHRINK, ADHESIVE LINED POLYOLEFIN, CLEAR THIN WALL TUBING.

REVISION	BY	APPROVED	DATE
ORIGINAL		A. OSKOUI	12/03
NOTES	BM	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

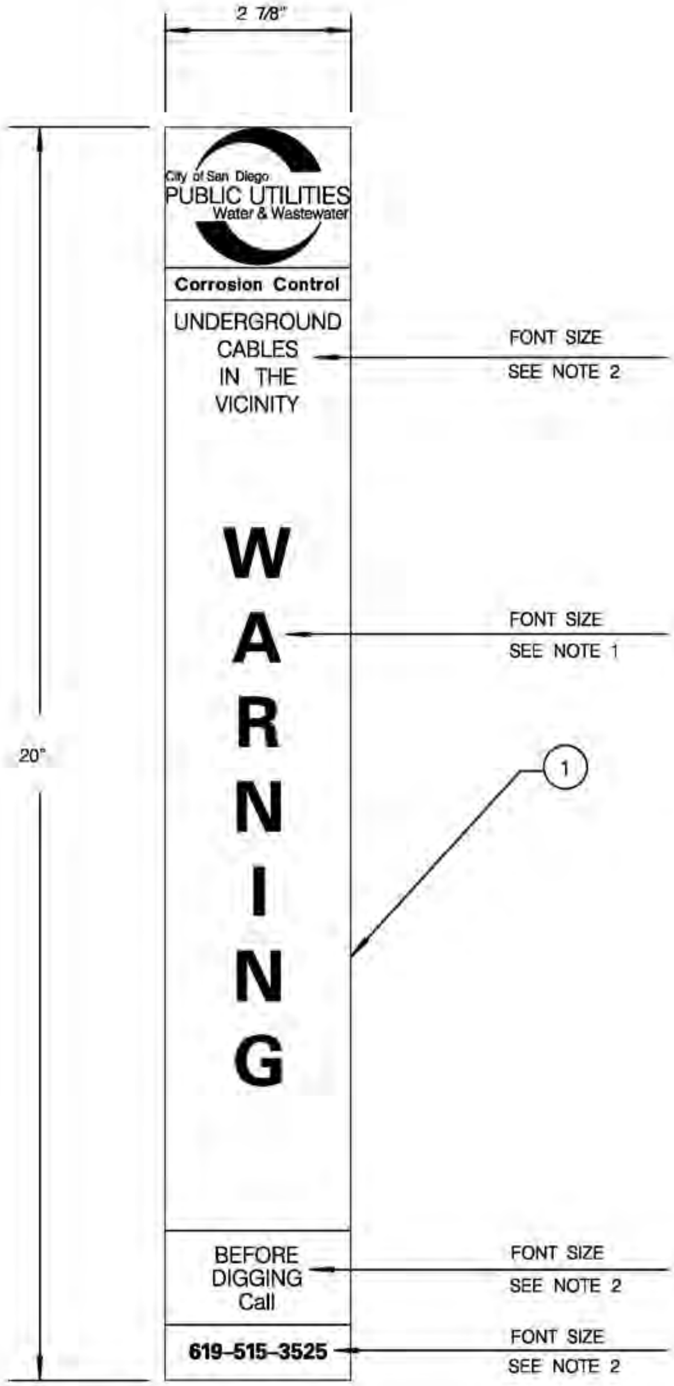
WIRE IDENTIFICATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-131**



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.

REVISION	BY	APPROVED	DATE
ORIGINAL	BM	A. OSKOUI	12/03
NOTES	BM	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

POST - MOUNTED CATHODIC PROTECTION WARNING DECAL

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-132**

ANODES

AV (X) Vertical AH [X] Horizontal

Where X:

AV1 – Al (ALUMINUM)	AH1 – Al (ALUMINUM)
AV2 – Pm (POLYMERIC)	AH2 – Pm (POLYMERIC)
AV3 – Pt (PLATINUM)	AH3 – Pt (PLATINUM)
AV4 – Fe (SCRAP IRON)	AH4 – Fe (SCRAP IRON)
AV5 – Gr (GRAPHITE)	AH5 – Gr (GRAPHITE)
AV6 – Ci (HS C IRON)	AH6 – Ci (HS C IRON)
AV7 – Zn (Zinc)	AH7 – Zn (ZINC)
AV8 – Mg (MAGNESIUM)	AH8 – Mg (MAGNESIUM)
AV9 – MMO (MIXED METAL OXIDE)	AH9 – MMO (MIXED METAL OXIDE)

CABLES (CB)

CB1	POSITIVE
CB2	POSITIVE IN CONDUIT
CB3	NEGATIVE
CB4	NEGATIVE IN CONDUIT

CABLE CONNECTION (CC)

CC1	EXOTHERMIC WELD
CC2	SPLICE TEE
CC3	STRAIGHT SPLICE

CASING (CS)

CS1	UNPROTECTED CASING
CS2	PROTECTED CASING

ANODE GROUNDBEDS (AG)

AG1	DEEP ANODE WELL
AG2	POLYMERIC OR PLATINUM
AG3	CONVENTIONAL – VERTICAL
AG4	CONVENTIONAL – HORIZONTAL

JUNCTION BOX (JB)

JB [X] WHERE X:

- JBN – NEGATIVE CABLES
- JBP – POSITIVE CALBES
- JBR – RESISTOR
- JBD – DIODE
- JBA – GALVANIC ANODE SHUNTS
- JBI – IMPRESSED ANODE SHUNTS
- JBS – CABLE SPLICE

INSULATING JOINTS (IJ)

IJ1	DIELECTRICALY INSULATED FLANGE JOINT
IJ2	NON-DIELECTRICALY INSULATED FLANGE JOINT
IJ3	FLANGED INSULATING PROTECTIVE DEVICE
IJ4	BONDED INSULATED FLANGE JOINT
IJ5	INSULATED FLANGE W/ADJUSTABLE RESISTANCE
IJ6	GATE VALVE INSULATED FLANGE JOINT
IJ7	BUTTERFLY VALVE INSULATED FLANGE JOINT
IJ8	MOV INSULATED FLANGE JOINTS
IJ9	MONOLITHIC INSULATING JOINT
IJ10	BONDED MECHANICAL COUPLING
IJ11	DIELECTRICALY INSULATED UNION
IJ12	BONDED DIELECTRIC UNION
IJ13	DIELECTRICALY INSULATED COUPLING

RECTIFIERS (RE)

RE1	PEDESTAL MOUNTED
RE2	POST MOUNTED

REFERENCE CELL (RC)

RC1 (CSE)	COPPER-COPPER SULFATE CELL
RC2 (Zn)	99.9% HIGH PURITY ZINC CELL
RC3 (Ag)	SILVER-SILVER CHLORIDE CELL

TEST STATION (TS)

ABOVE GRADE AT GRADE WHERE X:

- TS1 – IR-FREE COUPON
- TS2 – 2-WIRES STATION
- TS3 – FOREIGN CROSSING STATION
- TS4 – 4-WIRES STATION
- TS5 – CALIBRATING STATION
- TS6 – 6-WIRES STATION
- TS7 – INTERFERENCE CURRENT
- TS8 – 8-WIRES STATION
- TS9 – ELECTRICAL RESISTANCE PROBE

REVISION	BY	APPROVED	DATE
ORIGINAL	BM	A. OSKOUI	12/03
NOTES	BM	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

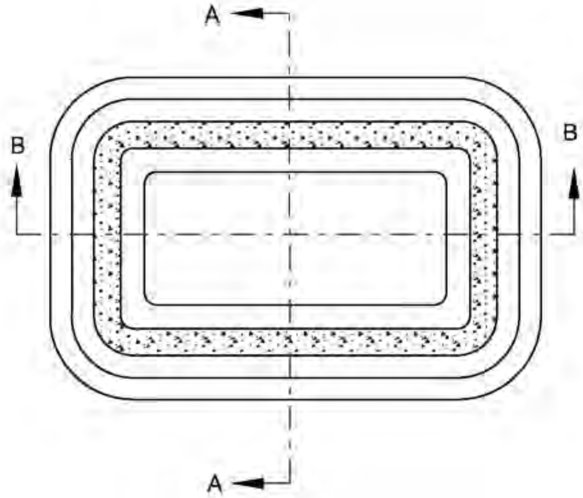
SYMBOLS
CATHODIC PROTECTION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

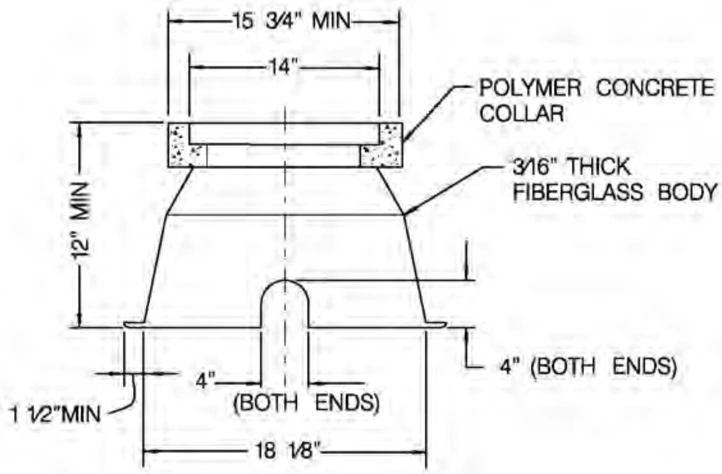
1/31/2012

COORDINATOR R.C.E. 65271 DATE

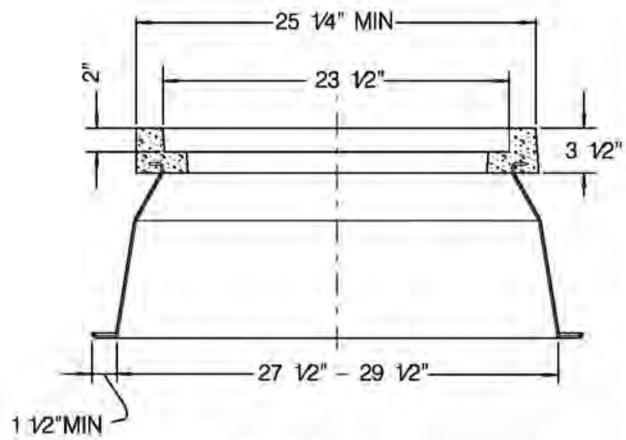
DRAWING NUMBER **SDW-133**



PLAN VIEW



SECTION A–A



SECTION B–B

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.

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

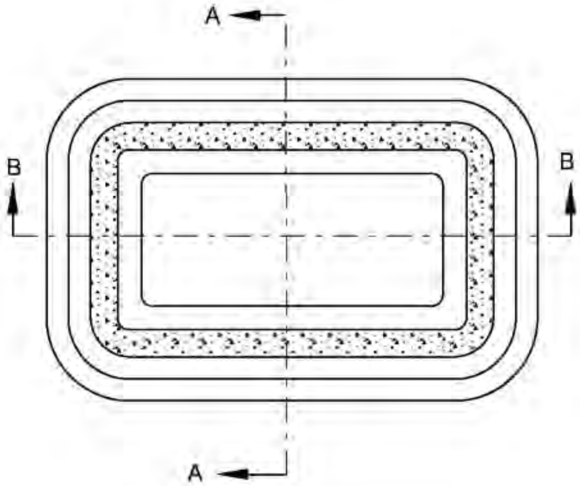
POLYMER CONCRETE WATER METER BOX FOR 1" WATER SERVICE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

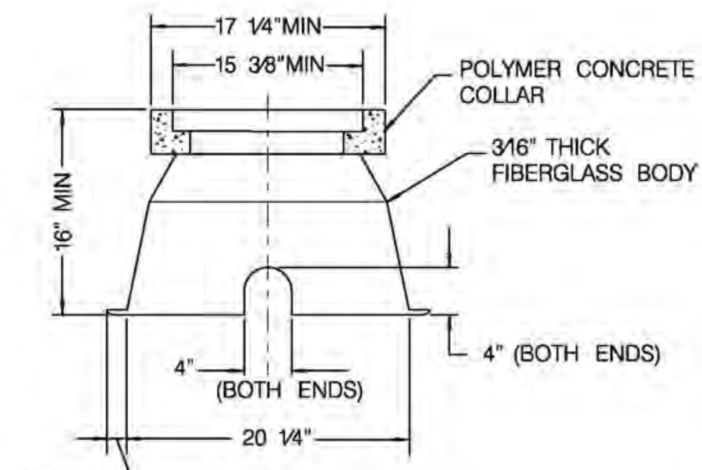
1/31/2012

COORDINATOR R.C.E. 65271 DATE

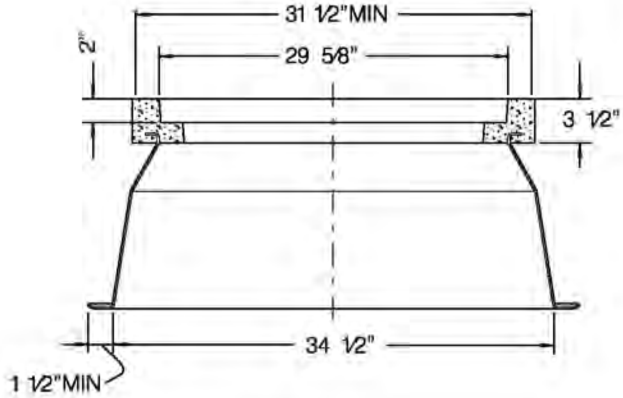
DRAWING NUMBER **SDW-134**



PLAN VIEW



SECTION A–A



SECTION B–B

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).

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

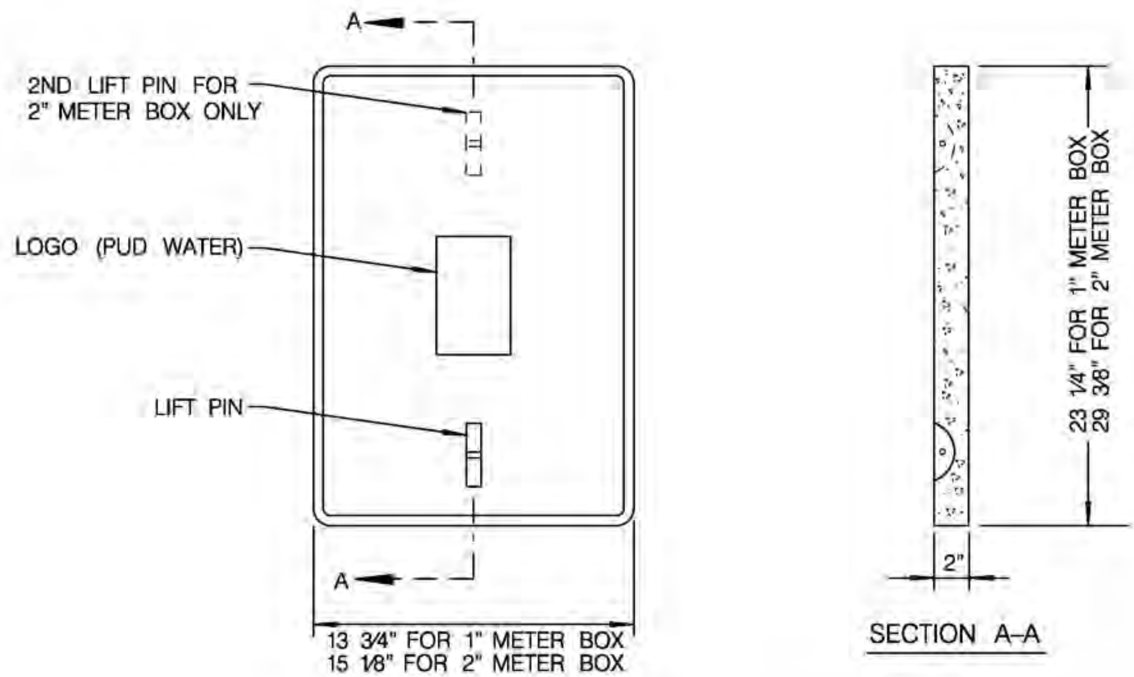
CITY OF SAN DIEGO – STANDARD DRAWING

POLYMER CONCRETE WATER METER BOX FOR 2" WATER SERVICE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDW-135**



SOLID COVER FOR TRAVELED WAY

NOTES:

1. LID SHALL WITHSTAND AASHTO H–20 (ASTM 857).
2. LID SHALL HAVE NON–SKID SURFACE.

SHEET 1 OF 2

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

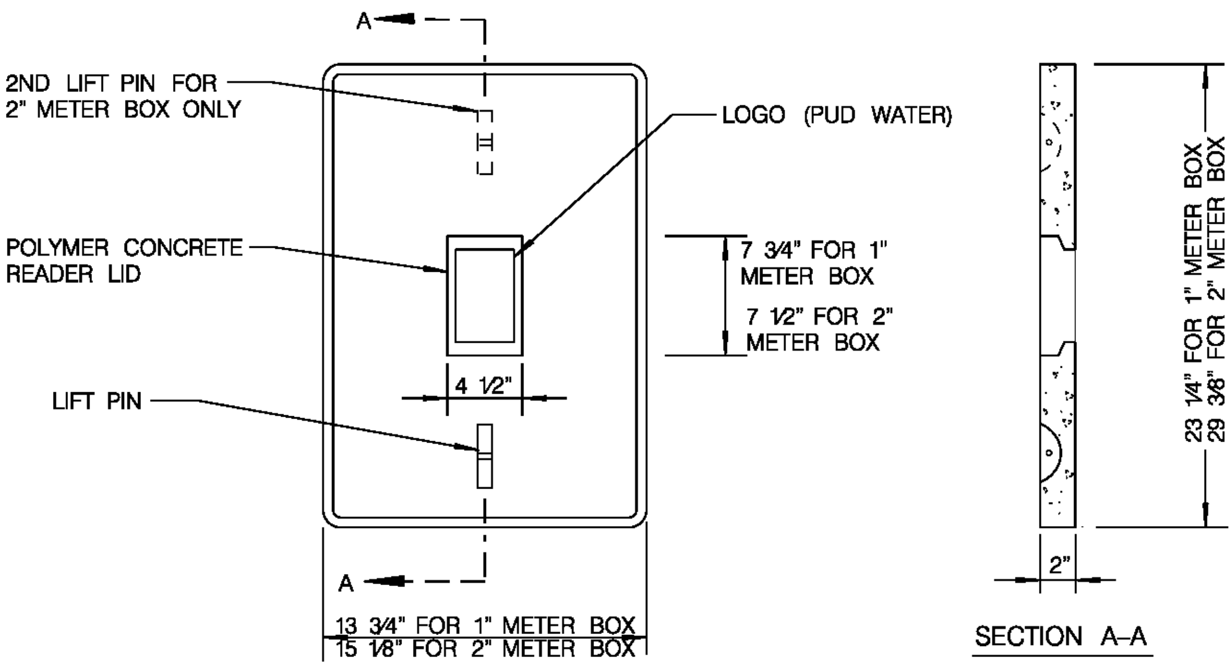
CITY OF SAN DIEGO – STANDARD DRAWING

METER BOX POLYMER CONCRETE COVER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDW-136**

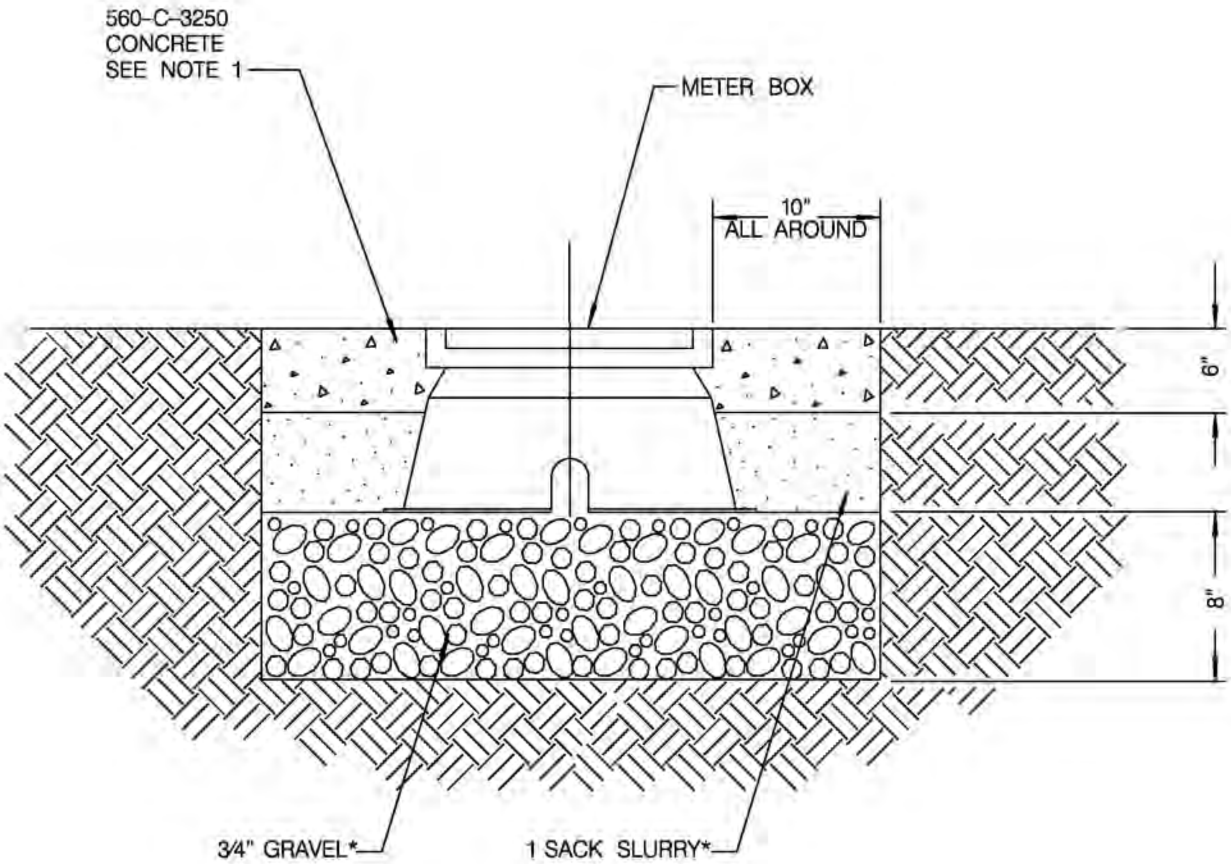


DROP IN COVER (OUTSIDE TRAVELLED WAY)

NOTES:

1. LID SHALL WITHSTAND AASHTO H–10 (ASTM C857–85).
2. LID SHALL HAVE NON–SKID SURFACE.
3. IF LID IS MANUFACTURED BY CDR, READER SHALL BE 6" X 9".

REVISION	BY	APPROVED	DATE	CITY OF SAN DIEGO – STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL	SS	A. OSKOUI	12/03		
UPDATED	KA	J. NAGELVOORT	01/12	**METER BOX POLYMER CONCRETE COVER**	COORDINATOR R.C.E. 65271 DATE
					DRAWING NUMBER **SDW-136**



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.

REVISION	BY	APPROVED	DATE
ORIGINAL	SS	A. OSKOUI	12/03
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

TRAFFIC RATED COVER AND METER BOX INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

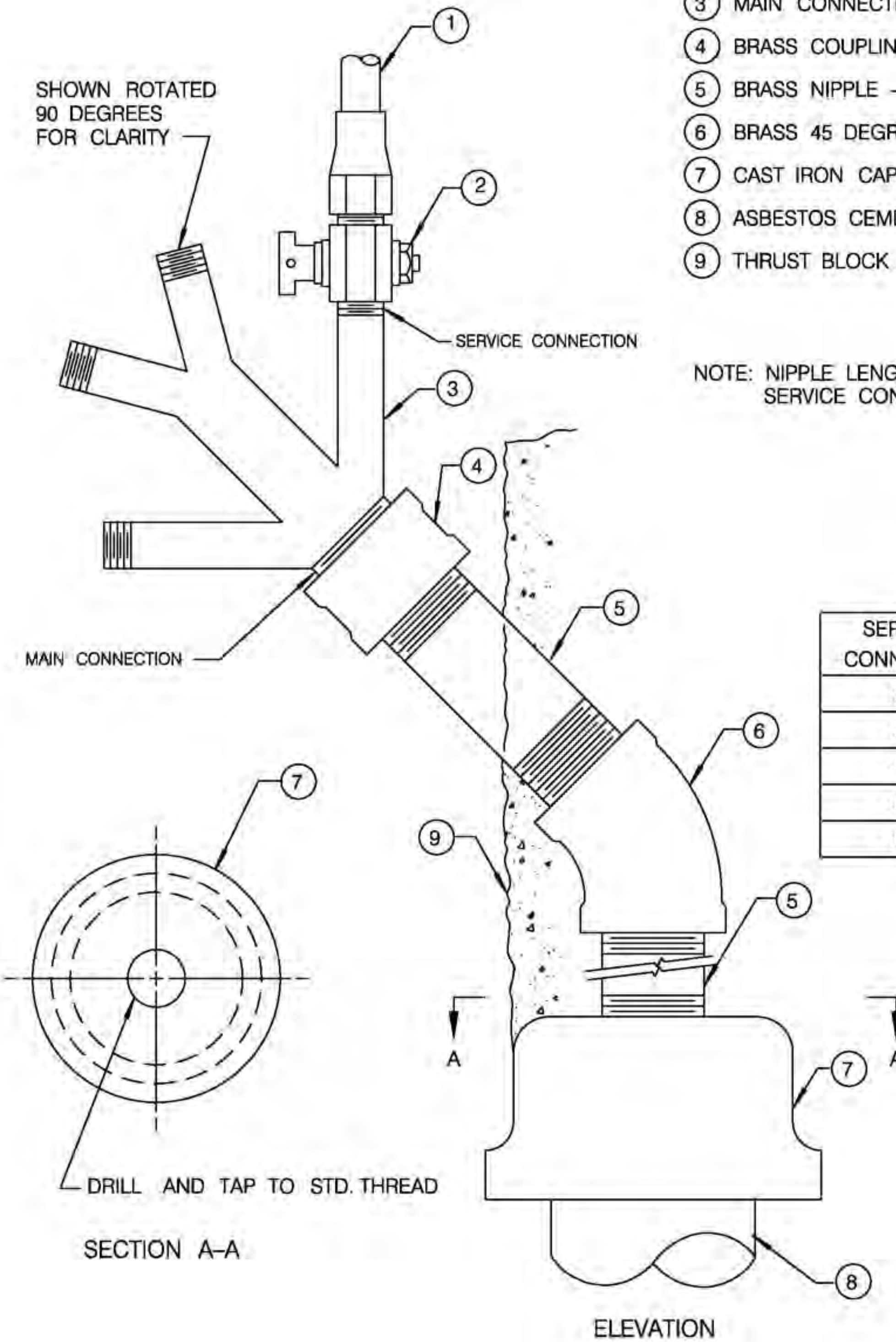
DRAWING NUMBER **SDW-137**

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

NOTE: NIPPLE LENGTHS TO BE SUFFICIENT TO ALLOW SERVICE CONNECTION TO CLEAR THRUST BLOCK.

SERVICE CONNECTION	MAIN CONNECTION ITEM 5
2	1 1/4"
3	1 1/2"
4	2"
6	2 1/2"
8	3"



SECTION A–A

ELEVATION

REVISION	BY	APPROVED	DATE
ORIGINAL	JS	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

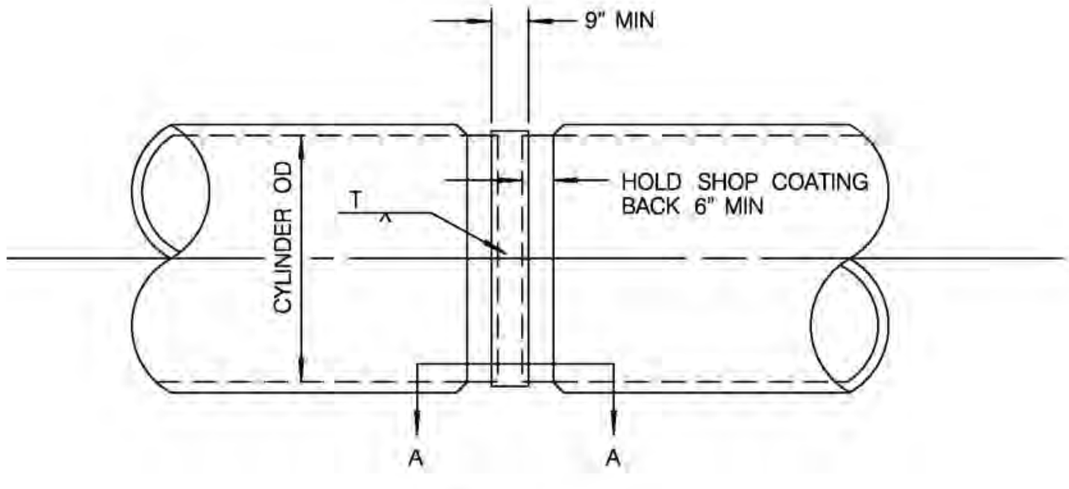
CITY OF SAN DIEGO – STANDARD DRAWING

MULTIPLE SERVICE ASSEMBLY
DEAD END MAIN

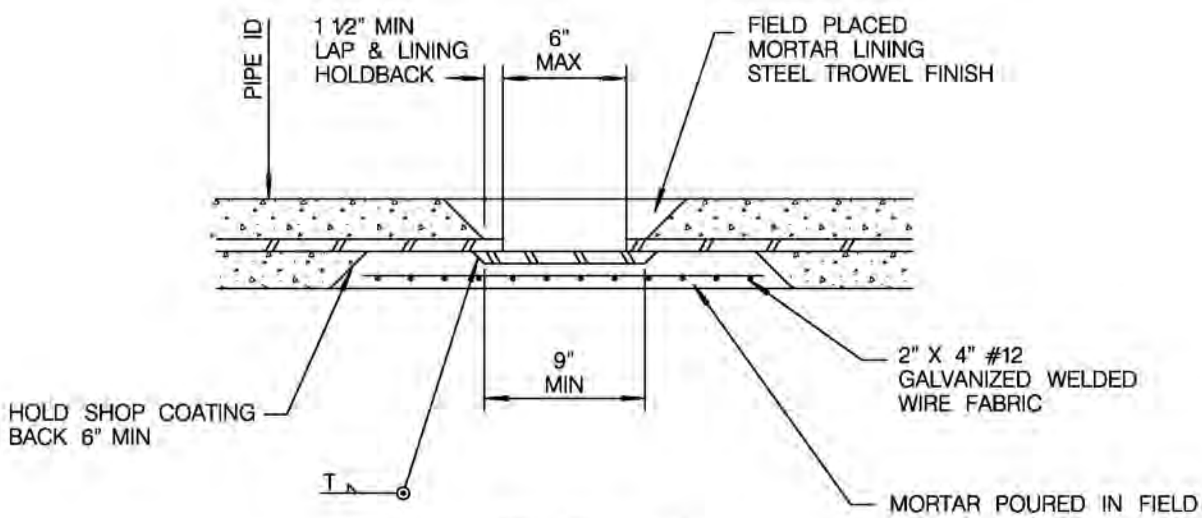
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDW-138**



ELEVATION



SECTION A – A

NOTES:

CONTRACTOR SHALL PROVIDE HANDHOLES AS REQUIRED TO COMPLETE THE WORK

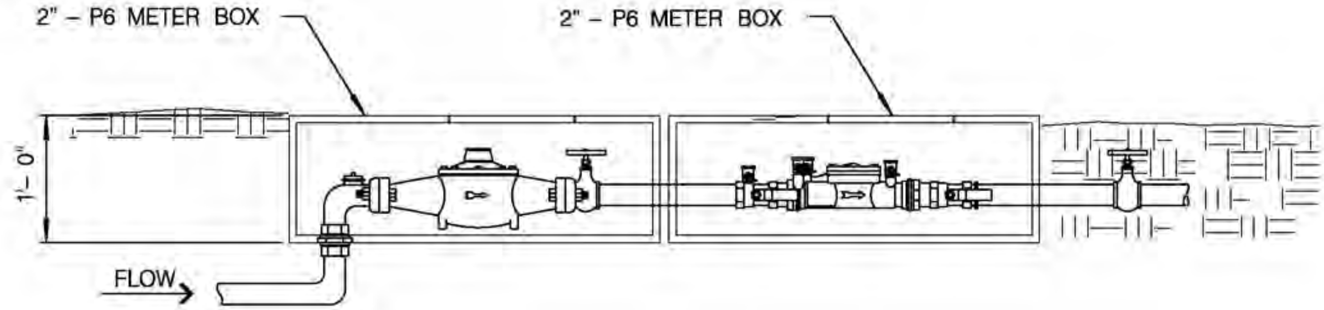
REVISION	BY	APPROVED	DATE	
ORIGINAL	JS	A. OSKOUI	12/06	CITY OF SAN DIEGO – STANDARD DRAWING
UPDATED	KA	J. NAGELVOORT	01/12	**SPLIT BUTT STRAP**

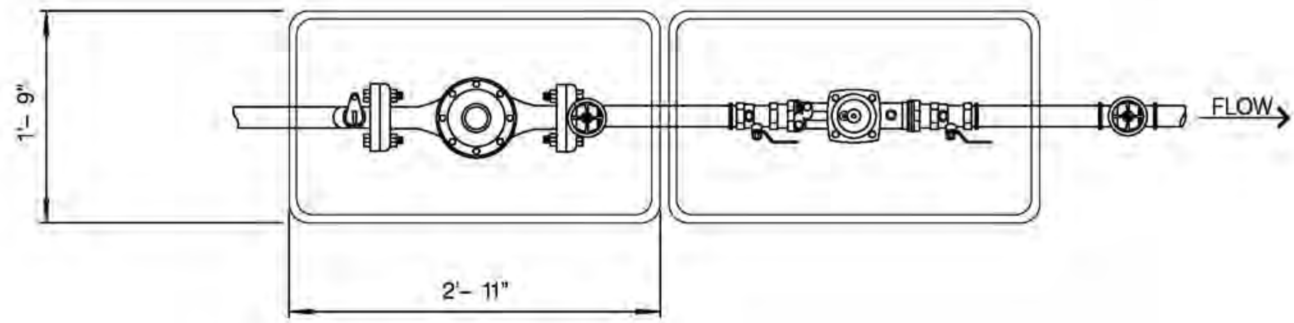
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-139**





NOTES:

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

2. ALL METAL IN CONTACT WITH CONCRETE PIPE SHALL BE POLYETHYLENE WRAPPED USING 2" WIDE PLASTIC BACKED ADHESIVE TAPE MINIMUM 8 MILS. THICK WITH 1/2" OVERLAP.

3. CONCRETE PAD TO BE 2" ABOVE GRADE UNLESS IN LAWN AREA WHERE IT WILL BE AT 1" ABOVE GRADE. CONCRETE PAD SHALL BE 4" THICK AND 18" WIDE MINIMUM 520-C-2500. (OPTIONAL WITH WATER DEPARTMENT APPROVAL).

4. FACTORY ASSEMBLED REDUCED PRESSURE PRINCIPLE ASSEMBLY /DOUBLE CHECK ASSEMBLY SHALL BE INCLUDED IN THE LATEST EDITION OF THE "APPROVED FOR SERVICE ISOLATION IN CALIFORNIA POBLIC WATER SYSTEMS ISSUED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES, OFFICE OF DRINKING WATER.

5. REGULATOR MAY BE INSTALLED UPSTREAM OF THE BACKFLOW PREVENTER ASSEMBLY WHEN WATER PRESSURE EXCEEDS BACKFLOW PREVENTER ASSEMBLY RATING.

6. WYE STRAINER AND REGULAR, WHEN REQUIRED, SHALL BE LOCATED DOWNSTREAM OF THE #2 SHUTOFF VALVE.

7. PROTECTIVE ENCLOSURE FOR BACKFLOW PREVENTER ASSEMBLY SHALL BE USED AT THE DISCRETION OF THE PROPERTY OWNER.

8. LOCATE PREVENTER ASSEMBLY AS CLOSE TO METER AS PRACTICAL AS APPROVED BY THE ENGINEER.

9. ALL RISERS, ELBOWS AND UNDERGROUND PIPING SHALL BE M OR L COPPER, BRASS, OR APPROVED EQUAL.

REVISION	BY	APPROVED	DATE
ORIGINAL			
REVISED	MC		9/06
NOTES	JS	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

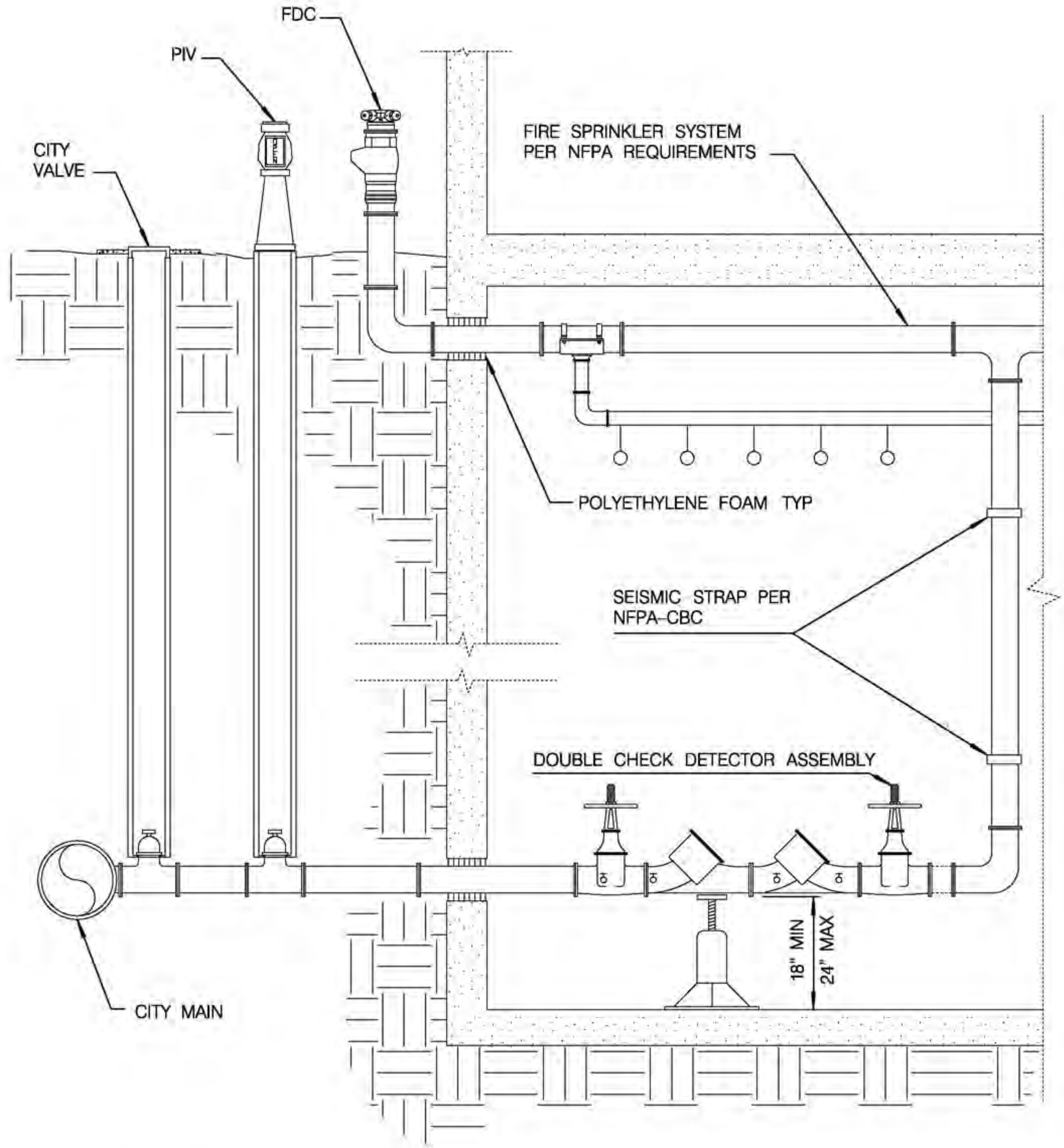
WATER METER WITH 2" AND SMALLER DOUBLE CHECK VALVE ASSEMBLY

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-140**



NOTES:

1. SEE SDW-120 FOR COMPLETE INSTALLATION REQUIREMENTS.
2. LOCATION MUST BE APPROVED BY WATER DEPARTMENT, WATER OPERATIONS DIVISION, METER / BACKFLOW GROUP AND SHOWN ON PLANS.

REVISION	BY	APPROVED	DATE
ORIGINAL	MC	A. OSKOUI	8/06
NOTES	JS	A. OSKOUI	12/06
UPDATED	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

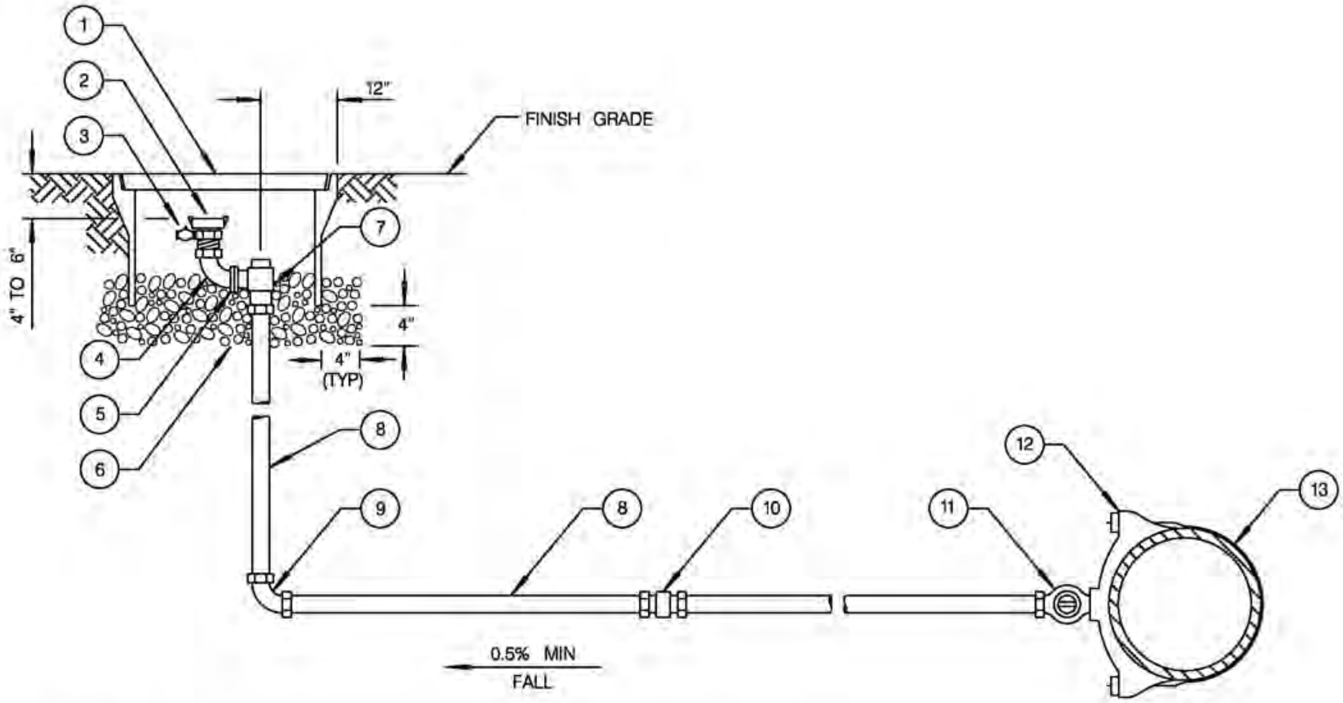
BACKFLOW PREVENTER
DOUBLE CHECK DETECTOR ASSEMBLY
FOR FIRE SERVICE 3" AND LARGER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-141**



NOTES:

1. SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE
2. LOCATE METER BOX
3. INSTALL WARNING / IDENTIFICATION TAPE
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 OTHER STANDARD DRAWINGS

LEGEND ON PLANS

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

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

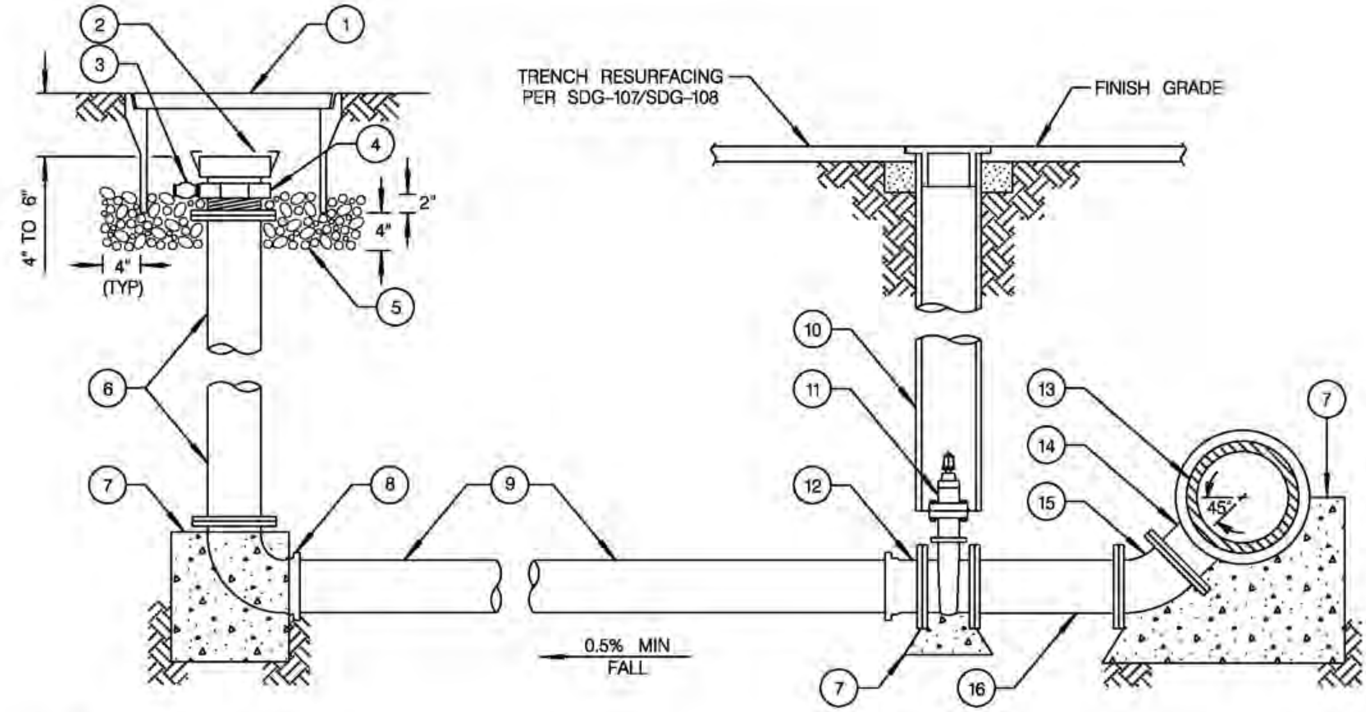
2" BLOW-OFF INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-143**



NOTES:

1) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE

2) LOCATE METER BOX

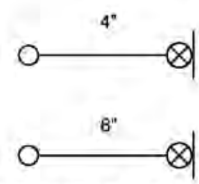
3) INSTALL WARNING / IDENTIFICATION TAPE

4) FOR BLOW-OFF INSTALLATION AT END OF MAIN SEE OTHER STANDARD DRAWINGS

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



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	POLYMER METER BOX WITH LID 17" x 30", SEE NOTE 2	8	4" OR 6" FLG x MJ/PO 90° BEND
2	4" OR 6" CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 7	9	USE STEEL PIPE ONLY
		10	VALVE WELL FRAME AND COVER (SEE SDW-153, SDW-154)
3	1/4" PRESSURE PET COCK	11	4" OR 6" FLG x MJ/PO/FLG RWGV
4	4" OR 6" FLANGED COMPANION x FIPT	12	4" OR 6" FLG x MJ/PO ADAPTER (IF REQUIRED)
5	3/8" ROCK 4" TO 6" DEEP	13	WATER MAIN
6	4" OR 6" FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOLS)	14	SIZE x 4" OR 6" MJ/PO/FLG x FLG TEE
		15	4" OR 6" FLANGED 45° BEND
7	CONCRETE THRUST BLOCK SEE SDW-151	16	4" OR 6" x 24" FLG DI SPOOL

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

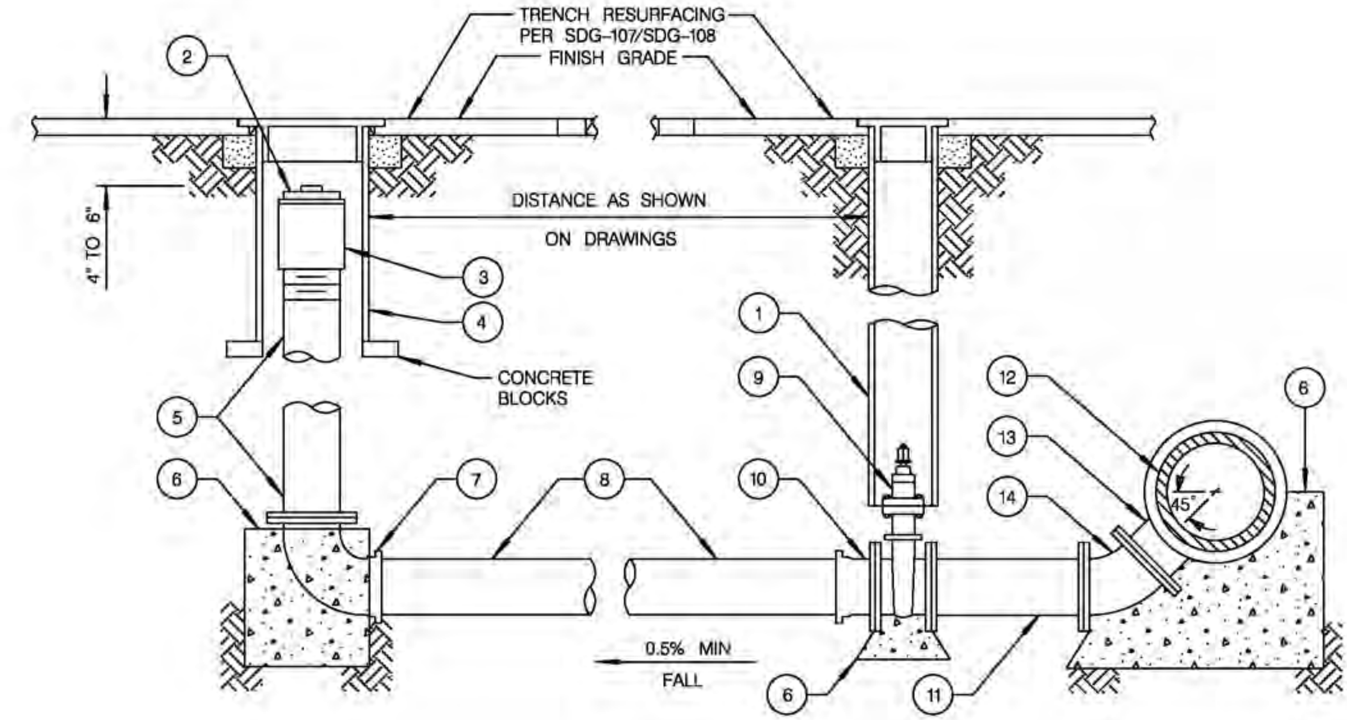
4" & 6" BLOW-OFF INSTALLATION TYPE A

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-144**



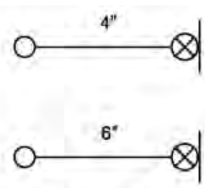
NOTES:

1) FOR BLOW-OFF INSTALLATION AT END OF MAIN SEE OTHER STANDARD DRAWINGS

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



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	GATE WELL WITH CAP SEE SDW-153 OR SDW-154	8	CAST IRON PIPE, DUCTILE IRON OR C-900 PVC
2	GALVANIZED IRON PLUG	9	4" OR 6" FLG x MJ / PO / FLG RWGV
3	GALVANIZED IRON COUPLING, THREADED	10	4" OR 6" FLG x MJ / PO ADAPTER (IF REQUIRED)
4	10" STEEL GATE WELL WITH CAP	11	4" OR 6" x 24" FLG DI SPOOL
5	4" OR 6" FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOLS)	12	WATER MAIN
6	CONCRETE THRUST BLOCK SEE SDW-151	13	SIZE x 4" OR 6 MJ / PO / FLG x FLG TEE
7	FLANGE x FLANGE x 90° BEND	14	4" OR 6" FLANGED 45° BEND, SEE NOTE 4

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

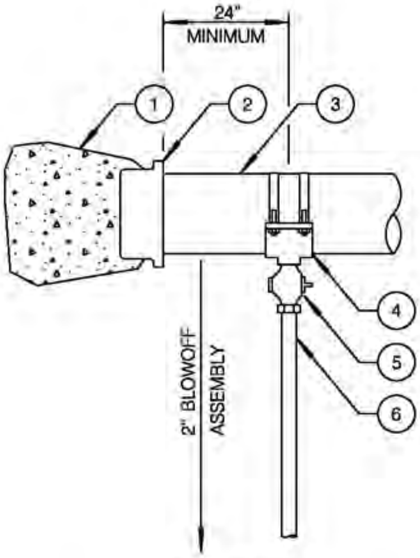
4" & 6" BLOW-OFF INSTALLATION IN STREET TYPE B

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

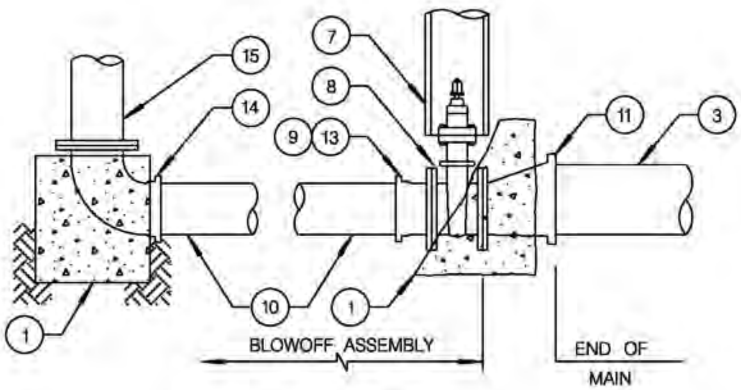
1/31/2012

COORDINATOR R.C.E. 65271 DATE

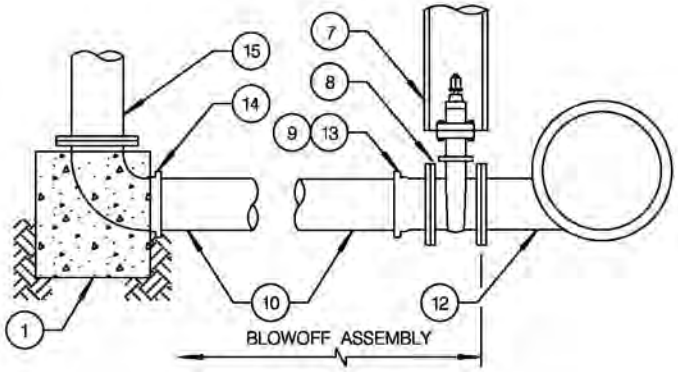
DRAWING NUMBER **SDW-145**



2" BLOWOFF
FROM END OF MAIN
(PLAN VIEW)



4" & 6"
BLOWOFF FROM END OF MAIN
(PROFILE VIEW)



4" & 6"
BLOWOFF FROM STEEL MAIN
(PROFILE VIEW)

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) SEE OTHER DRAWINGS FOR END OF MAIN DETAIL.

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	CONCRETE THRUST BLOCKS SEE SDW–151	8	FLG x MJ/PO/FLG RWGV
2	DI END CAP	9	FLG x MJ/PO ADAPTER (IF REQUIRED)
3	WATER MAIN	10	C–900 PVC PIPE
4	BRONZE SERVICE CLAMP (DOUBLE STRAP). SIZE x 2" SERVICE SADDLE	11	FLG x MJ/PO ECCENTRIC DI REDUCER
5	2" BRONZE MIPT x COMP CORPORATION STOP	12	MAIN SIZE x BLOWOFF SIZE FLANGE MANUFACTURED STEEL TANGENTIAL OUTLET
6	2" x REQ'D LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT	13	FLG x MJ/PO BEND (IF REQUIRED)
		14	FLG x MJ/PO 90° BEND
7	GATE WELL WITH CAP SEE SDW–153 & SDW–154	15	FLG DI PIPE x REQUIRED LENGTH (MAXIMUM OF 2 SPOOLS)

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

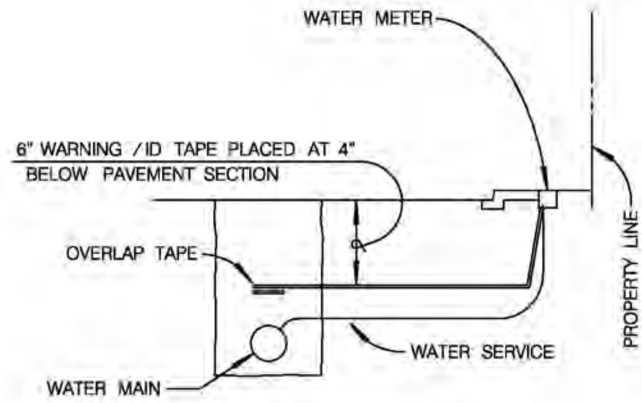
BLOW-OFF INSTALLATION FROM END OF MAIN & FROM STEEL MAIN

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

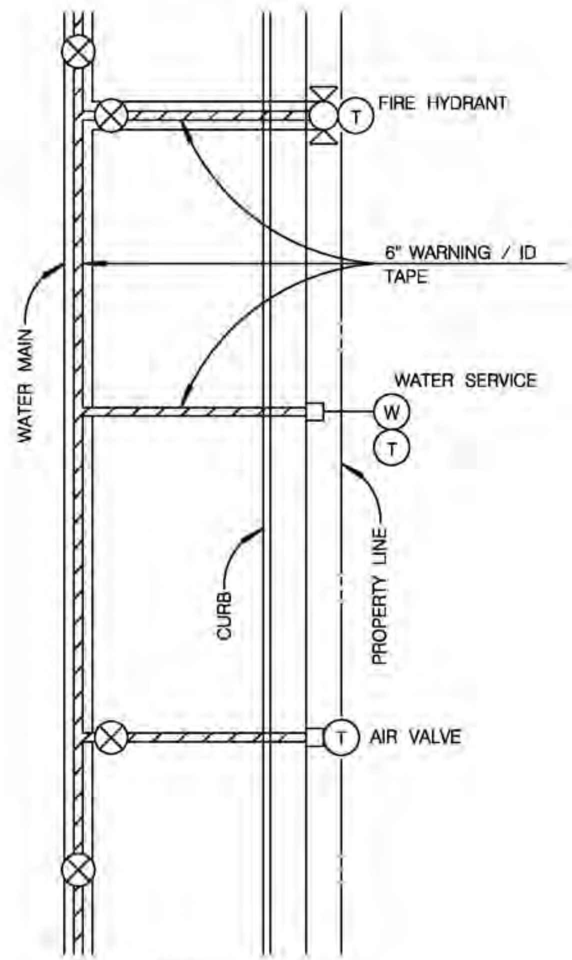
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-146**



SECTION AT WATER SERVICE



PLAN

NOTES:

1) 6" WARNING / IDENTIFICATION TAPE SHALL BE INSTALLED ABOVE THE PIPE AS SPECIFIED AND RUN CONTINUOUSLY ALONG THE ENTIRE LENGTH OF THE PIPE AND ALL RELATED APPURTENANCES.

2) ELECTRICALLY BOND SERVICE TAPE AND MAIN TAPE TOGETHER. TAPE SHALL EXTEND WITHIN METER BOX ITSELF TO ALLOW MARKOUT BY CONTINUITY TESTER.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

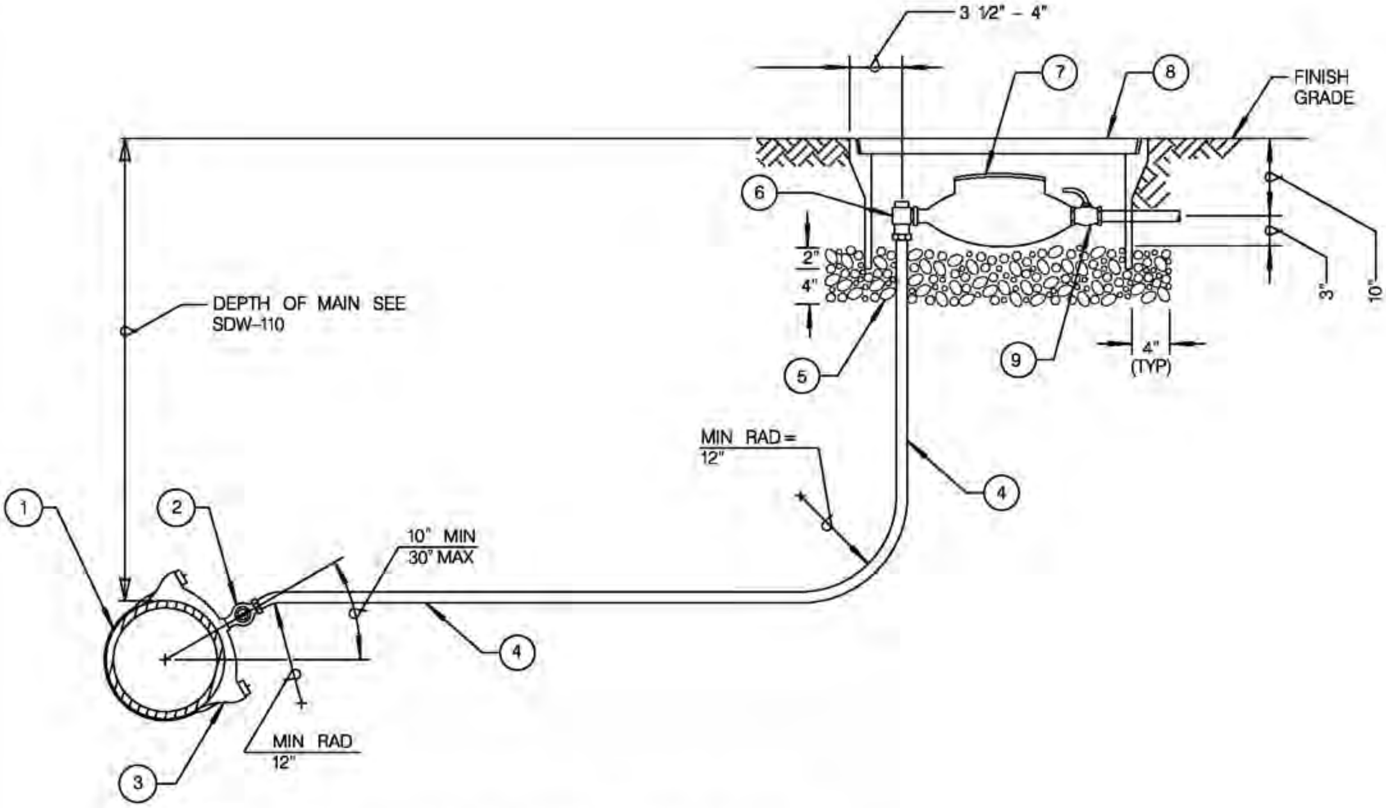
WARNING / IDENTIFICATION TAPE INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-148**



NOTES:

1) INSTALL CORPORATION STOP WITH KEY IN THE SIDE POSITION

2) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB, OR FINISH GRADE

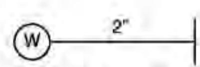
3) LOCATE METER BOX

4) INSTALL WARNING / IDENTIFICATION TAPE

5) SILVER SOLDER JOINTS SHALL NOT BE USED

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. ANY GLUE JOINT SHALL BE BEVELED PRIOR TO ASSEMBLY



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	WATER MAIN	6	2" BRONZE ANGLE METER STOP WITH LOCKWING
2	2" BRONZE CORPORATION STOP	7	WATER METER FURNISHED AND INSTALLED BY THE CITY
3	SIZE x 2" BRONZE SERVICE SADDLE DOUBLE STRAP	8	METER BOX WITH LID, #6: 35"x 21"
4	2" x REQUIRED LENGTH COPPER PIPE TYPE "K" SOFT/RIGID	9	CUSTOMER SHUT-OFF VALVE (LOCKABLE)
5	3/8" ROCK, 4" TO 6" DEEP		

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

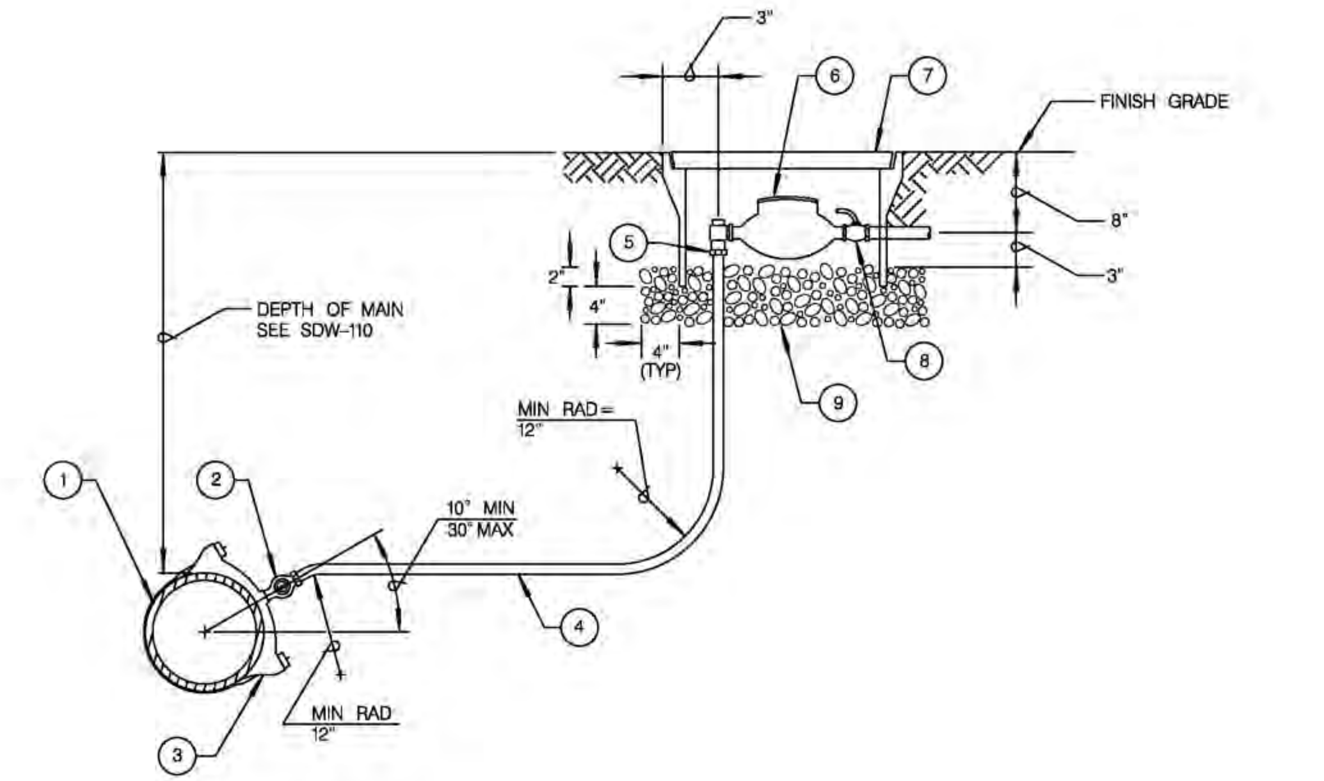
2" WATER SERVICE INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hasle 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-149**



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
4) INSTALL WARNING / IDENTIFICATION TAPE
5) SILVER SOLDER JOINTS SHALL NOT BE USED
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) PIPE. TOP TAPS ARE NOT PERMITTED.

LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	WATER MAIN	6	WATER METER FURNISHED & INSTALLED BY THE CITY
2	1" BRONZE CORPORATION STOP		
3	SIZE x 1" SERVICE SADDLE	7	METER BOX WITH LID, #37: 28" x 18"
4	USE COPPER TUBING TYPE (K) SOFT FOR 1" SERVICES ONLY. NO INTERMEDIATE JOINTS PERMITTED WITHIN THE FIRST 60' FROM THE MAIN FOR LENGTHS LONGER THAN 60 FEET USE FLARE JOINT UNION OR LOK-PAC FITTINGS WITH LOCKING CLAMP AND STAINLESS STEEL BOLT ONLY. NO SWEAT JOINTS ARE ALLOWED	8	CUSTOMER SHUT-OFF VALVE (LOCKABLE) FURNISHED AND INSTALLED BY THE CITY
		9	3/8" ROCK, 4" TO 6" DEEP
5	BRONZE ANGLE METER STOP WITH LOCKWING DEVICE AND METER COUPLING ATTACHED. "FURNISH AND INSTALL BRONZE PROPERTY VALVE. USE SPACER FOR METER"		

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

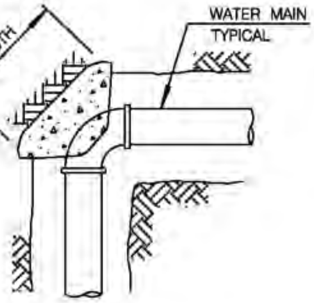
1" WATER SERVICE INSTALLATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

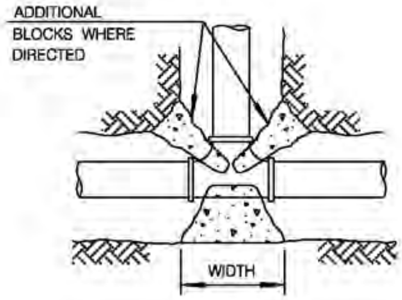
1/31/2012

COORDINATOR R.C.E. 65271 DATE

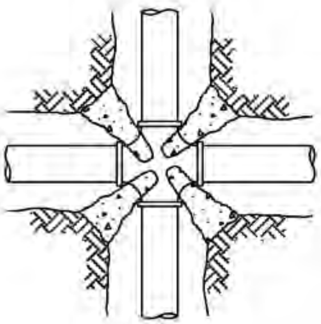
DRAWING NUMBER **SDW-150**



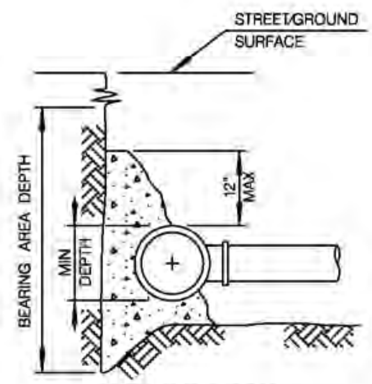
BEND



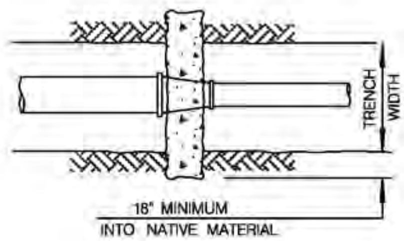
TEE PLAN



CROSS

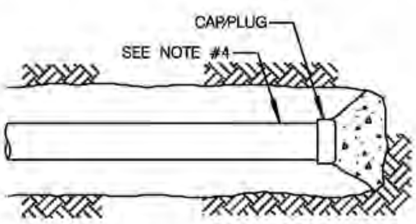


TEE ELEVATION

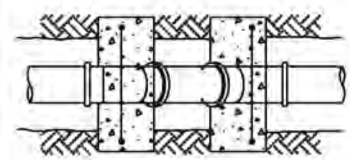


REDUCER

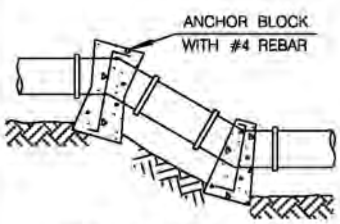
SEE NOTE 1 BELOW



END CAP



VERT BENDS PLAN



VERT BENDS ELEVATION

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.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

CONCRETE THRUST AND ANCHOR BLOCK INSTALLATIONS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

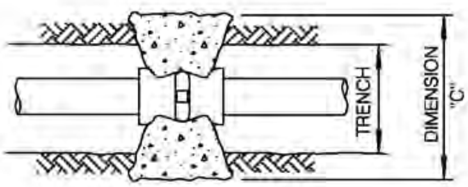
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-151**

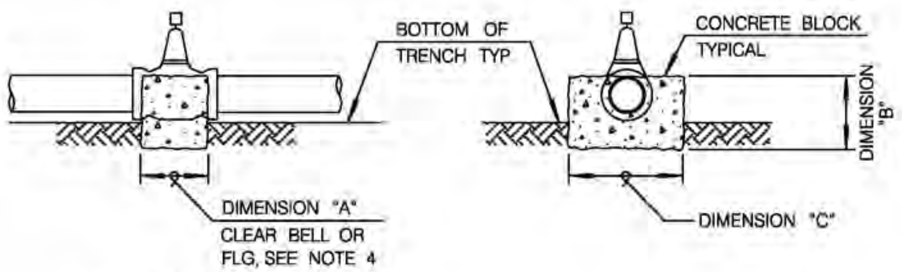
VALVE SUPPORT BLOCK		
VALVE SIZE	DIMENSION "A"	DIMENSION "B"
4"	12"	12"
6"	12"	12"
8"	13"	14"
10"	14"	16"
12"	15"	18"
DIMENSION "C" = TRENCH WIDTH PLUS TWO TIMES THE PIPE DIAMETER		

THRUST AND ANCHOR BLOCKS

MINIMUM BEARING AREA IN SQUARE FOOT (SQUARE METERS) SEE NOTE 2				
MAIN SIZE	TEES	90° BEND	45° BEND	$22\frac{1}{2}$° BEND
4"	4	5	3	1.5
6"	8	10	5	2.5
8"	12	16	9	4.5
10"	17	24	13	6.5
12"	24	33	19	9.5



VALVE SUPPORT
PLAN



VALVE SUPPORT
ELEVATION

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 ACCESSABLE FOR REPAIR OR REPLACEMENT.

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

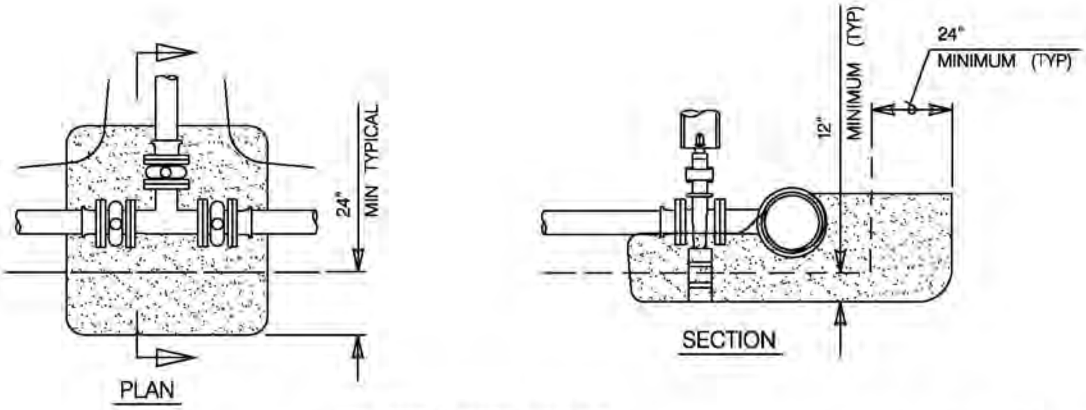
CONCRETE THRUST AND ANCHOR BLOCK INSTALLATIONS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

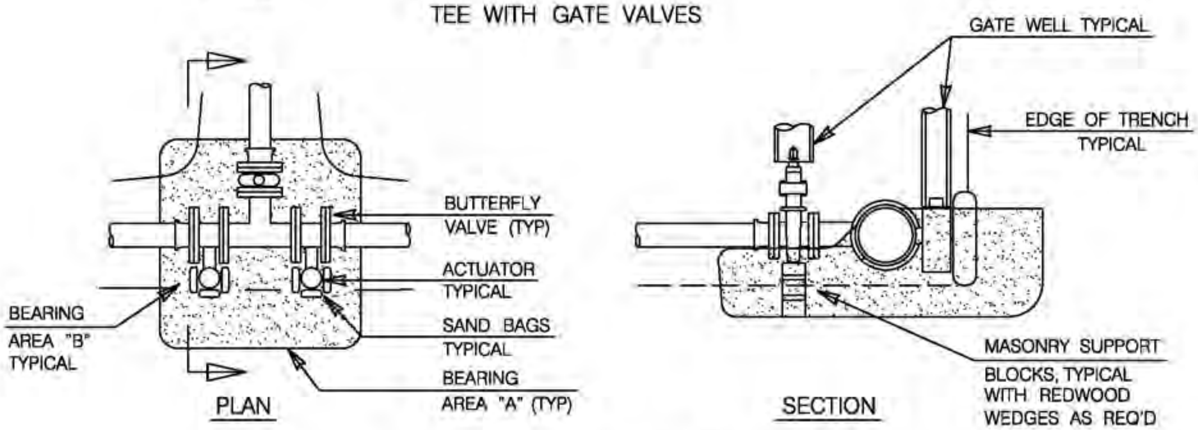
1/31/2012

COORDINATOR R.C.E. 65271 DATE

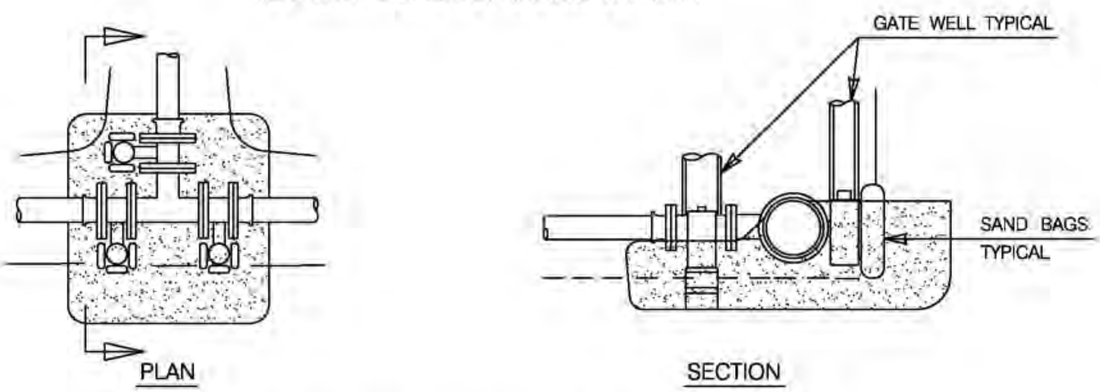
DRAWING NUMBER **SDW-151**



TEE WITH GATE VALVES



TEE WITH BUTTERFLY VALVES ON MAIN



TEE WITH BUTTERFLY VALVES

NOTES:

1) BEARING AREA "B" MUST BE EQUAL TO OR GREATER THAN THE AREA REQUIRED FOR A 90* ELBOW INSTALLATION.

2) INSTALL SAND BAGS AROUND BUTTERFLY VALVE ACTUATOR TO ISOLATE IT FROM CONCRETE.

3) BFV'S INSTALLED AT CROSSES OR TEES REQUIRE A FLANGED DUCTILE IRON SPOOL TO BE INSTALLED BETWEEN THE FITTING AND VALVE IN ACCORDANCE WITH THE SPECIFICATIONS.

SHEET 3 OF 3

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

CONCRETE THRUST AND ANCHOR BLOCK INSTALLATIONS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

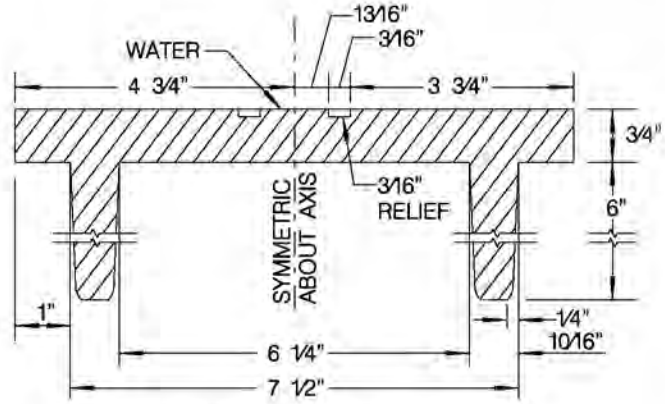
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-151**

POTABLE

WATER

GATE WELL LID



CAST IRON VALVE WELL CAP DETAIL

COLOR	GATE WELL AND LIDS USED FOR:
RED	NORMALLY CLOSED SYSTEM VALVES (NCV)
WHITE	RESILIENT WEDGE GATE VALVES
YELLOW	BUTTERFLY VALVES

INSIDE GATE WELL LID PAINTED IDENTIFICATION MARKING

VALVE CONDITION	BUTTERLY VALVE	GATE VALVE
PERMANENTLY CLOSED	RED	RED
TEMPORARILY CLOSED	YELLOW W/RED DOT	WHITE W/RED DOT
PERMANENTLY OPEN	YELLOW	WHITE

GATE WELL LID TOP COLOR & CONDITION

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

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

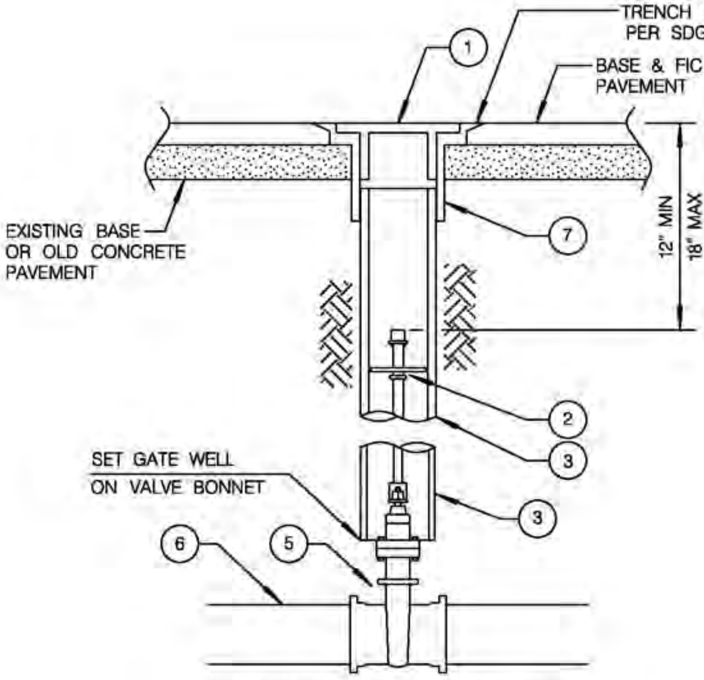
GATE WELL IDENTIFICATION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

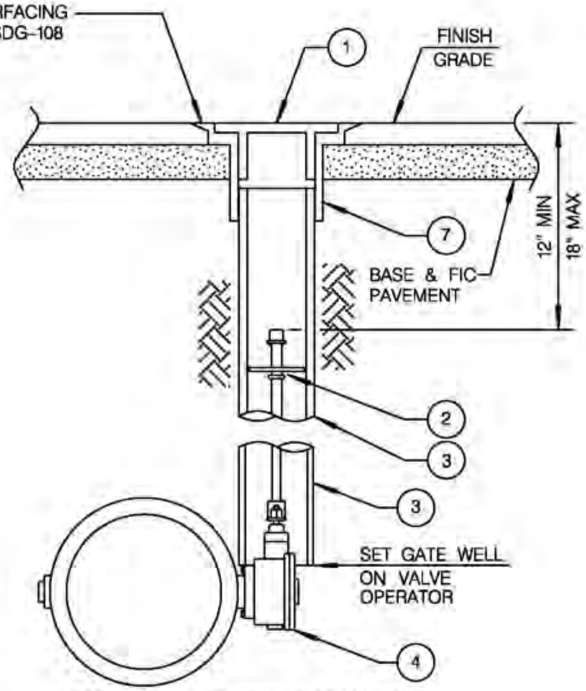
1/31/2012

COORDINATOR R.C.E. 65271 DATE

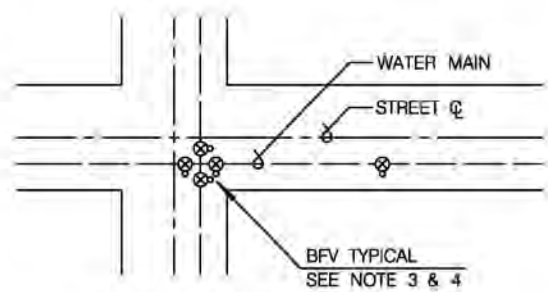
DRAWING NUMBER **SDW-152**



GATE WELL (GATE VALVES)

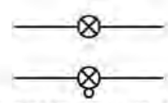


GATE WELL (BUTTERFLY VALVES)



BFV OPERATOR POSITION

NOTES:
1) VALVES DEEPER THAN 6' REQUIRE A VALVE STEM EXTENSION
2) EXTENSION STEMS SHALL NOT BE ATTACHED/BOLTED TO OPERATING NUT
3) GATE WELL AND CAP SHALL BE SET SO THAT NO MORE THAN TWO 1" ADJUSTMENT RINGS ARE USED
4) BFV OPERATORS TO BE LOCATED TO THE CURBLINE SIDE OF WATER MAIN
5) BFV'S INSTALLED AT CROSSES OR TEES REQUIRE A FLANGED DUCTILE IRON SPOOL TO BE INSTALLED BETWEEN THE FITTING AND VALVE IN ACCORDANCE WITH THE SPECIFICATIONS
6) GATE WELLS AND CAPS SHALL BE IDENTIFIED
7) FOR INLINE VALVE ANCHOR BLOCK INSTALLATION
8) VALVE WELL FRAME SHALL BE SET TO SLOPE OF STREET



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	GATE WELL WITH CAP SEE NOTE 6	5	RESILIENT WEDGE GATE VALVE
2	VALVE STEM EXTENSION SEE NOTES 1 & 2	6	WATER MAIN
3	8" OD x 1/8" STEEL CASING x REQUIRED LENGTH GATE WELL SEE NOTE 6	7	1/8" THICK, 8 5/8" OD STEEL PIPE
4	BUTTERFLY VALVE		

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

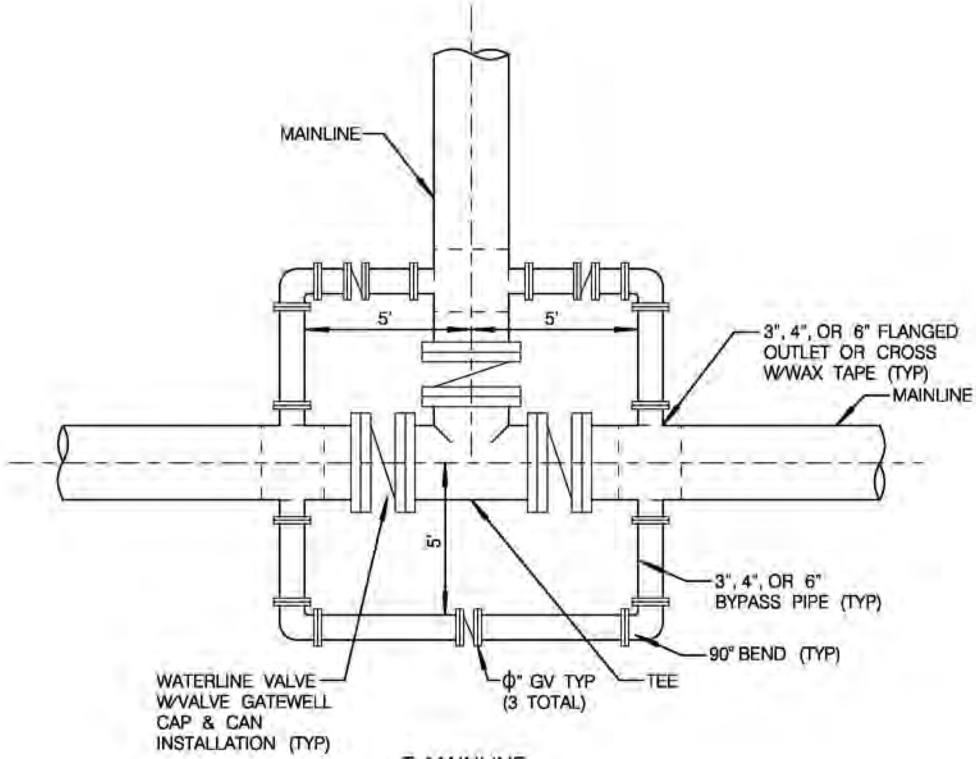
GATE WELL CAP & CAN INSTALLATION FOR VALVES 4" AND LARGER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

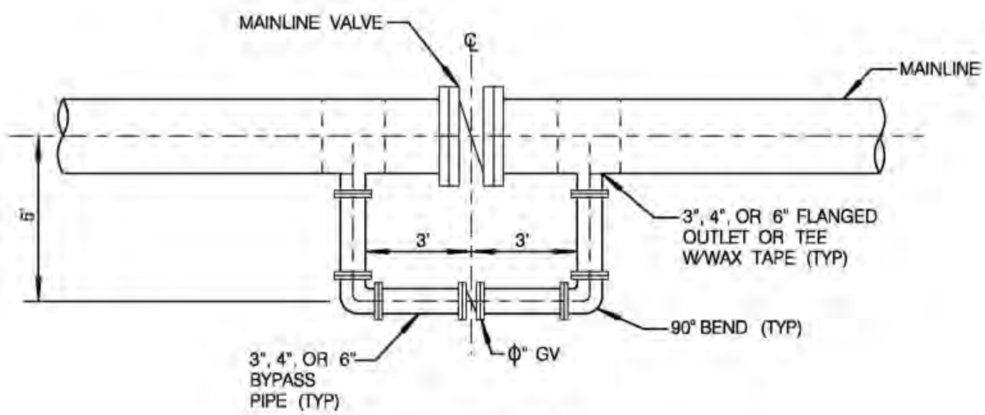
1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-153**



T–MAINLINE



STRAIGHT MAINLINE

NOTES:

1. BYPASS SHALL BE SAME MATERIAL AS MAINLINE PIPE.
2. THE VALVE SHALL BE THE SAME SIZE AS THE BYPASS PIPE.
3. SEE TABLE FOR BYPASS SIZE.

MAIN SIZE	BYPASS SIZE
16" TRANSMISSION	3"
> 16" AND =< 36"	4"
>36"	6"

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

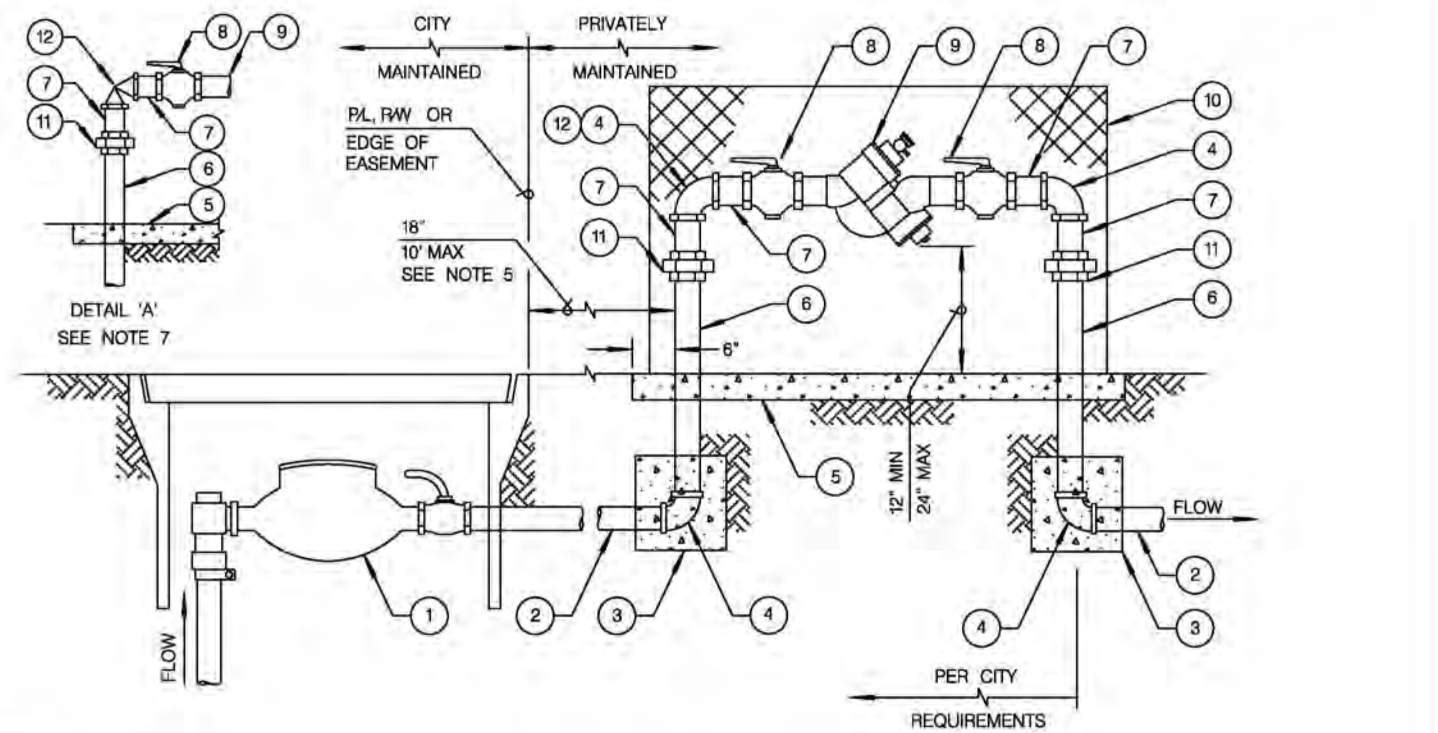
WATER VALVE BYPASS DETAILS FOR MAINLINES 16" AND LARGER

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-154**



NOTES:

1) INSTALL WARNING/IDENTIFICATION TAPE.

2) LOCATE BACKFLOW PREVENTION DEVICE (BPD) IN SUCH A MANNER THAT WILL ALLOW THE DEVICE 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 OR THREADED BRASS.

5) INSTALL A CASING ENCASED IN CONCRETE WHEN THE DISTANCE BETWEEN THE METER BOX AND THE RISER TO THE BPD EXCEEDS 18" (450mm). NO CONNECTIONS OF ANY KIND PERMITTED IN THIS AREA.

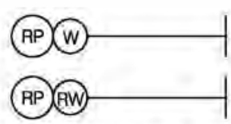
6) INSTALL AN ANGLE PRESSURE REDUCING VALVE IN LIEU OF THE FIRST 90* ELL WHEN SYSTEM PRESSURE EXCEEDS 150 PSI PER SPECIFICATIONS.

7) TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SPECIFICATIONS PRIOR TO ACCEPTANCE.

8) BACKFLOW PREVENTION DEVICE & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS.

9) LOCATION MUST BE APPROVED BY UTILITIES DEPARTMENT CUSTOMER SUPPORT DIVISION, METER SERVICES AND SHOWN ON THE PLANS.

10) ALL RISER ELBOWS AND UNDERGROUND PIPING SHALL BE TYPE (L) OR (M) COPPER, BRASS OR PUD APPROVED MATERIAL LIST BRASS UNIONS ACCEPTABLE.



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	METER BOX & METER ASSEMBLY SEE SDW-149 & SDW-150	8	BALL VALVE "SHUT-OFF"
2	SCH 80 PVC, BRASS OR COPPER PIPE	9	REDUCED PRESSURE BACKFLOW DEVICE
3	CONCRETE THRUST BLOCK SEE SDW-151	10	ENCLOSURE (OPTIONAL)
4	90° ELL SEE NOTES 4 & 6	11	UNION SEE NOTE 4
5	CONCRETE SLAB, MINIMUM 4" THICK x 18" WIDE	12	ANGLE PRV SEE NOTES 4 & 6
6	BRASS OR COPPER PIPE SEE NOTE 4		
7	3" LONG NIPPLE SEE NOTE 4		

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

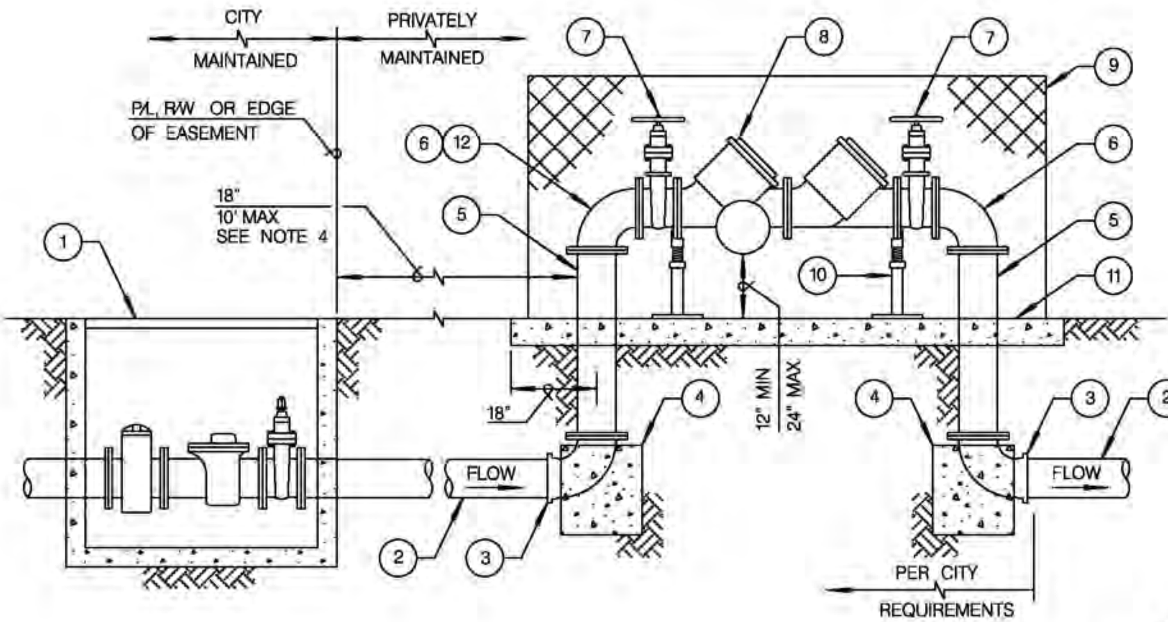
3/4" THRU 2" REDUCED PRESSURE BACKFLOW PREVENTION DEVICE

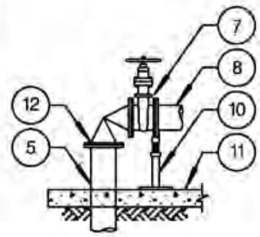
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

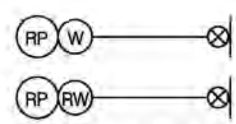
DRAWING NUMBER **SDW-155**





DETAIL 'A'
SEE NOTE 6

NOTES:
1) INSTALL WARNING/IDENTIFICATION TAPE
2) LOCATE BACKFLOW PREVENTION DEVICE (BPD) IN SUCH A MANNER THAT WILL ALLOW THE DEVICE 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 BPD EXCEEDS 18" (450mm)
5) INSTALL AN ANGLE PRESSURE REDUCING VALVE IN LIEU OF THE FIRST 90* ELL WHEN SYSTEM PRESSURE EXCEEDS 150 PSI PER SPECIFICATIONS
6) TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SPECIFICATIONS PRIOR TO ACCEPTANCE
7) BPD & APPURTENANCES INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	METER VAULT & METER ASSEMBLY SEE WS-04	7	FLANGED RESILIENT WEDGE GATE VALVE
2	PVC OR DUCTILE IRON PIPE	8	REDUCED PRESSURE BACKFLOW DEVICE
3	FLG x FLG OR MJ/PO x FLG 90* BEND	9	ENCLOSURE (OPTIONAL)
4	CONCRETE THRUST BLOCK SEE SDW-151	10	ADJUSTABLE VALVE SUPPORT
5	FLANGED DUCTILE IRON PIPE	11	CONCRETE SLAB, MINIMUM 4" THICK x 36" WIDE
6	FLANGED 90* BEND, SEE NOTE 5	12	FLANGED ANGLE PRESSURE REDUCING VALVE SEE NOTE 5

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

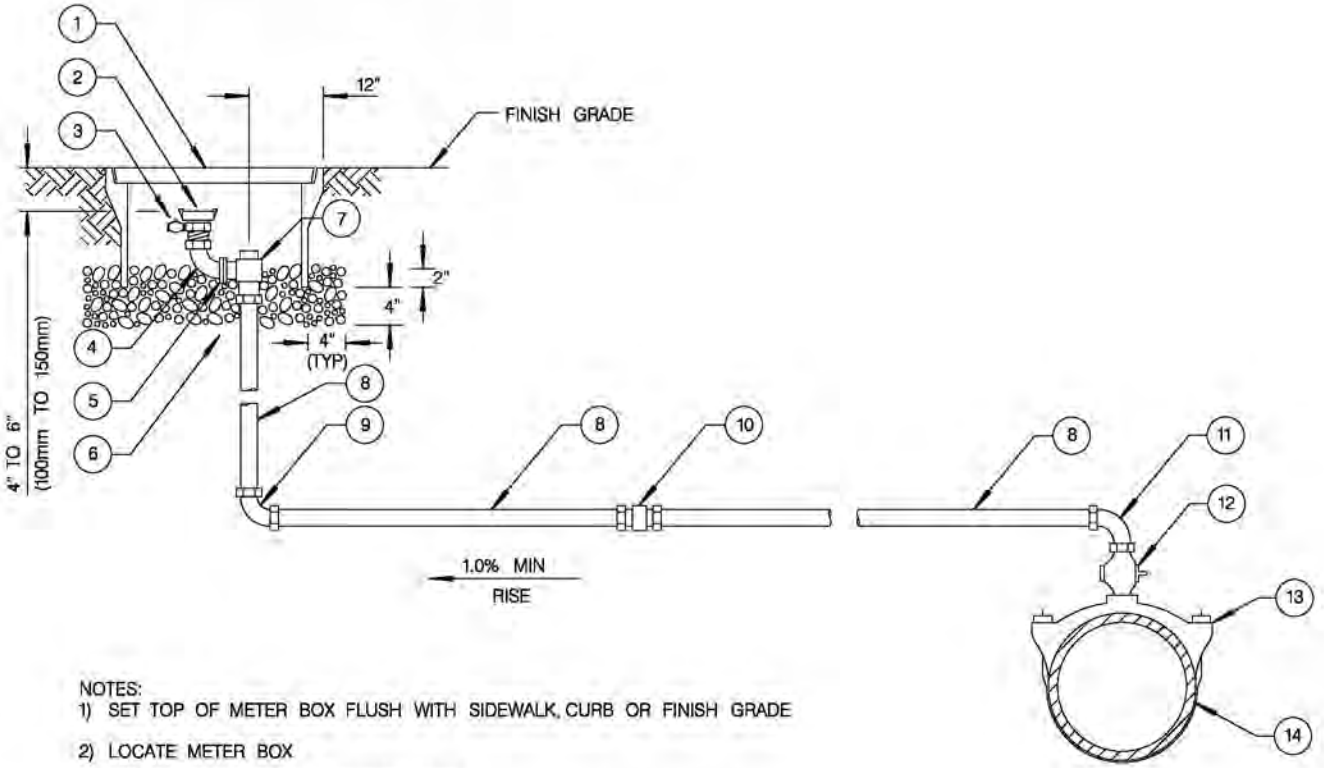
3" AND LARGER REDUCED PRESSURE BACKFLOW PREVENTION DEVICE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

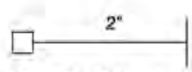
H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-156**



NOTES:
1) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB OR FINISH GRADE
2) LOCATE METER BOX
3) INSTALL WARNING/IDENTIFICATION TAPE
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



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	POLYMER METER BOX WITH LID 17" x 30", SEE NOTE 2	7	2" BRONZE COMP x FLG ANGLE METER STOP WITH LOCK WING
2	2" CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 7	8	2" x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT
3	1/4" PRESSURE PET COCK	9	2" 90° BRONZE COMPRESSION ELL
4	2" 90° BRONZE MIPT x FIPT ELL	10	2" BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)
5	2" OVAL METER FLANGE FLG x FIPT, WITH GASKET	11	2" 90° BRONZE FIPT x COMP ELL
6	3/8" ROCK 4" TO 6" DEEP	12	2" BRONZE MIPT x MIPT CORPORATION STOP
		13	SIZE x 2" SERVICE SADDLE
		14	WATER MAIN

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

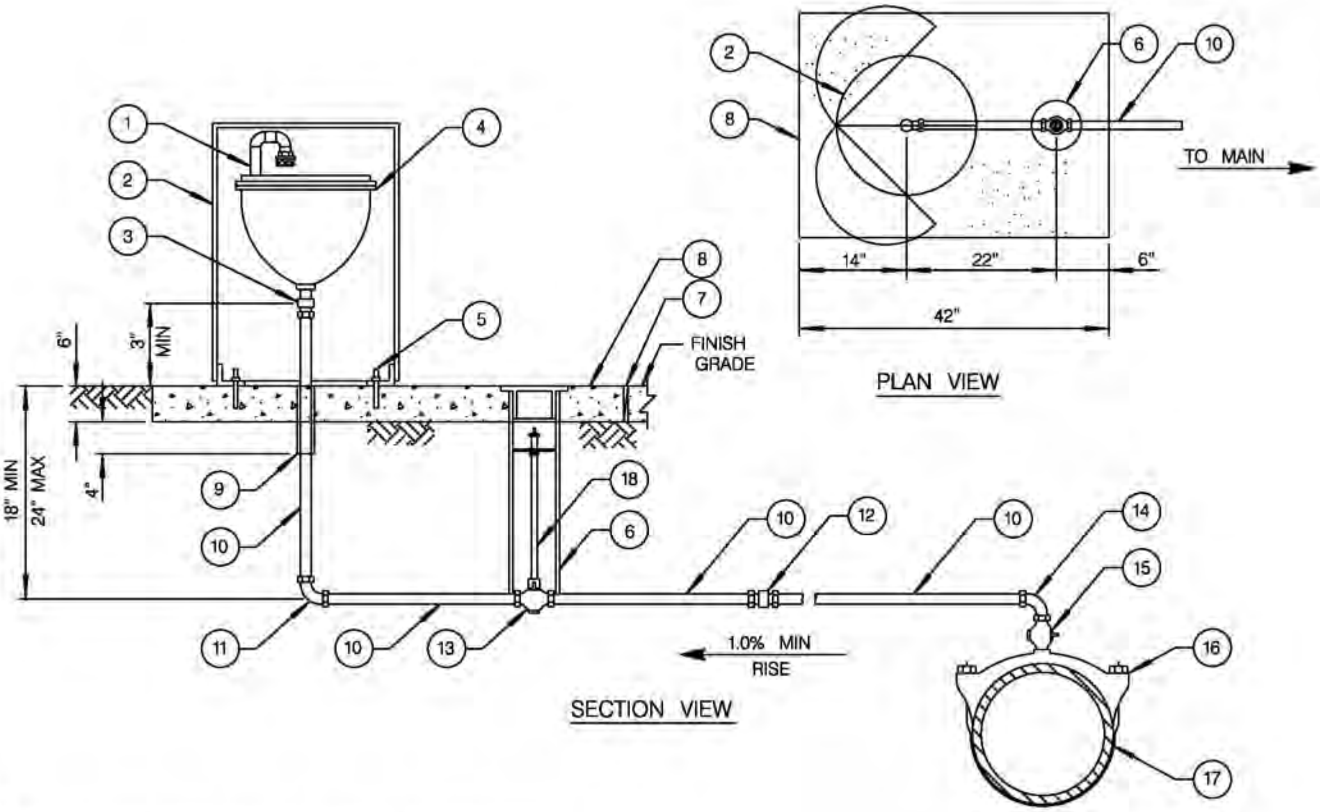
2" MANUAL AIR VALVE

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

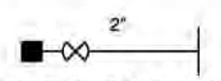
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-158**



NOTES:

1. NO DIPS OR LOW SPOTS WILL BE ALLOWED IN INSTALLATION.
2. LOCATE ENCLOSURE.
3. INSTALL /IDENTIFICATION TAPE.
4. AIR & VACUUM INSTALLED FOR THE USE OF 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).



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	2" PVC SCH 80 CLOSE NIPPLE & 2-SCH 80 STREET ELLS& INSECT SCREEN	9	2" X 1/2" BLACK FOAM SLEEVE
2	VALVE ENCLOSURE	10	COPPER TUBING OR PE 200 FOR 1 INCH PVC (IRON PIPE SIZE) FOR 2 INCHES.
3	2" MIPT X COMPRESSION ADAPTER	11	90˚ ELL (NO SWEAT JOINTS ALLOWED)
4	2" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE	12	2" BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)
5	1/2" X 3" STAINLESS STEEL DROP-IN ANCHORS (3 EA @120 APART)	13	2" COMP BALL BALVE W/TEE HEAD
6	4" SDR 35 SEWER PIPE GATE WELL WITH CAP	14	2" 90˚ BRONZE FIPT X COMP ELL
7	COLD JOINT STRIP	15	2" BRONZE MIPT X MIPT CORPORATION STOP
8	3'-6" X 2'-6" X 6" THICK CONCRETE SLAB	16	SIZE X 2" SERVICE SADDLE
		17	WATER MAIN
		18	VALVE STEM EXTNESION

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

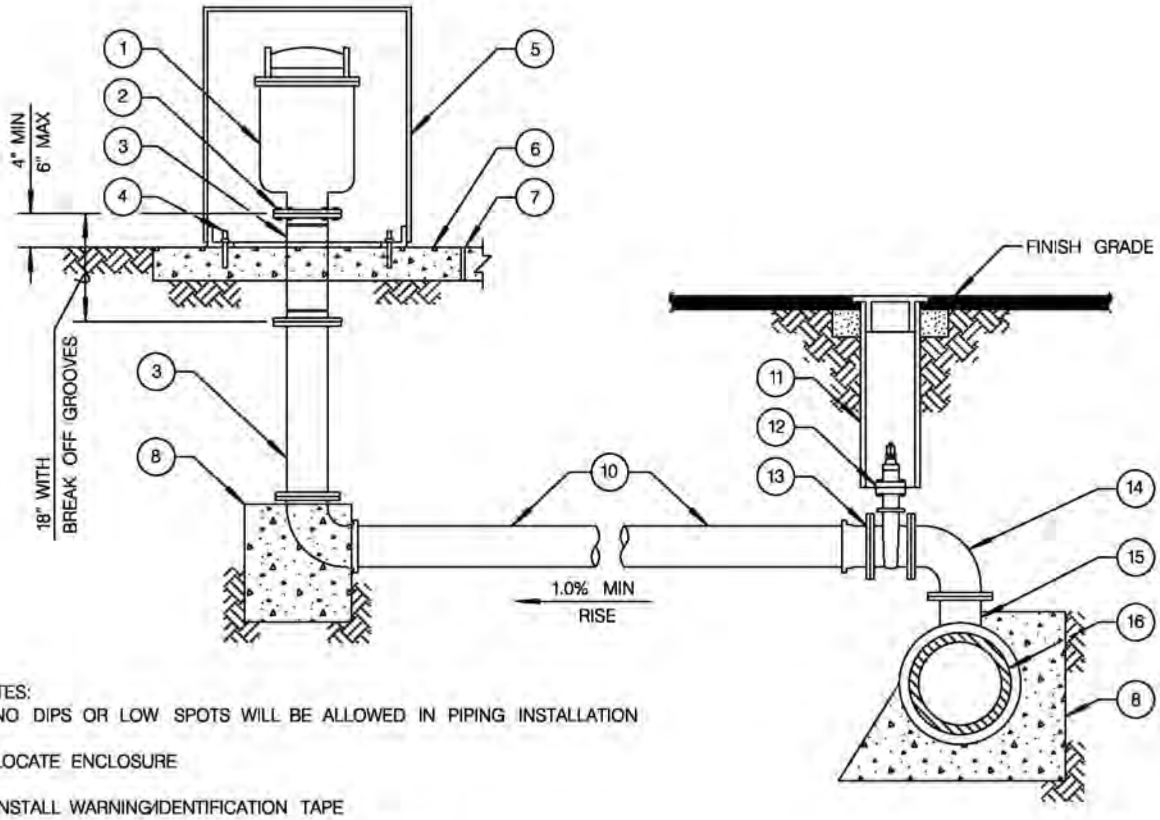
2" AUTOMATIC COMBINATION AIR RELEASE & AIR/ VACUUM VALVE INSTALLATIONS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-159**



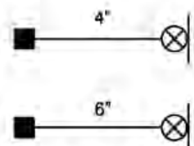
NOTES:
1) NO DIPS OR LOW SPOTS WILL BE ALLOWED IN PIPING INSTALLATION

2) LOCATE ENCLOSURE

3) INSTALL WARNING/IDENTIFICATION TAPE

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 RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN SPECIFICATIONS



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	4" OR 6" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE ASSEMBLY	10	4" OR 6" C-900 PVC PIPE
2	BREAK-AWAY BOLTS, SEE NOTE 4	11	GATE WELL WITH CAP
3	4" OR 6" FLANGED 8-BOLT DUCTILE IRON PIPE x REQ'D LENGTH (MAX OF 2 SPOOLS)	12	4" OR 6" FLG x MJ/PO/FLG RWGV
4	5/8" x 3" STAINLESS STEEL DROP-IN ANCHORS (3 EA @ 120° APART)	13	4" OR 6" FLG x MJ/PO ADAPTER (IF REQUIRED)
5	VALVE ENCLOSURE	14	4" OR 6" FLANGE 90° BEND
6	42" x 42" x 6" THICK CONCRETE SLAB	15	SIZE x 4" OR 6" MJ/PO/FLG x FLG TEE
7	COLD JOINT STRIP	16	WATER MAIN
8	CONCRETE THRUST/ANCHOR BLOCK SEE SDW-151		
9	4" OR 6" FLG x MJ/PO 90° BEND		

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

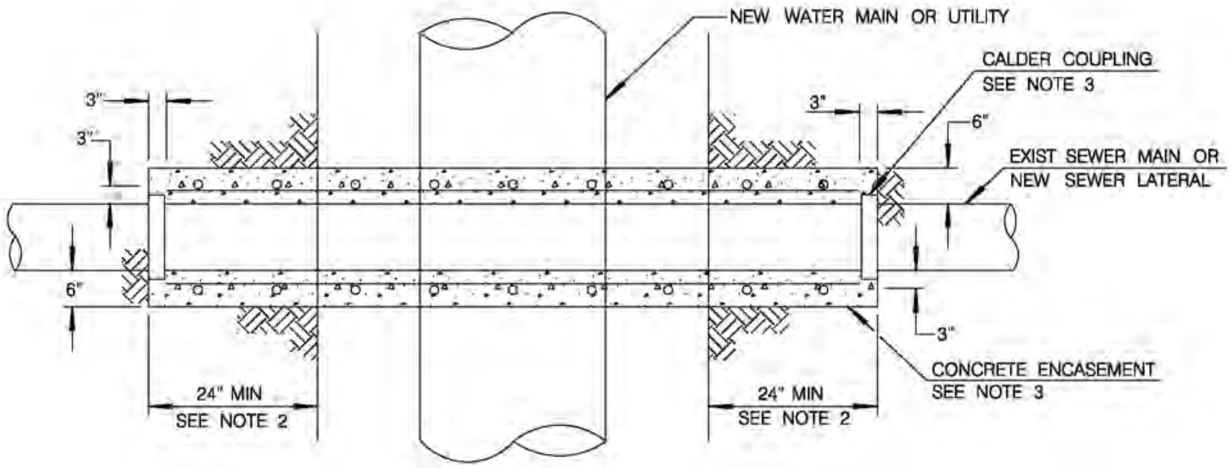
CITY OF SAN DIEGO - STANDARD DRAWING

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

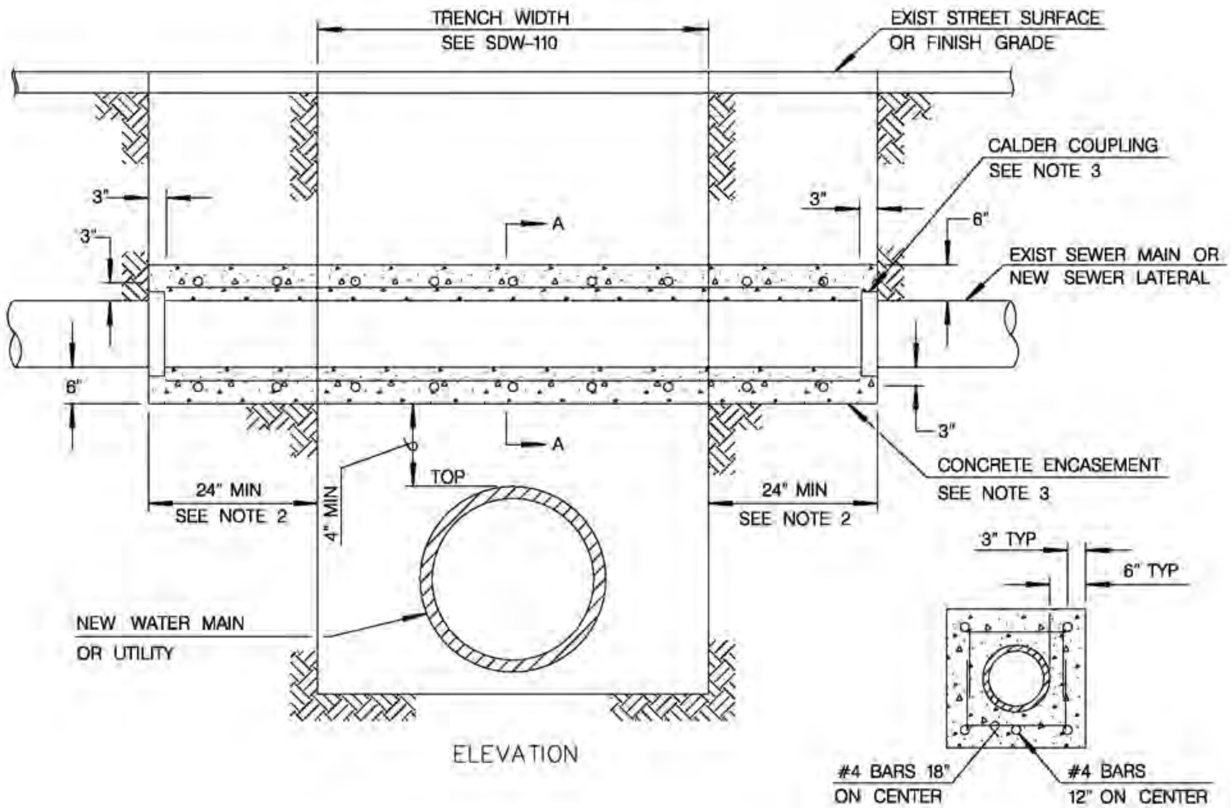
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

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

DRAWING NUMBER **SDW-160**



PLAN



ELEVATION

ENCASEMENT SECTION A-A

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

REVISION	BY	APPROVED	DATE
ORIGINAL*	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

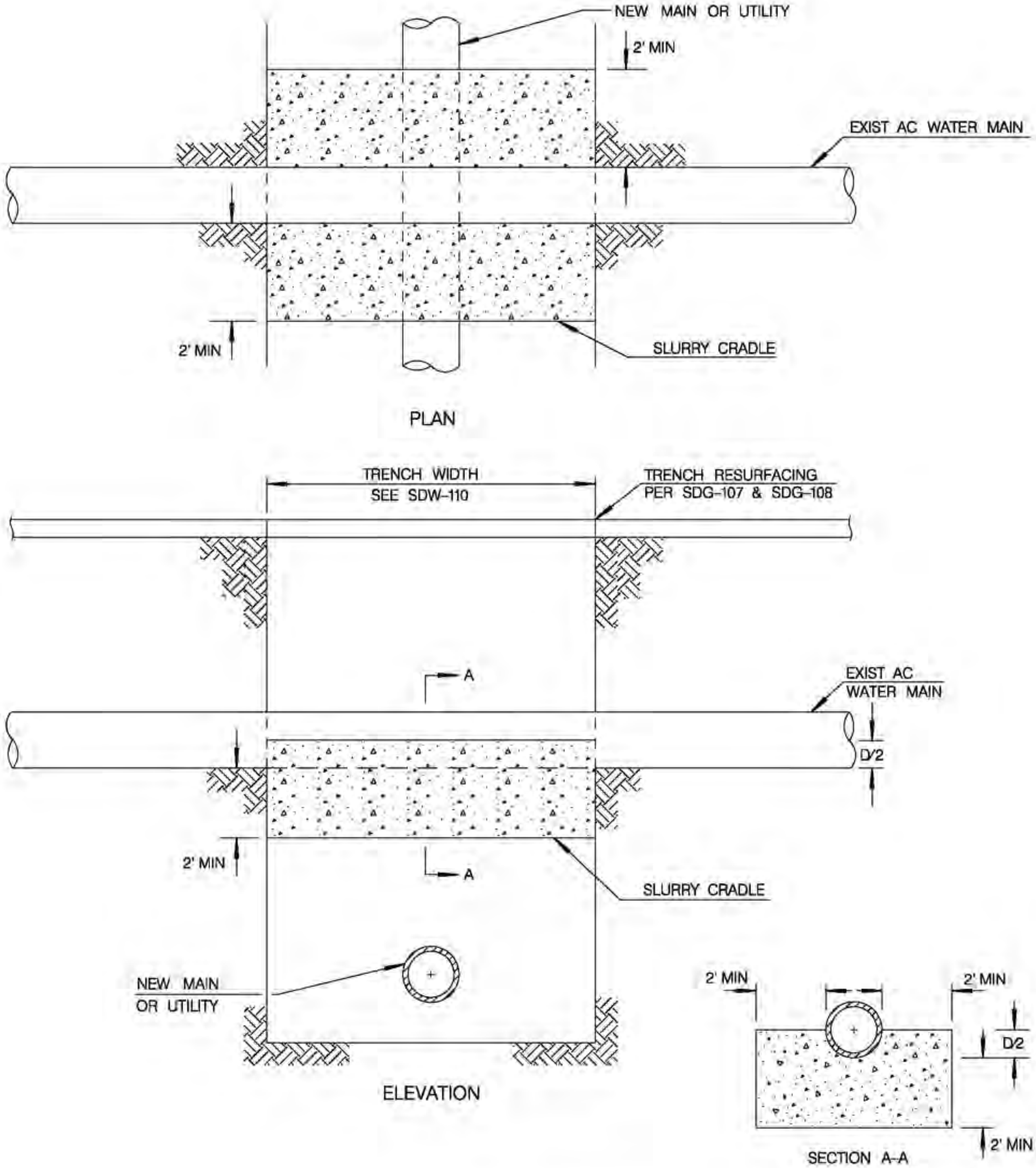
PIPE SUPPORT FOR UNDERCUT SEWER MAINS OR SEWER LATERALS

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-161**



NOTES:
1) SLURRY SHALL BE CONTROLLED LOW STRENGTH MATERIAL CLSM (100-E-100)

2) SLURRY SHALL BE PLACED ON FIRMLY COMPACTED BACKFILL

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

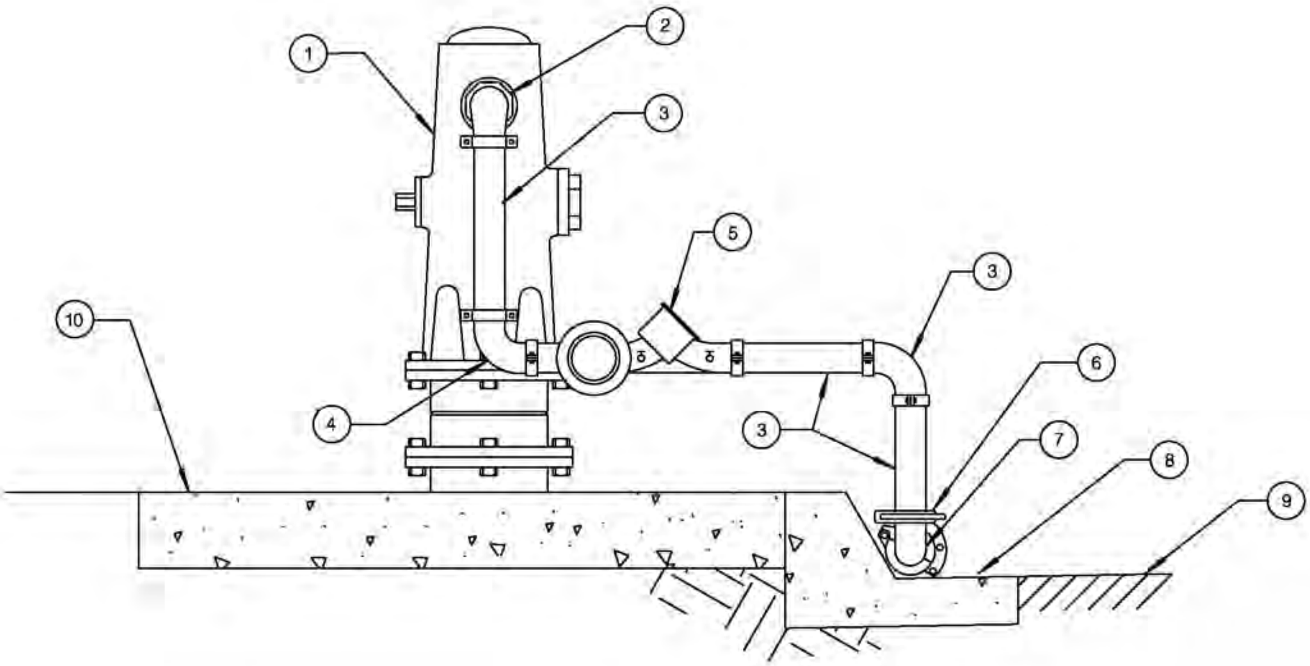
PIPE SUPPORT FOR UNDERCUT AC WATER MAIN

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

H. Hasli 1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-162**



1	EXISTING 2-PORT FIRE HYDRANT
2	2 1/2" PORT TO 2" ADAPTER ELBOW W/THREADED FITTING
3	2" PIPE (GROOVED)
4	2" 90° ELBOW W/THREADED JOINT FITTINGS
5	2" BACKFLOW PREVENTER W/ THREADED JOINT FITTINGS
6	SNAP-JOINT COUPLING (2-GROOVE)
7	2" TEE/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 PAD/SIDEWALK

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO - STANDARD DRAWING

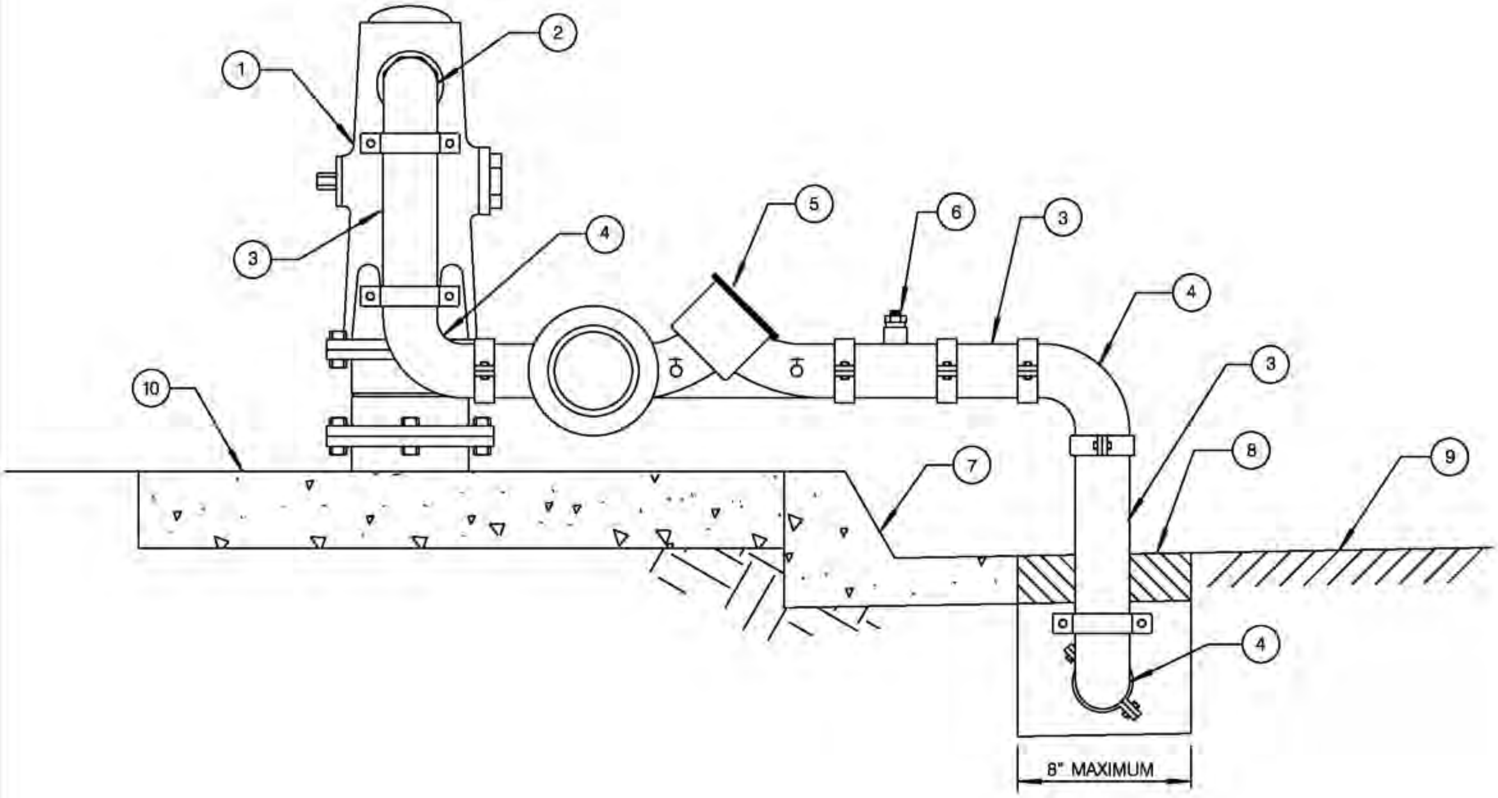
RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

2" FIRE HYDRANT HIGHLINING CONNECTION

DRAWING NUMBER **SDW-170**



1	EXISTING 3-PORT FIRE HYDRANT
2	PORT ADAPTER ELBOW W/THREADED JOINT FITTING
3	PIPE (GROOVED)
4	90° ELBOW W/THREADED JOINT FITTINGS
5	4" BACKFLOW PREVENTER W/THREADED JOINT FITTINGS
6	4" SHUTOFF VALVE W/THREADED JOINT FITTINGS
7	EXISTING CURB & GUTTER
8	SAW CUT ROADWAY, TRENCH, BACKFILL AND TEMPORARY ASPHALT SURFACE
9	EXISTING ROADWAY
10	EXISTING CONCRETE PAD/SIDEWALK

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

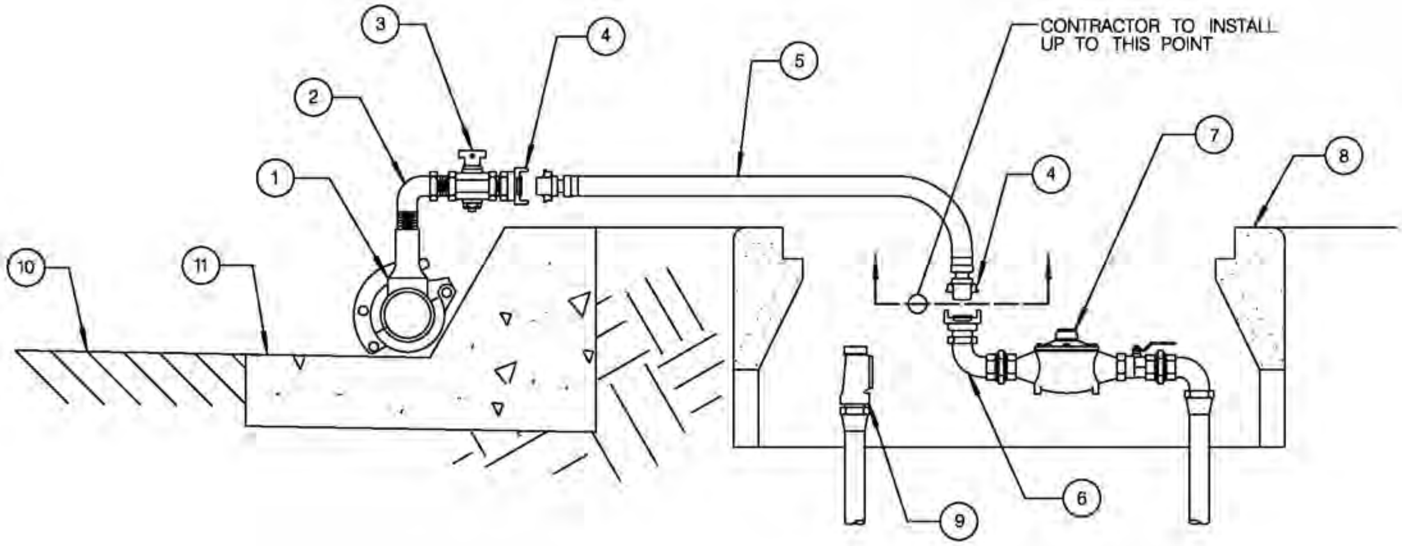
4" FIRE HYDRANT HIGHLINING CONNECTION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-171**



(1) GROOVED 2"x2"x1" TEE W/SNAP-JOINT COUPLING (2-GROOVE)

(2) 1" 90° ELBOW W/THREADED JOINT FITTINGS

(3) 1" SHUTOFF VALVE W/THREADED JOINT FITTINGS

(4) 1" PIPE TO HOSE ADAPTER

(5) 1" CONNECTION HOSE

(6) 1" 90° ELBOW TO METER THREADS (ADAPTERS MAY BE REQUIRED)

(7) EXISTING WATER METER

(8) EXISTNG WATER METER BOX

(9) EXISTNG SERVICE CONNECTION FROM WATER MAIN

(10) EXISTING ROADWAY

(11) EXISTING CURB & GUTTER

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

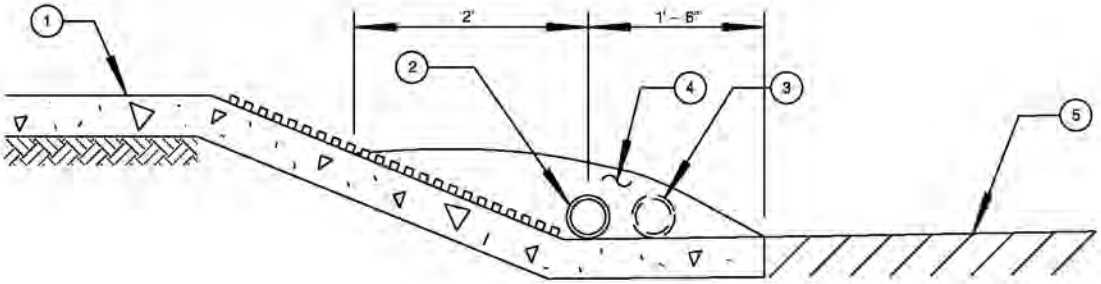
RESIDENTIAL USER HIGHLINING CONNECTION

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

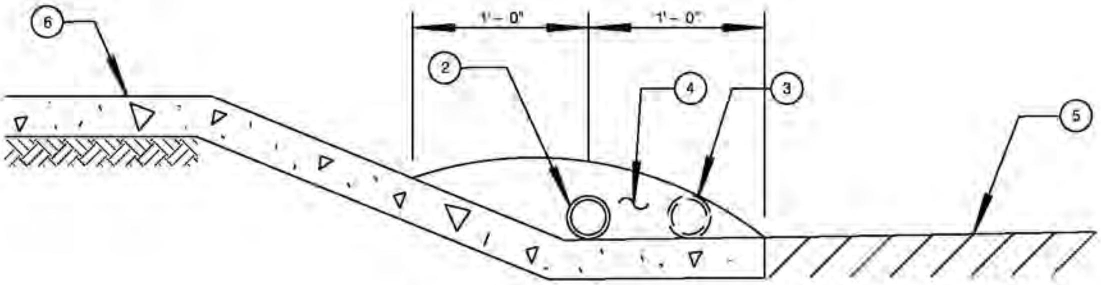
[signature] 1/31/2012

COORDINATOR R.C.E. 65271 DATE

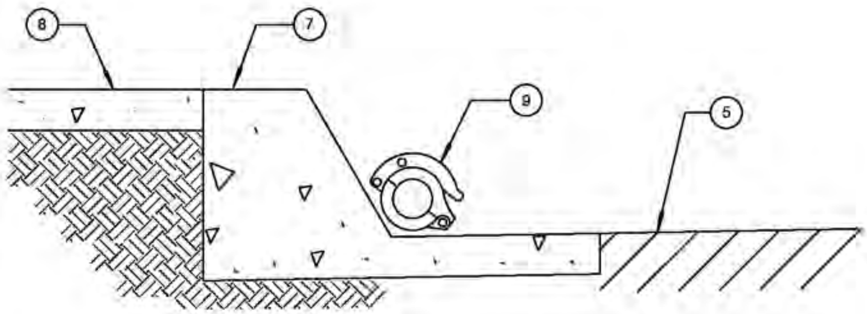
DRAWING NUMBER **SDW-172**



CURB RAMP HIGHLINING CROSSING



DRIVEWAY HIGHLINING CROSSING



CURB AND GUTTER HIGHLINING RUN

NOTES:

1. SLOPE OF TEMPORARY ASPHALT SHALL BE SMOOTH AND SLOPED TO HAVE A GRADUAL TRANSITION TO THE STREET AND SHALL NOT EXCEED 8.33%. CROSS SLOPE OF THE TEMPORARY ASPHALT SHALL MATCH EXISTING GUTTER SLOPE.
2. NO PIPE COUPLING SHALL BE PLACED WITHIN THE CURB RAMP OPENING.
3. MINIMUM ASPHALT COVER ON HIGHLINE PIPE SHALL BE 1".

(1) EXISTING CURB RAMP

(2) HIGHLINE PIPING

(3) DRAIN PIPING

(4) TEMPORARY ASPHALT (COLD MIX)

(5) EXISTING ROADWAY

(6) EXISTING DRIVEWAY

(7) EXISTING CURB & GUTTER

(8) EXISTING SIDEWALK

(9) HIGHLINE PIPING AND SNAP COUPLING (2 GROOVE)

REVISION	BY	APPROVED	DATE
ORIGINAL	KA	J. NAGELVOORT	01/12

CITY OF SAN DIEGO – STANDARD DRAWING

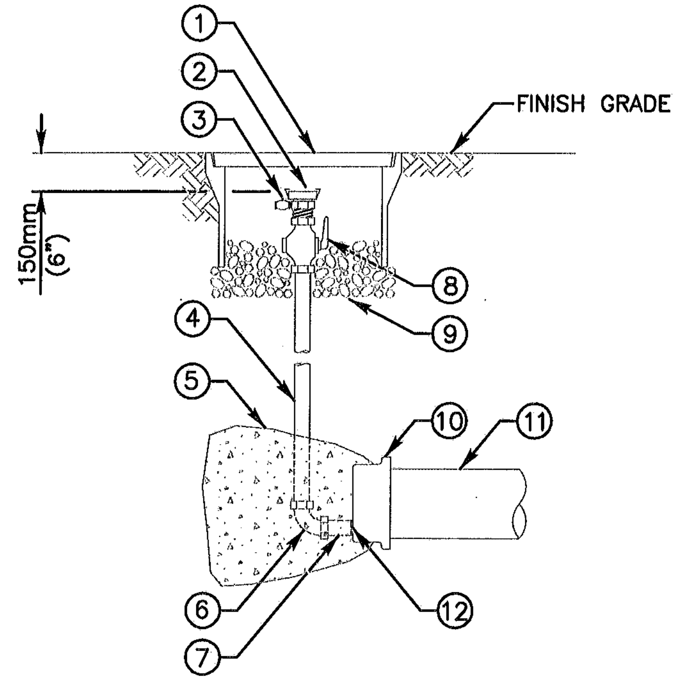
HIGHLINING CROSSING & RUN

RECOMMENDED BY THE CITY OF SAN DIEGO STANDARDS COMMITTEE

1/31/2012

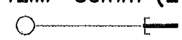
COORDINATOR R.C.E. 65271 DATE

DRAWING NUMBER **SDW-173**



NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) SET TOP OF METER BOX 50mm (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

TEMP 50mm (2")



LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	POLYMER METER BOX WITH LID 430mm x 760mm (17" x 30")	6	50mm (2") 90° BRONZE IRON PIPE THREAD BY COMPRESSION ELL
2	50mm (2") CAM & GROOVE ADAPTER x MIPT WITH LOCKING DUST CAP, SEE NOTE 5	7	50mm (2") CLOSE NIPPLE IPT
		8	50mm (2") COMPRESSION x FIPT BALL VALVE WITH HANDLE
3	6mm (1/4") PRESSURE PET COCK	9	10mm (3/8") ROCK 150mm (6") DEEP
4	50mm (2") x REQUIRED LENGTH COPPER PIPE TYPE "K" RIGID OR SOFT	10	DI END CAP WITH 63mm (2.5") FIPT OUTLET
5	CONCRETE THRUST BLOCK SEE WT-01	11	WATER MAIN
		12	NYLON DIELECTRIC BUSHING

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced W-07		J. Tomasulo	10/04

SAN DIEGO REGIONAL STANDARD DRAWING

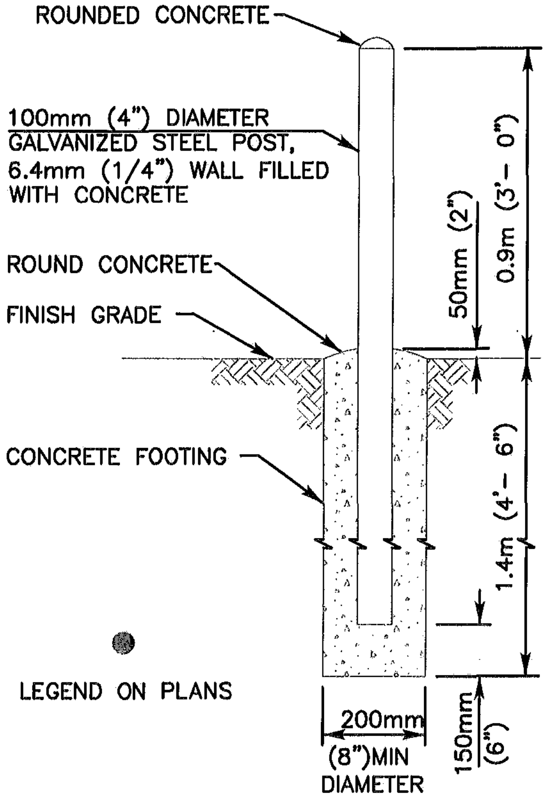
TEMPORARY 50mm (2") BLOW-OFF INSTALLATION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

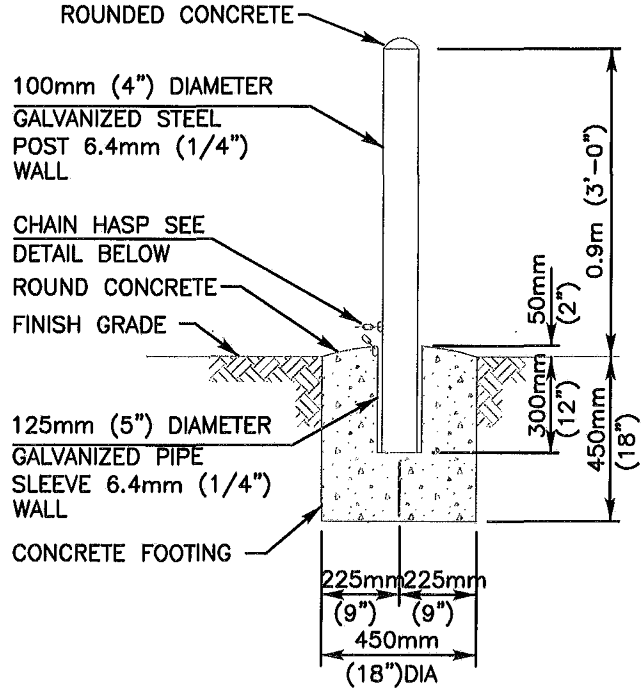
J. Stanton 10/28/2004

Chairperson R.C.E. 19246 Date

DRAWING NUMBER WB-05

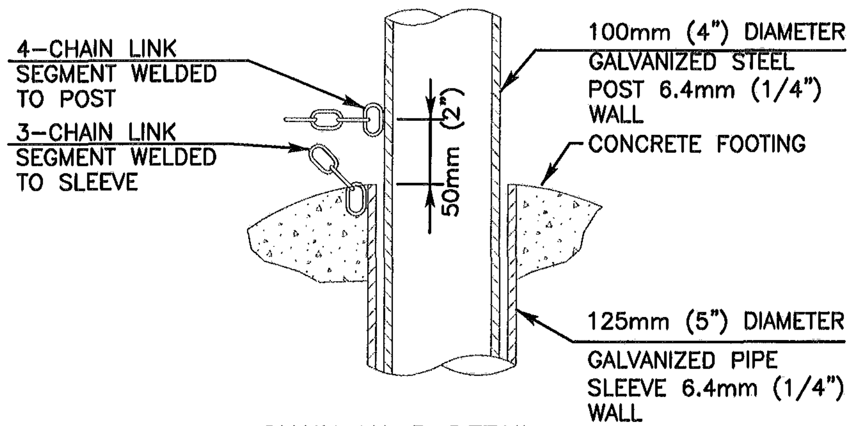


PROTECTION POST
TYPE "A"



DEMOUNTABLE PROTECTION POST
TYPE "B"

LEGEND ON PLANS



CHAIN HASP DETAIL

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 6.4mm (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

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced W-16		J. Tomasulo	10/04

SAN DIEGO REGIONAL STANDARD DRAWING

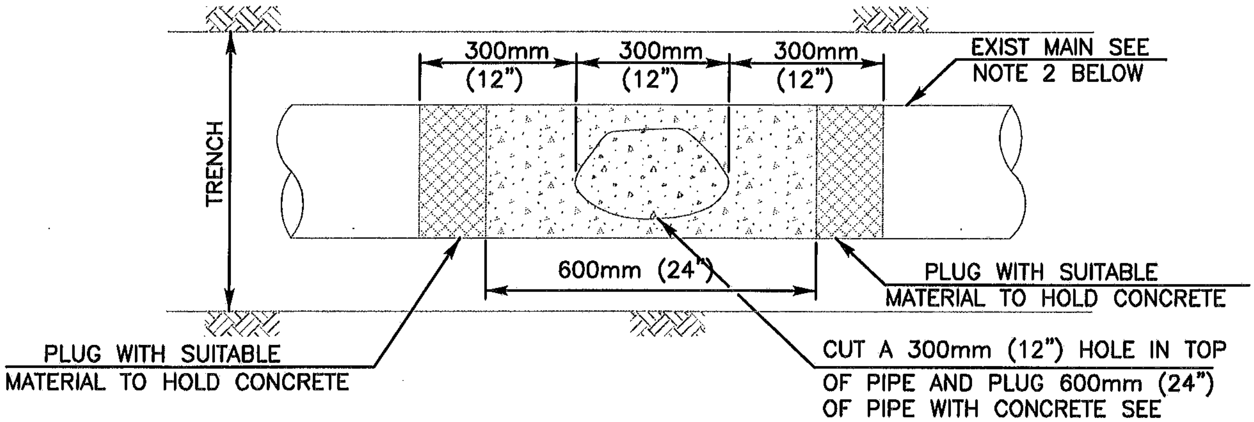
PROTECTION POST INSTALLATION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

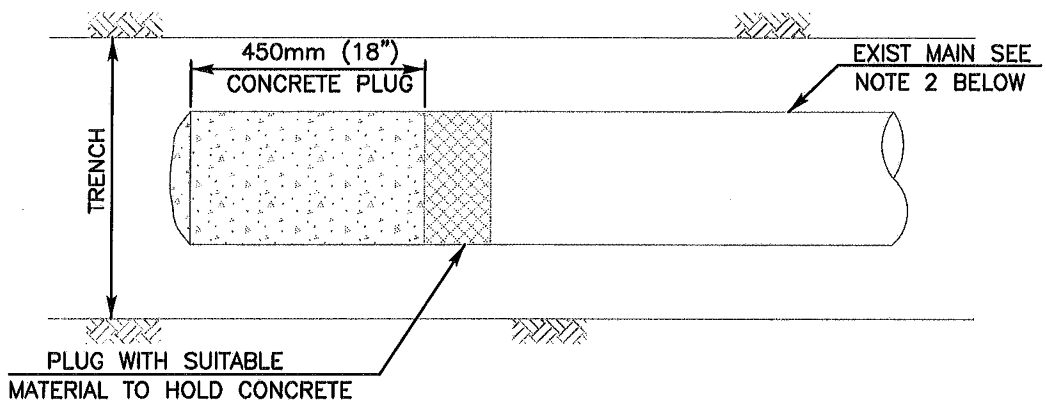
10/28/2004

Chairperson R.C.E. 19246 Date

DRAWING NUMBER WM-04



MIDDLE OF EXIST MAIN



END OF EXIST MAIN

NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) WATER AND RECYCLED WATER MAINS AND SEWER LATERALS 100mm (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 61m (200') OR AS DIRECTED BY THE ENGINEER
4) EXISTING MAINS 400mm (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

Revision	By	Approved	Date
ORIGINAL		J. Tomasulo	10/04

SAN DIEGO REGIONAL STANDARD DRAWING

CUTTING AND PLUGGING ABANDONED WATER, RECYCLED WATER AND SEWER MAINS

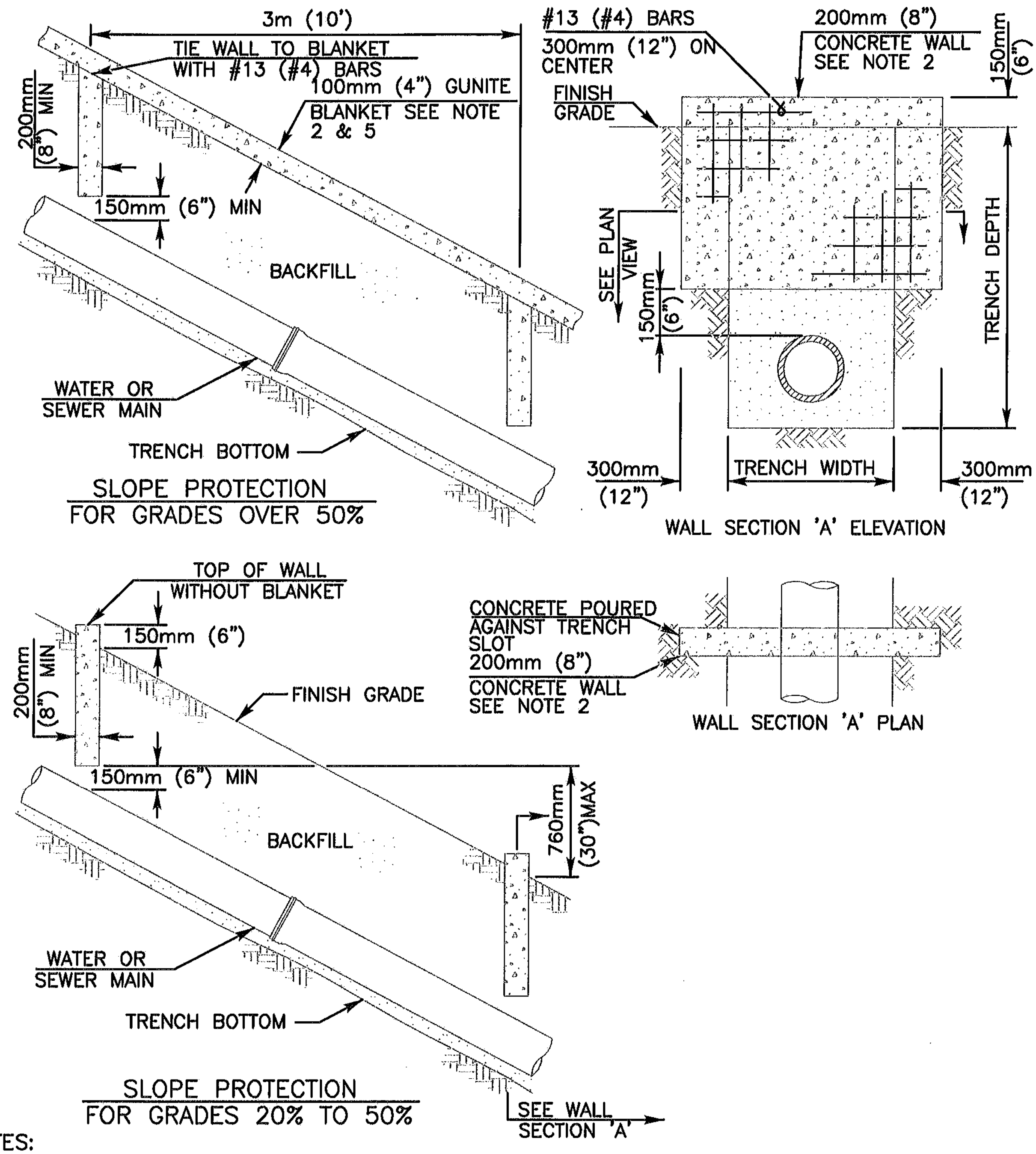
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

10/28/2004

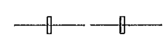
Chairperson R.C.E. 19246 Date

DRAWING NUMBER WP-03

August 2009

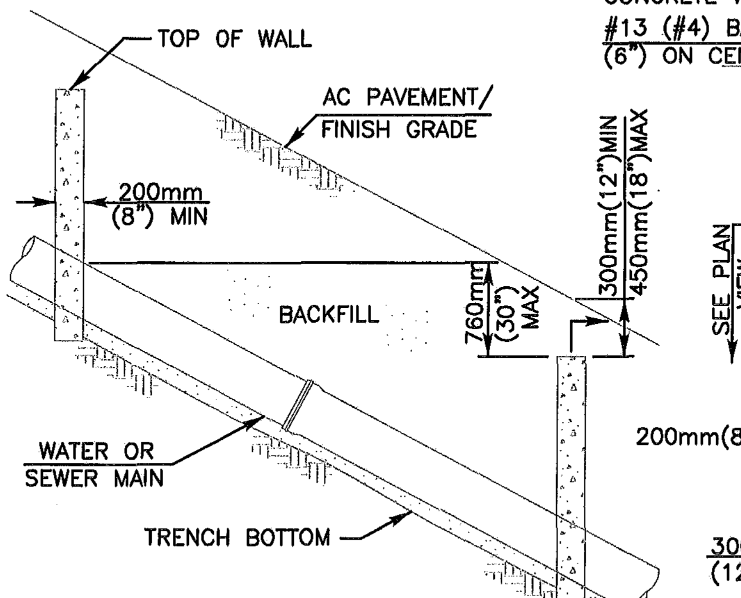


NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
3) WALLS SHALL BE REINFORCED CONCRETE OR 200mm x 200mm x 400mm (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) 100mm (4") GUNITE BLANKET WITH 150mm (6") SQUARE x 10 GAGE WIRE FABRIC AT THE ENGINEERS DISCRETION

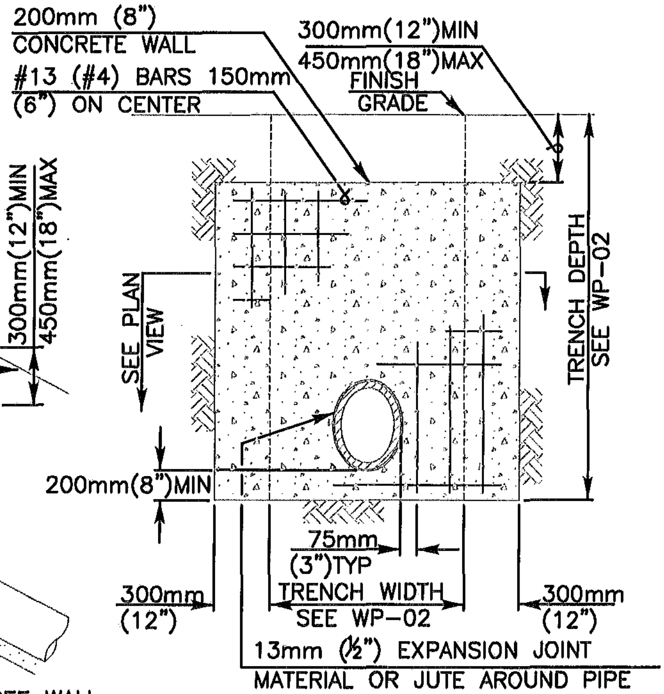


LEGEND ON PLANS

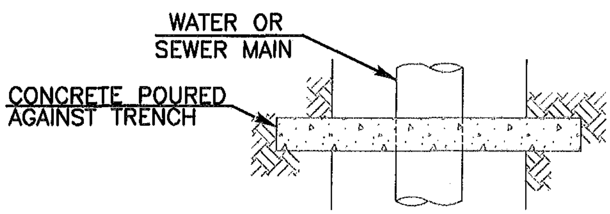
Revision	By	Approved	Date		
ORIGINAL		J. Tomasulo	10/04	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE 10/28/2004
				SLOPE PROTECTION INSTALLATIONS	Chairperson R.C.E. 19246 Date
					DRAWING NUMBER WP-05



CUT-OFF WALL
FOR GRADES 20% TO 50%



WALL SECTION 'A' ELEVATION

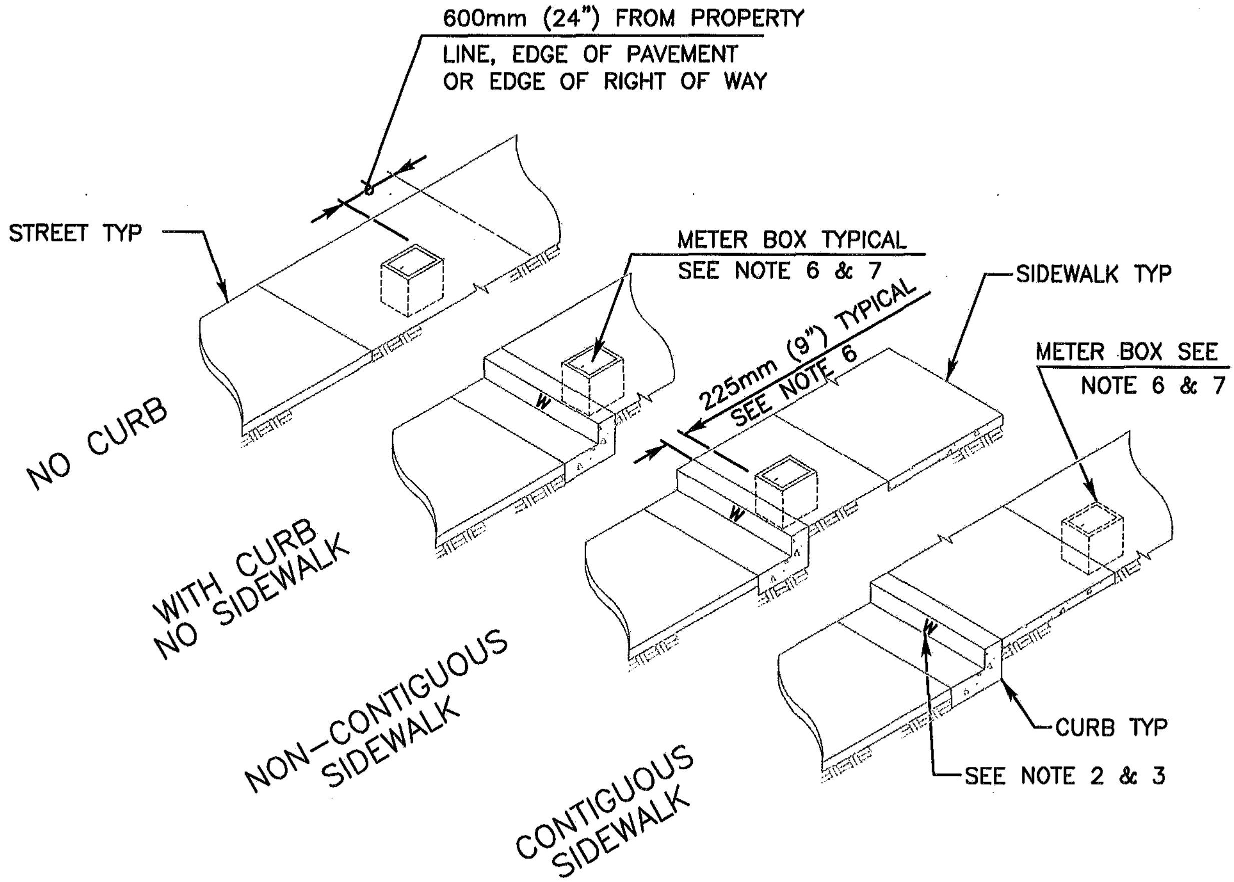


WALL SECTION 'A' PLAN

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 200mm x 200mm x 400mm (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

LEGEND ON PLANS

Revision	By	Approved	Date		
ORIGINAL		J. Tomasulo	10/04	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE 10/28/2004 Chairperson R.C.E. 19246 Date
				CUT-OFF WALL INSTALLATION IN TRAVELED AREAS	DRAWING NUMBER WP-07



NOTES:
1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) STAMP OR CHISEL A 50mm (2") HIGH 'W' IN CURB FACE TO IDENTIFY POTABLE WATER SERVICE LOCATION
3) STAMP OR CHISEL A 50mm (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 225mm (9") BETWEEN BOXES
6) METER BOX SHALL BE INSTALLED 225mm (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

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced W-15		J. Tomasulo	10/04

SAN DIEGO REGIONAL STANDARD DRAWING

METER BOX LOCATIONS FOR WATER AND RECYCLED WATER APPURTENANCES

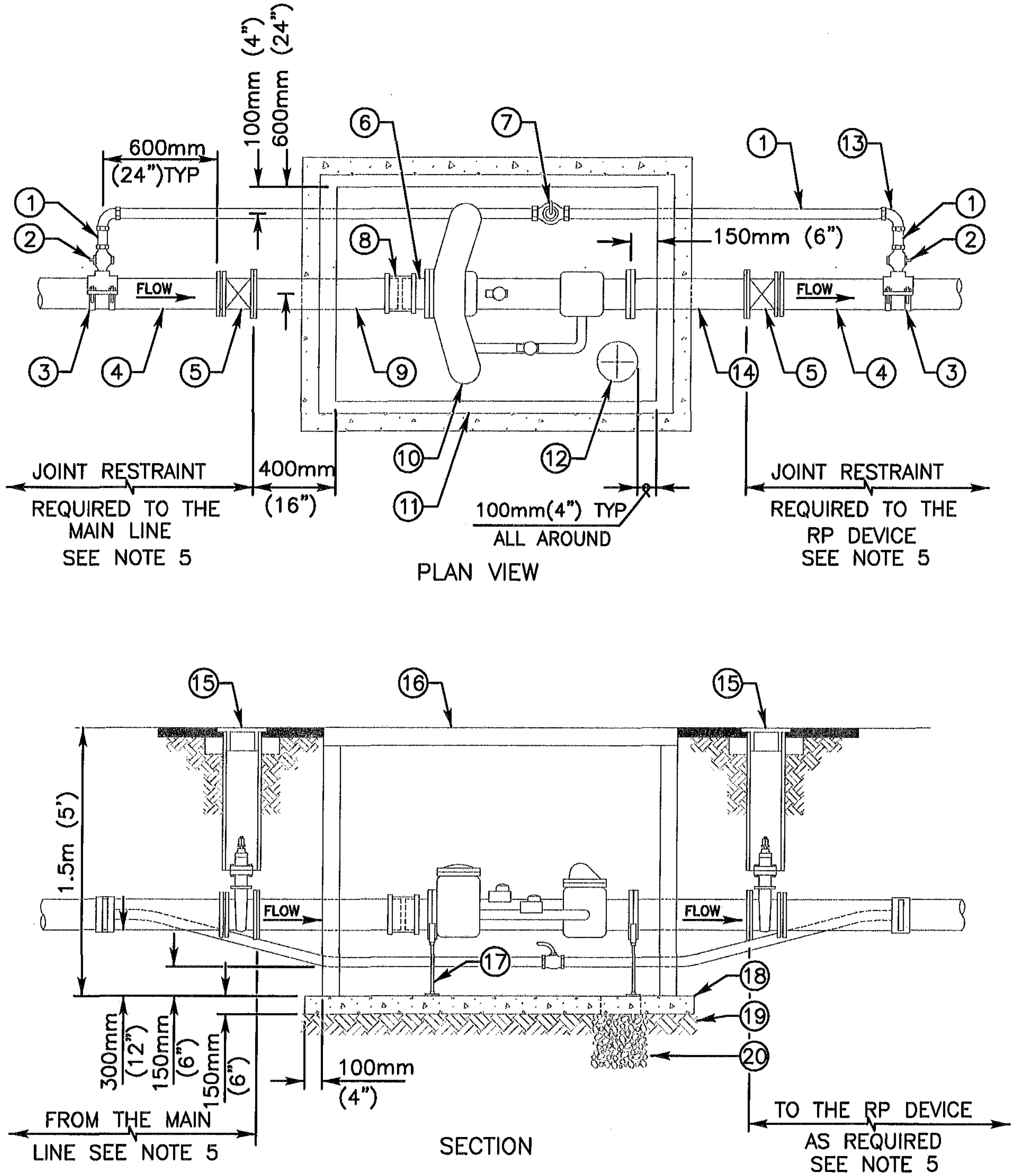
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

10/28/2004

Chairperson R.C.E. 19246 Date

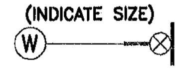
DRAWING NUMBER WS-03

August 2009



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

(INDICATE SIZE)



LEGEND ON PLANS

Revision	By	Approved	Date		
ORIGINAL		J. Tomasulo	10/04	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE 10/28/2004 Chairperson R.C.E. 19246 Date
				100mm (4") OR 150mm (6") FIRELINE/MASTER METER INSTALLATION	DRAWING NUMBER WS-04 (1 OF 2)

FOR DRAWING OF THE METER INSTALLATION SEE WS-04 (SHEET 1 OF 2)

NOTES:

1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
2) TO BE USED WHERE BOTH DOMESTIC SERVICE AND FIRE PROTECTION ARE INSTALLED ON THE SAME PRIVATE SYSTEM
3) LOCATION OF METER SHALL BE APPROVED BY THE DISTRICT ENGINEER PRIOR TO INSTALLATION IN ACCORDANCE WITH STANDARD DWG WS-06
4) 200mm (8") OR 250mm (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) 100mm (4") METER REQUIRES A 1200mm x 1500mm (48" x 60") VAULT
   150mm (6") METER REQUIRES A 1200mm x 1800mm (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

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
1	50mm (2") x REQUIRED LENGTH TYPE "K" COPPER PIPE	11	FRP VAULT WITH HINGED ACCESS DOOR, SEE NOTE 7
2	50mm (2") BRONZE CORPORATION STOP	12	300mm (12") DIAMETER x 150mm (6") LONG PVC PIPE
3	LINE SIZE x 50mm (2") SERVICE SADDLE	13	50mm (2") 90° COMPRESSION ELL (TYPICAL)
4	100mm (4") OR 150mm (6") PVC PIPE	14	LINE SIZE x 600mm (24") LONG FLANGED DUCTILE-IRON SPOOL
5	100mm (4") OR 150mm (6") FLG x MJ RWGV MECHANICALLY RESTRAINED, SEE NOTE 5	15	200mm (8") GATE WELL. SEE WV-01 & WV-02
6	LINE SIZE x 150mm (6") LONG FLG x PE DUCTILE-IRON SPOOL	16	HINGED VAULT ACCESS DOOR
7	50mm (2") COMPRESSION, LOCKABLE BALL VALVE	17	ADJUSTABLE PIPE SUPPORT (TYPICAL)
8	100mm (4") OR 150mm (6") FLEXIBLE COUPLING	18	150mm (6") CLASS "B" CONCRETE FLOOR WITH #3 BARS @ 300mm (12") C.C.
9	LINE SIZE x 750mm (30") LONG FLG x PE DUCTILE-IRON SPOOL	19	150mm (6") DG BASE COMPACTED TO 90%
10	100mm (4") OR 150mm (6") FIRELINE METER SEE NOTE 6	20	300mm (12") DIAMETER x 300mm (12") DEEP, 19mm (¾") GRAVEL SUMP, SEE NOTE 8

Revision	By	Approved	Date
ORIGINAL		J. Tomasulo	10/04

SAN DIEGO REGIONAL STANDARD DRAWING

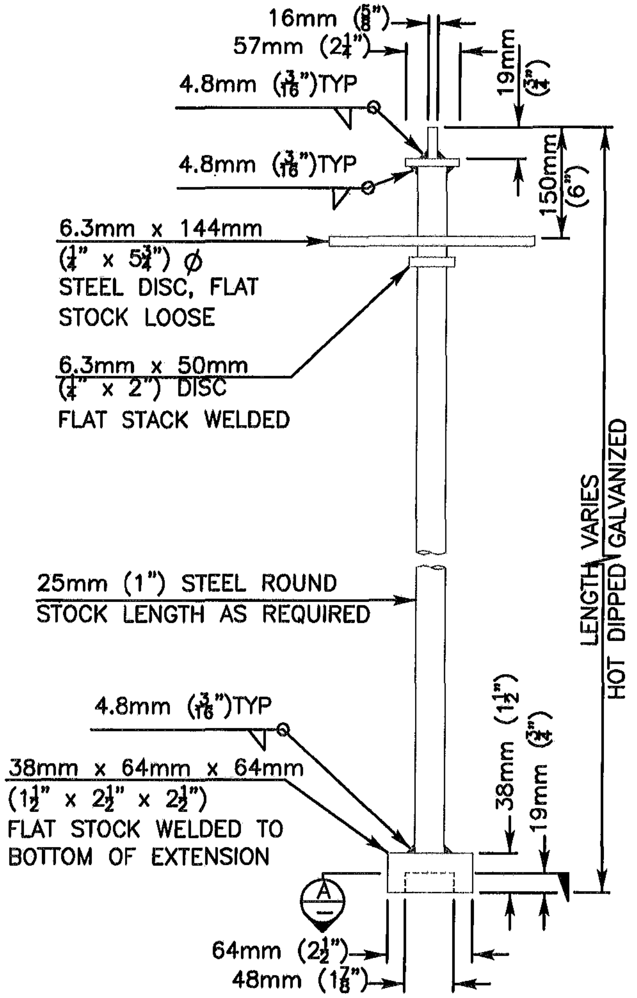
100mm (4") OR 150mm (6") FIRELINE/MASTER METER INSTALLATION

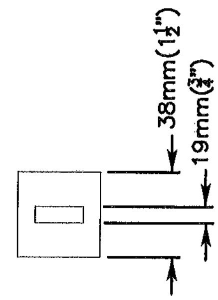
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

10/28/2004

Chairperson R.C.E. 19246 Date

DRAWING NUMBER WS-04 (2 OF 2)





DETAIL "A"

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 1.5m (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

Revision	By	Approved	Date
ORIGINAL		G.Parkinson	5/92
Add Metric		T. Stanton	03/03
Replaced W-13		J. Tomasulo	10/04

SAN DIEGO REGIONAL STANDARD DRAWING

STEEL VALVE STEM EXTENSION FOR VALVES 50mm (2") AND SMALLER

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

10/28/2004

Chairperson R.C.E. 19246 Date

DRAWING NUMBER WV-05

August 2009

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