



SAN DIEGO AREA

**REGIONAL
STANDARD
DRAWINGS**

STANDARD DRAWINGS FOR AGENCIES IN THE SAN DIEGO REGION

Recommended by the Regional Standards Committee

Maintained and Published by the San Diego County Department of Transportation

December, 1975



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AMERICAN INSTITUTE OF ARCHITECTS
AMERICAN PUBLIC WORKS ASSOCIATION
ASSOCIATED GENERAL CONTRACTORS OF AMERICA
BUILDING CONTRACTORS ASSOCIATION
CALIF. COUNCIL OF CIVIL ENGINEERS & LAND SURVEYORS
CARLSBAD, CITY OF
CHULA VISTA, CITY OF
CONSTRUCTION INDUSTRY COORDINATING COUNCIL
CORONADO, CITY OF

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NATIONAL CITY, CITY OF
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OTAY MUNICIPAL WATER DISTRICT
PACIFIC TELEPHONE COMPANY
SAN DIEGO, CITY OF
SAN DIEGO, COUNTY OF
SAN DIEGO COUNTY ROCK PRODUCERS ASSOCIATION
SAN DIEGO GAS & ELECTRIC COMPANY
SAN MARCOS, CITY OF
VISTA, CITY OF
VISTA IRRIGATION DISTRICT

Regional Standards Committee

December, 1975

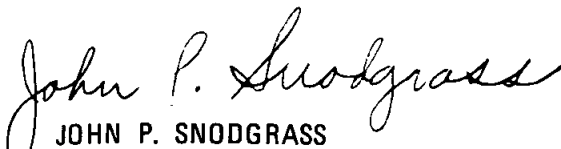
These standard drawings have been prepared and adopted by the San Diego Regional Standards Committee for the benefit of all agencies in the San Diego area. The Regional Standards Committee membership is comprised of the County's thirteen cities, the County of San Diego, various representative water districts and private industry organizations, the Pacific Telephone Company and the San Diego Gas and Electric Company. The San Diego County Department of Transportation is currently providing coordination and staff support for the Regional Standards Committee.

REVISIONS

The Regional Standards Committee will continuously accept proposed revisions and/or proposed new standard drawings for review. They should be submitted to the Regional Standards staff at the County Department of Transportation. The staff will assign the proposed revision a number and make any necessary preparations to ready the revision for presentation to the Regional Standards Committee. The staff will acknowledge receipt of all proposals in writing. Should the proposed revision be very minor in nature, ie., a grammatical error, etc., the staff will make the necessary change without taking it to the Regional Standard Committee. Once enough proposals have been submitted to warrant a Regional Standards Committee meeting, the staff will prepare an agenda and schedule a meeting.

At the meeting the Committee will take one of three possible actions: approve the change, reject the change or recommend that a subcommittee further study the change and make recommendations to the Committee. The individual or organization who submitted the change will then be notified in writing of the Committee action. After approval of the proposed change by the Regional Standards Committee the staff will print and distribute the change to the governmental agencies within San Diego County.

It is intended that the standard drawing package will be reprinted and distributed periodically incorporating all the changes approved by the Regional Standards Committee since the last printing. The reprinting will take place when the Regional Standards Committee determines enough revisions have been approved to warrant issuance of an updated drawing package.


JOHN P. SNODGRASS
Chairman

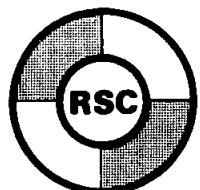


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SPECIAL NOTE

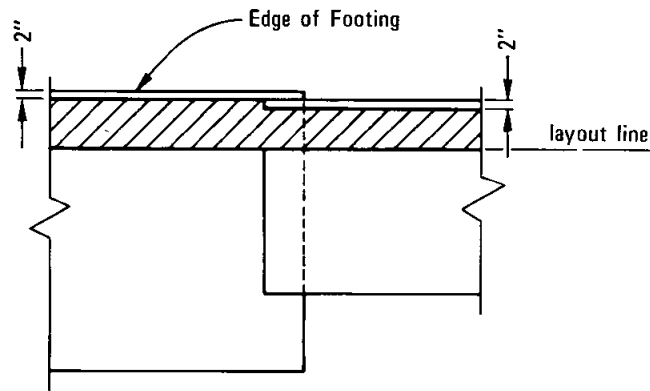
Concrete consisting of portland cement, concrete aggregate, sand and water is designated in these Standard Drawings by a symbol consisting of a number, a letter and a number; for example, 564-C-3000. The first number is the weight of cement in pounds per cubic yard, the last number is the compressive strength at twenty-eight days and the letter indicates the grading of the aggregate. This designation is in the STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, published by the Building News, Incorporated.

CONCRETE STRUCTURES

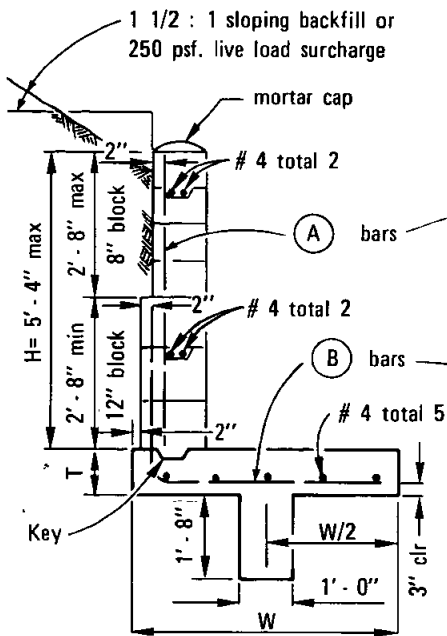
C

CONCRETE STRUCTURES

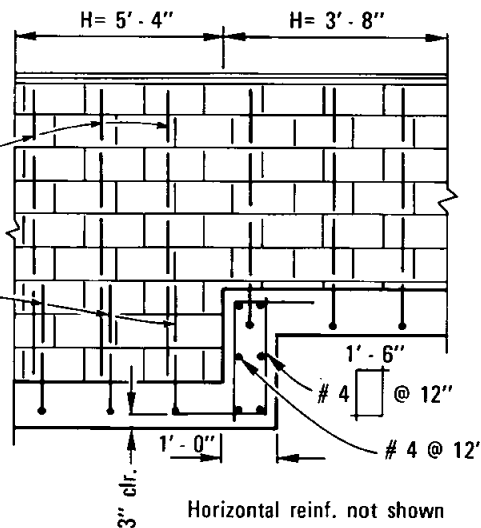
DRAWING NUMBER C-1



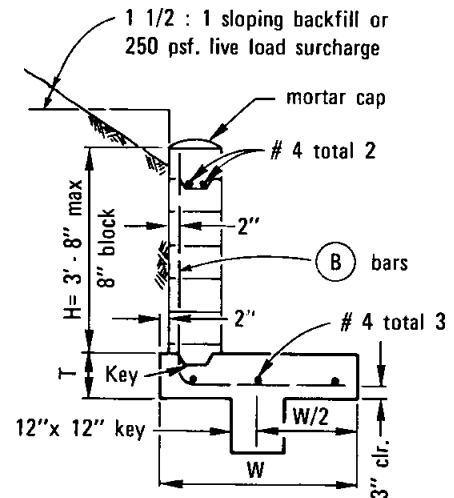
PLAN



TYPICAL SECTION
over 3' - 8"



ELEVATION



TYPICAL SECTION
3' - 8" max.

NOTES

1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

DIMENSIONS AND REINFORCING STEEL		
H (max)	5' - 4"	3' - 8"
T (min)	0' - 10"	0' - 10"
W (min)	5' - 0"	3' - 9"
(A) bars	# 4 @ 16"	—
(B) bars	# 6 @ 16"	# 4 @ 16"
max. toe press. (psf)	700	550

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

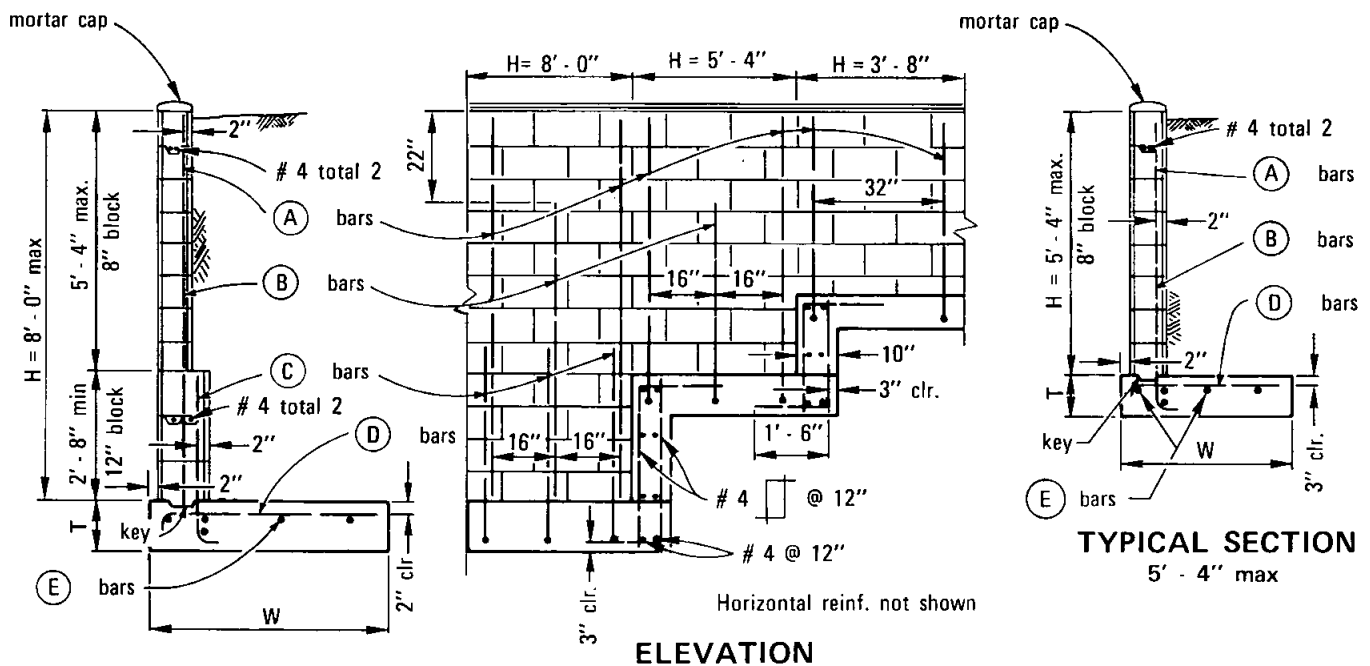
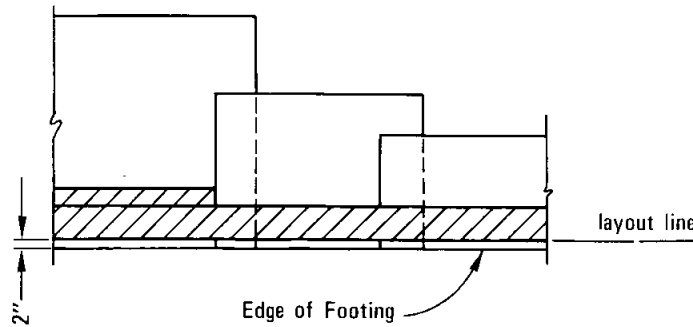
Allard A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **C-2**

SAN DIEGO REGIONAL STANDARD DRAWING

MASONRY RETAINING WALL TYPE 2
(LIVE LOAD SURCHARGE OR SLOPING BACKFILL)

Revision	By	Approved	Date



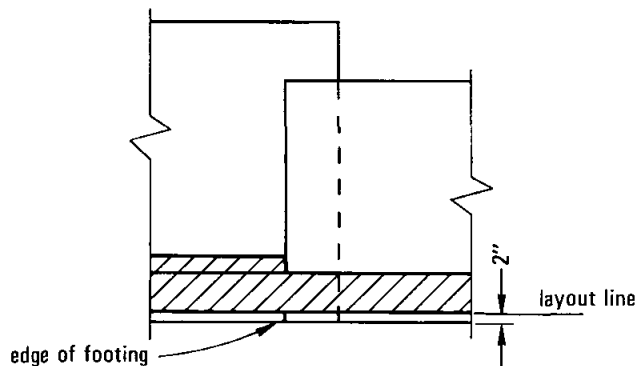
TYPICAL SECTION
over 5' - 4"

TYPICAL SECTION
5' - 4" max

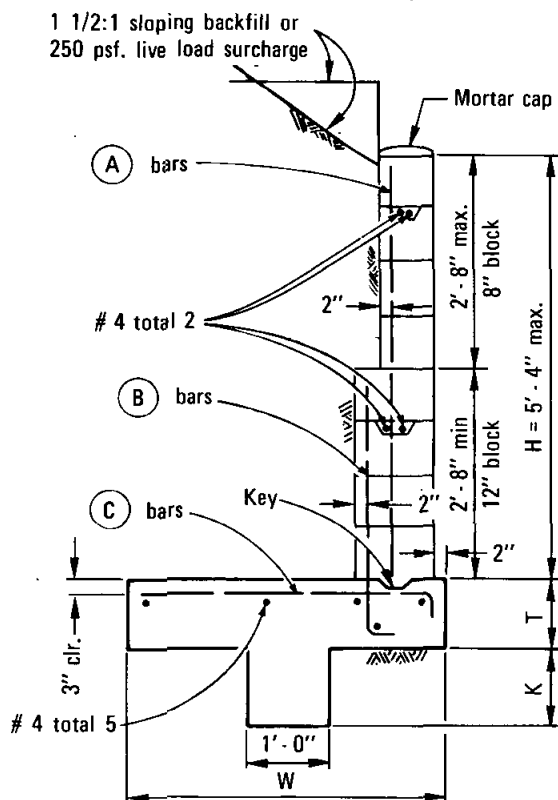
- NOTES**
1. See Standard Drawings C-7 and C-8 for additional notes and details.
 2. Fill all blockcells with grout.

DIMENSIONS AND REINFORCING STEEL			
H (max)	3' - 8"	5' - 4"	8' - 0"
T (min)	0' - 8"	0' - 10"	1' - 0"
W (min)	2' - 4"	3' - 2"	4' - 9"
(A) bars	# 4 @ 32"	# 4 @ 32"	# 4 @ 32"
(B) bars	—	# 4 @ 32"	# 4 @ 32"
(C) bars	—	—	# 6 @ 16"
(D) bars	# 4 @ 32"	# 4 @ 16"	# 6 @ 16"
(E) bars	# 4 total 4	# 4 total 5	# 4 total 6
max. soil press. (psf)	1100	1600	2200

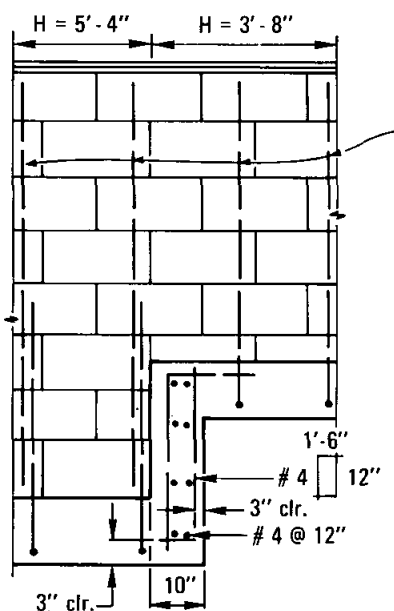
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING MASONRY RETAINING WALL TYPE 3 (LEVEL BACKFILL)	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Allen G. Kersch</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
DRAWING NUMBER C-3					



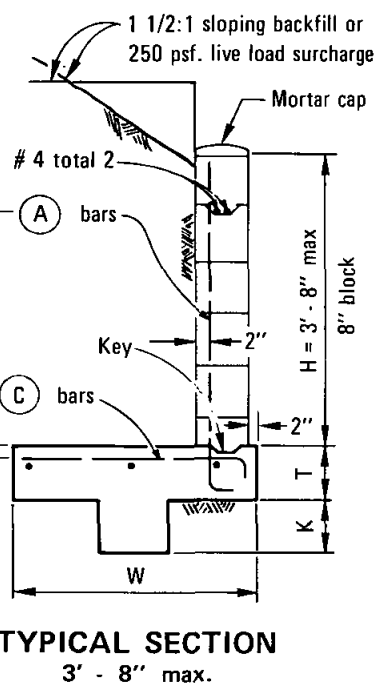
PLAN



TYPICAL SECTION
over 3' - 8"



Horizontal reinf. not shown
ELEVATION



TYPICAL SECTION
3' - 8" max.

NOTES

1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

DIMENSIONS AND REINFORCING STEEL				
H (max)	5' - 4"		3' - 8"	
T (min)	0' - 10"		0' - 8"	
W (min)	4' - 0"		3' - 0"	
(A) bars	# 4 @ 16"		# 4 @ 16"	
(B) bars	# 6 @ 16"			
Surcharge	sloping	live load	sloping	live load
(C) bars	# 6 @ 8"	# 6 @ 16"	# 6 @ 16"	# 6 @ 16"
K (min)	1' - 0"	0' - 8"	1' - 0"	0' - 8"
Toe press.	2700 psf.	1900 psf.	1700 psf	1430 psf

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

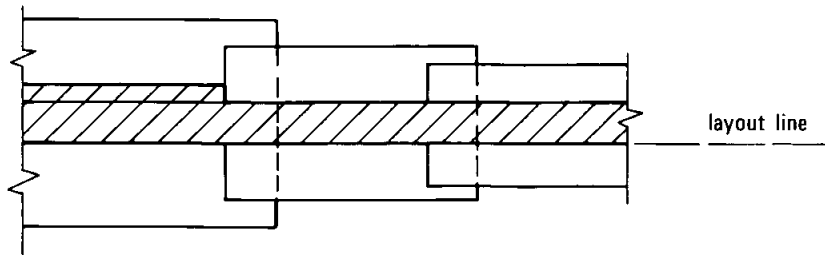
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **C-4**

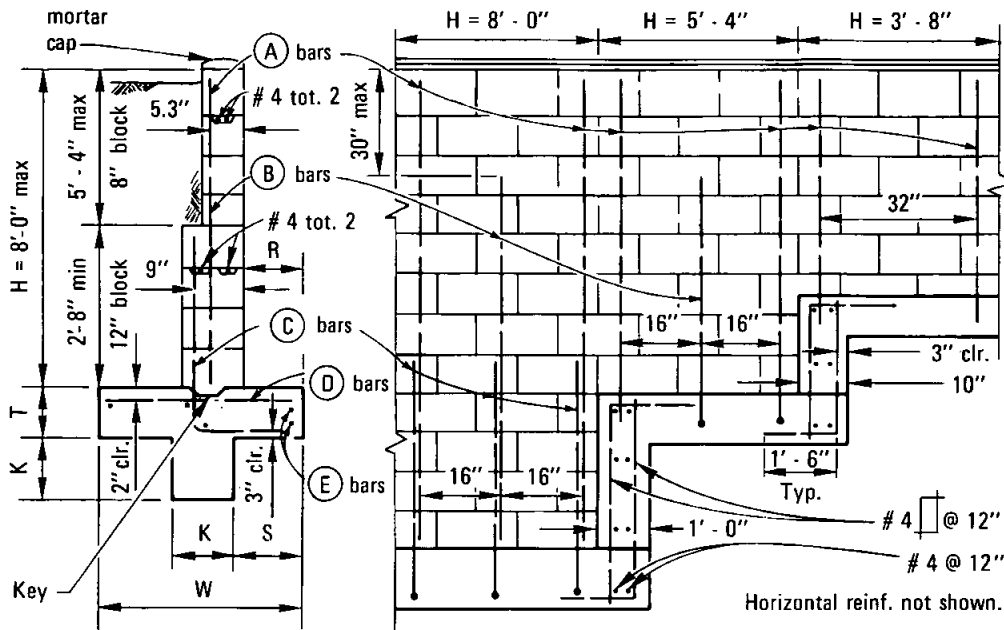
SAN DIEGO REGIONAL STANDARD DRAWING

MASONRY RETAINING WALL TYPE 4
(LIVE-LOAD SURCHARGE OR SLOPING BACKFILL)

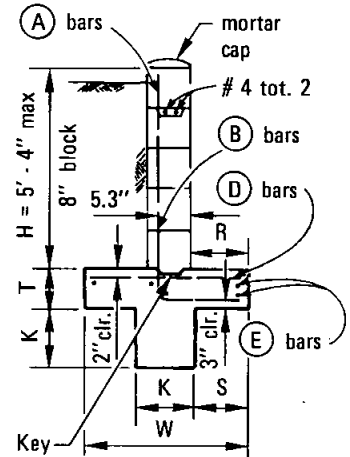
Revision By Approved Date



PLAN



TYPICAL SECTION
over 5' - 4"



TYPICAL SECTION
5' - 4" max

ELEVATION

NOTES

1. See Standard Drawing C-7 and C-8 for additional notes and details
2. Fill all block cells with grout.

DIMENSIONS AND REINFORCING STEEL			
H (max)	3' - 8"	5' - 4"	8' - 0"
T (min)	0' - 8"	0' - 10"	1' - 0"
W (min)	2' - 1"	3' - 1"	4' - 3"
R	0' - 9"	1' - 2"	1' - 5"
S	0' - 8 1/2"	1' - 1/2"	1' - 7 1/2"
K	0' - 8"	0' - 8"	0' - 12"
(A) bars	# 4 @ 32"	# 4 @ 32"	# 4 @ 32"
(B) bars	—	# 4 @ 32"	# 4 @ 32"
(C) bars	—	—	# 7 @ 16"
(D) bars	# 4 @ 32"	# 4 @ 16"	# 4 @ 16"
(E) bars	# 4 total 5	# 4 total 5	# 4 total 6
max soil press. (psf)	774	1030	1660

Revision	By	Approved	Date

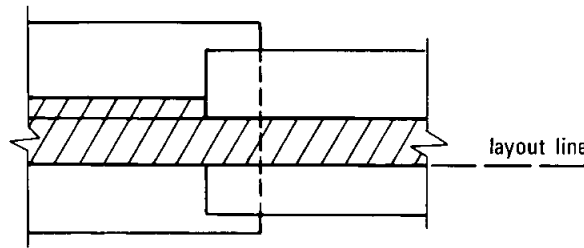
SAN DIEGO REGIONAL STANDARD DRAWING

MASONRY RETAINING WALL TYPE 5
(LEVEL BACKFILL)

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

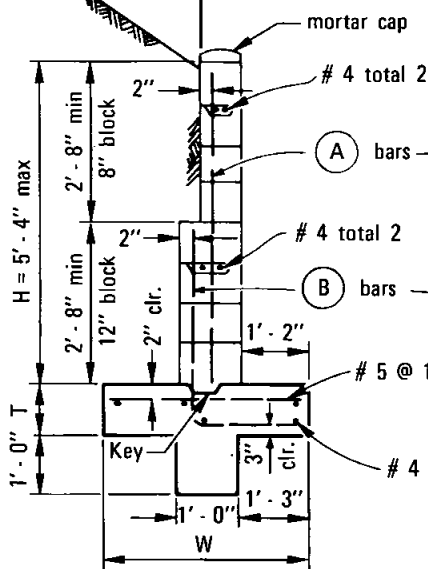
Allard G. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **C-5**

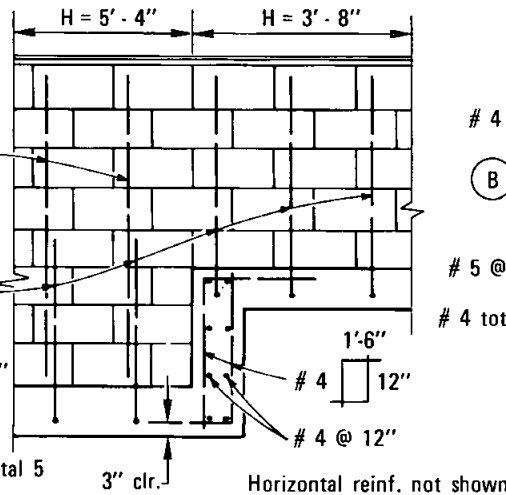


PLAN

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

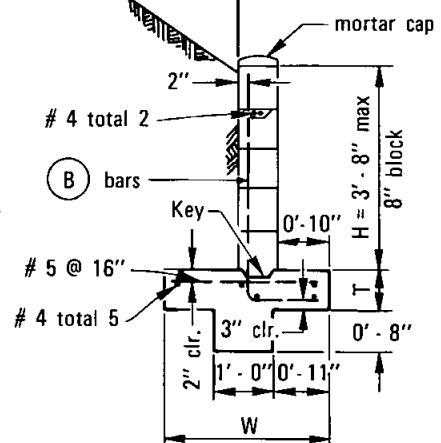


TYPICAL SECTION
over 3' - 8"



ELEVATION

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



TYPICAL SECTION
3' - 8" max

NOTES

1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

DIMENSIONS AND REINFORCING STEEL		
H (max)	5' - 4"	3' - 8"
T (min)	0' - 10"	0' - 8"
W (min)	3' - 10"	2' - 9"
(A) bars	# 4 @ 16"	—
(B) bars	# 6 @ 16"	# 4 @ 16"
Max. Toe Press. P.S.F.	2000	1400

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **C-6**

SAN DIEGO REGIONAL STANDARD DRAWING

MASONRY RETAINING WALL TYPE 6 (LIVE LOAD SURCHARGE OR SLOPING BACKFILL)

Revision	By	Approved	Date

DESIGN CONDITIONS

Walls are to be used for the loading conditions shown for each type wall.

Design H shall not be exceeded.

Footing key is required except as shown otherwise or when found unnecessary by the Engineer.

Special footing design is required where foundation material is incapable of supporting toe pressure listed in table.

DESIGN DATA

Reinforced Concrete:

$F_c = 1200 \text{ psi}$ $F'_c = 3000 \text{ psi}$

$F_s = 20,000 \text{ psi}$ $n = 10$

Reinforced Masonry:

$F'_m = 600 \text{ psi}$ $F_m = 200 \text{ psi}$

$F_s = 20,000 \text{ psi}$ $n = 50$

Earth = 120 pcf and equivalent fluid

Pressure = 36 psf per foot of height

Walls shown for 1 1/2:1 unlimited sloping

surcharge are designed in accordance with

Rankine's formula for unlimited sloping

surcharge with $\phi = 33^\circ$ 42'

REINFORCEMENT

Intermediate grade, hard grade, or rail steel deformation shall conform to ASTM A615 A616, A617.

Bars shall lap 40 diameters, where spliced, unless otherwise shown on the plans.

Bends shall conform to the Manual of Standard practice, A.C.I.

Backing for hooks is four diameters.

All bar embeddings are clear distances to outside of bar.

Spacing for parallel bars is center to center of bars.

CONCRETE

All concrete shall be 564 - C - 3000.

MASONRY

All reinforced masonry retaining walls shall be constructed of regular or light weight standard grade "A" units conforming to ASTM designation C-90 and manufactured in accordance with requirements of the Concrete Masonry Association Specifications. All masonry shall conform to the regulations of the Uniform Building Code.

MASONRY MORTAR

The mortar shall consist of one (1) part portland cement to three and one-half (3 1/2) parts graded mortar sand. Mortar shall be tempered with lime putty in an amount not exceeding one-quarter to one-half of the volume of the cement.

Mortar in horizontal joints shall fully cover all face shell and web members. Vertical joints shall be buttered to a depth greater than the thickness of the face shells of the block. Furrowing of mortar will not be permitted.

GROUT

The grout shall consist of one (1) part portland cement to three (3) parts clean sand for voids less than four inches. If desired, grout to be used in voids of 4" or greater dimensions, may be mixed of one (1) part portland cement to two (2) parts clean sand to two (2) parts pea gravel. Pea gravel shall be graded such that 100% passes 3/8" sieve and not more than 5% passes the No. 8 sieve. All cells shall be poured solid with grout.

EXCAVATION AND BACKFILL

Compaction of backfill material by jetting or ponding with water will not be permitted.

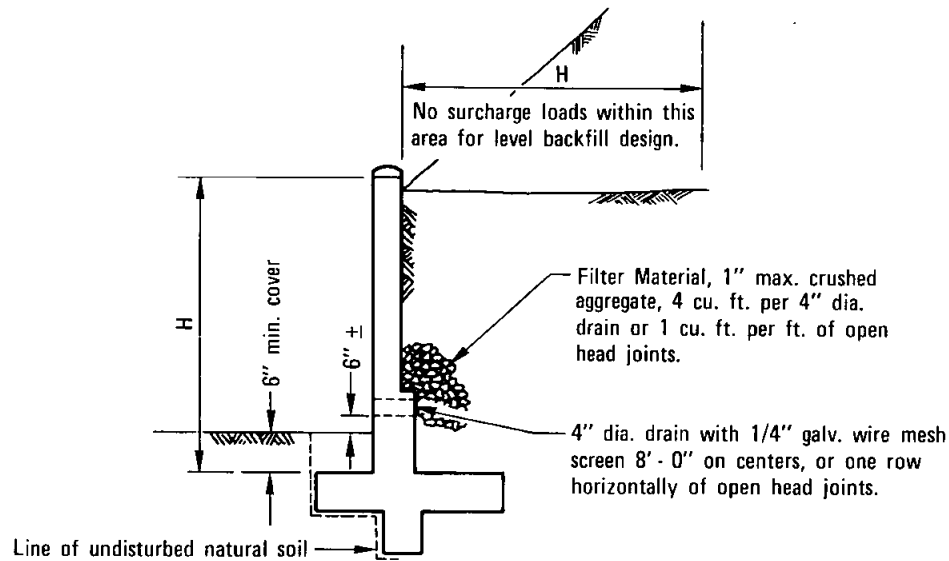
Each layer of backfill shall be moistened as directed by the Engineer and thoroughly tamped, rolled or otherwise compacted until the relative compaction is not less than 90%.

No backfill material shall be deposited against masonry retaining walls until the grout has developed a strength of 2,000 pounds per square inch in compression as determined by test 2" cubes, or until the masonry retaining wall has cured for a minimum of 14 days.

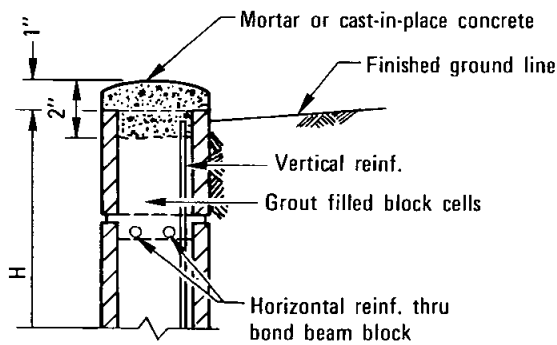
OPTIONAL MORTAR KEY

Embedment of the first course of block in a poured footing may be omitted by providing a mortar key. The key is formed by embedding a flat 2"x 4" flush with the top of the freshly poured footing. Remove the 2"x 4" after the concrete has started to harden.

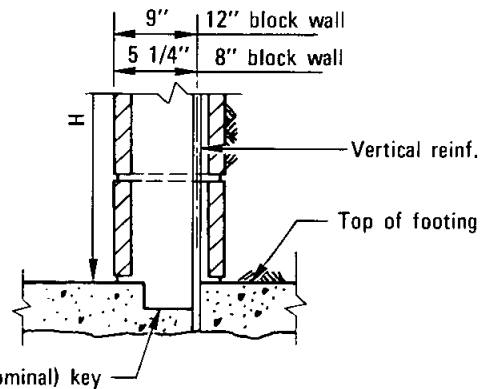
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				GENERAL NOTES FOR MASONRY RETAINING WALLS		<i>Allan A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
						DRAWING NUMBER C-7



TYPICAL SECTION



CAP DETAIL



KEY DETAIL

NOTE

All masonry retaining walls shall be constructed with cap, key and drainage details as shown hereon.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

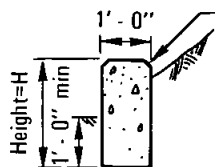
Allard O. Kuehnel Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

DETAILS FOR MASONRY RETAINING WALL

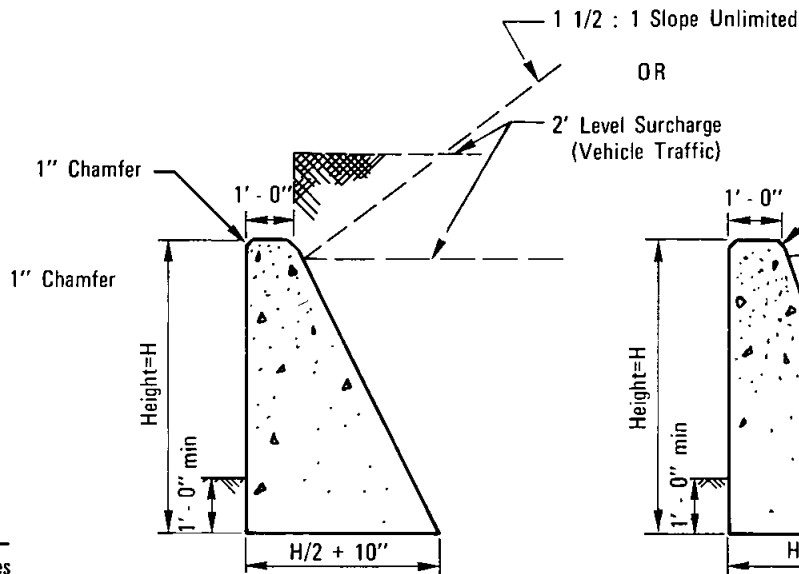
**DRAWING
NUMBER C-8**

Revision	By	Approved	Date

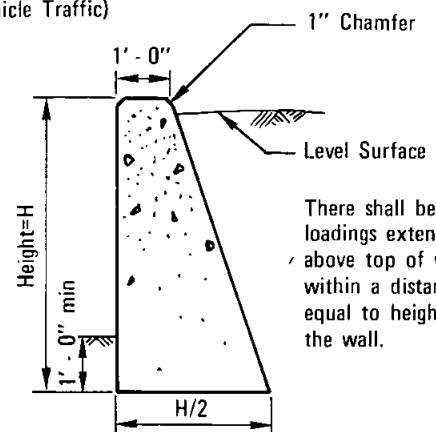


TYPE-A WALL

(Applicable for all types of backfill loadings)

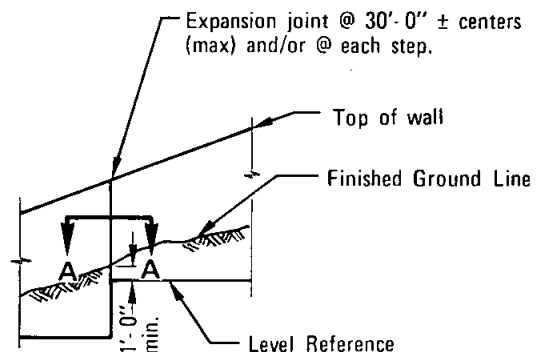


TYPE-B WALL



TYPE-C WALL

WALL TYPE	HEIGHT	BASE	CONC CF/FT
A	1' - 6"	1' - 0"	1.50
	2' - 0"	1' - 0"	2.00
B	3' - 0"	2' - 4"	4.99
	4' - 0"	2' - 10"	7.66
	5' - 0"	3' - 4"	10.82
	6' - 0"	3' - 10"	14.49
C	3' - 0"	1' - 6"	3.75
	4' - 0"	2' - 0"	6.00
	5' - 0"	2' - 6"	8.75
	6' - 0"	3' - 0"	12.00



TYPICAL ELEVATION

NOTE

See Standard Drawing C-10 for Section A-A, notes and details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				GRAVITY RETAINING WALLS		<i>Allard A. Kerschbaum</i> Dec. 1975	
						Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER	
						C-9	

CONCRETE

Concrete shall be 564 - C - 3000.

DESIGN CONDITIONS

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

DESIGN DATA

$F_c = 1200 \text{ psi}$ $F'_c = 3000 \text{ psi}$
Earth = 120 pcf and equivalent fluid pressure = 36 psf per foot of height

Walls shown for 1 1/2:1 unlimited sloping surcharge are designed in accordance with Rankine's Formula for unlimited sloping surcharge with $\phi = 33^\circ$ 42'.

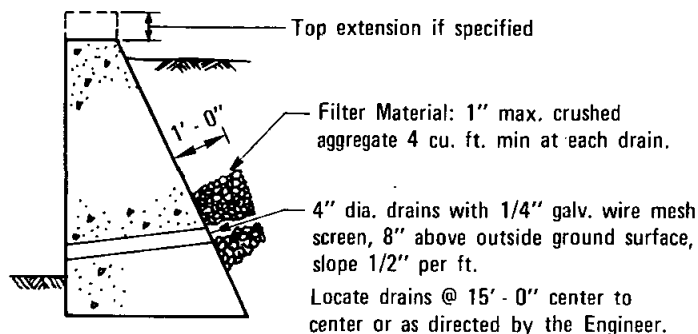
Note: Maximum toe pressure under wall footing = 1 1/2 tons. Special design required where footing material is incapable of supporting this pressure.

EXCAVATION AND BACKFILL

Compaction of backfill material by jetting or ponding with water will not be permitted.

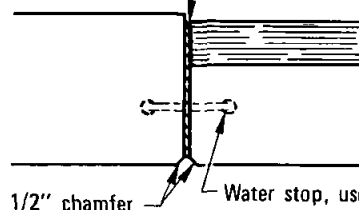
Each layer of backfill shall be moistened as directed by the Engineer and thoroughly tamped, rolled or otherwise compacted until the relative compaction is not less than 90 percent.

No backfill material shall be deposited against concrete retaining walls until the concrete has developed a strength of 2,500 pounds per square inch in compression as determined by test cyclinders, or until 28 days after wall has been placed.

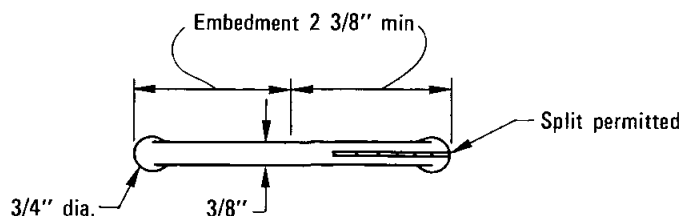


TYPICAL DRAINAGE WHEN H IS GREATER THAN 4' - 0"

1/2" Expansion joint, fill with premolded expansion joint filler. Locate joints at 30' - 0" $\pm$ centers or as directed by the Engineer.



SECTION A-A



RUBBER WATERSTOP

Use only when watertight joint is required.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

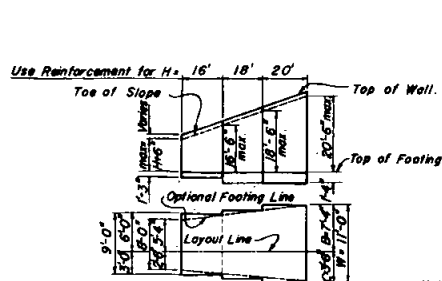
Allan A. Kuehnel Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **C-10**

SAN DIEGO REGIONAL STANDARD DRAWING

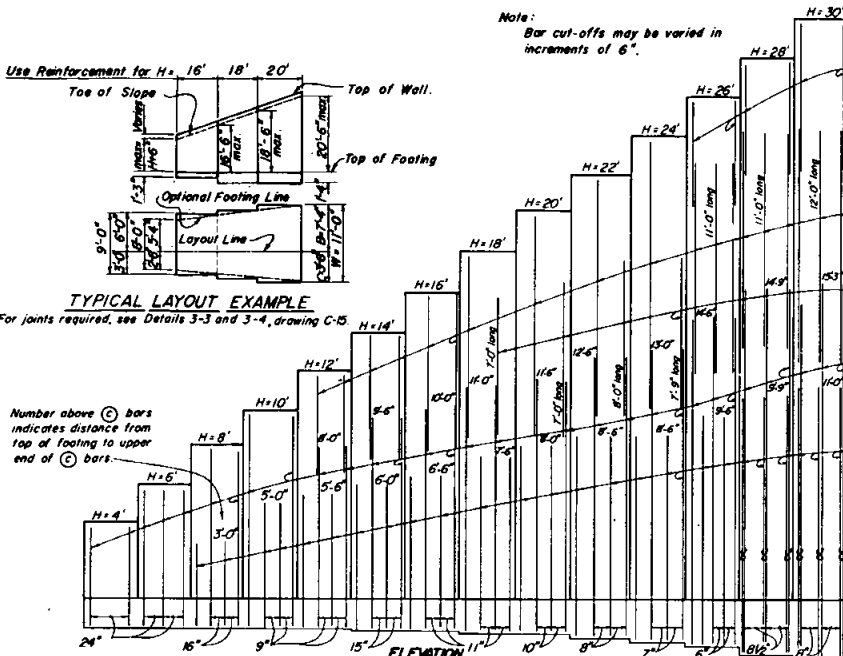
GENERAL NOTES AND DETAILS FOR GRAVITY RETAINING WALLS

Revision	By	Approved	Date

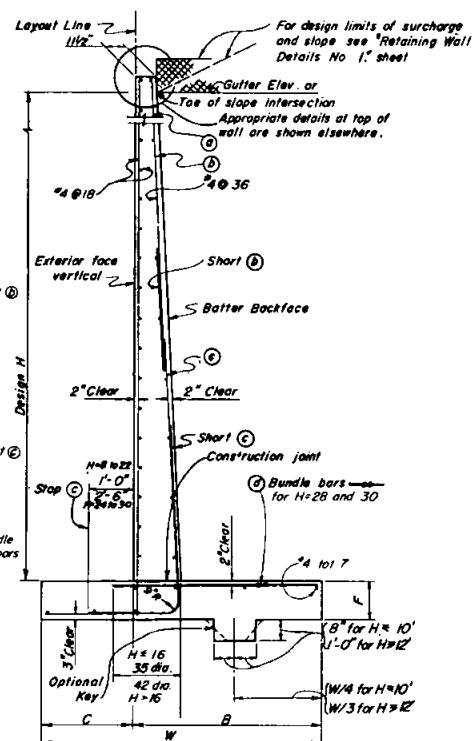


TYPICAL LAYOUT EXAMPLE
For joints required, see Details 3-3 and 3-4, drawing C-15.

Number above (C) bars indicates distance from top of footing to upper end of (C) bars.



Design H	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'
W	3'-2"	4'-2"	5'-2"	6'-2"	7'-2"	8'-2"	9'-2"	10'-2"	11'-2"	12'-2"	13'-2"	14'-2"	15'-2"	16'-2"
C	1'-0"	1'-4"	1'-8"	2'-0"	2'-4"	2'-8"	3'-0"	3'-4"	3'-8"	4'-0"	4'-4"	4'-8"	5'-0"	5'-4"
B	2'-2"	2'-10"	3'-6"	4'-2"	4'-10"	5'-6"	6'-2"	6'-10"	7'-6"	8'-2"	8'-10"	9'-6"	10'-2"	10'-10"
F Spread Fla.	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"
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	1/2-12	1/2-12	1/2-12	1/2-12
(C) bars	#4 @ 18"	#4 @ 18"	#4 @ 18"	#4 @ 18"	#4 @ 18"	#4 @ 18"	#4 @ 18"	#4 @ 18"	#4 @ 18"	#4 @ 18"	#4 @ 18"	#4 @ 18"	#4 @ 18"	#4 @ 18"
(C) bars	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"
(C) bars	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"	#5 @ 24"
Total (C) bars	6-#6	6-#6	6-#6	6-#6	6-#6	6-#6	6-#6	6-#6	6-#6	6-#6	6-#6	6-#6	6-#6	6-#6
2 Level Surcharge	1.6	1.9	2.2	2.3	2.8	3.3	3.5	4.0	4.3	4.6	4.9	5.3	5.7	6.2
2 Level Slope	1.1	1.5	2.0	2.5	2.7	3.3	3.6	4.2	4.7	5.5	5.9	6.5	7.1	7.5
112-1 Limited Slope	1.3	1.7	2.1	2.5	2.9	3.4	3.8	4.3	4.8	5.4	5.8	6.5	7.2	7.5
Spread Footing	17	20	28	37	51	80	103	147	187	246	303	407	449	507
Steel Bar/ft	8.9	12.3	16.3	20.2	25.4	30.1	34.6	40.1	45.0	52.1	63.3	77.0	88.1	104.8
Steel Bar/ft	29	32	41	70	84	113	140	172	212	270	322	427	469	528
Pile ftg	10.2	12.7	16.7	20.8	25.2	30.1	34.8	40.6	45.7	53.1	64.7	78.6	89.9	107.0

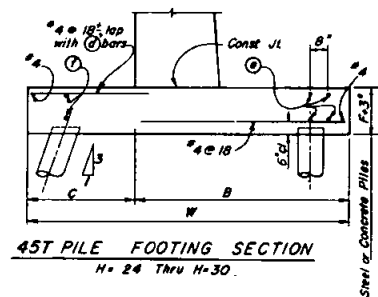
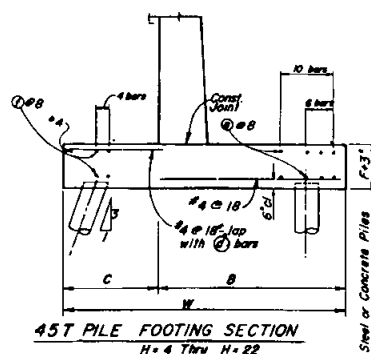


SPREAD FOOTING SECTION

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

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'.



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

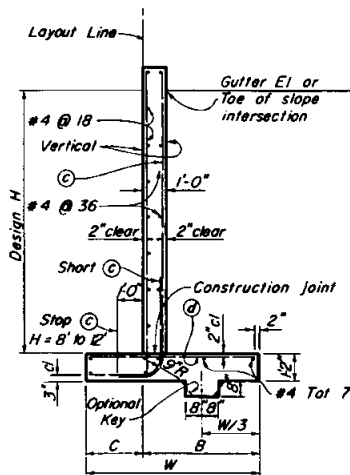
REINFORCED CONCRETE RETAINING WALL

TYPE 1

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Alfred A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING NUMBER C-11



SPREAD FOOTING SECTION

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

Note:

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

TABLE OF REINFORCING STEEL DIMENSIONS AND DATA					
Design H	4'	6'	8'	10'	12'
W	3'-2"	4'-2"	5'-2"	6'-2"	7'-2"
C	1'-0"	1'-4"	1'-8"	2'-0"	2'-4"
B	2'-2"	2'-10"	3'-6"	4'-2"	4'-10"
⊙ bars	#5 @ 24"	#5 @ 22"	#5 @ 11"	#6 @ 9"	#7 @ 7 1/2"
⊙ bars	#5 @ 24"	#5 @ 22"	#5 @ 22"	#7 @ 18"	#8 @ 15"
Total ⊙ bars	6 - #6	6 - #6	6 - #6	10 - #7	10 - #7
Total ⊙ bars	4 - #7	4 - #7	4 - #7	4 - #7	4 - #7
CASE I - Toe Press. psf	1590	1930	2240	2550	2840
CASE II - Toe Press. psf	1060	1460	1860	2280	2700
Spread Steel lbs/ft	15	21	27	46	70
Footing Conc CF/ft	8.6	11.8	14.9	18.1	21.3
Pile Flg Steel lbs/ft	25	32	38	75	101
Pile Flg Conc CF/ft	9.9	11.9	15.3	18.8	22.2

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'.

NOTES

Design Conditions

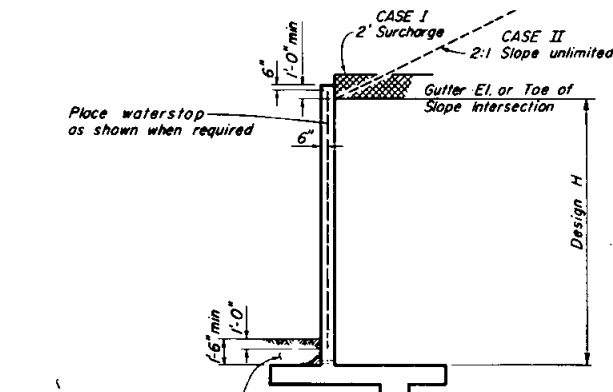
Design H may be exceeded by 6" before going to the next size. Footing key is required except when found unnecessary by the Engineer. Special footing design is required where foundation material is incapable of supporting toe pressure loads listed in table.

Design Data

$f_c = 1300$ psi $f'_c = 3250$ psi $f_s = 24,000$ psi
 $n = 10$ earth = 120 pcf

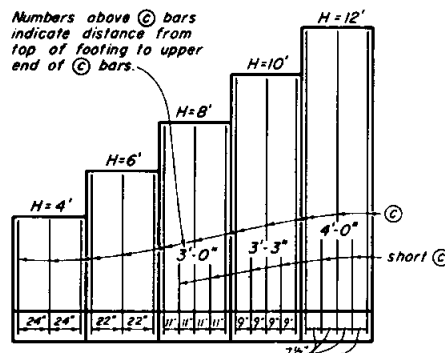
Case I Equivalent fluid pressure = 36 psf max for determination of toe pressure. 27 psf min for determination of heel pressure.

Case II - Earth pressure determined from Rankine's formula with $\phi = 33^\circ - 42^\circ$.

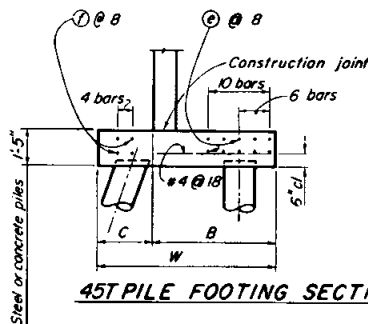


DESIGN

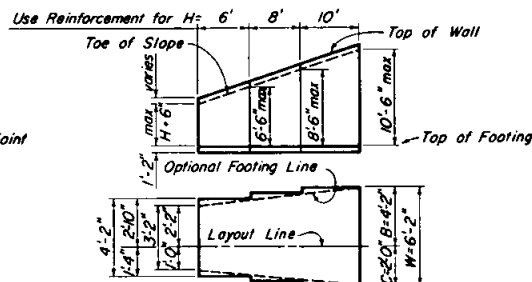
For drainage notes and other details, see "Retaining Wall Details No. 1," drawing C-13.



ELEVATION



45° PILE FOOTING SECTION



TYPICAL LAYOUT EXAMPLE

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

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

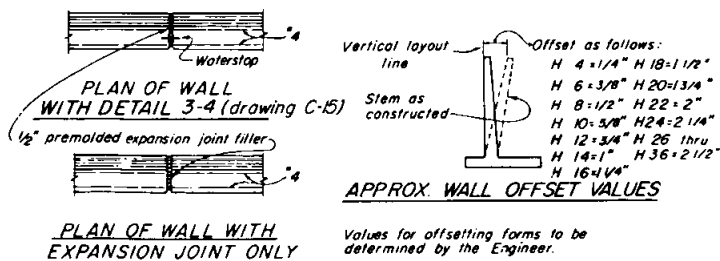
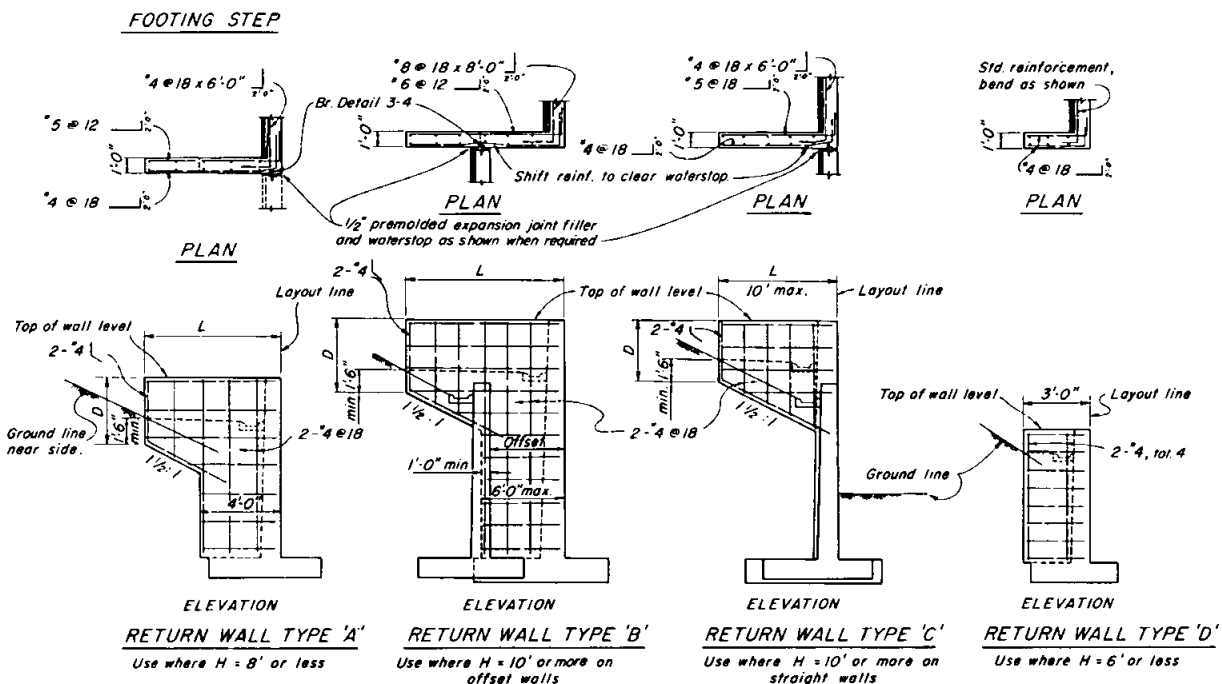
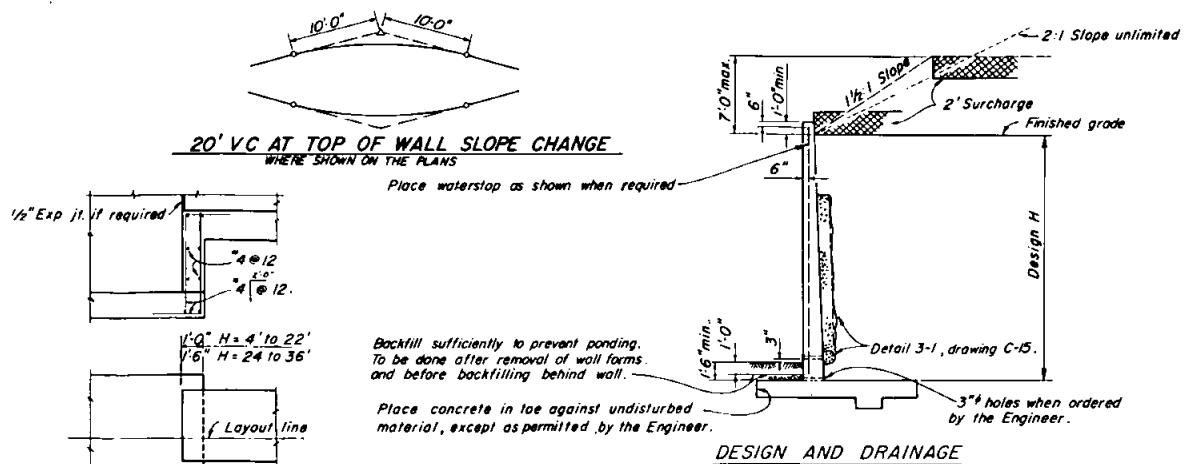
Allen A. Kuehnert Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER **C-12**

SAN DIEGO REGIONAL STANDARD DRAWING

REINFORCED CONCRETE RETAINING WALL TYPE 1A

Revision By Approved Date



NOTES:

Design Conditions:

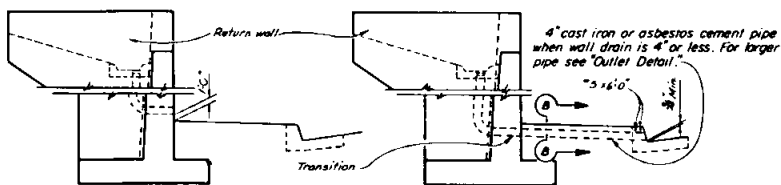
Design H may be exceeded by 6" before going to the next size.
Footing key is required except when found unnecessary by the Engineer.
Special footing design is required where foundation material is incapable of supporting toe pressure loads listed in table.
Return wall not required unless shown elsewhere.

Design Data:

$f_c = 1300 \text{ psi}$ $f_c = 3250 \text{ psi}$ $f_s = 24,000 \text{ psi}$ $n = 10$ earth = 120 pcf
2' Surcharge = 36 pcf max. for determination of toe pressure.
Equivalent fluid pressure = 27 pcf min. for determination of heel pressure.

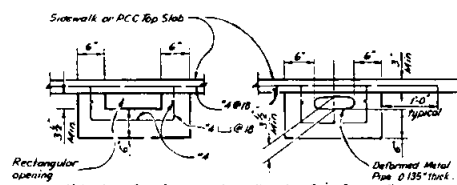
Earth pressures for 2:1 unlimited slope,
1 1/2:1 slope, and 1 1/2:1 unlimited slope,
determined from Rankine's formula with
 $\phi = 33^\circ, 42^\circ$.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				RETAINING WALL DETAILS NO. 1		<i>Alfred A. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER C-13	

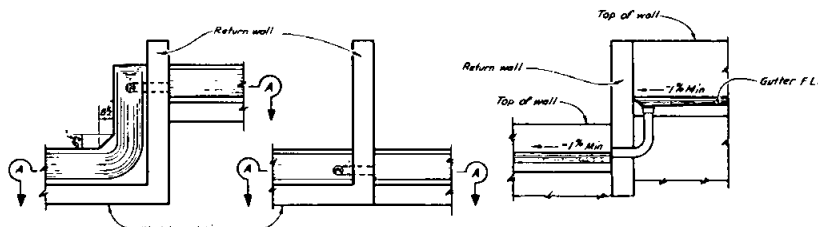


RETAINING WALL
FACE OF WALL OUTLET

RETAINING WALL
GUTTER OUTLET



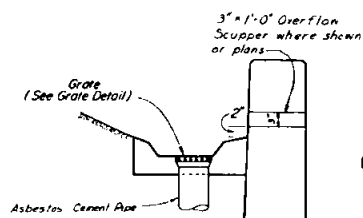
OUTLET DETAIL-SECTION B-B



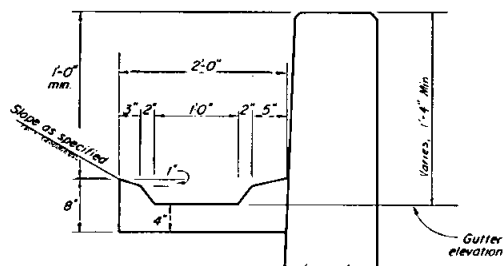
PLAN
OFFSET WALL DRAIN THROUGH RETURN WALL

PLAN
CONTINUOUS WALL

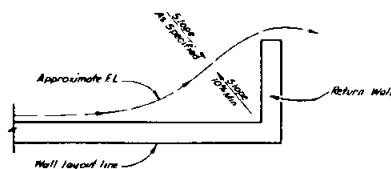
SECTION A-A



WALL DRAIN DETAIL



TYPICAL GUTTER DETAIL

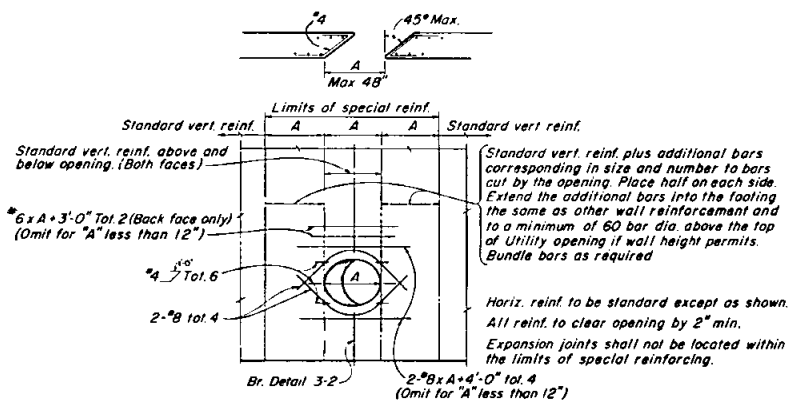


WALL DRAINAGE
WHERE GUTTER NOT REQUIRED



GRATE DETAIL

SIZES to fit Standard Hubs



RETAINING WALL-UTILITY OPENING

To be used in conjunction with the Retaining Wall Type 1' sheet.
Max. size of Opening (A)=48"

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

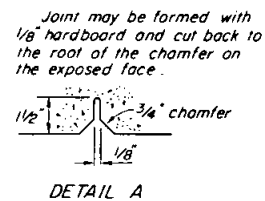
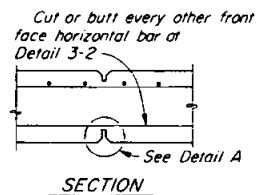
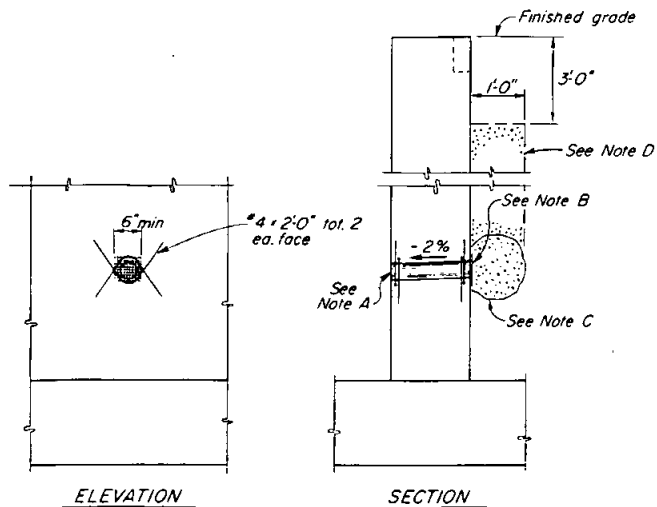
Attilio A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

RETAINING WALL DETAILS NO. 2

DRAWING
NUMBER C-14

Revision By Approved Date



WEAKENED PLANES

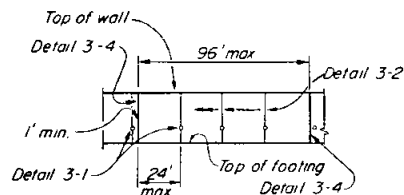
DETAIL 3-2

WEEP HOLE AND PERVIOUS BACKFILL

DETAIL 3-1

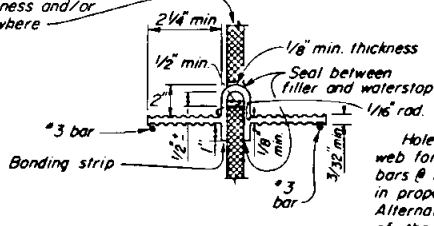
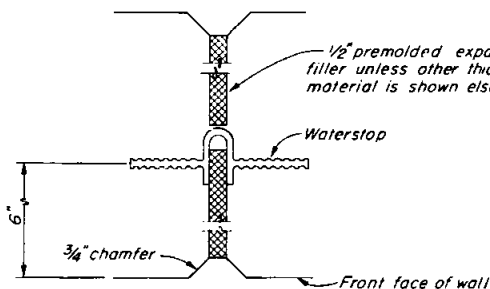
Notes :

- 4" x 4" drains @ 25' max. center to center (9' c-c for Type 3 and 9'3" c-c for Type 4 Retaining Walls) For walls adjacent to sidewalks or curbs, provide 4" cast iron or asbestos cement pipe under the sidewalk to discharge thru curb face. Exposed wall drains shall be located 3"± above finished grade.
- 6" square aluminum or galvanized steel wire 4 mesh hardware cloth. (Min wire diameter 0.03") Anchor firmly to backface.
- One cubic foot pervious backfill material in a burlap sack, securely tied.
- Pervious backfill material continuous behind retaining wall.



WALL EXPANSION JOINTS AND WEAKENED PLANES

DETAIL 3-3

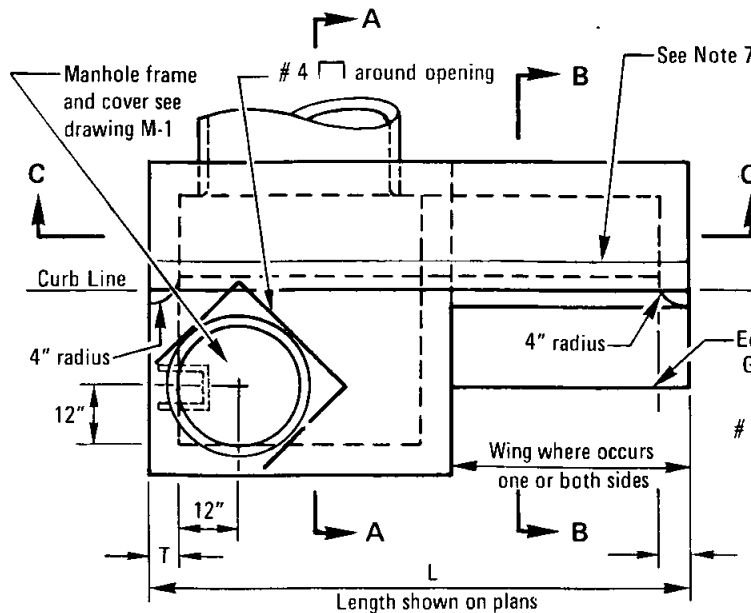


Waterstop to have 5 or more pairs of raised ribs to provide 0.1 sq. in. min. rib cross-section area on each half of the waterstop. Height of ribs to be 3/32" min.

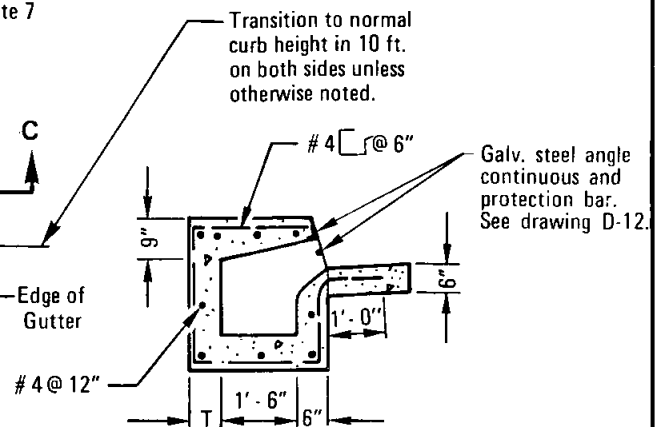
Holes will be permitted in the outer 1/2" of the web for wire, rings, etc. Tie web to #3 reinforcing bars @ 12" max. intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the Engineer.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				RETAINING WALL DETAILS NO. 3		Allen A. Kuehn	Dec. 1975
						Coordinator R.C.E. 19807	Date
						DRAWING NUMBER	C-15

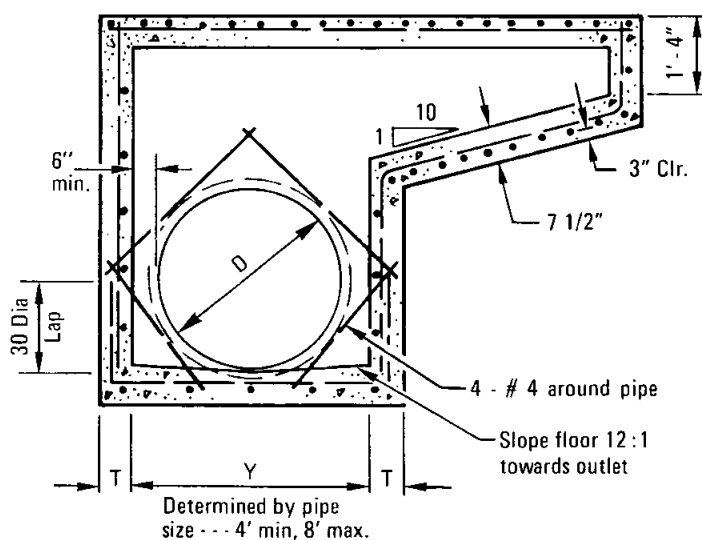
DRAINAGE SYSTEMS



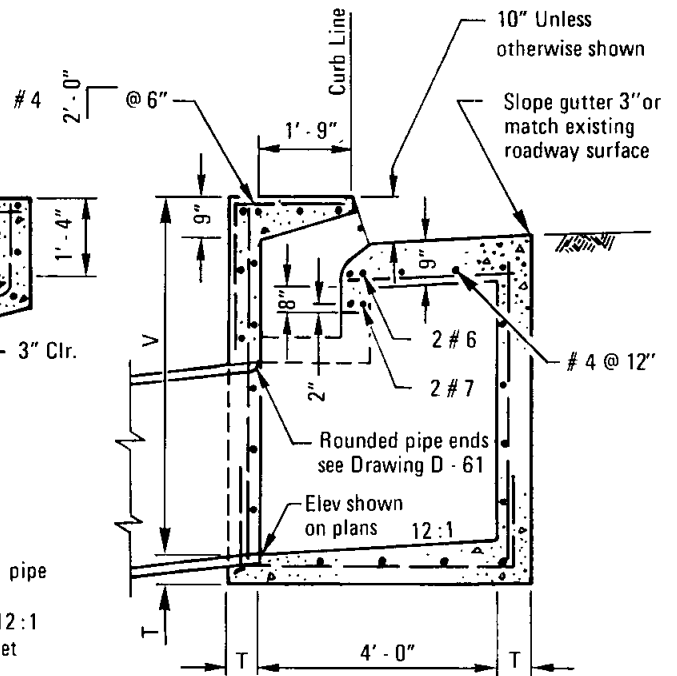
PLAN



SECTION B-B



SECTION C-C



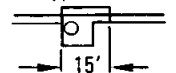
SECTION A-A

NOTES:

1. See Standard Drawings D-11 & D-12 for additional notes and details.
2. Types are designated as follows: (no wing) A, (one wing) A-1, (two wings) A-2.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. When V exceeds 4' steps shall be installed. See Standard Drawing D-11 for details.
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.
8. Surface of top slab shall be sidewalk finished to drain toward street at a slope of 1/4" per foot.
9. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.

LEGEND ON PLANS

15' Type A-1 inlet



Revision	By	Approved	Date

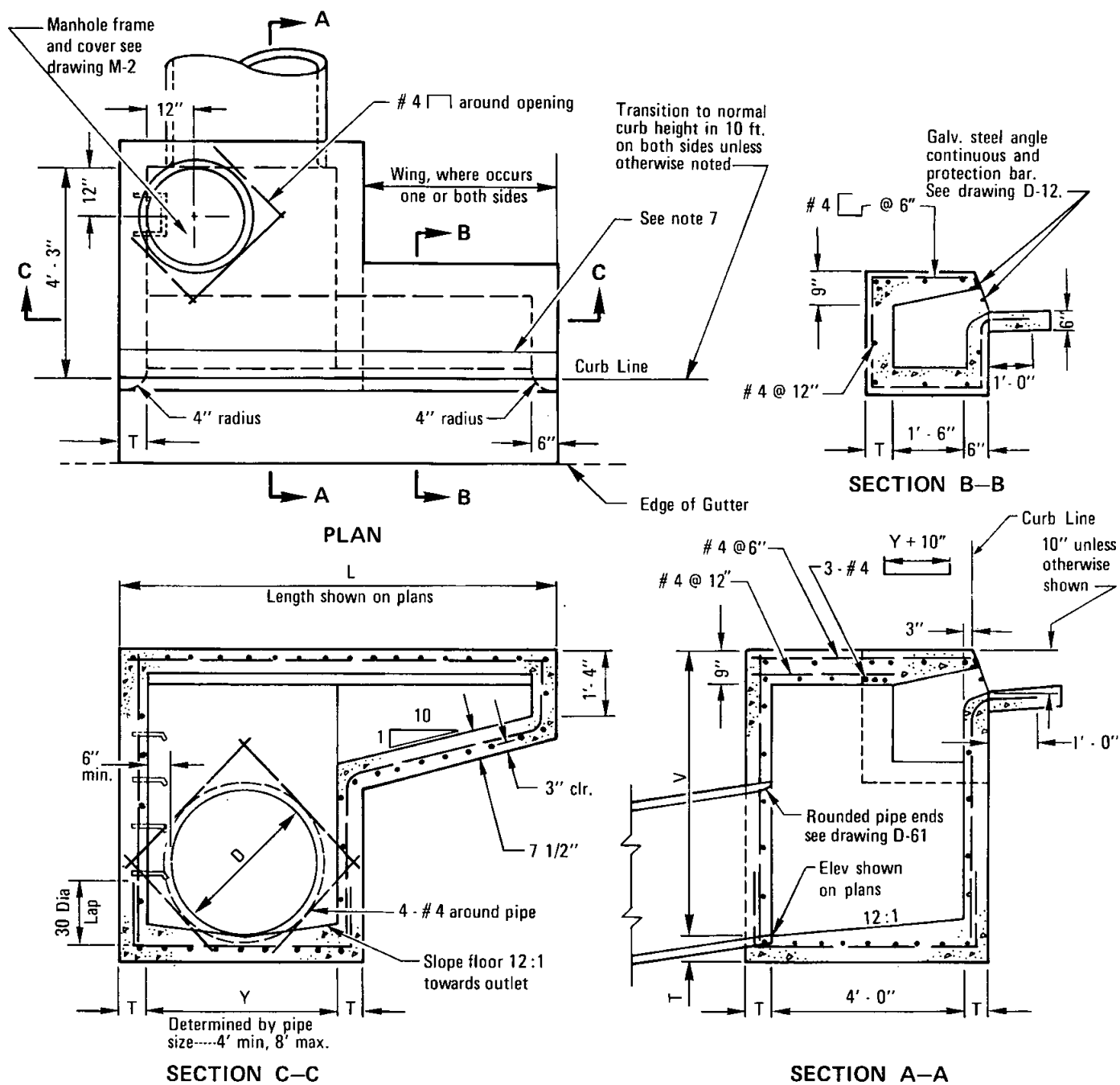
SAN DIEGO REGIONAL STANDARD DRAWING

CURB INLET - TYPE A

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allen A. Kersch Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER **D-1**

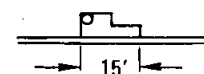


NOTES:

1. See Standard Drawings D-11 & D-12 or additional notes and details.
2. Types are designated as follows: (no wing) B, (one wing) B-1, (two wings) B-2.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. When V exceeds 4' steps shall be installed. See Standard Drawing D-11 for details.
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.
8. Surface of top slab shall be sidewalk finished to drain toward street at a slope of 1/4" per foot.
9. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.

LEGEND ON PLANS

15' Type B-1 inlet



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

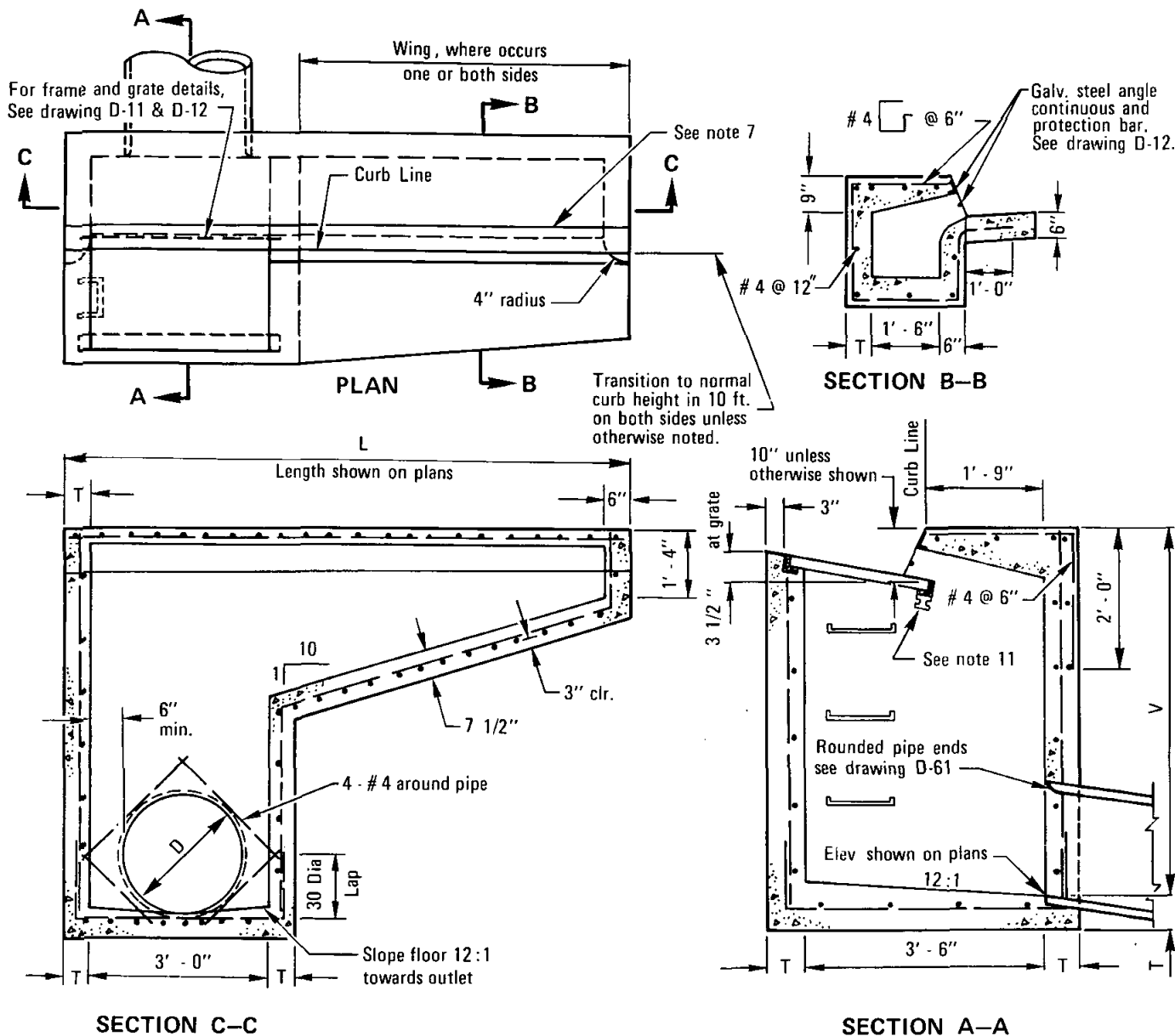
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

CURB INLET - TYPE B

DRAWING
NUMBER **D-2**

Revision	By	Approved	Date

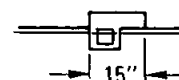


NOTES:

1. See Standard Drawings D-11 & D-12 for additional notes and details.
2. Types are designated as follows: (no wing) C, (one wing) C-1, (two wings) C-2.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. When V exceeds 4 ft. steps shall be installed. See Standard Drawing D-11 for details.
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.
8. Surface of top slab shall be sidewalk finished to drain toward street at a slope of 1/4" per foot.
9. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.
10. Where inlet is to be constructed on grade and Standard Drawing D-20 concrete apron is required, lift down-grade end of grate as shown on D-20.
11. When G-1 & G-2 grates are used place 3"-5.7 lb. steel I-beam, 3.5' long.

LEGEND ON PLANS

15" Type C-1 Inlet



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

CURB INLET - TYPE C

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

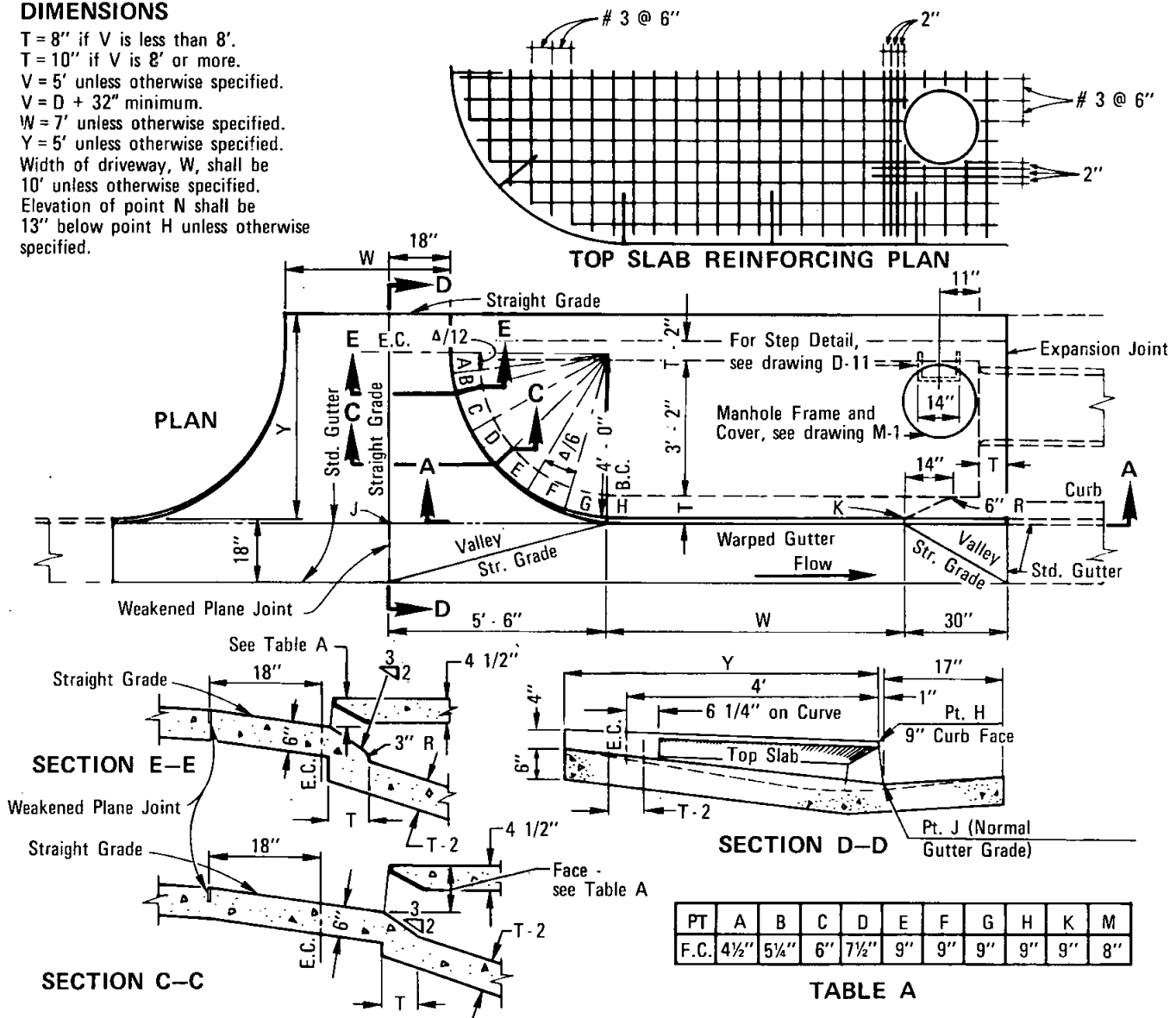
Alfred A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

D-3

DIMENSIONS

$T = 8''$ if V is less than $8'$.
 $T = 10''$ if V is $8'$ or more.
 $V = 5'$ unless otherwise specified.
 $V = D + 32''$ minimum.
 $W = 7'$ unless otherwise specified.
 $Y = 5'$ unless otherwise specified.
 Width of driveway, W , shall be $10'$ unless otherwise specified.
 Elevation of point N shall be $13''$ below point H unless otherwise specified.



NOTES

- Steel Plate should be of one continuous piece with curve portion a circular arc. Length = Width + $18''$ + circular arc.
- # 4 rebar $30''$ long, $1'$ O.C. shall be installed in top of walls for ties to top and gutters.
- The reinforcing steel in the top slab shall be # 3 bars $6''$ O.C. unless otherwise specified. Clearance shall be $1 1/2''$ from the bottom of the slab.
- Concrete for the inlet top to be placed at the same time as the s/w curb and gutter.
- Concrete shall be 564 - C - 3000.
- Exposed edges of concrete shall be rounded with a radius of $1/2''$.
- Surface of top slab shall be sidewalk finished to drain toward street at a slope of $1/4''$ per foot.

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

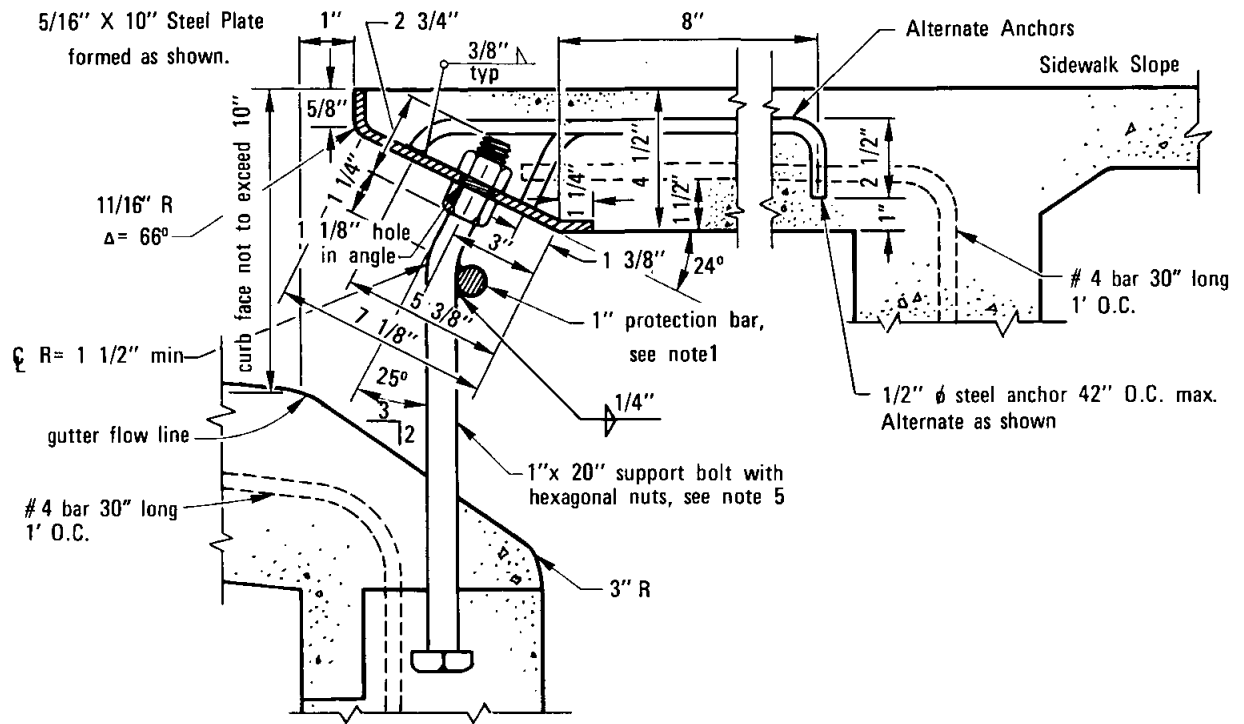
Allen A. Kuehn Dec. 1975
 Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

CURB INLET - TYPE D

DRAWING NUMBER **D-4**

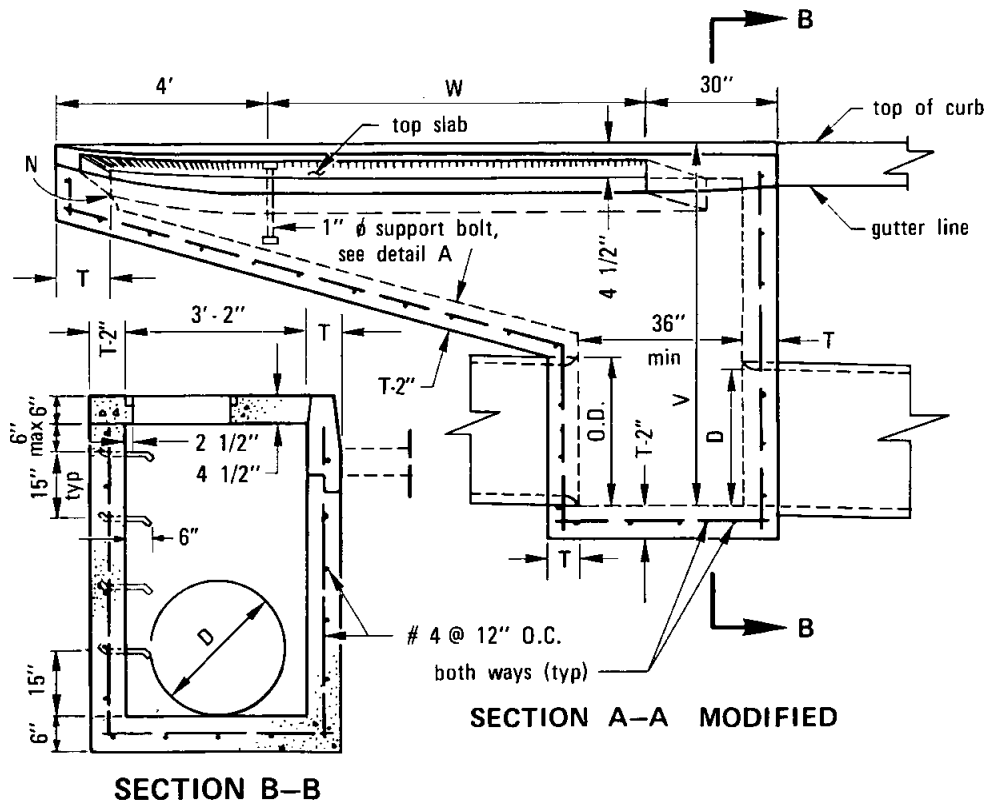
Revision	By	Approved	Date



DETAIL-A

NOTES

1. A plain, round steel protection bar 1" in dia. shall be installed. Bar shall be embedded 5" at each end.
2. Leave 8" hole blocked out in bottom placing of concrete for bolts placed at same time as gutter.
3. All exposed metal parts shall be galvanized.
4. All galvanizing damaged by welding shall receive two coats of aluminum paint.
5. Support bolts shall be spaced at not more than 5' - 0" O.C.
6. Adjusting nuts to be tightened and secured in place when steel plate is in proper position.



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

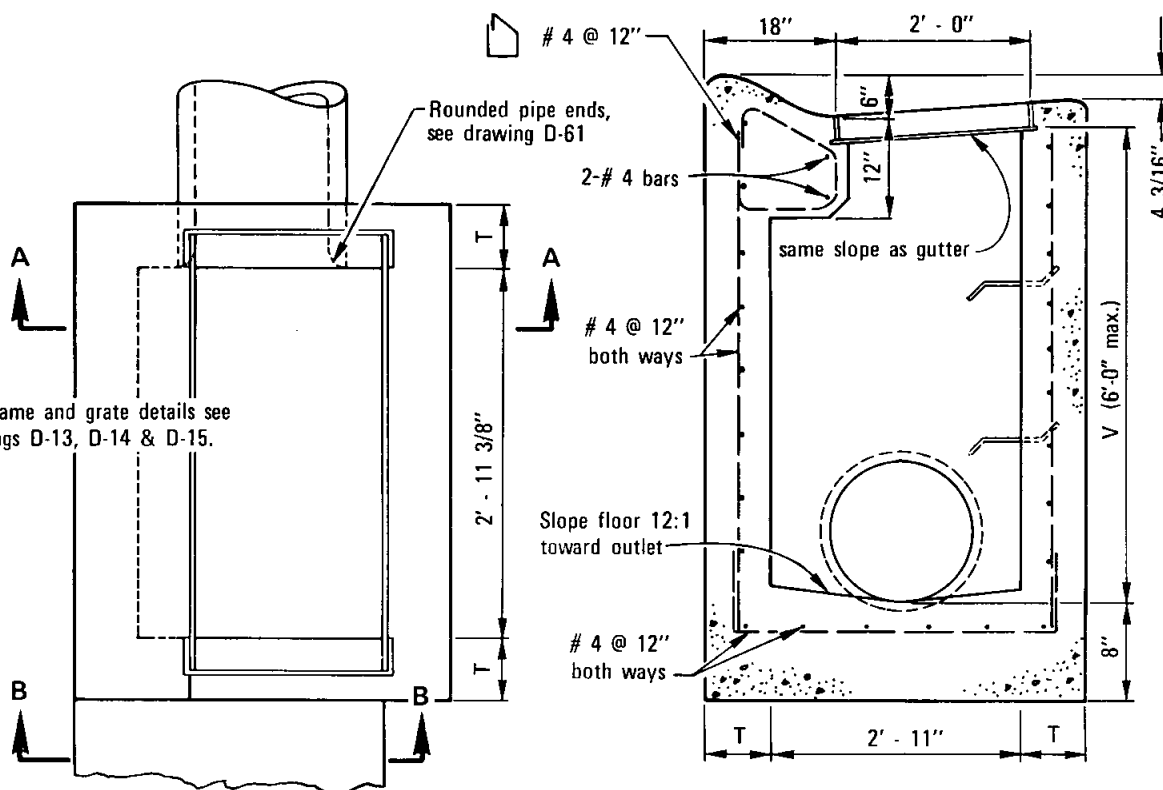
CURB INLET - TYPE D (DETAILS)

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allard A. Kerschbaum *Dec. 1975*
Coordinator R.C.E. 19807 Date

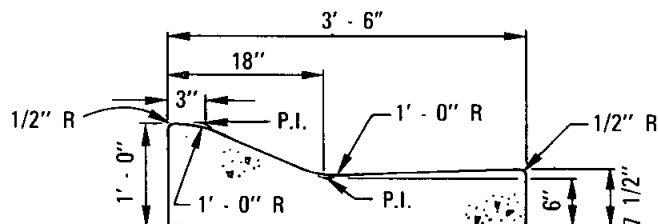
DRAWING NUMBER **D-5**

For frame and grate details see drawings D-13, D-14 & D-15.



PLAN

SECTION A-A



SECTION B-B

NOTES

1. See Standard Drawing D-11 for dimension T and additional notes and details.
2. When V exceeds 4', steps shall be installed. See Standard Drawing D - 11 for details.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. Maintain 1 1/2" clear spacing between reinforcing and surface.
5. Type E inlet to be used only with rolled curb. See Standard Drawing G - 4.
6. Transition 10' to curb Section B-B at inlet, both sides.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

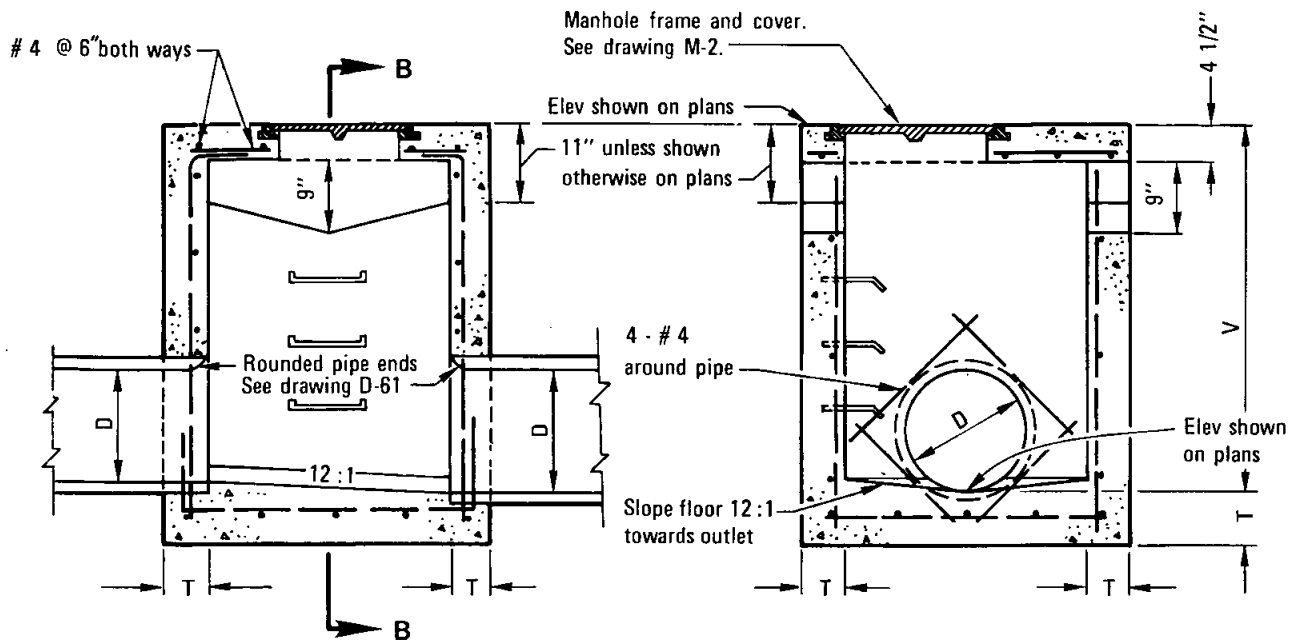
Allan A. Kerschman *Dec. 1975*
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

CURB INLET - TYPE E

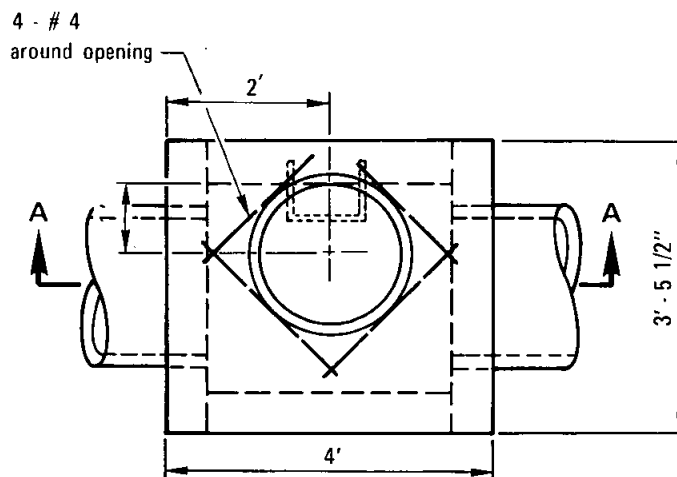
DRAWING
NUMBER **D-6**

Revision	By	Approved	Date



SECTION A-A

SECTION B-B

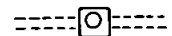


PLAN

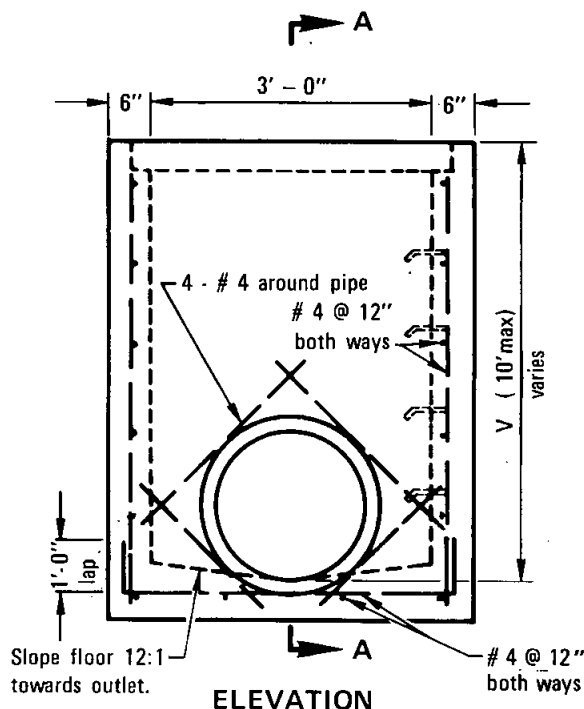
NOTES

1. See Standard Drawing D-11 for additional notes and details.
2. When V exceeds 4' steps shall be installed. See Standard Drawing D-11 for details.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. Openings on both sides unless otherwise shown on plans.
5. Maintain 1 1/2" clear spacing between reinforcing and surface.

LEGEND ON PLANS

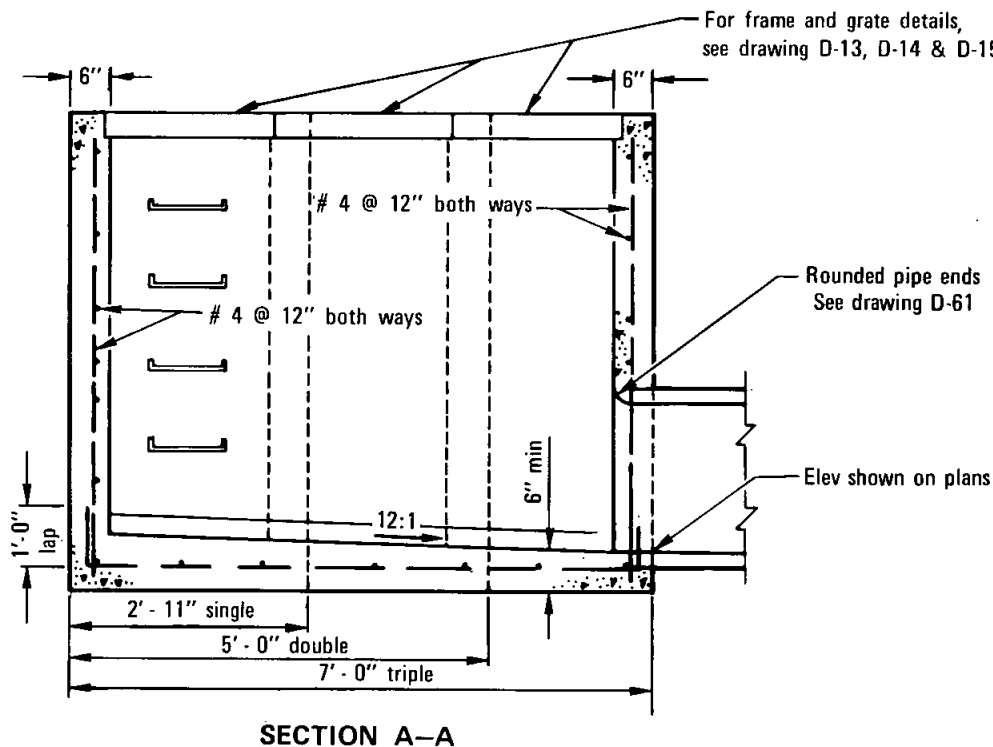


Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CATCH BASIN - TYPE F		<i>Allan A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	D-7



NOTES

1. See Standard Drawing D-11 for additional notes and details.
2. When V exceeds 4', steps shall be installed. See Standard Drawing D-11 for details.
3. Maintain 1 1/2" clear spacing between reinforcing and surface.
4. Increase in allowable depth subject to approval by Agency.
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 a 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, Types G-3 and G-4. See Standard Drawing D-14 and D-15.



LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard G. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

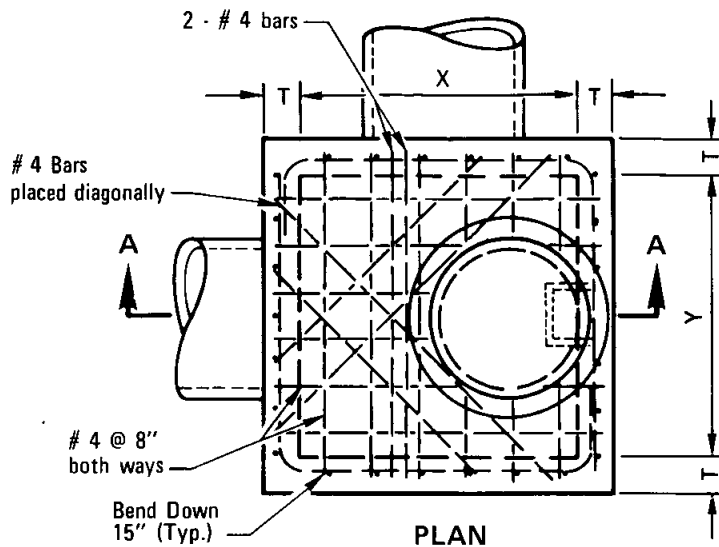
DRAWING
NUMBER

D-8

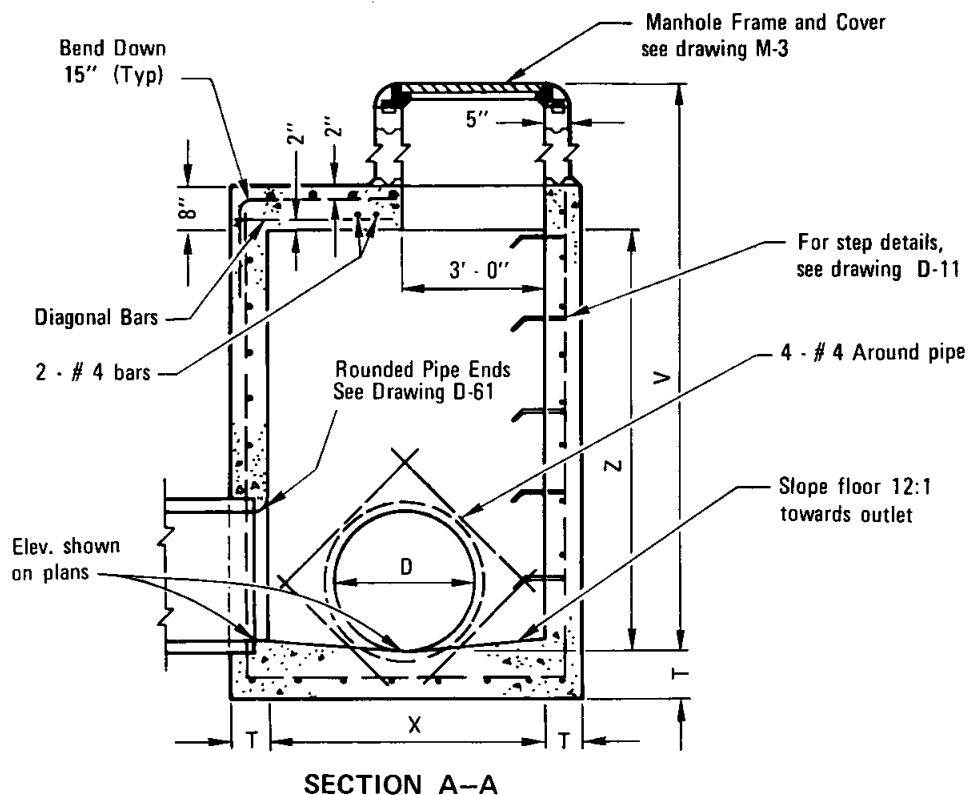
SAN DIEGO REGIONAL STANDARD DRAWING

CATCH BASIN - TYPE G

Revision	By	Approved	Date



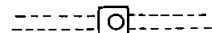
TYPE	PIPE DIA	X	Y	Z
A 4	up to 39"	4'	4'	6'
A 5	42" to 48"	5'	4'	6'
A 6	51" to 60"	6'	4'	6'
A 7	63" to 72"	7'	4'	7'
A 8	75" to 84"	8'	4'	8'



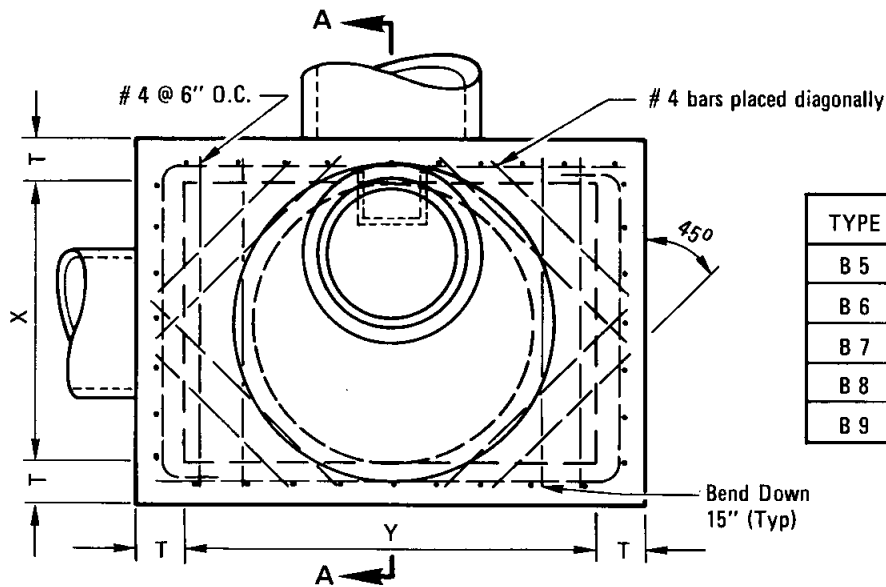
NOTES

1. See Standard Drawing D-11 for additional notes and details.
2. Concrete base shall be 564 - C - 3000.
3. All precast components shall be reinforced with 1/4" diameter steel, wound spirally on 4" centers.
4. All joints shall be set in Class C mortar.
5. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.
6. Exposed edges of concrete shall be rounded with a radius of 1/2".

LEGEND ON PLAN:



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				STORM DRAIN CLEANOUT - TYPE A		<i>Allen A. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date
				DRAWING NUMBER		D-9



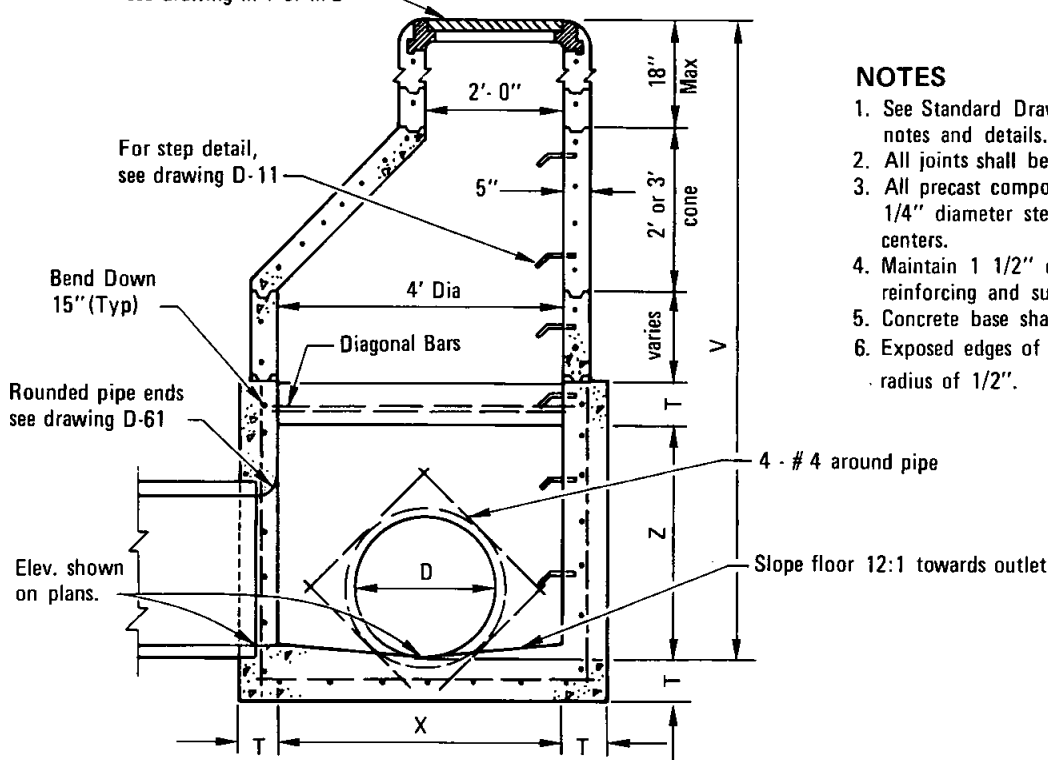
TYPE	PIPE DIA	X	Y	Z
B 5	up to 51"	4'	5'	5'
B 6	54" to 60"	4'	6'	6'
B 7	63" to 69"	4'	7'	7'
B 8	72" to 81"	4'	8'	8'
B 9	84" to 90"	4'	9'	9'

Manhole frame and cover
see drawing M-1 or M-2

PLAN

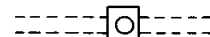
NOTES

1. See Standard Drawing D-11 for additional notes and details.
2. All joints shall be set in Class C mortar.
3. All precast components shall be reinforced with 1/4" diameter steel wound spirally on 4" centers.
4. Maintain 1 1/2" clear spacing between reinforcing and surface.
5. Concrete base shall be 564 - C - 3000.
6. Exposed edges of concrete shall be rounded with a radius of 1/2".



SECTION A-A

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

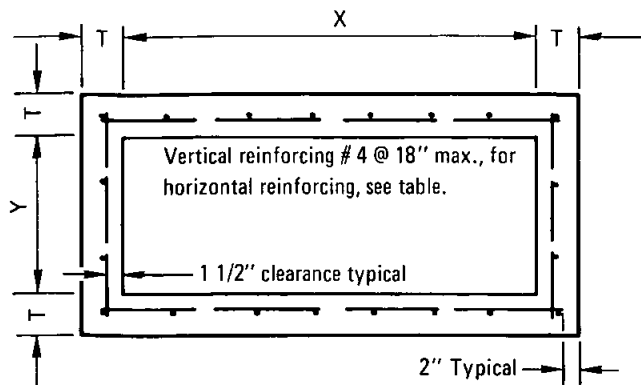
Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-10**

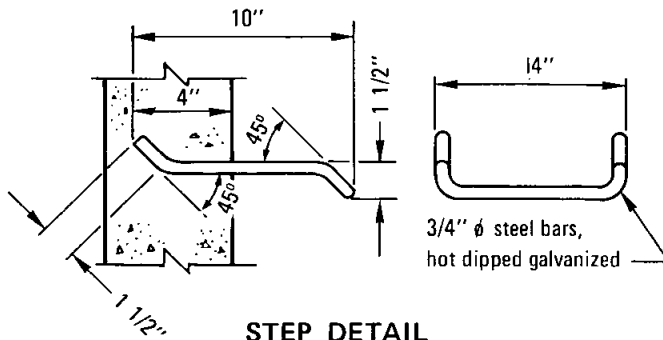
SAN DIEGO REGIONAL STANDARD DRAWING

STORM DRAIN CLEANOUT - TYPE B

Revision	By	Approved	Date



TYPICAL BOX SECTION



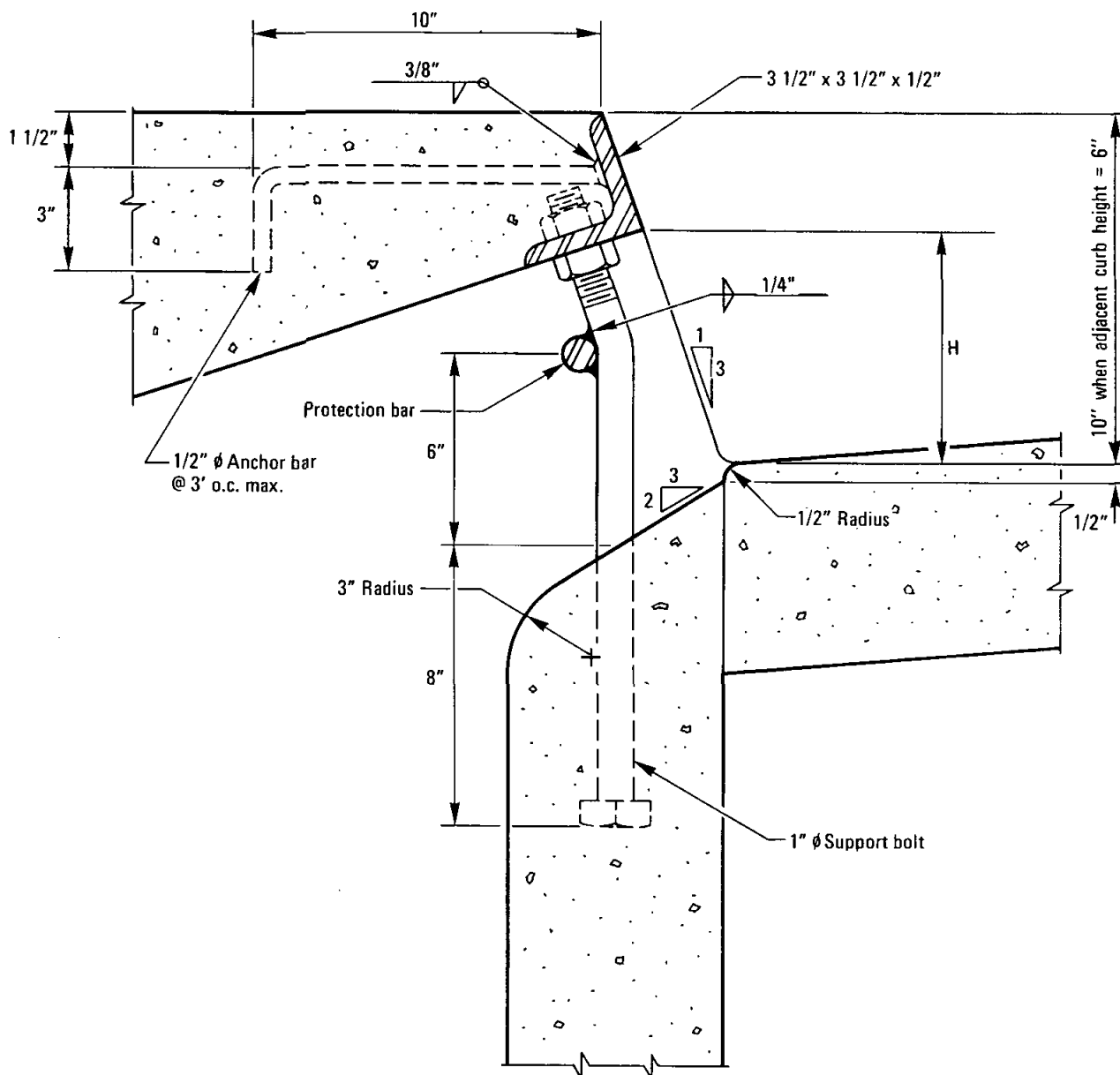
STEP DETAIL

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

NOTES

- Concrete shall be 564 - C - 3000 unless otherwise noted.
- Reinforcing steel shall comply with this drawing unless otherwise specified.
- Reinforcing steel shall be intermediate grade deformed bars conforming to latest ASTM specifications.
- Bends shall be in accordance with latest ACI code.
- Minimum splice length for reinforcing shall be 30 diameters.
- Floor shall have a wood trowel finish and, except where used as junction boxes, shall have a minimum slope of 1" per foot toward the outlet.
- Depth V is measured from the top of the structure to the flowline of the box.
- Wall thickness and reinforcing steel required may be decreased in accordance with table above.
- Wall thickness shall be stepped on the outside of the box.
- When the structure depth V exceeds 4', steps shall be cast into the wall at 15 inch intervals from 15" above floor to within 12 inches of top of structure. Where possible place steps in wall without pipe opening, otherwise over opening of smallest diameter.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				INLETS AND CLEANOUTS NOTES AND DETAILS		<i>Allan A. Kersch</i> <i>Dec. 1975</i>	
						Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER	
						D-11	



NOTES:

1. Face angle shall be cast into structure continuous for the full length "L".
2. All exposed metal parts to be hot-dipped galvanized after fabrication.
3. When curb inlet opening height (H) exceeds 6" install 1" ϕ steel protection bar.
4. Install additional bars at 3 1/2" clear spacing above first bar when opening exceeds 13".
5. When curb inlet opening length exceeds 8' install 1" ϕ steel support bolts, spaced at not more than 5' o.c.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

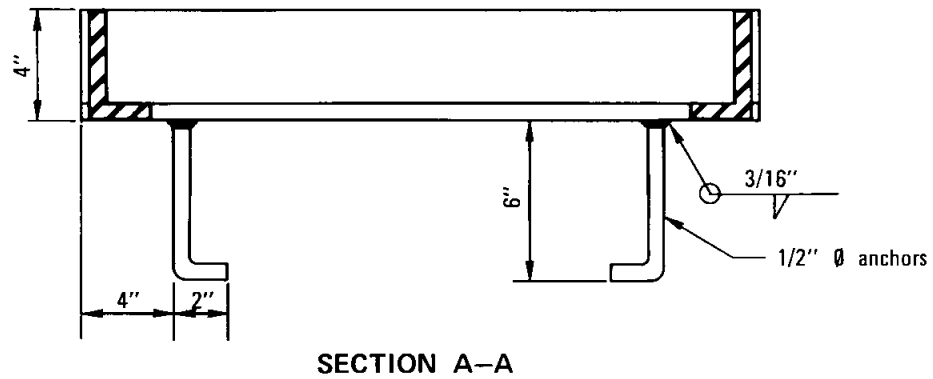
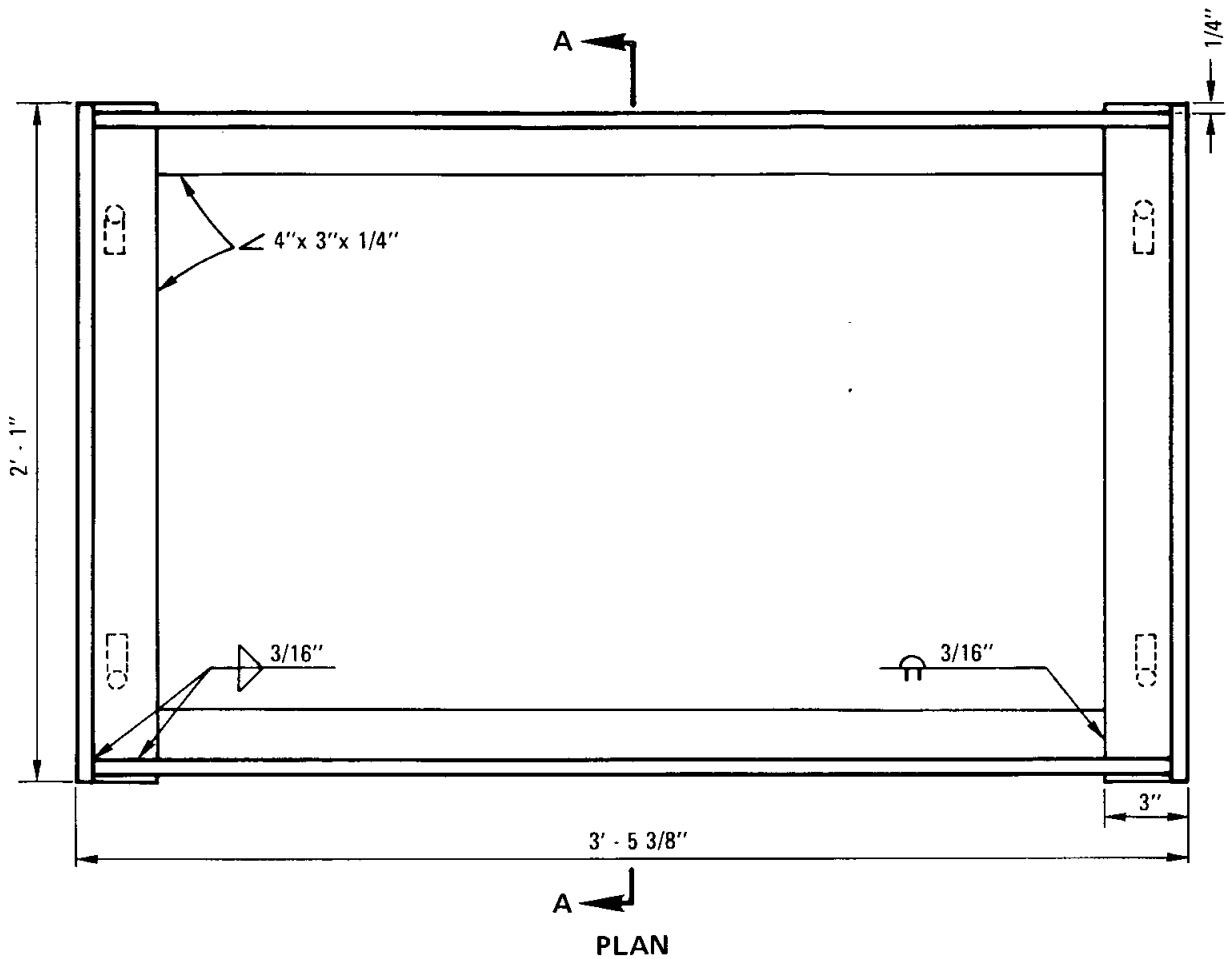
Allard A. Kuehnel *Dec. 1975*
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

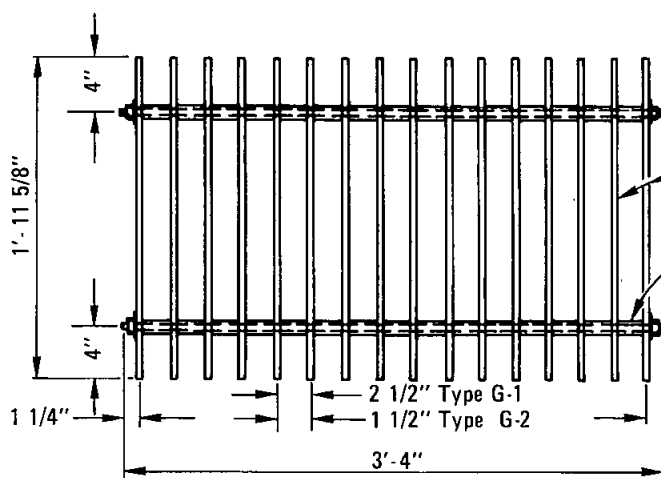
CURB INLET OPENING

DRAWING
NUMBER **D-12**

Revision	By	Approved	Date



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				WELDED STEEL GRATE FRAME	<i>Allan A. Kerschbaum</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
					DRAWING NUMBER D-13



3 1/2" x 3/8" x 1'-11 5/8" bars

15 3/4" pipe spacers— Type G-1

25 3/4" pipe spacers— Type G-2

1/2" dia rod

cut washers

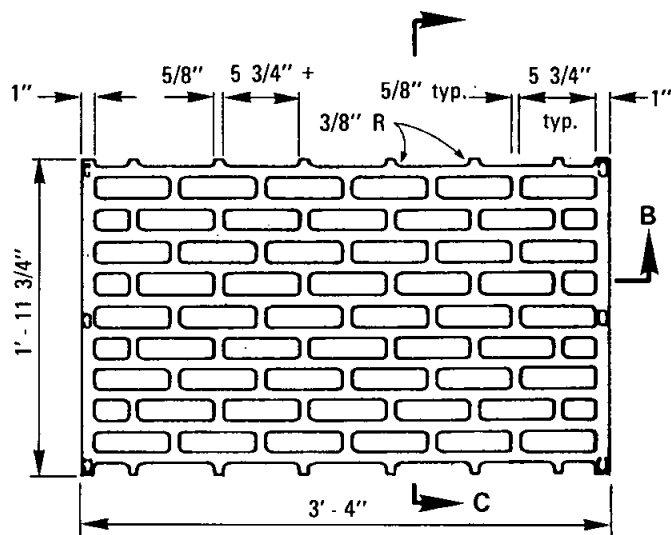
TYPE G-1 & G-2 GRATE

Wt. G-1 155 #

Wt. G-2 240 #

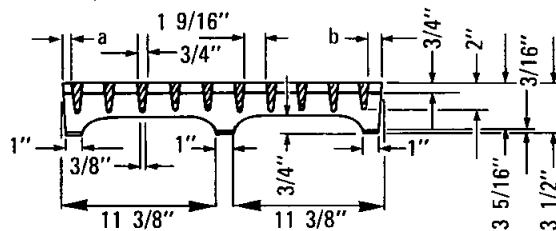
spot weld

SECTION A

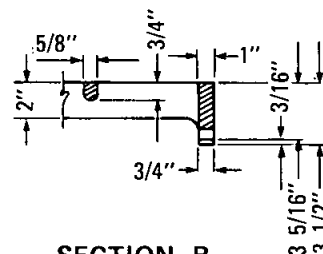


TYPE G-3 GRATE (CAST NODULAR IRON)

Wt. 155 #



SECTION A-A



SECTION B

NOTES:

1. Hot dip galvanize all parts after fabrication.
2. Dimensions to Centerline of bars unless otherwise noted.
3. Type G-1 and G-2 grates are not to be used in areas subject to bicycle traffic.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

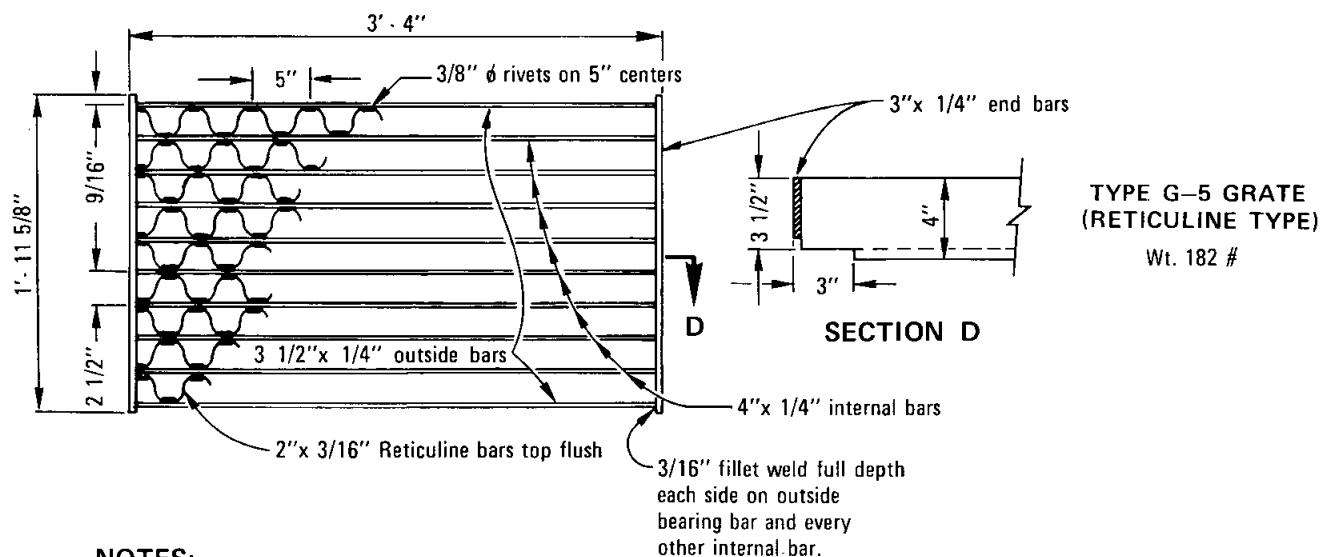
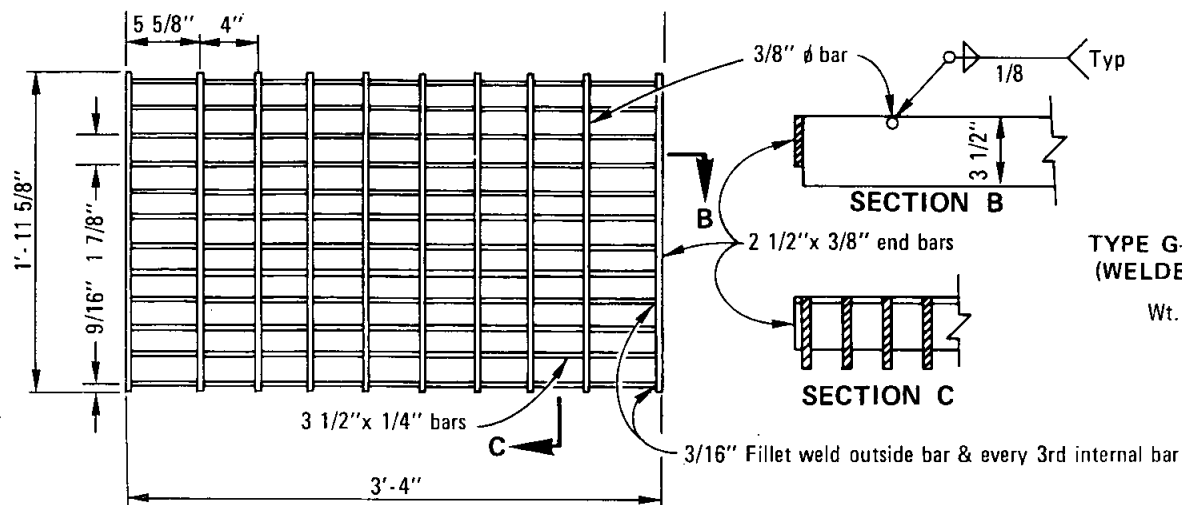
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-14**

SAN DIEGO REGIONAL STANDARD DRAWING

DRAINAGE STRUCTURE GRATES TYPES G1, G2 AND G3

Revision	By	Approved	Date



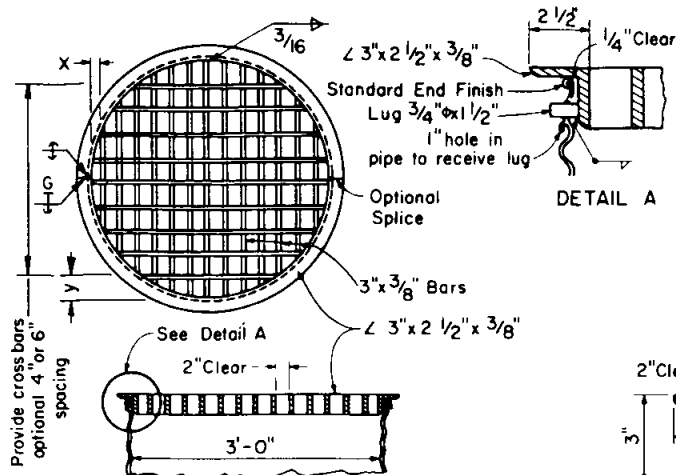
NOTES:

1. Hot dip galvanize all parts after fabrication.
2. Dimensions to Centerline of bars unless otherwise noted.

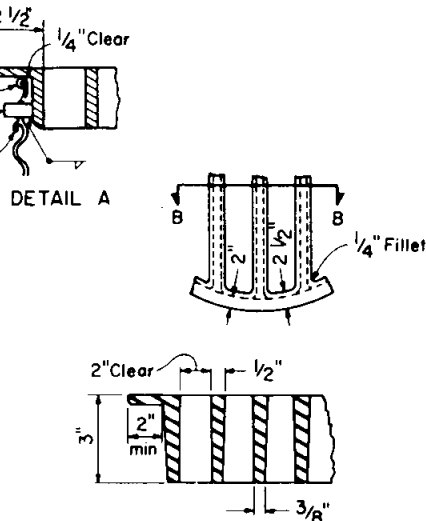
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				DRAINAGE STRUCTURE GRATES TYPES G4 AND G5		<i>Allan A. Kerschman</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	D-15



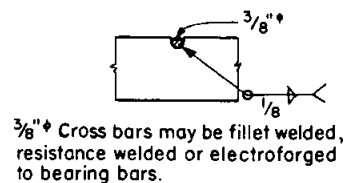
Revision	By	Approved	Date



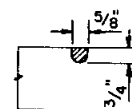
GRATE DETAILS



ALTERNATIVE CAST NODULAR IRON GRATE OR CAST STEEL



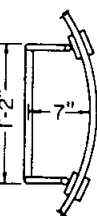
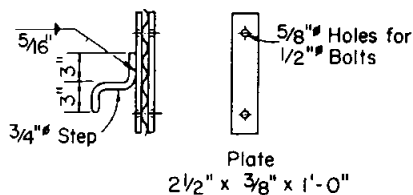
CROSS BAR DETAIL
GRATE (WELDED STEEL)



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

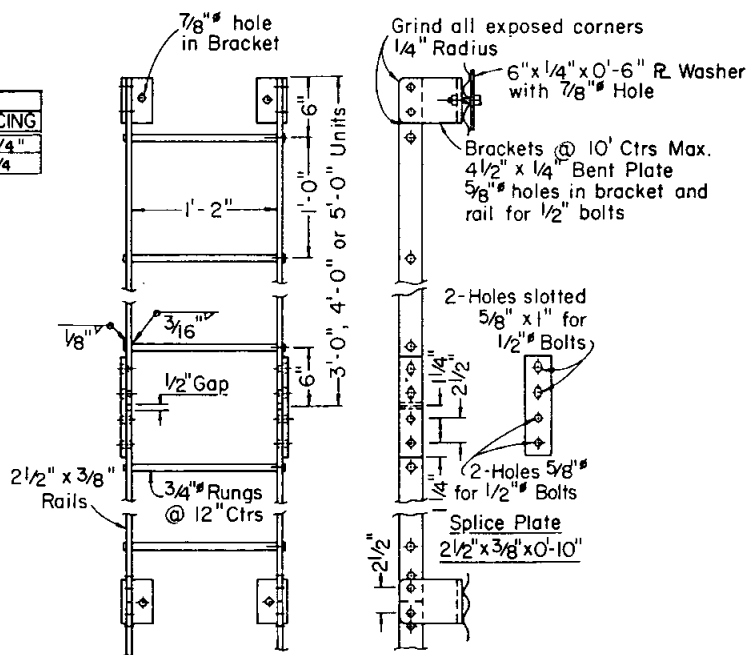
GRATE BAR SPACING TABLE

TYPE	NO. BARS	CLEAR BAR SPACING	X	4" SPACING	6" SPACING
welded	15	2	9/16	3 3/4"	5 3/4"
Cast	13	2	2 1/8	3 3/4"	5 3/4"



STEP DETAIL

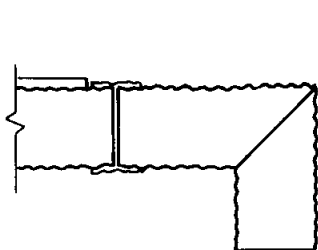
H = 3' - 6" to 4' - 11"



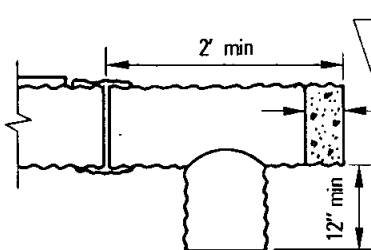
LADDER DETAIL

H = 5' - 0" or GREATER

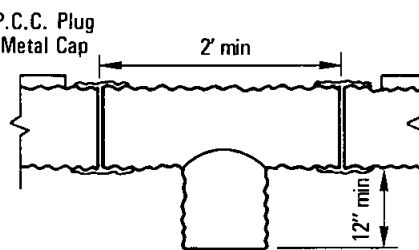
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CORRUGATED STEEL PIPE INLETS DETAILS		<i>Allan A. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER D-17	



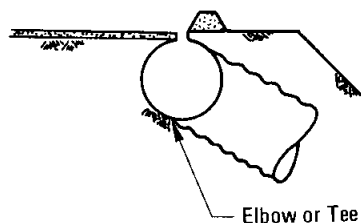
ELBOW



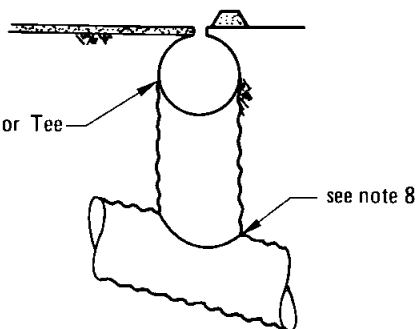
TEE



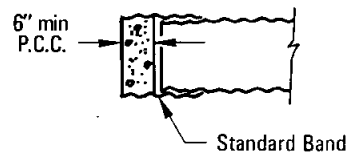
TEE-SAG CONDITION



Elbow or Tee

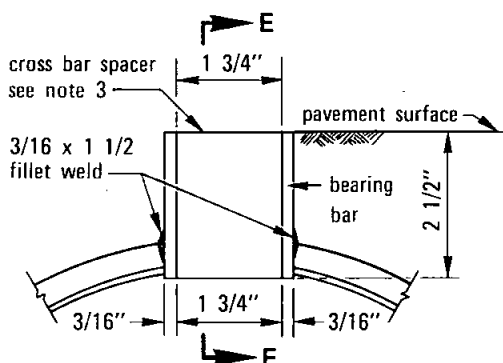


RISER

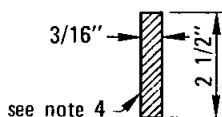


BAND PLUG

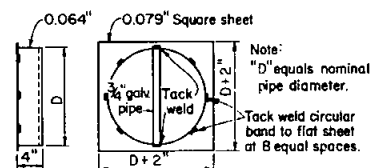
OVERSIDE DRAIN



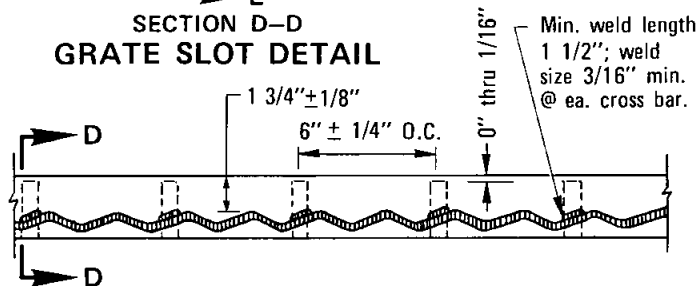
SECTION D-D
GRATE SLOT DETAIL



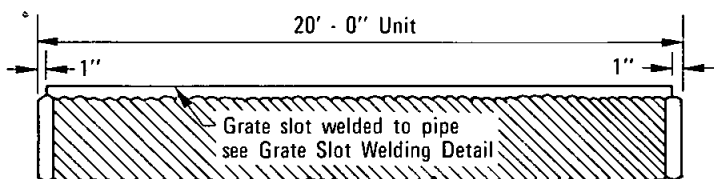
SECTION E-E



METAL CAP DETAIL



GRATE SLOT WELDING DETAIL



GRATE SLOT DRAIN

NOTES

1. Drain seams may be riveted or resistance spotwelded at equal centers, continuous helical lock seam or helical welded seam.
2. Each drain section shall be assembled with standard coupling bands.
3. Cross bar spacer of grate shall be pressure fusion or plug welded to bearing bars in such a manner as to develop the strength of the cross bar spacer.
4. Cross bar spacer (Section E-E) may differ from that shown provided section area is equal or greater.
5. Grate material shall be a weldable grade of steel complying to the requirements of ASTM A 36.
6. The maximum variance from a straight line from the extreme top corners of the bearing bar shall be 1/2" in 20 feet.
7. Installation lengths shall be 10 feet 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.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

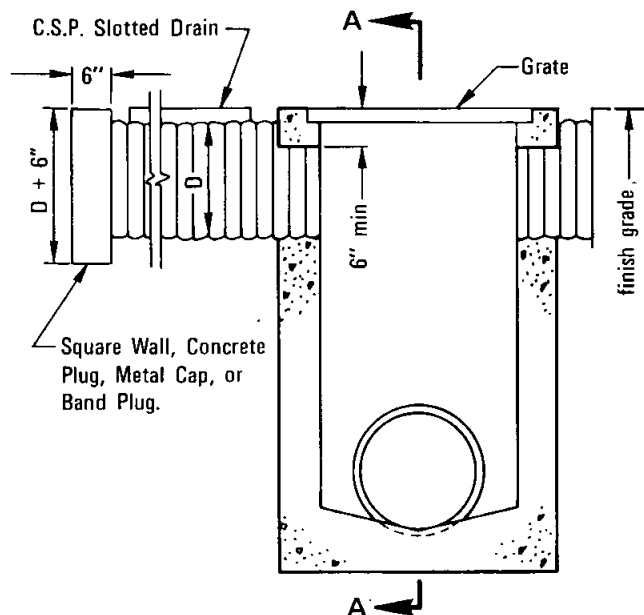
Allan G. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-18**

SAN DIEGO REGIONAL STANDARD DRAWING

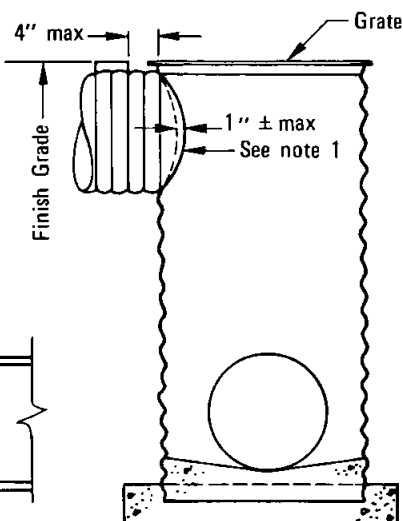
SLOTTED CORRUGATED STEEL PIPE DRAIN
12" THROUGH 24"

Revision	By	Approved	Date

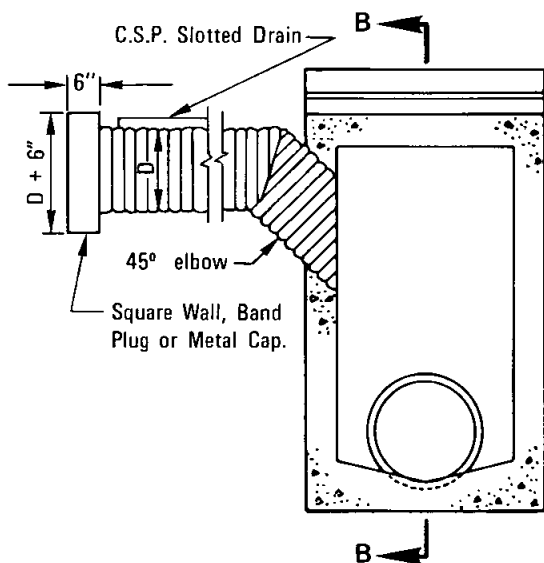


SECTION A-A

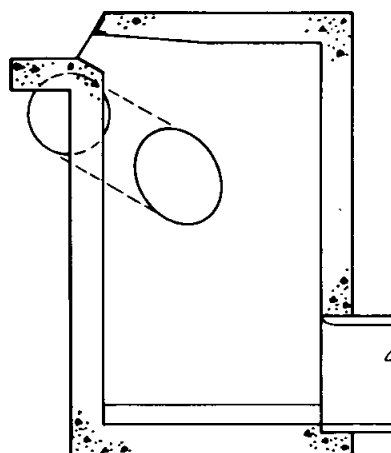
CATCH BASIN



C.S.P. INLET



SECTION B-B



ALTERNATE SECTION B-B

INLETS

NOTES

1. Either field joint 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.
2. See Standard Drawing D - 18 for additional notes and details.

Revision	By	Approved	Date

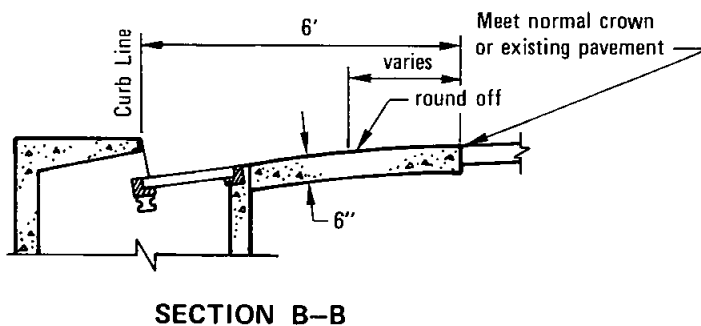
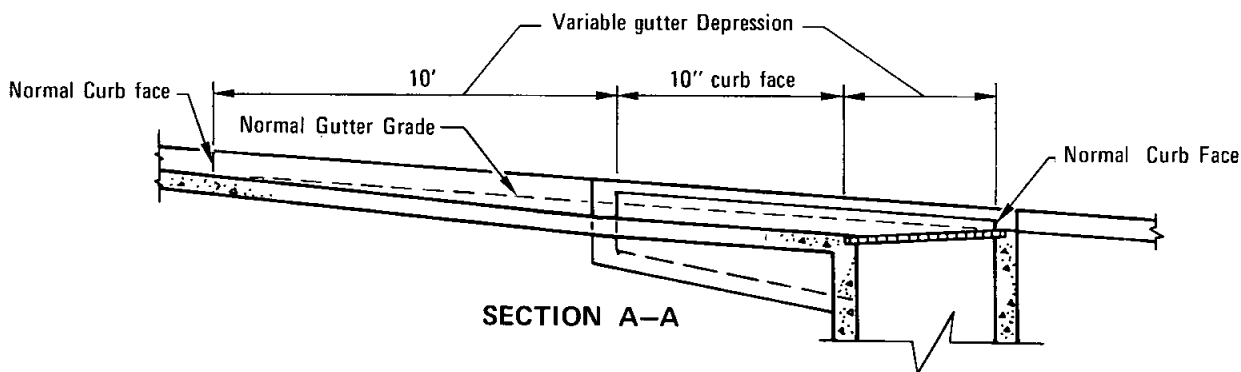
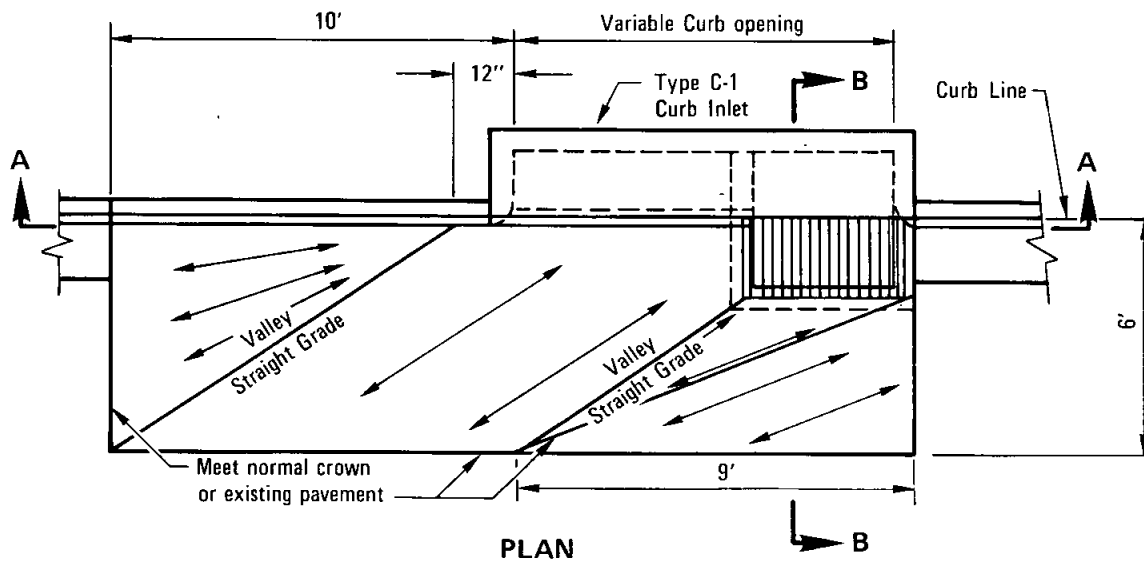
SAN DIEGO REGIONAL STANDARD DRAWING

SLOTTED DRAIN CONNECTIONS TO STANDARD INLETS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Alfred A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER **D-19**



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 required.
4. Screed Direction →
5. Concrete shall be 517-C-2500.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

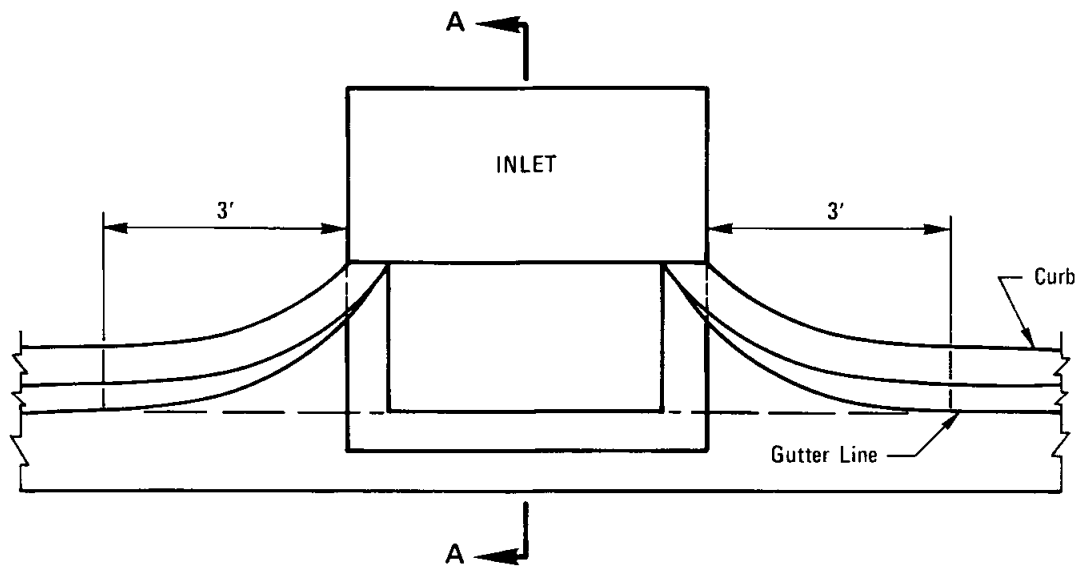
SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE APRON FOR CURB INLET

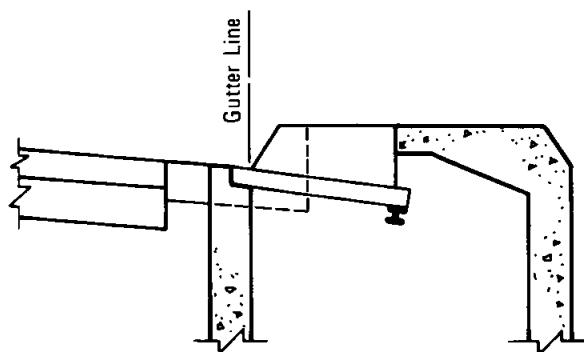
DRAWING
NUMBER

D-20

Revision	By	Approved	Date



PLAN

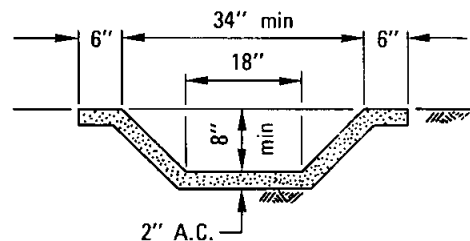
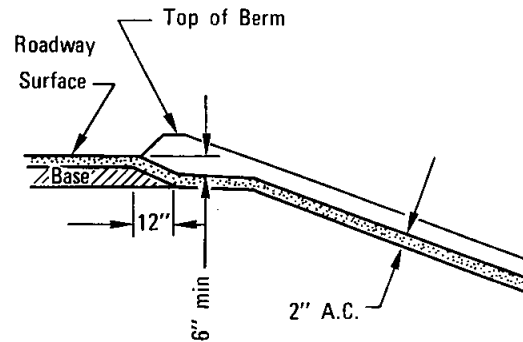
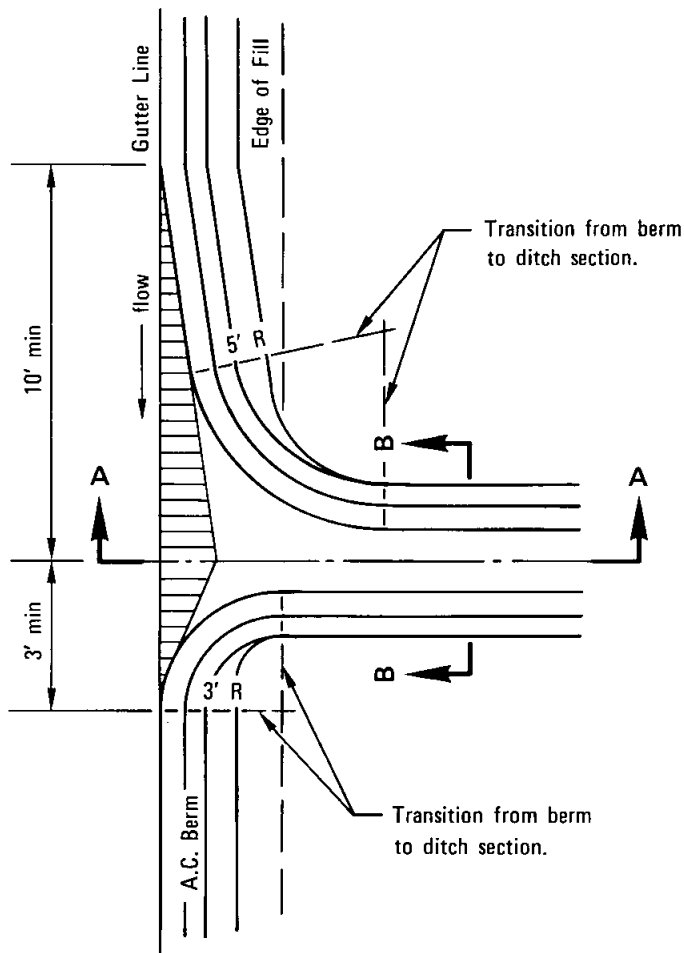


SECTION A--A

NOTES

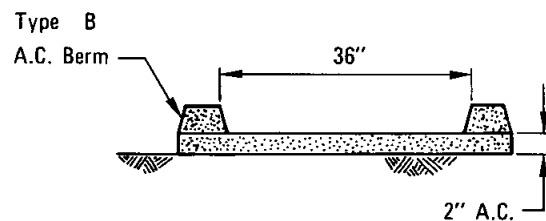
1. Fit curb to the face of inlet wall.
2. For use with Type C inlet only. See Standard Drawing D-3 for details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CURB RETURN FOR MEDIAN STRIP INLETS		<i>Allard A. Kerschbaum</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	D-21



NOTE

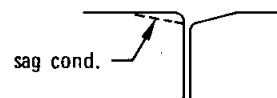
Cross - sectional area of ditch may be rounded, or trapezoidal.



NOTES

1. A.C. spillway may be used when fill is 10' or less, and where fill slope is 1 1/2:1 or flatter.
2. Use 10' min. length of gutter transition on each side of downdrain in sag condition.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

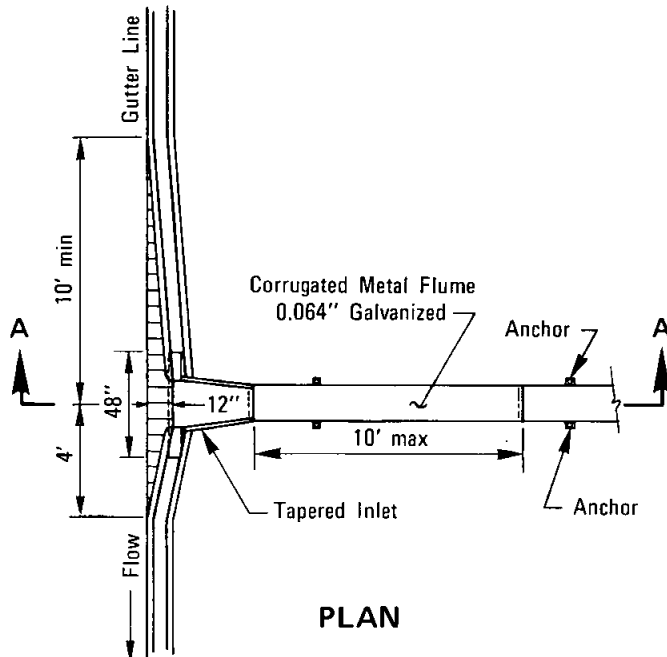
SAN DIEGO REGIONAL STANDARD DRAWING

ASPHALT CONCRETE SPILLWAY

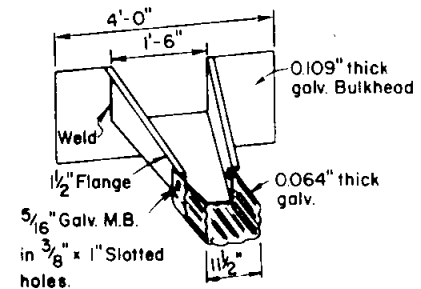
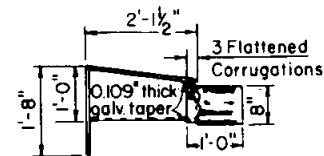
DRAWING
NUMBER

D-22

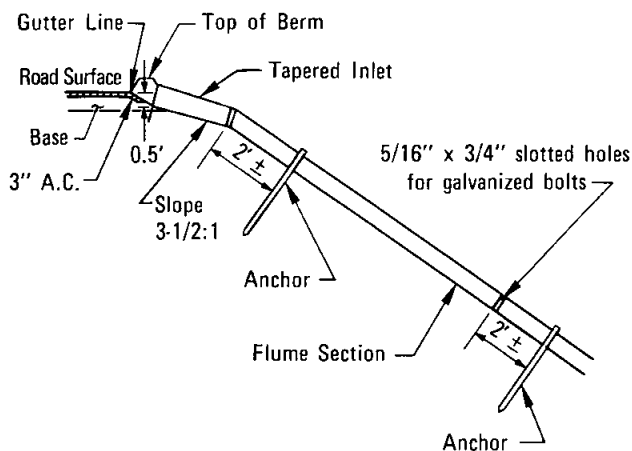
Revision	By	Approved	Date



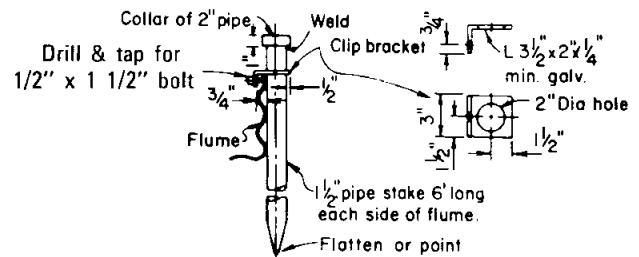
PLAN



TAPERED INLET



SECTION A-A

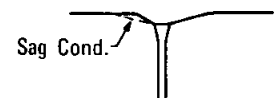


ANCHOR DETAIL

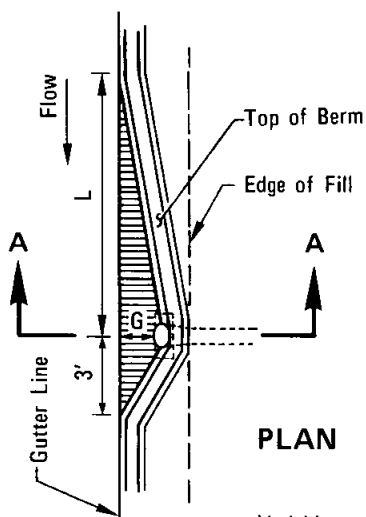
NOTES

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

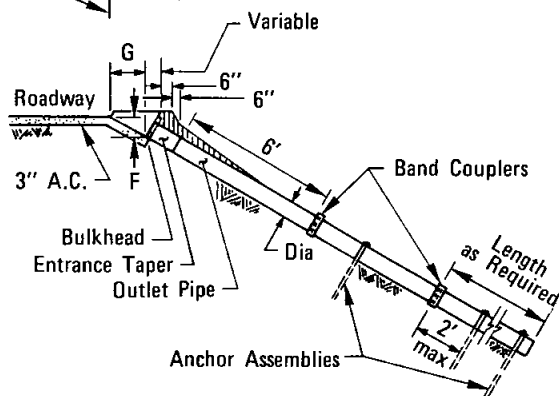
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				TAPERED INLET AND DOWNDRAIN FLUME		<i>Allan A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER D-23	



PLAN



SECTION A-A

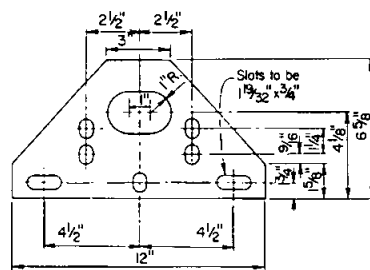


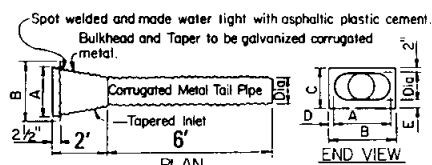
PLATE DETAIL

Dimensions to be as tabulated below for Assembly.

Dia	A	B	C	D	E	F	G	L
8"	16"	25 1/2"	15"	4 3/4"	5"	6"	18"	10'
12"	18"	25 1/2"	19"	3 3/4"	5"	9"	20"	15'
18"	24"	36"	26"	6"	6"	12"	24"	25'

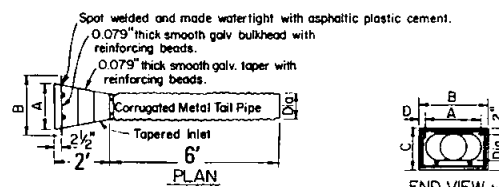
NOTES

1. All metal parts for anchor assemblies shall be galvanized after fabrication.
2. One anchor assembly required per length of pipe. When final length exceeds 10 ft. two anchors shall be required.



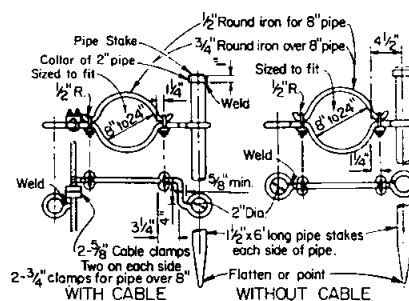
Bulkhead and Taper of same thickness as Tail Pipe with 0.079" Max. Tail Pipe of same thickness as Downdrain Pipe.

ENTRANCE TAPER- TYPE 1 ALTERNATIVE A



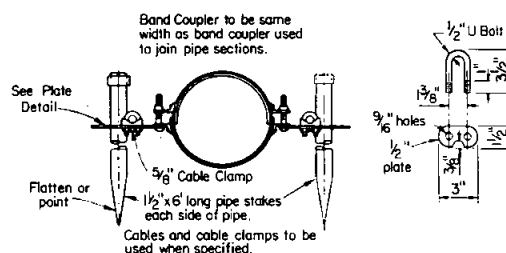
Tail Pipe of same thickness as Downdrain Pipe.

ENTRANCE TAPER- TYPE 1 ALTERNATIVE B



Cables and Cable Clamps to be used when specified

ANCHOR ASSEMBLY ALTERNATIVE-A



ANCHOR ASSEMBLY ALTERNATIVE-B

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen G. Kerschman *Dec. 1975*
Coordinator R.C.E. 19807 Date

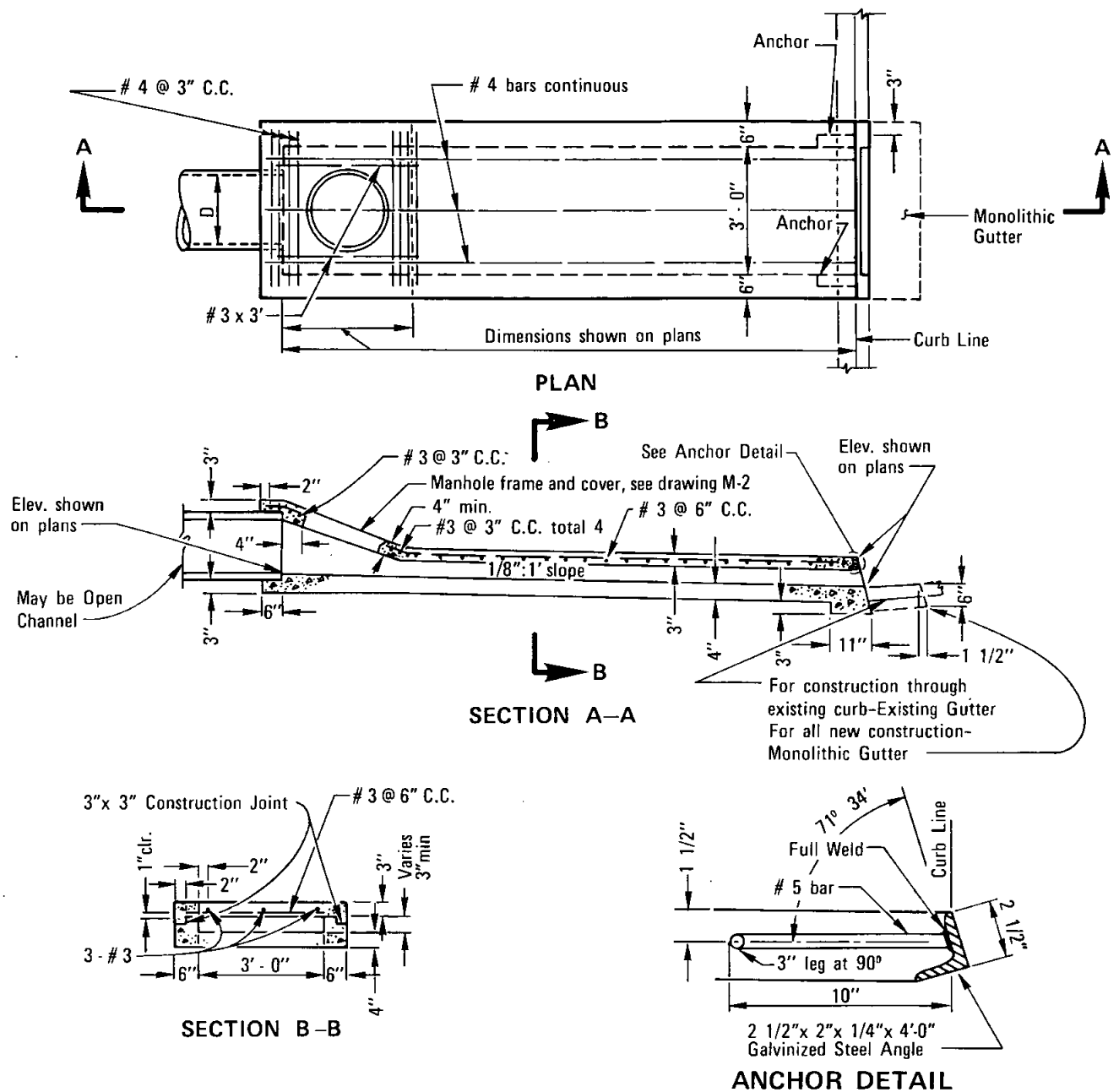
DRAWING
NUMBER

D-24

SAN DIEGO REGIONAL STANDARD DRAWING

ENTRANCE TAPER AND DOWNDRAIN PIPE

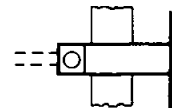
Revision	By	Approved	Date



NOTES

- Concrete shall be 564-C-3000.
- D=inside diameter of pipe or depth of channel.
- Section to be sloped laterally with top conforming to the grades of the existing sidewalk and curb.
- Manhole frame and cover may be deleted with open channel.
- Trowel finish top surface and reproduce markings of existing sidewalk and curb.
- Trowel finish floor of outlet.

LEGEND ON PLANS



Revision	By	Approved	Date

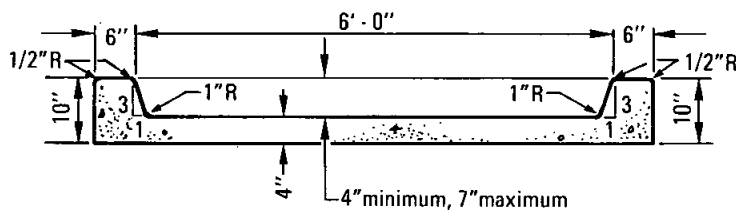
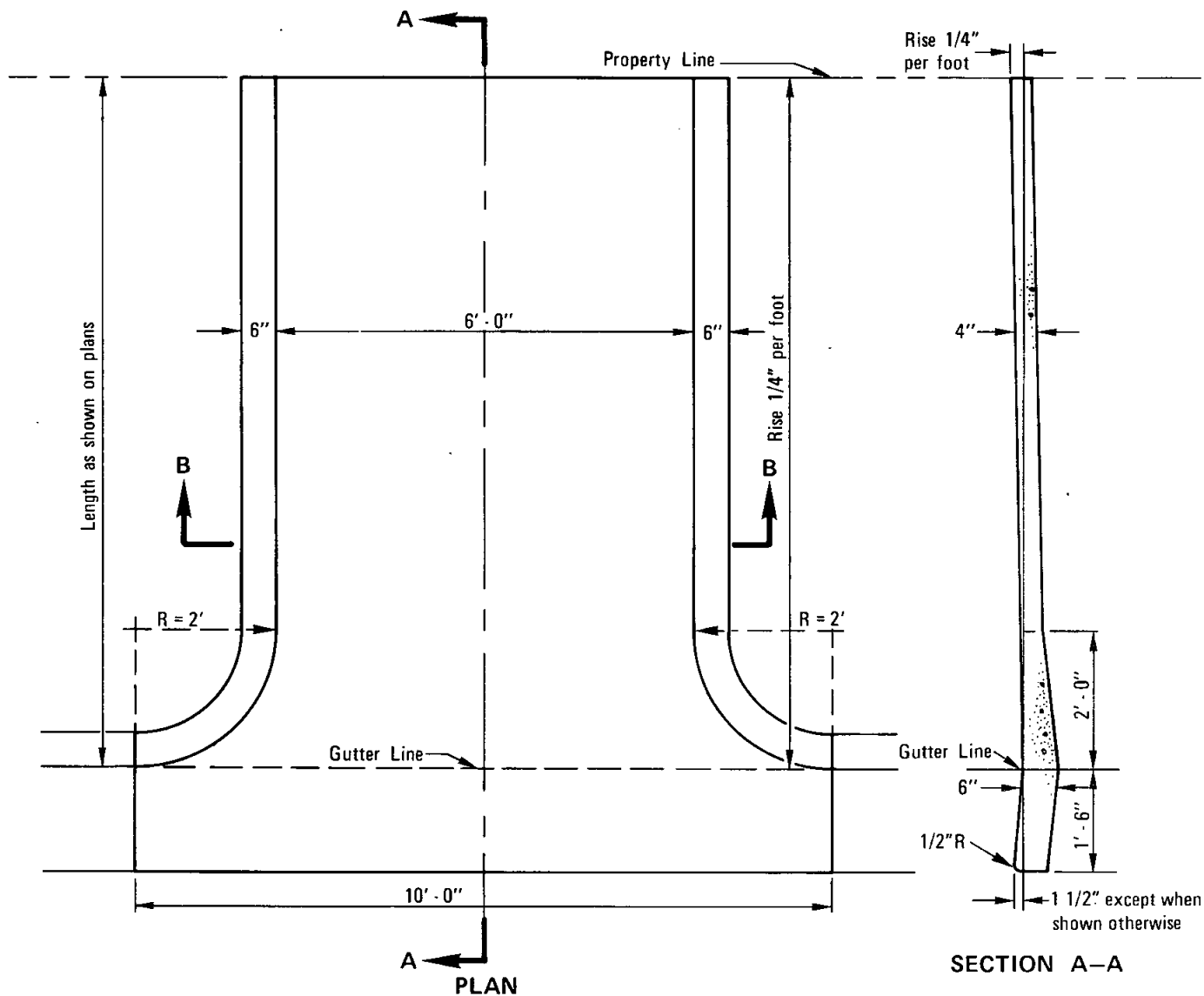
SAN DIEGO REGIONAL STANDARD DRAWING

CURB OUTLET - TYPE A

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER **D-25**

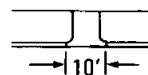


SECTION B-B

NOTES

1. Not to be used in sidewalk areas.
2. Concrete shall be 517-C-2500.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

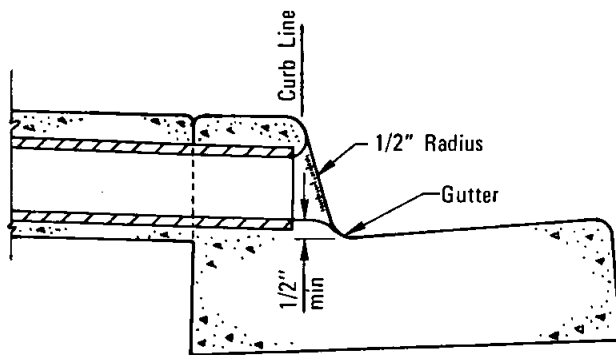
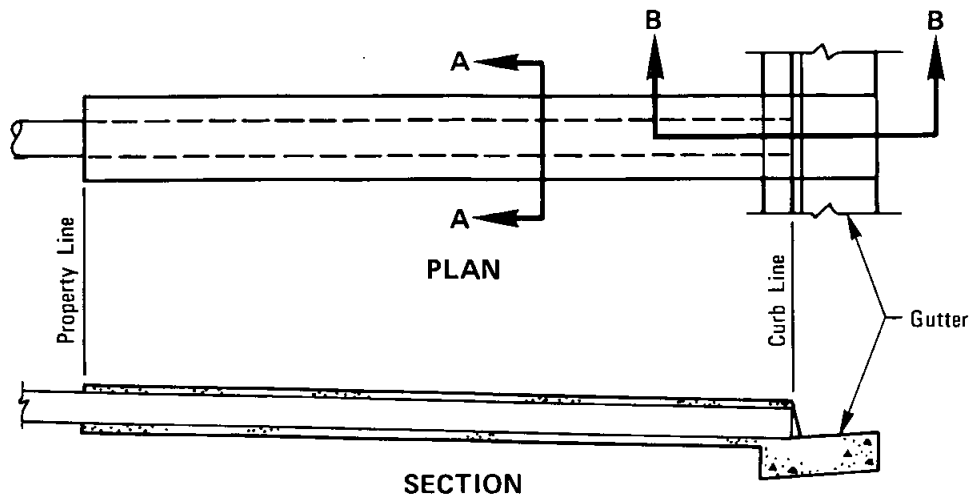
Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

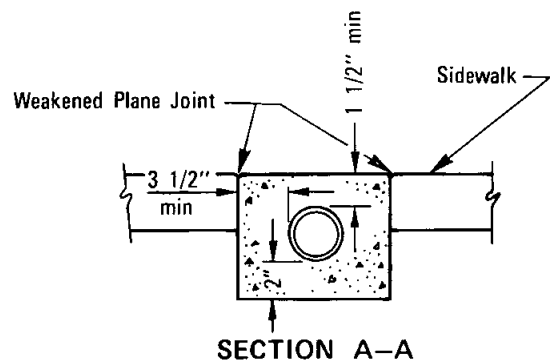
CURB OUTLET - TYPE B

DRAWING
NUMBER **D-26**

Revision	By	Approved	Date



SECTION B-B

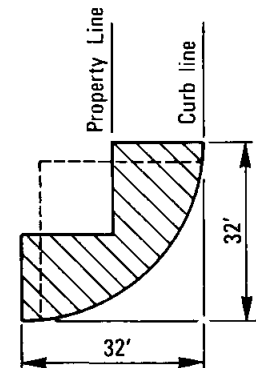


SECTION A-A

APPROVED DRAIN PIPE SIZES	
3"	6" to 8" CURB FACE
4"	8" CURB FACE
6"	10" CURB FACE

NOTES

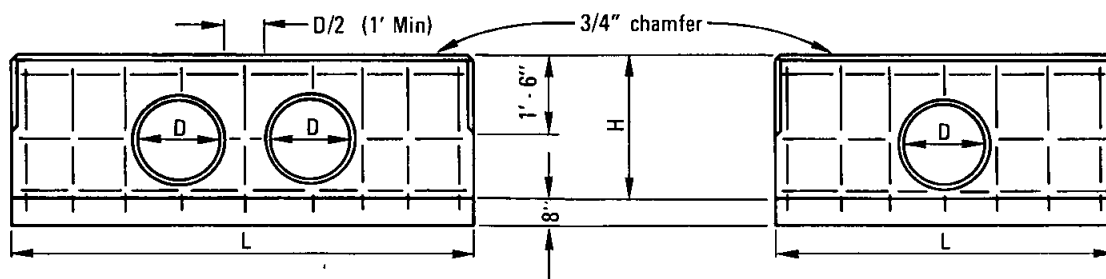
1. Pipe shall be one continuous length from property line to curb line.
2. Multiple pipes to be set a minimum distance of D/2 apart.
3. Concrete shall be 517-C-2500.
4. Pipe shall be circular asbestos cement, cast iron or rigid plastic.



Drain shall not occupy
the hatched area

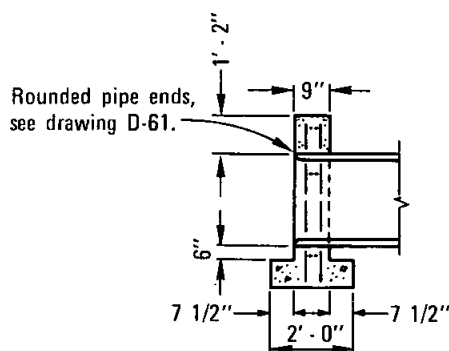
BLOCK CORNER

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				SIDEWALK UNDERDRAIN PIPE		<i>Allard A. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date
						DRAWING NUMBER D-27



ELEVATION DOUBLE HEADWALL

ELEVATION SINGLE HEADWALL



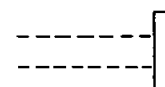
SECTION

D	H	SINGLE			DOUBLE		
		L	Steel Lbs.	Conc C. Y.	L	Steel Lbs.	Conc C. Y.
12"	2' - 8"	5' - 0"	35	0.60	8' - 0"	50	0.94
15"	2' - 11"	6' - 0"	40	0.75	9' - 6"	60	1.17
18"	3' - 2"	7' - 0"	50	0.91	10' - 6"	75	1.35
21"	3' - 5"	7' - 6"	60	1.02	11' - 6"	90	1.52
24"	3' - 8"	8' - 6"	75	1.20	12' - 6"	100	1.72
27"	3' - 11"	9' - 6"	85	1.39	14' - 0"	115	2.00
30"	4' - 2"	10' - 0"	85	1.52	15' - 0"	126	2.21
33"	4' - 5"	11' - 0"	100	1.73	16' - 0"	130	2.42
36"	4' - 8"	12' - 0"	105	1.95	17' - 0"	145	2.65
39"	4' - 11"	12' - 6"	130	2.09	18' - 0"	170	2.88
42"	5' - 2"	13' - 6"	140	2.34	19' - 0"	185	3.13
45"	5' - 5"	14' - 6"	150	2.60	20' - 0"	195	3.38
48"	5' - 8"	15' - 0"	160	2.75	21' - 0"	200	3.64
51"	5' - 11"	16' - 0"	180	3.03	22' - 6"	225	4.02
54"	6' - 2"	17' - 0"	190	3.31	23' - 6"	240	4.30

NOTES

- Concrete shall be 564-C-3000.
- All reinforcing steel # 4 bars. All vertical and horizontal tie bars 18" maximum spacing.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

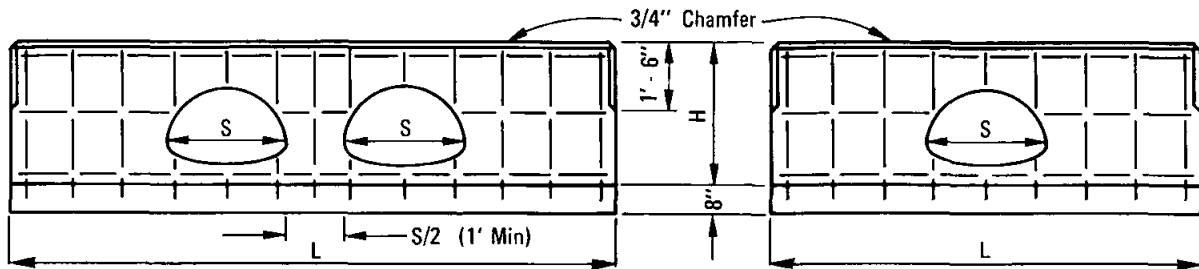
Allard G. Kerschbaum *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-30**

SAN DIEGO REGIONAL STANDARD DRAWING

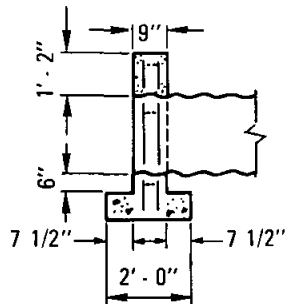
STRAIGHT HEADWALL - TYPE A (CIRCULAR PIPE)

Revision	By	Approved	Date



ELEVATION DOUBLE HEADWALL

ELEVATION SINGLE HEADWALL



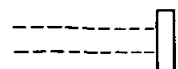
SECTION

C.S.P. ARCH SIZE	H	SINGLE			DOUBLE		
		L	Steel Lbs	Conc Cu. Yds.	L	Steel Lbs	Conc Cu. Yds.
18" x 11"	2' - 7"	5' - 6"	37	0.64	8' - 0"	52	.91
21" x 15"	2' - 11"	6' - 6"	45	0.80	10' - 0"	60	1.22
24" x 18"	3' - 2"	7' - 6"	50	0.96	11' - 6"	70	1.45
28" x 20"	3' - 4"	8' - 6"	60	1.12	13' - 6"	90	1.76
35" x 24"	3' - 8"	10' - 6"	85	1.47	15' - 6"	120	2.16
42" x 29"	4' - 1"	12' - 6"	110	1.76	18' - 0"	145	2.57
49" x 33"	4' - 5"	14' - 6"	130	2.26	21' - 0"	170	3.13
57" x 38"	4' - 10"	17' - 0"	155	2.81	24' - 6"	210	3.86
64" x 43"	5' - 3"	19' - 0"	175	3.31	27' - 0"	230	4.42
71" x 47"	5' - 7"	21' - 0"	195	3.81	30' - 0"	255	5.09

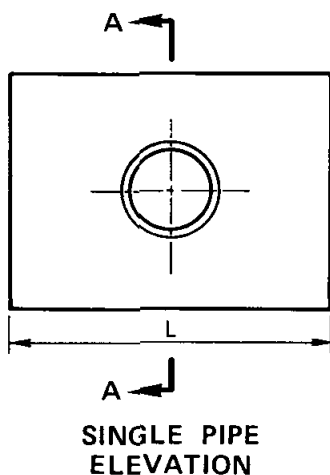
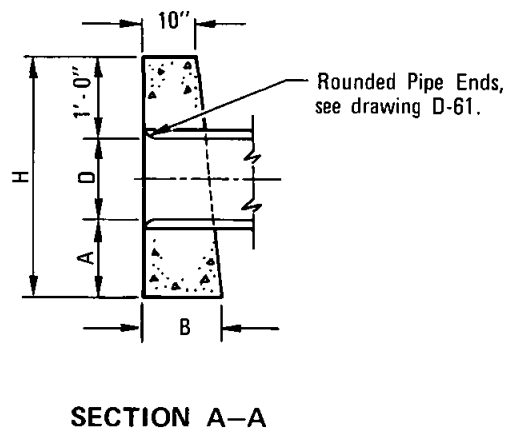
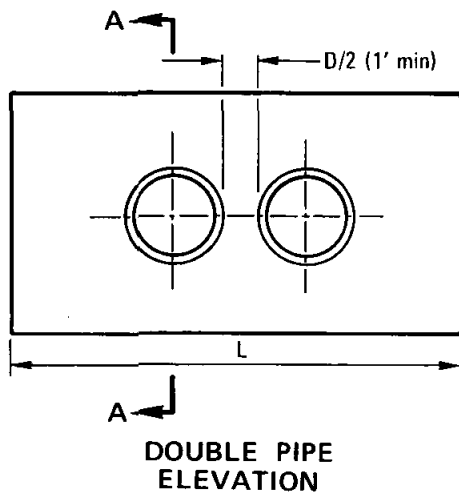
NOTES

1. Concrete shall be 564-C-3000.
2. All reinforcing steel # 4 bars. All vertical and horizontal tie bars 18" maximum spacing.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING STRAIGHT HEADWALL - TYPE A (C.S.P.-ARCH)	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Allard A. Kerschwald</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
DRAWING NUMBER				D-31	

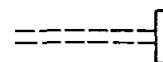


D	A	B	H	SINGLE		DOUBLE	
				L	Conc C.Y.	L	Conc C.Y.
12"	2'-0"	1'-0"	4'-0"	4'-0"	.45	5'-8"	.62
15"	2'-0"	1'-1"	4'-3"	5'-0"	.63	7'-1"	.85
18"	2'-0"	1'-2"	4'-6"	6'-0"	.83	8'-6"	1.12
24"	2'-6"	1'-5"	5'-6"	8'-0"	1.54	11'-4"	2.09
30"	2'-6"	1'-9"	6'-0"	10'-0"	2.41	14'-2"	3.26
36"	3'-0"	2'-0"	7'-0"	12'-0"	3.74	17'-0"	5.05

NOTES

1. Concrete shall be 564 - C - 3000.
2. Exposed corners to be chamfered 3/4".

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

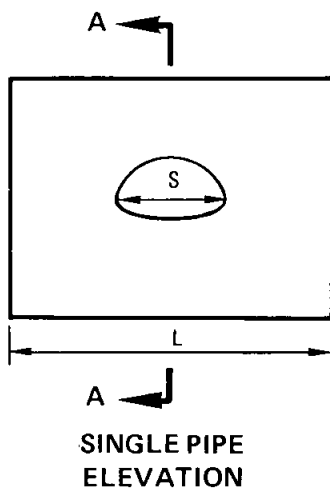
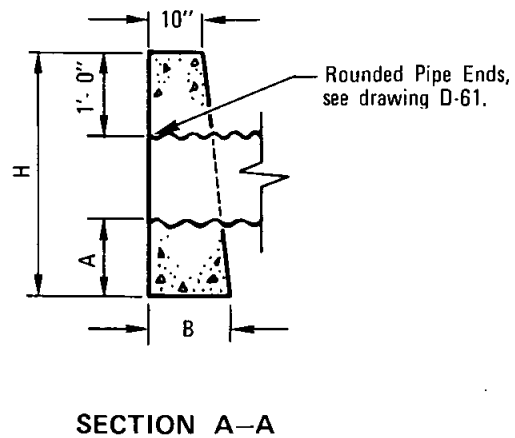
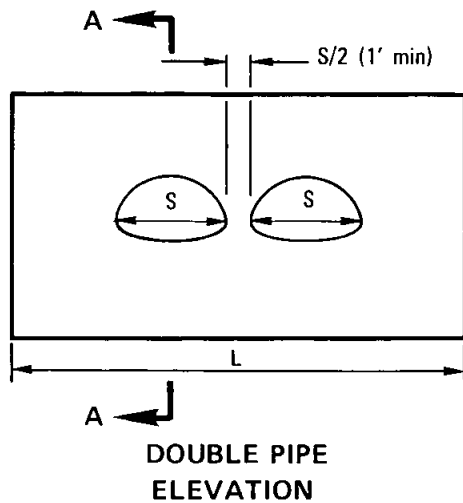
Allard A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-32**

SAN DIEGO REGIONAL STANDARD DRAWING

STRAIGHT HEADWALL - TYPE B (CIRCULAR-PIPE)

Revision	By	Approved	Date

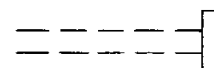


C.S.P. ARCH SIZE	A	B	H	SINGLE		DOUBLE	
				L	Conc C.Y.	L	Conc C.Y.
18"x 11"	2' - 0"	1' - 2"	3' - 11"	6'	0.83	7' - 3"	0.97
21"x 15"	2' - 0"	1' - 4"	4' - 1"	7'	1.08	9' - 8"	1.46
24"x 18"	2' - 0"	1' - 6"	4' - 4"	8'	1.41	11' - 6"	1.98
28"x 20"	2' - 6"	1' - 8"	5' - 0"	9'	1.97	12' - 6"	2.66
35"x 24"	2' - 6"	2' - 0"	5' - 4"	10'	2.56	14' - 5"	3.60

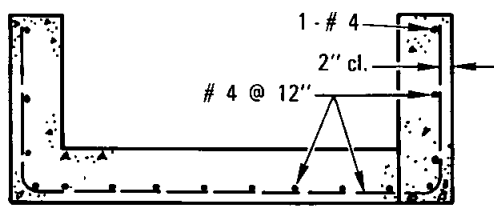
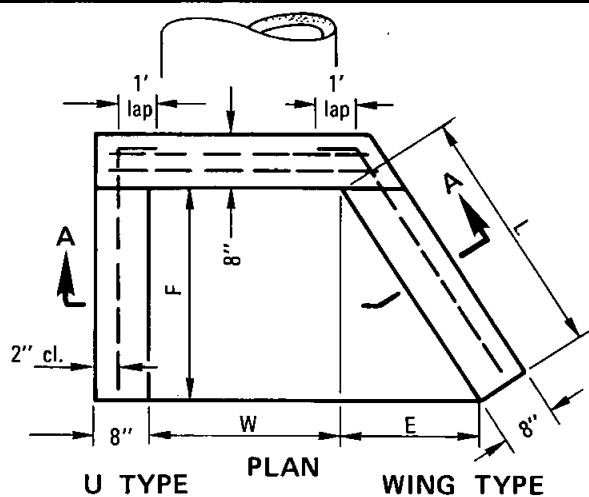
NOTES

1. Concrete shall be 564 - C - 3000.
2. Exposed corners to be chamfered 3/4".

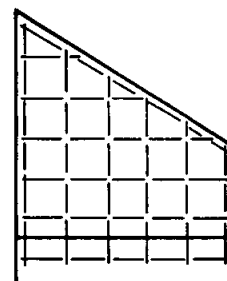
LEGEND ON PLANS



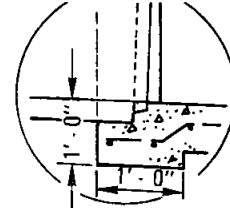
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				STRAIGHT HEADWALL - TYPE B (C.S.P. ARCH)		<i>Allan G. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER D-33	



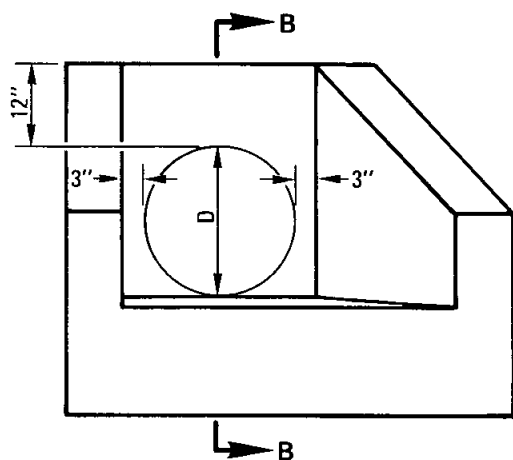
SECTION A-A



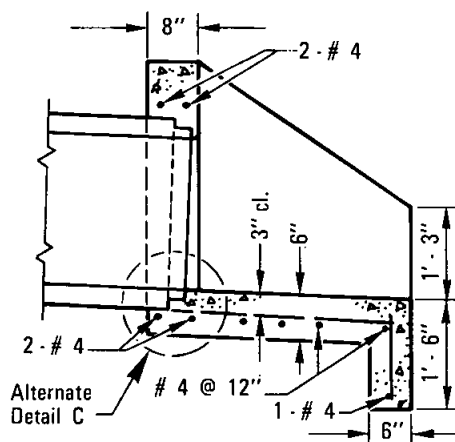
WING WALL REINFORCING



ALT. DETAIL C



ELEVATION



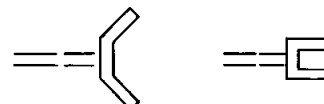
SECTION B-B

DIA OF PIPE	DIMENSIONS				SINGLE PIPE				DOUBLE PIPE			
					U TYPE		WING TYPE		U TYPE		WING TYPE	
					CONC		STEEL		CONC		STEEL	
	L	E	F	W	C. Y.	LBS.	C. Y.	LBS.	C. Y.	LBS.	C. Y.	LBS.
18"	2'-3 1/8"	1'-3"	1'-10 1/2"	2'-0"	0.55	35	0.63	43	0.82	53	0.90	61
24"	3'-1 7/8"	1'-9"	2'-7 1/2"	2'-6"	0.79	47	0.93	60	1.22	73	1.36	86
30"	4'-0 5/8"	2'-3"	3'-4 1/2"	3'-0"	1.05	71	1.29	85	1.66	109	1.92	123
36"	4'-11 1/2"	2'-9"	4'-1 1/2"	3'-6"	1.33	88	1.69	114	2.19	136	2.55	162

NOTES:

- Concrete shall be 564 - C - 3000.
- Exposed corners to be chamfered 3/4".
- Multiple pipes to be set a distance of D/2, with a 1' minimum between outside diameters of pipes.
- Top of headwall shall be placed approximately parallel to profile grade when the grade is 3% or more.
- Skewed pipes: Dimension W to be increased in width or length due to skew or multiple pipes.
- For pipe wall thickness greater than 3" use alternate Detail-C.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

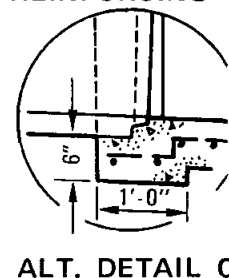
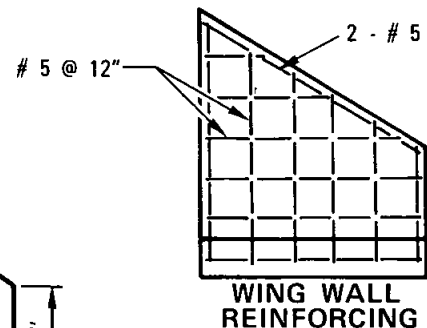
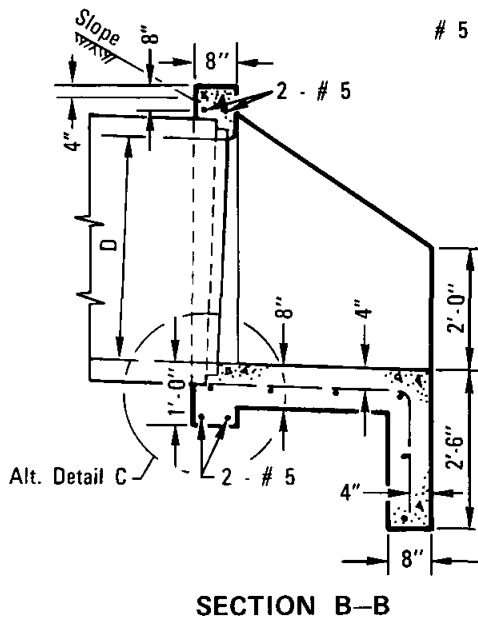
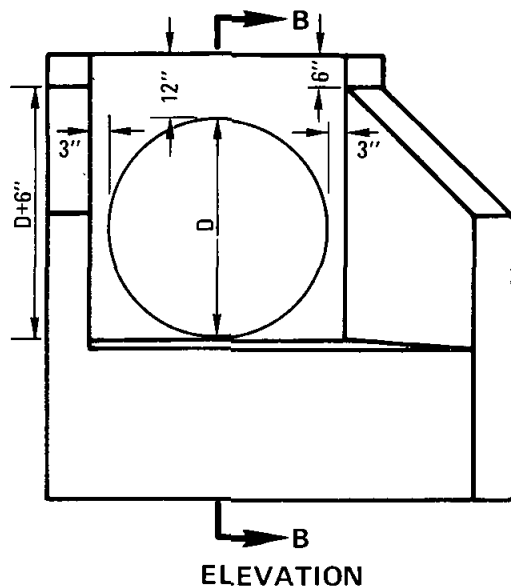
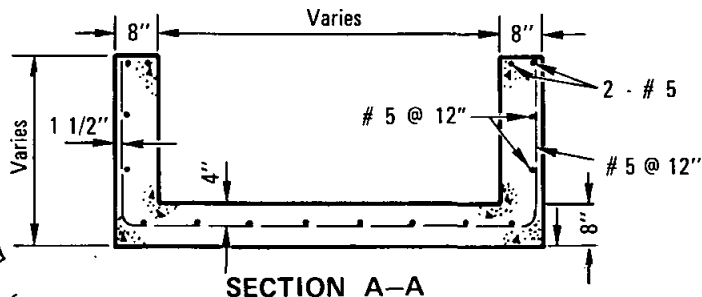
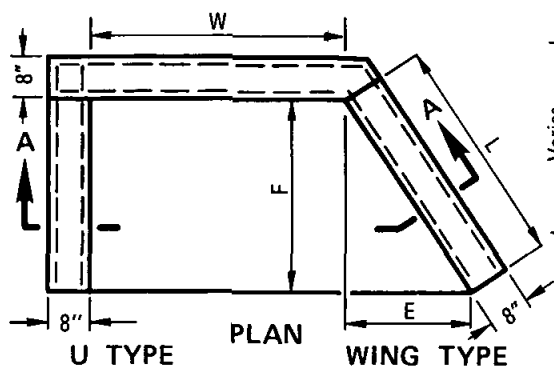
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

WING AND U TYPE HEADWALLS
FOR 12" TO 36" PIPES

DRAWING NUMBER **D-34**

Revision	By	Approved	Date



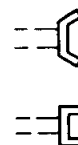
DIA. OF PIPE	DIMENSIONS				SINGLE PIPE				DOUBLE PIPE			
					U TYPE		WING TYPE		U TYPE		WING TYPE	
					CONC.	STEEL	CONC.	STEEL	CONC.	STEEL	CONC.	STEEL
	L	E	F	W	C.Y.	LBS.	C.Y.	LBS.	C.Y.	LBS.	C.Y.	LBS.
42"	3'-7 1/4"	2'-0"	3'-0"	4'-0"	1.57	117	1.90	135	2.69	190	3.16	214
48"	4'-6"	2'-6"	3'-9"	4'-6"	1.97	153	2.48	184	3.43	252	4.06	288
54"	5'-4 7/8"	3'-0"	4'-6"	5'-0"	2.41	190	3.07	246	4.24	319	5.06	368
60"	6'-3 3/4"	3'-6"	5'-3"	5'-6"	2.88	239	3.75	294	5.13	386	6.17	442
66"	7'-2 1/2"	4'-0"	6'-0"	6'-0"	3.38	294	4.52	356	6.08	454	7.20	516
72"	8'-1 3/8"	4'-6"	6'-9"	6'-6"	3.93	368	5.52	417	7.11	522	8.30	588
78"	9'-0"	5'-0"	7'-6"	7'-0"	4.50	444	6.70	503	8.20	595	9.50	693
84"	9'-10 3/4"	5'-6"	8'-3"	7'-6"	5.21	540	8.15	619	9.50	687	10.80	786

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 564-C-3000.
4. Exposed corners shall be chamfered 3/4".
5. Multiple pipes shall be set a distance of D/2, with a 1' minimum, between outside diameters of pipes.
6. For pipe wall thickness greater than 3" use Alternate Detail-C.

LEGEND ON PLANS



Revision	By	Approved	Date

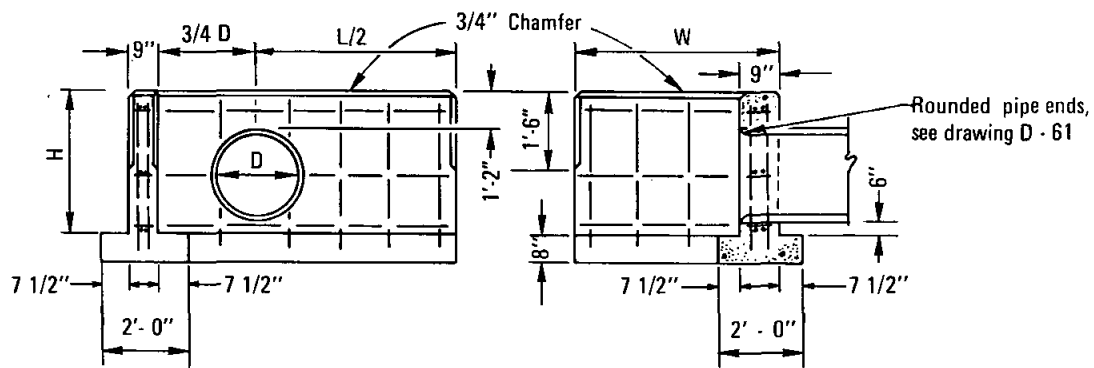
SAN DIEGO REGIONAL STANDARD DRAWING

WING AND U TYPE HEADWALLS FOR 42" TO 84" PIPES

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

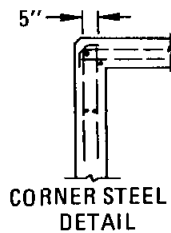
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-35**



ELEVATION

SECTION

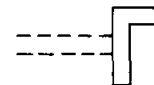


D	H	L/2	LENGTH OF W									
			3' - 4"		4' - 10"		6' - 4"		7' - 10"		9' - 4"	
			Steel lbs.	Conc C. Y.	Steel lbs.	Conc C. Y.	Steel lbs.	Conc C. Y.	Steel lbs.	Conc C. Y.	Steel lbs.	Conc C. Y.
12"	2' - 8"	2' - 6"	50	.79	60	.98						
15"	2' - 11"	3' - 0"	55	.91	65	1.11						
18"	3' - 2"	3' - 6"	65	1.04	75	1.25						
21"	3' - 5"	3' - 9"	75	1.15	90	1.36						
24"	3' - 8"	4' - 3"	85	1.29	100	1.51	110	1.74				
27"	3' - 11"	4' - 9"	90	1.44	105	1.67	115	1.91				
30"	4' - 2"	5' - 0"	95	1.55	110	1.80	120	2.05	135	2.29		
33"	4' - 5"	5' - 6"	105	1.71	120	1.97	135	2.23	150	2.48		
36"	4' - 8"	6' - 0"	110	1.88	125	2.15	140	2.41	155	2.68	170	2.95
39"	4' - 11"	6' - 3"			150	2.28	170	2.56	185	2.84	200	3.12
42"	5' - 2"	6' - 9"			155	2.42	175	2.76	190	3.05	210	3.34
45"	5' - 5"	7' - 3"					180	2.97	200	3.27	215	3.57
48"	5' - 8"	7' - 6"					190	3.13	216	3.44	230	3.75
51"	5' - 11"	8' - 0"							220	3.67	235	3.99
54"	6' - 2"	8' - 6"							235	3.91	250	4.24

NOTES

- Concrete shall be 564 - C - 3000.
- All reinforcing steel # 4 bars. All vertical and horizontal tie bars 18" maximum spacing.
- When multiple pipes are used, the distance between pipes shall be D/2 (1' min.). Dimension L/2 is from the center of the pipe nearest to the end of the headwall as shown.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

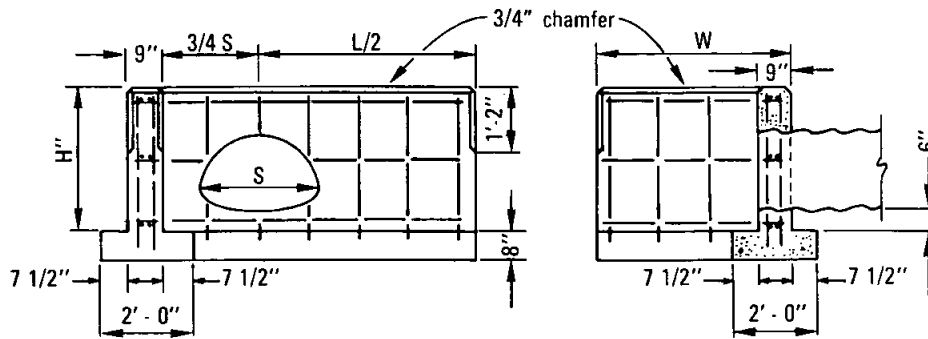
Allard A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-36**

SAN DIEGO REGIONAL STANDARD DRAWING

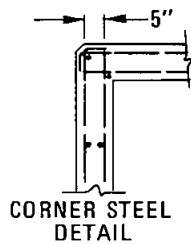
L TYPE HEADWALLS CIRCULAR PIPES

Revision	By	Approved	Date



ELEVATION

SECTION



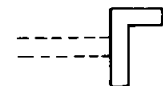
CORNER STEEL
DETAIL

C.S.P. ARCH SIZE	H	L/2	LENGTH OF W									
			3' - 4"		4' - 10"		6' - 4"		7' - 10"		9' - 4"	
			Steel lbs.	Conc C. Y.	Steel lbs.	Conc C. Y.	Steel lbs.	Conc C. Y.	Steel lbs.	Conc C. Y.	Steel lbs.	Conc C. Y.
18"x 11"	2'-7"	2'-9"	50	0.84	60	1.03	70	1.21	80	1.39	90	1.57
21"x 15"	2'-11"	3'-3"	60	1.00	65	1.18	75	1.38	90	1.58	100	1.77
24"x 18"	3'-2"	3'-9"	60	1.07	70	1.32	80	1.53	95	1.74	110	1.94
28"x 20"	3'-4"	4'-3"	70	1.26	80	1.47	90	1.68	100	1.90	115	2.11
35"x 24"	3'-8"	5'-3"	100	1.51	110	1.74	120	1.97	140	2.20	155	2.42
42"x 29"	4'-1"	6'-3"	115	1.82	130	2.06	140	2.31	155	2.55	170	2.83
49"x 33"	4'-5"	7'-3"	130	2.12	145	2.37	155	2.64	170	2.90	185	3.15
57"x 38"	4'-10"	8'-6"	145	2.52	160	2.79	175	3.07	190	3.35	205	3.61
64"x 43"	5'-3"	9'-6"	185	2.89	200	3.11	215	3.48	235	3.77	250	4.06
71"x 47"	5'-7"	10'-6"	200	3.25	215	3.56	235	3.86	250	4.17	270	4.48

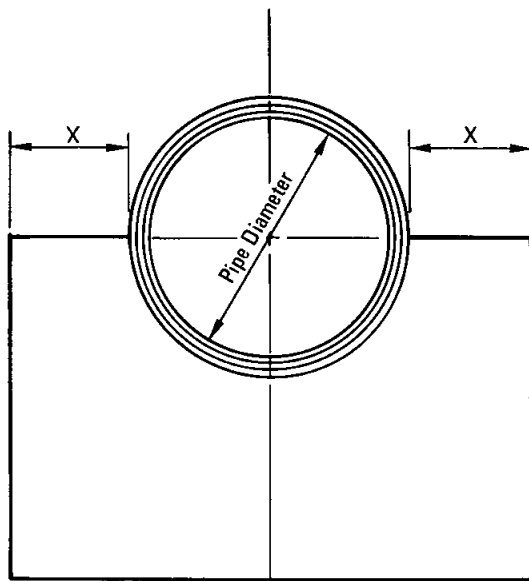
NOTES

1. Concrete shall be 564 - C - 3000.
2. All reinforcing steel # 4 bars. All vertical and horizontal tie bars 18" maximum spacing.
3. When multiple pipes are used, the distance between pipes shall be S/2 (1' min.). The dimension L/2 is from the center of the pipe nearest to the end of the headwall as shown.

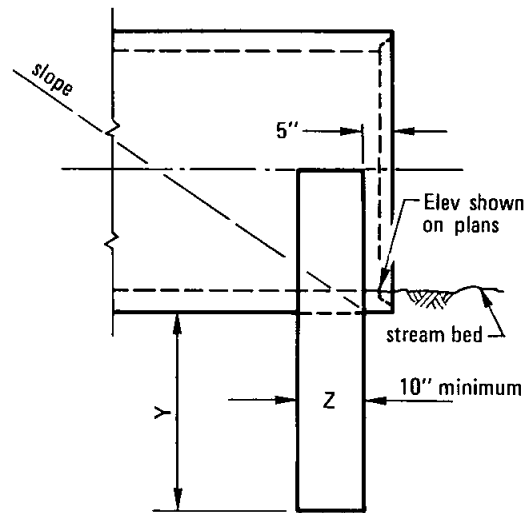
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				L TYPE HEADWALLS (C.S.P. ARCH)		<i>Allen A. Kerschbaum</i> Dec. 1975 Coordinator R.C.E. 19807 Date
						DRAWING NUMBER D-37



FACE ELEVATION



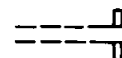
SIDE ELEVATION

PIPE DIAMETER	X	Y	Z
12" to 24"	1' - 0"	2' - 0"	10"
21" to 36"	1' - 6"	2' - 6"	12"
39" to 48"	2' - 0"	3' - 0"	12"
51" to 60"	2' - 6"	3' - 0"	14"
63" & Larger	3' - 0"	3' - 0"	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 564-C-3000.
3. Keep the pipe-end clear of obstructions to permit easy placing of culvert extension.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

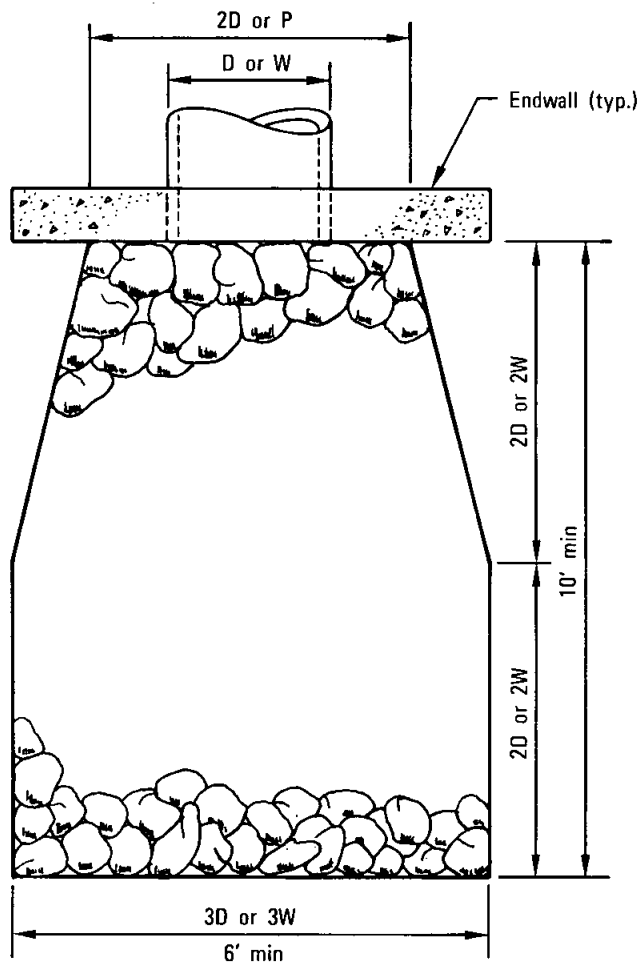
DRAWING
NUMBER

D-38

SAN DIEGO REGIONAL STANDARD DRAWING

CURTAIN WALL

Revision	By	Approved	Date



PLAN

D = Pipe Diameter

W = Bottom Width of Channel

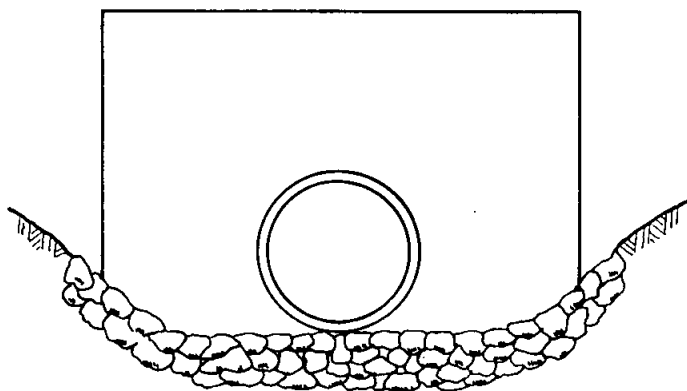
P = Wetted Perimeter of Channel

Design Velocity (ft./sec.)	Rock Classification
6 - 10	No. 2 Backing
10 - 12	1/4 Ton
12 - 14	1/2 Ton
14 - 16	1 Ton
16 - 18	2 Ton

SELECTION OF RIP RAP

NOTES

1. Type of Rip Rap
 - a. Regular Quarry Stone
 - b. Rounded Cobblestone
 - c. Broken Concrete (only allowed upon approval of the Agency)
2. Placement
 - a. Minimum depth = 1 1/2 times average stone size.
 - b. Rocks shall be placed so as to provide a minimum of voids.
 - c. Surface rocks or concrete shall protrude to at least 1/2 their vertical dimension.
 - d. Rip Rap is to be placed over a natural bedding, or it may be grouted or placed over a gravel bedding when required by the Agency.



ELEVATION

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

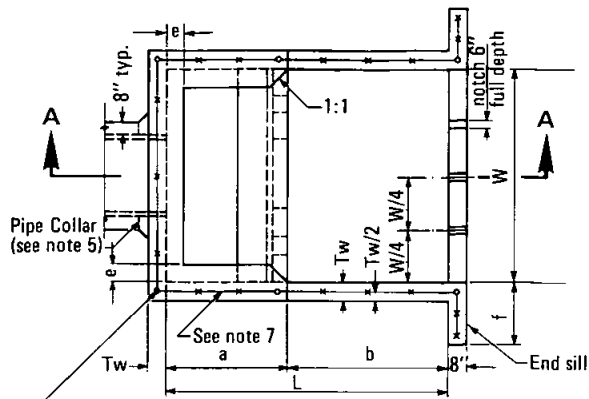
Alfred A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

RIP RAP ENERGY DISSIPATOR

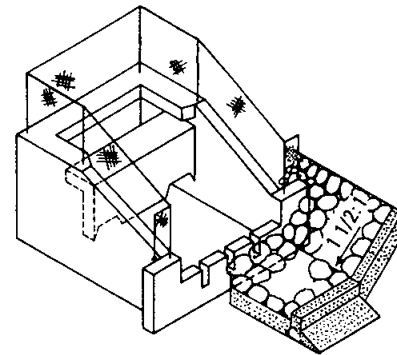
DRAWING
NUMBER **D-40**

Revision	By	Approved	Date

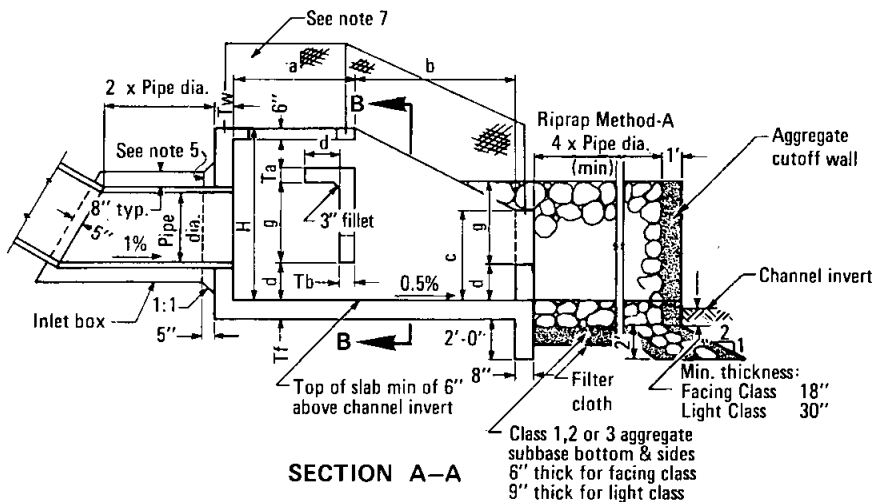


PLAN

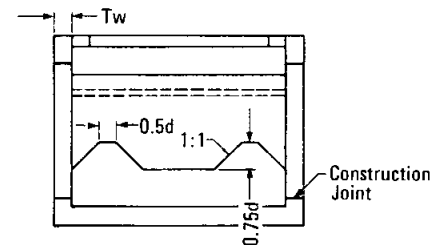
Note: Riprap not shown.



PICTORIAL VIEW



SECTION A-A



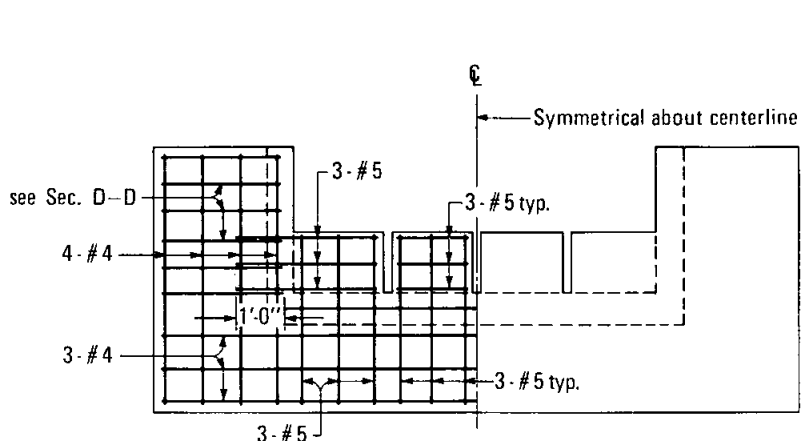
SECTION B-B

NOTES

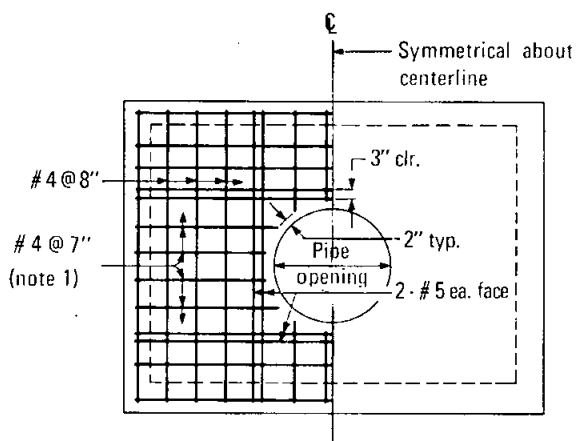
- Design:
Equivalent Fluid Pressure = 60 p.c.f.
Maximum Outlet Velocity = 35 f.p.s.
- Concrete shall be 564 - C - 3000.
- Reinforcing shall conform to ASTM designation A615 and may be grade 40 or 60. Reinforcing shall be placed with 2" clear concrete cover unless noted otherwise. Splices shall not be permitted except as indicated on the plans.
- For pipe grades not exceeding 20%, inlet box may be omitted.
- If inlet box is omitted, construct pipe collar as shown.
- Unless noted otherwise, all reinforcing bar bends shall be fabricated with standard hooks.
- Five foot high chain link fencing, embed post 18" deep in walls and encase with Class B mortar.
- In Sandy and Silty soil:
 - Riprap and aggregate base cutoff wall required at the end of rock apron.
 - Filter cloth (Polyfilter X or equivalent) shall be installed on native soil and base, minimum of 1 ft. overlaps at joints.

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"				

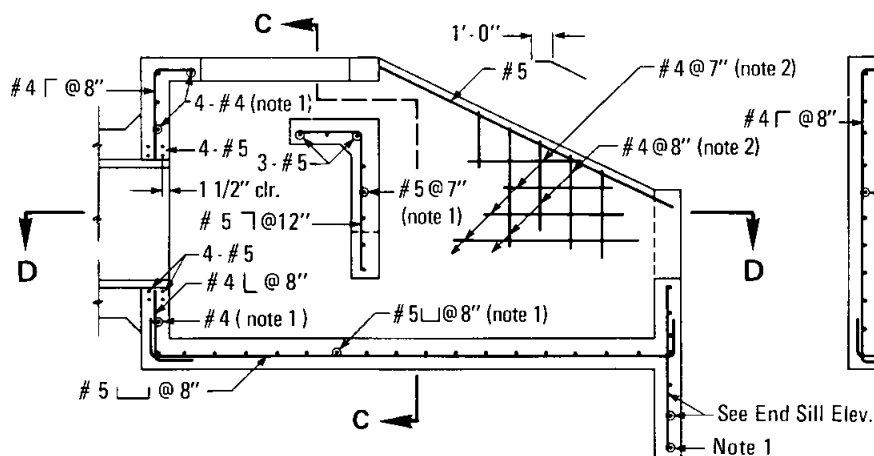
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CONCRETE ENERGY DISSIPATOR			
						COORDINATOR R.C.E. 19807	DATE
						DRAWING NUMBER	D-41



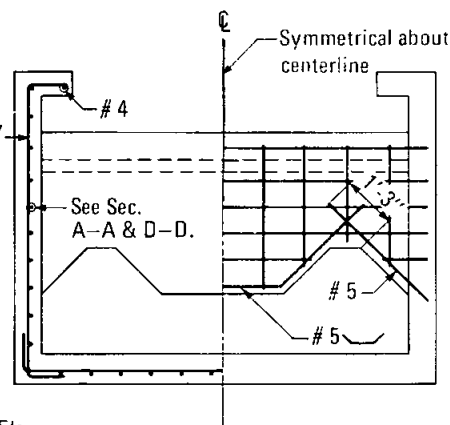
END SILL ELEVATION



HEADWALL ELEVATION



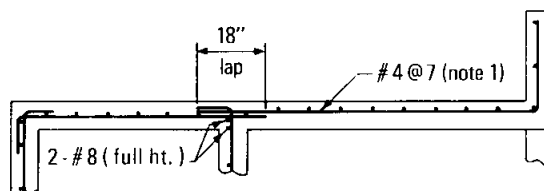
SECTION A-A



SECTION C-C

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 2" concrete cover, unless noted otherwise.



SECTION D-D

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehnel Dec. 1975
Coordinator R.C.E. 19807 Date

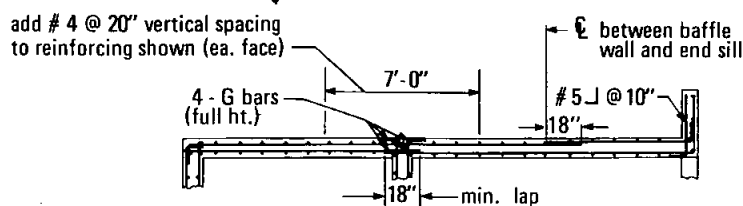
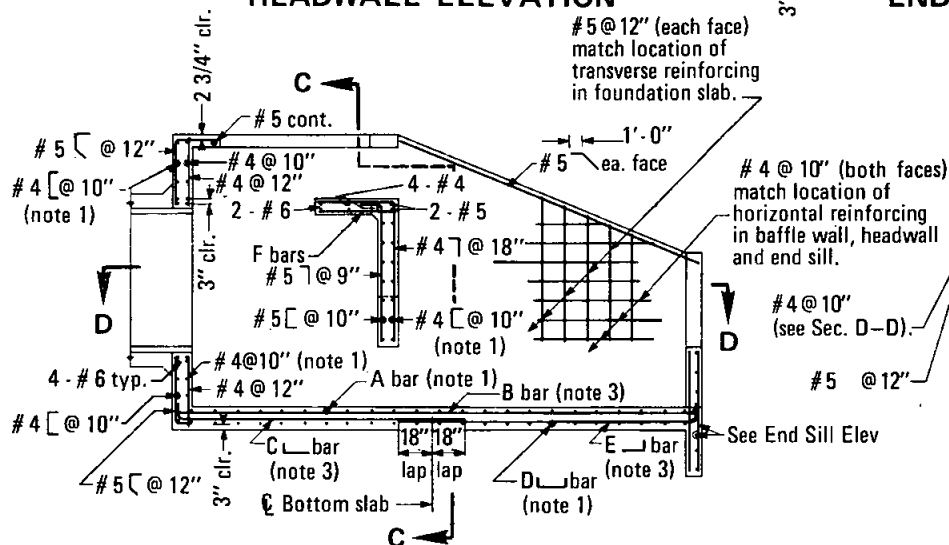
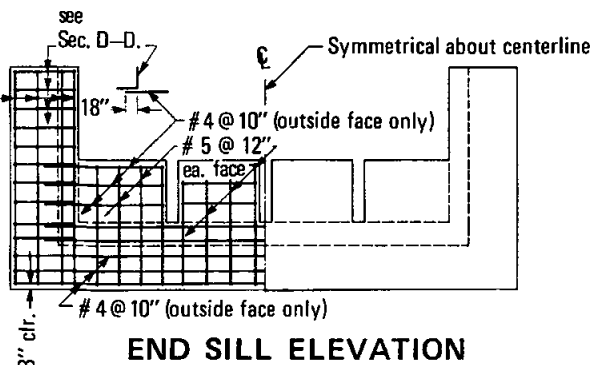
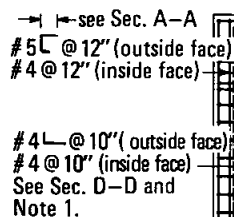
DRAWING
NUMBER **D-42**

SAN DIEGO REGIONAL STANDARD DRAWING

**CONCRETE ENERGY DISSIPATOR
(REINFORCEMENT)**

18" TO 30" DIAMETER PIPE

Revision	By	Approved	Date



Pipe dia. (in.)	36	42	48	54	60	72
A bar	# 5 @ 12"	# 6 @ 12"	# 7 @ 12"			
B bar	# 5 @ 12"		# 6 @ 12"			
C bar	# 4 @ 12"		# 5 @ 12"			
D bar	# 4 @ 12"	# 5 @ 12"	# 6 @ 12"			
E bar	# 4 @ 12"		# 5 @ 12"			
F bar	# 4 @ 9"		# 5 @ 9"		# 6 @ 9"	
G bar		# 7			# 11	

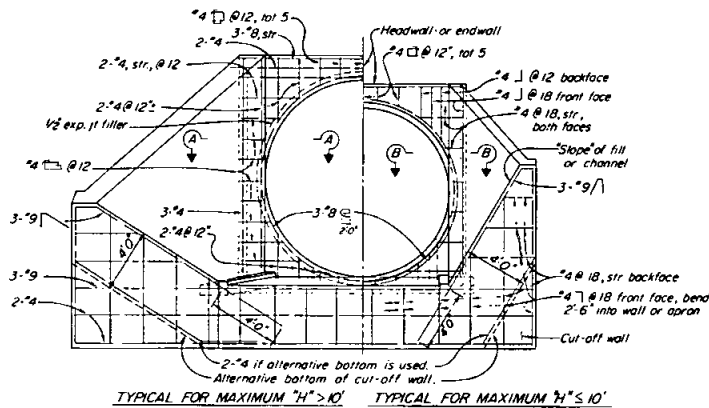
1. Match location of sidewall reinforcing.
2. Dowels having same size and spacing as wall reinforcing may be used in lieu of continuous bars at contractors option.
3. Match location of headwall or end sill reinforcing.

Revision	By	Approved	Date

CONCRETE ENERGY DISSIPATOR (REINFORCEMENT) 36" TO 72" DIAMETER PIPE

Allard A. Kerschbaum *Dec. 1975*
Coordinator R.C.E. 19807 Date .

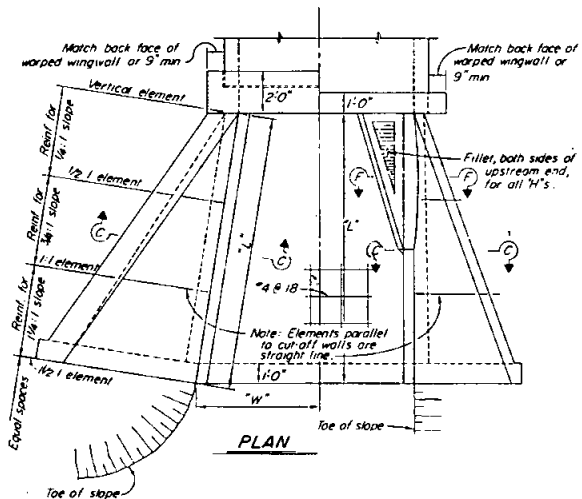
**DRAWING
NUMBER** **D-43**



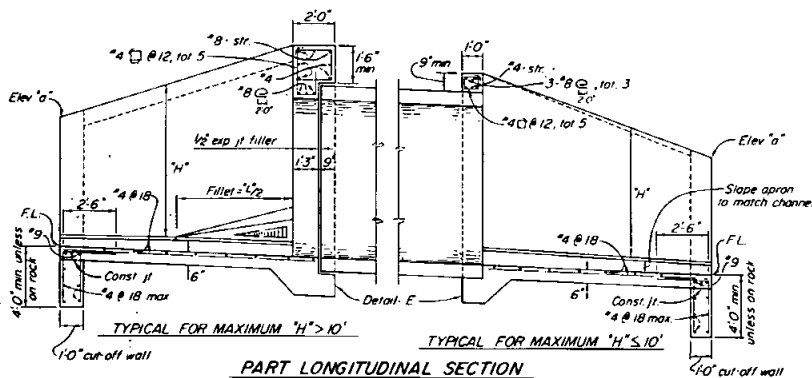
TYPICAL FOR MAXIMUM "H" > 10' TYPICAL FOR MAXIMUM "H" ≤ 10'

END ELEVATION

If at upstream end, fillet is not shown

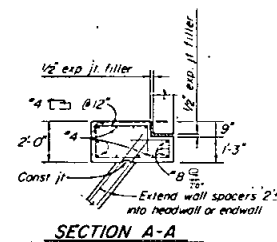


PLAN

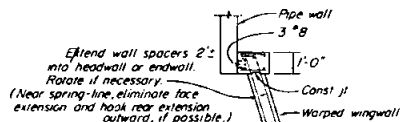


PART LONGITUDINAL SECTION

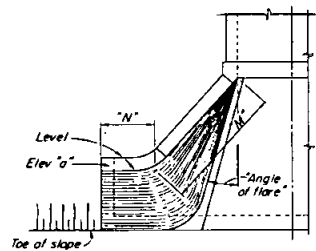
Note: RCP shown. Metal pipe similar except eliminate the expansion joint and use hook bolts @ 19'2" spacing. Size and length provided by manufacturer.



SECTION A-A

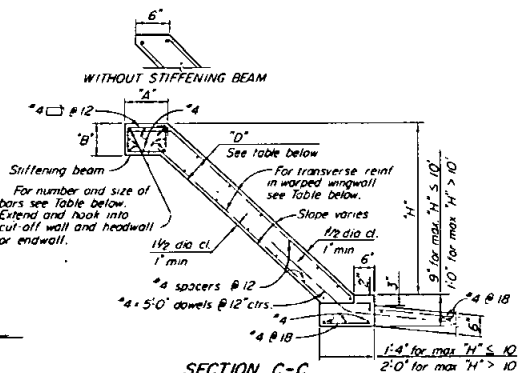


SECTION B-B



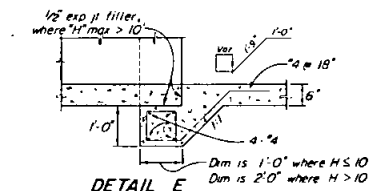
ALTERNATIVE WARPED WINGWALL

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

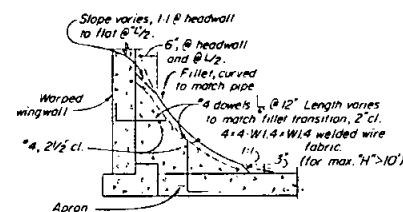


SECTION C-C

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



DETAIL E



SECTION F-F

WARPED WINGWALLS																					
WALL DIMENSIONS AND REINFORCING											STIFFENING BEAM DIMENSIONS AND REINFORCING										
Element	Slope	"H"	8' or less	10'	12'	14'	16'	18'	20'	22'	12'	14'	16'	18'	20'	25'	30'	35'	40' or more		
1/4 : 1	Front face reinf.	#4 @ 12"	#4 @ 7"	#5 @ 7"	#5 @ 5"	#5 @ 6"	#5 @ 6"	#5 @ 7"	#5 @ 6"	#5 @ 6"	6"	No beam. Place 2-6" in each face along top of wall.									
	Rear face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"		#4 @ 12"	#4 @ 12"	#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 @ 12"	#4 @ 10"	#4 @ 8"	#4 @ 6"	#4 @ 6"	12"	8"-9"									
	Rear face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 10"	#4 @ 7"	#4 @ 6"	#5 @ 8"	#5 @ 8"	#5 @ 8"		#5 @ 8"	#5 @ 8"	#5 @ 8"	#5 @ 8"	#5 @ 8"	#5 @ 8"	#5 @ 8"	#5 @ 8"	#5 @ 8"	
1 1/4 : 1	Front face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	16"	Tot 6'-6"									
	Rear face reinf.	#4 @ 8"	#4 @ 8"	#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"	#5 @ 6"	#5 @ 6"	
		"D" at Cut-off Wall	6"	6"	6"	7 1/2"	8"	9 1/2"	11"	18"	Tot 6'-7"										
		"D" at Headwall/Endwall	6"	6"	6"	8"	9 1/2"	11"	11'-1"	20"	Tot 6'-8"										

Notes: Walls designed for 2' surcharge; earth load = 120'cu ft; equivalent fluid pressure = 36'cu ft. Vary "D" at warped wall uniformly from that at cut-off wall to that at headwall or endwall, for max "H" > 12'. Dimensions "L", "W", "M", "N", "Elev. a", "Angle of flare", and end "Slope" (as apply) are shown on the plans.

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

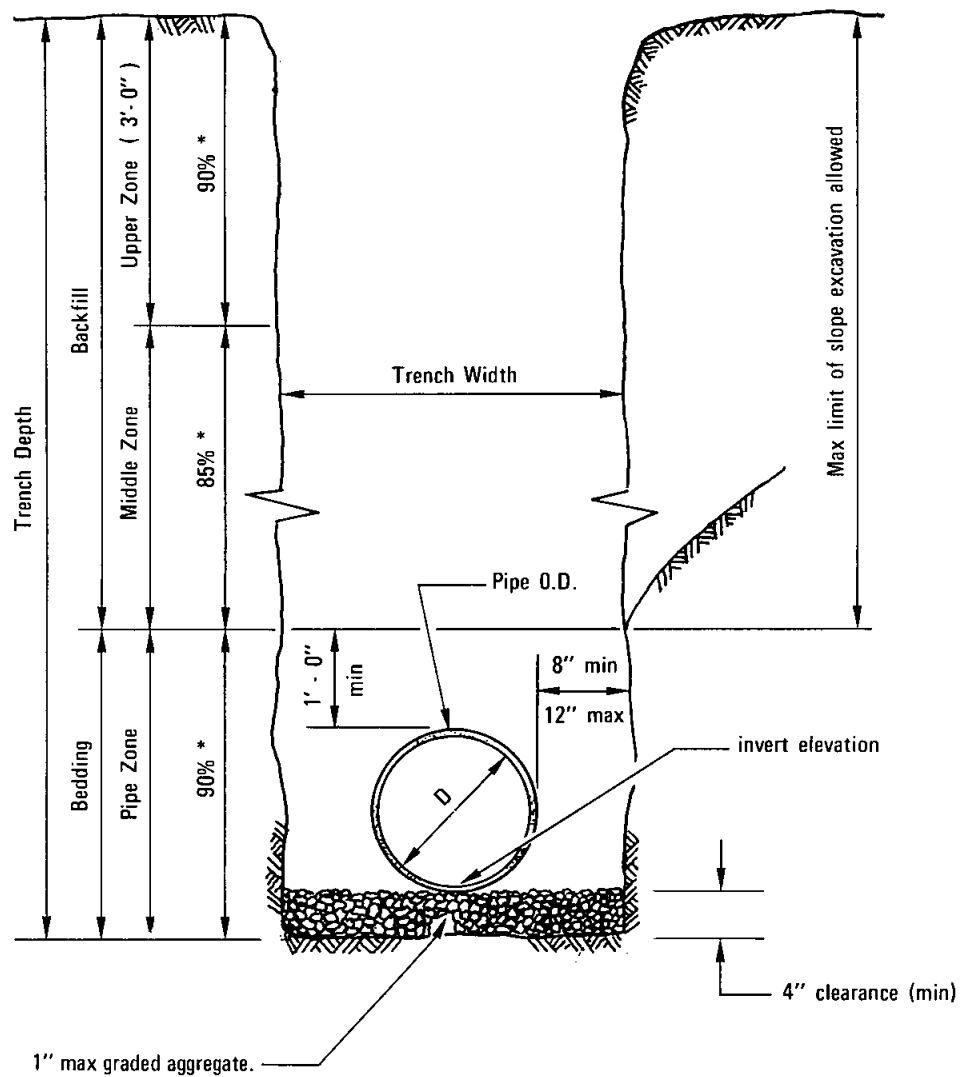
Attended by *Keith* Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER **D-44**

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE CULVERT-HEADWALLS,
ENDWALLS & WARPED WINGWALLS

Revision By Approved Date



SECTION

NOTES

1. For trenching on improved streets see Standard Drawing G - 24 or G - 25 for resurfacing details.
2. (*) indicates minimum relative compaction.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

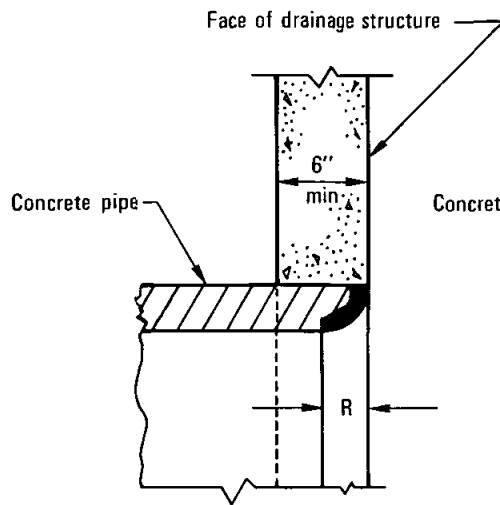
Alfred A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-60**

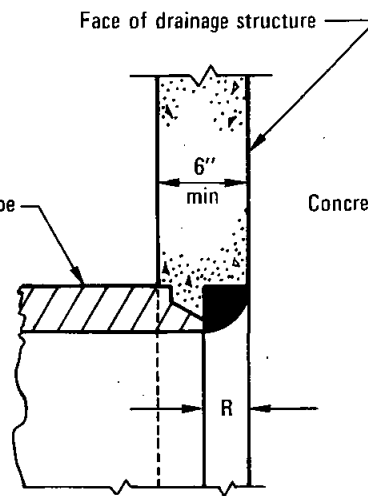
SAN DIEGO REGIONAL STANDARD DRAWING

**PIPE BEDDING AND TRENCH BACKFILL
FOR STORM DRAINS**

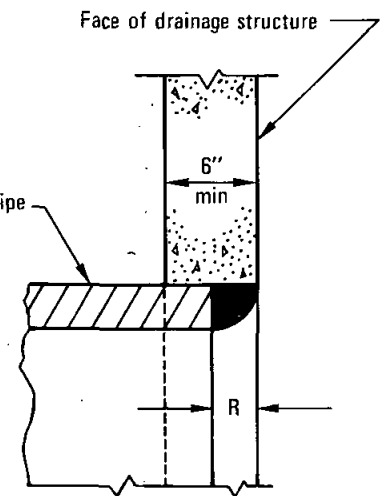
Revision	By	Approved	Date



BELL END



SPIGOT END

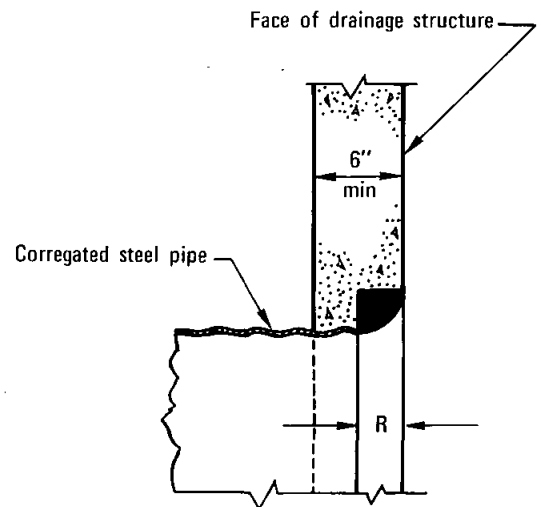


CUT END

R = Thickness of pipe

NOTE

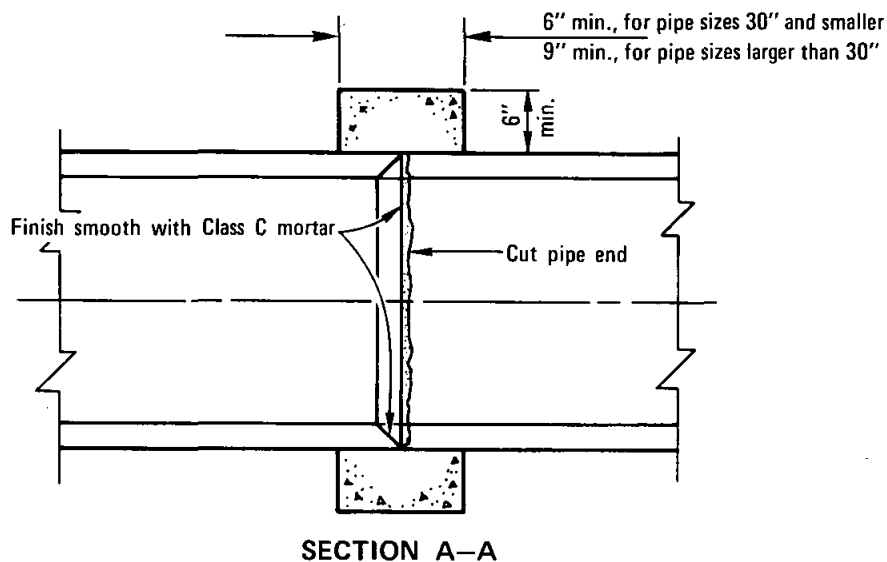
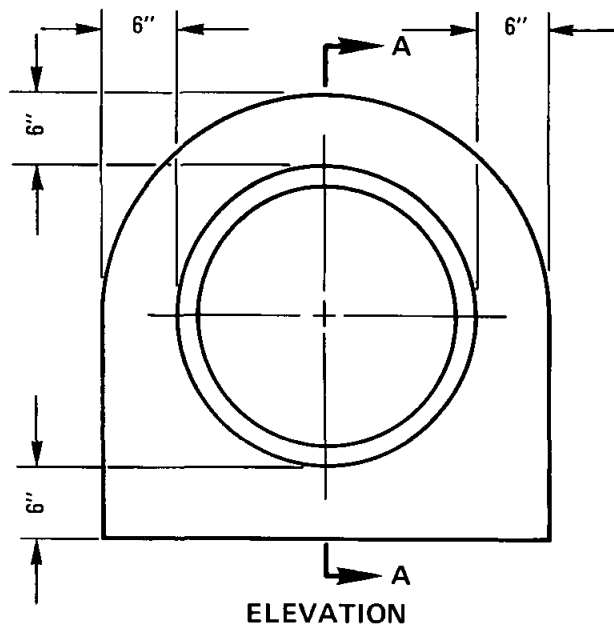
The rounded areas may be built up of cement mortar or poured in place with the drainage structure.



R = Inside diameter of pipe

10

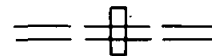
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				ROUNDED PIPE ENDS IN DRAINAGE STRUCTURES		<i>Allan A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	D-61



NOTES:

1. Pipe collar does not have to be finished if covered, but must have a minimum of 6" of concrete around joint.
2. Concrete shall be 564 - C - 3000

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

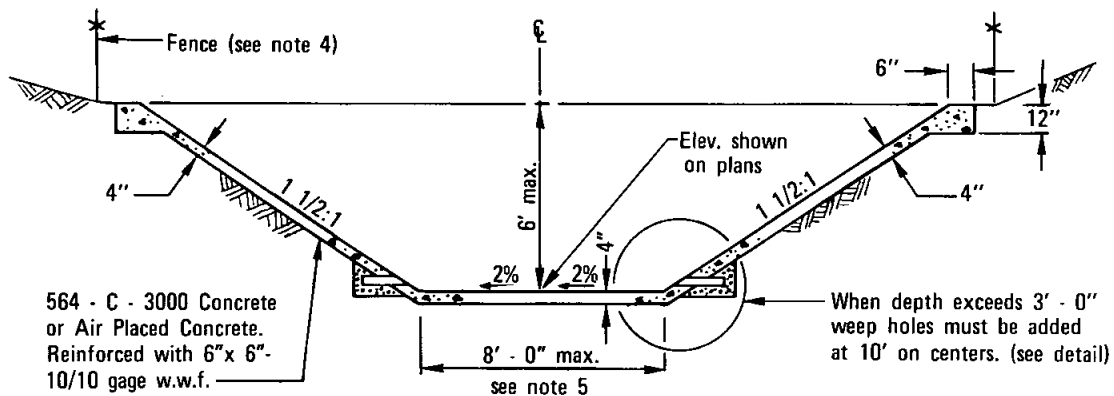
Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

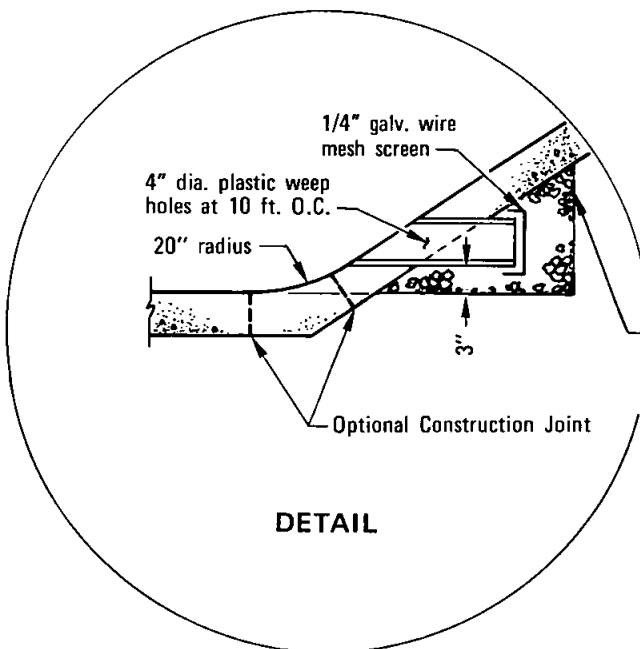
**DRAWING
NUMBER** **D-62**

PIPE COLLAR

Revision	By	Approved	Date

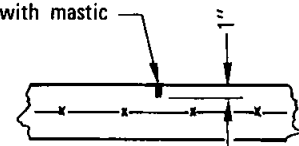


TYPICAL SECTION

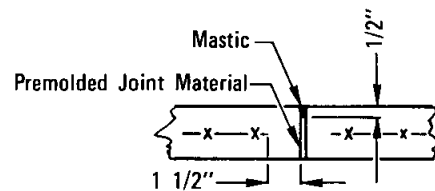


DETAIL

3/16" premolded joint material or
1/8" sawed joint filled with mastic



WEAKENED PLANE JOINT

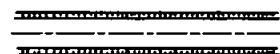


EXPANSION JOINT

NOTES

1. A.C. or 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 Standard Drawing D-72.
4. Chainlink fence shall be as required by Agency.
5. For bottom widths greater than 8 feet see Standard Drawing D-71.
6. Reinforcement shown is minimum.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

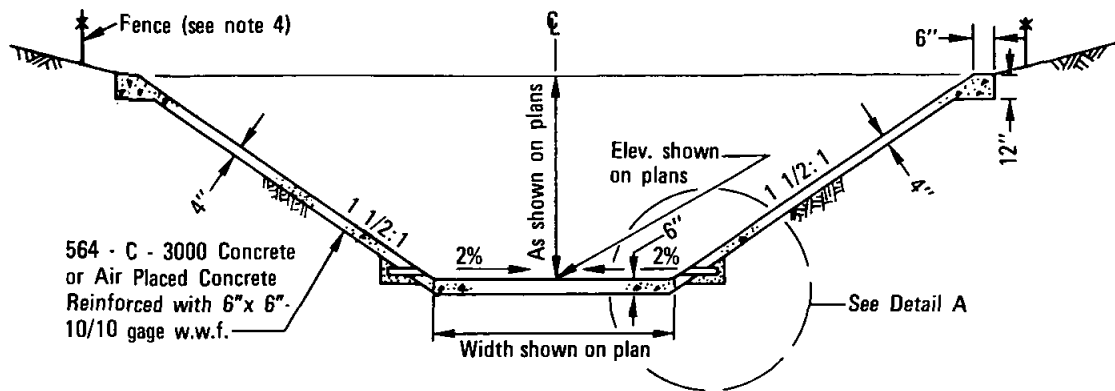
Alfred A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

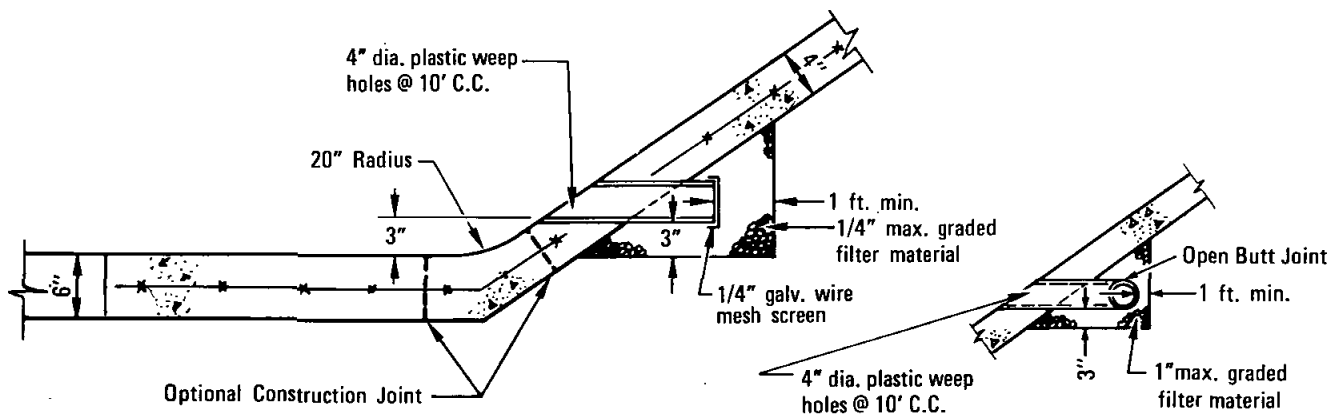
MINOR DRAINAGE CHANNEL

**DRAWING
NUMBER D-70**

Revision	By	Approved	Date



TYPICAL SECTION

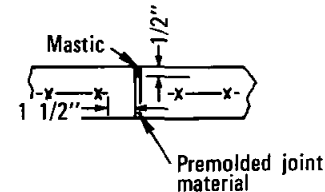


DETAIL A

ALT. CONTINUOUS DRAIN

3/16" premolded joint material or
1/8" sawed joint with mastic

WEAKENED PLANE JOINT



EXPANSION JOINT

NOTES

1. A.C. or 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 Standard Drawing D-72.
4. Chainlink fence shall be as required by Agency.
5. Reinforcement shown is minimum.

LEGEND ON PLANS



Revision	By	Approved	Date

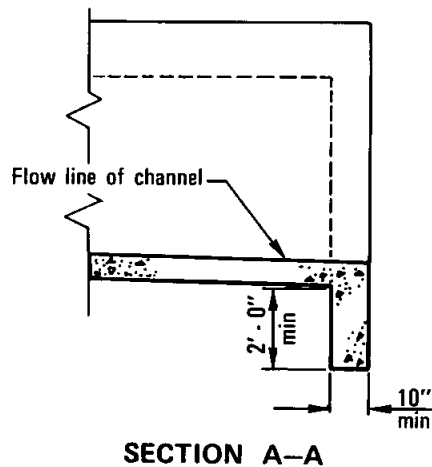
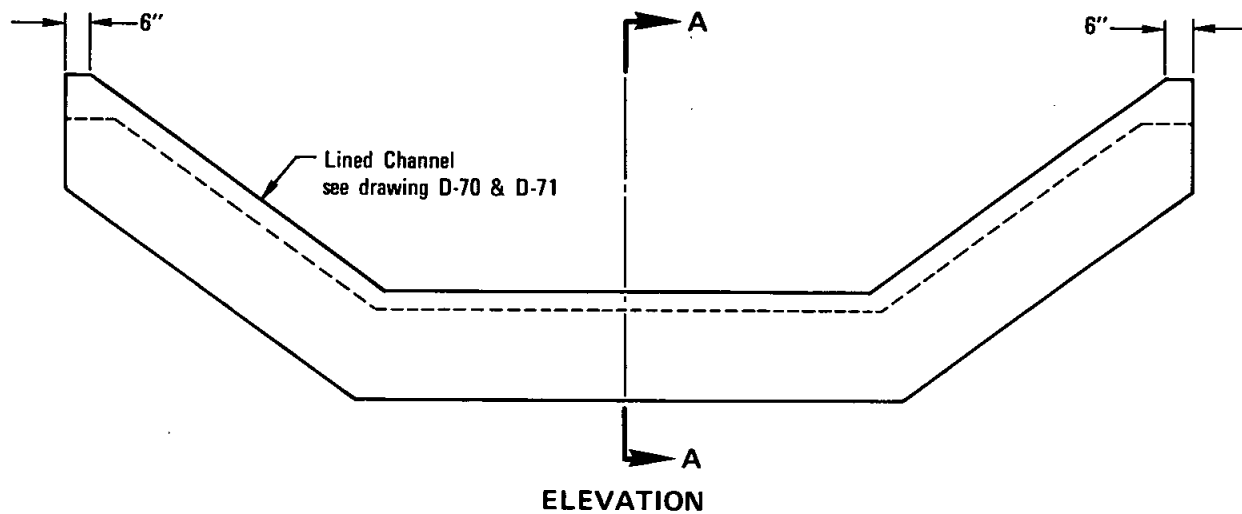
SAN DIEGO REGIONAL STANDARD DRAWING

MAJOR DRAINAGE CHANNEL

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

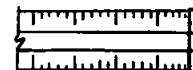
DRAWING
NUMBER **D-71**



NOTES

1. Thickness and wall depth shall be as shown on plan.
2. Reinforcing in cutoff wall shall be the same as that required in channel.
3. Concrete shall be 564-C-3000.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

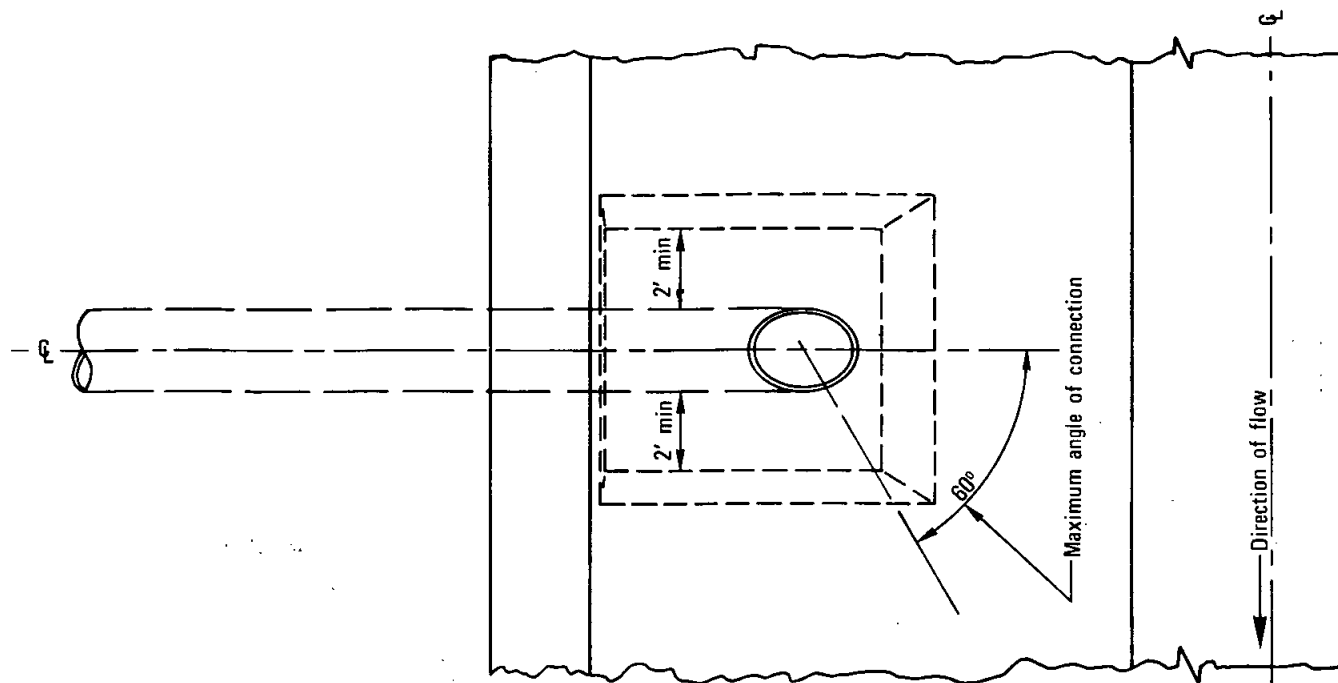
DRAWING
NUMBER

D-72

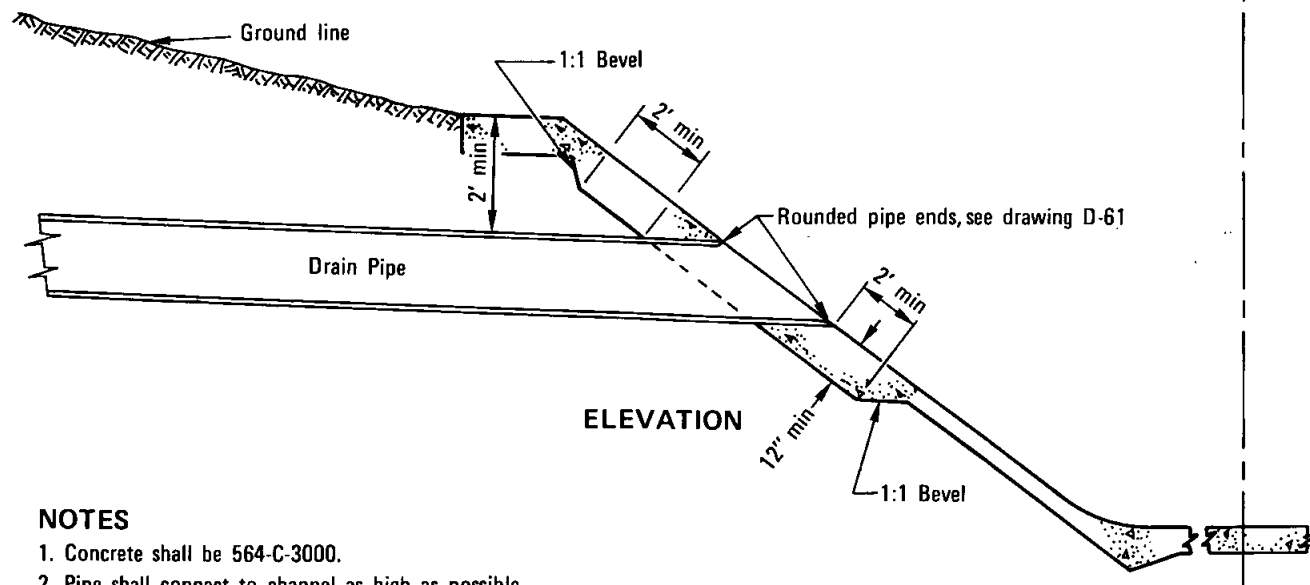
SAN DIEGO REGIONAL STANDARD DRAWING

CUTOFF WALL FOR DRAINAGE CHANNEL

Revision	By	Approved	Date



PLAN

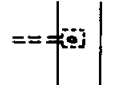


ELEVATION

NOTES

1. Concrete shall be 564-C-3000.
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

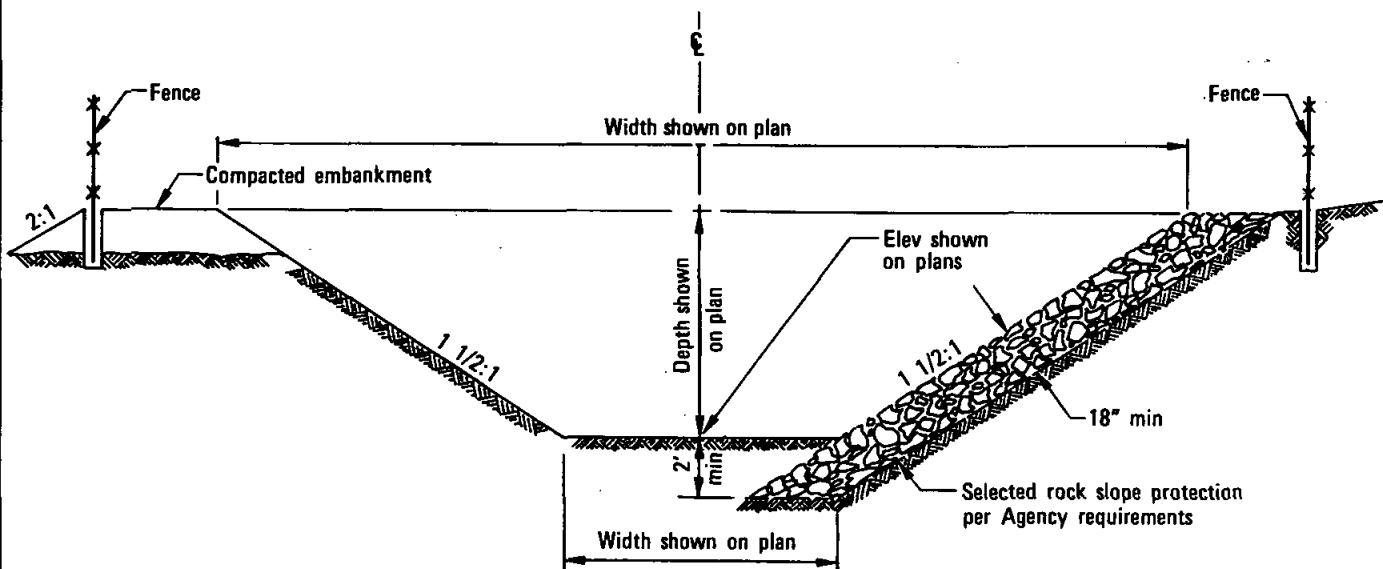
SAN DIEGO REGIONAL STANDARD DRAWING

PIPE TO CHANNEL CONNECTION

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Alfred G. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-73**



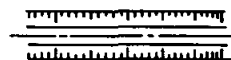
TYPICAL SECTION

NOTE

The following shall be as required by Agency:

- a) Low flow channel
- b) Filter blanket
- c) Cutoff wall
- d) Fence

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

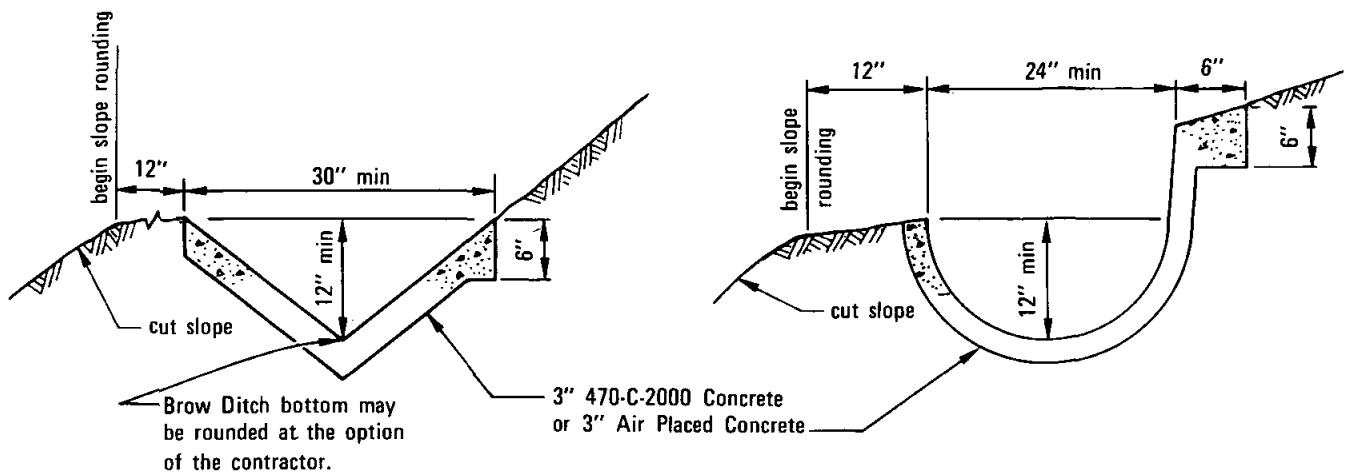
Allen A. Kershner *Dec. 1975*
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

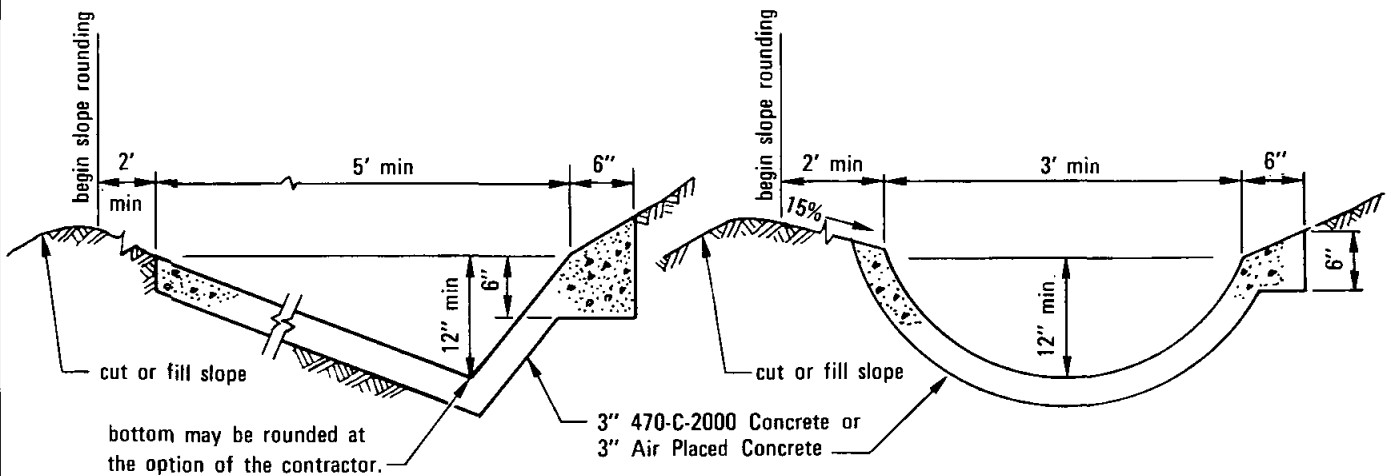
GRADED EARTH CHANNEL

DRAWING
NUMBER **D-74**

Revision	By	Approved	Date



BROW DITCH



TERRACE DITCH

NOTES

1. Longitudinal slope of lined ditch shall be 2% minimum.
2. Reinforcing, when required by Agency, shall be 1 1/2" x 1 1/2" 17 gage stucco netting.
3. Over slope down ditches shall employ 6" thickened edge section at both sides of ditch.

LEGEND ON PLANS



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

DRAINAGE DITCHES

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allen A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

D-75

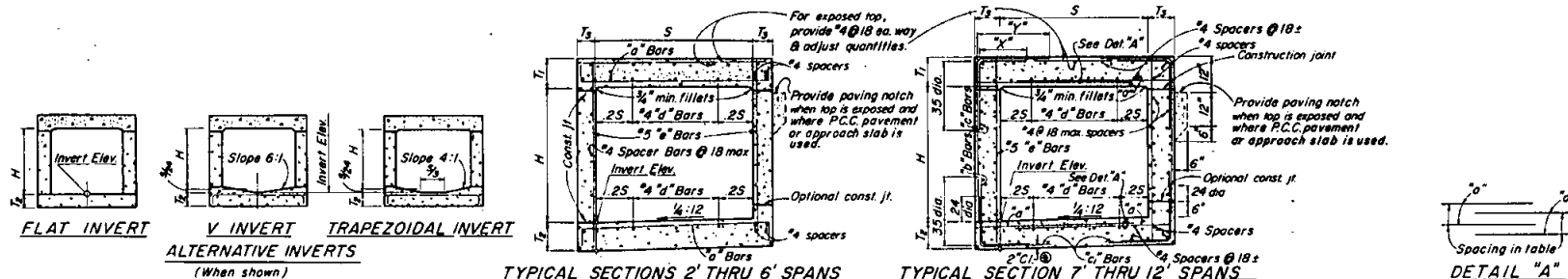
SINGLE BOX CULVERT

SAN DIEGO REGIONAL STANDARD DRAWING

Revision	By	Approved	Date
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SPAN		7'												8'												10'												12'																										
		3'			4'			5'			6'			7'			3'			4'			5'			6'			7'			8'			9'			10'			6'			7'			8'			9'			10'			12'								
HEIGHT		A			B			C			A			B			C			A			B			C			A			B			C			A			B			C			A			B			C			A			B			C		
Case	STRENGTH CLASSIFICATION																																																															
	MAX. LIFT OVER TOP																																																															
Case	Top Slab																																																															
	Bottom Slab																																																															
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Ⓢ For reinforcement clearance, except at bottom, see "Miscellaneous Details."



DOUBLE BOX CULVERT

SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
 Date: 10/10/1975
 Coordinator: R.C.E. 19807
 Date: _____
 DRAWING NUMBER: D-77

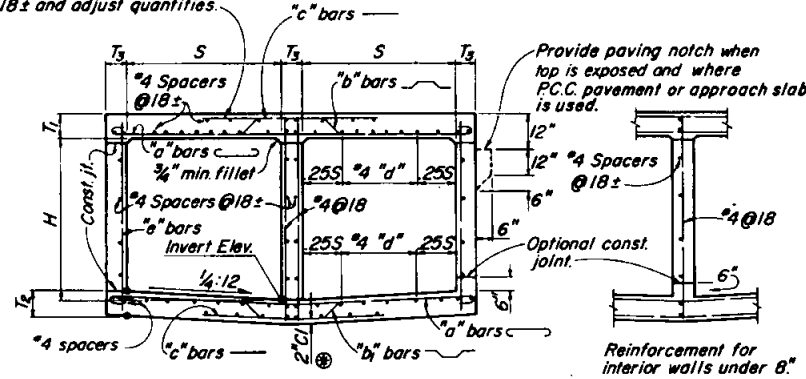
Revision: _____
 By: _____
 Approved: _____
 Date: _____

SPAN		2'				3'				4'				5'				6'				7'				8'			
HEIGHT		2'				3'				4'				5'				6'				7'				8'			
STRENGTH CLASSIFICATION		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D				
MAX. FILL OVER TOP		11	21	32	46	11	23	34	46	11	23	34	46	11	23	34	46	11	23	34	46	11	23	34	46				
Conc.	Top Slab	T ₁	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6					
	Bottom Slab	T ₂	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6					
	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					
Reinforcing Steel	a	Size: Bar	3	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4				
		Spacing	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10				
		Length	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10				
	b	Size: Bar	3	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4				
		Spacing	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11				
		Length	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
	c	Size: Bar	4	5	5	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4				
		Spacing	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11				
		Length	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
	d	Size: Bar	4	5	5	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4				
		Spacing	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11				
		Length	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
	e	Size: Bar	4	5	5	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4				
		Spacing	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11				
		Length	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				
f	Top Slab-Tot. No.	10	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6					
	Bottom Slab-Tot. No.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6					
	Size: Bar	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4					
g	Spacing	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18					
	Bars	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
	Spacers (Number)	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26					
Conc.	Concrete: C.Y. per lin ft	0.47	0.51	0.53	0.57	0.53	0.57	0.59	0.63	0.59	0.63	0.65	0.69	0.65	0.69	0.71	0.75	0.69	0.73	0.77	0.81	0.77	0.81	0.85					
	Reinif.: Lbs. per lin ft	81	74	84	84	79	91	101	87	89	99	111	99	100	109	103	104	112	105	109	113	109	116	126					

SPAN		10'																12'																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
HEIGHT		5'				6'				7'				8'				10'				6'				7'				8'				9'				10'				12'																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
STRENGTH CLASSIFICATION		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
MAX. FILL OVER TOP		2	17	30	2	17	30	2	17	30	2	16	29	36	2	16	29	36	2	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3	14	26	3

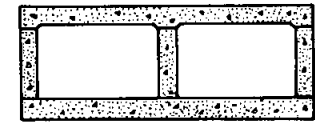
Note:
 For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

For exposed top, extend "c" bars full length, top slab only, provide additional #4 spacers @18" and adjust quantities.



TYPICAL SECTION

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



"FLAT INVERT" ALTERNATIVE
 (When shown)

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

SPAN		4'				5'				6'				8'			
HEIGHT		2'				3'				4'				5'			
STRENGTH CLASSIFICATION		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
MAX. FILL OVER TOP		10	24	38	10	24	38	10	24	38	10	24	38	10	24	38	10
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	6 1/4	6 1/4	7 1/4	6 1/4	6 1/4	7 1/4
	Bottom Slab	T ₂	6	7	8 1/4	6	7	8 1/4	6	7	8 1/4	6	7	8 1/4	6	7	8 1/4
Steel	Sidewalls	T ₃	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Size: Bar #	11	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2
Reinforcing	Spacing	11	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2
	Length	11	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2	13	11 1/2
Dist.	Top Slab - Tot. No.	15	9	9	15	9	9	15	9	9	15	9	9	15	9	9	15
	Bottom Slab - Tot. No.	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Bars	Size: Bar #	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Spacing	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Spacers		34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Concrete: C.Y. per lin. ft.		0.670	0.710	0.750	0.790	0.830	0.870	0.910	0.950	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35
Reinf. : Lbs. per lin. ft.		122	110	133	127	115	138	131	122	147	150	126	153	155	130	157	157

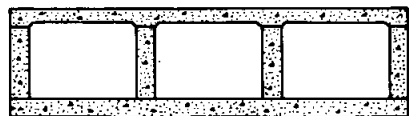
SPAN		5'				6'				7'				8'			
HEIGHT		10'				10'				10'				10'			
STRENGTH CLASSIFICATION		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
MAX. FILL OVER TOP		2	11	20	2	11	20	2	11	20	2	11	20	2	11	20	2
Conc.	Top Slab	T ₁	9	10	12	9	10	12	9	10	12	9	10	12	9	10	12
	Bottom Slab	T ₂	7 1/4	10 1/4	13	7 1/4	10 1/4	13	7 1/4	10 1/4	13	7 1/4	10 1/4	13	7 1/4	10 1/4	13
Steel	Sidewalls	T ₃	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Size: Bar #	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13
Reinforcing	Spacing	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13
	Length	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13	10 1/2	13
Dist.	Top Slab - Tot. No.	27	15	15	27	15	15	27	15	15	27	15	15	27	15	15	27
	Bottom Slab - Tot. No.	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Bars	Size: Bar #	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Spacing	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Spacers		68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68
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	2.68	3.18	2.70	3.26
Reinf. : Lbs. per lin. ft.		358	372	470	359	379	482	367	391	502	377	402	514	390	421	453	577

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

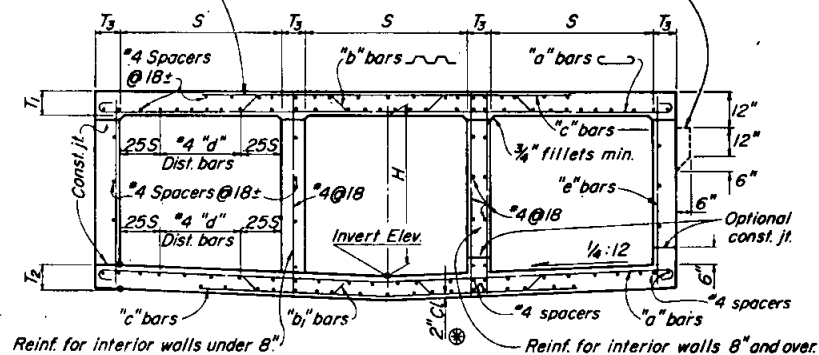
For reinforcement clearance, except at bottom, see "Miscellaneous Details."

For exposed top, extend "c" bars full length, provide additional #4 spacers @ 18" and adjust quantities.

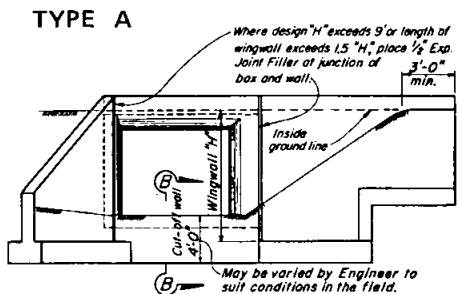
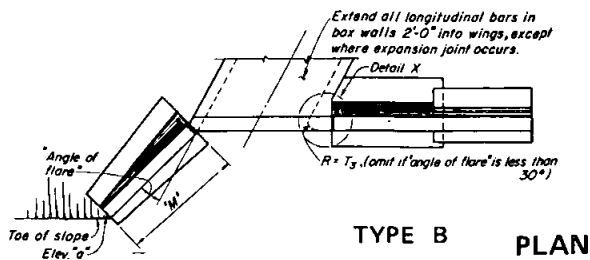
Provide paving notch when top is exposed and where P.C.C. pavement or approach slab is used.



"FLAT INVERT" ALTERNATIVE
(When shown)

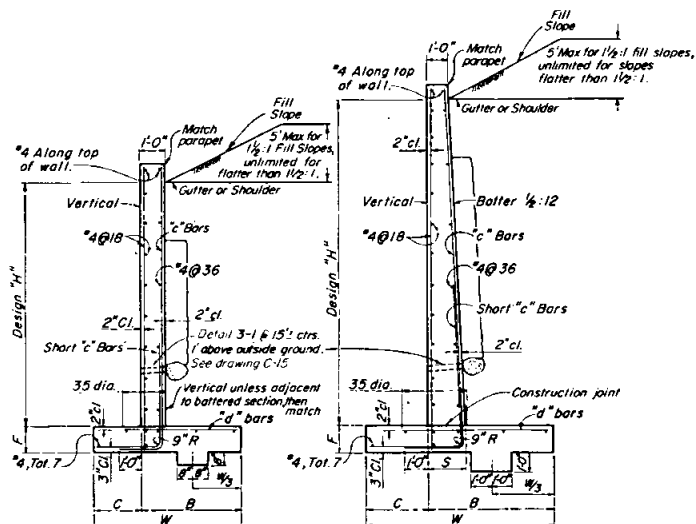


TYPICAL SECTION



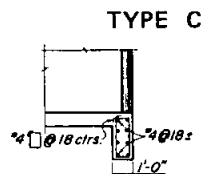
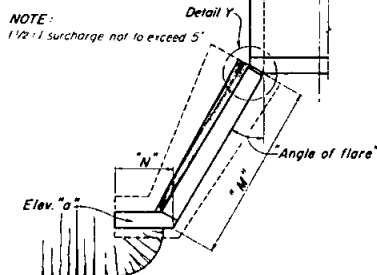
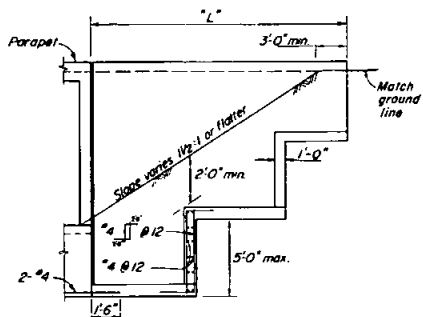
TYPE A TYPE B

END ELEVATION STRAIGHT WINGWALLS

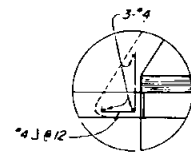


Typical Section
H = 4' thru 12'

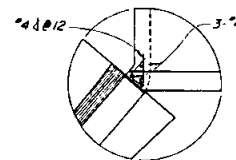
Typical Section
H = 13' thru 16'



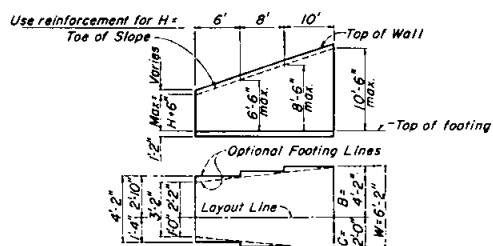
SECTION B-B



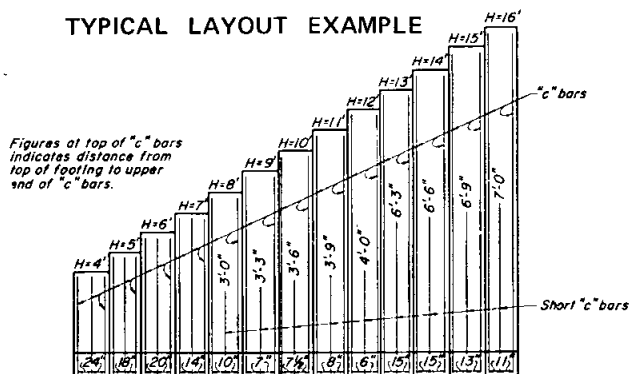
DETAIL X



DETAIL Y



TYPICAL LAYOUT EXAMPLE



REINFORCED CONCRETE WINGWALLS															
"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'-7"	1'-7 1/2"	1'-8"		
c' Bars	4 #24	4 #18	5 #20	5 #14	5 #10	5 #7	5 #7 1/2	7 #8	7 #6	9 #15	10 #15	10 #15	10 #11		
d' Bars	4 #24	4 #18	5 #20	5 #14	5 #10	5 #7	5 #7 1/2	7 #8	7 #6	9 #15	10 #15	10 #15	10 #11		
Conc. %	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. #	13	16	19	25	30	37	49	62	76	73	90	104	125		

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

NOTES

Unit Stresses: $f_s = 20,000$ p.s.i., $f_c = 1200$ p.s.i., $n = 10$

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. Walls designed for 2' liveload surcharge, 1 1/2:1 sloping surcharge not to exceed 5' in elevation plus 2' liveload surcharge, or unlimited 2:1 surcharge. Dimensions "H", "L", "M", "N", Elev. "a" and "Angle of flare" (as apply) are shown on the plans.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE			
				BOX CULVERT WINGWALL TYPES A, B & C				<i>Allen G. Kuehn</i> Sec. 1975 Coordinator R.C.E. 19807 Date			
								DRAWING NUMBER D-79			



Notes : Walls designed for 2' surcharge; earth load = 120 % cu. ft.; equivalent fluid pressure = 36 % cu. ft.
 Vary 'D' of warped wall uniformly from that at cut-off wall to that at culvert, for max. 'M' > 12'.
 Where abrasion is anticipated increase apron thickness to 7" min. to provide 2" min. reinforcement coverage.
 Dimensions 'L', 'W', 'H', 'M', 'N', Elev. 'a', Angle of flare, and end Slope (as apply) are shown on the plans



DESIGN NOTES

SPECIFICATIONS:

DESIGN: A.A.S.H.O. DATED 1973 WITH REVISIONS AND 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 2' - WHEEL LOAD DISTRIBUTION ON THE TOP SLAB IS $E=0.1755+3.2$ LONGITUDINALLY AND CONCENTRATED ALONG THE SPAN. WHEEL LOAD DISTRIBUTION ON THE INVERT SLAB IS 7.5' LONGITUDINALLY AND UNIFORMLY OVER THE BREADTH OF THE CULVERT.

COVER 2' OR MORE - WHEEL LOADS DISTRIBUTED UNIFORMLY OVER A SQUARE, THE SIDES OF WHICH ARE 1.75 TIMES THE DEPTH OF COVER, BUT NOT LESS LONGITUDINALLY THAN ON THE TOP SLAB, OR 7.5' ON THE INVERT SLAB. WHEN SUCH AREAS FROM SEVERAL WHEEL CONCENTRATIONS OVERLAP, THE TOTAL LOAD SHALL BE CONSIDERED AS UNIFORMLY DISTRIBUTED OVER THE AREA DEFINED BY THE OUTSIDE LIMITS OF THE INDIVIDUAL AREAS, BUT THE OVERALL LONGITUDINAL DIMENSION SHALL NOT EXCEED THE TOTAL LENGTH OF THE SUPPORTING SLAB. NEGLECT LIVE LOAD ON SINGLE SPANS WHEN COVER IS MORE THAN 8' AND EXCEEDS SPAN, AND ON MULTIPLE SPANS WHEN COVER EXCEEDS DISTANCE BETWEEN EXTERIOR WALLS.

DEAD LOAD: EARTH LOAD OF 120 PCF AND AN EQUIVALENT FLUID PRESSURE OF 36 PCF, REDUCED TO 84 PCF AND 25 PCF RESPECTIVELY FOR CLEAR SPANS OF 20' OR LESS.

UNIT STRESSES: $F_t = 20,000$ P.S.I., $N=10$

$F_c = 1,200$ P.S.I.

REINFORCEMENT EMBEDMENT IS $1\frac{1}{2}$ " DIA. CLEAR, MIN. 1" AND IN $\frac{1}{4}$ " INCREMENTS, EXCEPT AS NOTED.

DISTRIBUTION "d" BARS EXPRESSED AS A % OF MAIN POSITIVE REINFORCEMENT.

CLASSIFICATION "A": TOP SLAB = $\frac{100}{\text{SPAN}}$, MAX. 50% (UNLESS TRAFFIC LONGITUDINAL)
BOTTOM SLAB = $\frac{100}{\text{SPAN}}$ MAX.

CLASSIFICATION "B" TO "E": TOP AND BOTTOM SLABS $\frac{100}{\text{SPAN}}$ MAX.

GENERAL NOTES

QUANTITIES: QUANTITIES ARE FOR THE SLOPED INVERT SLAB AND DO NOT INCLUDE SPLICES IN 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 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 THE ϵ .

CONSTRUCTION NOTES

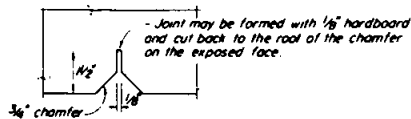
EXPANSION JOINTS: BOTTOM SLAB - NO EXPANSION JOINTS SHALL BE PLACED TOP SLAB AND WALLS - WHEN COVER IS LESS THAN SPAN LENGTH, PLACE $\frac{1}{2}$ " EXPANSION JOINT FILLER AT 30'S CENTERS OUTSIDE THE PAVED ROADWAY LANES AND PLACE BRIDGE DETAIL 3-2 AT 30'S CENTERS UNDER PAVED ROADWAY LANES. WHEN COVER IS MORE THAN SPAN LENGTH, PLACE $\frac{1}{2}$ " EXPANSION JOINT FILLER AT 30'S CENTERS AND ADDITIONAL $\frac{1}{2}$ " EXPANSION JOINTS AT LOCATIONS OF CHANGE IN FOUNDATION CHARACTER, AS DIRECTED BY THE ENGINEER.

CONSTRUCTION LOADS:

NOT PERMITTED UNTIL CONCRETE HAS REACHED A STRENGTH OF 3,000 P.S.I. OR AGE OF 28 DAYS, WHICHEVER OCCURS FIRST, AND FALSEWORK PLANS HAVE BEEN SUBMITTED BY THE CONTRACTOR TO THE ENGINEER, AND APPROVED.

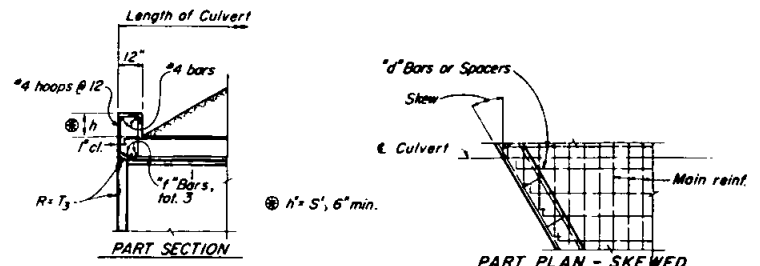
CONSTRUCTION JOINTS:

TEMPORARY JOINTS MAY BE PERMITTED IF NORMAL (OR RADIAL) TO ϵ OF RCB. OTHERWISE, THE CONTRACTOR IS TO SUBMIT A PROPOSAL FOR CONSIDERATION.

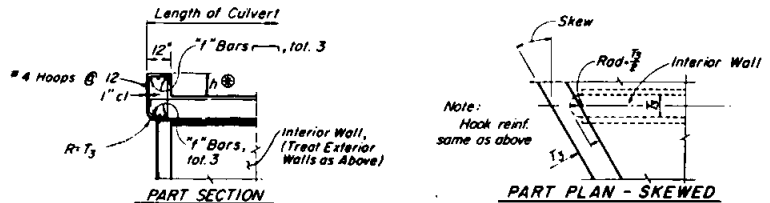


BRIDGE DETAIL 3-2
(Portion)

See Standard Drawing C-15

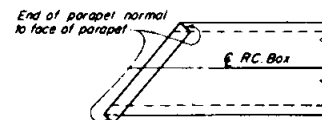


PARAPET DETAILS FOR SINGLE SPAN CULVERTS

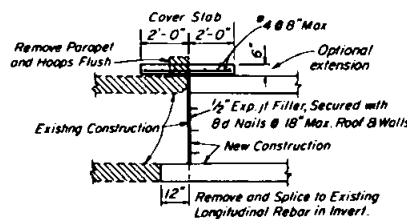


PARAPET DETAILS FOR MULTIPLE SPAN CULVERTS

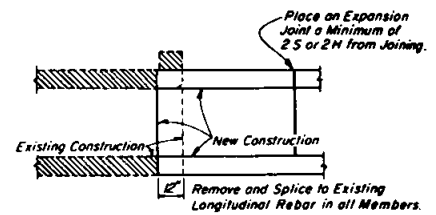
SPAN	PARAPET "f" BAR NOS			
	SKEW ANGLE	TO 0°	TO 15°	TO 30°
4'	15°	4	4	4
6'	15°	4	4	5
8'	15°	4	5	6
10'	15°	5	6	7
12'	15°	6	7	8
14'	15°	7	8	9



PARAPET DETAIL FOR SKEWED CULVERTS W/O WINGWALLS



COVER: 1' AND GREATER



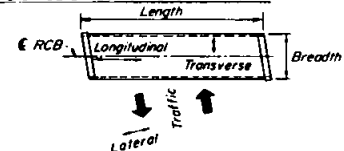
COVER: EXPOSED TOP AND GREATER

CULVERT EXTENSION
20° SKEW MAXIMUM

USE OF STANDARD DRAWING

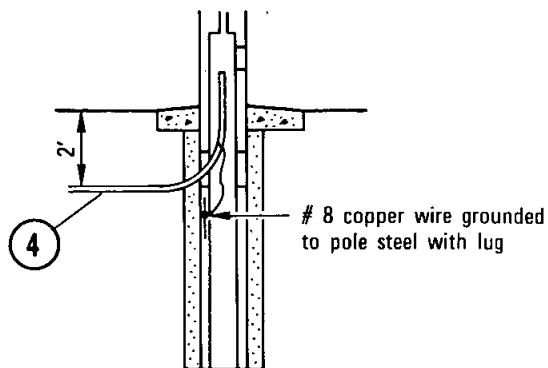
"STRENGTH CLASSIFICATION", SYMBOLIZED BY THE LETTERS "A", "B", "C" ETC., AT THE TOP OF THE DATA TABLE IS MERELY A CONVENIENT DESIGNATION FOR A PARTICULAR STRUCTURAL SECTION FOR A CULVERT OF ANY GIVEN OPENING. IT IS DICTATED BY THE COVER OR DEPTH OF FILL OVER THE TOP SLAB.

LIVE LOAD & RCB DIRECTIONAL TERMINOLOGY

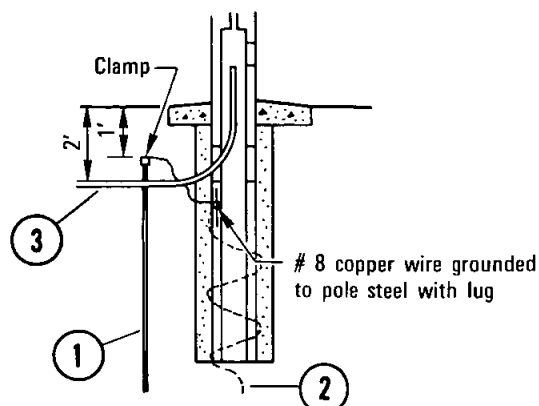


Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				BOX CULVERT MISCELLANEOUS DETAILS		<i>Allen G. Kuehn</i> <i>Dec. 1975</i>	
						Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER D-81	

ELECTRICAL SYSTEMS

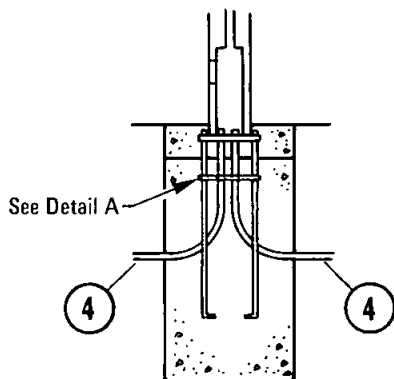


STEEL CONDUIT

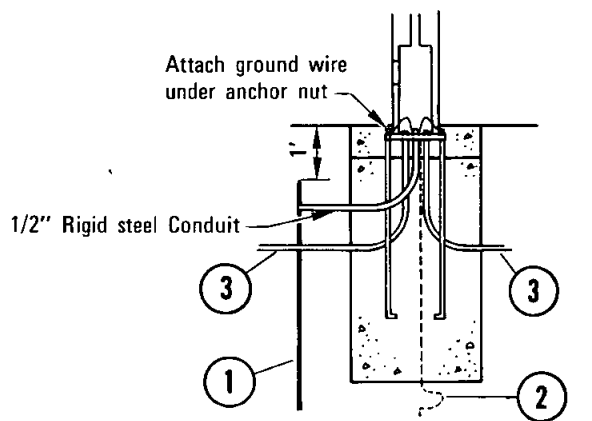


NON-METALLIC CONDUIT

DIRECT BURIAL FOUNDATION



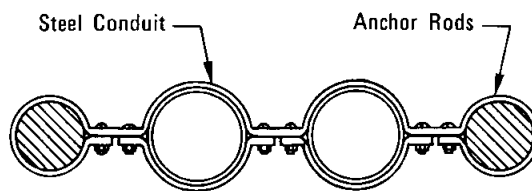
STEEL CONDUIT



NON-METALLIC CONDUIT

ANCHOR BASE FOUNDATION

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



DETAIL A

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

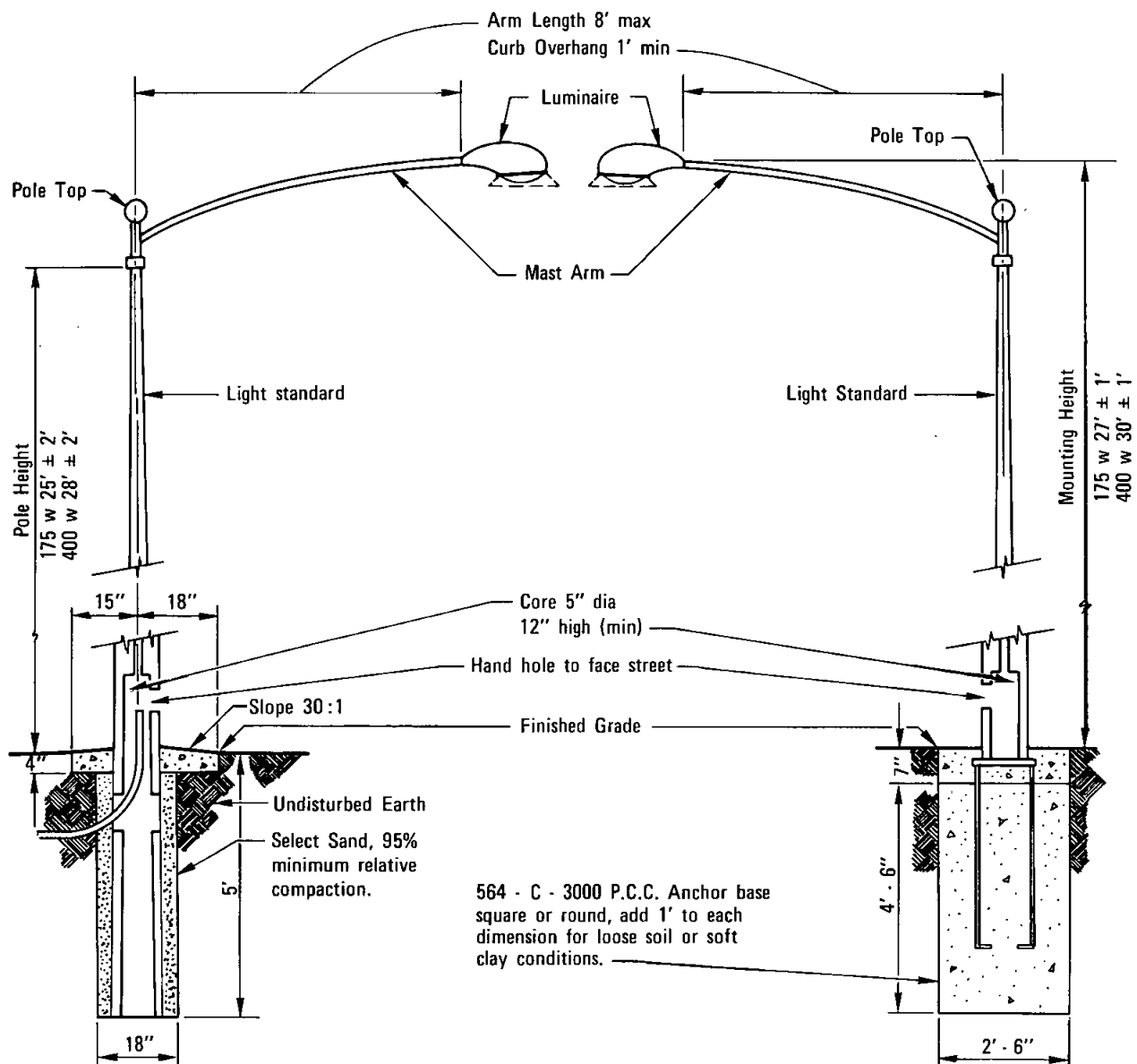
DRAWING
NUMBER

E-2

SAN DIEGO REGIONAL STANDARD DRAWING

GROUNDING
OF CONCRETE LIGHTING STANDARDS

Revision	By	Approved	Date

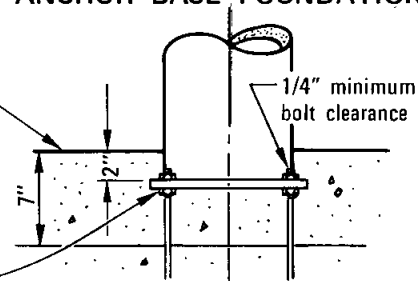


DIRECT BURIAL FOUNDATION

ANCHOR BASE FOUNDATION

Finished Grade
Anchor bolts must
not protrude.

Anchor Bolts (4 req.) 1"x 36"x 4" hook, galv.
Use two leveling nuts with washers (all galv.)
on each bolt.



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

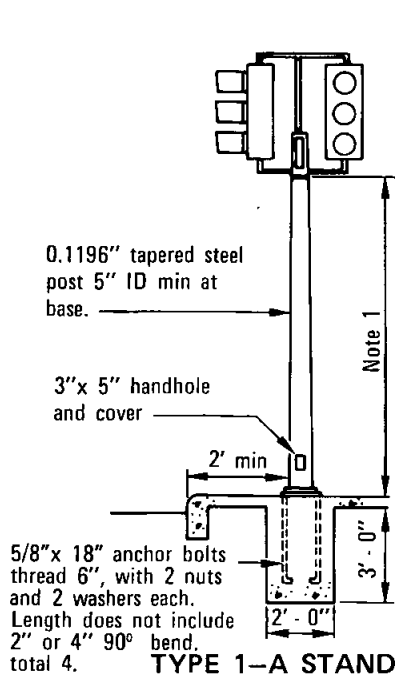
ORNAMENTAL STREET LIGHT

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

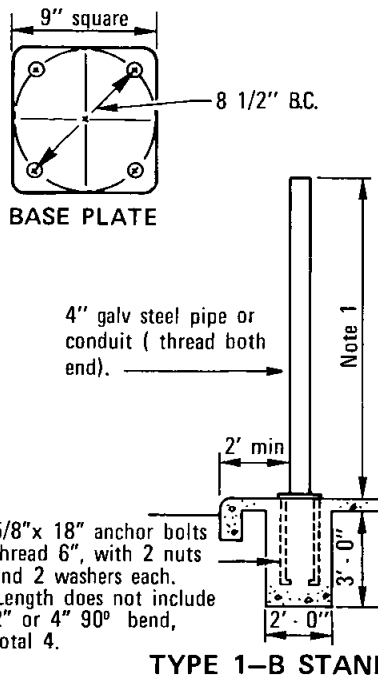
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

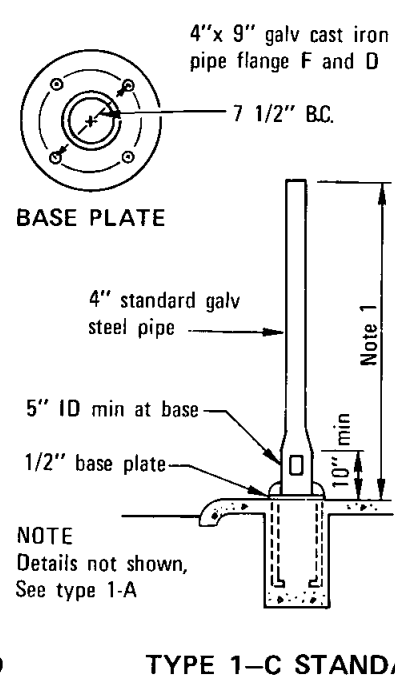
E-1



TYPE 1-A STANDARD

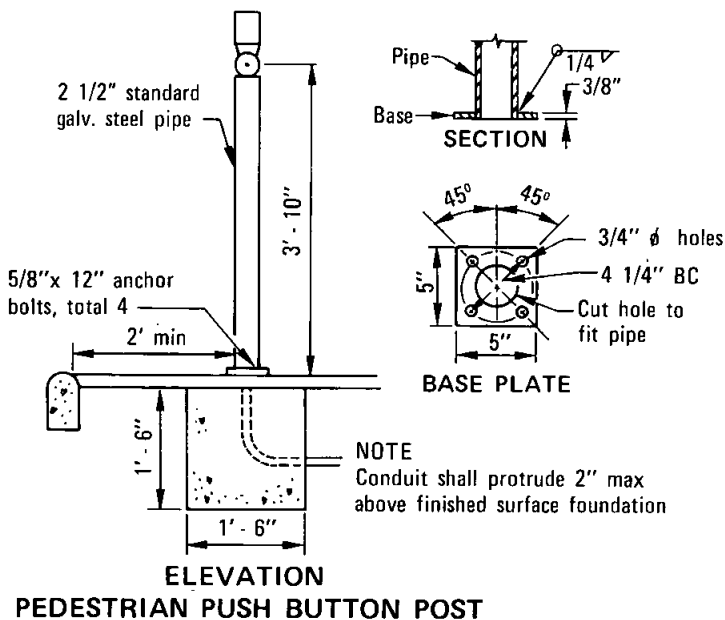


TYPE 1-B STANDARD



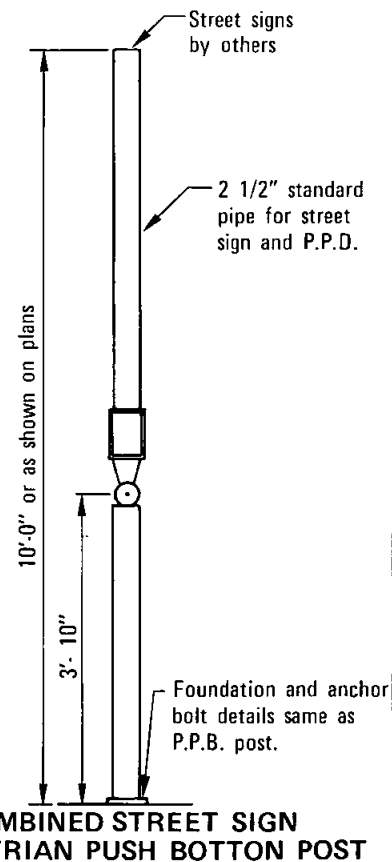
TYPE 1-C STANDARD

TYPE 1 SIGNAL STANDARDS

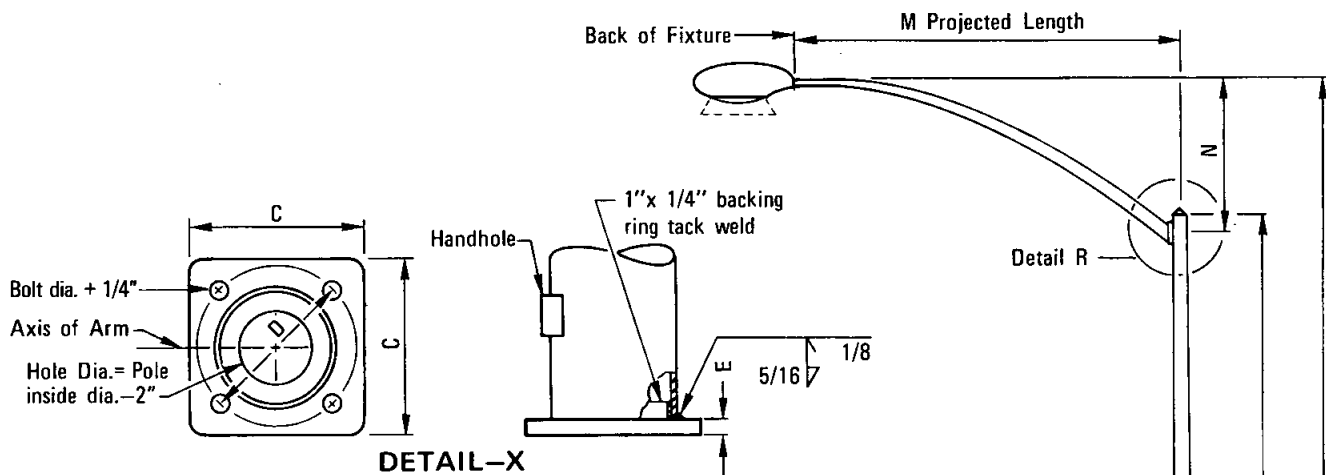


NOTES

- Standards shall be 10' - 0" $\pm$ 2" for vehicular signals and 7' - 0" $\pm$ 2" for pedestrian signals unless otherwise noted on plans.
- Top of Standards shall be 4 1/2" OD.
- Conduits shall extend 2" max above finished surface of foundation and for Type 1-A and 1-C Standards shall be sloped toward handhole.
- Anchor Bolts shall be bonded to conduit.
- Conduit between standard and adjacent pull box shall be 2" size min.



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				TRAFFIC SIGNAL STANDARD - TYPE 1 & PUSHBUTTON POSTS		<i>Allan G. Kerschbaum</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER E-3	



LUMINAIRE ARM DATA				
M Projected Length	N Rise	Min OD At Pole	Thick- ness	P Mounting Height
6' - 0"	2' - 0" ±	3 1/4"	0.1345"	30' - 0" ±
8' - 0"	2' - 6" ±	3 1/2"	0.1345"	30' - 6" ±
10' - 0"	3' - 3" ±	3 7/8"	0.1345"	31' - 3" ±
12' - 0"	4' - 3" ±	3 7/8"	0.1345"	32' - 3" ±
15' - 0"	4' - 9" ±	4 1/4"	0.1345"	32' - 9" ±

Pole Type	POLE DATA				BASE PLATE DATA					Luminaire Arm
	A Height	Min O D		Thickness	C	D B.C.	E	Anchor Bolts		
		Base	Top							
15	28' - 6"	7 3/4"	3 7/8"	0.1345"	11 1/2"	11"	1"	1"x 36"x 4" or 1"x 34"x6"	6'-15'	

NOTES

1. See Standard Drawing E-5 for Slip Base Insert.
2. See Standard Drawing E-17 for foundation details.
3. Luminaire arm projected length to be 12' unless otherwise shown on plans.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

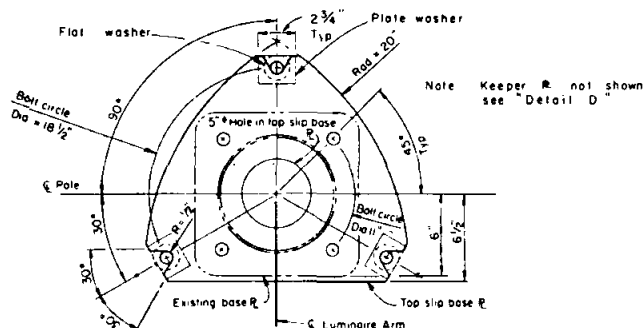
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **E-4**

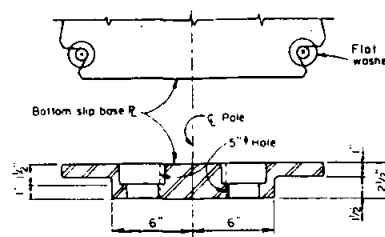
SAN DIEGO REGIONAL STANDARD DRAWING

**TRAFFIC SIGNAL & STREET LIGHTING
STANDARD - TYPE 15**

Revision	By	Approved	Date

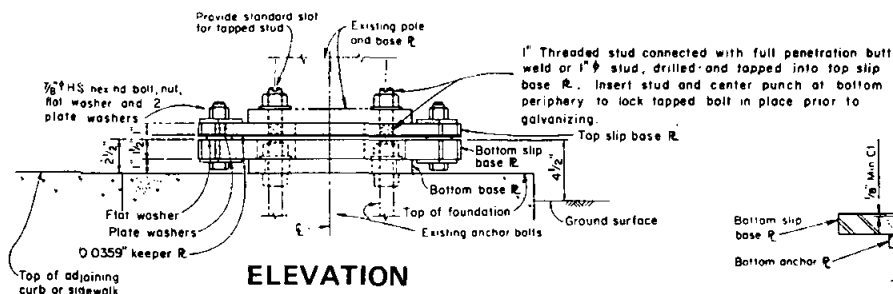


PLAN-TOP PLATES

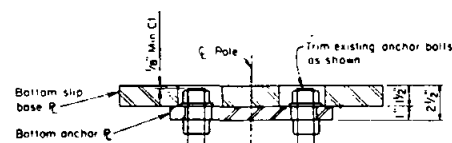


SECTION C-C
CAST OPTION

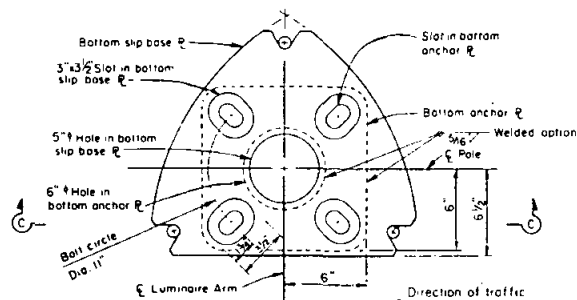
Note: For details not shown see "Bottom Anchor R Details" and "Plan - Bottom Plates"



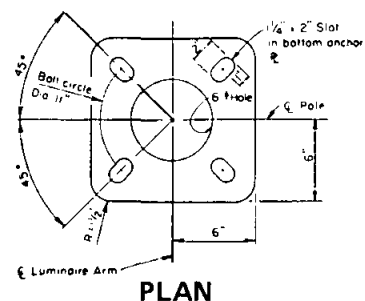
ELEVATION



SECTION C-C
WELDED OPTION



PLAN-BOTTOM PLATES



PLAN

SLIP BASE PLATE INSERT DETAILS

BOTTOM ANCHOR PLATE DETAILS

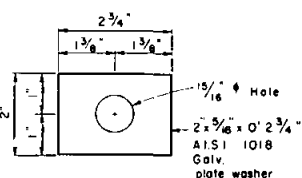
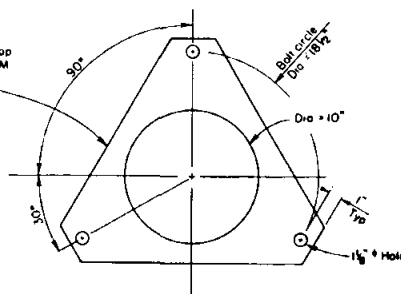


PLATE WASHER

0.0359" keeper R, place on top of middle flat washer ASTM A 526, 125 commercial

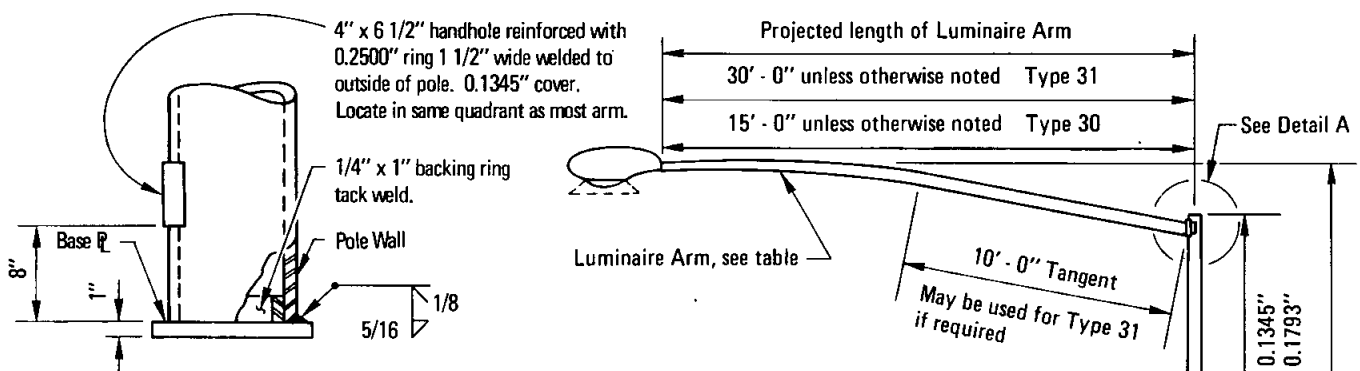


DETAIL-D

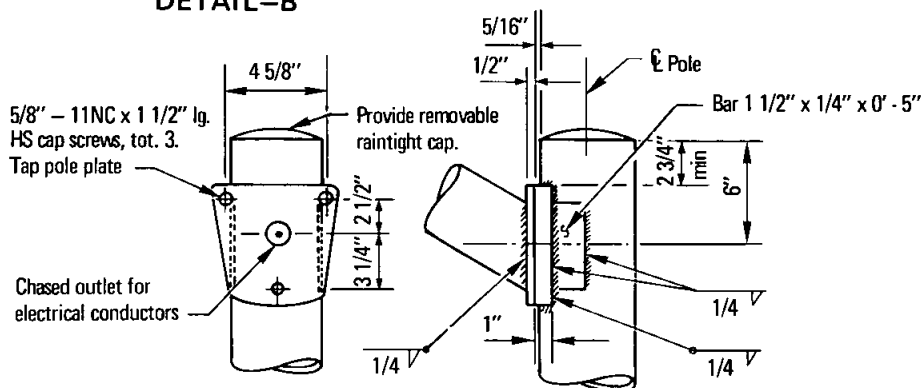
NOTES

1. All new material shall be galvanized after fabrication.
2. The 7/8" HS slip base bolts shall be torqued to the following values:
Front Bolts 84 foot-pounds
Rear Bolt 110 foot-pounds
3. All slots shall be filled with mastic.
4. Plates shall conform to ASTM A-36, except as noted.
5. Cast option shall conform to ASTM A-27 Grade 70-40.
6. Flat washer shall conform to ASTM A-325.

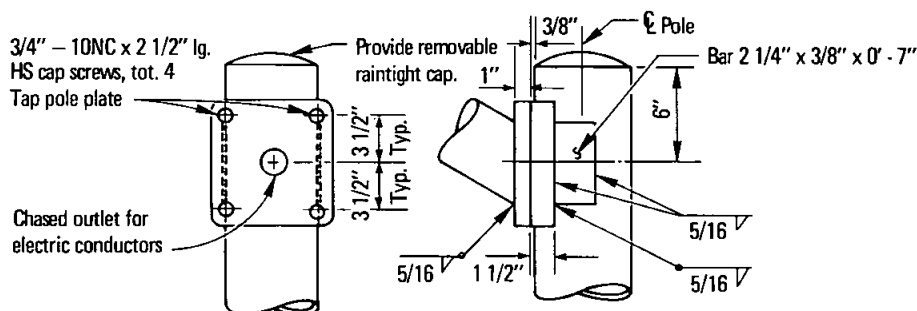
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				SLIP BASE INSERT FOR TYPE 15 TRAFFIC SIGNAL & STREET LIGHTING STANDARD		Allan A. Kuehnert Dec. 1975 Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER	E-5



DETAIL-B



DETAIL A-TYPE 30



DETAIL A-TYPE 31

Luminaire Arm Data			
Projected Length	Thickness	Minimum O.D. @ Pole	Mounting Height
6' - 0"	0.1345"	3 1/4"	36' - 9" ±
8' - 0"	0.1345"	3 1/2"	37' - 3" ±
10' - 0"	0.1345"	3 3/4"	38' - 0" ±
12' - 0"	0.1345"	3 3/4"	39' - 0" ±
15' - 0"	0.1345"	4 1/4"	39' - 6" ±
20' - 0"	0.1793"	5"	37' - 0" ±
25' - 0"	0.1793"	5 3/4"	38' - 6" ±
30' - 0"	0.1793"	6 1/2"	40' - 0" ±

* Type 30 - Arm Length 6' - 15' max.

** Type 31 - Arm Length 20' - 30'

Conduit bonded to anchor bars

Detail B

Base

35' - 0"
Type 30 Round tapered steel pole 3 7/8" x 8 3/4" min O.D. x 35' - 0"
Type 31 Round tapered steel pole 6" x 10 3/4" min O.D. x 35' - 0"

Mounting height, see table

5' - 0"
2' - 6"
□ or ○

NOTES

1. Sheet and plate thickness shown is nominal thickness.
2. For details not shown, see Standard Drawing E-17
3. Plates shall conform to ASTM A-36, except as noted.
4. In lieu of the torque requirements for HS bolts, cap screws shall be tightened by the turn-of-nut method 1/6 turn from snug tight condition. No washer will be required.
5. See Standard Drawing E-7 for base plate details.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

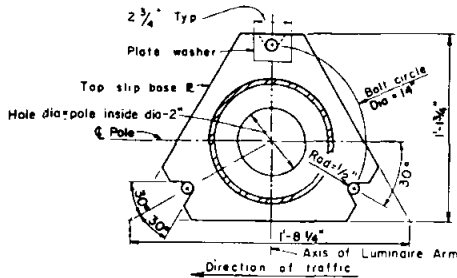
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **E-6**

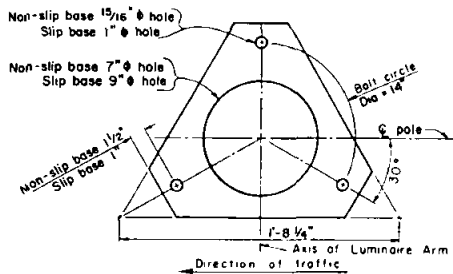
SAN DIEGO REGIONAL STANDARD DRAWING

**STREET LIGHTING STANDARDS
TYPES 30 AND 31**

Revision By Approved Date



PLAN-TYPICAL BASE PLATE



KEEPER PLATE

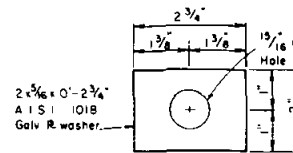
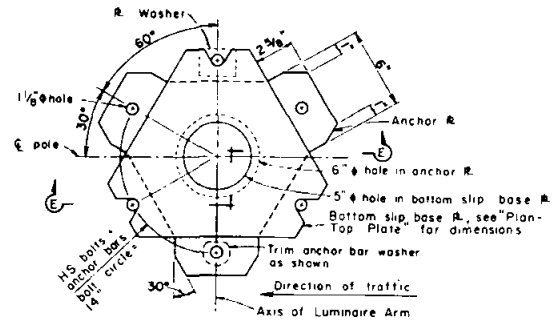
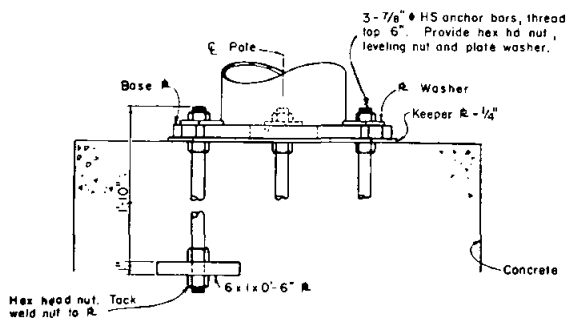


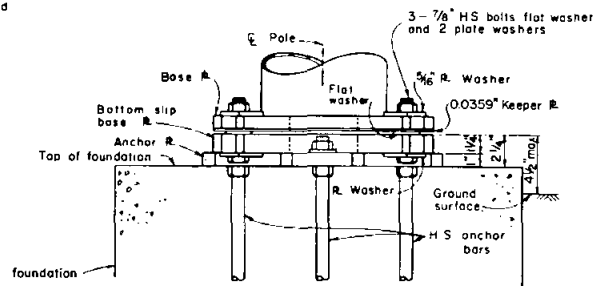
PLATE WASHER



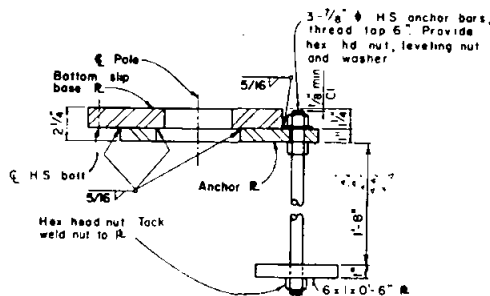
PLAN BOTTOM PLATES
SLIP BASE PLATE DETAILS



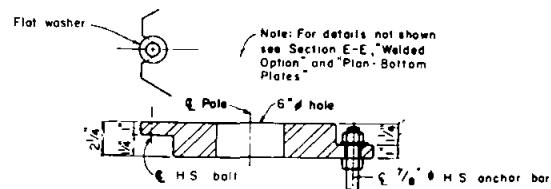
ELEVATION NON-SLIP BASE



ELEVATION SLIP BASE



WELDED OPTION



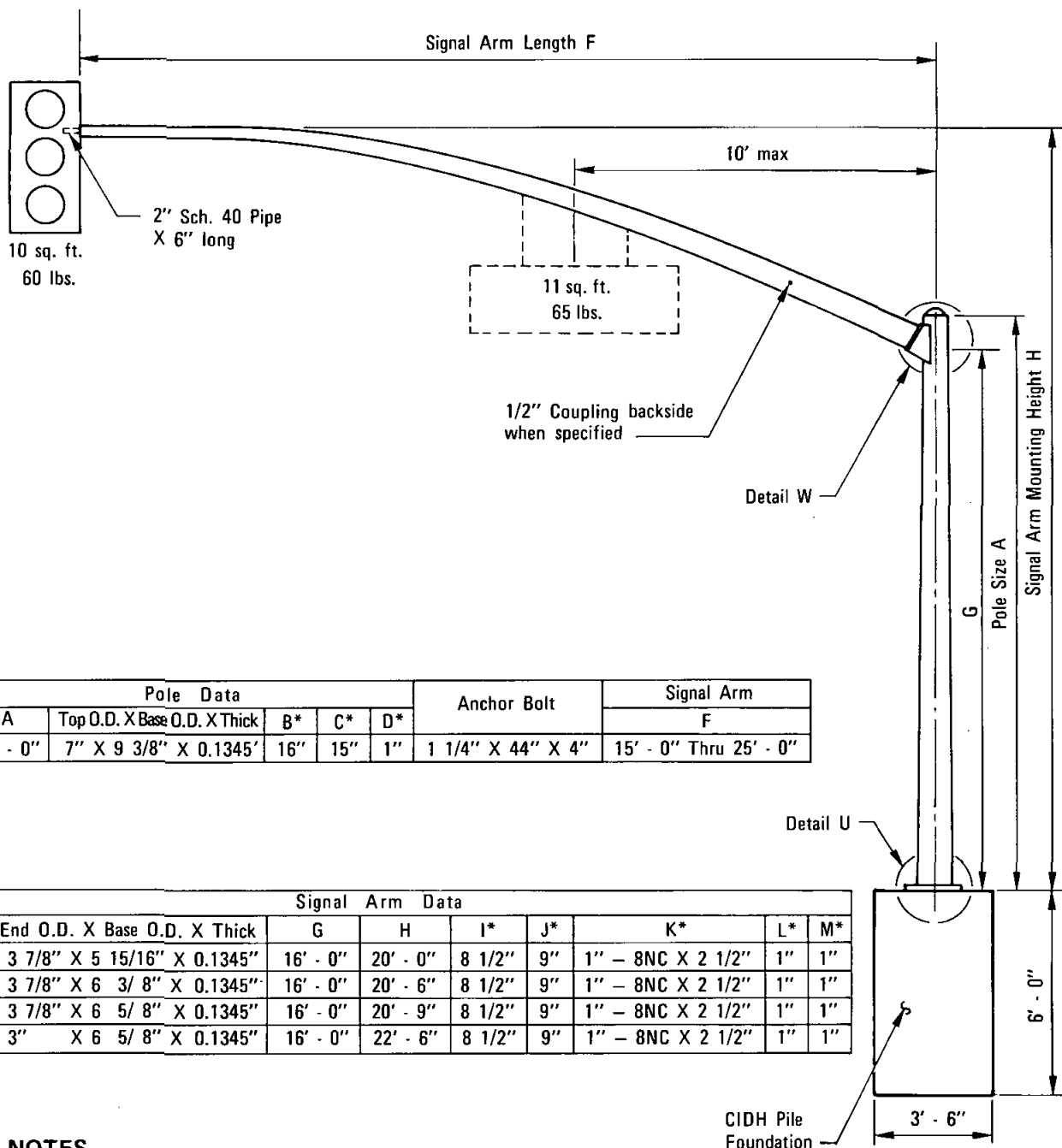
CAST OPTION

SECTION E-E

NOTES

1. Cast option shall conform to ASTM A-27, Grade 70-40.
2. The 7/8" HS slip base bolts shall be torqued to the following values: Front Bolts-84 foot-pounds; Rear Bolt-110 foot-pounds.
3. 7/8" HS anchor bars, wrench tighten, torque requirements waived.
4. HS bolts, flat washers and nuts and washers for HS anchor bars shall conform to ASTM A-325.
5. A slip base is to be furnished unless the plans or special provisions specify a non-slip base.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				BASE PLATE DETAILS TYPES 30 AND 31 STREET LIGHTING STANDARDS		<i>Allan G. Kersch</i> Dec. 1975 Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER E-7	



Pole Type	Pole Data						Anchor Bolt	Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*	F		
100	17' - 0"	7" X 9 3/8" X 0.1345"	16"	15"	1"	1 1/4" X 44" X 4"	15' - 0" Thru 25' - 0"	

Signal Arm Data								
F	End O.D. X Base O.D. X Thick	G	H	I*	J*	K*	L*	M*
15' - 0"	3 7/8" X 5 15/16" X 0.1345"	16' - 0"	20' - 0"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
18' - 0"	3 7/8" X 6 3/8" X 0.1345"	16' - 0"	20' - 6"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
20' - 0"	3 7/8" X 6 5/8" X 0.1345"	16' - 0"	20' - 9"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
25' - 0"	3" X 6 5/8" X 0.1345"	16' - 0"	22' - 6"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"

NOTES

- See Standard Drawings E-16 and E-17 for details.
- (*) indicates dimension shown on details.

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER **E-8**

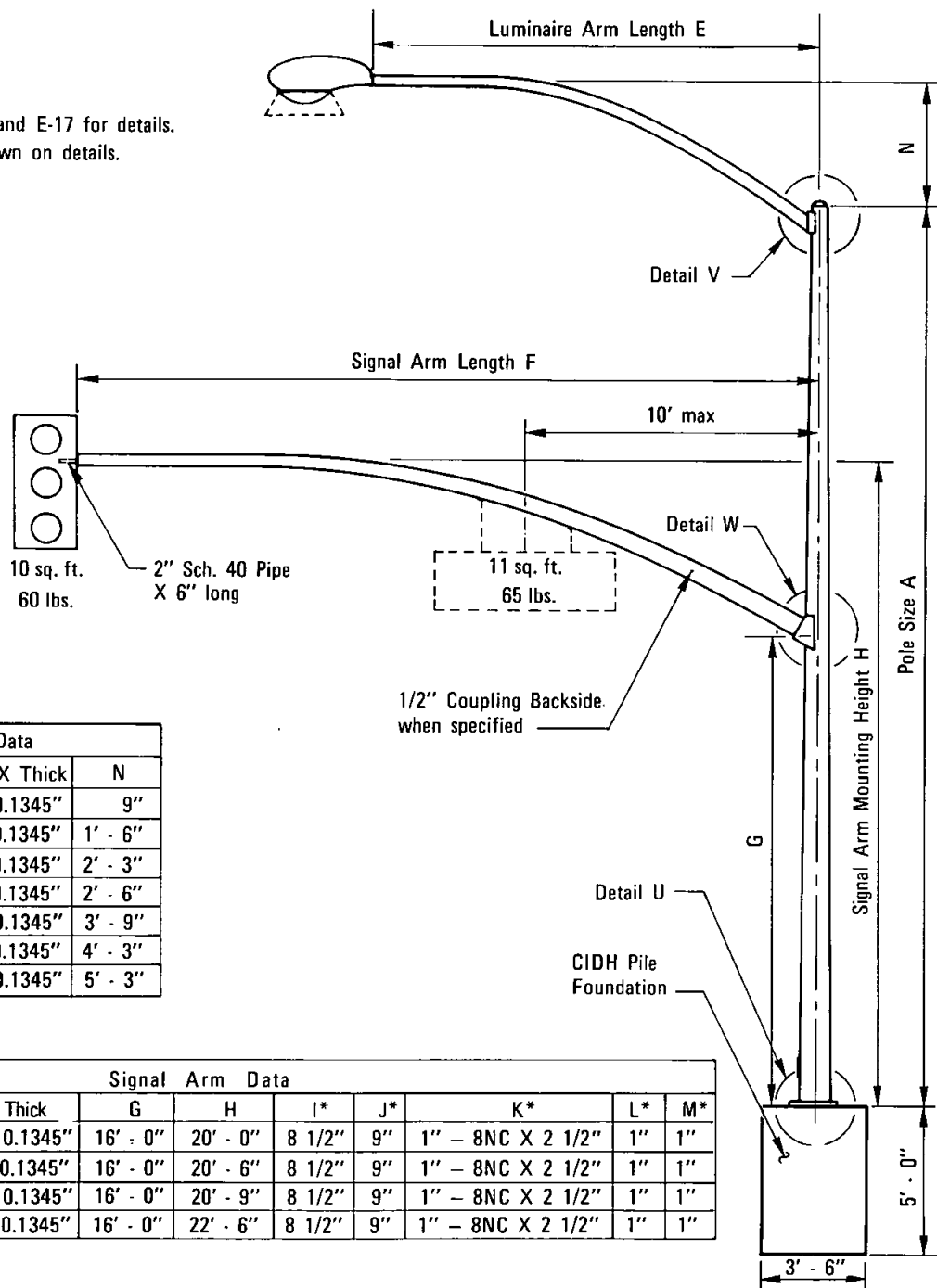
SAN DIEGO REGIONAL STANDARD DRAWING

**TRAFFIC SIGNAL STANDARD
TYPE-100**

Revision	By	Approved	Date

NOTES

1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.



Luminaire Arm Data			
E	End O.D. X Base O.D. X Thick	N	
4' - 0"	2 3/8" X 3" X 0.1345"	9"	
6' - 0"	2 3/8" X 3 3/8" X 0.1345"	1' - 6"	
8' - 0"	2 3/8" X 3 11/16" X 0.1345"	2' - 3"	
10' - 0"	2 3/8" X 3 7/8" X 0.1345"	2' - 6"	
12' - 0"	2 3/8" X 4 5/16" X 0.1345"	3' - 9"	
15' - 0"	2 3/8" X 4 3/4" X 0.1345"	4' - 3"	
18' - 0"	2 3/8" X 4 3/4" X 0.1345"	5' - 3"	

Signal Arm Data								
F	End O.D. X Base O.D. X Thick	G	H	I*	J*	K*	L*	M*
15' - 0"	3 7/8" X 5 15/16" X 0.1345"	16' - 0"	20' - 0"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
18' - 0"	3 7/8" X 6 3/8" X 0.1345"	16' - 0"	20' - 6"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
20' - 0"	3 7/8" X 6 5/8" X 0.1345"	16' - 0"	20' - 9"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
25' - 0"	3" X 6 5/8" X 0.1345"	16' - 0"	22' - 6"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"

Pole Type	Pole Data						Luminaire Arm		Signal Arm	
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*	Anchor Bolt	E		F	
101	30' - 0"	5 1/4" X 9 3/8" X 0.1345"	16"	15"	1"	1 1/4" X 44" X 4"	4' - 0" Thru 18' - 0"		15' - 0" Thru 25' - 0"	
102	35' - 0"	4 1/2" X 9 3/8" X 0.1345"	16"	15"	1"	1 1/4" X 44" X 4"	4' - 0" Thru 18' - 0"		15' - 0" Thru 25' - 0"	

Revision	By	Approved	Date

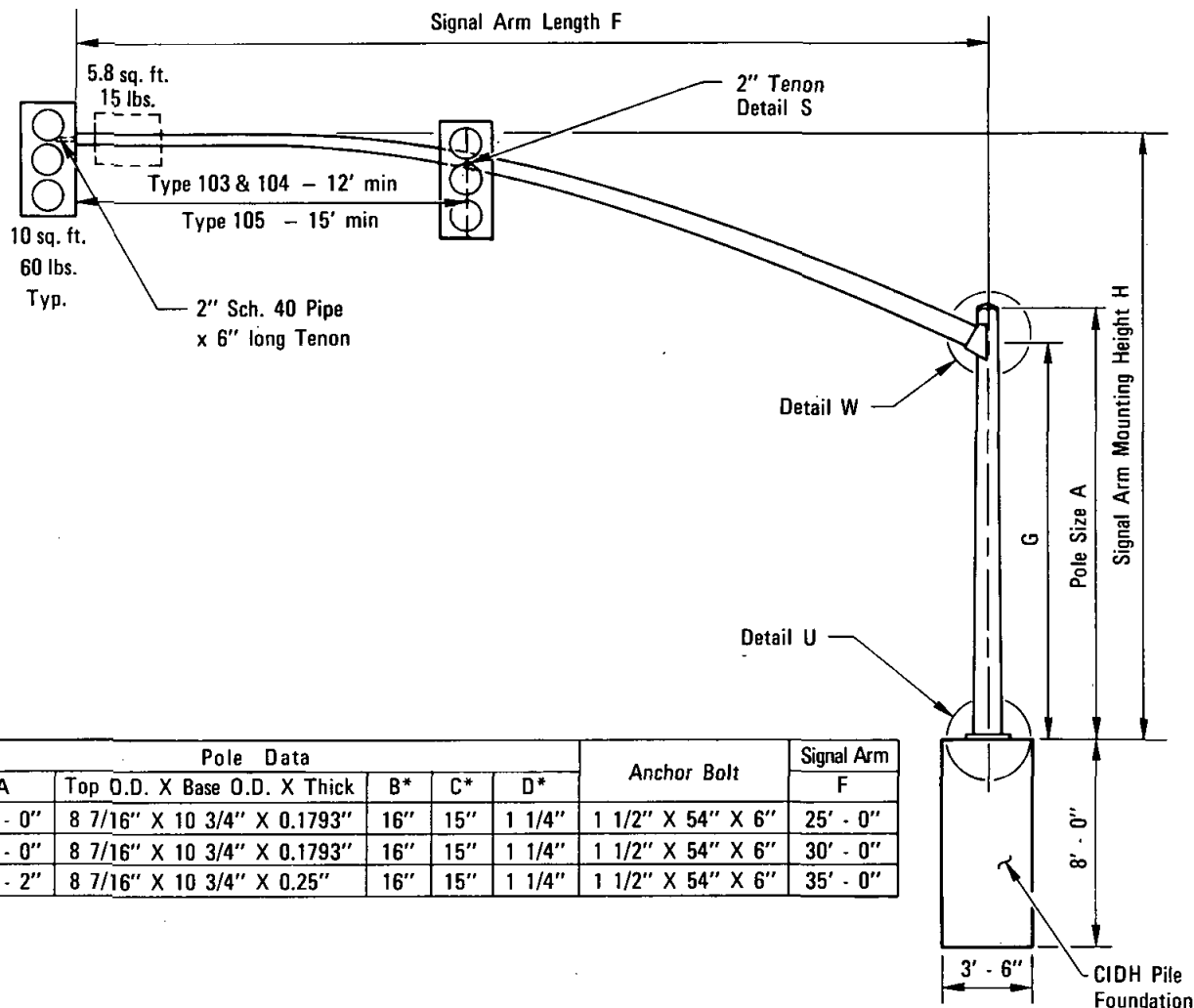
SAN DIEGO REGIONAL STANDARD DRAWING

TRAFFIC SIGNAL AND STREET LIGHTING
STANDARDS - TYPES 101 AND 102

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kerschbaum *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **E-9**



Pole Type	Pole Data						Anchor Bolt	Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*	F		
103	17' - 0"	8 7/16" X 10 3/4" X 0.1793"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	25' - 0"	
104	17' - 0"	8 7/16" X 10 3/4" X 0.1793"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	30' - 0"	
105	16' - 2"	8 7/16" X 10 3/4" X 0.25"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	35' - 0"	

Signal Arm Data									
F	End O.D. X Base O.D. X Thick	G	H	I*	J*	K*	L*	M*	
25' - 0"	3 7/8" X 7 5/16" X 0.1793"	16' - 0"	22' - 6"	10 1/2"	11"	1"- 8NC X 2 1/2"	1"	1 1/4"	
30' - 0"	3 7/8" X 8" X 0.1793"	16' - 0"	23' - 0"	10 1/2"	11"	1"- 8NC X 2 1/2"	1"	1 1/4"	
35' - 0"	3 7/8" X 8 11/16" X 0.1793"	15' - 2"	23' - 0"	12"	12"	1 1/4"- 7NC X 3"	1 1/4"	1 1/2"	

NOTES

1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **E-10**

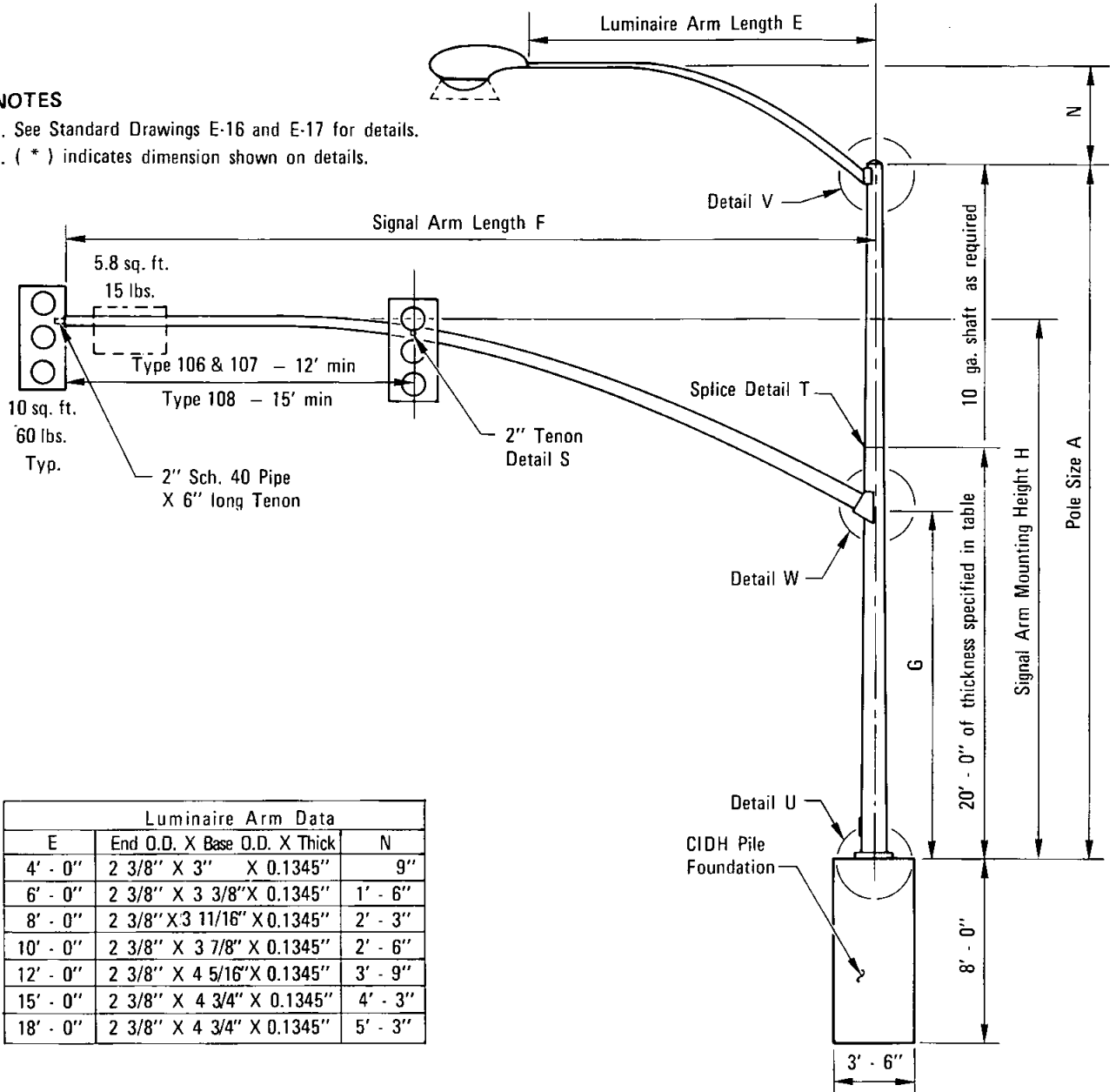
SAN DIEGO REGIONAL STANDARD DRAWING

TRAFFIC SIGNAL STANDARDS TYPES 103, 104 AND 105

Revision	By	Approved	Date

NOTES

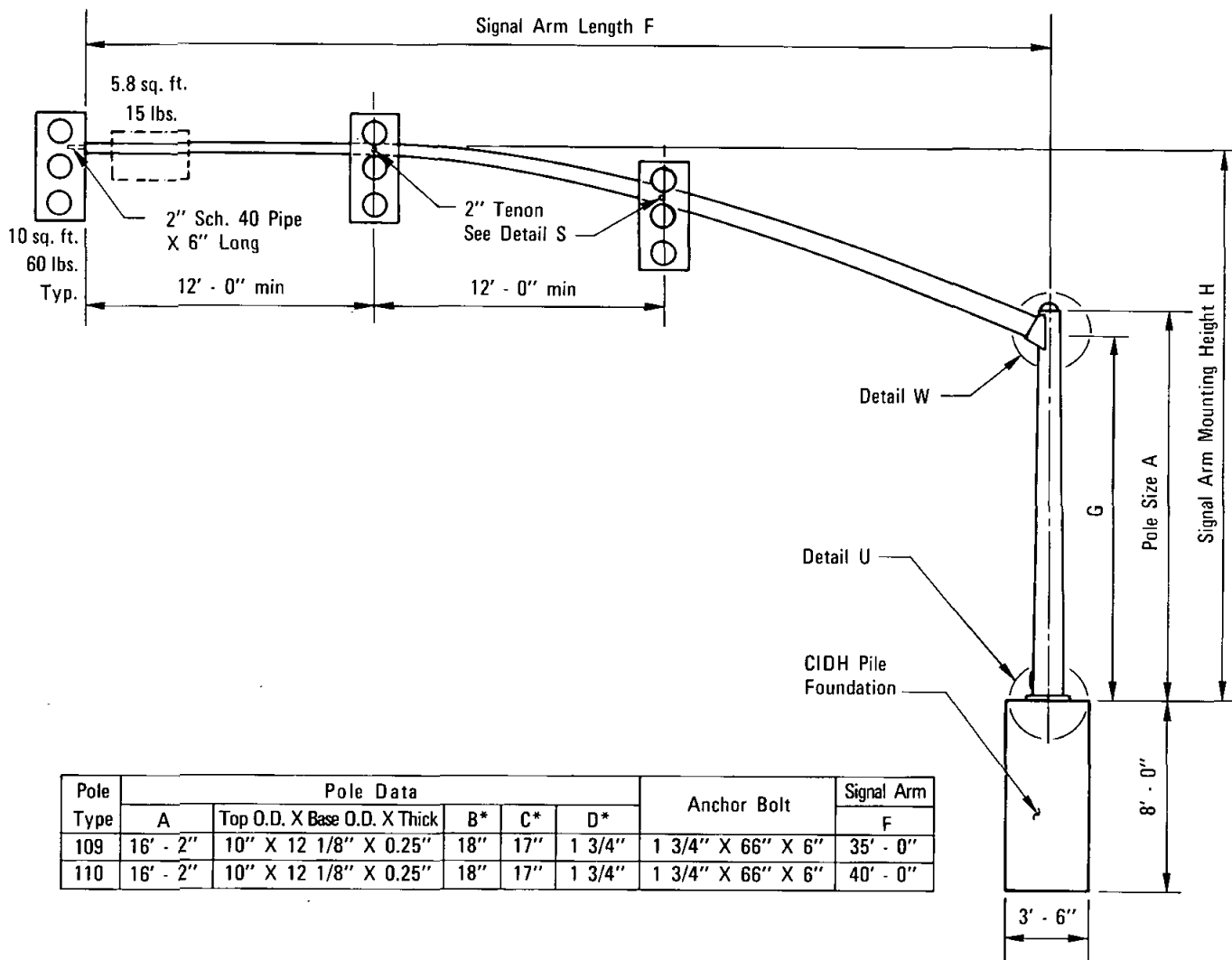
1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.



Pole Type	Pole Data					Anchor Bolt	Luminaire Arm	Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*		E	F
106	30' - 0"	6 5/8" X 10 3/4" X 0.1793"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	4' Thru 18'	25' - 0"
107	30' - 0"	6 5/8" X 10 3/4" X 0.1793"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	4' Thru 18'	30' - 0"
108	30' - 0"	6 5/8" X 10 3/4" X 0.25"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	4' Thru 18'	35' - 0"

Signal Arm Data								
F	End O.D. X Base O.D. X Thick	G	H	I*	J*	K*	L*	M*
25' - 0"	3 7/8" X 7 5/16" X 0.1793"	16' - 0"	22' - 6"	10 1/2"	11"	1" - 8NC X 2 1/2"	1"	1 1/4"
30' - 0"	3 7/8" X 8" X 0.1793"	16' - 0"	23' - 0"	10 1/2"	11"	1" - 8NC X 2 1/2"	1"	1 1/4"
35' - 0"	3 7/8" X 8 11/16" X 0.1793"	15' - 2"	23' - 0"	12"	12"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				TRAFFIC SIGNAL AND STREET LIGHTING STANDARDS - TYPES 106, 107 AND 108		<i>Allan A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
				DRAWING NUMBER		E-11



Pole Type	Pole Data					Anchor Bolt	Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*		F
	109	16' - 2"	10" X 12 1/8" X 0.25"	18"	17"	1 3/4"	1 3/4" X 66" X 6"
110	16' - 2"	10" X 12 1/8" X 0.25"	18"	17"	1 3/4"	1 3/4" X 66" X 6"	40' - 0"

Signal Arm Data									
F	End O.D. X Base O.D. X Thick	G	H	I*	J*	K*	L*	M*	
35' - 0"	3 7/8" X 8 11/16" X 0.25"	15' - 2"	23' - 0"	12"	12"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"	
40' - 0"	3 7/8" X 9 3/8" X 0.25"	15' - 2"	23' - 0"	12"	12"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"	

NOTES

1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Alfred A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

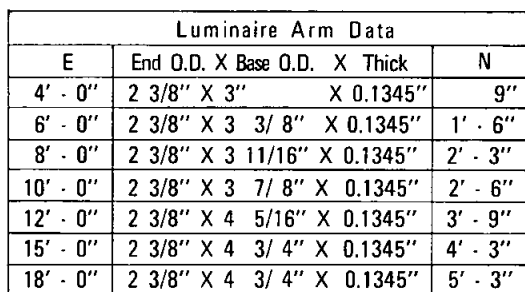
DRAWING
NUMBER **E-12**

SAN DIEGO REGIONAL STANDARD DRAWING

**TRAFFIC SIGNAL STANDARDS
TYPES 109 AND 110**

Revision	By	Approved	Date

1. See Standard Drawings E - 16 and E - 17 for details.
2. (*) indicates dimension shown on details.

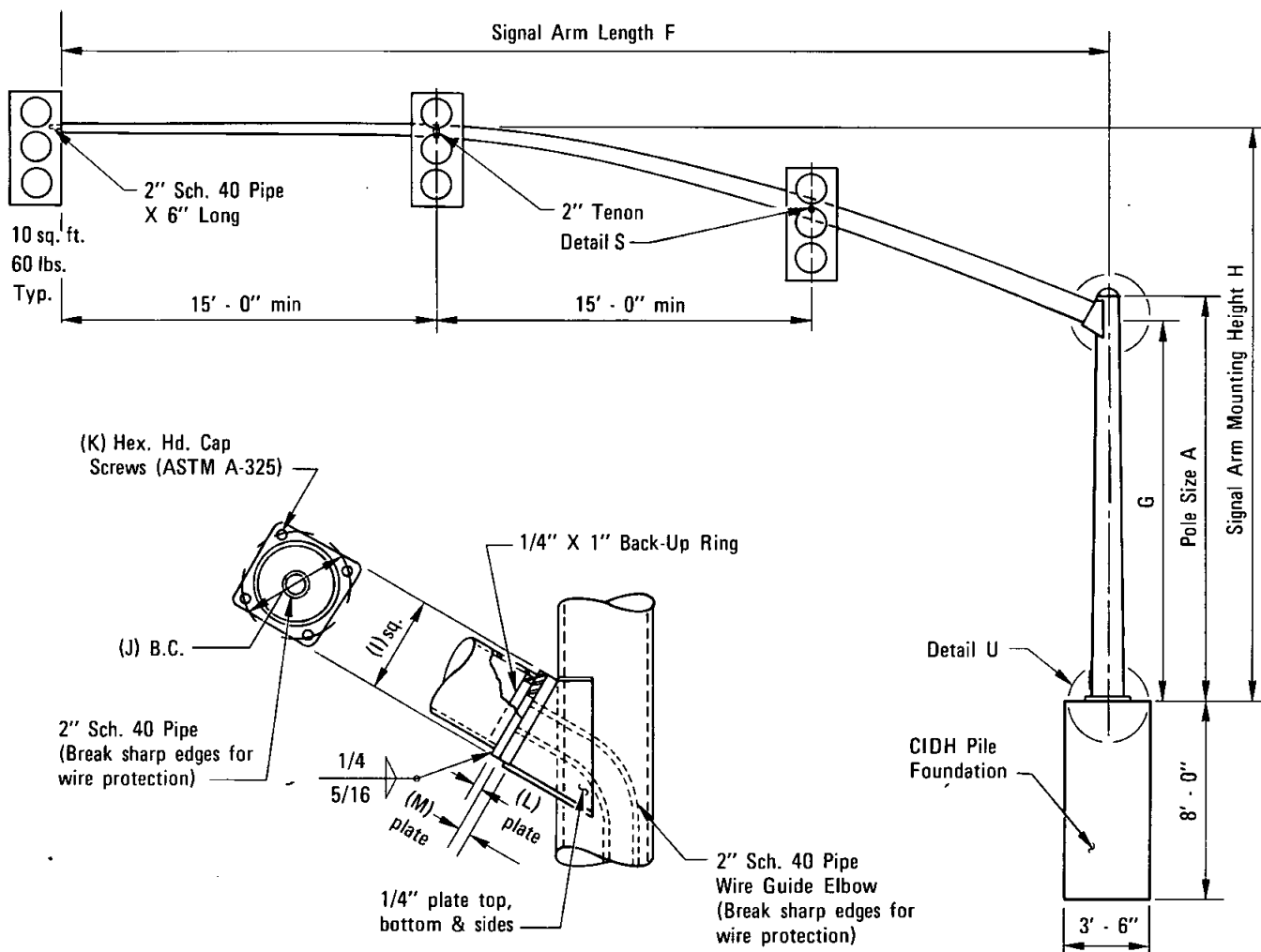


Signal Arm Data										
F	End O.D. X Base O.D.	X Thick	G	H	I*	J*	K*		L*	M*
35' - 0"	3 7/8" X 8 11/16"	X 0.25"	15' - 2"	23' - 0"	12"	12"	1 1/4" - 7NC X 3"		1 1/4"	1 1/2"
40' - 0"	3 7/8" X 9 3/8"	X 0.25"	15' - 2"	23' - 0"	12"	12"	1 1/4" - 7NC X 3"		1 1/4"	1 1/2"

Revision	By	Approved	Date

TRAFFIC SIGNAL AND STREET LIGHTING STANDARDS - TYPES 111 AND 112

**DRAWING
NUMBER** **E-13**



SIGNAL ARM CONNECTION

Pole Type	Pole Data					Anchor Bolt	Signal Arm F
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*		
113	16' - 2"	9 15/16" X 12 1/8" X 0.25"	18"	17"	1 3/4"	1 3/4" X 60" X 6"	45' - 0"

Signal Arm Data								
F	End O.D. X Base O.D. X Thick	G	H	I	J	K	L	M
45' - 0"	3 7/8" X 10 1/16" X 0.25"	15' - 2"	22' - 6"	13"	13"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"

NOTES

- See Standard Drawings E-16 and E-17 for details.
- (*) indicates dimensions shown on details.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Alfred A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

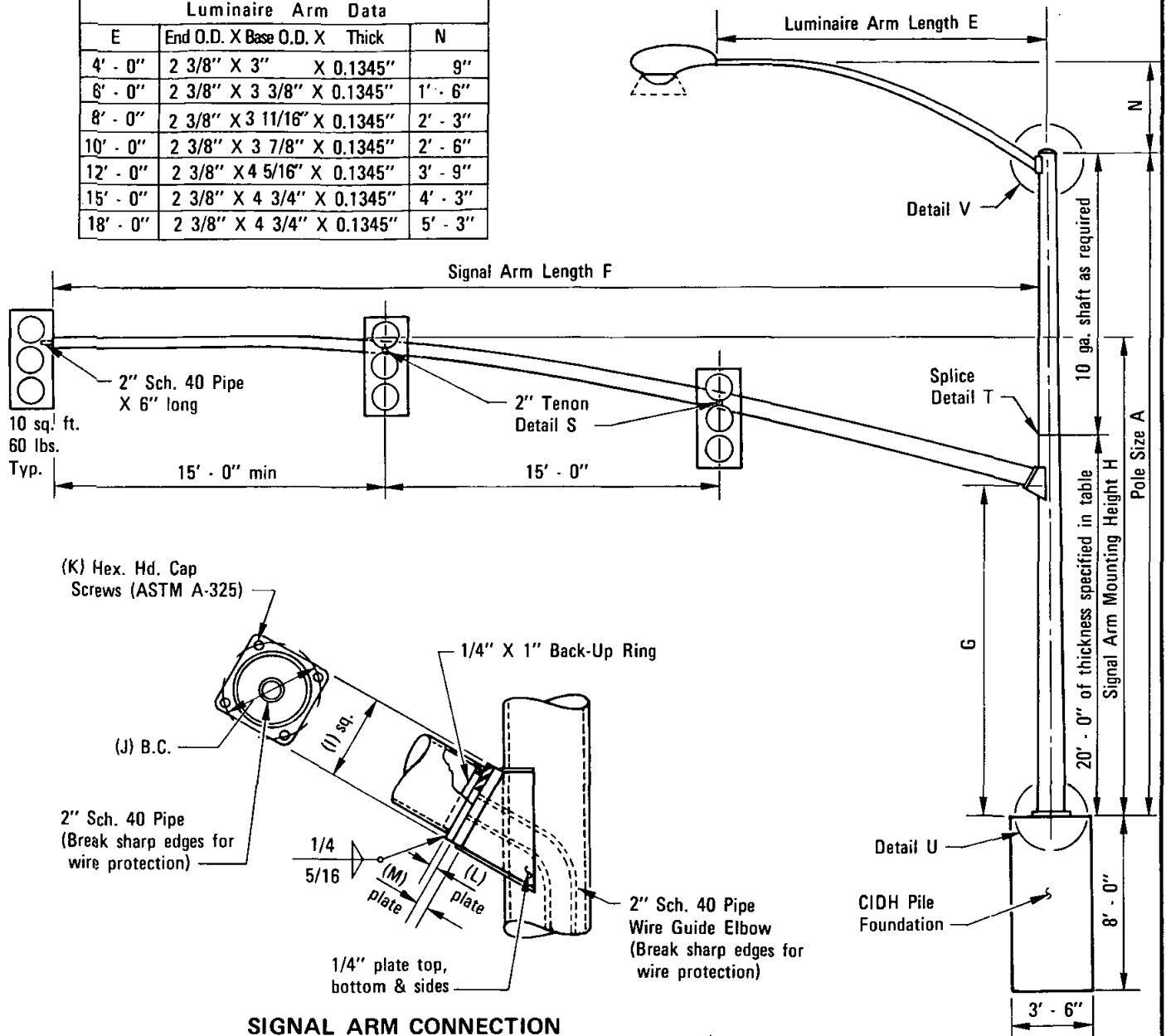
SAN DIEGO REGIONAL STANDARD DRAWING

TRAFFIC SIGNAL STANDARD TYPE 113

DRAWING
NUMBER **E-14**

Revision	By	Approved	Date

Luminaire Arm Data			
E	End O.D. X Base O.D. X Thick	N	
4' - 0"	2 3/8" X 3" X 0.1345"	9"	
6' - 0"	2 3/8" X 3 3/8" X 0.1345"	1' - 6"	
8' - 0"	2 3/8" X 3 11/16" X 0.1345"	2' - 3"	
10' - 0"	2 3/8" X 3 7/8" X 0.1345"	2' - 6"	
12' - 0"	2 3/8" X 4 5/16" X 0.1345"	3' - 9"	
15' - 0"	2 3/8" X 4 3/4" X 0.1345"	4' - 3"	
18' - 0"	2 3/8" X 4 3/4" X 0.1345"	5' - 3"	



SIGNAL ARM CONNECTION

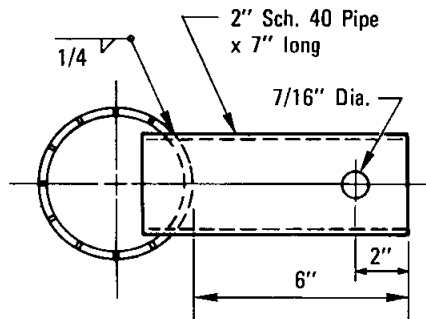
Pole Type	Pole Data						Anchor Bolt	Luminaire Arm		Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*			E	F	
114	30' - 0"	8" X 12 1/8" X 0.25"	18"	17"	1 3/4"	1 3/4" X 60" X 6"	1 3/4" X 60" X 6"	4' - 0" Thru 18' - 0"	45' - 0"	
115	35' - 0"	7 1/8" X 12 1/8" X 0.25"	18"	17"	1 3/4"	1 3/4" X 60" X 6"	1 3/4" X 60" X 6"	4' - 0" Thru 18' - 0"	45' - 0"	

Signal Arm Data									
F	End O.D. X Base O.D. X Thick	G	H	I	J	K	L	M	
45' - 0"	3 7/8" X 10 1/16" X 0.25"	15' - 2"	22' - 6"	13"	13"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"	

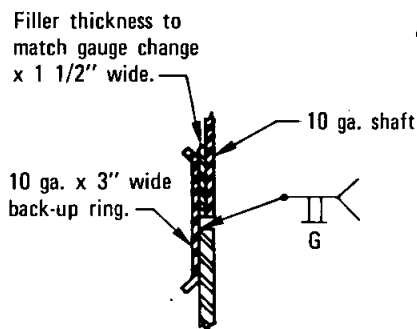
NOTES

- See Standard Drawings E-16 and E-17 for details.
- (*) indicates dimension shown on details.

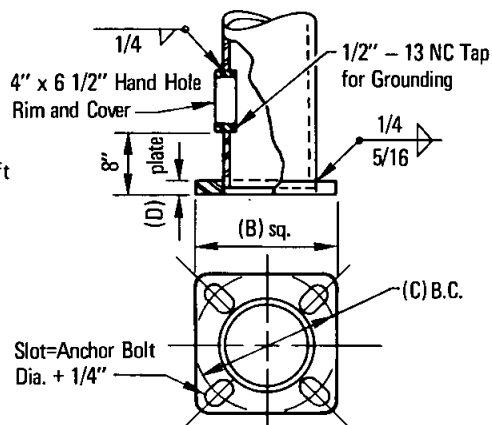
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				TRAFFIC SIGNAL AND STREET LIGHTING				<i>Allan A. Kuehn</i> Dec. 1975	
				STANDARDS - TYPES 114 AND 115				Coordinator R.C.E. 19807 Date	
								DRAWING NUMBER	
								E-15	



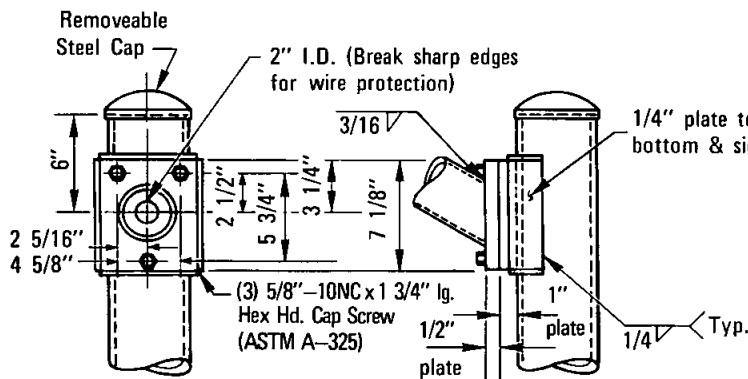
MID - MOUNTED TENON DETAIL
DETAIL-S



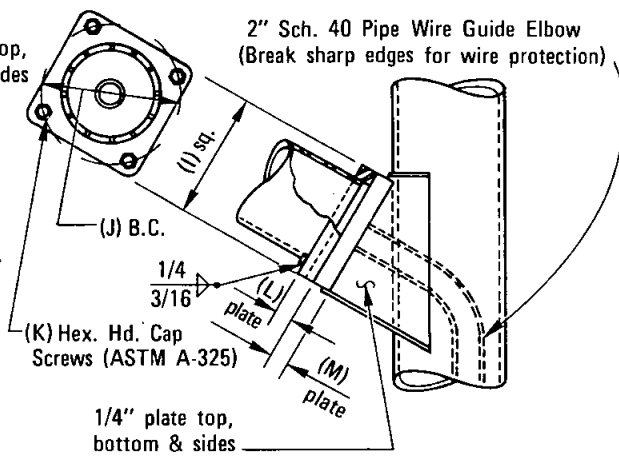
SPLICE DETAIL
DETAIL-T



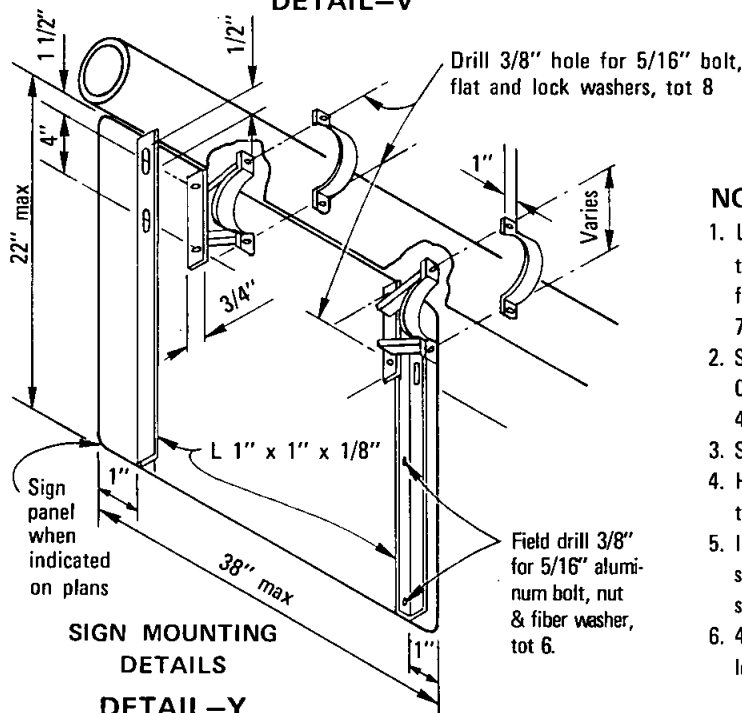
BASE DETAIL
DETAIL-U



LUMINAIRE ARM CONNECTION
DETAIL-V



SIGNAL ARM CONNECTION
DETAIL-W



SIGN MOUNTING
DETAILS
DETAIL-Y

NOTES

1. Luminaire arms shall be round, tapered steel tubes, maximum taper 0.14 inches per foot, with an end section 2 3/8" O.D. for mounting hardware. Extensions of 2" standard pipe about 7" long may be used at the option of the manufacturer.
2. Signal arms shall be round, tapered steel tubes, maximum taper 0.14 inches per foot. Extensions of 2" standard pipe about 4" long may be added to accommodate signal mounting hardware.
3. Sheet and plate thickness shown is nominal thickness.
4. Handhole reinforcement ring to be 1/4" X 1 1/2" for 0.1345" to 0.2500" poles, 3/8" X 2" for 0.3125".
5. In lieu of the torque requirements for H.S. bolts, cap screws shall be tightened by the turn-of-nut method 1/6 turn from a snug tight condition. No washer will be required.
6. 4 anchor bolts are required for each pole. Provide a hex nut, leveling nut and 2 washers for each anchor bolt.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

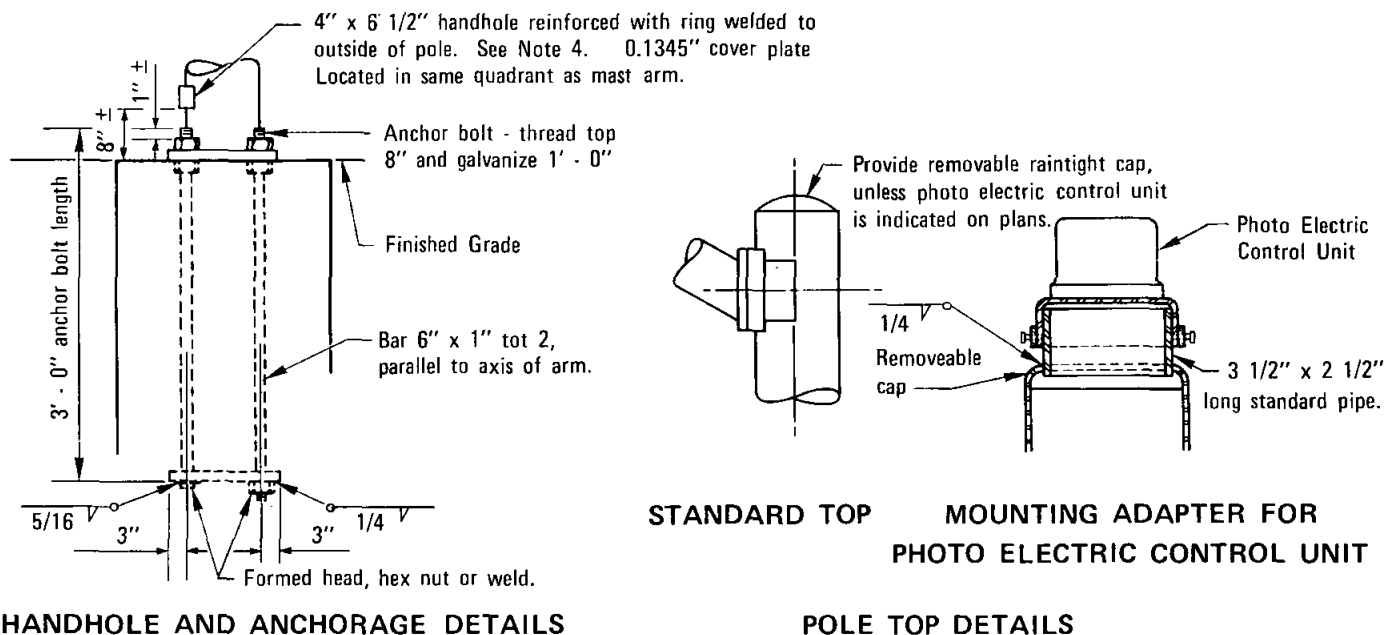
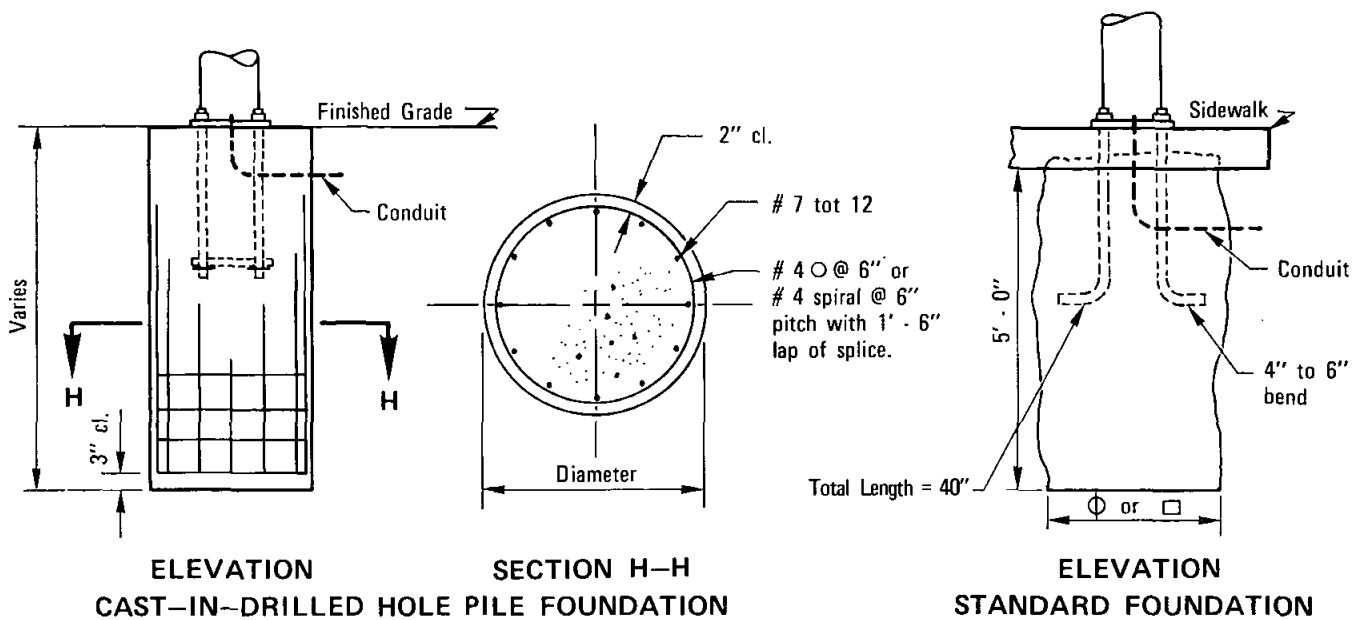
Allen A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **E-16**

SAN DIEGO REGIONAL STANDARD DRAWING

**TRAFFIC SIGNAL AND
STREET LIGHTING DETAILS**

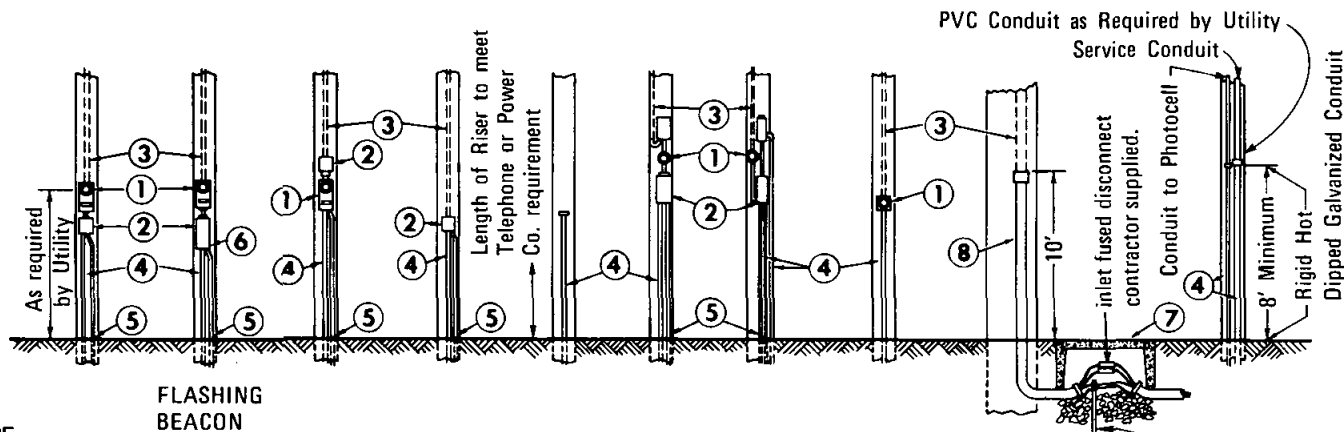
Revision	By	Approved	Date



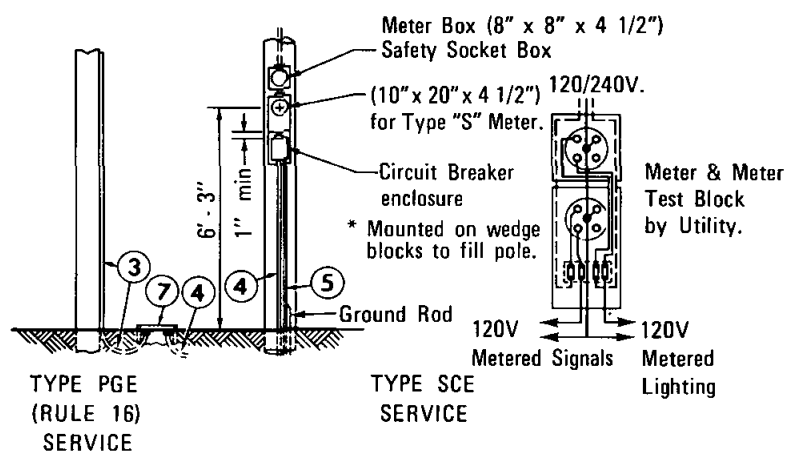
NOTES

1. Luminaire arms shall be round, tapered steel tubes, maximum taper 0.14 inches per foot, with an end section, 2 3/8" O.D., for mounting hardware. Extensions of 2" standard pipe about 7" long may be used at the option of the manufacturer.
2. Signal arms shall be round, tapered steel tubes, maximum taper 0.14 inches per foot. Extensions of 2" standard pipe about 4" long may be added to accommodate signal mounting hardware.
3. Sheet and plate thickness shown is nominal thickness.
4. Handhole reinforcement ring to be 1/4" X 1 1/2" for 0.1345" to 0.2500" poles, 3/8" X 2" for 0.3125".
5. In lieu of the torque requirements for H.S. bolts, cap screws shall be tightened by the turn-of-nut method 1/6 turn from a snug tight condition. No washer will be required.
6. 4 anchor bolts are required for each pole. Provide a hex nut, leveling nut and 2 washers for each anchor bolt.

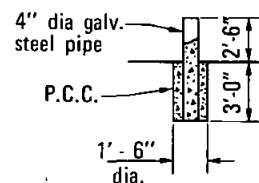
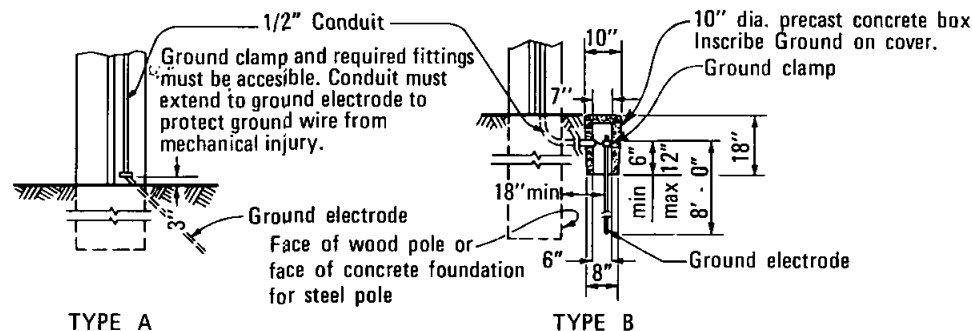
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				TRAFFIC SIGNAL AND STREET LIGHTING DETAILS		<i>Alfred A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	E-17



TYPE SERVICE: A B E F H J & JM JMA K LA SMUD



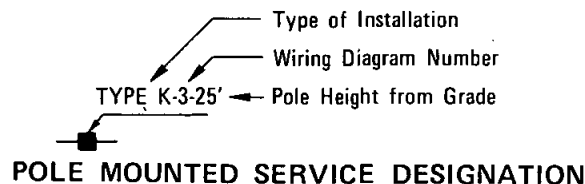
- ① Meter socket
- ② Service enclosure 60 amp. size minimum, unless otherwise shown
- ③ Agency owned pole. Service riser and all other required equipment furnished and installed by Contractor.
- ④ Conduit, size as required.
- ⑤ Ground conduit, 1/2" C, 1-# 6 AWG bare copper. See "Service Grounding" detail.
- ⑥ Flashing Beacon Control
- ⑦ Service pull box (# 5 w/ext. unless otherwise noted) furnished and installed by Contractor. Exact location determined by utility.
- ⑧ 2" rigid metal conduit furnished and installed by Contractor.



GUARD POST

SERVICE GROUNDING

(Use where serving utility requires 18" between electrode and pole.) Installation shown is for sidewalk or paved areas. Omit special box and locate ground clamp above ground in unpaved areas, or locate ground clamp in nearest electrical pullbox.



RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allan A. Kuehnel Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER E-18

SAN DIEGO REGIONAL STANDARD DRAWING

POLE MOUNTED
SERVICE INSTALLATIONS

Revision	By	Approved	Date

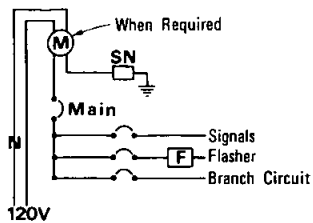


DIAGRAM 1
METERED OR UNMETERED

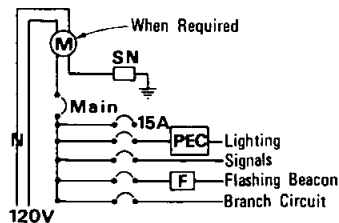


DIAGRAM 2
METERED OR UNMETERED

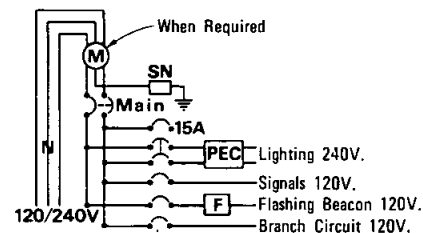


DIAGRAM 3
METERED OR UNMETERED

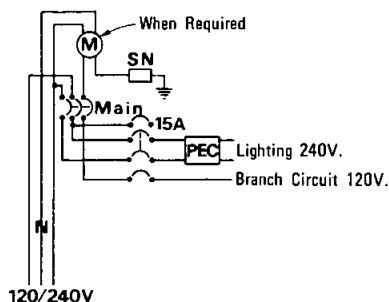


DIAGRAM 4
METERED & UNMETERED

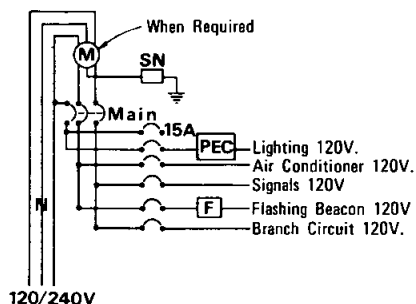


DIAGRAM 5
METERED & UNMETERED

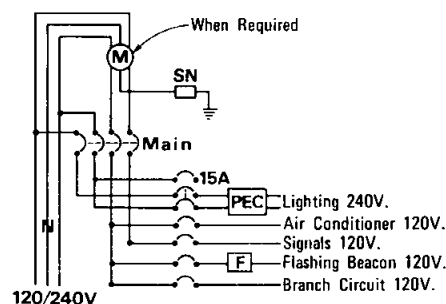


DIAGRAM 6
METERED & UNMETERED

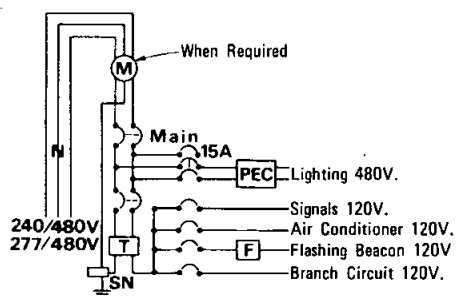


DIAGRAM 7
METERED & UNMETERED

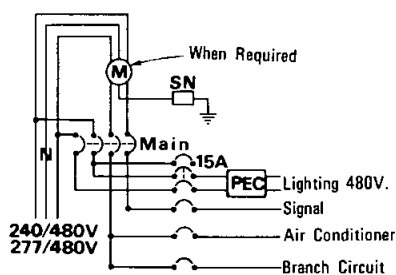


DIAGRAM 8
METERED & UNMETERED

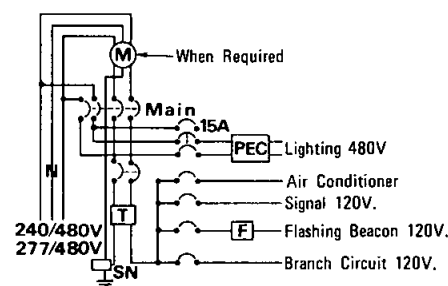
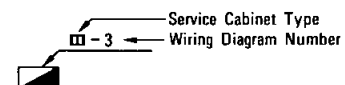


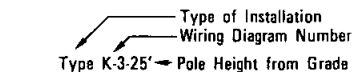
DIAGRAM 9
METERED & UNMETERED

NOTES

1. For sodium vapor luminaires 2 meters required.
2. Use ground fault interrupter for receptacle outlet.

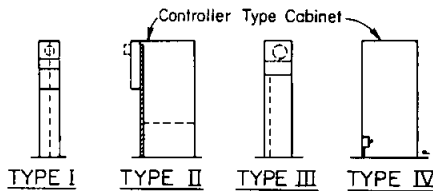


SERVICE CABINET DESIGNATION



POLE-MOUNTED SERVICE DESIGNATION

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
						<i>Allen A. Kuehn</i>	<i>Dec. 1975</i>
				SERVICE EQUIPMENT WIRING DIAGRAMS		Coordinator R.C.E. 19807	Date
						DRAWING NUMBER	E-19

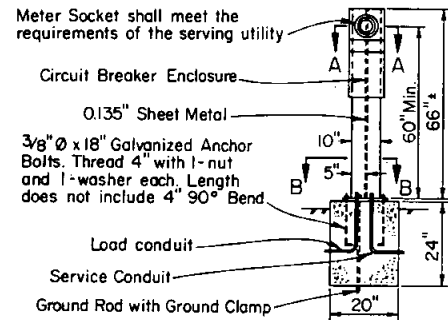


TYPES OF SERVICE (TYPICAL)

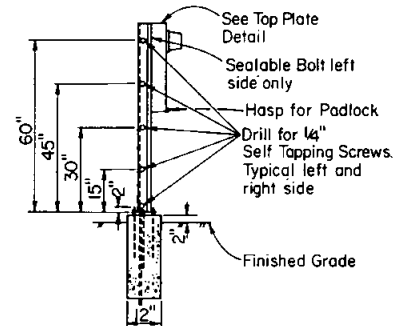
- Type I Service Equipment Cabinet mounted on Pedestal Type Wiring Gutter.
 Type II Service Equipment Cabinet mounted on side of a Controller Type Cabinet.
 Type III & III-A Complete Free-Standing Service Equipment Cabinet.
 Type IV Service Disconnect mounted inside a Controller Type Cabinet.

EQUIPMENT ENCLOSURES NOTES

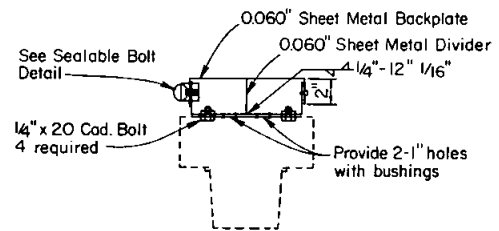
- Service Equipment Enclosures shall meet the requirements of the serving utility.
- Service Equipment Cabinets shall be pre-wired and conform to NEMA Standards.
- All Control Wiring shall be No. 14 TW 19-Strand Machine Tool Wire unless otherwise noted.
- Each Service Equipment Cabinet shall be provided with engraved phenolic name plate on the Dead Front Panel for each Breaker installed and the Service Point Number and Voltage on the Front Exterior.
- A Plastic Coated Wiring Diagram shall be provided and attached to the inside of Front Door.
- All Service Equipment Cabinets shall be NEMA 3-R Construction and shall be provided with Dead Front Panel and provisions for padlocking.
- All equipment supplied shall be a currently manufactured item.
- Type I and II Service Equipment Cabinets shall be provided with Dead Front Panels and Outside Top-Hinged Raintight Covers removable without the use of tools.
- Service conductors installed within a Controller Cabinet (Type II or IV) shall be encased in flexible conduit. Grounding shall be similar to that shown for Type III.
- When the Utility provides both metered and unmetered circuits, the Service Cabinet shall be provided with a separate bus for each circuit.
- In unpaved areas, a raised PCC pad of 24"x4"x width of foundation shall be placed in front of Type I and III Service.
- Circuit Breakers with Ratings shown on the Plans (and the 15-amp Breaker for the Photoelectric Control, if required) shall be installed in each Service Cabinet.
- At least 8 standard single pole circuit breaker spaces (3 1/4" nominal) shall be provided in Type III and III-A service cabinets. This shall include silver plated copper busing and mounting hardware. Busing shall be rated at 125 amp minimum.
- Type III - A Service Equipment Cabinet shall have at least 1 sq. ft. of combined net area of ventilation openings.



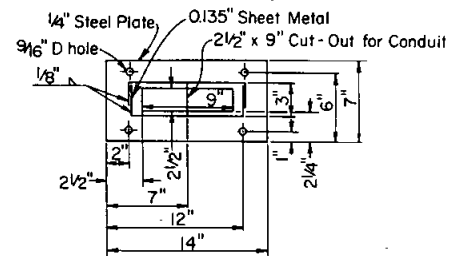
FRONT



LEFT SIDE
TYPE I SERVICE

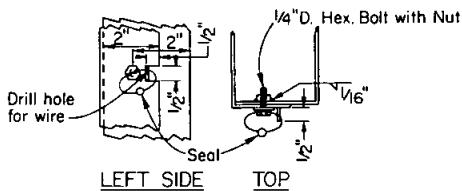
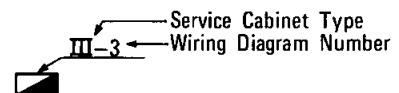


SECTION A-A

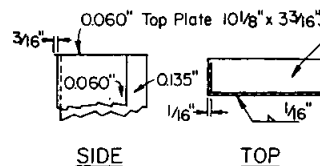


SECTION B-B

LEGEND ON PLANS



SEALABLE BOLT DETAIL



TOP PLATE DETAIL
(TYPICAL)

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen J. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

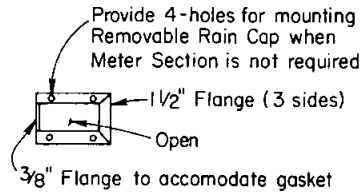
DRAWING
NUMBER **E-20**

SAN DIEGO REGIONAL STANDARD DRAWING

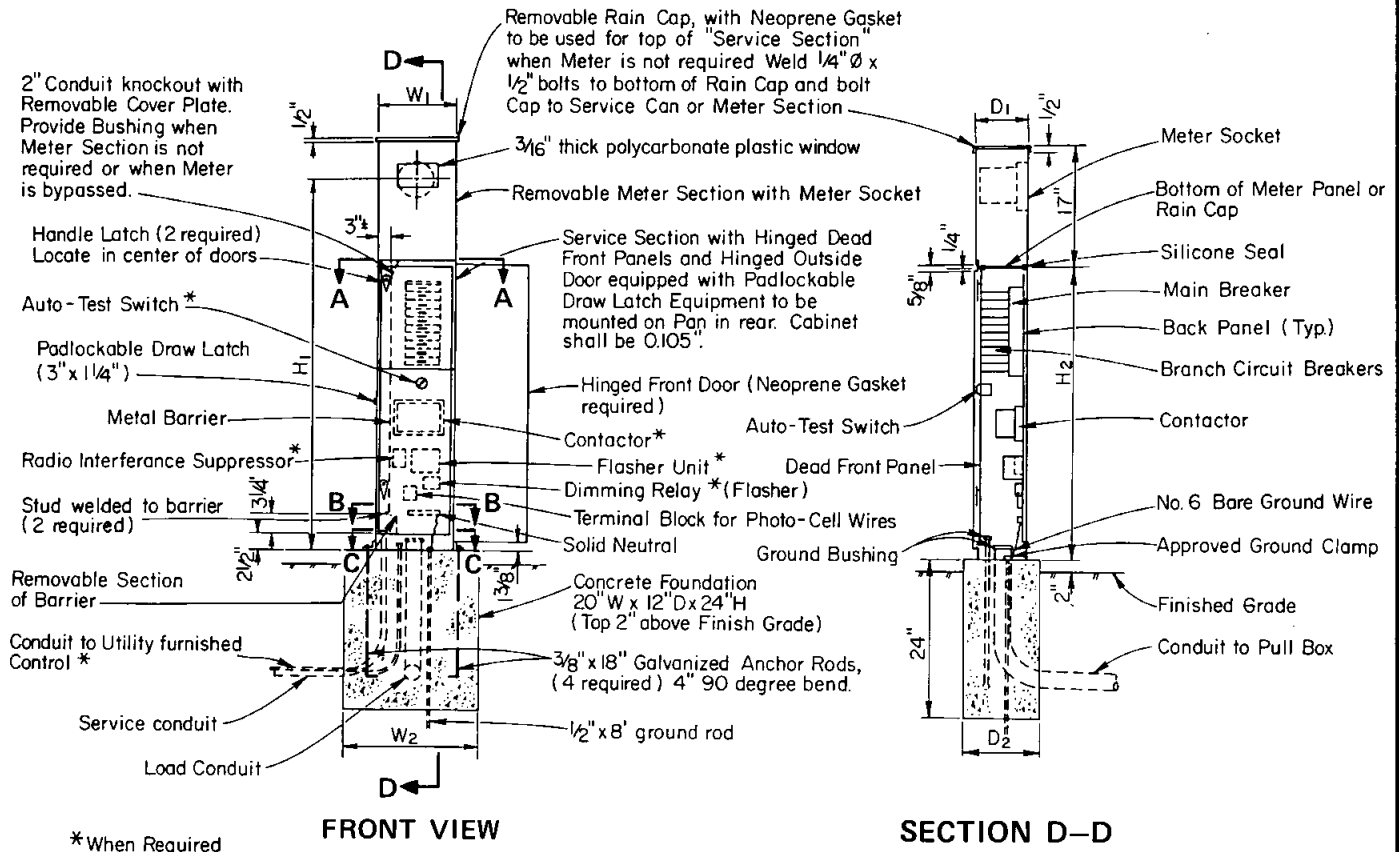
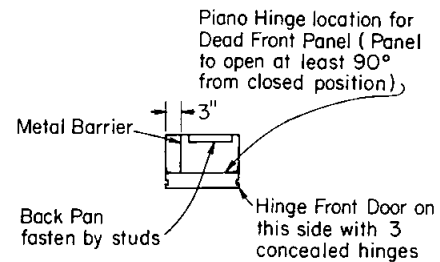
SERVICE EQUIPMENT CABINETS

Revision	By	Approved	Date

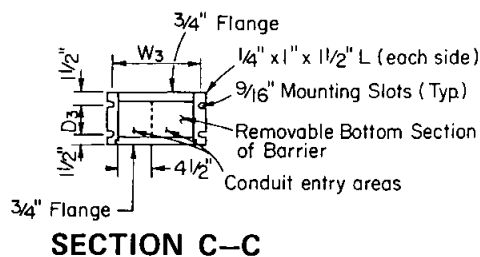
SECTION A-A



SECTION B-B



TYPE III & III-A SERVICE
(Type III Shown)



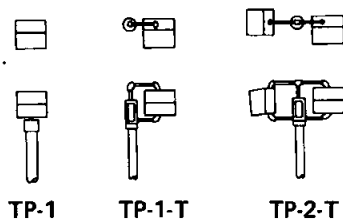
DIMENSION TABLE

TYPE	W ₁	W ₂	W ₃	H ₁	H ₂	D ₁	D ₂	D ₃
III	12"	20"	14"	54"	43"	8"	12"	4"
III - A	16"	24"	18"	64"	53"	12"	17"	9"

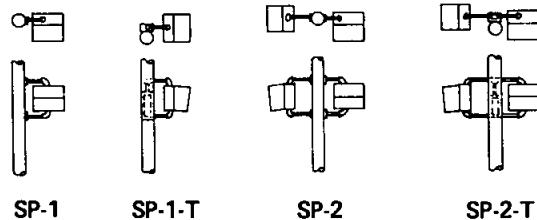
NOTE

See Standard Drawing E-20 for notes.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				SERVICE EQUIPMENT CABINETS				<i>Allan A. Kuehn</i> <i>Dec. 1975</i>	
								Coordinator R.C.E. 19807 Date	
								DRAWING NUMBER E-21	

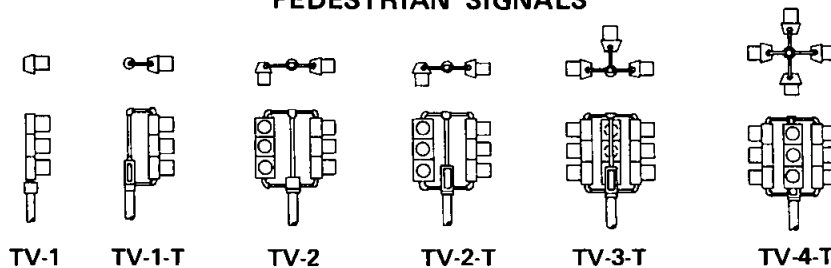


TOP MOUNTINGS

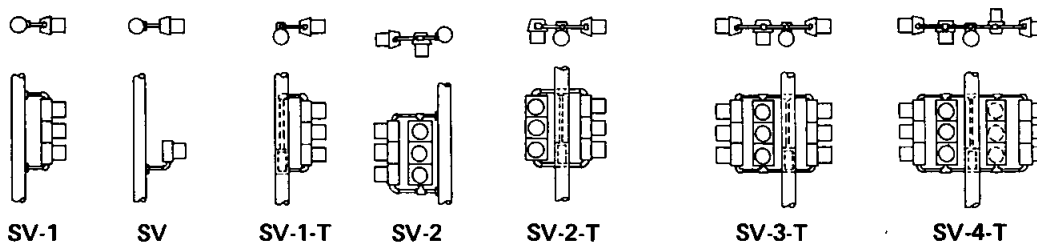


SIDE MOUNTINGS

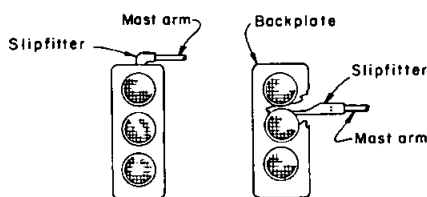
PEDESTRIAN SIGNALS



TOP MOUNTINGS

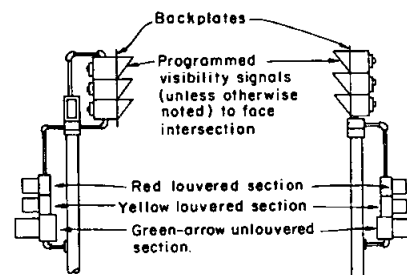


SIDE MOUNTINGS

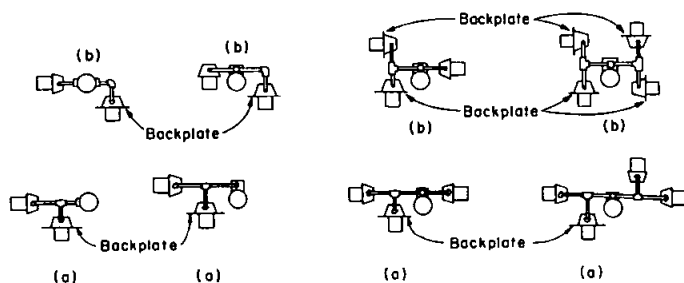


MAT
Top
attachment
MAS
Side
attachment
MAST ARM MOUNTINGS

VEHICULAR SIGNALS



LT-2-T **LT-2**
LEFT TURN MOUNTINGS



Typical bracket
arrangements
when backplates
are used.

NOTE

See Standard Drawing E-23 for
notes and additional details.

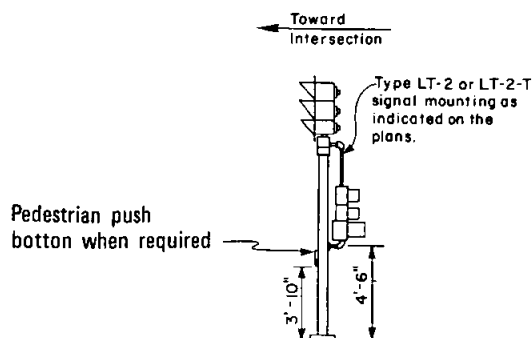
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE
Allan Q. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

SIGNAL HEADS AND MOUNTINGS

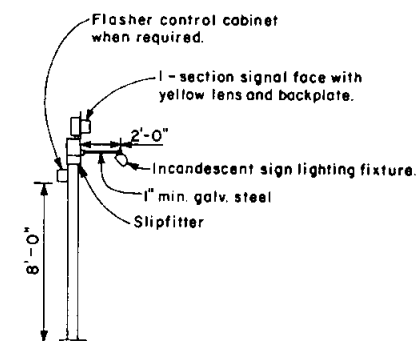
**DRAWING
NUMBER E-22**

Revision	By	Approved	Date



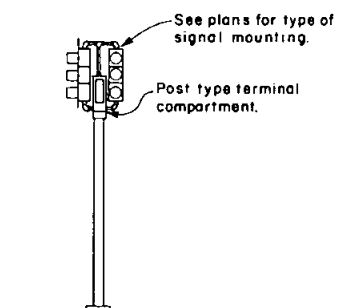
LEFT TURN LANE SIGNALS (LT)

Type 1A,1B or 1C standard as indicated on the plans



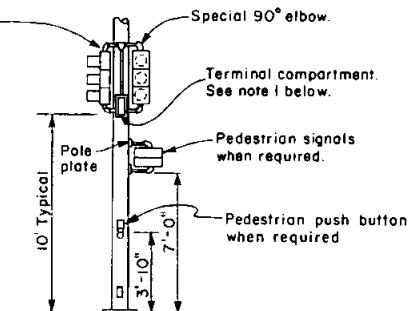
ADVANCE FLASHING BEACON INSTALLATION

Type 1A,1B or 1C standard as indicated on the plans



TOP MOUNTED SIGNALS (TV)

Type 1A,1B or 1C standard as indicated on the plans



SIDE MOUNTED SIGNALS (SV & SP)

Normally used on standards with luminaire and/or signal mast arm

TYPICAL SIGNAL INSTALLATIONS

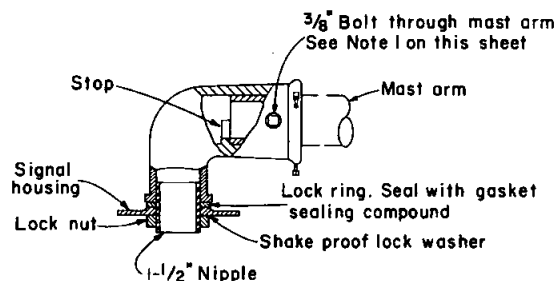
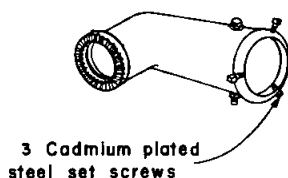
ABBREVIATIONS

TV	Top mounted Vehicular signals
TP	Top mounted Pedestrian signals
SV	Side mounted Vehicular signals
SP	Side mounted Pedestrian signals
MAT	Mast Arm mounted vehicular signals Top attachment
MAS	Mast Arm mounted vehicular signals Side attachment
LT	Left Turn signals
T	Terminal compartment
1,2,3,4	Number of signal faces (3-section unless otherwise indicated)

NOTES

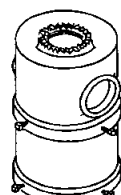
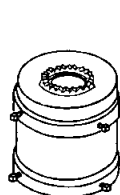
1. Mountings shall be oriented to provide maximum horizontal clearance to adjacent roadway.
2. Pedestrian signals shall be positioned on the side of standard nearest crosswalk controlled.
3. Bracket arms shall be long enough to permit proper alignment of signals and backplate installation.
4. See Standard Drawing E-24 for attachment fitting details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				SIGNAL HEADS AND MOUNTINGS		<i>Allan A. Kerschman</i> <i>Dec. 1975</i>
						Coordinator R.C.E. 19807 Date
						DRAWING NUMBER
						E-23



MAST ARM MOUNTING - TYPE "MAT"

For 2" pipe - See Note 1

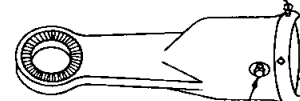


1 to 4 openings as required

TOP MOUNTING

For 4" pipe - See Note 2

3 Cadmium plated steel set screws

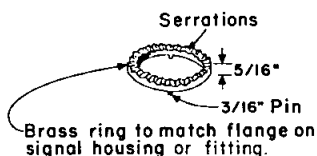


3/8" Bolt, See Note 1 on this sheet

MAST ARM MOUNTING TYPE "MAS"

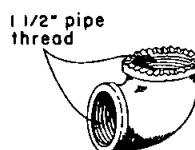
For 2" pipe - See Note 1

SIGNAL SLIP-FITTERS



LOCK RING

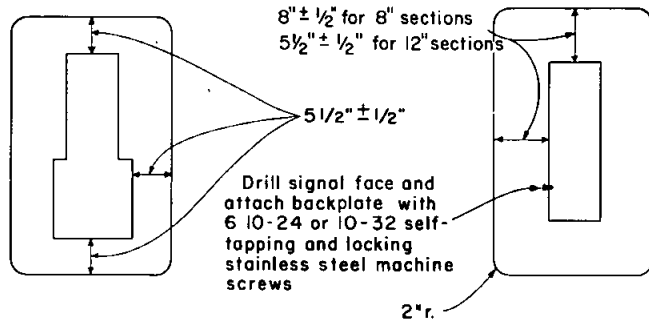
Use where locking ring is not integral with signal housing or fitting.



SPECIAL 90° ELBOW

One for each face, except those with special slip-fitter mounting.

MISCELLANEOUS MOUNTING HARDWARE



FOR COMBINATION 8" & 12" SECTIONS

FOR 8" & 12" SECTIONS

BACKPLATE

0.051" gage or heavier
3003-14 aluminum sheet.

NOTES

- After mast arm signal has been plumbed and secured, drill 7/16" hole through mast arm in line with slip-fitter hole. Place a 3/8" galvanized bolt with washer under bolt head through hole and secure with nut and lock nut.
- (a) Threaded top mounted slip fitter openings shall be 1 1/2" I.P.S.
(b) Serrations in fittings shall match those on bottom of signal heads or in lock ring.
(c) Top opening shall be offset when backplate is used.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

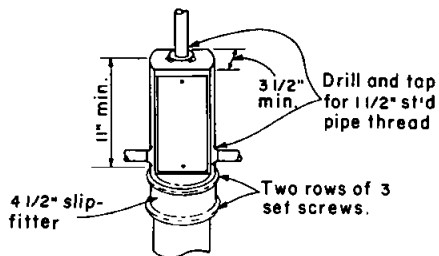
SAN DIEGO REGIONAL STANDARD DRAWING

**SIGNAL HEADS AND MOUNTINGS
DETAILS**

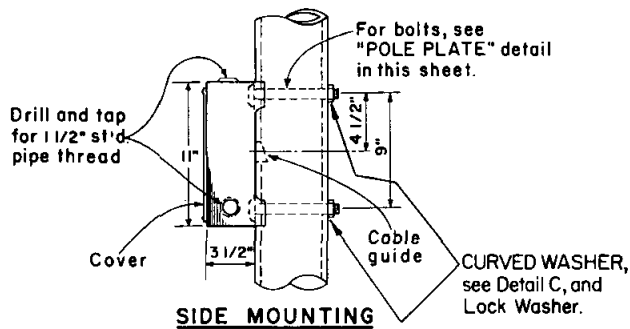
DRAWING
NUMBER

E-24

Revision By Approved Date

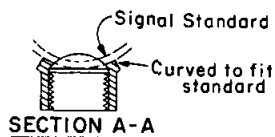


TOP MOUNTING

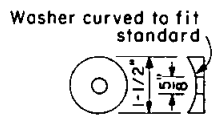


SIDE MOUNTING

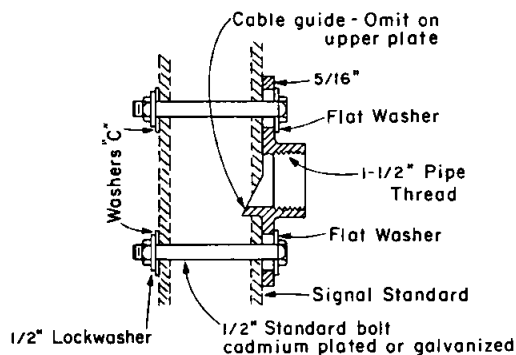
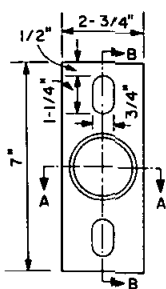
TERMINAL COMPARTMENTS



SECTION A-A

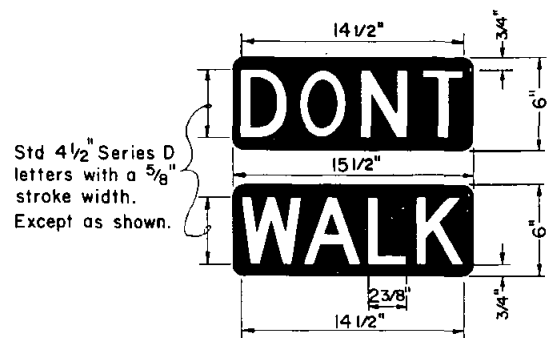


WASHER DETAIL "C"

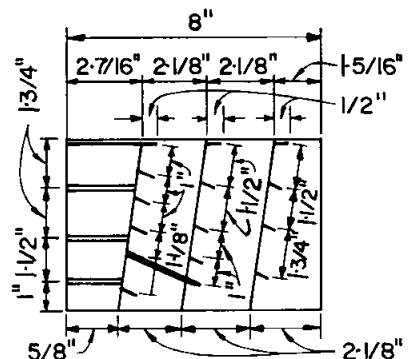


SECTION B-B

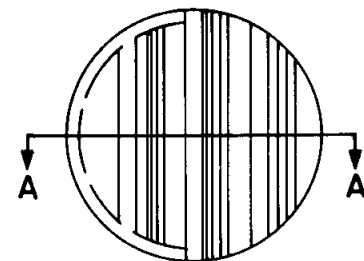
POLE PLATE
For Side Mountings



**PEDESTRIAN SIGNAL FACE
MESSAGES**



SECTION A-A

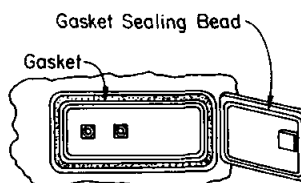
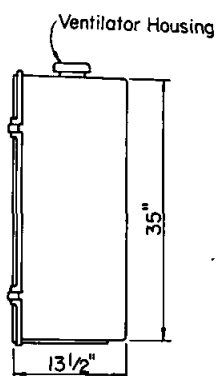
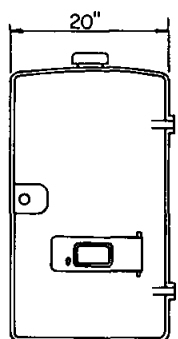
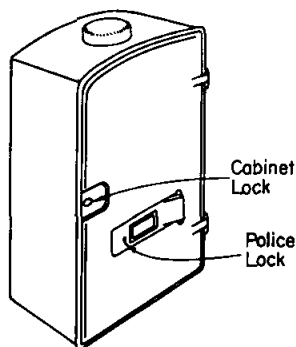


**FRONT VIEW
DIRECTIONAL LOUVER**

NOTE

Directional louvers shall be oriented as directed by the Engineer and secured in place with one plated brass machine screw and nut.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				SIGNAL HEADS AND MOUNTINGS DETAILS		<i>Allen G. Kuehn</i> <i>Dec. 1975</i>	
						Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER	
						E-25	



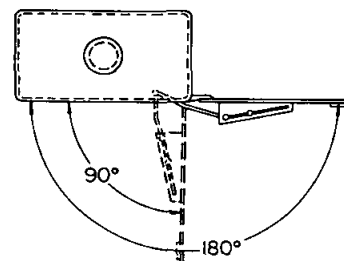
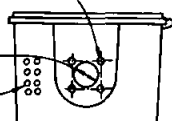
POLICE PANEL

NOTE

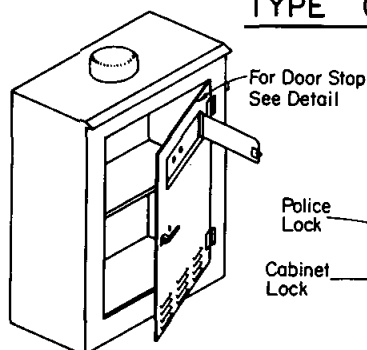
See Standard Drawing E-28 for additional notes and details.

See note 12, Drawing E-28

3" Dia. Min.
Screened Vent, see note 11, drawing E-28

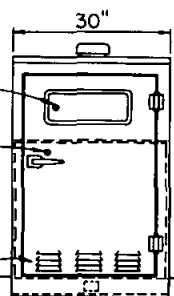


PLAN VIEW SHOWING 2 POSITION DOOR STOP



TYPE G CABINET

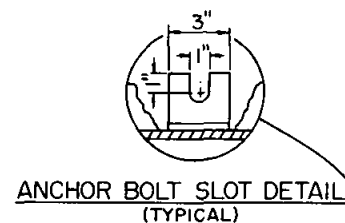
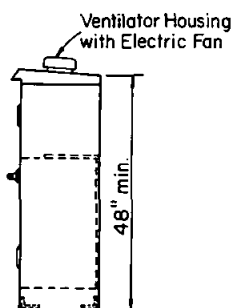
Police Lock
Cabinet Lock



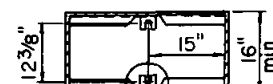
Filtered Ventilating Louvers

A

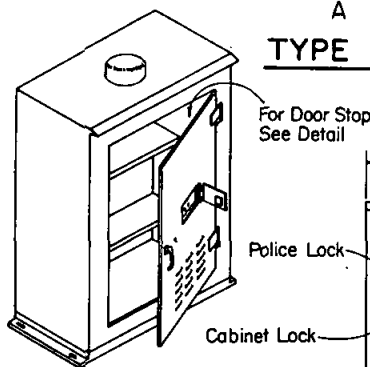
A



ANCHOR BOLT SLOT DETAIL (TYPICAL)

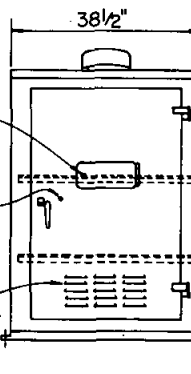


SECTION A-A



TYPE M CABINET

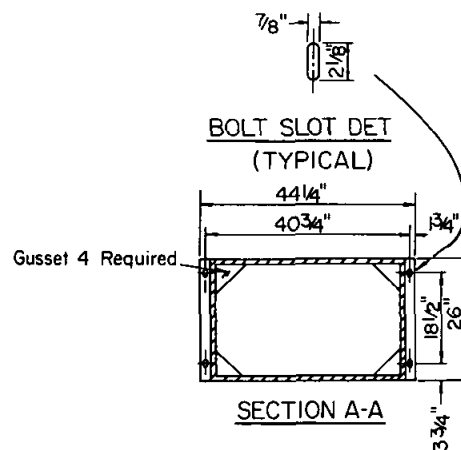
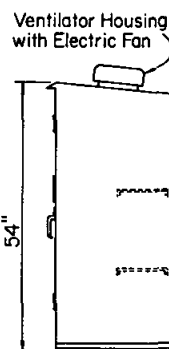
Police Lock
Cabinet Lock



Filtered Ventilating Louvers

A

A



BOLT SLOT DET (TYPICAL)

SECTION A-A

TYPE P CABINET

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

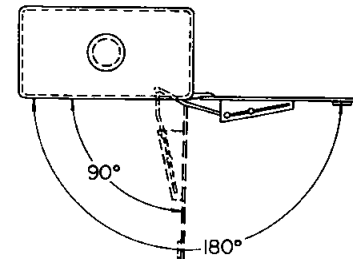
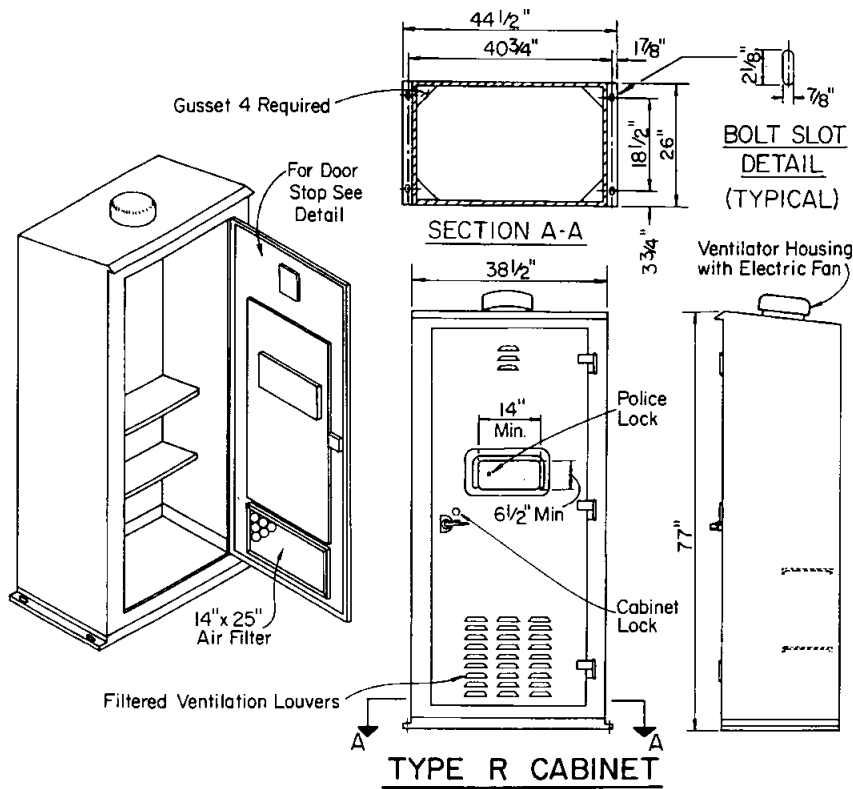
SAN DIEGO REGIONAL STANDARD DRAWING

CONTROLLER CABINETS

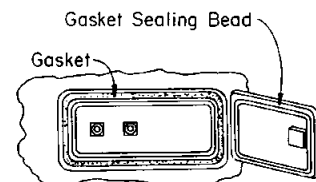
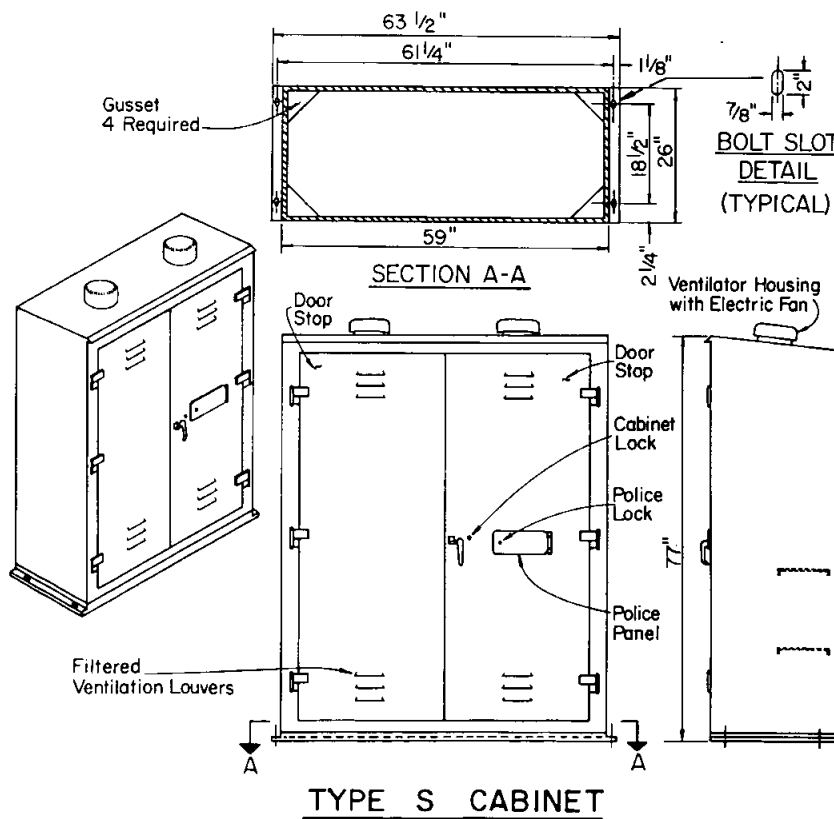
DRAWING
NUMBER

E-26

Revision	By	Approved	Date



**PLAN VIEW SHOWING
2 POSITION DOOR STOP**

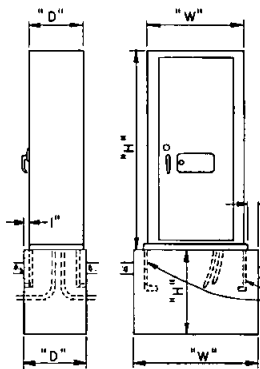


POLICE PANEL

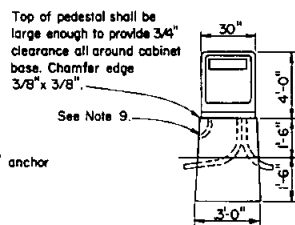
NOTE

See Standard Drawing E-28 for additional notes and details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
						<i>Allan A. Knechtel</i>	<i>Dec. 1975</i>
				CONTROLLER CABINETS		Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER E-27	



TYPICAL CABINET

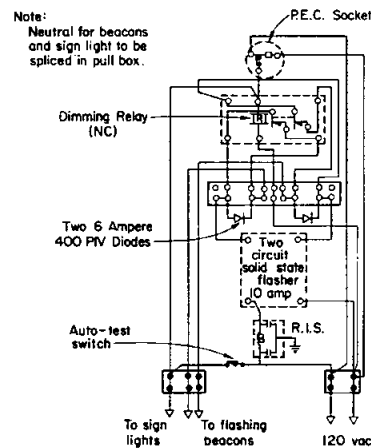


P.C.C. PEDESTAL FOUNDATION
FOR TYPE M CABINET

CABINET TYPE	FOUNDATION			BOLT MOUNTING	
	H	W	D	D	W
G	35"	20"	13 3/8"	36"	24"
M	48"	30"	16"	36"	22"
P	54"	38 1/2"	26"	24"	50"
R	77"	38 1/2"	26"	24"	50"
S	77"	59"	26"	24"	70"

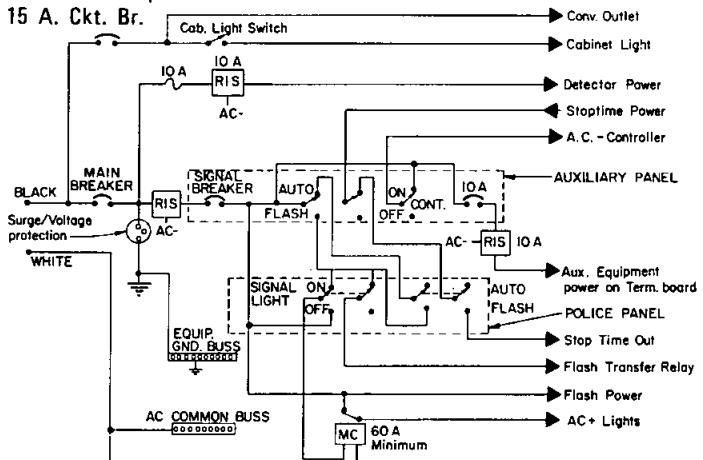
NOTES — CONTROLLER CABINETS

- All cabinet dimensions are nominal.
- Foundations shall be located to provide 2'-0" minimum clearance between face of curb and back of cabinet.
- All anchor bolts shall be bonded to conduit.
- Where telephone interconnect equipment is specified, a minimum of 5 inches clear vertical space shall be provided inside the cabinet for the equipment.
- Telephone interconnect conductors shall be enclosed in a 3/4" or larger conduit through the cabinet foundation. Flexible metal conduit shall be used to separate telephone and power conductors in cabinets and pedestals. Telephone conduit shall terminate in a pull box for interconnect conductors only.
- In unpaved areas, a raised P.C.C. pad shall be placed in front of each controller cabinet. Pad shall be 3'-0" x 3'-0" x 4" for steel pedestal mounted cabinets, and shall be 3'-0" x 0'-4" thick x width of foundation for Type M, P, R or S cabinets.
- In unpaved areas, the top of foundation for Types G, P, R and S cabinets shall be 6" above surrounding grade. Top of foundation for Type M cabinet shall be 18" above surrounding grade.
- In sidewalks and other paved areas, top of foundation for Type G cabinet shall be level with surrounding grade. Top of foundation for Type M cabinet shall be 18" above surrounding grade. Top of foundation for Type P, R, and S cabinets shall be 4" above surrounding grade.
- A 1" drain shall be provided through the foundation of the Type M cabinet. Drain pipe shall be screened.
- The pedestal, base, bolt circle and foundation for the Type G cabinet shall be the same as that shown for a Type I-C standard. Pedestal shall be 25"-30" in length.
- Provide 8 screened, raintight vent holes, 1/2" diameter or larger in the bottom of the Type G cabinet.
- Type G cabinet shall be provided with slipfitter to permit mounting on 4 1/2" O.D. pedestal. Slipfitter shall bolt to bottom of the cabinet.
- All cabinet shelves shall be removable and adjustable for vertical spacing. Type M, P, R and S cabinets shall be provided with a minimum of 2 shelves.
- Anchor bolts for Type M, P, R and S cabinets shall be 3/4" x 18" with a 2" - 90° bend. Four bolts required per cabinet. Anchor bolts may be inside or outside of cabinet.
- See Table for cabinet and foundation dimensions; "D"-Depth, "H"-Height, "W"-Width. See Table for anchor bolt spacing; "D"-Depth, "W"-Width.
- Controller units, shelf mounted equipment and wall mounted equipment shall be located to permit easy and safe removal or replacement. All plug mounted equipment shall be located so as to permit its replacement without removing any other piece of equipment.
- Main Breaker shall be rated for 30 amperes in Type G and M cabinets. It shall be rated at 60 amperes in Type P, R and S cabinets.



WIRING DIAGRAM
FLASHING BEACON CONTROL UNIT

Ground fault interrupter
type 15 A. Ckt. Br.



WIRING FOR SOLID-STATE CONTROLLER CABINETS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

CONTROLLER CABINET DETAILS

DRAWING
NUMBER **E-28**

Revision	By	Approved	Date

The Solid-state Switching devices shall intermate with a CINCH - JONES Socket S-2412-SB or equal connected as follows:

Pin No.	CIRCUIT	Pin No.	CIRCUIT
1	AC + Lights	7	Green or Walk Output
2	Chassis Ground	8	Yellow Input
3	Red or Dont Walk Output	9	DC + (15 to 24 volts)
4	Not Used	10	Green or Walk Input
5	Yellow Output	11	AC-
6	Red or Dont Walk Input	12	Not Used

2	1
4	3
6	5
8	7
10	9
12	11

Contacts shall be rated at 15 amperes min.

CONNECTOR SOCKET SOLID STATE SWITCHING DEVICE

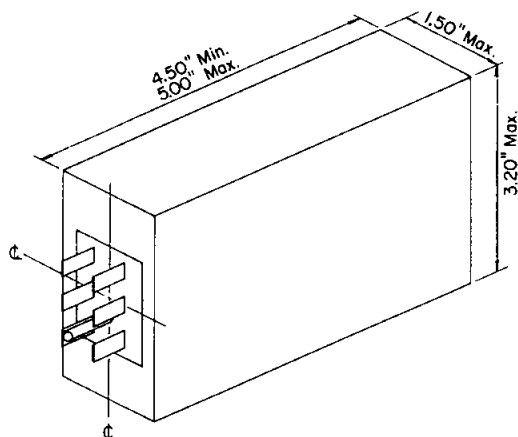
The Flash Transfer Relay shall intermate with a CINCH - JONES Socket S-408-SB or equal connected as follows:

Pin No.	CIRCUIT	Pin No.	CIRCUIT
1	Coil	5	Common, Circuit #1
2	Coil	6	Common, Circuit #2
3	N.C. Circuit #1	7	N.O. Circuit #1
4	N.C. Circuit #2	8	N.O. Circuit #2

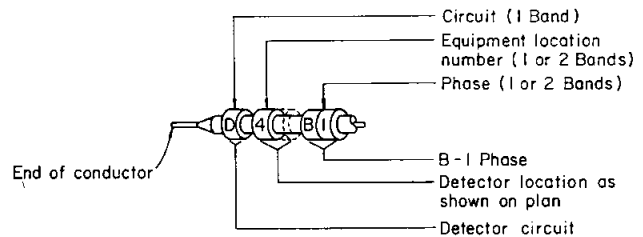
2	1
4	3
6	5
8	7

Contacts shall be rated at 15 amperes min.

CONNECTOR SOCKET FLASH TRANSFER RELAY



ENCLOSURE FOR
SOLID STATE FLASHER UNIT



TYPICAL BANDING OF CONDUCTOR ENDS

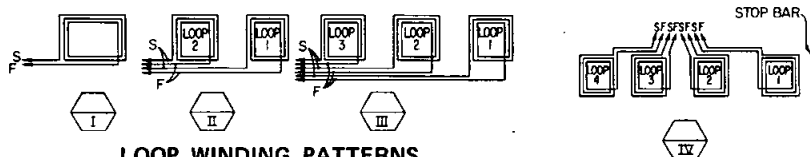
The FLASHER shall intermate with a CINCH-JONES Socket S-406-SB or equal connected as follows:

Pin No.	CIRCUIT	Pin No.	CIRCUIT
7	Load, Ckt. #1	10	AC-
8	Load, Ckt. #2	11	AC+
9	Chassis Ground	12	Logic Ground

8	7
10	9
12	11

CONNECTOR SOCKET SOLID STATE FLASHER UNIT

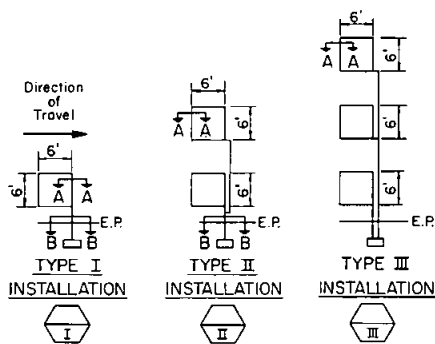
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING CONTROLLER CABINET DETAILS	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Allen A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
DRAWING NUMBER				E-29	



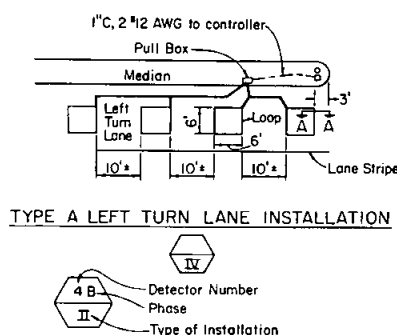
LOOP WINDING PATTERNS

Conductor identification shall include the following:

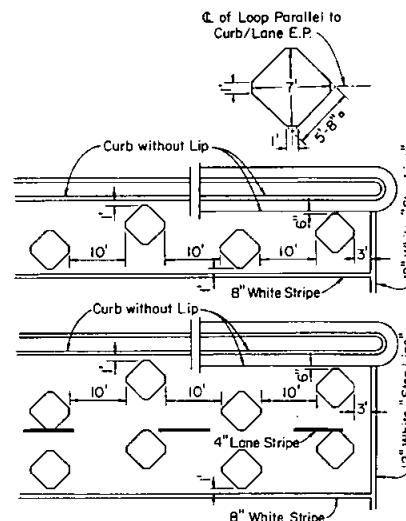
1. Sensor number and phase. 2. Loop number. 3. Start (S) or finish (F) (Typical identification: D-4-CI-LOOP 2-S)



DETECTOR LAYOUTS AND DIMENSIONS



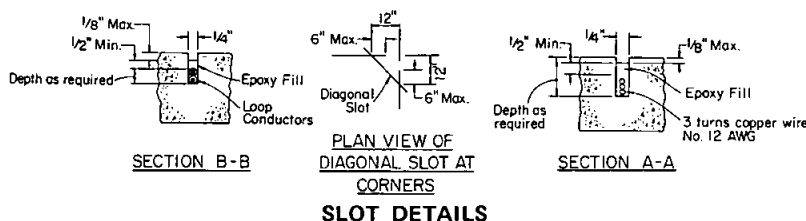
TYPE A LEFT TURN LANE INSTALLATION



TYPE B INSTALLATION

TYPICAL ONE AND TWO LANE LEFT TURN DETECTORS PLACEMENT DETAILS

(Use Only When Specified)



LOOP INSTALLATION PROCEDURE

1. Saw slots in pavement for loop conductors as shown in details. Blow out and dry thoroughly with compressed air.
2. Install termination pull box.
3. Install # 14 AWG loop conductor in slots using a 3/16" to 1/4" thick wood paddle (see "Loop Winding Patterns"). Allow additional length for the run to termination pull box plus 5 feet of slack in pull box. This additional length of conductor for each loop circuit shall be twisted together into a pair (at least 2 turns per foot) before being run to pull box.
4. Identify loop circuit pairs by sensor unit designation. Identify start of conductor.
5. Splice loop conductor to lead-in cable (where required) or tape ends of conductor (after testing) to prevent entrance of moisture. All splices shall be soldered using rosin core solder.
6. Test each loop circuit at controller cabinet (or if these are not installed, test at termination pull box) before filling slots. Perform a resistance test between circuit and between each circuit and ground. Insulation resistance shall be not less than 100 megohms. Test each loop circuit for continuity; loop circuit resistance shall not exceed 0.5 ohms plus 0.35 ohms per 100 feet of lead-in cable.
7. Fill slots as shown in details.
8. No more than four loop detector conductors shall be installed in one saw slot.
9. Lead-in cable shall not be spliced between the termination pull box and the controller cabinet.
10. Distance between side of loop and lead-in saw cut shall be 2' - 0" minimum. Distance between lead-in cuts shall be 6".
11. The Engineer shall have the authority to suspend epoxy fill operations due to unsuitable weather.
12. See Standard Drawing E-31 for curb termination details.

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

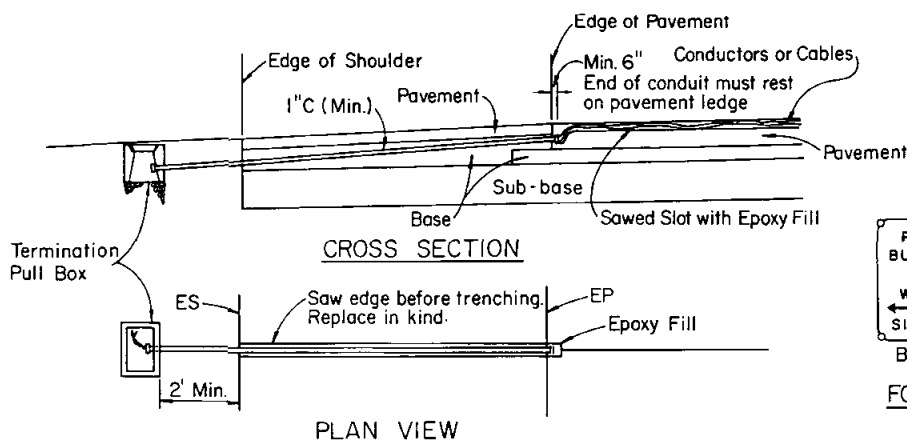
Allan A. Kuehnel *Dec. 1975*
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

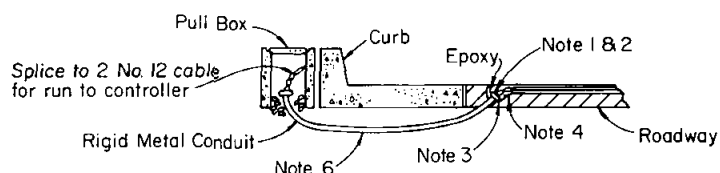
DETECTORS - INDUCTIVE LOOP

DRAWING NUMBER **E-30**

Revision	By	Approved	Date

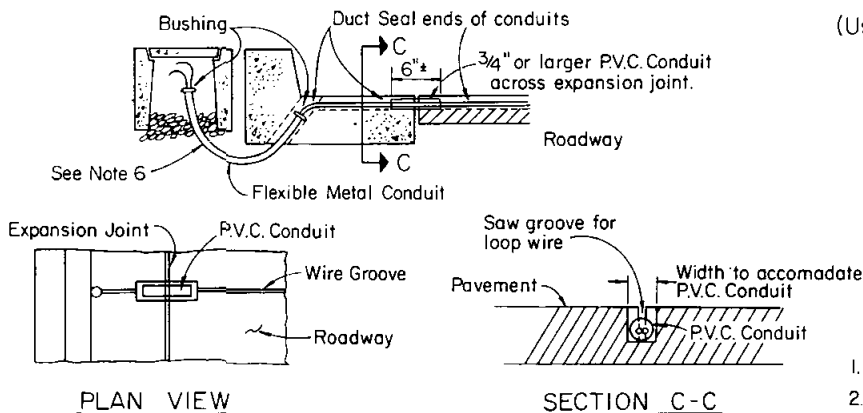


SHOULDER TERMINATION DETAIL

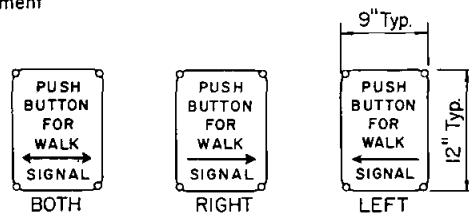


1. Non-metallic bushing shall be used at roadway end of conduit.
2. Tape wire 3 inches each side of roadway bushing.
3. Install duct seal compound to each end of roadway conduit before installing epoxy.
4. Round all sharp edges where wire has to pass.
5. End of roadway conduit shall be 2 inches below roadway.
6. Install 1" conduit minimum. Install 2" conduit for more than 4-#12 loop conductors or 3 magnetometer cables.

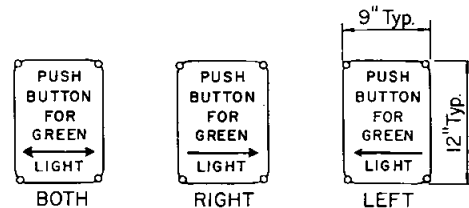
CURB TERMINATION DETAIL TYPE A



CURB TERMINATION DETAIL TYPE B (Use only when specified)



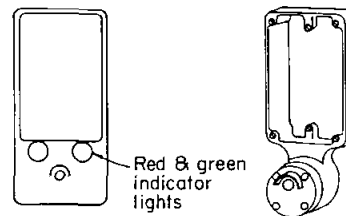
FOR WALK-DONT WALK SIGNALS



FOR 3-LIGHT SIGNALS

PEDESTRIAN PUSHBUTTON SIGNS

Signs shall be porcelain enameled.
Black letters on White background.



TYPE A

TYPE B

(Use Only When Specified)



TYPE C

(Use Only When Specified)

PEDESTRIAN PUSH BUTTONS

1. Shape back of casting to fit curvature of post.
2. Provide cover fitting for top of post, when PPB is mounted on pedestrian push button post.
3. Install pushbutton on crosswalk side of standard.

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

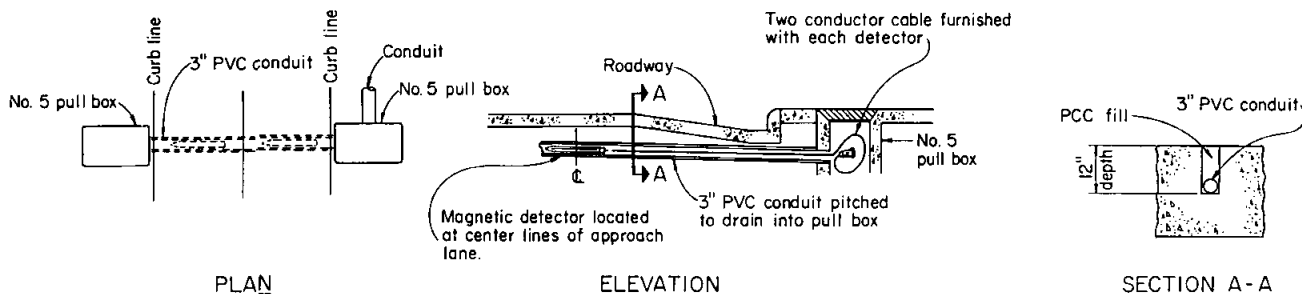
DETECTORS - CURB TERMINATION AND PUSH BUTTON DETAILS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

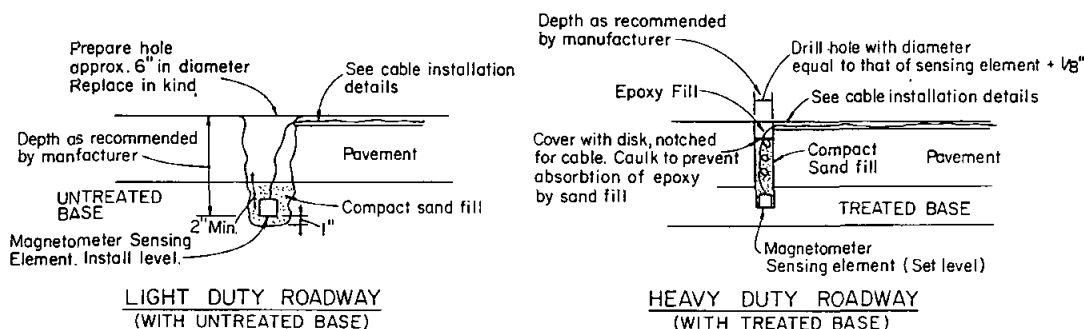
Allan A. Kuehnel Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

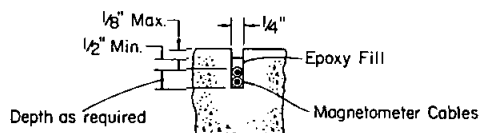
E-31



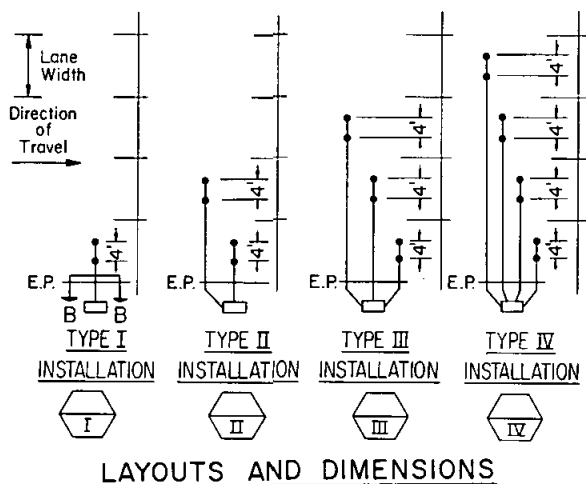
NON-DIRECTIONAL MAGNETIC VEHICLE DETECTOR INSTALLATION DETAILS



MAGNETOMETER SENSING ELEMENT INSTALLATION DETAILS



SECTION B-B SLOT DETAILS



MAGNETOMETER DETECTOR INSTALLATION PROCEDURE:

1. Prepare holes for sensing elements and saw slots in pavement for connecting cables as shown in details. Blow out and dry thoroughly with compressed air.
2. Install termination pull box. See termination details.
3. Install heads in holes and install cables in slots using a 3/16" to 1/4" thick wood paddle and run to adjacent pull box allowing 5 feet of slack at the pull box.
4. Identify cables by lane or sensor unit designation (traffic signal systems).
5. Splice sensing element cables to lead-in cables. All splices shall be soldered using rosin core solder.
6. Test each sensing element circuit at controller or count station cabinet before filling holes and slots. Excitation circuits shall have a resistance of 50 ohms* per head and detection circuits shall have a resistance of 300 ohms* per head. Measurements shall be made with a low range ohm-meter.
7. Fill slots and sensing element holes as shown in details.
8. Lead-in cable shall not be spliced between the termination pull box and the controller cabinet.
9. See Standard Drawing E-28 for curb termination details.

*Or other resistance per manufacturers' specifications

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **E-32**

SAN DIEGO REGIONAL STANDARD DRAWING

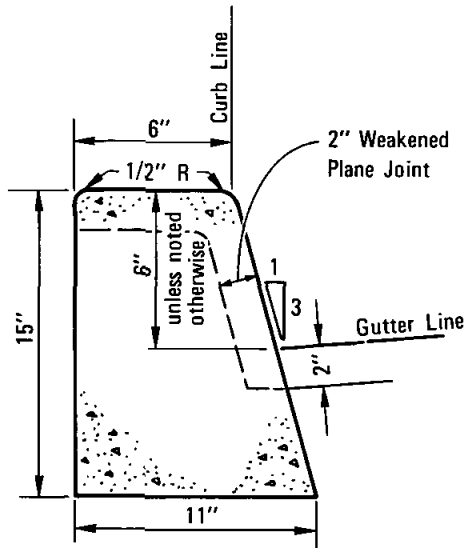
**DETECTORS - NON-DIRECTIONAL
MAGNETIC AND MAGNETOMETER**

Revision	By	Approved	Date

GENERAL SURFACE IMPROVEMENTS

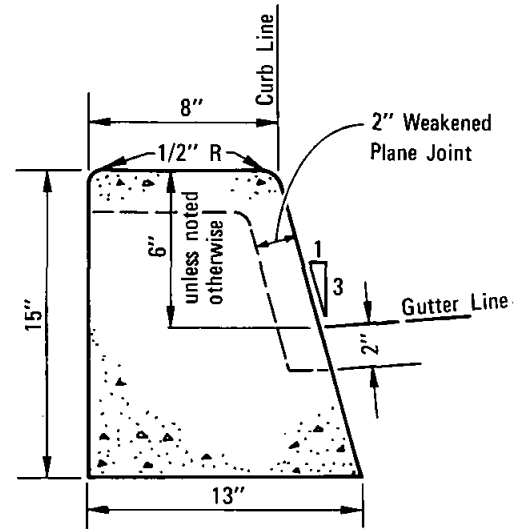
G

GENERAL SURFACE IMPROVEMENTS



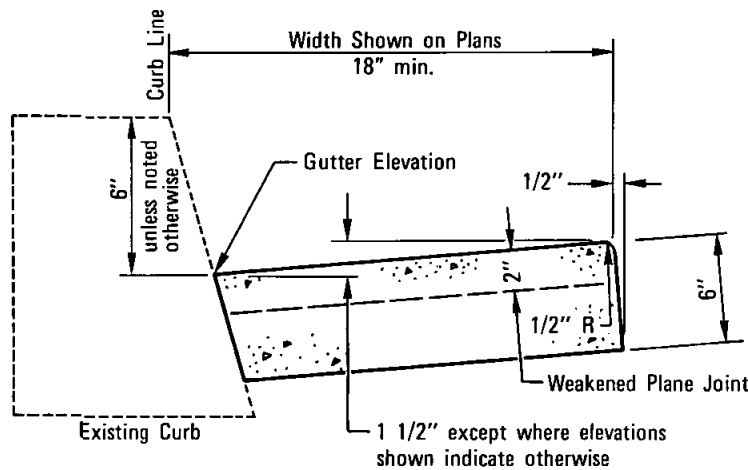
6" CURB

Area = 0.89 SQ. FT.



8" CURB

Area = 1.09 SQ. FT.

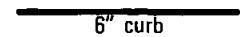


GUTTER

NOTES:

1. Concrete shall be 517 - C - 2500.
2. See Standard Drawing G-10 for joint details.

LEGEND ON PLANS



6" curb

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

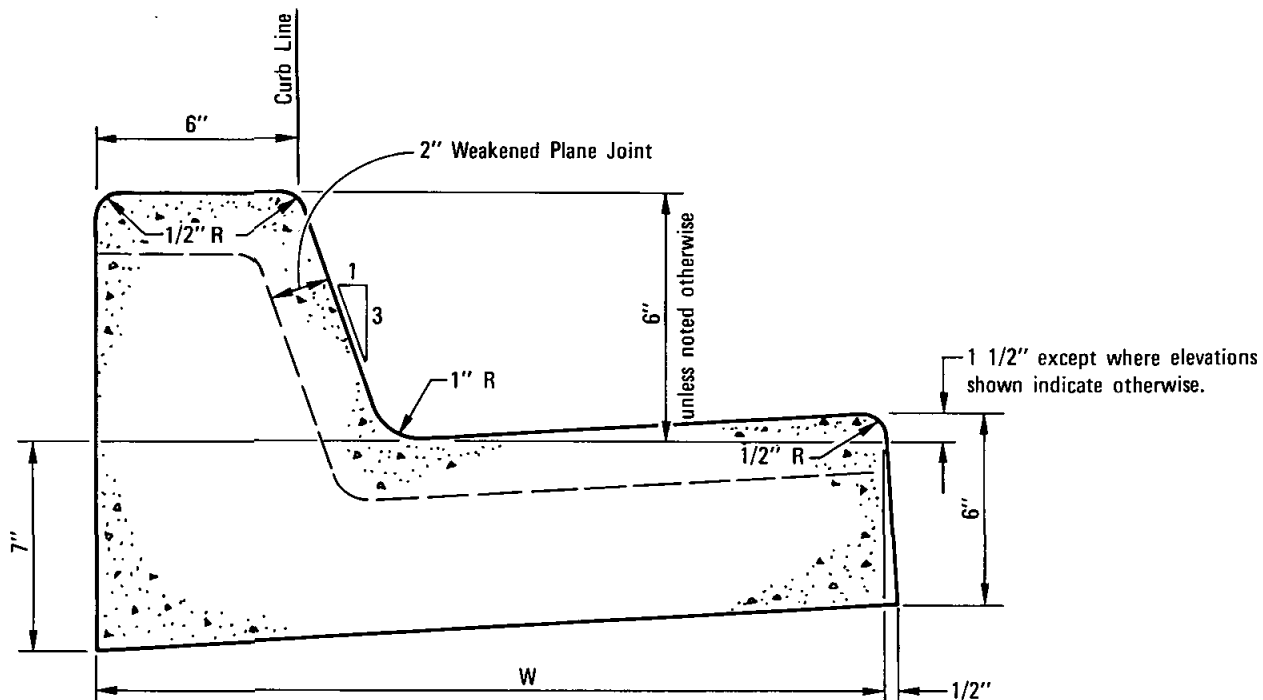
CURBS AND GUTTER - SEPARATE

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Alfred A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

G-1



TYPE G & H CURB

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

* with 6" Curb Face

NOTES:

1. Concrete shall be 517 - C - 2500.
2. See Standard Drawing G-10 for joint details.

LEGEND ON PLANS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

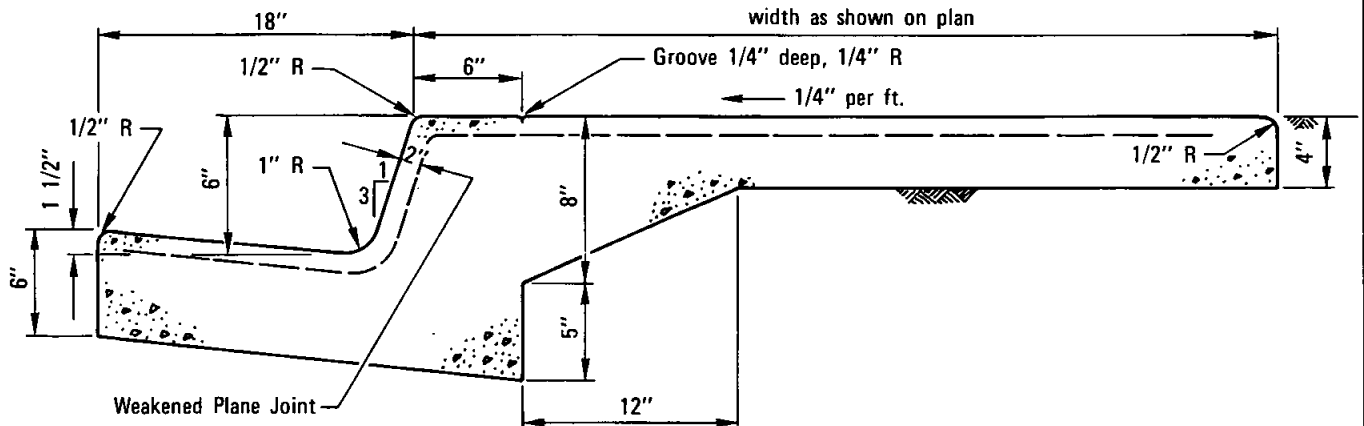
Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **G-2**

SAN DIEGO REGIONAL STANDARD DRAWING

CURB AND GUTTER - COMBINED

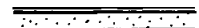
Revision	By	Approved	Date



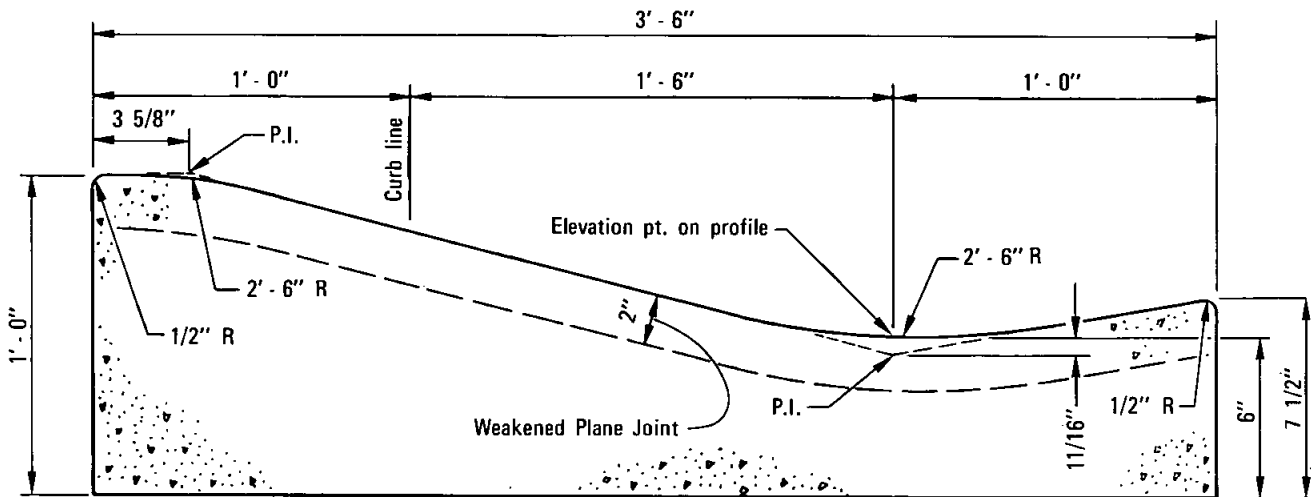
NOTES

1. Concrete shall be 517-C-2500.
2. See Standard Drawing G-10 for joint details.
3. Monolithic curb, gutter and sidewalk is to be used with Agency approval only.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				MONOLITHIC CURB, GUTTER AND SIDEWALK		<i>Alfred A. Kerschbaum</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	G-3



CURB AREA
(2.33 sq. ft.)

NOTES

1. Transition to type G curb at all curb returns, except where sidewalk ramps are provided, and at all cul-de-sacs with drainage structures.
2. See Standard Drawing D-6 for Rolled Curb Inlet.
3. Concrete shall be 517 - C - 2500.
4. See Standard Drawing G-10 for joint details.

LEGEND ON PLANS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

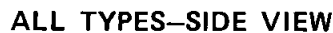
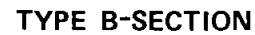
Allard A. Kuehnel Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **G-4**

SAN DIEGO REGIONAL STANDARD DRAWING

CURB AND GUTTER - ROLLED

Revision	By	Approved	Date

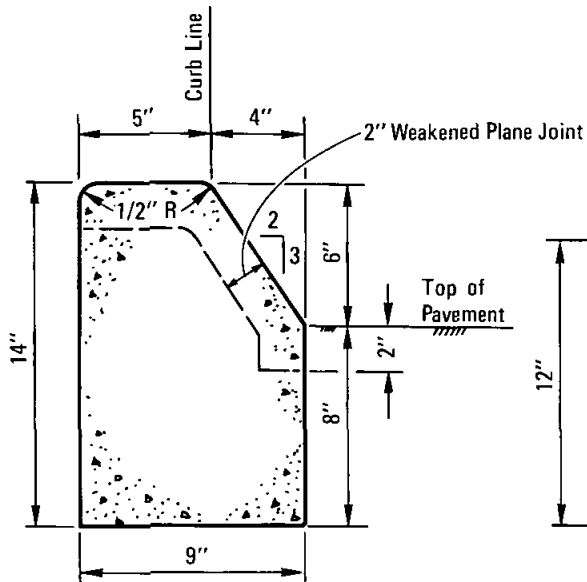


APPROX. DIKE QUANTITIES	
TYPE	TONS/LIN. FT.
A	0.0250
B	0.0375
C-6"	0.0375
C-8"	0.0583
C-9"	0.0702
D	0.0062

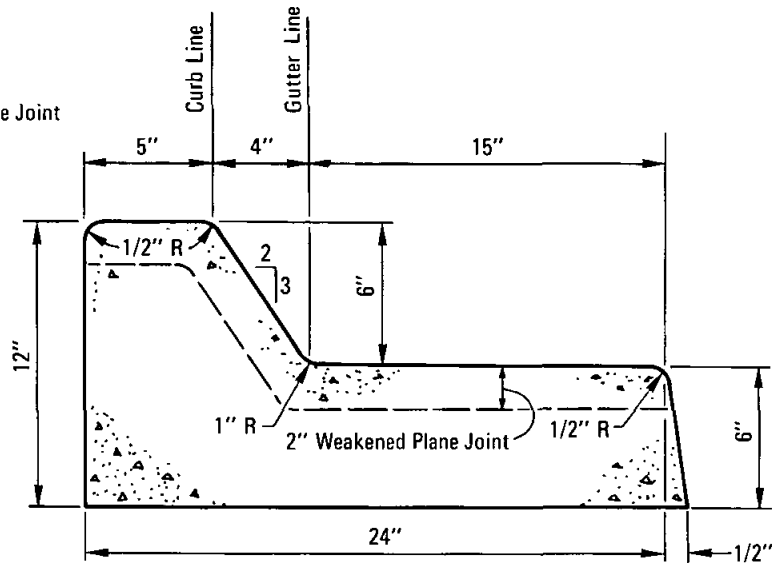
1. Dike is to be placed on a minimum 2" of A.C. road surfacing, extending throughout the width of the dike.
2. AR-8000 grade asphalt to be used for all dikes
3. A.C. dikes may be shaped and compacted with an extrusion machine or other equipment capable of shaping and compacting the material to the required cross section.

Type A Dike

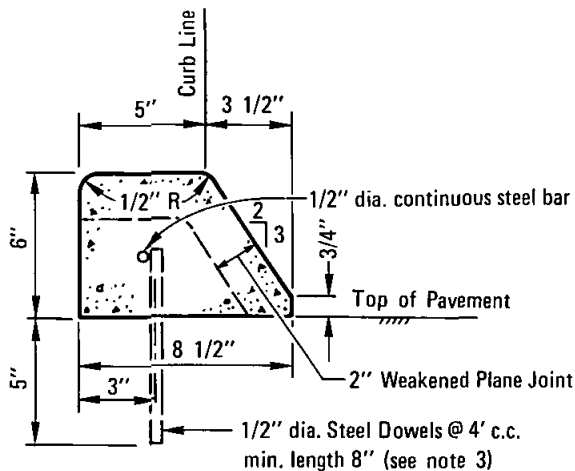
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING DIKES (BERMS) - ASPHALT CONCRETE	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Edward G. Kerschbaum</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
					DRAWING NUMBER G-5



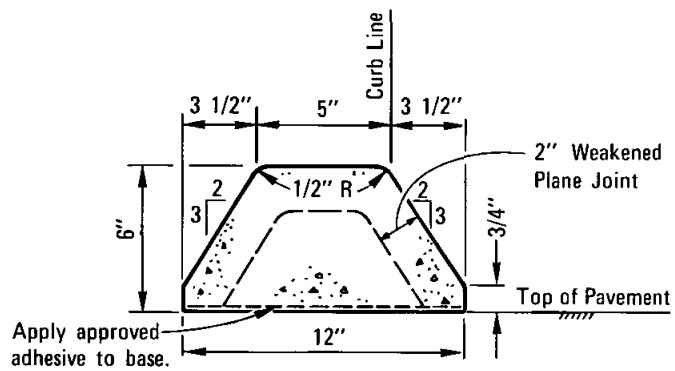
B-1
AREA = 0.79 SQ.FT.



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 517-C-2500.
2. See Standard Drawing G-10 for joint details.
3. Extruded type B-3 curb shall be anchored to existing pavement by placing steel dowels and reinforcing steel as shown or by using an approved adhesive.

LEGEND ON PLANS

Type B-2 Curb and Gutter

Type B-1, B-3, B-4 Curb

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

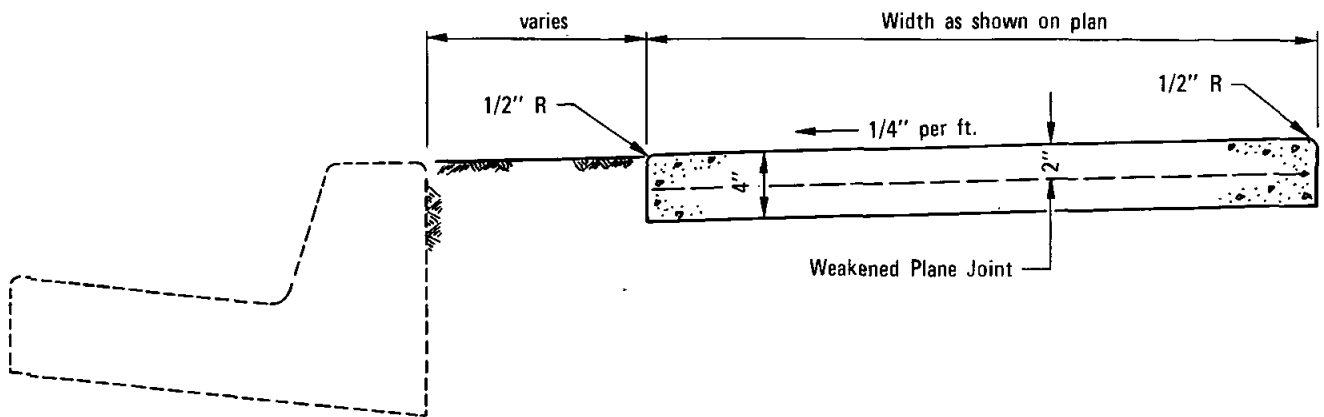
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

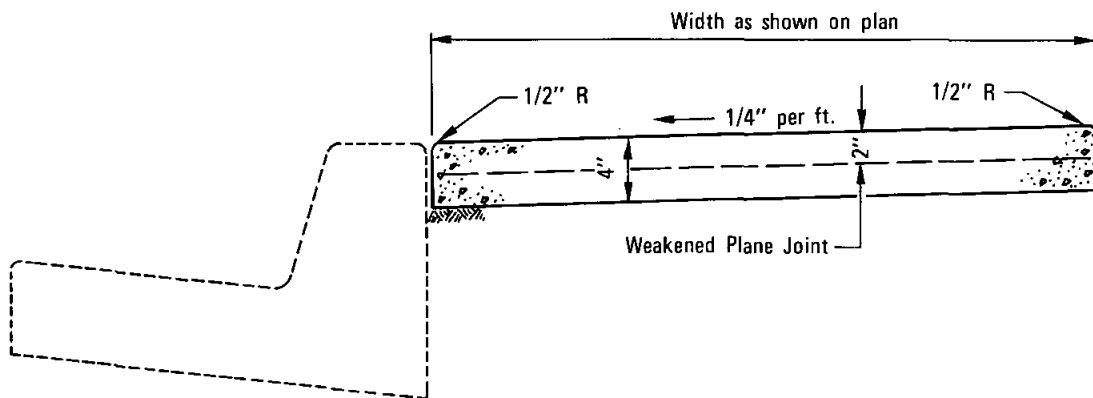
CURBS AND GUTTER - MEDIANS

DRAWING
NUMBER **G-6**

Revision	By	Approved	Date



NON-CONTIGUOUS

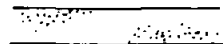


CONTIGUOUS

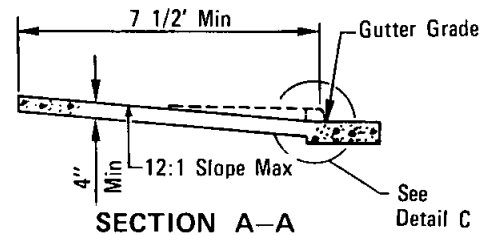
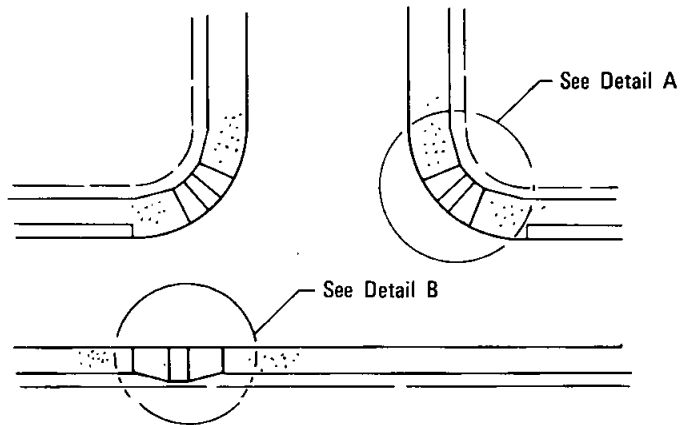
NOTES

1. Concrete shall be 517 - C - 2500.
2. See Standard Drawing G-10 for joint details.

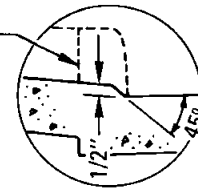
LEGEND ON PLANS



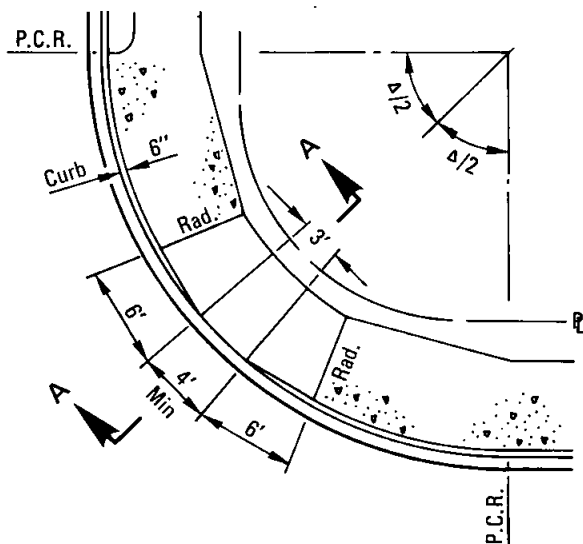
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				SIDEWALK - TYPICAL SECTIONS	<i>Allan G. Kerschbaum</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
					DRAWING NUMBER G-7



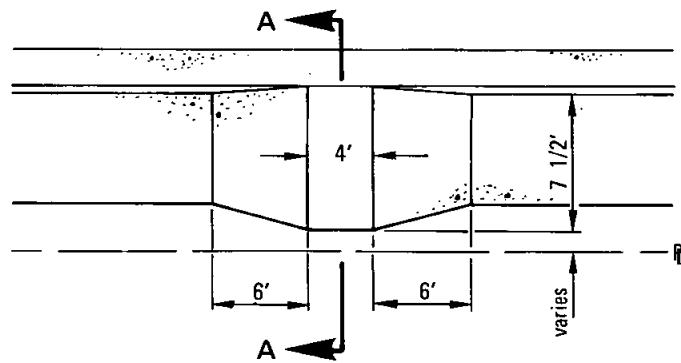
1/2" Lip on Depressed Curb
Section will be sloped at 45°



DETAIL C



DETAIL-A



DETAIL-B

NOTES

1. Ramp shall be centered on or directly opposite the bisector of the curb return or as directed by the Agency.
2. In the ramp area, the slope shall not exceed 12:1 (8.33%). Any deviation must be approved by the Agency.
3. Texture to be heavy broom finish transverse to axis of ramp.
4. Concrete shall be 517-C-2500.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

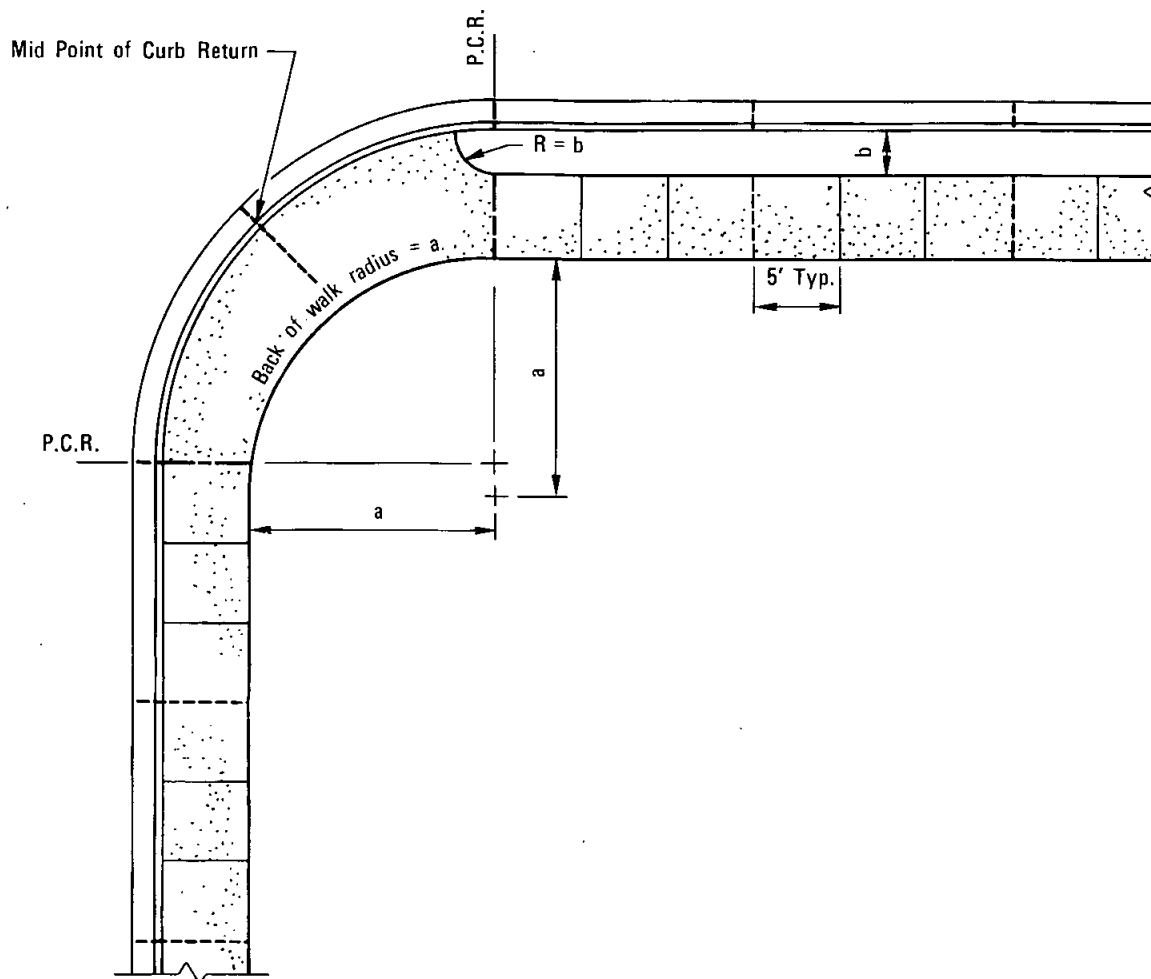
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

SIDEWALK RAMP

DRAWING
NUMBER **G-8**

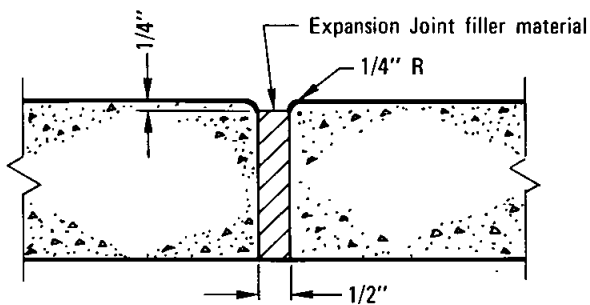
Revision	By	Approved	Date



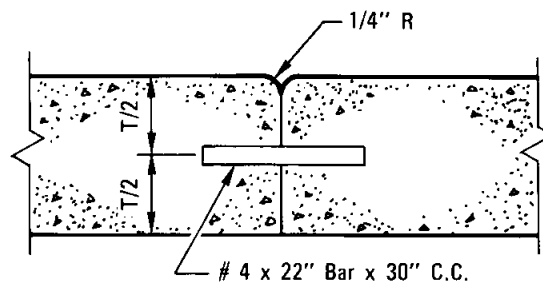
NOTES

1. Expansion Joints ——— at curb returns, and adjacent to structures.
(See Standard Drawing G-10).
2. Weakened Plane Joints - - - - - at mid point of curb return, when required,
and at 15' intervals from P.C.R.'s (See Standard Drawing G-10).
3. 1/4" grooves ——— with 1/4" radius edges at 5' intervals.
4. See Standard Drawing G-8 for installation of sidewalk ramps.

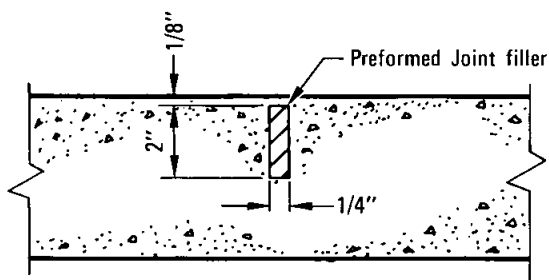
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				SIDEWALK JOINT LOCATIONS		<i>Allan A. Kuehn</i> <i>Dec. 1975</i>
						Coordinator R.C.E. 19807 Date
						DRAWING NUMBER G-9



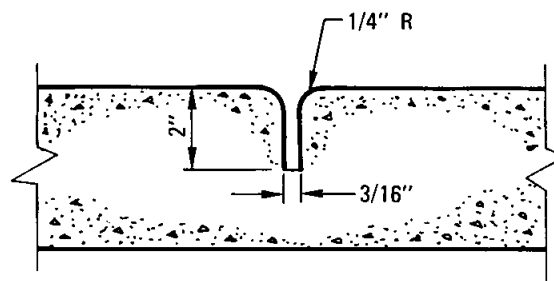
EXPANSION JOINT



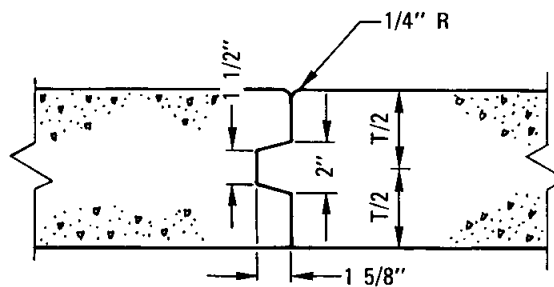
CONTACT JOINT



WEAKENED PLANE JOINT
PAVEMENT



WEAKENED PLANE JOINT
SIDEWALK



KEYED JOINT

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

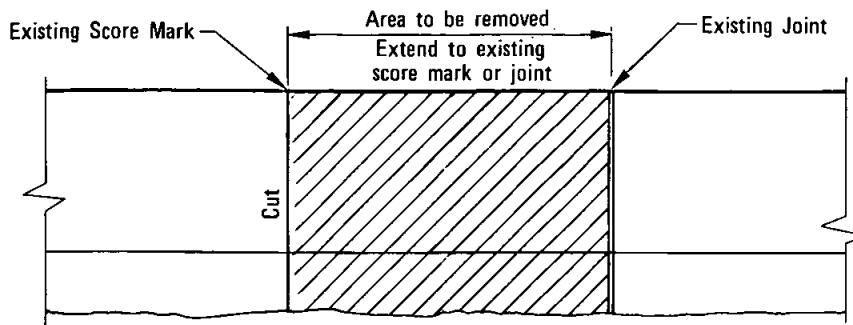
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **G-10**

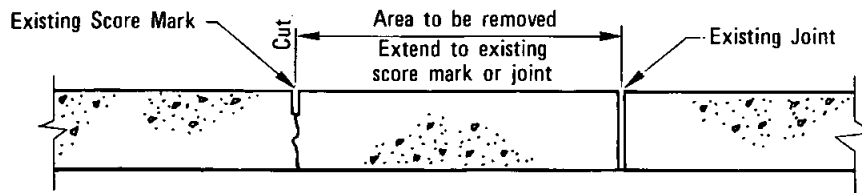
SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE JOINT DETAILS

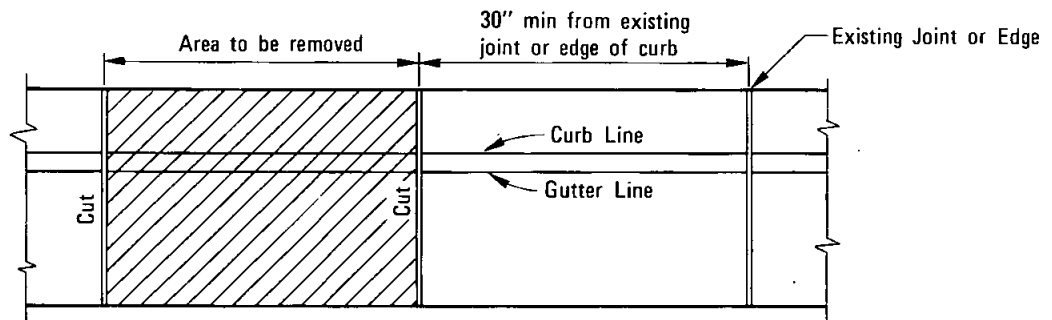
Revision	By	Approved	Date



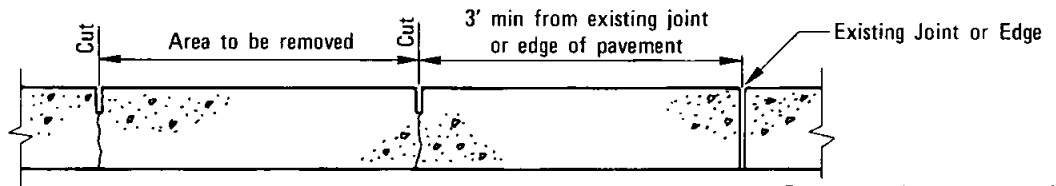
SIDEWALK PLAN



SIDEWALK SECTION

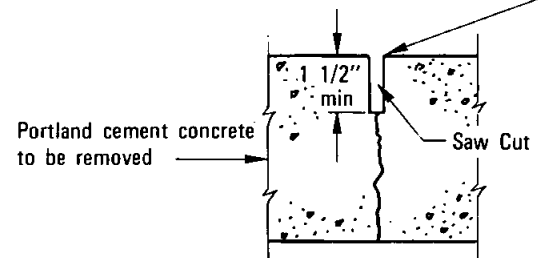


CURB PLAN



PAVEMENT SECTION

Remaining edge to be smooth and true with no shatter.



**SECTION
Showing Cut**

NOTE

When distance from, "Area to be removed", to existing joint, edge or score mark is less than minimum shown, "Area to be removed", shall be extended to that joint, edge or score mark.

Revision	By	Approved	Date

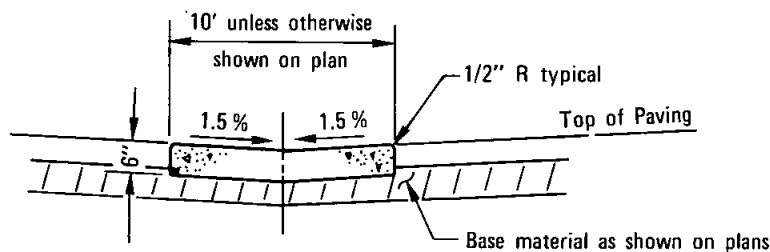
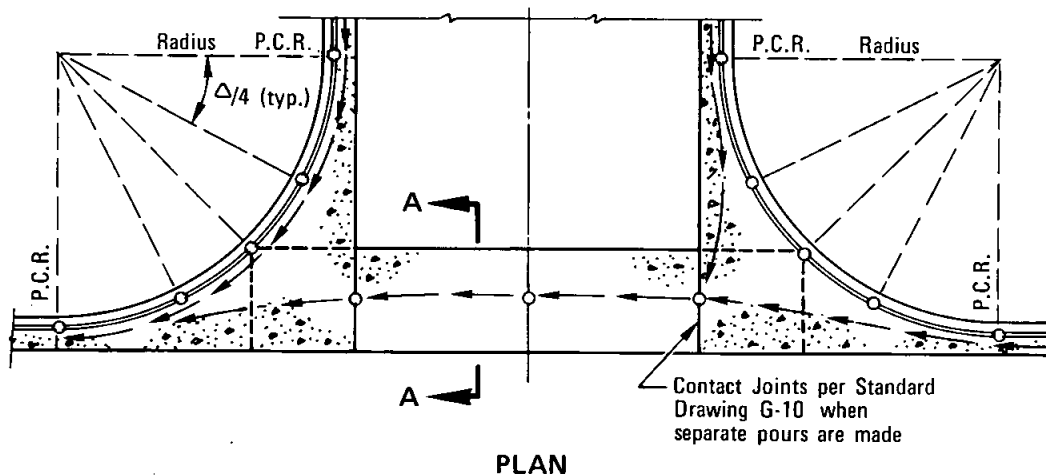
SAN DIEGO REGIONAL STANDARD DRAWING

**PORTLAND CEMENT CONCRETE CURB,
GUTTER, SIDEWALK AND PAVEMENT
REMOVAL AND REPLACEMENT**

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

**DRAWING
NUMBER G-11**



NOTES

1. Concrete shall be 517 - C - 2500.
2. ----- = Weakened plane joints.
3. ← ← = Typical flowlines.
4. ○ = Elevations to be shown on plans.
5. Return segments to be 6" thick.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

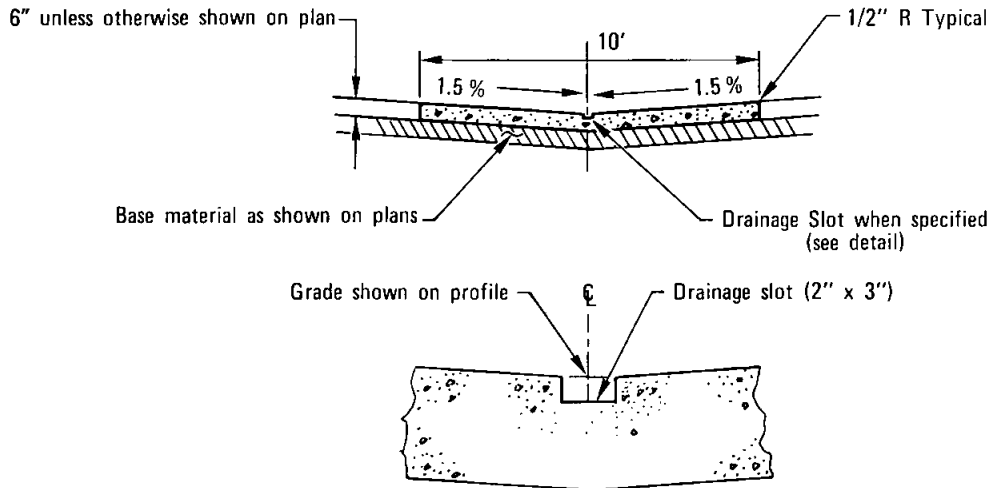
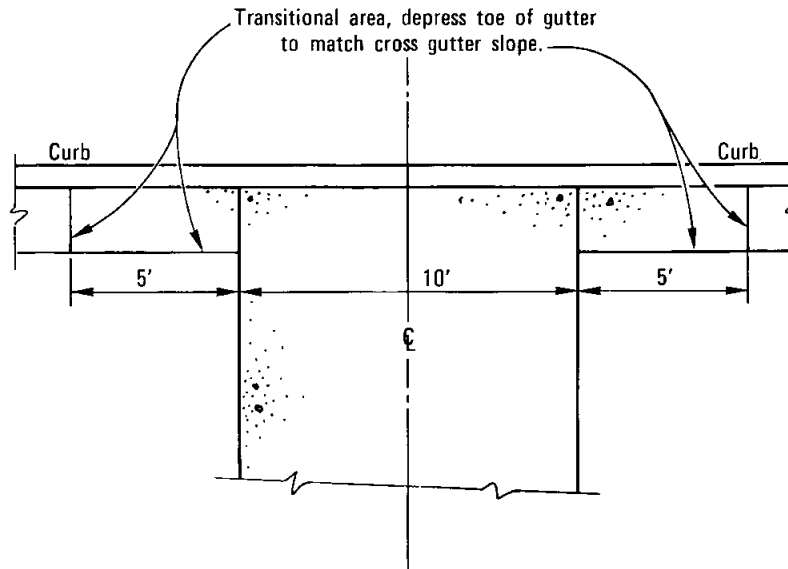
Allan G. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

CROSS GUTTER

DRAWING
NUMBER **G-12**

Revision	By	Approved	Date



DRAINAGE SLOT DETAIL

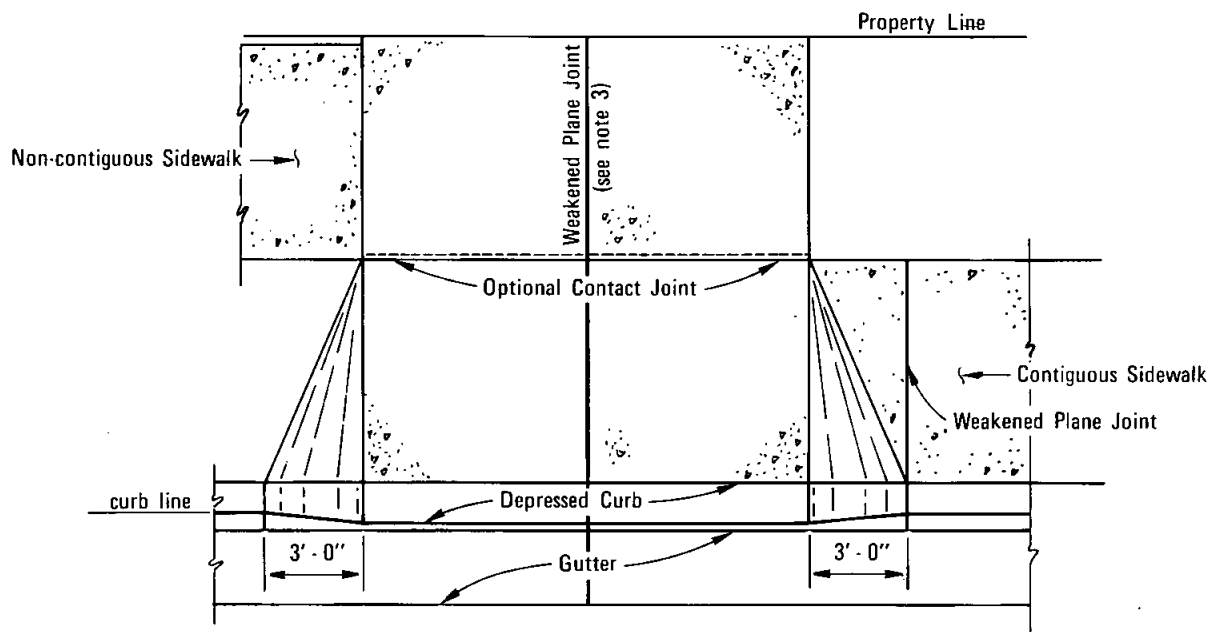
NOTES

1. Cross gutter to be constructed where the drainage is carried across street.
2. Minimum allowable cross slope is 0.5 %.
3. Concrete shall be 517 - C - 2500.

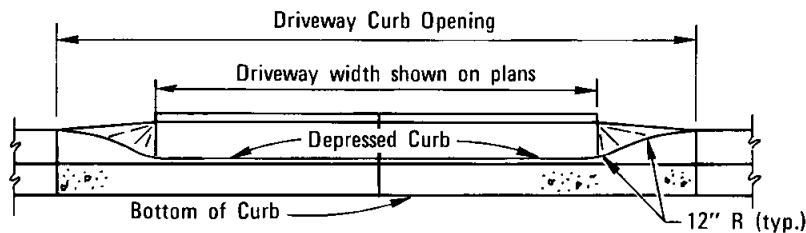
LEGEND ON PLANS



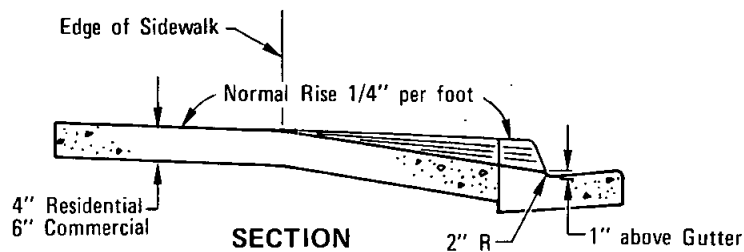
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				MID-BLOCK CROSS GUTTER		<i>Allan A. Kersch</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
							Date
						DRAWING NUMBER	G-13



PLAN



ELEVATION

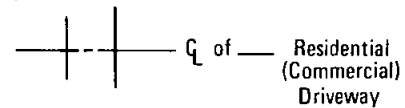


SECTION

NOTES

1. No concrete shall be placed until forms and subgrade are inspected by the Agency.
2. Concrete shall be 517-C-2500.
3. Weakened plane joints required on driveway C_L for driveways 12 ft. to 24 ft. wide, driveways wider than 24 ft. to 30 ft. wide shall have two weakened plane joints evenly spaced.
4. See standard drawings G-15 and G-16 for width and location requirements.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

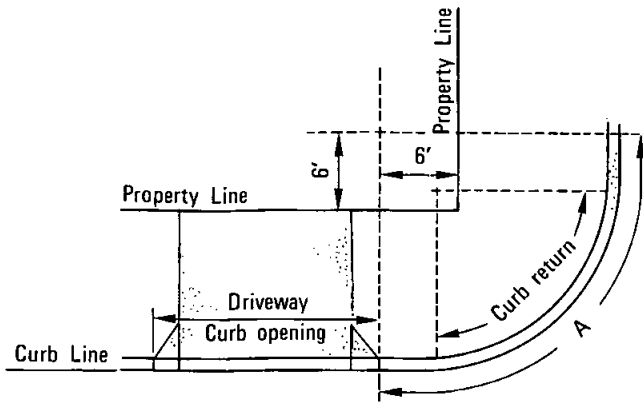
Allan G. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE DRIVEWAYS

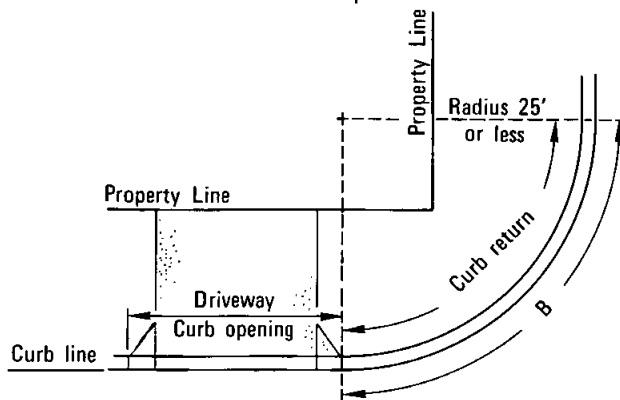
DRAWING
NUMBER **G-14**

Revision	By	Approved	Date



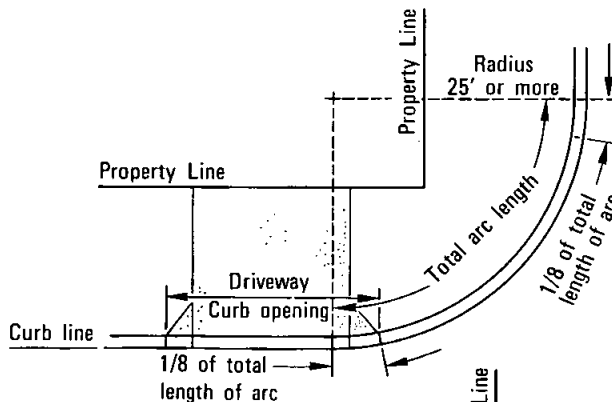
REQUIREMENT 1

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.



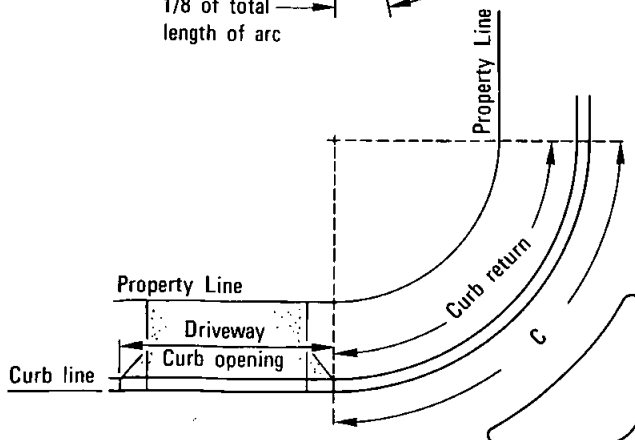
REQUIREMENT 2

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



REQUIREMENT 3

On all curb returns where the radius is 25' or more, curb openings may encroach upon each end of the return a distance equal to $12 \frac{1}{2}\%$ or $\frac{1}{8}$ 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

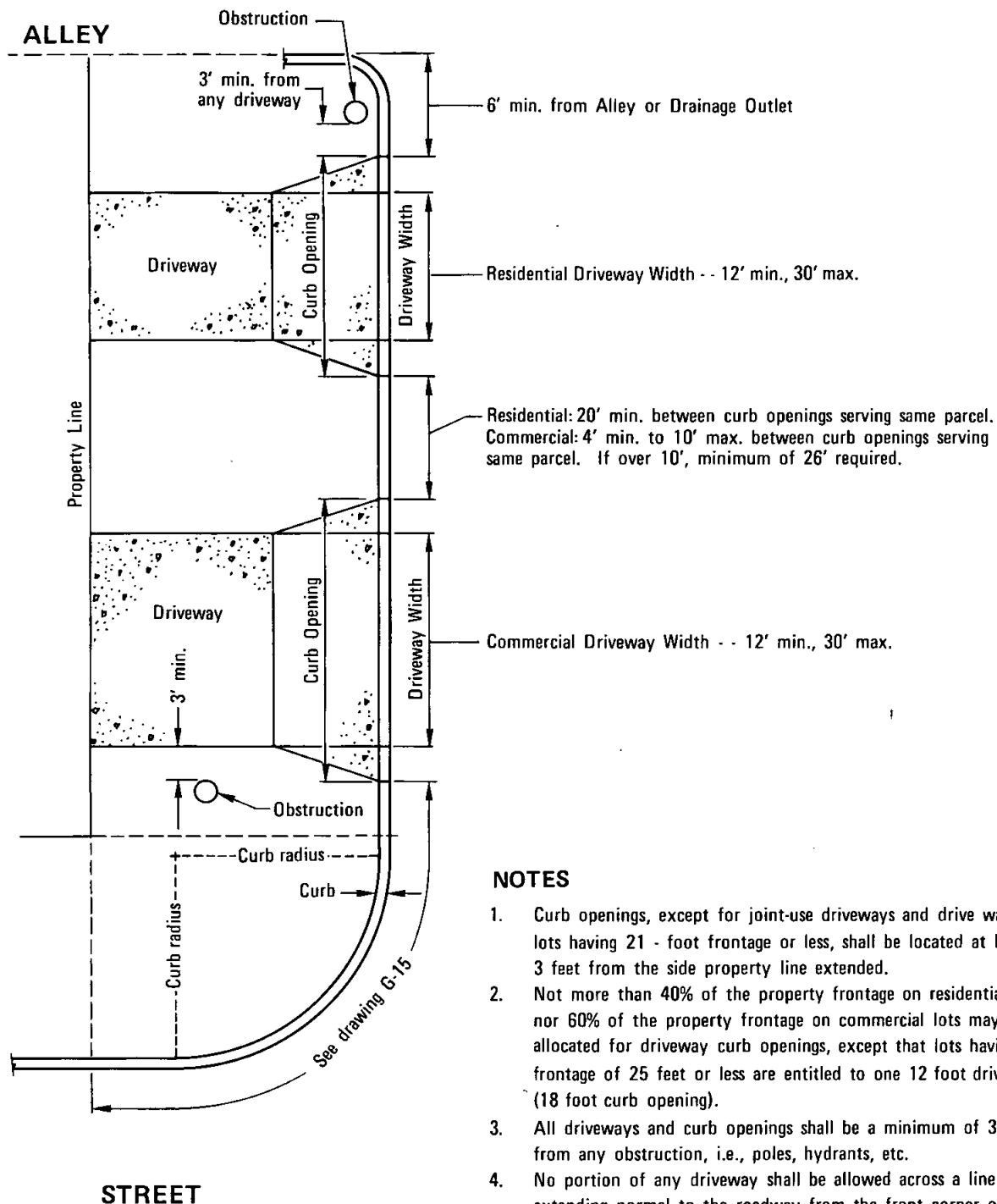
SAN DIEGO REGIONAL STANDARD DRAWING

**DRIVEWAY LOCATION - ADJACENT TO
CURB RETURNS AND STREET LINES**

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **G-15**



NOTES

1. Curb openings, except for joint-use driveways and drive ways on lots having 21 - foot frontage or less, shall be located at least 3 feet 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 25 feet or less are entitled to one 12 foot driveway (18 foot curb opening).
3. All driveways and curb openings shall be a minimum of 3 feet 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 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 Agency.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

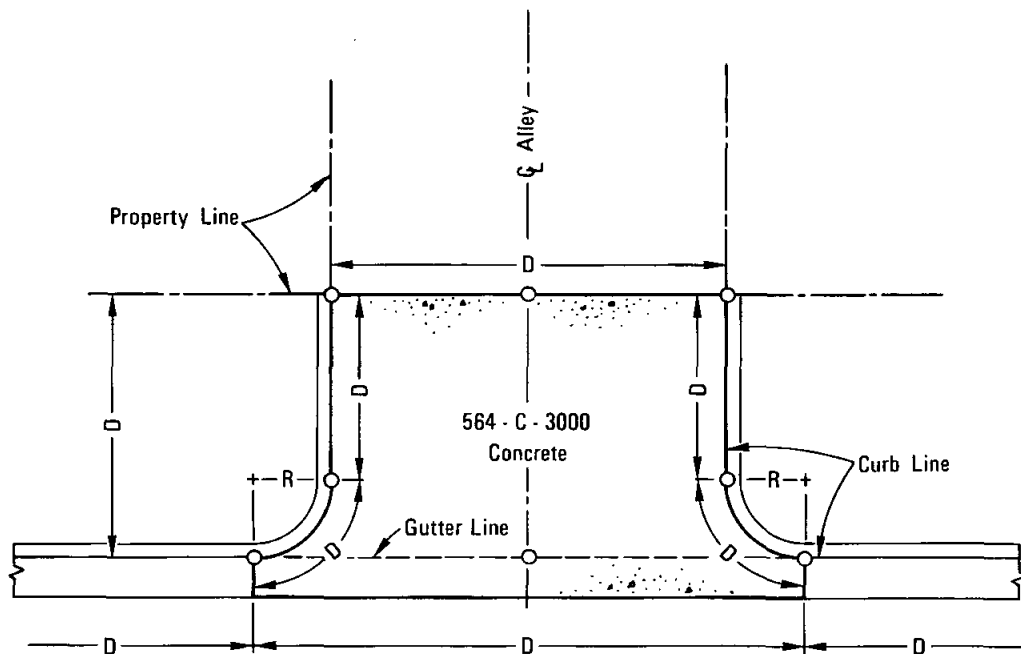
SAN DIEGO REGIONAL STANDARD DRAWING

DRIVEWAY LOCATION AND WIDTH REQUIREMENTS

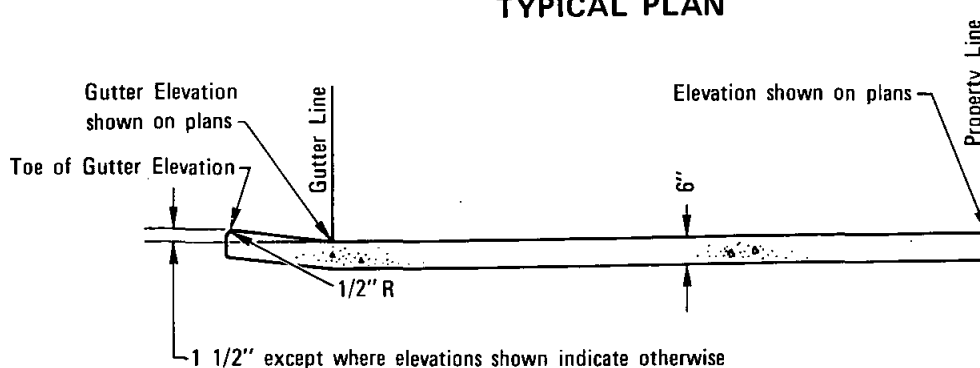
DRAWING
NUMBER

G-16

Revision	By	Approved	Date



TYPICAL PLAN



SECTION

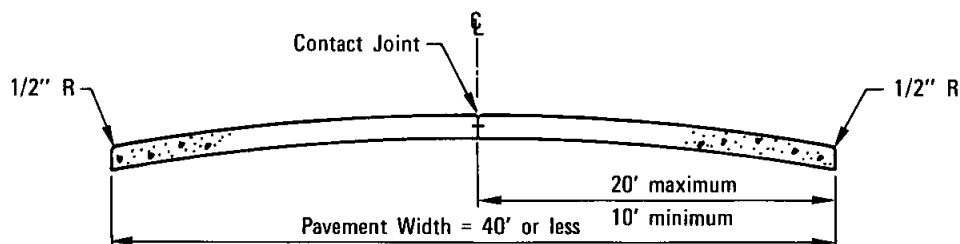
NOTES

1. Sidewalk Ramps shall be installed as required by Agency.
2. D = distance shown on plans.
3. R = radius shown on plans (3 ft. minimum).
4. O = elevations shown on plans (top of curb, and gutter elev.).

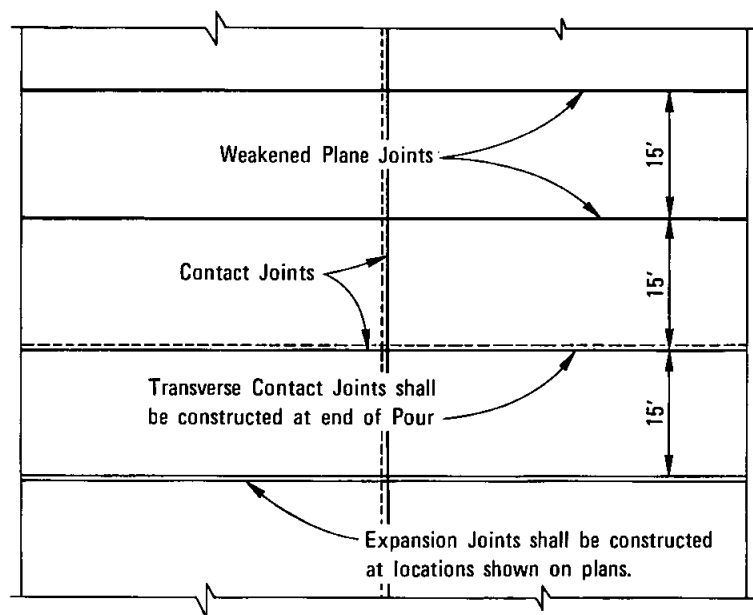
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				ALLEY APRON		<i>Allan G. Kerschbaum</i> Dec. 1975 Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER G-17	



TYPICAL SECTION



TYPICAL PLAN

NOTES

1. Concrete shall be 564 - C - 3000.
2. See Standard Drawing G-10 for Joint Details.
3. Adjust 15' interval between Transverse Joints to match adjacent existing improvements.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

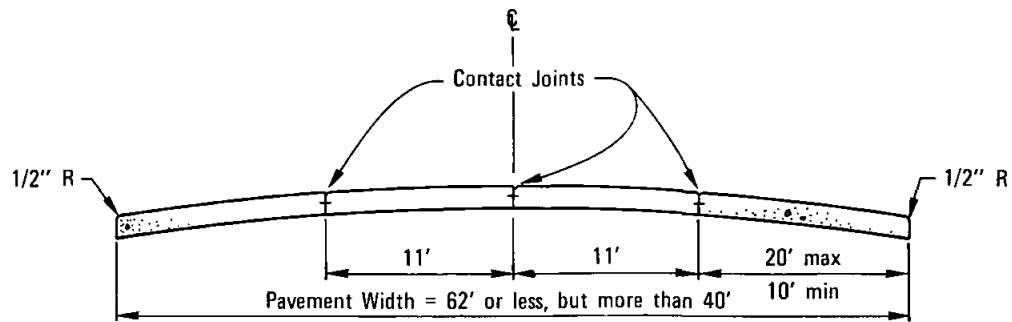
SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE PAVEMENT,
WIDTH 40' OR LESS

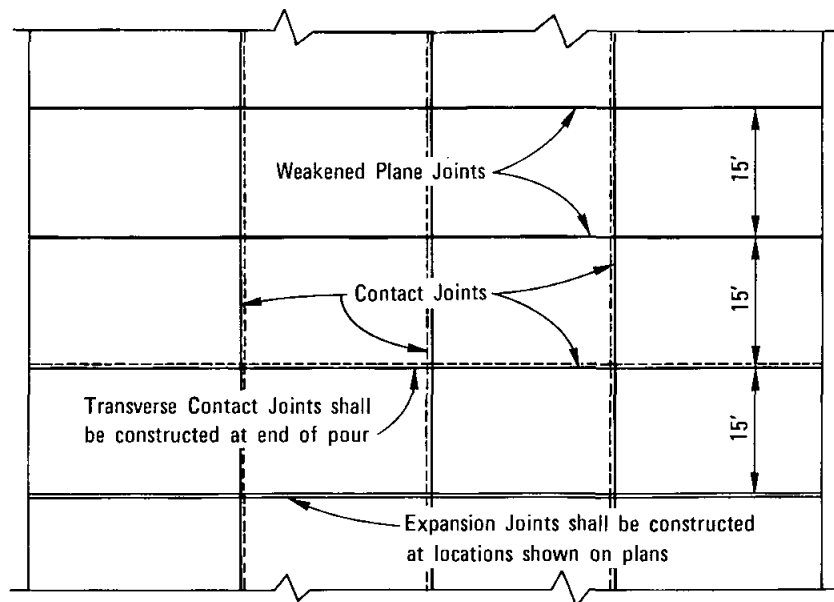
DRAWING
NUMBER

G-18

Revision	By	Approved	Date



TYPICAL SECTION

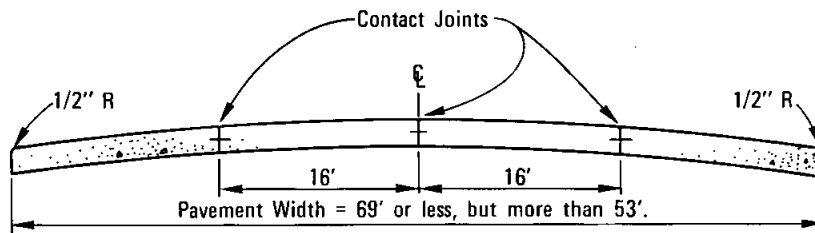


TYPICAL PLAN

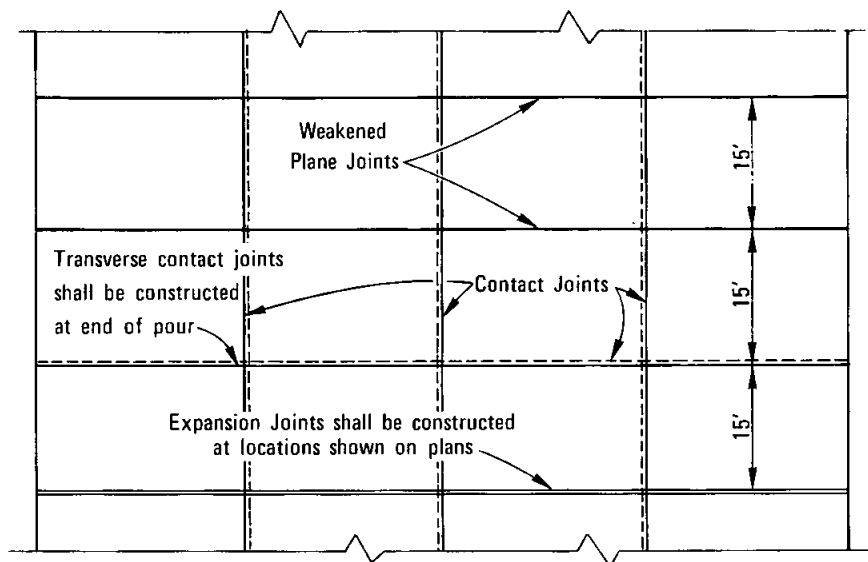
NOTES

1. Concrete shall be 564 - C - 3000.
2. See Standard Drawing G-10 for joint details.
3. Adjust 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
				CONCRETE PAVEMENT, WIDTH 40' TO 62'		<i>Alfred A. Kerschbaum</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
				DRAWING NUMBER		G-19



TYPICAL SECTION



TYPICAL PLAN

NOTES

1. Concrete shall be 564 - C - 3000.
2. See Standard Drawing G-10 for Joint Details.
3. Adjust 15' interval between Transverse Joints to match adjacent existing improvements.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

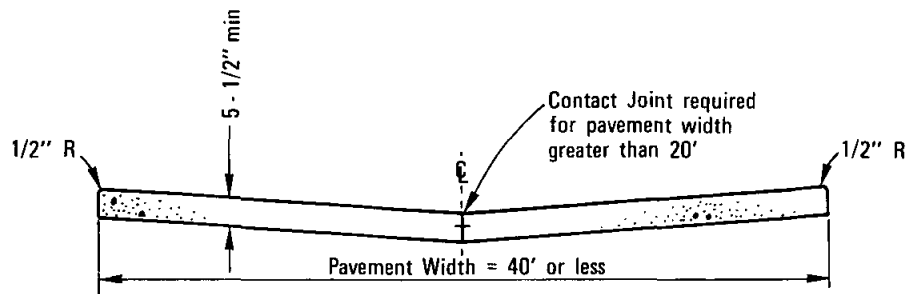
Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **G-20**

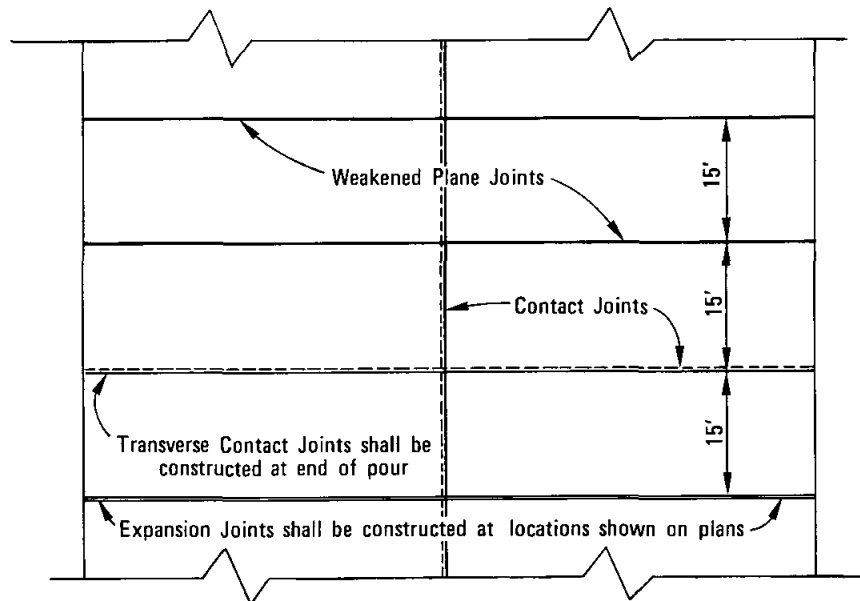
SAN DIEGO REGIONAL STANDARD DRAWING

**CONCRETE PAVEMENT,
WIDTH 53' TO 69'**

Revision	By	Approved	Date



TYPICAL SECTION

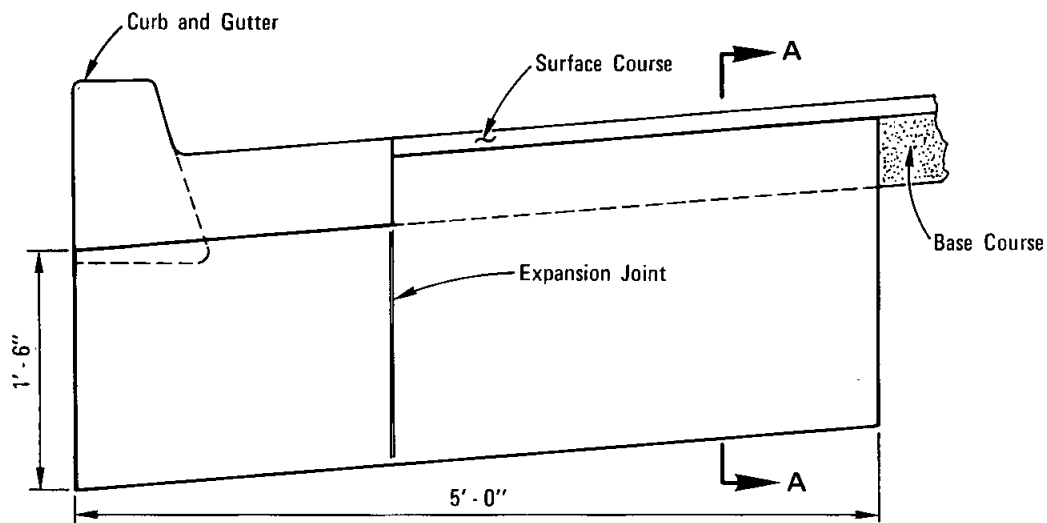


TYPICAL PLAN

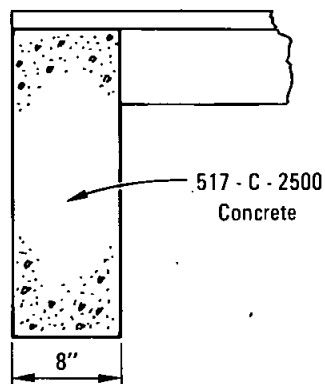
NOTES

1. Concrete shall be 564 - C - 3000.
2. See Standard Drawing G-10 for joint details.
3. Adjust 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	
				CONCRETE PAVEMENT, ALLEY SECTION, WIDTH 40' OR LESS		<i>Allan Q. Kersch</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
							Date
						DRAWING NUMBER	G-21

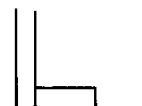


ELEVATION



SECTION A-A

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

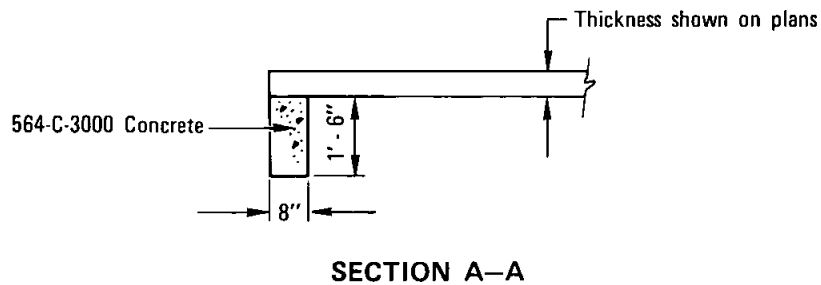
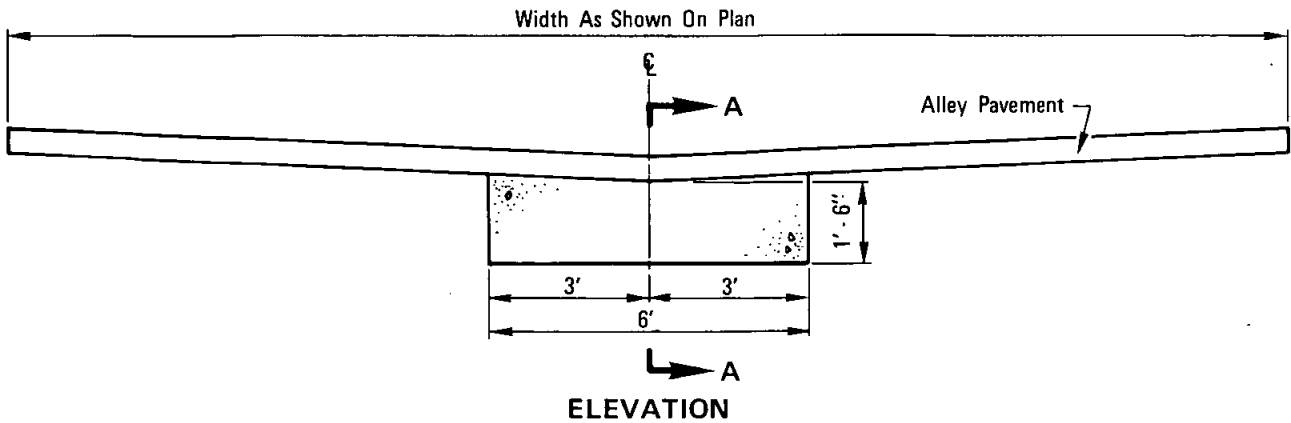
DRAWING
NUMBER

G-22

SAN DIEGO REGIONAL STANDARD DRAWING

**CUTOFF WALL AT END
OF PAVEMENT**

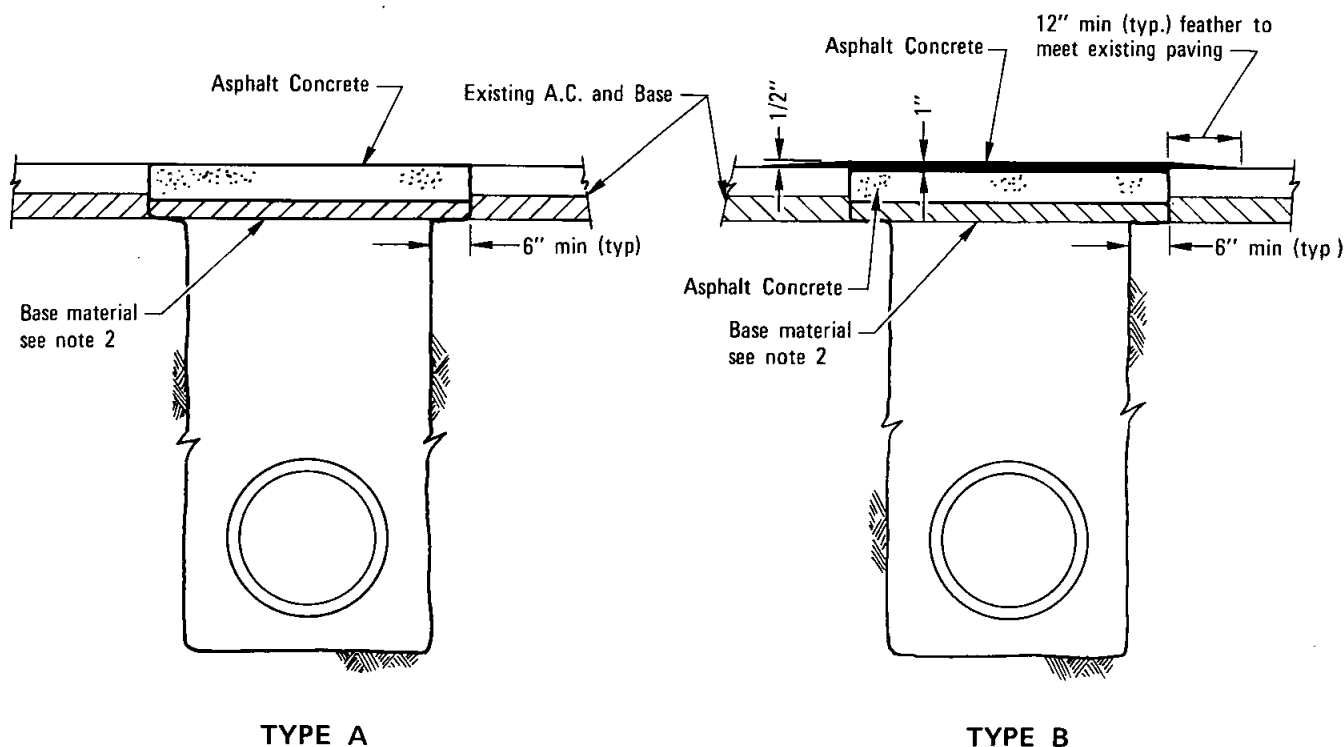
Revision	By	Approved	Date



LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CUTOFF WALL AT END OF ALLEY PAVEMENT		<i>Alfred A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	G-23



NOTES

1. Existing A.C. shall be cut and removed in such a manner so as not to tear, bulge or displace adjacent pavement. Edges shall be clean and vertical. All cuts shall be parallel or perpendicular to street centerline, when practical.
2. Base material to be replaced to depth of existing base. A.C. may be substituted for base material.
3. A tack coat of asphaltic emulsion or paving asphalt shall be applied to existing A.C. at all contact surfaces, prior to resurfacing.
4. Asphaltic Concrete Resurfacing:
 - a) Minimum total thickness shall be one inch greater than existing A.C.
 - b) A.C. shall be hot plant mix.
 - c) Finish course for Type B resurfacing shall be laid down using a spreader box.
5. All A.C. resurfacing shall be seal coated with an emulsified asphalt and covered with sand. Chip sealing shall be applied as required by Agency.
6. Type B not to be used on lateral crossings.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschman *Dec. 1975*
Coordinator R.C.E. 19807 Date

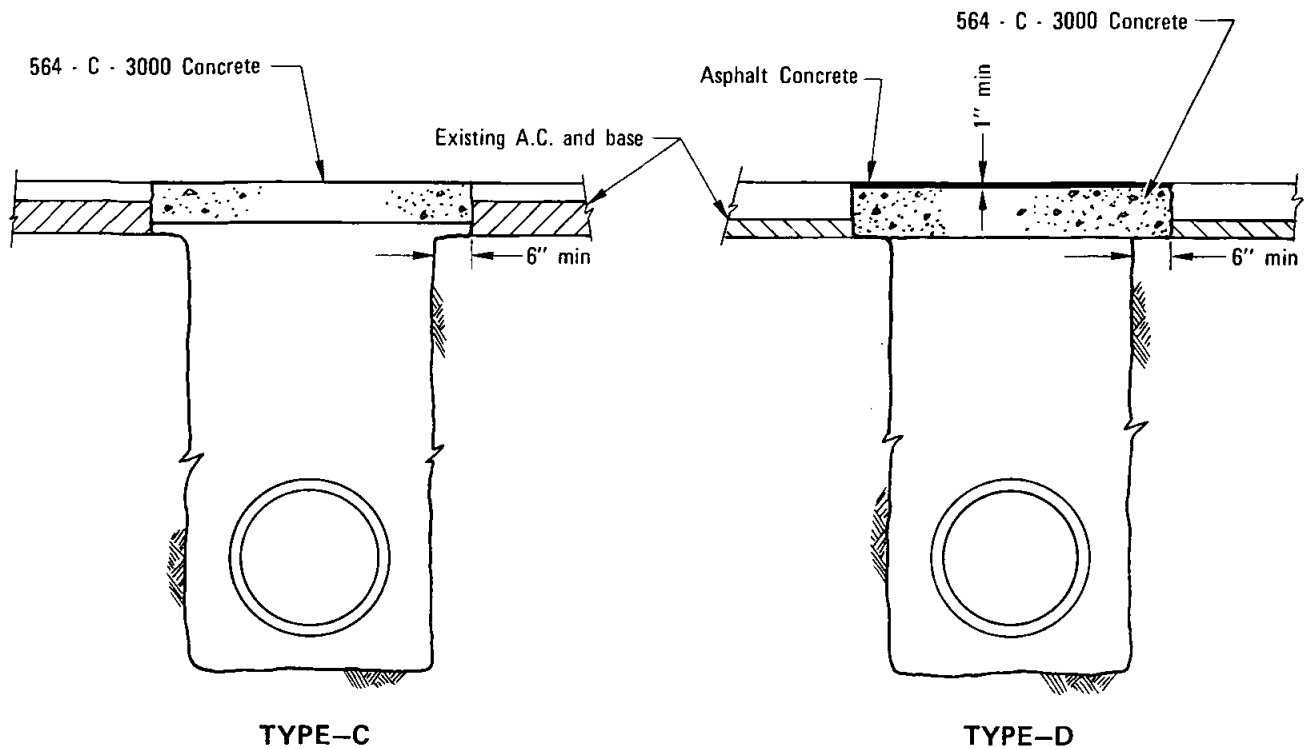
SAN DIEGO REGIONAL STANDARD DRAWING

TRENCH RESURFACING TYPES A & B

DRAWING
NUMBER

G-24

Revision	By	Approved	Date



GENERAL NOTES

- Existing A.C. shall be cut and removed in such a manner so as not to tear, bulge or displace adjacent pavement. Edges shall be clean and vertical. All cuts shall be parallel or perpendicular to street centerline, when practical.

NOTES TYPE-C

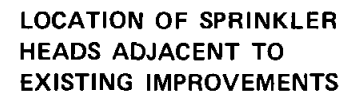
- Concrete shall be colored black. Method to be specified by Agency.
- Minimum concrete thickness:
 - Alleys and local residential streets 5 inches
 - Major streets and highways 7 inches

NOTES TYPE-D

- A.C. shall be hot plant mix.
- A tack coat of asphaltic emulsion or paving asphalt shall be applied to the existing A.C. at all contact surfaces and to the portland concrete prior to placing the new A.C.
- A.C. resurfacing shall be seal coated with an emulsified asphalt and covered with sand. Chip sealing shall be applied as required by Agency.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				TRENCH RESURFACING TYPES C & D		<i>Allard G. Kuehn</i> <i>Dec. 1975</i>
						Coordinator R.C.E. 19807 Date
				DRAWING NUMBER		G-25

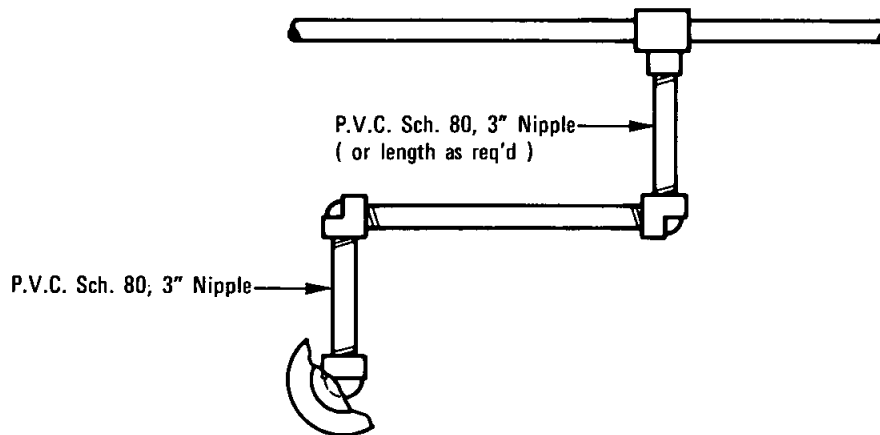
SPRINKLER IRRIGATION SYSTEMS



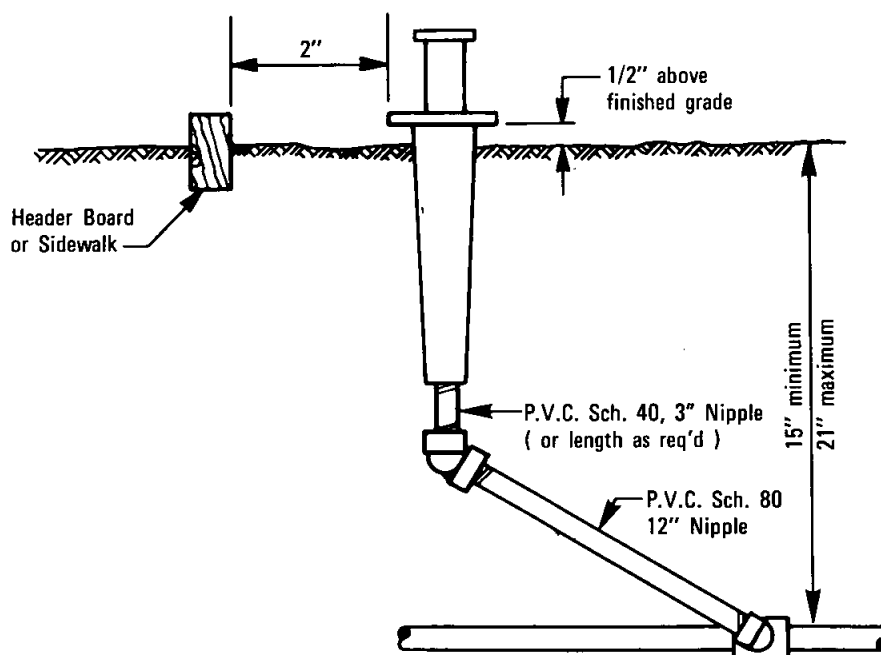
1. Teflon tape, 3/4" wide, shall be used on all threaded connections.
2. Close nipples shall not be used.

Show a number to indicate type head.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Allan A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
				SHRUBBERY SPRINKLER HEAD FIXED SPRAY TYPE	DRAWING NUMBER I-1



PLAN



ELEVATION

NOTES

1. All fittings shall be P.V.C. Sch. 40.
2. Teflon tape, 3/4\"
3. Short nipples shall not be used.

LEGEND ON PLANS

Show a number to indicate type head

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

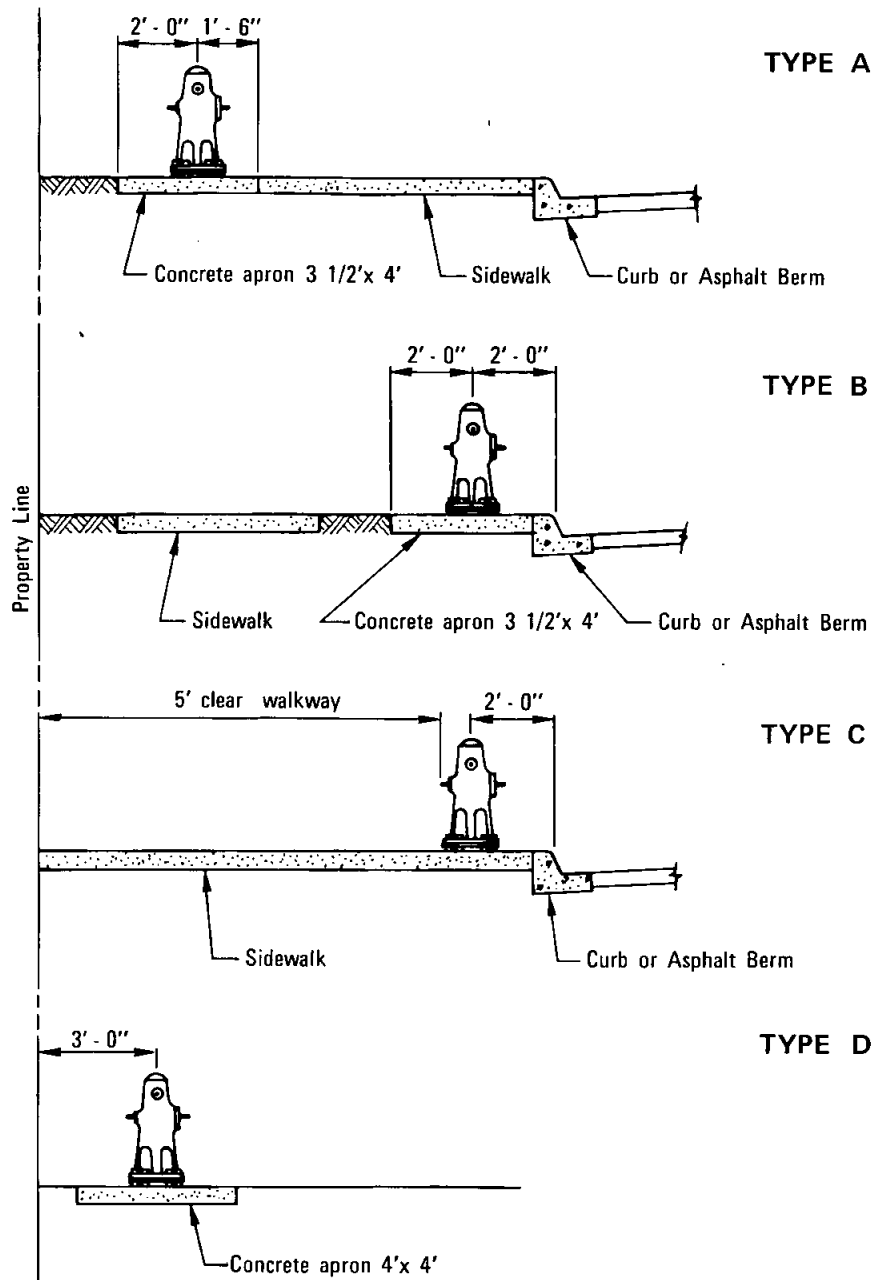
Allan A. Kershner *Dec. 1975*
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

LAWN SPRINKLER HEAD POP UP SPRAY TYPE

DRAWING
NUMBER 1-2

Revision	By	Approved	Date



NOTES:

1. Apron, where required by Agency, shall be 4" thick (470-C-2000) concrete.
2. When distance from hydrant to the top or toe of slope is less than 2' - 0", special hydrant installation will be required by Agency.
3. Where hydrant is not protected by a vertical face curb protective posts are required. See Standard Drawing W-16 for details.
4. Hydrant shall be located 5' from curb return, 3' min from driveway, on property line extension, or as shown on plans.

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

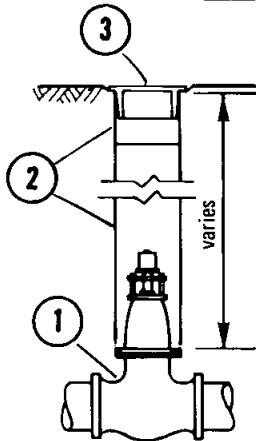
FIRE HYDRANT LOCATIONS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

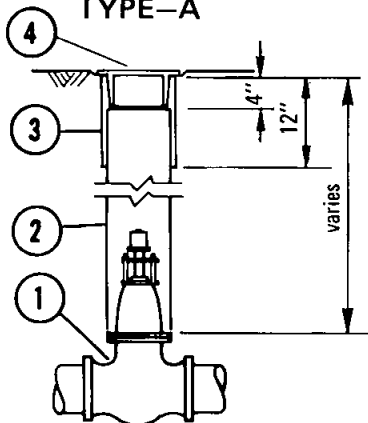
Alfred A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

**DRAWING
NUMBER**

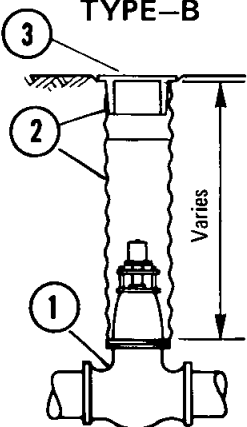
W-11



TYPE-A



TYPE-B



TYPE-C

- ① Valve
- ② 8" Asbestos Cement Pipe, Class 150
- ③ 8" Valve Well Cap with 4" Skirt

NOTES

1. Provide clamp or felt to hold pipe sections (item 2) together during backfill.
2. Pipe shall be saw or machine cut on each end, no beveled sections will be permitted.
3. The final adjustment to finish grade may be made with an asbestos cement ring of 1" minimum height.

- ① Valve
- ② 8" O.D. Steel Pipe, or 10 Ga. Asphalt Coated and Lined.
- ③ 8 5/8" O.D. Steel Pipe or 10 Ga. Asphalt Coated and Lined.
- ④ 8" Valve Well Cap with 4" Skirt

- ① Valve
- ② 8" Corrugated Steel Pipe, 16 Gage
- ③ 8" Valve Well Cap with 4" Skirt

NOTE

Pipe sections shall be tack welded together.

GENERAL NOTES

1. Clearance around cover shall permit lifting by hand without damage to pipe.
Maximum clearance shall be 3/16".
2. See Standard Drawing W-13 for valve stem extension, when required by Agency.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

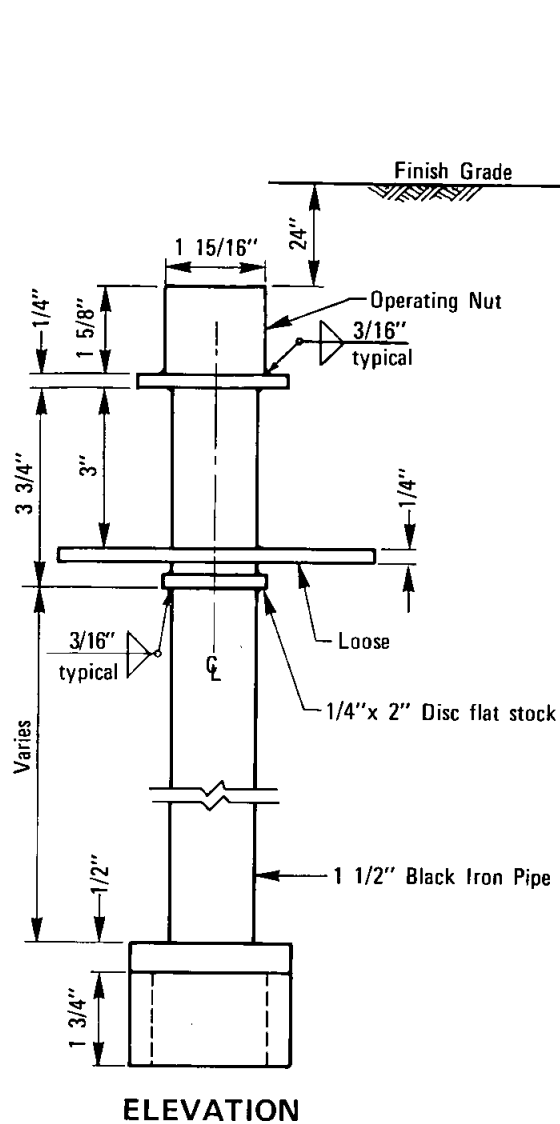
Allan G. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

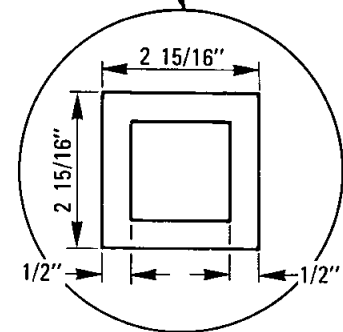
VALVE WELL INSTALLATION

DRAWING
NUMBER **W-12**

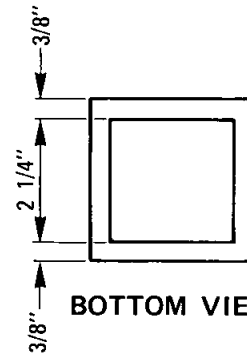
Revision	By	Approved	Date



Diameter varies. Make 1/4" less than I.D. of can.



TOP VIEW

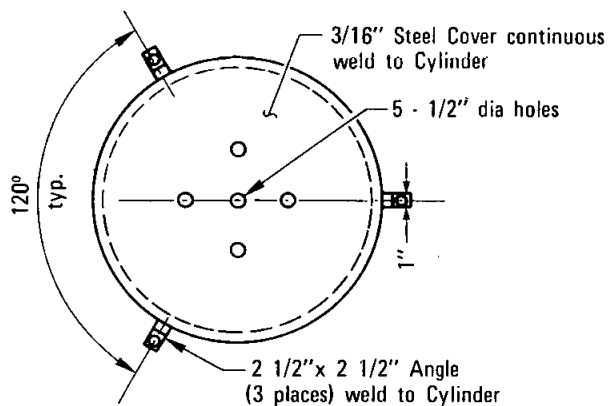


BOTTOM VIEW

NOTES

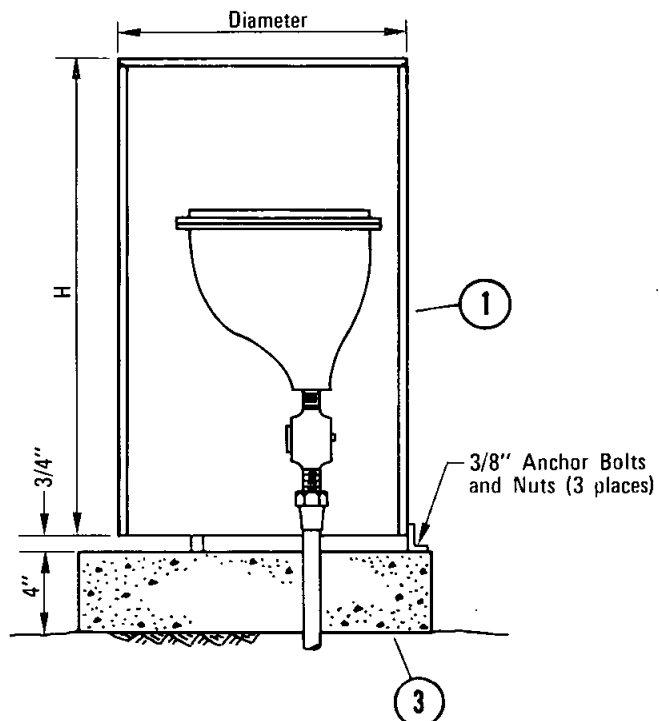
1. Extension to be used when top of valve nut is 5' or more below finish grade.
2. Paint all finished surfaces with asphalt varnish.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				VALVE STEM EXTENSION		<i>Allan A. Kerschbaum</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	W-13

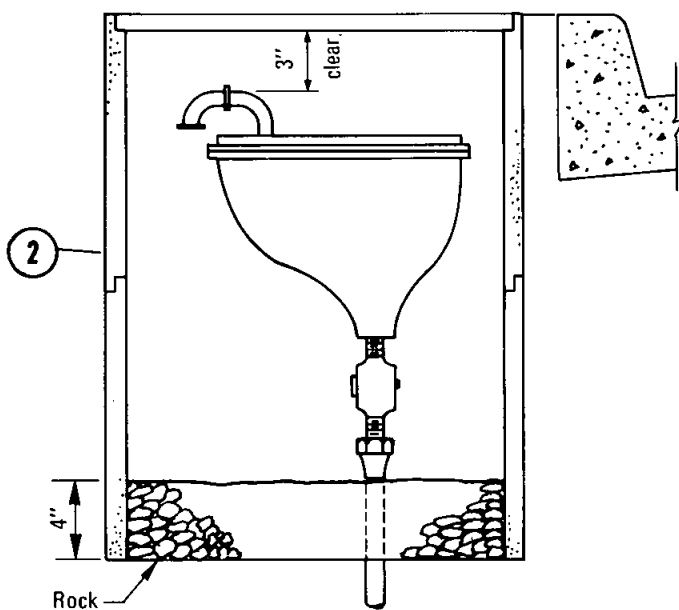


PLAN

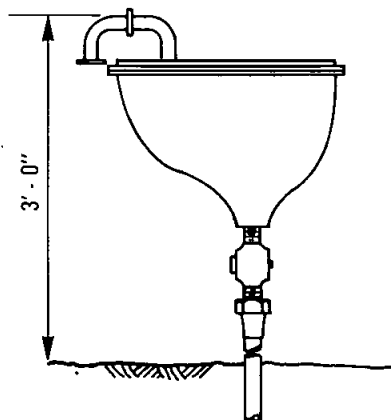
Valve Size	Dia	H
1" & 2"	14"	24"
4"	14"	30"
6"	16"	36"



TYPE A



TYPE B



TYPE C

- 1 Steel enclosure, paint as specified by Agency.
- 2 Meter box, see Standard Drawing W-15 for location.
- 3 2' x 2' pad, 470 - C - 2000 Concrete

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

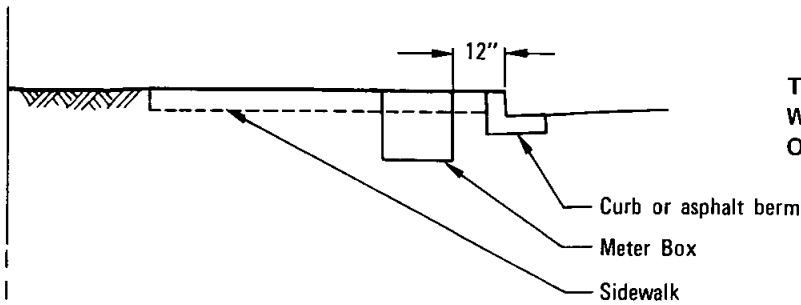
DRAWING
NUMBER

W-14

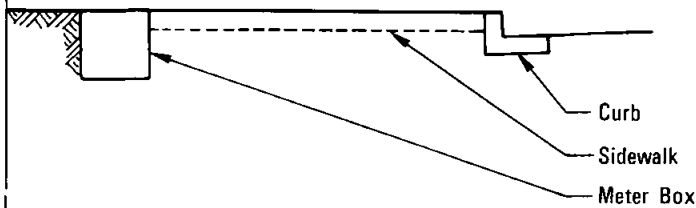
SAN DIEGO REGIONAL STANDARD DRAWING

AIR AND VACUUM VALVE ENCLOSURES

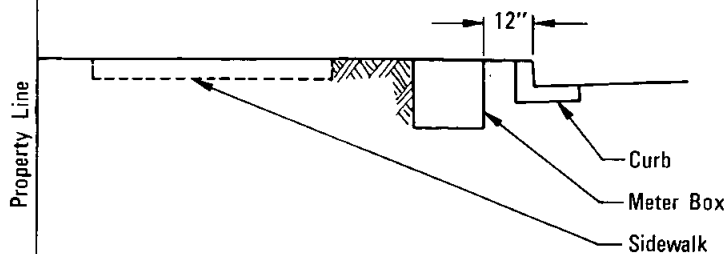
Revision	By	Approved	Date



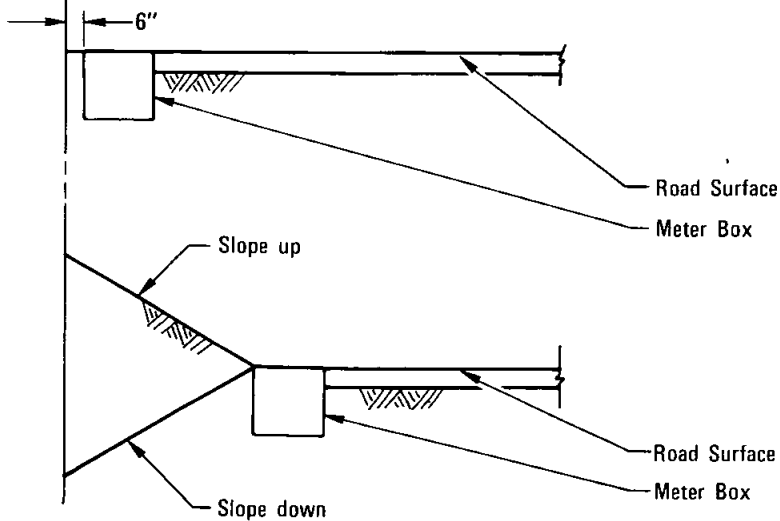
TYPE *A1
WITH OR WITHOUT COMMERCIAL
OR RESIDENTIAL SIDEWALK



TYPE *A2
CONTIGUOUS SIDEWALK



TYPE B
NON-CONTIGUOUS SIDEWALK



TYPE C
NO CURB

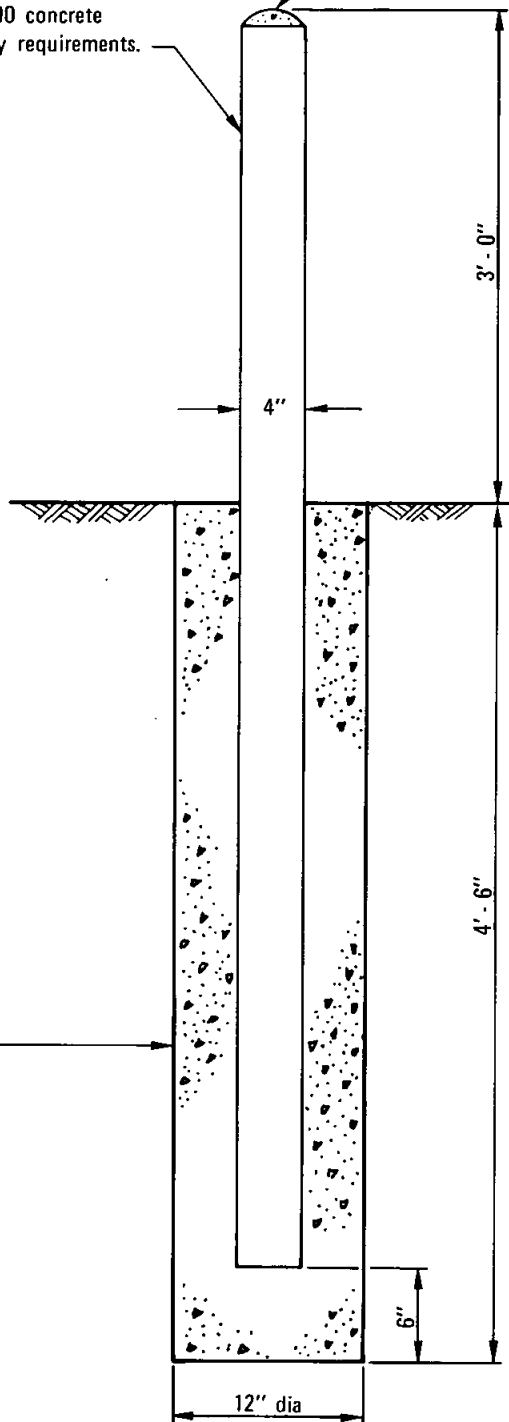
TYPE D
NO CURB

* Agency to determine alternate

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				METER BOX LOCATIONS		<i>Allan A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	W-15

4" steel pipe filled with 470 - C - 2000 concrete
and painted in accordance with Agency requirements.

Rounded Concrete



470 - C - 2000 concrete

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kerschman Dec. 1975
Coordinator R.C.E. 19807 Date

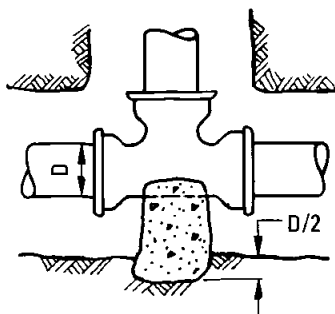
SAN DIEGO REGIONAL STANDARD DRAWING

PROTECTION POST

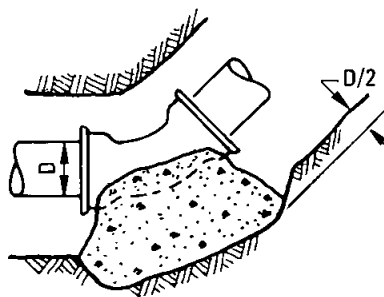
DRAWING
NUMBER

W-16

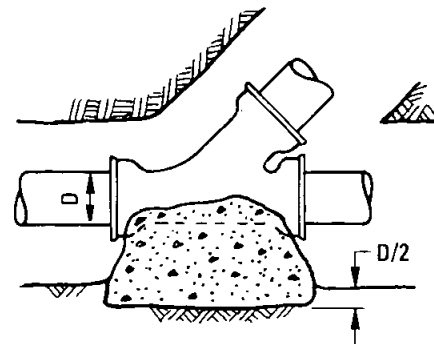
Revision	By	Approved	Date



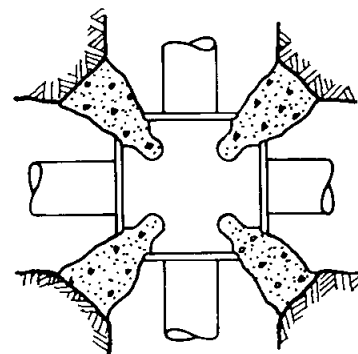
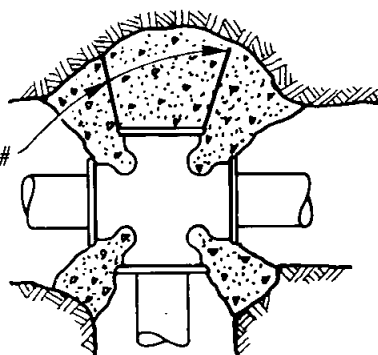
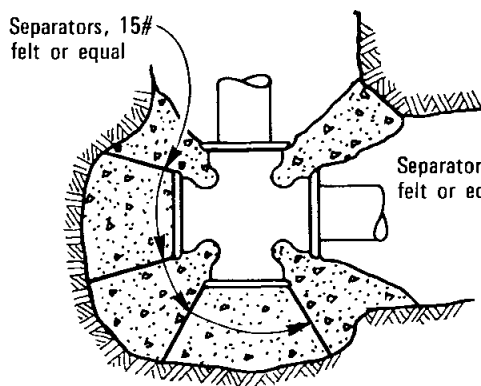
TEE



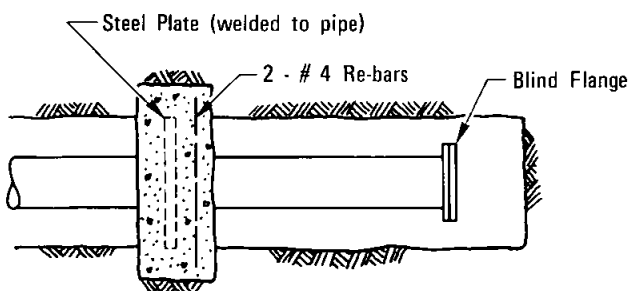
HORIZONTAL OR
VERTICAL BEND



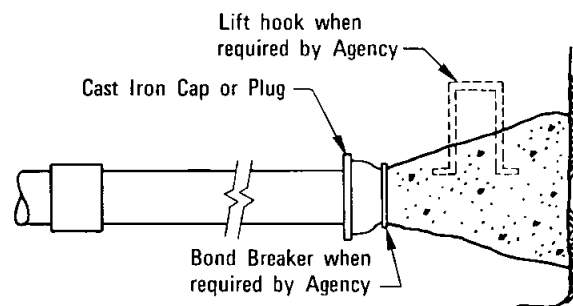
WYE



CROSS BLOCKING



STEEL PIPE
PLAN



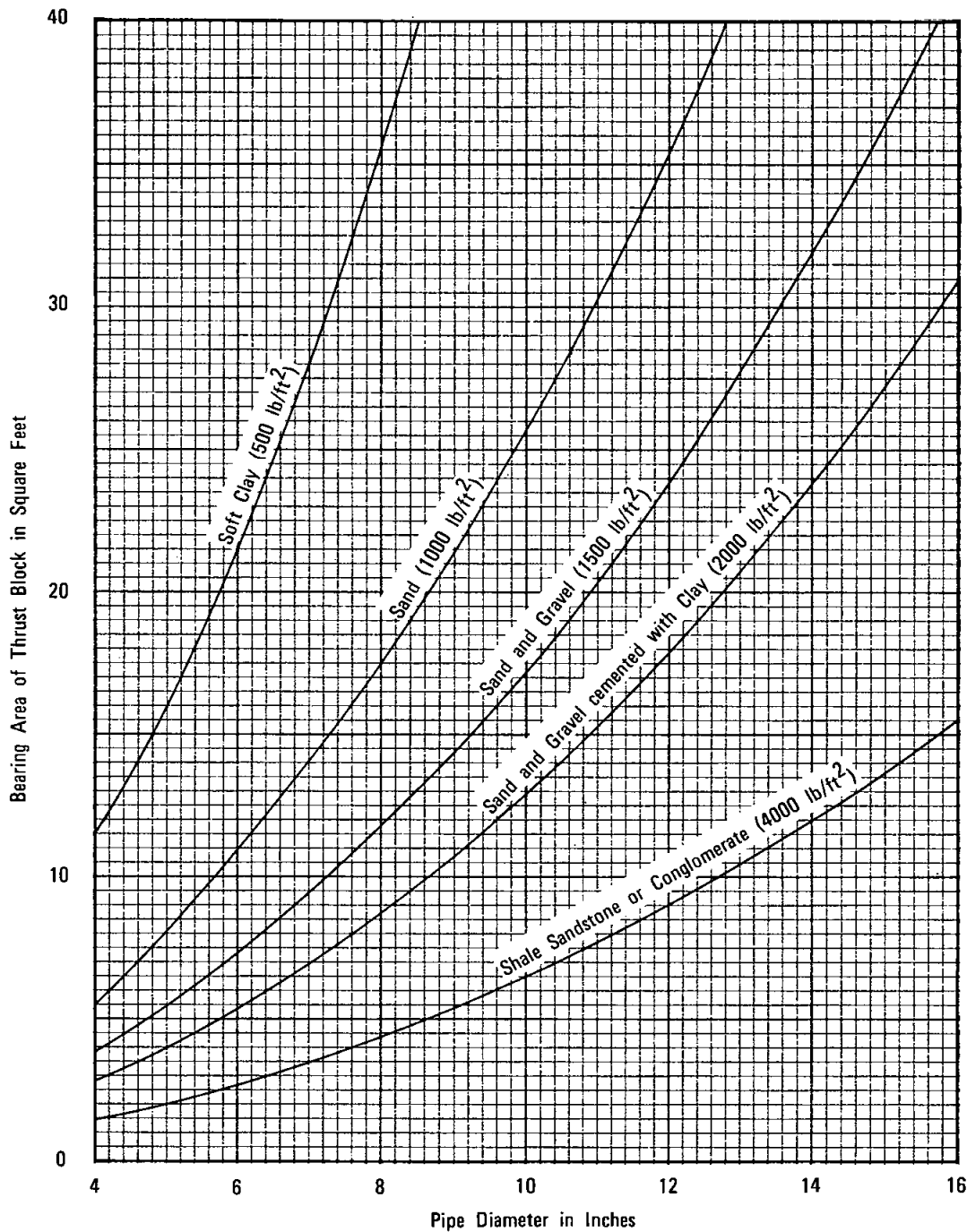
A.C. PIPE
ELEVATION

DEAD END BLOCKING

NOTES

1. Concrete shall be 470 - C - 2000.
2. See Standard Drawing W-18 for bearing areas.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CONCRETE THRUST BLOCKS		<i>Alfred A. Kuehn</i> <i>Dec. 1975</i>	
						Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER	
						W-17	



NOTES

1. Based on 225 psi test pressure and bearing values of dry soils.
2. Values from curves are for tees and deadends, i.e.; straight line thrust.
For 90° bend: 1.4 value from curve.
For 45° bend: 0.8 value from curve.
For 22 1/2° bend: 0.4 value from curve.
3. For conditions not covered by curves, special thrust blocks must be computed and approved.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

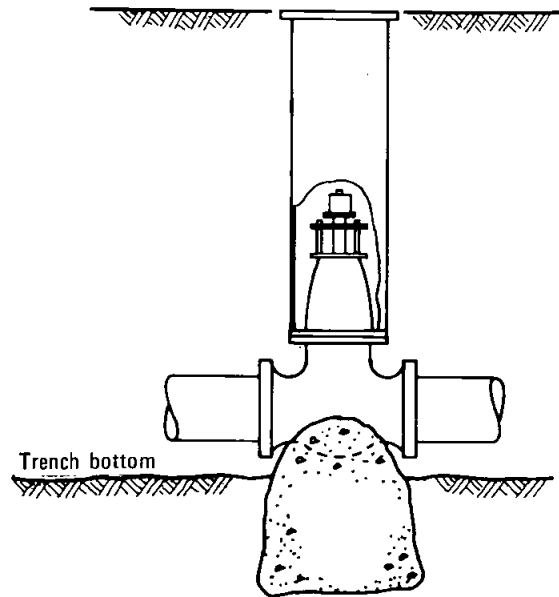
Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **W-18**

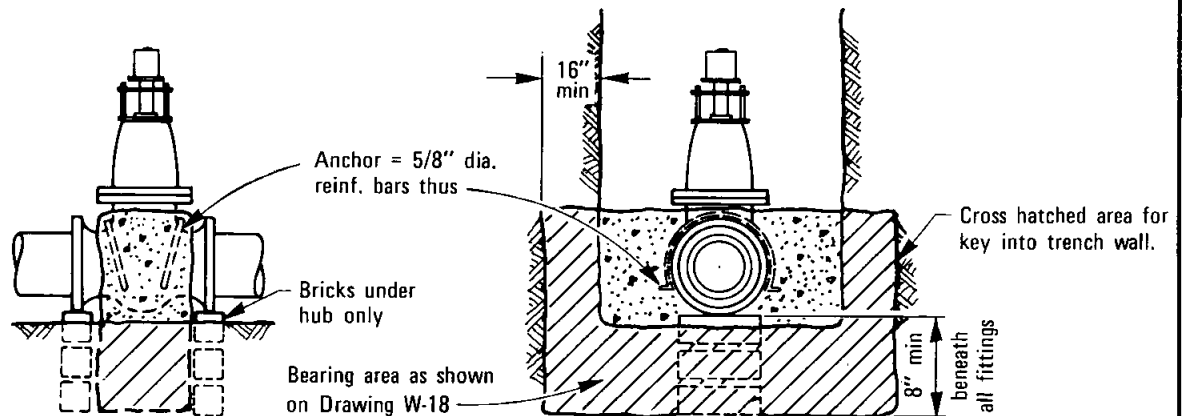
SAN DIEGO REGIONAL STANDARD DRAWING

THRUST BLOCK BEARING AREAS

Revision	By	Approved	Date



TYPE-A SUPPORT BLOCK

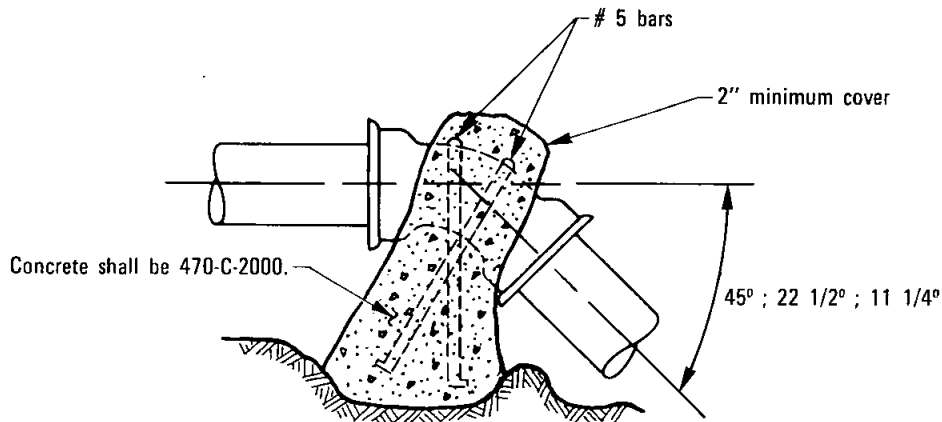


TYPE-B THRUST BLOCK

NOTE

Concrete shall be 470-C-2000.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CONCRETE VALVE BLOCKING		<i>Allan A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
							Date
						DRAWING NUMBER	W-19



Pipe Nominal Dia	Cubic Ft. Of Concrete Required per 100 P.S.I. Pressure *		
	45°	22 1/2°	11 1/4°
4	7	4	2
6	15	8	4
8	27	14	7
10	* *	21	11
12	* *	* *	16

* Increase volumes shown in proportion to pressures existing when pressure testing pipeline.

* * Special design required.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

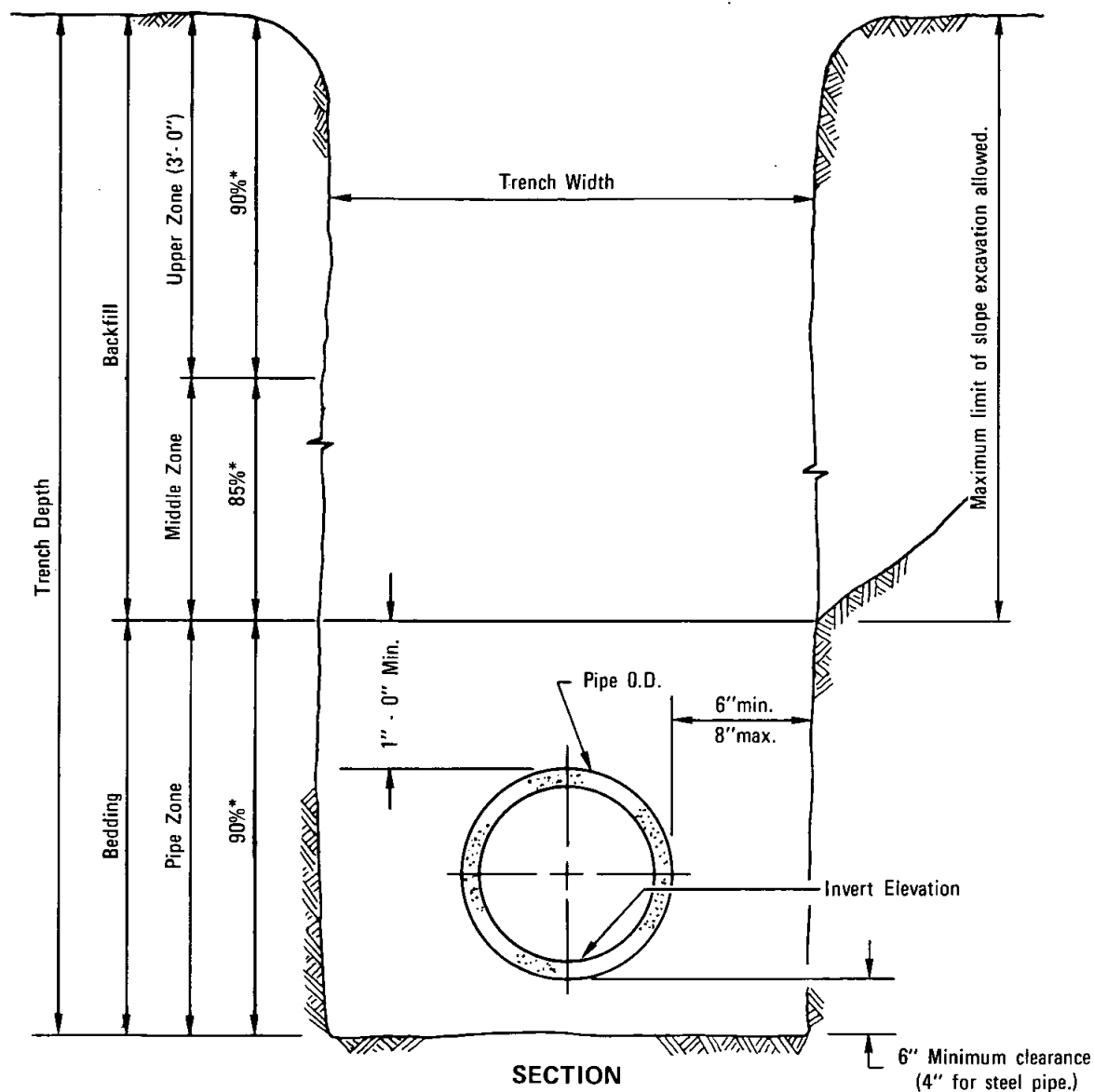
DRAWING
NUMBER

W-20

SAN DIEGO REGIONAL STANDARD DRAWING

**ANCHOR BLOCK
(VERTICAL BEND ONLY)**

Revision	By	Approved	Date



NOTES

1. For trenching on improved streets see standard drawing G-24 or G-25 for resurfacing details.
2. (*) indicates minimum relative compaction.

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE BEDDING AND TRENCH BACKFILL FOR WATER MAINS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

W-21