RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

STANDARD DRAWINGS

Jason E. Uhley
General Manager - Chief Engineer

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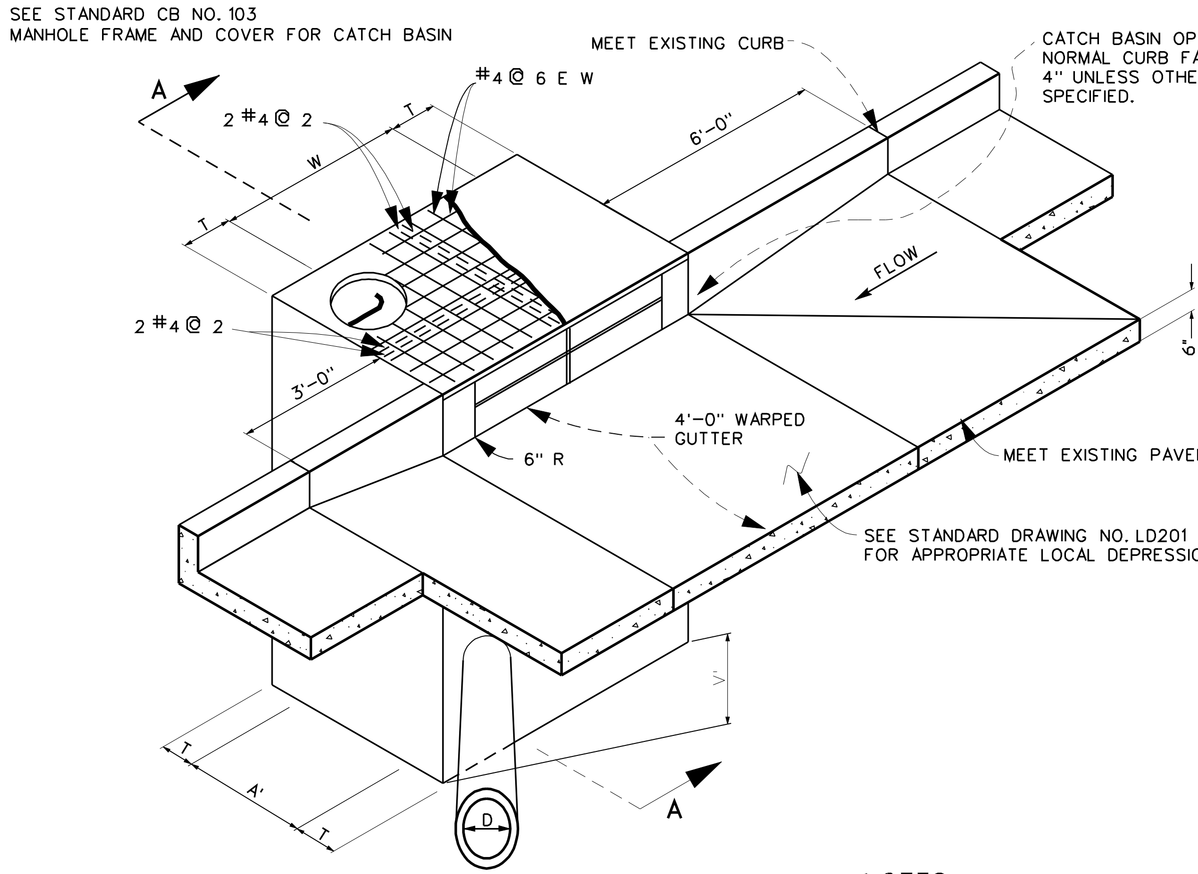
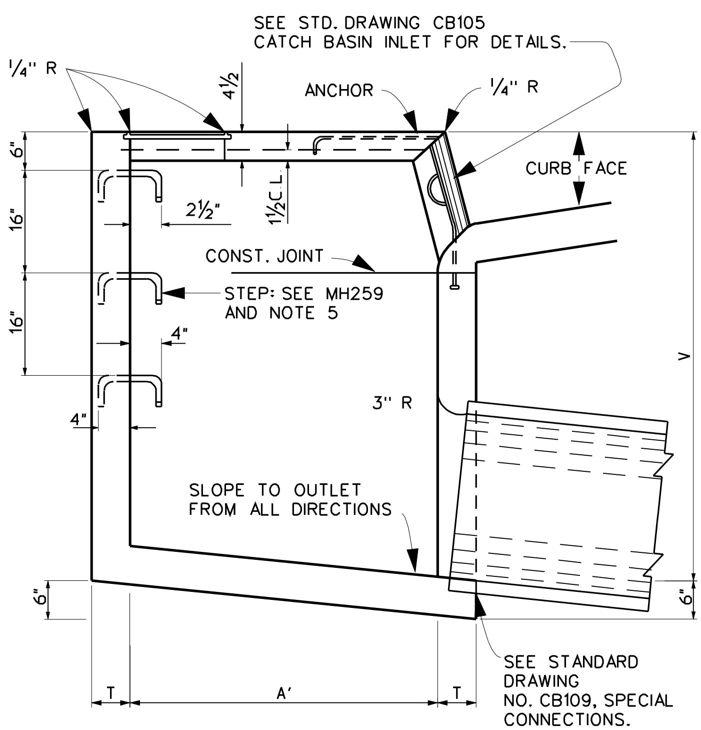
REVISION LOG

STANDARD DRAWING NUMBER		ORIGINAL DATE	EFFECTIVE DATE
CB100		11-1971	01-2005
CB101		06-1971	04-2004
CB102		05-1972	04-2004
CB103		11-1971	04-2004
CB104		06-1971	04-2004
CB105		05-1986	04-2004
CB106		06-1971	04-2004
CB107		06-1971	04-2004
CB108		06-1971	04-2004
CB109		06-1971	04-2004
CB110		10-1973	04-2004
LD201		11-1971	04-2004
LD202		06-1971	04-2004
JS226		06-1971	06-2018
JS227		06-1971	06-2018
JS228		06-1971	06-2018
JS229		11-1971	06-2018
JS230		11-1971	07-2020
JS231		11-1980	06-2018
JS232		06-1986	06-2018
JS233		10-2009	06-2018
MH251		06-1971	01-2011
MH252		06-1971	01-2011
MH253		06-1971	01-2011
MH254		06-1971	01-2011
MH255	(DELETED)	06-1971	04-2004
MH256		05-1972	04-2004
MH257		06-1971	04-2004
MH258		05-1972	04-2004
MH259		06-1971	04-2004
MH260		09-2016	09-2016
MH261		04-2004	10-2024
TS301		06-1971	01-2011
TS302		05-1972	01-2011
TS303		05-1972	01-2011
TS304		05-1972	01-2011
CH323		10-2009	03-2024
CH324		10-2009	03-2024
CH325		10-2009	03-2024
CH326		09-1971	03-2024
CH327		07-1976	04-2004
CH328		11-1971	04-2004
CH329		09-1976	01-2005
CH330		05-1972	03-2024
CH331		05-1972	03-2024
CH332		11-1971	04-2004

CH333		05-1984	04-2004
CH334		10-2009	10-2009
CH335		10-2009	10-2009
BX401		07-1976	04-2004
BX402	(DELETED)	05-1972	04-2004
BX403	(DELETED)	05-1972	04-2004
M801		02-1995	01-2005
M802	(DELETED)		
M803		06-1971	04-2004
M804	(DELETED)	11-1971	04-2004
M805	(DELETED)	05-1972	04-2004
M806	(DELETED)	06-1971	04-2004
M807		06-1971	04-2004
M808		06-1971	04-2004
M809	(DELETED)	06-1971	04-2004
M810	(DELETED)	06-1971	04-2004
M811	(DELETED)	06-1971	04-2004
M812	(DELETED)		
M813	(DELETED)	05-1972	04-2004
M814		07-1974	04-2004
M815		10-1975	09-2017
M816		10-1975	04-2004
M817		10-1975	04-2004
M818		03-1982	04-2004
M819		08-1977	04-2004
M820		04-1981	04-2004
M821	(DELETED)	10-1982	04-2004
M822	(DELETED)	11-1982	04-2004
M823		06-1988	04-2004
M824		06-1988	04-2004
M825		06-1988	04-2004
M826		11-1991	04-2004
M827		04-2004	04-2004



PERSPECTIVE OF
CATCH BASIN NO.1



SECTION A-A

NOTES

1. DIMENSIONS: UNLESS OTHERWISE SPECIFIED
   V' = 6"@ W =7',9"@ W =14',12"@ W =21'
   V = SHALL BE SHOWN ON THE PLANS.
   W = SHALL BE SHOWN ON THE PLANS (7 FOOT MIN.)
   T = 6" IF V IS 4' OR LESS.
   T = 8" IF V IS LESS THAN 8'.
   T = 10" IF V IS 8' OR MORE.
   D = 18" UNLESS OTHERWISE SPECIFIED.
   A' = 38" UNLESS OTHERWISE SPECIFIED.
2. STRUCTURAL CONCRETE SHALL BE CLASS "A" P.C.C. (6 SACK)
3. THE REINFORCING STEEL SHALL BE NUMBER 4 DEFORMED BARS. CLEARANCE SHALL BE 1 1/2" FROM THE BOTTOM OF THE SLAB. SEE NOTE 7.
4. THE SURFACE OF ALL EXPOSED CONCRETE SHALL CONFORM TO SLOPE, GRADE, COLOR, FINISH AND SCORING IN THE EXISTING OR PROPOSED CURB & WALK ADJACENT TO THE BASIN. THE BASIN FLOOR SHALL BE GIVEN A TIGHT WOOD FLOAT FINISH. CURVATURE OF THE LIP AND SIDEWALLS AT THE GUTTER OPENING SHALL NOT BE MADE BY PLASTERING. THE OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE THE CONCRETE IS POURED.
5. STEPS:
   3/4" PLAIN ROUND GALVANIZED STEEL STEPS SHALL BE INSTALLED 16" APART WHEN V EXCEEDS 4'-6". THE TOP STEP SHALL BE 6" BELOW THE TOP SURFACE AND SHALL BE 2 1/2" CLEAR FROM THE WALL . ALL OTHER STEPS SHALL BE 4" CLEAR FROM THE WALL. ONLY ONE STEP 12" FROM THE BOTTOM SHALL BE INSTALLED IF V IS 4'-6" OR LESS. ALL STEPS SHALL BE ANCHORED NOT LESS THAN 4" INTO THE WALL OF THE BASIN.
6. CURB, GUTTER AND LOCAL DEPRESSIONS SHALL BE CLASS "B" CONCRETE.
7. SEE STANDARD DRAWING CB106 FOR WALL & FLOOR STEEL REINFORCING.

L.A.C.F.C.D. No. 2-D162, 2-D163

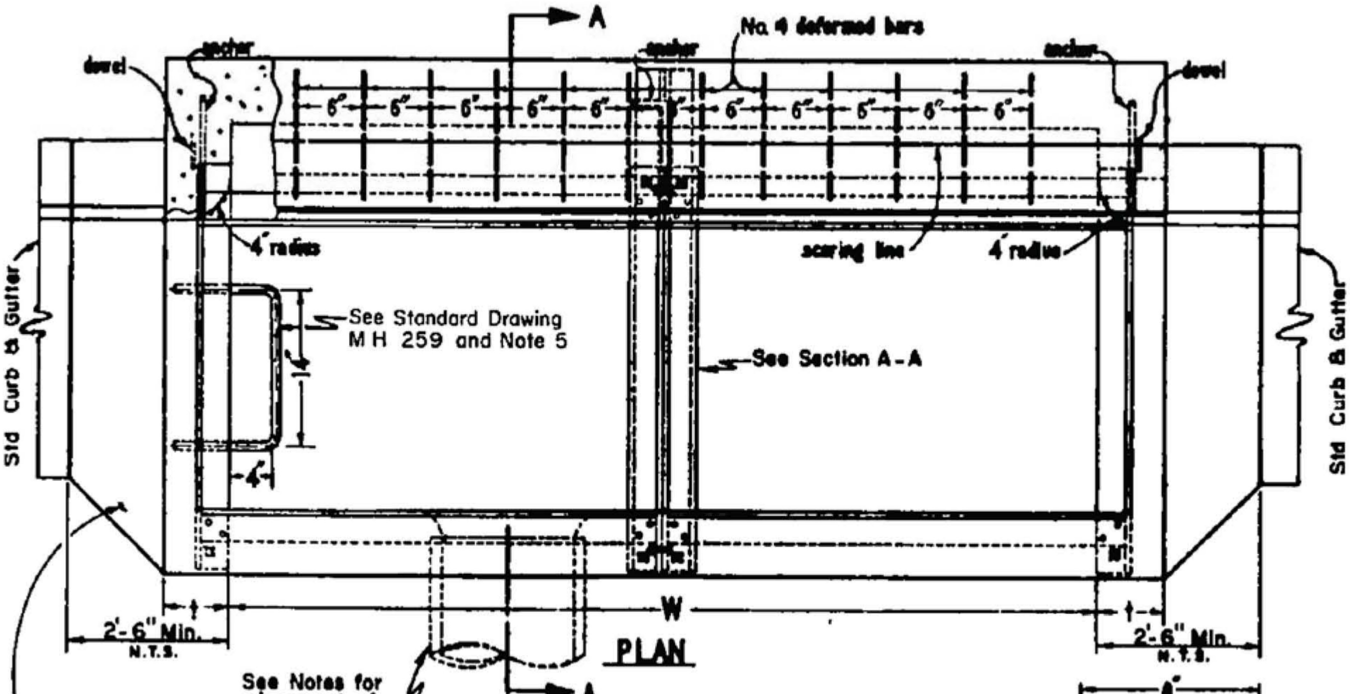
REGISTERED PROFESSIONAL ENGINEER
WARREN D. WILLIAMS
No. 32336
Exp. 12-31-06
CIVIL
STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

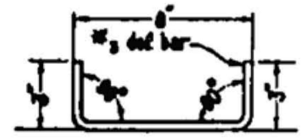
APPROVED BY:
CHIEF ENGINEER
DATE: JAN.10, 2005
R.E. NO. 32336

CATCH BASIN NO.1

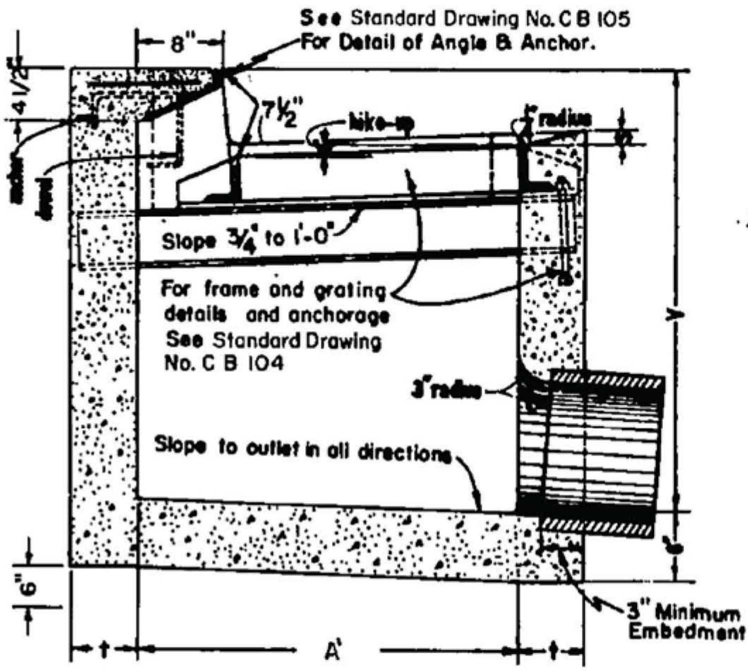
STANDARD DRAWING NUMBER CB100



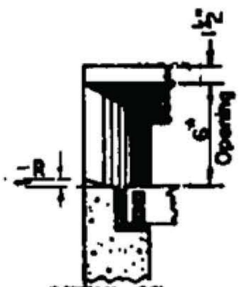
PLAN



DETAIL OF DOWEL



SECTION-AA



DETAIL OF END WALL

STEEL LIST					
No. of gratings	#4 Def bars 11" long	5/16"x10" Face Plate	Dowels	Anchors	3/4" Galv. steel steps
1	5	3'-11"	2	2	See notes
2	12	7'-4 3/4"	2	3	
3	19	10'-10"	2	4	

⚠

A'	GRATE TYPE
34"	R.C.F.C. STD. CB104
32"	CALTRANS STD. D77-B

CITY OF RIV. STD. NO. 406
CITY OF L.A. STD. NO. B-1536

REGISTERED PROFESSIONAL ENGINEER
WARREN D. WILLIAMS
No. 32336
Exp. 12-31-04
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STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

APPROVED BY:

CHIEF ENGINEER

DATE: April 5, 2004

R.C.E. NO. 32336

CATCH BASIN NO. 4

STANDARD DRAWING NUMBER CB101
SHEET 1 OF 2

NOTES FOR CATCH BASIN NO. 4

1. Dimensions: Unless otherwise specified.

   V = 3.5 feet.
   T = 6 inches, if V is 4 feet or less.
   T = 8 inches, if V is between 4 feet and 8 feet.
   T = 10 inches, if V is 8 feet or over.
   W = 2 feet, 11-3/8 inches for one grating. Add 3 feet, 5-3/8 inches for each additional grating.
   Hike-up shall be parallel to plane of gutter - slope 3/4 inch to 1 foot.
   Slope of floor parallel with curb shall be 1 in 12.

   S = $1\frac{1}{2}$ inches.
   R = 3/4 inch.

2. Concrete shall be Class "A" Portland Cement Concrete (6.0 Sack).

3. The reinforcing steel shall be Number 4 deformed bars. Clearance shall be 1-1/2 inches from top of slab. See standard drawing CB106 and note 3.

4. The surface of all exposed concrete shall conform to slope, grade, color, finish, and scoring in the existing of proposed curb and walk adjacent to the basin. The basin floor shall be given a tight wood float finish. Curvature of the lip and sidewalls at the gutter opening shall not be made by plastering. The outlet pipe shall be trimmed to final shape and length before the concrete is poured.

5. Steps: 3/4 inch plain round galvanized steel steps are required as follows:

   If V is 4.5 feet or less, no steps are required.
   If V is more than 4.5 feet, and not more than 5.0 feet, install one step 12 inches above floor of basin.
   If V is more than 5.0 feet, install steps 16 inches apart, with the top step 6 inches below the top of grating.
   All steps shall be 4 inches clear from the wall, and anchored not less than 4 inches in wall of basin.

CITY OF RIV. STD. NO. 406
CITY OF L.A. STD. NO. B-1536

REGISTERED PROFESSIONAL ENGINEER
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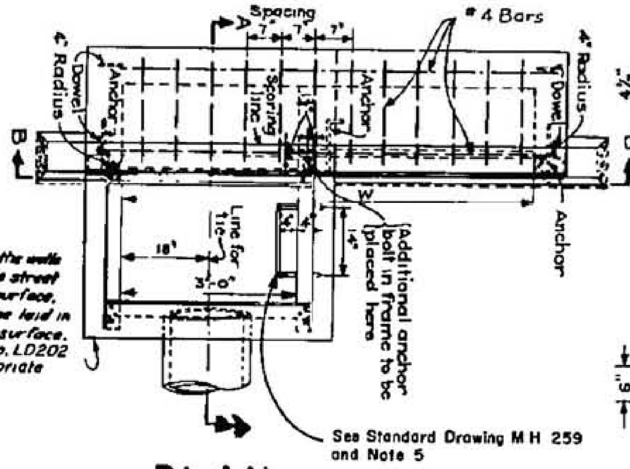
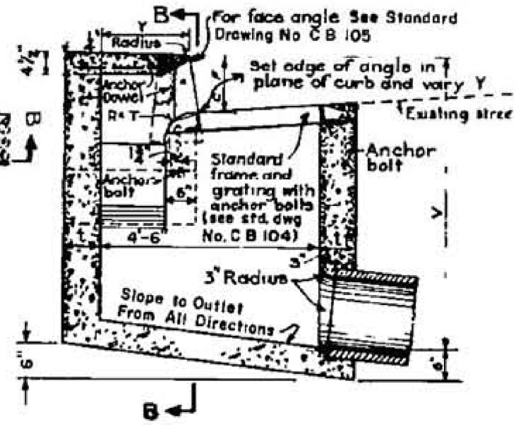
CIVIL
STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	CATCH BASIN NO. 4
APPROVED BY: CHIEF ENGINEER	
DATE: April 5, 2004 R.C.E. NO. 32336	STANDARD DRAWING NUMBER CB101 SHEET 2 OF 2

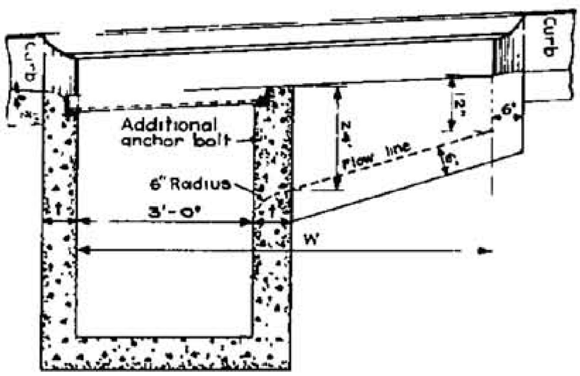


The outer edges of the walls shall conform to the street or local depression surface. The grating shall be laid in the plane of this surface. See Standard Dwg No. LD202 Note I(b) for appropriate local depression

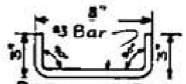
PLAN



SECTION A-A



SECTION B-B



DETAIL OF DOWEL

NOTES

1. DIMENSIONS: UNLESS OTHERWISE SPECIFIED V = 4.5 FEET. W = 7.0 FEET
   T = 6 INCHES IF V IS 5 FEET OR LESS. T = 8 INCHES IF V IS BETWEEN 5 FT. & 8 FEET.
   T = 10 INCHES IF V IS 8 FEET OR MORE. Y = 2 FEET 3 INCHES
2. CONCRETE SHALL BE CLASS "A" PORTLAND CEMENT CONCRETE (6.0 SACK).
3. THE REINFORCING STEEL SHALL BE NUMBER 4 DEFORMED BARS. CLEARANCE SHALL BE $1\frac{1}{2}$" FROM THE BOTTOM OF THE SLAB. SEE STANDARD DRAWING CB106-NOTE 3
4. THE SURFACE OF ALL EXPOSED CONCRETE SHALL CONFORM TO SLOPE, GRADE, COLOR, FINISH, AND SCORING IN THE EXISTING OR PROPOSED CURB AND WALK ADJACENT TO THE BASIN. THE BASIN FLOOR SHALL BE GIVEN A TIGHT WOOD FLOAT FINISH. CURVATURE OF THE LIP AND SIDEWALLS AT THE GUTTER OPENING SHALL NOT BE MADE BY PLASTERING. THE OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE THE CONCRETE IS POURED.
5. STEPS: 3/4 INCH PLAIN ROUND GALVANIZED STEEL STEPS SHALL BE INSTALLED 16 INCHES APART WHEN V EXCEEDS 4 FEET 6 INCHES. THE TOP STEP SHALL BE 6 INCHES BELOW THE TOP SURFACE AND SHALL BE 2 1/2 INCHES CLEAR FROM THE WALL. ALL OTHER STEPS SHALL BE 4 INCHES CLEAR FROM THE WALL. ONLY ONE STEP 12 INCHES FROM THE BOTTOM SHALL BE INSTALLED IF V IS 4 FEET 6 INCHES OR LESS. ALL STEPS SHALL BE ANCHORED NOT LESS THAN 4 INCHES INTO THE WALL OF THE BASIN.

REGISTERED PROFESSIONAL ENGINEER
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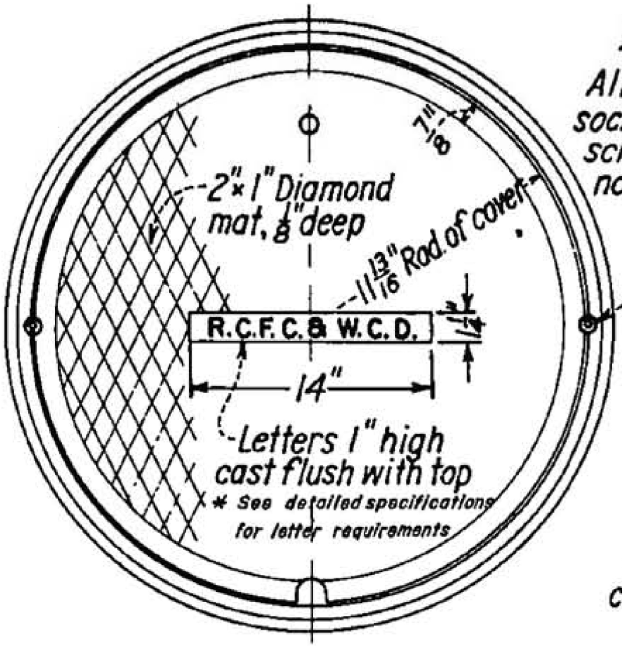
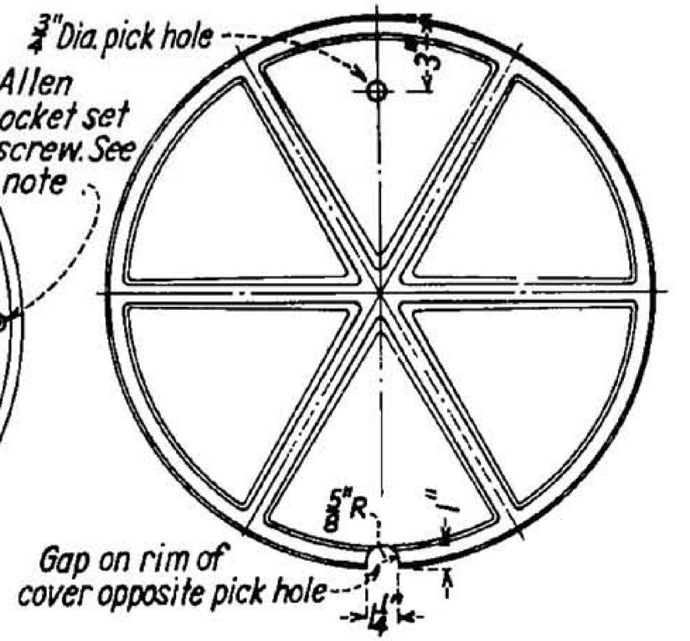
Exp. 12-31-04
CIVIL
STATE OF CALIFORNIA

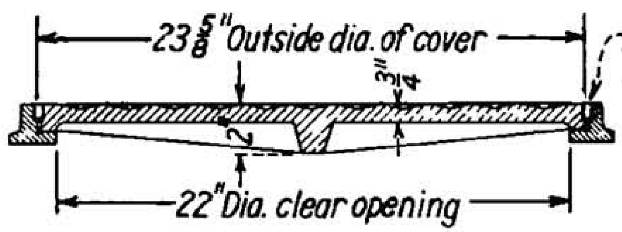
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT APPROVED BY: [illegible] CHIEF ENGINEER DATE: April 5, 2004 R.C.E. NO. 32338	CATCH BASIN NO. 6 STANDARD DRAWING NUMBER CB102



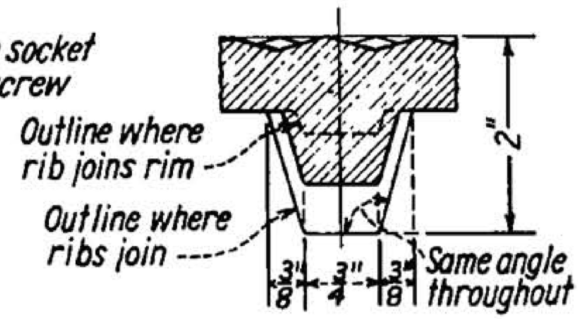
TOP OF MANHOLE FRAME & COVER
TOTAL WT. = 130 lbs.



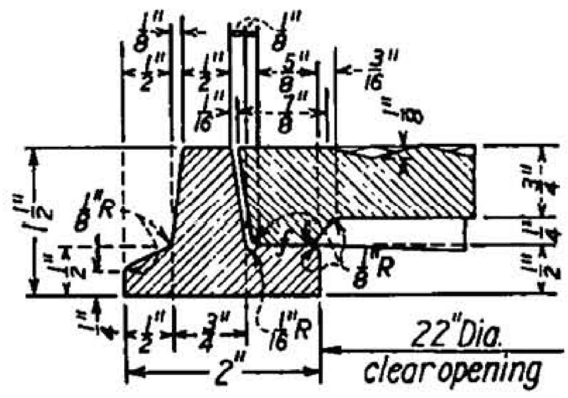
BOTTOM OF MANHOLE COVER



CROSS SECTION THRU FRAME & COVER



CROSS SECTION THRU RIB AT MID RADIUS



CROSS SECTION THRU RIM

NOTES

1. Frame and cover shall be gray cast iron conforming to the latest A.S.T.M. standard A48, class 30 or better. Galvanize per A.S.T.M.: A385.
2. Install two 3/4" × 3/4" Allen socket set screws, 90° to pick hole, in holes drilled and tapped 1" in depth. Galvanize per A.S.T.M. -153.
3. Frame and cover shall be tested for accuracy of fit and shall be marked in sets before delivery. Retap frame as required to suit set screws.

CITY OF RIV. STD. NO. B-2189
L.A.C.F.C.D. STD. NO. 2-D156

REGISTERED PROFESSIONAL ENGINEER
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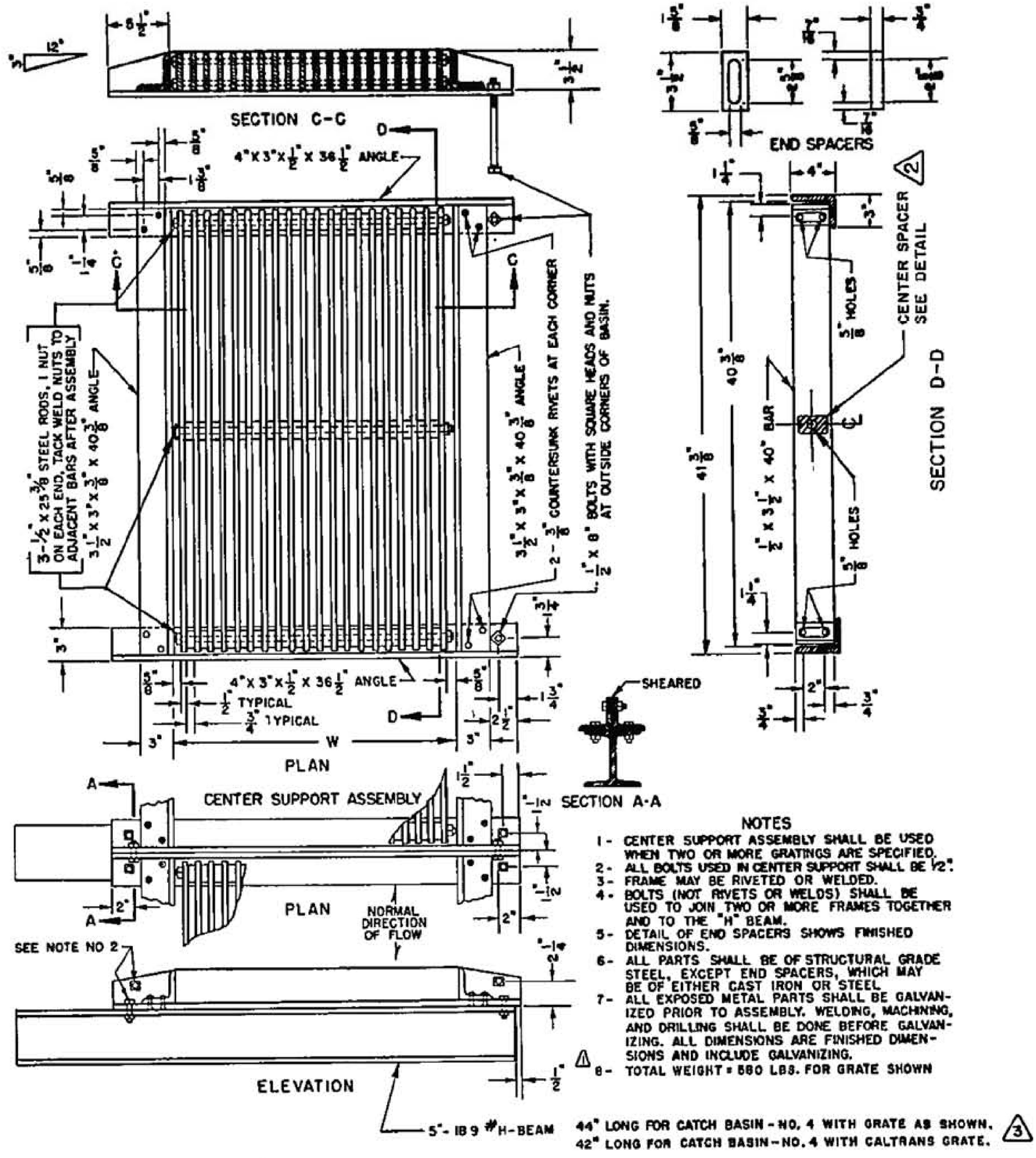
CIVIL
STATE OF CALIFORNIA

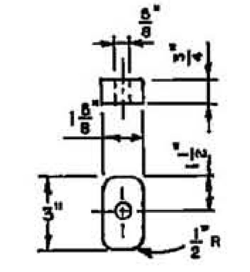
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	MANHOLE FRAME & COVER FOR CATCH BASINS
APPROVED BY: [illegible] CHIEF ENGINEER	
DATE: April 5, 2004 R.C.E. NO. 32336	STANDARD DRAWING NUMBER CB103



NOTES

1 - CENTER SUPPORT ASSEMBLY SHALL BE USED WHEN TWO OR MORE GRATINGS ARE SPECIFIED.
2 - ALL BOLTS USED IN CENTER SUPPORT SHALL BE 1/2".
3 - FRAME MAY BE RIVETED OR WELDED.
4 - BOLTS (NOT RIVETS OR WELDS) SHALL BE USED TO JOIN TWO OR MORE FRAMES TOGETHER AND TO THE "H" BEAM.
5 - DETAIL OF END SPACERS SHOWS FINISHED DIMENSIONS.
6 - ALL PARTS SHALL BE OF STRUCTURAL GRADE STEEL, EXCEPT END SPACERS, WHICH MAY BE OF EITHER CAST IRON OR STEEL.
7 - ALL EXPOSED METAL PARTS SHALL BE GALVANIZED PRIOR TO ASSEMBLY. WELDING, MACHINING, AND DRILLING SHALL BE DONE BEFORE GALVANIZING. ALL DIMENSIONS ARE FINISHED DIMENSIONS AND INCLUDE GALVANIZING.
1 8 - TOTAL WEIGHT = 560 LBS. FOR GRATE SHOWN

44" LONG FOR CATCH BASIN - NO. 4 WITH GRATE AS SHOWN.
42" LONG FOR CATCH BASIN - NO. 4 WITH CALTRANS GRATE. 3



4

W	GRATE TYPE
25 1/2"	AS SHOWN ABOVE
24"	CALTRANS STD. D77-B

CITY OF RIV. STD. NO. 406
CITY OF L.A. STD. NO. B-3656
L.A.C.F.C.D. STD. NO. 2-D227

REGISTERED PROFESSIONAL ENGINEER WARREN D. WILLIAMS No. 32336 Exp. 12-31-04 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

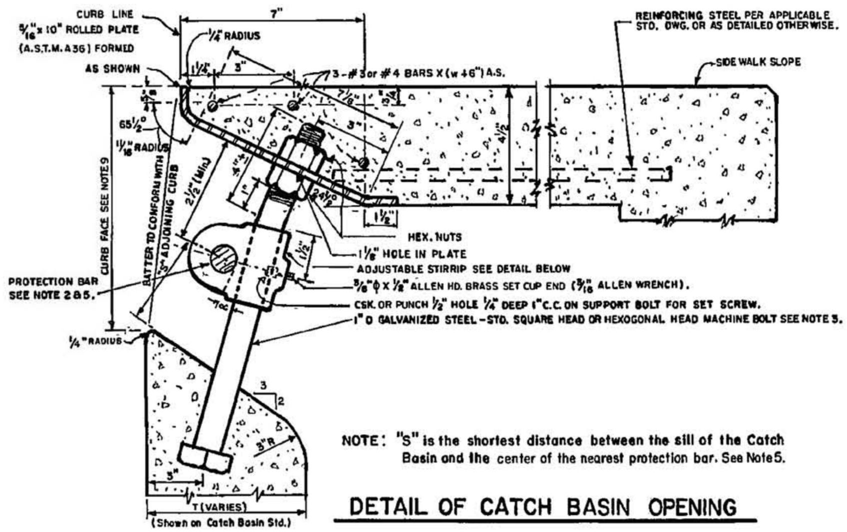
APPROVED BY: Warren D. Williams

CHIEF ENGINEER

DATE: April 5, 2004 R.C.E. NO. 32336

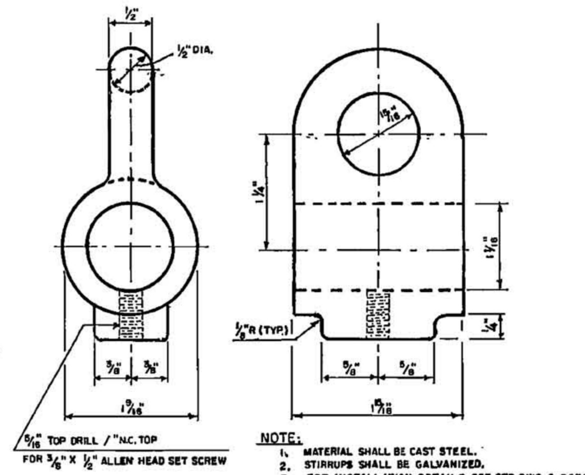
CATCH BASIN GRATE

STANDARD DRAWING NUMBER CB104



NOTE: "S" is the shortest distance between the sill of the Catch Basin and the center of the nearest protection bar. See Note5.

DETAIL OF CATCH BASIN OPENING



NOTE:
1. MATERIAL SHALL BE CAST STEEL.
2. STIRRUPS SHALL BE GALVANIZED.
3. FOR INSTALLATION DETAILS SEE STD.DWG. 2-D232.

ADJUSTABLE PROTECTION BAR STIRRUP

NOTES

1. SUPPORT BOLT ANGLE "∝" SHALL VARY TO CONFORM WITH BATTER OF ADJOINING CURB.
2. PROTECTION BAR SHALL BE INSTALLED AND SUPPORT BOLTS SPACED, ACCORDING TO SHEET 2 of 2.
3. SUPPORT BOLTS SHALL BE EQUAL IN LENGTH TO CURB FACE + 4" ± FOR ALL CURB BATTERS.
4. ALL EXPOSED METAL PARTS SHALL GALVANIZED AFTER FABRICATION.
5. PROTECTION BAR SPACING, PROTECTION BAR "S" SHALL BE INSTALLED WHEN THE MINIMUN CLEAR OPENING OF THE CATCH BASIN EXCEEDS 6" BAR "S" SHALL BE PLACED SUCH THAT NO MINIMUN CLEAR OPENING EXCEED 6".

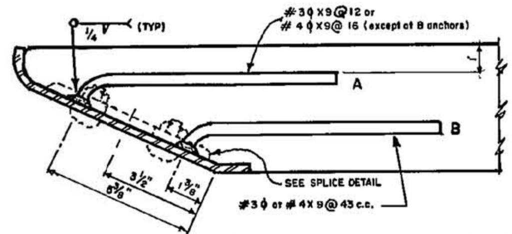
(A) WHEN ONE BAR IS REQUIRED "S" SHALL BE 6 3/4" HOWEVER THIS SHALL BE REDUCED IF NECESSARY SO THAT THE CENTER OF THE PROTECTION BAR IS NOT LESS THAN 2 1/4" FROM THE ROLLED PLATE.

(B) WHEN TWO OR MORE BARS ARE REQUIRED "S" SHALL BE 6 3/4" WITH REMAINING BARS SPACED AT 6 3/4" c.c. THE SPACING OF TOP BAR SHALL BE REDUCED IF NECESSARY SO THAT THE CENTER OF THE BAR IS NOT LESS THAN 2 1/2" FROM THE ROLLED PLATE.

6. WHERE CATCH BASIN ARE TO BE CONSTRUCTED ON CURVES, THE MAXIMUM CHORD LENGTH FOR FACE PLATE SHALL BE SUCH THAT THE MAXIMUM DIMENSION FROM SAID CHORD (MEASURED) PERPENDICULAR THERETO) TO THE TRUE CURVE WILL NOT EXCEED ONE INCH. WHERE MORE THAN ONE CHORD IS REQUIRED, CHORD LENGTH SHALL BE EQUAL.
7. WHERE LENGTH OF FACE PLACE IS BETWEEN 22' AND 43', TWO SECTIONS MAY BE USED WHEN LENGTH EXCEEDS 43', THREE SECTIONS MAY BE USED. SECTIONS SHALL BE SPLICED ACCORDING TO THE SPLICE DETAIL. SPLICE SHALL BE PLACED ONE FOOT FROM SUPPORT BOLT SEE SHEET 2 of 2.
8. LENGTH OF FACE PLATE IS W + 12" FOR ALL CATCH BASINS EXCEPT THE DRIVEWAY CATCH BASIN.
9. CATCH BASIN OPENING = NORMAL CURB FACE + 4" INCHES UNLESS OTHERWISE SPECIFIED.
10. SPACING OF ALL ANCHORAGE

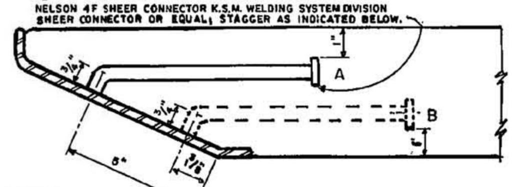
a. SET END ANCHORS 3" FROM ENDS OF FACE PLATE.

b. PLACE ONE A ANCHOR AT EACH SIDE OF ANY AND ALL SPLICE JOINTS AND WITHIN 6" THEREOF.



NOTE: CATCH BASIN TOP SLAB REINFORCING STEEL NOT SHOWN.

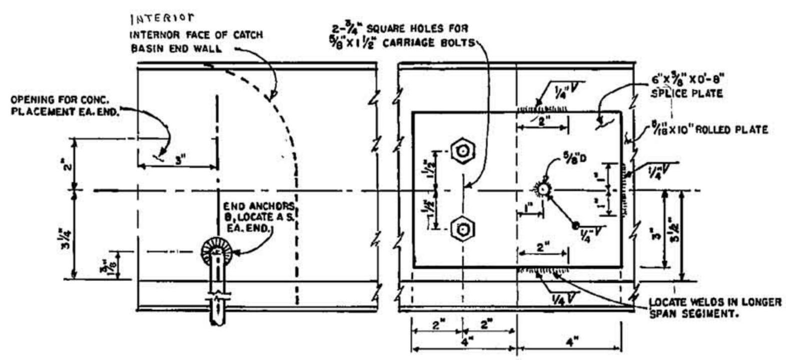
1/2" Φ 8" (LENGTH AFTER WELD) ELECTRICALLY WELDED STUDS. NELSON 4F SHEER CONNECTOR K.S.M. WELDING SYSTEM DIVISION SHEER CONNECTOR OR EQUAL, STAGGER AS INDICATED BELOW.



NOTE

Reinforcing Steel and Splice not shown Above Details.
Space Anchors approximately evenly at 15" max. c.c. between end anchors and anchors at splice joints except omit at B anchor location. Space B anchors at approximately 45° max. between e end anchors.

ALTERNATE METHODS FOR FACE PLATE ANCHORAGE



FACE PLATE END & SPLICE DETAILS

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY:

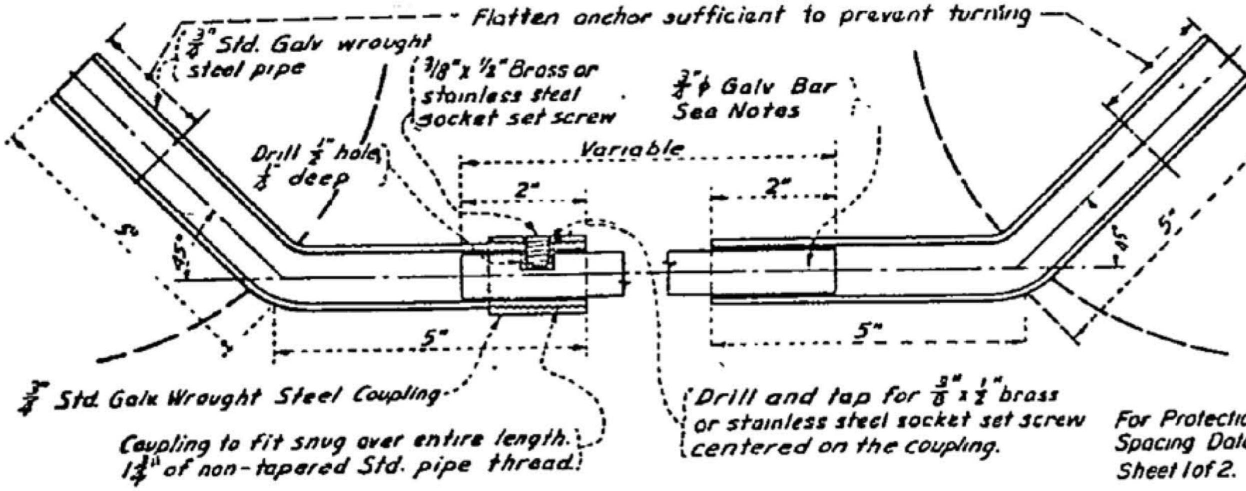
CHIEF ENGINEER

DATE: April 5, 2004 R.C.E. NO. 32336

DETAIL OF CATCH BASIN OPENING & INSTALLATION DETAILS

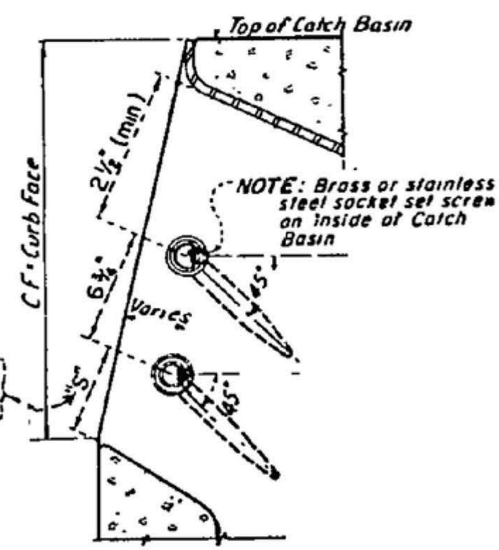
STANDARD DRAWING NUMBER CB105
SHEET NO. 1 OF 2

L.A.C.F.C.D. DWG. NO. 2-D264 AND 2-D232



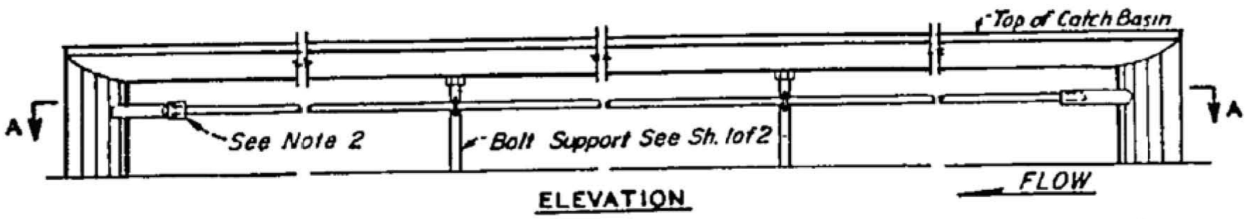
For Protection Bar Spacing Data, see Sheet 1 of 2.

DETAIL OF ANCHOR

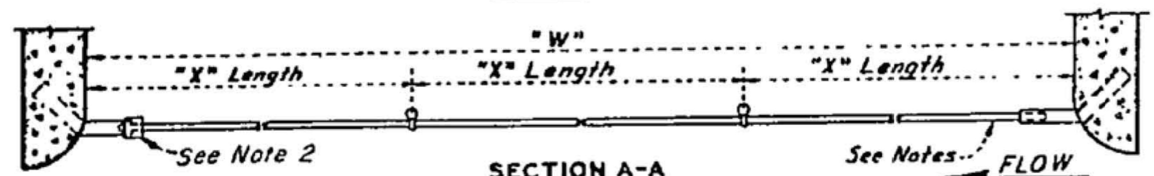


SECTION SHOWING LOCATION OF ANCHOR AT WALL OF CATCH BASIN

"W" (incl)	NUMBER OF SUPPORT BOLTS	NUMBER OF "X" LENGTHS
5' to 10'	1	2
10' to 15'	2	3
15' to 20'	3	4
20' to 25'	4	5
25' to 30'	5	6



ELEVATION



SECTION A-A

NOTES:

1. All bars shall be $\frac{3}{4}$" Galv, hot-rolled steel per A.S.T.M Designation A-36
   Bar lengths shall not exceed 21', and shall be cut to fit in field.
   When "W" is over 21', protection bar shall consist of two or more sections depending upon length of basin. Location of special support bars and additional socket set screw shall be determined by the Engineer in the field.
2. Install coupling at downstream end of catch basin opening

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APPROVED BY: [illegible]

CHIEF ENGINEER

DATE: April 5, 2004

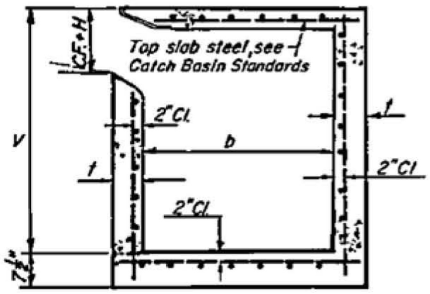
R.C.E. NO. 32336

REMOVABLE PROTECTION BAR FOR CATCH BASINS

STANDARD DRAWING NUMBER CB105
SHEET NO. 2 OF 2

W OF C.B.	V(ft.) From	V(ft.) To (incl)	t (in)	FRONT WALL STEEL Hor.	FRONT WALL STEEL Vert.	REAR & END WALLS & FLOOR STEEL Each Way
to 7'		4	6	#3 @6"	#3 @6"	# 3 @ 6"
to 7'	4	8	8	#4 @12"	#4 @12"	# 4 @ 12"
to 7'	8	12	10	#4 @10"	#4 @10"	# 4 @ 10"
14'		4	6	#3 @6"	#3 @6"	# 3 @ 6"
14'	4	8	8	#4 @12"	#4 @12"	# 4 @ 12"
14'	8	10	10	#4 @8"	#4 @12"	# 4 @ 10"
14'	10	12	10	#4 @6"	#4 @12"	# 4 @ 10"

WALL AND FLOOR STEEL

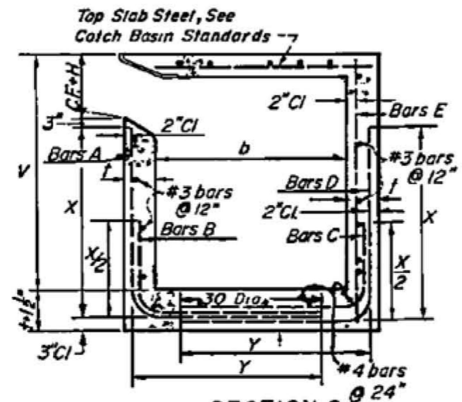


SECTION I

CATCH BASIN REINFORCEMENT—"W" to 14' (Incl.)

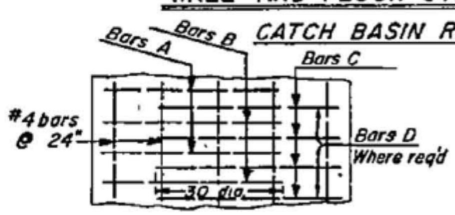
V (ft) From	V (ft) To (incl)	t (in)	FRONT WALL STEEL Bars A & B	REAR WALL STEEL Bars C	REAR WALL STEEL Bars D	REAR WALL STEEL Bars E	END WALL STEEL Hor. & Vert.
	4	6	# 3 @ 24"	#3 @12"	—	#4 @24"	# 3 @18"
4	5	8	# 3 @ 20"	#3 @12"	—	#4 @24"	# 3 @14"
5	6	8	# 3 @ 12"	#3 @10½"	—	#4 @24"	# 3 @14"
6	7	8	# 4 @ 17"	#3 @8½"	—	#4 @24"	#3 @ 14"
7	8	8	# 4 @ 13"	#3 @6½"	—	#4 @24"	#3 @ 14"
8	9	10	# 4 @ 15"	#3 @7½"	—	#4 @20"	#3 @ 11"
9	10	10	# 4 @ 12"	#4 @12"	—	#4 @20"	#3 @ 11"
10	11	10	# 5 @ 15"	—	#4 @ 11"	#4 @18"	#3 @ 11"
11	12	10	# 6 @ 18"	—	#4 @ 9"	#4 @13"	#3 @ 11"
	$X=(V+t)-(CF+H+4\frac{1}{2}")$			$Y=(\frac{b+21}{2})+15$ dia.$-2"$			

WALL AND FLOOR STEEL



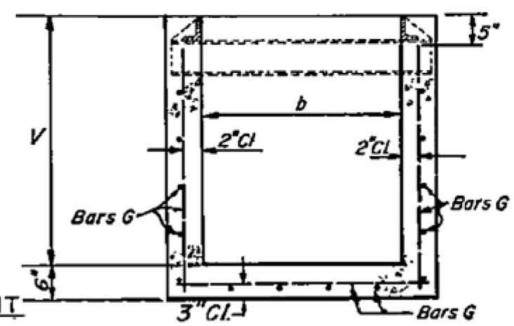
SECTION 2

CATCH BASIN REINFORCEMENT—"W" GREATER THAN 14'



FLOOR REINFORCEMENT SECTION 2

V(ft.) From	V(ft.) TO (incl)	t (in.)	SIDE & END WALL STEEL BARS G
	4	6	#3 @ 6"
4	8	8	#4 @ 6"
8	12	10	#5 @ 6"



GRATING BASIN REINFORCEMENT

NOTES

1. Wall & floor reinforcing shown hereon shall be used with Catch Basin Standard Drawings.
2. Reinforcing steel shown hereon shall be used in all Catch Basins on State Highways regardless of basin length or depth.
3. Provide wall & floor steel reinforcing when the following V depths are equaled or exceeded.

Basin length = W	Basin depth = V
To 7.0'	10'
7' To 14.0'	7'
14' To 21.0'	6'
Over 21.0'	All Depths

Reinforcing steel shown hereon shall be used in all catch basins when excavation or soil conditions require both sides of the walls to be formed regardless of basin length or depth.

REGISTERED PROFESSIONAL ENGINEER WARREN D. WILLIAMS No. 32336 Exp. 12-31-04 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

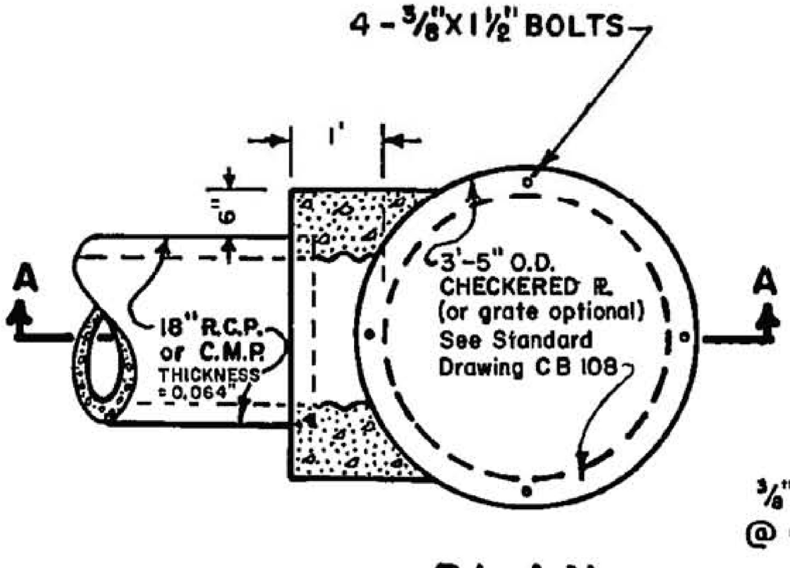
APPROVED BY:

CHIEF ENGINEER

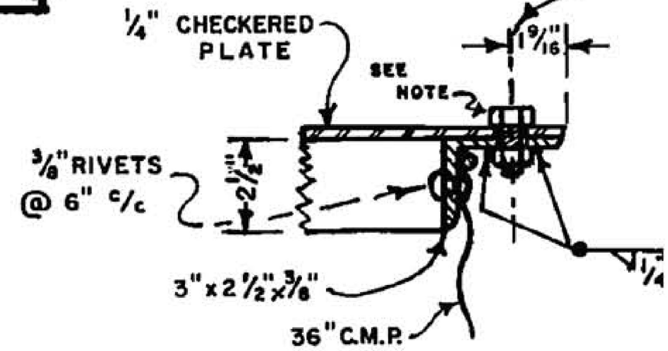
DATE: April 5, 2004 R.C.E. NO. 32336

CATCH BASIN REINFORCEMENT

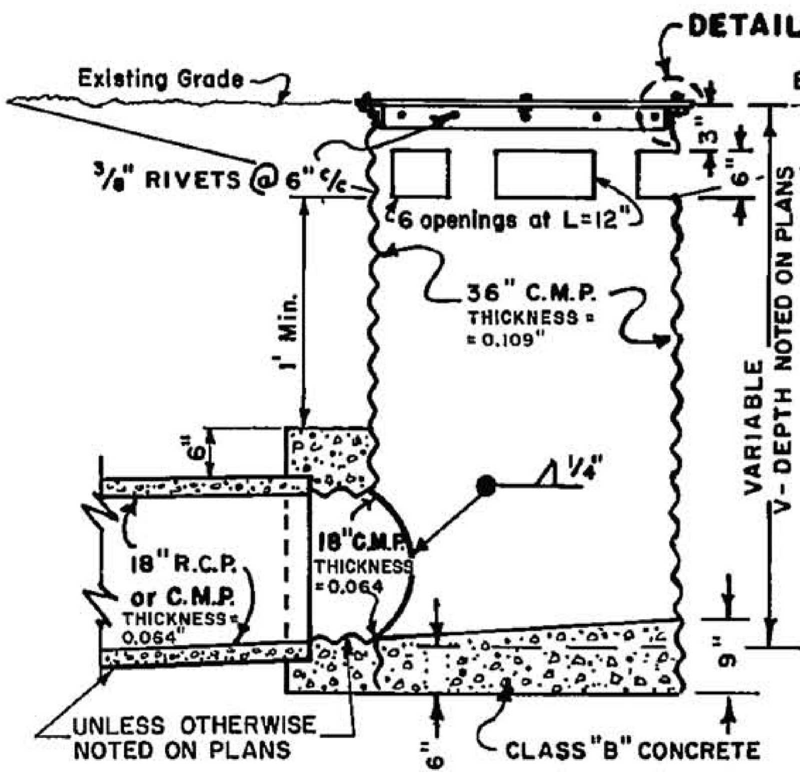
STANDARD DRAWING NUMBER CB106



PLAN



DETAIL "B"



SECTION A-A

NOTES

3/8" X 1 1/2" GALVANIZED BOLTS WITH HEX NUTS. FIELD WELD EACH NUT TO ANGLE.

DRILL HOLE 7/16" MATCHED 4 PLACES AS SHOWN IN PLAN.

PLATE AND ANGLE ASSEMBLY SHALL BE GALVANIZED.

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

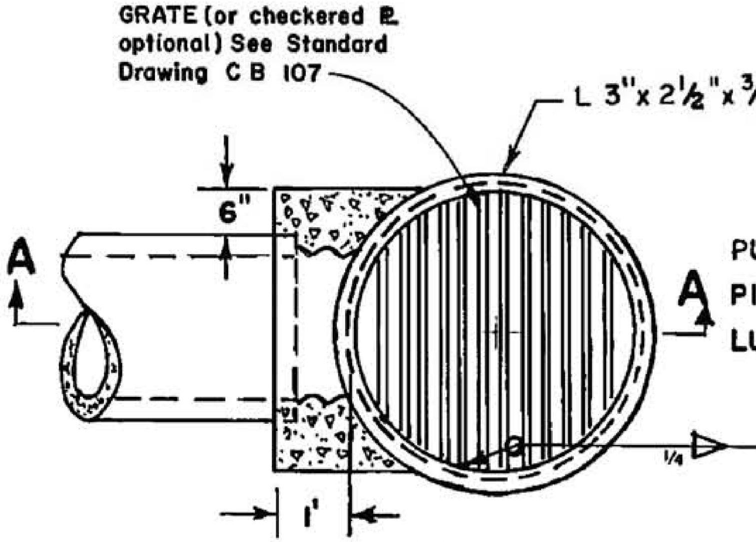
APPROVED BY:

CHIEF ENGINEER

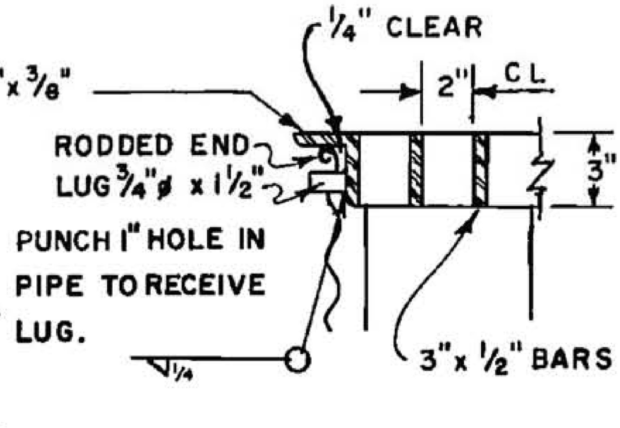
DATE: April 5, 2004 R.C.E. NO. 32338

INLET TYPE IX (CHECKERED PLATE)
FOR TEMPORARY USE ONLY

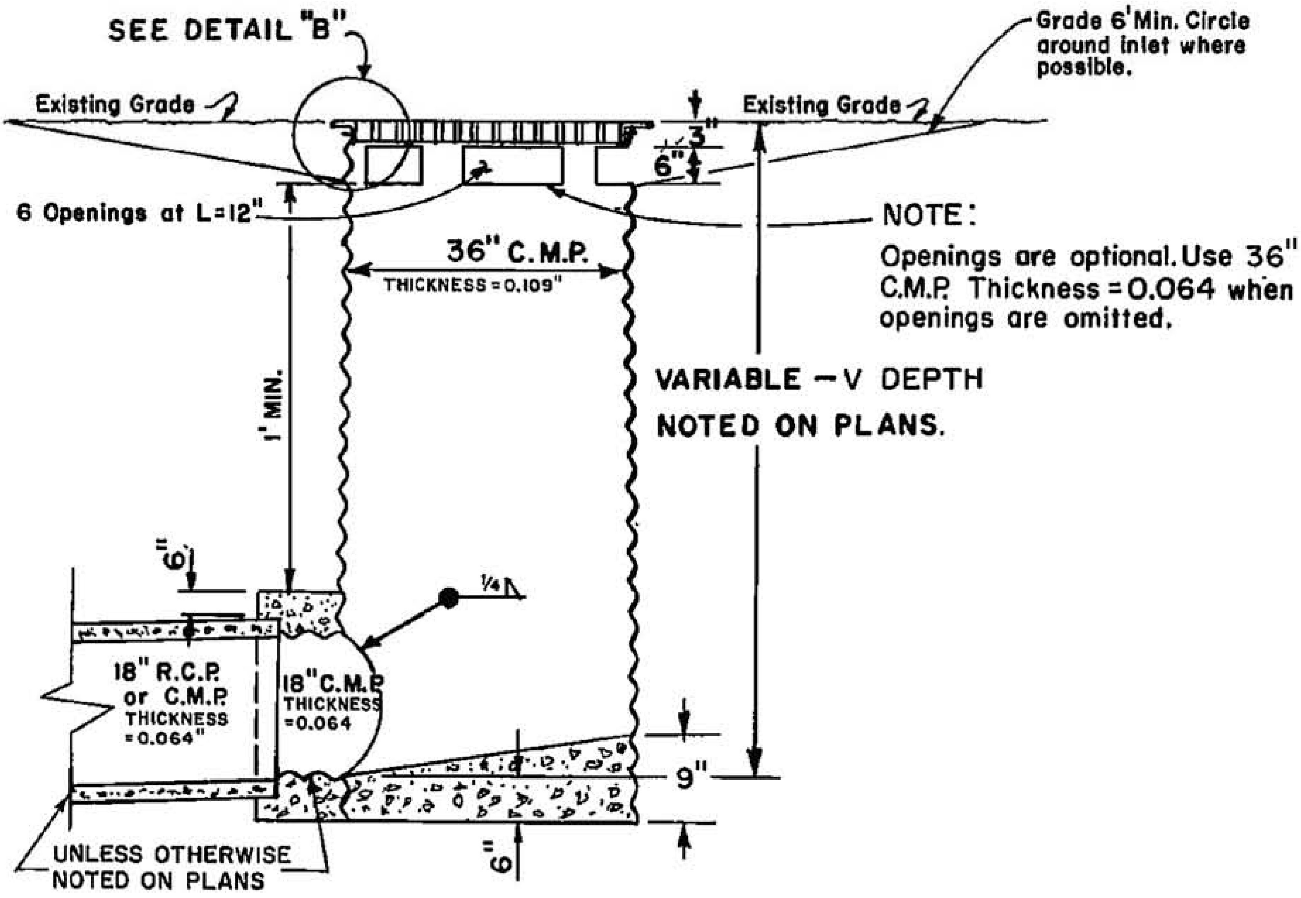
STANDARD DRAWING NUMBER CB107



PLAN



DETAIL "B"



SECTION A-A

NOTES:

1. PLACE GRATE BARS PARALLEL TO FLOW.
2. GRATE AND FRAME SHALL BE GALVANIZED.

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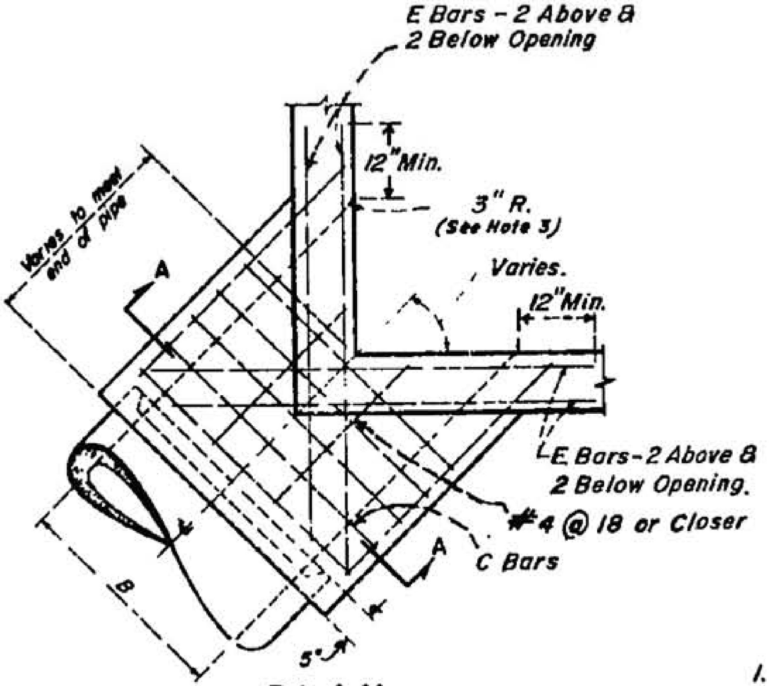
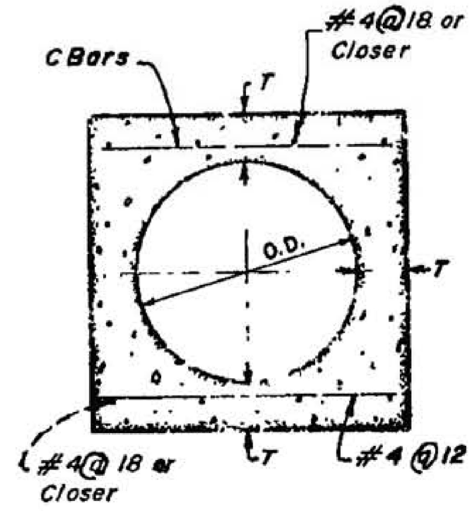
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	INLET TYPE X (GRATE DETAILS) FOR TEMPORARY USE ONLY
APPROVED BY: CHIEF ENGINEER	
DATE: April 5, 2004 R.C.E. NO. 32336	STANDARD DRAWING NUMBER CB108



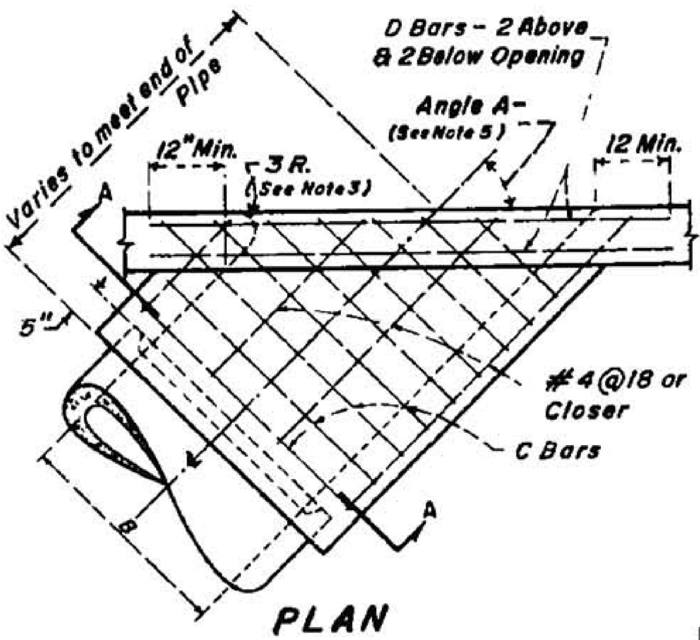
PLAN
CORNER CONNECTION



SECTION A-A

NOTES

1. Reinforcing steel shall be 1½" clear from inside face of concrete unless otherwise shown.
2. Reinforcing steel for inside face of Catch Basin wall shall be cut at center of opening and bent into walls of monolithic connection. Reinforcing steel for outside face of Catch Basin wall shall be cut 2" clear of opening.
3. Connection shall be poured monolithic with Catch Basin. The rounded edge of outlet shall be constructed by pouring concrete against a curved form with a radius of 3."
4. Floor of structure shall be steel-troweled to spring line.
5. Connections shall be constructed where
(a). Pipes, 12 inches through 72 inches in diameter, inlet or outlet through corner of Catch Basin at an angle less than 40°
(b). Angle A, for pipes 24 inches through 30 inches in diameter, is less than 45°.



PLAN
SIDE CONNECTION

B	T	C bars	D & E bars	B	T	C bars	D & E bars
12"	4"	#4 @ 6	#5	42"	7½"	#5 @ 6	#6
15"	4¼"			45"	7¾"		
18"	4½"			48"	8"		
21"	5"			51"	8½"		
24"	5¼"			54"	9"		
27"	5½"			57"	9¼"		
30"	6"			60"	9½"		
33"	6¼"			63"	10"		
36"	6½"			66"	10¼"		
39"	7"			69"	10¾"		
				72"	11"		

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RIVERSIDE COUNTY FLOOD CONTROL
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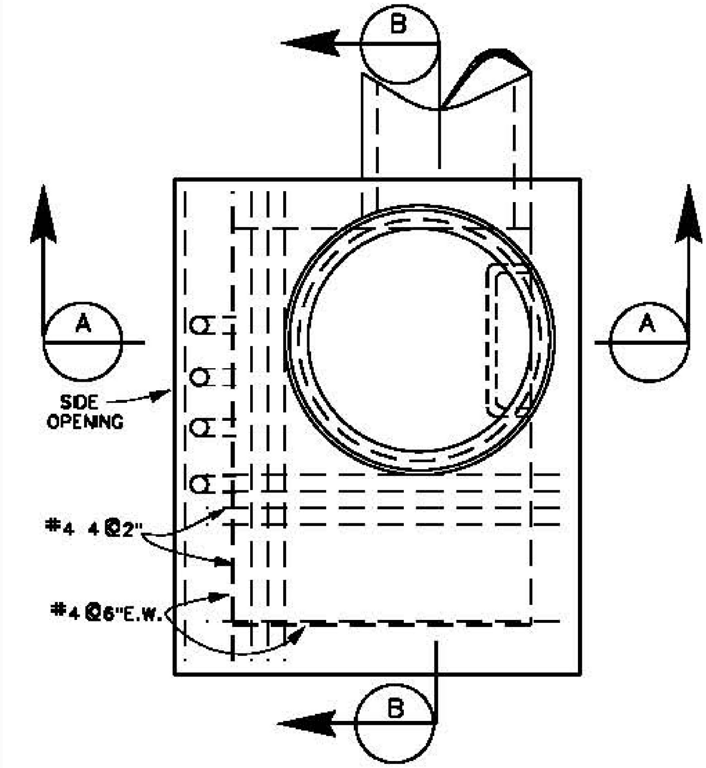
WATER CONSERVATION DISTRICT

APPROVED BY: [illegible]
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 32336

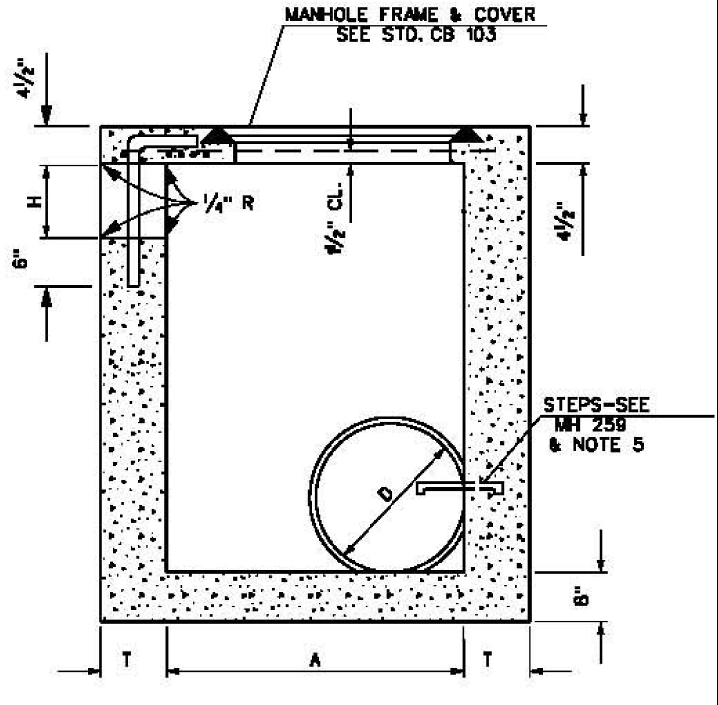
SPECIAL CONNECTIONS TO CATCH BASIN

STANDARD DRAWING NUMBER CB109

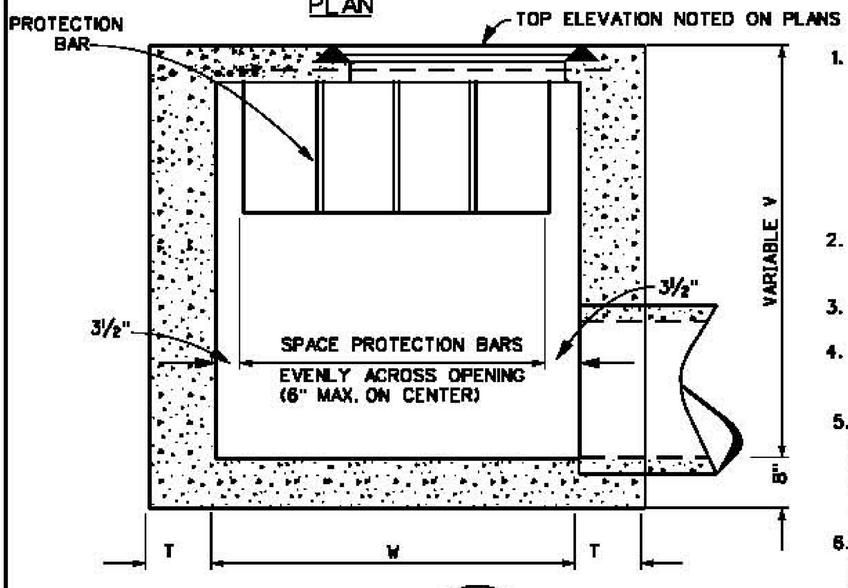
L.A.C.F.C.D. STD. NO. 2-D224



PLAN



SECTION A



SECTION B

1. DEMENSIONS:
   H= 9" OR AS NOTED ON PLANS
   V= SHALL BE SHOWN ON THE PLANS (8' MAX.)
   W= SHALL BE 36" OR AS NOTED ON PLANS.
   T= 6" IF V IS 4' OR LESS.
   T= 8" IF V IS 8' OR LESS
   D= 18" UNLESS OTHERWISE SPECIFIED.
   A= 36" UNLESS OTHERWISE SPECIFIED.
2. SEE STANDARD DRAWING CB 106 FOR WALL AND FLOOR STEEL REINFORCING
3. STRUCTURAL CONCRETE SHALL BE CLASS "A".
4. REINFORCING STEEL SHALL BE NO. 4 DEFORMED BARS. CLEARENCE SHALL BE ½" FROM BOTTOM OF SLAB.
5. THE BASIN FLOOR SHALL BE GIVEN A TIGHT WOOD FLOAT FINISH. CURAVTURE OF THE LIP & SIDEWALLS AT THE SIDE OPENING SHALL NOT BE MADE BY PLASTERING. THE OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE & LENGTH BEFORE THE CONCRETE IS POURED.
6. STEPS: ¾" PLAN ROUND GALVANIZED STEEL STEPS SHALL BE INSTALLED 16" APART WHEN V EXCEEDS 4'-6". THE TOP STEP SHALL BE 6" BELOW THE TOP SURFACE & SHALL BE 2½" CLEAR FROM THE WALL ALL OTHER STEPS SHALL BE 4" CLEAR FROM THE WALL ONLY ONE STEP 12" FROM THE BOTTOM SHALL BE ANCHORED NOT LESS THAN 4" INTO THE WALL OF THE BASIN.
7. PROTECTION BARS ARE PLAIN ROUND STEEL BARS 1" DIAMETER AND SHALL BE INSTALLED WITH ENDS EMBEDDED 6".
8. ALL EXPOSED METAL PARTS SHALL BE GALANIZED.
9. SLOPE BOTTOM TO OUTLET FROM ALL DIRECTIONS.

RIVERSIDE COUNTY FLOOD CONTROL
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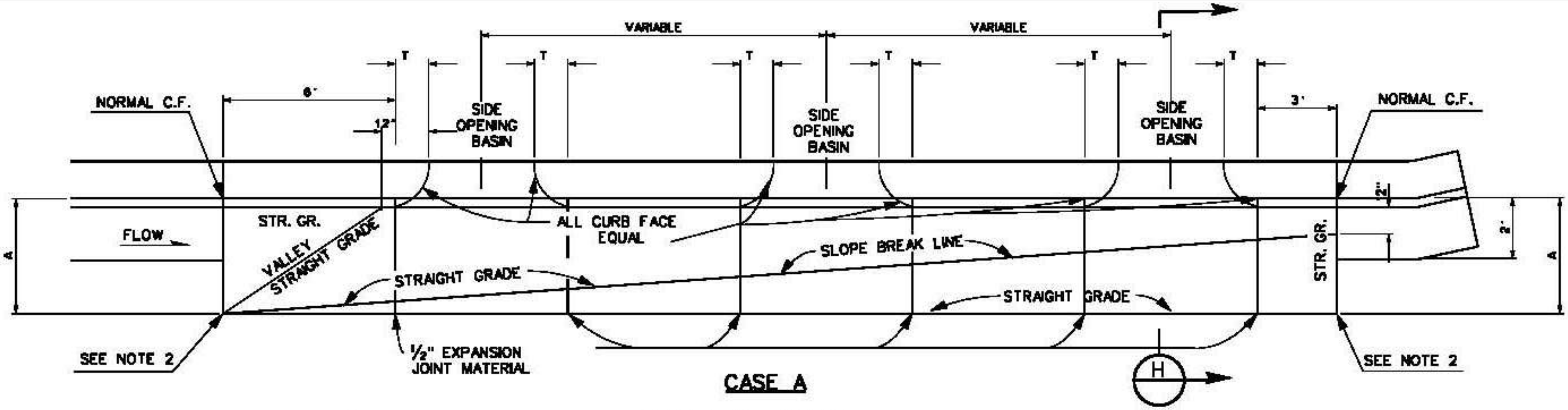
APPROVED BY:
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 32336

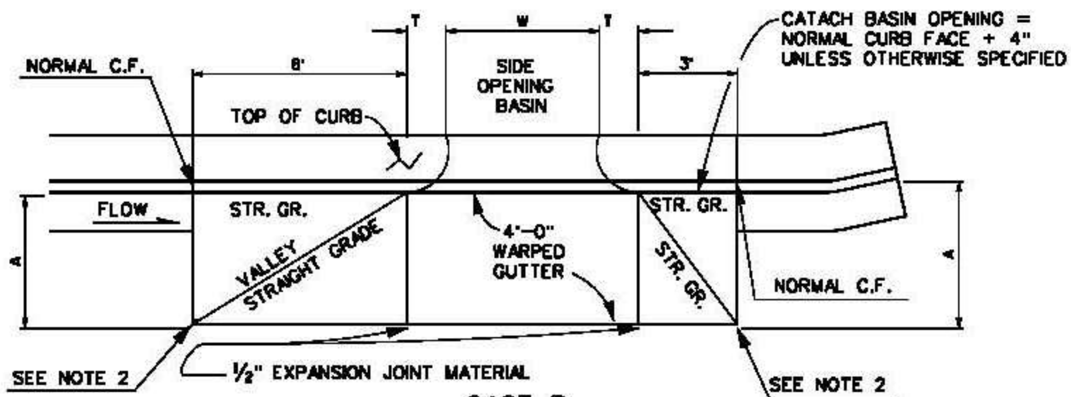
CONCRETE
DROP INLET

STANDARD DRAWING NUMBER CB110

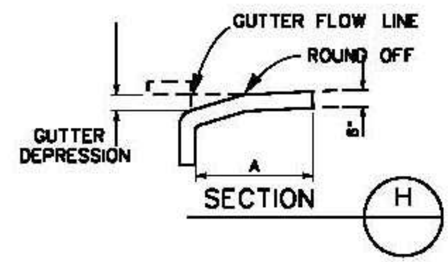
L.A.C.F.C.D. No. 2-D88



CASE A



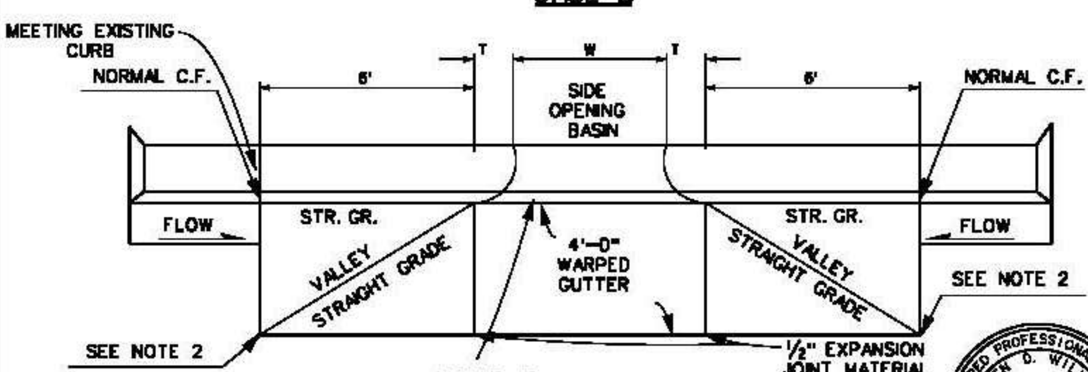
CASE B



SECTION H

NOTES

1. LOCAL DEPRESSION SHALL BE CASE B OTHERWISE SPECIFIED ON GENERAL PLAN.
2. ELEVATIONS AT OUTER CORNERS SHOWN ON GENERAL PLAN. IF NO ELEVATIONS ARE SPECIFIED, THE OUTER EDGE OF LOCAL DEPRESSION SHALL CONFORM TO FINISHED STREET SURFACE.
3. A= 4' UNLESS OTHERWISE SPECIFIED.
   T= SEE STANDARD DRAWING CB-100, NOTE 1.
   W= SEE STANDARD DRAWING CB-100, NOTE 1.
4. WHERE NO CURB EXIST, CURBS SHALL BE CONSTRUCTED BETWEEN ENDS OF LOCAL DEPRESSION. CURB SECTION SHALL CONFORM TO THAT OF CONTROLLING AGENCY.
5. DEPRESSION SHALL BE CLASS "B" CONCRETE

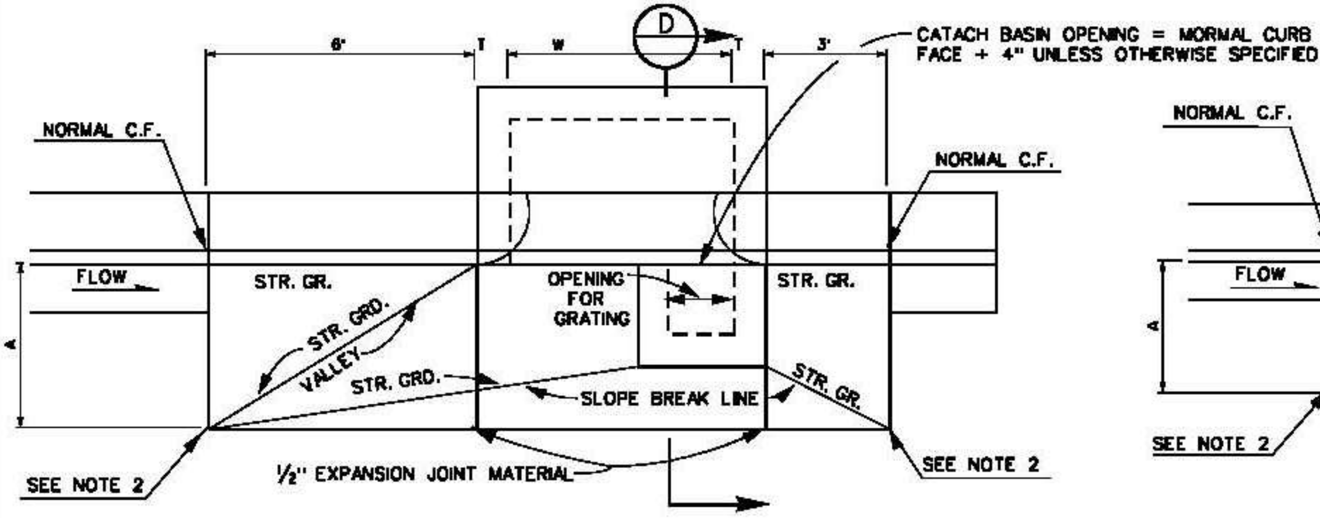


CASE C

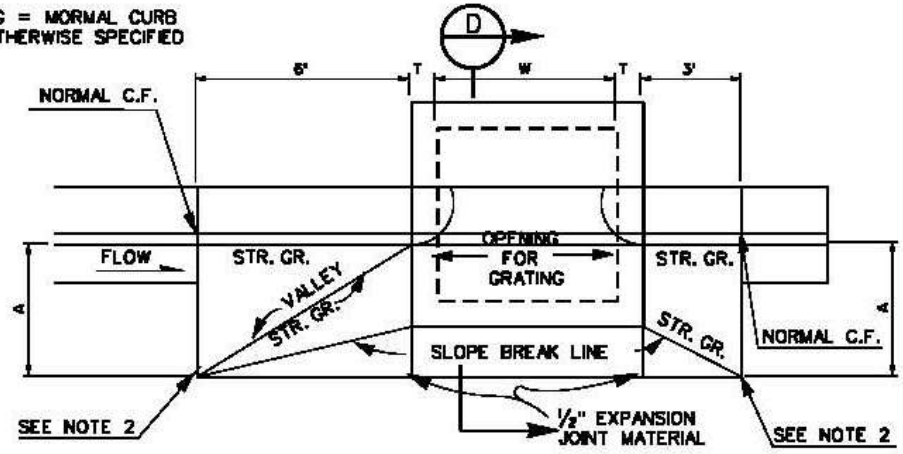
CATACH BASIN OPENING = NORMAL CURB FACE + 4" UNLESS OTHERWISE SPECIFIED

REGISTERED PROFESSIONAL ENGINEER WARREN D. WILLIAMS No. 32336 Exp. 12-31-04 CIVIL STATE OF CALIFORNIA

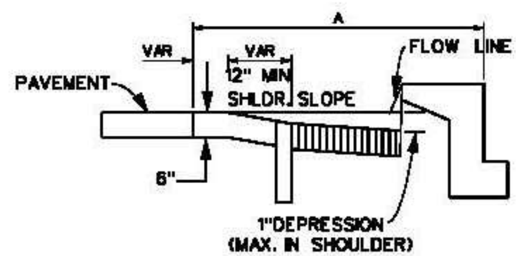
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	LOCAL DEPRESSION NO. 2
APPROVED BY: CHIEF ENGINEER	
DATE: April. 5, 2004 R.C.E. NO. 32336	STANDARD DRAWING NUMBER LD201



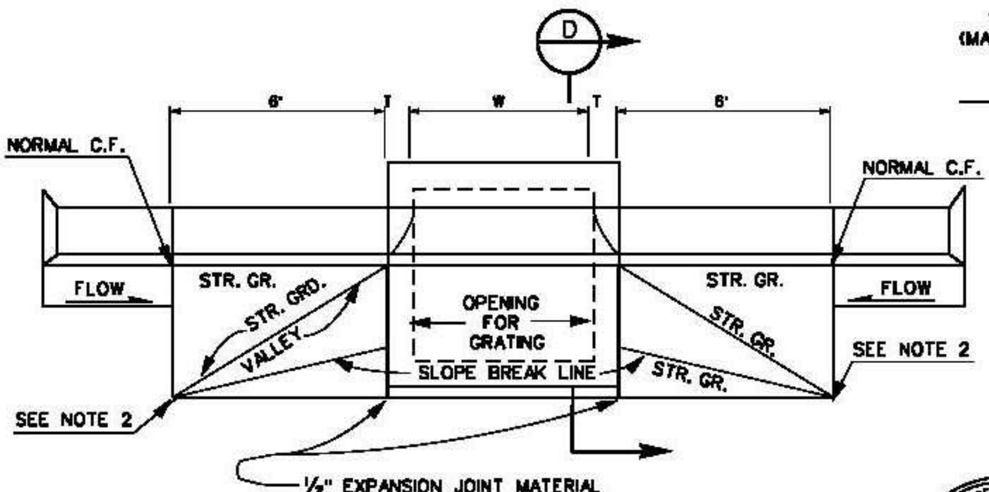
CASE B



CASE A



SECTION D



CASE C

NOTES

1. LOCAL DEPRESSION SHALL BE:
   (A) CASE "A" FOR CATCH BASIN NO. 4 (SEE STANDARD DRAWING CB 101) UNLESS OTHERWISE SPECIFIED.
   (B) CASE"B" FOR CATCH BASIN NO. 6 (SEE STANDARD DRAWING CB 102) UNLESS OTHERWISE SPECIFIED.
2. ELEVATIONS AT OUTER CORNERS SHOWN ON PROJECT DRAWINGS. IF NO ELEVATIONS ARE SPECIFIED, THE OUTER EDGE OF LOCAL DEPRESSION SHALL CONFORM TO FINISHED STREET SURFACE.
3. A= 4' UNLESS OTHERWISE SPECIFIED.
   T= SEE STANDARD DRAWING CB101 OR CB102
   W= SEE STANDARD DRAWING CB101 OR CB102
4. WHERE NO CURB EXIST, CURBS SHALL BE CONSTRUCTED BETWEEN ENDS OF LOCAL DEPRESSION. CURB SECTION SHALL CONFORM TO THAT OF CONTROLLING AGENCY.
5. DEPRESSION SHALL BE CLASS "B" CONCRETE

REGISTERED PROFESSIONAL ENGINEER WARREN D. WILLIAMS No. 32336 Exp. 12-31-04 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY:

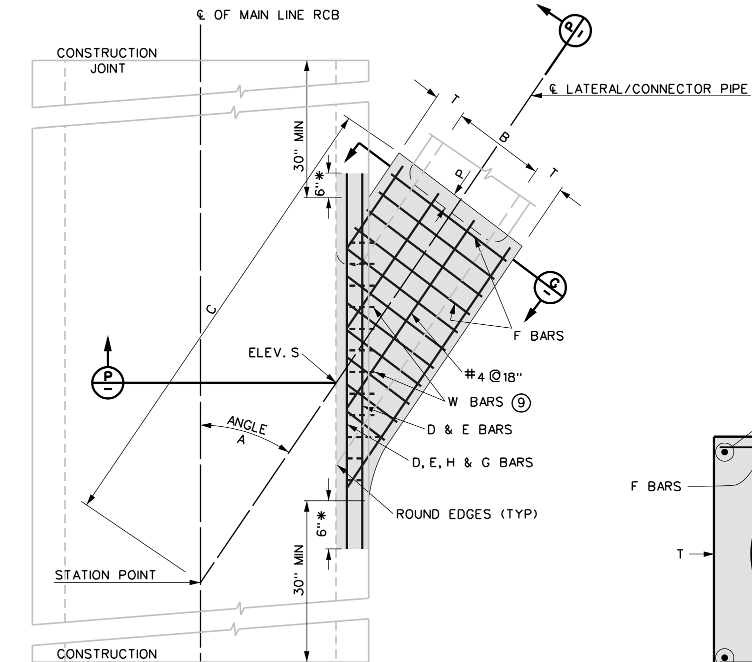
CHIEF ENGINEER

DATE: April. 5, 2004

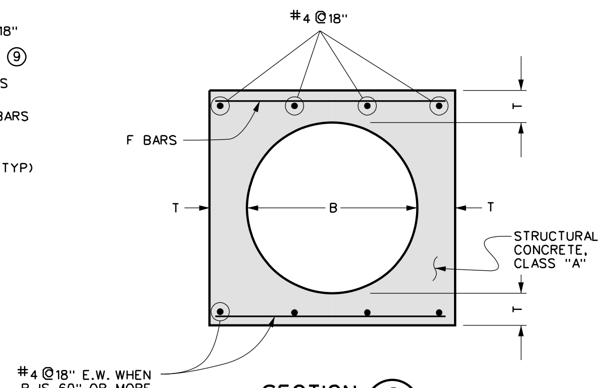
R.C.E. NO. 32336

LOCAL DEPRESSION NO. 3

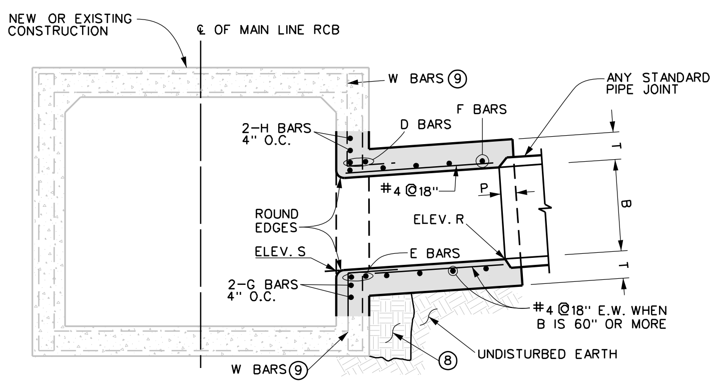
STANDARD DRAWING NUMBER LD202



PLAN



SECTION G



SECTION P

TABLES FOR DIMENSIONS AND BAR SIZES

B (INCHES)	T (INCHES)	P (INCHES)
12	5	5
15	5	
18	5	
21	5	
24	5¼	
27	5½	
30	6	
33	6¼	
36	6½	
39	7	
#5		D,E,H AND G BARS
#4 @6"		F BARS

B (INCHES)	T (INCHES)	P (INCHES)
42	7½	5
45	7¾	
48	8	
51	8½	
54	9	
57	9¼	
60	9½	
63	10	
66	10¼	
69	10¾	
72	11	
78	11¾	
84	12½	
#6		D,E,H AND G BARS
#5 @6"		F BARS

B (INCHES)	T (INCHES)	P (INCHES)
90	13¼	5
96	14	
102	15½	8
108	16	
114	16½	
120	17	
126	17	
132	17½	
138	17½	
144	18	
#7		D,E,H AND G BARS
#6 @6"		F BARS

NOTES

1. FOR NEW CAST-IN-PLACE CONSTRUCTION, JUNCTION STRUCTURE SHALL BE POURED MONOLITHICALLY WITH MAIN LINE STORM DRAIN, MANHOLE, OR TRANSITION.
2. THE NEED FOR AN EDGE BEAM AND/OR ADDITIONAL REINFORCEMENT SHALL BE INVESTIGATED BY THE ENGINEER FOR ANY ONE OF THE FOLLOWING CONDITIONS:
   a. ANGLE A IS LESS THAN 30°
   b. TOP OF INLET PIPE IS LESS THAN 6" BELOW THE SOFFIT.
   c. FLOW LINE OF INLET PIPE IS LESS THAN 7" ABOVE THE FLOOR OF THE MAIN LINE AT THE INSIDE FACE.
3. VALUES FOR A, B, C, ELEV. R, AND ELEV. S SHALL BE SPECIFIED ON PROJECT DRAWINGS. VALUES FOR T ARE SHOWN IN TABLES HEREIN.
4. STATIONS SPECIFIED ON DRAWINGS APPLY AT THE INTERSECTION OF CENTER LINES OF MAIN LINE AND LATERALS, UNLESS OTHERWISE NOTED.
5. UNLESS OTHERWISE SHOWN, ALL REINFORCING STEEL SHALL BE NEW STRAIGHT, DEFORMED STEEL BARS AND SHALL BE KEPT 1½" CLEAR FROM INSIDE FACE OF CONCRETE.
6. WHERE DESIGN VELOCITIES EXCEED 20 FT/SEC, CONCRETE COVER ON THE INSIDE FACE SHALL BE INCREASED TO PROVIDE ADDITIONAL COVER OVER THE REINFORCED STEEL AS SPECIFIED ON THE PROJECT DRAWINGS.
7. FLOOR OF STRUCTURE SHALL BE STEEL-TROWELED TO THE SPRING LINE.

(8) PLACE CLASS B CONCRETE, OR COMPACT SOIL UNDER STRUCTURE TO RELATIVE DENSITY REQUIRED BY SPECIFICATIONS. FILL MAY BE OMITTED IF STRUCTURE IS LAID ON UNDISTURBED EARTH TO MAIN LINE WALL.

(9) W BARS ARE MAIN LINE WALL STEEL (INTERIOR CURTAIN), AND SHALL BE CUT IN CENTER OF OPENING AND BENT INTO TOP AND BOTTOM OF JUNCTION STRUCTURE.

* LIMITS OF EXISTING CONSTRUCTION REMOVAL.

REGISTERED PROFESSIONAL ENGINEER JASON E. UHLEY No. 59795 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER CLAUDIO MANUEL PADRES No. 70355 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

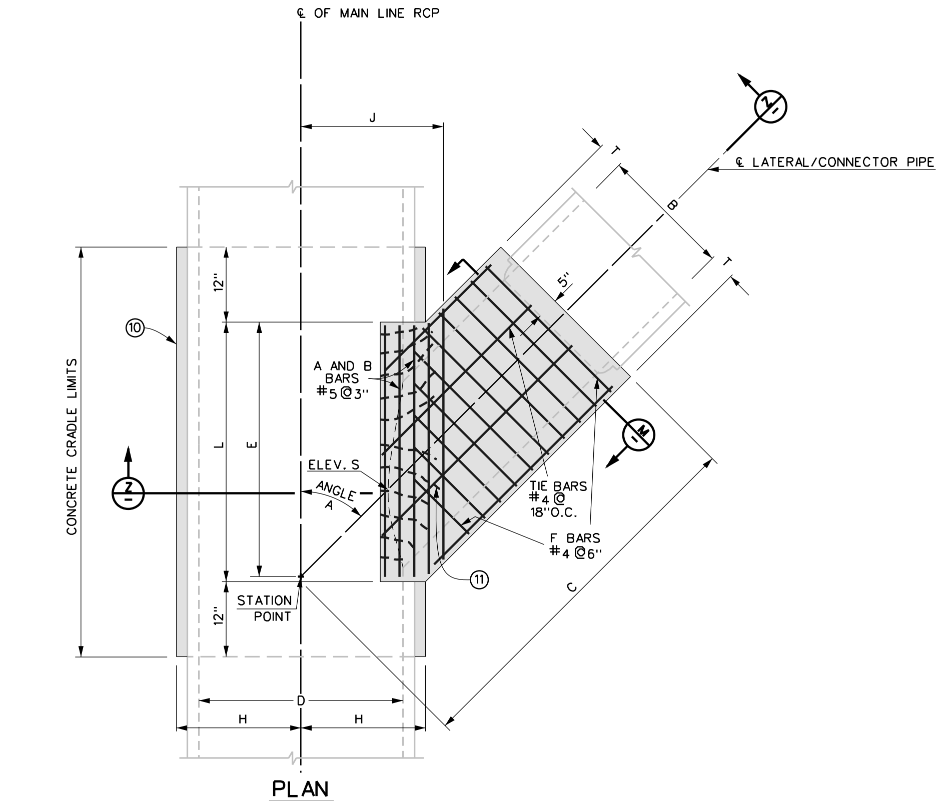
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE: 7-2-2019 R.C.E. NO. 59795

APPROVED BY: CHIEF, DESIGN & CONSTRUCTION DATE: 7-2-2019 R.C.E. NO. 70355

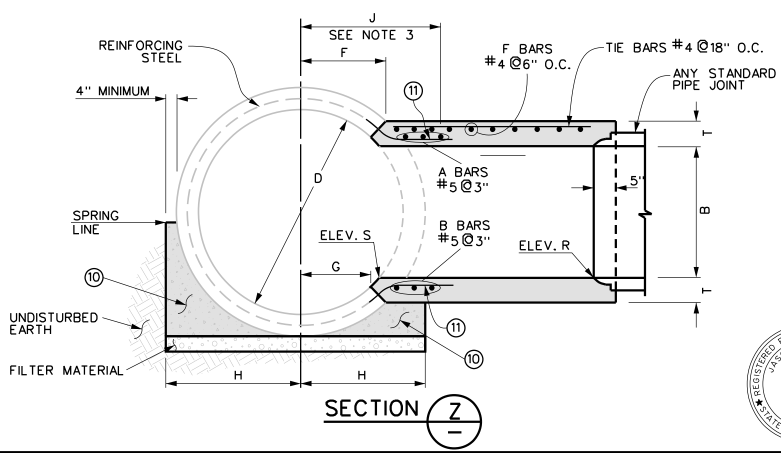
JUNCTION STRUCTURE NO. 1

STANDARD DRAWING NUMBER JS226
SHEET 1 OF 1

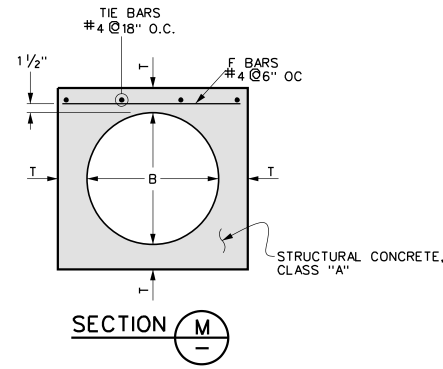
L.A.C.F.C.D. STD. NO. 2-D189 (MODIFIED)



PLAN



SECTION Z



SECTION M

TABLE OF VALUES FOR DIMENSIONS

B (INCHES)	T (INCHES)
8	5
12	5
15	5
18	5
21	5
24	5½
27	5½
30	6
33	6½
36	6½
39	7

NOTES

1. THIS JUNCTION STRUCTURE SHALL BE USED WHEN THE OUTSIDE DIAMETER OF THE LATERAL IS GREATER THAN ½ THE DIAMETER D OF THE MAIN LINE; OR WHEN THE INSIDE DIAMETER B OF THE LATERAL IS GREATER THAN 24". B SHALL NOT EXCEED 0.75 D OR 39".
2. VALUES FOR A, B, C, D, E, F, G, L, ELEV. R, AND ELEV. S SHALL BE SPECIFIED ON PROJECT DRAWINGS.
3. A AND B BARS SHALL BE CARRIED TO NOT LESS THAN J DISTANCE IN INCHES FROM CENTER LINE J=(7/12)D+6"
4. RECTANGULAR OPENING IN MAIN LINE PIPE SHALL BE CUT WITHIN LIMITS NORMAL TO PIPE SURFACE (DIMENSION L) WITHOUT DAMAGING STEEL.
5. UNLESS OTHERWISE SHOWN, ALL REINFORCING STEEL SHALL BE NEW, STRAIGHT, DEFORMED STEEL BARS AND SHALL BE KEPT 1½" CLEAR FROM INSIDE FACE OF CONCRETE.
6. WHERE DESIGN VELOCITIES EXCEED 20 FT/SEC, CONCRETE COVER ON THE INSIDE FACE SHALL BE INCREASED TO PROVIDE ADDITIONAL COVER OVER THE REINFORCED STEEL AS SPECIFIED ON THE PROJECT DRAWINGS.
7. FLOOR OF STRUCTURE SHALL BE STEEL-TROWELED TO SPRING LINE.
8. NO MORE THAN ONE OPENING SHALL BE MADE IN ANY ONE SECTION OF PIPE, AND SHALL NOT BE MADE WITHIN 12" OF A MAIN LINE JOINT.
9. STATIONS SPECIFIED ON DRAWINGS APPLY AT THE INTERSECTION OF CENTERLINES OF MAIN LINE AND LATERALS, UNLESS OTHERWISE NOTED.
10. PIPE SHALL BE CRADLED IN CLASS B CONCRETE EXTENDING LONGITUDINALLY TO POINTS 1 FT. BEYOND THE LIMITS OF L. MINIMUM H SHALL BE: H=½ OUTSIDE PIPE DIAMETER + 4 INCHES. CRADLE MAY BE OMITTED ON SIDE OPPOSITE LATERAL INLET WHEN CONSTRUCTED IN CONNECTION WITH EXISTING PIPE STORM DRAIN.
11. MAIN LINE REINFORCEMENT IN PIPE SHALL BE CUT IN CENTER OF OPENING AND BENT TO UNIFORM DISTANCE FROM TOP AND BOTTOM OF JUNCTION STRUCTURE.

CITY OF RIV. STD. NO. 421
L.A.C.F.C.D. DWG. NO. 2-D112 (MODIFIED)

REGISTERED PROFESSIONAL ENGINEER JASON E. UHLEY No. 59795 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER CLAUDIO MANUEL PADRES No. 70355 CIVIL STATE OF CALIFORNIA

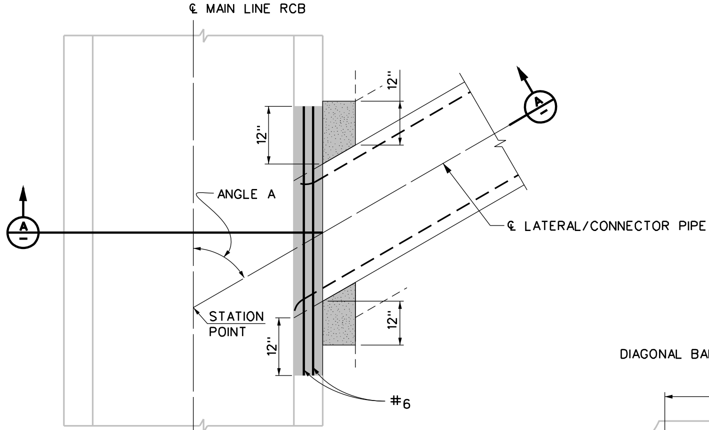
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE: 7-2-2019 R.C.E. NO. 59795

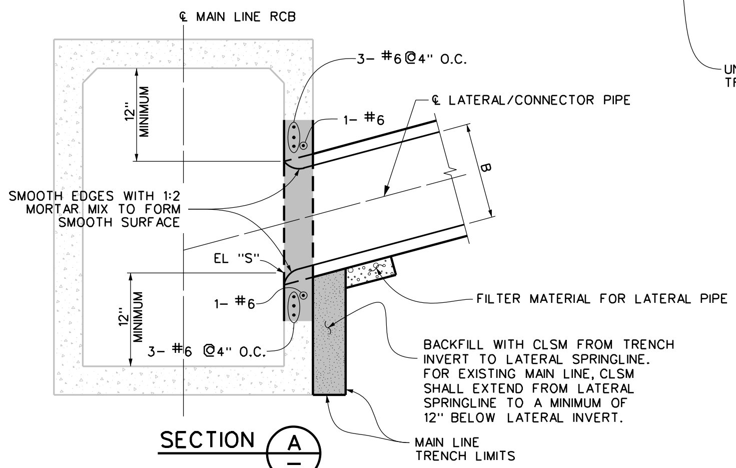
APPROVED BY: CHIEF, DESIGN & CONSTRUCTION DATE: 7-2-2019 R.C.E. NO. 70355

JUNCTION STRUCTURE NO. 2

STANDARD DRAWING NUMBER JS227
SHEET 1 OF 1

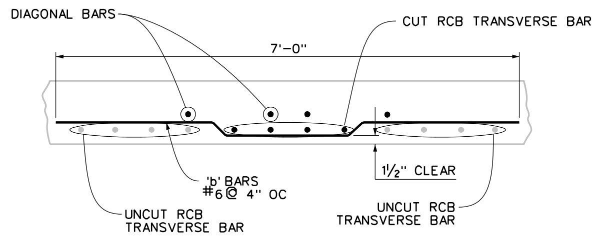


PLAN
BOX WALL ENTRANCE COLUMN SUPPORT

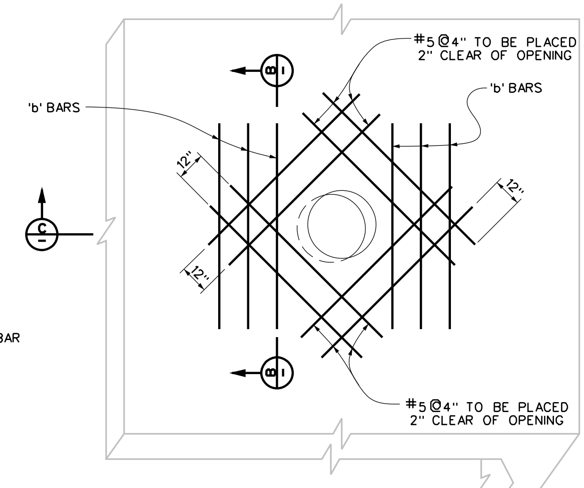


SECTION A/–

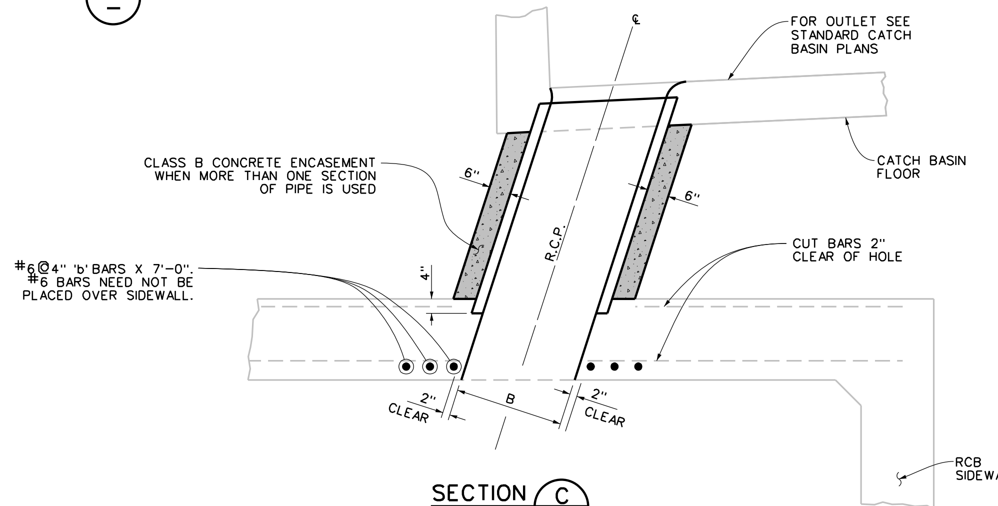
BOX WALL ENTRANCE COLUMN SUPPORT



SECTION B/–



TOP SLAB ENTRANCE
RCB REINFORCEMENT OMMITTED FOR CLARITY



SECTION C/–

NOTES

1. LATERAL SIZE:"B"=30" OR LESS (USE JS NO.1 FOR B>30").
2. APPLICABLE FOR NEW OR EXISTING CAST-IN-PLACE RCB MAIN LINE CONSTRUCTION. SPECIAL DESIGN REQUIRED FOR ALL CONNECTIONS INTO PRCB.
3. ANGLE A SHALL BE BETWEEN 45° AND 90°.
4. ELEV. S SHALL BE SPECIFIED ON PROJECT DRAWINGS.
5. NO MORE THAN ONE OPENING SHALL BE MADE IN ANY 10-FOOT LENGTH OF MAIN LINE RCB WITHOUT A SPECIAL STRUCTURAL DESIGN.
6. MAIN LINE REINFORCING STEEL SHALL BE CUT TO 2" CLEAR OF PIPE OPENING.
7. LATERAL OPENING SHALL NOT BE MADE WITHIN 24" OF A MAIN LINE JOINT.

REGISTERED PROFESSIONAL ENGINEER JASON E. UHLEY No. 59795 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER CLAUDIO MANUEL PADRES No. 70355 CIVIL STATE OF CALIFORNIA

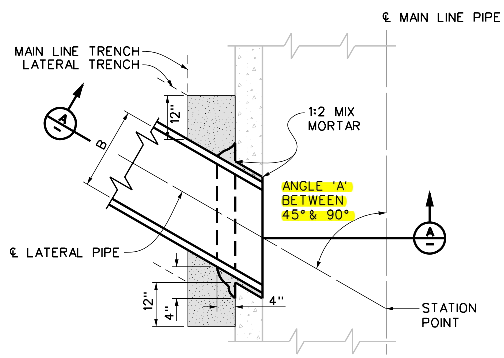
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY:	APPROVED BY:
GENERAL MANAGER-CHIEF ENGINEER	CHIEF, DESIGN & CONSTRUCTION
DATE: 7-2-2019 R.C.E. NO. 59795	DATE: 7-2-2019 R.C.E. NO. 70355

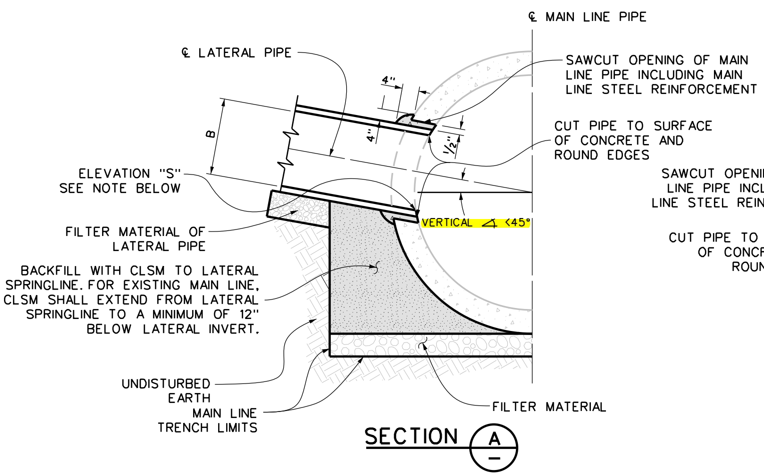
JUNCTION STRUCTURE NO. 3

STANDARD DRAWING NUMBER JS228
SHEET 1 OF 1

L.A.C.F.C.D. STD. NO. 2-D191 (MODIFIED)

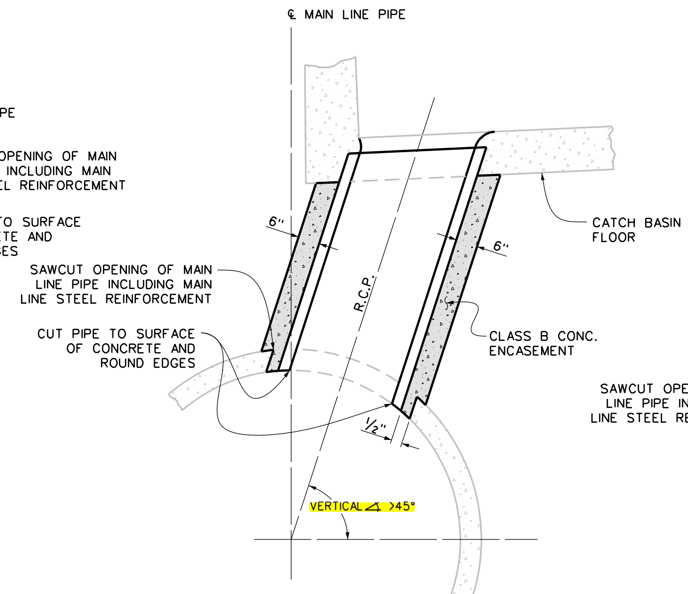


PLAN
PIPE WALL COLUMN SUPPORT

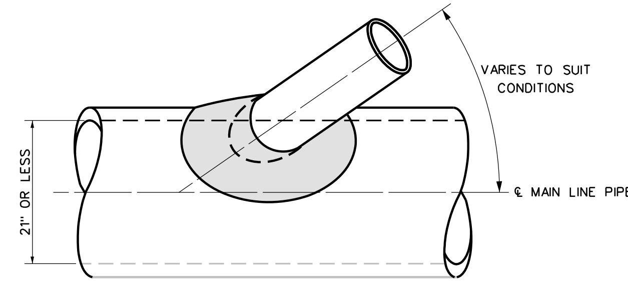


SECTION A

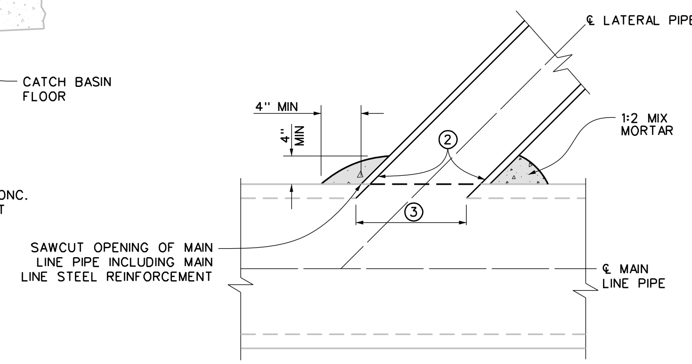
CASE 1
(VERTICAL ∡45° OR LESS)



CASE 2
CATCH BASIN ABOVE STORM DRAIN
(VERTICAL ∡ > 45°)



CASE 3
SADDLE CONNECTION PLAN
(MAIN LINE PIPE 21" DIAMETER OR LESS)



CASE 3
SADDLE CONNECTION DETAIL

NOTES: CASES 1 & 2

1. B SHALL BE 24" OR LESS, AND IN NO CASE SHALL THE OUTSIDE DIAMETER OF THE INLET PIPE EXCEED ONE-HALF THE INSIDE DIAMETER OF THE MAIN LINE. IF VERTICAL ∡ IS 45° OR LESS, USE CASE 1. IF VERTICAL ∡ IS GREATER THAN 45°, USE CASE 2.
2. ℄ OF INLET SHALL BE RADIAL TO THE MAIN STORM DRAIN EXCEPT WHEN ELEVATION "S" IS SHOWN ON PROJECT DRAWING PROFILE.
3. THE MINIMUM OPENING INTO THE EXISTING STORM DRAIN SHALL BE THE OUTSIDE DIAMETER OF THE CONNECTING PIPE PLUS 1 INCH.
4. STATION POINT AS SHOWN ON PROJECT DRAWING PLAN VIEW.
5. NO MORE THAN ONE OPENING SHALL BE MADE IN ANY ONE SECTION OF PIPE, AND SHALL NOT BE MADE WITHIN 12" OF A MAIN LINE JOINT.

NOTE: CASE 2

1. ALL CONNECTOR PIPES (WITHIN THE VERTICAL ANGLES SPECIFIED FOR CASE 2) SHALL BE ENCASED WHEN LAID WITHIN THE MAIN LINE EXCAVATED TRENCH, OR WHEN LAID ON FILL WHICH HAS NOT BEEN DENSIFIED.

NOTES: CASE 3

1. CONNECTIONS TO MAIN LINE PIPES 21" OR LESS IN DIAMETER WITHOUT JUNCTION STRUCTURES OR PRECAST Y BRANCHES SHALL BE MADE WITH SADDLES.

2. TRIM OR CUT LATERAL PIPE TO CREATE SADDLE CONNECTION THAT FITS SNUGLY OVER THE OUTSIDE OF THE MAIN LINE PIPE. SADDLE ALIGNMENT SHALL MATCH LATERAL ALIGNMENT LINE.

3. THE OPENING INTO THE MAIN LINE PIPE SHALL BE CUT AND TRIMMED TO MATCH THE INSIDE DIMENSIONS OF THE LATERAL PIPE.

REGISTERED PROFESSIONAL ENGINEER JASON E. UHLEY No. 59795 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER CLAUDIO MANUEL PADRES No. 70355 CIVIL STATE OF CALIFORNIA

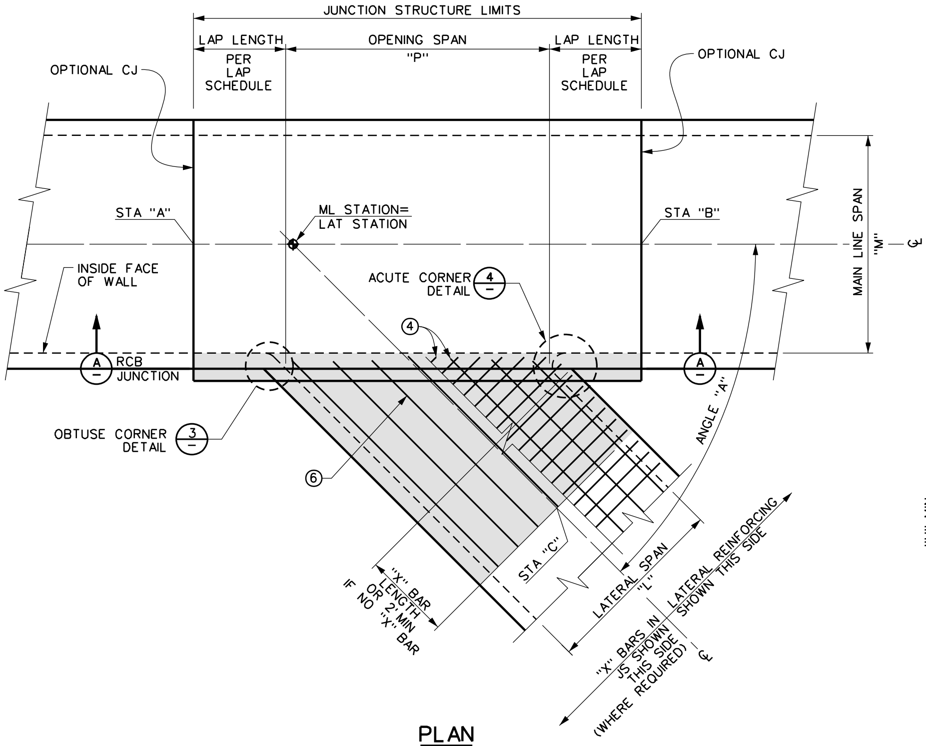
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY:	APPROVED BY:
GENERAL MANAGER-CHIEF ENGINEER	CHIEF, DESIGN & CONSTRUCTION
DATE: 7-2-2019 R.C.E. NO. 59795	DATE: 7-2-2019 R.C.E. NO. 70355

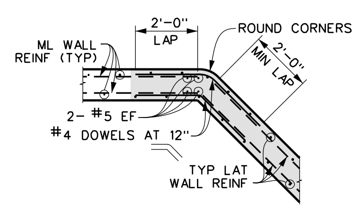
JUNCTION STRUCTURE NO. 4

STANDARD DRAWING NUMBER JS229
SHEET 1 OF 1

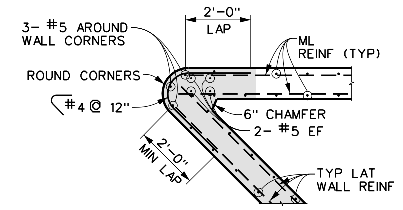
L.A.C.F.C.D. STD. NO. 2-D193 (MODIFIED)



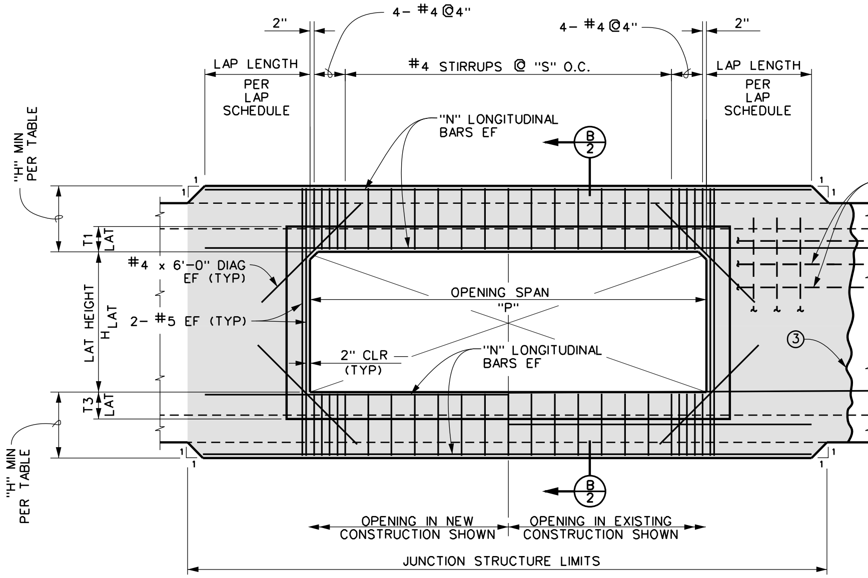
PLAN
NTS



DETAIL 3
OBTUSE WALL CORNER
NTS



DETAIL 4
ACUTE WALL CORNER
NTS



SECTION A
NTS

NOTES:

1. FOR INSTRUCTION ON USE OF THIS STANDARD, GENERAL NOTES AND DESIGN TABLES, SEE SHEET 3. VARIABLES B, H, N AND S PROVIDED IN TABLES A, B, OR C ON SHEET 3. DESIGN CASE SHALL BE SHOWN ON PLANS.

(2) PROTECT EXISTING REINFORCING. NOT ALL REINFORCING SHOWN. ANY BARS EXPOSED SHALL HAVE CONCRETE REMOVED TO 1". CONTINUE EXISTING LONGITUDINAL WALL STEEL THROUGH LAP LENGTH SHOWN.

(3) ROUGHEN SURFACE TO APPROXIMATE 1/4" AMPLITUDE. SURFACE SHALL BE CLEANED AND FREE OF LAITANCE.

(4) CUT LATERAL REINFORCING WHERE INTERSECTS WITH INSIDE OF MAINLINE RCB WALL, MAINTAIN 1½" CLEAR FROM INSIDE FACE.

5. ABBREVIATIONS SHALL BE AS DEFINED:

ML	MAIN LINE
LAT	LATERAL
T1	DECK THICKNESS PER CALTRANS STANDARD PLANS OR PROJECT DRAWINGS
T3	INVERT THICKNESS PER CALTRANS STANDARD PLANS OR PROJECT DRAWINGS

(6) "X" BAR, SEE TABLE ON SHEET 3 AND DETAIL 1 ON SHEET 2.

f'c = 3,600 PSI Fy = 60,000 PSI	
BAR SIZE	ALL BARS
#3	1'-1"
#4	1'-6"
#5	1'-9"
#6	2'-2"
#7	2'-10"
#8	3'-8"
#9	4'-8"
#10	5'-11"
#11	7'-3"

LAP SCHEDULE

REGISTERED PROFESSIONAL ENGINEER CHAD W. HARDEN No. S5232 STRUCTURAL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

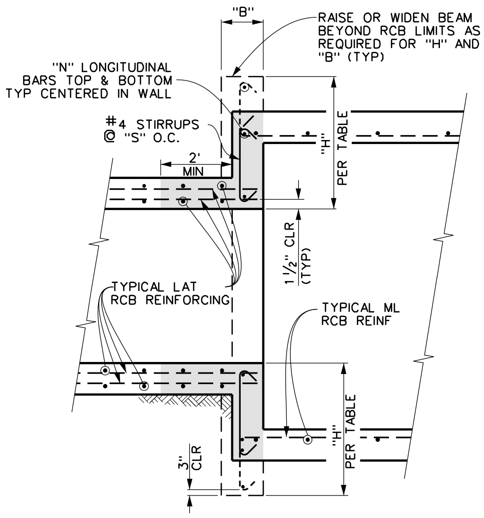
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE: 08/2015 R.C.E. NO. 59795

APPROVED BY: CHIEF, DESIGN & CONSTRUCTION DATE: 08/2015 R.C.E. NO. 70355

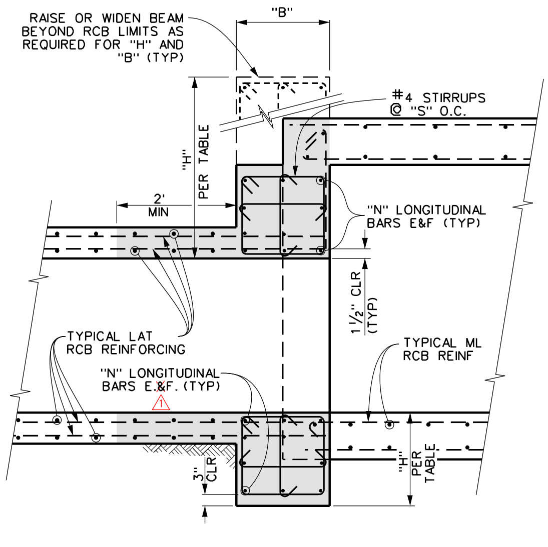
JUNCTION STRUCTURE NO. 5

STANDARD DRAWING NUMBER JS230

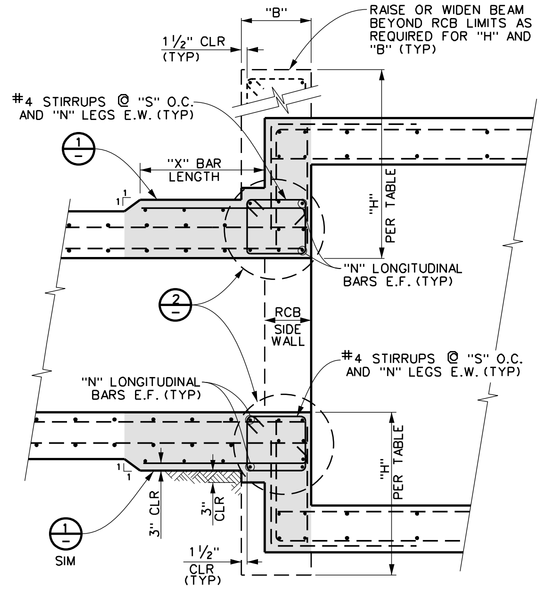
SHEET 1 OF 3



N=1, WITHOUT "X" BARS
NTS

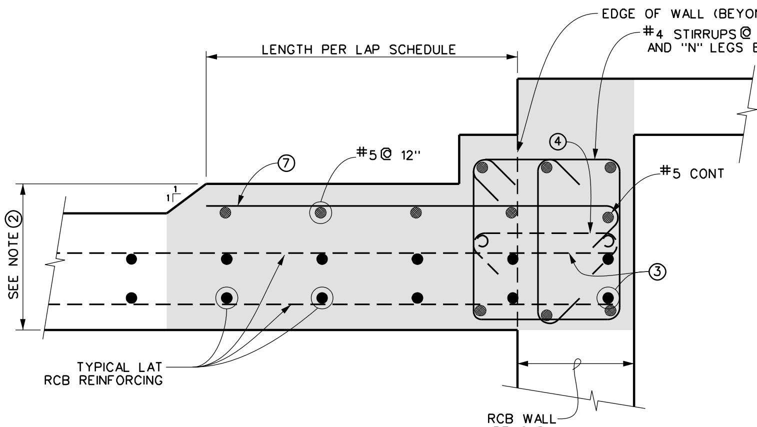


N>1, WITHOUT "X" BARS
NTS



N>1, WITH "X" BARS
NTS

TYPICAL SECTION B/1
BEAM SECTION
SEE NOTE 5
NTS



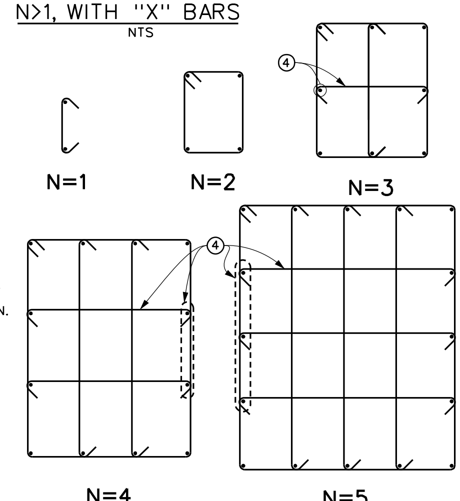
DETAIL 1
THICKENED DECK/INVERT
NTS

NOTES:

1. VARIABLES B, H, N AND S PROVIDED IN TABLES A, B OR C ON SHEET 3. N IS THE BAR CONFIGURATION PER DETAIL 2 HEREON, THE SIZE OF BARS IS PER THE TABLES ON SHEET 3.
2. DEPTH OF THICKENED SLAB SHALL MATCH THE MAIN LINE DECK OR INVERT, WHICHEVER IS GREATER.
3. CUT LATERAL REINFORCING OF MAINLINE RCB WALL TO MAINTAIN 1½" CLEAR FROM INSIDE FACE.
4. OMIT HORIZONTAL TIES AND BARS WHERE TIE IS WITHIN LATERAL SLAB, INVERT OR THICKENED EDGE.
5. SAMPLE CONFIGURATIONS OF LATERAL, MAIN LINE AND JUNCTION STRUCTURE GEOMETRIES ARE SHOWN. PLEASE NOTE THE POSITION OF THE LATERAL TO THE MAINLINE MAY VARY, SUCH AS MATCHING OR OFFSET INVERT ELEVATIONS, AND MATCHING OR OFFSET TOP SLAB ELEVATIONS. REINFORCING STEEL SHOP DRAWINGS SHOWING SPECIFIC GEOMETRY AND REINFORCING SHALL BE SUBMITTED TO THE DISTRICT FOR REVIEW AND APPROVAL.
6. ABBREVIATIONS SHALL BE AS DEFINED:

ML	MAIN LINE
LAT	LATERAL
T1	DECK THICKNESS PER CALTRANS STANDARD PLANS OR PROJECT DRAWINGS
T3	INVERT THICKNESS PER CALTRANS STANDARD PLANS OR PROJECT DRAWINGS

7. "X" BAR, SEE TABLE ON SHEET 3 AND DETAIL 1.



DETAIL 2
BEAM REINFORCEMENT DETAILING
NTS

REVISIONS

REF.	DESCRIPTION	APPR.	DATE
1	CORRECT TYPO: ADD TEXT TO NOTE 1 ON SHEET 2 OF 3		7/2020

REGISTERED PROFESSIONAL ENGINEER CHAD W. HARDEN No. S5232 STRUCTURAL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE: 08/2015 R.C.E. NO. 59795

APPROVED BY: CHIEF, DESIGN & CONSTRUCTION DATE: 08/2015 R.C.E. NO. 70355

JUNCTION STRUCTURE NO. 5

STANDARD DRAWING NUMBER JS230

SHEET 2 OF 3

DESIGN NOTES

DESIGN SPECIFICATIONS:
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2012 (SIXTH EDITION) WITH CALIFORNIA AMENDMENTS (AASHTO-CA BDS-6)

LOADING:
LIVE LOAD: (AASHTO LRFD 3.6.1.2)
HL-93 CONSISTS OF DESIGN TRUCK OR DESIGN TANDEM AND DESIGN LANE LOAD.

IMPACT FACTOR: (APPLY TO ROOF SLAB ONLY)
IM = 33(1.0-0.125DE) = 33 at 2-FT Fill, 0 OTHERWISE (AASHTO LRFD 3.6.2.2)
DE = MINIMUM DEPTH OF EARTH COVER

EARTH LOAD:
VERTICAL EARTH PRESSURE: 140 pcf

LOAD FACTORS:
AASHTO LRFD TABLE 3.4.1.1 & TABLE 3.4.1.2
STRENGTH I: U=1.35 (DC+EV) + 1.75 (LL+IM+LS)
STRENGHT IV: U=1.50(DC+EV)

STRENGTH REDUCTION FACTORS:
Ø = 0.90 SHEAR & MOMENT

UNIT STRESSES:
$f'c$ = 3,600 psi
fy = 60,000 psi

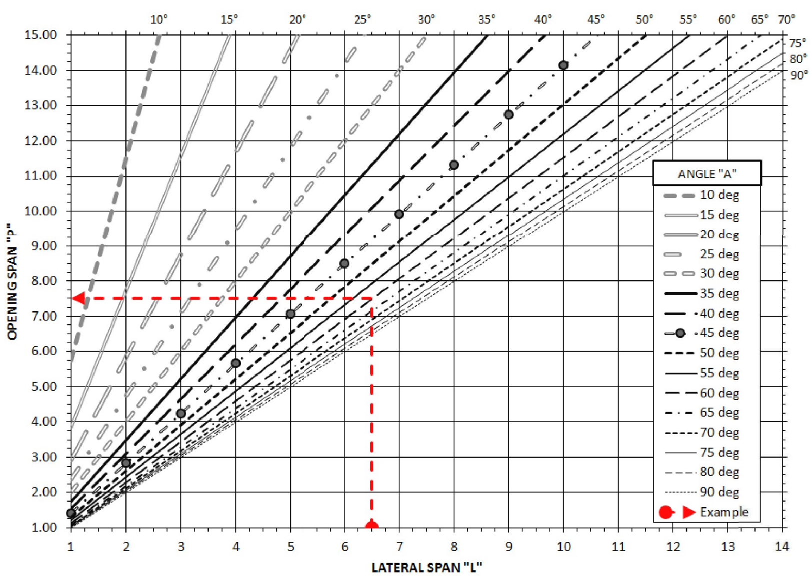
SHEAR:
$V_c = (0.0676\sqrt{f'_c} + 4.6\ \frac{A_s}{b d_e}\ \frac{V_u d_e}{M_u})\ b \times d_e$ (Kips)
$V_c \leq 0.126\sqrt{f'_c}\ b \times d_e$ (Kips)
V_c SHALL NOT BE LESS THAN $0.0948\sqrt{f'_c}\ b \times d_e$ FOR FRAME MEMBERS AND $0.0791\sqrt{f'_c}\ b \times d_e$ FOR SIMPLY SUPPORTED MEMBERS.

STRUCTURAL GENERAL NOTES

1. VERIFY ALL DIMENSIONS AND JOB SITE CONDITIONS PRIOR TO THE FABRICATION OF ANY MATERIAL.
2. THESE NOTES AND DETAILS ARE INTENDED TO WORK WITH CALTRANS STANDARD PLANS D80, D81 AND D82 BUT MAY BE USED FOR OTHER RCB DESIGNS AND GEOMETRIES UPON APPROVAL FROM THE PROJECT ENGINEER OF RECORD, AND AS REFERENCED BY PROJECT DRAWINGS.
3. THE PROJECT ENGINEER OF RECORD IS RESPONSIBLE FOR CHECKING THE PROPOSED IMPROVEMENTS ARE WITHIN THE DESIGN LIMITATIONS AND VARIABLES PRESENTED HEREIN.

STANDARD DRAWINGS NOTES FOR DESIGN TABLES

1. FOR DEFINITION OF LATERAL SPAN ("L") AND SKEW ("A") AS USED IN THE FOLLOWING NOMOGRAPH, SEE PLAN ON SHEET 1 HERON.
2. THE ENGINEER SHALL SPECIFY THE CONSTRUCTION CONDITION BY DESIGN COVER (TABLE A, B, OR C) AND MAXIMUM MAIN LINE SPAN ("M") AND OPENING SPAN ("P").
   EXAMPLE
   MAIN LINE SPAN, ("M")=9'-0", EARTH COVER=8'-0",
   OPENING SPAN ("P")=7'-8", LATERAL SPAN ("L")=6'6" WITH 60° SKEW WOULD SPECIFY:
   "CONSTRUCT JS NO.5 PER DISTRICT STD. JS230 DESIGN CASE BM10P8".
3. TO ESTIMATE OPENING SPAN BASED ON LATERAL SPAN AND SKEW, SEE "NOMOGRAPH FOR OPENING SPAN" BELOW.
4. BEAM WIDTH SHALL BE AS SPECIFIED OR MATCH MAIN LINE WALL WIDTH, WHICHEVER IS LARGER.
5. BEAM DEPTH SHALL BE AS SPECIFIED OR MATCH MAIN LINE DECK OR INVERT THICKNESS, WHICHEVER IS LARGER.



"P" SPAN NOMOGRAPH

EQUATION

P = L / SIN (A)

TABLE A

EARTH COVER = 0' TO 2'-0"						
DESIGN CASE	B (in)	H (in)	N (--)	BAR SIZE	S (in)	"X" BAR
AM4P2	12	12	2	6	6½	N/A
AM4P4	12	16	2	6	4½	N/A
AM4P6	12	18	2	7	6½	N/A
AM5P2	12	12	2	6	6½	N/A
AM5P4	12	16	2	6	4½	N/A
AM5P6	12	18	2	7	5	N/A
AM5P8	12	20	2	8	7	N/A
AM6P3	12	14	2	6	4	N/A
AM6P4	12	16	2	6	4½	N/A
AM6P6	12	18	2	7	5	N/A
AM6P8	12	20	2	8	5½	N/A
AM6P9	12	22	2	8	7	N/A
AM7P3	12	14	2	6	4	N/A
AM7P4	12	16	2	6	4½	N/A
AM7P6	12	18	2	7	5	N/A
AM7P8	12	20	2	8	5½	N/A
AM7P10	12	24	3	7	10½	N/A
AM8P4	12	16	2	6	4½	N/A
AM8P6	12	18	2	7	5	N/A
AM8P8	12	20	2	8	5½	N/A
AM8P10	12	24	3	7	10½	N/A
AM8P12	12	28	3	7	10½	N/A
AM10P4	8½	28	2	6	11½	#7@10"
AM10P6	12	18	2	7	5	#7@10"
AM10P8	12	20	2	8	5½	#7@10"
AM10P10	12	24	2	8	6½	#7@10"
AM10P12	18	18	4	9	5	#7@10"
AM10P14	18	20	4	9	5½	#7@10"
AM10P15	18	22	4	9	6	#7@10"
AM12P4	12	16	3	6	4½	#7@9"
AM12P6	12	16	3	7	4½	#7@9"
AM12P8	12	18	3	8	5	#7@9"
AM12P10	12	18	3	8	5	#7@9"
AM12P12	18	18	4	9	5	#7@9"
AM12P14	18	20	4	9	5½	#7@9"
AM12P15	18	22	4	9	6	#7@9"
AM14P4	12	16	3	6	4½	#8@9"
AM14P6	12	16	3	7	4½	#8@9"
AM14P8	12	18	3	8	5	#8@9"
AM14P10	12	20	3	9	5½	#8@9"
AM14P12	18	18	4	9	5	#8@9"
AM14P14	18	22	4	9	6	#8@9"
AM14P15	18	24	4	9	9½	#8@9"

NOTES:
1. M=MAIN LINE SPAN
2. P=OPENING SPAN

TABLE B

EARTH COVER = 2'-1" TO 10'-0"						
DESIGN CASE	B (in)	H (in)	N (--)	BAR SIZE	S (in)	"X" BAR
BM4P2	6	9	1	6	6	N/A
BM4P4	8	10	1	6	6	N/A
BM4P6	12	12	2	6	6½	N/A
BM5P2	6	9	1	6	6	N/A
BM5P4	6	10	1	6	5½	N/A
BM5P6	12	12	2	6	6½	N/A
BM5P8	12	14	2	7	8	N/A
BM6P3	6½	9	1	6	5	N/A
BM6P4	6½	10	1	7	5½	N/A
BM6P6	12	12	2	7	6½	N/A
BM6P8	12	14	2	8	8	N/A
BM6P9	12	14½	2	9	8	N/A
BM7P3	6½	9	1	6	5	N/A
BM7P4	6½	12	1	7	6½	N/A
BM7P6	12	12	2	7	6½	N/A
BM7P8	12	14	2	8	8	N/A
BM7P10	12	17	2	9	9½	N/A
BM8P4	6½	12	1	7	6½	N/A
BM8P6	12	14	2	8	8	N/A
BM8P8	12	16	2	8	9	N/A
BM8P10	12	18	2	9	10	N/A
BM8P12	18	18	4	8	10	N/A
BM10P4	12	12	2	6	6½	#7@10"
BM10P6	12	14	2	7	8	#7@10"
BM10P8	12	16	3	7	9	#7@10"
BM10P10	18	18	4	7	10	#7@10"
BM10P12	18	20	4	8	11½	#7@10"
BM10P14	18	22	4	9	11½	#7@10"
BM10P15	18	24	4	9	11½	#7@10"
BM12P4	12	12	2	6	6½	#7@9"
BM12P6	12	14	3	7	8	#7@9"
BM12P8	12	18	3	7	10	#7@9"
BM12P10	18	20	4	7	11½	#7@9"
BM12P12	18	22	4	8	11½	#7@9"
BM12P14	18	24	4	9	11½	#7@9"
BM12P15	18	26	4	9	11½	#7@9"
BM14P4	12	14	2	6	8	#8@9"
BM14P6	12	14	3	7	8	#8@9"
BM14P8	12	18	3	8	10	#8@9"
BM14P10	18	20	4	8	11½	#8@9"
BM14P12	18	22	4	9	11½	#8@9"
BM14P14	18	24	4	10	11½	#8@9"
BM14P15	18	26	4	10	11½	#8@9"

TABLE C

EARTH COVER = 10'-1" TO 20'-0"						
DESIGN CASE	B (in)	H (in)	N (--)	BAR SIZE	S (in)	"X" BAR
CM4P2	6	10	1	6	5½	N/A
CM4P4	12	10	2	6	5½	N/A
CM4P6	12	14	2	6	7½	N/A
CM5P2	6	10	1	6	5½	N/A
CM5P4	12	12	2	6	6½	N/A
CM5P6	12	14	2	7	4	N/A
CM5P8	12	20	2	7	5½	N/A
CM6P3	7	12	1	6	3	N/A
CM6P4	12	12	2	6	6½	N/A
CM6P6	12	16	2	7	4½	N/A
CM6P8	12	22	2	7	6½	N/A
CM6P9	12	26	2	7	6½	N/A
CM7P3	7	12	1	6	3	N/A
CM7P4	12	12	2	6	3	N/A
CM7P6	12	18	2	6	7	N/A
CM7P8	12	24	2	7	6½	N/A
CM7P10	12	20	3	8	5	N/A
CM8P4	12	14	2	6	8	N/A
CM8P6	12	20	2	6	7	N/A
CM8P8	12	26	2	7	6½	N/A
CM8P10	12	34	3	6	10	N/A
CM8P12	18	20	4	9	5	N/A
CM10P4	12	14	2	7	4	#7@10"
CM10P6	12	22	2	7	6½	#7@10"
CM10P8	12	30	2	7	6½	#7@10"
CM10P10	12	38	3	7	9½	#7@10"
CM10P12	18	22	4	9	4½	#7@10"
CM10P14	24	26	5	9	6	#7@10"
CM10P15	24	28	5	9	6	#7@10"
CM12P4	12	14	2	7	4	#8@9"
CM12P6	12	16	3	7	4½	#8@9"
CM12P8	12	20	3	8	4½	#8@9"
CM12P10	12	24	3	9	4	#8@9"
CM12P12	18	24	4	10	4½	#8@9"
CM12P14	24	26	5	10	5½	#8@9"
CM12P15	24	28	5	10	5½	#8@9"
CM14P4	12	14	2	7	4	#8@9"
CM14P6	12	18	3	8	5	#8@9"
CM14P8	12	20	3	9	4	#8@9"
CM14P10	12	24	3	11	3½	#8@9"
CM14P12	18	24	4	10	4	#8@9"
CM14P14	24	26	5	10	4½	#8@9"
CM14P15	24	28	5	10	4½	#8@9"

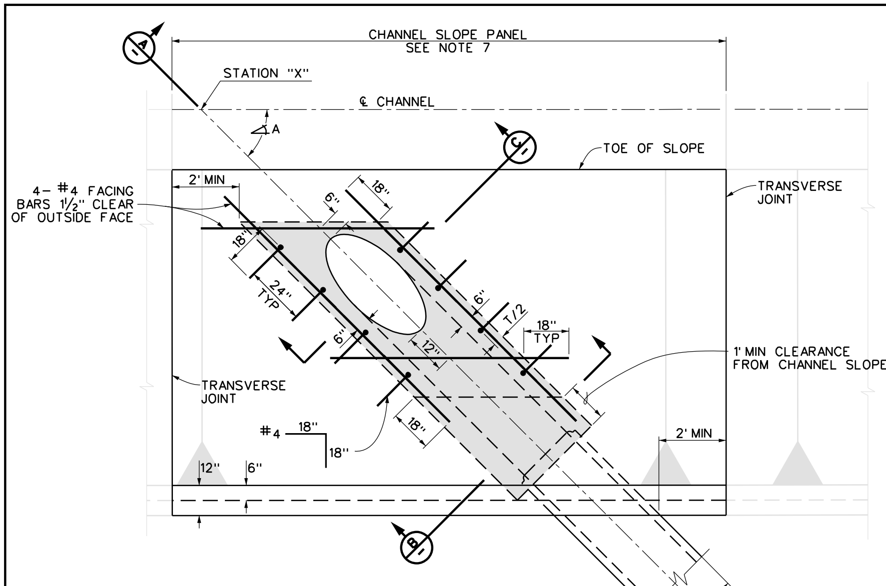
REGISTERED PROFESSIONAL ENGINEER
CHAD W. HARDEN
No. S5232
STRUCTURAL
STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

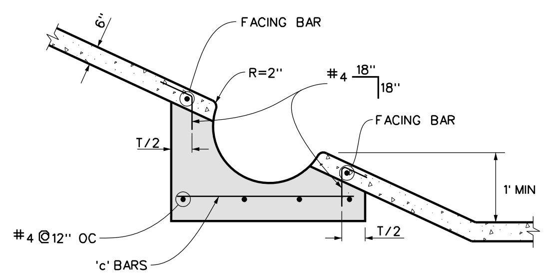
APPROVED BY:
GENERAL MANAGER-CHIEF ENGINEER
DATE: 08/2015
R.C.E. NO. 59795

APPROVED BY:
CHIEF, DESIGN & CONSTRUCTION
DATE: 08/2015
R.C.E. NO. 70355

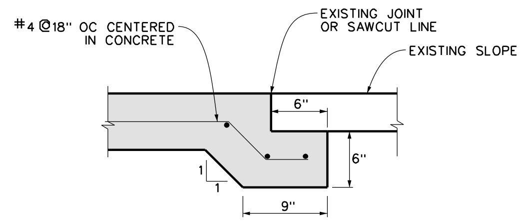
JUNCTION STRUCTURE
NO. 5
STANDARD DRAWING NUMBER JS230
SHEET 3 OF 3



PLAN
NTS



SECTION C
NTS

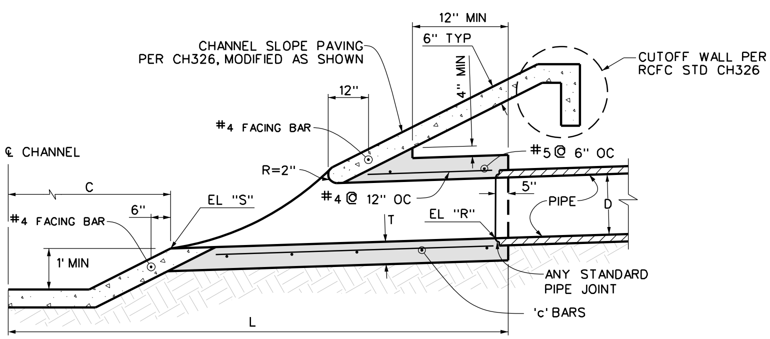


TRANSVERSE JOINT CONNECTION DETAIL 1
(EXISTING CHANNEL)
NTS

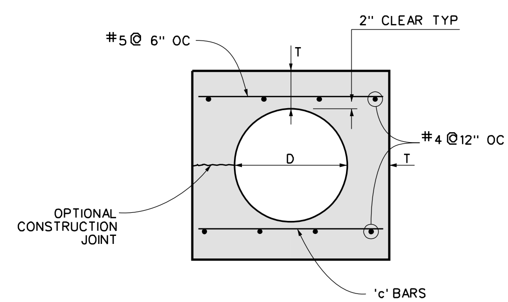
TABLE

FOR DIMENSIONS & BAR SIZES
D=18"-84"

D (IN)	T (IN)	'c' BARS
18	9	NONE
24	9	
30	9	
36	8	#4 @ 12"
42	8	
48	8	
54	9	
60	10	
66	11	
72	11	
84	13	



SECTION A
NTS



SECTION B
NTS

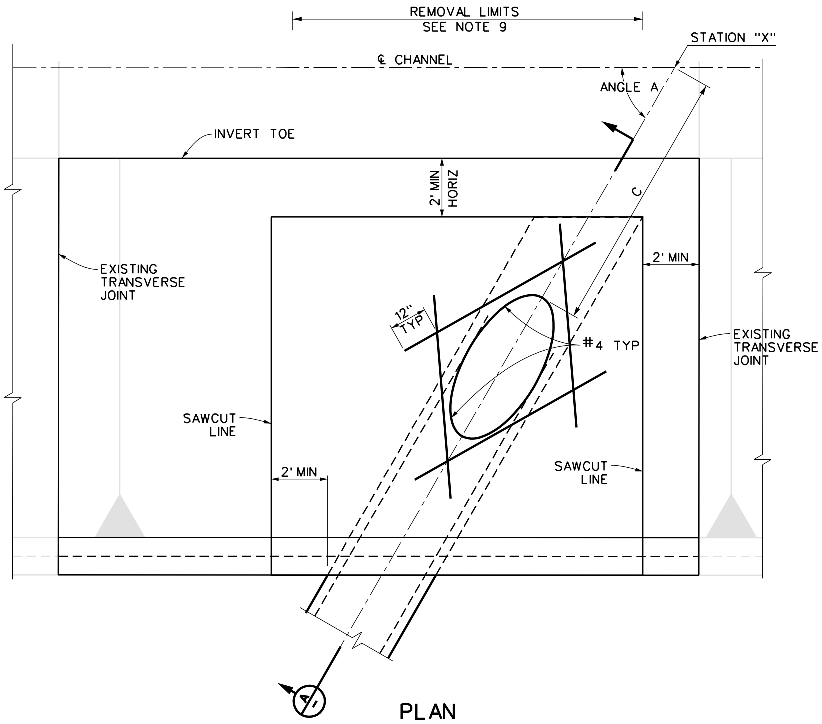
NOTES

1. ∠A SHALL BE BETWEEN 45° AND 90°.
2. VALUES FOR D, L, C, EL. R, EL. S, ANGLE A & STATION "X" ARE SHALL BE SPECIFIED ON PROJECT DRAWINGS.
3. REINFORCING BARS SHALL BE PLACED 2" CLEAR FROM FACE OF CONCRETE. TYPICAL UNLESS OTHERWISE NOTED.
4. CONCRETE SHALL BE CLASS "A".
5. REINFORCEMENT SHALL BE PROVIDED IN ALL PORTIONS OF THE JUNCTION STRUCTURE AS INDICATED ON DRAWINGS REGARDLESS OF BAR LENGTH MODIFICATION REQUIRED TO ACHIEVE PROPER CLEARANCES.
6. INSTALLATION OF LATERAL PIPE SHALL BE IN CONFORMANCE TO DISTRICT STD M815.
7. UNLESS OTHERWISE SPECIFIED, REMOVE AND REPLACE CHANNEL SLOPE PANEL PER STD CH326 (INCLUDING SLOPE THICKNESS, REINFORCING STEEL, WEEPHOLES, AND TRANSVERSE JOINTS).
8. TRANSVERSE JOINT CONNECTION SHALL BE CONSTRUCTED PER DETAIL 1 HEREIN FOR EXISTING CHANNELS.

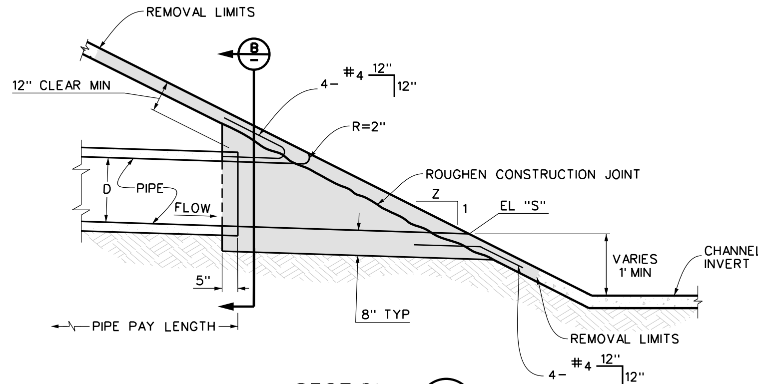
REGISTERED PROFESSIONAL ENGINEER JASON E. UHLEY No. 59795 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER CLAUDIO MANUEL PADRES No. 70355 CIVIL STATE OF CALIFORNIA

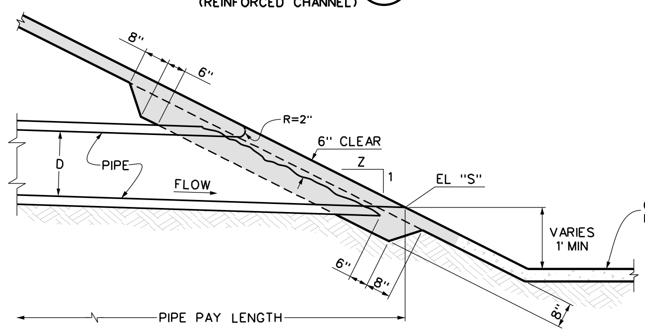
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		JUNCTION STRUCTURE NO. 6
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE: 7-2-2019 R.C.E. NO. 59795	APPROVED BY: CHIEF, DESIGN & CONSTRUCTION DATE: 7-2-2019 R.C.E. NO. 70355	STANDARD DRAWING NUMBER JS231 SHEET 1 OF 1



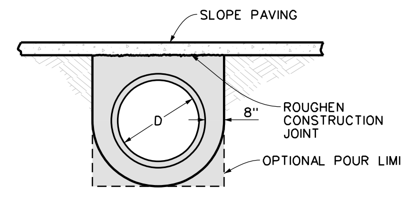
PLAN
NTS



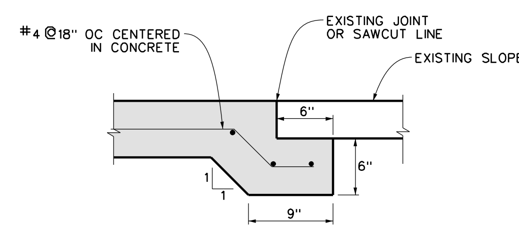
SECTION A
CASE 2
(REINFORCED CHANNEL)



SECTION A
CASE 1
(UNREINFORCED CHANNEL)



SECTION B
NTS



JOINT CONNECTION DETAIL 1
(EXISTING CHANNEL)
NTS

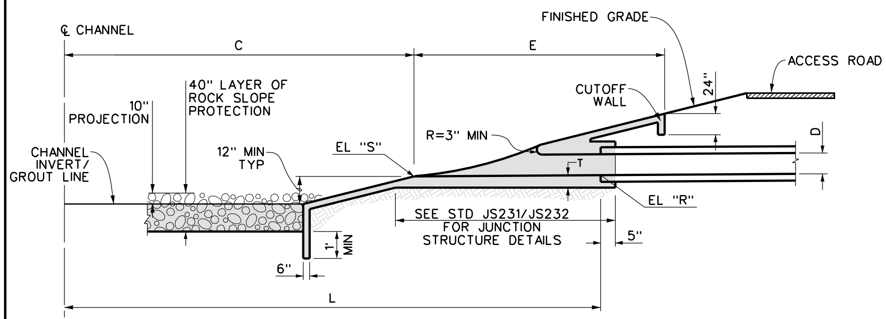
NOTES

1. APPLICABLE TO EXISTING TRAPEZOIDAL CHANNEL ONLY UPON CASE BY CASE APPROVAL BY DISTRICT OTHERWISE USE JS231.
2. HORIZONTAL ANGLE OF CONFLUENCE, "A", MUST BE BETWEEN 60° AND 90°.
3. D SHALL NOT EXCEED 24".
4. SIDE SLOPE, Z, SHALL NOT BE FLATTER THAN 2:1.
5. CONTRACTOR SHALL UTILIZE CASE 1 FOR EXISTING UNREINFORCED CHANNELS AND CASE 2 FOR EXISTING REINFORCED CHANNELS
6. VALUES FOR D, Z, ANGLE A, C, EL. "S", AND STATION "X", SHALL BE SPECIFIED ON PROJECT DRAWINGS.
7. ALL CONCRETE SHALL BE CLASS A.
8. JOINT CONNECTION SHALL BE CONSTRUCTED PER DETAIL 1 HEREIN FOR EXISTING CHANNELS.
9. RECONSTRUCTION OF CHANNEL SLOPE PAVING SHALL BE PER STD DWG CH326 AND AS SHOWN HEREON.

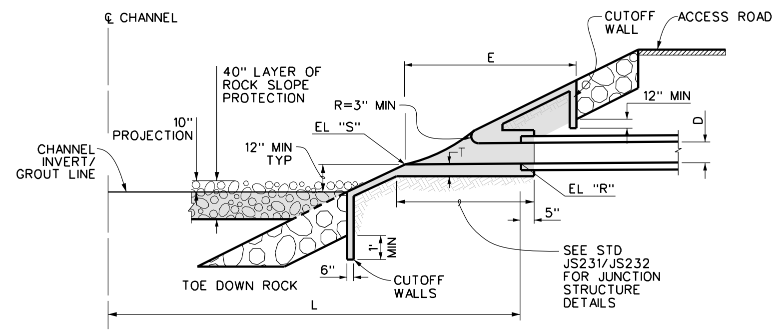
REGISTERED PROFESSIONAL ENGINEER JASON E. UHLEY No. 59795 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER CLAUDIO MANUEL PADRES No. 70355 CIVIL STATE OF CALIFORNIA

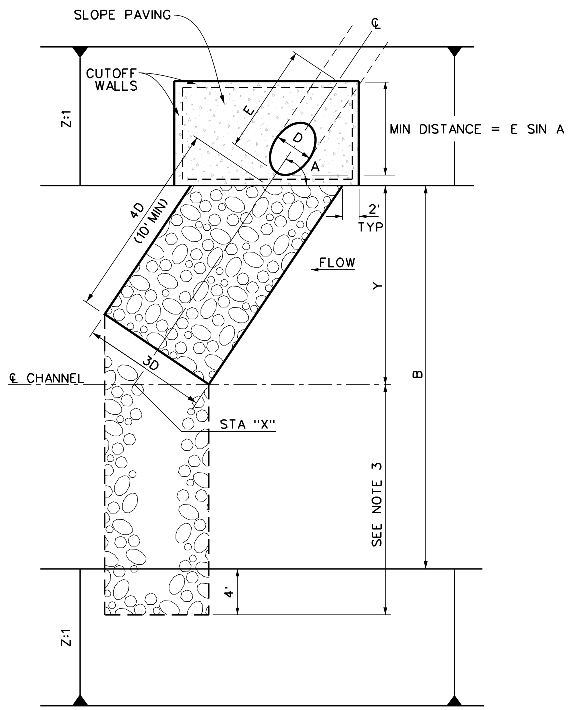
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		JUNCTION STRUCTURE NO. 7
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE: 7-2-2019 R.C.E. NO. 59795	APPROVED BY: CHIEF, DESIGN & CONSTRUCTION DATE: 7-2-2019 R.C.E. NO. 70355	STANDARD DRAWING NUMBER JS232 SHEET 1 OF 1



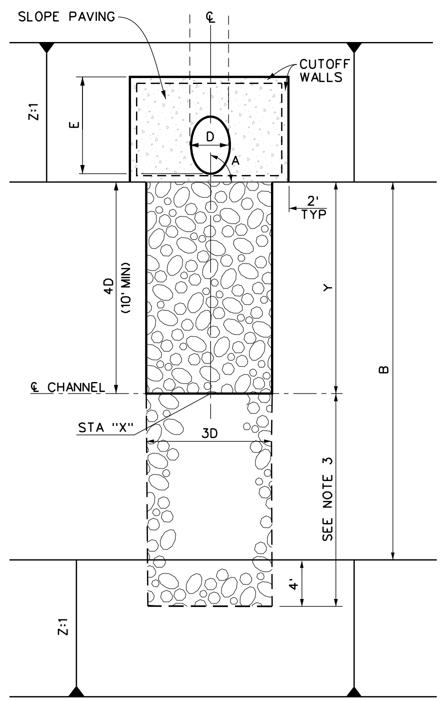
UNLINED CHANNEL CONDITION
NTS



ROCK LINED CHANNEL CONDITION
NTS



ROCK ENERGY DISSIPATOR
(ANGLED JUNCTION)
NTS



ROCK ENERGY DISSIPATOR
(PERPENDICULAR JUNCTION)
NTS

LEGEND

D = INSIDE PIPE DIAMETER (FT)

A = JUNCTION ANGLE TO BE DETERMINED BY ENGINEER

Z = HORIZONTAL COMPONENT OF SIDE SLOPE RATIO

$E_{MIN} = \frac{Z(D+2)}{SIN\ A}$ NOT TO EXCEED TOP OF CHANNEL

NOTES

1. 1/4 TON CONCRETE ROCK SLOPE PROTECTION PER CALTRANS STANDARD SPECIFICATION SECTION 72, CURRENT EDITION. NO ROCK ENERGY DISSIPATOR REQUIRED WHEN LATERAL Q IS LESS THAN 10 CFS.
2. CONCRETE MAY EXTEND TO TOP OF SLOPE FOR ROCK LINED CHANNEL.
3. IF "Y" IS GREATER THAN OR EQUAL TO B/2, EXTEND CONCRETED ROCK SLOPE PROTECTION ACROSS ENTIRE BASE WIDTH OF CHANNEL AND 4 FEET UP THE OPPOSITE SLOPE, OR AS APPROVED BY THE ENGINEER.
4. SEE STANDARD CH326 FOR SLOPE PAVING AND CUTOFF WALL (REINF.) DETAILS.

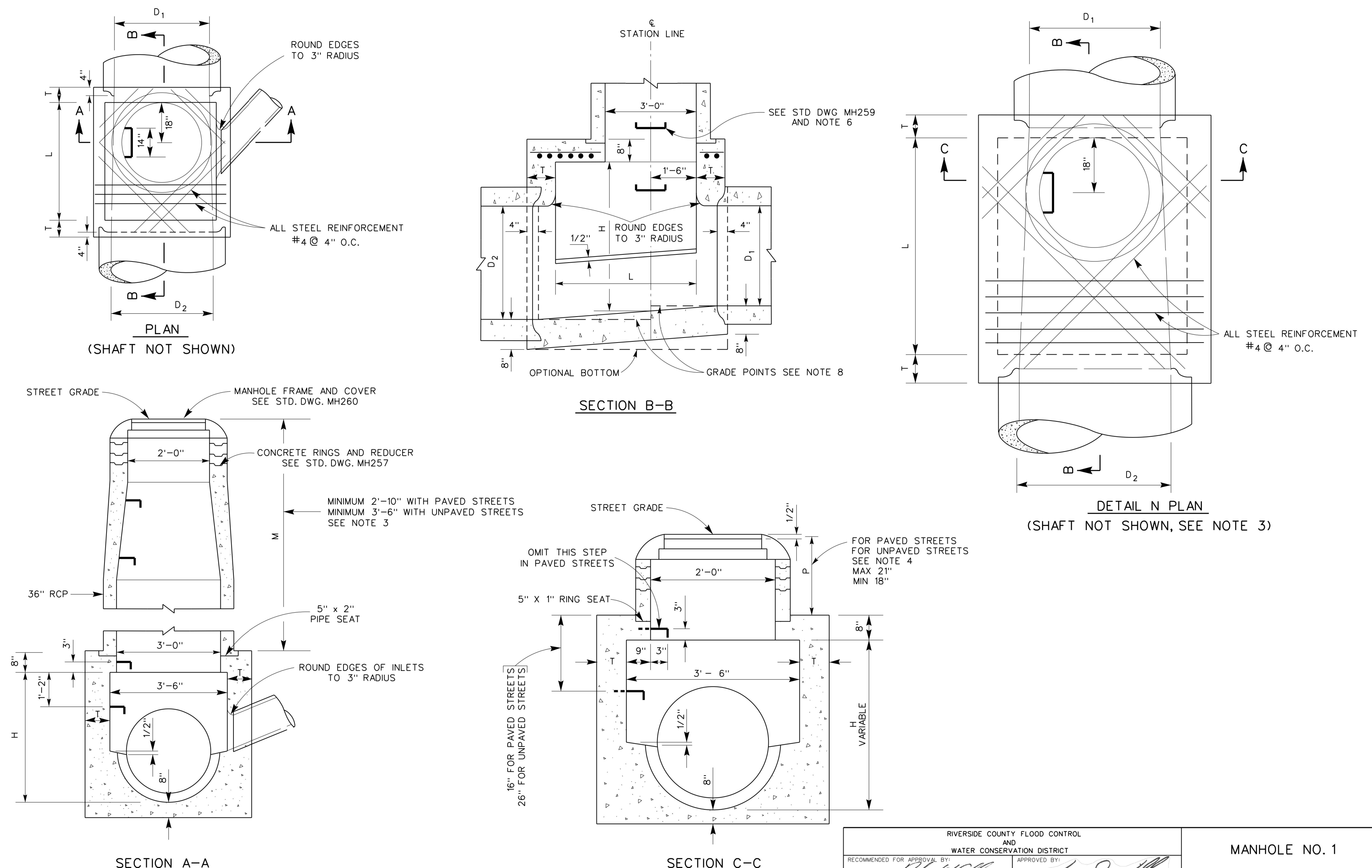
REGISTERED PROFESSIONAL ENGINEER JASON E. UHLEY No. 59795 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER CLAUDIO MANUEL PADRES No. 70355 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY:	APPROVED BY:
GENERAL MANAGER-CHIEF ENGINEER	CHIEF, DESIGN & CONSTRUCTION
DATE: 7-2-2019 R.C.E. NO. 59795	DATE: 7-2-2019 R.C.E. NO. 70355

JUNCTION STRUCTURE NO. 8 (SOFT-BOTTOM CHANNEL)
STANDARD DRAWING NUMBER JS233
SHEET 1 OF 1



RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY:	APPROVED BY:
CHIEF, DESIGN & CONSTRUCTION	CHIEF ENGINEER
DATE: JANUARY 2011 R.E. No. 44684	DATE: JANUARY 2011 R.C.E. NO. 32336

MANHOLE NO. 1

STANDARD DRAWING NUMBER MH251

SHEET 1 OF 2

NOTES

1. HEIGHT H SHALL BE NOT LESS THAN 4'-0" BUT MAY BE INCREASED AT OPTION OF CONTRACTOR PROVIDED THAT THE VALUE OF M SHALL NOT BE LESS THAN THE MINIMUM SPECIFIED AND THAT THE REDUCER SHALL BE USED. FOR H (IN SEC. C-C) SEE NOTE 4.

2. LENGTH L SHALL BE 4' UNLESS OTHERWISE SHOWN ON IMPROVEMENT PLAN. L MAY BE INCREASED OR LOCATION OF MANHOLE SHIFTED TO MEET PIPE ENDS, AT THE OPTION OF CONTRACTOR, EXCEPT THAT ANY CHANGE IN LOCATION OF MANHOLE MUST BE APPROVED BY THE ENGINEER.

3. SHAFT SHALL BE CONSTRUCTED AS PER SECTION C-C AND DETAIL N WHEN DEPTH M FROM STREET GRADE TO TOP OF BOX IS LESS THAN 2'-10 1/2" FOR PAVED STREETS OR 3'-6" FOR UNPAVED STREETS.

4. DEPTH P MAY BE REDUCED TO AN ABSOLUTE LIMIT OF 6" WHEN LARGER VALUES OF P WOULD REDUCE H (IN SECTION C-C) TO BE 3'-6" OR LESS.

5. T SHALL BE 8" FOR VALUES OF H UP TO AND INCLUDING 8'.
   T SHALL BE 10" FOR VALUES OF H OVER 8'.

6. STEPS SHALL BE 3/4" ROUND, GALVANIZED STEEL AND ANCHORED NOT LESS THAN 4" IN THE WALLS OF STRUCTURES. UNLESS OTHERWISE SHOWN, STEPS SHALL BE SPACED 16" ON CENTER. THE LOWEST STEP SHALL BE NOT MORE THAN 2' ABOVE THE INVERT.

7. REINFORCING STEEL SHALL BE ROUND, DEFORMED, BARS, NO. 4 AND 1 1/2" CLEAR FROM INSIDE FACE OF CONCRETE.

8. STATIONS REFER TO PLAN AND PROFILE SHEETS. ELEVATIONS AT ℄ AND PROLONGED INVERT GRADE LINE. SEE NOTE 2 FOR SHIFTING LOCATION.

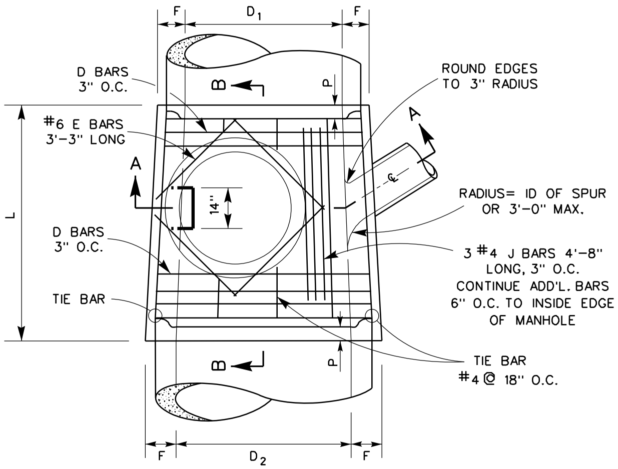
9. RINGS, REDUCER AND PIPE FOR ACCESS SHAFT SHALL BE SEATED IN CEMENT MORTAR AND NEATLY POINTED OR WIPED INSIDE SHAFT.

10. FLOOR OF MANHOLE SHALL BE STEEL TROWELED TO SPRINGLINE.

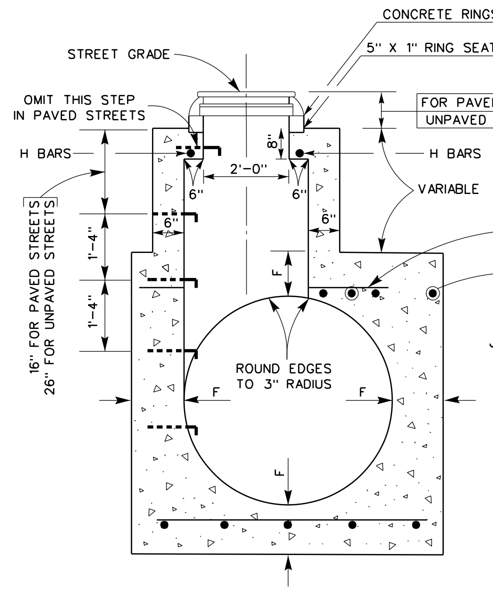
11. CONCRETE SHALL BE CLASS "A".

12. WHERE PRESSURE MANHOLE NO. 1 IS SPECIFIED ON PLANS SEE STD DWG MH256 AND MH258.

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		MANHOLE NO. 1
RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION	APPROVED BY: CHIEF ENGINEER	STANDARD DRAWING NUMBER MH251
DATE: JANUARY 2011 R.E. No. 44684	DATE: JANUARY 2011 R.C.E. NO. 32336	SHEET 2 OF 2

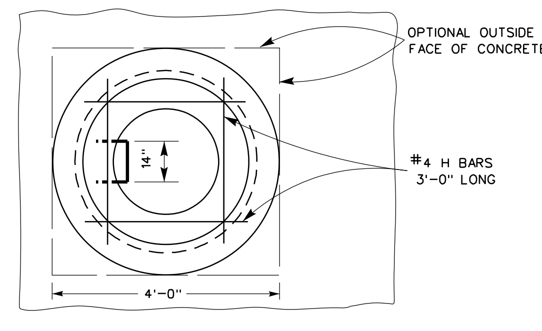


PLAN
(SHAFT NOT SHOWN)

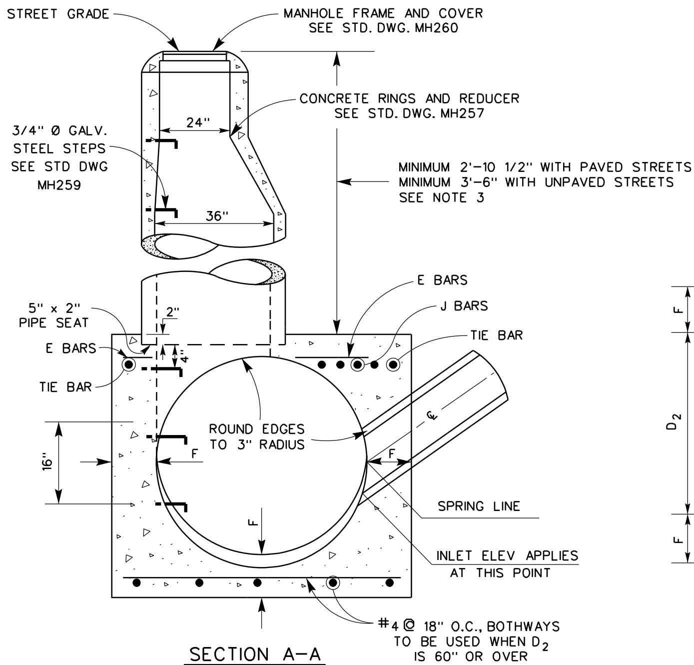


	MAX	MIN
FOR PAVED STREETS	11"	8 1/2"
UNPAVED STREETS	16"	15"

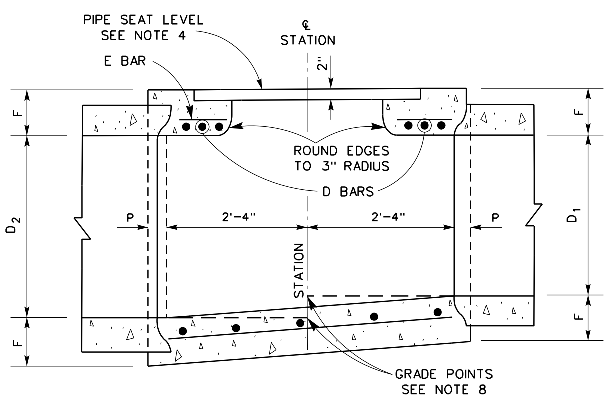
DETAIL M
(SEE NOTE 3)



PLAN



SECTION A-A



SECTION B-B

TABLE OF VALUES FOR "F"

x D_2, D_1	F	x D_2, D_1	F
36"	6 1/2"	78"	11 3/4"
39"	7"	84"	12 1/2"
42"	7 1/2"	90"	13 1/4
45"	7 3/4"	96"	14"
48"	8"	102"	15 1/2"
51"	8 1/2"	108"	16"
54"	9"	114"	16 1/2"
57"	9 1/4"	120"	17"
60"	9 1/2"	126"	17"
63"	10"	132"	17 1/2"
66"	10 1/4"	138"	17 1/2"
69"	10 3/4"	144"	18"
72"	11"		

x USE D_2, OR D_1 WHICHEVER IS GREATER

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY:	APPROVED BY:
CHIEF, DESIGN & CONSTRUCTION	CHIEF ENGINEER
DATE: JANUARY 2011 R.E. No. 44684	DATE: JANUARY 2011 R.C.E. NO. 32336

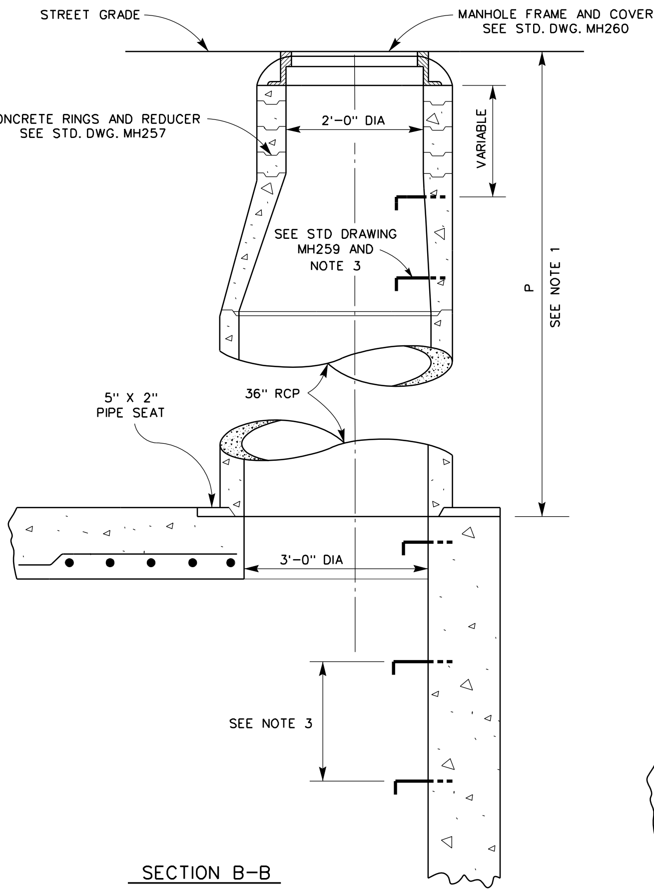
MANHOLE NO. 2

STANDARD DRAWING NUMBER MH252
SHEET 1 OF 2

NOTES

1. TABLE OF VALUES FOR F ARE ON PLAN SHEET 1.
2. CENTER OF MANHOLE SHAFT SHALL BE LOCATED OVER CENTER LINE OF STORM DRAIN WHEN DIAMETER D_1 IS 48" OR LESS, IN WHICH CASE PLACE E BARS SYMETRICALLY AROUND SHAFT AT 45° WITH CENTERLINE AND OMIT J BARS.
3. DETAIL M WHEN DEPTH OF MANHOLE FROM STREET GRADE TO TOP OF BOX IS LESS THAN 2'-10 1/2" FOR PAVED STREET OR 3'-6" FOR UNPAVED STREET, CONSTRUCT MONOLITHIC SHAFT AS PER DETAIL M. SHAFT FOR ANY DEPTH OF MANHOLE MAY BE CONSTRUCTED AS PER DETAIL M. WHEN DIAMETER D_1 IS 48" OR LESS, CENTER OF SHAFT MAY BE LOCATED AS PER NOTE 2.
4. THICKNESS OF DECK SHALL VARY WHEN NECESSARY TO PROVIDE LEVEL PIPE SEAT, BUT SHALL NOT BE LESS THAN TABULAR VALUES FOR F SHOWN ON PLAN SHEET 1.
5. REINFORCING STEEL SHALL BE ROUND, DEFORMED, STRAIGHT BARS, 1 1/2" CLEAR FROM INSIDE FACE OF CONCRETE UNLESS OTHERWISE SHOWN.
6. STEPS SHALL BE 3/4" ROUND, GALVANIZED STEEL AND ANCHORED NOT LESS THAN 4" IN THE WALLS OF STRUCTURE UNLESS OTHERWISE SHOWN THE SPACING SHALL BE 16". THE LOWEST STEP SHALL BE NOT MORE THAN 2'-0" ABOVE THE INVERT. SEE STD DWG MH259.
7. RINGS, REDUCER AND PIPE FOR ACCESS SHAFT BE SEATED IN CEMENT MORTAR AND NEATLY POINTED OR WIPED INSIDE SHAFT.
8. STATIONS OF MANHOLES SHOWN ON PLAN APPLY AT CENTER OF SHAFT ELEVATIONS SHOWN AT STATIONS REFER TO PROLONGED INVERT GRADE LINES.
9. FLOOR OF MANHOLE SHALL BE STEEL TROWELED TO SPRINGLINE.
10. BODY OF MANHOLE SHALL BE POURED IN ONE CONTINUOUS OPERATION, EXCEPT THAT THE CONSTRUCTION JOINT WITH A LONGITUDINAL KEYWAY MAY BE PLACED AT THE SPRINGLINE.
11. LENGTH L AND EMBEDMENT P SHALL HAVE THE FOLLOWING VALUES, UNLESS OTHERWISE SHOWN ON THE PLAN
    FOR D_2 = 96" OR LESS, L= 5'-6", P= 5'
    D_2 = OVER 96", L= 6'-0", P= 8"
    L MAY BE INCREASED OR LOCATION OF MANHOLE SHIFTED TO MEET PIPE ENDS WHEN L IS GREATER THAN THAT SHOWN ABOVE IS SPECIFIED D BARS SHALL BE CONTINUED 6" O.C.
12. D BARS SHALL BE #4 FOR D_2 = 39" OR LESS #5 FOR D_2 42" TO 84" INCLUSIVE AND #6 FOR D_2 = 90" OR OVER TIE BARS SHALL BE #4 BARS.
13. STRUCTURAL CONCRETE SHALL BE CLASS "A".
14. CENTERLINE OF INLET PIPE TO INTERSECT INSIDE FACE OF CONE AT SPRINGLINE UNLESS SHOWN OTHERWISE.
15. WHERE PRESSURE MANHOLE NO. 2 IS SPECIFIED ON PLANS SEE STD DWG MH256 AND MH258.

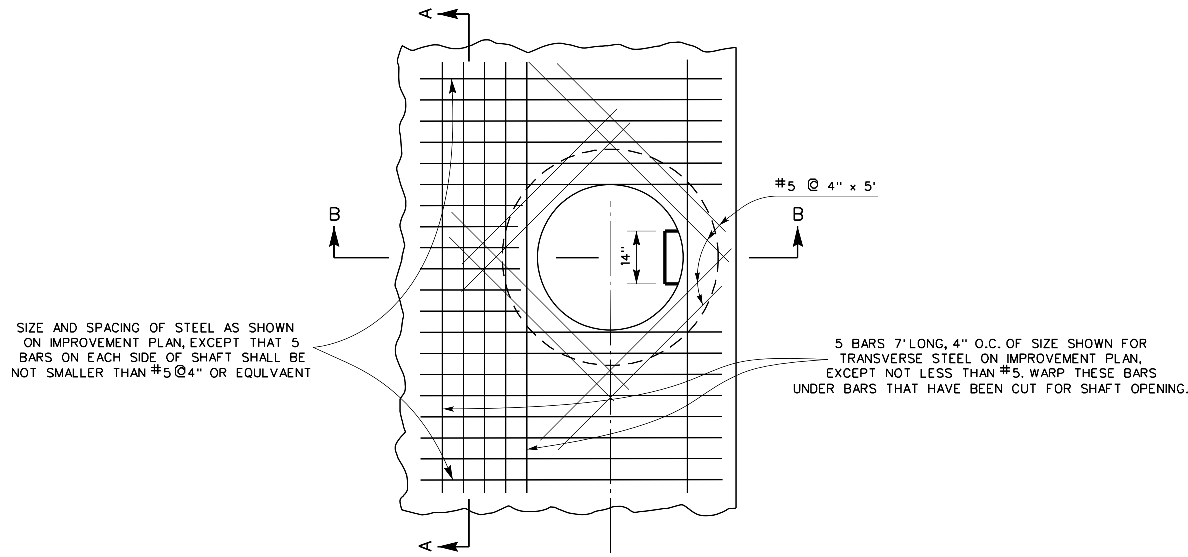
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		MANHOLE NO. 2
RECOMMENDED FOR APPROVAL BY:	APPROVED BY:	
CHIEF, DESIGN & CONSTRUCTION	CHIEF ENGINEER	STANDARD DRAWING NUMBER MH252
DATE: JANUARY 2011 R.E. No. 44684	DATE: JANUARY 2011 R.C.E. NO. 32336	SHEET 2 OF 2



SECTION B-B

MANHOLE FOR BOX SECTION STORM DRAIN

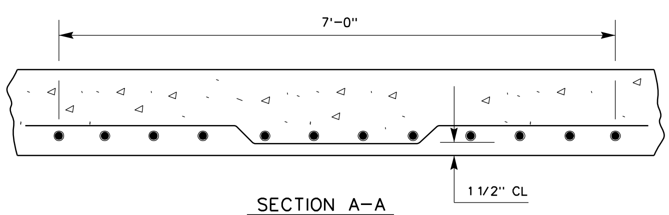
NTS



PLAN

(SHAFT NOT SHOWN)

NTS



SECTION A-A

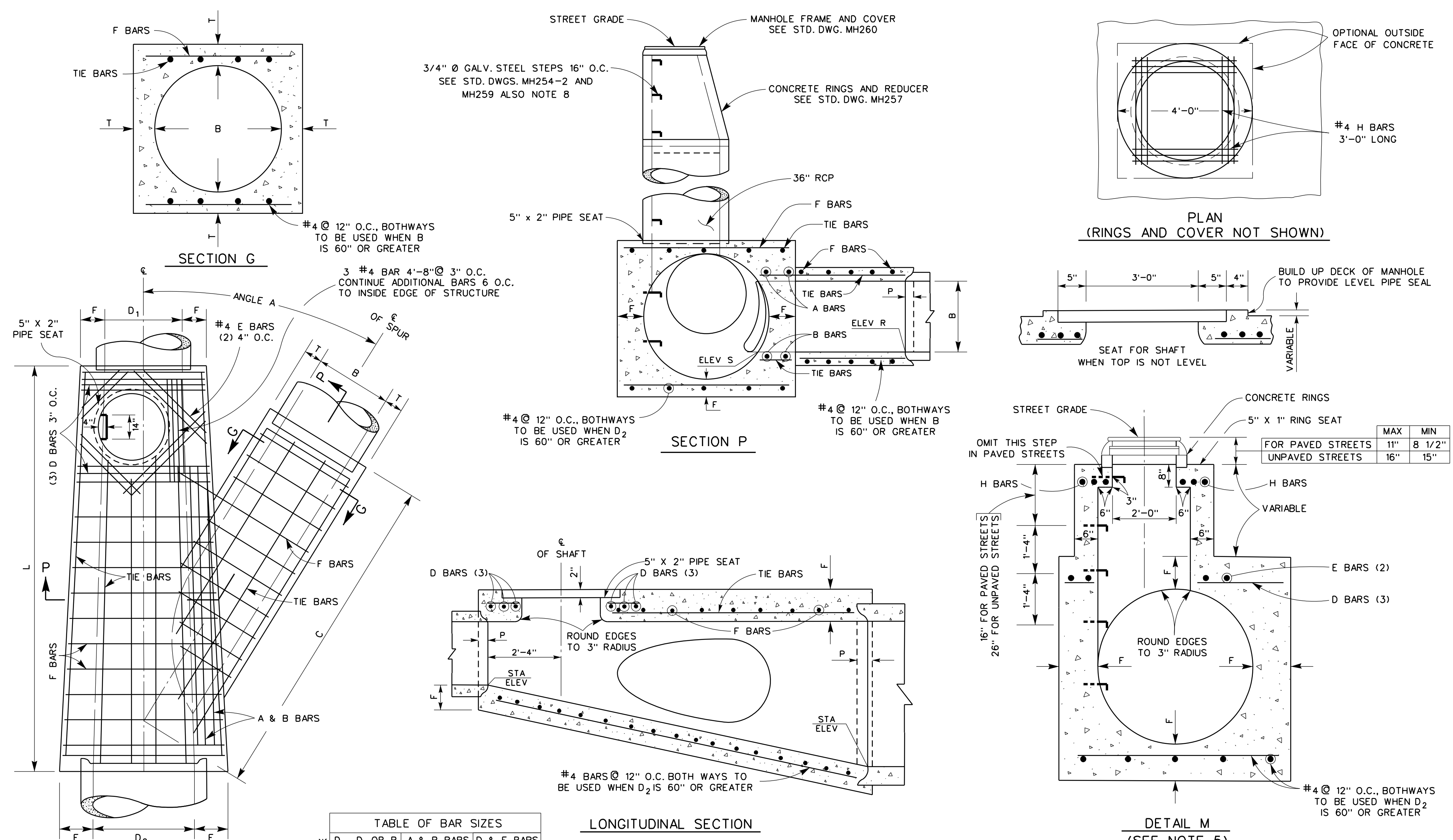
NTS

NOTE

1. DEPTH P: WHEN DEPTH P FROM STREET GRADE TO TOP OF PIPE SEAT IS LESS THAN 2' - 10 1/2" IN PAVED STREETS OR 3' - 6" IN UNPAVED STREETS, CONSTRUCT 2' DIAMETER SHAFT, USING CONCRETE RINGS AS PER STANDARD PLAN FOR CONCRETE RINGS: OTHERWISE, CONSTRUCT 3' SHAFT AS SHOWN ON THIS PLAN.
2. STATIONS SHOWN ON IMPROVEMENT PLANS REFER TO CENTER LINE OF SHAFT.
3. STEPS SHALL BE 3/4" ROUND GALVANIZED STEEL ANCHORED NOT LESS THAN 4" IN WALLS OF STRUCTURE AND UNLESS OTHERWISE SHOWN SHALL BE SPACED 16" ON CENTERS. THE LOWEST STEP SHALL BE NOT MORE THAN 2' ABOVE THE FLOOR.
4. WHERE PRESSURE MANHOLE NO. 3 IS SPECIFIED ON PLANS SEE STD DWG MH256 AND MH258.

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY:	APPROVED BY:	MANHOLE NO. 3
CHIEF, DESIGN & CONSTRUCTION	CHIEF ENGINEER	
DATE: JANUARY 2011 R.E. No. 44684	DATE: JANUARY 2011 R.C.E. NO. 32336	STANDARD DRAWING NUMBER MH253



PLAN
(SHAFT NOT SHOWN)

	MAX	MIN
FOR PAVED STREETS	11"	8 1/2"
UNPAVED STREETS	16"	15"

DETAIL M
(SEE NOTE 5)

TABLE OF BAR SIZES

* D_2, D_1 OR B	A & B BARS	D & F BARS
12" – 39"	#5 @ 3"	#4 @ 6"
42" – 84"	#6 @ 3"	#5 @ 6"
90" – 144"	#7 @ 3"	#6 @ 6"

* USE D_2, OR D_1, WHICHEVER IS GREATER, OR B

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY:
CHIEF, DESIGN & CONSTRUCTION
DATE: JANUARY 2011 R.E. No. 44684

APPROVED BY:
CHIEF ENGINEER
DATE: JANUARY 2011 R.C.E. NO. 32336

MANHOLE NO. 4

STANDARD DRAWING NUMBER MH254

SHEET 1 OF 2

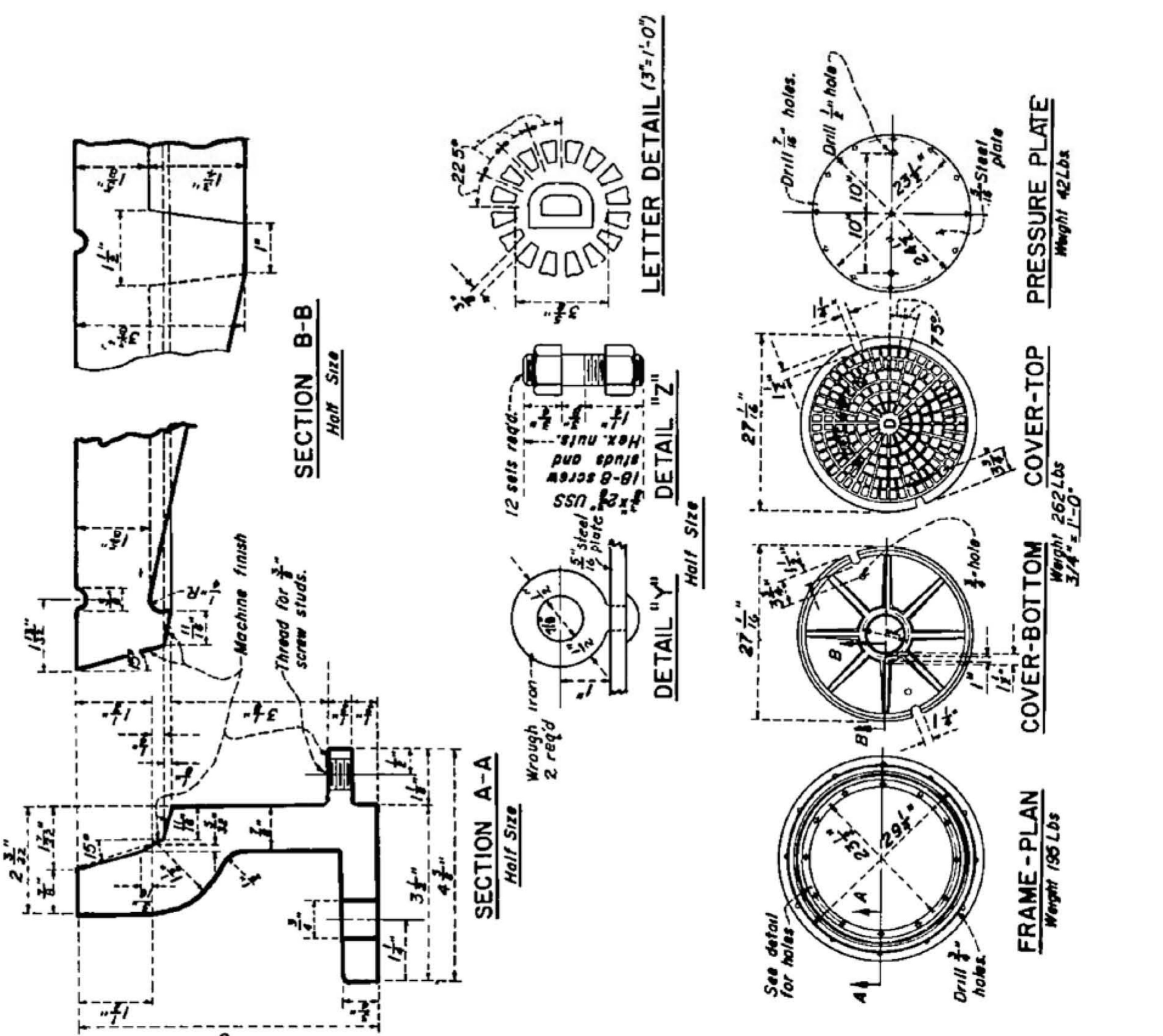
NOTES

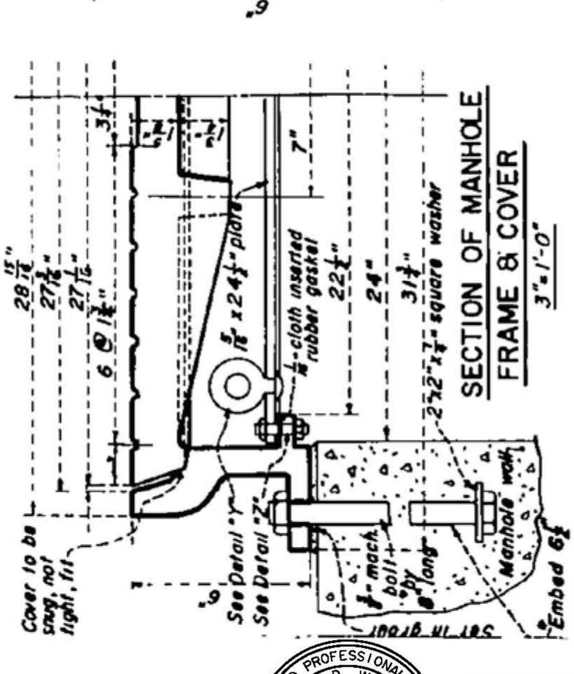
1. VALUES FOR A, B, C, D_1, D_2, ELEVATION R AND ELEVATION S ARE SHOWN ON THE IMPROVEMENT PLAN TABLE OF VALUES FOR F AND T HEREON.
2. LATERALS: IF LATERALS ENTER ON BOTH SIDES OF MANHOLE, ACCESS SHAFT SHALL BE LOCATED ON SIDE RECEIVING THE SMALLER LATERAL.
3. CENTER OF MANHOLE SHAFT SHALL BE LOCATED OVER CENTER LINE OF STORM DRAIN WHEN D_1 IS 48" OR LESS, IN WHICH CASE PLACE 8 E BARS SYMMETRICALLY AROUND SHAFT AT 45° WITH CENTER LINE
4. LENGTH L MAY BE INCREASED AT OPTION OF CONTRACTOR TO MEET PIPE ENDS, BUT ANY CHANGE IN LOCATION OF SPUR MUST BE APPROVED BY THE ENGINEER.
5. DETAIL M: WHEN DEPTH OF MANHOLE FROM STREET GRADE TO TOP OF BOX IS LESS THAN 2'-10 1/2" FOR PAVED STREETS OR 3'-6" FOR UNPAVED STREETS, CONSTRUCT MONOLITHIC SHAFT AS PER DETAIL M. THE CONTRACTOR SHALL HAVE THE OPTION OF CONSTRUCTING SHAFT AS PER DETAIL M FOR ANY DEPTH OF MANHOLE WHEN DIAMETER D_1 IS 48" OR LESS, CENTER OF SHAFT SHALL BE LOCATED AS PER NOTE 3.
6. REINFORCING STEEL SHALL BE ROUND, DEFORMED, STRAIGHT BARS, 1 1/2" CLEAR FROM INSIDE FACE UNLESS OTHERWISE SHOWN. TIE BARS SHALL BE NO. 4 AND SPACED 18" ON CENTERS OR CLOSER.
7. CONCRETE SHALL BE CLASS A, 1 1/2" AGGREGATE.
8. STEPS SHALL BE 3/4" ROUND, GALVANIZED STEEL AND ANCHORED NOT LESS THAN 6" IN THE WALLS OF STRUCTURE UNLESS OTHERWISE SHOWN THE SPACING SHALL BE 16" ON CENTERS. THE LOWEST STEP SHALL BE NOT MORE THAN 2' ABOVE THE INVERT.
9. RINGS, REDUCER AND PIPE FOR ACCESS SHAFT SHALL BE SEATED IN CEMENT MORTAR AND NEATLY POINTED OR WIPED INSIDE SHAFT.
10. FLOOR OF MANHOLE SHALL BE STEEL TROWELED TO SPRINGLINE.
11. BODY OF MANHOLE, INCLUDING SPUR, SHALL BE POURED IN ONE CONTINUOUS OPERATION, EXCEPT THAT THE CONTRACTOR SHALL HAVE THE OPTION OF PLACING AT THE SPRINGLINE A CONSTRUCTION JOINT WITH LONGITUDINAL KEYWAY AND REBAR DOWELS.
12. THE MAXIMUM COVER ABOVE THIS STRUCTURE SHALL BE 25'. IF THE COVER EXCEEDS 25' A SPECIAL STRUCTURE SHALL BE DESIGNED FOR THE COVER AND DETAILED ON THE PROJECT DRAWING.
13. P SHALL BE 5" UNLESS DIAMETER EXCEEDS 96" THEN P= 8".
14. WHERE PRESSURE MANHOLE NO. 4 IS SPECIFIED ON PLANS SEE STD DWG MH256 AND MH258.

** TABLE OF VALUES FOR F AND T

* D_2, D_1	F	* D_2, D_1	F	B	T	B	T
12"	4"	63"	10"	12"	4"	63"	10"
15"	4 1/4"	66"	10 1/4"	15"	4 1/4"	66"	10 1/4"
18"	4 1/2"	69"	10 3/4"	18"	4 1/2"	69"	10 3/4"
21"	5"	72"	11"	21"	5"	72"	11"
24"	5 1/4"	78"	11 3/4"	24"	5 1/4"	78"	11 3/4"
27"	5 1/2"	84"	12 1/2"	27"	5 1/2"	84"	12 1/2"
30"	6"	90"	13 1/4	30"	6"	90"	13 1/4
33"	6 1/4"	96"	14"	33"	6 1/4"	96"	14"
36"	6 1/2"	102"	15 1/2"	36"	6 1/2"	102"	15 1/2"
39"	7"	108"	16"	39"	7"	108"	16"
42"	7 1/2"	114"	16 1/2"	42"	7 1/2"	114"	16 1/2"
45"	7 3/4"	120"	17"	45"	7 3/4"	120"	17"
48"	8"	126"	17"	48"	8"	126"	17"
51"	8 1/2"	132"	17 1/2"	51"	8 1/2"	132"	17 1/2"
54"	9"	138"	17 1/2"	54"	9"	138"	17 1/2"
57"	9 1/4"	144"	18"	57"	9 1/4"	144"	18"
60"	9 1/2"			60"	9 1/2"		

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		MANHOLE NO. 4
RECOMMENDED FOR APPROVAL BY:	APPROVED BY:	STANDARD DRAWING NUMBER MH254
CHIEF, DESIGN & CONSTRUCTION	CHIEF ENGINEER	SHEET 2 OF 2
DATE: JANUARY 2011 R.E. No. 44684	DATE: JANUARY 2011 R.C.E. NO. 32336	





NOTES:

1. Manhole Frame and Cover shall be made of gray cast iron conforming to the latest A.S.T.M. standard A48, class 30 or Better Pressure Plate shall be steel
2. All parts of the Manhole Frame and Cover except machined surfaces shall be coated with asphaltum paint
3. Manhole Frame and Cover shall be tested for accuracy of fit and shall be marked in sets before delivery. The Cover shall fit the Frame snugly but not tightly
4. Weights of Frame, Cover, and Pressure Plate shall not vary more than two percent from those given hereon.
5. This structure shall be used with Standard Pressure Manhole Shaft, See Standard Drawing MH258. It may be used for hydrostatic heads up to 25' above steel plate.

REGISTERED PROFESSIONAL ENGINEER
WARREN D. WILLIAMS
No. 32336
Exp. 12-31-04
CIVIL
STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

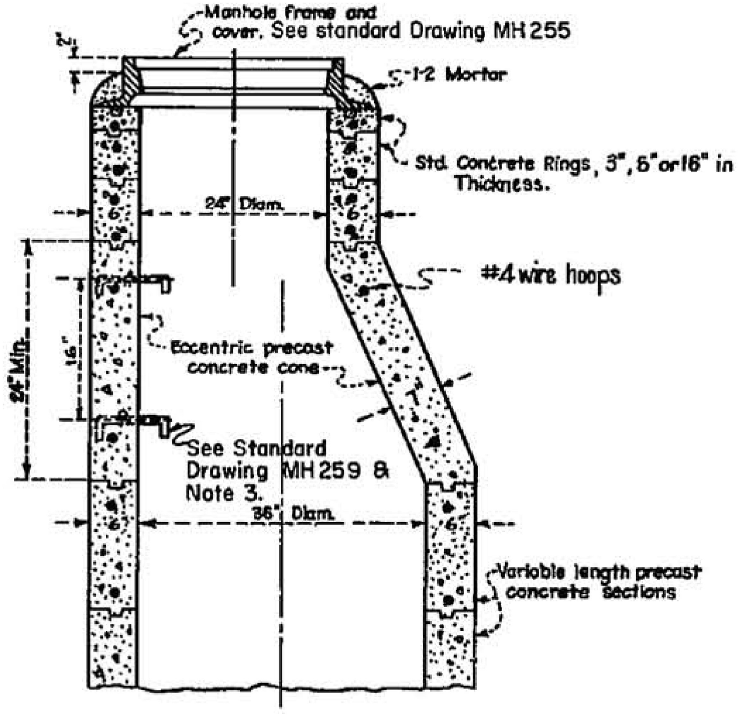
APPROVED BY:

CHIEF ENGINEER

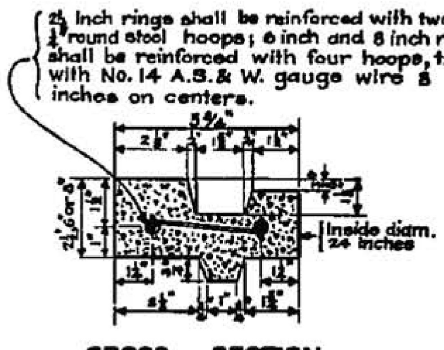
DATE: April 5, 2004 R.C.E. NO. 32336

MANHOLE FRAME & COVER PRESSURE TYPE

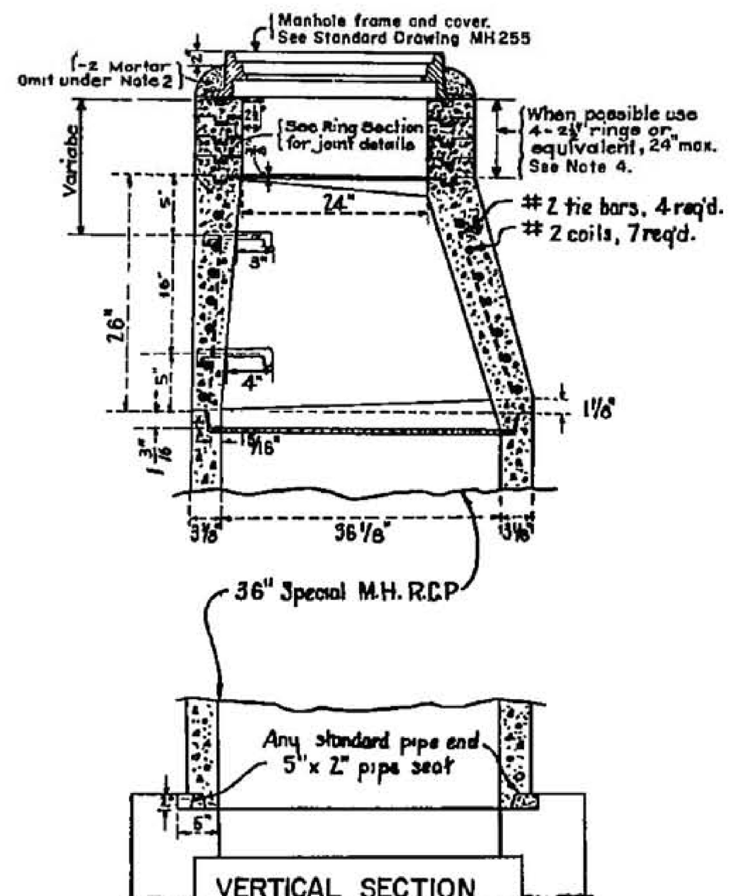
STANDARD DRAWING NUMBER MH256



VERTICAL SECTION
OF PLAIN CONCRETE
ECCENTRIC MANHOLE SHAFT



CROSS SECTION
OF REINFORCED
CONCRETE RING



VERTICAL SECTION
OF REINFORCED CONCRETE
ECCENTRIC MANHOLE SHAFT

NOTES

1. **ALL JOINTS** shall be filled with 1-2 mortar and neatly pointed or wiped on inside of shaft.
2. **COLLAR** of 1-2 mortar around cover frame shall be omitted in rock and oil streets and in paved streets.
3. **STEPS** shall be ¾ inch round galvanized steel. Top step shall be placed directly beneath the manhole cover frame.

   Width of all steps shall be 14 inches between leg centers. Except where shown otherwise, spacing of steps in shaft shall be 16 inches on center.
4. **ECCENTRIC MANHOLE** shaft, reducer, and rings may be plain concrete. For unreinforced sections, the minimum thickness shall be 6 inches. The concrete used shall be *Class "A"*.

L.A.C.F.C.D. STD. No. 2-D107

REGISTERED PROFESSIONAL ENGINEER
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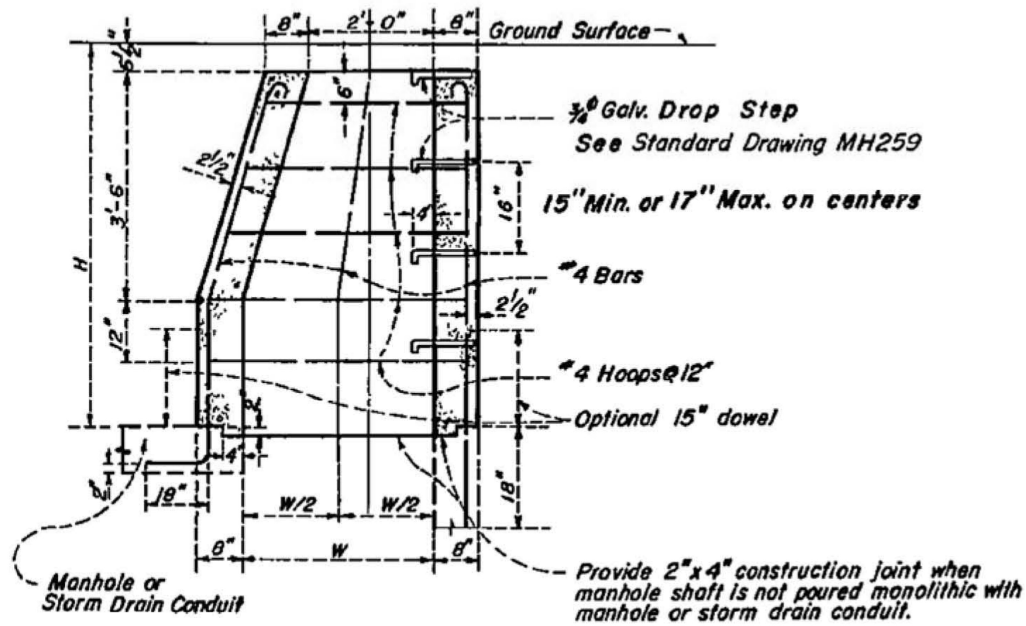
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

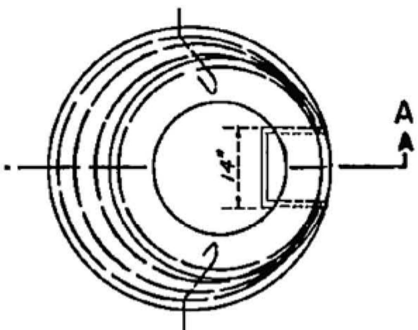
APPROVED BY: [signature]
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 32338

MANHOLE SHAFT FOR CAST PIPE

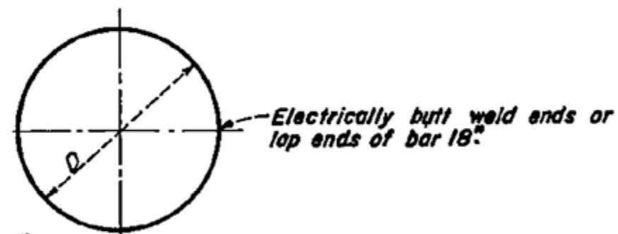
STANDARD DRAWING NUMBER MH257



SECTION A-A



PLAN



#4 HOOP BARS

Where H is more than 4'-0" D=3'-1¾" for topmost hoop in shaft; each lower hoop in succession increases 3⅛" in diameter to a maxi of 4'-0" in the vertical portion of the shaft.

NOTES:

1. If "H" is less than 1'-6", W=2'-0"
   If "H" is between 1'-6" and 2'-6", W= 2'-6".
   If "H" is 2'-6" or more, W= 3'-0".
   If "H" is more than 4'-0½", bring walls vertically to 4'-0½" below surface and taper from 3'-0" to 2'-0" as shown.
2. This structure shall be used with Standard Pressure Manhole Frame and Cover, See Standard Drawing MH 256. It may be used for hydrostatic heads up to 25' above the steel plate.
3. Concrete shall be Class "A"

REGISTERED PROFESSIONAL ENGINEER
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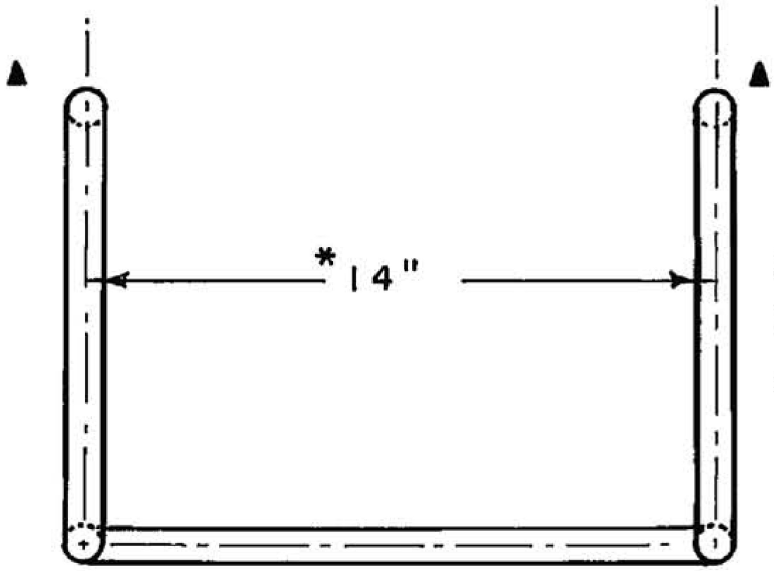
No. 32336
Exp. 12-31-04
CIVIL
STATE OF CALIFORNIA

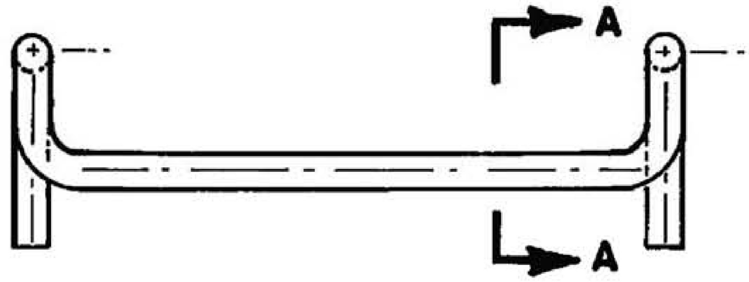
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	STANDARD PRESSURE MANHOLE SHAFT
APPROVED BY: Warren D. Williams CHIEF ENGINEER	
DATE: April 5, 2004 R.C.E. NO. 32336	STANDARD DRAWING NUMBER MH258



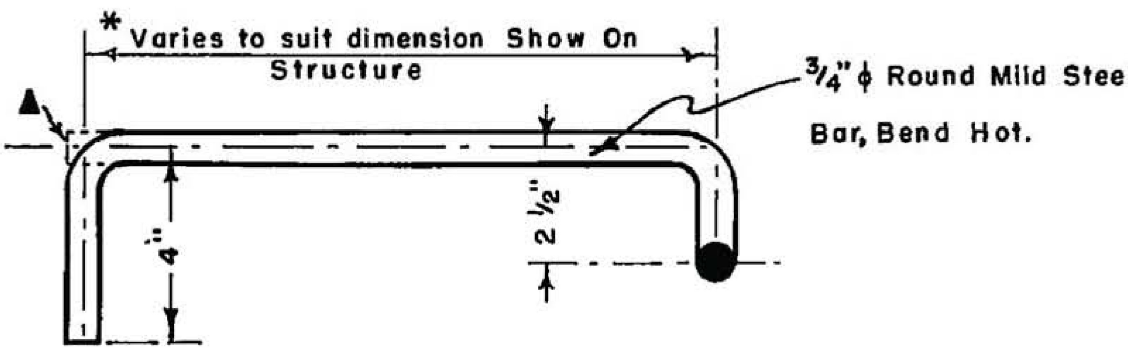
Note

▲ = When steel forms are used eliminate hook and use upset end.

PLAN VIEW



FRONT ELEVATION



SECTION A-A
GALVANIZE AFTER BENDING

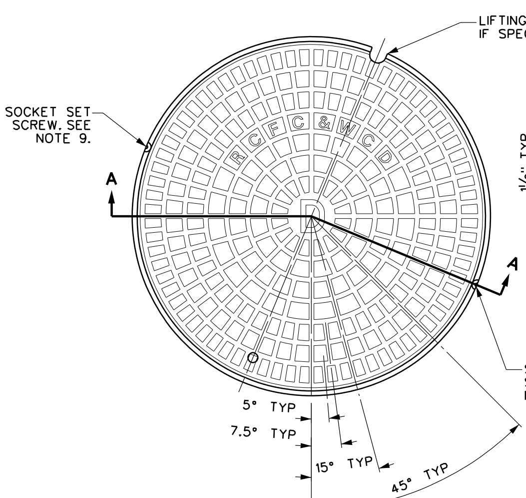
NOTE:

THIS DETAIL SHALL BE USED WHEREVER STEPS ARE REQUIRED.

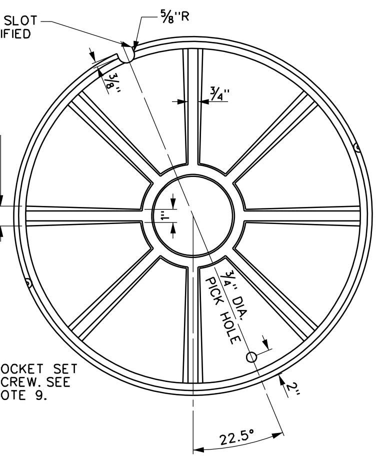
L.A.C.F.C.D. STD. NO. 2-D86

REGISTERED PROFESSIONAL ENGINEER
WARREN D. WILLIAMS
No. 32338
Exp. 12-31-04
CIVIL
STATE OF CALIFORNIA

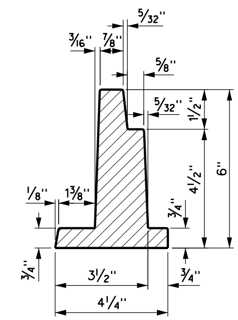
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	STANDARD DROP STEP
APPROVED BY: CHIEF ENGINEER	
DATE: April 5, 2004 R.C.E. NO. 32338	STANDARD DRAWING NUMBER MH259



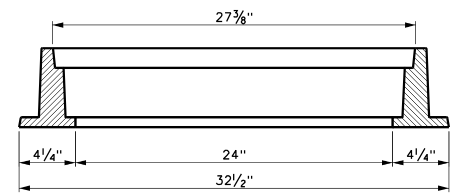
COVER FOR 24" CLEAR OPENING FRAME
NTS



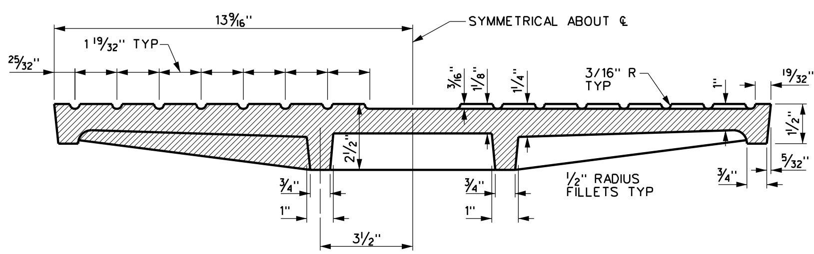
BOTTOM PLAN OF COVER
NTS



DETAIL OF FRAME
NTS



SECTION THRU FRAME
NTS



SECTION A-A
NTS

NOTES

1. THE CAST IRON USED SHALL CONFORM WITH ASTM A-48 CLASS 35B.
2. THE FRAME AND COVER SHALL BE COATED WITH ASPHALTUM OR BITUMINOUS PAINT AFTER TESTING AND INSPECTION.
3. COVERS SHALL BE CAST WITH THE LETTERS "D" AND "RCFC&WCD". THE LETTER "D" SHALL BE APPROXIMATELY 2½" HIGH WITH ½" LINE WIDTH AND PLACED IN THE CENTER OF THE COVER. ALL LETTERS SHALL BE FLUSH WITH THE FINISHED SURFACE OF THE COVER.
4. FOUNDRY IDENTIFYING MARK, HEAT AND DATE SHALL BE CAST ON THE BOTTOM OF THE COVER AND ON THE INSIDE OF THE FRAME,
5. IMPORTED COVERS AND FRAMES SHALL HAVE THE COUNTRY OF ORIGIN MARKING IN COMPLIANCE WITH FEDERAL REGULATIONS.
6. WEIGHT OF FRAME SHALL BE 265 POUNDS. WEIGHT OF COVER SHALL BE 175 POUNDS. ACTUAL WEIGHTS SHALL BE WITHIN A RANGE OF 95% TO 110%.
7. THE MANHOLE FRAME AND COVER SHALL BE INSPECTED BY THE ENGINEER PRIOR TO SHIPMENT TO THE JOB SITE. ACCEPTANCE WILL BE INDICATED BY THE AGENCY'S MARK.
8. THE PROOF LOAD FOR TEST METHOD B OF THE STANDARD SPECIFICATION IS 40,700 POUNDS.
9. ALL COVERS SHALL BE PROVIDED WITH SOCKET SET SCREW LOCKING DEVICES. DRILL AND TAP TWO HOLES TO A DEPTH OF ONE INCH AT 90 DEGREES TO PICK HOLE AND INSTALL ¾ INCH X ¾ INCH STAINLESS STEEL SOCKET SET SCREWS WITH ⅜ INCH RECESSED HEX HEAD. ALL THREADS SHALL BE N.C.

REGISTERED PROFESSIONAL ENGINEER JASON E. UHLEY No. 59795 CIVIL STATE OF CALIFORNIA

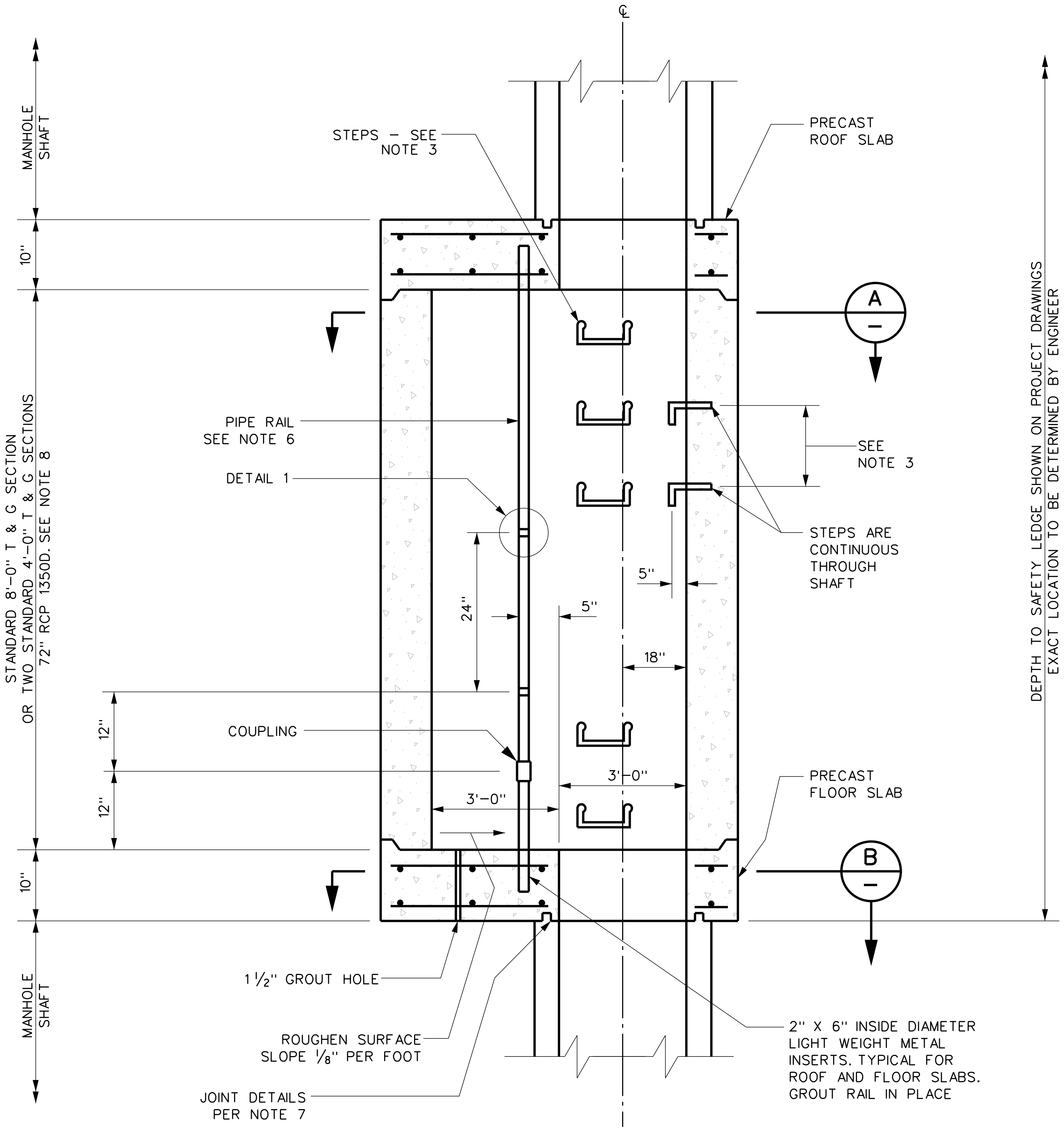
REGISTERED PROFESSIONAL ENGINEER ROBERT J. CULLEN No. 44684 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

APPROVED BY:	APPROVED BY:
GENERAL MANAGER-CHIEF ENGINEER	CHIEF, DESIGN & CONSTRUCTION
DATE: 09-21-2016 R.C.E. NO. 59795	DATE: 09-21-2016 R.C.E. NO. 44684

24-INCH MANHOLE FRAME AND COVER

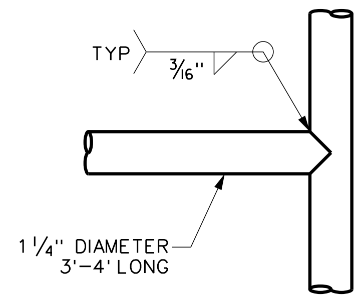
STANDARD DRAWING NUMBER MH260
SHEET 1 OF 1



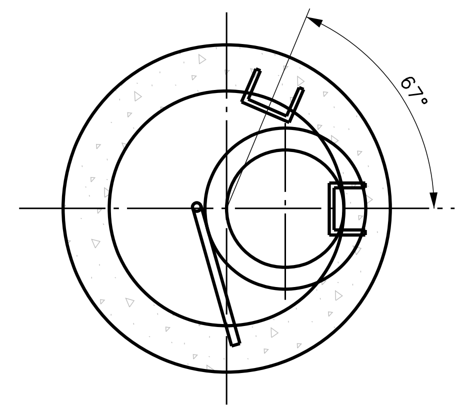
VERTICAL SECTION

NOTES

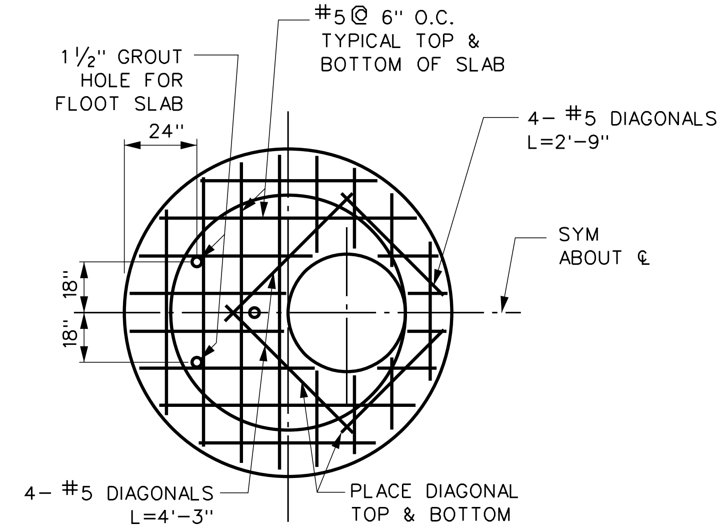
1. MANHOLE SHAFT SAFETY LEDGE WILL BE NOTED ON THE PROJECT DRAWINGS WHEN REQUIRED. IT IS TO BE CONSTRUCTED WHEN DEPTH OF MANHOLE TO INVERT IS GREATER THAN 20' AND MANHOLE SHAFT IS GREATER THAN 10'.
2. A SAFETY LEDGE SHALL NOT BE USED IF A PRESSURE MANHOLE IS REQUIRED.
3. STEPS SHALL CONFORM TO STANDARD DRAWING MH259 AND SHALL BE ANCHORED 4" IN THE WALL OF THE STRUCTURE. STEPS SHALL BE PLACED TO MATCH THE SPACING OF THE MANHOLE SHAFT.
4. REINFORCEMENT SHALL BE PER ASTM A 615, GRADE 40 AND SHALL TERMINATE 2" CLEAR OF CONCRETE SURFACES UNLESS OTHERWISE SHOWN.
5. GROUT HOLES, PIPE AND FITTINGS SHALL BE PROVIDED IN THE FLOOR SLAB. PRESSURE GROUTING SHALL BE USED TO FILL VOIDS AND TO SECURE UNIFORM BEARING. THE GROUT SHALL BE NEAT CEMENT GROUT AND GROUTING PRESSURES SHALL BE AS DETERMINED IN THE FIELD BY THE ENGINEER.
6. PIPE AND RAIL SHALL BE FABRICATED OF 1 1/4" STANDARD GALVANIZED PIPE COMPOSED OF TWO SECTIONS 7'-6" AND 18" IN LENGTH JOINED BY A GALVANIZED COUPLING. THE COUPLING SHALL BE THREADED A MINIMUM OF 2" ON EACH PIPE LENGTH.
7. ROOF AND FLOOR SLABS SHALL BE PRECAST AND KEYED FOR REINFORCED CONCRETE PIPE SECTIONS AS SHOWN. ALL JOINTS SHALL BE FILLED WITH CLASS C MORTAR AND NEATLY POINTED OR WIPED ON THE INSIDE.
8. 72" RCP SHALL BE PROVIDED WITH TWO CIRCULAR CAGES OF REINFORCEMENT.



DETAIL 1
ROTATED 90°



SECTION A



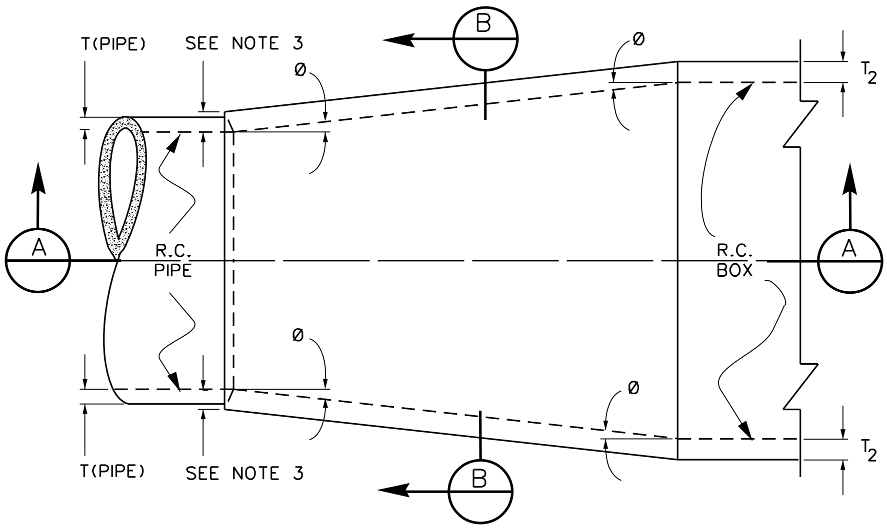
SECTION B

APWA STD PLAN 330-1 (MODIFIED)

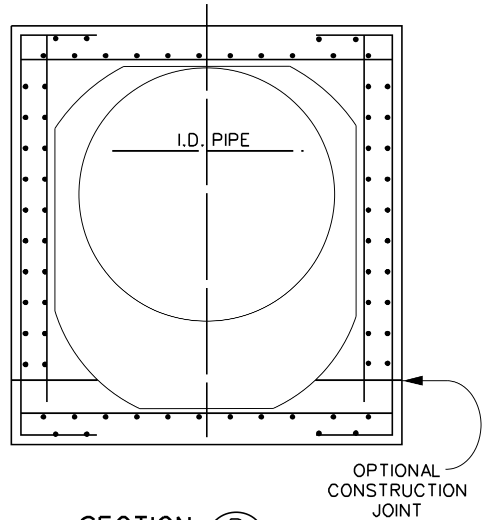
REGISTERED PROFESSIONAL ENGINEER JASON E. UHLEY No. 59795 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER KAMYAR GHODS No. 72196 CIVIL STATE OF CALIFORNIA

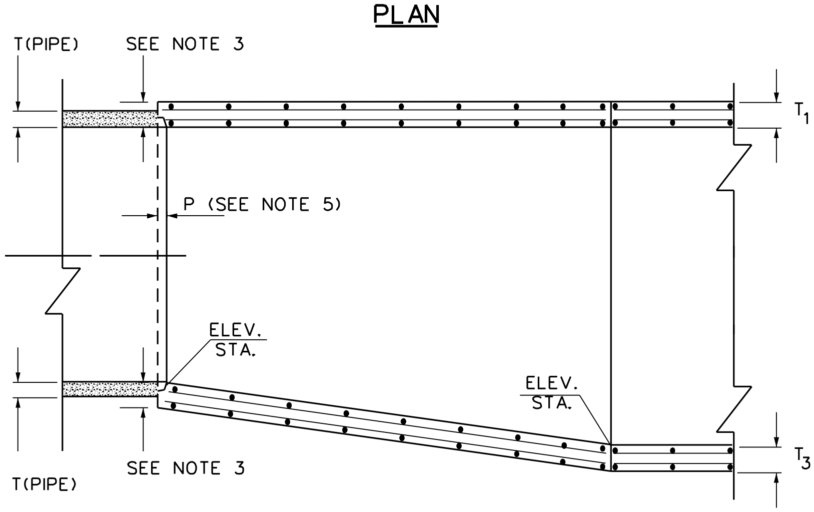
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		MANHOLE SHAFT SAFETY LEDGE
APPROVED BY:	APPROVED BY:	
GENERAL MANAGER-CHIEF ENGINEER	CHIEF, DESIGN	STANDARD DRAWING NUMBER MH261
DATE: 10-24-2024 R.C.E. NO. 59795	DATE: 10-24-2024 R.C.E. NO. 72196	SHEET 1 OF 1



PLAN



SECTION B

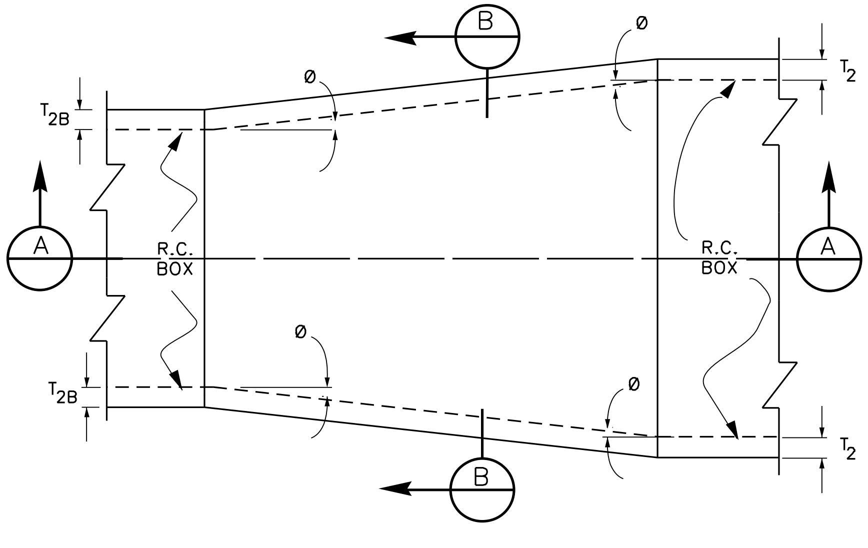


SECTION A

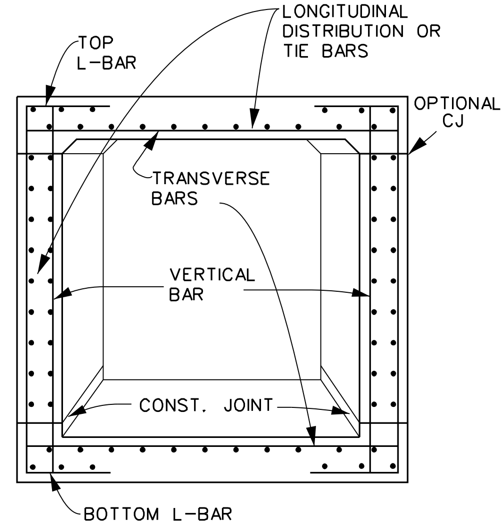
NOTES

1. THE HORIZONTAL ANGLE OF DIVERGENCE OR CONVERGENCE, Ø, SHALL NOT EXCEED 5° 45'.
2. REINFORCING STEEL BAR SIZES, SPACING PATTERN AND COVER OVER THE STEEL SHALL BE THAT OF THE BOX SECTION. THE BAR LENGTHS SHALL VARY UNIFORMLY THROUGHOUT THE TRANSITION.
3. THE CONCRETE THICKNESS SHALL BE THAT OF THE BOX SECTION UNLESS THE WALL THICKNESS OF THE PIPE PLUS 4" IS GREATER, IN WHICH CASE THE CONCRETE THICKNESS SHALL VARY UNIFORMLY FROM THAT OF THE BOX SECTION TO THAT OF THE PIPE WALL PLUS 4".
4. THE INTERIOR SURFACE SHALL BE SMOOTH AND VARY UNIFORMLY BETWEEN THE TWO ADJOINING SECTIONS.
5. AT PIPE JUNCTURE, EMBEDMENT P SHALL BE 5" FOR PIPE SIZES OF 96" OR LESS AND 8" FOR PIPE OVER 96".
6. CONSTRUCTION JOINTS OF THE SAME DIMENSIONS AS THOSE OF THE BOX MAY BE CARRIED THROUGH THE TRANSITION STRUCTURE AT CONTRACTOR'S OPTION. SEE SECTION B ABOVE.
7. THE TRANSITION STRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE GENERAL STRUCTURAL NOTES APPLYING TO BOX AS SHOWN ON THE PROJECT DRAWINGS.
8. STRUCTURAL CONCRETE SHALL BE CLASS "A".

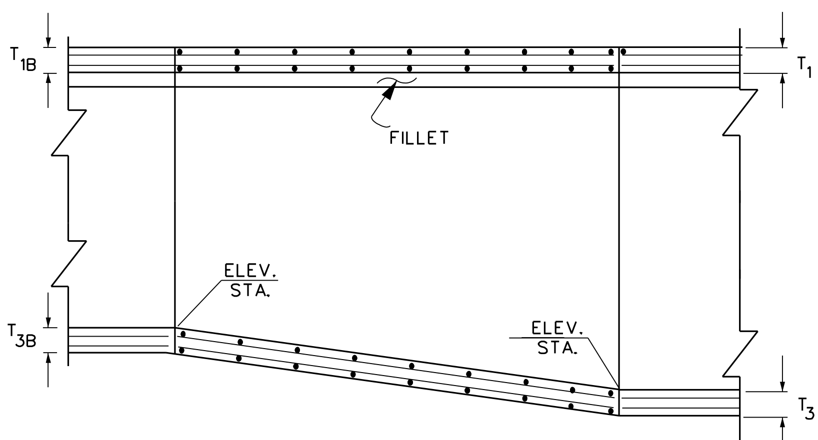
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		TRANSITION STRUCTURE NO. 1
RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION	APPROVED BY: CHIEF ENGINEER	
DATE: JANUARY 2011 R.E. No. 44684	DATE: JANUARY 2011 R.C.E. NO. 32336	STANDARD DRAWING NUMBER TS301



PLAN



SECTION B

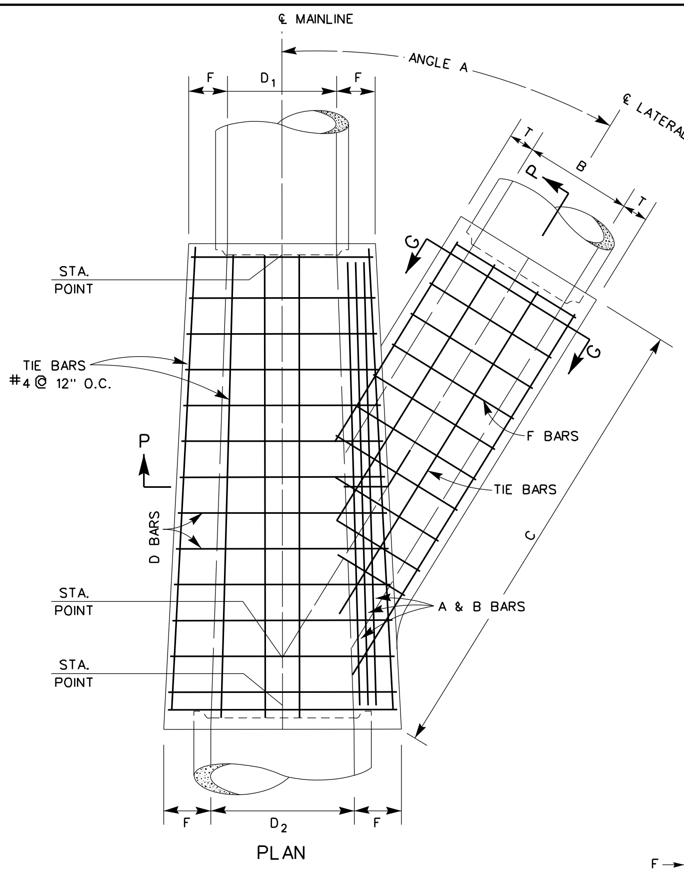


SECTION A

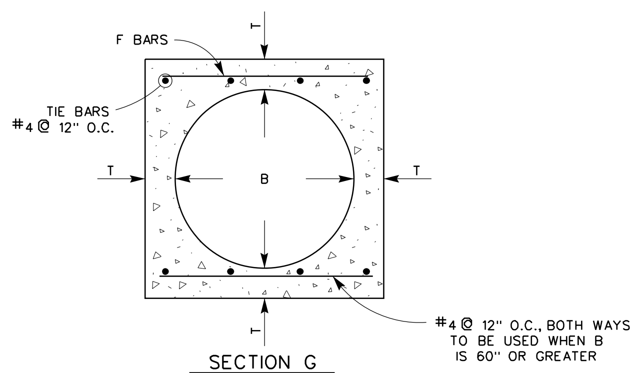
NOTES

1. THE HORIZONTAL ANGLE OF DIVERGENCE OR CONVERGENCE, Ø, SHALL NOT EXCEED 5° 45'.
2. DETAILS OF CONSTRUCTION JOINTS SHALL BE AS SHOWN ON THE PROJECT DRAWINGS FOR SINGLE BARREL BOX STRUCTURE.
3. THE REINFORCING STEEL BAR SIZES, SPACING AND COVER OVER THE STEEL OF STRAIGHT TRANSVERSE BARS IN TOP OR BOTTOM SLABS, OF L-BARS IN TOP OR BOTTOM CORNERS, OF STRAIGHT VERTICAL BARS IN SIDE WALLS AND OF LONGITUDINAL DISTRIBUTION AND TIE BARS IN TOP OR BOTTOM SLABS OR SIDE WALLS SHALL BE THOSE OF WHICHEVER ADJOINING BOX SECTION PROVIDES THE GREATER STEEL AREA FOR EACH TYPE OF BAR. THE BAR LENGTHS SHALL VARY UNIFORMLY THROUGHOUT THE TRANSITION.
4. THE THICKNESS OF THE WALL AND SLABS SHALL BE THOSE OF THE ADJOINING BOX SECTION AT EACH END OF THE TRANSITION AND SHALL VARY UNIFORMLY BETWEEN THE TWO ENDS.
5. STRUCTURAL CONCRETE SHALL BE CLASS "A".
6. THE TRANSITION STRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE GENERAL STRUCTURAL NOTES APPLYING TO BOX STRUCTURES, AS SHOWN ON THE PROJECT DRAWINGS.

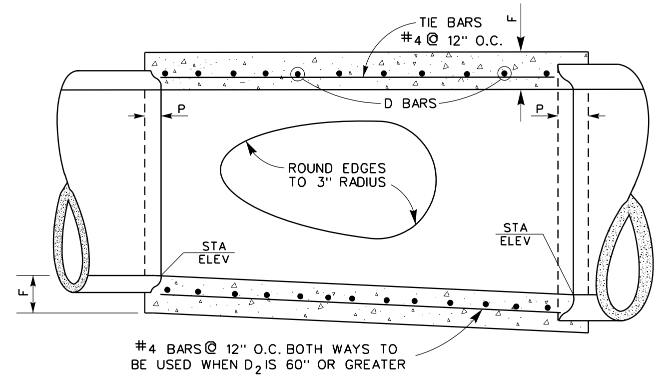
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		TRANSITION STRUCTURE NO. 2
RECOMMENDED FOR APPROVAL BY: CHIEF, DESIGN & CONSTRUCTION	APPROVED BY: CHIEF ENGINEER	
DATE: JANUARY 2011 R.E. No. 44684	DATE: JANUARY 2011 R.C.E. NO. 32336	STANDARD DRAWING NUMBER TS302



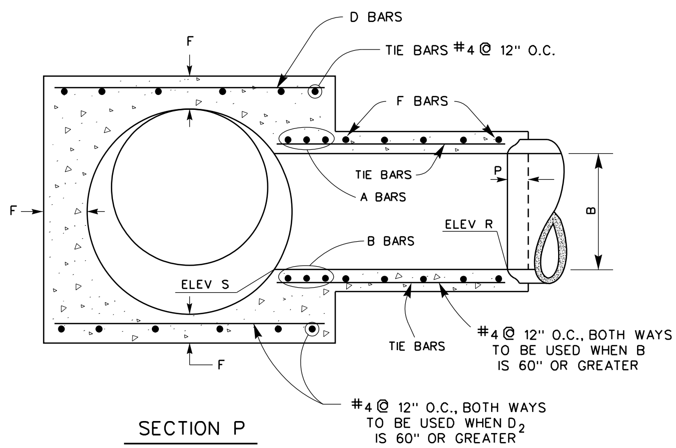
PLAN



SECTION G



LONGITUDINAL SECTION



SECTION P

TABLE

*D_2, D_1, OR B	F OR T	A OR B BARS	D OR F BARS	P
12	4	#5 @ 3" O.C.	#4 @ 6" O.C.	5"
18	4 1/2			
24	5 1/4			
30	6			
36	6 1/2			
42	7 1/2	#6 @ 3" O.C.	#5 @ 6" O.C.	
48	8			
54	9			
60	9 1/2			
66	10 1/4			
72	11			
84	12 1/2			
90	13 1/4	#7 @ 3" O.C.	#6 @ 6" O.C.	
96	14			
102	15 1/2			8"
108	16			
114	16 1/2			
120	17			
126	17			
132	17 1/2			
138	17 1/2			
144	18			

* USE D_2, OR D_1, WHICHEVER IS GREATER, OR B

NOTES

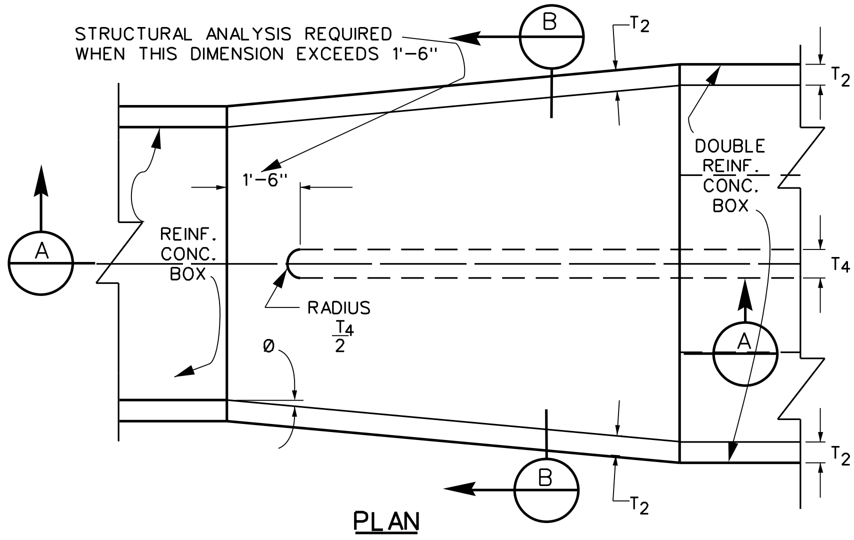
1. NUMBER OF A&B BARS SHOWN IS REPRESENTATIONAL. SEE TABLE FOR SPACING & BAR COUNT.
2. VALUES FOR A, B, C, D_1, D_2, ELEV. R AND ELEV. S ARE SHOWN ON IMPROVEMENT PLAN. LENGTH OF THE STRUCTURE MAY BE INCREASED TO MEET PIPE ENDS USING D BARS IN EXTENDED PORTION OF SAME DIMENSION AND SPACING AS SPECIFIED.
3. CONCRETE SHALL BE CLASS "A". FLOOR OF THE STRUCTURE SHALL BE STEEL-TROWELED TO SPRING LINE. STRUCTURE SHALL BE POURED IN ONE CONTINUOUS OPERATION, EXCEPT THAT THE CONTRACTOR SHALL HAVE THE OPTION OF PLACING AT THE SPRING LINE A CONSTRUCTION JOINT WITH A LONGITUDINAL KEYWAY.
4. REINFORCING STEEL CLEAR COVER SHALL BE 1½" ON INSIDE. TIE BARS SHALL BE NO.4 AND SPACED 12" C/C.
5. WHEN DIMENSION "C" IS NOT SPECIFIED THE SPUR SHALL NOT BE CONSTRUCTED AND A & B BARS SHALL BE OMITTED.
6. THE MAXIMUM COVER ABOVE THIS STRUCTURE SHALL BE 25'. IF THE COVER EXCEEDS 25', A SPECIAL STRUCTURE SHALL BE DESIGNED FOR THE COVER AND DETAILED ON THE PROJECT DRAWINGS.

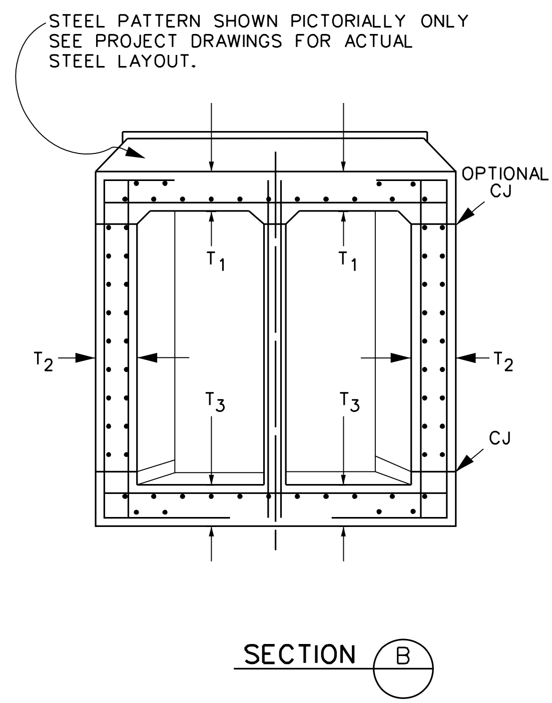
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

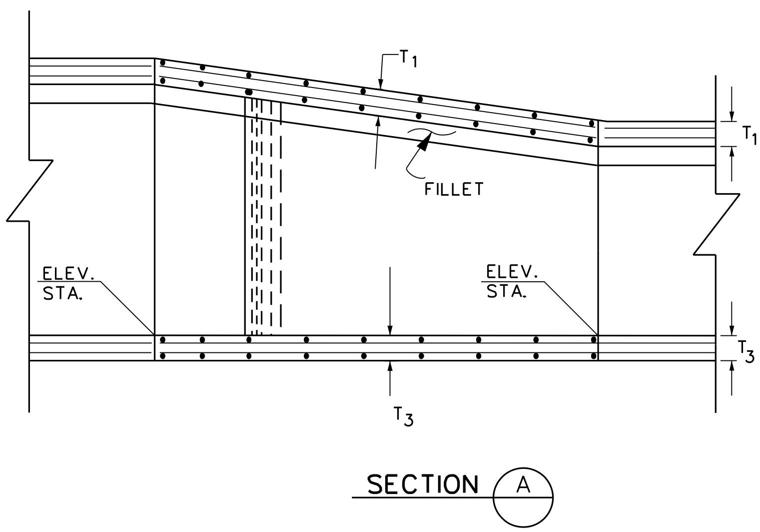
RECOMMENDED FOR APPROVAL BY:	APPROVED BY:
CHIEF, DESIGN & CONSTRUCTION	CHIEF ENGINEER
DATE: JANUARY 2011 R.E. No. 44684	DATE: JANUARY 2011 R.C.E. NO. 32336

TRANSITION STRUCTURE
NO. 3

STANDARD DRAWING NUMBER TS303



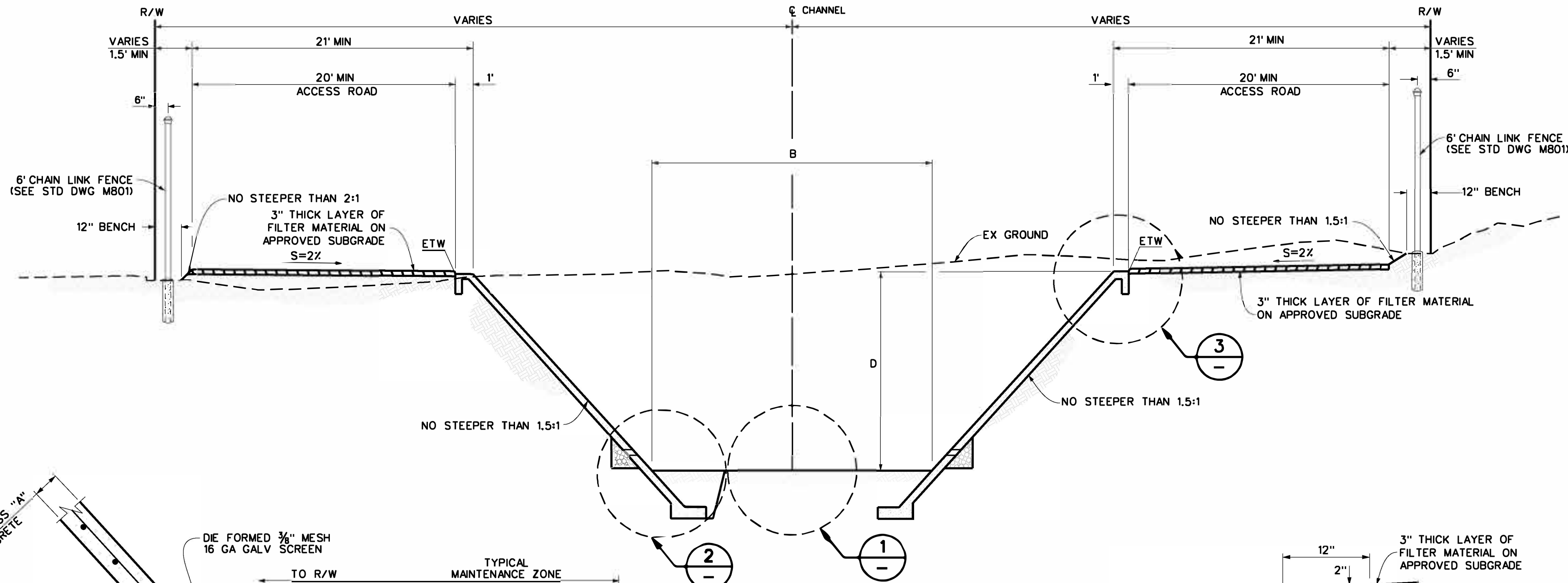




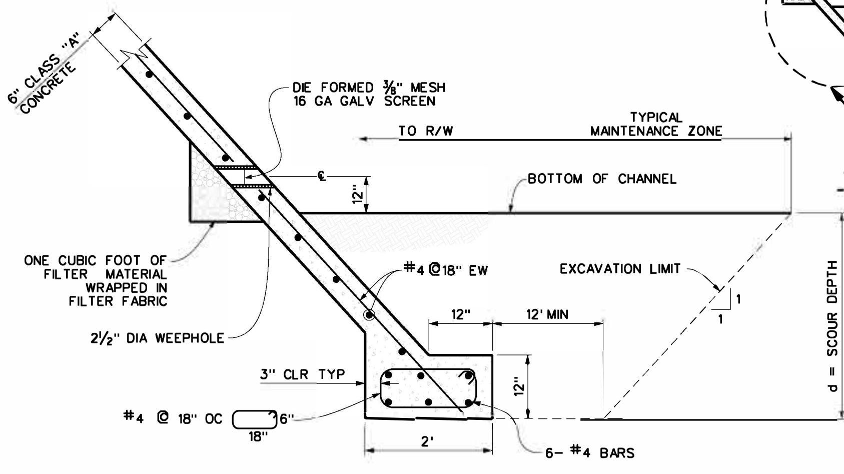
NOTES

1. THE HORIZONTAL ANGLE OF DIVERGENCE OR CONVERGENCE, Ø, SHALL NOT EXCEED 5° 45'.
2. THE REINFORCING STEEL BAR SIZES, SPACING AND OUTSIDE COVER SHALL BE THAT OF DOUBLE BOX SECTION. FOR CURVED TRANSITIONS, SPACE BAR ON CENTER LINE & PLACE TRANSVERSE STEEL RADIALLY. THE BAR LENGTHS & DIMENSIONS SHALL VARY UNIFORMLY THROUGH OUT TRANSITION. LONGITUDINAL BARS SHALL BE CONTINUED THROUGH THE JOINTS WITH THE TRANSITION STRUCTURE.
3. THE CONCRETE THICKNESS SHALL BE THAT OF THE DOUBLE BOX SECTION.
4. STRUCTURAL CONCRETE SHALL BE CLASS "A".

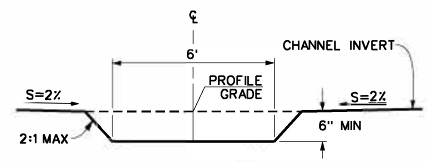
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		TRANSITION STRUCTURE NO. 4
RECOMMENDED FOR APPROVAL BY: [illegible] CHIEF, DESIGN & CONSTRUCTION	APPROVED BY: [illegible] CHIEF ENGINEER	
DATE: JANUARY 2011 R.E. No. 44684	DATE: JANUARY 2011 R.C.E. NO. 32336	STANDARD DRAWING NUMBER TS304



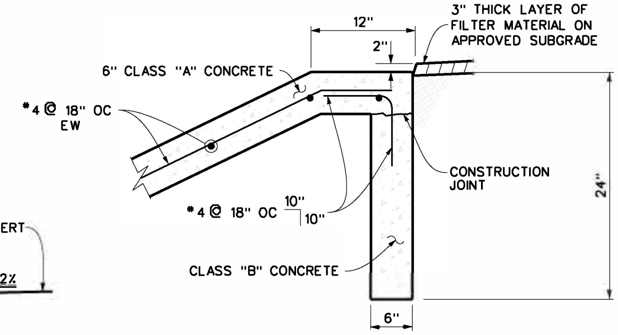
TYPICAL CHANNEL SECTION
NTS



TOE DOWN DETAIL (2)
NTS



LOW FLOW DETAIL (1)
FOR B ≥ 50'
NTS



CUTOFF WALL DETAIL (3)
NTS

NOTES

1. VALUES FOR D, B, AND d, SHALL BE SPECIFIED ON PROJECT DRAWINGS.
2. ACCESS ROAD SHALL BE 2" HIGHER THAN CONCRETE LINING.
3. TRANSVERSE JOINTS SHALL BE CONSTRUCTED 10' ON CENTER.
4. WEEPHOLES SHALL BE FORMED AS SHOWN IN BOTH WALLS AT A SPACING OF 10' ON CENTER WITH 1 CUBIC FOOT OF FILTER MATERIAL WRAPPED IN FILTER FABRIC PLACED AT EACH HOLE.

REGISTERED PROFESSIONAL ENGINEER JASON E. UHLEY No. 59795 CIVIL STATE OF CALIFORNIA

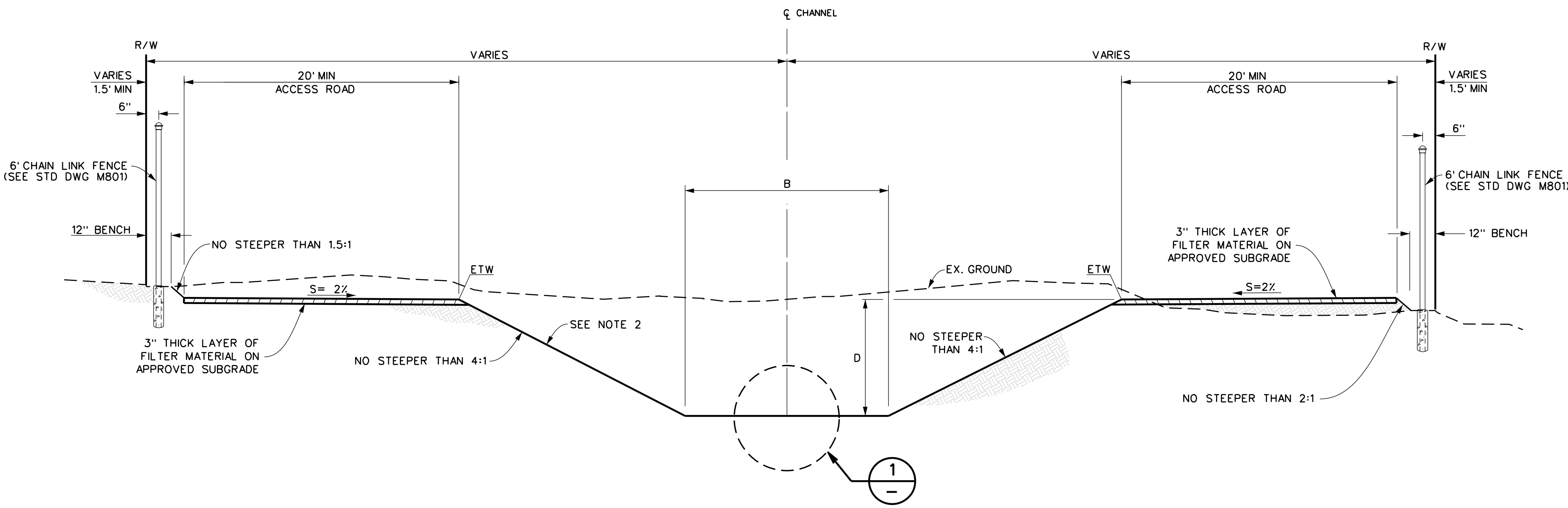
REGISTERED PROFESSIONAL ENGINEER KAMYAR GHODS No. 72196 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

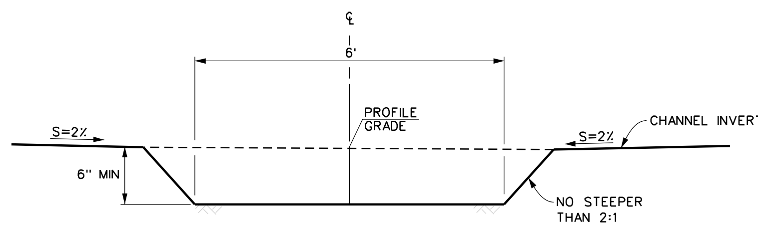
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE: 3-27-2024 R.C.E. NO. 59795	APPROVED BY: CHIEF, DESIGN DATE: 3-27-2024 R.C.E. NO. 72196

CONCRETE LINED
SOFT BOTTOM CHANNEL

STANDARD DRAWING NUMBER CH323
SHEET 1 OF 1



TYPICAL CHANNEL SECTION
NTS



LOW FLOW DETAIL (1/–)
FOR B ≥ 50'
NTS

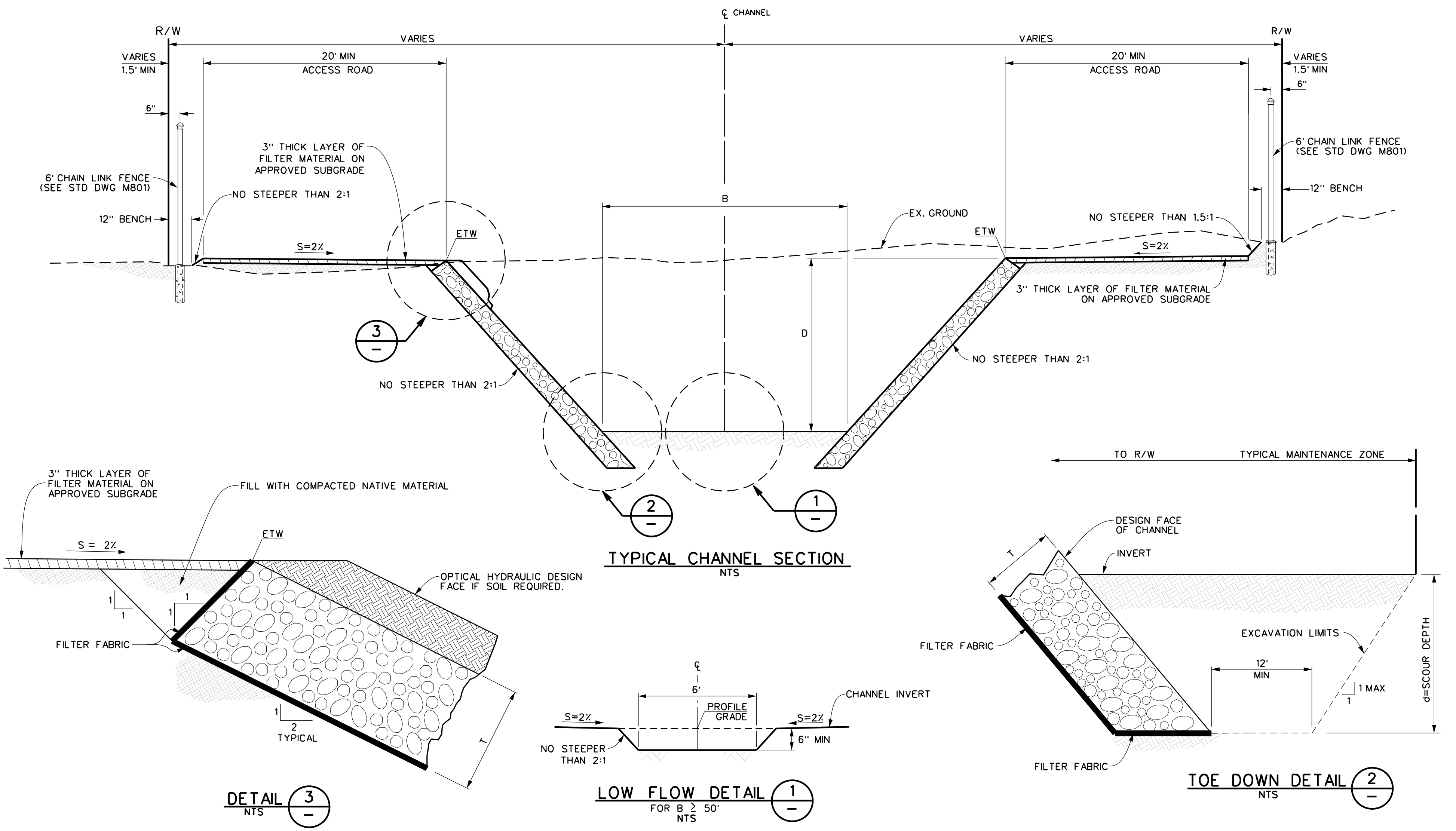
NOTES

1. VALUES FOR D AND B SHALL BE SPECIFIED ON PROJECT DRAWINGS.
2. HYDROSEED CHANNEL SIDE SLOPES AND DISTURBED AREAS PER SPECIFICATIONS.

REGISTERED PROFESSIONAL ENGINEER — JASON E. UHLEY — No. 59795 — CIVIL — STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER — KAMYAR GHODS — No. 72196 — CIVIL — STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		UNLINED CHANNEL
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE: 3-27-2024 R.C.E. NO. 59795	APPROVED BY: CHIEF, DESIGN DATE: 3-27-2024 R.C.E. NO. 72196	STANDARD DRAWING NUMBER CH324 SHEET 1 OF 1



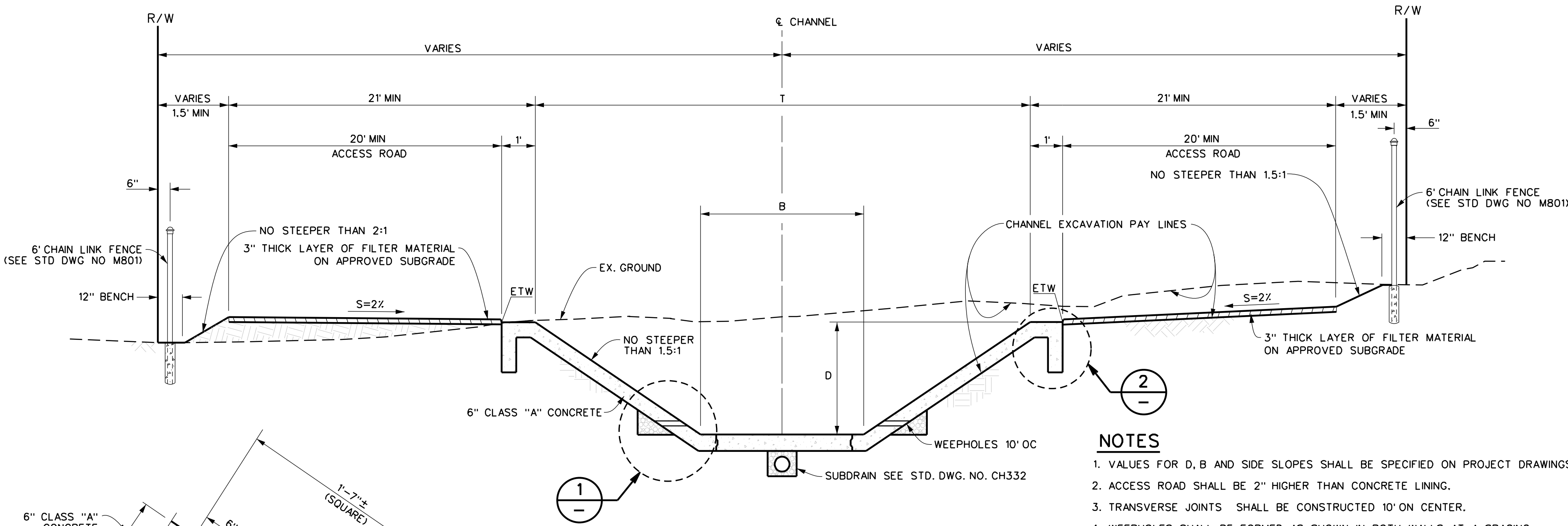
NOTES

1. VALUES FOR D, B, d, AND T SHALL BE SPECIFIED ON PROJECT DRAWINGS.
2. ROCK SLOPE PROTECTION PER CALTRANS STANDARD SPEC, SECTION 72, UNLESS OTHERWISE NOTED.

REGISTERED PROFESSIONAL ENGINEER · JASON E. UHLEY · No. 59795 · CIVIL · STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER · KAMYAR GHODS · No. 72196 · CIVIL · STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		ROCK LINED CHANNEL
APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE: 3-27-2024 R.C.E. NO. 59795	APPROVED BY: CHIEF, DESIGN DATE: 3-27-2024 R.C.E. NO. 72196	STANDARD DRAWING NUMBER CH325 SHEET 1 OF 1

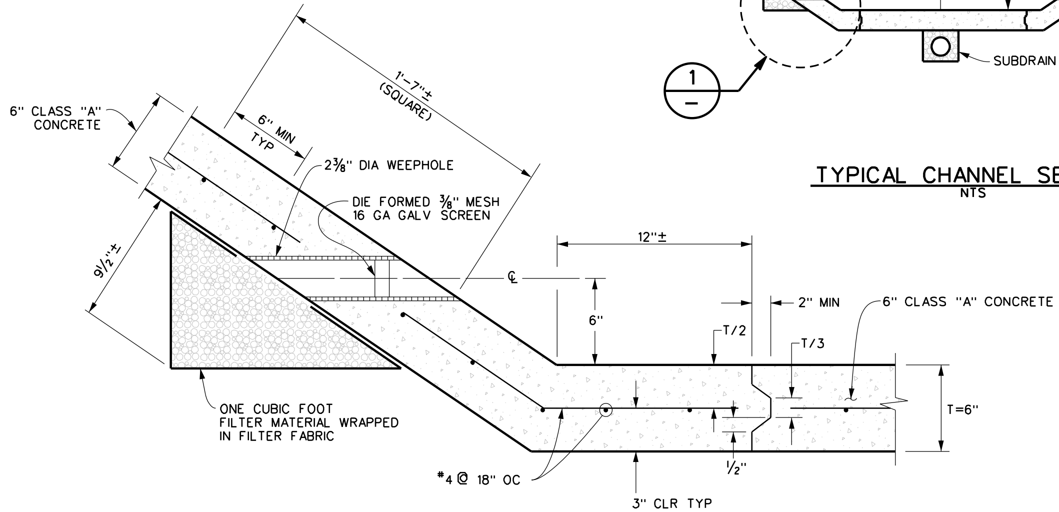


TYPICAL CHANNEL SECTION

NTS

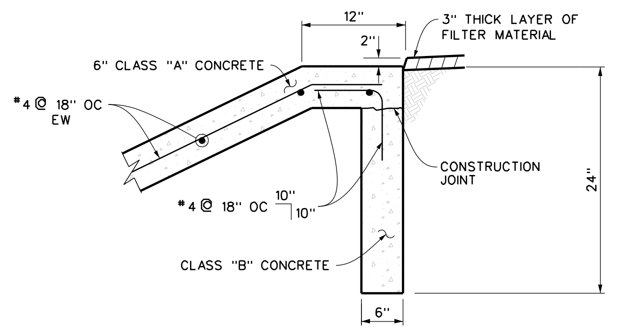
NOTES

1. VALUES FOR D, B AND SIDE SLOPES SHALL BE SPECIFIED ON PROJECT DRAWINGS.
2. ACCESS ROAD SHALL BE 2" HIGHER THAN CONCRETE LINING.
3. TRANSVERSE JOINTS SHALL BE CONSTRUCTED 10' ON CENTER.
4. WEEPHOLES SHALL BE FORMED AS SHOWN IN BOTH WALLS AT A SPACING OF 10' ON CENTER AT TRANSVERSE JOINTS WITH ONE CUBIC FOOT OF FILTER MATERIAL WRAPPED IN FILTER FABRIC PLACED AT EACH HOLE.
5. SUBDRAIN IS REQUIRED WHEN B=6' OR GREATER OR AS REQUIRED BY GROUND WATER CONDITION. FOR REQUIRED NUMBER OF SUBDRAINS, SEE PLAN & PROFILE.



TYPICAL LONGITUDINAL CONSTRUCTION JOINT 1

NTS



2' CUTOFF WALL 2

NTS

REGISTERED PROFESSIONAL ENGINEER JASON E. UHLEY No. 59795 CIVIL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER KAMYAR GHODS No. 72196 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY: GENERAL MANAGER-CHIEF ENGINEER DATE: 3-27-2024 R.C.E. NO. 59795

APPROVED BY: CHIEF, DESIGN DATE: 3-27-2024 R.C.E. NO. 72196

TRAPEZOIDAL CONCRETE LINED CHANNEL DETAILS

STANDARD DRAWING NUMBER CH326
SHEET 1 OF 1

DATA	DETAIL SCHEDULE A	B	C	D
WIDTH				
HEIGHT				
WALL T_1				
BOTTOM SLAB T_2				
HEEL Z				
A BARS				
HORIZ. LENGTH				
VERT. LENGTH				
B BARS				
HORIZ. LENGTH				
VERT. LENGTH				
C BARS				
HORIZ. LENGTH				
VERT. LENGTH				
D BARS				
HORIZ. LENGTH				
VERT. LENGTH				
E BARS				
HORIZ. LENGTH				
F BARS				
HORIZ. LENGTH				
CONCRETE CY/L.F.				
REINFORCING lbs/L.F.				

SPLICES BAR	LENGTH	SEC	REMARKS

LOCATION SCHEDULE STATIONS FROM	TO	CHANNEL

NOTES

1. Structural concrete shall be Class "A".

2. All longitudinal bars shall be #4 @ 18 inches unless otherwise noted. Place bars in bottom slab symmetrically about centerline. Place bars in walls starting at top with 2 inches of clear cover.

3. Clear cover for steel shall be 2 inches for walls and 3 inches each face for bottom slab.

4. Steel is dimensioned to back of bar bend.

5. For construction on curves, straight transverse bars shall be aligned radially with spacing measured at face of wall. For L-bars in walls, spacing shall be measured between the vertical legs of bars.

6. All transverse construction joints shall be in a vertical plane normal to the centerline and the spacing thereof shall not exceed 50 feet or be less than 10 feet. Continuous keyways shall be constructed as shown in detail A. A complete curtain of transverse steel shall be placed 3 inches from each face of the joints and longitudinal steel will not be continuous through the joints. In addition, expansion joints shall be constructed between reinforced concrete channel and reinforced concrete box sections as shown in detail B. Dowels shall be placed at 12 inches spacing centered in the middle third of the bottom slab and the top third of side walls. A minimum of 3 dowels per slab and walls shall be placed.

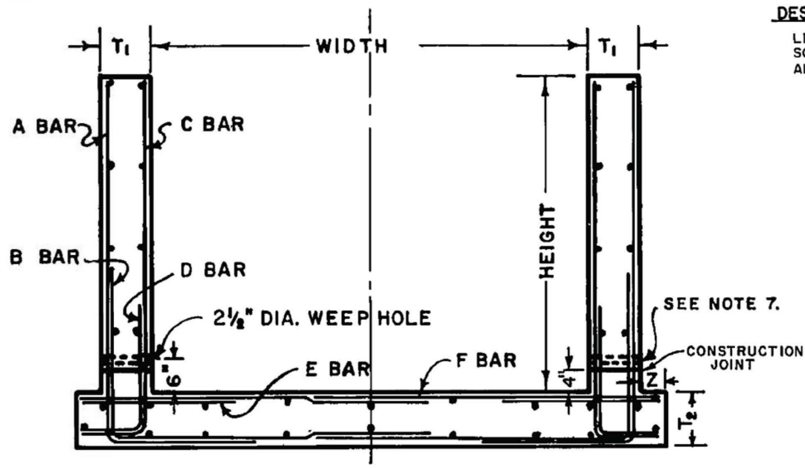
7. Weepholes shall be formed as shown in both walls at a spacing of 10 feet with one cubic foot of filter material wrapped in filter fabric placed at each hole.

8. All quantities shown are approximate.

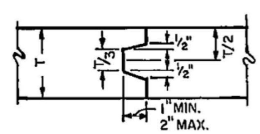
9. All splices are subject to approval by the Engineer.

DESIGN DATA:

LIVE LOAD =
SOIL DENSITY =
ALLOWABLE STRESSES:
fc' = fc =
fy = fs =

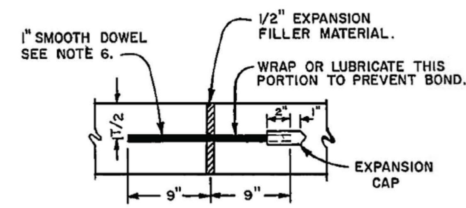


TYPICAL SECTION



TRANSVERSE CONSTRUCTION JOINT

DETAIL A



TRANSVERSE EXPANSION JOINT

DETAIL B

✱ STANDARD FORMAT TO BE USED AS FULL SIZE DRAWING

REGISTERED PROFESSIONAL ENGINEER WARREN D. WILLIAMS No. 32336 Exp. 12-31-04 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY:

CHIEF ENGINEER

DATE: April 5, 2004 R.C.E. NO. 32336

RECTANGULAR CHANNEL STRUCTURAL DETAILS

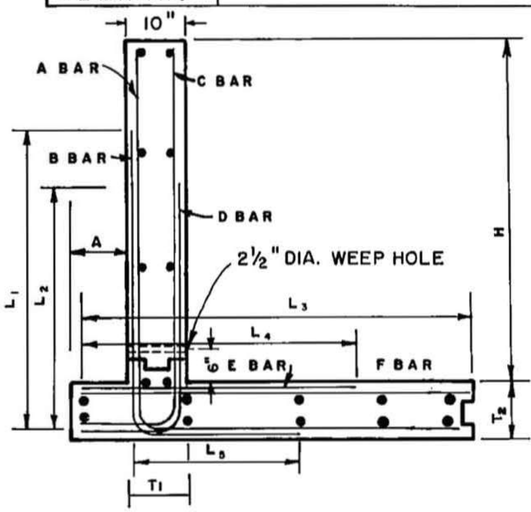
STANDARD DRAWING NUMBER CH327

DETAIL SCHEDULE

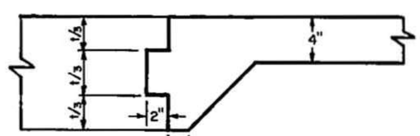
DATA	A	B	C	D	E	F	G	H	I.	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
WIDTH W																								
HEIGHT H																								
WALL T_1																								
BOTTOM SLAB T_2																								
HEEL A																								
A BARS																								
B BARS																								
C BARS																								
D BARS																								
E BARS																								
F BARS																								
L_1																								
L_2																								
L_3																								
L_4																								
L_5																								
CONC. Cy/ft.																								
STEEL lbs./ft.																								
REMARKS																								

LOCATION SCHEDULE

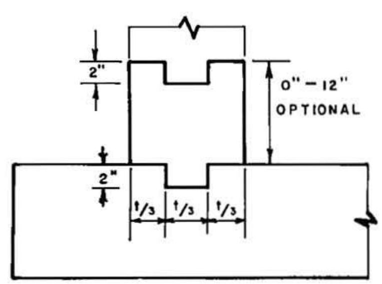
STATION		
FROM	TO	CHANNEL



TYPICAL SECTION



"L" WALL DETAIL



CORNER JOINT

NOTES

1. Structural concrete shall be Class "A".
2. All longitudinal bars shall be #4 @ 18 inches. Place bars in bottom slab symmetrically about centerline. Place bars in walls starting at top with 2 inches of clear cover.
3. Clear cover for steel shall be 2 inches each face for walls and 3 inches each face for bottom slab.
4. Steel is dimensioned to back of bar bend.
5. For construction on curves, straight transverse bars in slab shall be aligned radially with spacing measured at centerline. For L-bars in walls, spacing shall be measured between vertical legs of bars.
6. All transverse construction joints shall be in a vertical plane normal to the centerline and the spacing thereof shall not exceed* 50 feet or be less than 10 feet. Continuous keyways (in both slabs and walls) conforming to longitudinal keyway shown for bottom corner joint will be required at all joints with #4 x 3 feet long dowels at 12 inch spacing placed at the center of sections with 18 inches wrapped to prevent bond. A complete curtain of transverse steel shall be placed 3 inches from each face of the joint and longitudinal steel will not be continuous through the joint.
7. Weep holes shall be formed as shown at a spacing of 10 feet with one cubic foot of filter material wrapped in filter fabric placed at each hole.
8. All splices are subject to approval by the Engineer.
9. All quantities shown are approximate.

* STANDARD FORMAT TO BE USED AS FULL SIZE DRAWINGS

REGISTERED PROFESSIONAL ENGINEER WARREN D. WILLIAMS No. 32336 Exp. 12-31-04 CIVIL STATE OF CALIFORNIA

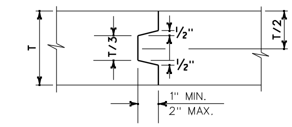
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	"L" WALL STEEL PLACEMENT DIAGRAM
APPROVED BY: CHIEF ENGINEER	
DATE: April 5, 2004 R.C.E. NO. 32336	STANDARD DRAWING NUMBER CH328

DATA	DETAIL SCHEDULE			
STATION TO STATION				
X				
Y				
HEIGHT				
WALLS T_1				
BOTTOM SLAB T_2				
A BARS				
HORIZ. LENGTH				
SLOPE LENGTH				
B BARS				
HORIZ. LENGTH				
SLOPE LENGTH				
C BARS				
SLOPE LENGTH				
D BARS				
HORIZ. LENGTH				
CONCRETE C.Y./L.F.				
STEEL LBS./L.F.				

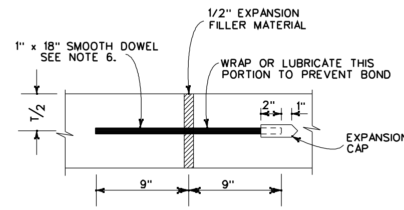
SPLICES			
BAR	LENGTH	SEC.	REMARKS

DESIGN DATA

LIVE LOAD =
SOIL DENSITY =
ALLOWABLE STRESSES:
f'_c =
f_c =
f_y =
f_s =



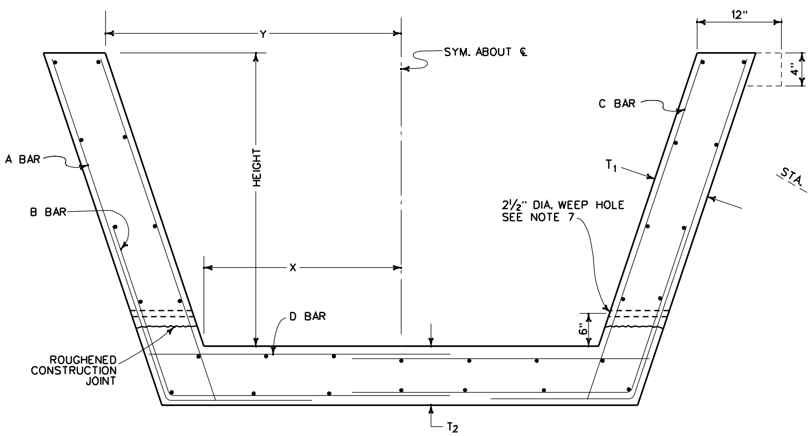
TRANSVERSE CONSTRUCTION JOINT
DETAIL A



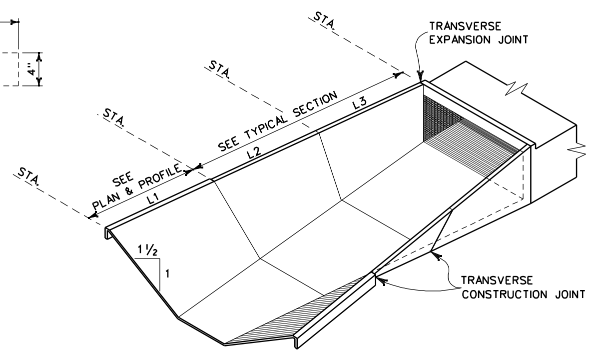
TRANSVERSE EXPANSION JOINT
DETAIL B

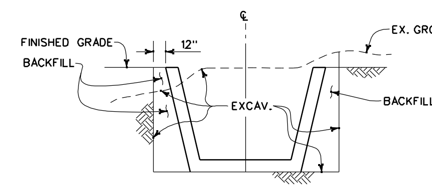
NOTES

1. STRUCTURAL CONCRETE SHALL BE CLASS "A".
2. ALL LONGITUDINAL BARS SHALL BE #4 @ 18 INCHES. PLACE BARS IN BOTTOM SLAB SYMMETRICALLY ABOUT CENTERLINE. PLACE BARS IN WALLS STARTING AT TOP WITH 2 INCHES CLEAR COVER.
3. CLEAR COVER FOR STEEL SHALL BE 2 INCHES EACH FACE FOR WALLS AND 3 INCHES EACH FACE FOR BOTTOM SLAB.
4. STEEL IS DIMENSIONED TO BACK OF BAR BEND.
5. FOR CONSTRUCTION ON CURVES, STRAIGHT TRANSVERSE BARS IN THE SLAB SHALL BE ALIGNED RADIALLY WITH SPACING MEASURED AT WALLS. FOR L-BARS IN WALLS, SPACING SHALL BE MEASURED BETWEEN VERTICAL LEGS OF BARS.
6. ALL TRANSVERSE CONSTRUCTION JOINTS SHALL BE IN A VERTICAL PLANE NORMAL TO THE CENTERLINE. CONTINUOUS KEYWAYS SHALL BE CONSTRUCTED AS SHOWN IN DETAIL A. A COMPLETE CURTAIN OF TRANSVERSE STEEL SHALL BE PLACED 3 INCHES FROM EACH FACE OF THE JOINTS AND LONGIITUDINAL STEEL WILL NOT BE CONTINOUS THROUGH THE JOINTS. AN EXPANSION JOINT SHALL BE CONSTRUCTED BETWEEN THE REINFORCED CONCRETE TRANSITION AND REINFORCED CONCRETE BOX SECTIONS AS SHOWN DETAIL B. DOWELS SHALL BE PLACED AT 18 INCH SPACING CENTERED IN THE MIDDLE OF THE BOTTOM SLAB AND THE TOP THIRD OF SIDE WALLS. A MINIMUM OF 3 DOWELS PER SLAB AND WALLS SHALL BE PLACED.
7. WEEPHOLES SHALL BE FORMED IN BOTH WALLS PER STD. CH326 AT A SPACING OF 10 FEET.
8. ALL QUANTITIES SHOWN ARE APPROXIMATE.
9. ALL SPLICES ARE SUBJECT TO APPROVAL BY THE ENGINEER.
10. SECTION L1 PAY LIMIT PER STANDARD CH326.
11. THE LENGTH OF SECTIONS L1, L2 AND L3 ARE NOT NECESSARILY EQUAL. THE TOP OF TRANSITION SHALL BE STRAIGHT ALONG ITS ENTIRE LENGTH.



TYPICAL SECTION
NTS





L2 AND L3
PAY LINES

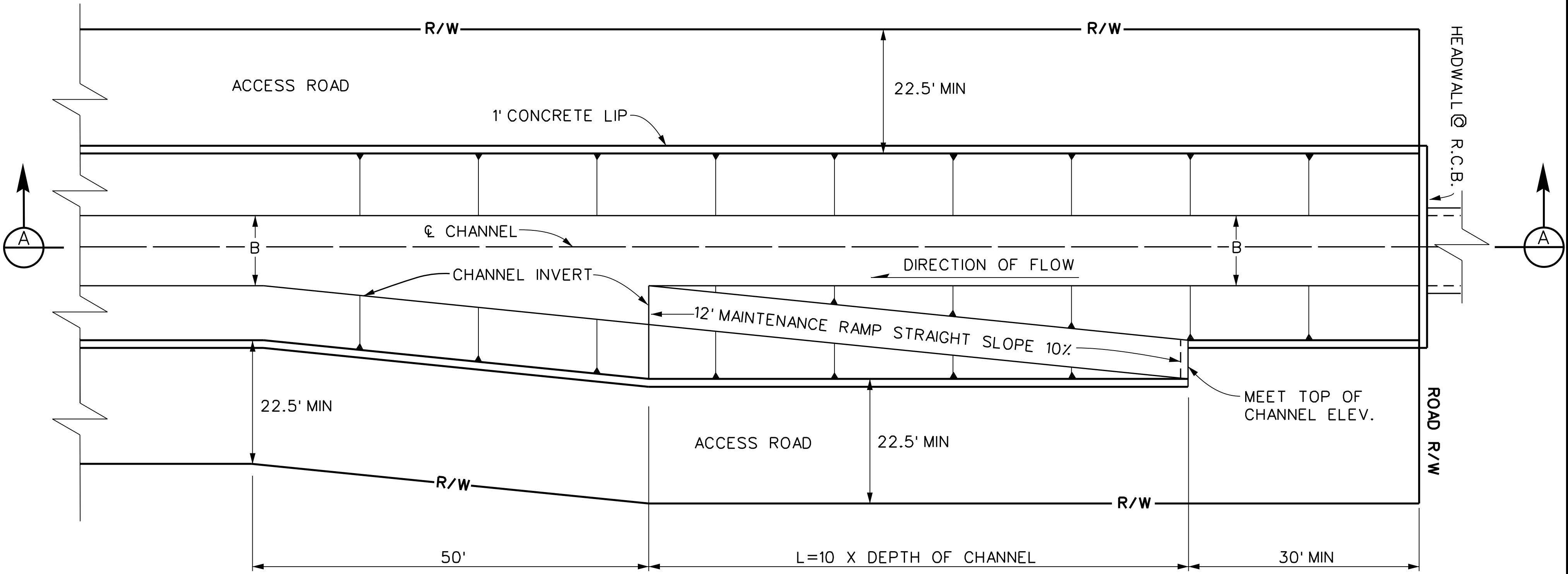
* STANDARD FORMAT TO BE USED AS FULL SIZE DRAWING

REINFORCING BAR SPACING FOR STRUCTURAL WALL SECTIONS SHALL NOT BE GREATER THAN 6" E.W. FOR AIR PLACED CONCRETE CONSTRUCTION.

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY:
CHIEF ENGINEER
DATE: JAN. 10, 2005
R.C.E. NO. 32336

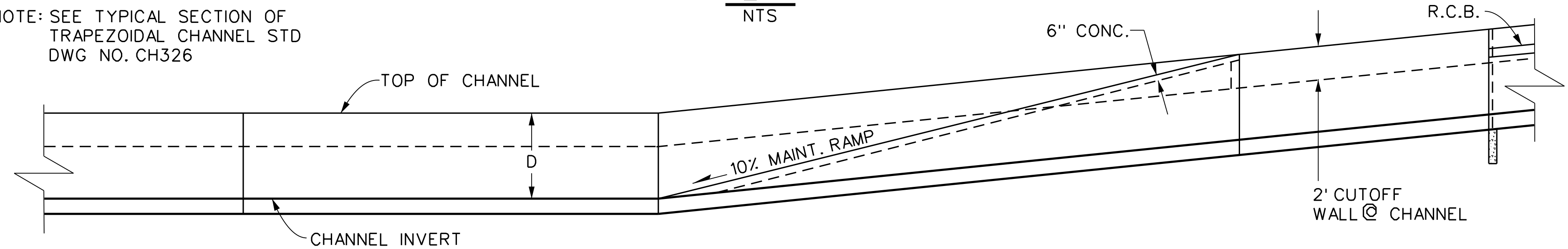
TRANSITION STRUCTURAL DETAILS

STANDARD DRAWING NUMBER CH329



PLAN
NTS

NOTE: SEE TYPICAL SECTION OF TRAPEZOIDAL CHANNEL STD DWG NO. CH326



SECTION A–A
NTS

REGISTERED PROFESSIONAL ENGINEER
JASON E. UHLEY
No. 59795
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
KAMYAR GHODS
No. 72196
CIVIL
STATE OF CALIFORNIA

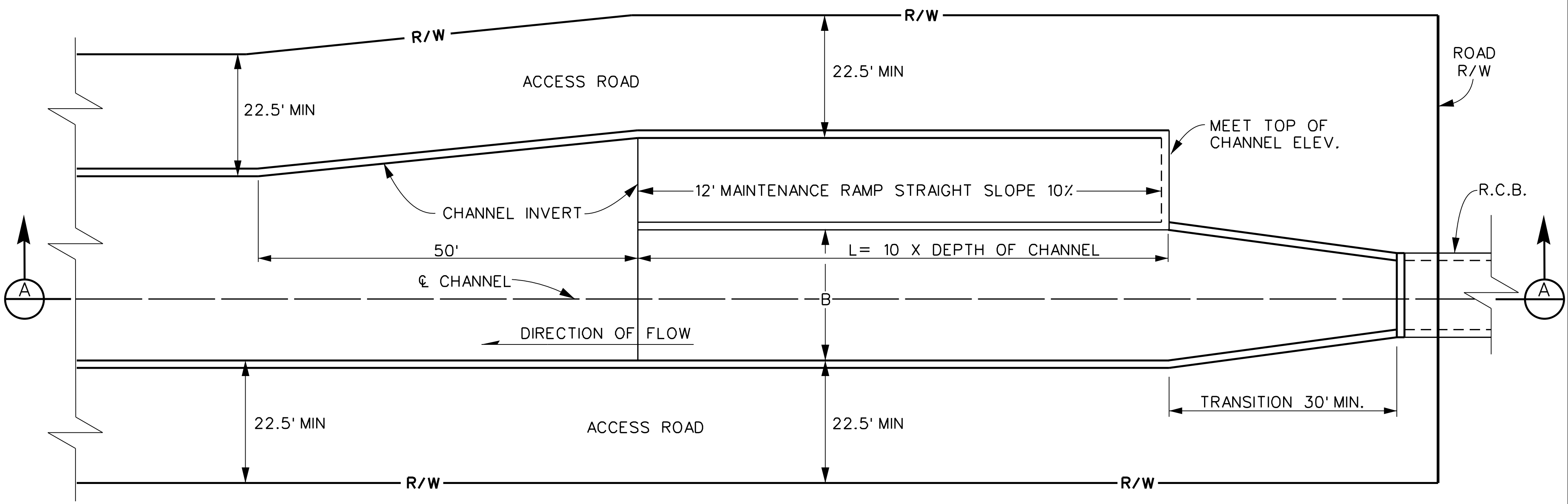
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

APPROVED BY:
GENERAL MANAGER-CHIEF ENGINEER
DATE: 3-27-2024
R.C.E. NO. 59795

APPROVED BY:
CHIEF, DESIGN
DATE: 3-27-2024
R.C.E. NO. 72196

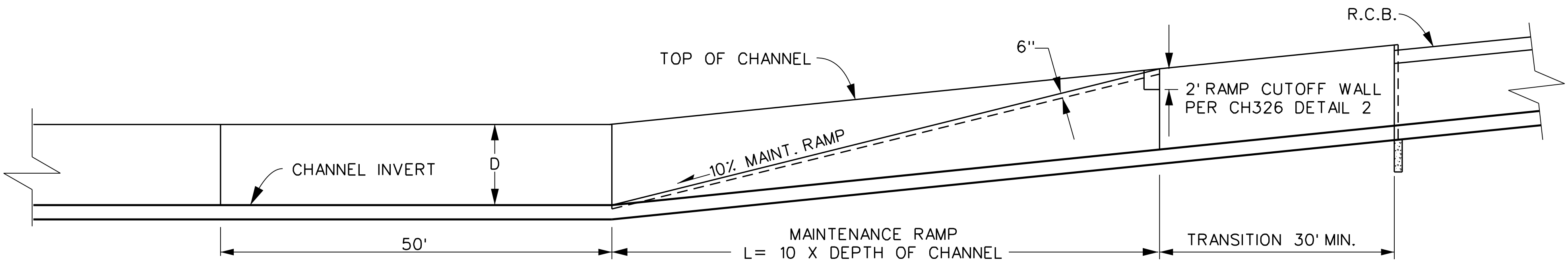
MAINTENANCE RAMP FOR TRAPEZOIDAL CHANNEL

STANDARD DRAWING NUMBER CH330
SHEET 1 OF 1



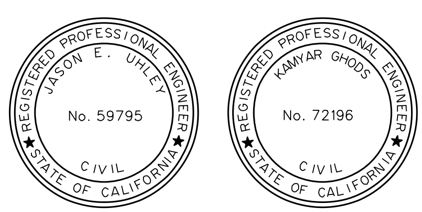
PLAN OF VERTICAL WALL CHANNEL

NTS



SECTION A-A

NTS



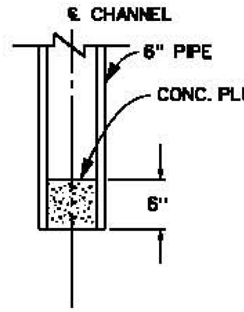
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY:	APPROVED BY:
GENERAL MANAGER-CHIEF ENGINEER	CHIEF, DESIGN
DATE: 3-27-2024 R.C.E. NO. 59795	DATE: 3-27-2024 R.C.E. NO. 72196

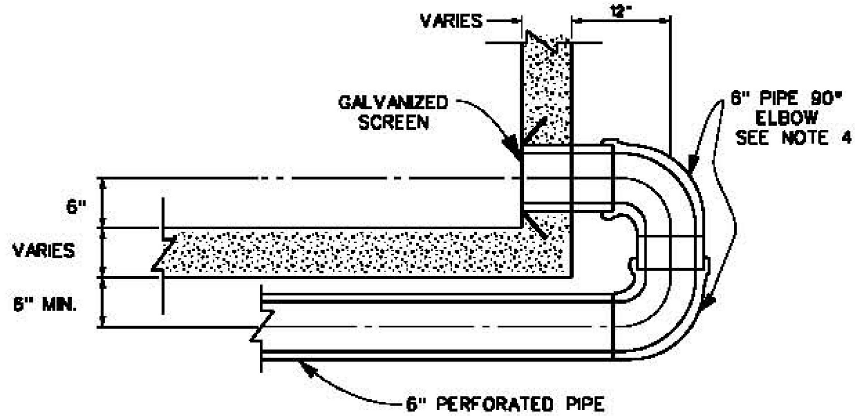
MAINTENANCE RAMP FOR VERTICAL WALL CHANNEL

STANDARD DRAWING NUMBER CH331

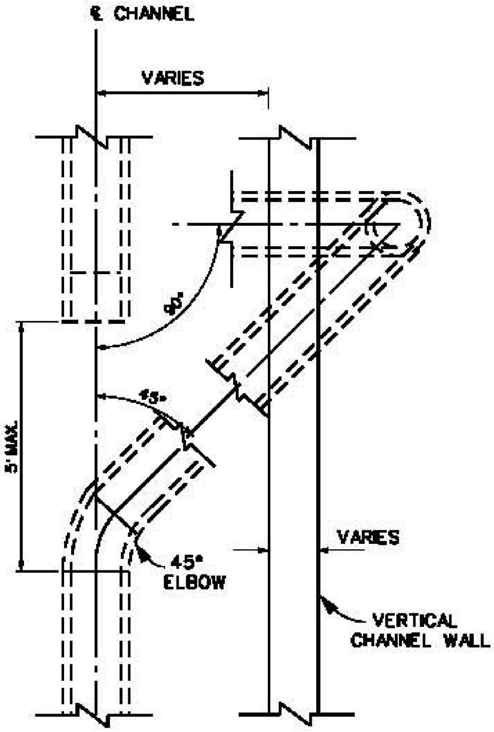
SHEET 1 OF 1



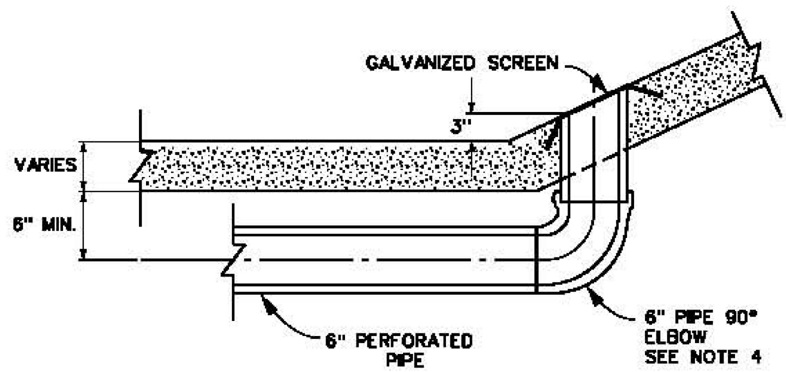
PLUG DETAIL



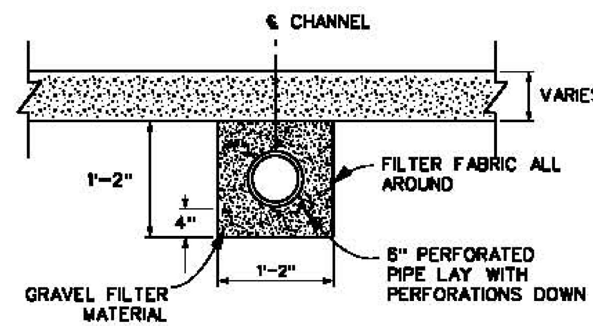
TYPICAL OUTLET IN VERTICAL CHANNEL WALL



PLAN VERTICAL & SLOPED WALL



TYPICAL OUTLET IN SLOPED CHANNEL WALL



TYPICAL SUBDRAIN

NOTES

1. DRAIN PIPE OUTLETS SHALL BE COVERED WITH ½" MESH GALVANIZED SCREEN, ANCHORED IN CONCRETE A MINIMUM OF 4", OF 16 GAGE WIRE OR HEAVIER.
2. SUBDRAIN OUTLET SHALL BE CONSTRUCTED AT 300' INTERVALS, ALONG THE CHANNEL CENTERLINE, AS LOCATED ON THE PLANS OR IN THE SPECIFICATIONS: AND/OR AS DIRECTED BY ENGINEER.
3. SUBDRAIN SHALL BEGIN AND END WITHIN 5' OF BOX CULVERTS UNLESS THE PLANS SPECIFICALLY REQUIRE THE SUBDRAIN TO BE CONTINUOUS UNDER THE BOX.
4. OPTIONAL TO USE 90° ELBOW OR OTHER SPECIALS, AS APPROVED BY THE ENGINEER

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY:

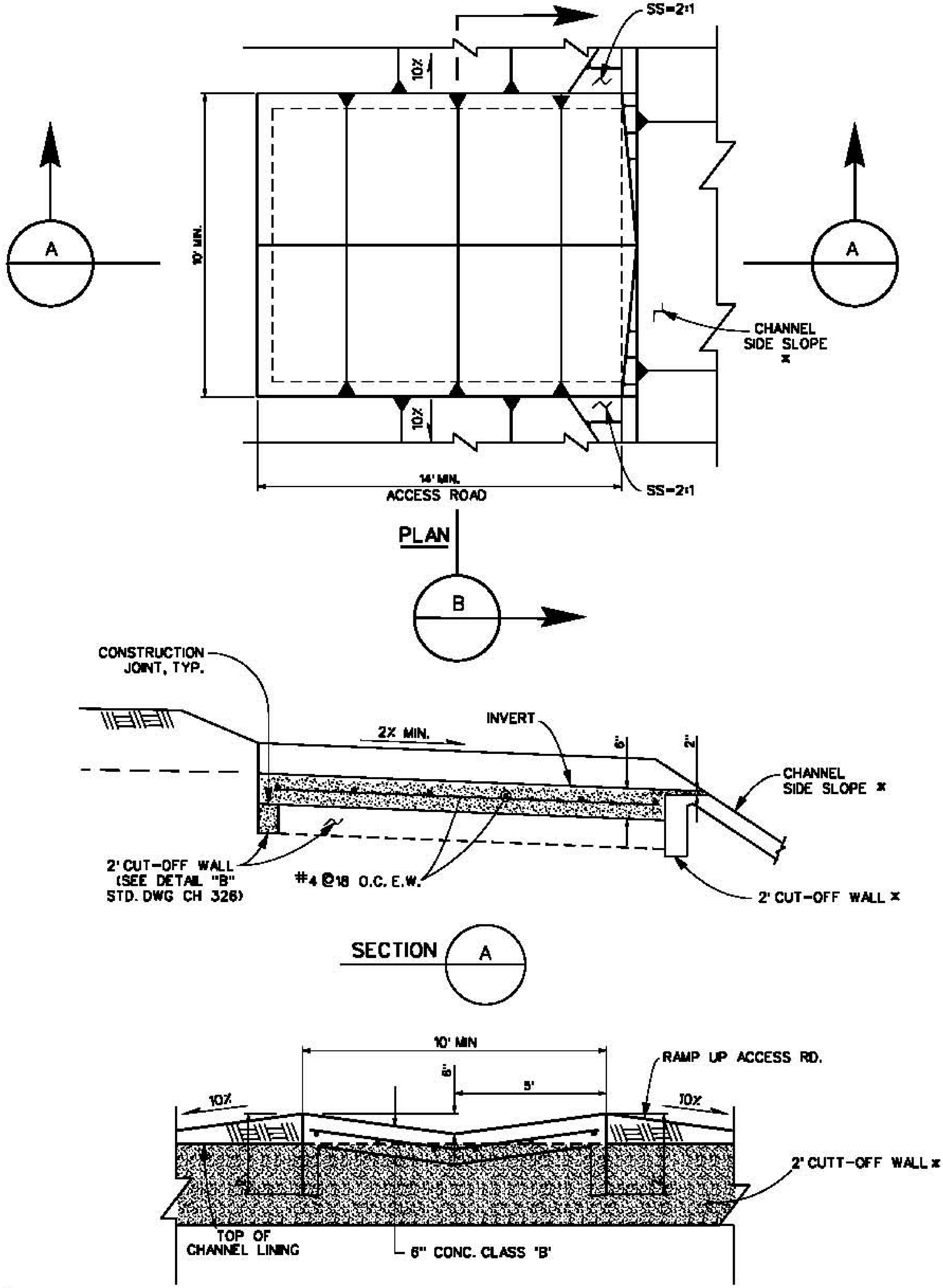
CHIEF ENGINEER

DATE: April 5, 2004

R.C.E. NO. 32336

SUBDRAINS LAYOUT, SECTIONS & DETAILS

STANDARD DRAWING NUMBER CH332



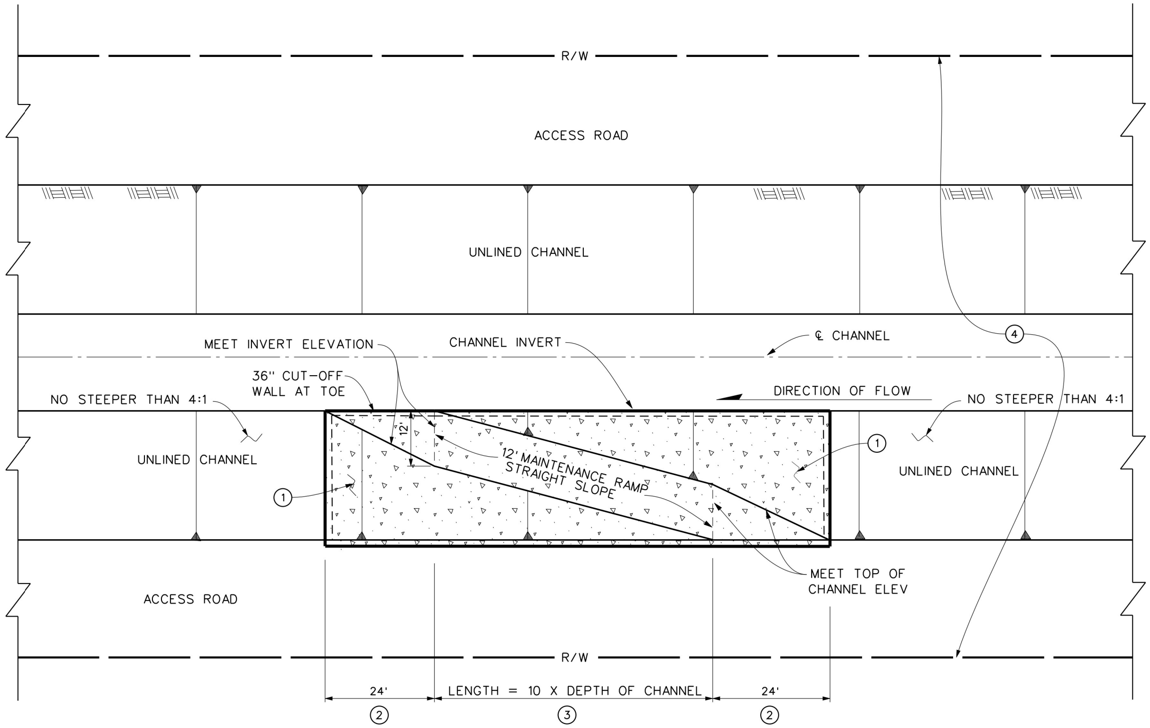
SECTION B

* **NOTES:**

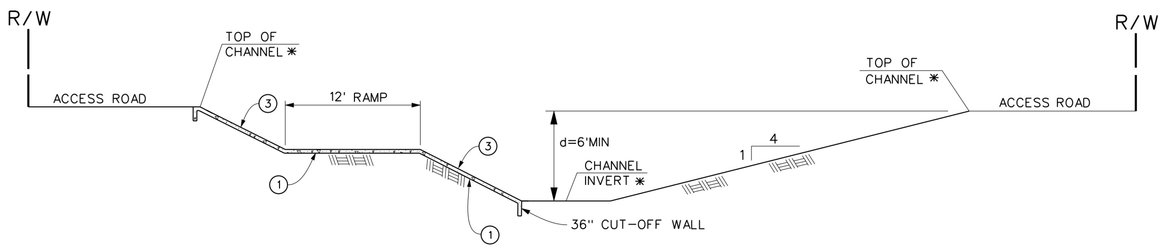
DRAINAGE APRON MAY ALSO BE USED FOR RECTANGULAR CHANNEL ACCESS ROADS.

REGISTERED PROFESSIONAL ENGINEER
WARREN D. WILLIAMS
No. 32336
Exp. 12-31-04
CIVIL
STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	DRAINAGE APRON FOR ACCESS ROAD
APPROVED BY: CHIEF ENGINEER	
DATE: April 5, 2004 — R.C.E. NO. 32336	STANDARD DRAWING NUMBER CH333



PLAN
NTS



TYPICAL SECTION
✱ELEV PER PLAN AND PROFILE
NTS

NOTES

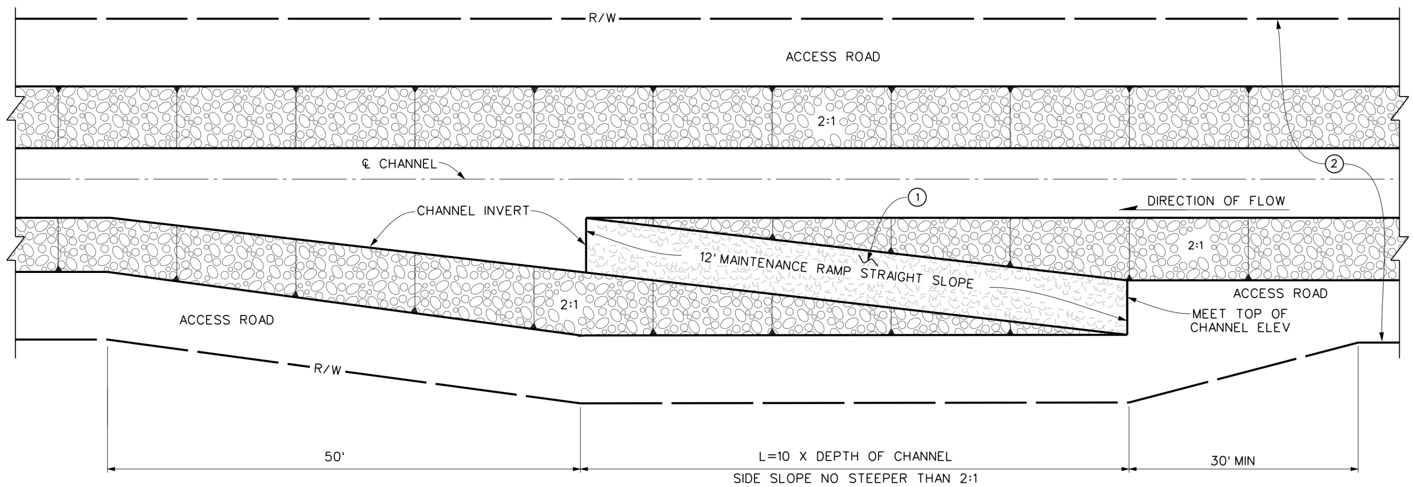
1. ALL CONCRETE STRUCTURAL SECTIONS PER STD DWG CH326. EXTEND CUT-OFF WALL TO 36 INCHES AT TOE OF SLOPE.
2. SIDE SLOPE SHALL VARY FROM 4:1 TO (4d− 12)/d:1.
3. SIDE SLOPE RATIO SHALL BE (4d−12)/d:1.
4. SEE PLAN AND PROFILE DRAWINGS FOR DIMENSIONS.
5. MAINTENANCE RAMPS TO BE PROVIDED AT EVERY REACH OF CHANNEL WITH A MAXIMUM SPACING OF 2600'. PROVIDE RAMP AT EACH CROSSING OR PROVIDE A CULVERT−8' MIN WIDTH X 7' MIN HEIGHT.
6. MATERIALS OTHER THAN CONCRETE MAY BE USED AS APPROVED BY THE GENERAL MANAGER−CHIEF ENGINEER.

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

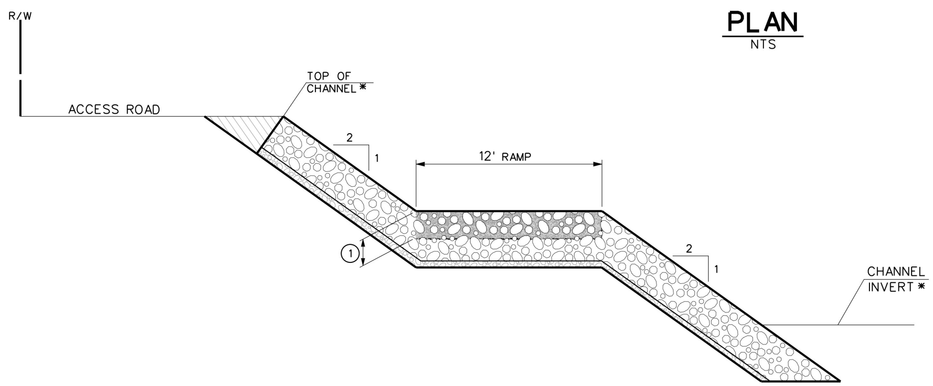
RECOMMENDED FOR APPROVAL BY:	APPROVED BY:
CHIEF, DESIGN & CONSTRUCTION	CHIEF ENGINEER
DATE: OCTOBER 2009 R.E. No. 44684	DATE: OCTOBER 2009 R.C.E. NO. 32336

MAINTENANCE RAMP FOR UNLINED CHANNEL

STANDARD DRAWING NUMBER CH334



PLAN
NTS



TYPICAL SECTION
* ELEV PER PLAN AND PROFILE
NTS

NOTES

1. GROUT TO A MIN DEPTH OF 12" FLUSH WITH THE TOP OF RIP RAP TO PROVIDE A DRIVEABLE SURFACE. HEAVY BROOM FINISH PERPENDICULAR TO DRIVING DIRECTION. GROUT PER SPECIFICATIONS.
2. SEE PLAN AND PROFILE DRAWINGS FOR DIMENSIONS.
3. MAINTENANCE RAMPS TO BE PROVIDED AT EVERY REACH OF CHANNEL WITH A MAXIMUM SPACING OF 2600'. PROVIDE RAMP AT EACH CROSSING OR PROVIDE A DRIVEABLE CULVERT–8' MIN WIDTH X 7' MIN HEIGHT.

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY:	APPROVED BY:
CHIEF, DESIGN & CONSTRUCTION	CHIEF ENGINEER
DATE: OCTOBER 2009 R.E. No. 44684	DATE: OCTOBER 2009 R.C.E. NO. 32336

MAINTENANCE RAMP FOR ROCK LINED CHANNEL

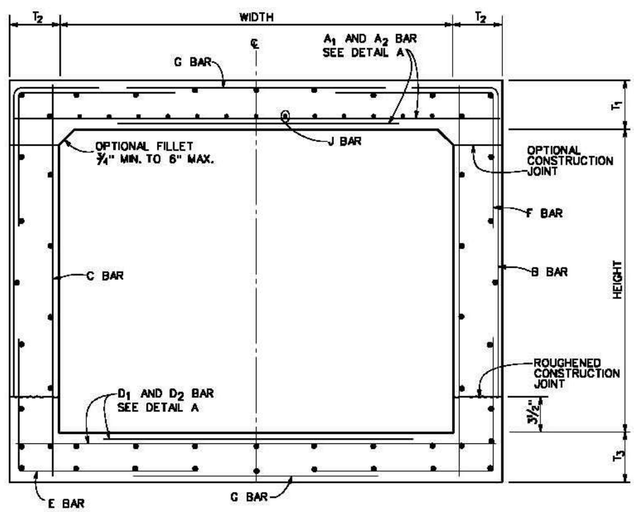
STANDARD DRAWING NUMBER CH335

DATA	DETAIL SCHEDULE A	B	C	D
DESIGN COVER				
WIDTH				
HEIGHT				
TOP SLAB T_1				
SIDE WALLS T_2				
BOTTOM SLAB T_3				
A_1 BAR				
HORIZ. LENGTH				
A_2 BAR				
HORIZ. LENGTH				
B BARS				
HORIZ. LENGTH				
VERT. LENGTH				
C BAR				
VERT. LENGTH				
D_1 BAR				
HORIZ. LENGTH				
D_2 BAR				
HORIZ. LENGTH				
E BAR				
HORIZ. LENGTH				
VERT. LENGTH				
F BAR				
HORIZ. LENGTH				
VERT. LENGTH				
G BAR				
TOP HORIZ. LENGTH				
BOT HORIZ. LENGTH				
J BAR				
LONGITUDINAL BARS				
NO.				
CONCRETE C.Y./L.F.				
STEEL LBS./L.F.				

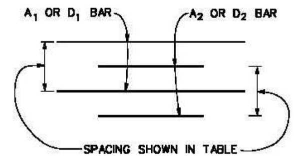
LOCATION SCHEDULE STATIONS FROM	TO	BOX

SPLICES

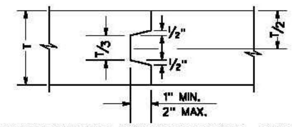
BAR	LENGTH	BOX	REMARKS



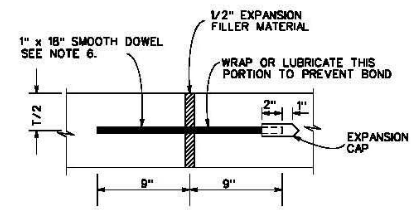
TYPICAL SECTION
NTS



DETAIL A
(PLAN VIEW)



TRANSVERSE CONSTRUCTION JOINT
DETAIL B



TRANSVERSE EXPANSION JOINT
DETAIL C

DESIGN DATA
LIVE LOAD =
SOIL DENSITY =
ALLOWABLE STRESSES:
f_c =
f_o =
f_y =
f_R =

NOTE:

1. STRUCTURAL CONCRETE SHALL BE CLASS "A".
2. ALL LONGITUDINAL BARS SHALL BE 4@#18 INCHES UNLESS OTHERWISE NOTED. PLACE BARS IN TOP AND BOTTOM SLABS SYMMETRICALLY ABOUT CENTERLINE. PLACE BARS IN WALLS SYMMETRICALLY ABOUT MID-HEIGHT OF WALLS. J BARS ARE IN REPLACEMENT OF THE LONGITUDINAL BARS.
3. CLEAR COVER FOR STEEL SHALL BE 2 INCHES FOR TOP SLAB AND SIDE WALLS AND 3 INCHES FOR THE INNER FACE AND 3 INCHES FOR THE OUTER FACE OF THE BOTTOM SLAB.
4. STEEL IS DIMENSIONED TO BACK OF BAR BEND.
5. FOR CONSTRUCTION ON CURVES, STRAIGHT TRANSVERSE BARS IN TOP AND BOTTOM SLABS SHALL BE ALIGNED RADIALLY WITH SPACING MEASURED AT CENTERLINE. FOR STRAIGHT BARS AND L-BARS IN WALLS SPACING SHALL BE MEASURED BETWEEN THE VERTICAL LEGS OF BARS.
6. ALL TRANSVERSE CONSTRUCTION JOINTS SHALL BE IN A VERTICAL PLANE NORMAL TO THE CENTERLINE AND THE SPACING THEREOF SHALL NOT EXCEED 50 FEET OR BE LESS THAN 10 FEET. CONTINUOUS KEYWAYS SHALL BE CONSTRUCTED AS SHOWN IN DETAIL B. A COMPLETE CURTAIN OF TRANSVERSE STEEL SHALL BE PLACED 3 INCHES FROM EACH FACE OF THE JOINTS AND LONGITUDINAL STEEL WILL NOT BE CONTINUOUS THROUGH THE JOINTS. IN ADDITION, EXPANSION JOINTS SHALL BE CONSTRUCTED BETWEEN REINFORCED CONCRETE CHANNEL AND REINFORCED CONCRETE BOX SECTIONS AS SHOWN IN DETAIL C. DOWELS SHALL BE PLACED AT 12" SPACING CENTERED IN THE MIDDLE THIRD OF BOTTOM SLAB AND THE TOP THIRD OF SIDE WALLS. A MINIMUM OF 3 DOWELS PER SLAB AND WALLS SHALL BE PLACED.
7. ALL QUANTITIES SHOWN ARE APPROXIMATE.
8. ALL SPLICES ARE SUBJECT TO APPROVAL BY THE ENGINEER.
9. ENGINEER SHALL DETERMINE WHETHER WEEPHOLES OR SUBDRAINS ARE REQUIRED.

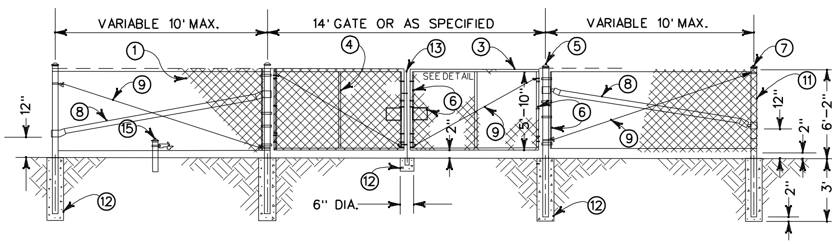
✕ STANDARD FORMAT TO BE USED AS FULL SIZE DRAWINGS

REGISTERED PROFESSIONAL ENGINEER WARREN D. WILLIAMS No. 32336 Exp. 12-31-04 CIVIL STATE OF CALIFORNIA

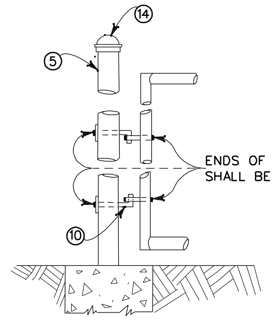
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY:
CHIEF ENGINEER
DATE: April 5, 2004 R.C.E. NO. 32336

SINGLE CELL RCB STRUCTURAL DETAILS

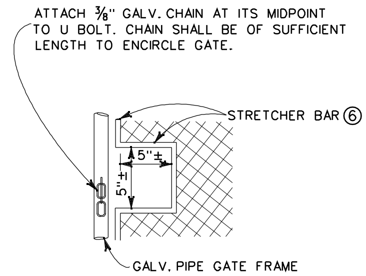
STANDARD DRAWING NUMBER BX401



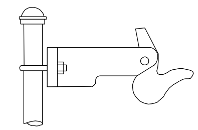
14' DOUBLE DRIVE GATE



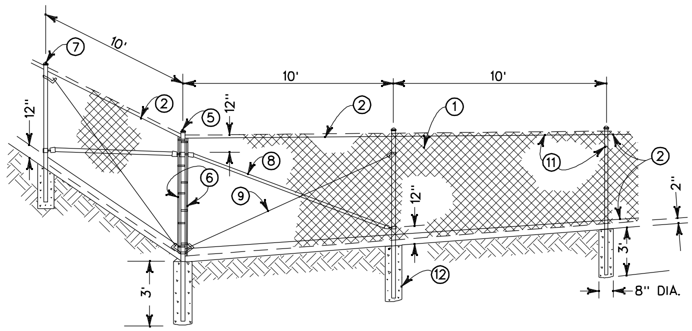
HINGE DETAIL



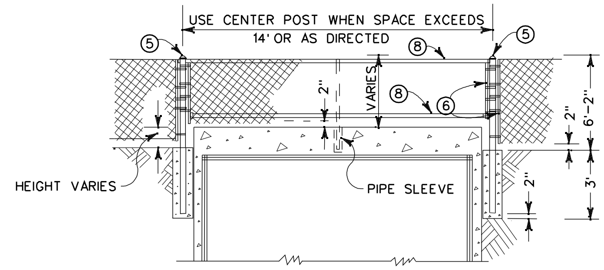
GATE LOCKING DETAIL



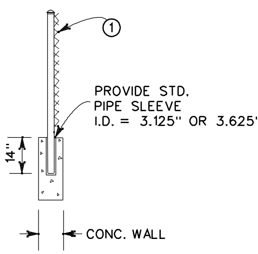
GATE KEEPER



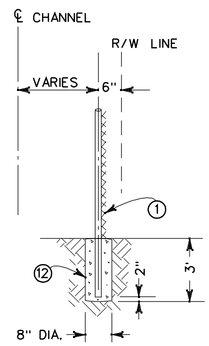
END OR CORNER POST ASSEMBLY



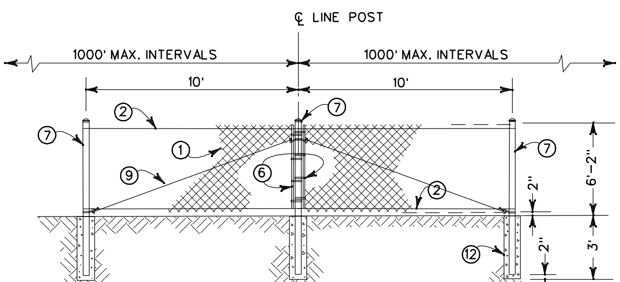
HEADWALL FENCE ASSEMBLY



CHANNEL WALL FENCE



FENCE LOCATION



TRUSS POST ASSEMBLY

NOTE

1. CHAIN LINK FENCE 72" FABRIC (9 GAGE)
2. 7 GAGE SPRING STEEL TENSION WIRE
3. 1.660" O.D. GALV. PIPE FOR GATE FRAME. TIE FABRIC TO TOP AND BOTTOM OF FRAME.
4. 1.660" O.D. GALV. STIFFENER.
5. GATE, END & CORNER POSTS 2.875" O.D.
6. STRETCHER BAR $\frac{3}{16}$" X ¾" MIN.
7. LINE POST 2.375" O.D.
8. BRACE REQUIRED ACROSS ALL HEADWALLS OR PARAPETS. 1.660" O.D.
9. ⅜" TENSION ROD WITH TENSION ADJUSTMENT.
10. HINGE BOLTS ⅝".
11. GAGE 11 WIRE TIES
12. 2000 p.s.i. (4 SACK CONC.)
13. PLUNGER ROD
14. CAPS ON ALL POSTS
15. GATE KEEPER

NOTE

FENCING MATERIAL SHALL CONFORM TO SECTION 206-6 OF STD. SPEC. FOR PUBLIC WORKS CONSTRUCTION. LATEST EDITION EXCEPT THE FENCE FABRIC SHALL HAVE A KNUCKLED FINISH ON ONE EDGE AND A TWISTED AND BARBED FINISH ON THE OTHER EDGE.

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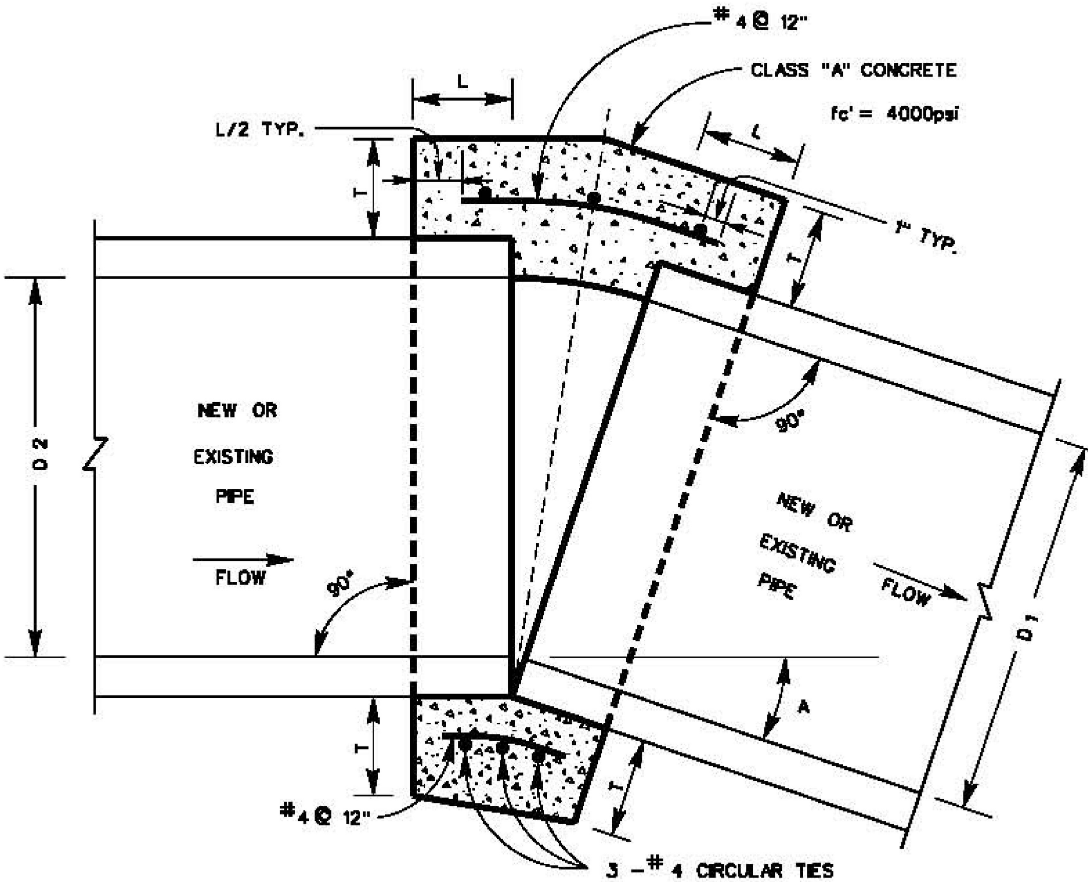
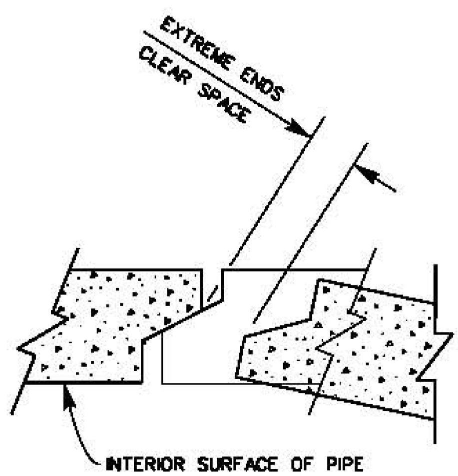
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT APPROVED BY: [illegible] CHIEF ENGINEER DATE: JAN. 10, 2005 R.C.E. NO. 32336	CHAIN LINK FENCE DETAILS STANDARD DRAWING NUMBER M801



D	L	T
12"	1.0'	4"
18"	1.0'	5"
24"	1.0'	6"
36"	1.5'	8"
48"	1.5'	10"
57"	1.5'	10"
60"	1.75'	11"
66"	1.75'	11"

NOTES

1. A CONCRETE COLLAR IS REQUIRED WHERE THE CHANGE IN GRADE EXCEEDS 0.10 FT. PER FOOT, OR IF CHANGE IN ALIGNMENT EXCEEDS 0.10 FT. PER FOOT.
2. IF THE EXTREME ENDS OF THE PIPE LEAVE A CLEAR SPACE THAT IS GREATER THAN 1", BUT LESS THAN 6", A CONCRETE COLLAR IS REQUIRED (SEE DETAIL A THIS SHEET). IF THE CLEAR SPACE IS 6" OR GREATER, A TRANSITION STRUCTURE IS REQUIRED.
3. CONCRETE COLLAR SHALL NOT BE USED FOR A SIZE CHANGE ON THE MAIN LINE.
4. WHERE PIPES OF DIFFERENT DIAMETERS ARE JOINED WITH A CONCRETE COLLAR, L AND T SHALL BE THOSE OF THE LARGER PIPE. $D=D_1$ OR D_2, WHICHEVER IS GREATER.
5. FOR PIPE LARGER THAN 66" A SPECIAL COLLAR DETAIL IS REQUIRED.
6. FOR PIPE SIZE NOT LISTED USE THE NEXT SIZE LARGER.
7. OMIT REINFORCING ON PIPES 24" AND LESS IN DIAMETER AND ON ALL PIPES WHERE ANGLE A IS LESS THAN 10°.
8. WHERE REINFORCING IS REQUIRED THE DIAMETER OF THE CIRCULAR TIES SHALL BE D + (2 X WALL THICKNESS) + 8".
9. WHEN D_1 IS EQUAL TO OR LESS THAN D_2 JOIN INVERTS AND WHEN D_1 IS GREATER THAN D_2 JOIN SOFFITS.
10. PIPE MAY BE CORRUGATED METAL PIPE, CONCRETE PIPE, OR REINFORCED CONCRETE PIPE.



DETAIL "A"

TYPICAL JOINT FOR
REINFORCED CONCRETE PIPE

APWA STD. PLAN 380-1
L.A.C.F.C. 2-D393

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RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

APPROVED BY: [illegible]

CHIEF ENGINEER

DATE: April 5, 2004

R.C.E. NO. 32336

CONCRETE COLLAR
FOR
PIPE 12 INCHES THROUGH
66 INCHES

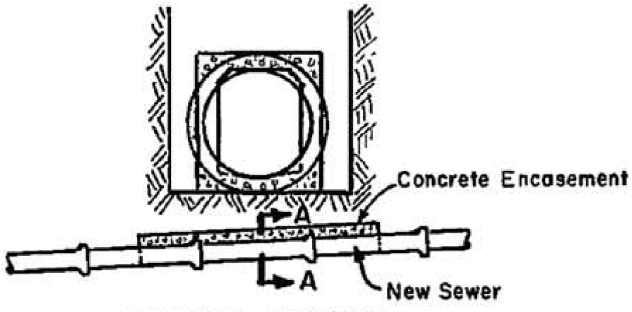
STANDARD DRAWING NUMBER M803

NOTES

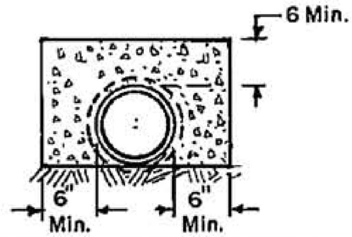
1. Concrete for encasement and blanket shall be CLASS "B" concrete.

2. The concrete encasement or blanket shall extend across the full width of the storm drain trench plus an additional 12" inches into undisturbed earth on each side of the storm drain trench.

3. When the clearance between the bottom of the storm drain and the top of the sewer is between 6 inches and 18" inches the sewer shall be encased for Case I or blanketed for Case II as shown below.

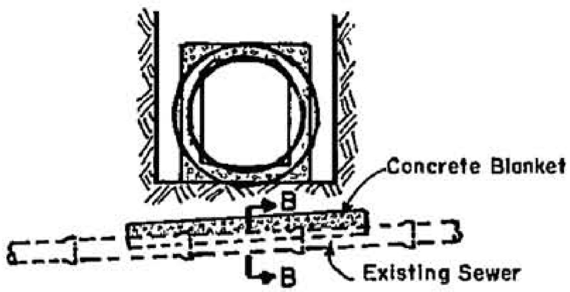


TYPICAL SECTION

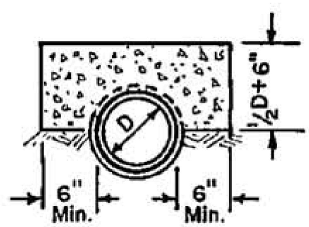


CONCRETE ENCASEMENT
SECTION A-A

PROTECTION FOR NEW SEWERS - CASE I



TYPICAL SECTION



CONCRETE BLANKET
SECTION B-B

PROTECTION FOR EXISTING SEWERS - CASE II

NOTES

1. CAST IN-PLACE STORM DRAINS

(a.) When the clearance between the bottom of the storm drain and the top of the sewer is less than 6 inches, the sewer shall be encased monolithically with the base of the storm drain; in addition it shall be constructed or replaced, as the case may be, with standard cast iron soil pipe, in the case of house connections, or with class "B" or class "150" cast iron pipe, in the case of main line sewers.

(b) When the bottom slab of the cast-in-place storm drain intersects sewers under 15 inches in diameter, construct per typical encasement as shown below.

2. PRECAST PIPE STORM DRAINS

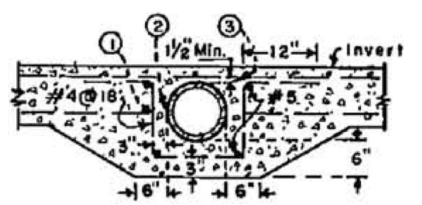
When the clearance between the bottom of the storm drain and the top of the sewer is less than 6 inches, the sewer shall be encased, in addition it shall be constructed or replaced with standard cast iron soil pipe, in the case of house connections, or with class "B" or class "150" cast iron pipe, in the case of main line sewers.

3. WRAP 1/2" MASTIC AROUND SEWER PIPE.

① Cut off 2" clear of C.I.P.

② Construct C.I.P. or replace existing sewer pipe with C.I.P.

③ Clearance between the top of the sewer pipe and the steel reinforcement shall be a minimum of 1½"



TYPICAL ENCASEMENT WHERE SEWER IS IN BASE AND APPROXIMATELY AT RIGHT ANGLES TO STORM DRAIN

L.A.C.F.C.D. STD. NO. 2-D251

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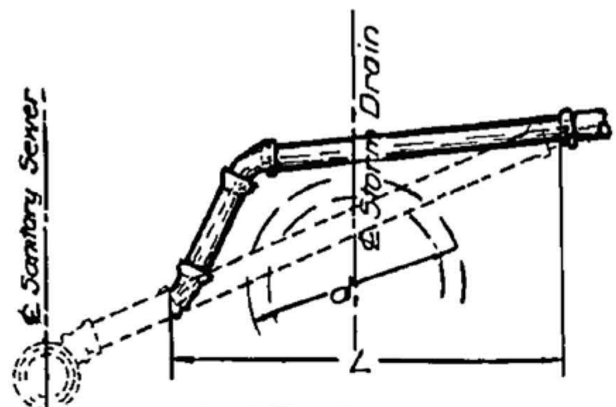
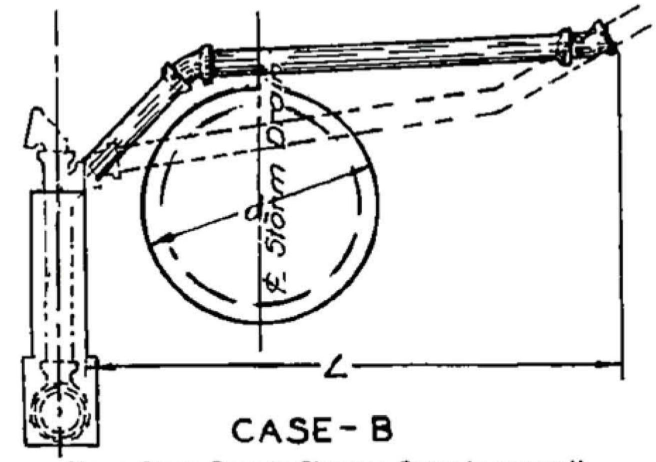
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT APPROVED BY: [illegible] CHIEF ENGINEER DATE: April 5, 2004 R.C.E. NO. 32338	SANITARY SEWER POTECTION STANDARD DRAWING NUMBER M807



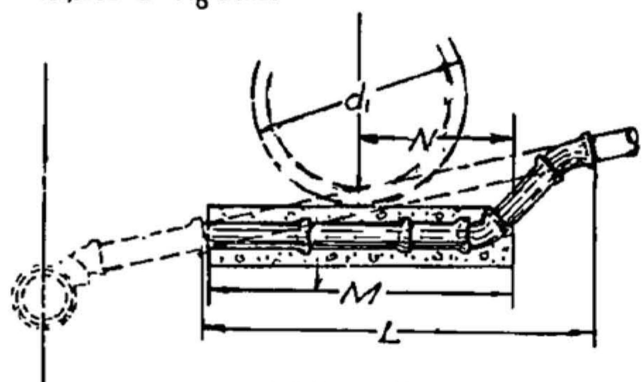
CASE - A

Above Storm Drain to House Connection-Specials required. 2-4 1/8 Bends



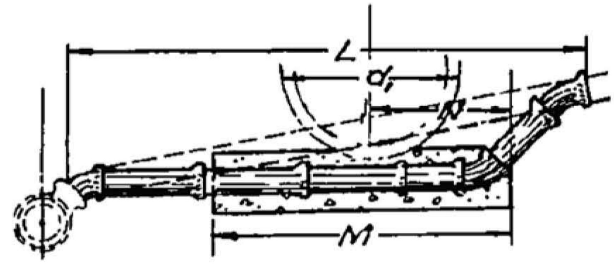
CASE - B

Above Storm Drain to Chimney-Specials required: 2-4" 1/8 Bends.



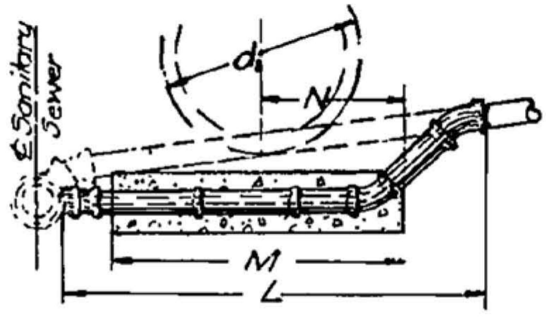
CASE - C

Below Storm Drain to House Connection — Specials required: 2-4" 1/8 Bends



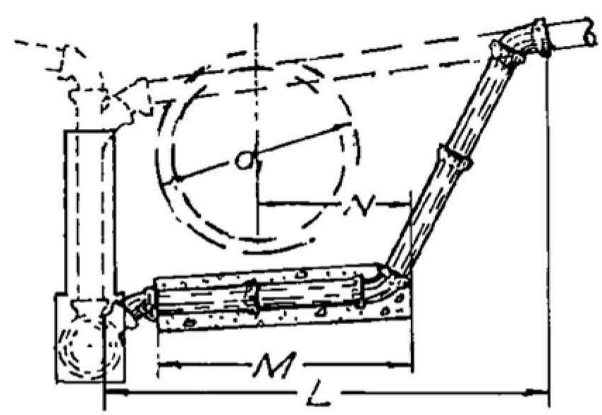
CASE - D

Below Storm Drain to Y- Specials required: 3-4" 1/8 Bends.



CASE - E

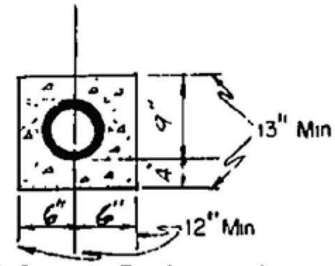
Below Storm Drain to Flat Saddle - Specials required: 3-4" 1/8 Bends , 1- Saddle



CASE - F

Below Storm Drain to Saddle - Specials required 3-4" 1/8 Bends , 1 Saddle

FOR NOTES SEE STANDARD DRAWING No. 808 SHEET 2



Cross Section of Concrete Reinforcement For 4" Pipe

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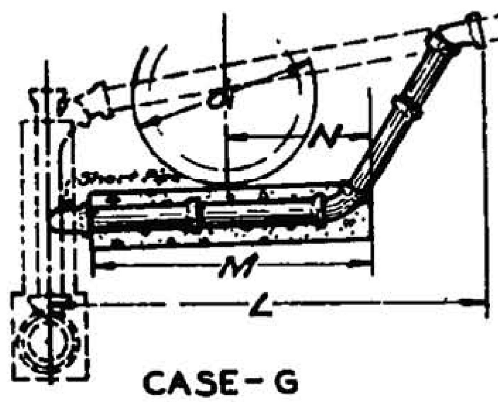
STATE OF CALIFORNIA

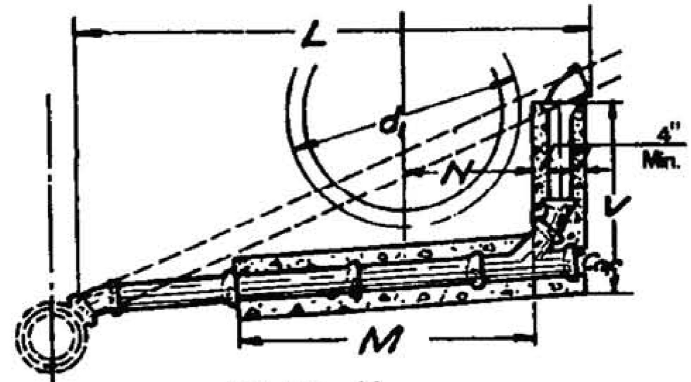
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	REMODELING DETAILS HOUSE CONNECTION SEWERS
APPROVED BY: CHIEF ENGINEER	STANDARD DRAWING NUMBER M808
DATE: April 5, 2004 R.C.E. NO. 32336	SHEET 1 OF 2

CITY OF RIV. STD. NO. 454



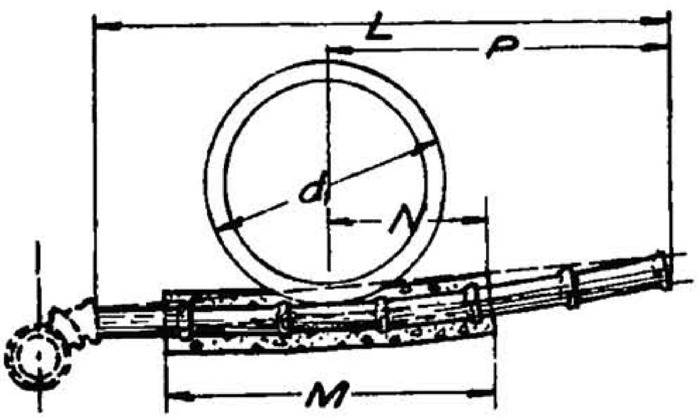
CASE-G

Below Storm Drain to Chimney-Specials required: 2-4" 1/8 Bends.



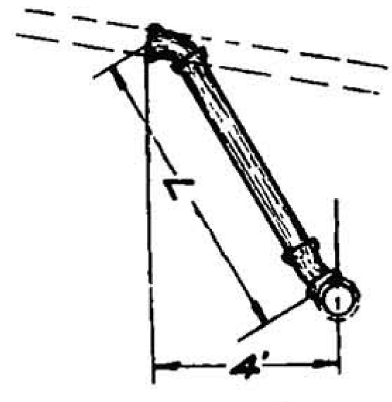
CASE-H

Below Storm Drain to Y-Specials required: 3-4" 1/8 Bends, 1-4"x4" Y.



CASE-K

Below Storm Drain to House Connection. Slope slightly modified.



CASE-R

Connection with New Sewer-Specials required: 2-4" 1/8 Bends.

NOTES

1. Existing pipes are indicated by broken lines
2. Pipes to be constructed are indicated by full lines.
3. All pipes shall be 4" internal diameter, or shall match existing lateral.
4. All bends shall be 4" – 1/8 bends unless specified otherwise.
5. Concrete reinforcement, cross section shown sheet 1 shall be used on all pipes to be constructed under storm drain, top portion within 1" of storm drain to be omitted.
6. Dimensions:

   L is specified on plan as the average total length.

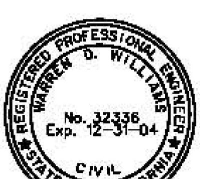
   $M = (d_1 + 24")$ less enough to avoid a fraction of a foot.

   $N = 1/2\ M$, except where specified otherwise on plan.

   P, used for CASE-K, is specified where L does not extend to the bend.

   V, used for CASE-H, is specified to the nearest foot and in summary, is itemized as Concrete Reinforcement for 6" pipe.
7. A 4" Saddle, where used, shall be connected to the pipe constituting the existing Y or T, or to the next lower pipe length.

CITY OF RIV. STD. NO. 454
CITY OF L.A. STD. NO. 29810



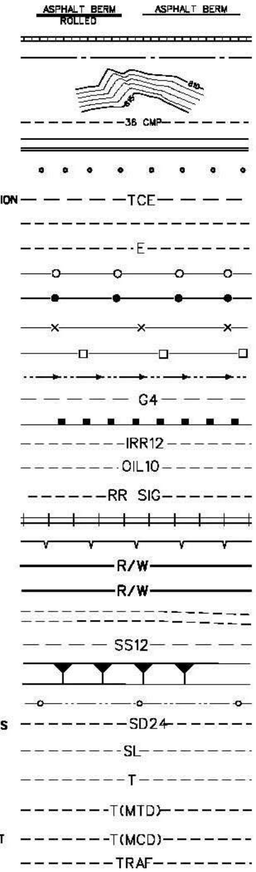
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT APPROVED BY: CHIEF ENGINEER DATE: April 5, 2004 R.C.E. NO. 32336	REMODELING DETAILS HOUSE CONNECTION SEWERS STANDARD DRAWING NUMBER M808 SHEET 2 OF 2

ABBREVIATIONS

AH	AHEAD
BK	BACK
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AB	AGGREGATE BASE
ABND	ABANDONED
AC	ASPHALT CONCRETE
ACP	ASBESTOS CEMENT PIPE
∠ PT	ANGLE POINT
APPROX	APPROXIMATE
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
AWWA	AMERICAN WATER WORKS ASSOCIATION
b	CHANNEL BASE WIDTH
BC	BEGINNING OF CURVE
BCR	BEGINNING OF CURVE RETURN
BM	BENCH MARK
BNSF	BURLINGTON NORTHERN SANTA FE
BVC	BEGINNING OF VERTICAL CURVE
CALC	CALCULATED
CB	CATCH BASIN
CC	CENTER TO CENTER
CF	CURB FACE OR CUBIC FEET
cfs	CUBIC FEET PER SECOND
C&G	CURB AND GUTTER
CIPP	CAST IN PLACE PIPE
CIP	CAST IRON PIPE
CJ	CONSTRUCTION JOINT
CL	CLASS
CLR	CLEAR
℄	CENTERLINE
CML&C	CEMENT MORTAR LINED AND COATED
CMP	CORRUGATED METAL PIPE
CMPA	CORRUGATED METAL PIPE ARCH
CO	CLEAN OUT
CONC	CONCRETE
CONST	CONSTRUCT
COR	CORNER
CP	CONTROL POINT
CSP	CORRUGATED STEEL PIPE
CY	CUBIC YARDS
D	DEPTH
∠	CURVE TOTAL DEFLECTION ANGLE
DG	DECOMPOSED GRANITE
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DN	DOWN
D/W	DRIVEWAY
DWG	DRAWING
E	EAST OR ELECTRICAL
EA	EACH
EC	END OF CURVE
ECR	END OF CURVE RETURN
EF	EACH FACE
ELEV	ELEVATION
ELY	EASTERLY
EP	EDGE OF PAVEMENT
EQ	EQUATION OR EQUAL
EVC	END OF VERTICAL CURVE
EW	EACH WAY
EX	EXISTING
EXCAV	EXCAVATION
EX GND	EXISTING GROUND
F	FIRE
FB	FIELD BOOK
FD	FOUND
FG	FINISHED GRADE
FH	FIRE HYDRANT
℄, FL	FLOW LINE
fps	FEET PER SECOND
FT	FEET OR FOOT
FWY	FREEWAY
G	GAS
GALV	GALVANIZED
H	HEIGHT
HC	HOUSE CONNECTION
HDPE	HIGH DENSITY POLYETHYLENE
HGL	HYDRAULIC GRADE LINE
HORIZ	HORIZONTAL
ID	INSIDE DIMENSION
IN	INCH OR INCHES
IP	IRON PIPE
IRR	IRRIGATION
JS	JUNCTION STRUCTURE
L	LENGTH
LBS	POUNDS
LD	LOCAL DEPRESSION
LF	LINEAL FEET
LONG	LONGITUDINAL
LS	LUMP SUM OR LAND SURVEYOR
LT	LEFT
L&T	LEAD & TACK
MAX	MAXIMUM
MCD	MULTIPLE CEMENT DUCT
MEAS	MEASURED
MH	MANHOLE
MIN	MINIMUM
MTD	MULTIPLE TILE DUCT (TEL)
MVC	MIDDLE OF VERTICAL CURVE
N	NORTH
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
NGVD	NATIONAL GEODEDIC VERTICAL DATUM
NGS	NATIONAL GEODETIC SURVEY
NLY	NORTHERLY
NO, #	NUMBER
N&T	NAIL & TIN
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIMENSION
OR	OFFICIAL RECORD
PCC	POINT OF COMPOUND CURVATURE OR PORTLAND CEMENT CONCRETE
PI	POINT OF INTERSECTION
PL OR ℗	PROPERTY LINE
PP	POWER POLE
PPM	PARTS PER MILLION
PRC	POINT OF REVERSE CURVATURE
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE PIPE
PVMT	PAVEMENT
Q	RATE OF FLOW (cfs)
R	RADIUS OR RANGE
RCB	REINFORCED CONCRETE BOX
RCE	REGISTERED CIVIL ENGINEER
RCFC&WCD	RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RCP	REINFORCED CONCRETE PIPE
RR	RAILROAD
R/S	RECORD OF SURVEY
RT	RIGHT
R/W	RIGHT OF WAY
S	SOUTH OR SLOPE
SS	SIDE SLOPE OR SANITARY SEWER
SD	STORM DRAIN
SEC	SECTION
SHT	SHEET
SIG	SIGNAL
SL	STREET LIGHT
SLY	SOUTHERLY
SPRR	SOUTHERN PACIFIC RAILROAD
SF	SQUARE FEET
SY	SQUARE YARDS
STA	STATION
STD	STANDARD
S&T	SPIKE & TIN
S/W	SIDEWALK
T	TANGENT, THICKNESS, TOWNSHIP OR TELEPHONE
TBM	TEMPORARY BENCH MARK
TC	TOP OF CURB
TCE	TEMPORARY CONSTRUCTION EASEMENT
TRAFF	TRAFFIC
TR	TRACT
TRANS	TRANSITION
TS	TRANSITION STRUCTURE
TW	TOP OF WALL
TYP	TYPICAL
UPRR	UNION PACIFIC RAILROAD
USC&GS	UNITED STATES COAST AND GEODETIC SURVEY
USGS	UNITED STATES GEOLOGICAL SURVEY
V	VELOCITY OF FLOW OR DEPTH OF CATCH BASIN
VABM	VERTICAL ANGLE BENCH MARK
VAR	VARIABLE OR VARIES
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
VPI	VERTICAL POINT OF INTERSECTION
W	WEST, WIDTH OR WATER
WLY	WESTERLY
WS	WATER SURFACE

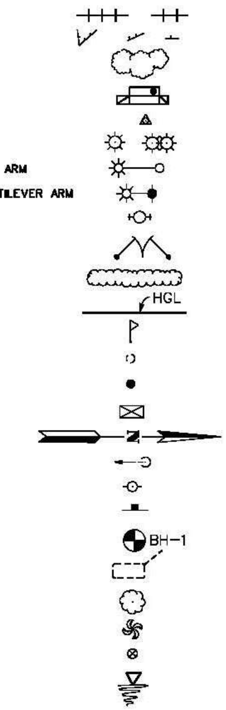
LINE TYPES

ASPHALT BERM
BLOCK WALL
CENTERLINE
CONTOURS
CULVERT, EXISTING
CURB & GUTTER, EXISTING
DELINEATORS
EASEMENT, TEMPORARY CONSTRUCTION
EASEMENT, UTILITY
ELECTRICAL LINE
FENCE, CHAIN LINK, EXISTING
FENCE, CHAIN LINK, PROPOSED
FENCE, WIRE
FENCE, WOODEN
FLOW LINE
GAS LINE, ID IN INCHES
GUARD RAIL
IRRIGATION LINE, ID IN INCHES
OIL LINE, ID IN INCHES
RAILROAD SIGNAL LINE
RAILROAD TRACKS
RETAINING WALL
RIGHT OF WAY, FLOOD CONTROL
RIGHT OF WAY, STREET
ROAD, DIRT
SANITARY SEWER, ID IN INCHES
SIDE SLOPE
SPRINKLERS
STORM DRAIN, EXISTING, ID IN INCHES
STREET LIGHT CONDUIT
TELEPHONE CABLE
TELEPHONE, MULTIPLE TILE DUCT
TELEPHONE, MULTIPLE CEMENT DUCT
TRAFFIC SIGNAL LINE



SYMBOLS

BARRICADE
BILLBOARD
BUSHES
CATCH BASIN, PROPOSED
CONTROL POINT
ELECTROLIER (S) ON POLE
ELECTROLIER ON POLE, CANTILEVER ARM
ELECTROLIER ON POWER POLE, CANTILEVER ARM
FIRE HYDRANT
GATE, DOUBLE DRIVE
HEDGE
HYDRAULIC GRADE LINE
MAIL BOX
MANHOLE COVER, EXISTING
MANHOLE COVER, PROPOSED
METER, WATER OR GAS
NORTH ARROW
POLE, GUY WITH ANCHORS
POLE, POWER OR TELEPHONE
SIGN, STREET
SOIL BORINGS
TRAFFIC DETECTOR LOOP
TREE, OTHER THAN PALM
TREE, PALM
VALVE, WATER OR GAS
WATER SURFACE PROFILE



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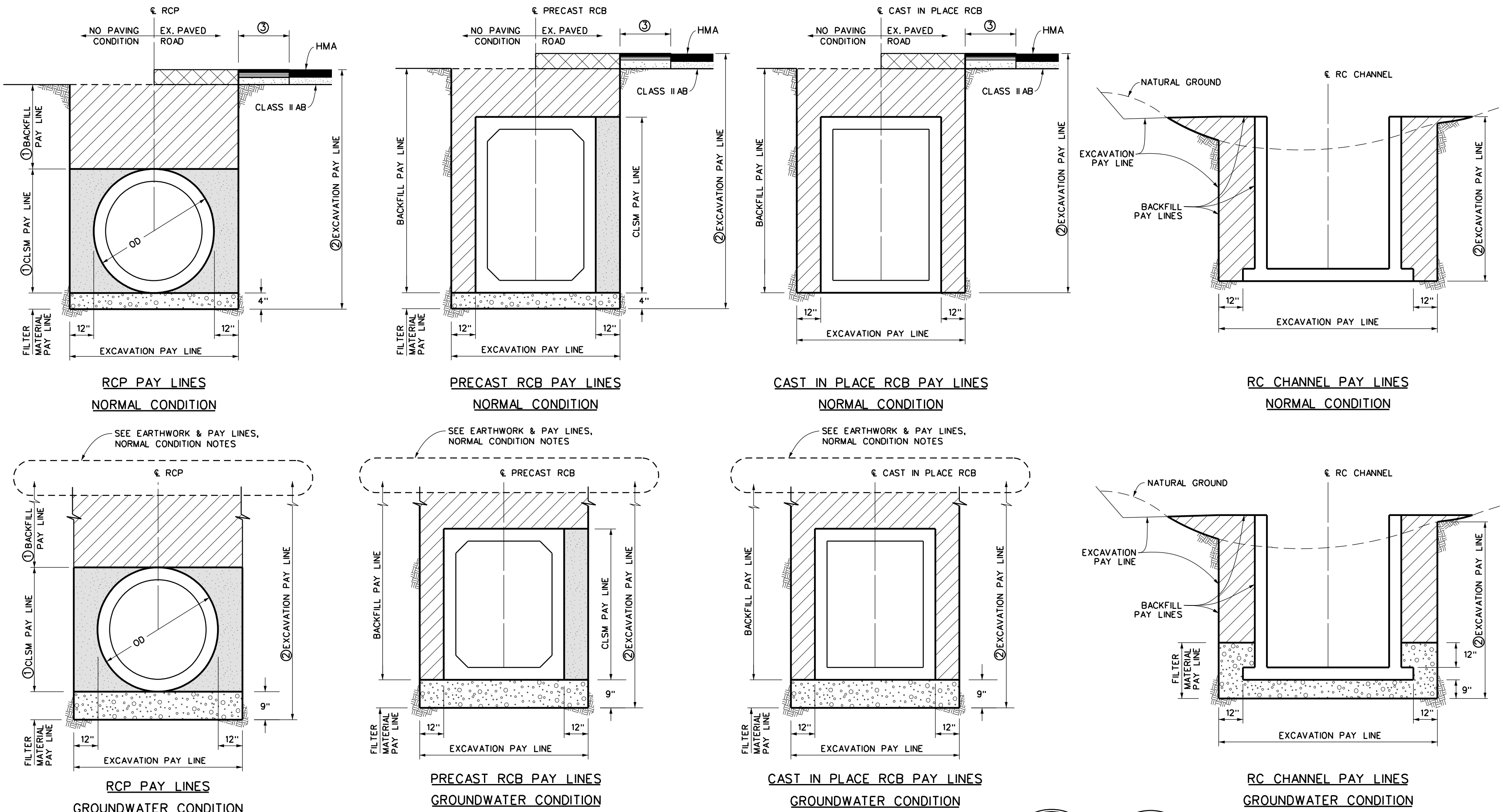
Exp. 12-31-04
CIVIL
STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY:
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 32336

ABBREVIATIONS AND SYMBOLS

STANDARD DRAWING NUMBER M814



LEGEND

- CLSM
- FILTER MATERIAL
- BACKFILL
- STRUCTURAL ROAD SECTION

NOTES

① FOR RCP WITH COVER LESS THAN OR EQUAL TO 2 FEET, THE CLSM AND BACKFILL SHALL BE REPLACED WITH CONCRETE SLURRY (f'c=2,000 PSI MINIMUM) TO A MINIMUM OF 4 INCHES AND A MAXIMUM OF 12 INCHES ABOVE THE TOP OF THE PIPE.

② IF PAVEMENT IS NOT INCLUDED IN EXCAVATION, THE EXCAVATION PAY LINES WILL BE TO THE EXISTING GROUND. SURFACE ELEVATIONS WILL BE ESTABLISHED BY FIELD SURVEYS.

③ PAVING/HMA RESTORATION LIMITS TO BE SHOWN ON PAVING PLANS OR PER CITY OR COUNTY PAVEMENT RESTORATION PLAN

REGISTERED PROFESSIONAL ENGINEER — JASON E. UHLEY — No. 59795 — CIVIL — STATE OF CALIFORNIA

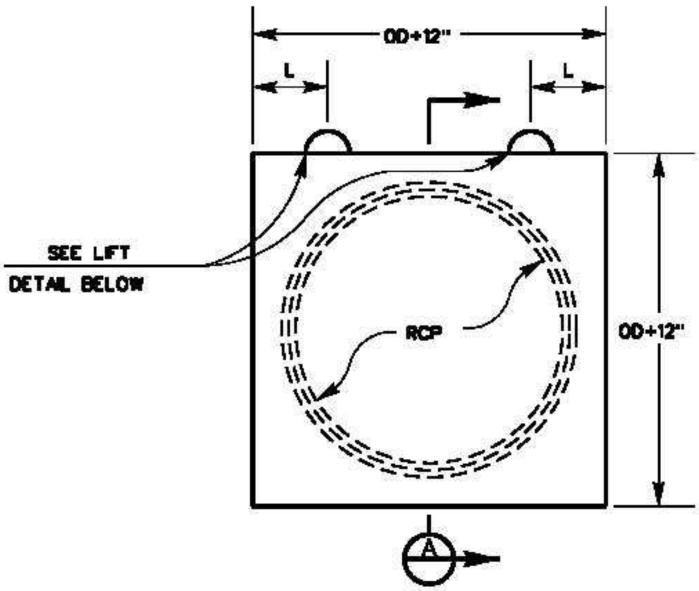
REGISTERED PROFESSIONAL ENGINEER — CLAUDIO MANUEL PADRES — No. 70355 — CIVIL — STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

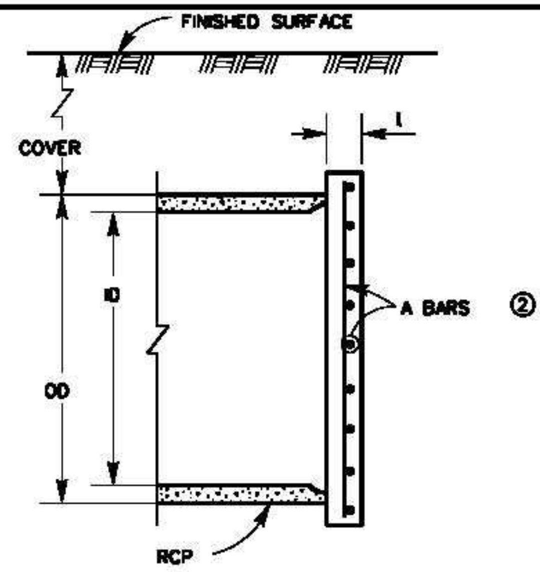
APPROVED BY:	APPROVED BY:
GENERAL MANAGER-CHIEF ENGINEER	CHIEF, DESIGN & CONSTRUCTION
DATE: SEPTEMBER 2017 — R.C.E. NO. 59795	DATE: SEPTEMBER 2017 — R.C.E. NO. 70355

EXCAVATION AND BACKFILL PAY LINES

STANDARD DRAWING NUMBER M815
SHEET 1 OF 1

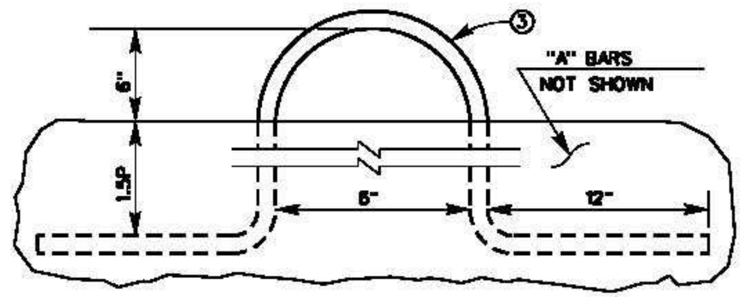


FRONT VIEW

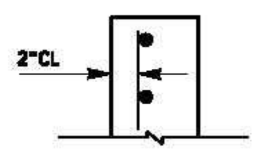


SECTION A

ID (IN)	MAX COVER (FT)	t (IN)	A BARS	L, P
48	5	4	4@ 9	1'-6"
	10	4	4@ 6	
	15	5	4@ 6	
60	5	4	4@ 6	1'-8"
	10	5	4@ 6	
	15	5	5@ 6	
66	5	5	4@ 6	1'-10"
	10	5	5@ 6	
	15	5	5@ 6	
72	5	5	4@ 6	2'-0"
	10	5	5@ 6	
	15	5	6@ 6	
78	5	5	5@ 6	2'-2"
	10	5	6@ 6	
	15	6	6@ 6	
84	5	5	5@ 6	2'-4"
	10	5	6@ 6	
	15	6	6@ 5	
90	5	5	6@ 6	2'-5"
	10	6	6@ 6	
	15	6	6@ 5	
96	5	5	6@ 6	2'-7"
	10	6	6@ 5	
	15	6	7@ 6	



LIFT DETAIL



DETAIL

NOTES

1. CONCRETE SHALL BE CLASS 'A'.

② ALL REINFORCING STEEL SHALL BE CENTERED IN BULKHEAD EXCEPT FOR PIPE DIAMETER GREATER THAN 96", VERTICAL "A" BARS SHALL BE PLACED AT 2" CLEAR FROM THE INSIDE FACE OF THE BULKHEAD. HORIZONTAL "A" BARS SHALL BE PLACED TOWARDS OUTSIDE FACE OF BULKHEAD PER DETAIL.

③ LIFTS SHALL BE WOVEN STEEL CABLE WITH SAME MINIMUM DIAMETER (d) AS "A" BARS. WEAVE CABLE THROUGH HORIZONTAL "A" BARS. COAT EXPOSED PORTION OF CABLE LIFTS WITH AN APPROVED BITUMINOUS PAINT PRIOR TO BACKFILLING TRENCH.

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

APPROVED BY:

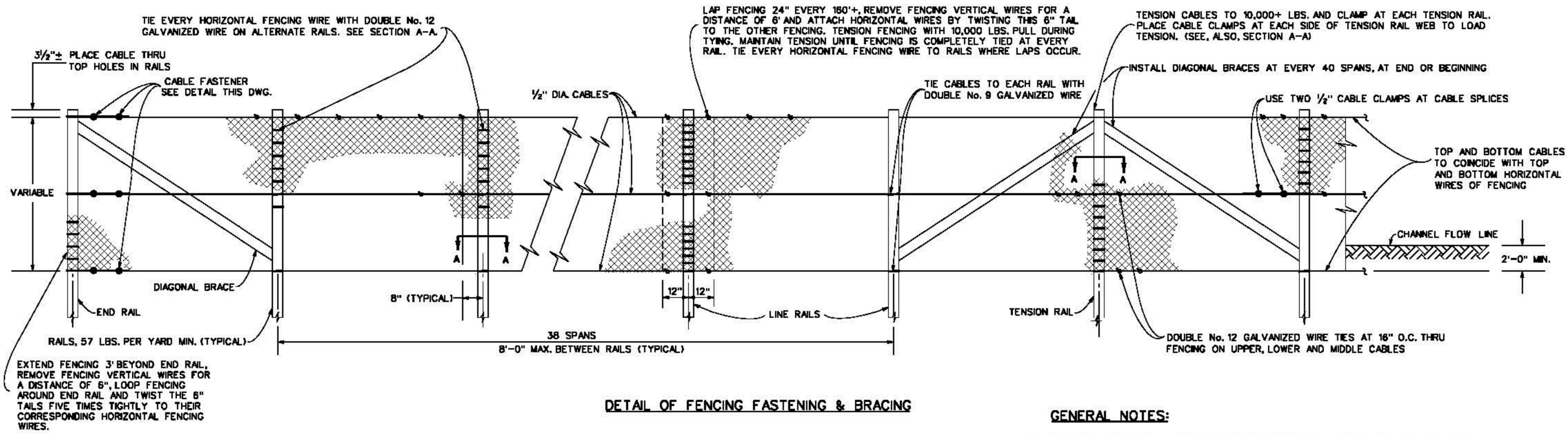
CHIEF ENGINEER

DATE: April 5, 2004

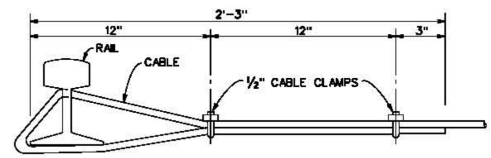
R.C.E. NO. 32336

CONCRETE BULKHEAD

STANDARD DRAWING NUMBER M816



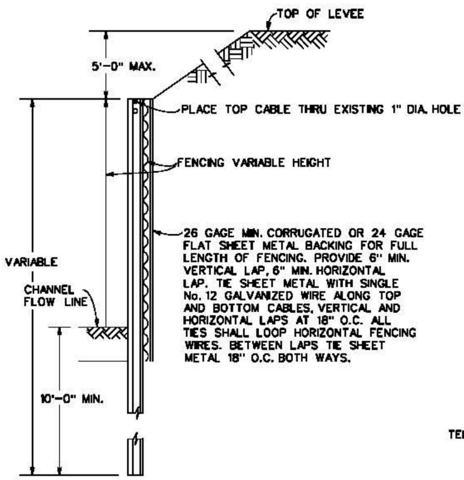
DETAIL OF FENCING FASTENING & BRACING



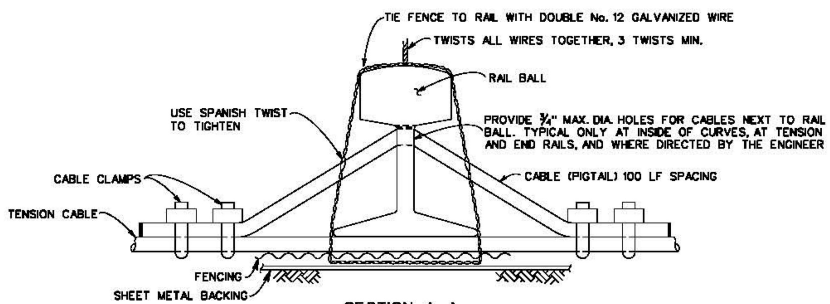
DETAIL OF CABLE FASTENING

GENERAL NOTES:

1. THE TERM "ENGINEER", WHERE IT APPEARS HEREON, SHALL BE TAKEN TO MEAN THE AUTHORIZED REPRESENTATIVE OF THE DISTRICT.
2. USED CABLE AND RAIL MAY BE USED AS APPROVED BY THE ENGINEER. USED CABLE SHALL BE 5/16" MIN. DIA.
3. DIAGONAL BRACES ARE 11 LBS. MINIMUM WEIGHT PER YARD. WELD BRACES TO RAILS WITH A MIN. OF 9" OF 3/8" FILLET WELD, SYMETRICALLY PLACED. CUT ENDS OF BRACES TO FIT SNUGLY AGAINST RAILS PRIOR TO WELDING.
4. RAILS SHALL BE 15 FOOT MINIMUM LENGTH, AND 57 LBS. MINIMUM WEIGHT PER YARD.
5. THE TERM "FENCING", WHERE IT APPEARS HEREON, SHALL BE TAKEN TO MEAN NEW COLORADO FUEL & IRON, TYPE J-3, V-MESH FENCE FABRIC, OF SPECIFIED HEIGHT, OR AN APPROVED EQUIVALENT.
6. ALL GALVANIZED WIRE SHALL BE ANNEALED AND OF SUFFICIENT STRENGTH TO PROVIDE A SATISFACTORY CONNECTION.

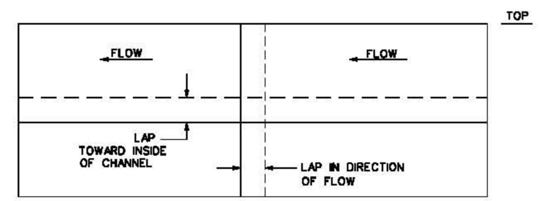


TYPICAL SECTIONS



SECTION A-A

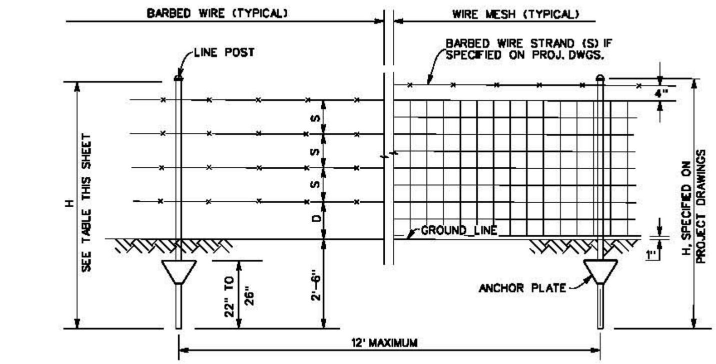
(TYPICAL AT ALL RAILS)



SHEET METAL LAP DETAIL

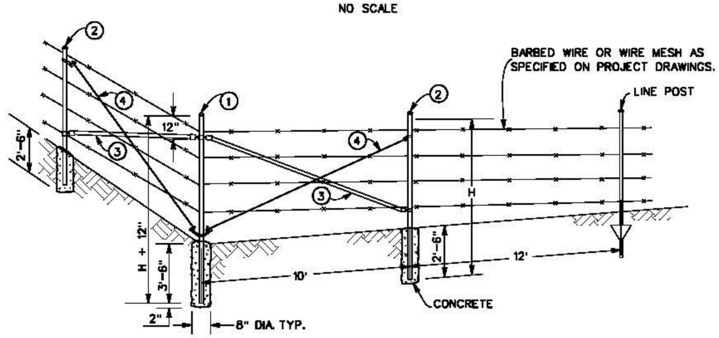
REGISTERED PROFESSIONAL ENGINEER WARREN D. WILLIAMS No. 32336 Exp. 12-31-04 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT APPROVED BY: [illegible] CHIEF ENGINEER DATE: April 5, 2004 R.C.E. NO. 32336	RAIL & WIRE REVETMENT (WITH SHEET METAL BACKING) STANDARD DRAWING NUMBER M817

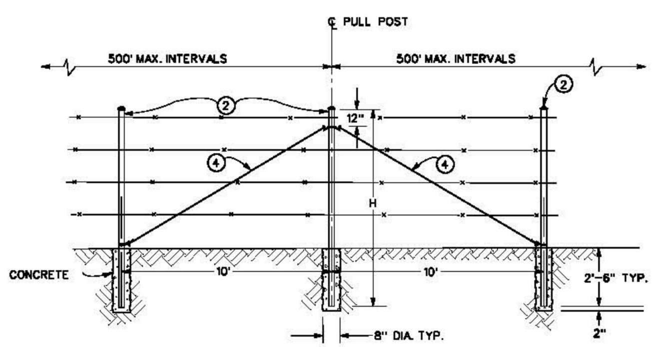


LINE POSTS

NO SCALE



END OR CORNER POST ASSEMBLY



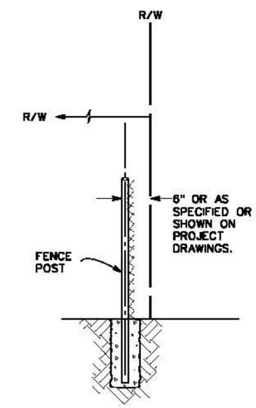
PULL POST ASSEMBLY

NO SCALE

BARBED WIRE FENCE DIMENSIONS

NUMBER OF WIRE STRANDS	3	4	5
H	6'-6"	7'-0"	7'-0"
S	12"	12"	10"
D	15"	15"	12"

1. ROUND METAL POST, 2.875" O.D.
2. ROUND METAL POST, 2.375" O.D.
3. ROUND METAL BRACE, 1.660" O.D.
4. ⅜" TENSION ROD WITH TENSION ADJUSTMENT.



FENCE LOCATION

NO SCALE

SUPERCEDES DRAWING OF SAME No. DATED MAR. 31, 1982

NOTES:

1. SEE PROJECT DRAWINGS FOR NUMBER OF STRANDS OF BARBED WIRE OR WIDTH OF WIRE MESH.
2. BARBED WIRE SHALL BE 4-POINT ROUND BARBS, SPACED APPROXIMATELY 5-INCHES APART, AND WOUND ON TWO STRANDS OF WIRE. WIRE SIZE SHALL BE No. 12½-GAGE WIRE STRANDS AND No. 14-GAGE BARBS. BARBED WIRE SHALL CONFORM TO ASTM A121, CLASS 1.
3. WIRE MESH SHALL BE FABRIC CONFORMING TO ASTM A121, CLASS 1. IT SHALL HAVE VERTICAL STAYS SPACED APART AS NOTED ON THE DRAWINGS. THE TOP AND BOTTOM WIRES SHALL BE 10-GAGE AND THE INTERMEDIATE WIRES AND VERTICAL STAYS SHALL BE 12½-GAGE.
4. LINE POSTS SHALL BE 1⅜"x1⅜"x⅛" TEE SHAPED STEEL POSTS, AND SHALL BE PROVIDED WITH A TAPERED ANCHOR PLATE SECURELY ATTACHED THERETO AT APPROXIMATELY 22 TO 26 INCHES FROM THE BOTTOM OF THE POST, UNLESS OTHERWISE SPECIFIED. THE ANCHOR PLATE SHALL HAVE A MINIMUM AREA OF 20 SQUARE INCHES AND SHALL BE CUT FROM NOT LESS THAN 8-GAGE METAL. THE LINE POST AND ANCHOR PLATE SHALL BE PAINTED GREEN.
5. FENCING MATERIAL FOR THE END, CORNER, AND PULL POST ASSEMBLIES SHALL CONFORM TO SECTION 206-6 OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.
6. LINE POSTS SHALL BE DRIVEN INTO THE GROUND. END, CORNER AND PULL POST ASSEMBLIES SHALL BE SET IN CONCRETE AND CURED FOR 7 DAYS BEFORE ERECTING BARBED WIRE STRANDS.
7. BARBED WIRE SHALL BE ERECTED IN THE FOLLOWING ORDER: TOP STRAND FIRST, BOTTOM STRAND SECOND; REMAINING STRANDS THIRD.
8. WIRE USED TO FASTEN BARBED WIRE AND WIRE MESH TO POSTS SHALL BE GALVANIZED AND 11-GAGE OR HEAVIER. CLIPS AND HOG RINGS SHALL BE 9-GAGE OR HEAVIER.
9. END OF CORNER POST ASSEMBLY SHALL BE INSTALLED WHERE A CHANGE IN FENCE DIRECTION IS GREATER THAN 15°.
10. LINE POSTS ON CURVES SHALL BE VERTICAL AFTER BARBED WIRE STRANDS ARE ERECTED & DRAWN TAUT. SPACING OF LINE POST SHALL BE ADJUSTED IN THE FIELD TO SUIT SOIL CONDITIIONS AND CURVATURE OF THE FENCE. SPACING SHALL BE UNIFORM ON CURVES. MINIMUM SPACING SHALL BE 8 FEET AND MAXIMUM SPACING SHALL BE 12 FEET.
11. SPLICES FOR BARBED WIRE SHALL BE DOUBLE WESTERN UNION.
12. CONCRETE SHALL BE 4 SACK, 2000 PSI AT 28 DAYS.
13. ALL MATERIALS SHALL BE APPROVED BY THE ENGINEER PRIOR TO ERECTION.
14. ERECTION METHODS AND ALL SPLICES ARE SUBJECT TO APPROVAL BY THE ENGINEER.

REGISTERED PROFESSIONAL ENGINEER
WARREN D. WILLIAMS
No. 32336
Exp. 12-31-04
CIVIL
STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY: [illegible]
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 32336

WIRE FENCE DETAILS

STANDARD DRAWING NUMBER M818

REINFORCED CONCRETE RECTANGULAR CHANNEL

WALL RADIUS FEET	MAX. LENGTH WALL CHORD FEET
LESS THAN 50	SMOOTH CURVE
50 TO 90	2
91 TO 400	4
401 TO 600	8
601 TO 1000	16
1001 TO 3000	24
GREATER THAN 3000	50

REINFORCED CONCRETE BOX

WALL RADIUS FEET	MAX. LENGTH WALL CHORD FEET
LESS THAN 45	SMOOTH CURVE
45 TO 90	8
91 TO 200	16
201 TO 600	24
GREATER THAN 600	50

NOTE:

1. THE CONTRACTOR MAY FORM CURVED STRUCTURES IN ACCORDANCE WITH THE ABOVE CRITERIA UNLESS OTHERWISE SPECIFIED ON THE PROJECT DRAWINGS. MAXIMUM LENGTH OF WALL CHORD SHALL BE BASED ON THE INSIDE WALL RADIUS. CHORD LENGTH SHALL BE UNIFORM THROUGHOUT EACH CURVE.
2. PROPOSED FORMING ON CURVES SHALL BE APPROVED BY THE DISTRICT PRIOR TO CONSTRUCTION.

REGISTERED PROFESSIONAL ENGINEER
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APPROVED BY:

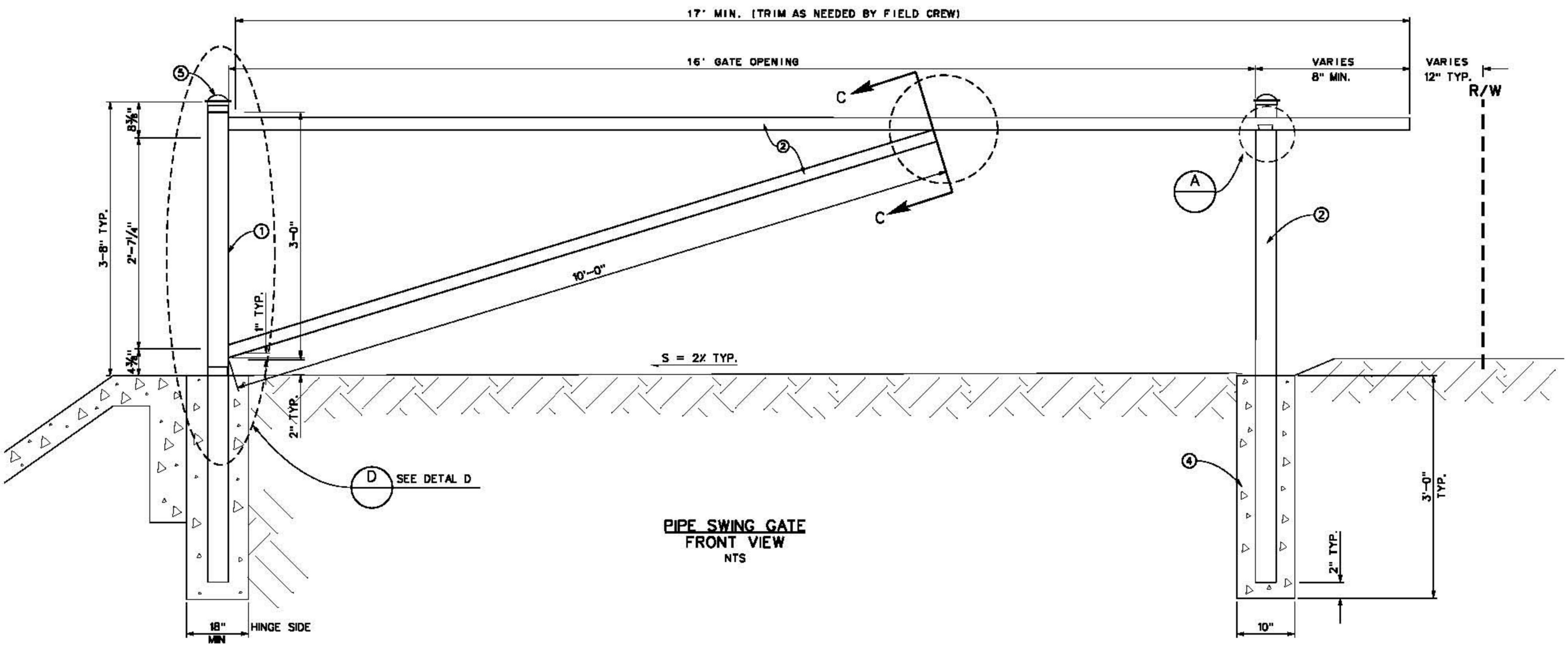
CHIEF ENGINEER

DATE: April 5, 2004

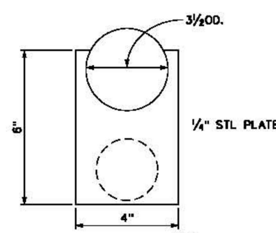
R.C.E. NO. 32336

MAXIMUM CHORD LENGTHS FOR CURVED SECTIONS

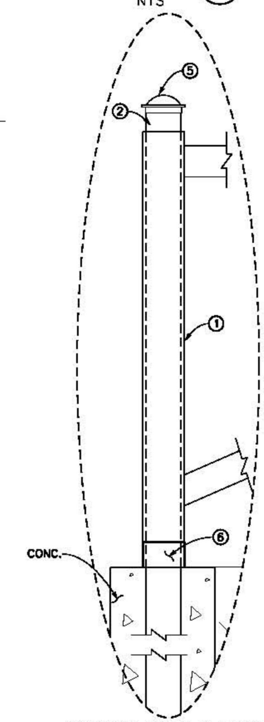
STANDARD DRAWING NUMBER M819



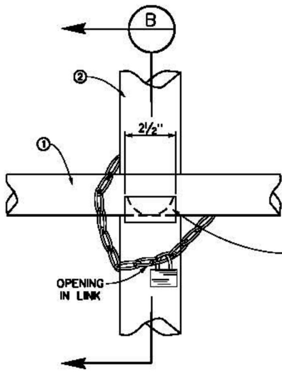
PIPE SWING GATE
FRONT VIEW
NTS



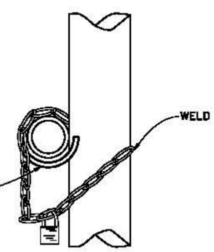
SECTION C
NTS



REVISED GATE & HINGE
DETAIL D
NTS



DETAIL A
NTS



SECTION B
NTS

NOTES

1. GALVANIZED IRON PIPE 3½" O.D. WALL THICKNESS 0.318".
2. GALVANIZED IRON PIPE 2.875" O.D. WALL THICKNESS 0.276".
3. GATE REST. ONE-HALF OF GALVANIZED IRON PIPE 3½" O.D. GRIND TO FIT VERTICAL POST. FIELD WELD.
4. CLASS "B" CONCRETE.
5. POST ANCHORED IN CONCRETE SHALL HAVE CAPS.
6. 2" FREE STANDING PIVOT SLEEVE 3½" WALL THICKNESS 0.318".
7. ⅜" GALVANIZED CHAIN. FIELD WELD ONE LINK TO VERTICAL POST. PROVIDE OPENING IN LINKS FOR PADLOCK AS SHOWN. CHAIN SHALL BE OF SUFFICIENT LENGTH TO ENCIRCLE HORIZONTAL PIPE.
8. MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE APPLICABLE PORTION OF SECTION 206-6, 210-3 AND 304-3 OF "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION," LATEST EDITION.

REGISTERED PROFESSIONAL ENGINEER
WARREN D. WILLIAMS
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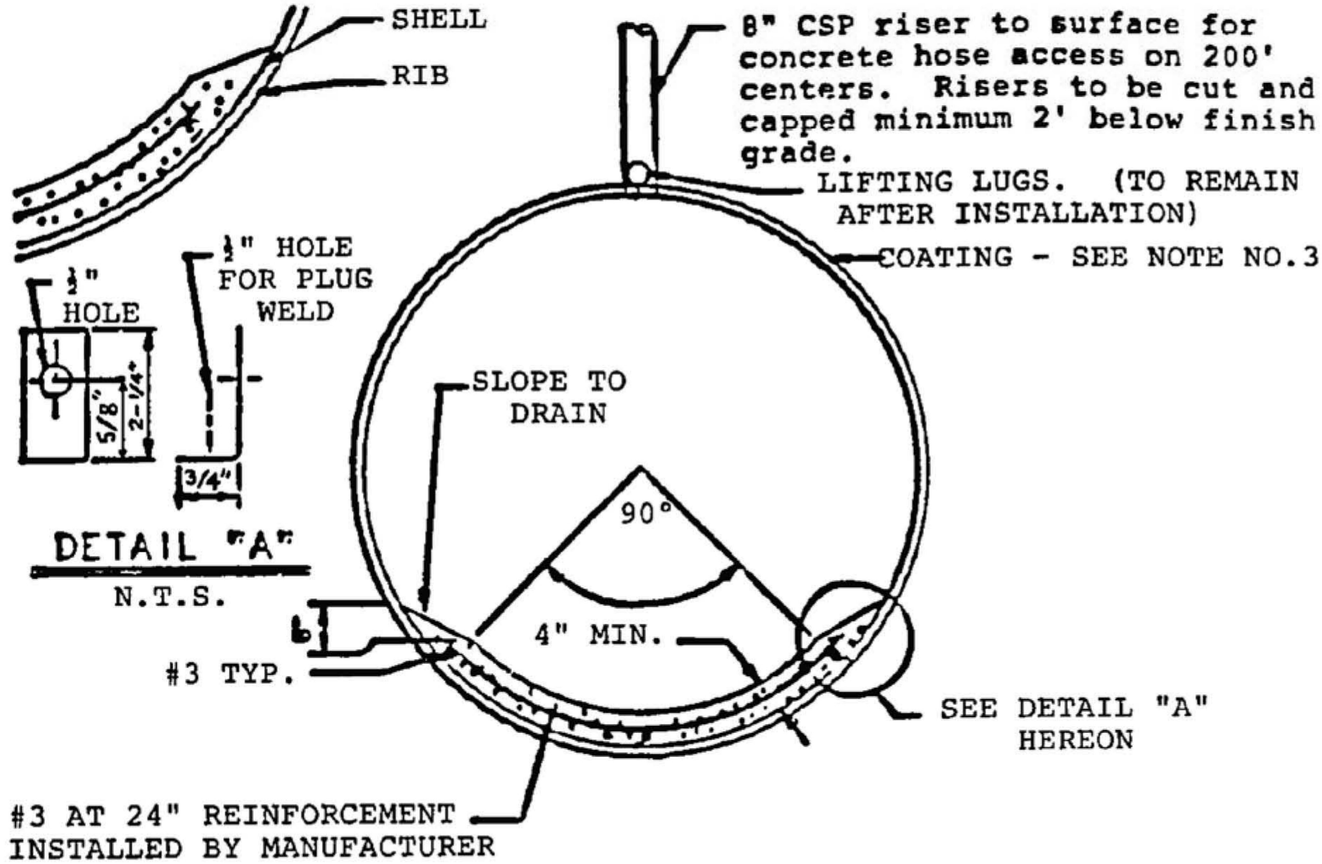
Exp. 12-31-04
CIVIL
STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY:
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 32336

PIPE SWING GATE

STANDARD DRAWING NUMBER M820



PIPE AND INVERT PAVING DETAIL

NOTES

NO SCALE

1. CONCRETE shall be 3000 psi at 28 days.
2. A MECHANICAL FINISHING process shall be used to produce profile and finish in one pass.
3. PROTECTIVE COATINGS
   (A) EXTERIOR COATINGS. 25 mils of cold-applied mastic material that complies to AASHTO designation M-243.
   (B) Installation of lifting lugs and steel reinforcement shall be accomplished prior to application of coating material.
4. CONCRETE INVERT shall be installed after completion of backfill operation in conformance with subsection 207-11.5.3. of the standard specifications.

REGISTERED PROFESSIONAL ENGINEER WARREN D. WILLIAMS No. 32336 Exp. 12-31-04 CIVIL STATE OF CALIFORNIA

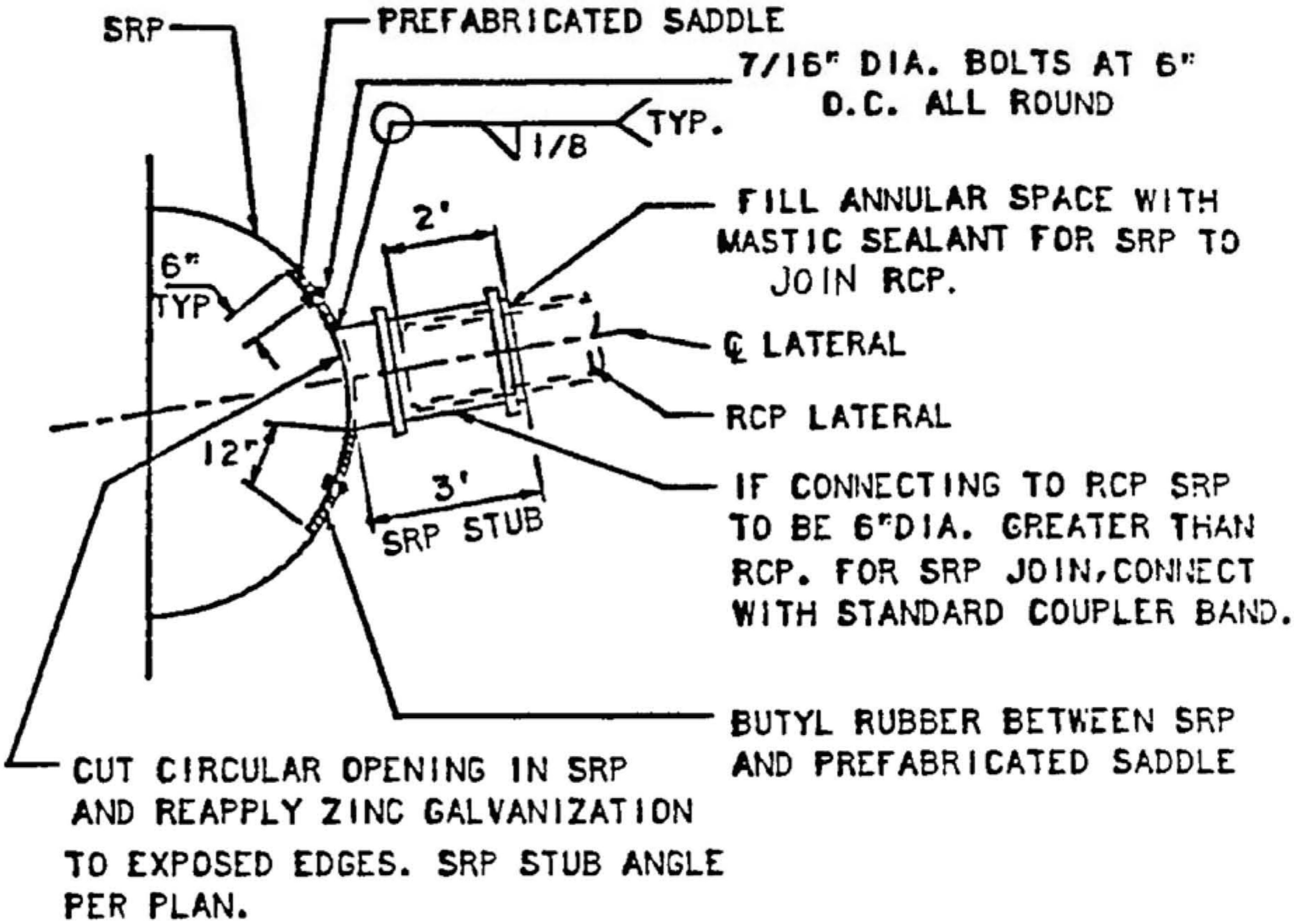
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY: Warren D. Williams
CHIEF ENGINEER

DATE: April 5, 2004 R.C.E. NO. 32336

SPIRAL RIB PIPE INVERT PAVING

STANDARD DRAWING NUMBER M823



REGISTERED PROFESSIONAL ENGINEER
WARREN D. WILLIAMS
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RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

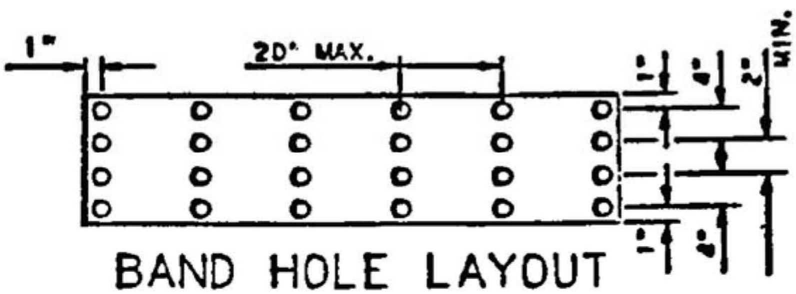
APPROVED BY:

CHIEF ENGINEER

DATE: April 5, 2004 R.C.E. NO. 32336

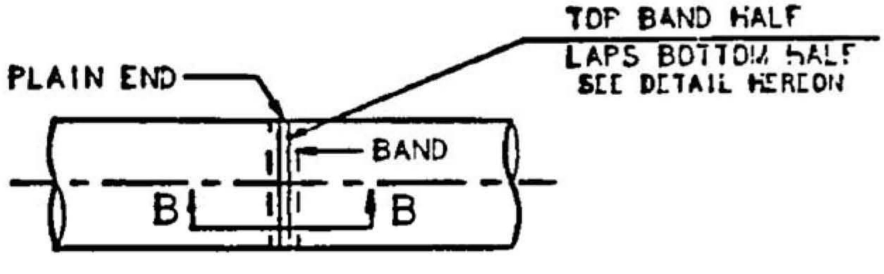
SPIRAL RIB PIPE
SADDLE BRANCH
JUNCTION

STANDARD DRAWING NUMBER M824



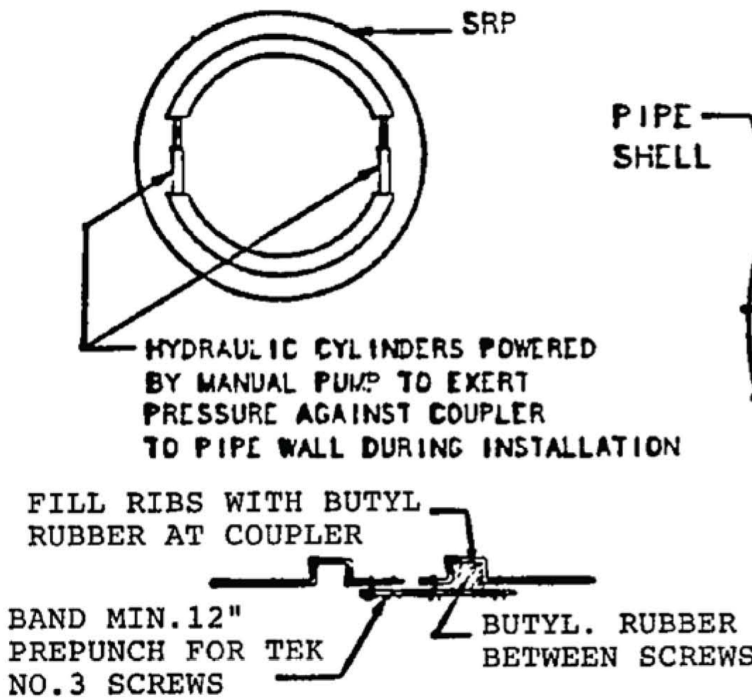
BAND HOLE LAYOUT

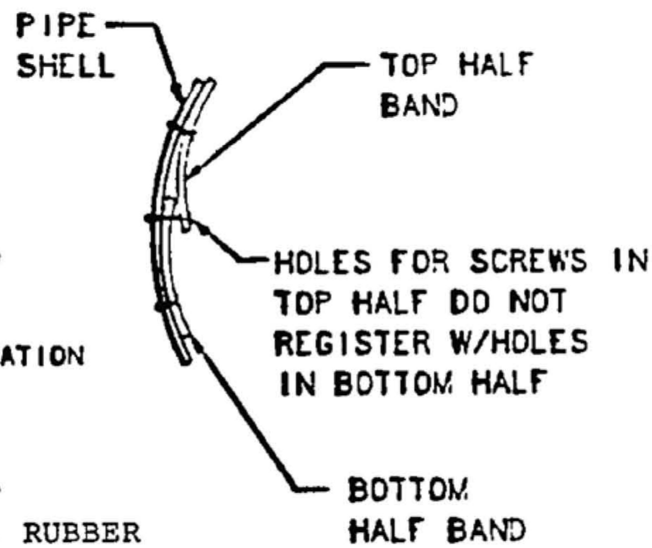
N.T.S.



ELEVATION

N.T.S.





SECTION "B-B"

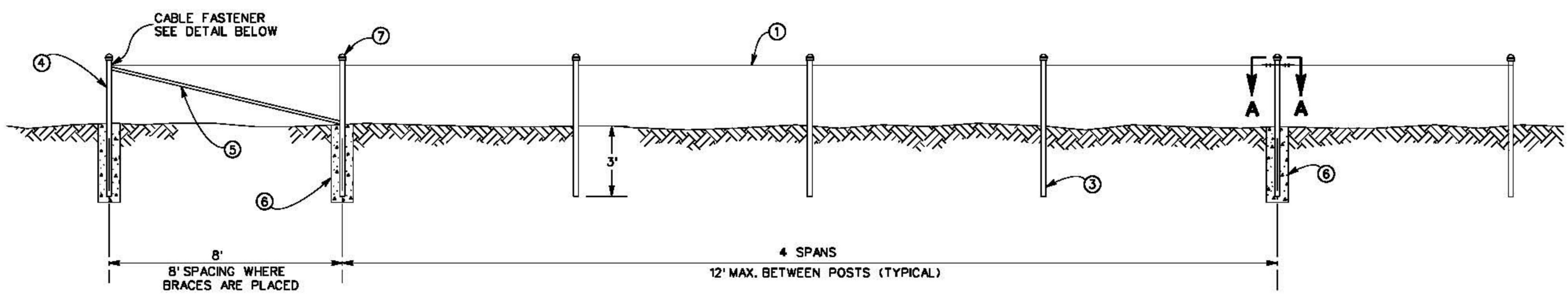
N.T.S.

BAND LAP DETAIL

N.T.S.

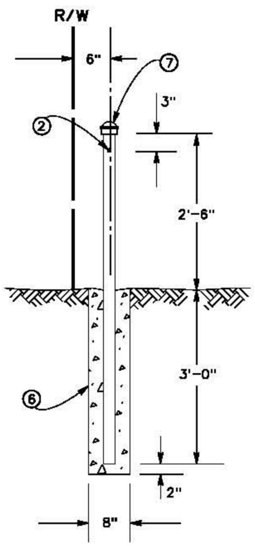
BANDING DETAIL : 48" DIA. AND LARGER PIPES

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	SPIRAL RIB PIPE BANDING DETAIL
APPROVED BY: [signature] CHIEF ENGINEER	
DATE: April 5, 2004 R.C.E. NO. 32336	STANDARD DRAWING NUMBER M825



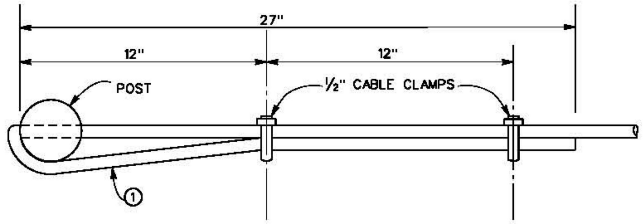
DETAIL OF FENCING FASTENING & BRACING

N.T.S.



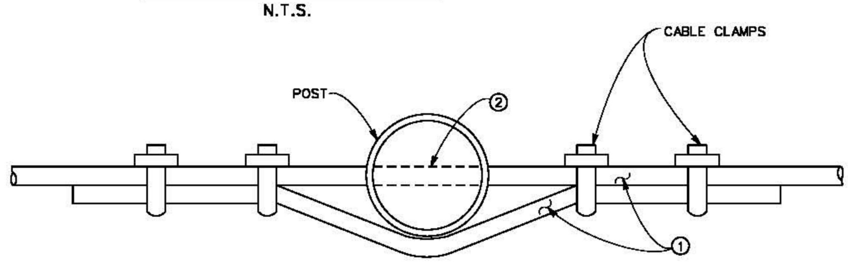
TYPICAL SECTION

N.T.S.



CABLE FASTENER DETAIL

N.T.S.



SECTION A-A

(PIGTAIL)
(TYPICAL EVERY FOURTH POST)
N.T.S.

GENERAL NOTES

1. ½" DIAMETER CABLE.
2. ¾" DIAMETER HOLES FOR CABLE THRU CENTER OF POSTS. PROVIDE ADEQUATE TENSION IN THE CABLE TO MINIMIZE SAG BETWEEN SPANS.
3. LINE POSTS 2⅜" O.D.
4. GATE, END AND CORNER POSTS 2⅜" O.D.
5. DIAGONAL BRACE AT EVERY ANGLE POINT AND IN END SPANS 2⅜" O.D. WELDED IN PLACE.
6. 2000 PSI (4 SACK CONC.) AT EVERY 4TH POST, EVERY ANGLE POINT, BRACE POINT AND AT ENDS.
7. CAPS ON ALL POSTS.
8. THERE SHOULD BE ENOUGH TENSION IN THE CABLE TO MINIMIZE SAG BETWEEN SPANS.
9. THE TERM "ENGINEER", WHERE IT APPEARS HEREON, SHALL BE TAKEN TO MEAN THE AUTHORIZED REPRESENTATIVE OF THE DISTRICT.
10. RAIL MAY BE USED IN PLACE OF POSTS AS APPROVED BY THE ENGINEER.
11. USED CABLE, RAIL OR POSTS MAY BE USED AS APPROVED BY THE ENGINEER. USED CABLE SHALL BE ½" MIN. DIA.

REGISTERED PROFESSIONAL ENGINEER
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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

APPROVED BY:

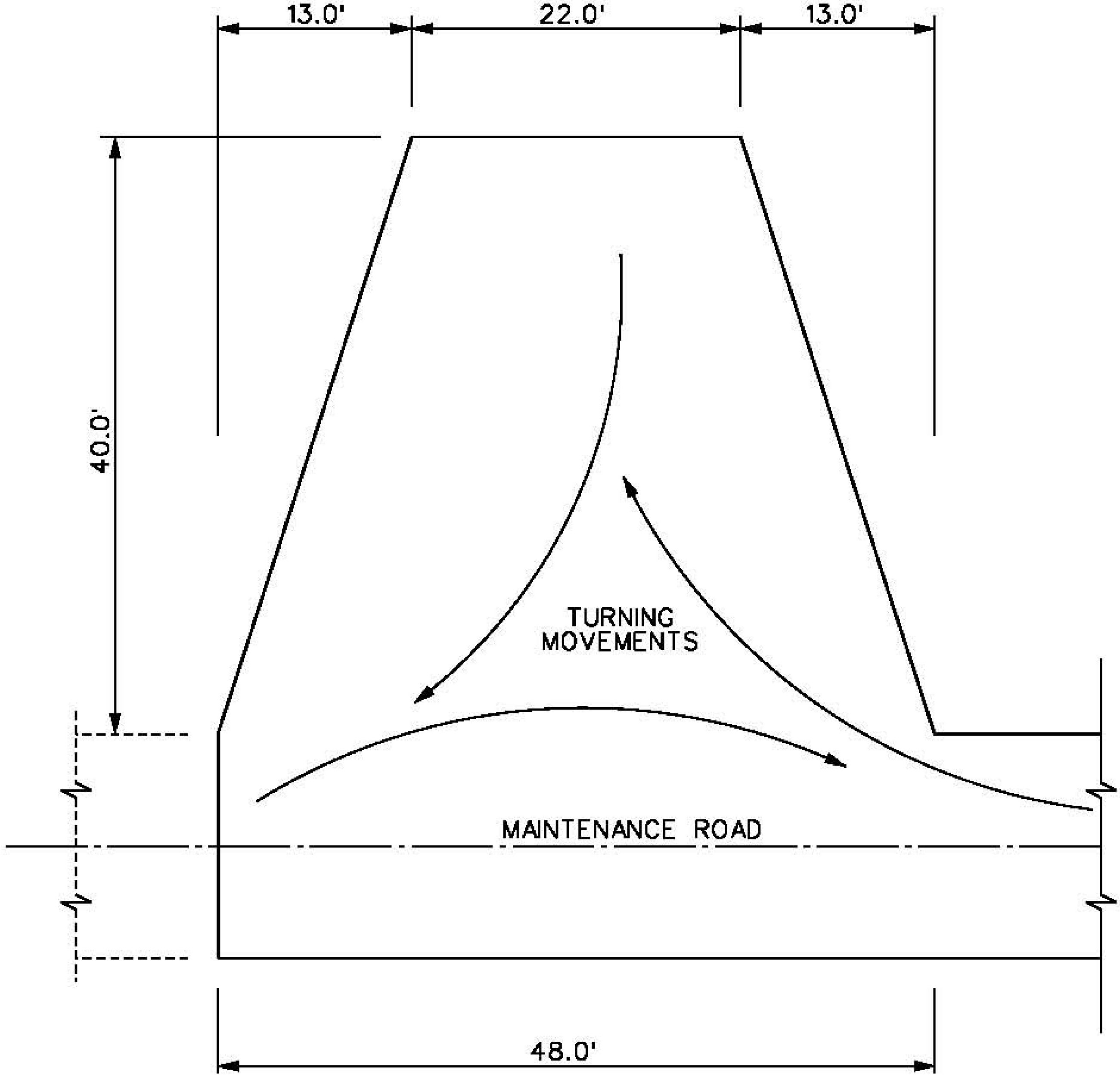
CHIEF ENGINEER

DATE: April 5, 2004

R.C.E. NO. 32336

CABLE FENCE DETAIL

STANDARD DRAWING NUMBER M826



RIVERSIDE COUNTY FLOOD CONTROL
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VEHICULAR TURN AROUND AREA

STANDARD DRAWING NUMBER M827