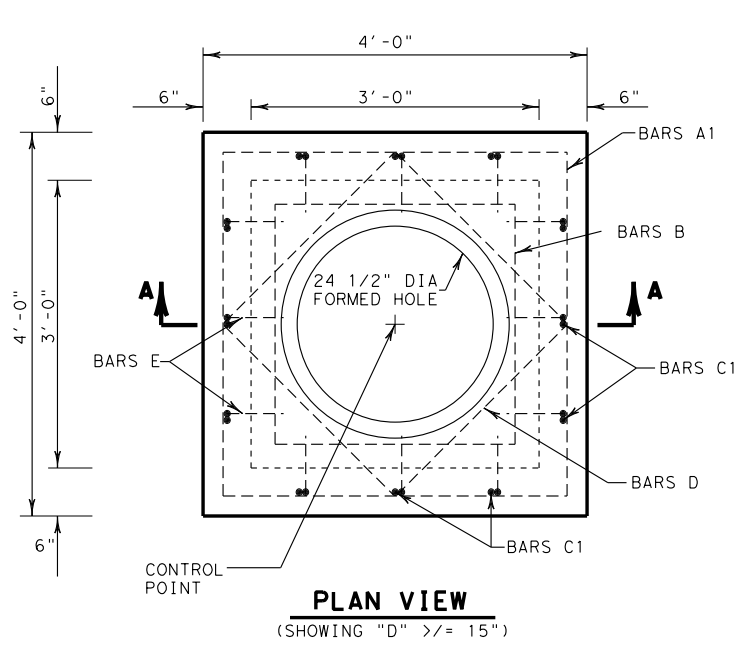
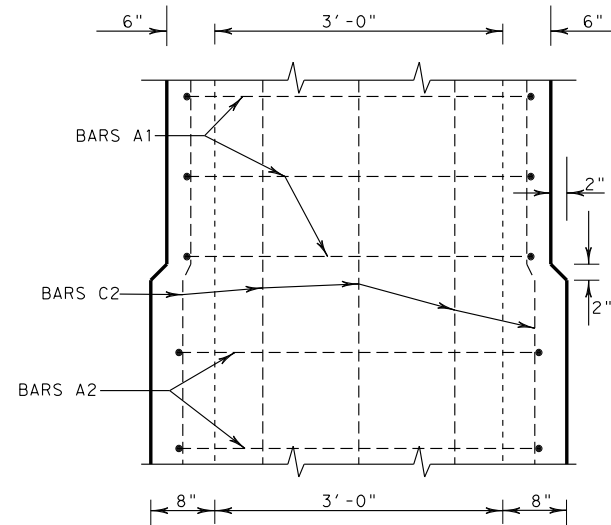


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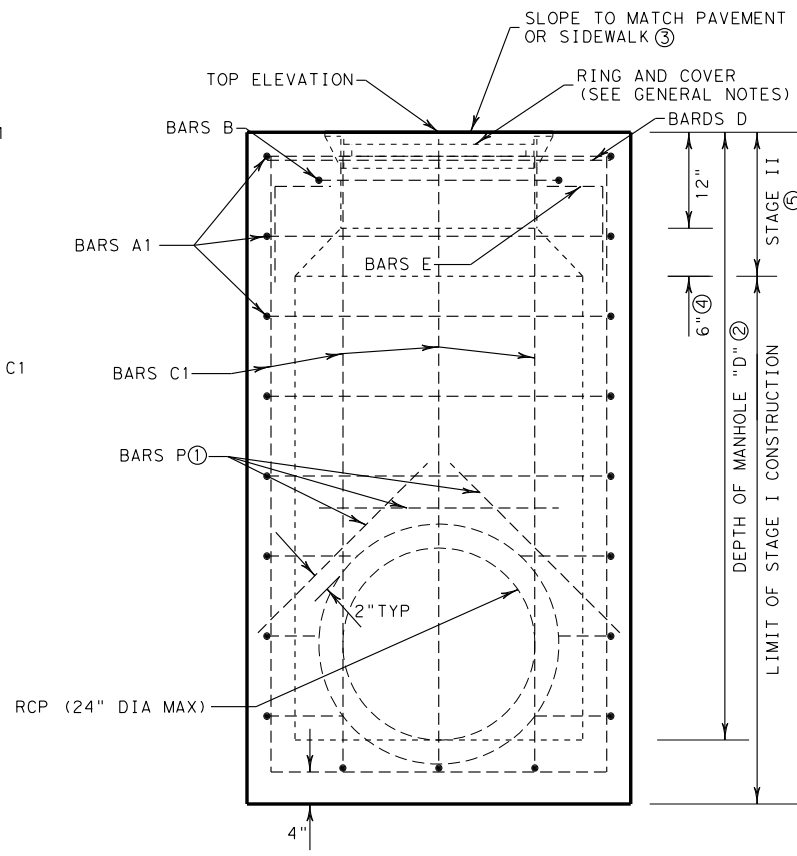
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PLAN VIEW
(SHOWING "D" >= 15")



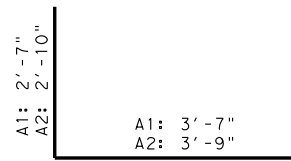
WALL THICKNESS TRANSITION DETAIL
FOR DEPTHS 15" - 30"



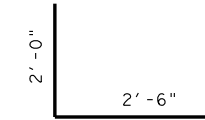
SECTION A-A
(SHOWING "D" >= 15")

- ① BARS P LENGTH = PIPE O.D. + 9"
PLACE 3 BARS P AS SHOWN, AT EACH PIPE OPENING, WITH 2" CLEAR COVER OVER PIPES.
POSITION AS NEEDED TO PROVIDE 2" CLEAR COVER AT WALLS.
- ② SEE WALL THICKNESS TRANSITION DETAIL FOR DEPTHS 15'-30'.
- ③ LEVEL IF NOT LOCATED IN PAVEMENT OR SIDEWALK.
- ④ TRANSITION FROM 24 1/2" DIA FORMED HOLE TO 3' SQUARE MANHOLE.
- ⑤ STAGE II DEPTH = 18" IF OUTSIDE PAVEMENT;
DEPTH TO TOP OF SUBGRADE IF UNDER PAVEMENT.

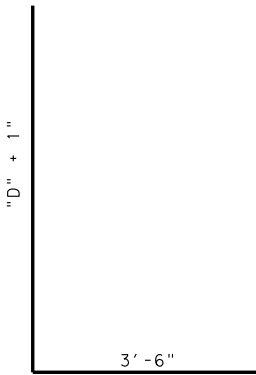
TABLE OF QUANTITIES - FREE-STANDING MANHOLE														
Bar	Size	Spacing (in)	D=4'-0"			D=10'-0"			D=20'-0"			D=30'-0"		
			No	Length	Wt	No	Length	Wt	No	Length	Wt	No	Length	Wt
A1	#4	10"	8	8.750	47	22	8.750	129	36	8.750	210	36	8.750	210
A2	#5	12"	0	0.000	0	0	0.000	0	10	9.416	98	30	9.416	295
B	#4	-	2	6.500	9	2	6.500	9	2	6.500	9	2	6.500	9
C1	#4	12"	6	11.667	47	6	23.667	95	0	0.000	0	0	0.000	0
C2	#5	12"	0	0.000	0	0	0.000	0	12	22.916	287	12	32.916	412
D	#4	-	4	2.500	7	4	2.500	7	4	2.500	7	4	2.500	7
E	#4	-	12	1.583	13	12	1.583	13	12	1.583	13	12	1.583	13
Total Steel - Lbs			122			251			624			945		
Class "C" Concrete - CY			1.70			3.26			6.43			10.05		
						D=3' TO D=15'			D=15' TO D=30'					
						Lbs Steel = 102 + 21.38 Lb/Lf			Lbs Steel = 362 + 32.16 Lb/Lf					
						CY Conc. = 1.44 + 0.259 CY/Lf			CY Conc. = 4.55 + 0.362 CY/Lf					



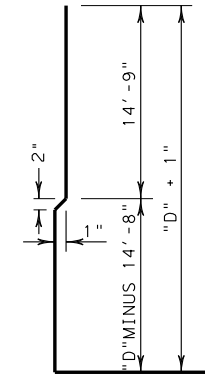
BARS A1 & A2



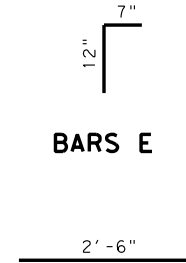
BARS B



BARS C1
("D" < 15')



BARS C2
("D" = 15'-30')



BARS D

BARS E

SEE SHEET 2 OF 2 FOR GENERAL NOTES

SHEET 1 OF 2 SHEETS

Texas Department of Transportation

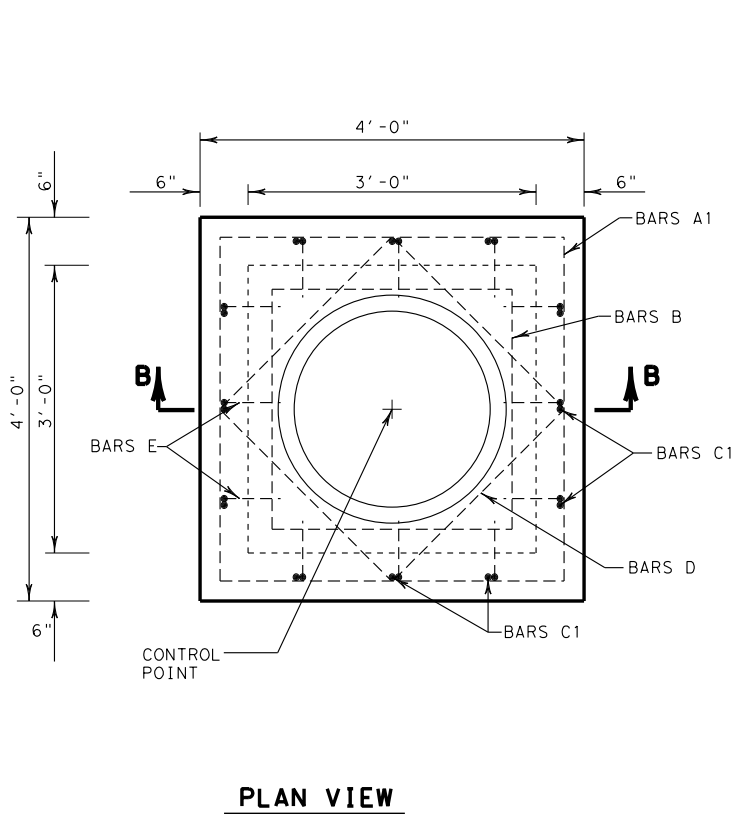
Fort Worth District Standard

STORM DRAIN MANHOLE DETAILS TYPE A MH-SD (FTW)

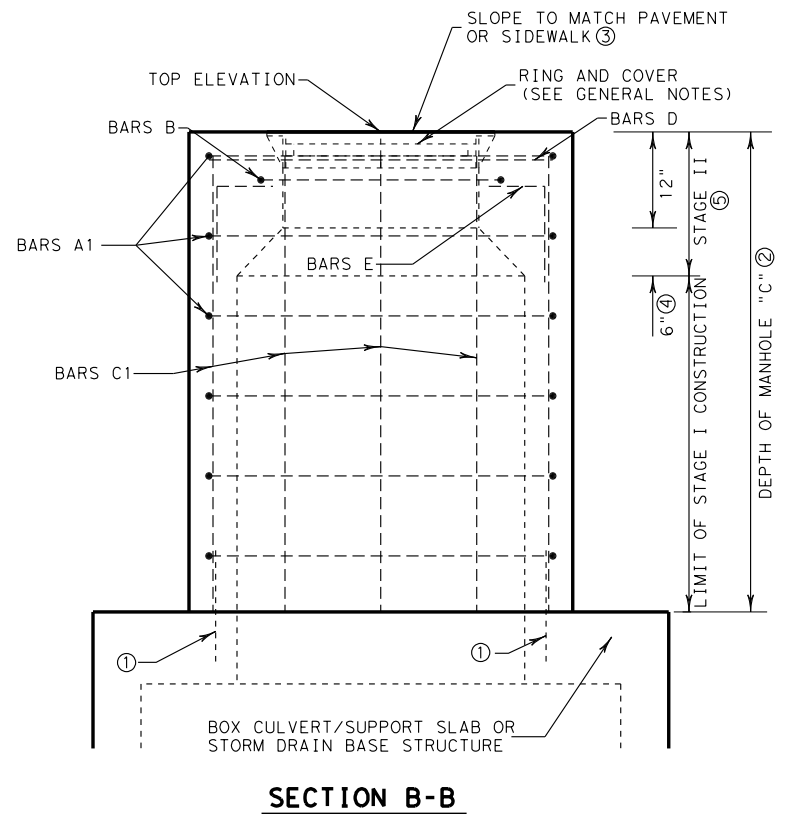
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DATE		REVISIONS		
05/2019		NEW STANDARD	6	
11/2020		REVISE JOINT NOMENCLATURE	STATE DIST. NO. TEXAS	COUNTY FTW
07/2022		REVISE NOTES AND ADD DETAILS FOR USE WITH PRECAST BASE AND RISER	CONT.	SECT. JOB HIGHWAY NO.

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PLAN VIEW



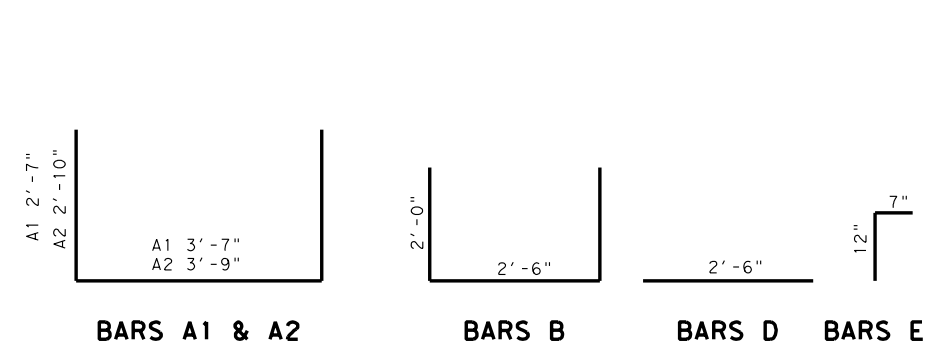
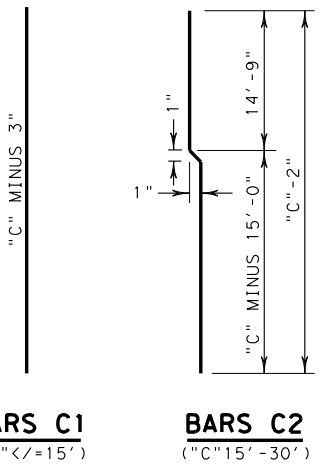
SECTION B-B
(SHOWING "D" \geq 15')

TABLE OF QUANTITIES - MANHOLE (RISER ONLY)

Bar	Size	Spacing (in)	C-1'-6"			C-10'-0"			C-20'-0"			C-30'-0"					
			No	Length	Wt	No	Length	Wt	No	Length	Wt	No	Length	Wt			
A1	#4	10"	4	8.750	23	24	8.750	140	36	8.750	210	36	8.750	210			
A2	#5	12"	0	0.000	0	0	0.000	0	10	9.416	98	30	9.416	295			
B	#4	-	2	6.500	9	2	6.500	9	2	6.500	9	2	6.500	9			
C1	#4	12"	0	0.000	0	6	9.833	39	0	0.000	0	0	0.000	0			
C2	#5	12"	0	0.000	0	0	0.000	0	12	19.833	248	12	29.833	373			
D	#4	-	4	2.500	7	4	2.500	7	4	2.500	7	4	2.500	7			
E	#4	-	12	1.583	13	12	1.583	13	12	1.583	13	12	1.583	13			
Total Steel - Lbs						51			208			585			906		
Class "C" Concrete - CY						0.66			2.86			5.97			9.59		

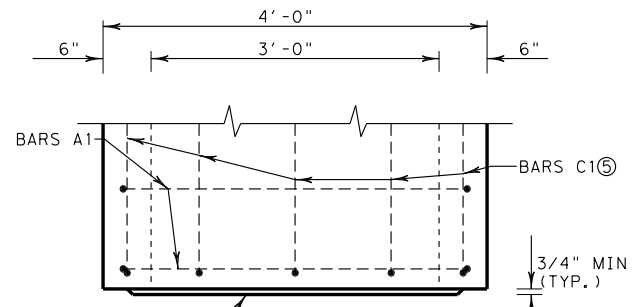
C=1'-6" TO C=15'
 Lbs Steel = 51 + 14.03 Lb/Lf
 CY Conc. = 0.66 + 0.259 CY/Lf

C=15' TO C=30'
 Lbs Steel = 238 + 32.16 Lb/Lf
 CY Conc. = 4.16 + 0.362 CY/Lf



TYPE A STORM DRAIN MANHOLE (RISER ONLY)

LOCATED ON BASE STRUCTURE OR BOX CULVERT
 DO NOT USE WITH BOX CULVERT SPAN LESS THAN 4'
 SEE MI-CBC FOR CULVERT SPAN \geq 4'
 SEE MI-B&R FOR CULVERT SPAN $<$ 4'
 N. T. S.



CONNECTION TO PRECAST RISER OR PRECAST BASE STRUCTURE
(STAGE I DEPTH $>$ 2')

FORM BOTTOM OF CIP RISER TO CONFORM TO PRECAST RISER OR BASE STRUCTURE. SEE GENERAL NOTE 2.

- ① REFER TO STANDARD MI-CBC (FTW) FOR DETAILS OF CONNECTION TO BOX CULVERT SUPPORT SLAB. SEE MI-B&R (FTW) FOR DETAILS OF CONNECTION TO BASE STRUCTURE.
- ② SEE WALL THICKNESS TRANSITION DETAIL FOR DEPTHS 15'-30'.
- ③ LEVEL IF NOT LOCATED IN PAVEMENT OR SIDEWALK.
- ④ TRANSITION FROM 24 1/2" DIA FORMED HOLE TO 3" SQUARE MANHOLE.
- ⑤ IF USED IN CONJUNCTION WITH PRECAST RISER, MORE THAN 2' BELOW TOP OF STAGE I, ADJUST LENGTH OF BARS C1 AS SHOWN.
- ⑥ STAGE II DEPTH = 18" IF OUTSIDE PAVEMENT; DEPTH TO TOP OF SUBGRADE IF UNDER PAVEMENT.

GENERAL NOTES:

- 1. DESIGNED FOR AASHTO LRFD HL 93 LOADING.
- 2. STAGE I MAY BE EITHER CAST-IN-PLACE OR PRECAST. IF PRECAST, A MINIMUM 2' DEPTH AT TOP OF STAGE I TO BE FABRICATED USING REBAR AS SHOWN, WITH BARS C1 AND/OR C2 TO BE INCLUDED WITH STAGE I. SPLICING OF BARS WILL NOT BE PERMITTED.
- 3. STAGE II SHALL BE CAST-IN-PLACE. CONSTRUCT TOP TO CONFORM TO SLOPE OF SURFACE. STAGE II MAY BE CAST MONOLITHICALLY WITH CONCRETE PAVEMENT. IF NOT CAST MONOLITHICALLY, PLACE A SEALED 1/2" ISOLATION JOINT AROUND THE TOP OF THE MANHOLE STRUCTURE, TO THE DEPTH OF CONCRETE PAVEMENT. USE CLASS 5 OR 8 JOINT SEALANT TO SEAL THE JOINT. SEE STANDARD JS (FTW) FOR ADDITIONAL INFORMATION.
- 4. USE CLASS "C" CONCRETE FOR CAST-IN-PLACE STRUCTURES; USE CLASS "H" CONCRETE (MINIMUM 5000 PSI DESIGN STRENGTH) FOR PRECAST STRUCTURES.
- 5. USE GRADE 60 STEEL FOR ALL REINFORCING.
- 6. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO THE CENTERS OF BARS.
- 7. FIELD CUT AND BEND BARS AS NECESSARY TO ACCOMMODATE STORM DRAIN PIPE.
- 8. FABRICATE CAST IRON RING AND COVER CONFORMING TO ITEM 471. SEE MISCELLANEOUS DRAINAGE DETAILS FOR RING AND COVER DETAILS. FOR MANHOLES LOCATED IN PAVEMENT, SECURE COVER WITH 4-1/2"-13X2" BOLTS.
- 9. FOR CAST-IN-PLACE STRUCTURES, A CONSTRUCTION JOINT MAY BE PLACED AT EACH 5' (MIN) INCREMENT OF DEPTH.
- 10. FOR PIPE OR BOX CONNECTIONS TO PRECAST STRUCTURES, SEE STANDARD PBCC.
- 11. MAXIMUM DEPTH "D" FOR CAST-IN-PLACE FREE-STANDING MANHOLE IS 30', WITH INCREASED WALL THICKNESS AND ADDITIONAL REINFORCEMENT FOR DEPTHS GREATER THAN 15', AS DETAILED. MAXIMUM DEPTH "D" FOR MANHOLES USING PRECAST UNITS IN STAGE I, OR "C" FOR RISERS ON BASE STRUCTURES, IS 25' TO THE TOP OF THE BASE SLAB, IN ACCORDANCE WITH STANDARD MI-B&R (FTW). DETERMINE QUANTITIES FOR DEPTHS OTHER THAN THOSE SHOWN HEREON BY INTERPOLATION.
- 12. DO NOT COMMENCE WITH STAGE II CONSTRUCTION UNTIL PERMISSION IS GRANTED BY THE ENGINEER.
- 13. INSTALL A TEMPORARY WOOD COVER AFTER STAGE I IS COMPLETED, TO REMAIN IN PLACE UNTIL STAGE II CONSTRUCTION BEGINS.
- 14. LOCATION OF MANHOLE AS SHOWN IN THE PLANS REFERS TO THE CONTROL POINT SHOWN HEREON AND DETAILED ON THE "DRAINAGE STRUCTURE CONTROL DATA" SHEET. FOR MANHOLE RISERS LOCATED ON BASE STRUCTURE, LOCATE AND POSITION BASE AS DETAILED ON THE DRAINAGE STRUCTURE CONTROL DATA SHEET, OR AS DIRECTED. FOR MANHOLES LOCATED ON BOX CULVERT LESS THAN 4' SPAN, USE WITH BASE STRUCTURE.

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SHEET 2 OF 2 SHEETS

Fort Worth District Standard

Texas Department of Transportation

STORM DRAIN MANHOLE DETAILS

TYPE A

MH-SD (FTW)

ORIGINAL DRAWING:	05/2019	mhsd-ftw.dgn	FED. RD. DIV. NO.:	6	PROJECT NO.:		SHEET NO.:	
DATE:	REVISIONS			6				
05/2019	REPLACES MH-1-02 (FW)			STATE	STATE	COUNTY		
11/2020	REVISE JOINT NOMENCLATURE			TEXAS	FTW			
07/2022	REVISE NOTES AND ADD DETAILS FOR USE WITH PRECAST BASE AND RISER			CONT.	SECT.	JOB	HIGHWAY NO.	