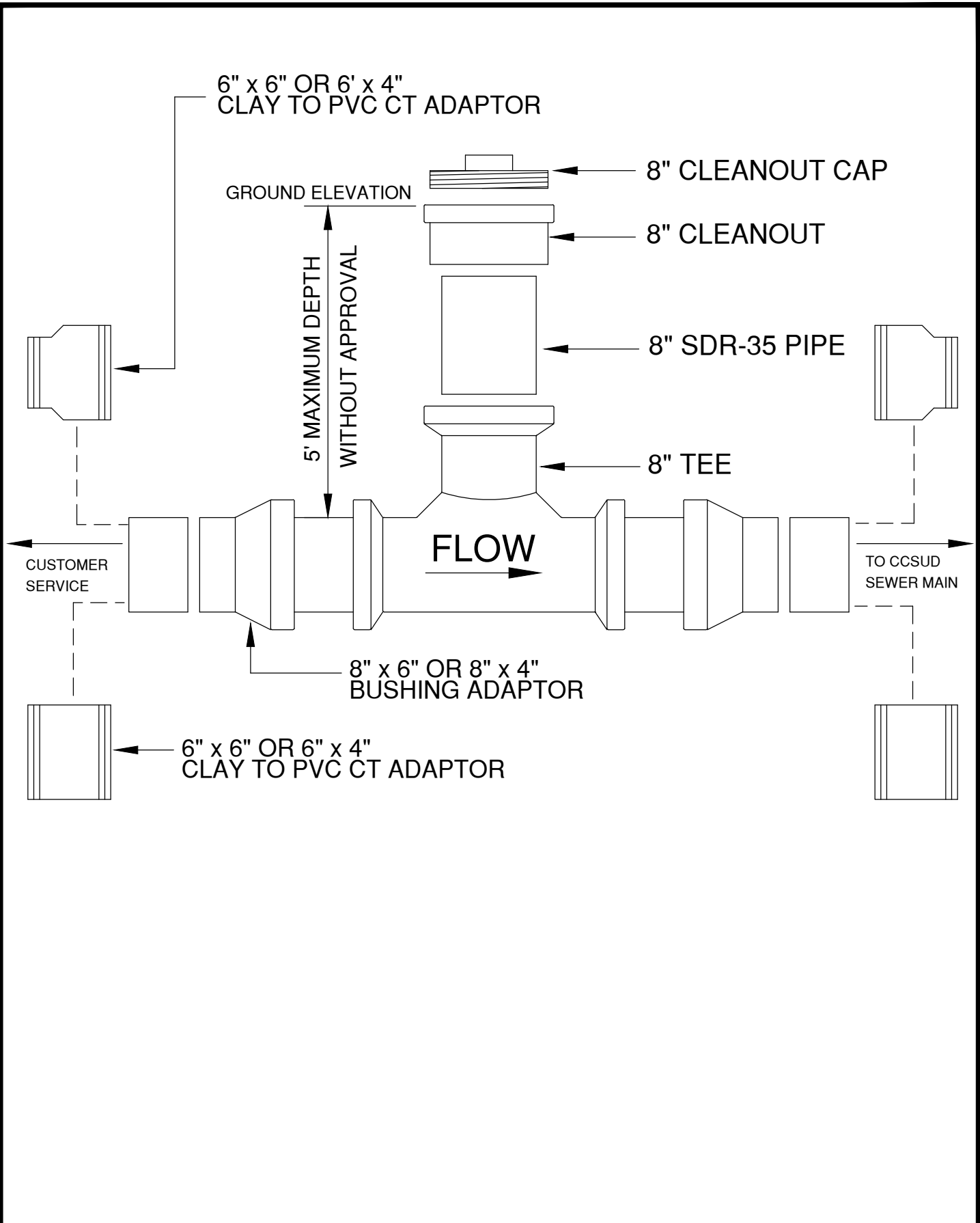



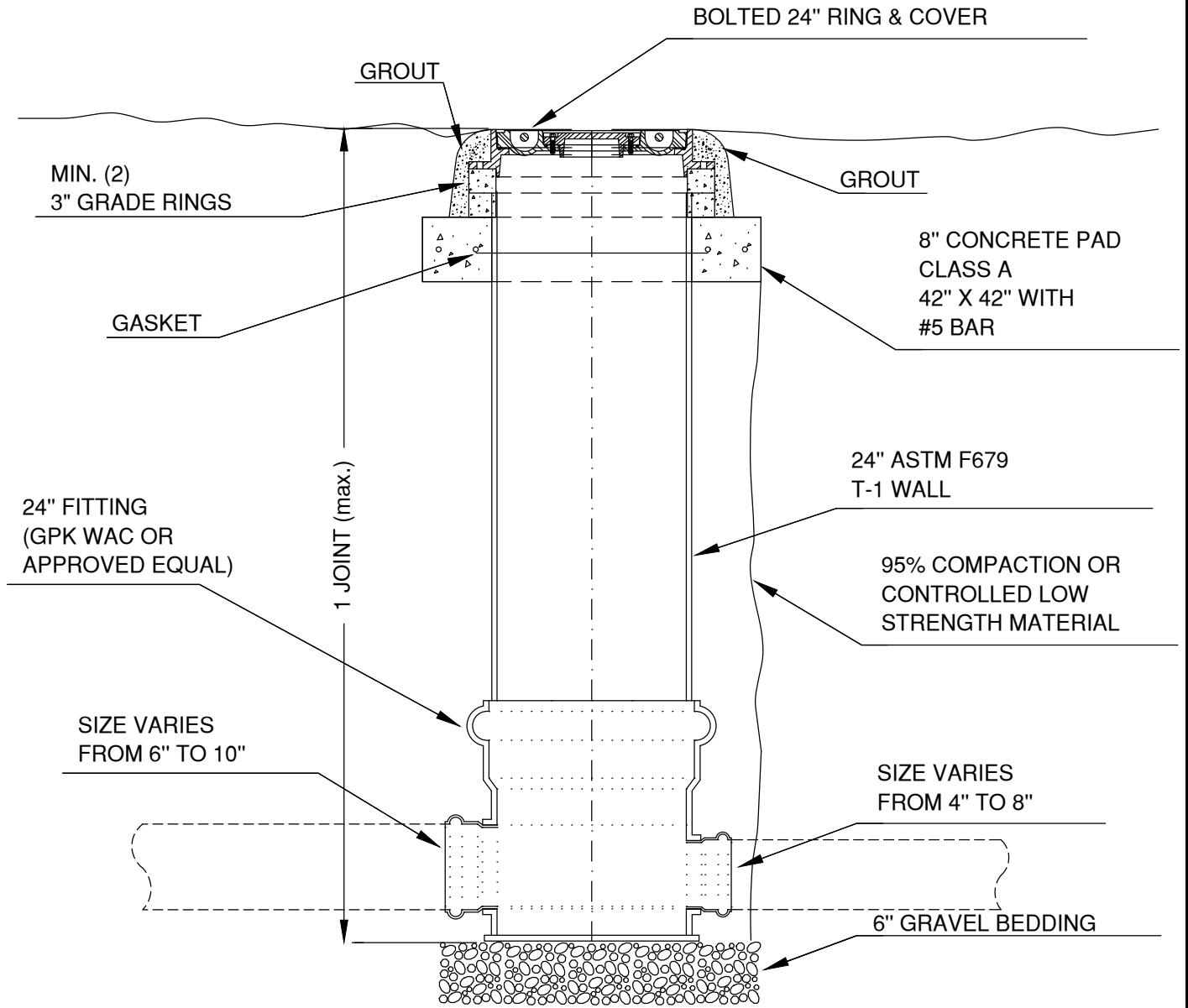
\*STACKS SHALL BE REQUIRED WHERE THE TOP OF THE SEWER MAIN IS AT A DEPTH OF 8' OR GREATER (MEASURED FROM TOP OF SEWER MAIN TO FINISHED GRADE)



PROPERTY OF 	DTL #304 WASTEWATER SAMPLING SITE FOR SERVICE 5' AND UNDER IN DEPTH (FROM GROUND ELEV.)	 <b>M&amp;S ENGINEERING</b> ELECTRICAL   CIVIL   MEP <small>TXENG FIRM # F-1394   TBPELS FIRM #10169800          WWW.MSENGR.COM   (830) 228-5446</small>	APPROVED	REVISION
			02/15/2022	
			SHEET 1 OF 1	

DISTRICT SIDE

OWNER SIDE



PROPERTY OF



DTL #305  
 CONTROL OR MINI MANHOLE



**M&S ENGINEERING**  
 ELECTRICAL | CIVIL | MEP  
 TXENG FIRM # F-1394 | TBPELS FIRM #10169800  
 WWW.MSENGR.COM | (830) 228-5446

APPROVED

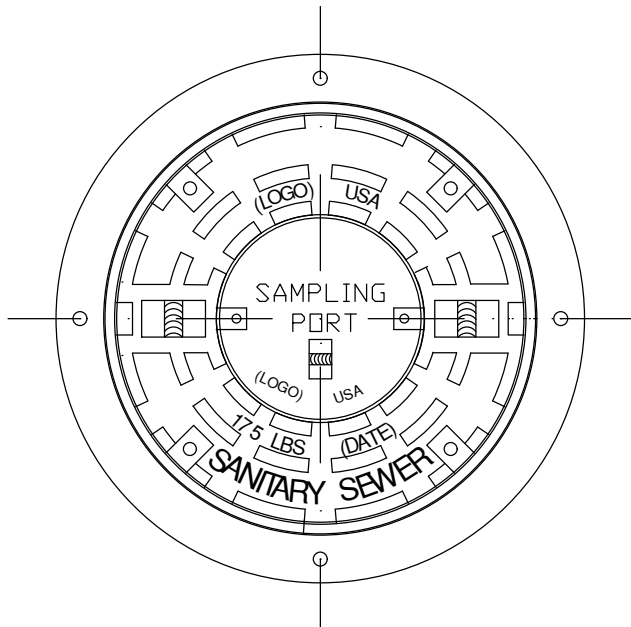
REVISION

02/15/2022

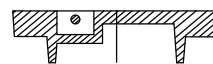
SHEET

1 OF 2

BOLTED 24" RING & COVER



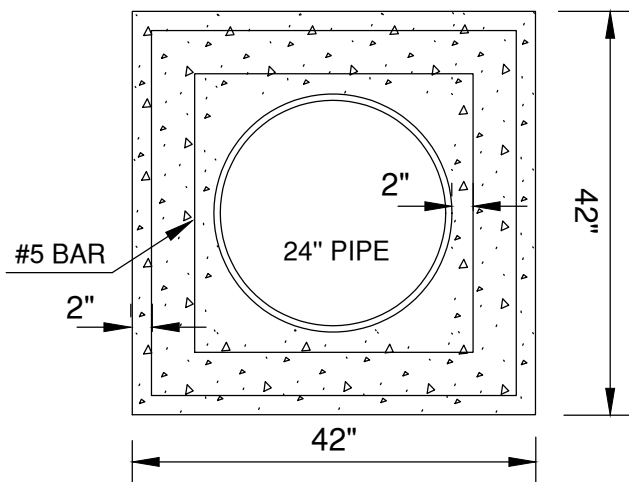
SAMPLING PORT COVER



NOTE:

48" CONCRETE MANHOLE WITH  
 24" SAMPLING PORT LID MAY BE  
 USED IN PLACE OF THIS CONTROL  
 MANHOLE.

42" X 42" CONCRETE PAD



PROPERTY OF



DTL #305  
 CONTROL OR MINI MANHOLE



**M&S ENGINEERING**  
 ELECTRICAL | CIVIL | MEP  
 TXENG FIRM # F-1394 | TBPELS FIRM #10169800  
 WWW.MSENGR.COM | (830) 228-5446

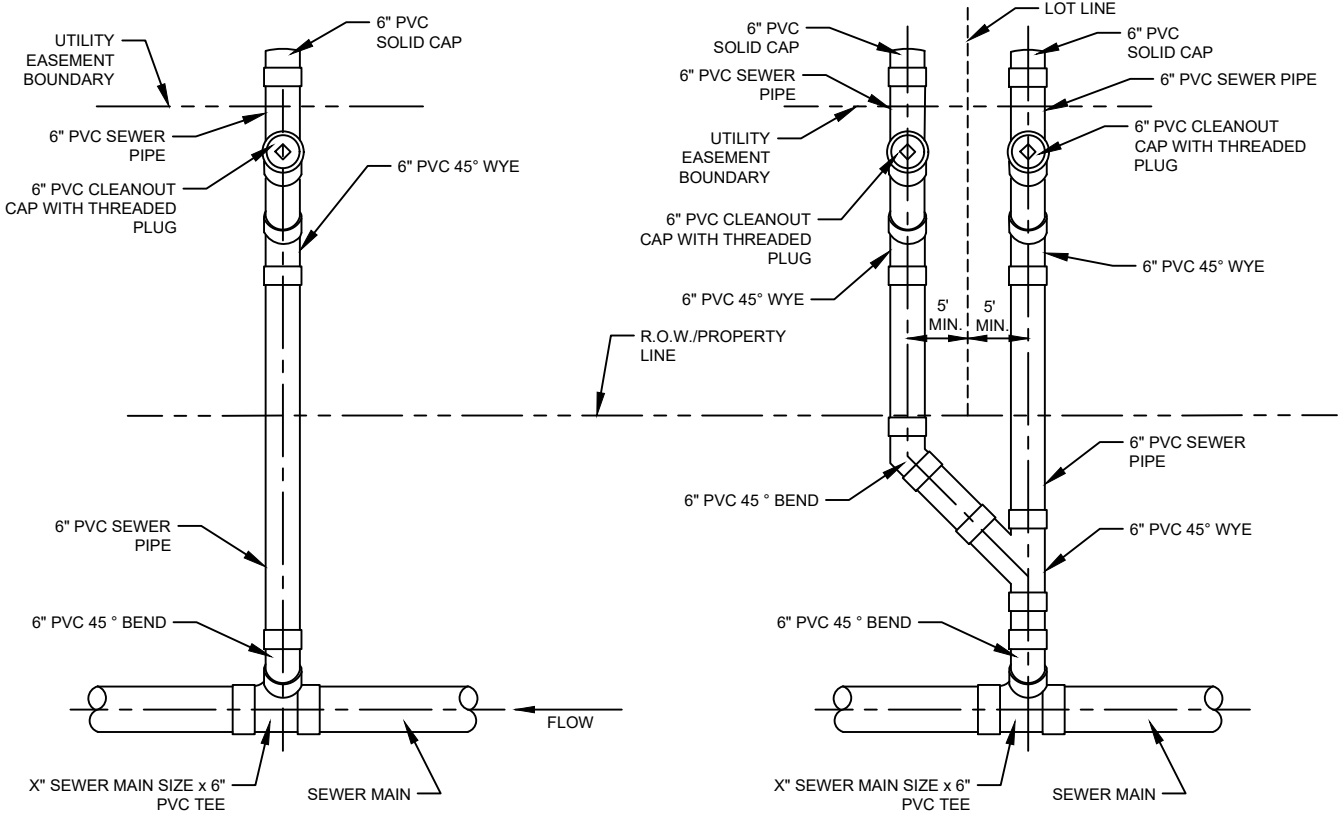
APPROVED

REVISION

02/15/2022

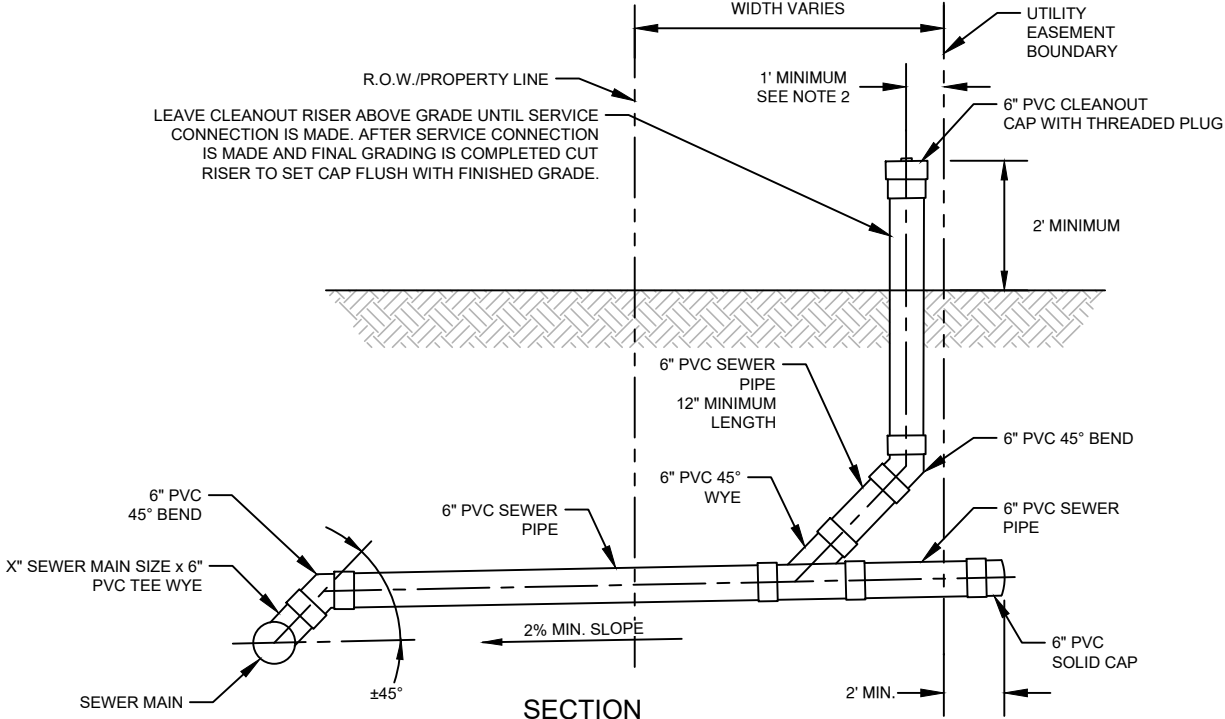
SHEET

2 OF 2



**SINGLE SERVICE PLAN**

**DOUBLE SERVICE PLAN**

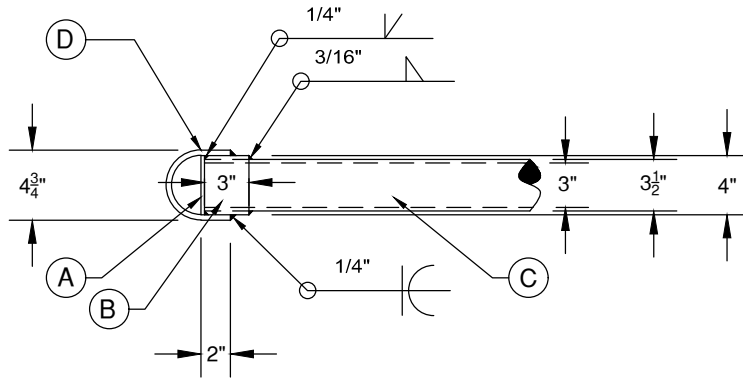


**SECTION**

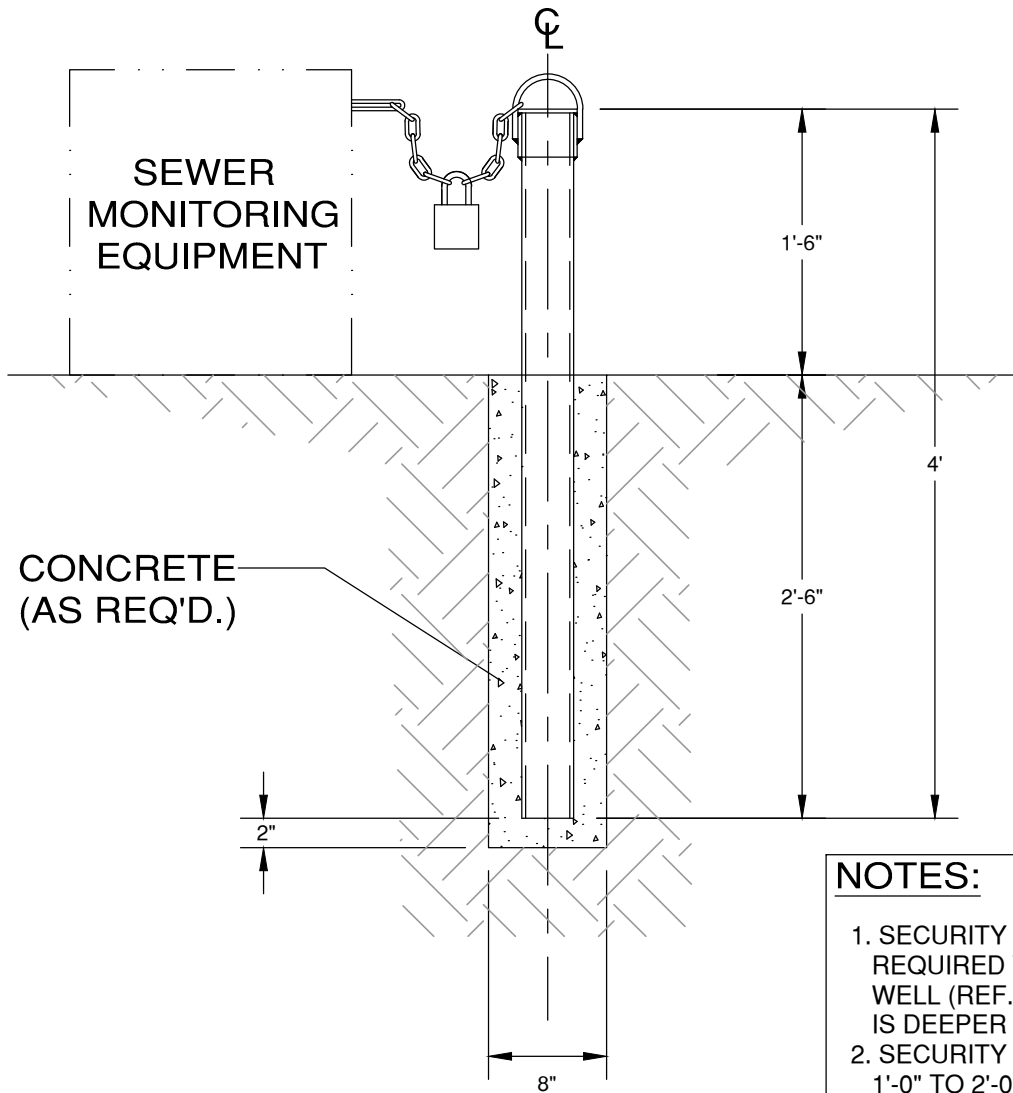
**NOTES:**

1. FOR NEW DEVELOPMENTS, CLEANOUTS MAY NOT BE PLACED IN PAVED AREAS (I.E. SIDEWALKS, DRIVEWAYS, OR PARKING LOTS) AND MUST BE LOCATED A MINIMUM OF 6' FROM ALL PAVED AREAS.
2. SEWER CLEANOUTS SHALL BE HORIZONTALLY PLACED 5' FROM LOT LINE AND MEET MINIMUM SPACING REQUIREMENTS FROM ALL WATER MAINS PER TAC §290.44.
3. SEWER LATERALS SHALL BE INSTALLED BENEATH OTHER UTILITIES (IF POSSIBLE) WITH A MINIMUM VERTICAL CLEARANCE OF 1' ABOVE AND BELOW THE SEWER LATERALS. WATER PIPES REQUIRE 2' OF VERTICAL SEPARATION.
4. WHEN MINIMUM SEPARATION REQUIREMENTS FOR LATERALS AND CLEANOUTS CANNOT BE MET, PROTECTION REQUIREMENTS SHALL BE PER TAC §217.53 AND TAC §290.44.

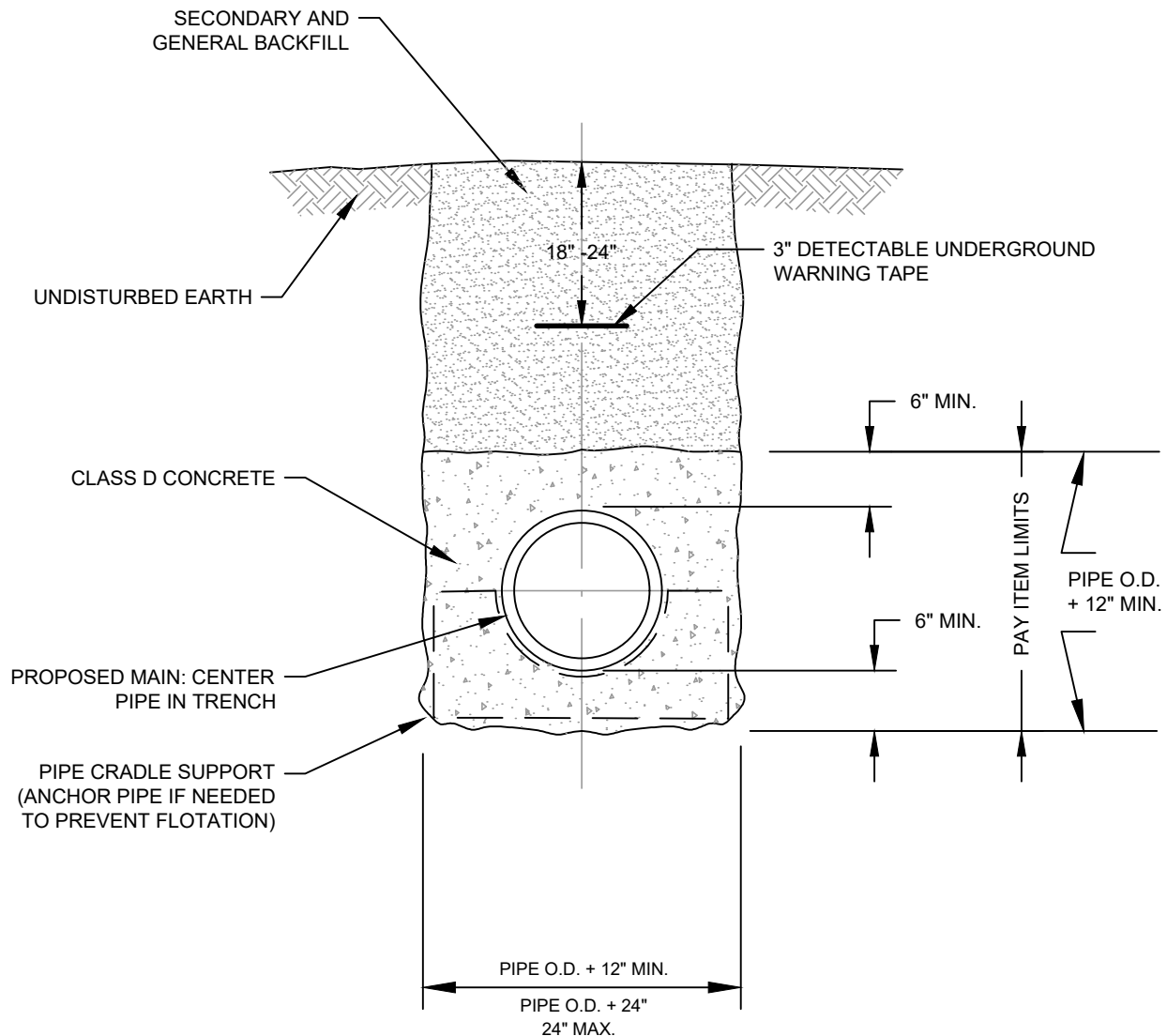
PROPERTY OF  <b>CRYSTAL CLEAR</b> SPECIAL UTILITY DISTRICT	DTL #306 SEWER CLEANOUT ASSEMBLY	 <b>M&amp;S ENGINEERING</b> ELECTRICAL   CIVIL   MEP <small>TXENG FIRM # F-1394   TBPELS FIRM #10169800                  WWW.MSENGR.COM   (830) 228-5446</small>	APPROVED	REVISION
			11/21/2022	01/20/2025
SHEET 1 OF 1				



- DETIAL A (1 EA.) 1/4" X 4" DIA. STEEL PLATE
- DETIAL B (1 EA.) 4" O.D. X 3 5/8" I.D. X 3" LENGTH STD. GALV. PIPE
- DETIAL C (1 EA.) 3 1/2" O.D. X 3" I.D. X 3'-11 3/4" LENGTH STD. GALV. PIPE
- DETIAL D (1 EA.) 3/8" X 12" STEEL ROD



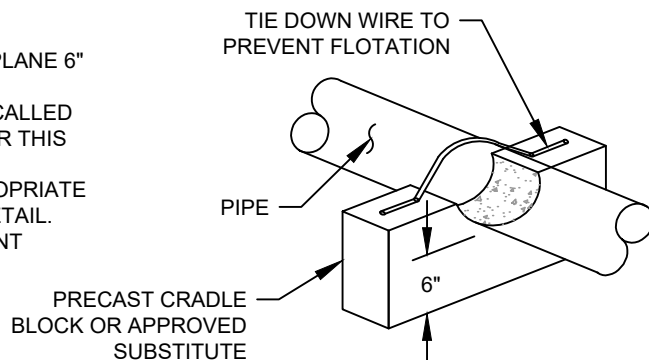
- NOTES:**
1. SECURITY POST WILL BE REQUIRED WHERE SAMPLING WELL (REF. DWG. 304) IS DEEPER THAN 5'-0"
  2. SECURITY POST TO BE LOCATED 1'-0" TO 2'-0" FROM SAMPLING WELL



**CONCRETE ENCASEMENT**



**NOTES:**

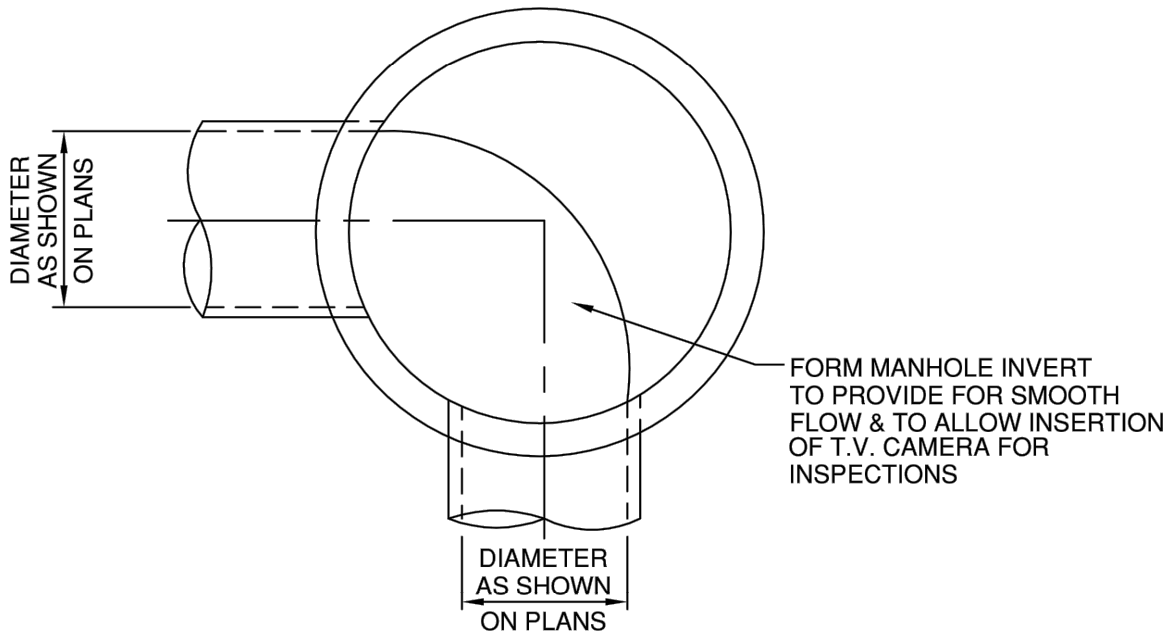
1. ALL CONCRETE ENCASEMENT SHALL BE POURED AT A PLANE 6" ABOVE THE PIPE BETWEEN EXCAVATED TRENCH WALL.
2. CONCRETE ENCASEMENT WILL BE USED ONLY WHERE CALLED OUT IN THE PLANS AND LIMITS OF PAYMENT WILL BE PER THIS DETAIL.
3. BACKFILL AND RESTORATION WORK WILL BE PER APPROPRIATE TRENCH DETAIL WITH EMBEDMENT FOLLOWING THIS DETAIL.
4. SUPPORTS ARE SUBSIDIARY TO CONCRETE ENCASEMENT



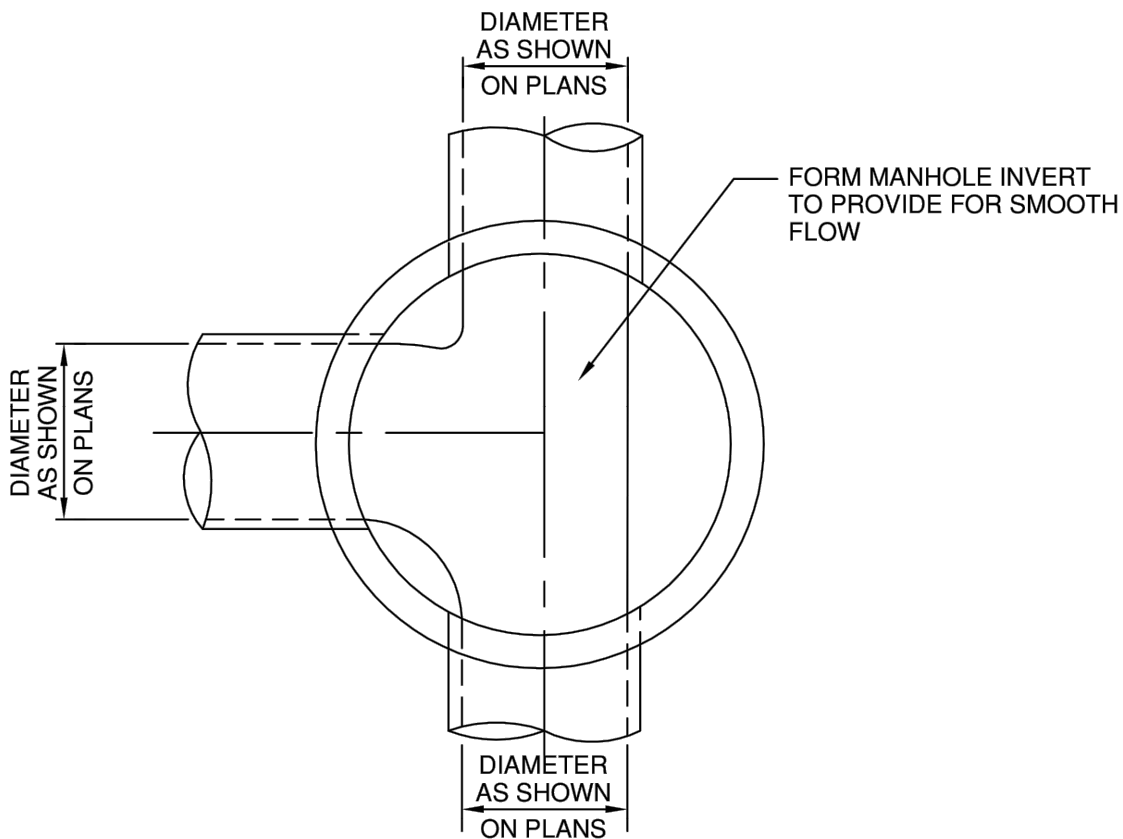
**PIPE CRADLE SUPPORT**

NOT TO SCALE



	DTL #310 CONCRETE ENCASEMENT	 <b>M&amp;S ENGINEERING</b> ELECTRICAL   CIVIL   MEP <small>TXENG FIRM # F-1394   TBPELS FIRM #10169800                  WWW.MSENGR.COM   (830) 228-5446</small>	APPROVED	REVISION
			02/15/2022	
			SHEET 1 OF 1	



TYPICAL MANHOLE AT ANGLE IN SEWER



TYPICAL JUNCTION MANHOLE

PROPERTY OF 	DTL #320 MANHOLE INVERT PLAN	 <b>M&amp;S ENGINEERING</b> ELECTRICAL   CIVIL   MEP <small>TXENG FIRM # F-1394   TBPELS FIRM #10169800                  WWW.MSENGR.COM   (830) 228-5446</small>	APPROVED	REVISION
			02/15/2022	
			SHEET 1 OF 2	



# STANDARD MANHOLE

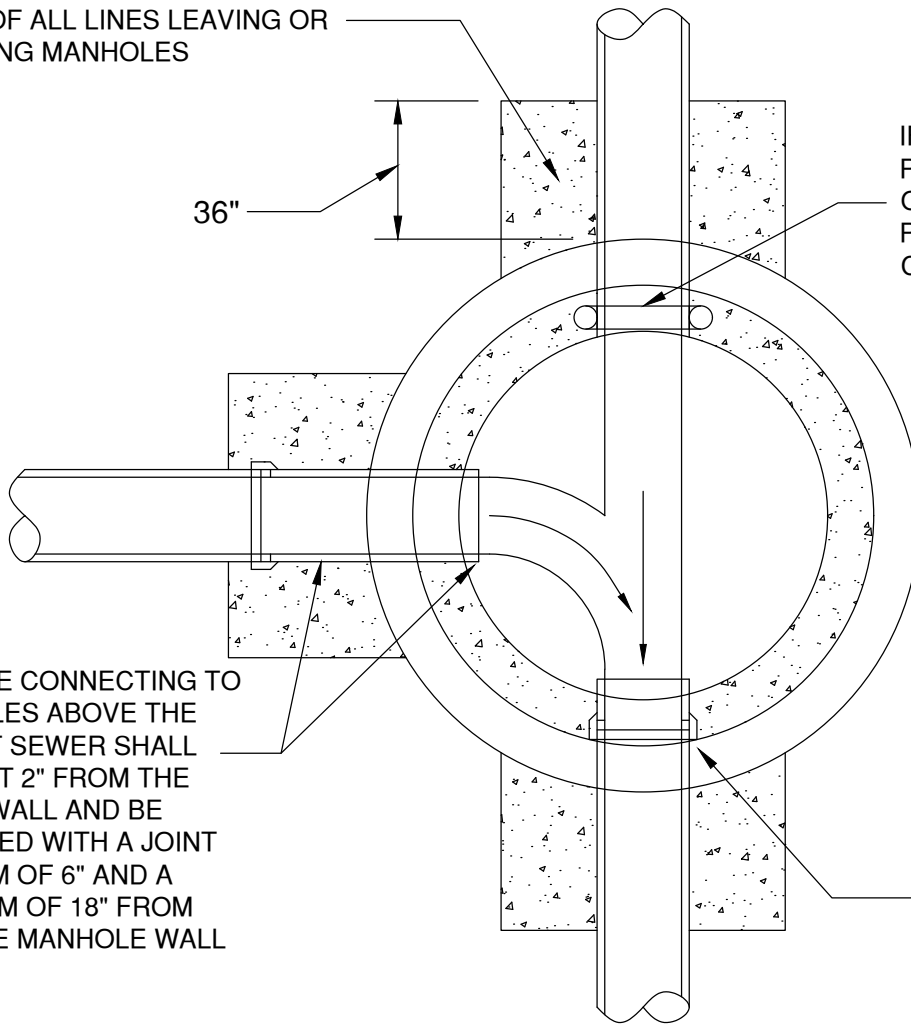
CONCRETE CRADLE TO NEAREST POINT OF ALL LINES LEAVING OR ENTERING MANHOLES

36"

IF PVC PIPE IS USED, PROVIDE RUBBER GASKETS ONE SIZE SMALLER THAN PIPE AT EACH WALL CROSSING OF MANHOLE

THE PIPE CONNECTING TO MANHOLES ABOVE THE LOWEST SEWER SHALL PROJECT 2" FROM THE INSIDE WALL AND BE INSTALLED WITH A JOINT MINIMUM OF 6" AND A MAXIMUM OF 18" FROM OUTSIDE MANHOLE WALL

NO JOINTS FOR PIPE WILL BE ALLOWED WITHIN WALL SECTION



## MANHOLE FLOOR PLAN

AUGUST 1998

PROPERTY OF



DTL #320  
 STANDARD MANHOLE  
 MANHOLE FLOOR PLAN



**M&S ENGINEERING**  
 ELECTRICAL | CIVIL | MEP  
 TXENG FIRM # F-1394 | TBPELS FIRM #10169800  
 WWW.MSENGR.COM | (830) 228-5446

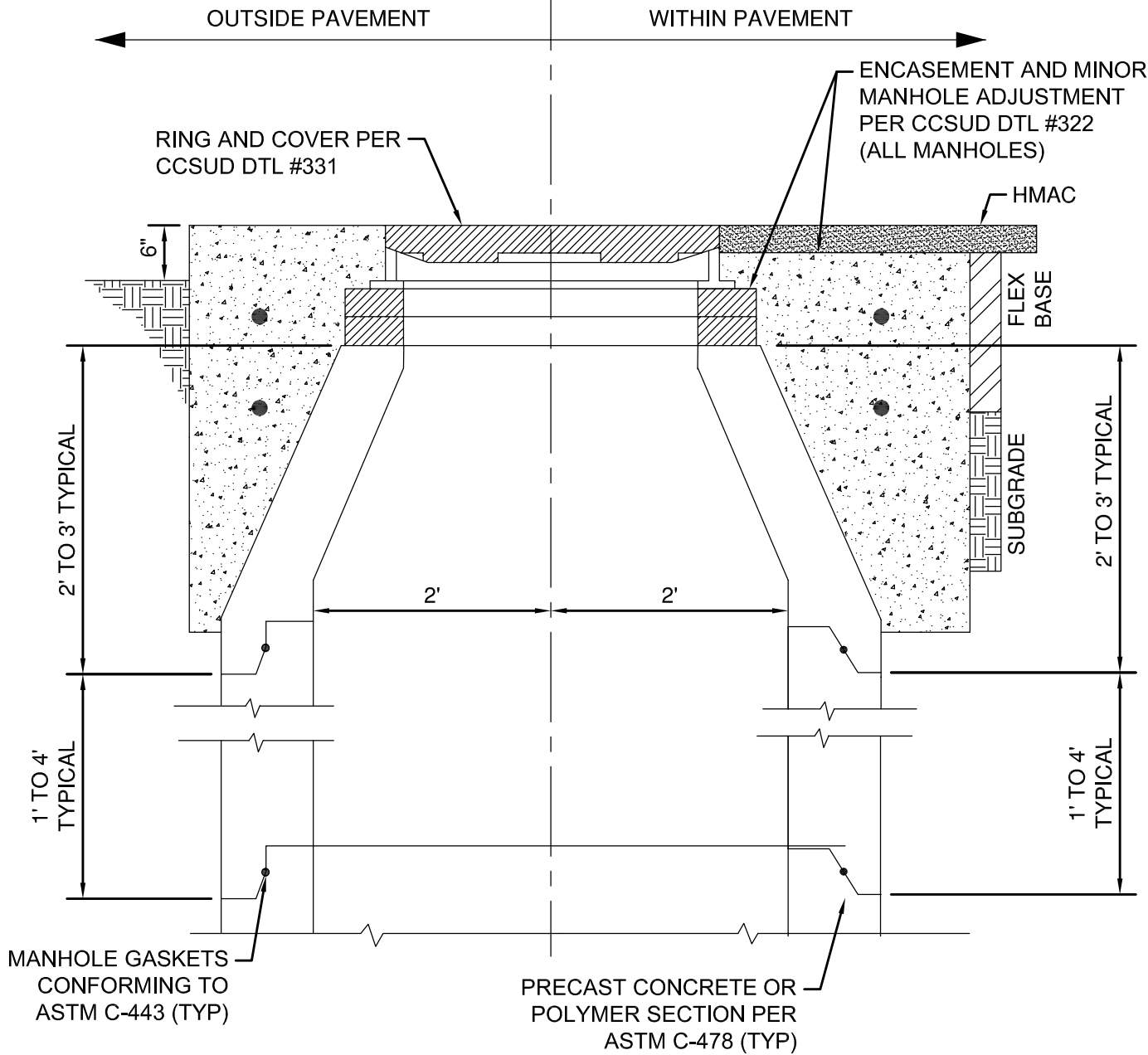
APPROVED

REVISION

02/15/2022

SHEET

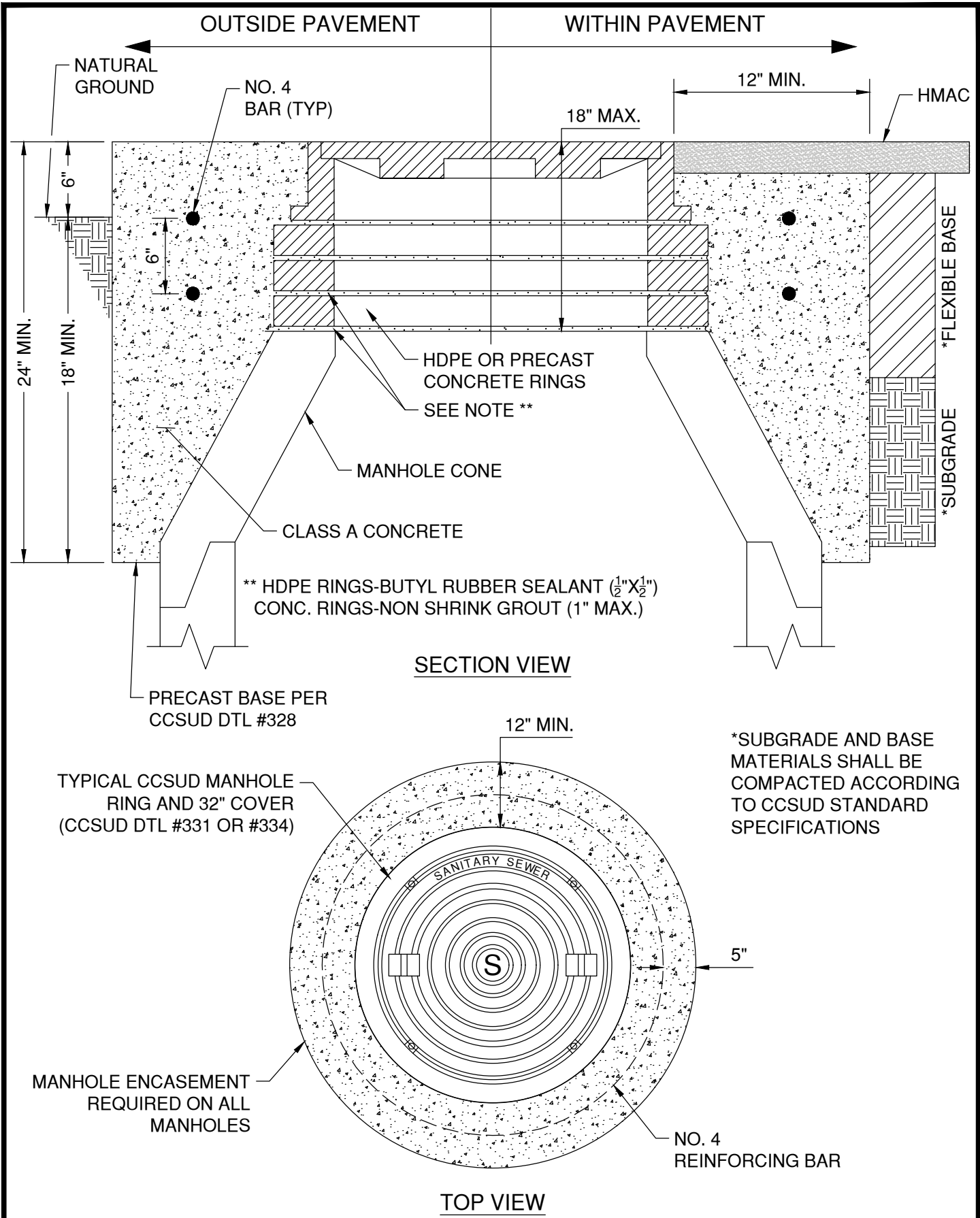
2 OF 2



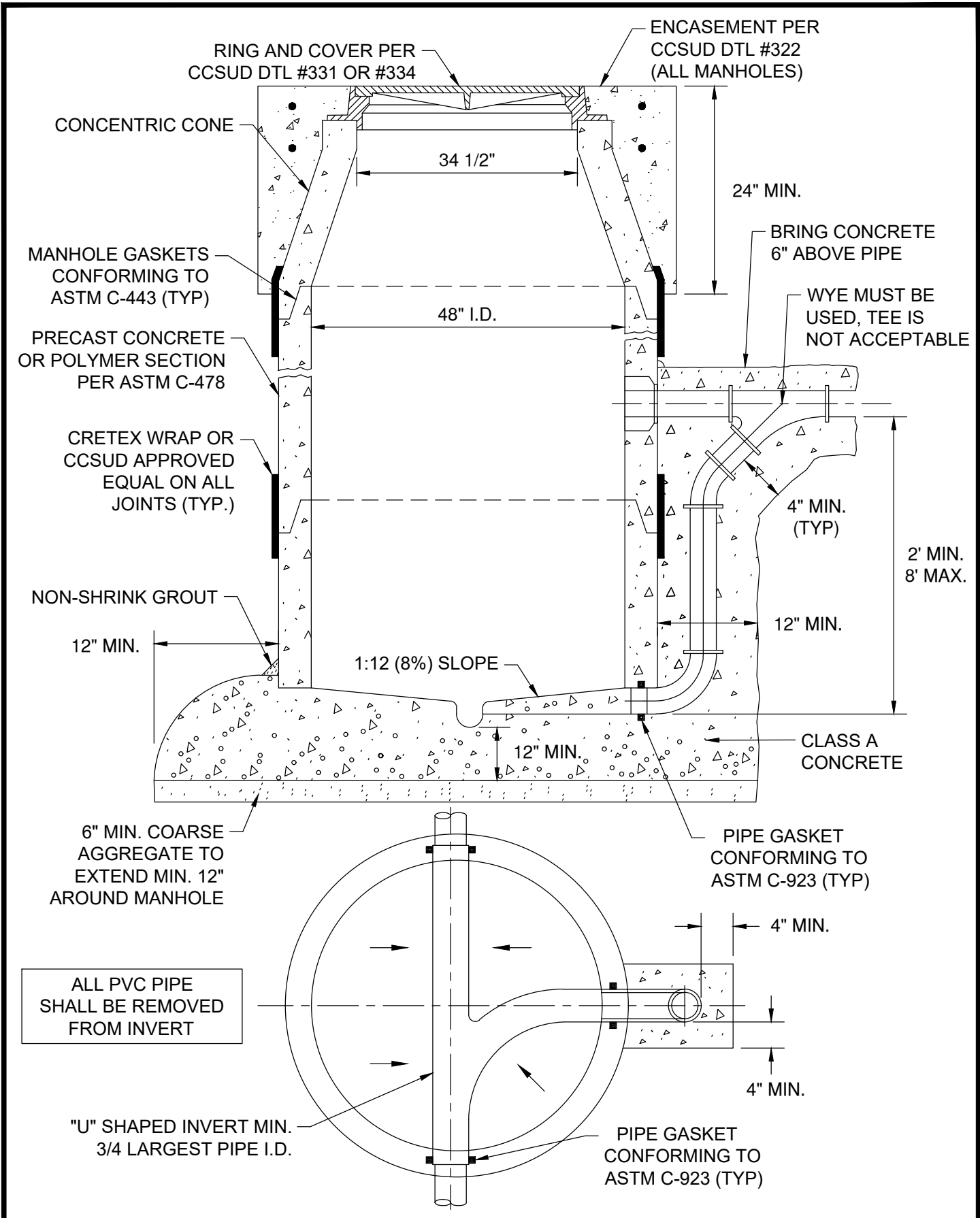
**NOTES:**

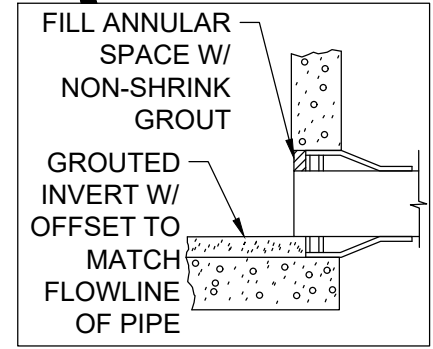
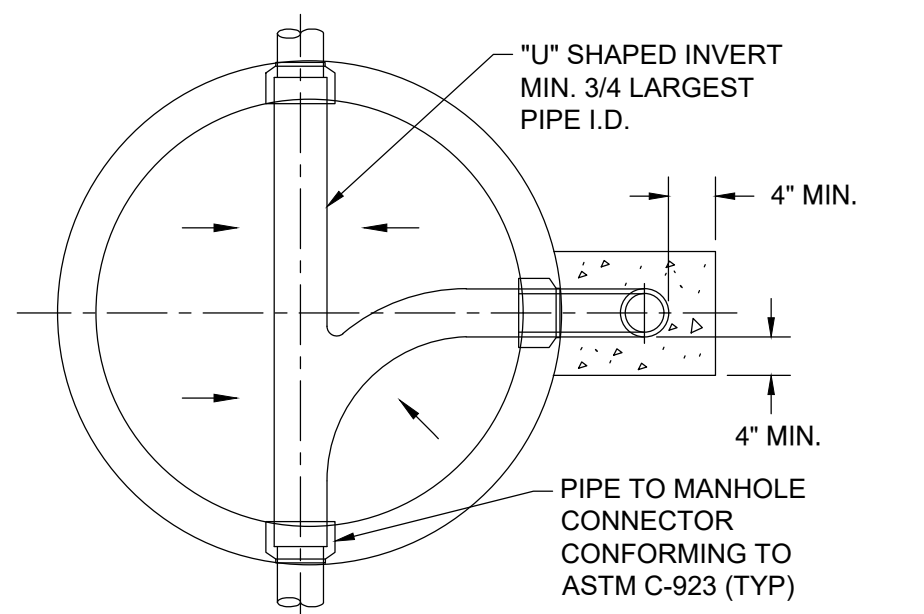
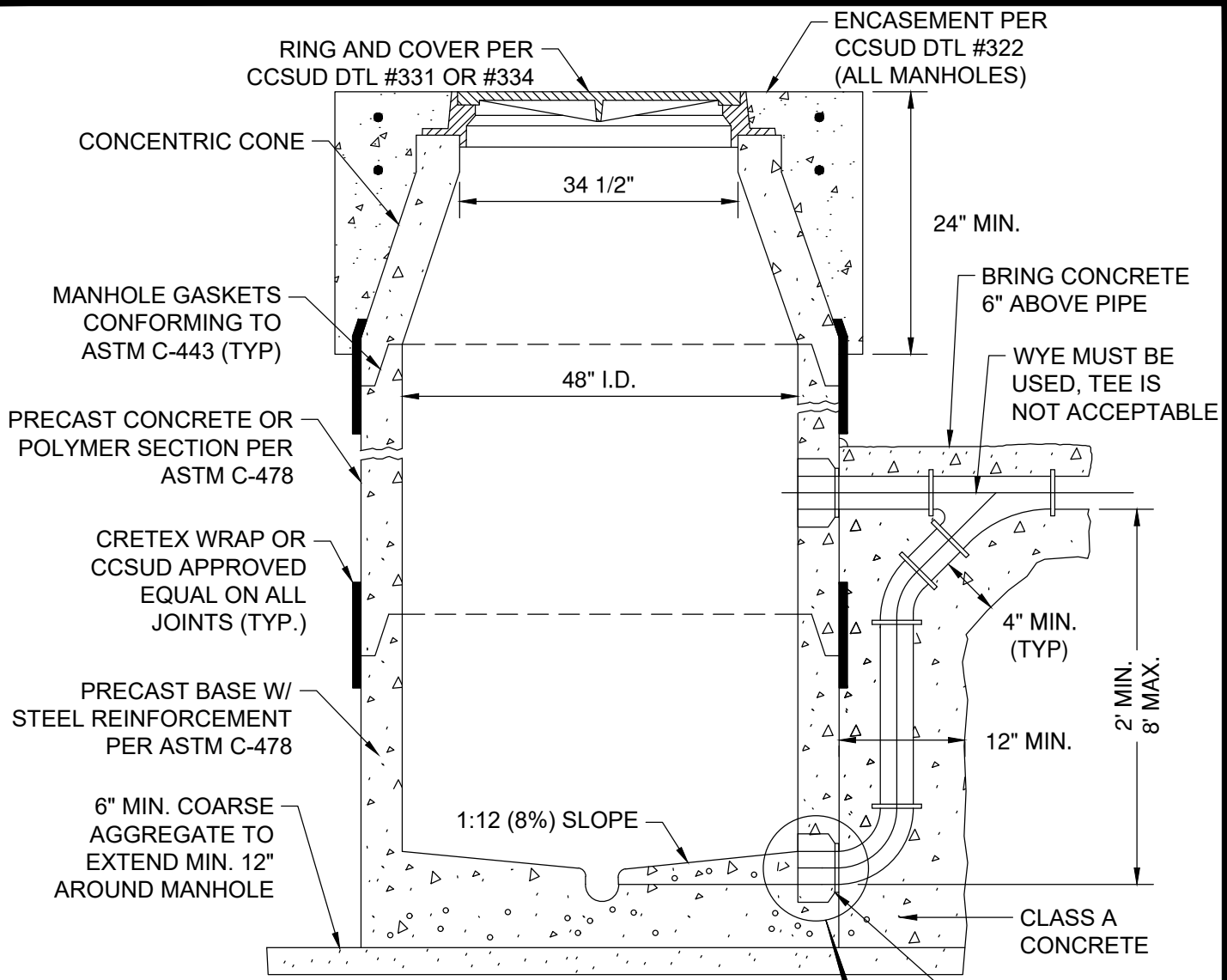
1. MANHOLE SECTIONS TEMPORARILY REMOVED FOR ROADWAY CONSTRUCTION MAY BE REUSED ONLY WITH THE WRITTEN APPROVAL OF THE INSPECTOR. GASKETS SHALL NOT BE REUSED.
2. ANY COMBINATION OF REMOVING THE CONCRETE RINGS, AND / OR THE MANHOLE CONE, AND/OR THE STRAIGHT RISER SECTION OF THE MANHOLE SHALL BE ACCEPTABLE TO TEMPORARILY LOWER THE MANHOLE GRADE FOR ROADWAY RECONSTRUCTION.
3. WHILE THE MANHOLE IS TEMPORARILY LOWERED, A SHEET OF STEEL SUITABLE TO SUPPORT ALL IMPOSED LOADS SHALL BE USED TO COVER THE OPENING. THE STEEL PLATE SHALL BE SET IN MORTAR TO PREVENT LEAKAGE.
4. SUBGRADE AND BASE MATERIALS SHALL BE COMPACTED TO 95% AND 100% DENSITIES, RESPECTIVELY, COMPACTION SHALL BE BY MECHANICAL TAMPING TO THE DENSITIES SPECIFIED.
5. MANHOLE SHALL BE SET SO RING AND COVER MATCH STREET SLOPE.

PROPERTY OF 	DTL #321 MAJOR MANHOLE ADJUSTMENT	 <b>M&amp;S ENGINEERING</b> ELECTRICAL   CIVIL   MEP <small>TXENG FIRM # F-1394   TBPELS FIRM #10169800                  WWW.MSENGR.COM   (830) 228-5446</small>	APPROVED	REVISION
			01/08/2025	
			SHEET 1 OF 1	

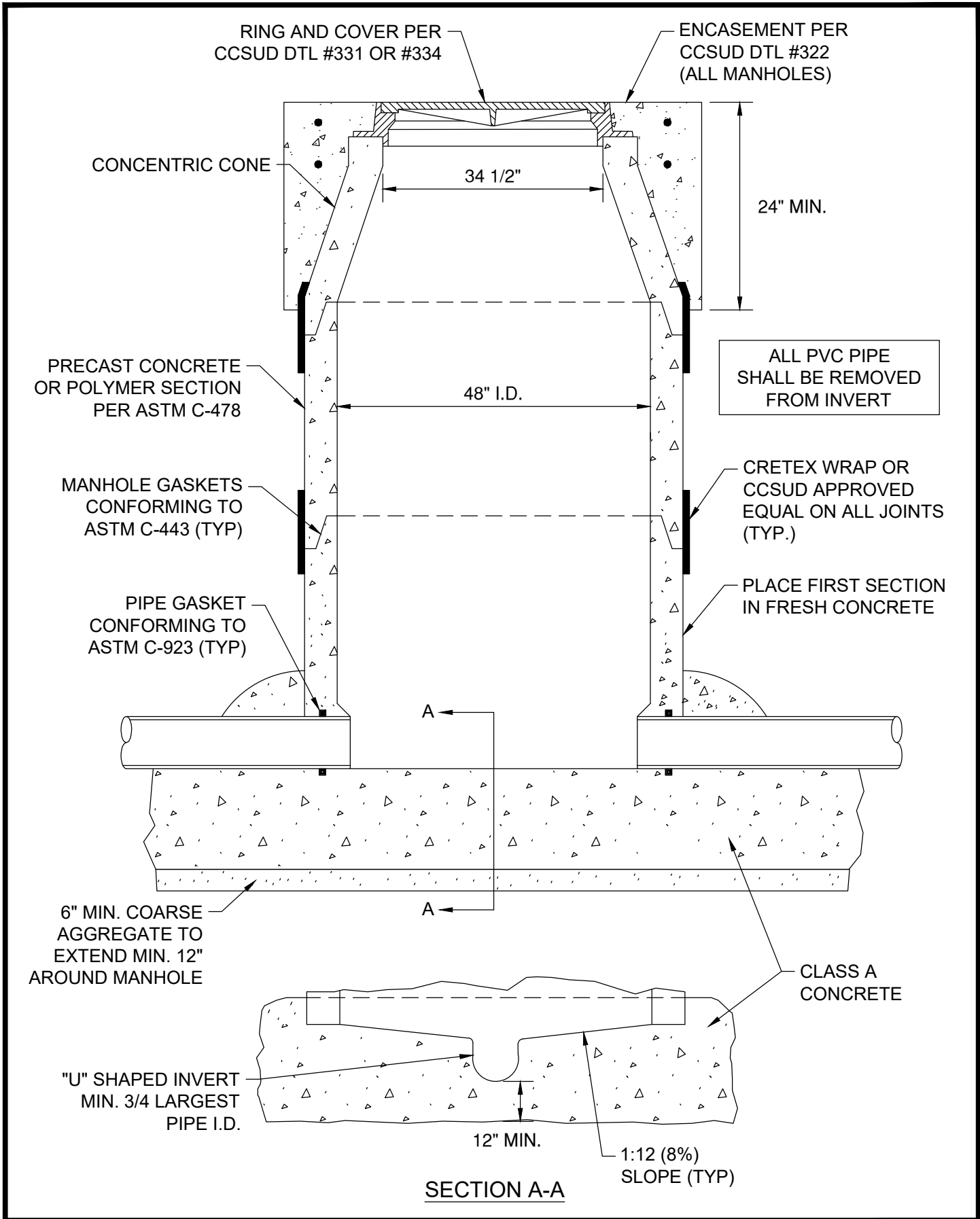


	DTL #322 NEW MANHOLE CONSTRUCTION AND MINOR MANHOLE ADJUSTMENT	M&S ENGINEERING ELECTRICAL   CIVIL   MEP <small>TXENG FIRM # F-1394   TBPELS FIRM #10169800                  WWW.MSENGR.COM   (830) 228-5446</small>	APPROVED	REVISION
			02/15/2022	02/02/2023
			SHEET 1 OF 1	





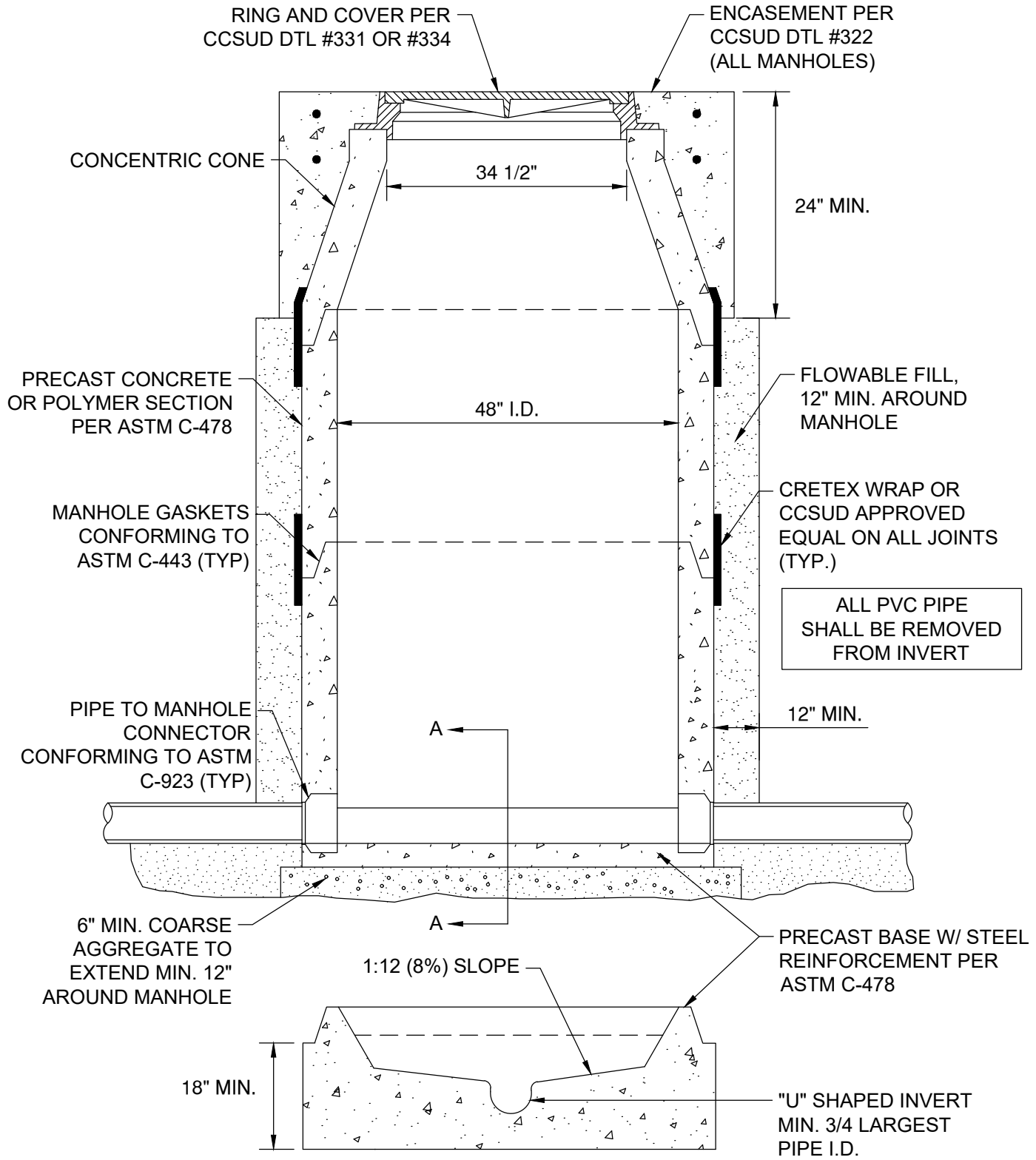


\*CONTRACTOR SHALL LEVEL AND PLUMB THE BASE PRIOR TO SETTING THE PRECAST MANHOLE RISER SECTIONS ON THE PRECAST CONCRETE BASE.




SECTION A-A

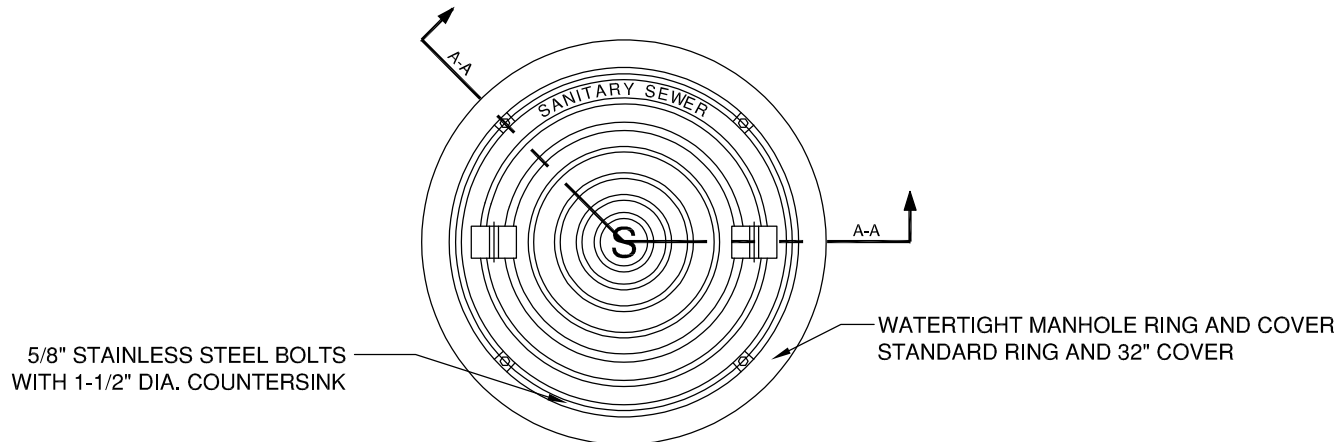
PROPERTY OF 	DTL #327 WASTEWATER MANHOLE ON CAST IN PLACE FOUNDATION	 <b>M&amp;S ENGINEERING</b> ELECTRICAL   CIVIL   MEP <small>TXENG FIRM # F-1394   TBPELS FIRM #10169800          WWW.MSENGR.COM   (830) 228-5446</small>	APPROVED	REVISION
			02/15/2022	
			<b>SHEET</b> 1 OF 1	



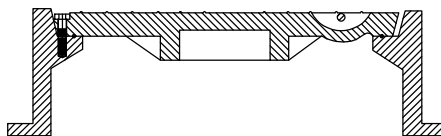
**SECTION A-A**

\*CONTRACTOR SHALL LEVEL AND PLUMB THE BASE PRIOR TO SETTING THE PRECAST MANHOLE RISER SECTIONS ON THE PRECAST CONCRETE BASE.

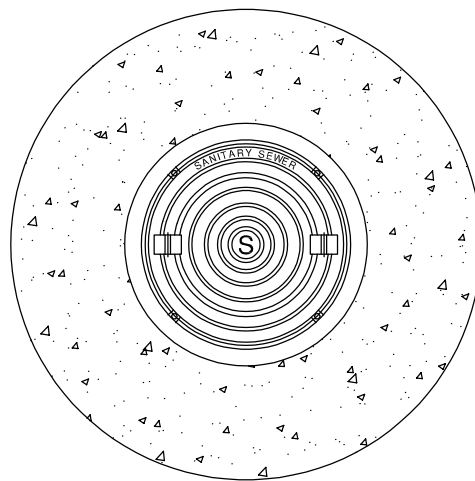
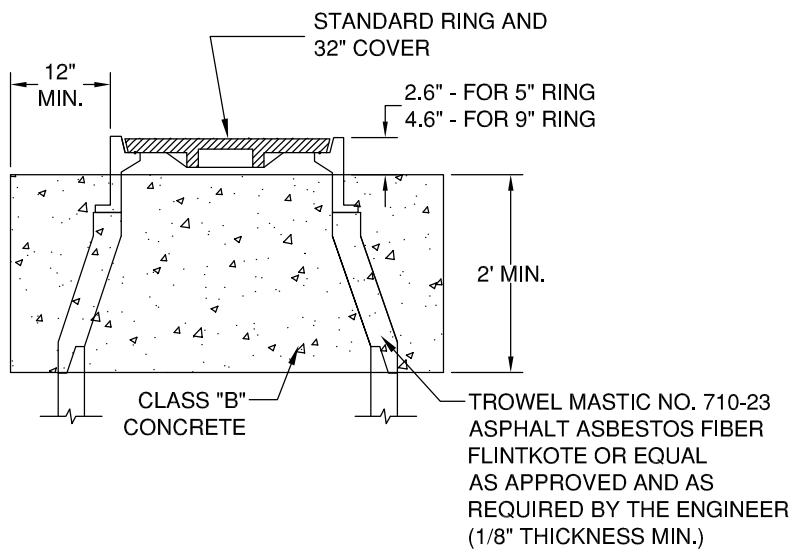
PROPERTY OF 	DTL #328 WASTEWATER MANHOLE ON PRECAST BASE	 <b>M&amp;S ENGINEERING</b> ELECTRICAL   CIVIL   MEP <small>TXENG FIRM # F-1394   TBPELS FIRM #10169800                  WWW.MSENGR.COM   (830) 228-5446</small>	APPROVED	REVISION
			02/15/2022	02/02/2023
			SHEET 1 OF 1	



TOP VIEW



SECTION "A-A"



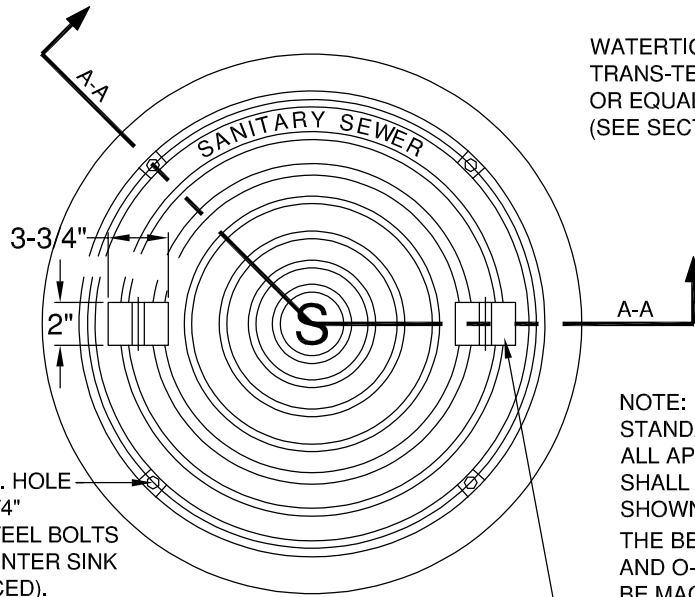
MANHOLE RING

ENCASMENT DETAIL  
(ALL MANHOLES)

**NOTE:**  
 MANHOLE RING ENCASMENT IS REQUIRED ON ALL MANHOLES EXCEPT MANHOLES IN NEW OR EXISTING STREETS WHERE AS DIRECTED BY THE ENGINEER.



WATERTIGHT MANHOLE RING AND COVER.  
 TRANS-TEX A-77 O.R.  
 OR EQUAL AS SHOWN  
 (SEE SECTION "A-A")

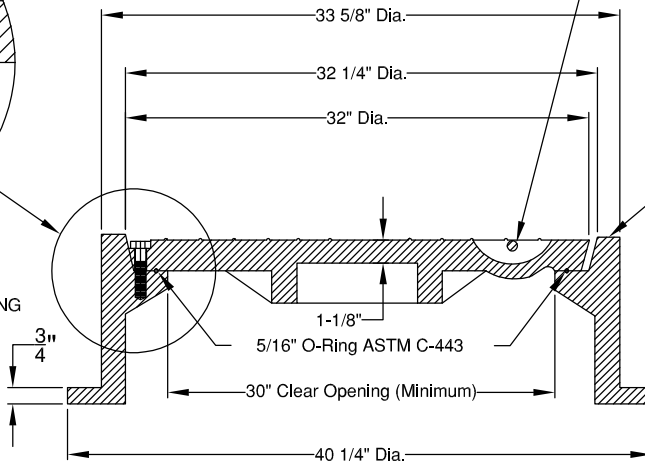
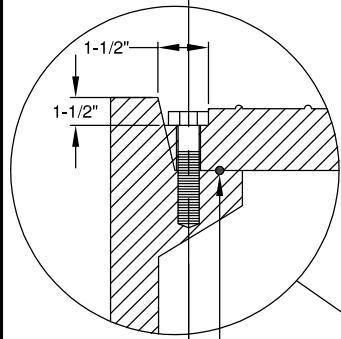


NOTE:  
 STANDARD MANHOLE RING AND COVER  
 ALL APPLICABLE DIMENSIONS  
 SHALL CONFORM TO THE DIMENSIONS  
 SHOWN HERE.  
 THE BEARING SURFACES  
 AND O-RING GROOVE SHALL  
 BE MACHINED GROUND.

(4 EA.) 3/4" DIA. HOLE  
 FOR 5/8" X 1-3/4"  
 STAINLESS STEEL BOLTS  
 1-1/2" SQ. COUNTER SINK  
 (EVENLY SPACED).

**TOP VIEW**

PICK SLOT (1-1/8" VERTICAL CLEAR SPACE)  
 WITH LIFTING BAR (1" DIAMETER).



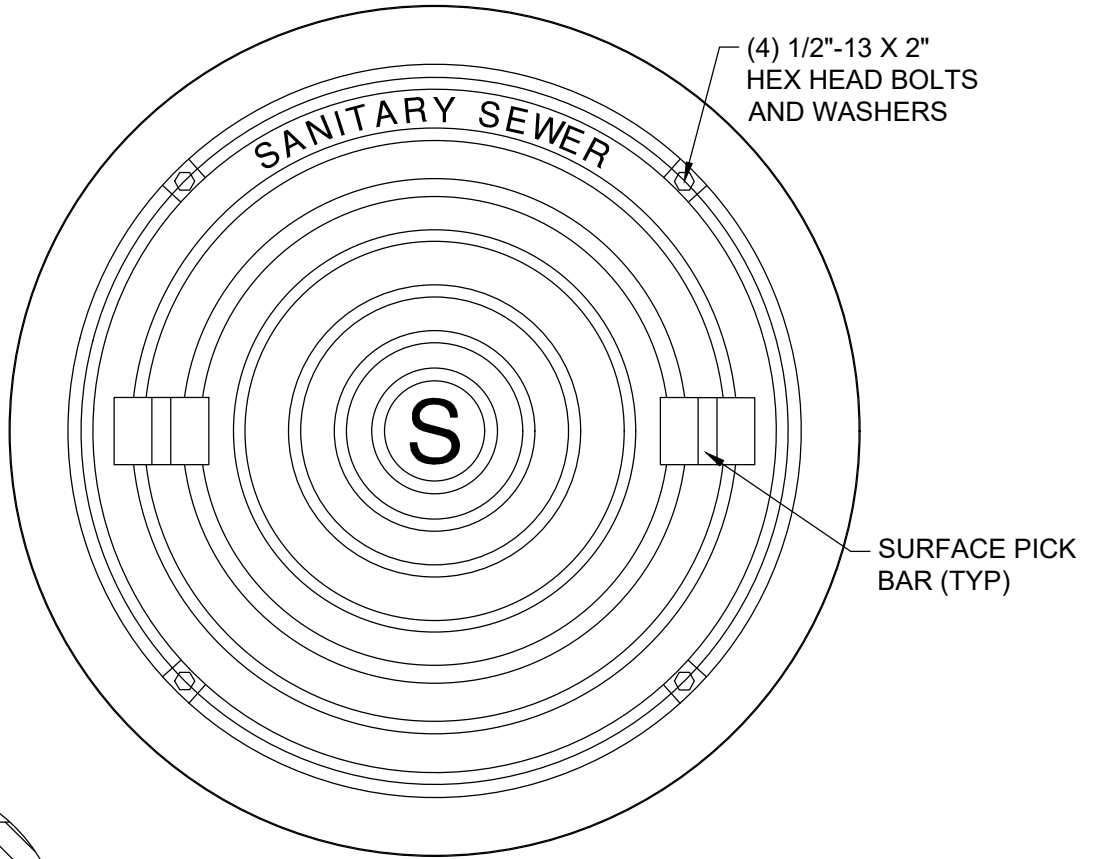
MANUFACTURER'S  
 IDENTIFICATION  
 ON THIS SURFACE

**Section "A-A"**

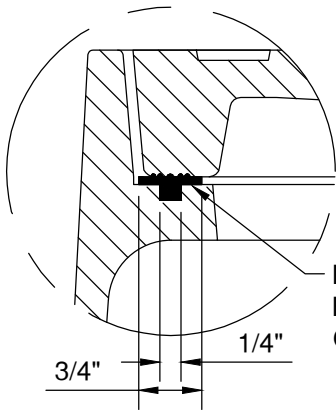
NOTE:  
 ALL DIMENSIONS MAY VARY EXCEPT THE DIAMETER OF THE LID, AND THE DIAMETER  
 OF THE CENTER LINE OF THE BOLT HOLES, AND THE MINIMUM DIAMETER OF THE CLEAR  
 OPENING. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 400 LBS.

**MANHOLE RING & COVER DETAIL**

PROPERTY OF 	DTL #329 MANHOLE RING & ENCASMENT DETAIL	<b>M&amp;S ENGINEERING</b> ELECTRICAL   CIVIL   MEP <small>TXENG FIRM # F-1394   TBPELS FIRM #10169800          WWW.MSENGR.COM   (830) 228-5446</small>	APPROVED	REVISION
			02/15/2022	07/23/2024
			SHEET	
		2 OF 2		

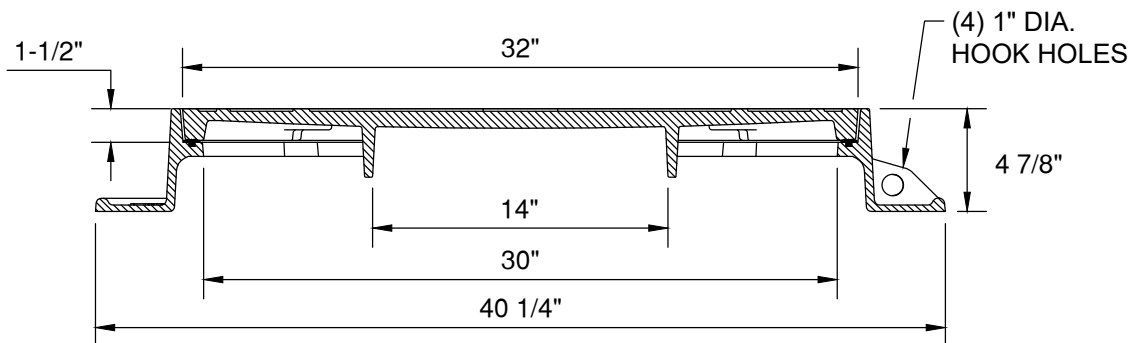


PLAN VIEW



GASKET DETAIL

MACHINE GROOVE IN  
 FRAME SEAT FOR  
 OIL-RESISTANT GASKET



SECTION VIEW

MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B



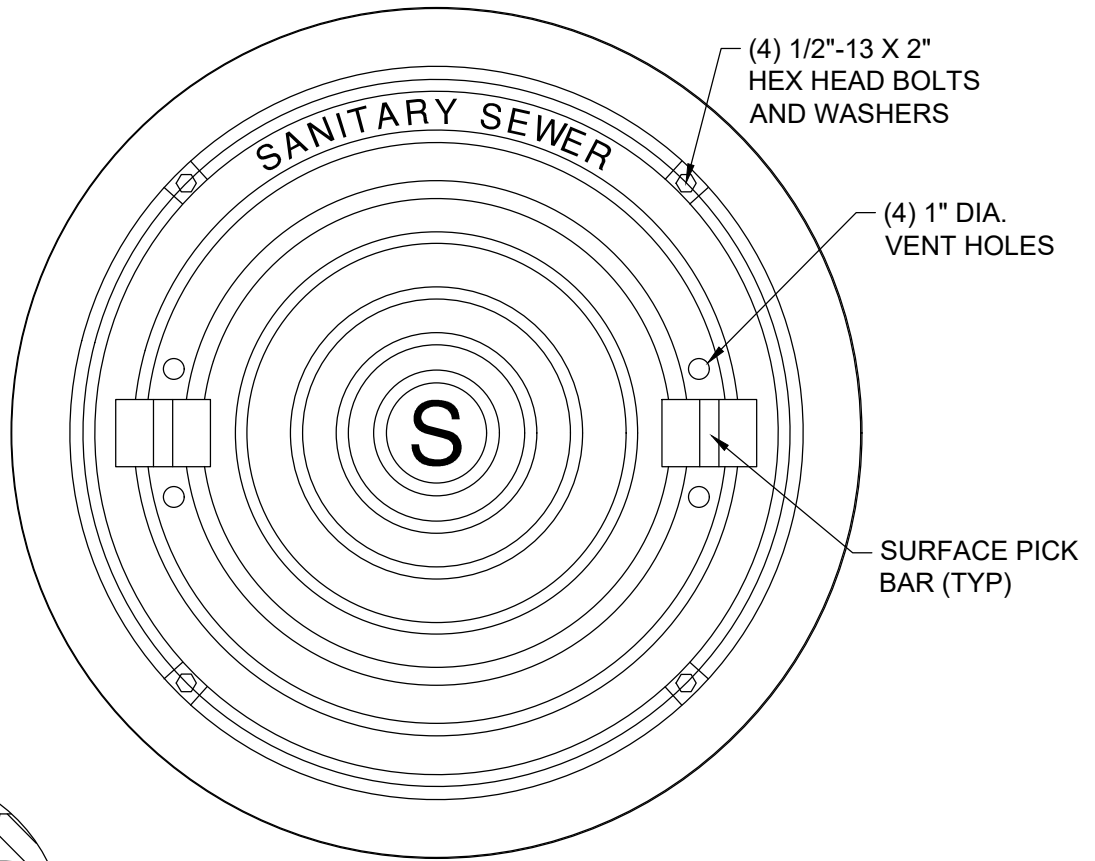
DTL #331  
 SANITARY SEWER  
 MANHOLE COVER



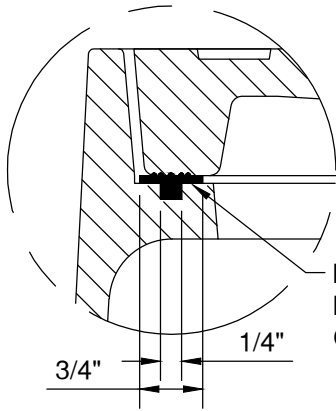
**M&S ENGINEERING**  
 ELECTRICAL | CIVIL | MEP  
 TXENG FIRM # F-1394 | TBPELS FIRM #10169800  
 WWW.MSENGR.COM | (830) 228-5446

APPROVED	REVISION
02/15/2022	

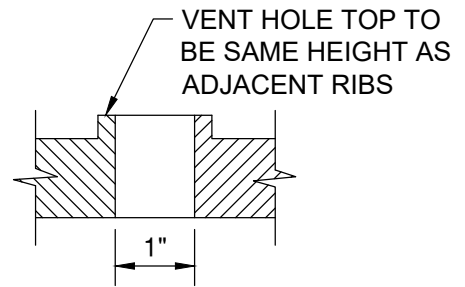
SHEET  
 1 OF 1



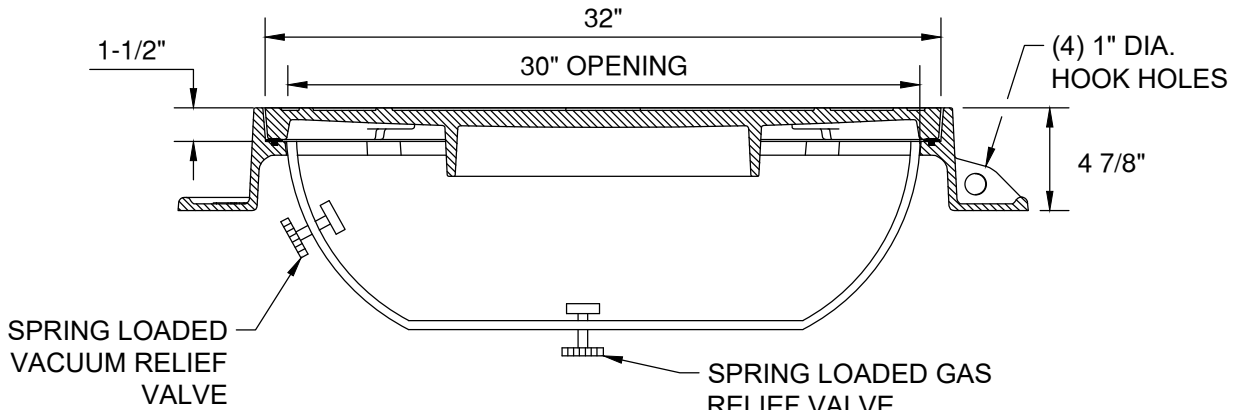
PLAN VIEW



GASKET DETAIL



VENT HOLE DETAIL



SECTION VIEW

MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B

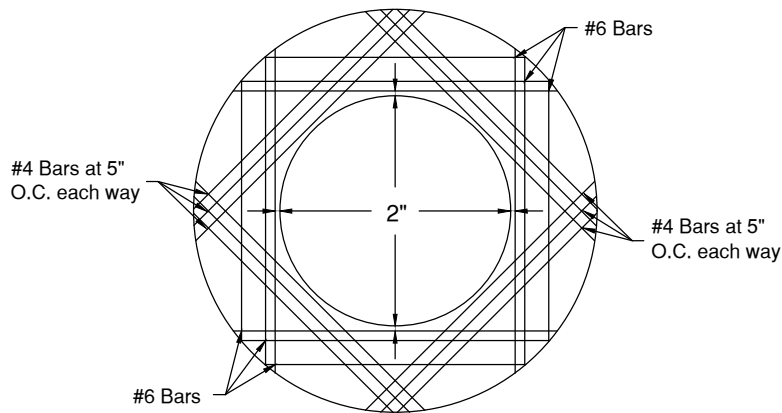


DTL #334  
 VENTED SANITARY SEWER  
 MANHOLE COVER

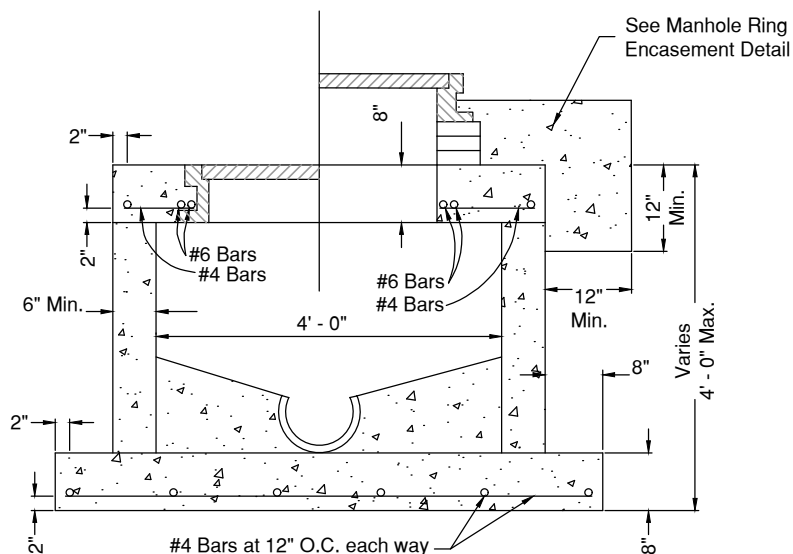


APPROVED	REVISION
02/15/2022	

SHEET  
 1 OF 1



**TOP SLAB**



**SHALLOW MANHOLE  
 PRECAST OR MONOLITHIC**

SIZE	A	B*	MANDREL O.D.		RING O.D.	
			PVC (SDR-35)	PVC (SDR-26)	PVC (SDR-35)	PVC (SDR-26)
6"	4.0"	4.5"	5.62	5.50	4.91	4.79
8"	5.5"	6"	7.52	7.37	6.81	6.66
10"	7.0"	7.5"	9.41	9.21	8.70	8.50
12"	8.0"	9"	11.19	10.96	10.48	10.25
15"	10.0"	11"	13.70	13.42	12.99	12.71
18"	12.0"	13.5"	16.75	---	16.04	---
21"	14.0"	16"	19.74	---	19.03	---
24"	16.0"	18"	22.21	---	21.50	---
27"	18.0"	20"	25.03	---	24.32	---

\* MINIMUM LENGTH

Note:  
 PVC pipes and fittings six inches (6") to fifteen inches (15") in diameter shall conform to ASTM D-3034.  
 PVC pipes and fittings eighteen inches (18") to twenty-seven (27") in diameter shall conform to ASTM F-679.

This information is provided as a reference. All deflection testing shall be done in accordance with TCEQ Chapter 317.

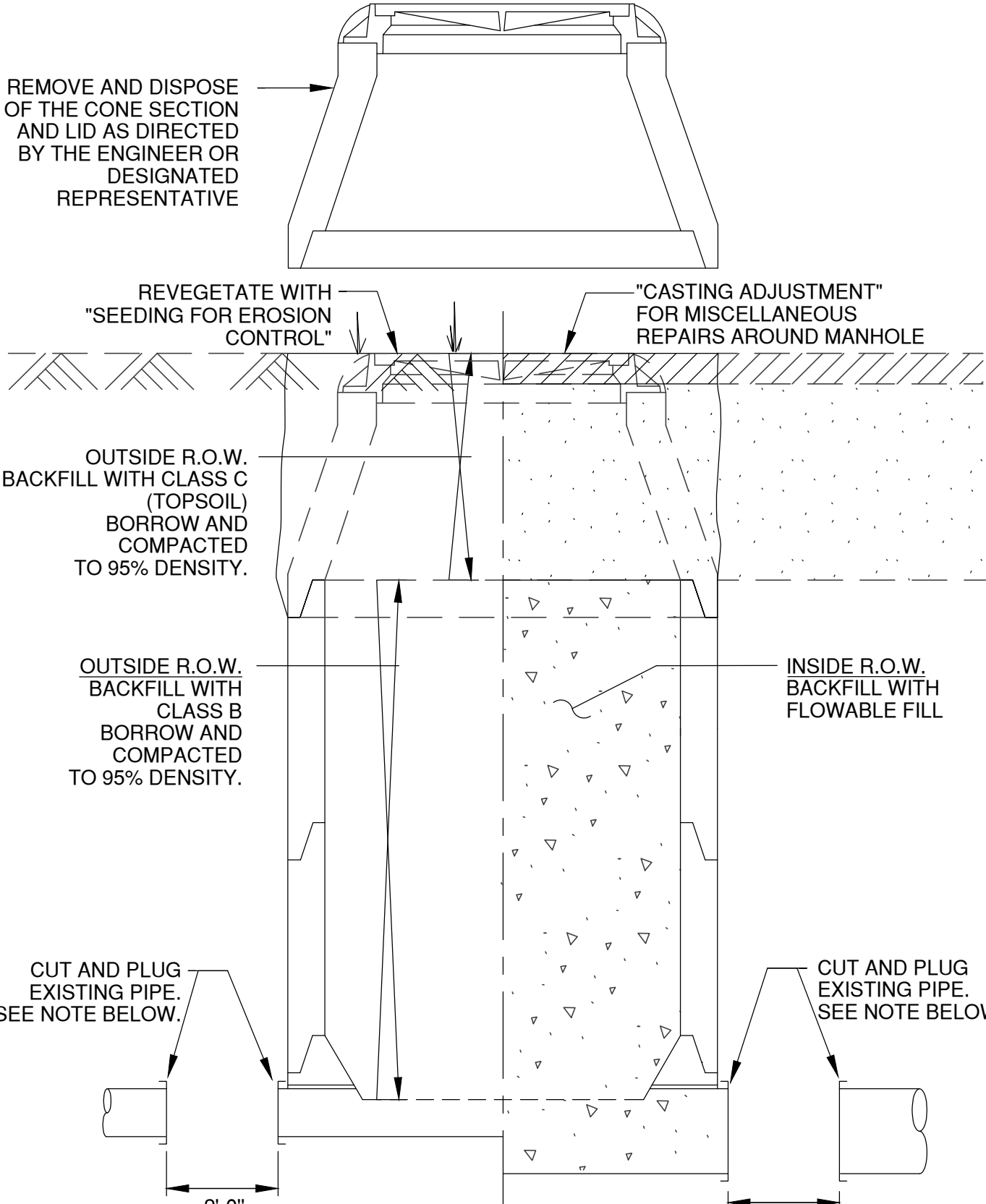
**CHART**




PROPERTY OF  
 DTL #335  
 SHALLOW MANHOLE:  
 PRECAST OR MONOLITHIC,  
 TOP SLAB & CHART

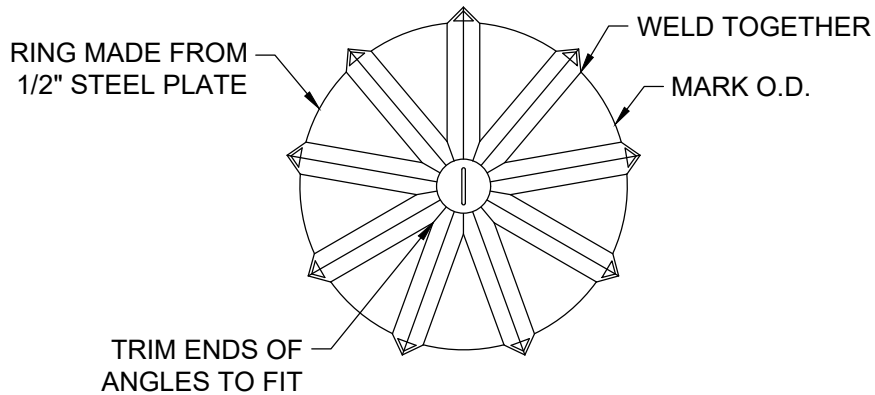


APPROVED	REVISION
02/15/2022	
SHEET	
1	OF 1



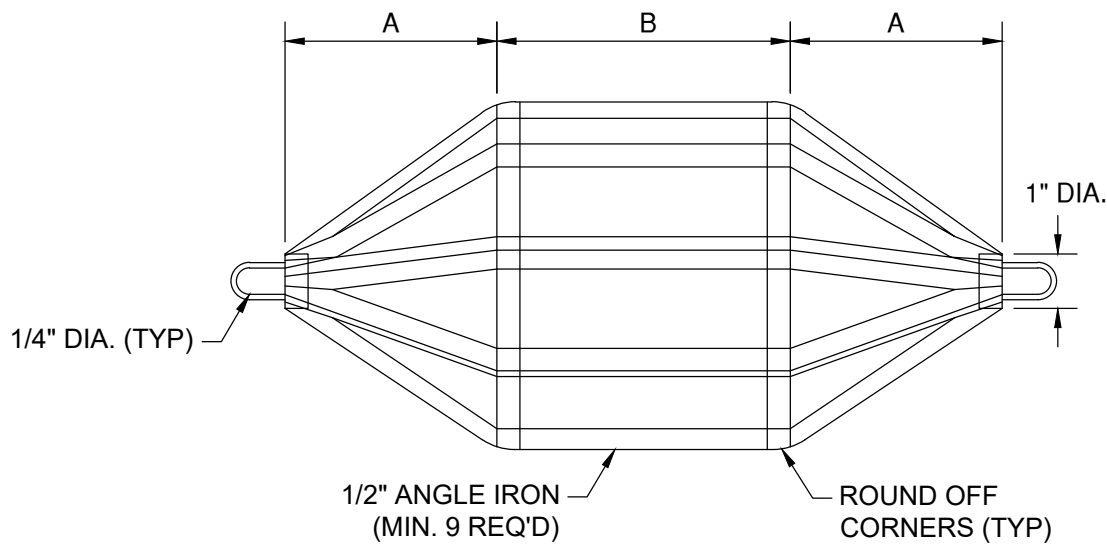
**NOTE:**  
 THE PLUG SHOULD BE COMPOSED OF A MATERIAL SIMILAR TO THE EXISTING PIPE AS INSTRUCTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.

 <p>PROPERTY OF  <b>CRYSTAL CLEAR</b>          SPECIAL UTILITY DISTRICT</p>	<p>DTL #340                  ABANDONED MANHOLE</p>	 <p><b>M&amp;S ENGINEERING</b>                  ELECTRICAL   CIVIL   MEP  <small>TXENG FIRM # F-1394   TBPELS FIRM #10169800                  WWW.MSENGR.COM   (830) 228-5446</small></p>	APPROVED	REVISION
			02/15/2022	
			<p><b>SHEET</b>                  1 OF 1</p>	



END VIEW

DIMENSIONS  
 A - 67% OF PIPE I.D.  
 B - 75% OF PIPE I.D.



SIDE OR TOP VIEW

MANDREL REQUIREMENTS:

1. O.D. NOT LESS THAN 95% OF THE I.D. OF THE PIPE, AS SPECIFIED BY THE ASTM, AWWA, UNI-BELL OR ANSI.
2. ABLE TO WITHSTAND 200 PSI WITHOUT BEING DEFORMED.
3. ODD NUMBER OF RUNNERS OR LEGS.

\*THIS INFORMATION IS PROVIDED AS A REFERENCE. ALL DEFLECTION TESTING SHALL BE DONE IN ACCORDANCE WITH TCEQ CHAPTER 217.

PROPERTY OF 	DTL #350 GO, NO GO DEFLECTION TESTING MANDREL	 <b>M&amp;S ENGINEERING</b> ELECTRICAL   CIVIL   MEP <small>TXENG FIRM # F-1394   TBPELS FIRM #10169800                  WWW.MSENGR.COM   (830) 228-5446</small>	APPROVED	REVISION
			02/15/2022	
			SHEET 1 OF 1	