

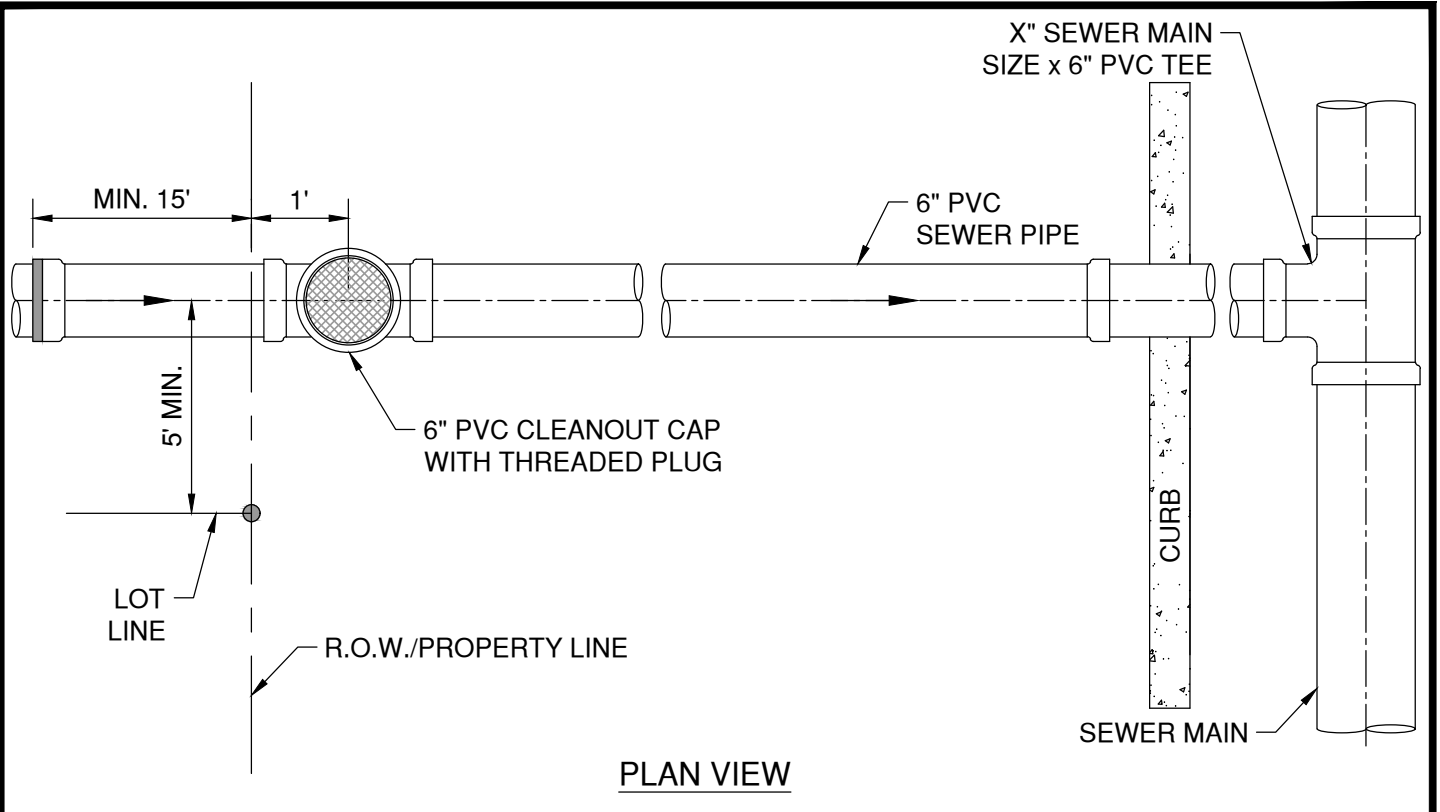
R.O.W. OR ESMT. LINE

DEPTH OF CONC. IS EQUAL TO BOTTOM OF TRENCH TO TOP OF FIRST 45° BEND

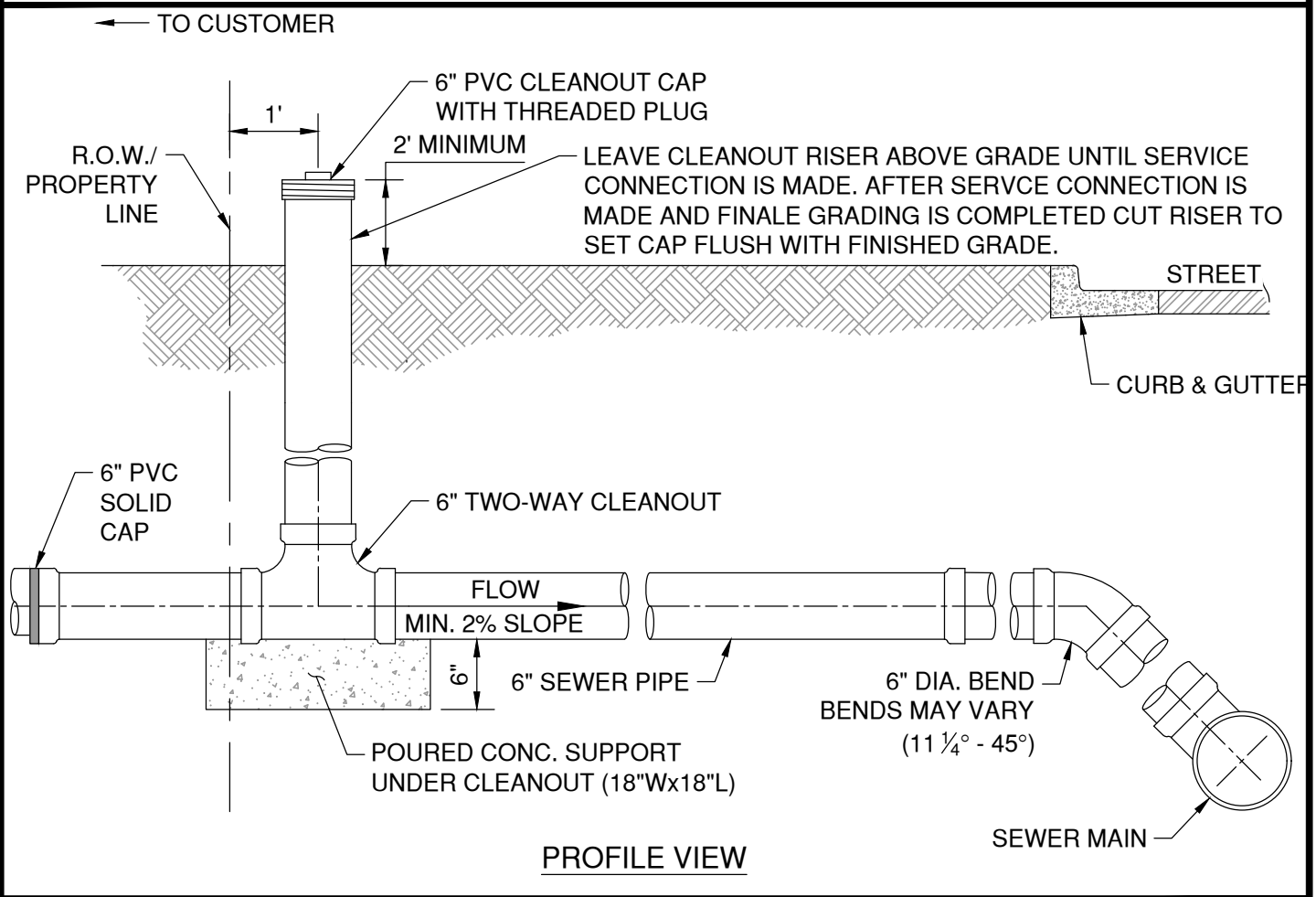
CONCRETE AT SERVICE CONNECTION SHALL COMPLETELY FILL TRENCH WIDTH TO DEPTH INDICATED ON DETAIL AND EXTEND 6" EACH WAY BEYOND TEE OR WYE JOINTS.

*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)

CONCRETE ENCASEMENT FOR SERVICE CONNECTION



PLAN VIEW



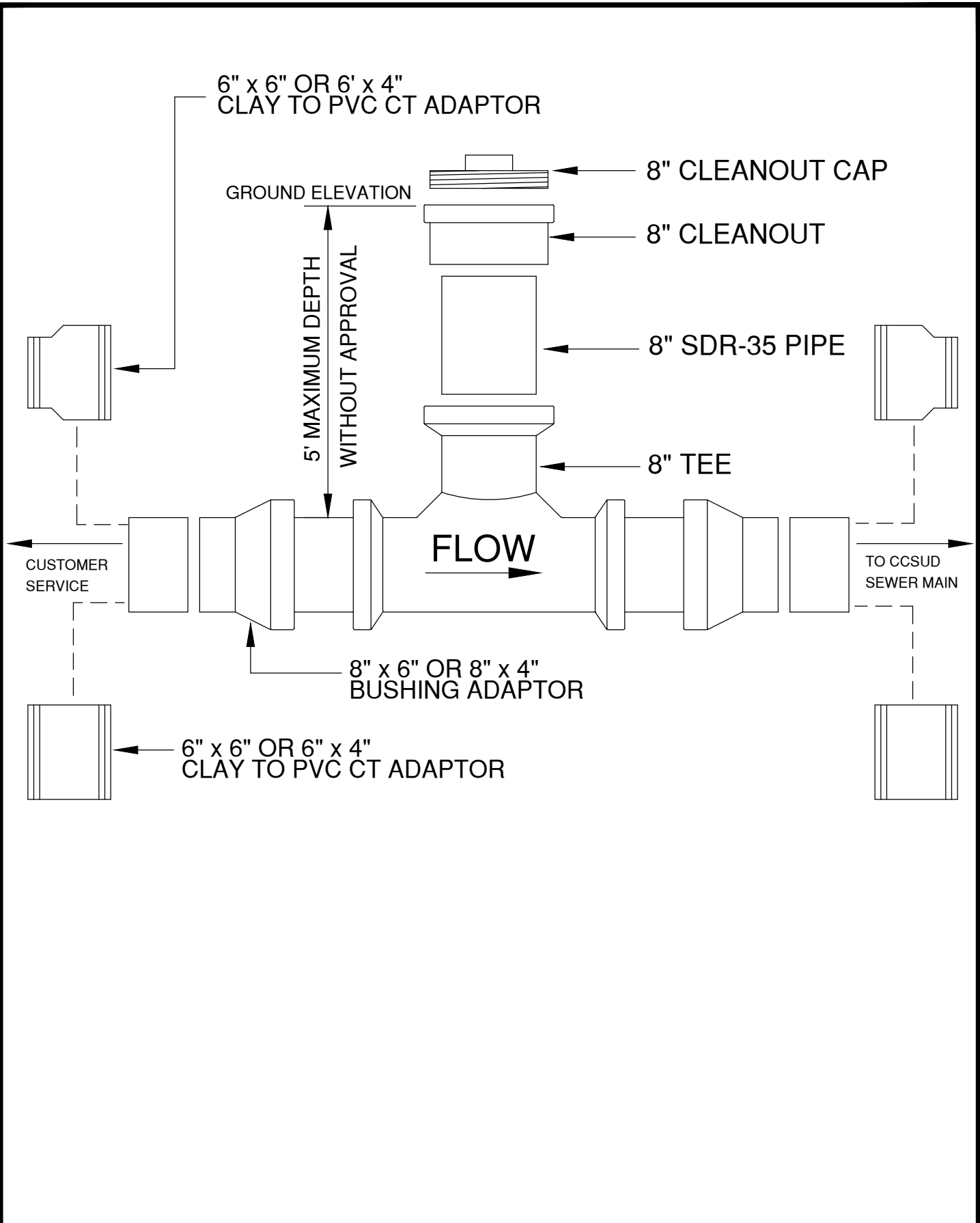
PROFILE VIEW

PROPERTY OF 	DTL #302 SINGLE WASTEWATER SERVICE CONNECTION DETAIL	 M&S ENGINEERING ELECTRICAL CIVIL MEP <small>TXENG FIRM # F-1394 TBPOLS FIRM #10169800 WWW.MSENGR.COM (830) 228-5446</small>	APPROVED 02/15/2022	REVISION 03/09/2023	
	SHEET 1 OF 2				

NOTES:

1. CONTRACTOR, DURING SUBDIVISION CONSTRUCTION, SHALL INSTALL WASTEWATER CONNECTION TO MAIN, 6" STUB WITH 6" SERVICE BRANCH WITH 2-WAY CLEANOUT, CONCRETE SUPPORT (MIN. 18"Wx18"Lx6"H), RISER FOR CLEAN OUT (CAPPED), MINIMUM 15' EXTENSION, AND PLUG. ALL WASTEWATER PIPING SHALL HAVE ELASTOMERIC GASKET TYPE JOINTS AND SHALL SLOPE DOWNWARD TO MAIN 2%, 1/4" PER FOOT, MINIMUM TO 45° MAXIMUM. DEPTH OF SERVICE STUB AT PROPERTY LINE WILL BE SHOWN ON PLANS BY ENGINEER OR DESIGNATED REPRESENTATIVE IF GREATER THAN 4', OTHERWISE, THE INSTALLED DEPTH WILL TYPICALLY BE 4' TO 6'. IF WASTEWATER SERVICE LINE TO MAIN REQUIRES DEFLECTION EXCEEDING 45°, REFER TO DTL #301. ALL INSTALLATIONS SHALL BE MADE IN ACCORDANCE WITH INFORMATION SHOWN ON APPLICABLE STANDARD DRAWINGS AND WILL BE INSPECTED BY CCSUD CONSTRUCTION INSPECTION PERSONNEL.
2. 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. CLEANOUTS SHALL BE HORIZONTALLY PLACED 5' FROM LOT LINE. THE WYE FOR DOUBLE SEWER TAPS SHALL NOT BE PLACED WITHIN EASEMENT.
3. SEWER LATERAL PIPE SHALL BE INSTALLED BENEATH OTHER UTILITIES (IF POSSIBLE) WITH A MINIMUM VERTICAL CLEARANCE OF 1' ABOVE AND BELOW SEWER PIPE.
4. CUSTOMER SHALL REMOVE PLUG, INSTALL 4" WASTEWATER LINE [EXTEND 4" PIPE 6" MINIMUM INTO 6" PIPE AND JOINT WITH FLEXIBLE ADAPTOR]. IF WASTEWATER WILL NOT SATISFACTORILY FLOW BY GRAVITY TO SEWER MAIN ADJACENT TO PROPERTY, PUMP EQUIPMENT MUST BE PROVIDED BY THE CUSTOMER AS PART OF CUSTOMER'S WASTEWATER SYSTEM.
5. CUSTOMER IS RESPONSIBLE FOR PIPING SYSTEM UNTIL WASTEWATER IS CONNECTED. ANY MISSING OR DAMAGED PARTS SHALL BE REINSTALLED BY CUSTOMER WHO SHALL GUARANTEE, FOR A PERIOD OF TWO (2) YEARS FROM DATE OF FINAL ACCEPTANCE, THAT CONNECTIONS TO CCSUD SYSTEMS ARE FREE FROM DEFECTS IN WORKMANSHIP OR MATERIALS. CUSTOMER ALSO HAS THE RESPONSIBILITY TO ASSURE THAT 2-WAY CLEANOUTS REMAIN CLEAR OF SIDEWALKS AND OTHER OBSTRUCTIONS.
6. CCSUD'S ACTIVITY IS LIMITED TO INSPECTION OF CONNECTIONS TO THE WASTEWATER SYSTEM. FOR MAINTENANCE PURPOSES, CCSUD'S RESPONSIBILITY ENDS AT THE CUSTOMER'S WASTEWATER CONNECTION TO THE 2-WAY CLEANOUT OR THE PROPERTY LINE, WHICHEVER IS CLOSER TO WASTEWATER MAIN.
7. PIPING IN STREET RIGHT-OF-WAY AND IN EASEMENT AREA SHALL BE BEDDED IN GRANULAR MATERIALS AS REQUIRED BY CCSUD STANDARD SPECIFICATION; MATERIALS SHALL BE AS SPECIFIED; BACKFILL ABOVE THE GRANULAR BEDDING. SERVICE LINES IN THESE AREAS SHALL HAVE A MINIMUM COVER BELOW FINAL STREET GRADE OF 42"; ANY EXCEPTION MUST BE SPECIFICALLY APPROVED BY THE ENGINEER.

PROPERTY OF 	DTL #302 SINGLE WASTEWATER SERVICE CONNECTION DETAIL	 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	03/09/2023
			SHEET 2 OF 2	



PROPERTY OF



CRYSTAL CLEAR
SPECIAL UTILITY DISTRICT

DTL #304
 WASTEWATER SAMPLING SITE
 FOR SERVICE 5' AND UNDER IN
 DEPTH (FROM GROUND ELEV.)

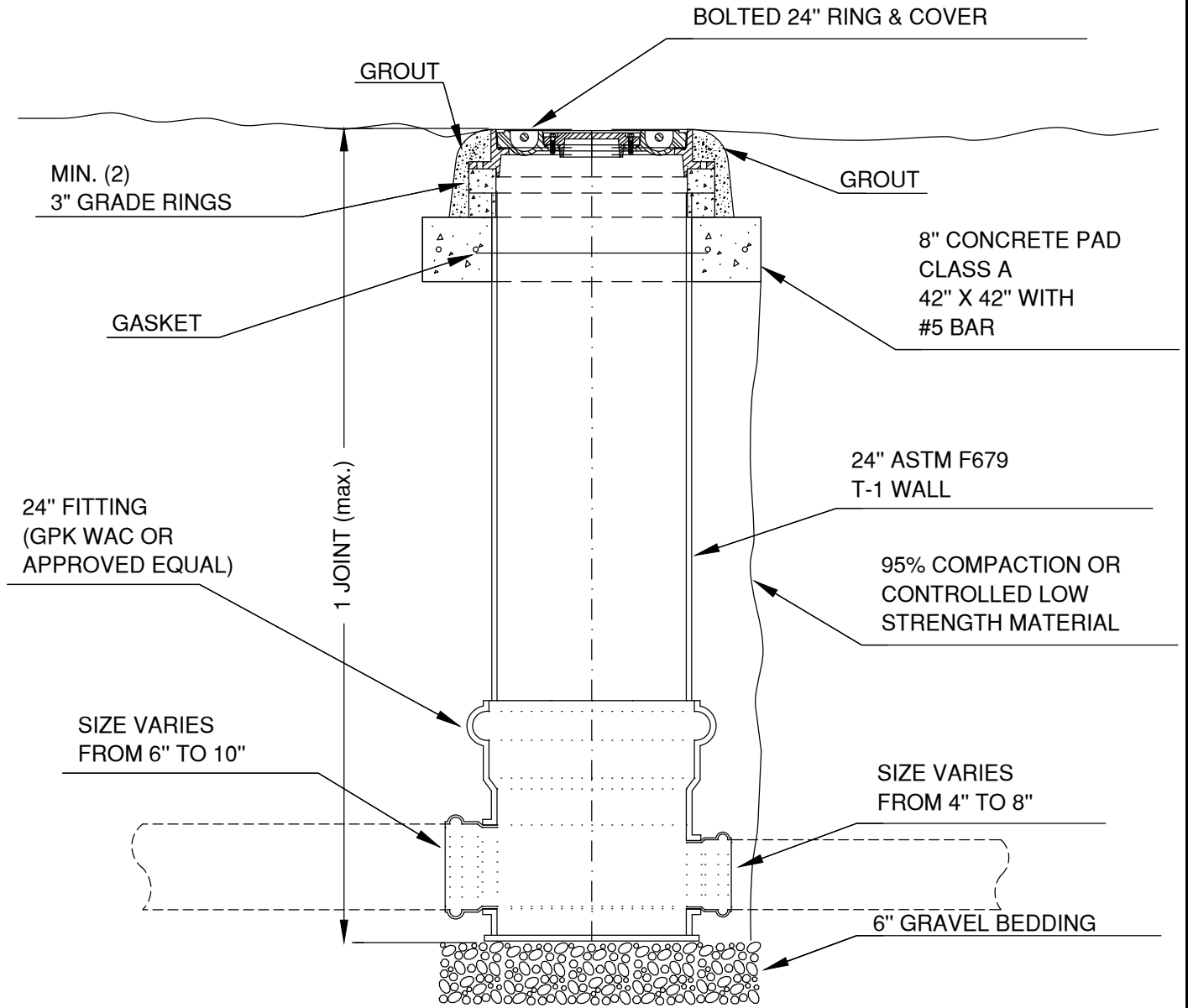


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DISTRICT SIDE

OWNER SIDE



PROPERTY OF



DTL #305
 CONTROL OR MINI MANHOLE



M&S ENGINEERING
 ELECTRICAL | CIVIL | MEP
 TXENG FIRM # F-1394 | TBPELS FIRM #10169800
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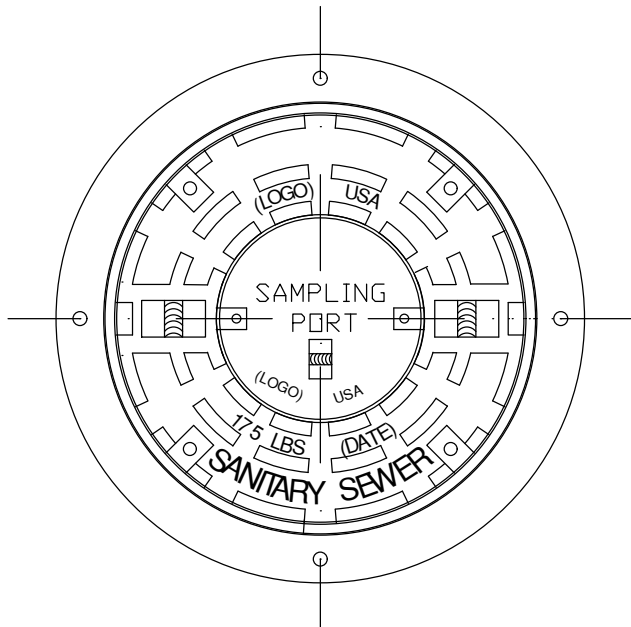
REVISION

02/15/2022

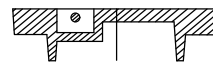
SHEET

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BOLTED 24" RING & COVER



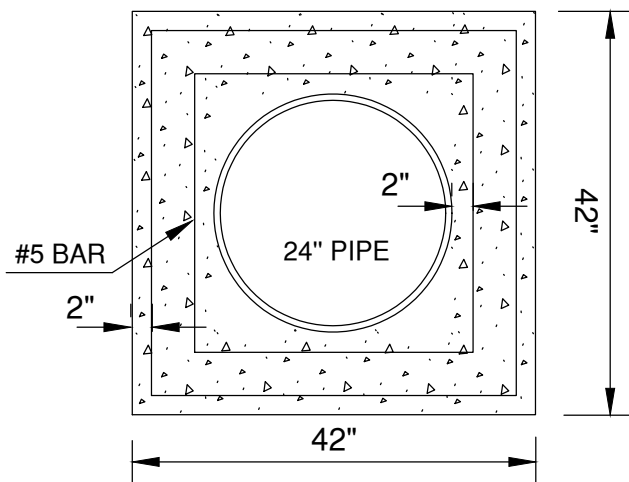
SAMPLING PORT COVER



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



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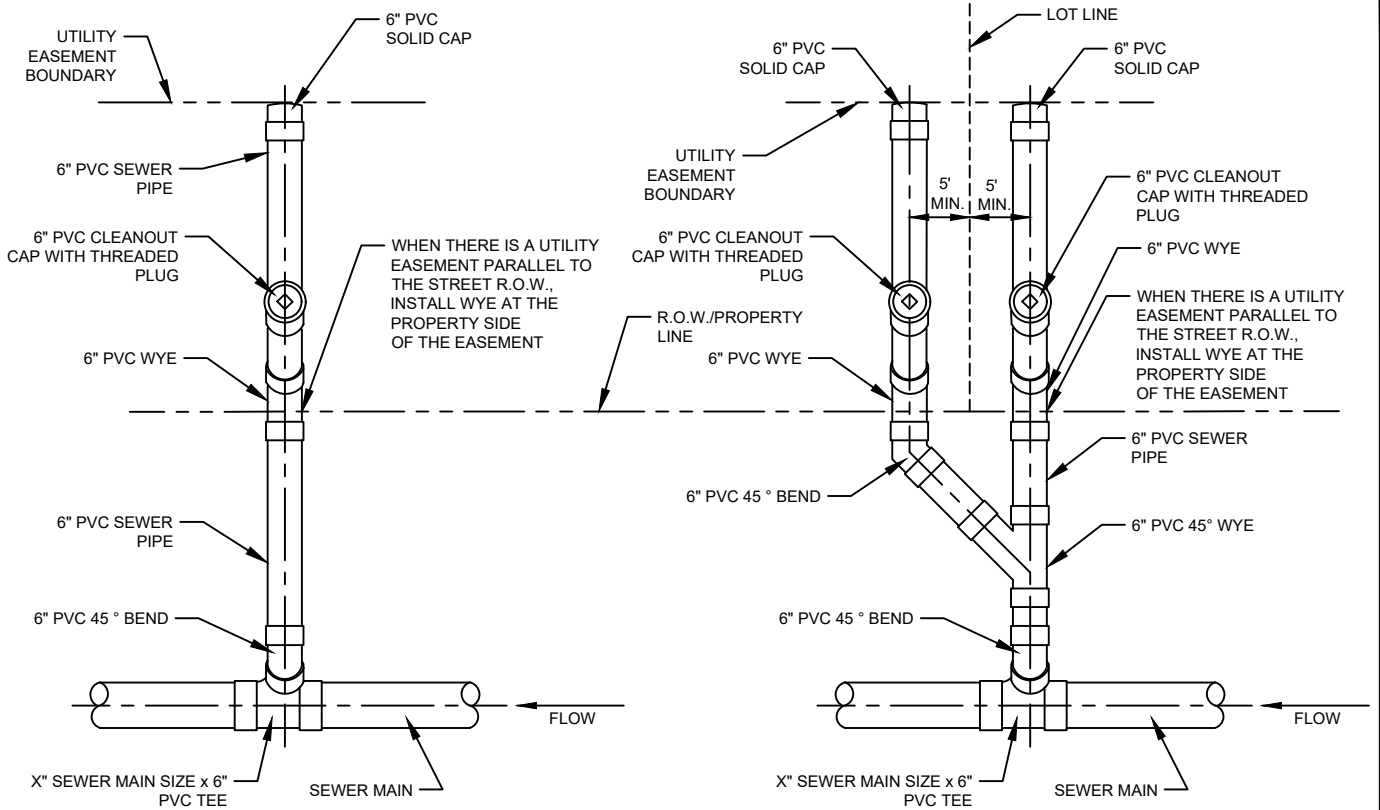
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REVISION

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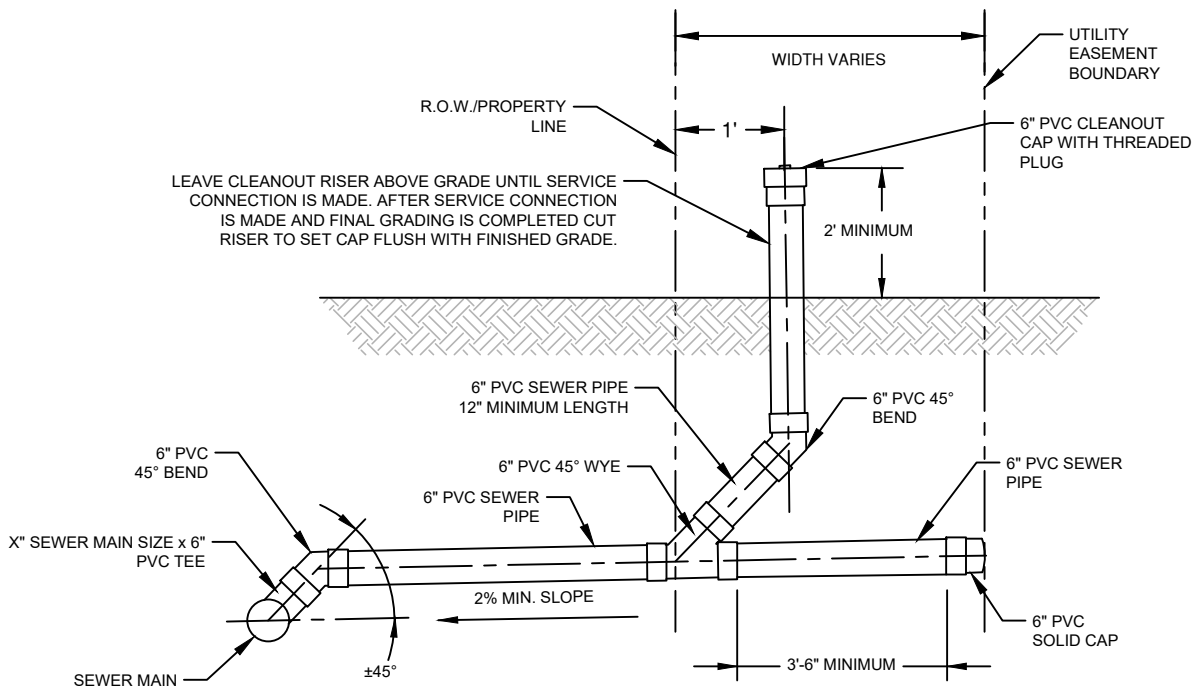
SHEET

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SINGLE SERVICE PLAN

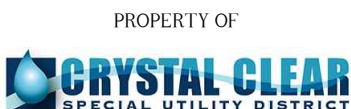
DOUBLE SERVICE PLAN



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.
3. WYE FOR DOUBLE SEWER TAP SHALL NOT BE PLACED WITHIN EASEMENT.

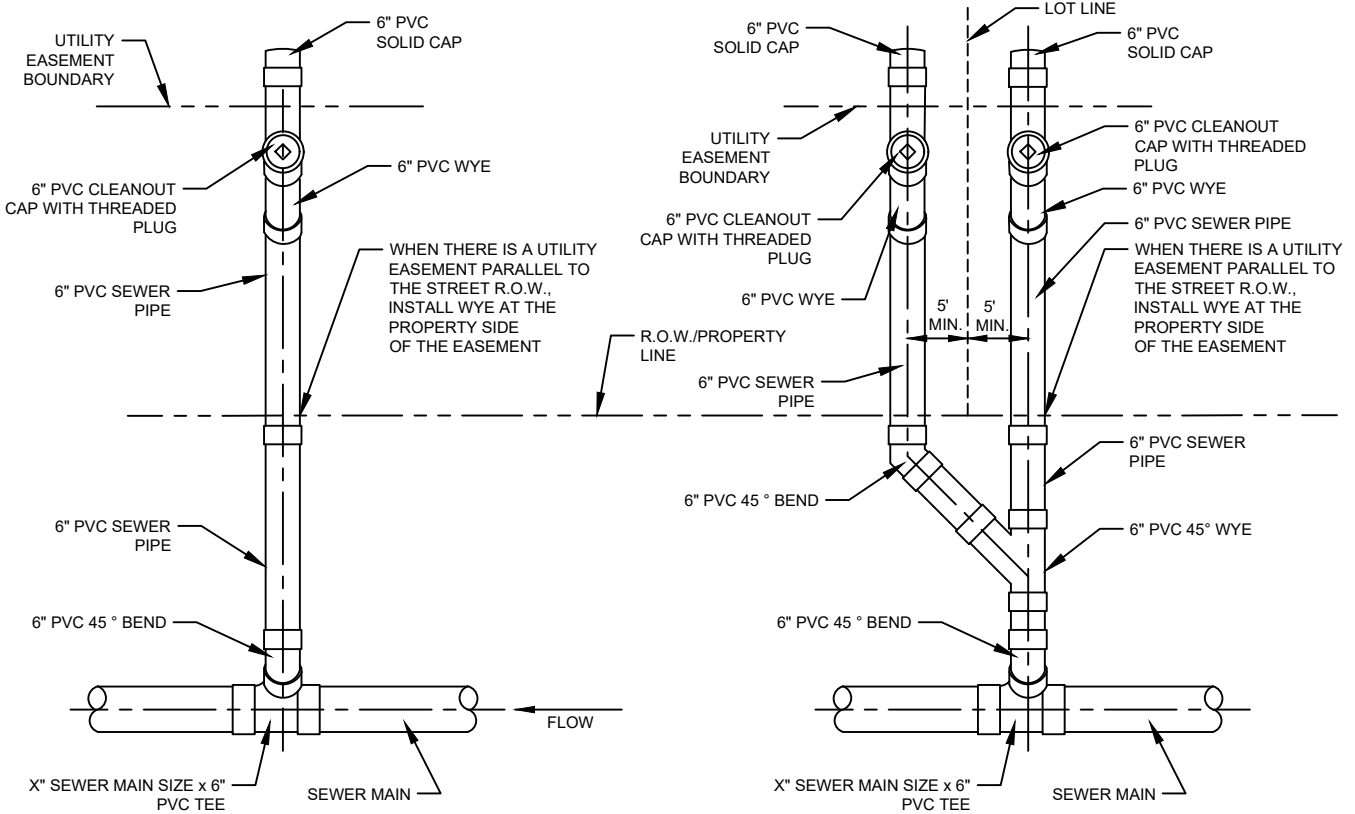


DTL #306 - A
 SEWER CLEANOUT
 ASSEMBLY
 LAYOUT 1
 (FRONT OF EASEMENT)



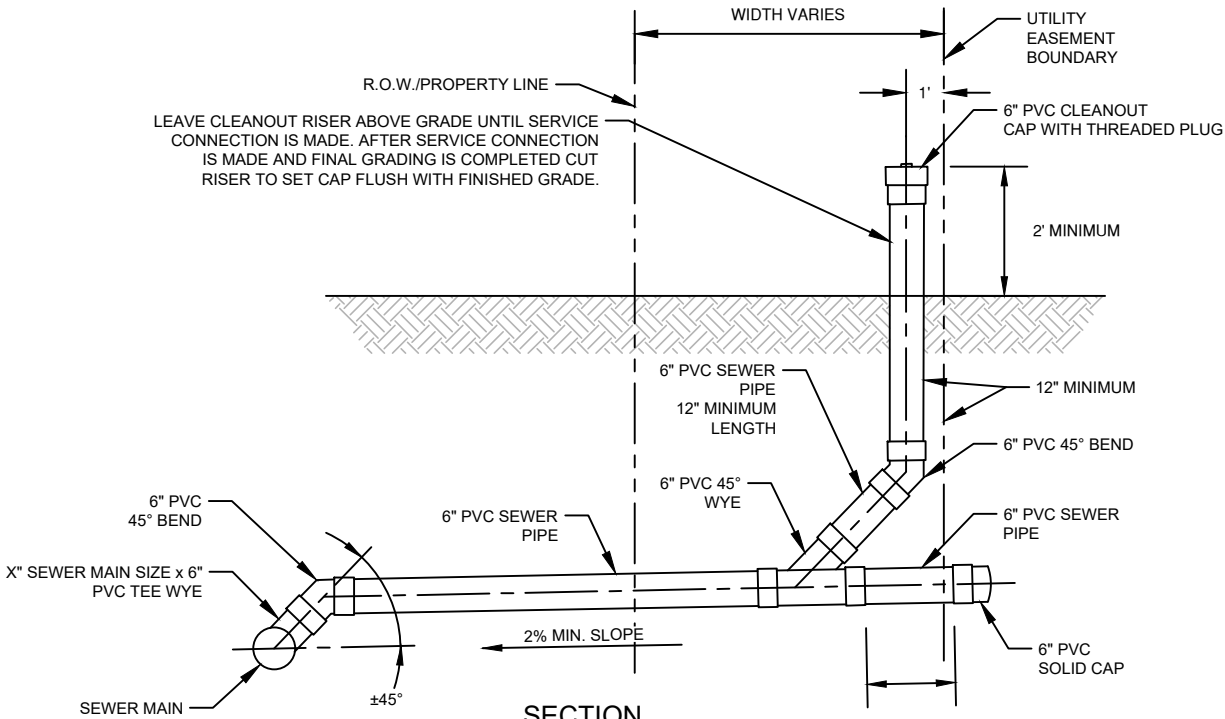
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SHEET	
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SINGLE SERVICE PLAN



DOUBLE SERVICE PLAN

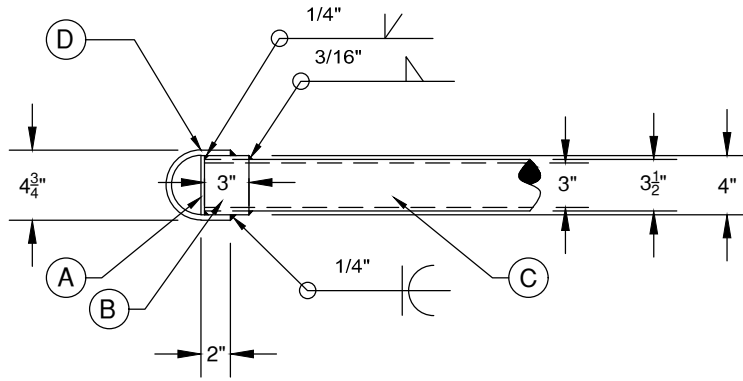


SECTION

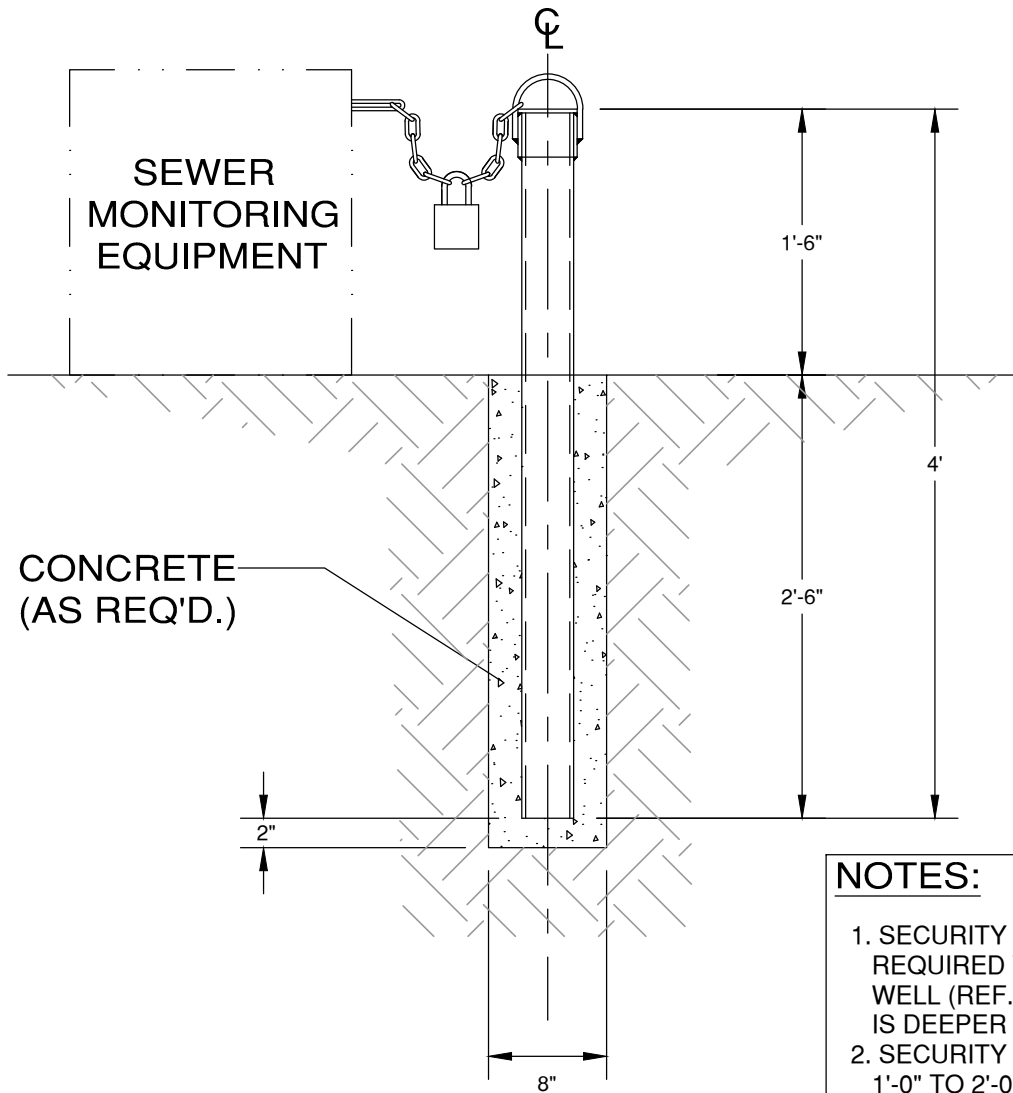
NOTES:

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.
3. SEWER LATERAL PIPE SHALL BE INSTALLED BENEATH OTHER UTILITIES (IF POSSIBLE) WITH A MINIMUM VERTICAL CLEARANCE OF 1' ABOVE AND BELOW THE SEWER PIPE.
4. WYE FOR DOUBLE SEWER TAP SHALL NOT BE PLACED WITHIN EASEMENT.

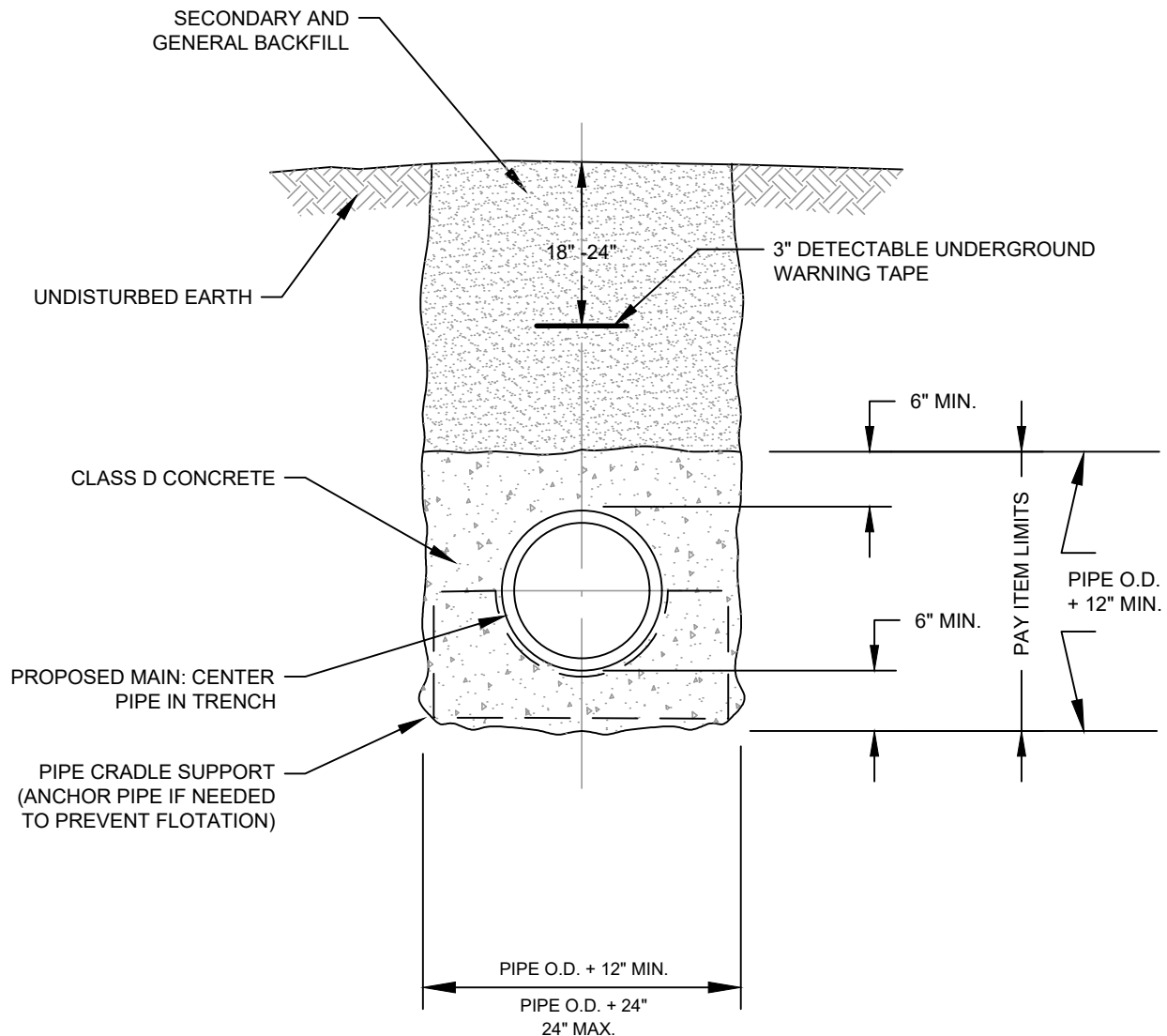
	DTL #306 - B SEWER CLEANOUT ASSEMBLY LAYOUT 2 (BACK OF EASEMENT)	 <p>M&S ENGINEERING ELECTRICAL CIVIL MEP <small>TXENG FIRM # F-1394 TBPELS FIRM #10169800 WWW.MSENGR.COM (830) 228-5446</small></p>	APPROVED 11/21/2022	REVISION
	SHEET 1 OF 1			



- 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



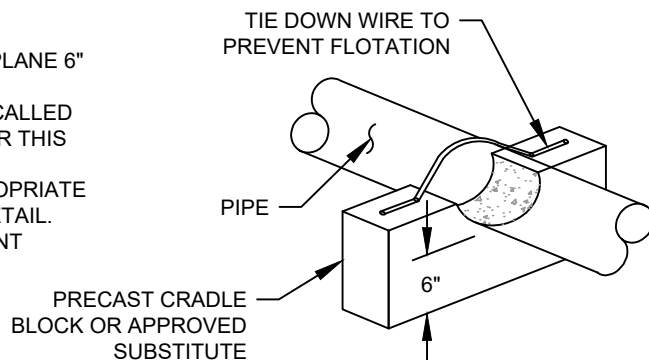
- NOTES:**
1. SECURITY POST WILL BE REQUIRED WHERE SAMPLING WELL (REF. DWG. 304) IS DEEPER THAN 5'-0"
 2. SECURITY POST TO BE LOCATED 1'-0" TO 2'-0" FROM SAMPLING WELL



CONCRETE ENCASEMENT



NOTES:

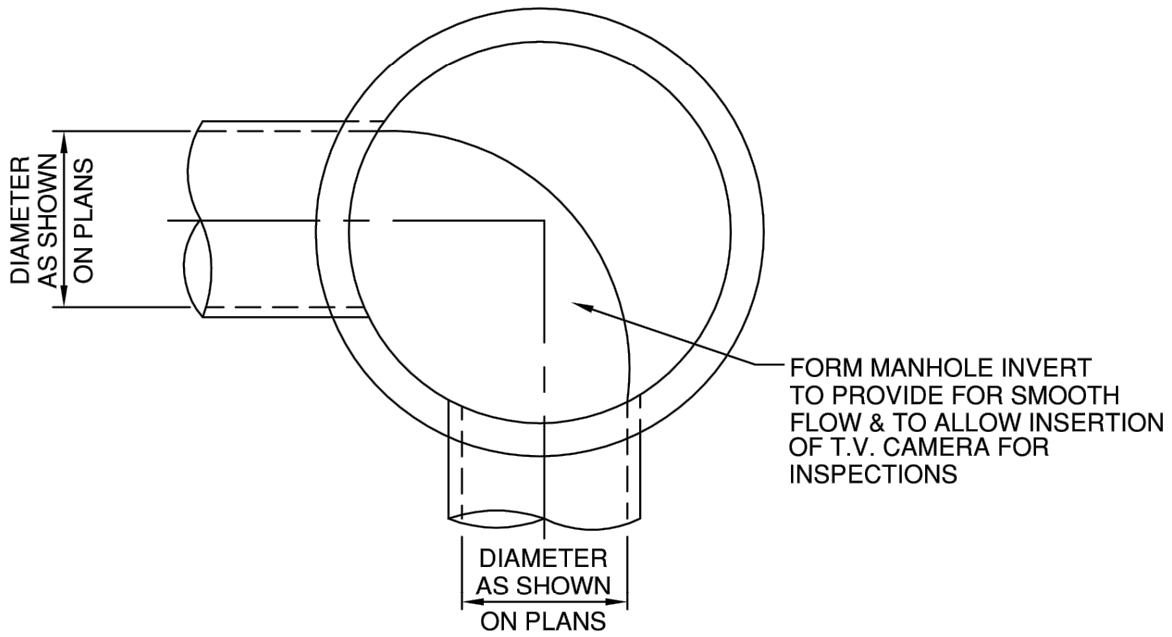
1. ALL CONCRETE ENCASEMENT SHALL BE POURED AT A PLANE 6" ABOVE THE PIPE BETWEEN EXCAVATED TRENCH WALL.
2. CONCRETE ENCASEMENT WILL BE USED ONLY WHERE CALLED OUT IN THE PLANS AND LIMITS OF PAYMENT WILL BE PER THIS DETAIL.
3. BACKFILL AND RESTORATION WORK WILL BE PER APPROPRIATE TRENCH DETAIL WITH EMBEDMENT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



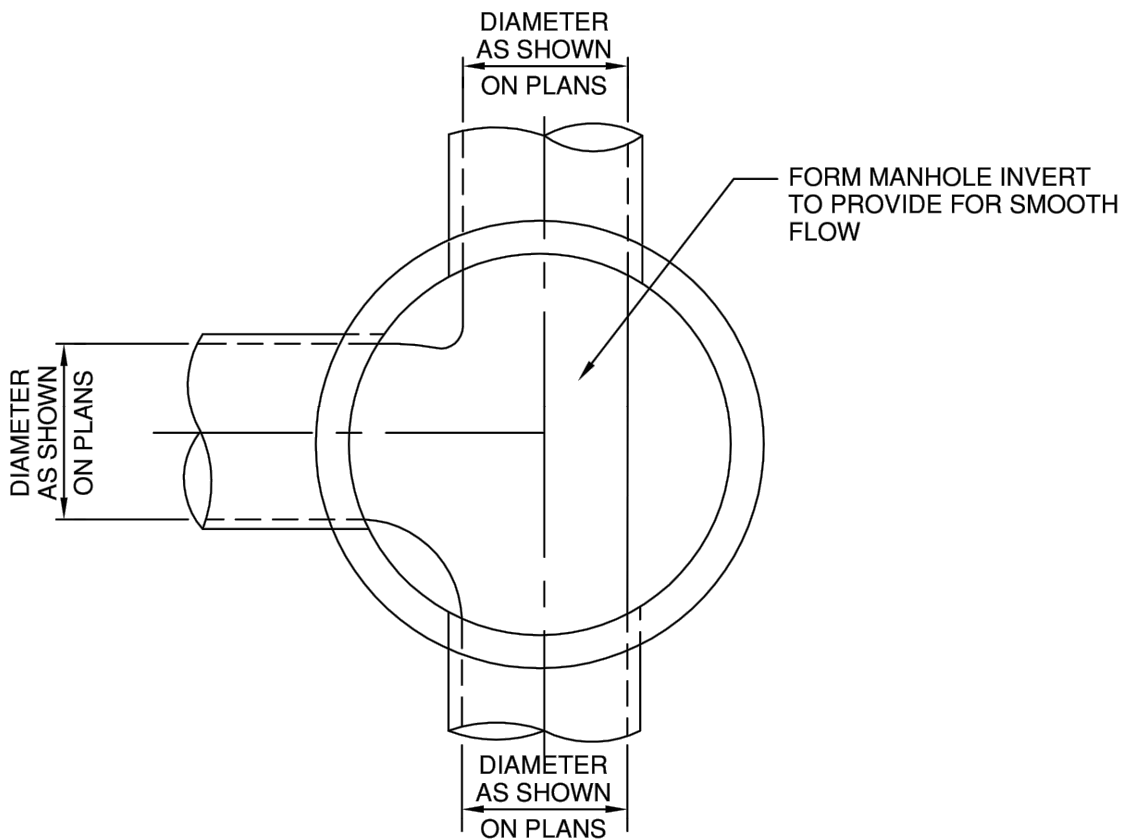
PIPE CRADLE SUPPORT

NOT TO SCALE

PROPERTY OF 	DTL #310 CONCRETE ENCASEMENT	 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		
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TYPICAL MANHOLE AT ANGLE IN SEWER



TYPICAL JUNCTION MANHOLE

PROPERTY OF



DTL #320
 MANHOLE INVERT PLAN



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STANDARD MANHOLE

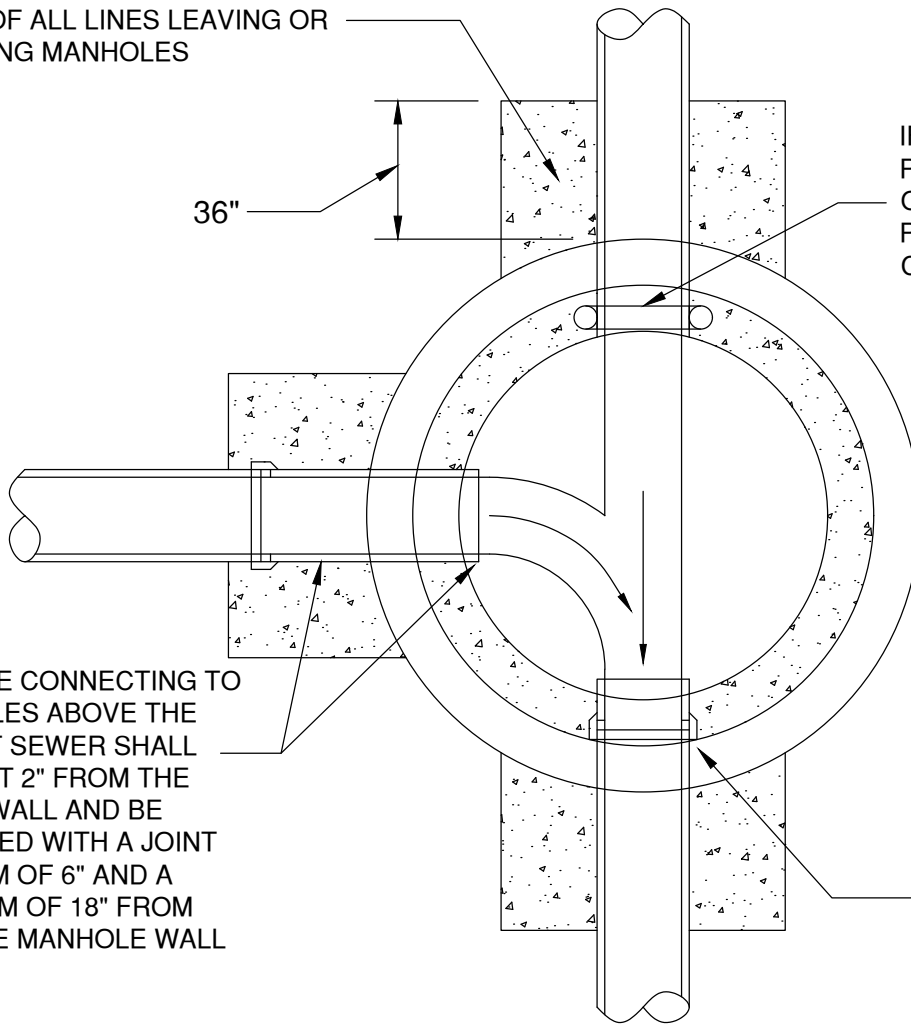
CONCRETE CRADLE TO NEAREST POINT OF ALL LINES LEAVING OR ENTERING MANHOLES

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



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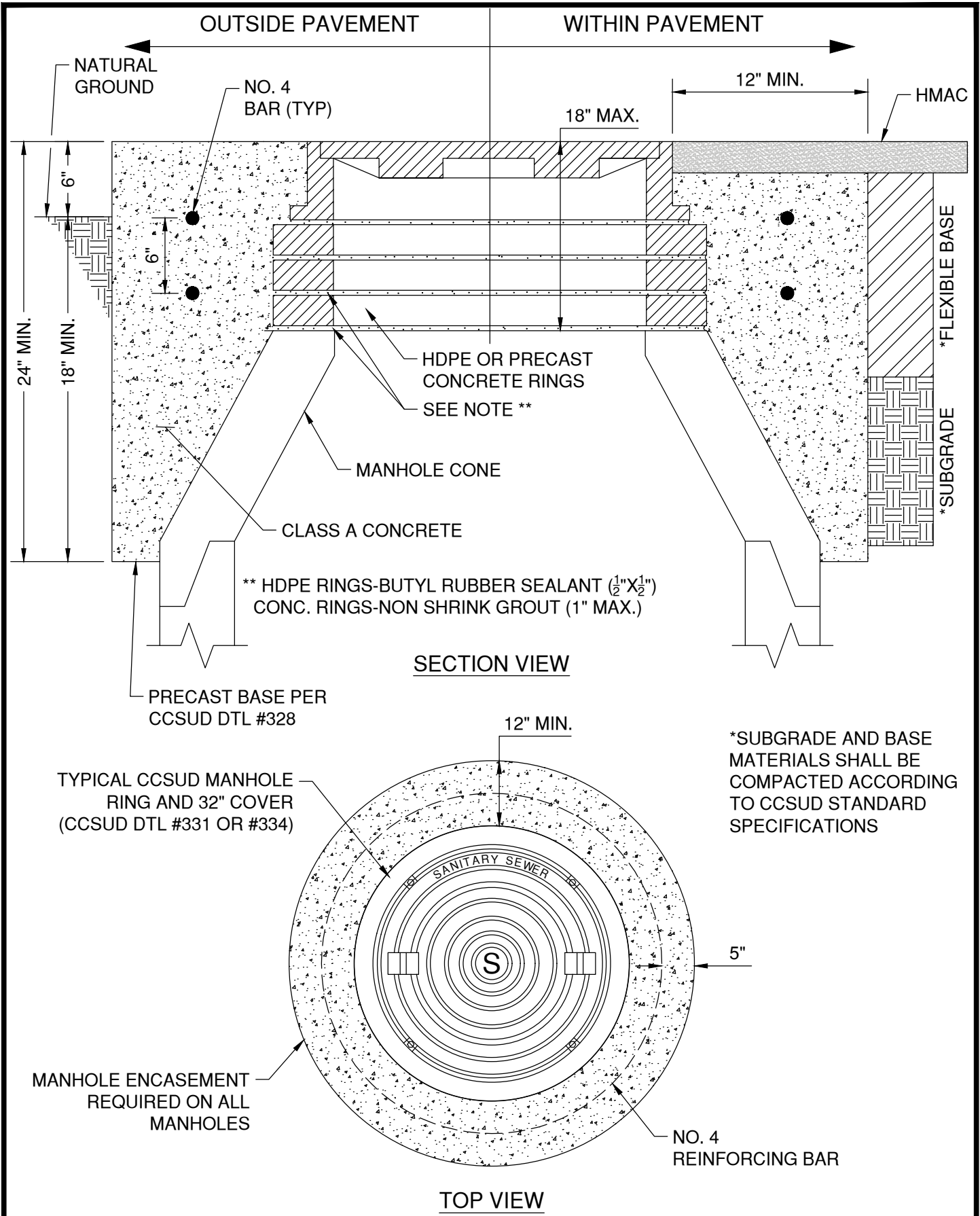
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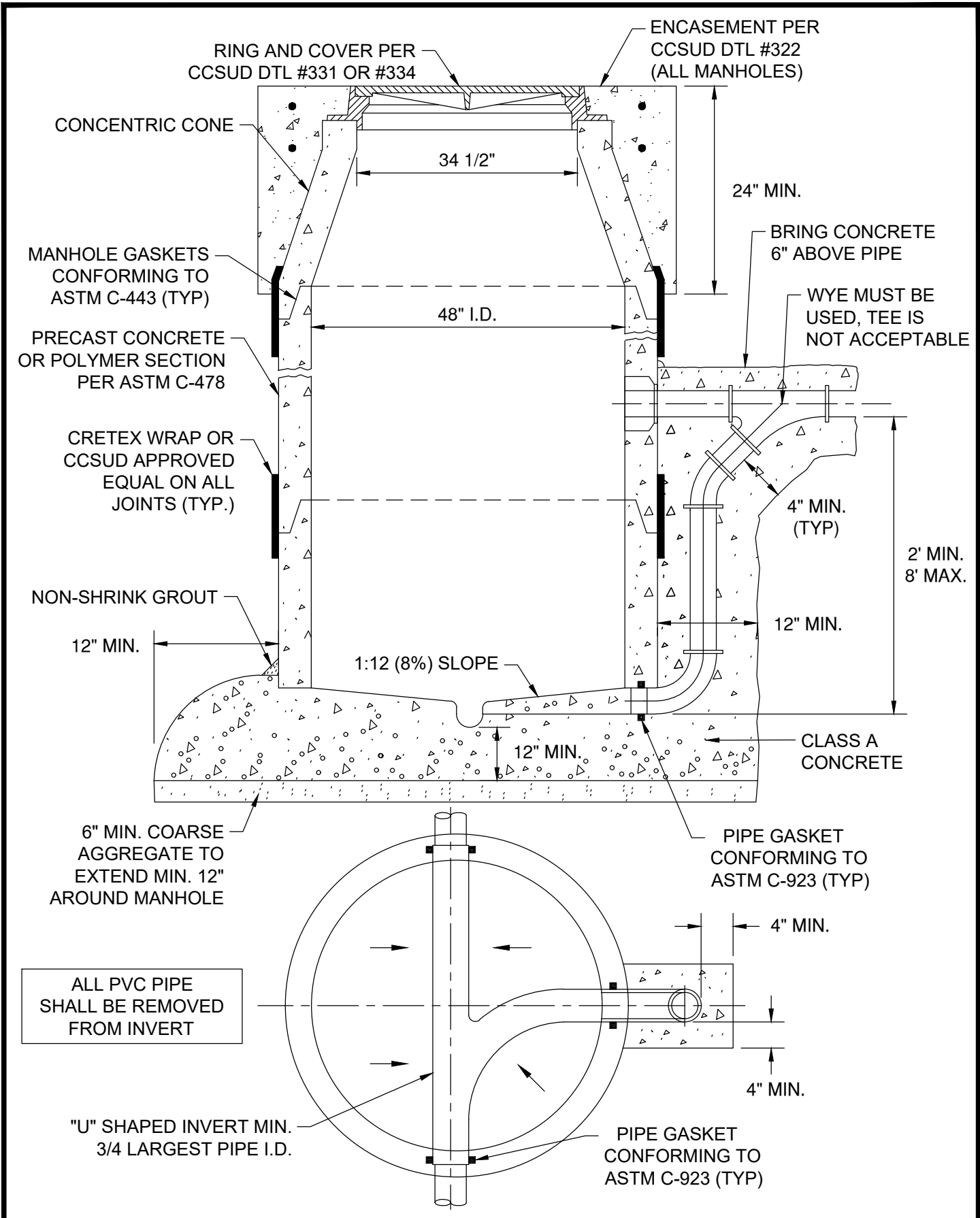
02/15/2022

SHEET

2 OF 2




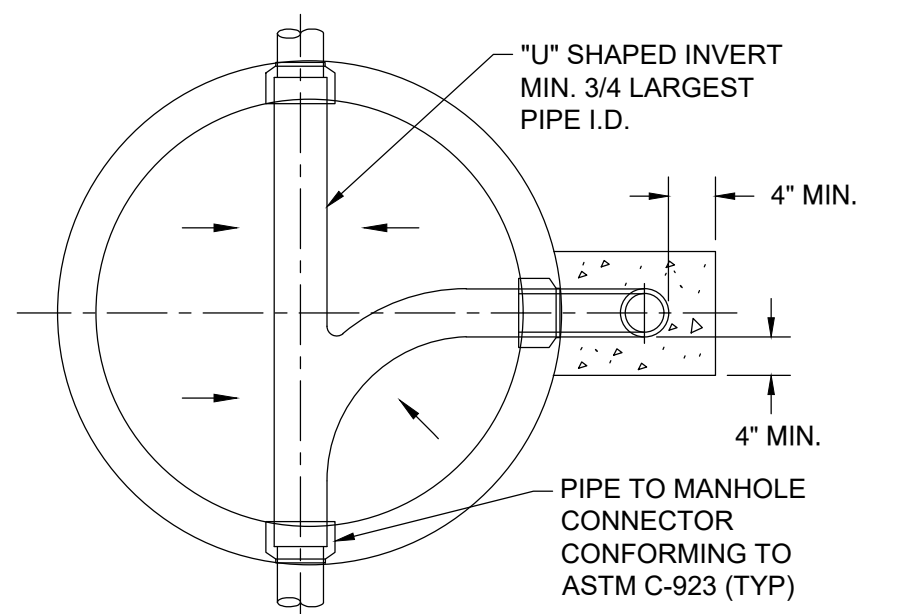
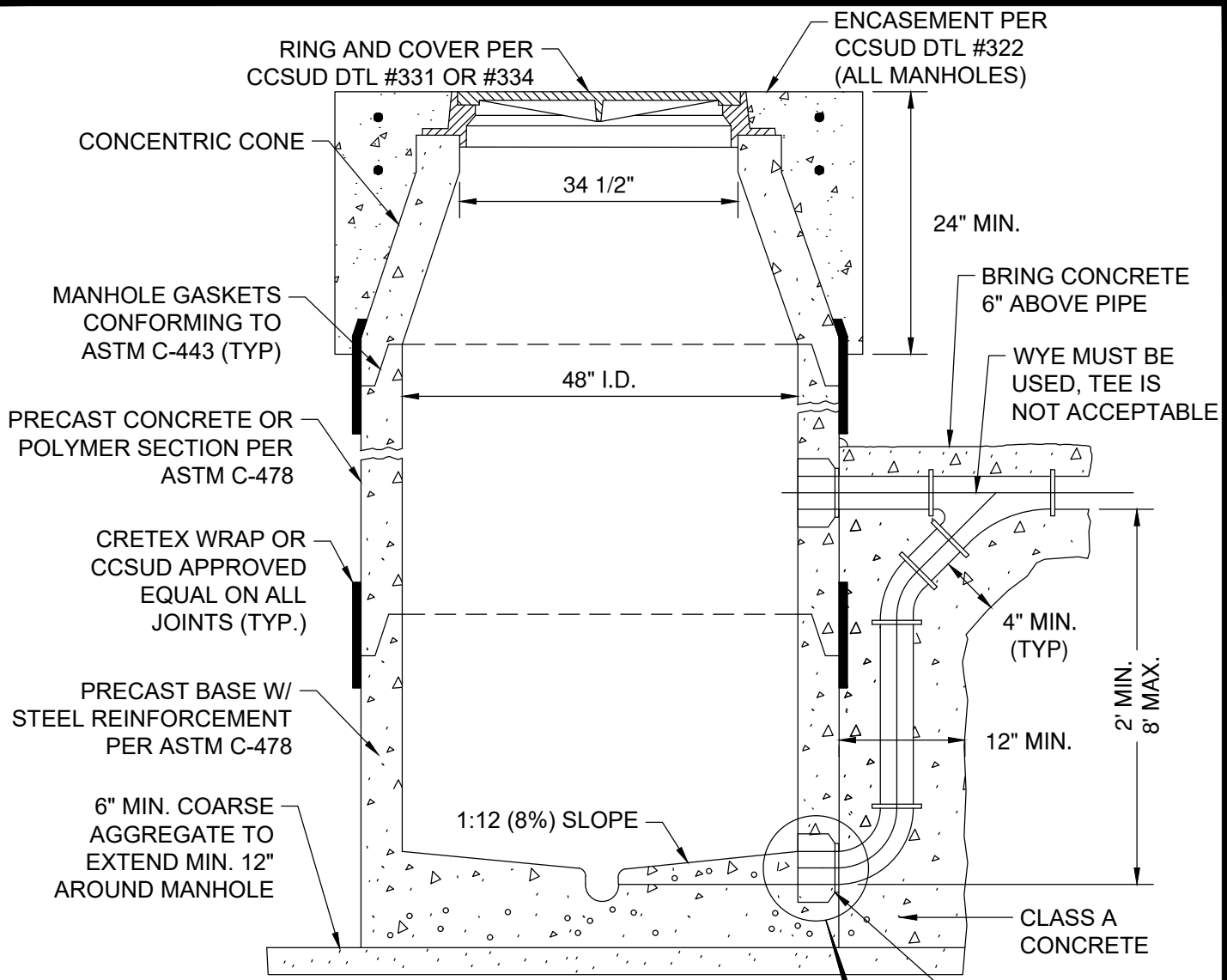
<p>PROPERTY OF CRYSTAL CLEAR SPECIAL UTILITY DISTRICT</p>	<p>DTL #322 NEW MANHOLE CONSTRUCTION AND MINOR MANHOLE ADJUSTMENT</p>	<p>M&S ENGINEERING ELECTRICAL CIVIL MEP TXENG FIRM # F-1394 TBPELS FIRM #10169800 WWW.MSENGR.COM (830) 228-5446</p>	APPROVED	REVISION
			02/15/2022	02/02/2023
			<p>SHEET 1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



ALL PVC PIPE SHALL BE REMOVED FROM INVERT

"U" SHAPED INVERT MIN. 3/4 LARGEST PIPE I.D.

PROPERTY OF 	DTL #324 WASTEWATER MANHOLE W/ DROP INLET ON CAST IN PLACE BASE	 M&S ENGINEERING ELECTRICAL CIVIL MEP <small>TXENG FIRM # F-1394 TBPELS FIRM #10169800 WWW.MSENGR.COM (830) 228-5446</small>	APPROVED	REVISION
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ENCASEMENT PER CCSUD DTL #322 (ALL MANHOLES)

24" MIN.

BRING CONCRETE 6" ABOVE PIPE

WYE MUST BE USED, TEE IS NOT ACCEPTABLE

48" I.D.

34 1/2"

CONCENTRIC CONE

RING AND COVER PER CCSUD DTL #331 OR #334

MANHOLE GASKETS CONFORMING TO ASTM C-443 (TYP)

PRECAST CONCRETE OR POLYMER SECTION PER ASTM C-478

CRETEX WRAP OR CCSUD APPROVED EQUAL ON ALL JOINTS (TYP.)

PRECAST BASE W/ STEEL REINFORCEMENT PER ASTM C-478

6" MIN. COARSE AGGREGATE TO EXTEND MIN. 12" AROUND MANHOLE

1:12 (8%) SLOPE

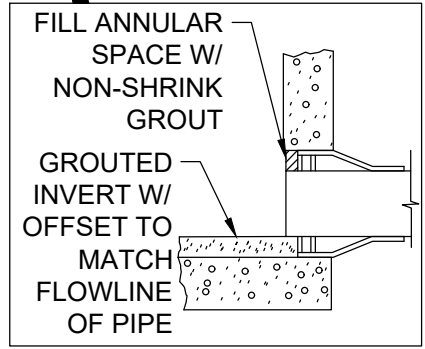
4" MIN. (TYP)

12" MIN.

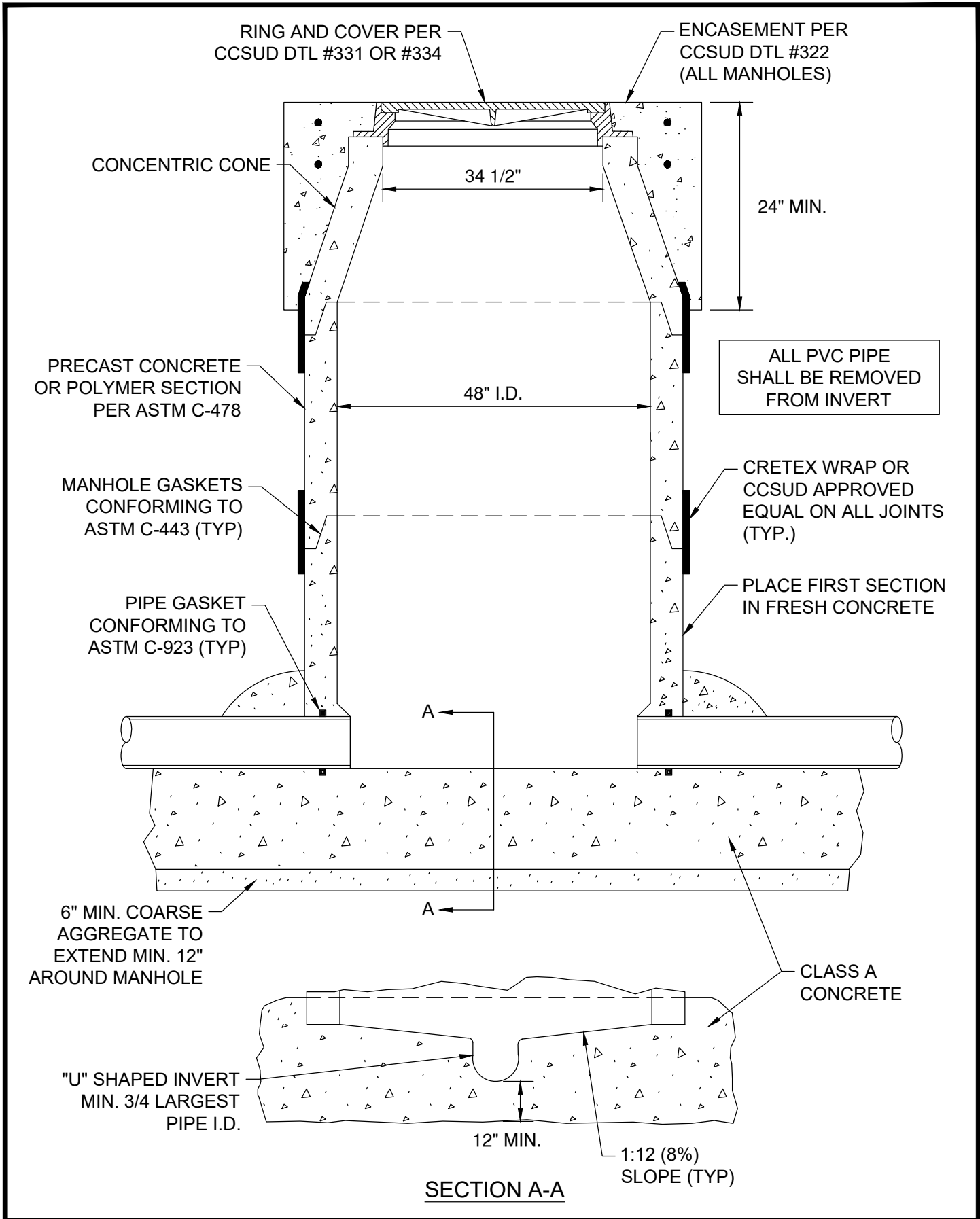
2' MIN. 8" MAX.

CLASS A CONCRETE



PIPE TO MANHOLE CONNECTOR CONFORMING TO ASTM C-923 (TYP)

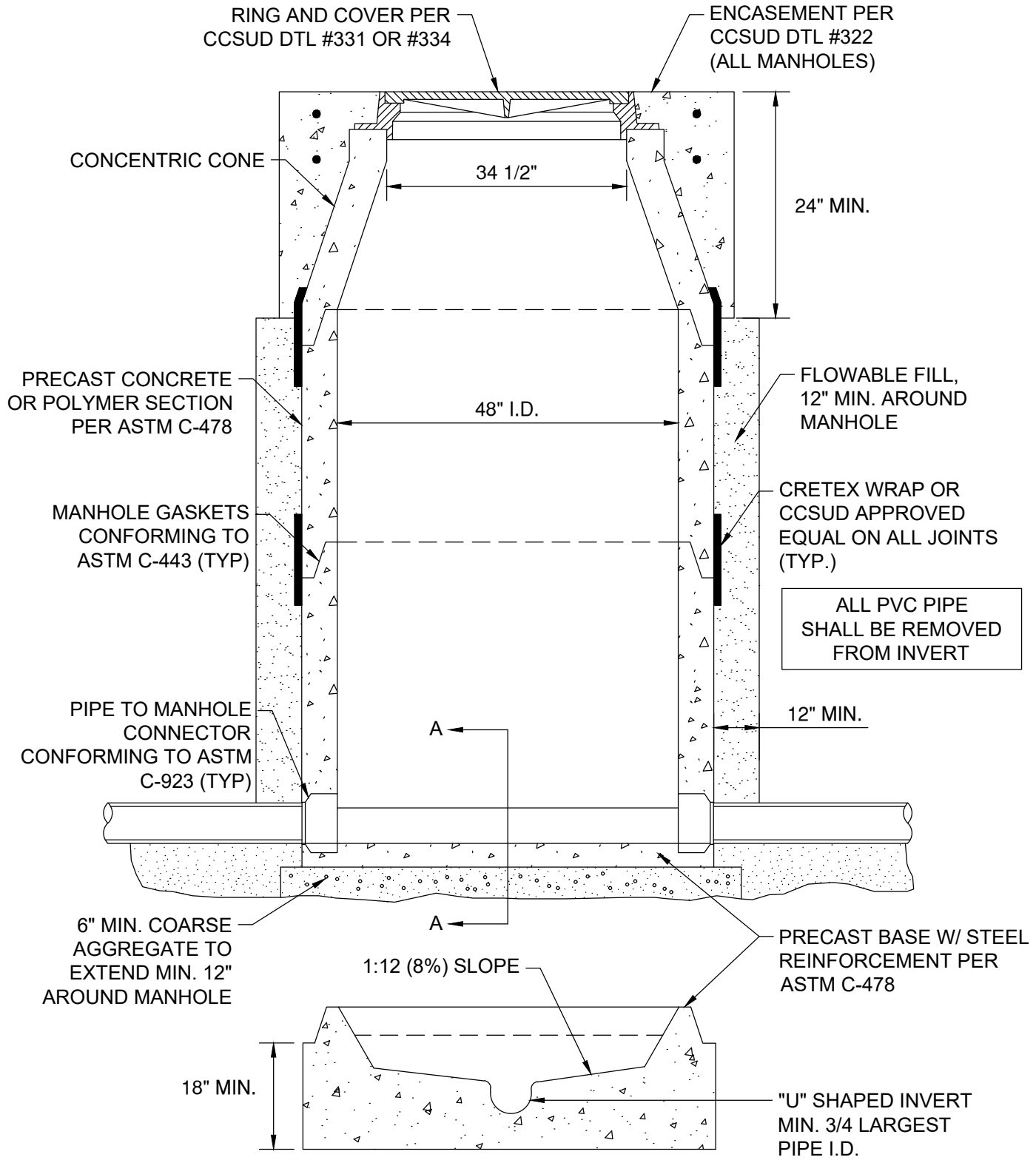


*CONTRACTOR SHALL LEVEL AND PLUMB THE BASE PRIOR TO SETTING THE PRECAST MANHOLE RISER SECTIONS ON THE PRECAST CONCRETE BASE.




SECTION A-A

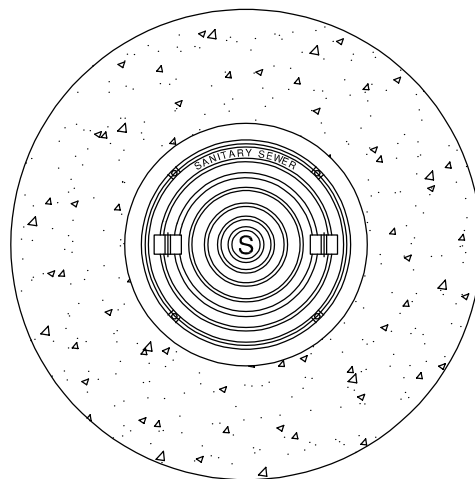
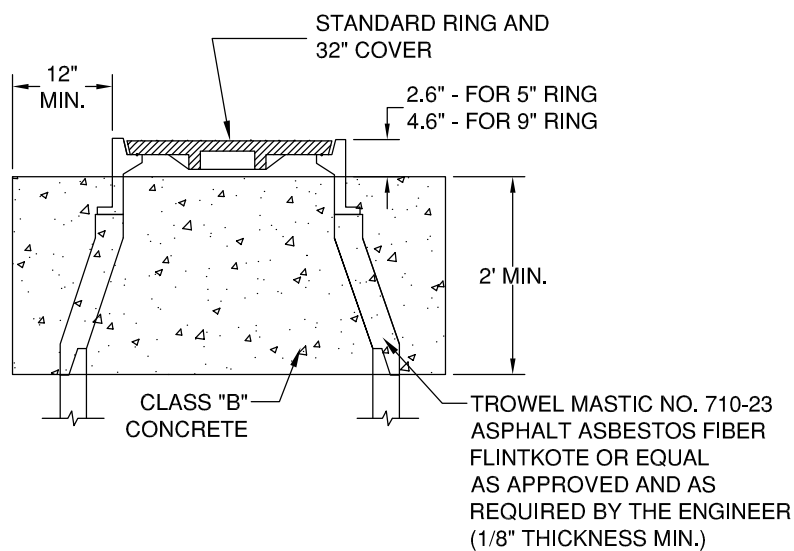
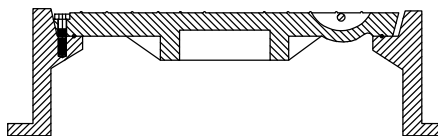
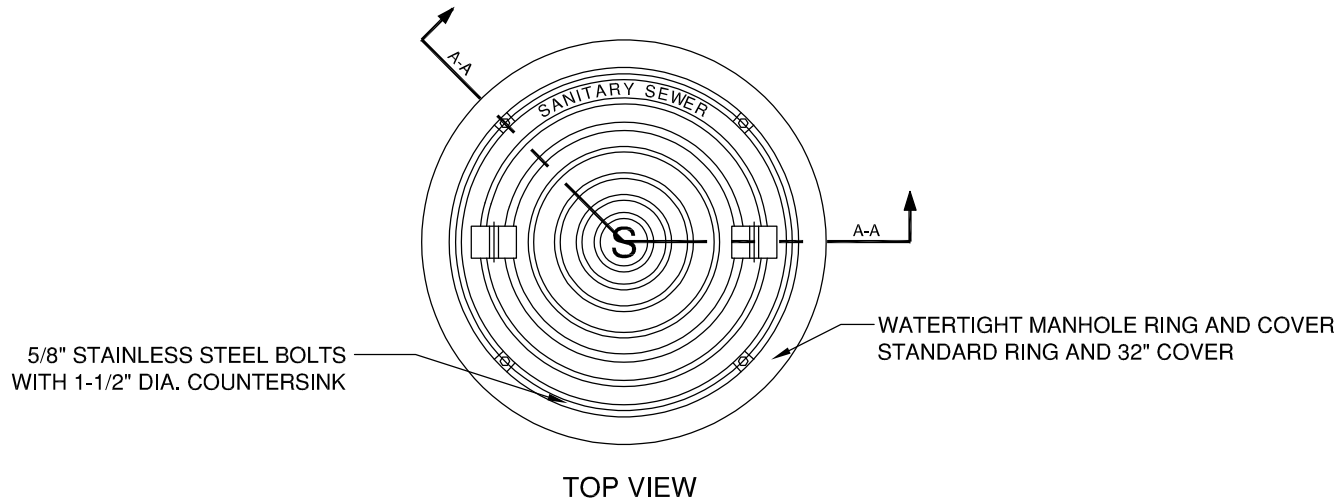
PROPERTY OF 	DTL #327 WASTEWATER MANHOLE ON CAST IN PLACE FOUNDATION	 M&S ENGINEERING ELECTRICAL CIVIL MEP <small>TXENG FIRM # F-1394 TBPELS FIRM #10169800 WWW.MSENGR.COM (830) 228-5446</small>	APPROVED	REVISION
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SECTION A-A

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

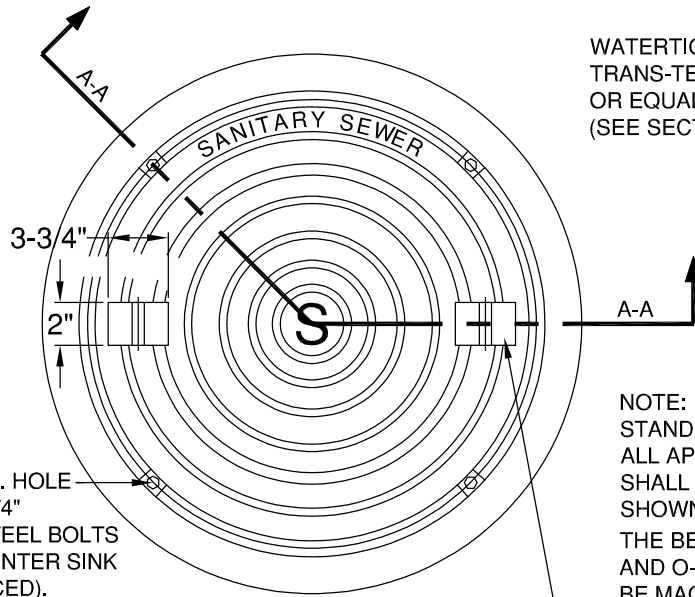
PROPERTY OF 	DTL #328 WASTEWATER MANHOLE ON PRECAST BASE	 M&S ENGINEERING ELECTRICAL CIVIL MEP <small>TXENG FIRM # F-1394 TBPELS FIRM #10169800 WWW.MSENGR.COM (830) 228-5446</small>	APPROVED	REVISION
			02/15/2022	02/02/2023
			SHEET 1 OF 1	



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")

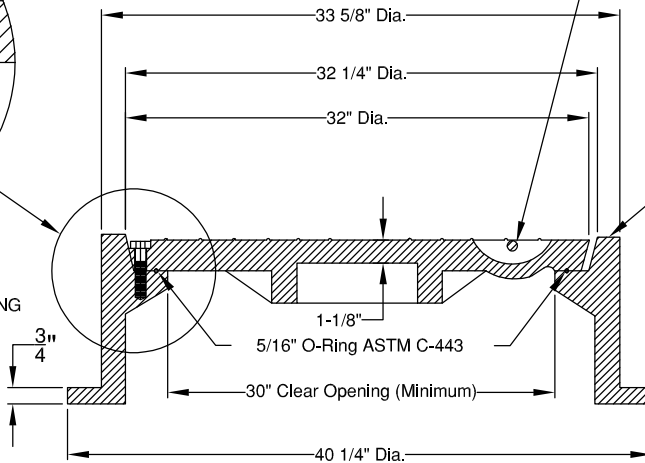
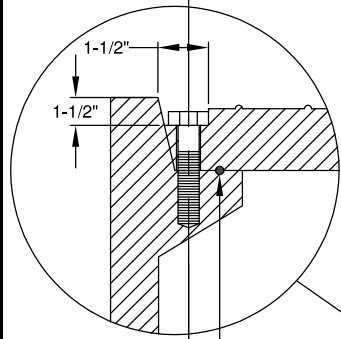


NOTE:
 STANDARD MANHOLE RING AND COVER
 ALL APPLICABLE DIMENSIONS
 SHALL CONFORM TO THE DIMENSIONS
 SHOWN HERE.
 THE BEARING SURFACES
 AND O-RING GROOVE SHALL
 BE MACHINED GROUND.

(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).



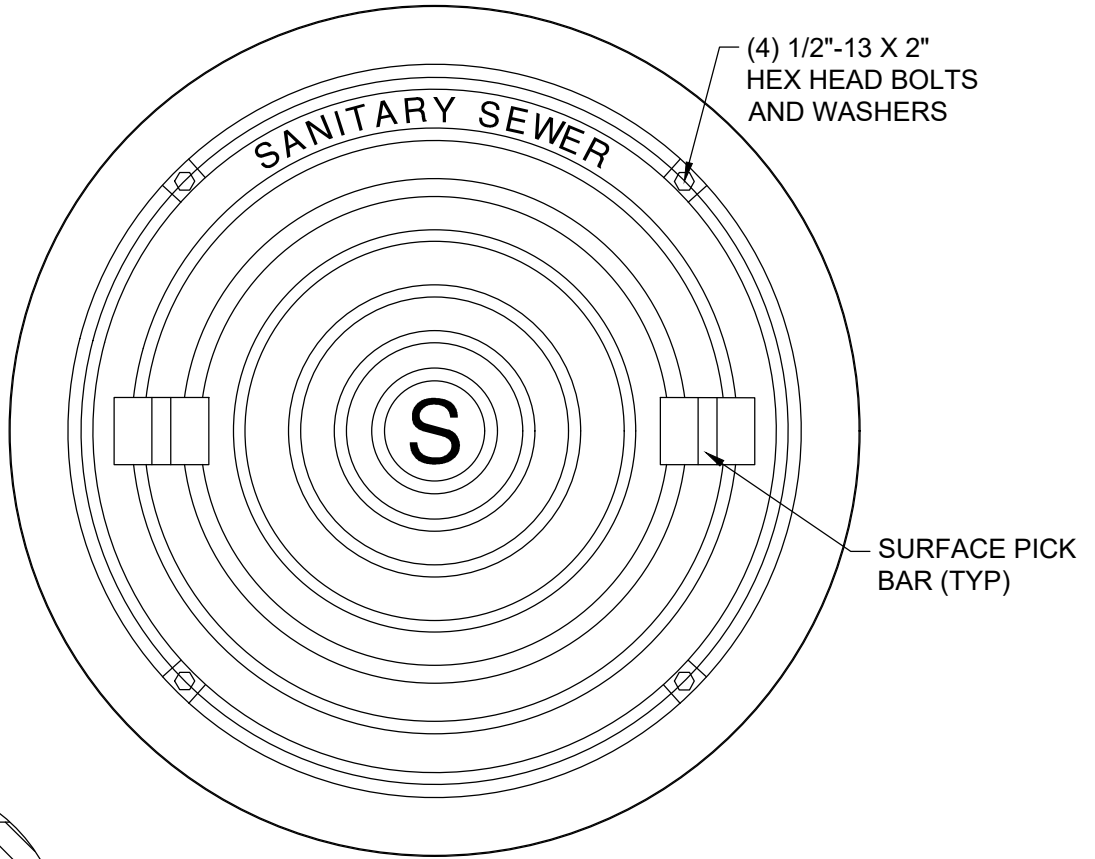
MANUFACTURER'S
 IDENTIFICATION
 ON THIS SURFACE

Section "A-A"

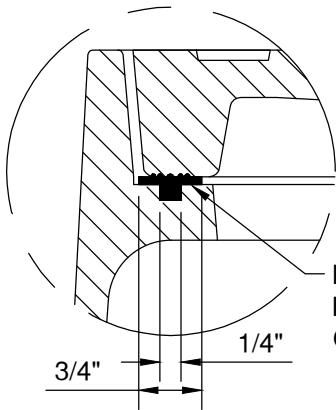
NOTE:
 ALL DIMENSIONS MAY VARY EXCEPT THE DIAMETER OF THE LID, AND THE DIAMETER
 OF THE CENTER LINE OF THE BOLT HOLES, AND THE MINIMUM DIAMETER OF THE CLEAR
 OPENING. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 400 LBS.

MANHOLE RING & COVER DETAIL

PROPERTY OF 	DTL #329 MANHOLE RING & ENCASMENT DETAIL	M&S ENGINEERING ELECTRICAL CIVIL MEP <small>TXENG FIRM # F-1394 TBPCLS FIRM #10169800 WWW.MSENGR.COM (830) 228-5446</small>	APPROVED	REVISION
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			SHEET 2 OF 2	

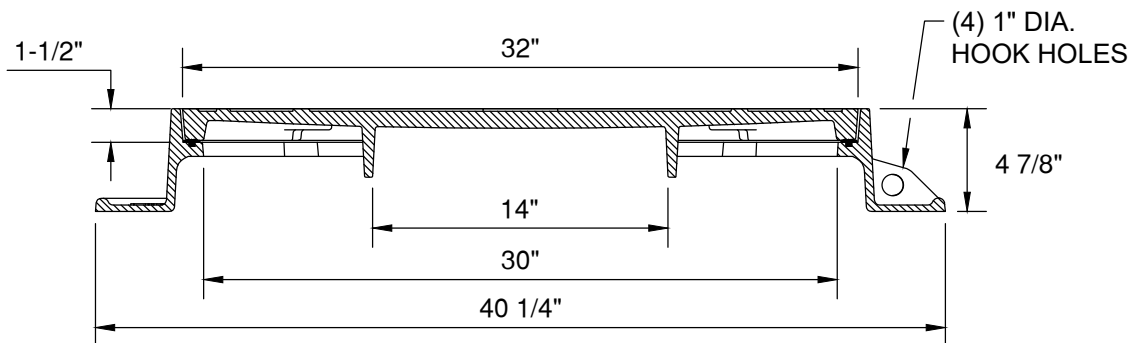


PLAN VIEW



GASKET DETAIL

MACHINE GROOVE IN
 FRAME SEAT FOR
 OIL-RESISTANT GASKET



SECTION VIEW

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



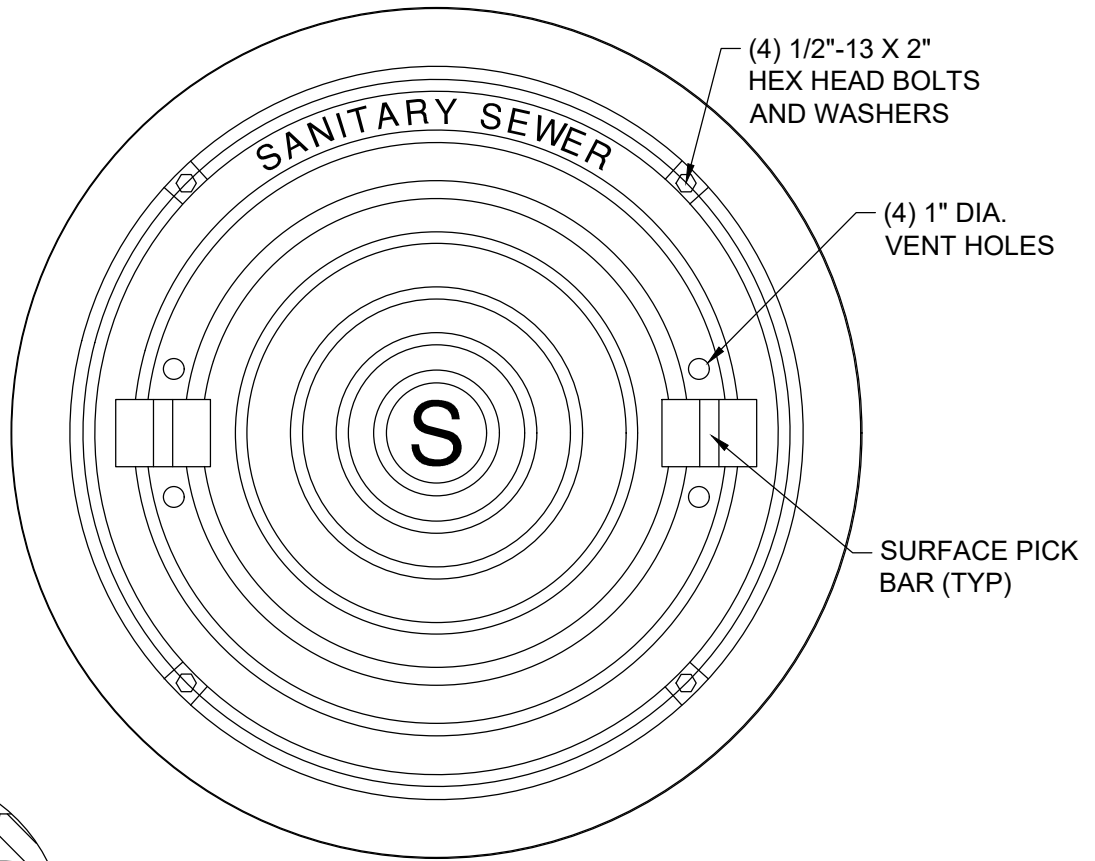
DTL #331
 SANITARY SEWER
 MANHOLE COVER



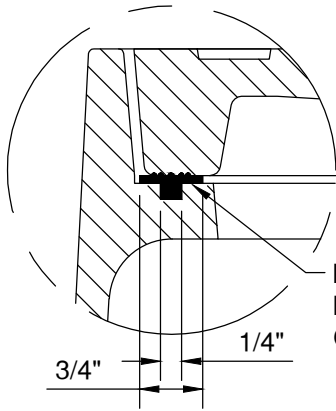
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02/15/2022	

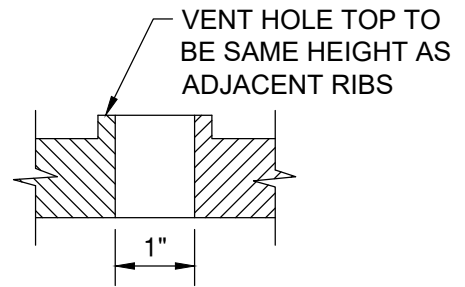
SHEET
 1 OF 1



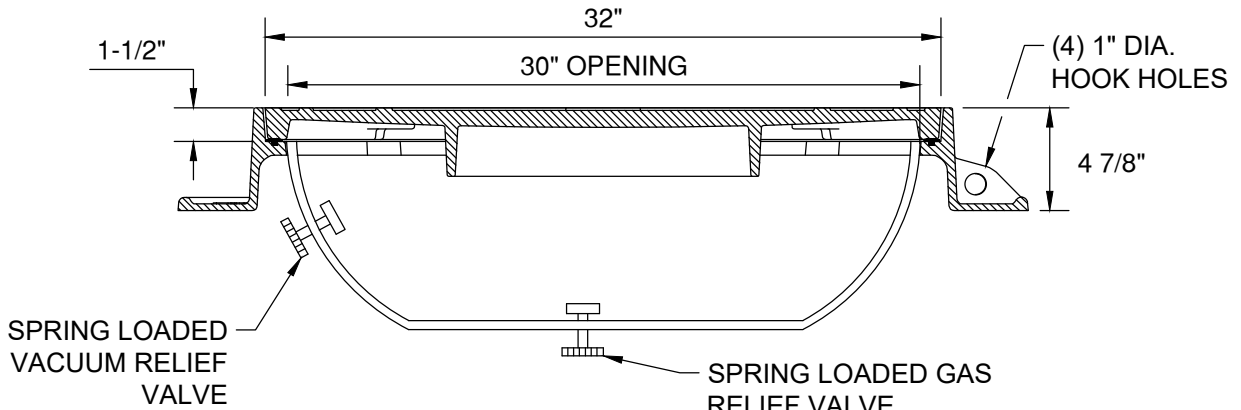
PLAN VIEW



GASKET DETAIL



VENT HOLE DETAIL



SECTION VIEW

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



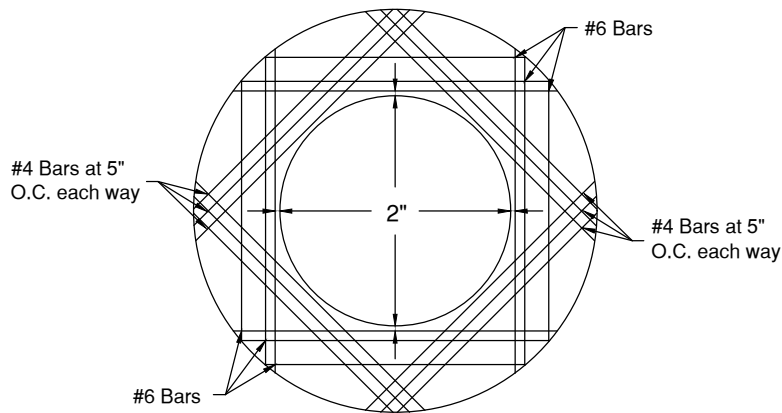
DTL #334
 VENTED SANITARY SEWER
 MANHOLE COVER



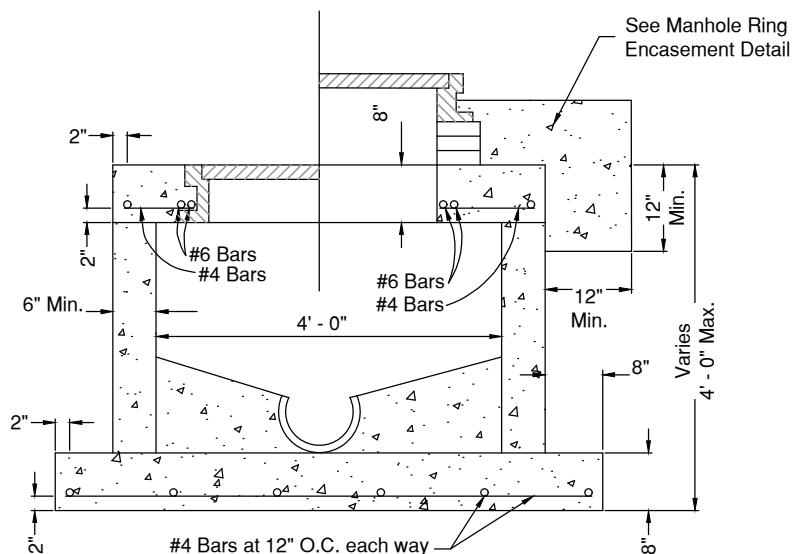
M&S ENGINEERING
 ELECTRICAL | CIVIL | MEP
 TXENG FIRM # F-1394 | TBPELS FIRM #10169800
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TOP SLAB



**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

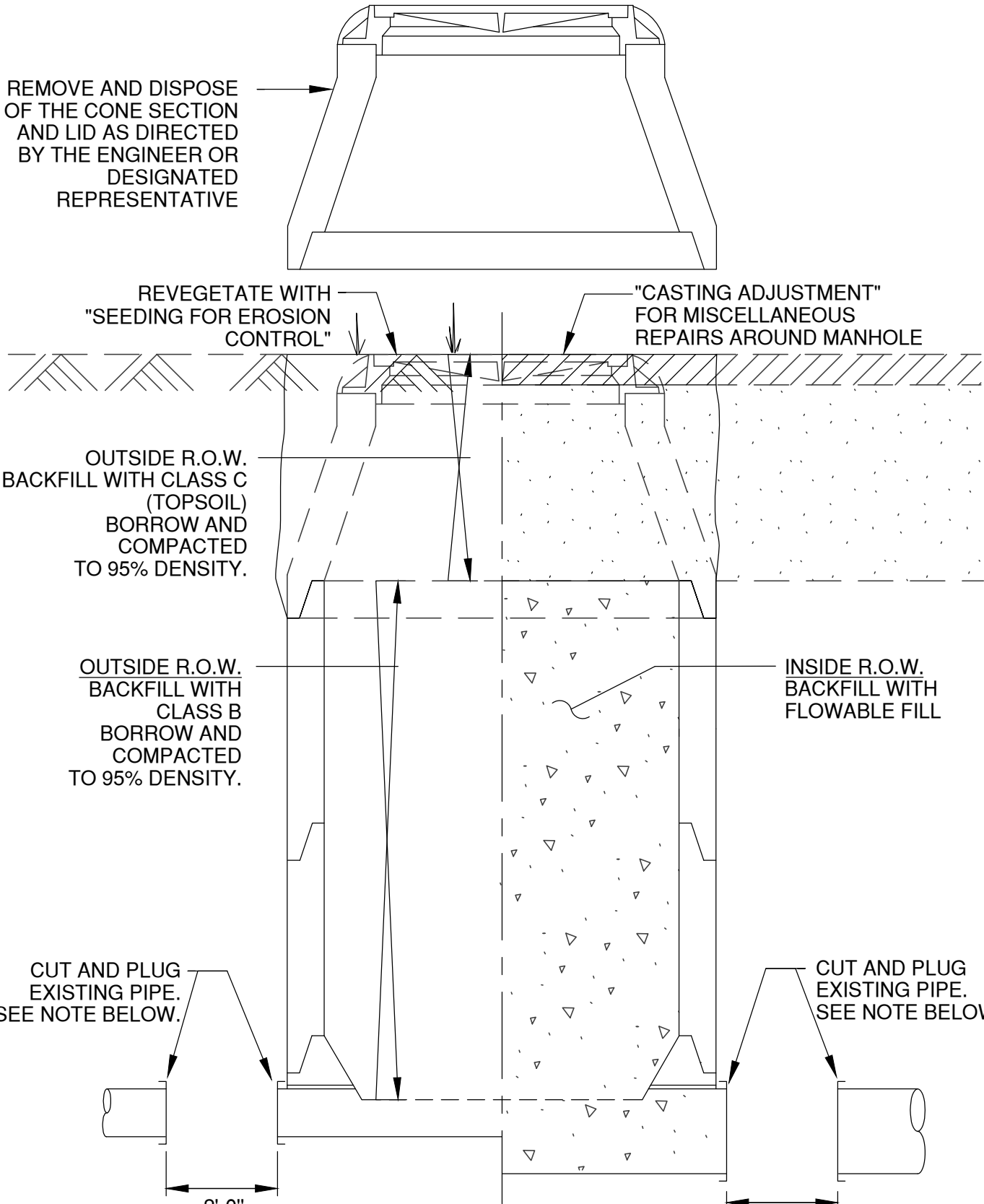


PROPERTY OF
 DTL #335
 SHALLOW MANHOLE:
 PRECAST OR MONOLITHIC,
 TOP SLAB & CHART





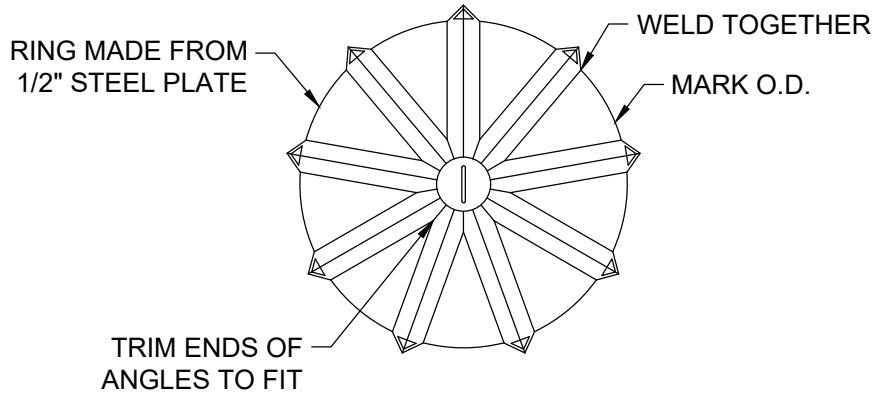
M&S ENGINEERING
 ELECTRICAL | CIVIL | MEP
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SHEET	
1	OF 1



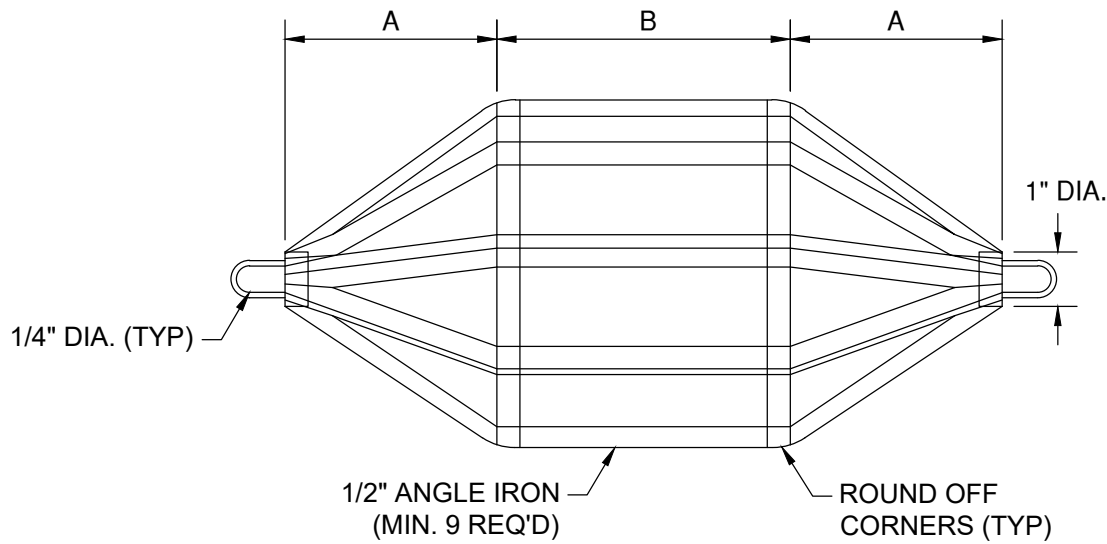
NOTE:
 THE PLUG SHOULD BE COMPOSED OF A MATERIAL SIMILAR TO THE EXISTING PIPE AS INSTRUCTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.

PROPERTY OF 	DTL #340 ABANDONED MANHOLE	 M&S ENGINEERING ELECTRICAL CIVIL MEP <small>TXENG FIRM # F-1394 TBPELS FIRM #10169800 WWW.MSENGR.COM (830) 228-5446</small>	APPROVED	REVISION
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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	 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	
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