

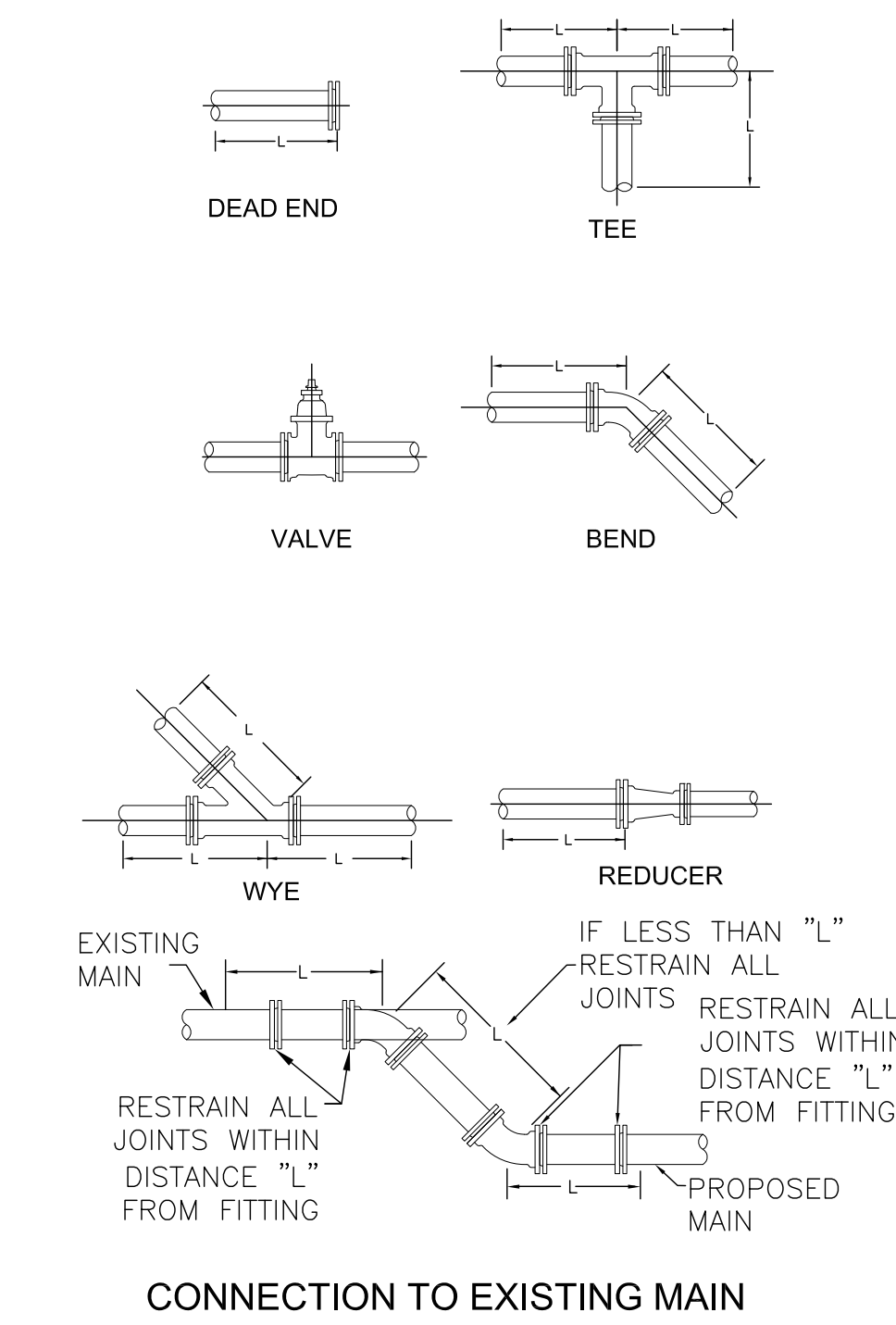
VALVE & BOX DETAIL
NOT TO SCALE

- NOTES:**
1. RESTRAINING DEVICES OR RESTRAINED JOINTS SHALL HAVE A WORKING PRESSURE OF 250 PSI WITH A MINIMUM SAFETY FACTOR OF 2.0
 2. RESTRAINED LENGTH SHOWN IS BASED ON 3' OF COVER, SOIL TYPE CL, TRENCH TYPE 2, 2:1 SAFETY FACTOR, AND DUCTILE IRON PIPE AT A TEST PRESSURE OF 150 PSI. IF FIELD CONDITIONS DIFFER FROM THOSE LISTED, CONTACT ENGINEER TO DETERMINE REQUIRED RESTRAINED LENGTH.
 3. RESTRAINED LENGTHS SHOWN IN CHART WERE CALCULATED USING METHODOLOGY DEVELOPED BY THE DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA) AND ARE INTENDED AS A GENERAL GUIDE BASED ON CONDITIONS SHOWN IN NOTE 2. FOR FITTINGS AND/OR FIELD CONDITIONS NOT SHOWN, ENGINEER SHALL SUBMIT CALCULATIONS USING DIPRA METHODOLOGY TO THE TOWN FOR APPROVAL.
 4. EXISTING PIPE ADJACENT TO PROPOSED BENDS, WYES, VALVES, TEES, AND PLUGS SHALL BE UNCOVERED AND THE JOINTS RESTRAINED FOR THE LENGTHS INDICATED. IF THE EXISTING PIPE IS UNABLE TO ACCEPT THE MECHANICAL JOINT RESTRAINING MECHANISM, THE EXISTING PIPE SHALL BE REPLACED WITH DUCTILE IRON PIPE MAIN IN ACCORDANCE WITH THE SPECIFICATIONS AND RESTRAINED LENGTH INDICATED. IN LIEU OF RESTRAINING JOINTS OF EXISTING PIPE, A BULKHEAD ANCHOR AS SHOWN IN DETAILS CA-1 AND CA-2 MAY BE USED.
 5. FIRE HYDRANTS SHALL BE RESTRAINED AT EACH JOINT IN THE ASSEMBLY.
 6. ALL JOINTS WITHIN CASING PIPES SHALL BE RESTRAINED.
 7. IF A CASING PIPE FALLS WITHIN THE RESTRAINED LENGTH "L", THE REQUIRED RESTRAINED LENGTH SHALL BE INCREASED BY THE LENGTH OF THE CASING.
 8. THRUST RESTRAINTS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND SHALL CONFORM TO THE FOLLOWING TABLE OR APPROVED EQUAL. SHOP DRAWINGS FOR ALTERNATE RESTRAINTS SHALL BE SUBMITTED TO THE TOWN FOR APPROVAL PRIOR TO CONSTRUCTION.

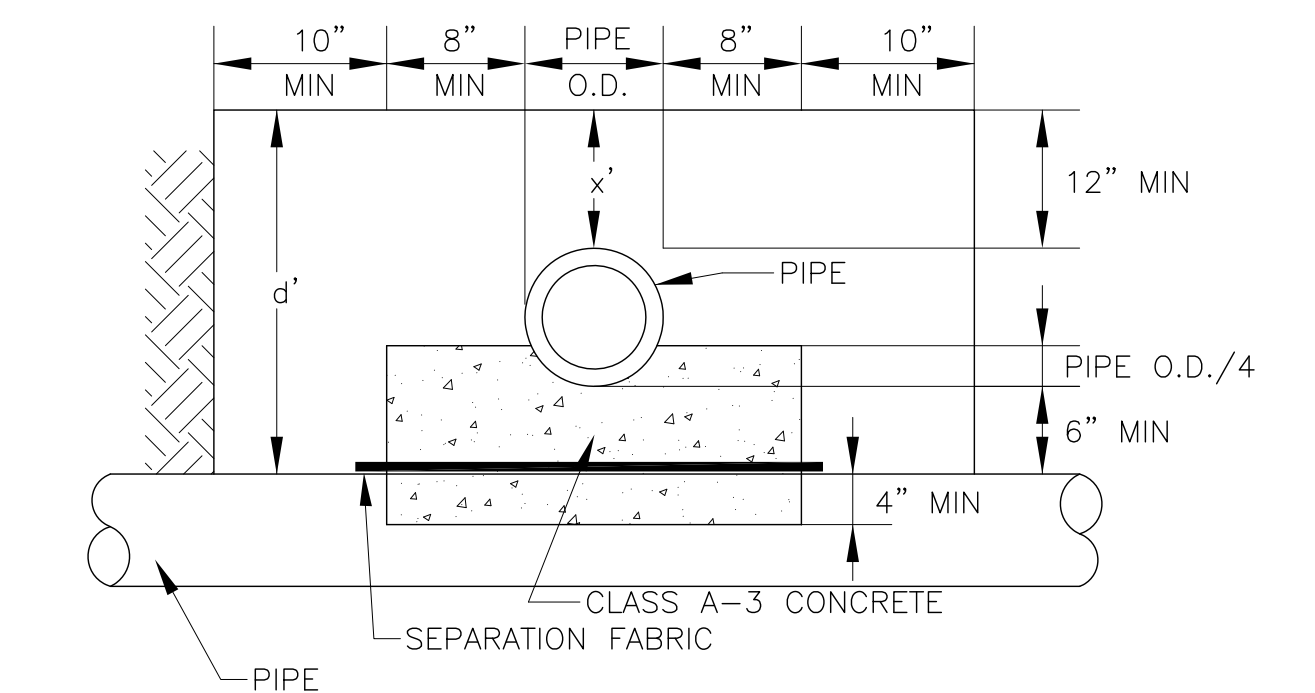
PIPE SIZE	MINIMUM LENGTH OF PIPE WITH RESTRAINED JOINTS (L) IN FEET												
	HORIZONTAL BEND			VERTICAL BEND UP			VERT. BEND DOWN			DEAD END OR VALVE	UNIFORM SIZE TEE OR WYE	REDUCER LARGER Ø TO SMALLER Ø	
4"	2	5	10	24	2	5	10	4	7	15	18	13	
6"	3	7	15	35	3	7	15	5	10	21	26	21	13
8"	5	9	19	46	5	9	19	7	14	28	34	29	14
10"	6	11	23	56	6	11	23	8	17	34	42	37	14
12"	7	13	28	67	7	13	28	10	20	41	50	45	15
14"	8	15	32	77	8	15	32	11	23	48	57	52	15
16"	9	17	36	87	9	17	36	13	26	54	65	60	15
18"	10	19	40	97	10	19	40	14	29	61	73	68	15
20"	11	21	45	108	11	21	45	16	32	67	81	76	15
24"	13	25	53	128	13	25	53	19	38	80	97	92	29

MECHANICAL RESTRAINING DEVICES FOR PIPES
NOT TO SCALE

MECHANICAL RESTRAINING DEVICE DETAILS

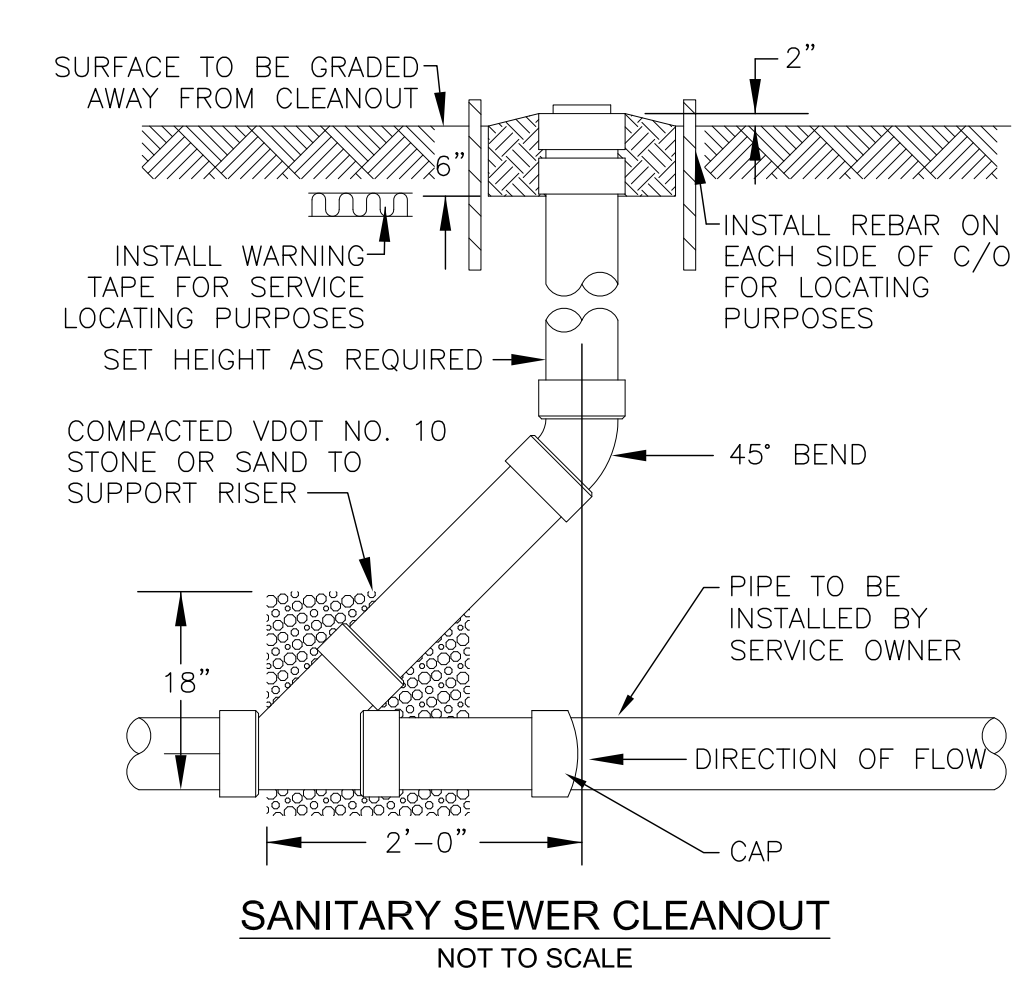


CONNECTION TO EXISTING MAIN
NOT TO SCALE

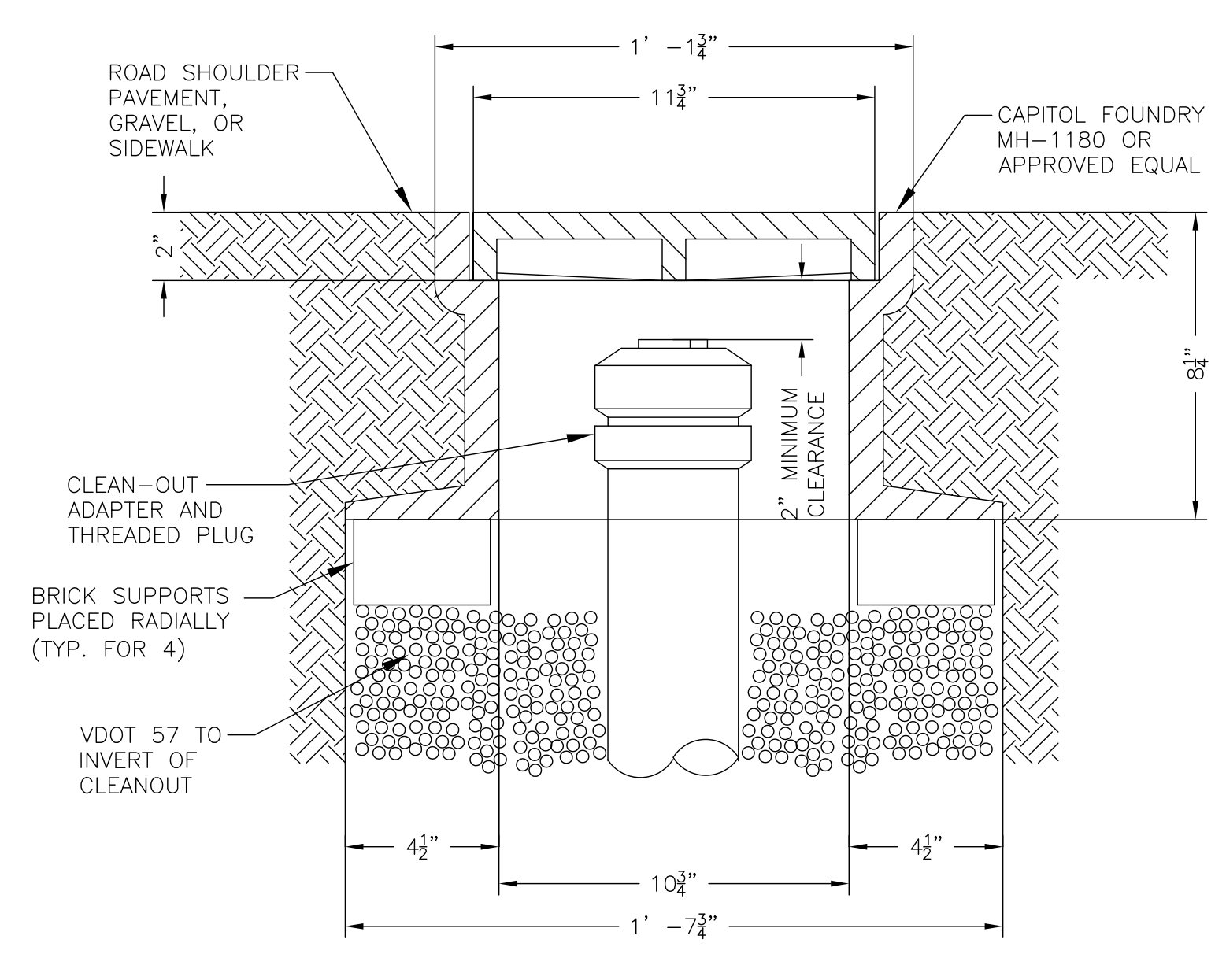


- NOTES:**
1. WHERE THE TRENCH BOTTOM IS IN ROCK, EXCAVATE TO A MINIMUM OF 8" BELOW THE BOTTOM OF THE PIPE AND BACKFILL WITH BEDDING MATERIAL.
 2. WHERE PIPE FOUNDATIONS ARE YIELDING, BED PIPE ON A MINIMUM OF 8" BEDDING MATERIAL.
 3. CONCRETE CRADLE SHALL FOLLOW THE PIPE CONTOUR A MINIMUM OF 4" ABOVE THE CROWN.
 4. INSTALL ONE JOINT OF DIP SHALL BE CENTERED ON STORM CULVERT WHEN CONCRETE CRADLE IS REQUIRED
 5. INSTALL SEPARATION FABRIC BETWEEN STORM CULVERT & CONCRETE TO PREVENT CONCRETE FROM ADHERING TO STORM CULVERT.
 6. LENGTH OF CRADLE SHALL BE A MINIMUM OF 12" PAST BOTH SIDES OF STORM CULVERT.
 7. WHEN:
 $d' > 4.5'$ CRADLE NOT NECESSARY
 $d' < 4.5'$ USE CRADLE
 $x' \leq 2'$ USE COMPLETE ENCASEMENT

CONCRETE CAP & CRADLE
NOT TO SCALE

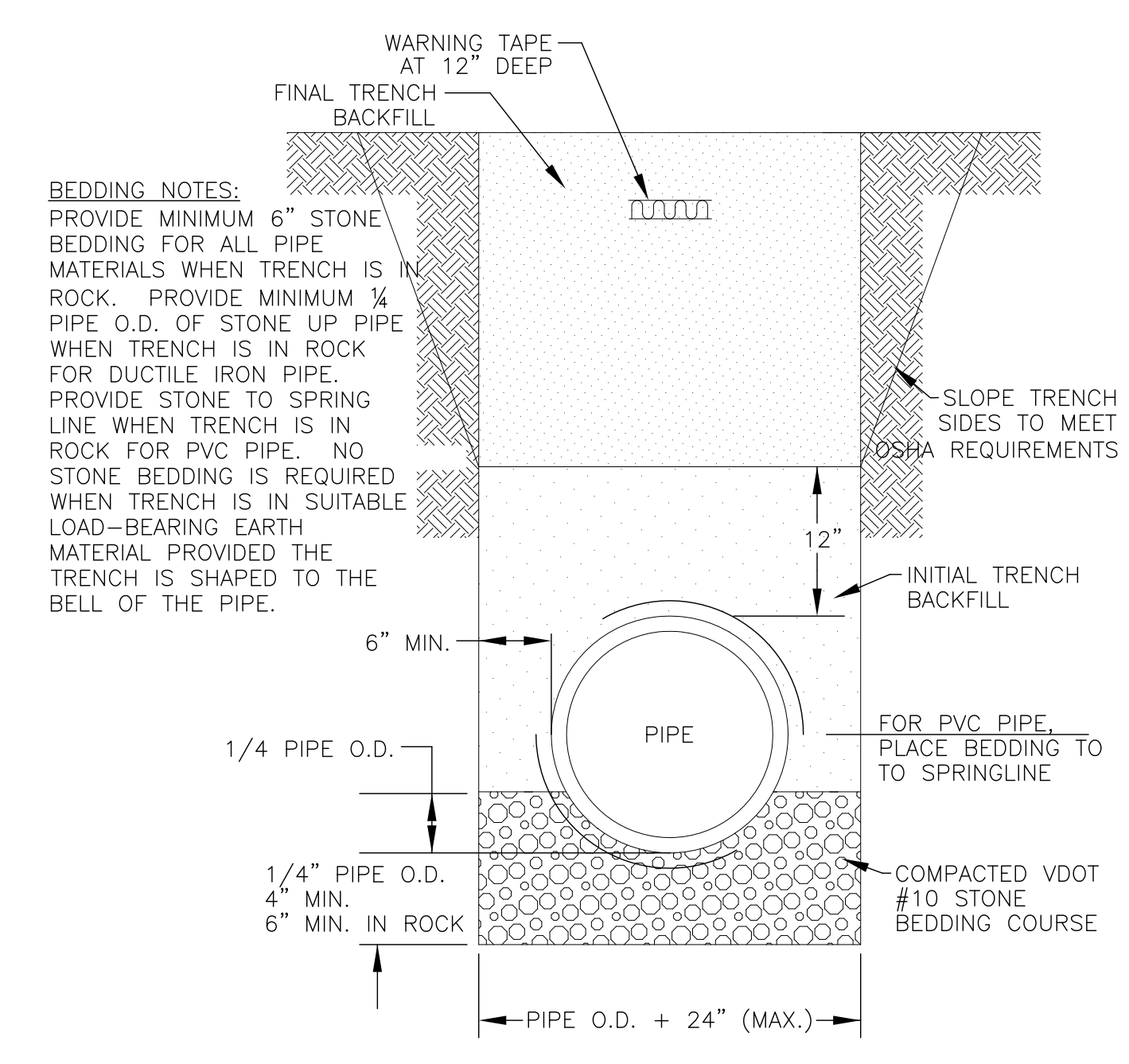


SANITARY SEWER CLEANOUT
NOT TO SCALE



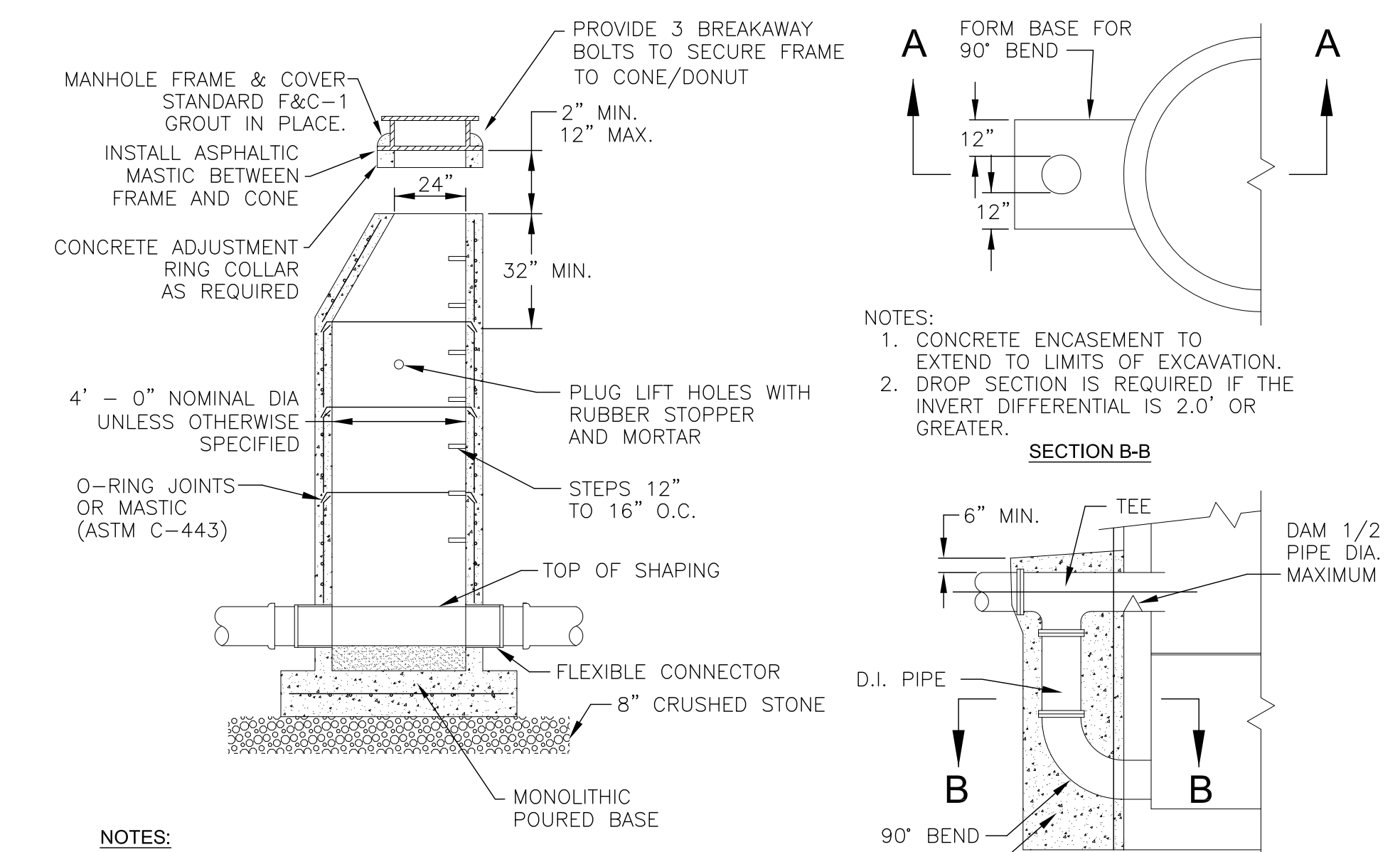
TRAFFIC BEARING CLEAN-OUT CROSS SECTION
NOT TO SCALE

USE TRAFFIC BEARING CLEANOUT IN ALL GRAVEL AND PAVEMENT AREAS



PIPE TRENCH DETAIL
NOT TO SCALE

BEDDING NOTES:
 PROVIDE MINIMUM 6" STONE BEDDING FOR ALL PIPE MATERIALS WHEN TRENCH IS IN ROCK. PROVIDE MINIMUM 1/4 PIPE O.D. OF STONE UP PIPE WHEN TRENCH IS IN ROCK FOR DUCTILE IRON PIPE. PROVIDE STONE TO SPRING LINE WHEN TRENCH IS IN ROCK FOR PVC PIPE. NO STONE BEDDING IS REQUIRED WHEN TRENCH IS IN SUITABLE LOAD-BEARING EARTH MATERIAL PROVIDED THE TRENCH IS SHAPED TO THE BELL OF THE PIPE.

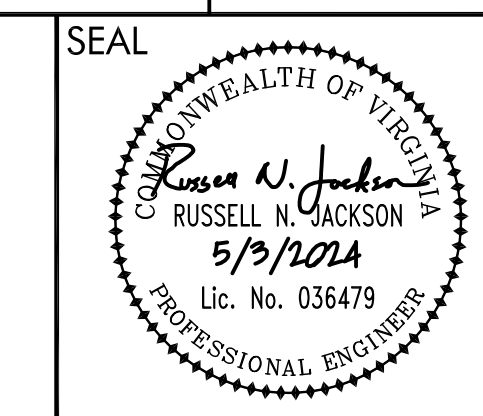


- NOTES:**
1. MANHOLES WILL CONFORM TO ASTM C-478.
 2. STEPS WILL BE ENCASED IN CORROSION RESISTANT RUBBER OR OTHER MATERIAL APPROVED BY THE ENGINEER. STEPS WILL HAVE A CONTINUOUS ALIGNMENT BETWEEN SECTIONS.
 3. FLEXIBLE CONNECTOR SHALL MEET ASTM C-923M. BOOT SHALL BE MADE FROM NEOPRENE RUBBER AND HAVE A 3/8" MINIMUM WALL THICKNESS. ALL BANDS AND STRAPS TO SECURE BOOT SHALL BE STAINLESS STEEL. THE BOOT ASSEMBLY SHALL ALLOW LATERAL AND VERTICAL MOVEMENT A MINIMUM OF 20 DEGREES AND BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 4. GROUT UP FULL INVERT OF PIPE CONNECTOR INSIDE MANHOLE.

SANITARY SEWER MANHOLE
NOT TO SCALE

Peed & Bortz, L.L.C.
 CIVIL & ENVIRONMENTAL ENGINEERS
 20 MIDWAY PLAZA DRIVE - SUITE 100
 CHRISTIANBURG, VIRGINIA 24073
 PHONE: (540) 394 - 3214 FAX: (540) 394 - 3215

NEW RIVER REGIONAL WATER AUTHORITY
WATER TREATMENT PLANT EXPANSION
 AUSTINVILLE VIRGINIA



DRAWN BY: RNJ
 REVIEW BY: RNJ
 DATE: 3 MAY 2024
 REVISION:

SHEET DESCRIPTION:
 STANDARD DETAILS

D03