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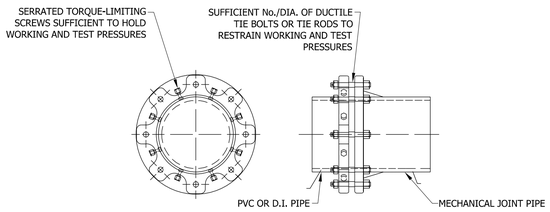

RESTRAINED JOINTS ON MECHANICAL JOINT PIPE & FITTINGS

MINIMUM FOOTAGE OF RESTRAINED PIPE FOR VARIOUS DIAMETERS & DEGREES CAST & DUCTILE IRON ELBOWS

COVER / DIA. MAIN	DEGREE OF ELBOW 11.25°	22.5°	45°	90°	VERTICAL OFFSET 45° UPPER BEND (3')	VERTICAL OFFSET 45° LOWER BEND (3')	BRANCH OF TEE	REDUCER (LARGE SIDE ONLY)
	3'	3'	3'	3'			3'	3'
6"	2'	5'	10'	25'	15'	10'	15'	20'
8"	4'	6'	14'	33'	25'	15'	30'	40'
10"	5'	8'	18'	42'	27'	18'	40'	40'
12"	5'	10'	20'	50'	30'	20'	55'	45'
16"	7'	13'	28'	67'	45'	30'	80'	45'
20"	8'	17'	35'	84'	55'	35'	105'	45'

RESTRAINED JOINT DETAIL

9/20/19

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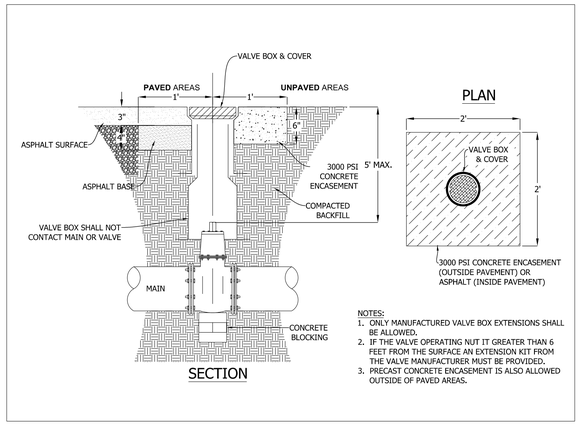

NOTES:
1. ONLY MANUFACTURED VALVE BOX EXTENSIONS SHALL BE ALLOWED.
2. IF THE VALVE OPERATING NUT IT GREATER THAN 6 FEET FROM THE SURFACE AN EXTENSION KIT FROM THE VALVE MANUFACTURER MUST BE PROVIDED.
3. PRECAST CONCRETE ENCASEMENT IS ALSO ALLOWED OUTSIDE OF PAVED AREAS.

VALVE BOX INSTALLATION

9/20/19

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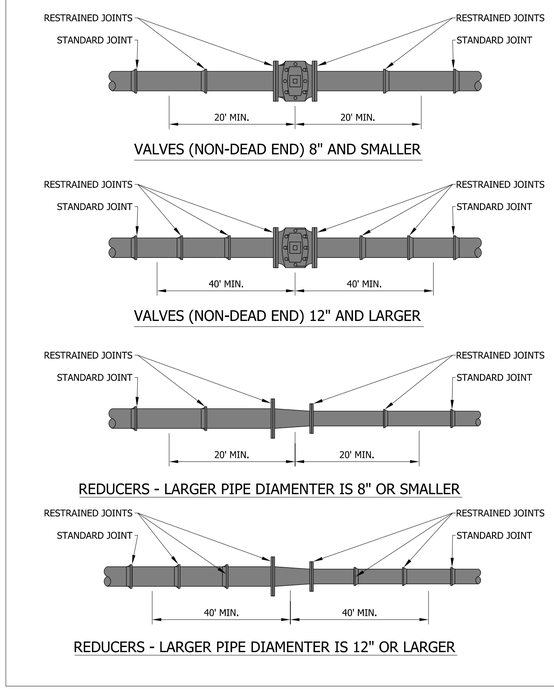
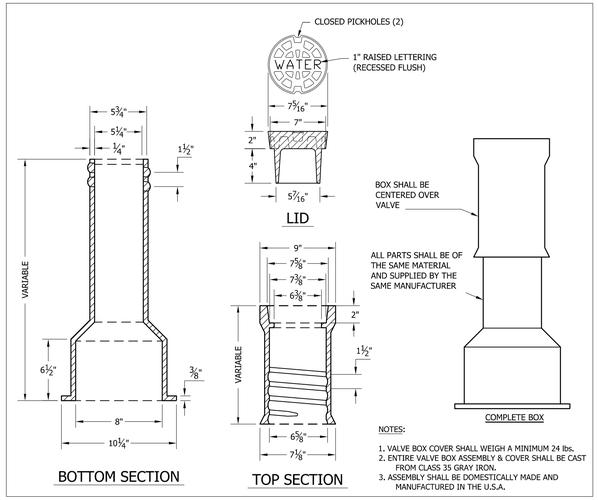


TYP. RESTRAINING FOR VALVES AND REDUCERS

9/20/19

N.T.S. Source: VHB 0



NOTES:
1. VALVE BOX COVER SHALL WEIGH A MINIMUM 24 lbs.
2. ENTIRE VALVE BOX ASSEMBLY & COVER SHALL BE CAST FROM CLASS 35 GRAY IRON.
3. ASSEMBLY SHALL BE DOMESTICALLY MADE AND MANUFACTURED IN THE U.S.A.

VALVE BOX INSTALLATION

9/20/19

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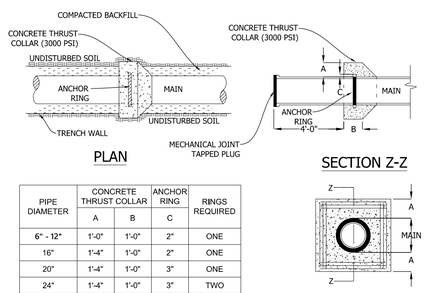

PIPE DIAMETER	CONCRETE THRUST COLLAR A	B	ANCHOR RING C	RINGS REQUIRED
6" - 12"	1'-0"	1'-0"	2"	ONE
16"	1'-4"	1'-0"	2"	ONE
20"	1'-4"	1'-0"	3"	ONE
24"	1'-4"	1'-0"	3"	TWO
30"	1'-4"	1'-2"	4"	TWO
36"	1'-4"	1'-4"	4"	TWO

NOTE:
6" TO 16" MAINS--12-NO. 7 BARS
20"TO 36" MAINS--12-NO. 8 BARS
* BARS PLACED AS SHOWN

THRUST COLLAR INSTALLATION

9/20/19

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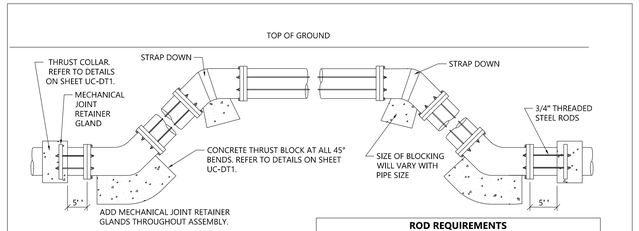


ROD REQUIREMENTS		
SIZE OF 45 BEND	STATIC THRUST IN POUNDS	NO. OF RODS REQUIRED
6"	4,328	2
8"	7,694	4
12"	17,312	4
16"	30,779	8
24"	69,252	8

GENERAL NOTES:
1. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.
3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTINGS.
4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY.
5. 3' MINIMUM COVER MUST BE MAINTAINED ON ALL WATER MAINS

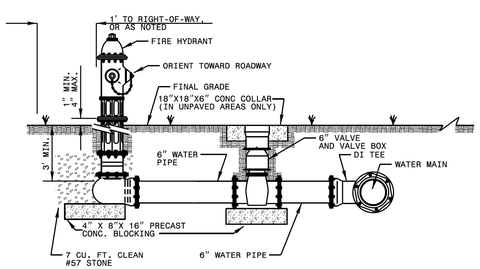
STANDARD VERTICAL BEND

5/9

N.T.S. Source: VHB

NOTES:

1. THIS DETAIL SHOWS THE TYPICAL FINAL FIRE HYDRANT CONFIGURATION AFTER INSTALLATION OF A PROPOSED FIRE HYDRANT, RECONNECTION OF AN EXISTING FIRE HYDRANT, OR RELOCATION OF A FIRE HYDRANT.
2. KEEP DRAIN PORTS FREE FROM OBSTRUCTION.
3. RESTRAIN ALL PIPE JOINTS AND FITTINGS. ACCEPTABLE TYPES OF RESTRAINT INCLUDE RESTRAINING GLANDS; RESTRAINED, PUSH-ON JOINTS; AND 3/4" BITUMINOUS COATED, ALL-THREAD RESTRAINING RODS. THRUST BLOCKS ARE NOT AN ACCEPTABLE TYPE OF RESTRAINT.
4. FOR RELOCATED OR RECONNECTED FIRE HYDRANTS,VERIFY THE VALVE IS RESTRAINED TO THE MAIN. PROVIDE APPROPRIATE RESTRAINT.
5. HYDRANT LOCATION APPLIES TO PROPOSED AND RELOCATED FIRE HYDRANTS.
6. LOCATE FIRE HYDRANT WITH 3' HORIZONTAL CLEARANCE FROM ABOVE GROUND OBJECTS.
7. PROVIDE A MINIMUM OF 3' COVER OVER ALL SECTIONS OF HORIZONTAL PIPE. USE FITTINGS AS NECESSARY.
8. TAPPING SLEEVES MAY BE USED ON EXISTING MAINS IN LIEU OF DI TEES.
9. LOCATE FIRE HYDRANT OUTSIDE OF THE VEHICLE RECOVERY AREA, ADJACENT TO THE R/W LINE, OR IN A PROTECTED AREA.



STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1.18

ROADWAY STANDARD DRAWING FOR
FIRE HYDRANT

SHEET 1 OF 1
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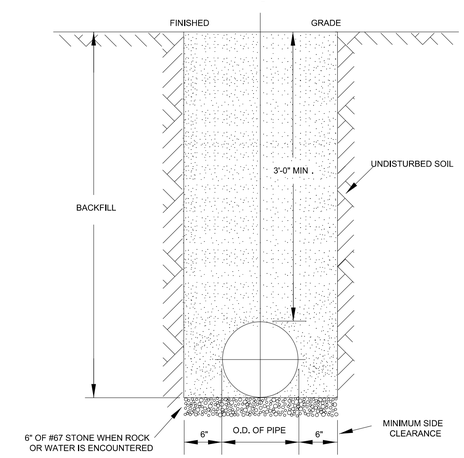

NOTES:
1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS.
5. ACHIEVE 95% COMPACTION IN BACKFILL.

TRENCH BOTTOM & BACKFILLING REQUIREMENTS

9/20/19

N.T.S. Source: VHB 0

PROJECT REFERENCE NO.	SHEET NO.
R-5816	UC-3

UTILITIES ENGINEER

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DocuSign Envelope ID: F5C24010-0B9B-4DA2-84DF-BB5975A24300
PROFESSIONAL SEAL 14101 ENGINEER JOHN M. KEMPEATH
5/16/2022

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Prepared by

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