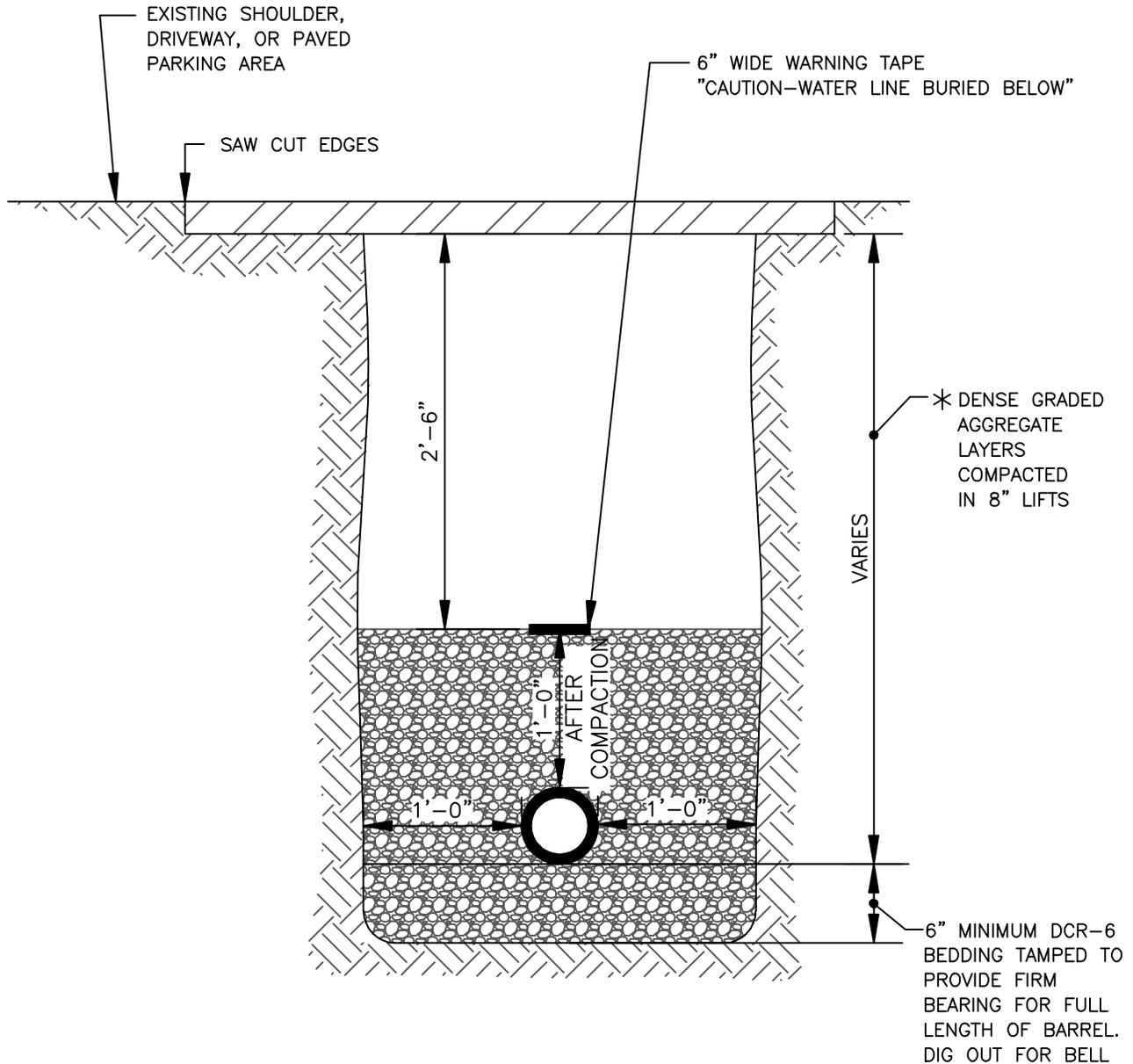


Hagerstown Water Details

- W1. Roadway, Shoulder and Paved Parking Area - Trench, Excavation and Backfill
- W2. Grassed Area Repair
- W3. Ductile Iron Tyton Joint Pipe and Pipe Deflection Details
- W4. Hagerstown Standard Hydrant Thread
- W5. Fire Hydrant Setting
- W6. Blow Off Valve
- W7. Sleeve Boring and Jacking Detail
- W8. Casing for Main Under Highway
- W9. Standard Restraint – Tees, Bends, Dead Ends
- W10. Buttress for Mechanical Joint Tees
- W11. Buttress for Horizontal M.J. Bends Less Than 90°
- W12. Anchorages for M.J. Bends
- W13. Buttress for Horizontal M.J. Bends
- W14. Buttress for Push On Plug
- W15. Air and Vacuum Relief Valve
- W16. 1 Inch Single Water House Connection
- W17. 1 inch Double Water House Connection
- W18. 1 Inch Residential Standard Double Water House Connection
- W19. 4 Inch Fire Domestic Meter Vault



NOTES:

1. BACKFILL TO BE COMPACTED IN 8" LAYERS TO 95% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE AASHTO-T-99 STANDARD PROCTOR.
2. MAINTAIN MINIMUM OF 3'-6" COVER TO TOP OF PIPE UNLESS NOTED ON PLANS OR DIRECTED BY ENGINEER.
- * 3. SEE THE CITY, COUNTY OR STATE STANDARD REQUIREMENTS FOR BACKFILL.



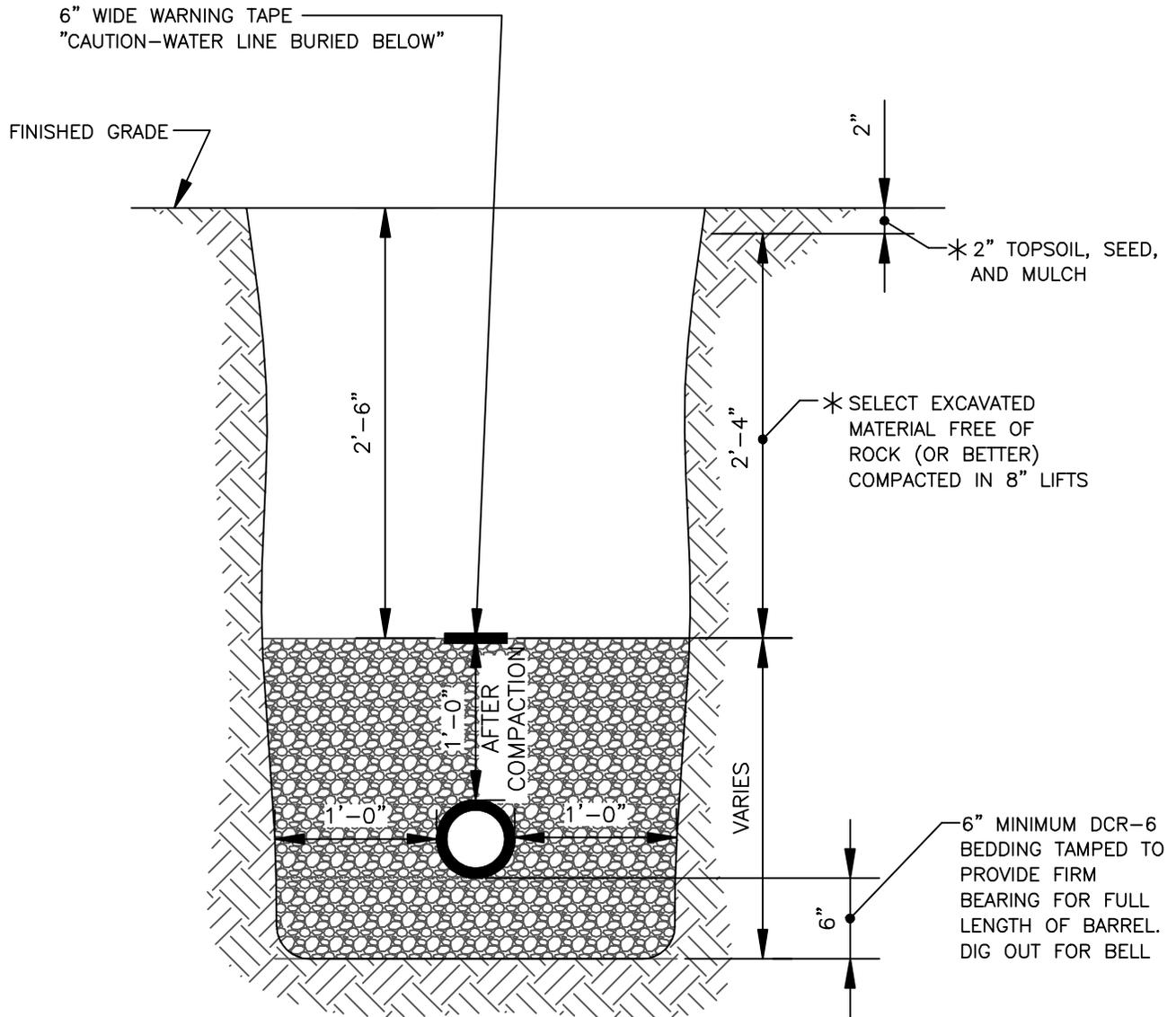
CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

ROADWAY, SHOULDER AND PAVED
PARKING AREA TRENCH,
EXCAVATION AND BACKFILL

ISSUE DATE: MARCH 2009

REVISIONS

Plate W-001



NOTES:

1. BACKFILL TO BE COMPACTED IN 8" LAYERS TO 95% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE AASHTO-T-99 STANDARD PROCTOR.
2. MAINTAIN MINIMUM OF 3'-6" COVER TO TOP OF PIPE UNLESS NOTED ON PLANS OR DIRECTED BY ENGINEER.
- * 3. SEE THE CITY, COUNTY OR STATE STANDARD REQUIREMENTS FOR BACKFILL.



CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

ISSUE DATE: MARCH 2009

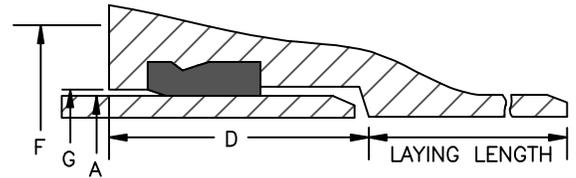
REVISIONS

GRASSED AREA REPAIR

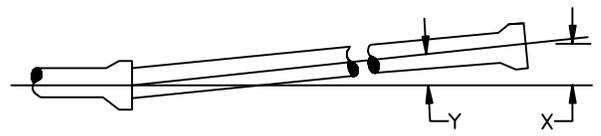
Plate W-002

| DUCTILE IRON TYTON PUSH-ON JOINTS PIPE STANDARD DIMENSIONS | | | | | |
|--|---------------|------------------------|---------------------|--------------------------------|-------------------------------|
| SIZE IN INCHES | LAYING LENGTH | "A" OUTSIDE DIAMETER Ø | "D" DEPTH OF SOCKET | "F" BELL OUTSIDE DIAMETER O.D. | "G" BELL INSIDE DIAMETER I.D. |
| DIMENSIONS IN INCHES | | | | | |
| 4 | 20'-1" | 4.80 | 3.31 | 7.00 | 4.91 |
| 6 | 20'-1" | 6.90 | 3.38 | 9.13 | 7.01 |
| 8 | 20'-1" | 9.05 | 3.75 | 11.50 | 9.16 |
| 10 | 20'-1" | 11.10 | 3.75 | 13.63 | 11.21 |
| 12 | 20'-1" | 13.20 | 3.75 | 15.75 | 13.31 |
| 14 | 20'-0 1/2" | 15.30 | 4.50 | 18.00 | 15.44 |
| 16 | 20'-0 1/2" | 17.40 | 4.50 | 20.00 | 17.54 |
| 18 | 20'-0 1/2" | 19.50 | 4.50 | 23.94 | 19.64 |
| 20 | 20'-0" | 21.60 | 4.75 | 25.88 | 21.74 |
| 24 | 20'-0" | 25.80 | 4.75 | 29.94 | 25.94 |
| 30 | 20'-0" | 32.00 | 6.00 | 35.75 | 32.17 |
| 36 | 20'-0" | 38.30 | 6.00 | 42.25 | 38.47 |
| 42 | 20'-0 1/2" | 44.50 | 5.25 | 48.00 | 44.67 |
| 48 | 20'-0 1/2" | 50.80 | 5.25 | 54.66 | 50.97 |
| 54 | 20'-0 1/2" | 57.10 | 5.25 | 61.44 | 57.27 |

| DUCTILE IRON TYTON PUSH-ON JOINT PIPE ALLOWABLE JOINT DEFLECTION | | | |
|--|---------------------------|---------------------------------|----------------------|
| MAXIMUM RECOMMENDED DEFLECTION | | | |
| SIZE IN INCHES | NORMAL LAYING LENGTH FEET | "X" OFFSET PER LENGTH IN INCHES | "Y" DEFLECTION ANGLE |
| 4 | 20 | 21 | 0'-5" |
| 6 | 20 | 21 | 0'-5" |
| 8 | 20 | 21 | 0'-5" |
| 10 | 20 | 21 | 0'-5" |
| 12 | 20 | 21 | 0'-5" |
| 14 | 20 | 17 | 0'-4" |
| 16 | 20 | 17 | 0'-4" |
| 18 | 20 | 12 | 0'-3" |
| 20 | 20 | 12 | 0'-3" |
| 24 | 20 | 12 | 0'-3" |
| 30 | 20 | 12 | 0'-3" |
| 36 | 20 | 12 | 0'-3" |
| 42 | 20 | 8 | 0'-2" |
| 48 | 20 | 8 | 0'-2" |
| 54 | 20 | 6 | 0'-1 1/2" |



JOINT PIPE DIMENSION DETAIL
NOT TO SCALE



PIPE DEFLECTION DETAIL
NOT TO SCALE

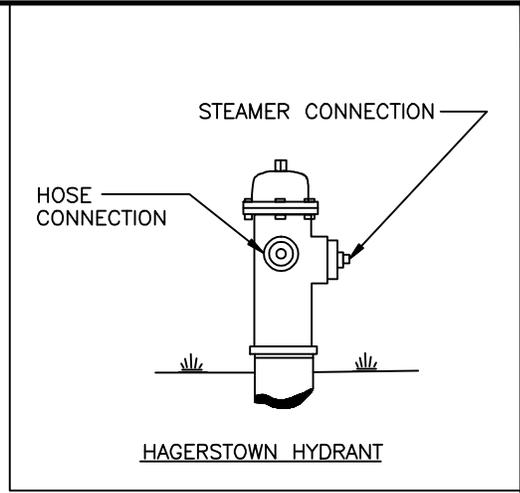
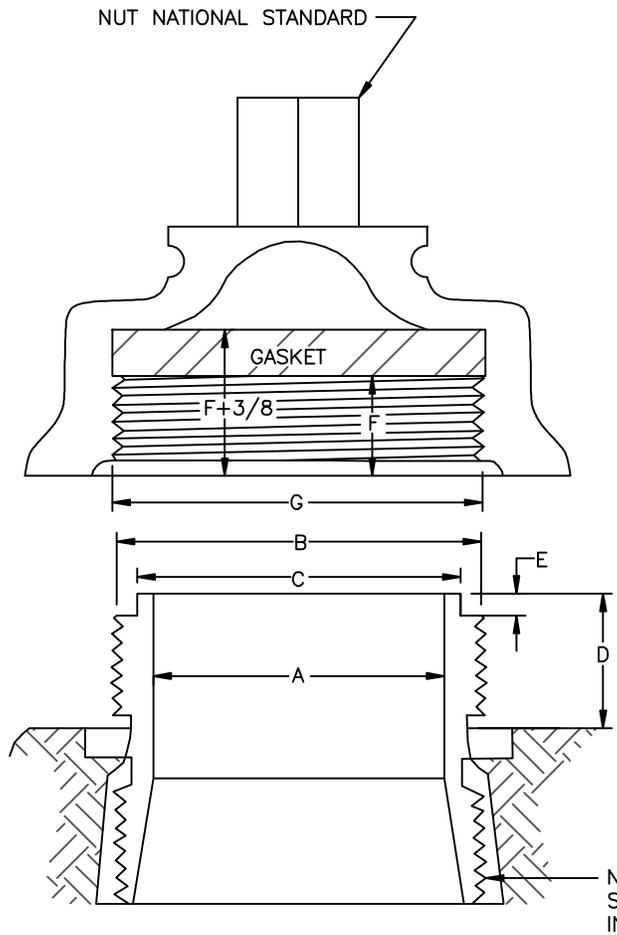


CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

| |
|------------------------|
| ISSUE DATE: MARCH 2009 |
| REVISIONS |
| |
| |

DUCTILE IRON TYTON JOINT PIPE AND PIPE DEFLECTION DETAILS

Plate W-003



NOTES:

1. THREADS TO BE 60° "V" THREAD PATTERN WITH .01 INCH CUT OFF TOP OF THREAD & .01 INCH LEFT IN BOTTOM OF VALLEY ON THE 2-1/2, 3, AND 3-1/2 INCH COUPLING, AND .02 INCH CUT OFF TOP & .02 INCH LEFT IN BOTTOM OF VALLEY ON 4-1/2 INCH COUPLING. OPEN LEFT
2. STEAMER (4.5") THREAD IS ALSO NATIONAL STANDARD.

| DIMENSION IN INCHES | | CONNECTION | |
|---------------------|----------------------------------|------------|-------|
| | | STEAMER | HOSE |
| A | INSIDE DIAMETER OF HOSE COUPLING | 4.500 | 2.531 |
| B | OUTSIDE DIAMETER OF THREAD | 5.750 | 3.156 |
| C | DIAMETER OF ROOT OF THREAD | 5.397 | 2.910 |
| D | TOTAL LENGTH OF MALE PART | 1.375 | 1.125 |
| E | LENGTH OF BLANK END OF MALE PART | 0.250 | 0.250 |
| F | LENGTH OF FEMALE THREAD | 1.250 | 0.625 |
| G | DIAMETER OF TOP OF FEMALE THREAD | 5.800 | 3.186 |
| - | NUMBER OF THREAD PER INCH | 4.000 | 7.000 |

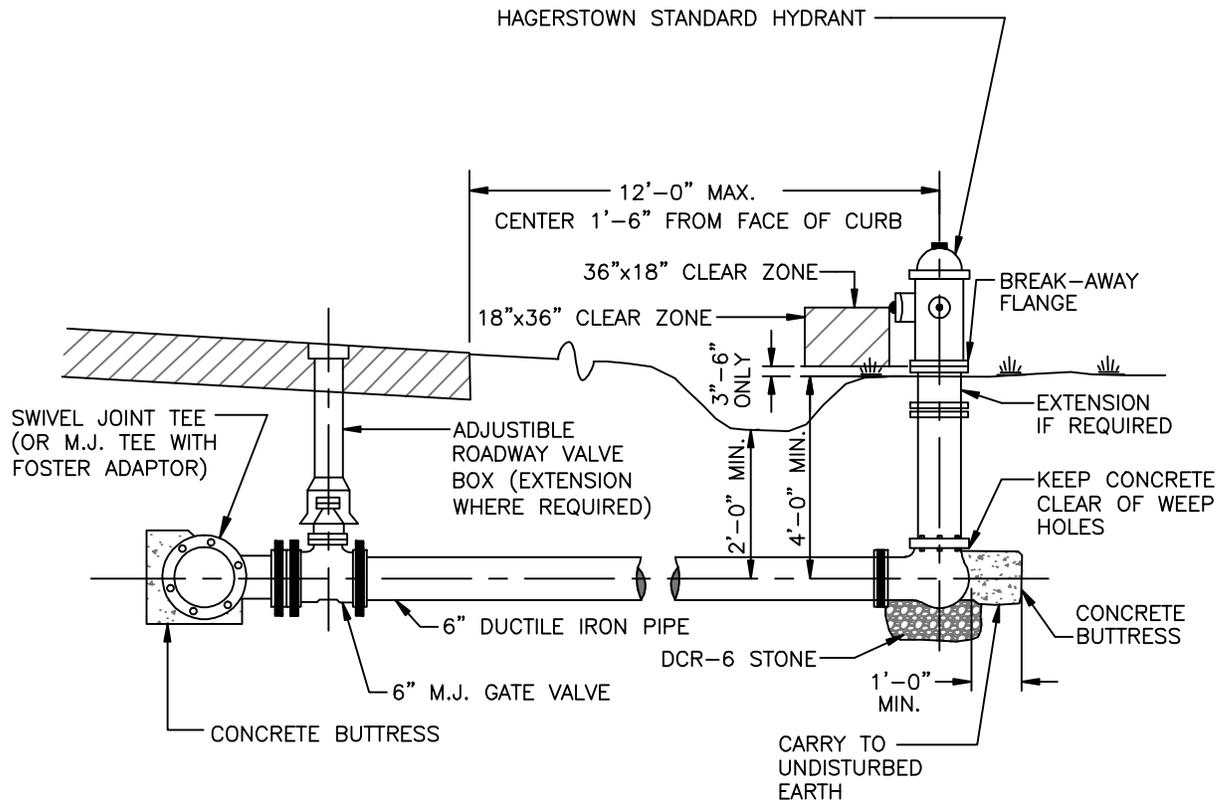


CITY OF HAGERSTOWN UTILITIES DEPARTMENT—WATER DIVISION

HAGERSTOWN STANDARD
HYDRANT THREAD

| | |
|------------------------|-------|
| ISSUE DATE: MARCH 2009 | |
| REVISIONS | |
| _____ | _____ |
| _____ | _____ |

Plate W-004



NOTE:

1. ALL PIPE MUST BE RESTRAINED FROM MAIN TO FIRE HYDRANT TO ELIMINATE CONCRETE BUTTRESS.
2. COVER FITTING WITH POLYETHYLENE WRAP 5 MIL. OR GREATER.



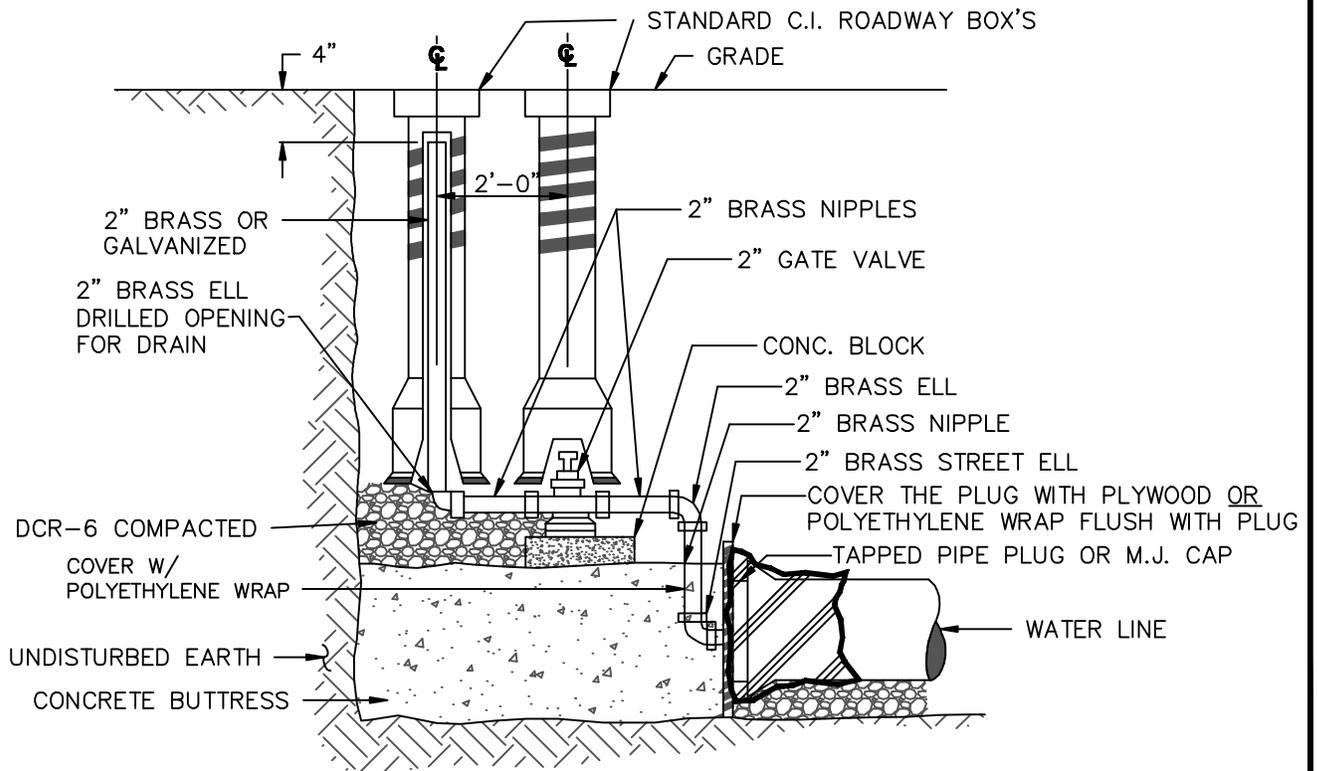
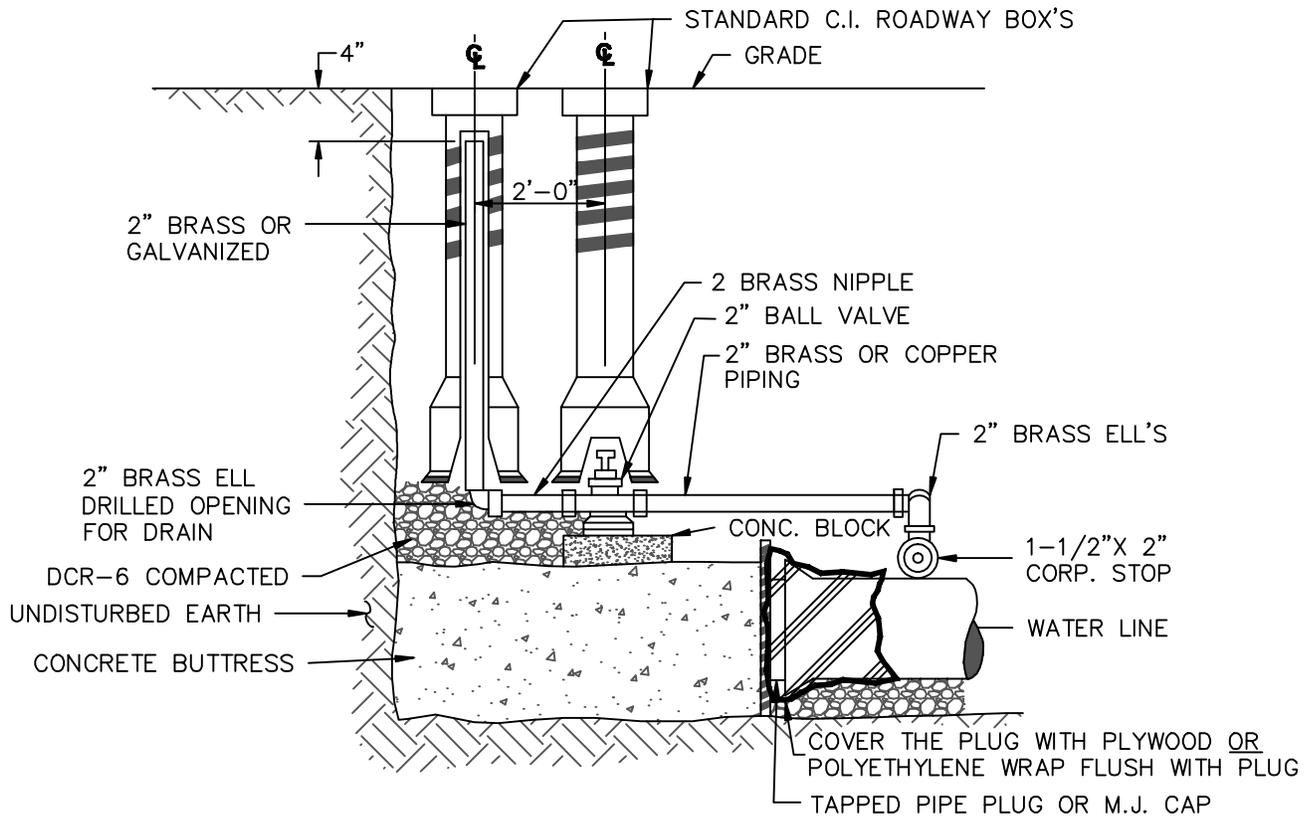
CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

ISSUE DATE: MARCH 2009

REVISIONS

FIRE HYDRANT SETTING

Plate W-005



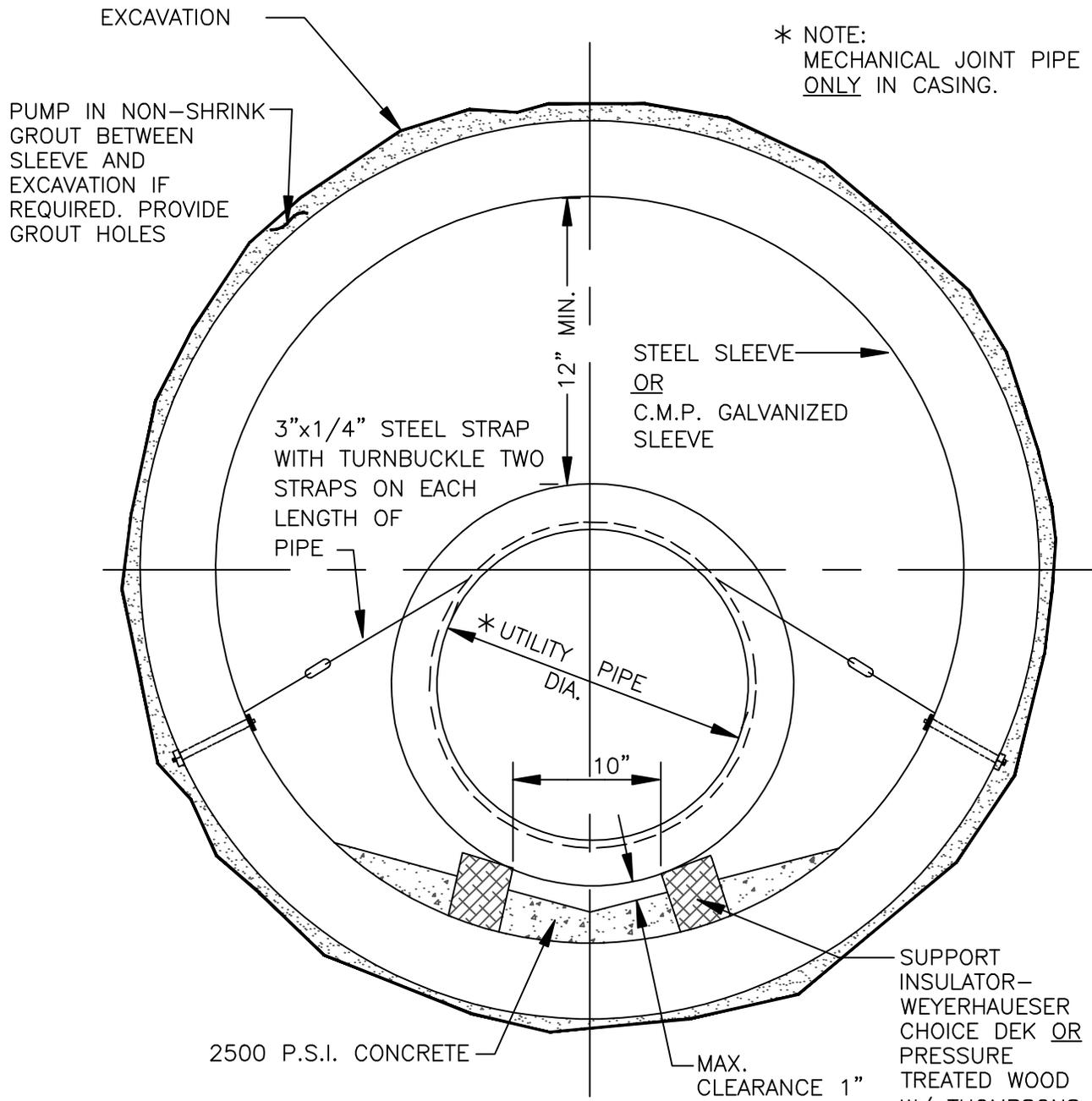
CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

ISSUE DATE: MARCH 2009

REVISIONS

2 INCH BLOW OFF

Plate W-006



| PIPE SIZE | SLEEVE MIN. SIZE |
|------------|------------------|
| 8"-10"-12" | 36" |
| 14"-16" | 42" |
| 20" | 48" |
| 24" | 54" |



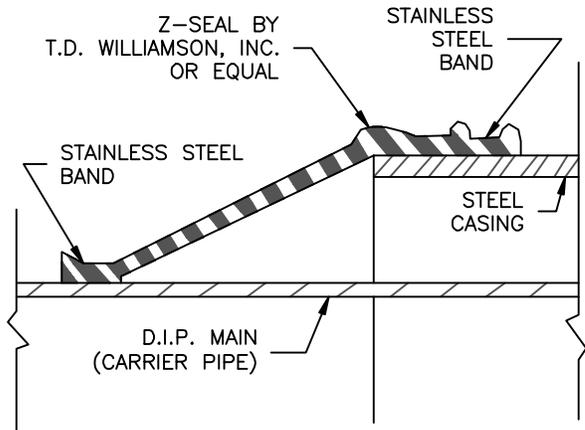
CITY OF HAGERSTOWN UTILITIES DEPARTMENT—WATER DIVISION

ISSUE DATE: MARCH 2009

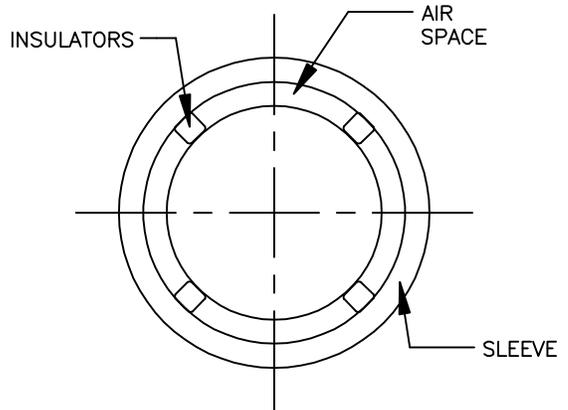
REVISIONS

SLEEVE BORING
AND JACKING DETAIL

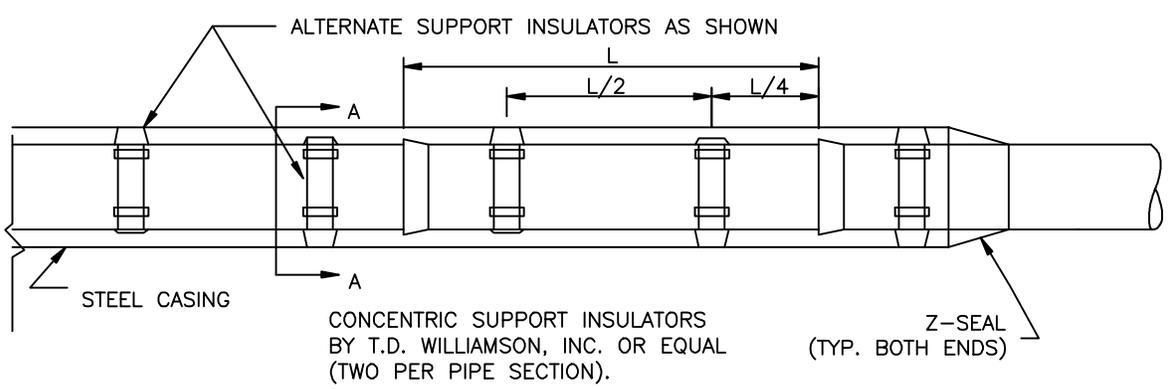
Plate W-007



END SEAL INSTALLATION



SECTION A-A



LOCATION OF INSULATORS

| NOMINAL DIAMETERS | |
|-------------------|-------------------------------|
| MAIN | CASING— INSIDE DIAMETER |
| 4" | 8" |
| 6" | 10" |
| 8" | 12" |
| 10" | 16" |
| 12" | 18" |
| 14" | 20" |
| 16" | 22" |
| 18" | 24" |
| 20" | 28" |
| 24" | 32" |

- NOTES:
1. CASING SHALL CONFORM TO AWWA C202. WALL THICKNESS ON SIZES THRU 10" SHALL BE 1/4", OTHERS SHALL BE 3/8".
 2. DUCTILE IRON CARRIER PIPE SHALL BE COATED IN ACCORDANCE WITH AWWA C-104.
 3. SEE MANUFACTURERS SPECIFICATIONS FOR THE USE OF FIELD LOC'S.
 4. USE OF MECHANICAL JOINT PIPE AS DIRECTED BY CITY OF HAGERSTOWN WATER/SEWER DIVISION INSPECTOR.



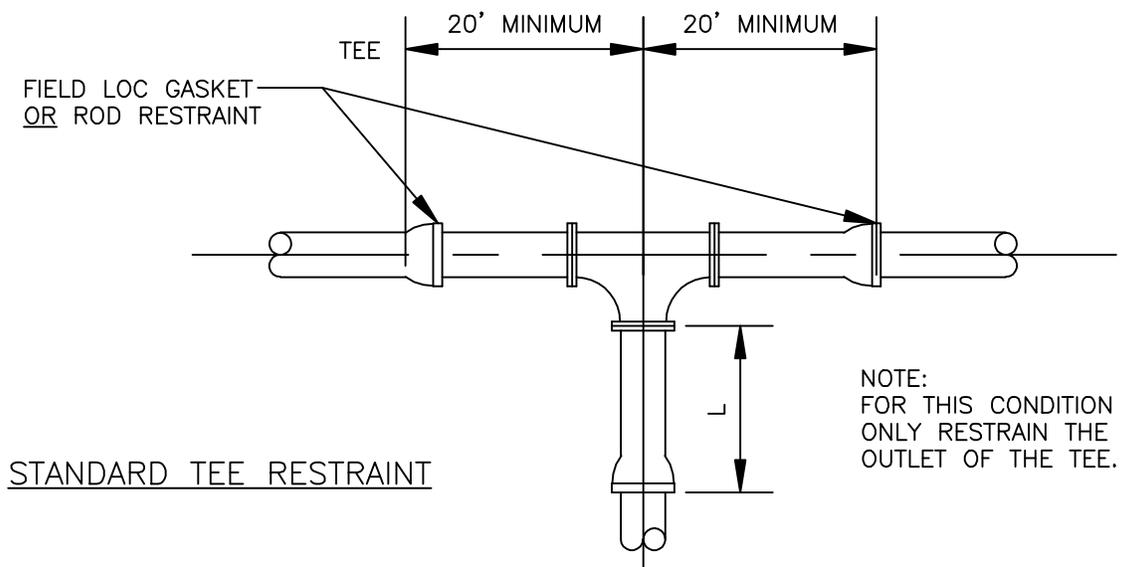
CITY OF HAGERSTOWN UTILITIES DEPARTMENT—WATER DIVISION

**CASING FOR MAIN
UNDER HIGHWAY**

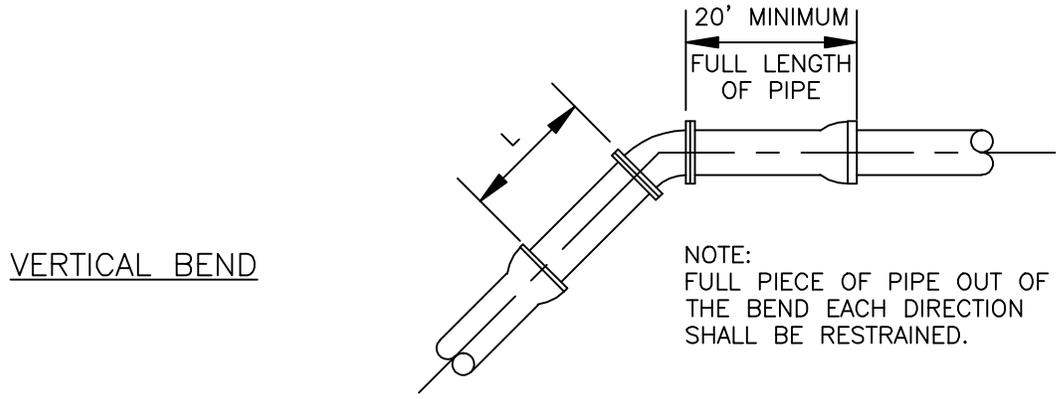
ISSUE DATE: MARCH 2009

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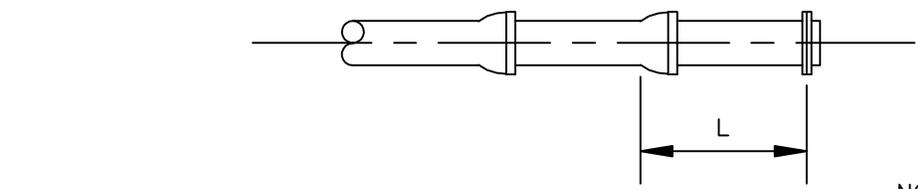
Plate W-008



NOTE:
FOR THIS CONDITION NEED ONLY RESTRAIN THE BRANCH OUTLET OF THE TEE.



NOTE:
FULL PIECE OF PIPE OUT OF THE BEND EACH DIRECTION SHALL BE RESTRAINED.



NOTE:
NORMAL PRACTICE IS A CONCRETE BUTTRESS AT THE END OF THE MAIN WITH 2" BLOWOFF.

GENERAL NOTE: L=FULL LENGTH OF PIPE (MINIMUM 20 FEET)



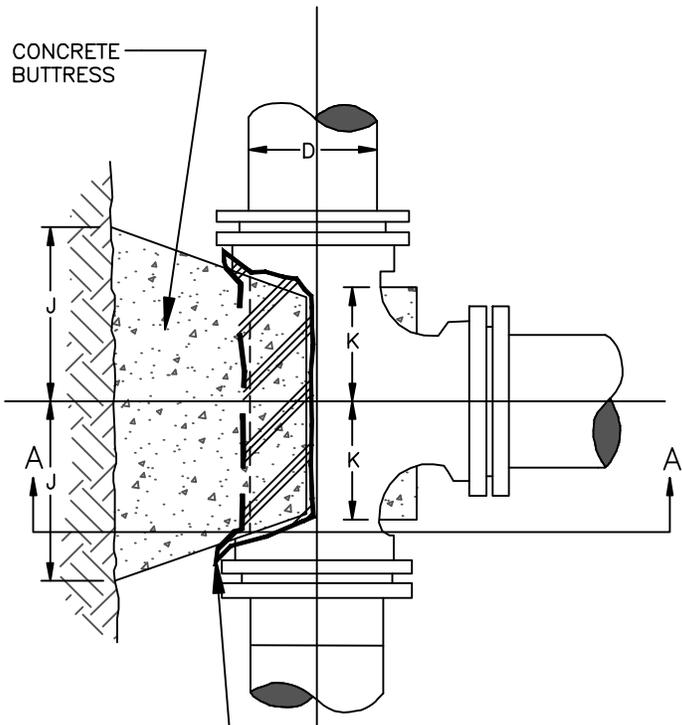
CITY OF HAGERSTOWN UTILITIES DEPARTMENT—WATER DIVISION

STANDARD RESTRAINT TEE,
DEAD END AND BEND

ISSUE DATE: MARCH 2009

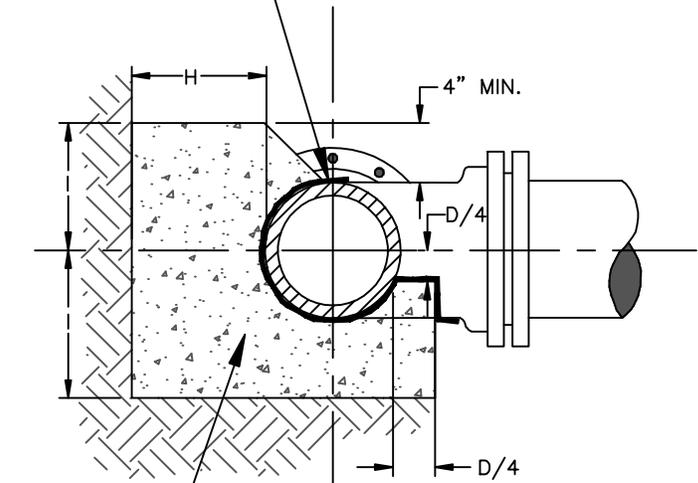
REVISIONS

Plate W-009



COVER THE PIPE WITH POLYETHYLENE WRAP

PLAN



CONCRETE BUTTRESS

SECTION A-A

| D | H | I | J | K |
|-----|--------|--------|--------|--------|
| 4" | 0'-9" | 0'-6" | 0'-9" | 0'-5" |
| 6" | 0'-9" | 0'-8" | 0'-9" | 0'-6" |
| 8" | 0'-9" | 0'-10" | 1'-0" | 0'-8" |
| 10" | 0'-10" | 1'-0" | 1'-3" | 0'-8" |
| 12" | 1'-0" | 1'-3" | 1'-5" | 0'-8" |
| 16" | 1'-2" | 1'-8" | 1'-10" | 0'-10" |
| 20" | 1'-4" | 2'-1" | 2'-3" | 1'-2" |
| 24" | 1'-6" | 2'-6" | 2'-8" | 1'-4" |
| 30" | 1'-9" | 3'-1" | 3'-4" | 1'-6" |
| 36" | 2'-0" | 3'-9" | 3'-11" | 1'-10" |

NOTES:

1. ALL CONCRETE TO BE 2,500 P.S.I.
2. CARRY CONCRETE TO UNDISTURBED EARTH.
3. ALL DIMENSIONS SHOWN ARE MINIMUM.
4. NO CONCRETE SHALL COVER FITTING HARDWARE.
5. COVER FITTING WITH POLYETHYLENE WRAP 5 MIL. OR GREATER.



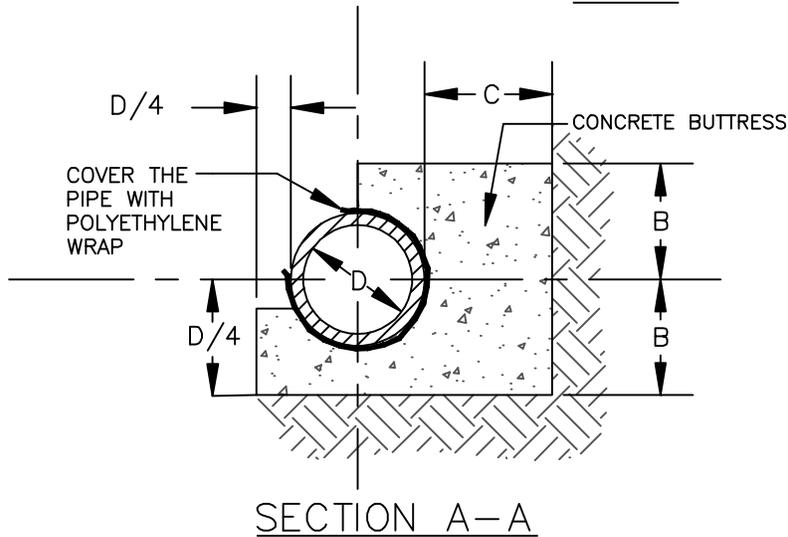
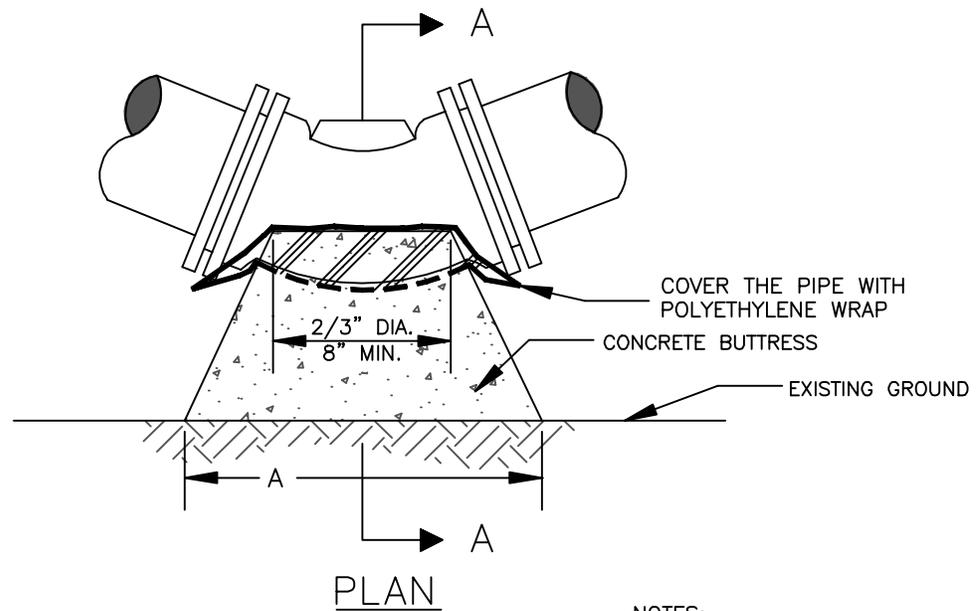
CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

BUTTRESS FOR MECHANICAL JOINT TEES

ISSUE DATE: MARCH 2009

REVISIONS

Plate W-010



NOTES:

1. ALL CONCRETE TO BE 2,500 P.S.I.
2. CARRY CONCRETE TO UNDISTURBED EARTH.
3. ALL DIMENSIONS SHOWN ARE MINIMUM.
4. NO CONCRETE SHALL COVER FITTING HARDWARE.
5. COVER FITTING WITH POLYETHYLENE WRAP 5 MIL. OR GREATER.

| DIA. | 45° | | | 22-1/2° | | | 11-1/4° | | |
|------|--------|--------|--------|---------|--------|--------|---------|--------|--------|
| | A | B | C | A | B | C | A | B | C |
| 4" | 1'-0" | 0'-6" | 0'-9" | 0'-8" | 0'-6" | 0'-9" | 0'-8" | 0'-6" | 0'-9" |
| 6" | 1'-3" | 0'-7" | 0'-9" | 0'-9" | 0'-7" | 0'-9" | 0'-8" | 0'-7" | 0'-9" |
| 8" | 2'-0" | 0'-8" | 0'-9" | 1'-0" | 0'-8" | 0'-9" | 0'-8" | 0'-8" | 0'-9" |
| 10" | 2'-6" | 0'-9" | 0'-11" | 1'-6" | 0'-9" | 0'-10" | 0'-10" | 0'-9" | 0'-9" |
| 12" | 2'-11" | 0'-11" | 1'-2" | 1'-9" | 0'-10" | 0'-11" | 1'-0" | 0'-10" | 0'-9" |
| 16" | 3'-8" | 1'-3" | 1'-5" | 2'-4" | 1'-0" | 1'-2" | 1'-4" | 1'-0" | 0'-9" |
| 20" | 4'-9" | 1'-6" | 1'-10" | 3'-2" | 1'-2" | 1'-4" | 1'-8" | 1'-2" | 0'-10" |
| 24" | 6'-1" | 1'-8" | 1'-11" | 4'-0" | 1'-4" | 1'-6" | 2'-0" | 1'-4" | 1'-0" |
| 30" | 7'-9" | 2'-0" | 3'-1" | 5'-0" | 1'-7" | 1'-9" | 2'-6" | 1'-7" | 1'-1" |
| 36" | 8'-11" | 2'-6" | 3'-4" | 5'-9" | 2'-0" | 2'-0" | 3'-0" | 1'-11" | 1'-2" |



CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

BUTTRESS FOR HORIZONTAL MECHANICAL
JOINT BENDS LESS THAN 90°

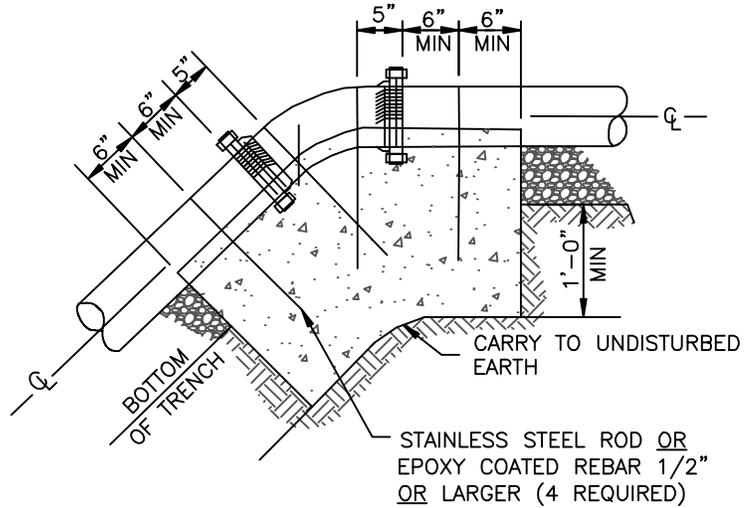
ISSUE DATE: MARCH 2009

REVISIONS

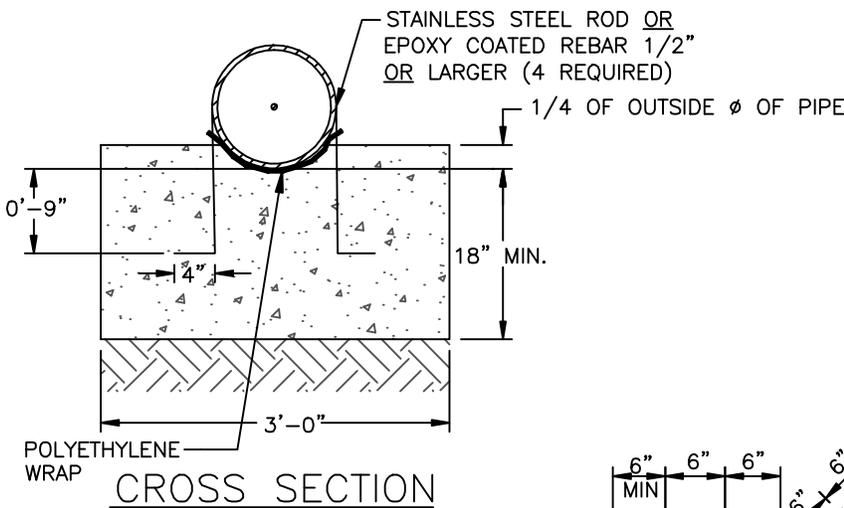
Plate W-011

NOTES:

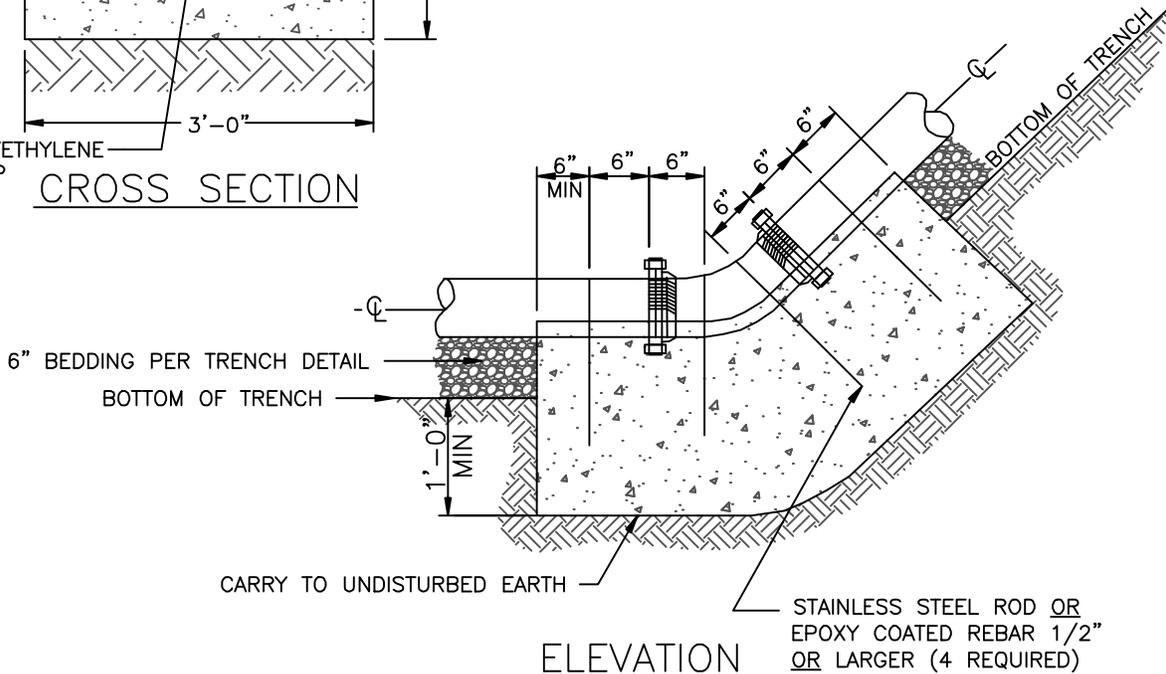
1. ALL CONCRETE TO BE 2,500 P.S.I.
2. CARRY CONCRETE TO UNDISTURBED EARTH.
3. ALL DIMENSIONS SHOWN ARE MINIMUM.
4. NO CONCRETE SHALL COVER FITTING HARDWARE.
5. COVER FITTING PIPE WITH POLYETHYLENE WRAP 5 MIL. OR GREATER.



ELEVATION



CROSS SECTION



ELEVATION



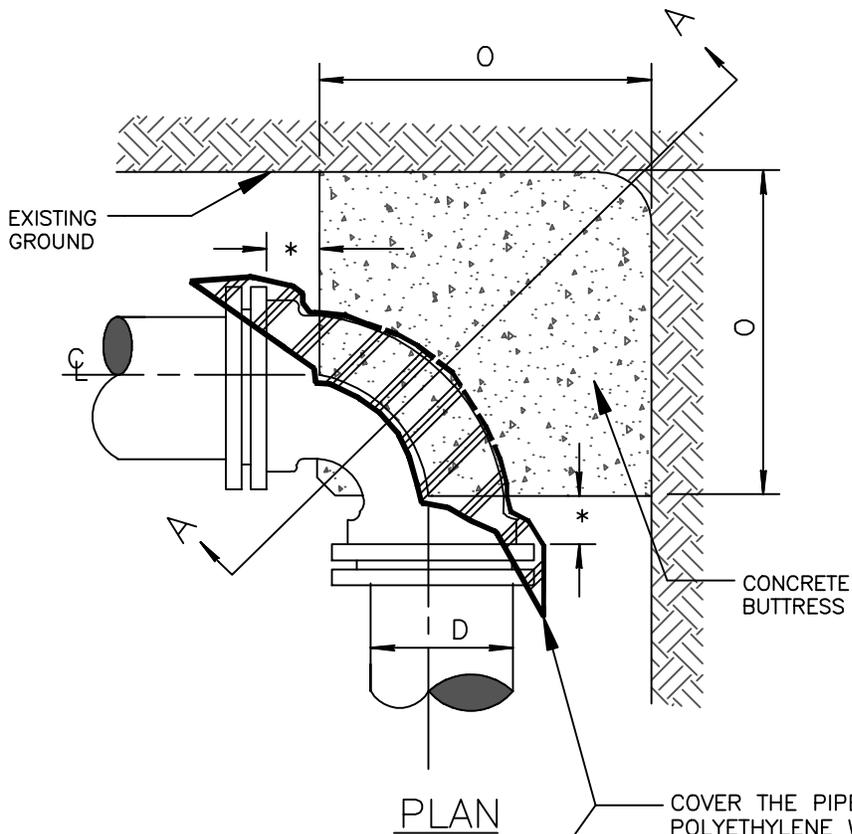
CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

ISSUE DATE: MARCH 2009

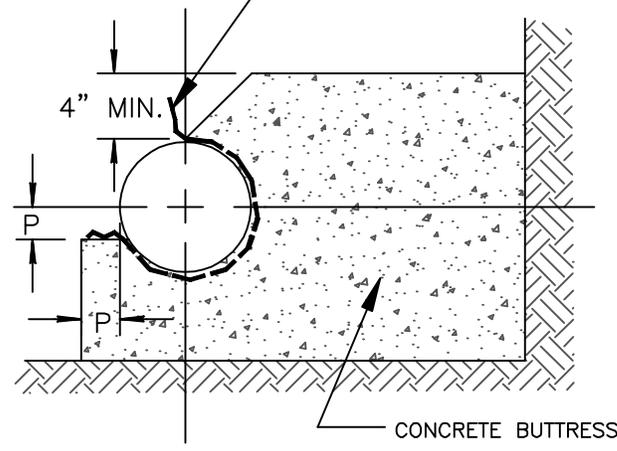
REVISIONS

ANCHORAGES FOR MECHANICAL JOINT BENDS

Plate W-012



| DIA. | O | P |
|------|--------|----|
| 4" | 1'-5" | 1" |
| 6" | 1'-7" | 1" |
| 8" | 1'-10" | 2" |
| 10" | 2'-11" | 3" |
| 12" | 2'-5" | 3" |
| 16" | 2'-11" | 4" |
| 20" | 3'-9" | 5" |
| 24" | 4'-3" | 6" |
| 30" | 5'-4" | 7" |
| 36" | 6'-7" | 9" |



SECTION A-A

NOTES:

1. ALL CONCRETE TO BE 2,500 P.S.I.
2. CARRY CONCRETE TO UNDISTURBED EARTH.
3. ALL DIMENSIONS SHOWN ARE MINIMUM.
4. NO CONCRETE SHALL COVER FITTING HARDWARE.
- * 3" MINIMUM-6" MAXIMUM
5. USE OF 90° BENDS AS DIRECTED BY ENGINEERING DIVISION.



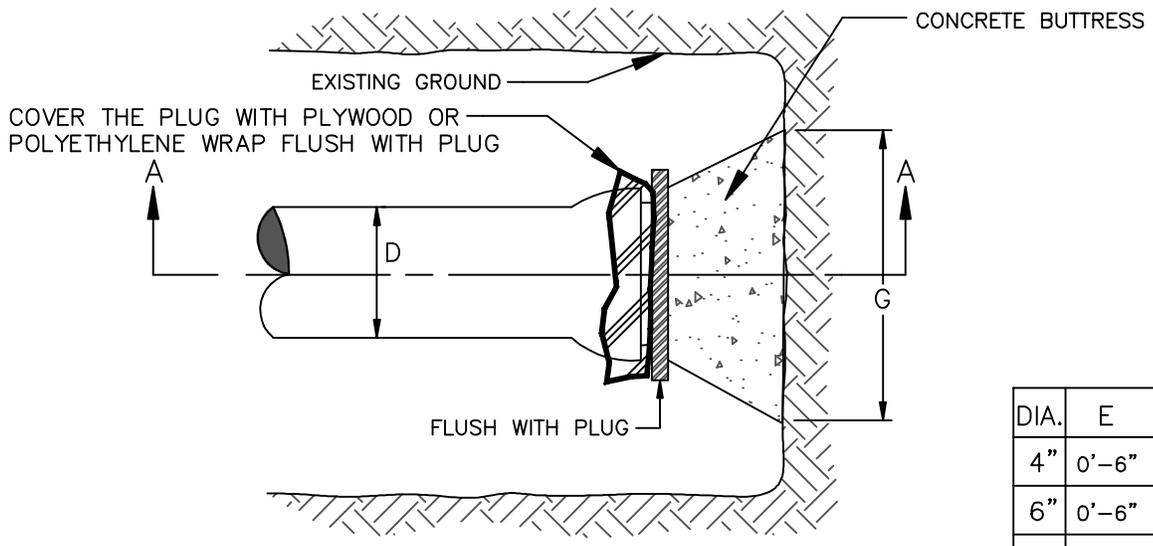
CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

BUTTRESS FOR HORIZONTAL MECHANICAL JOINT BENDS

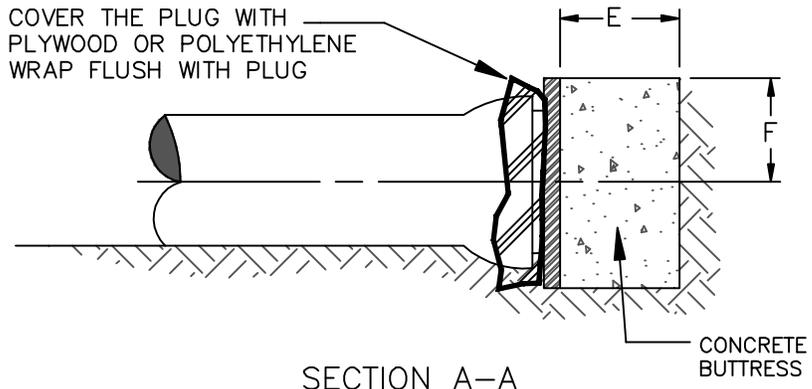
ISSUE DATE: MARCH 2009

REVISIONS

Plate W-013



PLAN VIEW



SECTION A-A

| DIA. | E | F | G |
|------|--------|--------|-------|
| 4" | 0'-6" | 0'-4" | 1'-0" |
| 6" | 0'-6" | 0'-6" | 1'-3" |
| 8" | 0'-8" | 0'-7" | 1'-8" |
| 10" | 0'-8" | 0'-9" | 2'-1" |
| 12" | 0'-10" | 0'-11" | 2'-6" |
| 16" | 1'-0" | 1'-2" | 3'-4" |
| 20" | 1'-4" | 1'-5" | 4'-2" |
| 24" | 1'-8" | 1'-9" | 5'-0" |
| 30" | 2'-0" | 2'-2" | 6'-3" |
| 36" | 2'-0" | 2'-8" | 7'-6" |

NOTES:

1. ALL CONCRETE TO BE 2,500 P.S.I.
2. CARRY CONCRETE TO UNDISTURBED EARTH.
3. ALL DIMENSIONS SHOWN ARE MINIMUM.
4. NO CONCRETE SHALL COVER FITTING HARDWARE.
5. COVER FITTING PIPE WITH POLYETHYLENE WRAP 5 MIL. OR GREATER.



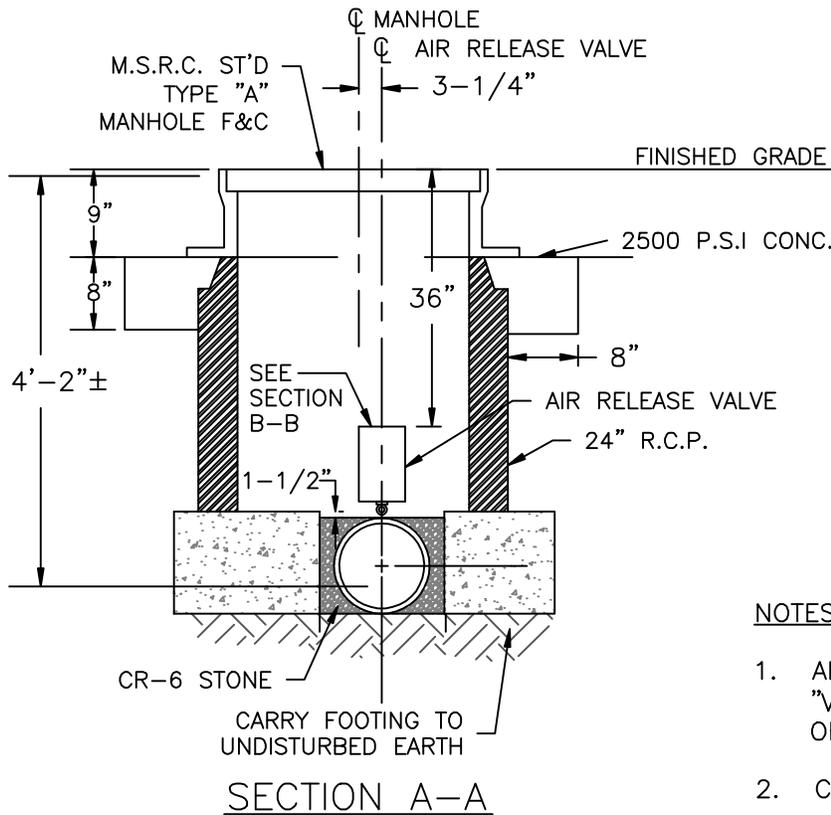
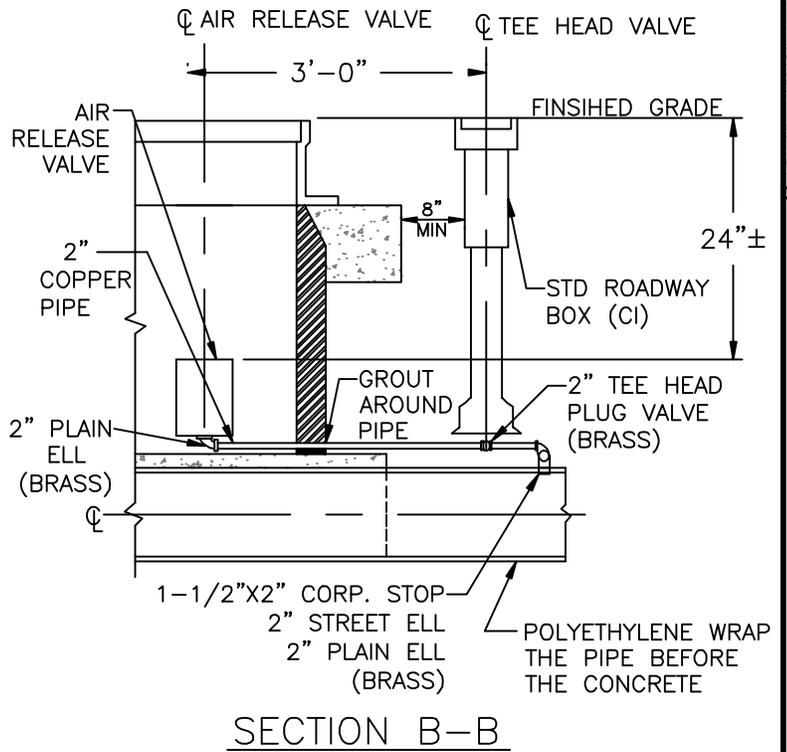
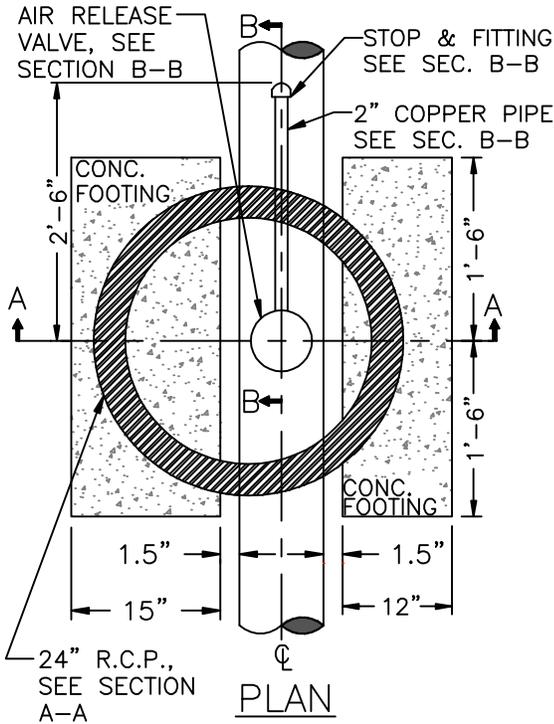
CITY OF HAGERSTOWN UTILITIES DEPARTMENT—WATER DIVISION

ISSUE DATE: MARCH 2009

REVISIONS

BUTTRESS FOR
PUSH-ON PLUG

Plate **W-014**



NOTES

1. AIR RELEASE VALVE SHALL BE "VAL-MATIC AIR AND VACUUM VALVE" OR APPROVED EQUAL.
2. CONCRETE TO BE 2500 P.S.I.



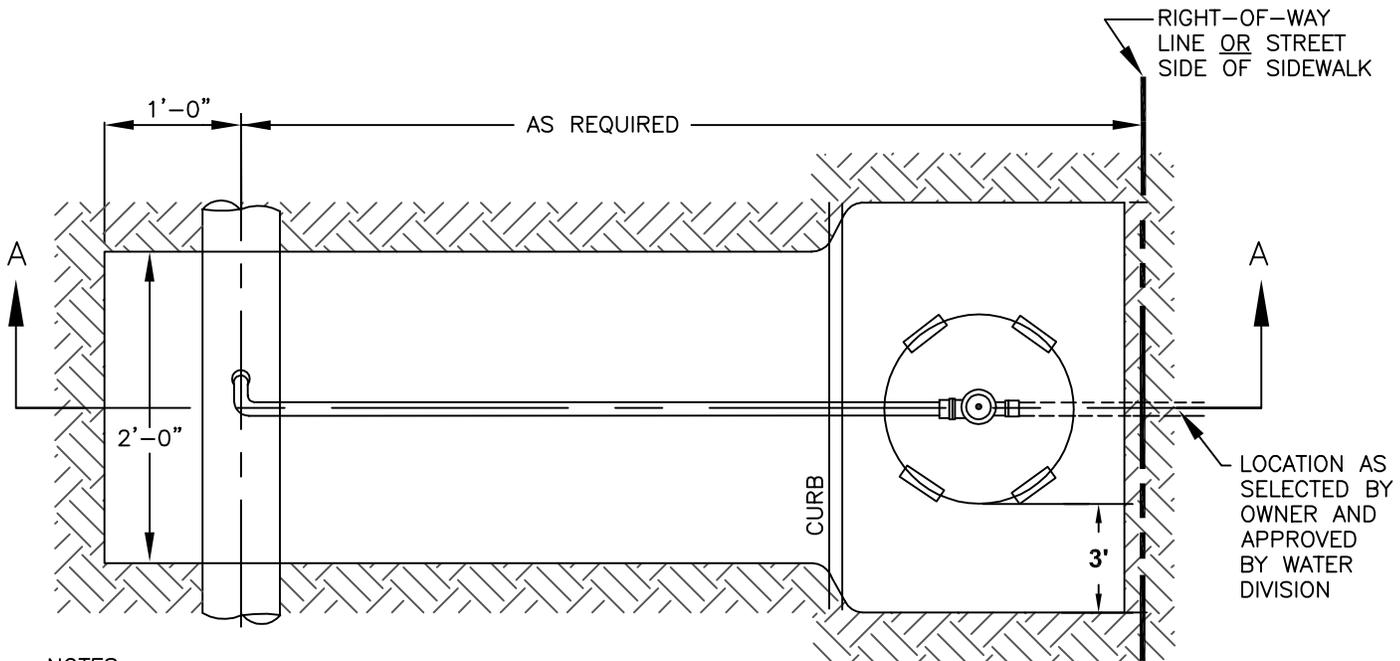
CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

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2 INCH AIR RELEASE VALVE

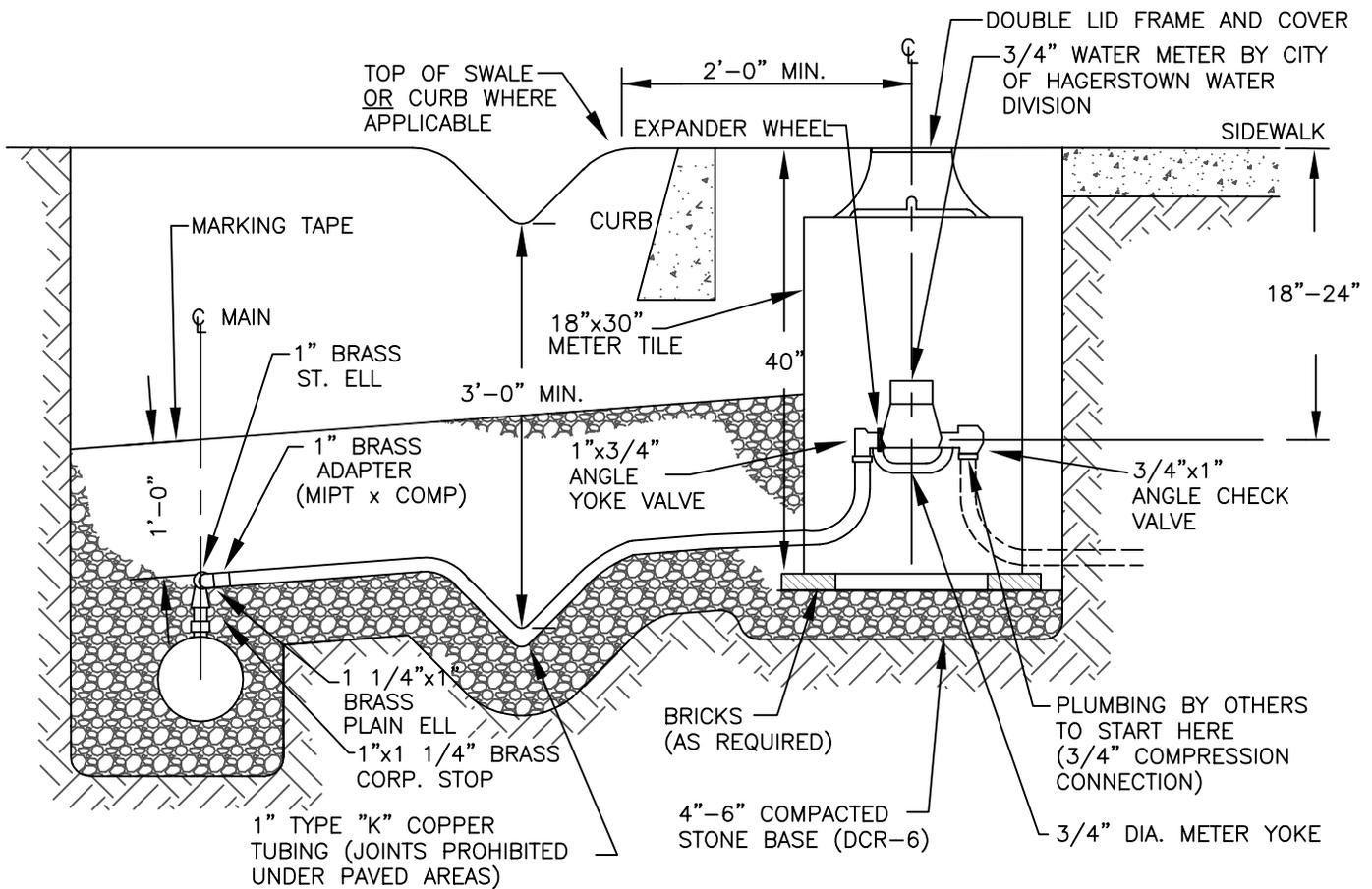
Plate W-015



NOTES:

- METER SETTINGS SHALL NOT BE LOCATED IN TRAFFIC AREAS (DRIVEWAYS) OR DRAINAGE SWALES.
- THE SERVICE SHALL HAVE 1'-0" OF COMPACTED DCR-6 STONE WITH MARKING TAPE.

PLAN



SECTION A-A



CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

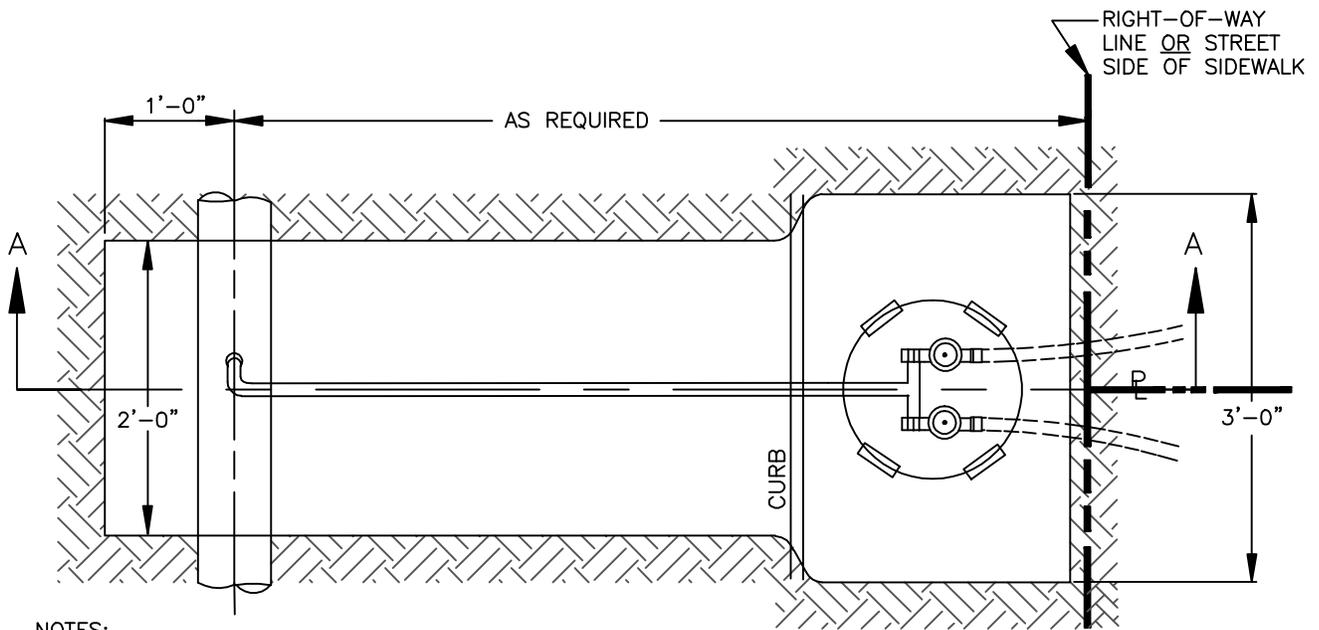
1 INCH SINGLE SERVICE
WATER HOUSE CONNECTION

ISSUE DATE: MARCH 2009

REVISIONS

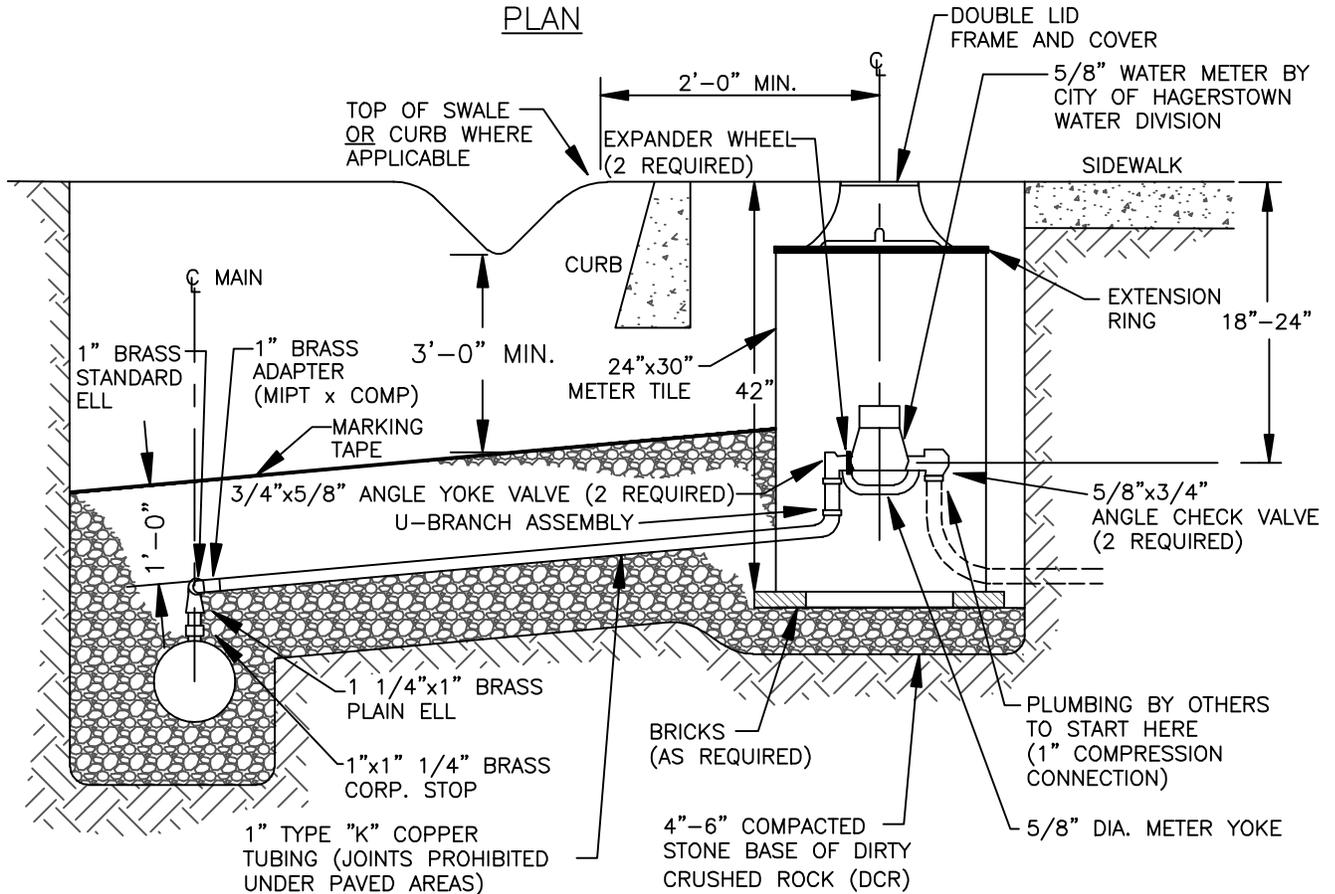
| | | |
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| 7/2/12 | KAR | _____ |
| _____ | _____ | _____ |

Plate W-016



- NOTES:
- METER SETTINGS SHALL NOT BE LOCATED IN TRAFFIC AREAS (DRIVEWAYS) OR DRAINAGE SWALES.
 - THE SERVICE SHALL HAVE 1'-0" OF COMPACTED DCR-6 STONE WITH MARKING TAPE.

PLAN



SECTION A-A



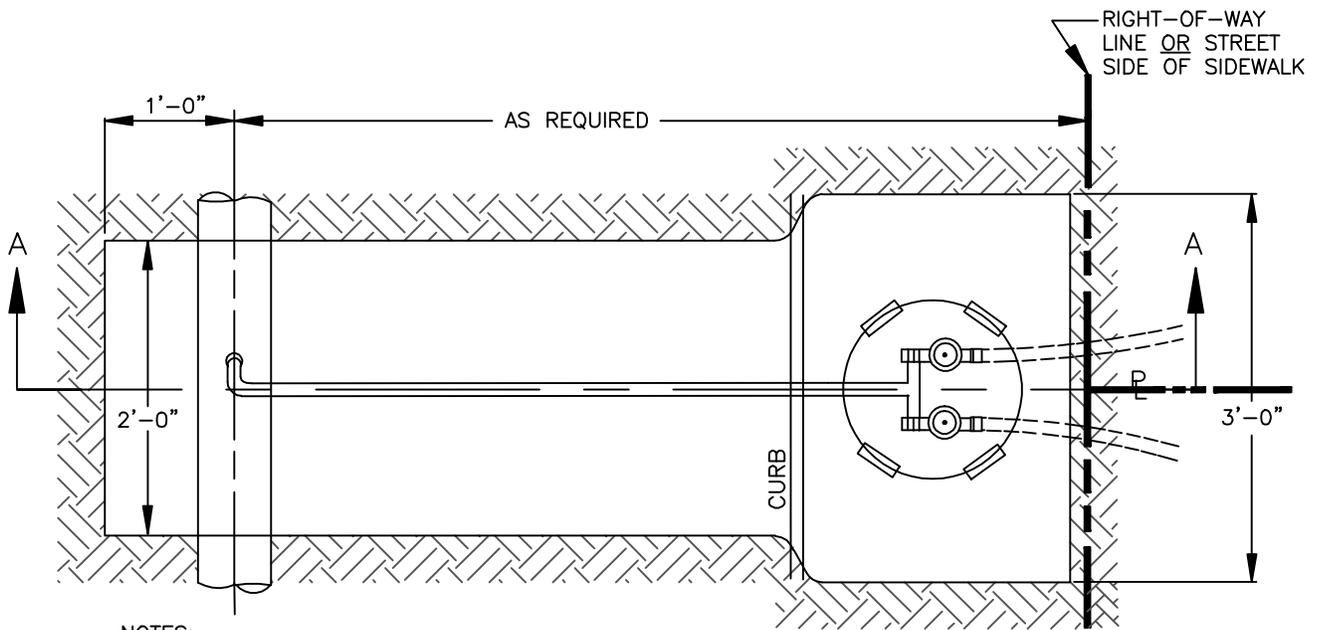
CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

1 INCH
DOUBLE WATER HOUSE CONNECTION

ISSUE DATE: MARCH 2009

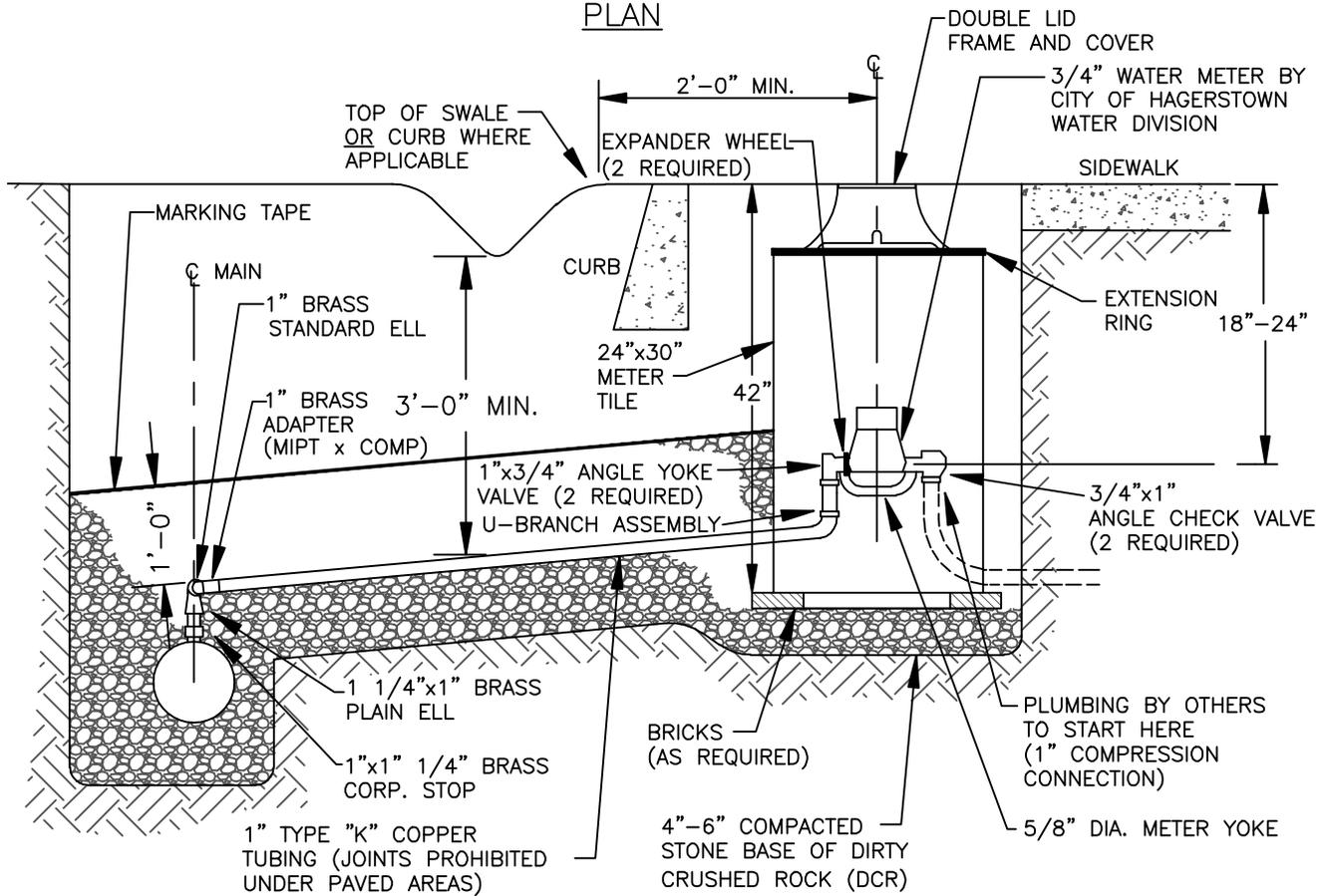
REVISIONS

Plate **W-017**



- NOTES:
- METER SETTINGS SHALL NOT BE LOCATED IN TRAFFIC AREAS (DRIVEWAYS) OR DRAINAGE SWALES.
 - THE SERVICE SHALL HAVE 1'-0" OF COMPACTED DCR-6 STONE WITH MARKING TAPE.

PLAN



SECTION A-A



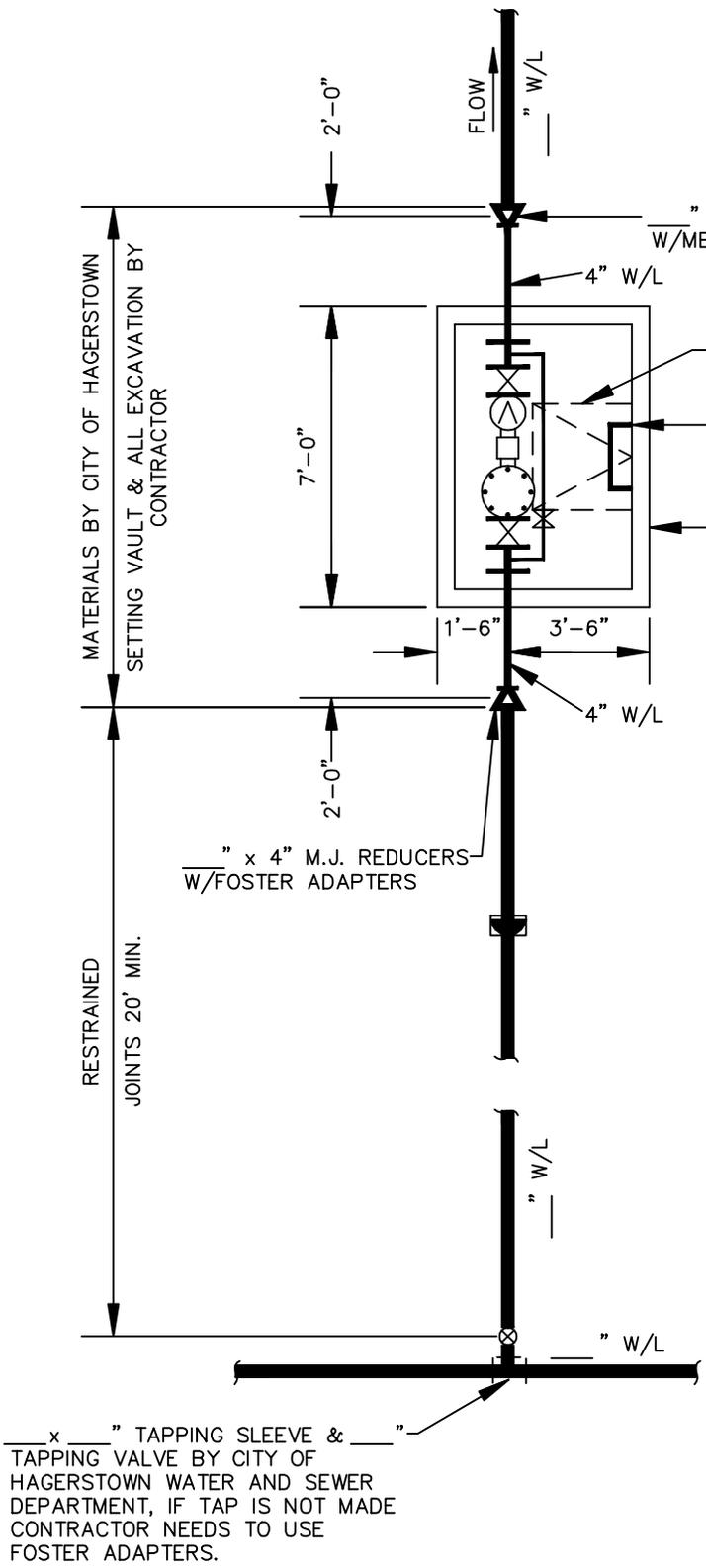
CITY OF HAGERSTOWN UTILITIES DEPARTMENT-WATER DIVISION

**1 INCH RESIDENTIAL STANDARD
DOUBLE WATER HOUSE CONNECTION**

ISSUE DATE: MARCH 2009

REVISIONS

Plate W-018



NOTES:

1. VAULT, LADDER AND DOOR TO BE ACQUIRED BY OWNER/DEVELOPER AND DELIVERED TO SITE AND SET THE VAULT. (USE A.C. MILLER "HAGERSTOWN STANDARD" ONLY). THE TOP OF THE VAULT NEEDS TO BE REMOVABLE.
2. CONTRACTOR TO INSTALL ALL VALVE BOXES, PIPE TO VAULT AND PRECAST VAULT.
3. CONTRACTOR TO BACKFILL AROUND VAULT UP TO BOTTOM OF PIPE IMMEDIATELY AFTER VAULT IS SET.
4. NO BENDS PERMITTED BETWEEN THE MAIN VALVE AND VAULT.
5. ENTIRE ASSEMBLY TO BE PRESSURE TESTED FROM THE MAIN TO UPSTREAM O.S.&Y. VALVE TO CITY OF HAGERSTOWN WATER DIVISION STANDARDS.
6. ALL JOINTS BETWEEN THE MAIN AND METER ASSEMBLY TO BE RESTRAINED.
7. TOP OF VAULT EXCLUDING THE TOP SLAB TO BE LEVEL IN ALL DIRECTIONS 1"±. PIPING AND VAULT TO BE PERPENDICULAR TO WATER MAIN. MAXIMUM ALLOWABLE HORIZONTAL OR VERTICAL DEFLECTION IS 1" PER 10'-0".
8. FOR INSTALLATION REQUIRING A "WET TAP" ON EXISTING MAINS. THE MATERIALS AND INSTALLATION TO BE MADE BY CITY OF HAGERSTOWN WATER & SEWER DEPARTMENT.
9. CONTRACTOR SHALL CORE DRILL THE PIPE INTO AND OUT OF THE VAULT FOR THE METER INSTALLATION. THE METER SHALL SET 1'-0" OFF OF THE FLOOR OF THE VAULT.
10. VAULT SHALL BE SEALED WATER TIGHT.

_____ x _____" TAPPING SLEEVE & _____" TAPPING VALVE BY CITY OF HAGERSTOWN WATER AND SEWER DEPARTMENT, IF TAP IS NOT MADE CONTRACTOR NEEDS TO USE FOSTER ADAPTERS.



CITY OF HAGERSTOWN UTILITIES DEPARTMENT—WATER DIVISION

4 INCH FIRE DOMESTIC METER VAULT

ISSUE DATE: MARCH 2009

| REVISIONS | |
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Plate W-019