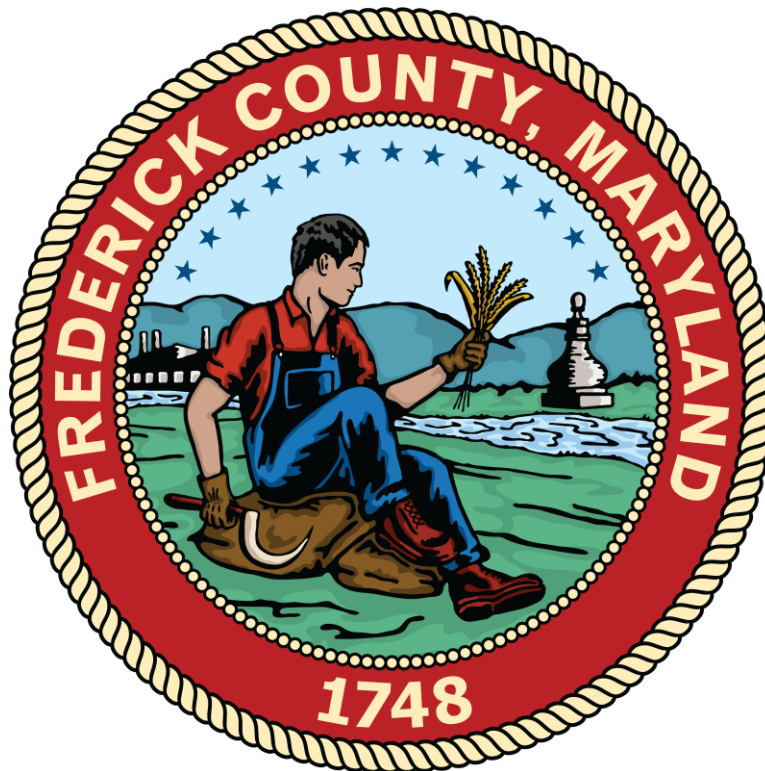


Frederick County, Maryland  
Division of Utilities and Solid Waste Management [DUSWM]  
Department of Engineering and Planning

## **Standard Details**

for Water Mains, Sanitary Sewers and Related Structures



4520 Metropolitan Court  
Frederick, Maryland 21704

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THE EFFECTIVE DATE OF THIS RESOLUTION IS JANUARY 24, 2013

RESOLUTION NO. 13-01

RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS  
OF FREDERICK COUNTY, MARYLAND

Re: Amendments to Standard Details (including Special Provisions)  
for Water Mains, Sanitary Sewers and Related Structures

RECITALS

Pursuant to the authority contained in Chapter 2-13 of the Code of Public Local Laws of Frederick County, Maryland, the Board of County Commissioners is seeking to amend the *Standard Details for Water Mains, Sanitary Sewers and Related Structures* (originally adopted via Resolution 83-34 on December 13, 1983 with most recent changes, including the formal adoption of the "Special Provisions", adopted via Resolution 06-30 on July 20, 2006). These amendments to the *Standard Details for Water Mains, Sanitary Sewers and Related Structures* are necessary due to equipment changes, installation and maintenance issues.

A public hearing was held on these proposed changes on January 17, 2013, at which time the public had the opportunity to comment.


NOW THEREFORE BE IT RESOLVED by the Board of County Commissioners of Frederick County that the current *Standard Details for Water Mains, Sanitary Sewers and Related Structures* are hereby repealed and replaced with the revised *Standard Details for Water Mains, Sanitary Sewers and Related Structures* attached hereto as Exhibit A;

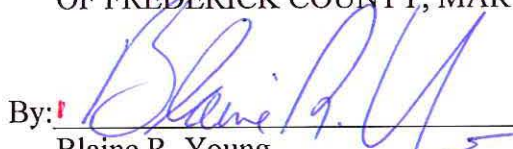
AND BE IT FURTHER RESOLVED that this Resolution shall take effect on January 24, 2013.

The undersigned hereby certifies that this Resolution was approved and adopted on the 24<sup>th</sup> day of January, 2013.

ATTEST:

BOARD OF COUNTY COMMISSIONERS  
OF FREDERICK COUNTY, MARYLAND

  
Lori L. Depies, CPA  
County Manager

By:  (SEAL)  
Blaine R. Young  
President

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| <u>Misc. Water &amp; Sewer Details</u>                             | <u>Detail No.</u> |
|--------------------------------------------------------------------|-------------------|
| Standard Symbols for Water & Sewer Drawings _____                  | 1.1               |
| Typical Trench for Sewer or Water Lines _____                      | 2.1               |
| Pay Widths by Materials _____                                      | 2.3               |
| County Road Repair Over Water & Sewer Trenches _____               | 3.1               |
| Water & Sewer Line Crossing _____                                  | 4.1               |
| Manhole Frame & Cover for Water & Sewer _____                      | 5.1               |
| Straight Wall Manhole Frame and Cover for Water & Sewer _____      | 5.2               |
| Method of Anchoring Frame, Grade Rings & Gaskets to Manholes _____ | 5.3               |
| Installation of Full Circle Repair Clamp _____                     | 8.1               |

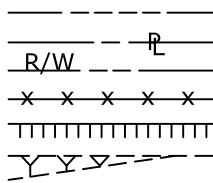
| <u>Water Details</u>                                              | <u>Detail No.</u> |
|-------------------------------------------------------------------|-------------------|
| Curvature of Water Mains _____                                    | 101.1             |
| Buttresses for use at Horizontal & Lower Vertical Bends _____     | 102.1             |
| Buttresses for Caps & Tees on Water Mains _____                   | 103.1             |
| Anchors for Plugs _____                                           | 104.1             |
| Anchors for 11-1/4°, 22-1/2° & 45° Upper Vertical Bends _____     | 105.1             |
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| Fire Hydrant Setting & Grading _____                              | 108.1             |
| Low Point Dewatering Fire Hydrant _____                           | 108.2             |
| Mechanical Joint Retainer Gland _____                             | 109.1             |
| 3/4" & 1" Water Meter Setting _____                               | 110.1             |
| 3/4" Water Meter Setting with Pressure Regulator _____            | 110.2             |
| 1" Water Meter Setting with Pressure Regulator _____              | 110.3             |
| Single & Double 1" Water Meter Setting (Townhouse) _____          | 110.4             |
| Retro-fitting of 3/4" Water Meter with Pressure Regulators _____  | 110.5             |
| 1-1/2" & 2" Water Meter Installation _____                        | 111.1             |
| 3", 4", 6", 8" & 10" compound & Detector Meter Installation _____ | 112.1             |
| Meter Vault Ladder with Support Extension _____                   | 112.2             |
| 3/4", 1", 1-1/2" & 2" Water House Connections _____               | 113.1             |
| Valve Boxes for Water Mains _____                                 | 114.1             |
| 2" Air Release Valve in MH for 24" & Smaller Water Mains _____    | 115.1             |
| Cap & Blowoff at End of Main _____                                | 116.1             |
| Blowoff for 30" or 36" Water Mains _____                          | 116.2             |
| Tapping Sleeve & Valve Installation _____                         | 117.1             |
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| Casing for D.I.P. Main under Highways & Railroads _____           | 123.1             |

|                                                                                                                      |           |      |                                   |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Table Of Contents<br><br>Sheet #1 |
|                                                                                                                      | Date      | Note |                                   |
|                                                                                                                      | .         | .    |                                   |
|                                                                                                                      | .         | .    |                                   |
|                                                                                                                      | .         | .    |                                   |
|                                                                                                                      | .         | .    |                                   |

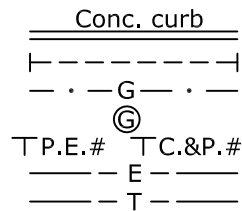
| <u>Sewer Details</u>                                                 | <u>Detail No.</u> |
|----------------------------------------------------------------------|-------------------|
| Precast Concrete Manhole Detail 48"Ø _____                           | 201.1             |
| Precast Concrete Manhole Detail 72"Ø _____                           | 201.2             |
| Shallow Manhole _____                                                | 201.3             |
| Precast Concrete Manhole Built on Existing PVC Pipe _____            | 201.4             |
| Precast Concrete Manhole Built over Existing Sewer Type I _____      | 201.5             |
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| Low Pressure Sewer In-Line Valve _____                               | 301.1             |
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| Low Pressure Sewer Terminal Flushing Connection _____                | 306.1             |
| Low Pressure Sewer In-Line Flushing Connection _____                 | 307.1             |
| Grinder Pump System Electrical Service to an Existing Dwelling _____ | 308.1             |
| Typical Simplex Grinder Pump Installation _____                      | 309.1             |

# Miscellaneous Water & Sewer Details

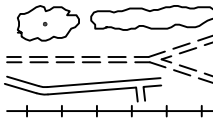
County Boundary Lines  
 Prop. lines (except R/W)  
 R/W lines  
 Fences  
 Walls (Conc., stone, etc.)  
 Slopes



Conc. curb and sidewalk  
 Existing drains and culverts  
 Gas mains  
 Gas meter  
 Utility poles  
 Electric lines - buried  
 Telephone lines - buried



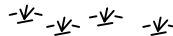
Trees and Brush  
 Earth and Stone roads  
 Bituminous and Conc. roads  
 Railroads (per set of rails)



Streams, Ponds, Ditches



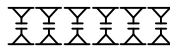
Marsh



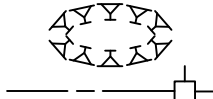
Sign post

o S

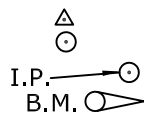
Excavation or Cut



Sink holes



Prop. mon. or stone  
 Triang. sta., Traverse sta.  
 Hub and tack  
 Iron pipe  
 Bench mark  
 Nail, spike or iron rod



Vitrified Clay Pipe Extra strength  
 Cast Iron Pipe  
 Ductile Iron Pipe  
 Corrugated Metal Pipe  
 Reinforced Conc. Pipe  
 Poly (Vinyl Chloride)  
 Acrylonitrile Butadiene Styrene

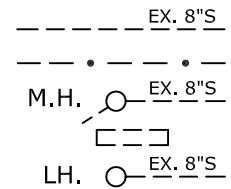
V.C.P.X  
 C.I.P.  
 D.I.P.  
 C.M.P.  
 R.C.P.  
 P.V.C.  
 A.B.S.

Pay Width  
 Excavation  
 First floor  
 Footing  
 Cellar  
 Right of Way

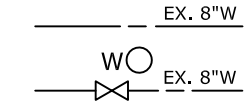
P.W.  
 Exc.  
 F.F.  
 Ftg.  
 C.  
 R/W

## Existing Work

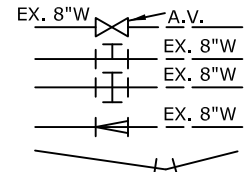
Sewers  
 Storm water drains  
 Sewer Manhole  
 Rectangular Vaults  
 Lampholes



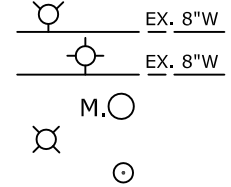
Water mains  
 Water Manholes  
 Valves



Air valve  
 Tee  
 Cross  
 Reducer  
 Bend

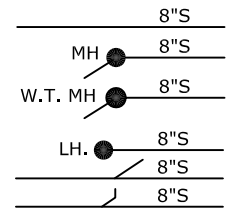


Blow-off  
 Fire hydrant and valve  
 Meter Boxes  
 Elevated tank  
 Stand pipe

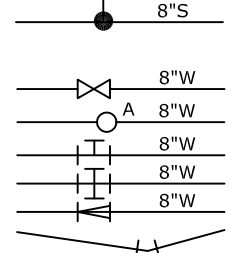


## Proposed Work

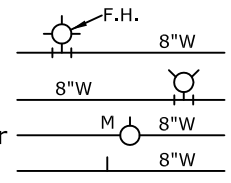
Sewers  
 Manholes  
 Water-tight Manhole  
 Lamphole  
 Y branch  
 Sewer Service Conn.- S.S.C.



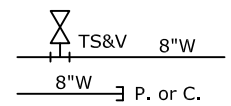
Drop Sewer Service  
 Conn.- D.S.S.C.  
 Water main w/ valve  
 Automatic air-release valve  
 Tee  
 Cross  
 Reducer  
 Bend



Fire hydrant w/ valve  
 Blow-off  
 House water service and meter  
 House water service - W.S.C.



Tapping sleeve & valve  
 Plug or Cap



Frederick County  
 Division of Utilities &  
 Solid Waste Management  
 Department of  
 Engineering & Planning

| Revisions |      |
|-----------|------|
| Date      | Note |
|           |      |
|           |      |
|           |      |
|           |      |
|           |      |

Standard Symbols for  
 Water and Sewer

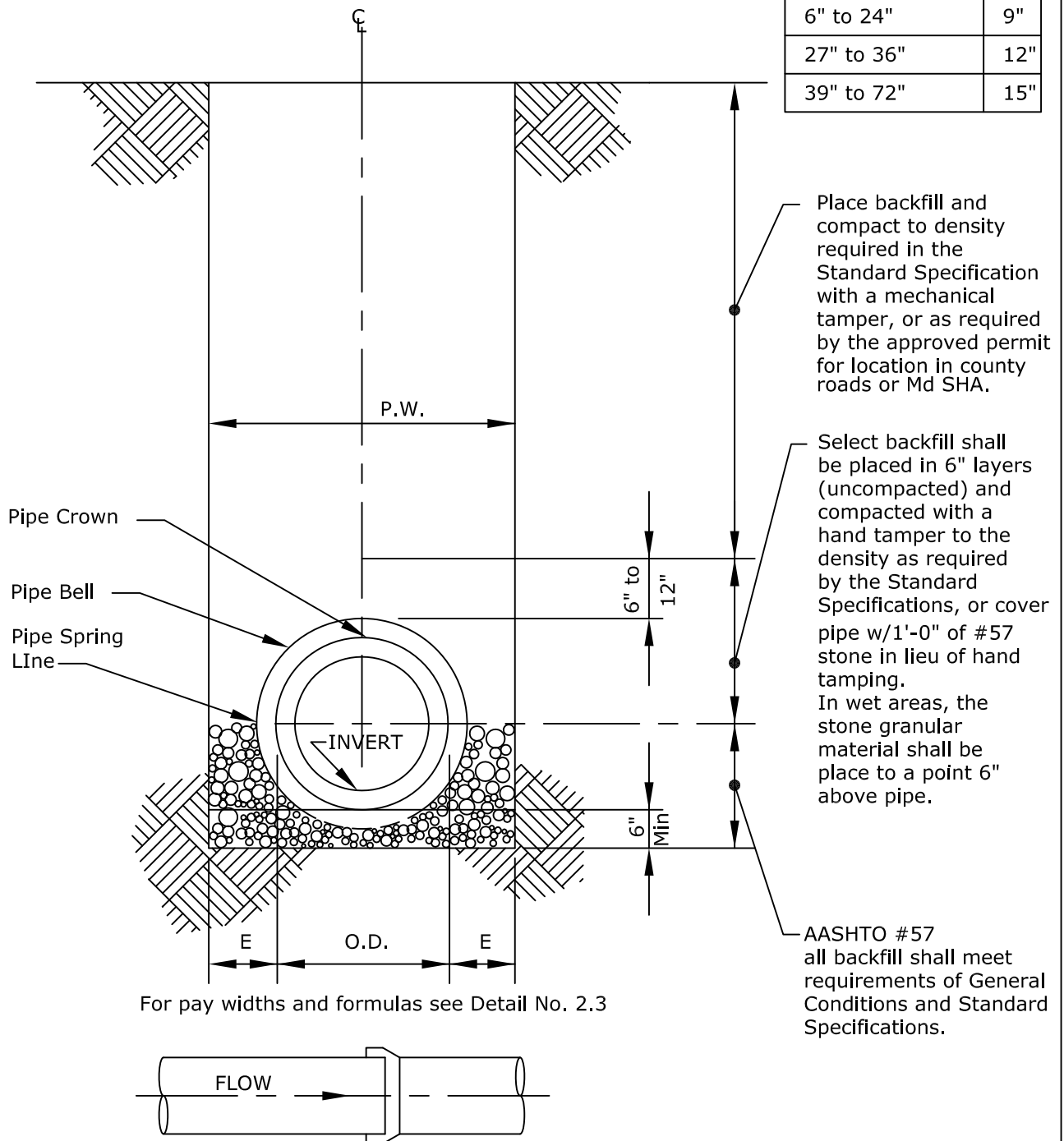
Detail No.

1.1

Date:  
 01-24-2013

Maximum payment width (P.W.) = Pipe Barrel O.D. + 2E

| Nominal Pipe size | E   |
|-------------------|-----|
| 6" to 24"         | 9"  |
| 27" to 36"        | 12" |
| 39" to 72"        | 15" |



Sewer pipe shall be installed from spigot to bell in direction with flow.

Note:  
If ductile iron pipe watermain, stone backfill not required.

|                                                                                                                  |           |      |                                            |                       |
|------------------------------------------------------------------------------------------------------------------|-----------|------|--------------------------------------------|-----------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Typical Trench for Sewer<br>or Water Lines | Detail No.<br><br>2.1 |
|                                                                                                                  | Date      | Note |                                            |                       |
|                                                                                                                  | .         | .    |                                            | Date:<br>01-24-2013   |
|                                                                                                                  | .         | .    |                                            |                       |
|                                                                                                                  | .         | .    |                                            |                       |
|                                                                                                                  | .         | .    |                                            |                       |

## PAY WIDTH FOR DIFFERENT PIPE BY MATERIAL AND SIZE

### PVC

Dia. 6" - 2.02' p.w.  
 Dia. 8" - 2.20' p.w.  
 Dia. 10" - 2.38' p.w.  
 Dia. 12" - 2.54' p.w.  
 Dia. 15" - 2.78' p.w.  
 Dia. 18" - 3.06' p.w.  
 Dia. 21" - 3.34' p.w.  
 Dia. 24" - 3.57' p.w.  
 Dia. 27" - 4.33' p.w.

### RCSP

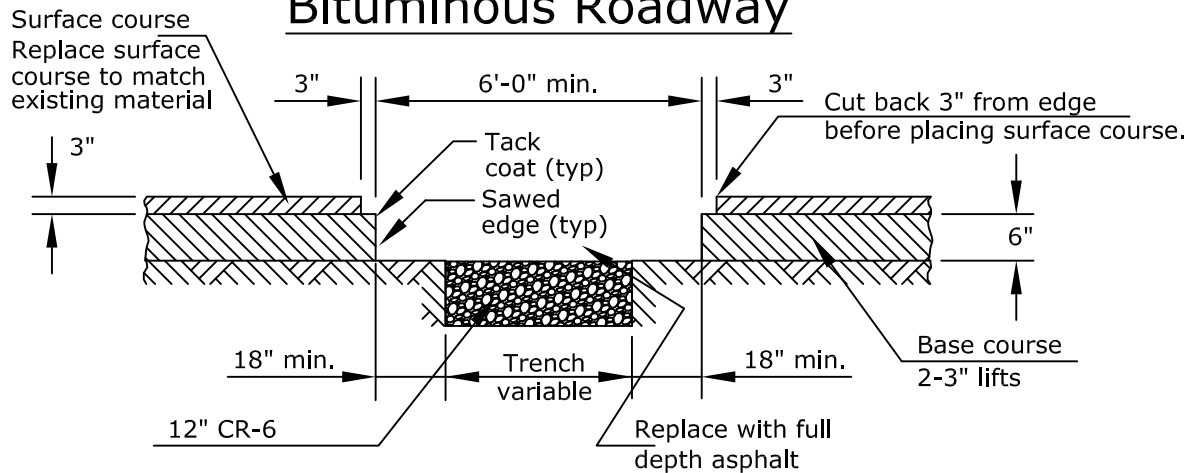
Dia. 18" - 3.65' p.w.  
 Dia. 30" - 5.25' p.w.  
 Dia. 36" - 5.83' p.w.

### DIP

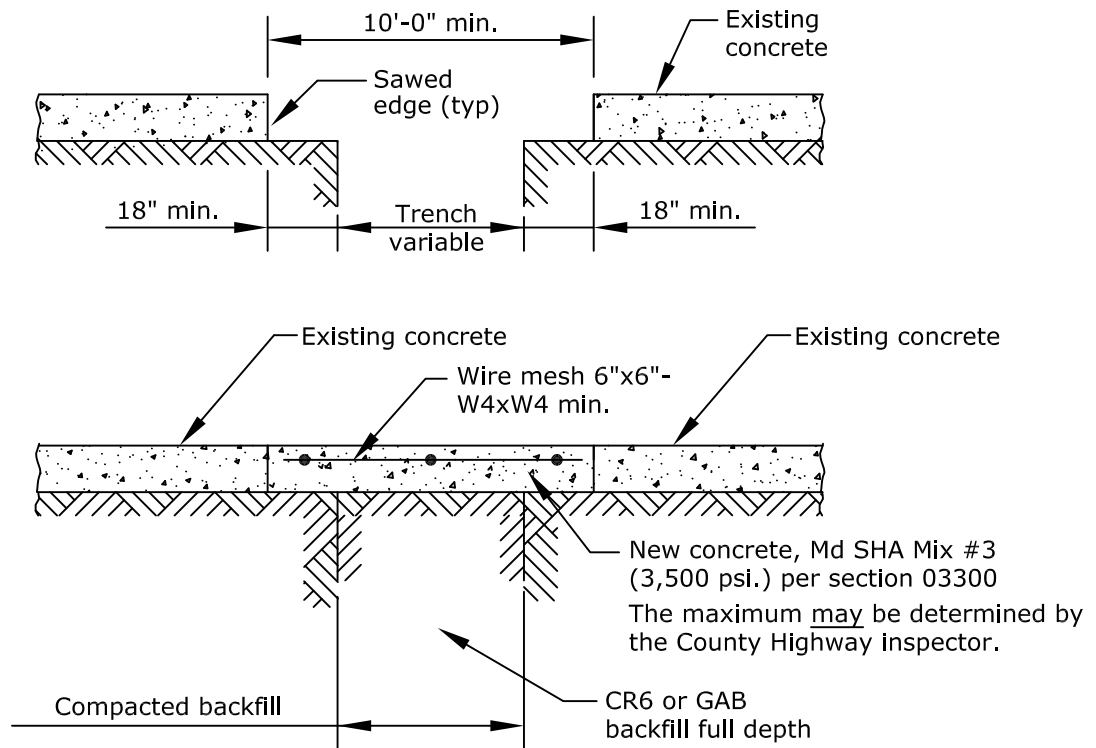
Dia. 6" - 2.08' p.w.  
 Dia. 8" - 2.25' p.w.  
 Dia. 10" - 2.42' p.w.  
 Dia. 12" - 2.60' p.w.  
 Dia. 16" - 2.95' p.w.  
 Dia. 20" - 3.30' p.w.  
 Dia. 24" - 3.65' p.w.

|                                                                                                                      |           |      |                               |                     |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|-------------------------------|---------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Pay Width By<br><br>Materials | Detail No.          |
|                                                                                                                      | Date      | Note |                               | 2.3                 |
|                                                                                                                      | .         | .    |                               | Date:<br>01-24-2013 |
|                                                                                                                      | .         | .    |                               |                     |
|                                                                                                                      | .         | .    |                               |                     |
|                                                                                                                      | .         | .    |                               |                     |

## Bituminous Roadway



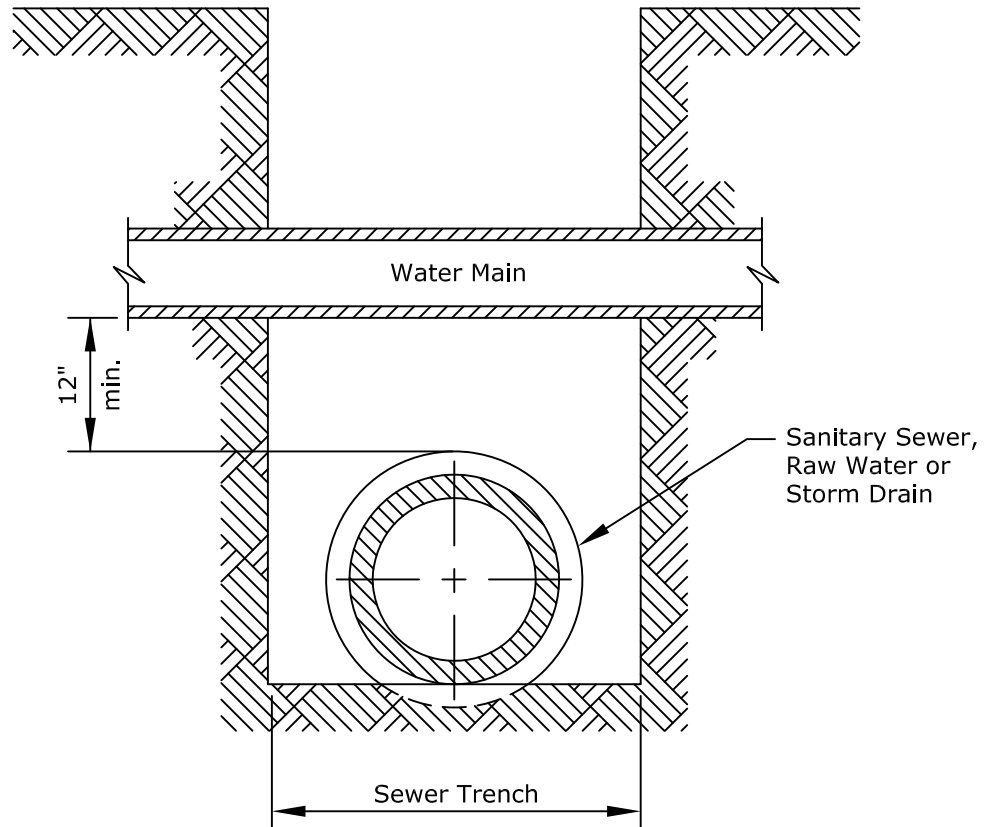
## Cement Concrete Roadway



- 1: County roads shall be repaired as above unless the County Road crossing permit requires other repairs - then perform the work in accordance with the permit.
- 2: Measurement and payment for these items shall be the number of square yards of surface course materials furnished and installed in-place and in accordance with the project specific details (note any variations) and to the limits as shown on the drawings.

|                                                                                                                  |           |      |                                                     |                       |
|------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------------------------|-----------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | County Road Repair Over<br>Water and Sewer Trenches | Detail No.<br><br>3.1 |
|                                                                                                                  | Date      | Note |                                                     |                       |
|                                                                                                                  | .         | .    |                                                     | Date:<br>01-24-2013   |
|                                                                                                                  | .         | .    |                                                     |                       |
|                                                                                                                  | .         | .    |                                                     |                       |
|                                                                                                                  | .         | .    |                                                     |                       |



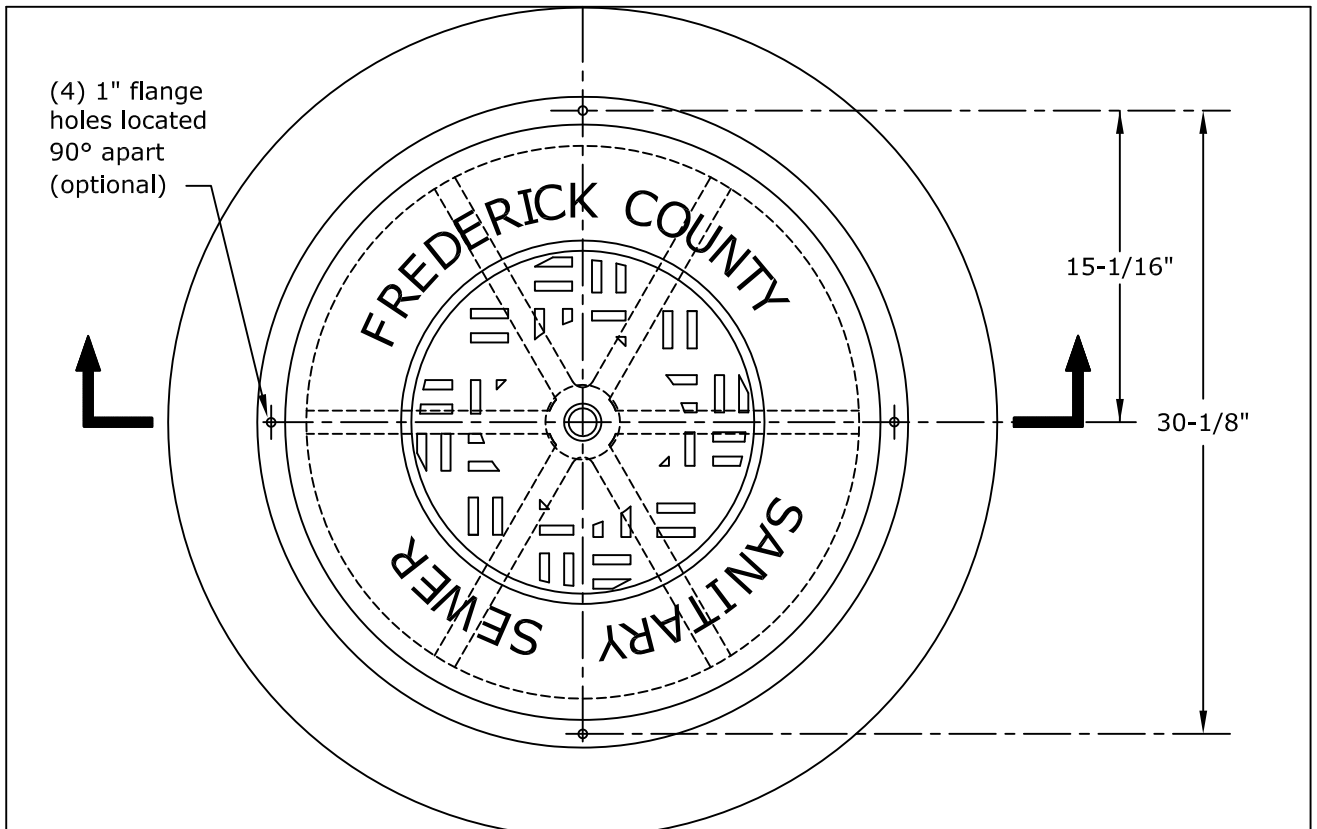


## Section

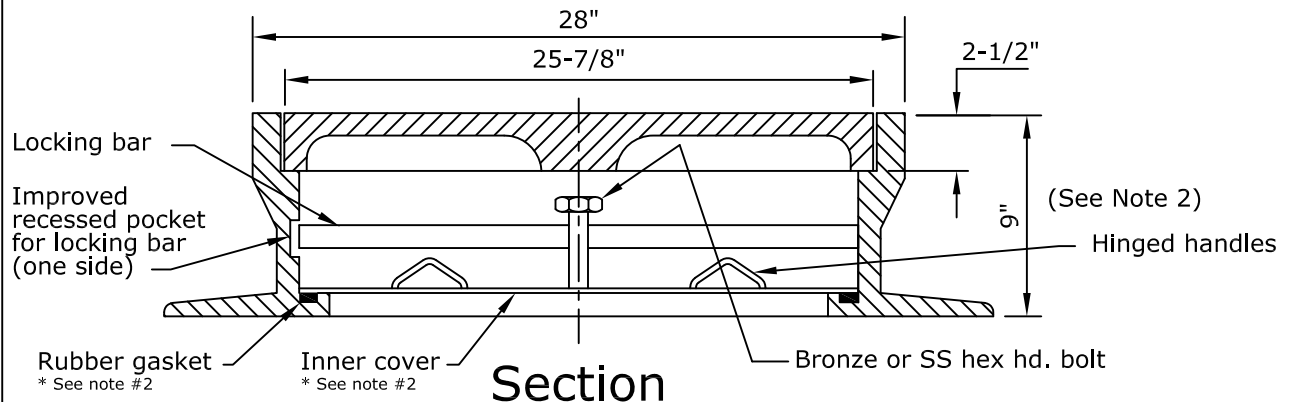
### Notes:

1. If clearance is less than 12 inches - Encase the lower of the two pipe lines in concrete 10 feet minimum each side of crossing. Concrete shall extend to the face of the bells at both ends of the encasement.
2. If joint on exposed existing water main is within the limits of newly constructed sewer trench, a bell clamp joint shall be provided on the water main joint.
3. If water main is below sanitary sewer line, encasement is required as per note No. 1 above, regardless of clearance. An alternative to the above encasement is the use of 20 foot lengths of pipe so that no joint is within 10 feet of crossing.

|                                                                                                                      |           |      |                                  |            |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|----------------------------------|------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Water and Sewer<br>Line Crossing | Detail No. |
|                                                                                                                      | Date      | Note |                                  | 4.1        |
|                                                                                                                      | .         | .    |                                  | Date:      |
|                                                                                                                      | .         | .    |                                  | 01-24-2013 |
|                                                                                                                      | .         | .    |                                  |            |
|                                                                                                                      | .         | .    |                                  |            |



## Manhole Frames and Covers

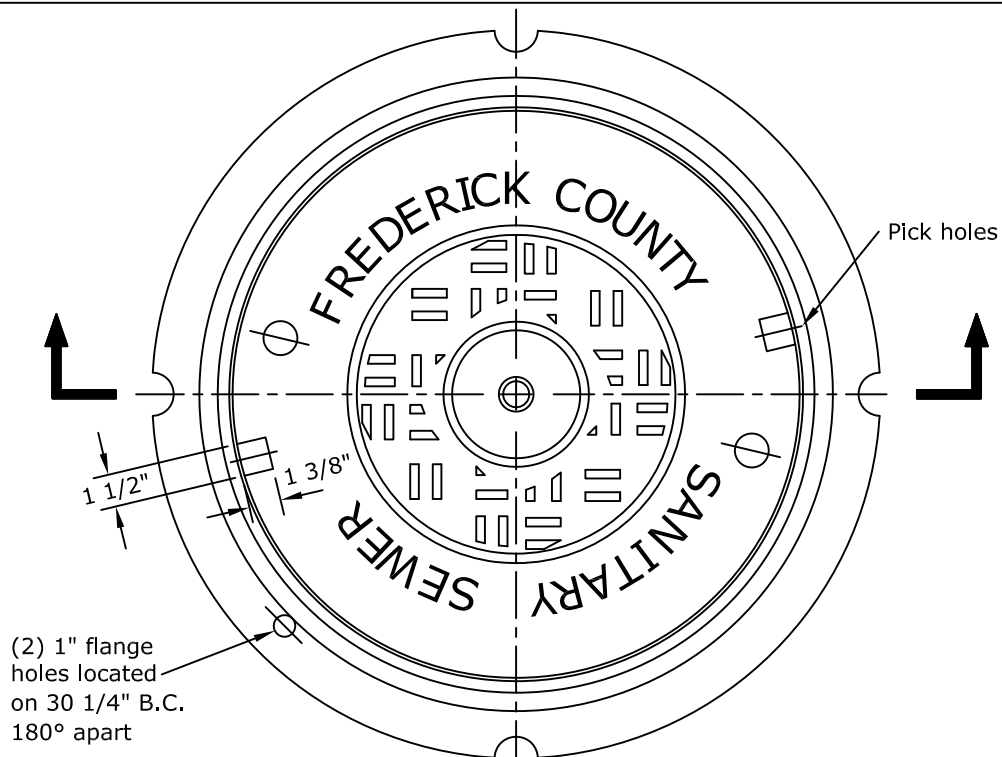


Frame & outer cover - cast iron ASTM A-48, class 30 and designed for H-20 loading.  
 Inner cover, hinges & locking bar - steel ASTM A-36.  
 Neoprene "O" ring endless gasket, glued in place.  
 Inner cover lift handles are hinged type to prevent breakage.  
 Recessed pocket permits installation and removal of inner cover.  
 Locking bolt to have a 3/4" dia. shank.  
 Weight - approximately 480 lbs. (frame & cover).

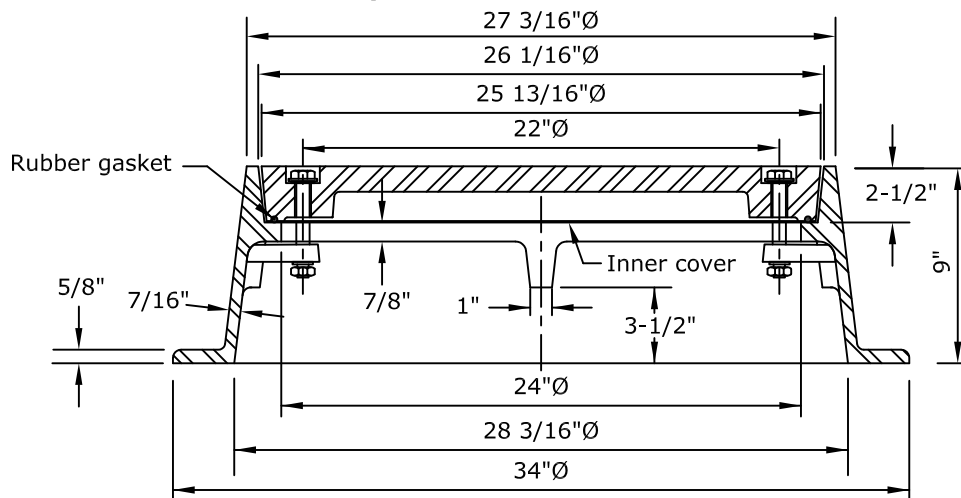
### Notes:

1. When frame and cover are used for water structures, replace "Sanitary Sewer" with "Water".
2. Standard frame and cover does not include inner cover or rubber gasket. Watertight frame and cover includes the inner cover and rubber gasket as shown. Use of a 4" frame may NOT be used with watertight installations. A 4-inch frame may be used, if approved by the County prior to installation, which is attributed to unforeseen field conditions or design changes beyond the control of the contractor.
3. Detail 5.1 acceptable except when specific contract documents dictate otherwise.

|                                                                                                                      |           |      |                                                 |                       |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|-------------------------------------------------|-----------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Manhole<br>Frame and Cover for<br>Water & Sewer | Detail No.<br><br>5.1 |
|                                                                                                                      | Date      | Note |                                                 |                       |
|                                                                                                                      | .         | .    |                                                 | Date:                 |
|                                                                                                                      | .         | .    |                                                 | 01-24-2013            |
|                                                                                                                      | .         | .    |                                                 |                       |



## Heavy Frames and Covers



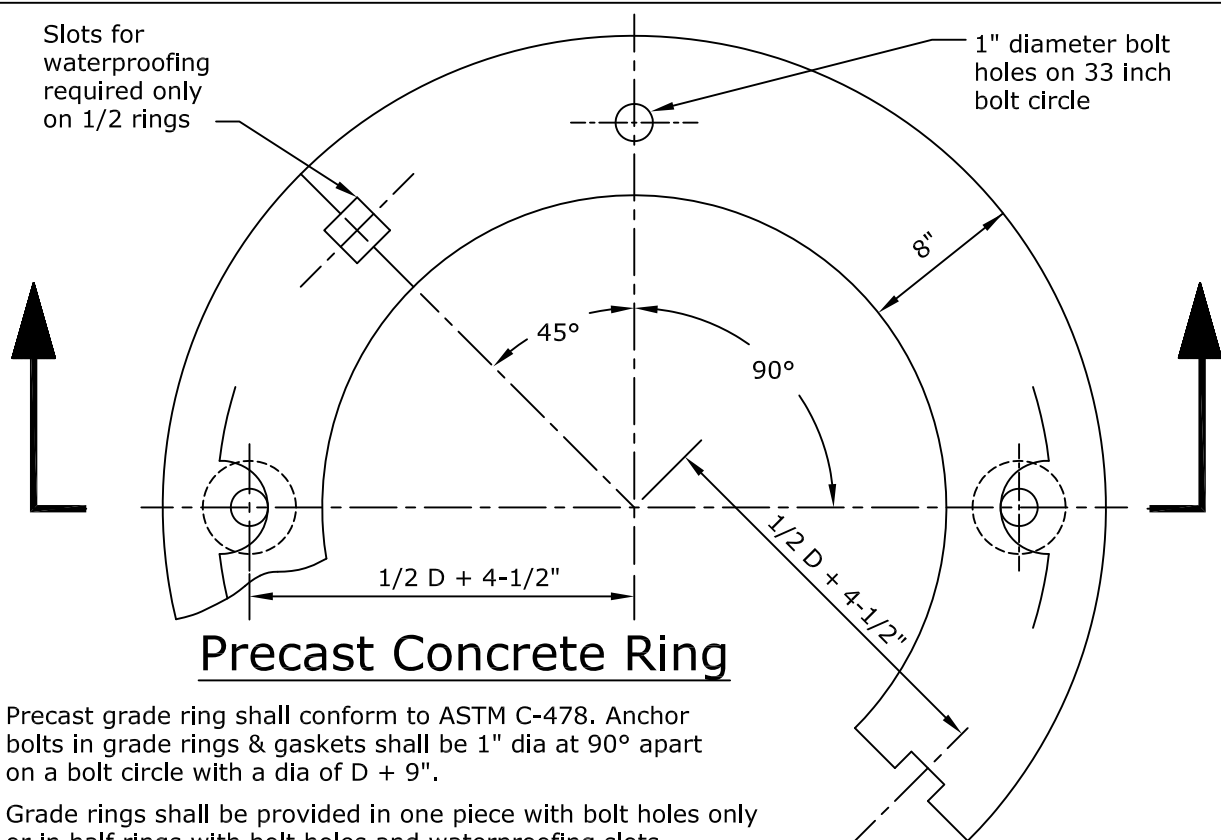
## Section

Frame & outer cover - cast iron ASTM A-48, class 30 and designed for H-20 loading.  
 Inner cover, hinges & locking bar - steel ASTM A-36.  
 Neoprene "O" ring endless gasket - 3/4" dia, solid.  
 Weight - approximately 480 lbs. (frame & cover).

### Notes:

1. When frame and cover are used for water vaults or related structures, replace "Sanitary Sewer" with "Water".
2. Standard straight wall frame and cover does not include cams, bolts, bolt holes or rubber gasket. Watertight straight wall frame and cover includes cams, bolts, bolt holes and rubber gasket.
3. Detail 5.2 acceptable except when specific contract documents dictate otherwise.

|                                                                                                                      |           |      |                                                               |                       |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|---------------------------------------------------------------|-----------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Straight Wall Manhole<br>Frame and Cover for<br>Water & Sewer | Detail No.<br><br>5.2 |
|                                                                                                                      | Date      | Note |                                                               |                       |
|                                                                                                                      | .         | .    |                                                               | Date:                 |
|                                                                                                                      | .         | .    |                                                               | 01-24-2013            |
|                                                                                                                      | .         | .    |                                                               |                       |

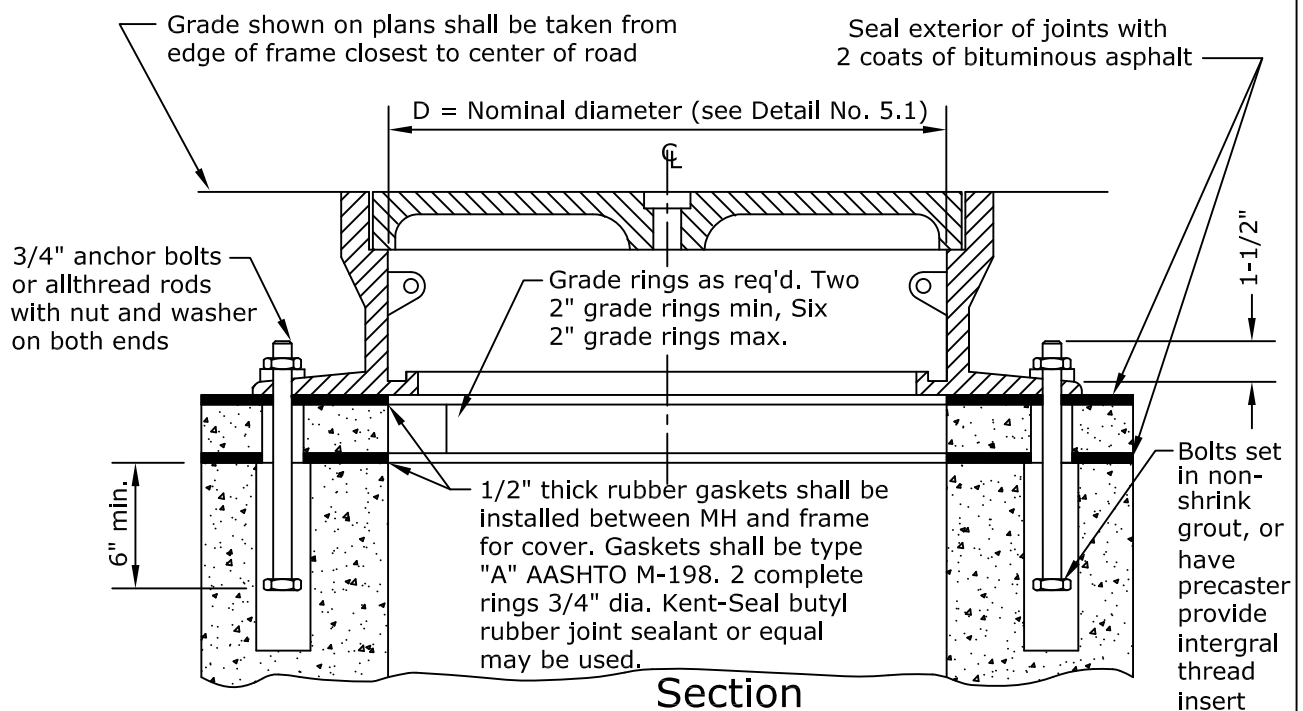


Precast grade ring shall conform to ASTM C-478. Anchor bolts in grade rings & gaskets shall be 1" dia at 90° apart on a bolt circle with a dia of  $D + 9"$ .

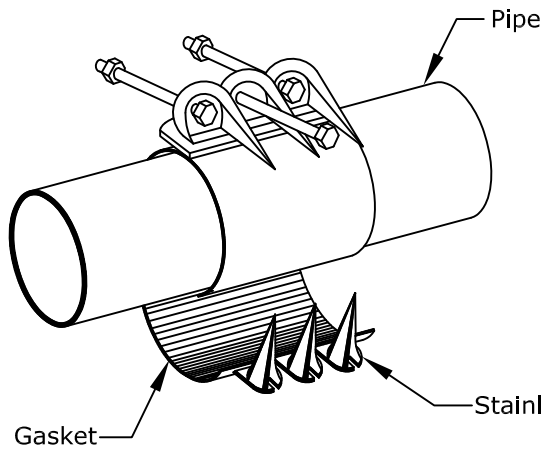
Grade rings shall be provided in one piece with bolt holes only or in half rings with bolt holes and waterproofing slots.

Grade adjustment rings allow for correction not only at the time of installation and paving, but provide for some adjustment with future paving projects.

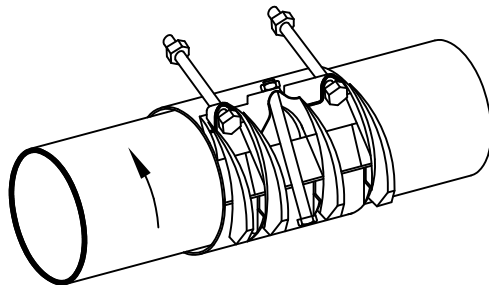
Waterproofing slots shall be filled with bituminous asphalt and all exposed steel bolts, etc. shall be coated with bituminous asphalt.



|                                                                                                                  |           |      |                                                                      |                       |
|------------------------------------------------------------------------------------------------------------------|-----------|------|----------------------------------------------------------------------|-----------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Method of Anchoring<br>Frame, Grade Rings and<br>Gaskets to Manholes | Detail No.<br><br>5.3 |
|                                                                                                                  | Date      | Note |                                                                      |                       |
|                                                                                                                  |           |      |                                                                      | Date:<br>01-24-2013   |
|                                                                                                                  |           |      |                                                                      |                       |
|                                                                                                                  |           |      |                                                                      |                       |
|                                                                                                                  |           |      |                                                                      |                       |

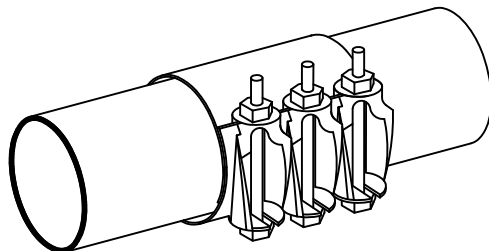


Clean pipe and mark for position where repair clamp is to be installed for centering over break. Lubricate pipe with soap solution. Center clamp over damaged area.



Tuck tapered gasket flap in place and mesh lug fingers. Then engage center bolt and tighten finger tight.

Rotate clamp on pipe in the direction indicated by arrow to seat gasket flap smoothly on the pipe.



Engage remaining bolts and tighten all evenly with a torque wrench. All 5/8" bolts shall be torqued to 60-65 foot lb. and all 3/4" bolts shall be torqued to 80-85 foot lb. On multi-band units, equalize gaps between bands.

Contractor shall provide Rockwell full circle repair clamp Nos. 226 or 228 or approved equal at no extra cost to Frederick County.

**NOTE:**  
When pipe is found to be damaged, DUSWM Operations will evaluate to determine exactly how standard detail shall be applied.

|                                                                                                                      |           |      |                                                 |                       |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|-------------------------------------------------|-----------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Installation of<br><br>Full Circle Repair Clamp | Detail No.<br><br>8.1 |
|                                                                                                                      | Date      | Note |                                                 |                       |
|                                                                                                                      | .         | .    |                                                 | Date:<br>01-24-2013   |
|                                                                                                                      | .         | .    |                                                 |                       |
|                                                                                                                      | .         | .    |                                                 |                       |
|                                                                                                                      | .         | .    |                                                 |                       |

# Water Details

## Mechanical Joint Pipe

| Nominal<br>Pipe<br>Size | Max. Deflection |         |              |         | Minimum Radius-Feet |              |
|-------------------------|-----------------|---------|--------------|---------|---------------------|--------------|
|                         | 18 Ft Length    |         | 20 Ft Length |         | 18 Ft Length        | 20 Ft Length |
|                         | Inches          | Degrees | Inches       | Degrees |                     |              |
| 4                       | 31              | 8.17    | 35           | 8.30    | 125                 | 140          |
| 6                       | 27              | 7.13    | 30           | 7.13    | 145                 | 160          |
| 8                       | 20              | 5.29    | 22           | 5.24    | 195                 | 220          |
| 10                      | 20              | 5.29    | 22           | 5.24    | 195                 | 220          |
| 12                      | 20              | 5.29    | 22           | 5.24    | 195                 | 220          |
| 16                      | 13.5            | 3.57    | 15           | 3.58    | 285                 | 320          |
| 18                      | 11              | 2.92    | 12           | 2.86    | 340                 | 380          |
| 20                      | 11              | 2.92    | 12           | 2.86    | 340                 | 380          |
| 24                      | 9               | 2.39    | 10           | 2.39    | 450                 | 500          |
| 36                      | 9               | 2.39    | 10           | 2.39    | 450                 | 500          |
| 42                      | 7.5             | 1.99    | 8            | 1.91    | 510                 | 570          |
| 48                      | 7.5             | 1.99    | 8            | 1.91    | 510                 | 570          |

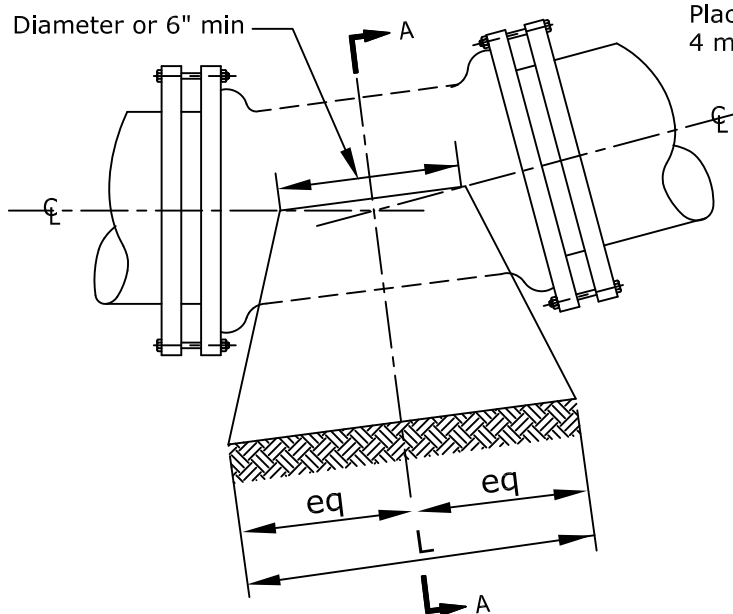
## Push-on Joint Pipe

| Nominal<br>Pipe<br>Size | Max. Deflection |         |              |         | Minimum Radius-Feet |              |
|-------------------------|-----------------|---------|--------------|---------|---------------------|--------------|
|                         | 18 Ft Length    |         | 20 Ft Length |         | 18 Ft Length        | 20 Ft Length |
|                         | Inches          | Degrees | Inches       | Degrees |                     |              |
| 4                       | 19              | 5.03    | 21           | 5.00    | 205                 | 230          |
| 6                       | 19              | 5.03    | 21           | 5.00    | 205                 | 230          |
| 8                       | 19              | 5.03    | 21           | 5.00    | 205                 | 230          |
| 10                      | 19              | 5.03    | 21           | 5.00    | 205                 | 230          |
| 12                      | 19              | 5.03    | 21           | 5.00    | 205                 | 230          |
| 16                      | 11              | 2.92    | 12           | 2.86    | 340                 | 380          |
| 18                      | 11              | 2.92    | 12           | 2.86    | 340                 | 380          |
| 20                      | 11              | 2.92    | 12           | 2.86    | 340                 | 380          |
| 24                      | 11              | 2.92    | 12           | 2.86    | 340                 | 380          |
| 36                      | 11              | 2.92    | 12           | 2.86    | 340                 | 380          |
| 42                      | 7.5             | 1.99    | 8            | 1.91    | 510                 | 570          |
| 48                      | 7.5             | 1.99    | 8            | 1.91    | 510                 | 570          |

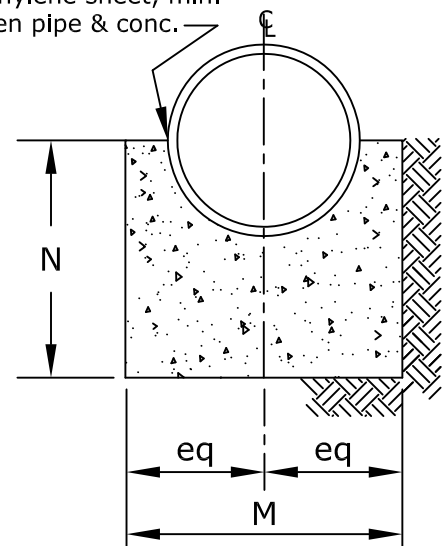
The Above Charts Are in Accordance With AWWA C600.

|                                                                                                                      |           |      |                                 |                     |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|---------------------------------|---------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Curvature of<br><br>Water Mains | Detail No.          |
|                                                                                                                      | Date      | Note |                                 | 101.1               |
|                                                                                                                      | .         | .    |                                 | Date:<br>01-24-2013 |
|                                                                                                                      | .         | .    |                                 |                     |
|                                                                                                                      | .         | .    |                                 |                     |
|                                                                                                                      | .         | .    |                                 |                     |





**Elevation or Plan**



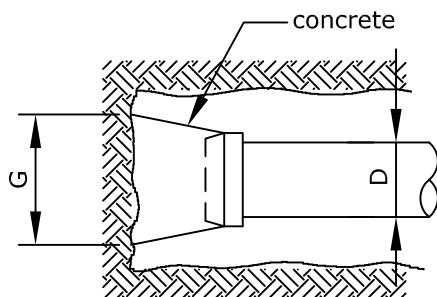
**Section A-A**

| Buttress Dimensions |   |       |       |       |       |       |       |       |       |        |       |
|---------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| Bend                |   | Size  |       |       |       |       |       |       |       |        |       |
|                     |   | 3"    | 4"    | 6"    | 8"    | 10"   | 12"   | 16"   | 20"   | 24"    | 30"   |
| 11 1/4°             | L | 6"    | 6"    | 6"    | 8"    | 8"    | 8"    | 1'-1" | 1'-5" | 1'-10" | 2'-8" |
|                     | M | 1'-0" | 1'-0" | 1'-2" | 1'-4" | 1'-6" | 2'-0" | 2'-4" | 2'-8" | 3'-0"  | 3'-4" |
|                     | N | 8"    | 8"    | 8"    | 8"    | 8"    | 8"    | 9"    | 10"   | 12"    | 12"   |
| 1/32                | L | 6"    | 8"    | 10"   | 11"   | 1'-3" | 1'-4" | 2'-1" | 2'-9" | 3'-7"  | 5'-3" |
|                     | M | 1'-0" | 1'-0" | 1'-2" | 1'-4" | 1'-6" | 2'-0" | 2'-4" | 2'-8" | 3'-0"  | 3'-2" |
|                     | N | 8"    | 8"    | 8"    | 8"    | 9"    | 9"    | 12"   | 1'-2" | 1'-4"  | 1'-6" |
| 22 1/2°             | L | 10"   | 1'-0" | 1'-2" | 1'-9" | 2'-5" | 2'-8" | 4'-0" | 5'-6" | 6'-0"  | 8'-2" |
|                     | M | 1'-0" | 1'-0" | 1'-2" | 1'-4" | 1'-6" | 2'-0" | 2'-4" | 2'-8" | 3'-6"  | 4'-0" |
|                     | N | 8"    | 8"    | 8"    | 8"    | 12"   | 1'-2" | 1'-6" | 2'-0" | 2'-6"  | 3'-0" |
| 1/16                | L | 10"   | 1'-0" | 1'-2" | 1'-9" | 2'-5" | 2'-8" | 4'-0" | 5'-6" | 6'-0"  | 8'-2" |
|                     | M | 1'-0" | 1'-0" | 1'-2" | 1'-4" | 1'-6" | 2'-0" | 2'-4" | 2'-8" | 3'-6"  | 4'-0" |
|                     | N | 8"    | 8"    | 8"    | 8"    | 12"   | 1'-2" | 1'-6" | 2'-0" | 2'-6"  | 3'-0" |
| 45°                 | L | 10"   | 1'-0" | 1'-2" | 1'-9" | 2'-5" | 2'-8" | 4'-0" | 5'-6" | 6'-0"  | 8'-2" |
|                     | M | 1'-0" | 1'-0" | 1'-2" | 1'-4" | 1'-6" | 2'-0" | 2'-4" | 2'-8" | 3'-6"  | 4'-0" |
|                     | N | 8"    | 8"    | 8"    | 8"    | 12"   | 1'-2" | 1'-6" | 2'-0" | 2'-6"  | 3'-0" |
| 1/8                 | L | 1'-0" | 1'-4" | 2'-0" | 2'-8" | 3'-4" | 3'-8" | 5'-6" | 6'-8" | 8'-0"  | 9'-8" |
|                     | M | 9"    | 10"   | 12"   | 1'-4" | 1'-9" | 2'-3" | 2'-8" | 3'-6" | 4'-0"  | 4'-7" |
|                     | N | 1'-8" | 1'-8" | 1'-8" | 1'-8" | 1'-8" | 1'-8" | 2'-0" | 2'-3" | 2'-9"  | 3'-5" |
| 90°                 | L | 1'-0" | 1'-4" | 2'-0" | 2'-8" | 3'-4" | 3'-8" | 5'-6" | 6'-8" | 8'-0"  | 9'-8" |
|                     | M | 9"    | 10"   | 12"   | 1'-4" | 1'-9" | 2'-3" | 2'-8" | 3'-6" | 4'-0"  | 4'-7" |
|                     | N | 1'-8" | 1'-8" | 1'-8" | 1'-8" | 1'-8" | 1'-8" | 2'-0" | 2'-3" | 2'-9"  | 3'-5" |
| 1/4                 | L | 1'-0" | 1'-4" | 2'-0" | 2'-8" | 3'-4" | 3'-8" | 5'-6" | 6'-8" | 8'-0"  | 9'-8" |
|                     | M | 9"    | 10"   | 12"   | 1'-4" | 1'-9" | 2'-3" | 2'-8" | 3'-6" | 4'-0"  | 4'-7" |
|                     | N | 1'-8" | 1'-8" | 1'-8" | 1'-8" | 1'-8" | 1'-8" | 2'-0" | 2'-3" | 2'-9"  | 3'-5" |

**Notes:**

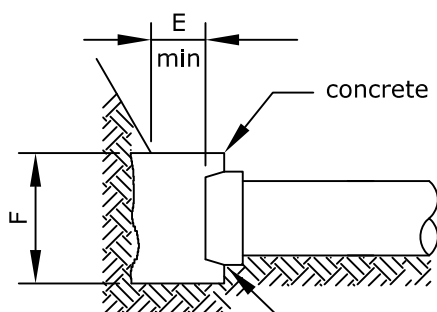
1. All concrete to be Md. S.H.A. mix No. 1.
2. All bearing surfaces shall be placed against undisturbed ground with a min. soil bearing pressure of 3,000 lbs. per s.f. & static water pressure of 150 p.s.i. Where pressure exceeds 150 p.s.i. or where soil bearing pressure is less than 3,000 p.s.f., special buttress design is required.
3. These buttresses shall be used for horizontal and lower vertical bends.
4. Mechanical joint restraint may be used in lieu of concrete buttresses.

|                                                                                                                  |           |      |                                                                 |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Buttresses for Use<br>at Horizontal and<br>Lower Vertical Bends | Detail No.<br><br>102.1 |
|                                                                                                                  | Date      | Note |                                                                 |                         |
|                                                                                                                  | .         | .    |                                                                 | Date:<br>01-24-2013     |
|                                                                                                                  | .         | .    |                                                                 |                         |
|                                                                                                                  | .         | .    |                                                                 |                         |
|                                                                                                                  | .         | .    |                                                                 |                         |



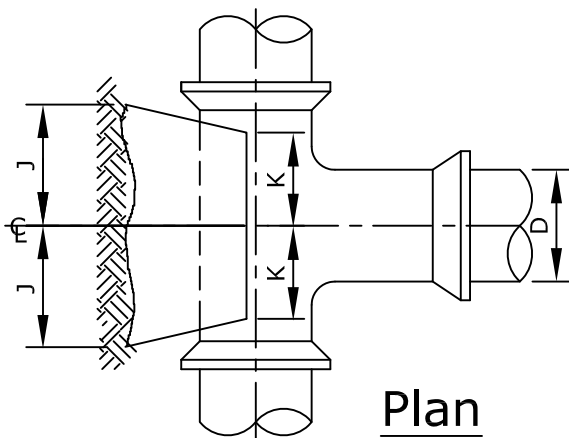
**Plan**

| Buttress for Caps |     |     |       |        |       |        |       |       |       |       |
|-------------------|-----|-----|-------|--------|-------|--------|-------|-------|-------|-------|
| D                 | 3"  | 4"  | 6"    | 8"     | 10"   | 12"    | 16"   | 20"   | 24"   | 30"   |
| E                 | 7"  | 7"  | 6"    | 8"     | 8"    | 10"    | 1'-0" | 1'-4" | 1'-8" | 2'-0" |
| F                 | 14" | 14" | 1'-0" | 1'-4"  | 1'-8" | 2'-0"  | 2'-8" | 3'-3" | 4'-0" | 4'-9" |
| G                 | 12" | 12" | 1'-5" | 1'-11" | 2'-5" | 2'-10" | 3'-9" | 4'-9" | 5'-8" | 7'-6" |



**Section**

place polyethylene sheet  
between cap and concrete

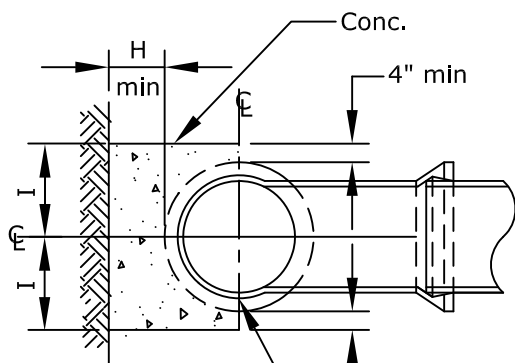


**Plan**

| Buttress for Tees |    |    |     |       |       |       |       |       |       |       |
|-------------------|----|----|-----|-------|-------|-------|-------|-------|-------|-------|
| D                 | 3" | 4" | 6"  | 8"    | 10"   | 12"   | 16"   | 20"   | 24"   | 30"   |
| H                 | 7" | 7" | 8"  | 9"    | 10"   | 1'-0" | 1'-4" | 1'-8" | 2'-2" | 2'-8" |
| I                 | 7" | 7" | 10" | 1'-1" | 1'-4" | 1'-7" | 2'-2" | 2'-8" | 3'-2" | 3'-8" |
| J                 | 6" | 6" | 6"  | 8"    | 1'-1" | 1'-1" | 1'-5" | 1'-9" | 2'-1" | 2'-6" |
| K                 | 4" | 4" | 6"  | 7"    | 8"    | 9"    | 10"   | 1'-2" | 1'-4" | 1'-6" |

**Notes:**

1. All concrete shall be Mix No. 1.
2. Buttress dimensions shown are based upon soil bearing pressure of 3,000 p.s.f. & static water pressure of 150 p.s.i. Where pressure exceeds 150 p.s.i. or where soil bearing pressure is less than 3,000 p.s.f., special buttress design is required.
3. For caps on mains where rock has been excavated ahead of pipe laying, use Detail No. 104.1.
4. Mechanical joint restraint may be used in lieu of concrete buttresses.



**Section**

Place polyethylene sheet, min.  
4 mil between tee & concrete

Frederick County  
Division of Utilities &  
Solid Waste Management  
Department of  
Engineering & Planning

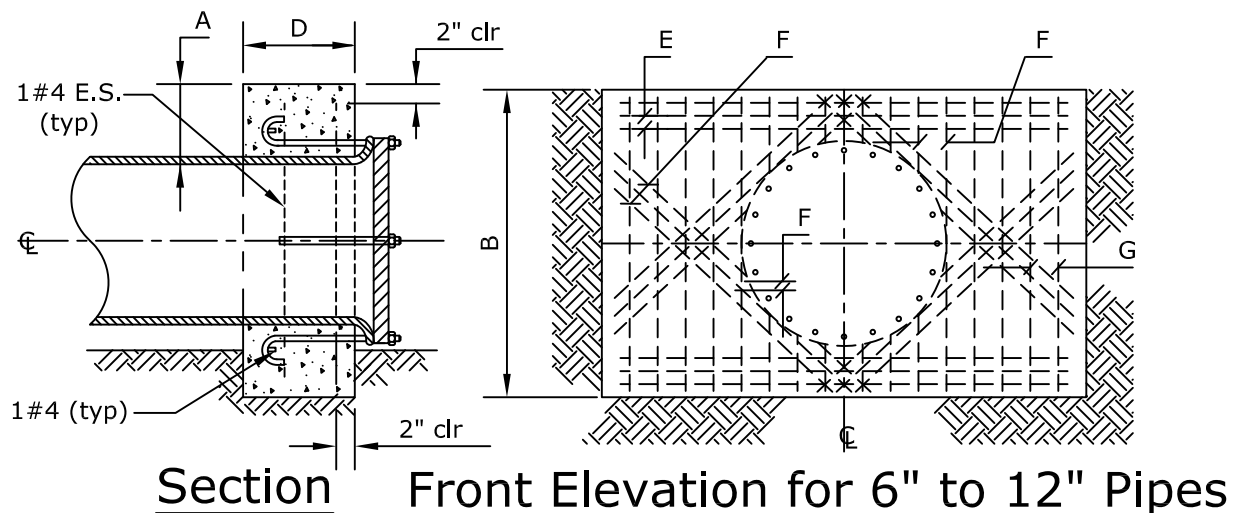
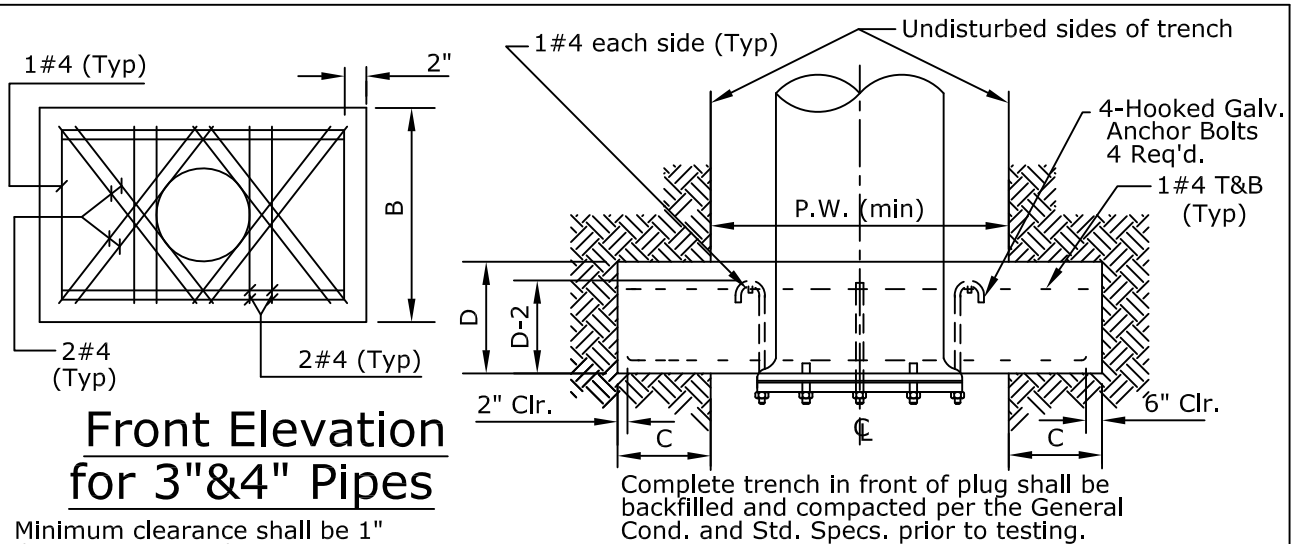
| Revisions |      |
|-----------|------|
| Date      | Note |
|           |      |
|           |      |
|           |      |
|           |      |

**Buttresses for Caps  
and Tees on Water Mains**

Detail No.

**103.1**

Date:  
01-24-2013



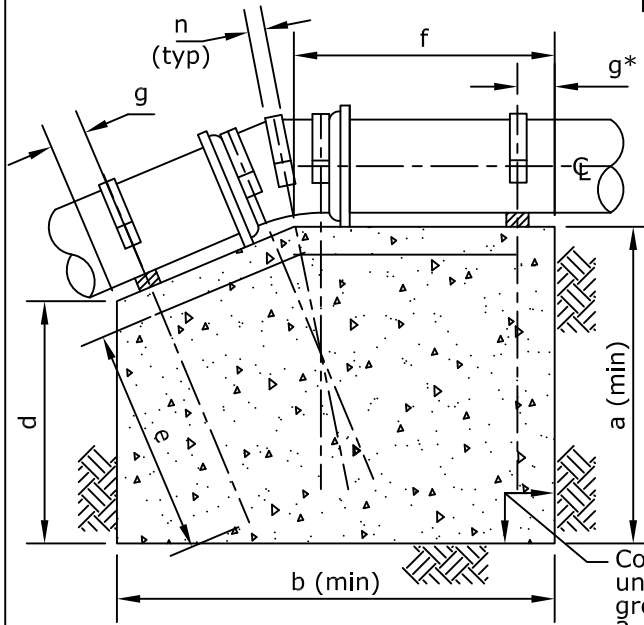
| Anchor Dimensions |       |       |       |       | Steel-Size & Spacing |      |       |
|-------------------|-------|-------|-------|-------|----------------------|------|-------|
| Pipe size         | A     | B     | C     | D     | E                    | F    | G     |
| 3"                | 4"    | 1'-0" | 6"    | 12"   | —                    | —    | —     |
| 4"                | 4"    | 1'-0" | 9"    | 12"   | —                    | —    | —     |
| 6"                | 6"    | 1'-6" | 1'-0" | 12"   | 2-#4                 | 2-#4 | #4@3" |
| 8"                | 1'-0" | 2'-9" | 1'-0" | 1'-6" | 2-#4                 | 2-#4 | #4@3" |
| 10"               | 1'-0" | 3'-3" | 1'-3" | 1'-6" | 3-#4                 | 2-#4 | #4@3" |
| 12"               | 1'-0" | 3'-9" | 1'-6" | 1'-6" | 4-#4                 | 2-#4 | #4@3" |

**Notes:**

- Concrete shall be MSHA Mix No. 1.
- Reinforcing Steel to be A.S.T.M. A-615 Grade 40 and/or Grade 60.
- Galvanized anchor bolts to have a minimum  $F_y = 36,000$  p.s.i..
- If trench width exceeds P.W. by more than 25% anchor wall design must be verified for structural adequacy.
- Pipe test pressure = 150 p.s.i. hydrostatic.
- Mechanical joint restraint may be used in lieu of concrete anchors.

|                                                                                                                  |           |      |                   |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|-------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Anchors for Plugs | Detail No.<br><br>104.1 |
|                                                                                                                  | Date      | Note |                   |                         |
|                                                                                                                  | .         | .    |                   | Date:                   |
|                                                                                                                  | .         | .    |                   | 01-24-2013              |
|                                                                                                                  | .         | .    |                   |                         |

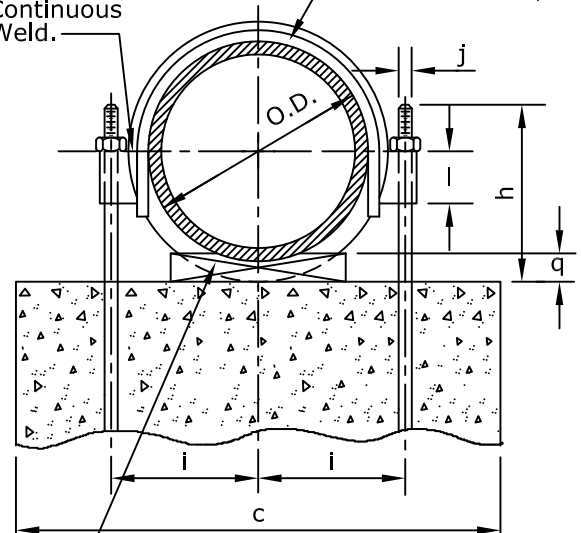
\*Omit strap at ends of block, where 'g' has no tabulated dimension.



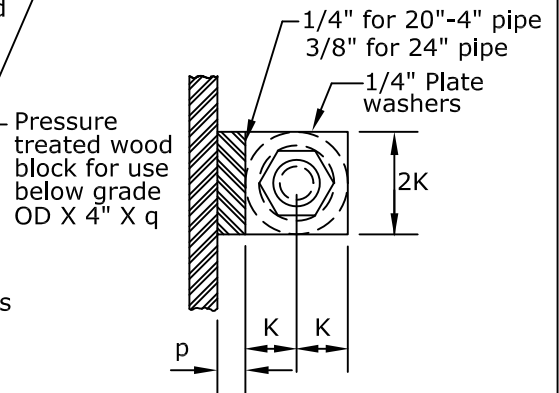
**Side Elevation**

Weld Extra Strength Steel Pipe to Flat Steel Strap With Continuous Fillet Weld.

O=Length of flat Steel Strap



**Cross Section**



**Strap Attachment**

**Notes:**

1. Concrete shall be MSHA mix No. 1.
  2. Anchor bolts shall have 3" threaded length & std. 90° hook facing center of block, and shall be tied to rebar w/equal diameter.
  3. All exposed steel to be painted with 2 coats of bituminous paint conforming to MIL-P-23236P, class 2.
  4. Bell to rest on screeded upper surfaces of block.
  5. Test pressure 150 p.s.i. hydrostatic.
- \* This method is alternative to use of Mega-Lugs.

**Dimensions for Vertical Bend Anchorages - In Inches**

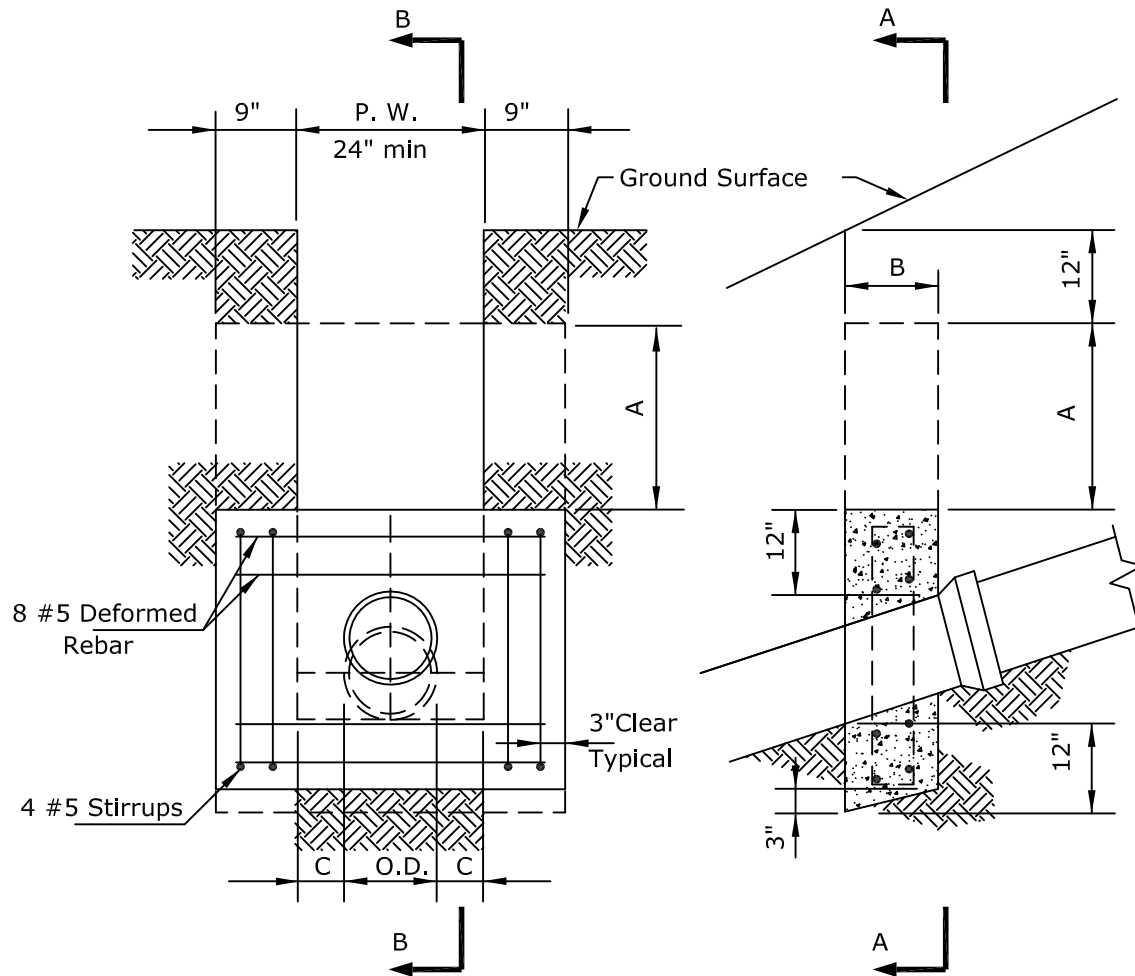
| Bend size | 1/32 - 11-1/4° |        |         |        |        |        |         |        | 1/16 - 22-1/2° |        |         |        |        |        |        |        | 1/8 - 45° |        |         |       |        |         |        |         |
|-----------|----------------|--------|---------|--------|--------|--------|---------|--------|----------------|--------|---------|--------|--------|--------|--------|--------|-----------|--------|---------|-------|--------|---------|--------|---------|
| Ø         | 4              | 6      | 8       | 10     | 12     | 16     | 20      | 24     | 4              | 6      | 8       | 10     | 12     | 16     | 20     | 24     | 4         | 6      | 8       | 10    | 12     | 16      | 20     | 24      |
| a         | 12             | 16     | 18      | 22     | 26     | 34     | 36      | 42     | 15             | 20     | 26      | 36     | 36     | 42     | 48     | 56     | 18        | 27     | 45      | 48    | 60     | 66      | 72     | 76      |
| b         | 12             | 18     | 20      | 26     | 34     | 44     | 50      | 54     | 18             | 22     | 33      | 44     | 50     | 72     | 80     | 90     | 21        | 39     | 51      | 63    | 75     | 84      | 99     | 111     |
| c         | 15             | 18     | 28      | 30     | 30     | 34     | 42      | 50     | 18             | 30     | 30      | 30     | 36     | 39     | 48     | 54     | 30        | 30     | 30      | 36    | 36     | 51      | 60     | 72      |
| d         | 11             | 14-1/4 | 16      | 19-1/2 | 22-3/4 | 30     | 31-1/2  | 37     | 11-1/2         | 16     | 19-3/4  | 27-1/4 | 26-1/4 | 28-1/4 | 38-1/2 | 39     | 9         | 13     | 28      | 28    | 31     | 37      | 37     | 40      |
| e         | 8              | 12     | 14      | 18     | 22     | 28     | 30      | 36     | 11             | 16     | 22      | 30     | 30     | 36     | 42     | 50     | 14        | 23     | 39      | 42    | 54     | 60      | 66     | 70      |
| f         | 6-1/2          | 9-1/2  | 10      | 14     | 18     | 24     | 27      | 29     | 9-1/2          | 18     | 22      | 24     | 27     | 39     | 43     | 49     | 12        | 25     | 34      | 43    | 46     | 55      | 64     | 75      |
| g         | —              | —      | —       | —      | —      | 6      | 6       | 6      | —              | —      | —       | —      | 6      | 6      | 6      | 6      | —         | —      | —       | —     | 6      | 6       | 6      | 6       |
| h         | 6-1/2          | 7-1/2  | 8-1/2   | 9-1/2  | 10-3/4 | 13     | 15-1/8  | 18     | 6-1/2          | 7-1/2  | 8-1/2   | 9-1/2  | 10-3/4 | 15     | 15-1/2 | 18     | 6-1/2     | 7-1/2  | 8-1/2   | 9-1/2 | 10-3/4 | 13-1/4  | 15-1/2 | 18      |
| i         | 3-1/2          | 4-9/16 | 5-11/16 | 6-3/4  | 7-3/4  | 9-3/4  | 12-1/16 | 14-1/4 | 3-1/2          | 4-9/16 | 5-11/16 | 6-3/4  | 7-3/4  | 9-3/4  | 12-1/4 | 14-1/4 | 3-1/2     | 4-5/16 | 5-11/16 | 6-3/4 | 7-7/8  | 10-1/16 | 12-1/4 | 14-5/16 |
| j         | 3/4            | 3/4    | 3/4     | 3/4    | 3/4    | 3/4    | 7/8     | 1      | 3/4            | 3/4    | 3/4     | 3/4    | 3/4    | 3/4    | 7/8    | 1      | 3/4       | 3/4    | 3/4     | 3/4   | 3/4    | 1-1/4   | 1-1/4  | 1-1/4   |
| k         | 3/4            | 3/4    | 3/4     | 3/4    | 3/4    | 3/4    | 7/8     | 15/16  | 3/4            | 3/4    | 3/4     | 3/4    | 3/4    | 3/4    | 7/8    | 15/16  | 3/4       | 3/4    | 3/4     | 3/4   | 3/4    | 15/16   | 15/16  | 1-3/8   |
| l         | 1              | 1      | 1       | 1      | 1-1/4  | 2      | 3       | 4      | 1              | 1      | 1-1/4   | 2      | 1-1/2  | 2-1/4  | 3-1/2  | 5      | 1         | 1-1/2  | 2-1/2   | 2     | 2-1/2  | 4-1/4   | 4-1/4  | 6       |
| m         | 1              | 1      | 1       | 1      | 1      | 1-1/4  | 1-1/2   | 1      | 1              | 1      | 1       | 1      | 1      | 1-1/4  | 1-1/2  | 1      | 1         | 1      | 1       | 1     | 1-1/4  | 1-1/2   | 1-1/2  | 1-1/2   |
| n         | 1-1/4          | 1-1/4  | 1-1/4   | 1-1/4  | 1-1/4  | 2      | 2       | 2-1/2  | 1-1/4          | 1-1/4  | 1-1/4   | 1-1/4  | 2      | 2      | 2      | 2-1/2  | 1-1/4     | 1-1/4  | 2       | 2     | 2      | 2-1/2   | 2-1/2  | 2-1/2   |
| o         | 12-1/4         | 15-3/4 | 19      | 22-1/4 | 26-1/8 | 33-3/4 | 42-1/8  | 51-1/8 | 12-1/4         | 15-1/2 | 19-1/2  | 24     | 26-1/2 | 34     | 43     | 53     | 12-1/4    | 16-1/8 | 22      | 24    | 29     | 38      | 46     | 55      |
| p         | 1/4            | 1/4    | 1/4     | 1/4    | 1/4    | 3/8    | 3/8     | 1/4    | 1/4            | 1/4    | 1/4     | 1/4    | 1/4    | 1/4    | 3/8    | 3/8    | 1/4       | 1/4    | 1/4     | 1/4   | 3/8    | 3/8     | 1/2    | 1/2     |
| q         | 1              | 1      | 1       | 1-1/8  | 1-1/8  | 1-5/8  | 1-5/8   | 1-5/8  | 1              | 1      | 1       | 1-1/8  | 1-1/8  | 1-5/8  | 1-5/8  | 1-5/8  | 1         | 1      | 1       | 1-1/8 | 1-1/8  | 1-5/8   | 1-5/8  | 1-5/8   |

Frederick County  
Division of Utilities &  
Solid Waste Management  
Department of  
Engineering & Planning

| Revisions |      |
|-----------|------|
| Date      | Note |
|           |      |
|           |      |
|           |      |
|           |      |

Anchors for 11-1/4°, 22-1/2°  
and 45° Upper Vertical  
Bends

Detail No.  
**105.1**  
Date:  
01-24-2013



Section "A - A"

Section "B - B"

A= Extension of anchor to 12" below ground, when necessary to prevent washout of backfill by surface water.

B= 12" for pipes 10" or less, 18" for pipes 10" to 18" nominal diameter

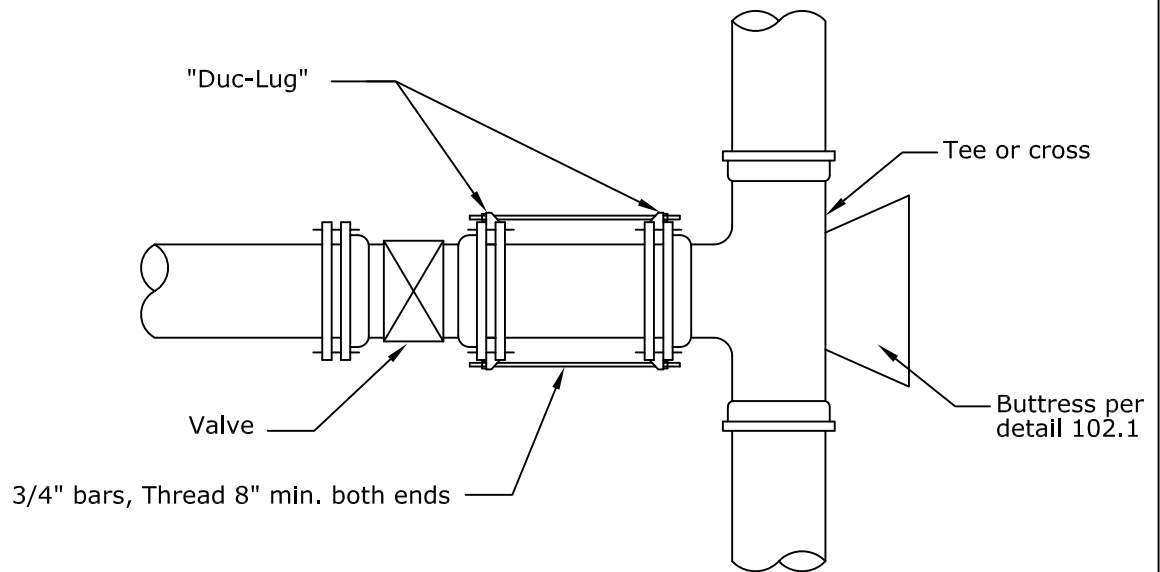
P.W. - O.D. + 2E.

E= See Detail 2.1

Notes:

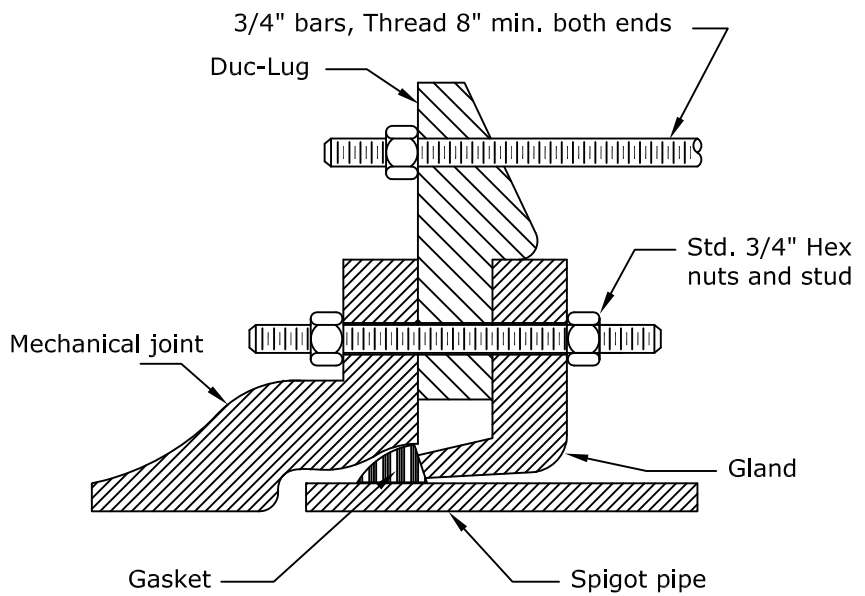
1. Provide no anchors on grades less than 20% unless noted on the plans.
2. Provide anchors 36 feet center to center on grades between 20% & 34%.
3. Provide anchors 24 feet center to center on grades between 34% & 50%.
4. On grades over 50% the method of anchoring pipe is to be determined via geotechnical study.
5. Provide anchors 16 feet center to center on grades between 50% & 70%.
6. All anchors to be MSHA mix no. 1 concrete, placed downgrade of bell, as shown above.
7. Place anchors in multiple lengths, 18' or 20', if anchors is to be immediately downgrade of bell.

|                                                                                                                  |           |      |                                                                 |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Concrete Anchors for<br>Pipe Installed on<br>Grades 20% or More | Detail No.<br><br>106.1 |
|                                                                                                                  | Date      | Note |                                                                 |                         |
|                                                                                                                  | .         | .    |                                                                 | Date:<br>01-24-2013     |
|                                                                                                                  | .         | .    |                                                                 |                         |
|                                                                                                                  | .         | .    |                                                                 |                         |
|                                                                                                                  | .         | .    |                                                                 |                         |



## Plan

| Valve size | No. of 3/4" dia bars required | Max. Spigot length |
|------------|-------------------------------|--------------------|
| 3"         | 2                             | 27"                |
| 4"         | 2                             | 27"                |
| 6"         | 2                             | 27"                |
| 8"         | 2                             | 27"                |
| 10"        | 4                             | 27"                |
| 12"        | 6                             | 27"                |
| 16"        | 8                             | 36"                |
| 20"        | 12                            | 36"                |
| 24"        | 16                            | 36"                |
| 30"        | 20                            | 36"                |



## Cross Section of Lug Assembly

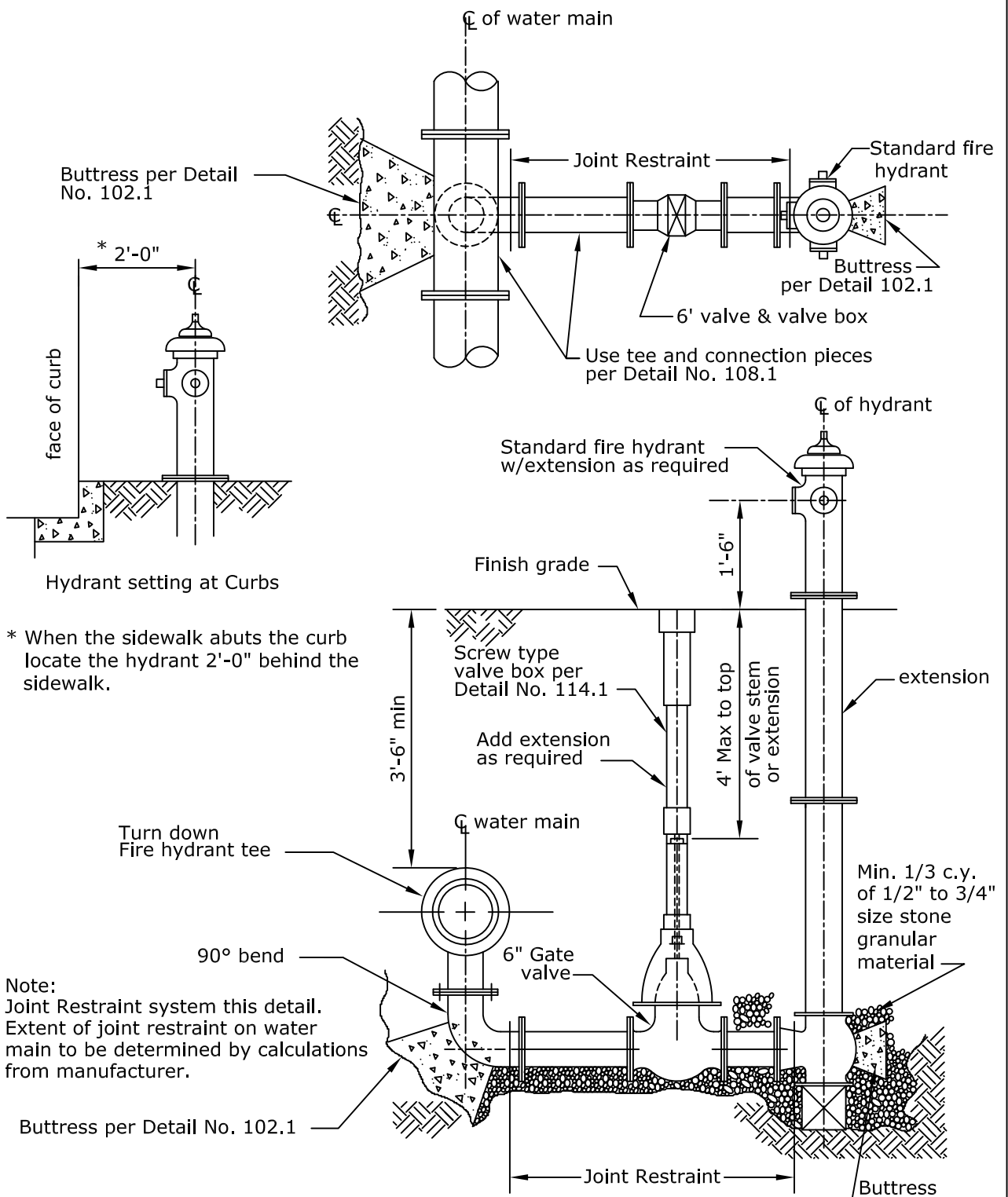
### Notes:

1. Mechanical joint fittings only shall be used.
  2. All steel shall be coated with two coats of bituminous paint, conforming to MIL-P-23236P, class 2.
  3. If tapping sleeve & valve are used, omit strapping and spigot pipe.
  4. Tie bolts by "Star" are an approved equal to "Duc-Lugs".
  5. "Duc-Lugs" only to be used when "Mega-Lug" restraint is not possible.
- \* Used as alternative to Mega-Lug restraints.

|                                                                                                                      |           |      |                                                        |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|--------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Method of Strapping<br>Valve to Tee with<br>"Duc-Lugs" | Detail No.<br><br>107.1 |
|                                                                                                                      | Date      | Note |                                                        |                         |
|                                                                                                                      | .         | .    |                                                        | Date:<br>01-24-2013     |
|                                                                                                                      | .         | .    |                                                        |                         |
|                                                                                                                      | .         | .    |                                                        |                         |
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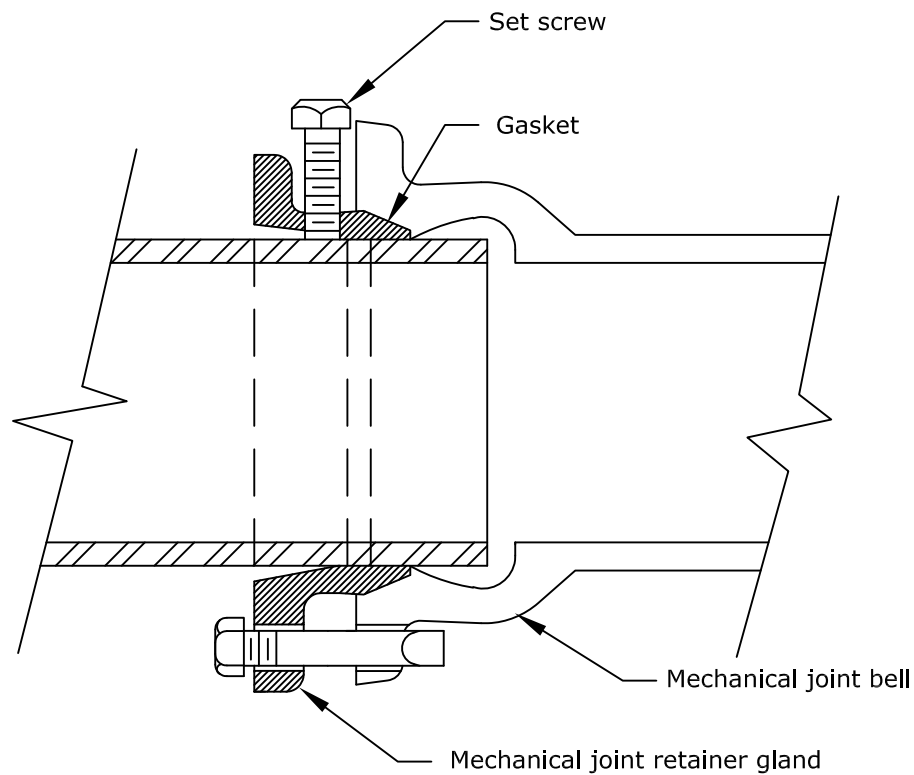






- Note:
- Alternate method per Detail No. 108.1 requires rodding.
1. When hydrant height would exceed 8'-0" then 45° vertical bends may be used in place of the 90° bends to mitigate necessary cut and hydrant height.

|                                                                                                                  |           |      |                                         |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Low Point<br>Dewatering<br>Fire Hydrant | Detail No.<br><br>108.2 |
|                                                                                                                  | Date      | Note |                                         |                         |
|                                                                                                                  | .         | .    |                                         | Date:                   |
|                                                                                                                  | .         | .    |                                         | 01-24-2013              |
|                                                                                                                  | .         | .    |                                         |                         |



| Nominal size in inches | No. of set screws | Pressure rating in PSI |
|------------------------|-------------------|------------------------|
| 3                      | 4                 | 300                    |
| 4                      | 4                 | 300                    |
| 6                      | 6                 | 300                    |
| 8                      | 9                 | 200                    |
| 10                     | 16                | 200                    |
| 12                     | 16                | 200                    |
| 16                     | 24                | 200                    |
| 20                     | 28                | 200                    |
| 24                     | 32                | 150                    |
| 30                     | 40                | 150                    |

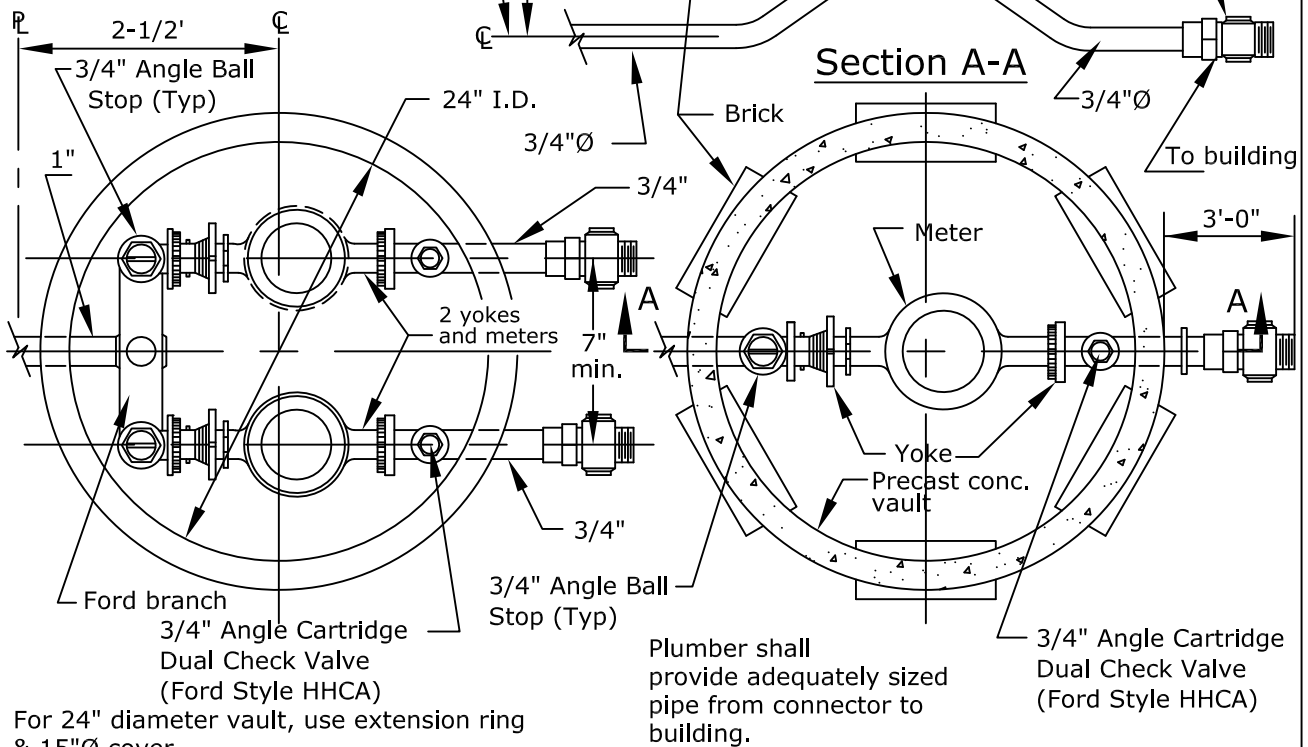
**Notes:**

1. Mechanical joint pipe & fittings only.
2. All set screws are 5/8" with hardened cupped ends and 5/8" square heads.
3. Sizes 16" through 30" are for installation on ductile iron pipe only.
4. Tighten set screws evenly to 80 foot-pounds on 3"-12" glands and 65 foot-pounds on 16"- 30" glands.

|                                                                                                                      |           |      |                                    |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Mechanical Joint<br>Retainer Gland | Detail No.<br><br>109.1 |
|                                                                                                                      | Date      | Note |                                    |                         |
|                                                                                                                      | .         | .    |                                    | Date:<br>01-24-2013     |
|                                                                                                                      | .         | .    |                                    |                         |
|                                                                                                                      | .         | .    |                                    |                         |
|                                                                                                                      | .         | .    |                                    |                         |

1. Idler shall be furnished by contractor with a Ford EC-23 expansion connection or approved equal and be installed in the yoke for testing purposes and shall remain installed until the meter is installed by the County.

- Type K copper from corporation stop in water main installed without splices. ➔



## Single Service Plan

|                                                                                                                      |           |      |                                      |                     |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|--------------------------------------|---------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | 3/4" & 1" Water<br><br>Meter Setting | Detail No.          |
|                                                                                                                      | Date      | Note |                                      | 110.1               |
|                                                                                                                      | .         | .    |                                      | Date:<br>01-24-2013 |
|                                                                                                                      | .         | .    |                                      |                     |
|                                                                                                                      | .         | .    |                                      |                     |
|                                                                                                                      | .         | .    |                                      |                     |

1. Idlers shall be furnished by the contractor with a Ford EC-23 expansion connection or approved equal and be installed in both yokes for testing purposes and shall remain installed until the meter and PRV are installed by the County.
2. Twin yoke assembly shall be a 5/8" x 3/4" Ford model A-95095 or approved equal. Assembly includes: yoke bars, PRV adapters, yoke elbows (with crossover pipe), angle valve and angle cartridge dual check valve.
3. Vault shall be placed on bricks. Bricks shall be placed on compacted or undisturbed earth.
4. All angle stops shall have locking wings



|                                                                                                                      |           |      |                                                                |            |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|----------------------------------------------------------------|------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | 3/4" Water Meter<br><br>Setting with Pressure<br><br>Regulator | Detail No. |
|                                                                                                                      | Date      | Note |                                                                | 110.2      |
|                                                                                                                      | .         | .    |                                                                |            |
|                                                                                                                      | .         | .    |                                                                |            |
|                                                                                                                      | .         | .    |                                                                |            |
|                                                                                                                      | .         | .    | Date:<br>01-24-2013                                            |            |

1. Idlers shall be furnished by the contractor with a Ford EC-4 expansion connection or approved equal and be installed in both yokes for testing purposes and shall remain installed until the meter and PRV are installed by the County.

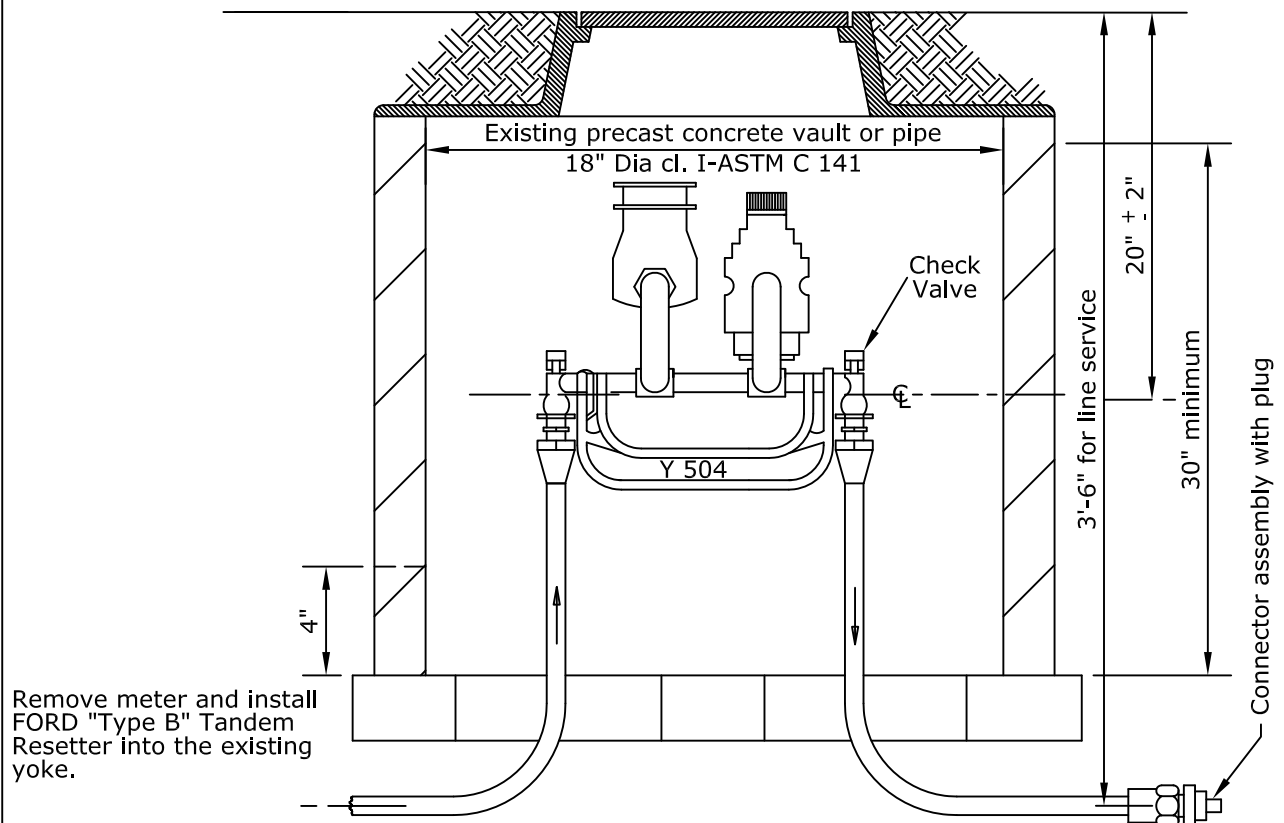
- Coil enough copper in the bottom of —  
the meter vault to allow for a maximum  
of 12" vertical height adjustment

Type K copper from corp stop in water main installed without splices.

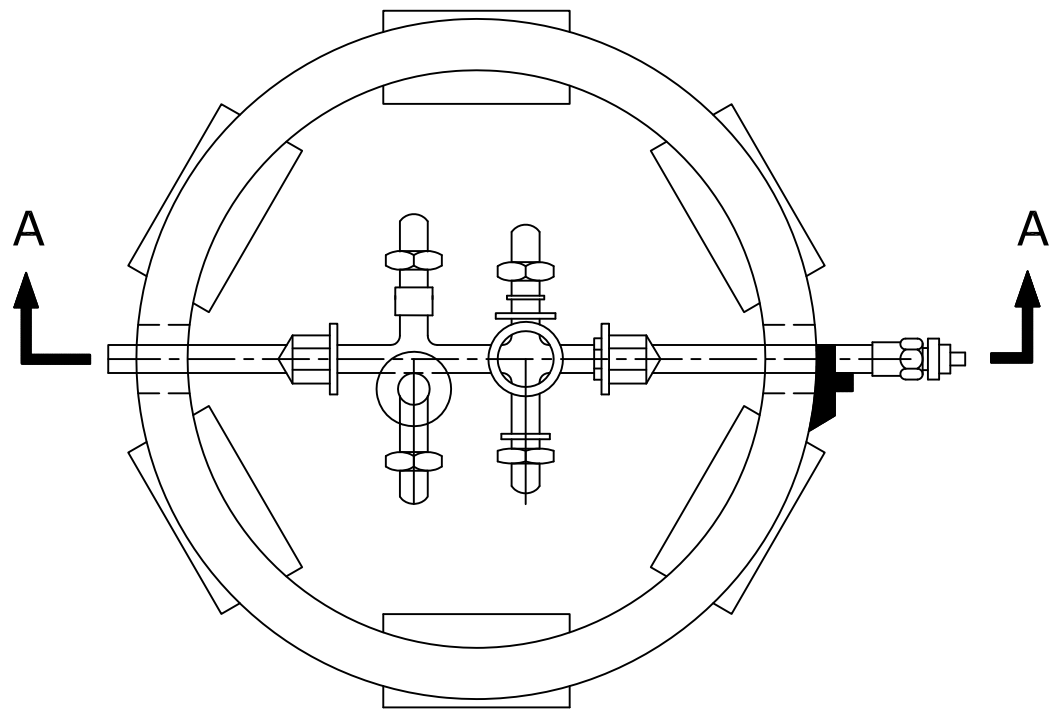
- 
- Technical drawing showing a cross-section (Section A-A) of a water meter vault and its connection to a building.
- Section A-A (Side View):**
- Top Cover:** A53TP Cover w/ EXT-2 ring.
  - Vault Dimensions:** 24" dia precast conc. vault or pipe CL-I, A.S.T.M. C76. Overall height is 30" Min. (20" ± 1/2" for the vault body).
  - Internal Components:**
    - Meter will be supplied and installed by the County.
    - Meter Yoke Assembly (See Note 2).
    - 10 3/4" laying length.
    - connector assembly with plug.
  - Connections:**
    - to water line main (3'-6" vertical distance).
    - To building (via Pressure Regulator See Note 5).
  - Other Labels:** 2-1/2', 4", 3'-6", 20" ± 1/2", 30" Min., 1"Ø, Bricks, 1" Angle Ball stop (TYP).
- Plan View (Bottom):**
- Components:** 1" Angle Cartridge Dual Check Valve, Meter, 1" Angle Ball stop (TYP).
  - Dimensions:** 7" min. (distance between yokes), 3'-0" (distance from vault to building connection).
  - Notes:** Plumber shall provide adequately sized pipe from connector to building.

|                                                                                                                      |           |      |                                                          |            |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|----------------------------------------------------------|------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | 1" Water Meter<br><br>Setting with Pressure<br>Regulator | Detail No. |
|                                                                                                                      | Date      | Note |                                                          | 110.3      |
|                                                                                                                      |           |      |                                                          |            |
|                                                                                                                      |           |      |                                                          |            |
|                                                                                                                      |           |      |                                                          |            |
|                                                                                                                      |           |      |                                                          |            |
|                                                                                                                      |           |      | Date:<br>01-24-2013                                      |            |





**Section A-A**



|                                                                                                                      |           |      |                                                                  |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|------------------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Retro-fitting of 3/4" Water<br>Meter with Pressure<br>Regulators | Detail No.<br><br>110.5 |
|                                                                                                                      | Date      | Note |                                                                  |                         |
|                                                                                                                      | .         | .    |                                                                  | Date:<br>01-24-2013     |
|                                                                                                                      | .         | .    |                                                                  |                         |
|                                                                                                                      | .         | .    |                                                                  |                         |
|                                                                                                                      | .         | .    |                                                                  |                         |



Waterproof all joints between top, bottom and grade rings with rubber gasket or equal.

(1) 1-1/2" meter use Ford Custom setter "VBHH76-15B-44-66-G or equal.

2" meter use Ford Custom setter "VBHH77-15B-44-77-G or equal.

1" Iron Pipe, placed thru tee and supported on brick, each side of meter

1-1/2" or 2" meter with elliptical flange ends, supplied & installed by the County Contractor to provide idler w/ elliptical ends.

12" dia x 4" deep sump cast in base

1-1/2" or 2" Type K copper with connector per Detail No. 110.1, as determined by the Engineer.

Frame and cover to be bolted to MH top slab per Detail No. 5.2. 24" MH frame & cover per Detail No. 5.1

**Plan**

Bring to grade per Detail No. 5.3

Flat precast top slab per Detail No. 201.3

Standard 4' dia 5' deep precast manhole base and riser. Steel per Detail No. 201.3

Rubber gasket around pipe typ.

Water main

Corp.

45°

Min. 6" of #57 Stone granular material

See (1) above

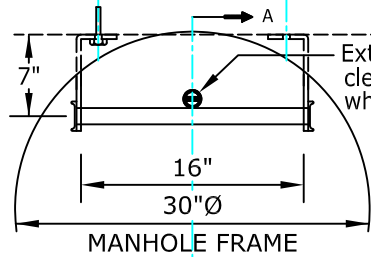
**Section A-A**

Connect w/plug or connect to building

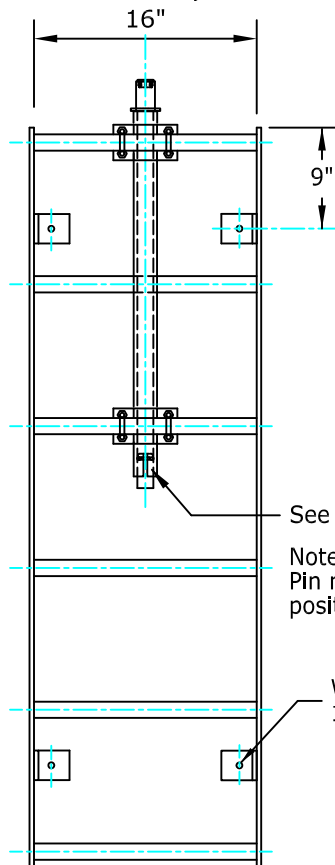
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|------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | 1-1/2" & 2" Water Meter<br>Installation | Detail No.<br><br>111.1 |
|                                                                                                                  | Date      | Note |                                         |                         |
|                                                                                                                  | .         | .    |                                         | Date:<br>01-24-2013     |
|                                                                                                                  | .         | .    |                                         |                         |
|                                                                                                                  | .         | .    |                                         |                         |



Per  
Manufacture  
instructions



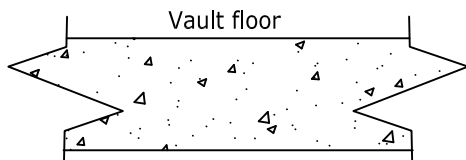
MANHOLE FRAME



See Detail

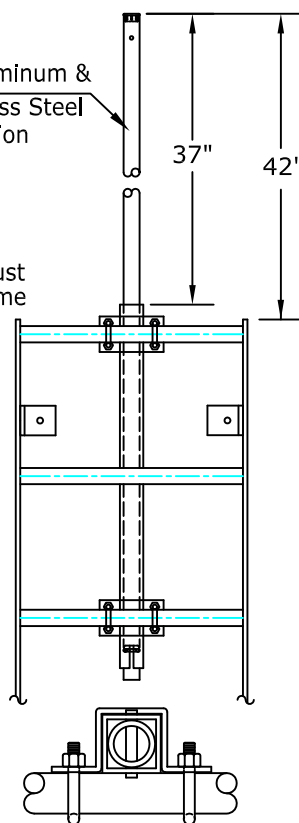
Notes:  
Pin must be in locked  
position prior to operation.

Wall Mounted Bracket  
1/2"Ø Mounting Holes



Vault floor

All Aluminum &  
Stainless Steel  
Extension



DETAIL

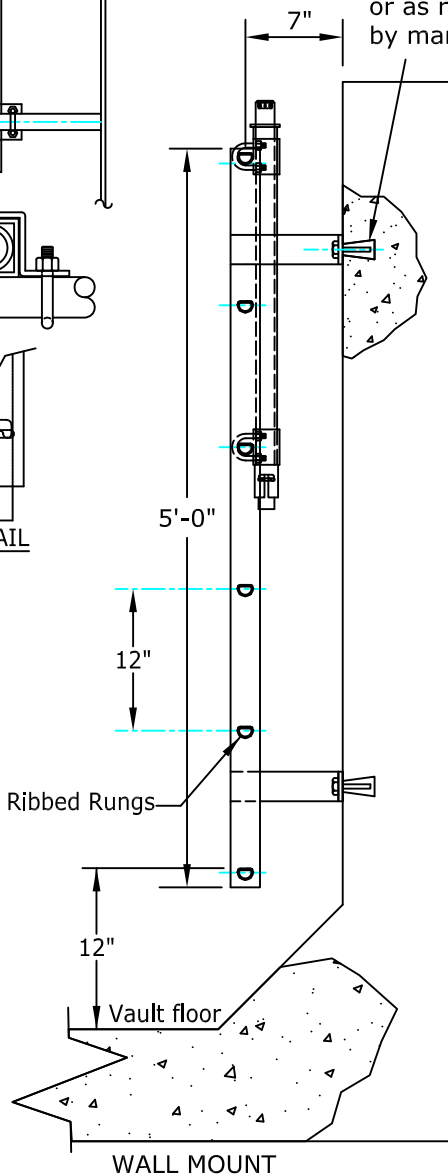
1 3/8"Ø "D" Ribbed Rungs

### General Notes:

All Aluminum welded construction.  
1 3/8" Type "D" Rung with flat slip  
resistant surface.  
Flat wall mounting only.

Installation & Operating instructions:  
Per manufacture's instruction.

Provide cast-in-place  
bolting inserts and  
galvanized bolts  
(4 required)  
or as recommended  
by manufacture



WALL MOUNT

Frederick County  
Division of Utilities &  
Solid Waste Management  
Department of  
Engineering & Planning

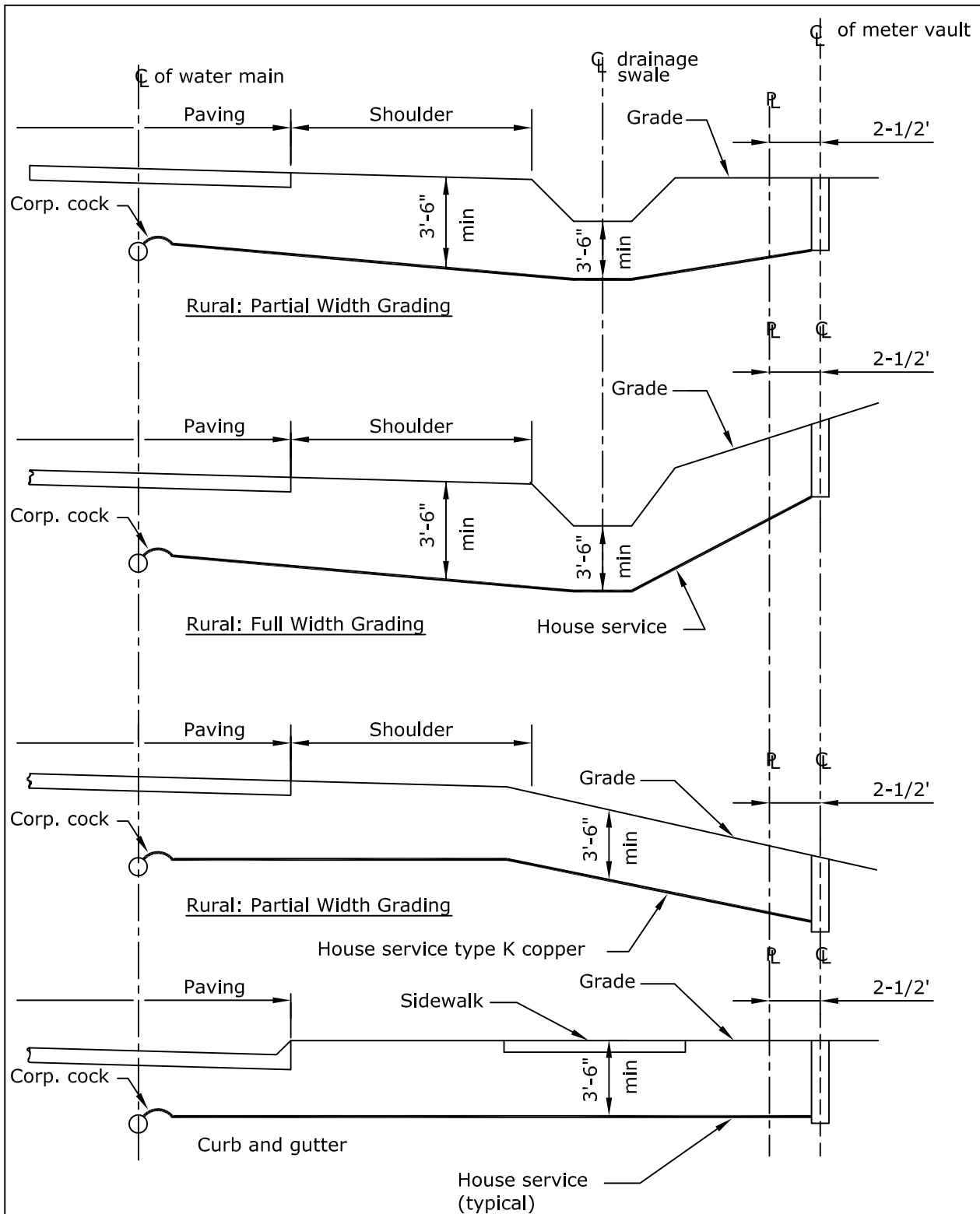
| Revisions |      |
|-----------|------|
| Date      | Note |
|           |      |
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|           |      |
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Meter Vault Ladder  
with Support  
Extension

Detail No.

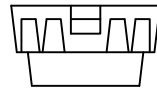
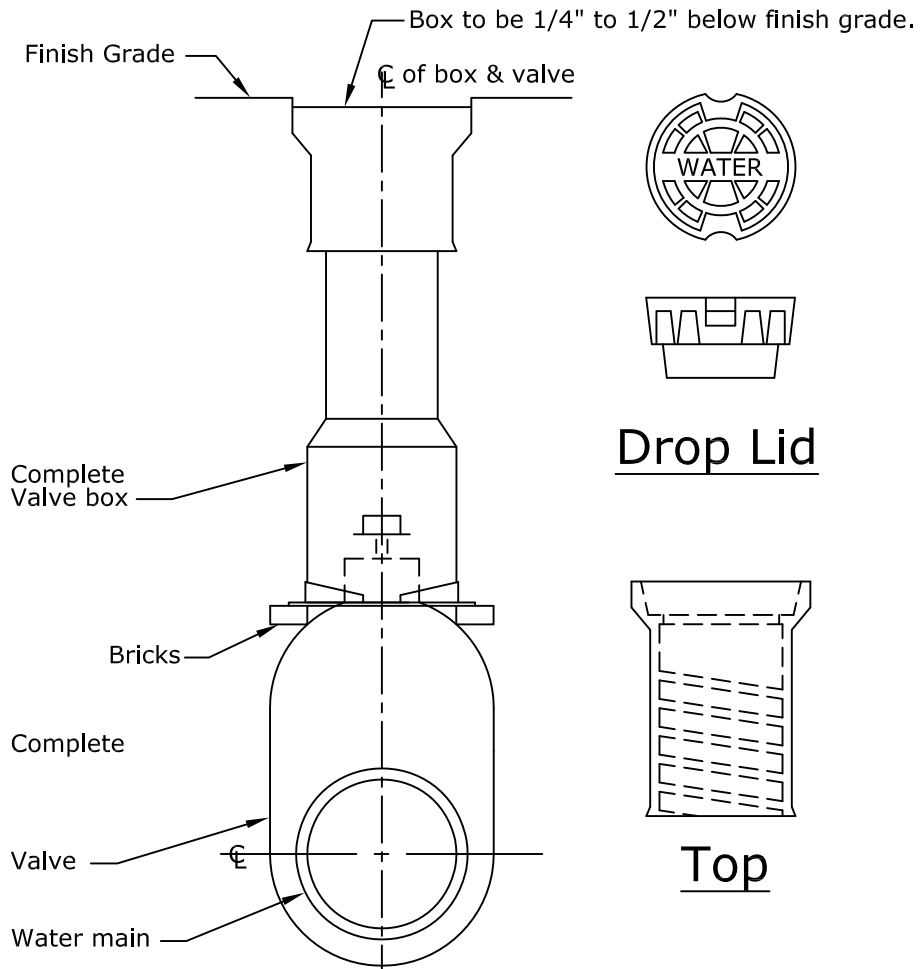
112.2

Date:  
01-24-2013

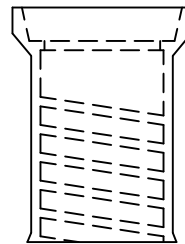


- 1: House service shall be type K copper pipe.
- 2: Meter vault shall be provided with a plug or cap unless house is connected immediately.
- 3: 1 1/2" & 2" lines require tapped tee at main line.

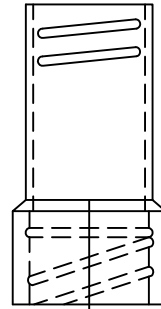
|                                                                                                                  |           |      |                                                   |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|---------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | 3/4", 1", 1-1/2", & 2"<br>Water House Connections | Detail No.<br><br>113.1 |
|                                                                                                                  | Date      | Note |                                                   |                         |
|                                                                                                                  | .         | .    |                                                   | Date:<br>01-24-2013     |
|                                                                                                                  | .         | .    |                                                   |                         |
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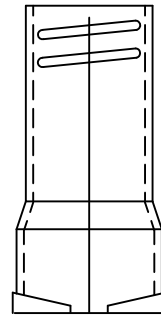
Drop Lid



Top



Extension

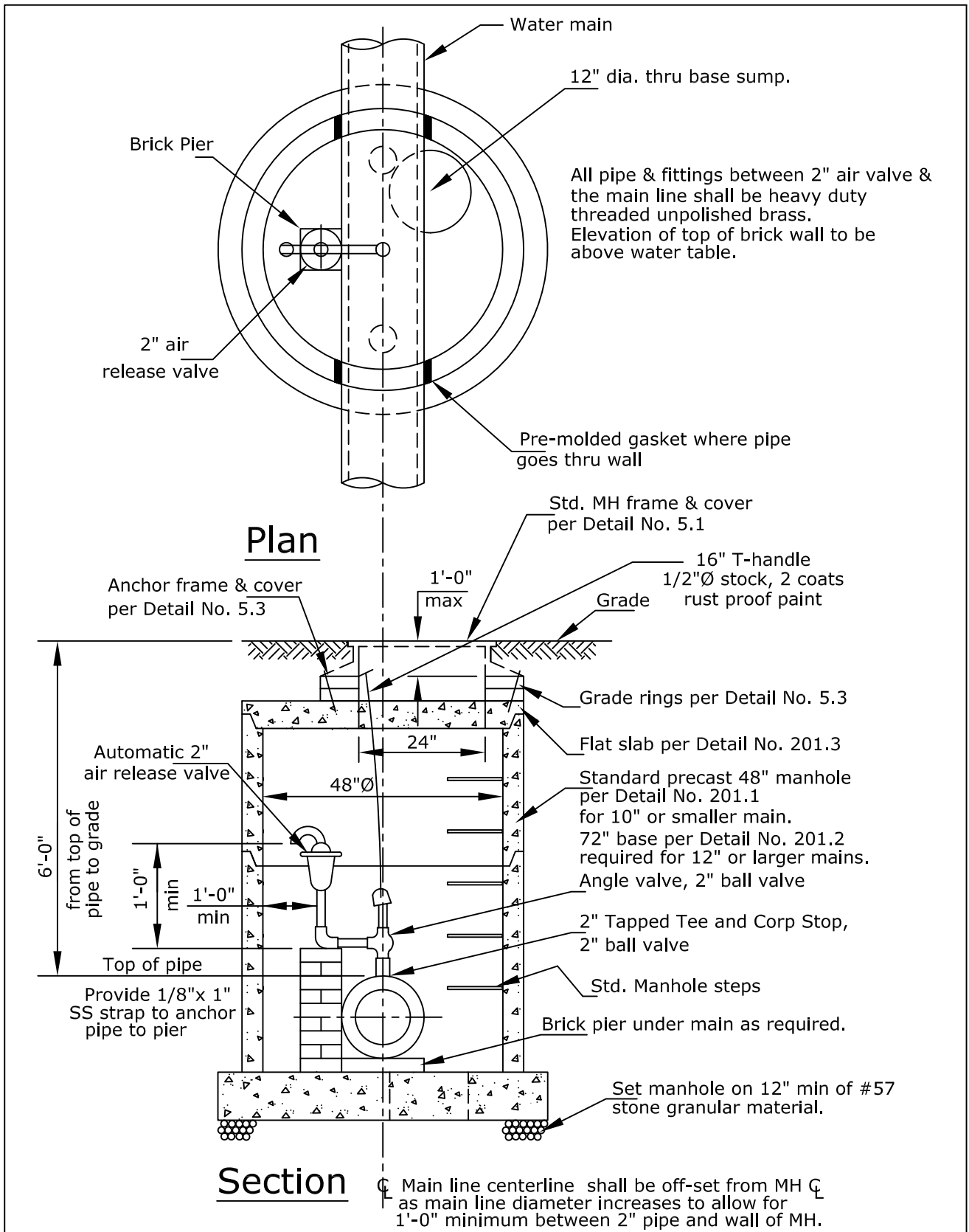


Bottom

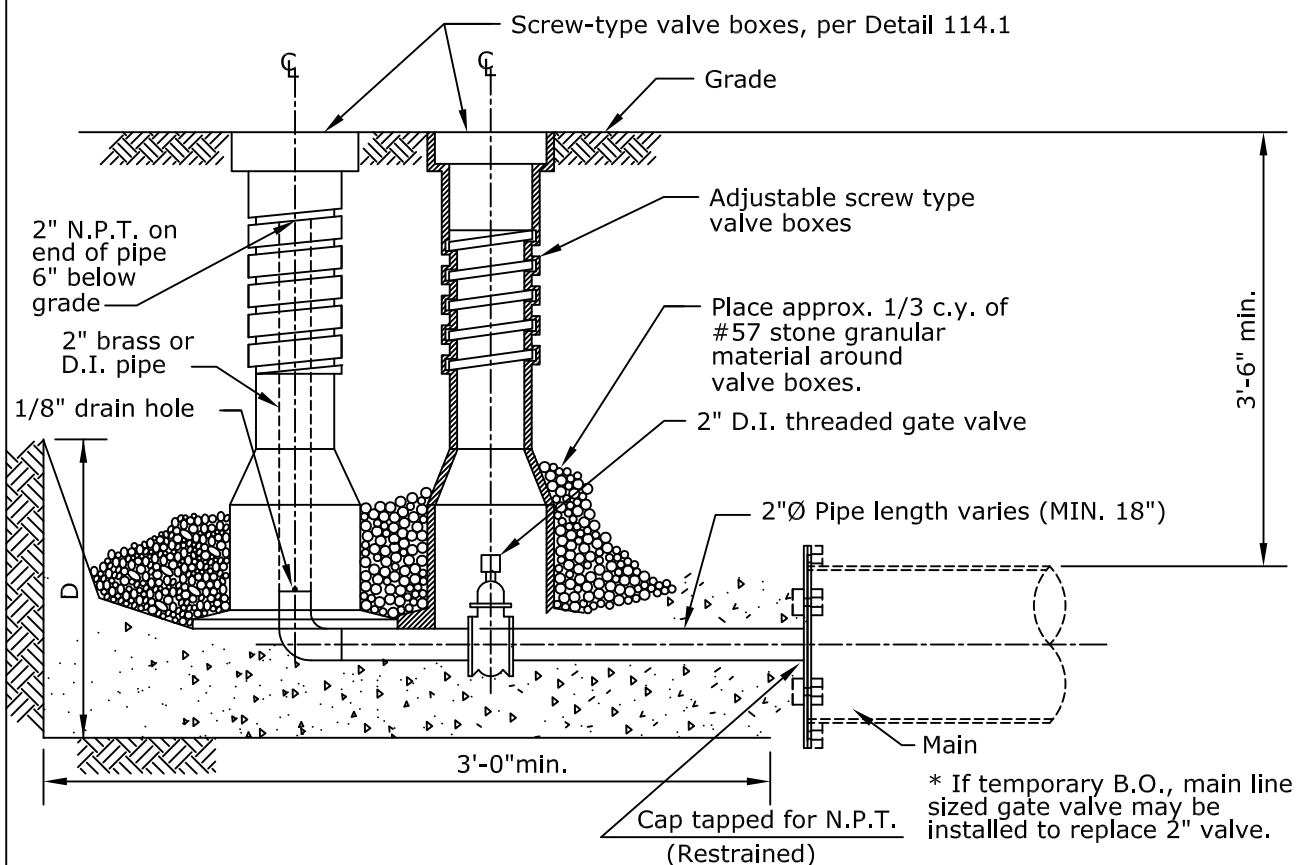
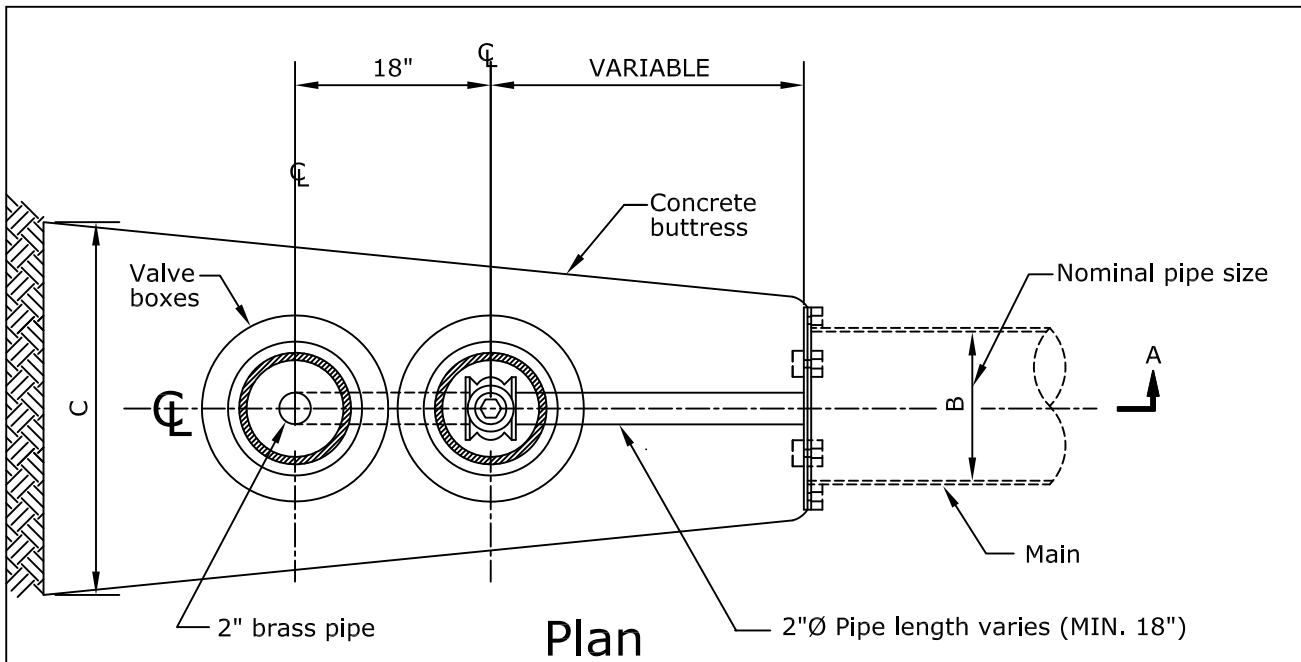
**Notes:**

1. Valve box bases shall be sized and installed so that valve box can not transfer loads to valves. Place base on bricks.
2. Valve box shall be adjusted to finished grade to allow future 6" adjustment up or down.
3. Valve boxes shall be cast iron, screw type with 5-1/4" shaft by Tyler Pipe, General Engineering or equal.

|                                                                                                                      |           |      |                                |                                |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|--------------------------------|--------------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Valve Boxes for<br>Water Mains | Detail No.<br><br><b>114.1</b> |
|                                                                                                                      | Date      | Note |                                |                                |
|                                                                                                                      | .         | .    |                                | Date:<br>01-24-2013            |
|                                                                                                                      | .         | .    |                                |                                |
|                                                                                                                      | .         | .    |                                |                                |
|                                                                                                                      | .         | .    |                                |                                |



|                                                                                                                      |           |      |                                                                |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|----------------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | 2" Air Release Valve in MH<br>for 24" & Smaller<br>Water Mains | Detail No.<br><br>115.1 |
|                                                                                                                      | Date      | Note |                                                                |                         |
|                                                                                                                      |           |      |                                                                | Date:<br>01-24-2013     |
|                                                                                                                      |           |      |                                                                |                         |
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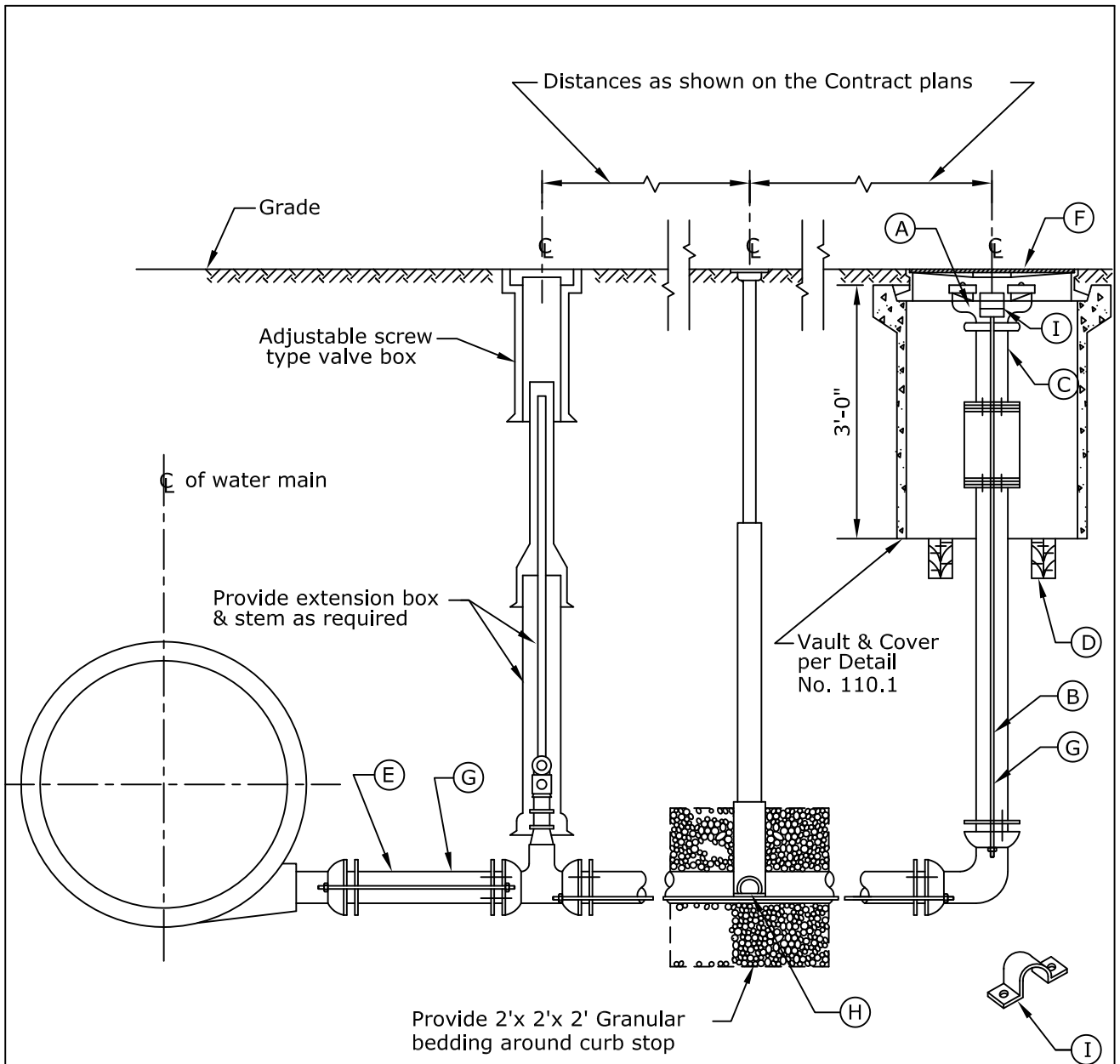
To undisturbed ground  
(Limit of measurement for payment)

## Section A-A

Concrete shall be Mix. No. 1.

| Buttress Dimensions in Inches |    |    |    |    |    |    |
|-------------------------------|----|----|----|----|----|----|
| B                             | 4  | 6  | 8  | 10 | 12 | 16 |
| C                             | 17 | 17 | 23 | 29 | 34 | 45 |
| D                             | 10 | 12 | 16 | 20 | 24 | 32 |

|                                                                                                                  |           |      |                                                         |                                |
|------------------------------------------------------------------------------------------------------------------|-----------|------|---------------------------------------------------------|--------------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | <b>Cap and Blow-off<br/>at End of Main<br/>Modified</b> | Detail No.<br><br><b>116.1</b> |
|                                                                                                                  | Date      | Note |                                                         |                                |
|                                                                                                                  |           |      |                                                         | Date:                          |
|                                                                                                                  |           |      |                                                         | 01-24-2013                     |
|                                                                                                                  |           |      |                                                         |                                |

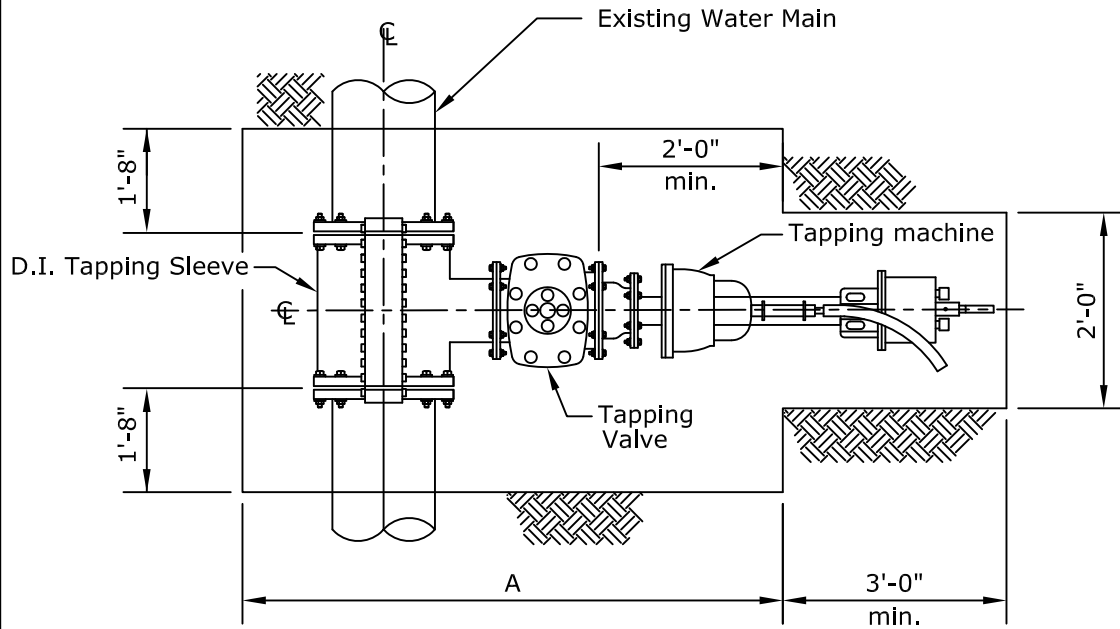


- (A) 2-1/2"x 2-1/2"x4" straight body siamese connection-install without clappers.
- (B) Strap siamese connection to bell of bend with two 3/4" dia stainless steel bars and strap I
- (C) 1'-3" long-4" stainless steel pipe, 4-1/2" O.D. schedule 40 with one end plain and one end threaded to match thread on siamese connection.
- (D) 2-pressure treated (rated for ground contact) oak 2x6's spiked together shall extend a min. of 18" on each side beyond the limits of the trench to firm bearing.
- (E) Strap valve and 90° bend to main line using 3/4" stainless steel bars or retainer glands per Detail No. 107.1
- (F) Siamese connection housing to be located outside of present or proposed traffic bearing area.
- (G) Paint all exposed steel surfaces with 2 coats of bituminous paint per MIL-P-23236P, cl.2.
- (H) 3/4" corp. cock, short copper nipple and curb stop with curb box and cut-off stem to ground surface as required to drain pipe.
- (I) 2-1/2" wide x 1/4" thick stainless steel strap bent to conform to the siamese connection.

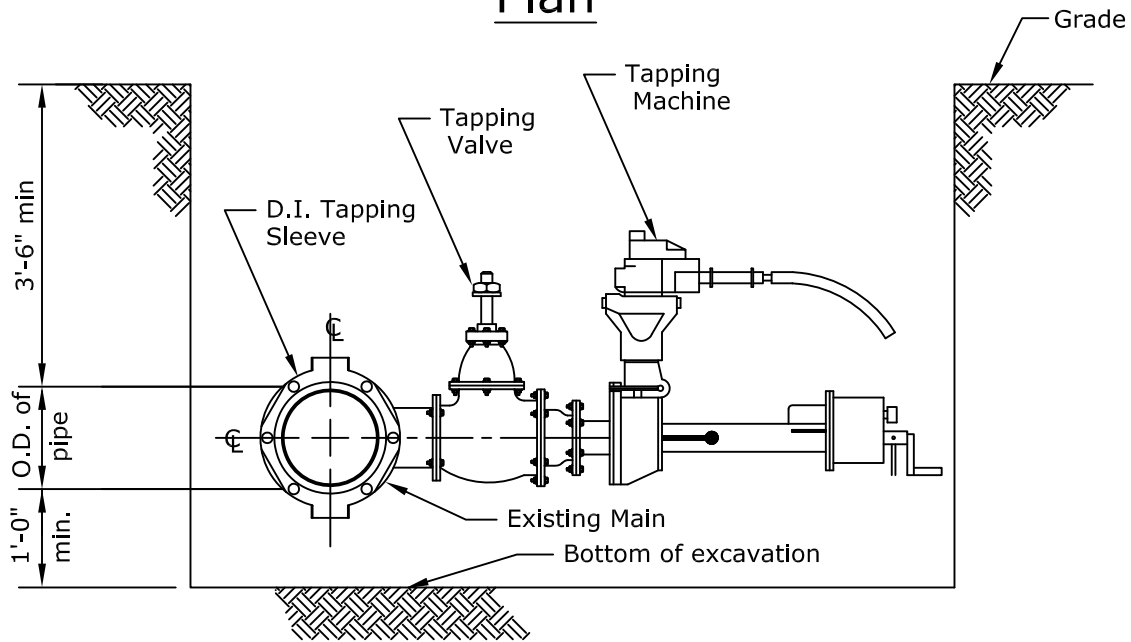
|                                                                                                                      |           |      |                                       |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|---------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Blowoff for 30" or<br>36" Water Mains | Detail No.<br><br>116.2 |
|                                                                                                                      | Date      | Note |                                       |                         |
|                                                                                                                      | .         | .    |                                       | Date:                   |
|                                                                                                                      | .         | .    |                                       | 01-24-2013              |
|                                                                                                                      | .         | .    |                                       |                         |
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|           |        |       |       |       |       |       |       |       |       |
|-----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| Main Dia. | 4"     | 6"    | 8"    | 10"   | 12"   | 14"   | 16"   | 18"   | 20"   |
| A (min)   | 4'-10" | 5'-3" | 5'-6" | 5'-9" | 6'-0" | 6'-2" | 6'-8" | 7'-3" | 7'-6" |



Plan



After tapping, buttress per Detail No. 103.1

Elevation

Not to scale

**NOTE:**  
**NO STAINLESS STEEL**

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Solid Waste Management  
Department of  
Engineering & Planning

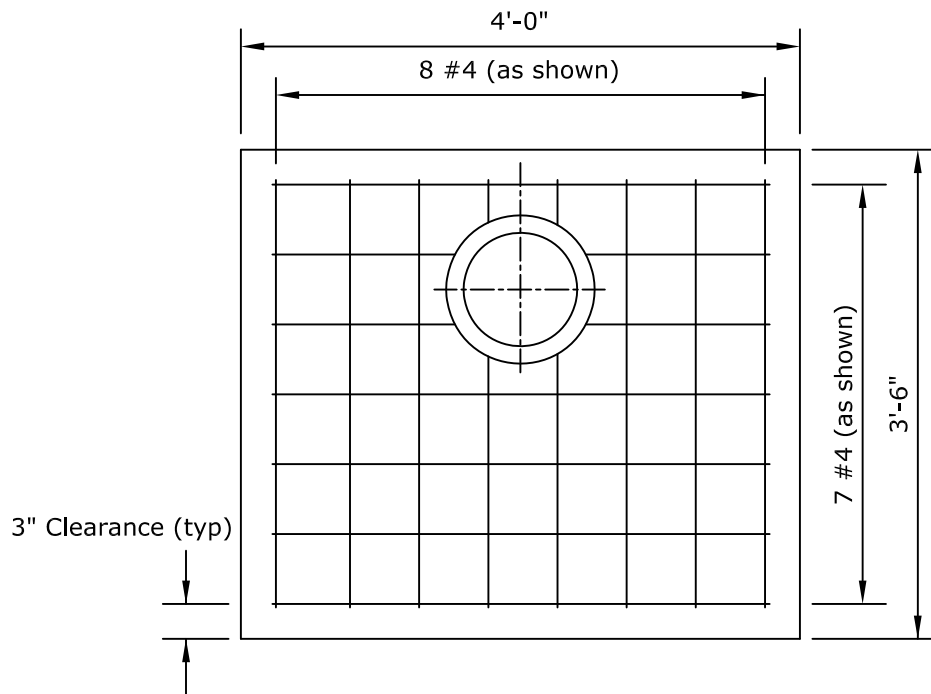
| Revisions |      |
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| Date      | Note |
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**Tapping Sleeve  
and Valve  
Installation**

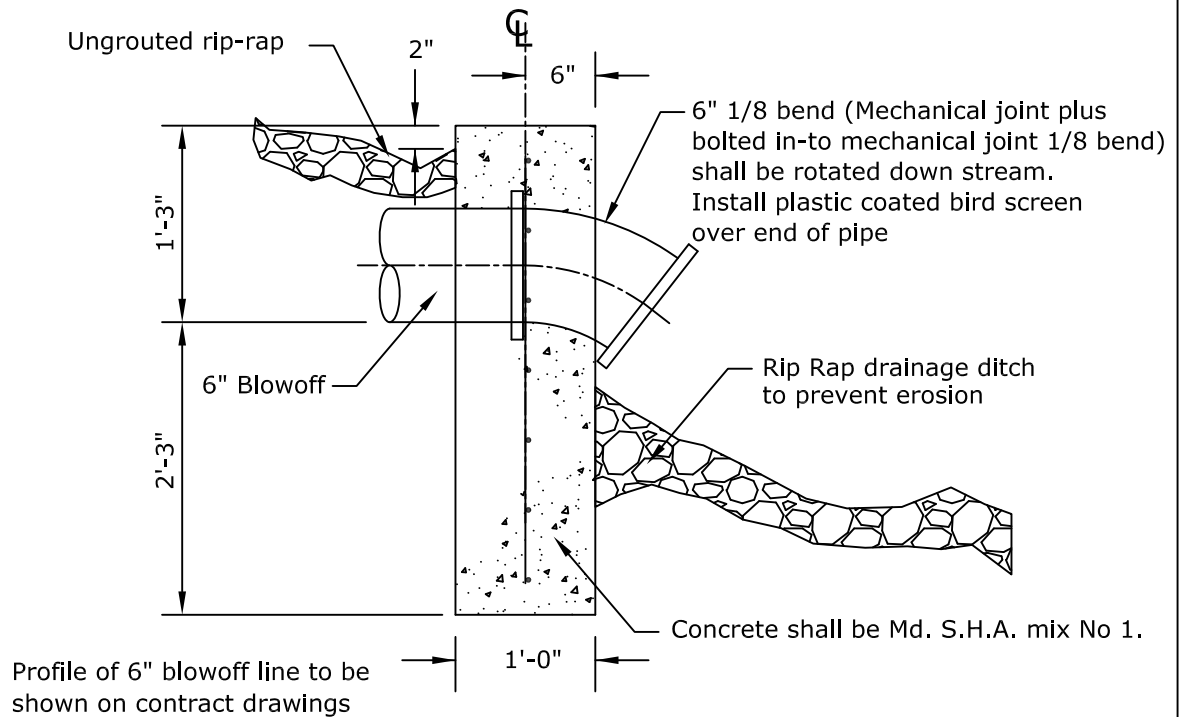
Detail No.

**117.1**

Date:  
01-24-2013



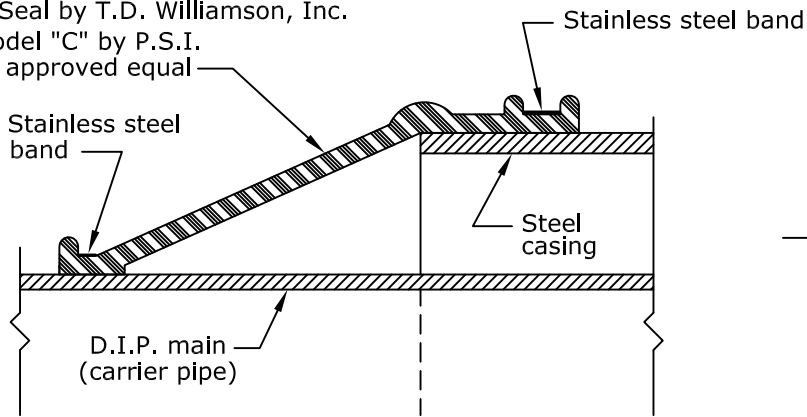
Elevation



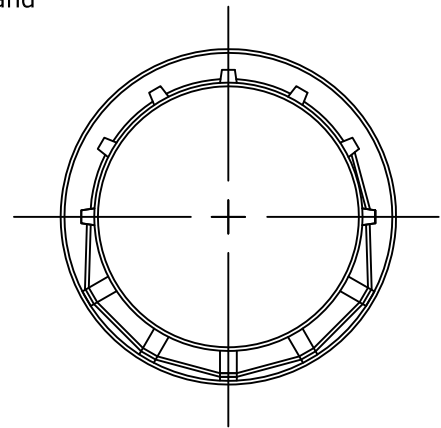
Section

|                                                                                                                  |           |      |                        |            |
|------------------------------------------------------------------------------------------------------------------|-----------|------|------------------------|------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Endwall For 6" Blowoff | Detail No. |
|                                                                                                                  | Date      | Note |                        | 118.1      |
|                                                                                                                  | .         | .    |                        | Date:      |
|                                                                                                                  | .         | .    |                        | 01-24-2013 |
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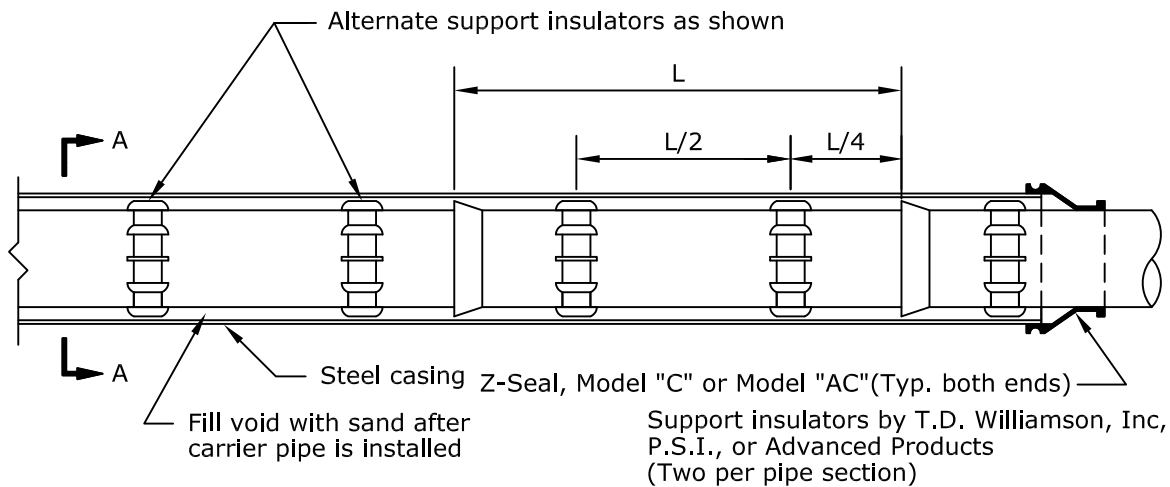
Model "AC" by Advanced Products and Systems  
 Z-Seal by T.D. Williamson, Inc.  
 Model "C" by P.S.I.  
 or approved equal



**End Seal Installation**



**Section A-A**



**Location of Insulators**

Nominal Diameters in Inches

| Main Diameter<br>D.I.P. | Min. Steel Casing Diameter |                    |
|-------------------------|----------------------------|--------------------|
|                         | Push Joint D.I.P.          | Mech. Joint D.I.P. |
| 3                       | 10                         | 12                 |
| 4                       | 10                         | 12                 |
| 6                       | 12                         | 16                 |
| 8                       | 16                         | 18                 |
| 10                      | 18                         | 20                 |
| 12                      | 20                         | 24                 |
| 14                      | 24                         | 24                 |
| 16                      | 30                         | 30                 |
| 18                      | 30                         | 30                 |
| 20                      | 30                         | 36                 |
| 24                      | 36                         | 36                 |

Casing shall conform to AWWA C200.  
 Min. Wall thickness shall be 3/8".

Ductile Iron carrier pipe shall be coated in  
 accordance with AWWA C-104.

All carrier pipe joints shall be  
 restrained within casing.

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 Engineering & Planning

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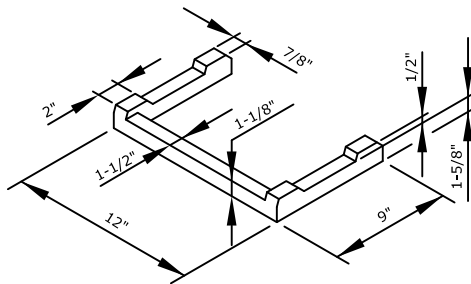
Casing for D.I.P.  
 Main under Highways  
 and Railroads

Detail No.

123.1

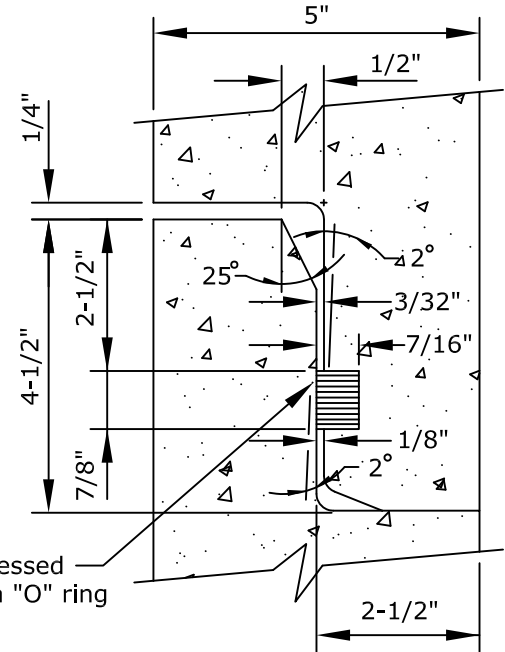
Date:  
 01-24-2013

# Sewer Details



## Plastic Covered Steel Manhole Step

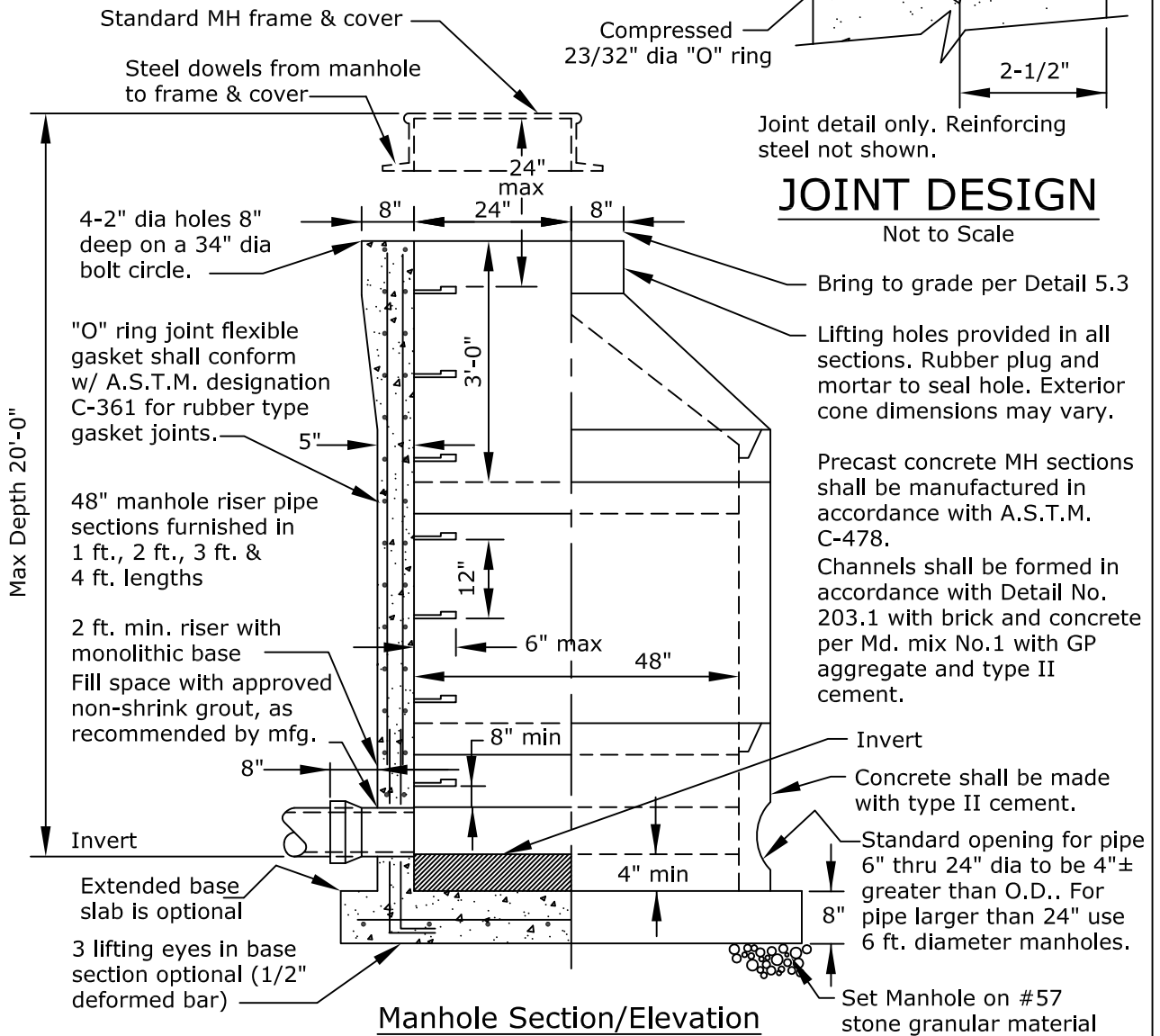
**NOTE:**  
All joints to be "Chem" patched on interior and exterior.  
Exterior shall be painted with Bitumastic.



Joint detail only. Reinforcing  
steel not shown.

## JOINT DESIGN

Not to Scale



## Manhole Section/Elevation

48" MH shall be used with 24" and smaller pipe at a max. depth of 20 feet (Top of rim to invert)

|                                                                                                                      |           |      |                                                     |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Precast Concrete<br><br>Manhole Detail 48" Diameter | Detail No.<br><br>201.1 |
|                                                                                                                      | Date      | Note |                                                     |                         |
|                                                                                                                      |           |      |                                                     | Date:<br>01-24-2013     |
|                                                                                                                      |           |      |                                                     |                         |
|                                                                                                                      |           |      |                                                     |                         |

Bottom steel 1/2" dia rods 6" O.C. both ways  
1-3/4" clear from bottom

1/2" dia hoop rods-weld all points of contact

2-3/4" dia diagonal rods

3-3/4" dia. rods adjacent to opening in lieu of 1/2" dia rods

Top steel to be 1/2" dia hoop bars and 3"x8"-#2x#6 mat with #6 bars parallel to hoop centers.

Lifting holes shall be sealed with rubber plugs and mortar

## 72" Slab Reinforcing Plan

Standard MH frame and cover.

Bring to grade per Detail No. 5.3

24" max. between cover and first step.

48" manhole riser pipe  
Sections furnished in 2ft., 3ft., & 4ft. lgths. 10ft. max

"O" ring flexible gasket joint-see Detail No.201.1

MH steps shall be plastic covered steel per detail No. 201.1

72" manhole riser pipe sections furnished in 1ft., 2ft., 3ft. & 4ft lgths.

7ft. min. riser with monolithic base.

Fill annular space with approved non-shrink grout. For plastic pipe see Detail No. 210.1

Excavation below pipe to be back-filled with compacted 1/2" to 3/4" size stone granular material

### Plan

4-2" dia holes 6" deep on a 34" dia bolt circle.  
Grade

Shallow manhole shall be any without 48" riser. Slab to be same as above except for 24" opening.

Slab on 48" riser to have 24" opening. Steel to be same as 72" slab except bottom mat to be all 1/2" bar.

Use type II cement, Identify MH's by Number & Manufacturer.

Concrete slab (for reinf. see above plan)

Double wrap circumferential steel in bells.

All MH bases, risers, cones and flat slabs shall be precast concrete in accordance with A.S.T.M. C-478 as modified herein.

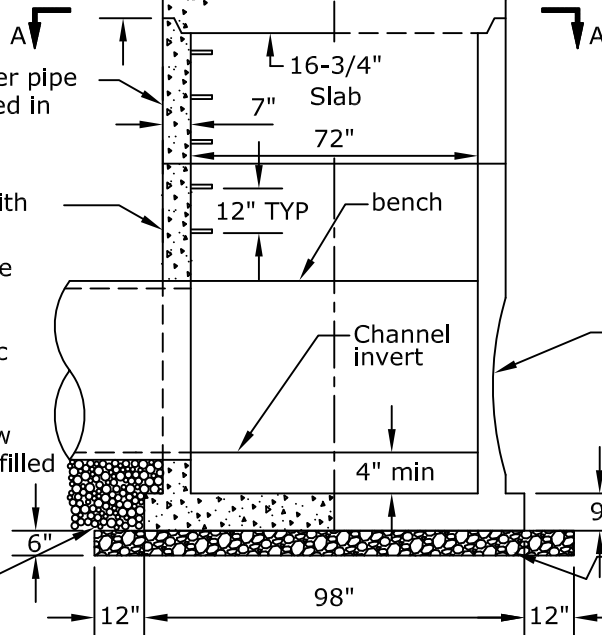
Channels shall be formed per Detail No. 203.1 with brick or conc. per Md. mix No. 1 with GP aggregate and type II cement.

Standard opening for pipe 27" thru 48" dia. to be 4"± greater than pipe O.D.

3 lifting eyes in base section optional (1/2" deformed bar)

Steel in base to be 1/2" dia @ 16" O.C. each way-min.

MH to be set on 6" of 1/2" to 3/4" size stone granular material.



### Section A-A

Frederick County  
Division of Utilities &  
Solid Waste Management  
Department of  
Engineering & Planning

| Revisions |      |
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Precast Concrete  
Manhole Detail 72"  
Diameter

Detail No.

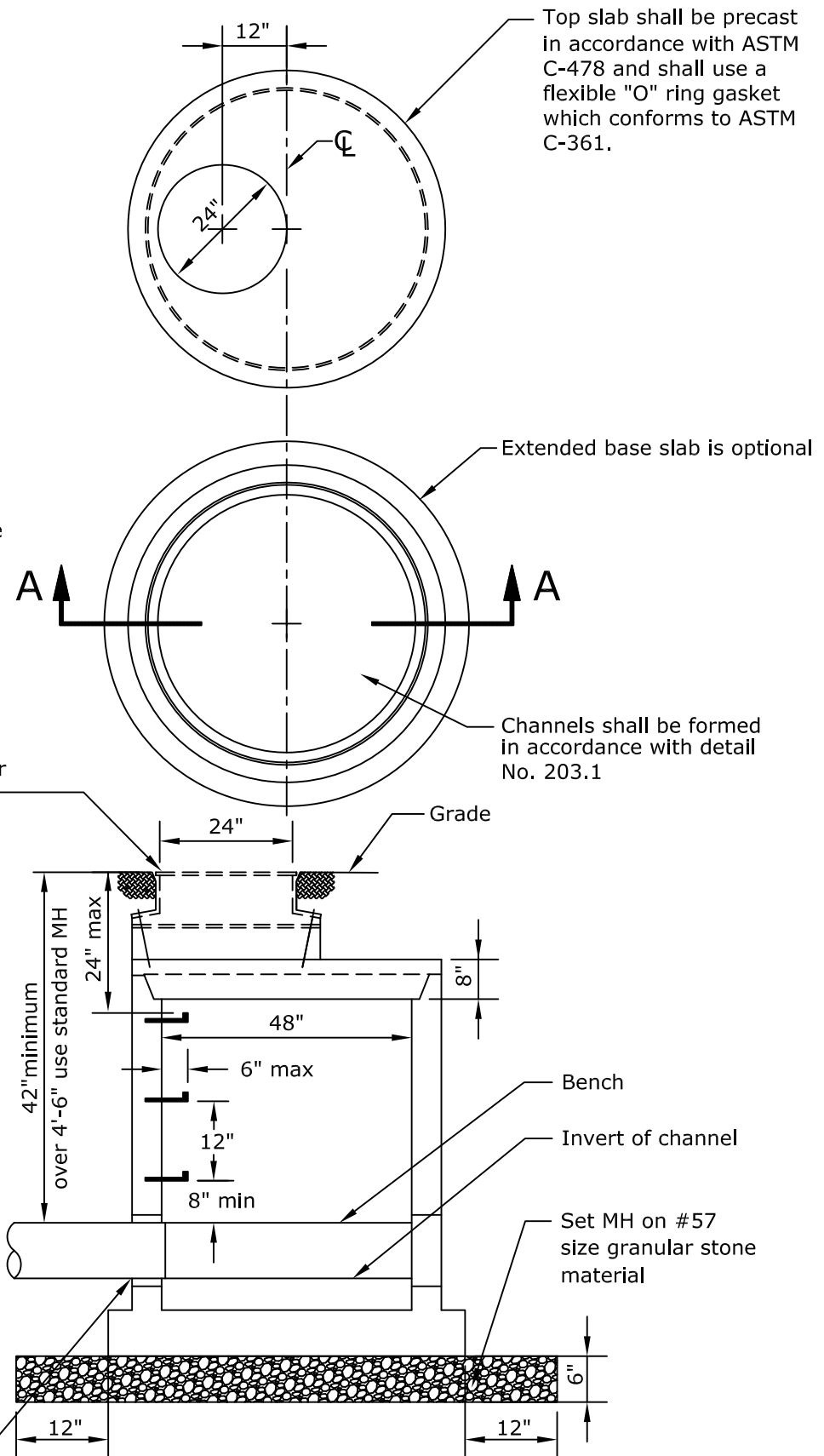
201.2

Date:  
01-24-2013

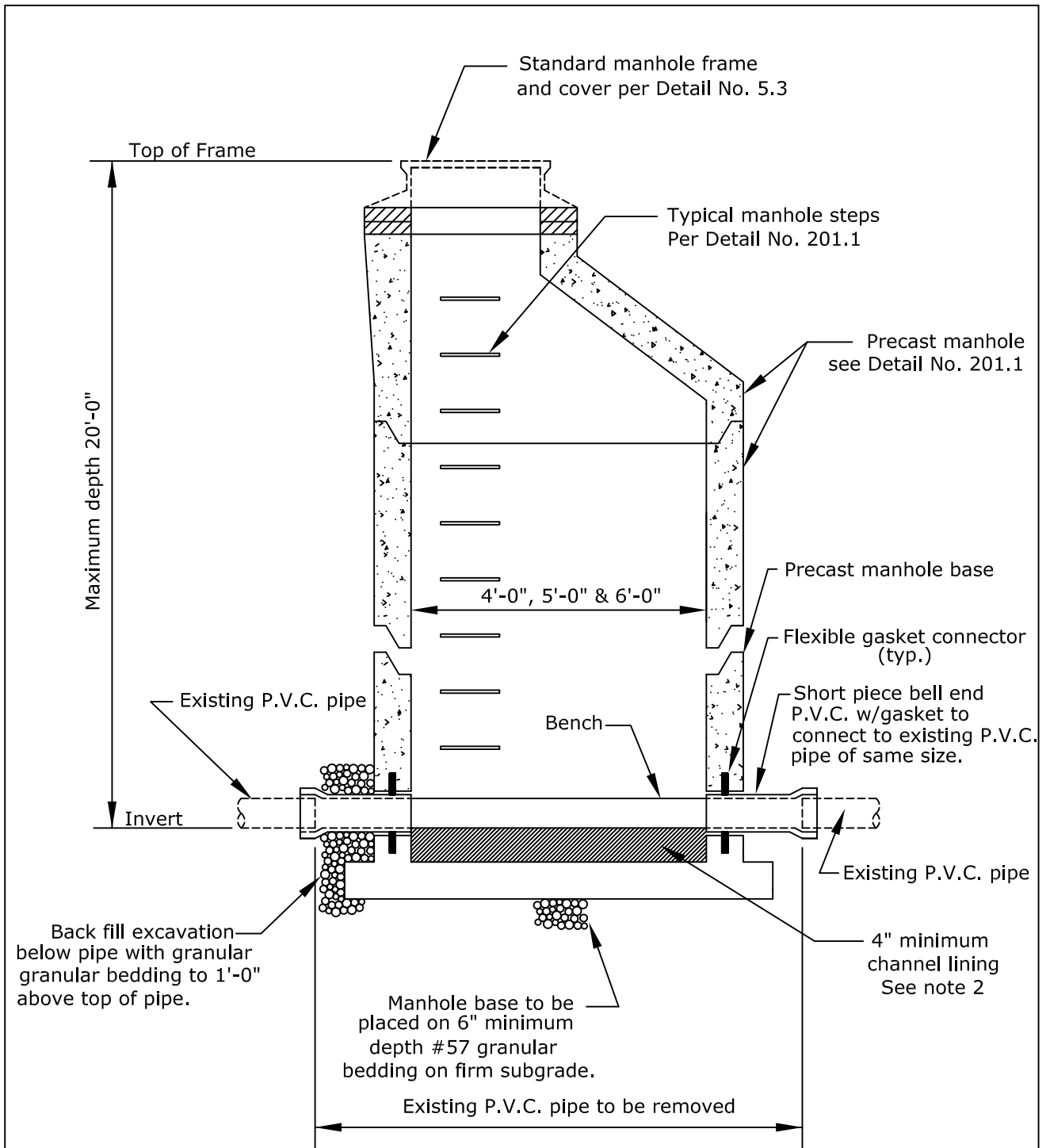
**Notes:**

1. Lifting holes shall be provided in base and top slab.
2. Riser shall have a monolithic base.
3. Plastic covered steel MH steps per Detail No. 201.1
4. Pipe openings 4"± greater, than pipe O.D.
5. 48" MH shall be used with 24" and smaller pipe.
6. See joint on Detail No. 201.1
7. Precast concrete base and flat top slab, ASTM C 478, using type II cement.

Frame and cover per Detail No. 5.1  
Bring to grade & anchor per Detail No. 5.3



|                                                                                                                  |           |      |                 |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Shallow Manhole | Detail No.<br><br>201.3 |
|                                                                                                                  | Date      | Note |                 |                         |
|                                                                                                                  | .         | .    |                 | Date:<br>01-24-2013     |
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**Notes:**

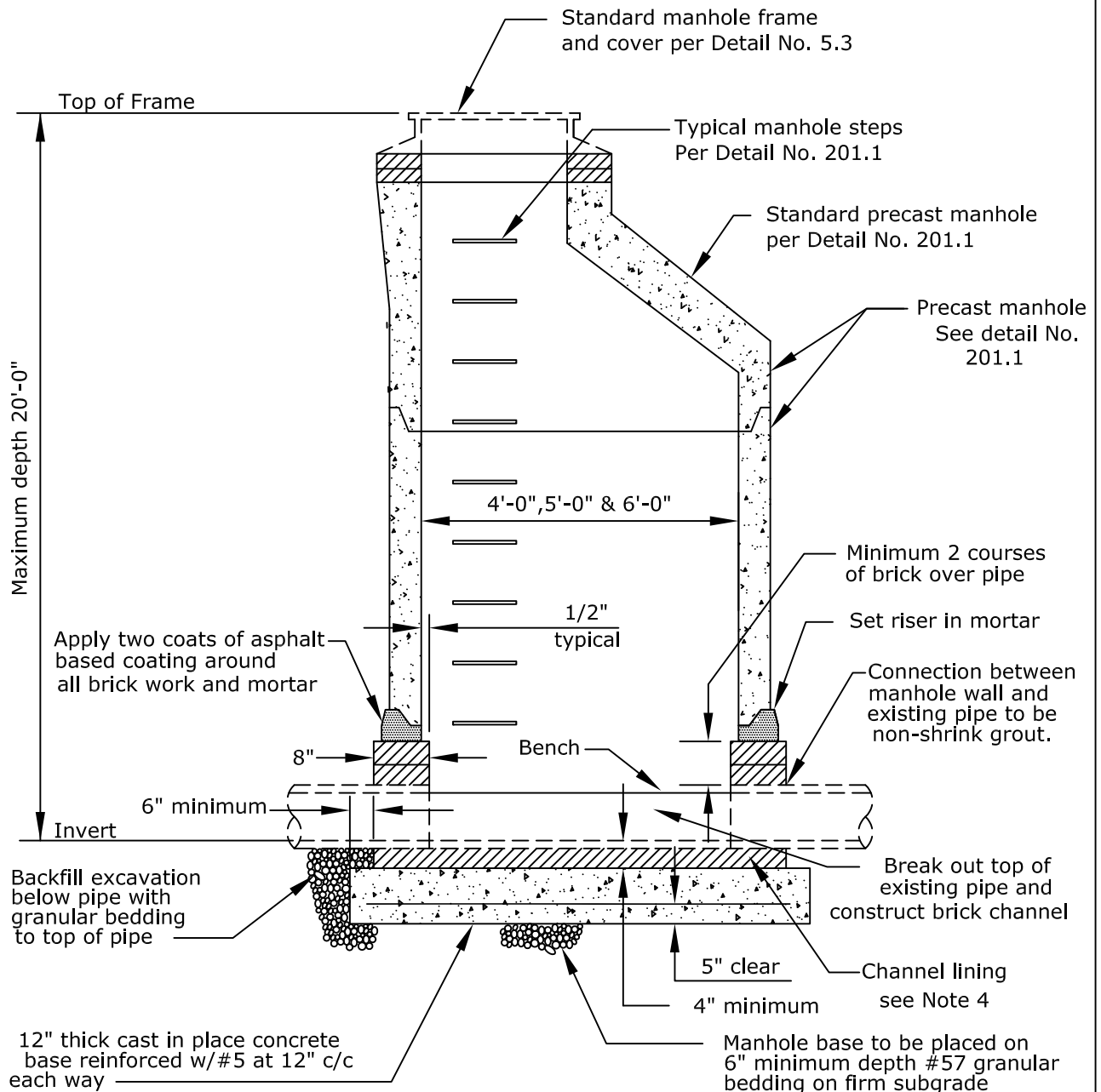
1. Manhole maximum depth = 20'-0".
2. Channel must be constructed so as to allow "TV" equipment to be pulled through manhole.

|                                                                                                                      |           |      |                                                  |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|--------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Precast Manhole<br>Built on Existing<br>PVC Pipe | Detail No.<br><br>201.4 |
|                                                                                                                      | Date      | Note |                                                  |                         |
|                                                                                                                      | .         | .    |                                                  | Date:                   |
|                                                                                                                      | .         | .    |                                                  | 01-24-2013              |
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**Notes:**

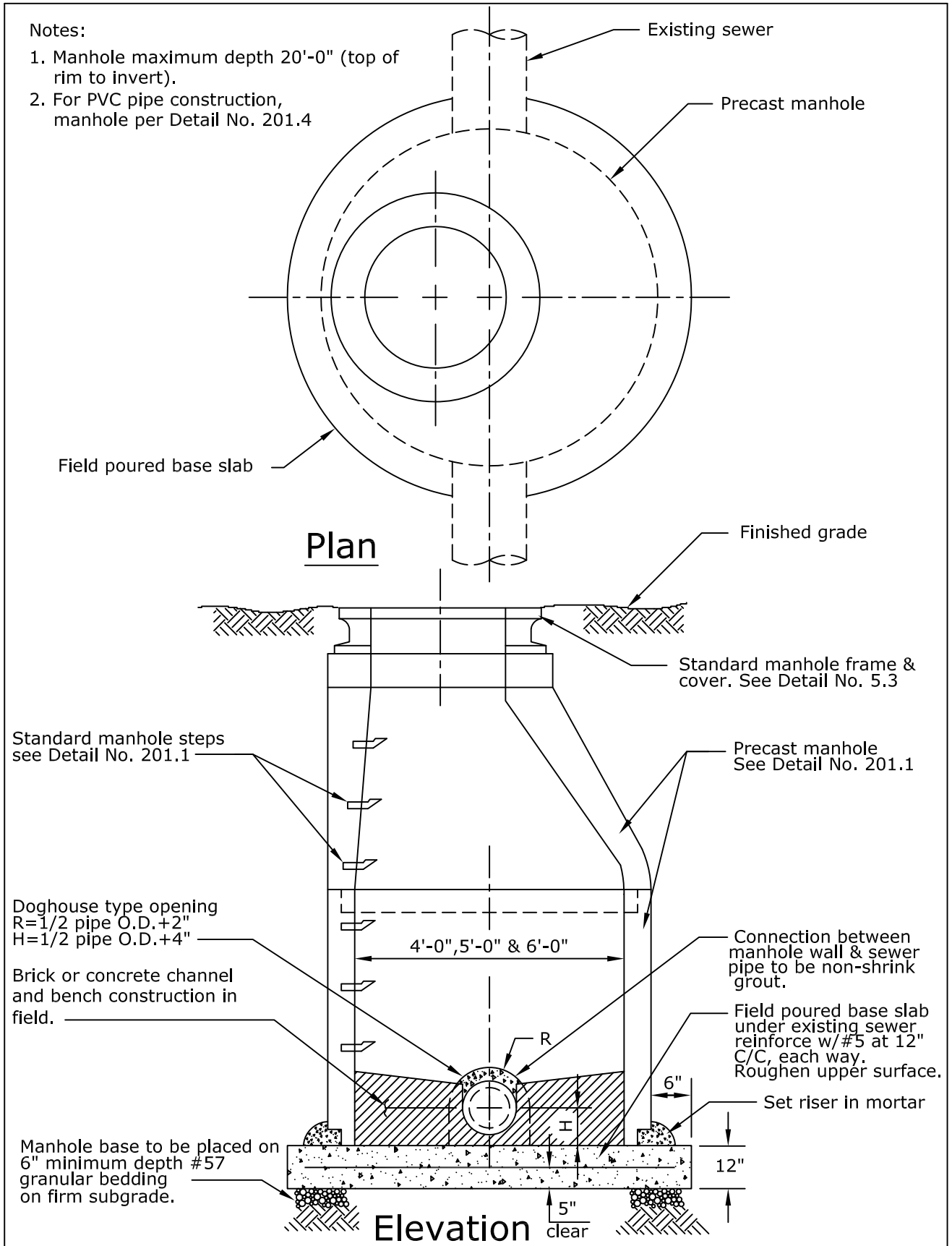
1. Manhole maximum depth 20'-0".
2. For P.V.C. pipe, construct manhole per detail No. 201.4.
3. Engineer may at his option allow precast variation of detail shown. See Detail No. 201.6.
4. Channel must be constructed to permit "TV" equipment to be pulled through manhole.



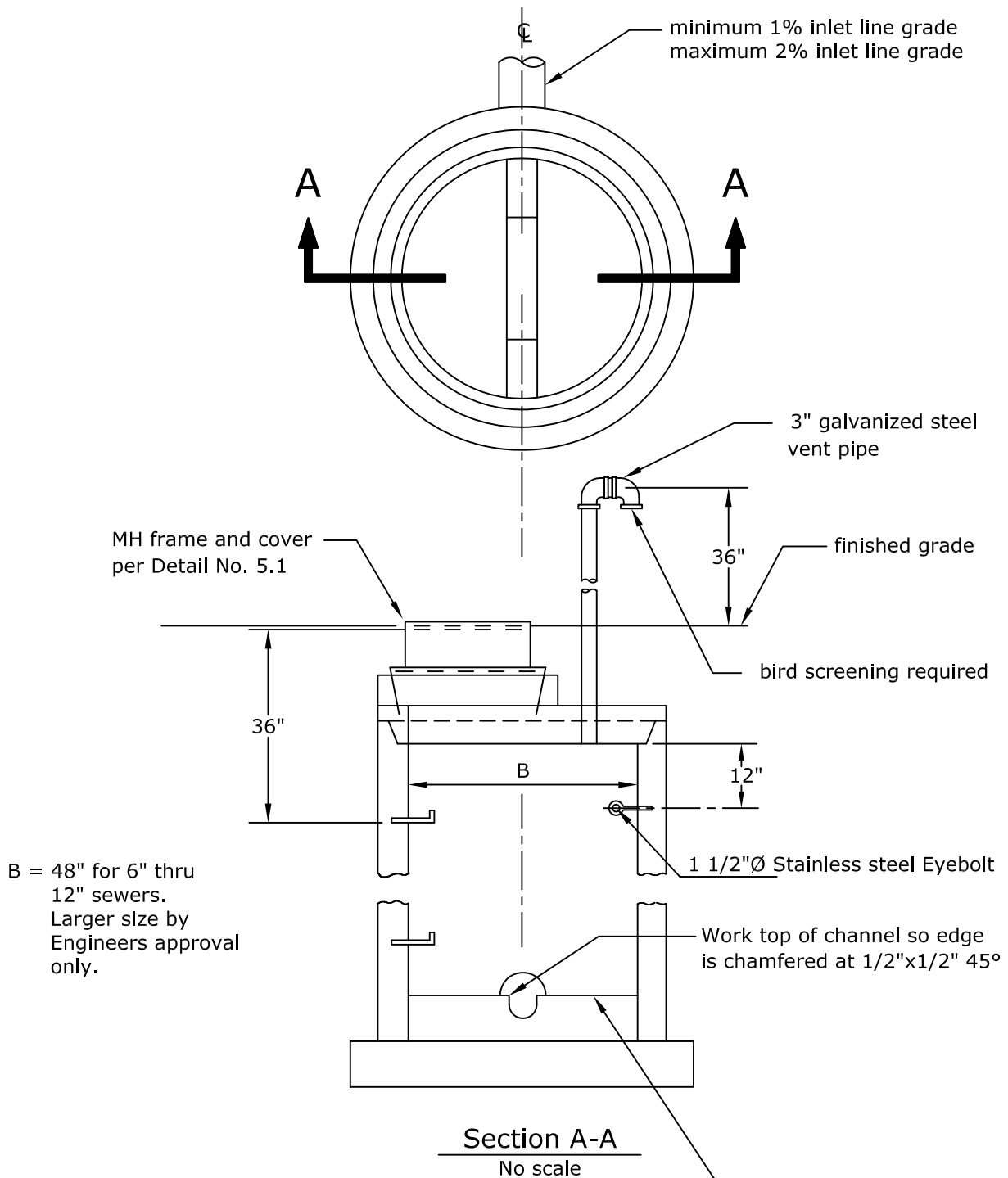
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|----------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Precast Concrete<br>Manhole Built Over<br>Existing Sewer Type 1 | Detail No.<br><br>201.5 |
|                                                                                                                      | Date      | Note |                                                                 |                         |
|                                                                                                                      | .         | .    |                                                                 | Date:<br>01-24-2013     |
|                                                                                                                      | .         | .    |                                                                 |                         |
|                                                                                                                      | .         | .    |                                                                 |                         |
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**Notes:**

1. Manhole maximum depth 20'-0" (top of rim to invert).
2. For PVC pipe construction, manhole per Detail No. 201.4



|                                                                                                                      |           |      |                                                                  |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|------------------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Precast Concrete<br>Manhole Built Over<br>Existing Sewer Type II | Detail No.<br><br>201.6 |
|                                                                                                                      | Date      | Note |                                                                  |                         |
|                                                                                                                      | .         | .    |                                                                  | Date:<br>01-24-2013     |
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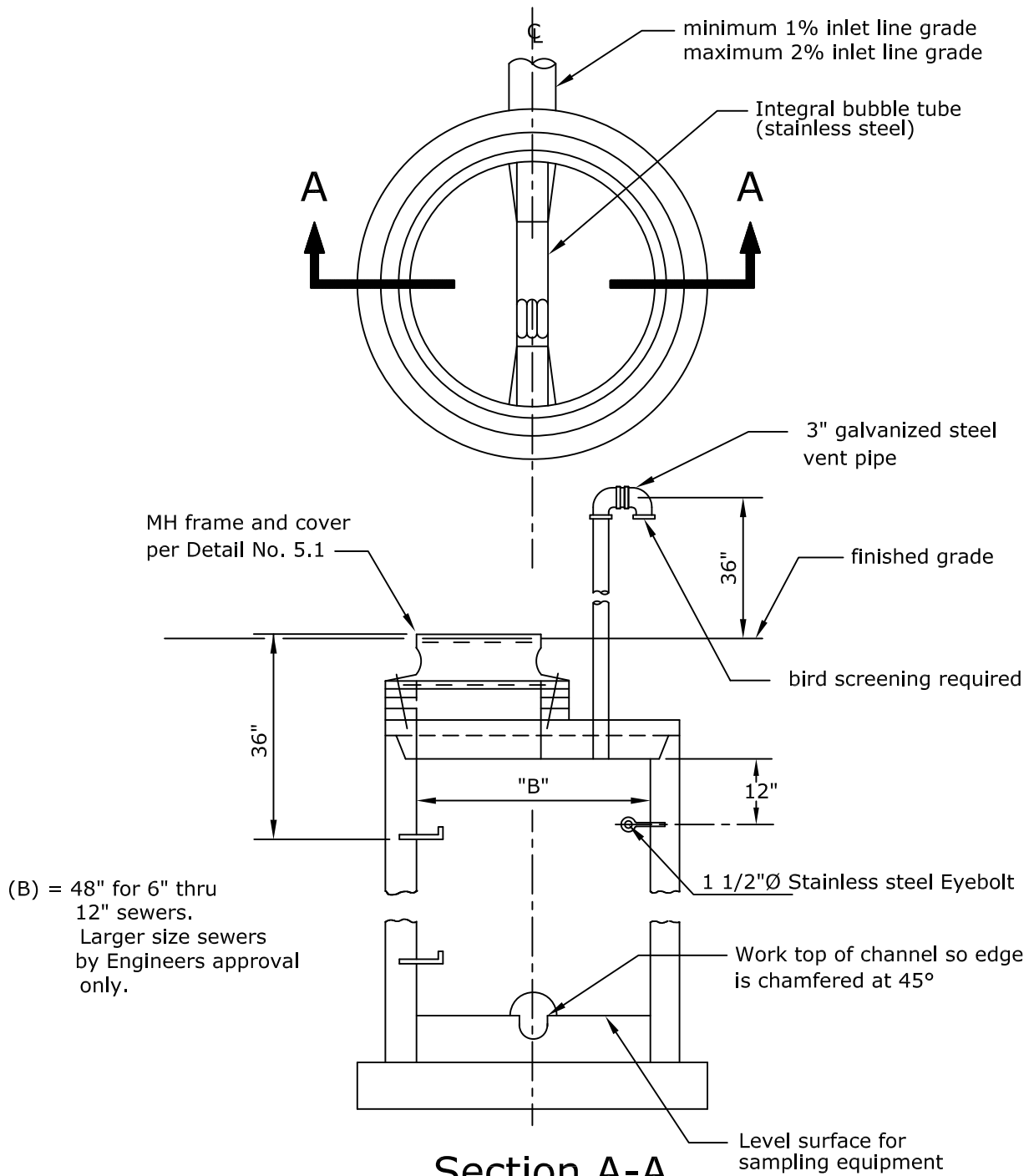


B = 48" for 6" thru 12" sewers.  
Larger size by Engineers approval only.

**Notes:**

1. Channel grade thru manhole must be at 0.0%.
2. Flow must be stabilized (straight pipe) a minimum of 25 pipe diameters before entering the manhole.
3. Incoming flow must be under gravity flow.
4. Locate manholes in non-traffic areas.
5. See shallow manhole Detail 201.3 for specific design details.

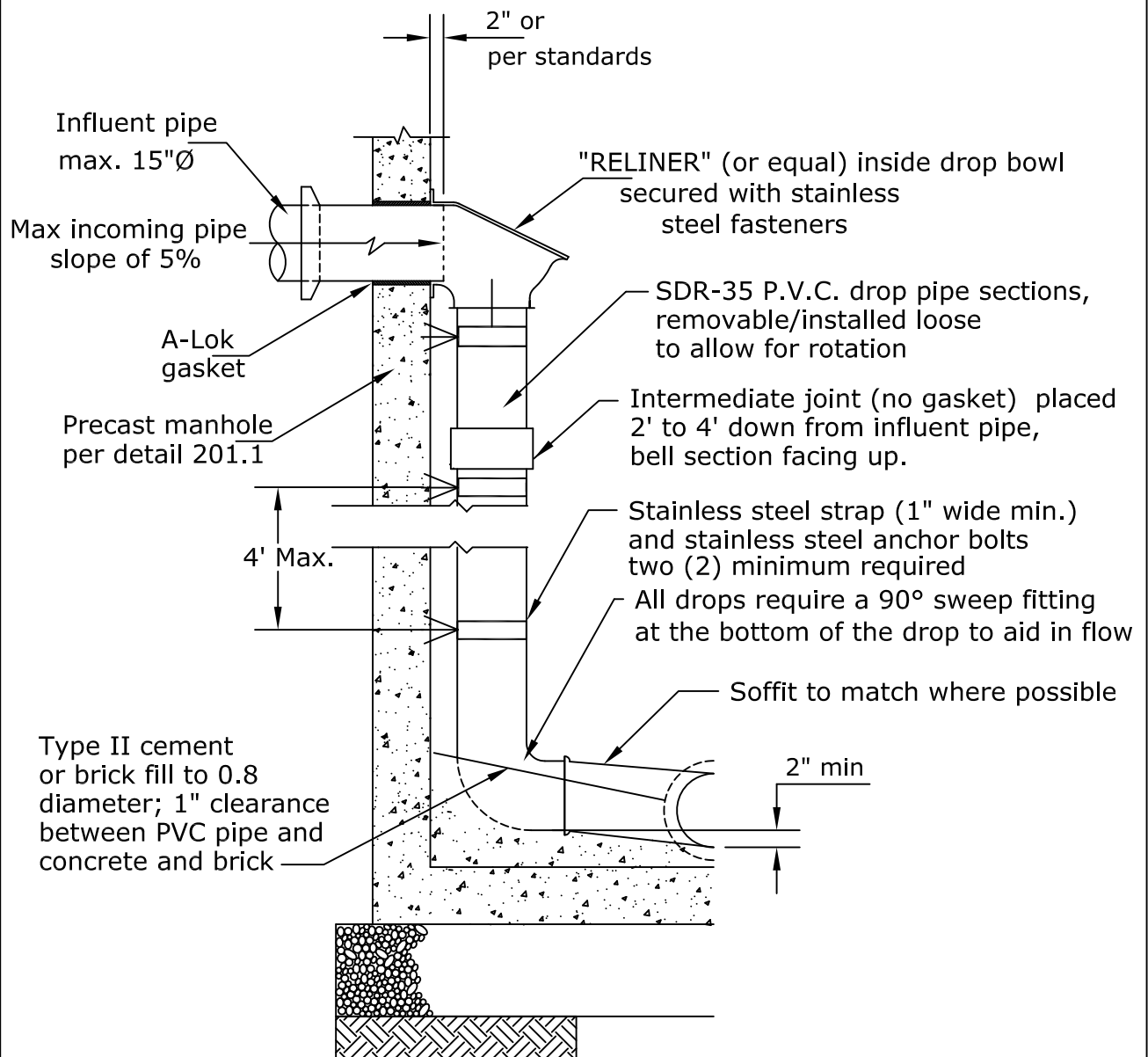
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| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Type I (Without Flume)<br><br>Industrial Monitoring Manhole | Detail No.<br><br>201.7 |
|                                                                                                                      | Date      | Note |                                                             |                         |
|                                                                                                                      | .         | .    |                                                             | Date:<br>01-24-2013     |
|                                                                                                                      | .         | .    |                                                             |                         |
|                                                                                                                      | .         | .    |                                                             |                         |



**Notes:**

1. Channel grade thru manhole must be at 0.0%.
2. Flow must be stabilized (straight pipe) a minimum of 25 pipe diameters before entering the manhole.
3. Incoming flow must be under gravity flow.
4. Sizing of flume must be based on volume of flow not diameter of incoming pipe.
5. Locate manholes in non-traffic areas.
6. See shallow manhole Detail No. 201.3 for specific design details.
7. Type II manhole only for larger industrial users with a DUSWM approval.

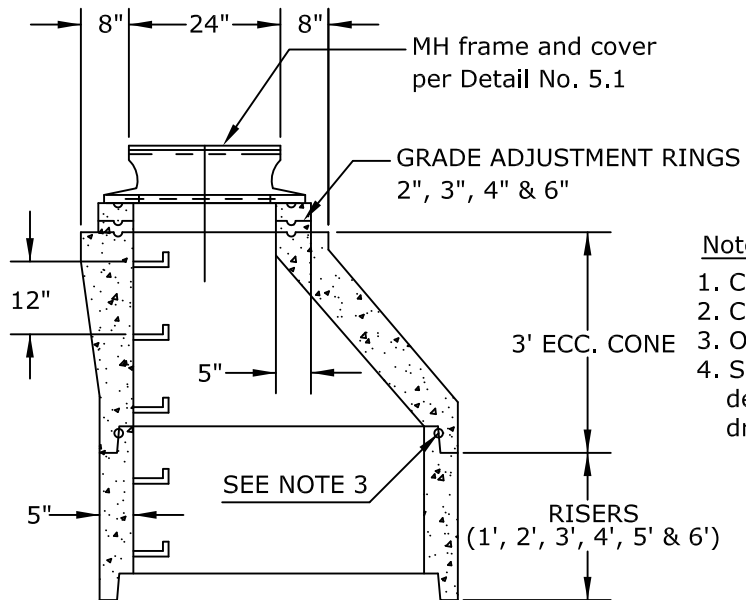
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| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Type II (With Flume)<br><br>Industrial Monitoring Manhole | Detail No.<br><br>201.8 |
|                                                                                                                      | Date      | Note |                                                           |                         |
|                                                                                                                      | .         | .    |                                                           | Date:<br>01-24-2013     |
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Notes:

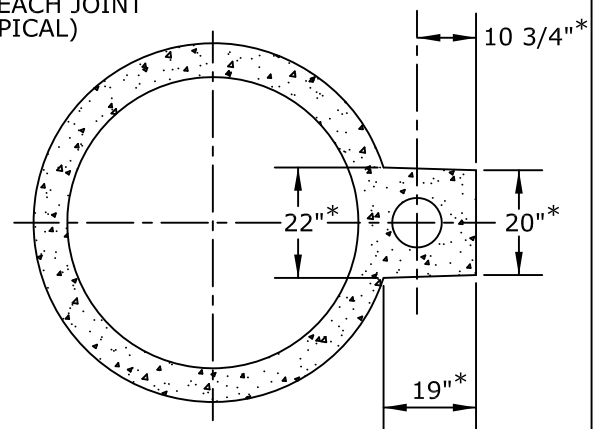
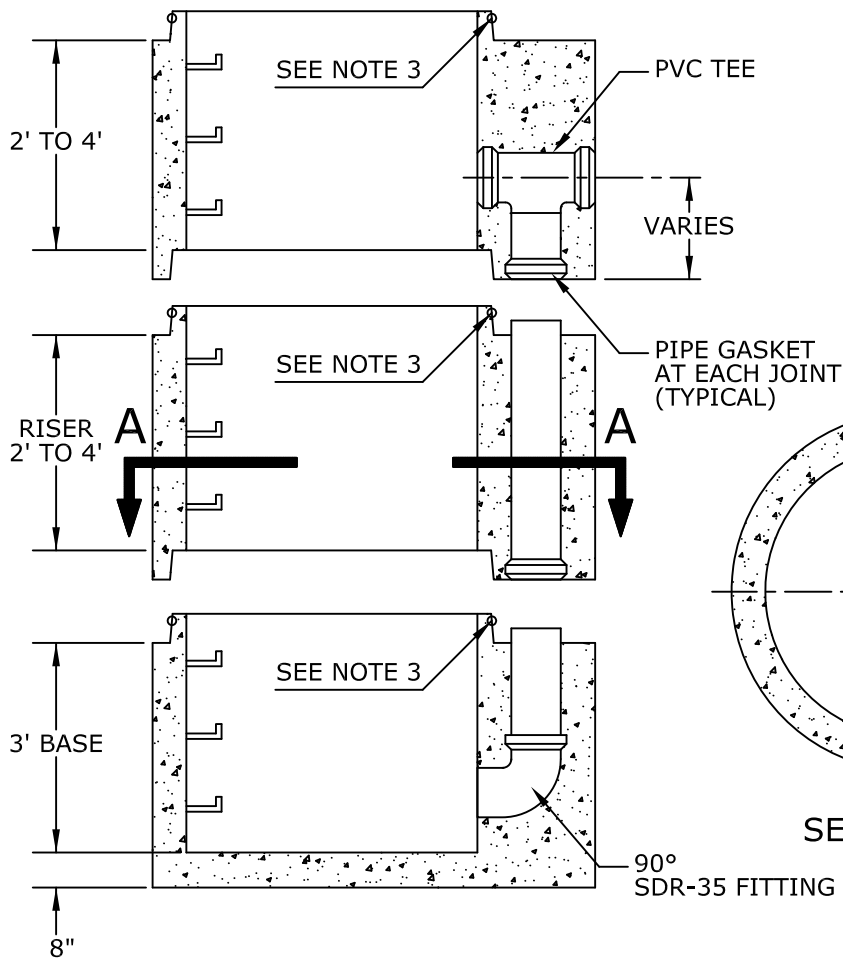
1. 48" diameter Manhole may be used with one (1) 8" inside drop.
2. 72" diameter Manhole required when two (2) or more inside drops.
3. Drop pipe dia. same as incoming pipe dia. (up to 8"Ø), for larger pipe downsize the drop pipe dia.

|                                                                                                                      |           |      |                        |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Inside<br>Drop Manhole | Detail No.<br><br>202.1 |
|                                                                                                                      | Date      | Note |                        |                         |
|                                                                                                                      | .         | .    |                        | Date:                   |
|                                                                                                                      | .         | .    |                        | 01-24-2013              |
|                                                                                                                      | .         | .    |                        |                         |



Notes:

1. Concrete 4,500 P.S.I. at 28 days min.
2. Conforms to ASTM C-478.
3. O-ring joints meet ASTM C-443.
4. See detail No. 201.1 for manhole details other than the precast drop manhole.



SECTION A-A

\* Dimensions for 8"Ø pipe must be adjusted for other diameters.

Frederick County  
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| Revisions |      |
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| Date      | Note |
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Precast  
Outside Drop Manhole

Detail No.

202.2

Date:  
01-24-2013

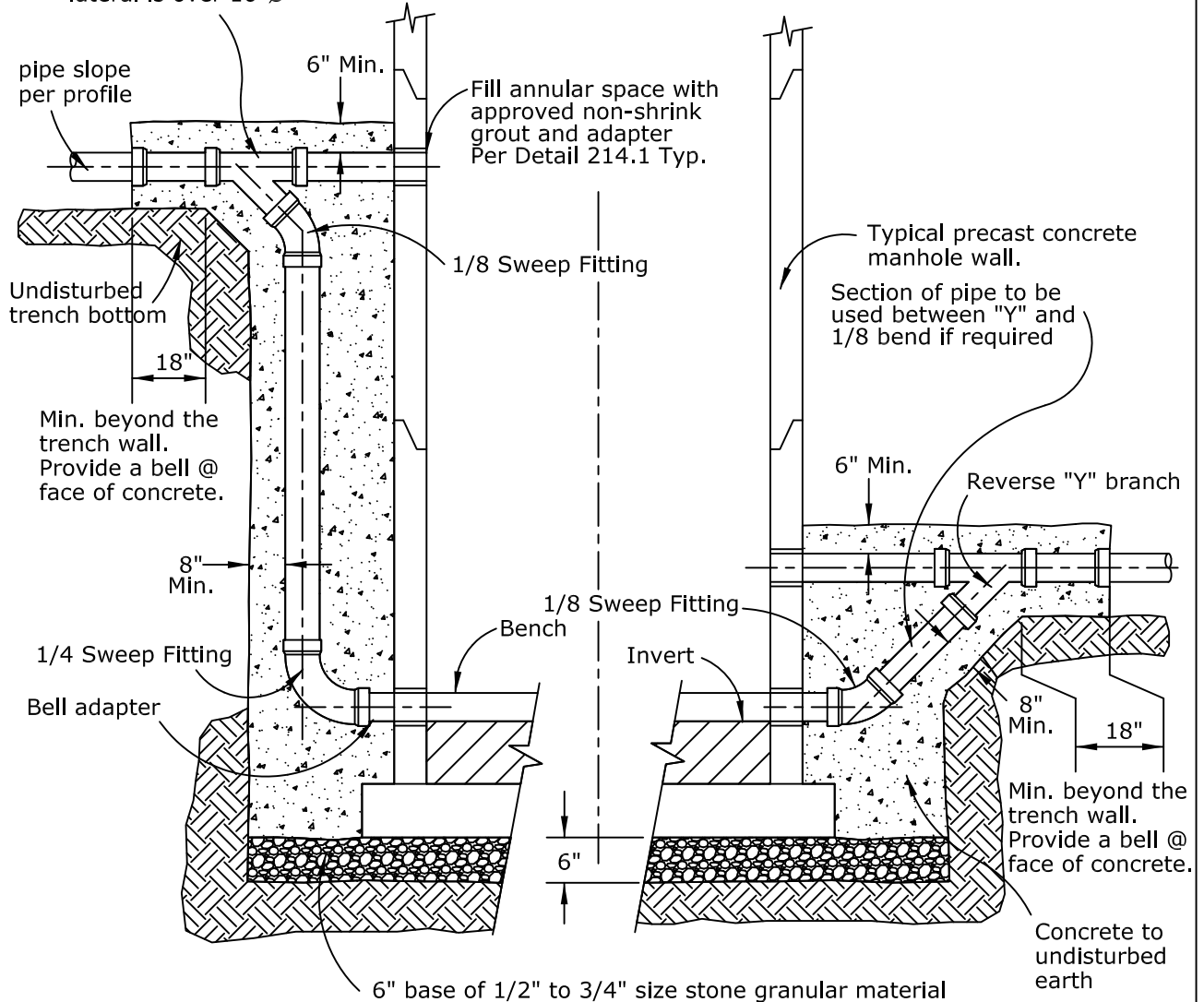
# Drop Connections

| Nom.<br>Pipe Ø | Type "E"  |           | Type "F"  |
|----------------|-----------|-----------|-----------|
|                | Max. Drop | Min. Drop | Min. Drop |
| 6"-8"          | 3'-9"     | 1'-9"     | 3'-9"     |
| 10"            | 4'-0"     | 2'-0"     | 4'-0"     |
| 12"            | 6'-0"     | 2'-6"     | 6'-0"     |
| 15"            | 6'-0"     | 2'-6"     | 6'-0"     |

## Notes:

1. P.V.C. pipe shall be provided as per the "General Conditions and Standard Specifications."
2. All fittings shall be the same type of material as that used for the main lines.
3. Concrete shall be MSHA mix no.1.

Reverse "Y" branch  
Reduce one size where  
lateral is over 10"Ø

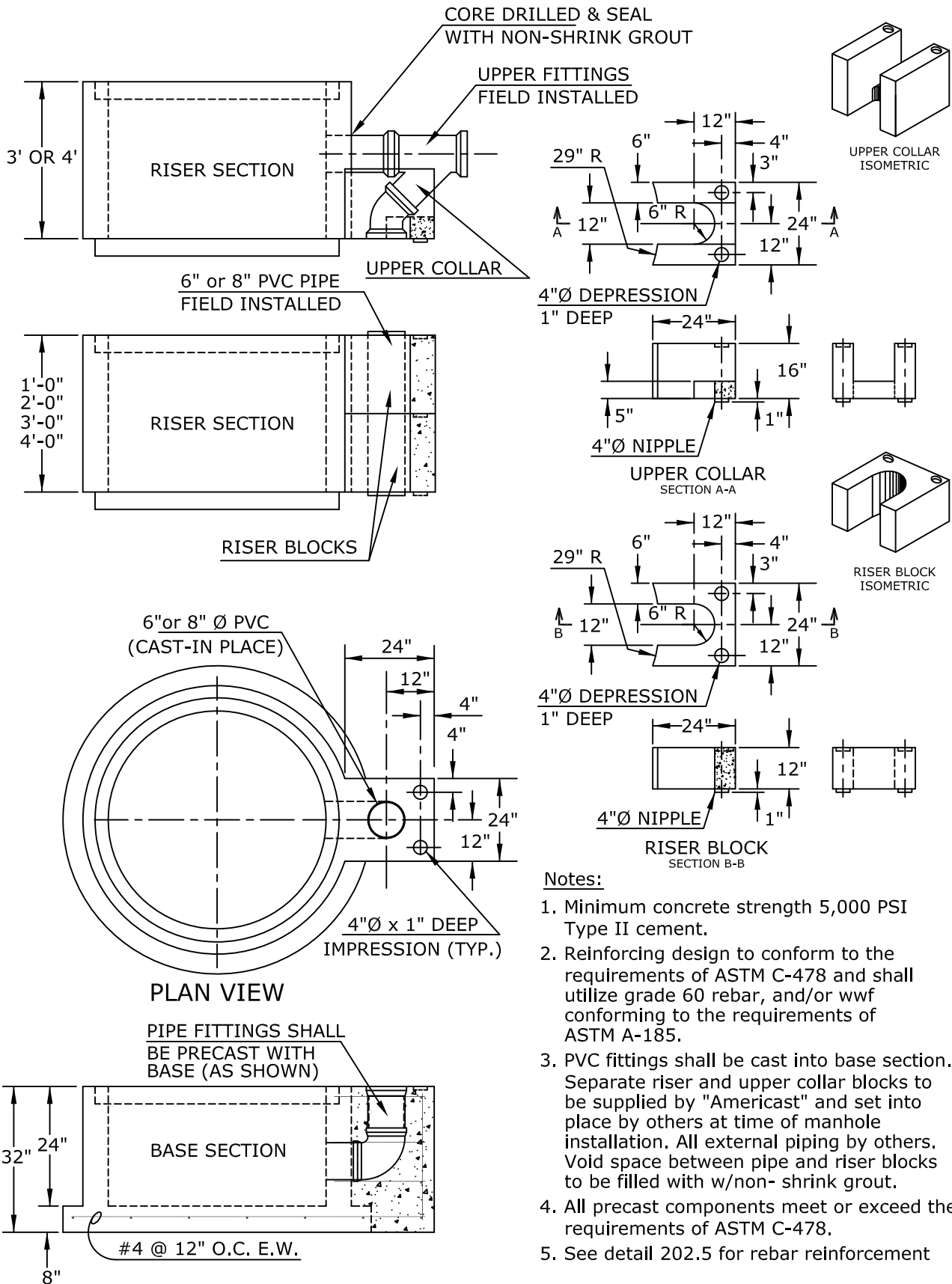


Type "F" Drop

Type "E" Drop

Note: 6" sewer service connection slope shall be 2%-5%.

|                                                                                                                  |           |      |                                         |            |
|------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------------|------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Outside Drop Manhole<br>Types "E" & "F" | Detail No. |
|                                                                                                                  | Date      | Note |                                         | 202.3      |
|                                                                                                                  |           |      |                                         | Date:      |
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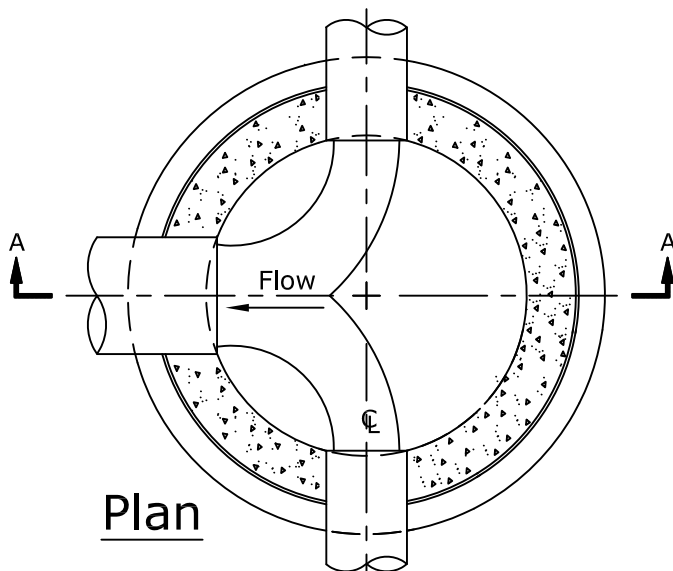


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| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Precast<br>Outside Drop Manhole<br>6" & 8" PVC Sewer lines Only | Detail No.<br><br>202.4 |
|                                                                                                                  | Date      | Note |                                                                 |                         |
|                                                                                                                  | .         | .    |                                                                 | Date:                   |
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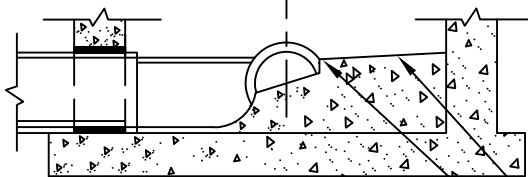




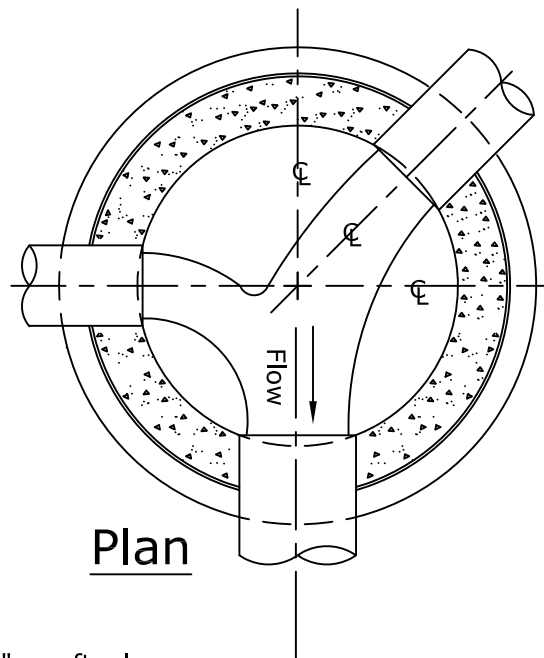
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| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Rebar Placement<br>6" & 8" PVC In Risers | Detail No. |
|                                                                                                                      | Date      | Note |                                          | 202.5      |
|                                                                                                                      | .         | .    |                                          |            |
|                                                                                                                      | .         | .    |                                          |            |
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Plan



Section A-A

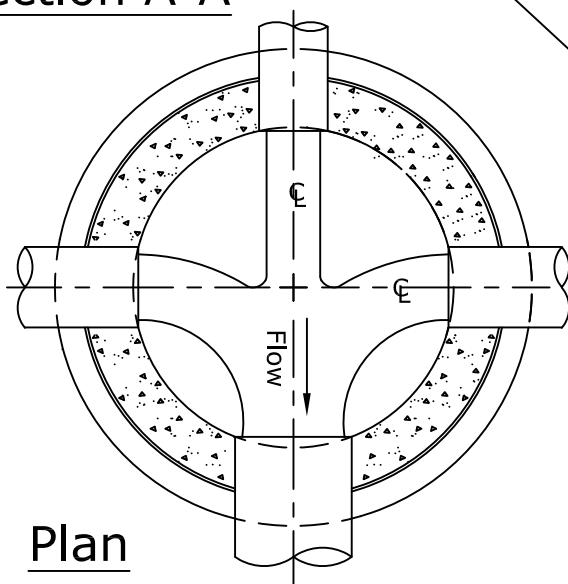


Plan

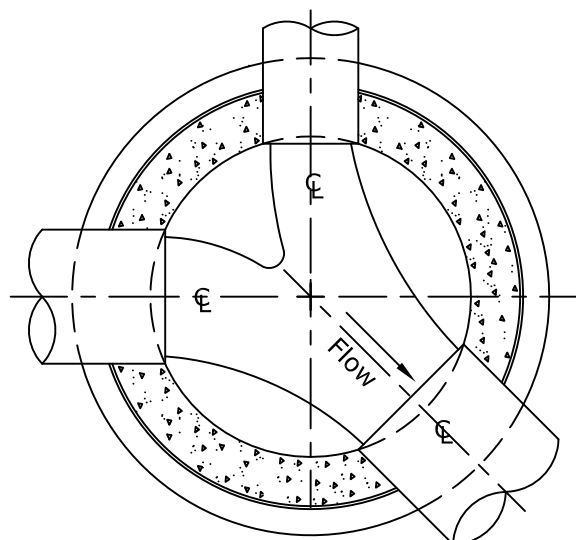
3/4" per ft. slope

Bench to crown of pipe but not to overhang the channel.

Tie-in at an existing MH will require bench and channel reworked to meet this detail.



Plan



Plan

Channels shall be constructed using a template to ensure that channel cross-section will allow insertion of testing, cleaning and inspection equipment.

Inside diameter of MH's is either 48" or 72".

Conc. channels shall be Md. S.H.A. mix No.1 with type II cement and GP aggregate.

Frederick County  
Division of Utilities &  
Solid Waste Management  
Department of  
Engineering & Planning

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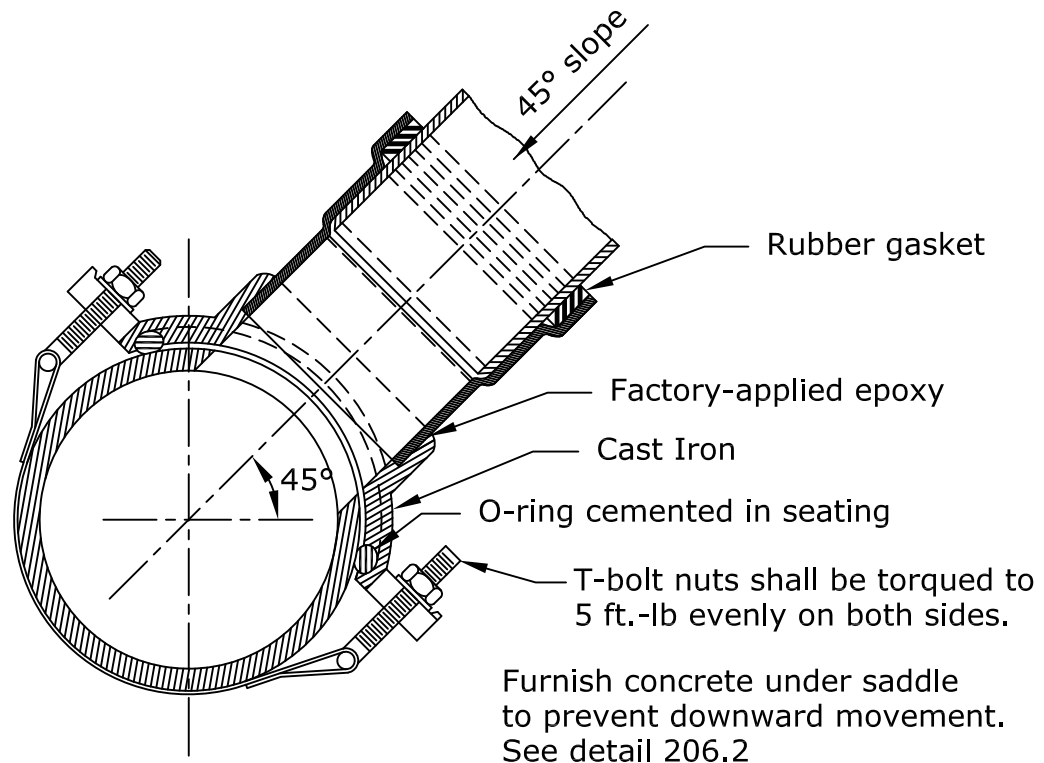
Channel Layout  
for Sewer Manhole  
Bases

Detail No.

203.1

Date:

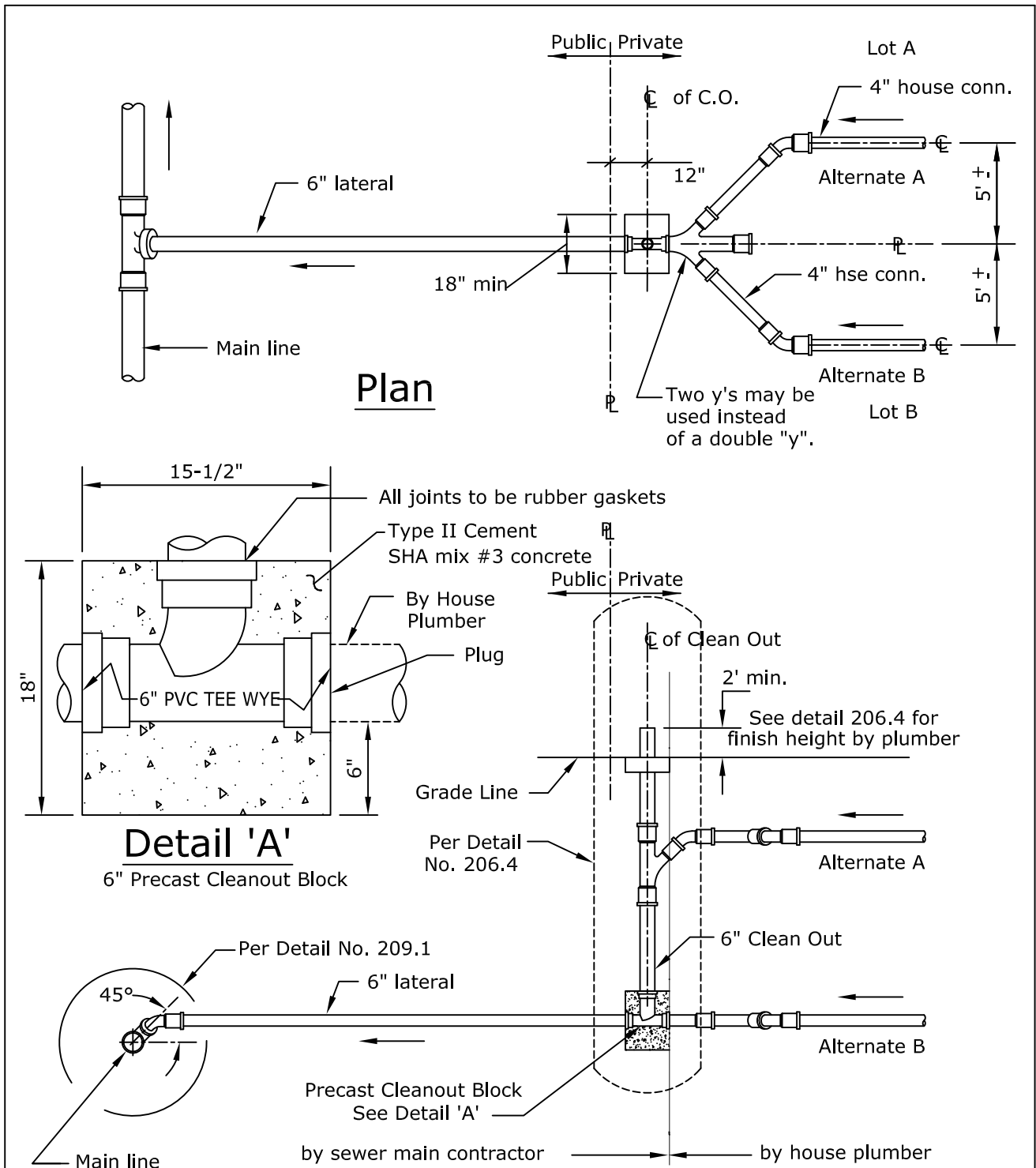
01-24-2013



## Existing Mains 6" thru 12"

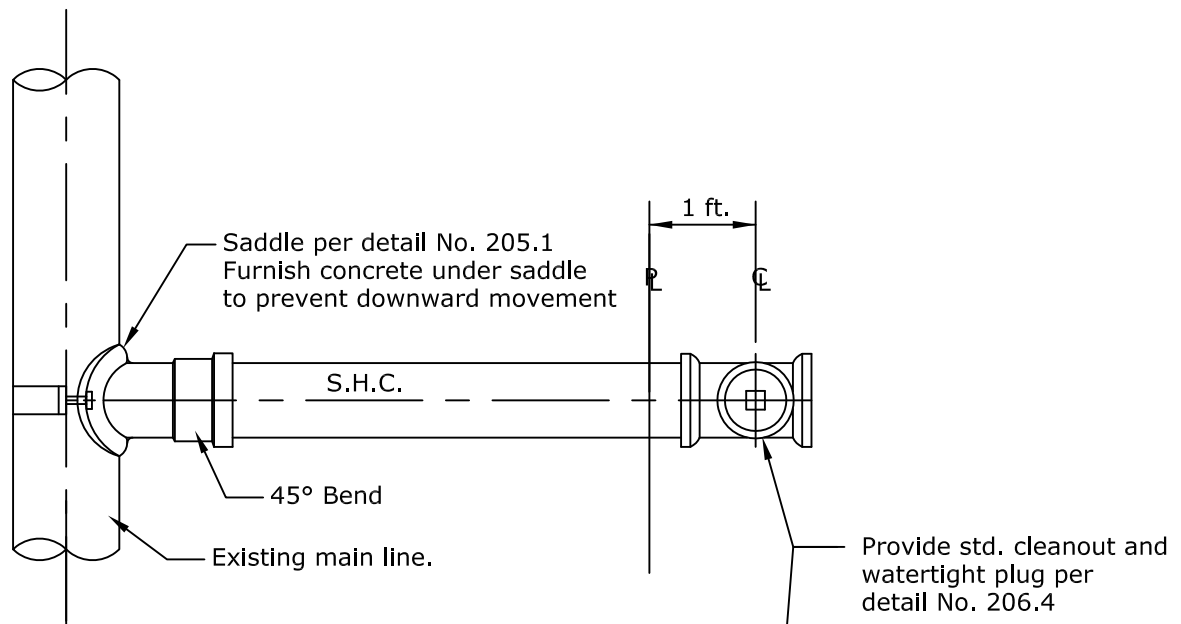
Opening in existing pipe wall shall be cored and Coupon given to inspector.  
Saddle shall be for use with the two sizes and types of pipe being joined as manufactured by Sealtite 8 The General Engineering Co. or equal.

|                                                                                                                      |           |      |                                                                      |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|----------------------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Saddle to Connect House<br>Connection to Existing<br>Main Line Sewer | Detail No.<br><br>205.1 |
|                                                                                                                      | Date      | Note |                                                                      |                         |
|                                                                                                                      | .         | .    |                                                                      | Date:<br>01-24-2013     |
|                                                                                                                      | .         | .    |                                                                      |                         |
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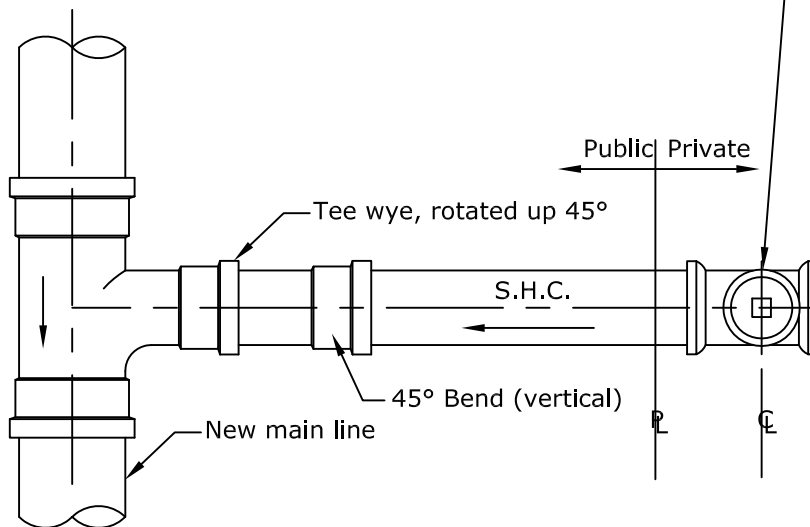


- 1) The double house connection shown can be connected to type A, B, C, or D house drop connections.
- 2) House sewer can be connected at point A or B.
- 3) Precast cleanout block shall be from Pre-Approved materials list or submitted for engineer approval.
- 4) Doubles only allowed for townhouses.
- 5) Pannella cap to be used on all installations.

|                                                                                                                  |           |      |                                   |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Type A Double<br>House Connection | Detail No.<br><br>206.1 |
|                                                                                                                  | Date      | Note |                                   |                         |
|                                                                                                                  | .         | .    |                                   | Date:                   |
|                                                                                                                  | .         | .    |                                   | 01-24-2013              |
|                                                                                                                  | .         | .    |                                   |                         |



## Adding Lateral to Existing Main - Plan

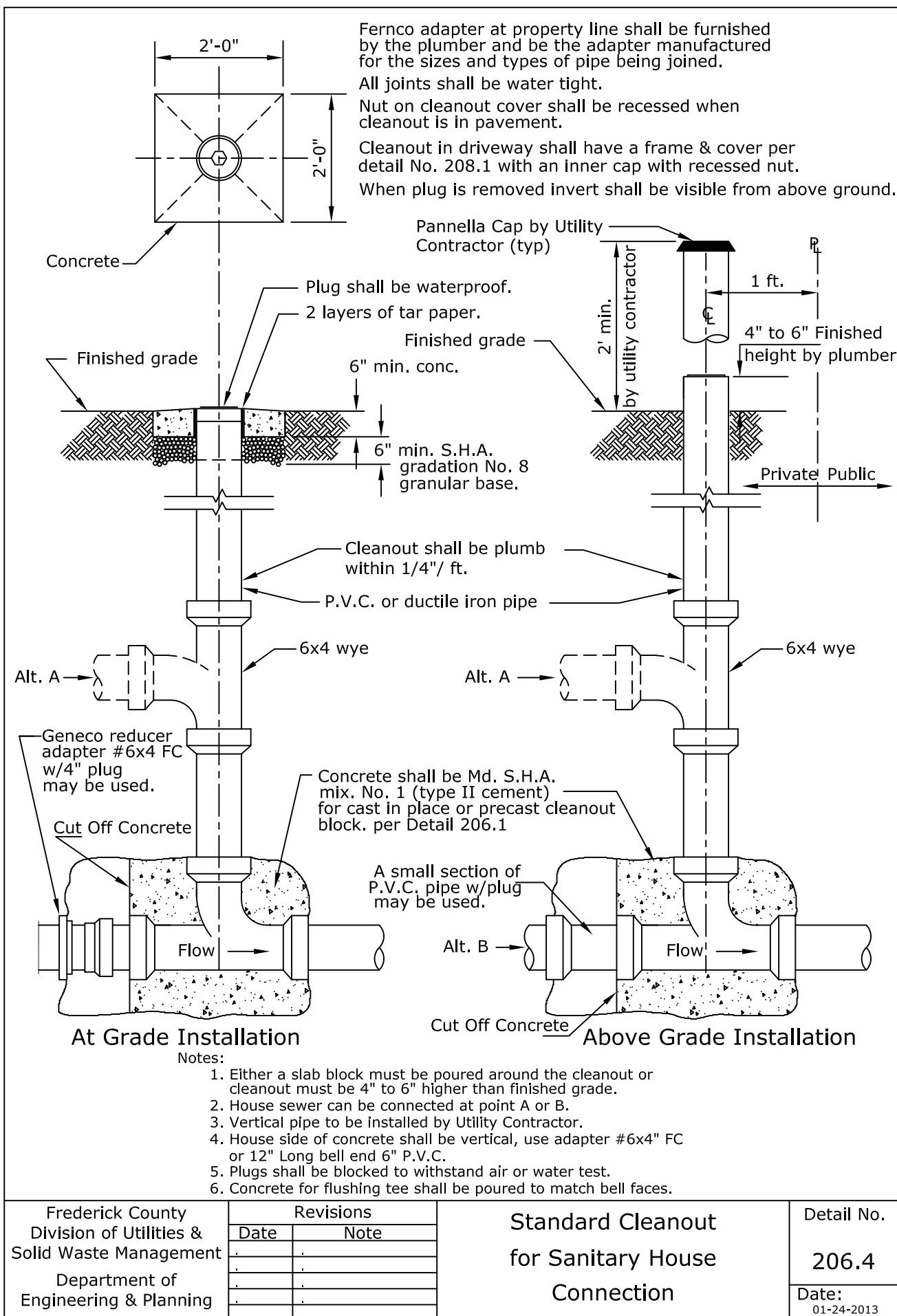


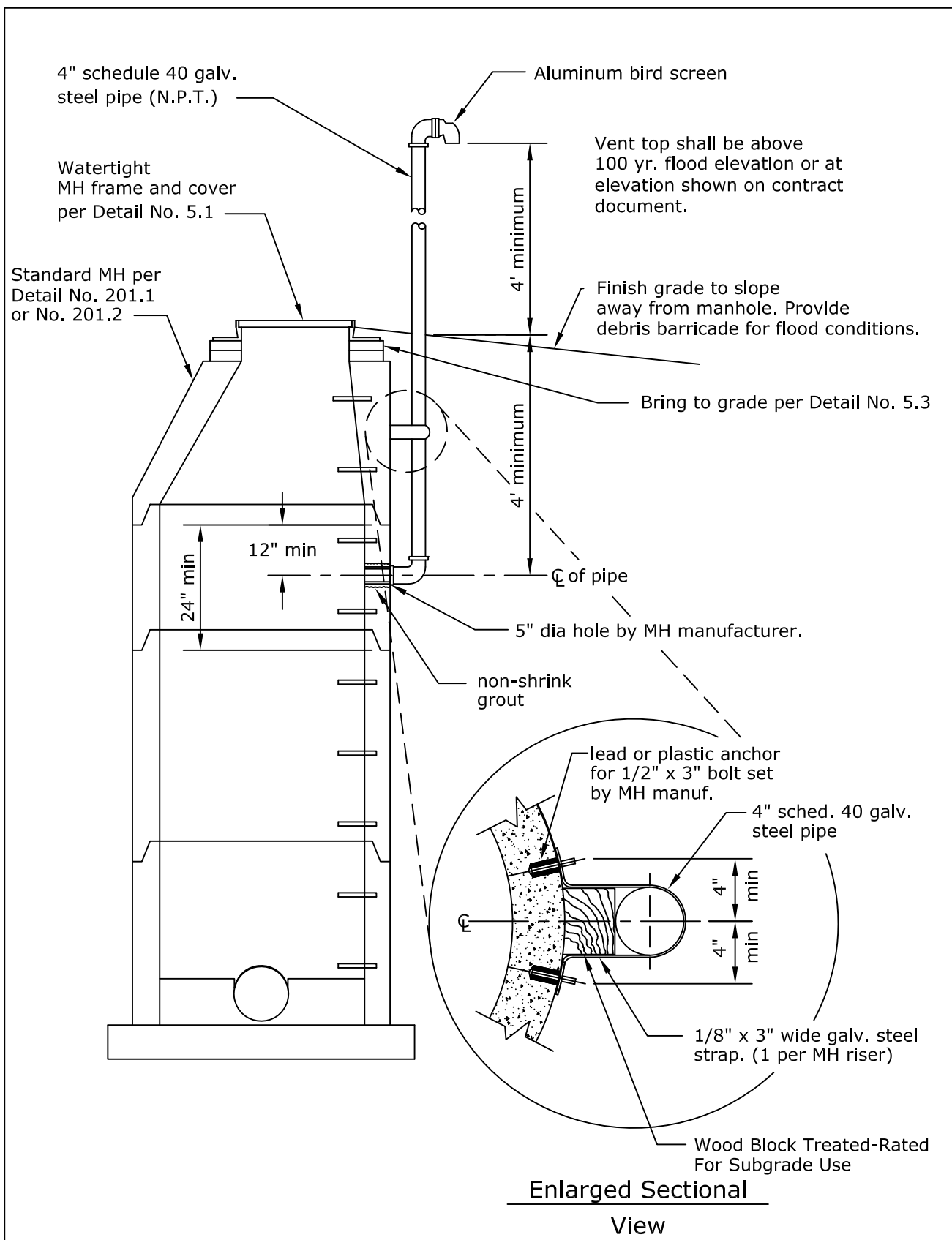
## New Construction - Plan

### Notes:

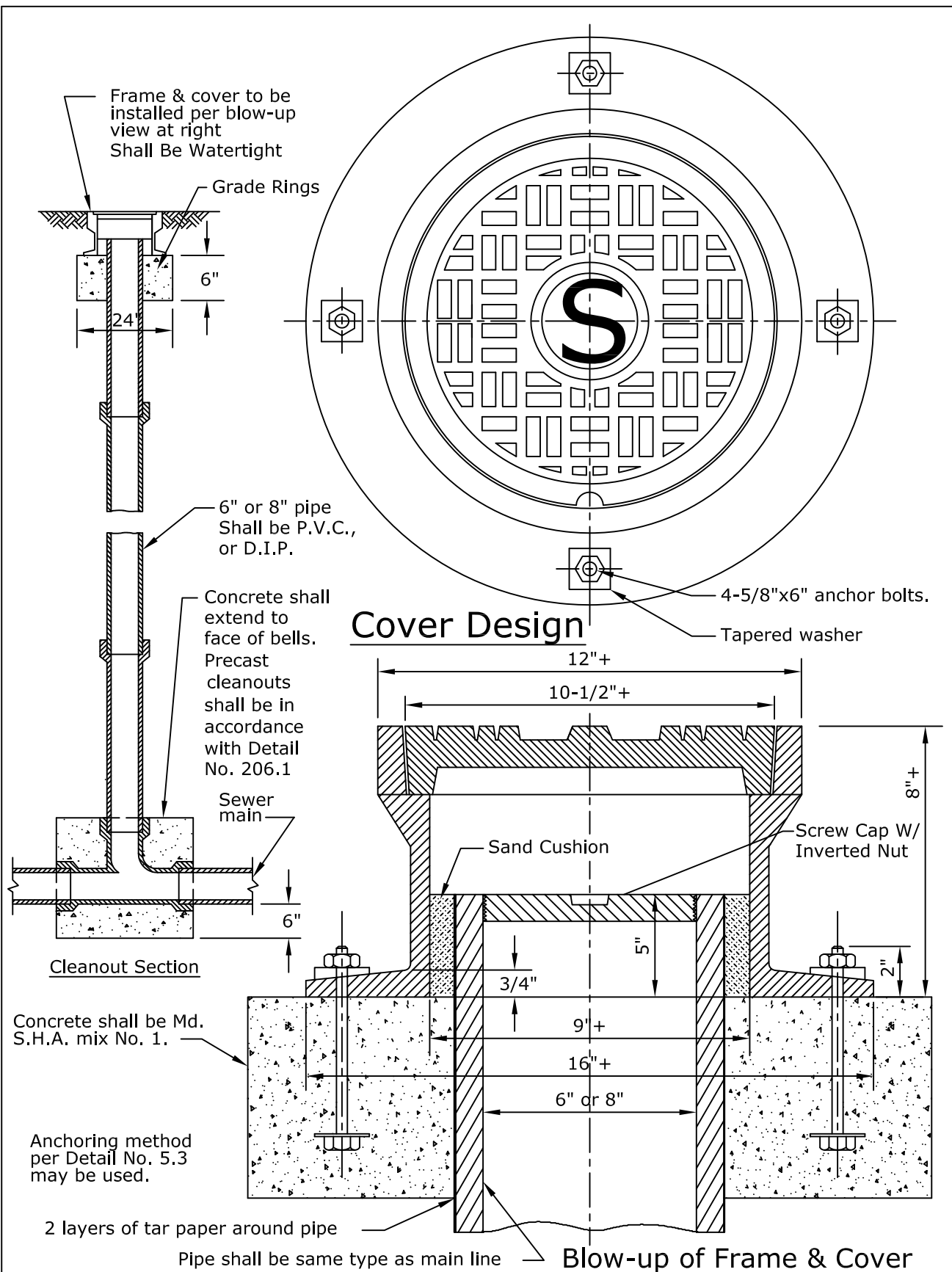
1. Abbreviation for sewer service connection is S.H.C.
2. S.H.C. to be laid at a minimum 2% - maximum 5%, per section 2570, III.C.

|                                                                                                                  |           |      |                                        |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|----------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | House Connection<br>Fittings for Sewer | Detail No.<br><br>206.2 |
|                                                                                                                  | Date      | Note |                                        |                         |
|                                                                                                                  | .         | .    |                                        | Date:<br>01-24-2013     |
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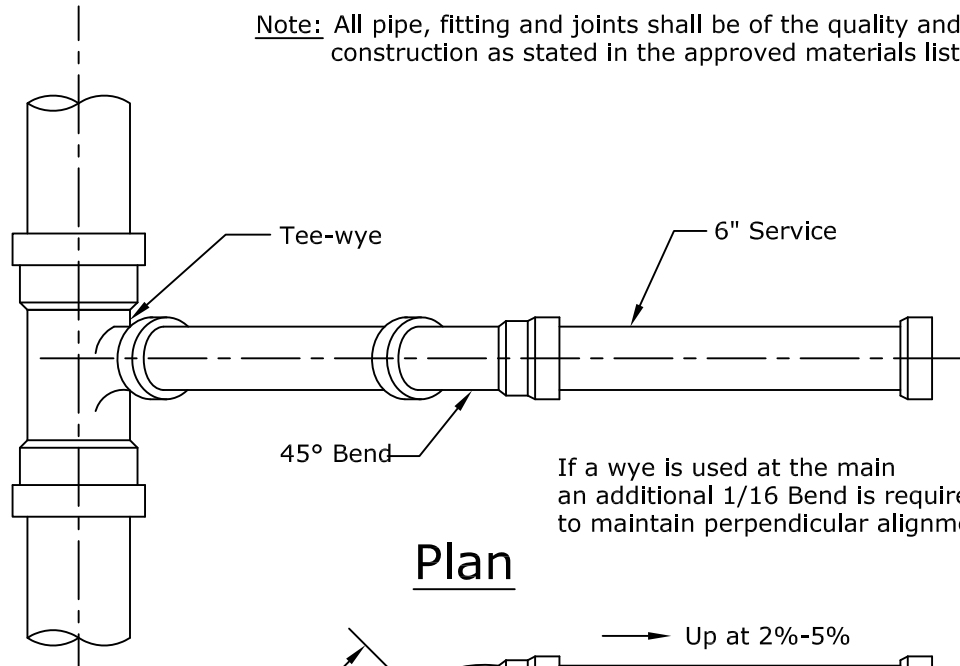
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|----------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Sewer Manhole<br>Vent | Detail No.<br><br>207.1 |
|                                                                                                                      | Date      | Note |                       |                         |
|                                                                                                                      | .         | .    |                       | Date:<br>01-24-2013     |
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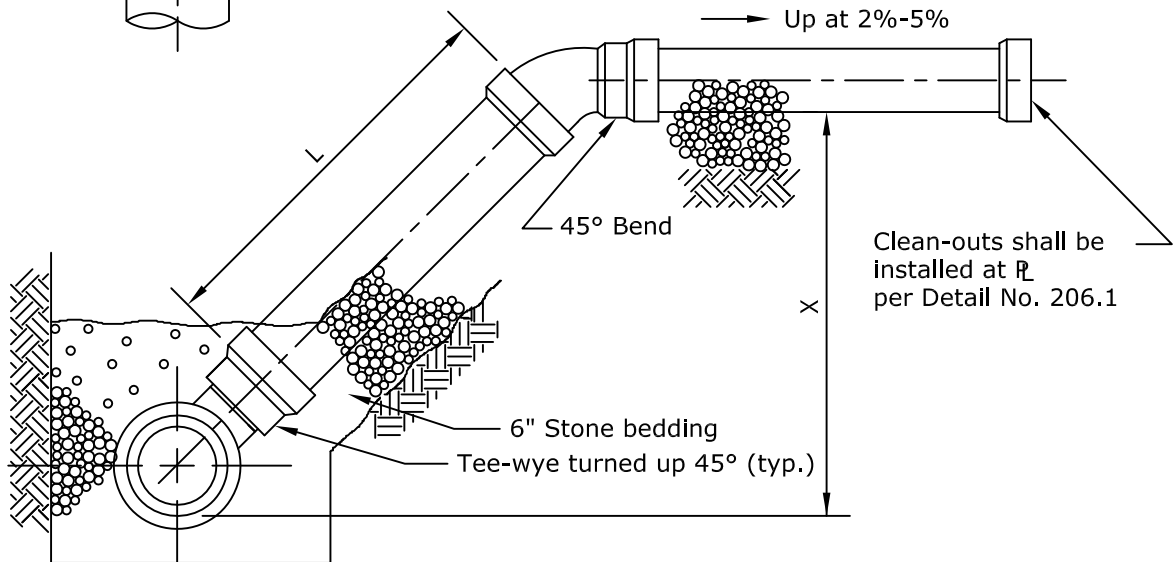
|                                                                                                                  |           |      |                                  |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|----------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Main Line Cleanout<br>(Lamphole) | Detail No.<br><br>208.1 |
|                                                                                                                  | Date      | Note |                                  |                         |
|                                                                                                                  |           |      |                                  | Date:<br>01-24-2013     |
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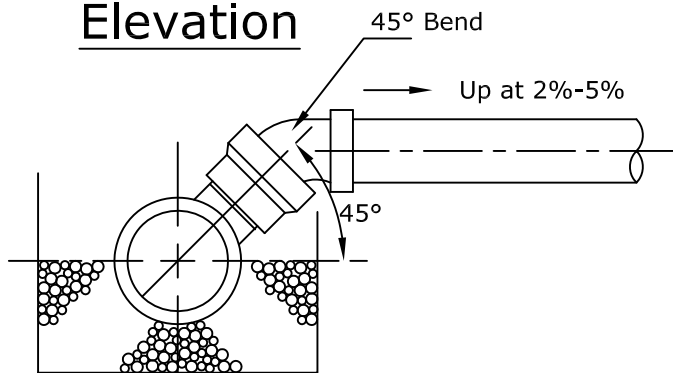
Note: All pipe, fitting and joints shall be of the quality and construction as stated in the approved materials list.



**Plan**



**Elevation**



Notes:

1. The "X" & "L" dimensions shall be determined in the field to meet the cleanout elevation required on contract drawing,

where:  $L = \sqrt{2} \left( X - \frac{D}{24} \right) - 0.75$

X = Difference in elevation between the invert of the service at the main and the invert of the 1/4 bend in feet.

L = Length of pipe in feet.

D = Diameter of sewer in inches.

**Standard Type "A"**

Frederick County  
Division of Utilities &  
Solid Waste Management  
Department of  
Engineering & Planning

| Revisions |      |
|-----------|------|
| Date      | Note |
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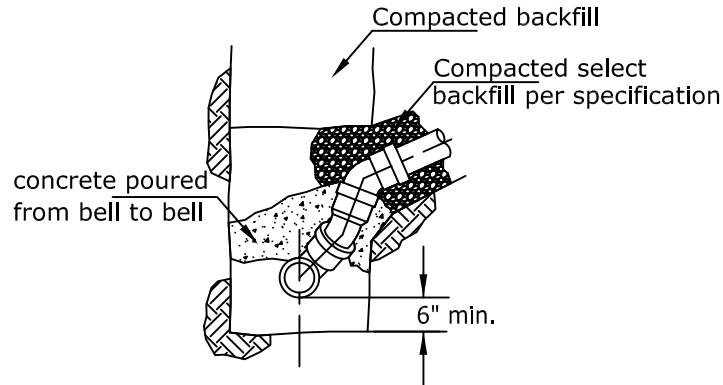
**Standard & Type A Drop  
House Connection**

Detail No.

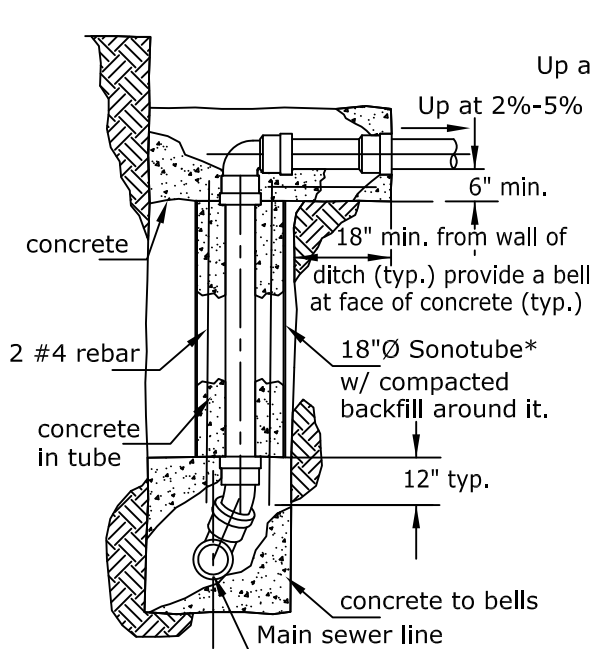
**209.1**

Date:

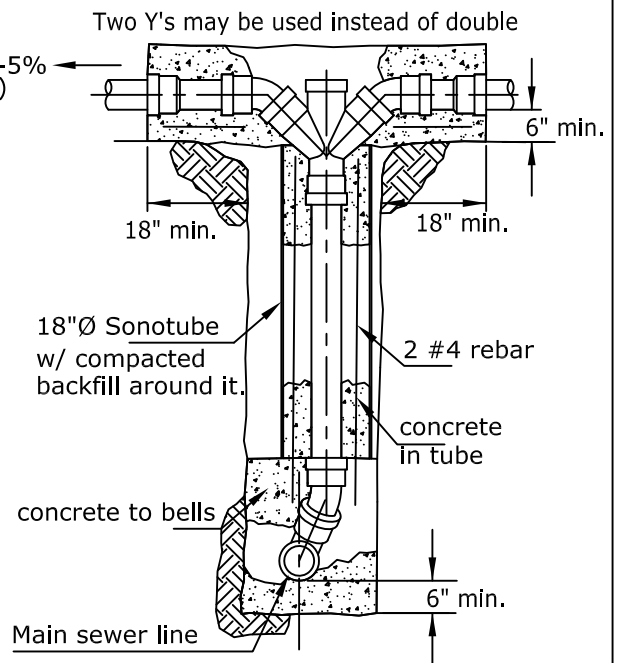
01-24-2013



Type "B"



Type "C"

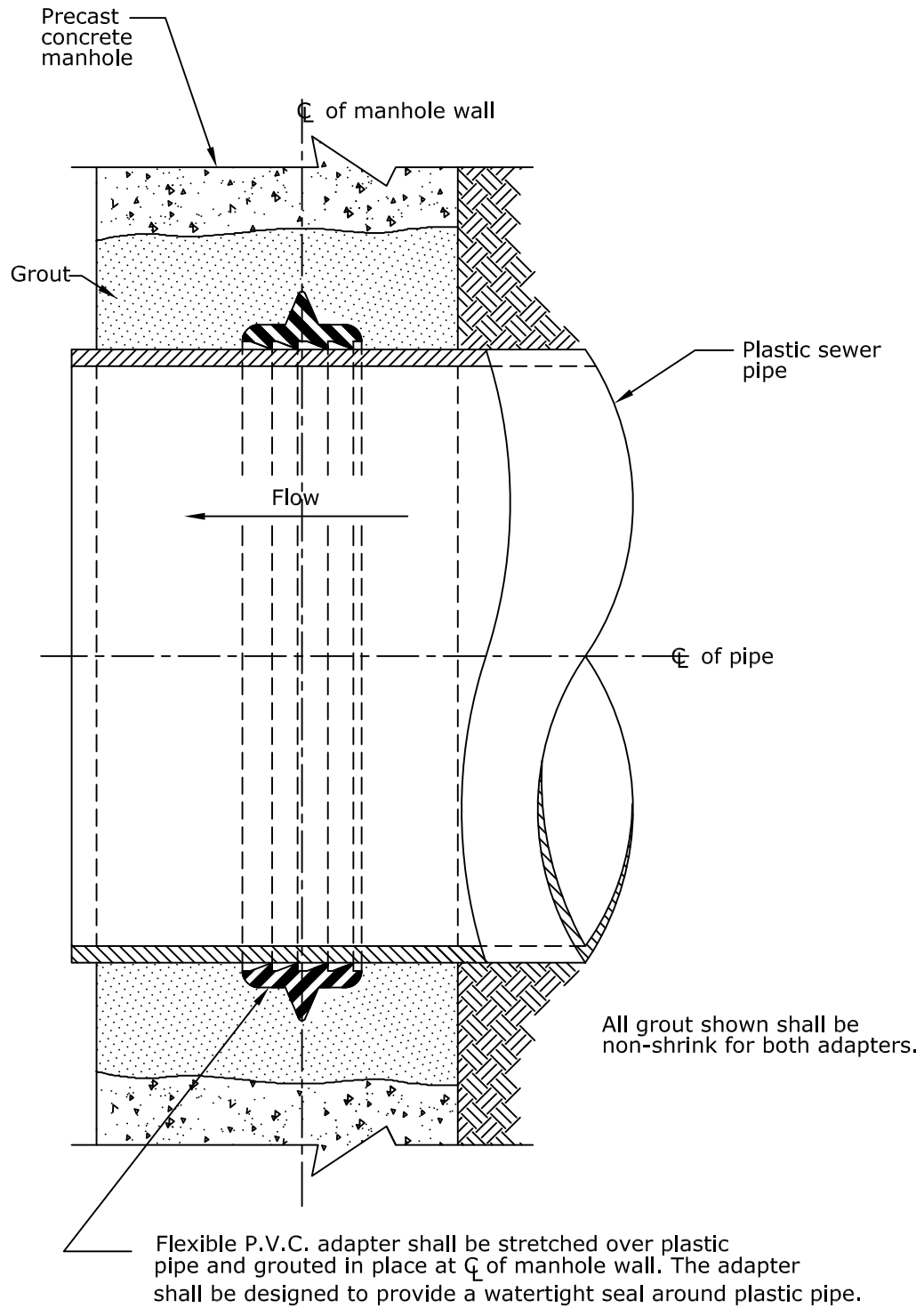


Type "D"

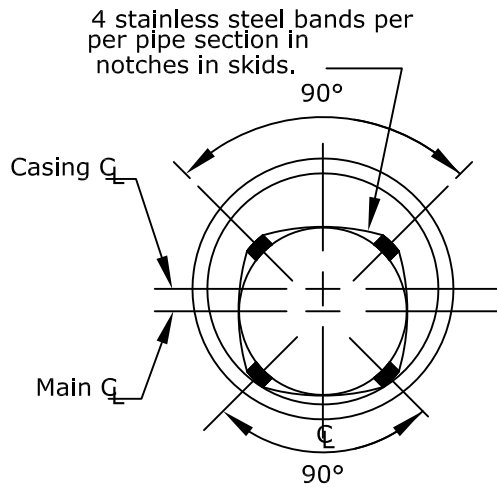
\*The Sonotube shall be installed plumb; the vertical PVC stack tolerance may be between 2% and 5% off plumb but must ensure positive drainage from the cleanout to the elbow.

**Note:** All concrete shall be Md. Mix No. 1 and poured from bell to bell.

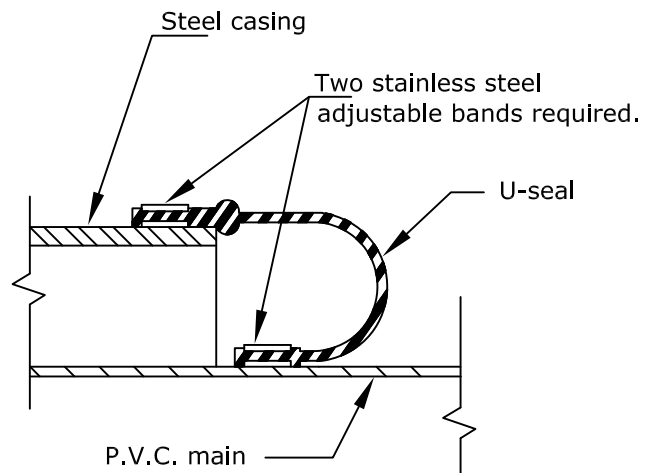
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|------------------------------------------------------------------------------------------------------------------|-----------|------|----------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Type B, C & D Drop<br>House Connection | Detail No.<br><br>209.2 |
|                                                                                                                  | Date      | Note |                                        |                         |
|                                                                                                                  | .         | .    |                                        | Date:                   |
|                                                                                                                  | .         | .    |                                        | 01-24-2013              |
|                                                                                                                  | .         | .    |                                        |                         |



|                                                                                                                  |           |      |                                      |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|--------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Plastic Pipe Adapter<br>Installation | Detail No.<br><br>210.1 |
|                                                                                                                  | Date      | Note |                                      |                         |
|                                                                                                                  | .         | .    |                                      | Date:                   |
|                                                                                                                  | .         | .    |                                      | 01-24-2013              |
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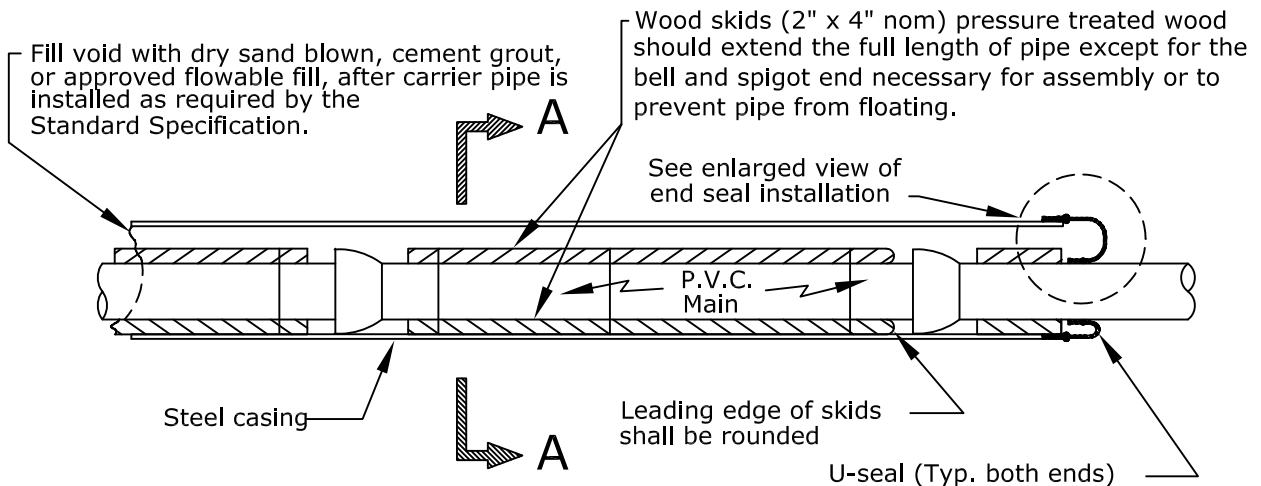


**Section A-A**



**End Seal installation**

Enlarged View



**Elevation View**

| MainØ | Min. CasingØ |
|-------|--------------|
| 4     | 12           |
| 6     | 16           |
| 8     | 16           |
| 10    | 18           |
| 12    | 24           |
| 15    | 24           |
| 18    | 26           |
| 21    | 30           |
| 24    | 36           |
| 27    | 36           |

Casing shall conform to AWWA C-200.  
P.V.C. Carrier pipe shall conform to ASTM D 3034-SDR 35 & ASTM F679-SDR 26.

The Skids Should be High enough to allow for clearance between the bell and steel casing bottom. Minimum size of skids to be 2" x 4" (nom).

The inside surface of the casing and/or the skids shall be lubricated to facilitate the sliding of the P.V.C. Main pipe.

Other methods of pipe support that varies from using wood may be considered, but must be approved by the County prior to installation.

Frederick County  
Division of Utilities &  
Solid Waste Management  
Department of  
Engineering & Planning

| Revisions |      |
|-----------|------|
| Date      | Note |
| .         | .    |
| .         | .    |
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| .         | .    |

**Casing for PVC Sewer  
Main Under Highways  
and Railroads**

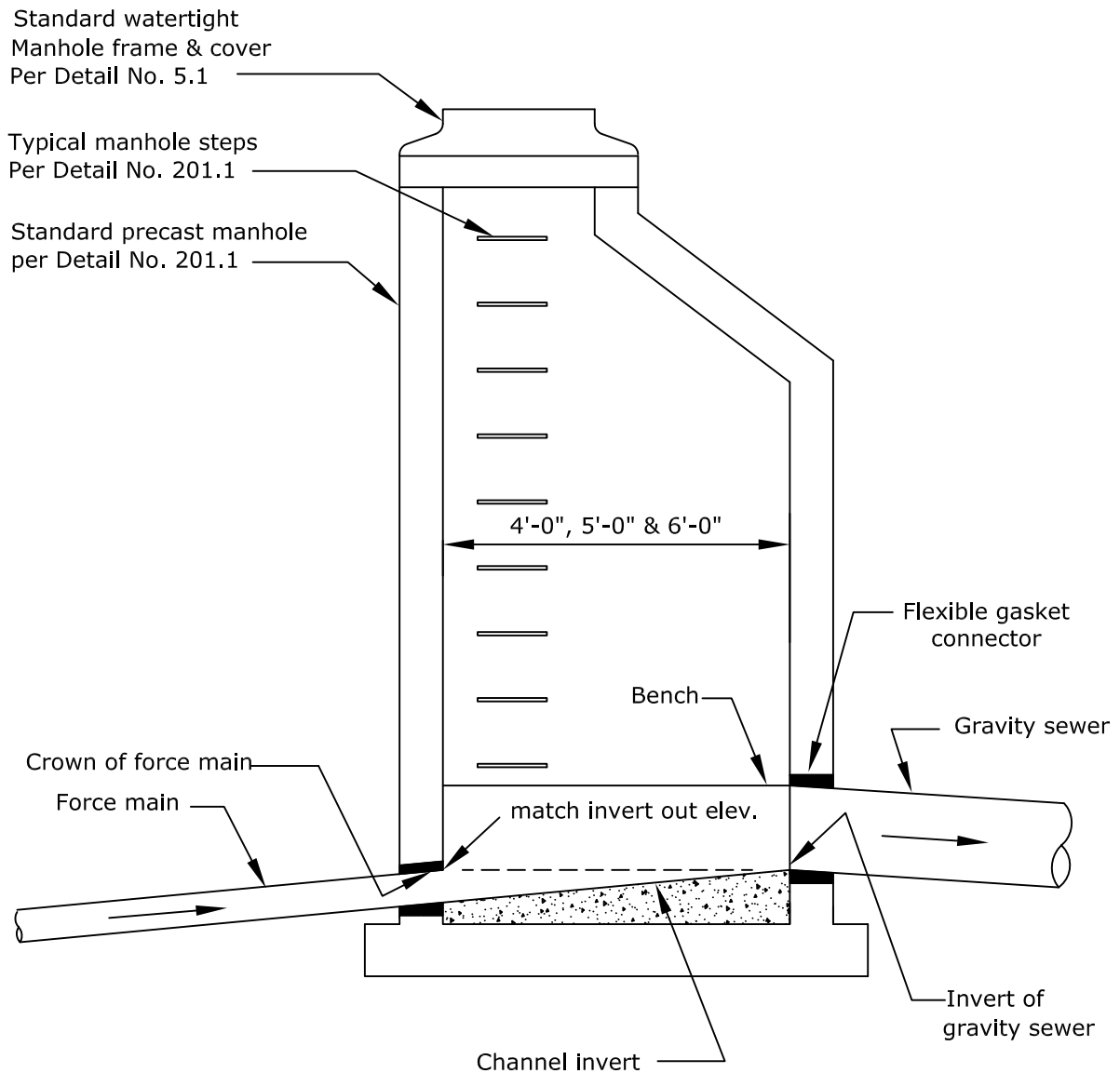
Detail No.

**211.1**

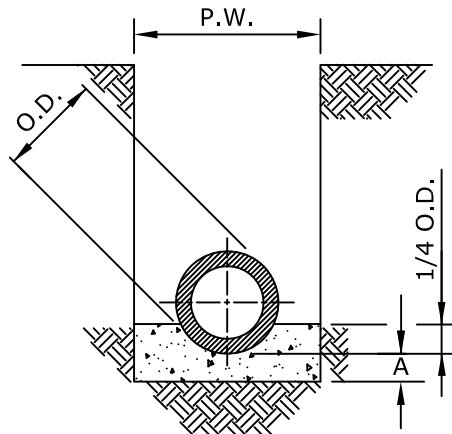
Date:  
01-24-2013

Notes:

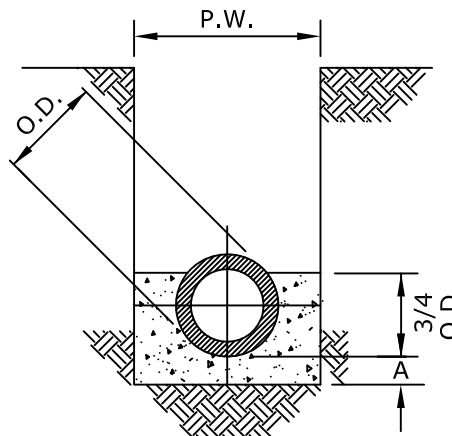
1. Elevation of gravity sewer invert shall be minimum 0.1' above elevation of force main crown.
2. Provide smooth upward sloping channel from force main to gravity sewer.
3. For transition manhole details for a grinder pump/pressure sewer system  
See Details No. 213.2, 213.3 & 217.1.
4. The relationship of the inlet (force main) to the outlet (gravity sewer)  
Shall be maximum of 30° deflection 180°.



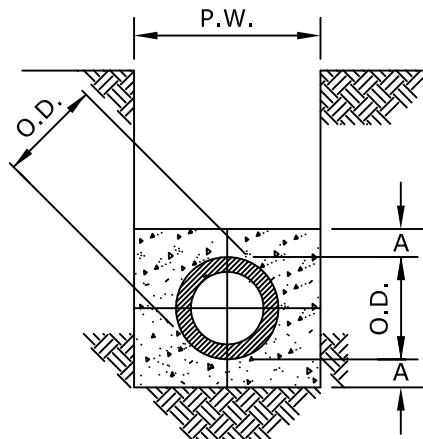
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|----------------------------------------------------------------------------------------------------------------------|-----------|------|------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Transition Manhole<br>Force Main to<br>Gravity Sewer | Detail No.<br><br>212.1 |
|                                                                                                                      | Date      | Note |                                                      |                         |
|                                                                                                                      | .         | .    |                                                      | Date:<br>01-24-2013     |
|                                                                                                                      | .         | .    |                                                      |                         |
|                                                                                                                      | .         | .    |                                                      |                         |
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**Concrete Low Cradle**



**Concrete High Cradle**



**Concrete Encasement**

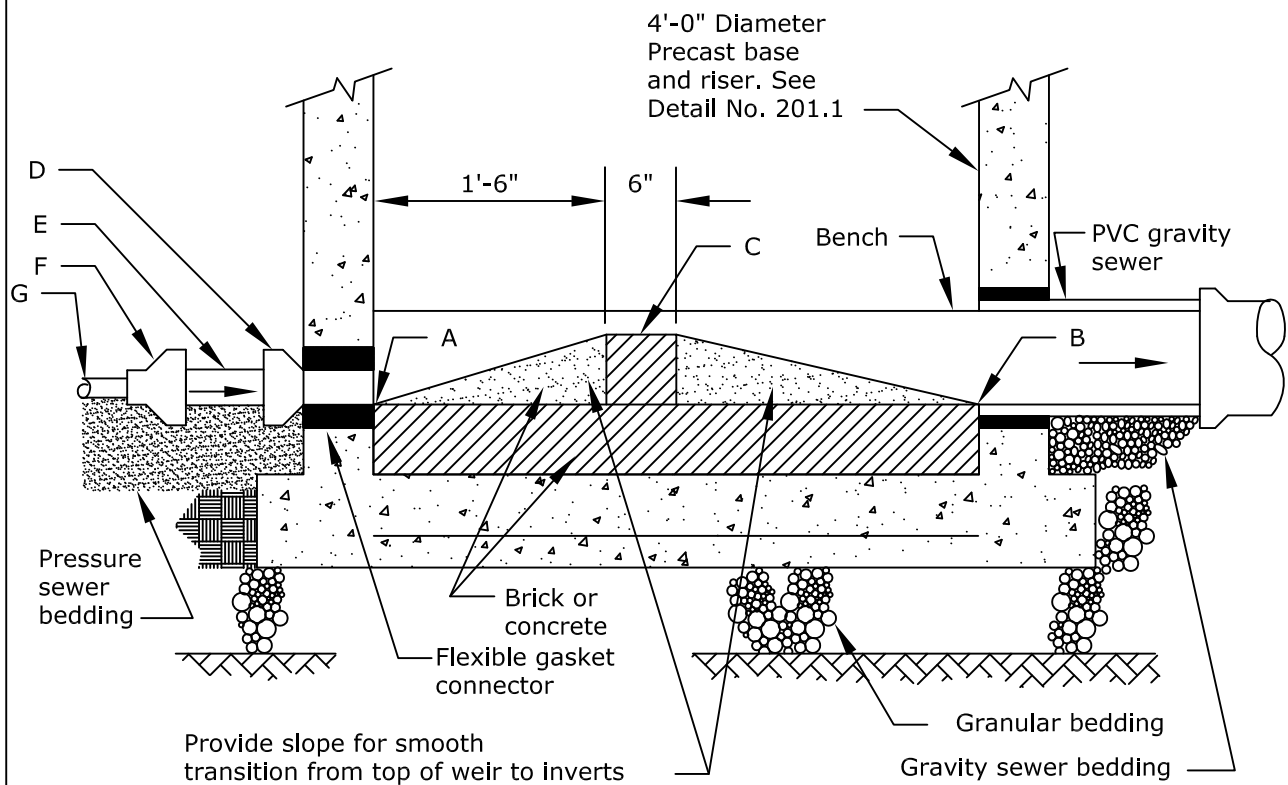
A=3" min. for pipes 24" dia and smaller.  
A=4" min. for pipes larger than 24" dia.  
P.W. (pay width) shall be determined per detail No. 2.1

| Nominal Diameter | Payment Allowance in Cu. Ft. per Lin. Ft. |             |            |
|------------------|-------------------------------------------|-------------|------------|
|                  | Low Cradle                                | High Cradle | Encasement |
| 6" PVC/ABS       | .73                                       | 1.12        | 1.85       |
| 6" DIP           | .75                                       | 1.21        | 1.98       |
| 8" PVC           | .86                                       | 1.40        | 2.26       |
| 8" ABS           | .92                                       | 1.52        | 2.44       |
| 8" DIP           | .90                                       | 1.47        | 2.37       |
| 10" PVC          | 1.00                                      | 1.68        | 2.68       |
| 10" ABS          | 1.08                                      | 1.82        | 2.92       |
| 10" DIP          | 1.04                                      | 1.76        | 2.80       |
| 12" PVC          | 1.13                                      | 1.93        | 3.06       |
| 12" ABS          | 1.24                                      | 2.14        | 3.38       |
| 12" DIP          | 1.18                                      | 2.03        | 3.21       |
| 15" PVC          | 1.33                                      | 2.33        | 3.66       |
| 15" ABS          | 1.50                                      | 2.65        | 4.15       |
| 16" DIP          | 1.55                                      | 2.62        | 4.10       |
| 18" PVC          | 1.59                                      | 2.81        | 4.39       |
| 21" PVC          | 1.85                                      | 3.30        | 5.16       |
| 24" PVC          | 2.08                                      | 3.73        | 5.81       |
| 27" PVC          | 3.12                                      | 5.56        | 8.68       |

To calculate the cubic yards of concrete payment, multiply Lin. ft. by figure from above table, then divide by 27.

All concrete shall be Md. S.H.A. mix No.1.  
Pour concrete against undisturbed earth. Remove sheeting before pouring concrete or pull sheeting up above the poured concrete.  
Anchor all pipe prior to pouring concrete to insure that the pipe doesn't float.

|                                                                                                                      |           |      |                                                       |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|-------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Concrete Encasement<br>& Cradles Payment<br>Allowance | Detail No.<br><br>213.1 |
|                                                                                                                      | Date      | Note |                                                       |                         |
|                                                                                                                      | .         | .    |                                                       | Date:<br>01-24-2013     |
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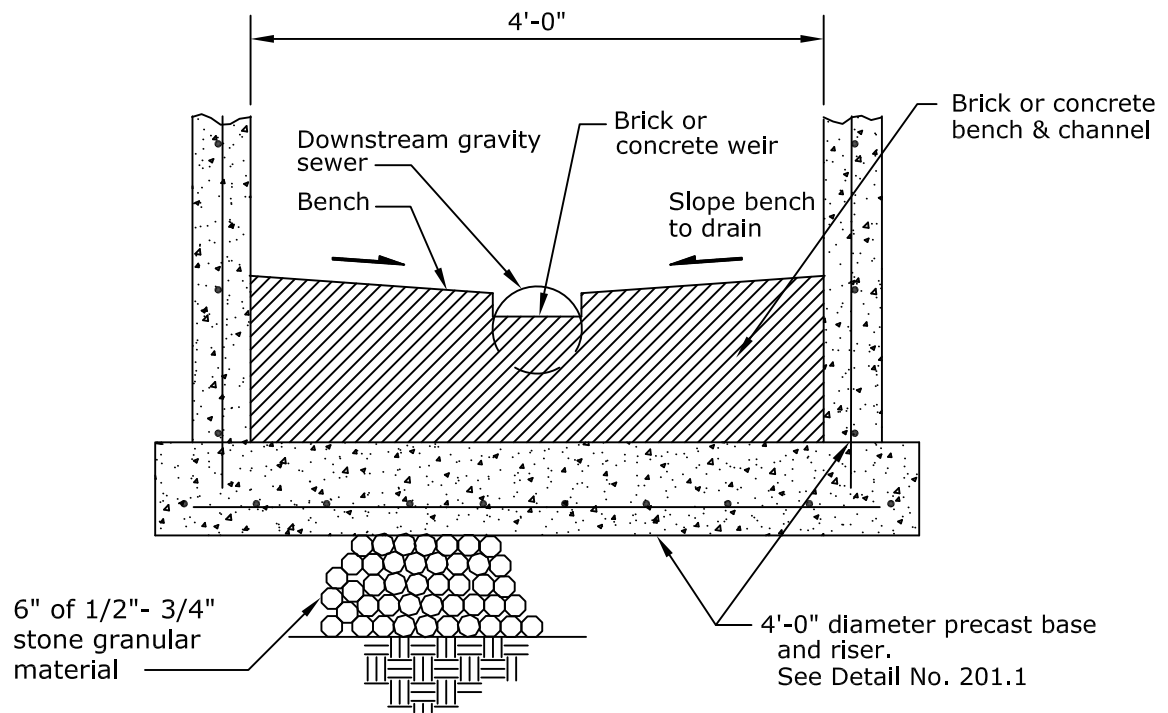
## Elevation and Fitting Schedule

|   |                                                             |
|---|-------------------------------------------------------------|
| A | Pressure sewer influent invert elevation                    |
| B | Gravity sewer invert elevation                              |
| C | Weir top elevation 0.1' higher than crown of pressure sewer |
| D | P.V.C. Bell-end section-4" O / minimum size                 |
| E | P.V.C. Nipple-4" Ø                                          |
| F | P.V.C. Reducer-increase to 4" O /                           |
| G | P.V.C. Pressure sewer                                       |
|   |                                                             |

### Note:

1. See Detail No. 217.1 for Plan View.
2. For specific elevations and fitting sizes, see contract drawings

|                                                                                                                  |           |      |                                   |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Transition Manhole<br>Section A-A | Detail No.<br><br>213.2 |
|                                                                                                                  | Date      | Note |                                   |                         |
|                                                                                                                  | .         | .    |                                   | Date:                   |
|                                                                                                                  | .         | .    |                                   | 01-24-2013              |
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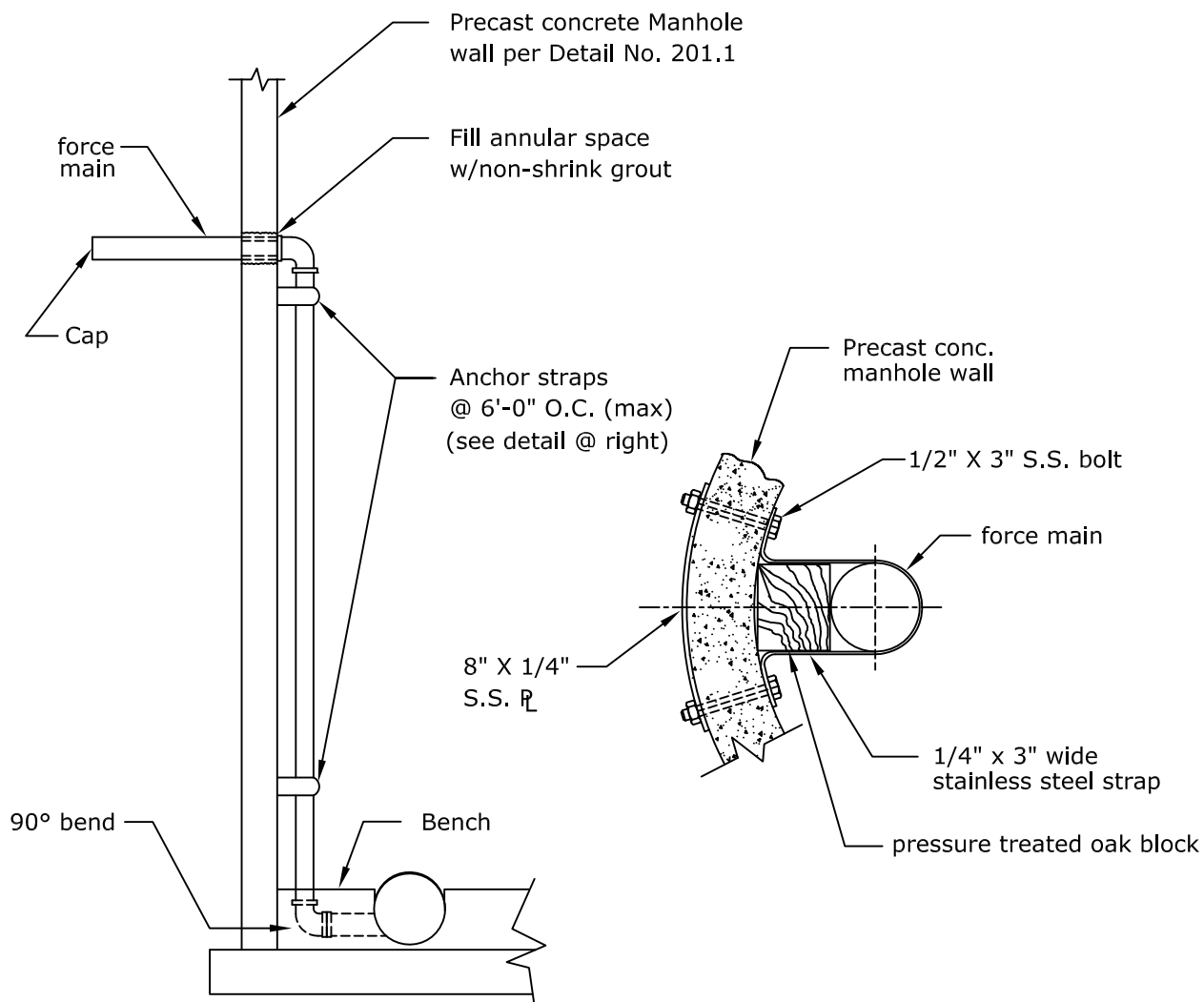


**Note:**

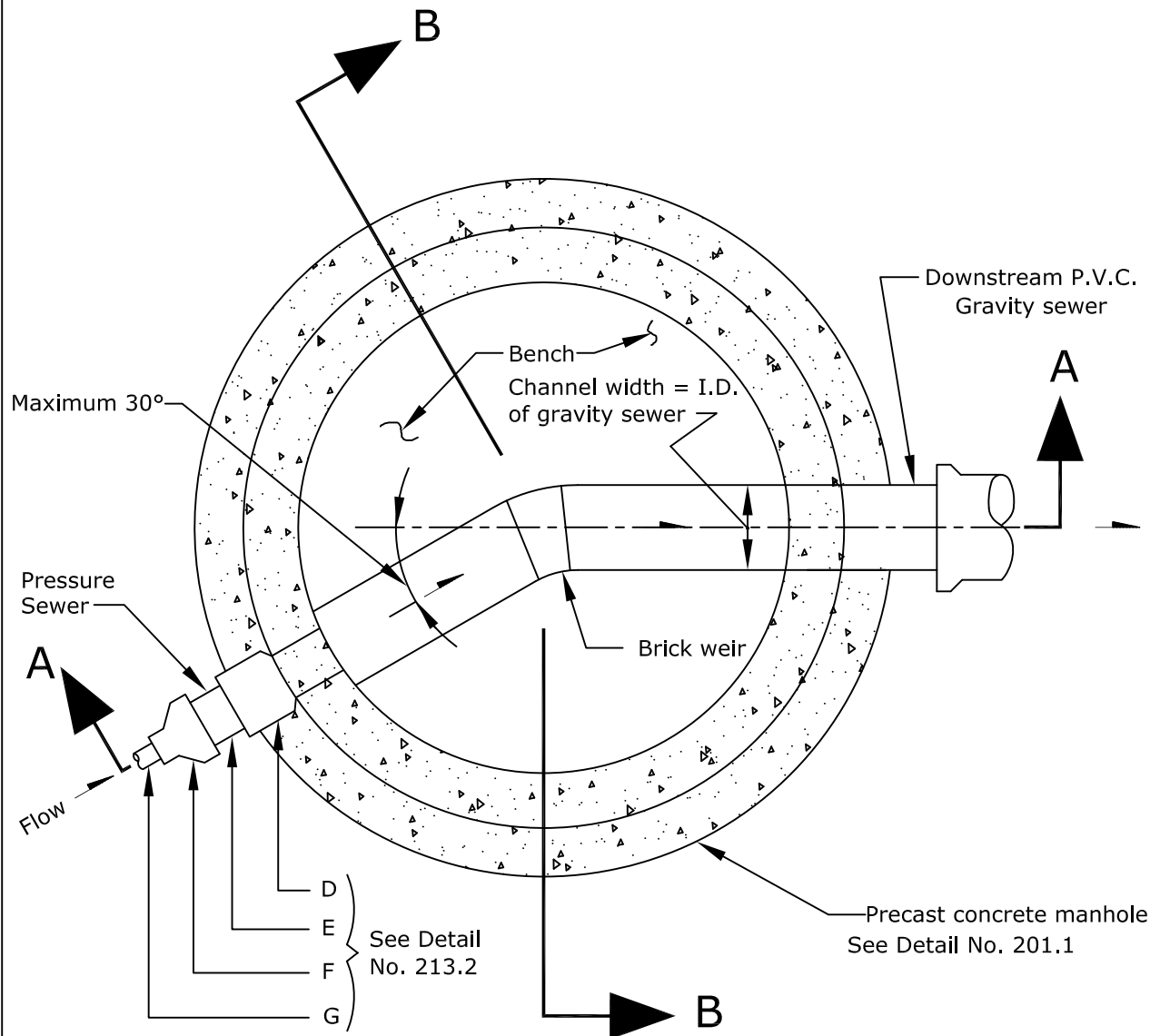
1. See Detail No. 217.1 for Plan View.

|                                                                                                                      |           |      |                                   |            |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------|------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Transition Manhole<br>Section B-B | Detail No. |
|                                                                                                                      | Date      | Note |                                   | 213.3      |
|                                                                                                                      | .         | .    |                                   | Date:      |
|                                                                                                                      | .         | .    |                                   | 01-24-2013 |
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|                                                                                                                      |           |      |                                     |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|-------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Force Main Connection<br>at Manhole | Detail No.<br><br>214.1 |
|                                                                                                                      | Date      | Note |                                     |                         |
|                                                                                                                      | .         | .    |                                     | Date:<br>01-24-2013     |
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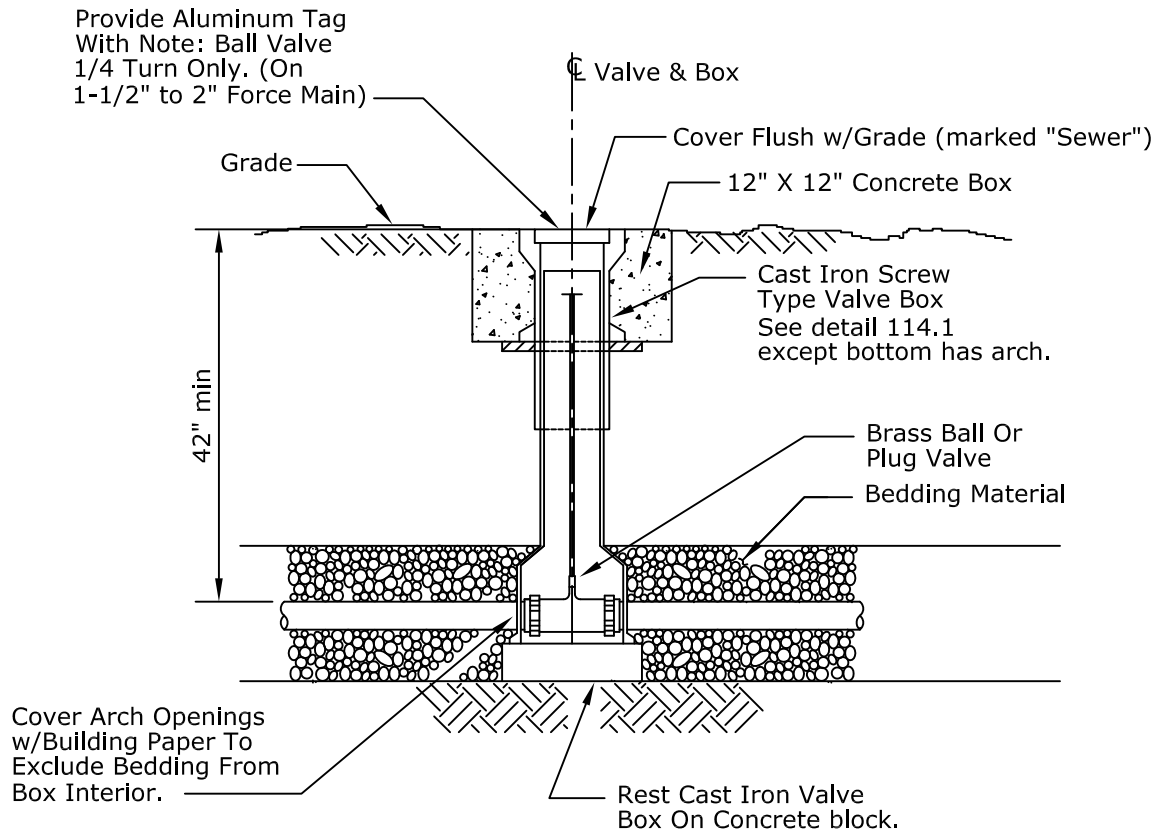
Plan View

Notes:

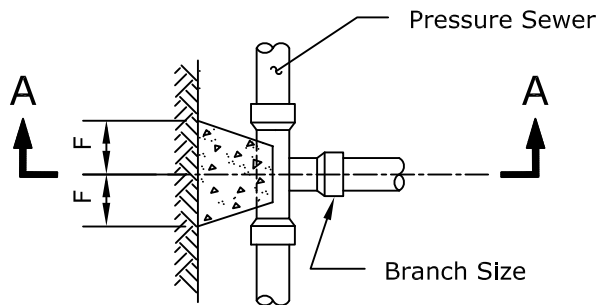
1. For section A-A, see Detail No. 213.2
2. For section B-B, see Detail No. 213.3

|                                                                                                                  |           |      |                                                                 |                         |
|------------------------------------------------------------------------------------------------------------------|-----------|------|-----------------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br>Department of<br>Engineering & Planning | Revisions |      | Transition Manhole for<br>Grinder Pump/Pressure<br>Sewer System | Detail No.<br><br>217.1 |
|                                                                                                                  | Date      | Note |                                                                 |                         |
|                                                                                                                  | .         | .    |                                                                 | Date:<br>01-24-2013     |
|                                                                                                                  | .         | .    |                                                                 |                         |
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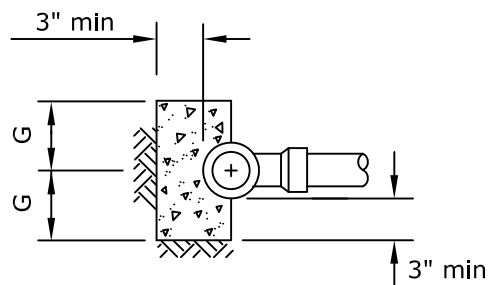
# Low Pressure Sewer Details



|                                                                                                                      |           |      |                                     |                     |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|-------------------------------------|---------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Low Pressure Sewer<br>In-line Valve | Detail No.          |
|                                                                                                                      | Date      | Note |                                     | 301.1               |
|                                                                                                                      | .         | .    |                                     | Date:<br>01-24-2013 |
|                                                                                                                      | .         | .    |                                     |                     |
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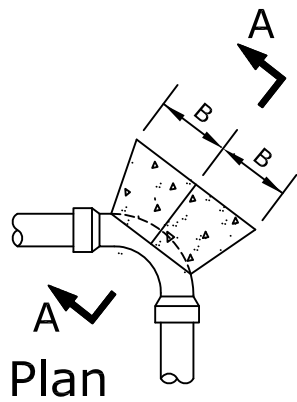


Plan

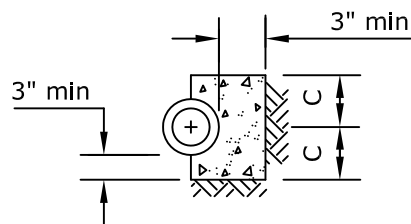


Section A-A

## Tees, Including Pressure SHC'S

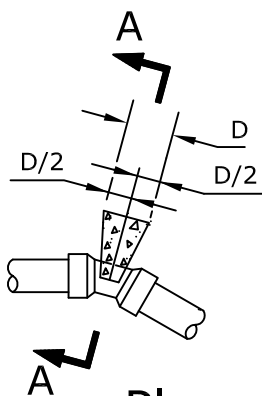


Plan

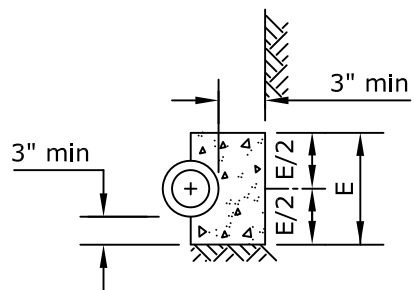


Section A-A

## 90°Horizontal Bends



Plan



Section A-A

## 11-1/4°, 22-1/2°, 45° Horizontal & Lower Vertical Bends

| Pipe Size       | B  | C  | D  | E  | F  | G  |
|-----------------|----|----|----|----|----|----|
| 1-1/4" & 1-1/2" | 4" | 4" | 5" | 5" | 3" | 3" |
| 2"              | 5" | 5" | 7" | 7" | 5" | 5" |

### Notes:

1.  $f'c = 3000$  p.s.i. @ 28 days.
2. Carry All Bearing Surfaces to Undisturbed Ground Or Firm Subgrade.
3. Buttress Sized For 160 p.s.i.
4. See Detail 303.1 For Upper Vert. Bends.
5. Do Not Encase Joints.

Frederick County  
Division of Utilities &  
Solid Waste Management  
Department of  
Engineering & Planning

| Revisions |      |
|-----------|------|
| Date      | Note |
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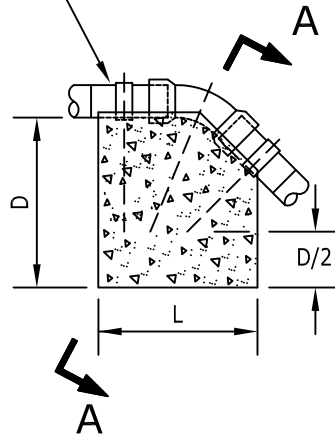
Low Pressure Sewer  
Pressure Sewer  
Blocking

Detail No.

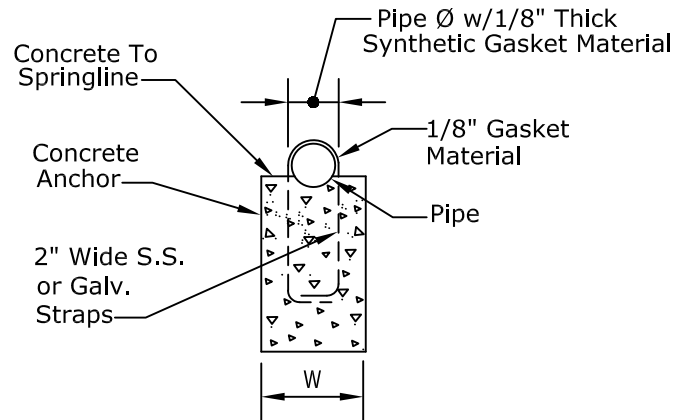
302.1

Date:  
01-24-2013

1/8" Thick Gasket  
Material Between  
Strap & Pipe.



Profile



Section A-A

| Bend    |   | Size in inches |          |    |    |
|---------|---|----------------|----------|----|----|
|         |   | 1-1/4, 1-1/2   | 2, 2-1/2 | 3  | 4  |
| 11 1/4° | L | 12             | 15       | 18 | 18 |
|         | W | 10             | 12       | 15 | 18 |
|         | D | 10             | 15       | 15 | 18 |
| 22 1/2° | L | 15             | 20       | 20 | 24 |
|         | W | 15             | 20       | 20 | 24 |
|         | D | 12             | 12       | 18 | 20 |
| 45°     | L | 20             | 24       | 24 | 30 |
|         | W | 20             | 20       | 24 | 30 |
|         | D | 12             | 20       | 24 | 26 |

Notes:

1. Galvanized or Stainless Steel Straps Shall Be 20 Gage and 2" Wide.
2. Straps Shall Be Embedded in Concrete A Distance Of D/2.
3. 1/8" Thick Synthetic Gasket Material Shall Be Placed Between Strap And Pipe.
4. Paint Exposed Galvanized With 2 Coats Of Bituminous Paint.
5. f's=3000 p.s.i. At 28 Days.
6. Carry All Bearing Surfaces To Undisturbed Earth Or Firm Subgrade.
7. Concrete Anchorage Dimensions Are Based On Total Pressure Of 150 p.s.i.

Frederick County  
Division of Utilities &  
Solid Waste Management  
Department of  
Engineering & Planning

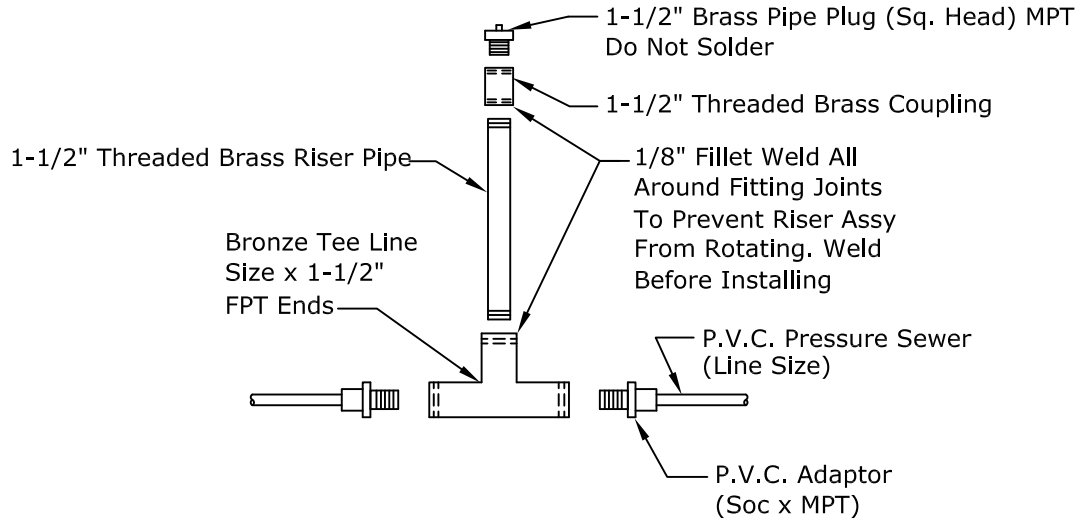
| Revisions |      |
|-----------|------|
| Date      | Note |
|           |      |
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Low Pressure Sewer  
Vertical Blocking

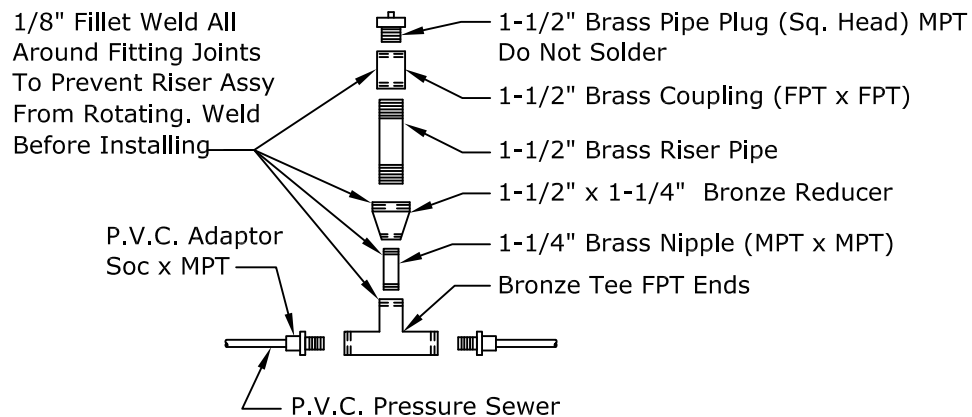
Detail No.

303.1

Date:  
01-24-2013



## Connection For 1-1/2"-4" Main Line Pressure Sewer



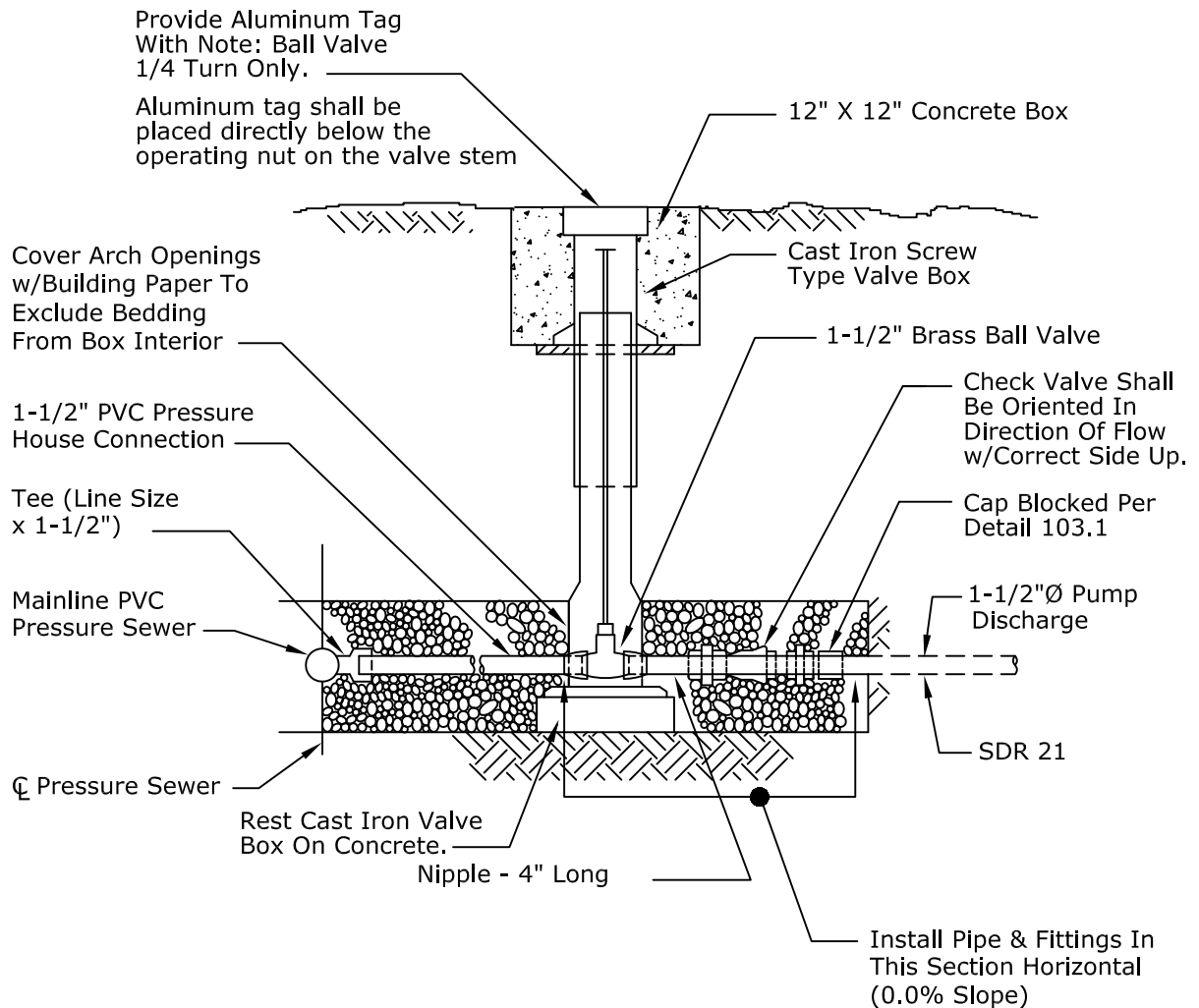
## Connection For 1-1/4" Main Line Pressure Sewer

### LEGEND:

MPT = Male Pipe Thread  
FPT = Female Pipe Thread

Note: Copper tracer wire shall be installed with all P.V.C. pipe.

|                                                                                                                      |           |      |                                      |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|--------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Low Pressure Sewer<br>Riser Assembly | Detail No.<br><br>304.1 |
|                                                                                                                      | Date      | Note |                                      |                         |
|                                                                                                                      | .         | .    |                                      | Date:                   |
|                                                                                                                      | .         | .    |                                      | 01-24-2013              |
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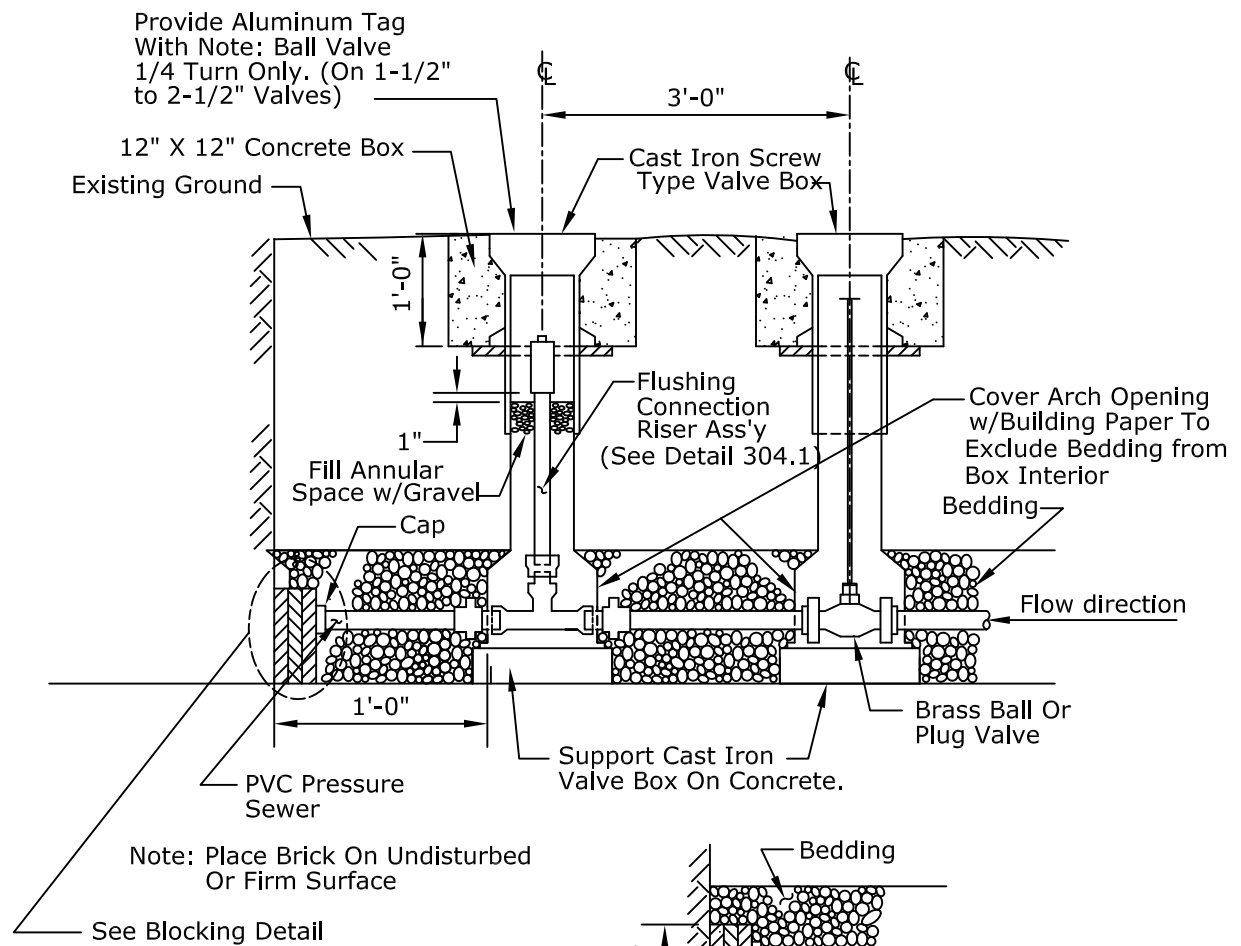


**Notes:**

1. Place Brick On Undisturbed Earth Or Firm Soil.
2. Installation Of New Pressure Sewer Service Connections To Previously Installed Mains Requires Tapping. Tap Main Using A Ford #FC202 Series Saddle And A Ford #FB1600 Series Corporation Stop. Provide Male PVC Adaptor Between The Corporation Stop And Pressure Sewer Service Connection.

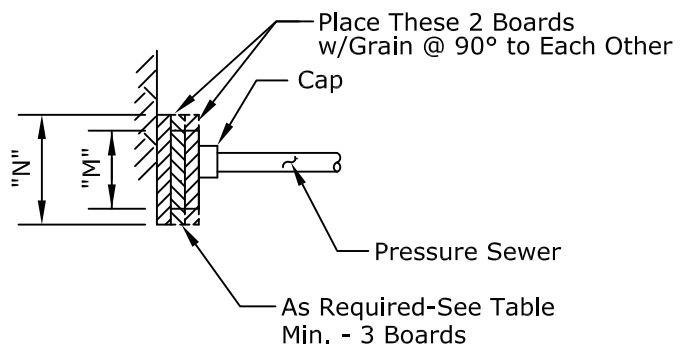
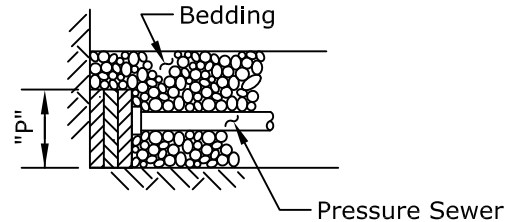
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| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Low Pressure Sewer<br>Service Connection | Detail No.<br><br>305.1 |
|                                                                                                                      | Date      | Note |                                          |                         |
|                                                                                                                      | .         | .    |                                          | Date:<br>01-24-2013     |
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Notes:

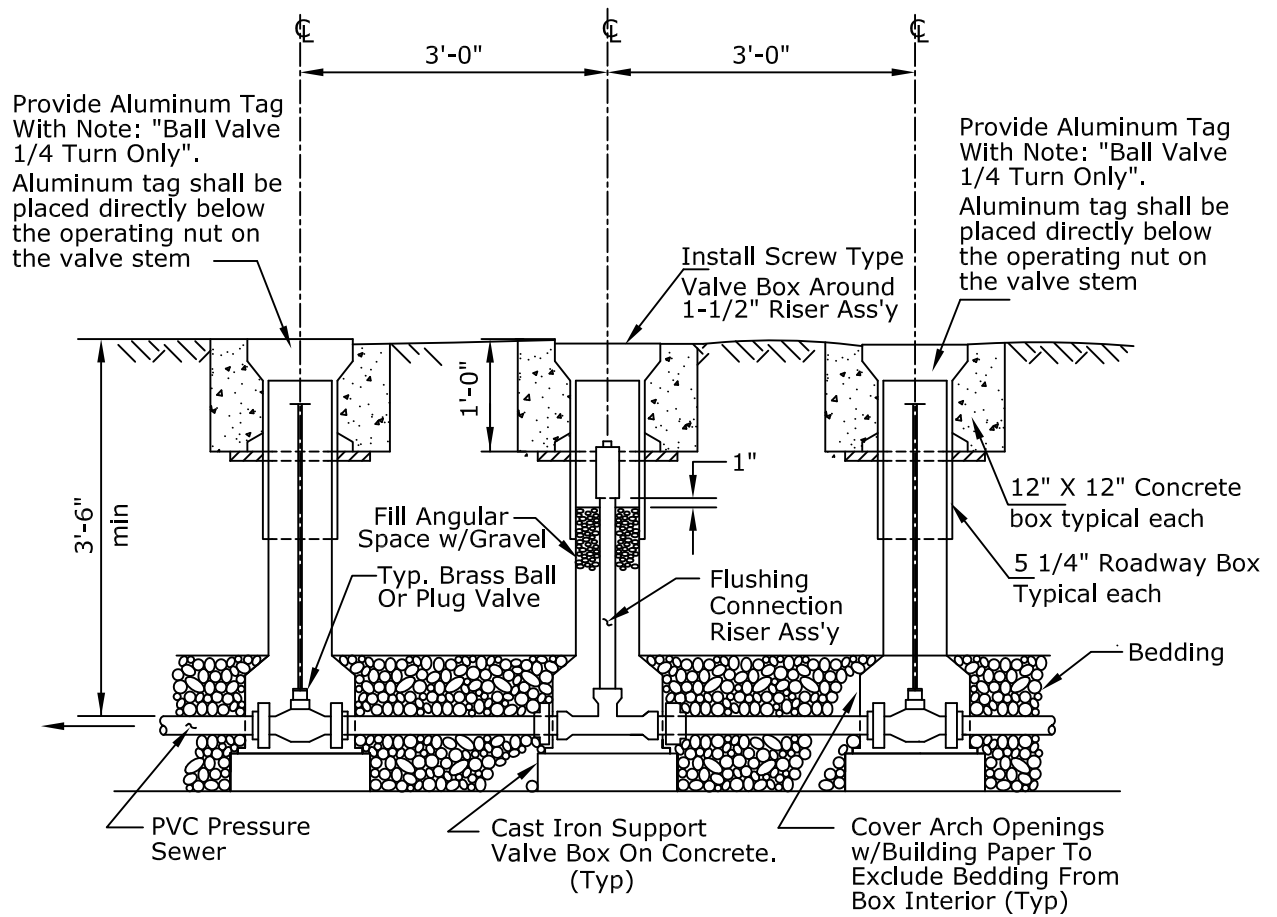
1. Carry All Bearing Surfaces To Undisturbed Earth Or Firm Subgrade
2. Nominal Thickness Of All Boards Is 2".
3. All Boards To Be Pressure Treated (CCA) Yellow Pine.



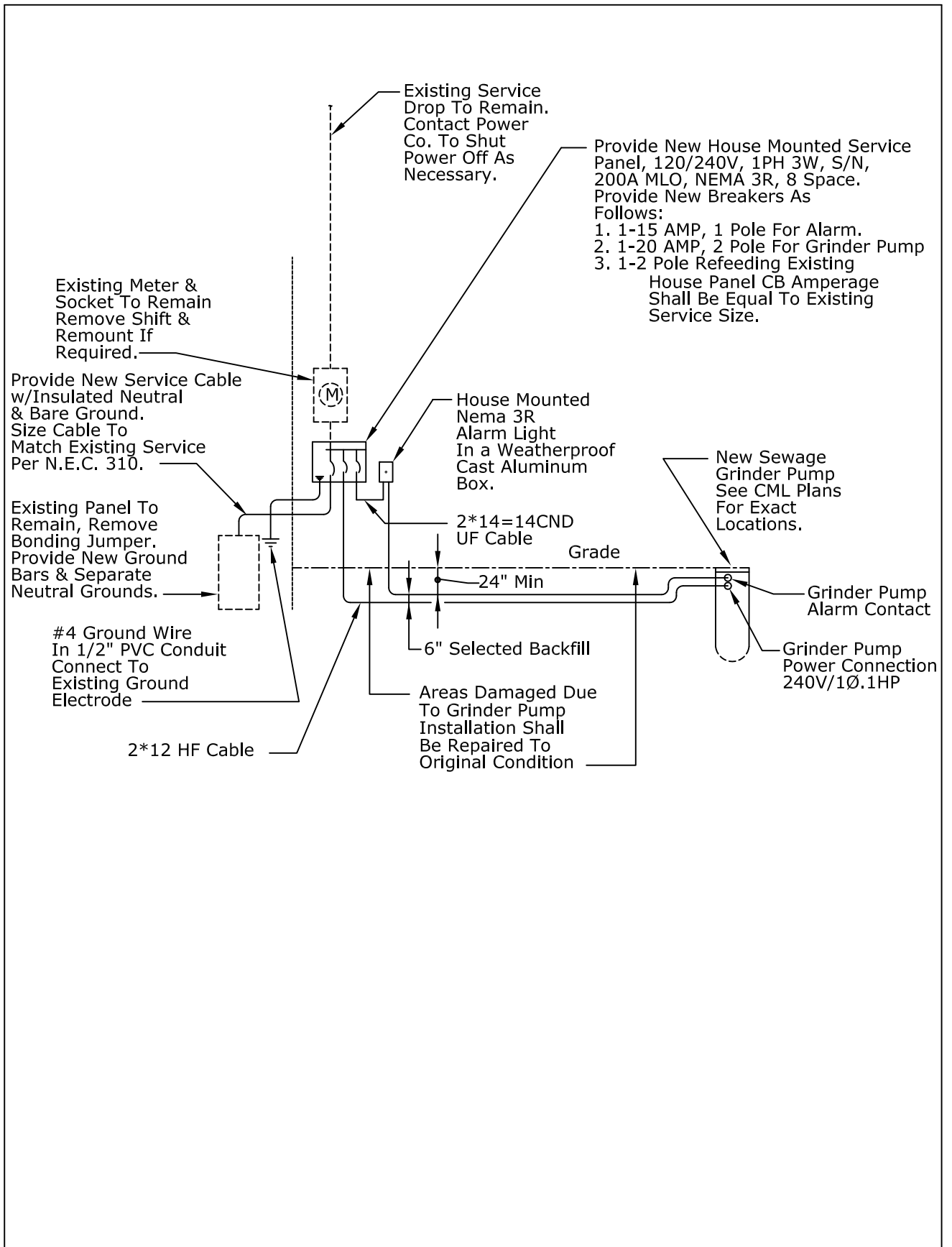
Blocking Details

| Pipe Size | M   | N   | P   |
|-----------|-----|-----|-----|
| 1/4"      | 6"  | 6"  | 8"  |
| 1/2"      | 6"  | 6"  | 8"  |
| 2"        | 6"  | 8"  | 8"  |
| 2-1/2"    | 8"  | 8"  | 10" |
| 3"        | 12" | 18" | 12" |
| 4"        | 12" | 18" | 12" |

|                                                                                                                      |           |      |                                                       |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|-------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Low Pressure Sewer<br>Terminal Flushing<br>Connection | Detail No.<br><br>306.1 |
|                                                                                                                      | Date      | Note |                                                       |                         |
|                                                                                                                      | .         | .    |                                                       | Date:<br>01-24-2013     |
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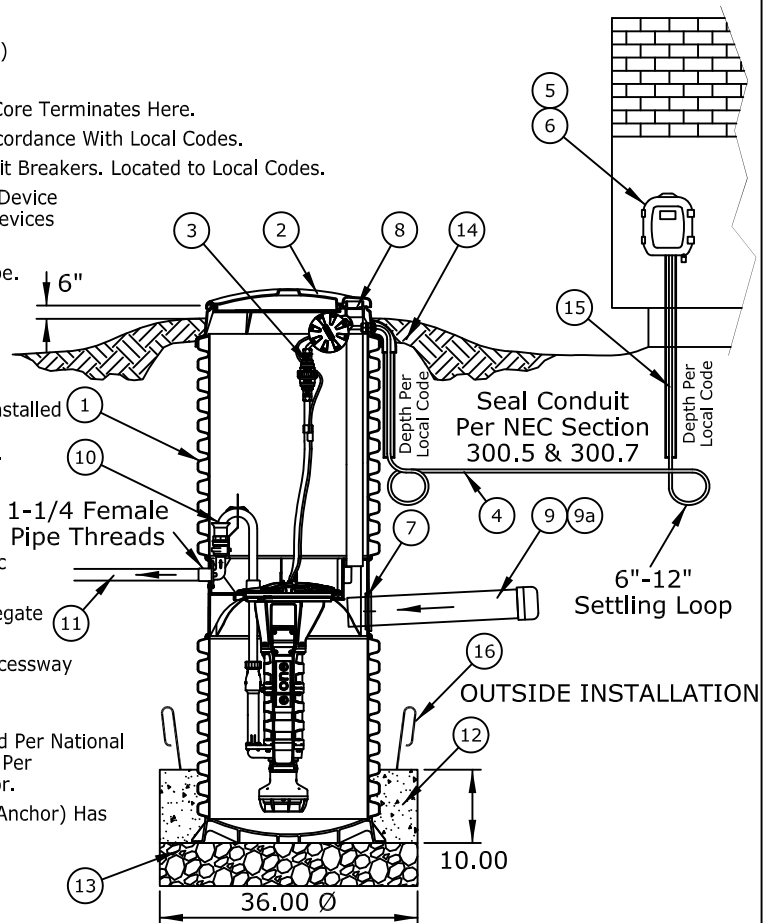
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| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Low Pressure Sewer<br>In-Line Flushing<br>Connection | Detail No.<br><br>307.1 |
|                                                                                                                      | Date      | Note |                                                      |                         |
|                                                                                                                      | .         | .    |                                                      | Date:<br>01-24-2013     |
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|----------------------------------------------------------------------------------------------------------------------|-----------|------|----------------------------------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Grinder Pump System<br>Electrical Service To<br>An Existing Dwelling | Detail No.<br><br>308.1 |
|                                                                                                                      | Date      | Note |                                                                      |                         |
|                                                                                                                      | .         | .    |                                                                      | Date:<br>01-24-2013     |
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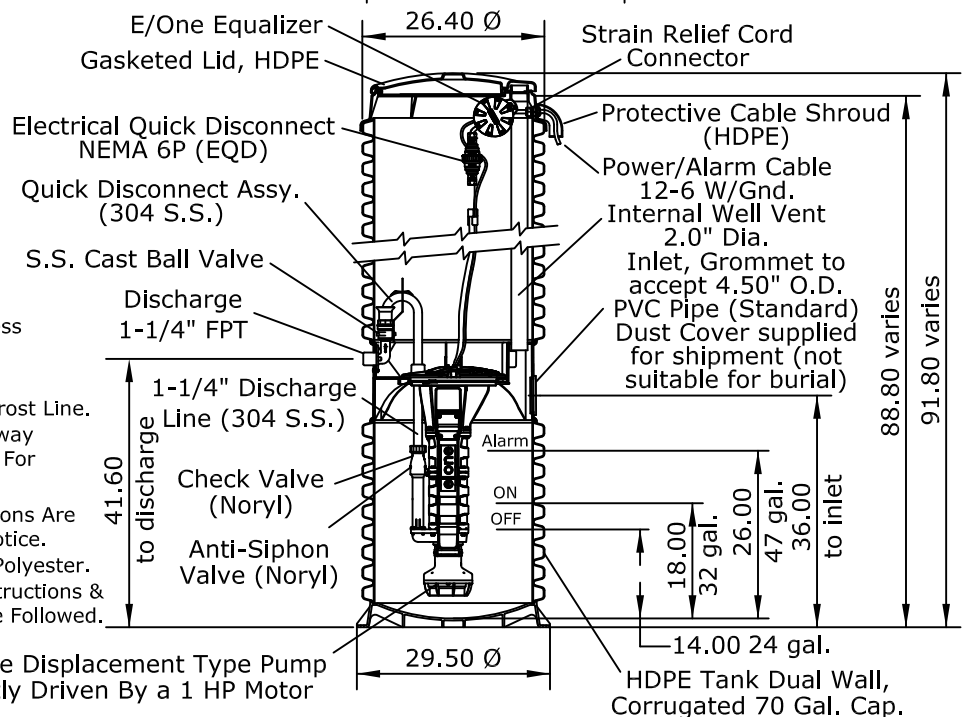
## Specifications:

1. Grinder Pump Basin - High Density Polyethylene (HDPE)
2. Accessway Cover - FRP.
3. Electrical Quick Disconnect (EQD) - Cable From Pump Core Terminates Here.
4. Power And Alarm Cable - Circuits To Be Installed In Accordance With Local Codes.
5. Alarm Panel - NEMA 4X Enclosure. Equipped With Circuit Breakers. Located to Local Codes.
6. Alarm Device - Every Installation Is To Have An Alarm Device To Alert Homeowner of a Potential Malfunction. Visual Devices Should Be Placed In Very Conspicuous Locations.
7. Inlet - EDPM Grommet (4.5" ID). For 4.5" OD DWV. Pipe.
8. Wet Well Vent - 2.0" Tank Vent. Supplied By Factory In Units With Accessway.
9. Gravity Service Line - 4" DWV. (4.5" OD). Supplied By contractor.
- 9a. Stub-Out - 4" X 5" long Watertight Stub-Out, To Be Installed At Times Of Burial Unless The Gravity Service Line Is Connected During Installation. Supplied By Contractor.
10. Discharge Valve - 1-1/4" Female Pipe Threads.
11. Discharge Line - 1-1/4" Nominal Pipe size. Supplied By Contractor.
12. Concrete Anchor - See Ballast Calculations For Specific Weight For Station Height. Supplied By contractor.
13. Bedding Material - 6" Minimum Depth, Rounded Aggregate (Pea Gravel).
14. Finished Grade - Grade Line to Be 6" Below Top Of Accessway And Slope Away From Accessway Opening. And Local Codes.
15. Conduit - 1" Or 1-1/4" Material And Depth As Required Per National Conduit Must Enter Panel From Bottom And Be Sealed Per NEC Section 300.5 & 300.7. Supplied By Contractor.
16. Rebar - Required To Lift Tank After Ballast (Concrete Anchor) Has Been Attached, 4 Places, Evenly Spaced Around Tank.



## Notes:

1. All Dimensions In Inches Unless Noted Otherwise.
2. Do Not Scale Drawing.
3. Discharge Line To Be Below Frost Line.
4. All Joints In Tank And Accessway Are Manufactured And Tested For Watertight Integrity.
5. All Dimensions And Specifications Are Subject To Change Without Notice.
6. \*FRP - Fiberglass Reinforced Polyester.
7. E/One Typical Installation Instructions & Warranty Information Shall Be Followed.



Concrete Ballast May Be Required  
See Installation Instruction  
For Details

|                                                                                                                      |           |      |                                              |                         |
|----------------------------------------------------------------------------------------------------------------------|-----------|------|----------------------------------------------|-------------------------|
| Frederick County<br>Division of Utilities &<br>Solid Waste Management<br><br>Department of<br>Engineering & Planning | Revisions |      | Typical Simplex Grinder Pump<br>Installation | Detail No.<br><br>309.1 |
|                                                                                                                      | Date      | Note |                                              |                         |
|                                                                                                                      | .         | .    |                                              | Date:<br>01-24-2013     |
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