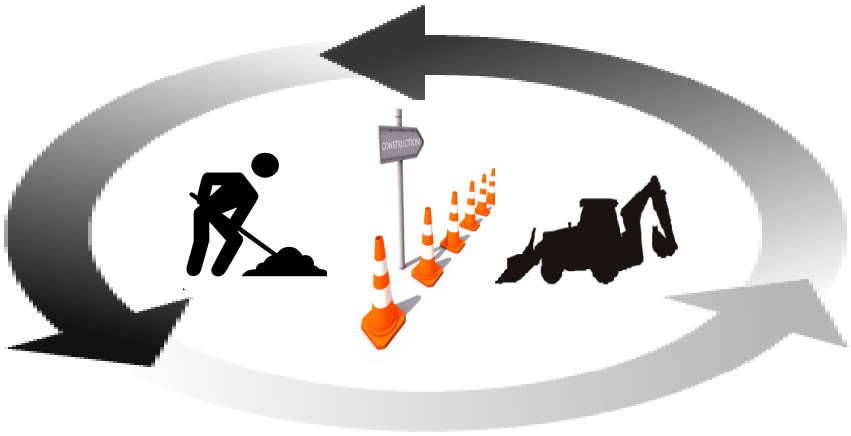
dallas water utilities
city of dallas

STANDARD DRAWINGS FOR WATER & WASTEWATER CONSTRUCTION



July 2024

City of Dallas	Document Number:	DWU-PRO-019-ENG	Revision Number:	3
	Approved By:	Engineering Services Division Manager	Effective Date:	07/25/2024
	Description of Last Change:	Updates to Div 200 drawings for Inspection Insertion Access Points and increased copper pipe size to 2”		
Document Title:	Standard Drawings for Water and Wastewater Construction			

PREFACE

The intent of this manual is to provide guidelines for the standard appurtenances of water and wastewater mains owned and operated by Dallas Water Utilities (DWU). This manual replaces the previous edition of “Standard Drawings for Water and Wastewater Construction” by DWU dated October, 2021.The chronological list of events in developing this manual is summarized as follows:

JAN, 1984 FIRST EDITION: Standard drawings are compiled into the first edition of the manual.

MAY, 1998 SECOND EDITION: The 1984 manual is revised and retitled. This edition includes revisions made in 1985, 1986, 1989 and 1991.

FEB. 2009 THIRD EDITION: The 1998 manual is revised to accommodate new construction standards required by 30 TAC §217. This edition includes minor revisions made in 2003.

OCT. 2010 FOURTH EDITION: The 2009 manual is revised to accommodate new construction standards required by Public Works Construction Standards for North Central Texas by North Central Council of Governments (NCTCOG), October 2004. This edition includes minor revisions made in 2009 and 2010.

OCTOBER 2011: The 2011 manual includes minor revisions made in 2011. Henceforth, this edition and all subsequent editions will be designated by the year of publication.

OCTOBER 2012: The 2012 manual includes three new AMI Standard Drawings, a Project Construction Sign Technical Specifications, two new Flush Point drawings, and several revisions of some of the existing Standard Drawings.

OCTOBER 2021: The 2021 manual includes revisions to reflect adopted Public Works Construction Standard for North Central Texas by North Central Council of Governments (NCTCOG), 5th Edition (Oct 2017)

JULY 2024: The 2024 manual includes revisions to Standard Drawings Division 200 (207C, 209-220), and addition of 328A

This edition of “Standard Drawings for Water and Wastewater Construction” is written by Engineering Services, Dallas Water Utilities. Any questions or suggestions regarding to this manual should be forwarded to Engineering Services, Dallas Water Utilities.

Copies Available On-line At:

htttp:/www.dallascityhall.com/departments/waterutilities/Pages/DWU_design_standards.aspx

PART 1 - COMMON FOR WATER & WASTEWATER CONSTRUCTION

PART 2 - WATER MAIN CONSTRUCTION

PART 3 - WASTEWATER MAIN CONSTRUCTION

PART 4 - WATER AND WASTEWATER ADJUSTMENTS

PART 5 - LARGE WATER SERVICE INSTALLATIONS

PART 6 – CATHODIC PROTECTION

PART 1

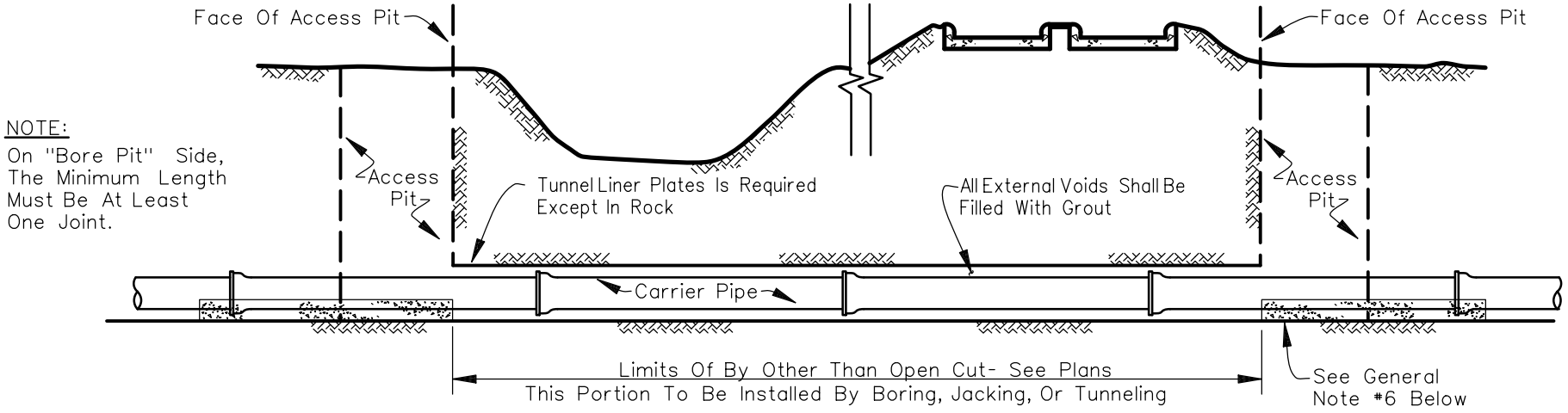
(Series 100)

COMMON FOR WATER & WASTEWATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department

PART 1
COMMON FOR WATER & WASTEWATER CONSTRUCTION

BY OTHER THAN OPEN CUT-FOR WATER MAINS & WASTEWATER MAINS
(NON Tx.D.O.T. - NON RAILROAD)



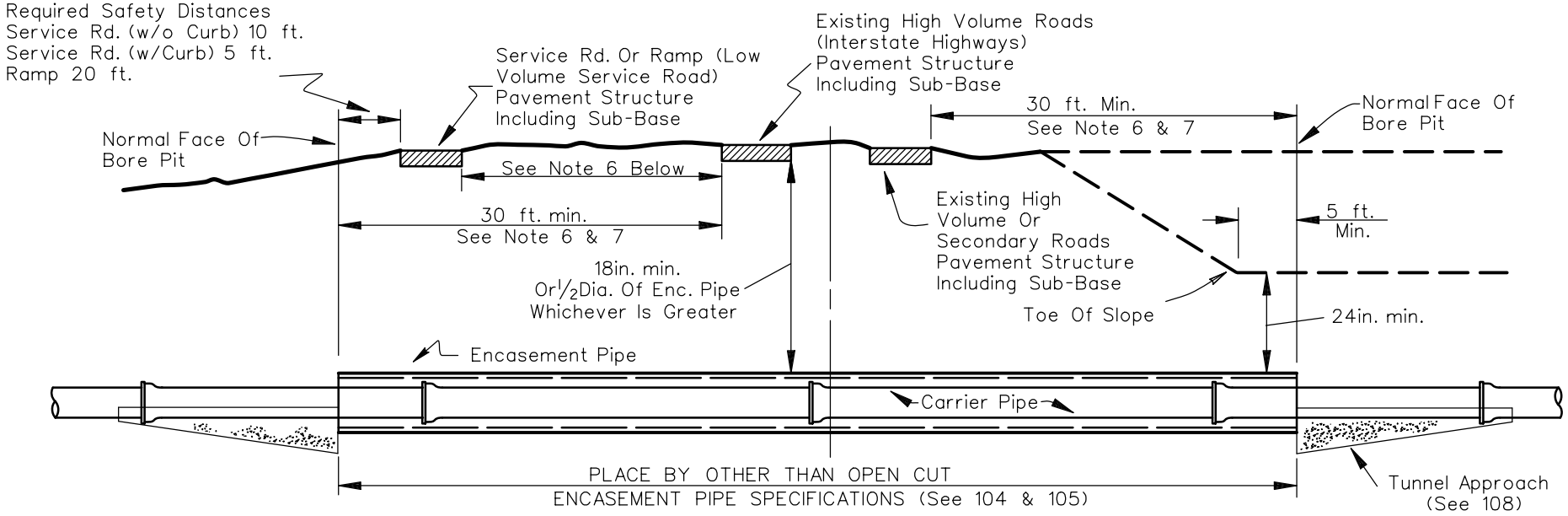
GENERAL NOTES

1. By Other Than Open Cut Construction Methods Are To Conform NCTCOG Specifications Item 503.3 Methods Of Jacking, Boring, Or Tunneling & 2010 City of Dallas Addendum To NCTCOG Specs. (Unless Otherwise Noted)
2. Carrier Pipe To Be Made Up Outside The Limits Of By Other Than Open Cut Area, Then Pushed Through Shaft Area.
3. The Carrier Pipe Must Be Restrained (Weighted) In Place Prior To The Placing Of Grout To Prevent The Carrier Pipe From Floating.
4. The Voids Between The Encasement Pipe/Tunnel Liner Plate And The Earthen Bore Are To Be Filled With Grout.
5. The Voids Between The Encasement Pipe/Tunnel Liner Plate And The Carrier Pipe Are To Be Filled With Grout.
6. Hold-Down Jacks Or Pipe Spacers (If Required By Design) Shall Conform To Page 109. Additionally, Grout Will Be Applied To All Voids Between The Carrier Pipe And Encasement Pipe.
7. When Main Is Installed With An Encasement Pipe Or Tunnel Liner Plate, The Carrier Pipe Is To Be Supported By A Class "B" Concrete Cradle As Shown On Page 108.
8. The Contractor Must Submit An Encasement Design For Approval By The Owner. For Encasement Pipes Greater Than 15 Inches (I.D.), The Submittal Must Be Sealed By A Professional Engineer Registered Within The State Of Texas.
9. Foam Grout Is An Acceptable Type Of Grout.

NCTCOG Spec: 503.3- Methods Of Jacking, Boring Or Tunneling
2021 COD Addendum 503.3.3.1. - General

BY OTHER THAN OPEN CUT (Non-Tx.D.O.T. & Non-Railroad)		COD	(Page No.) 101
		DATE JULY. 2021	

TYPICAL FOR HIGHWAY CROSSING FOR ALL WASTEWATER MAINS & FOR WATER MAINS 12 in. & UNDER IN DIAMETER



GENERAL NOTES

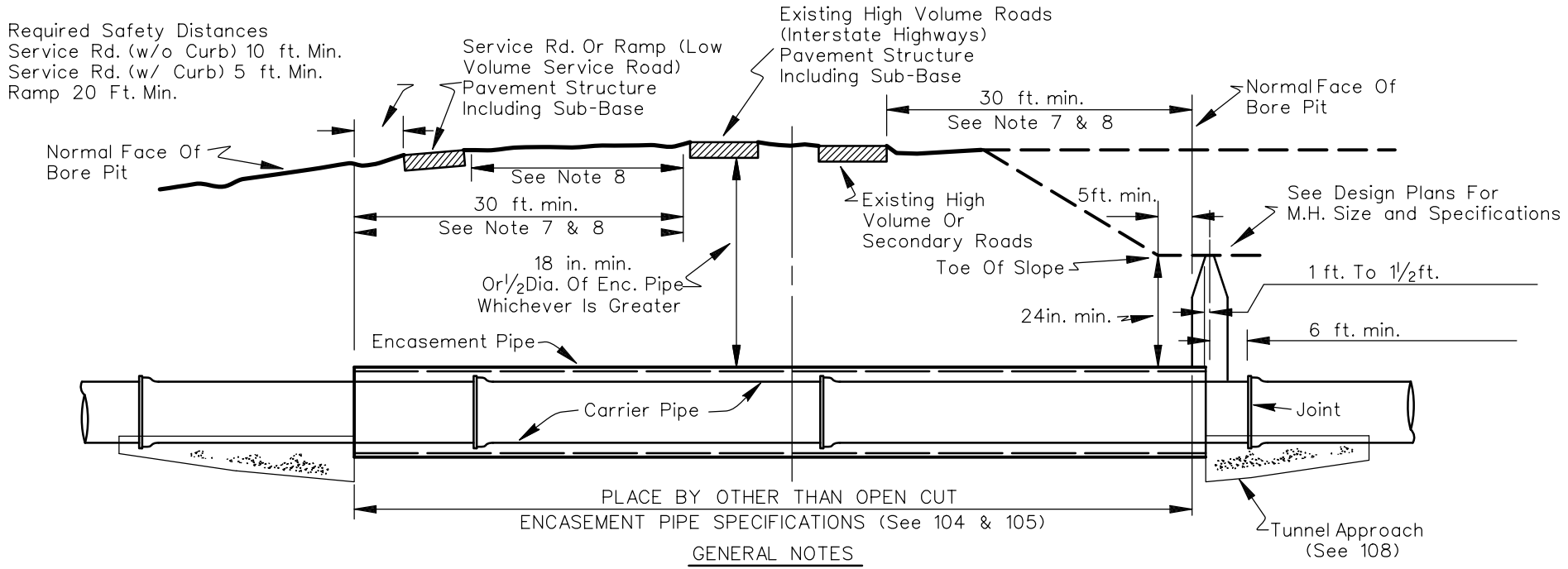
1. Carrier Pipe To Be Made Up Outside The Encasement Pipe And Pushed Through WIth The Bell Of The Pipe Resting On The Encasement Pipe Or A Class "B" Concrete Cradle Where Applicable.
2. Carrier Pipe Shall Be Supported On A Continuous Class "B" Concrete Cradle, Within Corrugated Metal And Flange Liner Encasements.
3. Carrier Pipe Must Be Restrained (Weighted) In Place Prior To The Placing Of Grout To Prevent The Carrier Pipe From Floating.
4. Construct Tapered Concrete Tunnel Approach At Each End Of Enc. Pipe. See Detail On 108.
5. The Contractor Must Submit An Encasement Design For Approval By The Owner. For Encasement Pipes Great Than 15 Inches (I.D.), The Submittal Must Be Sealed By A Professional Engineer Restered Within The State Of Texas.
6. Where Circumstances Necessitate The Excavation Of A Bore Pit Or Trench Closer To The Edge Of Pavement Than Set Forth On This Sheet, Guard Fence Or Other Approved Protective Devices Will Be Installed For The Protection Of The Traveling Public.
7. If Construction Site Is Wider Than Required Safety Distances And If Side Slopes Will Allow, Construction Of Bore Pits May Be Allowed (With Tx.D.O.T. Approval) But Access To Those Pits Must Be By Means Other Than Main Traffic Lanes.
8. In Tunnel Sections, Voids Between Earth Or Rock & Enc. Pipe Shall Be Filled With 1:7 Grout Including 5% Air Entrainment By Pressure Injection.
9. In Tunnel Sections, Voids Between Encasement Pipe And Carrier Pipe Shall Be Filled With 1:7 Grout Including 5%-40% Air Entrainment By Pressure Injection.

NCTCOG Spec: 509.2 - State Highway Crossing
NCTCOG Spec:702.3.4 - Quality Of Concrete

REFER TO PAGES: 103 104 105 106 107 108 109

HIGHWAY CROSSING FOR ALL WASTEWATER MAINS & FOR WATER MAINS 12" & UNDER IN DIAMETER.		COD	(Page No.) 102
		DATE JULY. 2021	

TYPICAL FOR HIGHWAY CROSSING FOR WATER MAINS OVER 12in. (30.5cm.) DIAMETER



GENERAL NOTES

1. There Shall Be A Minimum Of Two Hold-Down Jacks or Pipe Spacers Per Carrier Pipe Joint, See 109.
2. Carrier Pipe Shall Be Supported On A Continuous Class "B" Concrete Cradle, Within Corrugated Metal And Flange Liner Encasements.
3. Construct Tapered Concrete Tunnel Approach At Each End Of Enc. Pipe. See Detail On 108.
4. When Standard Pipe Is Made Up Inside Larger Enc. Pipe, The Carrier Pipe Shall Be Laid To Grade On A Class "B" Concrete Embedment Which Shall Extend To The 1/4 Point Of The Diameter Of The Carrier Pipe. When Mechanical Joint Pipe Is Used As A Carrier Pipe In Larger Enc. Pipe, Precast Concrete Blocks May Be Placed Back Of Each Bell. Each Block Will Have Minimum Dimensions Of 9 in. In Length By 0.866 "D" In Breadth (Where "D" Is The External Diameter Of The Placed Carrier Pipe) With A Sufficient Thickness To Clear The Bells From The Enc. Pipe And To Bring The Carrier Pipe To Grade.
5. Where Circumstances Necessitate The Excavation Of A Bore Pit Or Trench Closer To The Edge Of Pavement Than Set Forth On This Sheet, Guard Fence Or Other Approved Protective Devices Will Be Installed For The Protection Of The Traveling Public.
6. If Construction Site Is Wider Than Required Safety Distances And If Side Slopes Will Allow, Construction Of Bore Pits May Be Allowed (With Tx.D.O.T. Approval) But Access To Those Pits Must Be By Means Other Than Main Traffic Lanes.
7. The Contractor Must Submit An Encasement Design For Approval By The Owner. For Encasement Pipes Greater Than 15 Inches (I.D.), The Submittal Must Be Sealed By A Professional Engineer Registered Within The State Of Texas.
8. In Tunnel Sections, Voids Between Earth Or Rock & Enc. Pipe Shall Be Filled With 1:7 Grout Including 5% Air Entrainment By Pressure Injection.
9. In Tunnel Sections, Voids Between Encasement Pipe And Carrier Pipe Shall Be Filled With 1:7 Grout Including 5%-40% Air Entrainment By Pressure Injection.
10. Foam Grout Is An Acceptable Type Of Grout.

REFER TO PAGES:
102, 104, 105, 106, 107, 108 & 109

NCTCOG Spec: 509.2 - State Highway Crossing
NCTCOG Spec: 702.3.4 - Quality Of Concrete

HIGHWAY CROSSING FOR WATER MAINS OVER 12" DIAMETER

COD		(Page No.) 103
DATE JULY. 2021		

ENC. PIPE I.D.	2 FLNG. LINER H-20-L.L.		4 FLNG. LINER H-20-L.L.		CORRUGATED METAL		COUPLING BAND		R.C. CULVERT PIPE					STEEL PIPE	
	Gauge	Max. Cov.	Gauge	Max. Cov.	Gauge	Max. Cov.	Min. Width	Gauge	Class	Wall	For Open-Cut Maximum Cover Ft. (M) Embedment			Wall Thick.	Max. Cov.
in.	Ga.	Ft.	Ga.	Ft.	Ga.	Ft.	In.	Ga.			Class "C"	Class "B"	Class "A"	In.	Ft.
12"	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT ALLOWED IN TxDOT. DISTRICT 18 OR CITY OF DALLAS		NOT ALLOWED IN TxDOT. DISTRICT 18 OR CITY OF DALLAS				NOT ALLOWED IN TxDOT. DISTRICT 18 OR CITY OF DALLAS			3/16"	∞
15"														1/4"	∞
18"														1/4"	∞
21"														5/16"	∞
24"														3/8"	∞
27"														7/16"	∞
30"														7/16"	∞
36"														1/2"	∞
42"														1/2"	∞
48"	14	∞	12	∞											
54"	14	∞	12	∞											
60"	14	∞	12	∞											
66"	14	∞	12	∞											
72"	14	∞	12	∞											
	ALT. "B"													ALT. "D"	

NOTE:
∞ Infinity

HIGHWAY CROSSING ENCASEMENT PIPE, GAUGE, CLASS, COVER

DWU

(Page No.) 104

DATE OCT. 2009

ENC. PIPE I.D.	2 FLNG. LINER H-20-L.L.		4 FLNG. LINER H-20-L.L.		CORRUGATED METAL		COUPLING BAND		R.C. CULVERT PIPE					STEEL PIPE	
	Gauge	Max. Cov.	Gauge	Max. Cov.	Gauge	Max. Cov.	Min. Width	Gauge	Class	Wall	For Open-Cut Maximum Cover Ft. (M) Embedment			Wall Thick.	Max. Cov.
in.	Ga.	Ft.	Ga.	Ft.	Ga.	Ft.	In.	Ga.			Class "C"	Class "B"	Class "A"	In.	Ft.
78"	12	∞	12	∞											
84"	12	∞	12	∞											
90"	10	∞	10	∞											
96"	10	∞	10	∞											
102"	10	∞	10	∞											
108"	10	∞	8	∞											
114"	8	∞	8	∞											
120"	8	∞	8	30'											
126"	8	31'	8	27'											
126"	8	29'	8	22'											
138"	8	28'	8	22'											
	ALT. "B"													ALT. "D"	

NOT ALLOWED IN TxDOT DISTRICT 18 OR CITY OF DALLAS

NOTE:
∞ Infinity

HIGHWAY CROSSING ENCASEMENT PIPE, GAUGE, CLASS, COVER

DWU

(Page No.) 105

DATE OCT. 2009

STATE HIGHWAY CROSSINGS

All State Highway crossings shall conform to Tx.D.O.T.'s Public Transportation Utility Accommodation Policy Manual Special Specifications, and the following requirements:

All excavations within the State controlled right-of-way shall be back filled by tamping in 6 inch horizontal layers. All surplus material shall be removed from the right-of-way and the excavation area shall be restored flush with the surrounding natural ground.

All areas of sod that are disturbed by the construction operations are to be restored at completion of project. Areas with slopes of 2% or less are to be restored by mulch sodding. Areas with slopes greater the 2% are to be restored with block sod.

Crossings below paved roadways by water and wastewater mains within the State controlled right-of-way are to be installed by boring or tunneling methods. Optional "Wet"bore or "Slurry" bore methods must be approved by Tx.D.O.T. Water or other fluids used in the boring operation may only be used for lubricating the cutting head of the tunneling machine. Bores may not be installed by water jetting or jacking.

Highway crossings for all wastewater lines and water lines 12 inches and under will require an encasement pipe at least 2 inches greater than the largest outside diameter of the carrier pipe. The diameter of the encasement pipe for water lines over 12 inches will be determined by the Design Engineer and indicated on design plans. Encasement pipes will be of sectional liner or smooth bore steel pipe to suit conditions of crossing. Manholes will be specified on design plans. For all mains, voids between encasement and carrier pipe will be filled with 1:7 Grout with 5% Air Entrainment. Regardless of method used for installing the encasement pipe, it will be installed with even bearing throughout its length, and all voids between the encasement pipe and the earth or rock shall be filled with grout. Timber supports shall not be used. Trench excavations and bore pits shall not be closer than 30 feet from the edge of the nearest through traffic lane of High Volume Roadways. For other paved areas (Service Roads), open trenching and bore pits shall not be closer than 10 feet from the edge of pavement or 5 feet from the face of curb. The carrier pipe will be the kind and class designed to carry the water and wastewater. No explosives shall be used within limits of Highway without written permission from the Tx.D.O.T.

See 102, 103, 104, 105, 107

NCTCOG Spec: 509.2 - State Highway Crossing

STATE HIGHWAY CROSSINGS
Continued

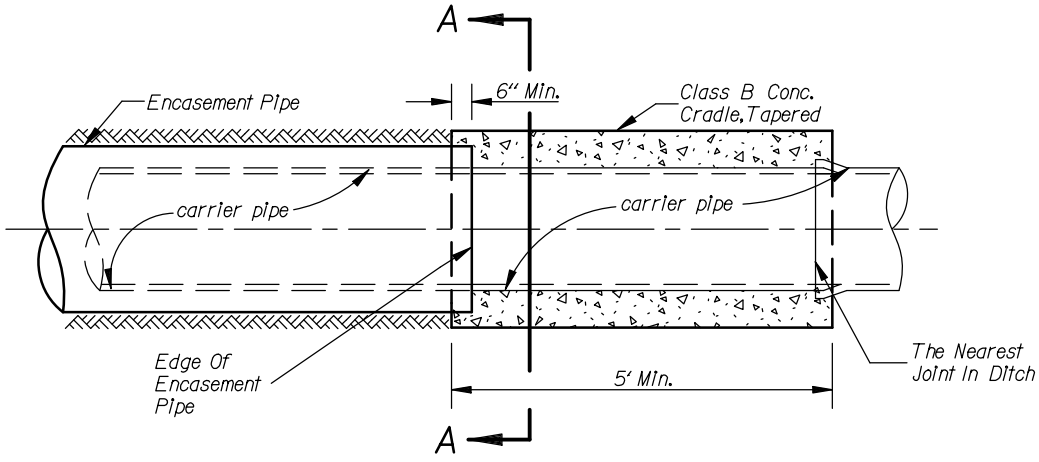
Depth of Cover

If depth of cover is insufficient to support live and dead loads, encasement or carrier pipe shall be installed concurrently as excavation of hole progresses so as to leave no more than 2 linear feet of unprotected hole at one time.

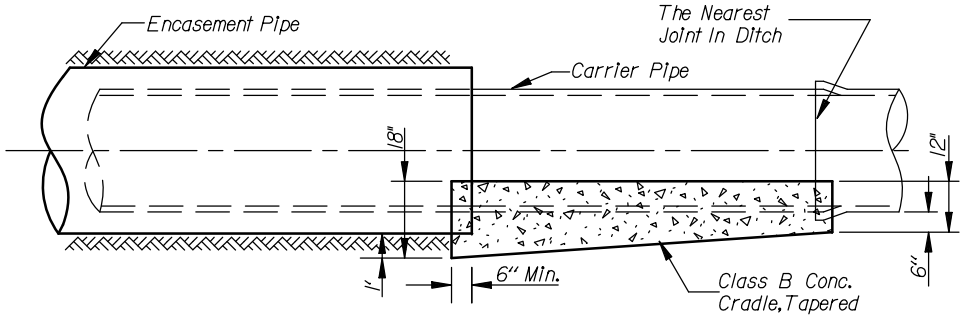
Open Cutting Of Pavement

Specific Tx.D.O.T. written approval is required for open cutting of all State Highway pavements. Any approved open cutting of pavement must conform to the special Tx.D.O.T. specification "Utility Facilities Involving Open Cutting of Pavement".

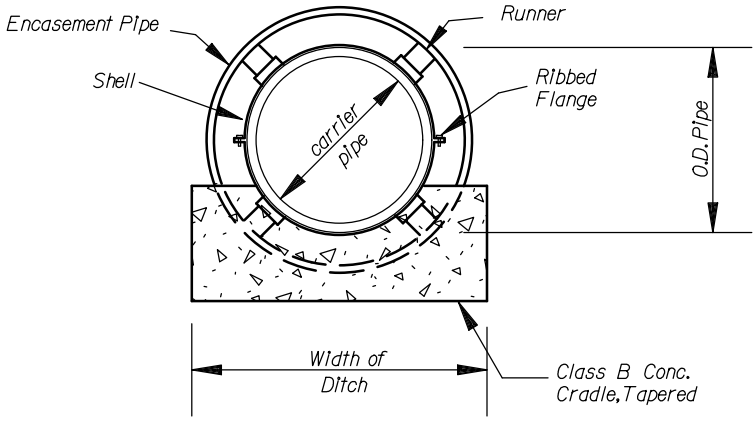
See 102, 103, 104, 105, 106



PLAN VIEW

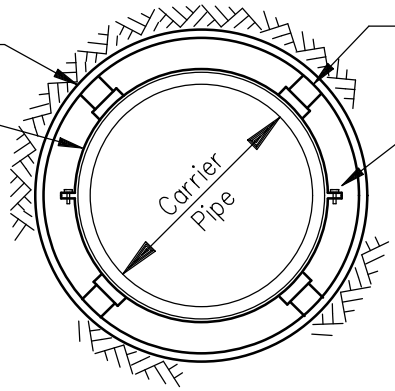


PROFILE VIEW



SECTION A-A

TUNNEL APPROACHES WITH CASING SPACERS		DWU	(PAGE No.) 108
		DATE OCT. 2009	

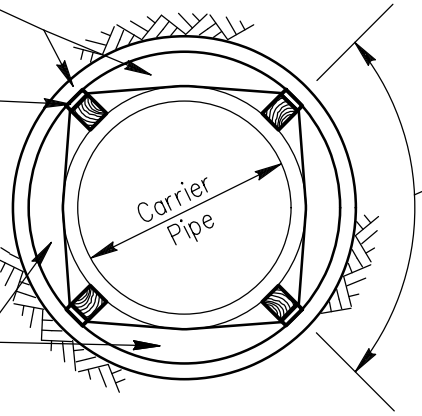


CASING SPACERS SEPARATION

A Maximum Of 10' Separation Between Spacers If Pipe Is To Be Grouted

A Maximum Of 7' Separation Between Spacers If Pipe Is Not To Be Grouted

CASING SPACERS



Evenly Space Skids

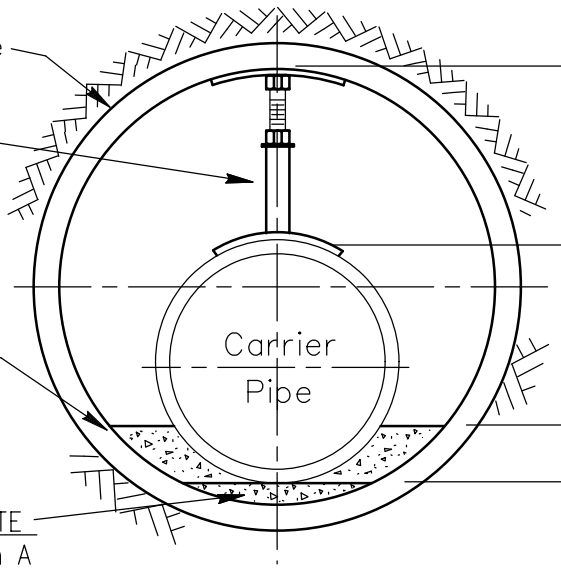
4 Skids For 12" Or Less Carrier Pipes

6 Skids For Carrier Pipes Larger Than 12"

Skids Shall Be Evenly Spaced Around Carrier Pipe

Skids Shall Be Trimmed And Shimmed As Necessary To Maintain Grade On Wastewater Mains.

WOODEN SKIDS



Hold-Down-Jacks
Minimum 2 Per Pipe Joint If Accessible Or 1 Per Pipe Joint If Not Accessible (See Fabrication Detail Pg.109A)

FOR STEEL ENCASEMENT PIPE

Carrier Pipe Is to Rest On Bottom Of Encasement Pipe

Concrete Cradle
1/4 O.D. Of Carrier Pipe

FOR FLANGED LINER PLATE

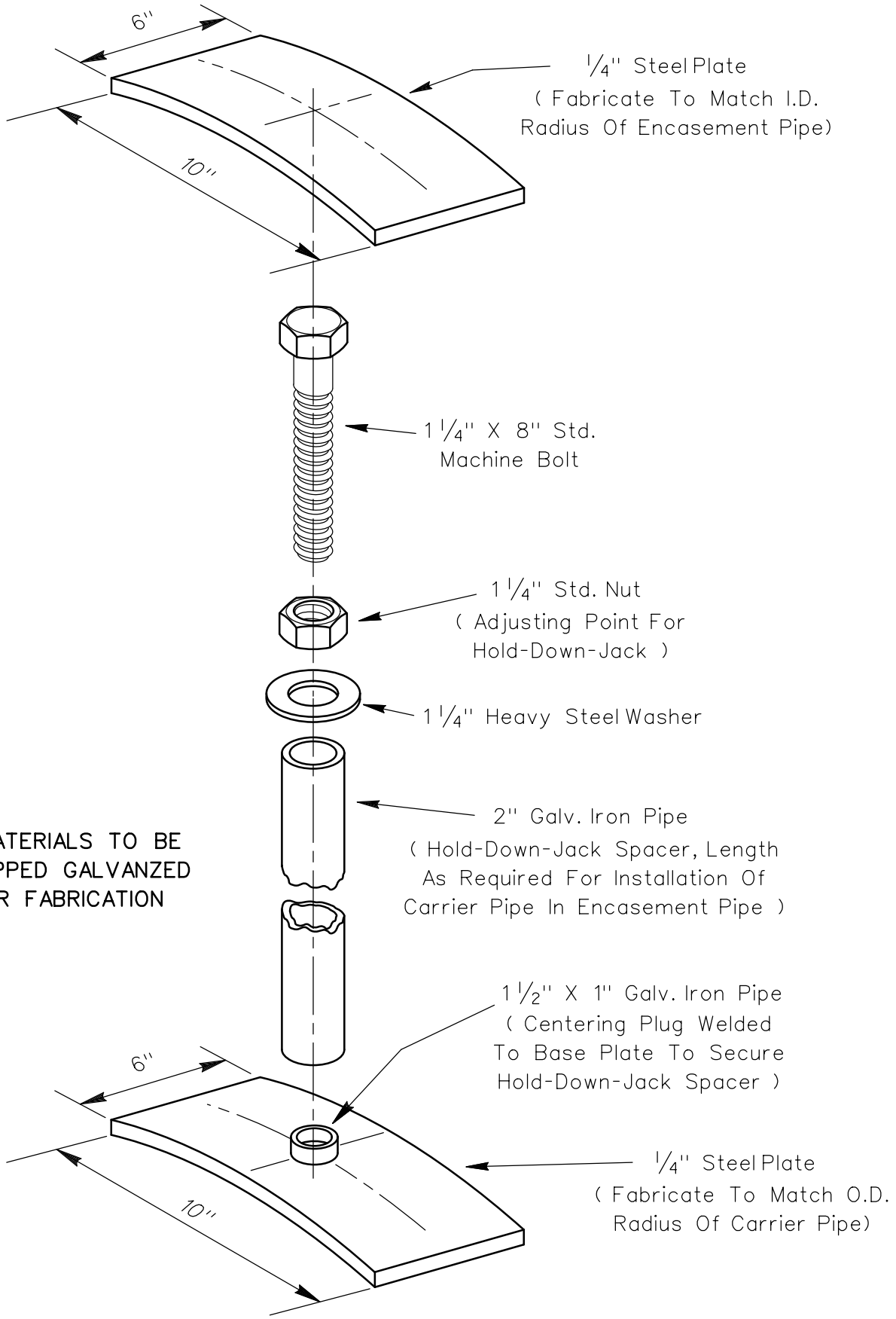
Carrier Pipe Is To Rest On A 6" Thick Concrete Pad.

HOLD-DOWN-JACK

Hold-Down-JacksTo Be Used OnWater Mains ONLY

CARRIER PIPE SUPPORT (TUNNEL)

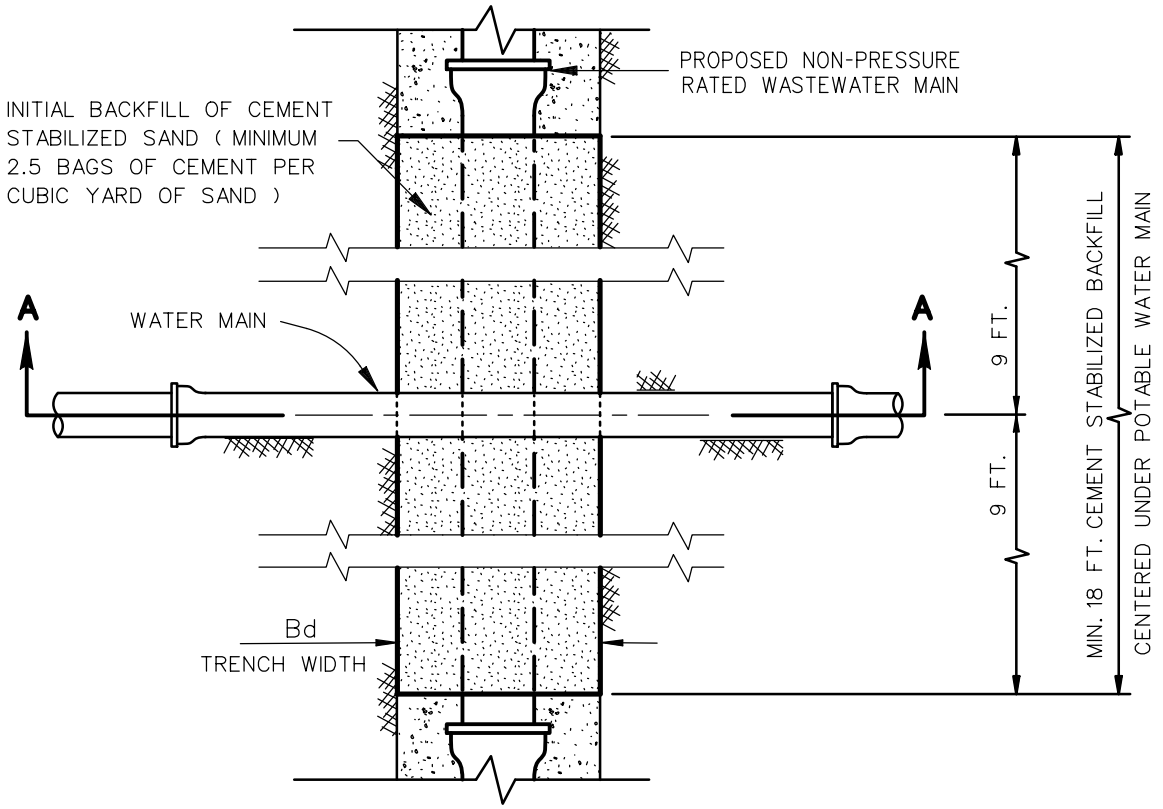
DWU		(PAGE No.) 109
DATE OCT. 2015		



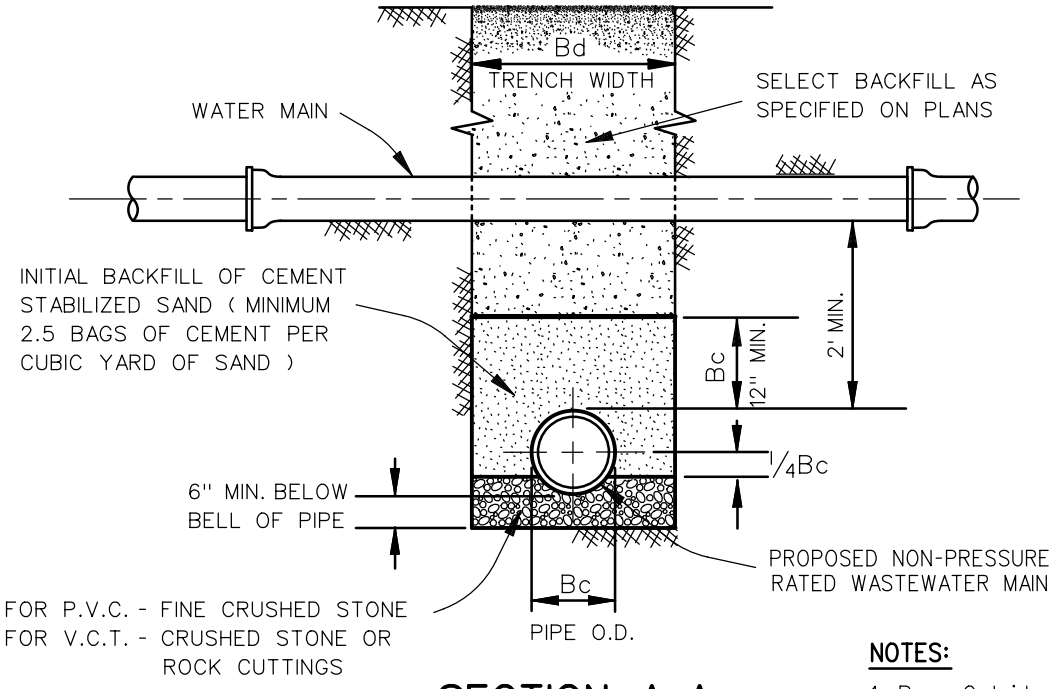
ALL MATERIALS TO BE
HOT DIPPED GALVANZED
AFTER FABRICATION

HOLD-DOWN-JACK FABRICATION DETAIL

DWU		(PAGE No.) 109A
DATE DEC.2001		



SECTIONAL PLAN VIEW

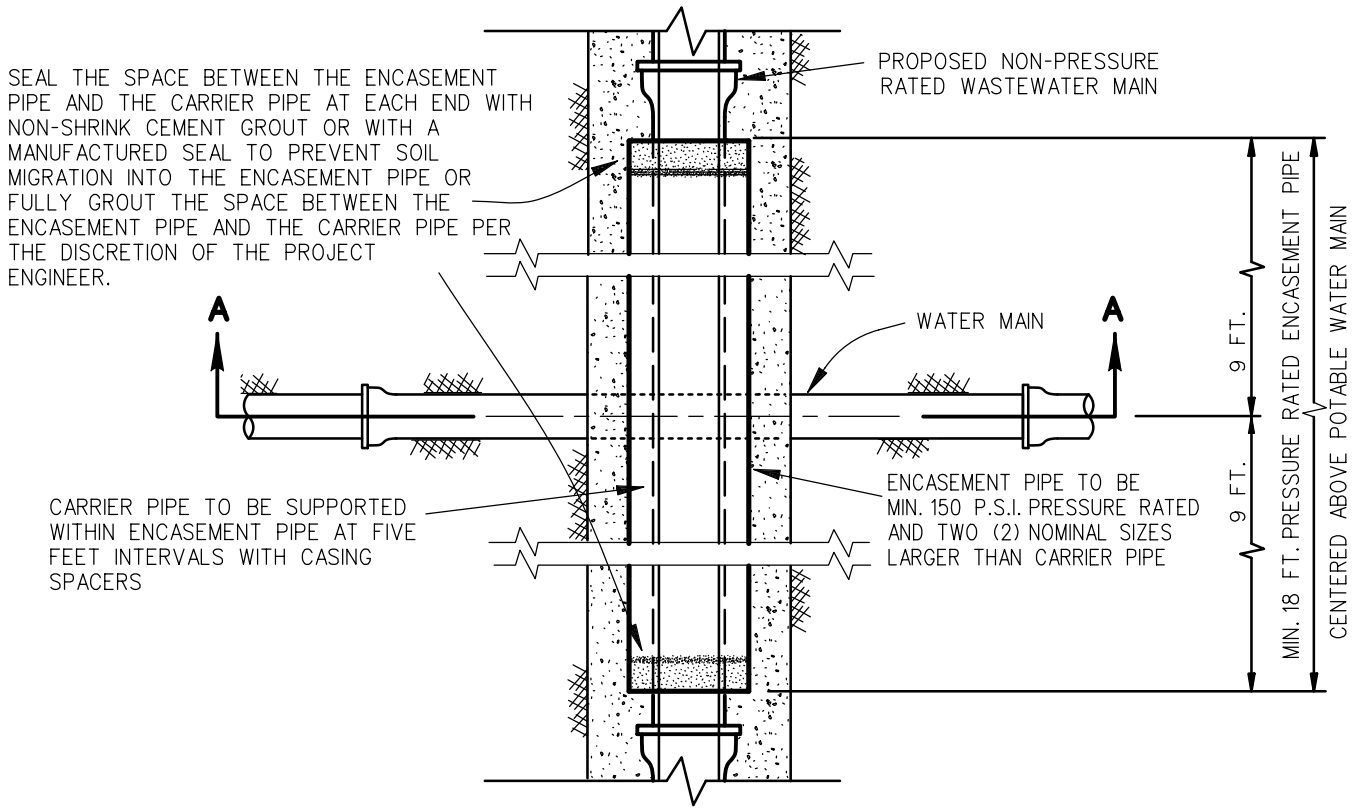


SECTION A-A

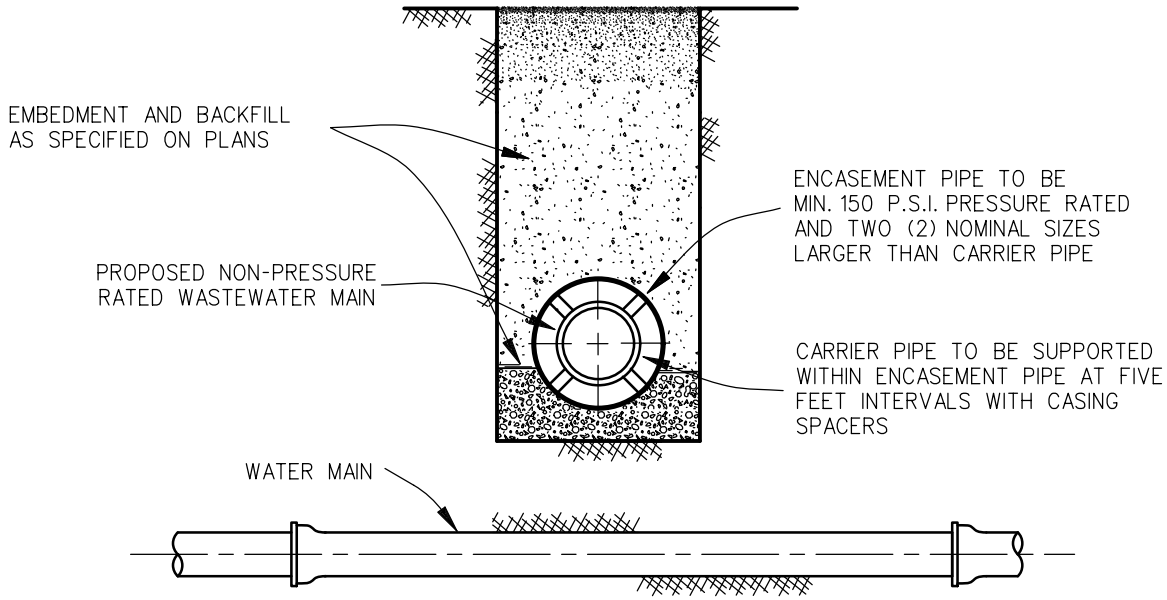
NOTES:

1. Bc = Outside Diameter Of Pipe
2. Bd = Trench Width (See Pg.112 for Calculation Of "Bd")

EMBEDMENT DETAIL FOR NON-PRESSURE RATED WASTEWATER MAINS BELOW WATER MAINS		DWU	(PAGE No.) 110
		DATE OCT. 2009	

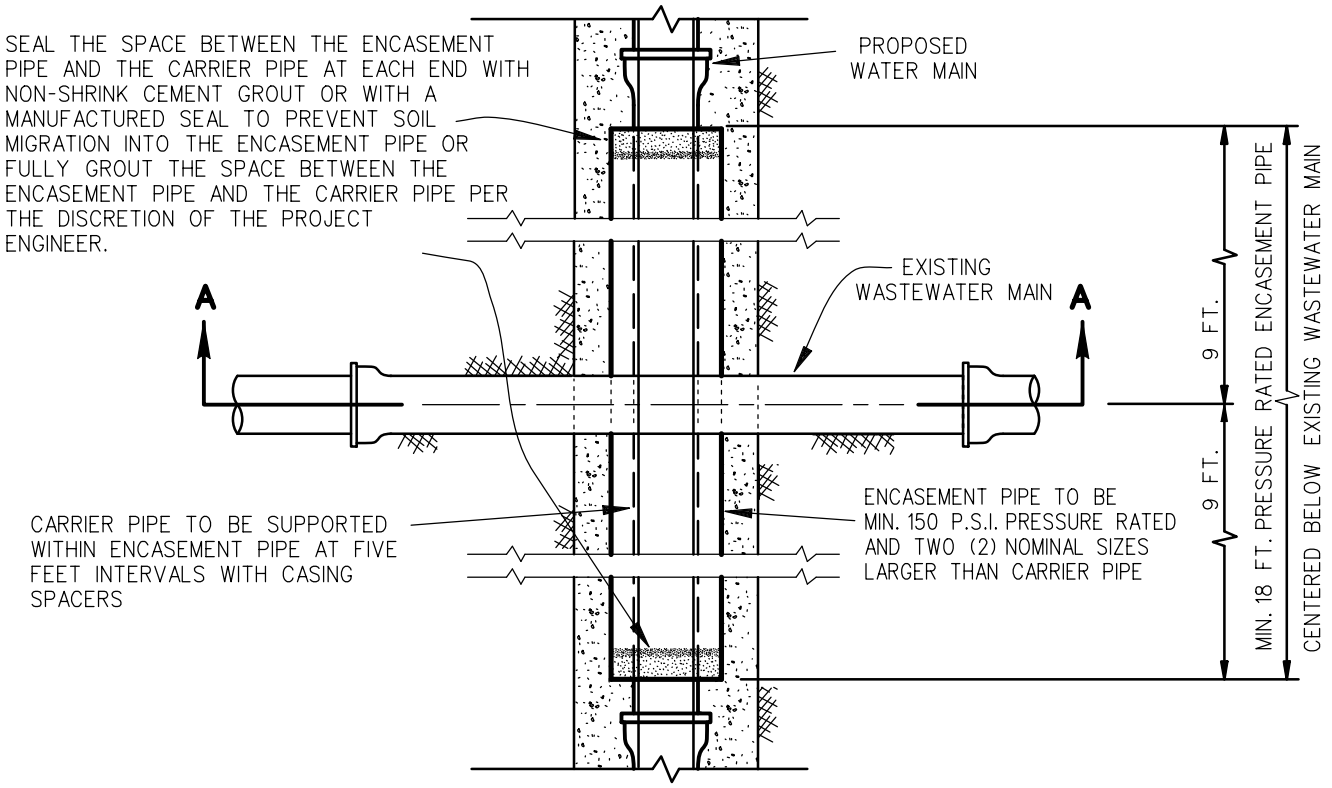


SECTIONAL PLAN VIEW

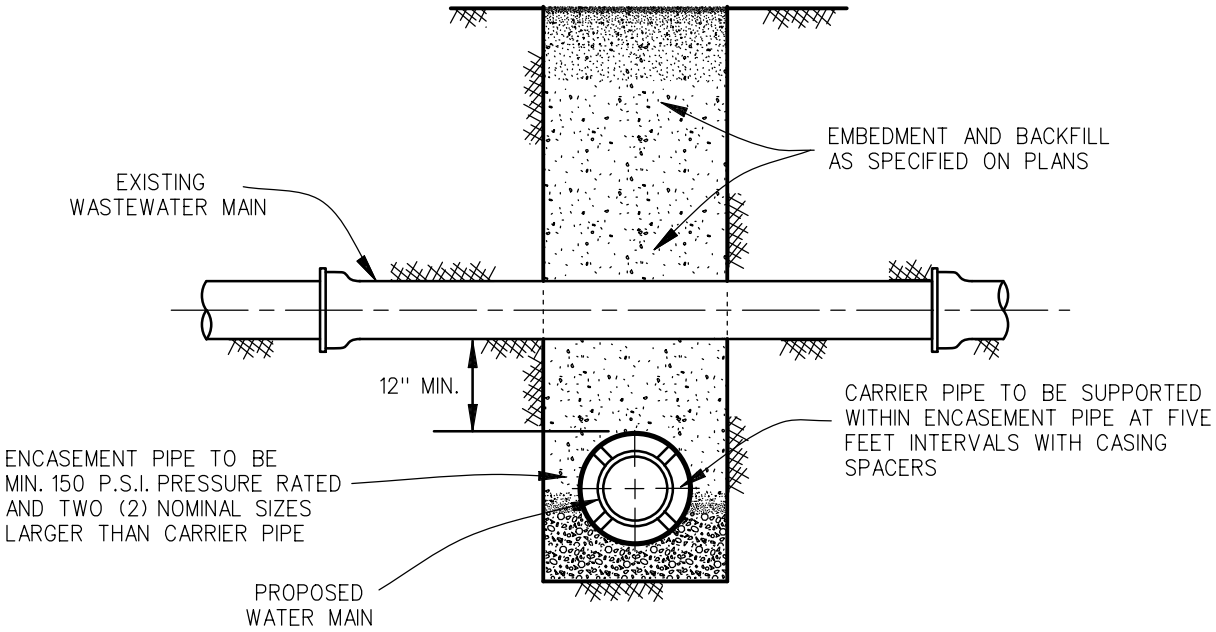


SECTION A-A

ENCASEMENT DETAIL FOR NON-PRESSURE RATED WASTEWATER MAINS ABOVE WATER MAINS		DWU	(Page No.) 111
		DATE OCT. 2009	



SECTIONAL PLAN VIEW



SECTION A-A

ENCASEMENT DETAIL FOR PROPOSED WATER MAINS BELOW WASTEWATER MAINS

DWU		(Page No.) 111A
DATE OCT. 2009		

TRENCH WIDTH FOR WATER & WASTEWATER MAINS ARE LIMITED TO "Bd" AS CALCULATED BY THE FOLLOWING FORMULAS:

For 12" Diameter Pipe and Smaller :

Minimum - "Bd" (Trench Width) = Outside Diameter of Pipe Bell plus 12 inches or a minimum of 24", Whichever is greater

Maximum - "Bd" (Trench Width) = Shall Not Exceed 32"

For Pipe Diameters Greater Than 12" to 24" :

"Bd" (Trench Width) Shall Be Limited To Outside Diameter of Pipe Bell plus 12 inches

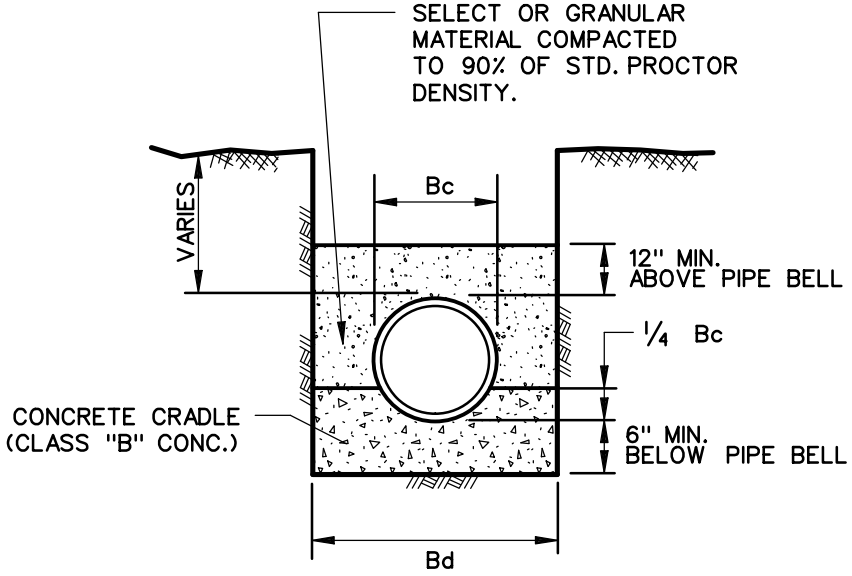
For Pipe Diameters Greater Than 24" to 72" :

"Bd" (Trench Width) Shall Be Limited To Outside Diameter of Pipe plus 24 inches

For Pipe Diameters Greater Than 72" :

"Bd" (Trench Width) Shall Be Limited To Outside Diameter of Pipe Times (X) 1.25 plus 12 inches

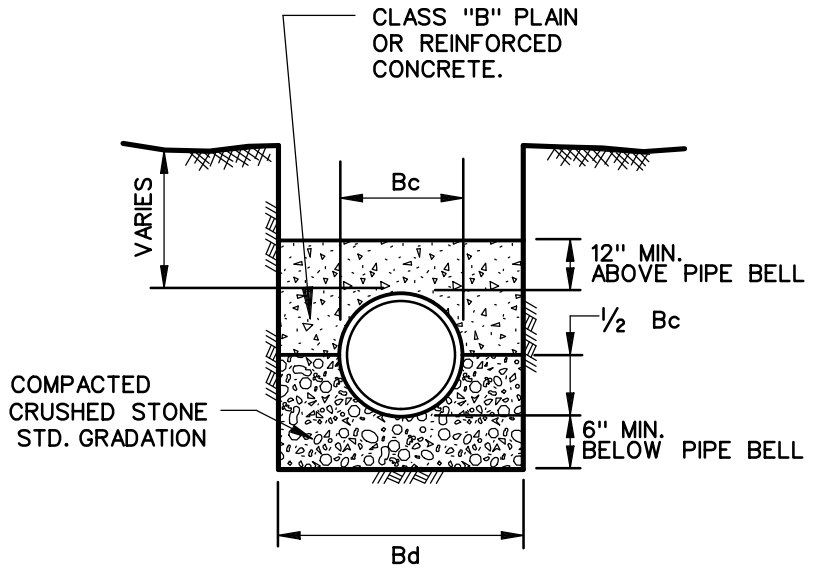
(REFER TO PAGES 113 THRU 119 FOR USAGE OF "Bd")



CLASS "A"

CLASS "B" CONCRETE CRADLE
PLAIN CONC. LF 2.8
REINF. CONC. LF 3.4 P=0.4%

N.T.S.



CLASS "A-1"

CLASS "B" CONCRETE CAP
PLAIN CONC. LF 2.8
REINF. CONC. LF 3.4 P=0.4%
REINF. CONC. LF 4.8 P=1.0%

N.T.S.

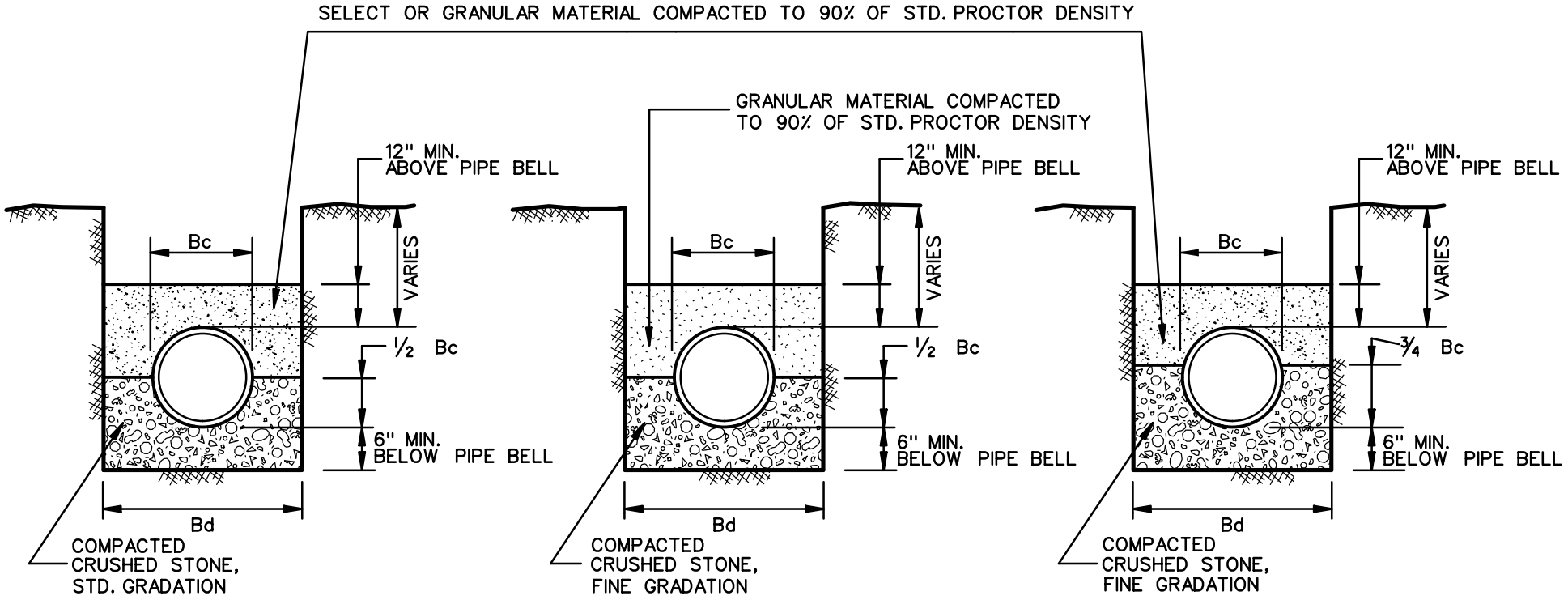
NOTES:

1. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
2. FREE-FALL OF CONCRETE NOT TO EXCEED 5 FT. MAXIMUM.
3. P = Rho FOR STEEL %
4. Bc = OUTSIDE DIAMETER OF PIPE
5. Bd = TRENCH WIDTH
6. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

EMBEDMENT
CLASS "A" & "A-1"

DWU	(PAGE NO.) 113
DATE JAN. 2010	



CLASS "B"

N.T.S.

L.F. = 1.9
E' = 700

CLASS "B+"

N.T.S.

BEDDING ANGLE 150°
L.F. = 1.9
E' = 700

CLASS "B-1"

N.T.S.

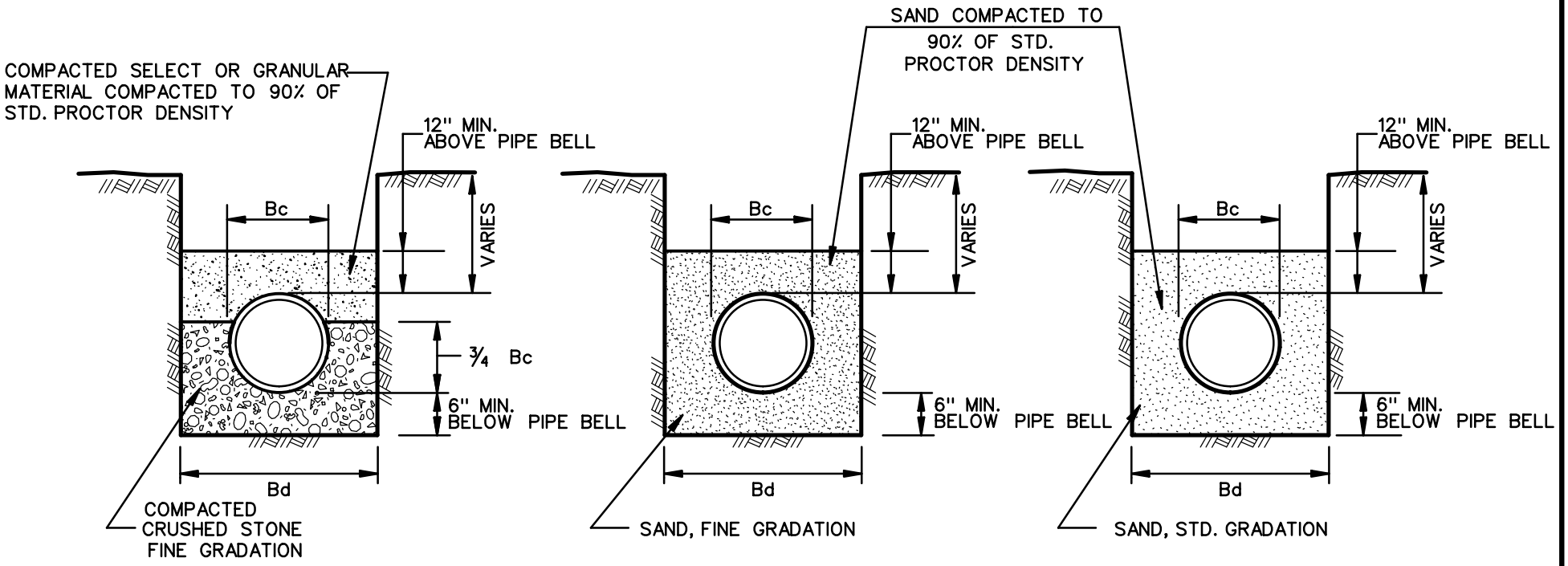
NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
4. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

EMBEDMENT
CLASS "B", "B+", & "B-1"

DWU	(PAGE NO.) 114
DATE OCT. 2011	



CLASS "B-2"

N.T.S.

CLASS "B-3"

N.T.S.

CLASS "B-4"

N.T.S.

NOTES:

1. Bc - OUTSIDE DIAMETER OF PIPE
2. Bd - TRENCH WIDTH
3. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

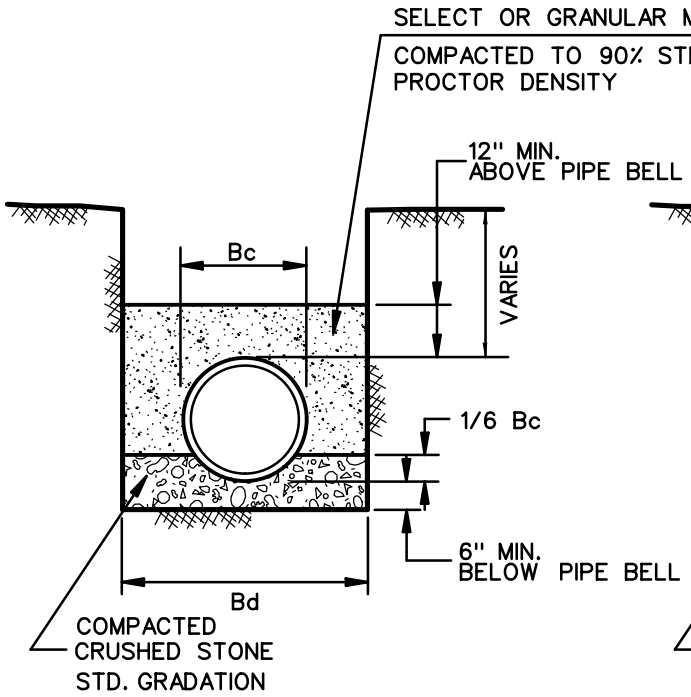
(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

EMBEDMENT
CLASS "B-2","B-3", & "B-4"

DWU

(PAGE NO.) 115

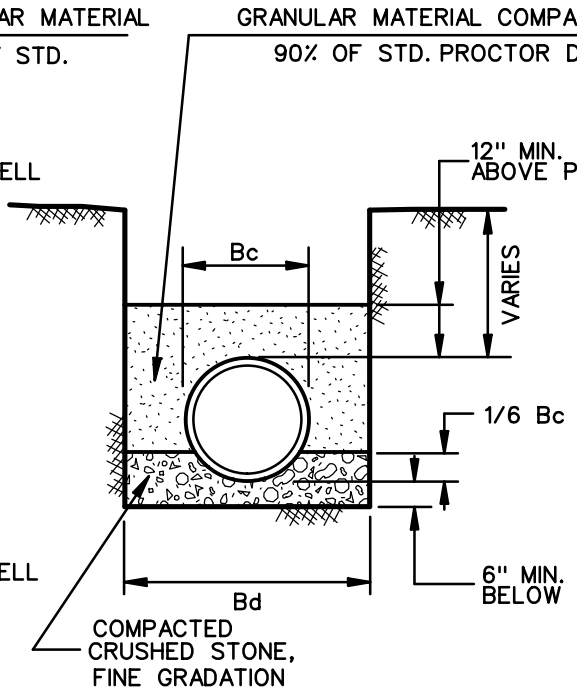
DATE JAN. 2010



CLASS "C"

N.T.S.

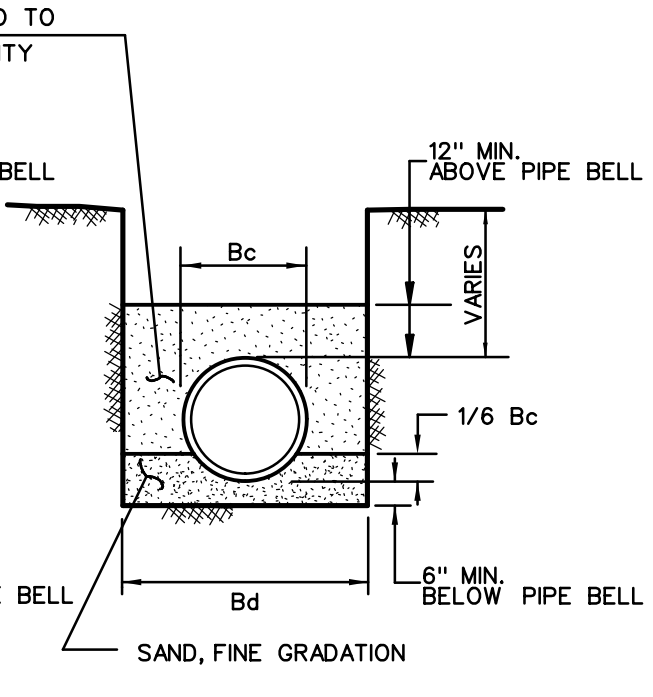
BEDDING ANGLE 75°
L.F. = 1.5
E' = 300



CLASS "C+"

N.T.S.

BEDDING ANGLE 75°
L.F. = 1.5
E' = 300



CLASS "C-1"

N.T.S.

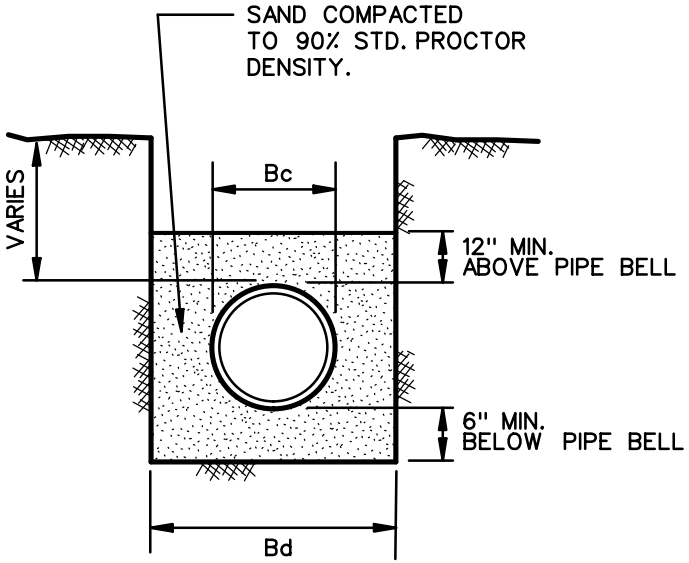
NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
4. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

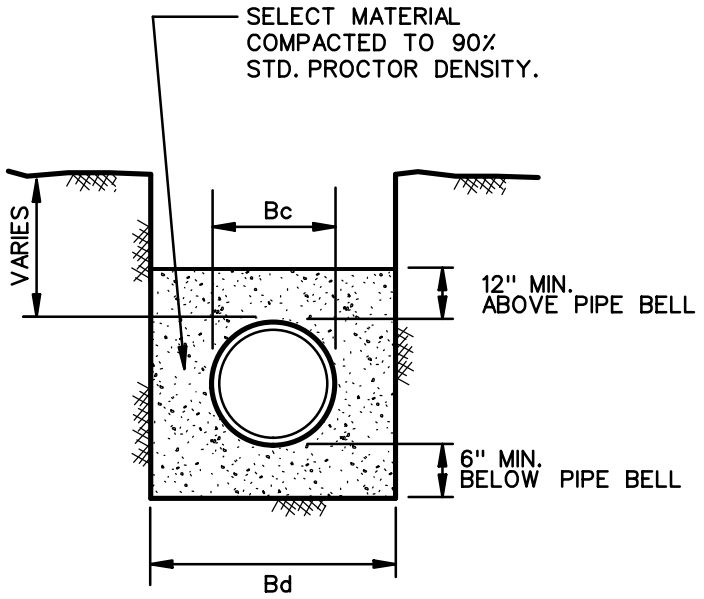
EMBEDMENT
CLASS "C", "C+", & "C-1"

DWU	(PAGE NO.) 116
DATE OCT. 2011	



CLASS "C-2"

N.T.S.



CLASS "D+"

N.T.S.

BEDDING ANGLE 30°
L.F. - 1.3
E' - 200

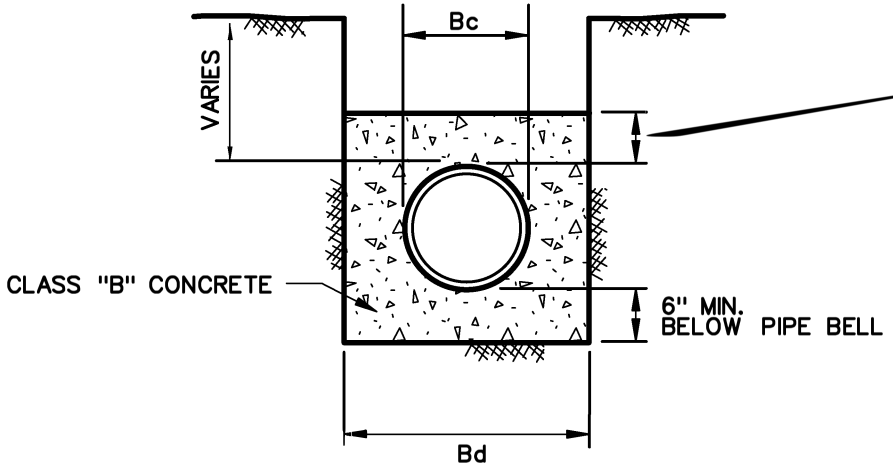
NOTES:

1. Bc - OUTSIDE DIAMETER OF PIPE
2. Bd - TRENCH WIDTH
3. LF. - LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
4. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

EMBEDMENT
CLASS "C-2" & "D+"

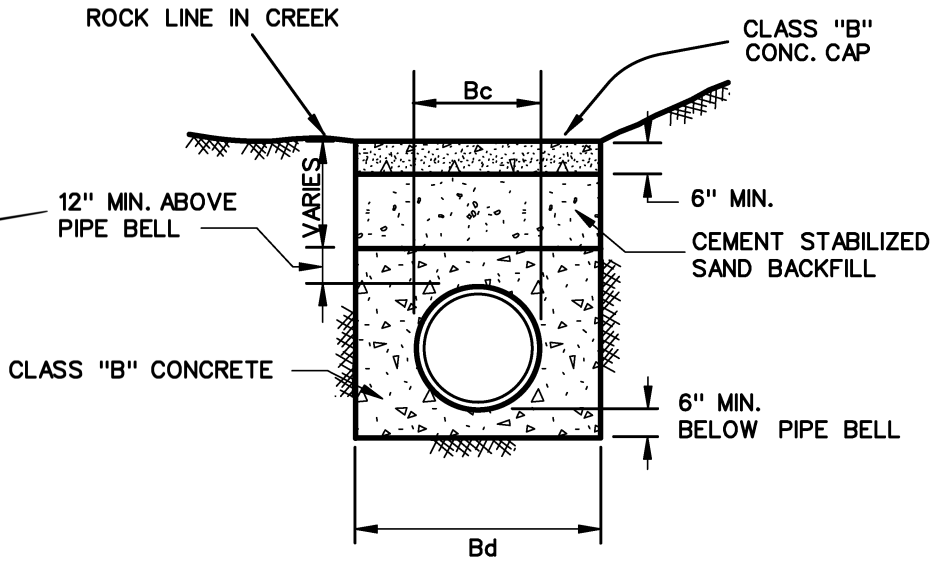
DWU		(PAGE NO.) 117
DATE OCT. 2011		



CLASS "G"

N.T.S.

L.F. = 4.2



CLASS "G-1"

(FOR ROCK DITCHES IN CREEKS)

N.T.S.

L.F.=4.2

NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
4. FREE-FALL OF CONCRETE NOT TO EXCEED 5 FT. MAXIMUM.
5. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

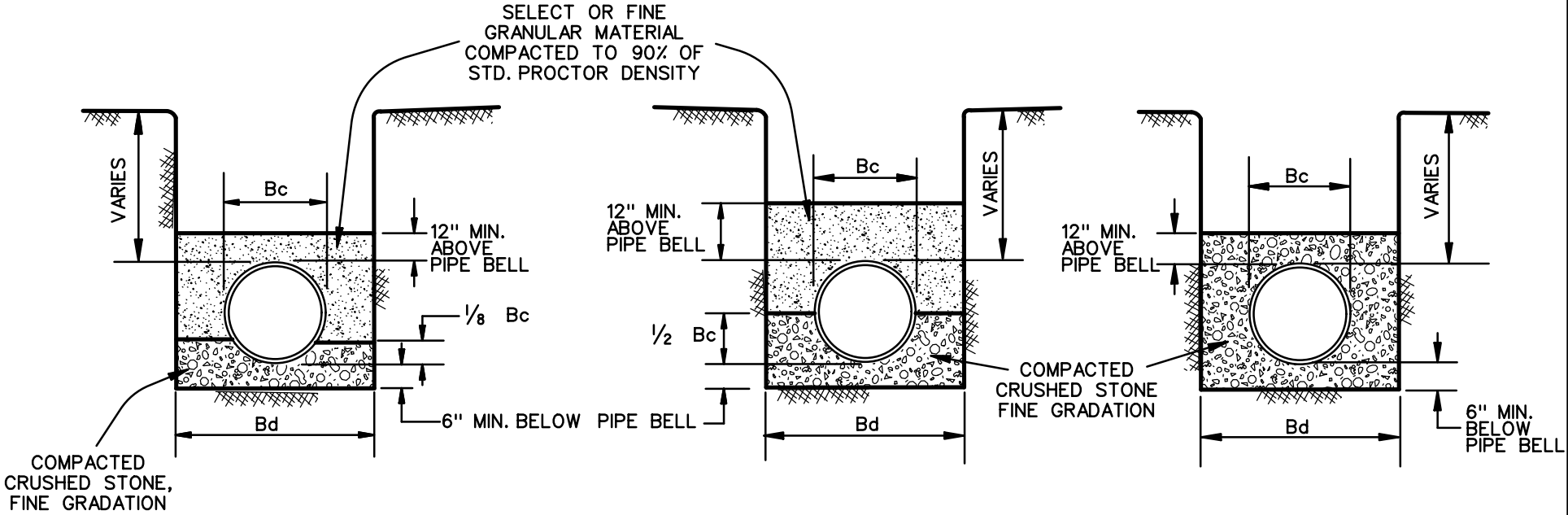
EMBEDMENT
CLASS "G" & "G-1"

DWU

(PAGE NO.) 118

DATE

OCT. 2011



CLASS "B-1a"

CLASS " B-2a "

CLASS " B-5 "

NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

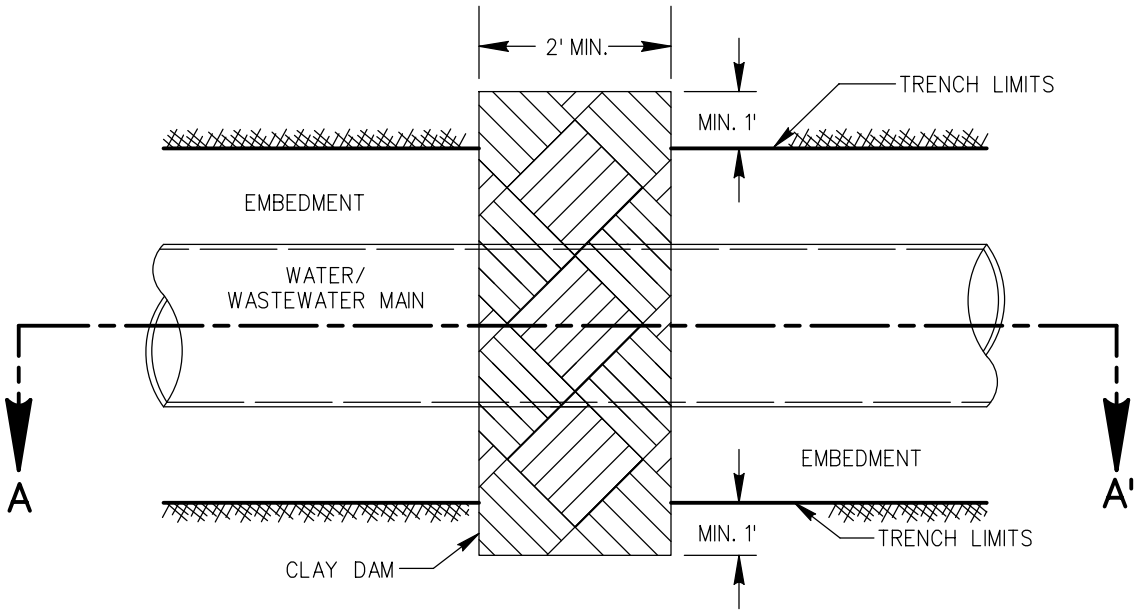
EMBEDMENT CLASS"B-1a","B-2a"&"B-5"

DWU

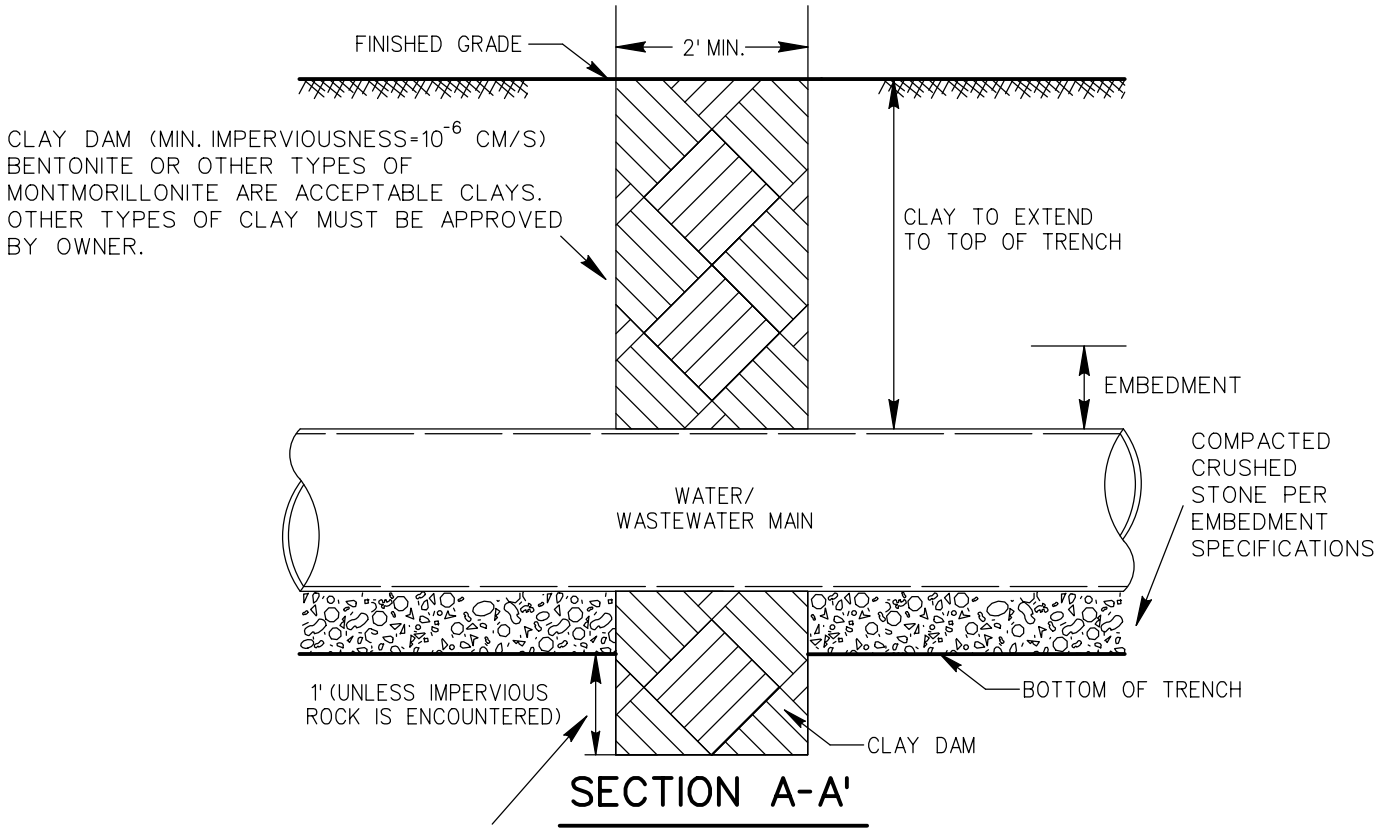
(PAGE NO.) 119

DATE OCT. 2011

CLAY DAMS SHALL BE PLACED AT CONTAMINATION PLUME LIMITS TO PREVENT CONTAMINANT CONVEYANCE THROUGH UTILITY TRENCH. PLACEMENT AND LOCATION OF DAMS ARE SUBJECT TO DWU APPROVAL.



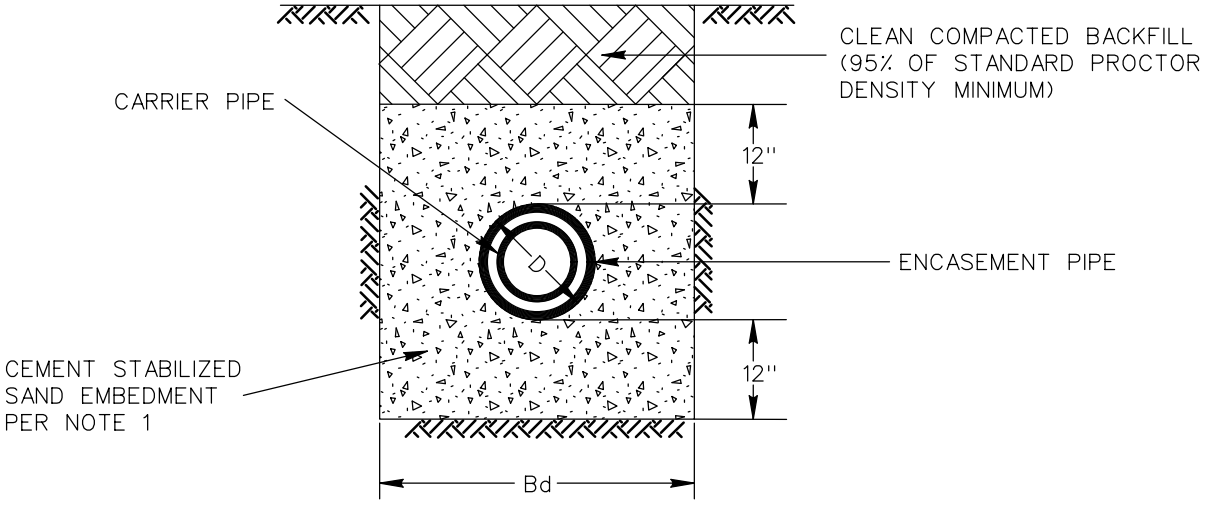
CLAY DAM PLAN VIEW



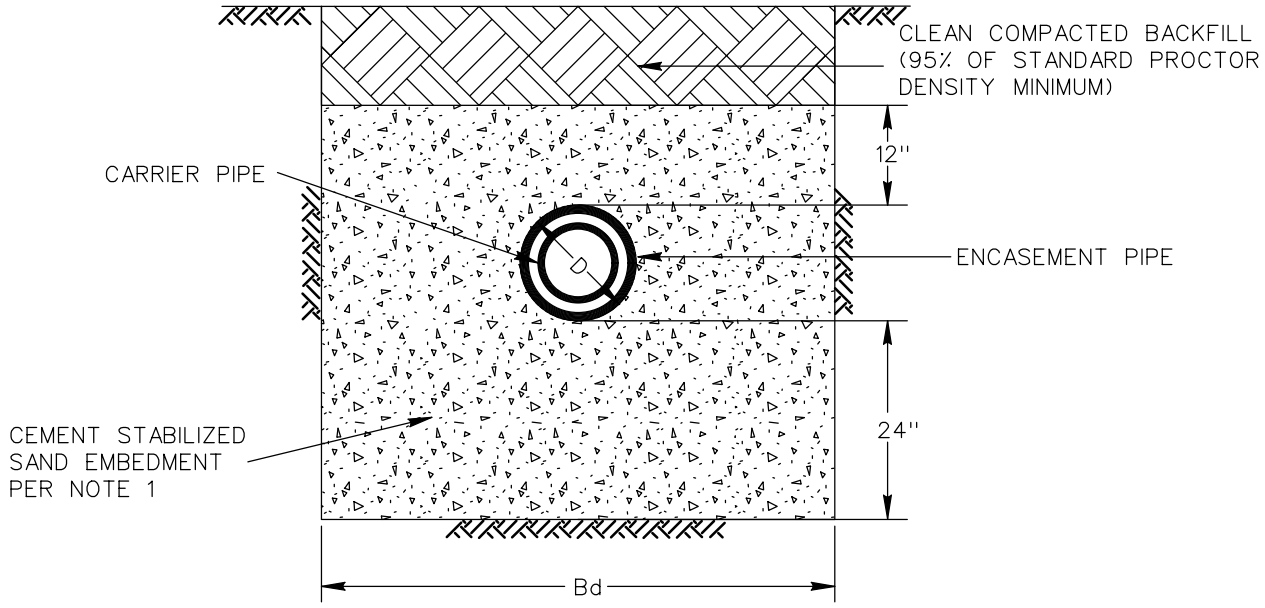
SECTION A-A'

REFER TO PAGES 112, 113, 114, 115, 116, 117, 118 & 119

CONTAMINATED SOIL CLAY CUT-OFF DAM		DWU	119A
		OCT. 2011	



TRENCH E-1 (CLEAN ZONE)
CEMENT STABILIZED SAND EMBEDMENT



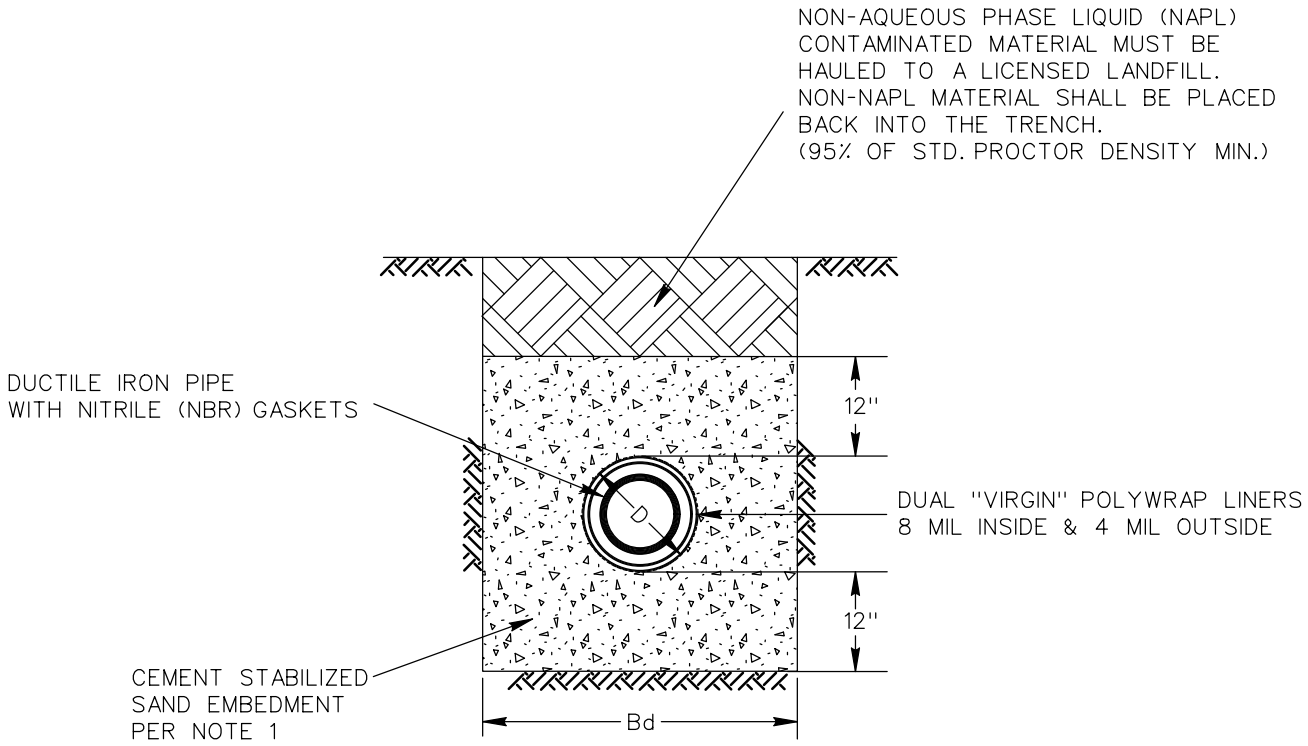
TRENCH E-2 (TRASH ZONE)
CEMENT STABILIZED SAND EMBEDMENT

DIMENSIONS NOTES:
1. D = Inside Diameter Of Containment Pipe
2. Bd = Trench Width Per Standard Drawing 112

Note 1: Cement stabilized sand shall have a minimum of 12% cement per cubic yard of cement stabilized sand mixture, based on loose dry weight volume (at least 3 bags of cement per cubic yard of mixture).

REFER TO PAGE 112

EMBEDMENT CLASS "E-1" & "E-2" LANDFILL		DWU	119B
		OCT. 2011	

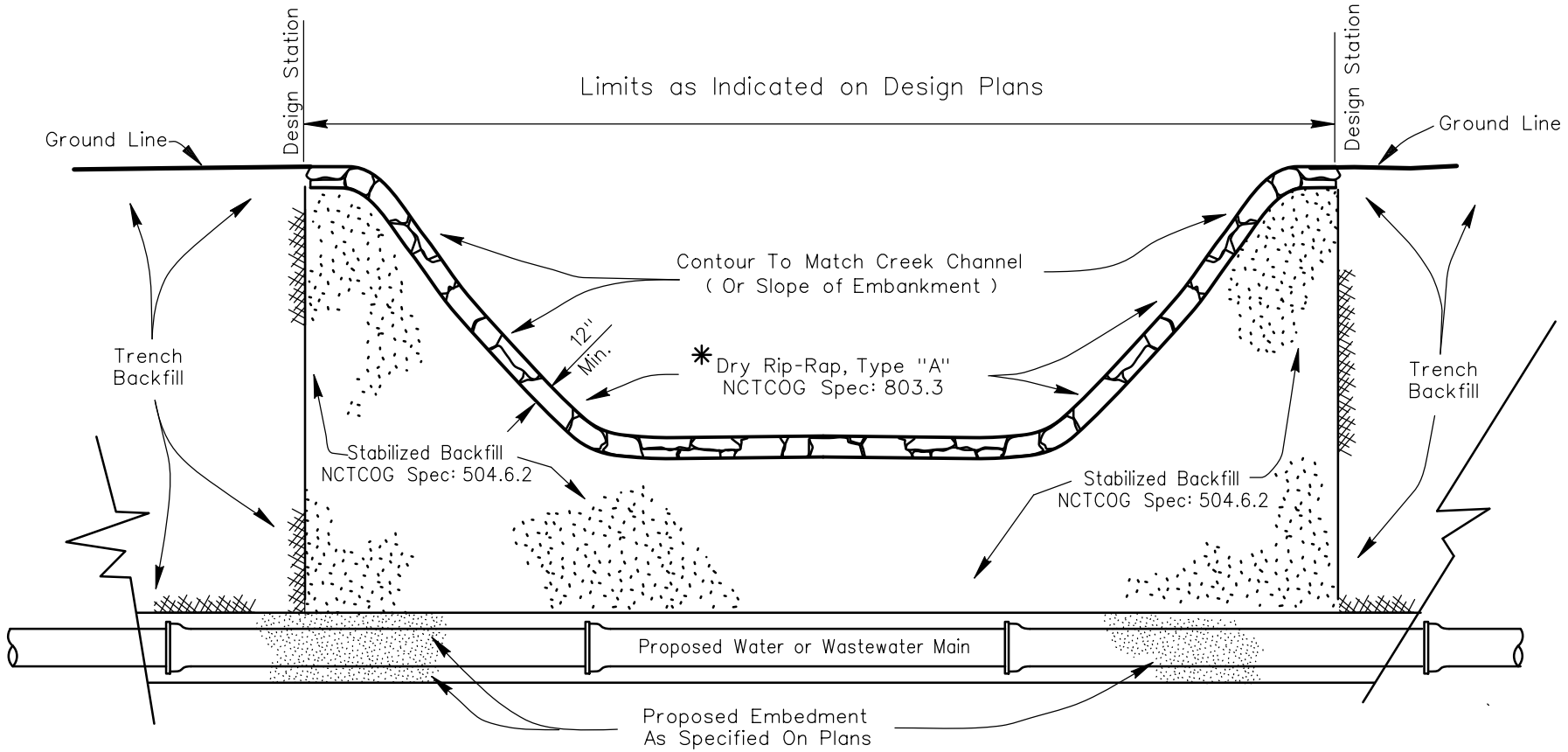


TRENCH E-3
"HIGH" CHEMICAL OF CONCERN ZONE

Note 1: Cement stabilized sand shall have a minimum of 12% cement per cubic yard of cement stabilized sand mixture, based on loose dry weight volume (at least 3.0 bags of cement per cubic yard of mixture). Minimum final permeability to be 10^{-6} cm/s.

EMBEDMENT CLASS "E-3" HIGH CHEMICAL OF CONCERN ZONE		DWU	119C
		OCT. 2011	

DETAIL SHOWN FOR CREEK CROSSING
(TYPICAL FOR EMBANKMENT SLOPE PROTECTION)



* OPTION
Dry Rip-Rap As Indicated on Design Plans.
Dry Rip-Rap to Span Disturbed Trench Width Area Plus 1 Ft. on Each Side.

NCTCOG Spec: 803.3 - Riprap
NCTCOG Spec: 504.6.2 - Stabilized Backfill
2021 COD Addendum: 803.3.4.DWU - Measurement And Payments

STABILIZED BACKFILL & RIP-RAP DETAIL FOR EMBANKMENT SLOPE PROTECTION		COD	(Page No.) 120
		DATE JULY. 2021	

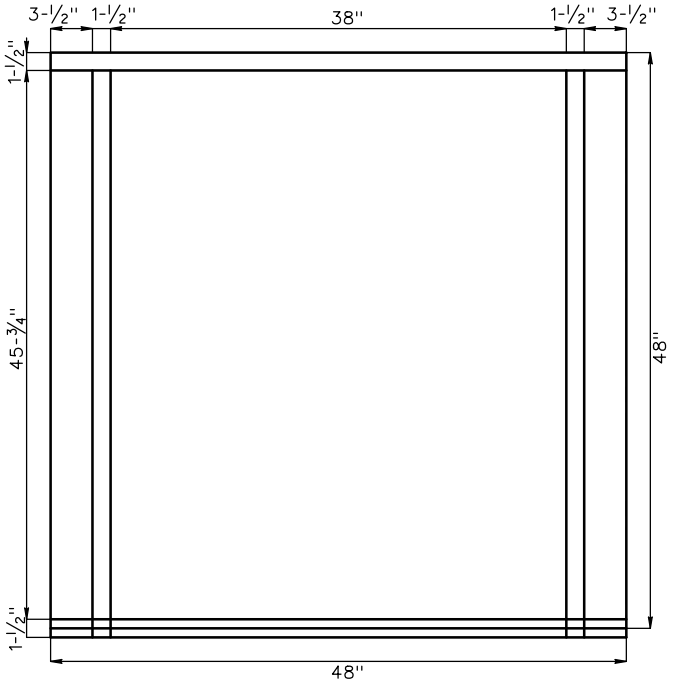
PROJECT CONSTRUCTION SIGN

NOT TO SCALE

PROJECT SIGN TECHNICAL SPECIFICATIONS

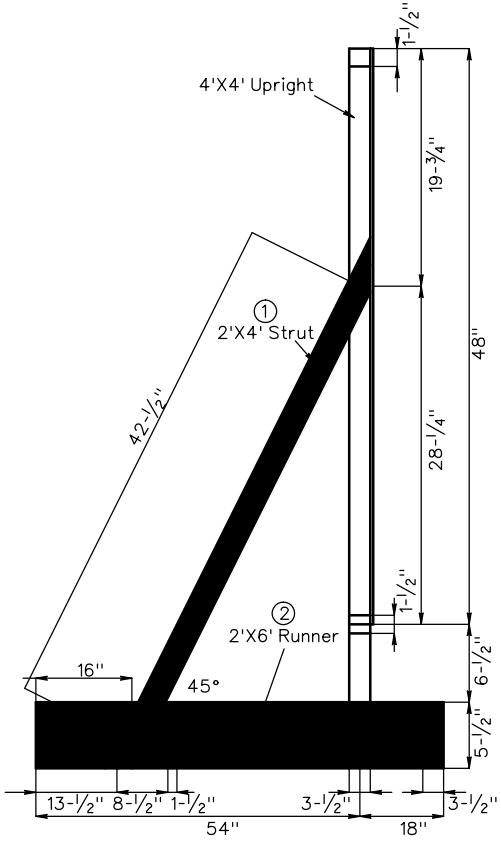
1) BOARD - 1/2" PRE-FINISHED (WHITE) SIGN GRADE,MDO PLYWOOD ("SIGN READY" FORMICA FINISH)
2) DALLAS SYMBOL AND THE DALLAS PLAN SYMBOL -LEFT-HAND SECTION OF SIGN
   1. Shaded Area - Painted With Bulletin Color Type, Sign Grade Enamel. Sign Color Per Department As Shown Below:
      a) Public Works And Transportation Department - Pantone 1945 (3M Burgundy), 4010106 Carmine, Or Approved Equal
      b) Dallas Water Utilities Department - Pantone 286 (3M Royal Blue), 4010152 Light Blue, Or Approved Equal
      c) Parks Department - Pantone 5753 (3M Moss Green), 4010144 Medium Green, Or Approved Equal
      d) Equipment And Building Services Department - Pantone 1595 (3M Burnt Orange), 4010124 Orange, Or Approved Equal
   2. Shaded Area Lettering
      a) White Paint (101-L Polar White) On Colored Background
3) PROJECT INFORMATION - RIGHT-HAND SECTION OF SIGN
   1. Vinyl Lettering (Used On Multi-Segment Projects. Specified On Purchase Order)
      a. Background Color - White
      b. Lettering - Black Vinyl
   2. Painted Lettering (Used On Facility Projects. Specified on Purchase Order)
      a. Background Color - White
      b. Lettering - Black Paint (199-L Black)
4) STRIPES AND BORDERS - BLACK REFLECTIVE VINYL APPROX. 1/2" WIDE
5) LETTERING TYPE - ARIAL BLACK, SIZES AS SPECIFIED ON THIS DRAWING SPECIFICATION
6) FRAME TO BE PAINTED WHITE
7) LUMBER - TREATED

PROJECT SIGN FRAME



NOT TO SCALE

Notes:
1) All Dimensions Are In Inches.
2) All Materials Exterior Grade, Pressure Treated Pine, Two By Four (2"x4") Dimensional Lumber.
3) 16P Nails Acceptable For Butt Connections.
4) Use 1/2" Galvanized Coated Bolts, Washers And Nuts For Side Connections.
5) Screw Front Panels To Frame Using #8 1-3/4" Galvanized Screws 2 Ft. OC.



SIDE

NOT TO SCALE

Note: Contractor Shall Provide Items ① & ②

PROJECT CONSTRUCTION SIGN TECHNICAL SPECIFICATIONS

DWU	(Page No.) 121
DATE OCT. 2015	

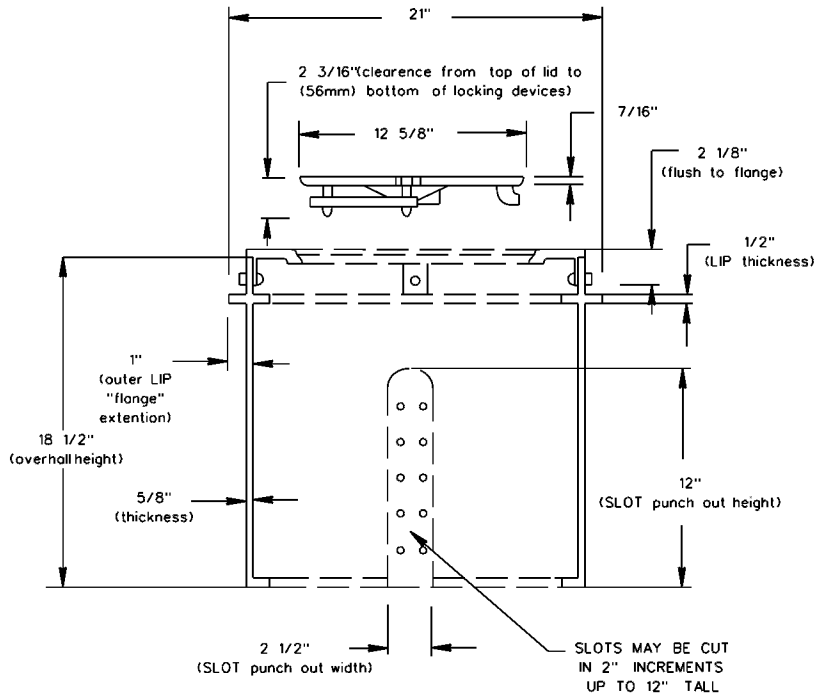
PART 2

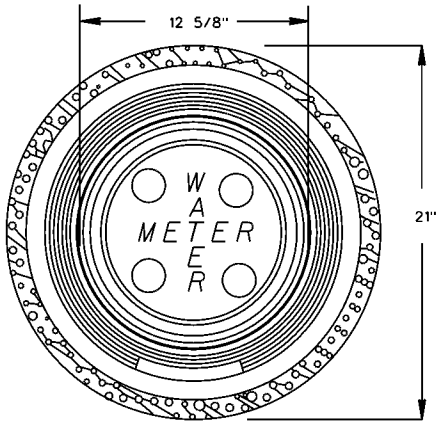
(Series 200)

WATER MAIN CONSTRUCTION

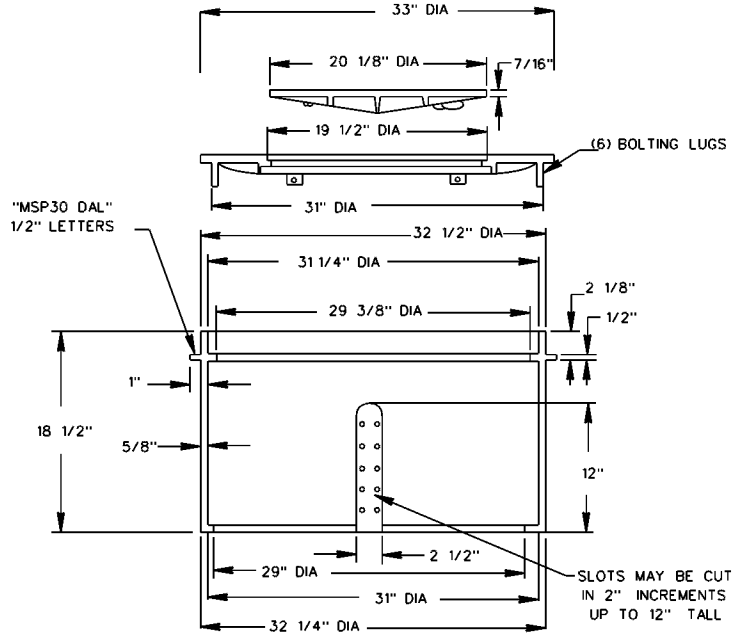
City of Dallas
Water Utilities Department

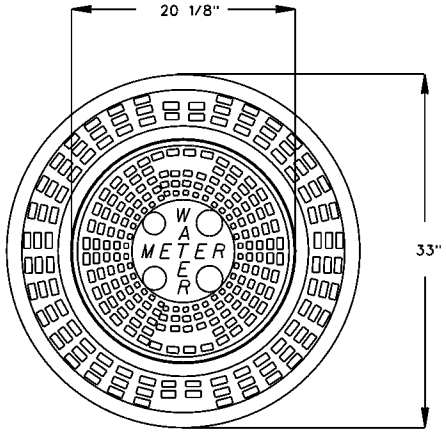
PART 2
WATER MAIN CONSTRUCTION

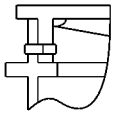




5/8" Meter Box



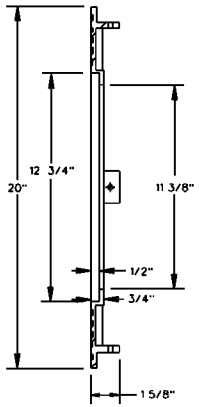




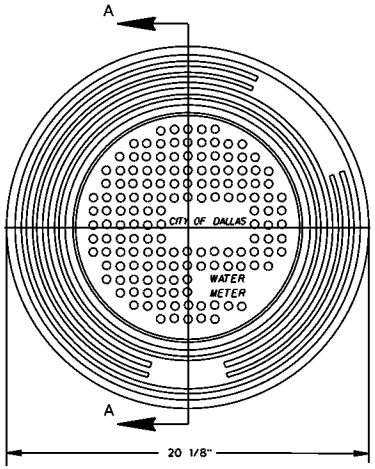
METER RING AND PLASTIC METER BOX
ARE BOLTED TOGETHER WITH (6) 1/4"
STAINLESS STEEL BOLTS AND T-NUTS

2" Meter Box

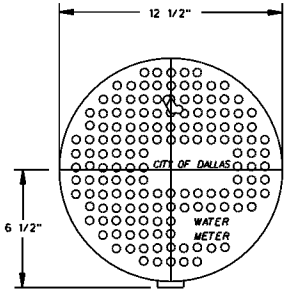
METER BOX (5/8" and 2") WITH DUCTILE RING AND COVER		DWU	200
		DATE OCT. 2013	



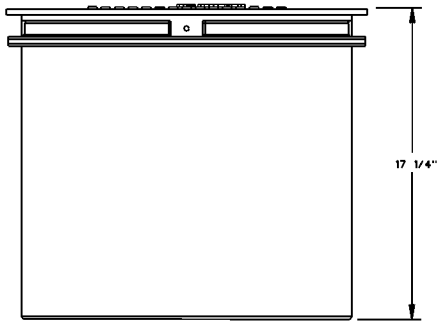
SECTION VIEW A-A



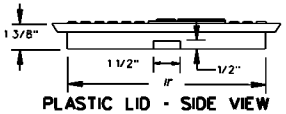
TOP VIEW



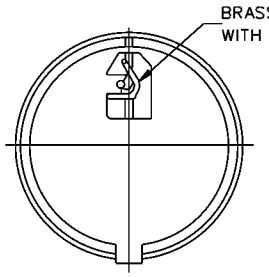
PLASTIC LID - TOP VIEW



SIDE VIEW

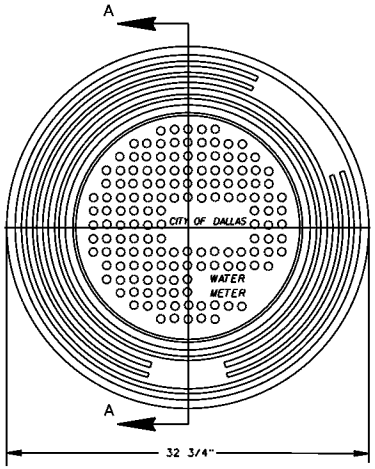


PLASTIC LID - SIDE VIEW

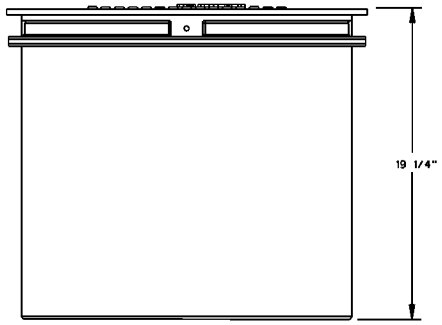


PLASTIC LID - BACK VIEW

5/8" Meter Box



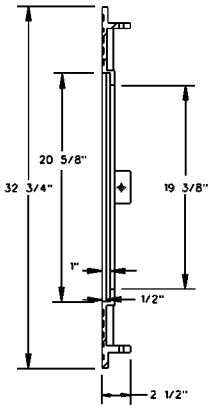
TOP VIEW



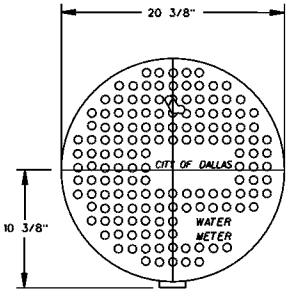
SIDE VIEW

2" Meter Box

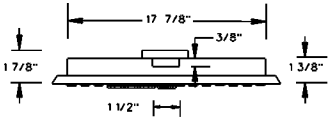
N.T.S.



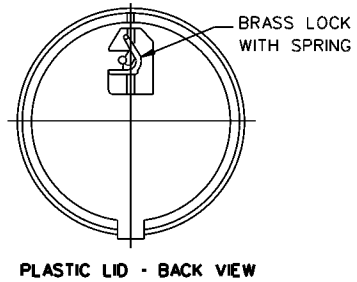
SECTION VIEW A-A



PLASTIC LID - TOP VIEW



PLASTIC LID - SIDE VIEW



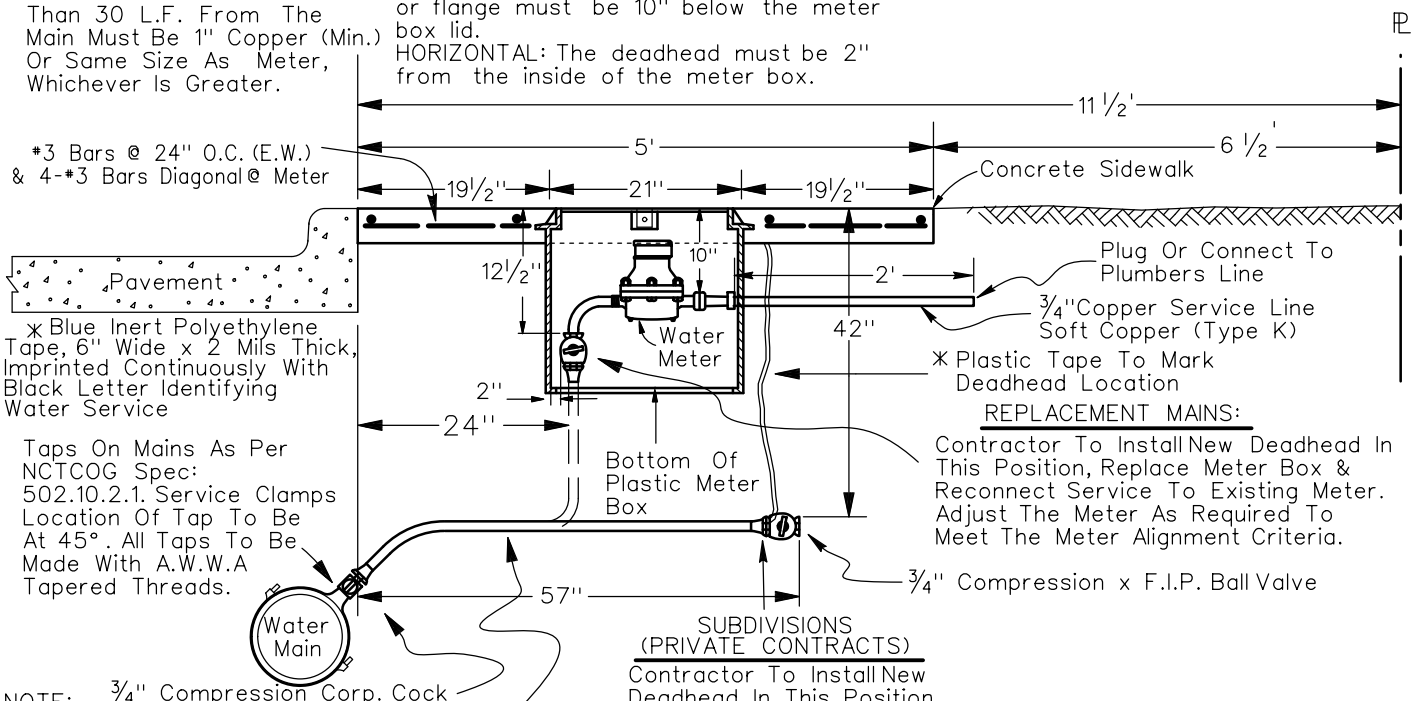
PLASTIC LID - BACK VIEW

METER BOX (5/8" and 2")
WITH PLASTIC AMI LID

DWU	200A
DATE OCT. 2013	

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be 10" below the meter box lid.
HORIZONTAL: The deadhead must be 2" from the inside of the meter box.



REPLACEMENT MAINS:
Contractor To Install New Deadhead In This Position, Replace Meter Box & Reconnect Service To Existing Meter. Adjust The Meter As Required To Meet The Meter Alignment Criteria.

SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

NOTE:
Install Meter & Box In The Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway Or Driveway Approach.

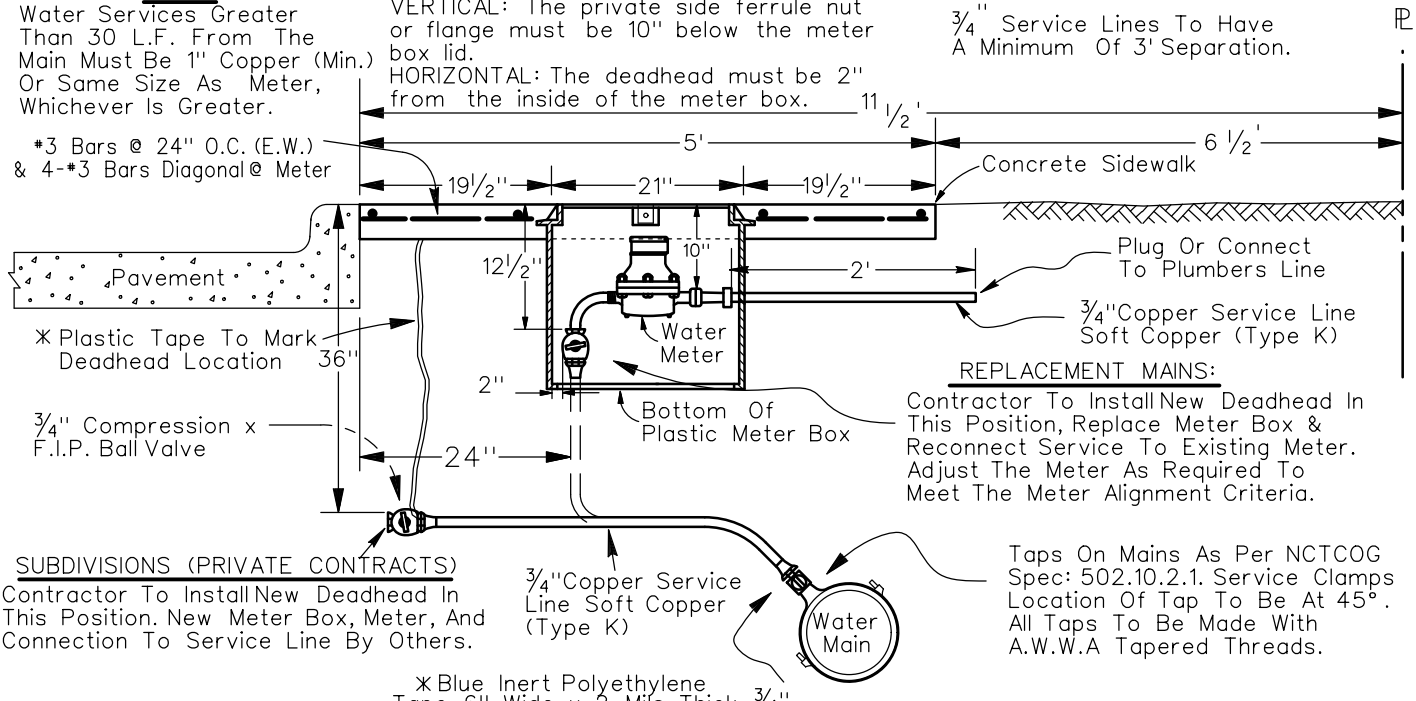
NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2021 COD Addendum:
502.10.3.1.1.COD - Taps Through
502.10.3.1.7.COD - Tapping Of PVC Pipe

WATER MAIN IN STREET

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be 10" below the meter box lid.
HORIZONTAL: The deadhead must be 2" from the inside of the meter box.

NOTE:
3/4" Service Lines To Have A Minimum Of 3' Separation.



REPLACEMENT MAINS:
Contractor To Install New Deadhead In This Position, Replace Meter Box & Reconnect Service To Existing Meter. Adjust The Meter As Required To Meet The Meter Alignment Criteria.

SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

NOTE:
Install Meter & Box In The Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway Or Driveway Approach.

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2021 COD Addendum:
502.10.3.1.1.COD - Taps Through
502.10.3.1.7.COD - Tapping Of PVC Pipe

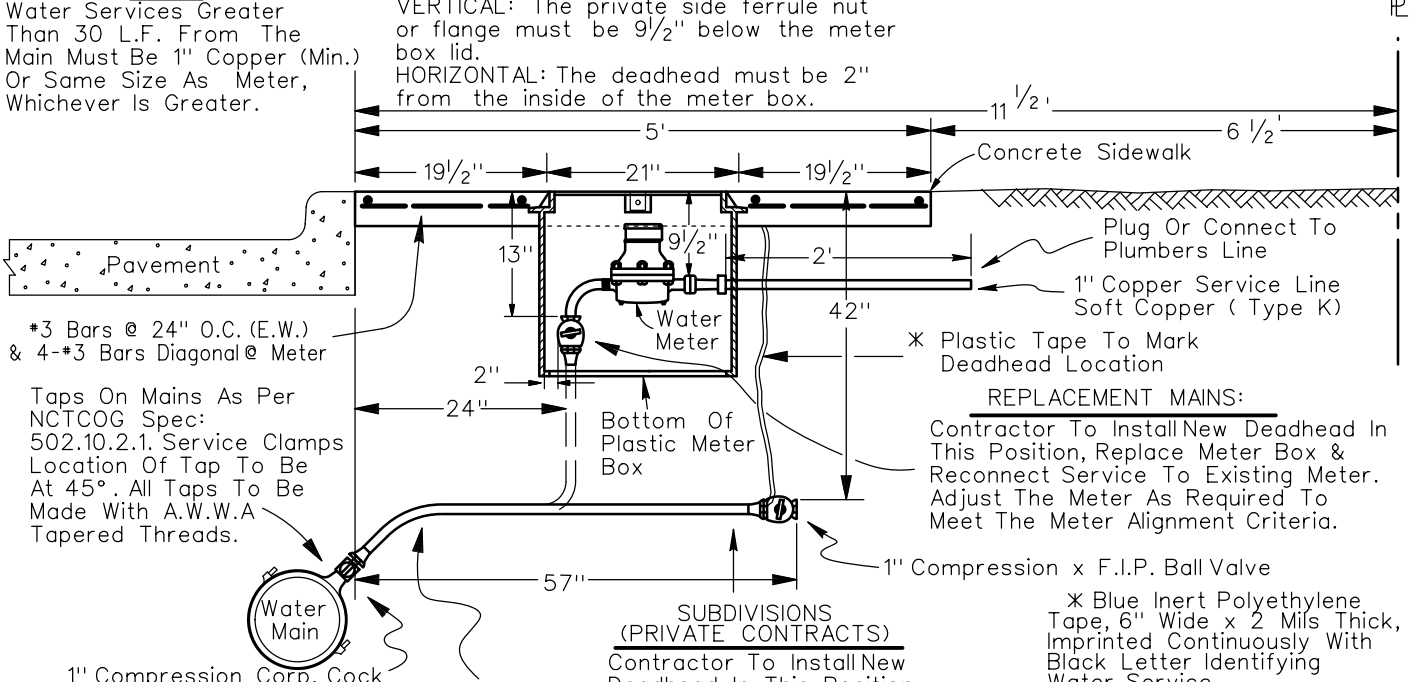
WATER MAIN IN PARKWAY

3/4" WATER SERVICE INSTALLATIONS (SIDEWALK ADJACENT TO CURB)

COD		(PAGE No.) 201
DATE JULY 2021		

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be 9½" below the meter box lid.
HORIZONTAL: The deadhead must be 2" from the inside of the meter box.



REPLACEMENT MAINS:
Contractor To Install New Deadhead In This Position, Replace Meter Box & Reconnect Service To Existing Meter. Adjust The Meter As Required To Meet The Meter Alignment Criteria.

SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letter Identifying Water Service

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2021 COD Addendum:
502.10.3.1.1.COD - Taps Through
502.10.3.1.7.COD - Tapping Of PVC Pipe

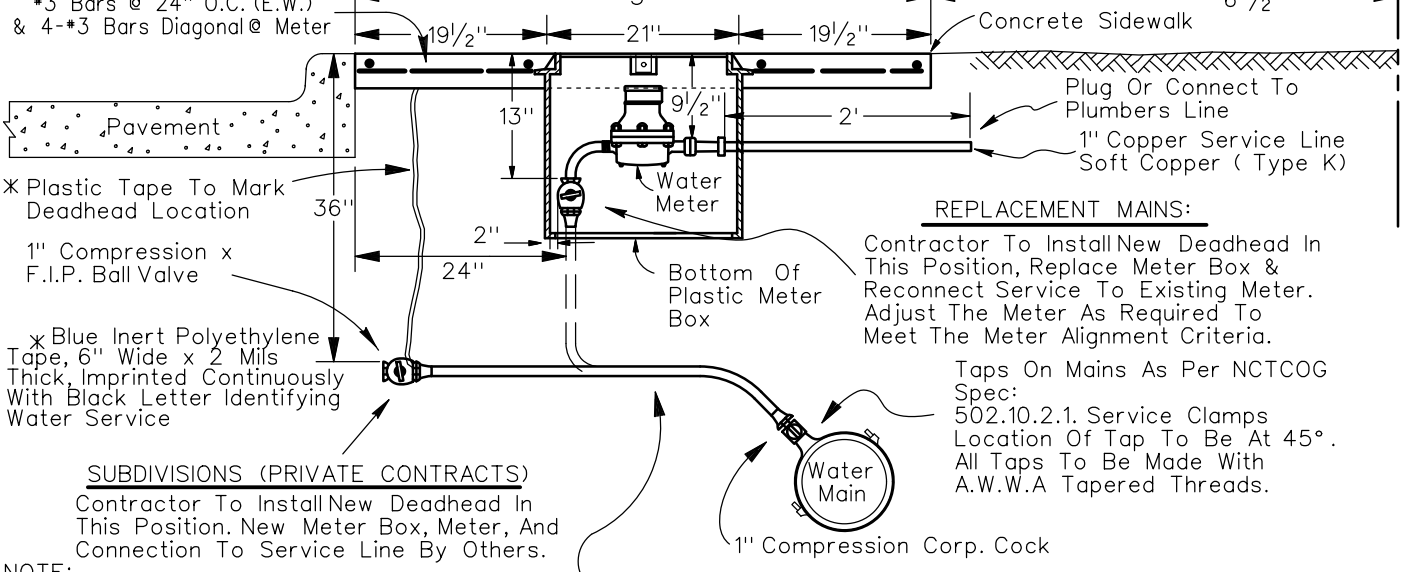
NOTE:
Install Meter & Box In The Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway of Driveway Approach

WATER MAIN IN STREET

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be 9½" below the meter box lid.
HORIZONTAL: The deadhead must be 2" from the inside of the meter box.

NOTE:
1" Service Lines To Have A Minimum Of 3' Separation.



REPLACEMENT MAINS:
Contractor To Install New Deadhead In This Position, Replace Meter Box & Reconnect Service To Existing Meter. Adjust The Meter As Required To Meet The Meter Alignment Criteria.

SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

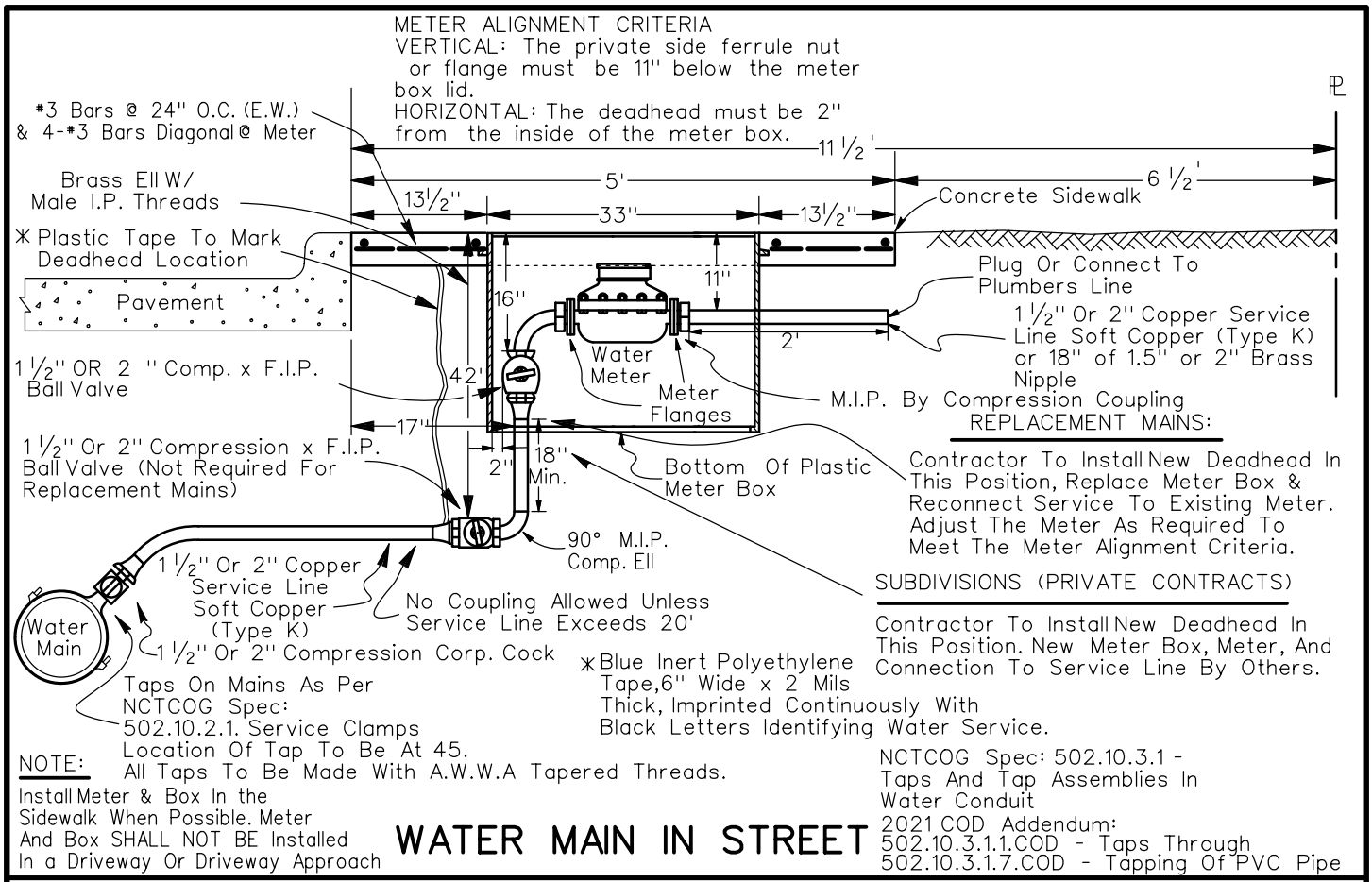
NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2021 COD Addendum:
502.10.3.1.1.COD - Taps Through
502.10.3.1.7.COD - Tapping Of PVC Pipe

NOTE:
Install Meter & Box In The Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway of Driveway Approach

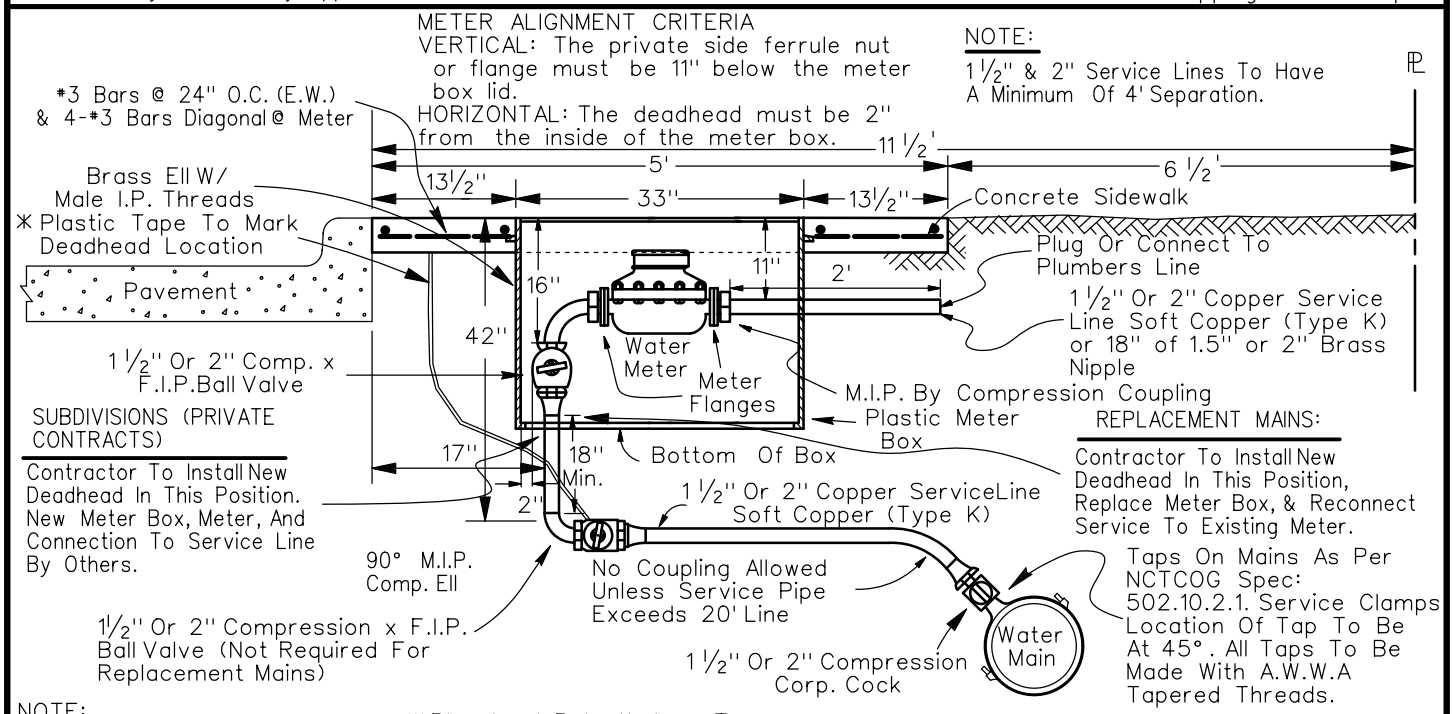
WATER MAIN IN PARKWAY

1" WATER SERVICE INSTALLATIONS (SIDEWALK ADJACENT TO CURB)

COD		(PAGE No.) 202
DATE JULY 2021		



WATER MAIN IN STREET



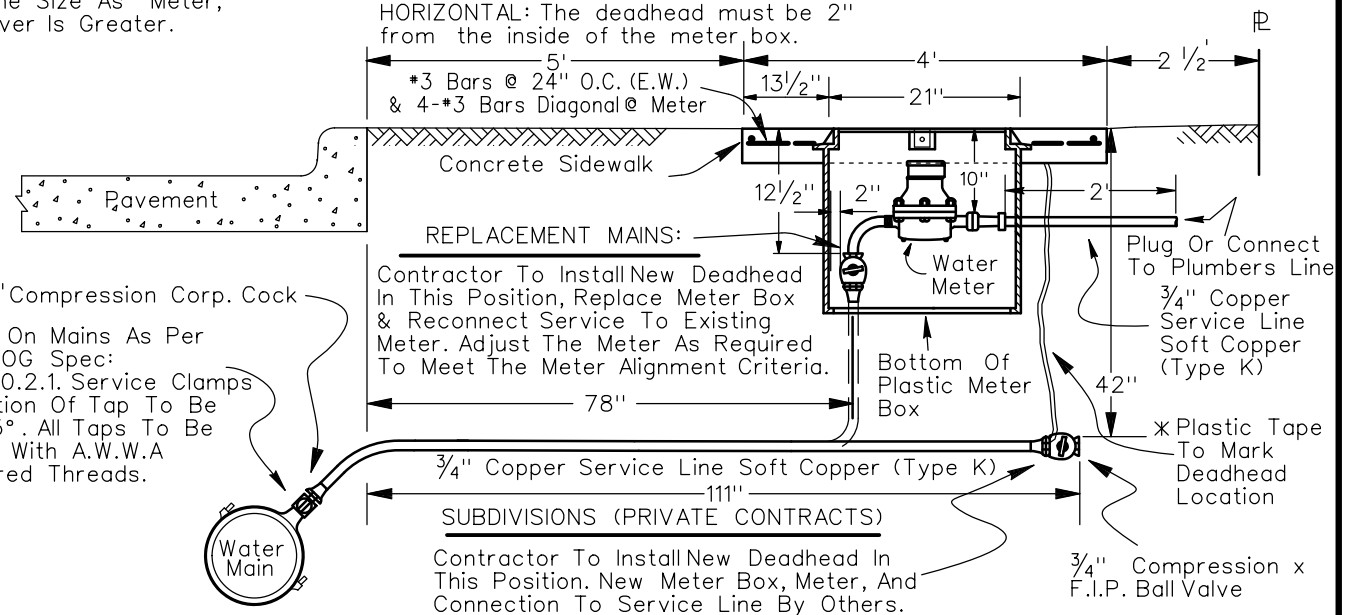
WATER MAIN IN PARKWAY

1½" OR 2" WATER SERVICE INSTALLATION (SIDEWALK ADJACENT TO CURB)

		(PAGE No.)
COD		203
DATE JULY 2021		

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flangemust be 10" below the meter box lid.
HORIZONTAL: The deadhead must be 2" from the inside of the meter box.



REPLACEMENT MAINS:
Contractor To Install New Deadhead In This Position, Replace Meter Box & Reconnect Service To Existing Meter. Adjust The Meter As Required To Meet The Meter Alignment Criteria.

3/4"Compression Corp. Cock

Taps On Mains As Per NCTCOG Spec: 502.10.2.1. Service Clamps Location Of Tap To Be At 45°. All Taps To Be Made With A.W.W.A Tapered Threads.

SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

NOTE:
Install Meter & Box in The Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway or Driveway Approach.

* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letters Identifying Water Service.

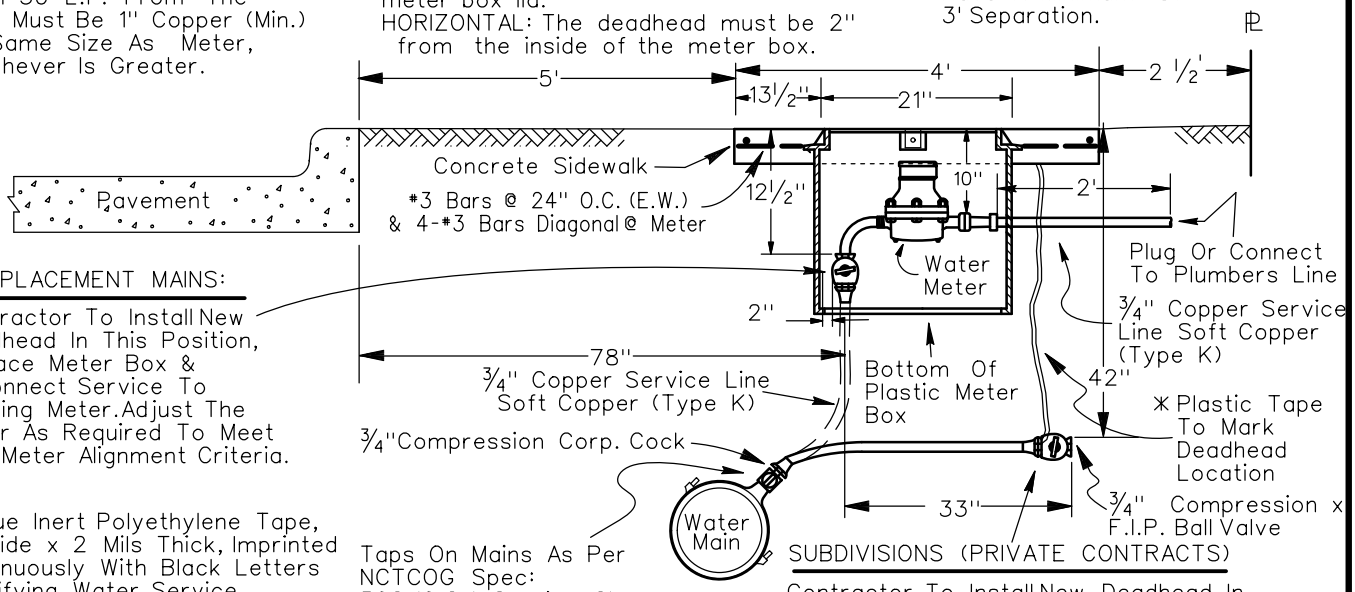
NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2021 COD Addendum:
502.10.3.1.1.COD - Taps Through
502.10.3.1.7.COD - Tapping Of PVC Pipe

WATER MAIN IN STREET

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be 10" below the meter box lid.
HORIZONTAL: The deadhead must be 2" from the inside of the meter box.

NOTE:
3/4" Service Lines To Have A Minimum Of 3' Separation.



REPLACEMENT MAINS:
Contractor To Install New Deadhead In This Position, Replace Meter Box & Reconnect Service To Existing Meter. Adjust The Meter As Required To Meet The Meter Alignment Criteria.

* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letters Identifying Water Service.

Taps On Mains As Per NCTCOG Spec: 502.10.2.1. Service Clamps Location Of Tap To Be At 45°. All Taps To Be Made With A.W.W.A Tapered Threads.

SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

NOTE:
Install Meter & Box in The Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway or Driveway Approach.

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2021 COD Addendum:
502.10.3.1.1.COD - Taps Through
502.10.3.1.7.COD - Tapping Of PVC Pipe

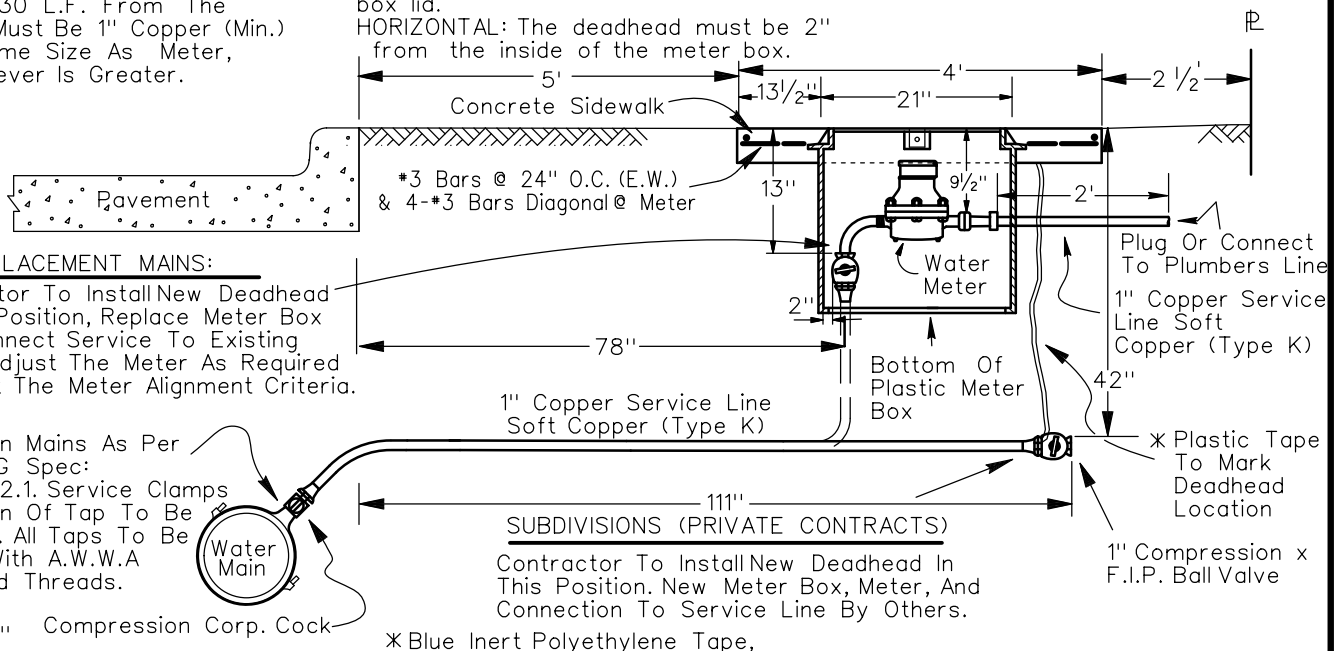
WATER MAIN IN PARKWAY

3/4" WATER SERVICE INSTALLATIONS (SIDEWALK 5' FROM CURB)

	COD	(PAGE No.) 204
	DATE JULY 2021	

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be 9½" below the meter box lid.
HORIZONTAL: The deadhead must be 2" from the inside of the meter box.



REPLACEMENT MAINS:
Contractor To Install New Deadhead In This Position, Replace Meter Box & Reconnect Service To Existing Meter. Adjust The Meter As Required To Meet The Meter Alignment Criteria.

SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

NOTE:
Install Meter & Box in The Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway or Driveway Approach.

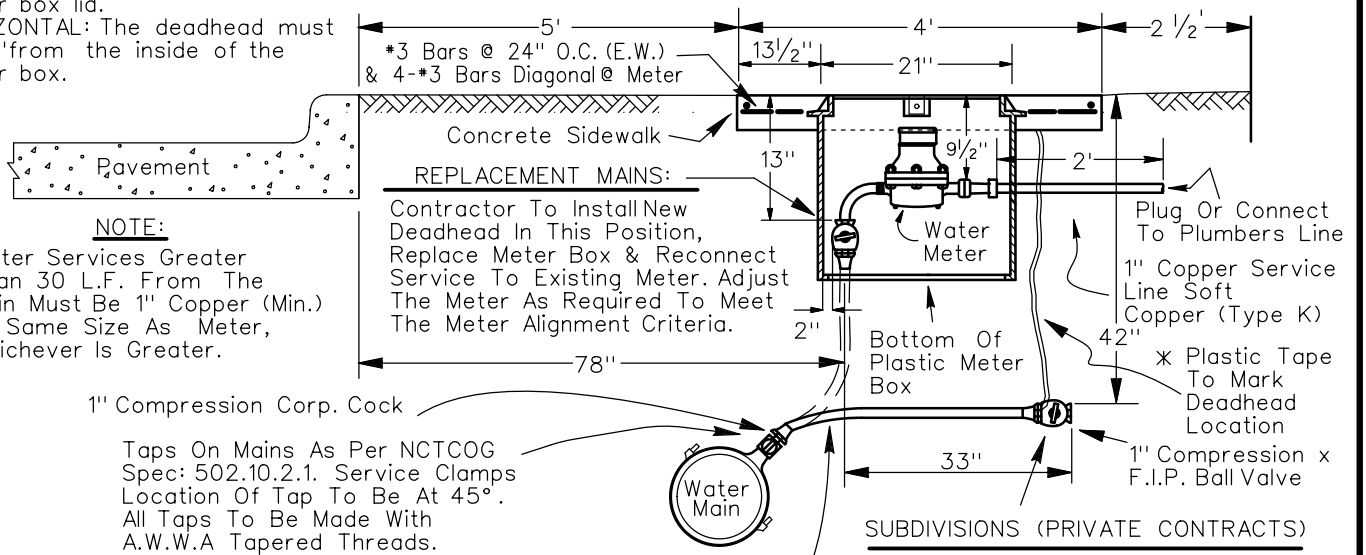
* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letters Identifying Water Service.

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2021 COD Addendum:
502.10.3.1.1.COD - Taps Through
502.10.3.1.7.COD - Tapping Of PVC Pipe

WATER MAIN IN STREET

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be 9½" below the meter box lid.
HORIZONTAL: The deadhead must be 2" from the inside of the meter box.

NOTE:
1 Service Lines To Have A Minimum Of 3' Separation.



NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

REPLACEMENT MAINS:
Contractor To Install New Deadhead In This Position, Replace Meter Box & Reconnect Service To Existing Meter. Adjust The Meter As Required To Meet The Meter Alignment Criteria.

SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letters Identifying Water Service.

NOTE:
Install Meter & Box in The Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway or Driveway Approach.

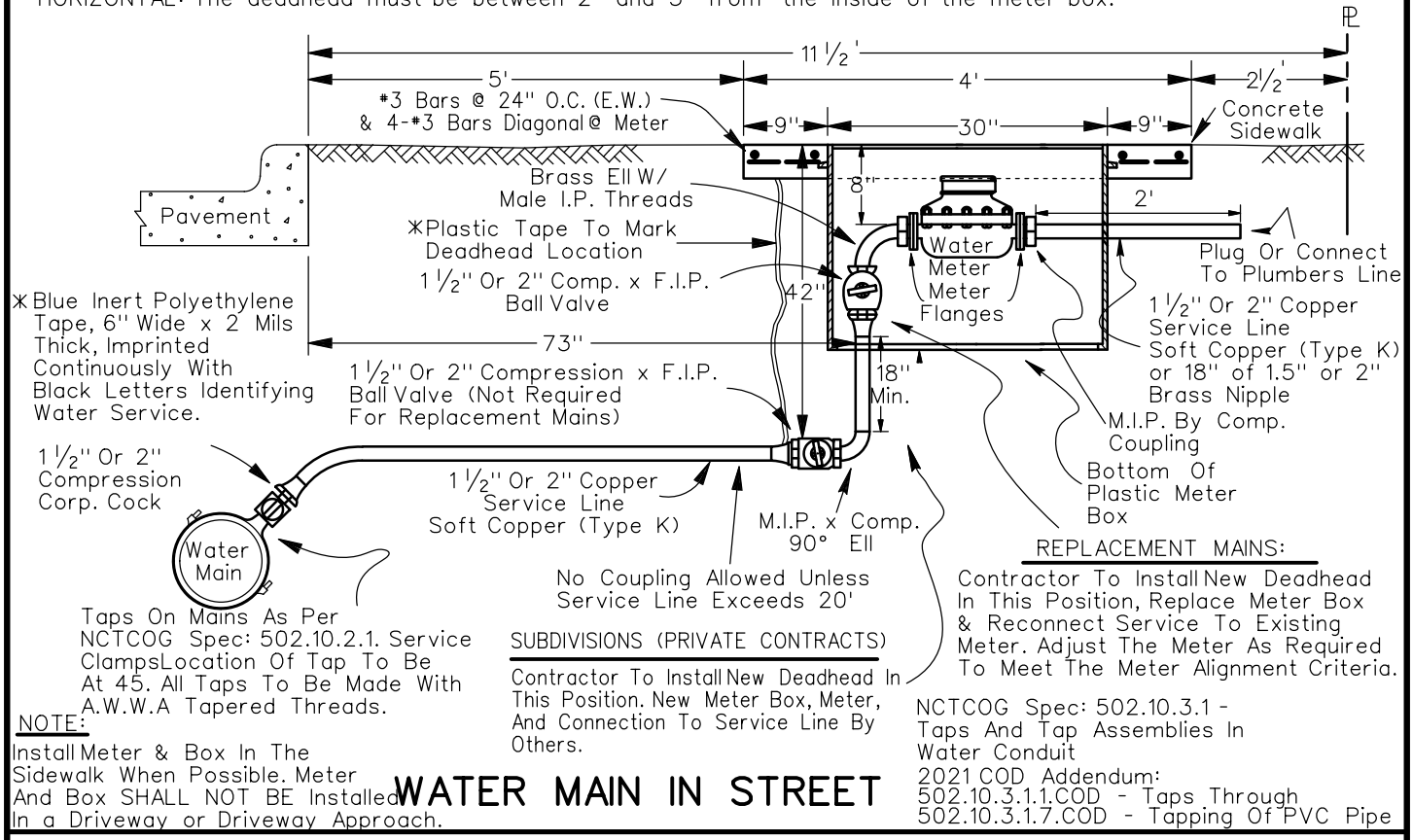
NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2011 COD Addendum:
502.10.3.1.1.COD - Taps Through
502.10.3.1.7.COD - Tapping Of PVC Pipe

WATER MAIN IN PARKWAY

1" WATER SERVICE INSTALLATIONS (SIDEWALK 5' FROM CURB)

		(PAGE No.)
COD		205
DATE JULY 2021		

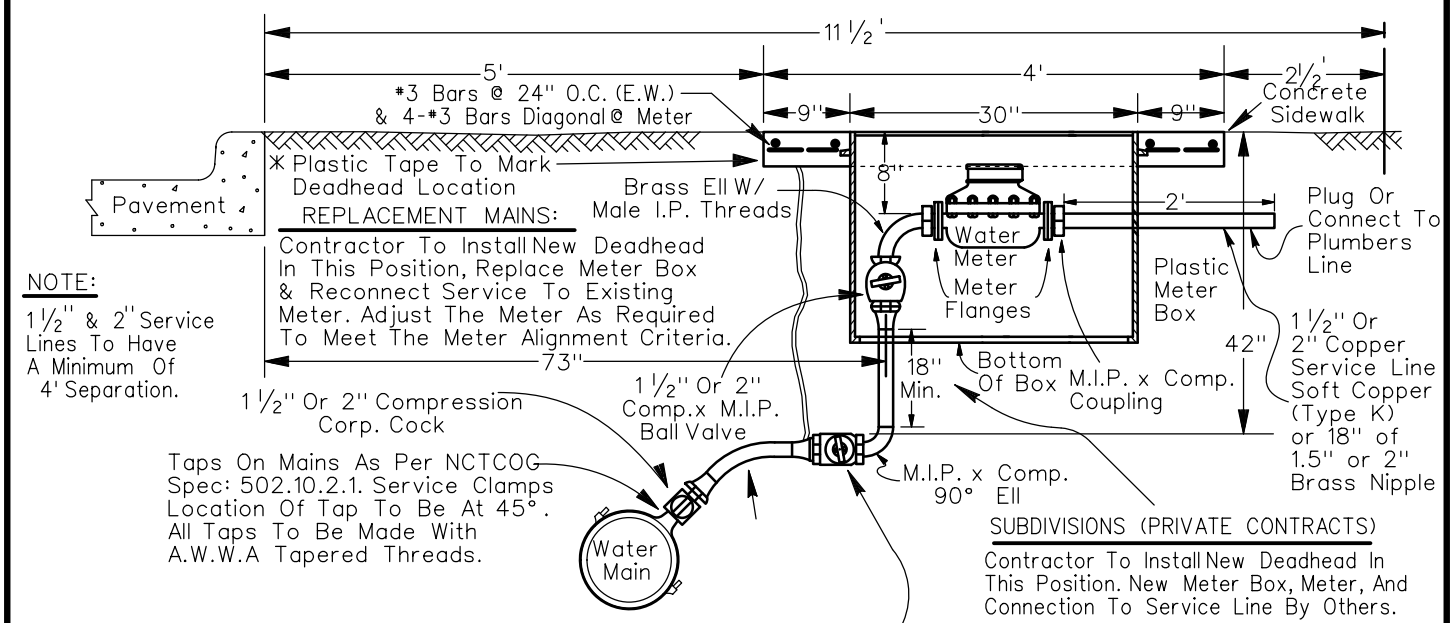
METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORIZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.



NOTE:
Install Meter & Box In The Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway or Driveway Approach.

WATER MAIN IN STREET

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORIZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.



NOTE:
1 ½" & 2" Service Lines To Have A Minimum Of 4' Separation.

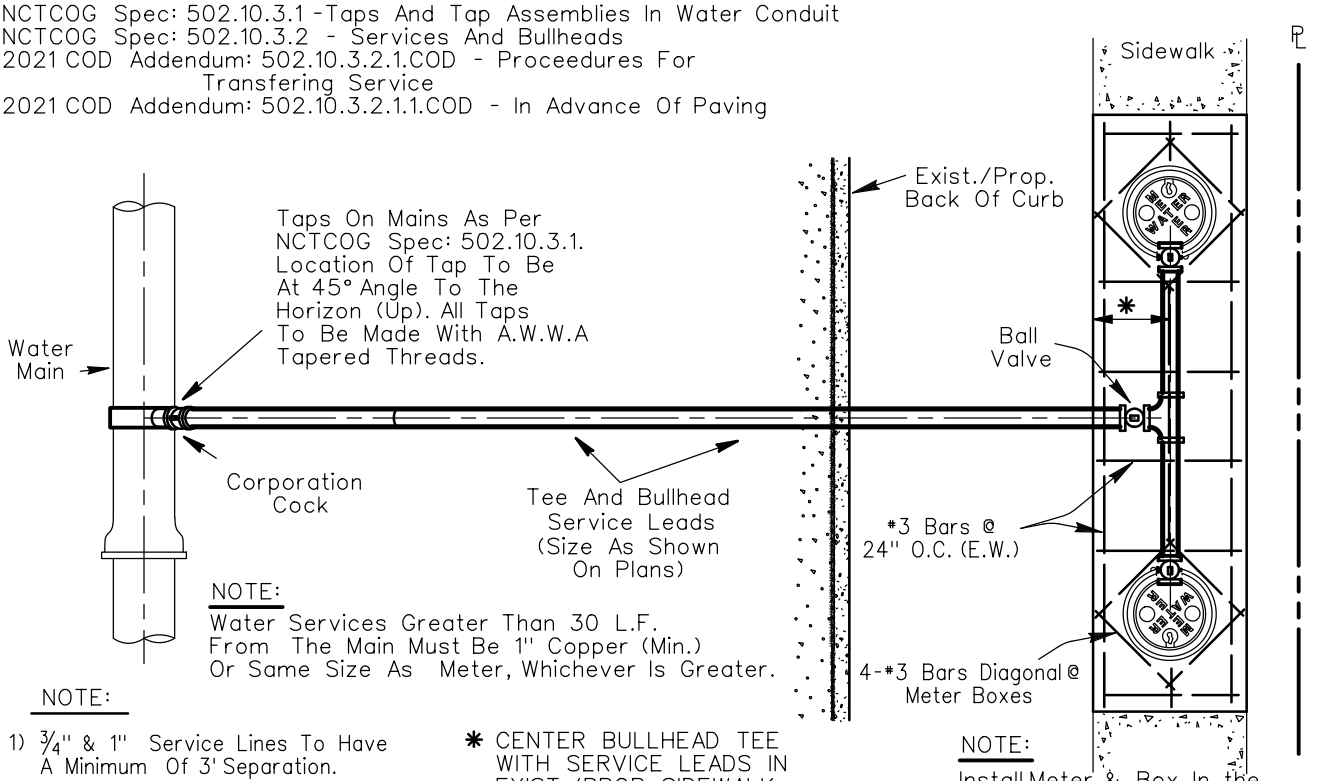
NOTE:
Install Meter & Box In The Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway or Driveway Approach.

WATER MAIN IN PARKWAY

1 ½" OR 2" WATER SERVICE INSTALLATIONS (SIDEWALK 5' FROM CURB)

	COD	(PAGE No.) 206
	DATE JULY 2021	

NCTCOG Spec: 502.10.3.1 -Taps And Tap Assemblies In Water Conduit
NCTCOG Spec: 502.10.3.2 - Services And Bullheads
2021 COD Addendum: 502.10.3.2.1.COD - Proceedures For Transfering Service
2021 COD Addendum: 502.10.3.2.1.1.COD - In Advance Of Paving



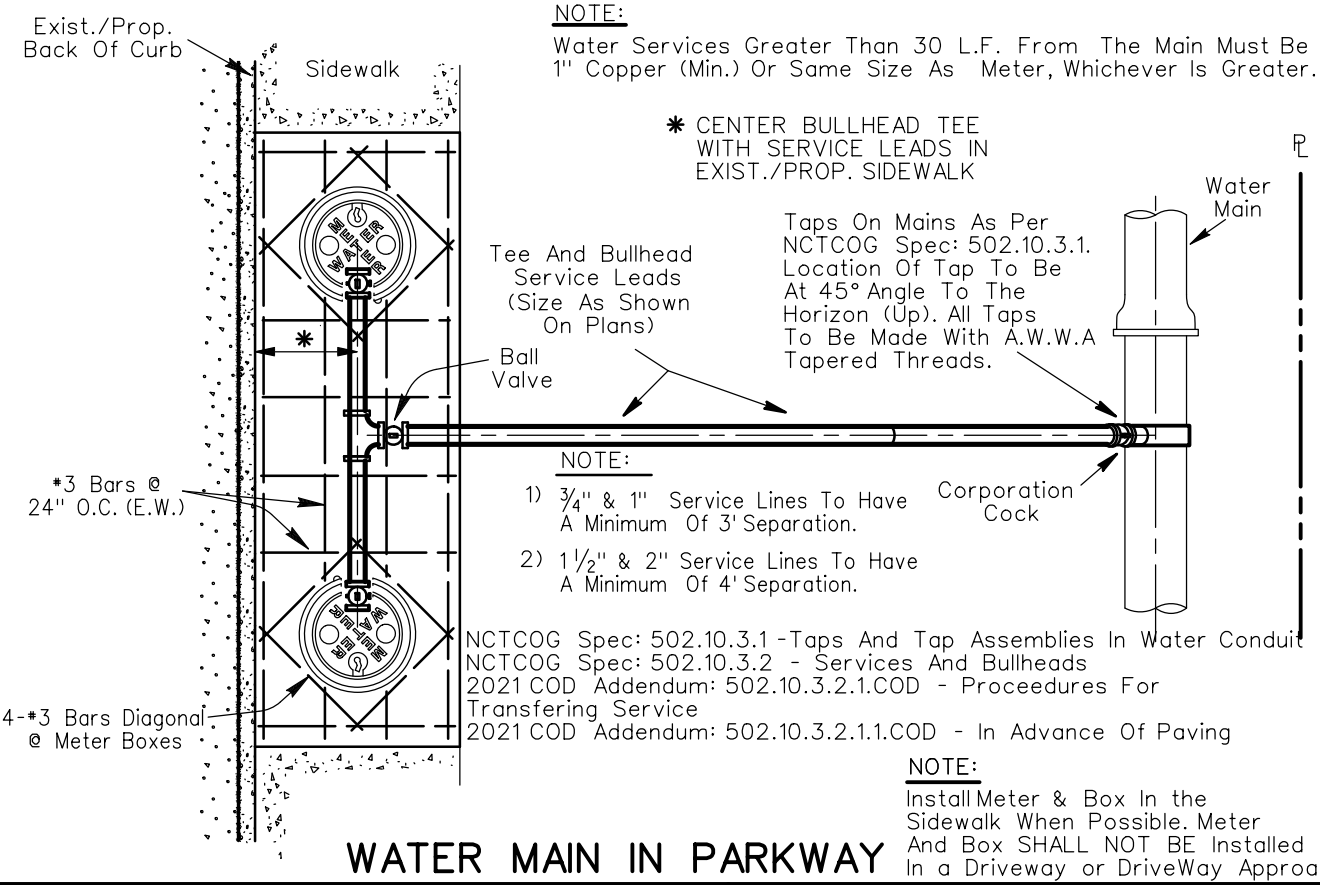
NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

NOTE:
1) ¾" & 1" Service Lines To Have A Minimum Of 3' Separation.
2) 1½" & 2" Service Lines To Have A Minimum Of 4' Separation.

✱ CENTER BULLHEAD TEE WITH SERVICE LEADS IN EXIST./PROP. SIDEWALK

NOTE:
Install Meter & Box In the Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway or DriveWay Approach

WATER MAIN IN STREET



NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

✱ CENTER BULLHEAD TEE WITH SERVICE LEADS IN EXIST./PROP. SIDEWALK

NOTE:
1) ¾" & 1" Service Lines To Have A Minimum Of 3' Separation.
2) 1½" & 2" Service Lines To Have A Minimum Of 4' Separation.

NCTCOG Spec: 502.10.3.1 -Taps And Tap Assemblies In Water Conduit
NCTCOG Spec: 502.10.3.2 - Services And Bullheads
2021 COD Addendum: 502.10.3.2.1.COD - Proceedures For Transfering Service
2021 COD Addendum: 502.10.3.2.1.1.COD - In Advance Of Paving

NOTE:
Install Meter & Box In the Sidewalk When Possible. Meter And Box SHALL NOT BE Installed In a Driveway or DriveWay Approach.

WATER MAIN IN PARKWAY

BULL HEAD SERVICES

	COD	(PAGE NO.) 206A
	DATE JULY. 2021	

Installation For Advanced Metering Infrastructure (AMI) Meter

1. The Contractor Shall Not Remove, Damage, Or Otherwise Disturb The AMI Meter Endpoint Components Except By Direction Of The Meter Reading Operation (MRO) Technician. The Installer Shall Be Liable For The Replacement Cost Of Any Lost Or Damaged AMI Components.

2. For Meters 2" Or Smaller:
   The Contractor Shall Install A New Meter Box With A New Meter AMI Lid For Water Meters 2" And Smaller In Existing And Proposed AMI Areas With The Following Configuration As Applicable:

   -For $\frac{5}{8}$" to 1" Meters: 12" Water Meter AMI Lid As Per the Approved Material List.

   -For 1 $\frac{1}{2}$" to 2" Meters: 20" Water Meter AMI Lid As Per the Approved Material List.

   The Contractor Shall Also Return The Existing AMI Lids From Existing AMI Area TO DWU MRO For All Meters 2" And Smaller.

   For Meters 3" Or Larger:
   The Contractor Shall Either Connect To The Existing Meter Vault Or Construct A New Meter Vault As Specified On The Plans.

3. All Meters In The Existing And Proposed AMI Area Shall Be AMI Ready Meters As Furnished By DWU. A Non AMI Ready Meter Shall Be Replaced With An AMI Ready Meter By DWU.

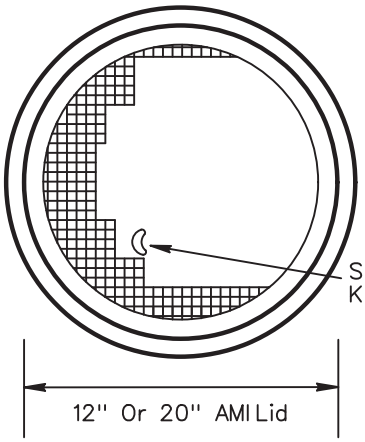
4. The Contractor Shall Contact DWU MRO Five (5) Working Days In Advance At 214-670-5537 And By Email At DWUMRO@dallascityhall.com Before Any Removal, Disconnection, Reconnection, Or Installation Of AMI Endpoint Components.

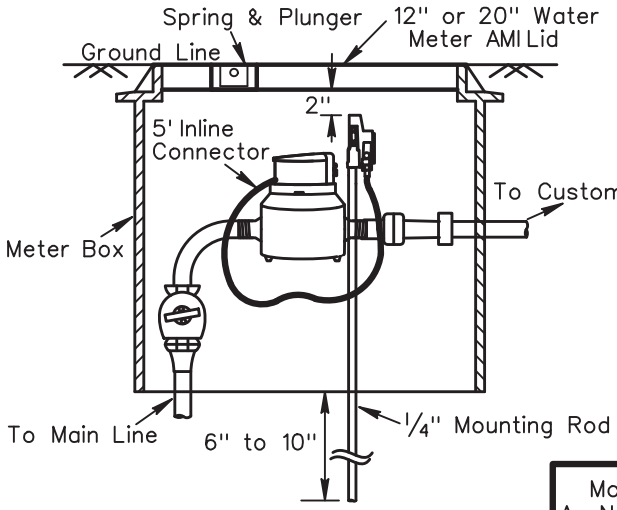
REFER TO PAGES 206C & 206D

Installation Requirements For AMI Meter		DWU	(PAGE No.) 206B
		DATE MAY 2012	

Fixed Network Or Mobile System
(100W Endpoint Or Approved Equal)

100W Endpoint

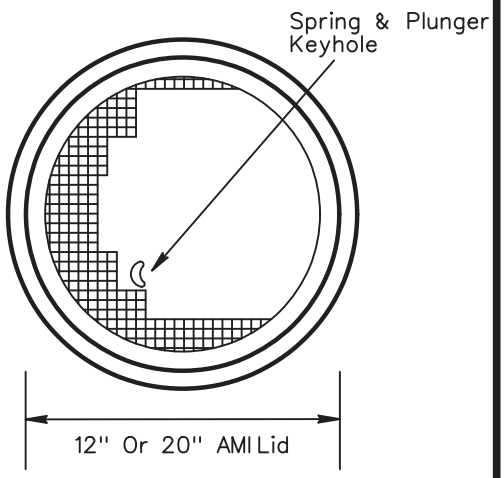




Finished Installation With
100W Endpoint Configuration

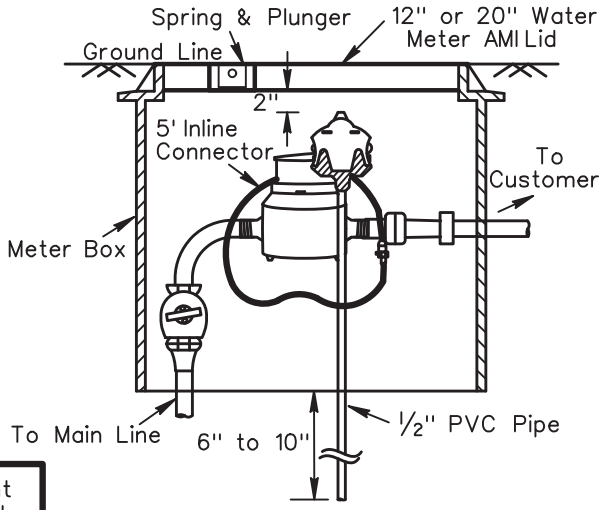
Fixed Network
(200W Endpoint Or Approved Equal)

200W Endpoint With
External Mounting Cradle



Plan View

Profile View



Finished Installation With
200W Endpoint Configuration

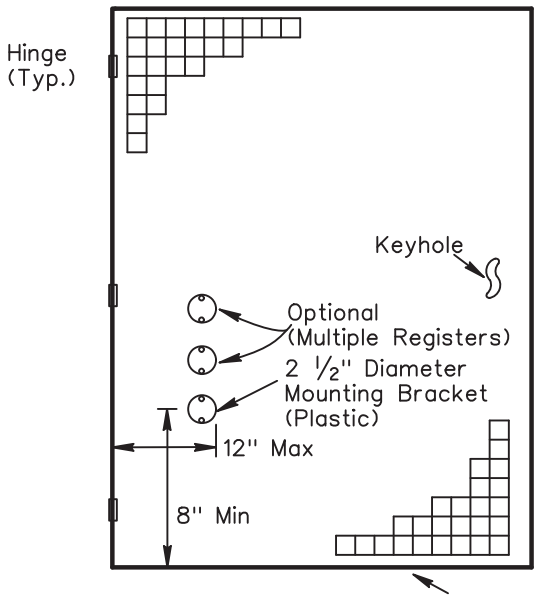
Mount The Endpoint
As Near To The Center
Of The Meter Box
As Possible Without
Touching The Meter

REFER TO PAGES 206B & 206D

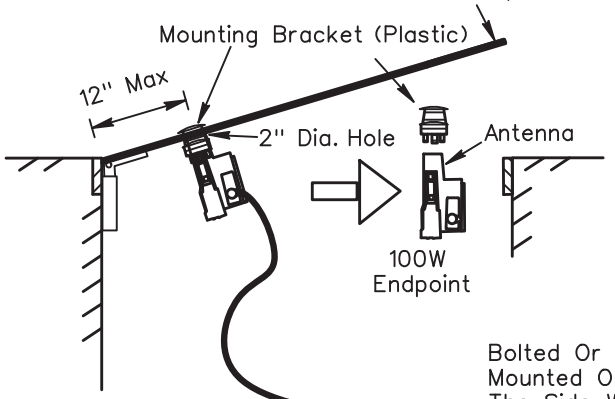
AMI Meter Installation Details For 2" Or Smaller Meters

	DWU	(PAGE No.) 206C
	DATE MAY 2012	

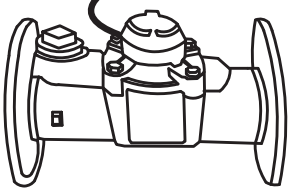
Fixed Network Or Mobile System
(100W Endpoint Or Approved Equal)



4'x3' Access Hatch
Per DWU Spec.

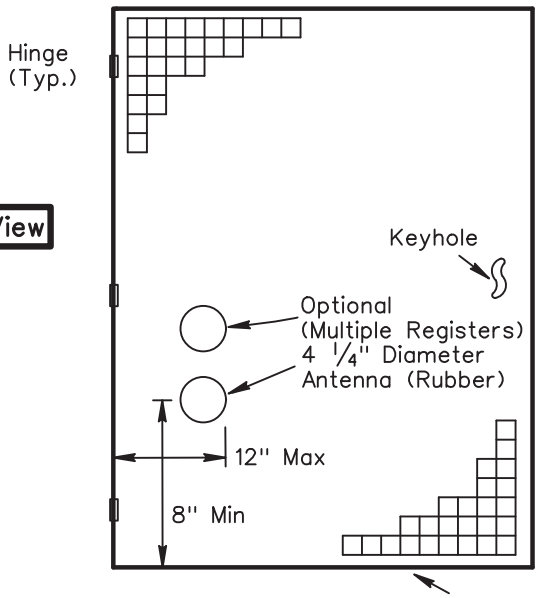


25' Inline Connector Cable

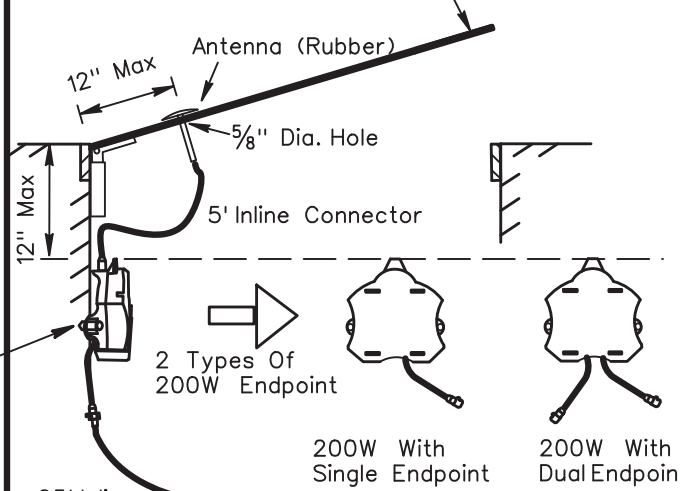


AMI Meter With AMI Encoded
Register With Factory Potted
25' Inline Connector Cable

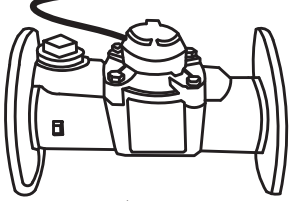
Fixed Network
(200W Endpoint Or Approved Equal)



4'x3' Access Hatch
Per DWU Spec.



25' Inline
Connector Cable



AMI Meter With AMI Encoded
Register With Factory Potted
25' Inline Connector Cable

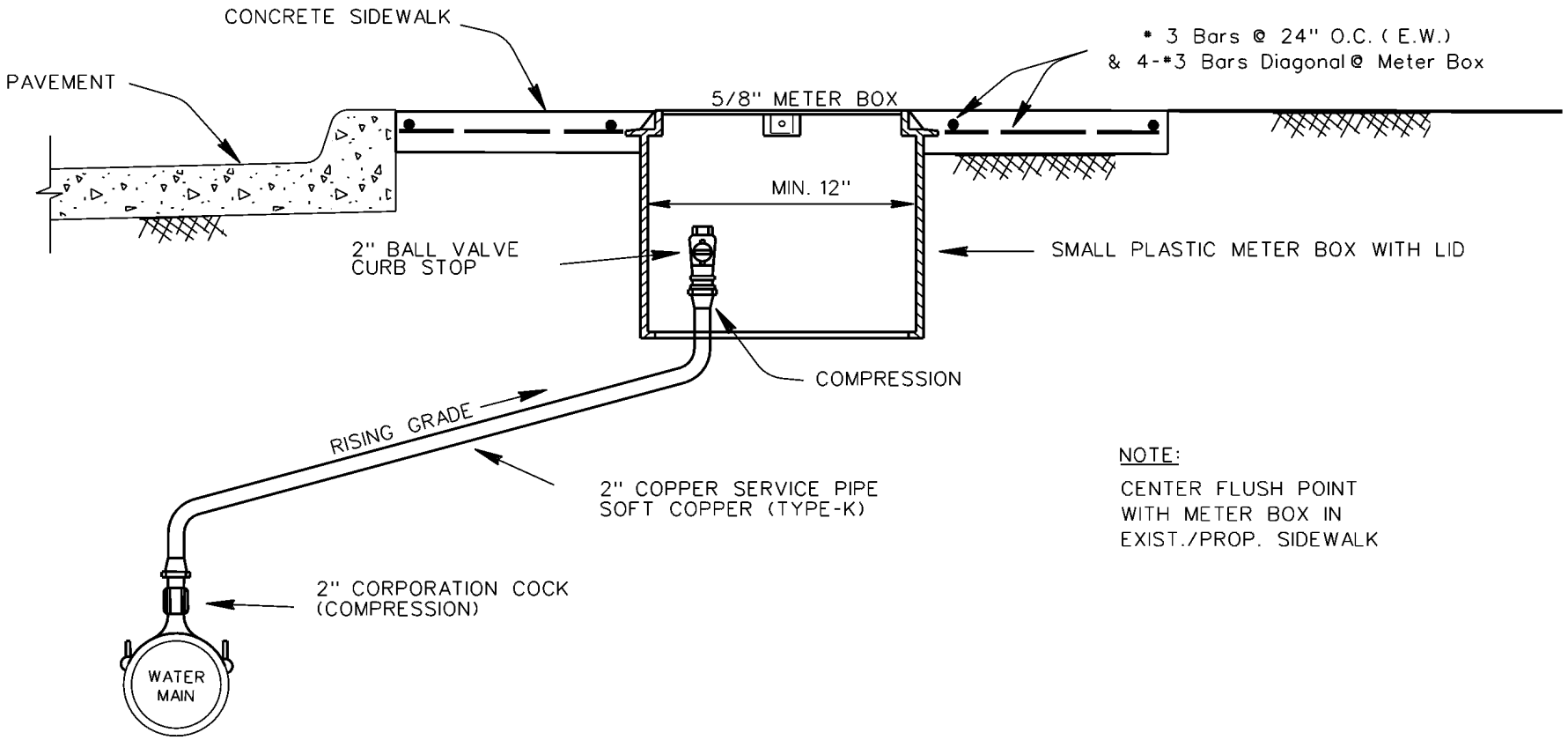
Plan View

Profile View

REFER TO PAGES 206B & 206C

AMI Meter Installation Details For 3" And Larger Meters

DWU		(PAGE No.) 206D
DATE MAY 2012		



NOTE:

CENTER FLUSH POINT
WITH METER BOX IN
EXIST./PROP. SIDEWALK

MANUAL FLUSH POINT

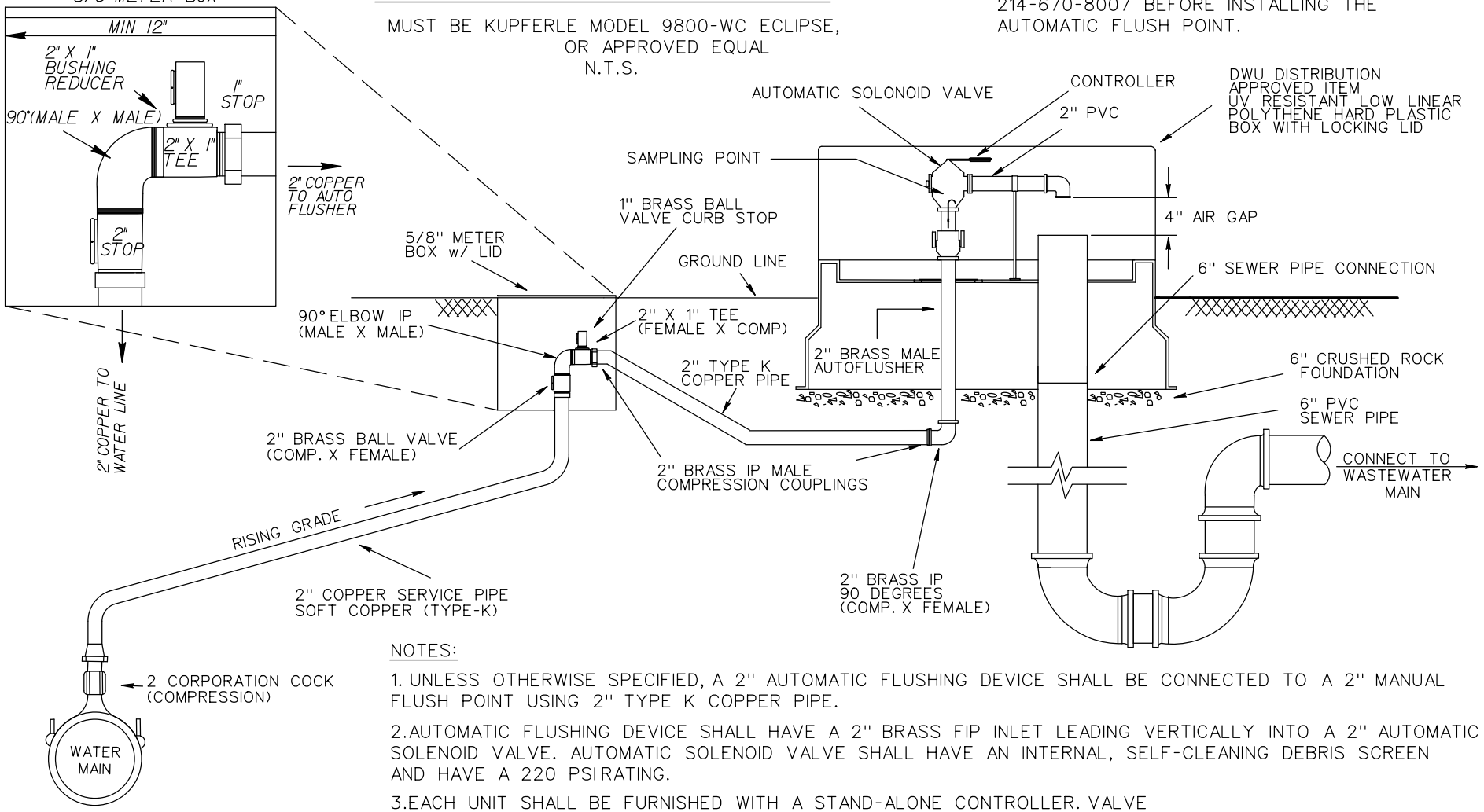
2 INCH MINIMUM
OR
LARGER/SMALLER IF STATED ON PLANS
N.T.S.

MANUAL FLUSH POINT INSTALLATION		DWU	(Page No.) 207
		DATE OCT. 2012	

AUTOMATIC FLUSHING DEVICE

MUST BE KUPFERLE MODEL 9800-WC ECLIPSE,
OR APPROVED EQUAL
N.T.S.

* CONTRACTOR SHALL CONTACT DISTRIBUTION AT 214-670-8007 BEFORE INSTALLING THE AUTOMATIC FLUSH POINT.



NOTES:

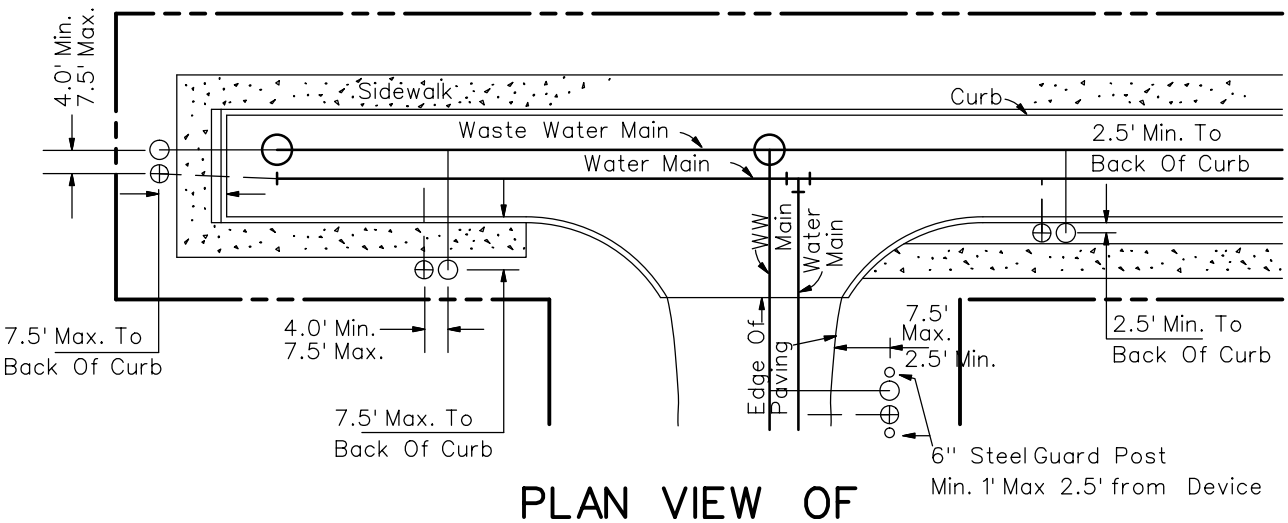
1. UNLESS OTHERWISE SPECIFIED, A 2" AUTOMATIC FLUSHING DEVICE SHALL BE CONNECTED TO A 2" MANUAL FLUSH POINT USING 2" TYPE K COPPER PIPE.

2. AUTOMATIC FLUSHING DEVICE SHALL HAVE A 2" BRASS FIP INLET LEADING VERTICALLY INTO A 2" AUTOMATIC SOLENOID VALVE. AUTOMATIC SOLENOID VALVE SHALL HAVE AN INTERNAL, SELF-CLEANING DEBRIS SCREEN AND HAVE A 220 PSI RATING.

3. EACH UNIT SHALL BE FURNISHED WITH A STAND-ALONE CONTROLLER. VALVE CONTROLLER WILL NOT REQUIRE A SECOND HAND-HELD DEVICE FOR PROGRAMMING. CONTROLLER MUST HAVE A MINIMUM OF 9 POSSIBLE FLUSHING CYCLES PER DAY, SHALL BE SUBMERSIBLE TO 12 FEET, OPERATE 9 VOLT BATTERY AND HAVE RESIN-SEALED ELECTRICAL COMPONENTS. SOLENOID SHALL HAVE NO LOOSE PARTS WHEN REMOVED FROM VALVE. EACH UNIT SHALL HAVE A DOUBLE VALVE, ALL BRASS SAMPLING POINT. REMOVAL OF 2" SOLENOID VALVE SHALL BE POSSIBLE VIA A QUICK DISCONNECT BELOW THE VALVE.

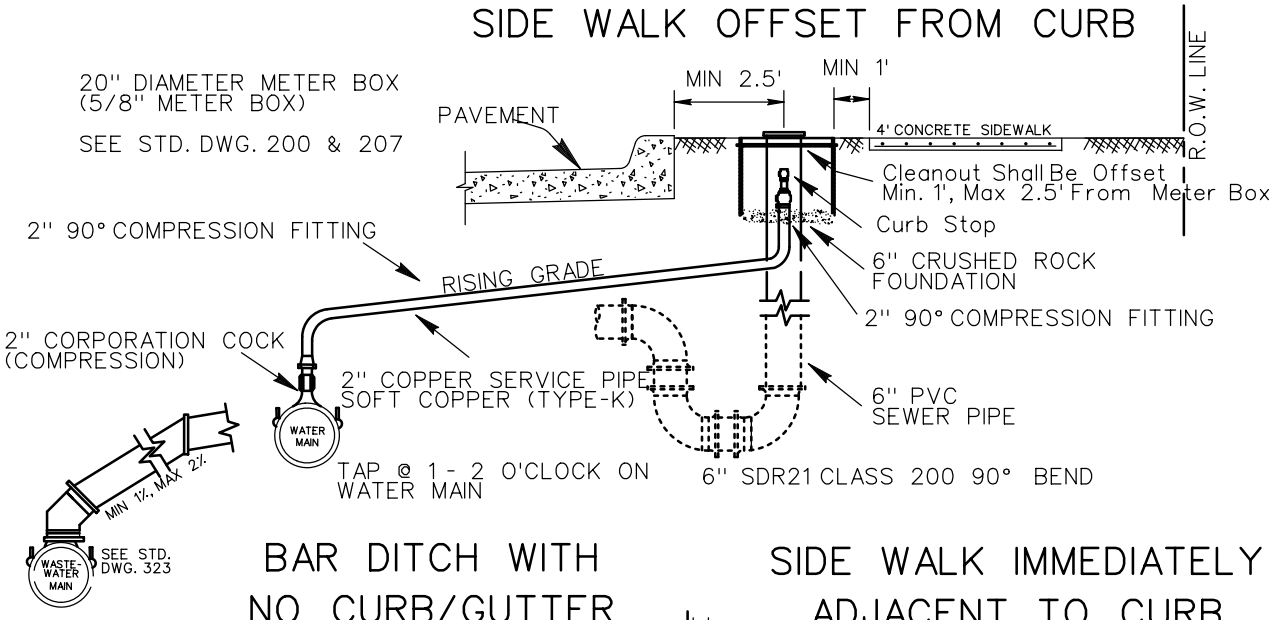
4. ALL ABOVE-GROUND COMPONENTS SHALL BE CONTAINED WITHIN A UV-RESISTANT LOCKING COVER KUPFERLE FOUNDRY COMPANY. 2511 NORTH 9TH STREET ST. LOUIS, MO. 63102 1-800-231-3990.

AUTOMATIC FLUSH POINT		DWU	(Page No.) 207A
		DATE OCT. 2017	

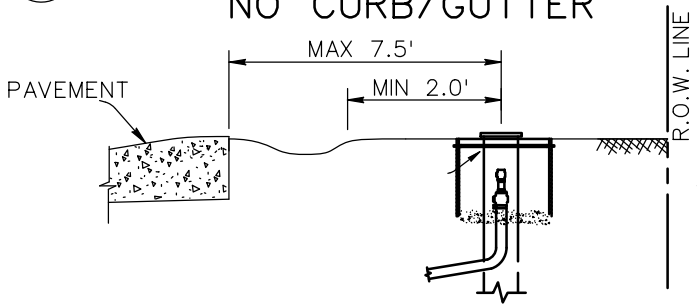


PLAN VIEW OF AUTO. READY FLUSH POINT PLACEMENT

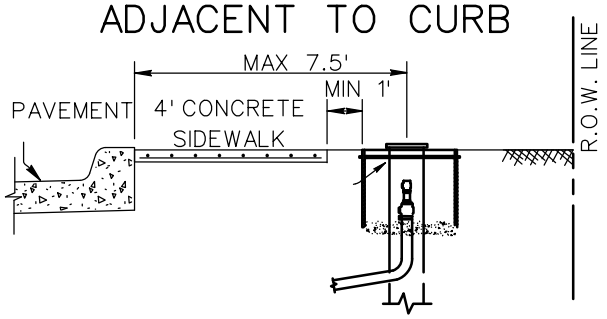
SIDE WALK OFFSET FROM CURB



BAR DITCH WITH NO CURB/GUTTER



SIDE WALK IMMEDIATELY ADJACENT TO CURB



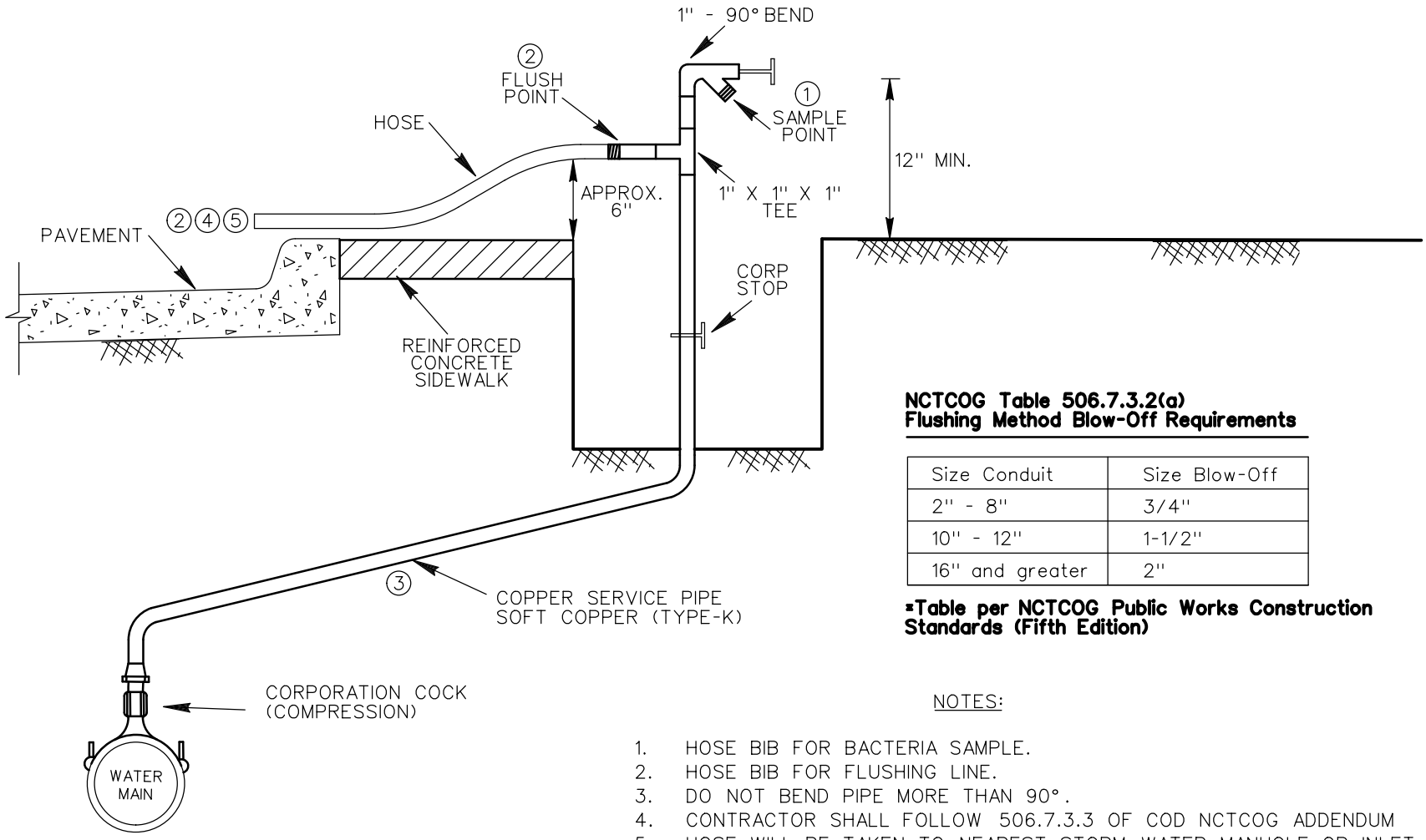
ELEVATION VIEW

N.T.S.

* SIDEWALK: SET 1FT MIN BEHIND SIDEWALK
* NO SIDEWALK: SET 2FT MIN BEHIND CURB
  INSTALL 2 - 6" STEEL GUARD POSTS AS PER STANDARD DRAWINGS 236
* NO CURB: SET 4FT MIN BEHIND STREET
  INSTALL 2 - 6" STEEL GUARD POSTS AS PER STANDARD DRAWINGS 236

REFER TO PAGES 200, 207 & 323

AUTOMATIC READY MANUAL FLUSH POINT WITH 6" LATERAL		DWU	(PAGE NO.) 207B
		DATE OCT. 2016	



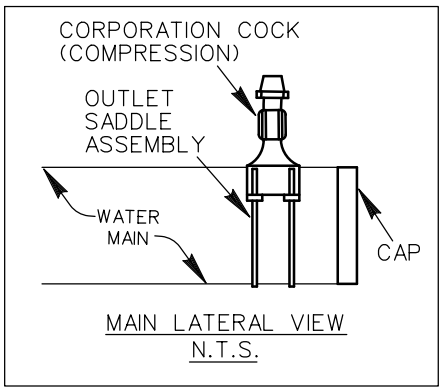
NCTCOG Table 506.7.3.2(a)
Flushing Method Blow-Off Requirements

Size Conduit	Size Blow-Off
2" - 8"	3/4"
10" - 12"	1-1/2"
16" and greater	2"

***Table per NCTCOG Public Works Construction Standards (Fifth Edition)**

NOTES:

1. HOSE BIB FOR BACTERIA SAMPLE.
2. HOSE BIB FOR FLUSHING LINE.
3. DO NOT BEND PIPE MORE THAN 90°.
4. CONTRACTOR SHALL FOLLOW 506.7.3.3 OF COD NCTCOG ADDENDUM
5. HOSE WILL BE TAKEN TO NEAREST STORM WATER MANHOLE OR INLET.



MAIN LATERAL VIEW
N.T.S.

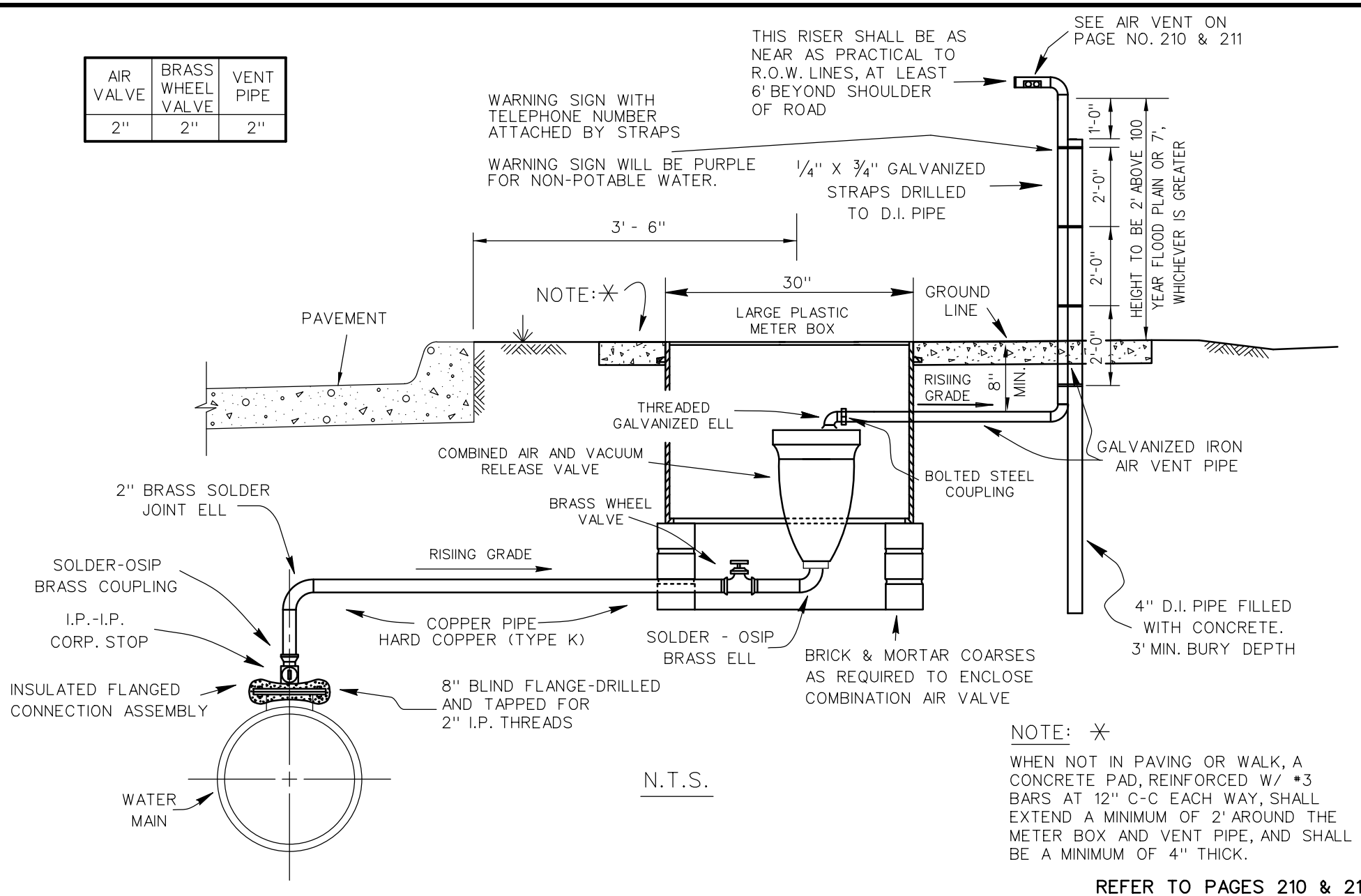
TEMPORARY FLUSH POINT WITH SAMPLE POINT

N.T.S.

FLUSH POINT WITH SAMPLE POINT INSTALLATION

	COD	(Page No.) 207C
	DATE JUNE. 2024	

AIR VALVE	BRASS WHEEL VALVE	VENT PIPE
2"	2"	2"



N.T.S.

NOTE: ✳

WHEN NOT IN PAVING OR WALK, A CONCRETE PAD, REINFORCED W/ #3 BARS AT 12" C-C EACH WAY, SHALL EXTEND A MINIMUM OF 2' AROUND THE METER BOX AND VENT PIPE, AND SHALL BE A MINIMUM OF 4" THICK.

REFER TO PAGES 210 & 211

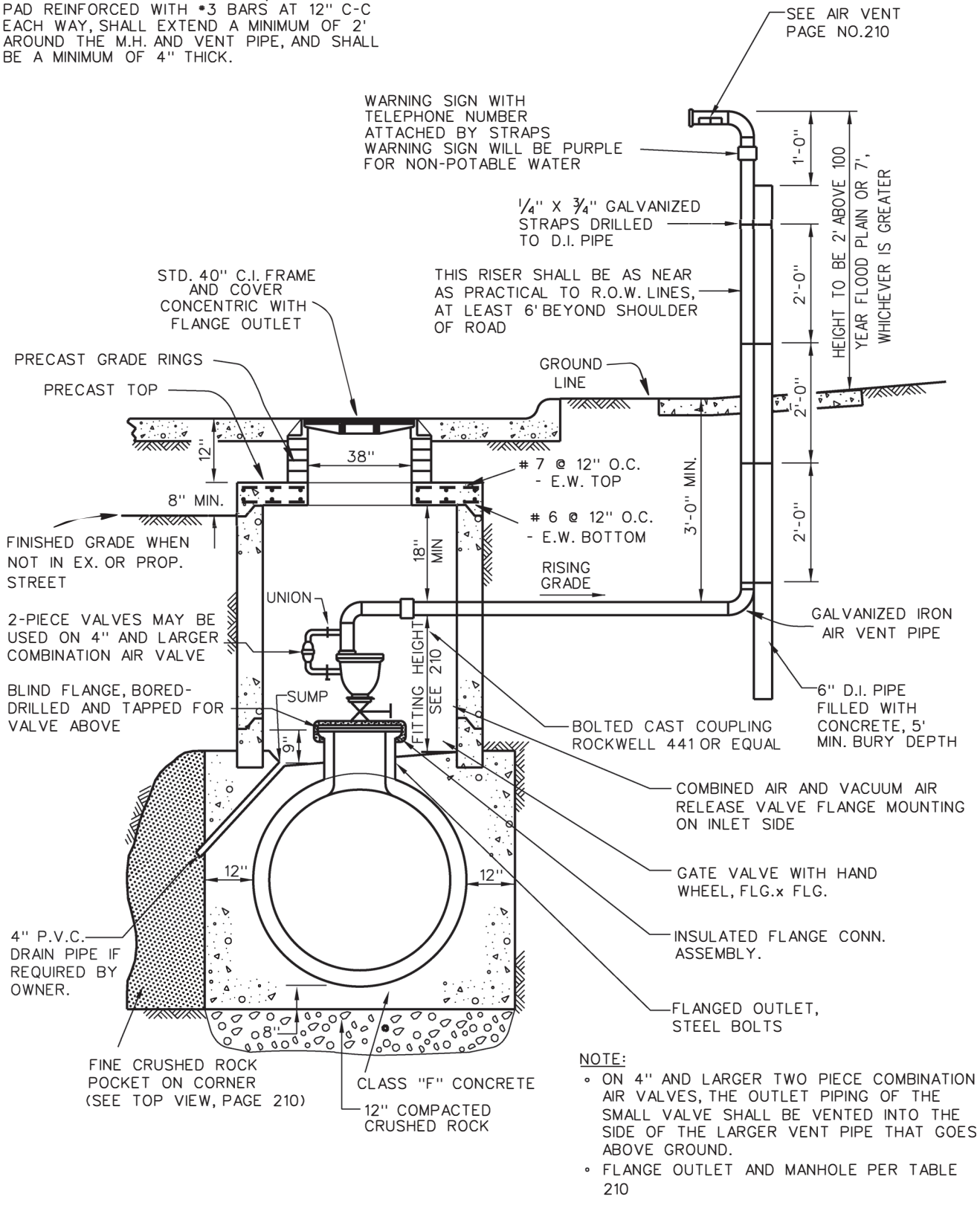
AIR RELEASE VALVE TYPE 1

DWU

(Page No.) 208

DATE OCT. 2015

NOTE:
WHEN NOT IN PAVING OR WALK, A CONCRETE PAD REINFORCED WITH #3 BARS AT 12" C-C EACH WAY, SHALL EXTEND A MINIMUM OF 2' AROUND THE M.H. AND VENT PIPE, AND SHALL BE A MINIMUM OF 4" THICK.

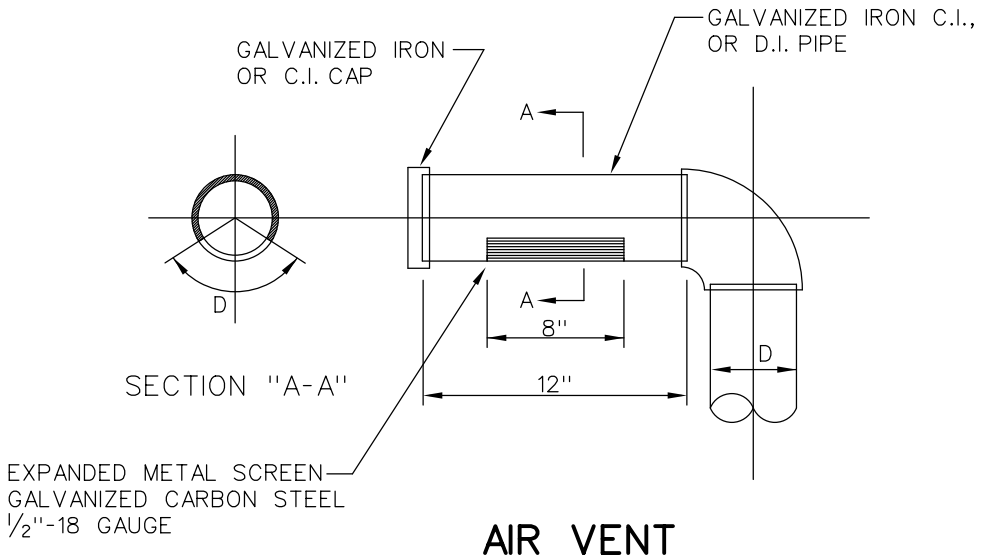


NOTE:
- ON 4" AND LARGER TWO PIECE COMBINATION AIR VALVES, THE OUTLET PIPING OF THE SMALL VALVE SHALL BE VENTED INTO THE SIDE OF THE LARGER VENT PIPE THAT GOES ABOVE GROUND.
- FLANGE OUTLET AND MANHOLE PER TABLE 210

REFER TO PAGES 210 & 211

AIR RELEASE VALVE TYPE 2

DWU		(Page No.) 209
DATE NOV. 2023		

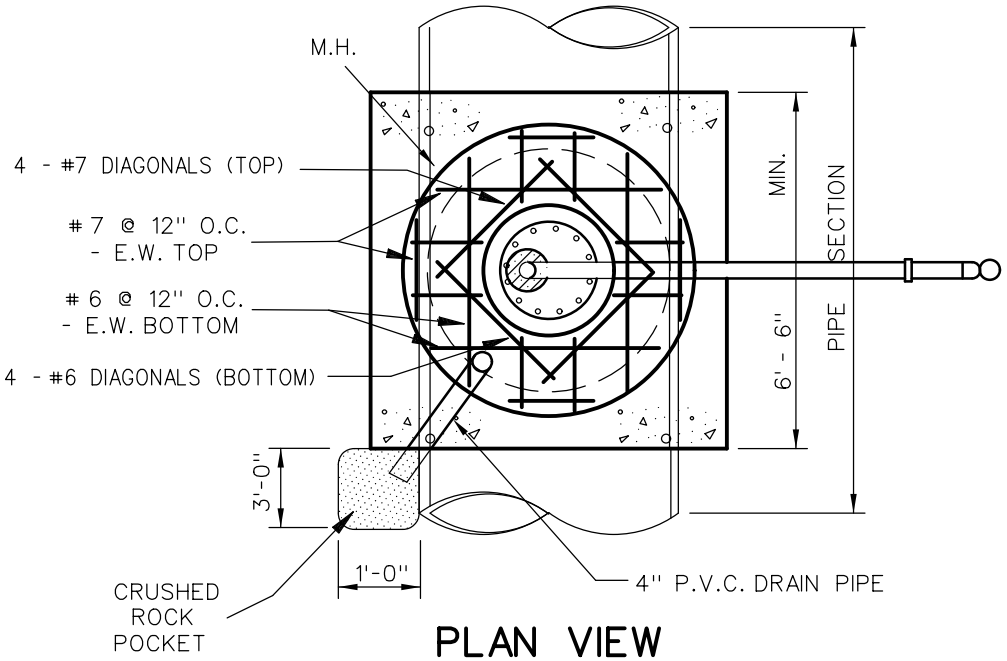


AIR VENT

N.T.S.

FLANGED OUTLET SIZES		
Pipe Diameter	*Flange Size*	*Manhole Diameter*
16" to 20"	*12"*	*5'*
24" to 30"	*18"*	*5'*
36" to 48"	*24" min. unless otherwise specified per Design*	*6'*
54" & up	*36" unless otherwise specified per Design*	*6' unless otherwise specified per Design*

AIR VALVE	GATE VALVE	MINIMUM FITTING HEIGHT	VENT PIPE DIAMETER	VENT PIPE MATERIAL
2"	2"	26"	2"	GALVANIZED OR PAINTED BLACK IRON
3"	3"	31"	3"	
4"	4"	38"	4"	CLASS 52 DUCTILE IRON
6"	6"	46"	6"	
8"	8"	53"	8"	
10"	10"	62"	10"	
12"	12"	72"	12"	



PLAN VIEW

N.T.S.

REFER TO PAGES 208, 209, & 211

AIR RELEASE VALVE TYPE 2

DWU		(Page No.) 210
DATE APR. 2024		

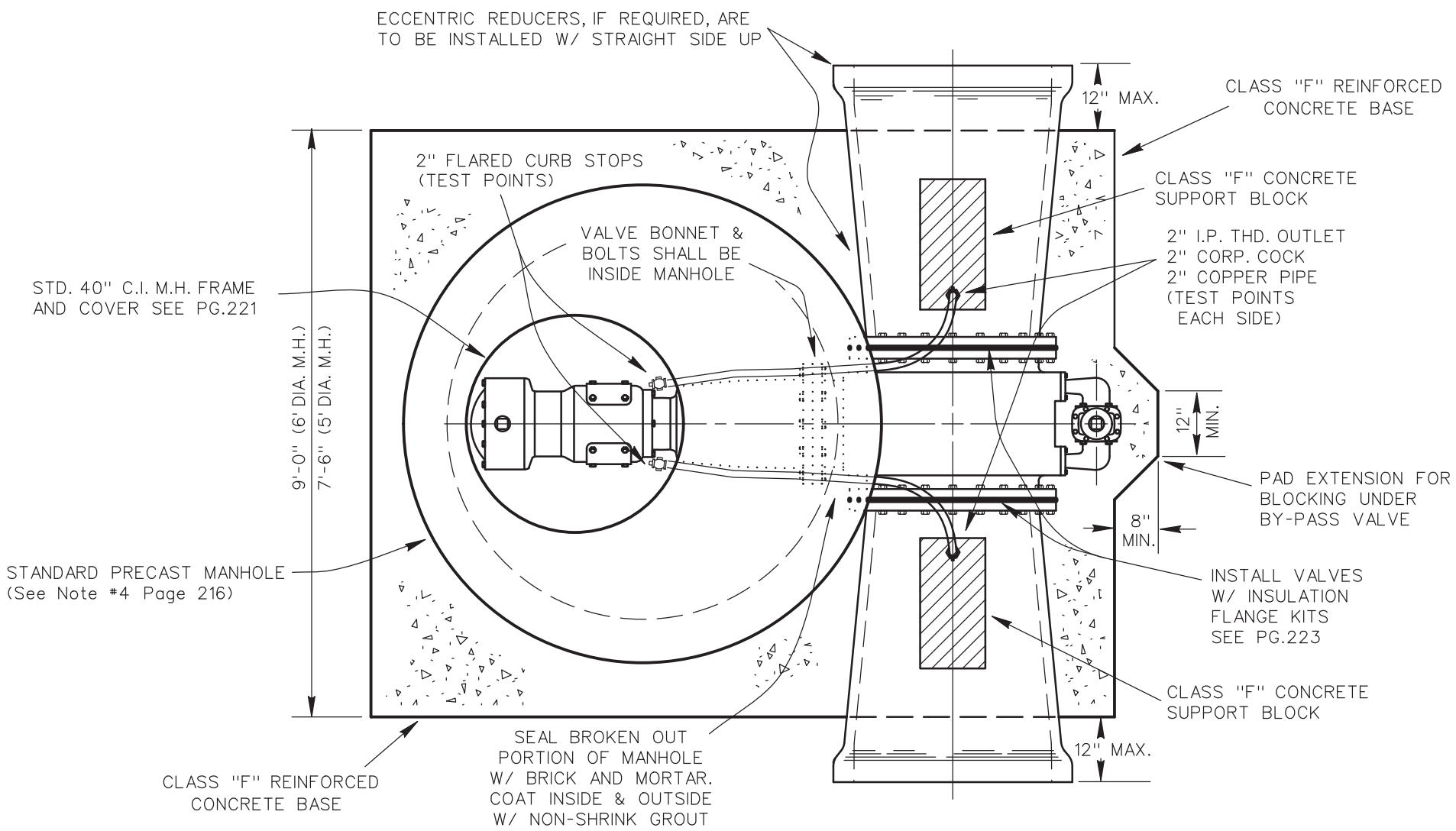
GENERAL NOTES

1. Manholes must be precast.
2. Air vent pipes 4" and larger shall be Class 52 Ductile Iron Pipe with flange fittings with Rustoleum 7582 gray primer or equal in lieu of tar coating. Pipe shall be painted with Devguard 4308 or equal (SILVER COLOR) per manufacture's instructions prior to installation.
3. A Dallas Water Utilities warning sign shall be furnished by the City and installed by the Contractor. Where the air valve is installed on a non-potable water line, the sign must be painted purple to designate the type of water.
4. Vent pipe must be extended a minimum of 7 feet above ground line, or (AS STATED ON DESIGN PLANS).
5. If vent pipe is located within a 100 year flood zone, vent pipe must be extended a minimum of 2 feet above the water surface, or (AS STATED ON DESIGN PLANS).
6. All underground portions of Ductile Iron Pipe will be encased in polywrap.
7. The following table of dimensions govern the required depths of cover for the installation of Type 2 air valves within public rights-of-ways;

TABLE OF DIMENSIONS FOR DEPTH OF COVER		
AIR VALVE SIZE	VALVE FITTING ASSEMBLY MIN. HEIGHT	MINIMUM REQUIERED DEPTH OF COVER
2"	26"	7.5'
3"	31"	7.8'
4"	38"	8.6'
6"	46"	9.3'
8"	53"	10.1'
10"	62"	10.8'
12"	72"	11.7'

REFER TO PAGES 209 & 210

GENERAL NOTES TYPE 2 AIR VALVE		DWU	(Page No.) 211
		DATE OCT. 2015	

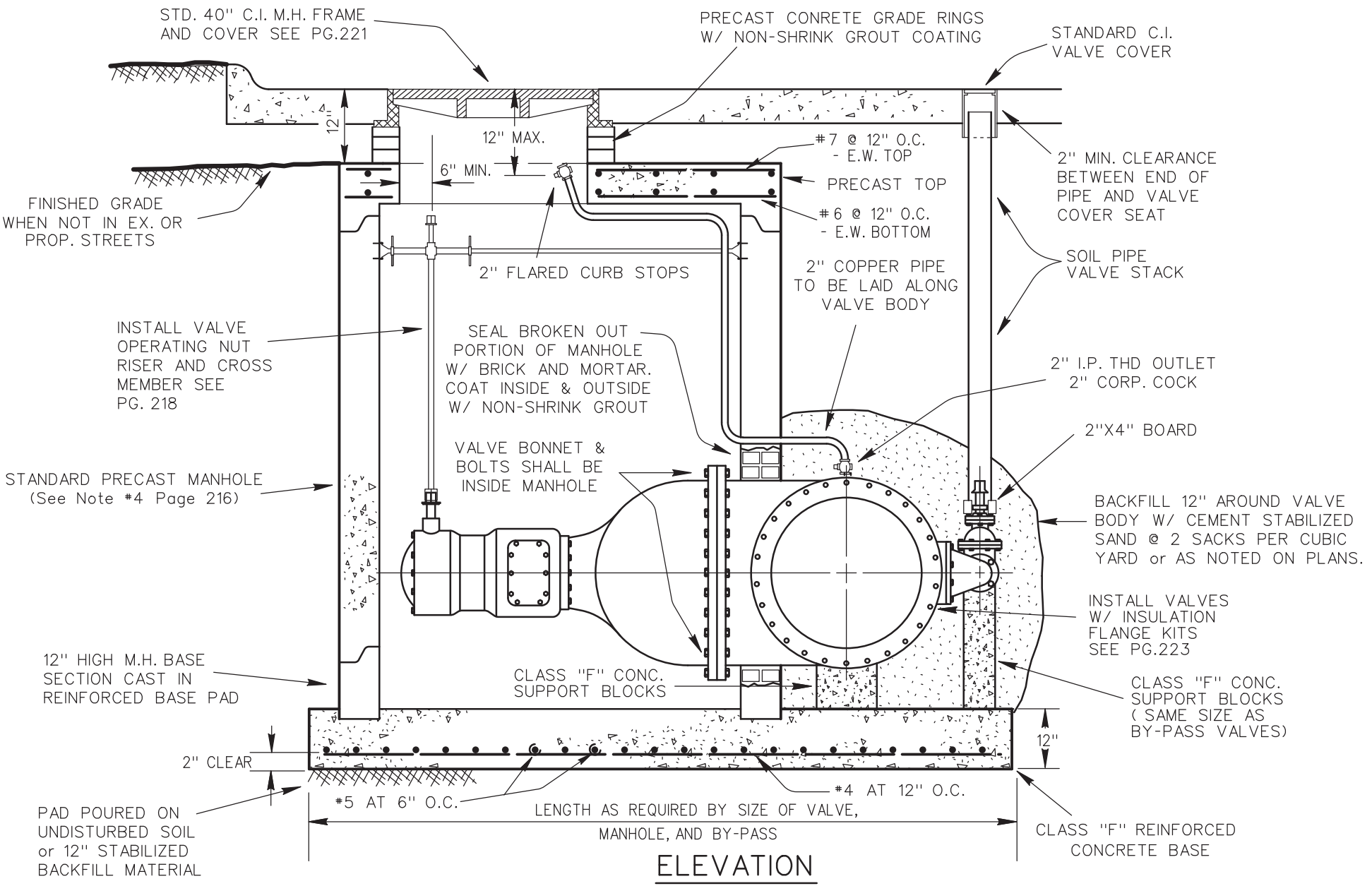


PLAN

REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

HORIZONTAL GATE VALVE WITH MANHOLE INSTALLATION

DWU	(Page No.) 212
DATE MAR.2024	



ELEVATION

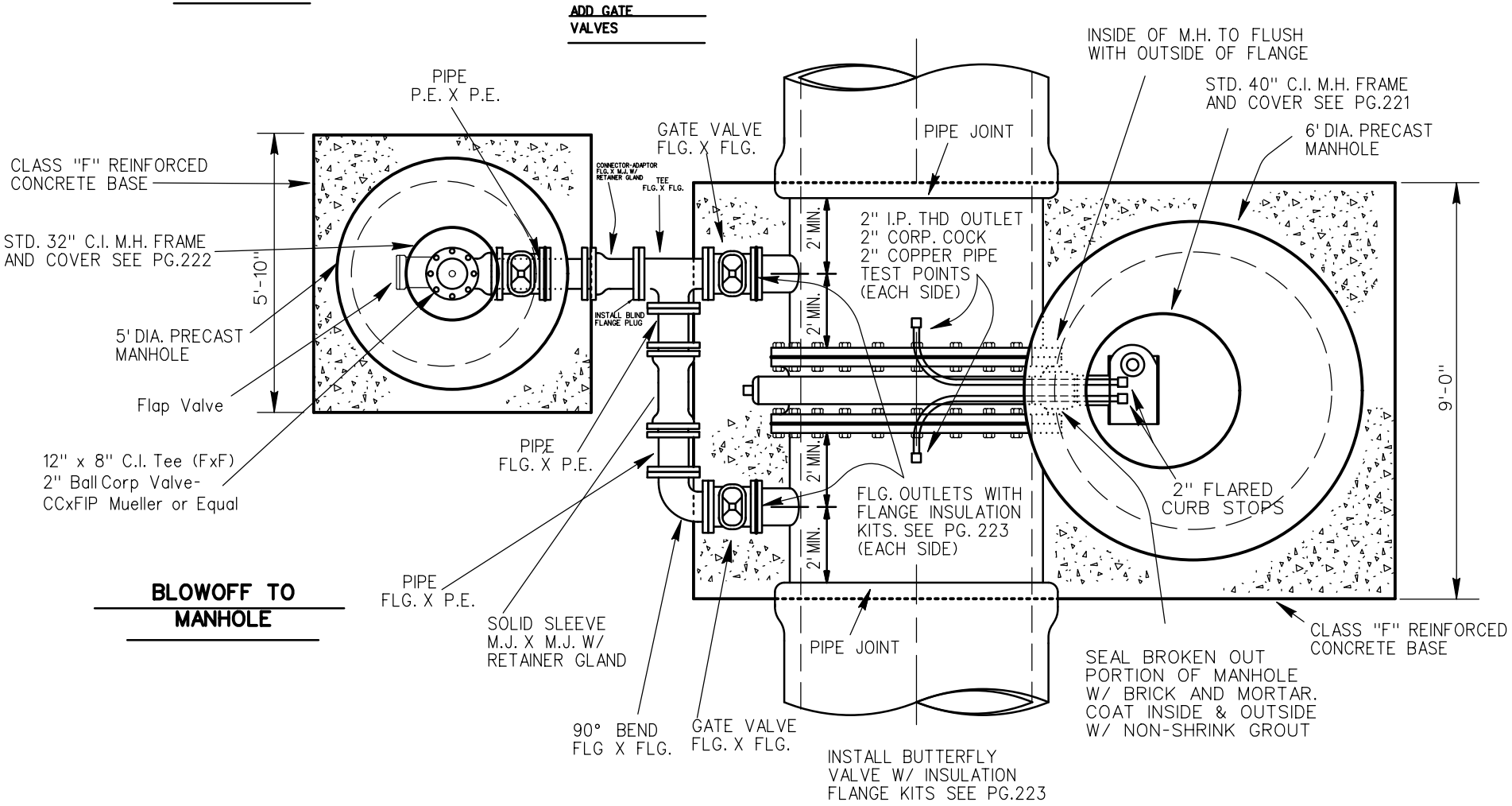
REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

HORIZONTAL GATE VALVE WITH MANHOLE INSTALLATION

	DWU	(Page No.) 213
	DATE MAR.2024	

BLOWOFF INSTALLATIONS

ADD GATE VALVES



BLOWOFF TO MANHOLE

PLAN

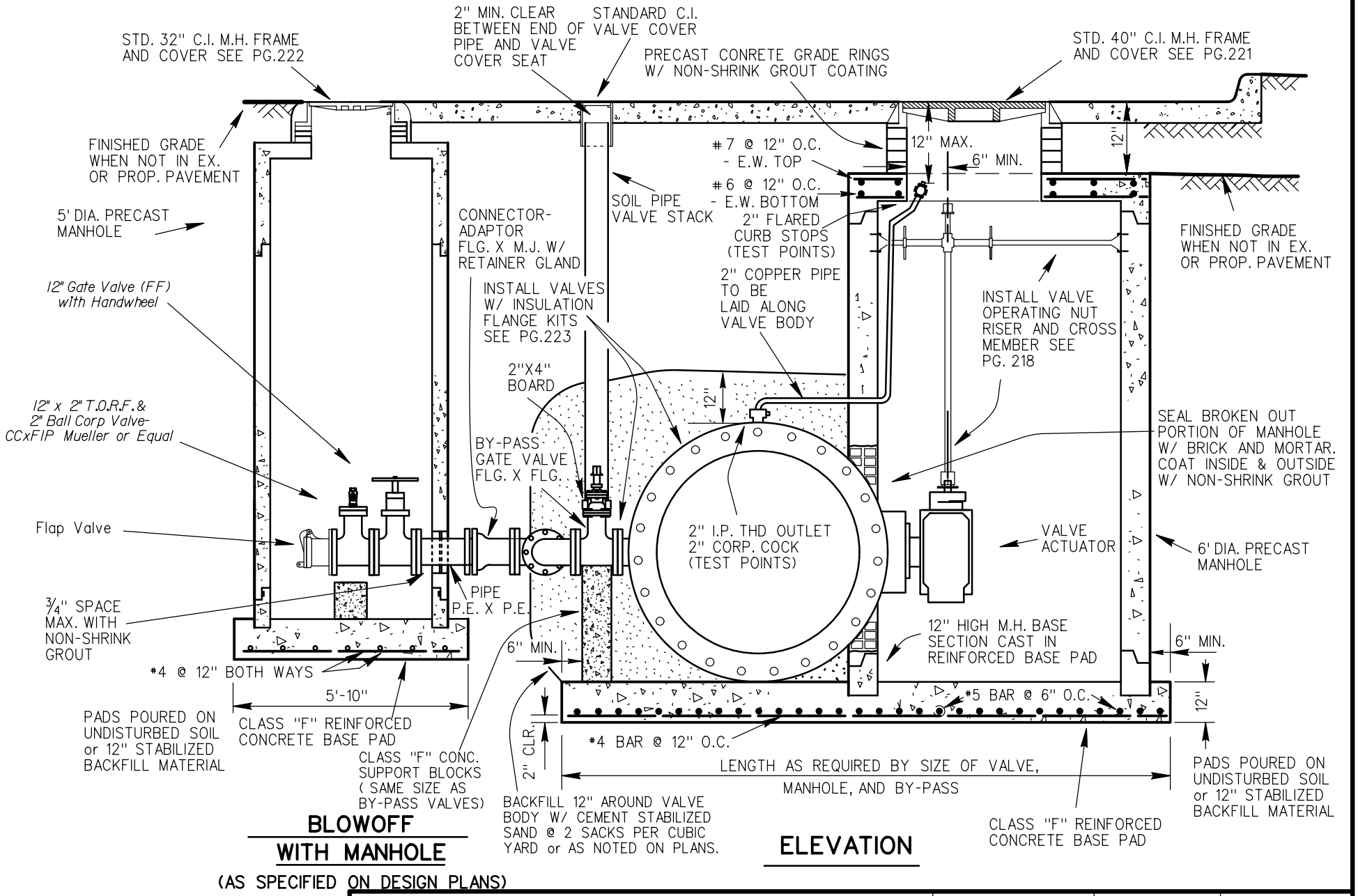
REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

BUTTERFLY VALVE WITH MANHOLE INSTALLATION

DWU

(Page No.) 214

DATE DEC 2023



BLOWOFF WITH MANHOLE

(AS SPECIFIED ON DESIGN PLANS)

ELEVATION

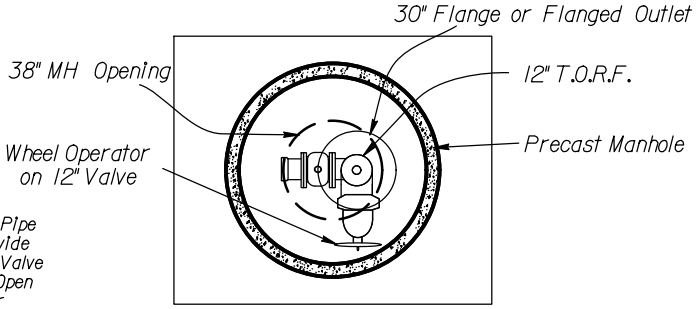
REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

BUTTERFLY VALVE WITH MANHOLE INSTALLATION

DWU

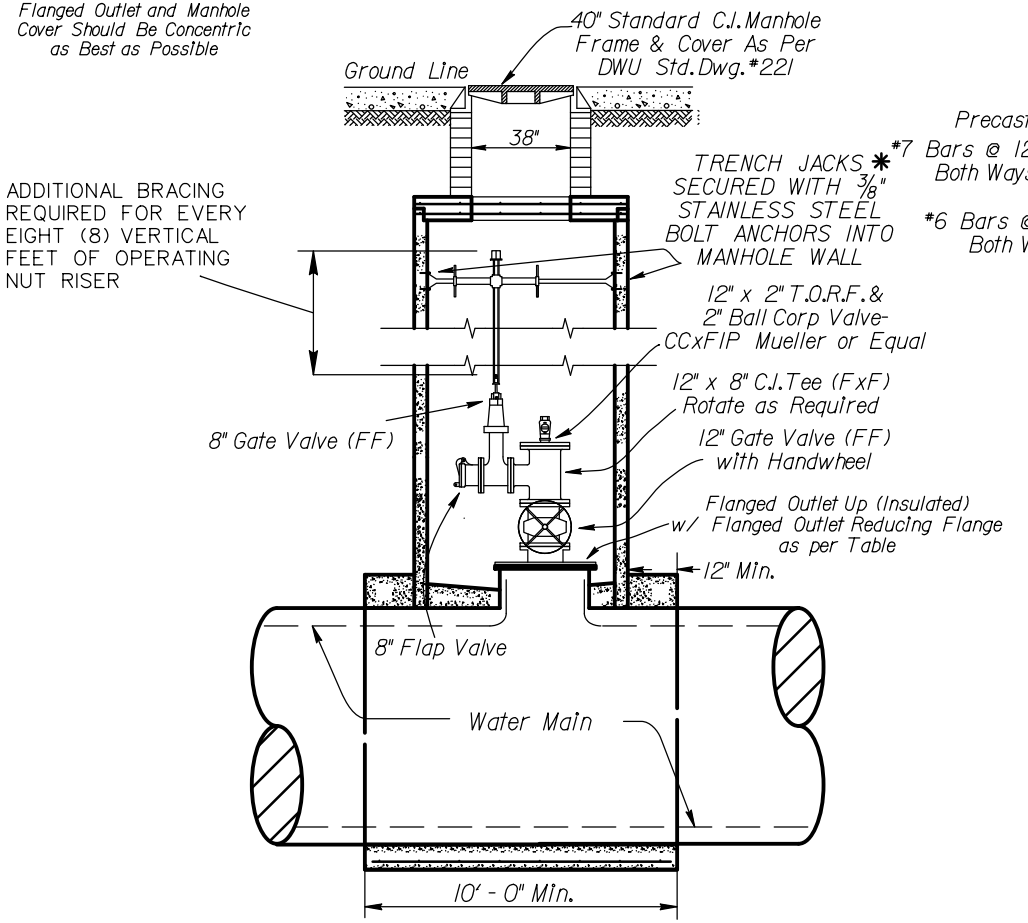
(Page No.) 215

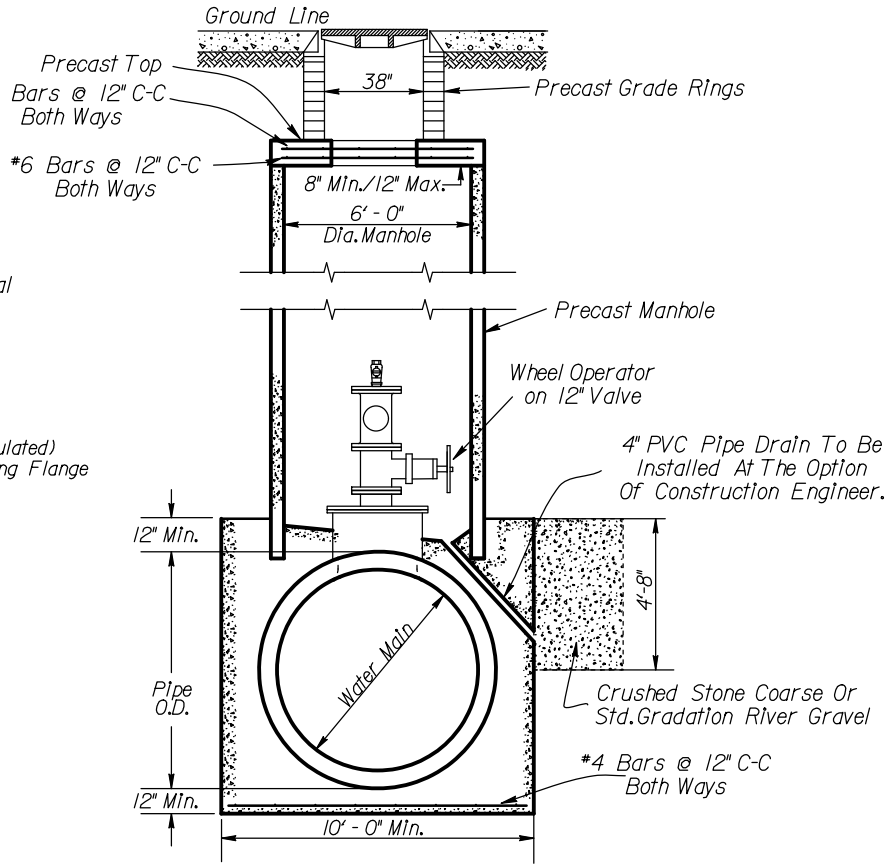
DATE APR. 2024



NOTE:
Adjust M.H. Over Pipe Location To Provide Easy Access For Valve Operation Thru Open Manhole Cover
Flanged Outlet and Manhole Cover Should Be Concentric as Best as Possible

FLANGED OUTLET SIZES		
Pipe Diameter	Flange Size	Manhole Diameter
16" to 20"	12"	5'
24" to 30"	18"	5'
36" to 48"	24" min. unless otherwise specified per Design	6'
54" & up	36" unless otherwise specified per Design	6' unless otherwise specified per Design





REFER TO PAGE 218

LARGE MAIN BLOW-OFF

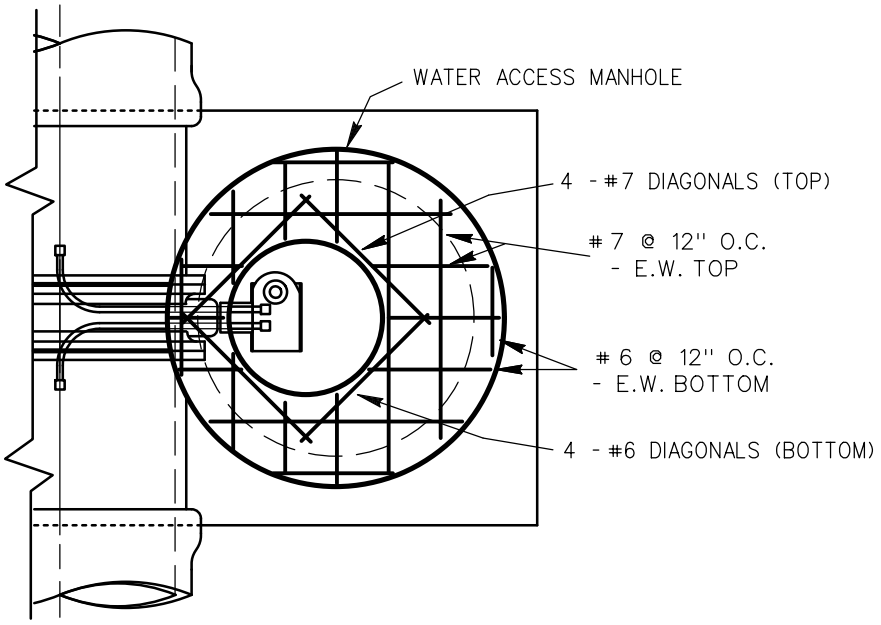
DWU

(Page No.) 215A

DATE MAR. 2024

GENERAL NOTES

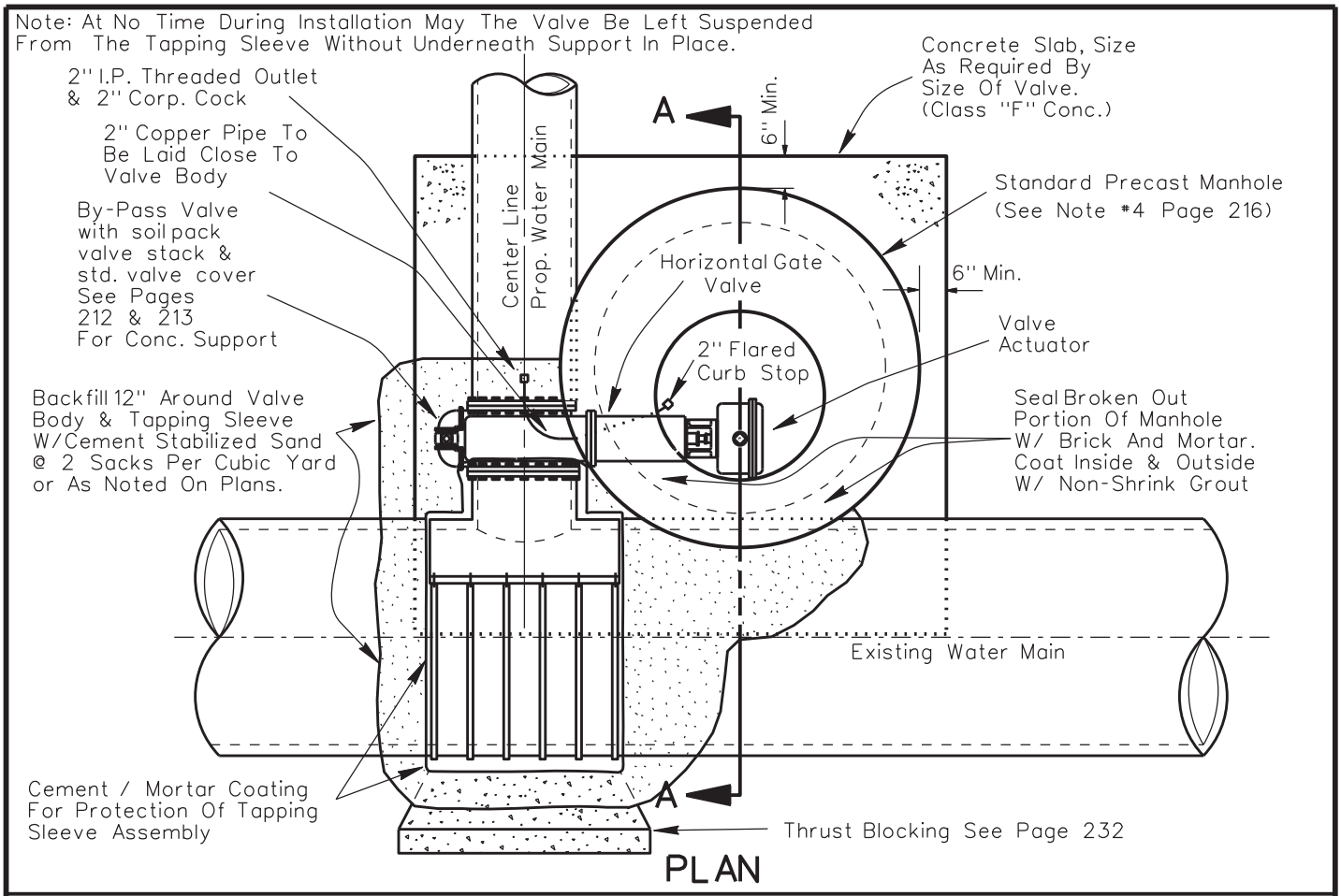
1. Precast grade rings shall be eliminated and the top of the manhole shall be placed at existing grade when the location is not in an existing or proposed street. For this case only, the standard 40" manhole frame and cover will be set in the manhole precast top.
2. In open country, a 4" thick concrete pad, reinforced with #3 bars on 12" centers each way shall extend a minimum of 2' around the manholes and bypass valve stack.
3. When a reducer is installed into a hub and valve, the exposed steel on the end of the reducer will be wrapped with wire mesh and a minimum of 1" mortar coating shall be applied.
4. Manholes for 30" and larger valves shall be 6' in diameter.

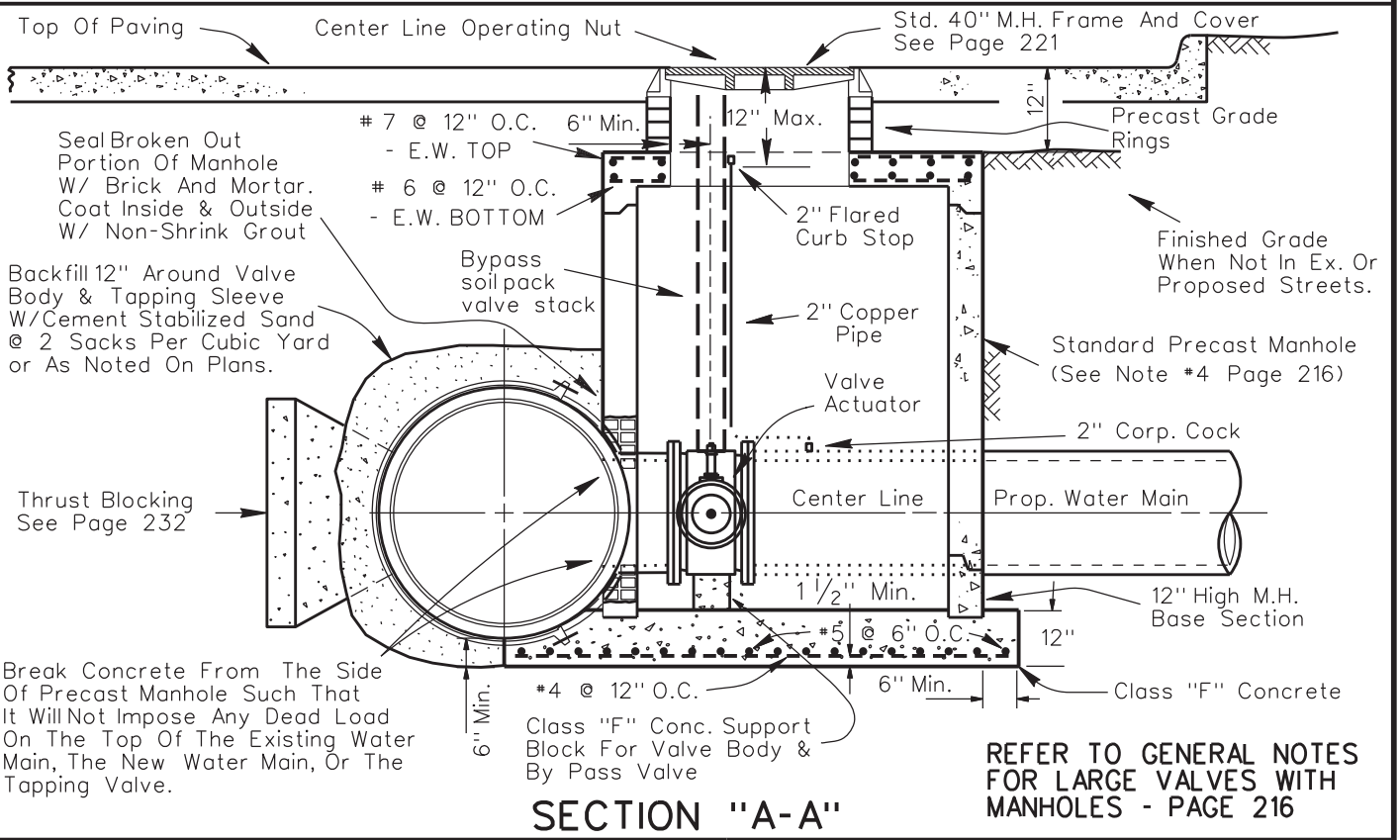


PLAN VIEW FOR TYPICAL REINFORCING FOR WATER ACCESS MANHOLE TOPS

(MANHOLE FOR VALVE ACCESS SHOWN)

GENERAL NOTES FOR LARGE VALVES WITH MANHOLES		DWU	(Page No.) 216
		DATE OCT. 2010	



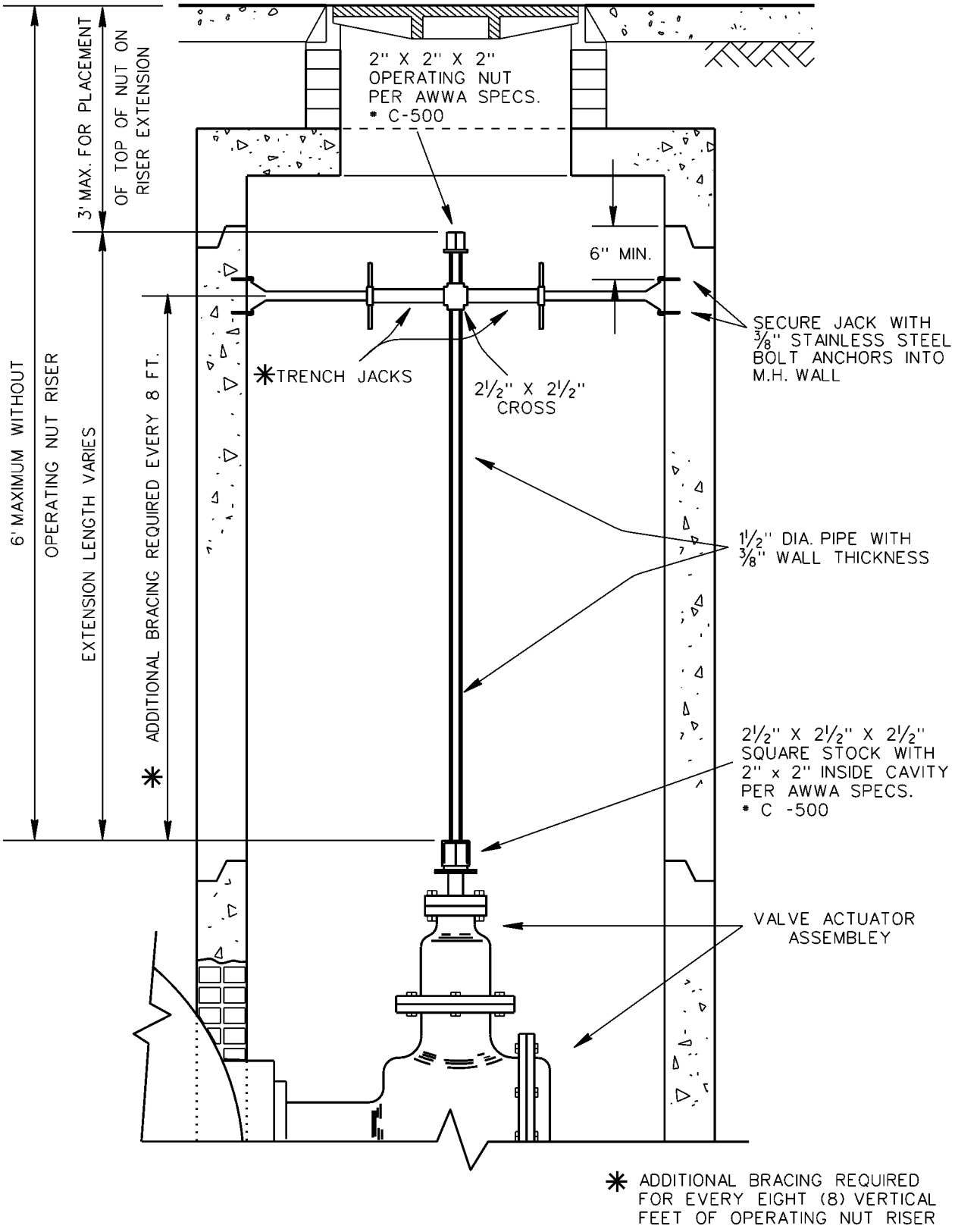


LARGE TAPPING VALVE INSTALLATION

DWU

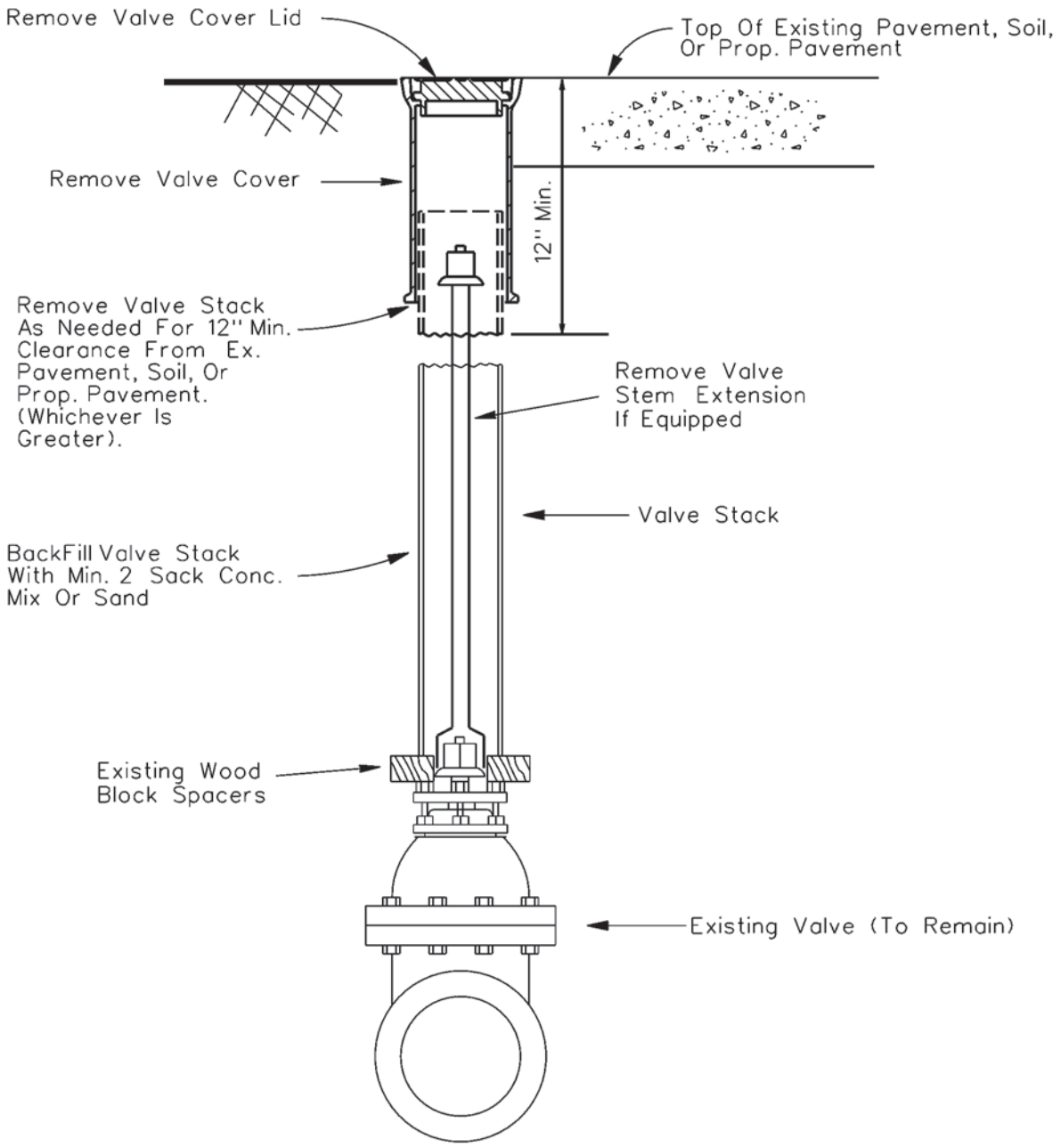
(PAGE NO.) 217

DATE APR. 2024



OPERATING NUT RISER
(For Large Valve Installations)

DWU		(PAGE NO.) 218
DATE DEC.2001		



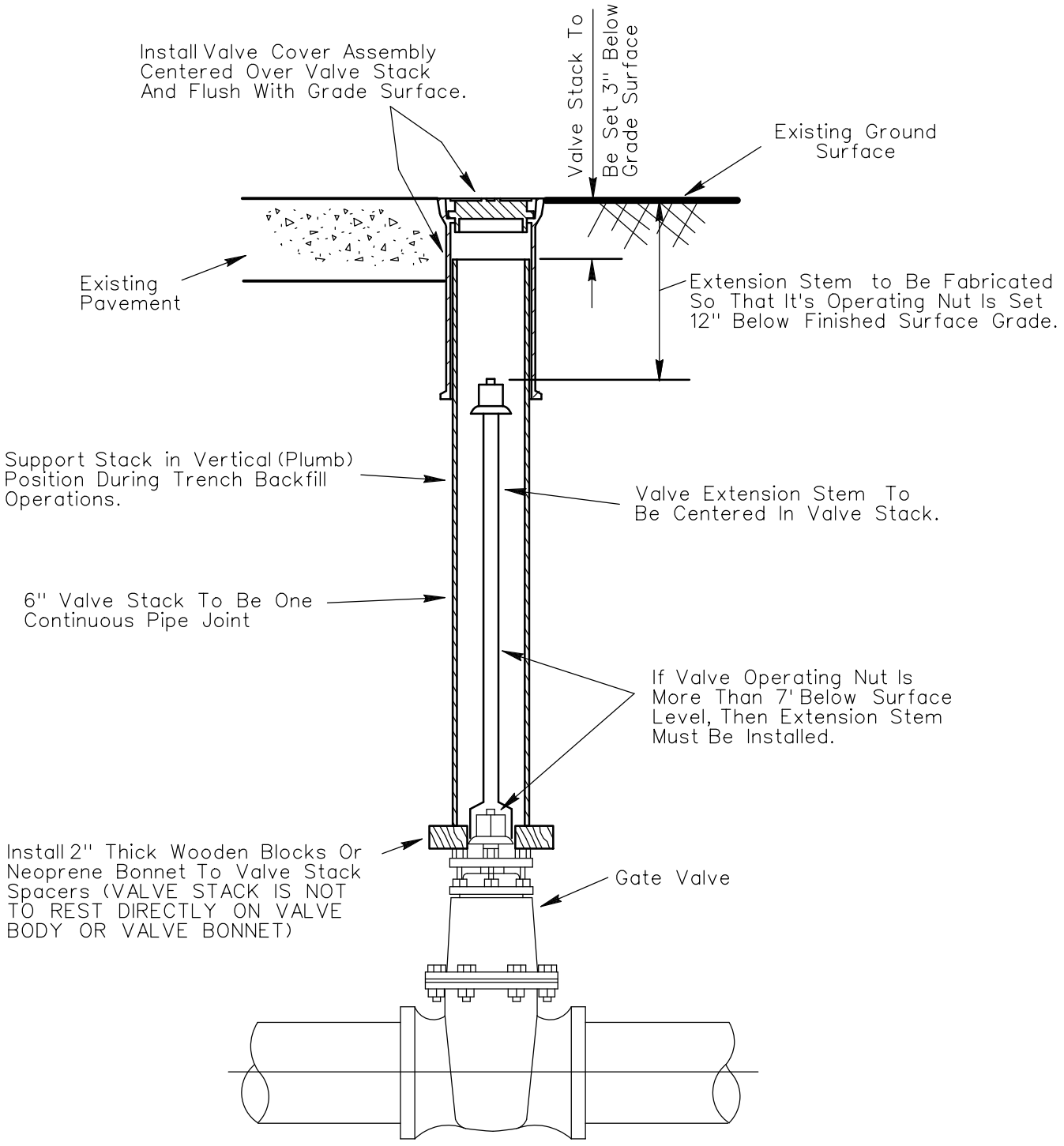
NOT IN PAVEMENT

Match Existing Soil & Compact As Needed Or As Required By Construction Inspector.

IN PAVEMENT

All Cuts And Repairs To Ex. Paving Must Conform P.W. & T. Pavement Cut And Repair Standards Manual.

# 4" to 16" GATE VALVE ABANDONMENT		DWU	(PAGE NO.) 219
		DATE JAN. 2010	

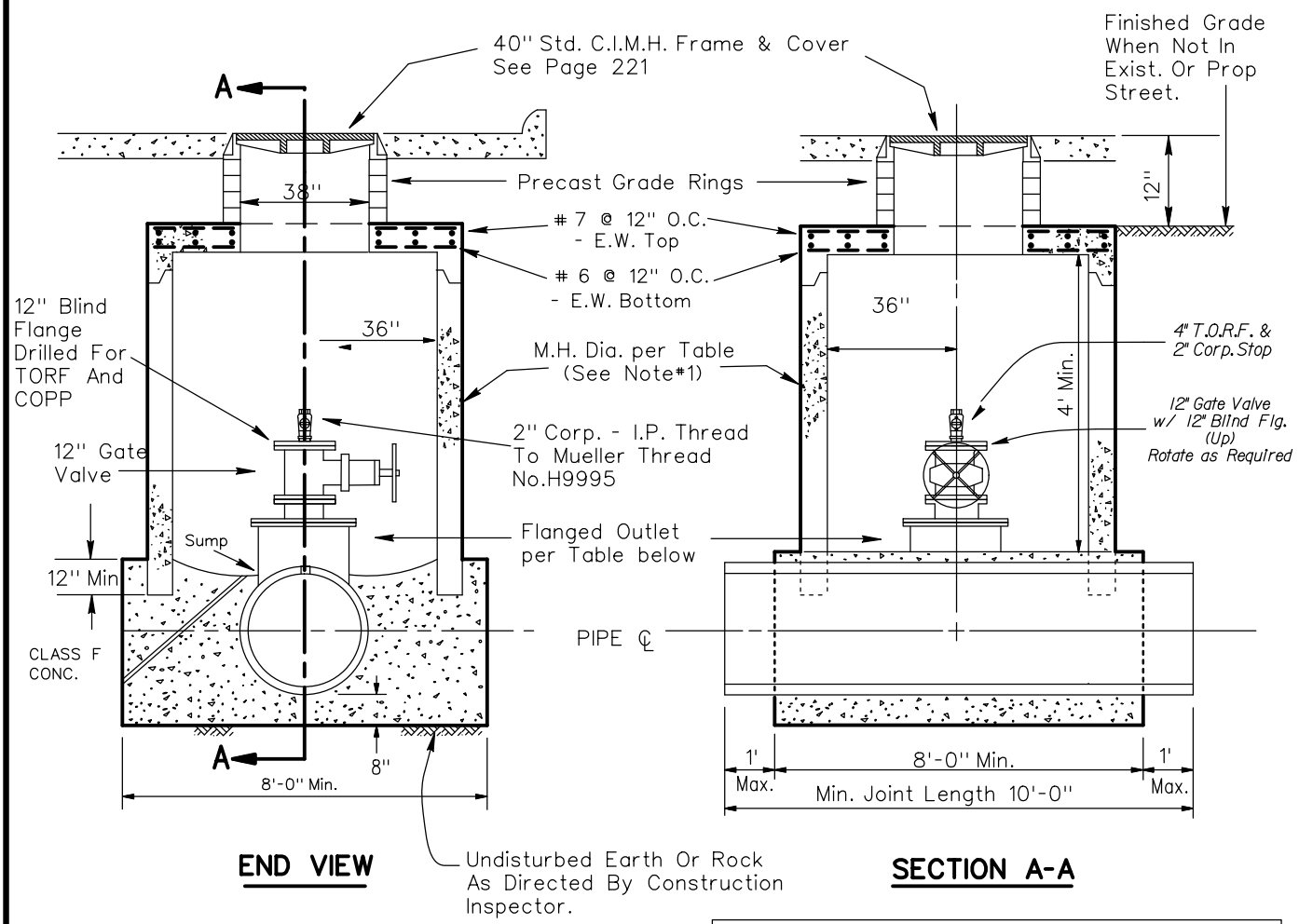


4" to 16" GATE VALVE
COVER, STACK, & STEM INSTALLATION

DWU

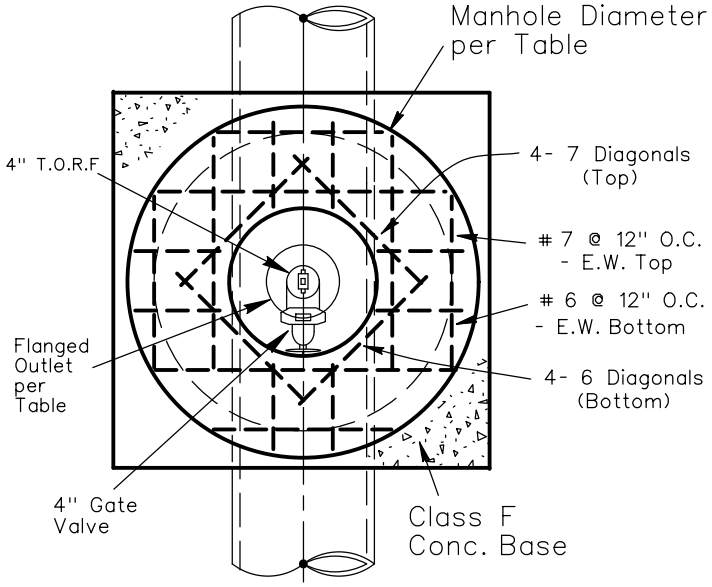
(PAGE NO.) 219A

DATE JUNE 2002



END VIEW

SECTION A-A



TOP VIEW

FLANGED OUTLET SIZES		
Pipe Diameter	*Flange Size*	*Manhole Diameter*
16" to 20"	*12"*	*5'*
24" to 30"	*18"*	*5'*
36" to 48"	*24" min. unless otherwise specified per Design*	*6'*
54" & up	*36" unless otherwise specified per Design*	*6' unless otherwise specified per Design*

NOTES

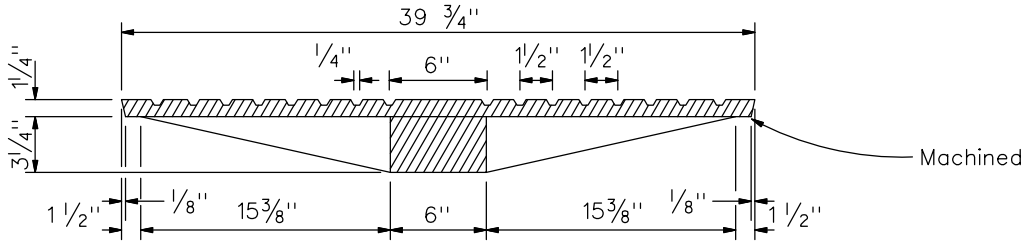
1. Precast Grade Rings Shall Be Eliminated When Not In Existing Or Proposed Street (Open Country). In This Case, 40" Standard C.I. M.H. Frame And Cover Shall Be Set In M.H. Top.

INSPECTION INSERTION ACCESS POINT

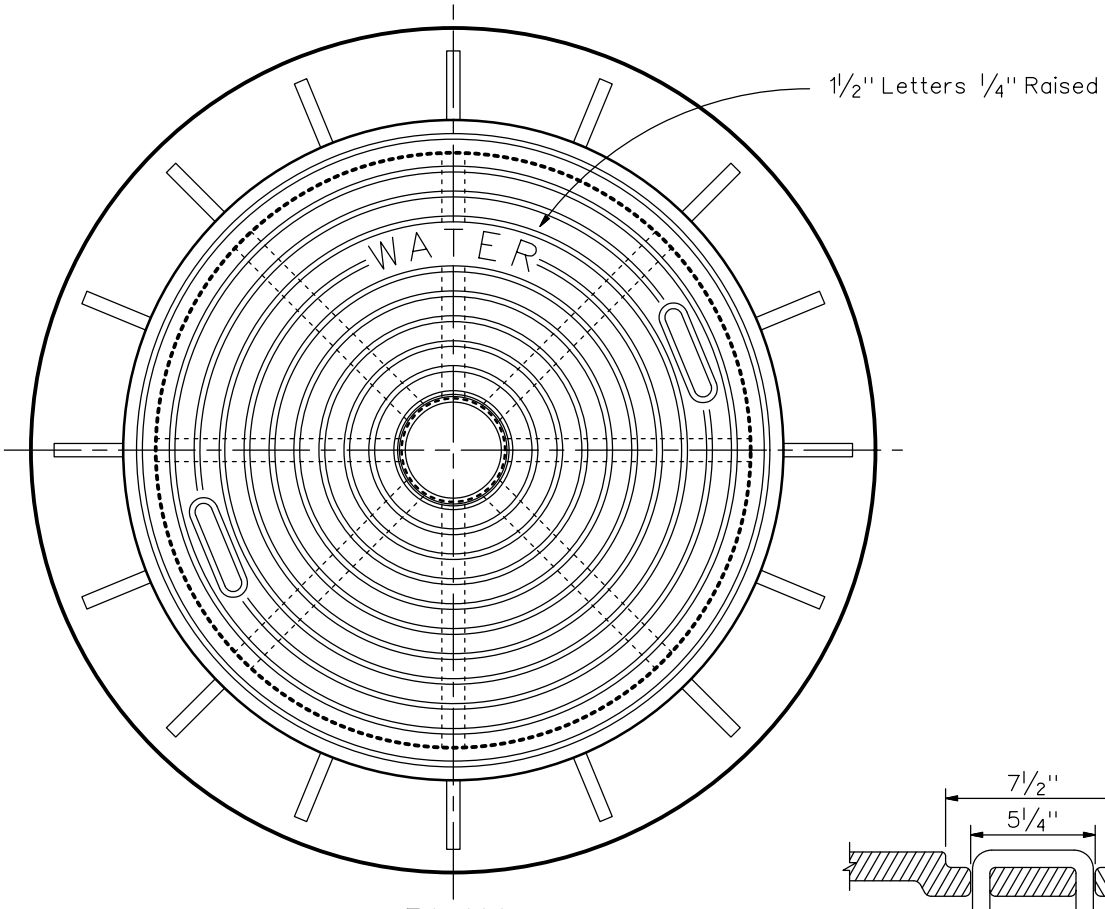
COD

(PAGE NO.) 220

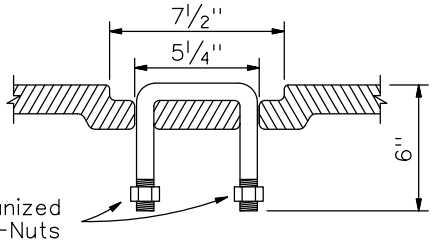
DATE Mar. 2024

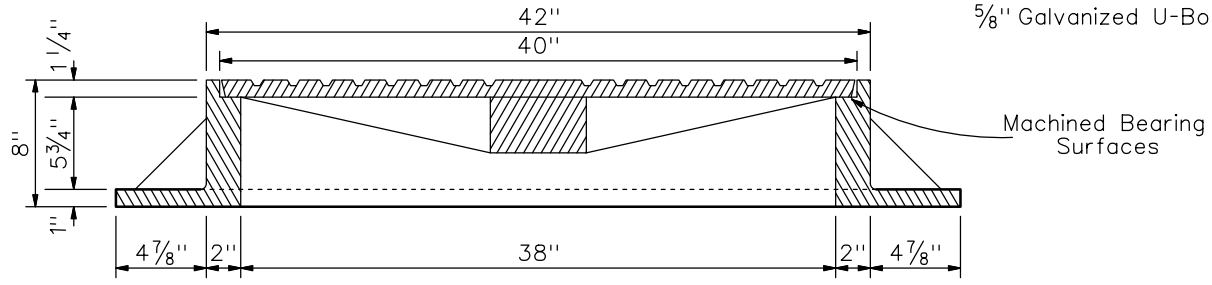


SECTION THRU COVER



PLAN

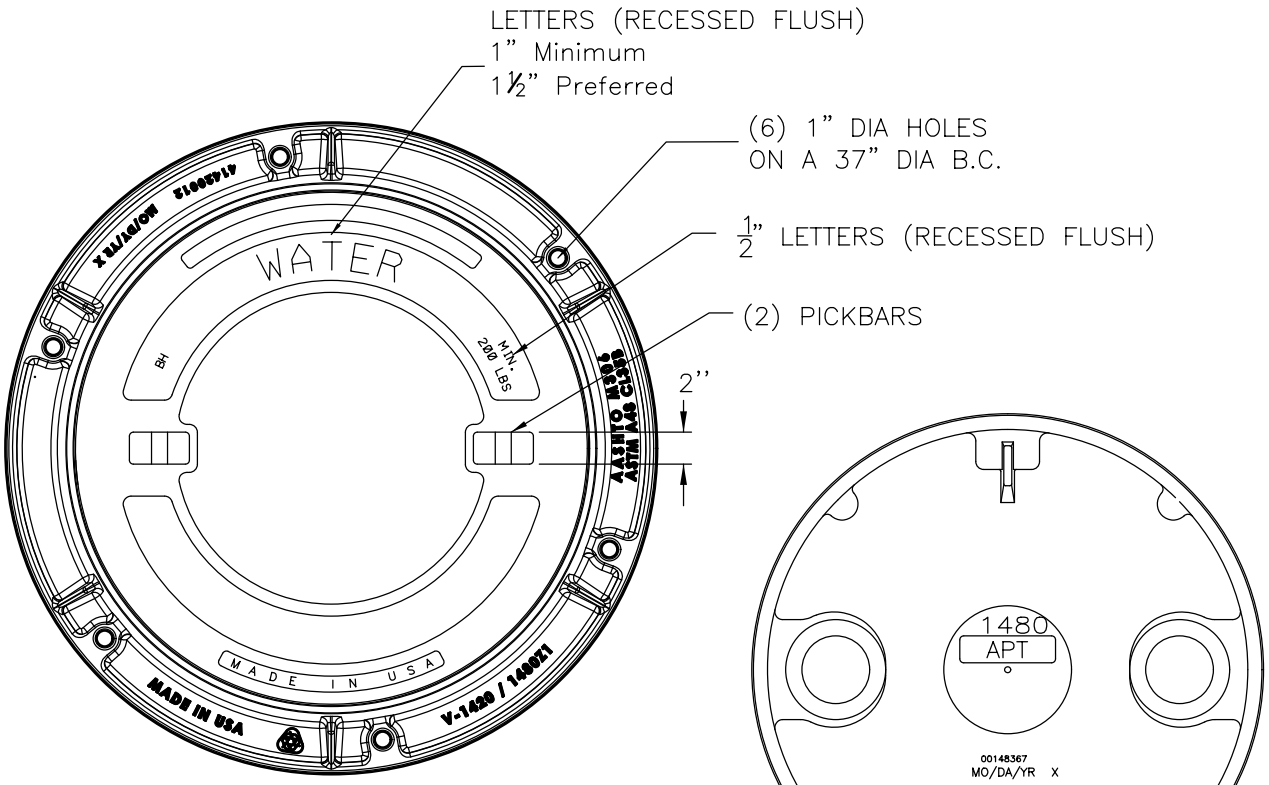




SECTION THRU FRAME

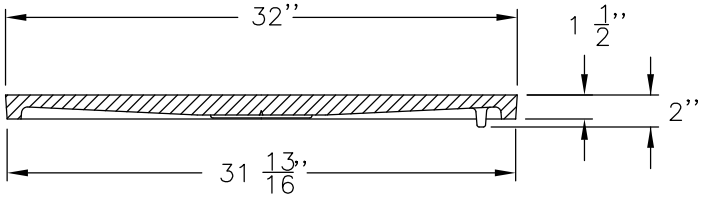
Ring & Cover Material per ASTM A48 Class 35B Min. Gray Iron Castings.

STANDARD 40" MANHOLE FRAME AND COVER		DWU	(PAGE NO.) 221
		DATE DEC.2001	

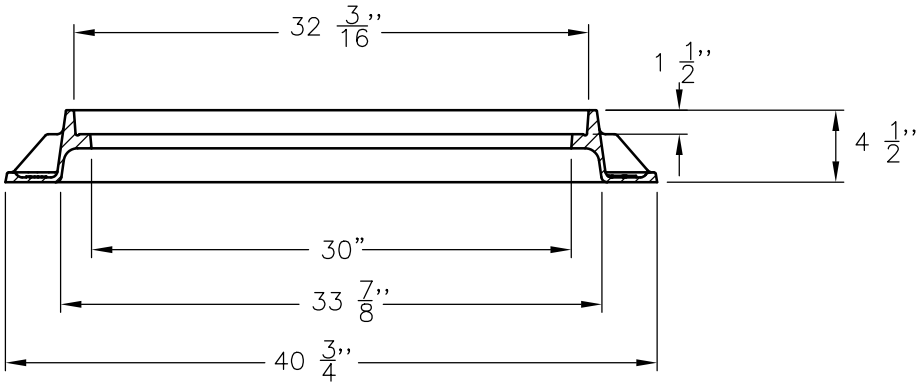


PLAN VIEW

BOTTOM VIEW OF COVER



COVER SECTION

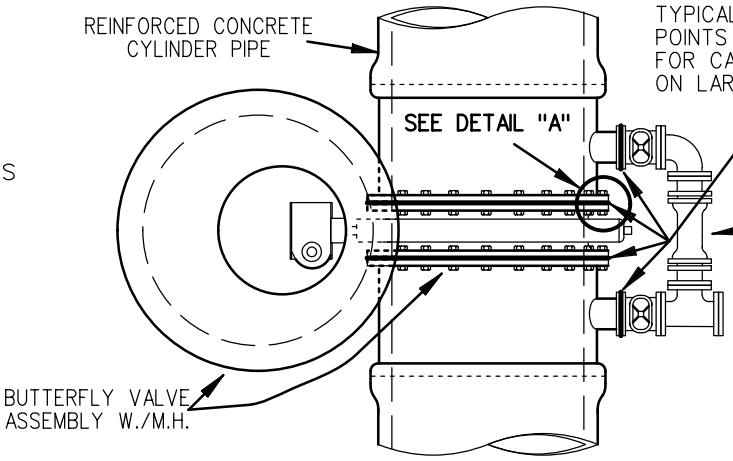


COVER – GRAY IRON
ASTM A48 CL35B
FRAME – GRAY IRON
ASTM A48 CL35B

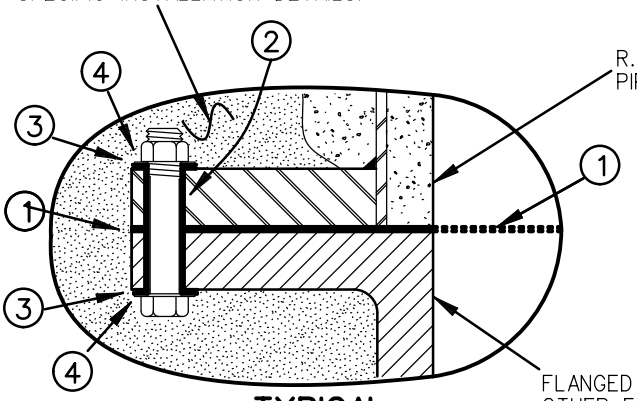
STANDARD 32" MANHOLE. FRAME AND COVER	WATER	DWU	(PAGE NO.) 222
		DATE OCT.2011	

INSULATING MATERIAL (KIT)

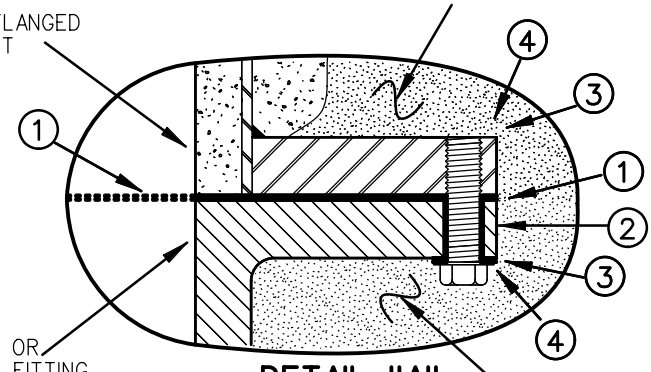
1. 1/8" THICK - CIRCULAR\ (DOUGHNUT) GASKET
2. INSULATING SLEEVE FOR EACH BOLT
3. 2 ~ INSULATING WASHERS FOR EACH BOLT
4. 2 ~ STEEL WASHERS FOR EACH BOLT



ALL FLANGE BOLTS & FLANGES TO BE COVERED WITH CEMENT MORTAR AT LEAST 1" THICK. (UNLESS NOTED OTHERWISE ON DESIGN PLANS OR OTHER SPECIFIC INSTALLATION DETAILS)

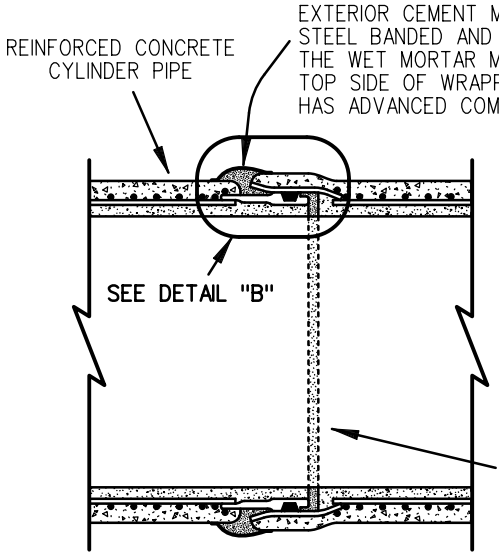


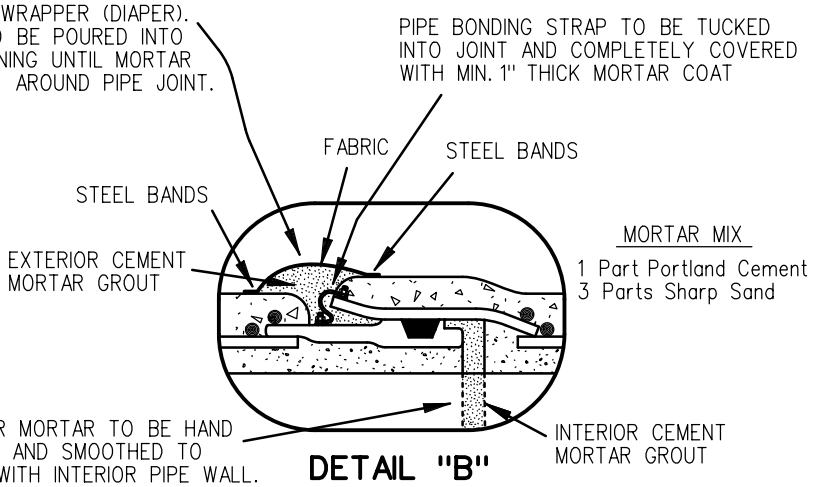
TYPICAL CONNECTION



DETAIL "A" THREADED CONNECTION ON BUTTERFLY VALVES

INSULATION KIT INSTALLATION DETAIL (FOR R.C.C.P. INSTALLATIONS)



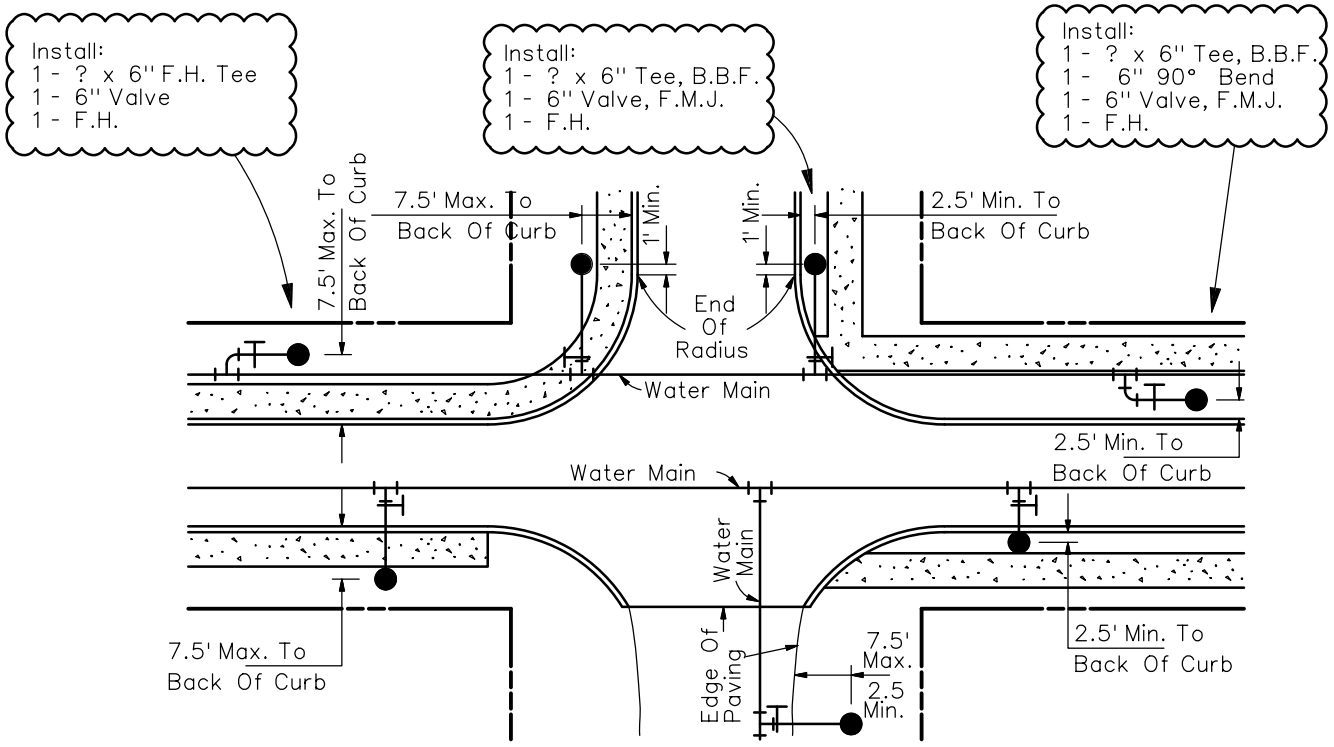


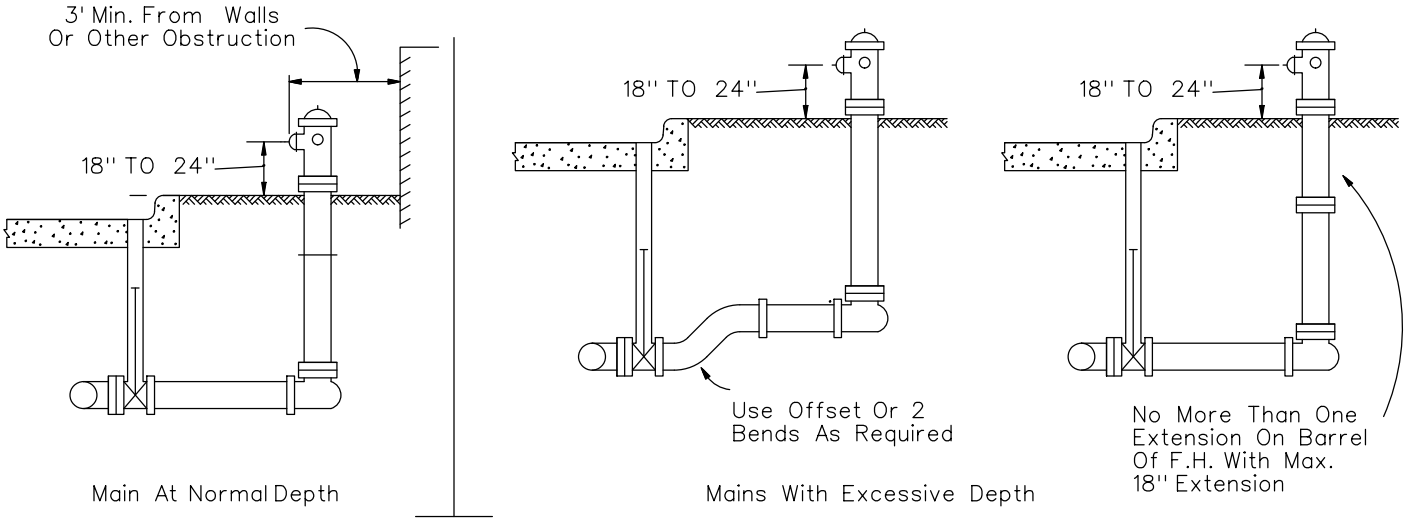
DETAIL "B"

MORTAR PROTECTION @ R.C.C.P. JOINTS (BELL & SPIGOT JOINT SHOWN - ALSO APPLIES TO FLANGED JOINTS)

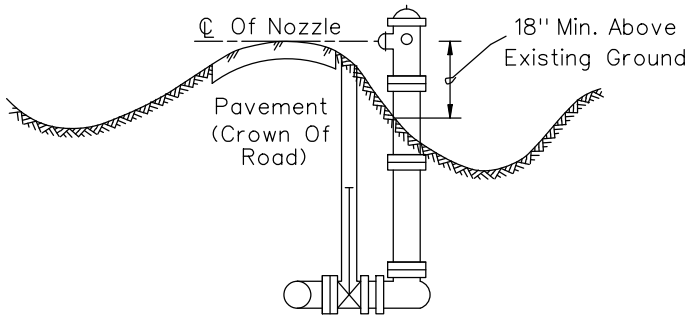
MORTAR PROTECTION SHALL BE PER PIPE MANUFACTURER RECOMMENDATION.

MORTAR PROTECTION @ R.C.C.P. JOINTS & INSULATION KIT FOR FLANGED JOINTS		DWU	(PAGE NO.) 223
		DATE OCT. 2015	





ELEVATION VIEW OF FIRE HYDRANT



When No Curb Or Gutter Exists, Set F.H. On Front Slope Of Ditch With ℄ Of Nozzle Equal To The Crown Of The Road.

GENERAL NOTES

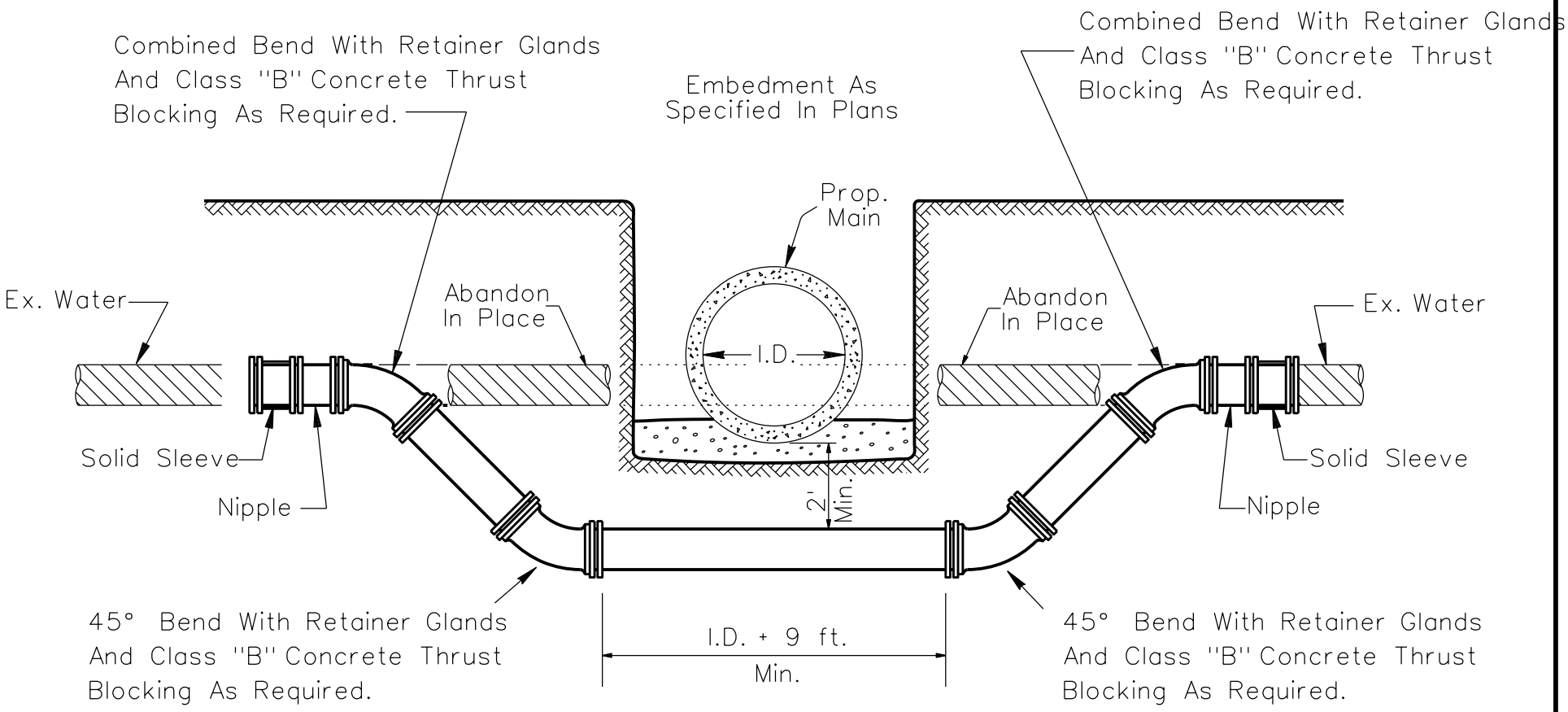
1. ℄ Of F.H. Barrel Shall Not Be Less Than 2.5 Or More Than 7.5 From Back Of Curb Or Edge Of Pavement.
2. Do Not Set F.H. In An Existing Or Proposed Sidewalk, Unless Otherwise Noted.
3. All Tees For F.H.s Must Provide Secure Anchoring From The Main To F.H. Valves
4. Set F.H. On The Lot Line Extended When Possible.
5. On Private Contracts, The Developer's Engineer Will Stake Location & Grade, Must Still Meet DWU Requirements.
6. Never Place F.H. Where Fire Truck Could Not Park Beside It.

METHODS FOR SETTING FIRE HYDRANTS

DWU

(PAGE NO.) 224

DATE OCT. 2011



Pipe Material As Specified on Plans

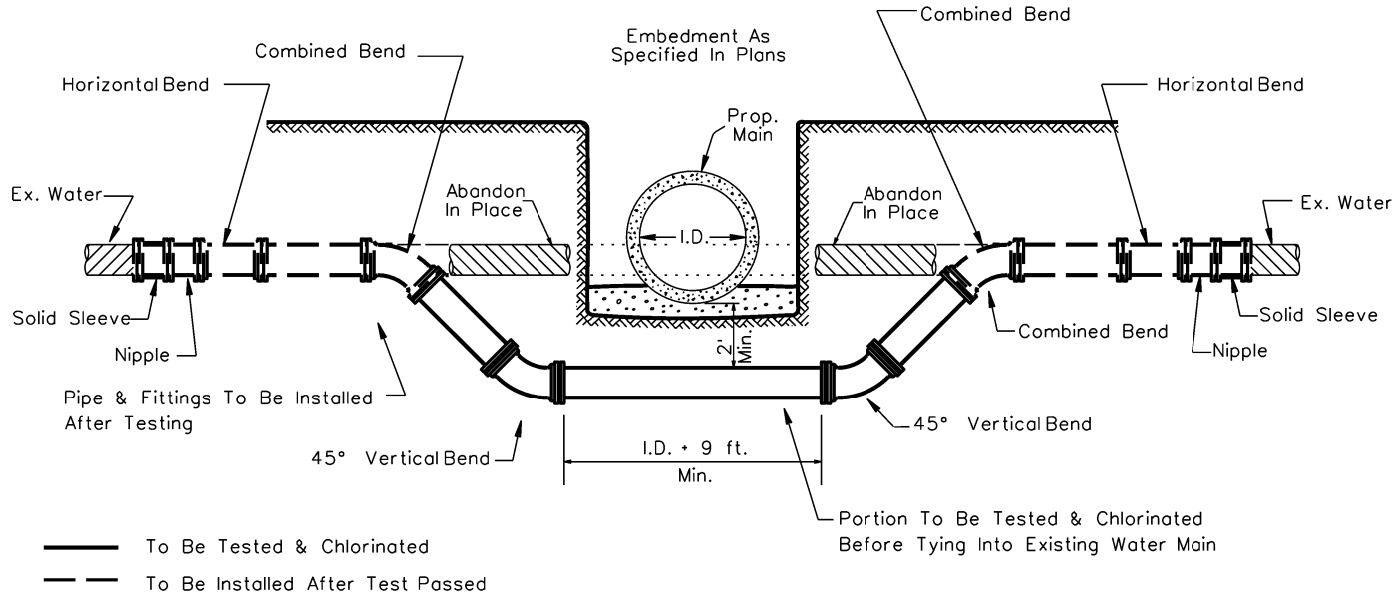
Any Water Lowering Greater Than 20 L.F. Needs To Be Offset, Refer to Std. Dwg 226

STANDARD WATER MAIN LOWERING

DWU		(PAGE NO.) 225
DATE JUN. 2021		

Profile View

All Bends Require Retainer Glands And Class "B" Concrete Thrust Blocking.



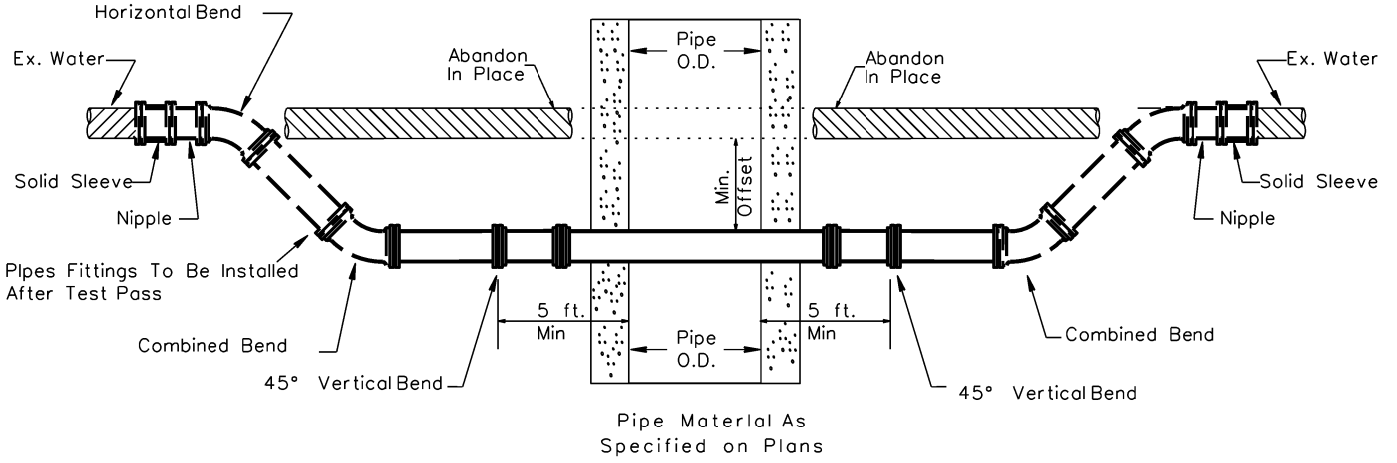
Pipe Material As Specified on Plans

Plan View

Horizontal Bend

All Bends Require Retainer Glands And Class "B" Concrete Thrust Blocking.

All Bends Require Retainer Glands And Class "B" Concrete Thrust Blocking.

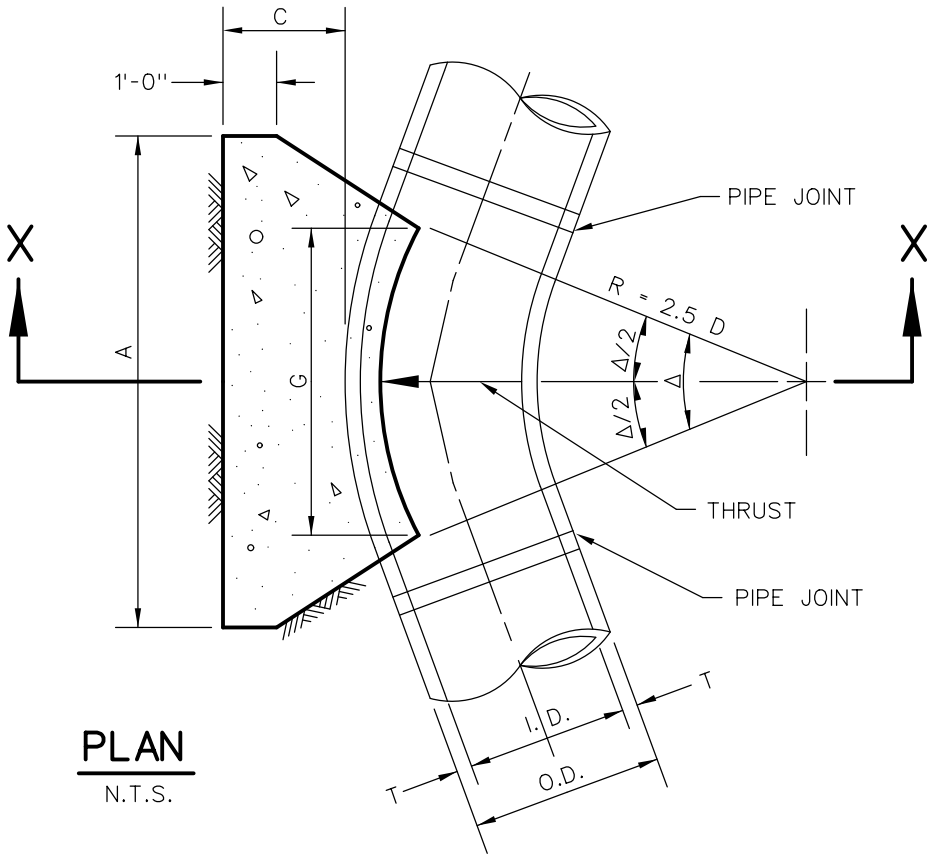


Pipe Material As Specified on Plans

$$\text{Min Offset} = \tfrac{1}{2} B_{\text{d Existing Water}} + 1\text{ ft} + \tfrac{1}{2} B_{\text{d Proposed Water}}$$

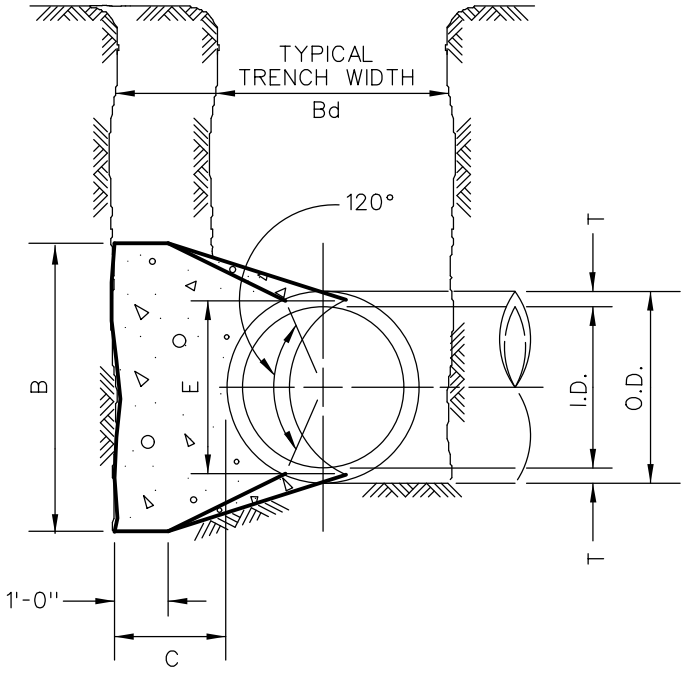
OFFSET WATER MAIN LOWERING

DWU		(PAGE NO.) 226
DATE JUN. 2021		



PLAN

N.T.S.



SECTION X-X

N.T.S.

REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

HORIZONTAL THRUST BLOCK AT PIPE BEND

		(Page. No.)
DWU		229
DATE DEC.2001		

TABLES OF DIMENSIONS AND QUANTITIES

Cubic Yard To Sacks of Concrete Conversion Table

VOL. (C.Y)	60 LB SACK	80 LB SACK
0.1	6	5
0.2	12	10
0.3	18	14
0.4	24	19
0.5	30	23
0.6	36	28
0.7	42	32
0.8	48	37
0.9	54	41
1.0	60	46

I.D. (IN.)	T (IN.)	C Δ = 11.25° (FT.)	C $\Delta \geq$ 22.50° (FT.)	E (FT.)
4,6,8	0.4	1.5	1.5	0.9
10,12	0.5	1.5	1.5	1.2
16,18	0.6	1.5	1.5	1.6
20	0.7	1.5	1.5	1.8
24	0.9	1.5	1.5	2.1
30	2.9	1.5	1.9	2.6
36	4.5	1.5	2.3	3.3
42	5.0	1.8	2.6	3.8
48	5.5	2.0	3.0	4.3
54	6.0	2.3	3.4	4.8
60	6.5	2.5	3.8	5.3
66	6.8	2.8	4.1	5.7
72	7.5	3.0	4.5	6.3
78	7.5	3.3	4.9	6.7
84	8.0	3.5	5.3	7.2
90	8.5	3.8	5.6	7.7
96	9.0	4.0	6.0	8.2

	Δ = 11.25°									Δ= 22.50°							
			EARTH			ROCK						EARTH			ROCK		
I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)
4,6,8	0.4	1.0	1.0	1.5	0.1	1.0	1.0	0.1	4,6,8	0.8	2.0	1.5	1.5	0.1	1.0	1.0	0.1
10,12	0.6	2.2	1.5	1.5	0.1	1.0	1.5	0.1	10,12	1.1	4.4	2.0	2.5	0.3	1.5	1.5	0.1
16,18	0.8	5.0	2.0	2.5	0.3	1.5	2.0	0.2	16,18	1.6	9.9	3.0	3.5	0.6	2.0	2.5	0.3
20	0.9	6.2	2.0	3.5	0.4	1.5	3.0	0.3	20	1.8	12.3	3.5	3.5	0.7	2.0	3.0	0.4
24	1.1	8.9	3.0	3.5	0.5	1.5	3.0	0.3	24	2.2	17.7	4.0	4.5	1.0	3.0	3.5	0.5
30	1.4	10.4	3.0	3.5	0.6	2.0	3.5	0.4	30	2.7	20.7	5.0	4.5	1.5	3.0	4.0	0.8
36	1.7	15.0	3.5	4.5	0.9	2.0	4.0	0.5	36	3.3	29.8	5.5	5.5	2.3	4.0	4.0	1.3
42	1.9	20.4	4.5	5.0	1.5	2.5	5.0	0.8	42	3.8	40.5	7.0	6.0	3.9	4.5	5.0	2.1
48	2.2	26.6	4.5	6.0	2.0	2.5	6.0	1.1	48	4.4	52.9	8.0	7.0	5.7	4.5	6.0	2.8
54	2.5	33.7	6.0	6.0	3.0	3.0	6.0	1.4	54	4.9	67.0	9.0	8.0	8.0	6.0	6.0	4.1
60	2.7	41.6	6.0	7.0	3.8	3.0	7.0	1.8	60	5.5	82.7	9.5	9.0	10.6	6.0	7.0	5.3
66	3.0	50.3	6.5	8.0	5.1	3.5	8.0	2.7	66	6.0	100.1	10.5	10.0	14.1	6.5	8.0	7.2
72	3.3	59.9	7.5	8.0	6.3	4.0	8.0	3.3	72	6.6	119.1	11.0	11.0	17.6	7.5	8.0	9.1
78	3.6	70.2	8.0	9.0	8.1	4.0	9.0	3.9	78	7.1	139.8	12.0	12.0	22.5	8.0	9.0	11.7
84	3.8	81.5	8.5	10.0	10.3	4.5	10.0	5.3	84	7.6	162.1	13.0	12.5	27.2	8.5	10.0	14.8
90	4.1	93.5	9.5	10.0	12.2	5.0	10.0	6.3	90	8.2	186.1	14.0	13.5	33.7	9.5	10.0	17.7
96	4.4	106.4	10.0	11.0	15.0	5.0	11.0	7.4	96	8.7	211.7	15.0	14.5	41.2	10.0	11.0	21.8

REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

HORIZONTAL THRUST BLOCK AT PIPE BEND

DWU

DATE OCT.2015

TABLES OF DIMENSIONS AND QUANTITIES

I.D. (IN.)	Δ = 30° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)	I.D. (IN.)	Δ = 45° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)
4,6,8	1.0	2.6	2.0	1.5	0.2	1.0	1.5	0.1	4,6,8	1.5	3.9	2.0	2.0	0.2	1.5	1.5	0.1
10,12	1.5	5.9	2.5	2.5	0.3	2.0	1.5	0.2	10,12	2.2	8.7	3.5	2.5	0.5	2.0	2.5	0.3
16,18	2.2	13.2	3.5	4.0	0.8	2.5	3.0	0.4	16,18	3.2	19.5	4.5	4.5	1.2	3.0	3.5	0.6
20	2.4	16.3	4.5	4.0	1.0	3.0	3.0	0.5	20	3.6	24.1	5.5	4.5	1.5	3.5	3.5	0.7
24	2.9	23.4	6.0	4.0	1.4	3.5	3.5	0.7	24	4.3	34.6	8.0	4.5	2.3	4.5	4.0	1.1
30	3.6	27.5	6.5	5.0	1.9	3.5	4.0	0.9	30	5.4	40.6	8.5	5.0	3.2	5.5	4.0	1.6
36	4.4	39.5	7.0	6.0	3.4	4.5	4.5	1.6	36	6.5	58.5	10.0	6.0	5.3	6.5	4.5	2.6
42	5.1	53.8	8.0	7.0	5.1	5.5	5.0	2.5	42	7.5	79.6	11.5	7.0	8.1	8.0	5.0	4.2
48	5.8	70.3	9.0	8.0	7.4	6.0	6.0	3.7	48	8.6	104.0	13.0	8.0	11.9	9.0	6.0	6.3
54	6.5	89.0	10.0	9.0	10.3	7.0	6.5	5.3	54	9.7	131.5	15.0	9.0	17.1	10.5	6.5	8.9
60	7.3	110.0	11.0	10.0	13.9	7.5	7.5	7.3	60	10.7	162.4	16.5	10.0	23.1	11.0	7.5	12.0
66	8.0	132.9	12.5	11.0	18.9	8.5	8.0	9.6	66	11.8	196.5	18.0	11.0	30.1	12.0	8.5	16.2
72	8.7	158.2	13.5	12.0	24.0	9.0	9.0	12.3	72	12.9	233.9	19.5	12.0	38.6	14.0	8.5	20.7
78	9.4	185.6	14.5	13.0	30.0	10.0	9.5	15.6	78	13.9	274.5	21.5	13.0	49.8	14.5	9.5	25.9
84	10.1	215.3	15.5	14.0	37.1	10.5	10.5	19.5	84	15.0	318.4	23.0	14.0	61.2	15.5	10.5	32.6
90	10.9	247.1	16.5	15.0	45.0	11.5	11.0	23.9	90	16.1	365.5	24.5	15.0	74.5	17.5	10.5	39.6
96	11.6	281.2	18.0	16.0	55.5	12.5	11.5	28.9	96	17.1	415.6	26.0	16.0	89.5	18.5	11.5	48.5

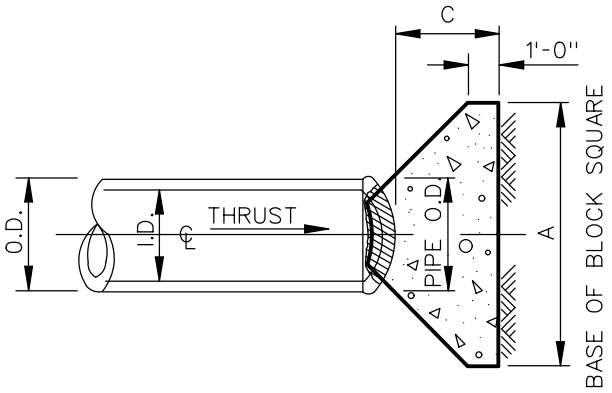
I.D. (IN.)	Δ = 67.50° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)	I.D. (IN.)	Δ = 90° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)
4,6,8	2.1	5.6	3.0	2.0	0.3	2.0	1.5	0.2	4,6,8	2.7	7.1	5.0	1.5	0.4	2.0	2.0	0.2
10,12	3.1	12.6	5.5	2.5	0.8	3.5	2.0	0.4	10,12	4.0	16.0	6.5	2.5	1.0	3.5	2.5	0.5
16,18	4.7	28.3	7.5	4.0	1.9	5.5	3.0	0.9	16,18	6.0	36.0	9.0	4.0	2.4	4.5	4.0	1.0
20	5.2	34.9	9.0	4.0	2.3	5.5	3.5	1.2	20	6.6	44.4	10.0	4.5	3.1	6.0	4.0	1.5
24	6.2	50.3	11.5	4.5	3.5	6.5	4.0	1.6	24	7.9	64.0	14.5	4.5	5.0	8.0	4.0	2.1
30	7.8	58.9	12.0	5.0	4.8	7.5	4.0	2.2	30	9.9	75.0	15.0	5.0	6.7	10.0	4.0	3.3
36	9.4	84.9	14.5	6.0	8.2	9.5	4.5	3.8	36	11.9	108.0	18.0	6.0	11.4	12.0	4.5	5.3
42	10.9	115.5	17.0	7.0	12.8	11.0	5.5	6.3	42	13.9	147.0	21.0	7.0	17.8	14.0	5.5	8.7
48	12.5	150.9	19.0	8.0	18.4	13.0	6.0	9.2	48	15.9	192.0	24.0	8.0	26.2	16.0	6.0	12.4
54	14.0	191.0	21.5	9.0	26.0	15.0	6.5	12.9	54	17.9	243.0	27.0	9.0	36.9	18.0	7.0	18.1
60	15.6	235.8	24.0	10.0	35.6	16.0	7.5	17.6	60	19.9	299.8	30.0	10.0	50.3	20.0	7.5	24.0
66	17.1	285.3	26.0	11.0	46.0	18.0	8.0	23.0	66	21.8	362.8	33.0	11.0	66.2	22.0	8.5	32.5
72	18.7	339.5	28.5	12.0	57.8	19.0	9.0	28.4	72	23.8	431.8	36.0	12.0	85.6	24.0	9.0	41.0
78	20.2	398.5	31.0	13.0	75.7	21.0	9.5	37.4	78	25.7	506.7	39.0	13.0	108.2	26.0	10.0	53.2
84	21.8	462.1	33.5	14.0	94.7	22.0	10.5	46.5	84	27.7	587.7	42.0	14.0	134.4	28.0	10.5	64.8
90	23.3	530.5	35.5	15.0	114.4	24.5	11.0	58.2	90	29.0	674.6	45.0	15.0	164.9	30.0	11.5	81.2
96	24.9	603.6	38.0	16.0	138.9	25.5	12.0	70.0	96	31.6	767.5	48.0	16.0	199.0	32.0	12.0	95.1

REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

HORIZONTAL THRUST BLOCK AT PIPE BEND

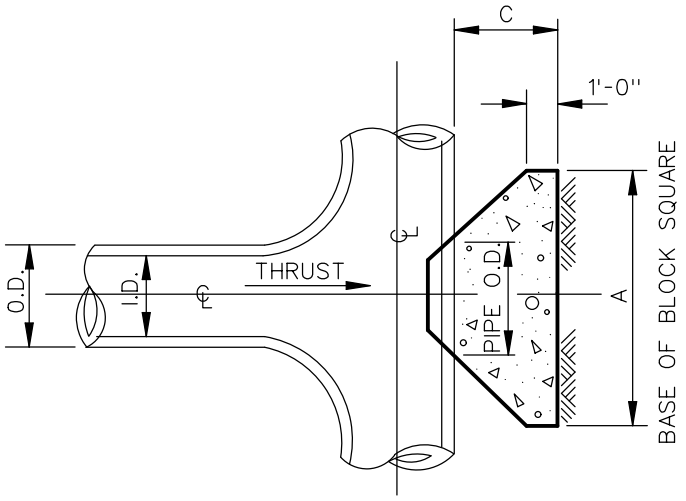
DWU

DATE DEC.2001



PLAN OF PLUG THRUST BLOCK

N.T.S.



PLAN OF TEE THRUST BLOCK

N.T.S.

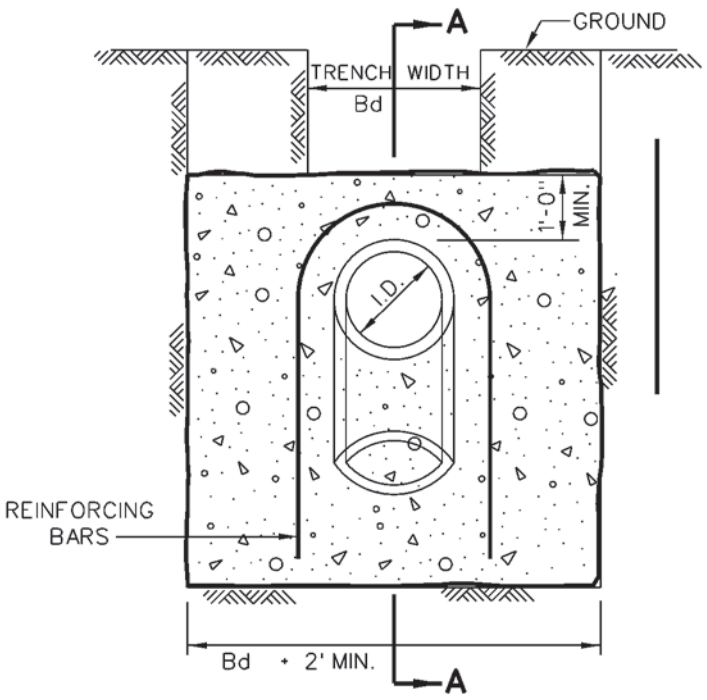
			EARTH		ROCK	
I.D. (IN.)	THRUST (TONS)	C (FT.)	A (FT.)	VOL. (C.Y.)	A (FT.)	VOL. (C.Y.)
4,6,8	5.1	1.5	2.5	0.3	2.0	0.2
10,12	11.3	1.5	3.5	0.6	2.5	0.3
16,18	25.5	2.0	5.5	1.6	4.0	0.9
20	31.5	2.0	6.0	1.9	4.0	0.9
24	45.2	2.5	7.0	3.1	5.0	1.7
30	53.0	3.0	7.5	4.1	5.5	2.4
36	76.3	4.0	9.0	7.3	6.5	4.2
42	104.0	4.5	10.5	11.0	7.5	6.2
48	136.0	5.0	12.0	15.6	8.5	8.7
54	172.0	5.5	13.5	21.4	9.5	11.9
60	212.0	6.0	15.0	28.4	10.5	15.7
66	257.0	6.5	16.5	36.8	11.5	20.5
72	305.0	7.5	17.5	47.2	12.5	27.2
78	358.0	8.0	19.0	58.9	13.5	33.7
84	416.0	8.5	20.5	72.3	14.5	41.2
90	477.0	9.0	22.0	87.7	15.5	49.7
96	543.0	9.5	23.5	104.8	16.5	61.0

REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

HORIZONTAL THRUST BLOCK AT TEES AND PLUGS

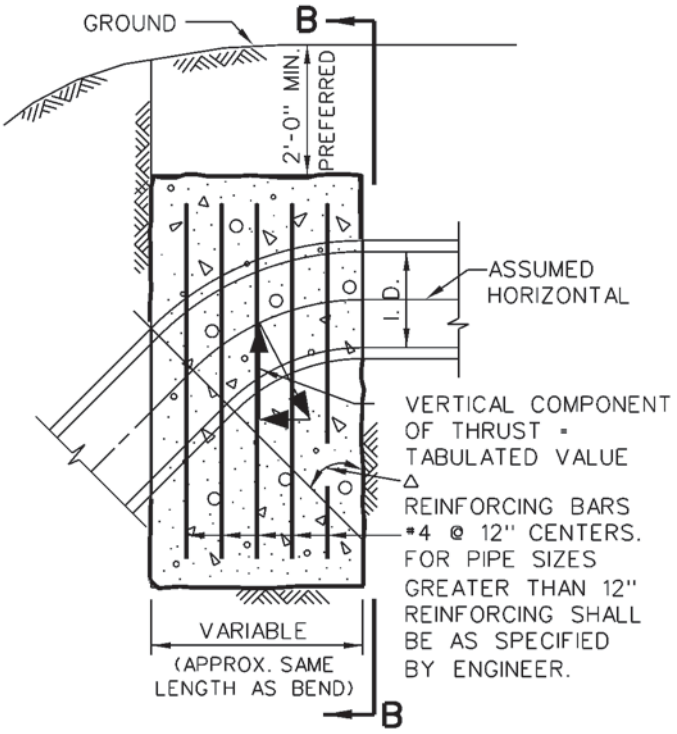
DWU

DATE DEC.2001



ELEVATION "B-B"

N.T.S.



SECTION "A-A"

N.T.S.

Δ →	11.25°		22.50°		30°		45°		67.50°		90°		← Δ
I.D. (IN.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	I.D. (IN.)
4,6,8	1.0	0.5	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.5	4,6,8
10,12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	5.7	10,12
16,18	5.0	2.5	9.7	4.9	12.7	6.4	18.0	9.0	23.5	11.8	25.5	12.7	16,18
20	6.1	3.1	12.0	6.0	15.7	7.9	22.2	11.1	29.2	14.5	31.4	15.7	20
24	8.2	4.4	17.3	8.7	22.6	11.3	32.0	16.0	41.8	20.9	45.2	22.6	24
30	10.5	5.2	20.3	10.1	26.5	13.3	37.5	18.8	49.0	24.5	53.1	26.5	30
36	14.9	7.5	29.2	14.6	38.2	19.1	54.0	27.0	70.5	35.3	76.4	38.2	36
42	20.3	10.1	39.8	19.9	52.0	26.0	73.5	36.7	96.0	48.0	104.0	52.0	42
48	26.5	13.2	51.9	26.0	67.9	33.9	96.0	48.0	126.0	62.7	136.0	67.9	48
54	33.5	16.8	65.7	32.9	85.9	42.9	122.0	60.7	159.0	79.4	172.0	85.9	54
60	41.4	20.7	81.2	40.6	106.0	53.0	150.0	75.0	196.0	98.0	212.0	106.0	60
66	50.1	25.0	98.2	49.1	128.0	64.2	182.0	90.7	237.0	119.0	257.0	128.0	66
72	59.6	29.8	117.0	58.4	153.0	76.3	216.0	108.0	282.0	141.0	305.0	153.0	72
78	69.9	35.0	137.0	68.6	179.0	90.0	254.0	127.0	331.0	166.0	358.0	179.0	78
84	81.1	40.5	159.0	79.5	208.0	104.0	294.0	147.0	384.0	192.0	416.0	208.0	84
90	93.1	46.5	183.0	91.3	239.0	119.0	337.0	169.0	441.0	221.0	477.0	239.0	90
96	106.0	53.0	208.0	104.0	272.0	136.0	384.0	192.0	502.0	251.0	543.0	272.0	96

REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

VERTICAL THRUST BLOCK AT PIPE BEND

DWU

(Page No.) 233

DATE DEC.2001

GENERAL NOTES FOR ALL THRUST BLOCKS:

1. Concrete for blocking shall be CLASS "B". See NCTCOG 702.2.4.2
2. All calculations are based on internal pressure of 200 P.S.I. for ductile iron and P.V.C., and 150 P.S.I. for concrete pipe.
3. Volumes of thrust blocks are net volumes of concrete to be furnished. The corresponding weight of the concrete (CLASS "B") is equal to or greater than the vertical component of the thrust on the vertical bend.
4. Wall thickness T (See Table Page 230) assumed for estimating purposes only.
5. Pour concrete for thrust blocks against undisturbed earth.
6. Dimensions may be varied as required by field conditions where and as directed by the inspector. The volume of concrete blocking shall not be less than shown in tables.
7. The calculations are based on bearing pressures equal to 1,000 lbs./s.f. in soil and 2,000 lbs./s.f. in rock.
8. Use polyethylene wrap between concrete blocking and bends, tees, and plugs to prevent the concrete from sticking to fittings.
9. Concrete shall not extend beyond joints.

REFER TO PAGES:
229, 230, 231, 232, & 233

THRUST BLOCK GENERAL NOTES		DWU	(Page No.) 234
		DATE OCT. 2012	

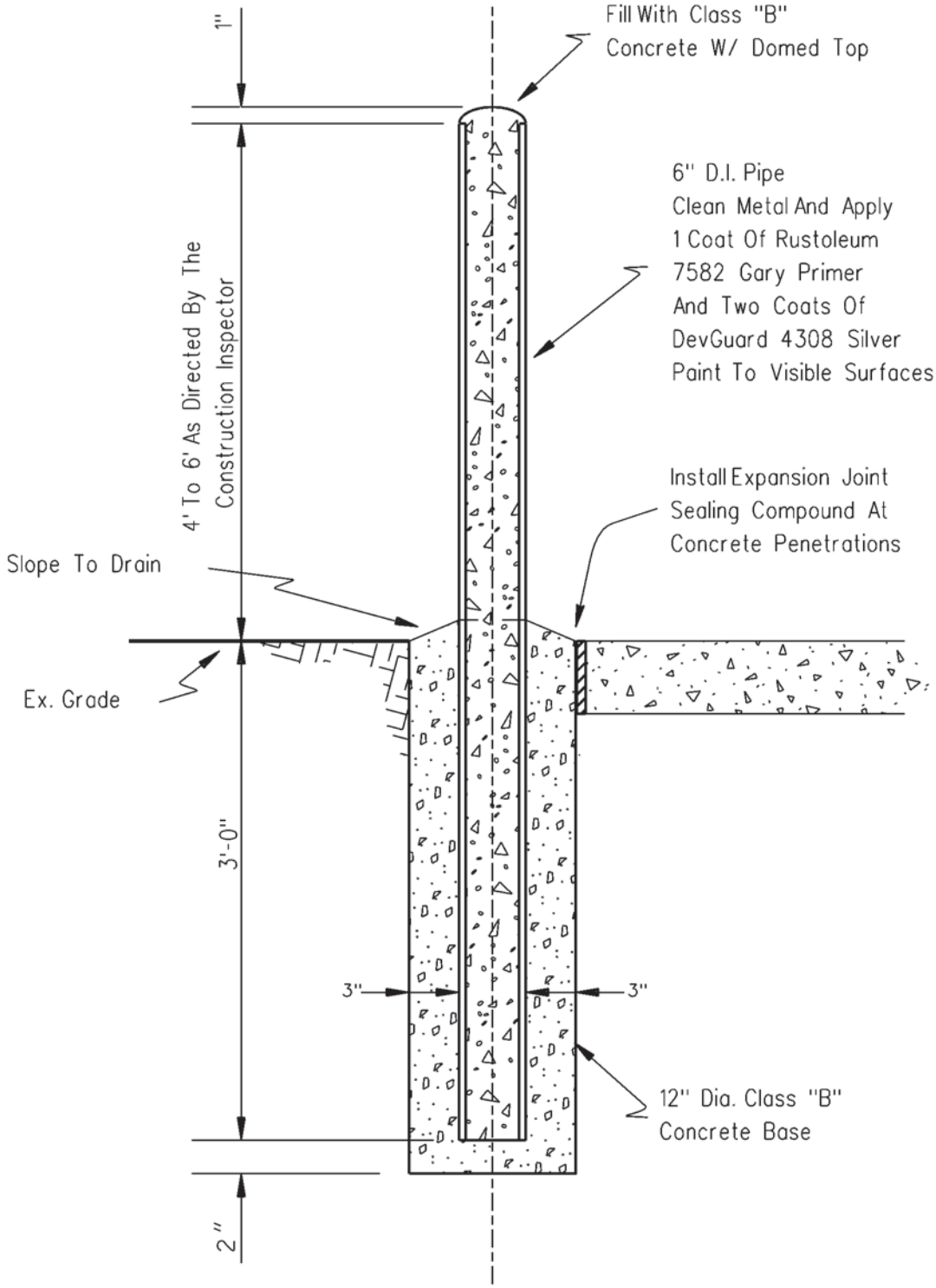
SIZE AND MATERIAL TYPE OF WATER MAINS	EMBEDMENT TYPE PER DEPTH IN EARTH			EMBEDMENT TYPE PER DEPTH IN ROCK		
	0' -8'	8' -16'	>16'	0' -8'	8' -16'	>16'
16" And Smaller Ductile Iron	D+	C	B	C	C	B
18" And Larger Ductile Iron	B	B	B	B	B	B
16" And Smaller Pretensioned	C	C	B	C	C	B
18" And Larger Pretensioned	B	B	B	B	B	B
All Prestressed	C	C	B	C	C	B
All Steel	B+	B+	B+	B	B	B
All P.V.C. Water Pipe	C+	B+	B+	C+	B+	B+

EMBEDMENT TYPES- SPECIFIED FOR WATER MAINS

DWU

(PAGE NO.) 235

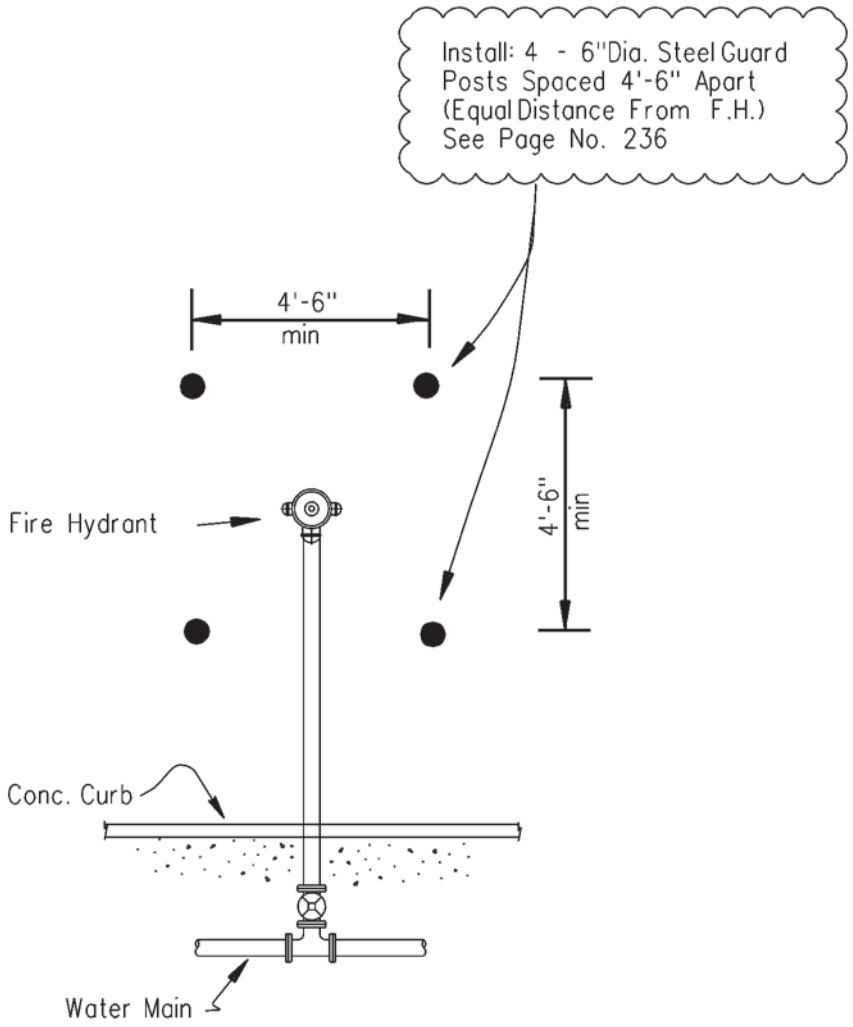
DATE JAN 2010



STEEL GUARD POST

(SIZE DESIGNATED ON PLANS)
N.T.S.

STEEL GUARD POST DETAIL		DWU	(PAGE NO.) 236
		DATE OCT. 2010	



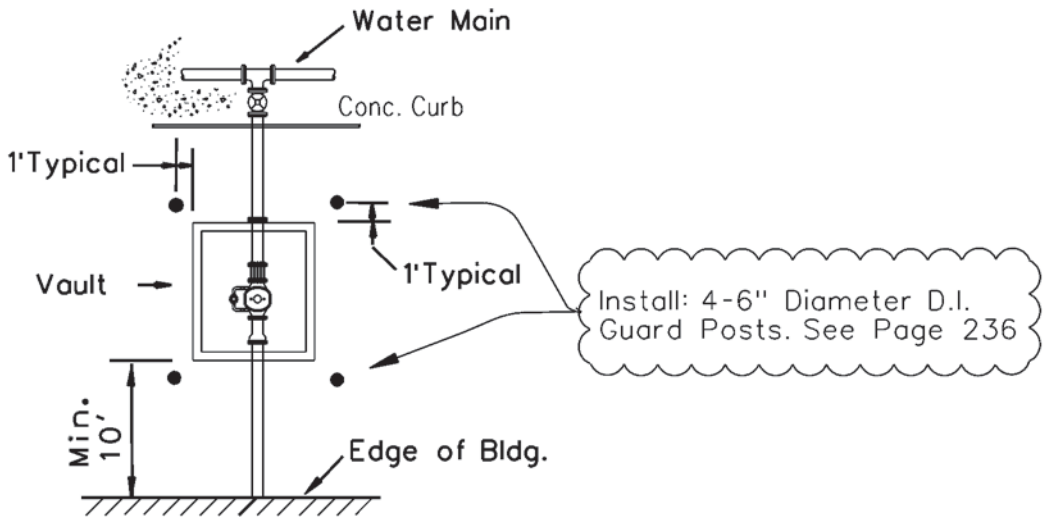
Refer. To Pages 224 & 236

GUARD POST PROTECTION FOR FIRE HYDRANTS

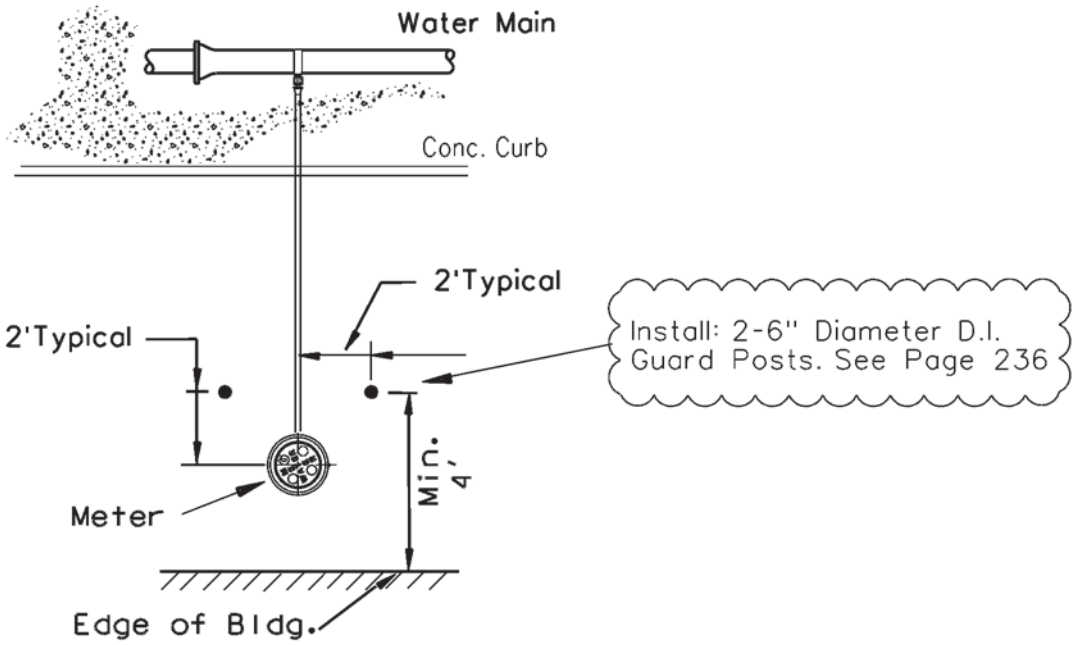
DWU

(PAGE NO.) 237

DATE JAN. 2010



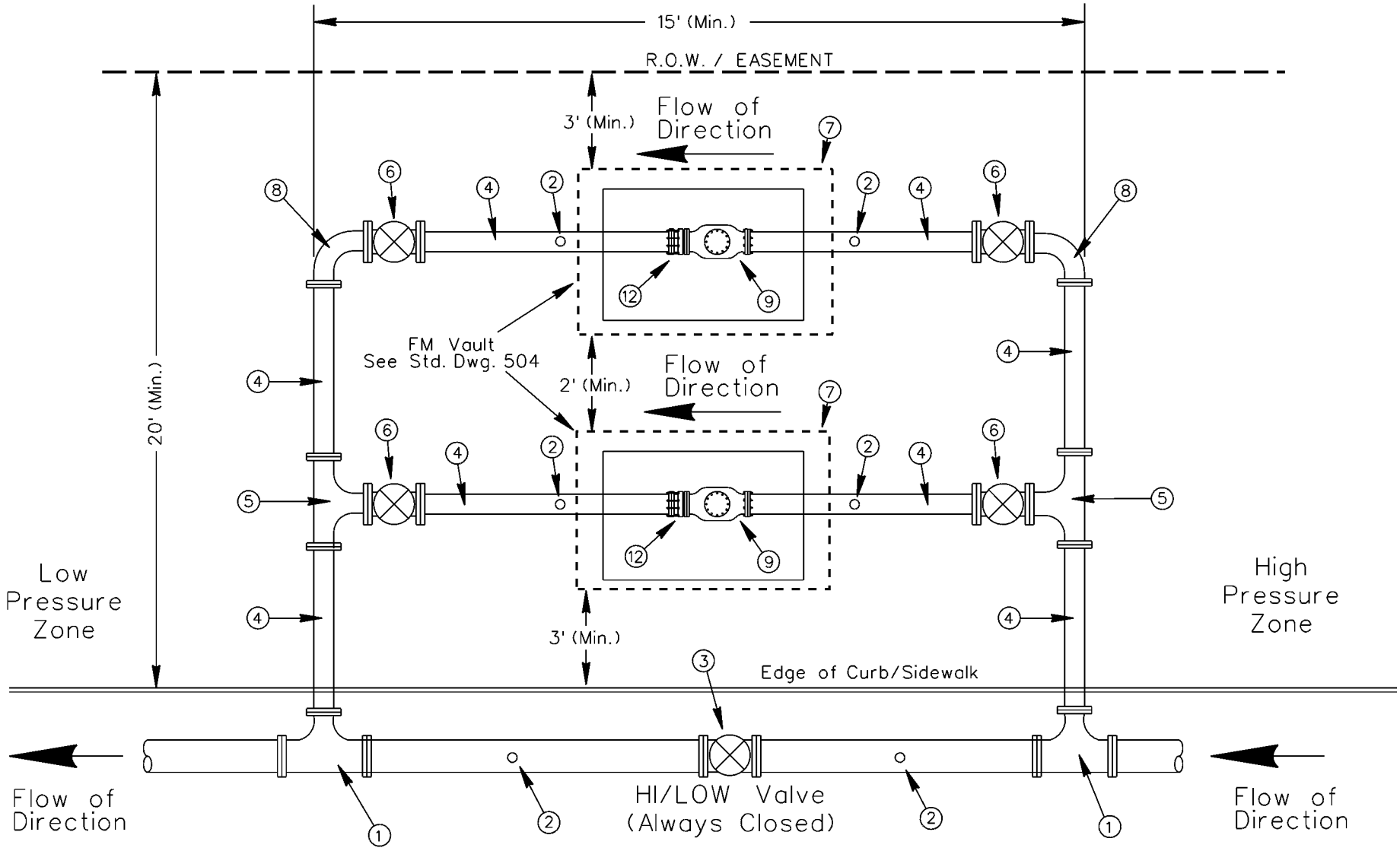
DETAIL FOR METER VAULTS



DETAIL FOR METERS 2" AND SMALLER

GUARD POST PROTECTION FOR WATER METERS		DWU	(PAGE NO.) 238
		DATE JAN. 2010	

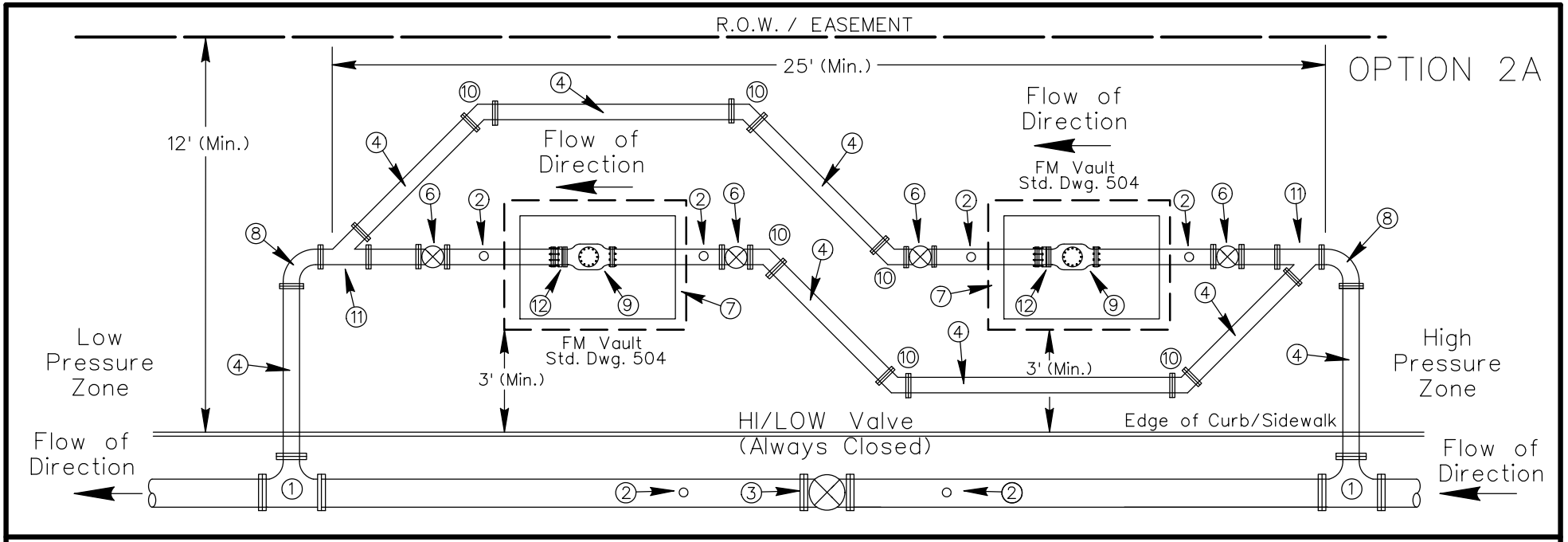
ATTENTION: PRV Design Subject to DWU Approval.

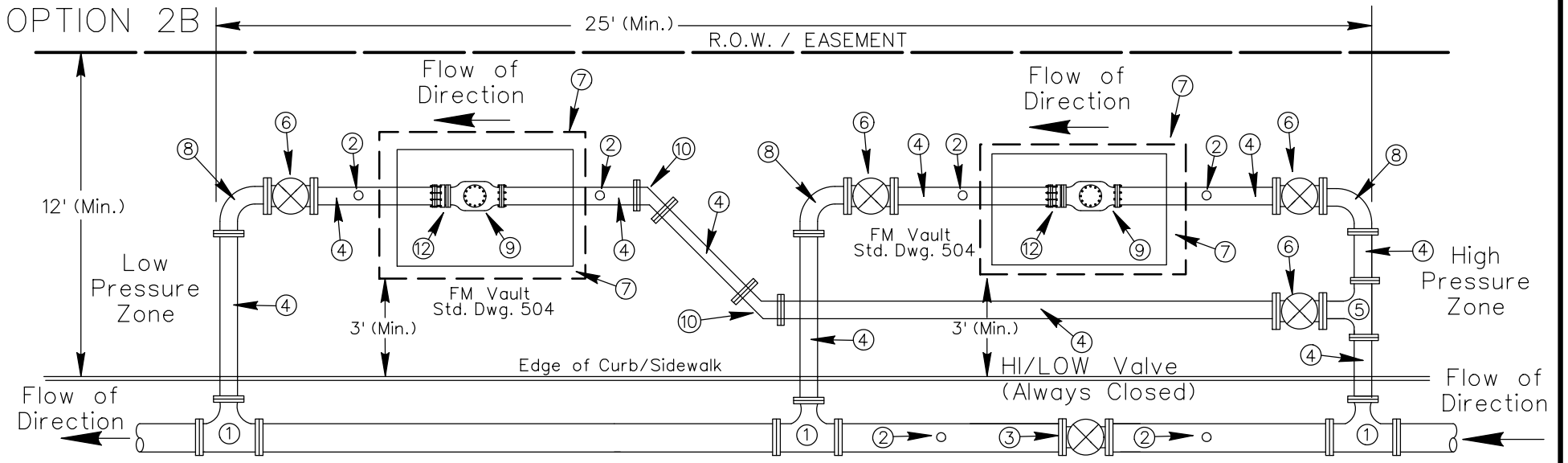


Refer To Pages 242, 243, 244, 245 & 504

DUAL PRV ASSEMBLY (OPTION 1)

DWU	(PAGE NO.) 239
DATE OCT. 2011	





ATTENTION:
PRV Designs Are Subject To DWU Approval.

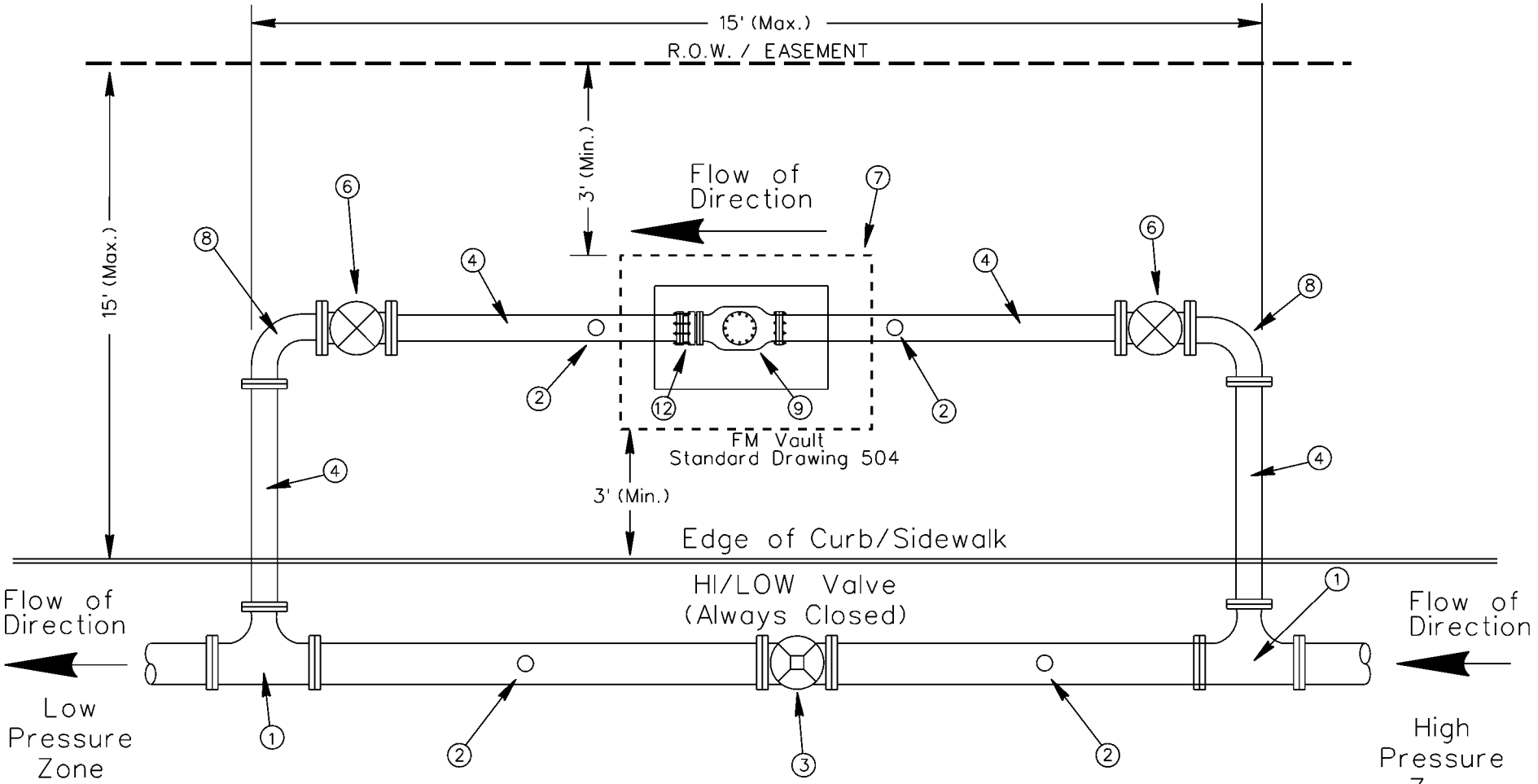
Refer To Pages
242, 243, 244, 245 & 504

DUAL PRV ASSEMBLY (OPTIONS 2A & 2B)

DWU

DATE
OCT. 2011

(PAGE NO.)
240



NOTE: Single PRV Assemblies Require Special Approval by DWU.

Refer To Pages 242, 243, 244, 245 & 504

SINGLE PRV ASSEMBLY

DWU		(PAGE NO.) 241
DATE OCT. 2011		

			MAIN SIZE		
Tag No.	Description	Fitting/Pipe Type	8"	12"	16"
1	Reducing Tee	Flange x Flange	8"x8"x6"(Max)	12"x12"x8"(Max)	16"x16"x12"(Max)
2	1" Flush Point	Copper	1"	1"	1"
3	Hi/Low Valve	Flange x Flange	8"	12"	16"
4	Pipe	Ductile Iron	6"	8"	12"
5	Tee	Flange x Flange	6"x6"x6"	8"x8"x8"	12"x12"x12"
6	Gate Valve	Flange x Flange	6"	8"	12"
7	Precast Vault	Precast	-	-	-
8	90° Bend	Flange x Flange	6"	8"	12"
9	Pressure Reducing Valve	Flange x Flange	4" - 8"	6" - 10"	10" - 16"
10	45° Bend	Flange x Flange	6"	8"	12"
11	45° Wye	Flange x Flange	6"	8"	12"
12	Flange Coupling Adaptor	Flange x Flange	6"	8"	12"

ATTENTION:
PRV Design And Parts Selection Are Subject to DWU Approval.

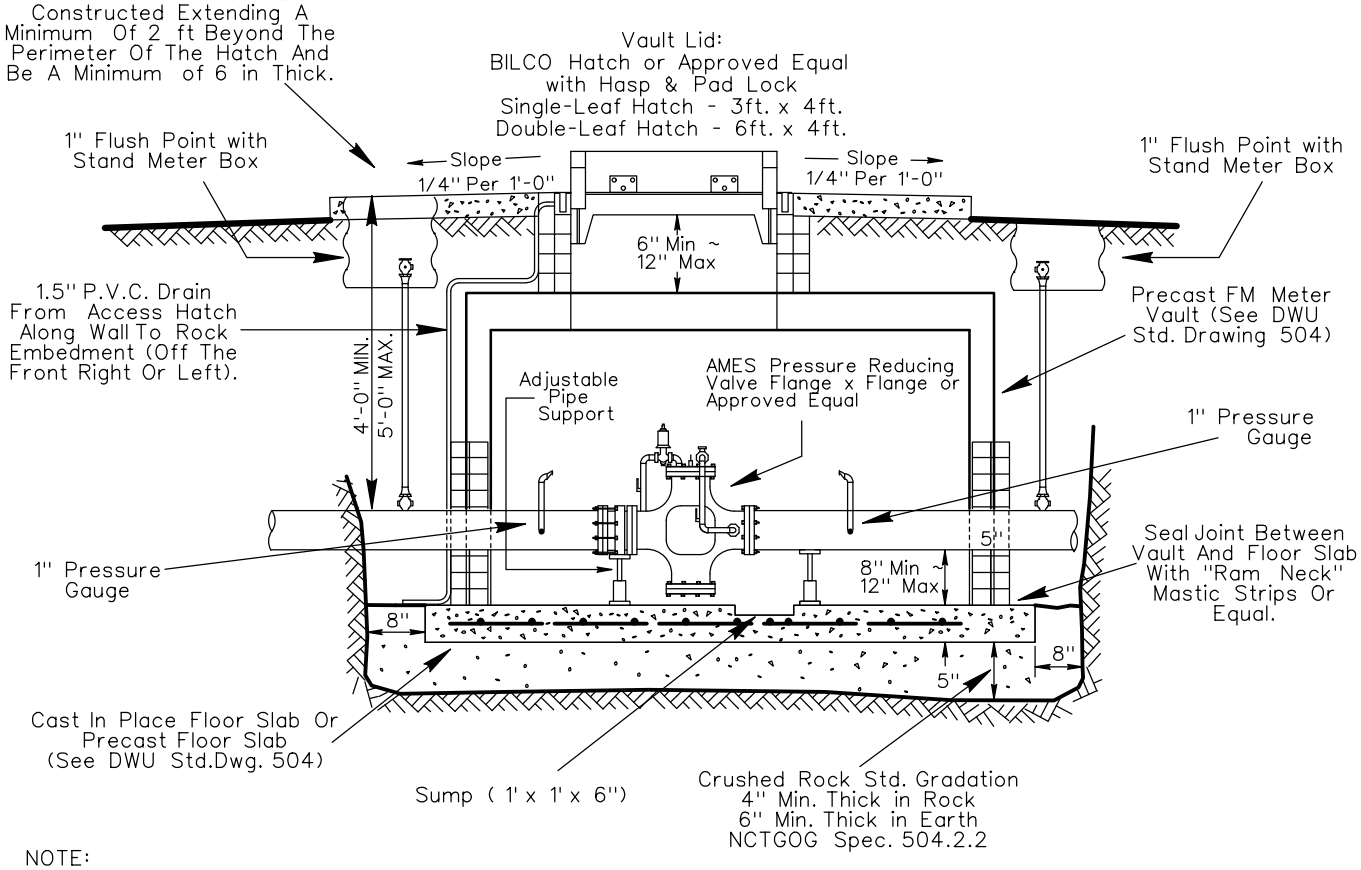
PRV PARTS LIST

DWU

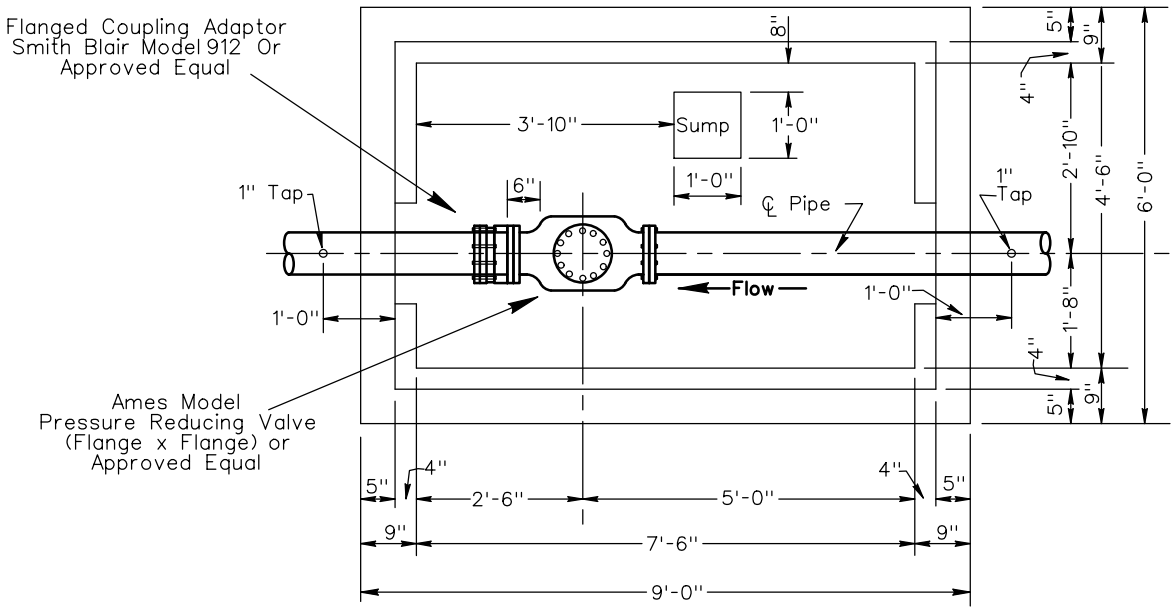
DATE
OCT. 2011

(PAGE NO.)
242

All Hardware Must be Stainless Steel.
Zinc Plated And Chromate Sealed
Finishes Are NOT Acceptable.



NOTE:
PRV Shall Be Centered Under The Hatch.
The Top Of The Vault Shall Be At Least 6 in Above The Finished Grade.



Refer To Page 504

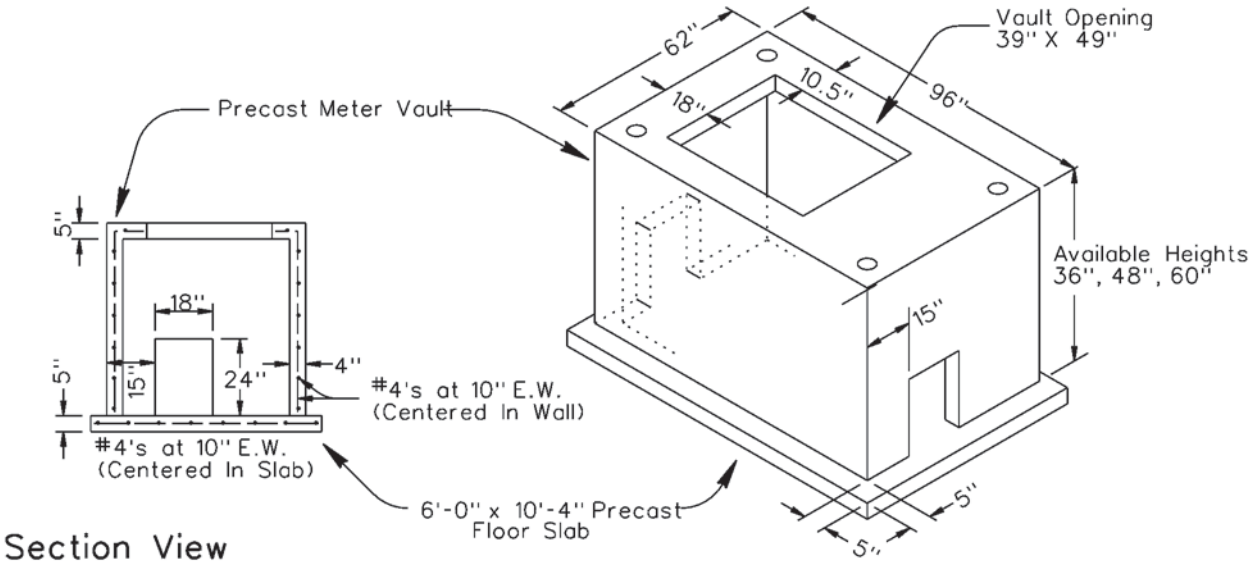
NCTCOG Spec: 504.2.2 -
Pipe Embedment Material for Water and Wastewater Mains

PRV VAULT
ELEVATION & SECTIONAL PLAN

COD

(PAGE NO.) 243

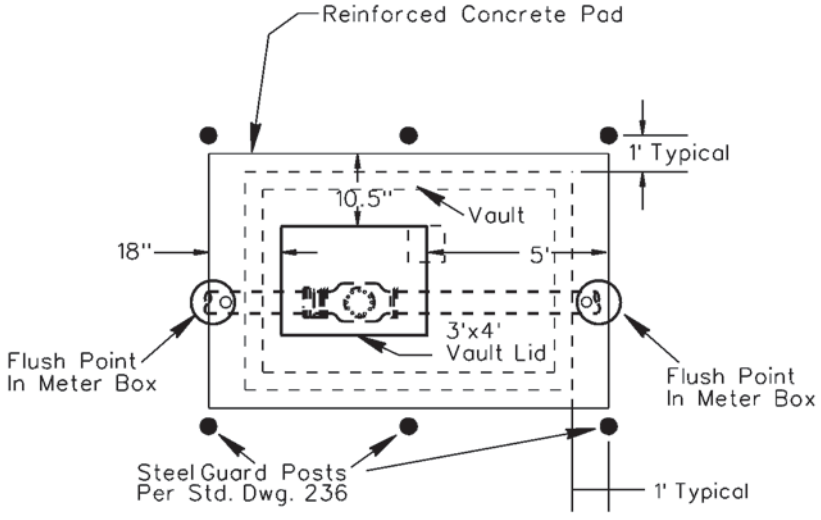
DATE
JULY. 2021



Section View

Vault Size
(NTS)

* Special Applications To Be Determined By Engineer. Vault shall be built according to Engineering Specifications.



Bollard Location Plan
(NTS)

Refer To Pages TO 236

PRV DETAILS		DWU	(PAGE NO.) 244
		DATE OCT. 2011	

1. All pressure-reducing valves shall include a verifiable certification of compliance with the National Sanitation Foundation (NSF) Standard 61. Every bidder shall submit with their bid a signed statement clearly stating the present status of their receiving certification of compliance with the NSF 61 Standard for each particular make, model and size of pressure reducing valve being bid. A failure to submit this verification shall result in the disqualification of that bid and its removal from consideration.

2. Every bidder shall submit re-lined copies of these standard drawings for exception requests needing final approval by DWU. If there are no exceptions to the specification, a signed statement at the bottom of the specification shall indicate "No Exception Taken". A failure to do so shall result in the disqualification of that bid and its removal from consideration.

3. All materials contained in the valves being bid shall be described and specified in the most current manufacturer's product literature.

4. The Distribution Division of the Dallas Water Utilities Department shall be the sole authority in determining the acceptability of any alternate valves.

5. All pressure reducing valves shall be certified by the manufacturer as being capable of withstanding a cold hydrostatic test of at least one hundred percent (100%) above the maximum pressure for which the valve is to operate.

6. All valves, parts and components shall be new and unused original factory-authorized manufacturer's parts and components. No "after-market" substitute parts from other manufacturers shall be accepted. No rebuilt or remanufactured parts allowed.

7. The pressure reducing valve provided shall be designed and constructed to maintain a pre-adjusted downstream pressure regardless of changes in the flow rate.

8. The adjustment range of the pilot valve shall be from 15 to 175 psi.

9. The main body flanges of the pressure reducing valves provided shall have bolt patterns compatible with ANSI/ASME B 16.1.

10. The pressure reducing valves provided shall be complete and shall all have factory-installed position indicators, gauge cocks, control valve isolation valves, strainers and pilot valves.

11. All external control piping on the pressure reducing valve shall be copper or stainless steel.

12. The body of the valve and the cover of the valves shall be fabricated entirely of stainless steel.

13. The entire interior wetted surface of the valve, including the spring, the upper diaphragm support, the disc holder, the seat ring and the shaft shall be fabricated of stainless steel and shall be inherently corrosion-resistant without any special coating.

14. The diaphragm shaft shall be guided at the top and at the bottom.

15. All internal and external threaded studs and nuts shall be fabricated of stainless steel.

16. The seat disc shall be fabricated of Buna-N resilient synthetic rubber.

17. All valves, parts and components shall be supplied with a three (3) year manufacturer's warranty on materials and workmanship.

18. All valves shall be AMES MODEL 605GS reduced port, single chamber pressure reducing valves.

19. All valves, parts, and components shall either be bid Freight On Board (FOB) Factory, Freight Allowed or FOB Destination (4120 Scottsdale, Dallas, Tx 75227)

20. All valves shall be crated in sturdy shipping containers to prevent damage to position indicators, control valves and control valve piping during shipment.

21. The pressure reducing valve must be installed by the manufacturer in the presence of DWU Distribution and Pumping personnel.

22. All construction materials including valves, pipes, fittings and flush points shall conform to the most current version of the NCTCOG specifications, the City of Dallas Addendum to those specifications, this manual and the Approved Materials List.

23. All precast vaults shall meet DWU specifications and be approved by DWU.

24. The location of the vault must be approved by DWU.

25. The minimum depth for the piping in the vault shall be 4 feet.

26. All spool pipe shall be ductile iron pipe.

PRV GENERAL NOTES		DWU	(PAGE NO.) 245
		DATE OCT. 2011	

PART 3

(Series 300)

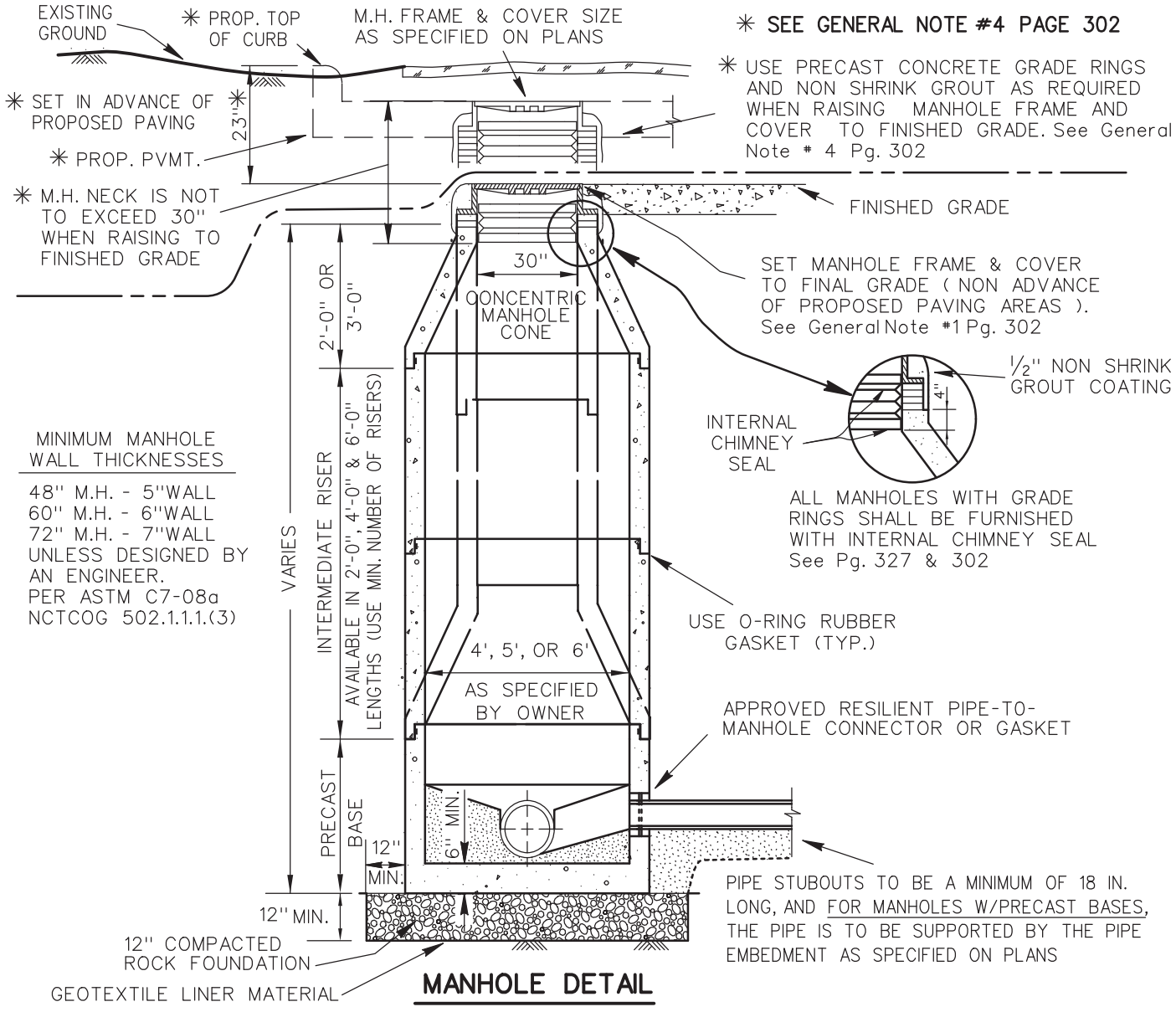
WASTEWATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department

PART 3
WASTEWATER MAIN CONSTRUCTION

✳ MANHOLE UNDER PROPOSED PAVING WITHIN STREET R.O.W.

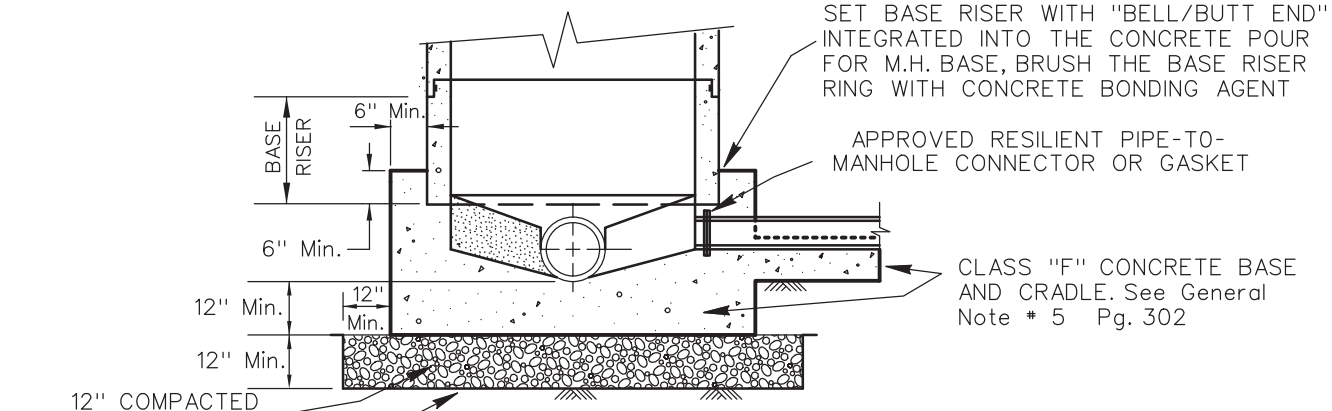
(IN ADVANCE OF PROPOSED PAVING IMPROVEMENT PROJECTS)



MINIMUM MANHOLE WALL THICKNESSES

48" M.H. - 5"WALL
60" M.H. - 6"WALL
72" M.H. - 7"WALL
UNLESS DESIGNED BY AN ENGINEER.
PER ASTM C7-08a
NCTCOG 502.1.1.1.(3)

MANHOLE DETAIL



CAST-IN-PLACE OPTIONAL BASE DETAIL

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE PRECAST		DWU	(Page No.) 301
		DATE OCT. 2015	

GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION

1) All non-pressure type manholes are to be constructed with a minimum of 2 - precast concrete grade rings and with an internal chimney seal. The maximum allowable extension of manhole necks using grade rings is limited to 30". See typical drawing detail on page 327.

2) All manholes are to have inverts constructed as per details on pages 309 and 309A.

3) All wastewater main stubouts from manholes shall be a minimum of 18 inches in length and terminated with a water tight stopper or cap.

4) Where new manholes are constructed in advance of proposed paving, the frame and cover shall be set 23" below the proposed top of curb, or flush with the existing ground, which ever is lower. Use precast concrete grade rings to raise M.H. frame and cover to final paving grade. (LIMITED TO 30" MAXIMUM MANHOLE NECK EXTENSION, AS MEASURED FROM THE TOP TAPER OF THE M.H. CONE TO M.H. LID). When M.H. neck extension exceeds 30", then the M.H. cone is to be removed and reset in such a manner as to reduce the number of grade rings required to reset M.H. frame and cover to final grade. See typical drawing detail on page 301.

5) For all manholes with cast in place bases, the first pipe joint must extend a minimum of 18 inches past the edge of manhole, with a concrete cradle poured integrally with the base, and under the entire pipe joint length.

6) All cast in place manholes are to be constucted with pipe to manhole connectors as per detail on page 310, or with a connector as approved by the DWU construction superintendent.

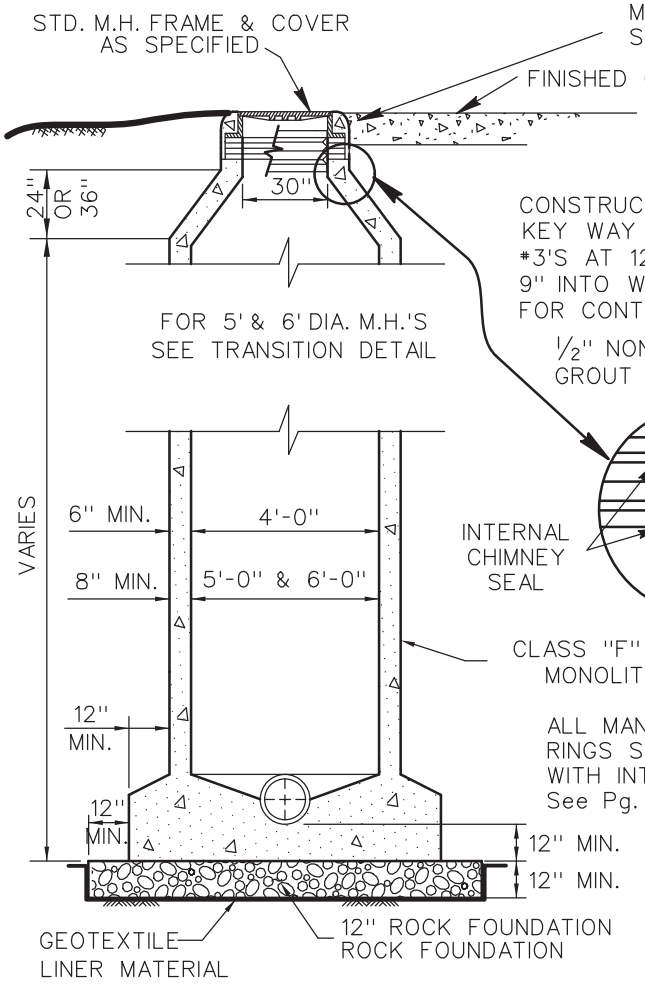
7) False manhole bottoms are required on all advance of paving projects. They shall be constructed, installed, and removed in accordance with details and instructions on page 311.

8) Minimum manhole wall thicknesses are per ASTM C76-08a unless designed by and engineer. The standard thicknesses are: 48" manhole=5"wall; 60" manhole=6" wall; 72" manhole=7"wall

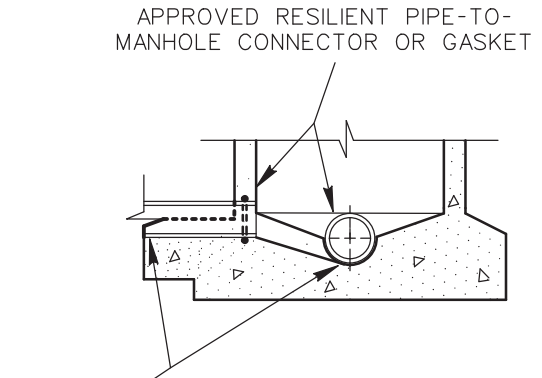
GENERAL NOTES FOR WASTEWATER MANHOLES		DWU	(Page No.) 302
		DATE OCT. 2015	

FOR CONSTRUCTION OF MANHOLES IN ADVANCE OF PROPOSED PAVING PROJECTS, See Detail On Pg. 301 & General Note #4 On Pg. 302.

USE PRECAST CONCRETE GRADE RINGS AND NON SHRINK GROUT AS REQUIRED TO SET MANHOLE FRAME AND COVER TO FINAL GRADE. See General Note #1 On Page 302



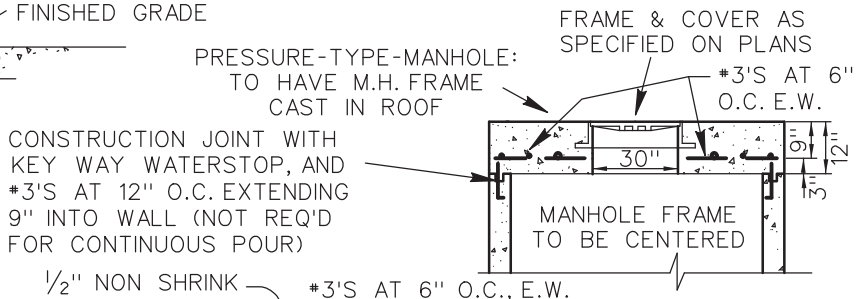
MANHOLE DETAIL

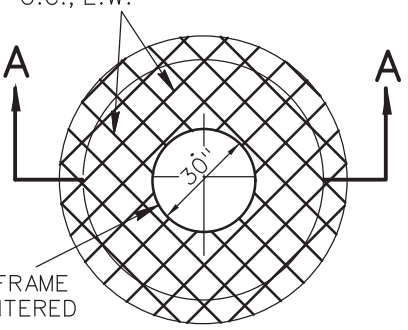


CONNECTION DETAIL

N.T.S.

FIRST MAIN LINE JOINT TO BE A MIN. OF 18" LONG, WITH CONC. CRADLE (POURED CONTIGUOUS WITH CONC. BASE) AND UNDER ENTIRE JOINT See General Note # 5 On Pg. 302

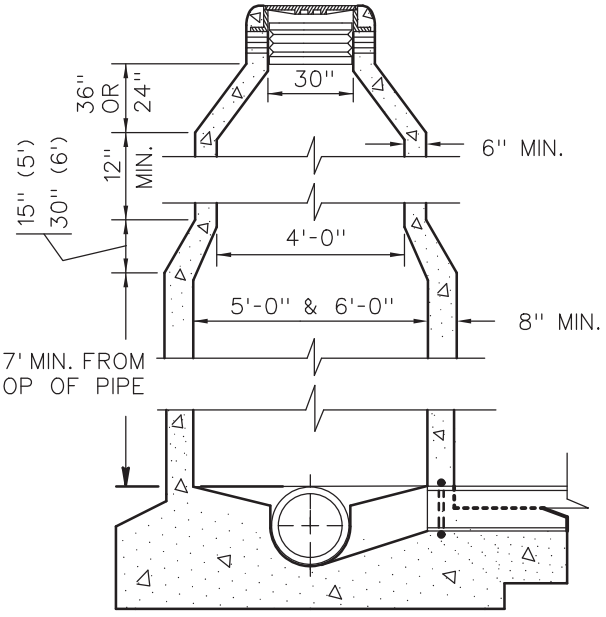




ROOF STEEL LAYOUT

N.T.S.

ALL MANHOLES WITH GRADE RINGS SHALL BE FURNISHED WITH INTERNAL CHIMNEY SEAL See Pg. 327 & 302



TRANSITION DETAIL FOR 5' & 6' DIA. M.H.'S

N.T.S.

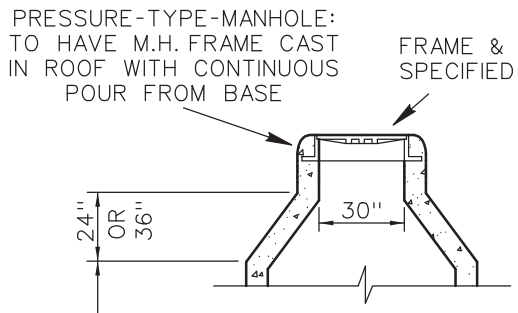
REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE CAST-IN-PLACE

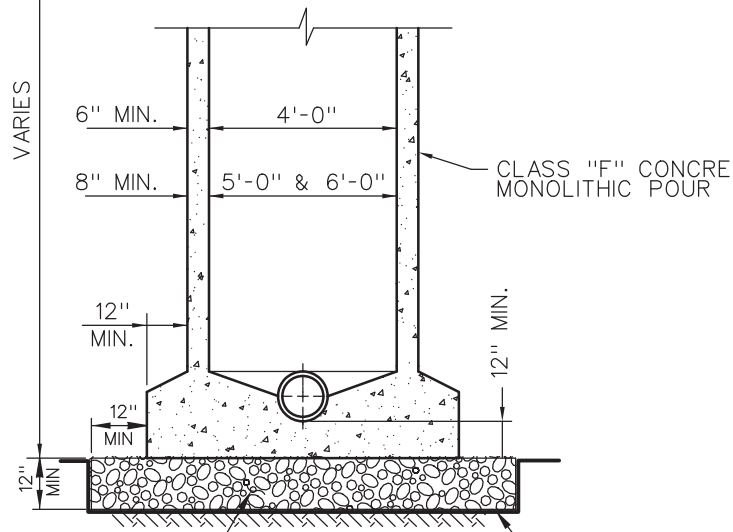
DWU		(Page No.) 303
DATE OCT. 2015		

CONCRETE CONE ⇦ ROOF OPTIONS ⇨ REINFORCED CONCRETE SLAB

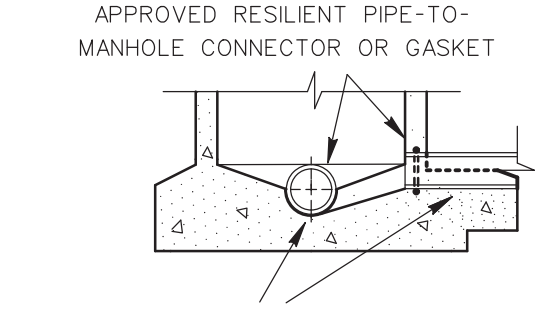
N.T.S.



FOR 5' & 6' DIA. M.H.'S SEE TRANSITION DETAIL



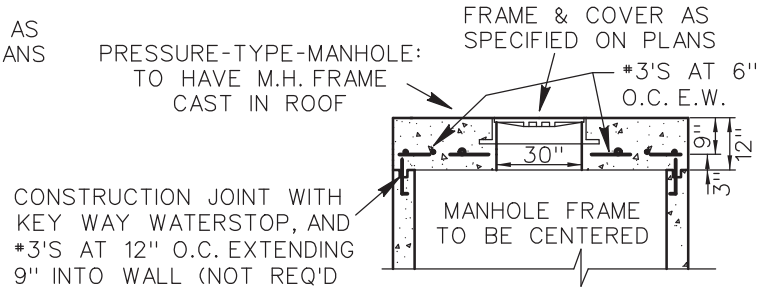
MANHOLE DEAIL



CONNECTION DETAIL

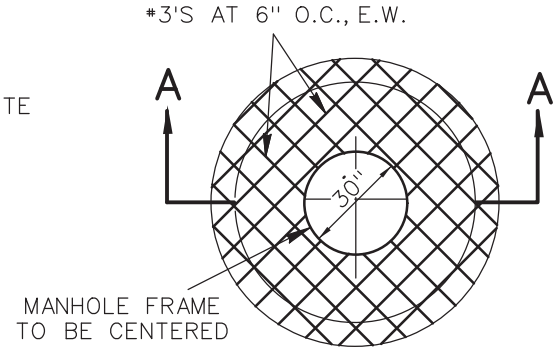
N.T.S.

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302



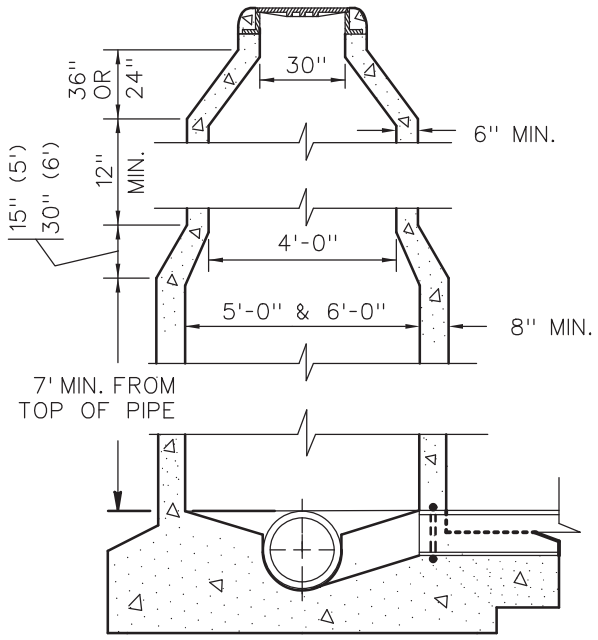
SECTION A - A

N.T.S.



ROOF STEEL LAYOUT

N.T.S.

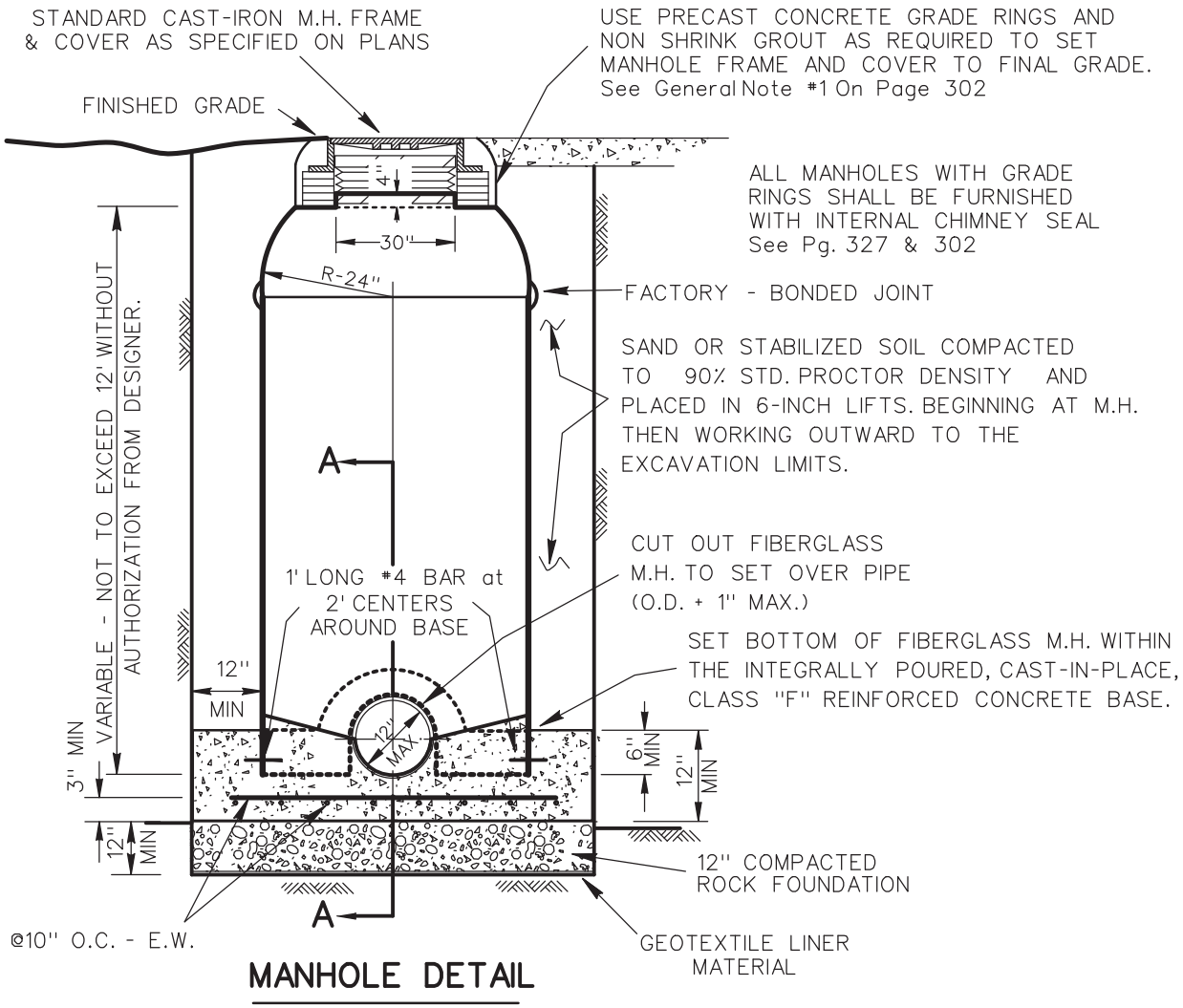


TRANSITION DETAIL FOR 5' & 6' DIA. M.H.'S

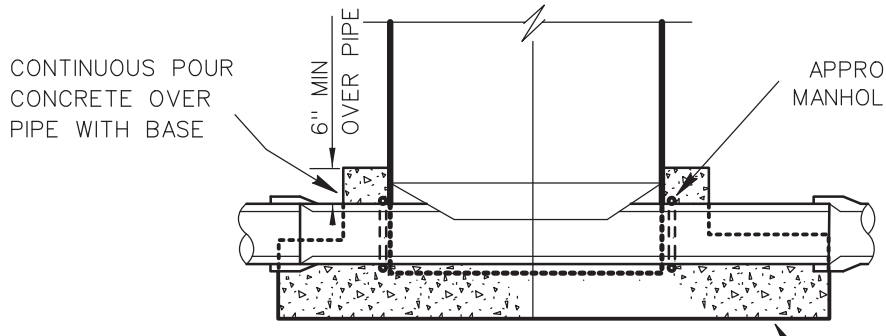
N.T.S.

WASTEWATER MANHOLE PRESSURE-TYPE

		(Page No.)
DWU		304
DATE OCT. 2015		



MANHOLE DETAIL



SECTION A-A

N.T.S.

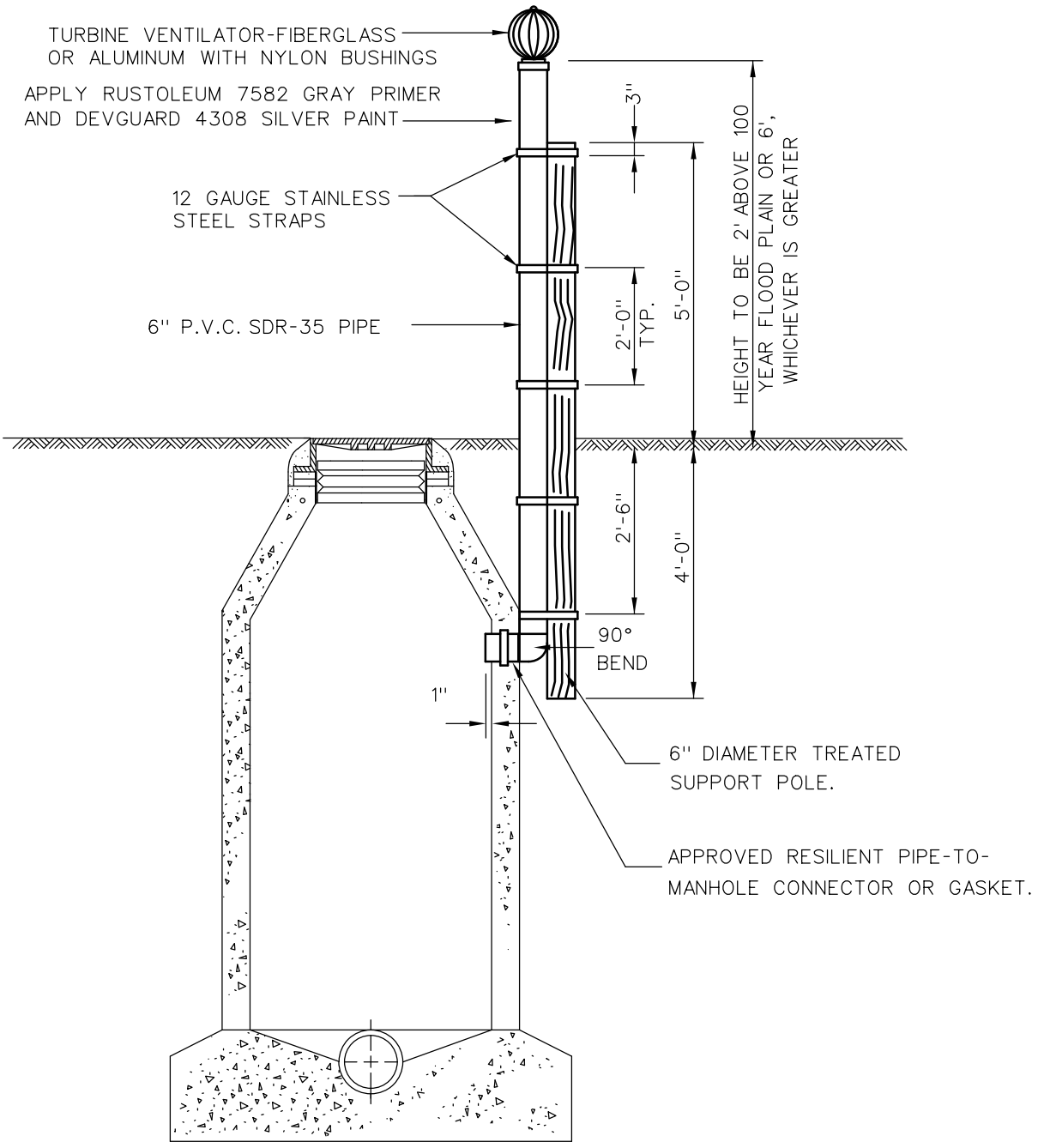
NOTES:

1. FUTURE CONNECTIONS. IF A SEALANT BETWEEN PIPE & M.H. IS NEEDED, USE APPROVED SILICONE SEALANT.
2. DESIGN : HS 20 LOADING

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE FIBERGLASS

		(Page No.)
DWU		305
DATE OCT.2015		



WASTEWATER MANHOLE VENTED

DWU		(Page No.) 306
DATE JAN. 2010		

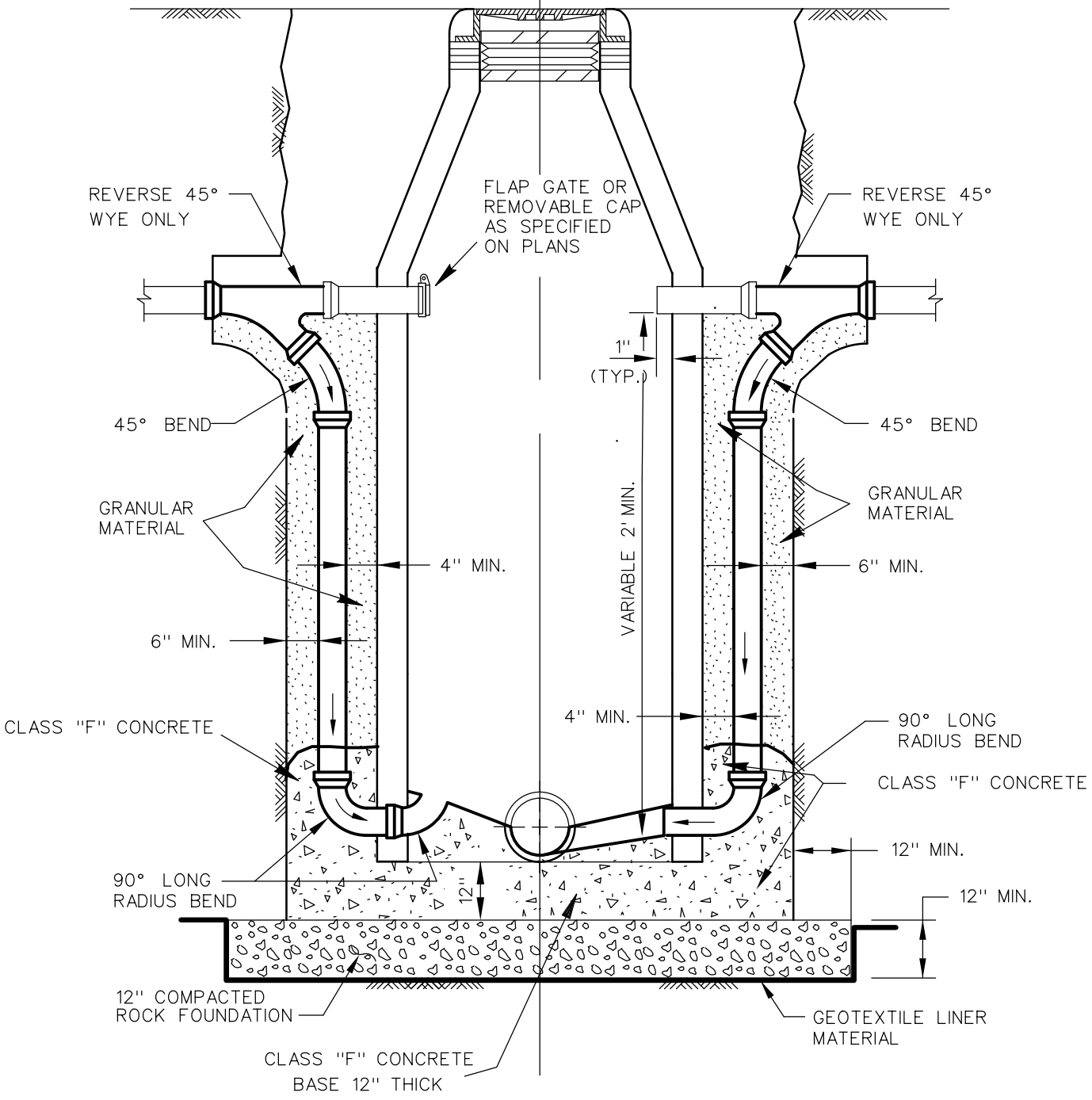
MANHOLE TYPE-AS
SPECIFIED ON PLANS

GAS SEALED DROP CONNECTION

N.T.S.

STANDARD DROP CONNECTION

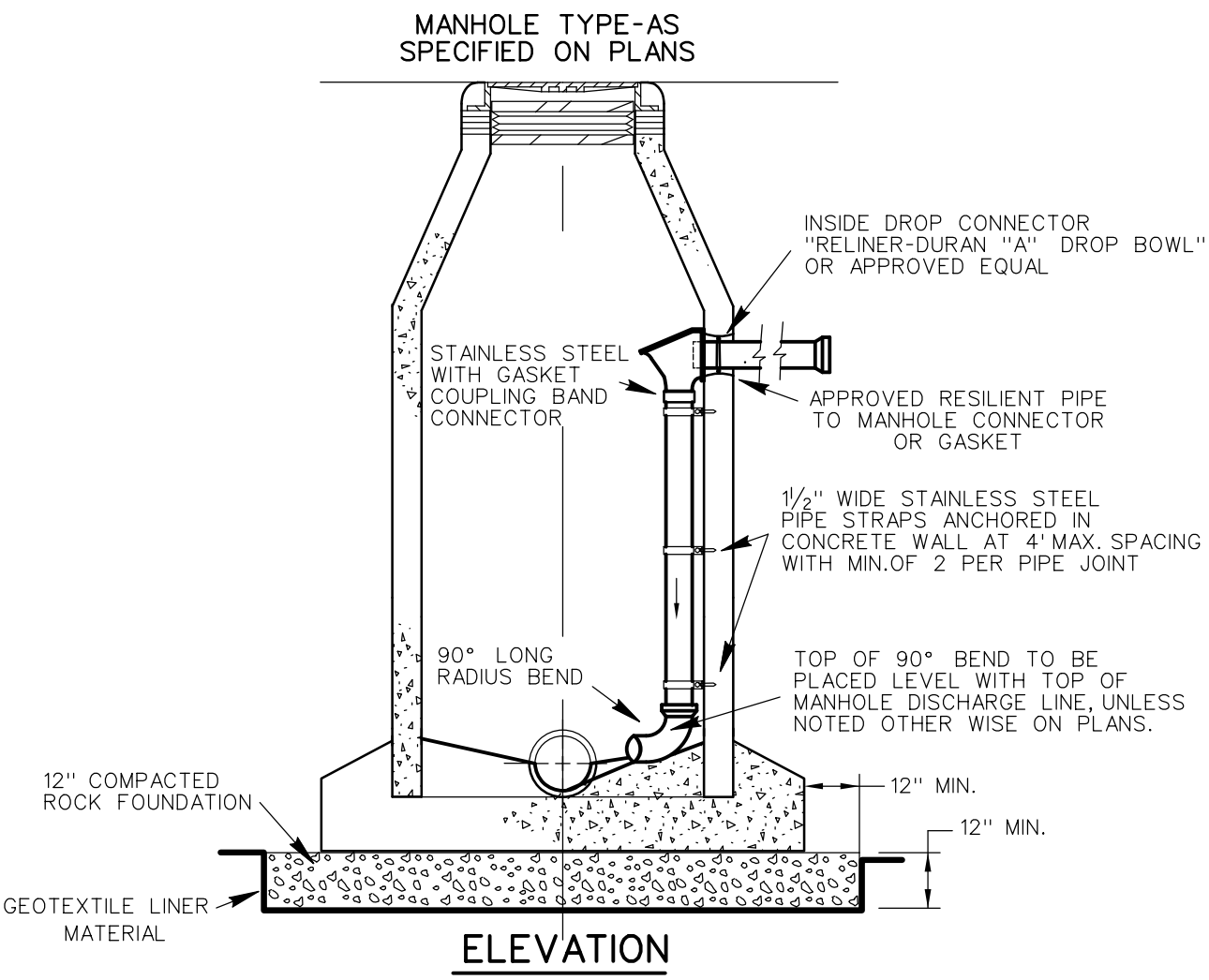
N.T.S.



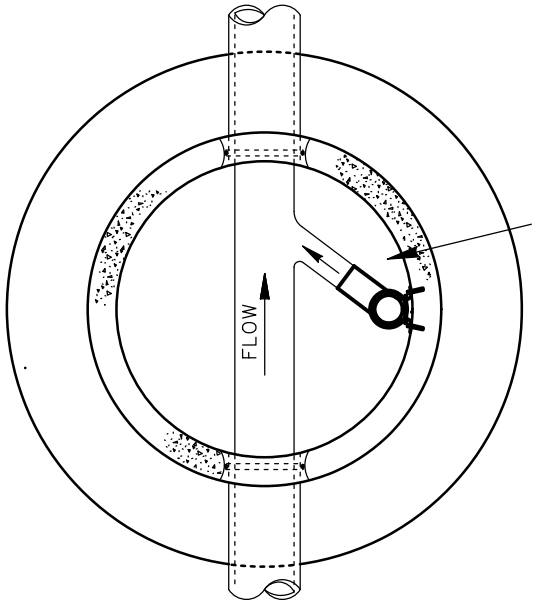
SEE GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE OUTSIDE DROP CONNECTIONS

		(Page No.)
DWU		307
DATE OCT.2010		



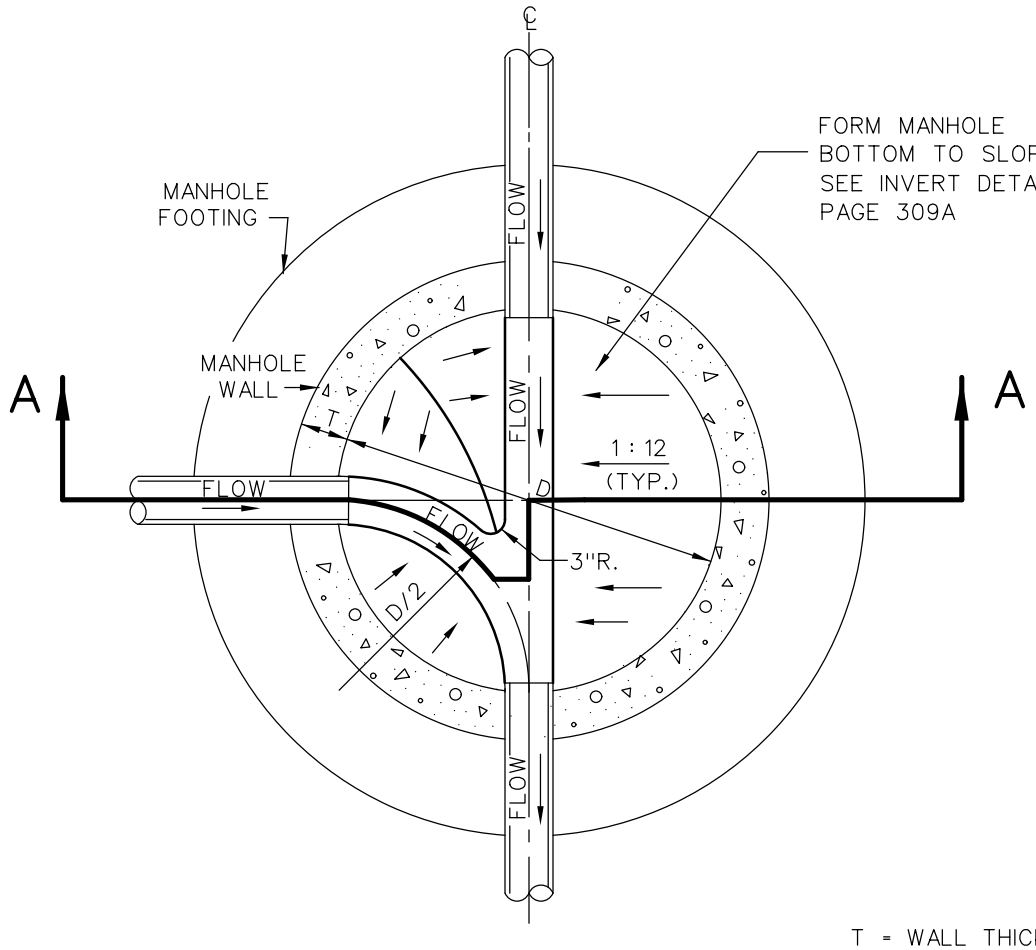
ELEVATION



PLAN

SEE GENERAL NOTES
FOR WASTEWATER MANHOLE
CONSTRUCTION - PAGE 302

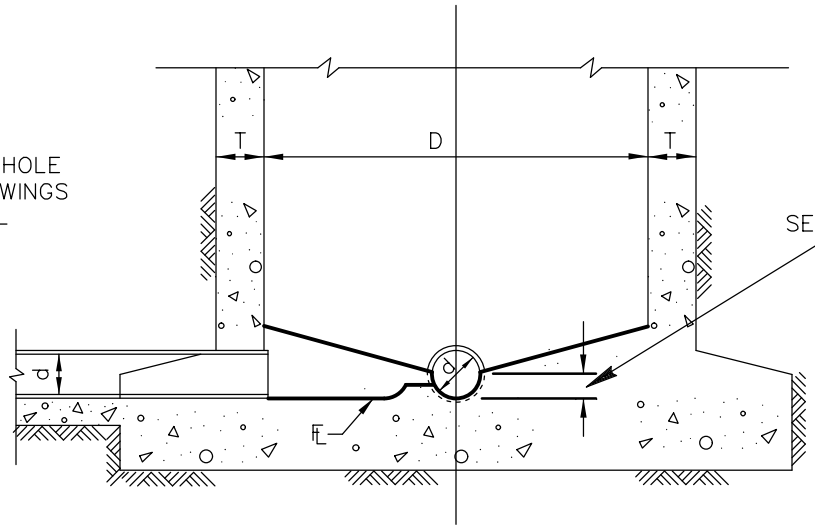
WASTEWATER MANHOLE INSIDE DROP CONNECTION		DWU	(Page No.) 308
		DATE SEP.2010	



T = WALL THICKNESS
D = MANHOLE DIAMETER
d = PIPE DIAMETER

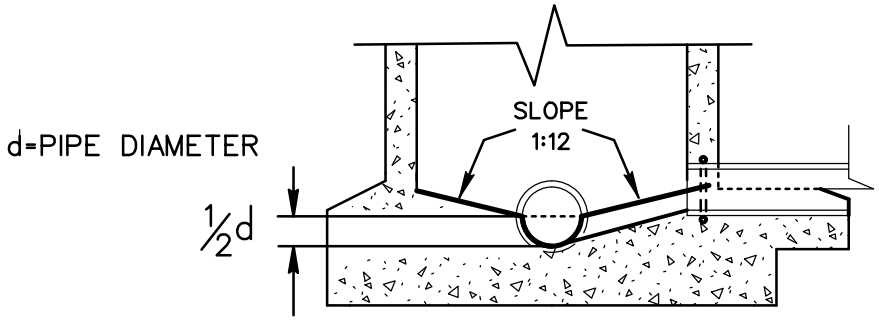
PLAN
N.T.S.

NOTE:
REFER TO MANHOLE STANDARD DRAWINGS FOR ADDITIONAL DETAIL OF M.H.

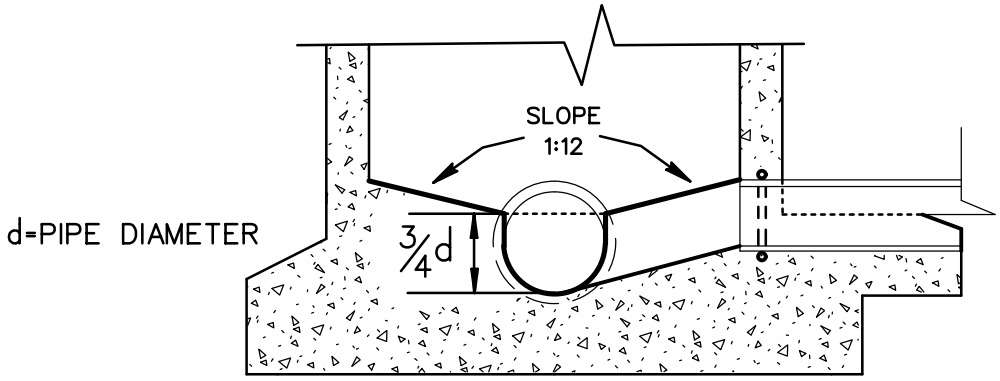


SECTION A-A
N.T.S.

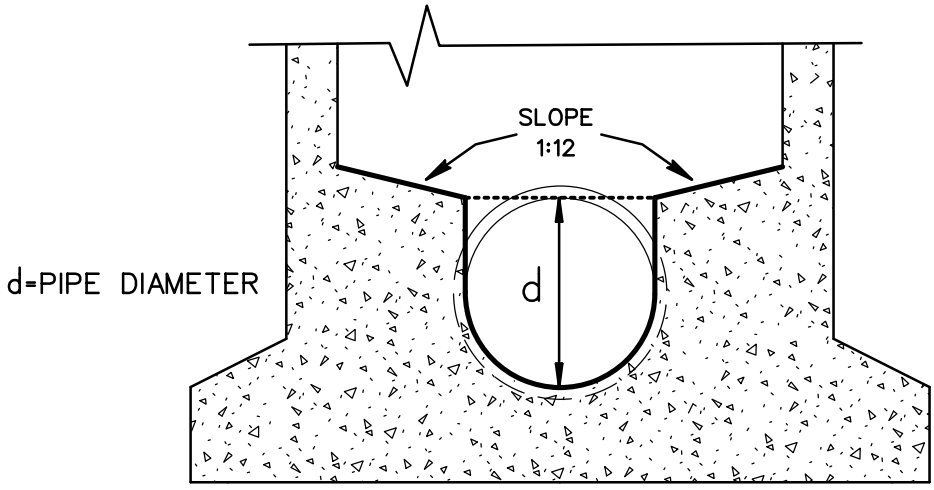
WASTEWATER MANHOLE INVERT INTERSECTION DETAIL		DWU	(Page No.) 309
		DATE DEC.2001	



FOR PIPE SMALLER
THAN 15" IN DIAMETER

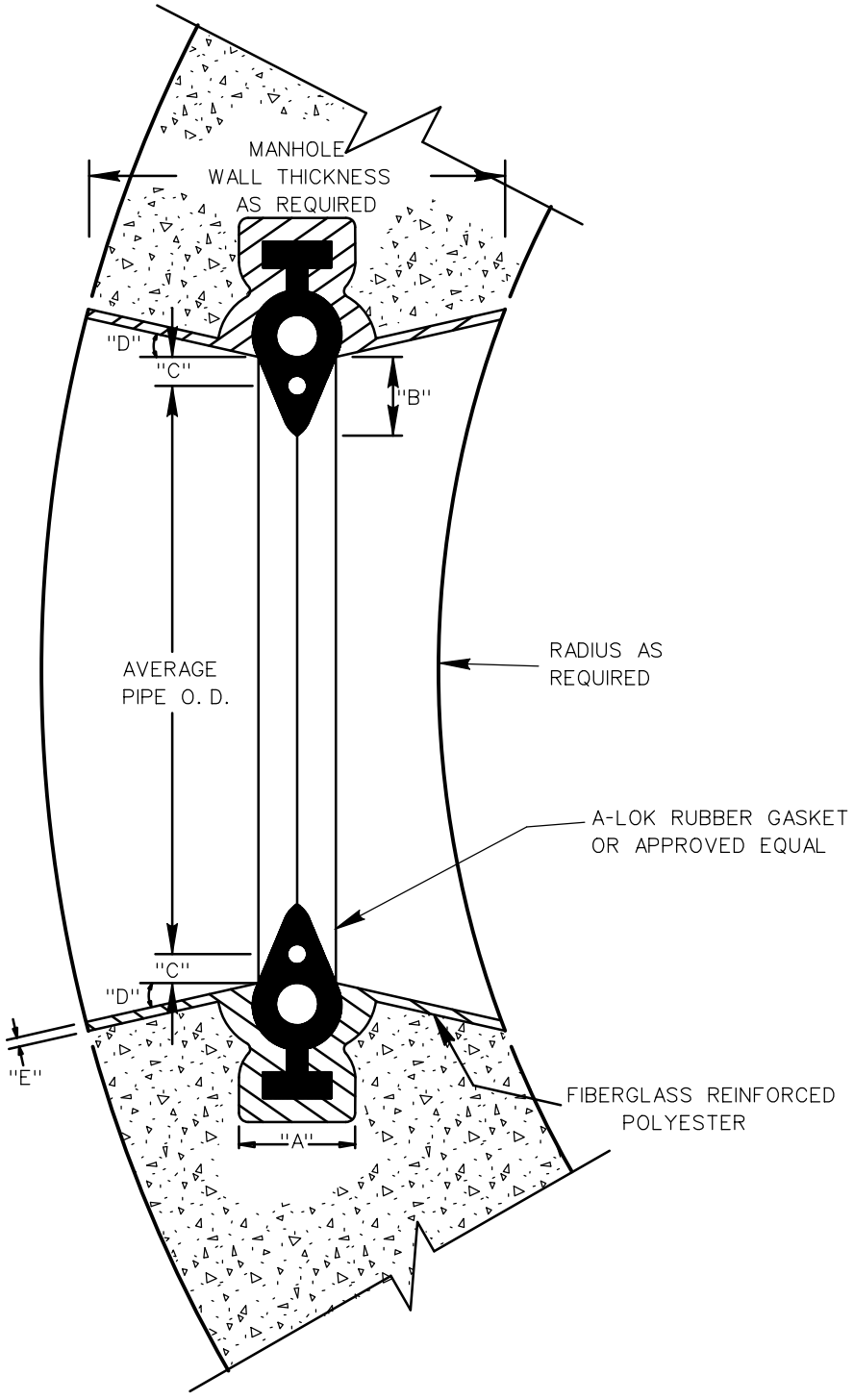


FOR PIPE FROM
15" TO 24" IN DIAMETER



FOR PIPE LARGER
THAN 24" IN DIAMETER

WASTEWATER MANHOLE INVERT BENCH DETAIL		DWU	(Page No.) 309A
		DATE JAN.2001	



DIMENSION FOR MANHOLE PIPE CONNECTOR A.S.T.M. C-923

PIPE SIZE	A	B	C	D	E
4" - 6"	1 1/2"	7/8"	3/8"	10°	1/4"-3/8"
8" - 21"	2 1/8"	1 3/8"	5/8"	10°	1/4"-3/8"
24" - 60"	2 3/8"	1 3/4"	3/4"	10°	1/4"-3/8"

MANHOLE PIPE CONNECTOR
(FOR CAST-IN-PLACE MANHOLES)

DWU

DATE
JAN. 2010

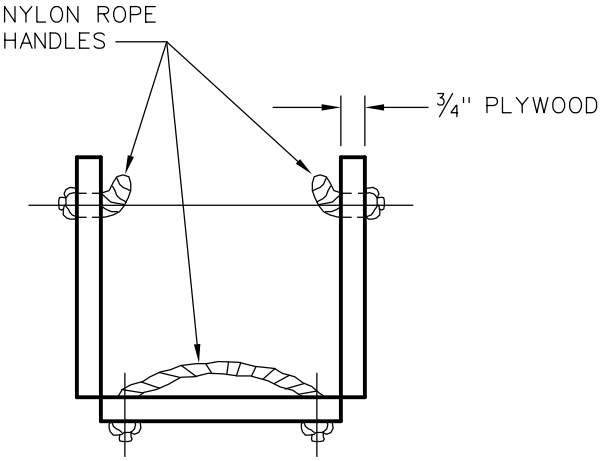
(PAGE No.)
310

INSTALLATION

FALSE MANHOLE BOTTOM SHALL BE FURNISHED AND INSTALLED IN ALL MANHOLES CONSTRUCTED IN ADVANCE OF PAVING. THESE FALSE MANHOLE BOTTOMS WILL BE INSTALLED AT A TIME DIRECTED BY THE ENGINEER BUT WILL USUALLY BE AFTER ALL WORK IS COMPLETED ON THE WASTEWATER SYSTEM INCLUDING THE AIR TEST, BUT PRIOR TO THE FINAL INSPECTION.

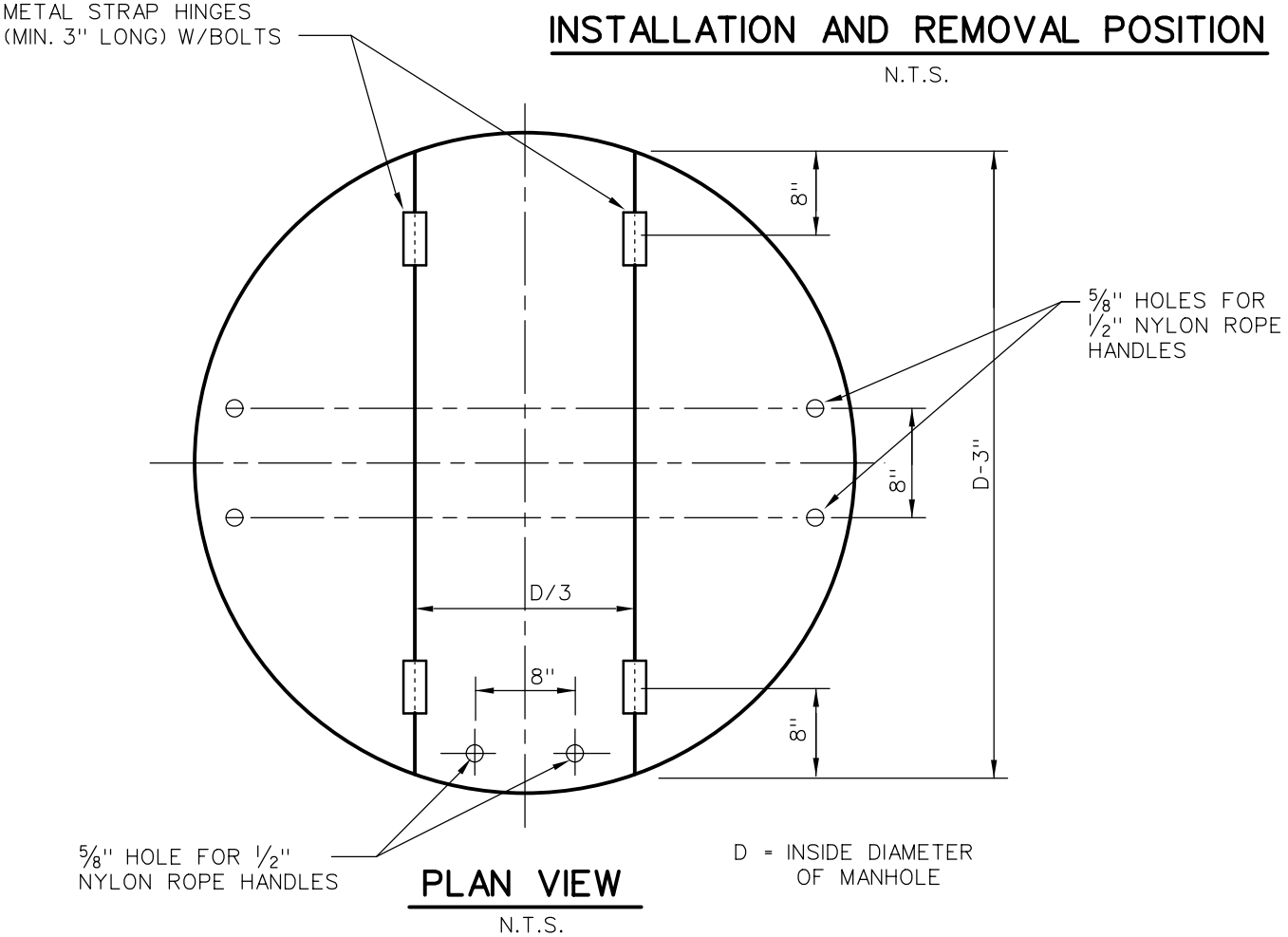
REMOVAL

FALSE MANHOLE BOTTOM SHALL BE REMOVED AFTER THE FINAL APPURTENANCE ADJUSTMENT INSPECTION. THE PAVING CONTRACTOR AND OWNER'S REPRESENTATIVE WILL COORDINATE THE REMOVAL OF THE FALSE MANHOLE BOTTOMS.



INSTALLATION AND REMOVAL POSITION

N.T.S.

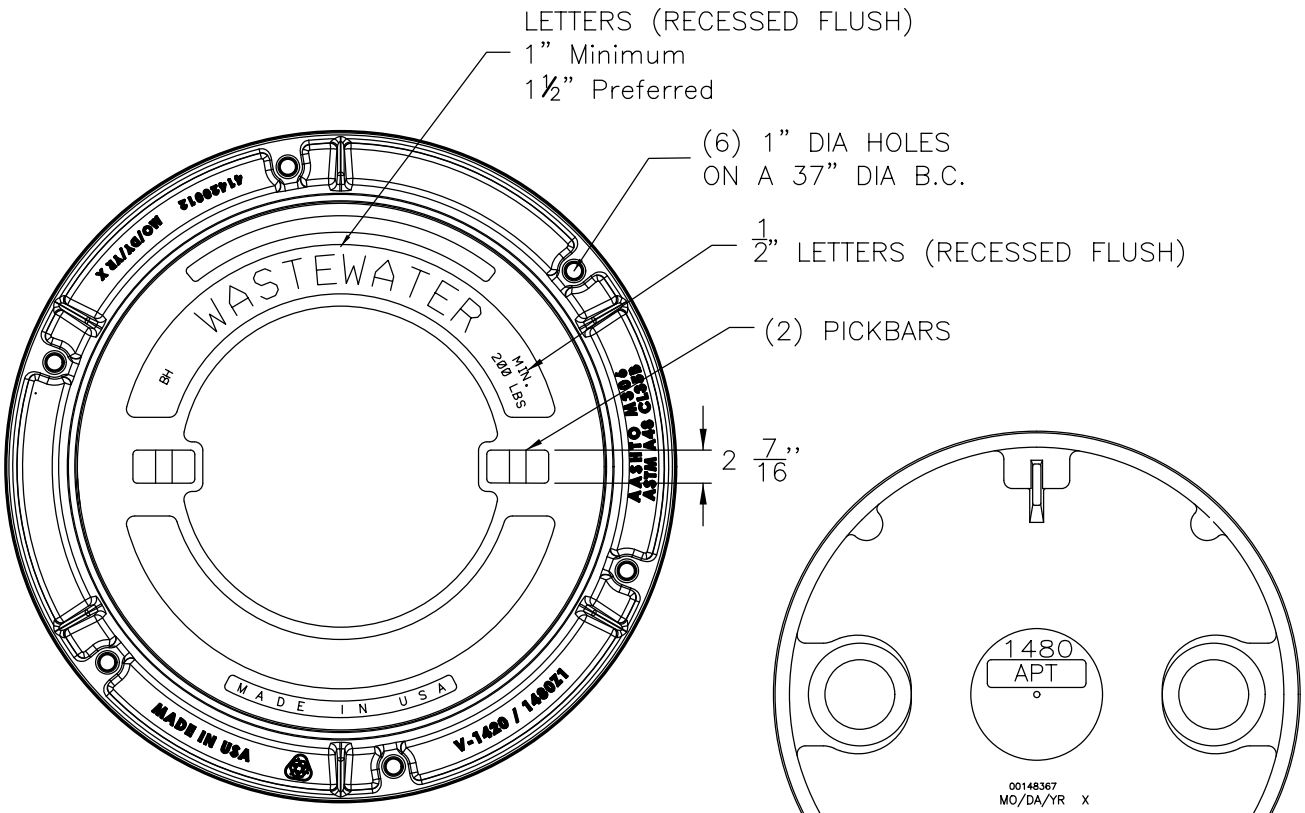


PLAN VIEW

N.T.S.

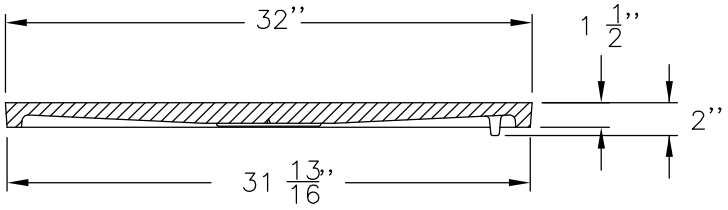
WASTEWATER MANHOLE FALSE BOTTOM

DWU		(Page No.) 311
DATE DEC.2001		

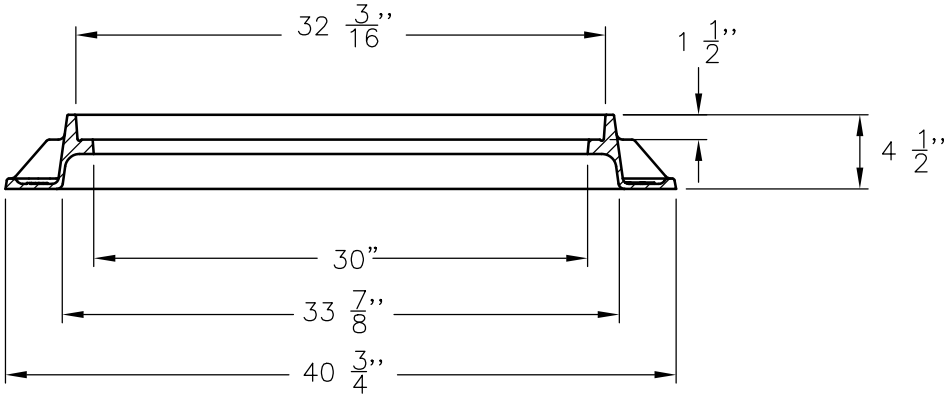


PLAN VIEW

BOTTOM VIEW OF COVER



COVER SECTION

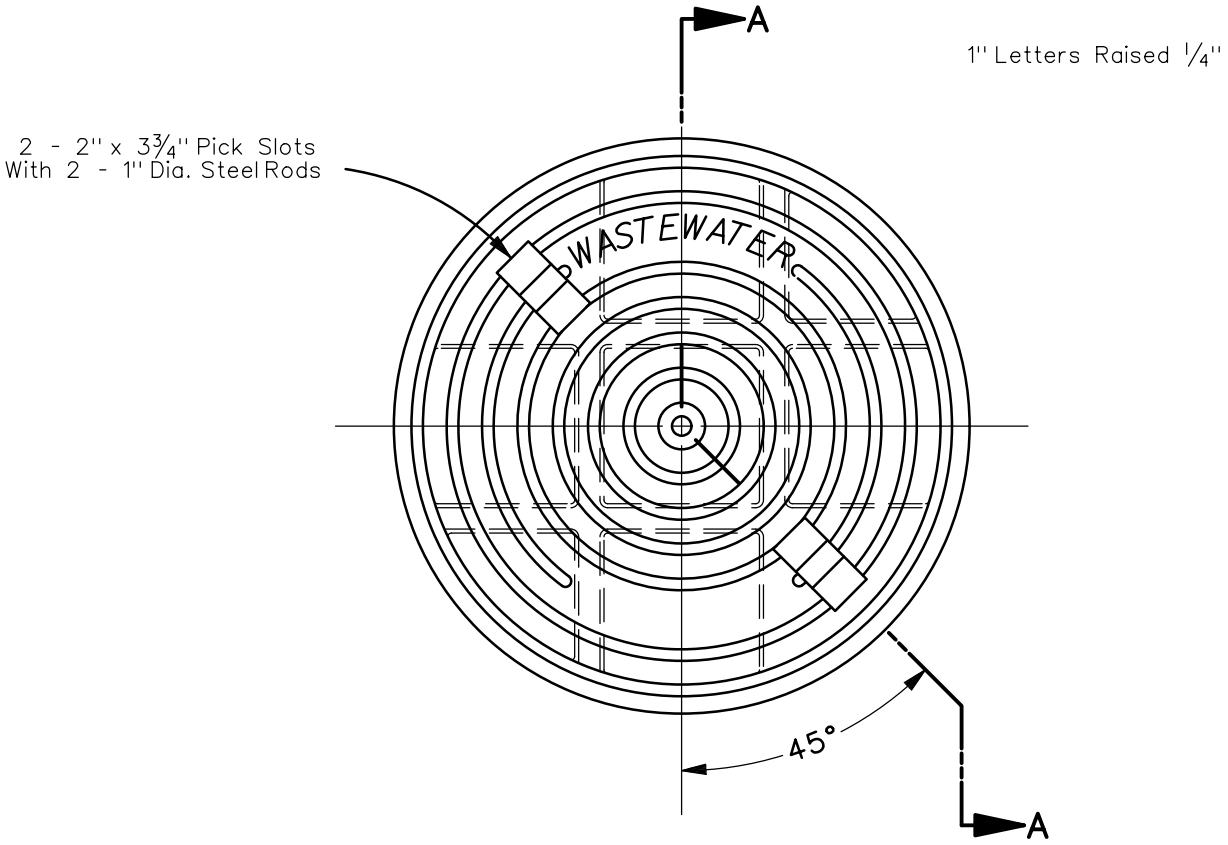


COVER – GRAY IRON
ASTM A48 CL35B
FRAME – GRAY IRON
ASTM A48 CL35B

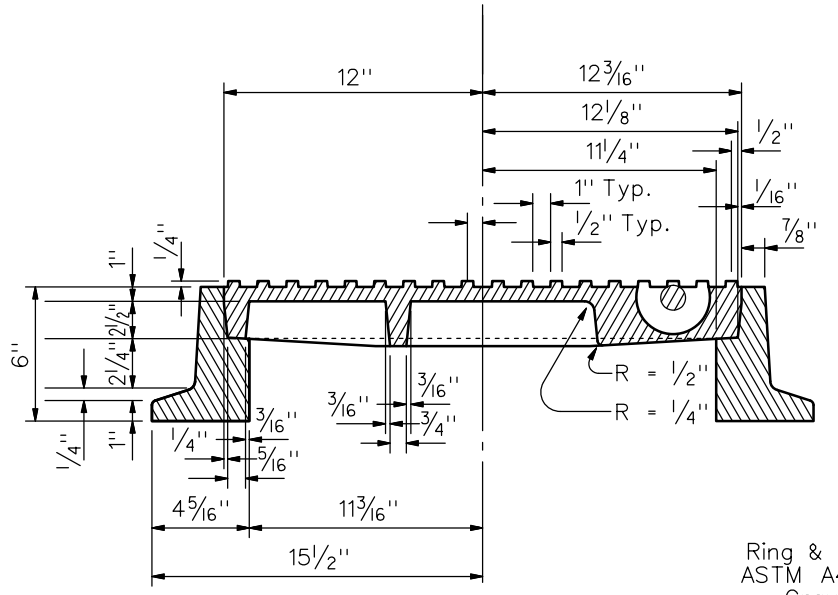
LID MAY BE IDENTIFIED WITH EITHER
"WASTEWATER" OR "SANITARY SEWER"

STANDARD 32" C.I. M.H. FRAME & COVER	WASTEWATER	DWU	(PAGE No.) 312
		DATE OCT.2011	

NOT TO BE USED FOR NEW CONSTRUCTION



PLAN

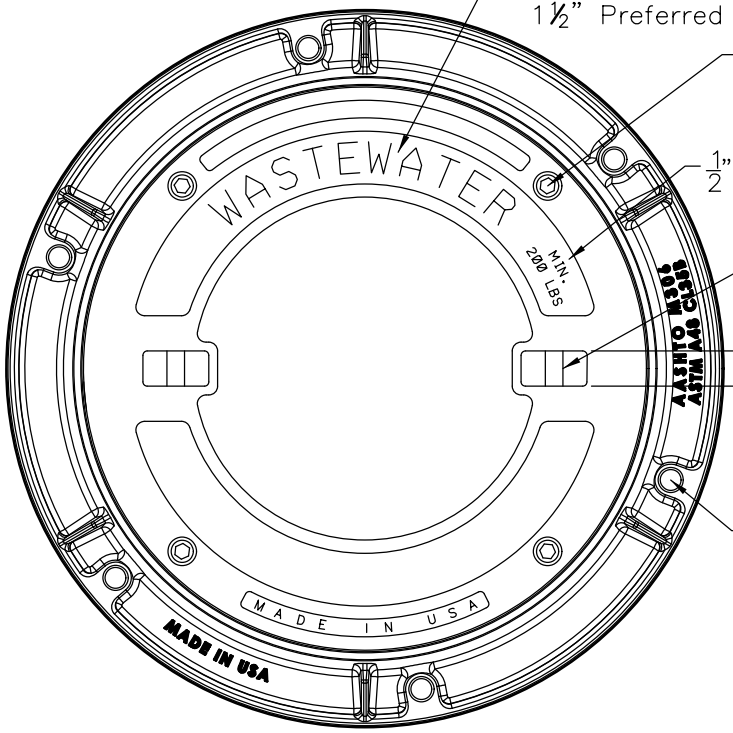


SECTION "A-A"

Ring & Cover Material per
ASTM A48 Class 35B Min.
Gray Iron Castings.

STANDARD 24" C.I. M.H. FRAME & COVER		DWU	(PAGE No.) 312A
		DATE JAN. 2010	

LID MAY BE IDENTIFIED WITH EITHER "WASTEWATER" OR "SANITARY SEWER"



LETTERS (RECESSED FLUSH)
1" Minimum
1½" Preferred

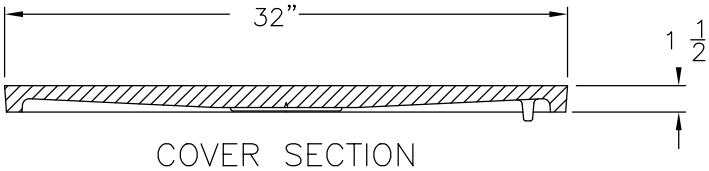
(4) ½"–13 X 2" LG. SS HEX HEAD BOLTS W/ STL AND RUBBER WASHERS

½" LETTERS (RECESSED FLUSH)

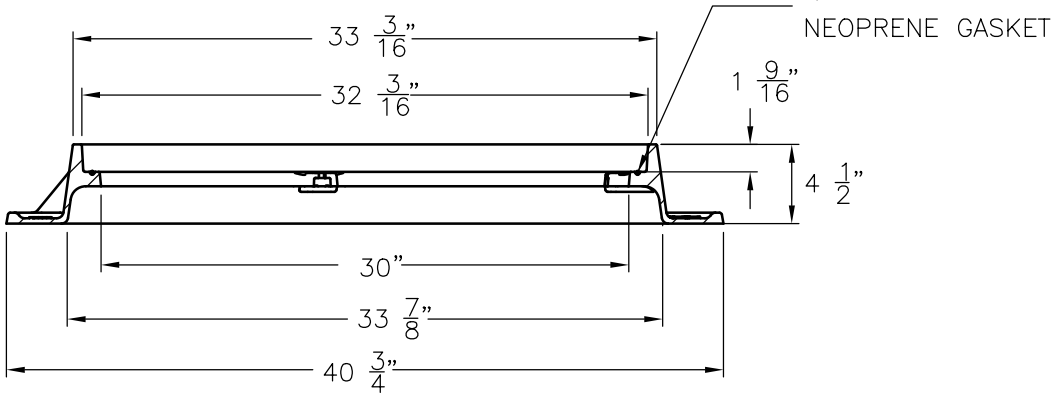
(2) PICKBARS

2 3/16"

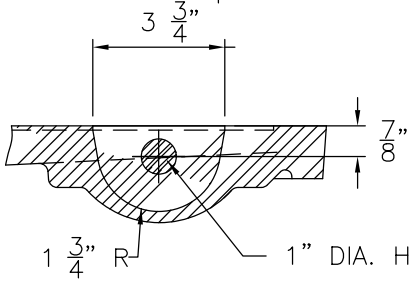
(6) 1 1/8" DIA. BOLT HOLES ON 37" DIA. BOLT CIRCLE



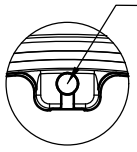
COVER SECTION



FRAME SECTION



PICKBAR DETAIL



EON LOCK™ OR EQUAL POCKETS FOR ½"–13 SQ NUT ON A 29 3/8" DIA. B.C. (TYP)

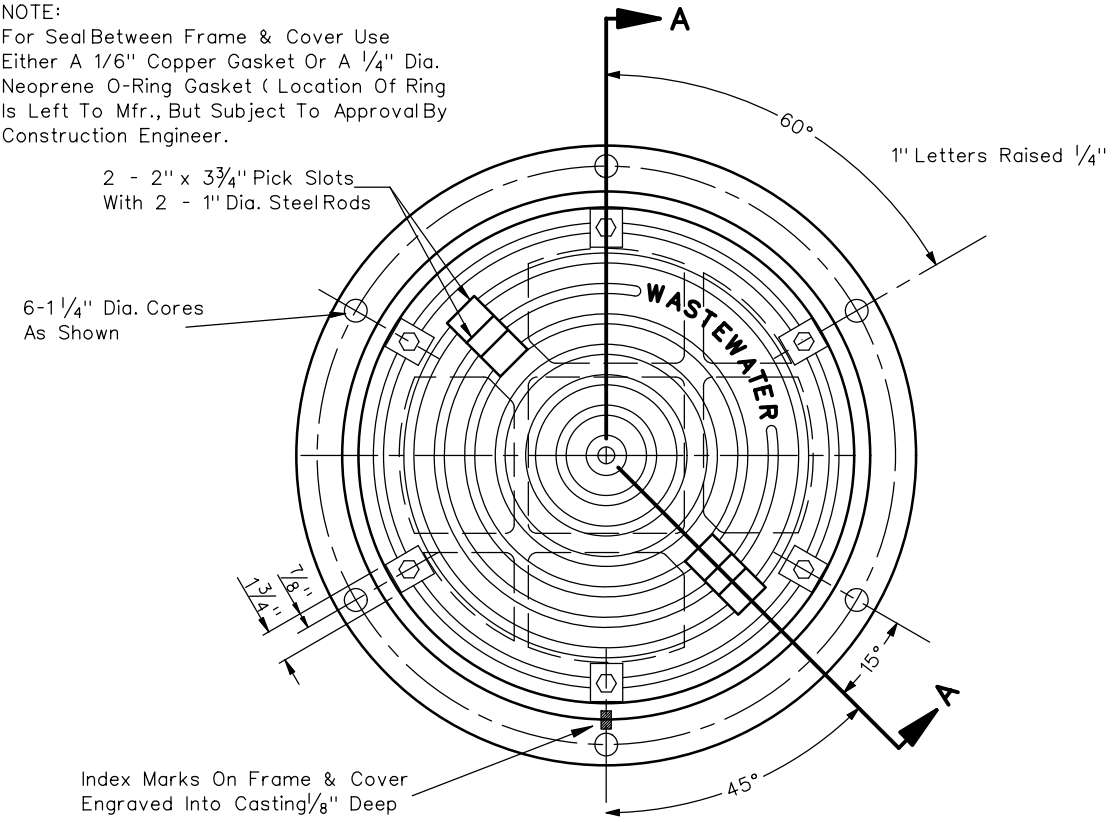
FRAME BOLTING DETAIL

COVER – GRAY IRON ASTM A48 CL35B
FRAME – GRAY IRON ASTM A48 CL35B

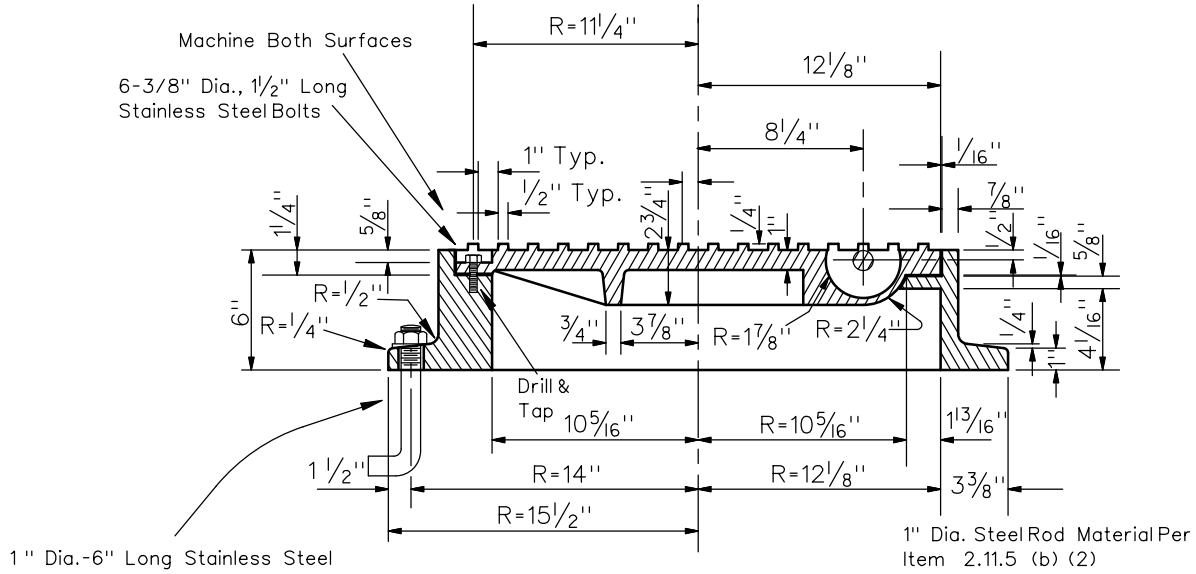
32" PRESSURE TYPE CAST-IRON MH. FRAME & COVER	WASTEWATER	DWU	(PAGE No.) 313
		DATE OCT. 2011	

NOT TO BE USED FOR NEW CONSTRUCTION

NOTE:
For Seal Between Frame & Cover Use Either A 1/6" Copper Gasket Or A 1/4" Dia. Neoprene O-Ring Gasket (Location Of Ring Is Left To Mfr., But Subject To Approval By Construction Engineer.



PLAN



1" Dia.-6" Long Stainless Steel Anchor Bolts w/Hex. Head Nut 6-Required

SECTION "A-A"

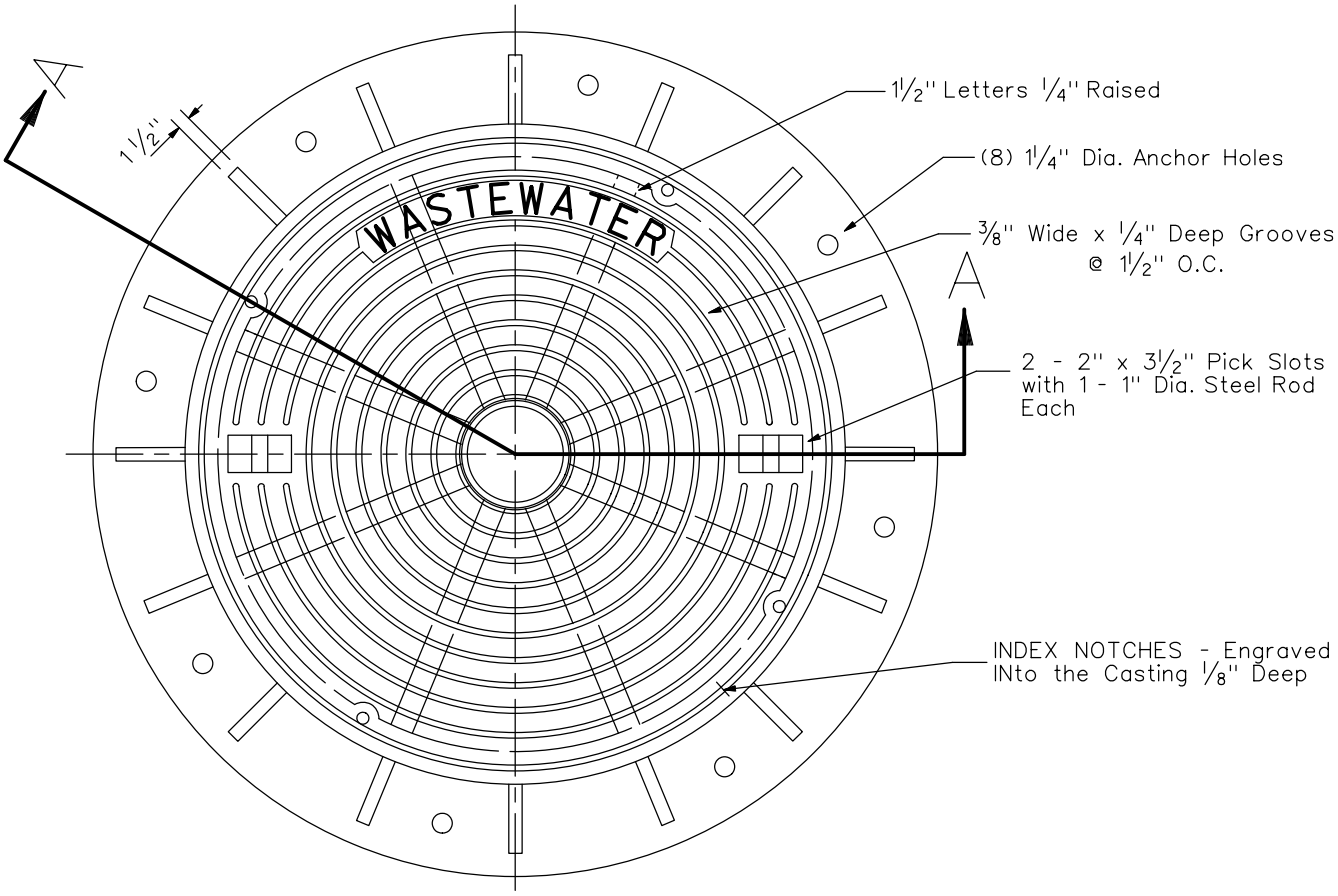
1" Dia. Steel Rod Material Per Item 2.11.5 (b) (2)
Ring & Cover Material Per Item 2.11.5 (c)

Ring & Cover Material per ASTM A48 Class 35B Min. Gray Iron Castings.

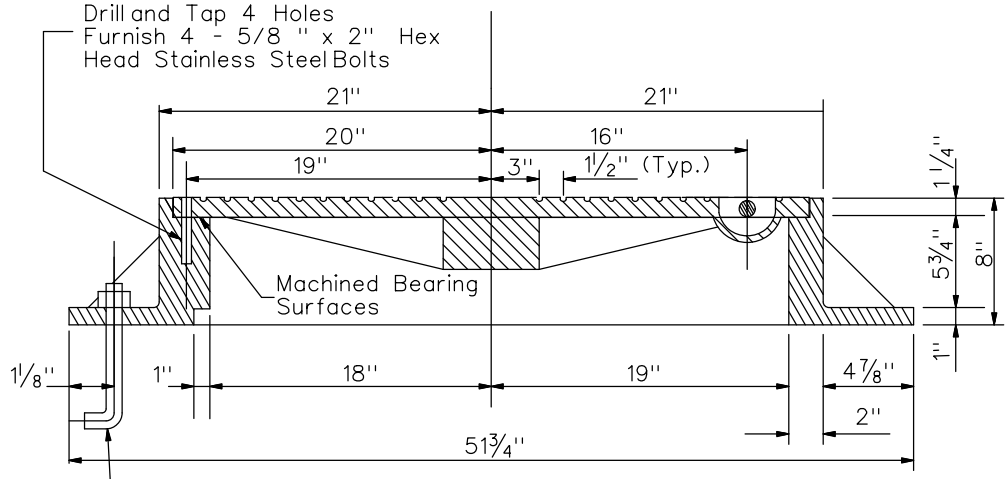
24" PRESSURE TYPE CAST-IRON MH. FRAME & COVER		DWU	(PAGE No.) 313A
		DATE JAN. 2010	

NOTE: For seal between frame and cover use either a 1/16" thick copper gasket or a 1/4" diameter neoprene "O"-ring. Location of the "O"-ring is left to the manufacturer, but subject to approval by DWU Construction Engineer.

LID MAY BE IDENTIFIED WITH EITHER "WASTEWATER" OR "SANITARY SEWER"



PLAN

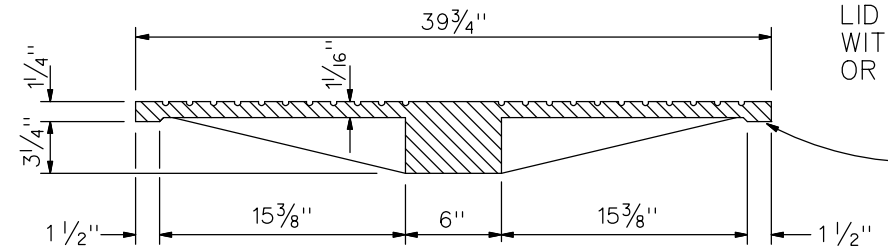


SECTION "A-A"

1" Dia. - 6" Long Stainless Steel Anchor Bolts w/ Hex Head Nuts 8 Required

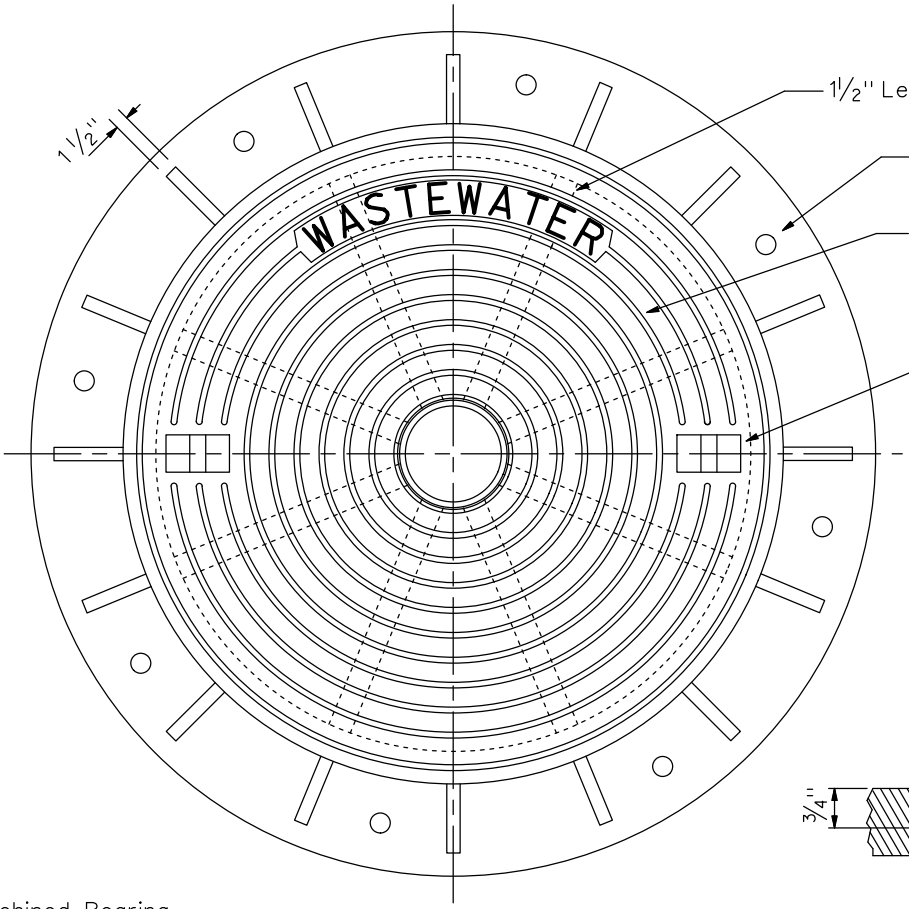
Ring & Cover Material per ASTM A48 Class 35B Min. Gray Iron Castings.

40" PRESSURE TYPE CAST IRON M.H. FRAME & COVER		DWU	(PAGE NO.) 314
		DATE JAN.2010	

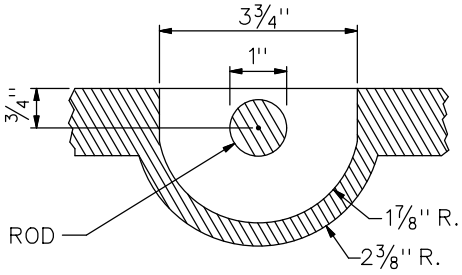


LID MAY BE IDENTIFIED WITH EITHER "WASTEWATER" OR "SANITARY SEWER"

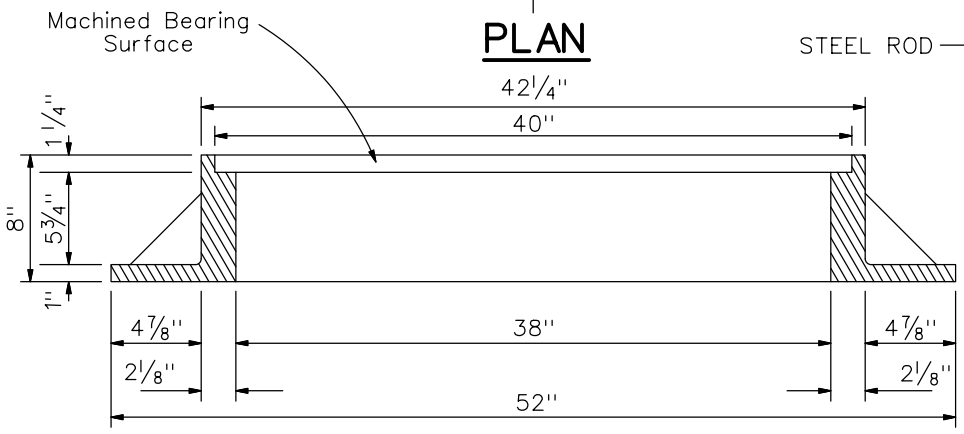
SECTION THRU COVER



PLAN



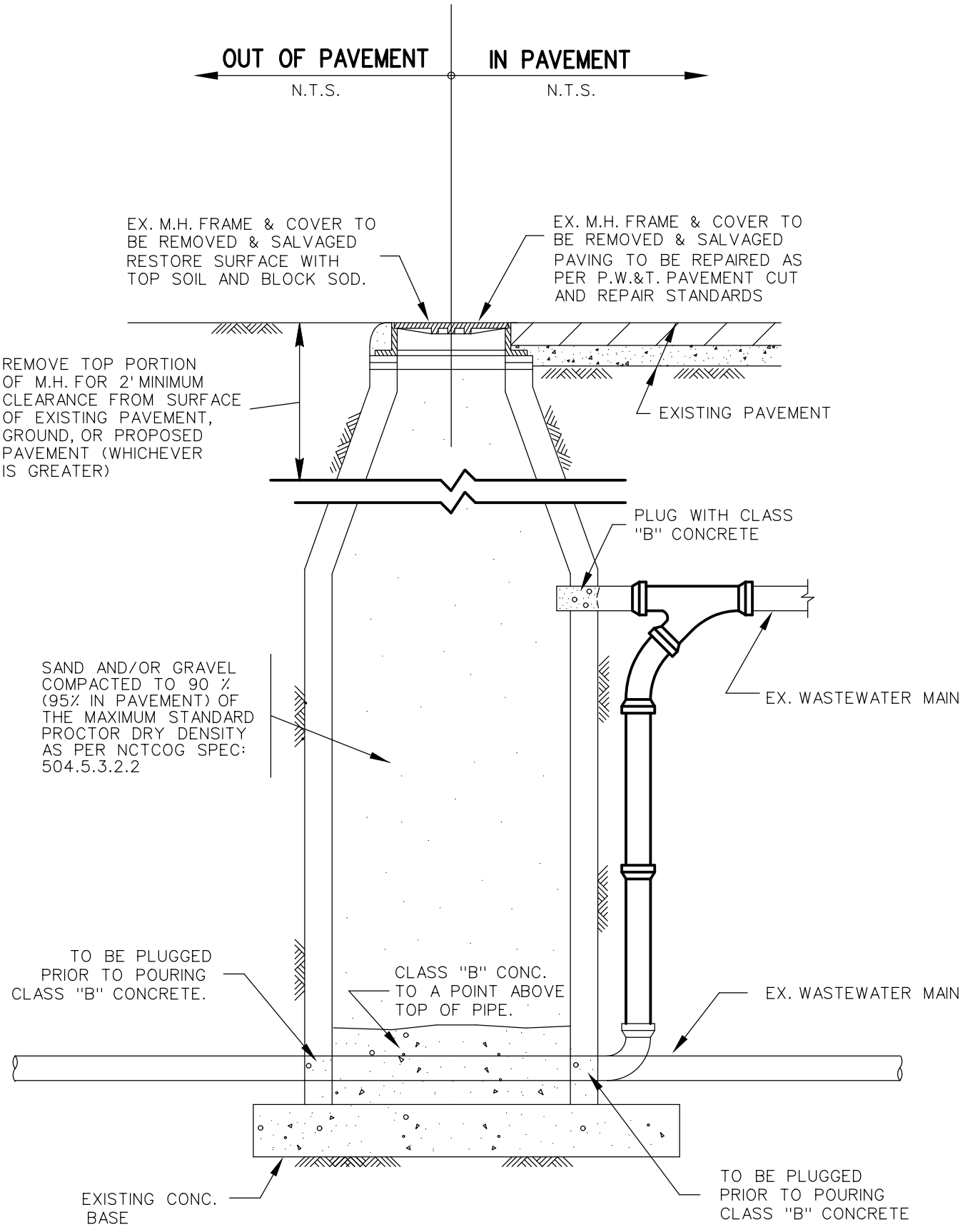
PICKBAR DETAIL



SECTION THRU FRAME

Ring & Cover Material per ASTM A48 Class 35B Min. Gray Iron Castings.

STANDARD 40" MANHOLE FRAME AND COVER		DWU	(PAGE NO.) 315
		DATE DEC.2001	

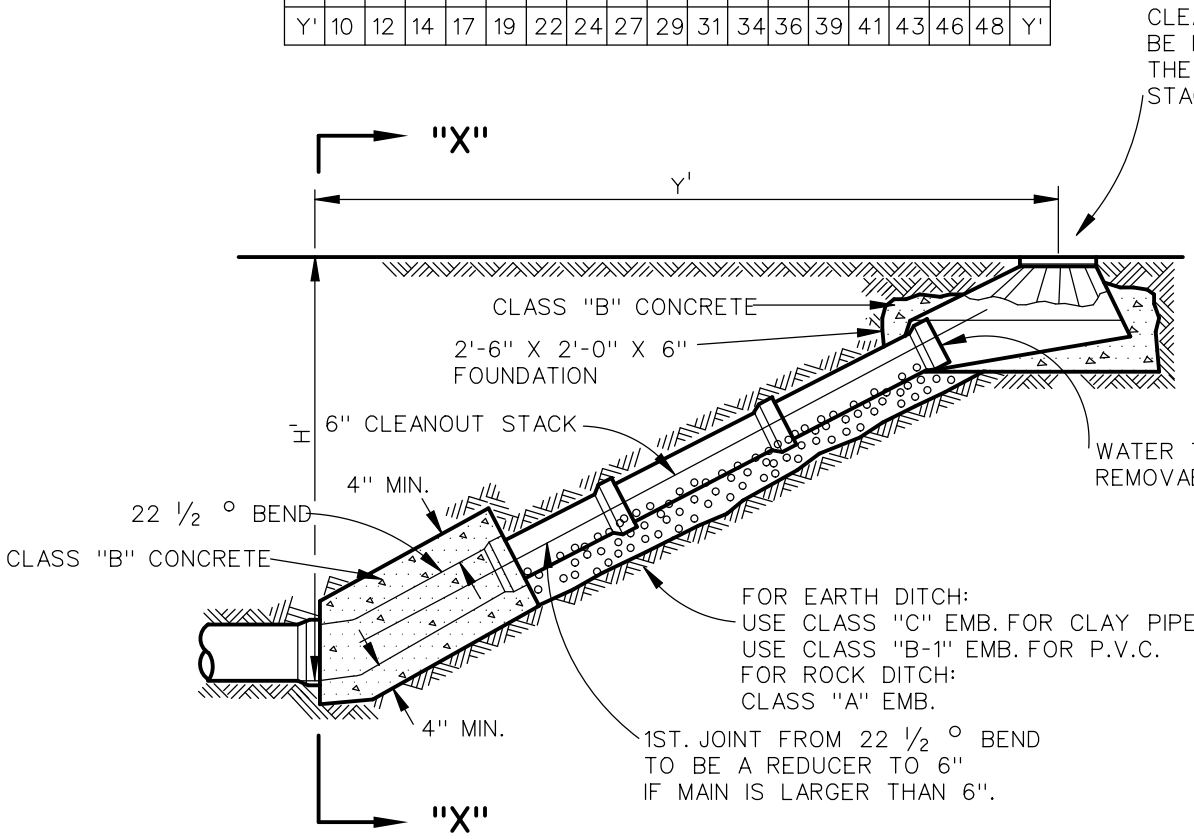


NCTCOG Spec: 504.5.3.2.2. - Densities - Areas Not Subjected To Or Influenced By Vehicular Traffic
2009 DWU Addendum: 504.5.3.2.2.DWU: Densities - Areas Not Subjected To Or Influenced By Vehicular Traffic

ABANDONMENT OF MANHOLE IN OR OUT OF PAVEMENT

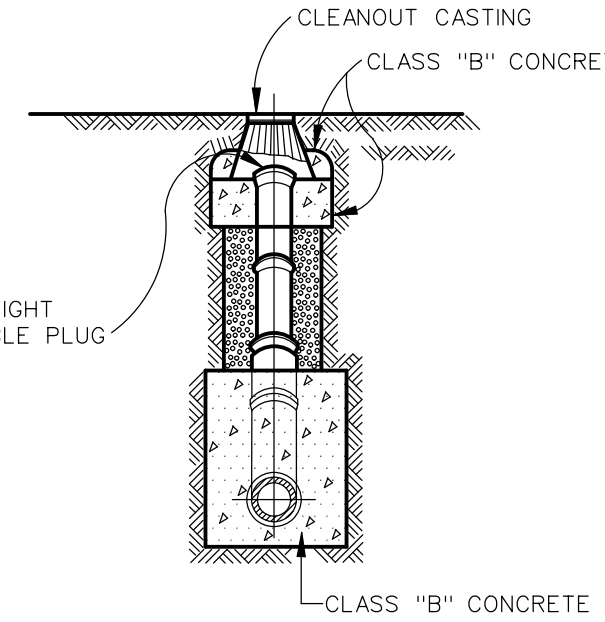
	(Page No.)
DWU	316
DATE OCT.2010	

H'	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	H'
Y'	10	12	14	17	19	22	24	27	29	31	34	36	39	41	43	46	48	Y'



PROFILE VIEW

N.T.S.



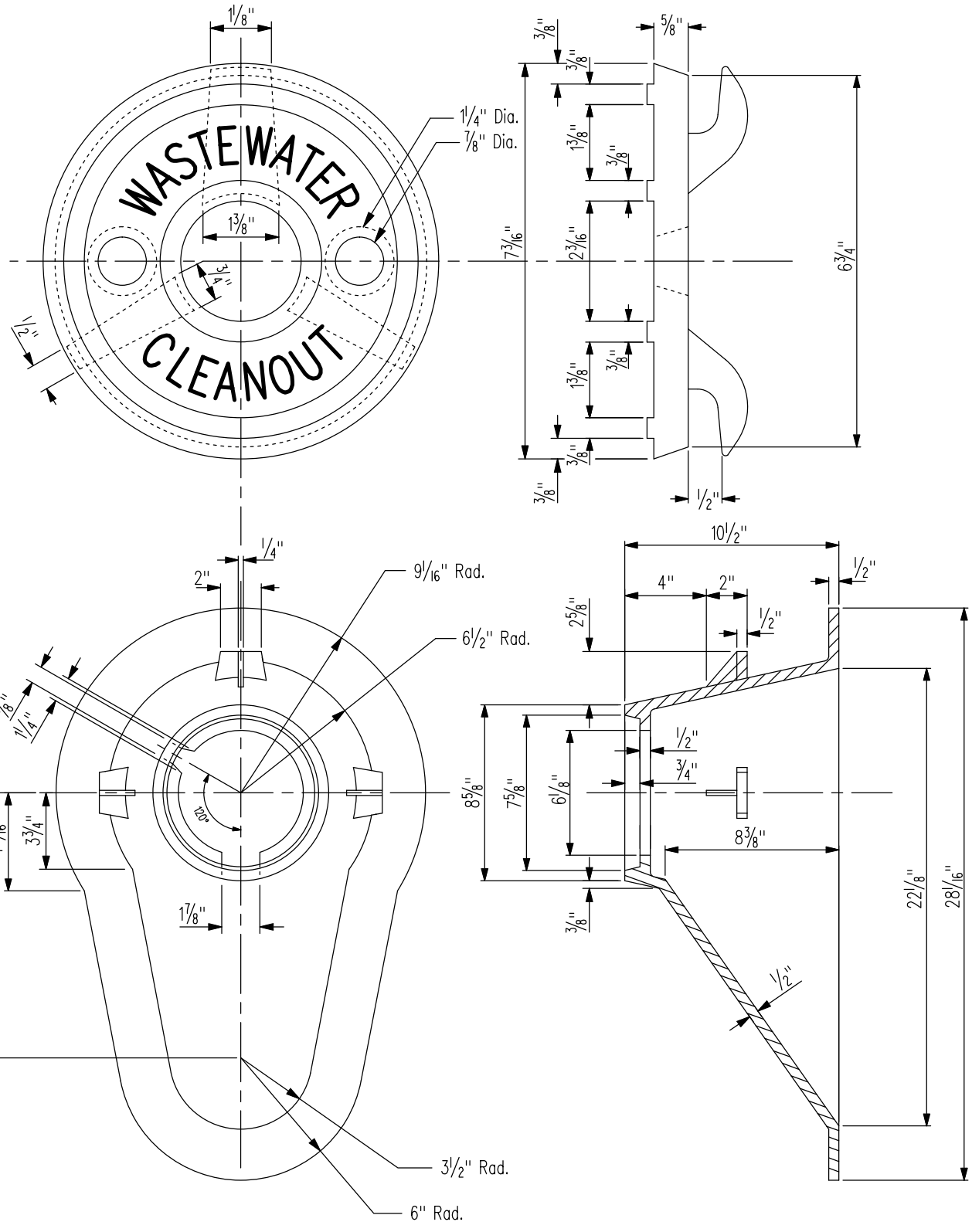
SECTION "X - X"

N.T.S.

NOTE:
IF CLEANOUT IS PLACED IN ADVANCE OF PAVEMENT PLACE SAND AROUND CLEANOUT CASTING IN LIEU OF CLASS "B" CONCRETE.

WASTEWATER MAIN CLEANOUT

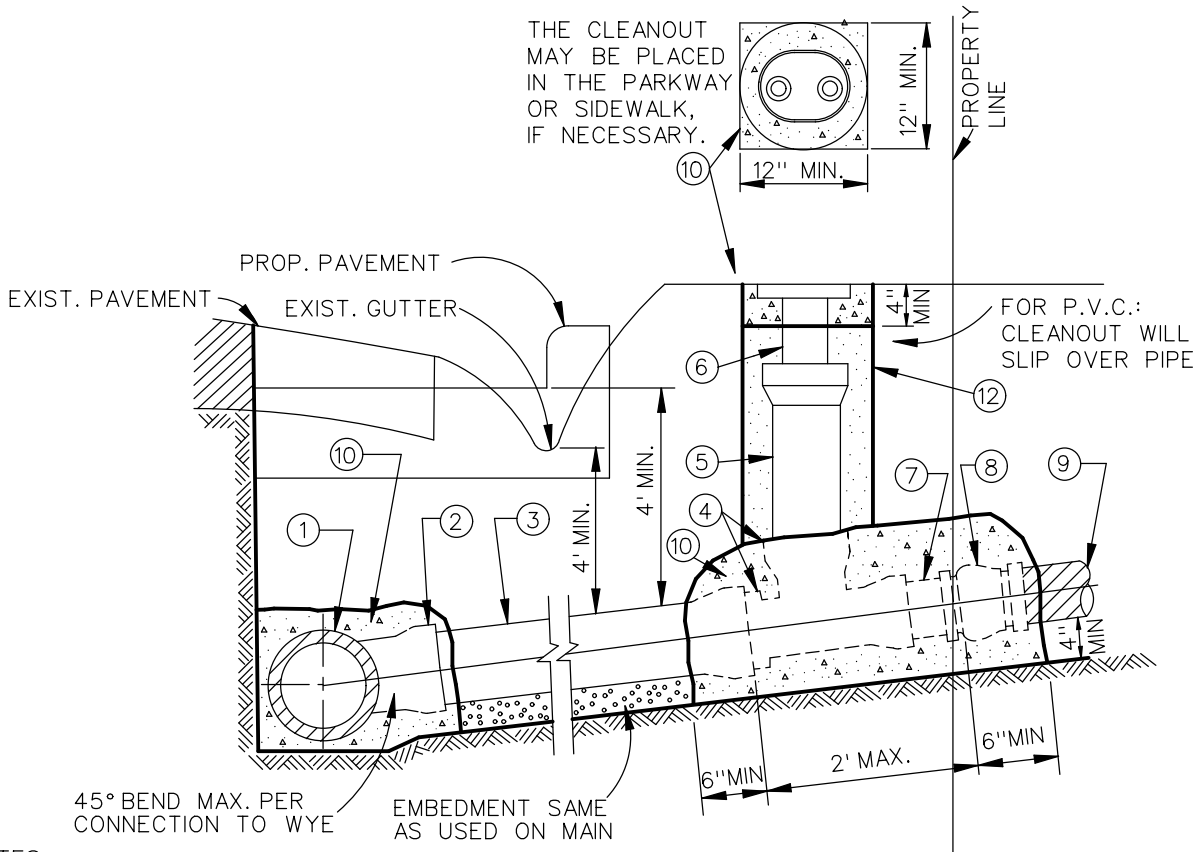
	DWU	(Page No.) 317
	DATE JAN.2001	



CAST IRON C.O. CASTING FOR WASTEWATER MAINLINE		DWU	(PAGE No.) 318
		DATE JAN. '98	

KEY:

1. WASTEWATER MAIN
2. 6" WYE OR TAPPING SADDLE (SEE NOTE 8)
3. 6" WASTEWATER LAT. (LENGTH VARIES)
4. 6" X 4" RED. AND 4" X 4" TEE OR 6" X 4" TEE.
5. 4" STACK (LENGTH VARIES)
6. 4" WASTEWATER LAT. CLEANOUT CASTING
7. 4" WASTEWATER PIPE (LENGTH VARIES)
8. ADAPTOR
9. BUILDING SEWER LAT.
10. CLASS "B" CONCRETE
11. 6" X 4" REDUCER
12. COMPACTED AS SPECIFIED, OR INUNDATED SAND



NOTES:

1. CLEANOUT CASTING TO BE FURNISHED AND PLACED PER SPECIAL CONDITIONS. IN VEHICLE TRAFFIC AREAS AND FOR COMMERCIAL MAINLINE LATERALS, WASTEWATER CLEANOUT SHALL BE OF CAST IRON.
2. SLOPE OF LATERAL TO BE 1% MIN., 2% MAX. UNLESS INSTRUCTED OTHERWISE BY OWNER.
3. THE WASTEWATER LATERAL SHALL BE CONNECTED TO BUILDING LATERAL AND CONSTRUCTED IN SUCH MANNER AS TO CLEAR EXISTING UTILITES AND PROPOSED FACILITIES SUCH AS STORM SEWER MAINS, PAVING, SIDEWALKS, RETAINING WALLS, ETC. VERTICAL BENDS (22.5° MAX.) MAY BE USED IF APPROVED BY OWNER.
4. THE MAINLINE LATERAL CONNECTION TO THE PRIVATE BUILDING LATERAL SHALL BE AS CLOSE TO THE PROPERTY LINE AS POSSIBLE.
5. INSTALL 4" STOPPER OR CAP AT PROPERTY LINE IF BUILDING LATERAL DOES NOT EXIST.
6. SUBSTITUE 4" FOR 6" FITTINGS IF PLANS OR SPEC. COND. CALL FOR 4" LATERALS.
7. THE CLEANOUT STACK & CASTING MAY BE PLACED IN THE PARKWAY, VEHICLE TRAFFIC AREAS, OR SIDEWALK, IF NECESSARY.
8. TAPPING SADDLES CAN ONLY BE USED IN CONJUNCTION WITH PIPE BURSTING OR IF THE EXISTING MAIN IS 10" OR LARGER.

WASTEWATER LATERALS WITH CLEANOUT

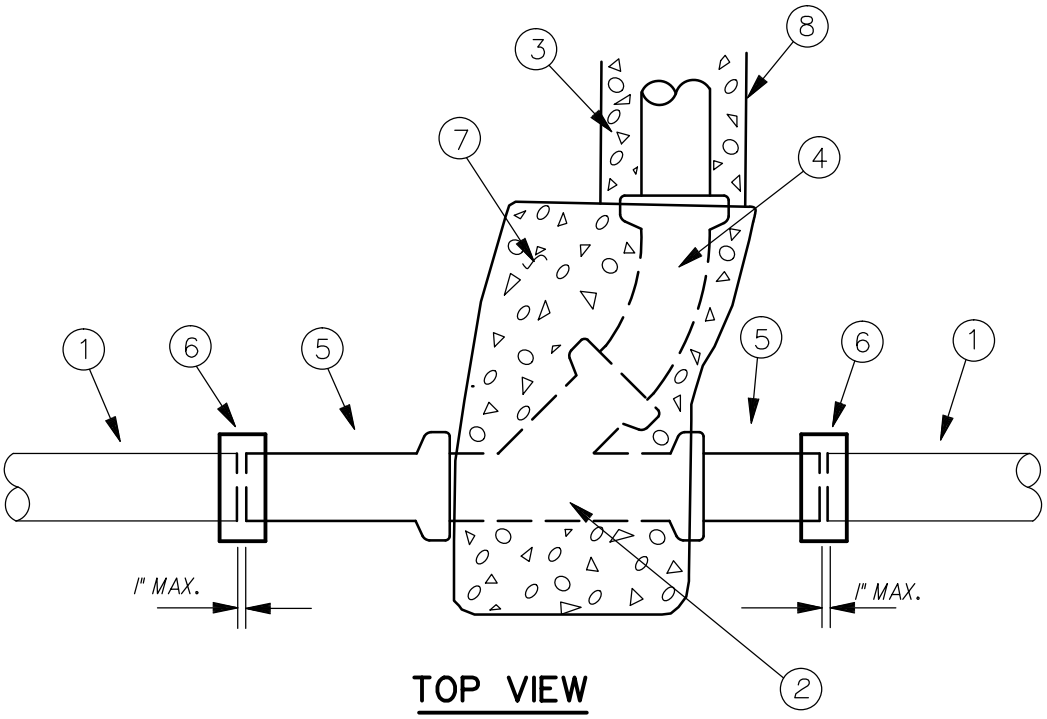
DWU

DATE
OCT. 2011

(Page No.)
319

KEY

① WASTEWATER MAIN
② WYE (45° MAX.)
③ MAINLINE LATERAL
④ 45° BEND (MAX.)
⑤ ADAPTOR
⑥ RUBBER SLEEVE COUPLING OR PVC ADAPTER COUPLING
⑦ CLASS "B" CONCRETE
⑧ EMBEDMENT SAME AS USED ON MAIN.



TOP VIEW

NOTES :

A) THE WYE AND ADAPTORS INSTALLED SHALL BE OF THE SAME MATERIAL AS THE WASTEWATER MAINLINE.

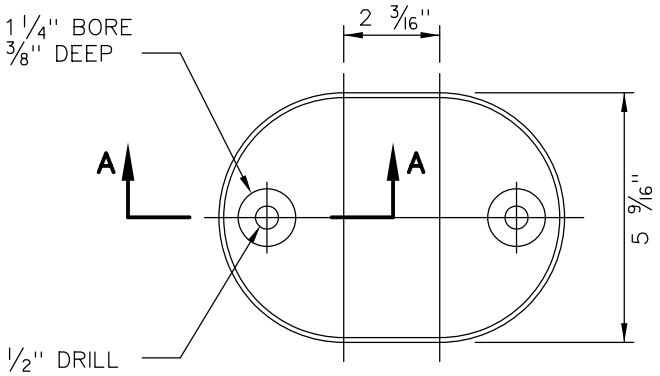
B) THE WYE AND ADAPTORS SHALL BE ASSEMBLED PRIOR TO INSTALLATION.

C) CONNECTIONS TO THE EXISTING MAIN SHALL BE MADE USING A RUBBER SLEEVE COUPLING WITH STAINLESS STEEL BAND CLAMPS. THE CLAMPS SHALL BE TIGHTENED TO THE TORQUE RECOMMENDED BY THE MANUFACTURER.

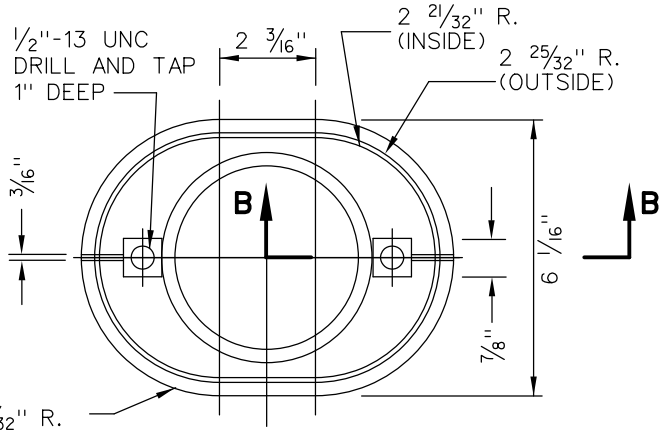
D) THE EMBEDMENT USED SHALL BE EQUAL TO THAT USED FOR THE MAINLINE SEWER.

NOTE: THIS DETAIL SHALL NOT BE USED FOR THOSE CASES WHERE 150 PSI PVC IS REQUIRED BY T.C.E.Q.

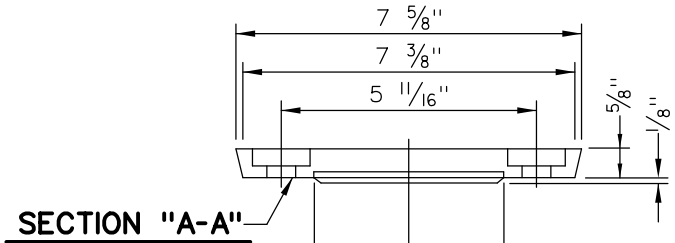
WASTEWATER LATERAL WYE CONNECTION TO THE EXISTING MAINLINE		DWU	(PAGE No.) 320
		DATE JAN. 2010	



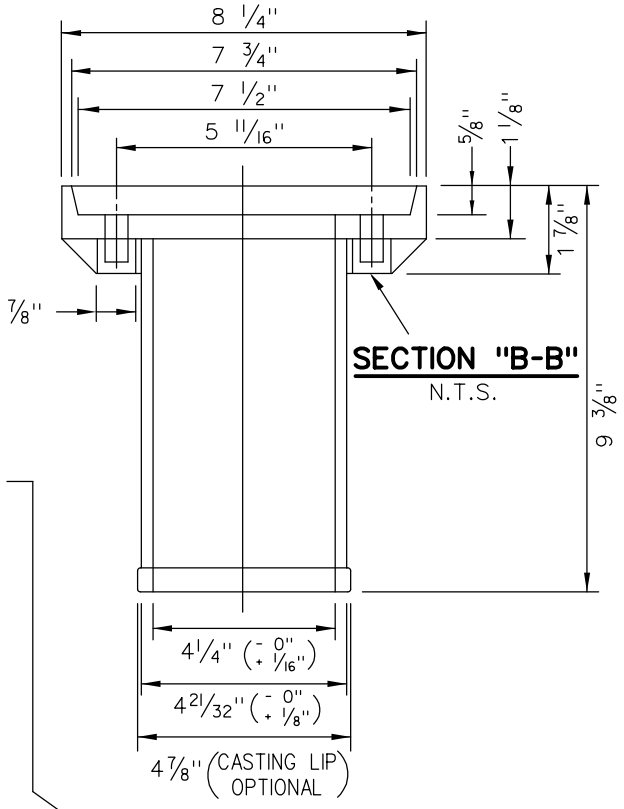
COVER
N.T.S.



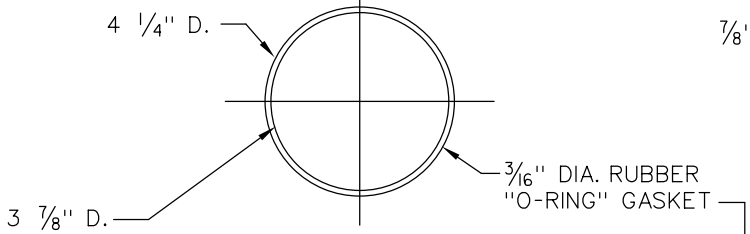
CLEANOUT FRAME TOP
N.T.S.

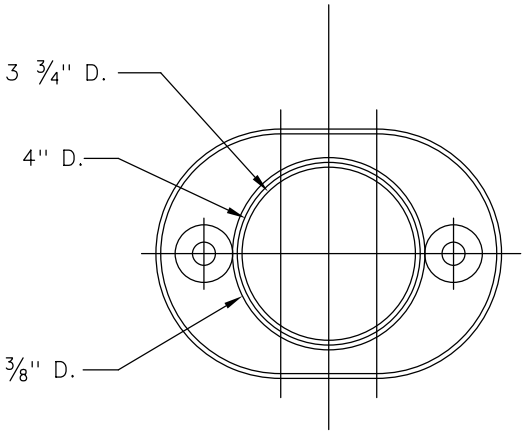


SECTION "A-A"
N.T.S.

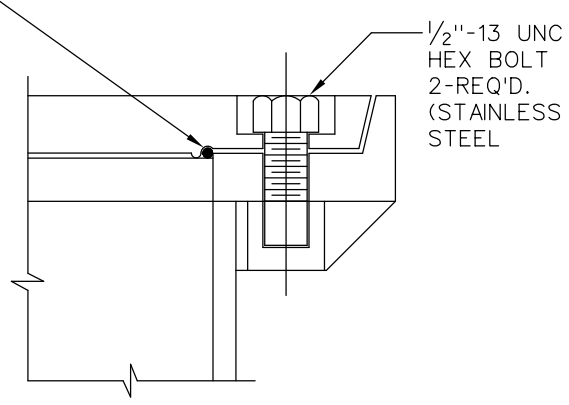


SECTION "B-B"
N.T.S.





CLEANOUT FRAME BOTTOM
N.T.S.



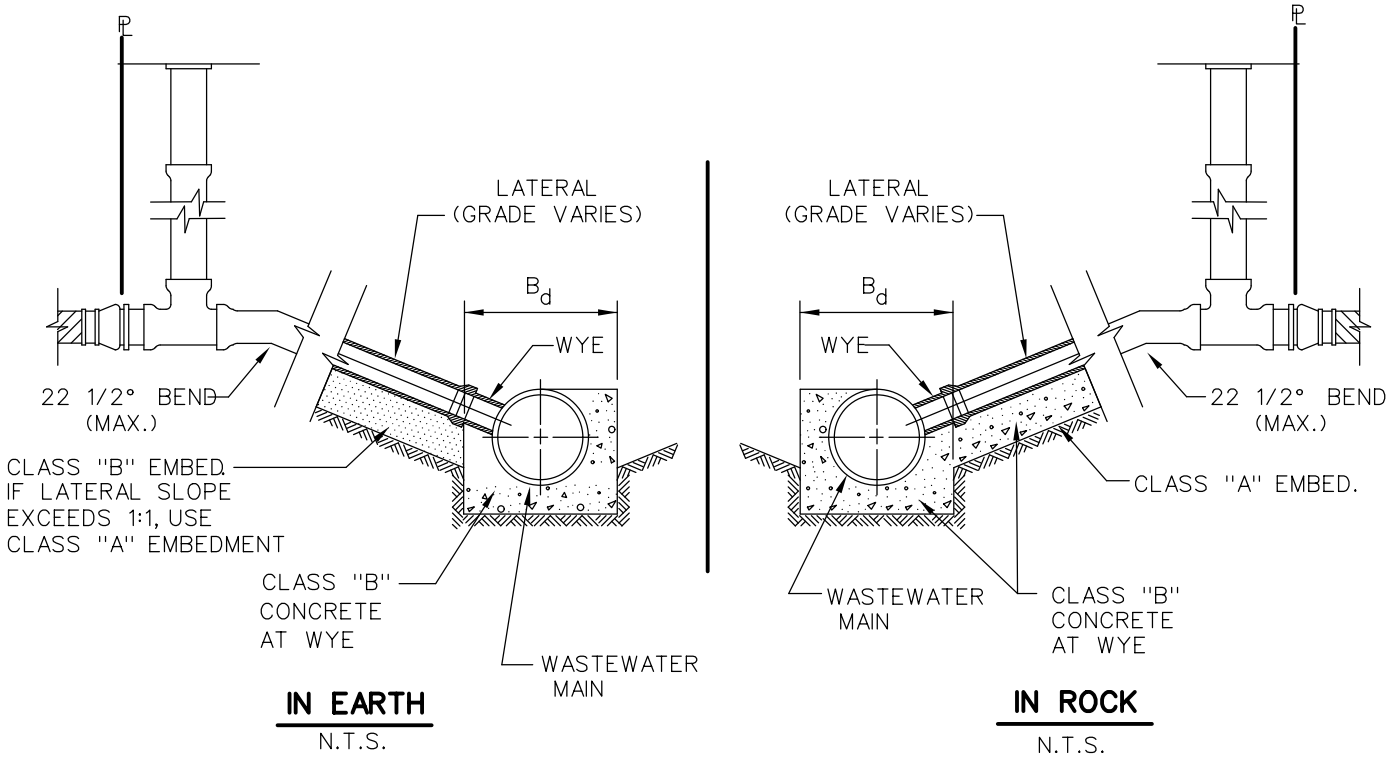
ASSEMBLY VIEW
N.T.S.

NOTES:

1. THE WORDS "WASTEWATER LATERAL CLEANOUT" SHALL BE CAST INTO TOP OF COVER.
2. MATERIALS TO BE CAST IRON, P.V.C. OR ABS PLASTIC.
3. CAST IRON REQUIRED WHERE TRAFFIC MAY BE PRESENT.

WASTEWATER LATERAL CLEANOUT FRAME & COVER

		(Page No.)
DWU		321
DATE OCT. 2015		



TRENCH WITH SLOPING SIDES

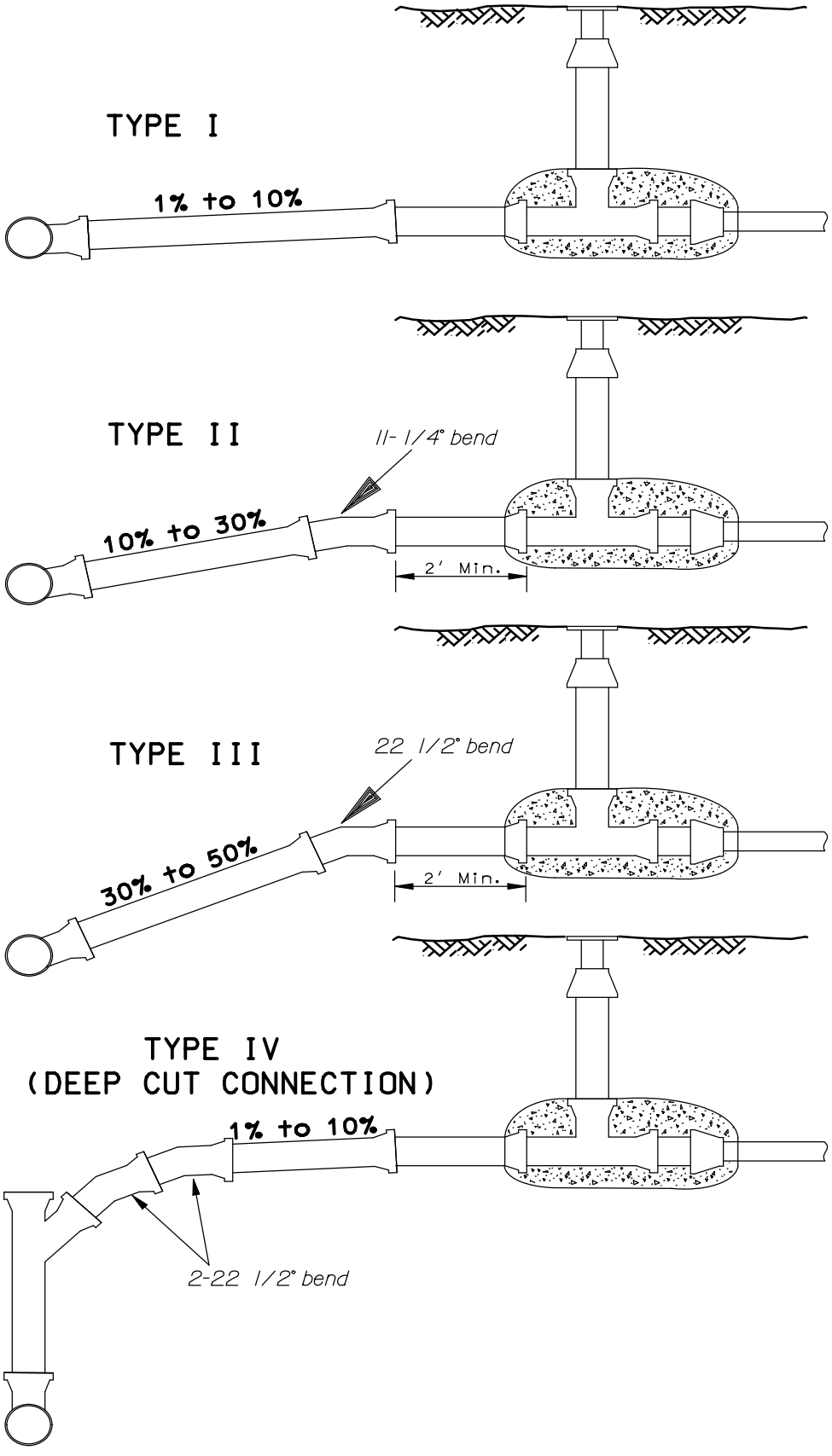
N.T.S.

NOTES:

1. WYE SHALL BE SUPPORTED AS SHOWN FOR WYE CONNECTION SUPPORT.
2. LATERALS ARE TO CLEAR ALL EXISTING UTILITIES. 11 1/4" OR 22 1/2° BEND, ONLY, MAY BE REQUIRED.

REFER TO PAGES 319, 320, 323, 324 & 325

WASTEWATER LATERAL CONNECTIONS IN EARTH & IN ROCK		DWU	(Page No.) 322
		DATE OCT. 2011	



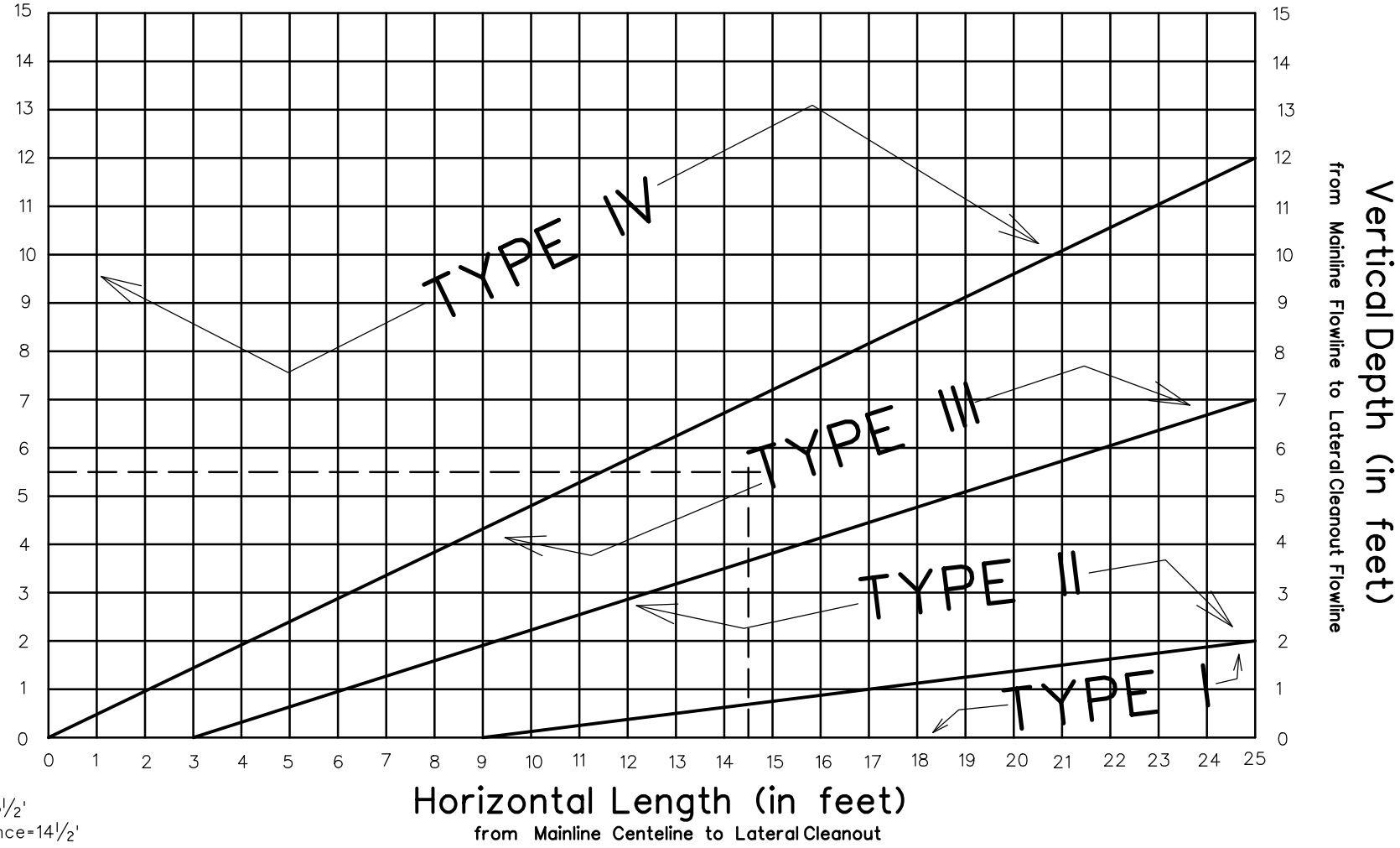
REFER TO PAGES 319, 320, 324 & 325

LATERALS TYPES

DWU

(PAGE NO.) 323

DATE OCT. 2011



Example:
Vertical Depth=5 1/2'
Horizontal Distance=14 1/2'
Use Lateral Type III As
Shown Above

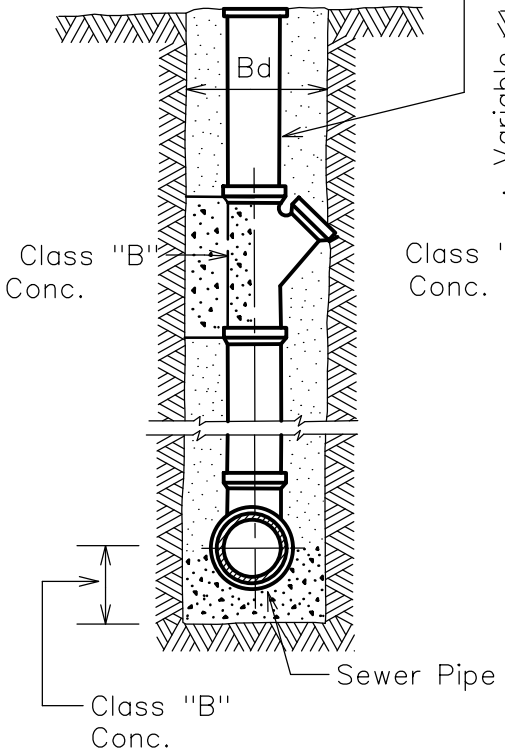
REFER TO PAGES 323 & 325

LATERAL APPLICATION SCHEDULE

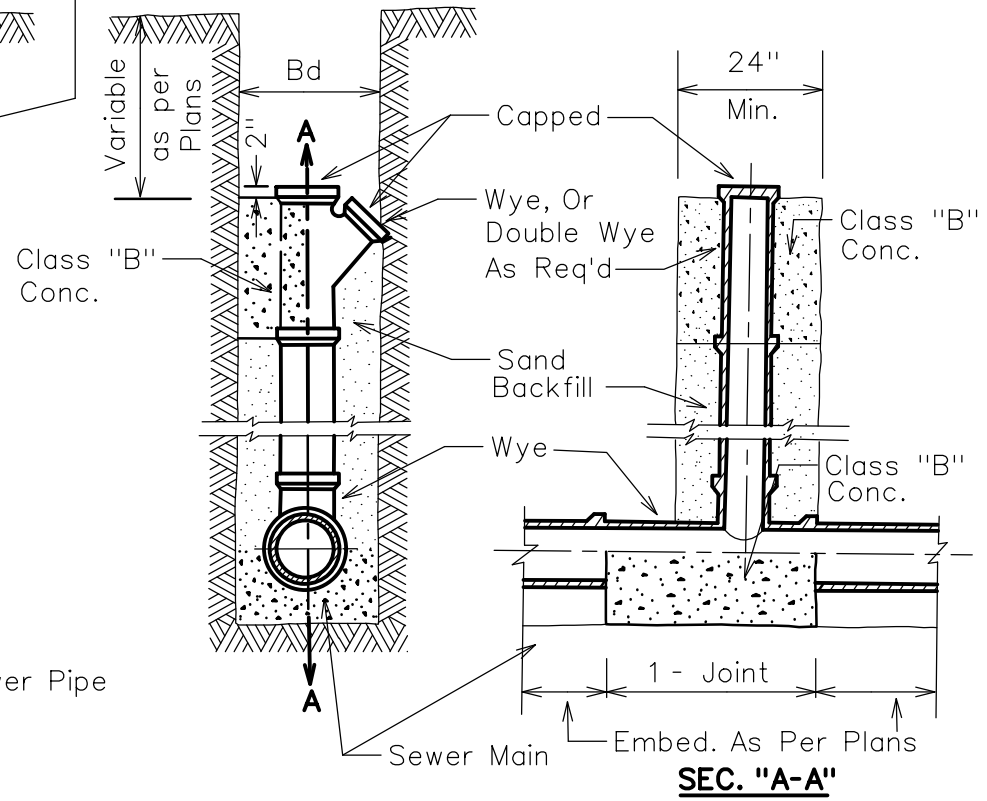
DWU		(Page No.) 324
DATE DEC. 2010		

Note! Clean out as per
Page 319 to Ground Surface

DEEP CUT CONNECTION
W / C. O.



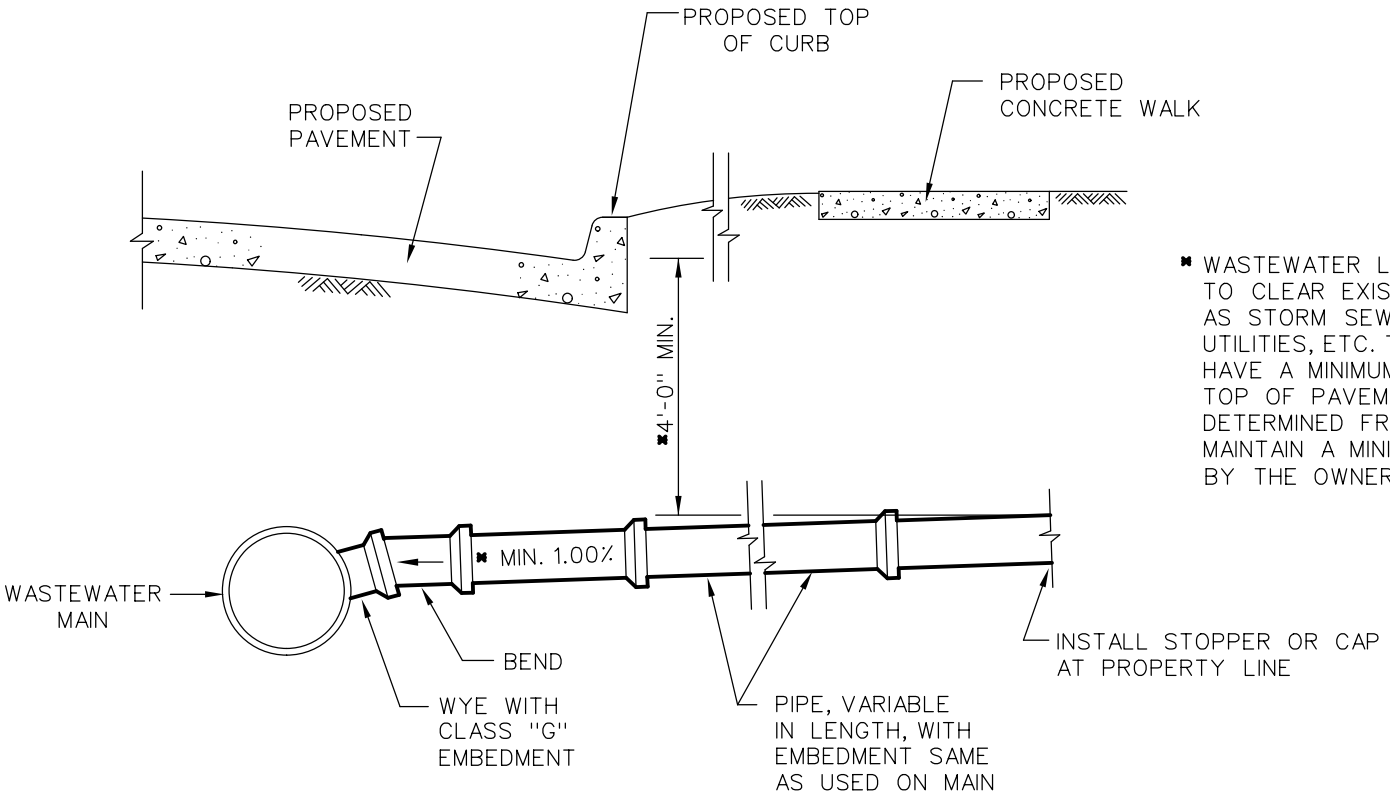
DEEP CUT CONNECTION



SEC. "A-A"

Refer To Pages 319, 320, 321, 322, 323 & 324

DEEP - CUT CONNECTION		DWU	(PAGE NO.) 325
		DATE OCT. 2011	



✖ WASTEWATER LATERALS ARE TO BE CONSTRUCTED TO CLEAR EXISTING AND PROPOSED FACILITIES, SUCH AS STORM SEWER MAINS, RETAINING WALLS, OTHER UTILITIES, ETC. THE WASTEWATER LATERAL SHALL HAVE A MINIMUM COVER OF 4'-0" BELOW THE PROPOSED TOP OF PAVEMENT CURB GRADE AT THE PROPERTY LINE, DETERMINED FROM PAVING GRADE, OR AS REQUIRED TO MAINTAIN A MINIMUM OF 1.00% GRADE, OR AS DIRECTED BY THE OWNER.

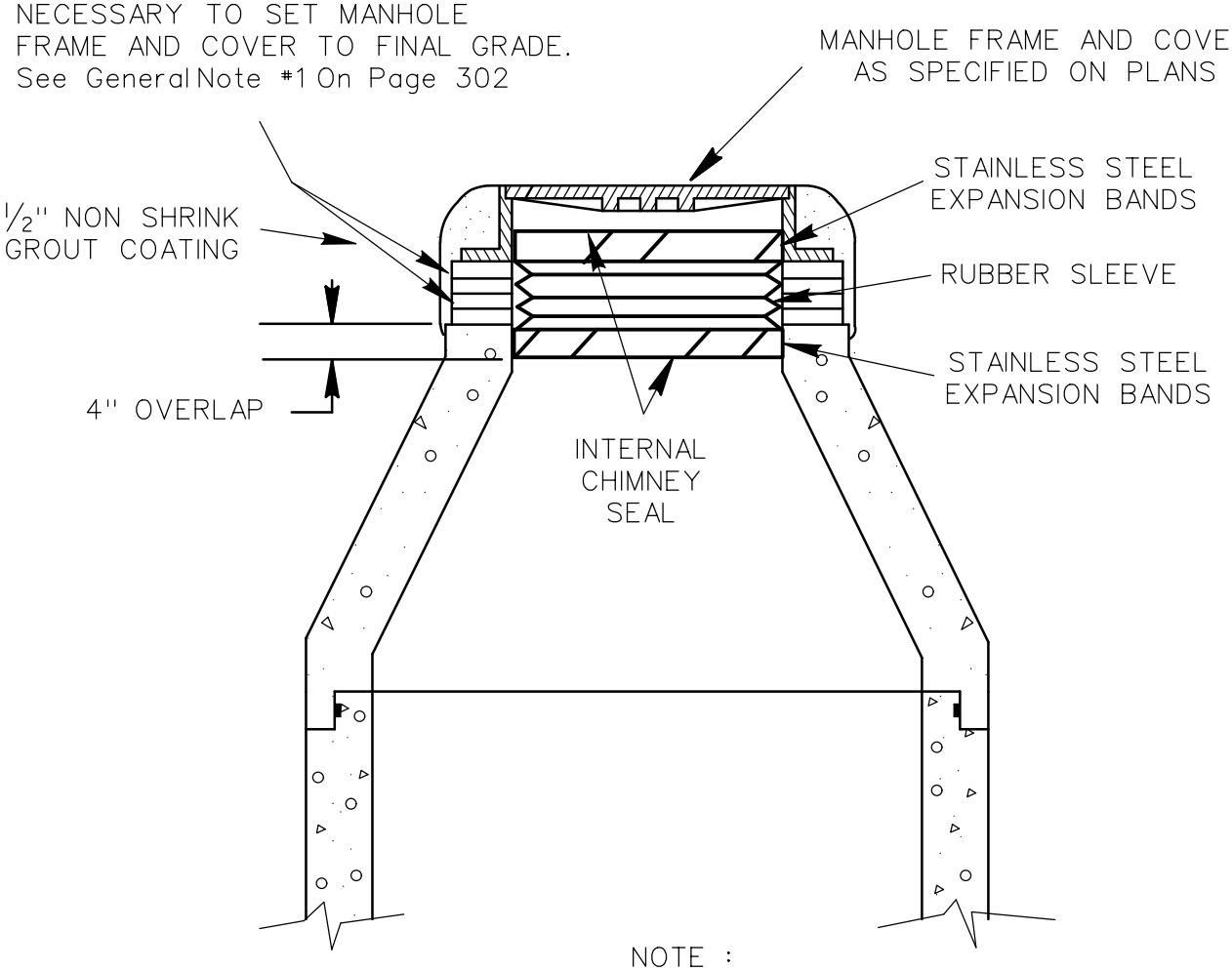
WASTEWATER LATERAL STUBOUT

N.T.S.

REFER TO 319, 320, 321, 322, 323, 324 & 325

WASTEWATER LATERAL STUBOUT		DWU	(Page No.) 326
		DATE OCT. 2011	

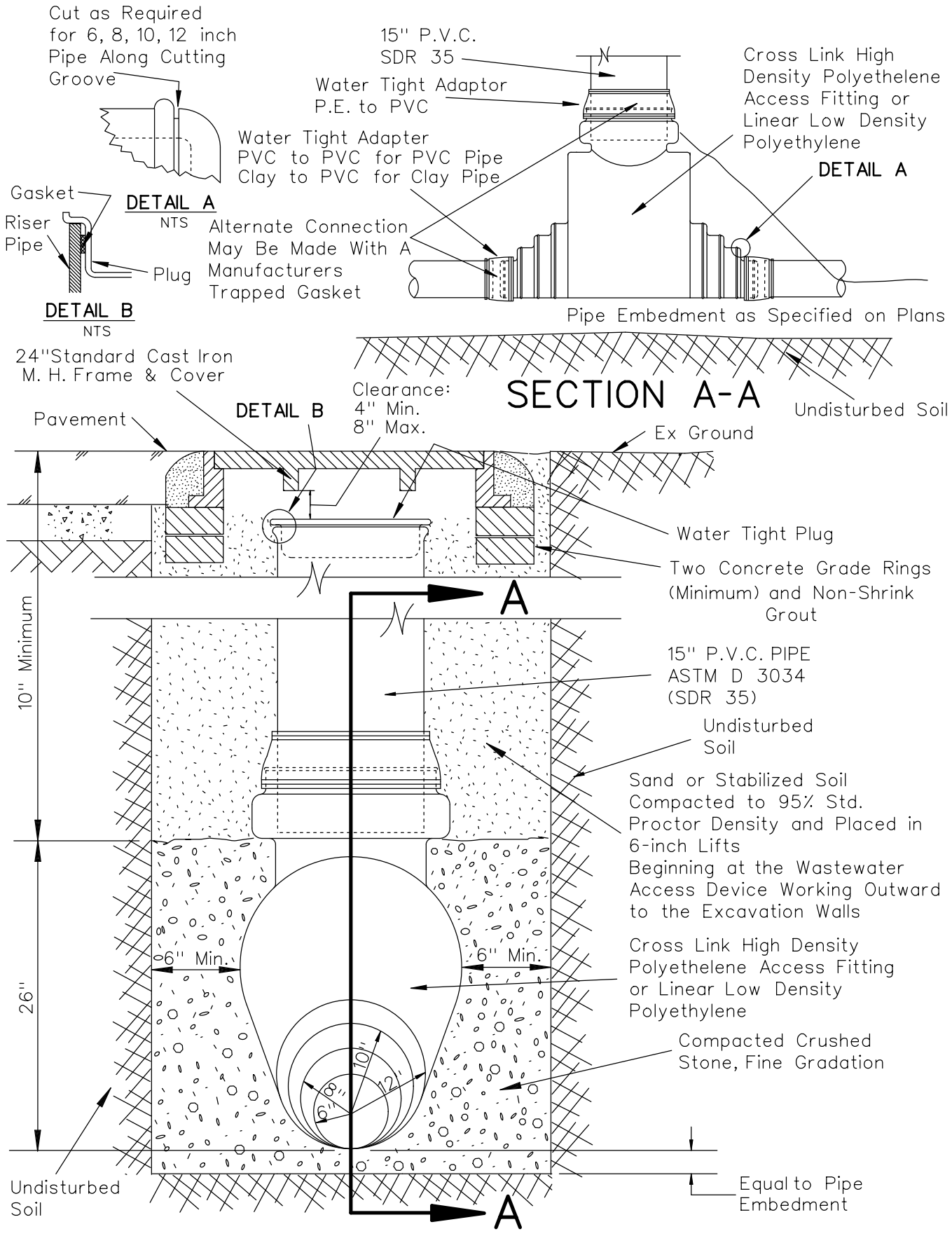
USE PRECAST CONCRETE GRADE RINGS AND NON SHRINK GROUT AS NECESSARY TO SET MANHOLE FRAME AND COVER TO FINAL GRADE. See General Note #1 On Page 302



NOTE :
INTERNAL CHIMNEY SEAL TYPE TO BE APPROVED BY CONSTRUCTION ENGINEER

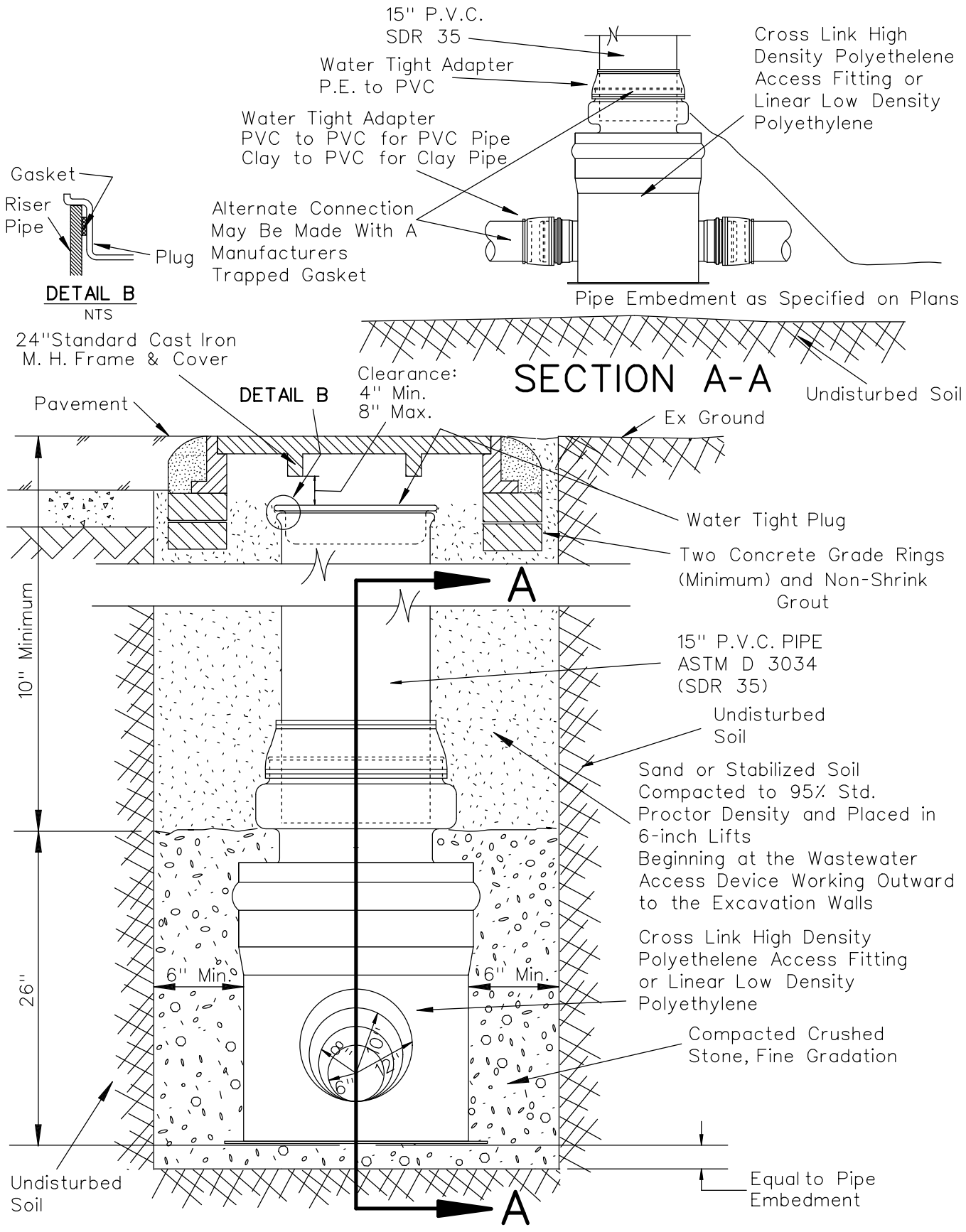
REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302, & DRAWINGS ON PAGES 301, 303, 304, & 305

WASTEWATER MANHOLE INTERNAL SEAL		DWU	(Page No.) 327
		DATE MARCH 2001	



WASTEWATER ACCESS DEVICE

DWU		(Page No.) 328
DATE OCT. 2011		

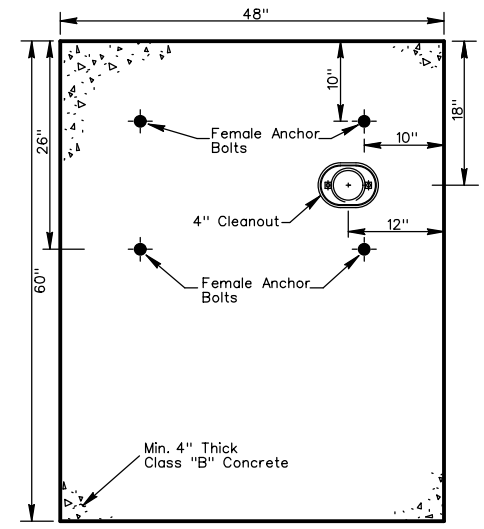


WASTEWATER ACCESS DEVICE ALTERNATIVE

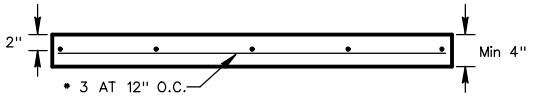
	(Page No.)
DWU	328A
DATE JULY 2024	

SAMPLING PLATFORM DETAIL

FOR CLEAN OUT

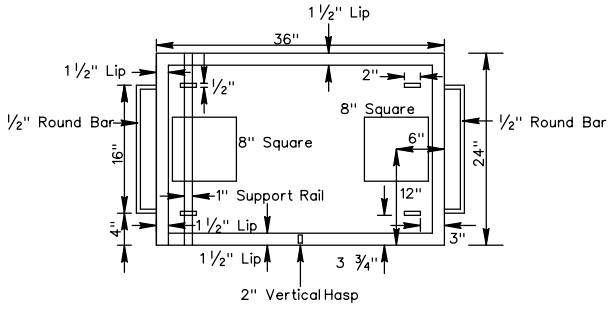


Plan View

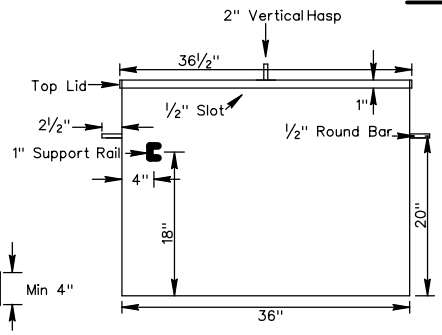


Vertical View

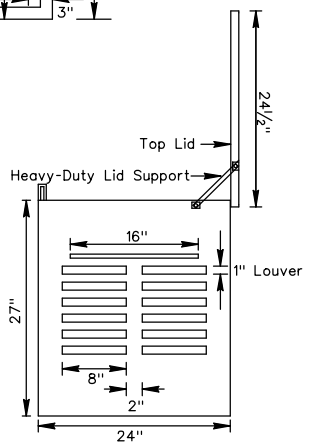
DIAGRAM OF SECURITY BOX



Plan View



Front View



Side View

Not To Scale

SAMPLE SITE CONSTRUCTION NOTES

A. The 5'X4' Platform Is To Be Constructed Of Class "B" Concrete And A Minimum Of 4" Thick. Reinforce Pad With #3 Bars at 12" O.C. In Both Directions And Centered Within Pad

B. The Platform Is To Be Level, With The Cleanout Cover Flush With The Surface Of The Platform.

C. The Platform And Cleanout Cover Are To Be Elevated A Minimum Of 2" To 3" Above Ground Level To Prevent Intrusion Of Rainwater Runoff.

D. The Pipe Opening Shall Be Covered With A C.O. Casting And Cover. The Casting Shall Be Connected To The Pipe With Water Tight Adaptor. The Pipe Running Down From The Platform Should Connect To The Sewer Lateral With A Straight Tee (C. O. Tee), Not A Curve Tee, So That The Wastewater Flow Into The Lateral Be Observed From The Platform. Standard Lateral C. O. Castings (Plastic Or Cast Iron) Will Be Furnished Upon Request.

E. ½" Threaded Female Anchor Bolts Shall Be Set In Each Corner 10" Inset From The Rear And Sides Of The Pad. The Front Bolts Need To Be 26" From The Rear Of The Pad. The Top Of The Female Ancher Bolts Shall Be Flush With The Surface Of The Platform.

F. The Box and Lid Will Be Constructed Of Aluminum Or Steel. All Seams and Joints Are To Be Joined By A Continuous Weld.

G. The Sides of The Box Will Consist Of Two Banks Of 8" Louvers With a Total Of Twelve Stamped. Each Louver Will Be 8"x1". A Sixteen-inch Aluminum Grab Handle Will Be Installed On Each 24" Side Panel. The Support Rail Will Be 18" From The Bottom Of The Box And 4" From The Side Of The Box. The Handle Will Be ½" Round Bar Stock.

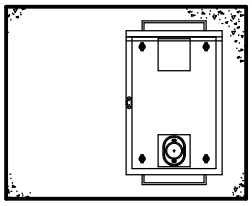
H. The Lid Is Attached To The Box By A Heavy Hinge With A Continuous Weld AlongThe Length Of One Side (36"). The Lid Is To Be Locked To The Box With A Heavy-Duty Hasp, Which Enters Through A Hole Punched In The Lid. The Lid Will Have A 1 ½" Lip.

I. Two Heavy-Duty Plated Steel Lid Supports (See Example) Will Be Installed To Allow Lid To Remain Open During Setup Of An Automatic Sampler.

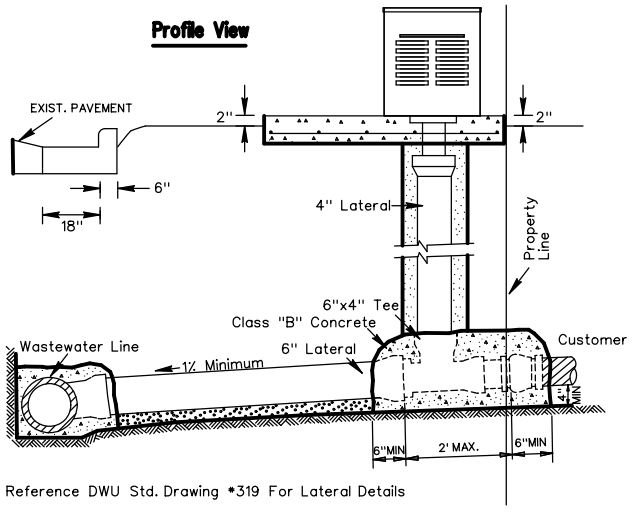
J. The Security Box Will Be Painted White.

K. Modifications May Occur For Security Boxes If Approved And Any Question Concerning The Installation Of The Sample Platform Should Be Addressed To: Pretreatment And Laboratory Services

*Suggested Vendors for Security Boxes:
Company:The EMF Co. Model: DWU CAB-001 Tel: (214) 350-6848
or Approved Equal



Profile View



Reference DWU Std. Drawing #319 For Lateral Details

Not To Scale

WASTEWATER SAMPLE SITE - CONCRETE PLATFORM DETAIL

DWU

(PAGE NO.) 329

DATE OCT. 2011

PART 4

(Series 400)

WATER & WASTEWATER ADJUSTMENTS

City of Dallas
Water Utilities Department

PART 4
WATER AND WASTEWATER ADJUSTMENTS

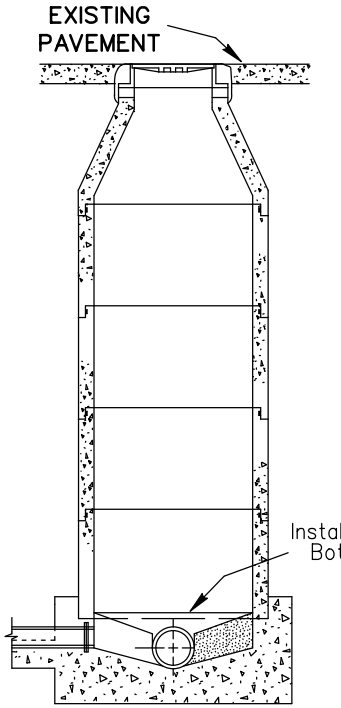


FIGURE 1

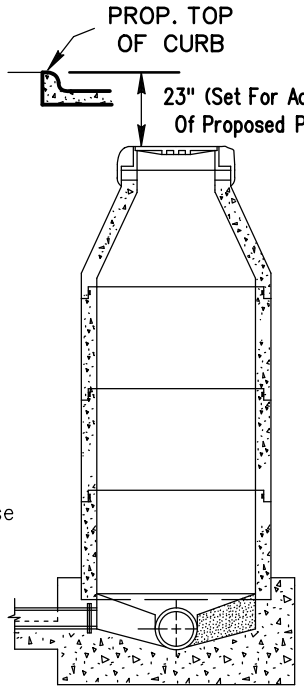


FIGURE 2
PRE-GRADING
(ALTER)

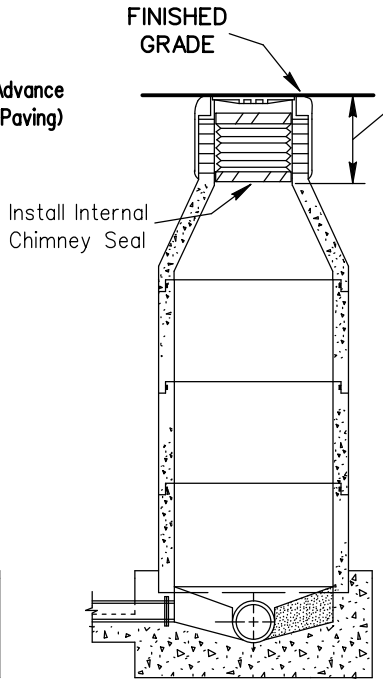


FIGURE 3
PRE-PAVING
(ADJUST)

NOTE: If the existing wastewater main is in cone section or if there is only one riser section, the entire manhole must be removed and a new manhole is to be installed.

FIGURE 1 EXISTING MANHOLE

1. Install a false bottom in the manhole.
2. Remove and salvage the existing ring and cover and remove the existing grade rings or brick. If the ring and/or cover are damaged at any time prior to final acceptance, it will be replaced by the contractor at no cost to the City.
3. Remove the cone section and remove or add one or more riser section as required.

FIGURE 2 PRE-GRADING (ALTER)

4. Reset the cone section on the existing manhole. To meet the required depth, one or more existing riser sections may have to be removed and replaced with new riser section(s) of a different height.
5. Reset the salvaged ring and cover on the cone section with concrete mortar.

FIGURE 3 PRE-PAVING (ADJUST)

6. Remove the salvaged ring and cover and mortar.
7. Use precast concrete grade rings and non-shrink grout to raise M.H. frame and cover to final paving grade. (LIMITED TO 30" MAX. MANHOLE NECK EXTENSION, AS MEASURED FROM THE TOP TAPER OF THE M.H. CONE TO M.H. LID). When M.H. neck extension exceeds 30", then the M.H. cone is to be removed and reset in such a manner as to reduce the number of grade rings required to reset M.H. frame and cover to final grade.
8. Set the salvaged ring and cover in place withnon-shrink grout. Install internal chimney seal. See pg. 327
9. Coat the entire outside of the neck with a waterproof bituminous coating.
10. The false bottom will be removed during the final inspection

ALTER & ADJUSTMENT OF STANDARD PRECAST MANHOLE

DWU	(Page No.) 401
DATE DEC. 2001	

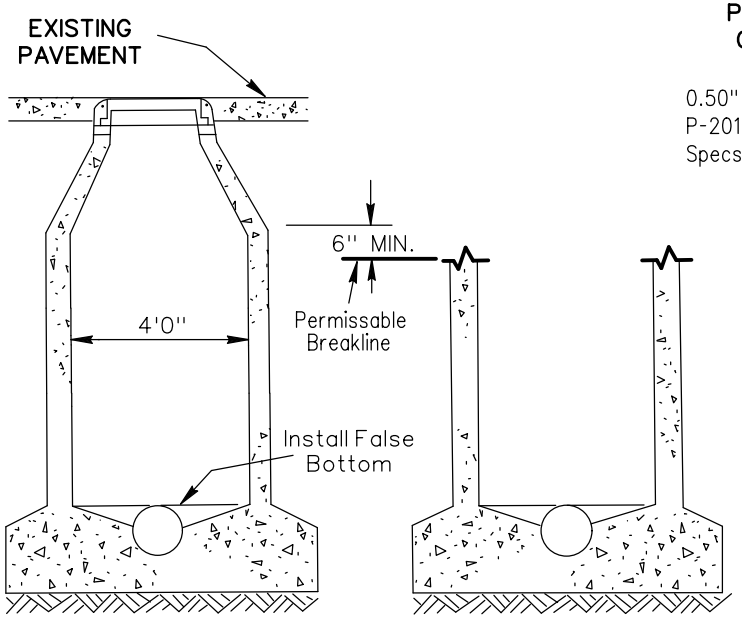


FIG. 1 FIG. 2

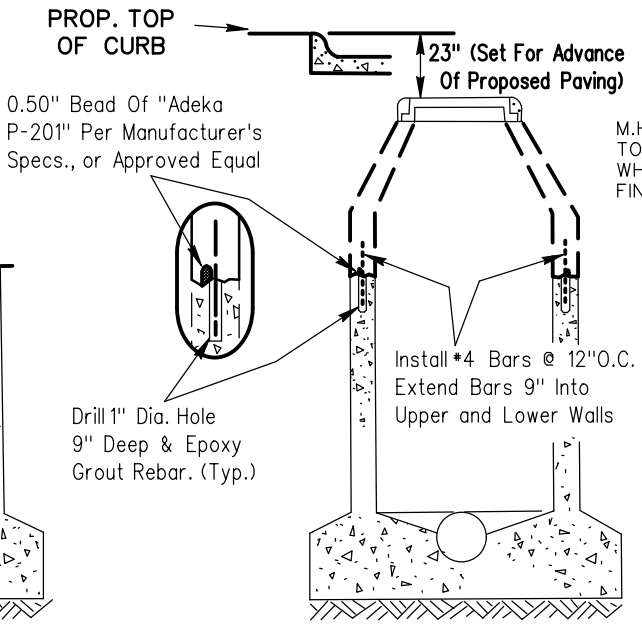


FIG. 3 PRE-GRADING

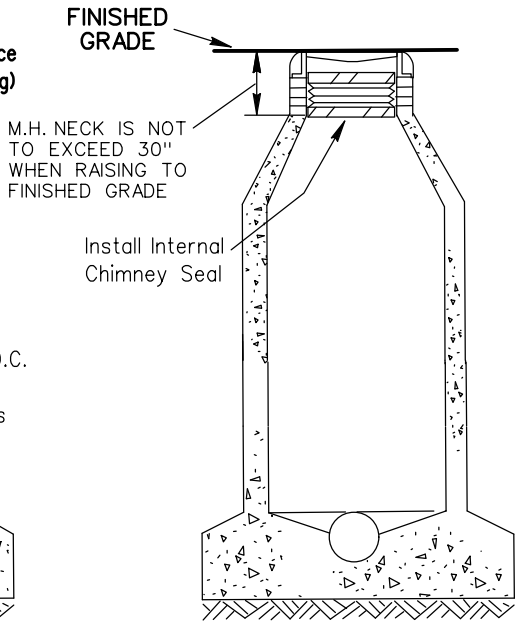


FIG. 4 PRE-PAVING

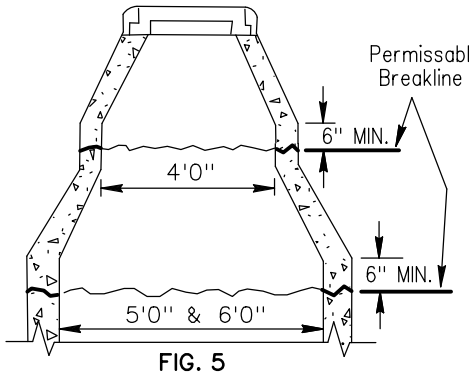


FIG. 5

FIGURE 1 EXISTING MANHOLE

1. Install a false bottom in the manhole.
2. Remove the existing ring, cover and any grade rings or bricks.

FIGURE 2

3. Remove the existing manhole cone section to a minimum of 6" below the cone taper to M.H. Wall.

FIGURE 3 PRE-GRADING

4. Form and monolithically pour a new manhole extension with cone section. Use epoxy bonding agent. "Sikadur 32, HiMod" or approved equal, to bond new concrete to existing concrete. Coat entire outside of the new concrete with a waterproof bituminous coating. Set an new ring and cover meeting current TCEQ requirements on top of the new section with concrete mortar.

FIGURE 4 PRE-PAVING

5. Remove the new ring and cover and mortar.
6. Use precast concrete grade rings to raise manhole frame and cover to final paving grade. (LIMITED TO 30" MAX. MANHOLE NECK EXTENSION, AS MEASURED FROM THE TOP TAPER OF THE MANHOLE. CONE TO MANHOLE LID). When M.H. neck extension exceeds 30",then the manhole cone is to be removed and reset in such a manner as to reduce the number of grade rings required to reset manhole frame and cover to final grade.
7. Set the new ring and cover in place with non-shrink grout. Install internal chimney seal. See pg. 327
8. Coat the entire outside of the neck with a waterproof bituminous coating.
9. The false bottom will be removed during the final inspection.

ALTER & ADJUSTMENT OF STANDARD CAST-IN-PLACE MANHOLE		DWU	(Page No.) 402
		DATE OCT. 2011	

REFER TO PAGE 305--WASTEWATER MANHOLE FIBERGLASS

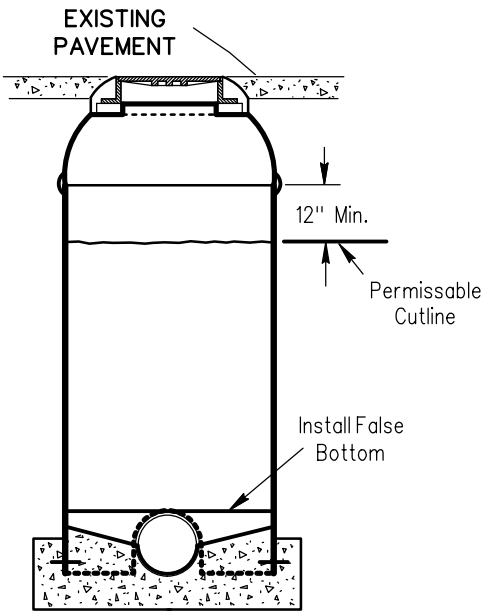


FIGURE 1

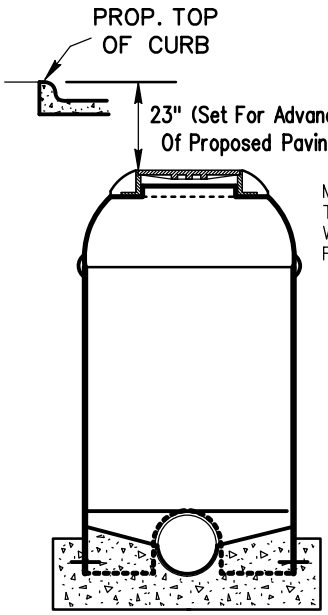


FIGURE 2
PRE-GRADING

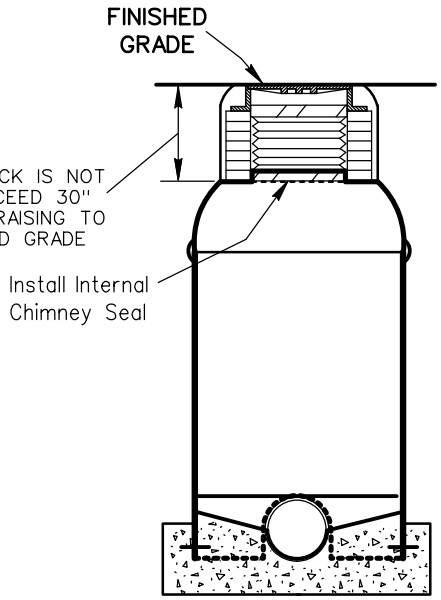


FIGURE 3
PRE-PAVING

FIGURE 1 EXISTING MANHOLE

1. Install a false bottom in the manhole.
2. Remove the existing ring, cover and any grade rings or bricks.
3. Cut the existing manhole at a point no closer than 1' below the bottom of the cone section.

FIGURE 2 PRE-GRADING

4. Build up or remove a portion of the manhole to meet the required depth. A new riser section may be required if the manhole is to be raised. The salvaged cone section may be used if approved by the engineer. A manufacturer's repair kit approved by the engineer must be used to make the connection(s).
5. Backfill material must be sand or stabilized soil compacted to a minimum of 90% Std. Proctor Density and placed in 6" lifts beginning at the manhole and working outward to the excavation walls.
6. Set the new ring and cover meeting current TCEQ requirments on the cone section with concrete mortar.

FIGURE 3 PRE-PAVING

7. Remove the new ring and cover and mortar.
8. Use precast concrete grade rings and non-shrink grout to raise manhole frame and cover to final paving grade. (LIMITED TO 30" MAX. MANHOLE NECK EXTENSION, AS MEASURED FROM THE TOP TAPER OF THE MANHOLE CONE TO MANHOLE LID). When manhole neck extension exceeds 30", then the manhole cone is to be removed and reset in such a manner as to reduce the number of grade rings required to reset manhole frame and cover to final grade.
9. Set the new ring and cover in place with non-shrink grout. Install internal chimney seal. See pg. 327
10. Coat the entire outside of the neck with a waterproof bituminous coating.
11. The false bottom will be removed during the final inspection.

ALTER & ADJUSTMENT OF FIBERGLASS MANHOLE		DWU	(PAGE NO.) 403
		DATE OCT. 2011	

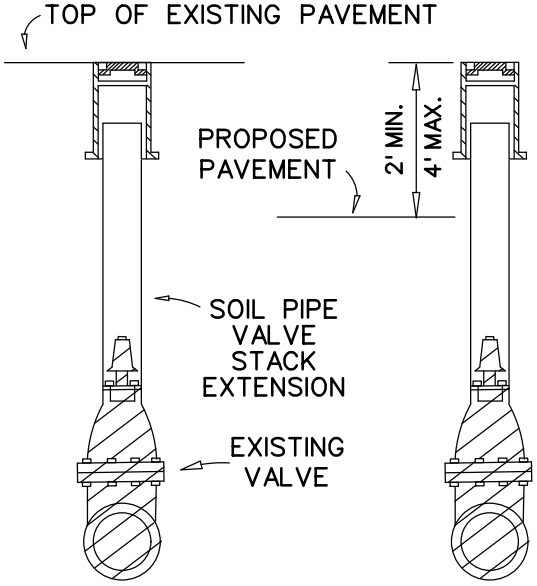


FIG. 1

FIG. 2

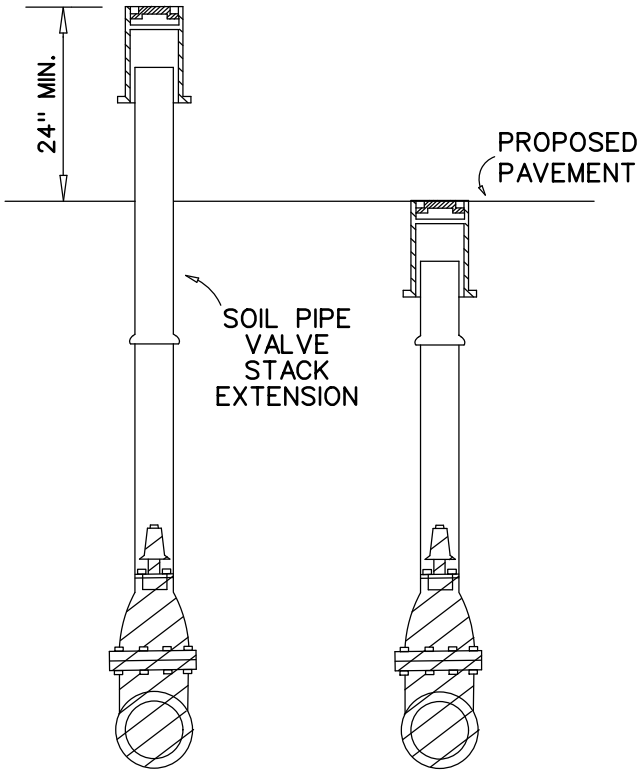


FIG. 3 FIG. 4

NOTE: The valve cover must always be exposed so the valve can be operated at any time. Exceptions must be approved by the engineer in advance.

The existing valve cover and lid may be reused if not damaged during removal. If the valve cover and/or lid is damaged at any time prior to final acceptance, it will be replaced by the contractor at no cost to the City.

FIGURE 1 EXISTING VALVE STACK AND COVER

FIGURE 2 PRE-GRADING

1. If the proposed paving is 2' to 4' below the top of the existing valve cover , the entire valve stack and cover may be left in place until final adjustment for paving.

FIGURE 3 PRE-GRADING

2. If the proposed paving is less than 2' below the top of the existing valve cover, the valve stack must be extended.

3. The cover is removed and an extension of soil pipe only is installed on the existing valve stack. The valve stack and extension must be properly aligned so that the valve can be operated properly. The extension must be connected to the existing valve stack with a bell and rubber gasket.

FIGURE 4 PRE-PAVING

4. The valve stack or extension is cut to a point not more than 3" below the proposed top of paving.

5. The valve cover is installed over the valve stack or extension to the top of the paving grade.

ALTER & ADJUSTMENT OF VALVE STACK		DWU	(PAGE NO.) 404
		DATE OCT. 2011	

KEY:

1. WASTEWATER MAIN
2. WYE OR TAPPING SADDLE
3. MAINLINE LATERAL
4. TEE
5. 4" STACK
6. 4" WASTEWATER CLEANOUT CASTING (CAST IRON, P.V.C. OR ABS PLASTIC) (CAST IRON ONLY FOR COMMERCIAL LATERALS)
7. WATER TIGHT ADAPTOR
8. PRIVATE WASTEWATER LATERAL
9. CLASS "B" CONCRETE
10. COMPACTED AS SPECIFIED
11. WATER TIGHT RUBBER SLEEVE COUPLING

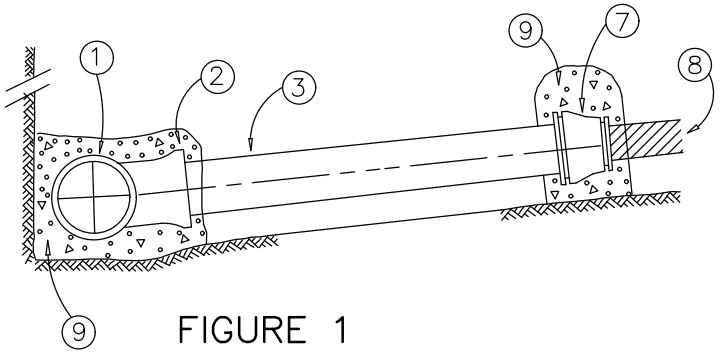


FIGURE 1

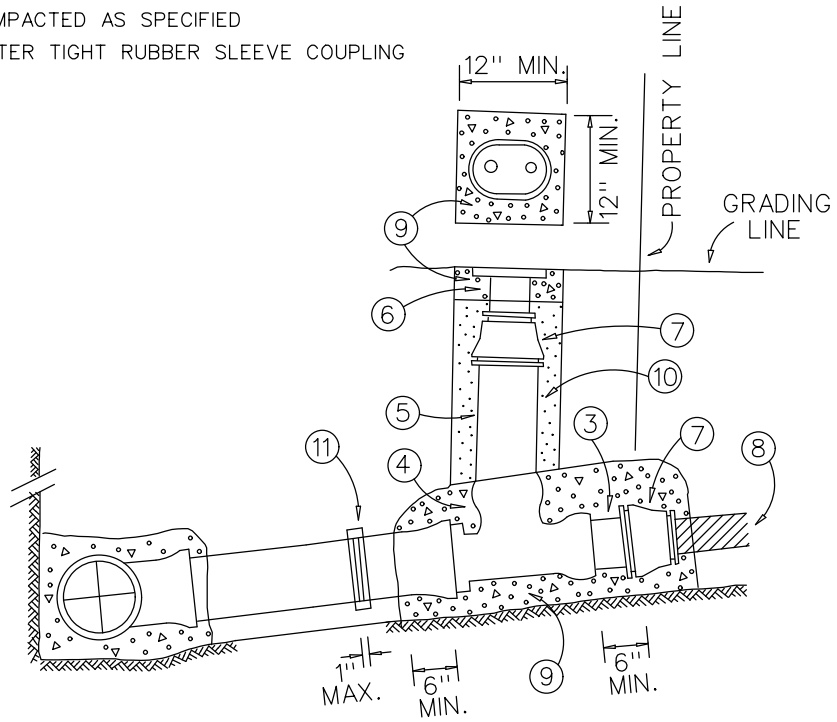


FIGURE 2

FIGURE 1 EXISTING LATERAL WITHOUT CLEANOUT

1. The adaptor may not be encased in concrete. If it is not, the same adaptor may be used if it is in serviceable condition. If the adaptor is encased in concrete, the concrete and adaptor must be removed and replaced.

FIGURE 2 NEW CLEANOUT INSTALLED

2. Cut the existing lateral as shown and remove the existing lateral pipe to the private line.
3. Install the new cleanout as shown. The new pipe and embedment shall be of the same type as the existing.

NEW LATERAL CLEANOUT ON EXISTING LATERAL

DWU		(Page No.) 405
DATE DEC.2001		

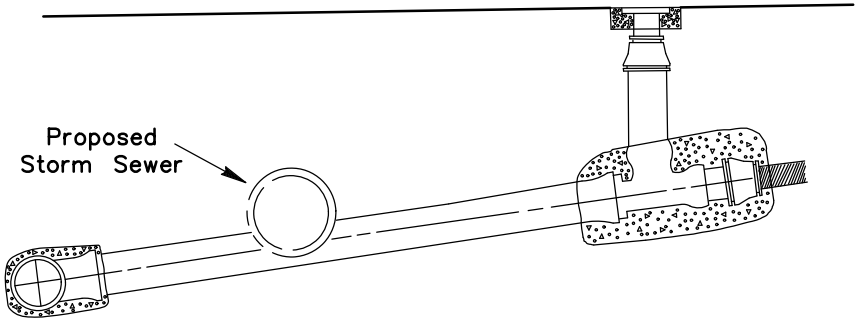


FIGURE 1

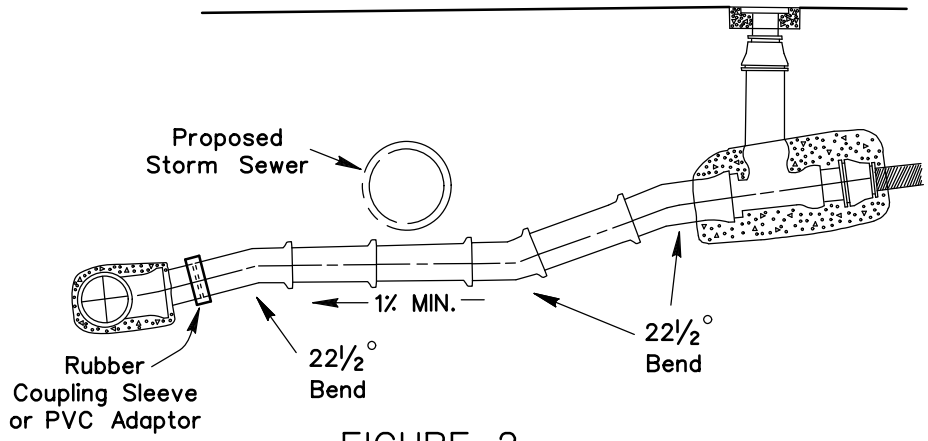


FIGURE 2

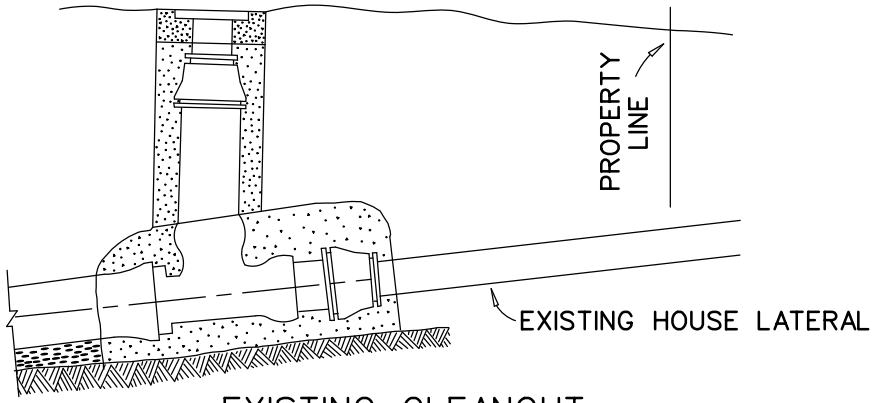
FIGURE 1 EXISTING LATERAL

1. Conflict with a proposed utility shown.

FIGURE 2 PRE-PAVING

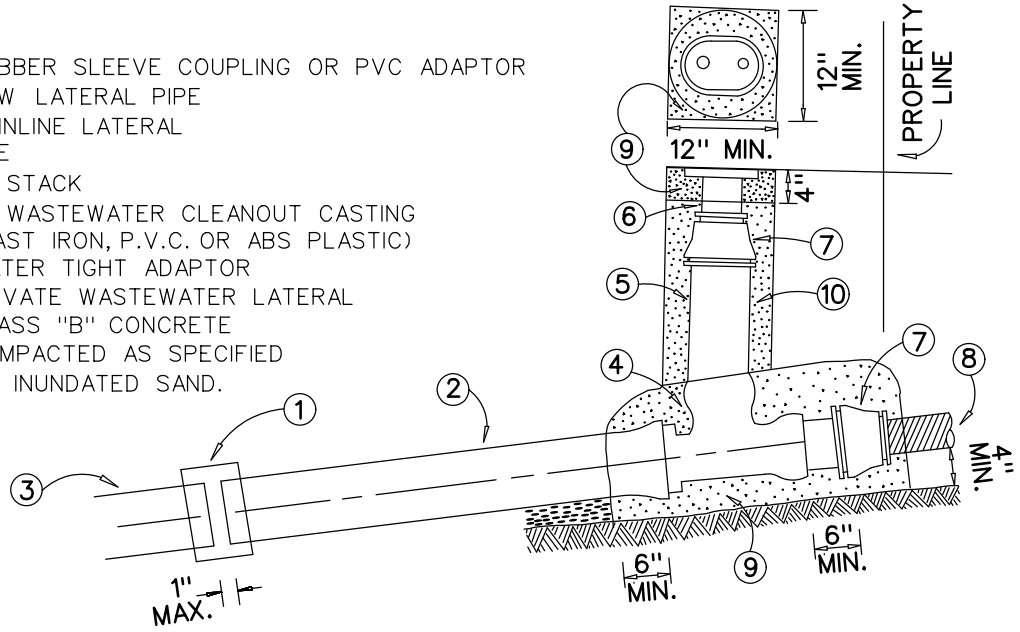
2. The new adjustment may be constructed over or under the proposed conflict:
   - A. A downstream minimum grade of 1.0% must be maintained.
   - B. Bends greater than 22-½ degrees are NOT permitted.
   - C. The new pipe and embedment must be of the same type as the existing.(Unless the lateral is concrete pipe, in which case clay pipe is to be used.)
   - D. Connections between the existing lateral pipe and new lateral pipe may be made with a rubber sleeve coupling or PVC adaptor, which ever is appropriate.
   - E. A minimum clearance between the outside of the new lateral pipe and the proposed conflict will be 6". If the clearance is less than 6", a steel pipe or D.I. pipe encasement will be required as shown on PAGE 414, ENCASEMENT PROTECTION FOR WASTEWATER MAINS.
3. The existing wye or tee connection to the existing main may have to be removed and reinstalled to meet the proposed new grade of the lateral. This work, if required, will be included at no additional cost to the City.

ADJUSTMENT OF EXISTING LATERAL		DWU	(Page No.) 406
		DATE JAN. 2010	



EXISTING CLEANOUT

1. RUBBER SLEEVE COUPLING OR PVC ADAPTOR
2. NEW LATERAL PIPE
3. MAINLINE LATERAL
4. TEE
5. 4" STACK
6. 4" WASTEWATER CLEANOUT CASTING (CAST IRON, P.V.C. OR ABS PLASTIC)
7. WATER TIGHT ADAPTOR
8. PRIVATE WASTEWATER LATERAL
9. CLASS "B" CONCRETE
10. COMPACTED AS SPECIFIED OR INUNDATED SAND.



NEW CLEANOUT

NOTES

A) The new lateral pipe shall be the same type of pipe as the existing lateral. If the lateral is concrete, the entire lateral must be rebuilt.

B) For commercial laterals, use cast iron cleanout castings only.

C) The new cleanout shall be constructed as close to the property line as possible.

D) The embedment will match the embedment on the existing lateral.

PROCEDURE

1. Remove existing cleanout and lateral to limits of existing concrete.

2. Salvage the cleanout casting and lid. If either is damaged, a new cleanout casting and/or lid will be furnished at no cost to the City.

3. Install the lateral extension and cleanout as shown in the detail using all new materials. The salvaged cleanout casting and lid may be used if approved by the engineer.

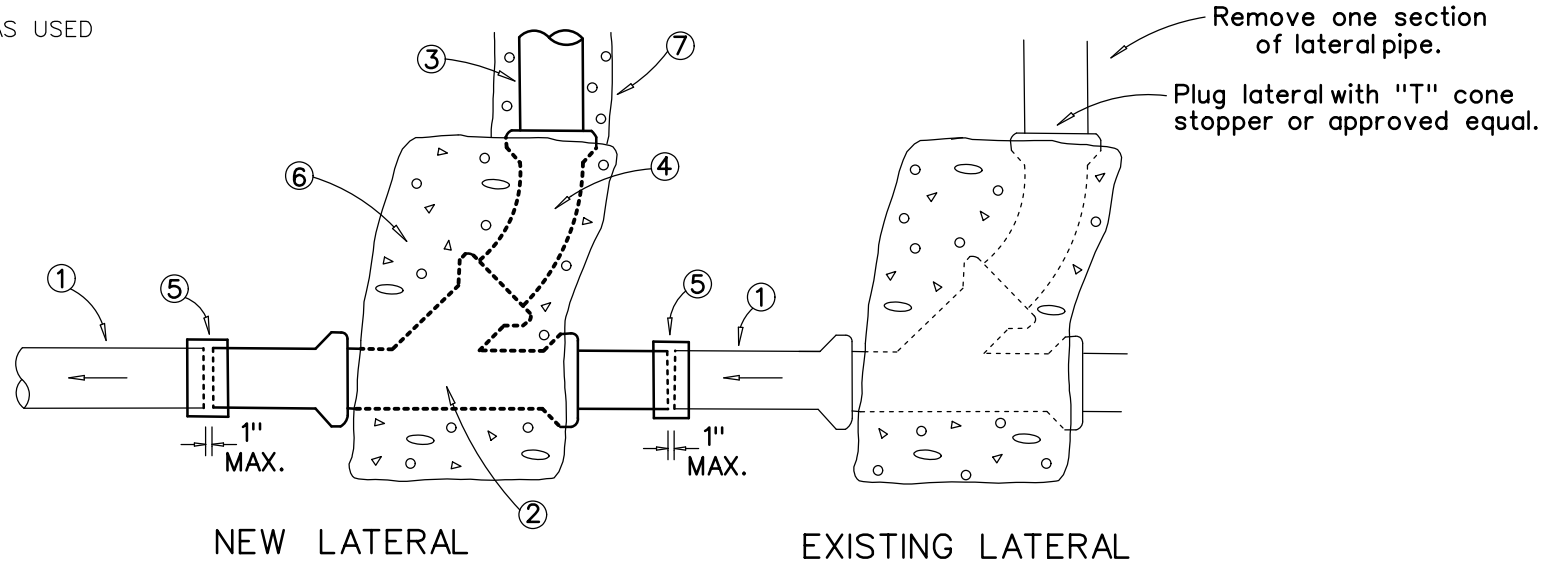
NCTCOG Spec: 702.3.4 - Quality of Concrete
2021 COD Addendum: Item 702.COD - Concrete Structures

REPLACE EXISTING LATERAL CLEANOUT

		COD	(Page No.) 407
		DATE JULY. 2021	

REFER TO PAGE 319 "LATERAL CONSTRUCTION"
FOR PROFILE VIEW

1. WASTEWATER MAIN
2. WYE (45° MAX.)
3. MAINLINE LATERAL
4. 45° BEND (MAX.)
5. WATER TIGHT RUBBER SLEEVE COUPLING OR PVC ADAPTOR
6. CLASS "B" CONCRETE
7. EMBEDMENT SAME AS USED ON MAIN



A) The wye and adaptors installed shall be of the same material as the wastewater mainline.
B) The wye and adaptors shall be assembled prior to installation.
C) Connections to the existing main shall be made using a rubber sleeve coupling with stainless steel band clamps or PVC adaptor. The clamps shall be tightened to the torque recommended by the manufacturer.
D) The embedment used shall be equal to that used for the mainline sewer.
E) Class "B" concrete shall be installed in accordance with PAGE 322 to support the wye.

NCTCOG Spec: 702.3.4 - Quality Of Concrete

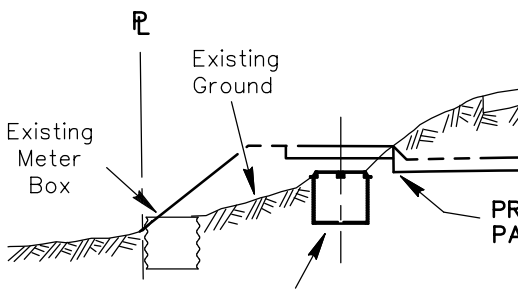
REPLACE EXISTING LATERAL TO EXISTING MAINLINE

COD

DATE
JULY.2021

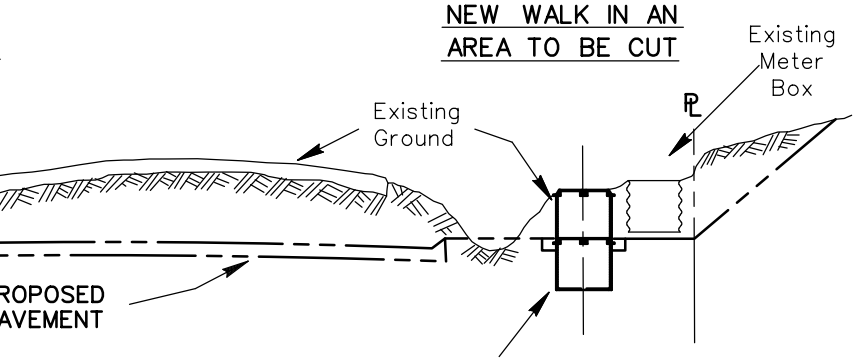
(Page No.)
408

NEW WALK IN AN AREA TO BE FILLED



SET THE NEW METER BOX IN THE CENTERLINE OF THE PROP. NEW WALK. SET THE METER BOX AT THE EXISTING GROUND ELEVATION. IT WILL BE RAISED TO GRADE DURING PAVING OPERATIONS.

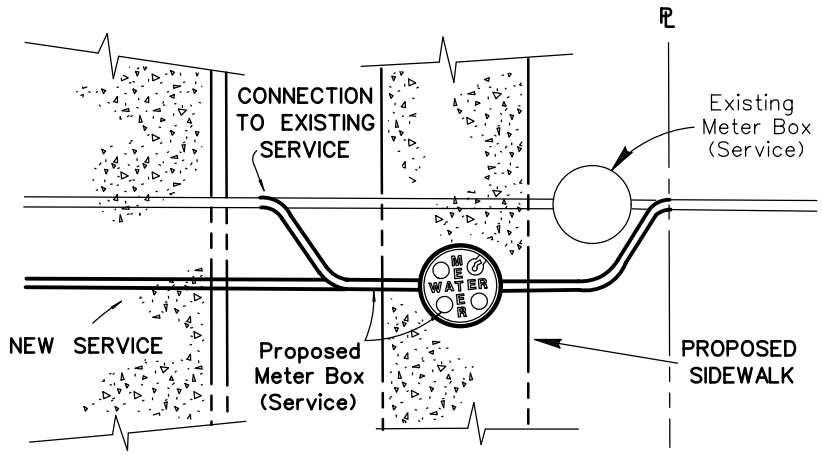
NEW WALK IN AN AREA TO BE CUT



SET THE NEW METER BOX IN THE CENTERLINE AND AT THE ELEVATION OF THE PROP. NEW WALK. SET THE METER IN THIS BOX. STACK METER BOX ON TOP OF THIS BOX TO THE EXISTING GROUND. PUT THE METER BOX LID ON THE TOP BOX. (THIS IS LIMITED TO 2 STACKED METER BOXES. ANY ADDITIONAL LOWERING TO GRADE WILL BE DONE DURING PAVING OPERATIONS

ELEVATION

A NEW WATER SERVICE IS INSTALLED TO THE NEW BOX. A LINE IS RUN FROM THE NEW BOX TO THE PROPERTY LINE NEXT TO THE EXISTING HOUSE LINE AND TURNED UP WITH A CURB STOP. AFTER FLUSHING, THE NEW LINE IS CONNECTED TO THE EXISTING HOUSE LINE AT THE PROPERTY LINE.



PLAN

IF A NEW SERVICE IS INSTALLED TO REPLACE AN EXISTING SERVICE TO THE EXISTING MAIN, THE CONNECTION WILL BE MADE AS FOLLOWS:

EXISTING MAIN UNDER PRESSURE. Connect the new copper pipe to the existing corporation cock on the main

EXISTING MAIN NOT UNDER PRESSURE. Tap the existing main a minimum of 1' from the existing tap and install a new corporation cock and service. Remove the existing corporation cock and plug the tap with a plug approved by the engineer.

If the new copper pipe is connected to the existing copper pipe, it shall be accomplished with the use of an approved compression type coupling.

If any existing water service is galvanized pipe, it must be replaced to the existing main with a new copper service.

REFER TO PAGES 201 thru 206 WATER SERVICE INSTALLATIONS

METER BOX REPLACEMENT		DWU	(PAGE NO.) 409
		DATE JUNE 2002	

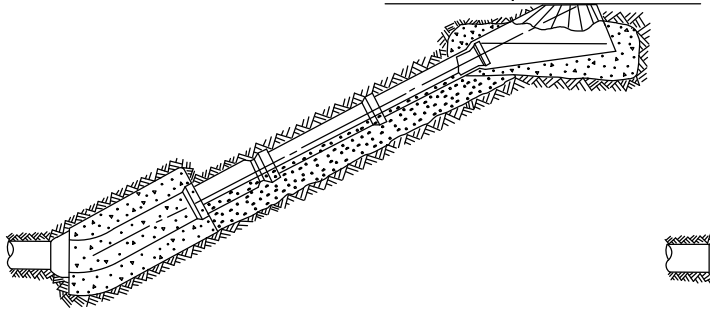


FIGURE 1

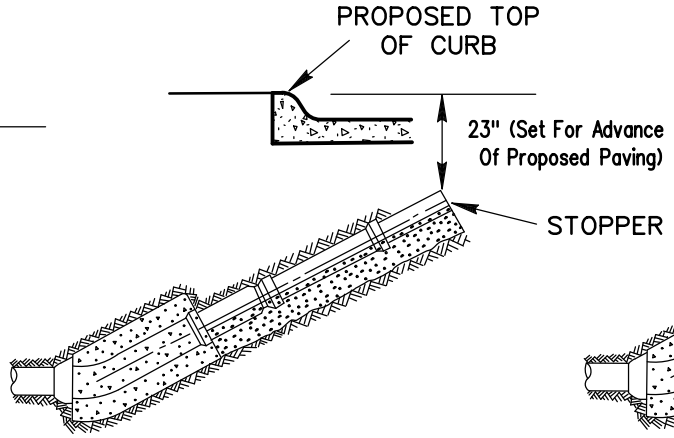


FIGURE 2
PRE - GRADING

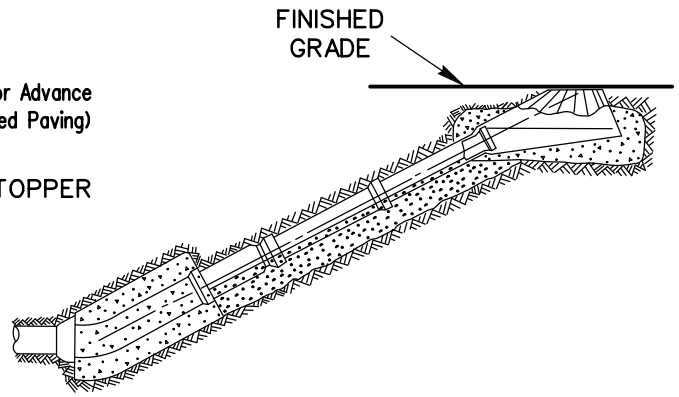


FIGURE 3
PRE - PAVING

FIGURE 1. EXISTING CLEANOUT

1. Remove and salvage the existing cleanout. If the cleanout cannot be salvaged or is damaged prior to final acceptance, it will be replaced by the contractor at no cost to the city.

FIGURE 2. PRE - GRADING

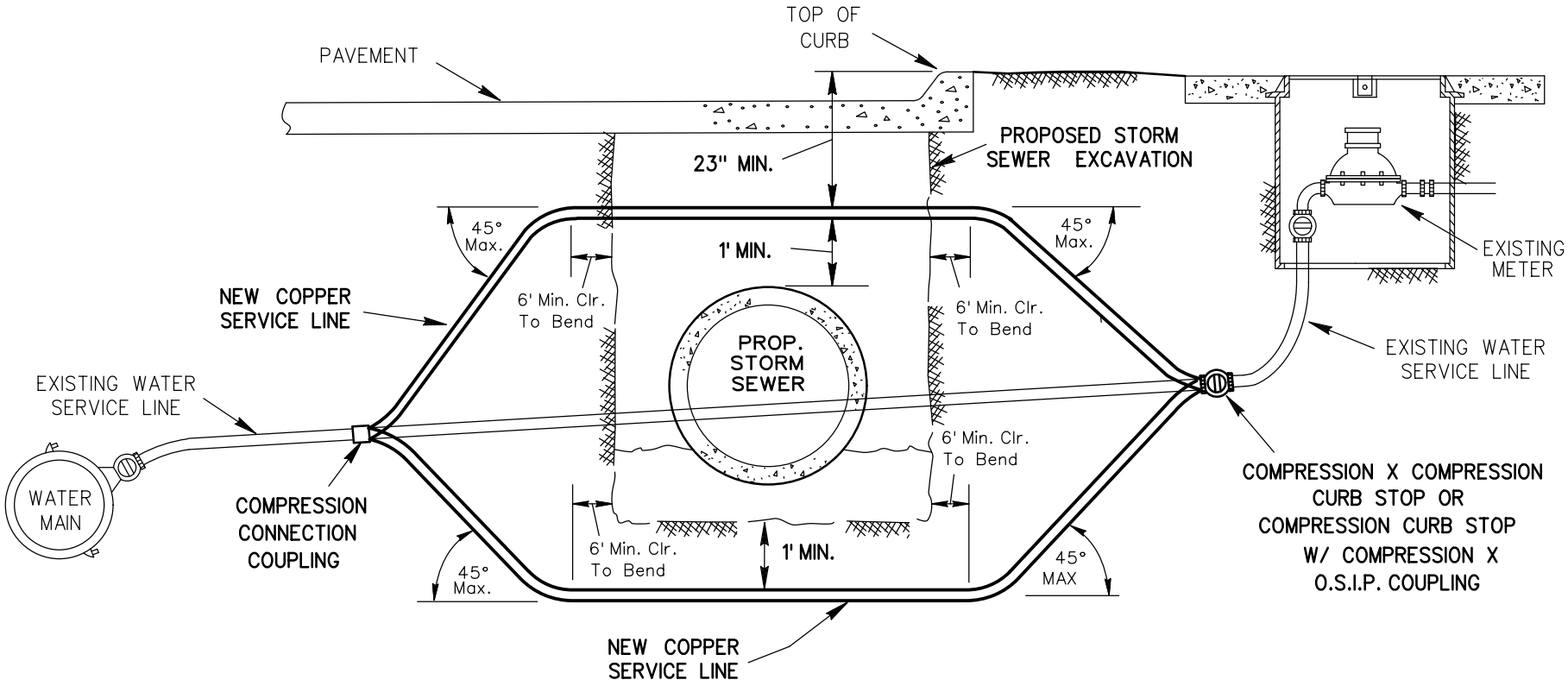
2. Remove the cleanout pipe to a point 23" below the proposed top of curb.
3. Plug the pipe with a "T" Cone Stopper or approved equal.

FIGURE 3. PRE - PAVING

4. Extend the existing cleanout pipe, if required. The connection to the existing pipe will be made with a rubber sleeve coupling. The new pipe and embedment shall be of the same type as the existing.
5. Set the salvaged or new cleanout on a Class B concrete pad.
6. Insert a "T" Cone Stopper or approved equal in the cleanout pipe.

REFER TO PAGE 317 MAINLINE CLEANOUT

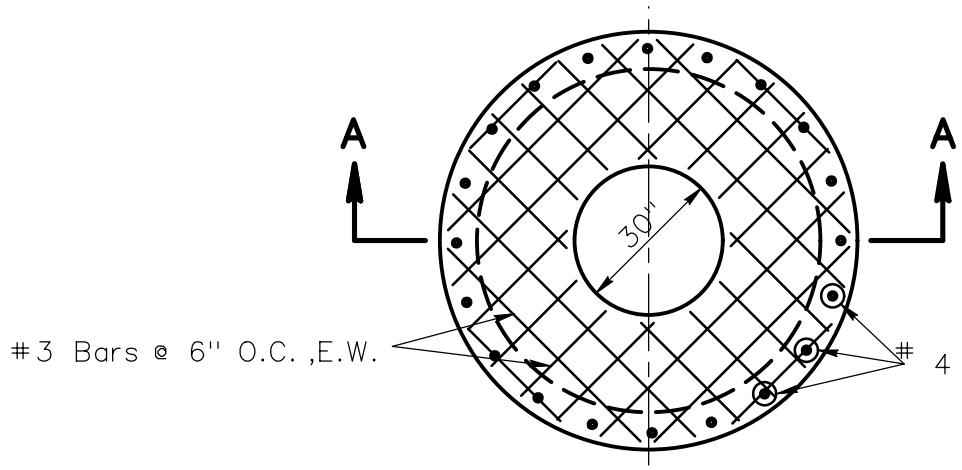
ALTERATION & ADJUSTMENT OF STANDARD MAINLINE CLEANOUT		DWU	(Page) 410
		DATE DEC.2001	



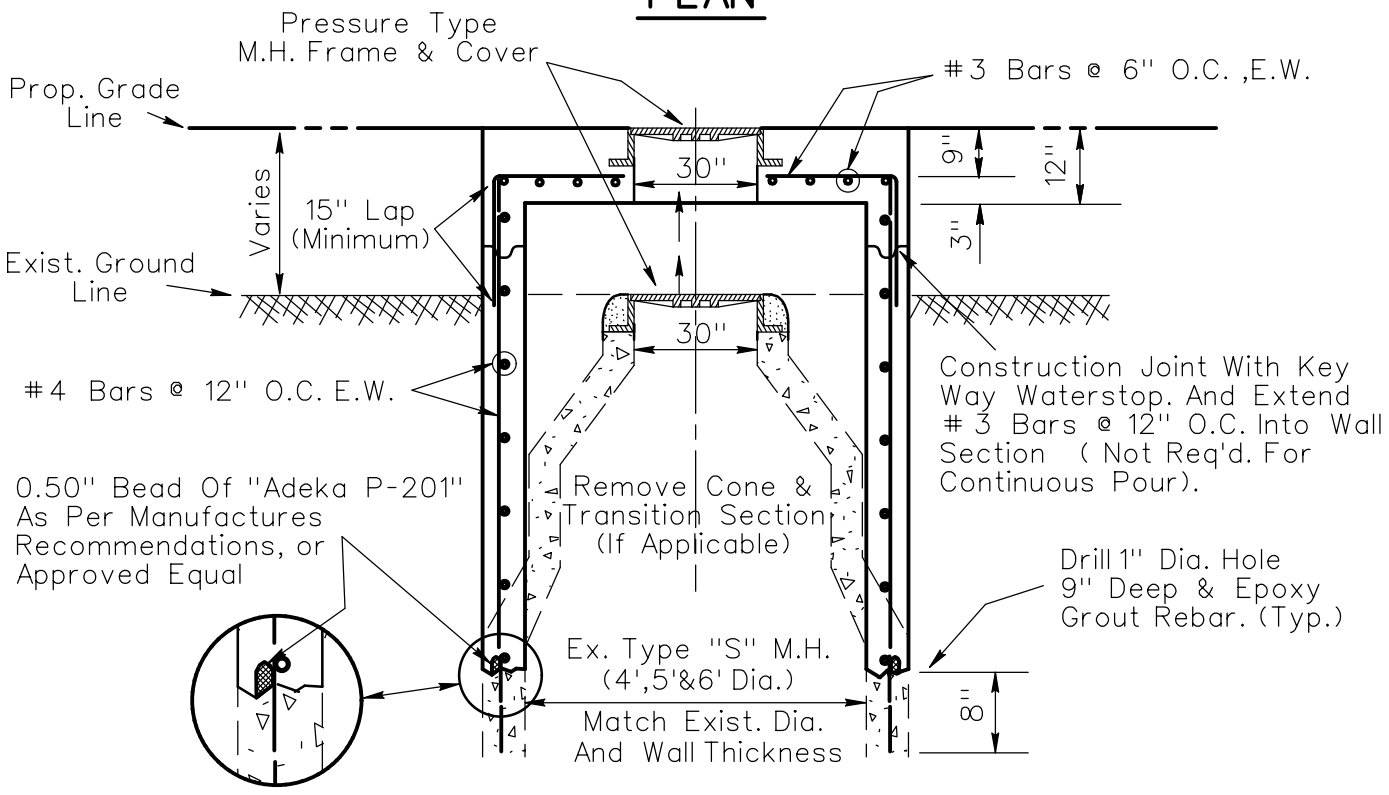
NOTES:

1. All materials must be new.
2. Install the new service with a minimum clearance of 1 foot below the excavation of the trench for the proposed storm sewer and a minimum of 1 foot clearance from the edge of the trench excavation when the service is installed laterally along the proposed storm sewer.
3. The minimum bending radius of the copper shall be 6 times the O.D. of the pipe.
4. Adjustment of the proposed water service may be over the proposed storm sewer only if the minimum clearances are maintained, otherwise the service must be installed under the proposed storm sewer excavation.
5. The bend angle is not to exceed 45° for any bend in a new copper service line.

ADJUSTMENT OF EXISTING WATER SERVICE		DWU	(Page) 411
		DATE JAN. 2010	



PLAN



SECTION "A-A"

N.T.S.

NOTES

1) Use an epoxy bonding agent to bond new concrete to existing concrete. Bonding agent shall be "Sikadur 32, Hi Mod" or Approved Equal.

2) Epoxy grout to be a high strength rigid epoxy adhesive manufactured for the purpose of anchoring dowels into hardened concrete. Epoxy grout shall be "Sikadur Hi-Mod, LV No. 32" or approved equal.

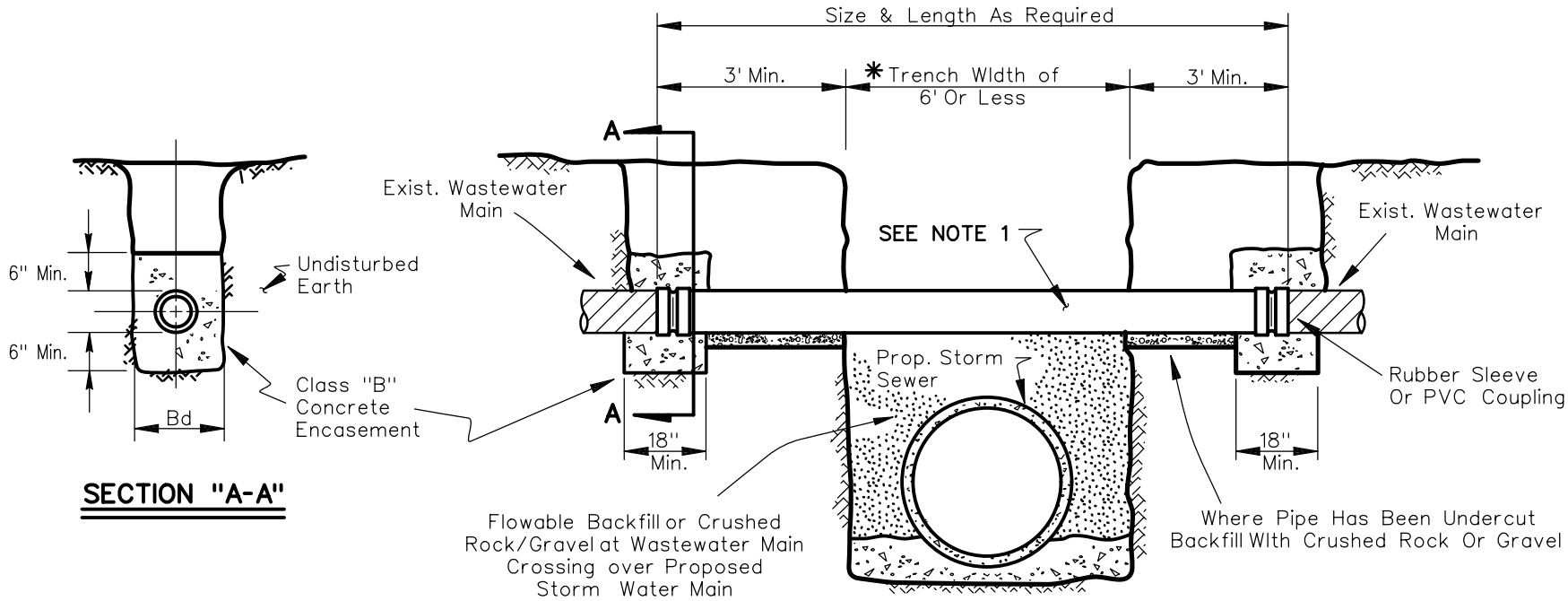
3) Coat the entire outside of the new concrete with a waterproof bituminous coating.

4) Follow construction sequence typical to the notes as outlined on page 402.

ADJUSTMENT OF TYPE "S" MANHOLE		DWU	(PAGE NO.) 412
		DATE OCT. 2011	

NCTCOG Spec: 501.17 - Polyvinyl Chloride (PVC) Wastewater Pipe And Fittings With Dimensional Control
NCTCOG Spec: 702.3.4 - Quality Of Concrete

✱If Trench Width Exceeds 6' Or If The Diagonal Crossing Of Trench Exceeds 6', The Use Of Type "A" Utility Support Shall Be Required. See 121. If The Crossing Exceeds 25', A Special Utility Support Design Will Be Required.



SECTION "A-A"

NOTES:

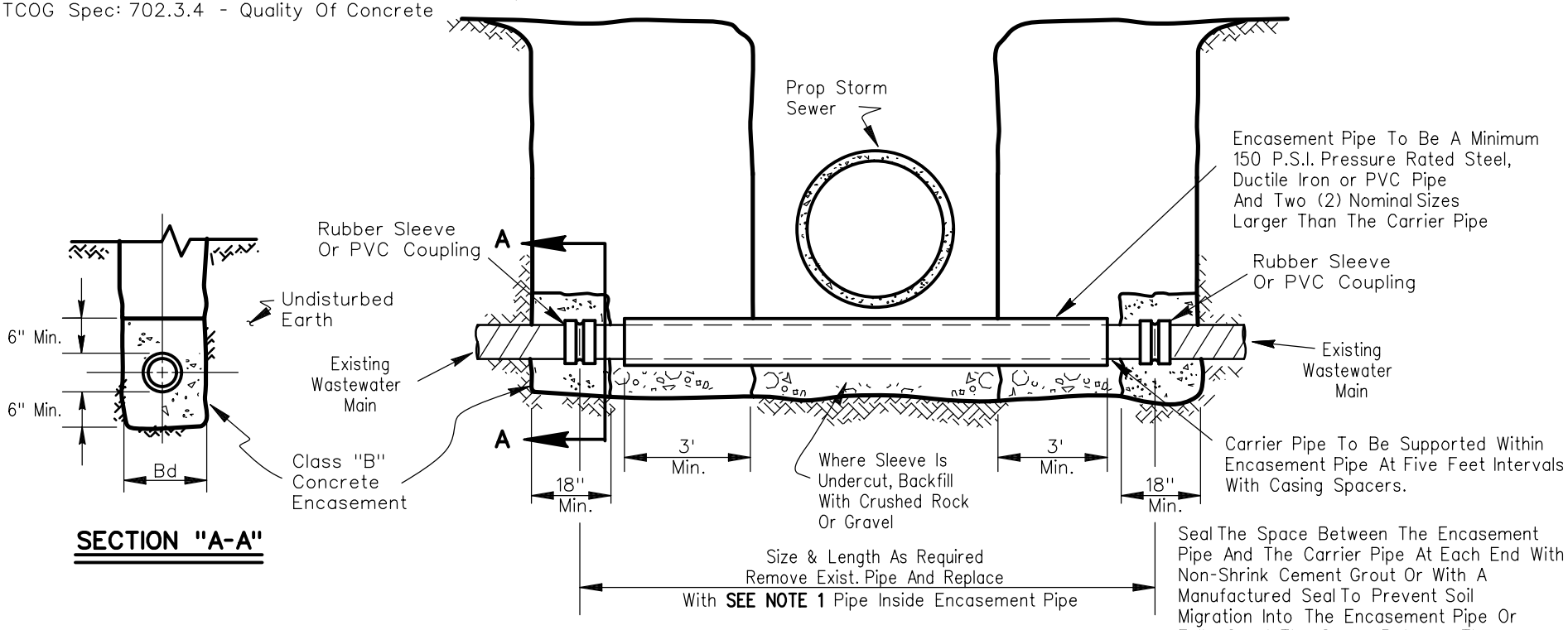
1. REPLACE EX. R.C.P./CLAY PIPE WITH CLAY PIPE.
   REPLACE P.V.C. PIPE WITH P.V.C. PIPE.
2. USE RUBBER SLEEVE COUPLINGS FOR R.C.P./CLAY PIPE WITH CLAY PIPE.
   USE PRESSURE RATE PVC COUPLINGS FOR PVC PIPE WITH PVC PIPE.
3. RELAY NEW WASTEWATER MAIN TO MATCH EXISTING GRADE.

Contractor Must Contact Wastewater Collection Two Working Days Prior To Construction.

WASTEWATER MAIN UNDERCUT BY PROPOSED STORMWATER MAIN		COD	(Page No.) 413
		DATE JULY.2021	

NCTCOG Spec: 501.17 - Poylvinyl Chloride (PVC) Wastewater Pipe And Fittings With Dimensional Control
NCTCOG Spec: 501.7 - Ductile Iron Pressure Pipe and Fittings
2021 COD Addendum Item 501.7.COD: Ductile Iron Pressure Pipe And Fittings
2021 COD Addendum Item 501.7.2.COD: Joints through 501.7.4.1.DWU: NSF 61 Compliance
NCTCOG Spec: 501.9 - Steel Pipe And Fittings
2021 COD Addendum Item 501.9.3.COD: Pipe And Fittings
2021 COD Addendum Item 501.9.3.1.COD: NSF 61 Compliance
NCTCOG Spec: 702.3.4 - Quality Of Concrete

Encasement Protection For Wastewater Mains Under Proposed Storm Sewers Where Vertical Clearance Is Less Than 0.5' (To Be Installed By Public Works Storm Sewer Contractor or Trinity Watershed Management).



SECTION "A-A"

NOTES:

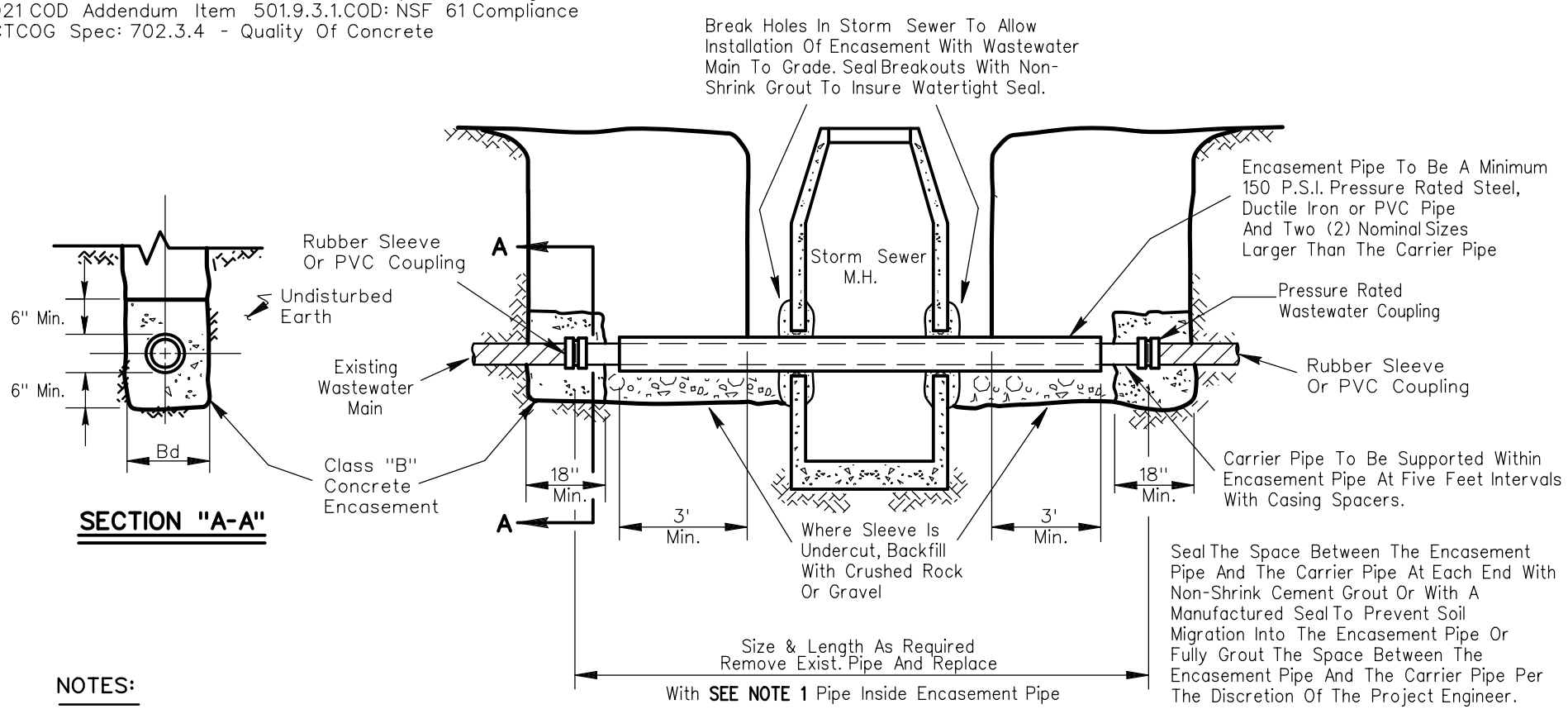
1. REPLACE EX. R.C.P./CLAY PIPE WITH CLAY PIPE.
   REPLACE P.V.C. PIPE WITH P.V.C. PIPE.
2. USE RUBBER SLEEVE COUPLINGS FOR R.C.P./CLAY PIPE WITH CLAY PIPE.
   USE PRESSURE RATE PVC COUPLINGS FOR PVC PIPE WITH PVC PIPE.
3. RELAY NEW WASTEWATER MAIN TO MATCH EXISTING GRADE.

Contractor Must Contact Wastewater Collection Two Working Days Prior To Construction.

ENCASEMENT PROTECTION FOR WASTEWATER MAIN

		(Page No.)
COD		414
DATE JULY. 2021		

NCTCOG Spec: 501.17 - Poylvinyl Chloride (PVC) Wastewater Pipe And Fittings With Dimensional Control
NCTCOG Spec: 501.7 - Ductile Iron Pressure Pipe and Fittings
2021 COD Addendum Item 501.7.COD: Ductile Iron Pressure Pipe And Fittings
2021 COD Addendum Item 501.7.2.COD: Joints through 501.7.4.1.DWU: NSF 61 Compliance
NCTCOG Spec: 501.9 - Steel Pipe And Fittings
2021 COD Addendum Item 501.9.3.COD: Pipe And Fittings
2021 COD Addendum Item 501.9.3.1.COD: NSF 61 Compliance
NCTCOG Spec: 702.3.4 - Quality Of Concrete



SECTION "A-A"

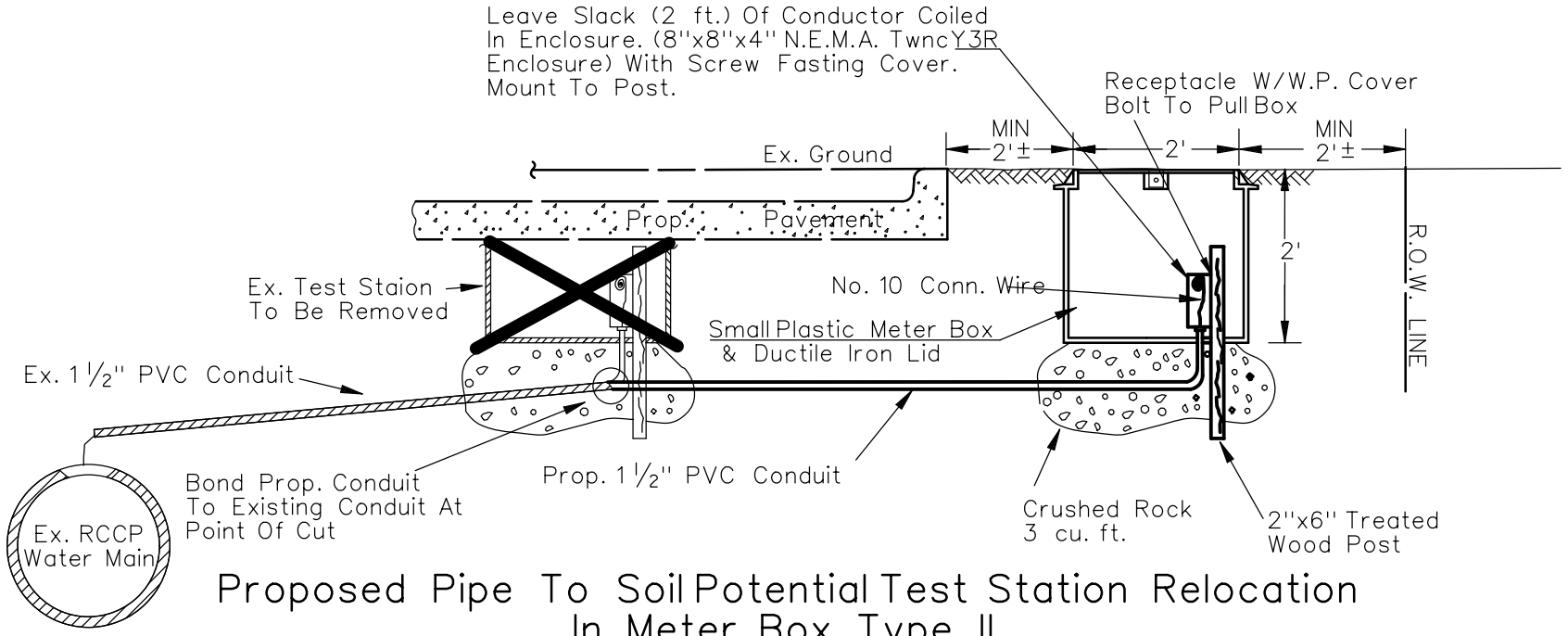
NOTES:

1. IF USE OF THIS STANDARD DRAWING IS NECESSARY, REVIEW AND APPROVAL BY DWU WASTEWATER COLLECTION AND DWU NEIGHBORHOOD DRAINAGE IS REQUIRED IN WRITING.
2. REPLACE EX. R.C.P./CLAY PIPE WITH CLAY PIPE. REPLACE P.V.C. PIPE WITH P.V.C. PIPE.
3. USE RUBBER SLEEVE COUPLINGS FOR R.C.P./CLAY PIPE WITH CLAY PIPE. USE PRESSURE RATE PVC COUPLINGS FOR PVC PIPE WITH PVC PIPE.
4. RELAY NEW WASTEWATER MAIN TO MATCH EXISTING GRADE.

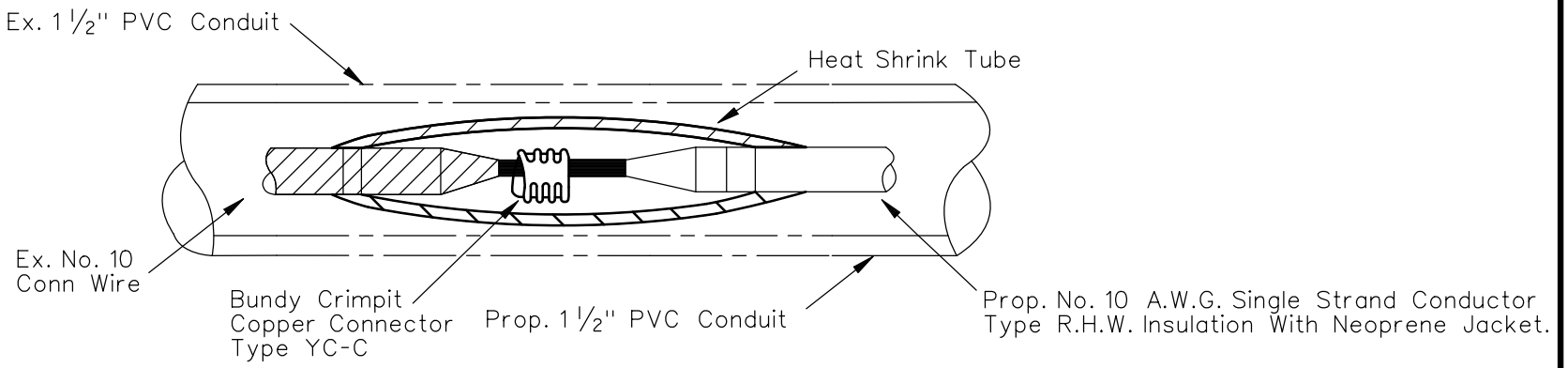
Contractor Must Contact Wastewater Collection Two Working Days Prior To Construction.

WASTEWATER MAIN PASSING THROUGH STORM WATER MANHOLE

	(Page No.)
COD	416
DATE JULY.2024	



Proposed Pipe To Soil Potential Test Station Relocation In Meter Box Type II



MECHANICAL CABLE SPLICE DETAIL

RELOCATION OF PIPE-TO-SOIL POTENTIAL TEST STATION (BURIED CONFIGURATION)		DWU	(Page No.) 417
		DATE JAN. 2010	

PART 5

(Series 500)

4" and LARGER WATER SERVICE INSTALLATIONS

City of Dallas
Water Utilities Department

PART 5
LARGE WATER SERVICE INSTALLATIONS

GENERAL DESCRIPTION OF LARGE WATER SERVICES

1) A Closed Fireline Service -

   A) Definition - A system with automatic sprinklers only, regularly inspected and supervised by an insurance agency.

   B) Metering - Monitored with a detector check device.

2) Combined Water Service - (Domestic and Fire)

   A) Definition - Fire protection and domestic water through a single water service and meter.

   B) Metering - Metered with Underwriter approved "FM" full flow meter or turbine meter with U.L. approved strainer.

3) Domestic Water Service

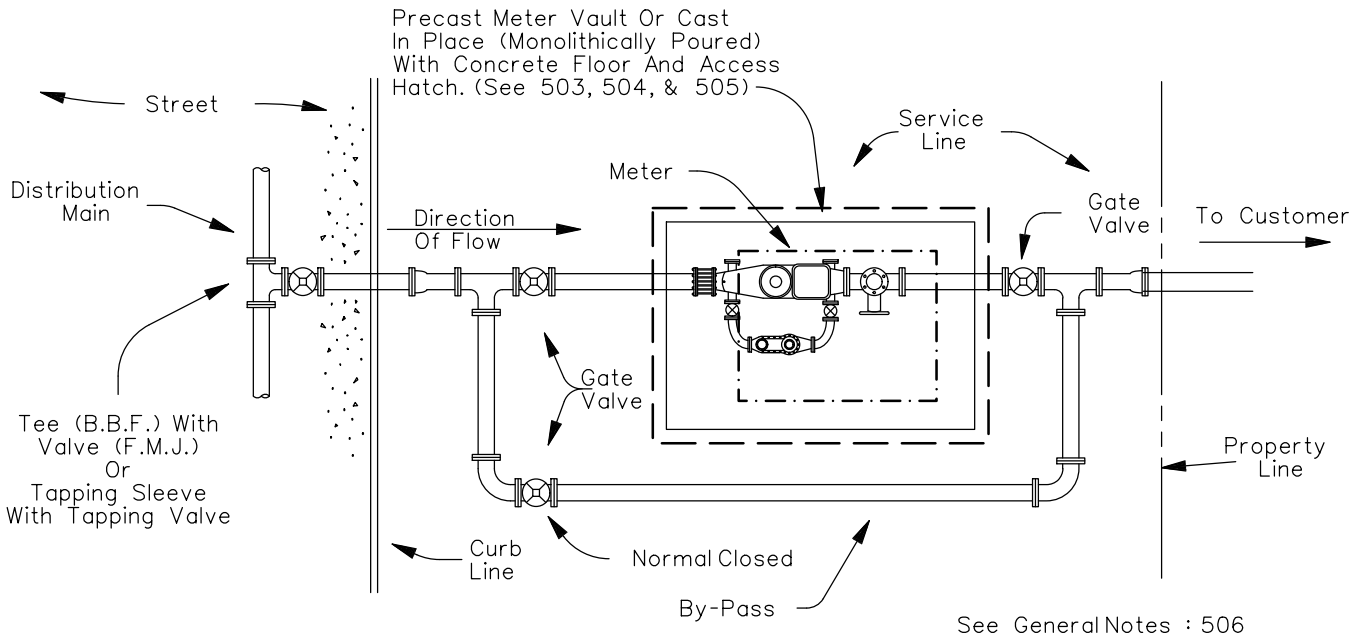
   A) Definition - Domestic water through a single water service and meter.

   B) Metering - Metered with compound meter or turbine meter with domestic type strainer.

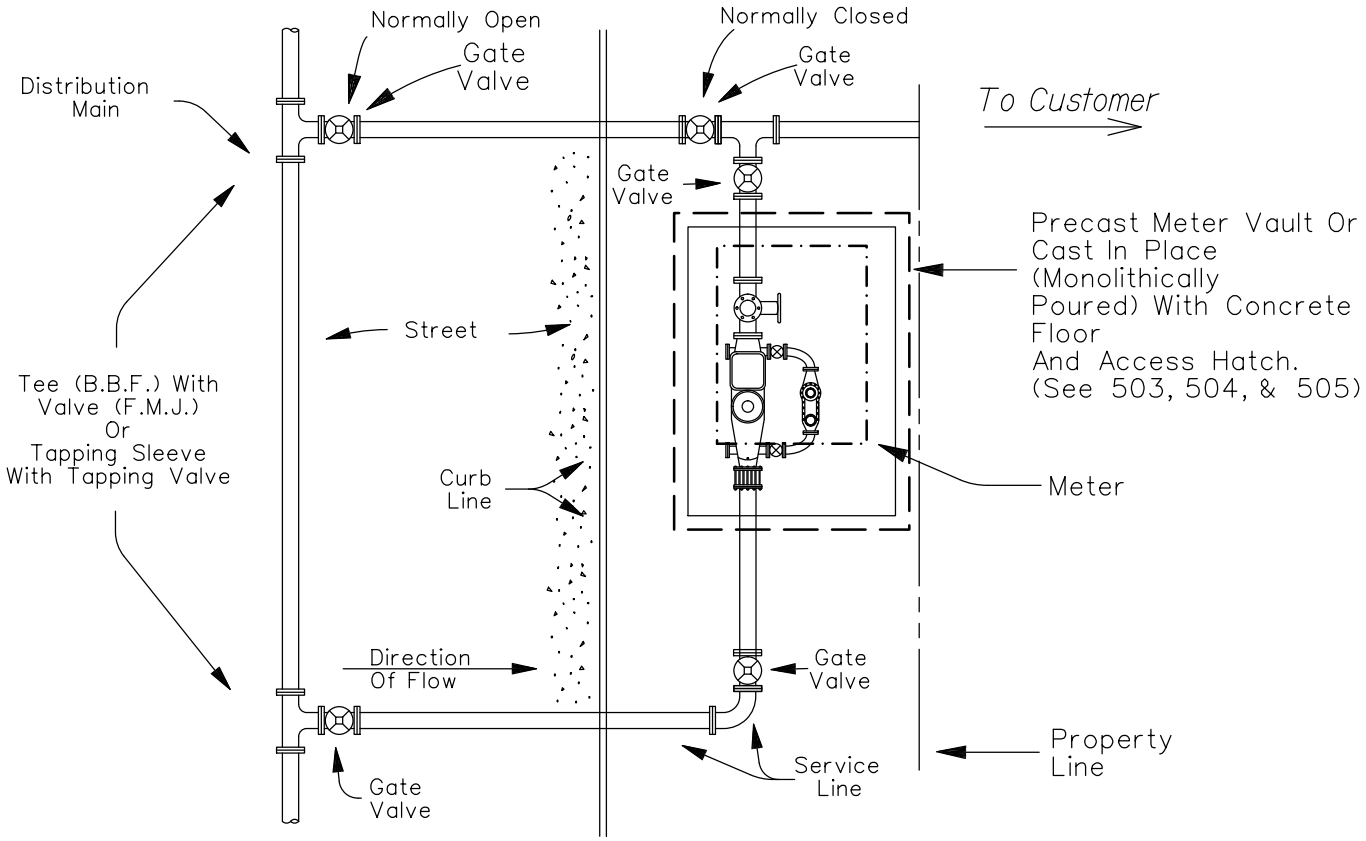
4) Irrigation Water Service

   A) Definition - Same as domestic water through a single water service and meter without a bypass and for irrigation purpose only.

   B) Metering - Metered with compound meter or turbine meter with domestic type strainer.



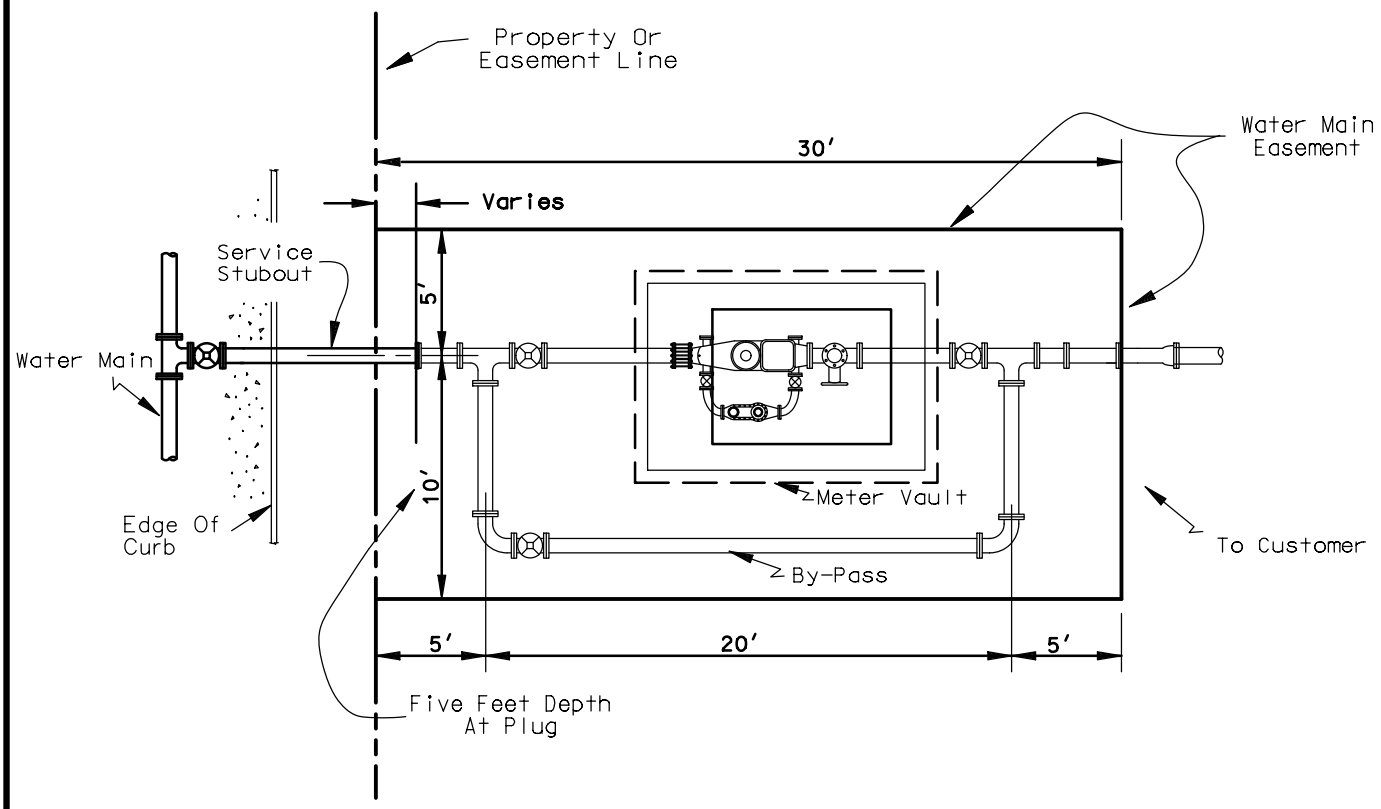
TYPICAL METER ALIGNMENT
(Combined Service Shown)



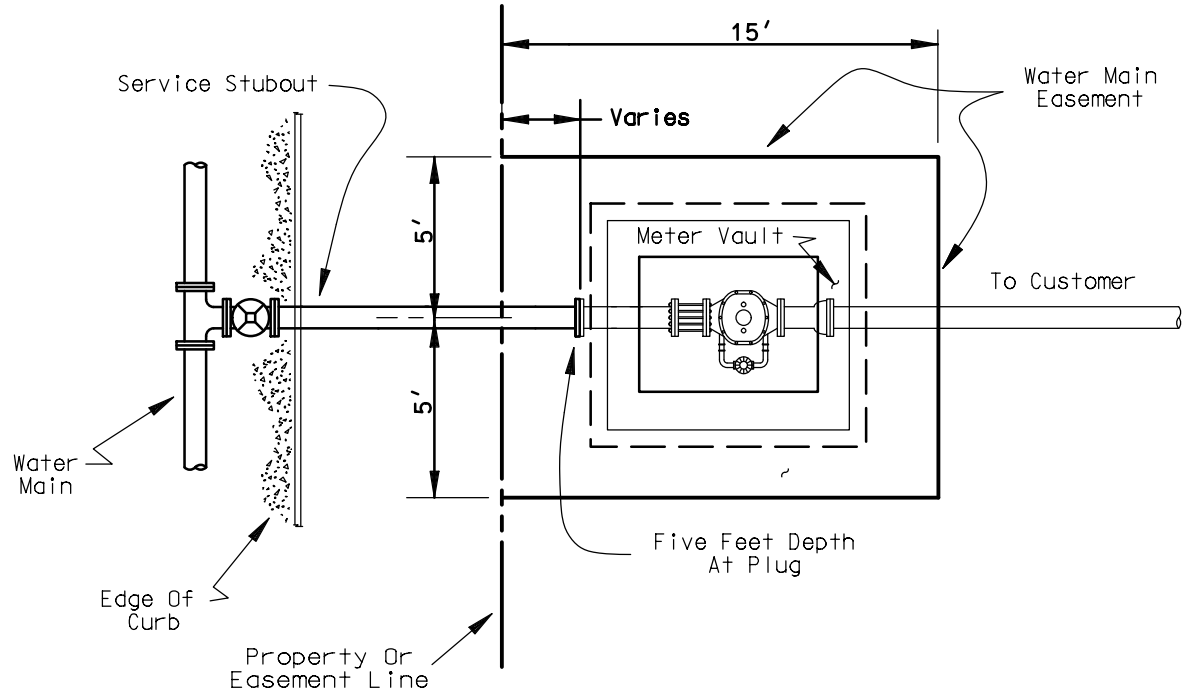
ALTERNATE METER ALIGNMENT *
FOR LIMITED SPACE INSTALLATION
(Combined Service Shown)

* When alternate alignment or any deviation from DWU Design and Construction Standards is necessary, review and approval by DWU Distribution is required in writing.

LARGE SERVICE INSTALLATION DETAILS PLAN VIEWS		DWU	(Page No.) 502
		DATE JULY 2024	

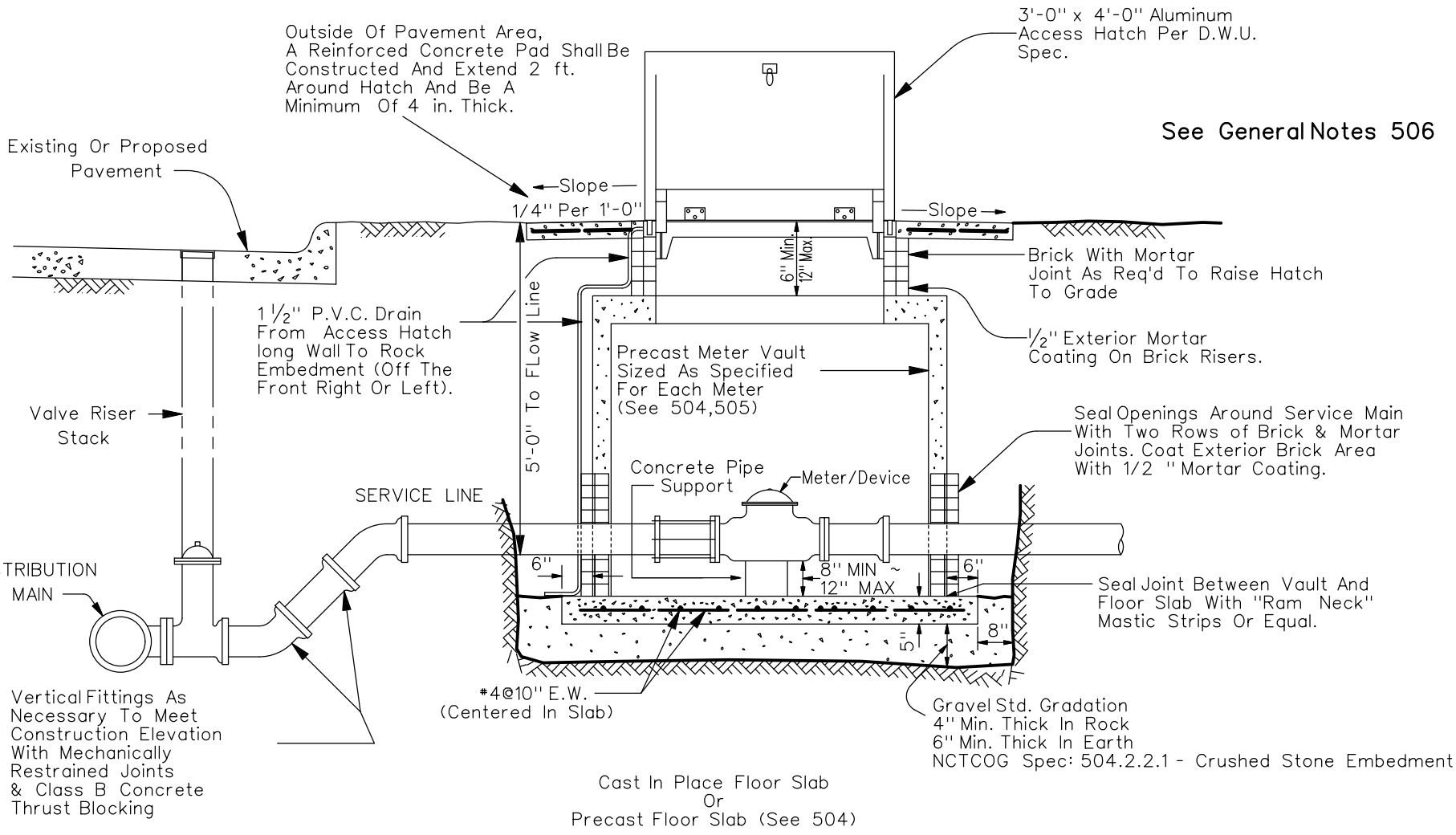


COMBINED SERVICE - 15' x 30' EASEMENT



FIRE LINE SERVICE - 10' x15' EASEMENT

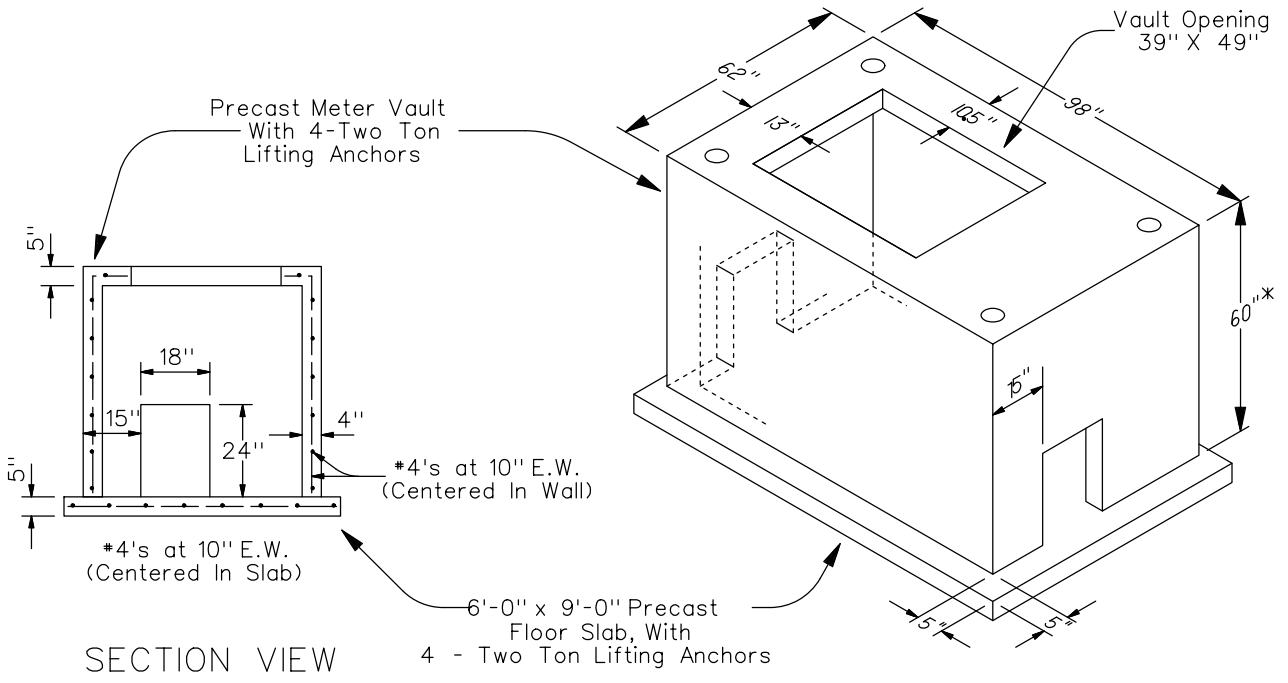
MINIMUM EASEMENT SIZES FOR LARGE METER INSTALLATIONS		DWU	(PAGE NO.) 502A
		DATE OCT. 2011	



TYPICAL FOR ALL LARGE METER VAULTS

NCTCOG Spec: 504.2.2.1 - Crushed Stone Embedment

LARGE SERVICE INSTALLATION DETAIL ELEVATION VIEW		DWU	(Page No.) 503
		DATE OCT.2009	

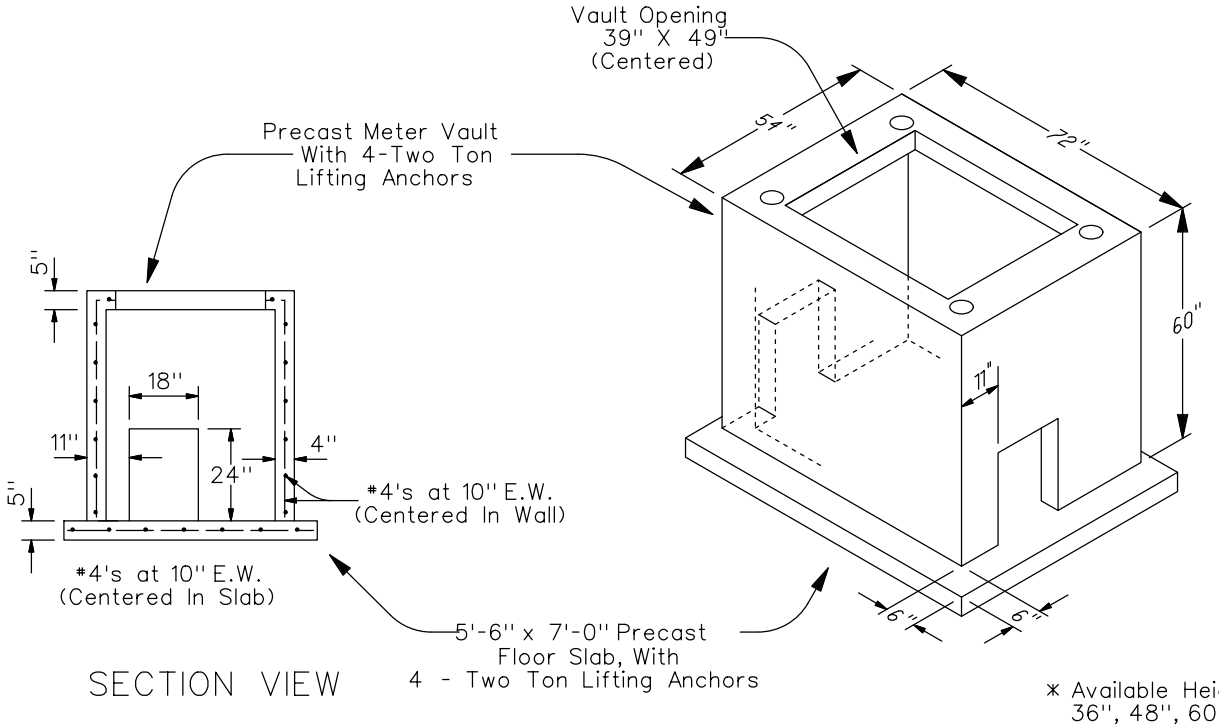


SECTION VIEW

* Available Heights
36", 48", 60"

F.M. VAULT

* Special Applications To Be Determined
By Engineer.



SECTION VIEW

* Available Heights
36", 48", 60"

D.C. VAULT

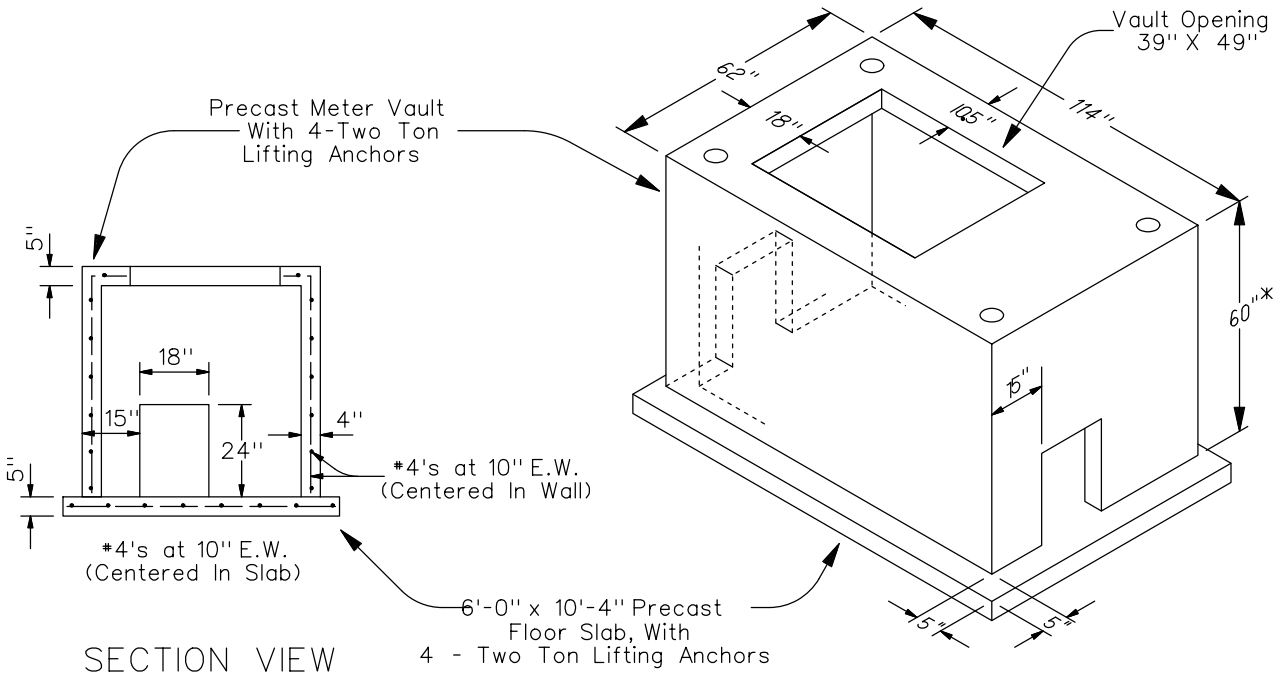
* Special Applications To Be Determined
By Engineer.

LARGE SERVICE INSTALLATION DETAILS
PRECAST VAULTS

DWU

(Page No.) 504

DATE
JUNE 2002



SECTION VIEW

* Available Heights
36'', 48'', 60''

10'' VAULT

* Special Applications To Be Determined By Engineer.

LARGE SERVICE INSTALLATION DETAILS PRECAST VAULTS		DWU	(Page No.) 505
		DATE JAN. '98	

GENERAL NOTES FOR MATERIAL AND CONSTRUCTION METHODS

1.) All materials including tapping sleeves, tapping valves, valves, pipe, associated fittings and construction methods shall conform to the most current version of the NCTCOG specifications, the DWU Addendum to that specification, this manual and the latest edition of the approved materials list.

NOTE:

A.) Only full body gray or ductile iron fittings and glands will be permitted for large water service installation. In no case will compact fittings be allowed

B.) All connections including valves and fittings shall be restrained joints. No threaded rod will be allowed. Along with restrained joints, thrust blocking will be required.

C.) All pipe must be either Ductile Iron (Class 52) or PVC C900 (DR-14).

2.) All precast vaults and precast floors used in the installation of large water services will meet DWU specifications and must be on the approved materials list.

3.) Vault, bypass, pipe, fittings, and valves shall be located within the provided easement or the right of way and shall not be located within driveway, approch, roadways, dedicated parking spaces, or otherwise subject to vehicular traffic loads.

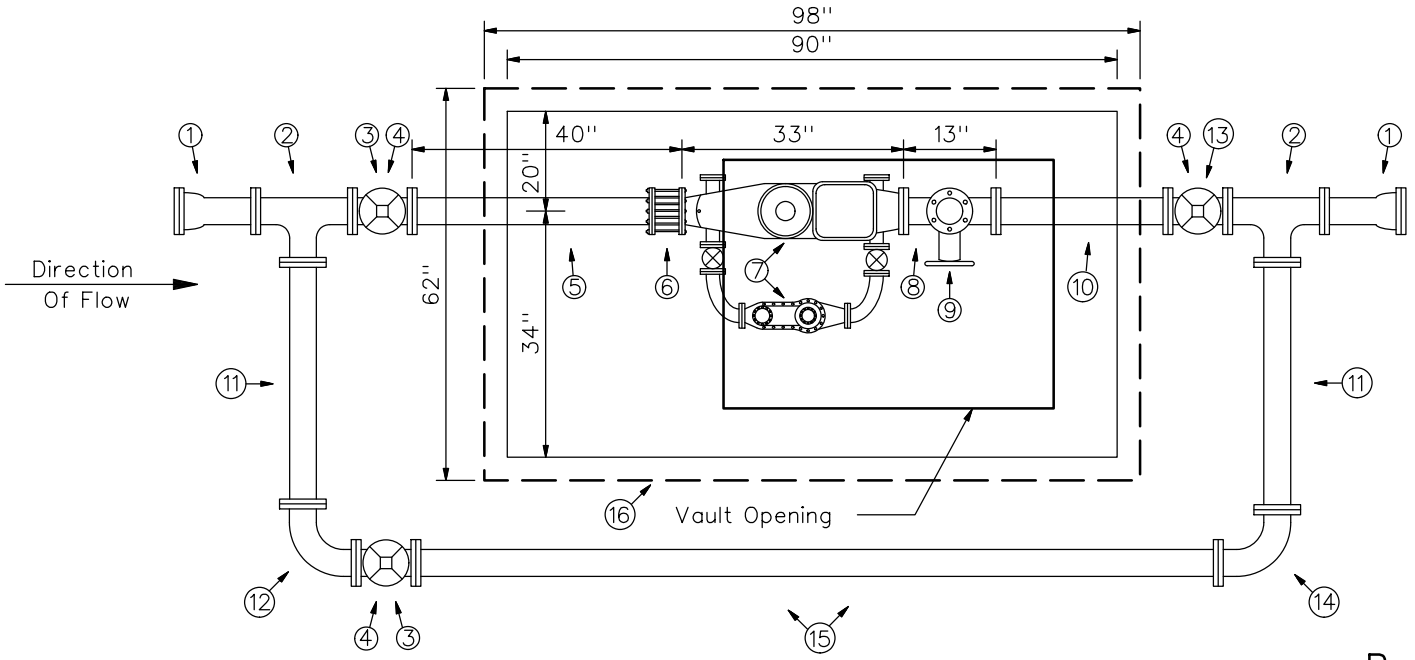
4.) Service lines shall be kept as short as possible.
If the vault is within the right-of-way, one 90° bend horizontal bend between the vault and the service line connection to the water main is acceptable.
If the vault is not in the right of way, the service line shall be straight (no horizontal bends) from the water main to the vault and within the provided easement.

5.) Each service line shall have only one connection to a water main.

6.) When alternate alignment or any deviation from DWU Design and Construction Standards is necessary, review and approval by DWU Distribution is required in writing.

Material List		
Part No.	Quantity	Description
①	2 Ea.	4" x 8" Nipple M.J. x F.
②	2 Ea.	4" x 4" . Tee F. x F.
③	2 Ea.	4" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	4" x 40" Pipe S. x S.
⑥	1 Ea.	4" Flanged Coupling Adaptor
⑦	1 Ea.	4" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	4" x 4" Tee F. x F. (test Point)
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑩	1 Ea.	4" x 24" Nipple F. x F.
⑪	2 Ea.	4" x 36" Nipple F. x F.
⑫	1 Ea.	4" 90° Bend F. x F.
⑬	1 Ea.	4" Gate Valve F. x F.
⑭	1 Ea.	4" 90° Bend M.J. x F.
⑮	1 Ea.	4" Pipe
⑯	1 Ea.	Precast F.M. Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

4" COMBINED SERVICE WITH 4" METER

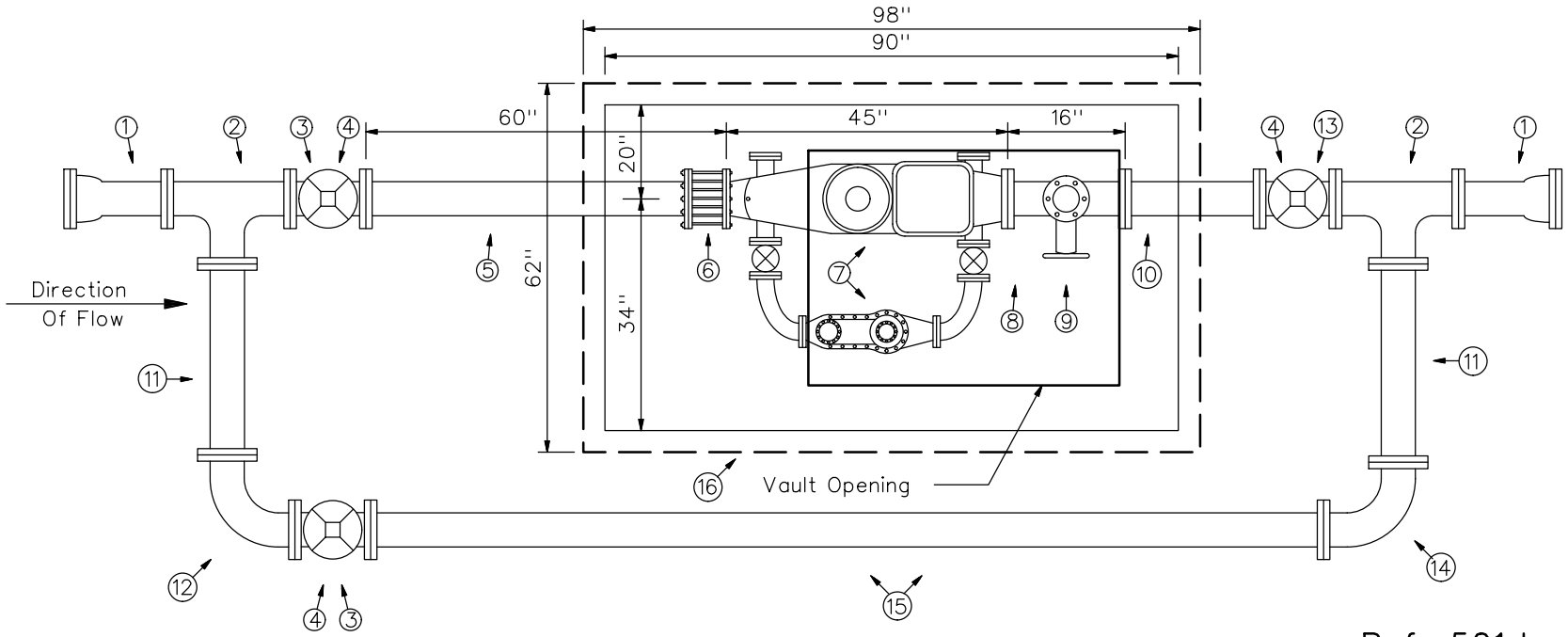
DWU

(Page No.) 507

DATE JUNE 2002

Material List		
Part No.	Quantity	Description
①	2 Ea.	6" x 8" Nipple M.J. x F.
②	2 Ea.	6" x 6" Tee F. x F.
③	2 Ea.	6" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	6" x 60" Pipe S. x S.
⑥	1 Ea.	6" Flanged Coupling Adaptor
⑦	1 Ea.	6" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	6" x 4" Tee F. x F. (test Point)
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑩	1 Ea.	6" x 24" Nipple F. x F.
⑪	2 Ea.	6" x 36" Nipple F. x F.
⑫	1 Ea.	6" 90° Bend F. x F.
⑬	1 Ea.	6" Gate Valve F. x F.
⑭	1 Ea.	6" 90° Bend M.J. x F.
⑮	1 Ea.	6" Pipe
⑯	1 Ea.	Precast F.M. Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

6" COMBINED SERVICE WITH 6" METER

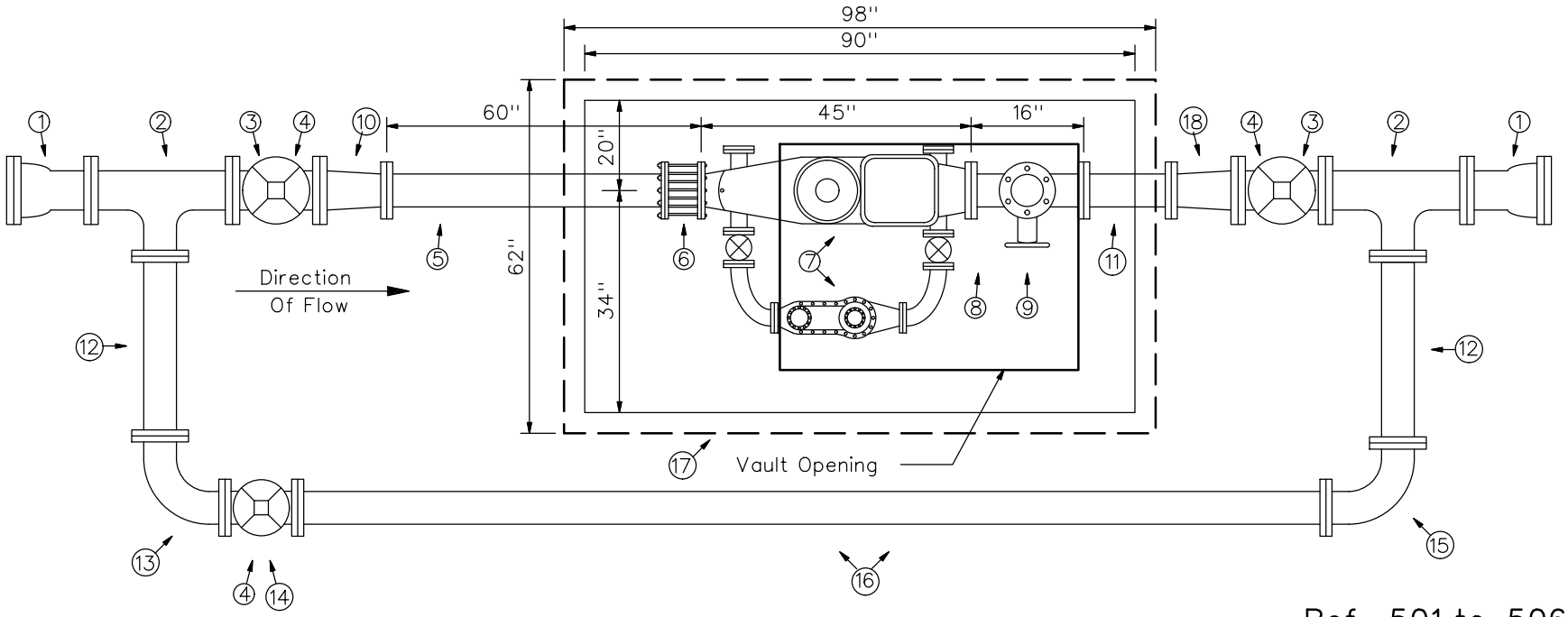
DWU

(Page No.) 508

DATE
JUNE 2002

Material List		
Part No.	Quantity	Description
①	2 Ea.	8" x 8" Nipple M.J. x F.
②	2 Ea.	8" x 6" Tee F. x F.
③	2 Ea.	8" Gate Valve F. x F.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	6" x 60" Pipe S. x S.
⑥	1 Ea.	6" Flanged Coupling Adaptor
⑦	1 Ea.	6" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	6" x 4" Tee F. x F. (Test Point)
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)
⑩	1 Ea.	8" x 6" Reducer F. x M. J.

Material List		
Part No.	Quantity	Description
⑪	1 Ea.	6" x 12" Nipple F. x F.
⑫	2 Ea.	6" x 36" Nipple F. x F.
⑬	1 Ea.	6" 90° Bend F. x F.
⑭	1 Ea.	6" Gate Valve F. x M.J.
⑮	1 Ea.	6" 90° Bend M.J. x F.
⑯	1 Ea.	6" Pipe
⑰	1 Ea.	Precast F.M. Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑱	1 Ea.	8" x 6" Reducer F. x F.



Ref. 501 to 506

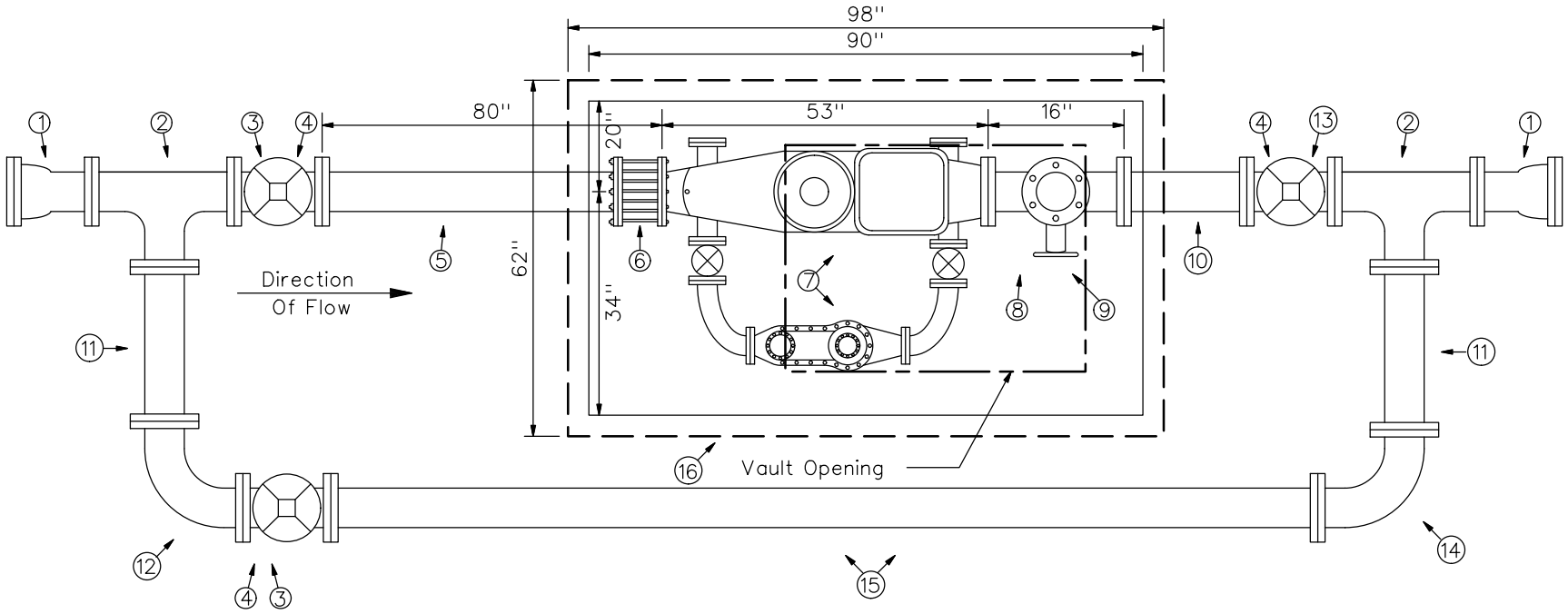
8" COMBINED SERVICE WITH 6" METER

DWU

DATE
JUNE 2002

Material List		
Part No.	Quantity	Description
①	2 Ea.	8" x 8" Nipple M.J. x F.
②	2 Ea.	8" x 8" Tee F. x F.
③	2 Ea.	8" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	8" x 80" Pipe S. x S.
⑥	1 Ea.	8" Flanged Coupling Adaptor
⑦	1 Ea.	8" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	8" x 4" Tee F. x F. (Test Point)
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑩	1 Ea.	8" x 24" Nipple F. x F.
⑪	2 Ea.	8" x 36" Nipple F. x F.
⑫	1 Ea.	8" C.I. 90° Bend F. x F.
⑬	1 Ea.	8" Gate Valve F. x F.
⑭	1 Ea.	8" 90° Bend M.J. x F.
⑮	1 Ea.	8" Pipe
⑯	1 Ea.	Precast F.M. Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

8" COMBINED SERVICE WITH 8" METER

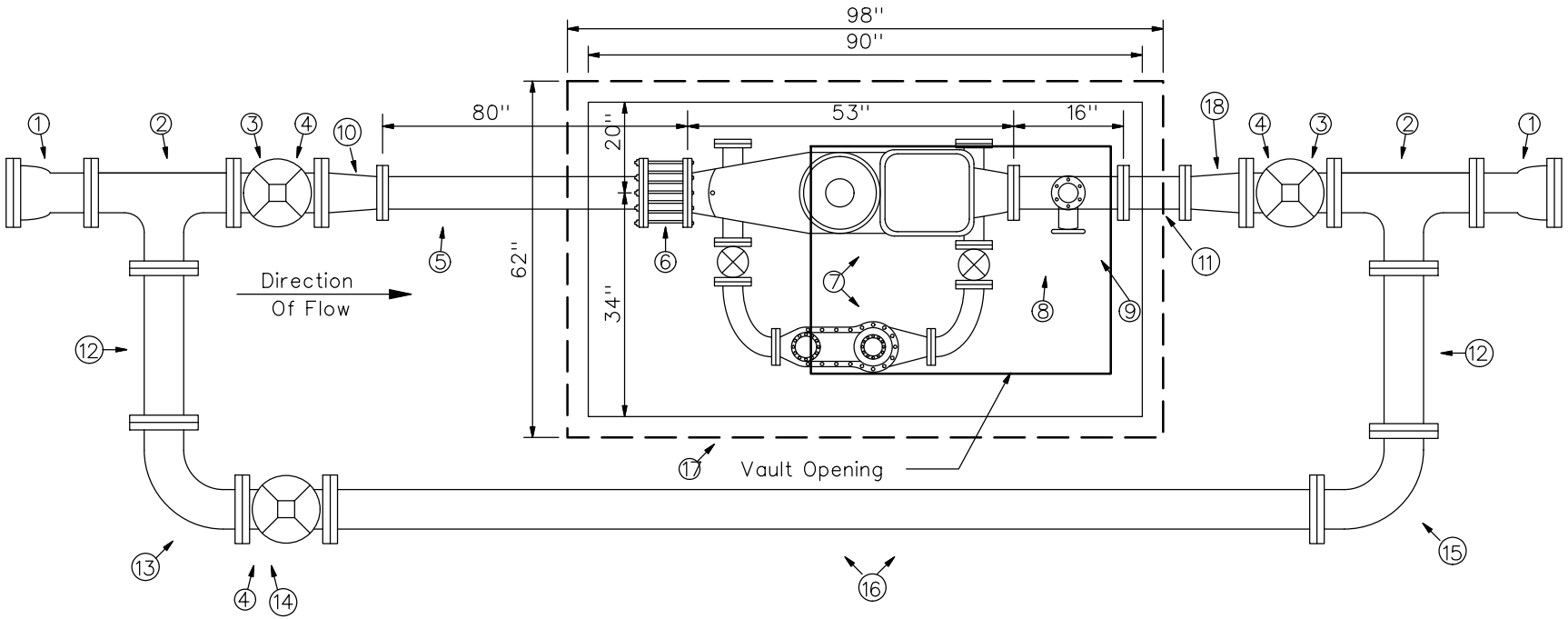
DWU

(Page No.) 510

DATE OCT 2011

Material List		
Part No.	Quantity	Description
①	2 Ea.	10" x 8" Nipple M.J. x F.
②	2 Ea.	10" x 8" Tee F. x F.
③	2 Ea.	10" Gate Valve F. x F.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	8" x 80" Pipe S. x S.
⑥	1 Ea.	8" Flanged Coupling Adaptor
⑦	1 Ea.	8" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	8" x 4" Tee F. x F. (Test Point)
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)
⑩	1 Ea.	10" x 8" Reducer F. x M. J.

Material List		
Part No.	Quantity	Description
⑪	1 Ea.	8" x 12" Nipple F. x F.
⑫	2 Ea.	8" x 36" Nipple F. x F.
⑬	1 Ea.	8" 90° Bend F. x F.
⑭	1 Ea.	8" Gate Valve F. x M.J.
⑮	1 Ea.	8" 90° Bend M.J. x F.
⑯	1 Ea.	8" Pipe
⑰	1 Ea.	Precast F.M. Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑱	1 Ea.	10" x 8" Reducer F. x F.



Ref. 501 to 506

10" COMBINED SERVICE WITH 8" METER

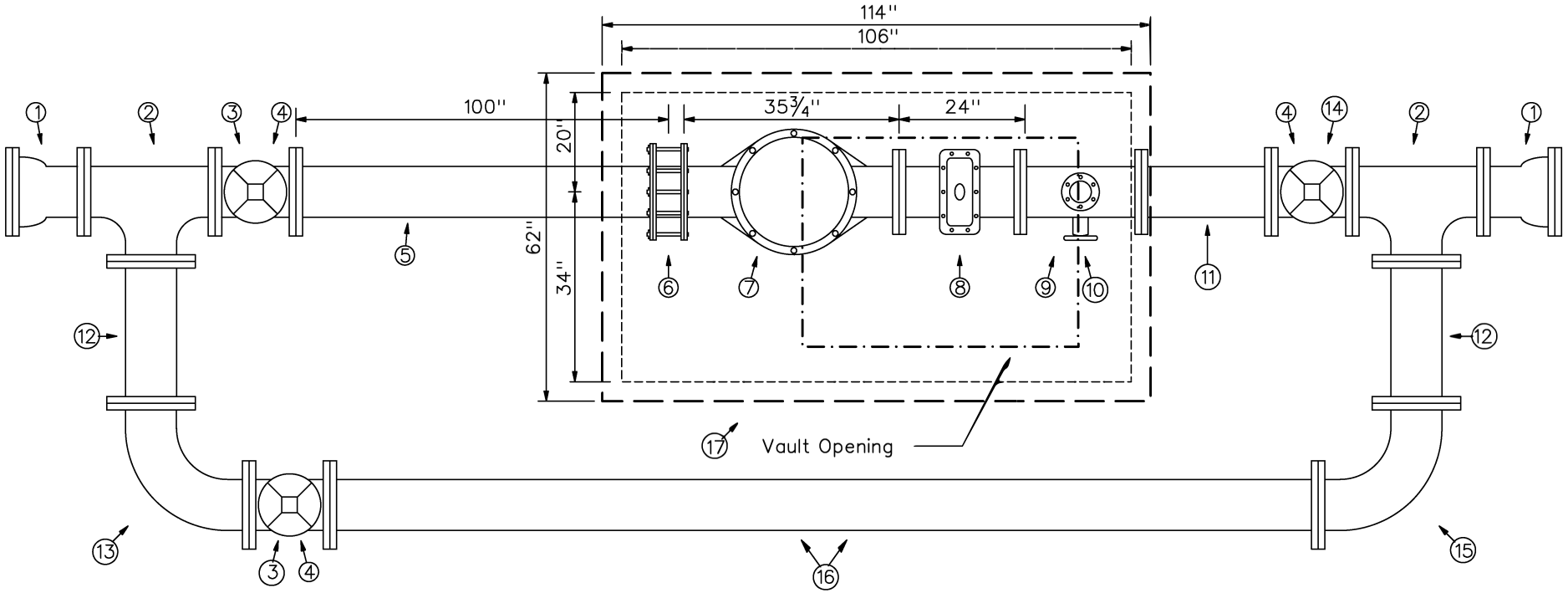
DWU

DATE
JUNE 2002

(Page No.)
511

Material List		
Part No.	Quantity	Description
①	2 Ea.	10" x 8" Nipple M.J. x F.
②	2 Ea.	10" x 10" Tee F. x F.
③	2 Ea.	10" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	10" x 100" Pipe S. x S.
⑥	1 Ea.	10" Flanged Coupling Adaptor
⑦	1 Ea.	10" U.L. Approved Strainer (For Turbine)
⑧	1 Ea.	10" Meter As Specified (Type F.M. Shown)
⑨	1 Ea.	10" x 4" Tee F. x F. (Test Point)
⑩	1 Ea.	4" Gate Valve F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑪	1 Ea.	10" x 24" Nipple F. x F.
⑫	2 Ea.	10" x 36" Nipple F. x F.
⑬	1 Ea.	10" 90° Bend F. x F.
⑭	1 Ea.	10" Gate Valve F. x F.
⑮	1 Ea.	10" 90° Bend M.J. x F.
⑯	1 Ea.	10" Pipe
⑰	1 Ea.	Precast 10" Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

10" COMBINED SERVICE WITH 10" METER

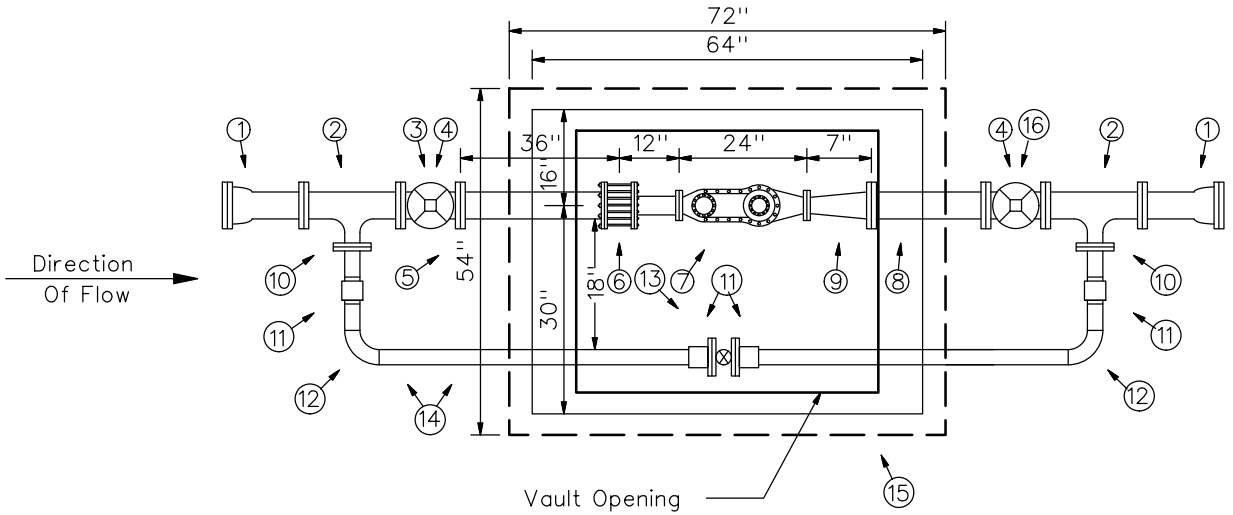
DWU

(Page No.) 512

DATE JULY 2024

Material List		
Part No.	Quantity	Description
①	2 Ea.	4" x 8" Nipple M.J. x F.
②	2 Ea.	4" x 2" Tee F. x F.
③	1 Ea.	4" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	4" x 36" Pipe S. x S.
⑥	1 Ea.	4" X 3" Reducing Flanged Coupling Adaptor
⑦	1 Ea.	3" Meter As Specified (Type Compound Shown)
⑧	1 Ea.	4" x 24" Nipple F. x F.
⑨	1 Ea.	4" x 3" Reducer F. x F.

Material List		
Part No.	Quantity	Description
⑩	2 Ea.	2" Companion Flange
⑪	4 Ea.	2" Comp X OSIP Adaptor
⑫	2 Ea.	2" Comp 90 Deg. Ell
⑬	1 Ea.	2" Ball Valve
⑭	1 Ea.	2" Copper Pipe
⑮	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑯	1 Ea.	4" Gate Valve F. x F.



Ref. 501 to 506

4" DOMESTIC SERVICE WITH 3" METER

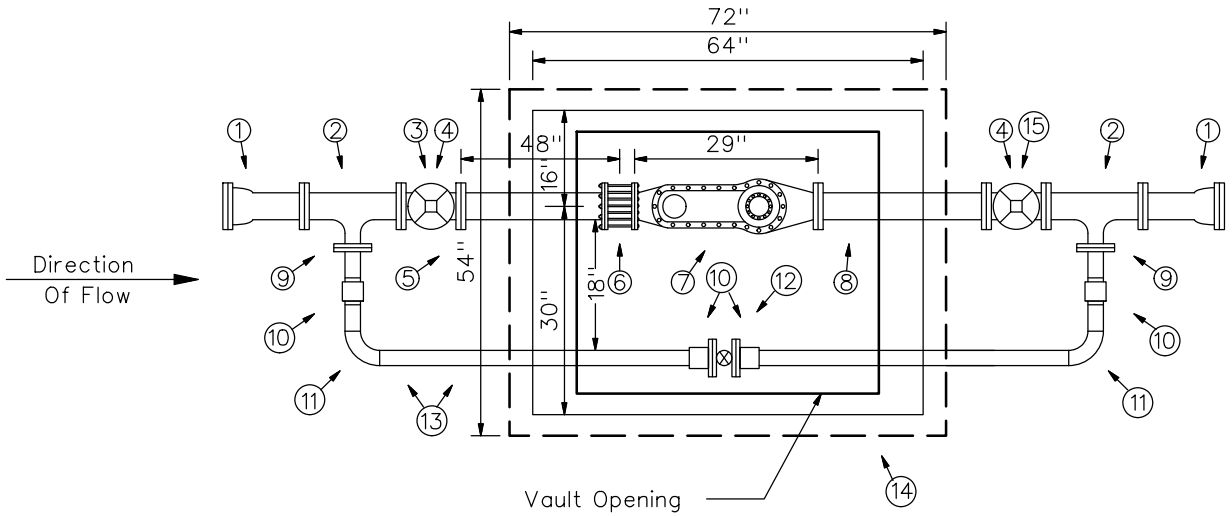
DWU

(Page No.) 513

DATE OCT 2010

Material List		
Part No.	Quantity	Description
①	2 Ea.	4" x 8" Nipple M.J. x F.
②	2 Ea.	4" x 2" Tee F. x F.
③	1 Ea.	4" Gate Valve F. x M.J.
④	2 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	4" x 36" Pipe S. x S.
⑥	1 Ea.	4" Flanged Coupling Adapter
⑦	1 Ea.	4" Meter As Specified (Type Compound Shown)
⑧	1 Ea.	4" x 36" Pipe F. x F.

Material List		
Part No.	Quantity	Description
⑨	2 Ea.	2" Companion Flange
⑩	4 Ea.	2" Comp X OSIP Adaptor
⑪	2 Ea.	2" Comp 90 Deg. Ell
⑫	1 Ea.	2" Ball Valve
⑬	1 Ea.	2" Copper Pipe
⑭	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑮	1 Ea.	4" Gate Valve F. x F.



Ref. 501 to 506

4" DOMESTIC SERVICE WITH 4" METER

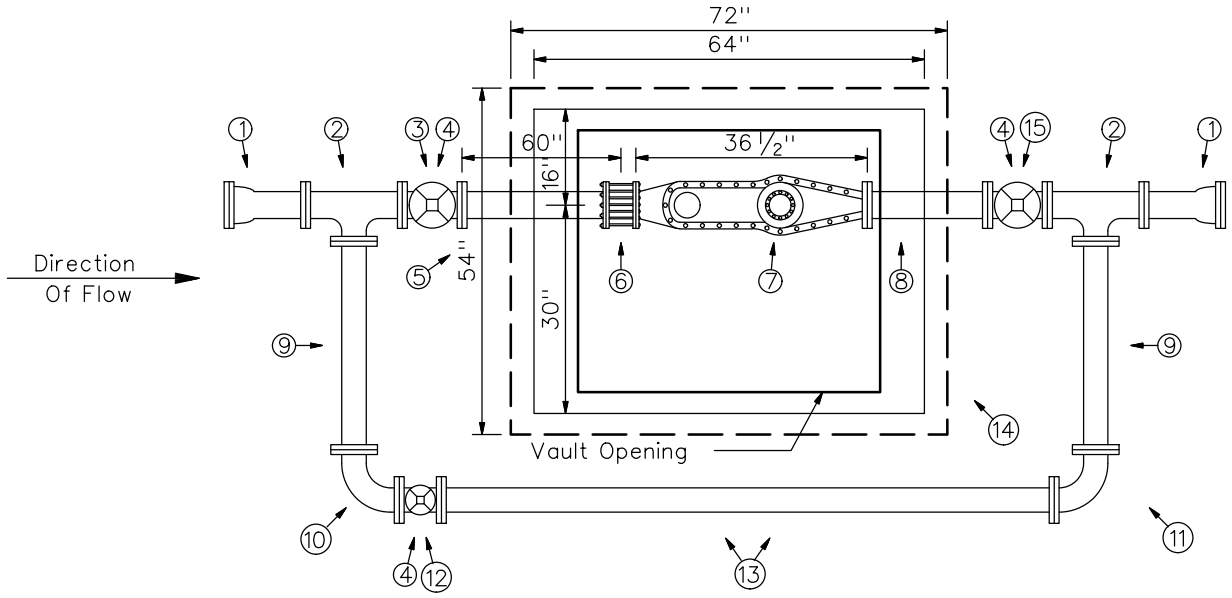
DWU

(Page No.) 514

DATE OCT 2010

Material List		
Part No.	Quantity	Description
①	2 Ea.	6" x 8" Nipple M.J. x F.
②	2 Ea.	6" x 4" Tee F. x F.
③	1 Ea.	6" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	6" x 24" Pipe S. x S.
⑥	1 Ea.	6" Flanged Coupling Adapter
⑦	1 Ea.	6" Meter As Specified (Type Compound Shown)
⑧	1 Ea.	6" x 24" Pipe F. x F.

Material List		
Part No.	Quantity	Description
⑨	2 Ea.	4" x 36" Nipple F. x F.
⑩	1 Ea.	4" 90 Deg. Bend F.x F.
⑪	1 Ea.	4" 90 Deg. Bend M.J. x F.
⑫	1 Ea.	4" Gate Valve F. x M.J.
⑬	1 Ea.	4" Pipe
⑭	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑮	1 Ea.	6" Gate Valve F. x F.



Ref. 501 to 506

6" DOMESTIC SERVICE WITH 6" METER

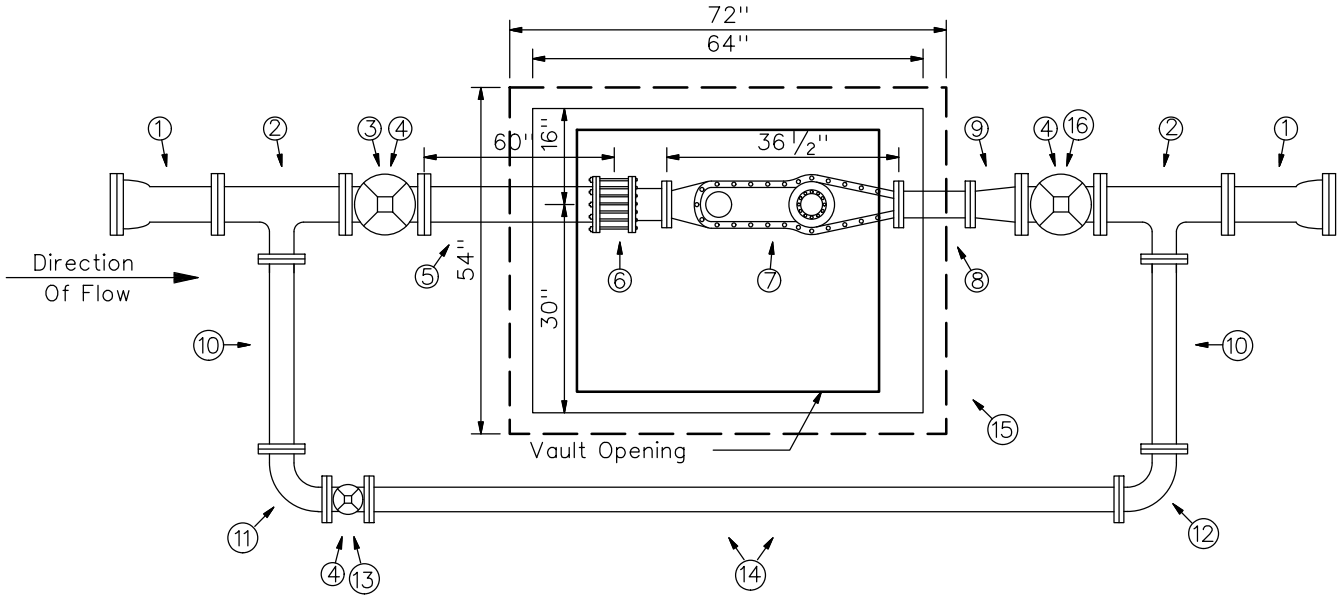
DWU

(Page No.) 515

DATE OCT 2011

Material List		
Part No.	Quantity	Description
①	2 Ea.	8" x 8" Nipple M.J. x F.
②	2 Ea.	8" x 4" Tee F. x F.
③	1 Ea.	8" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	8" x 24" Pipe S. x S.
⑥	1 Ea.	8" x 6" Reducing Flanged Coupling Adaptor
⑦	1 Ea.	6" Meter As Specified (Type Compound Shown)
⑧	1 Ea.	6" x 24" Pipe F. x F.
⑨	1 Ea.	8" x 6" Reducer F. x F.

Material List		
Part No.	Quantity	Description
⑩	2 Ea.	4" x 36" Nipple F. x F.
⑪	1 Ea.	4" 90 Deg. Bend F.x F.
⑫	1 Ea.	4" 90 Deg. Bend M.J. x F.
⑬	1 Ea.	4" Gate Valve F. x M.J.
⑭	1 Ea.	4" Pipe
⑮	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑯	1 Ea.	8" Gate Valve F. x F.



Ref. 501 to 506

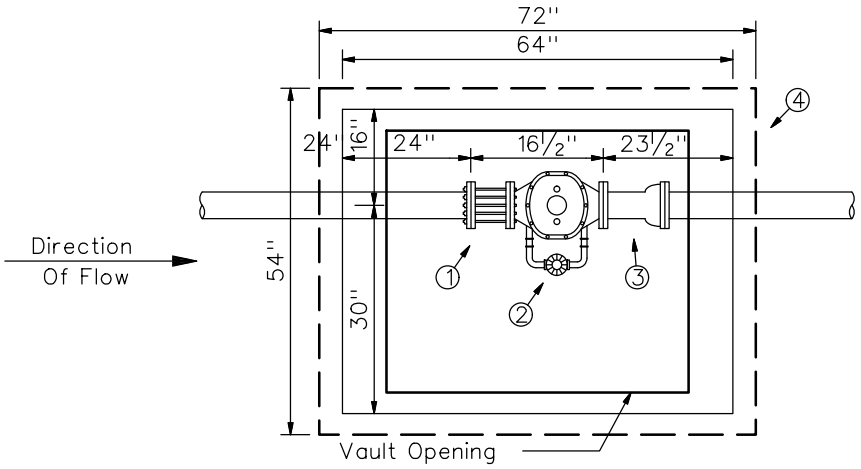
8" DOMESTIC SERVICE WITH 6" METER

DWU

(Page No.) 516

DATE OCT 2010

Material List		
Part No.	Quantity	Description
①	1 Ea.	4" Flanged Coupling Adaptor
②	1 Ea.	4" Detector Check Device W/ By-Pass Meter
③	1 Ea.	4" x 8" Nipple M.J. x F.
④	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

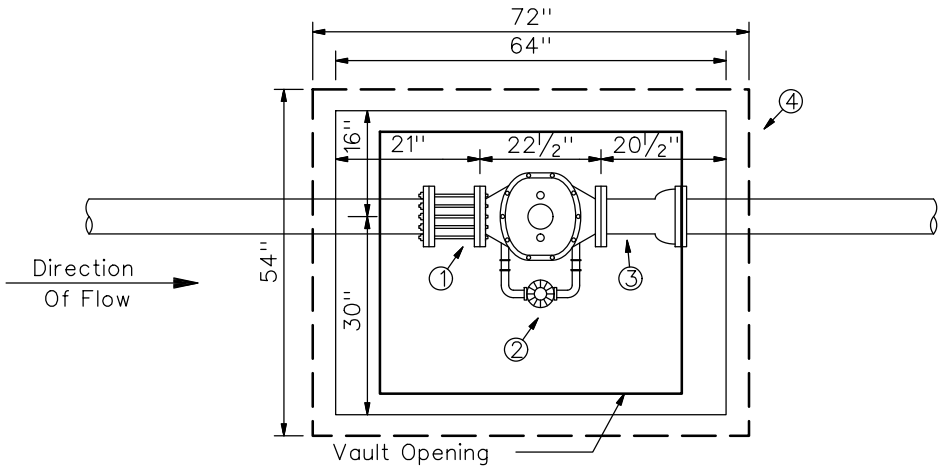
4" CLOSED FIRELINE SERVICE WITH 4" DETECTOR CHECK DEVICE

DWU

(Page No.) 517

DATE JUNE 2002

Material List		
Part No.	Quantity	Description
①	1 Ea.	6" Flanged Coupling Adaptor
②	1 Ea.	6" Detector Check Device W/ By-Pass Meter
③	1 Ea.	6" x 8" Nipple M.J. x F.
④	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

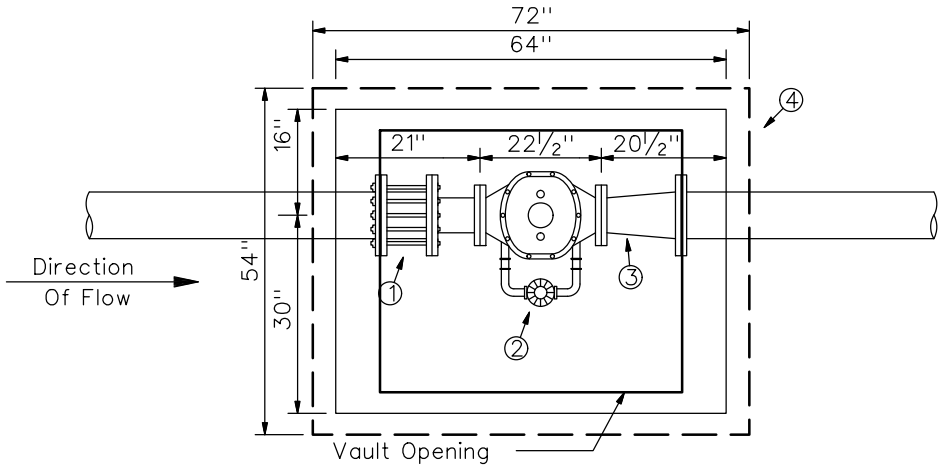
6" CLOSED FIRELINE SERVICE WITH 6" DETECTOR CHECK DEVICE

DWU

(Page No.) 518

DATE JUNE 2002

Material List		
Part No.	Quantity	Description
①	1 Ea.	8" X 6" Flanged Coupling Adaptor
②	1 Ea.	6" Detector Check Device W/ By-Pass Meter
③	1 Ea.	8" X 6" Reducer M.J. X F.
④	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

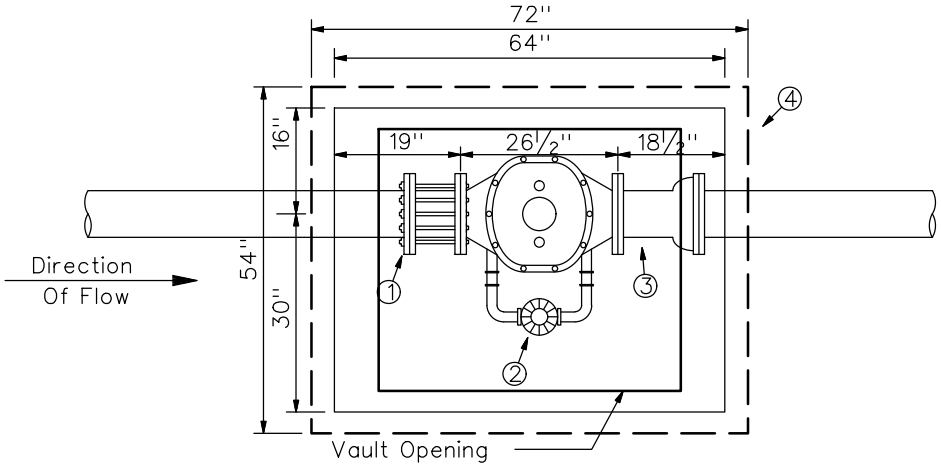
8" CLOSED FIRELINE SERVICE WITH 6" DETECTOR CHECK DEVICE

DWU

(Page No.) 519

DATE JUNE 2002

Material List		
Part No.	Quantity	Description
①	1 Ea.	8" Flanged Coupling Adaptor
②	1 Ea.	8" Detector Check Device W/ By-Pass Meter
③	1 Ea.	8" X 8" Nipple M.J. X F.
④	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

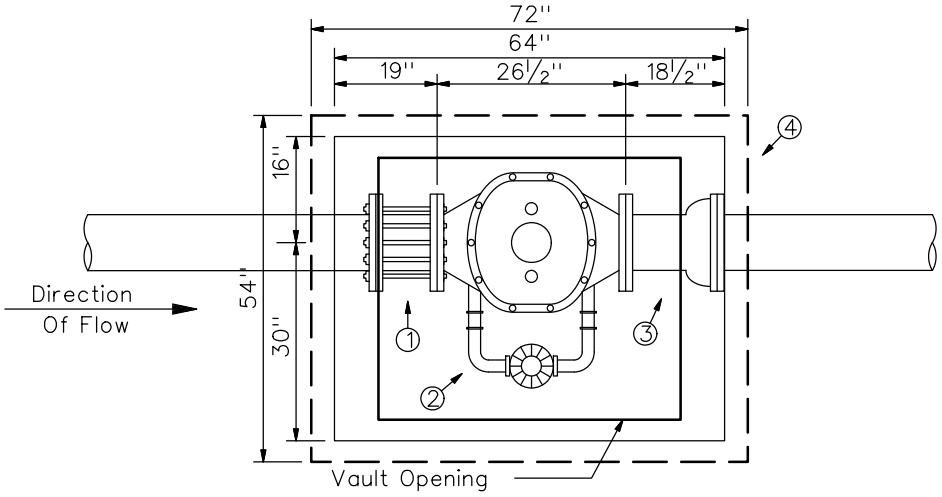
8" CLOSED FIRELINE SERVICE WITH 8" DETECTOR CHECK DEVICE

DWU

(Page No.) 520

DATE
JUNE 2002

Material List		
Part No.	Quantity	Description
①	1 Ea.	10" Flanged Coupling Adaptor
②	1 Ea.	10" Detector Check Device W/ By-Pass Meter
③	1 Ea.	10" X 8" Nipple M.J. X F.
④	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

10" CLOSED FIRELINE SERVICE WITH 10" DETECTOR CHECK DEVICE

DWU

(Page No.) 521

DATE JUNE 2002

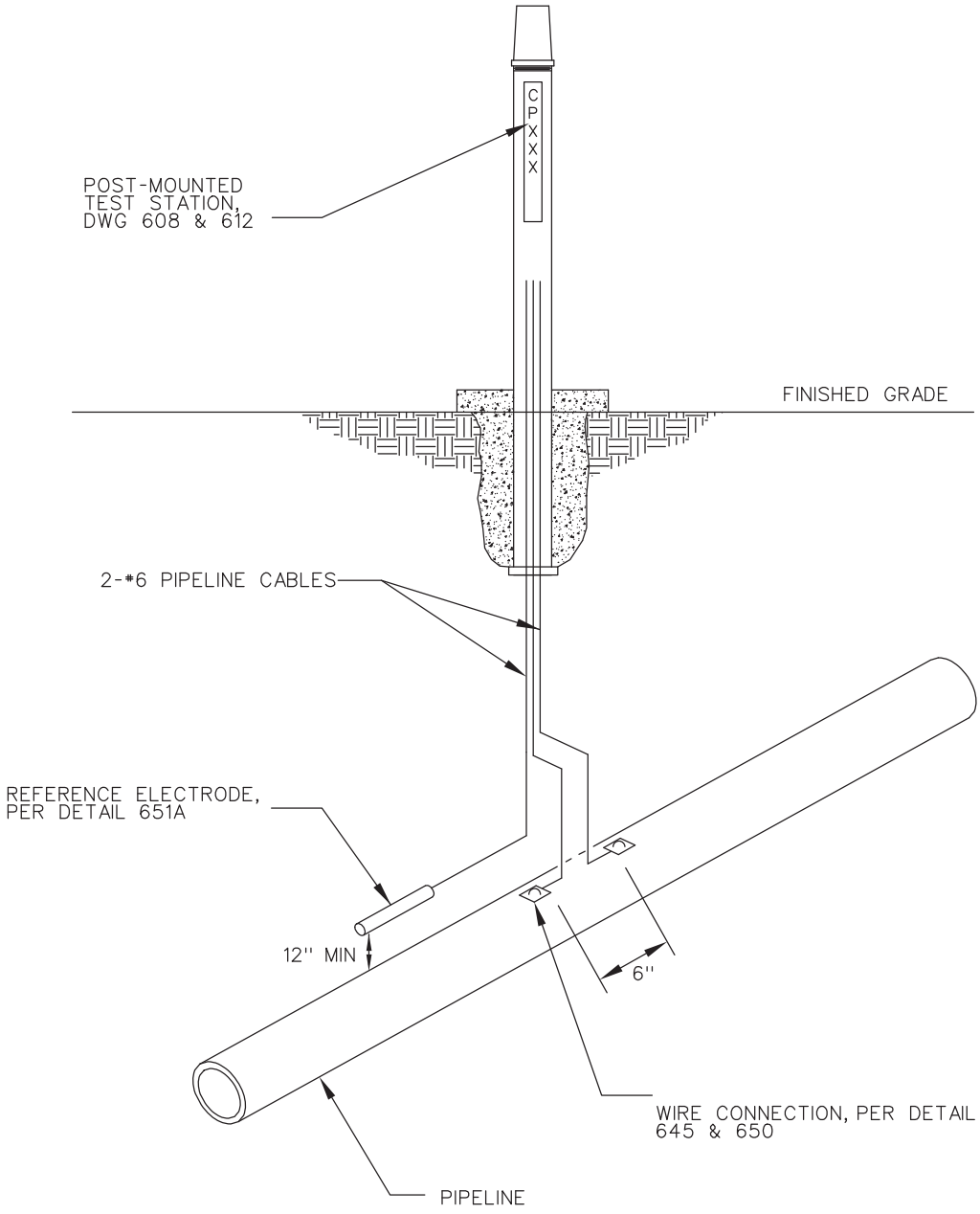
PART 6

(Series 600)

CATHODIC PROTECTION

City of Dallas
Water Utilities Department

PART 6
CATHODIC PROTECTION



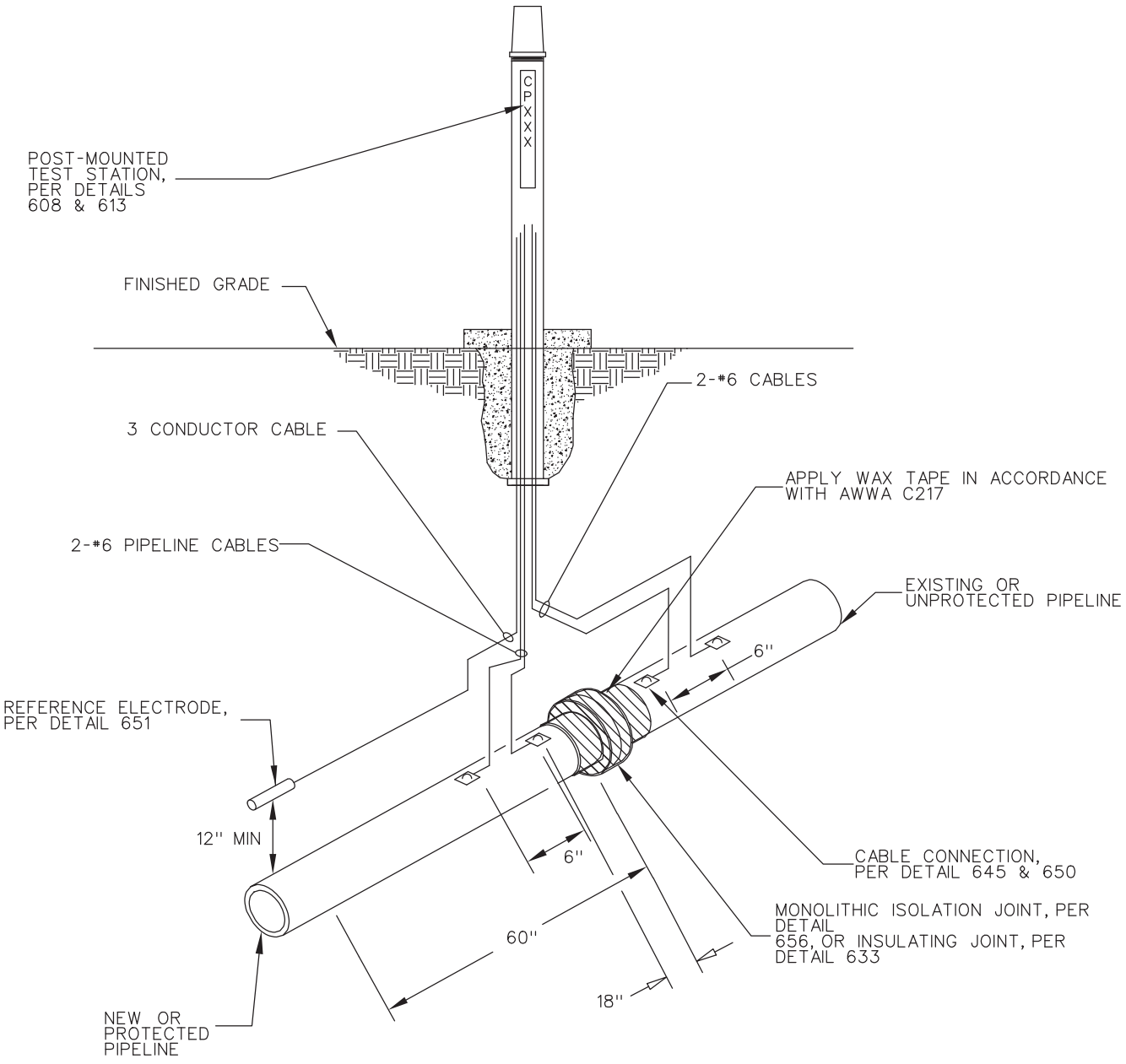
NOTES:

1. PLACE PLASTIC WARNING TAPE 12" ABOVE CABLES RUNS.
2. HORIZONTAL RUNS TO BE 36" BELOW GRADE.

REFER TO PAGES 608, 612, 645, 650 & 651A

POTENTIAL TEST STATION

	(Page No.)
DWU	601
DATE OCT. 2016	

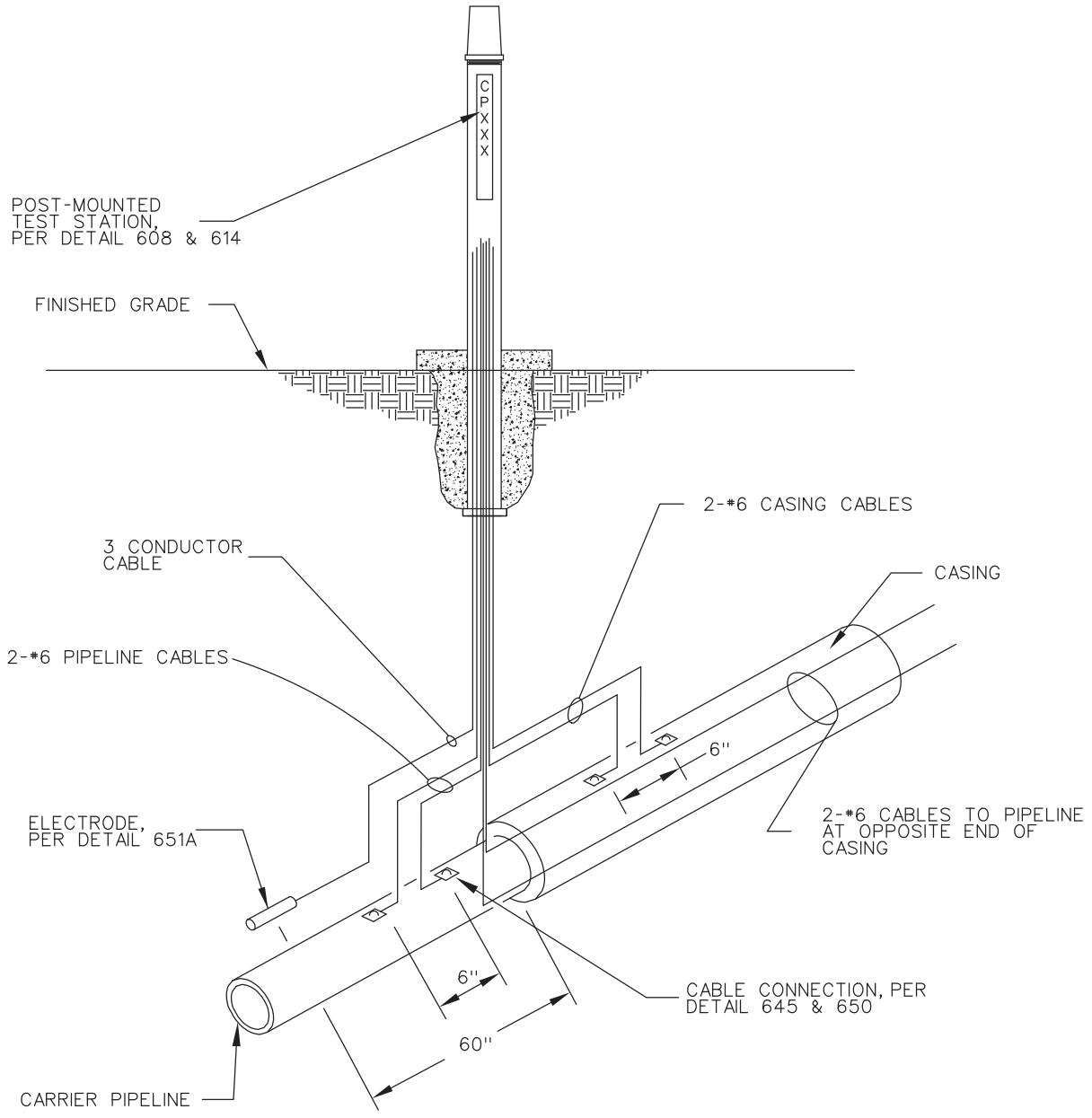


NOTES:

1. PLACE PLASTIC WARNING TAPE 12" ABOVE CABLE RUNS.
2. HORIZONTAL RUNS TO BE 36" BELOW GRADE.
3. DO NOT MAKE CABLE CONNECTIONS WITHIN 18" OF MONOLITHIC ISOLATION JOINT.

REFER TO PAGES 608,613,633,645,
650, 651A & 656

INSULATING JOINT TEST STATION		DWU	(Page No.) 602
		DATE OCT. 2016	



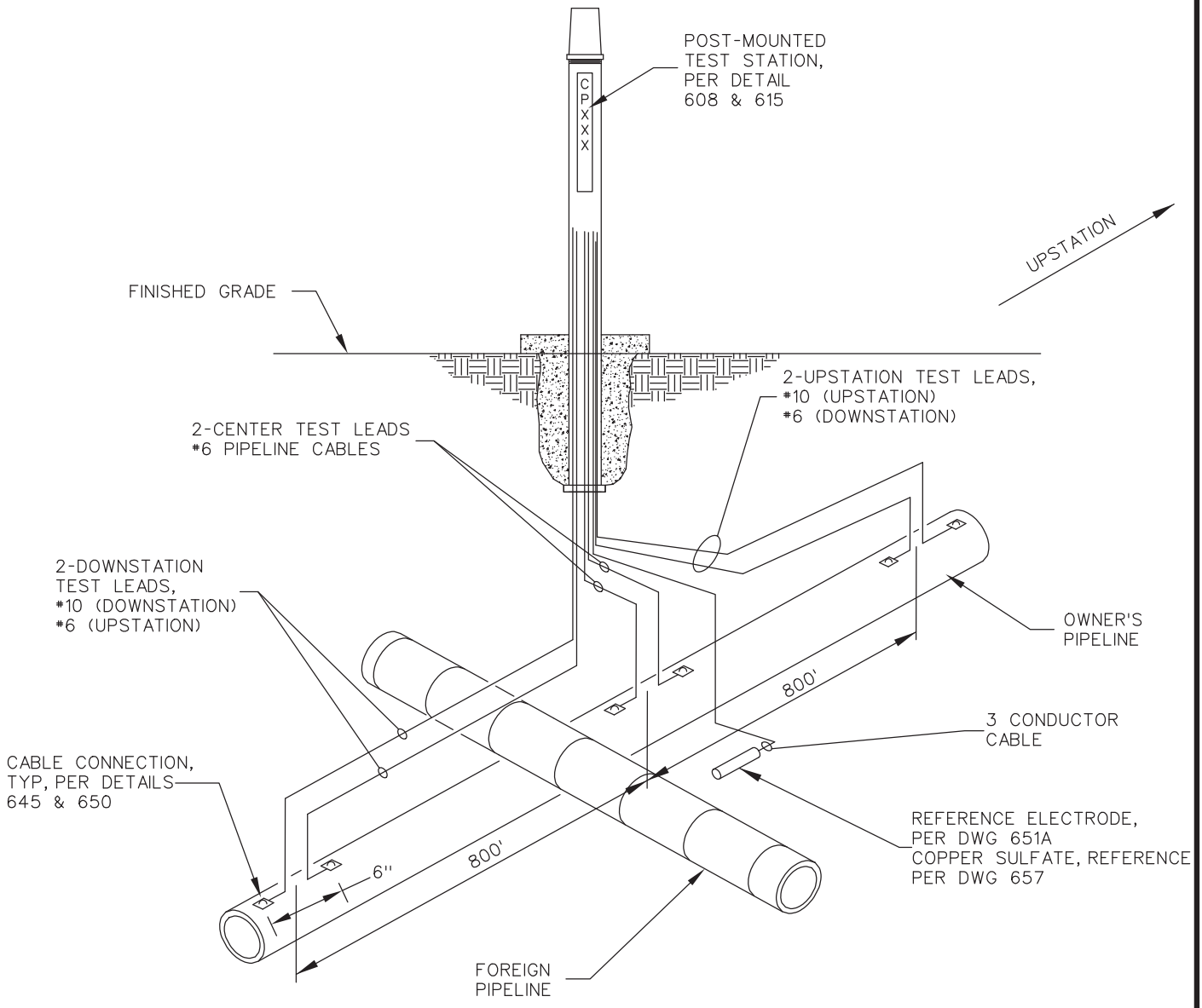
NOTES:

1. PLACE PLASTIC WARNING TAPE 12" ABOVE WIRE RUNS.
2. HORIZONTAL RUNS TO BE 36" BELOW GRADE.

REFER TO PAGES 608, 614, 645, 650, & 651A

CASING TEST STATION

DWU		(Page No.) 603
DATE OCT. 2016		



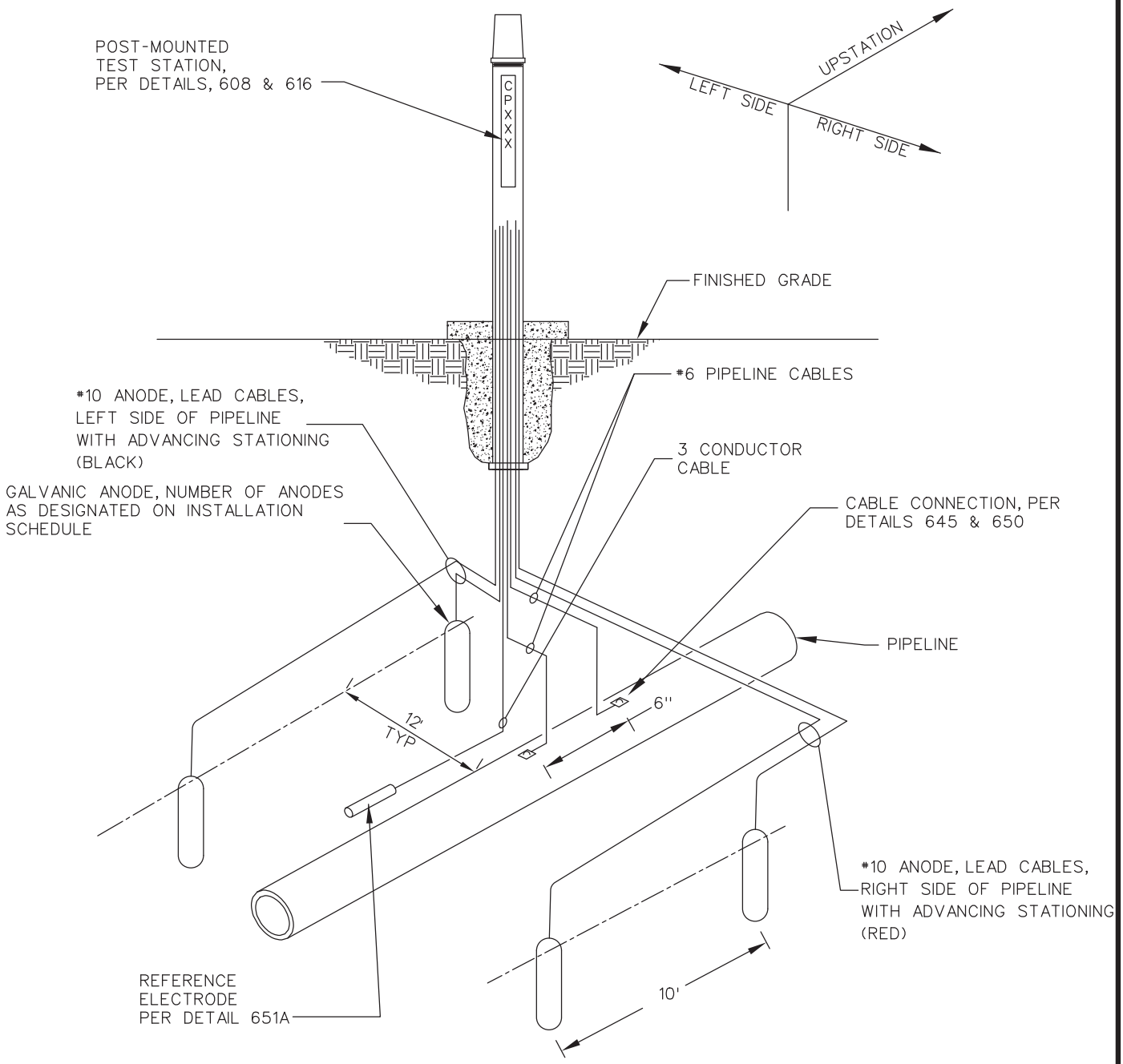
NOTES:

1. PLACE PLASTIC WARNING TAPE 12" ABOVE CABLE RUNS.
2. HORIZONTAL RUNS TO BE 36" BELOW GRADE.

REFER TO PAGES 608, 615, 645, 650, 651A & 657

FOREIGN PIPELINE TEST STATION

DWU		(Page No.) 604
DATE OCT. 2016		



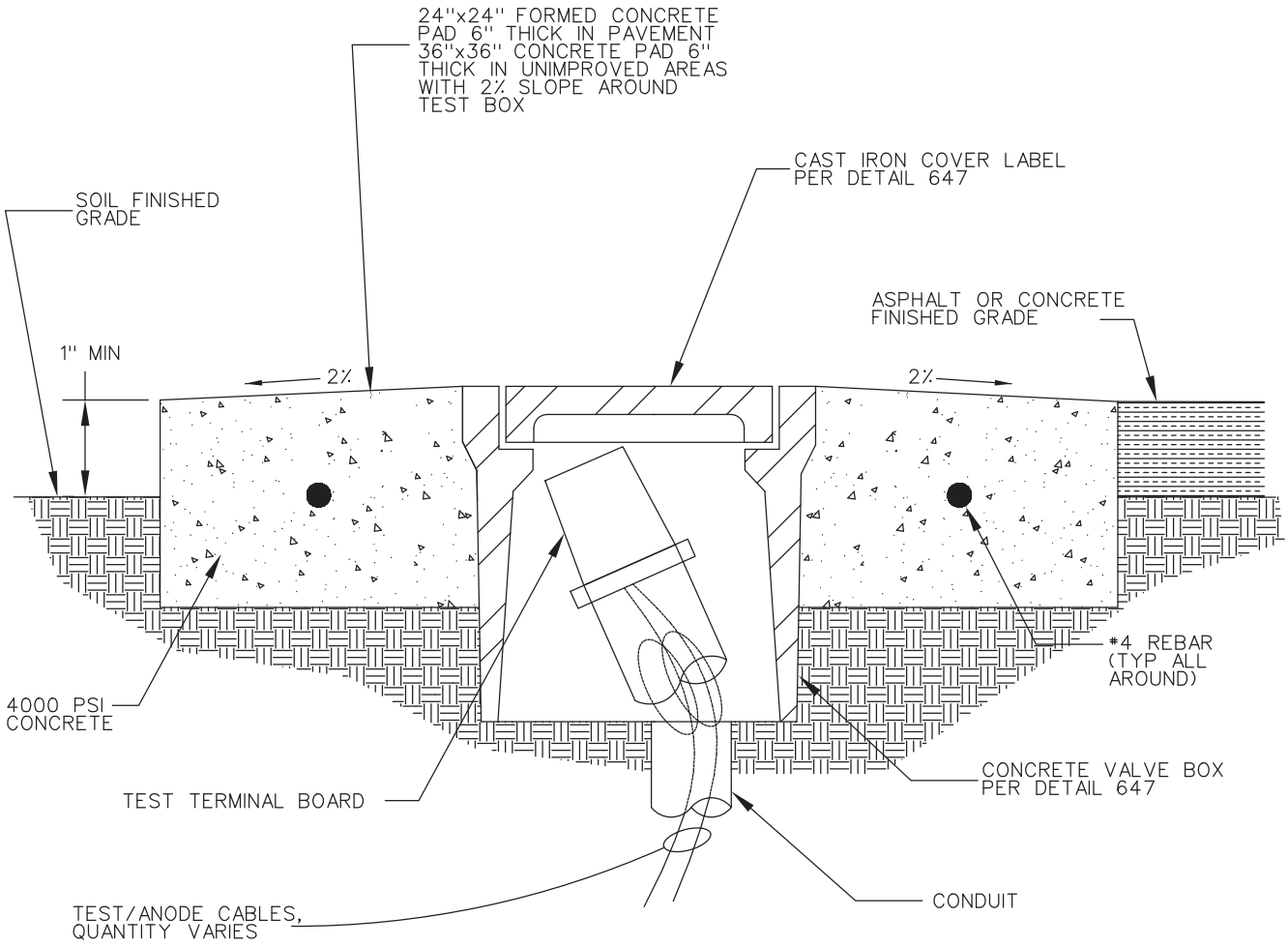
NOTES:

1. PLACE PLASTIC WARNING TAPE 12" ABOVE CABLE RUNS.
2. HORIZONTAL RUNS TO BE 36" BELOW GRADE.

REFER TO PAGES 608, 616, 645, 650 & 651A

GALVANIC ANODE TEST STATION

	(Page No.)
DWU	605
DATE OCT. 2016	



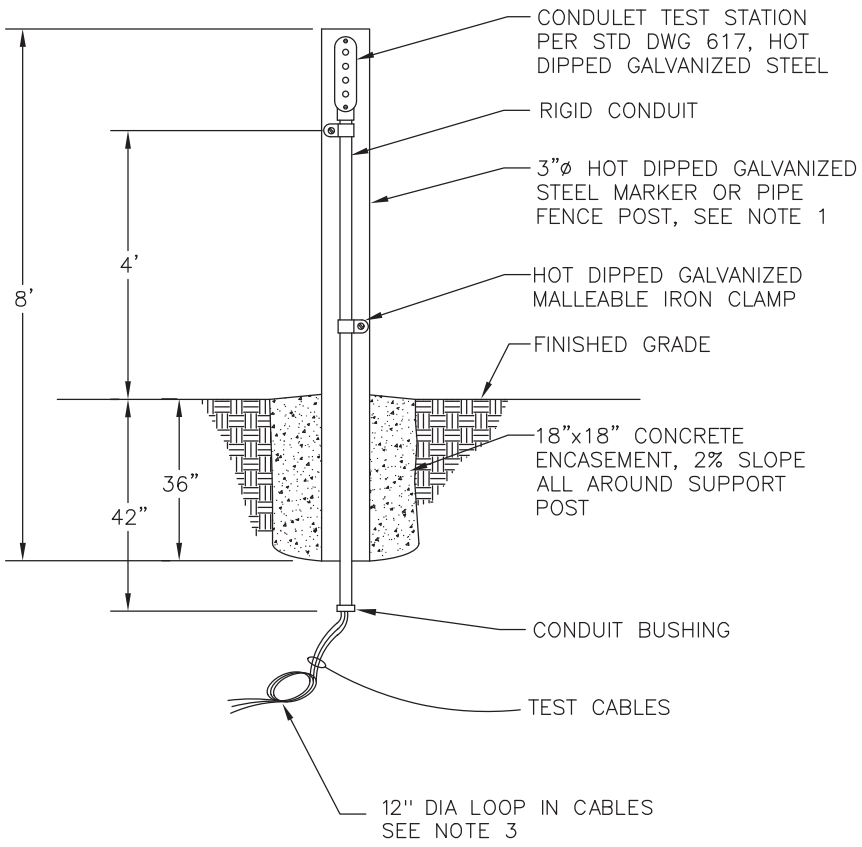
NOTES:

1. PROVIDE SLACK IN CABLES, 24" MINIMUM
2. INSTALL CONCRETE SLAB 1" TO 2" ABOVE FINISH GRADE IN OPEN AREAS AND FLUSH WITH FINISH GRADE IN ASPHALT OR CONCRETE PAVED AREAS.
3. PROVIDE EXTENSIONS AS REQUIRED TO MATCH OR EXCEED PAVEMENT THICKNESS, NOT SHOWN.
4. BOTTOM OF VALVE BOX SHALL BE NATIVE SOIL. DO NOT PLACE ROCK, GRAVEL, OR SAND IN VALVE BOX.

REFER TO PAGE 647

FLUSH MOUNTED TEST STATION

DWU	(Page No.) 606
DATE OCT. 2016	

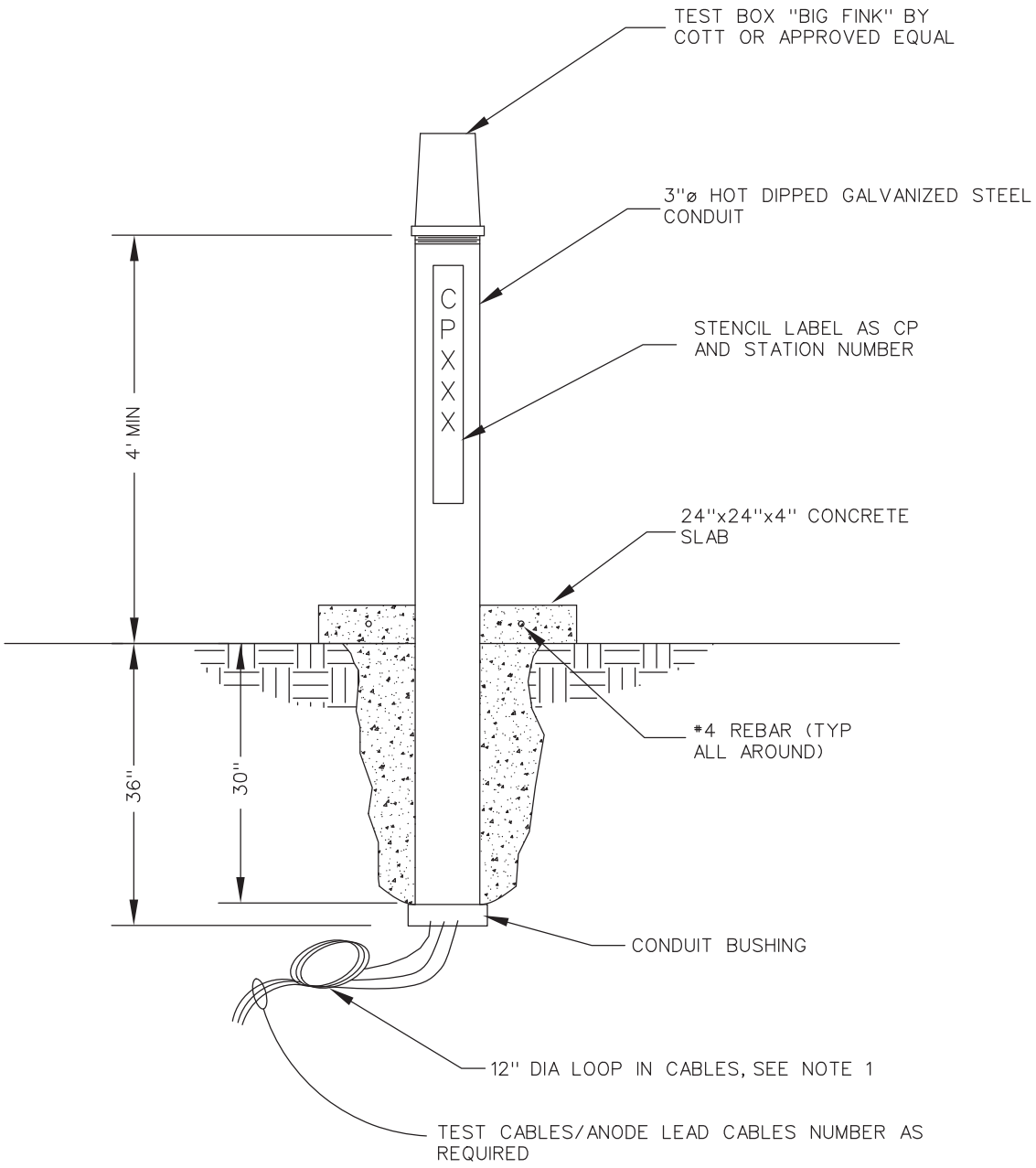


NOTES:

1. USE CONDULET STYLE TEST STATION ONLY WHERE SUPPORT IS PROVIDED BY STEEL PIPE MARKER, FENCE POST, ABOVE GROUND STRUCTURE, MANHOLE, OR BUILDING.
2. LOOP WIRE AT BASE OF POST TO MINIMIZE CABLE STRESS.
3. STENCIL LABEL ON SIDE OF POST AS DEPICTED IN DWG 608.

REFER TO PAGE 617

CONDULET STYLE TEST STATION		DWU	(Page No.) 607
		DATE OCT. 2016	

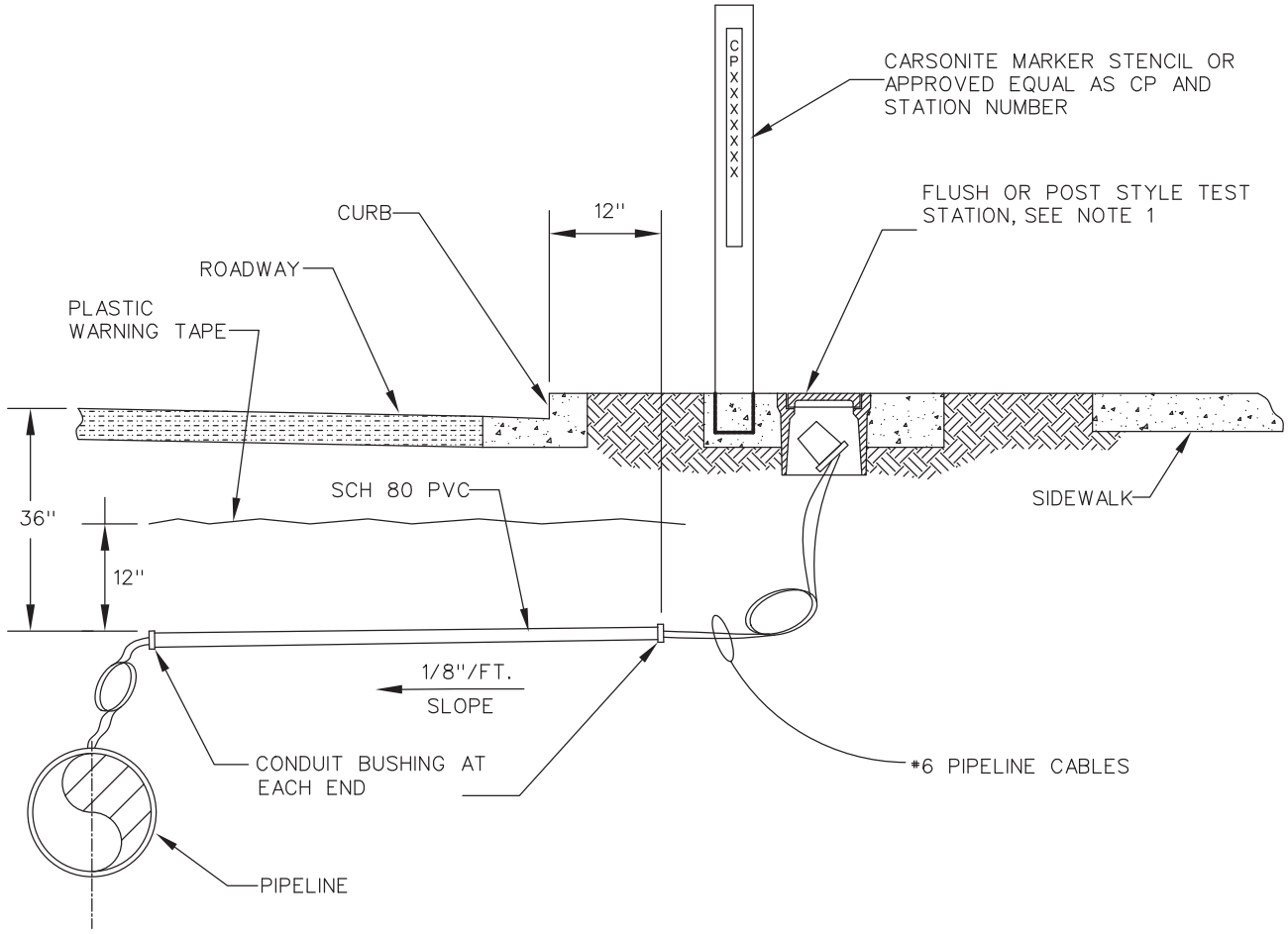


NOTES:

1. LOOP WIRE AT BASE OF POST TO MINIMIZE CABLE STRESS.
2. COAT CABLES WITH INORGANIC ZINC PRIMER OR COLD GALVANIZING REPAIR COATING.
3. FOR ANODE TEST STATION, USE ANODE JUNCTION BOX IF NUMBER OF ANODES IS MORE THAN 4, PER STD DWG 618.
4. ALL WELDING BEFORE WIRE INSTALLATION TO PREVENT DAMAGE TO CABLE.
5. REMOVE SHARP EDGES FROM STEEL CONDUIT.

REFER TO PAGE 618

POST MOUNTED TEST STATION		DWU	(Page No.) 608
		DATE OCT. 2016	



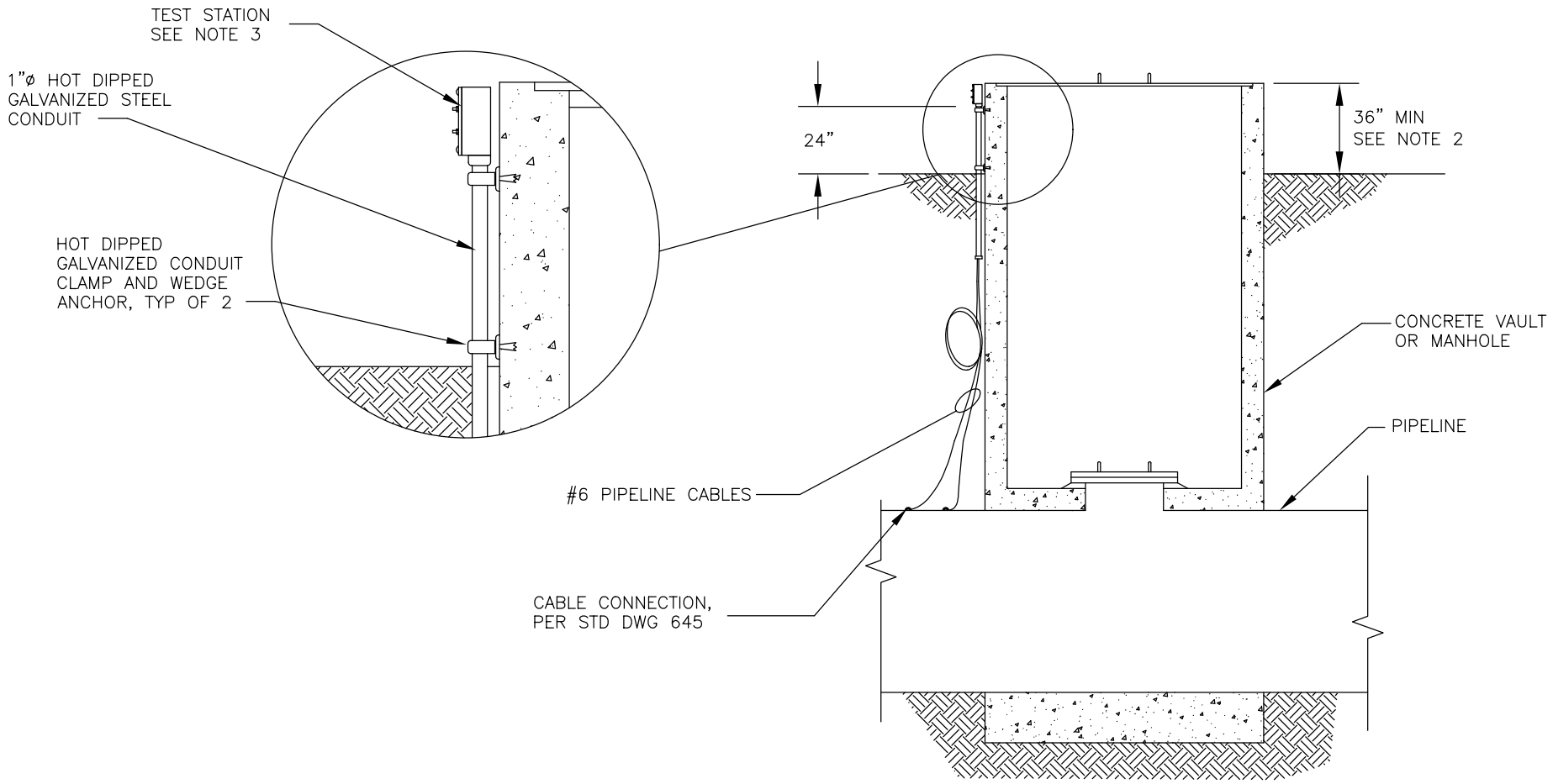
NOTES:

1. INSTALLATION SIMILAR FOR POST STYLE TEST STATION.
2. BURIED CONDUIT TO BE SCH 80 PVC.
3. SEAL BOTH ENDS OF RIGID CONDUIT WITH DUCT COMPOUND OR URETHANE FOAM.
4. EMBED CARSONITE MARKER IN CONCRETE.

REFER TO PAGES 608 & 618

TYPE ROADWAY OFFSET

DWU		(Page No.) 609
DATE OCT. 2016		



NOTES:

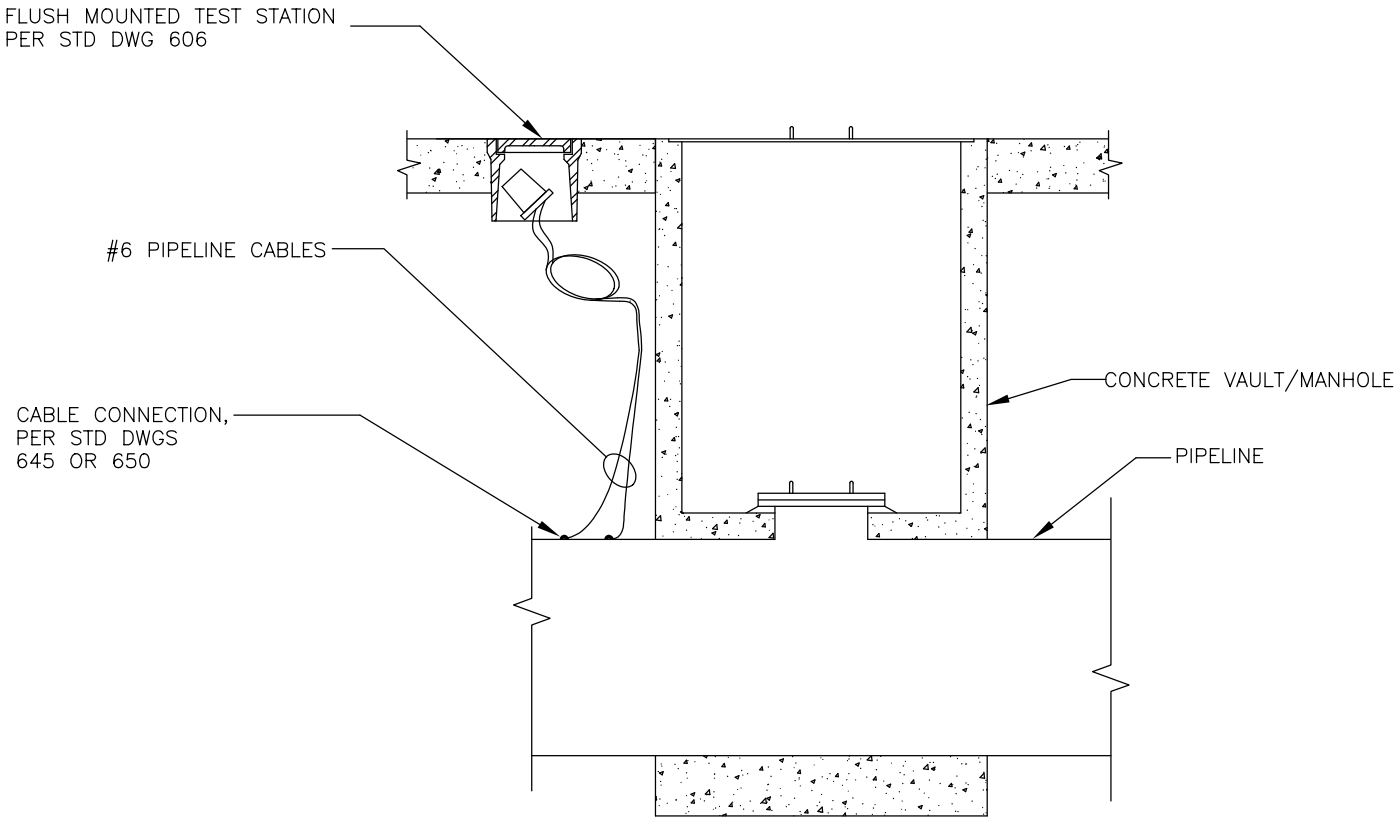
1. INSTALL TEST STATION OVER CENTER OF PIPE.
2. IF VAULT TOP IS LESS THAN 36" ABOVE FINISHED GRADE, THEN INSTALL FLUSH MOUNTED VAULT PER STD DWG 611.
3. TEST BOX SHOULD BE TYPE CONDULET TEST BOX. PER STD DWG 617.

REFER TO PAGES 611, 617 & 645

REFER TO GENERAL NOTES
FOR LARGE VALVES WITH
MANHOLES - PAGE 216

WALL MOUNTED VAULT STYLE TEST STATION

DWU	(Page No.) 610
DATE OCT. 2016	



NOTE:

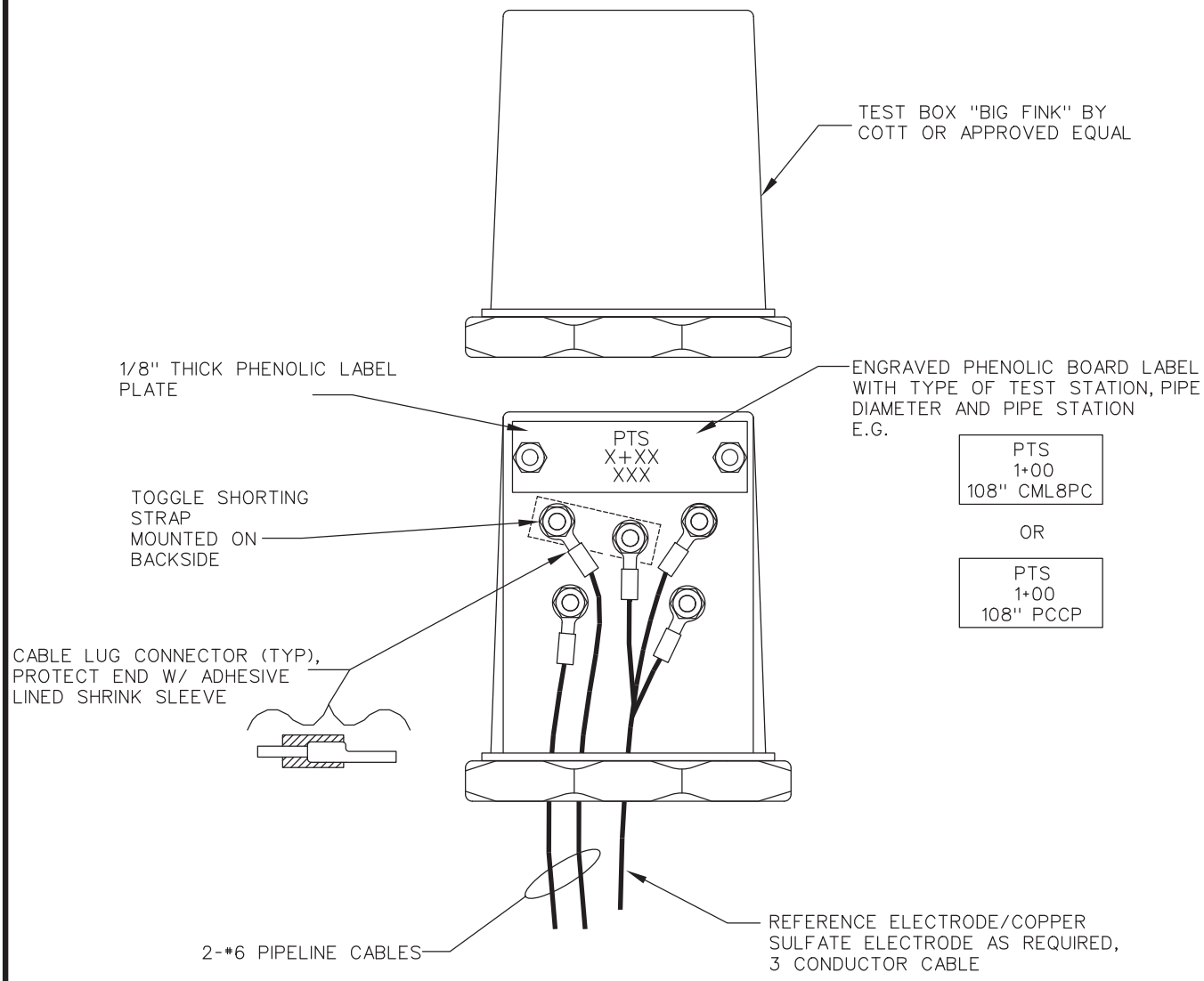
1. INSTALL TEST STATION OVER CENTER OF PIPE.

REFER TO PAGES 606, 645 & 650

REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

FLUSH MOUNTED VAULT STYLE TEST STATION

	DWU	(Page No.) 611
	DATE OCT. 2016	



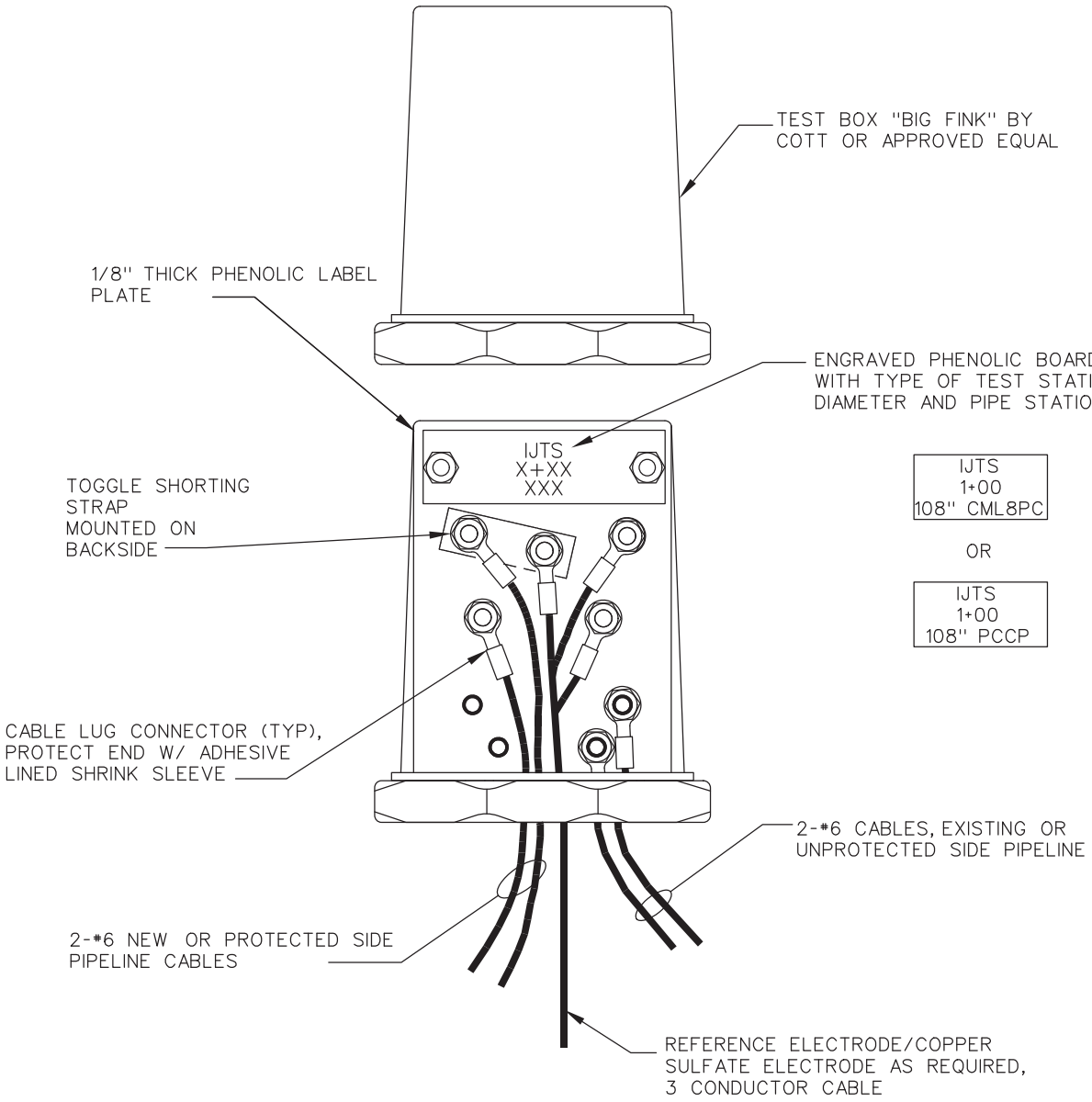
NOTES:

1. TERMINALS SHALL BE 1/4" NICKEL PLATED BRASS LOCKING WASHER, TWO FLAT WASHERS, AND DOUBLE NUTS.
2. SOLDER ALL LUGS TO CABLES.
3. REFERENCE ELECTRODE SHOULD ONLY BE INSTALLED AT TEST STATIONS DESIGNATED IN THE INSTALLATION SCHEDULE.

REFER TO PAGE 657

FLUSH MOUNTED POTENTIAL TEST STATION TEST TERMINAL BOARD

	(Page No.)
DWU	612
DATE OCT. 2016	

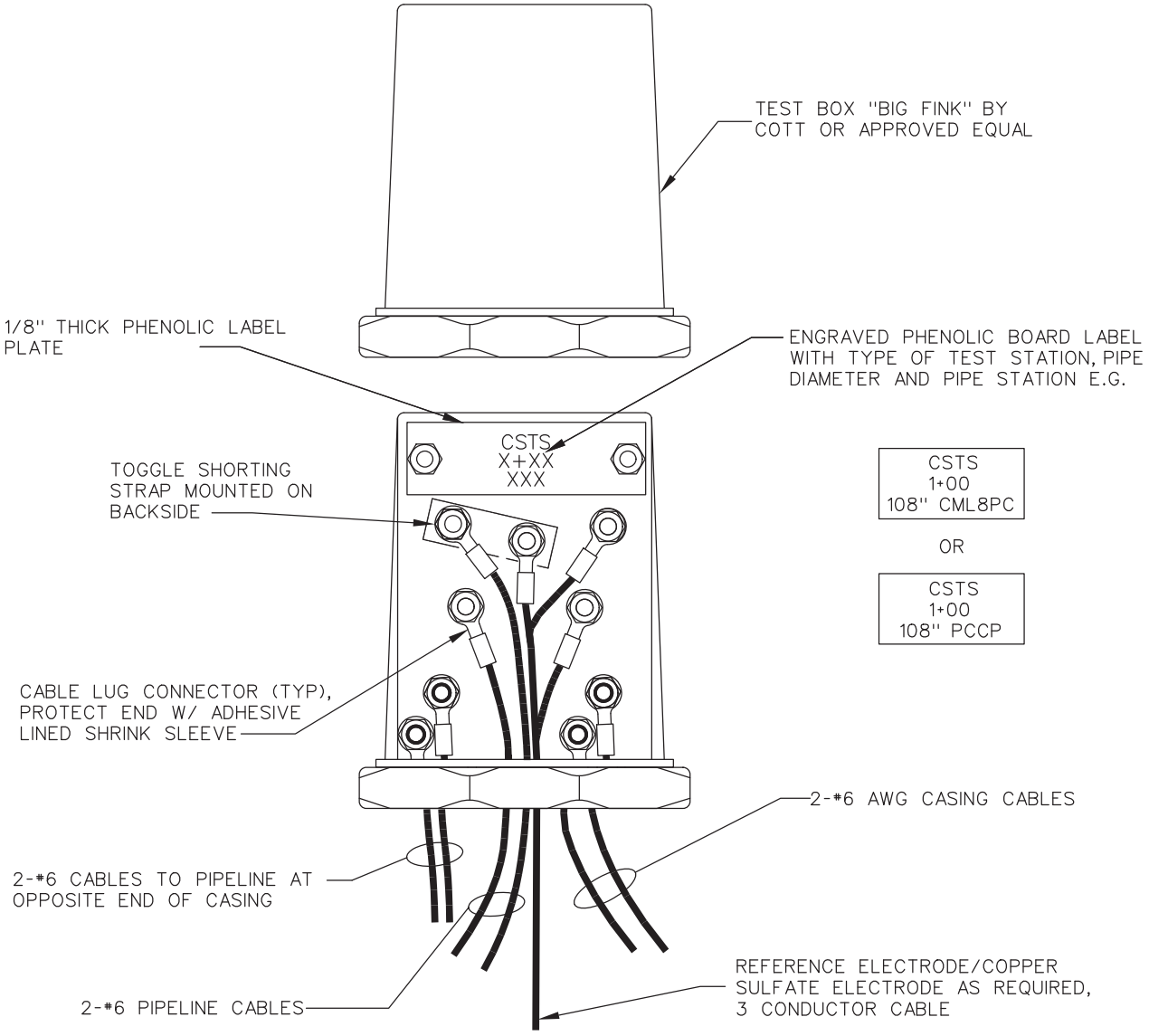


NOTES:

1. TERMINALS SHALL BE 1/4" NICKEL PLATED BRASS WITH LOCKING WASHER, TWO FLAT WASHERS, AND DOUBLE NUTS.
2. SOLDER ALL LUGS TO CABLES.

REFER TO PAGE 657

FLUSH MOUNTED INSULATING JOINT TEST STATION TEST TERMINAL BOARD		DWU	(Page No.) 613
		DATE OCT. 2016	

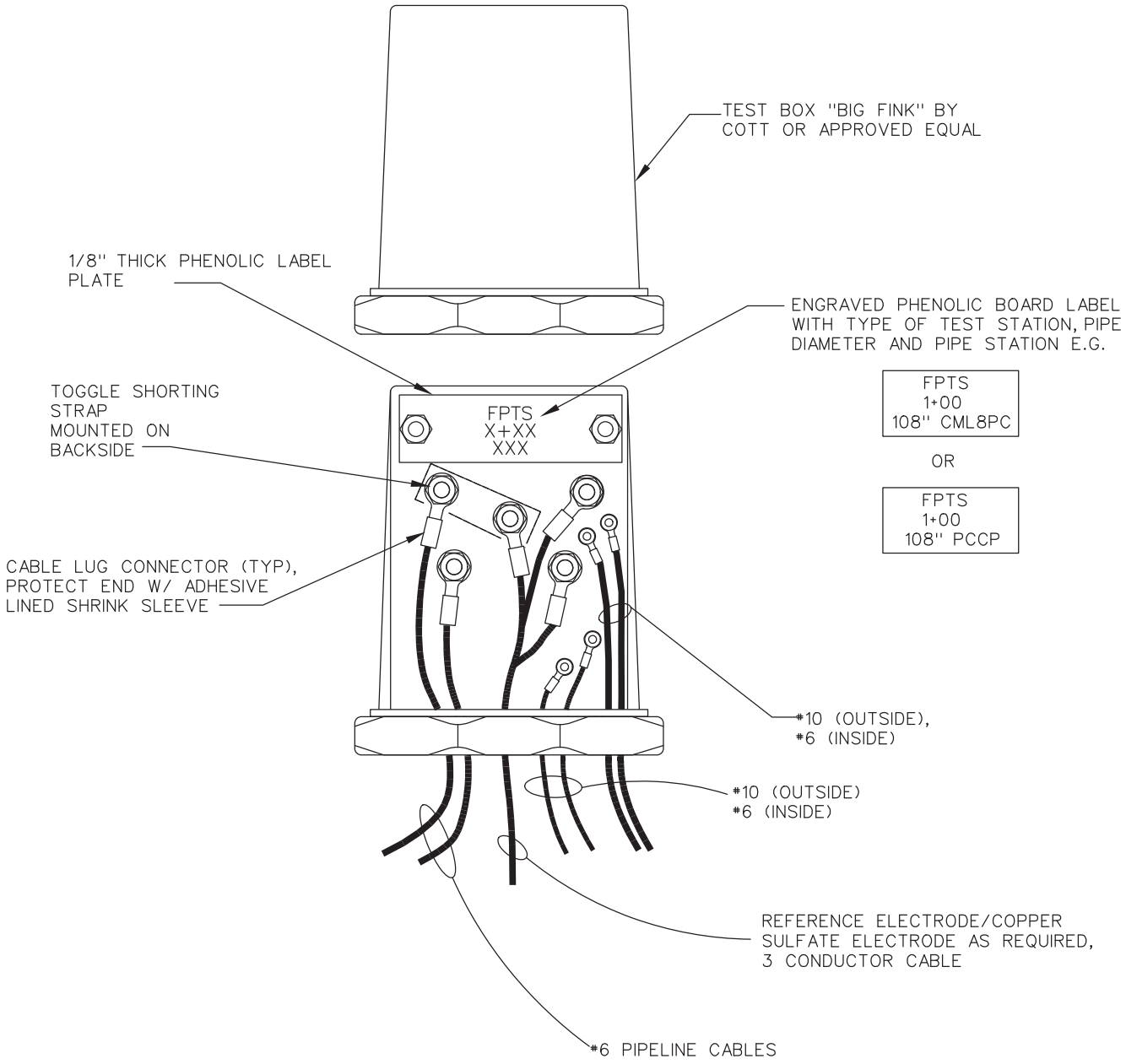


NOTES:

1. TERMINALS SHALL BE 1/4" NICKEL PLATED BRASS WITH LOCKING WASHER, TWO FLAT WASHERS, AND DOUBLE NUTS.
2. SOLDER ALL LUGS TO CABLES.

REFER TO PAGE 657

FLUSH MOUNTED CASING TEST STATION TEST TERMINAL BOARD		DWU	(Page No.) 614
		DATE OCT. 2016	



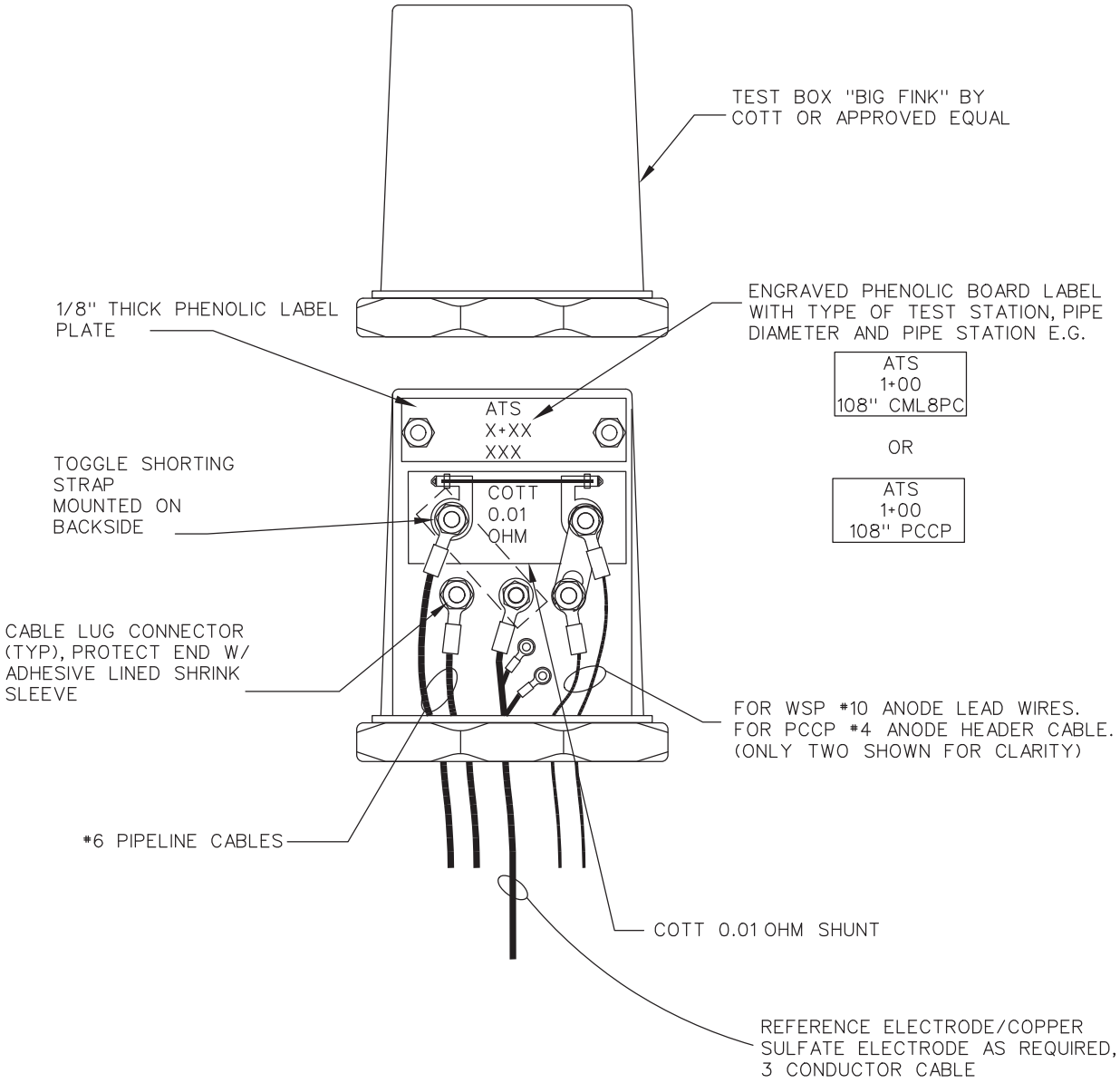
NOTES:

1. TERMINALS SHALL BE 1/4" NICKEL PLATED BRASS WITH LOCKING WASHER, TWO FLAT WASHERS, AND DOUBLE NUTS.
2. SOLDER ALL LUGS TO CABLES.

REFER TO PAGE 657

FLUSH MOUNTED FOREIGN PIPELINE TEST STATION TEST TERMINAL BOARD

	(Page No.)
DWU	615
DATE OCT. 2016	

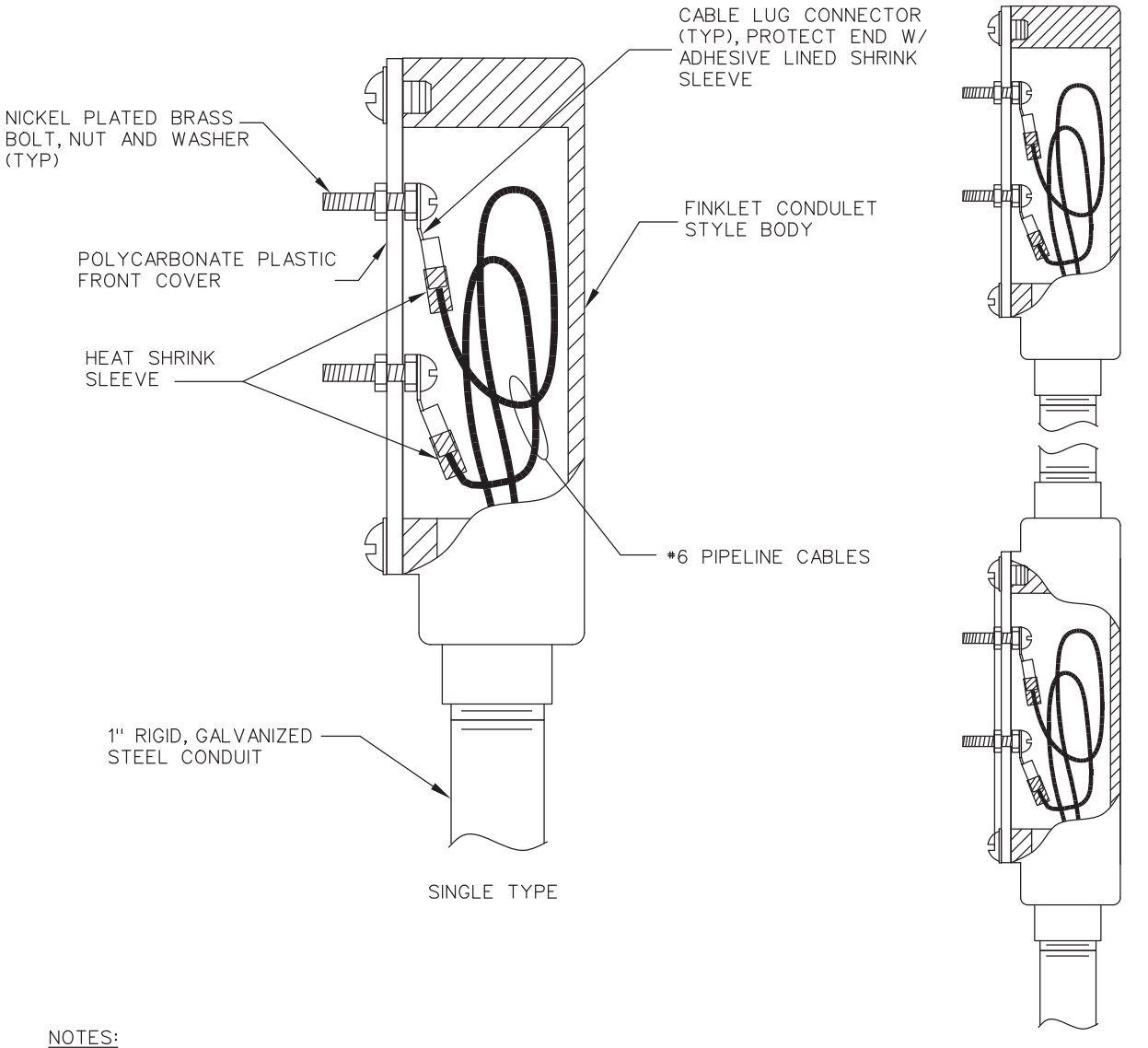


NOTES:

1. TERMINALS SHALL BE 1/4" NICKEL PLATED BRASS WITH LOCKING WASHER,TWO FLAT WASHERS, AND DOUBLE NUTS.
2. SOLDER ALL LUGS TO CABLES.
3. REFERENCE ELECTRODE SHOULD ONLY BE INSTALLED AT TEST STATIONS DESIGNATED IN THE INSTALLATION SCHEDULE.

REFER TO PAGE 657

FLUSH MOUNTED ANODE TEST STATION TEST TERMINAL BOARD		DWU	(Page No.) 616
		DATE OCT. 2016	



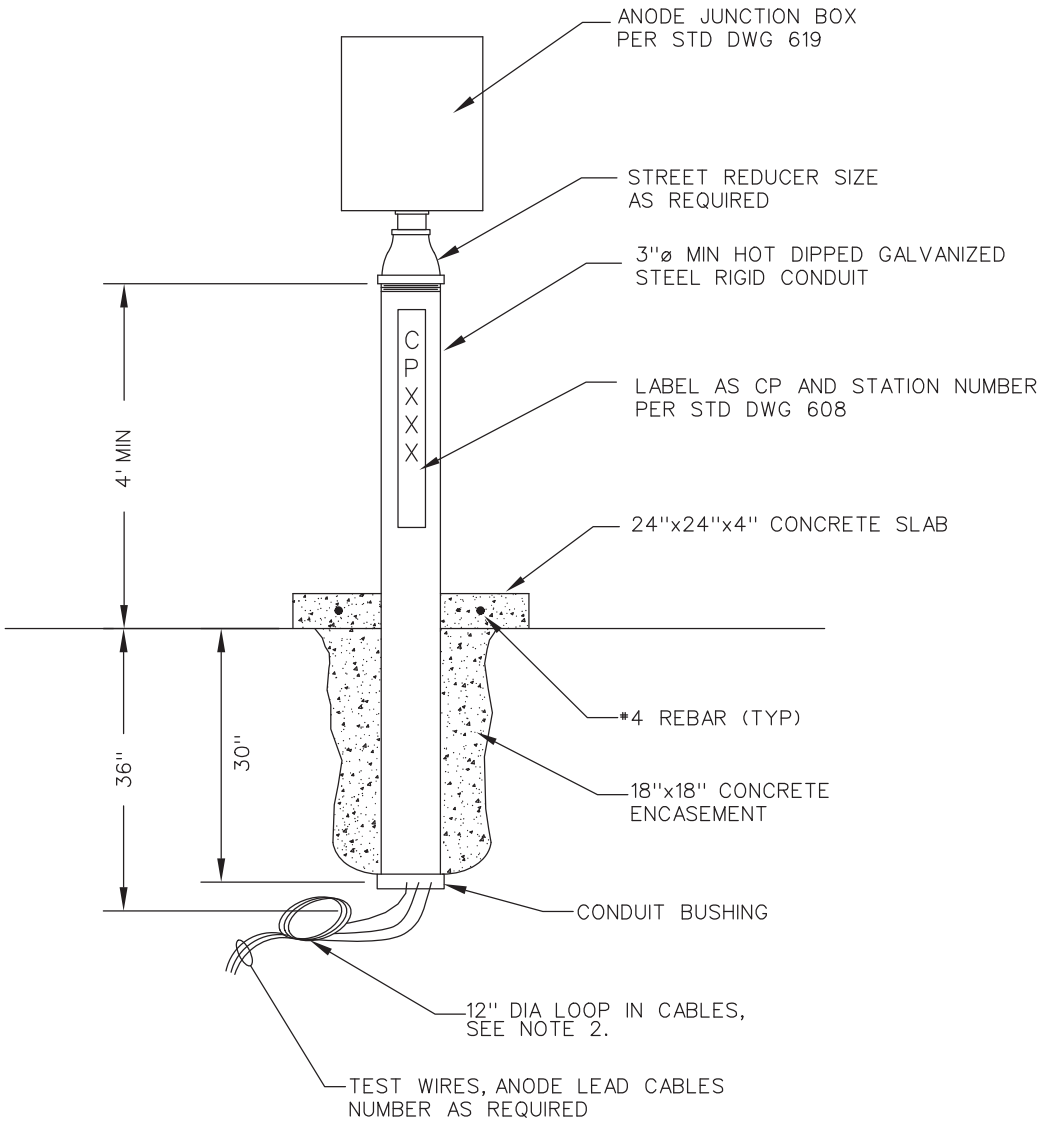
NOTES:

1. COLOR OF FRONT COVER TO DENOTE APPLICATION,
2. USE CONDULET STYLE TEST STATION ONLY WHERE SUPPORT IS PROVIDED BY STEEL PIPE MARKER,FENCE POST,ABOVE GROUND STRUCTURE, MANHOLE, OR BUILDING.
3. LOOP WIRE AT BASE OF POST TO MINIMIZE CABLE STRESS.
4. STENCIL LABEL ON SIDE OF POST AS DEPICTED IN DWG 608.

REFER TO PAGE 608

CONDULET TEST BOX

	(Page No.)
DWU	617
DATE OCT. 2016	

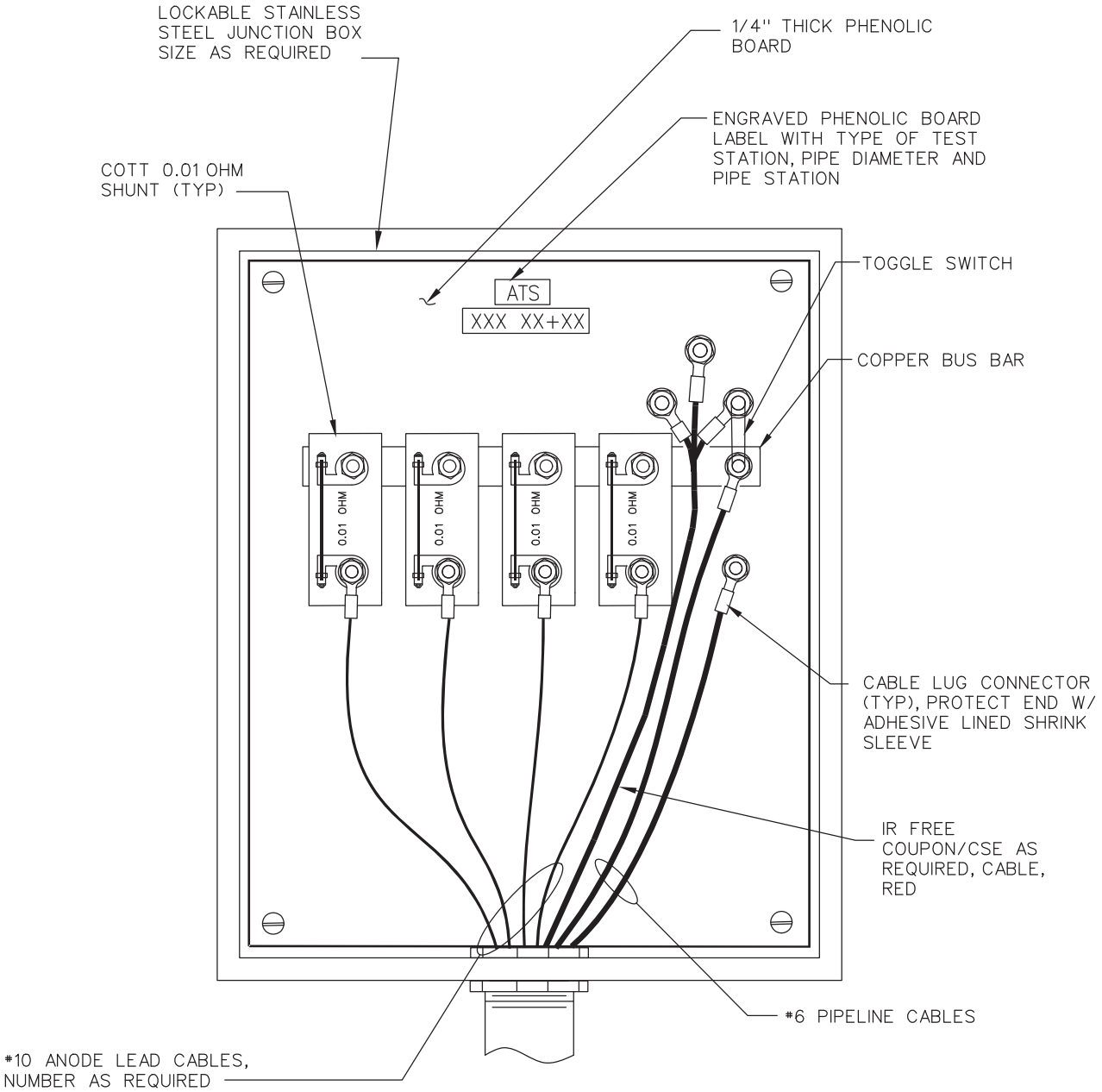


NOTES:

1. LOOP WIRE AT BASE OF POST TO MINIMIZE WIRE STRESS.
2. COAT THREADS WITH INORGANIC ZINC PRIMER OR COLD GALVANIZING REPAIR COATING.

REFER TO PAGES 608 & 619

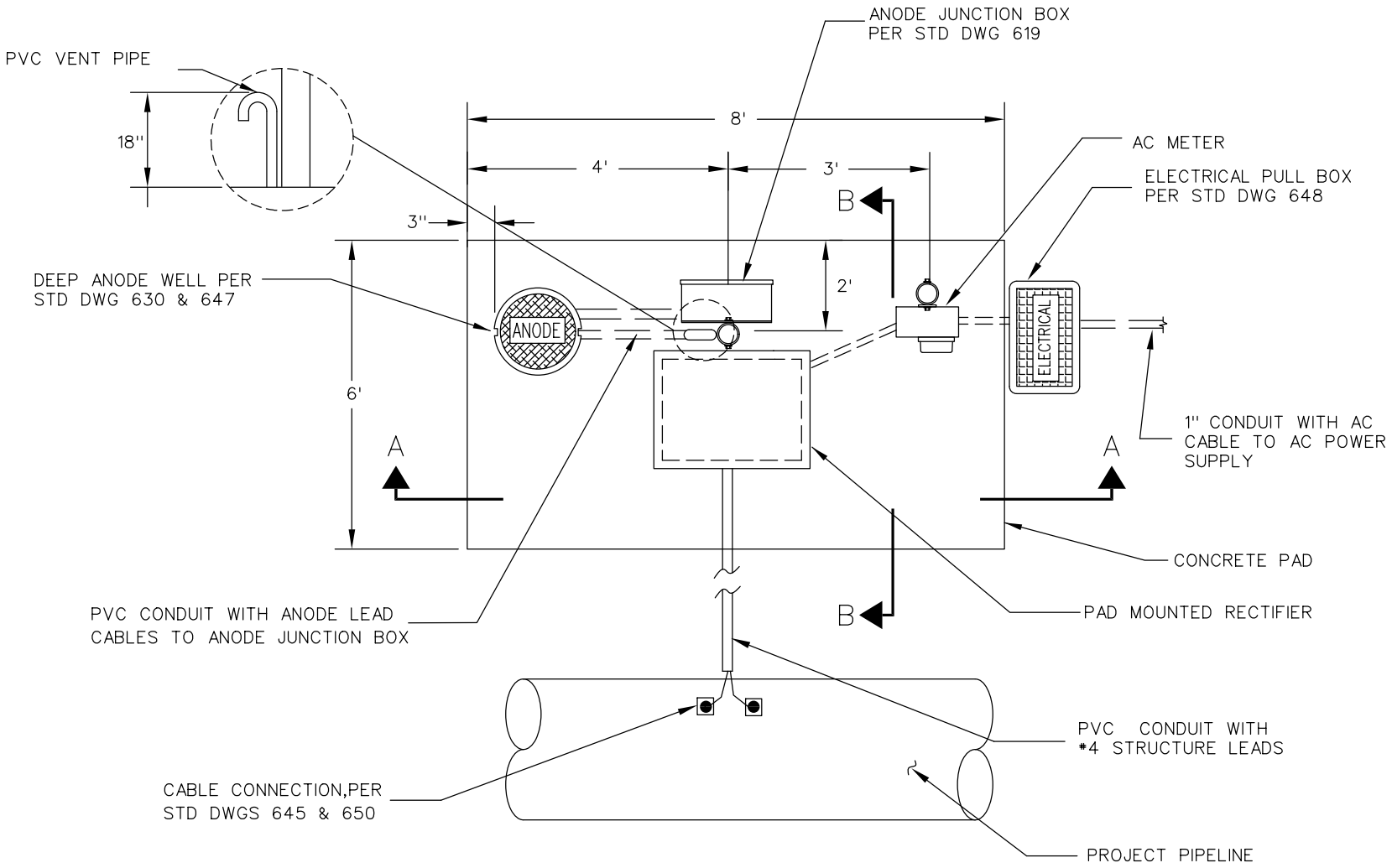
POST MOUNTED GALVANIC ANODE JUNCTION BOX TEST STATION		DWU	(Page No.) 618
		DATE OCT. 2016	



NOTE:

1. TERMINALS SHALL BE 1/4" STAINLESS STEEL WITH LOCKING WASHER, TWO FLAT WASHERS, AND DOUBLE NUTS.

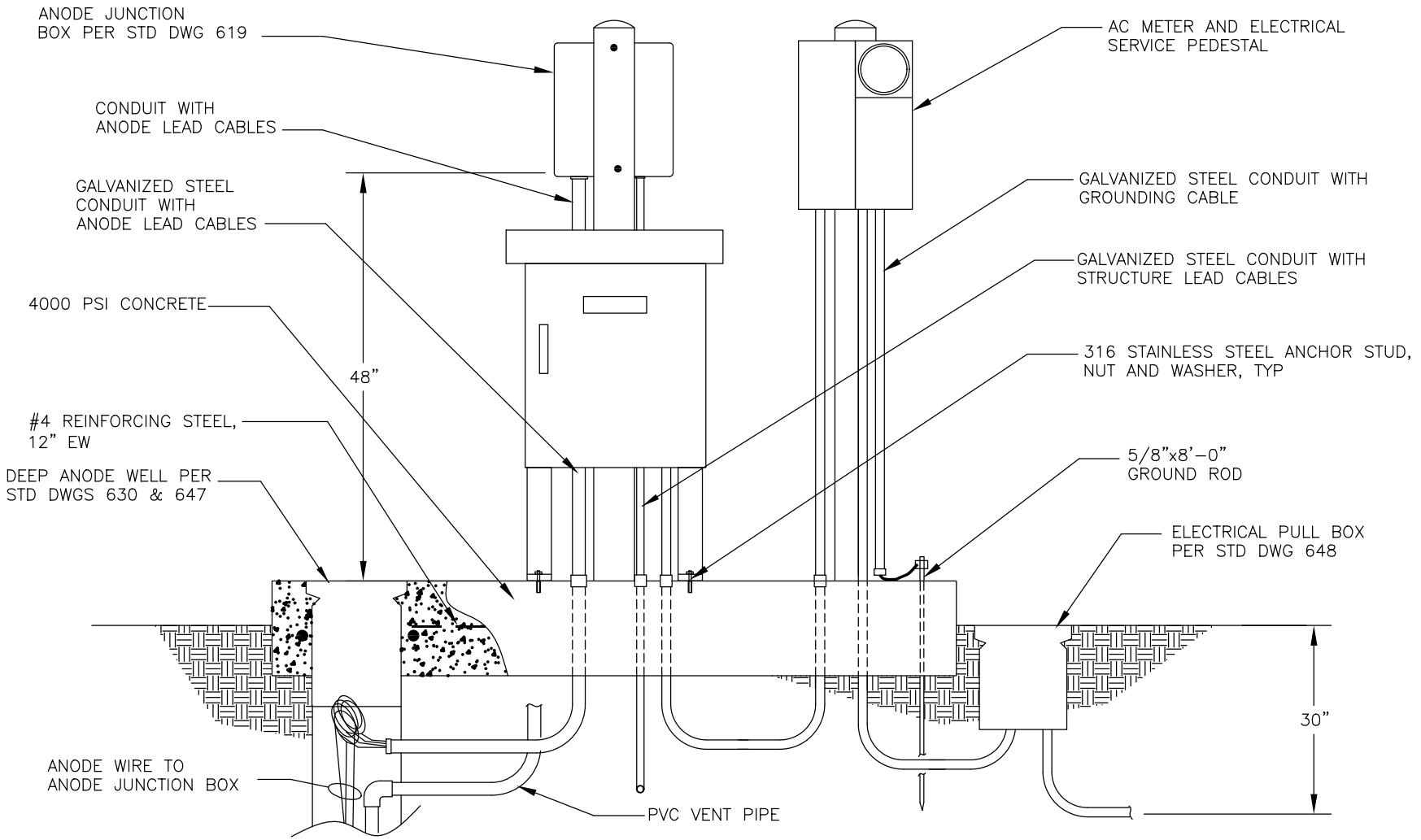
GALVANIC ANODE JUNCTION BOX		DWU	(Page No.) 619
		DATE OCT. 2016	



REFER TO PAGES 621, 622, 630, 645, 647, 648 & 650

POST MOUNTED FOREIGN PIPELINE TEST STATION TEST TERMINAL BOARD

DWU	(Page No.) 620
DATE OCT. 2016	

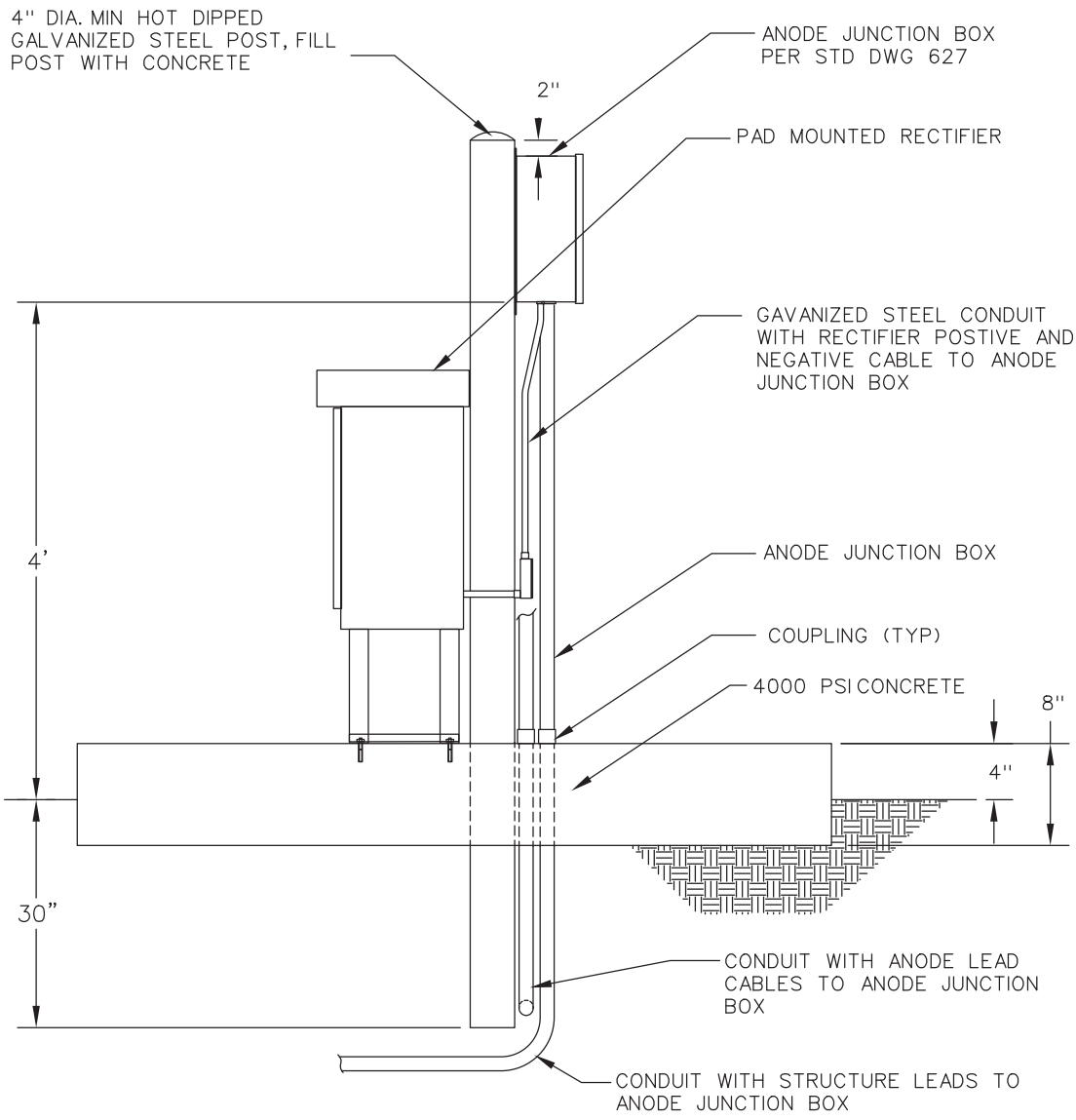


SECTION A–A

REFER TO PAGES 619, 620, 622, 630, 647 & 648

POST MOUNTED FOREIGN PIPELINE TEST STATION TEST TERMINAL BOARD

DWU	(Page No.) 621
DATE OCT. 2016	

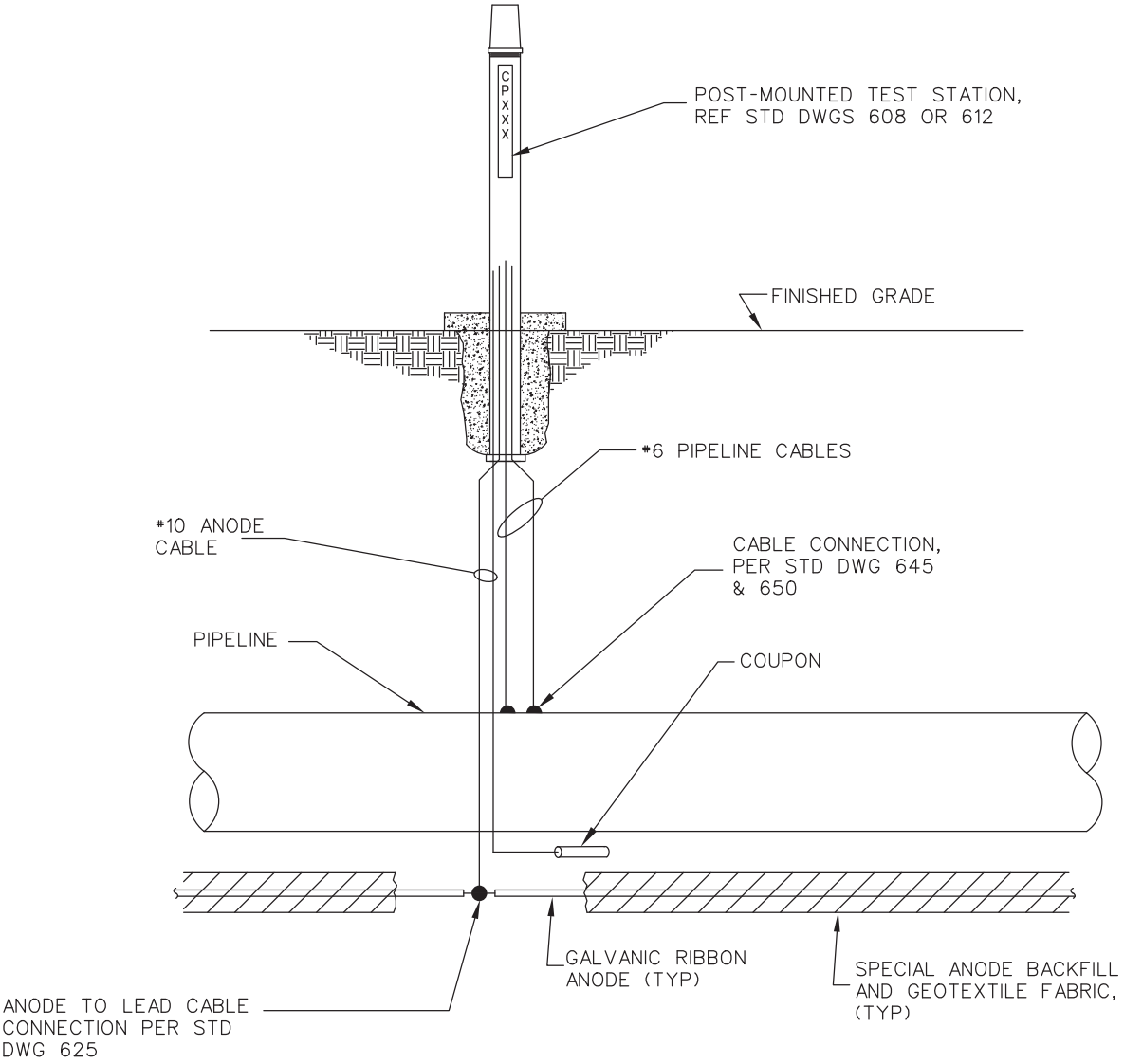


SECTION B–B

REFER TO PAGES 620, 621, 627, 631, 645 & 650

POST MOUNTED FOREIGN PIPELINE TEST STATION TEST TERMINAL BOARD

DWU	(Page No.) 622
DATE OCT. 2016	



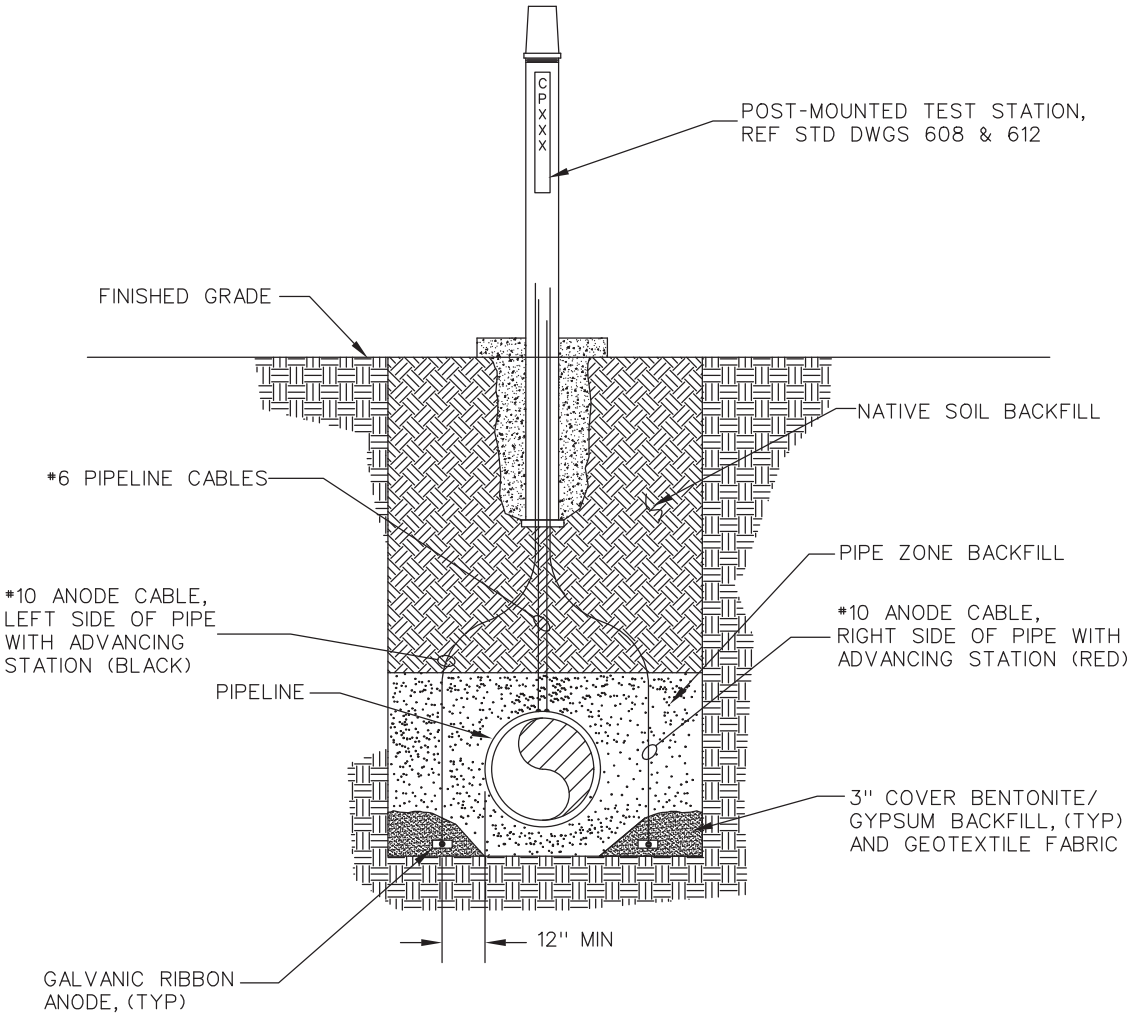
REFER TO PAGES 608, 612, 625, 645 & 650

GALVANIC RIBBON TEST STATION

DWU

(Page No.) 623

DATE OCT. 2016



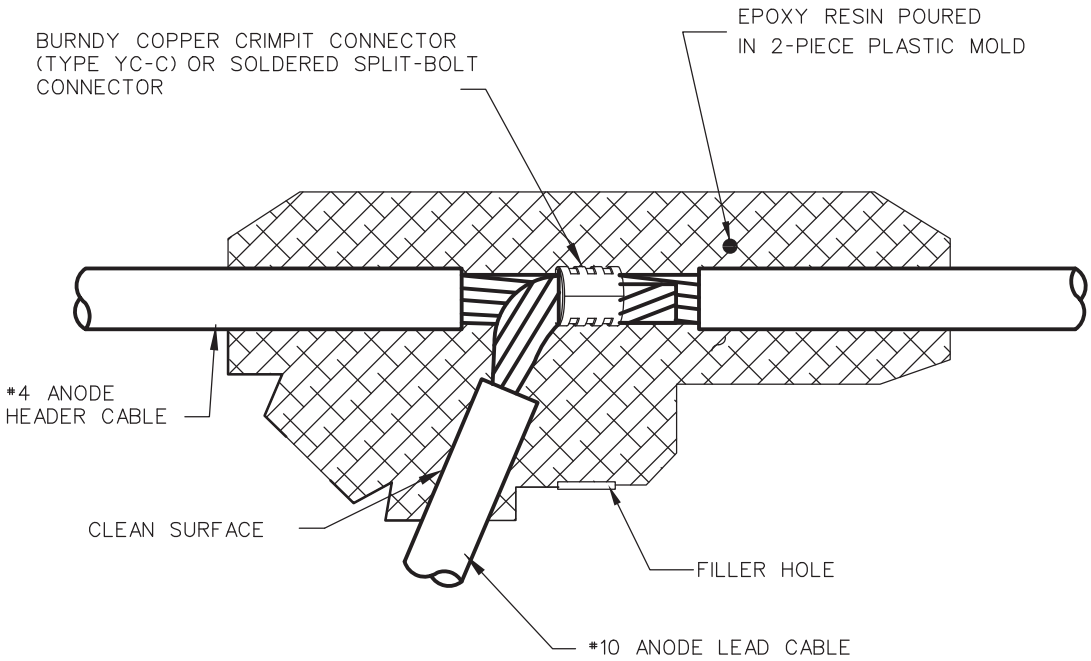
NOTES:

1. MAINTAIN 12" MINIMUM SEPARATION BETWEEN GALVANIC RIBBON ANODE AND PIPELINE.
2. WET ANODE BACKFILL AND GEOTEXTILE FABRIC PRIOR TO PIPE BACKFILL TO PREVENT LOSS OF ANODE BACKFILL.

REFER TO PAGES 608 & 612

GALVANIC RIBBON INSTALLATION SECTION-A

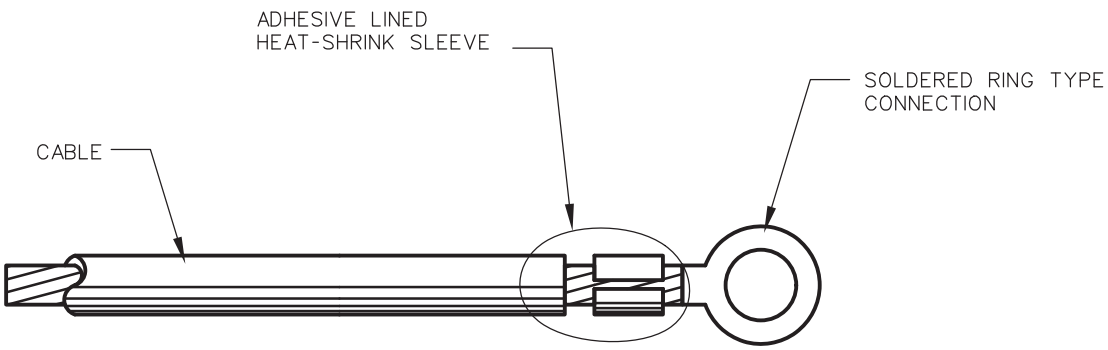
DWU	(Page No.) 624
DATE OCT. 2016	



NOTES:

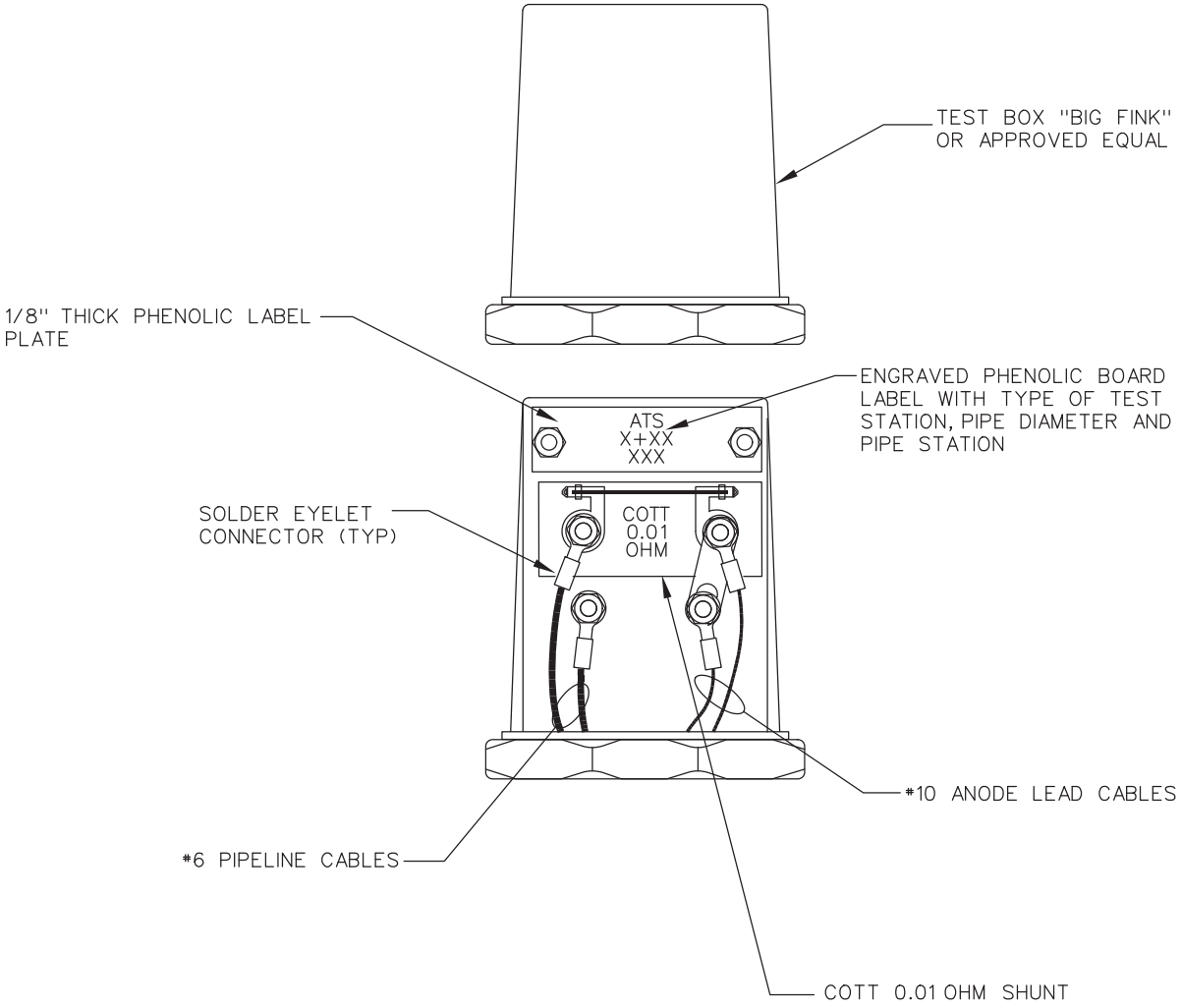
1. ANODE HEADER CABLE COLOR VARIES PER ANODE CONFIGURATIONS.
2. ONLY ONE ANODE LEAD CABLE CONNECTION ALLOWED PER SPLICE.

ANODE TO LEAD CABLE CONNECTION		DWU	(Page No.) 625
		DATE OCT. 2016	



SOLDERED TERMINAL CONNECTION

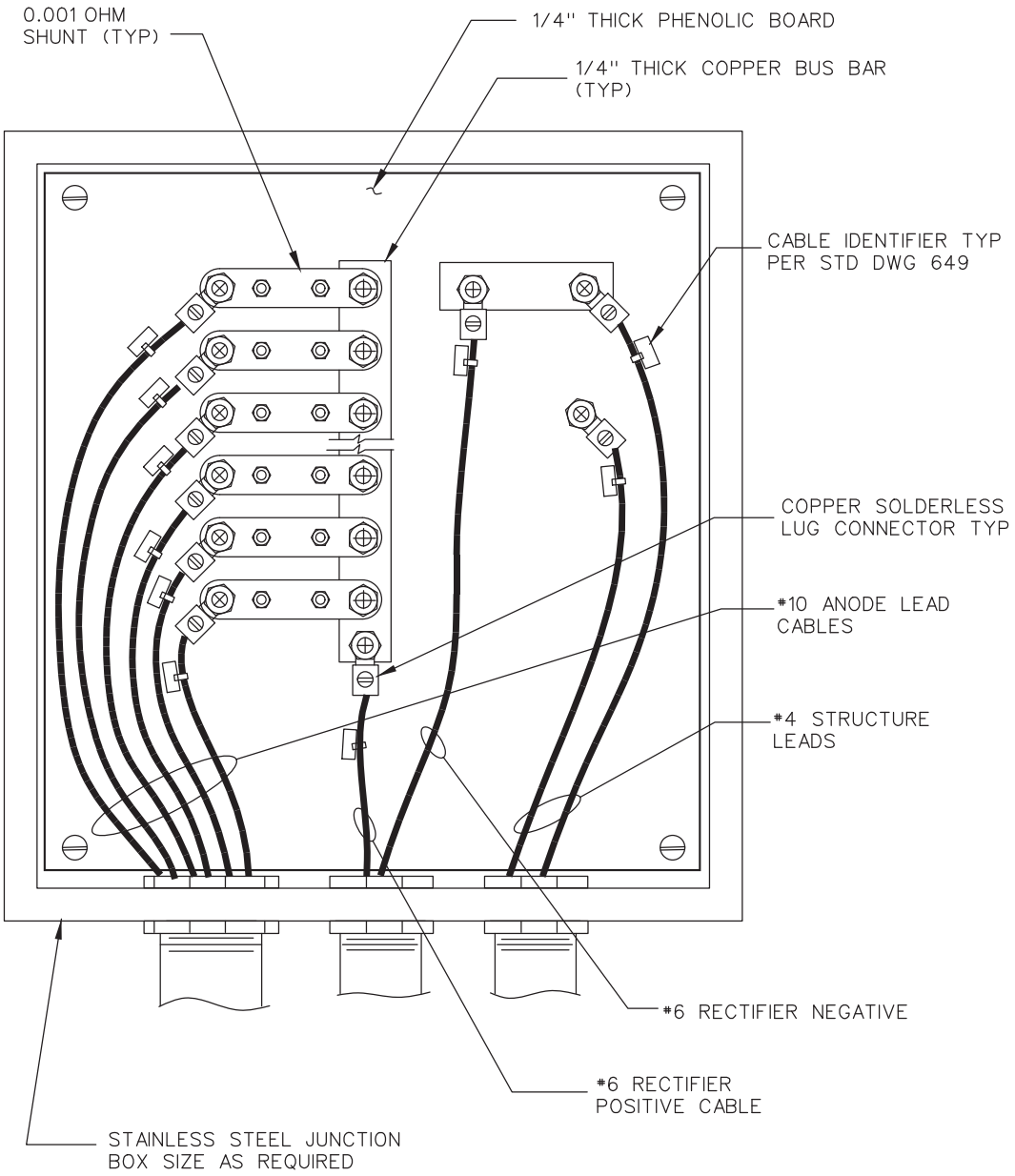
DWU		(Page No.) 625A
DATE OCT. 2016		



NOTE:

1. TERMINALS SHALL BE 1/4" STAINLESS STEEL WITH LOCKING WASHER, TWO FLAT WASHERS, AND DOUBLE NUTS.

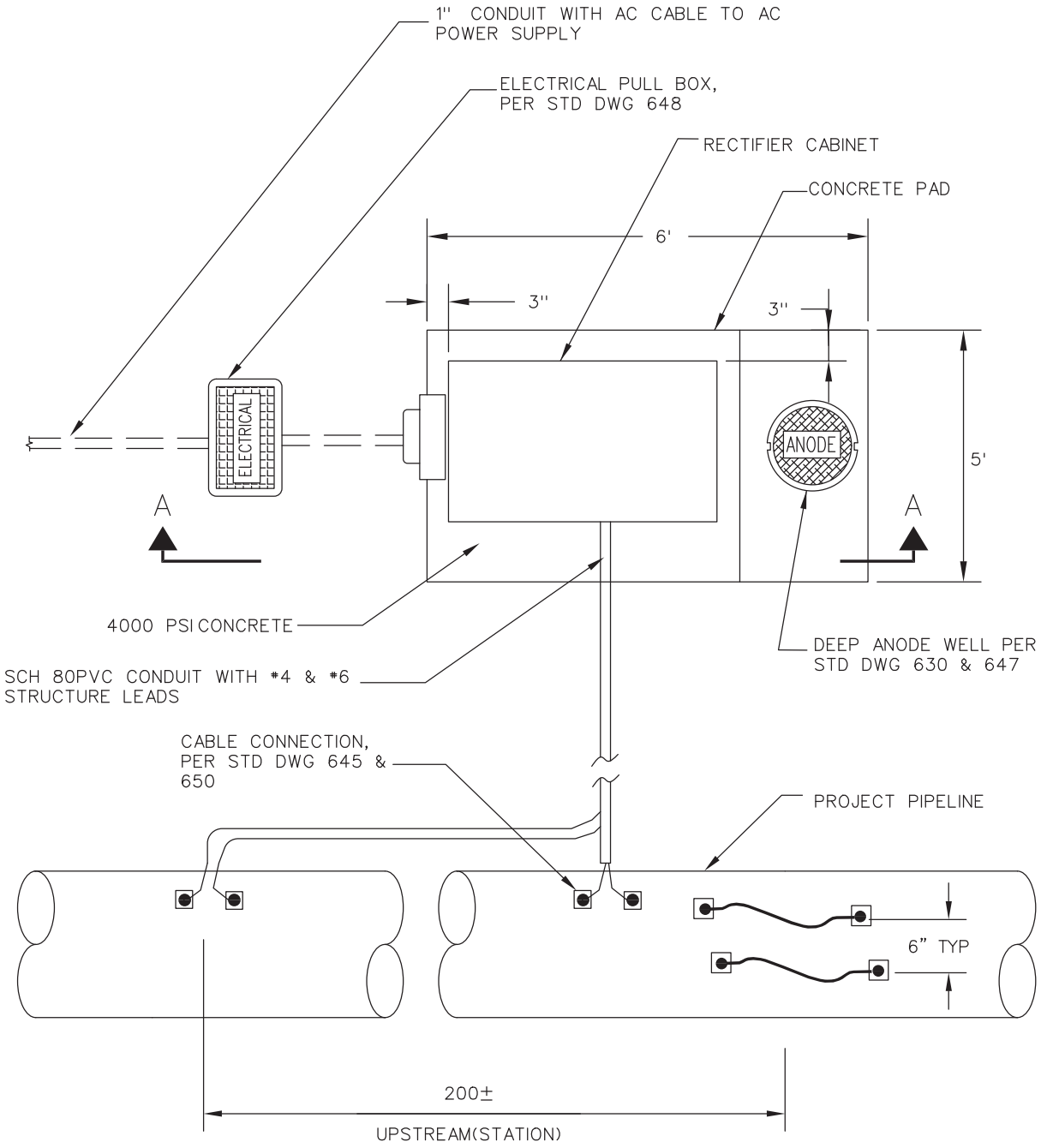
FLUSH MOUNTED RIBBON ANODE TEST STATION TEST TERMINAL BOARD		DWU	(Page No.) 626
		DATE OCT. 2016	



REFER TO PAGE 649

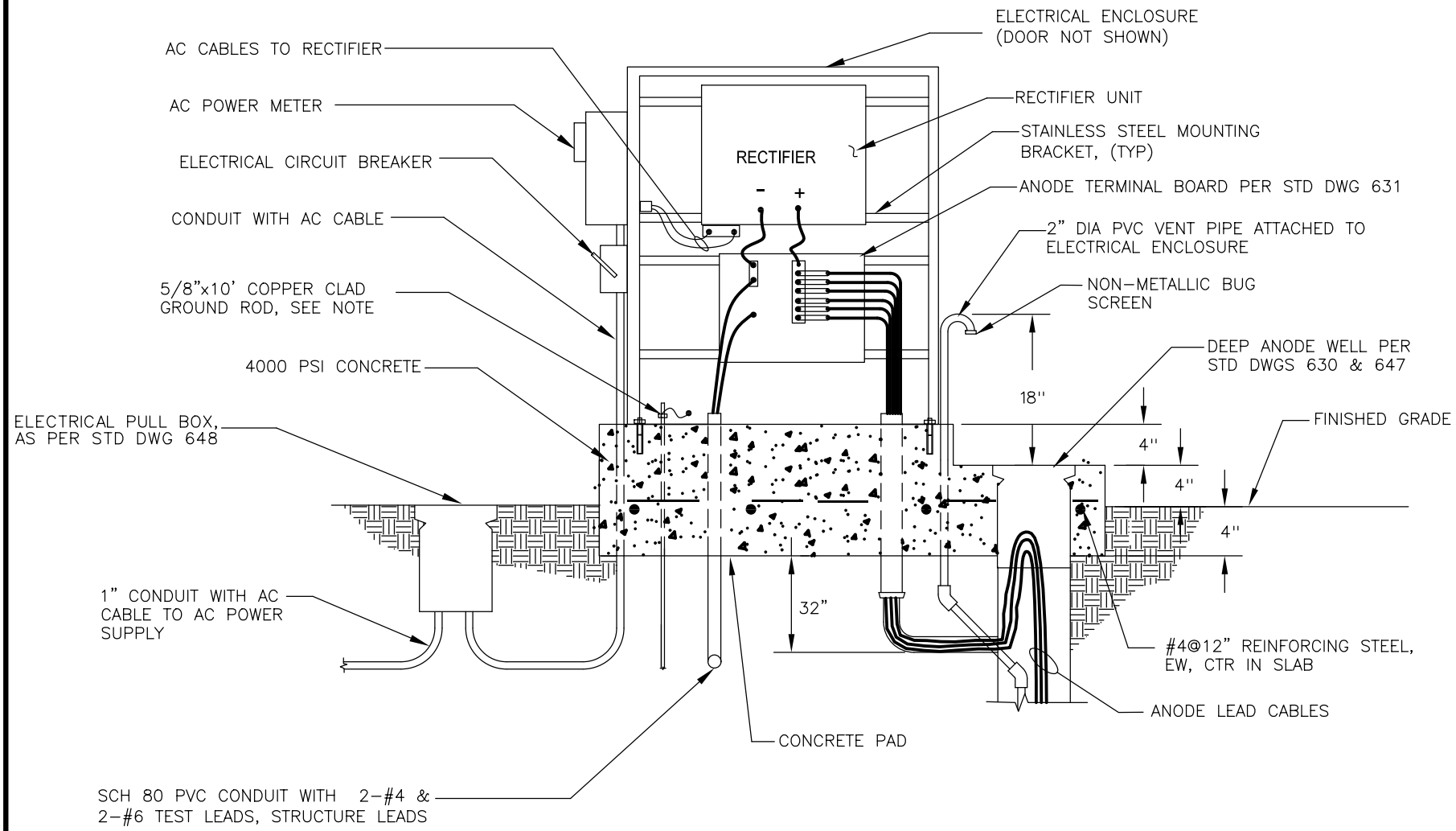
ANODE JUNCTION BOX

DWU		(Page No.) 627
DATE OCT. 2016		



REFER TO PAGES 629, 630, 645, 647, 648 & 650

RECTIFIER/DEEP ANODE WELL INSTALLATION PLAN VIEW		DWU	(Page No.) 628
		DATE OCT. 2016	



SECTION A-A

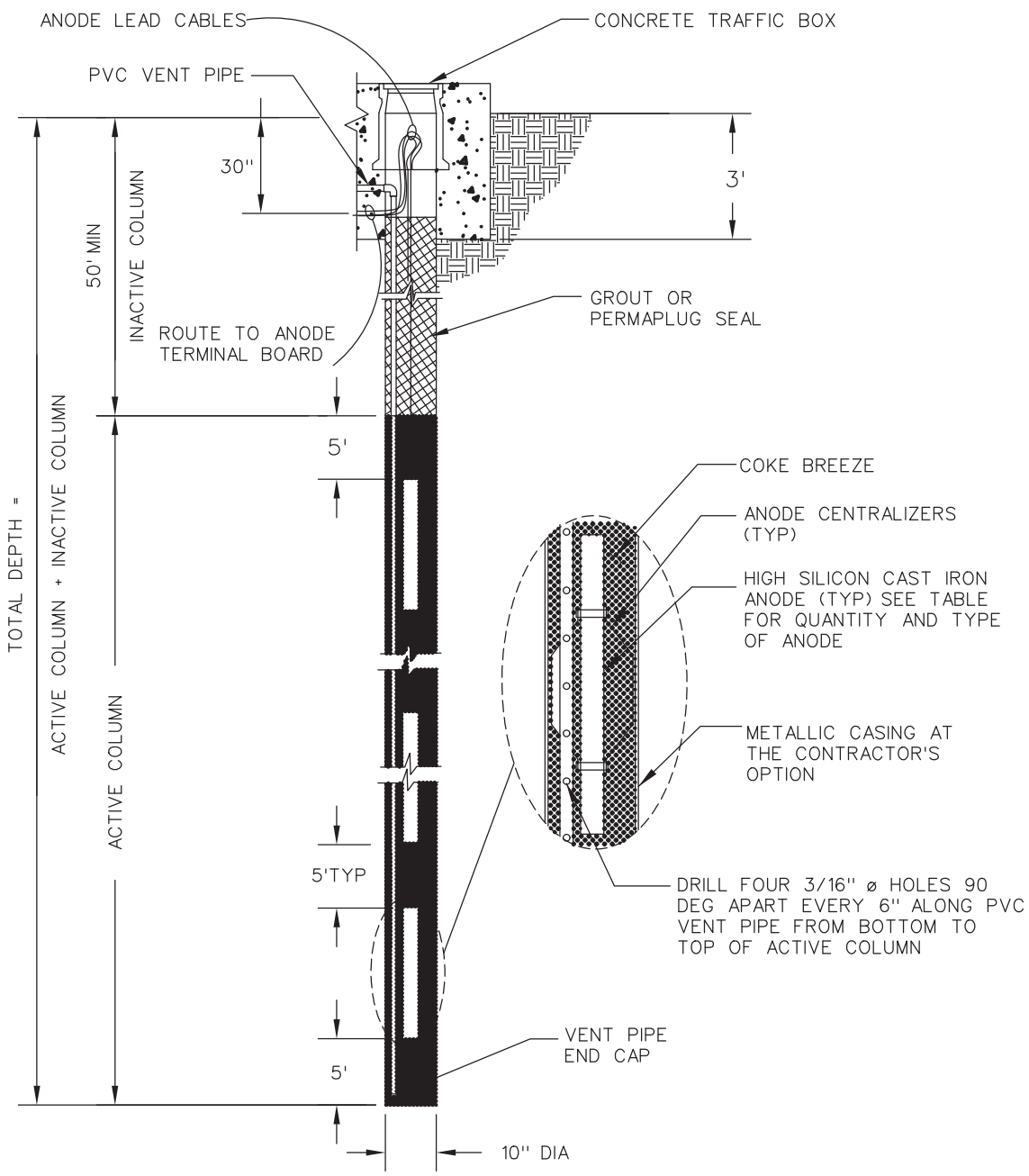
NOTE:

MAXIMUM AC GROUNDING SYSTEM TO EARTH IS 2 OHMS.

REFER TO PAGES 628, 630, 631, 647, 648 & 650

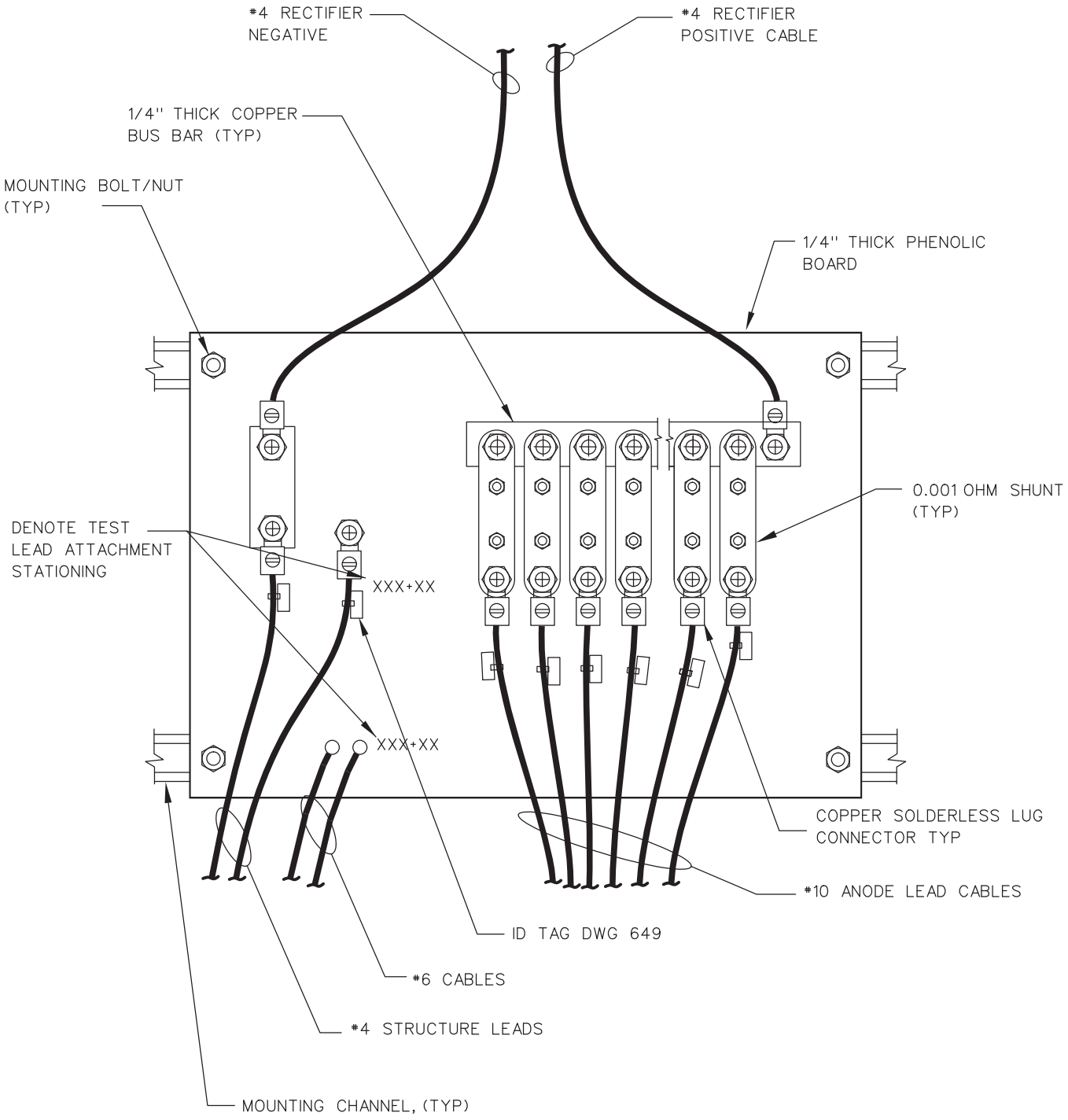
RECTIFIER/DEEP ANODE WELL INSTALLATION SECTION A

DWU	(Page No.) 629
DATE OCT. 2016	



DEEP WELL ANODE

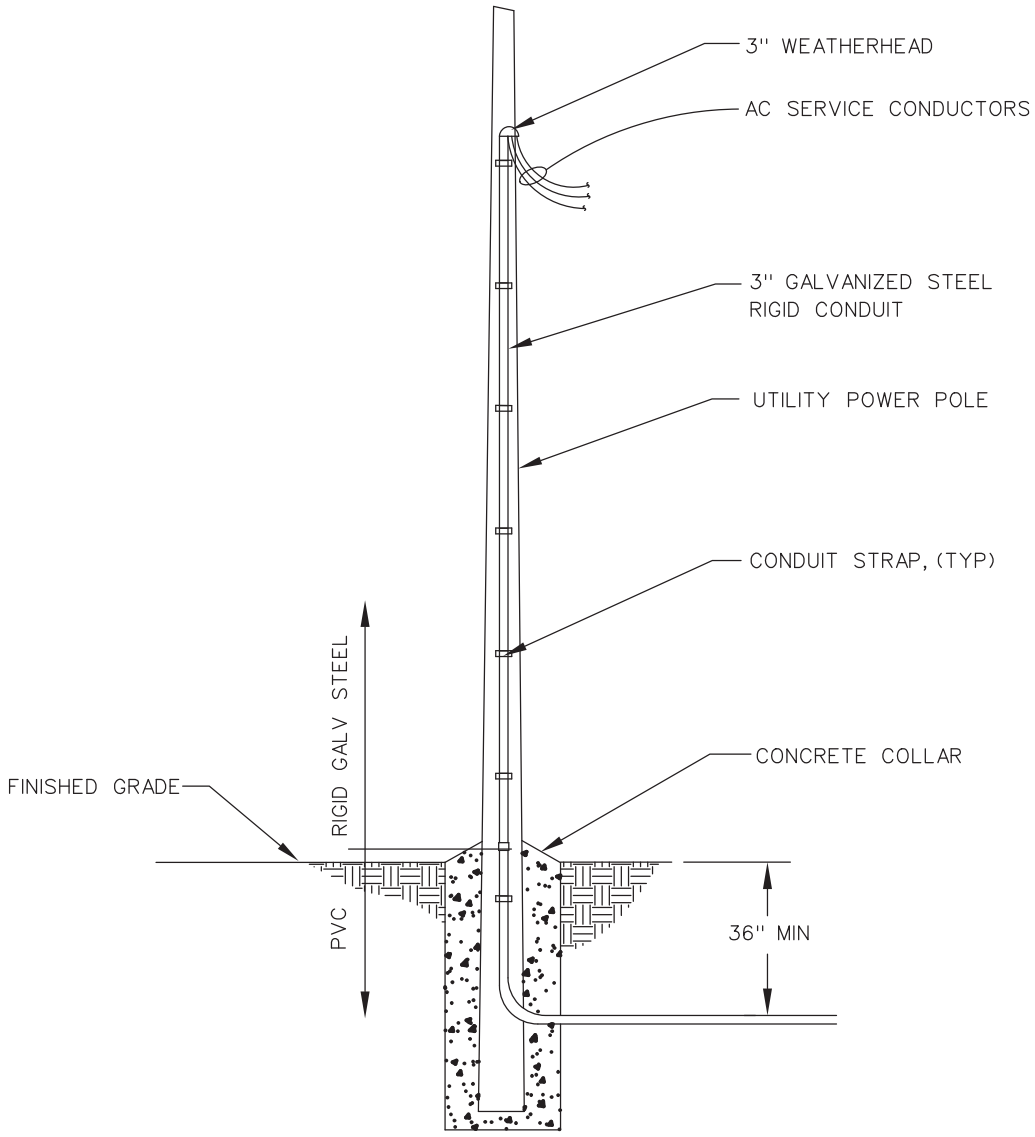
DWU	(Page No.) 630
DATE OCT. 2016	



REFER TO PAGE 649

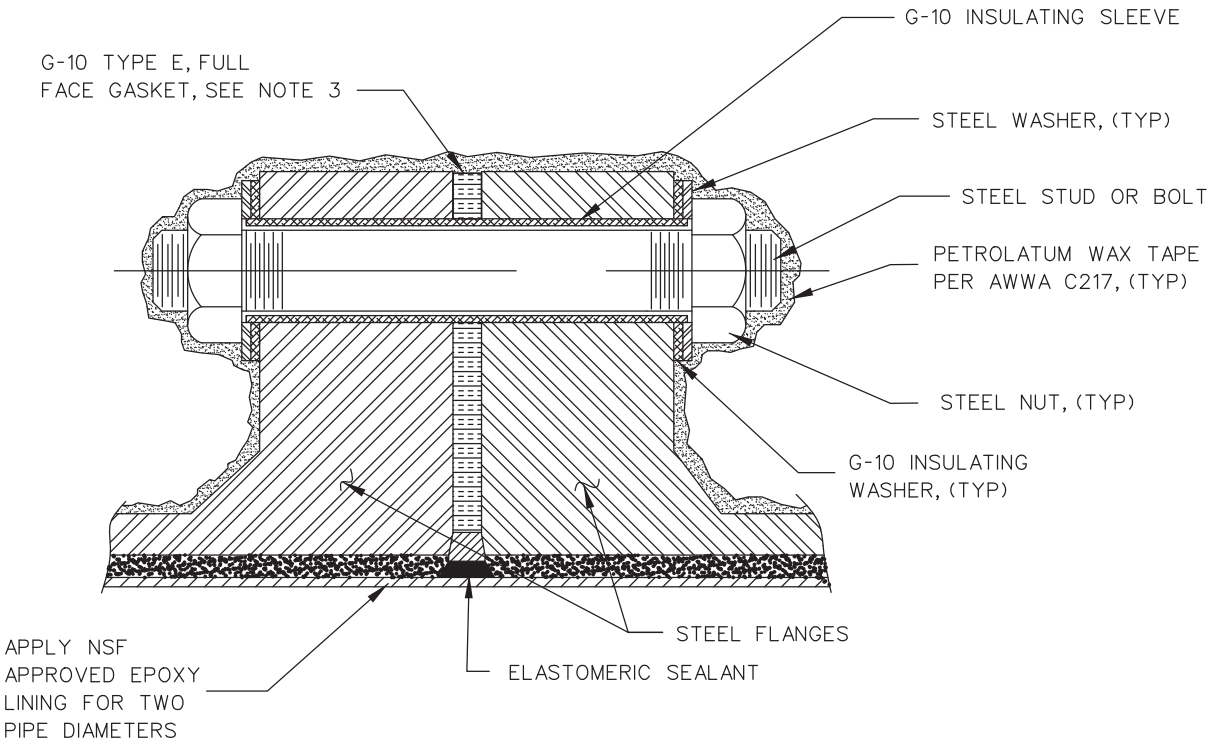
DEEP WELL ANODE

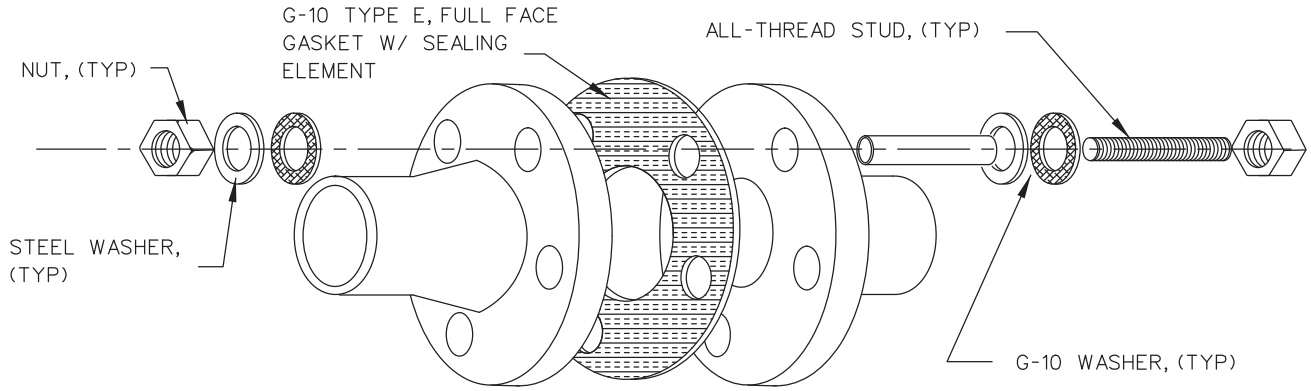
DWU	(Page No.) 631
DATE OCT. 2016	



UTILITY POLE

		DWU	(Page No.) 632
		DATE OCT. 2016	





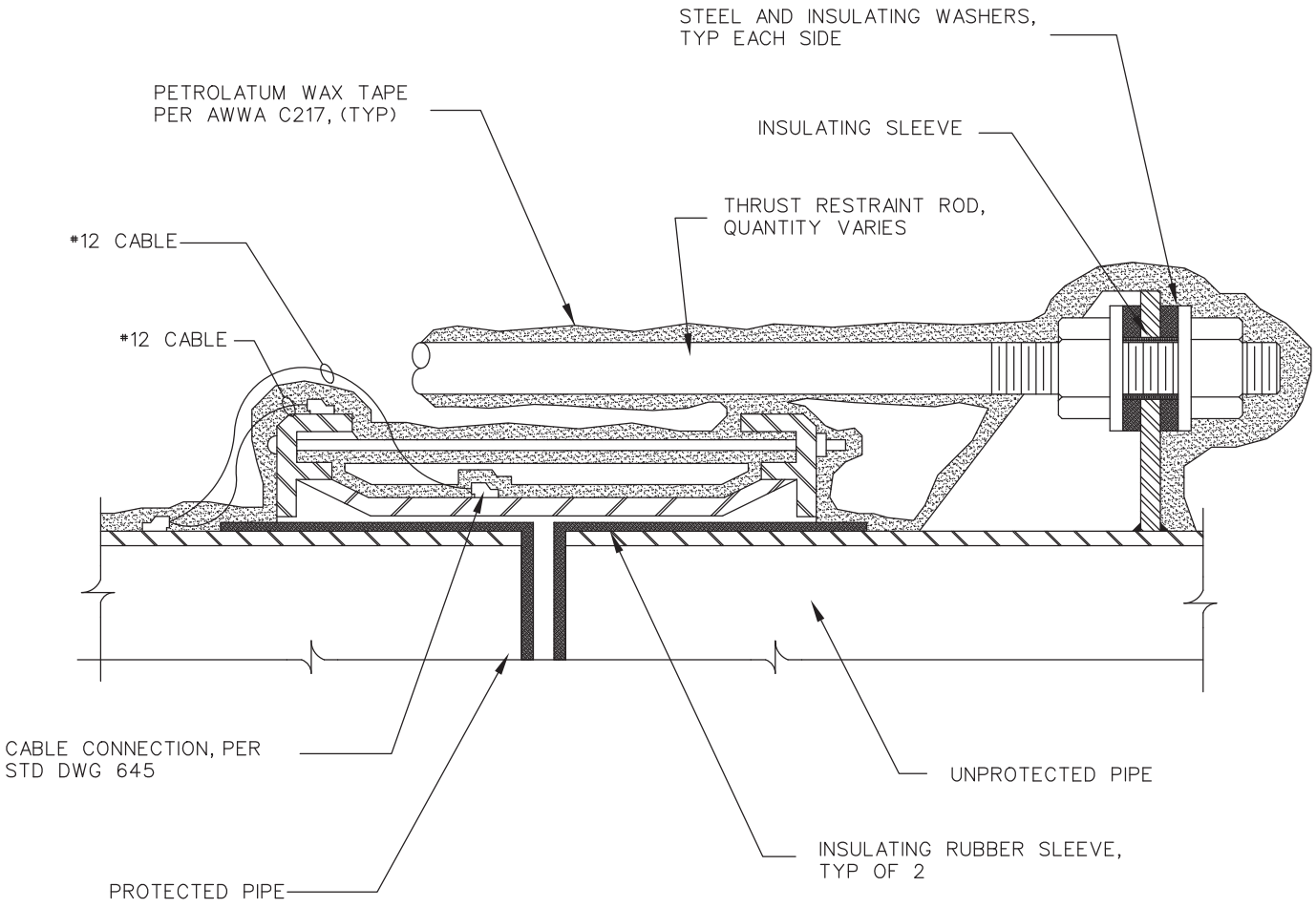
NOTES:

1. TEST INSULATING FLANGE BEFORE APPLYING WAX TAPE AND BURIAL.

2. EXTEND WAX TAPE 12" BEYOND FLANGE FACE OR 12" ONTO PIPE COATING, WHICHEVER IS GREATER.

3. EXTEND FULL FACE GASKET 1/8" BEYOND STEEL CAN ID. FILL REMAINING ANNULUS BETWEEN LINING W/ NSF APPROVED ELASTOMERIC SEALANT COMPATIBLE W/ LINING MATERIAL.

# INSULATING FLANGE		DWU	(Page No.) 633
		DATE OCT. 2016	

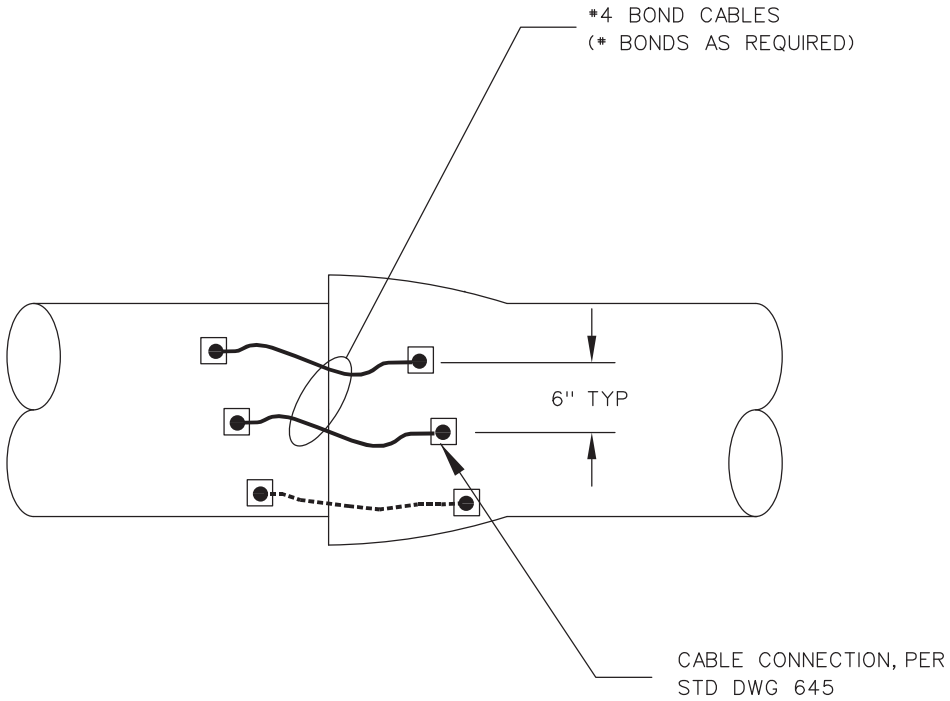


NOTE:

1. EXTEND WAX TAPE 12" BEYOND RESTRAINT HARNESS OR 12" ONTO PIPE COATING, WHICHEVER IS GREATER.

REFER TO PAGE 645

INSULATING FLEXIBLE COUPLING		DWU	(Page No.) 635
		DATE OCT. 2016	

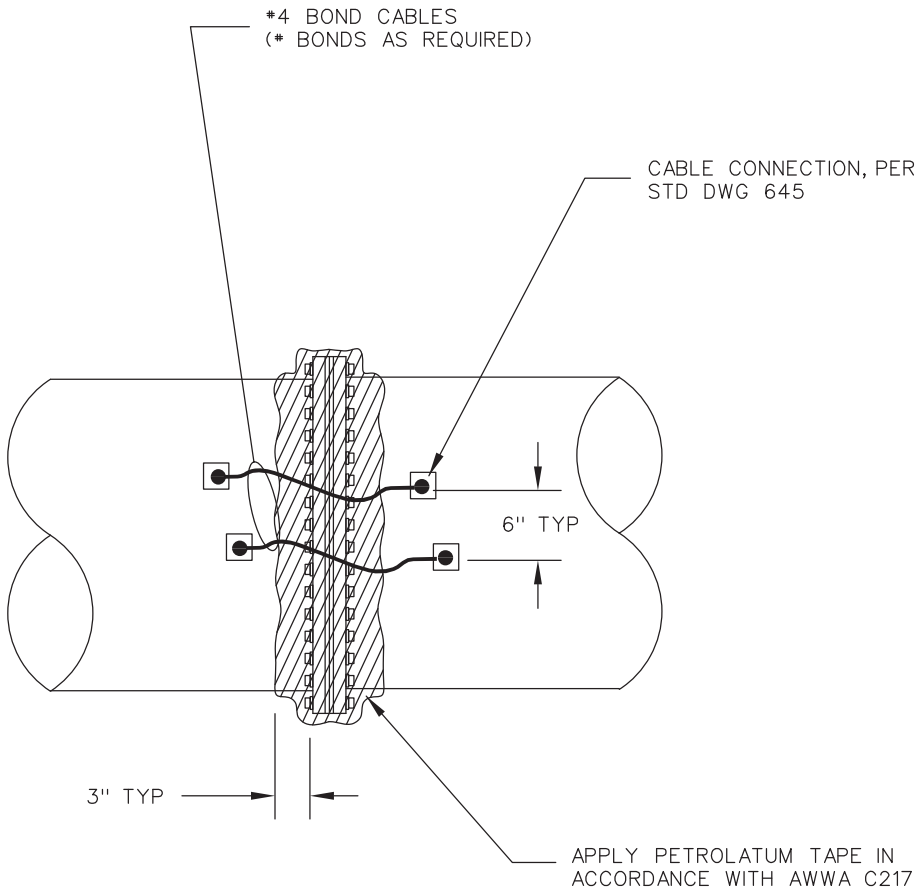


NOTES:

1. 2 BOND CABLES REQUIRED FOR PIPES DIAMETERS LESS THAN 18".
2. 3 BOND CABLES REQUIRED FOR PIPE DIAMETERS GREATER THAN OR EQUAL TO 18".

REFER TO PAGE 645

DUCTILE IRON PUSH-ON		DWU	(Page No.) 636
		DATE OCT. 2016	



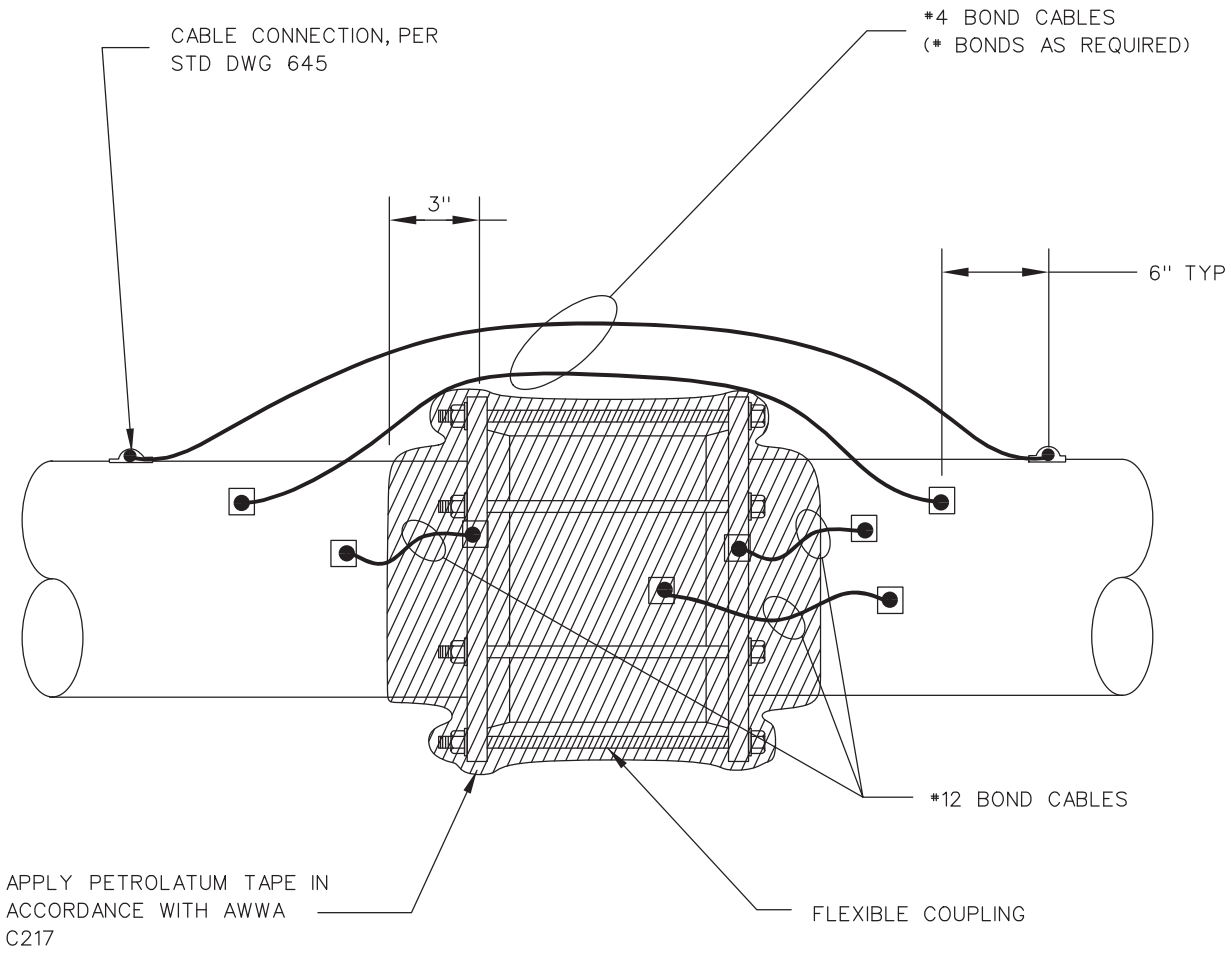
NOTES:

1. 2 BOND CABLES REQUIRED FOR PIPES DIAMETERS LESS THAN 18".
2. 3 BOND CABLES REQUIRED FOR PIPE DIAMETERS GREATER THAN OR EQUAL TO 18".
3. DO NOT INSTALL BOND CABLES IF JOINT IS AN INSULATING JOINT.

REFER TO PAGE 645

FLANGED JOINT BOND CABLES

DWU	(Page No.) 637
DATE OCT. 2016	

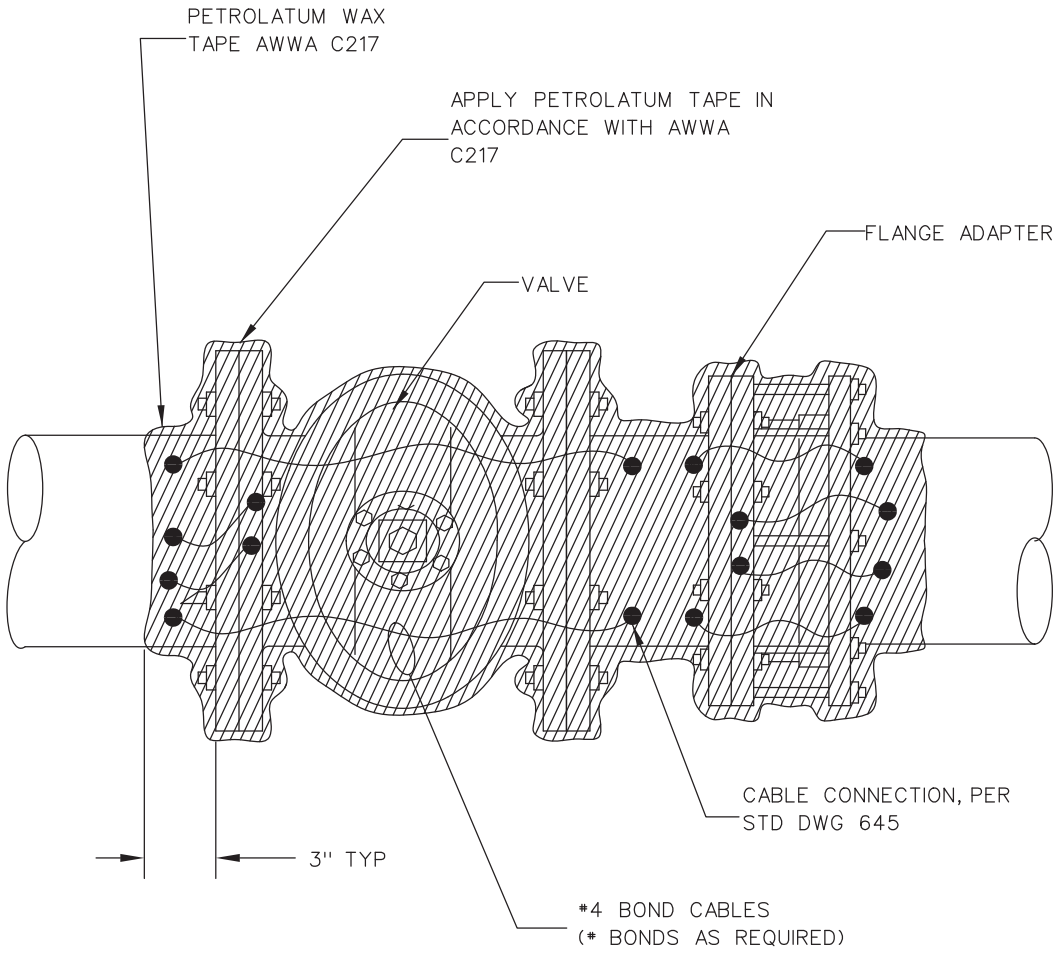


NOTES:

1. 2 BOND CABLES REQUIRED FOR PIPES DIAMETERS LESS THAN 18".
2. 3 BOND CABLES REQUIRED FOR PIPE DIAMETERS GREATER THAN OR EQUAL TO 18".
3. DO NOT INSTALL BOND CABLES IF JOINT IS AN INSULATING JOINT.

REFER TO PAGE 645

FLEXIBLE COUPLING BOND CABLES		DWU	(Page No.) 638
		DATE OCT. 2016	



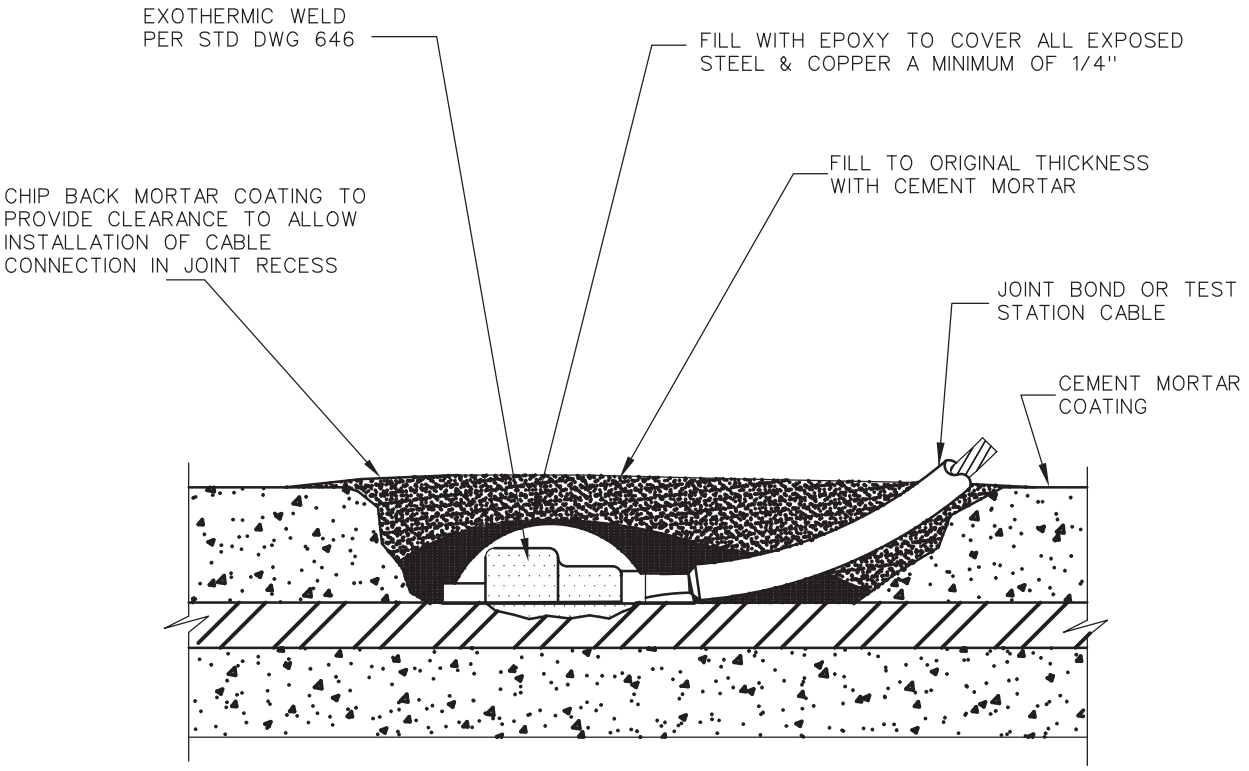
NOTES:

1. 2 BOND CABLES REQUIRED FOR PIPES DIAMETERS LESS THAN 18".
2. 3 BOND CABLES REQUIRED FOR PIPE DIAMETERS GREATER THAN OR EQUAL TO 18".
3. DO NOT INSTALL BOND CABLES IF JOINT IS AN INSULATING JOINT.

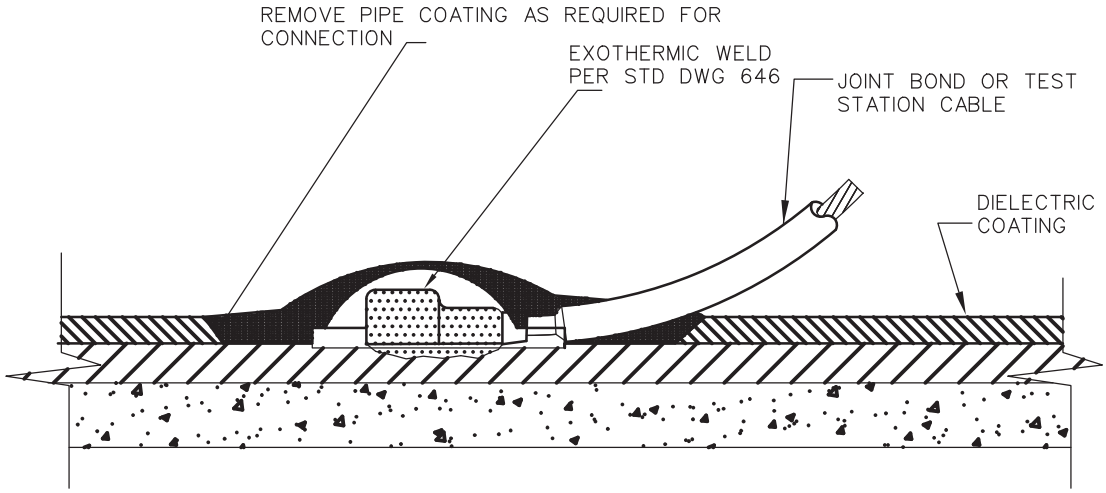
REFER TO PAGE 645

GATE VALVE AND FLANGE ADAPTER BONDINGS

	(Page No.)
DWU	639
DATE OCT. 2016	



MORTAR LINED AND COATED STEEL PIPE



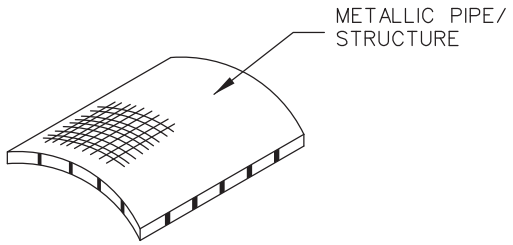
DUCTILE IRON OR STEEL PIPE

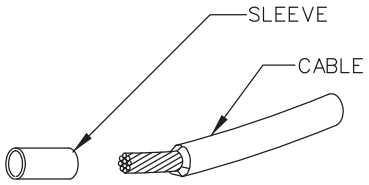
NOTE:

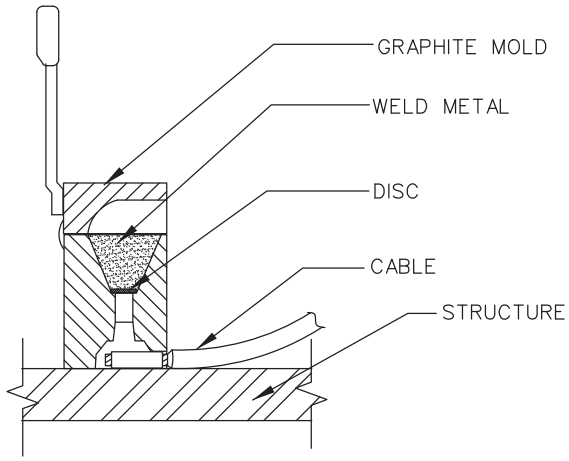
PLACE CONNECTIONS AT PIPE JOINTS/SPECIALS TO MINIMIZE COATING DAMAGE.

REFER TO PAGE 646

CABLE-TO-PIPE CONNECTION		DWU	(Page No.) 645
		DATE OCT. 2016	

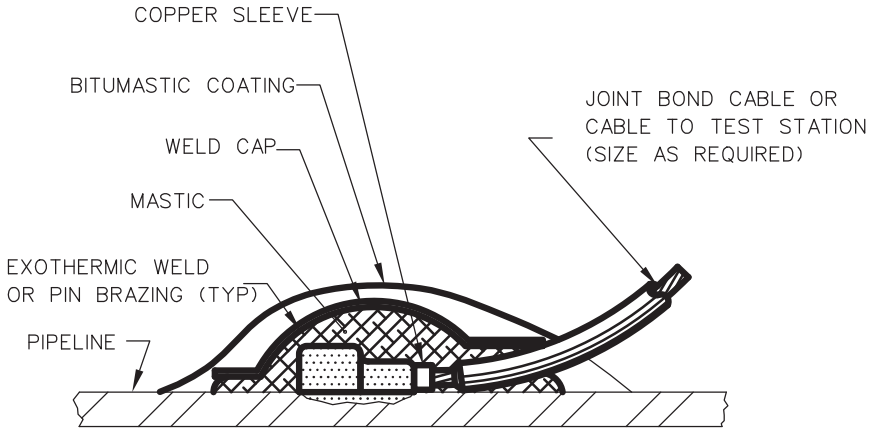






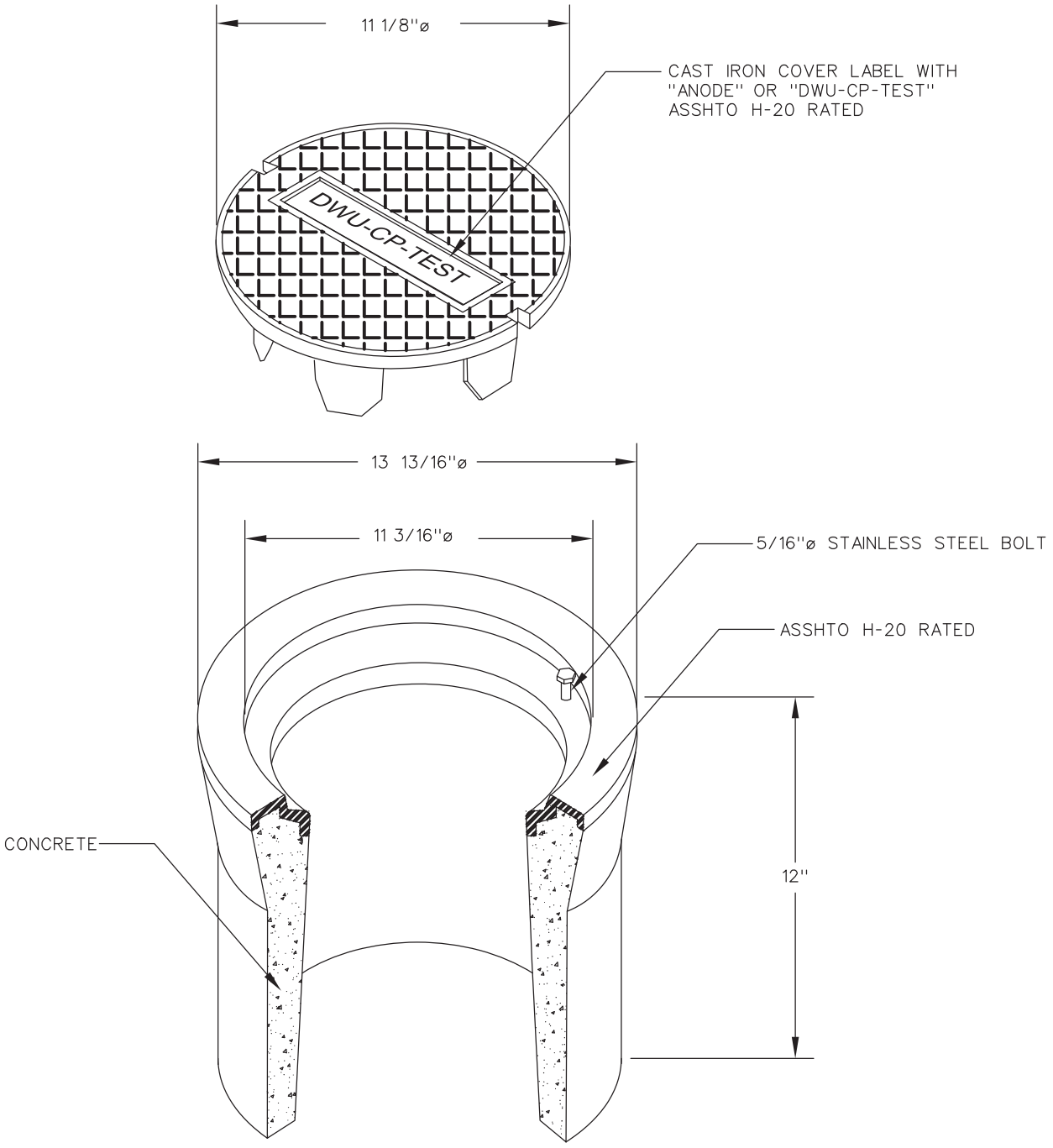
NOTES:

1. GRIND PIPE/STRUCTURE TO BARE METAL AND CLEAN SURFACE.
2. STRIP INSULATION FROM CABLE AND ATTACH SLEEVE.
3. HOLD MOLD FIRMLY WITH OPENING AWAY FROM OPERATOR. IGNITE WITH FLINT GUN, REMOVE SLAG FROM CONNECTION WITH CHIPPING HAMMER. TEST WELD WITH 22 OZ HAMMER W/GLANCING BLOW. IF WELD FAILS, POSITION WIRE ATTACHMENT A MINIMUM 3" AWAY REPEATING THE ABOVE STEPS. ATTACH LEAD CABLES A MINIMUM 6" APART.
4. COVER CONNECTION WITH BITUMASTIC COATING OVER ALL EXPOSED METAL, PLACE WELD CAP OVER CONNECTION. REPAIR ALL DAMAGE TO COATING AND LINING IN ACCORDANCE WITH MFG RECOMMENDATIONS.
5. ALLOW COATING TO CURE BEFORE BURIAL.
6. ILLUSTRATION DEPICTS HORIZONTAL WELDER. FOR OTHER ORIENTATION USE MOLD RECOMMENDED BY MANUFACTURER.



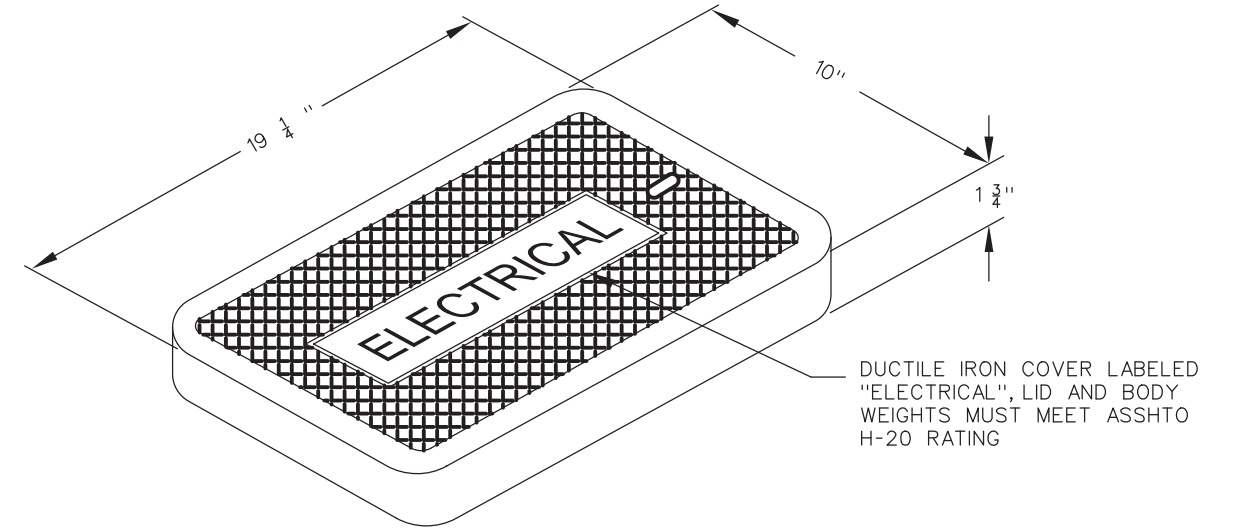
EXOTHERMIC WELD DETAIL

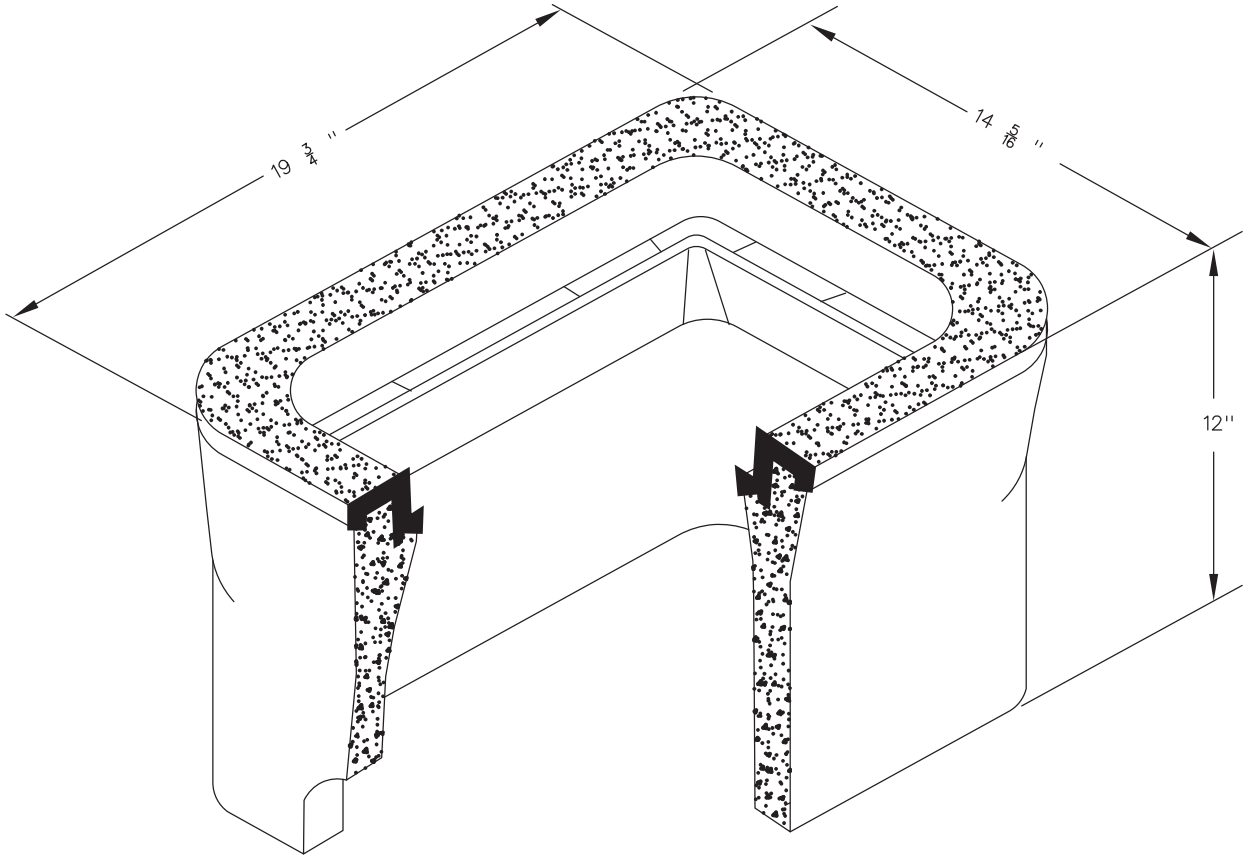
DWU	(Page No.)	646
DATE OCT. 2016		



CAST IRON COVER & VALVE BOX

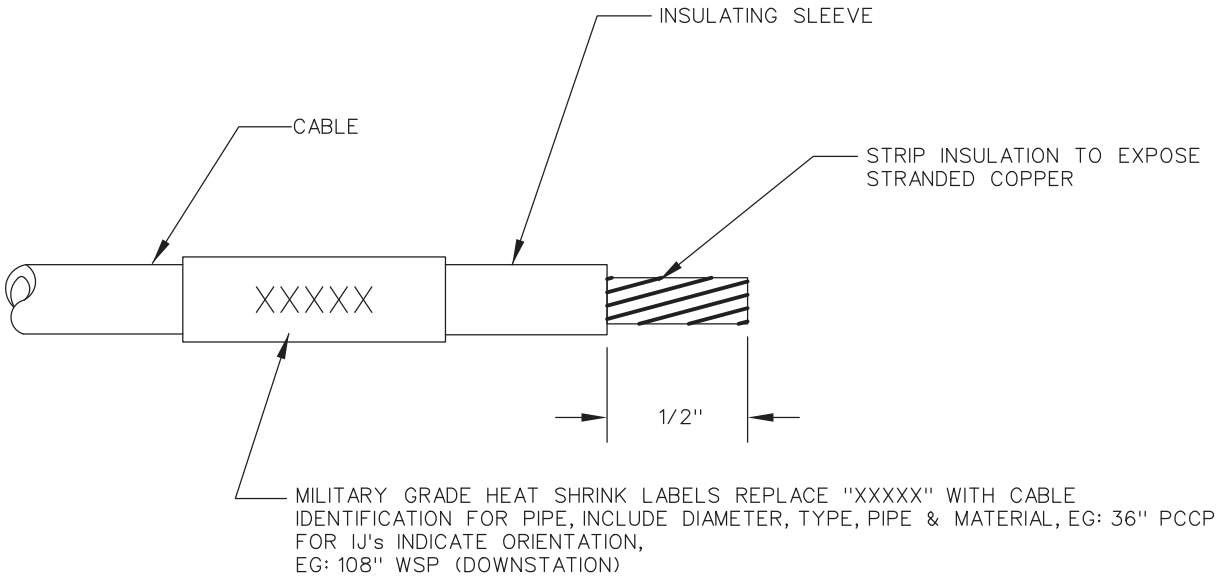
	DWU	(Page No.) 647
	DATE OCT. 2016	





ELECTRICAL PULL BOX

DWU	(Page No.)	648
DATE OCT. 2016		

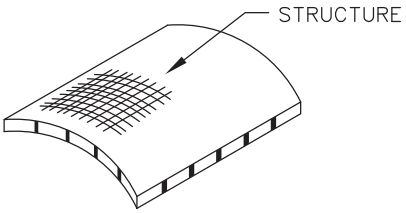


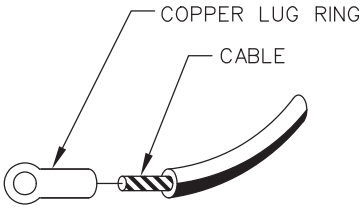
LEGEND:

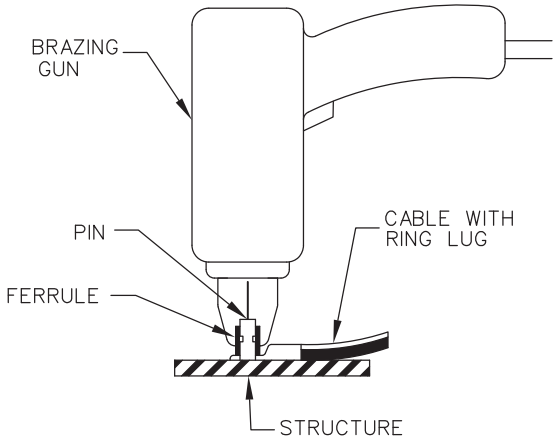
PCCP - PRE-STRESSED PIPE
WSP - WELDED STEEL PIPE
IR-CSE - IR-FREE COPPER-COPPER SULFATE ELECTRODE
ANODE - GALVANIC ANODE
CASING - CASING

*FOR FOREIGN TEST STATIONS INDICATE ATTACHMENT LOCATIONS RELATIVE TO TEST STATION (UPSTATION OR DOWNSTATION) AND FOR PCCP ANODES THE LOCATION RELATIVE TO TEST STATION AND SIDE OF PIPE (UPSTATION OR DOWN STATION AND LEFT OR RIGHT)

CABLE IDENTIFIER		DWU	(Page No.) 649
		DATE OCT. 2016	



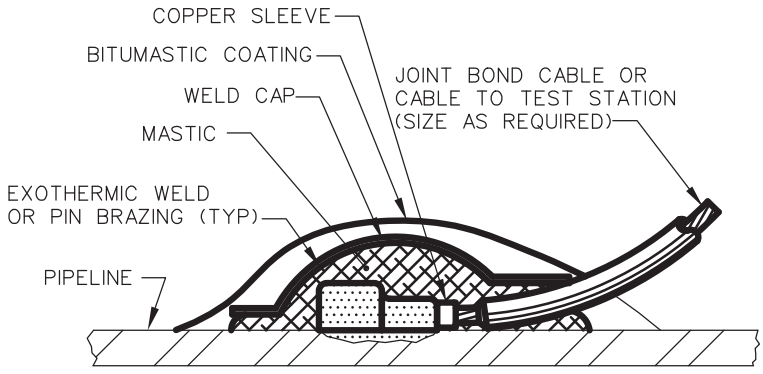




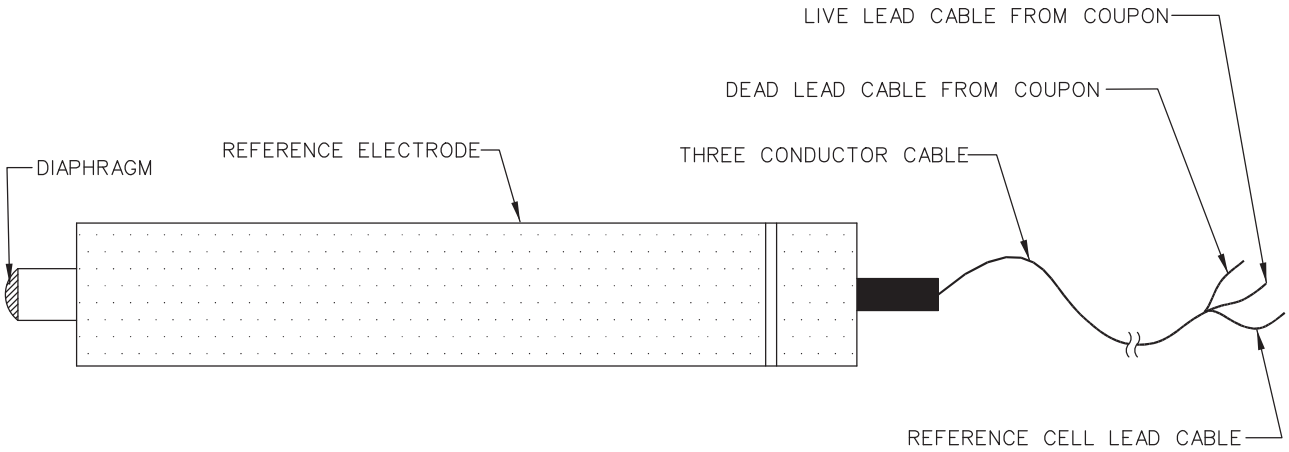
PIN BRAZING

NOTES:

1. DEGREASE AND CLEAN STRUCTURE TO BARE, BRIGHT METAL WITH MECHANICAL DEVICES.
2. STRIP INSULATION FROM WIRE AND ATTACH A BAC M1 COMPRESSION TERMINAL OR APPROVED EQUAL.
3. LOAD THE BRAZING GUN WITH A DIRECT BRAZING PIN AND FERRULE. USE A THREADED TYPE CONNECTION FOR ABOVE-GROUND USE ONLY.
4. BRAZE THE CABLE TO THE PIPE. EXTRA MATERIAL REQUIRED FOR DI OR CI PIPE.
5. TEST BRAZE BY BREAKING OFF THE SHANK OF THE PLAIN PIN WITH A HAMMER.
6. COVER CONNECTION WITH MASTIC FILLED WELD CAP AND BITUMASTIC COATING 80% SOLIDS BY VOLUME OVER WELD CAP AND ALL EXPOSED METAL.
7. ALL WELDS SHALL BE A MINIMUM OF 6" APART.
8. ALLOW WELD COATING TO CURE PER MANUFACTURER'S RECOMMENDATIONS BEFORE BURIAL.

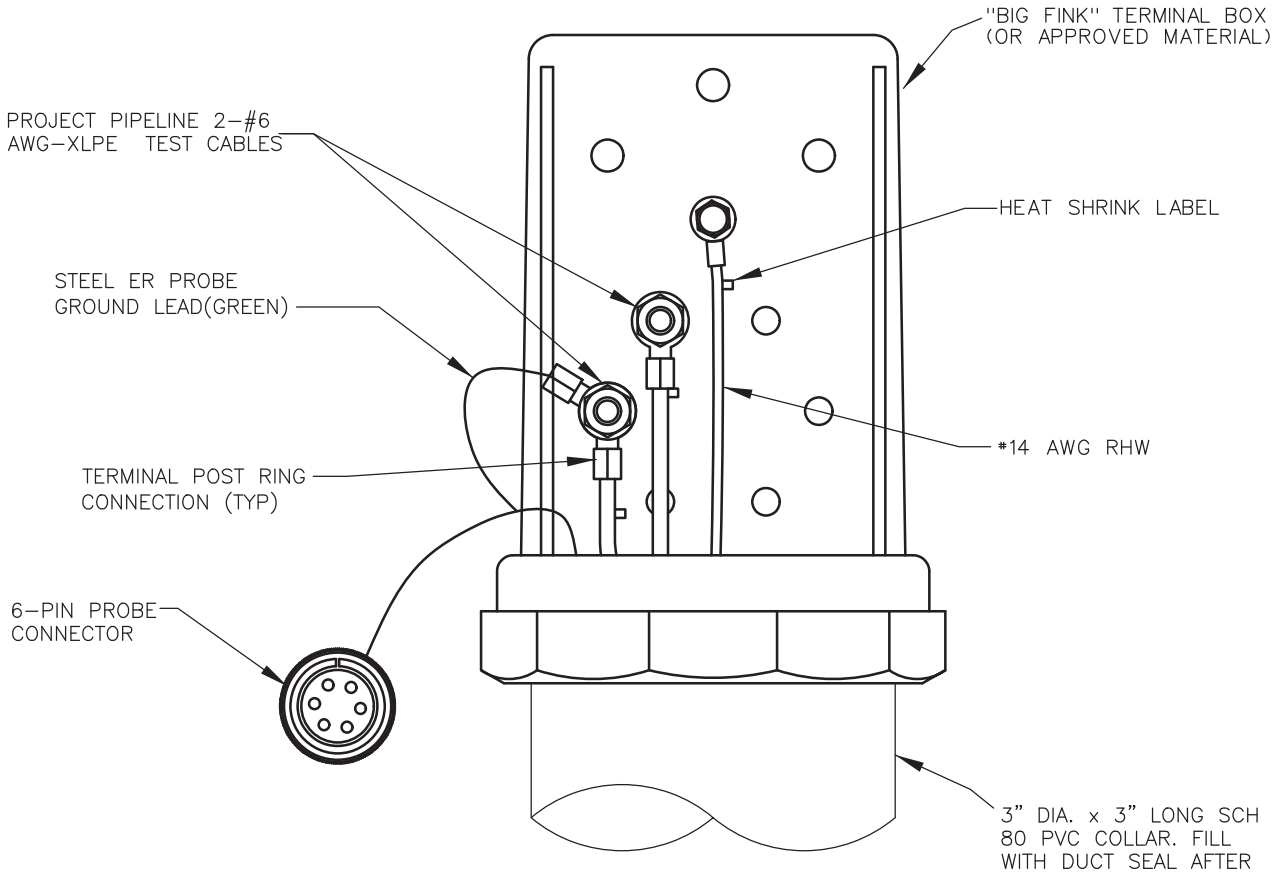


PIN BRAZING WIRING-TO-STRUCTURE WELD DETAIL		DWU	(Page No.) 650
		DATE OCT. 2016	



IR FREE COUPON DETAIL

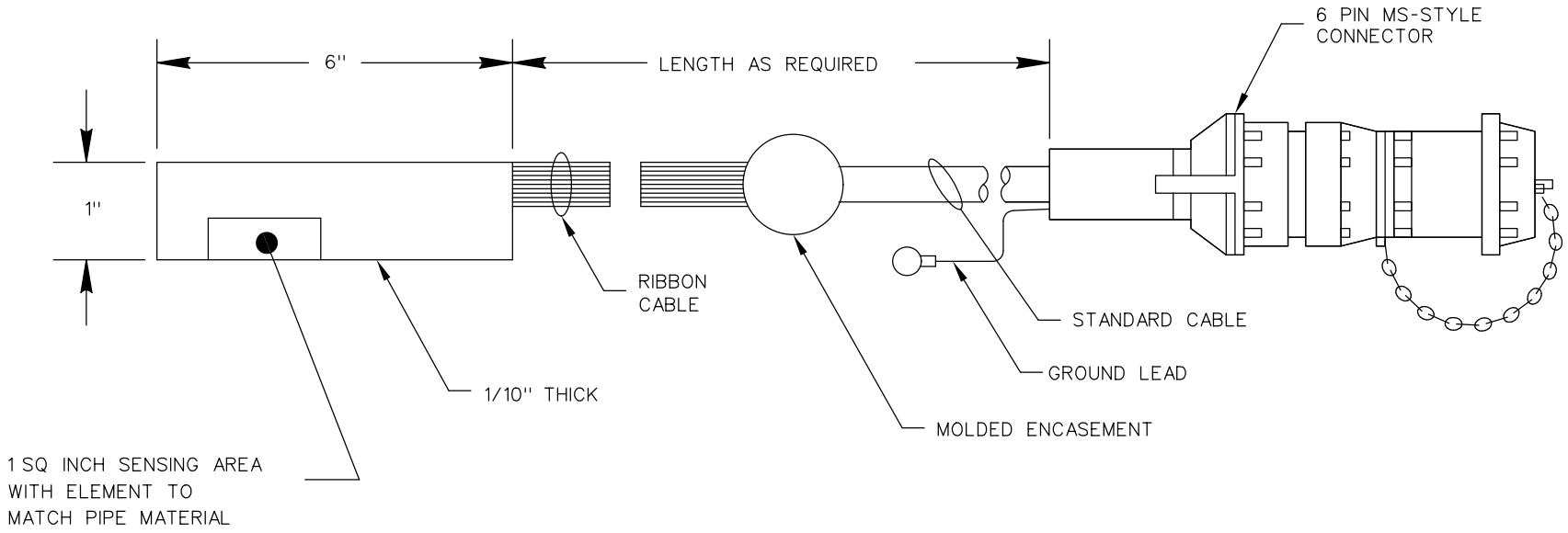
DWU		(Page No.) 651A
DATE OCT. 2016		



TERMINAL BOX

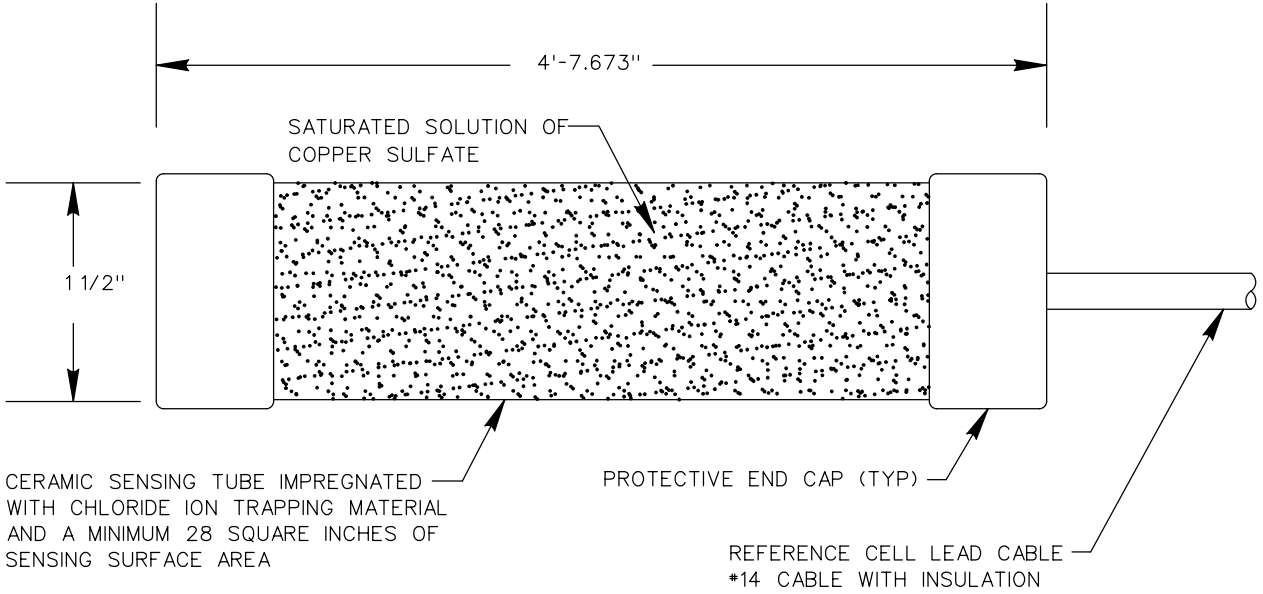
2-CABLE TEST STATION WITH ER PROBE DETAIL

DWU	(Page No.)	653
DATE OCT. 2016		



LOW PROFILE ER PROBE (ELECTRICAL RESISTANCE) PROBE DETAIL

DWU	(Page No.) 655
DATE OCT. 2016	



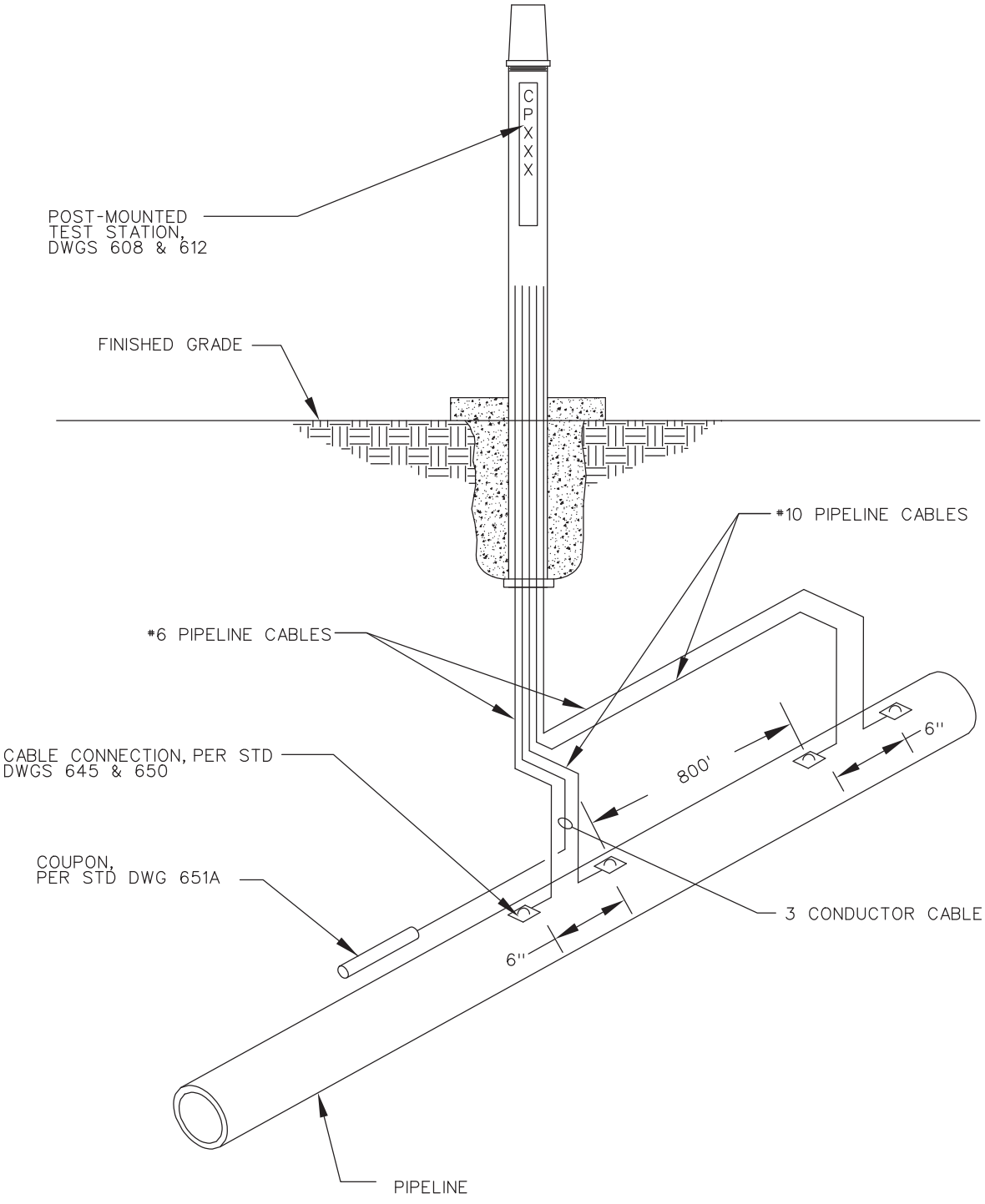
NOTES:

1. THE REFERENCE ELECTRODE SHALL HAVE A MINIMUM SENSING SURFACE AREA OF 28 SQUARE INCHES. IT SHALL BE CAPABLE OF MAINTAINING A STABLE POTENTIAL WITHIN PLUS OR MINUS 10 MILLIVOLTS TO THAT OF A FRESHLY MADE COPPER SULFATE REFERENCE ELECTRODE WHILE A 3 MICROAMPERE ELECTRICAL CURRENT IS APPLIED TO IT. PROVIDE STELTH 2 MODEL SRE-007-CUY BY BORIN MANUFACTURING OR STAPERM MODEL CU-1-UGPC BY GMC CORROSION, OR APPROVED EQUAL

2. MEASURE THE ACCURACY OF EACH COPPER SULFATE REFERENCE ELECTRODE BEFORE INSTALLING IT BY MEASURING THE DC VOLTAGE DIFFERENCE BETWEEN IT AND ONE OR MORE REFERENCE ELECTRODES OF KNOWN ACCURACY. THE MEASUREMENTS SHALL BE LESS THAN PLUS OR MINUS 0.010 DC VOLTS FOR ALL REFERENCE ELECTRODES. PERFORM THESE MEASUREMENTS AFTER TOTALLY SUBMERGING THE REFERENCE ELECTRODES IN A FIVE-GALLON BUCKET OF WATER FOR A MINIMUM PERIOD OF 15 MINUTES. USE ONLY POTABLE DRINKING WATER FOR THIS TEST. BRACKISH WATER OR SALTWATER WILL AFFECT THE TEST RESULTS AND DAMAGE THE REFERENCE ELECTRODE. PROVIDE FIVE DAYS WRITTEN NOTICE TO THE ENGINEER TO ALLOW THESE TESTS TO BE WITNESSED.

COPPER SULFATE REFERENCE ELECTRODE CELL DETAIL

DWU		(Page No.) 657
DATE OCT. 2010		



NOTES:

1. PLACE PLASTIC WARNING TAPE 12" ABOVE CONDUIT.
2. HORIZONTAL RUNS TO BE 36" BELOW GRADE.

REFER TO PAGES 608, 612 645, 650 & 651A

LINE CURRENT SPAN TEST STATION

	(Page No.)
DWU	660
DATE OCT. 2016	