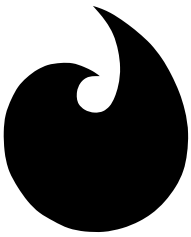
Standard Drawings for Water & Wastewater Construction



Dallas Water Utilities

City of Dallas
Water Utilities Department

REV 2010.04.01

JANUARY 2010

Standard Drawings For Water & Wastewater Construction

First Edition	JANUARY	1984
Revised	JANUARY	1985
Revised	DECEMBER	1986
Revised	MARCH	1989
Revised	MARCH	1991
Revised & Retitled	MAY	1998
Revised	OCTOBER	2003
Revised	FEBRUARY	2009
Revised	JANUARY	2010

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http://www.dallascityhall.com/dwu/dwu_design_standards.html

City of Dallas
Water Utilities Department

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 1

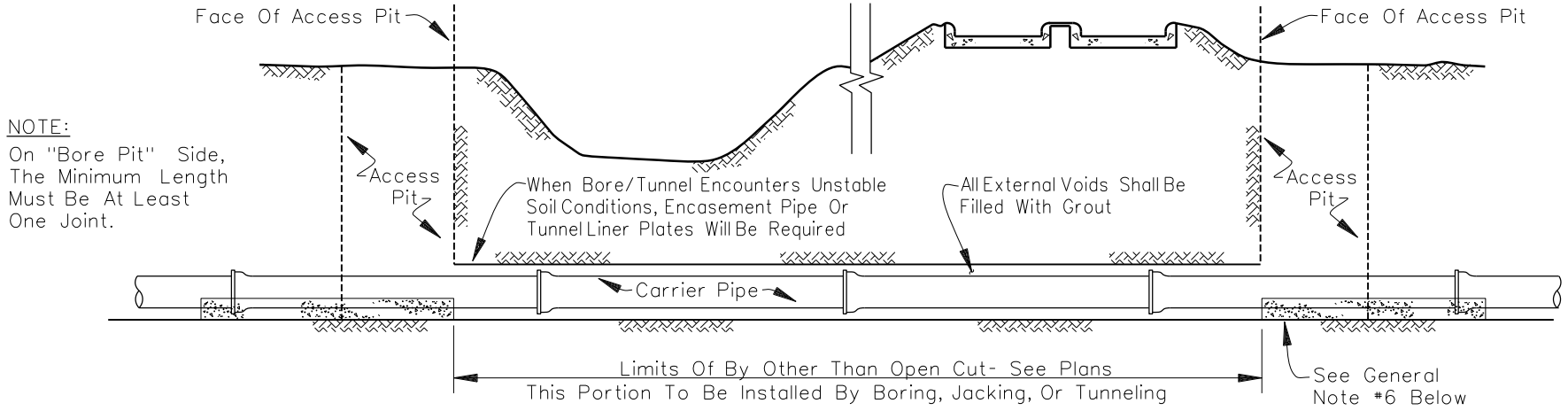
(Series 100)

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)



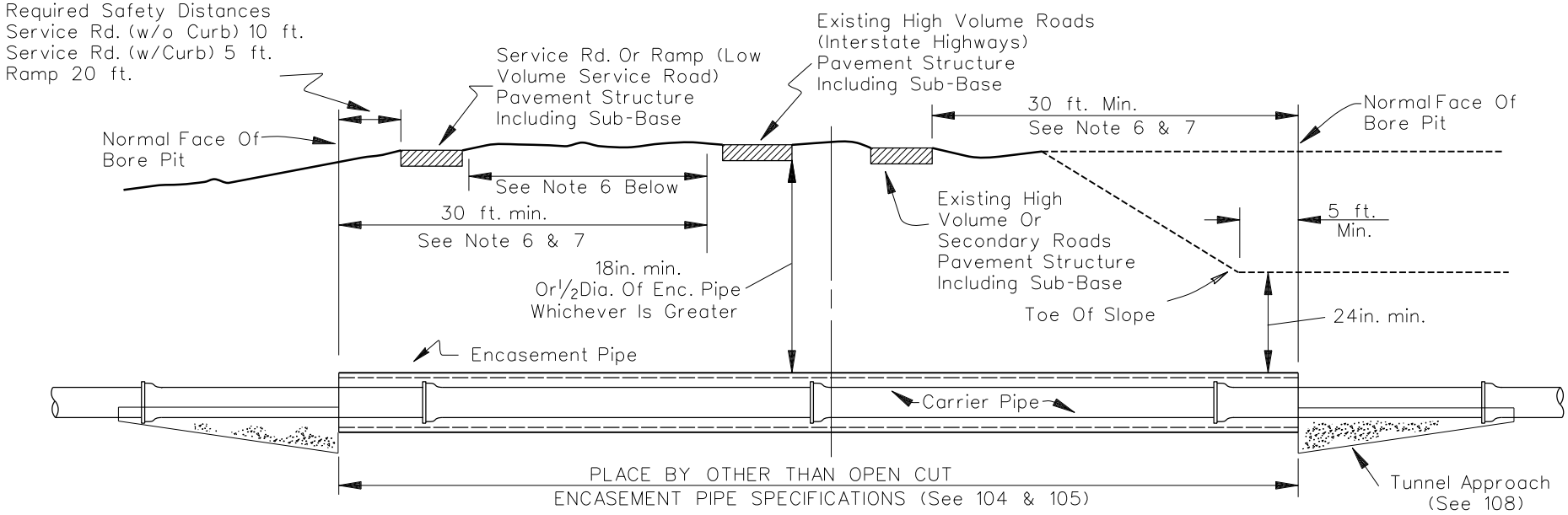
GENERAL NOTES

1. By Other Than Open Cut Construction Methods Are To Conform C.O.G. Specifications Item 6.4 For Jacking, Boring, Or Tunneling & D.W.U. Addendum To C.O.G. 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 Carrier Pipe, Or Encasement Pipe/Tunnel Liner (If Used), And The Earthen Bore Are To Be Filled With Grout.
5. 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.
6. 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.
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.

C.O.G. Specs., Item 6.4

BY OTHER THAN OPEN CUT (Non-Tx.D.O.T. & Non-Railroad)		DWU	(Page No.) 101
		DATE JAN. 2010	

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



GENERAL NOTES

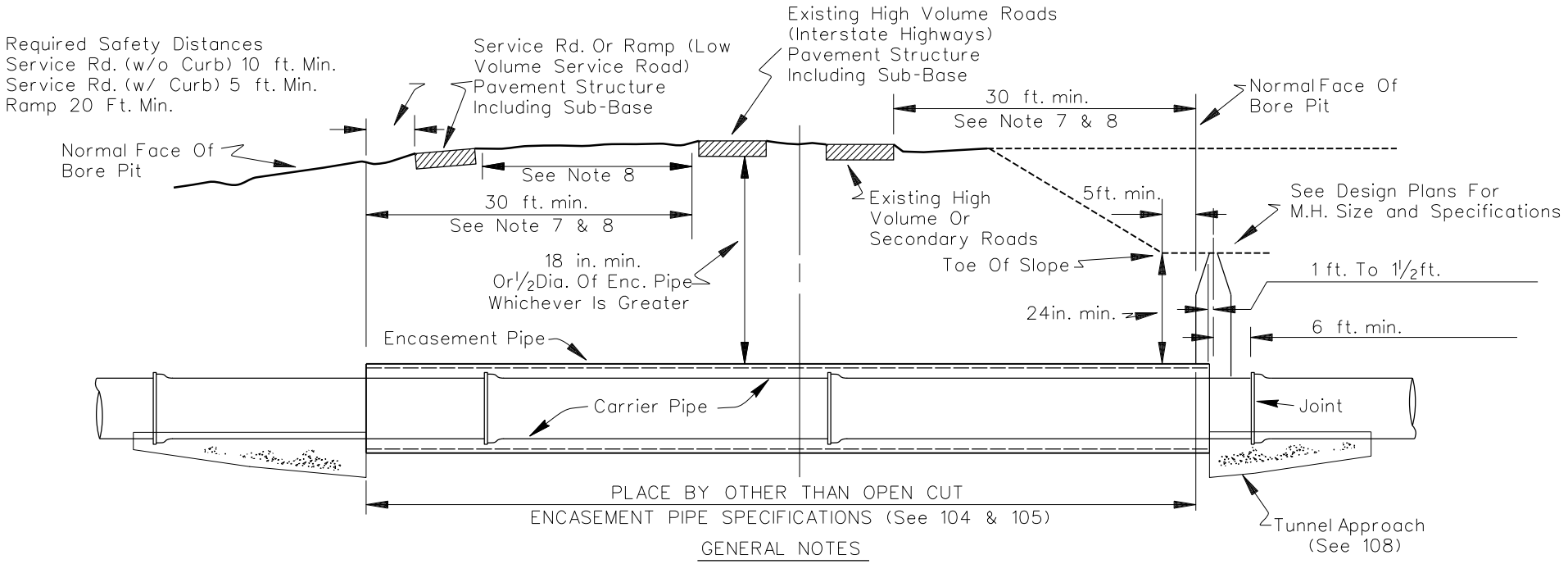
1. Carrier Pipe To Be Made Up Outside The Encasement Pipe And Pushed Through WIth The Bell Of The Pipe Resting On The Encasement Pipe Or A Class "B" Concrete Cradle Where Applicable.
2. Carrier Pipe Shall Be Supported On A Continuous Class "B" Concrete Cradle, Within Corrugated Metal And Flange Liner 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. In Tunnel Sections, Voids Between Earth Or Rock & Enc. Pipe Shall Be Filled With 1:7 Grout Including 5% Air Entrainment By Pressure Injection.
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. 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.

REFER TO PAGES: 103 104 105 106 107 108 109

ITEM 6.6.2
Concrete Class Item 7.4.5

HIGHWAY CROSSING FOR ALL WASTEWATER MAINS & FOR WATER MAINS 12" & UNDER IN DIAMETER.		DWU	(Page No.) 102
		DATE JAN. 2010	

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. Additionally, Grout Shall Be Applied To All Voids Between The Carrier Pipe And Encasement Pipe.
3. In Tunnel Sections, Voids Between Earth Or Rock & Enc. Pipe Shall Be Filled With 1:7 Grout Including 5% Air Entrainment By Pressure Injection.
4. Carrier Pipe Shall Be Supported On A Continuous Class "B" Concrete Cradle, Within Corrugated Metal And Flange Liner Encasements.
5. Construct Tapered Concrete Tunnel Approach At Each End Of Enc. Pipe. See Detail On 108.
6. 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 ¼ 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.
7. 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.
8. 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.
9. 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.

ITEM 6.6.2
Concrete Class Item 7.4.5

REFER TO PAGES: 102 104 105 106 107 108 109

HIGHWAY CROSSING FOR WATER MAINS OVER 12" DIAMETER		DWU	(Page No.) 103
		DATE JAN. 2010	

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 Class "C"	Class "B"	Class "A"	Wall Thick.	Max. Cov.
in.	Ga.	Ft.	Ga.	Ft.	Ga.	Ft.	In.	Ga.						In.	Ft.
12"	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT ALLOWED IN TX.D.O.T. DISTRICT 18 OR CITY OF DALLAS		NOT ALLOWED IN TX.D.O.T. DISTRICT 18 OR CITY OF DALLAS				NOT ALLOWED IN TX.D.O.T. 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 DEC. 2010

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'											

NOT ALLOWED IN Tx.D.O.T. DISTRICT 18 OR CITY OF DALLAS

NOT ALLOWED IN Tx.D.O.T. DISTRICT 18 OR CITY OF DALLAS

NOT ALLOWED IN Tx.D.O.T. DISTRICT 18 OR CITY OF DALLAS

ALT. "B"

ALT. "D"

NOTE:
∞ Infinity

HIGHWAY CROSSING ENCASEMENT PIPE, GAUGE, CLASS, COVER

DWU

(Page No.) 105

DATE JAN. 2010

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

STATE HIGHWAY CROSSINGS
Continued

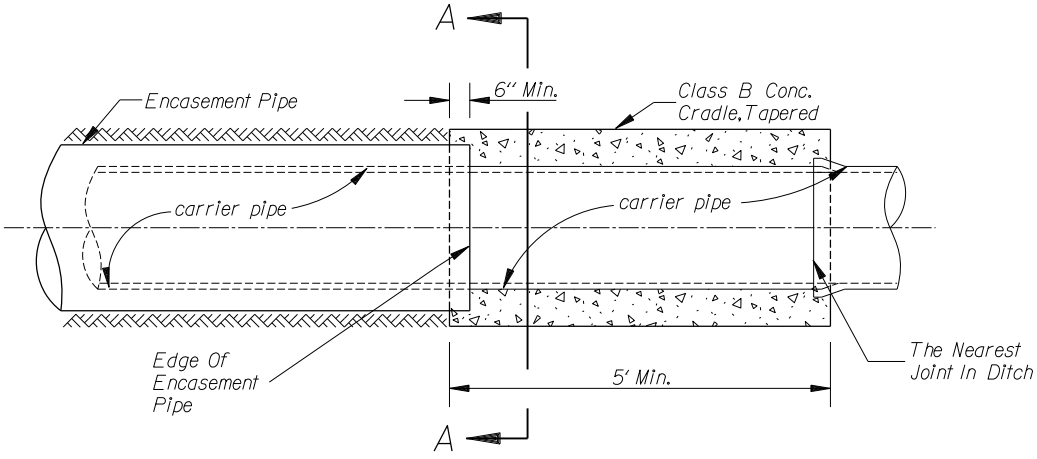
Depth of Cover

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.

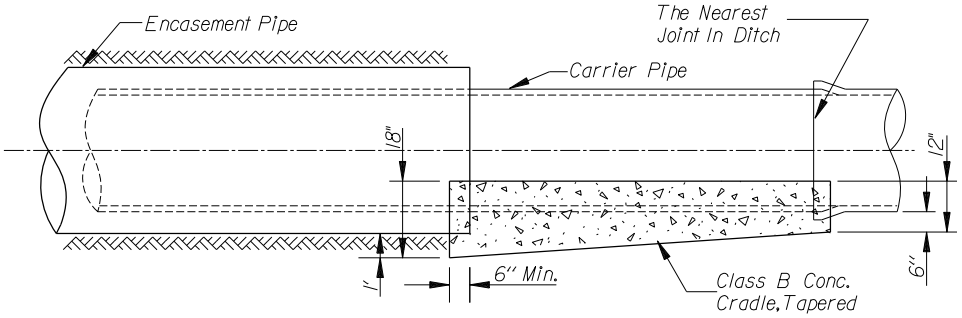
Open Cutting Of Pavement

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".

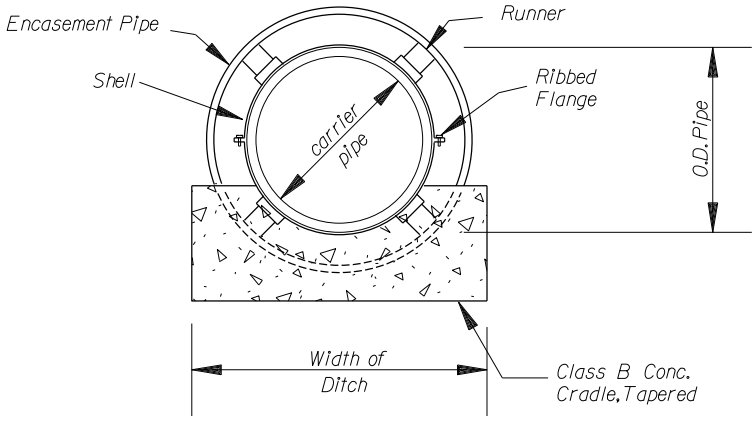
See 102, 103, 104, 105, 106



PLAN VIEW

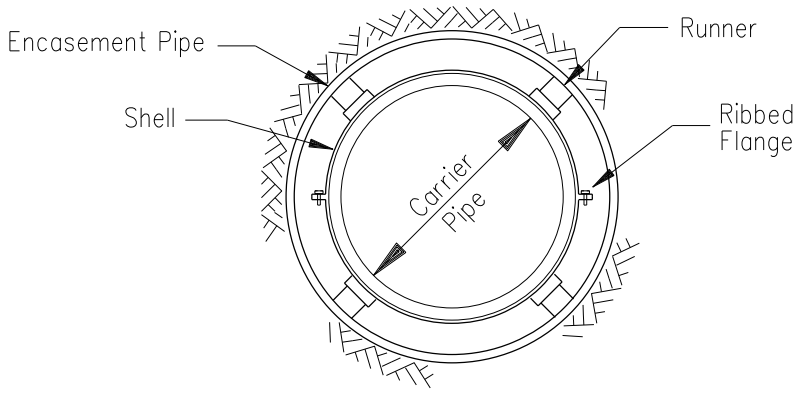


PROFILE VIEW

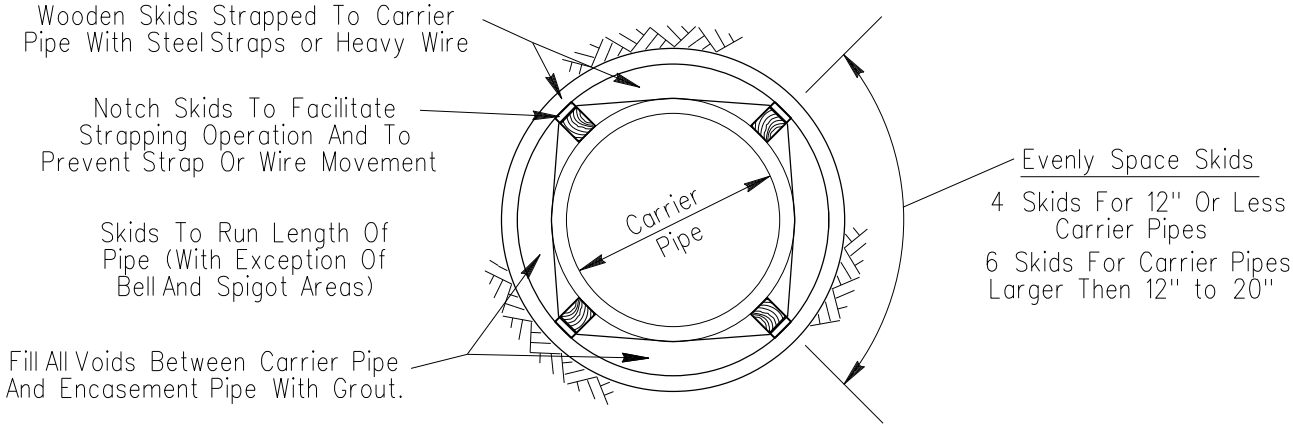


SECTION A-A

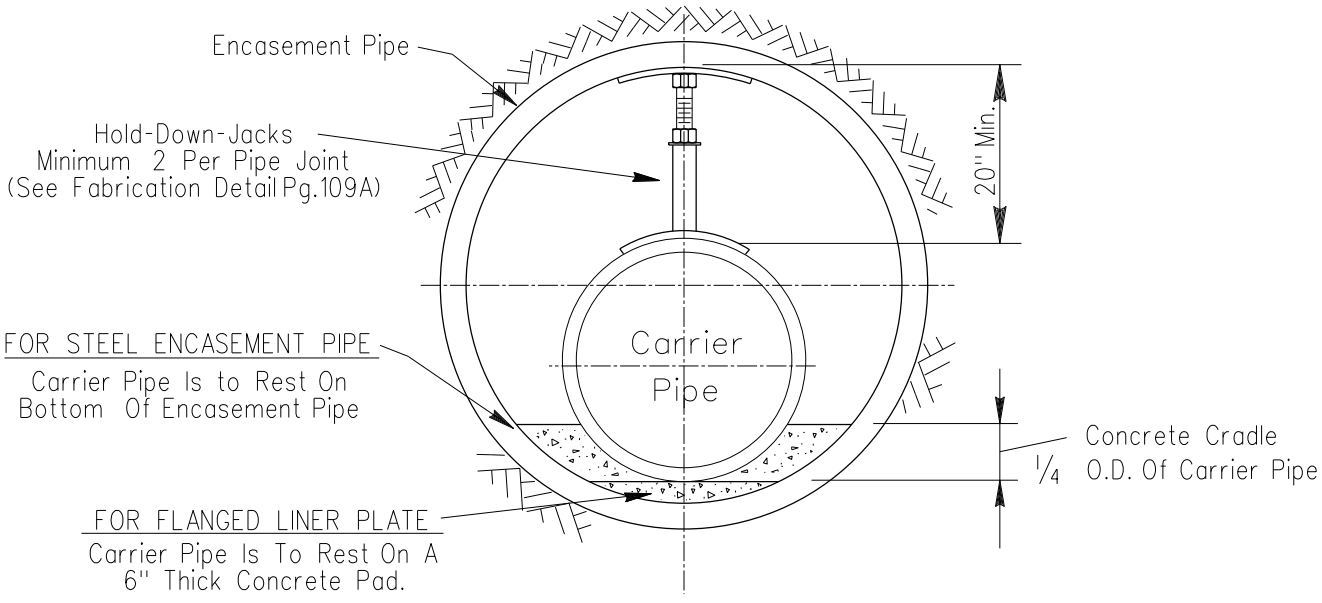
TUNNEL APPROACHES WITH CASING SPACERS		DWU	(PAGE No.) 108
		DATE JAN. 2010	



CASING SPACERS

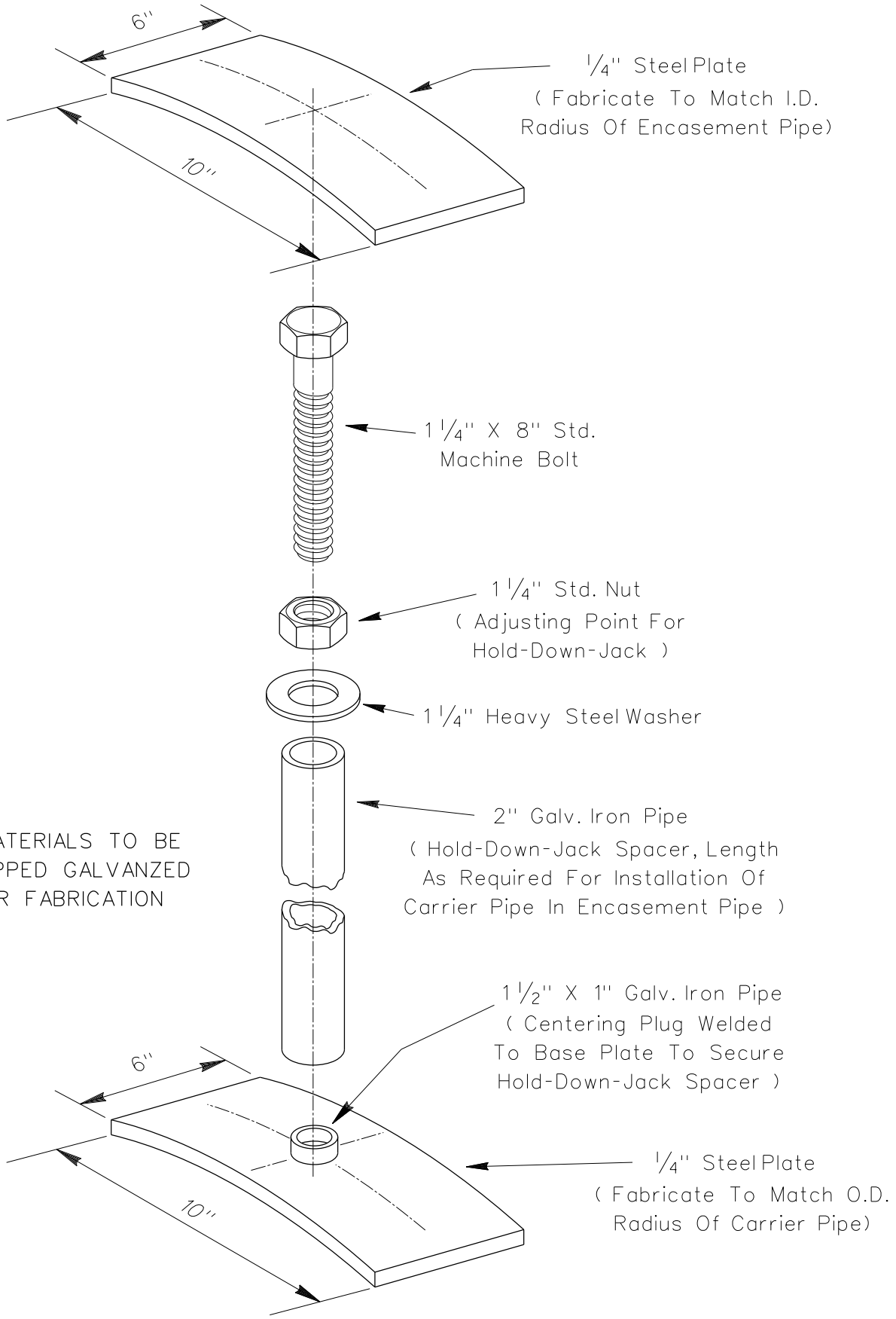


WOODEN SKIDS



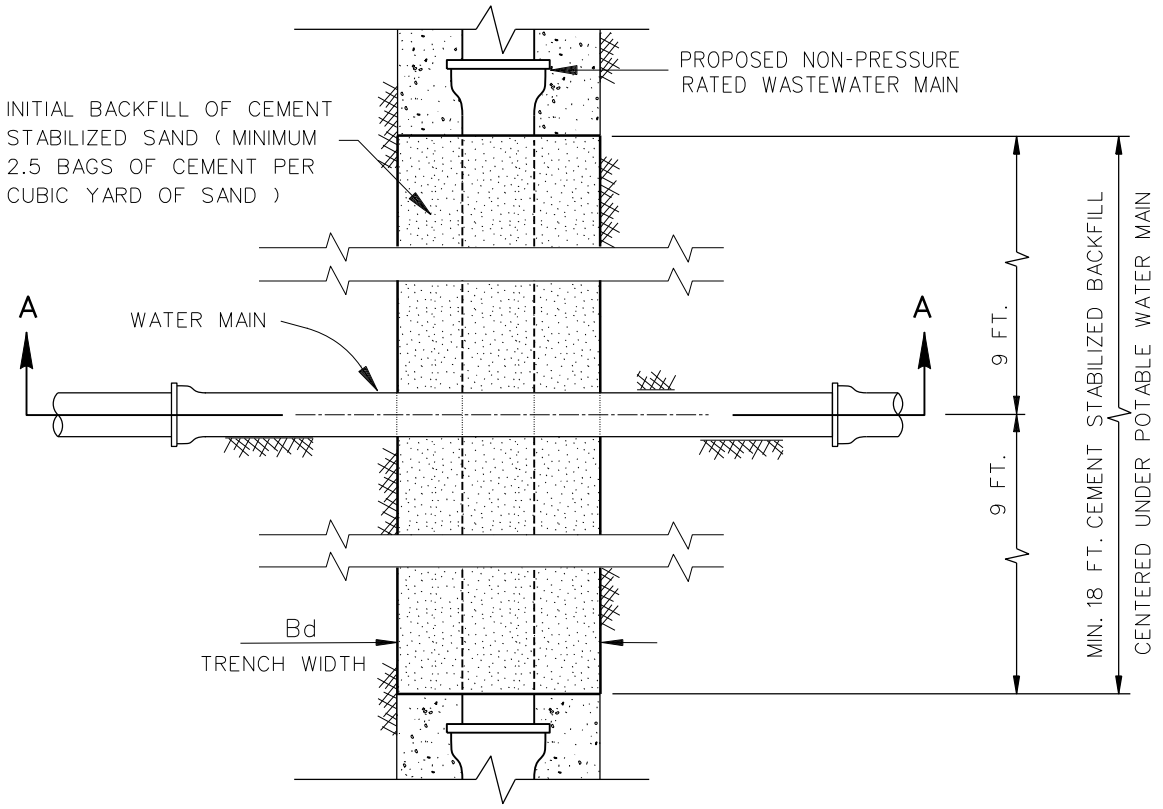
HOLD-DOWN-JACK

CARRIER PIPE SUPPORT (TUNNEL)		DWU	(PAGE No.) 109
		DATE JAN. 2010	

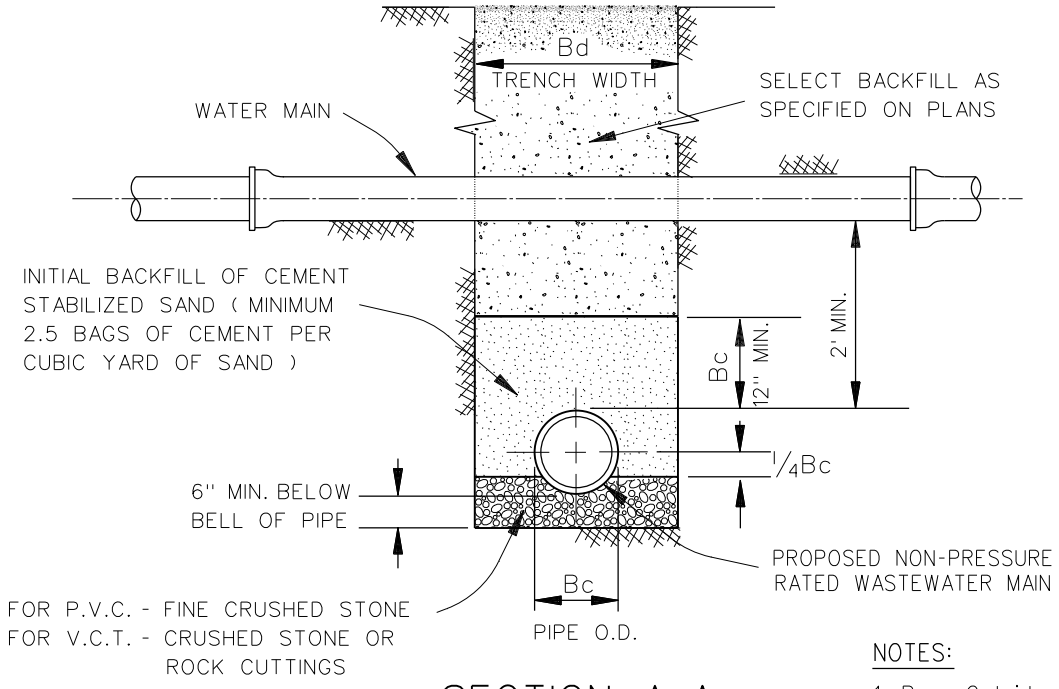


HOLD-DOWN-JACK FABRICATION DETAIL

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



SECTIONAL PLAN VIEW

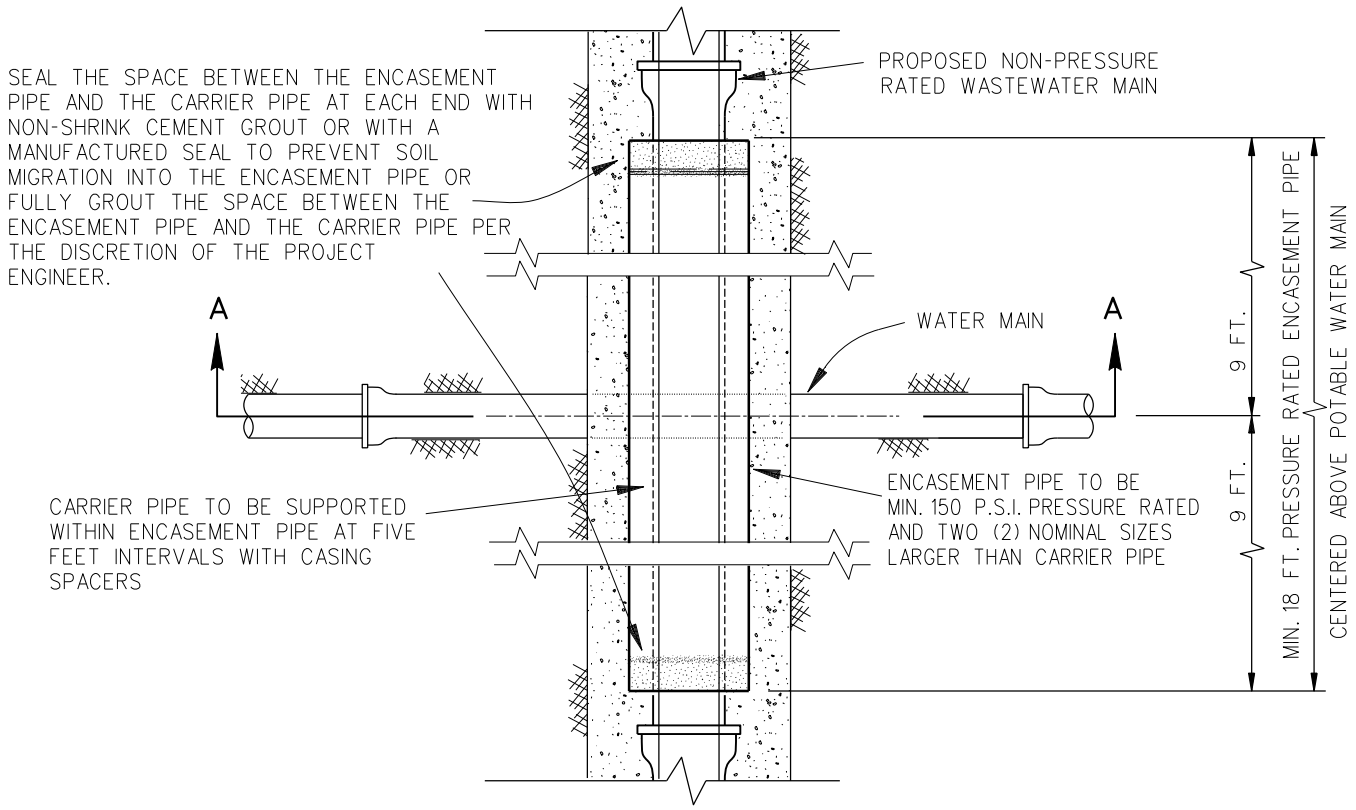


SECTION A-A

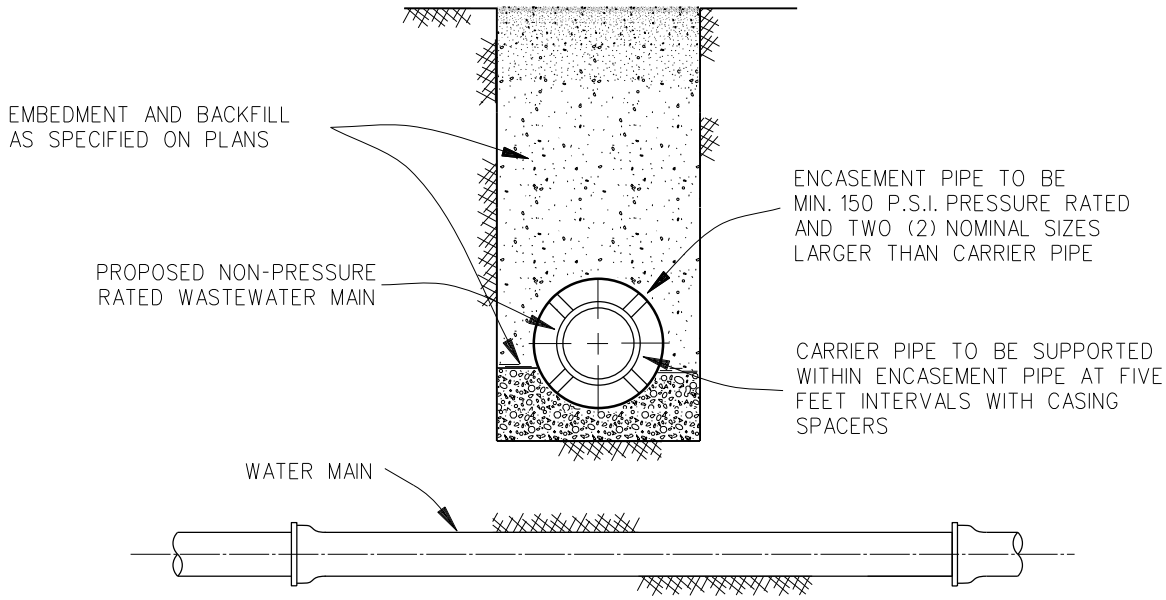
NOTES:

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 JAN. 2010	

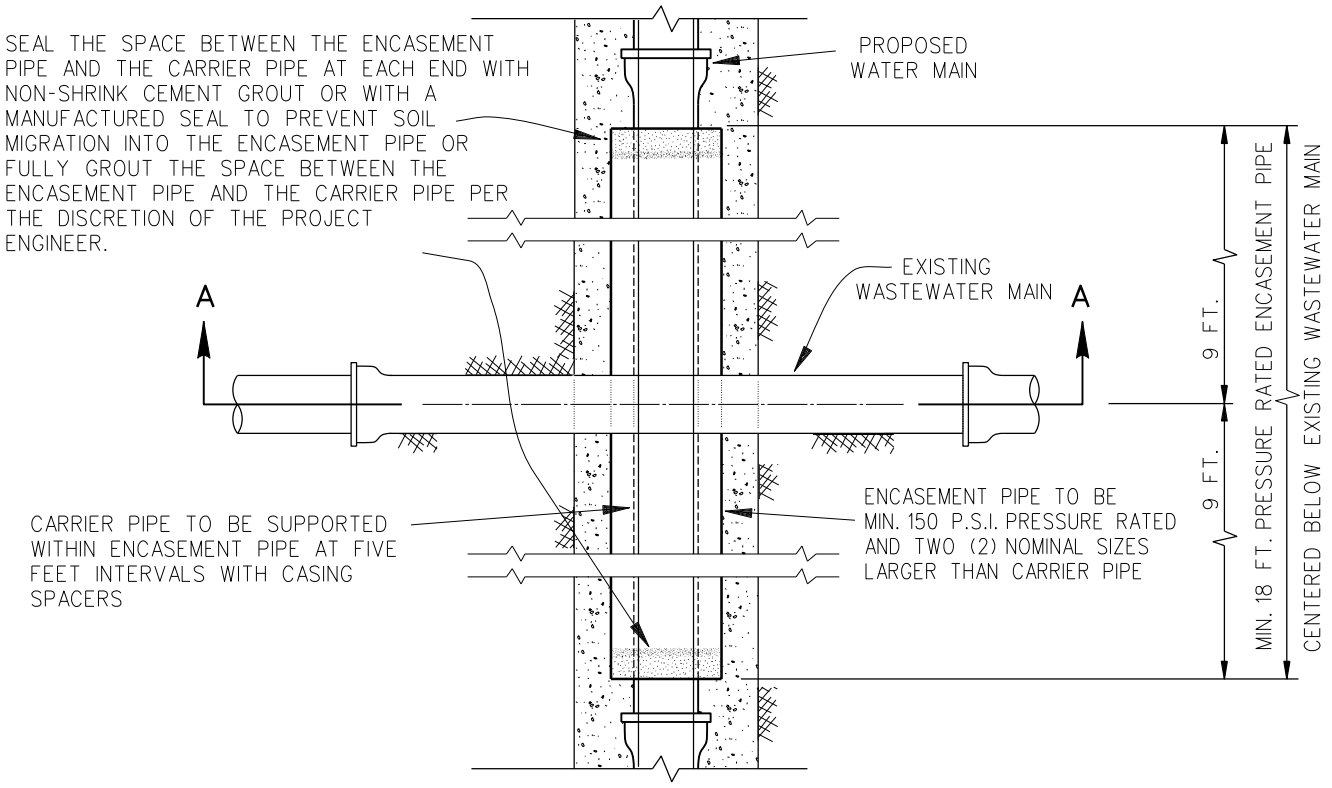


SECTIONAL PLAN VIEW

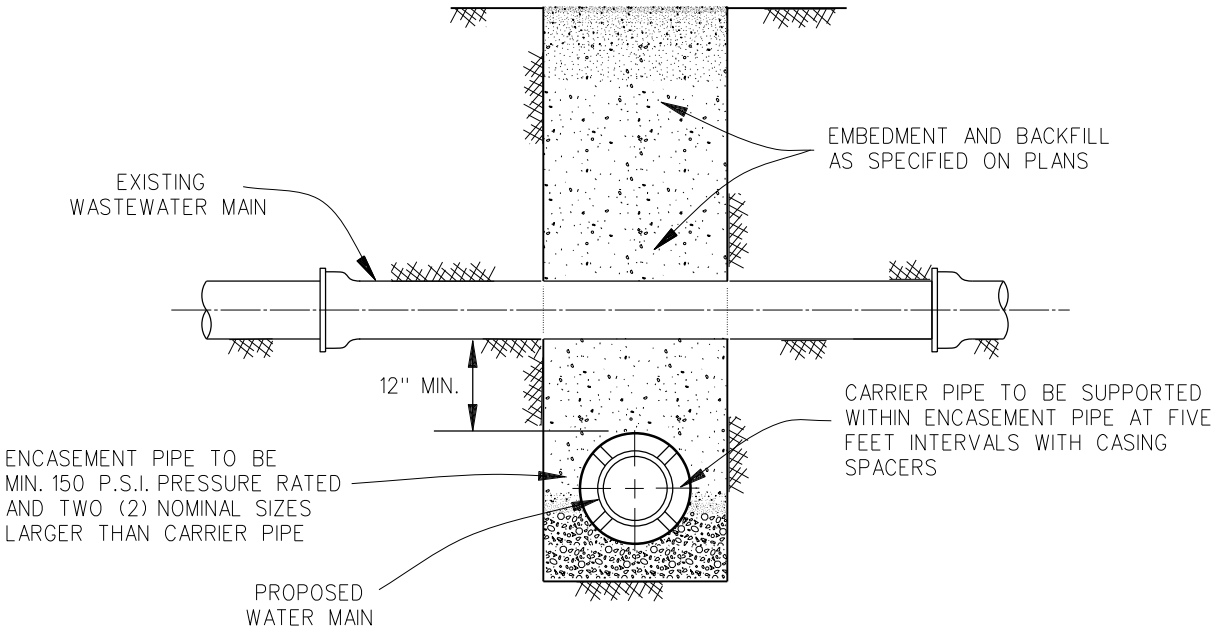


SECTION A-A

ENCASEMENT DETAIL FOR NON-PRESSURE RATED WASTEWATER MAINS ABOVE WATER MAINS		DWU	(Page No.) 111
		DATE JAN. 2010	



SECTIONAL PLAN VIEW



SECTION A-A

ENCASEMENT DETAIL FOR PROPOSED WATER MAINS BELOW WASTEWATER MAINS		DWU	(Page No.) 111A
		DATE JAN. 2010	

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

For 12" Diameter Pipe and Smaller :

Minimum - "Bd" (Embedment Width) = Outside Diameter Of The Pipe Bell Plus 12" Or A Minimum Of 24", Whichever Is Greater

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

For Pipe Diameters Between 12" & 24" :

Minimum - "Bd" (Embedment Width) Shall Be Limited To The Outside Diameter Of The Pipe Bell Plus 12"

For Pipe Diameters Between 24" & 72" :

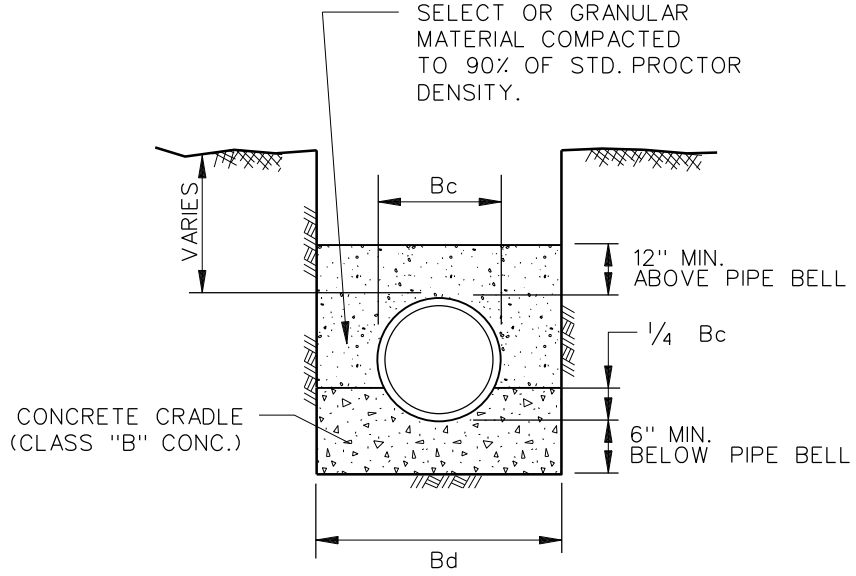
Minimum - "Bd" (Embedment Width) Shall Be Limited To The Outside Diameter Of the Pipe Plus 12"

For Pipe Diameters Greater Than 72" :

Minimum - "Bd" (Embedment Width) Shall Be Limited To Outside Diameter Of The Pipe Times (X) 1.25 plus 12"

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

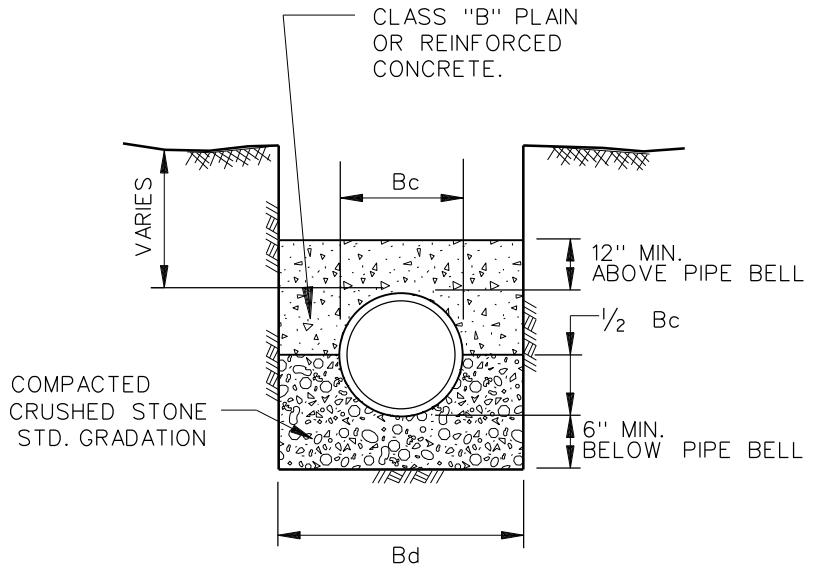
EMBEDMENT WIDTH CALCULATIONS FOR "Bd"		DWU	(Page No.) 112
		DATE APR.2010	REV 2010.04.01



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

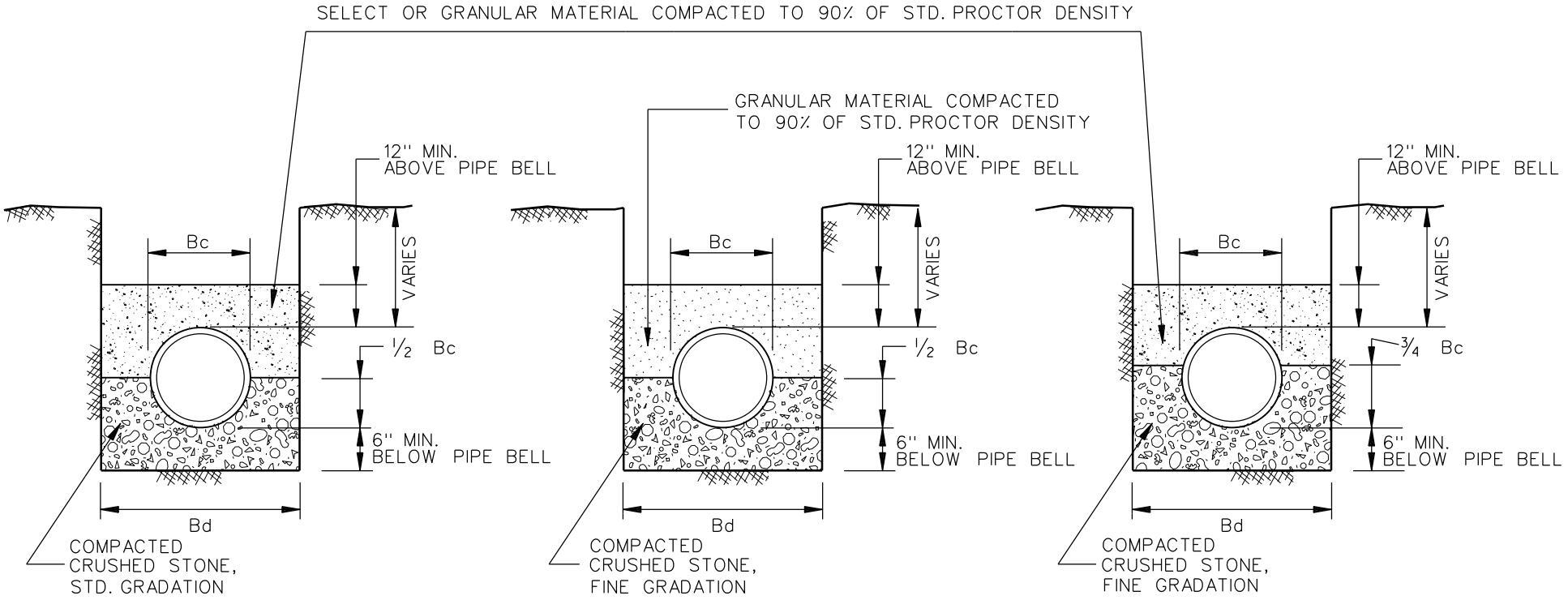
(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

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:

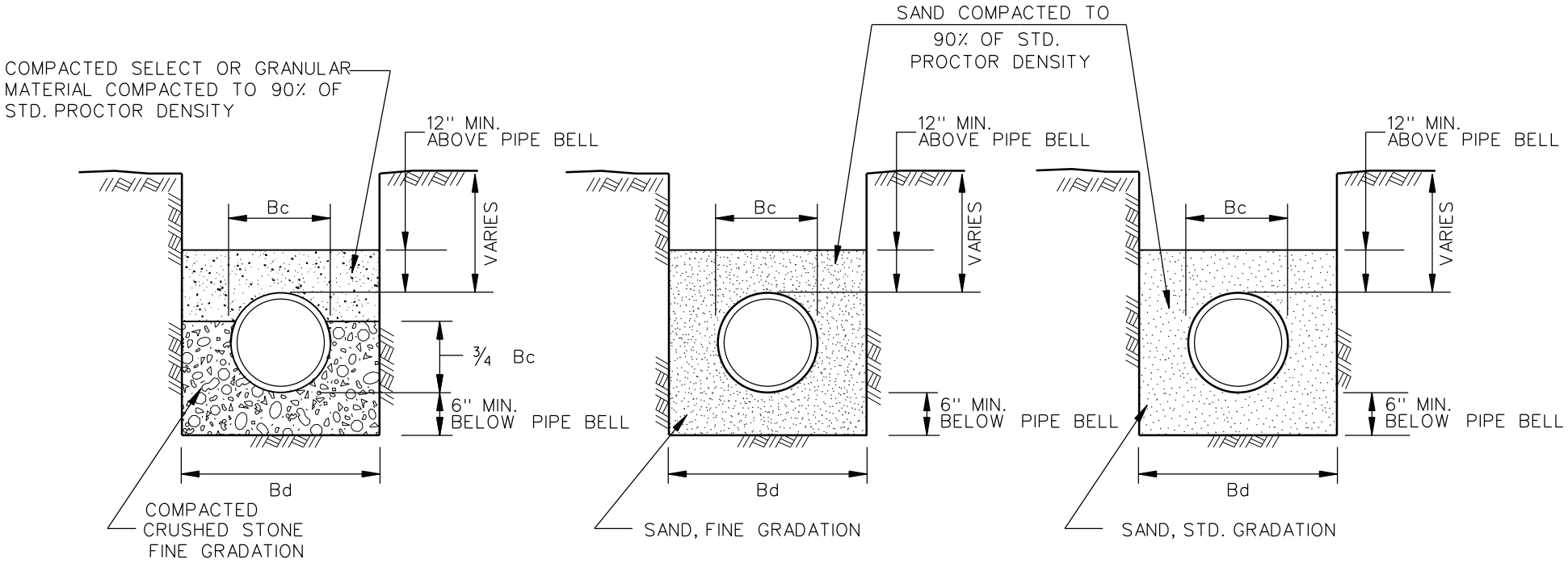
1. FOR MAINS 42" DIAMETER AND LARGER. 1/8 Bc SHALL BE TAKEN AS 6".
2. Bc = OUTSIDE DIAMETER OF PIPE
3. Bd = TRENCH WIDTH
4. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
5. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

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

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

DWU

DATE
JAN. 2010



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

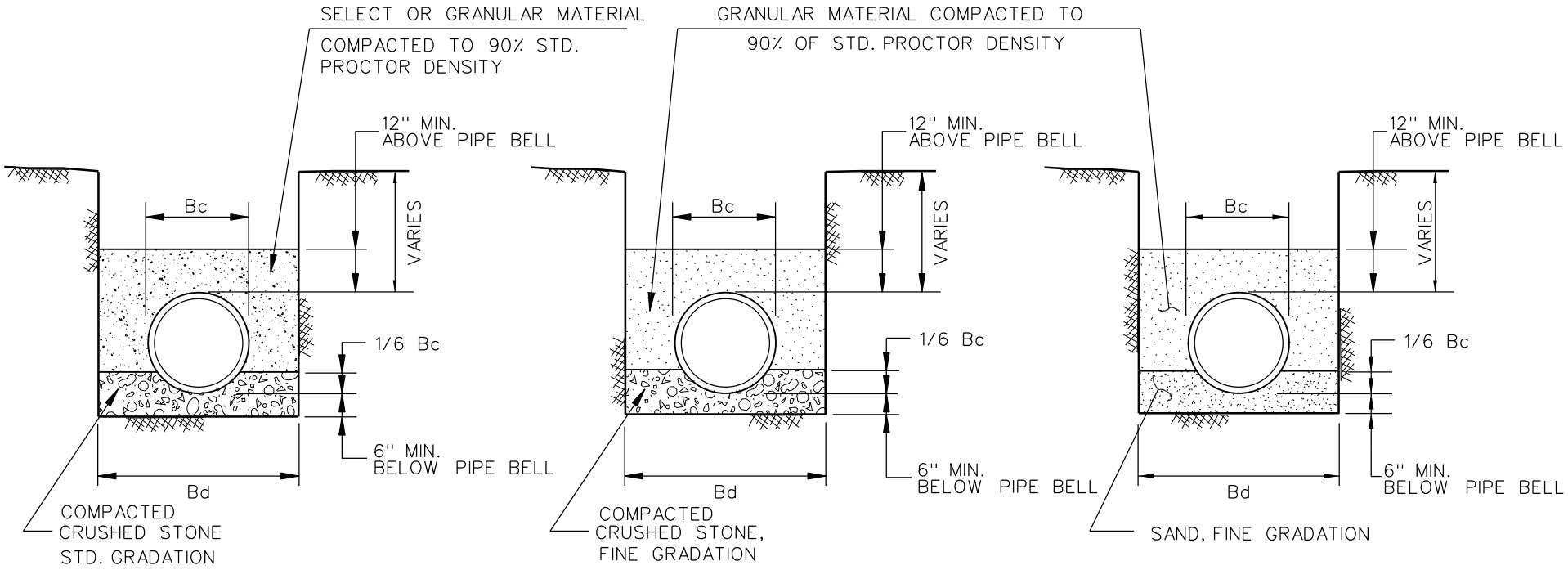
(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

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. FOR MAINS 42" DIAMETER AND LARGER, 1/8 Bc SHALL BE TAKEN AS 6".
2. Bc = OUTSIDE DIAMETER OF PIPE
3. Bd = TRENCH WIDTH
4. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
5. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

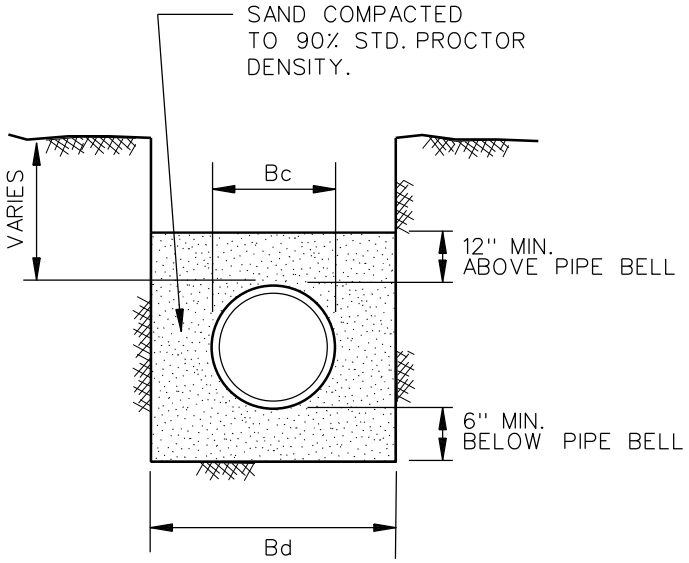
(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

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

DWU

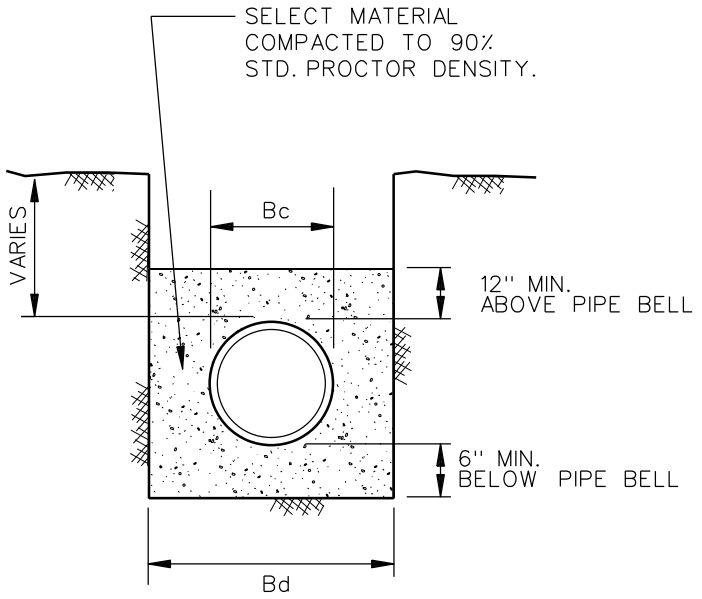
(PAGE NO.) 116

DATE JAN. 2010



CLASS "C-2"

N.T.S.



CLASS "D+"

N.T.S.

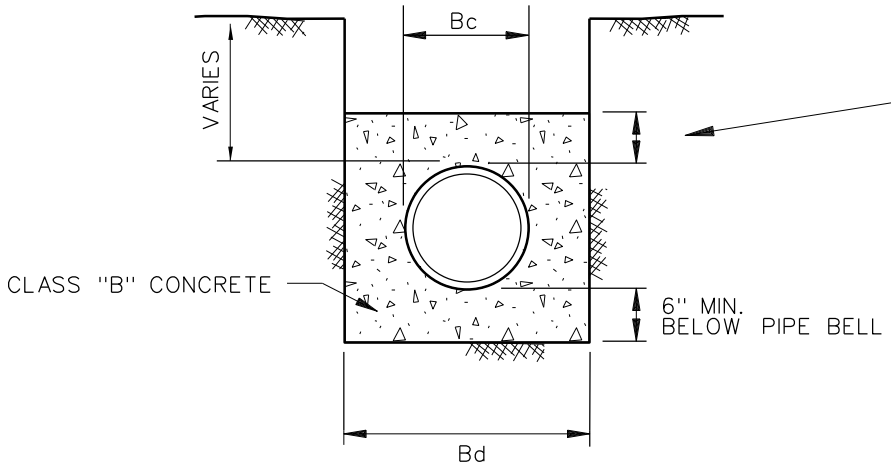
BEDDING ANGLE 30°
L.F. = 1.3
E' = 200

NOTES:

1. FOR MAINS 42" DIAMETER AND LARGER, 1/8 Bc SHALL BE TAKEN AS 6".
2. Bc = OUTSIDE DIAMETER OF PIPE
3. Bd = TRENCH WIDTH
4. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
5. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

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

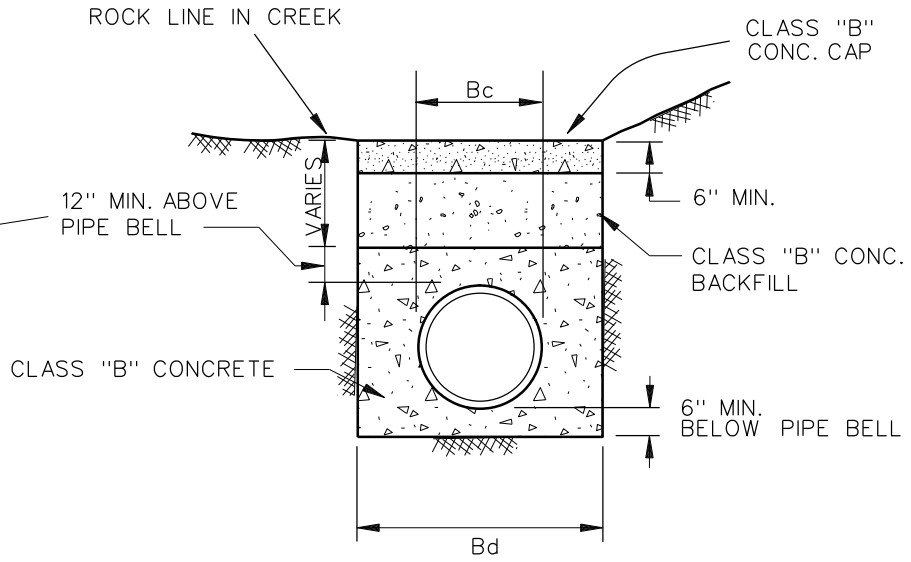
EMBEDMENT CLASS "C-2" & "D+"		DWU	(PAGE NO.) 117
		DATE JAN. 2010	



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")

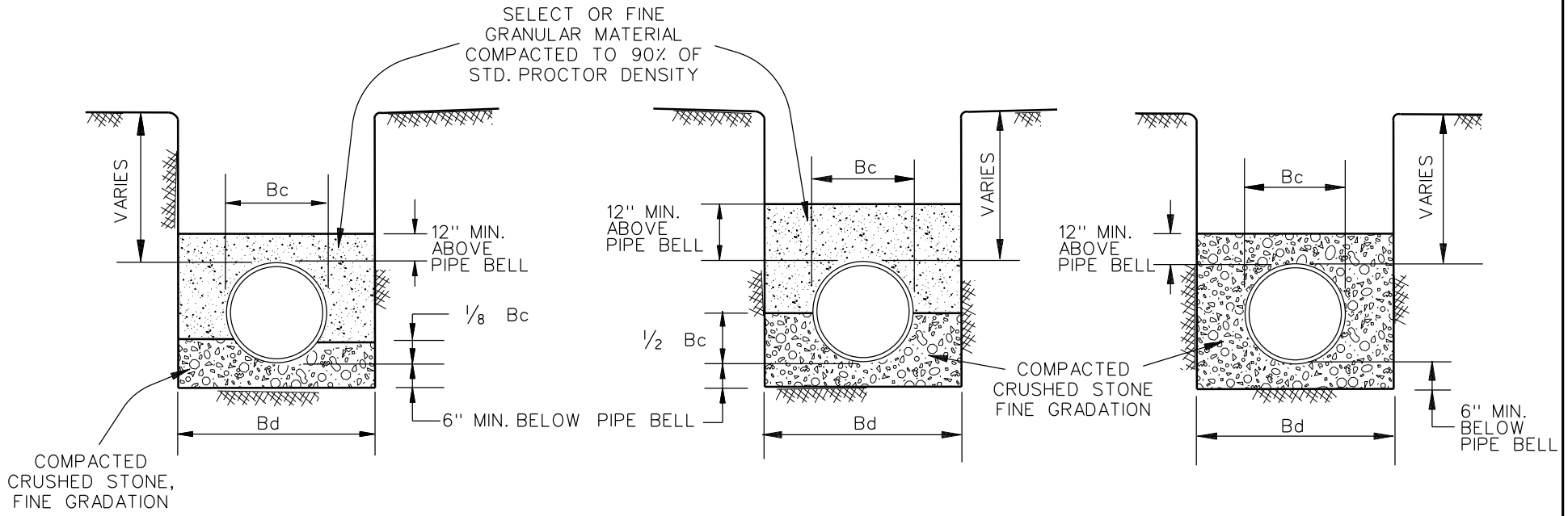
EMBEDMENT
CLASS "G" & "G-1"

DWU

(PAGE NO.) 118

DATE

JAN. 2010



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")

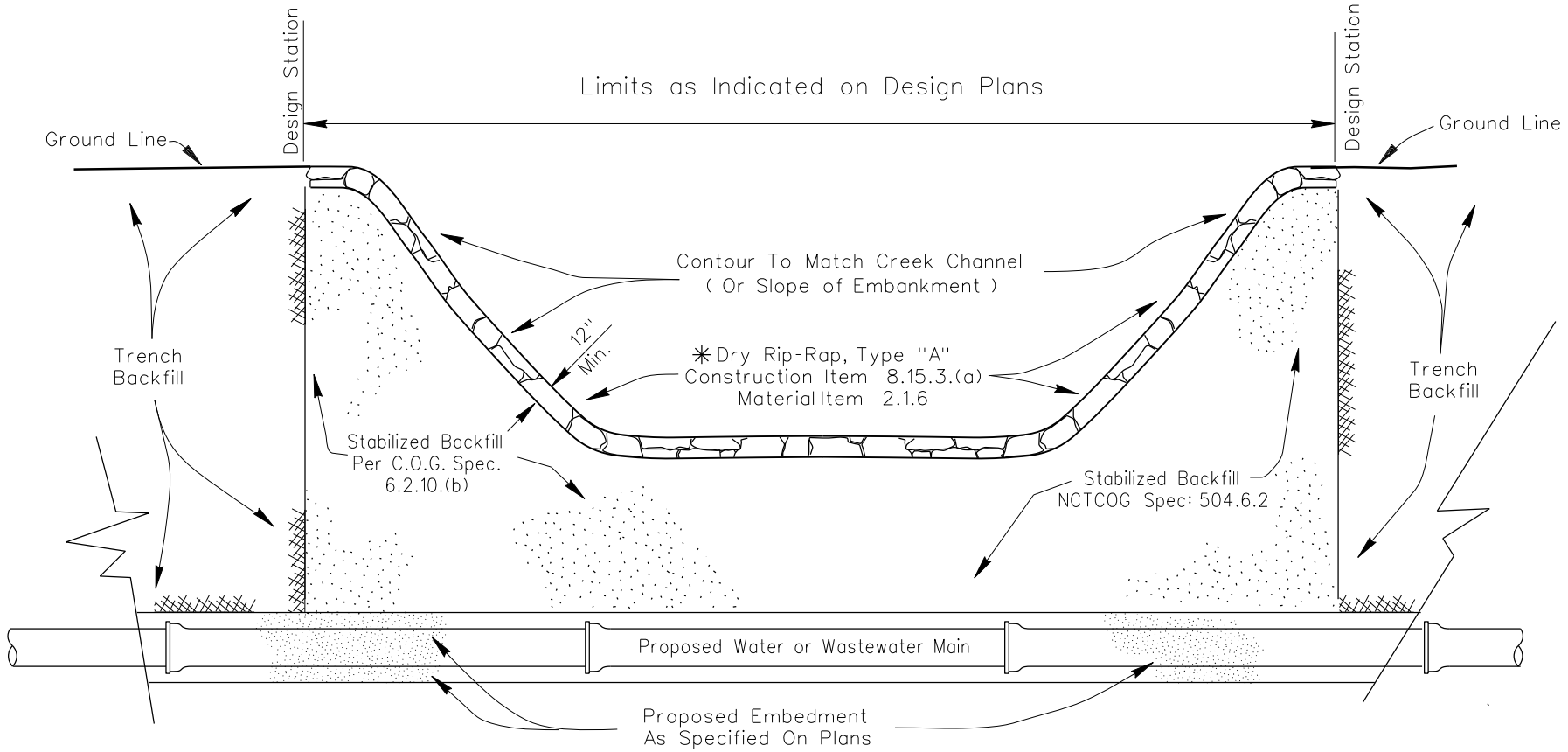
EMBEDMENT
CLASS"B-1a","B-2a"&"B-5"

DWU

(PAGE NO.) 119

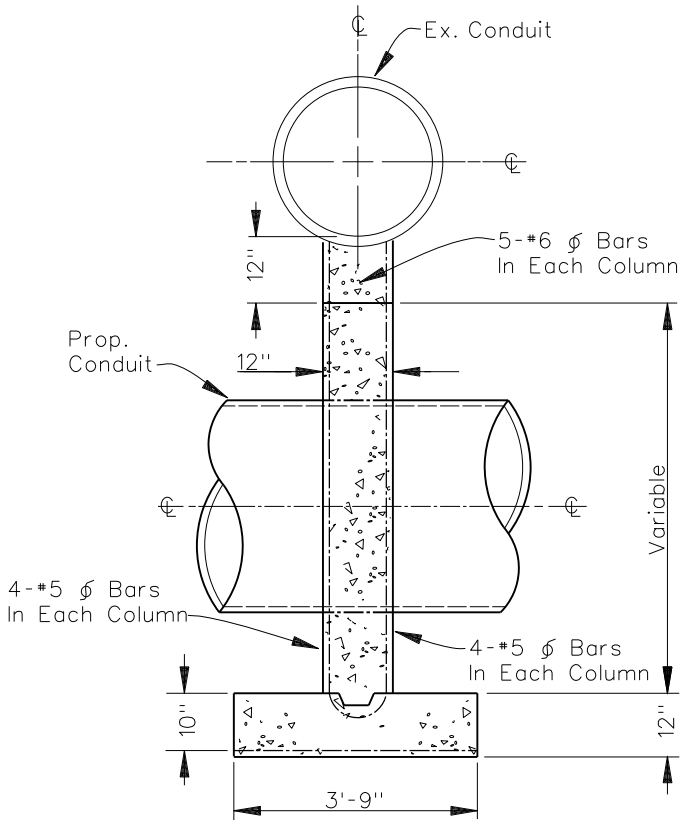
DATE JAN. 2010

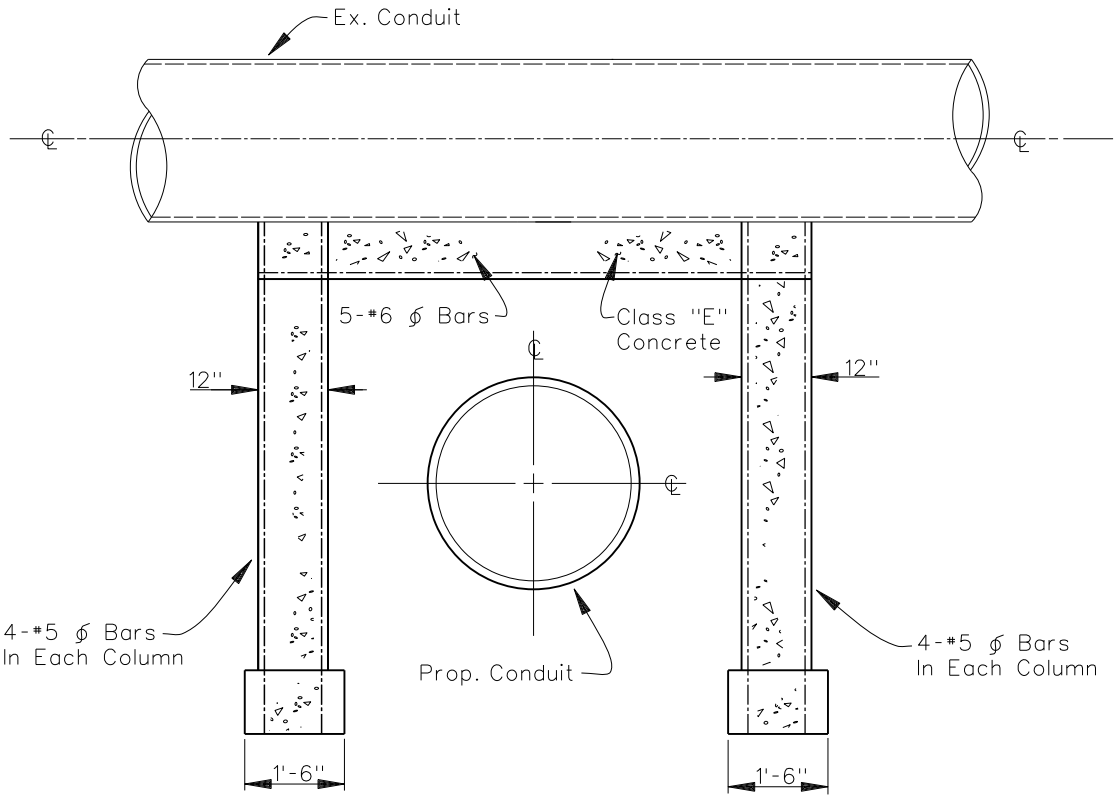
DETAIL SHOWN FOR CREEK CROSSING
(TYPICAL FOR EMBANKMENT SLOPE PROTECTION)



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

STABILIZED BACKFILL & RIP-RAP DETAIL FOR EMBANKMENT SLOPE PROTECTION		DWU	(Page No.) 120
		DATE DEC. 2001	





NOTES:

1. Contractor Must Contact Owner Of Existing Conduit 48 Hours Prior To Construction.
2. Columns May Be 12" Square or 12" Round.
3. The Engineer Shall Determine If A Foundation Is Required.
4. The Bottom Elevation Of The Vertical Columns Shall Be At The Base Of The Excavation, As Minimum, Or Lower As Determined By The Engineer.
5. The Vertical Columns Must Have A Minimum Horizontal Clearance Equal To The Minimum Ditch Width As Outlined In Sheet 113.

Steel Reinforcement 2.2.6
Concrete Class Item 7.4.5

TYPE "A"
UTILITY SUPPORT

DWU

DATE
DEC. 2001

(Page No.)
121

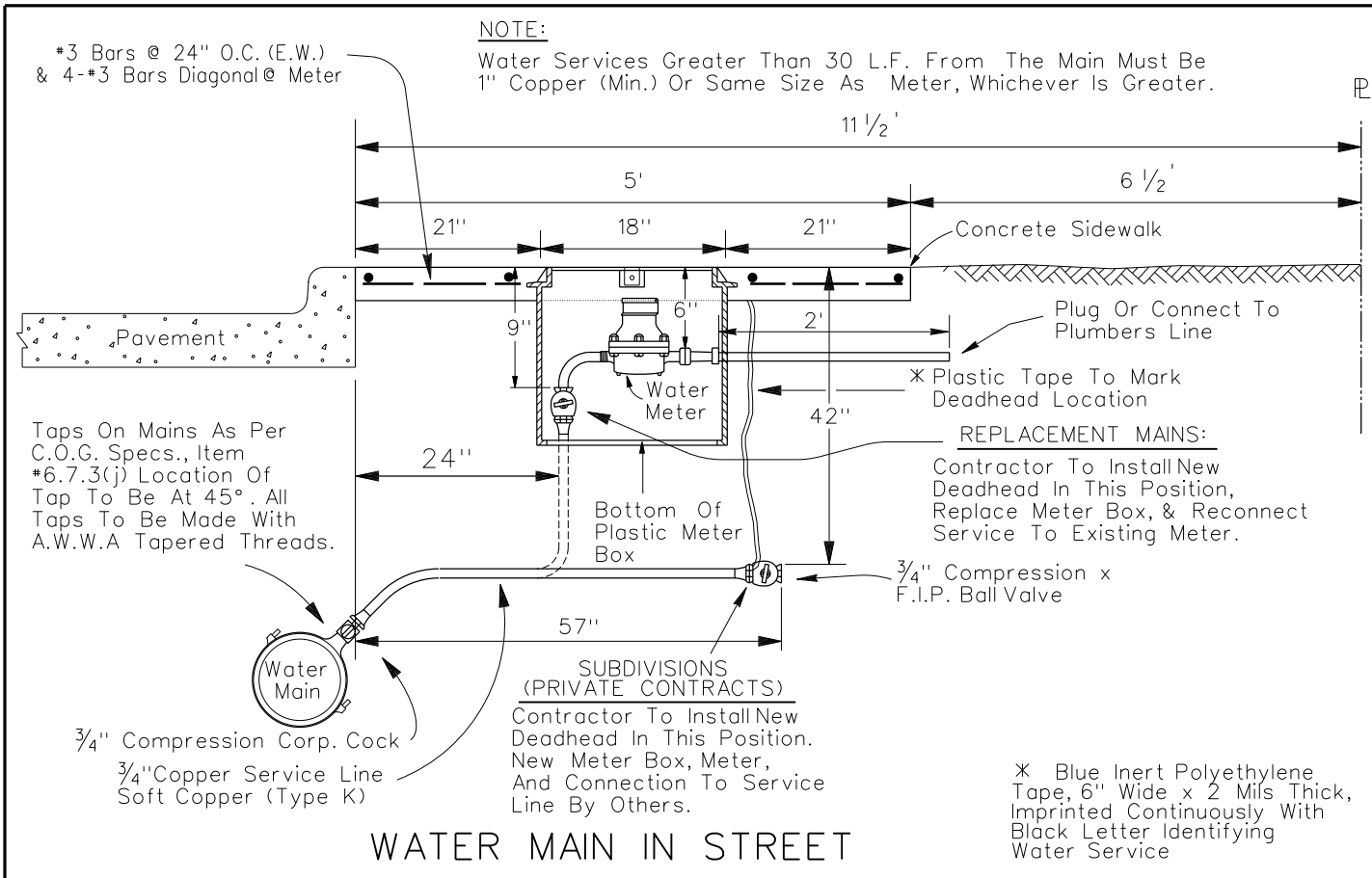
PART 2

(Series 200)

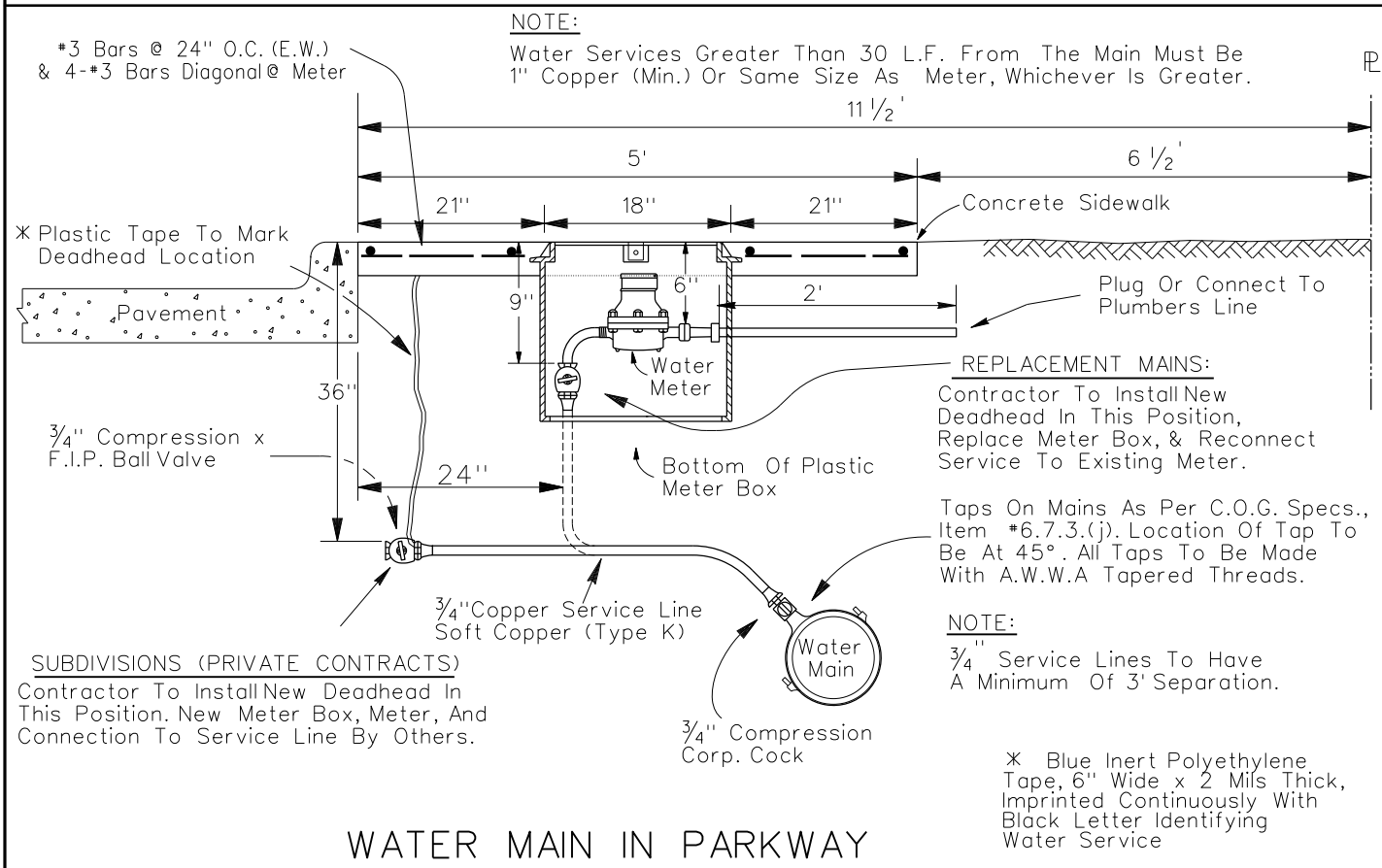
WATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department

PART 2
WATER MAIN CONSTRUCTION

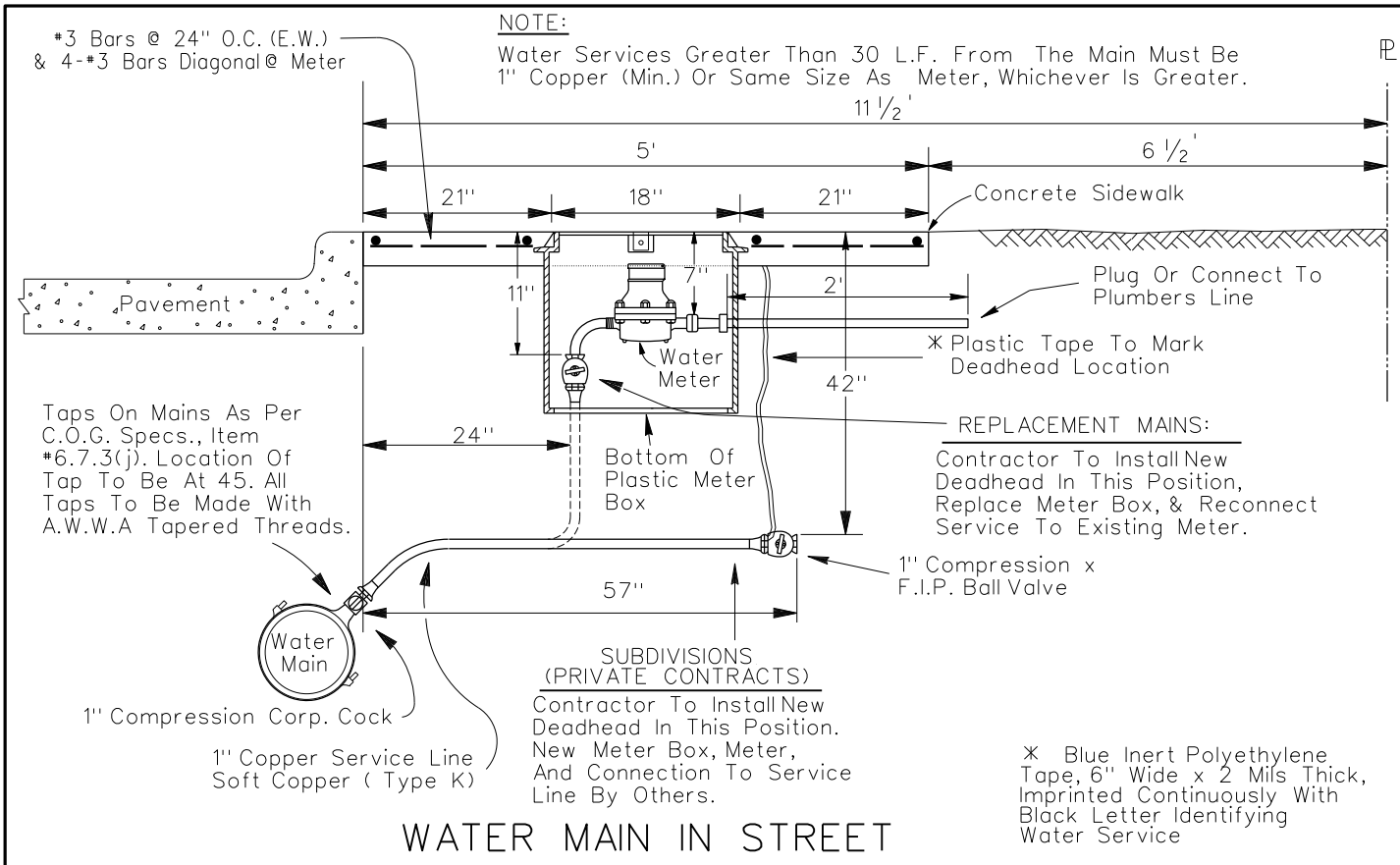


WATER MAIN IN STREET

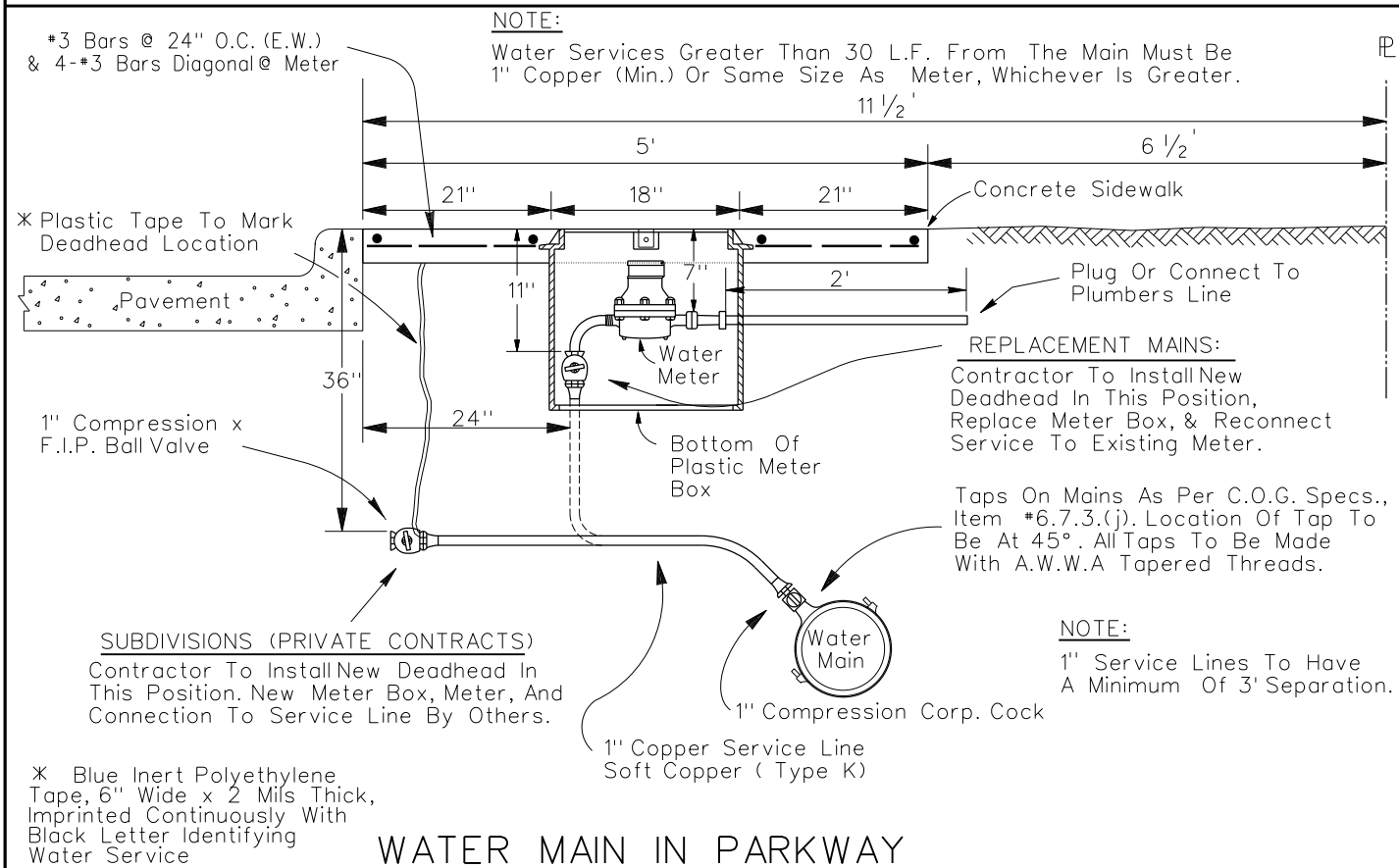


WATER MAIN IN PARKWAY

3/4" WATER SERVICE INSTALLATIONS (SIDEWALK ADJACENT TO CURB)		DWU	(PAGE No.) 201
		DATE JAN. 2010	



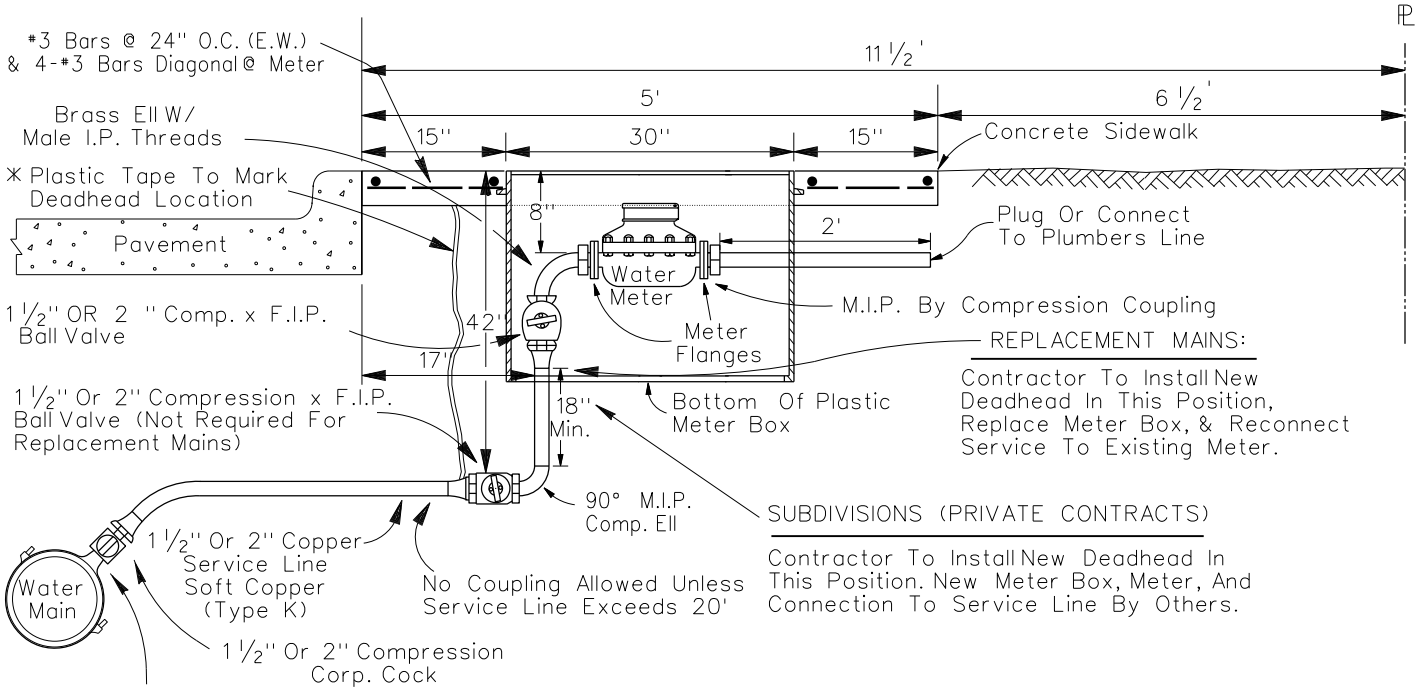
WATER MAIN IN STREET



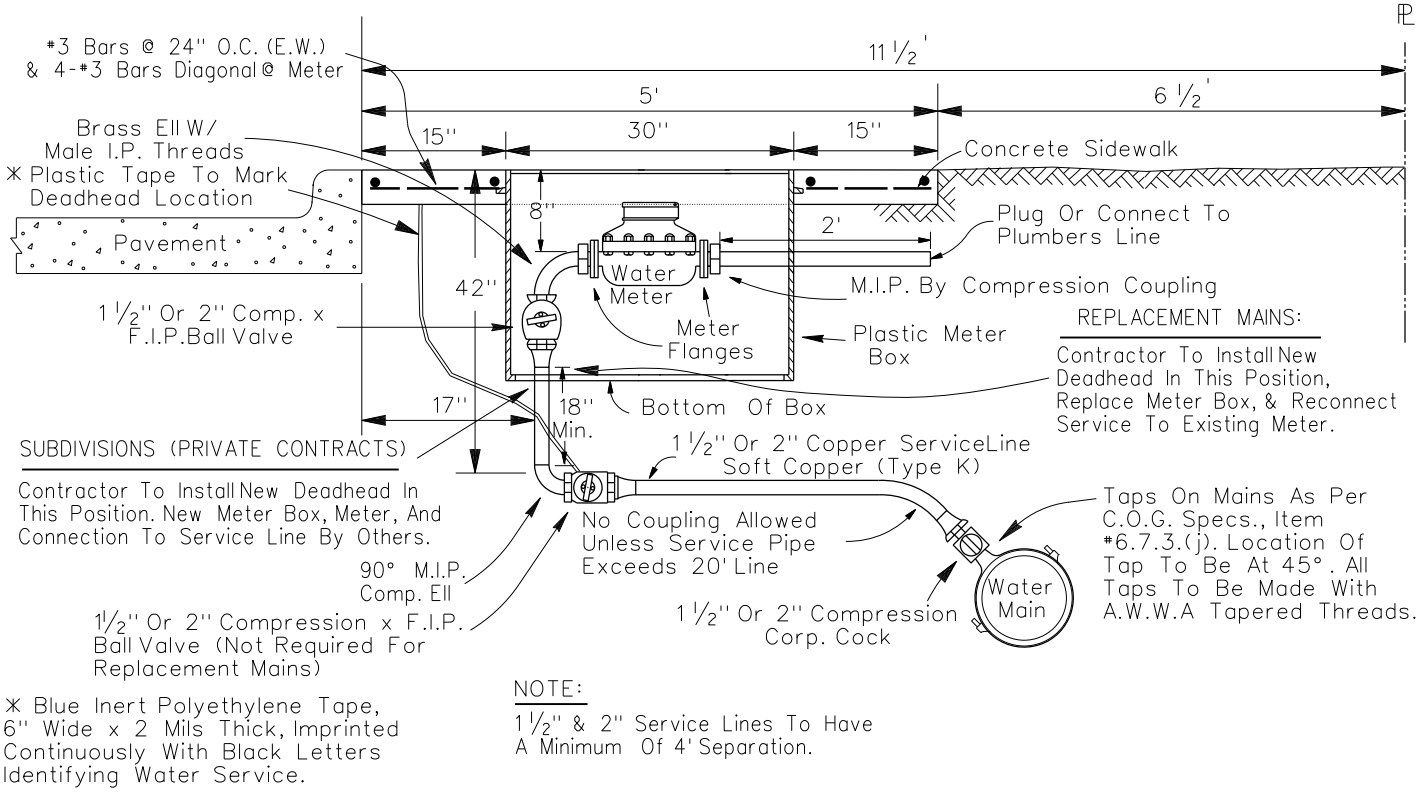
WATER MAIN IN PARKWAY

1" WATER SERVICE INSTALLATIONS (SIDEWALK ADJACENT TO CURB)

DWU		(PAGE No.) 202
DATE JAN. 2010		



WATER MAIN IN STREET



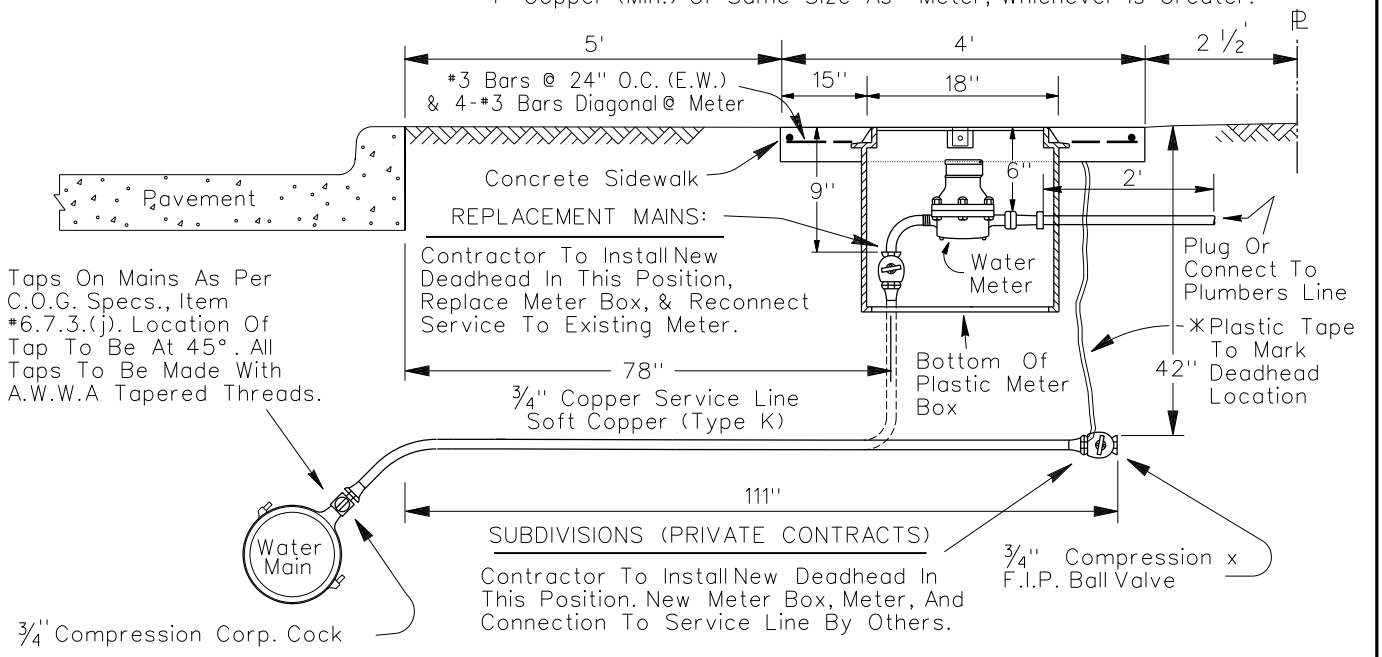
NOTE:
1 1/2" & 2" Service Lines To Have
A Minimum Of 4' Separation.

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

WATER MAIN IN PARKWAY

1 1/2" OR 2' WATER SERVICE INSTALLATION (SIDEWALK ADJACENT TO CURB)		DWU	(PAGE No.) 203
		DATE JAN. 2010	

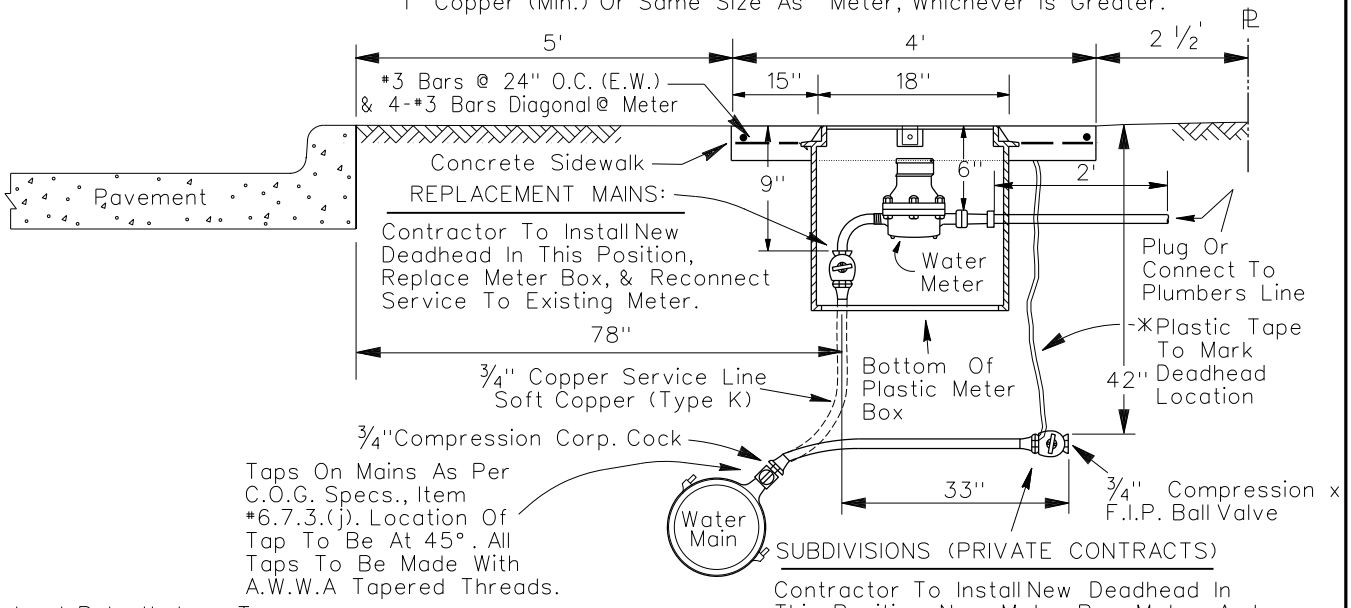
NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.



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

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.



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

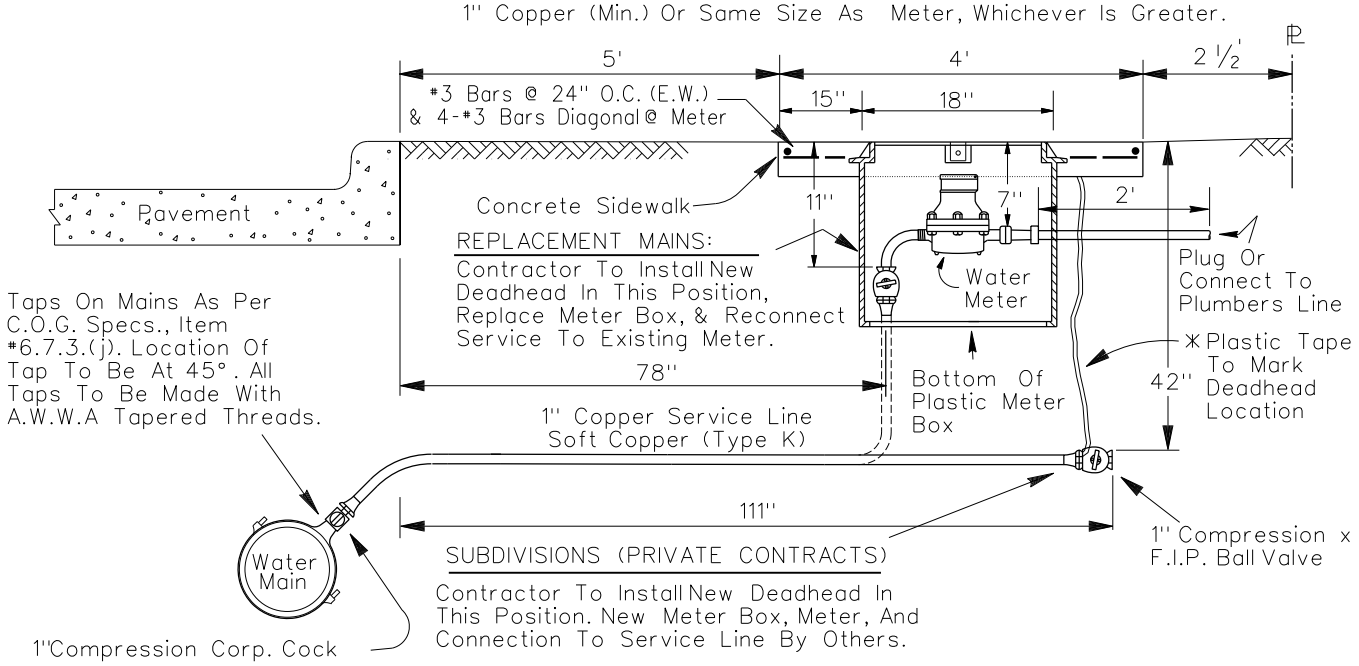
NOTE:
3/4" Service Lines To Have A Minimum Of 3' Separation.

WATER MAIN IN PARKWAY

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

DWU		(PAGE No.) 204
DATE JAN. 2010		

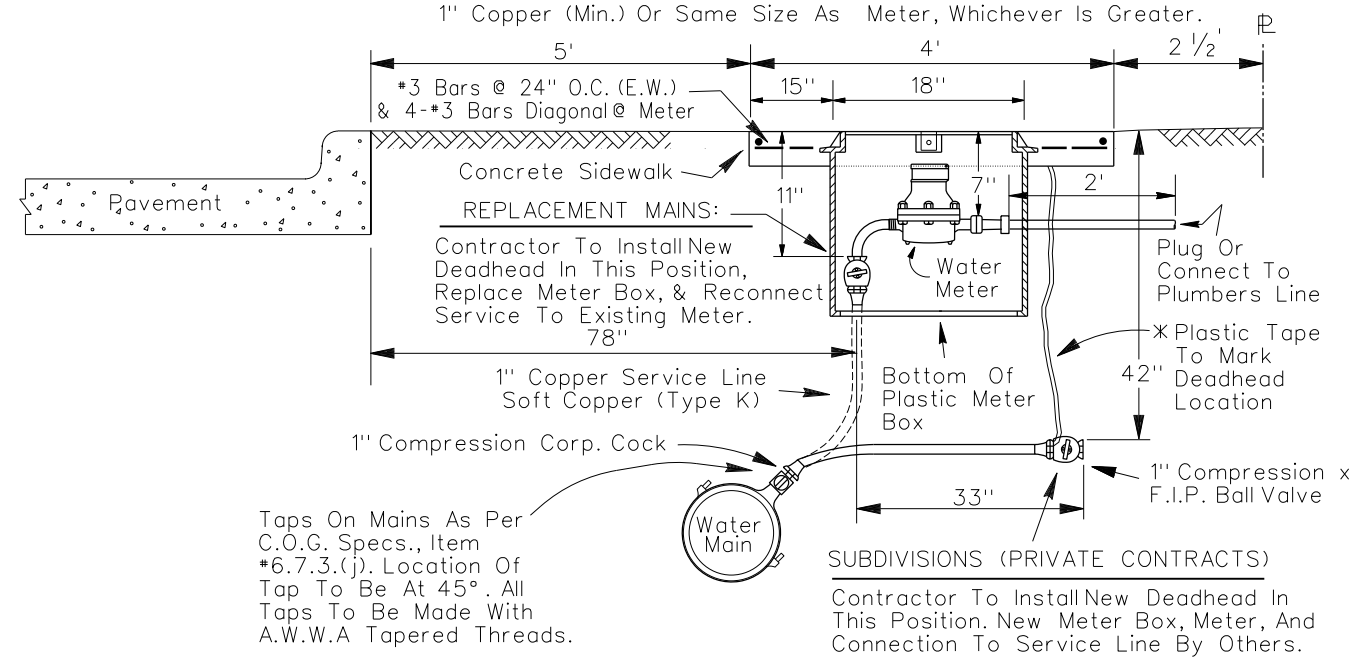
NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.



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

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.



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

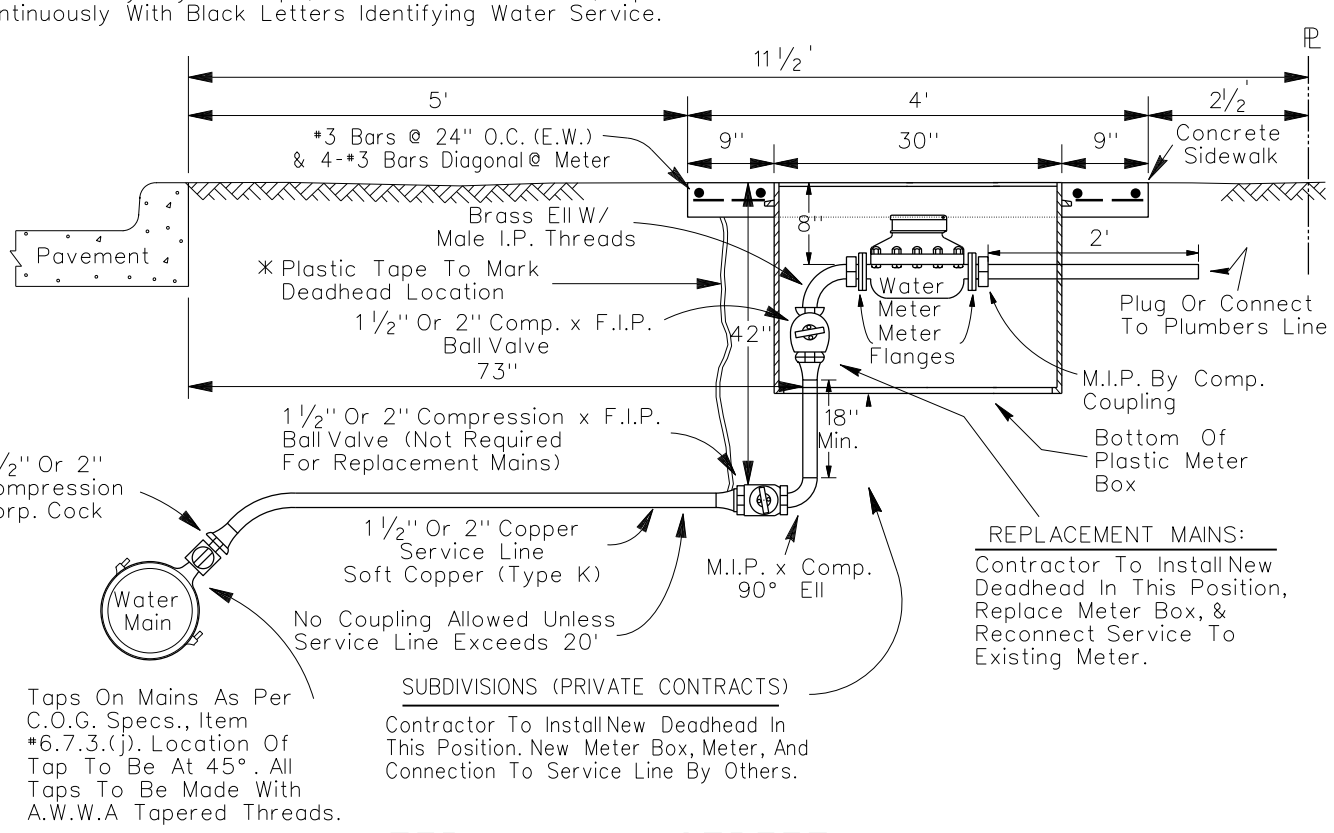
* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letters Identifying Water Service.

WATER MAIN IN PARKWAY

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

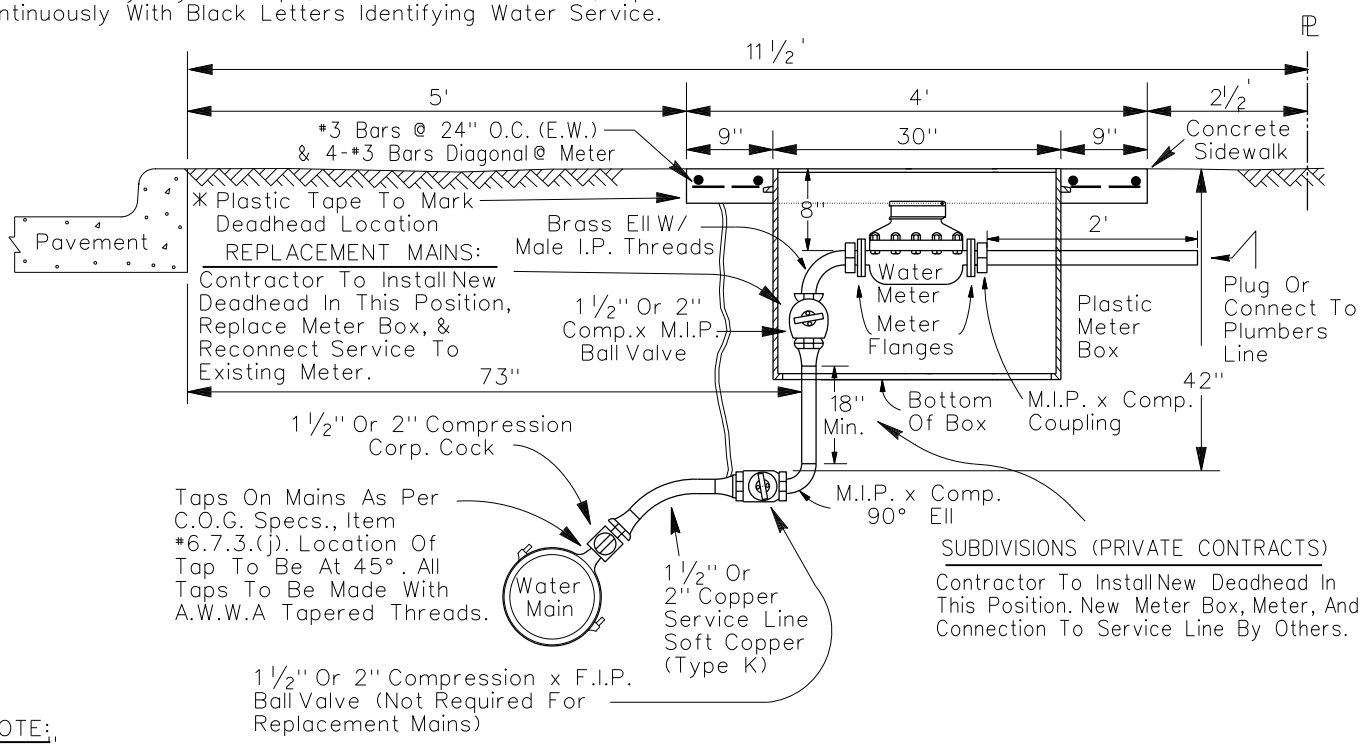
DWU		(PAGE No.) 205
DATE JAN. 2010		

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



WATER MAIN IN STREET

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

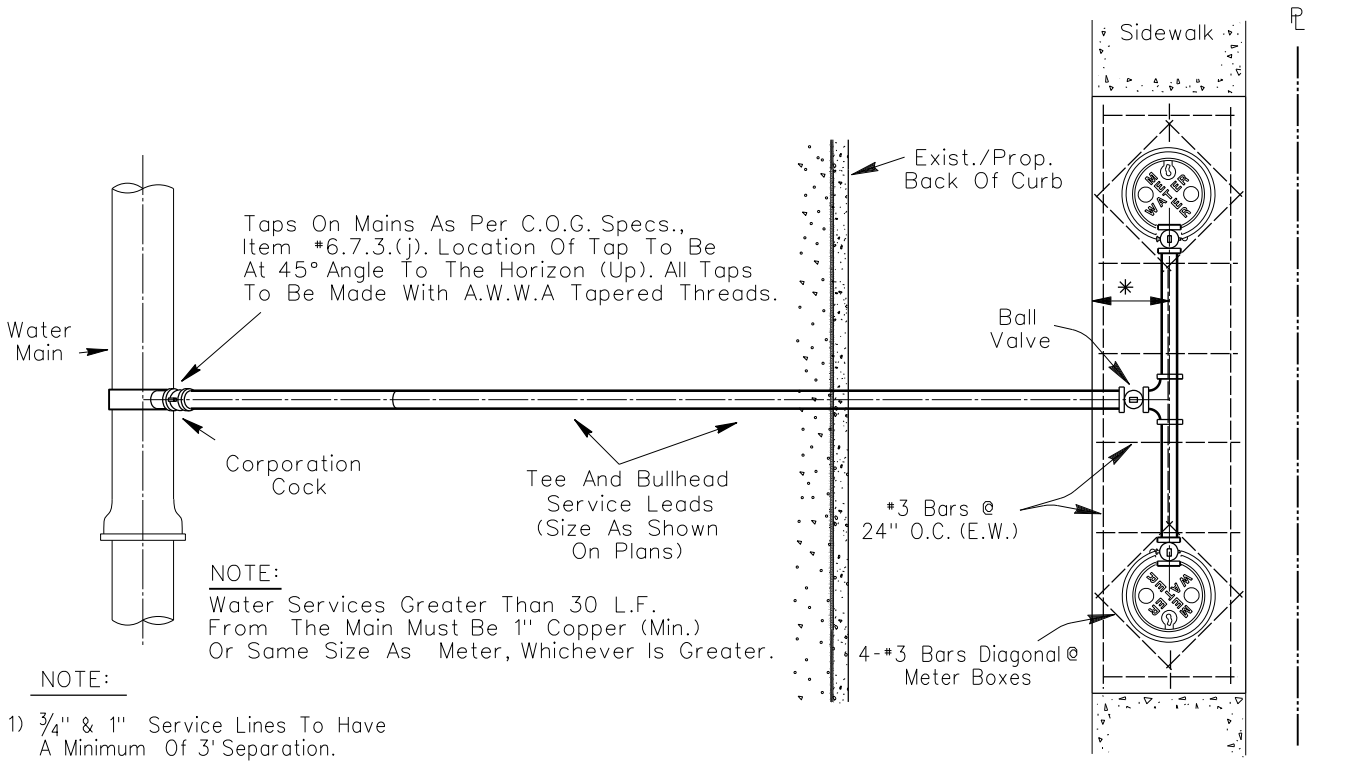


NOTE:
1 1/2 & 2 Service Lines To Have A Minimum Of 4' Separation.

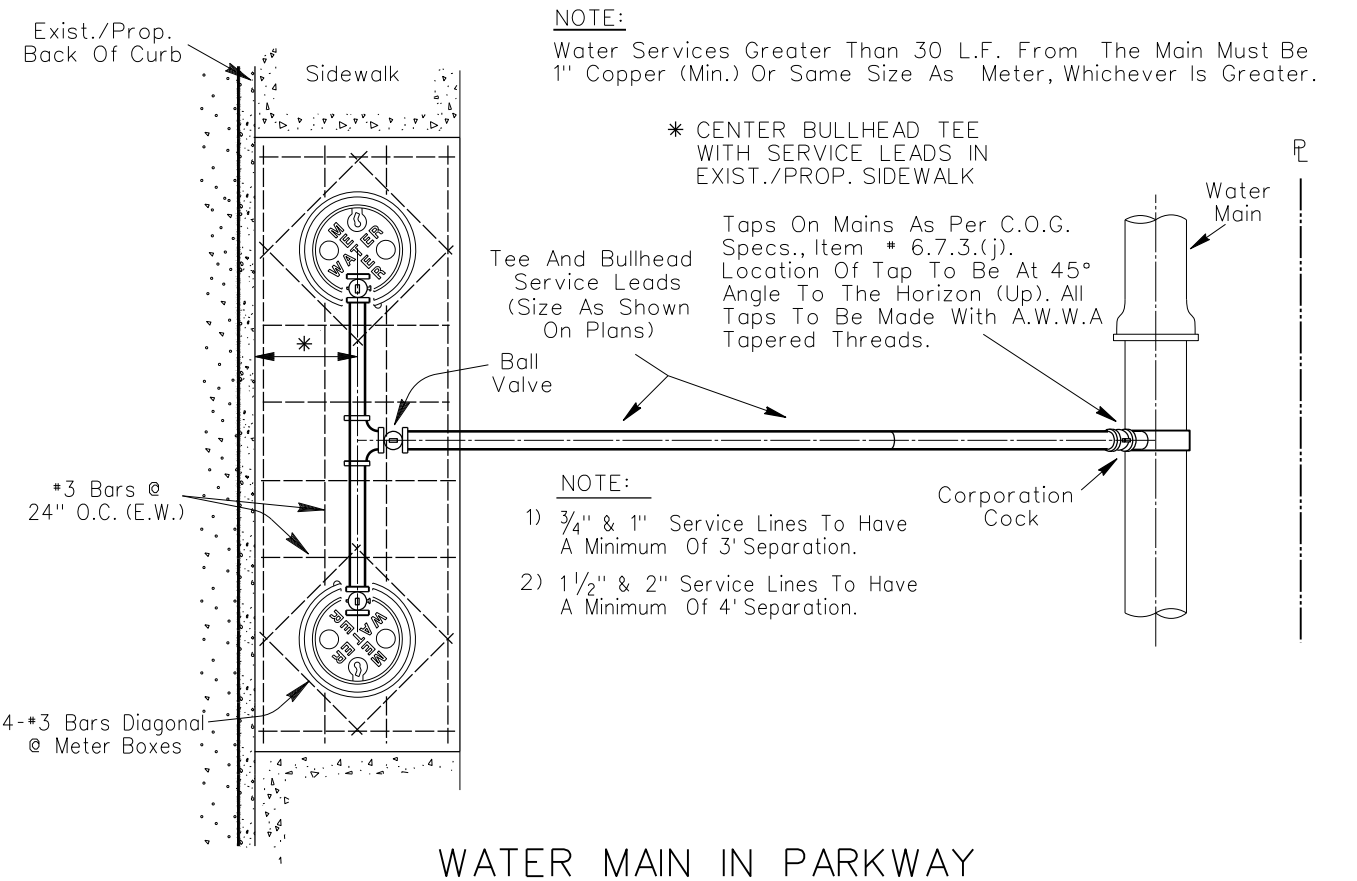
WATER MAIN IN PARKWAY

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

		(PAGE No.)
DWU		206
DATE JAN. 2010		



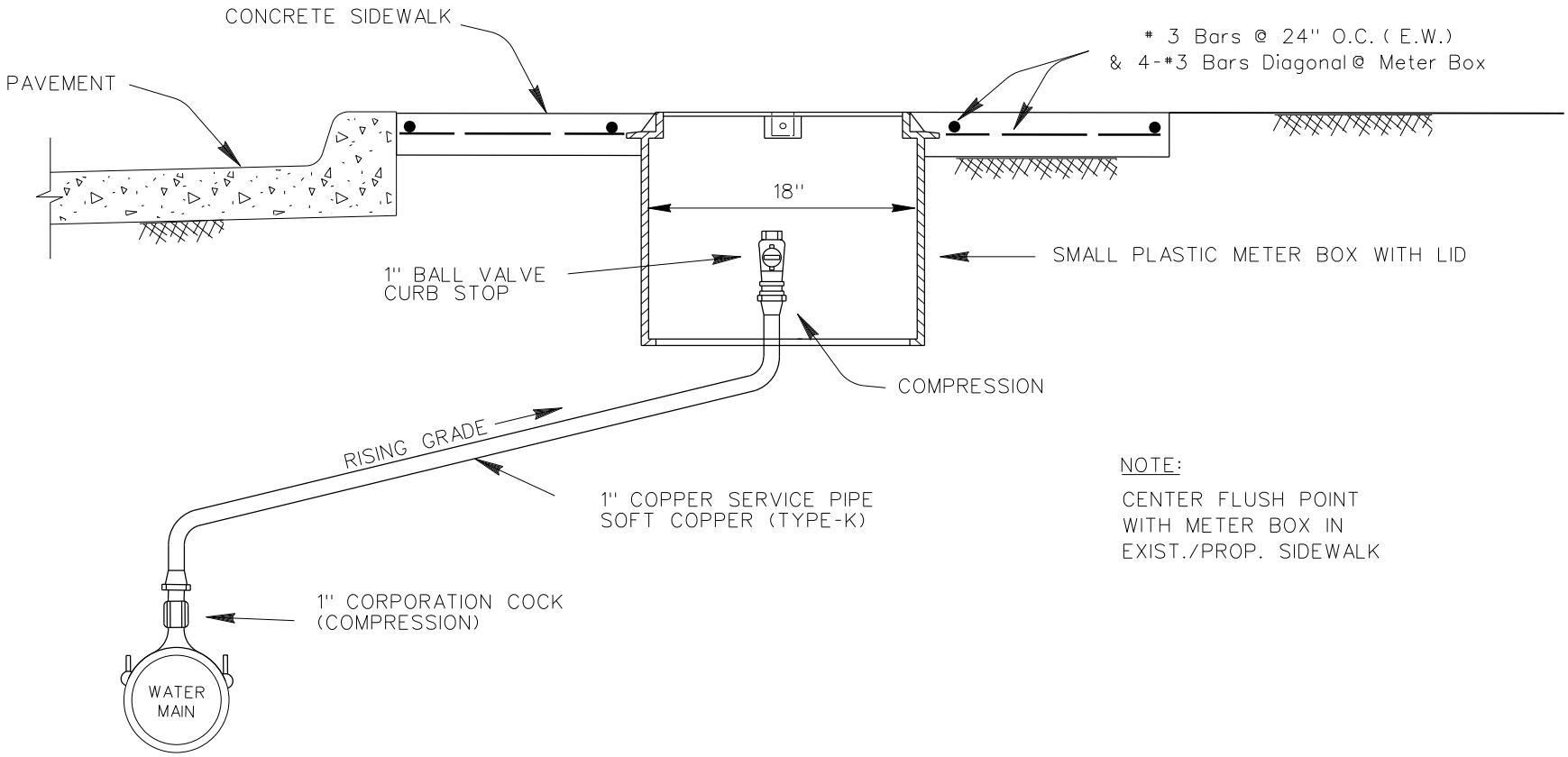
WATER MAIN IN STREET



WATER MAIN IN PARKWAY

BULL HEAD SERVICES

		DWU	(PAGE NO.) 206A
		DATE JAN. 2010	



NOTE:

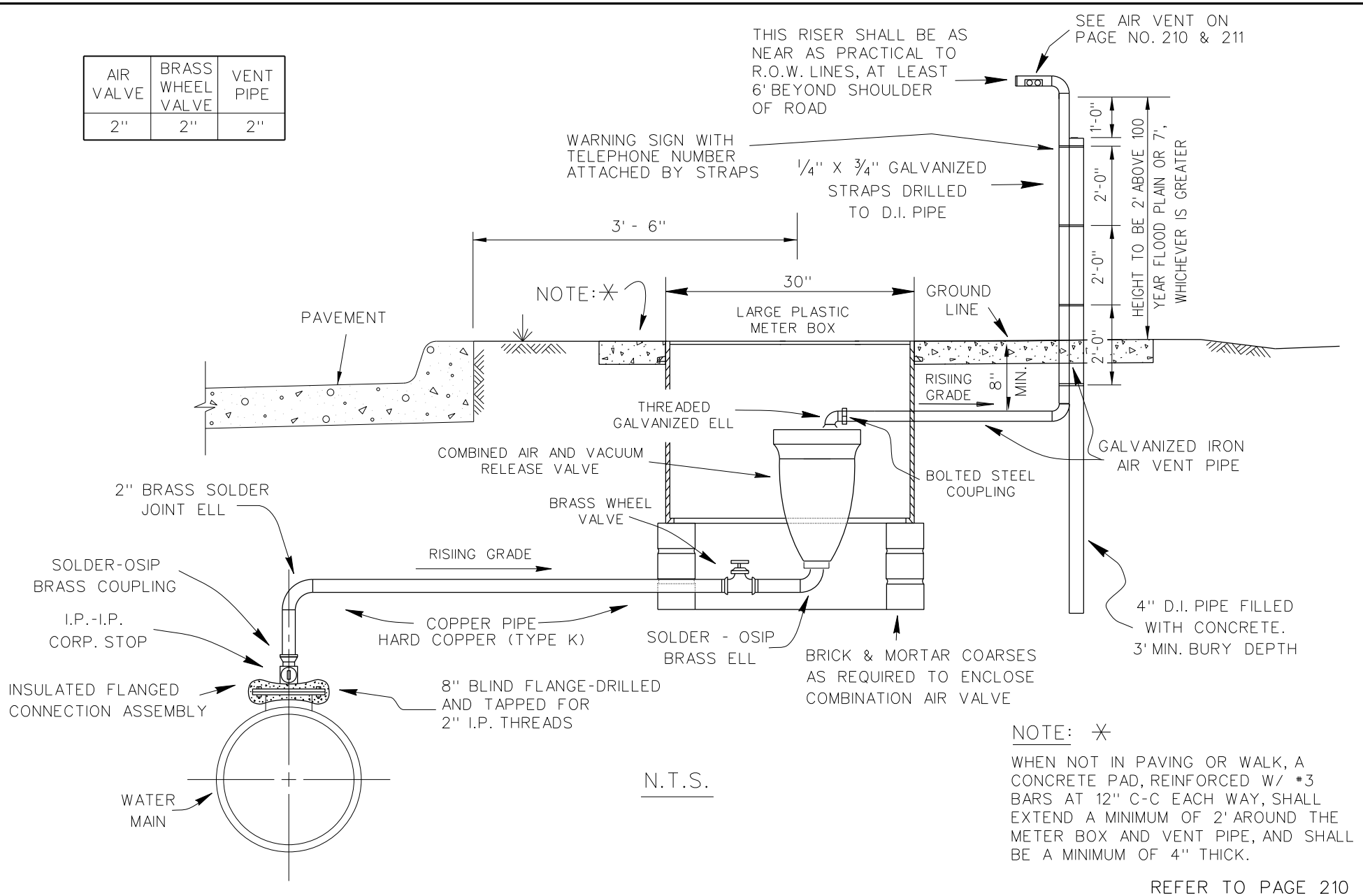
CENTER FLUSH POINT
WITH METER BOX IN
EXIST./PROP. SIDEWALK

FLUSH POINT

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

FLUSH POINT INSTALLATION		DWU	(Page No.) 207
		DATE JAN. 2010	

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



N.T.S.

NOTE: ✳

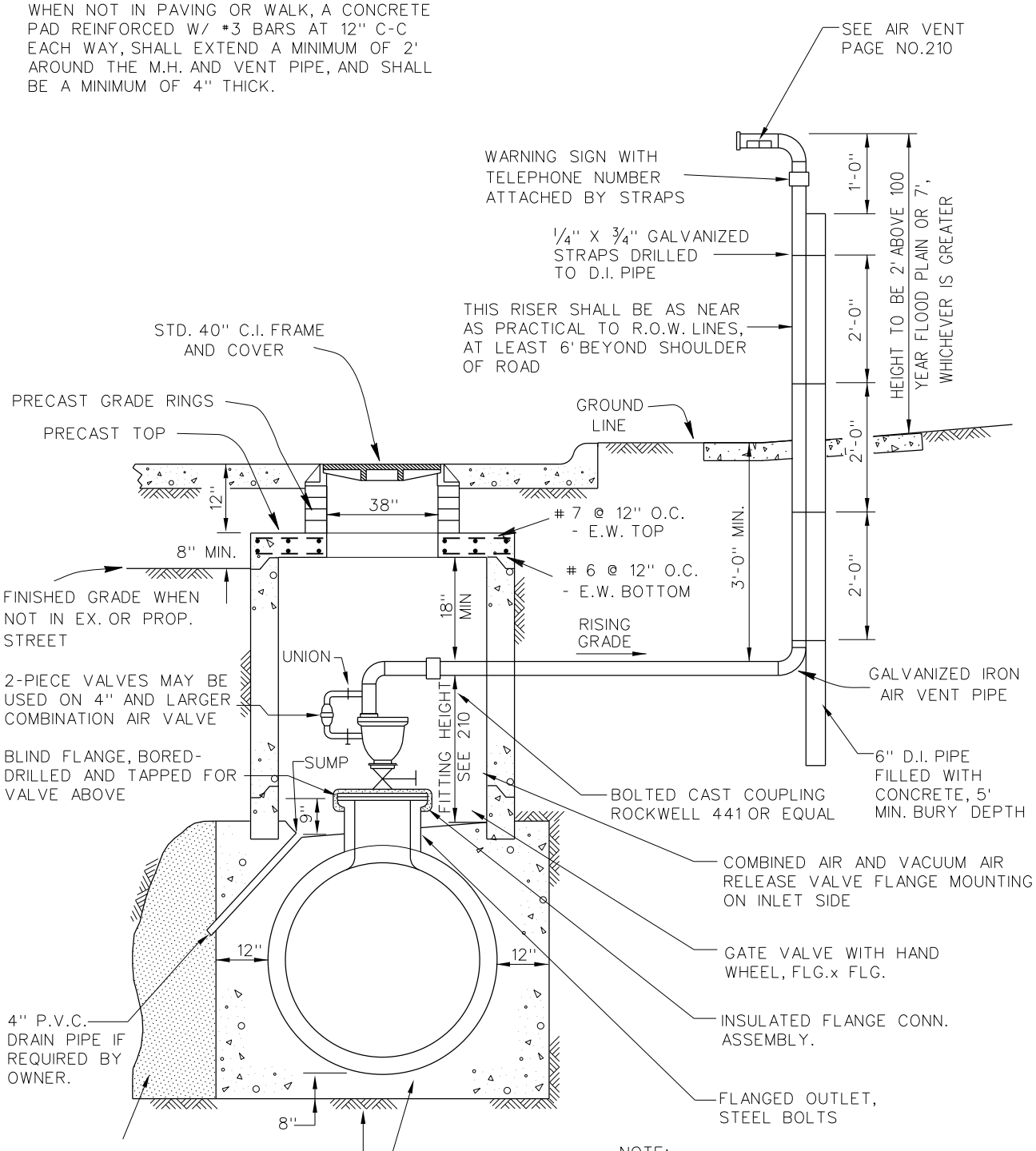
WHEN NOT IN PAVING OR WALK, A CONCRETE PAD, REINFORCED W/ #3 BARS AT 12" C-C EACH WAY, SHALL EXTEND A MINIMUM OF 2' AROUND THE METER BOX AND VENT PIPE, AND SHALL BE A MINIMUM OF 4" THICK.

REFER TO PAGE 210

AIR RELEASE VALVE TYPE "1"

DWU	(Page No.) 208
DATE JAN. 2010	

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 M.H. AND VENT PIPE, AND SHALL BE A MINIMUM OF 4" THICK.

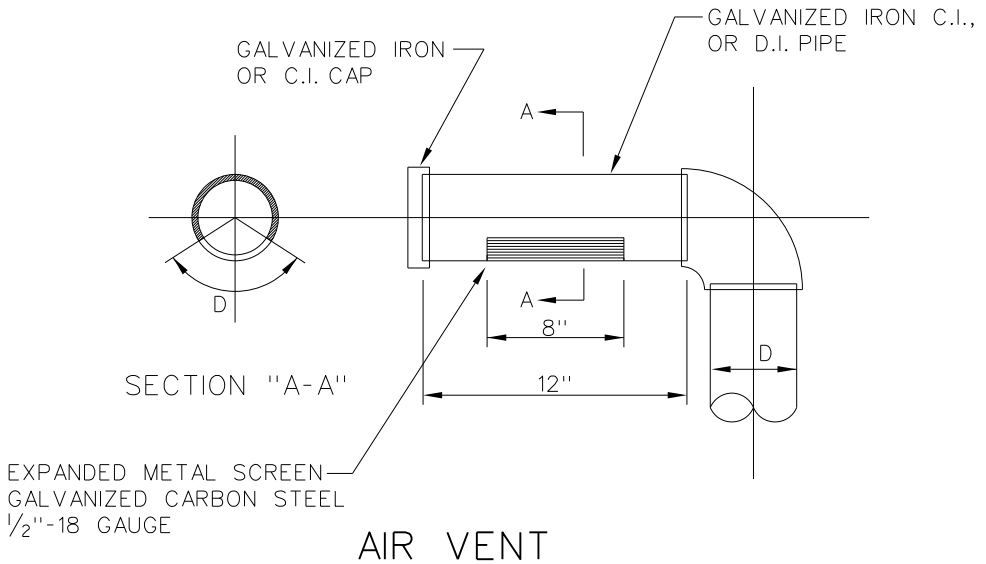


NOTE:
ON 4" AND LARGER TWO PIECE COMBINATION AIR VALVES, THE OUTLET PIPING OF THE SMALL VALVE SHALL BE VENTED INTO THE SIDE OF THE LARGER VENT PIPE THAT GOES ABOVE GROUND.

REFER TO PAGES 210 & 211

AIR RELEASE VALVE TYPE "2"

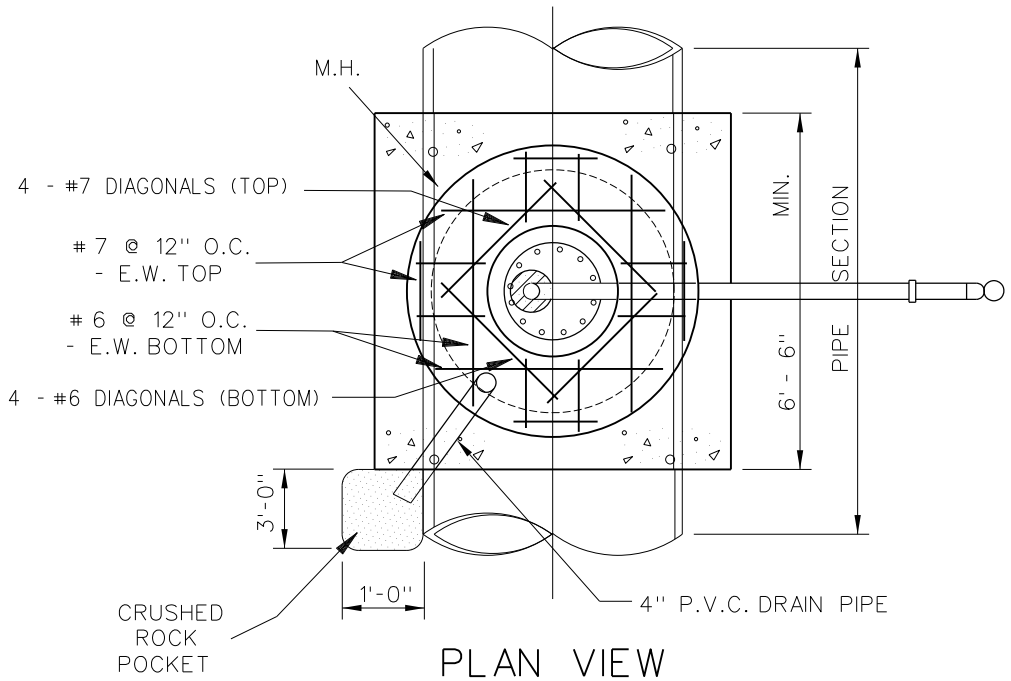
DWU	(Page No.) 209
DATE JAN. 2010	



AIR VENT

N.T.S.

AIR VALVE	GATE VALVE	FLANGE OUTLET	MINIMUM FITTING HEIGHT	VENT PIPE DIAMETER	MANHOLE DIAMETER	VENT PIPE MATERIAL
2"	2"	8"	26"	2"	5'	GALVANIZED OR PAINTED BLACK IRON
3"	3"	18"	31"	3"	5'	
4"	4"	18"	38"	4"	5'	CLASS 52 DUCTILE IRON
6"	6"	18"	46"	6"	5'	
8"	8"	18"	53"	8"	6'	
10"	10"	20"	62"	10"	6'	
12"	12"	24"	72"	12"	6'	



PLAN VIEW

N.T.S.

REFER TO PAGES 208, 209, & 211

AIR RELEASE VALVE TYPE "2"

DWU		(Page No.) 210
DATE JAN. 2010		

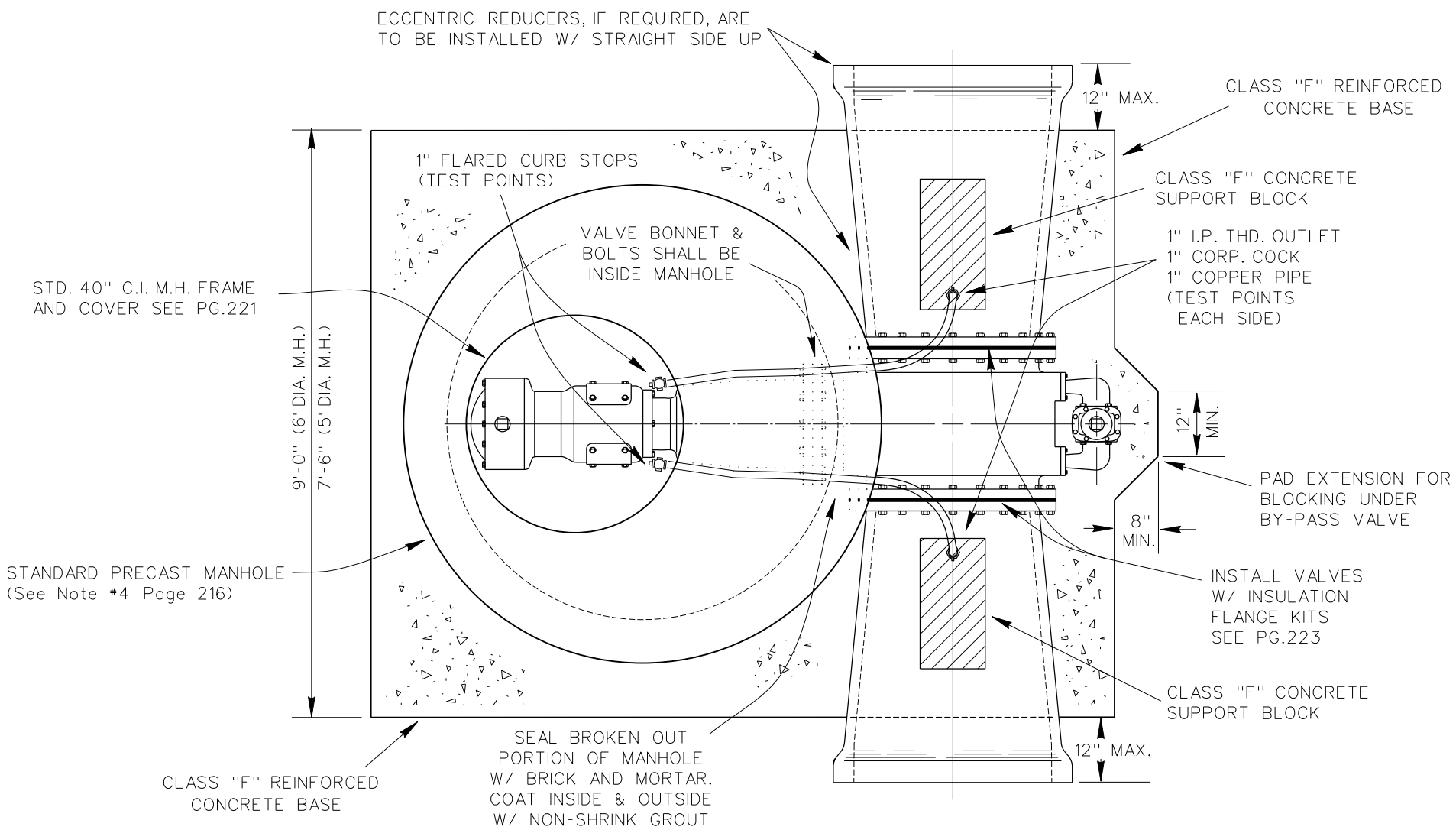
GENERAL NOTES

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.
4. Vent pipe must be extended a minimum of 2 feet above the water surface of the 100 year frequency flood (AS STATED ON DESIGN PLANS), or 7 feet above ground line, whichever is greater
5. The following table of dimensions govern the required depths of cover for the installation of Type 2 air valves within public rights-of-ways;
6. All underground portions of Ductile Iron Pipe will be encased in polywrap.

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 JAN. 2010	

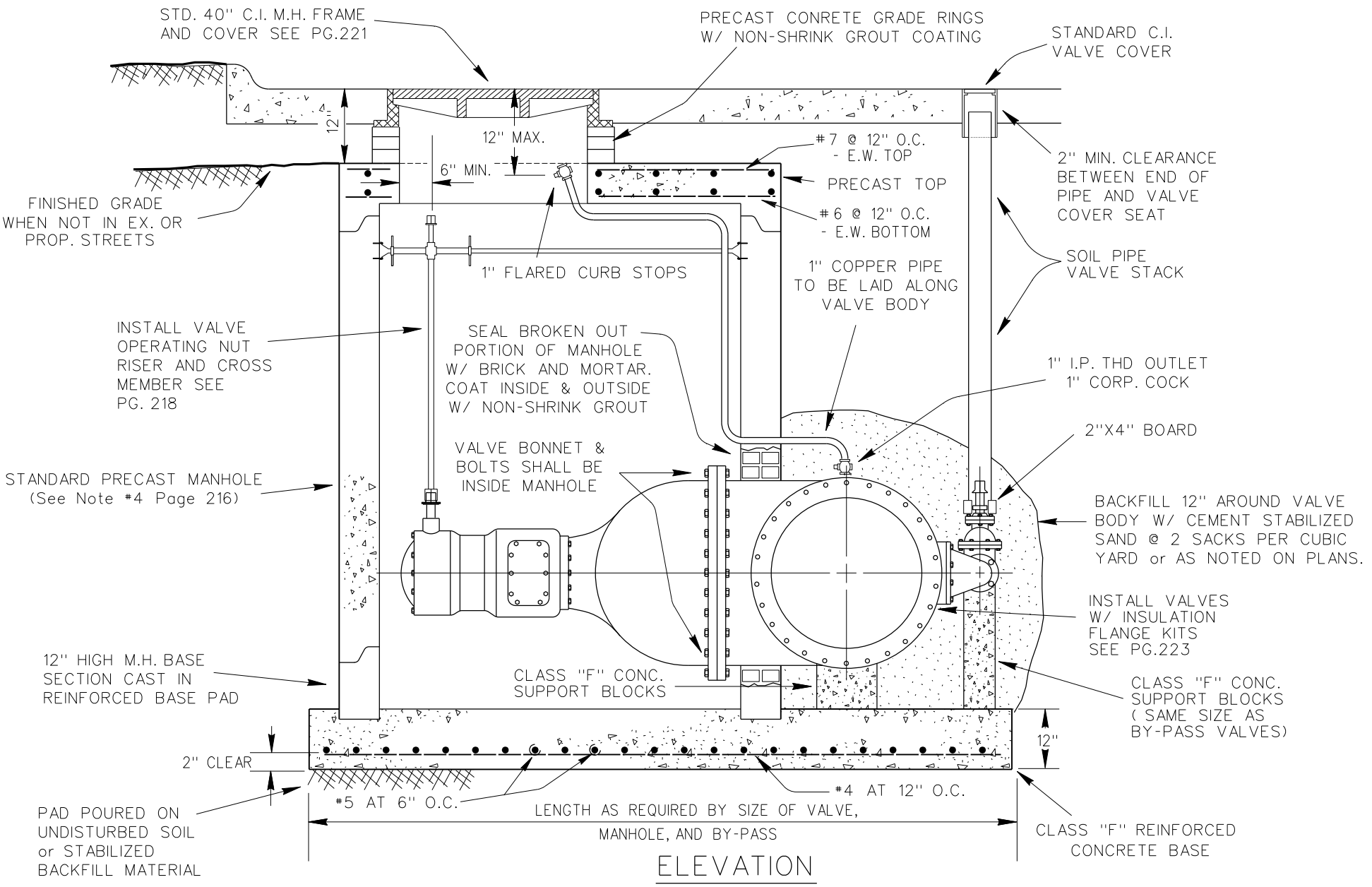


PLAN

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

HORIZONTAL GATE VALVE WITH MANHOLE INSTALLATION

DWU	(Page No.) 212
DATE JAN. 2010	

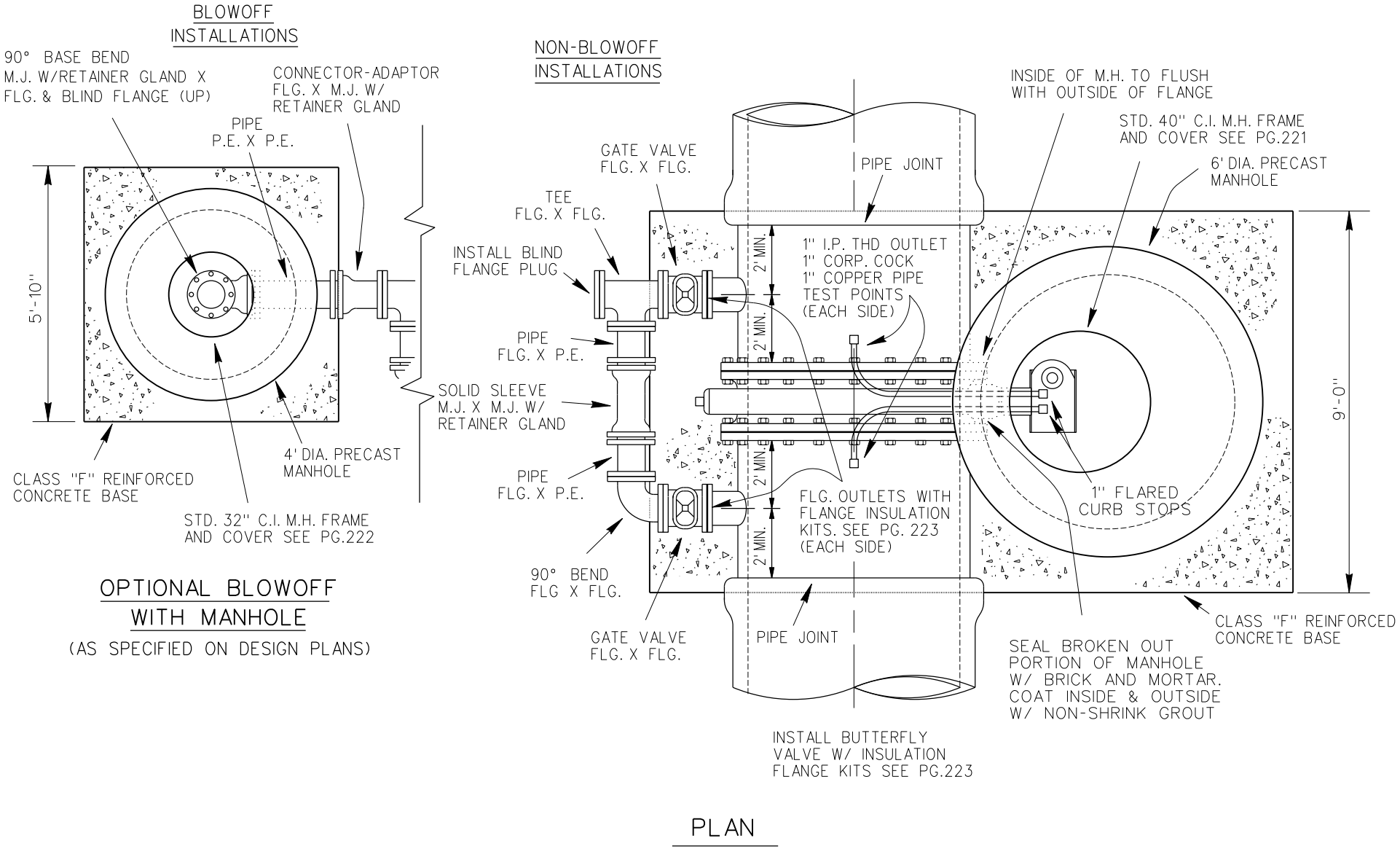


ELEVATION

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

HORIZONTAL GATE VALVE WITH MANHOLE INSTALLATION

DWU	(Page No.) 213
DATE JAN. 2010	

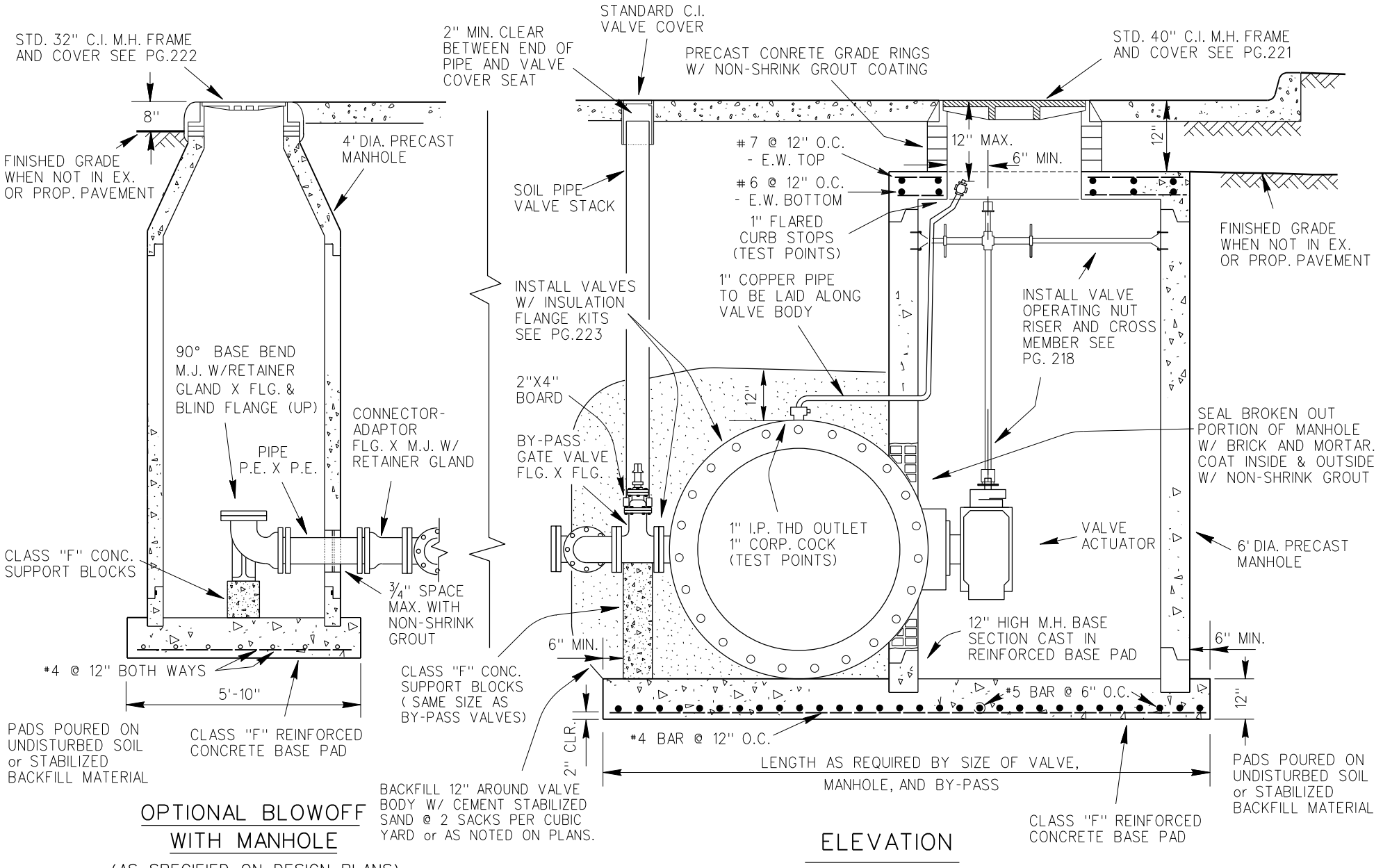


PLAN

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

BUTTERFLY VALVE WITH MANHOLE INSTALLATION

	DWU	(Page No.) 214
	DATE JAN. 2010	



OPTIONAL BLOWOFF WITH MANHOLE

(AS SPECIFIED ON DESIGN PLANS)

ELEVATION

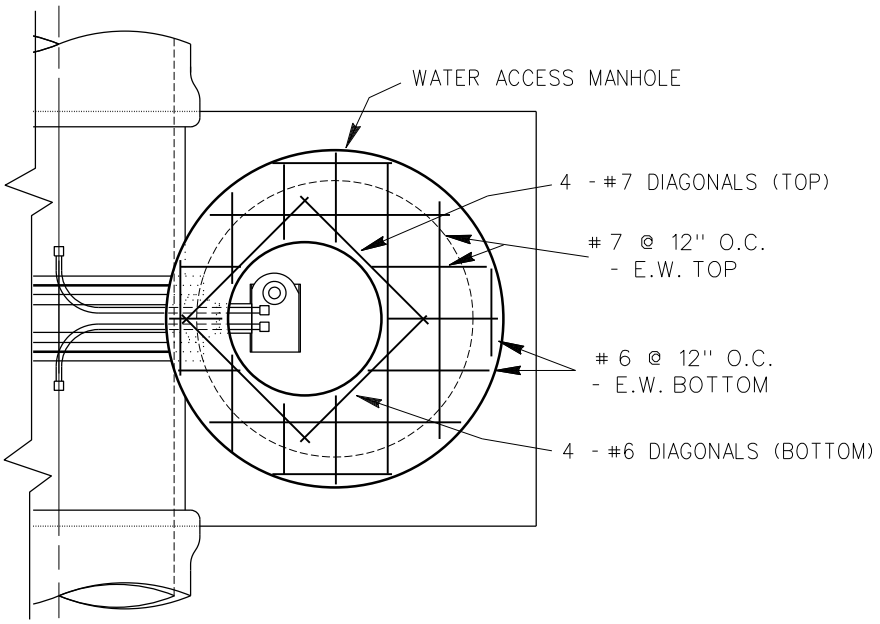
REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

BUTTERFLY VALVE WITH MANHOLE INSTALLATION

	DWU	(Page No.) 215
	DATE JAN. 2010	

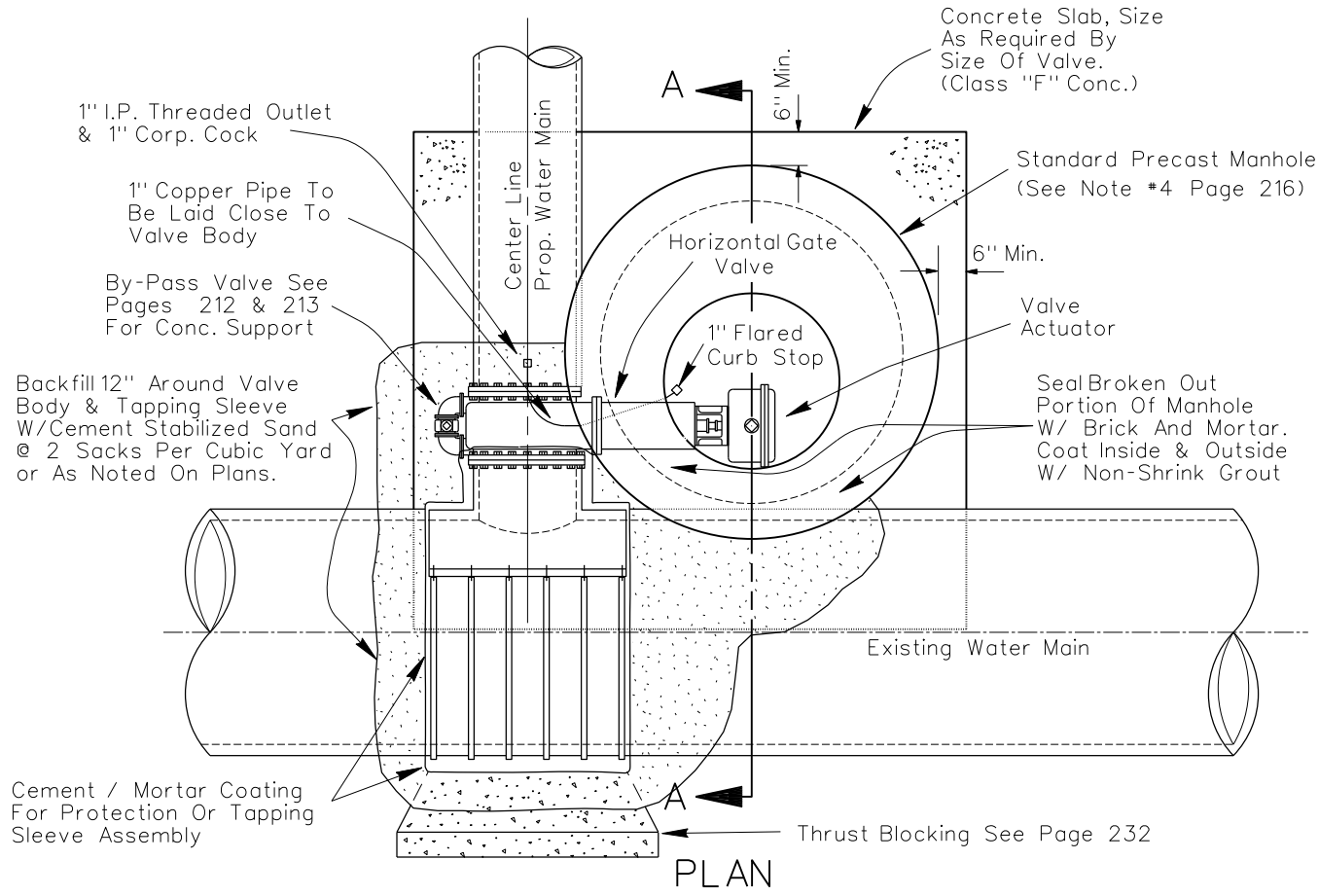
GENERAL NOTES

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.

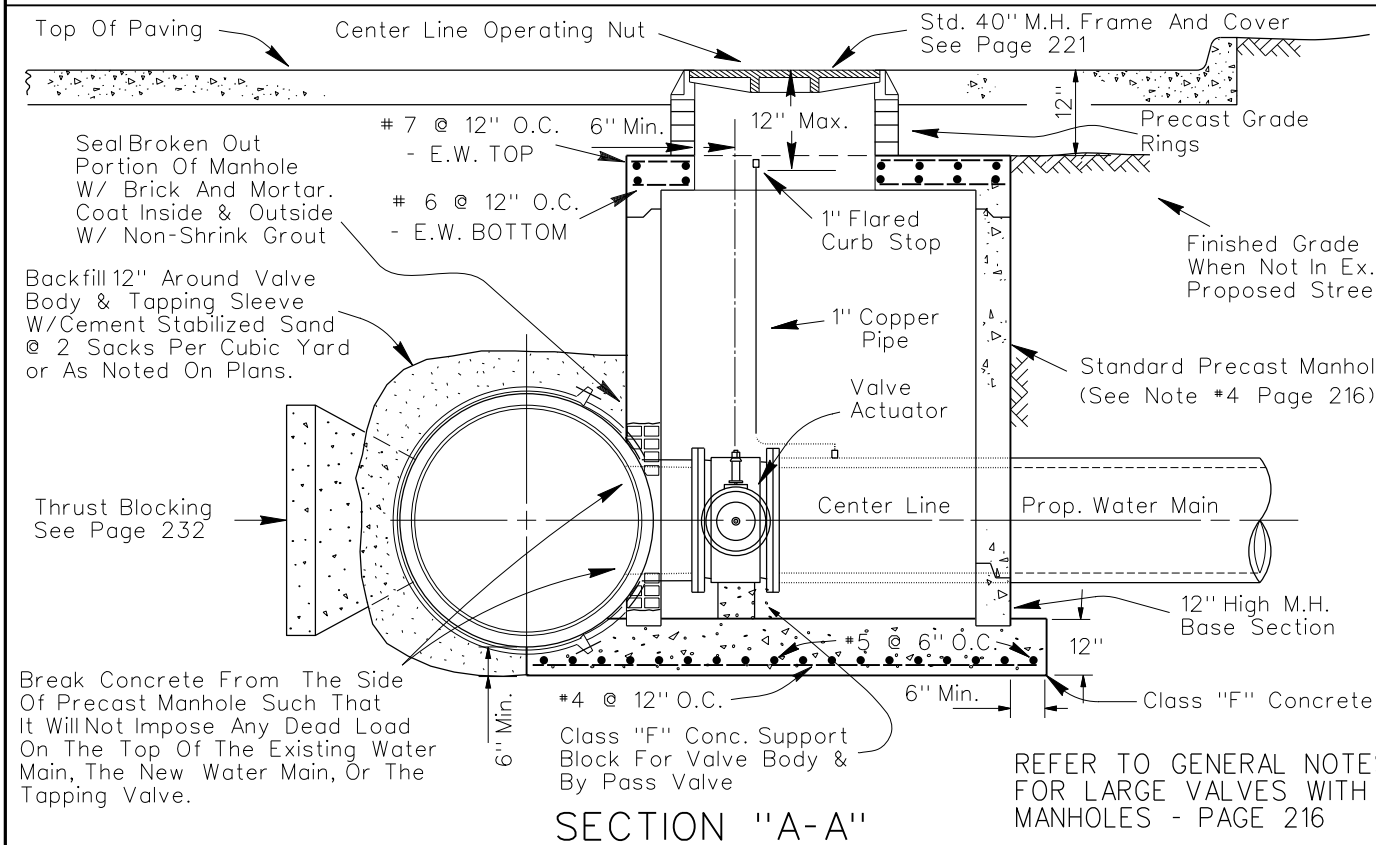


PLAN VIEW FOR TYPICAL REINFORCING
FOR WATER ACCESS MANHOLE TOPS
(MANHOLE FOR VALVE ACCESS SHOWN)

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



PLAN



SECTION "A-A"

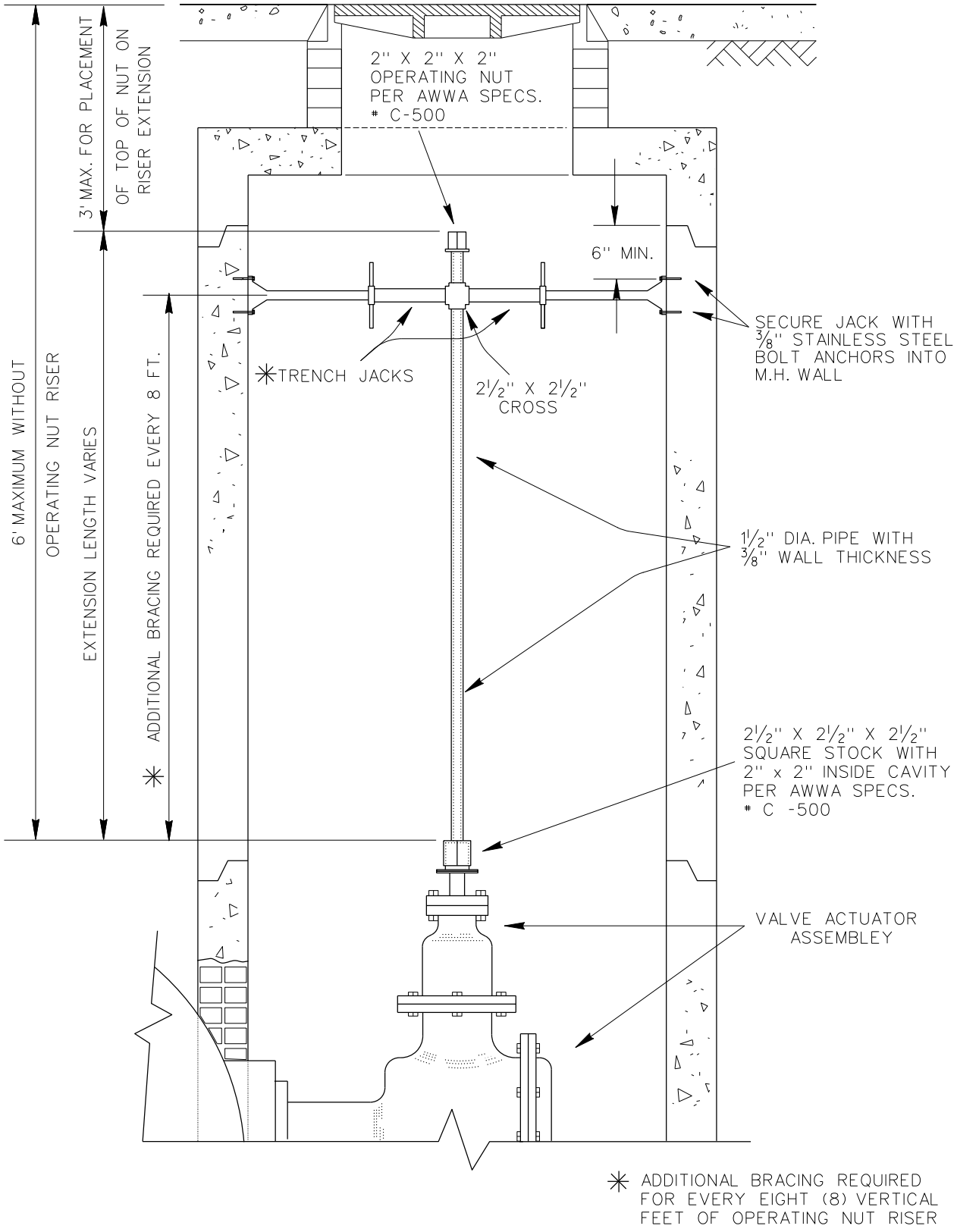
REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

LARGE TAPPING VALVE INSTALLATION

DWU

(PAGE NO.) 217

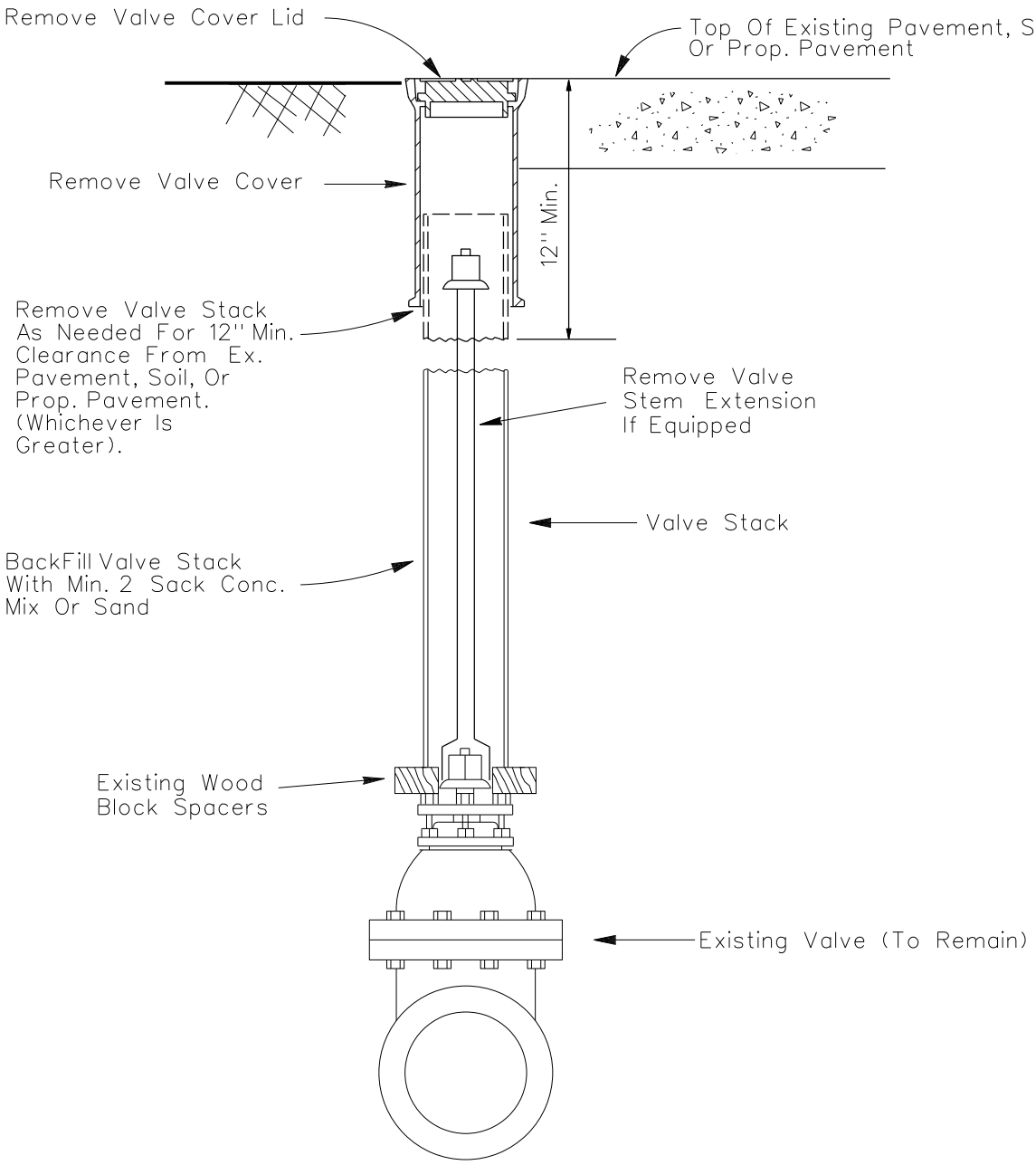
DATE JAN. 2010



✳ ADDITIONAL BRACING REQUIRED FOR EVERY EIGHT (8) VERTICAL FEET OF OPERATING NUT RISER

OPERATING NUT RISER
(For Large Valve Installations)

		(PAGE NO.)
DWU		218
DATE DEC.2001		



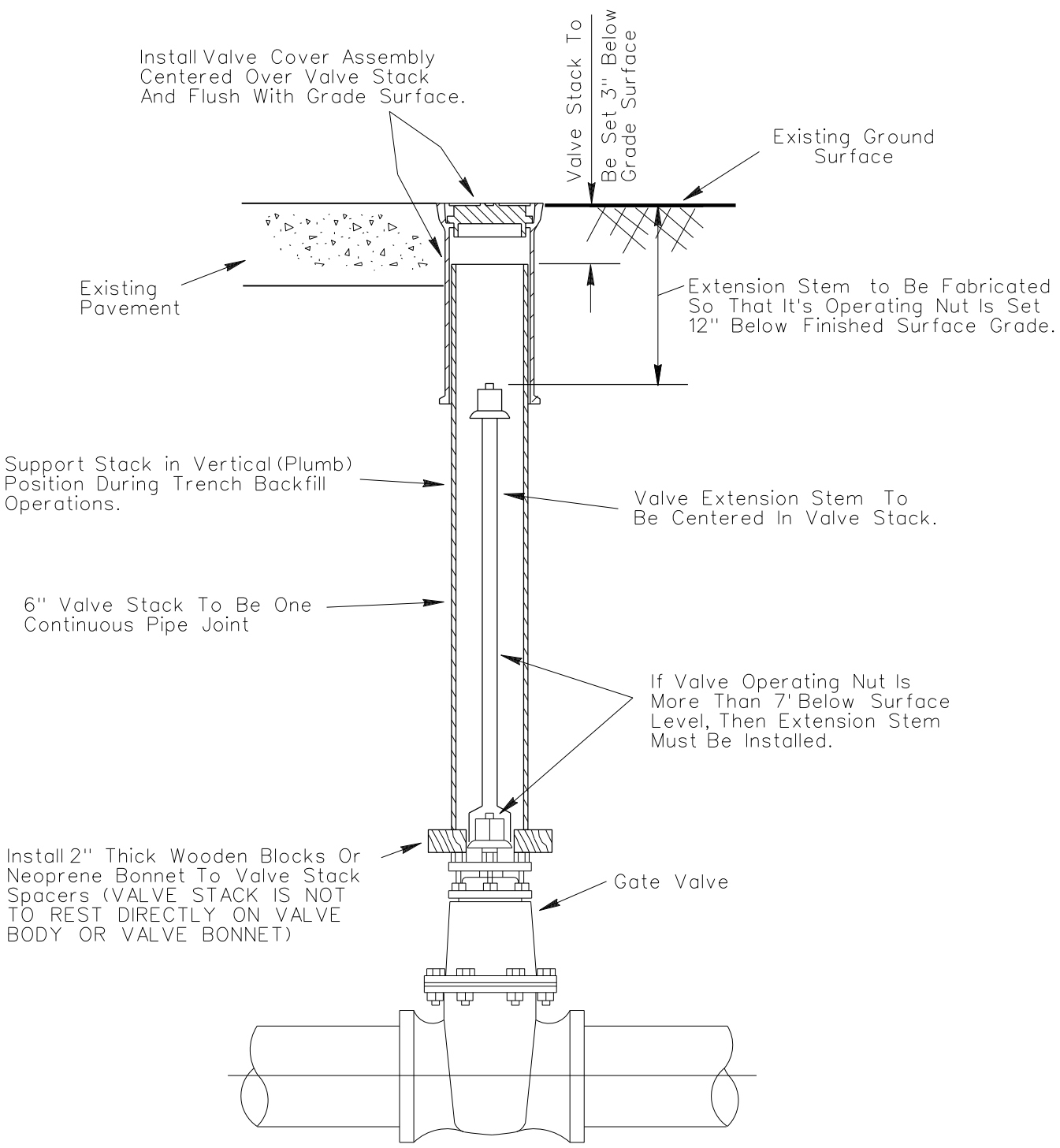
NOT IN PAVEMENT

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

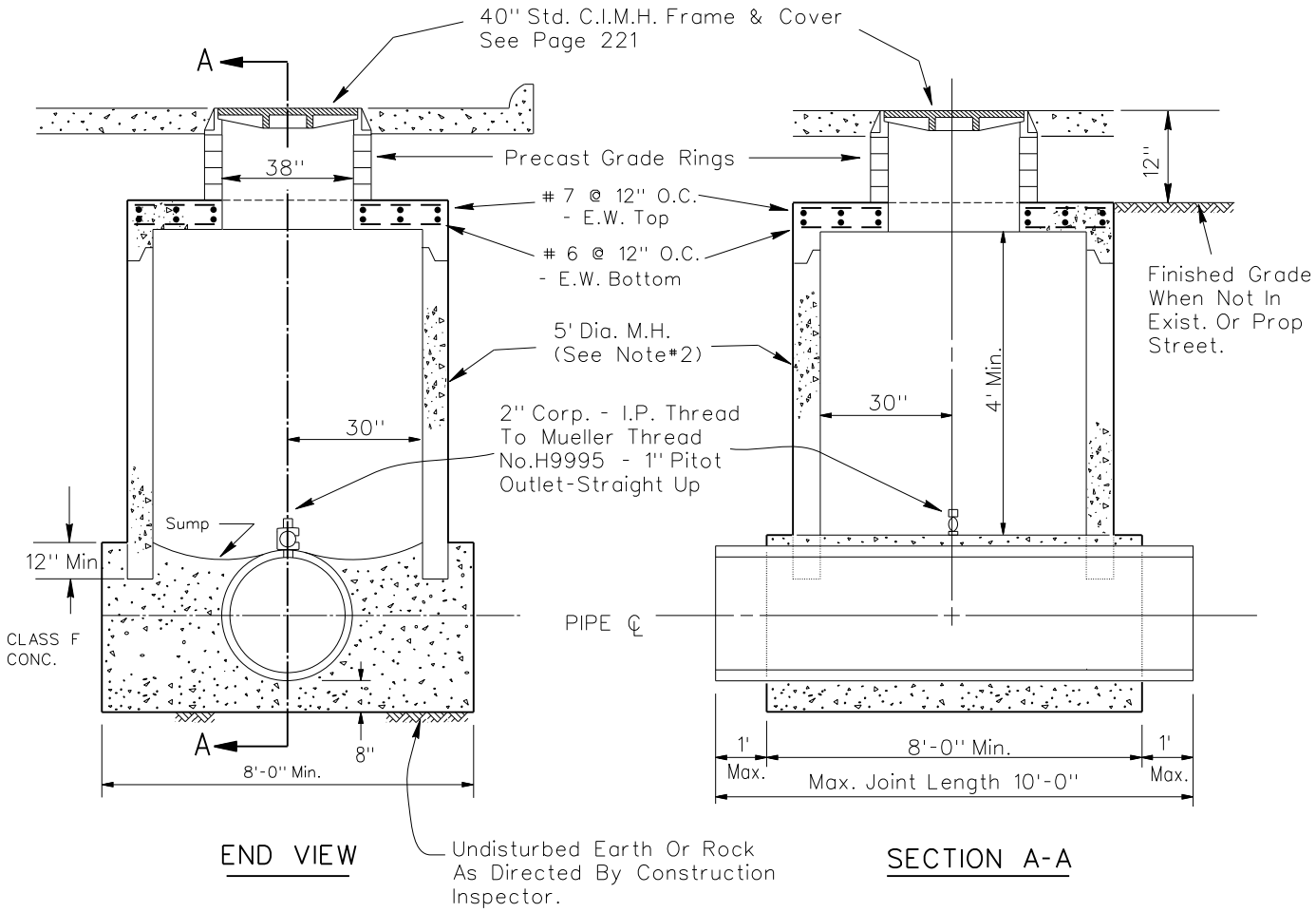
IN PAVEMENT

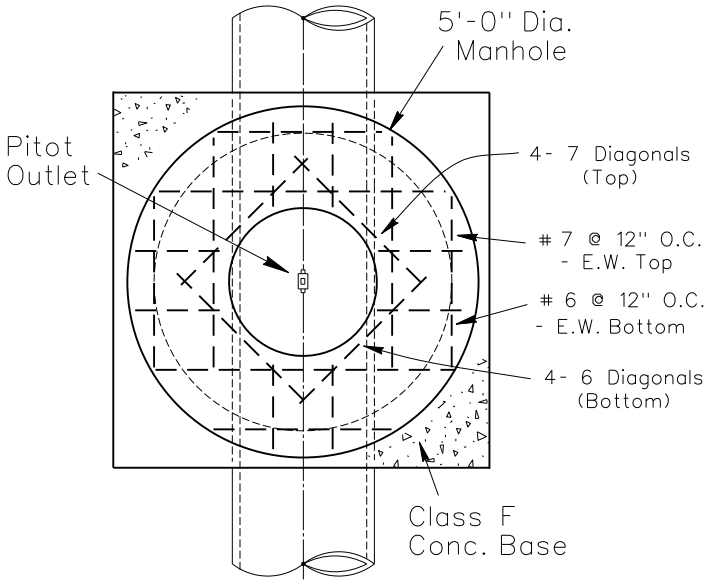
All Cuts And Repairs To Ex. Paving Must Conform P.W. & T. Pavement Cut And Repair Standards Manual.

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	





TOP VIEW

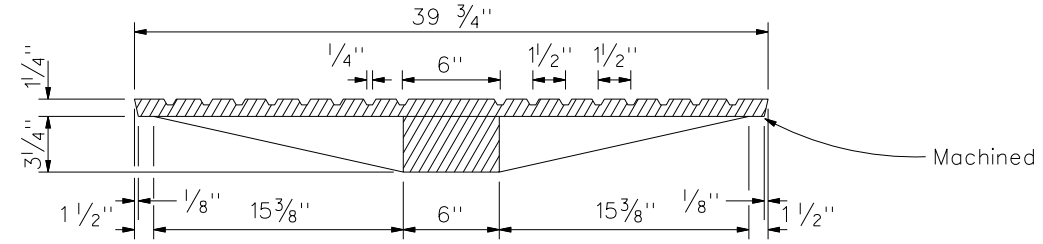
NOTES

1. Locate Pitot Outlets At Least 20 Pipe Diameters From Any Bends, Tees, Reducers Or Other Obstructions.

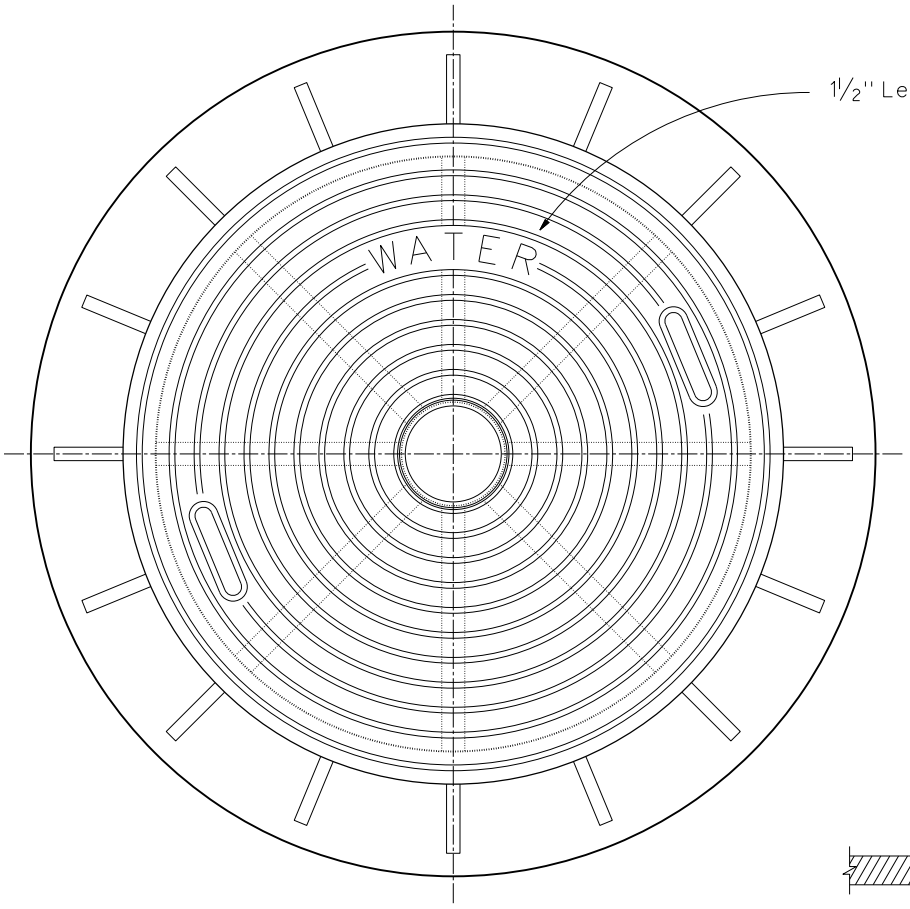
2. Manhole Shall Be Precast As Per C.O.G. Spec. Item 2.19

3. 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.

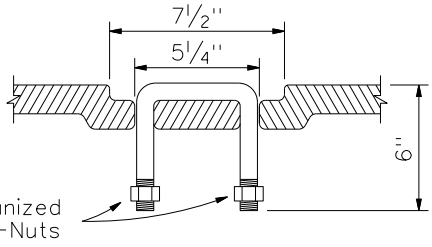
PITOT OUTLET		DWU	(PAGE NO.) 220
		DATE JAN. 2010	

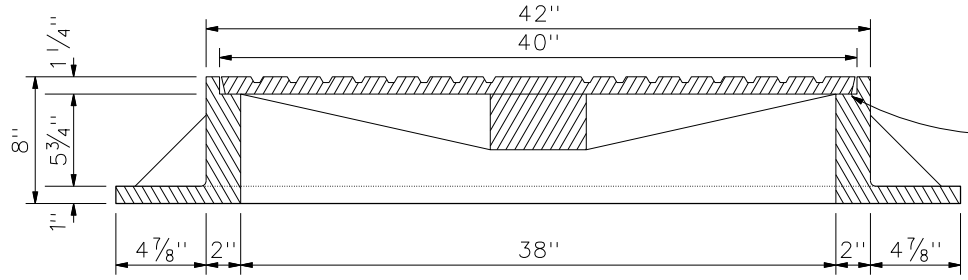


SECTION THRU COVER



PLAN

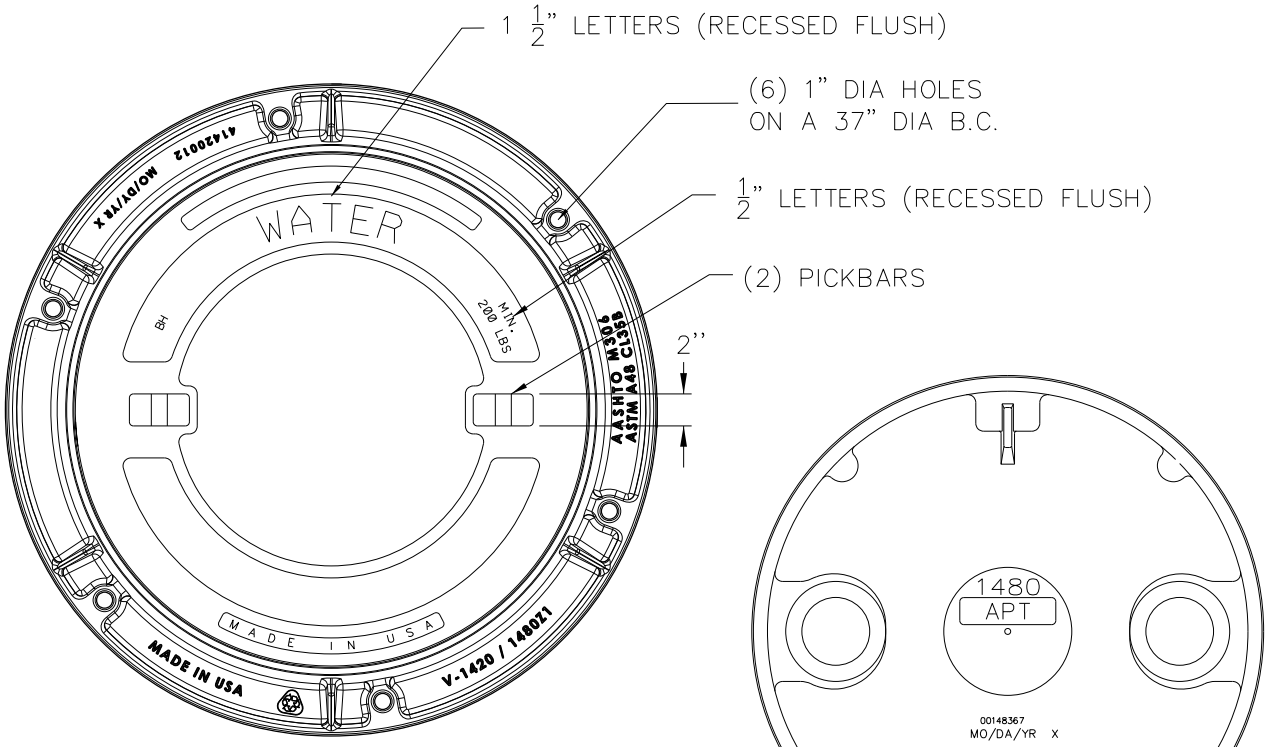




SECTION THRU FRAME

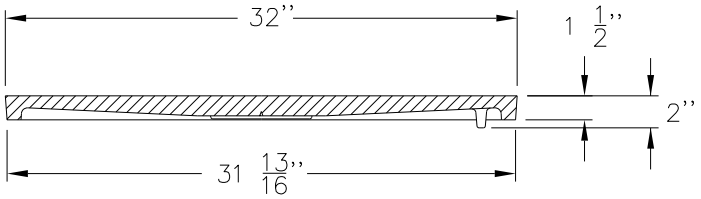
Ring & Cover Material per ASTM A48 Class 35B Min. Gray Iron Castings.

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

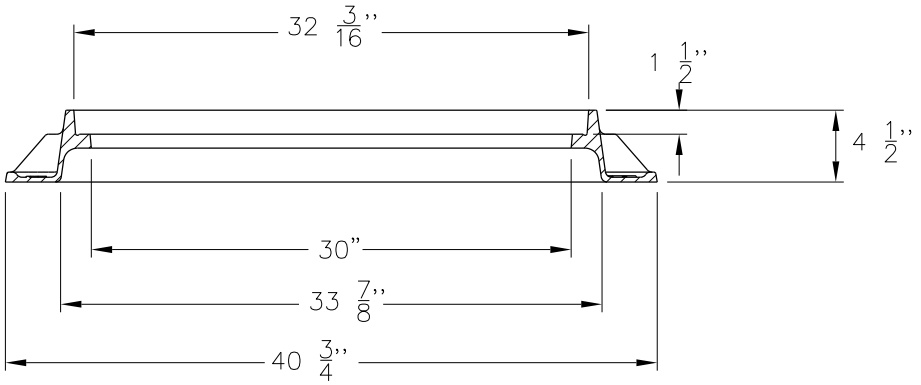


PLAN VIEW

BOTTOM VIEW OF COVER

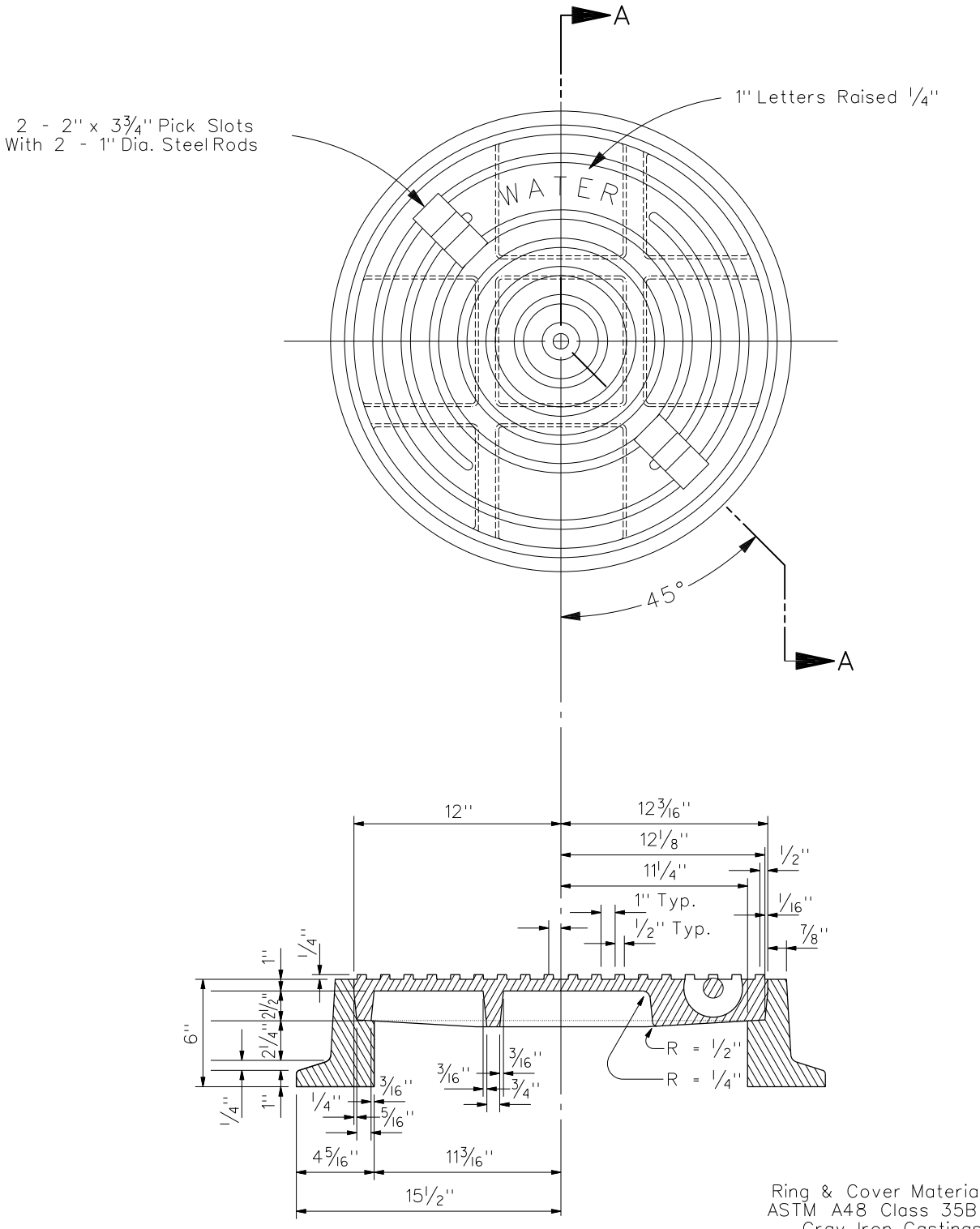


COVER SECTION



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

STANDARD 32'' MANHOLE. FRAME AND COVER	WATER	DWU	(PAGE NO.) 222
		DATE FEB.2009	



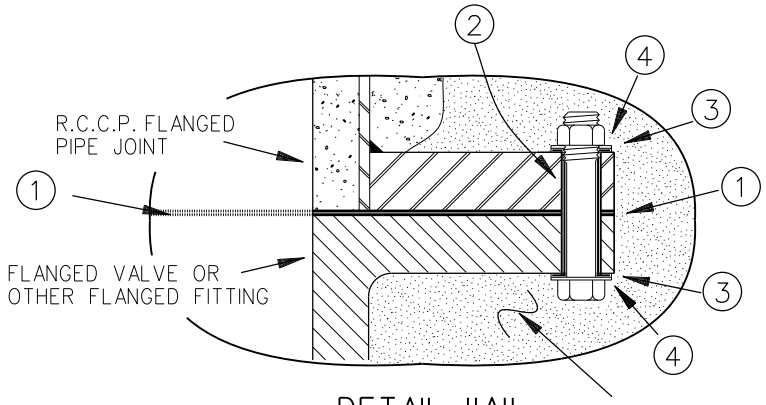
''A-A''

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

STANDARD 24'' MANHOLE. FRAME AND COVER		DWU	(PAGE NO.) 222A
		DATE JAN. 2010	

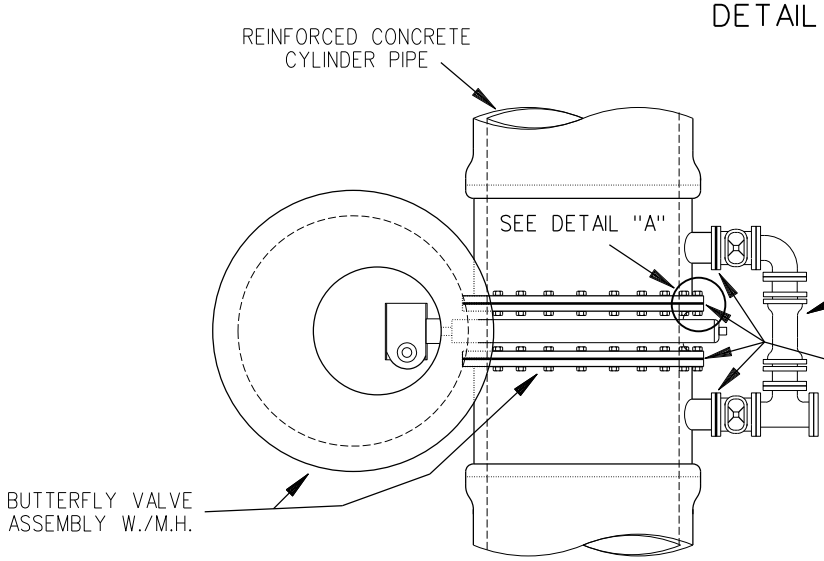
INSULATING MATERIAL (KIT)

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

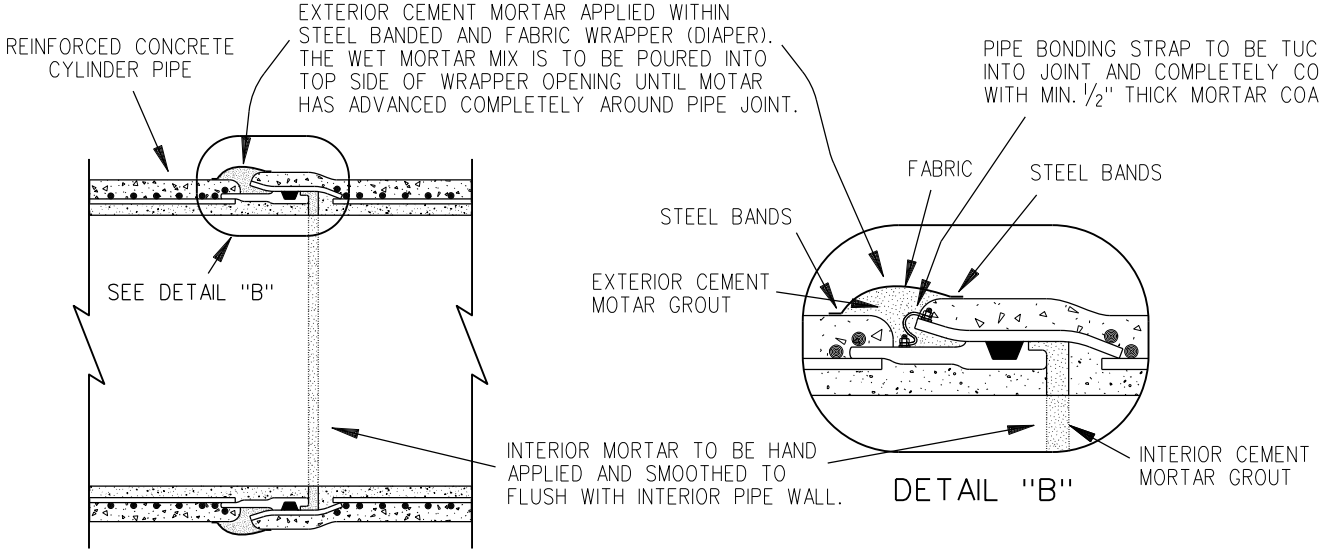


DETAIL "A"

ALL FLANGE BOLTS & FLANGES TO BE COVERED WITH CEMENT MORTAR AT LEAST 1/2" THICK. *(UNLESS NOTED OTHERWISE ON DESIGN PLANS OR OTHER SPECIFIC INSTALLATION DETAILS)*



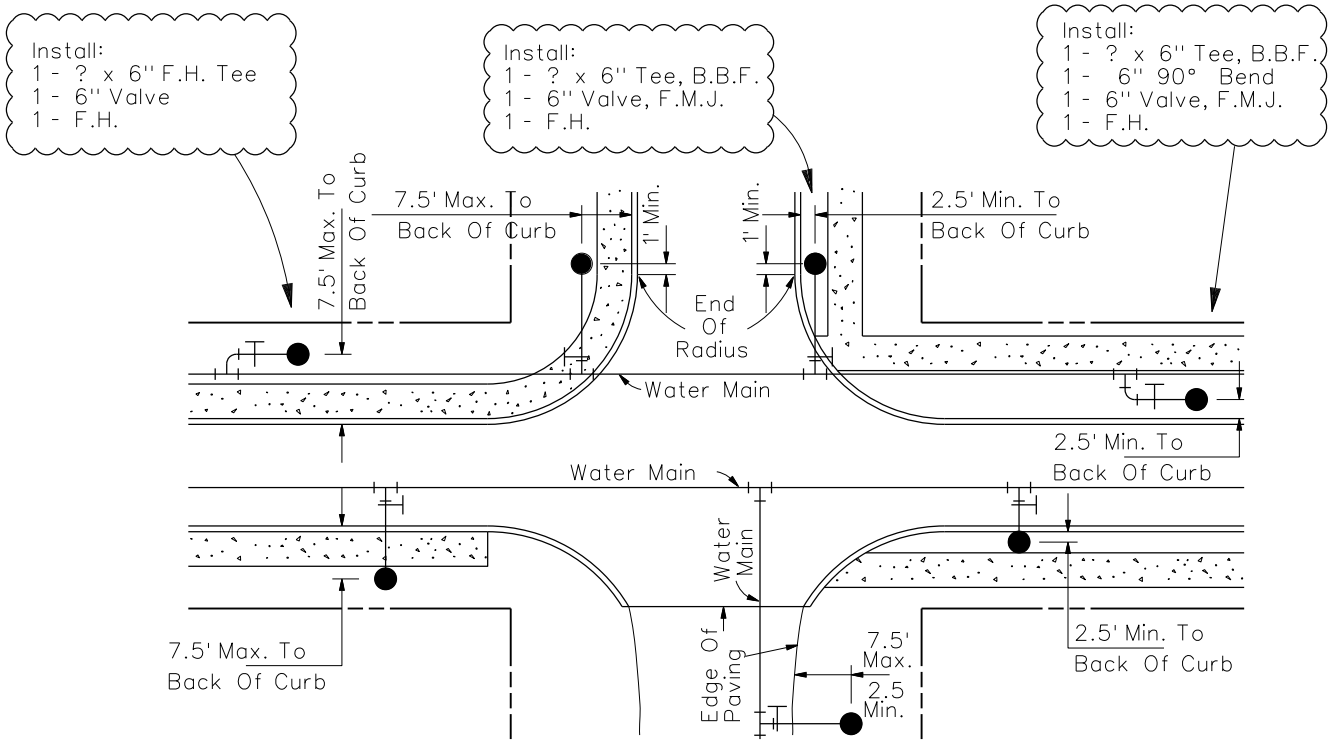
INSULATION KIT INSTALLATION DETAIL
(FOR R.C.C.P. INSTALLATIONS)

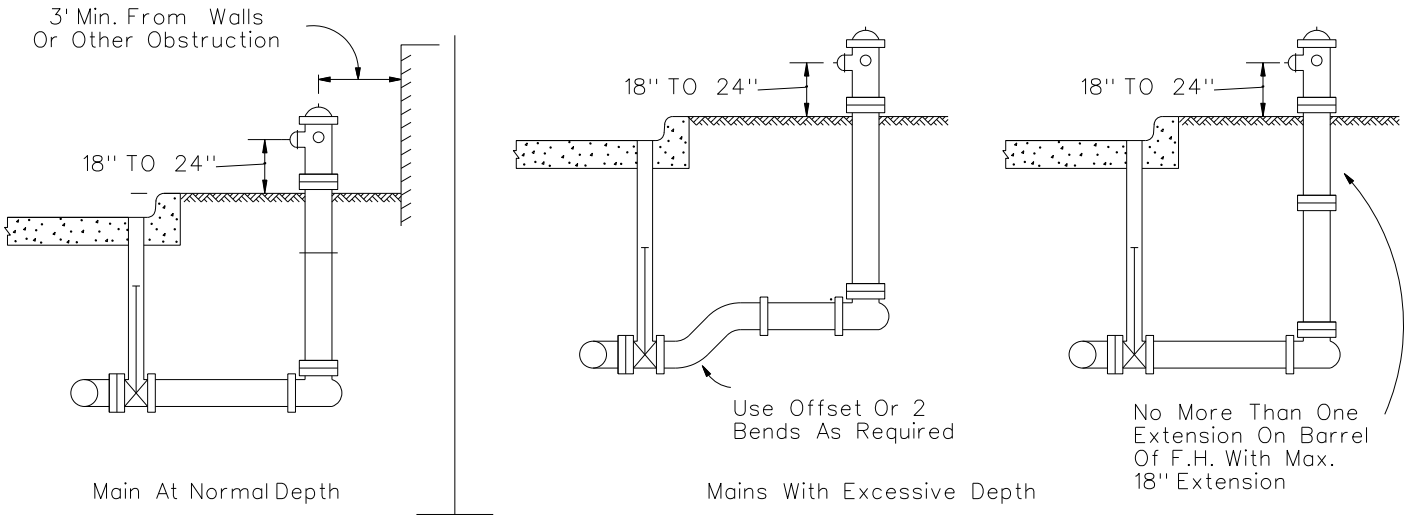


DETAIL "B"

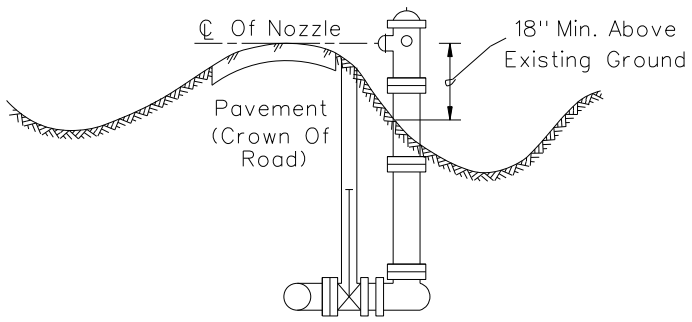
MORTAR PROTECTION @ R.C.C.P. JOINTS
(BELL & SPIGOT JOINT SHOWN - ALSO APPLIES TO FLANGED JOINTS)

MORTAR PROTECTION @ R.C.C.P. JOINTS & INSULATION KIT FOR FLANGED JOINTS		DWU	(PAGE NO.) 223
		DATE JAN. 2010	





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

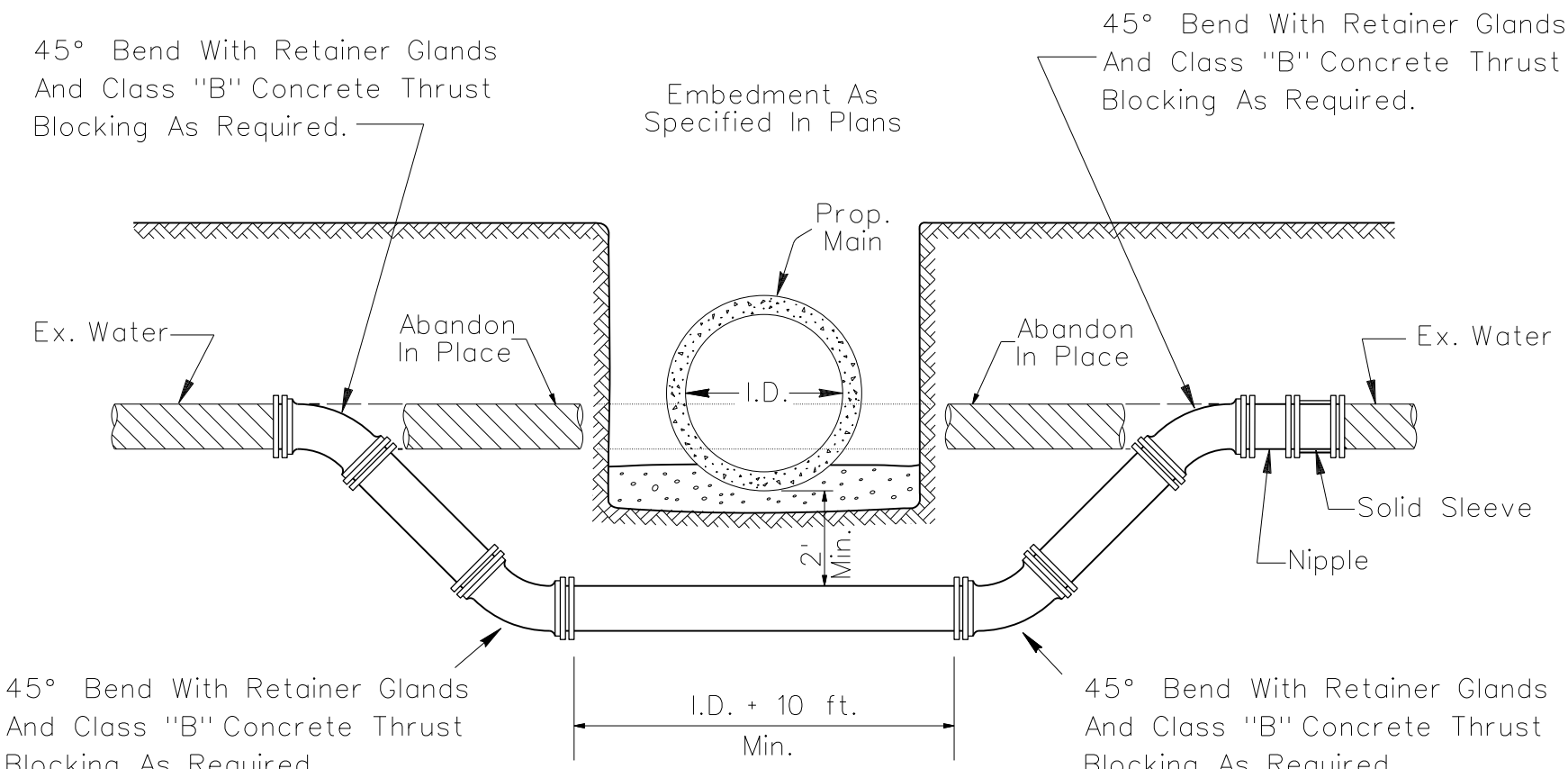
1. ℄ Of F.H. Barrel Shall Not Be Less Than 2.5 Or More Than 7.5 From Back Of Curb Or Edge Of Pavement.
2. Do Not Set F.H. In An Existing Or Proposed Sidewalk, Unless Otherwise Noted.
3. All Tees For F.H.s Must Provide Secure Anchoring From The Main To F.H. Valves
4. Set F.H. On The Lot Line Extended 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

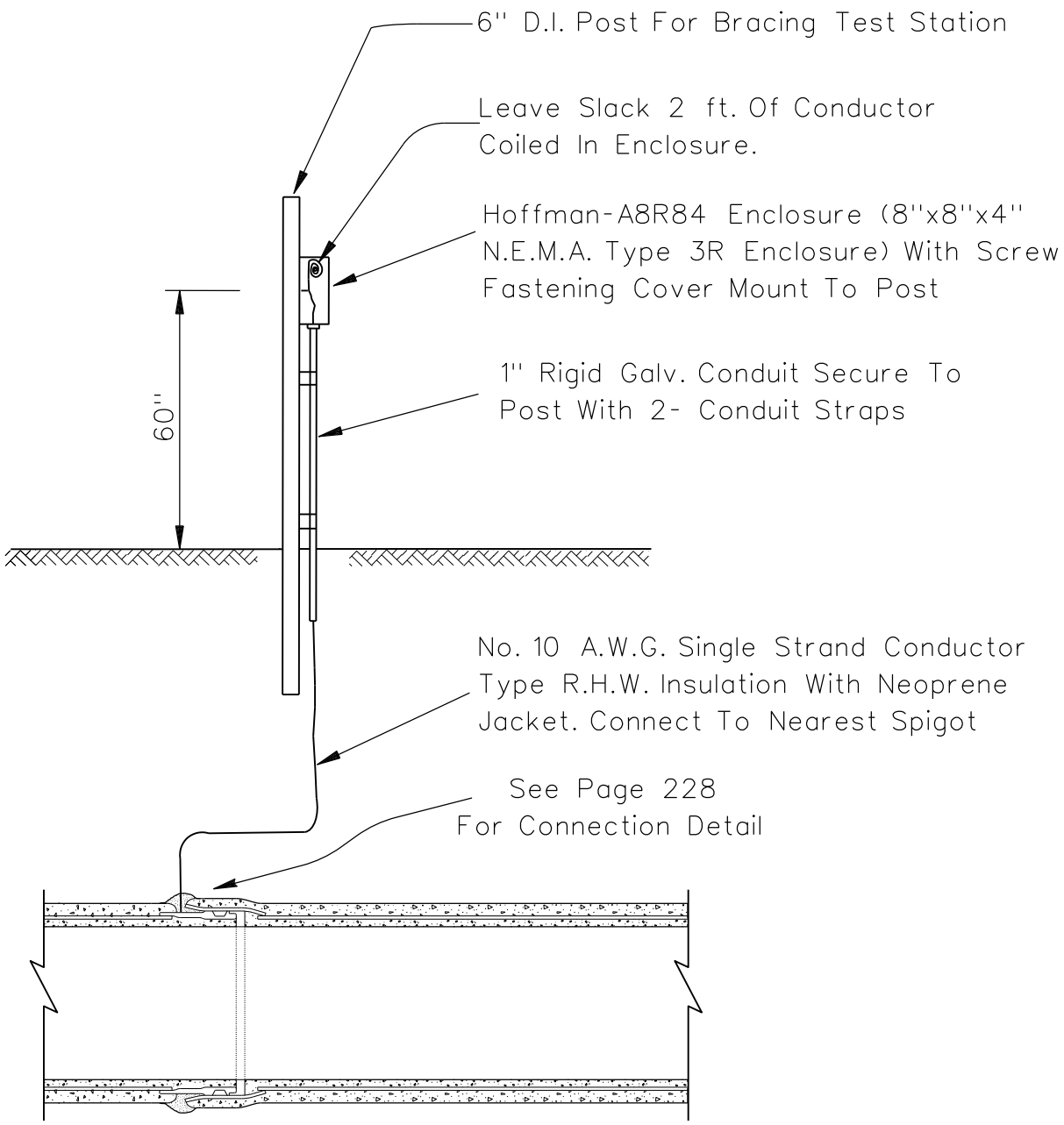
DATE JAN. 2010



Pipe Material As Specified on Plans

STANDARD WATER MAIN LOWERING

DWU		(PAGE NO.) 225
DATE APRIL 2001		

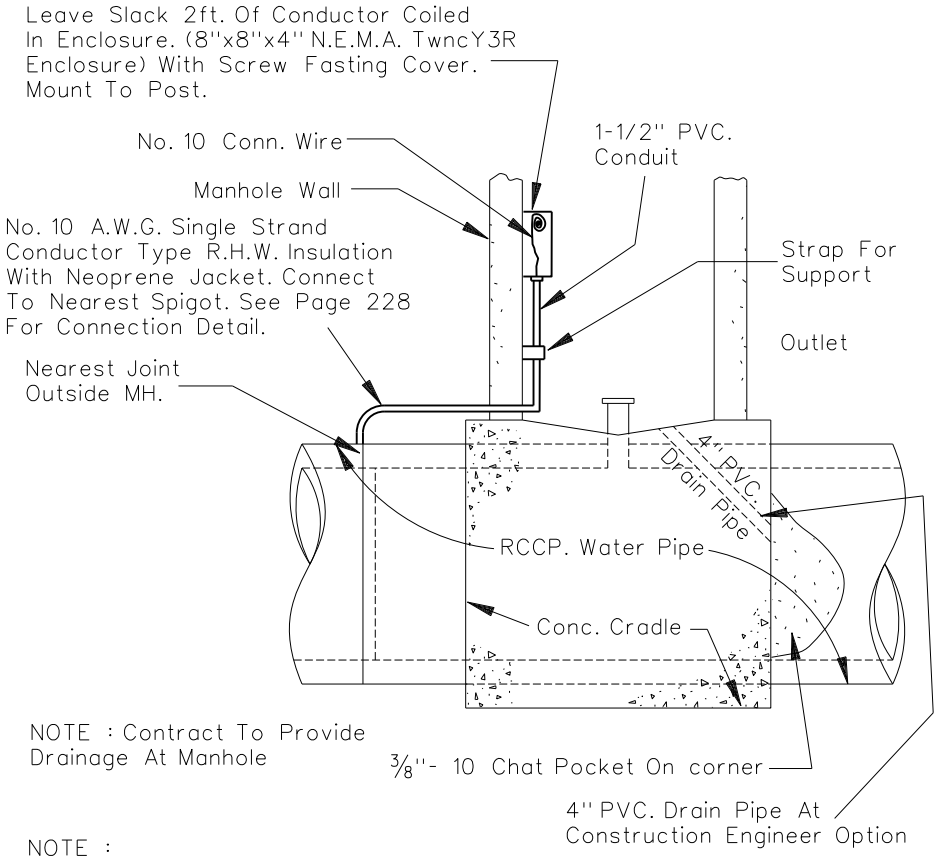


NOTE :

Conductor To Be Continuous With No Splices. Avoid Breaks To Conductor Jacket Or Insulation. Any Breaks To Jacket Insulation Must Be Repaired With 2 Layers Of 600V. Electrical Heat Shrink Tape. Any Contact Of Bare Conductor To Soil Will Render Erroneous Test Results When Monitoring Pipe Conditions.

PIPE-TO-SOIL POTENTION TEST STATION (POST MOUNTED)		DWU	(PAGE NO.) 226
		DATE MARCH 2003	

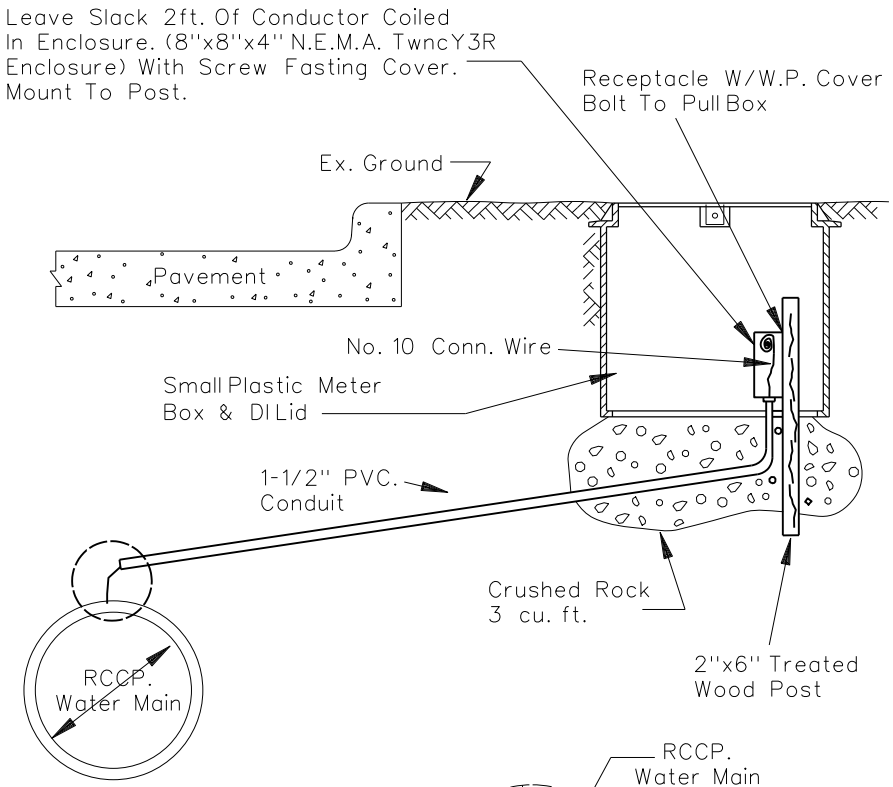
TEST STATION INSIDE MANHOLE TYPE I

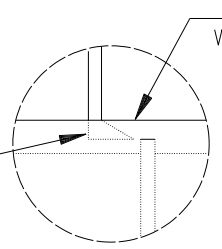


NOTE : Contract To Provide Drainage At Manhole

NOTE :
Conductor To Be Continuous With No Splices.
Avoid Breaks To conductor Jacket Or Insulation.
Any Breaks To Jacket insulation Must Be Repaired With 2 Layers Of 600V. Electrical Heat Shrink Tape. Any Contact Of Bare Conductor To Soil Will Render Erroneous Test Results When Monitoring Pipe Conditions.

TEST STATION IN METER BOX TYPE II

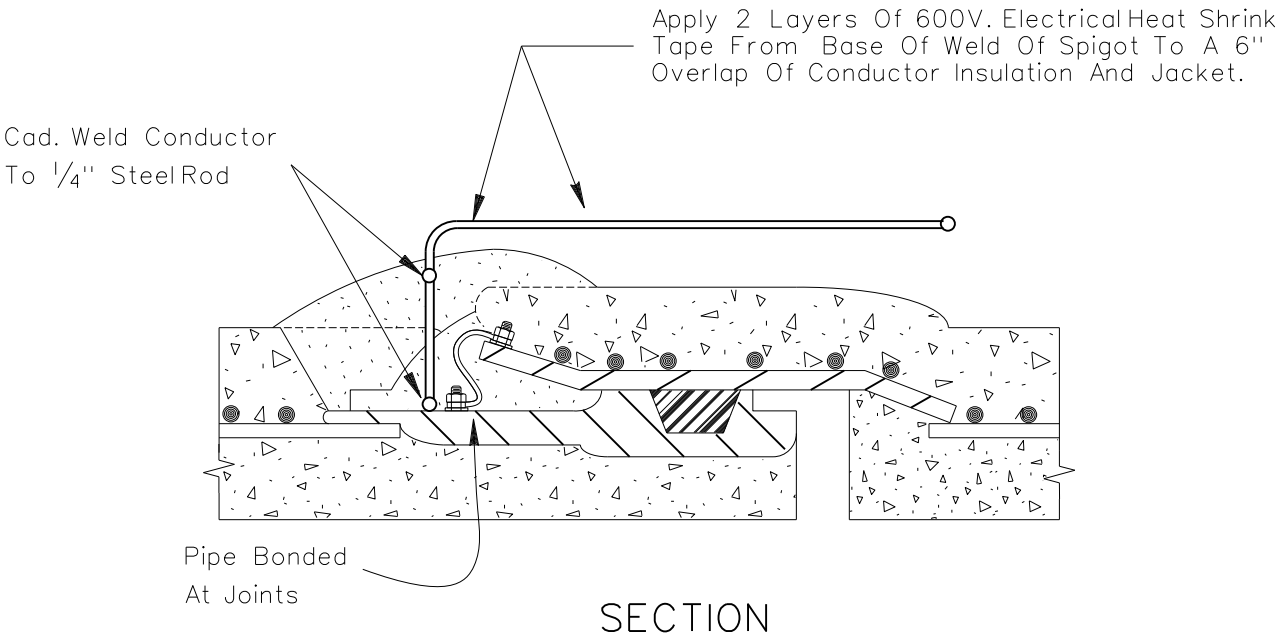




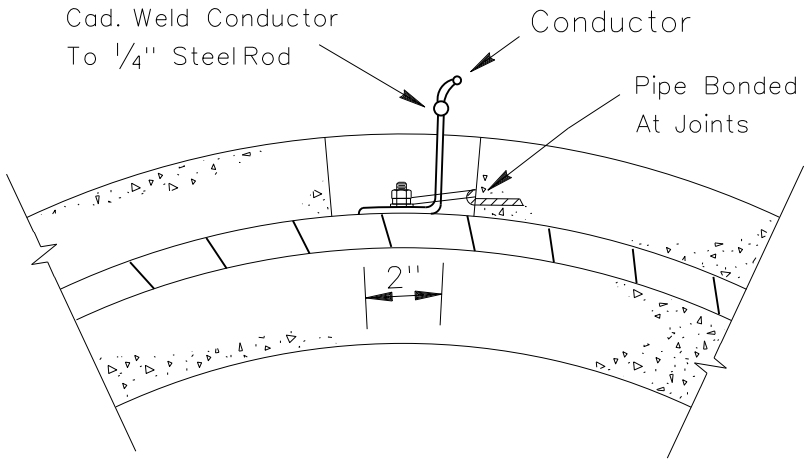
No. 10 A.W.G. Single Strand Conductor Type R.H.W. Insulation With Neoprene Jacket. Connect To Nearest Spigot. See Page 228 For Connection Detail.

PIPE-TO-SOIL POTENTIAL TEST STATION (BURIED CONFIGURATION)

DWU	(Page No.) 227
DATE DEC.2001	



SECTION



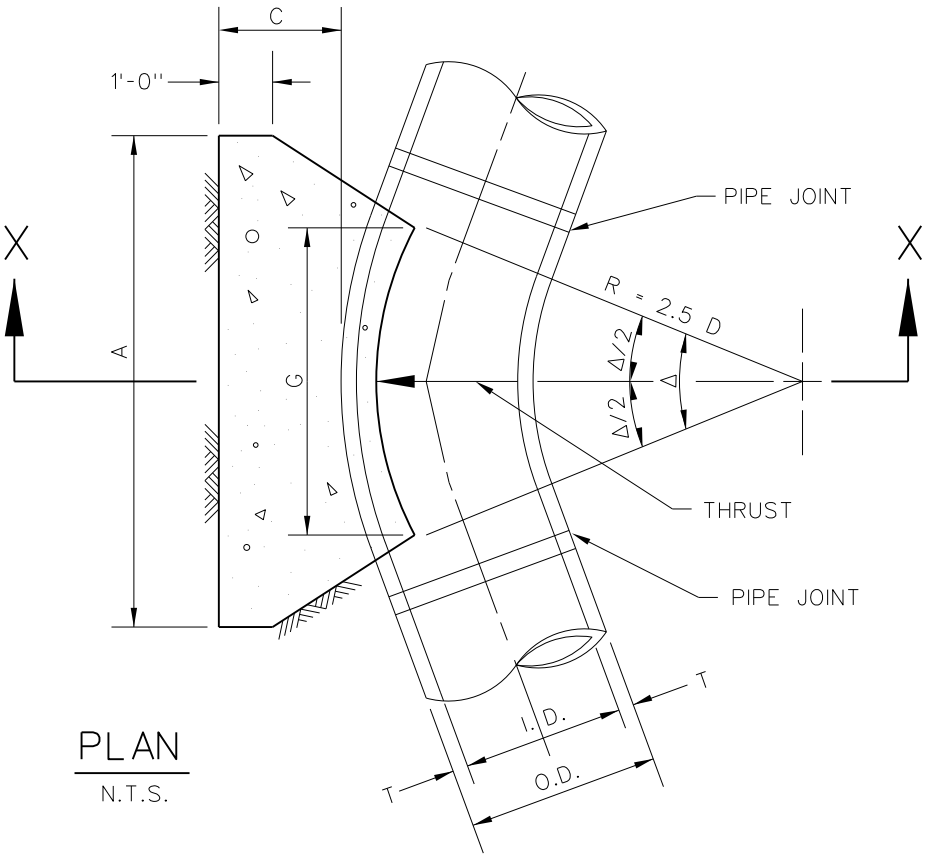
END VIEW

NOTE :

Conductor To Be Continuous With No Splices. Avoid Breaks To Conductor Jacket Or Insulation. Any Breaks To Jacket Insulation Must Be Repaired With 2 Layers Of 600V. Electrical Heat Shrink Tape. Any Contact Of Bare Conductor To Soil Will Render Erroneous Test Results When Monitoring Pipe Conditions.

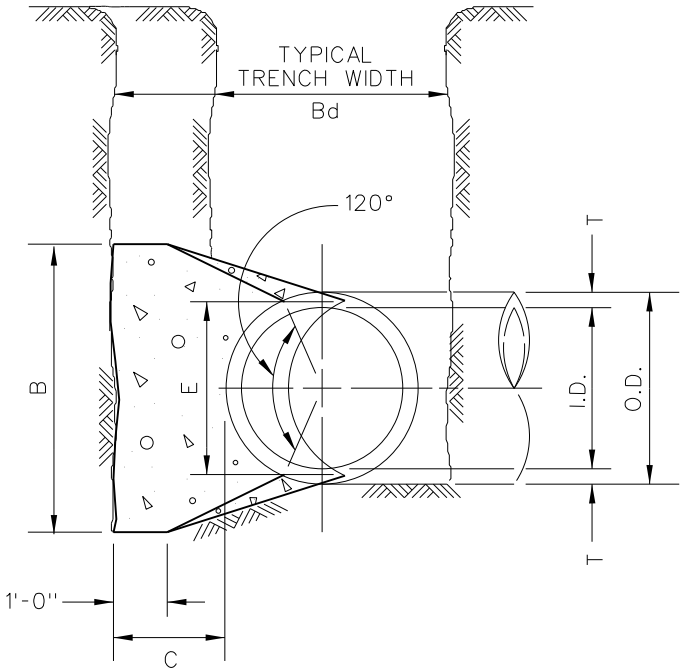
REFER TO PAGES 226 & 227

DETAIL OF TEST CONDUCTOR CONNECTION TO PIPE		DWU	(PAGE NO.) 228
		DATE MARCH 2003	



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

I.D. (IN.)	T (IN.)	C △ = 11.25° (FT.)	C △ ≥ 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
DEC.2001

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

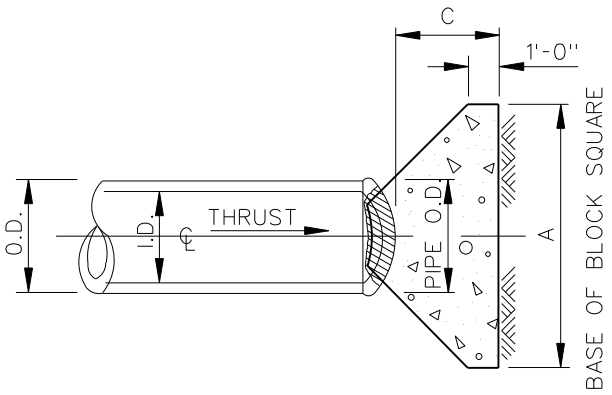
I.D. (IN.)	Δ = 67.50° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)	I.D. (IN.)	Δ = 90° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)
4,6,8	2.1	5.6	3.0	2.0	0.3	2.0	1.5	0.2	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

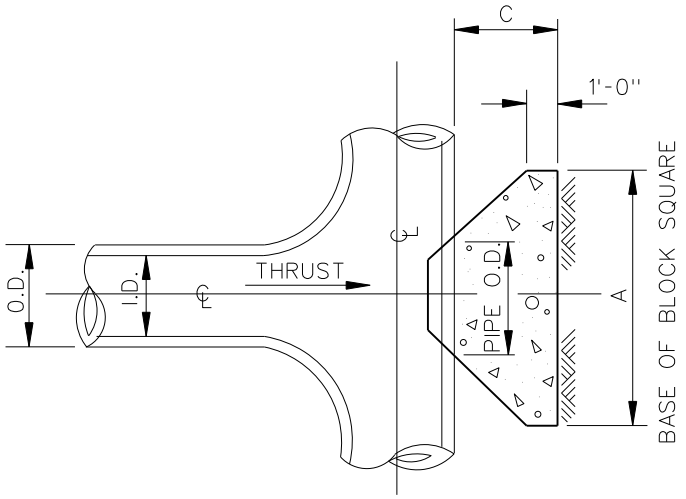
DWU

DATE DEC.2001



PLAN OF PLUG THRUST BLOCK

N.T.S.



PLAN OF TEE THRUST BLOCK

N.T.S.

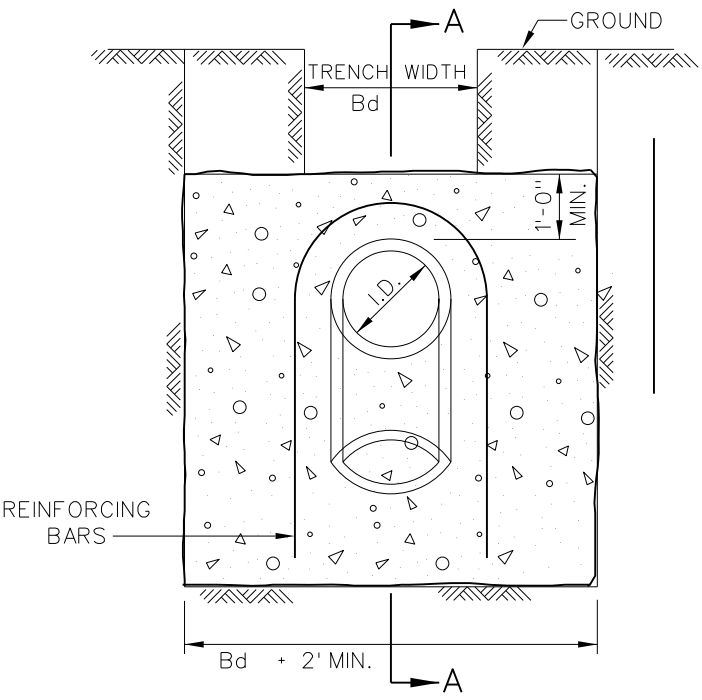
			EARTH		ROCK	
I.D. (IN.)	THRUST (TONS)	C (FT.)	A (FT.)	VOL. (C.Y.)	A (FT.)	VOL. (C.Y.)
4,6,8	5.1	1.5	2.5	0.3	2.0	0.2
10,12	11.3	1.5	3.5	0.6	2.5	0.3
16,18	25.5	2.0	5.5	1.6	4.0	0.9
20	31.5	2.0	6.0	1.9	4.0	0.9
24	45.2	2.5	7.0	3.1	5.0	1.7
30	53.0	3.0	7.5	4.1	5.5	2.4
36	76.3	4.0	9.0	7.3	6.5	4.2
42	104.0	4.5	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

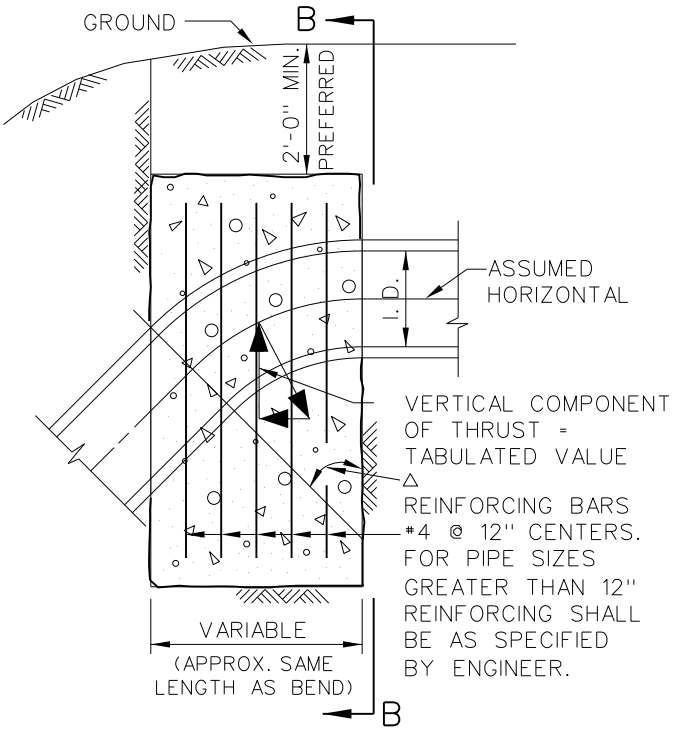
DWU

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".
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

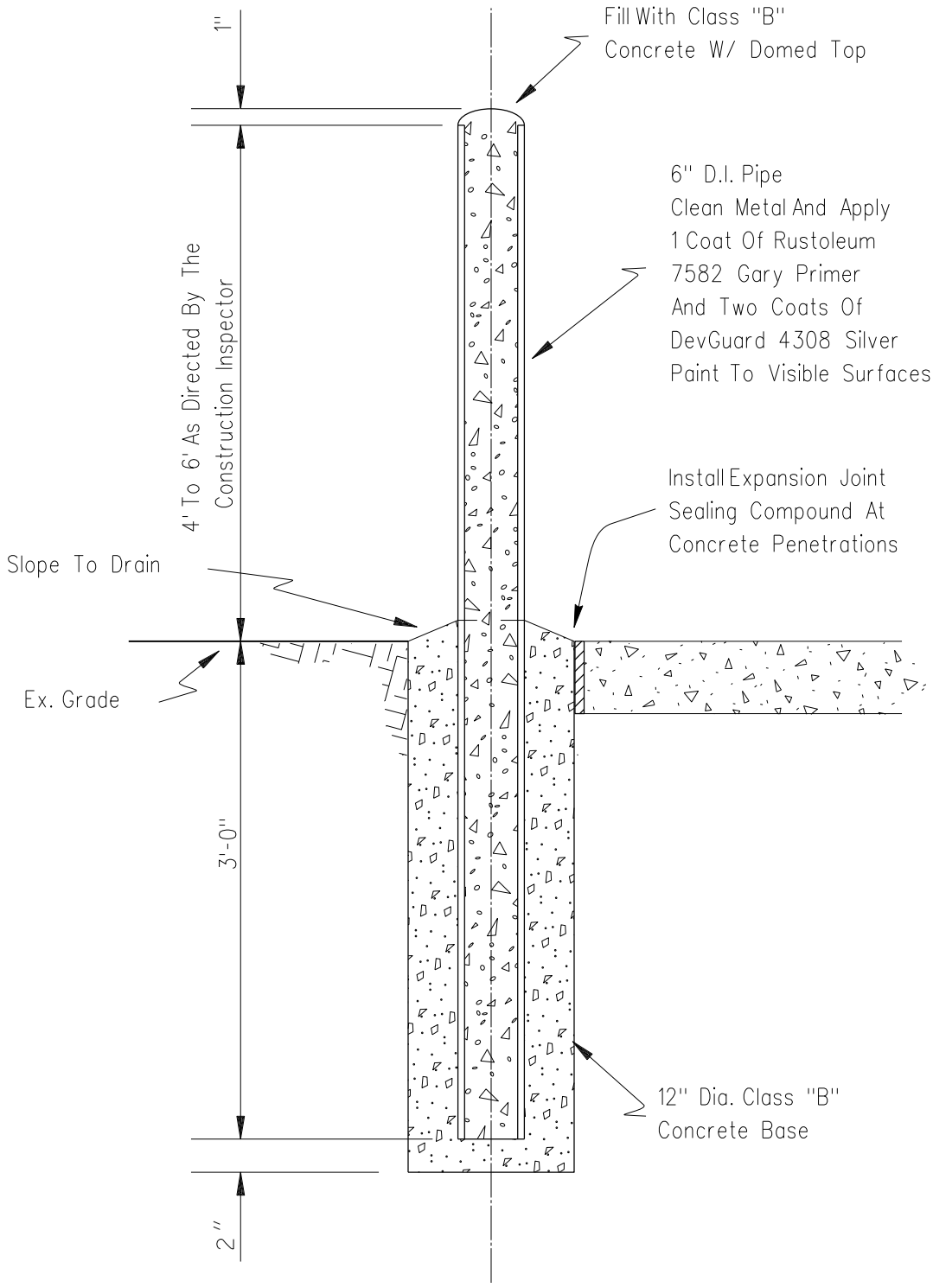
THRUST BLOCK GENERAL NOTES		DWU	(Page No.) 234
		DATE JAN. 2010	

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

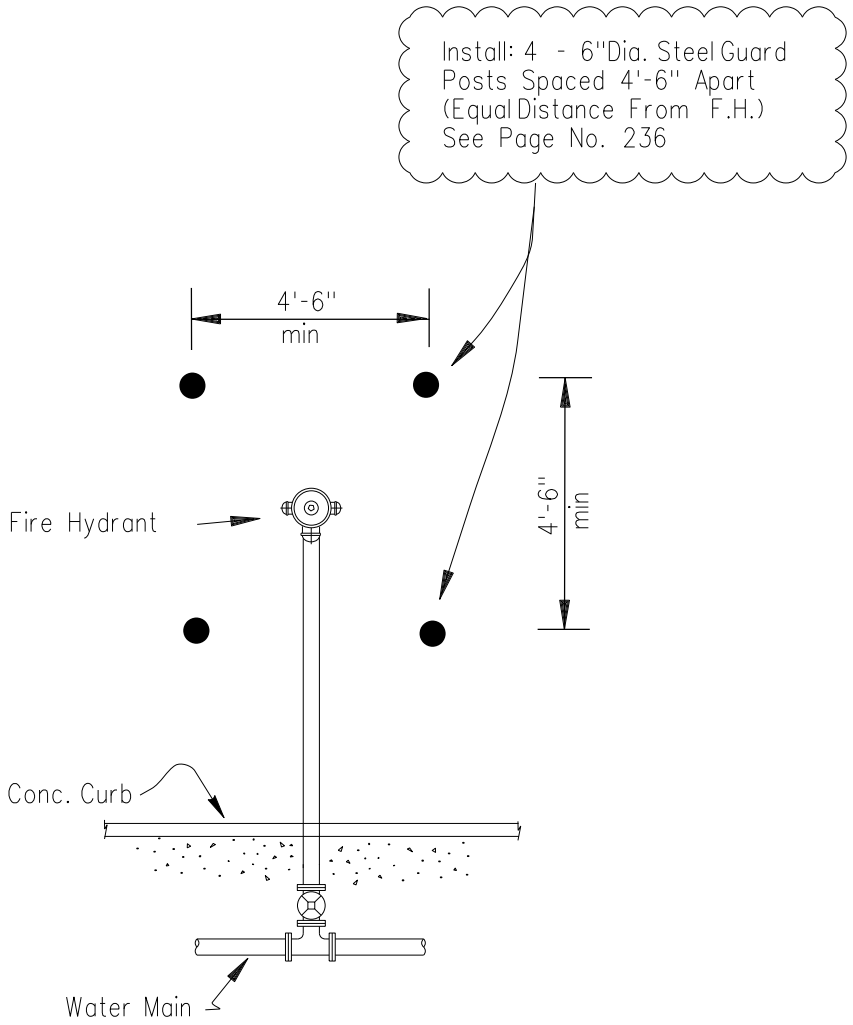
DWU

DATE JAN 2010



STEEL GUARD POST DETAIL

DWU		(PAGE NO.) 236
DATE JAN. 2010		



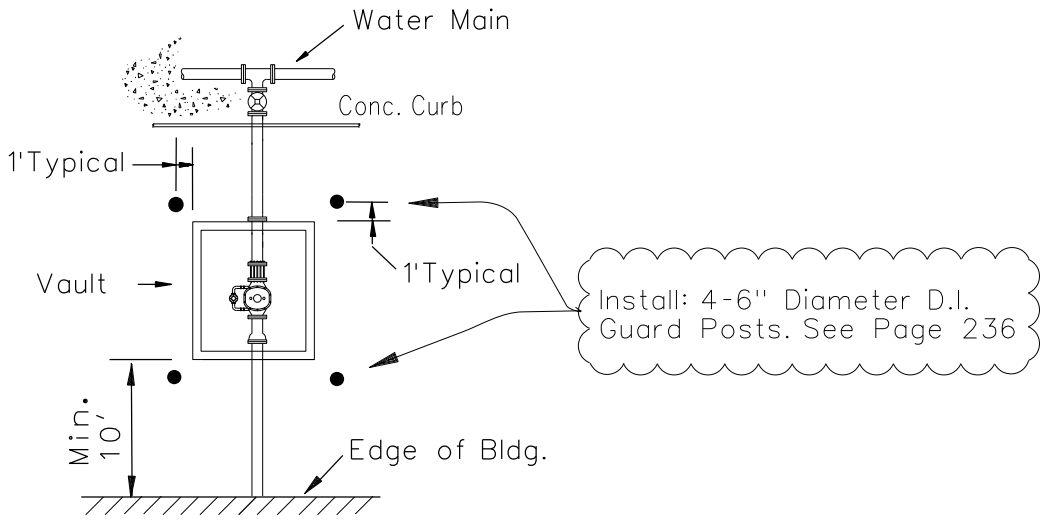
Refer. To Pages 224 & 236

GUARD POST PROTECTION FOR FIRE HYDRANTS

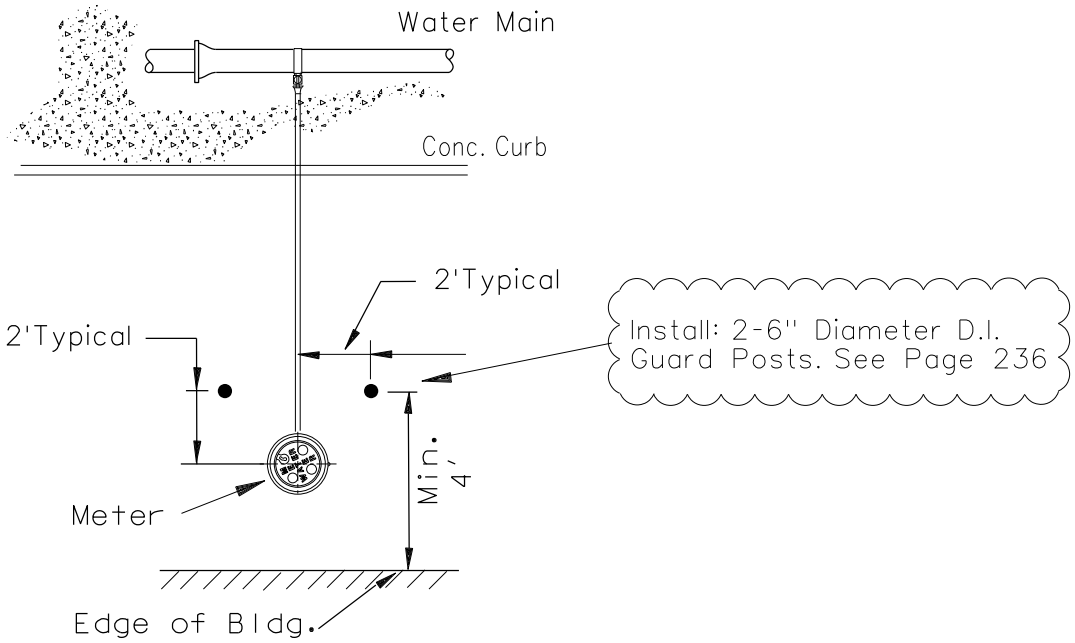
DWU

(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	

PART 3

(Series 300)

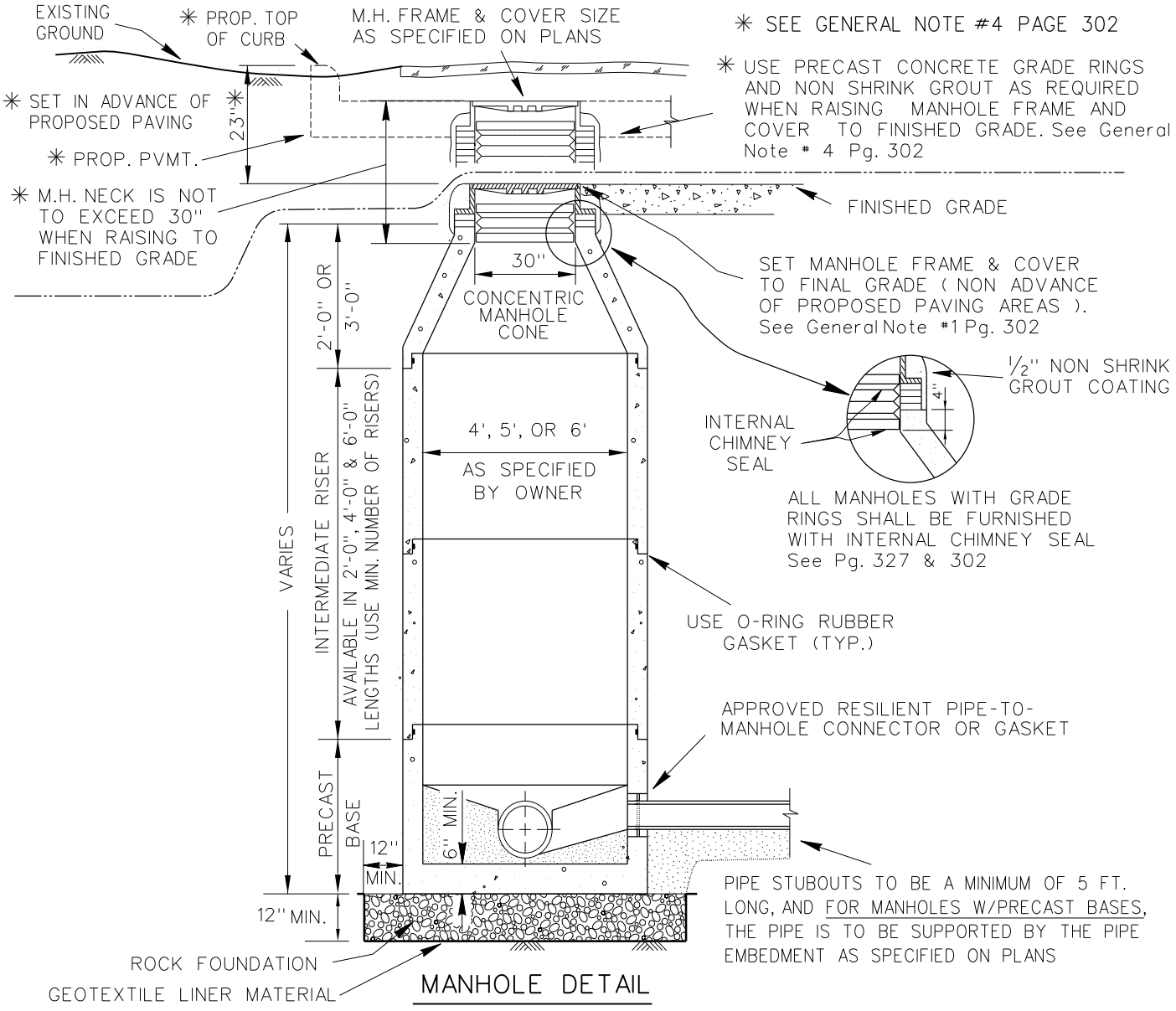
WASTEWATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department

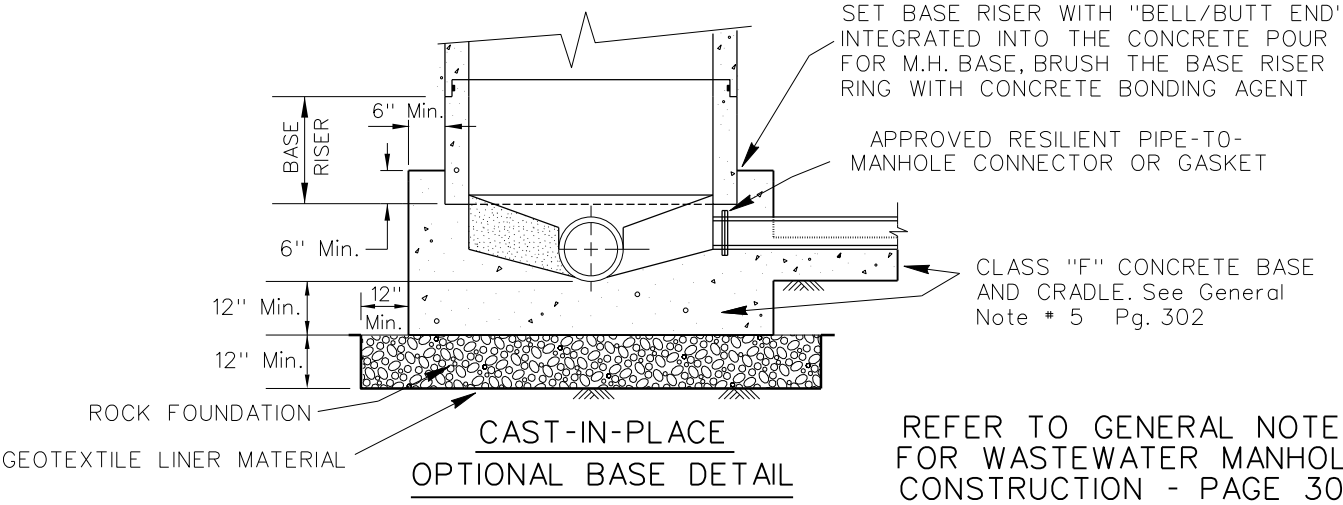
PART 3
WASTEWATER MAIN CONSTRUCTION

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

(IN ADVANCE OF PROPOSED PAVING IMPROVEMENT PROJECTS)



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 FEB. 2009	

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 5 feet 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.

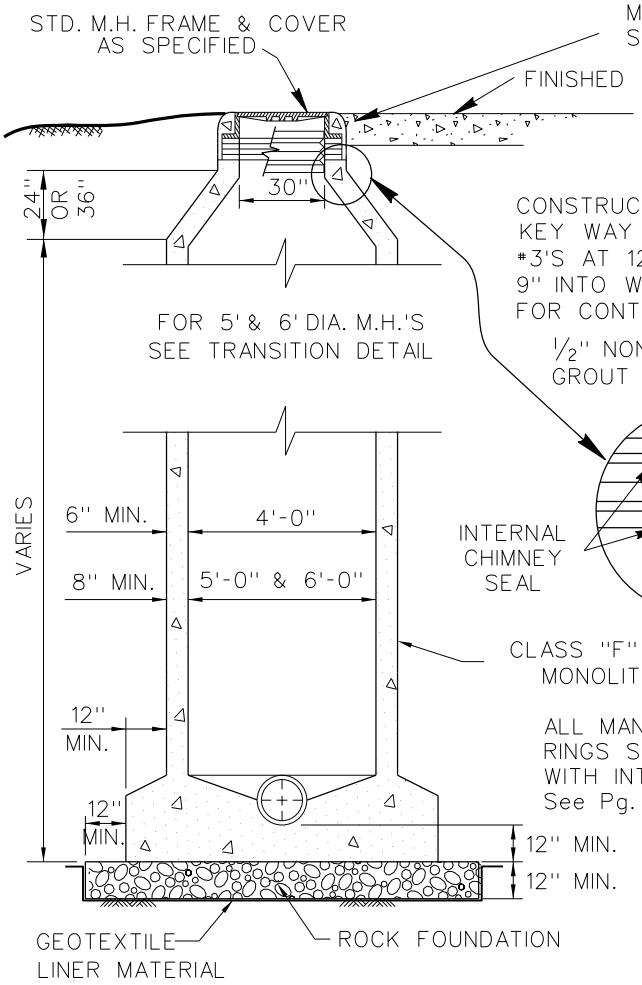
5) For all manholes with cast in place bases, the first pipe joint must extend a minimum of 5 feet past the edge of manhole, with a concrete cradle poured integrally with the base, and under the entire pipe joint length.

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.

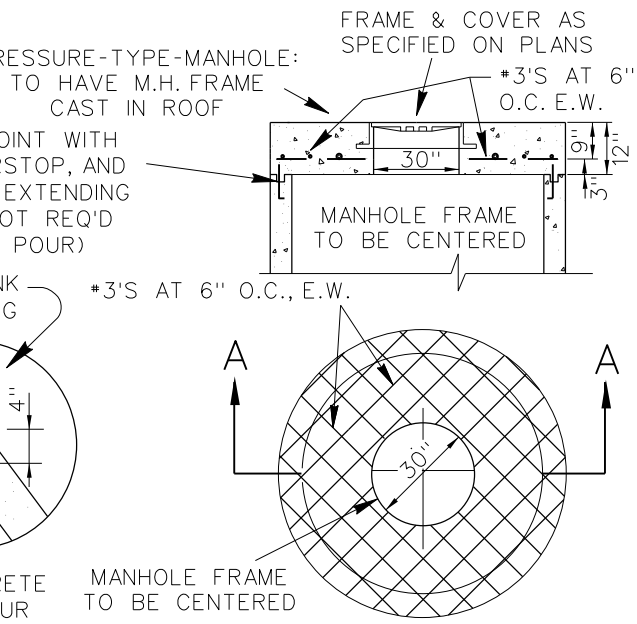
FOR CONSTRUCTION OF MANHOLES IN ADVANCE OF PROPOSED PAVING PROJECTS, See Detail On Pg. 301 & General Note #4 On Pg. 302.

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



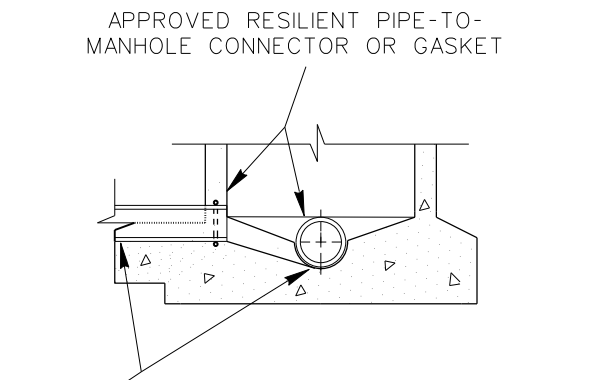
MANHOLE DETAIL

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



ROOF STEEL LAYOUT

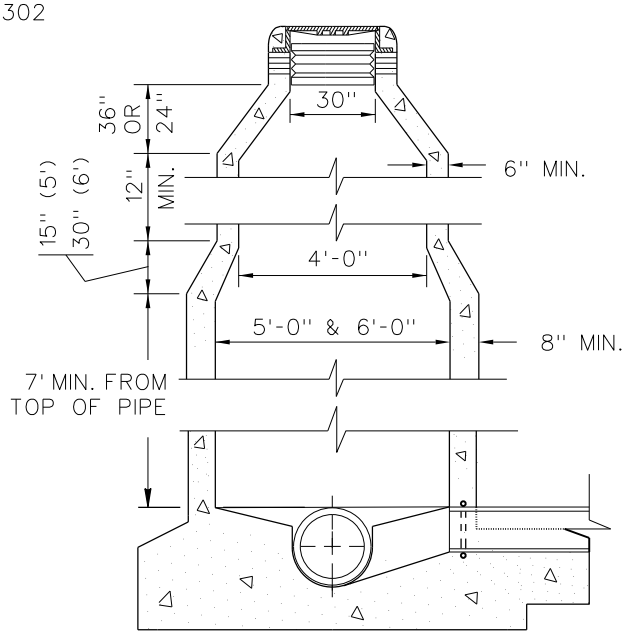
N.T.S.



CONNECTION DETAIL

N.T.S.

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



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

N.T.S.

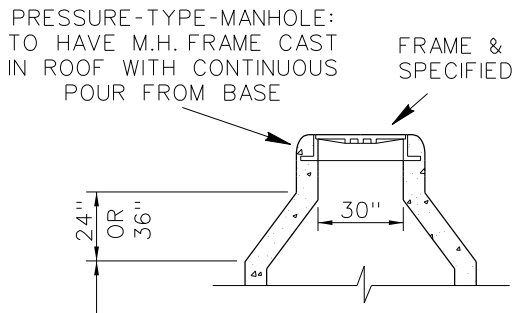
REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

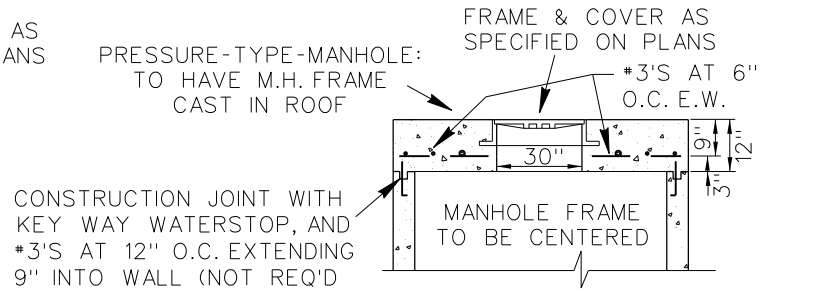
WASTEWATER MANHOLE CAST-IN-PLACE

	DWU	(Page No.) 303
	DATE JAN. 2010	

CONCRETE CONE ⇦ ROOF OPTIONS ⇨ REINFORCED CONCRETE SLAB

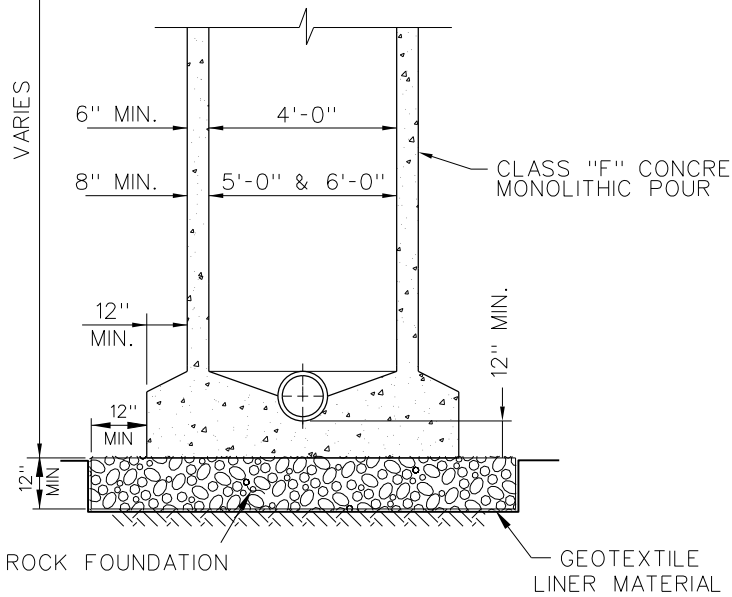
N.T.S.



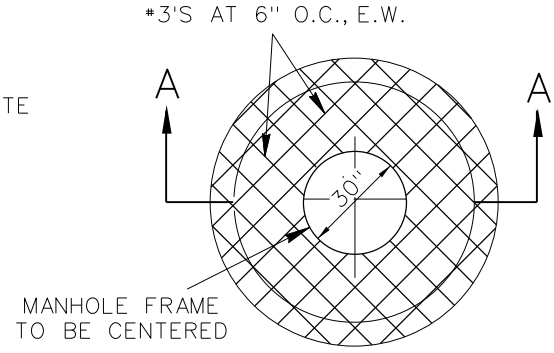


SECTION A - A

N.T.S.

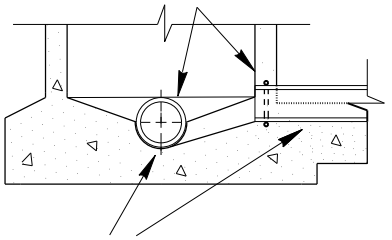


MANHOLE DEAIL



ROOF STEEL LAYOUT

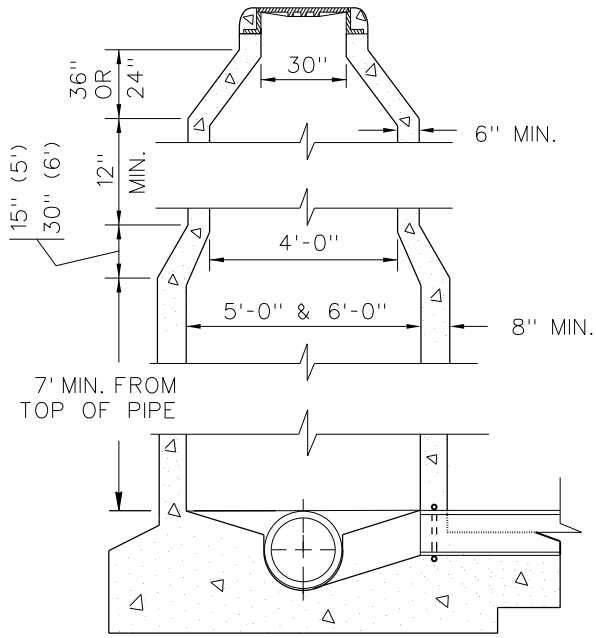
N.T.S.



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

CONNECTION DETAIL

N.T.S.

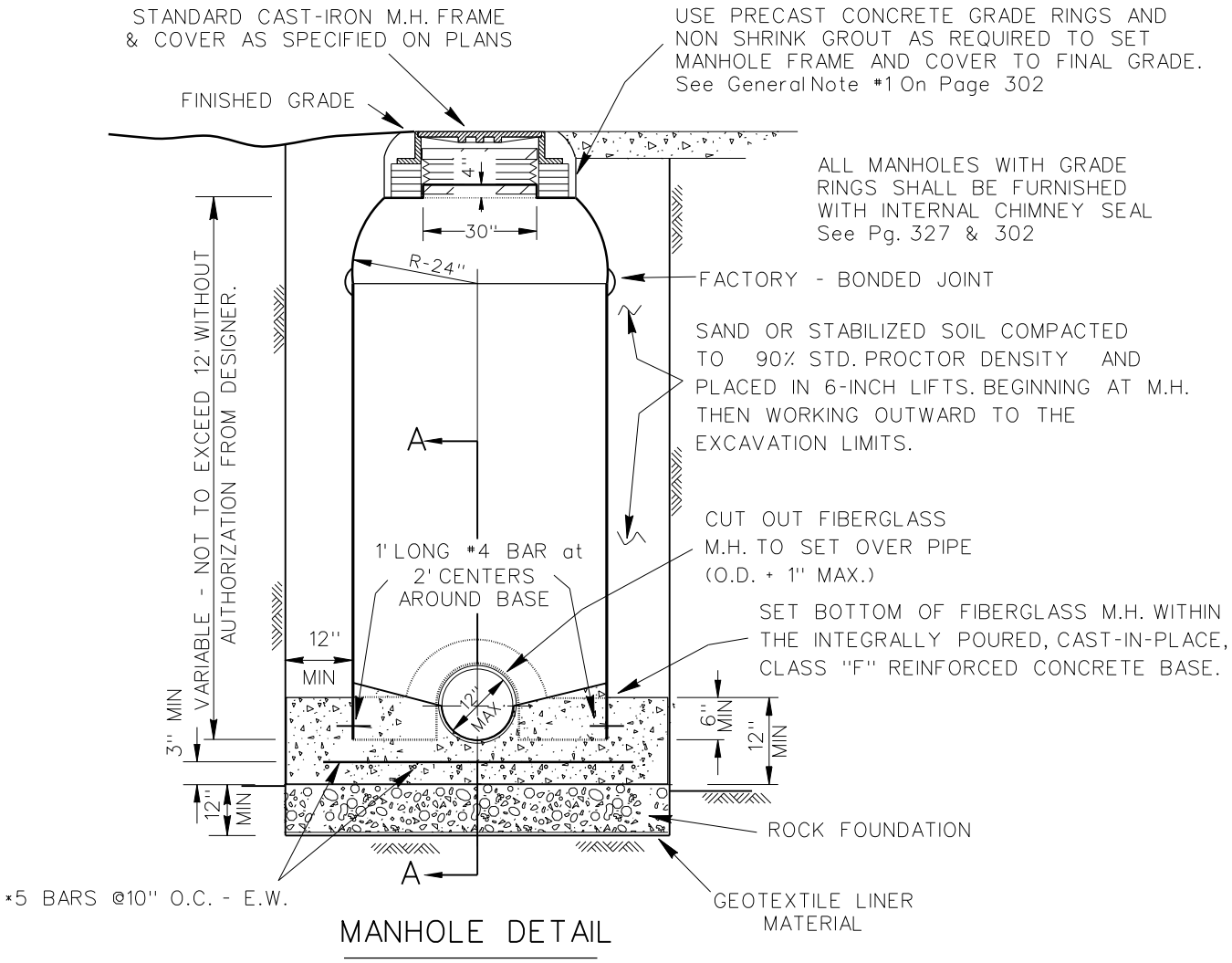


TRANSITION DETAIL FOR 5' & 6' DIA. M.H.'S

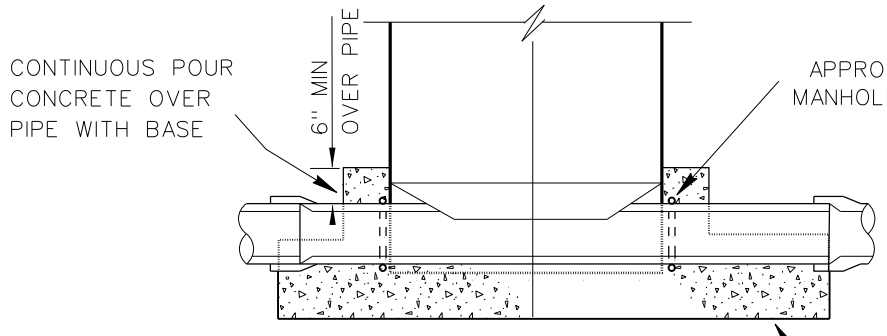
N.T.S.

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE PRESSURE-TYPE		DWU	(Page No.) 304
		DATE FEB. 2009	



MANHOLE DETAIL



SECTION A-A

N.T.S.

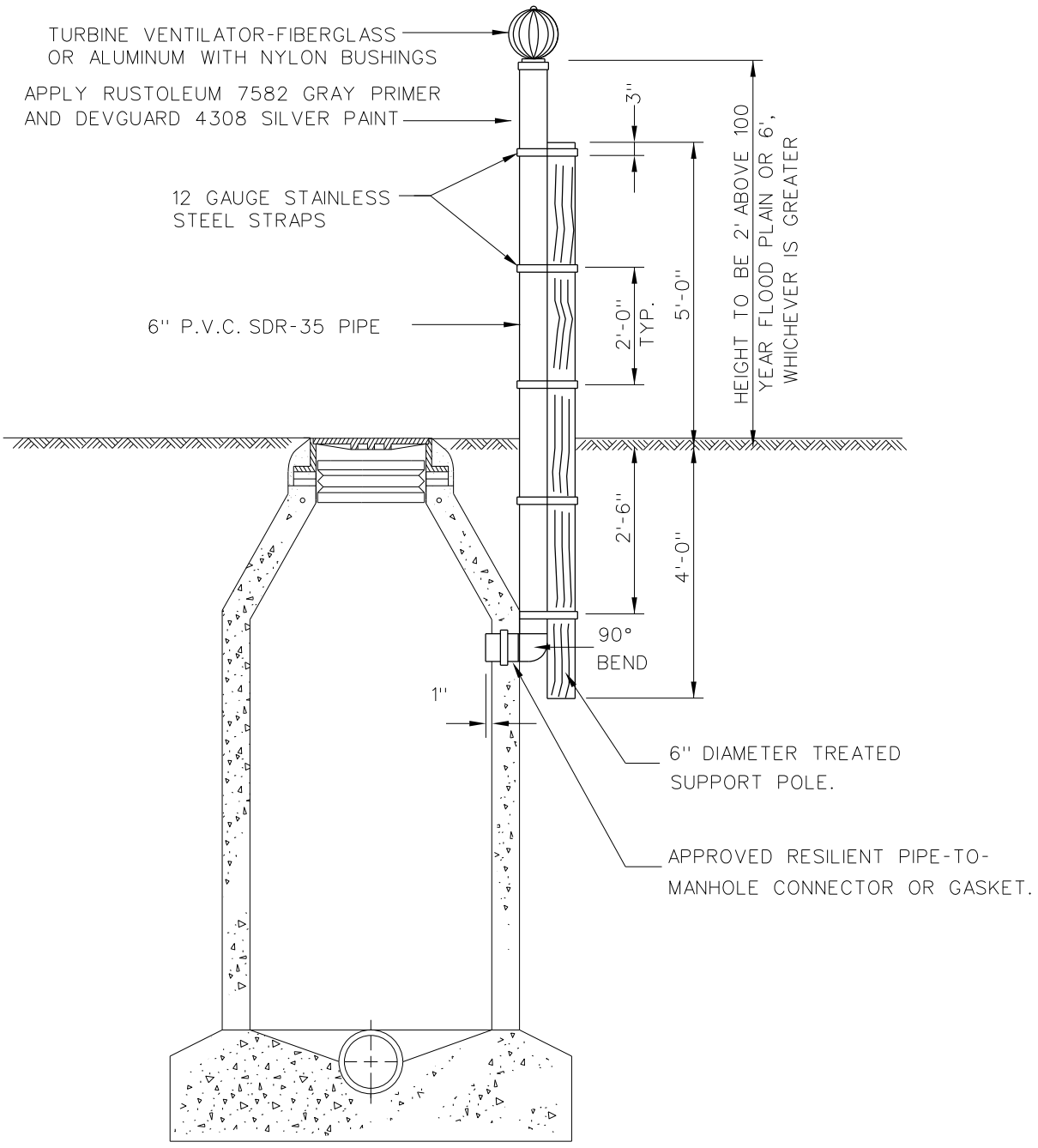
NOTES:

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 FEB.2009		



WASTEWATER MANHOLE VENTED

	DWU	(Page No.) 306
	DATE JAN. 2010	

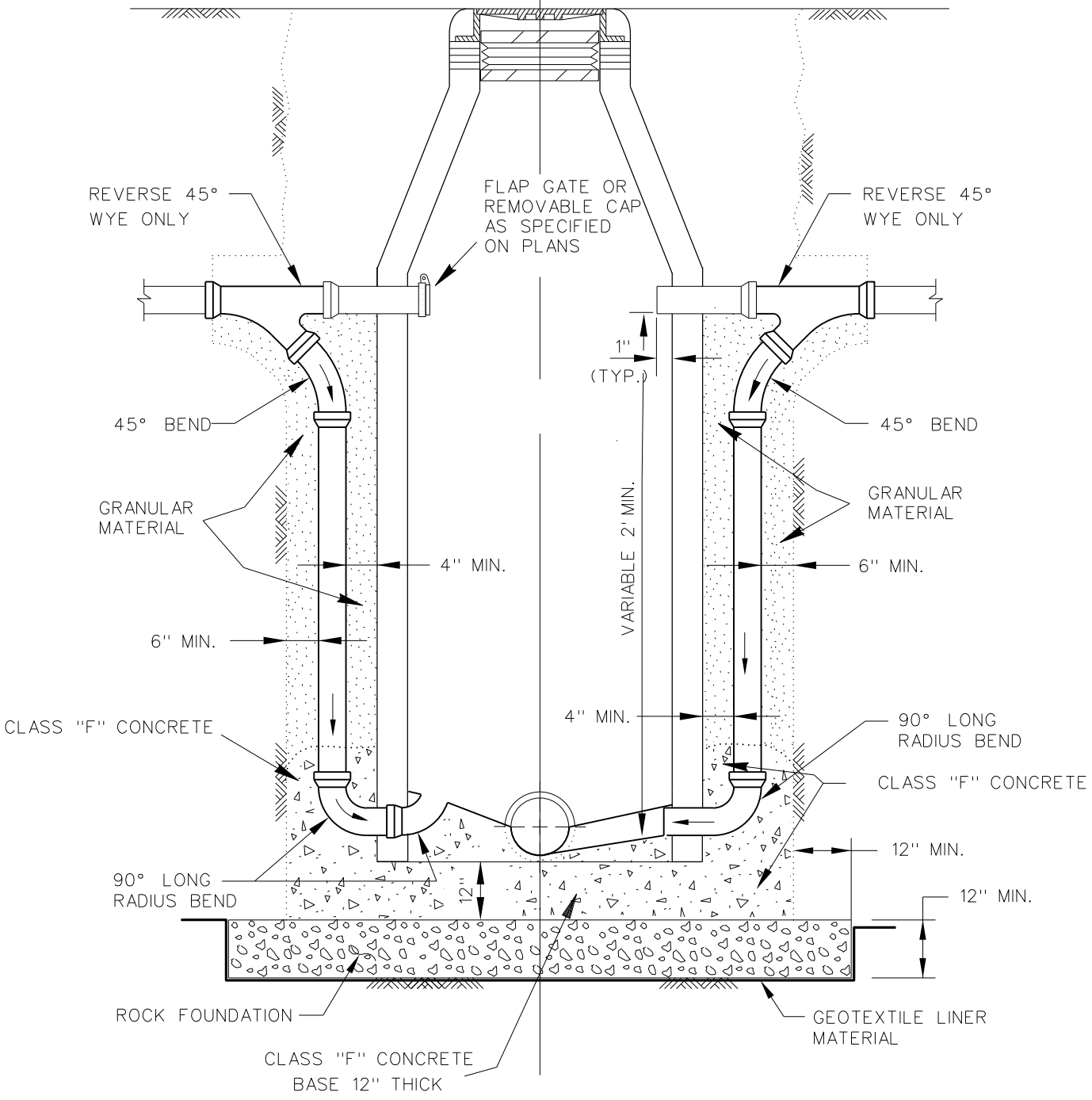
MANHOLE TYPE-AS
SPECIFIED ON PLANS

GAS SEALED DROP CONNECTION

N.T.S.

STANDARD DROP CONNECTION

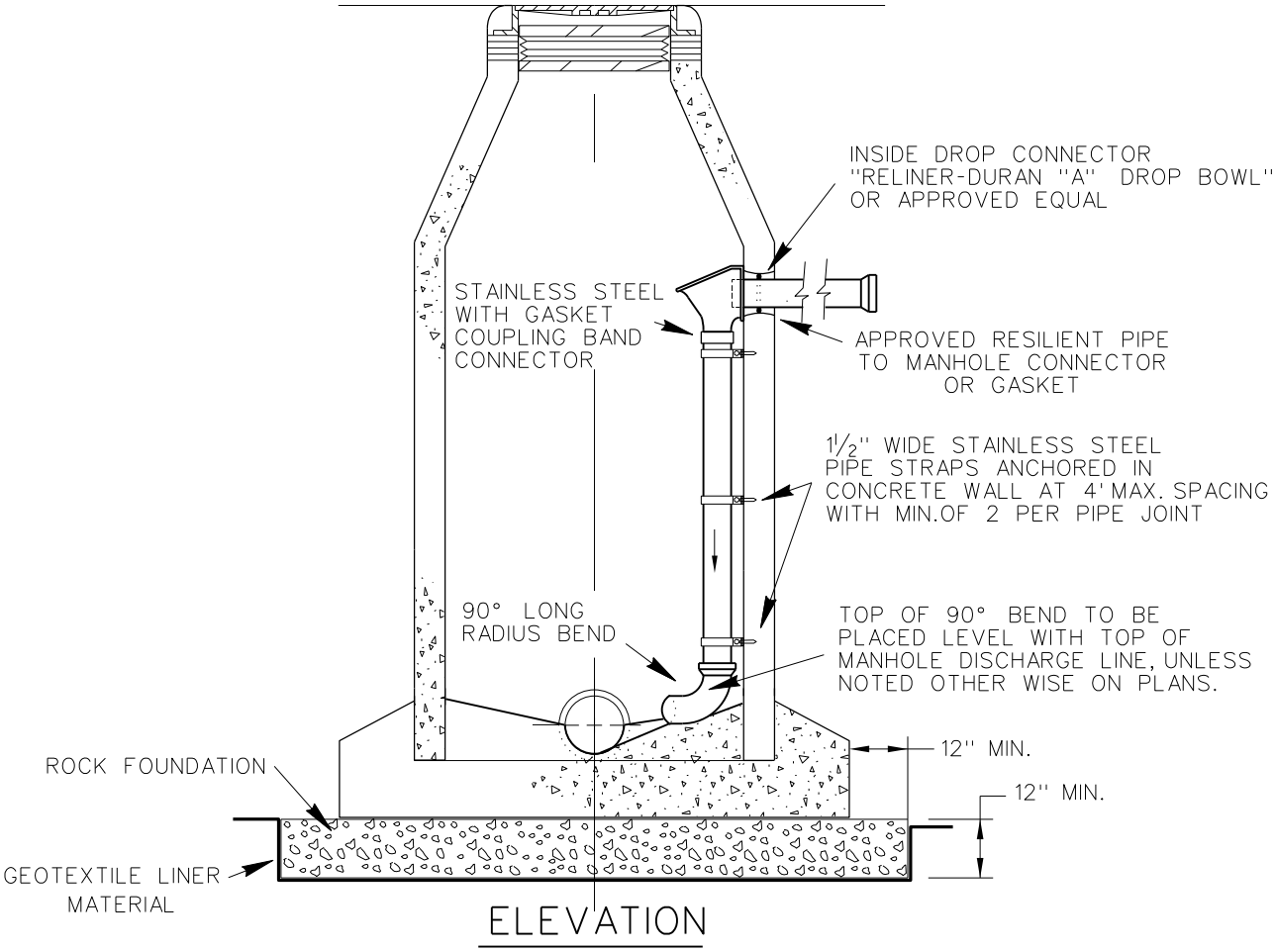
N.T.S.



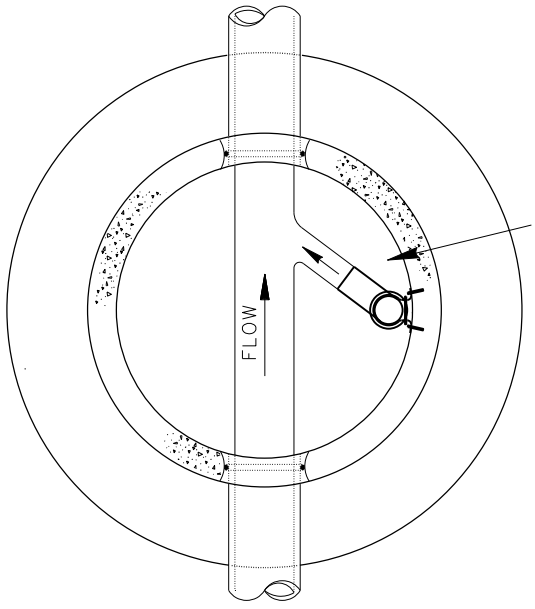
SEE GENERAL NOTES
FOR WASTEWATER MANHOLE
CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE OUTSIDE DROP CONNECTIONS

DWU	(Page No.) 307
DATE JAN.2001	



ELEVATION



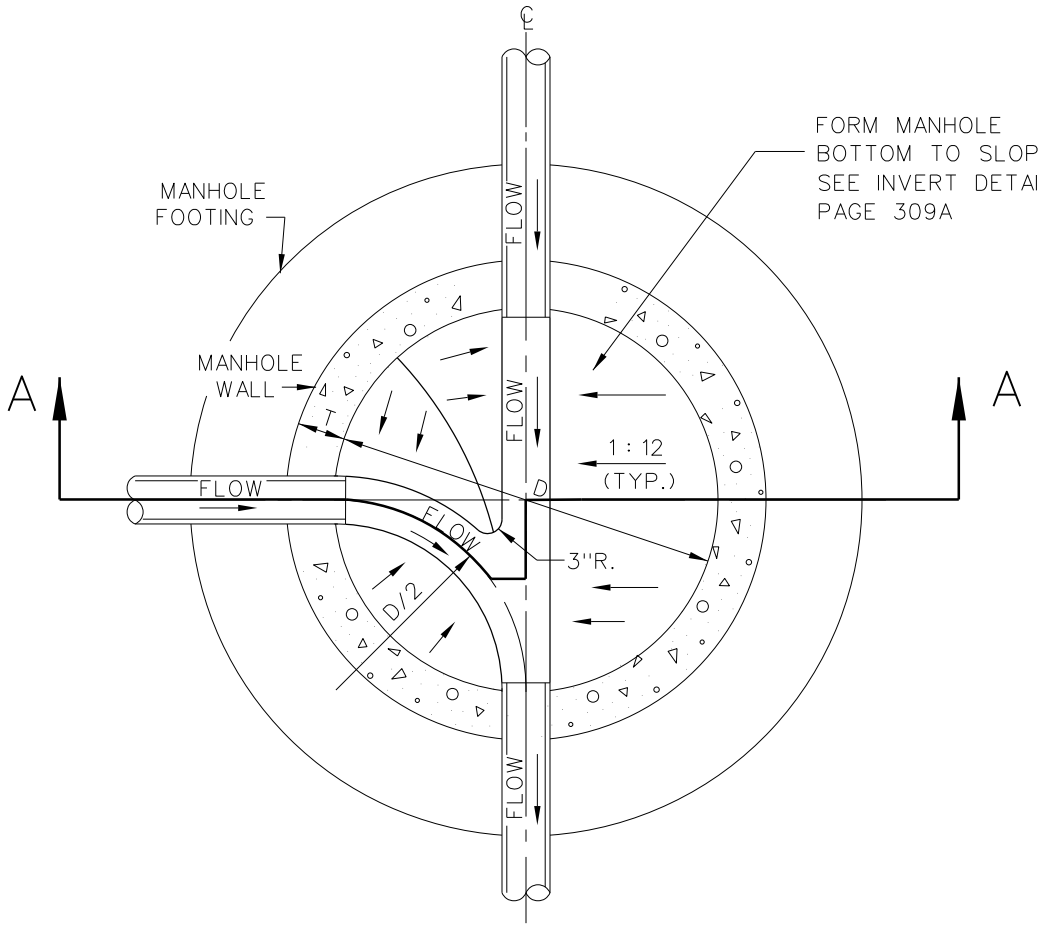
ROTATE LOWER 90° BEND
AND FORM INVERT TO DIVERT
DROP DISCHARGE DOWN STREAM

PLAN

SEE GENERAL NOTES
FOR WASTEWATER MANHOLE
CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE INSIDE DROP CONNECTION

	(Page No.)
DWU	308
DATE JAN.2001	

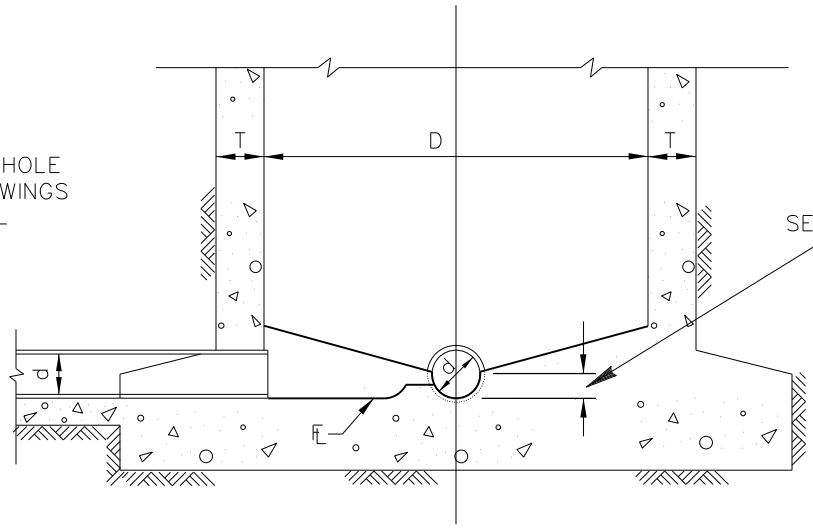


PLAN

N.T.S.

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

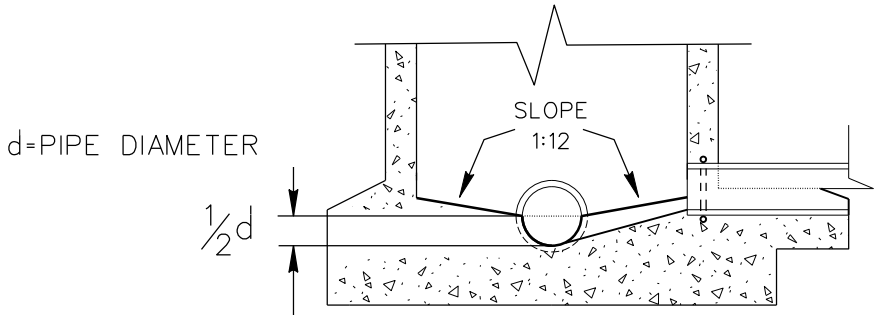
NOTE:
REFER TO MANHOLE STANDARD DRAWINGS FOR ADDITIONAL DETAIL OF M.H.



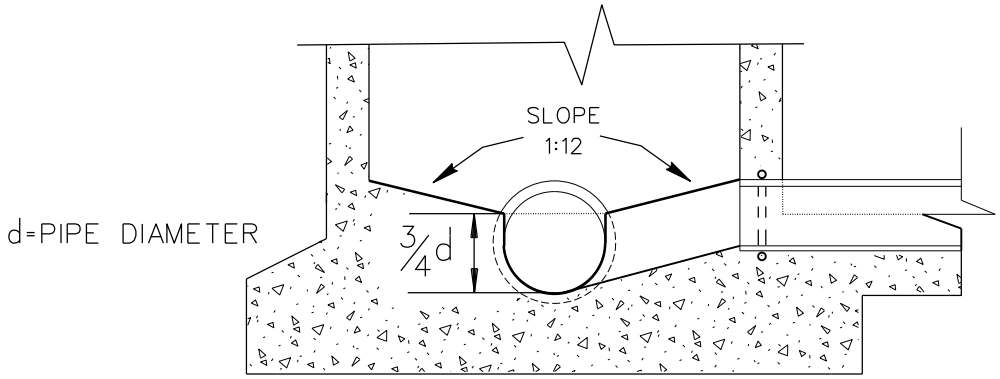
SECTION A-A

N.T.S.

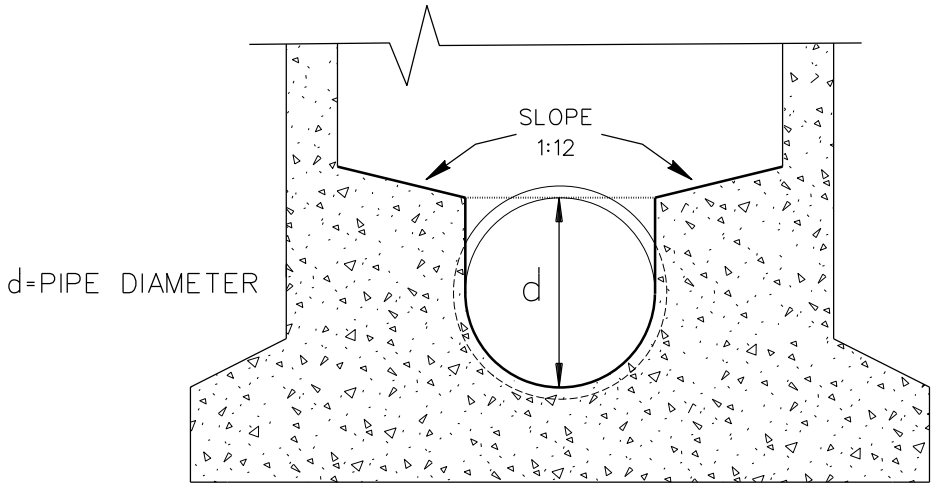
WASTEWATER MANHOLE INVERT INTERSECTION DETAIL		DWU	(Page No.) 309
		DATE DEC.2001	



FOR PIPE SMALLER
THAN 15" IN DIAMETER

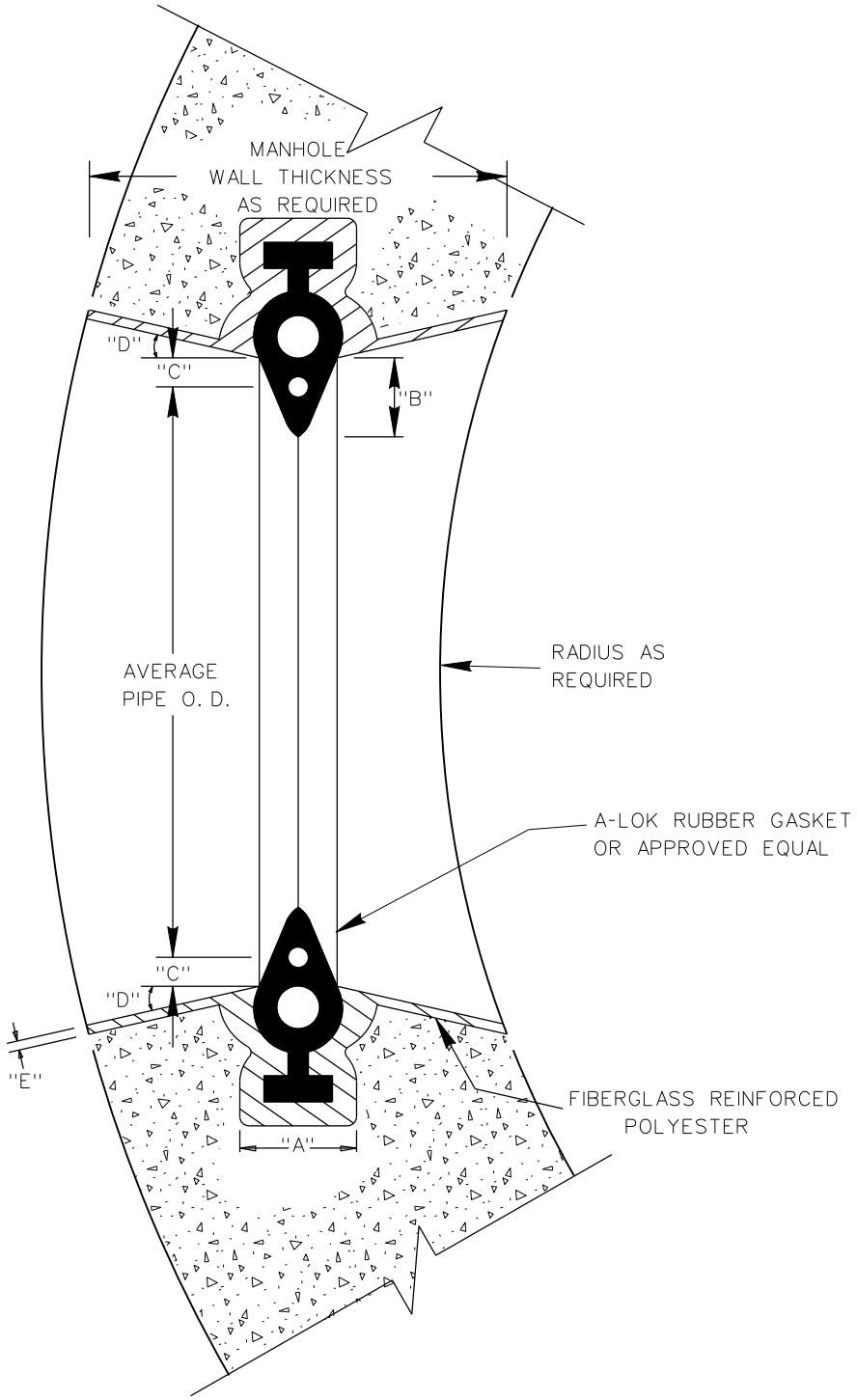


FOR PIPE FROM
15" TO 24" IN DIAMETER



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"

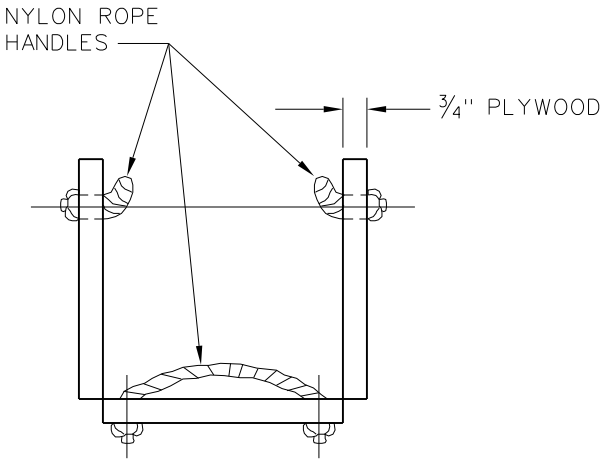
MANHOLE PIPE CONNECTOR (FOR CAST-IN-PLACE MANHOLES)		DWU	(PAGE No.) 310
		DATE JAN. 2010	

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.

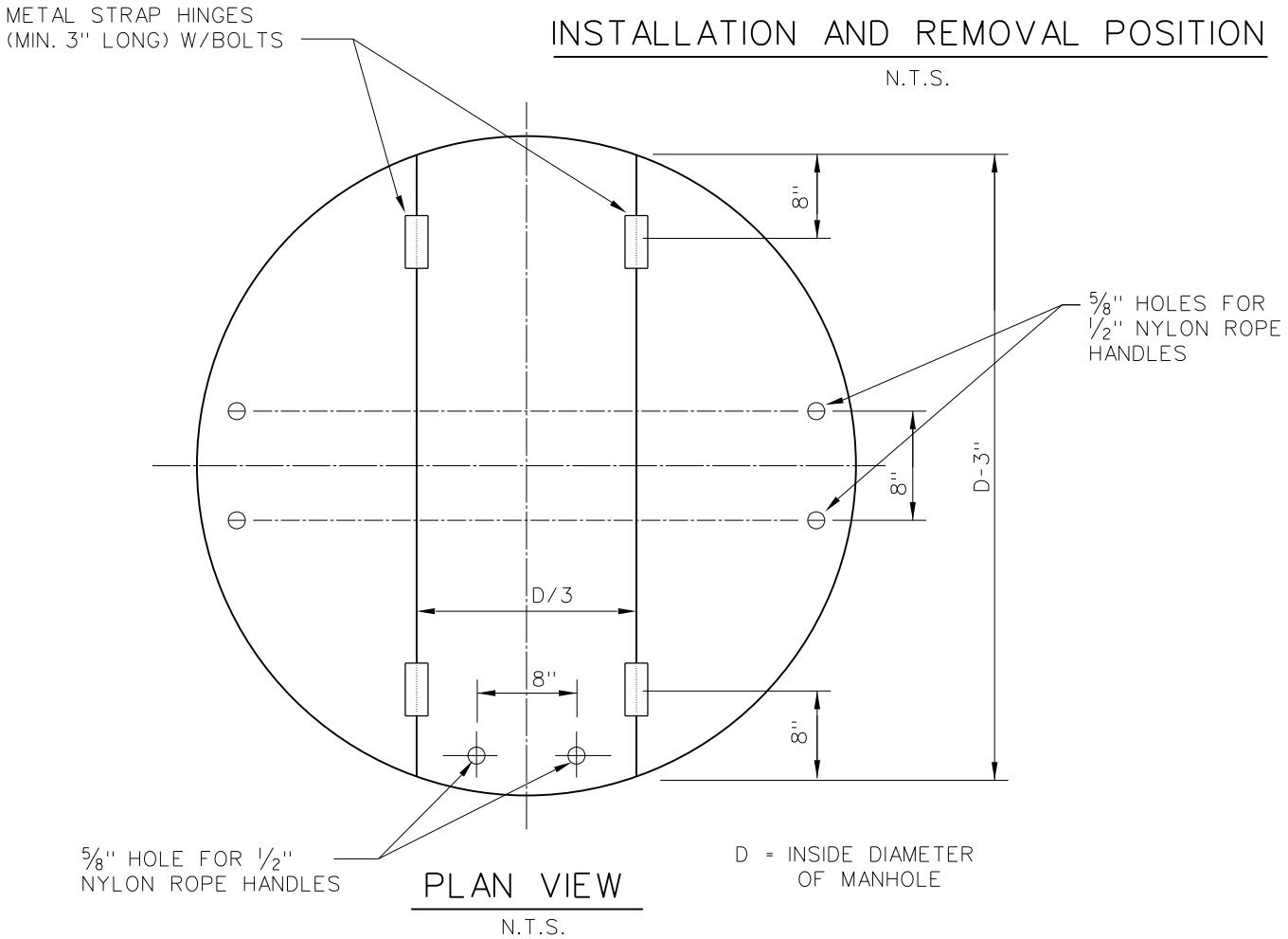
REMOVAL

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.



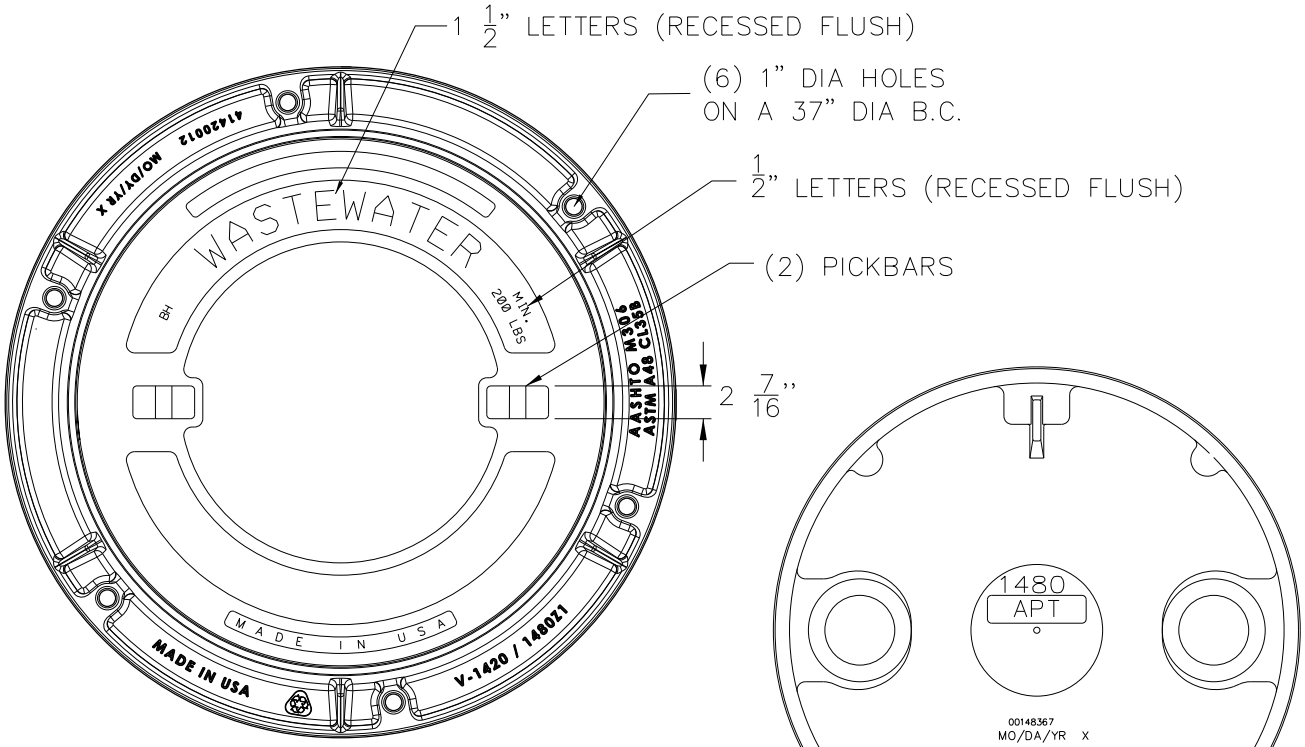
PLAN VIEW

N.T.S.

WASTEWATER MANHOLE FALSE BOTTOM

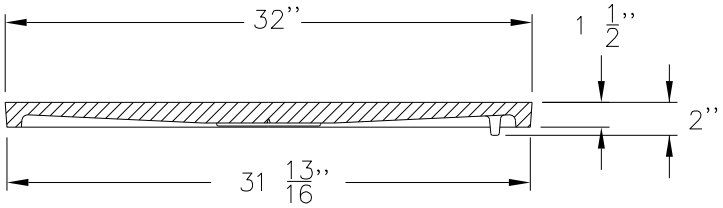
DWU		(Page No.) 311
DATE DEC.2001		

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

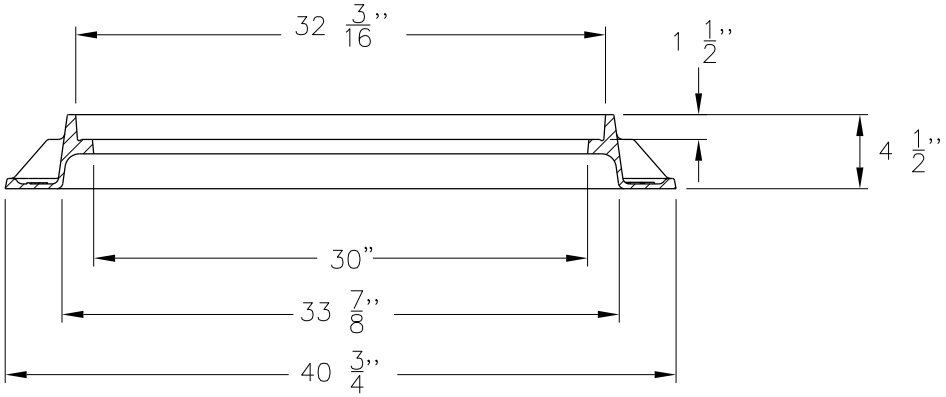


PLAN VIEW

BOTTOM VIEW OF COVER



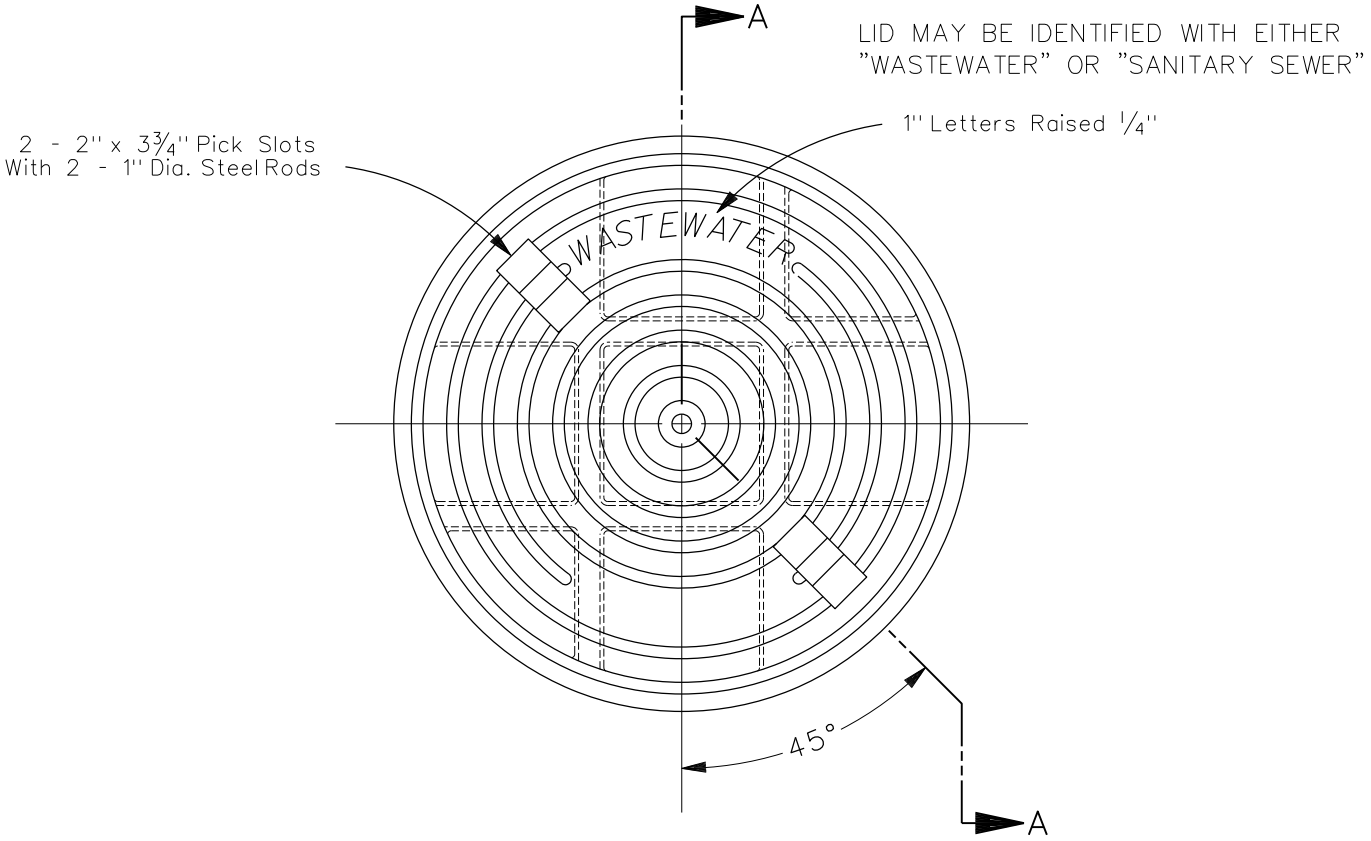
COVER SECTION



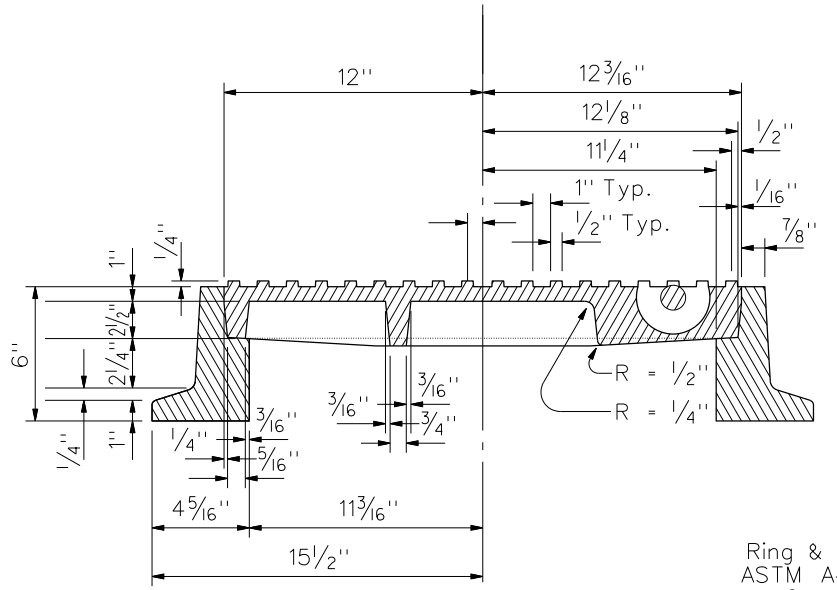
COVER – GRAY IRON
ASTM A48 CL35B
FRAME – GRAY IRON
ASTM A48 CL35B

STANDARD 32" C.I. M.H. FRAME & COVER	WASTEWATER	DWU	(PAGE No.) 312
		DATE FEB.2009	REV 2010.04.01

NOT TO BE USED FOR NEW CONSTRUCTION



PLAN

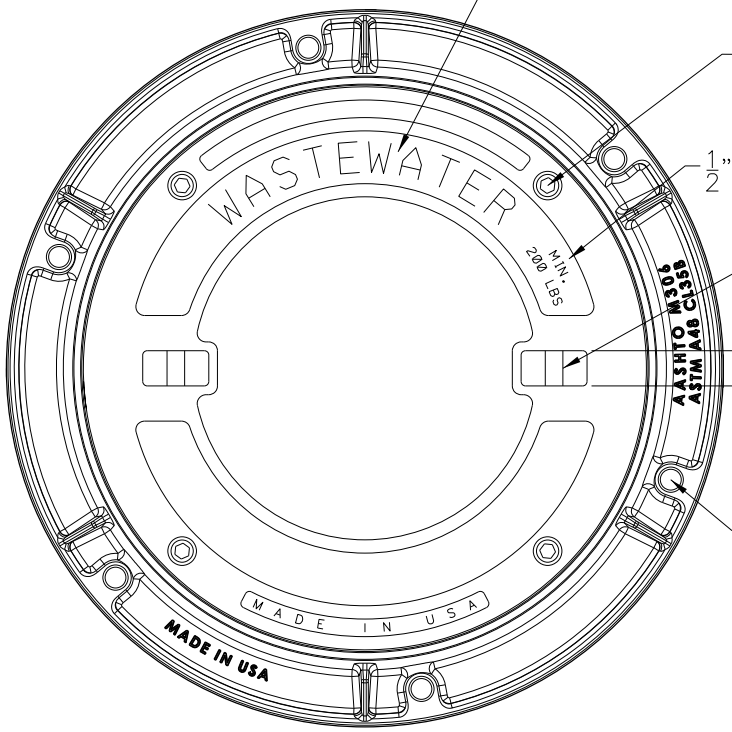


SECTION "A-A"

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	REV 2010.04.01

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



1 $\frac{1}{2}$" LETTERS, TYP (RECESSED FLUSH)

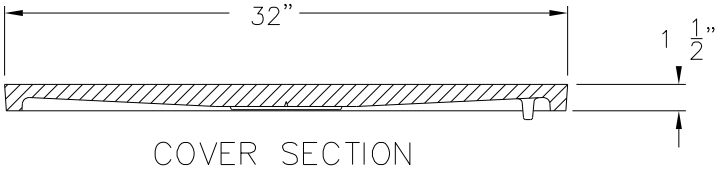
(4) $\frac{1}{2}$"–13 X 2" LG. SS HEX HEAD BOLTS W/ STL AND RUBBER WASHERS

$\frac{1}{2}$" LETTERS (RECESSED FLUSH)

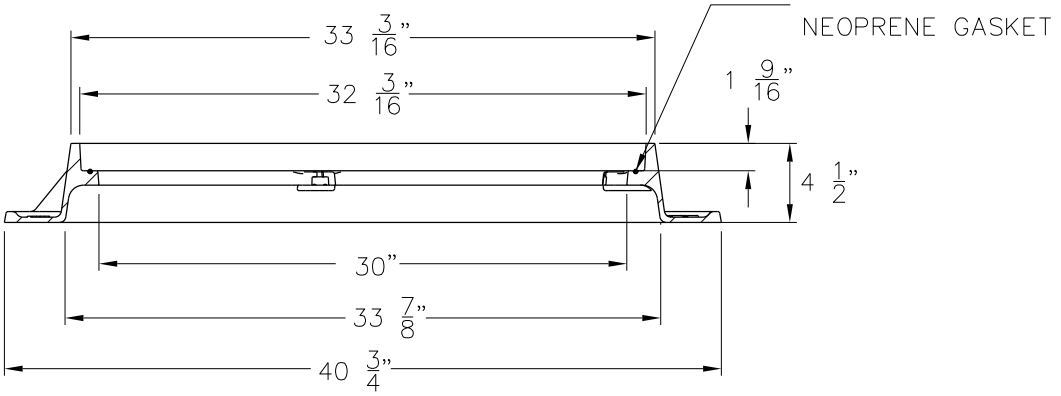
(2) PICKBARS

2 $\frac{3}{16}$"

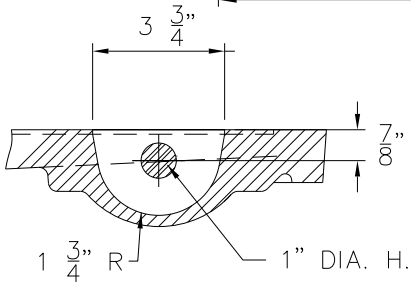
(6) 1 $\frac{1}{8}$" DIA. BOLT HOLES ON 37" DIA. BOLT CIRCLE



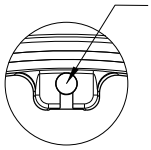
COVER SECTION



FRAME SECTION



PICKBAR DETAIL



EON LOCK™ OR EQUAL
POCKETS FOR $\frac{1}{2}$"–13 SQ NUT
ON A 29 $\frac{3}{8}$" DIA. B.C. (TYP)

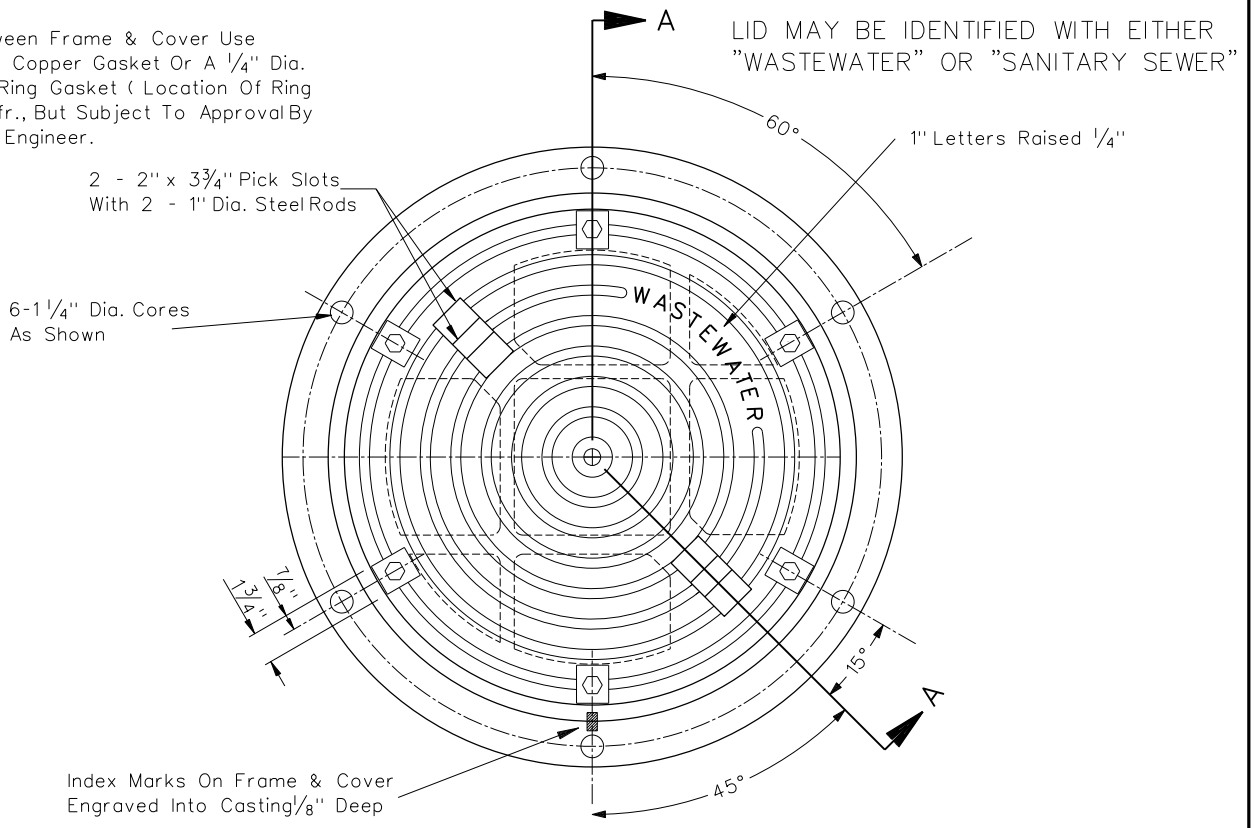
FRAME BOLTING DETAIL

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

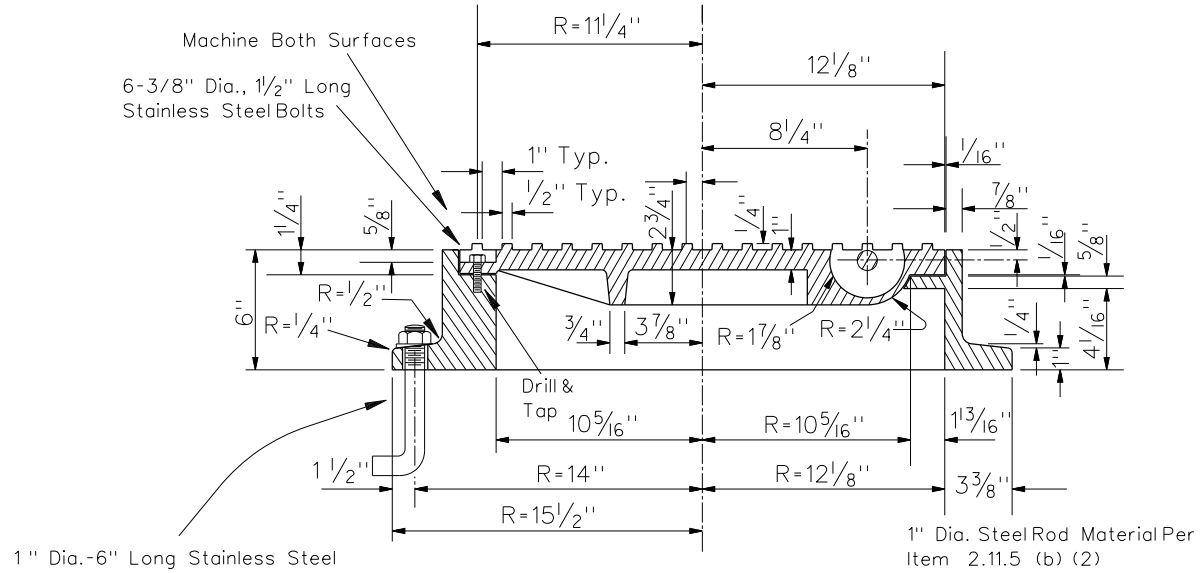
32" PRESSURE TYPE CAST-IRON MH. FRAME & COVER	WASTEWATER	DWU	(PAGE No.) 313
		DATE FEB. 2009	REV 2010.04.01

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



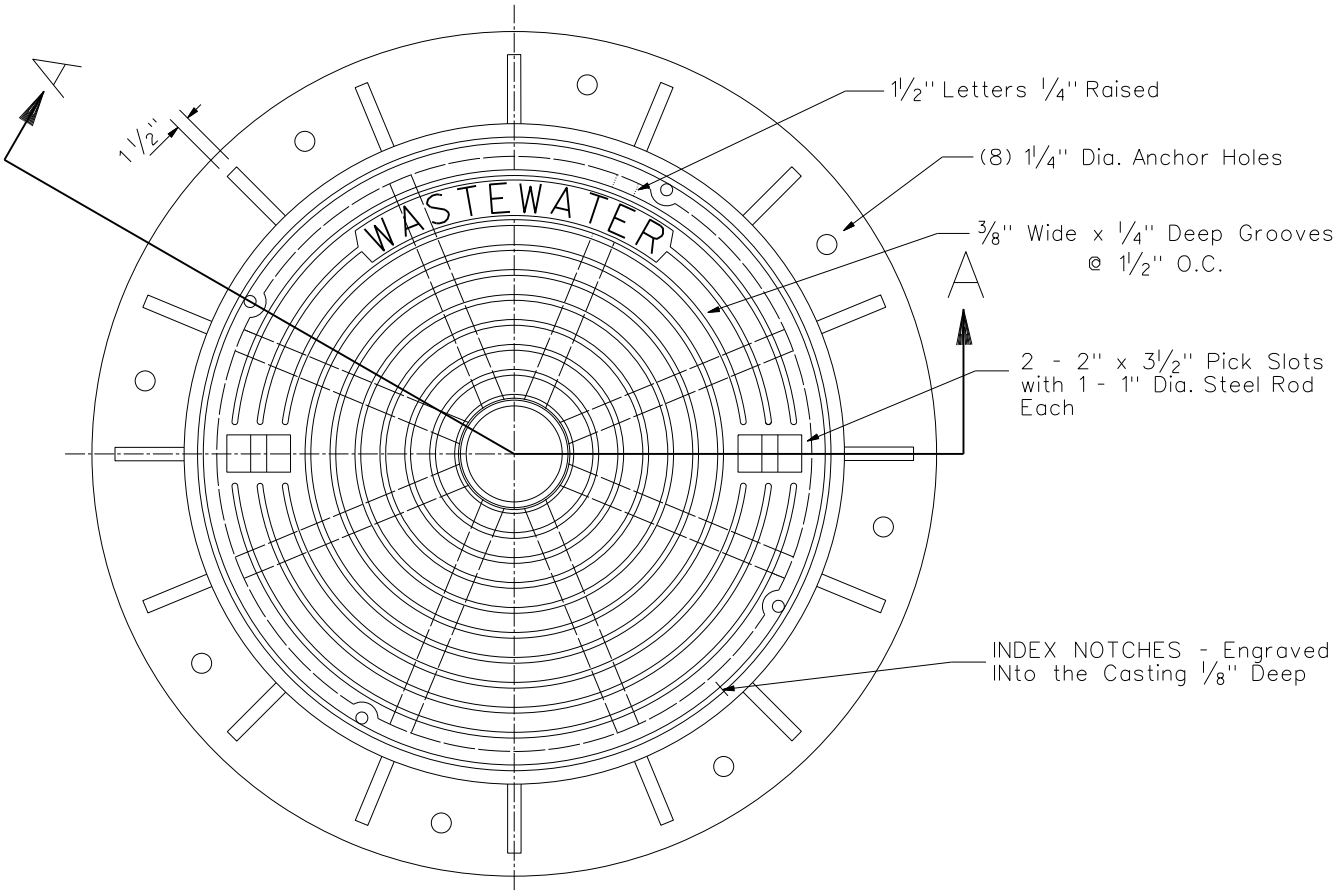
SECTION "A-A"

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

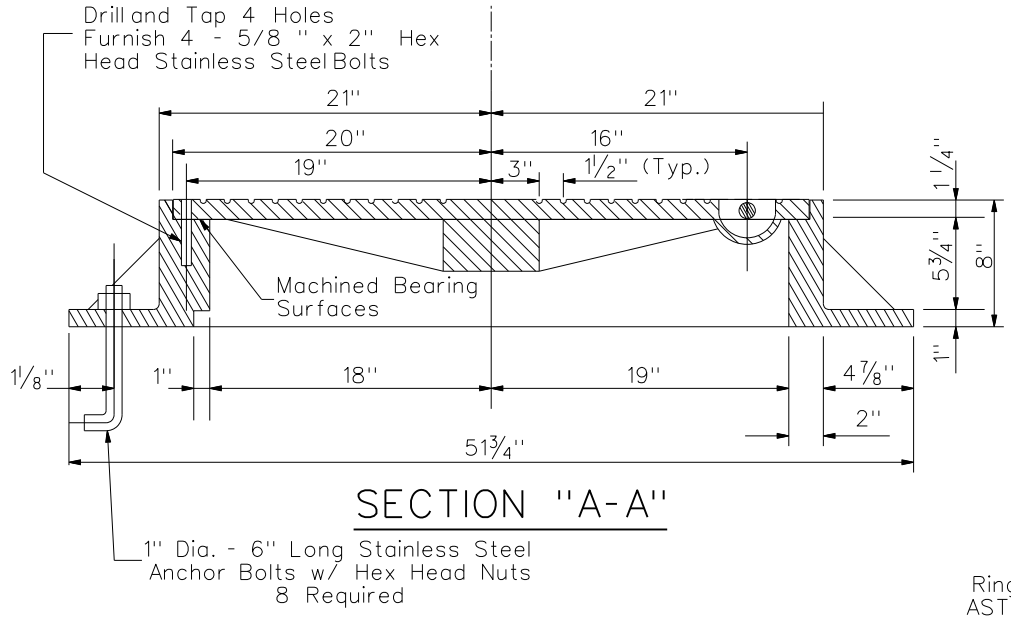
24" PRESSURE TYPE CAST-IRON MH. FRAME & COVER		DWU	(PAGE No.) 313A
		DATE JAN. 2010	REV 2010.04.01

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

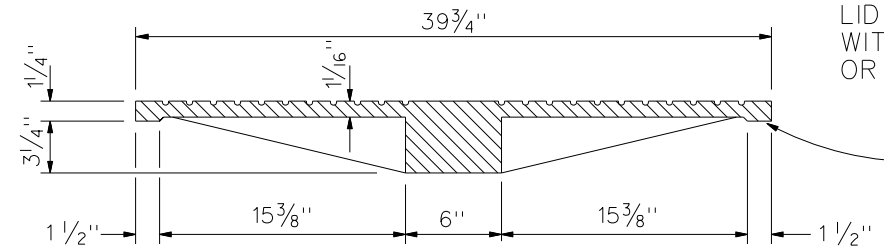


SECTION "A-A"

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

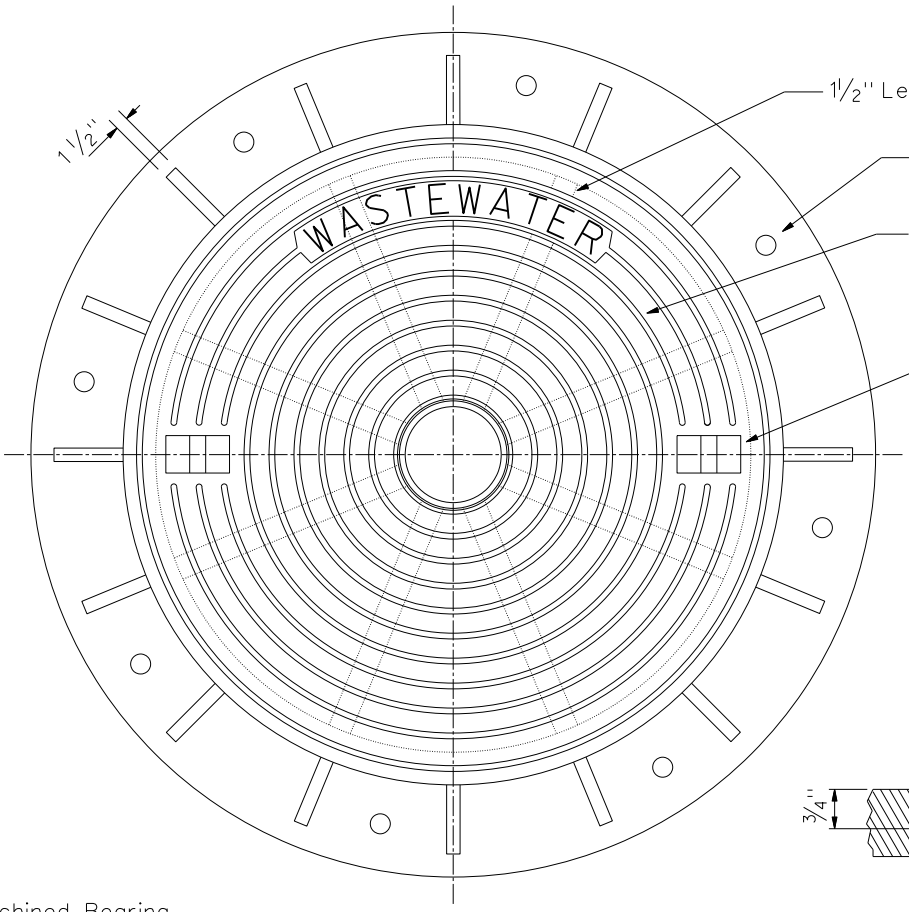
Ring & Cover Material per ASTM A48 Class 35B Min. Gray Iron Castings.

40" PRESSURE TYPE CAST IRON M.H. FRAME & COVER		DWU	(PAGE NO.) 314
		DATE JAN.2010	REV 2010.04.01

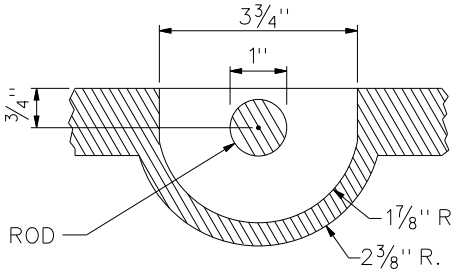


LID MAY BE IDENTIFIED WITH EITHER "WASTEWATER" OR "SANITARY SEWER"

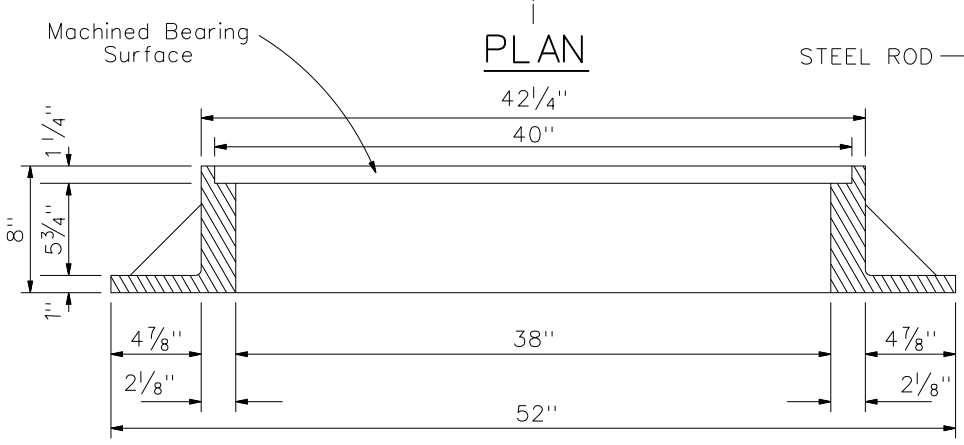
SECTION THRU COVER



PLAN



PICKBAR DETAIL

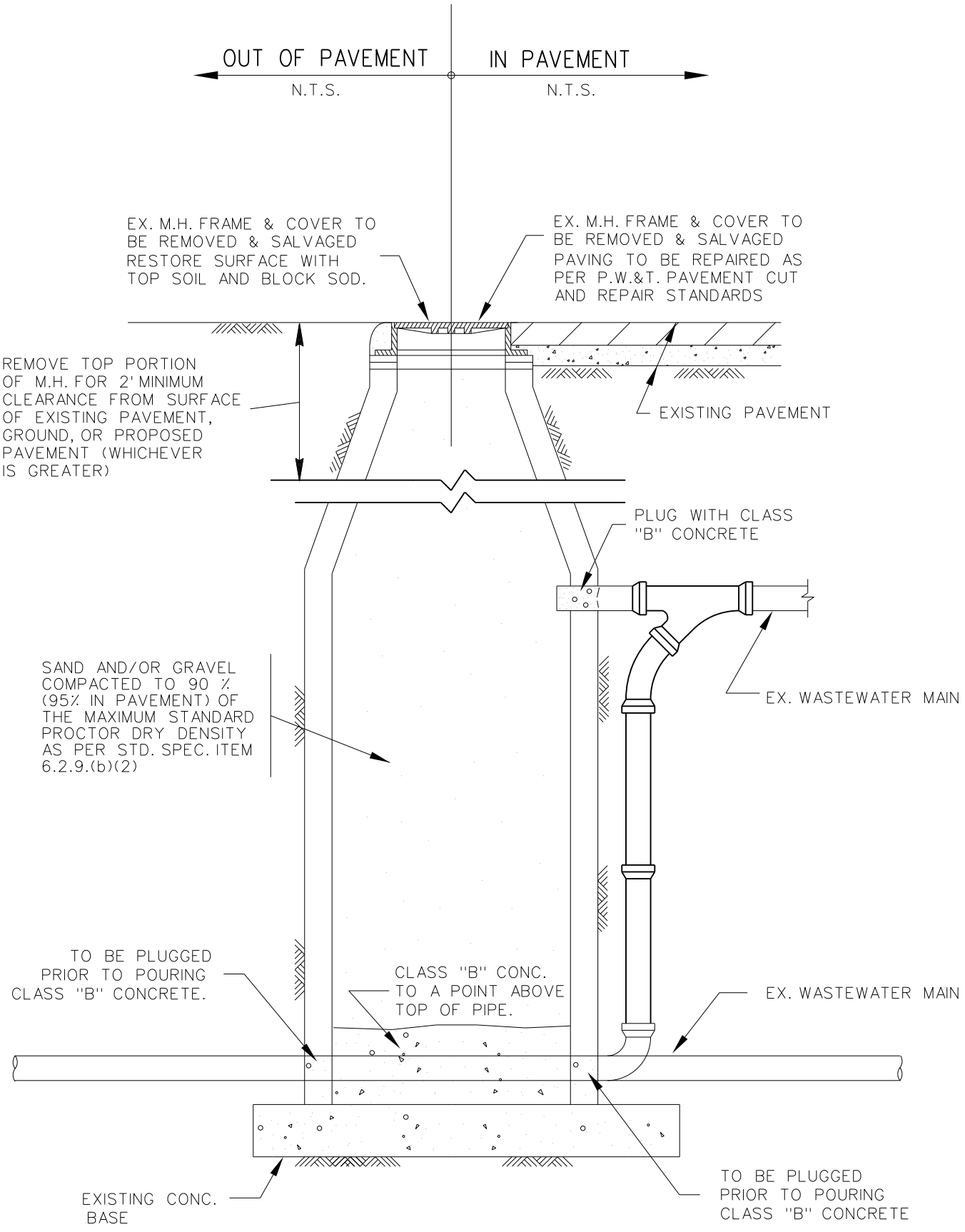


SECTION THRU FRAME

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

STANDARD 40" MANHOLE FRAME AND COVER

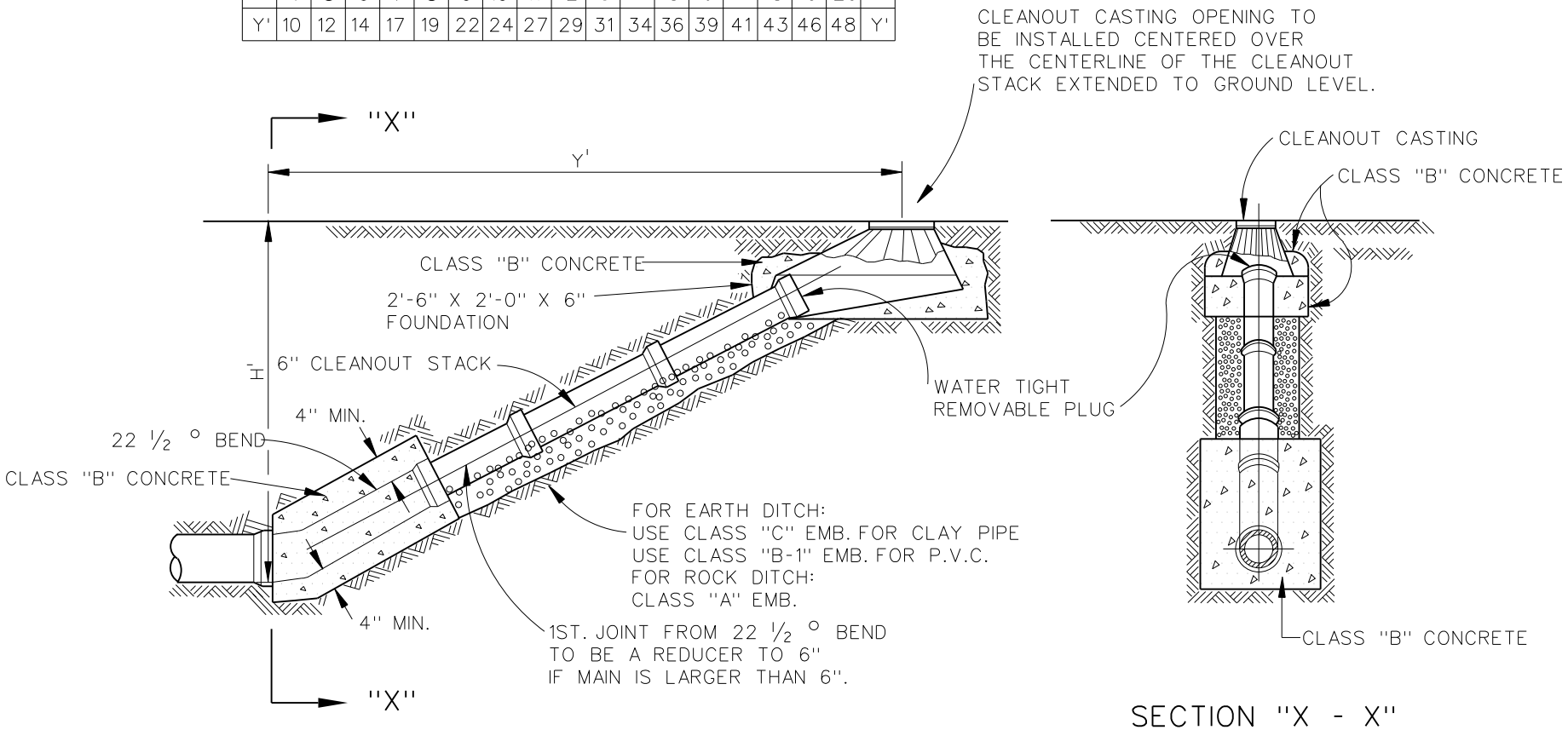
		(PAGE NO.)
DWU		315
DATE		REV
DEC.2001		2010.04.01



ABANDONMENT OF MANHOLE IN OR OUT OF PAVEMENT

	(Page No.)
DWU	316
DATE DEC. 2001	

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.

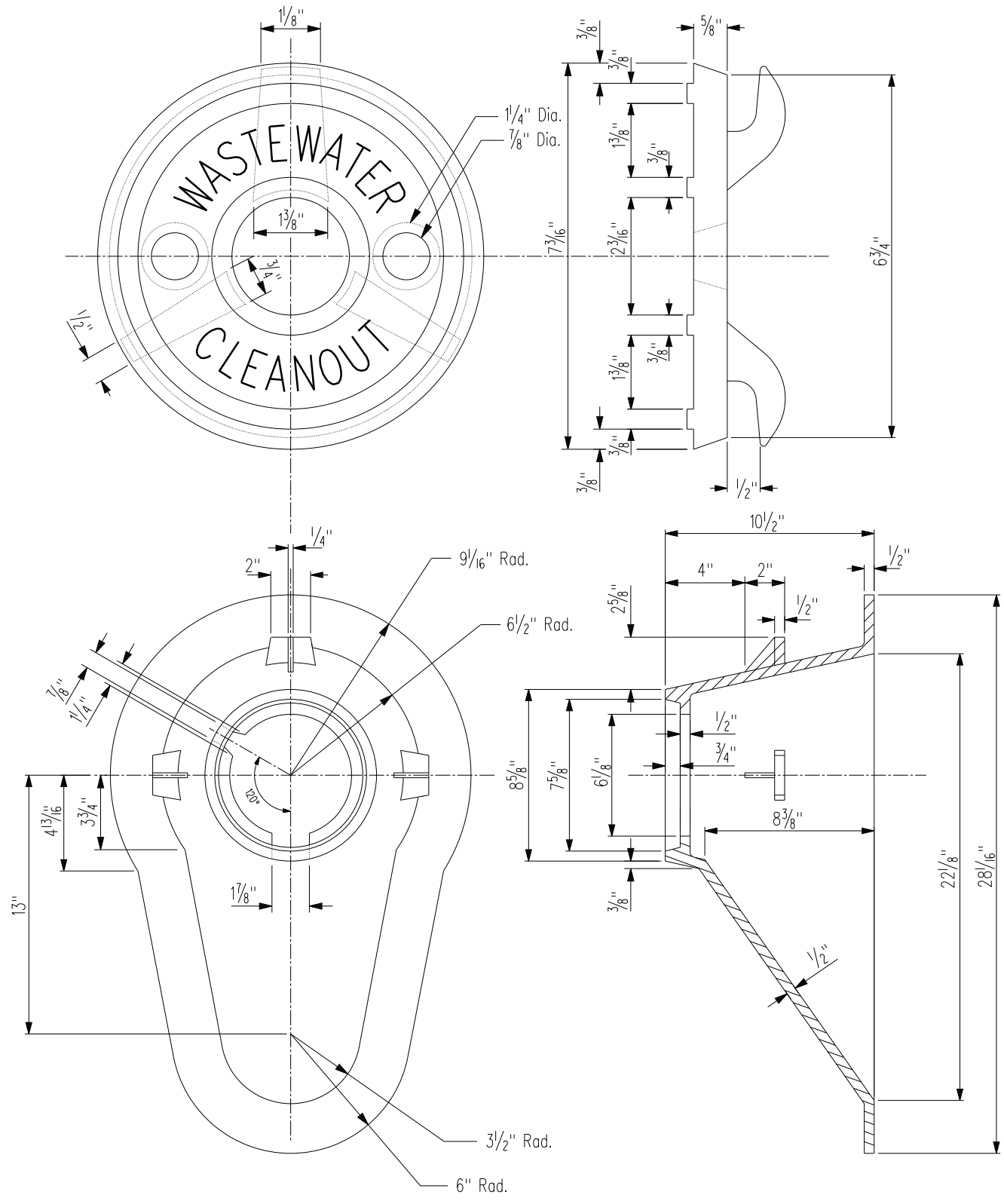
NOTE:
IF CLEANOUT IS PLACED IN ADVANCE OF PAVEMENT PLACE SAND AROUND CLEANOUT CASTING IN LIEU OF CLASS "B" CONCRETE.

WASTEWATER MAIN CLEANOUT

DWU

(Page No.) 317

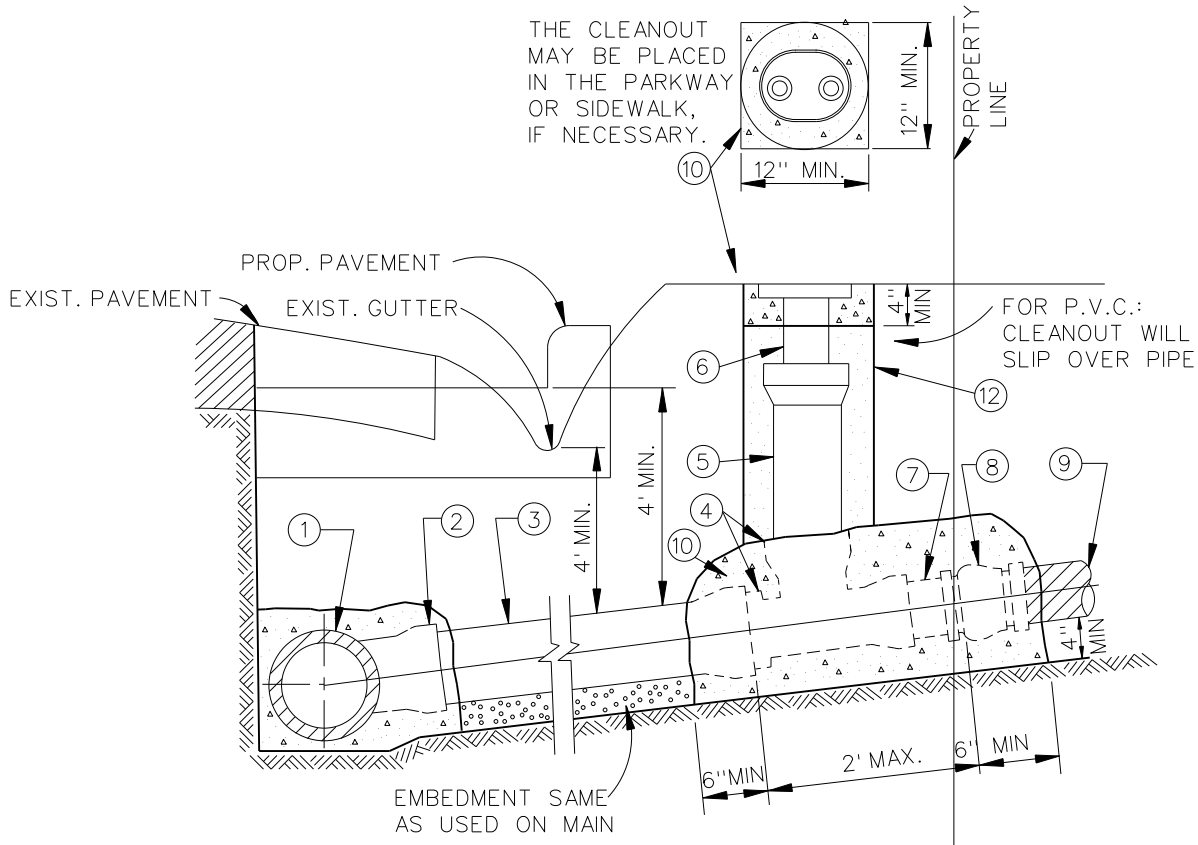
DATE JAN.2001



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 WYE, 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.

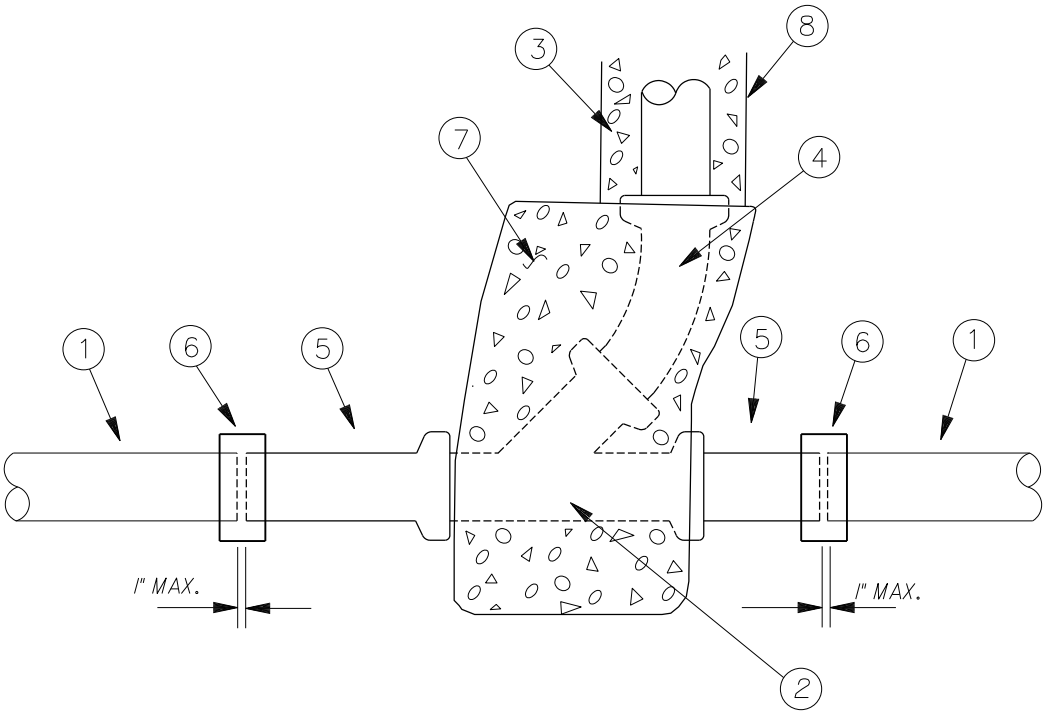
WASTEWATER LATERALS WITH CLEANOUT

DWU

DATE
JAN. 2010

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.



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.

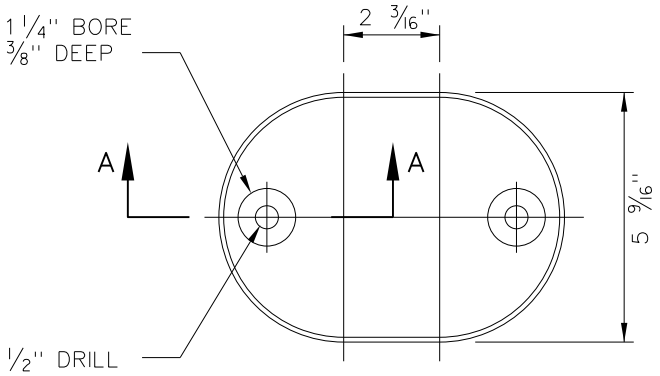
C) CONNECTIONS TO THE EXISTING MAIN SHALL BE MADE USING A RUBBER SLEEVE COUPLING WITH STAINLESS STEEL BAND CLAMPS. THE CLAMPS SHALL BE TIGHTENED TO THE TORQUE RECOMMENDED BY THE MANUFACTURER.

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

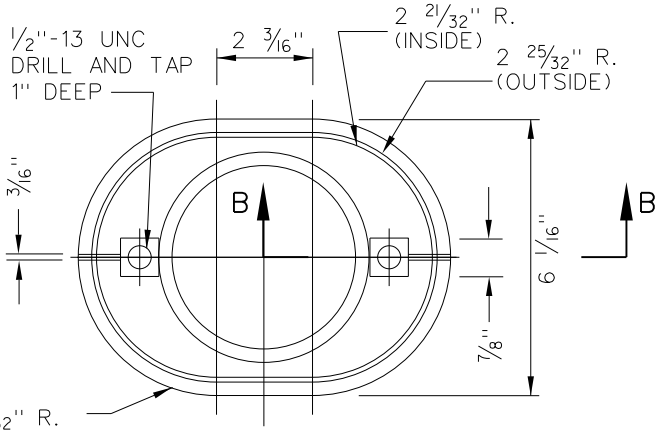
E) RUBBER SLEEVE COUPLINGS SHALL BE USED FOR CLAY TO CLAY OR CLAY TO CONCRETE CONNECTIONS ONLY.

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

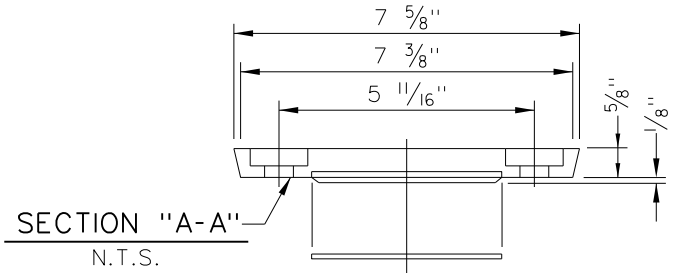
WASTEWATER LATERAL WYE CONNECTION TO THE EXISTING MAINLINE		DWU	(PAGE No.) 320
		DATE JAN. 2010	



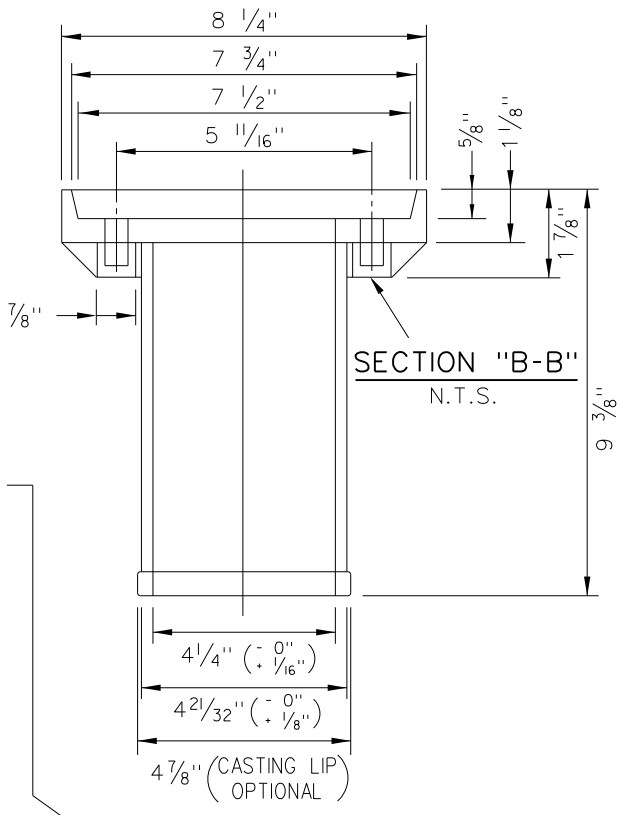
COVER
N.T.S.



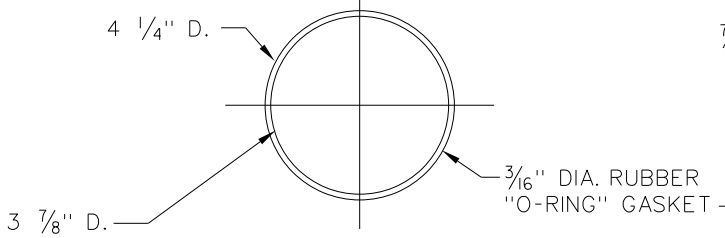
CLEANOUT FRAME TOP
N.T.S.

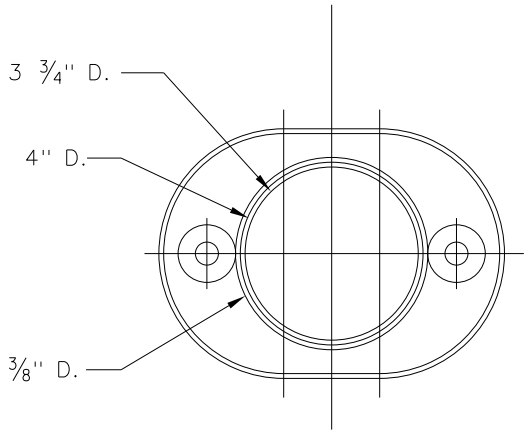


SECTION "A-A"
N.T.S.

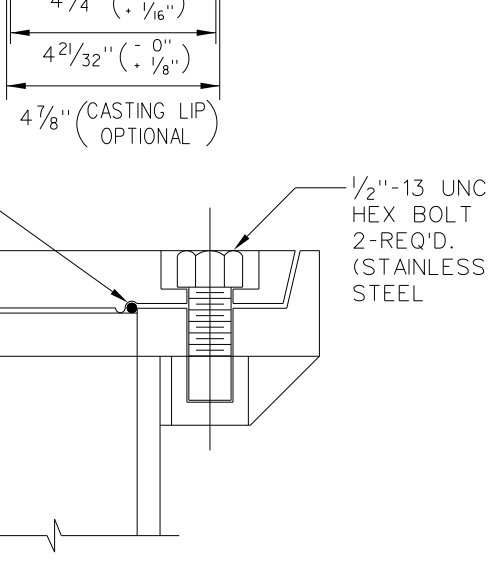


SECTION "B-B"
N.T.S.





CLEANOUT FRAME BOTTOM
N.T.S.



ASSEMBLY VIEW
N.T.S.

NOTES:

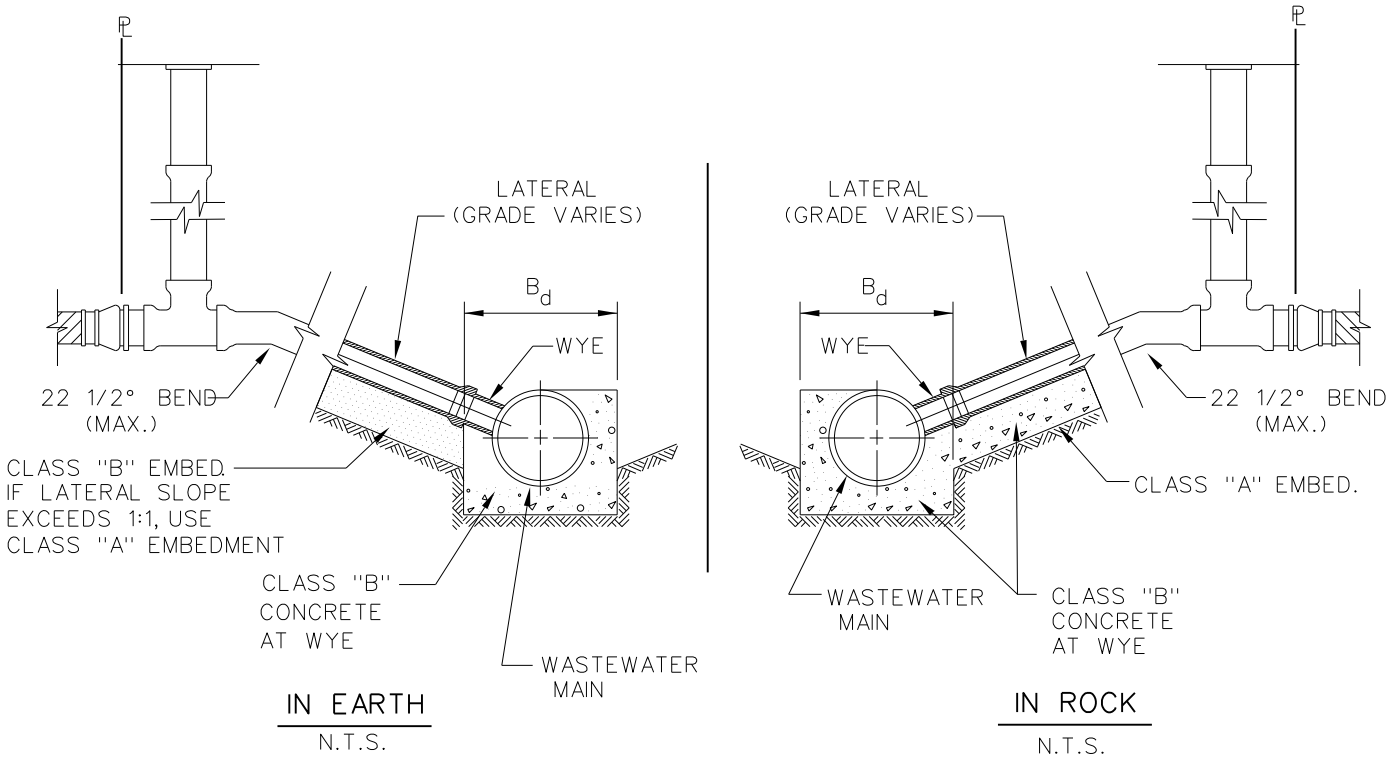
1. THE WORDS "WASTEWATER LATERAL CLEANOUT" SHALL BE CAST INTO TOP OF COVER.
2. MATERIALS TO BE CAST IRON, P.V.C. OR ABS PLASTIC.

WASTEWATER LATERAL CLEANOUT FRAME & COVER

DWU

(Page No.) 321

DATE JUNE 2002



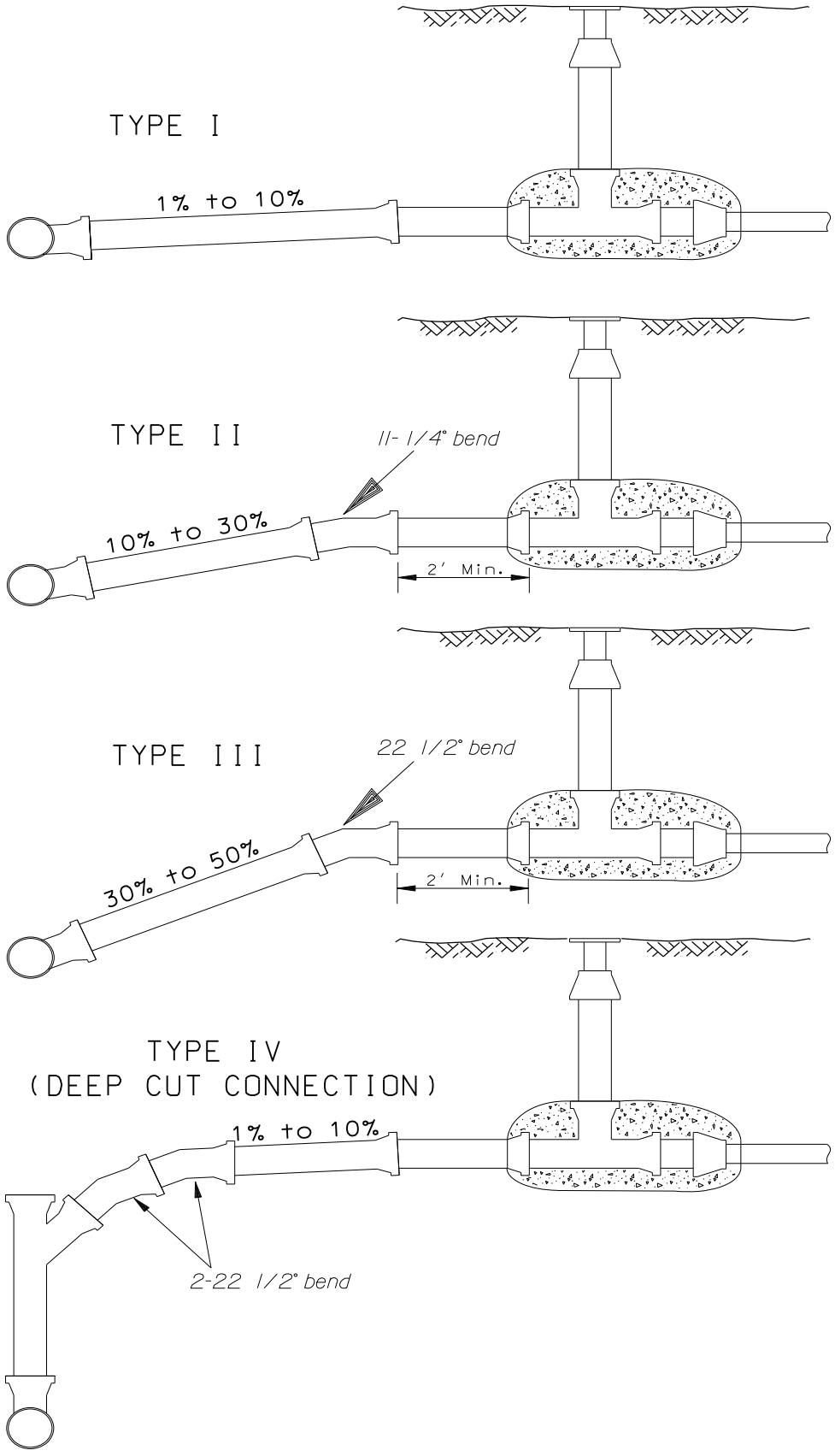
TRENCH WITH SLOPING SIDES

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.

WASTEWATER LATERAL CONNECTIONS IN EARTH & IN ROCK		DWU	(Page No.) 322
		DATE NOV. '96	



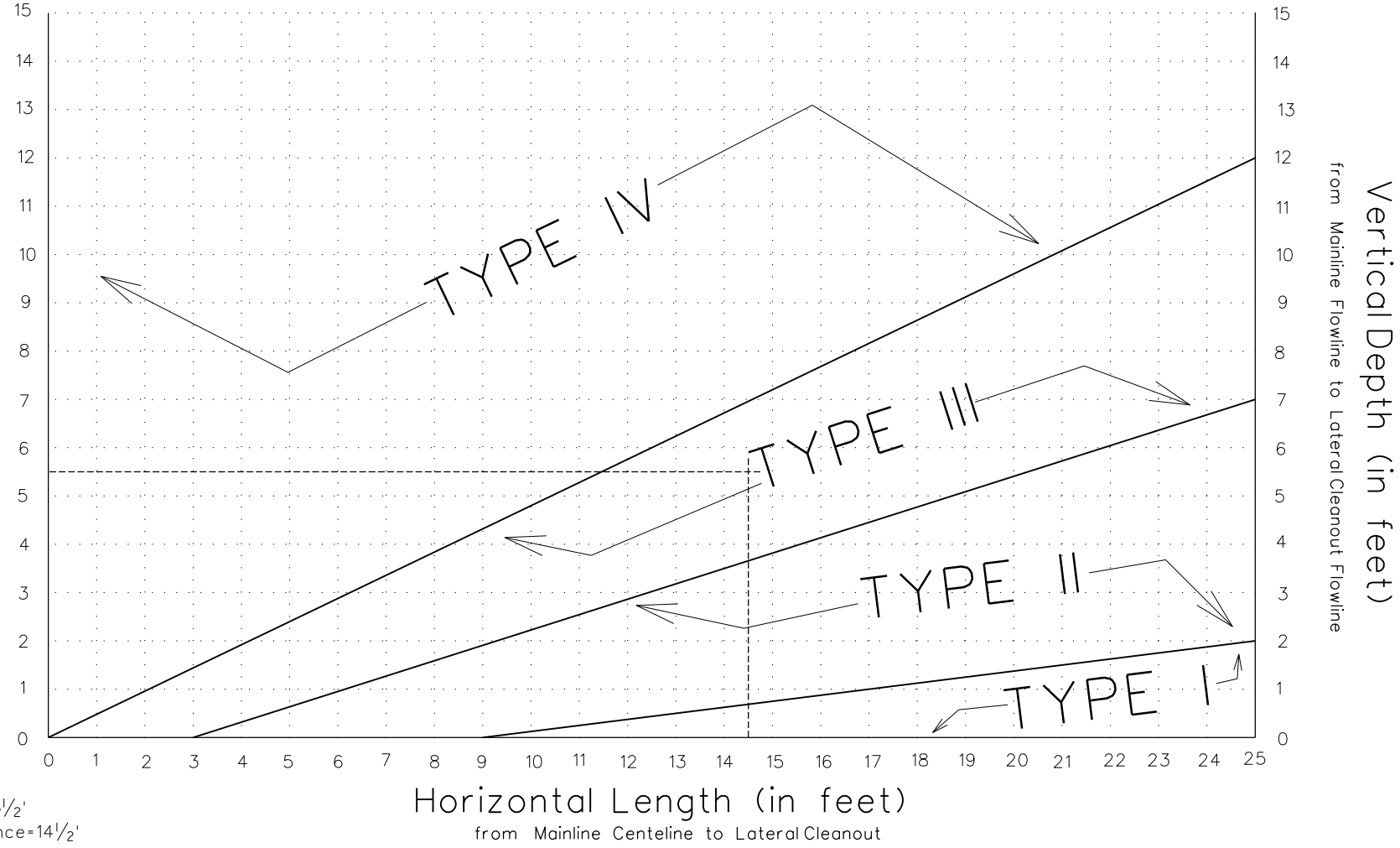
REFER TO PAGES 324 & 325

LATERALS TYPES

DWU

(PAGE NO.) 323

DATE JAN. 2010



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

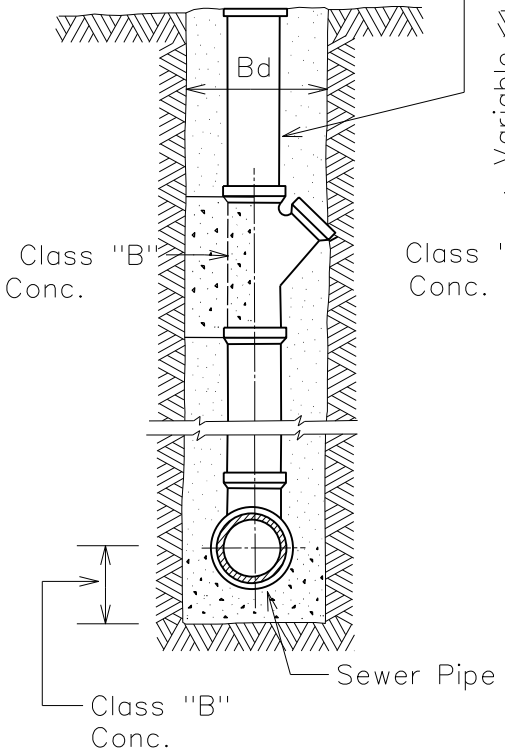
REFER TO PAGES 323 & 325

LATERAL APPLICATION SCHEDULE

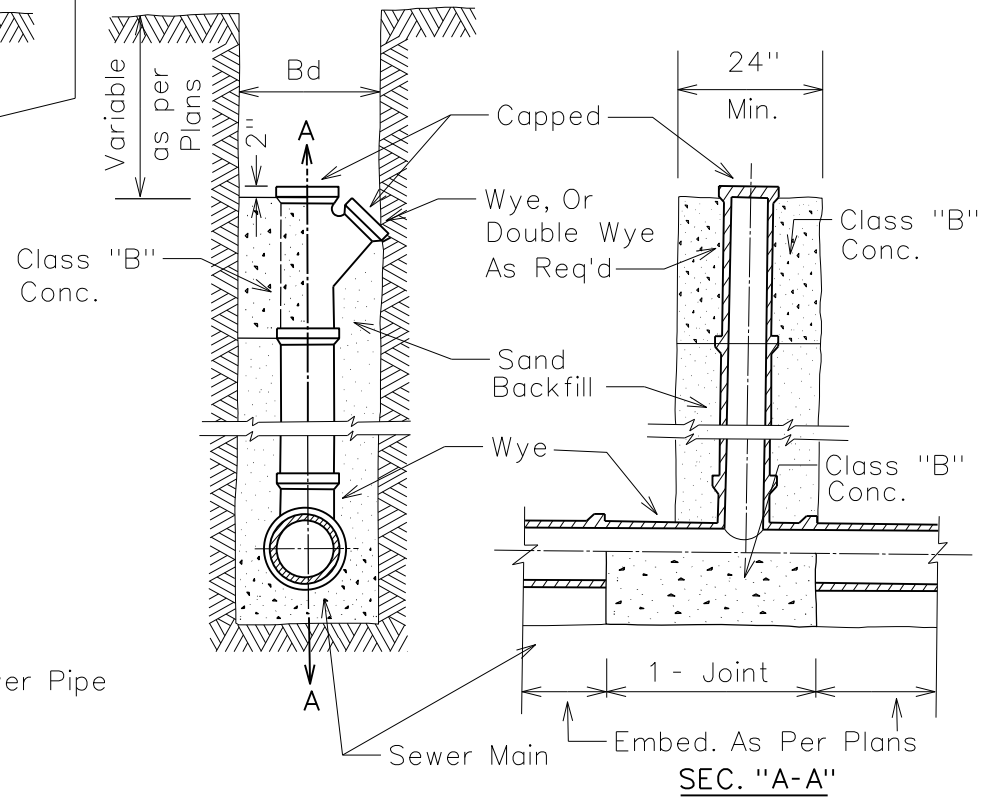
DWU		(Page No.) 324
DATE DEC. 2010		

Note! Clean out as per
Page 319 to Ground Surface

DEEP CUT CONNECTION
W / C. O.



DEEP CUT CONNECTION

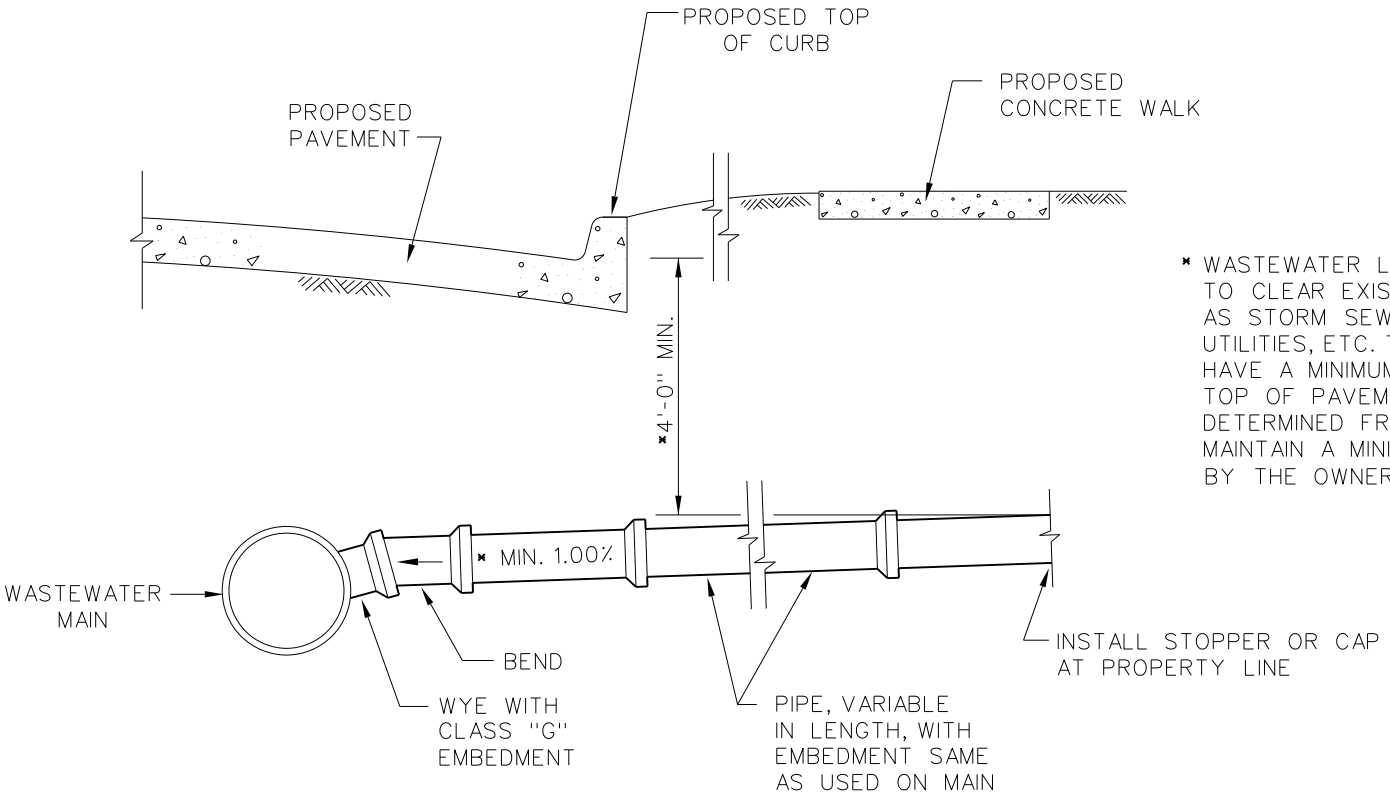


SEC. "A-A"

Refer To Pages 319, 321, 322 & 324

DEEP - CUT CONNECTION

DWU	(PAGE NO.) 325
DATE JAN. 2010	



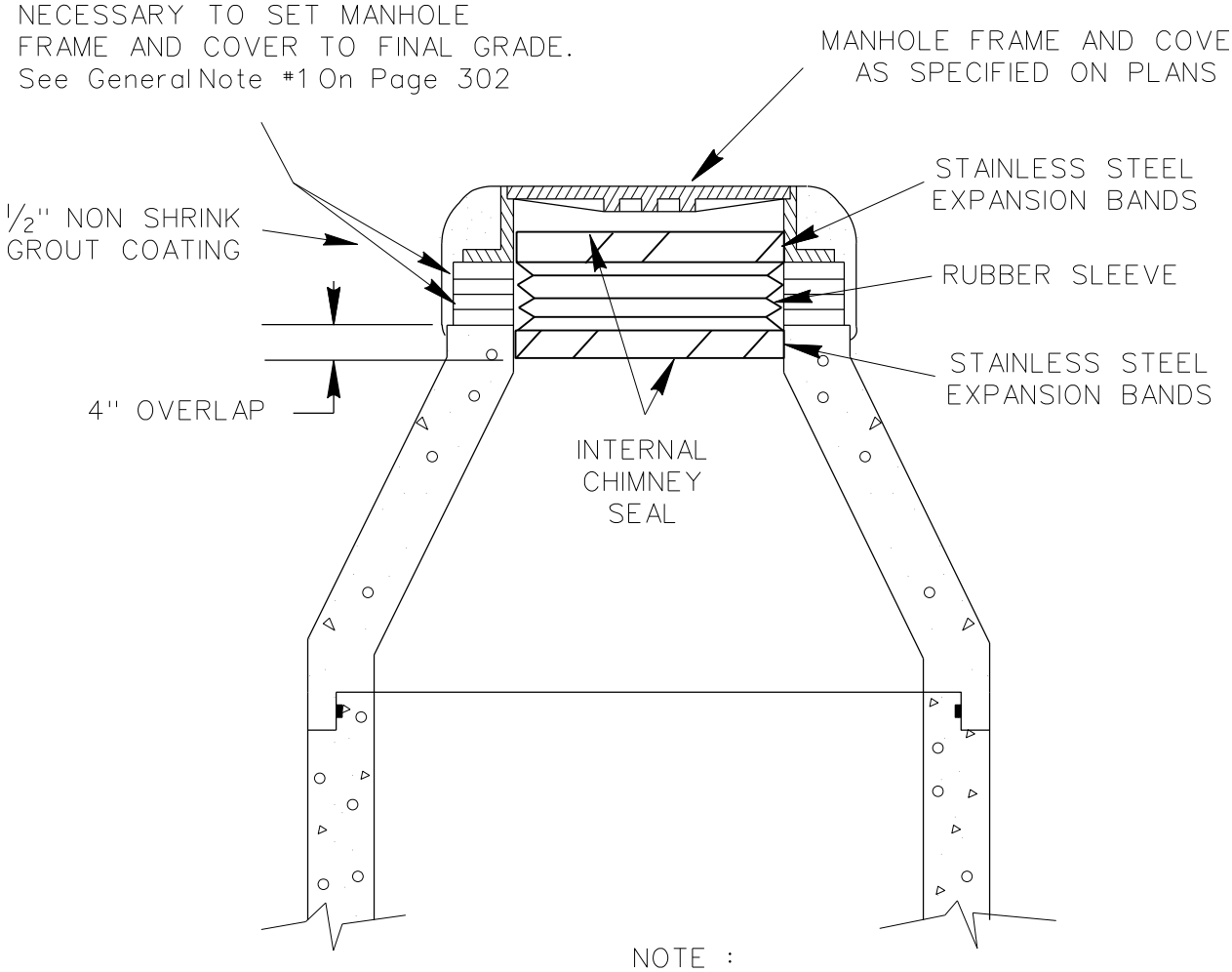
* WASTEWATER LATERALS ARE TO BE CONSTRUCTED TO CLEAR EXISTING AND PROPOSED FACILITIES, SUCH AS STORM SEWER MAINS, RETAINING WALLS, OTHER UTILITIES, ETC. THE WASTEWATER LATERAL SHALL HAVE A MINIMUM COVER OF 4'-0" BELOW THE PROPOSED TOP OF PAVEMENT CURB GRADE AT THE PROPERTY LINE, DETERMINED FROM PAVING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

WASTEWATER LATERAL STUBOUT

N.T.S.

WASTEWATER LATERAL STUBOUT		DWU	(Page No.) 326
		DATE JAN '98	

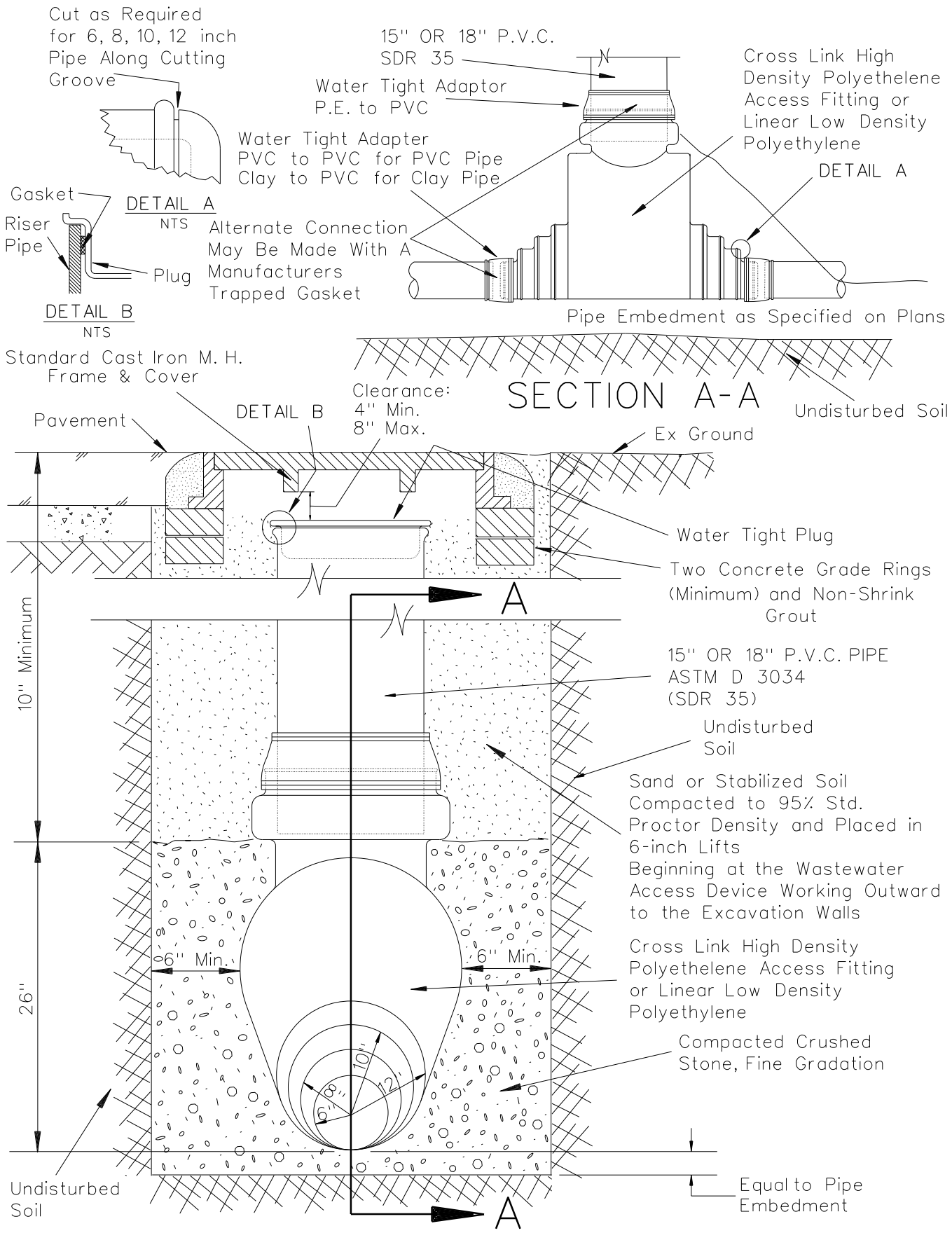
USE PRECAST CONCRETE GRADE RINGS AND NON SHRINK GROUT AS NECESSARY TO SET MANHOLE FRAME AND COVER TO FINAL GRADE. See General Note #1 On Page 302



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

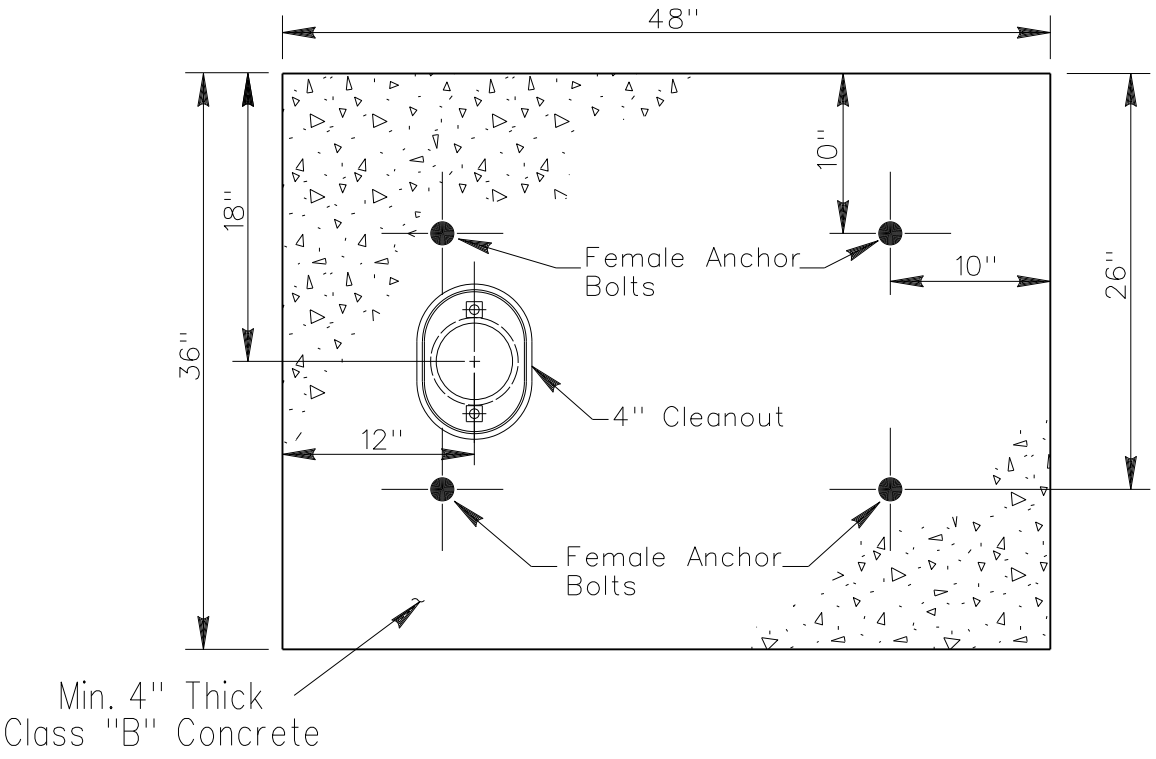
WASTEWATER MANHOLE INTERNAL SEAL		DWU	(Page No.) 327
		DATE MARCH 2001	



WASTEWATER ACCESS DEVICE

DWU	(Page No.) 328
DATE JAN. 2010	

CONCRETE PLATFORM DETAIL



SAMPLE SITE CONSTRUCTION NOTES

A. The 4'X3' 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 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.

* Any Question Concerning The Installation Of The Sample Platform Should Be Addressed To: Pretreatment & Laboratory Services.

WASTEWATER SAMPLE SITE - CONCRETE PLATFORM DETAIL		DWU	(PAGE NO.) 329
		DATE DEC.2001	

PART 4

(Series 400)

WATER & WASTEWATER ADJUSTMENTS

City of Dallas
Water Utilities Department

PART 4
WATER AND WASTEWATER ADJUSTMENTS

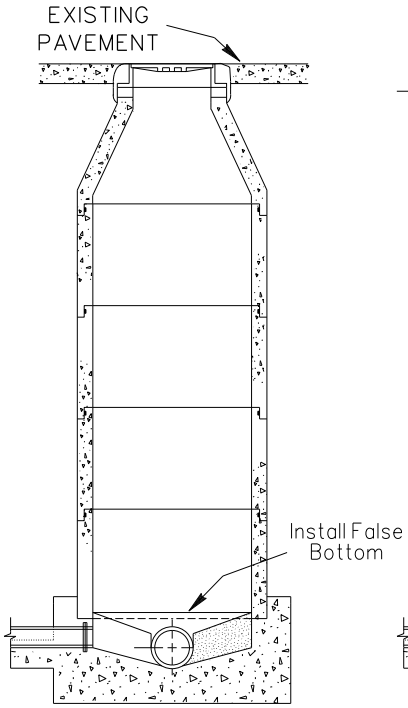


FIGURE 1

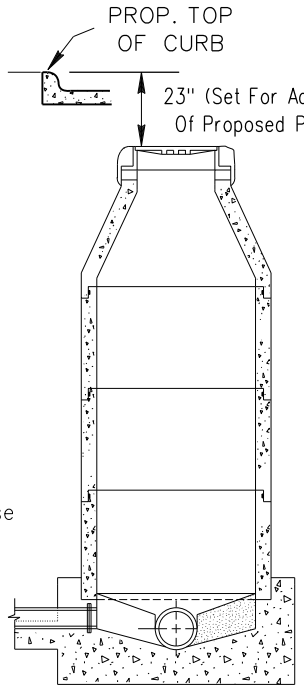


FIGURE 2
PRE-GRADING
(ALTER)

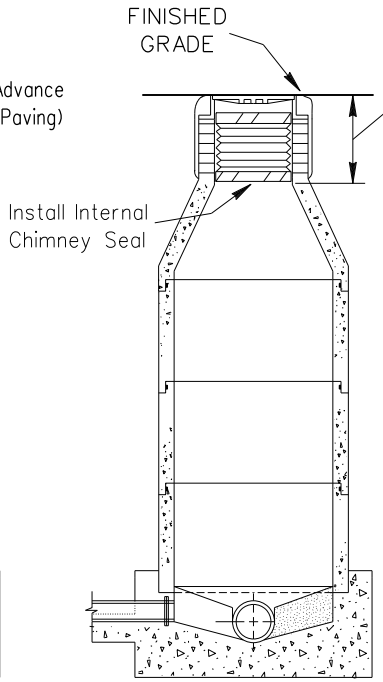


FIGURE 3
PRE-PAVING
(ADJUST)

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	

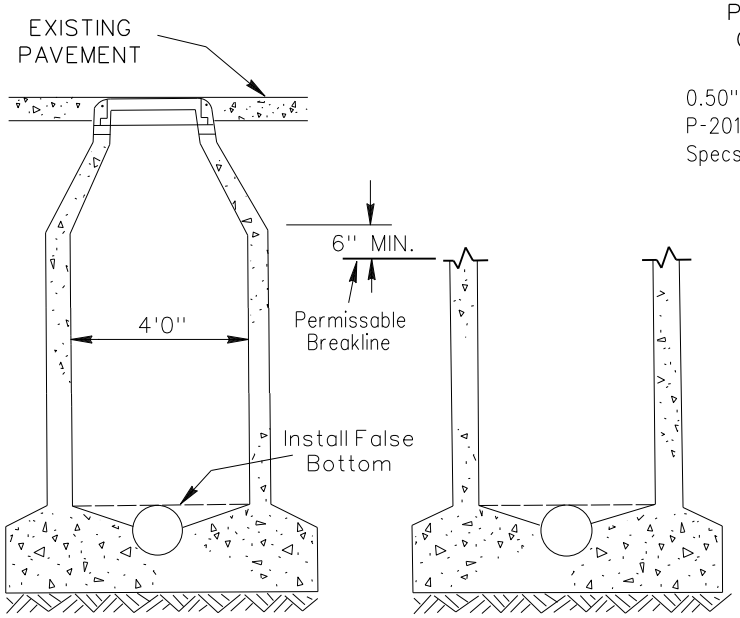


FIG. 1

FIG. 2

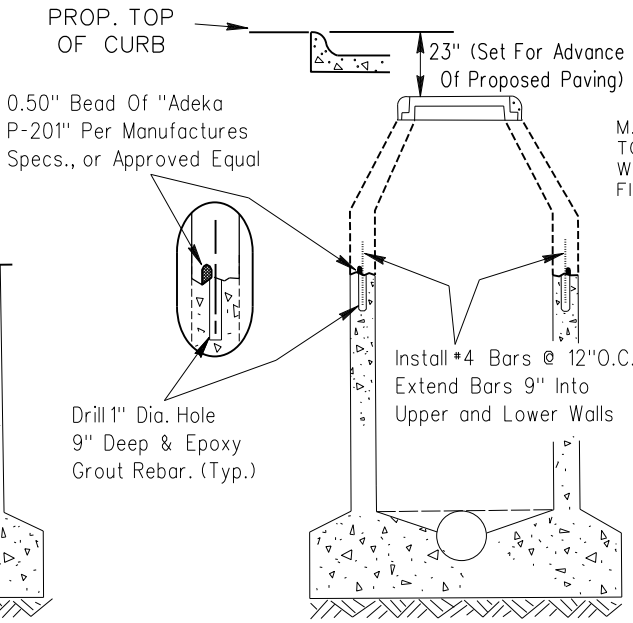


FIG. 3 PRE-GRADING

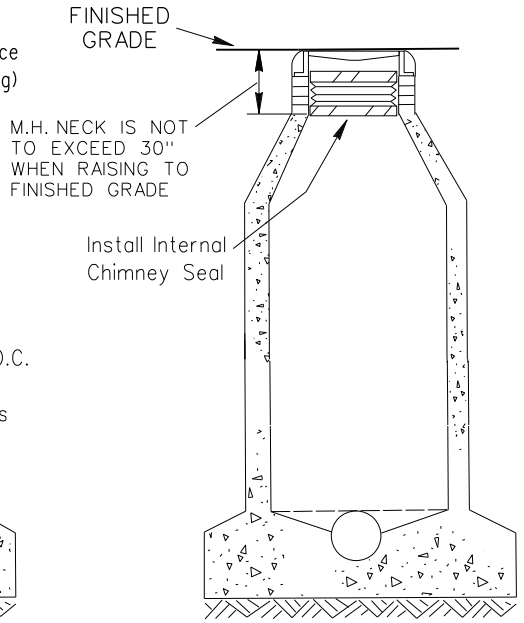


FIG. 4 PRE-PAVING

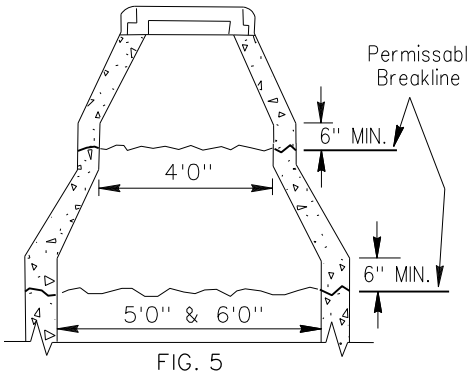


FIG. 5

FIGURE 1 EXISTING MANHOLE

1. Install a false bottom in the manhole.
2. Remove 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.

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 the salvaged ring and cover on top of new section with concrete mortar.

FIGURE 4 PRE-PAVING

5. Remove the salvaged ring and cover and mortar.
6. Use precast concrete grade rings 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.
7. Set the salvaged 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.

ADJUSTMENT OF STANDARD CAST-IN-PLACE MANHOLE		DWU	(Page No.) 402
		DATE DEC.2001	

REFER TO PAGE 305--WASTEWATER MANHOLE FIBERGLASS

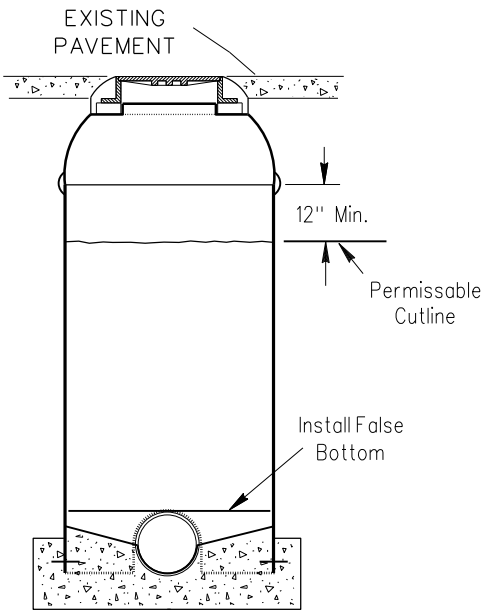


FIGURE 1

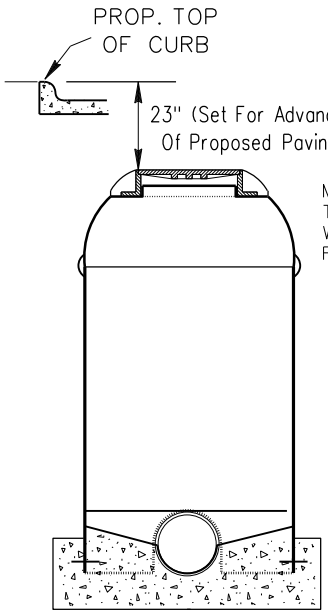


FIGURE 2
PRE-GRADING

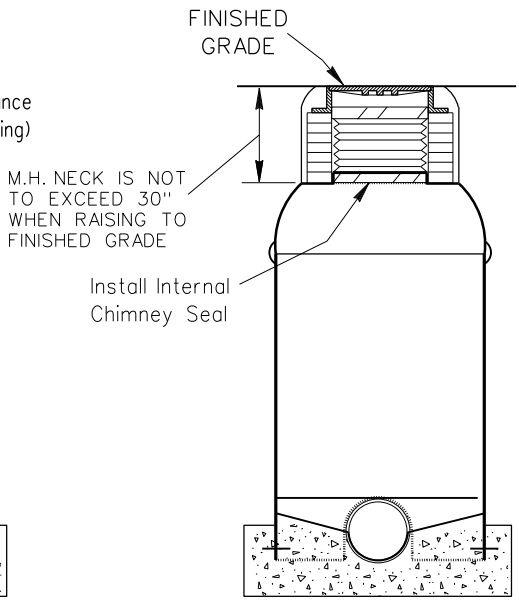


FIGURE 3
PRE-PAVING

FIGURE 1 EXISTING MANHOLE

1. Install a false bottom in the manhole.
2. Remove 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 City.
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. Reset the salvaged ring and cover on the cone section with concrete mortar.

FIGURE 3 PRE-PAVING

7. Remove the salvaged ring and cover and mortar.
8. 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.
9. Set the salvaged 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.

ADJUSTMENT OF FIBERGLASS MANHOLE		DWU	(PAGE NO.) 403
		DATE DEC.2001	

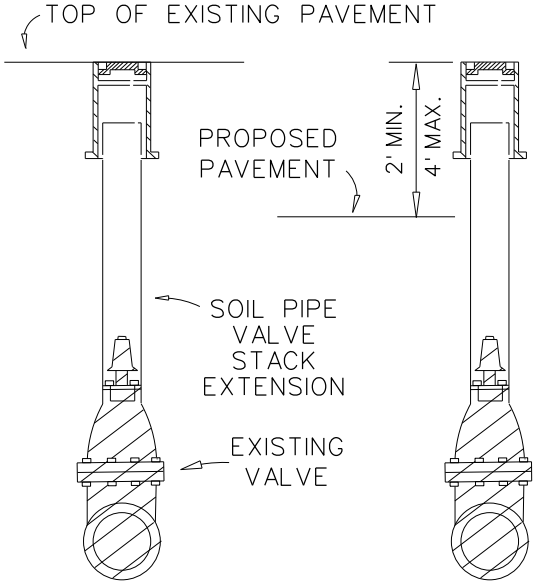


FIG. 1

FIG. 2

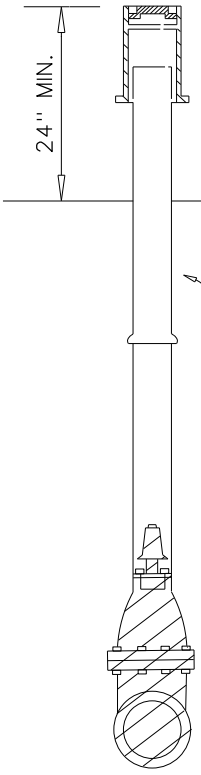


FIG. 3

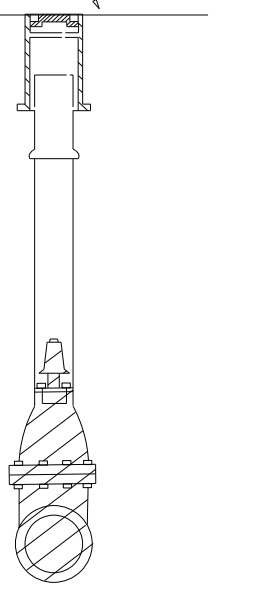


FIG. 4

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.

ADJUSTMENT OF VALVE STACK		DWU	(PAGE NO.) 404
		DATE JAN. 2010	

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

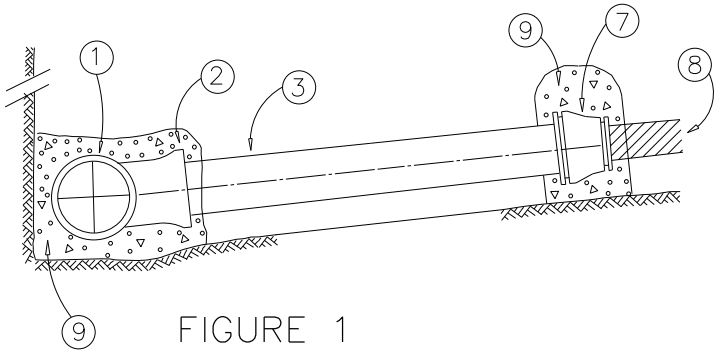


FIGURE 1

FIGURE 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.

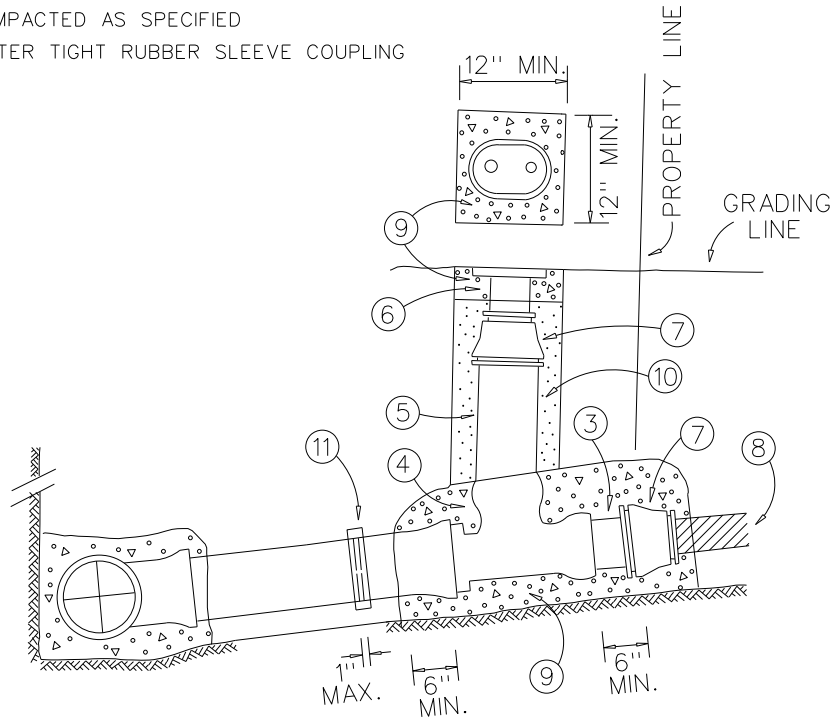


FIGURE 2

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	

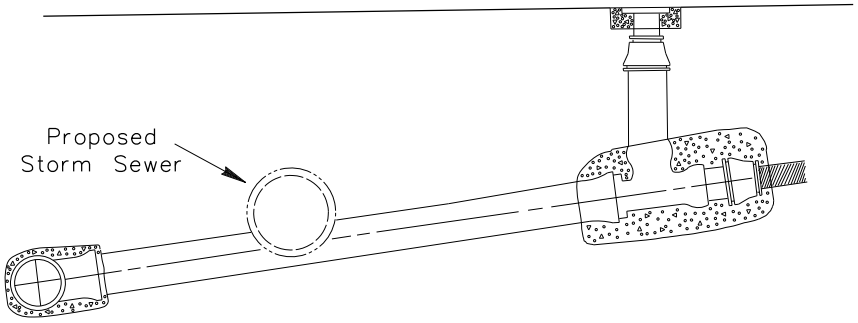


FIGURE 1

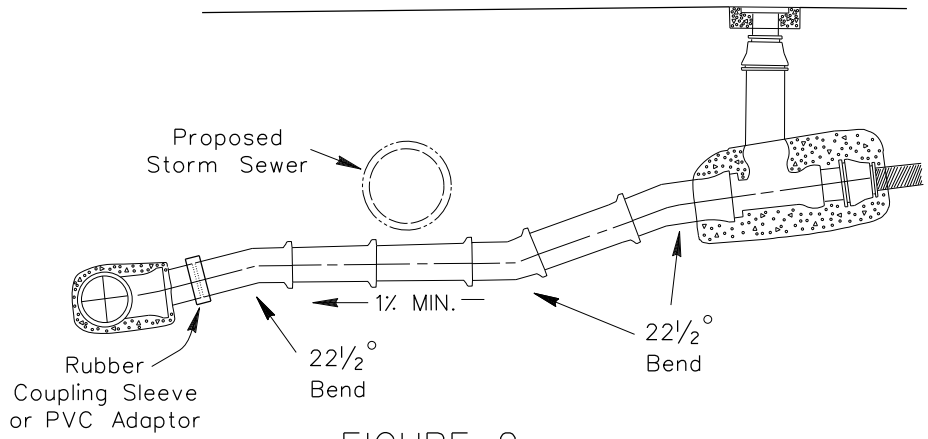


FIGURE 2

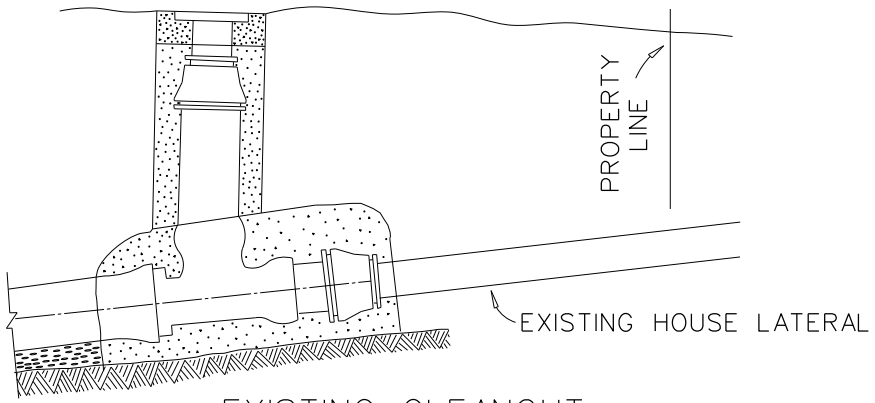
FIGURE 1 EXISTING LATERAL

1. Conflict with a proposed utility shown.

FIGURE 2 PRE-PAVING

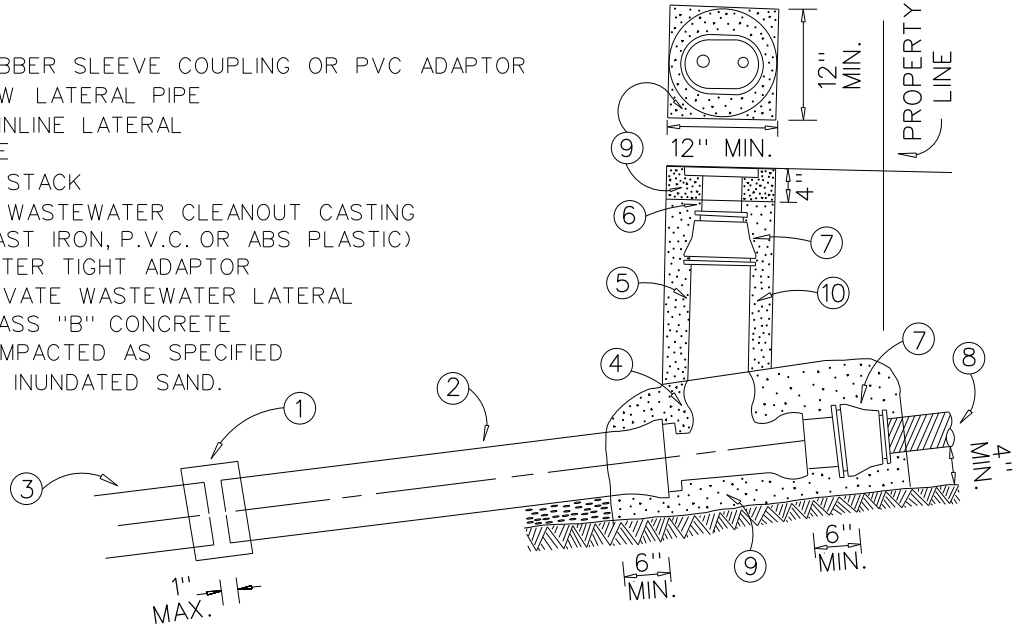
2. The new adjustment may be constructed over or under the proposed conflict:
   - A. A downstream minimum grade of 1.0% must be maintained.
   - B. Bends greater than 22-½ degrees are NOT permitted.
   - C. The new pipe and embedment must be of the same type as the existing.(Unless the lateral is concrete 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) Concrete Class Item 7.4.5.

E) 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.

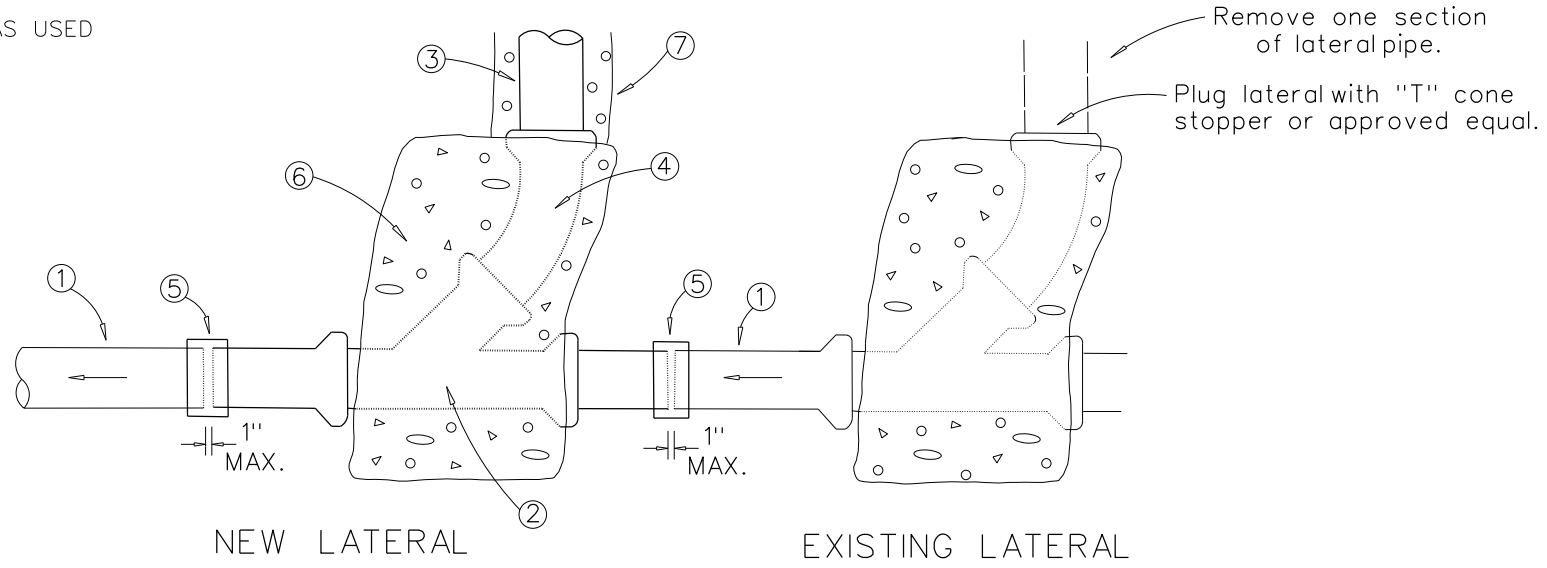
3. Install the lateral extension and cleanout as shown in the detail using all new materials. The salvaged cleanout casting and lid may be used if approved by the engineer.

REPLACE EXISTING LATERAL CLEANOUT

	DWU	(Page No.) 407
	DATE JAN. 2010	

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.

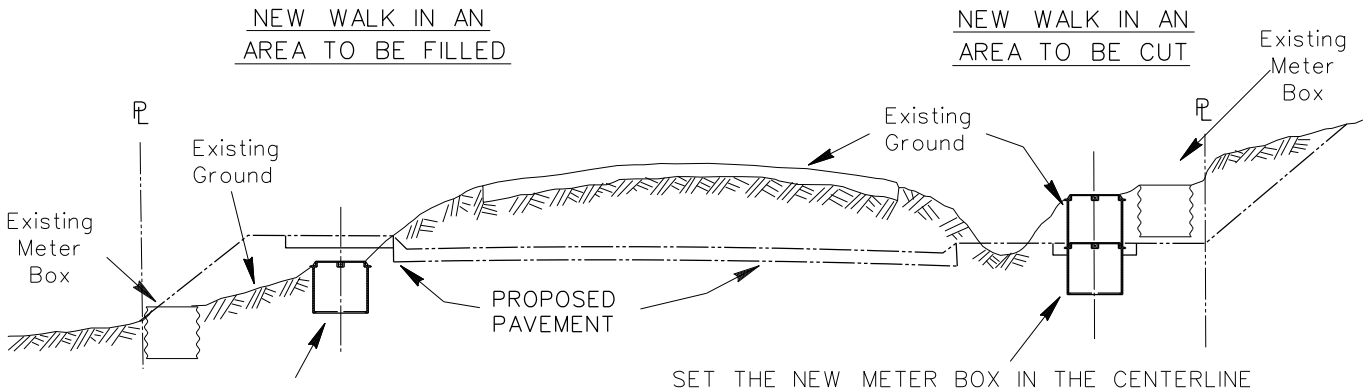
Concrete Class Item 7.4.5

REPLACE EXISTING LATERAL TO EXISTING MAINLINE

DWU

DATE JAN. 2010

(Page No.) 408

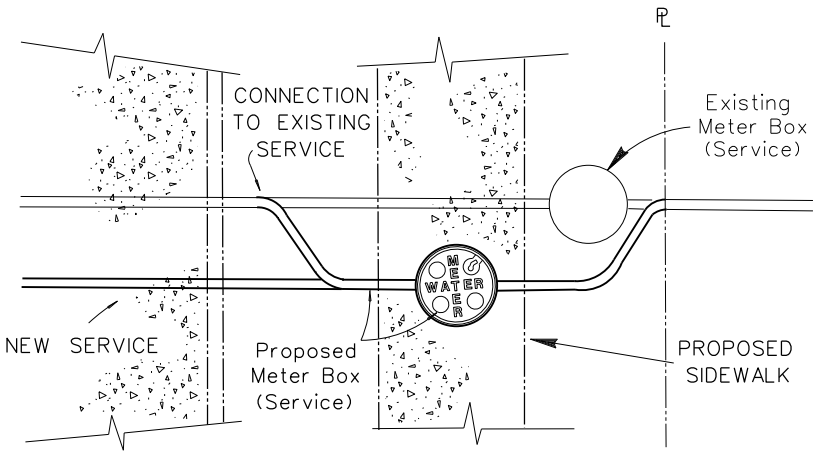


SET THE NEW METER BOX IN THE CENTERLINE OF THE PROP. NEW WALK. SET THE METER BOX AT THE EXISTING GROUND ELEVATION. IT WILL BE RAISED TO GRADE DURING PAVING OPERATIONS.

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	

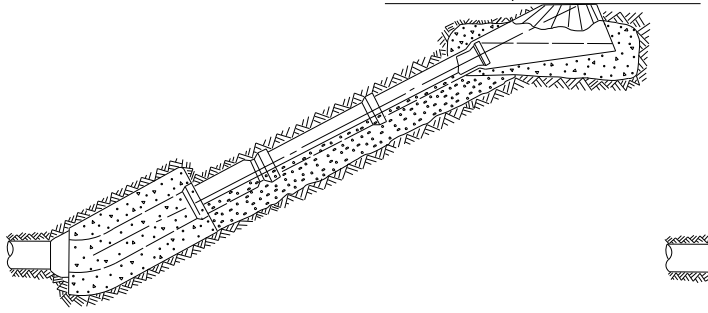


FIGURE 1

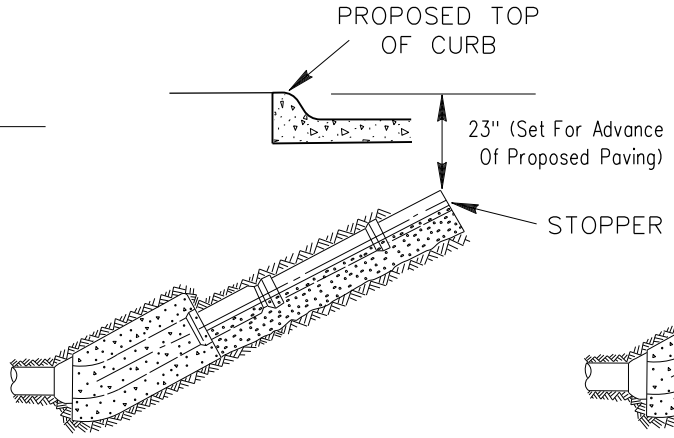


FIGURE 2
PRE - GRADING

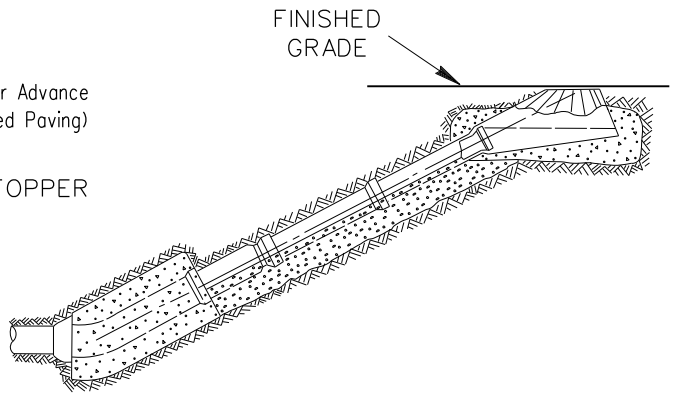


FIGURE 3
PRE - PAVING

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

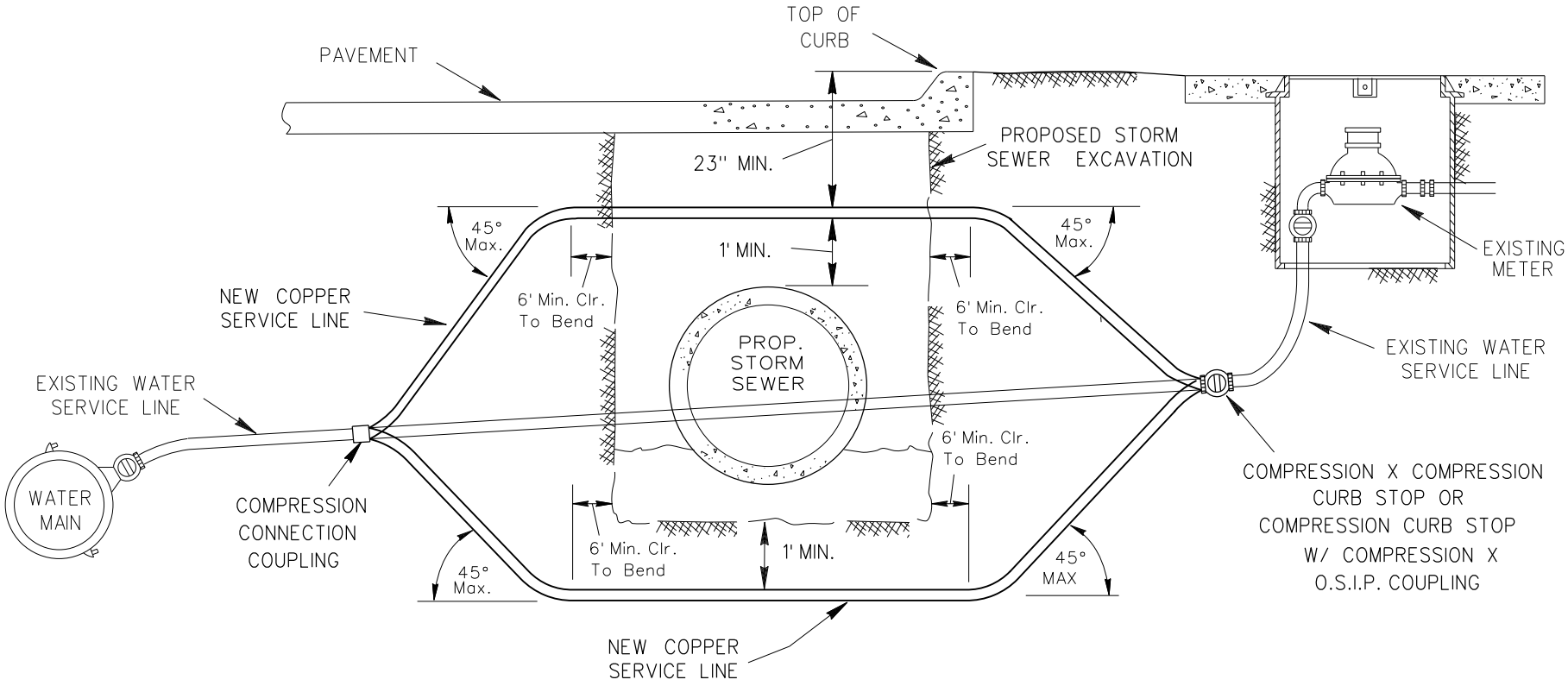
2. Remove the cleanout pipe to a point 23" below the proposed top of curb.
3. Plug the pipe with a "T" Cone Stopper or approved equal.

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

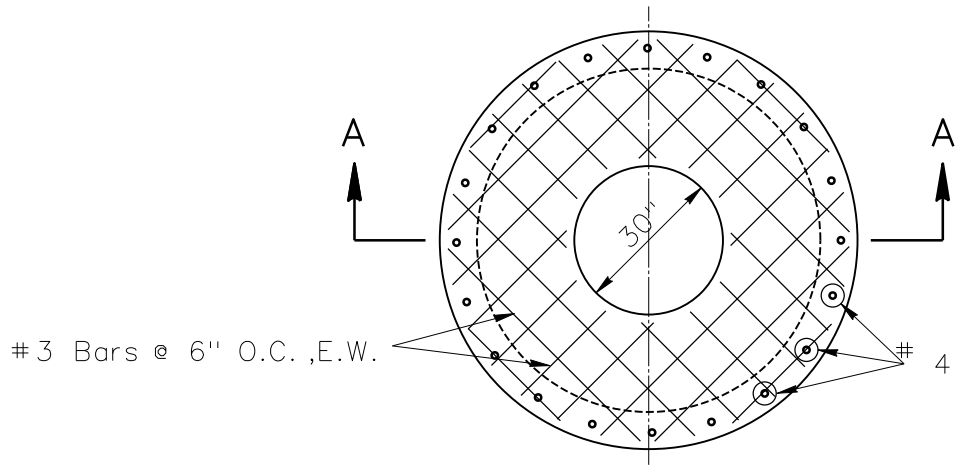
ALTERATION & ADJUSTMENT OF STANDARD MAINLINE CLEANOUT		DWU	(Page) 410
		DATE DEC.2001	



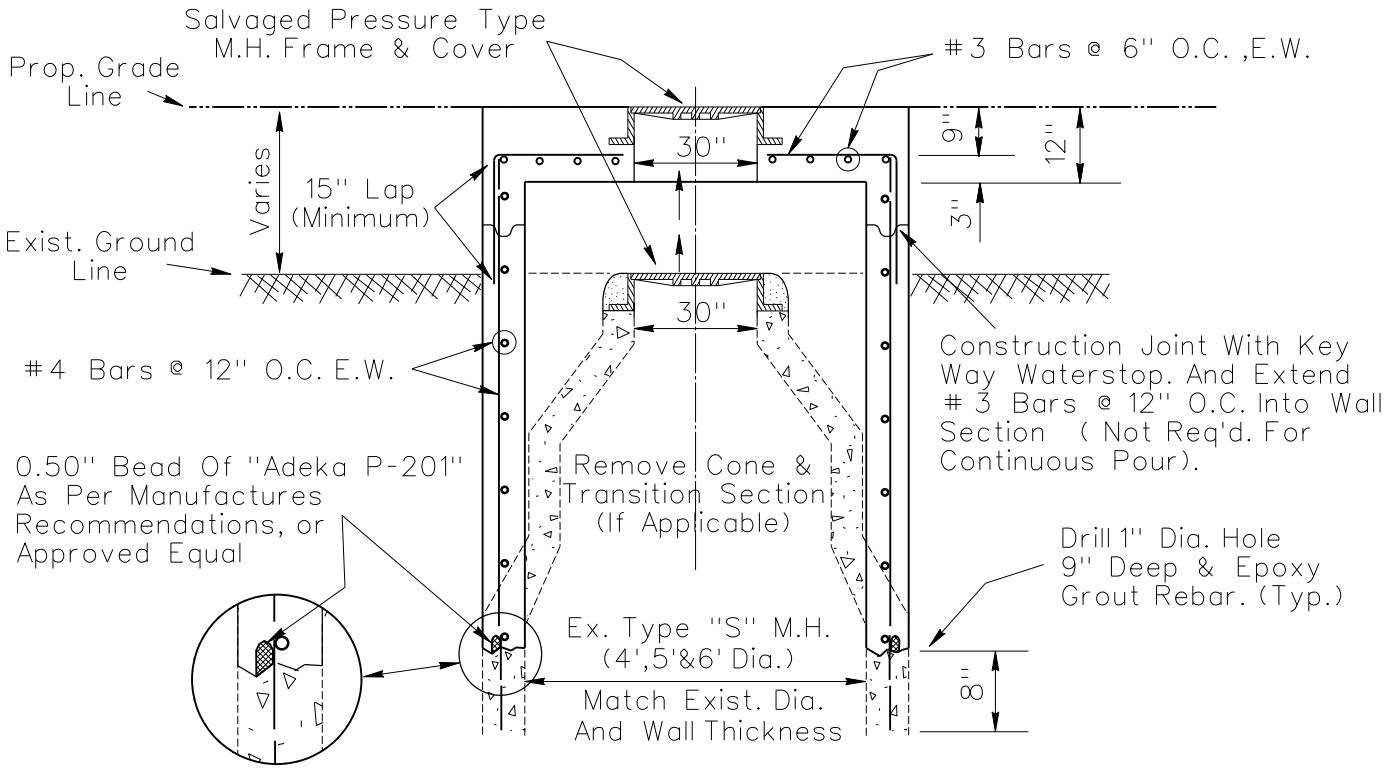
NOTES:

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.

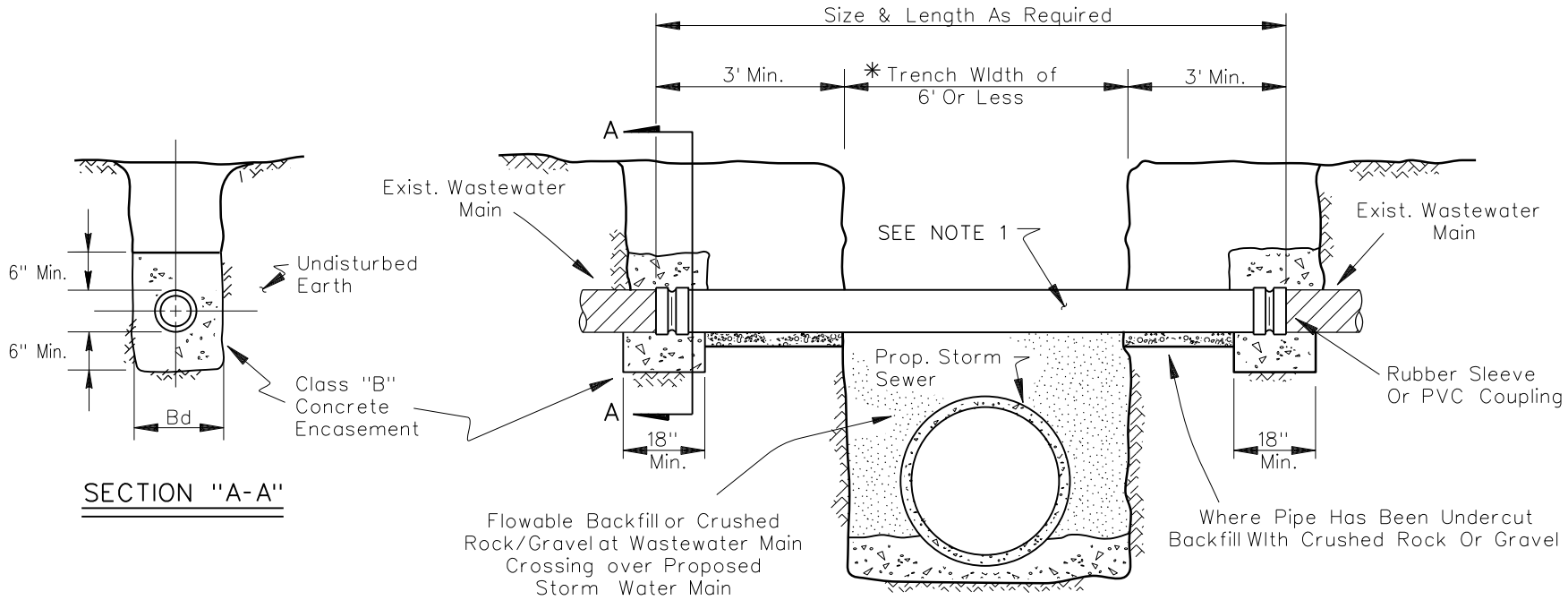
2) Epoxy grout to be a high strength rigid epoxy adhesive manufactured for the purpose of anchoring dowels into hardened concrete. Epoxy grout shall be "Sikadur Hi-Mod, LV No. 32" or approved equal.

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 JAN. 2010	

✳ 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.

P.V.C. Pipe Item 2.12.14.
Concrete Class Item 7.4.5.

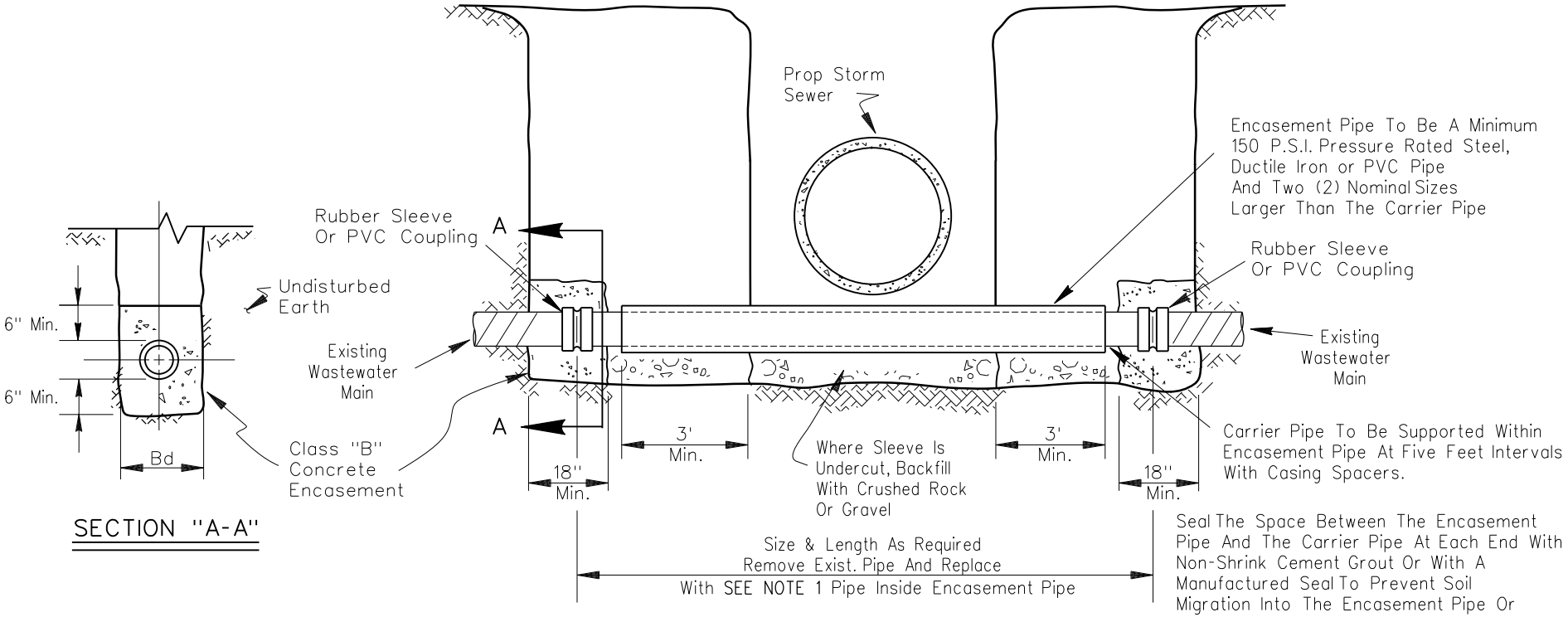
WASTEWATER MAIN UNDERCUT BY PROPOSED STORMWATER MAIN

DWU

DATE
JAN. 2010

(Page No.)
413

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



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.

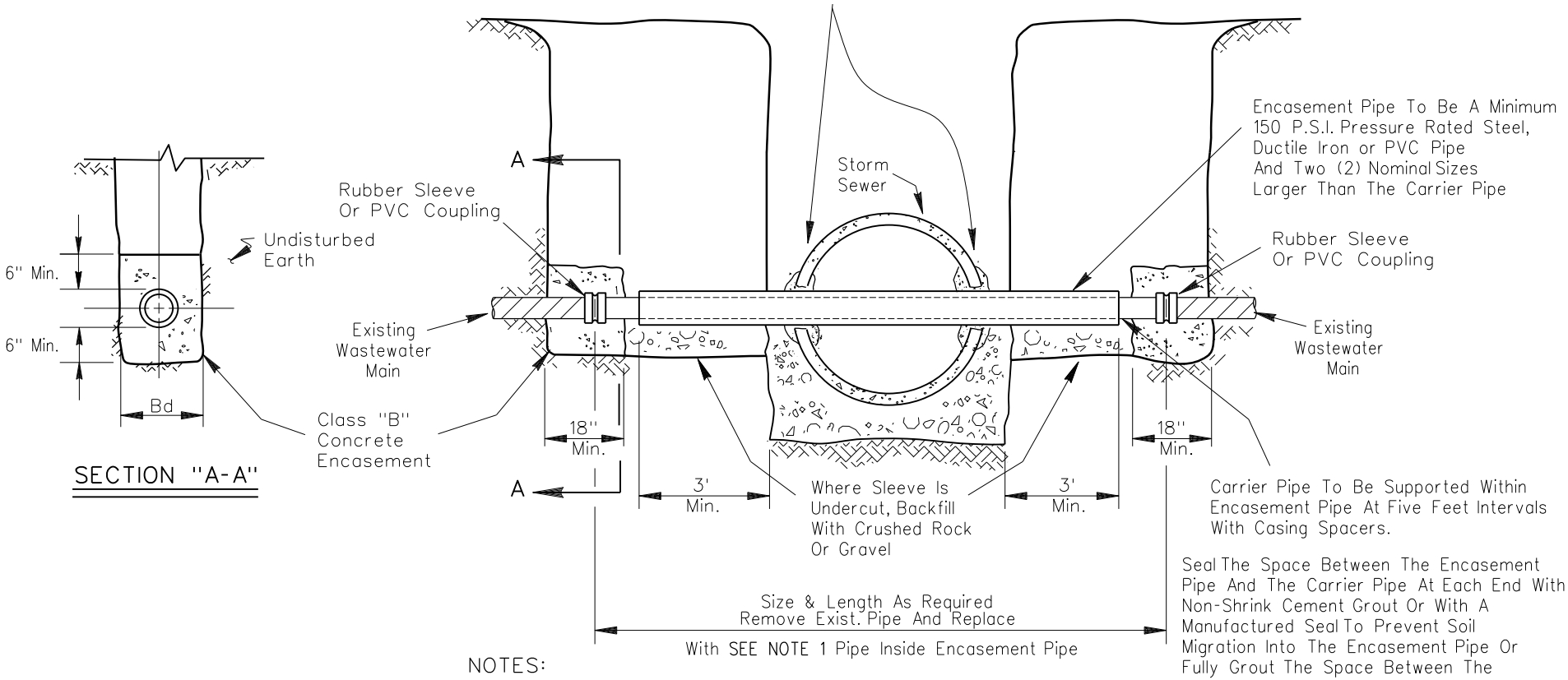
Steel Pipe Item 2.12.9.
D.I. Pipe Item 2.12.8.
P.V.C. Pipe Item 2.12.14.
Concrete Class Item 7.4.5.

ENCASEMENT PROTECTION FOR WASTEWATER MAIN

DWU

DATE
JAN. 2010

(Page No.)
414



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.

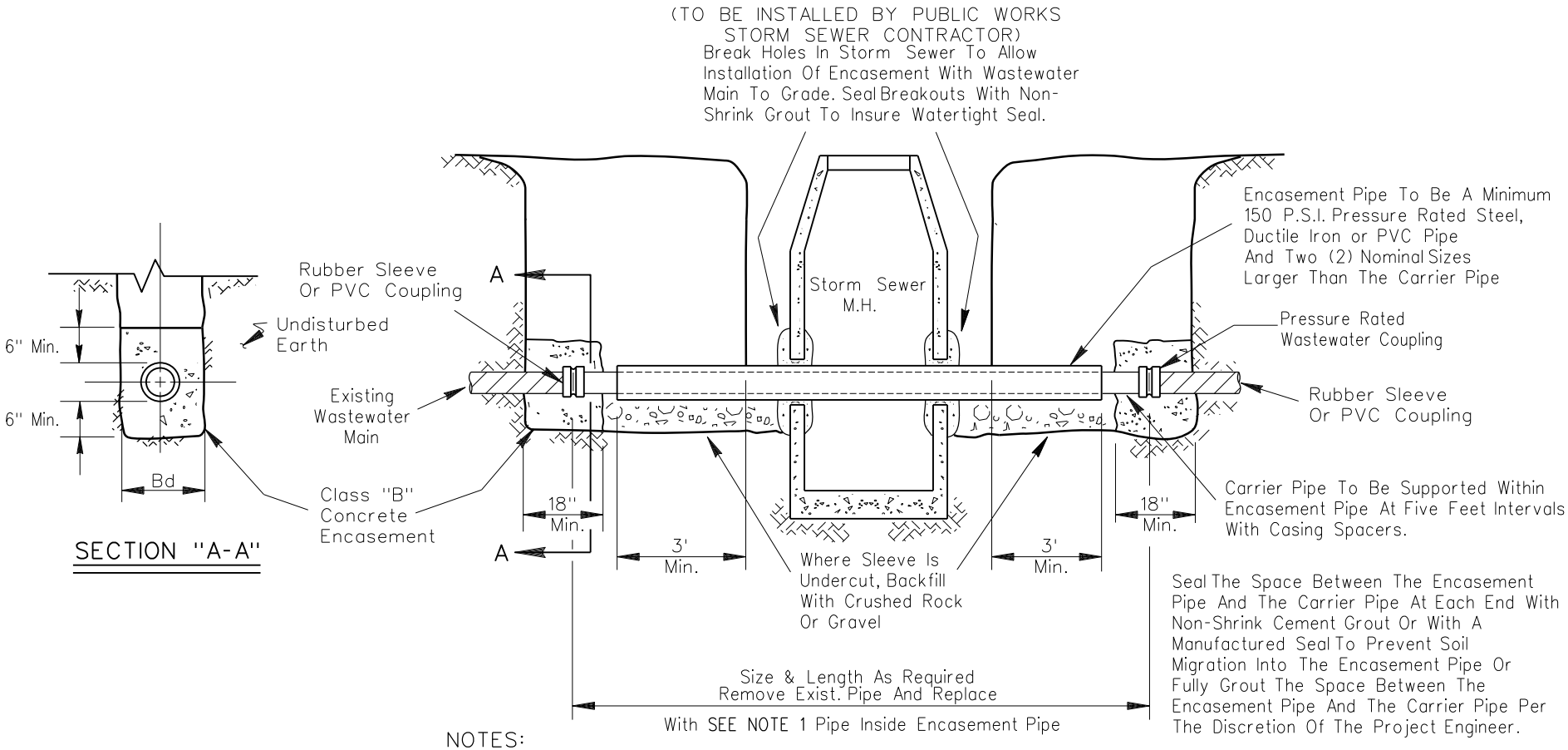
Steel Pipe Item 2.12.9.
D.I. Pipe Item 2.12.8.
P.V.C. Pipe Item 2.12.14.
Concrete Class Item 7.4.5.

WASTEWATER MAIN PASSING THROUGH STORM WATER MAIN

DWU

(Page No.) 415

DATE JAN. 2010



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.

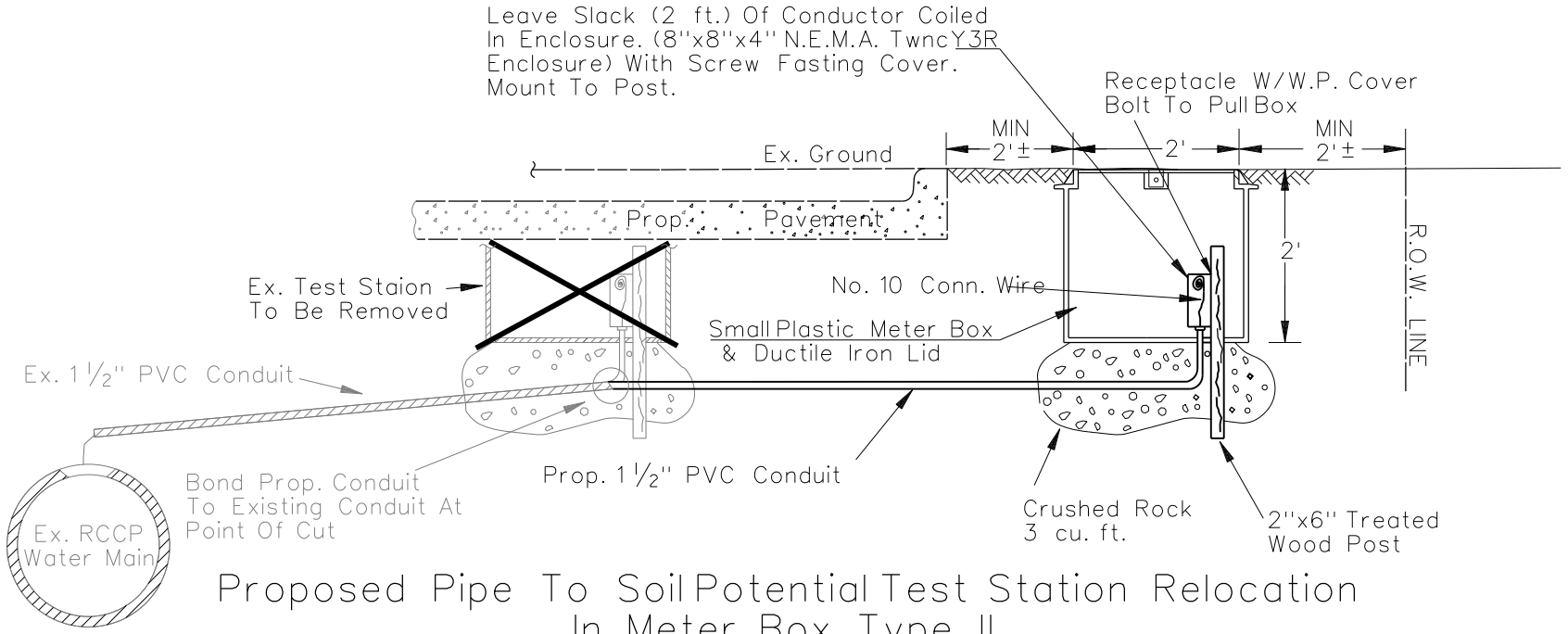
Contractor Must Contact Wastewater
Collection Two Working Days Prior
To Construction.

P.V.C. Pipe Item 2.12.14.
Steel Pipe Item 2.12.9.
D.I. Pipe Item 2.12.8.
Concrete Class Item 7.4.5.

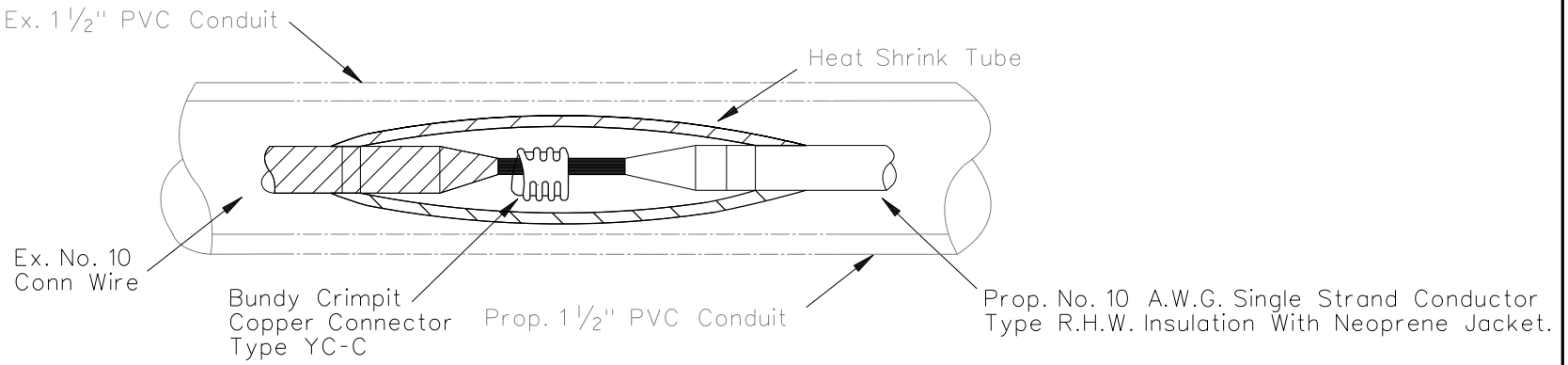
WASTEWATER MAIN PASSING THROUGH STORM WATER MANHOLE

DWU

DATE
JAN. 2010



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.

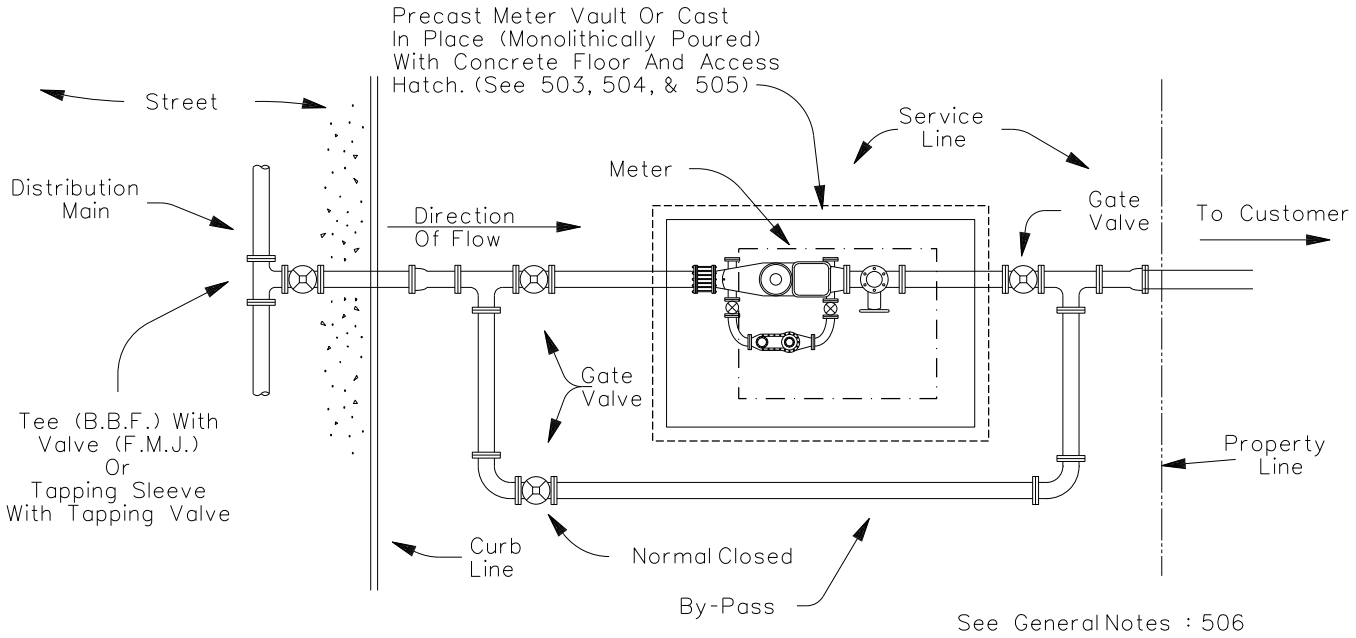
   B) Metering - Metered with C.T. meter or turbine meter with domestic type strainer.

4) Irrigation Water Service

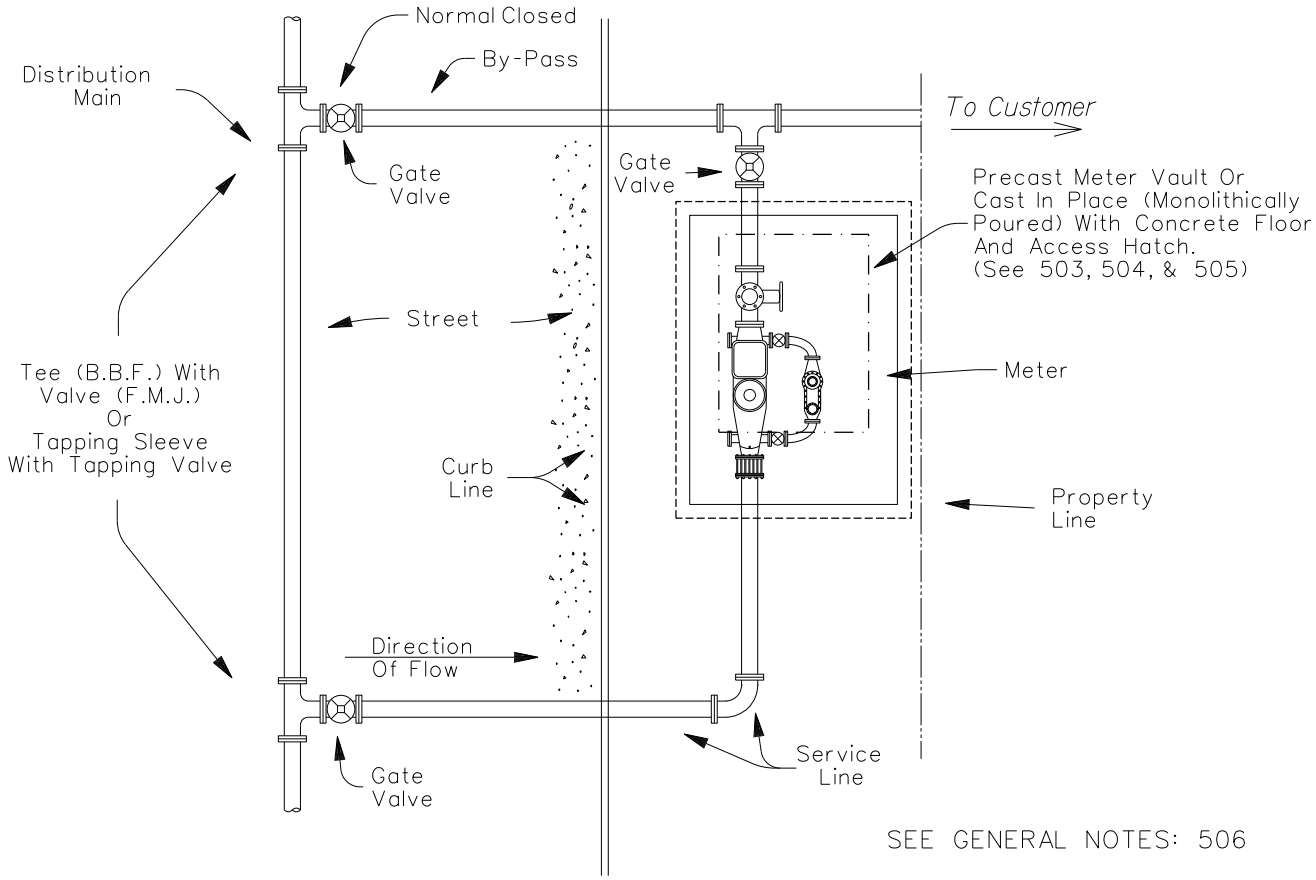
   A) Definition - Same as domestic water through a single water service and meter without a bypass and for irrigation purpose only.

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

LARGE WATER SERVICES (4" & LARGER) DESCRIPTIONS AND TYPICAL USES		DWU	(Page No.) 501
		DATE JAN. 2010	

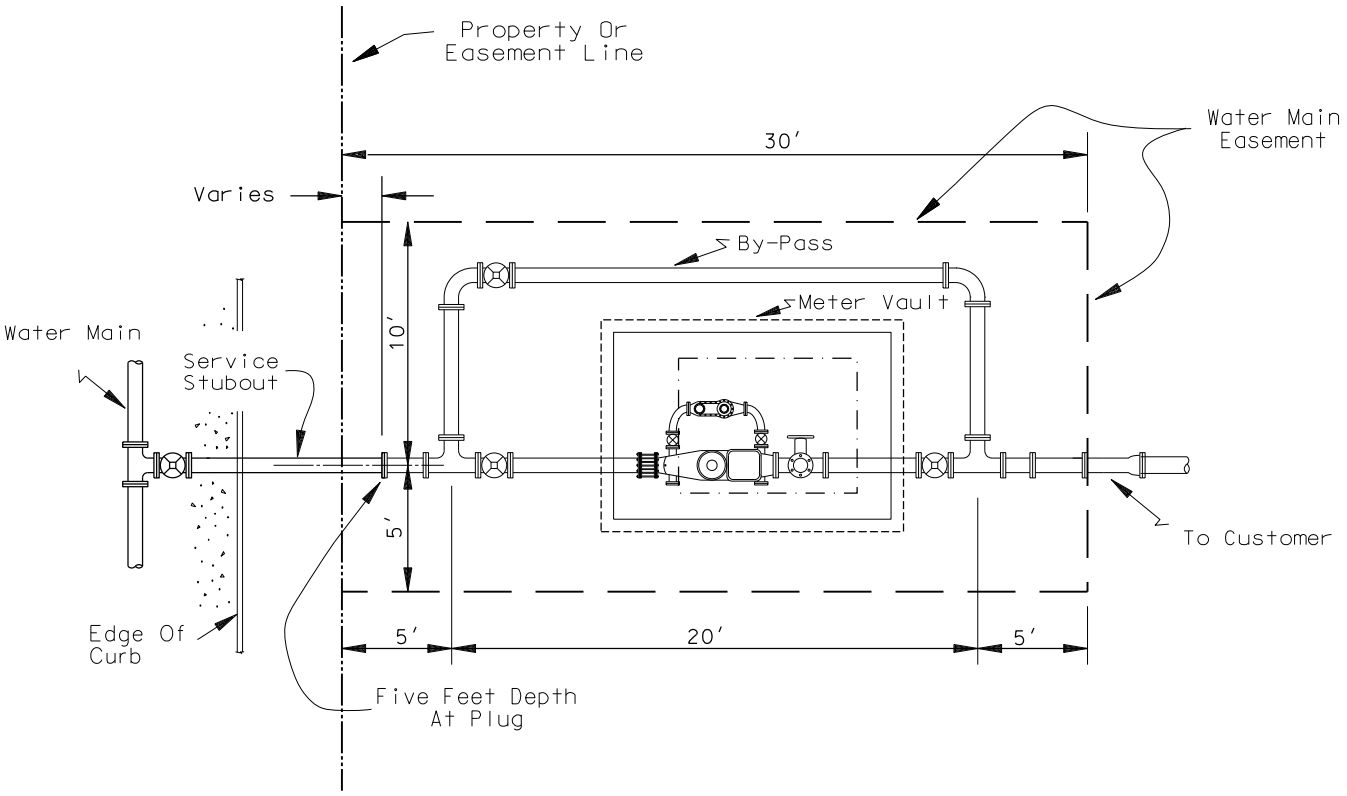


TYPICAL METER ALIGNMENT
(Combined Service Shown)

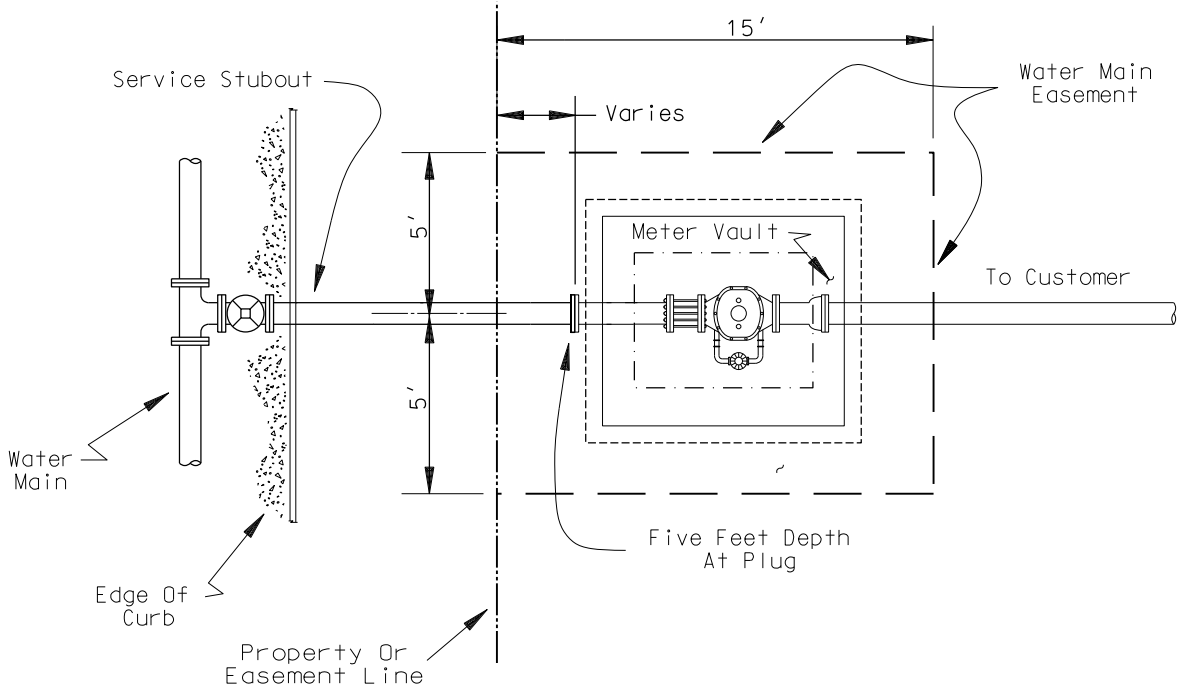


ALTERNATE METER ALIGNMENT
FOR LIMITED SPACE INSTALLATION
(Combined Service Shown)

LARGE SERVICE INSTALLATION DETAILS PLAN VIEWS		DWU	(Page No.) 502
		DATE JAN. 2010	

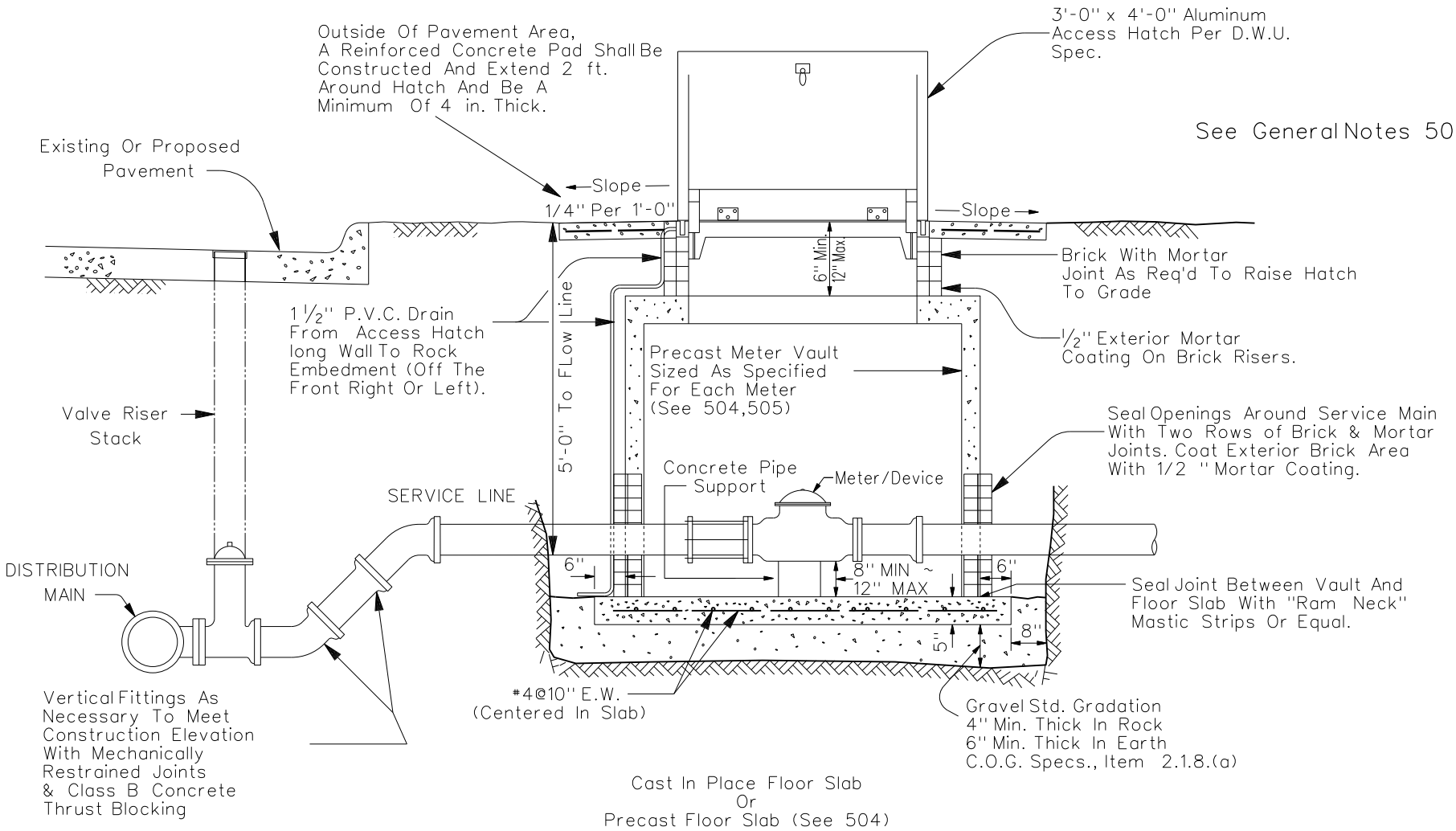


COMBINED SERVICE - 15' x 30' EASEMENT



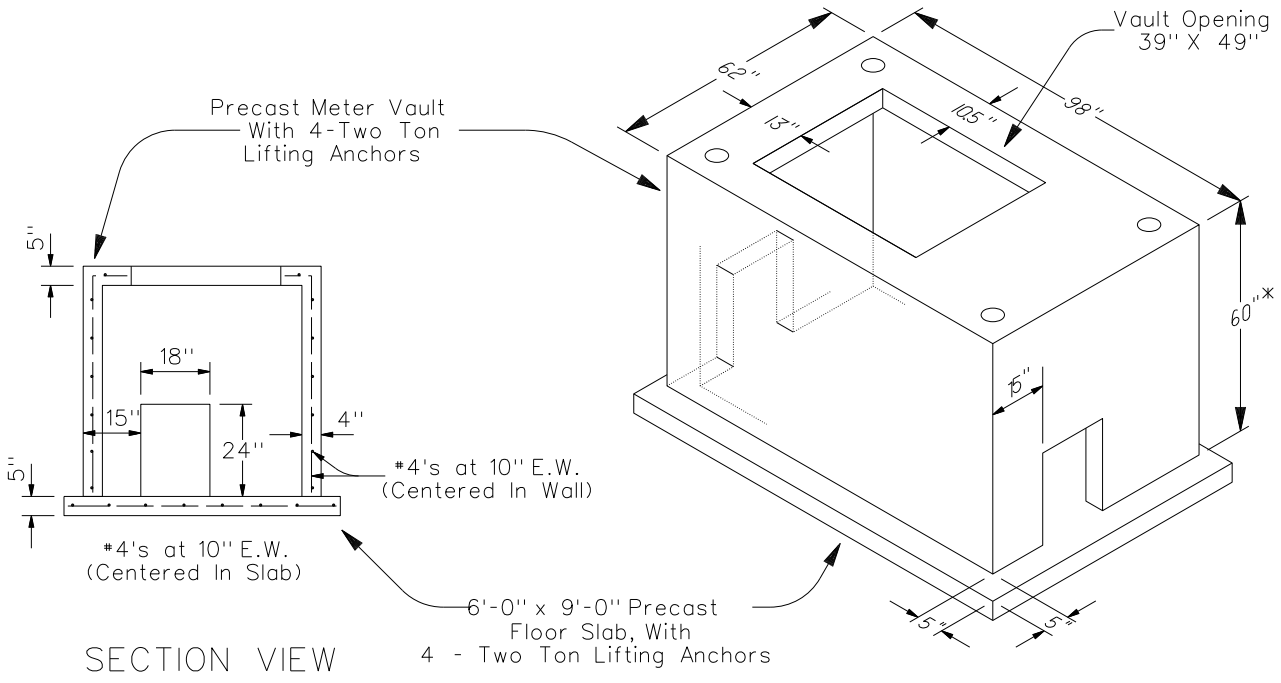
FIRE LINE SERVICE - 10' x 15' EASEMENT

MINIMUM EASEMENT SIZES FOR LARGE METER INSTALLATIONS		DWU	(PAGE NO.) 502A
		DATE JUNE 2002	



TYPICAL FOR ALL LARGE METER VAULTS

LARGE SERVICE INSTALLATION DETAIL ELEVATION VIEW		DWU	(Page No.) 503
		DATE JAN. 2010	

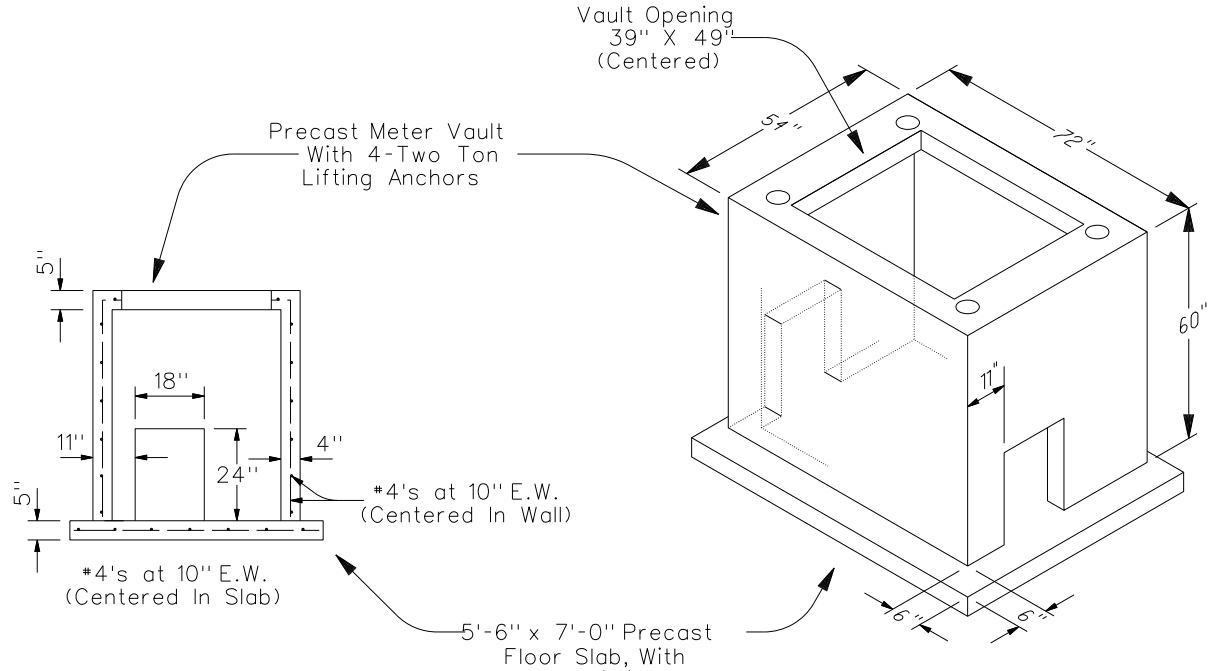


SECTION VIEW

F.M. VAULT

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

* Special Applications To Be Determined
By Engineer.



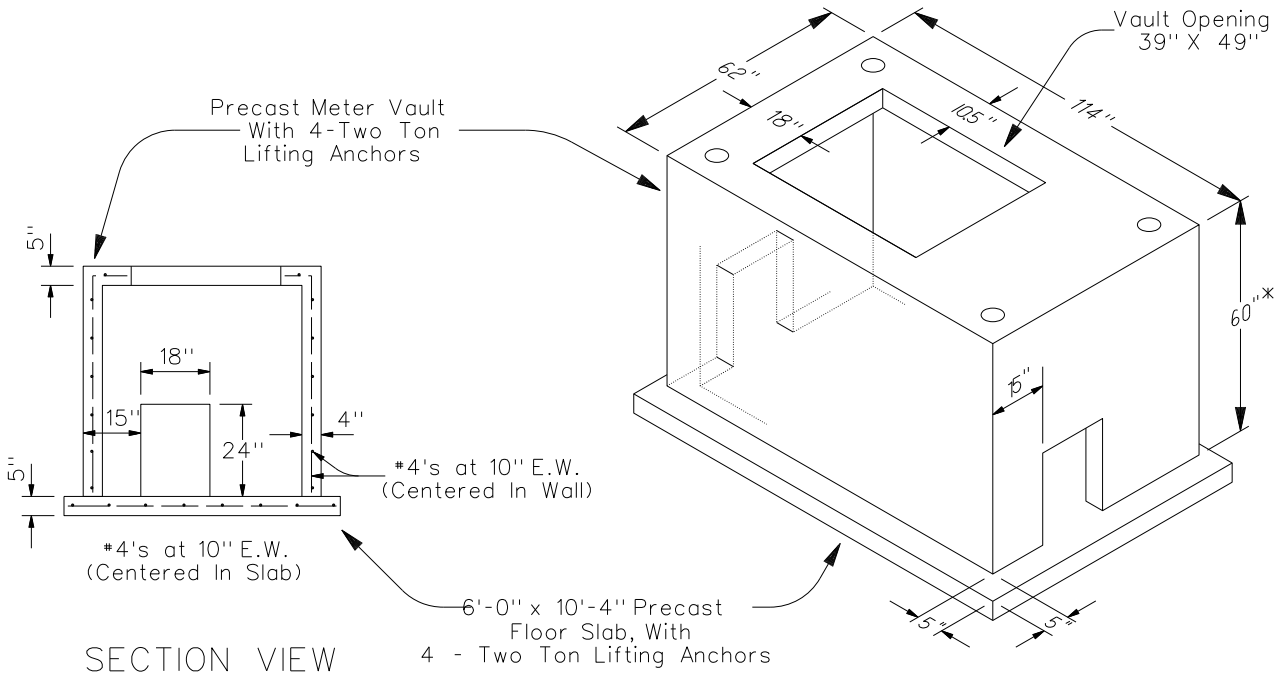
SECTION VIEW

D.C. VAULT

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

* 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''

* Special Applications To Be Determined By Engineer.

10'' VAULT

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 NCTCOG specifications, DWU Addendum to that specification, this manual and the latest addition 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).

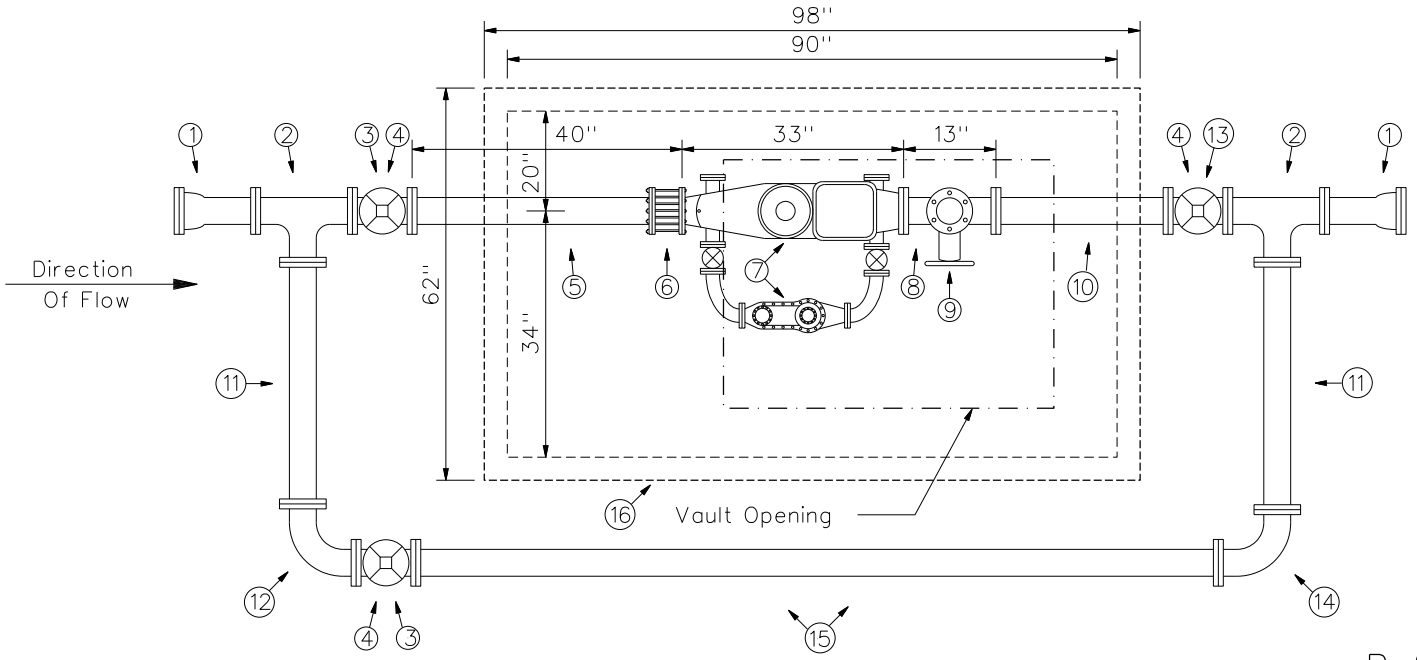
2.) All precast vaults and precast floors used in the installation of large water services will meet DWU specifications and must be on the approved materials list.

3.) Cast in place concrete shall be class "F" concrete, except for concrete used for thrust blocking, which shall be class "B" concrete.

4.) The 3' x 4' aluminum access hatch cover shall meet DWU specifications and must be on the approved material list. (Currently supplied by DWU and may be purchased for use on DWU facilities only.)

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

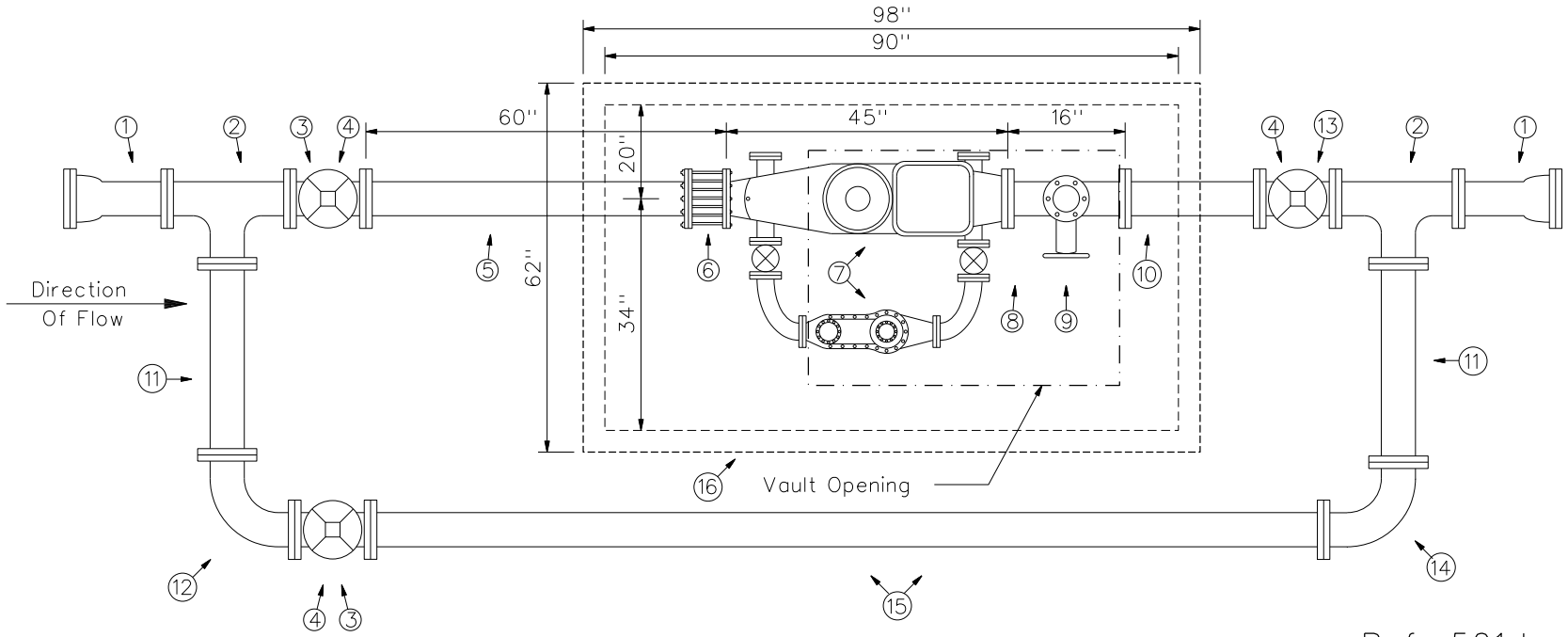
DWU

(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

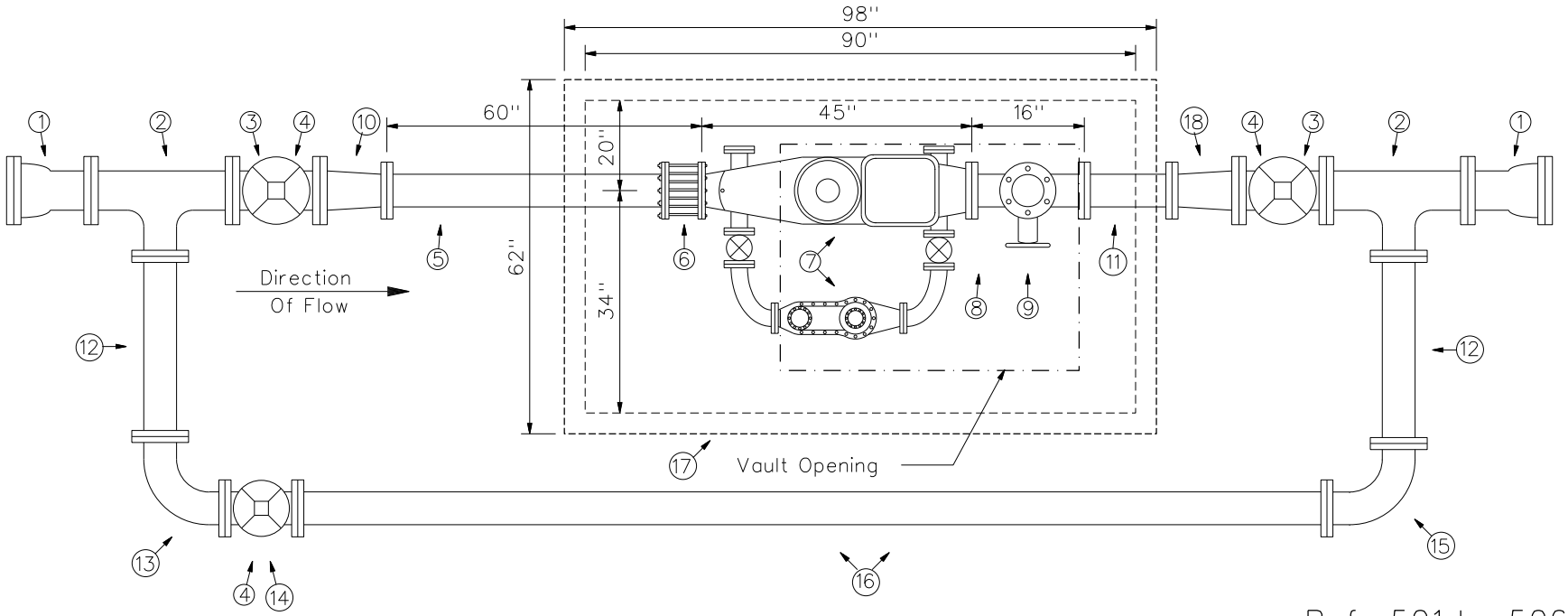
DWU

(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

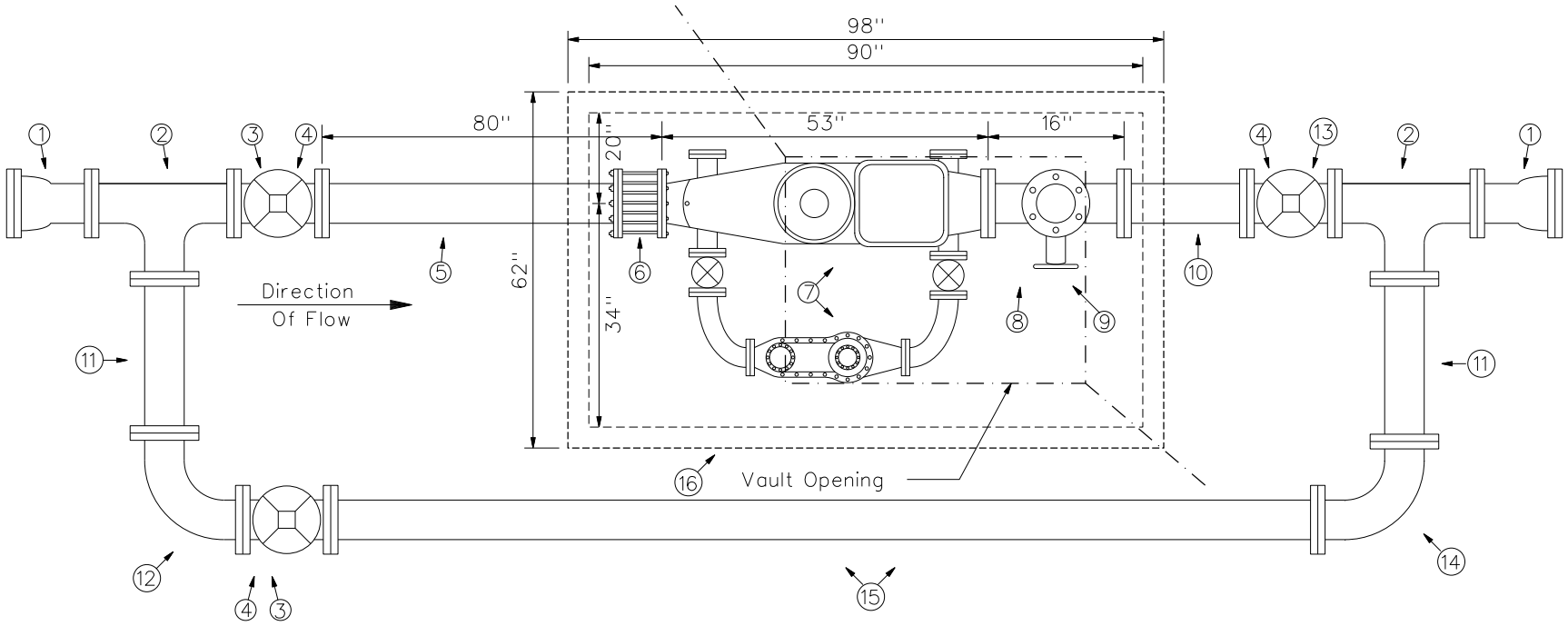
8" COMBINED SERVICE WITH 6" METER

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

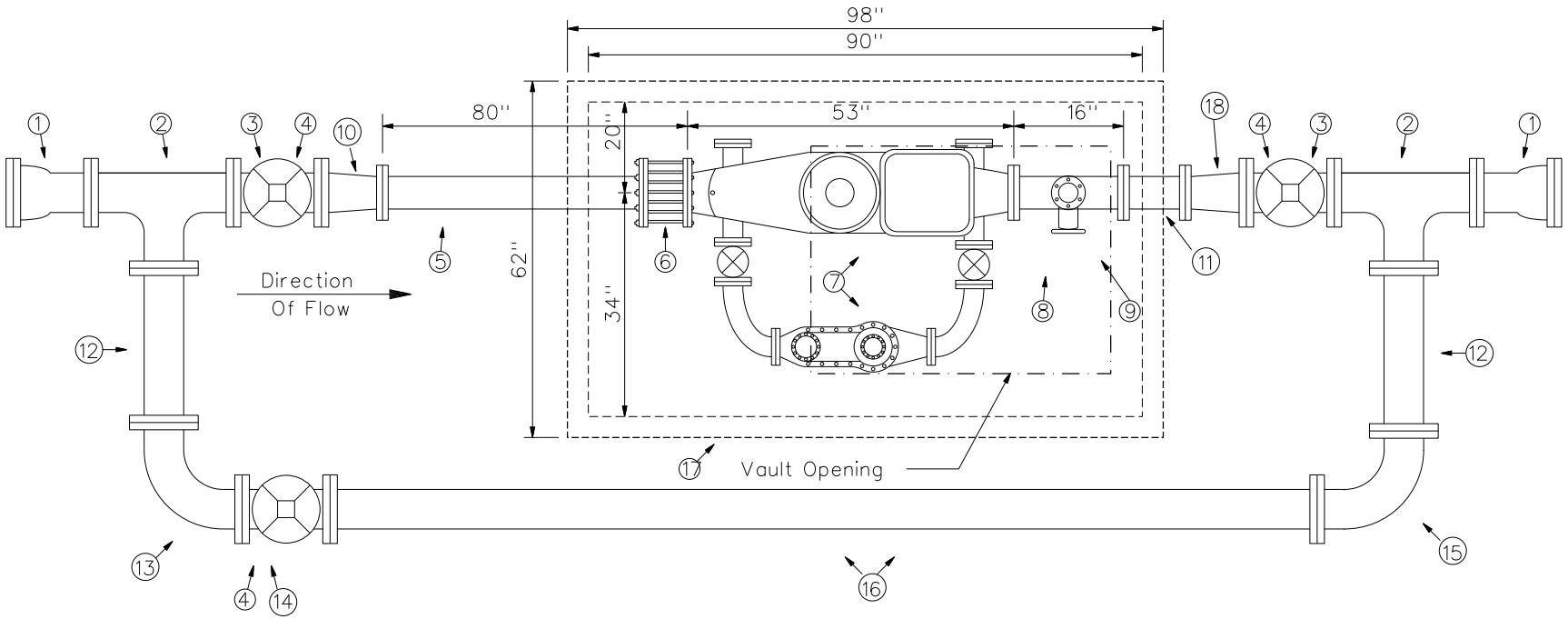
DWU

(Page No.) 510

DATE JUNE 2002

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

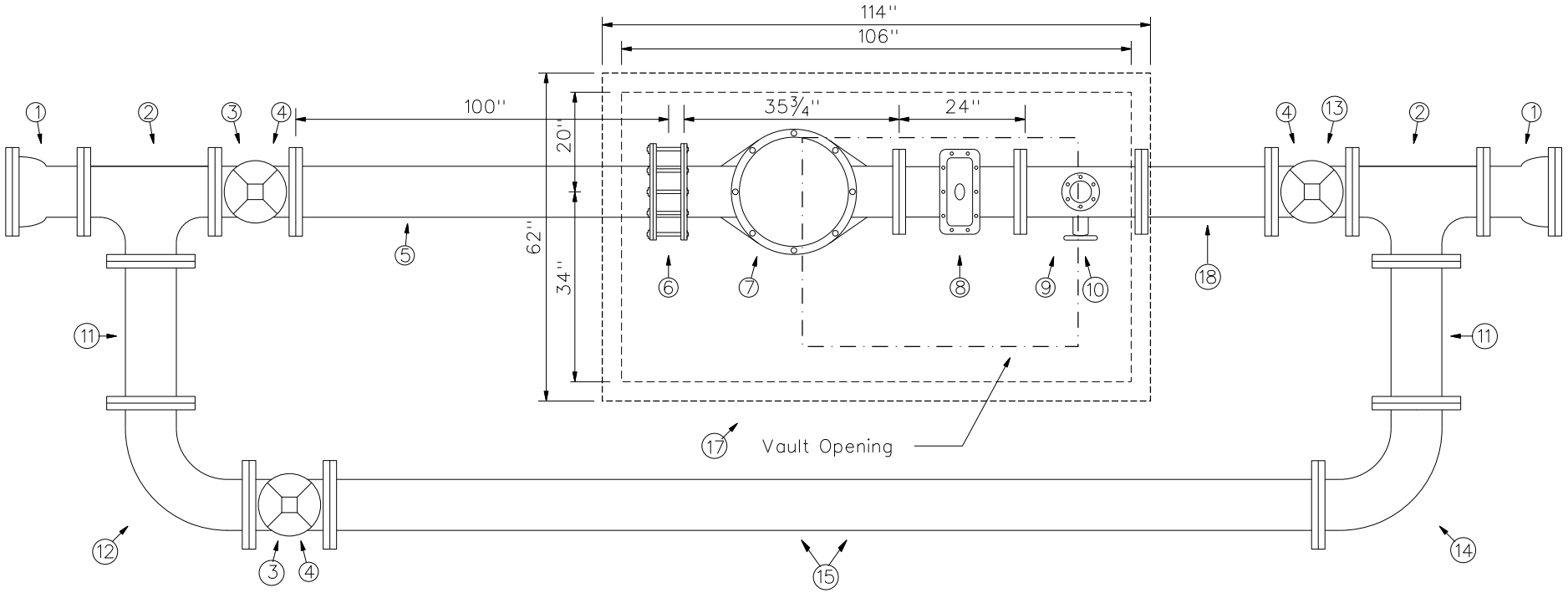
10" COMBINED SERVICE WITH 8" METER

DWU

DATE
JUNE 2002

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
⑱	1 Ea.	10" x 24" Nipple F. x F.
⑪	2 Ea.	10" x 36" Nipple F. x F.
⑫	1 Ea.	10" 90° Bend F. x F.
⑬	1 Ea.	10" Gate Valve F. x F.
⑭	1 Ea.	10" 90° Bend M.J. x F.
⑮	1 Ea.	10" Pipe
⑯	1 Ea.	Precast F.M. Vault
⑰	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

10" COMBINED SERVICE WITH 10" METER

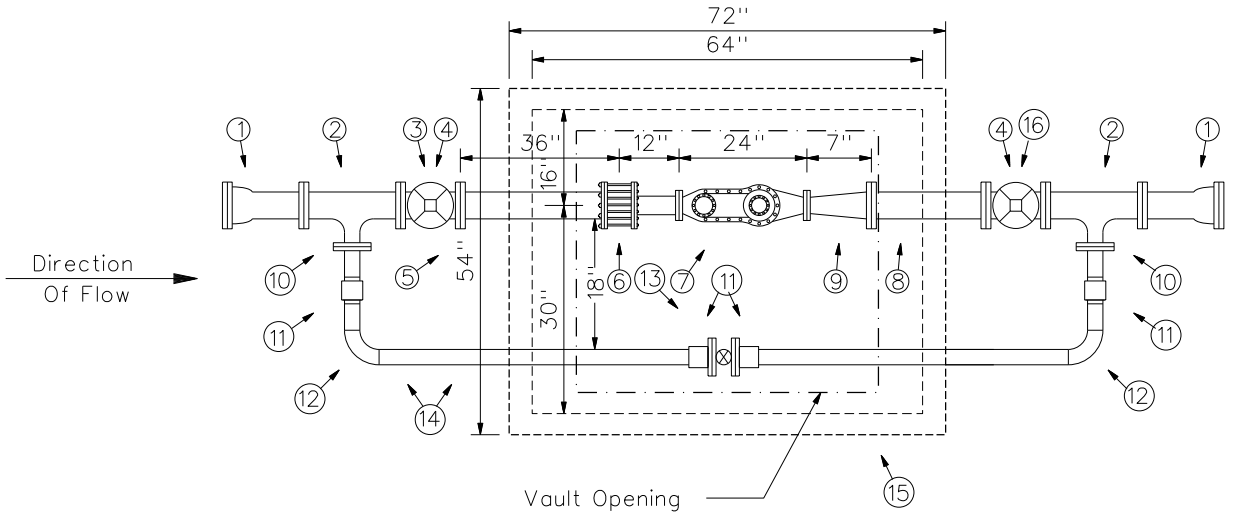
DWU

(Page No.) 512

DATE JUNE 2002

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 C.T. 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.

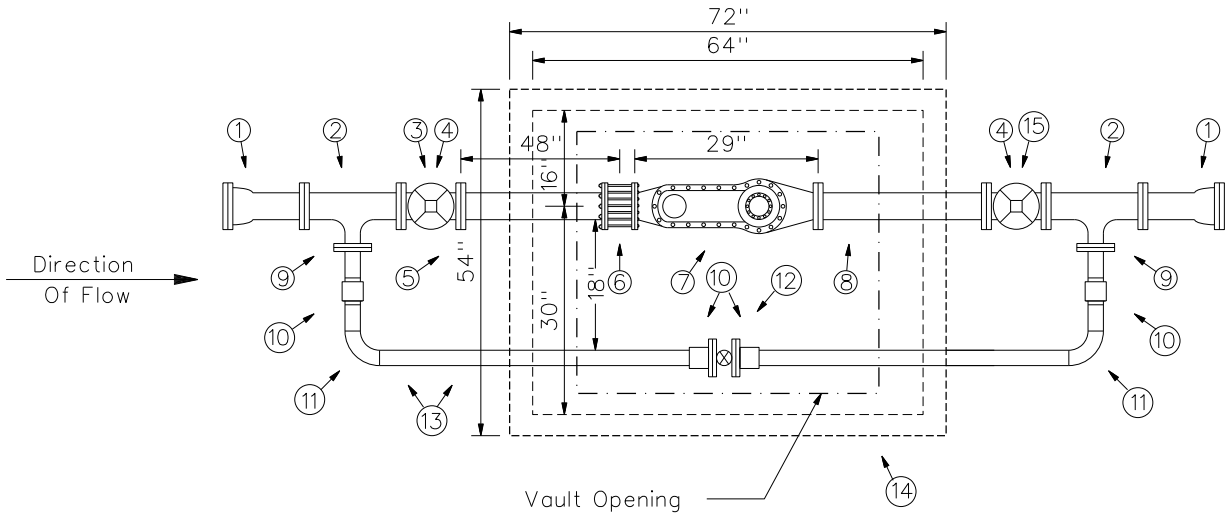


Ref. 501 to 506

4" DOMESTIC SERVICE WITH 3" METER		DWU	(Page No.) 513
		DATE JUNE 2002	

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 C.T. 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

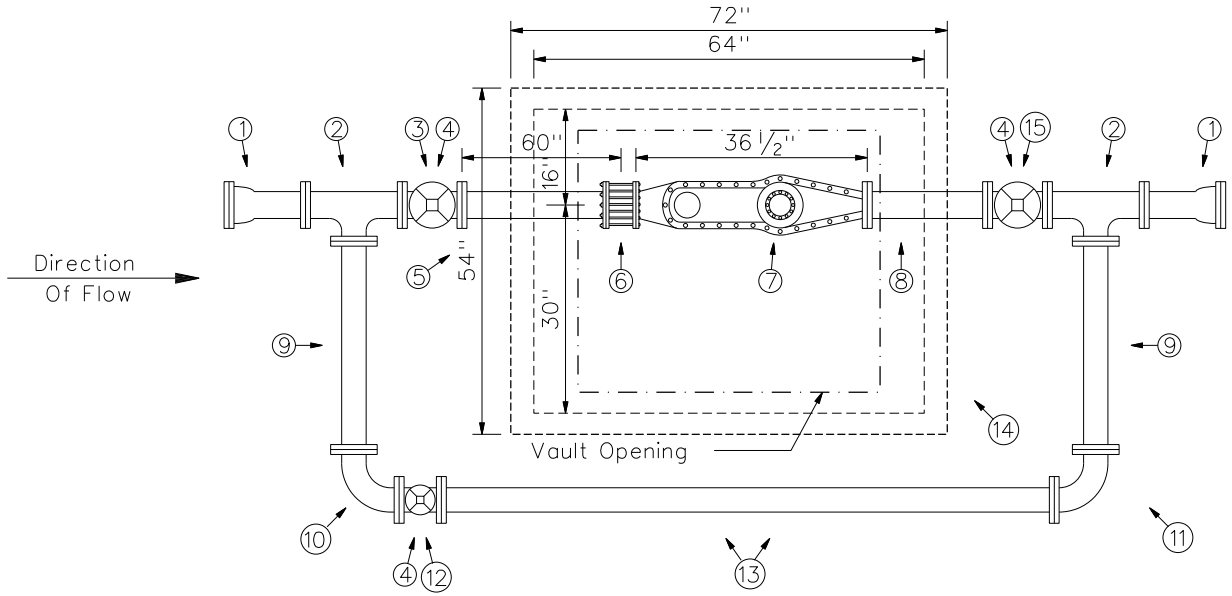
DWU

(Page No.) 514

DATE JUNE 2002

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 C.T. 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.	4" Gate Valve F. x F.



Ref. 501 to 506

6" DOMESTIC SERVICE WITH 6" METER

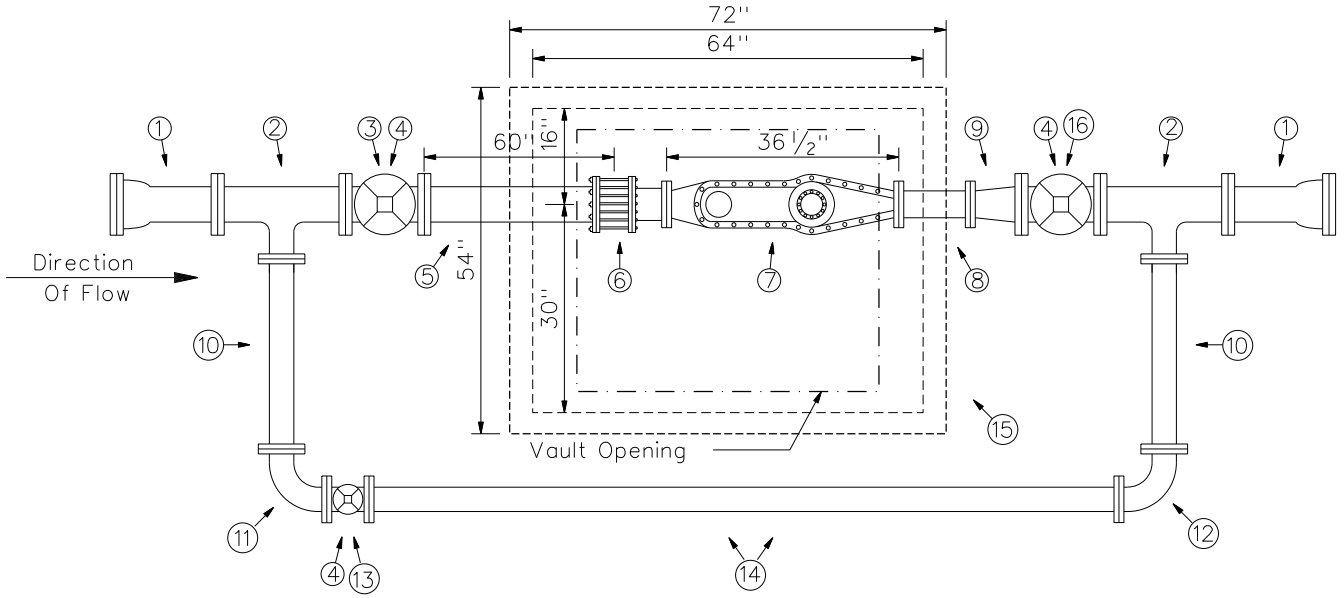
DWU

(Page No.) 515

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 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 C.T. 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

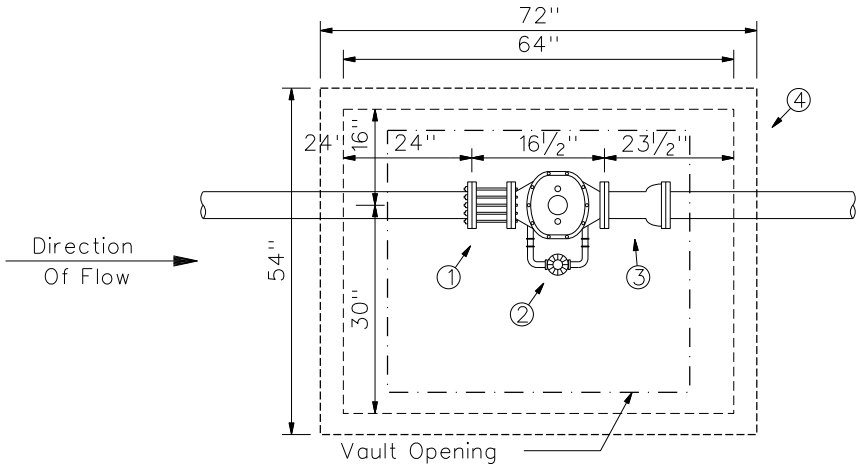
8" DOMESTIC SERVICE WITH 6" METER

DWU

(Page No.) 516

DATE JUNE 2002

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

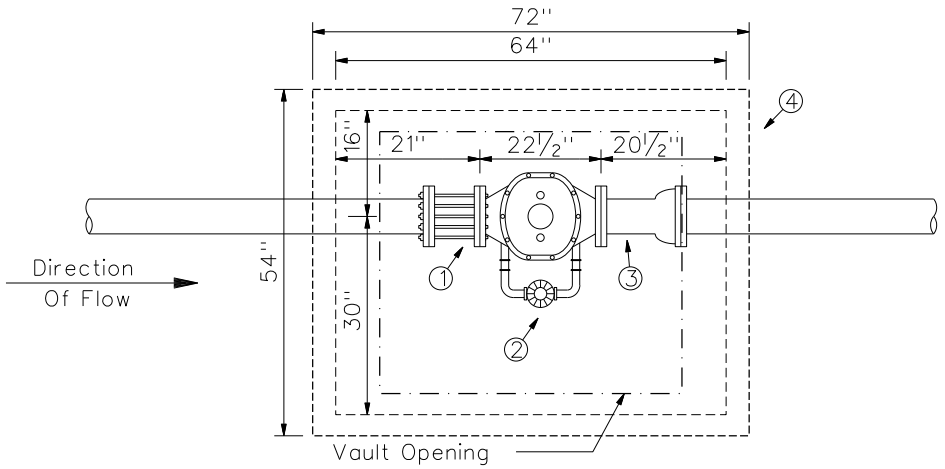
4" CLOSED FIRELINE SERVICE WITH 4" DETECTOR CHECK DEVICE

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

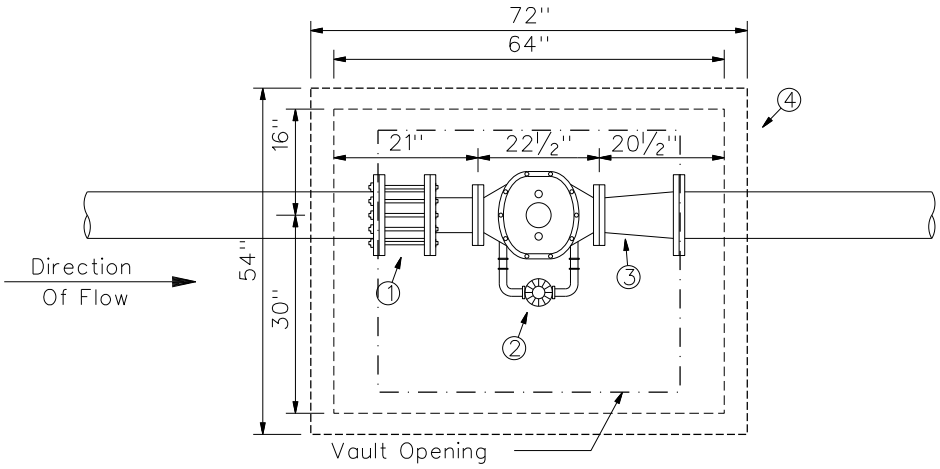
6" CLOSED FIRELINE SERVICE WITH 6" DETECTOR CHECK DEVICE

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

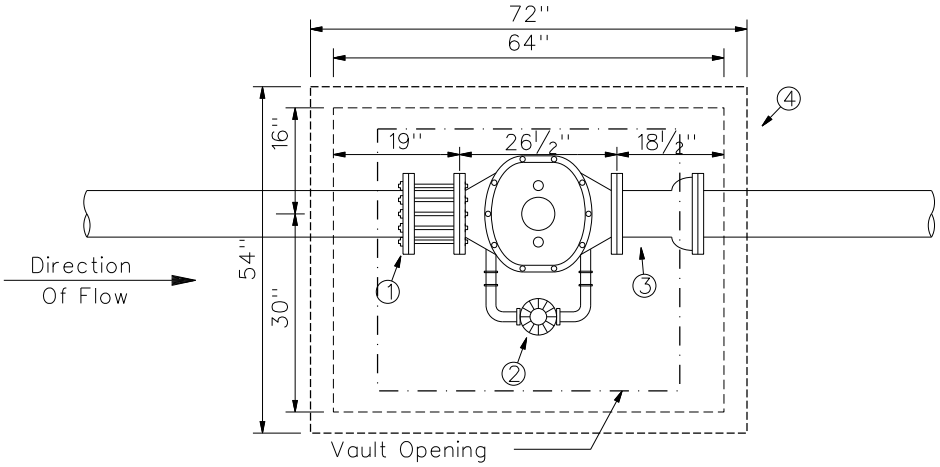
8" CLOSED FIRELINE SERVICE WITH 6" DETECTOR CHECK DEVICE

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

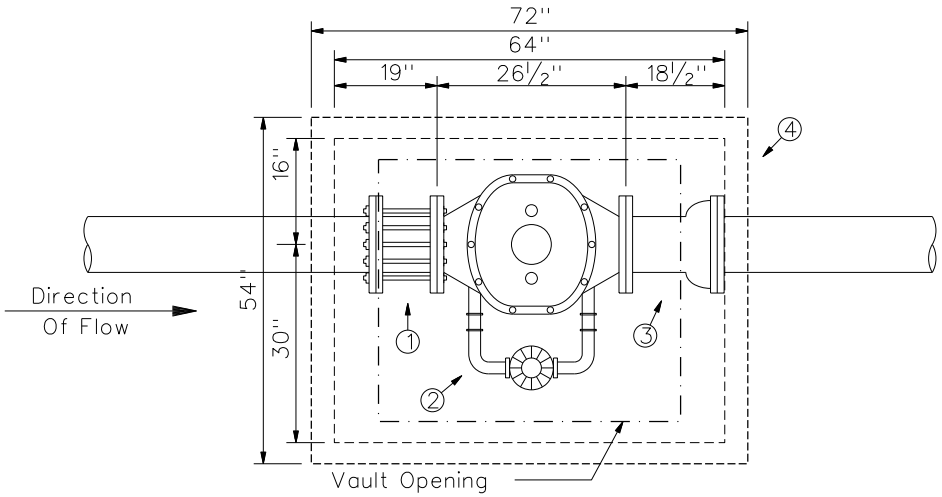
8" CLOSED FIRELINE SERVICE WITH 8" DETECTOR CHECK DEVICE

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

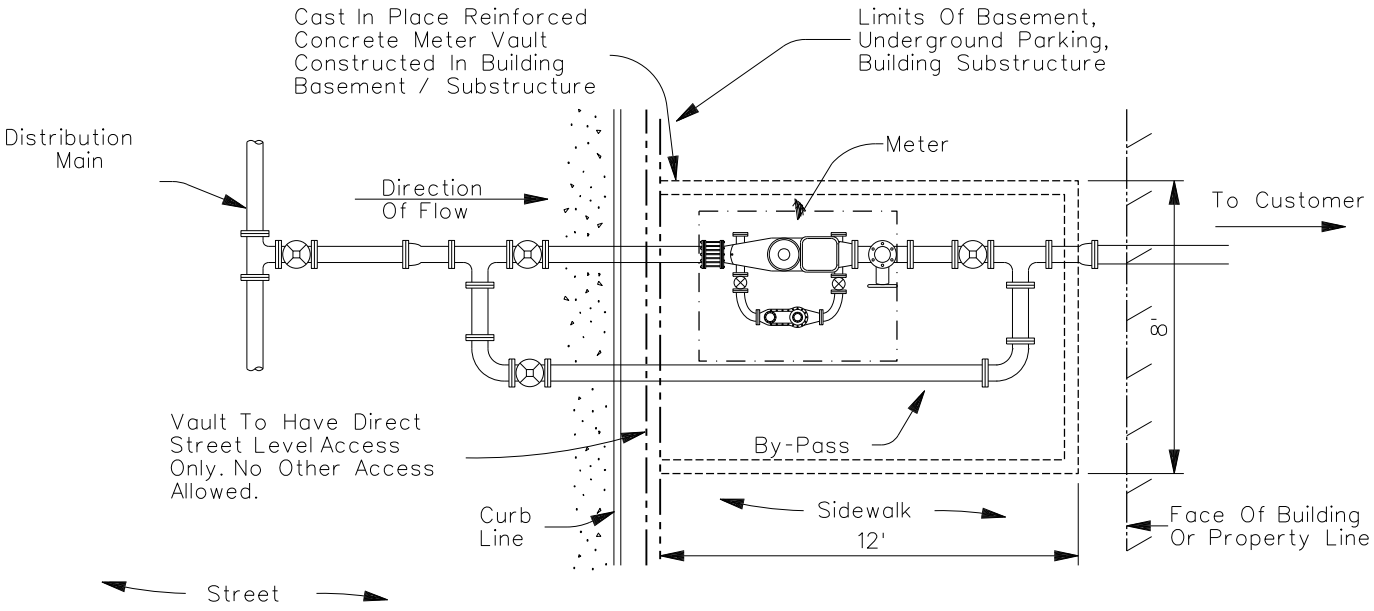
GENERAL DESCRIPTIONS AND NOTES FOR SUSPENDED VAULT INSTALLATION

1.) Suspended Vault Installation refers to the design and construction methods required to install a large water service within the basement or substructure of a building. This design and construction method is occasionally required in the Central Business District or in other commercial areas where the basements or substructure of the buildings extend into the right-of-way creating conditions that are too congested for conventional vault construction. The suspended vault installation method is compatible with all large water services.

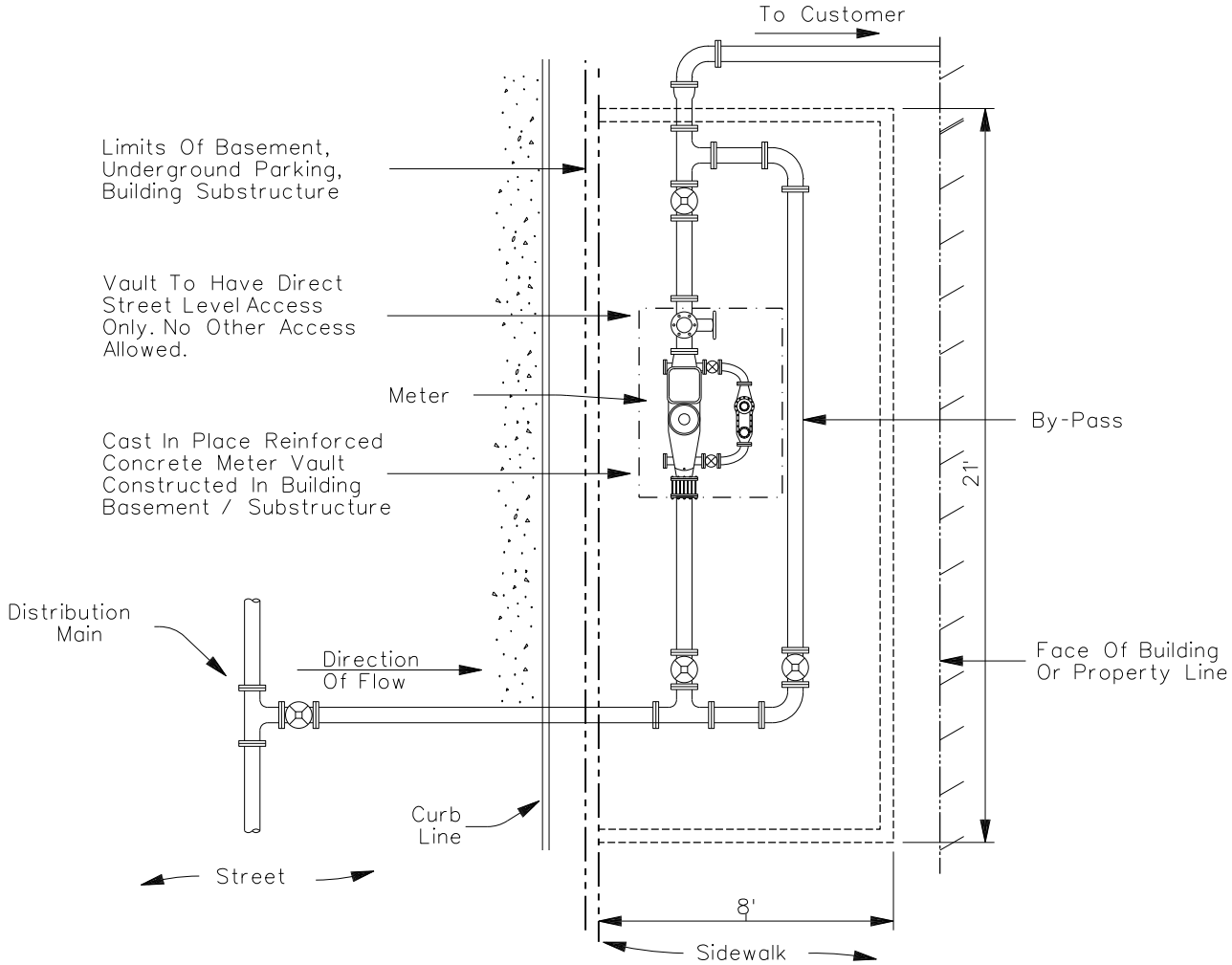
2.) The design of the cast-in-place reinforced concrete vault piping configuration and vault support system for the suspended vault installation is to be performed and sealed by a registered Professional Engineer at the expense of the Contractor or Developer. All plans are to be approved by Dallas Water Utilities.

3.) Refer to "General Notes" Page No. 506 for additional information on large water service installations.

SUSPENDED VAULT INSTALLATION DETAIL DESCRIPTION AND GENERAL NOTES		DWU	(Page No.) 522
		DATE JAN. 2010	



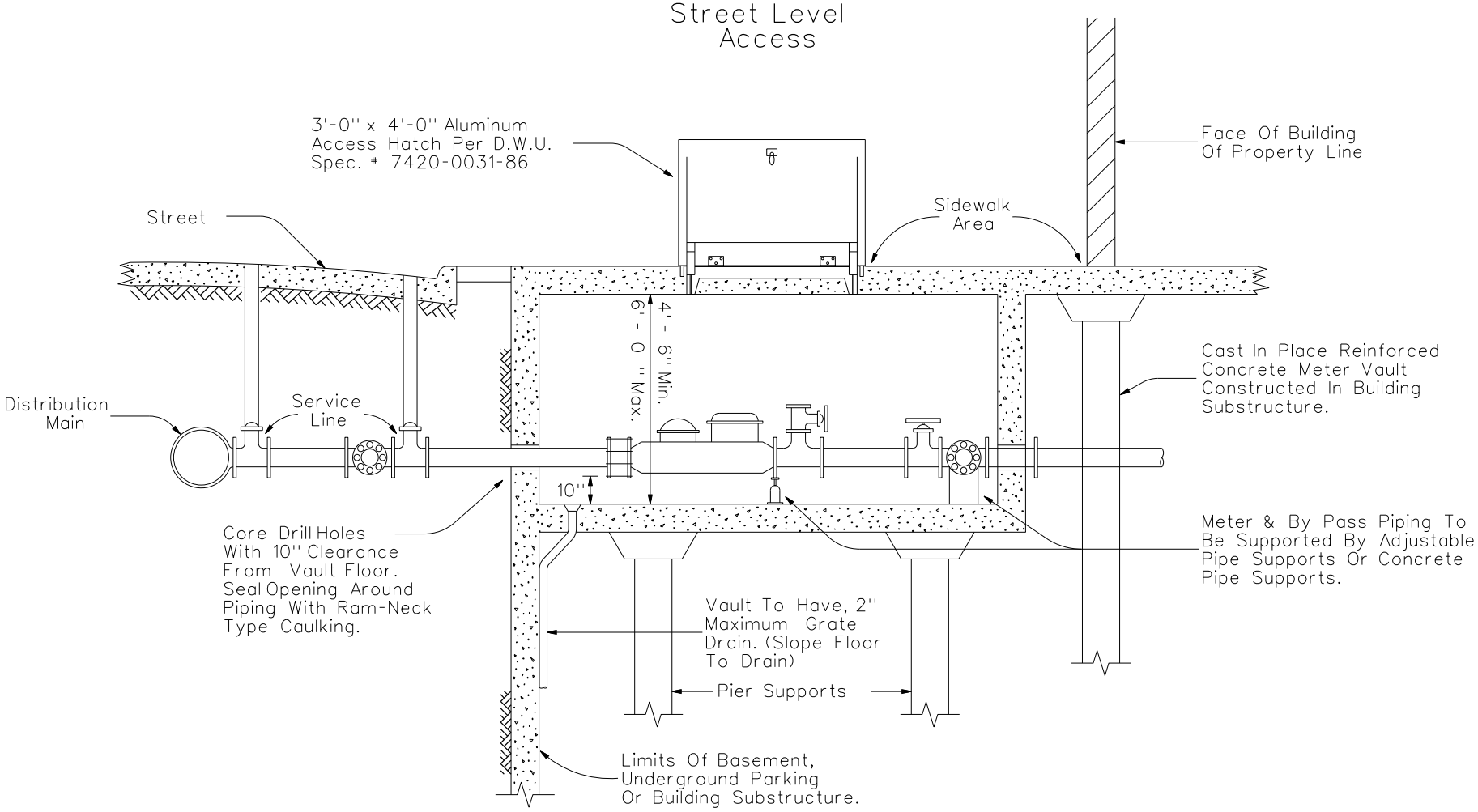
ALIGNED PERPENDICULAR TO DISTRIBUTION MAIN



ALIGNED PERPENDICULAR TO DISTRIBUTION MAIN

SUSPENDED VAULT INSTALLATION DETAILS PLAN VIEWS		DWU	(Page No.) 523
		DATE JAN. 2010	

Meter Vault To Have Direct
Street Level
Access



TYPICAL FOR ALL SUSPENDED VAULTS

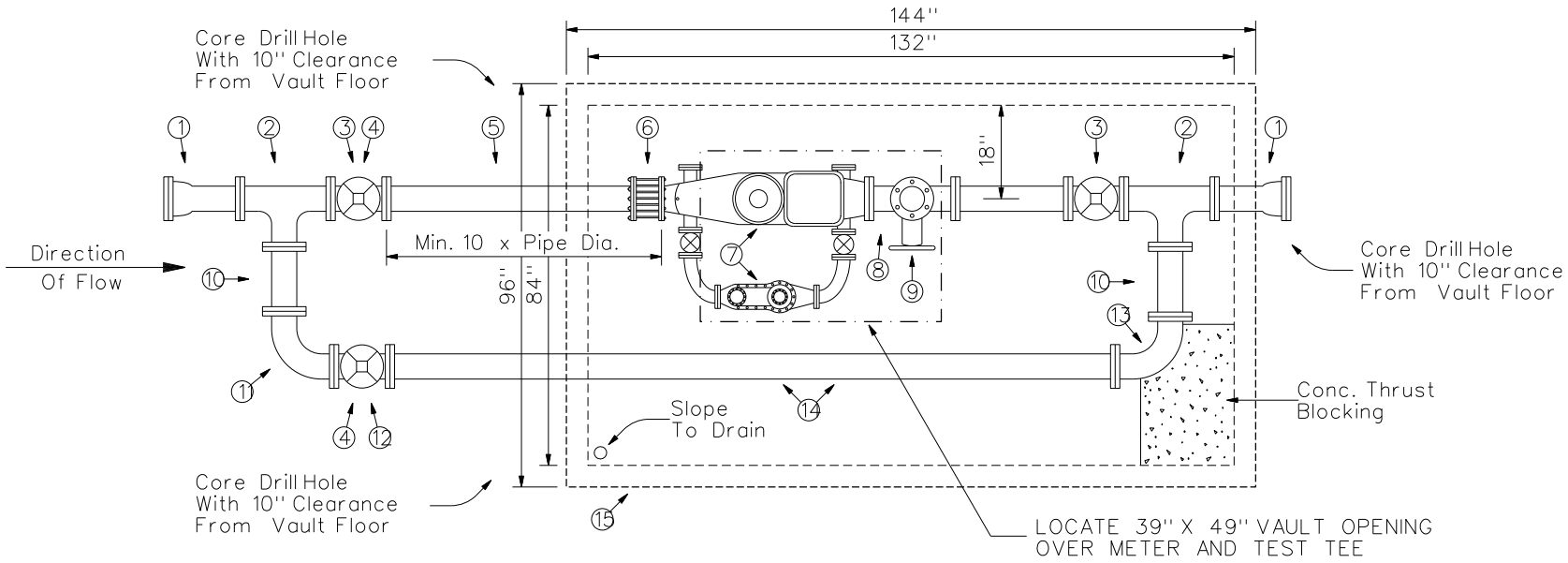
(Combined Service, Perpendicular To Distribution Main Shown)

SUSPENDED VAULT INSTALLATION DETAIL ELEVATION VIEW		DWU	(Page No.) 524
		DATE JAN. 2010	

Material List		
Part No.	Quantity	Description
①	2 Ea.	?" x 12" C.I. Nipple M.J. x F.
②	2 Ea.	?" x ?" C.I. Tee F. x F.
③	2 Ea.	?" Gate Valve F. x F.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	?" x ?" C.I. Nipple F. x S.
⑥	1 Ea.	?" Flanged Coupling Adaptor
⑦	1 Ea.	?" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	?" x 4" C.I. Tee F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)
⑩	3 Ea.	4" x 24" C.I. Nipple F. x F.
⑪	1 Ea.	?" C.I. 90° Bend F. x F.
⑫	1 Ea.	?" Gate Valve F. x M.J.
⑬	1 Ea.	?" C.I. 90° Bend M.J. x F.
⑭	1 Ea.	?" D.I. Pipe, Class 52, Approx. 10'
⑮	1 Ea.	Cast In Place Concrete Vault
	1 Ea.	Access Hatch (Not Shown)

?" = Size As Specified



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TYPICAL SUSPENDED VAULT DETAIL METER PERPENDICULAR TO MAIN

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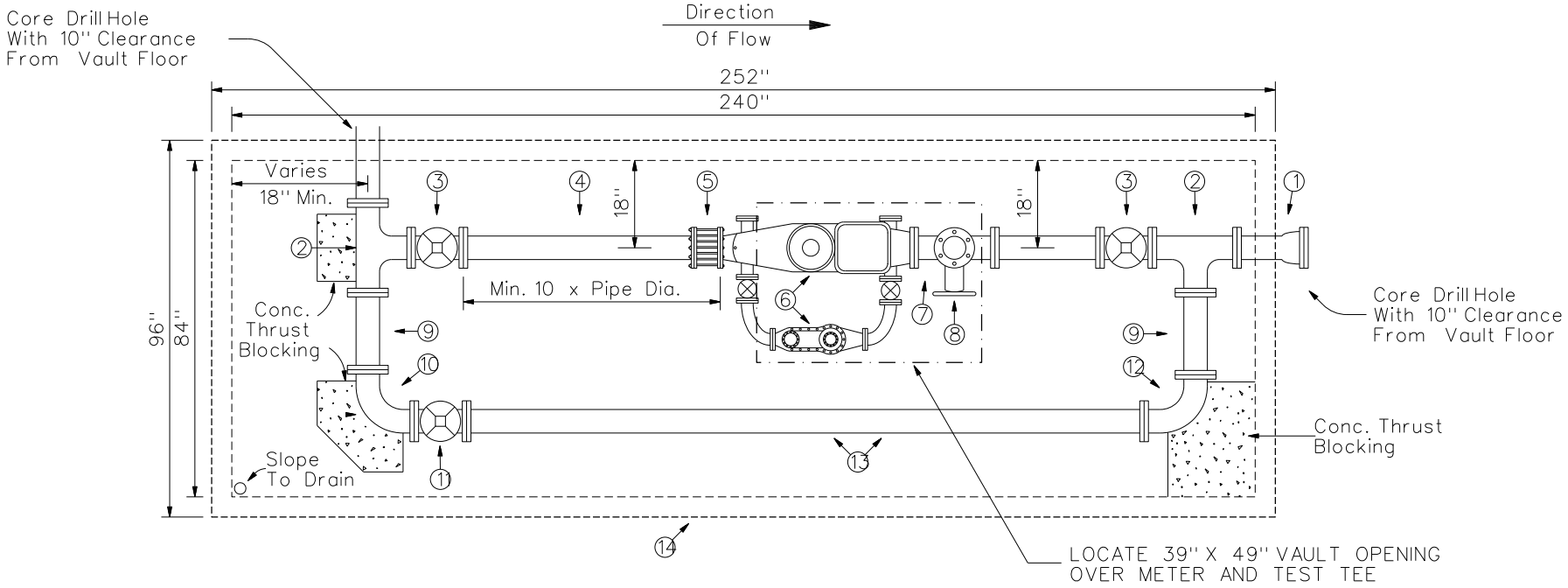
Material List		
Part No.	Quantity	Description
①	2 Ea.	?" x 12" C.I. Nipple M.J. x F.
②	2 Ea.	?"x 6" C.I. Tee F. x F.
③	2 Ea.	?" Gate Valve F. x F.
④	3 Ea.	?" x ?" C.I. Nipple F. x S.
⑤	1 Ea.	?" Flanged Coupling Adaptor
⑥	1 Ea.	?" Meter As Specified (Type F.M. Shown)
⑦	1 Ea.	?" x 4" C.I. Tee F. x F. (Test Point)
⑧	1 Ea.	4" Gate Valve F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑨	1 Ea.	?" x 24" C.I. Nipple F. x F.
⑩	3 Ea.	?" C.I. 90° Bend F. x F.
⑪	1 Ea.	?" Gate Valve F. x M.J.
⑫	1 Ea.	?" C.I. 90° Bend M.J. x F.
⑬	1 Ea.	?" D.I. Pipe, Class 52, Approx. 10'
⑭	1 Ea.	Cast In Place Concrete Vault
	1 Ea.	Access Hatch (Not Shown)

?" = Size As Specified



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TYPICAL SUSPENDED VAULT DETAIL METER PARALLEL TO MAIN		DWU	(Page No.) 526
		DATE JAN. 2010	