# Standard Drawings for Water & Wastewater Construction

## Dallas Water Utilities

City of Dallas
Water Utilities Department

FEBRUARY 2009

# Standard Drawings For Water & Wastewater Construction

| | | |
|---|---|---|
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City of Dallas
Water Utilities Department

# DALLAS WATER UTILITIES
# Standard Construction Drawings

PART 1 – COMMON FOR WATER AND WASTEWATER CONSTRUCTION

PART 2 – WATER MAIN CONSTUCTION

PART 3 – WASTEWATER MAIN CONSTRUCTION

PART 4 – WATER AND WASTEWATER ADJUSTMENTS

PART 5 – LARGE WATER SERVICE INSTALLATIONS

PART 6 – EROSION AND SEDIMENT CONTROL

# 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 )

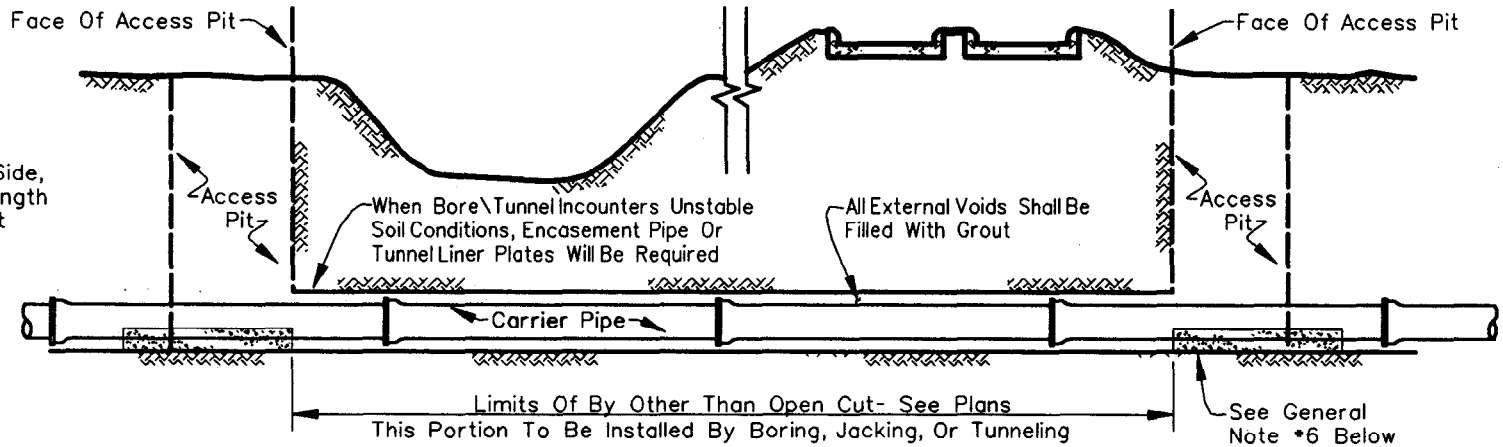
# COMMON FOR WATER & WASTEWATER MAIN CONSTRUCTION

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)

NOTE:
On "Bore Pit" Side, The Minimum Length Must Be At Least One Joint.



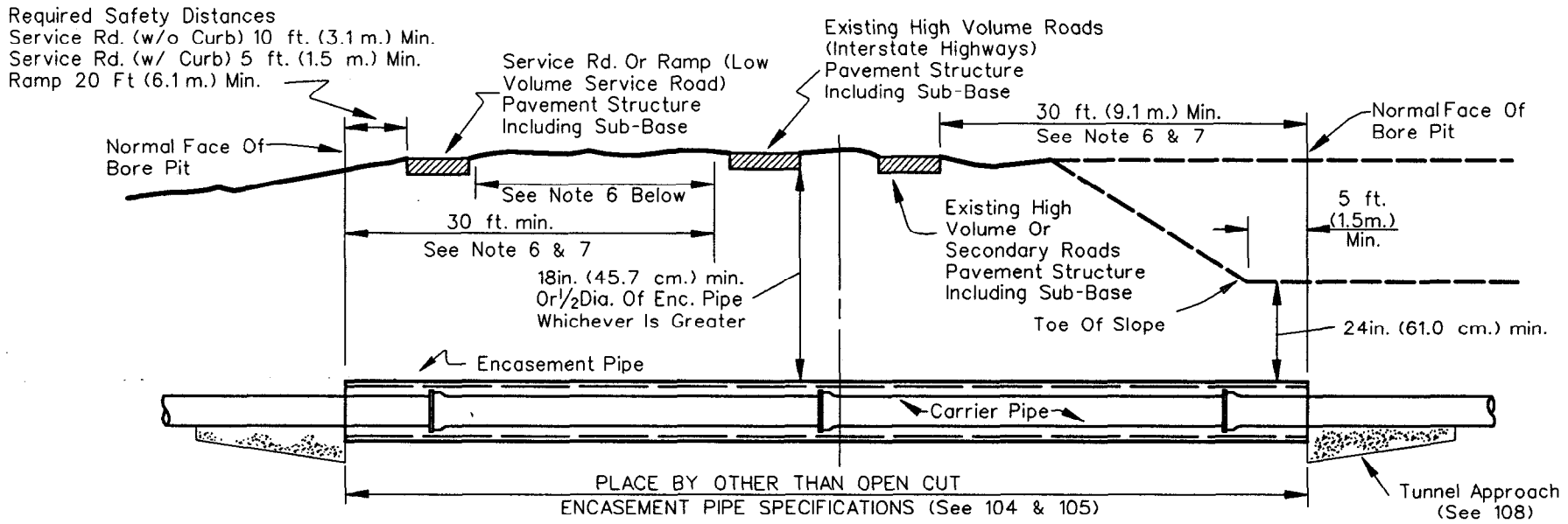

GENERAL NOTES

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. On Encasement Pipe 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 DEC. 2001 | |

# TYPICAL FOR HIGHWAY CROSSING FOR ALL WASTEWATER MAINS & FOR WATER MAINS 12 in. (30.5 cm.) & UNDER IN DIAMETER




## GENERAL NOTES

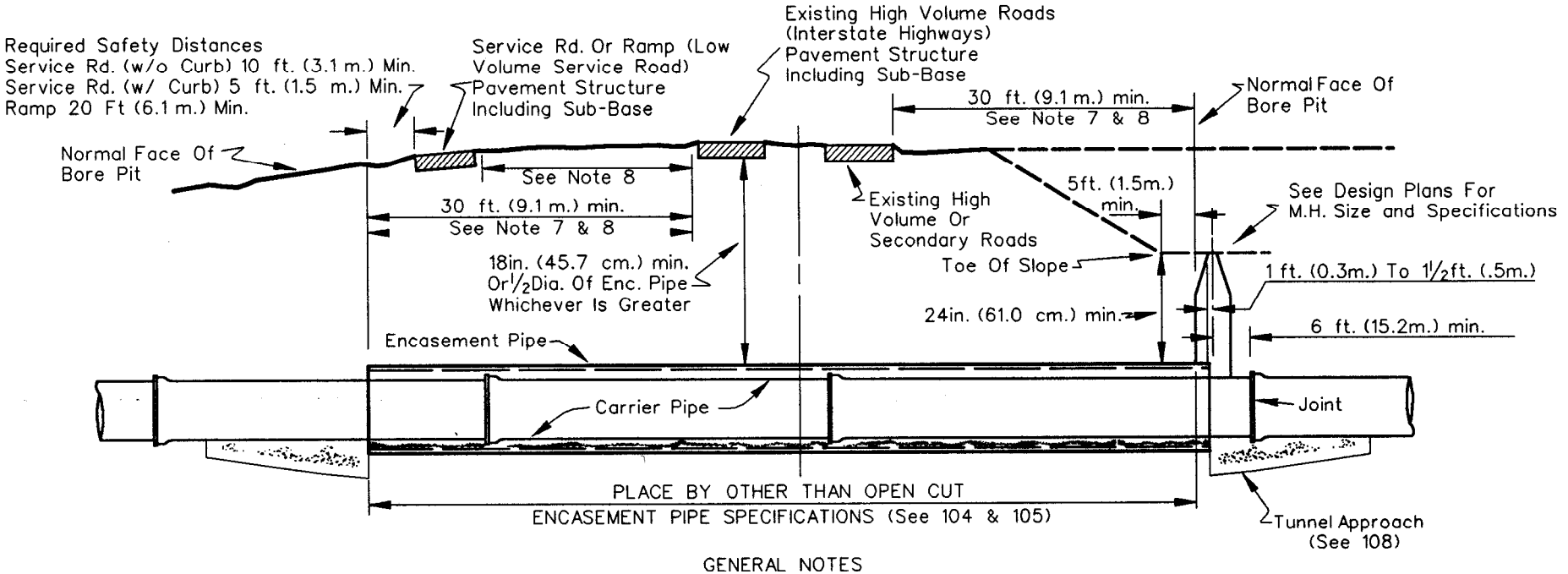
1. Carrier Pipe To Be Made Up Outside The Encasement Pipe And Pushed Through With The Bell Of The Pipe Resting On The Encasement Pipe Or A Class "B" Concrete Cradle Where Applicable.
2. Carrier Pipe Shall Be Supported On A Continuous Class "B" (13,789.5 Kpa) Concrete Cradle, Within Corrugated Metal And 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. In Tunnel Sections, Voids Between Earth Or Rock & Enc. Pipe Shall Be Filled With 2:7 Grout Including 5% Air Entrainment By Pressure Injection.

ITEM 6.6.2
Concrete Class Item 7.4.5.

REFER TO PAGES: 103 104 105 106 107 108 109

| HIGHWAY CROSSING FOR ALL WASTEWATER MAINS & FOR WATER MAINS 12" & UNDER IN DIAMETER. | | DWU | (Page No.) 102 |
|---|---|---|---|
| | | DATE DEC. 2001 | |

# 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 2:7 Grout Including 5% Air Entrainment By Pressure Injection.
4. Carrier Pipe Shall Be Supported On A Continuous Class "B" (13,789.5 Kpa) 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. (22.9 cm.) 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.

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 DEC. 2001 | |

| 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. (cm.) | Ga. (mm.) | Ft. (M.) | Ga. (mm.) | Ft. (M.) | Ga. (mm.) | Ft. (M.) | in. (cm.) | Ga. (mm.) | | | Class "C" | Class "B" | Class "A" | in. (mm.) | Ft. (M.) |
| 12" (30.5) | NOT AVAILABLE | NOT AVAILABLE | NOT AVAILABLE | NOT AVAILABLE | NOT ALLOWED IN TX.D.O.T. DISTRICT 18 | | NOT ALLOWED IN TX.D.O.T. DISTRICT 18 | | | | NOT ALLOWED IN TX.D.O.T. DISTRICT 18 | | | 3/16" (4.76) | ∞ |
| 15" (38.1) | | | | | | | | | | | | | | 1/4" (6.35) | ∞ |
| 18" (45.7) | | | | | | | | | | | | | | 1/4" (6.35) | ∞ |
| 21" (53.3) | | | | | | | | | | | | | | 5/16" (7.94) | ∞ |
| 24" (60.9) | | | | | | | | | | | | | | 3/8" (9.53) | ∞ |
| 27" (68.6) | | | | | | | | | | | | | | 7/16" (11.11) | ∞ |
| 30" (76.2) | | | | | | | | | | | | | | 7/16" (11.11) | ∞ |
| 36" (91.4) | | | | | | | | | | | | | | 1/2" (12.7) | ∞ |
| 42" (106.7) | | | | | | | | | | | | | | 1/2" (12.7) | ∞ |
| 48" (121.9) | 14 (1.91) | ∞ | 12 (2.66) | ∞ | | | | | | | | | | | |
| 54" (137.2) | 14 (1.91) | ∞ | 12 (2.66) | ∞ | | | | | | | | | | | |
| 60" (152.4) | 14 (1.91) | ∞ | 12 (2.66) | ∞ | | | | | | | | | | | |
| 66" (167.6) | 14 (1.91) | ∞ | 12 (2.66) | ∞ | | | | | | | | | | | |
| 72" (182.9) | 14 (1.91) | ∞ | 12 (2.66) | ∞ | | | | | | | | | | | |
| | ALT. "B" | | | | | | | | | | | | | ALT. "D" | |

**NOTE:**

∞ Infinity

a). 2 2/3" (6.8 cm) x 1/2" (1.3 cm) Corr.

b). 3" (7.6 cm) x 1" (2.5 cm) Corr.

# HIGHWAY CROSSING ENCASEMENT PIPE, GAUGE, CLASS, COVER

DWU

DATE MARCH 2001

| 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. (cm.) | Ga. (mm.) | Ft. (M.) | Ga. (mm.) | Ft. (M.) | Ga. (mm.) | Ft. (M.) | in. (cm.) | Ga. (mm.) | | | Class "C" | Class "B" | Class "A" | in. (mm.) | Ft. (M.) |
| 78" (198.1) | 12 (2.66) | ∞ | 12 (2.66) | ∞ | NOT ALLOWED IN TX D.O.T. DISTRICT | 18 | NOT ALLOWED IN TX D.O.T. DISTRICT | 18 | | | NOT ALLOWED IN TX D.O.T. DISTRICT | 18 | | | |
| 84" (213.4) | 12 (2.66) | ∞ | 12 (2.66) | ∞ | | | | | | | | | | | |
| 90" (228.6) | 10 (3.43) | ∞ | 10 (3.43) | ∞ | | | | | | | | | | | |
| 96" (243.8) | 10 (3.43) | ∞ | 10 (3.43) | ∞ | | | | | | | | | | | |
| 102" (259.1) | 10 (3.43) | ∞ | 10 (3.43) | ∞ | | | | | | | | | | | |
| 108" (274.3) | 10 (3.43) | ∞ | 8 (4.19) | ∞ | | | | | | | | | | | |
| 114" (289.6) | 8 (4.19) | ∞ | 8 (4.19) | ∞ | | | | | | | | | | | |
| 120" (304.8) | 8 (4.19) | ∞ | 8 (4.19) | 30' (9.14) | | | | | | | | | | | |
| 126" (320.0) | 8 (4.19) | 31' (9.45) | 8 (4.19) | 27' (8.23) | | | | | | | | | | | |
| 126" (320.0) | 8 (4.19) | 29' (8.84) | 8 (4.19) | 22' (6.71) | | | | | | | | | | | |
| 138" (350.5) | 8 (4.19) | 28' (8.53) | 8 (4.19) | 22' (6.71) | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

ALT. "B"

ALT. "D"

**NOTE:**

∞ Infinity

a). 2 2/3" (6.8 cm) x 1/2" (1.3 cm) Corr.

b). 3" (7.6 cm) x 1" (2.5 cm) Corr.

# HIGHWAY CROSSING ENCASEMENT PIPE, GAUGE, CLASS, COVER

DWU

DATE MARCH 2001

# 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 lubrication 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 2:7 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

Item 6.6.2

## STATE HIGHWAY CROSSINGS
Continued

### Depth of Cover

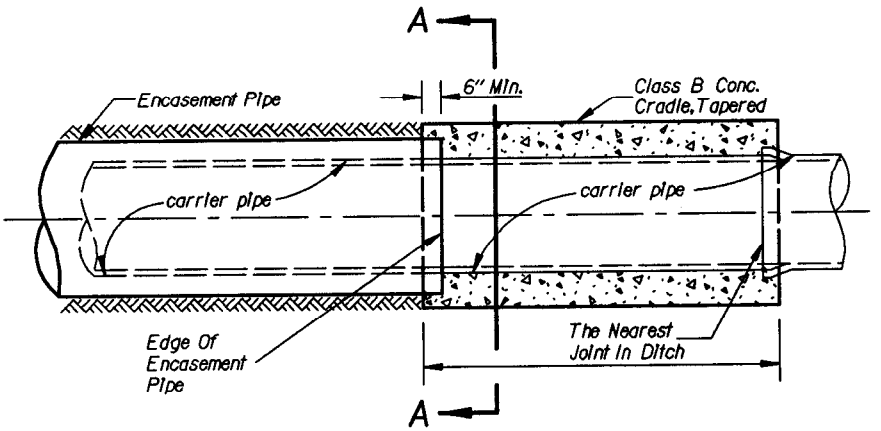
If depth of cover is insufficient to support live and dead loads, encasement or carrier pipe shall be installed concurrently as excavation of hole progresses so as to leave no more than 2 linear feet of unprotected hole at one time.

### Open Cutting Of Pavement

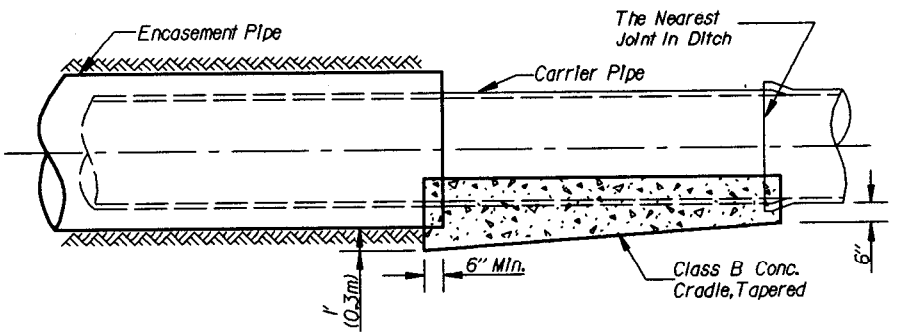
Specific Tx.D.O.T. written approval is required for open cutting of all State Highway pavements. Any approved open cutting of pavement must conform to the special Tx.D.O.T. specification "Utility Facilities Involving Open Cutting of Pavement".

See 102, 103, 104, 105, 106

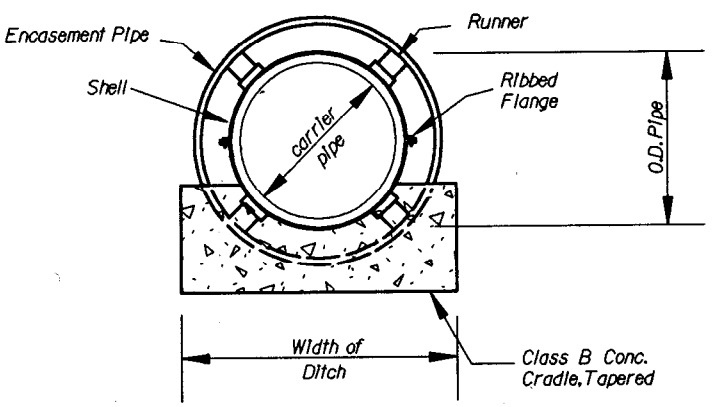
Item 6.6.2




PLAN VIEW

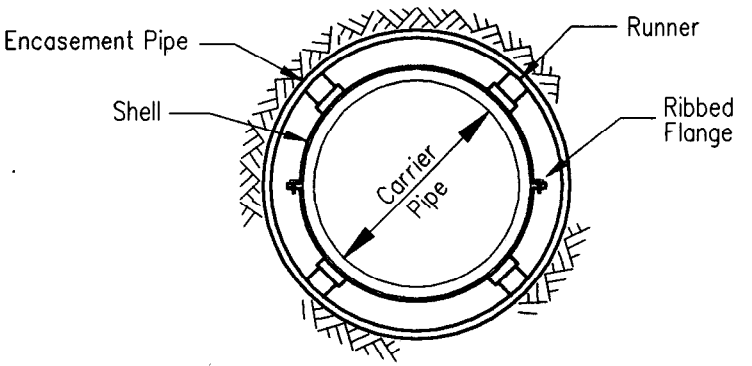



PROFILE VIEW

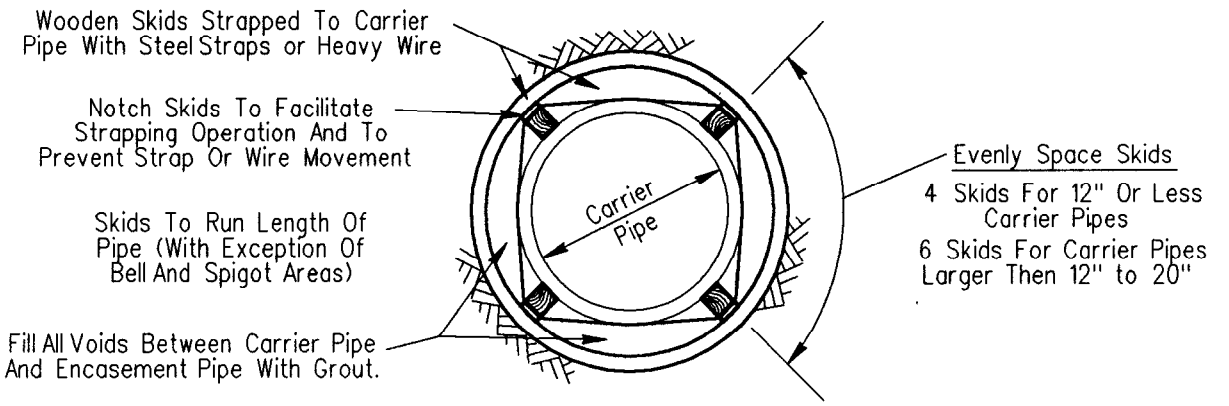



SECTION A-A

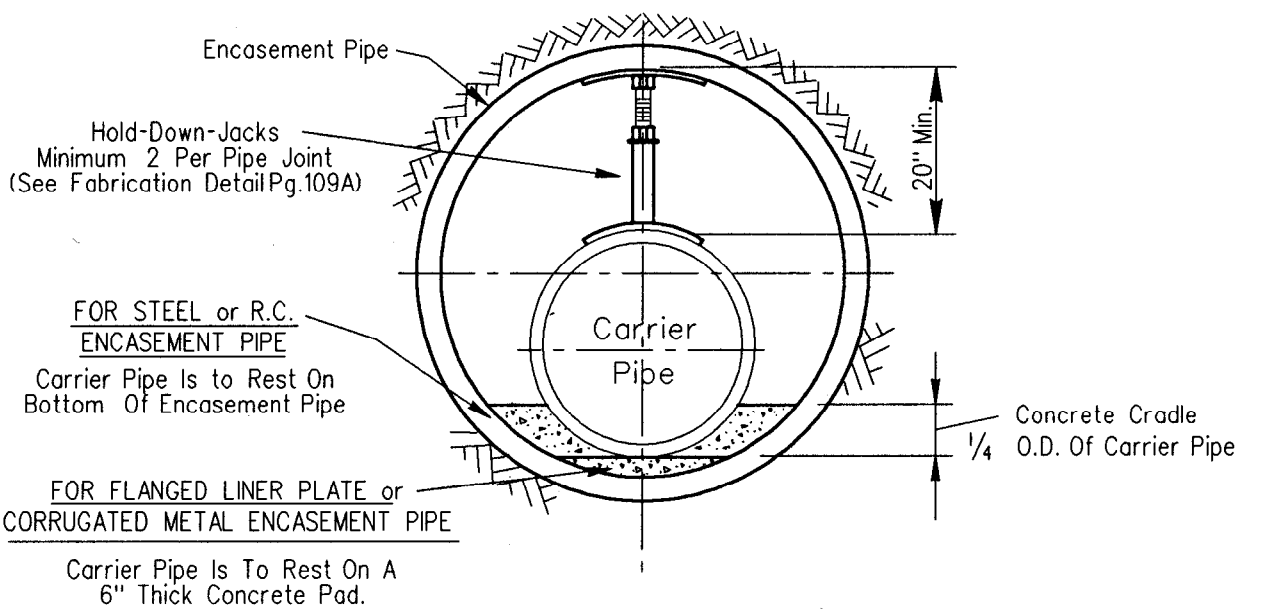
| TUNNEL APPROACHES WITH CASING SPACERS | | DWU | (PAGE No.) 108 |
|---|---|---|---|
| | | DATE DEC.2001 | |




## CASING SPACERS

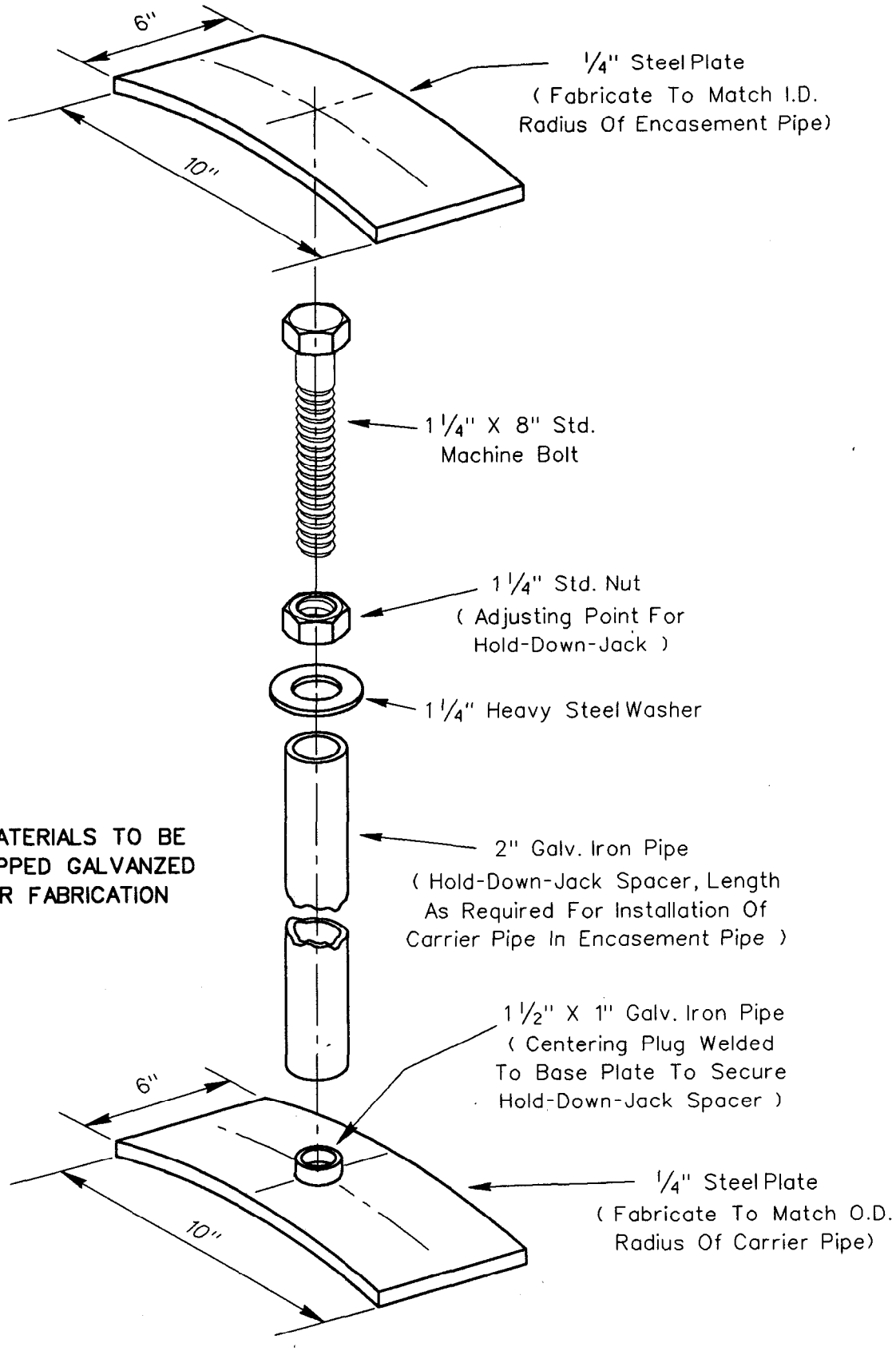



## WOODEN SKIDS




## HOLD-DOWN-JACK

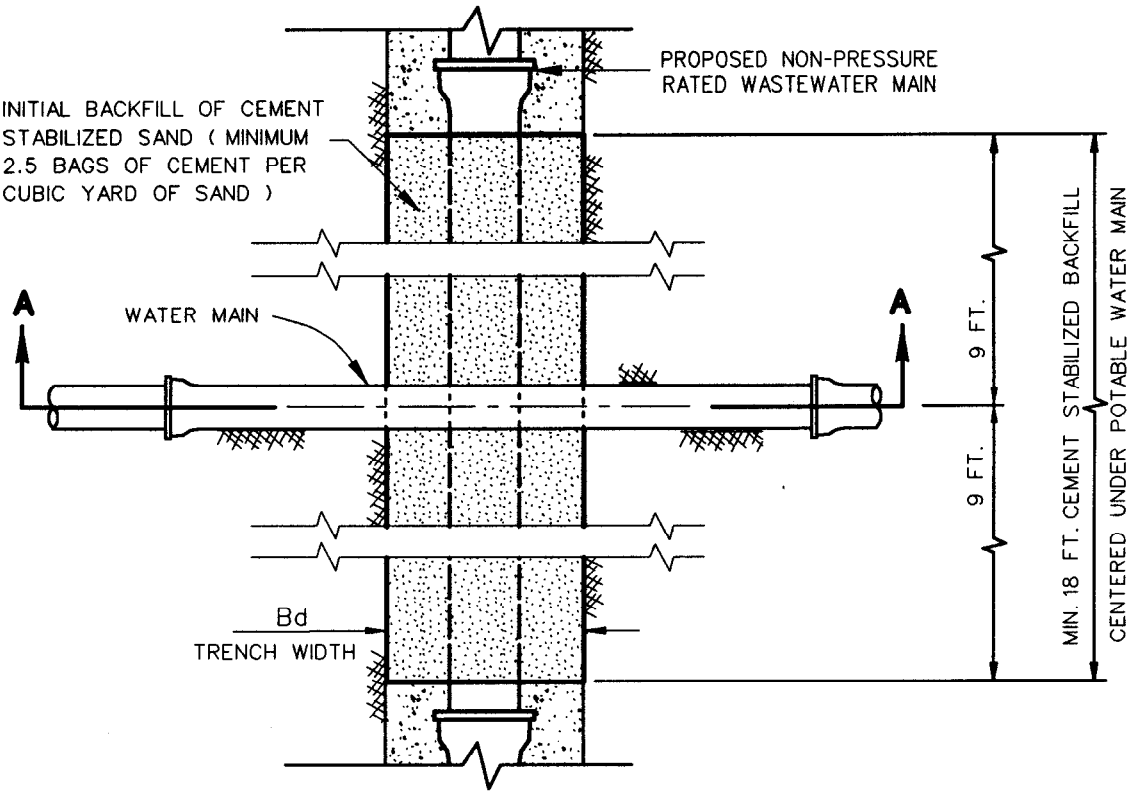
| CARRIER PIPE SUPPORT (TUNNEL) | | DWU | (PAGE No.) 109 |
|---|---|---|---|
| | | DATE JUNE 2002 | |



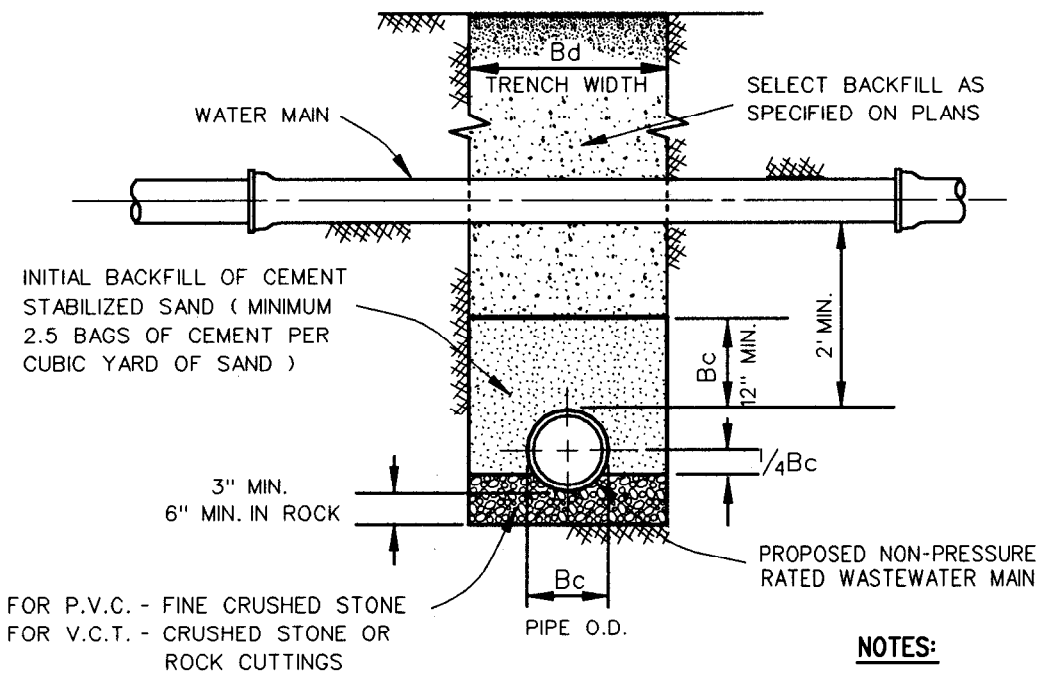

ALL MATERIALS TO BE HOT DIPPED GALVANZED AFTER FABRICATION

# HOLD-DOWN-JACK FABRICATION DETAIL

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




## SECTIONAL PLAN VIEW

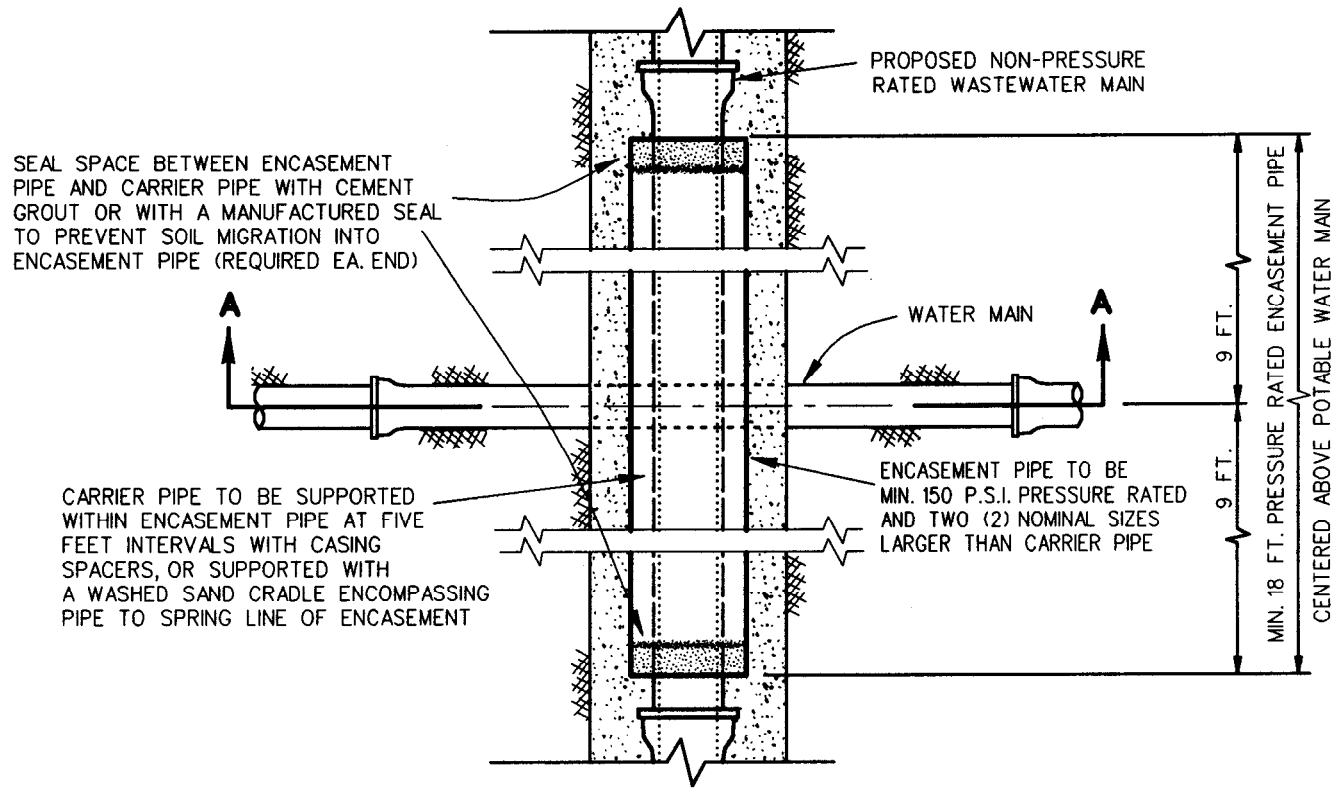



## SECTION A-A

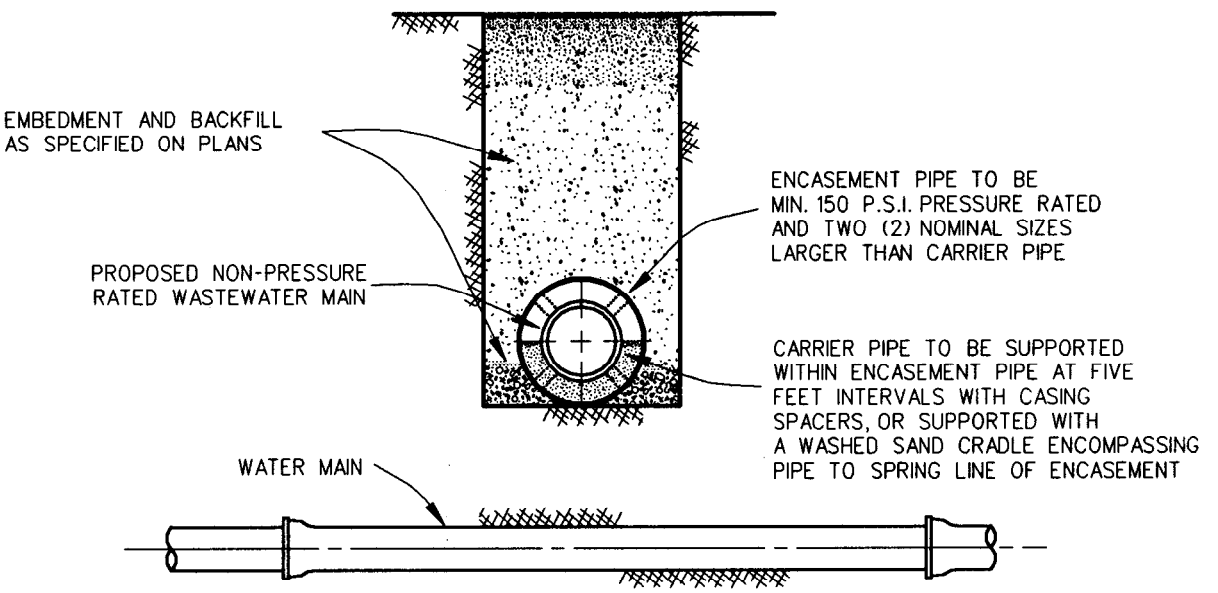
**NOTES:**

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

| EMBEDMENT DETAIL FOR NON-PRESSURE RATED WASTEWATER MAINS BELOW WATER MAINS | | DWU | (PAGE No.) 110 |
|---|---|---|---|
| | | DATE JAN.2001 | |

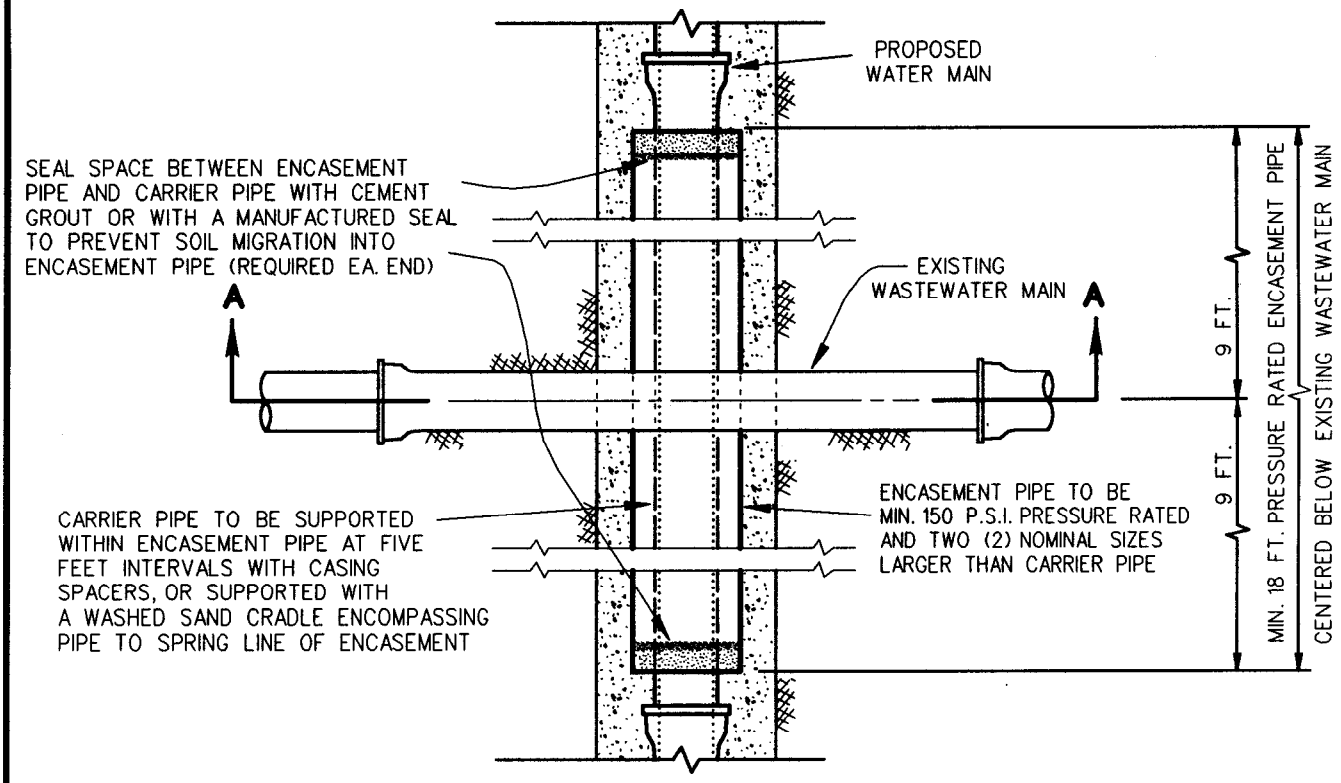



## SECTIONAL PLAN VIEW

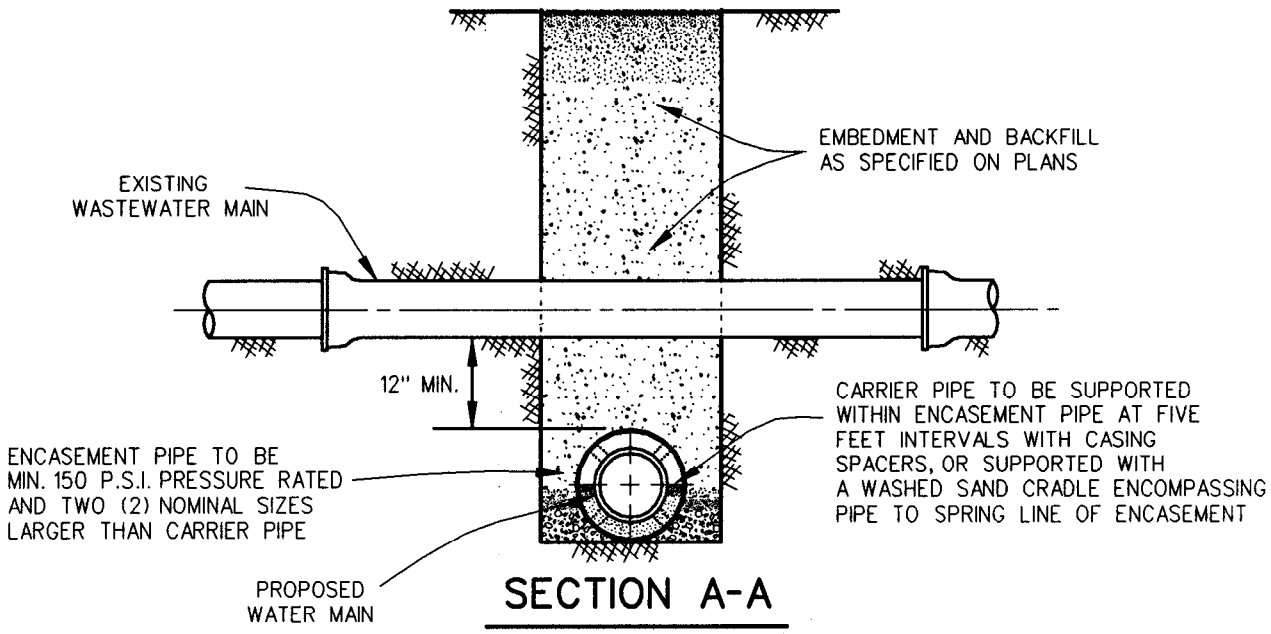



## SECTION A-A

| ENCASEMENT DETAIL FOR NON-PRESSURE RATED WASTEWATER MAINS ABOVE WATER MAINS | | DWU | (Page No.) 111 |
|---|---|---|---|
| | | DATE DEC.2001 | |




## SECTIONAL PLAN VIEW




## SECTION A-A

# ENCASEMENT DETAIL FOR PROPOSED WATER MAINS BELOW WASTEWATER MAINS

| | DWU | (Page No.) 111A |
|---|---|---|
| | DATE DEC.2001 | |

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

**For 12" Diameter Pipe and Smaller :**

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

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

**For Pipe Diameters Greater Than 12" to 24" :**

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

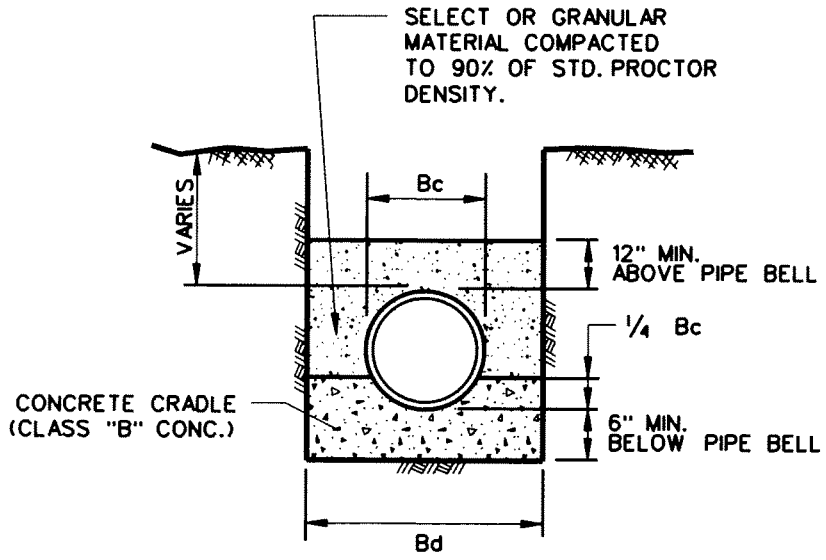
**For Pipe Diameters Greater Than 24" to 72" :**

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

**For Pipe Diameters Greater Than 72" :**

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

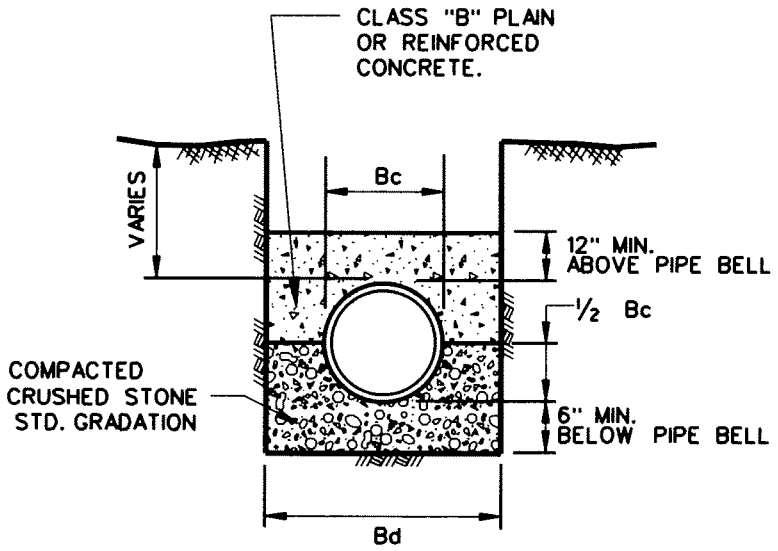
( REFER TO PAGES 113 THRU 119 FOR USAGE OF "Bd" )




## CLASS "A"

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

N.T.S.




## CLASS "A-1"

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

N.T.S.

NOTES:

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

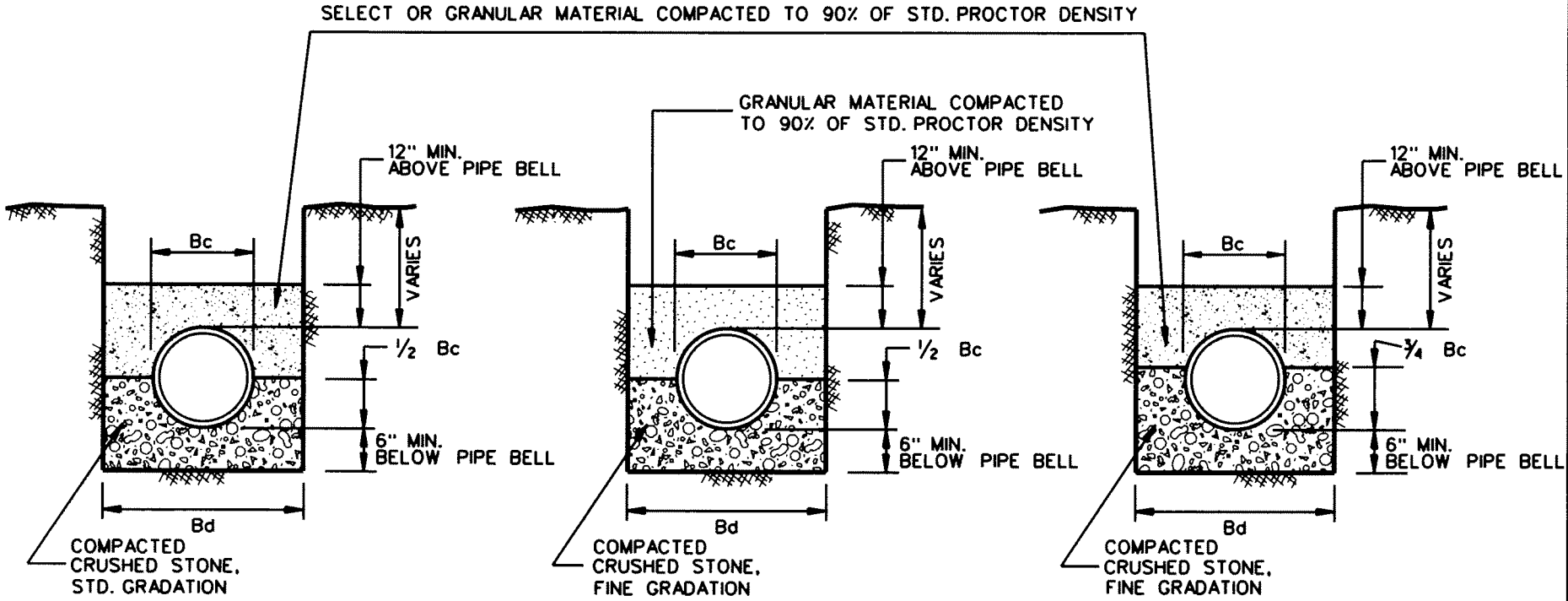
( REFER TO PAGE 112 FOR CALCULATION OF "Bd" )

# EMBEDMENT
# CLASS "A" & "A-1"

DWU

DATE
FEB. 2009

(PAGE NO.)
113




## 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 BELL
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

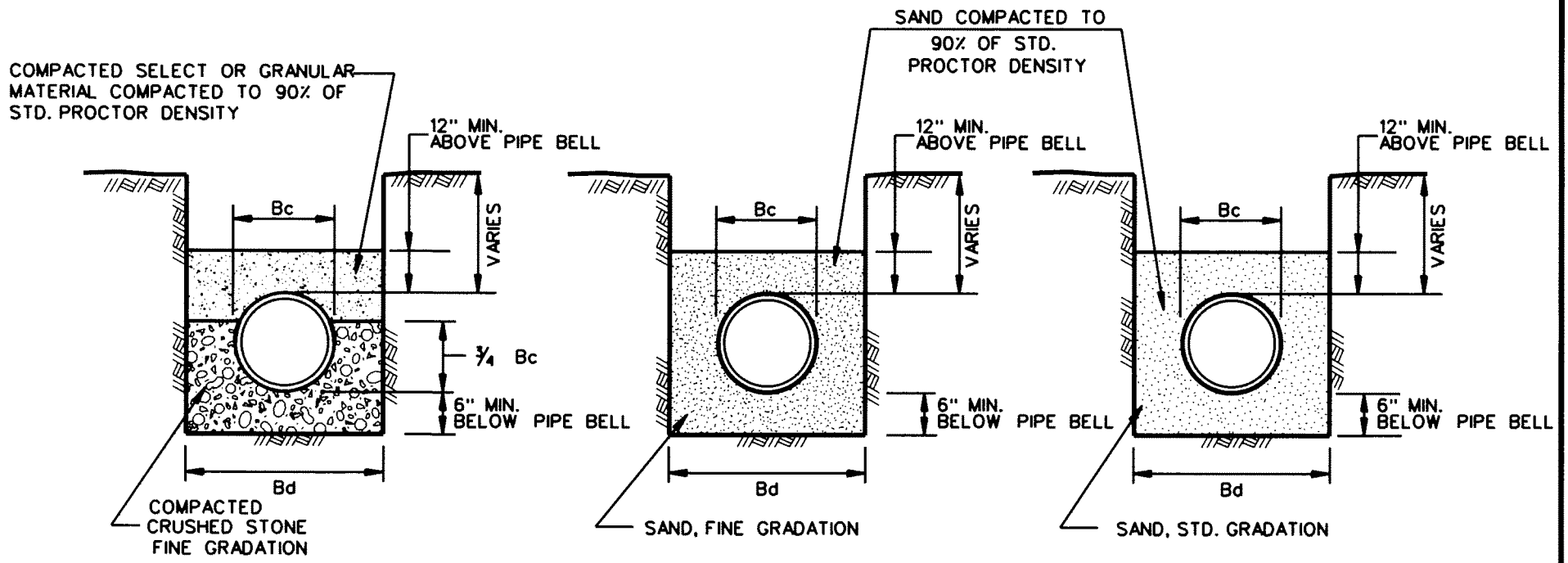
( REFER TO PAGE 112 FOR CALCULATION OF "Bd" )

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

DWU

(PAGE NO.) 114

DATE FEB. 2009




CLASS "B-2"

N.T.S.

CLASS "B-3"

N.T.S.

CLASS "B-4"

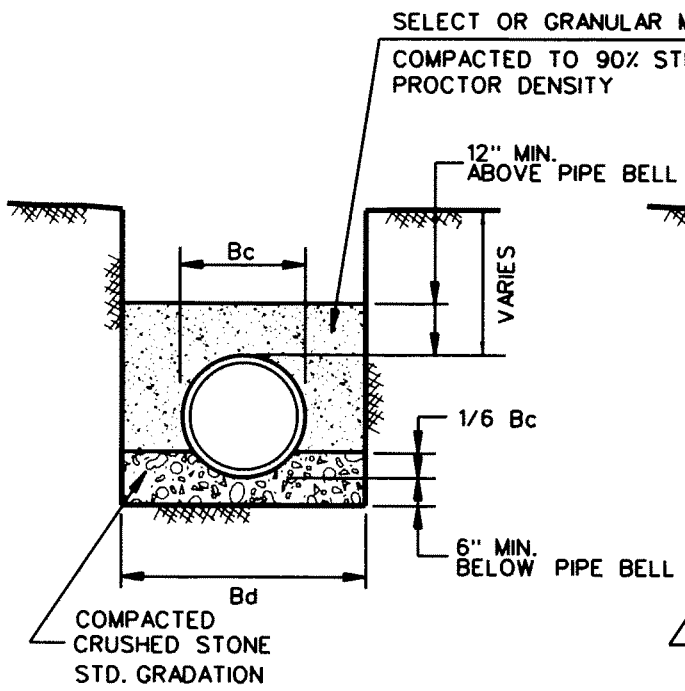
N.T.S.

NOTES:

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

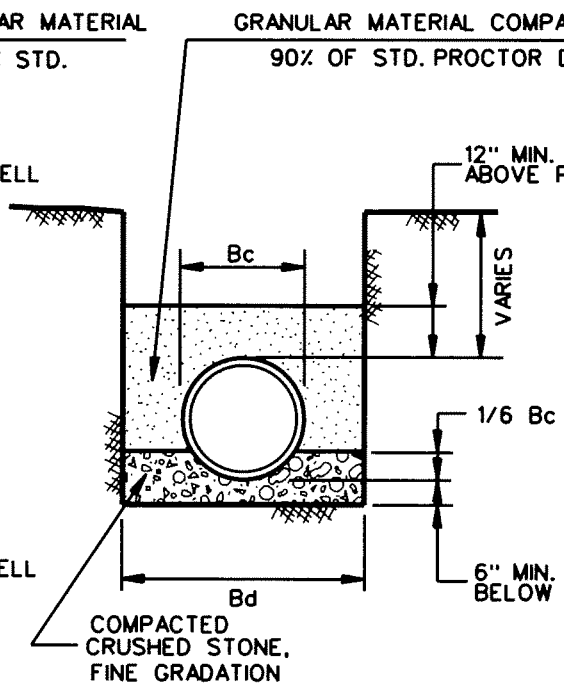
( REFER TO PAGE 112 FOR CALCULATION OF "Bd" )

| EMBEDMENT CLASS "B-2","B-3", & "B-4" | | DWU | (PAGE NO.) 115 |
|---|---|---|---|
| | | DATE FEB. 2009 | |



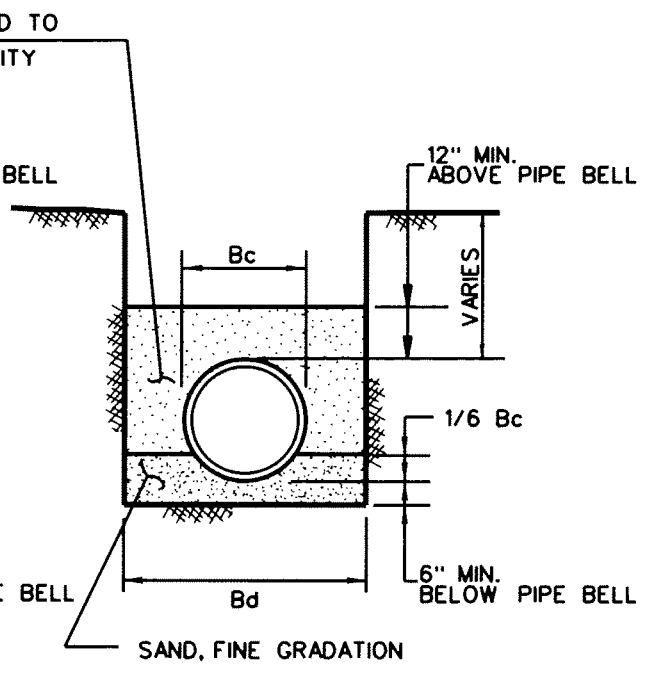

## CLASS "C"

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 BELL
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

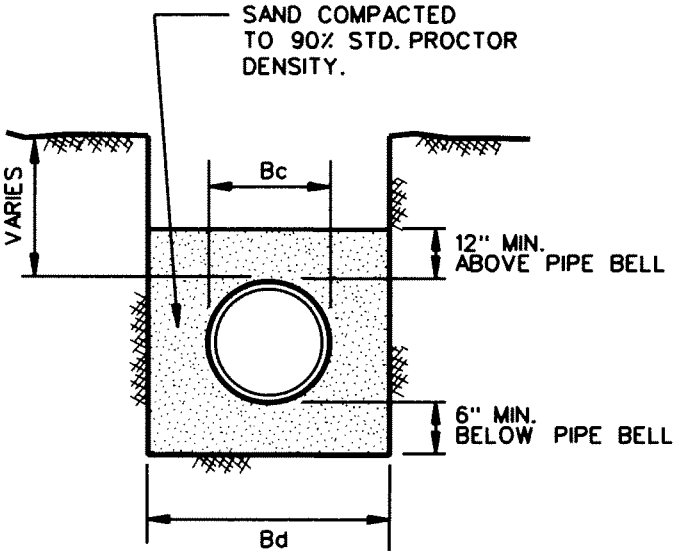
( REFER TO PAGE 112 FOR CALCULATION OF "Bd" )

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

DWU

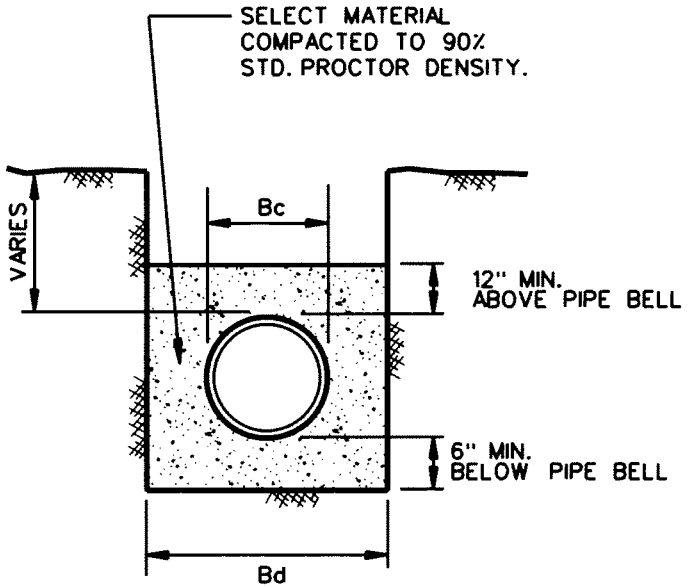
(PAGE NO.) 116

DATE FEB.2009




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 BELL
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

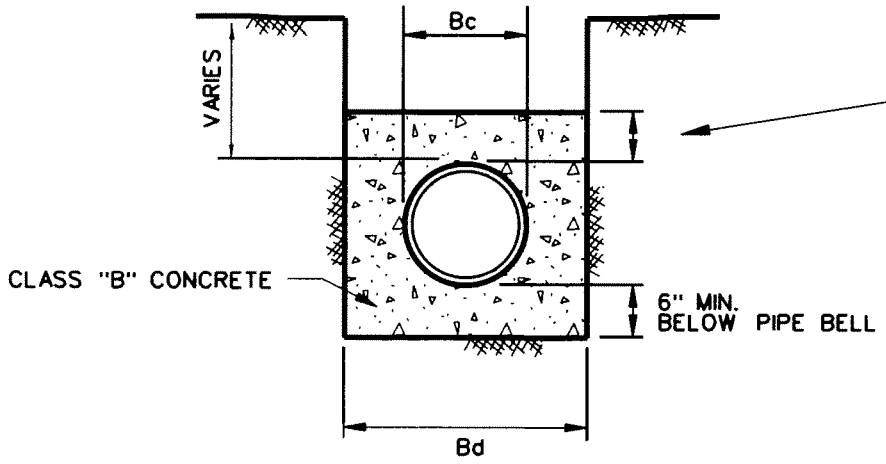
( REFER TO PAGE 112 FOR CALCULATION OF "Bd" )

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

DWU

(PAGE NO.) 117

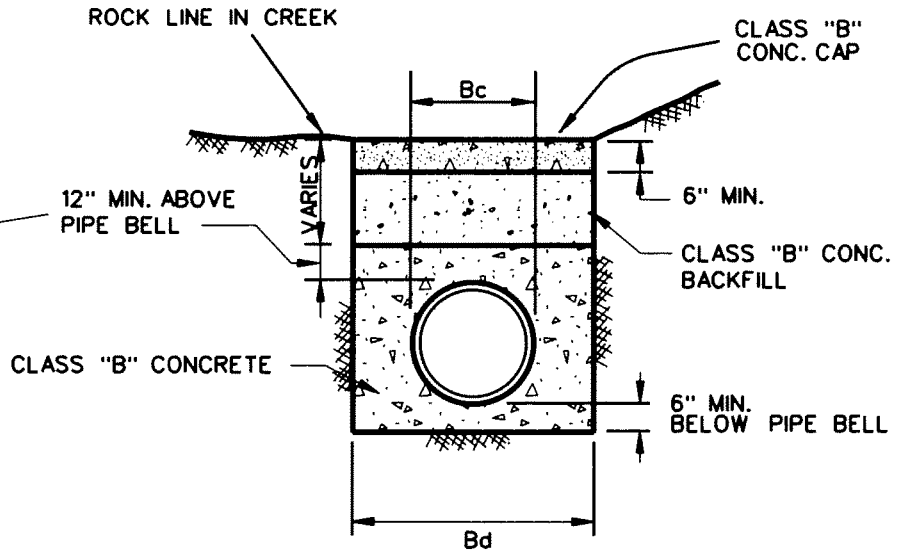
DATE FEB. 2009




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 BELL
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

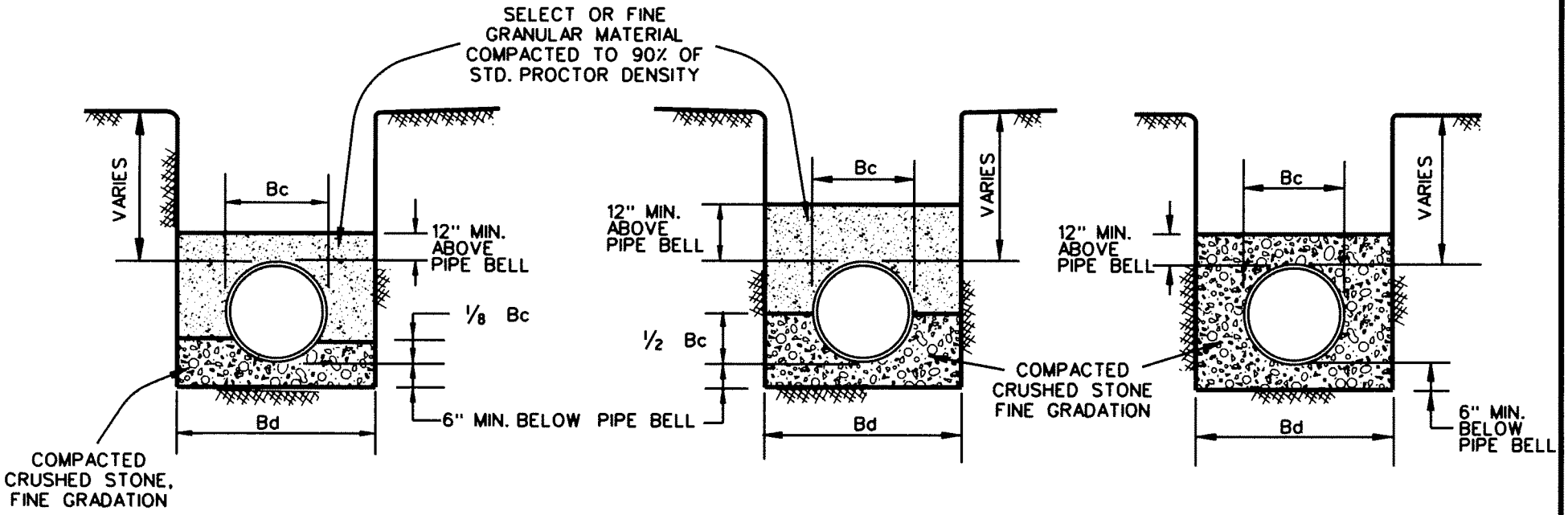
( REFER TO PAGE 112 FOR CALCULATION OF "Bd" )

# EMBEDMENT
# CLASS "G" & "G-1"

DWU

(PAGE NO.) 118

DATE FEB.2009




CLASS "B-1a"

CLASS " B-2a "

CLASS " B-5 "

NOTES:

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

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

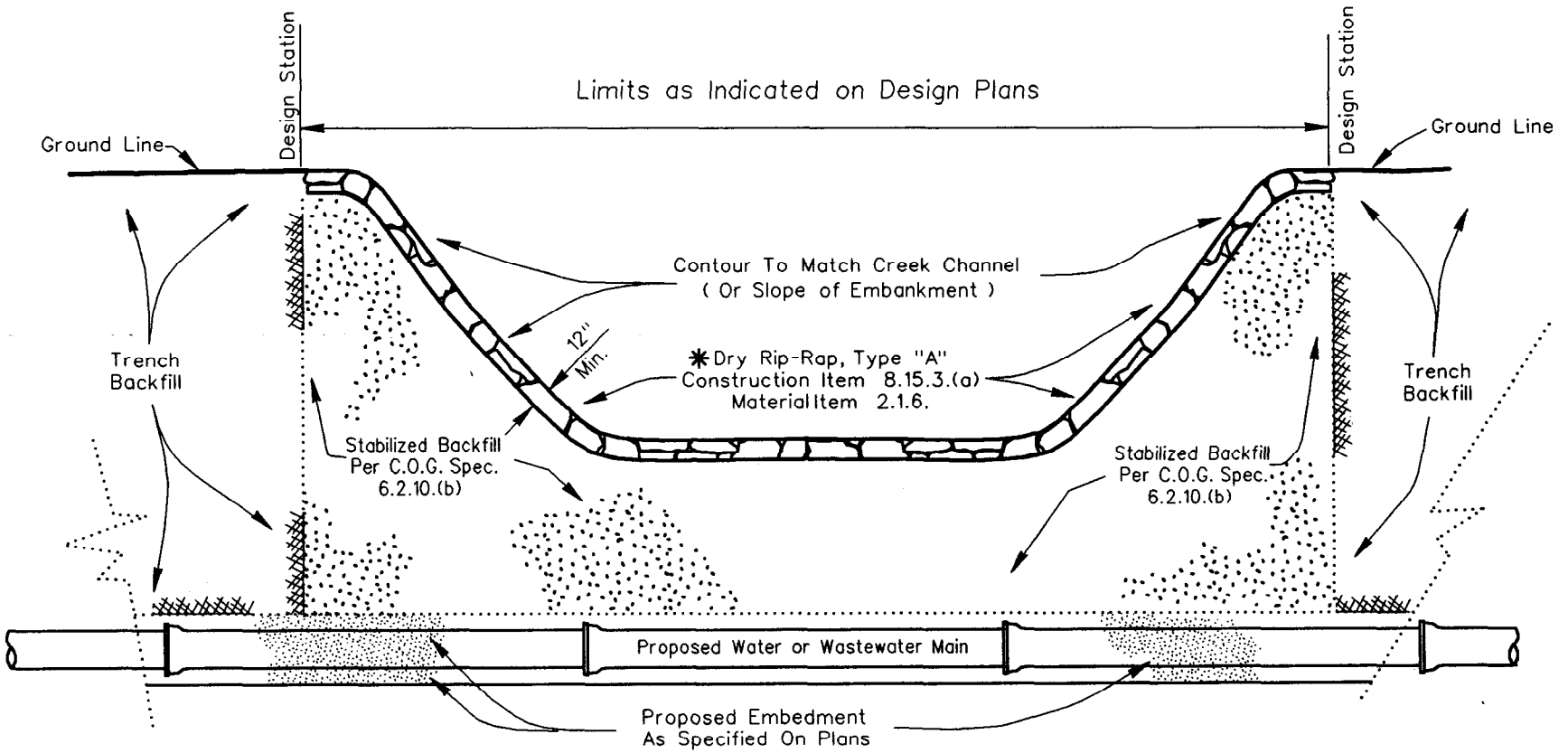
# EMBEDMENT
# CLASS"B-1a","B-2a"&"B-5"

DWU

(PAGE NO.) 119

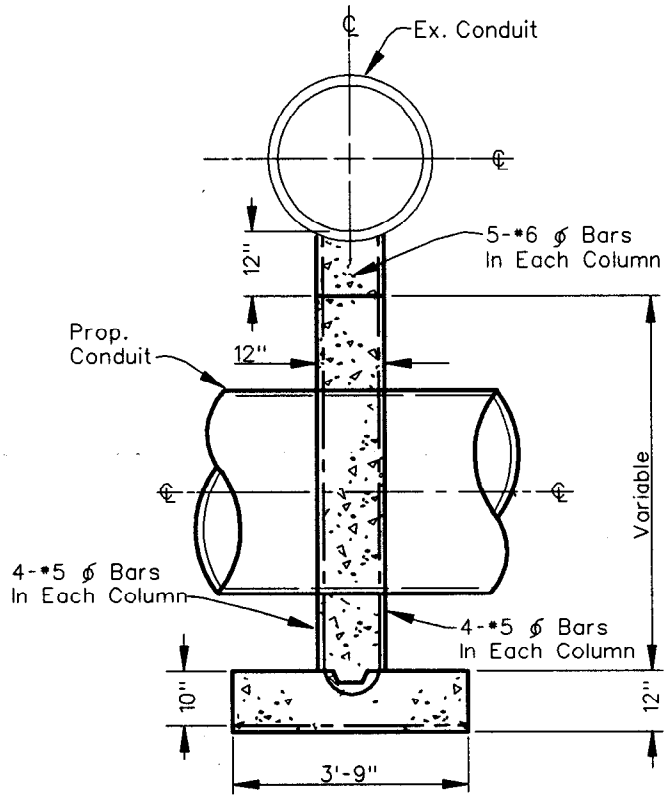
DATE FEB.2009

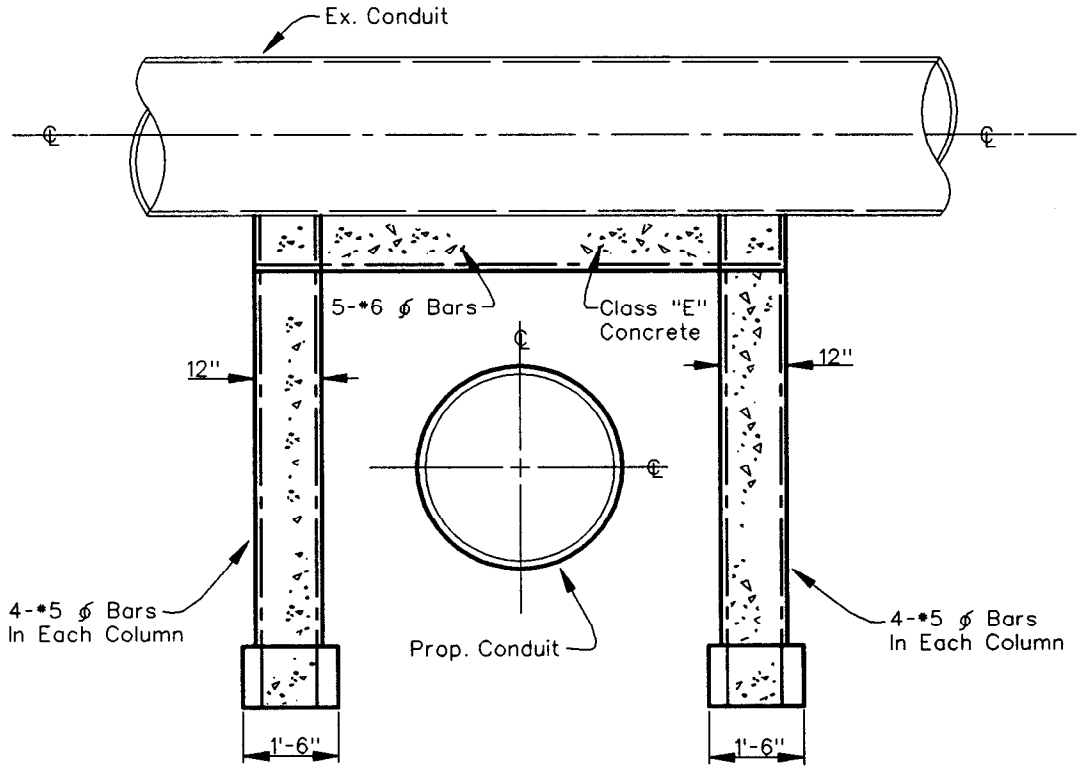
# DETAIL SHOWN FOR CREEK CROSSING
# ( TYPICAL FOR EMBANKMENT SLOPE PROTECTION )




✱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 Item 6.2.12.

Steel Reinforcement 2.2.6
Concrete Class Item 7.4.5

# TYPE "A"
# UTILITY SUPPORT

| DWU | (Page No.) 121 |
|---|---|
| DATE DEC.2001 | |

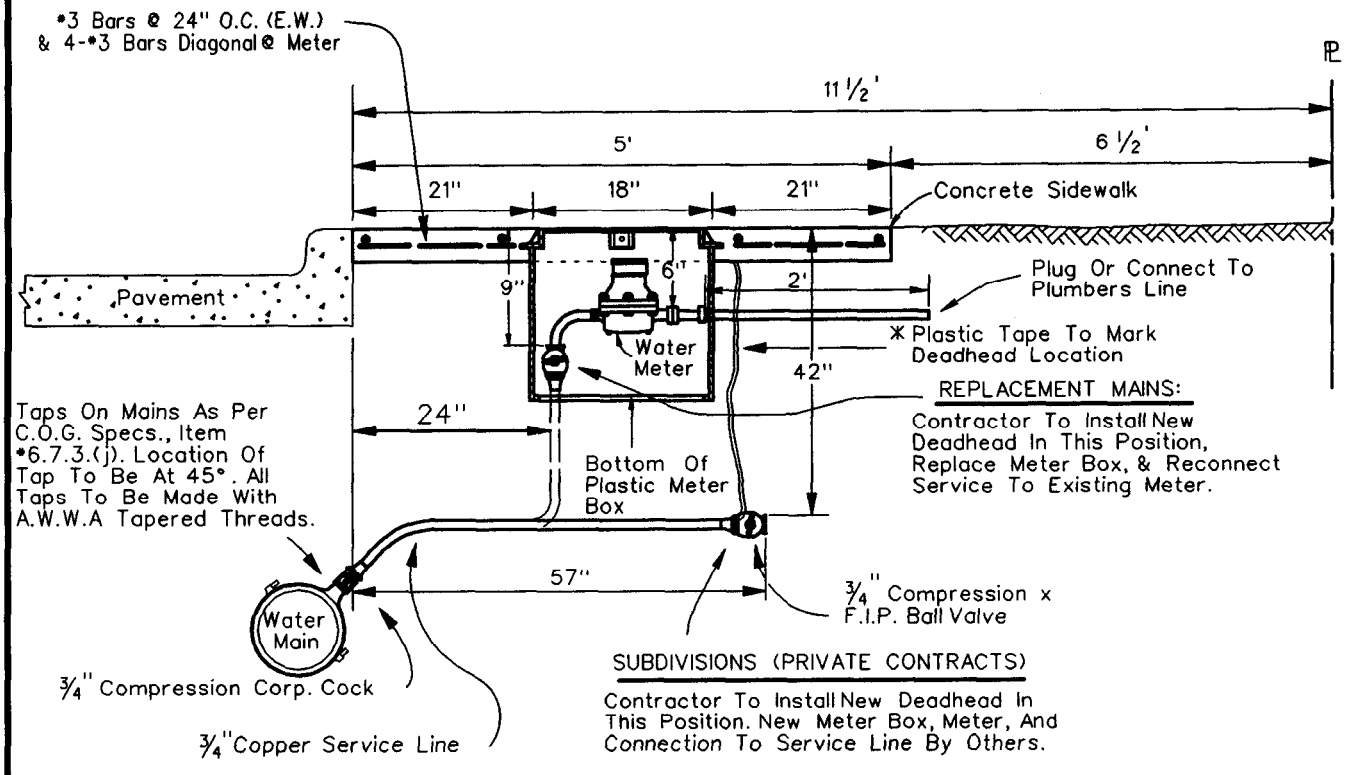
# PART 2

( Series 200 )

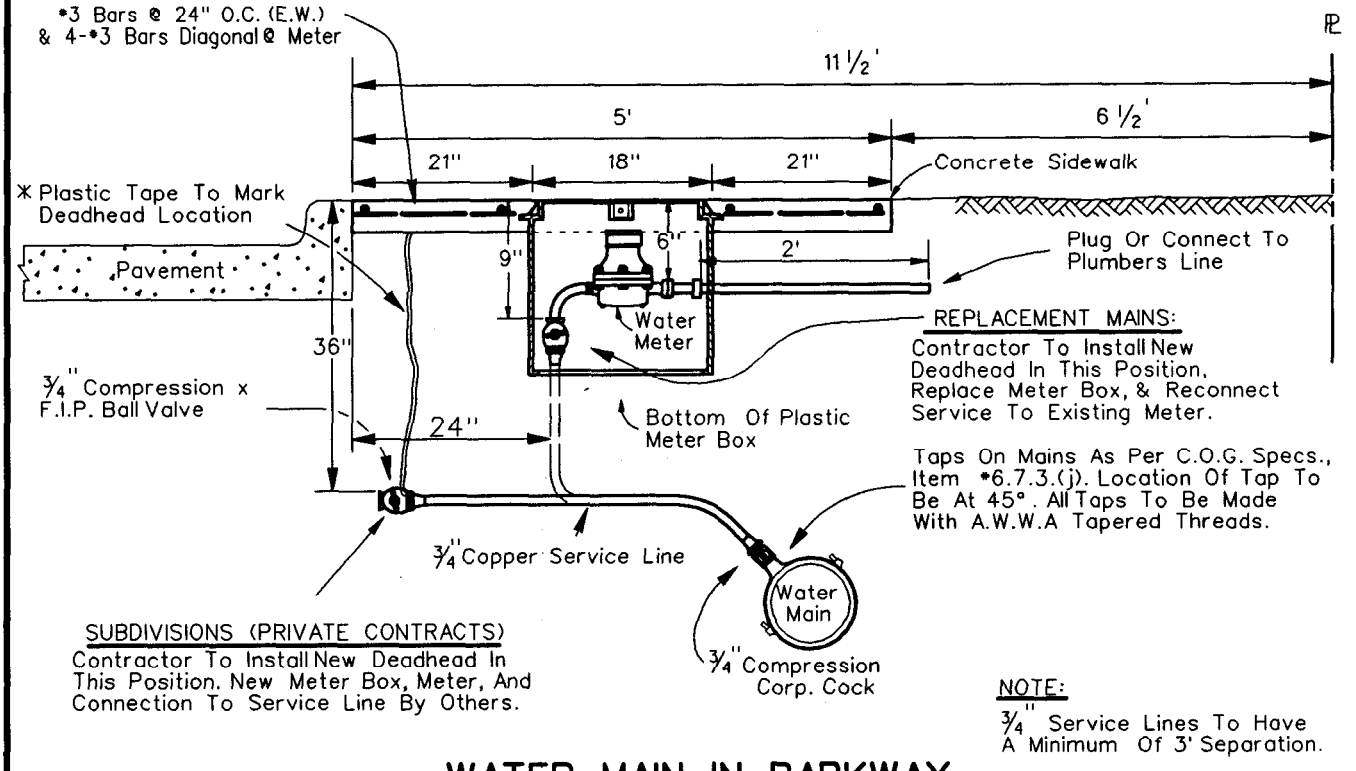
# WATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department

# PART 2
# WATER MAIN CONSTRUCTION




## WATER MAIN IN STREET

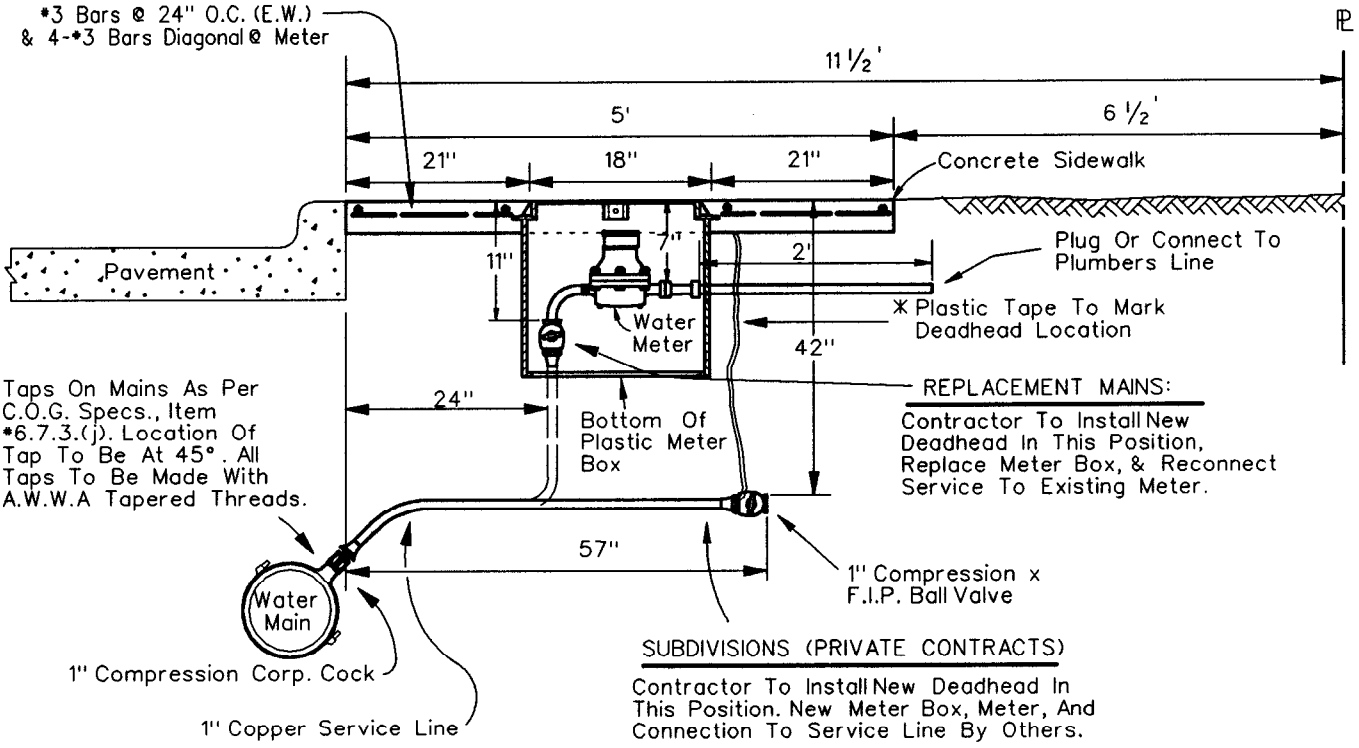



## WATER MAIN IN PARKWAY

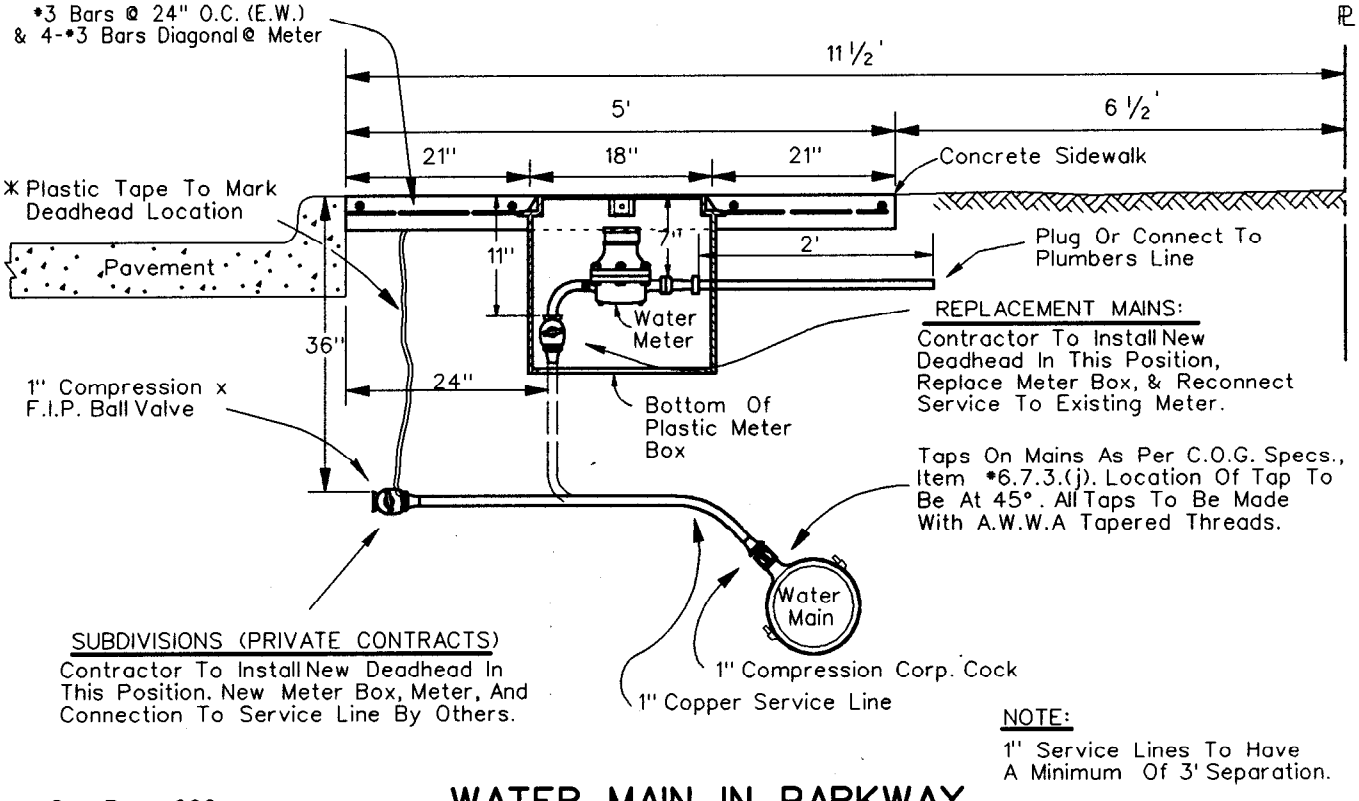
* See Page 206

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

| | | |
|---|---|---|
| DWU | | (PAGE No.) 201 |
| DATE JUNE 2002 | | |




## WATER MAIN IN STREET

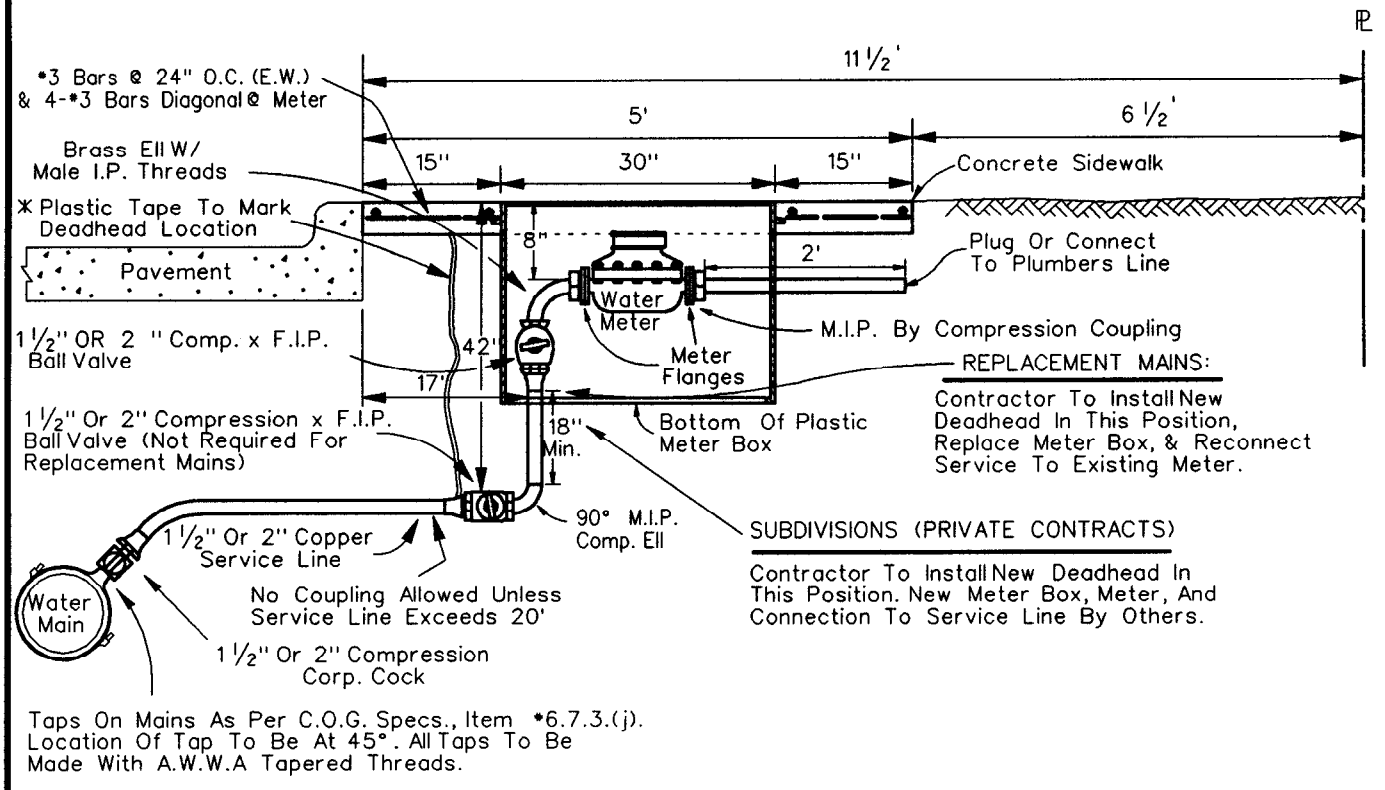



* See Page 206

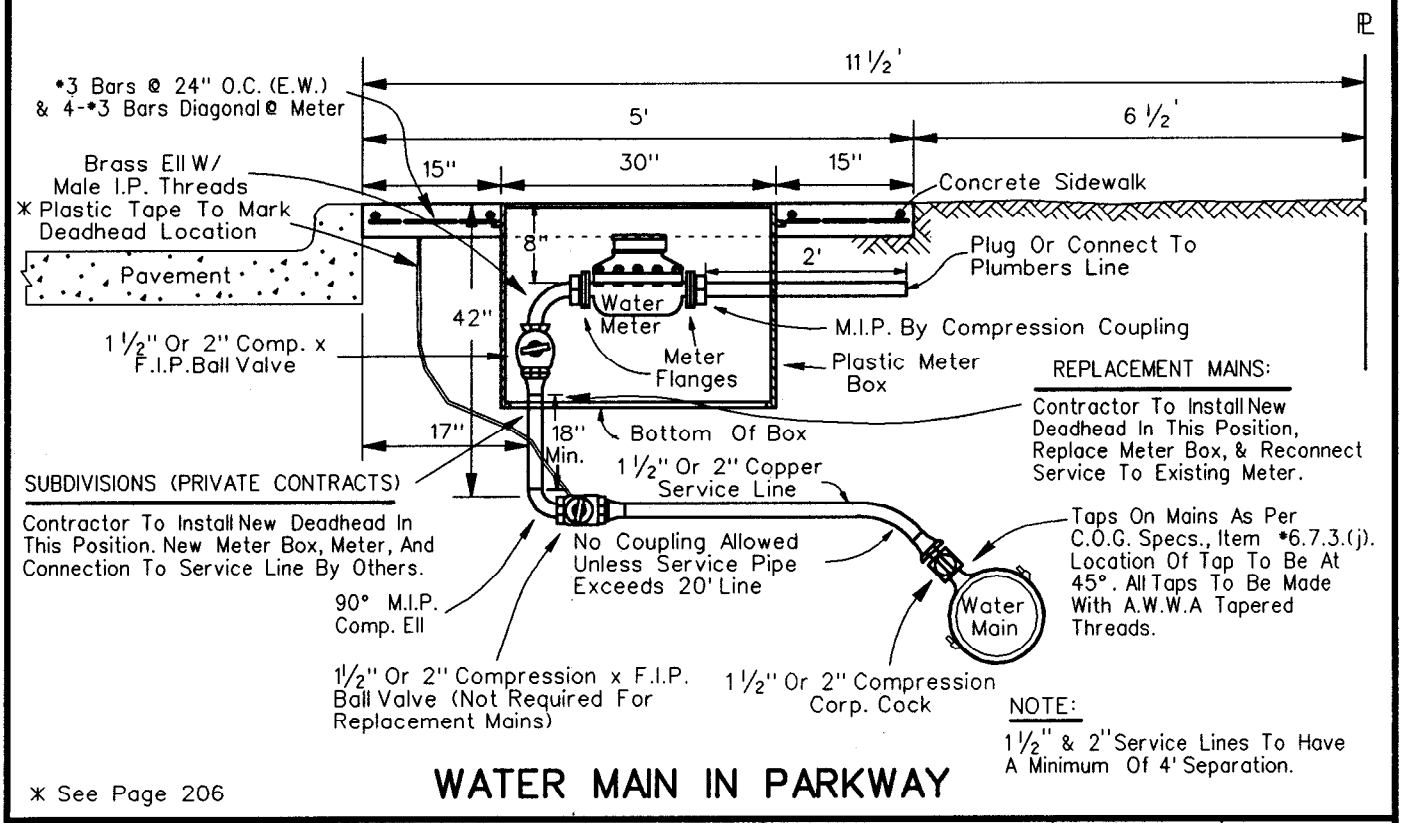
## WATER MAIN IN PARKWAY

# 1" WATER SERVICE INSTALLATIONS (SIDEWALK ADJACENT TO CURB)

| | DWU | (PAGE No.) 202 |
|---|---|---|
| | DATE JUNE 2002 | |



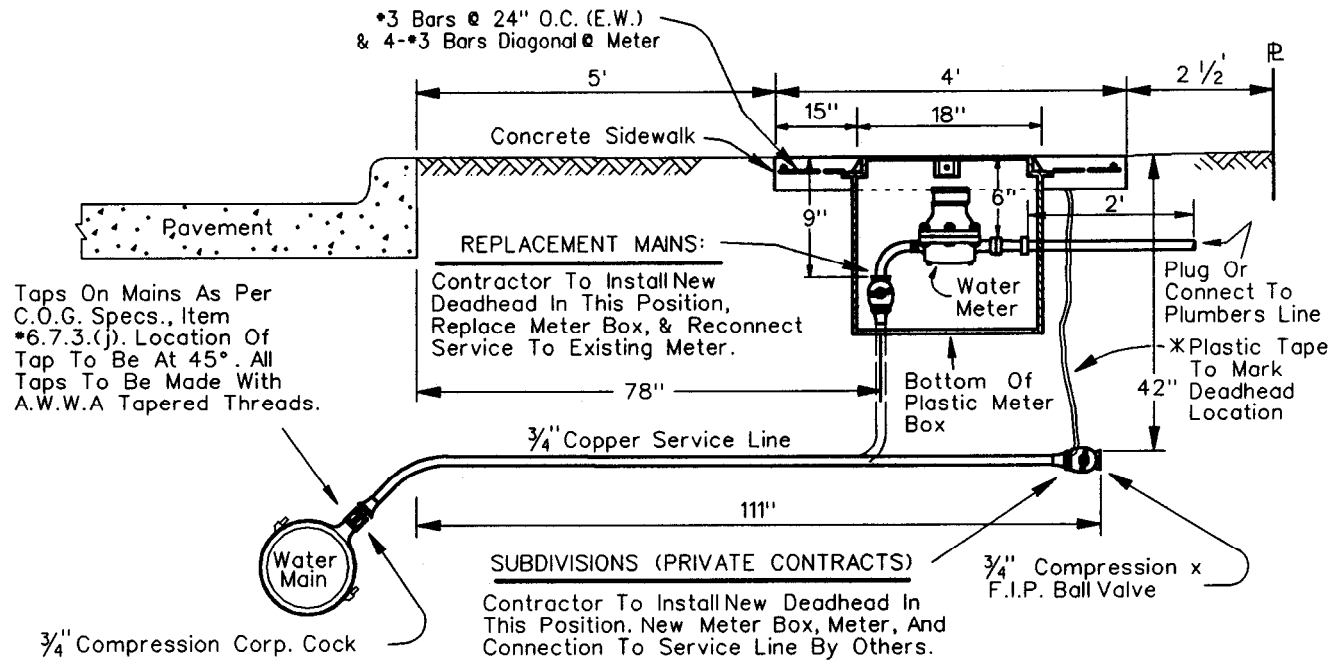

# WATER MAIN IN STREET



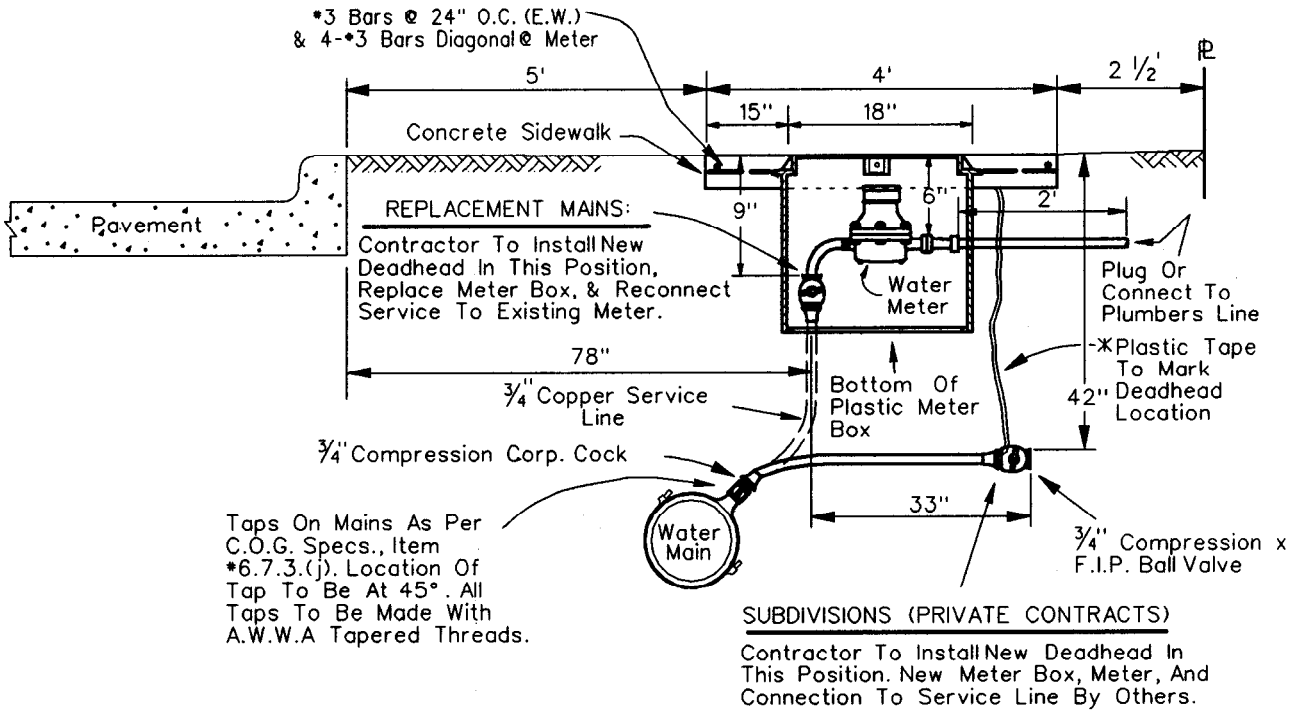

* See Page 206

# WATER MAIN IN PARKWAY

| 1 1/2" OR 2' WATER SERVICE INSTALLATION (SIDEWALK ADJACENT TO CURB) | | DWU | (PAGE No.) 203 |
|---|---|---|---|
| | | DATE JUNE 2002 | |




## WATER MAIN IN STREET

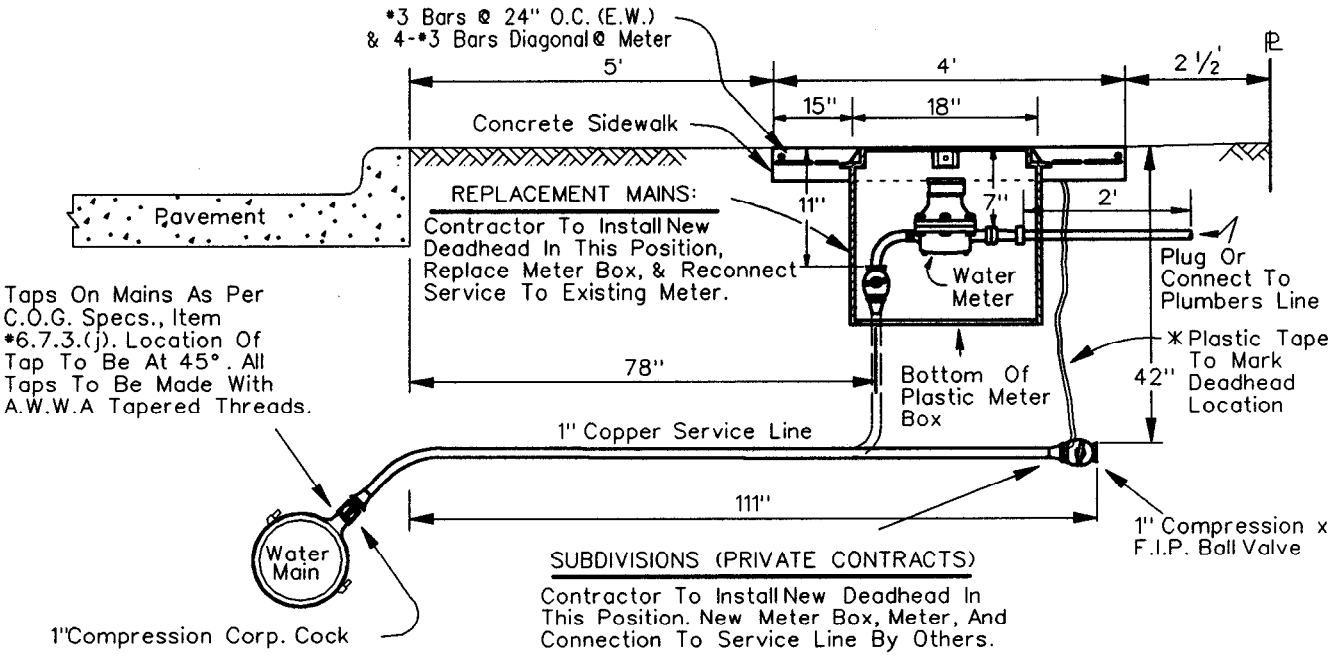



## WATER MAIN IN PARKWAY

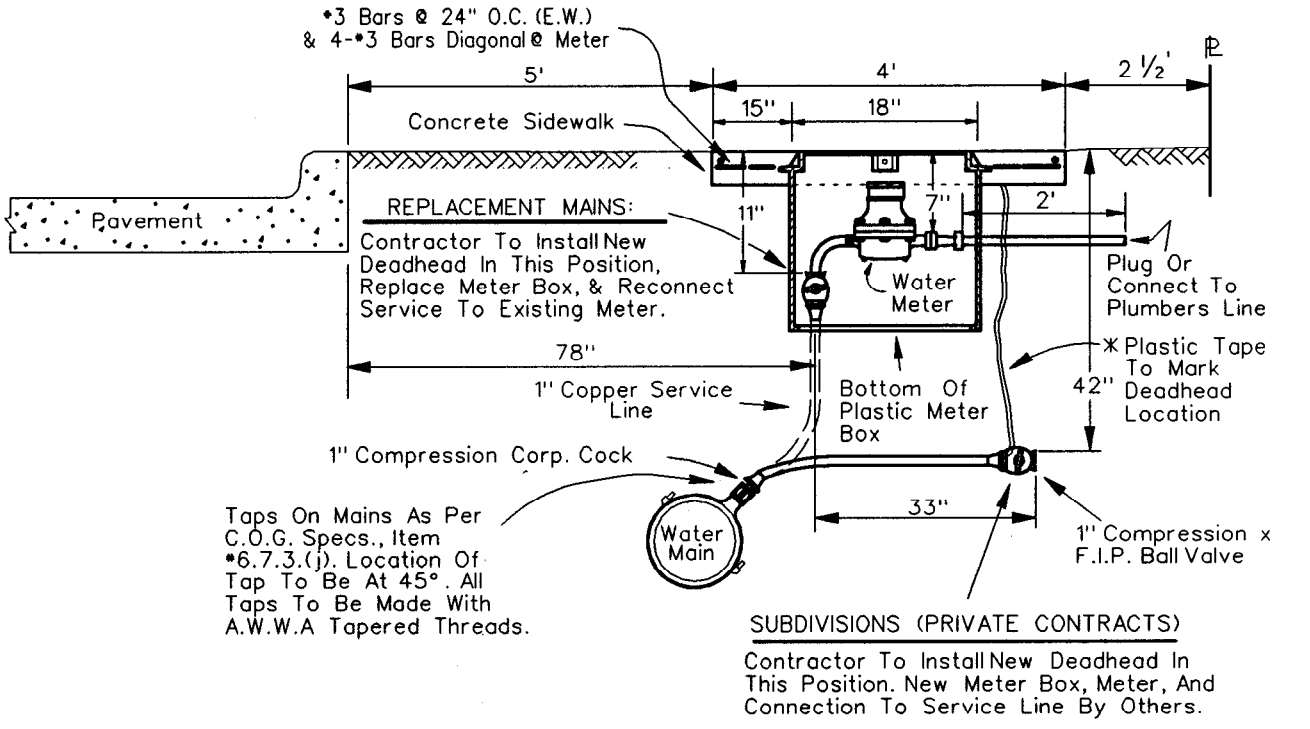
* See Page 206

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

| DWU | (PAGE No.) 204 |
|---|---|
| DATE JUNE 2002 | |




## WATER MAIN IN STREET

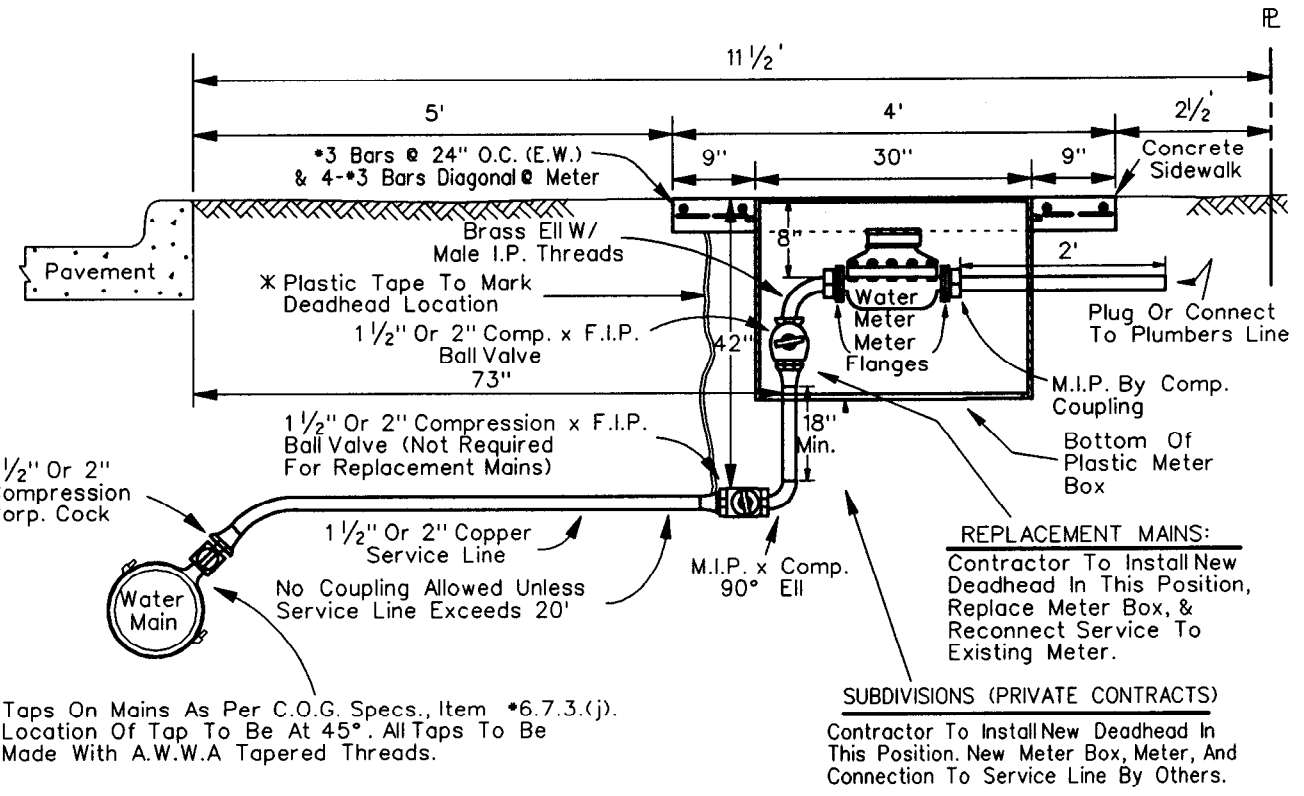



## WATER MAIN IN PARKWAY

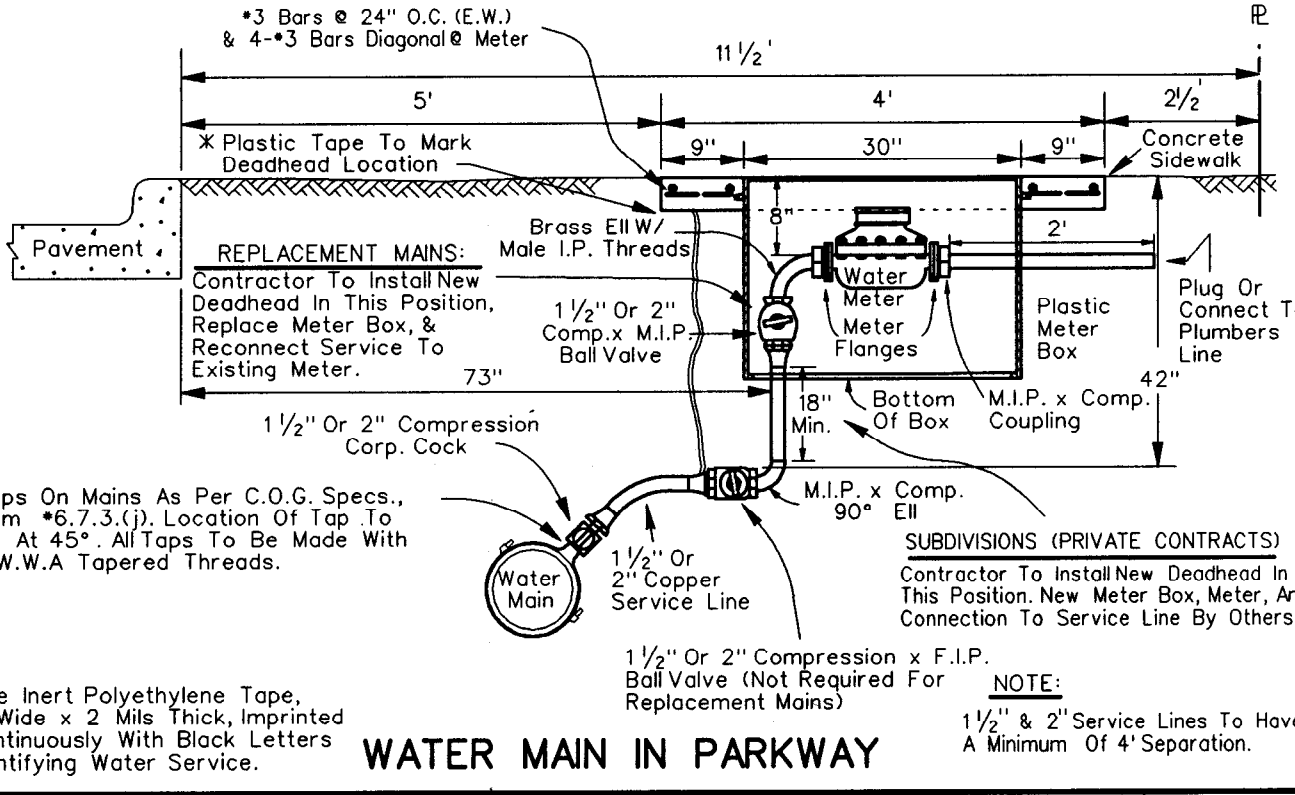
* See Page 206

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

| | DWU | (PAGE No.) 205 |
|---|---|---|
| | DATE JUNE 2002 | |




## WATER MAIN IN STREET

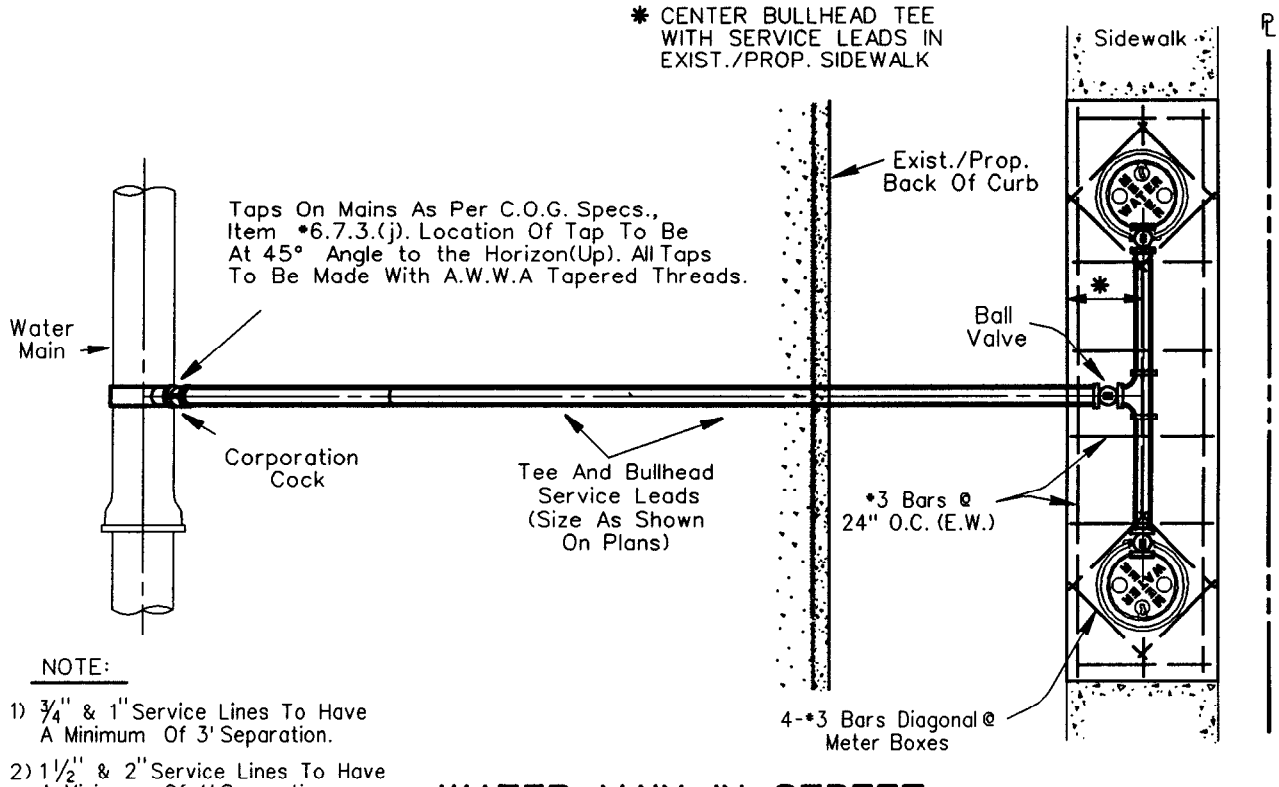



* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letters Identifying Water Service.

## WATER MAIN IN PARKWAY

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

| | DWU | (PAGE No.) 206 |
|---|---|---|
| | DATE JUNE 2002 | |

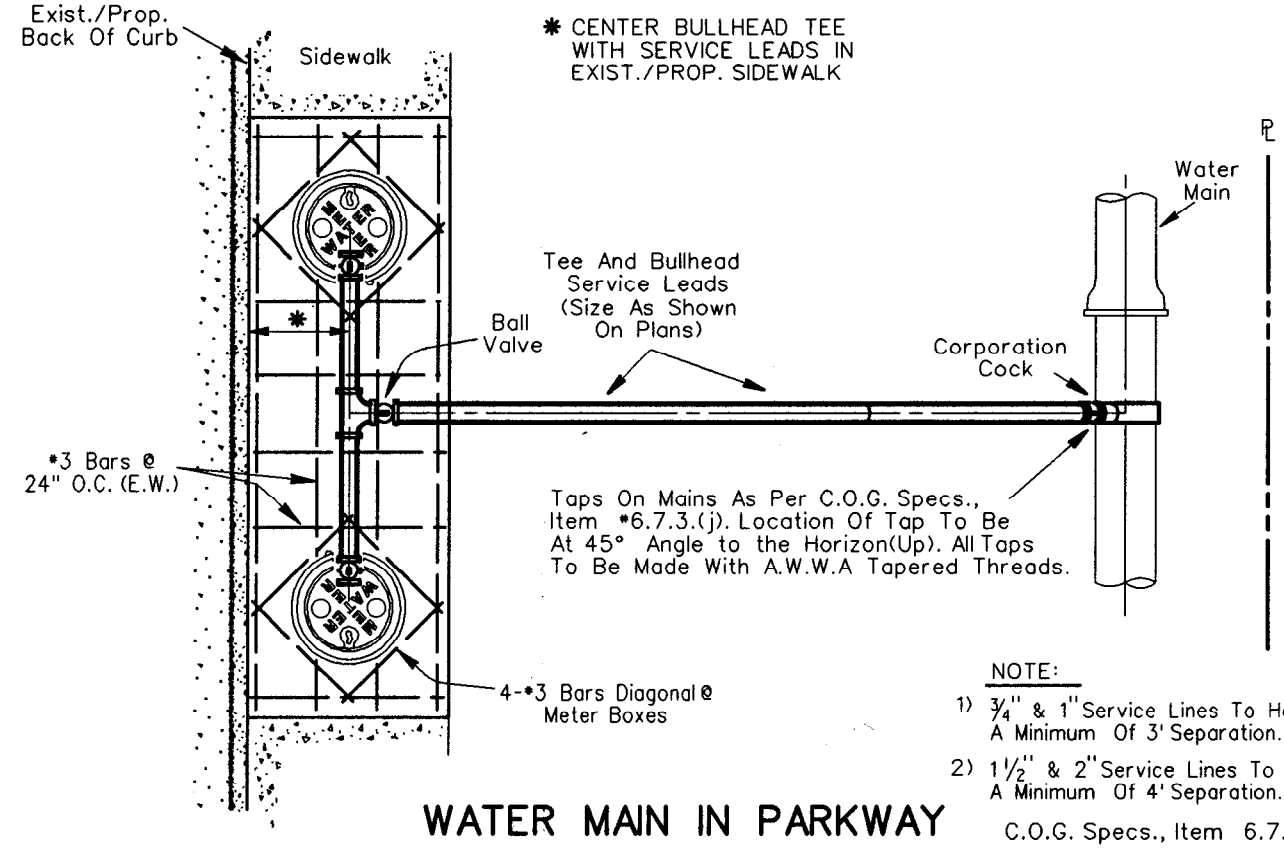



NOTE:

1) ¾" & 1" Service Lines To Have A Minimum Of 3' Separation.

2) 1½" & 2" Service Lines To Have A Minimum Of 4' Separation.

## WATER MAIN IN STREET




NOTE:

1) ¾" & 1" Service Lines To Have A Minimum Of 3' Separation.

2) 1½" & 2" Service Lines To Have A Minimum Of 4' Separation.

C.O.G. Specs., Item 6.7.3.(o)

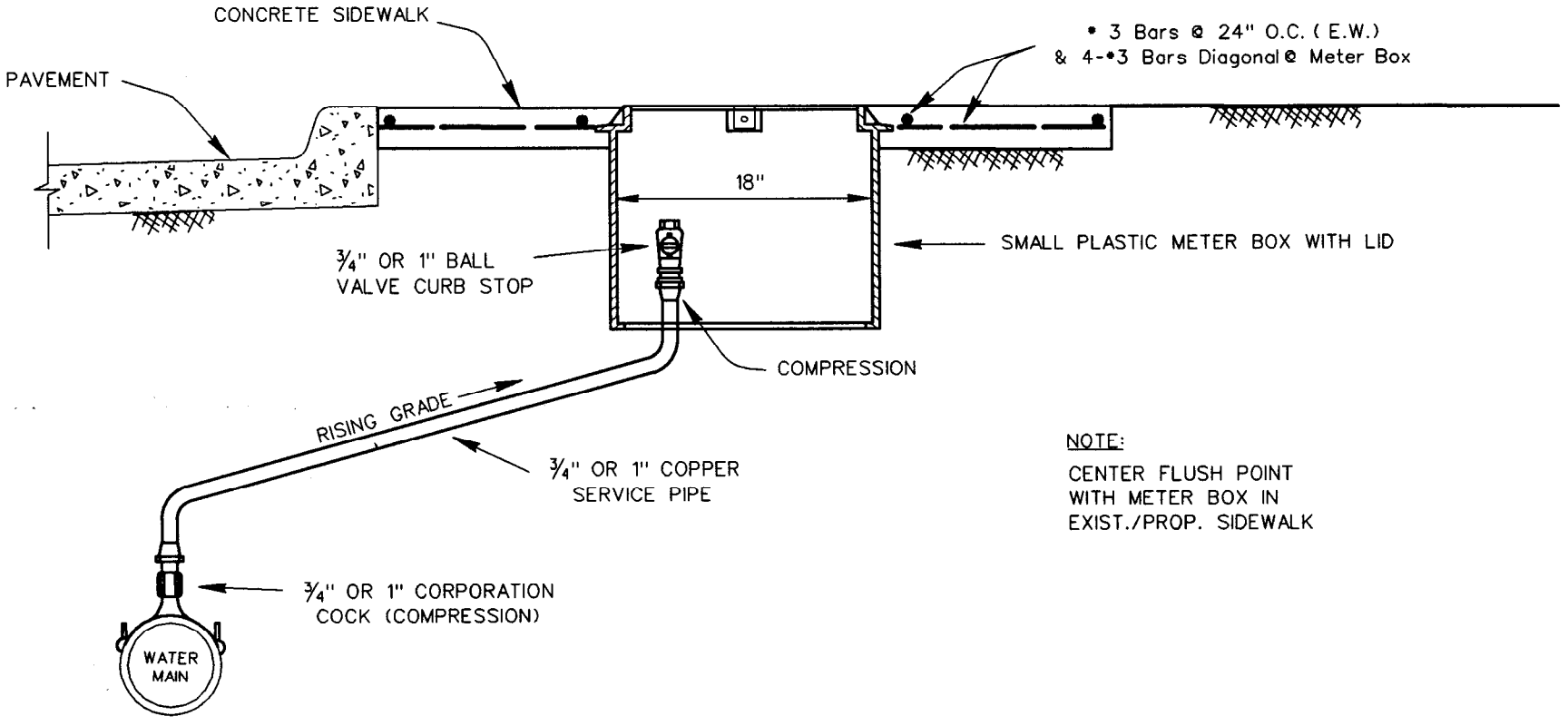
## WATER MAIN IN PARKWAY

# BULL HEAD SERVICES

DWU

(PAGE NO.) 206A

DATE JUNE 2002




NOTE:

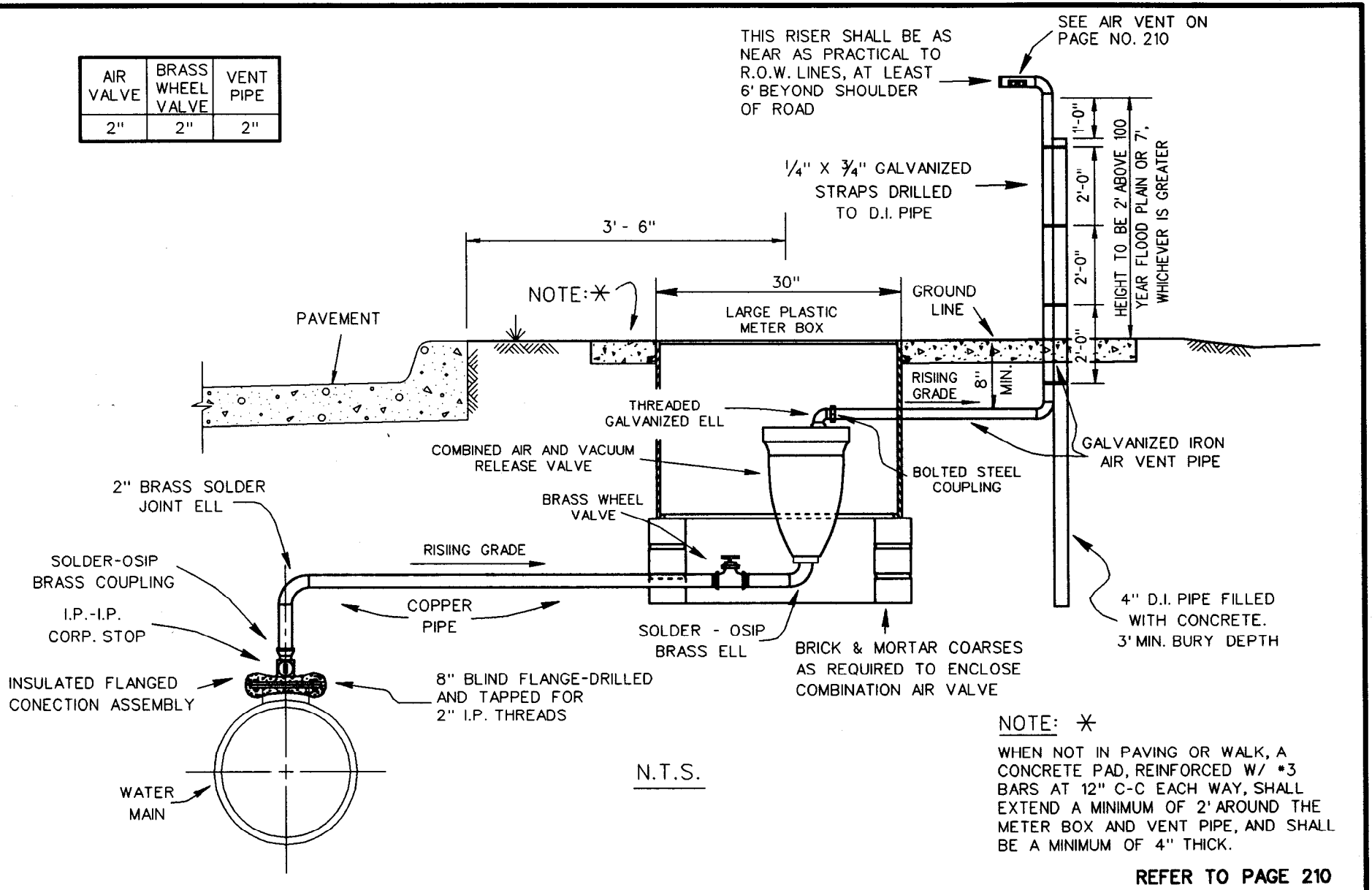
CENTER FLUSH POINT
WITH METER BOX IN
EXIST./PROP. SIDEWALK

# FLUSH POINT

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

| FLUSH POINT INSTALLATION | | DWU | (Page No.) 207 |
|---|---|---|---|
| | | DATE JUNE 2002 | |

| 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**

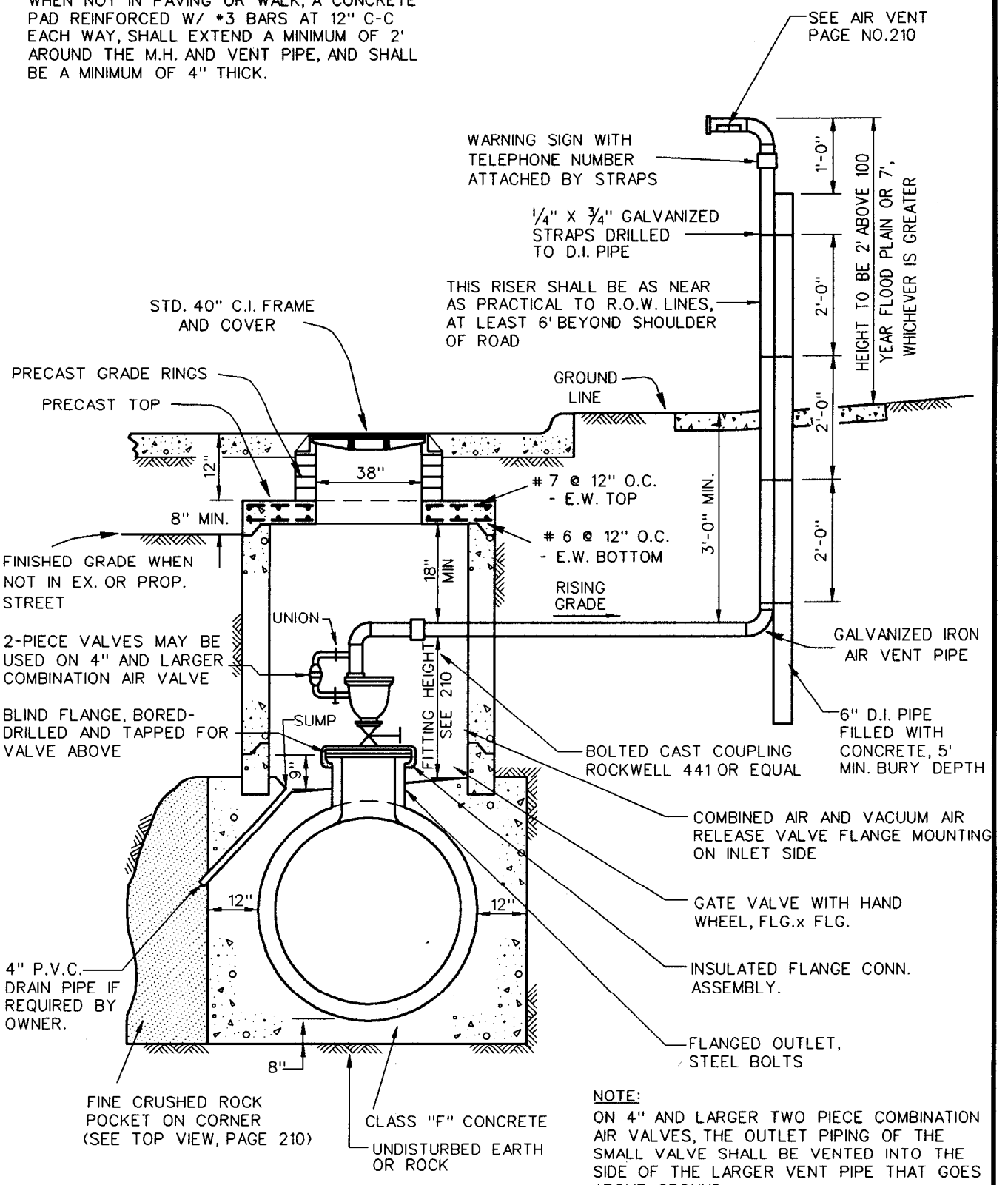
# AIR RELEASE VALVE TYPE "1"

DWU

(Page No.) 208

DATE JUNE 2002

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.

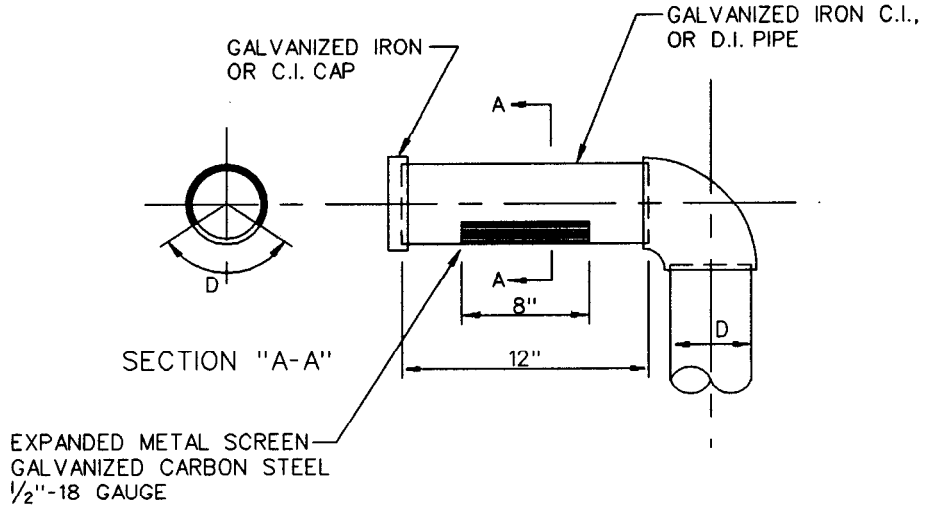



NOTE:
ON 4" AND LARGER TWO PIECE COMBINATION AIR VALVES, THE OUTLET PIPING OF THE SMALL VALVE SHALL BE VENTED INTO THE SIDE OF THE LARGER VENT PIPE THAT GOES ABOVE GROUND.

REFER TO PAGES 210 & 211

# AIR RELEASE VALVE TYPE "2"

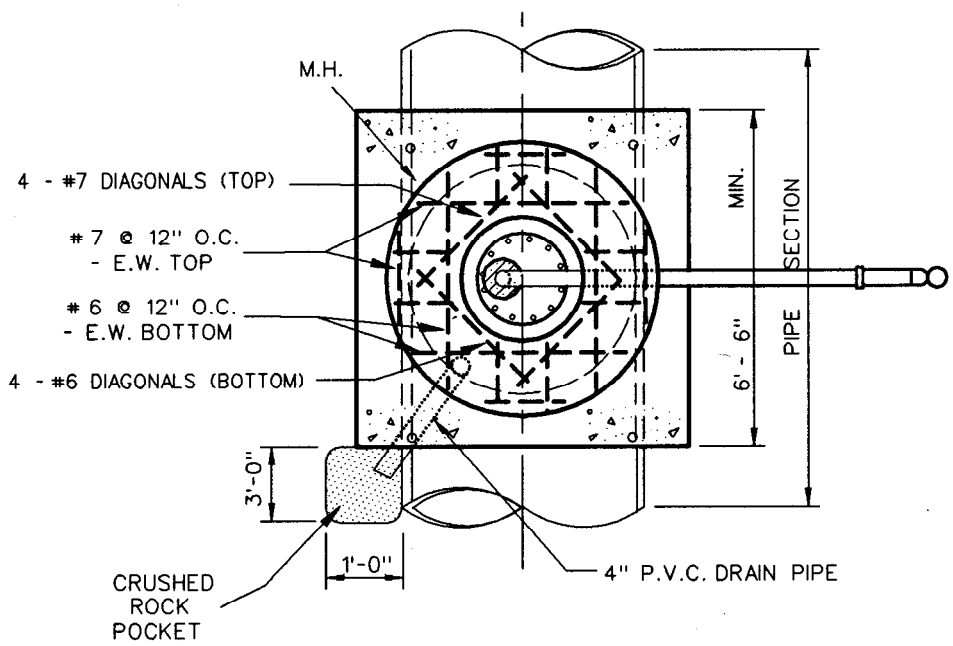
| | | |
|---|---|---|
| DWU | | (Page No.) 209 |
| DATE JUNE 2002 | | |




## AIR VENT

N.T.S.

| AIR VALVE | GATE VALVE | FLG. OUTLET | MIN. FITTING HEIGHT | VENT PIPE D | M.H. DIA. |
|---|---|---|---|---|---|
| 2" | 2" | 8" | 26" | 2" | 5' |
| 3" | 3" | 18" | 31" | 3" | 5' |
| 4" | 4" | 18" | 38" | 4" | 5' |
| 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 JUNE 2002

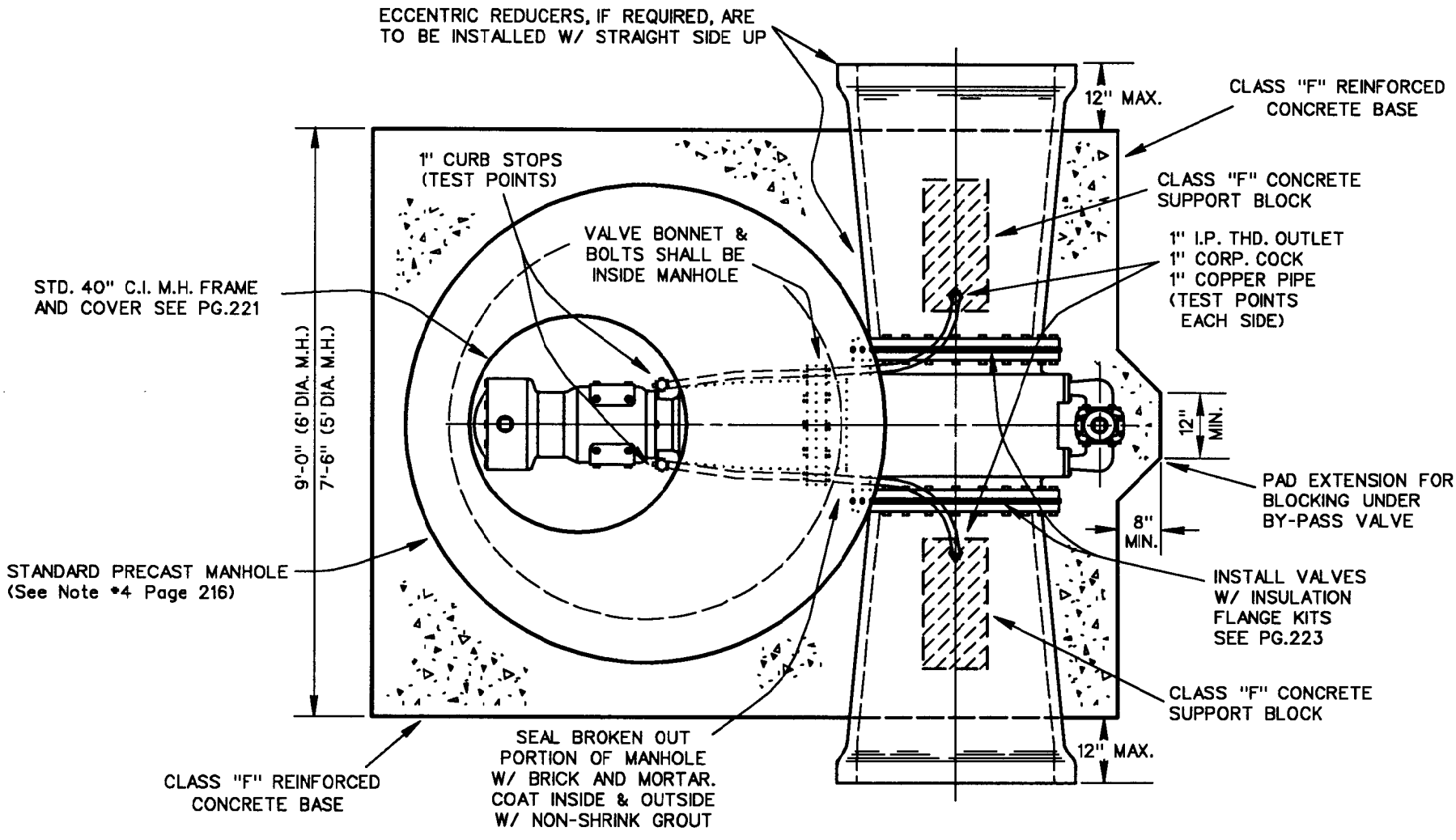
# GENERAL NOTES

1. Manholes must be precast.
2. Air vent pipes 6" and larger shall be D.I. pipe with flange fittings with Tnemec 37-77 Red Chem. primer or equal in lieu of tar coating. Pipe shall be painted with Rustomer 500 or equal (ALUMINUM 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:

| 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 JUNE 2002 | |




PLAN

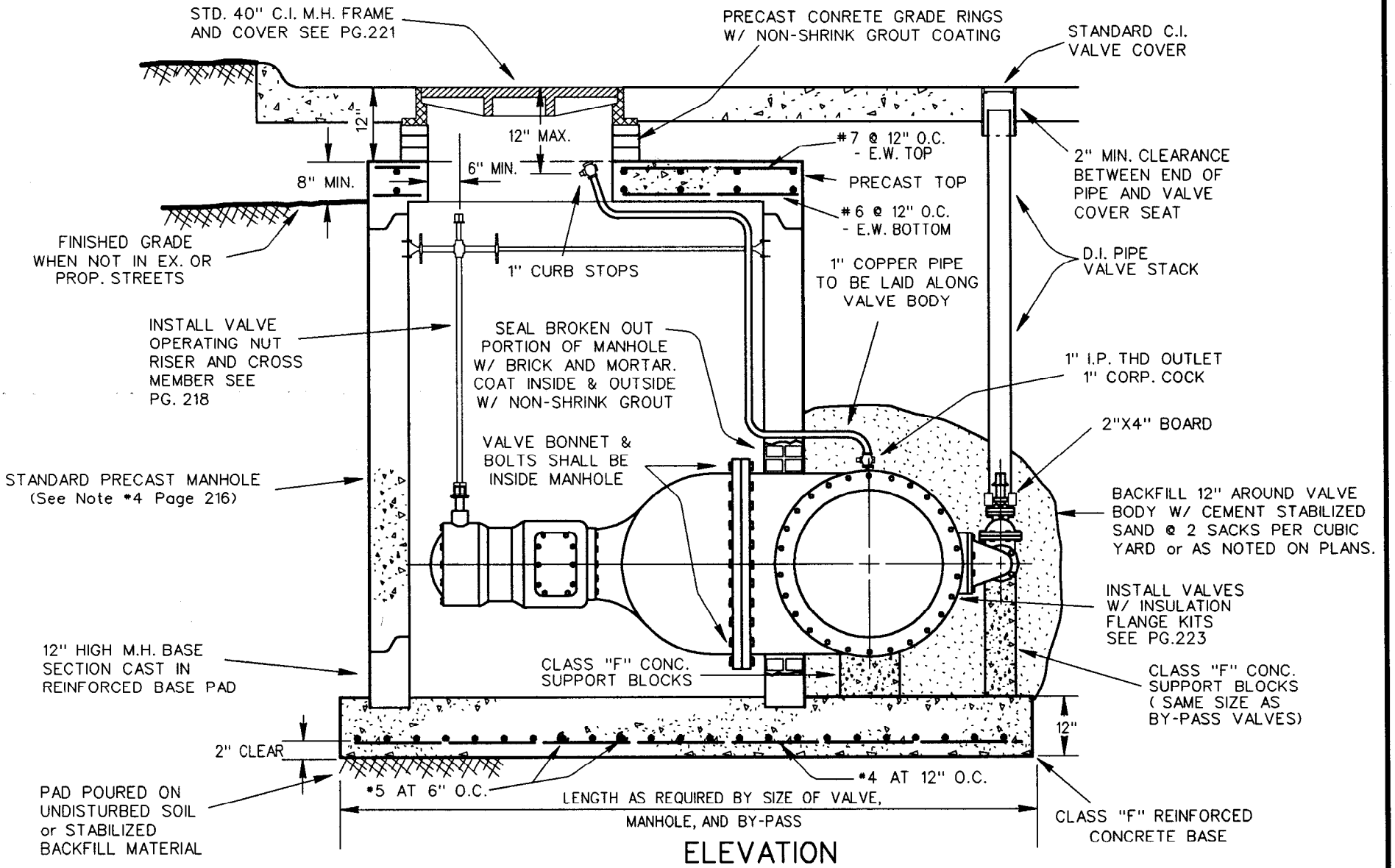
REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

# HORIZONTAL GATE VALVE WITH MANHOLE INSTALLATION

DWU

(Page No.) 212

DATE DEC.2002



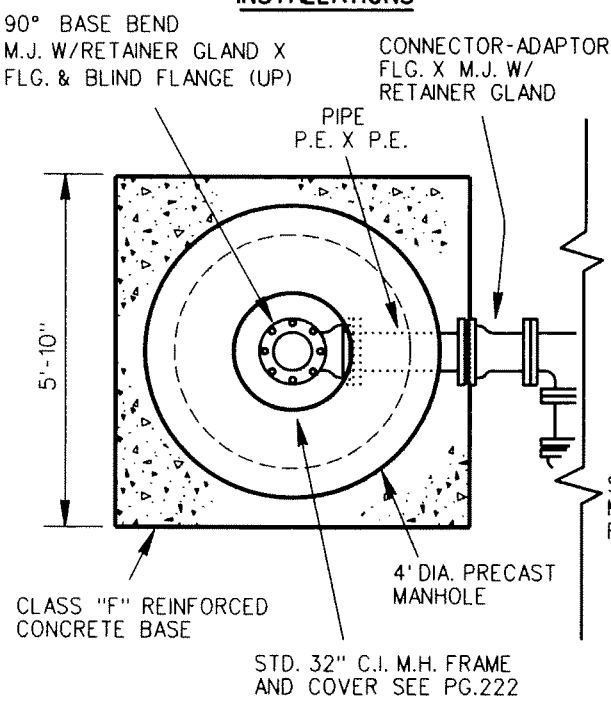

ELEVATION

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

# HORIZONTAL GATE VALVE WITH MANHOLE INSTALLATION

| DWU | (Page No.) 213 |
|---|---|
| DATE JUNE 2002 | |

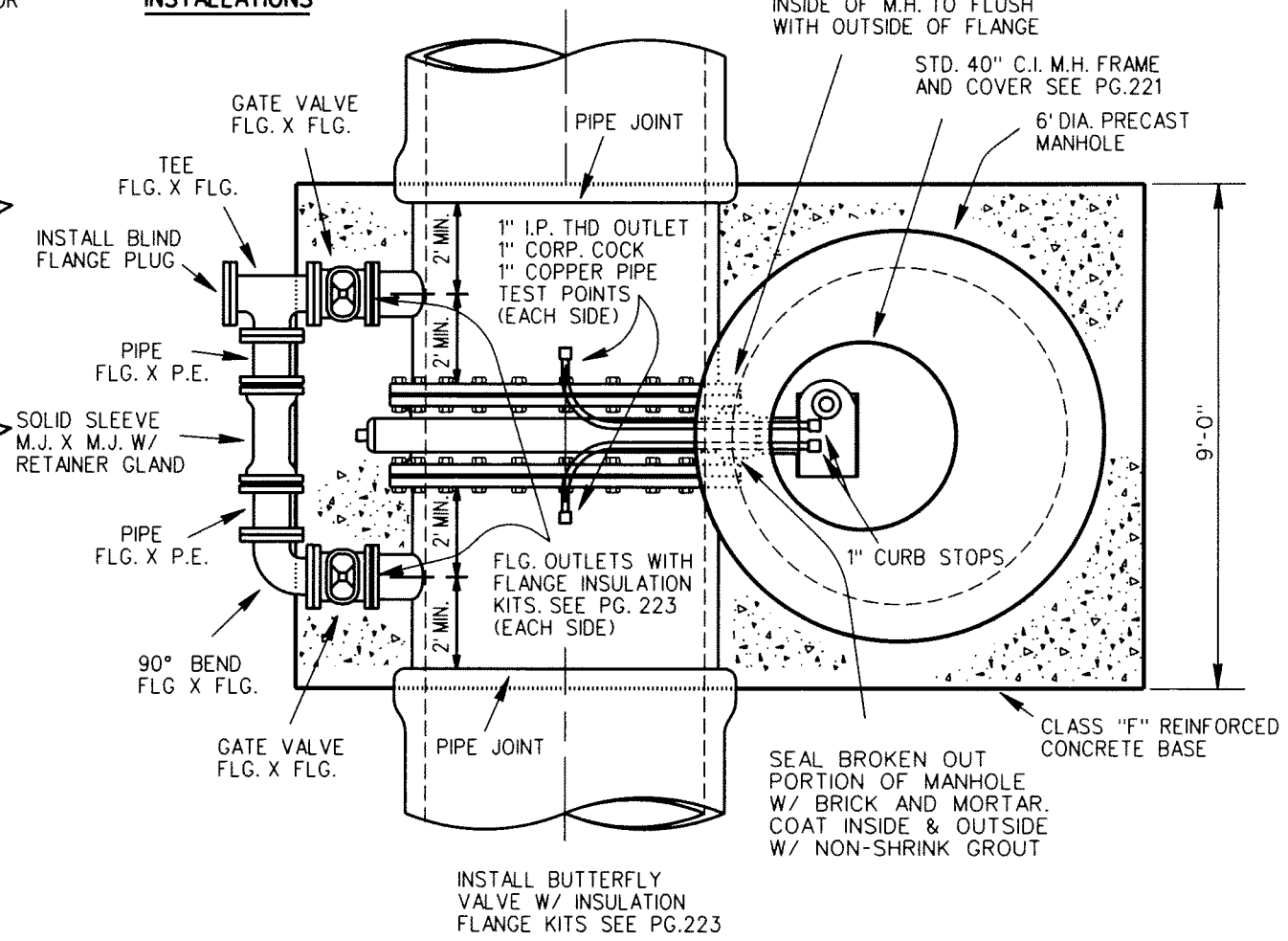
## BLOWOFF INSTALLATIONS




## OPTIONAL BLOWOFF WITH MANHOLE

(AS SPECIFIED ON DESIGN PLANS)

## NON-BLOWOFF INSTALLATIONS

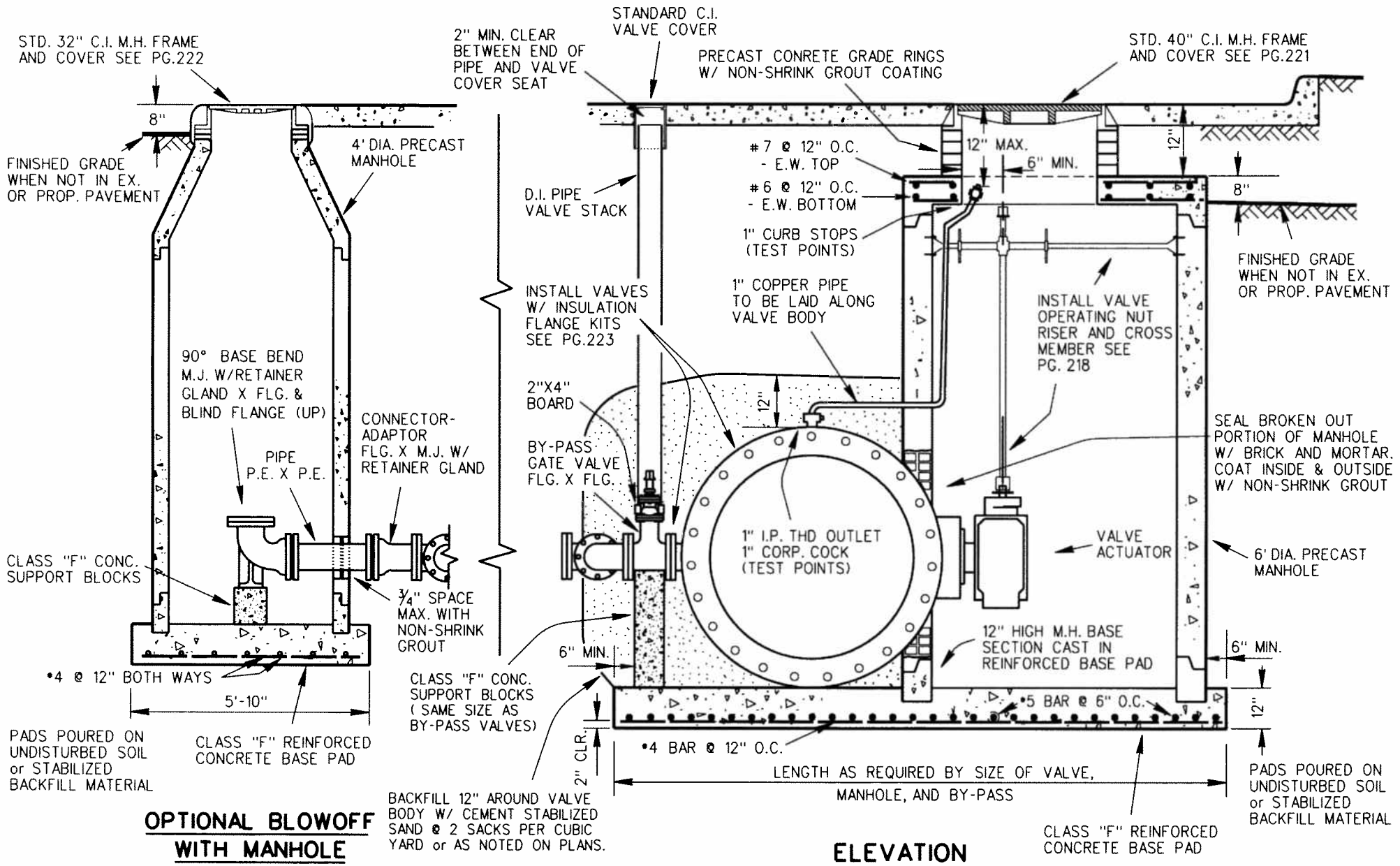



## PLAN

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

# BUTTERFLY VALVE WITH MANHOLE INSTALLATION

| | DWU | (Page No.) 214 |
|---|---|---|
| | DATE FEB.2009 | |




## OPTIONAL BLOWOFF WITH MANHOLE

(AS SPECIFIED ON DESIGN PLANS)

## ELEVATION

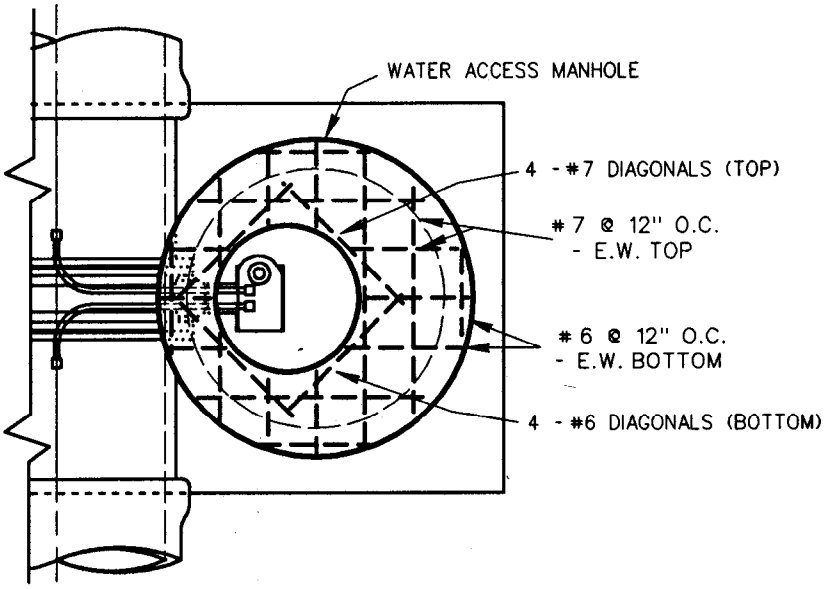
REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

# BUTTERFLY VALVE WITH MANHOLE INSTALLATION

| | | |
|---|---|---|
| | DWU | (Page No.) 215 |
| | DATE FEB. 2009 | |

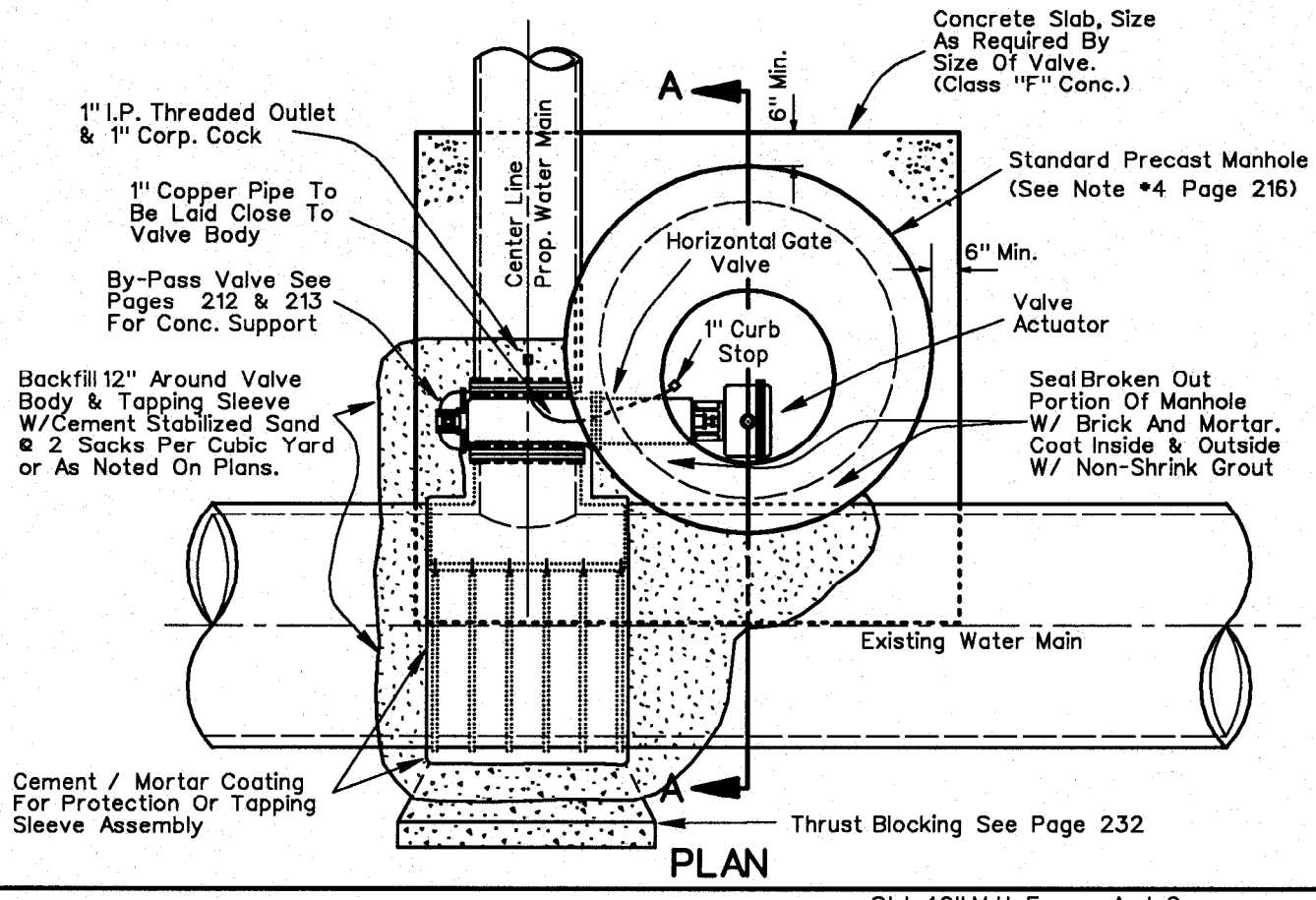
# GENERAL NOTES

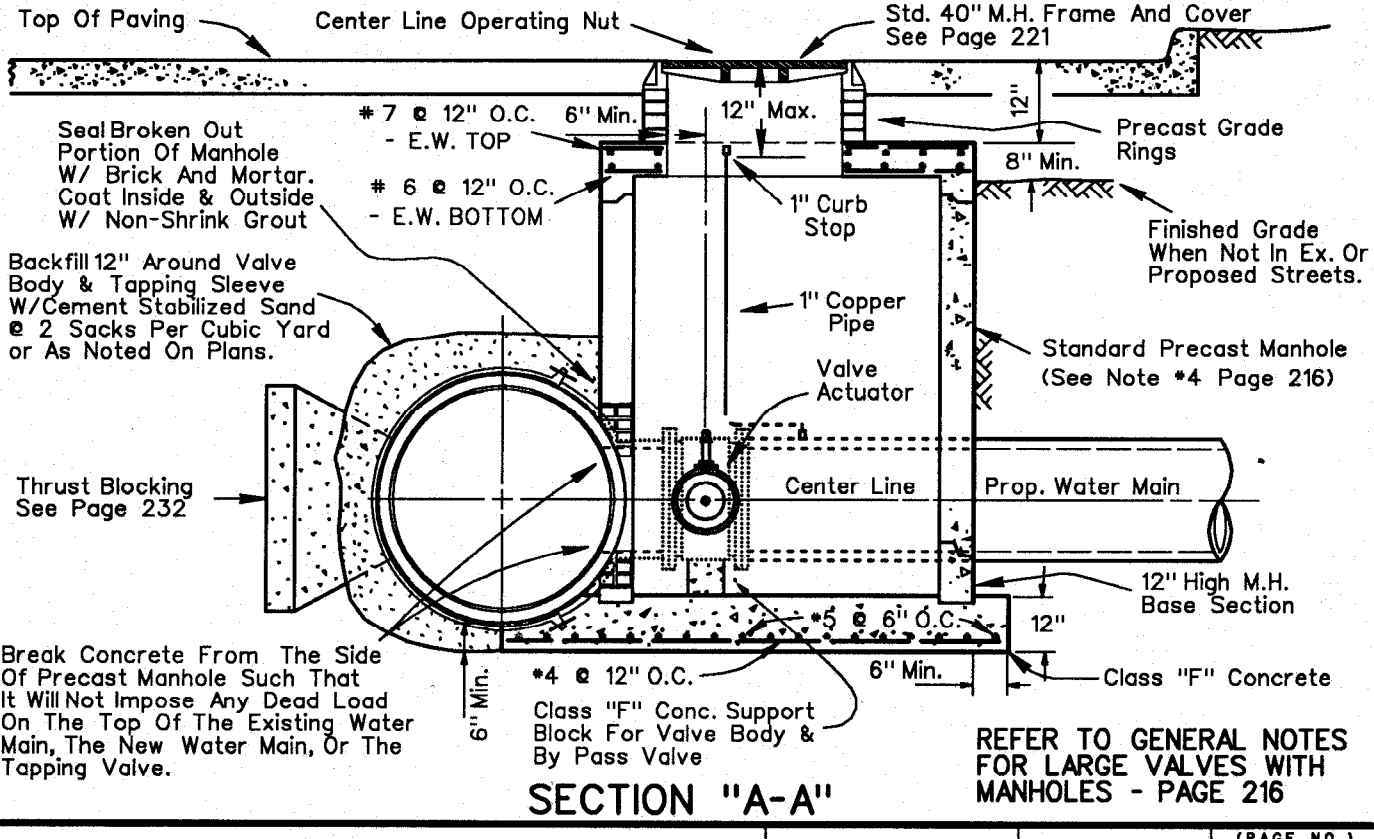
1. Precast grade rings shall be eliminated and the top of the manhole placed at 8" minimum above the existing grade when the location is not in an existing or proposed street. For this case only, the standard 40" manhole frame and cover will be set in the manhole precast top.
2. In open country, a 4" 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 JUNE 2002 | |



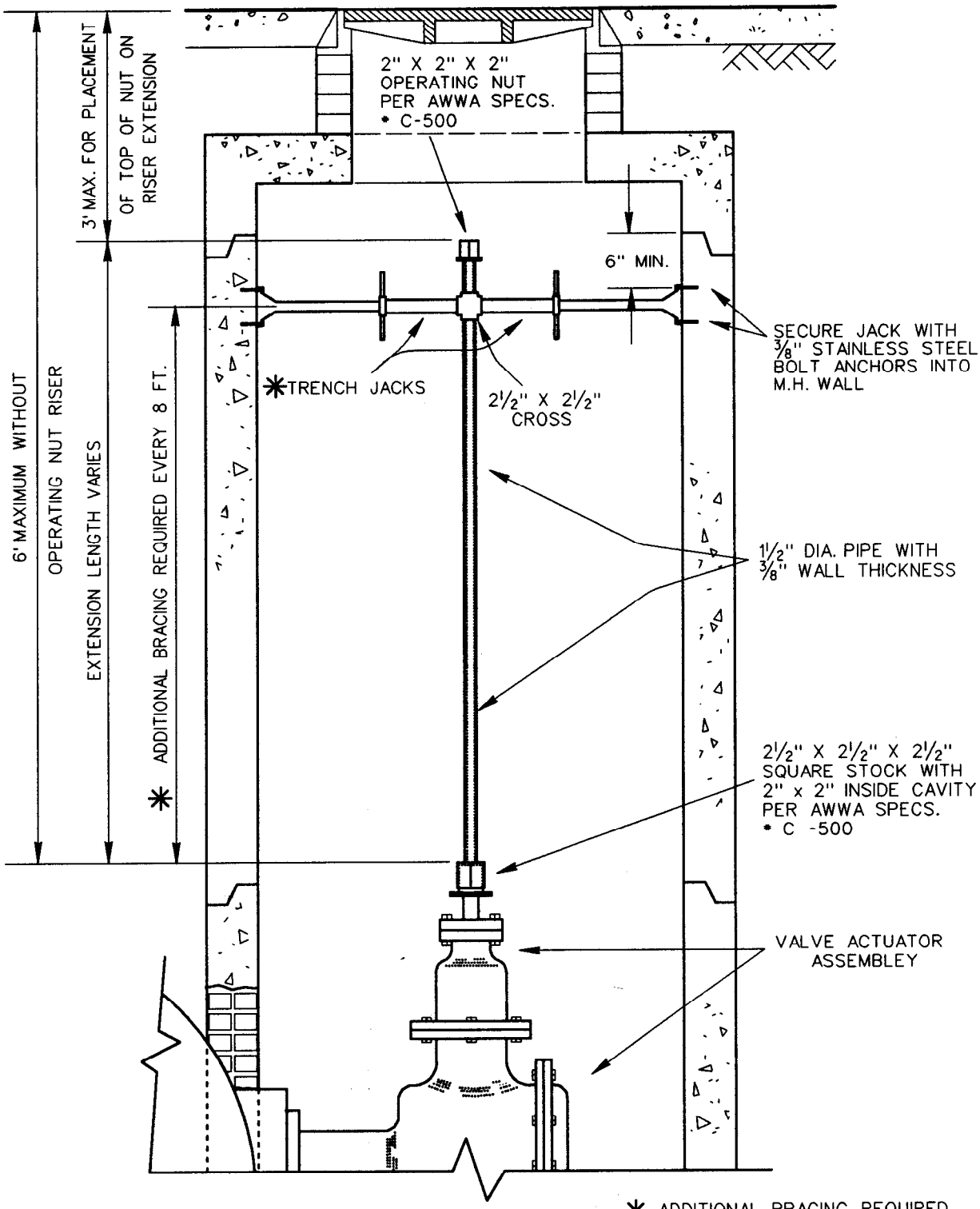

REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

# LARGE TAPPING VALVE INSTALLATION

DWU

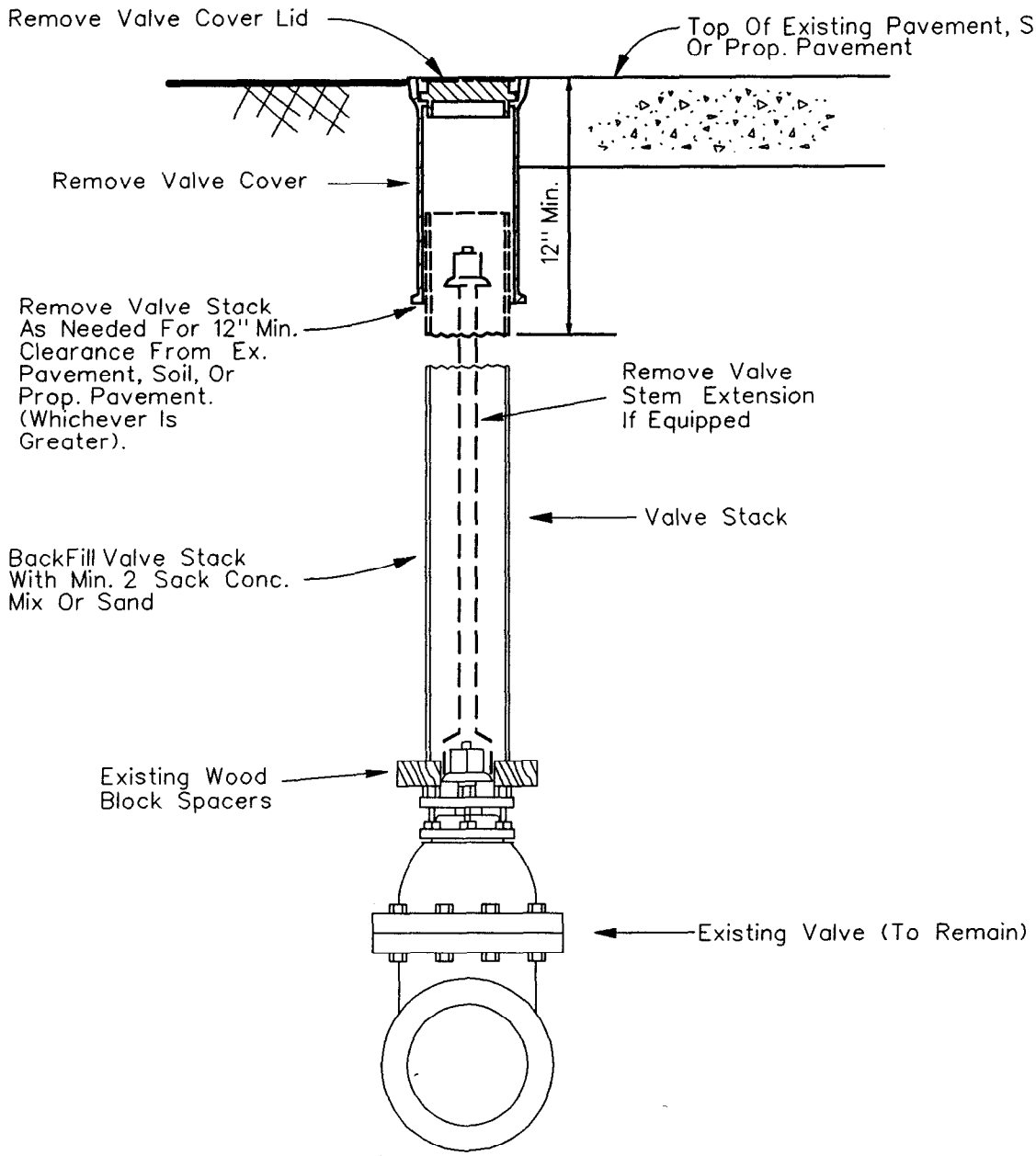
(PAGE NO.) 217

DATE DEC. 2002




# OPERATING NUT RISER
## (For Large Valve Installations)

| | | (PAGE NO.) |
|---|---|---|
| DWU | | 218 |
| DATE DEC.2001 | | |




## NOT IN PAVEMENT

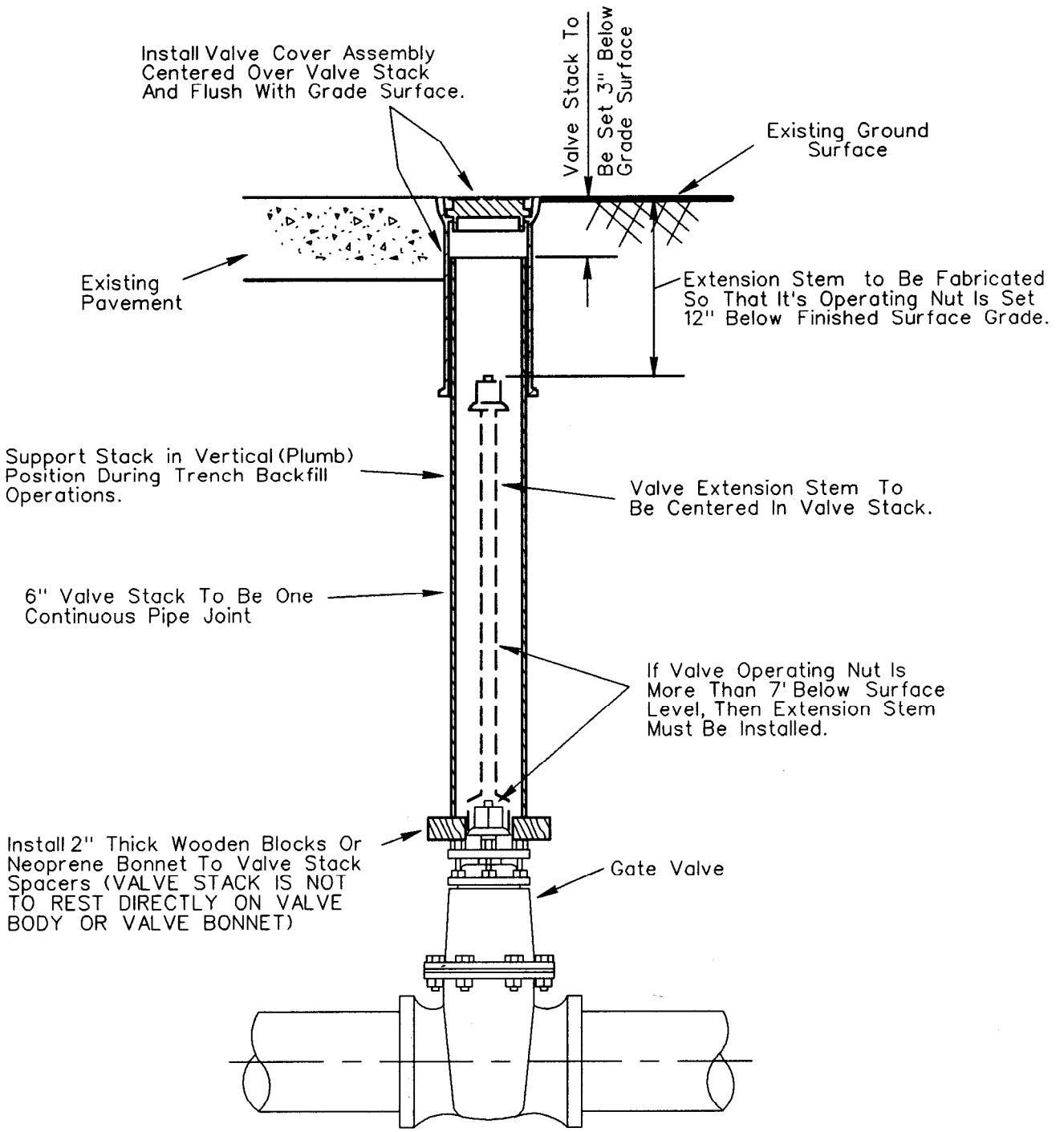
Match Existing Soil & Compact As Needed Or As Required By Construction Inspector.

## 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 DEC.2001 | |

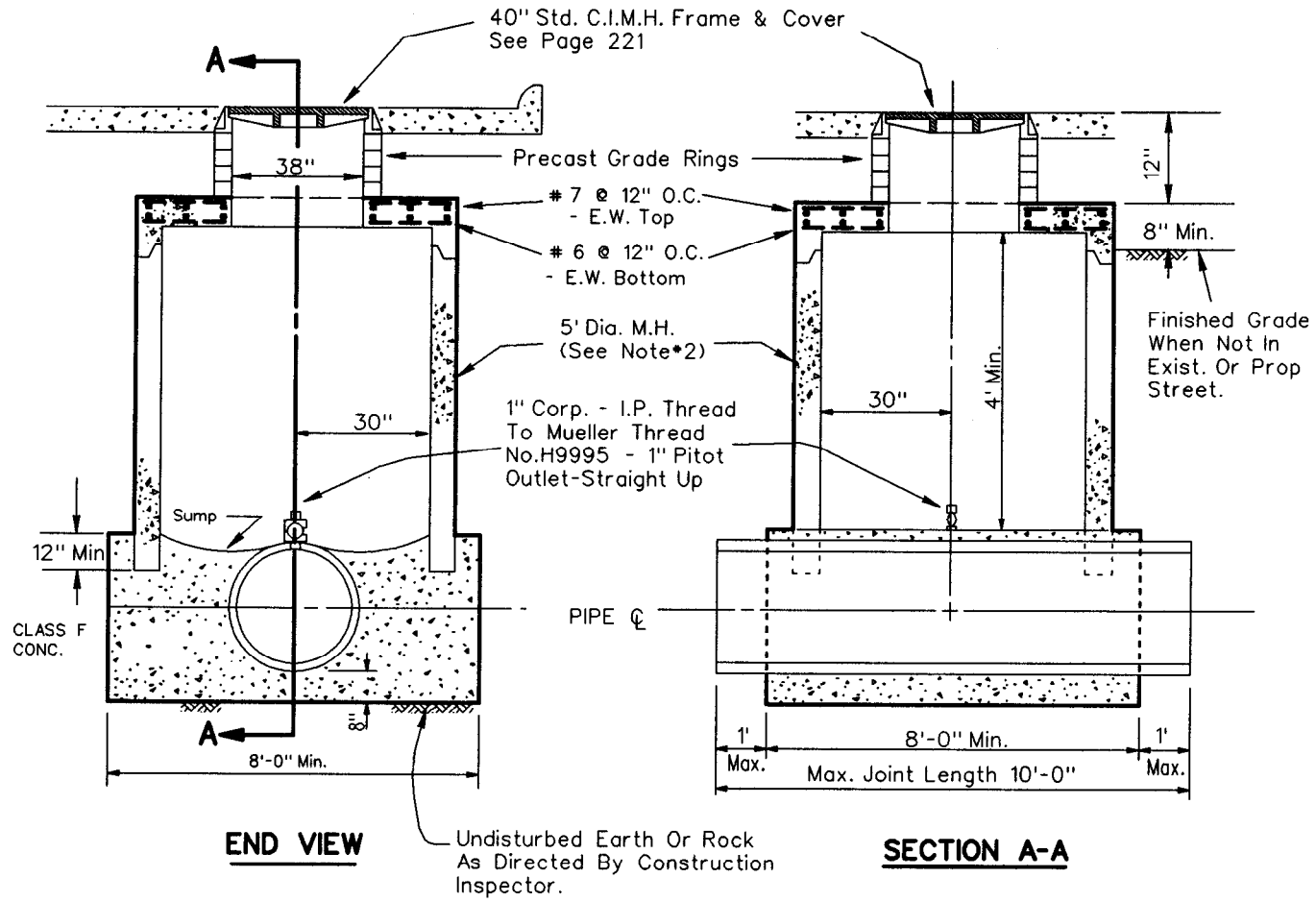


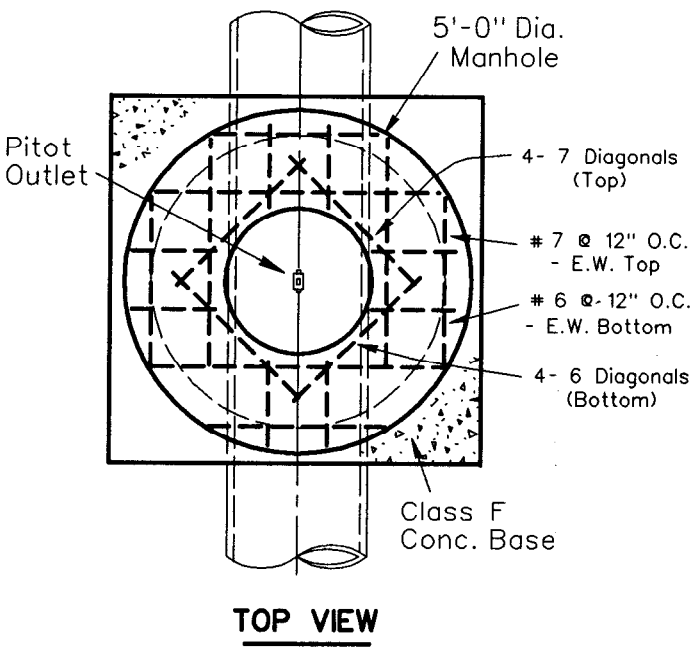

# 4" to 16" GATE VALVE COVER, STACK, & STEM INSTALLATION

DWU

DATE JUNE 2002

(PAGE NO.) 219A




## 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

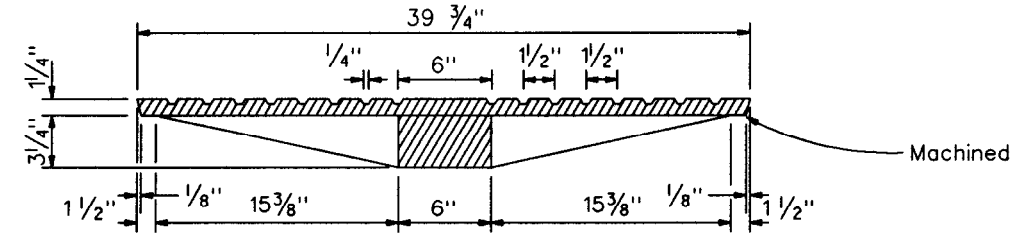
3. Precast Grade Rings Shall Be Eliminated When Not In Existing Or Proposed Street (Open Country). In This Case, 40" Standard C.I. M.H. Frame And Cover Shall Be Set In M.H. Top.

# PITOT OUTLET

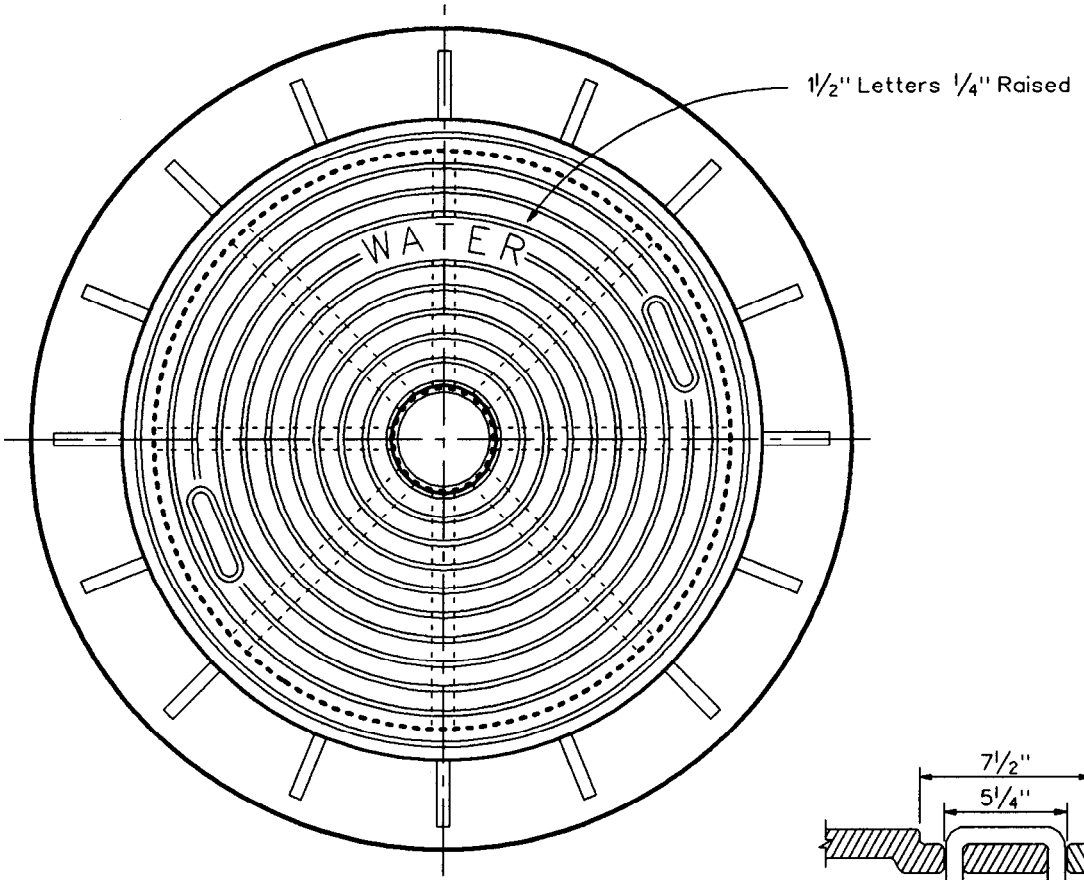
DWU

(PAGE NO.) 220

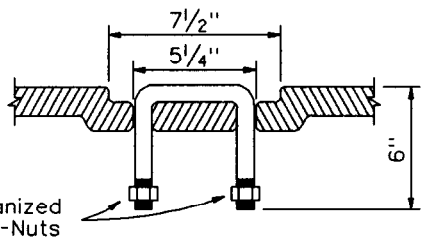
DATE
JUNE 2002

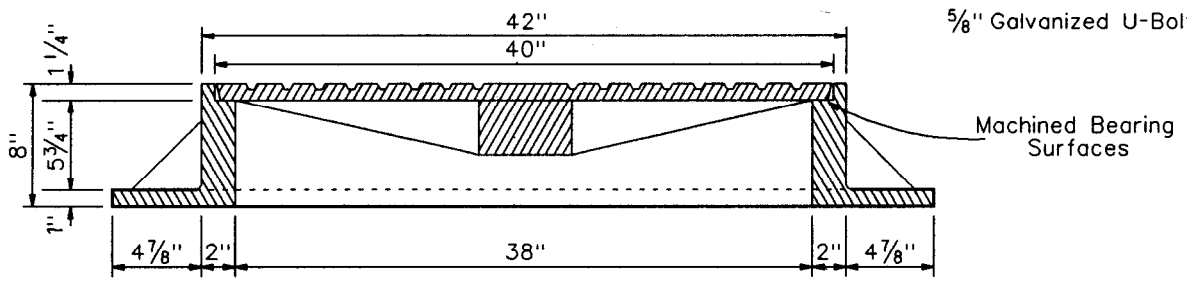



## SECTION THRU COVER




## PLAN

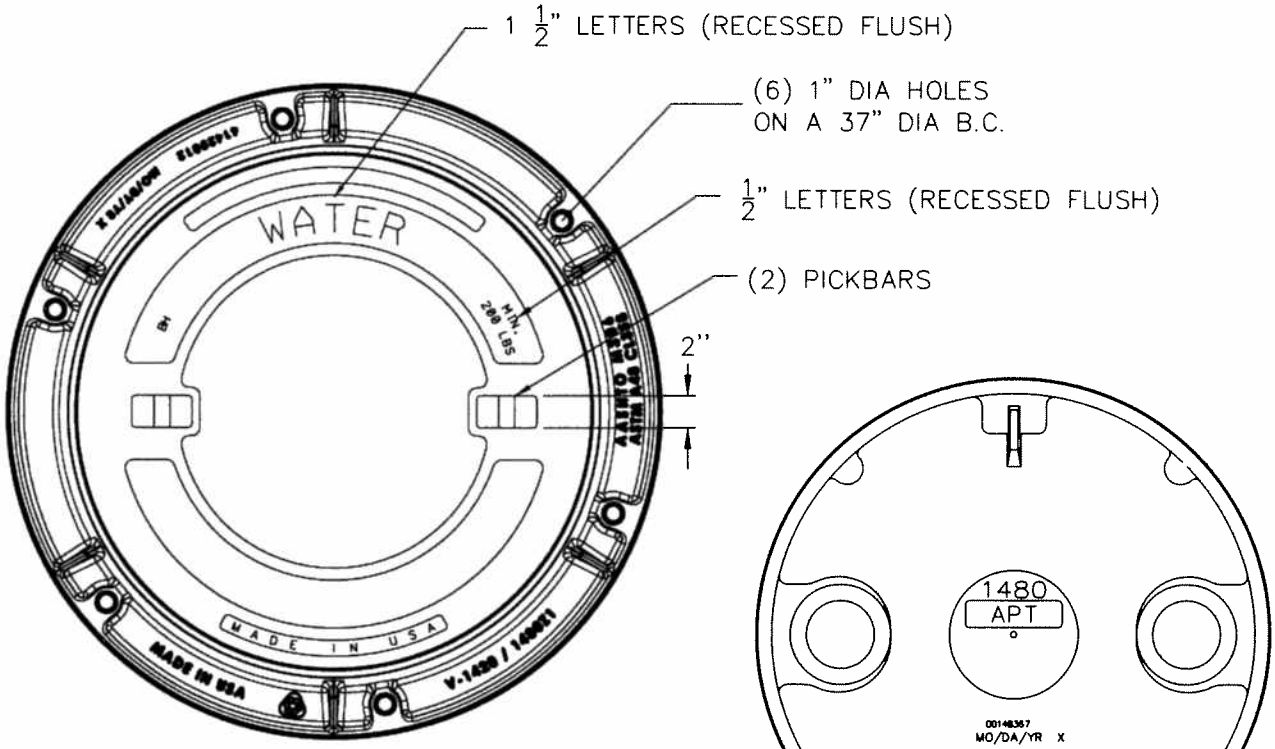



## SECTION THRU FRAME

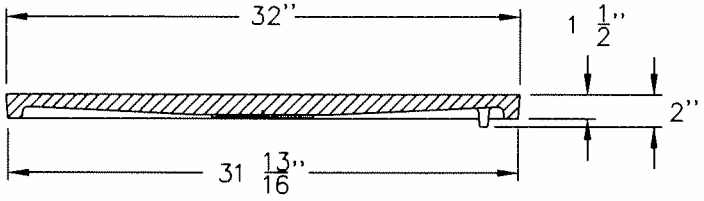
Ring & Cover Material per ASTM A48 Class 35B Min. Gray Iron Castings.

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

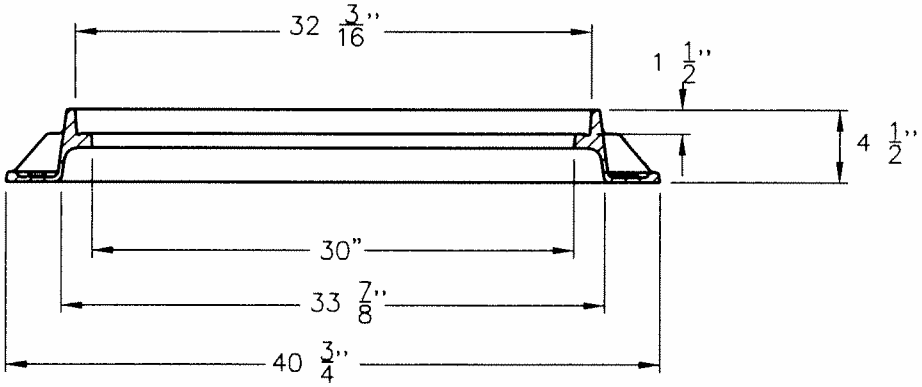



**PLAN VIEW**

**BOTTOM VIEW OF COVER**




**COVER SECTION**

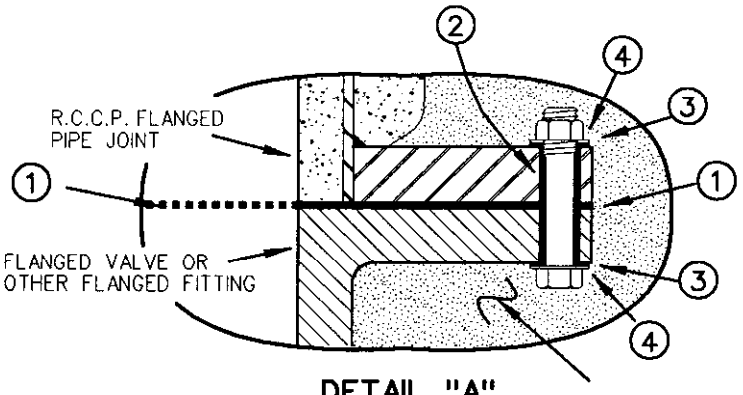



COVER – GRAY IRON
ASTM A48 CL35B
FRAME – GRAY IRON
ASTM A48 CL35B

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

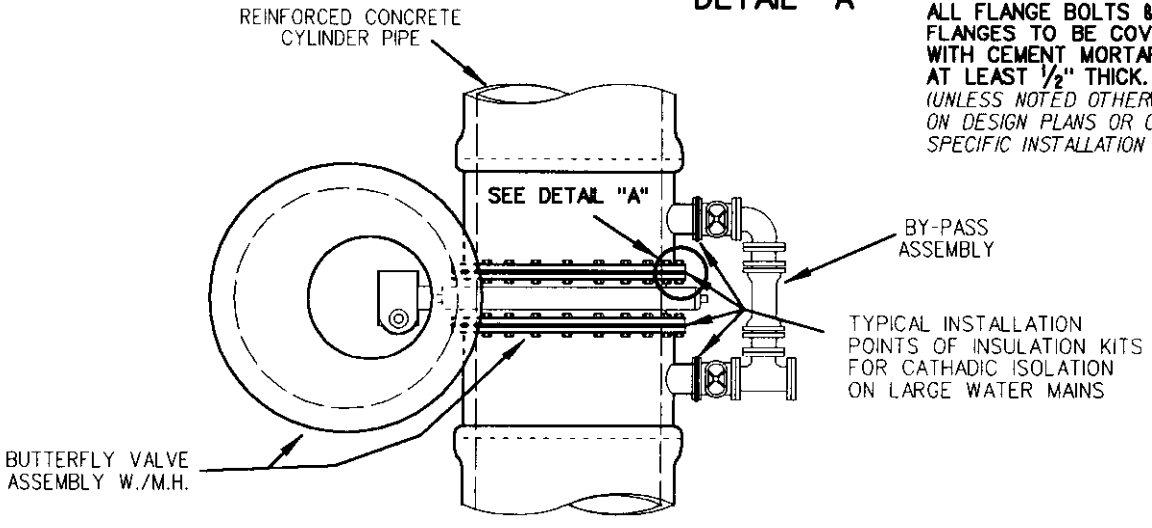
INSULATING MATERIAL (KIT)

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

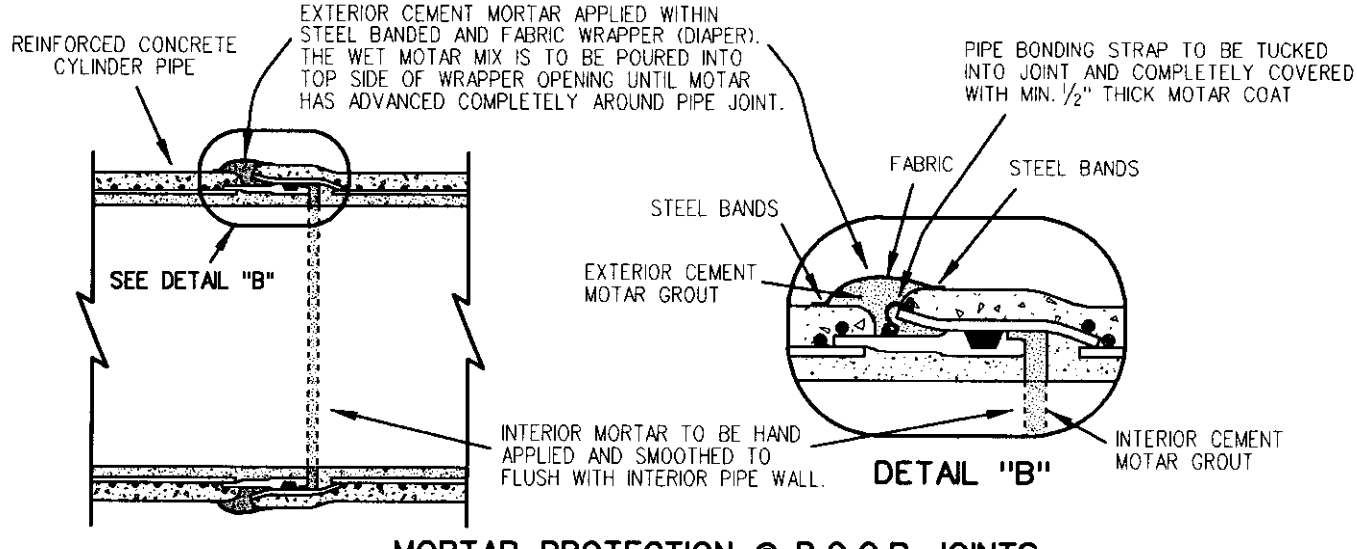



DETAIL "A"

**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)*



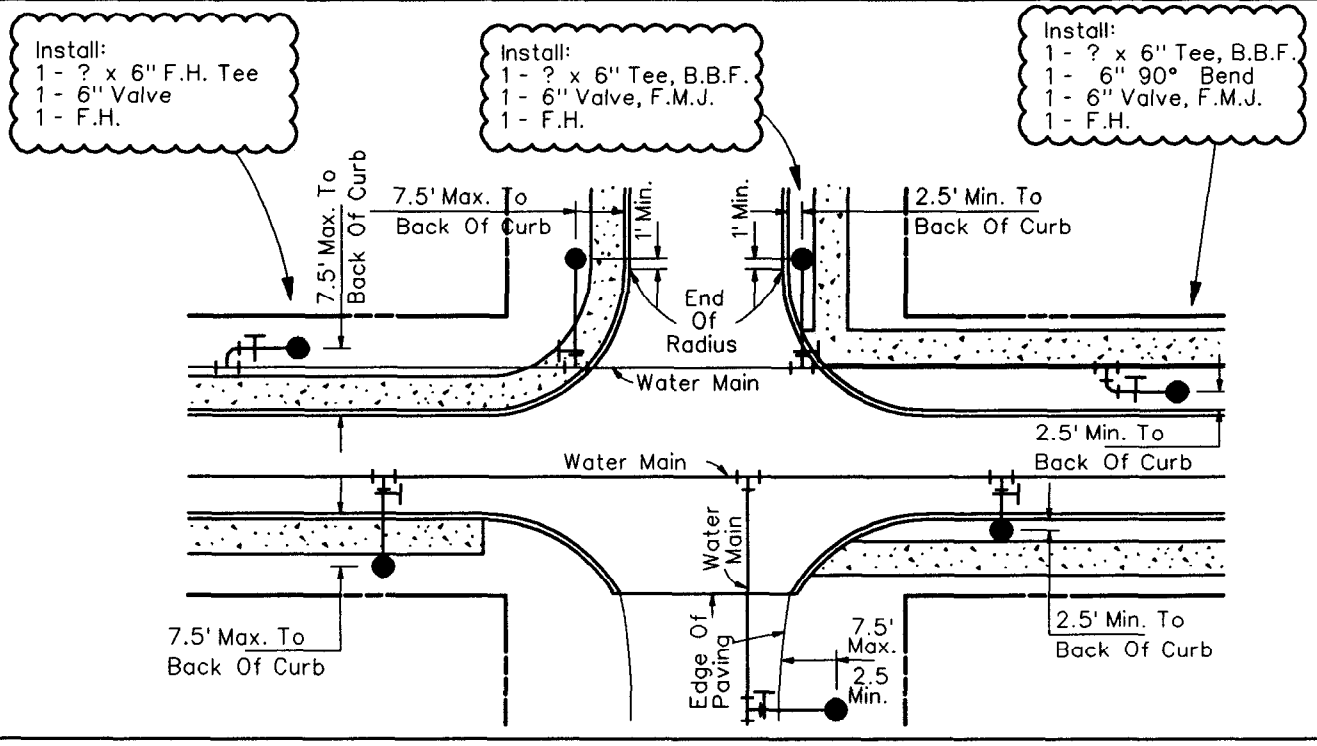

## INSULATION KIT INSTALLATION DETAIL
## ( FOR R.C.C.P. INSTALLATIONS )

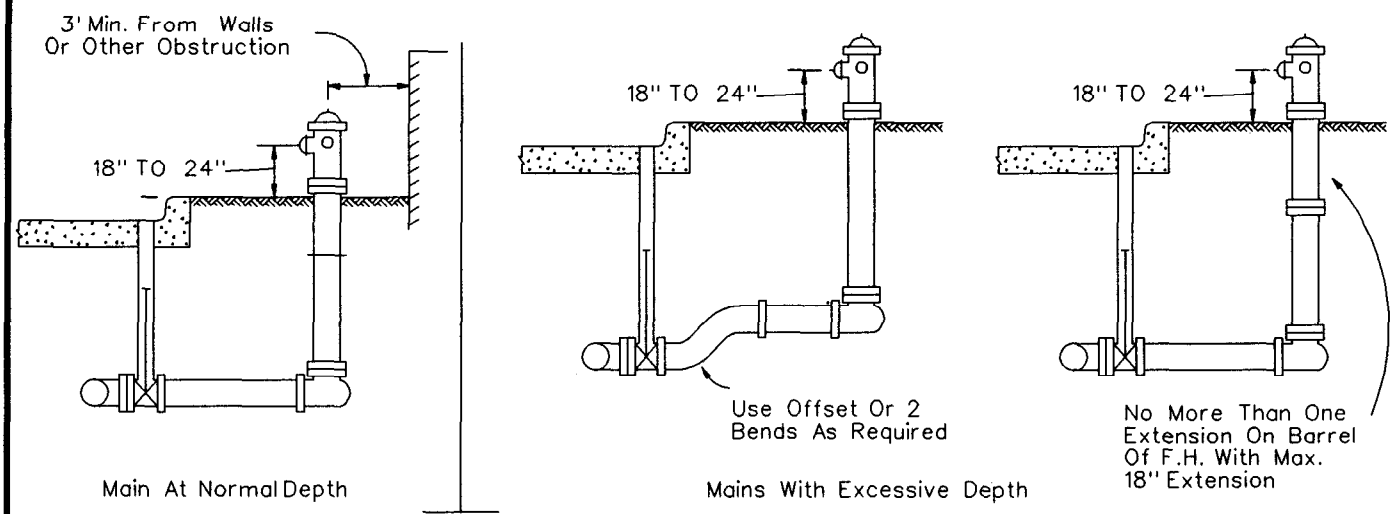



DETAIL "B"

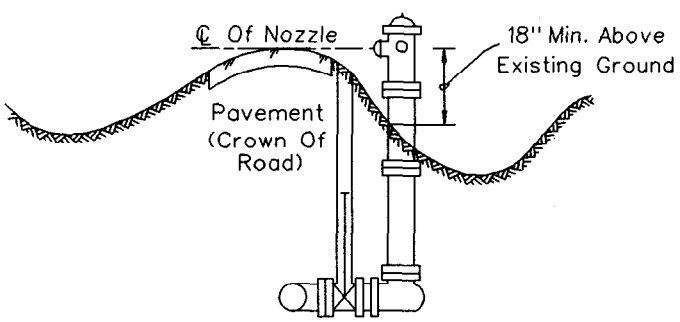
## MORTAR PROTECTION @ R.C.C.P. JOINTS
## ( BELL & SIGET JOINT SHOWN - ALSO APPLIES TO FLANGED JOINTS)

| MORTAR PROTECTION @ R.C.C.P. JOINTS & INSULATION KIT FOR FLANGED JOINTS | | DWU | (PAGE NO.) 223 |
|---|---|---|---|
| | | DATE DEC.'2002 | |




# 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

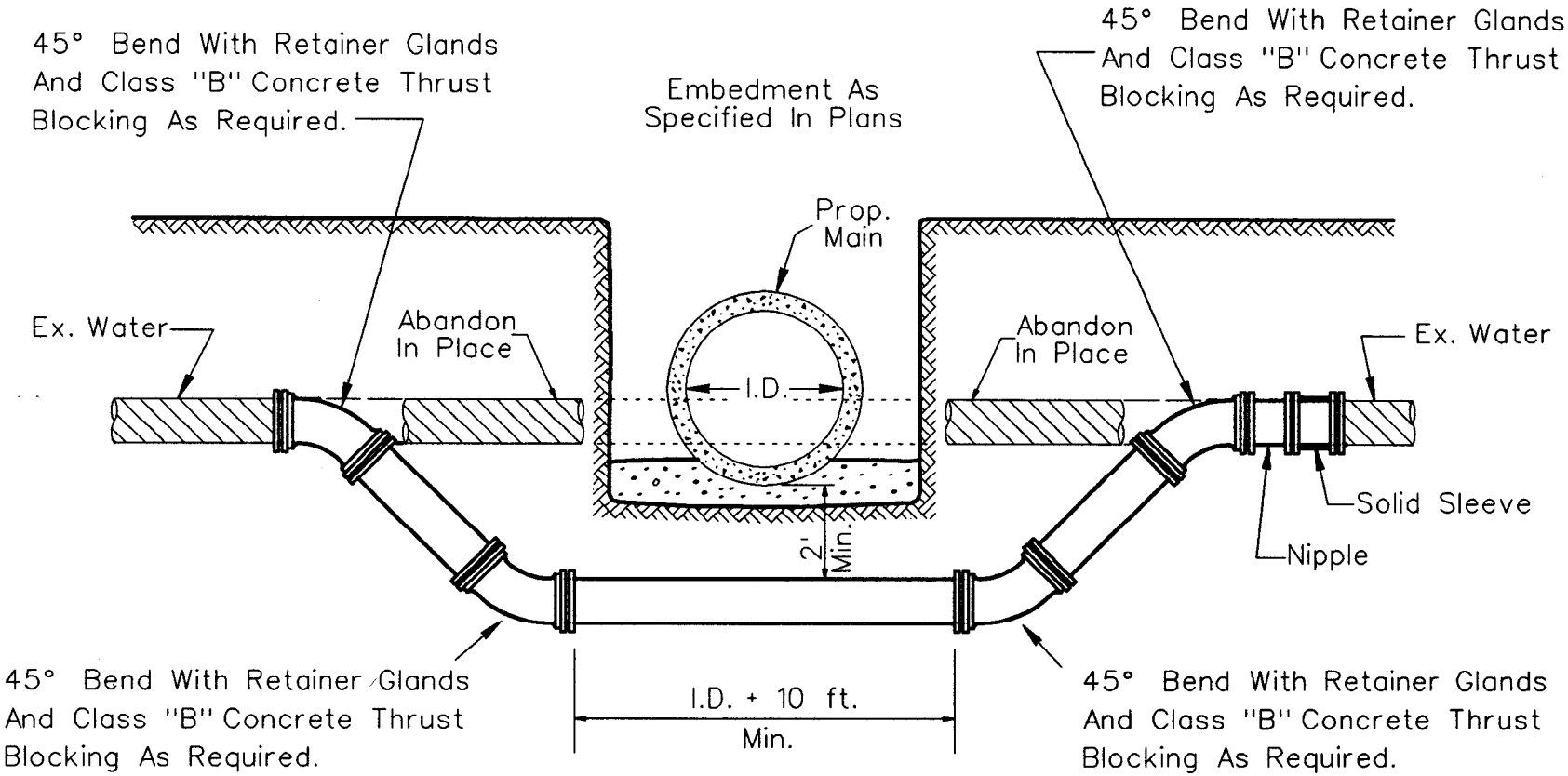
1. ℄ Of F.H. Barrel Shall Not Be Less Than 2.5 Or More Than 7.5 From Back Of Curb Or Edge Of Pavement.
2. Do Not Set F.H. In An Existing Or Proposed Sidewalk, Unless Otherwise Noted.
3. All Tees For F.H.s Must Provide Secure Anchoring From The Main To F.H. Valves
4. Set F.H. On The Lot Line Extended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

# METHODS FOR SETTING FIRE HYDRANTS

DWU

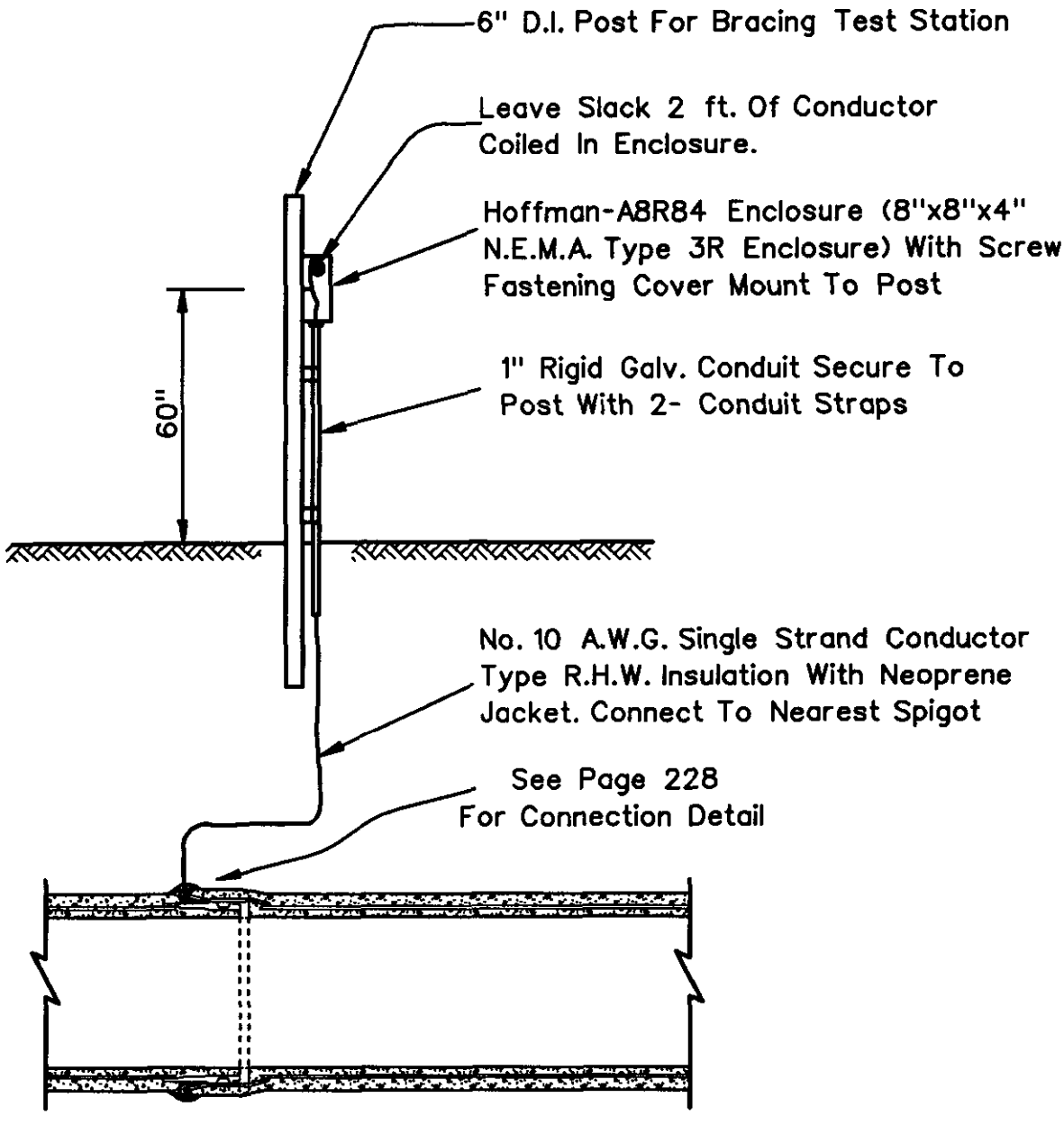
(PAGE NO.) 224

DATE JUNE 2002




Pipe Material As Specified on Plans

| STANDARD WATER MAIN LOWERING | | DWU | (PAGE NO.) 225 |
|---|---|---|---|
| | | DATE APRIL 2001 | |

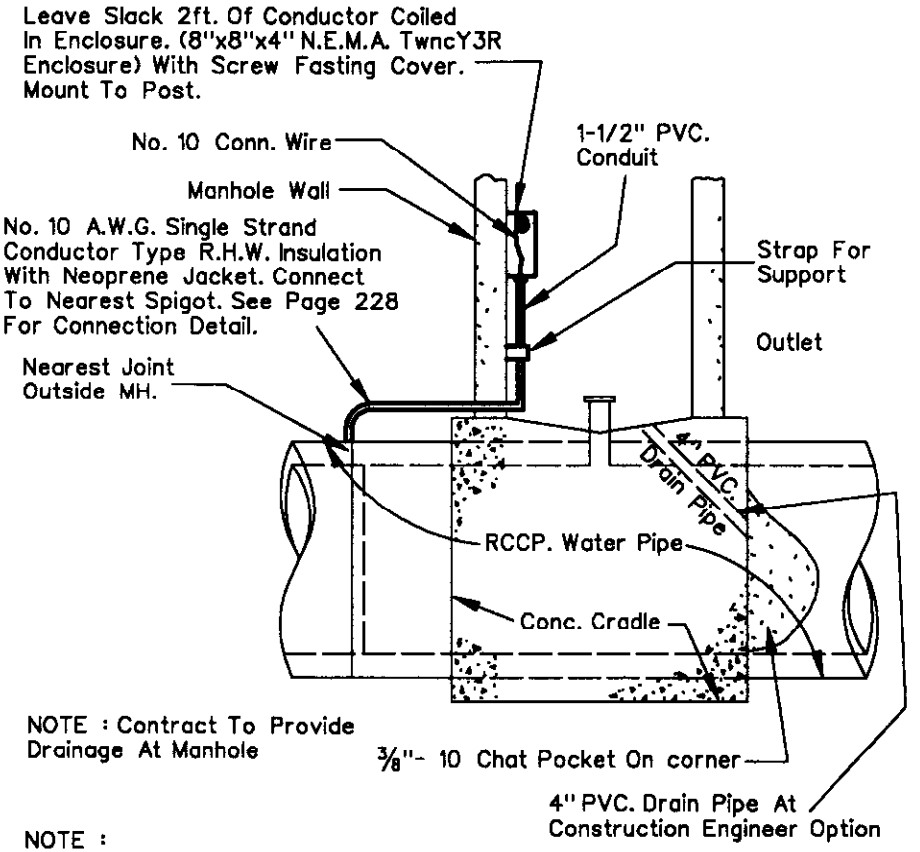



NOTE :

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.

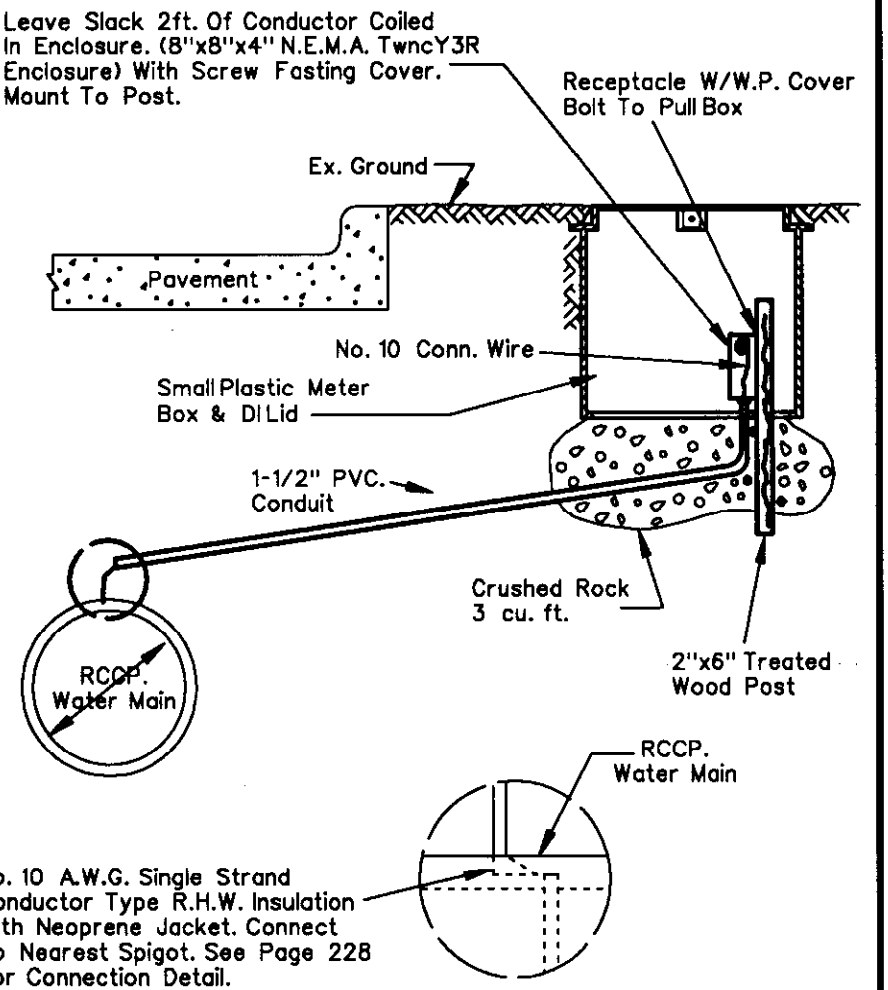
| PIPE-TO-SOIL POTENTION TEST STATION (POST MOUNTED) | | DWU | (PAGE NO.) 226 |
|---|---|---|---|
| | | DATE MARCH 2003 | |

## TEST STATION INSIDE MANHOLE TYPE I



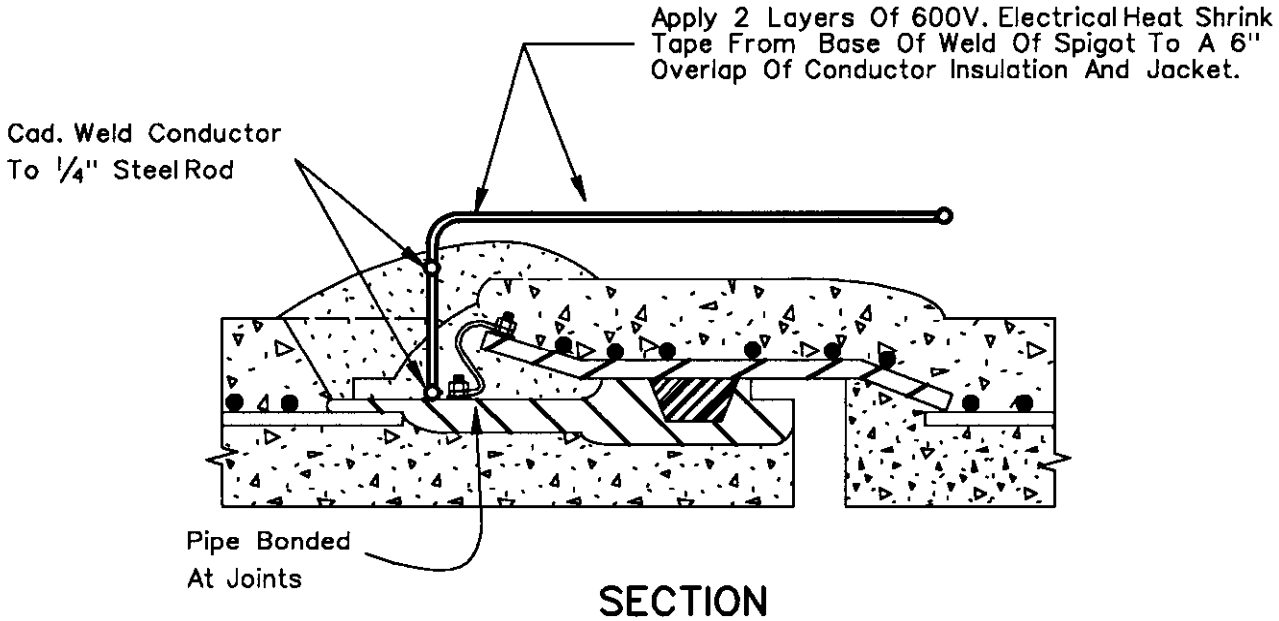

NOTE :
Conductor To Be Continuous With No Splices.
Avoid Breaks To conductor Jacket Or Insulation.
Any Breaks To Jacket insulation Must Be Repaired With 2 Layers Of 600V. Electrical Heat Shrink Tape. Any Contact Of Bare Conductor To Soil Will Render Erroneous Test Results When Monitoring Pipe Conditions.

## TEST STATION IN METER BOX TYPE II

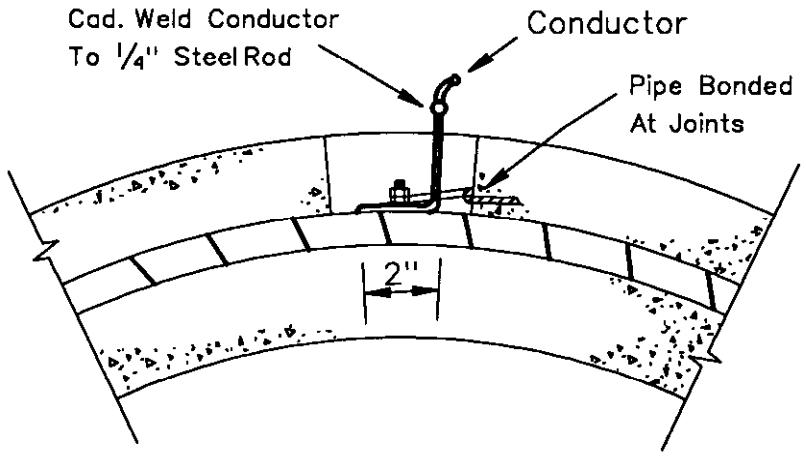



# PIPE-TO-SOIL POTENTIAL TEST STATION (BURIED CONFIGURATION)

| | |
|---|---|
| DWU | (Page No.) 227 |
| DATE DEC.2001 | |




## SECTION



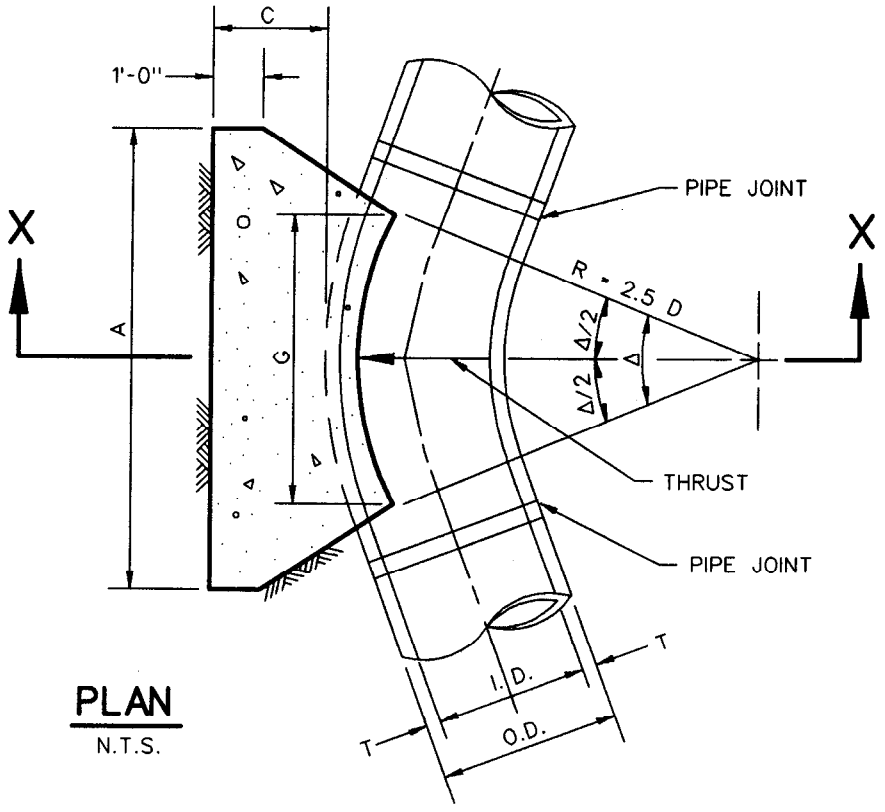

## END VIEW

NOTE :

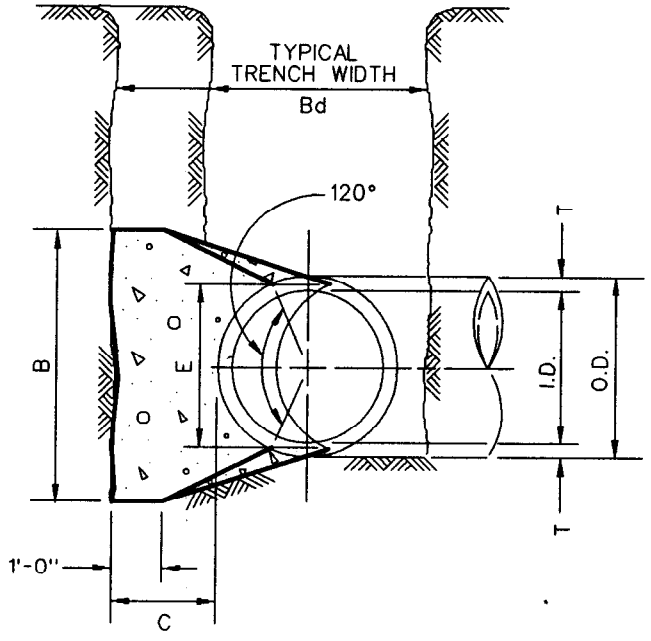
Conductor To Be Continuous With No Splices. Avoid Breaks To Conductor Jacket Or Insulation. Any Breaks To Jacket Insulation Must Be Repaired With 2 Layers Of 600V. Electrical Heat Shrink Tape. Any Contact Of Bare Conductor To Soil Will Render Erroneous Test Results When Monitoring Pipe Conditions.

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

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

# TABLES OF DIMENSIONS AND QUANTITIES

| I.D. (IN.) | T (IN.) | C Δ = 11.25° (FT.) | C Δ ≥ 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 |

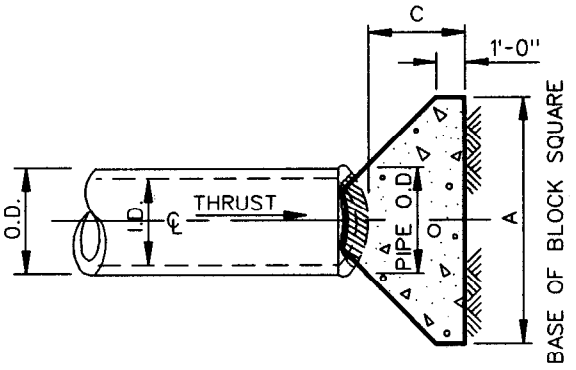
| I.D. (IN.) | Δ = 67.50° G (FT.) | THRUST (TONS) | EARTH A (FT.) | EARTH B (FT.) | EARTH VOL. (C.Y.) | ROCK A (FT.) | ROCK B (FT.) | ROCK VOL. (C.Y.) | I.D. (IN.) | Δ = 90° G (FT.) | THRUST (TONS) | EARTH A (FT.) | EARTH B (FT.) | EARTH VOL. (C.Y.) | ROCK A (FT.) | ROCK B (FT.) | ROCK VOL. (C.Y.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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

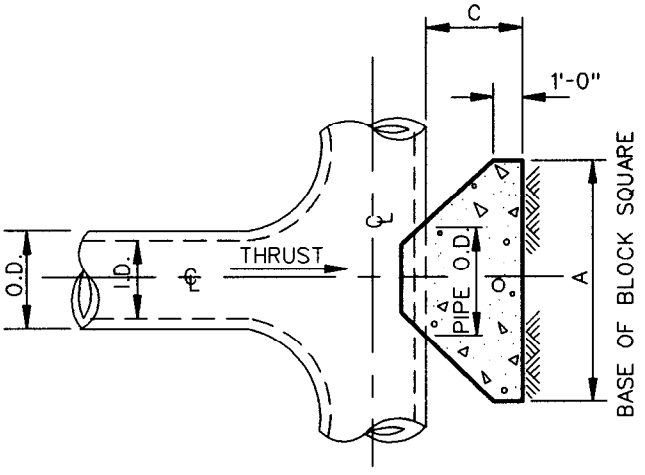
DWU

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 |

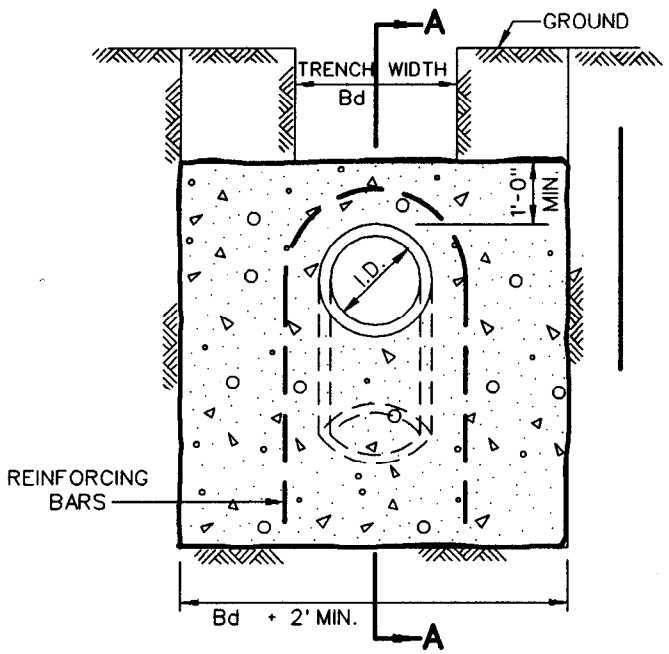
REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

# HORIZONTAL THRUST BLOCK AT TEES AND PLUGS

DWU

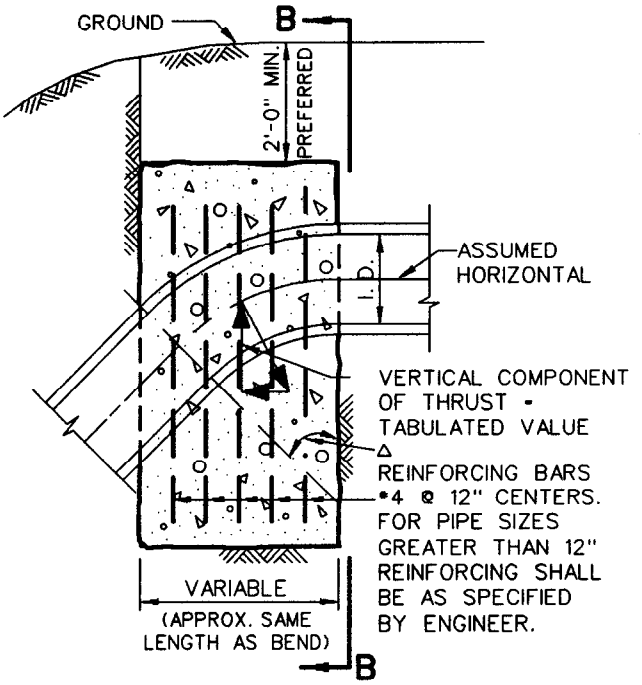
(Page No.) 232

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 trust 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. Diminsions 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 base 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

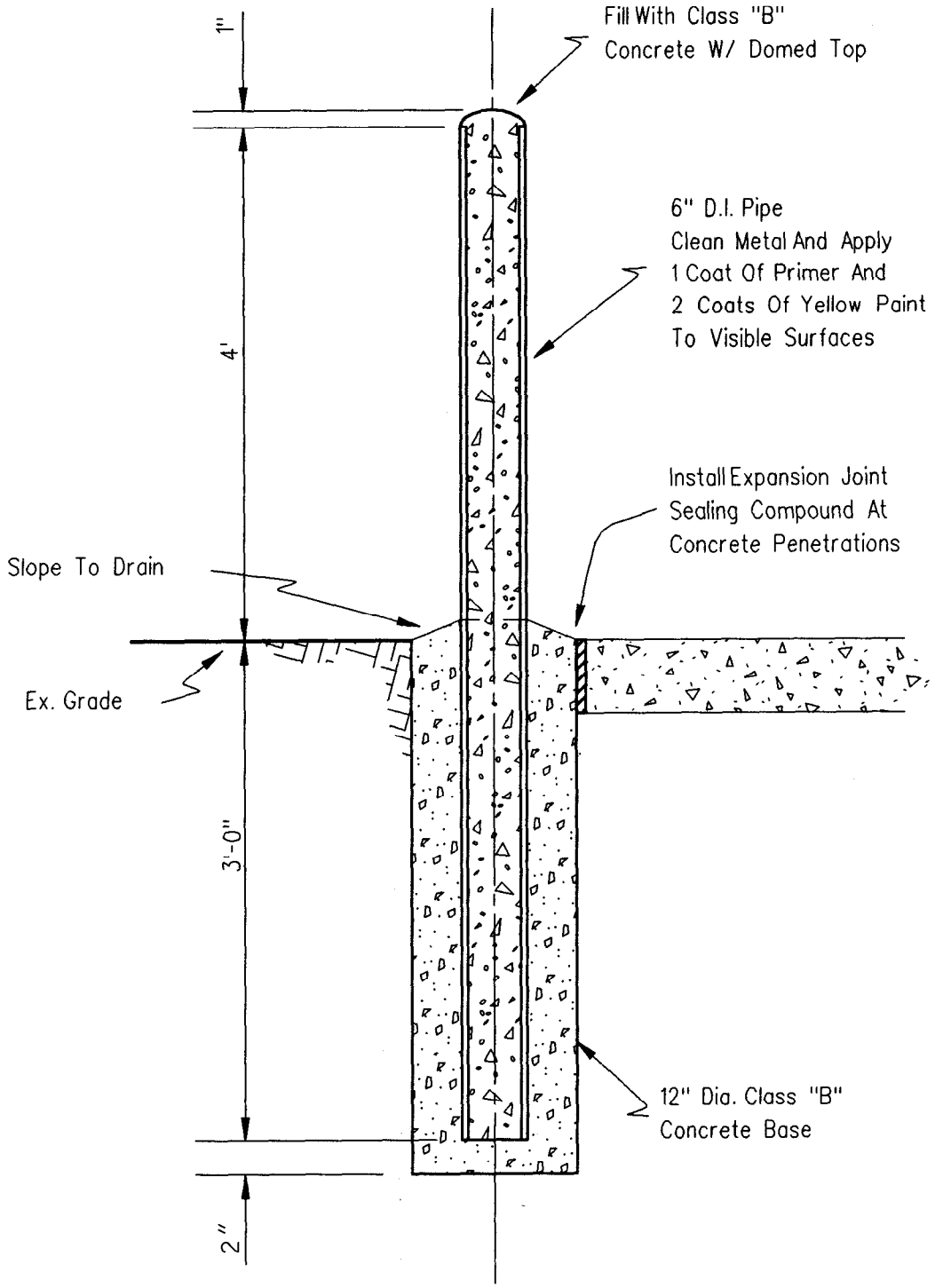
| | | | |
|---|---|---|---|
| THRUST BLOCK GENERAL NOTES | | DWU | (Page No.) 234 |
| | | DATE DEC.2001 | |

| 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' |
| | | | | | | |
| All Ductile Iron | C-2 | C-2 | C-2 | C-2 | C-2 | C-2 |
| | | | | | | |
| 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

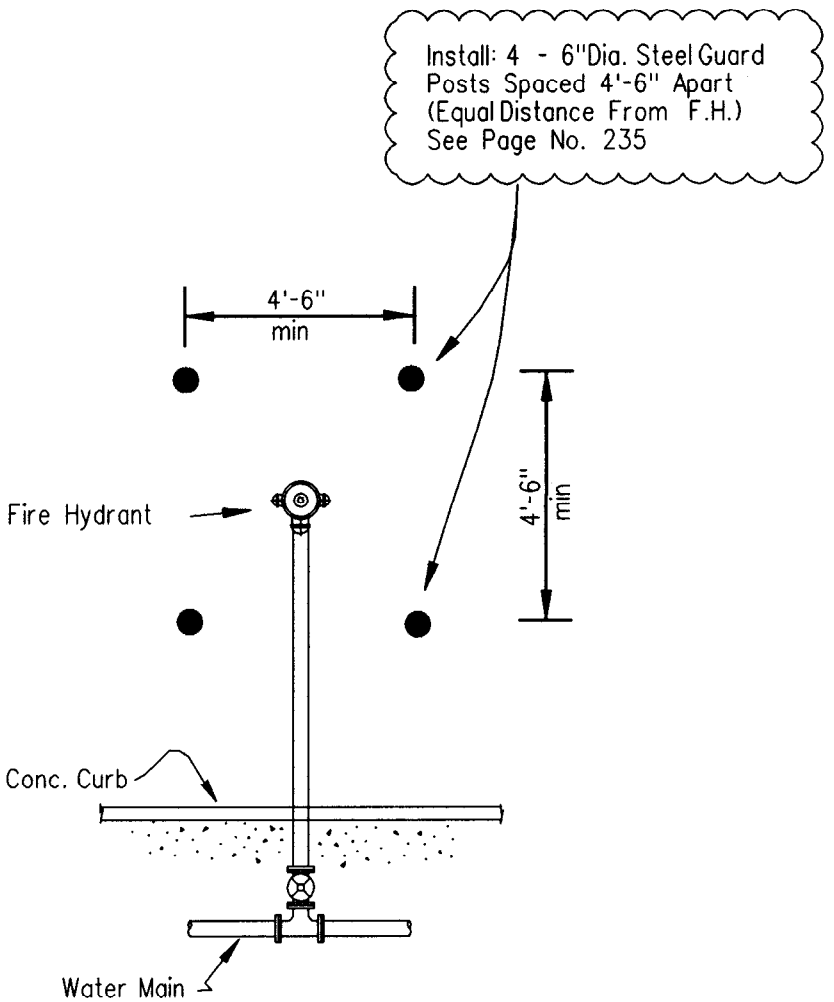
DWU

DATE JUNE 2002




# STEEL GUARD POST DETAIL

| | | |
|---|---|---|
| | DWU | (PAGE NO.) 236 |
| | DATE OCT.'99 | |

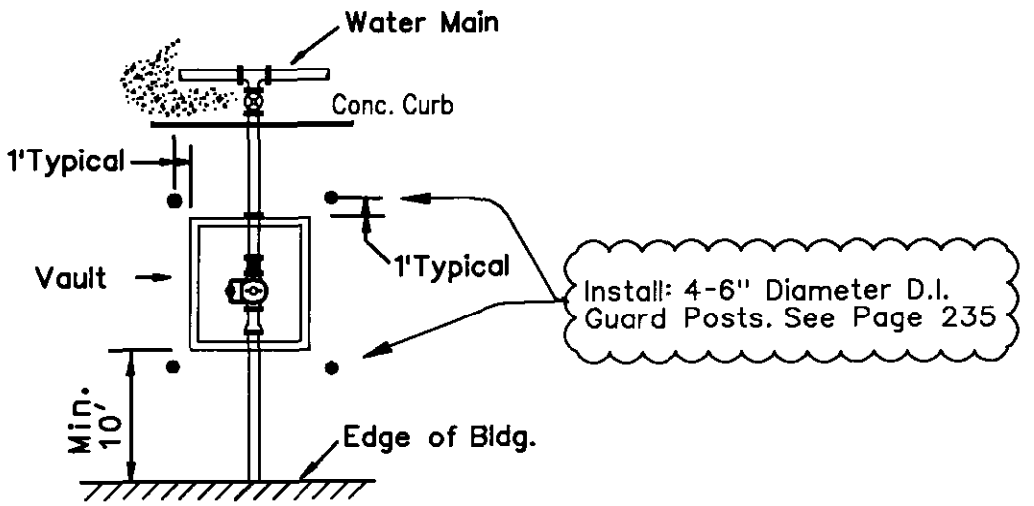



# GUARD POST PROTECTION FOR FIRE HYDRANTS

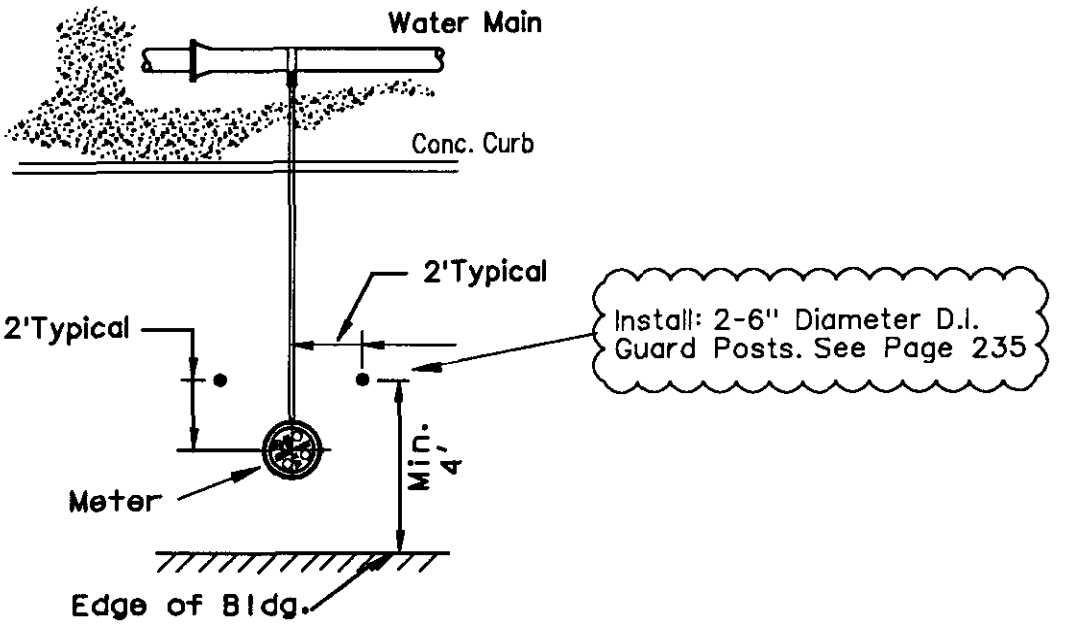
DWU

(PAGE NO.) 237

DATE OCT.'99




DETAIL FOR METER VAULTS




DETAIL FOR METERS 2" AND SMALLER

| GUARD POST PROTECTION FOR WATER METERS | | DWU | (PAGE NO.) 238 |
|---|---|---|---|
| | | DATE OCT.'99 | |

# PART 3

( Series 300 )

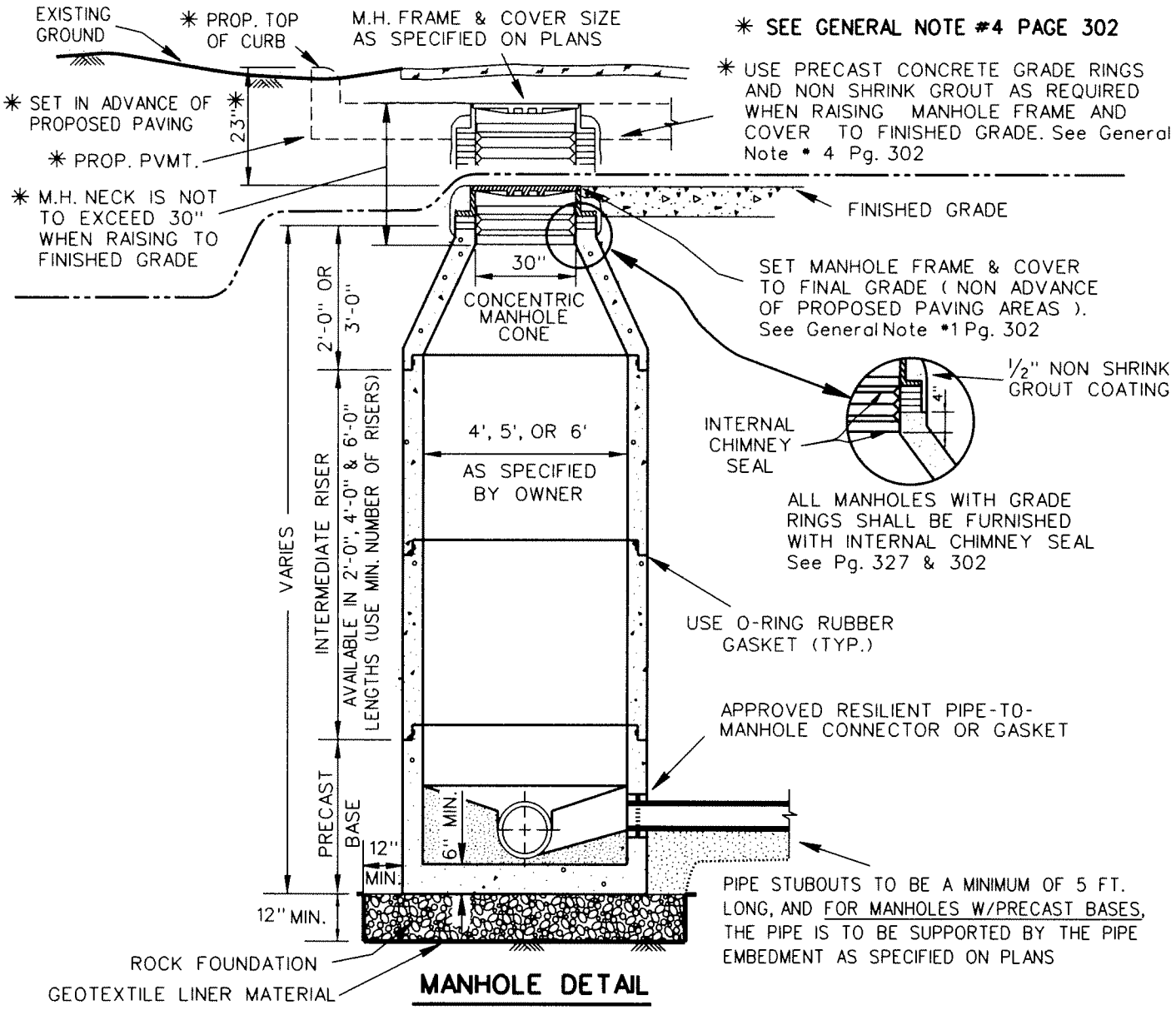
# WASTEWATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department

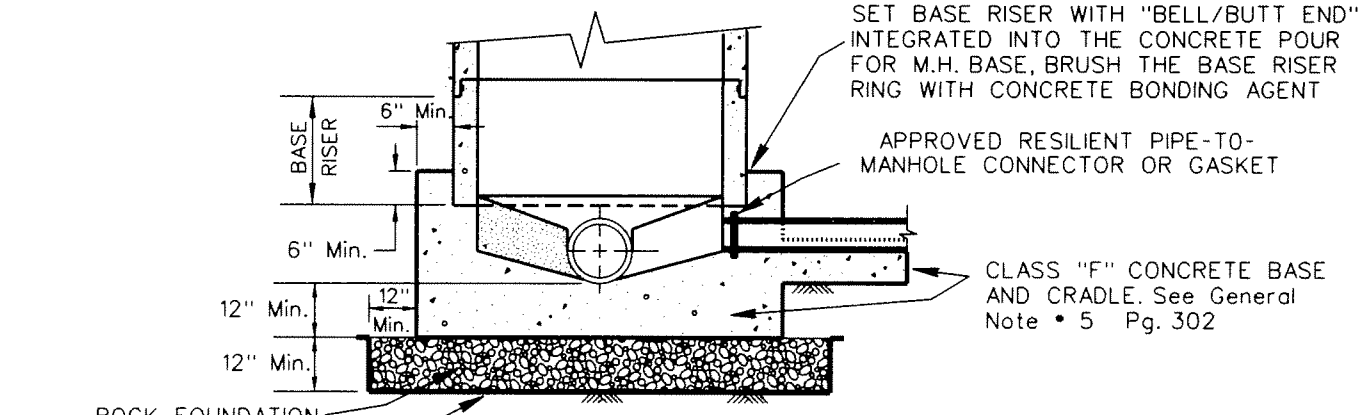
# PART 3
# WASTEWATER MAIN CONSTRUCTION

## ✳ 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.

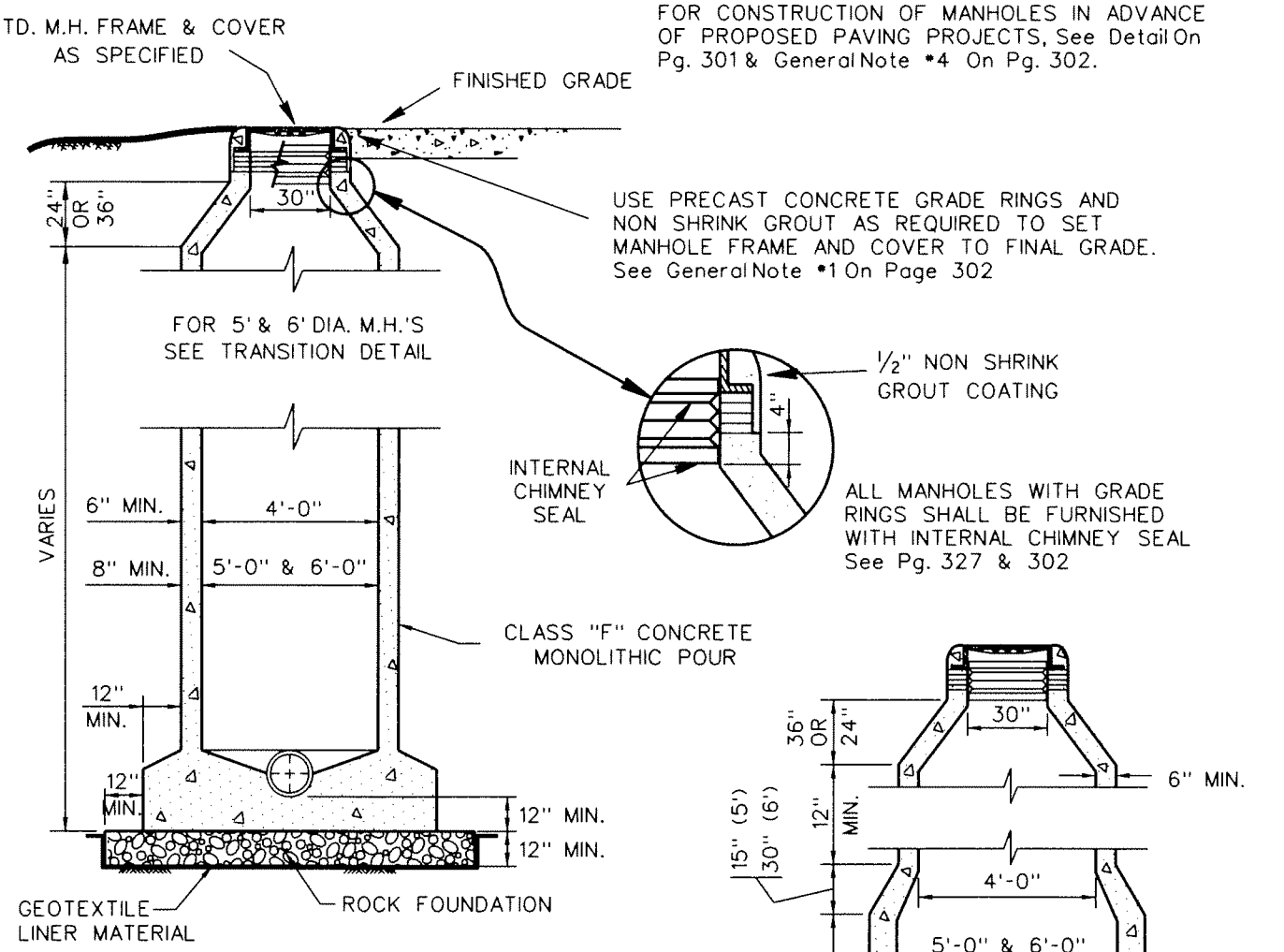
3) All wastewater main stubouts from manholes shall be a minimum of 5 feet in length and terminated with a water tight stopper or cap.

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.

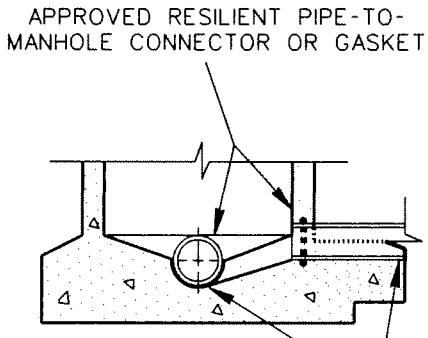



## MANHOLE DETAIL




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

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

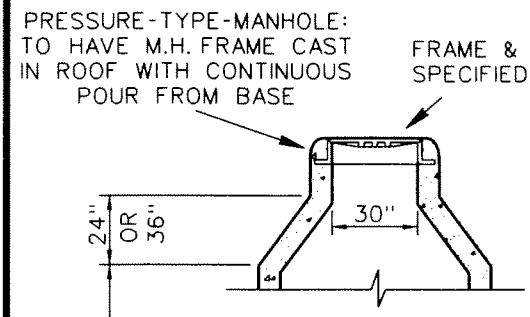
N.T.S.

**REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302**

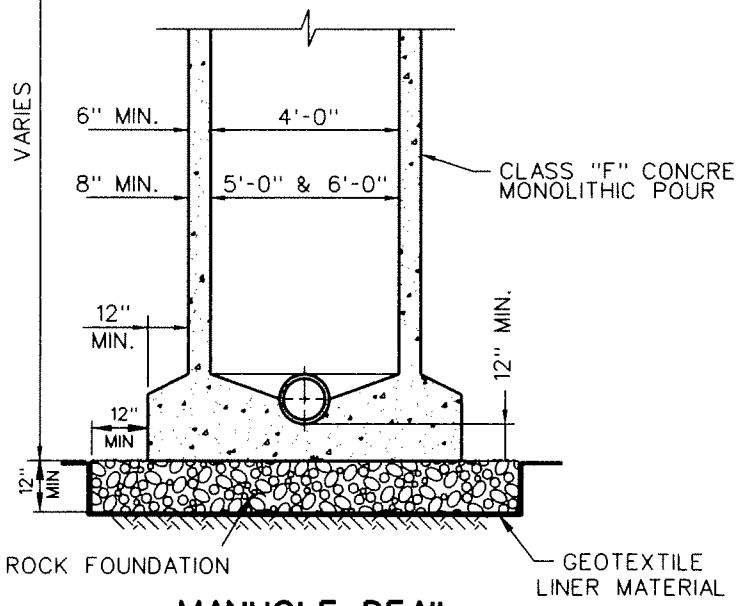
| WASTEWATER MANHOLE CAST-IN-PLACE | | DWU | (Page No.) 303 |
|---|---|---|---|
| | | DATE FEB.2009 | |

## CONCRETE CONE ⇦ ROOF OPTIONS ⇨ REINFORCED CONCRETE SLAB

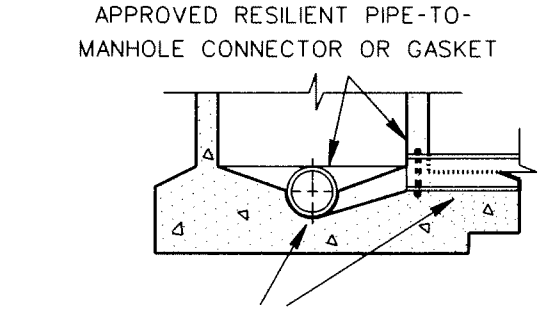
N.T.S.




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

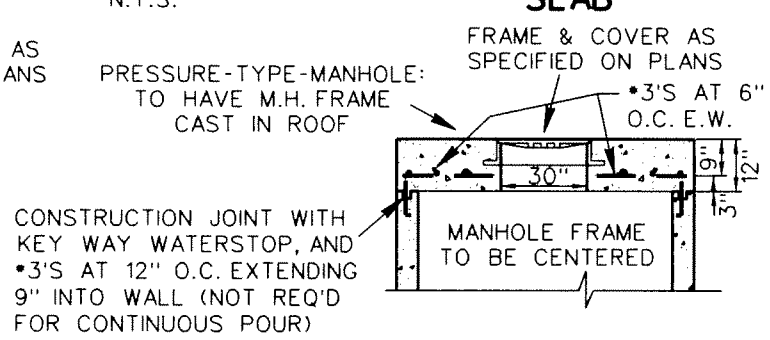



### MANHOLE DEAIL



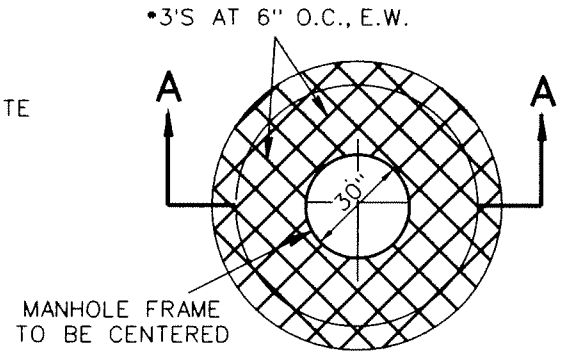

### CONNECTION DETAIL

N.T.S.



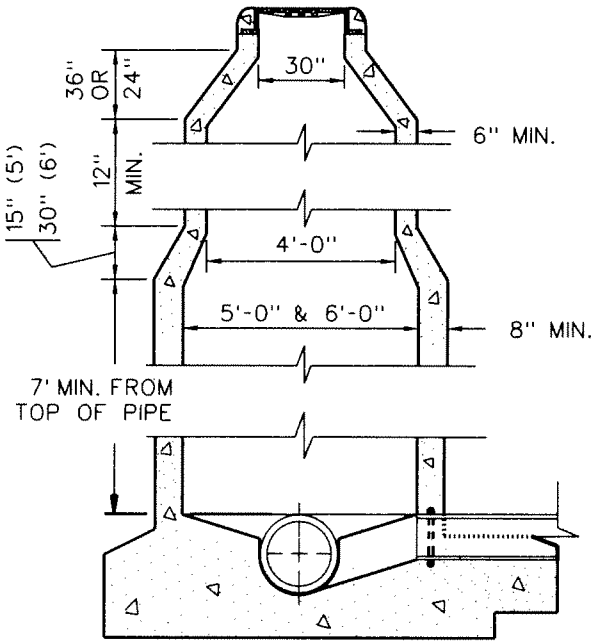

### SECTION A - A

N.T.S.




### ROOF STEEL LAYOUT

N.T.S.

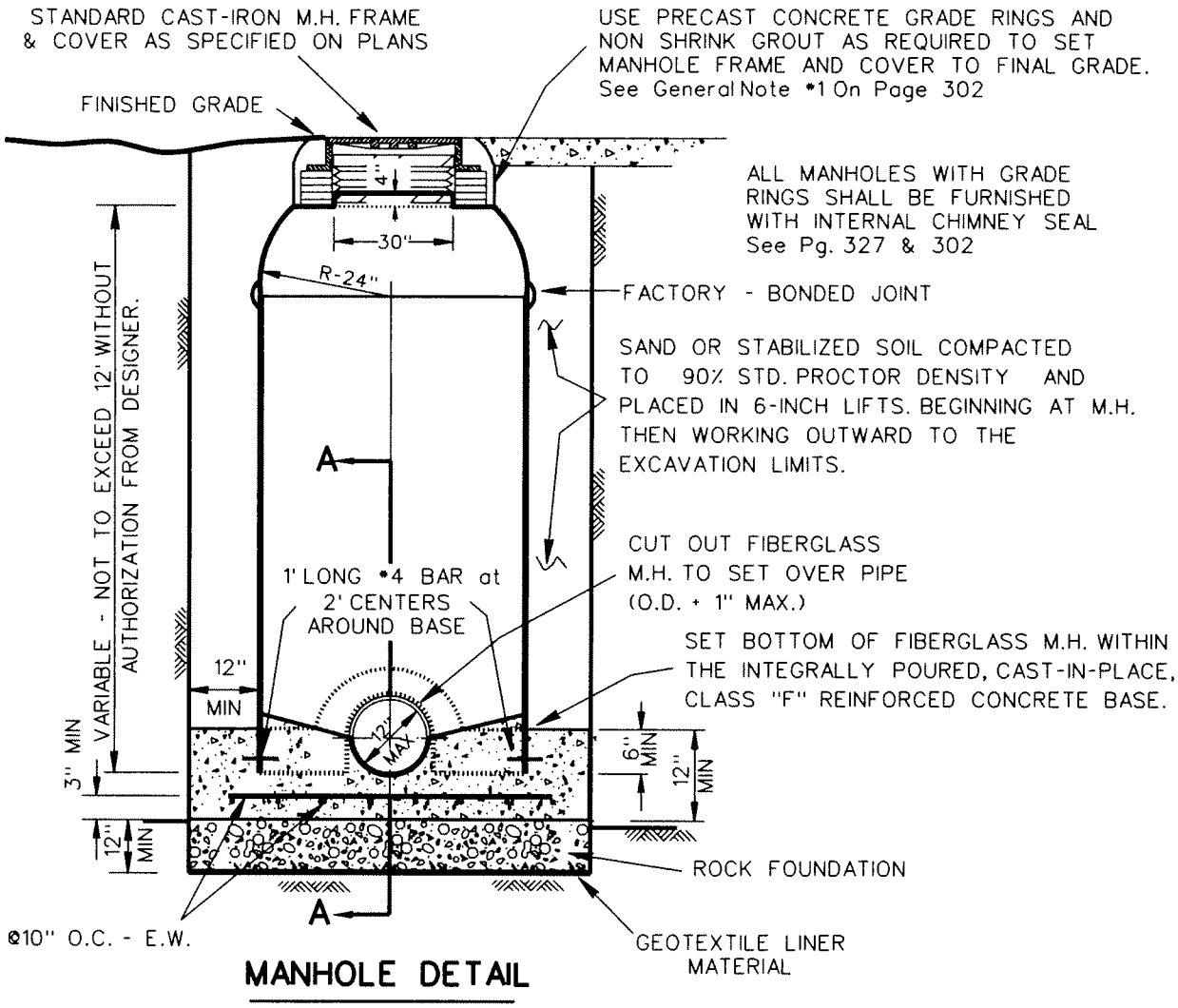



### TRANSITION DETAIL FOR 5' & 6' DIA. M.H.'S

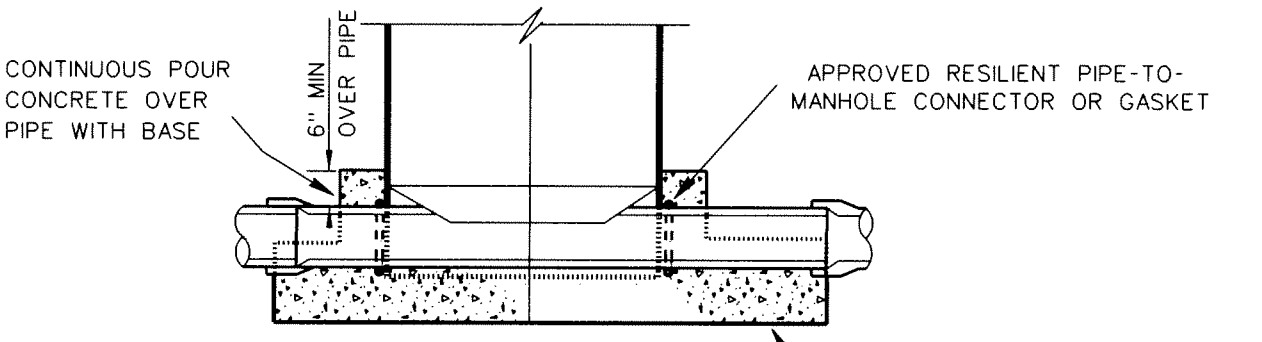
N.T.S.

**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.

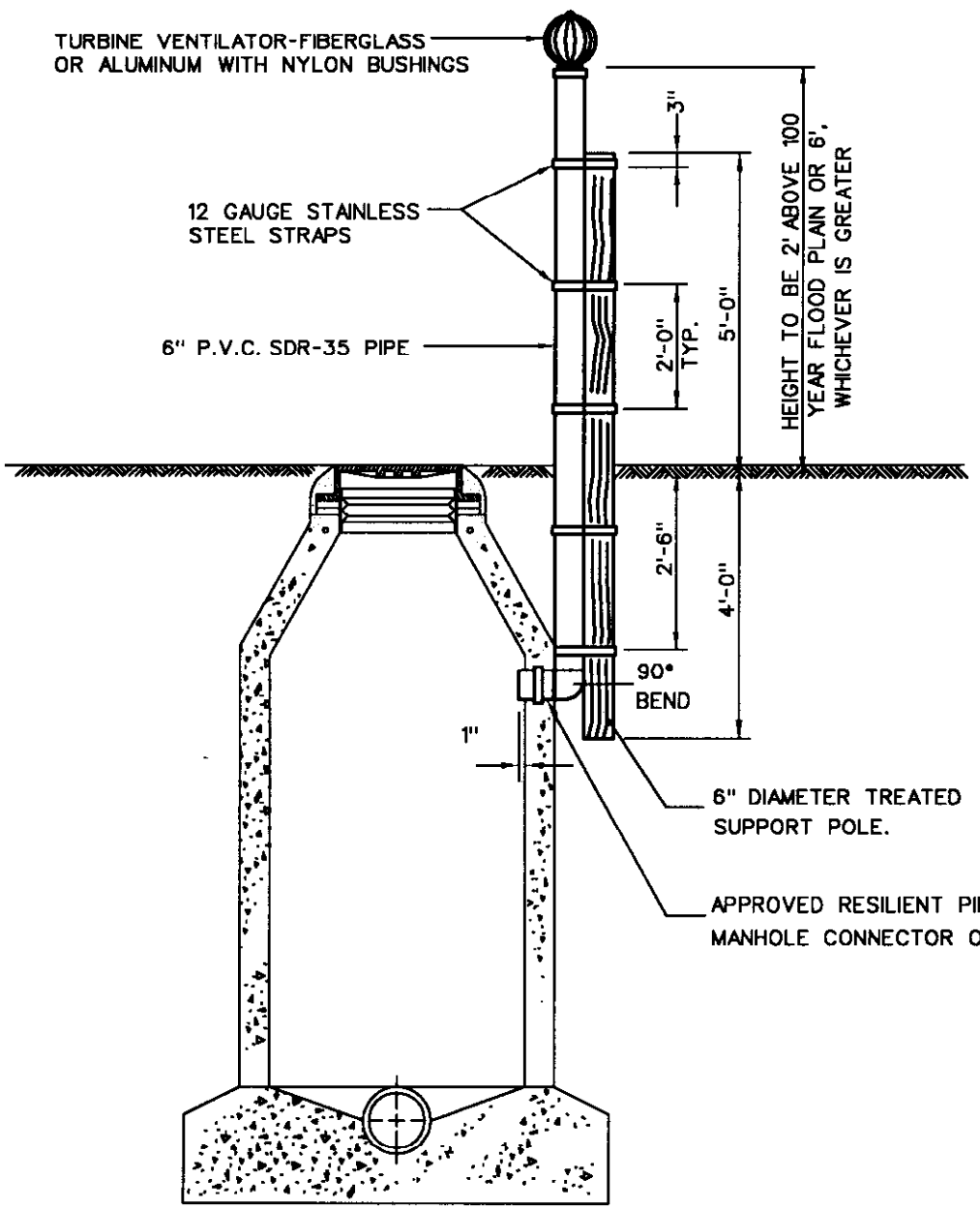
NOTES:

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

| | | |
|---|---|---|
| DWU | | (Page No.) 305 |
| DATE FEB.2009 | | |




# WASTEWATER MANHOLE VENTED

DWU

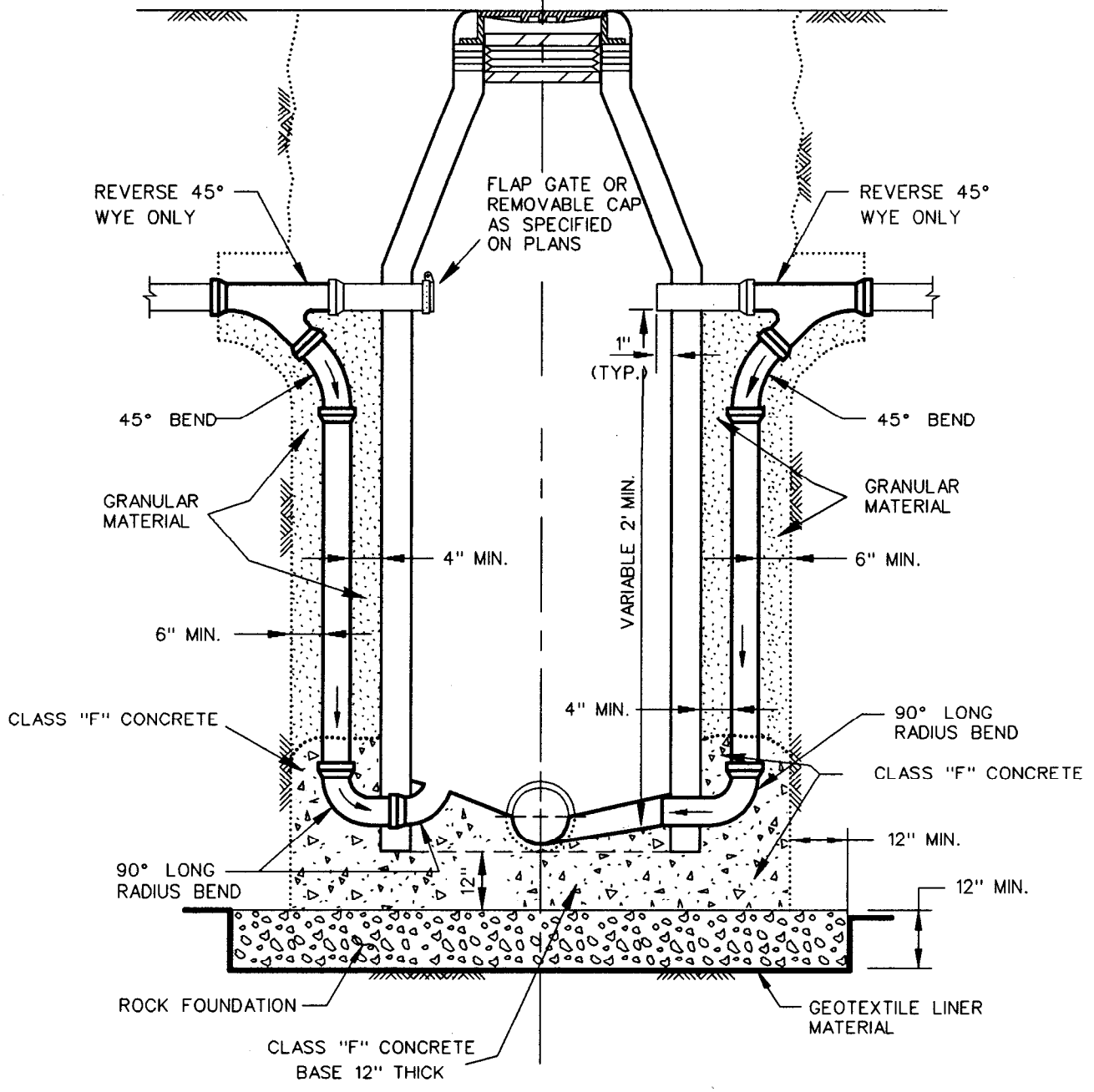
(Page No.) 306

DATE MARCH 2003

MANHOLE TYPE-AS
SPECIFIED ON PLANS

## GAS SEALED DROP CONNECTION
N.T.S.

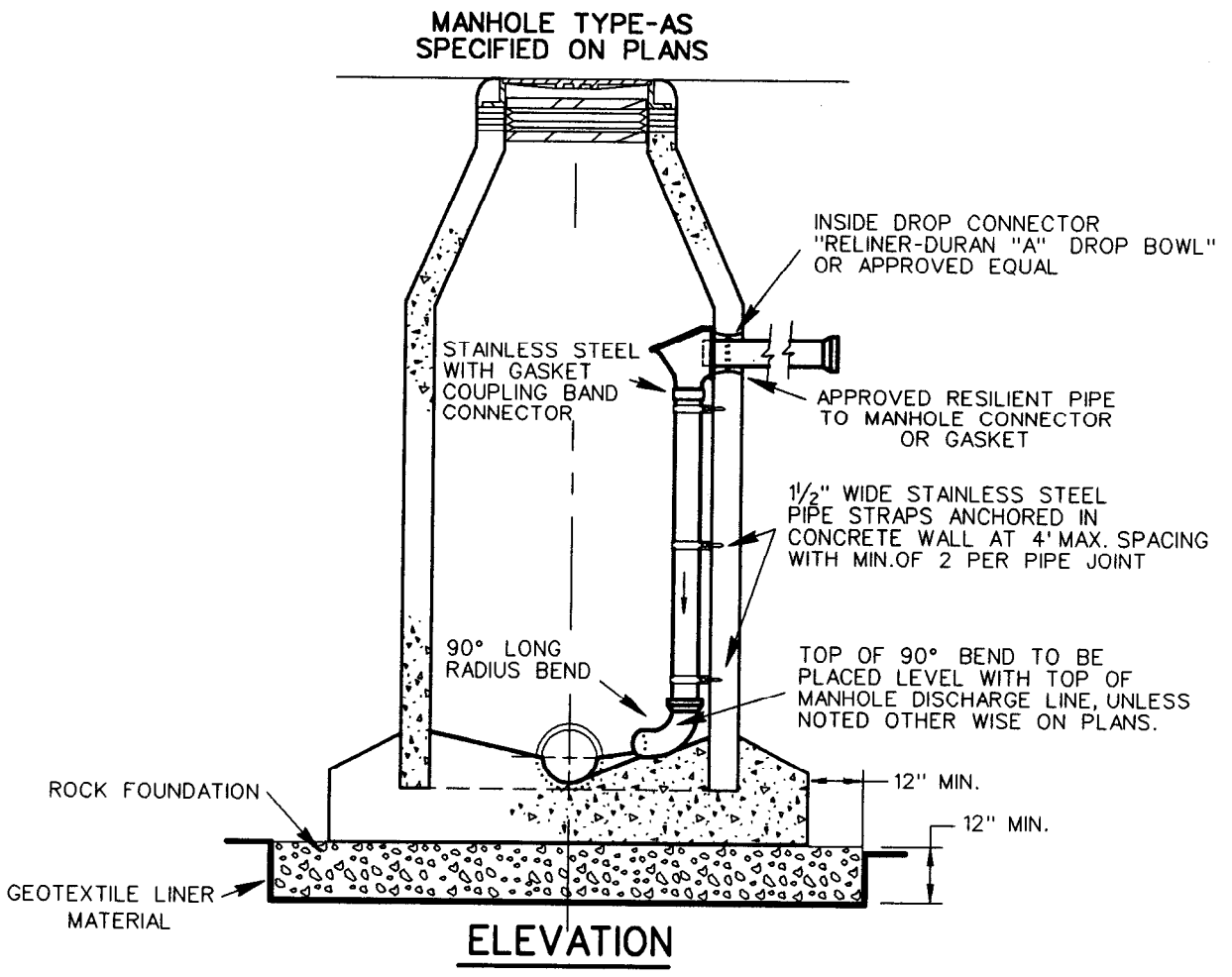
## STANDARD DROP CONNECTION
N.T.S.



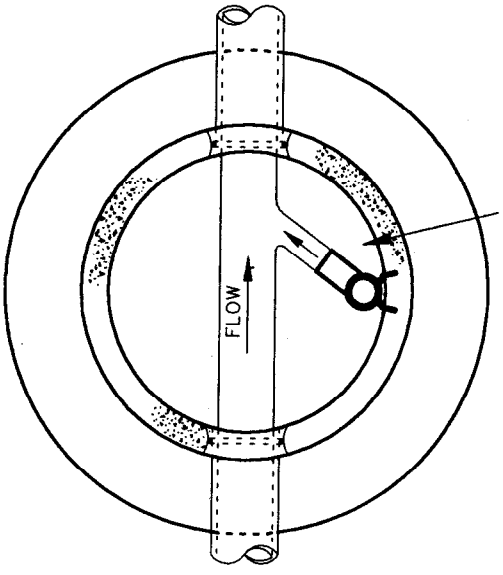

SEE GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

# WASTEWATER MANHOLE OUTSIDE DROP CONNECTIONS

| | (Page No.) |
|---|---|
| DWU | 307 |
| DATE JAN.2001 | |




## ELEVATION

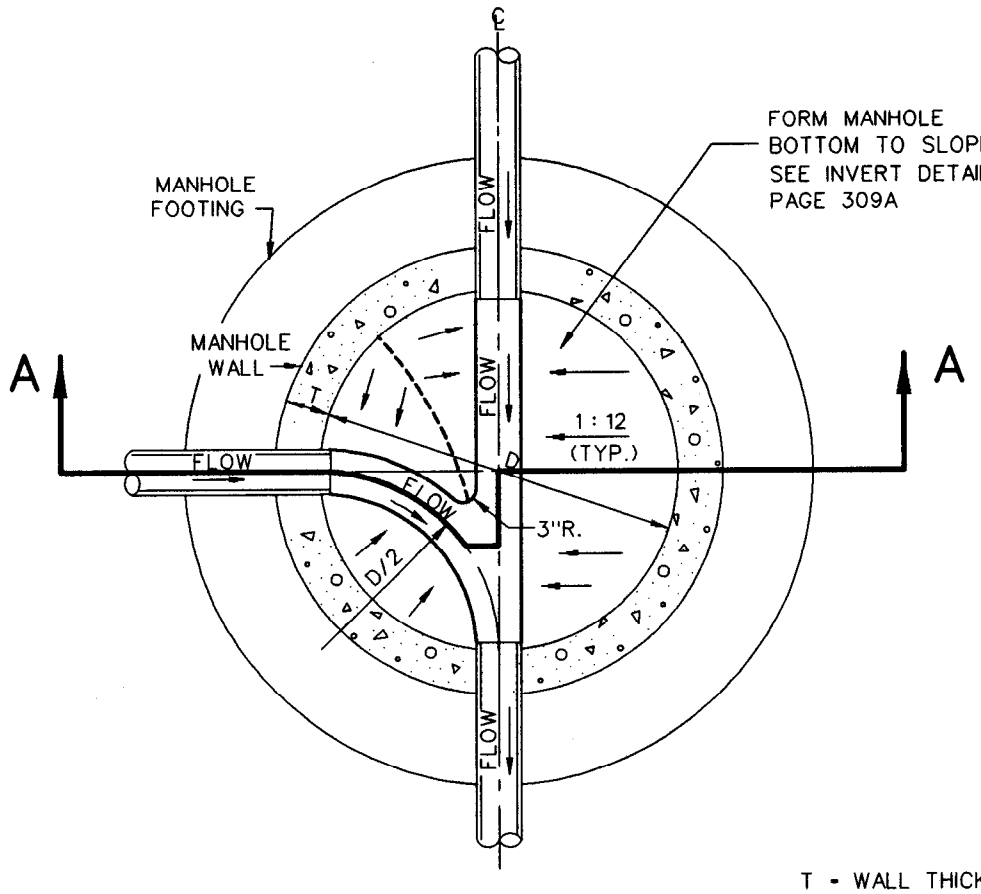



## PLAN

SEE GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

# WASTEWATER MANHOLE INSIDE DROP CONNECTION

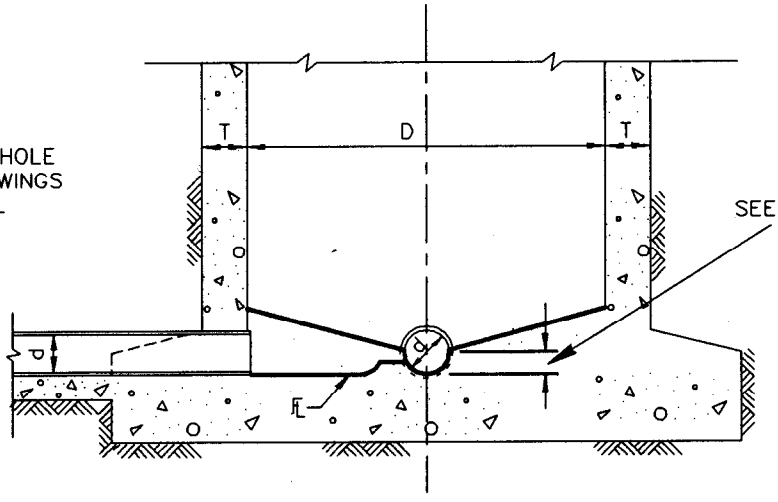
| | (Page No.) |
|---|---|
| DWU | 308 |
| DATE JAN.2001 | |




## PLAN
N.T.S.

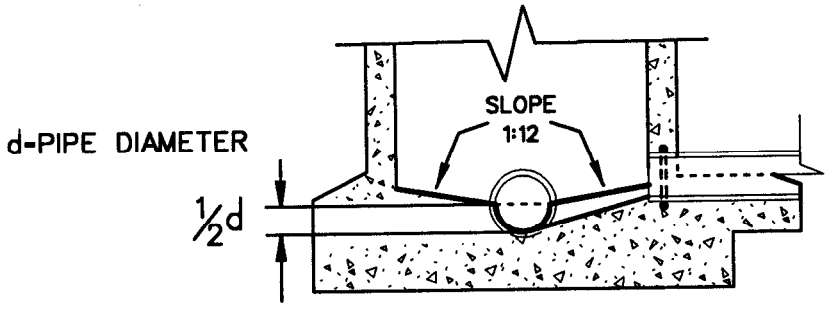
T = WALL THICKNESS
D = MANHOLE DIAMETER
d = PIPE DIAMETER

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

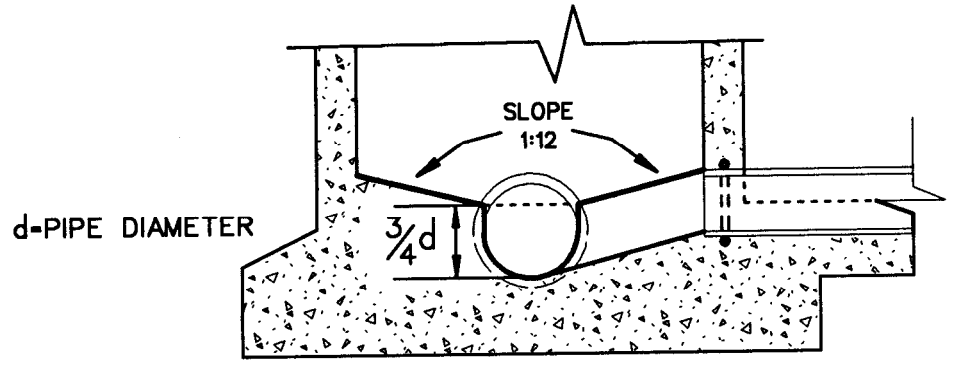



## SECTION A-A
N.T.S.

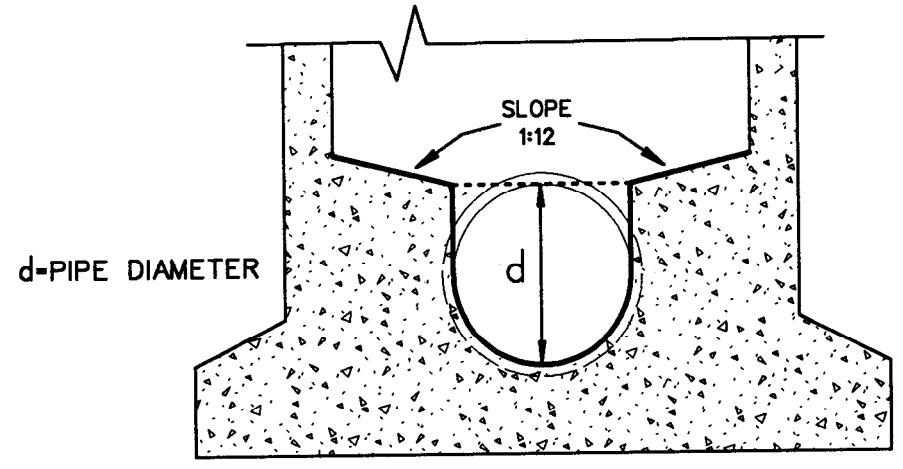
| WASTEWATER MANHOLE INVERT INTERSECTION DETAIL | | DWU | (Page No.) 309 |
|---|---|---|---|
| | | DATE DEC.2001 | |




FOR PIPE SMALLER
THAN 15" IN DIAMETER

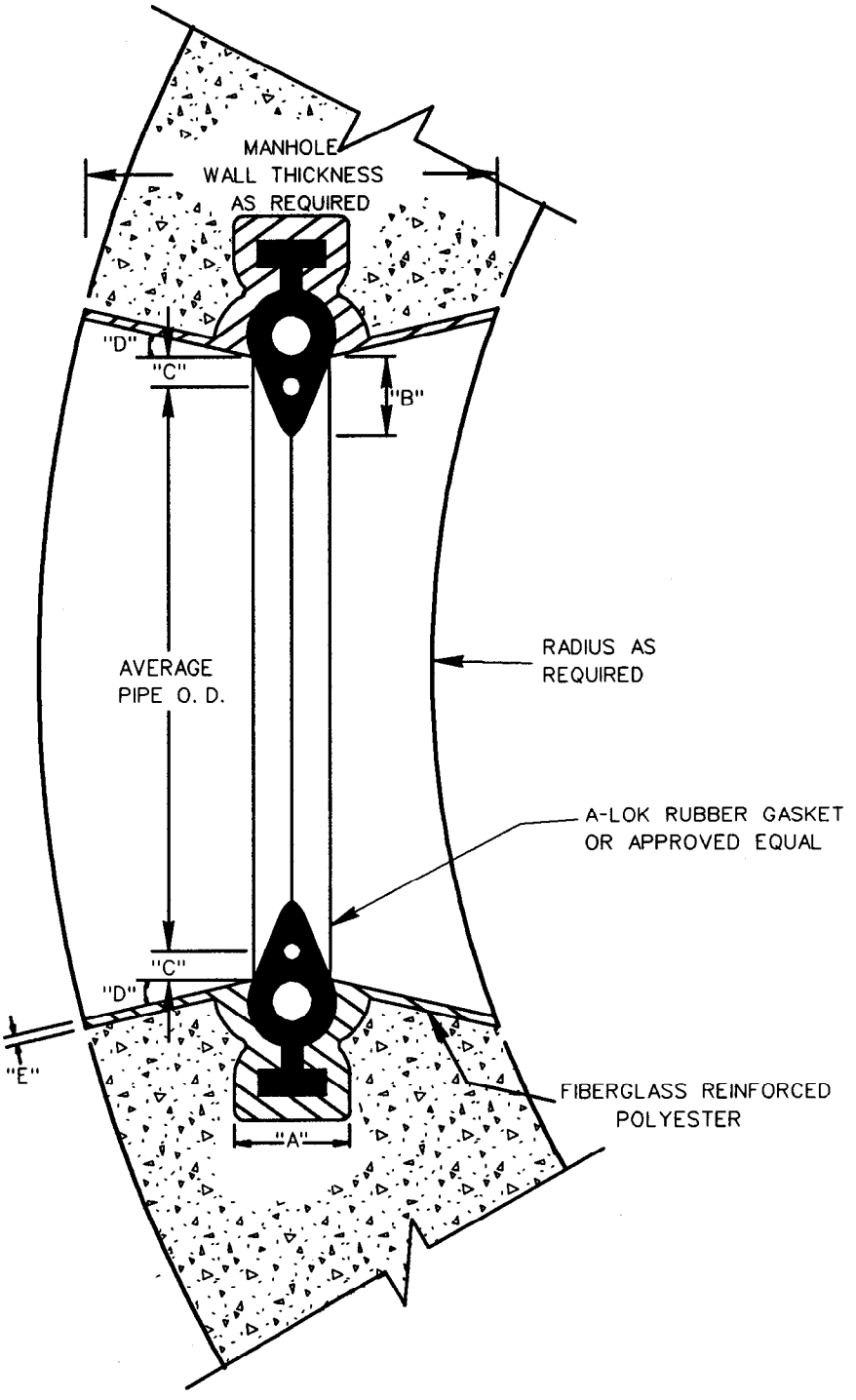



FOR PIPE FROM
15" TO 24" IN DIAMETER




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° | 0.10 ± |
| 8" - 21" | 2 1/8" | 1 3/8" | 5/8" | 10° | 0.10 ± |
| 24" - 60" | 2 3/8" | 1 3/4" | 3/4" | 10° | 0.25 ± |

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

DWU

DATE
DEC.2001

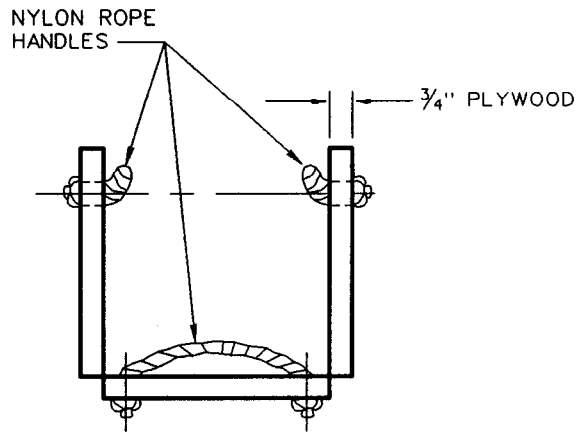
(PAGE No.)
310

## INSTALLATION

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

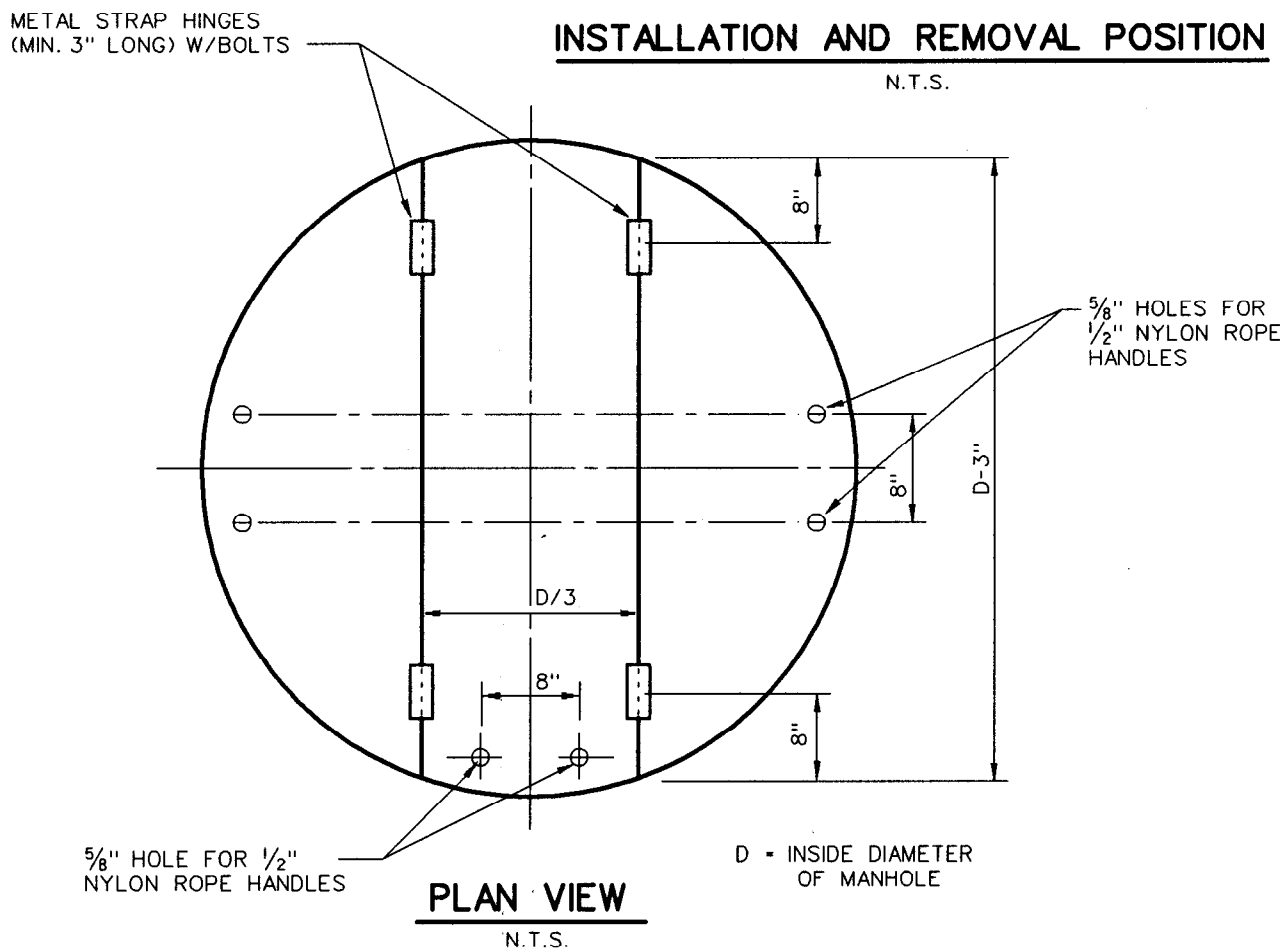
## REMOVAL

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




## INSTALLATION AND REMOVAL POSITION

N.T.S.

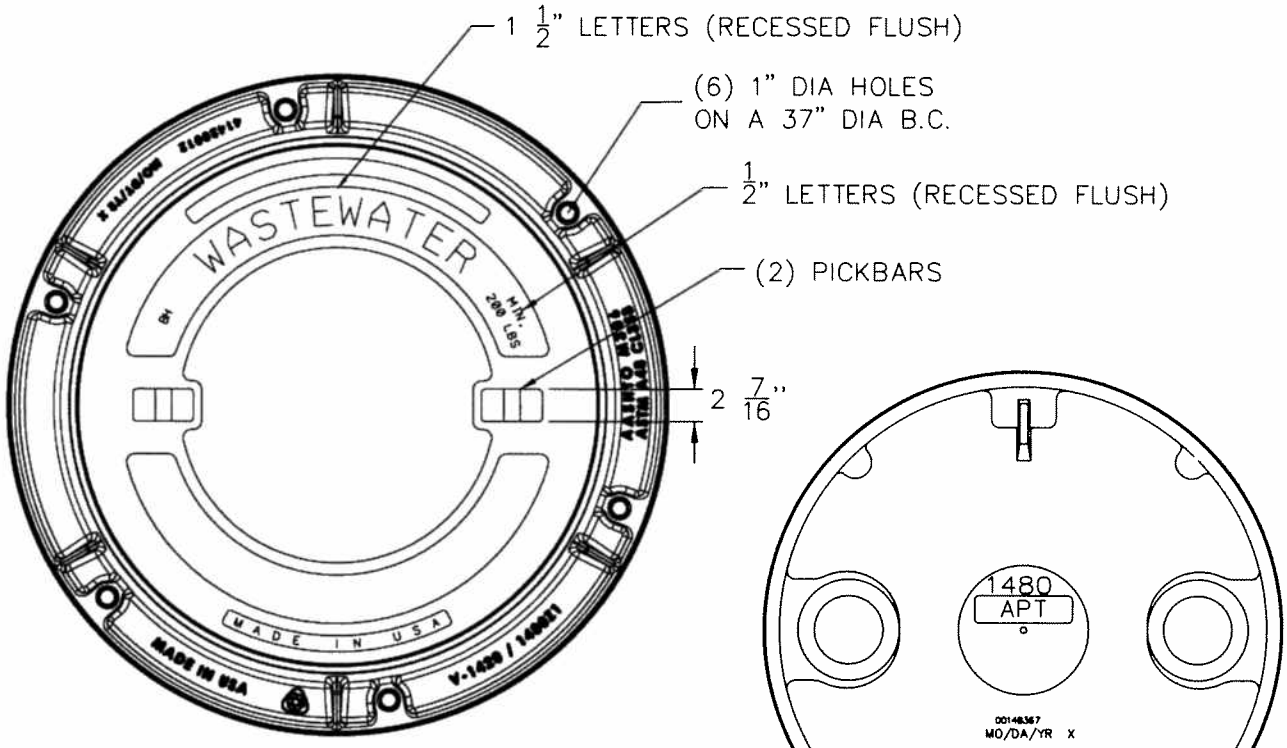



## PLAN VIEW

N.T.S.

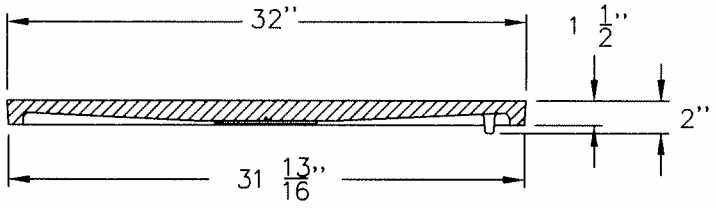
# WASTEWATER MANHOLE FALSE BOTTOM

| | | |
|---|---|---|
| DWU | | (Page No.) 311 |
| DATE DEC.2001 | | |

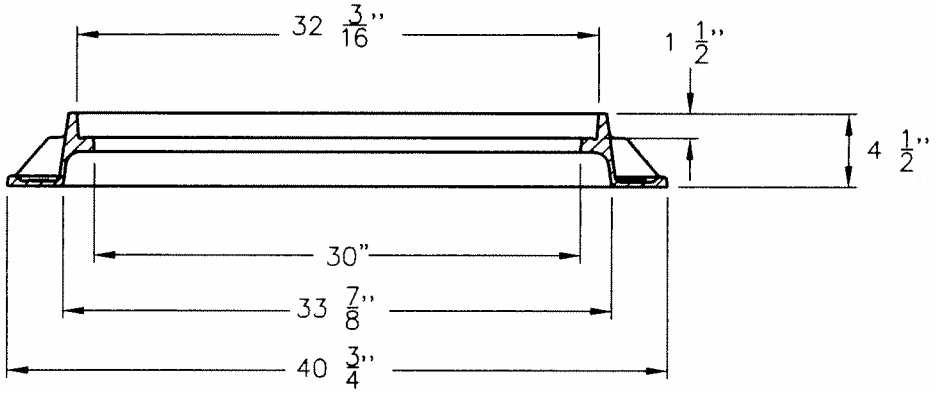



**PLAN VIEW**

**BOTTOM VIEW OF COVER**

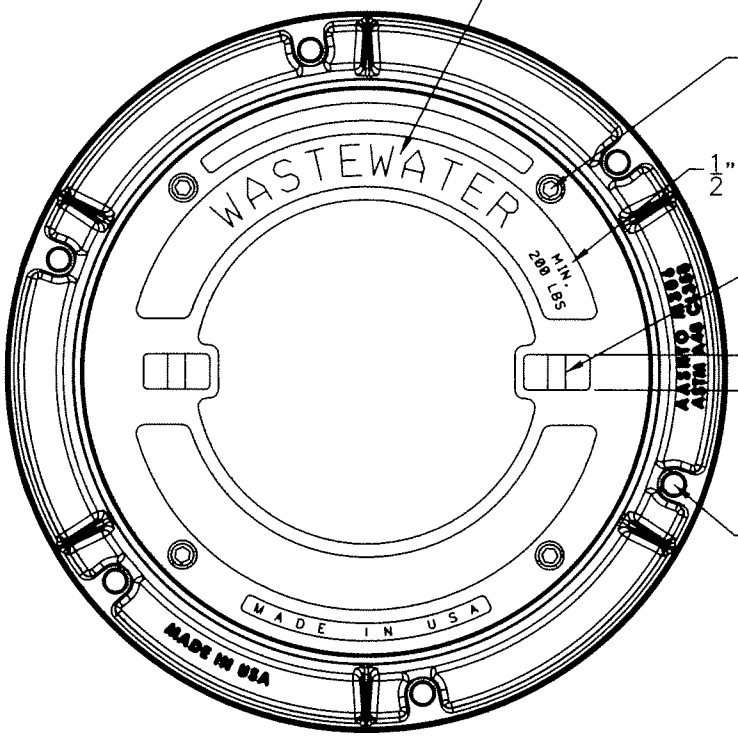



**COVER SECTION**




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

| STANDARD 32"<br>C.I. M.H. FRAME & COVER | WASTEWATER | DWU | (PAGE No.)<br>312 |
|---|---|---|---|
| | | DATE<br>FEB.2009 | |




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

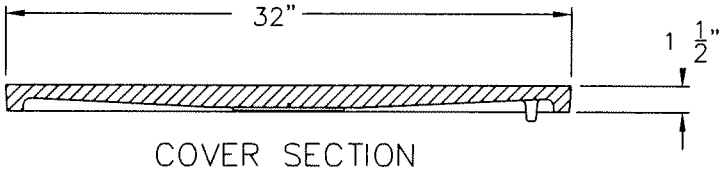
(4) $\frac{1}{2}$"–13 X 2" LG. SS HEX HEAD BOLTS W/ STL AND RUBBER WASHERS

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

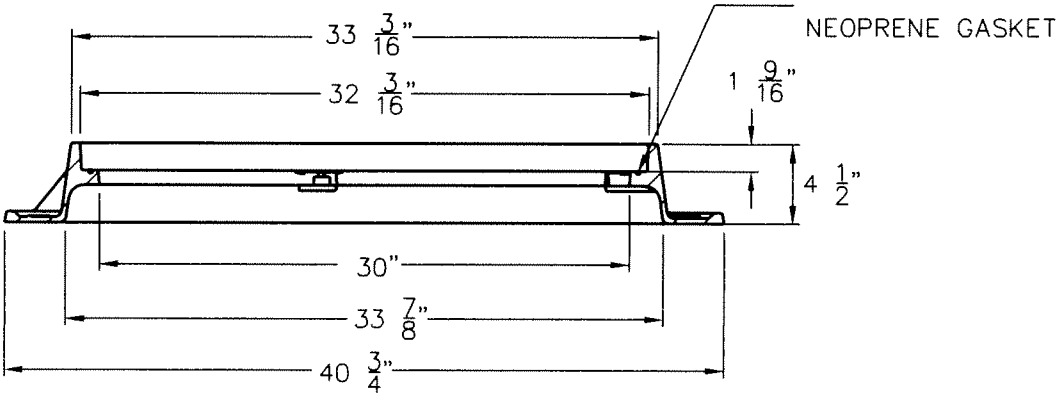
(2) PICKBARS

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

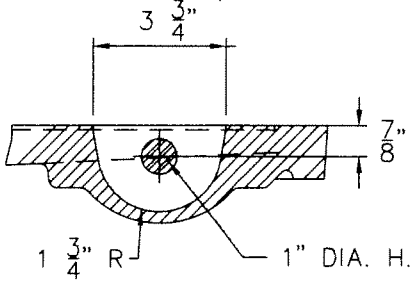
(6) 1 $\frac{1}{8}$" DIA. BOLT HOLES ON 37" DIA. BOLT CIRCLE



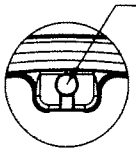

COVER SECTION




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)

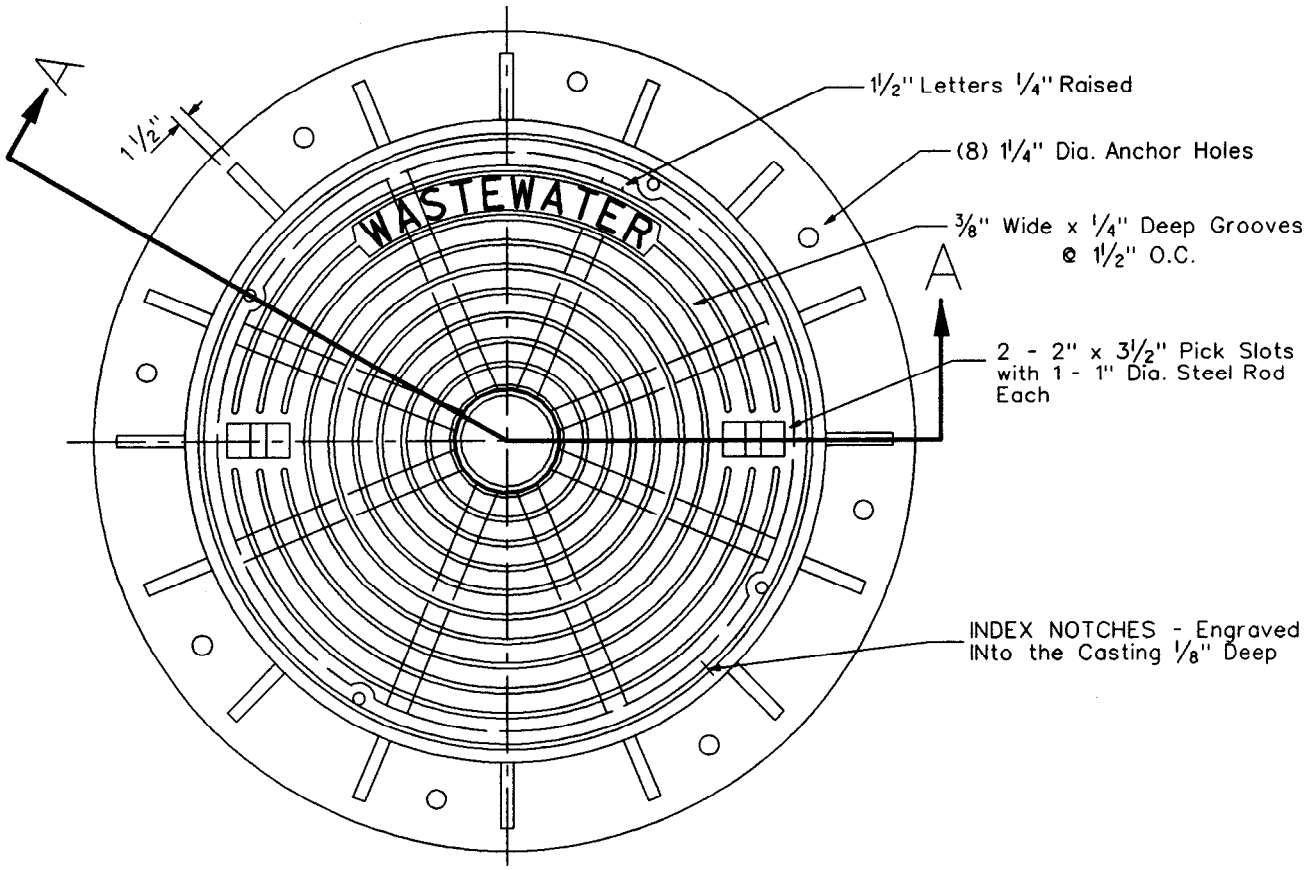
FRAME BOLTING DETAIL

COVER – GRAY IRON ASTM A48 CL35B

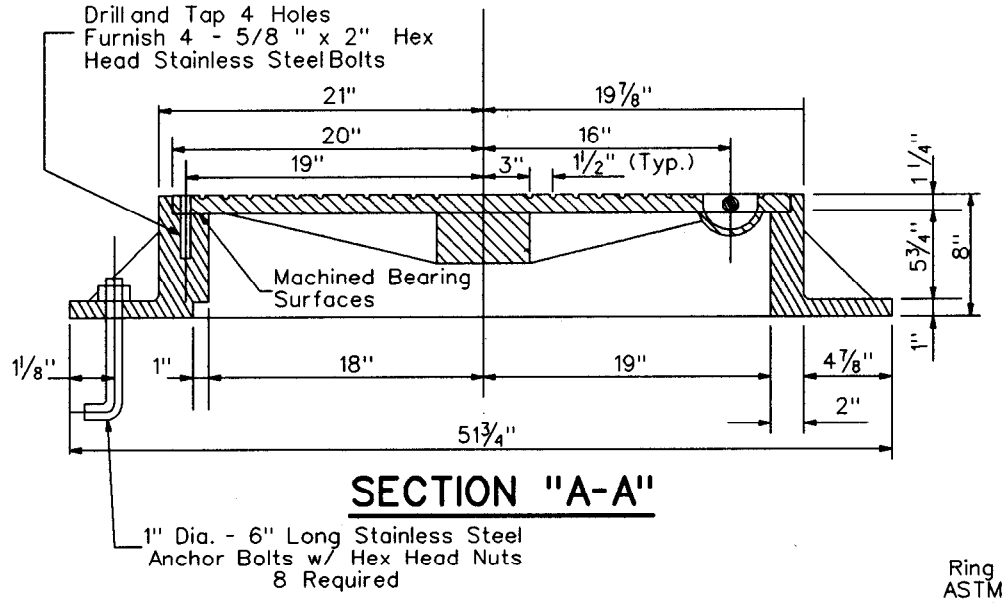
FRAME – GRAY IRON ASTM A48 CL35B

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

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.




## PLAN

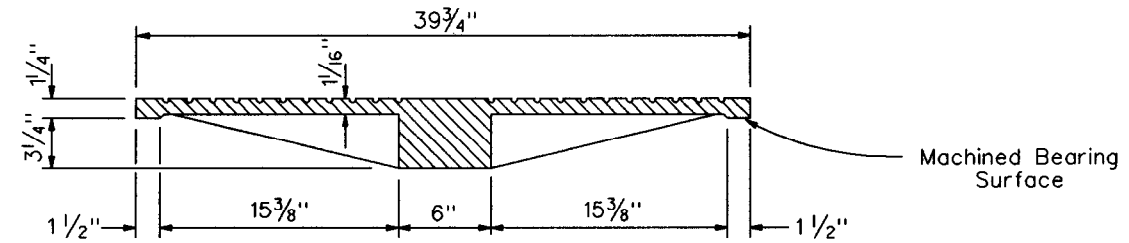



## SECTION "A-A"

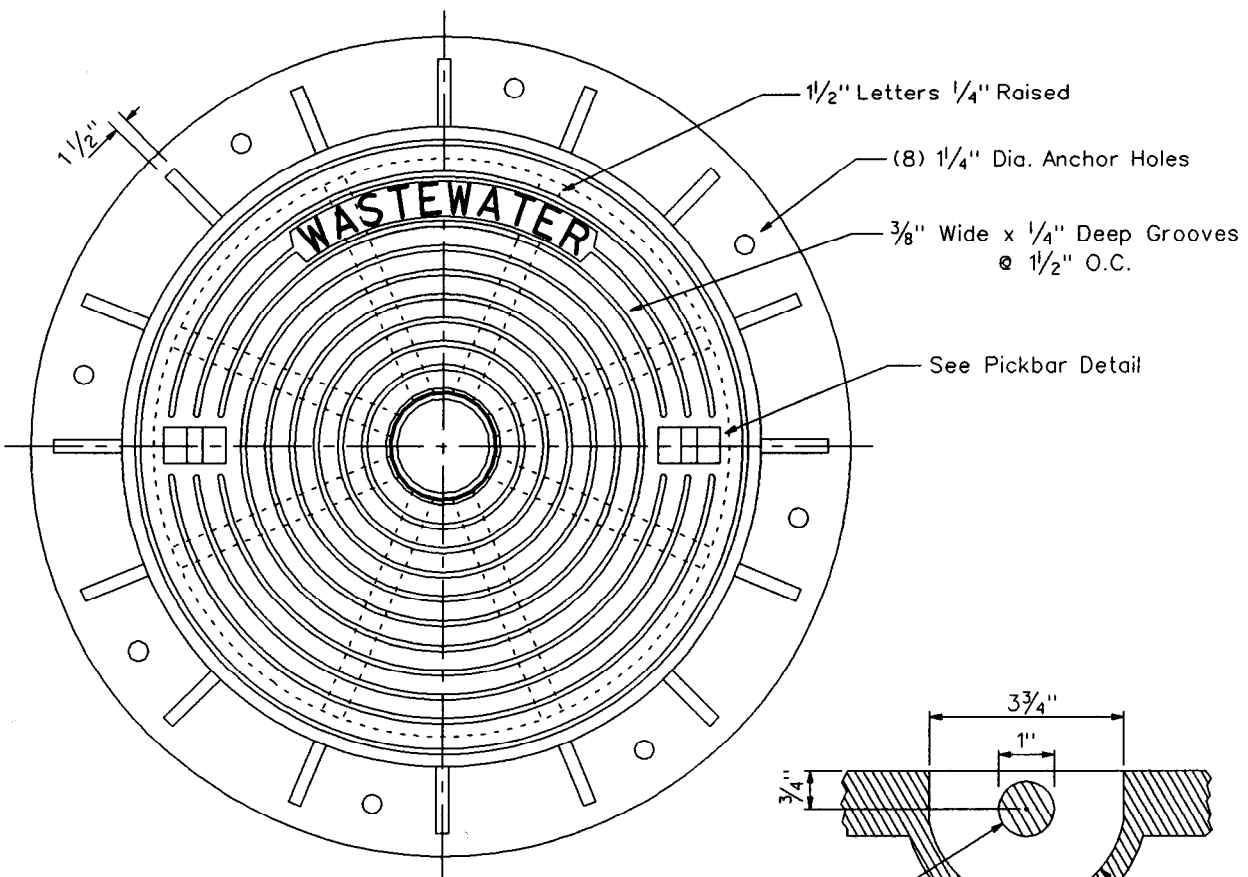
1" Dia. - 6" Long Stainless Steel Anchor Bolts w/ Hex Head Nuts 8 Required

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 DEC.2001 | |



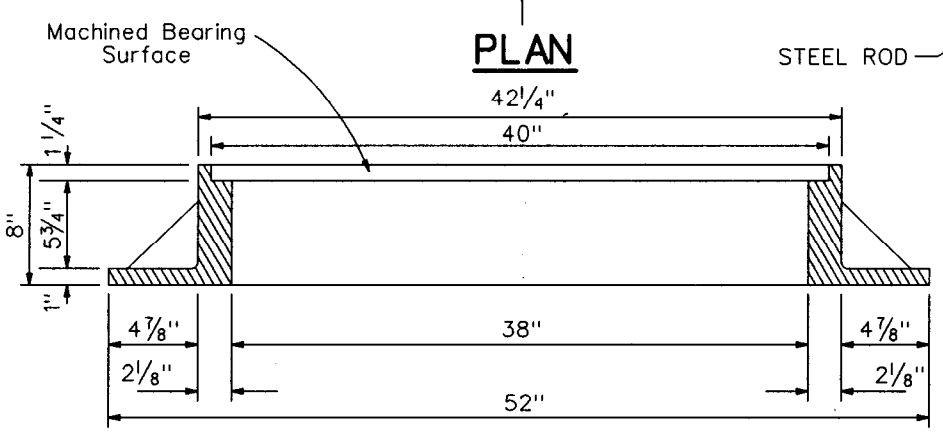

## SECTION THRU COVER




## PLAN



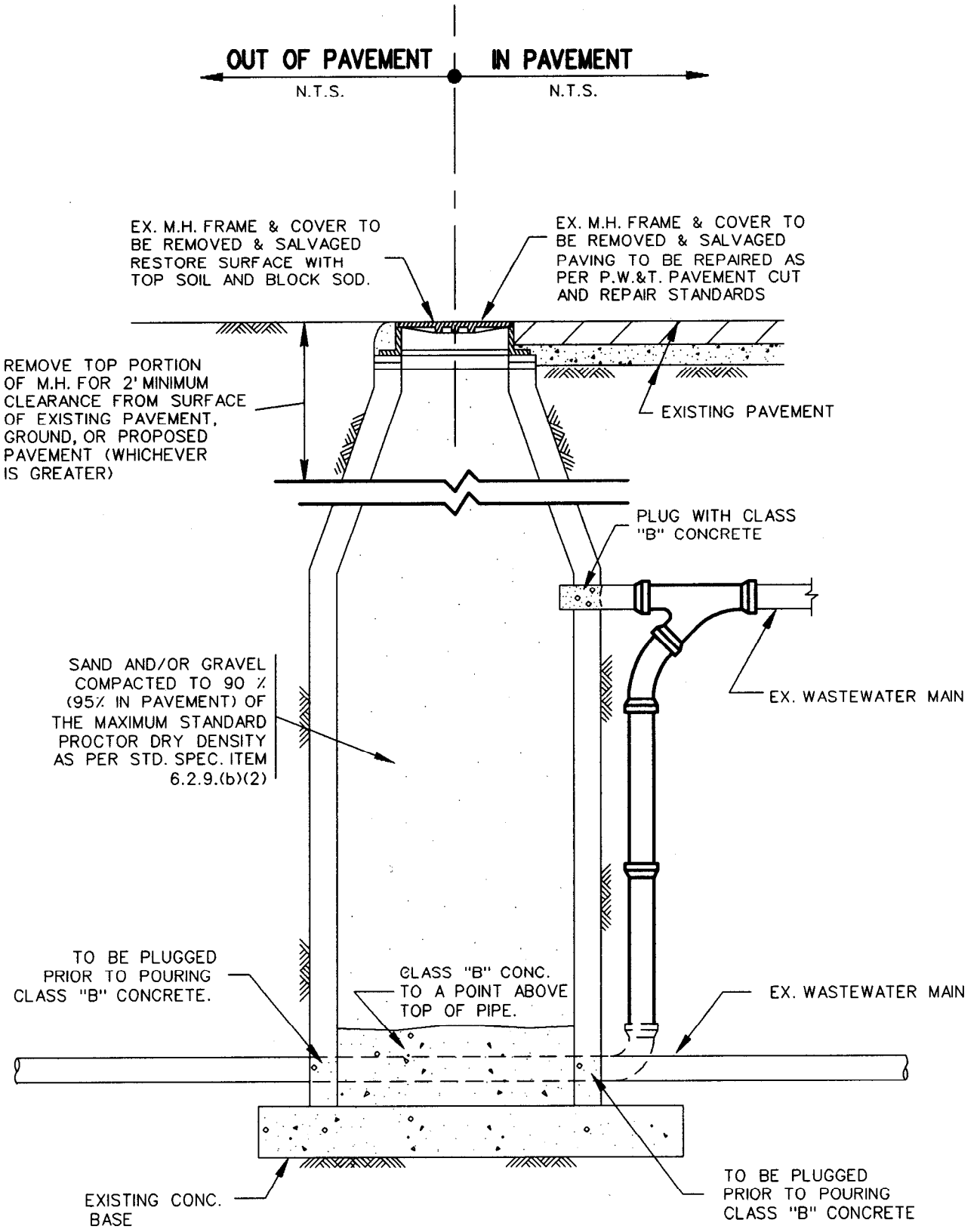

PICKBAR DETAIL




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

## SECTION THRU FRAME

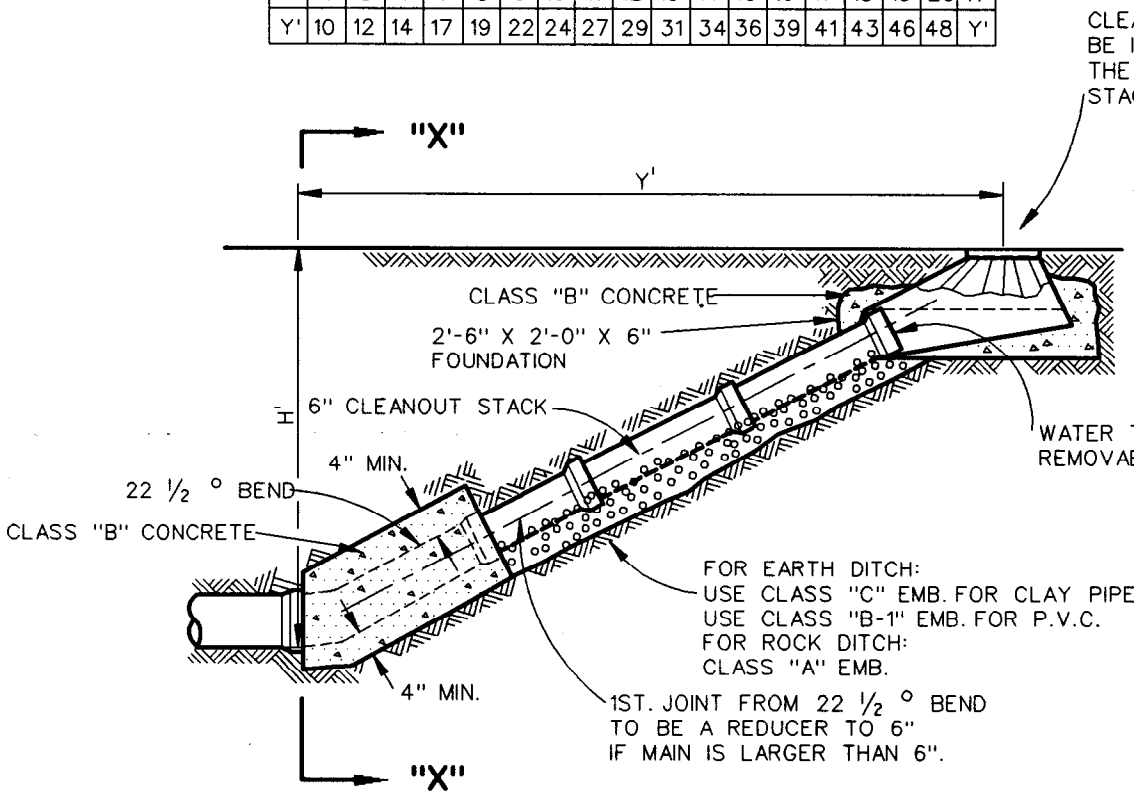
| | | | |
|---|---|---|---|
| STANDARD 40" MANHOLE FRAME AND COVER | | DWU | (PAGE NO.) 315 |
| | | DATE DEC.2001 | |




# ABANDONMENT OF MANHOLE IN OR OUT OF PAVEMENT

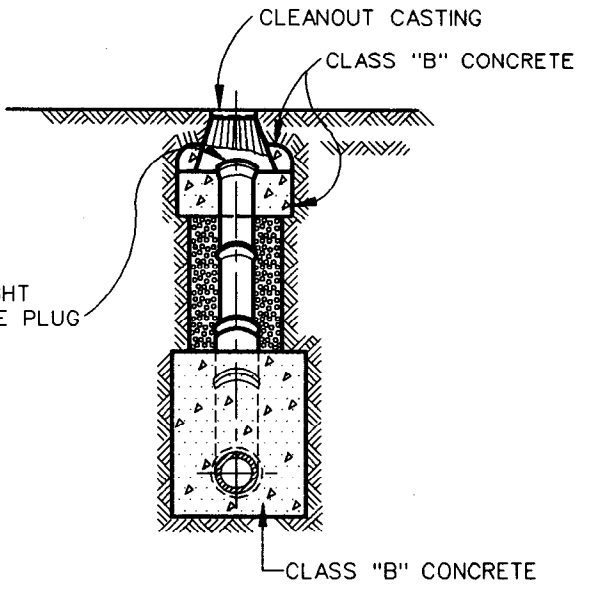
| | | (Page No.) |
|---|---|---|
| DWU | | 316 |
| DATE DEC.2001 | | |

| 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.

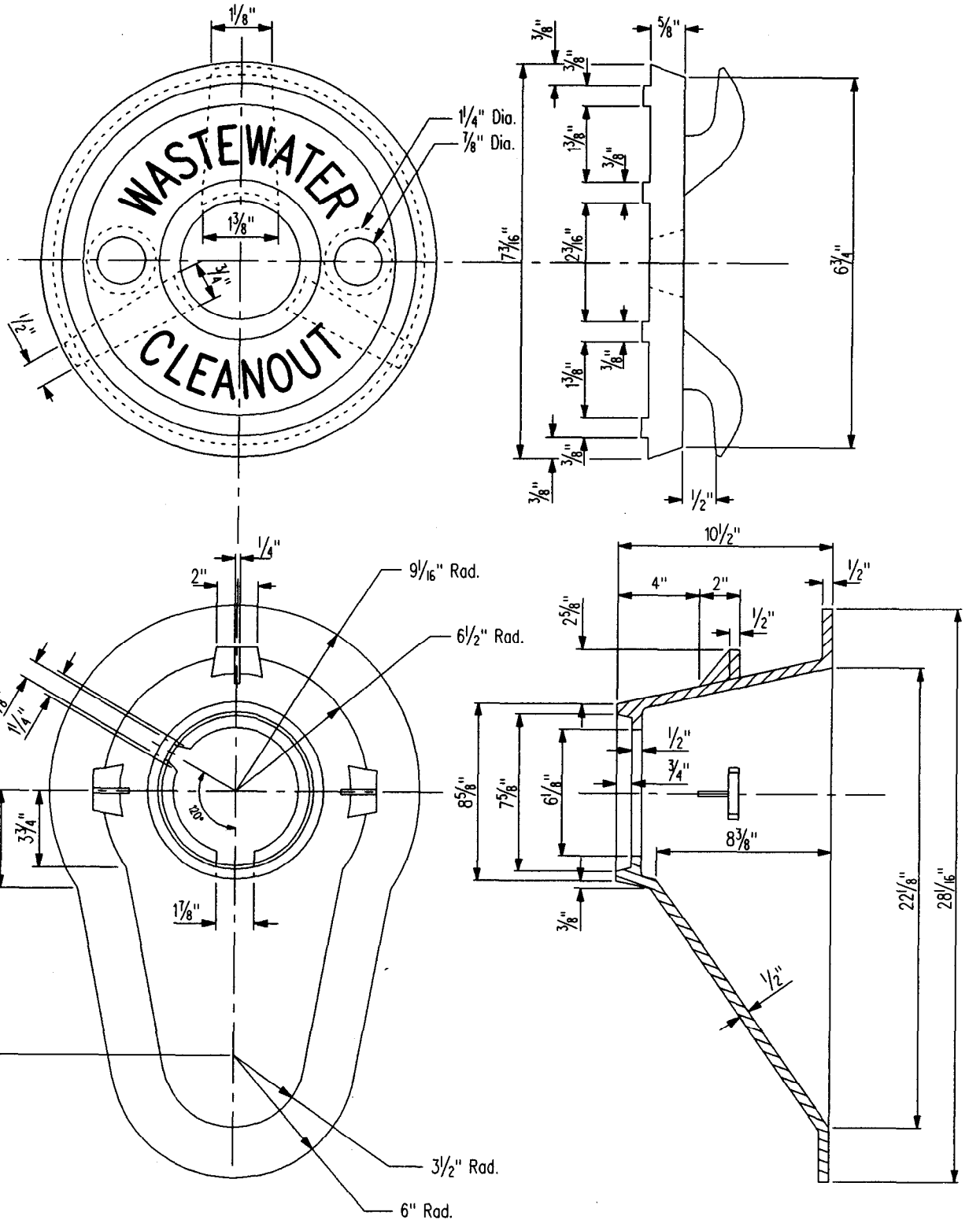



**SECTION "X - X"**

N.T.S.

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

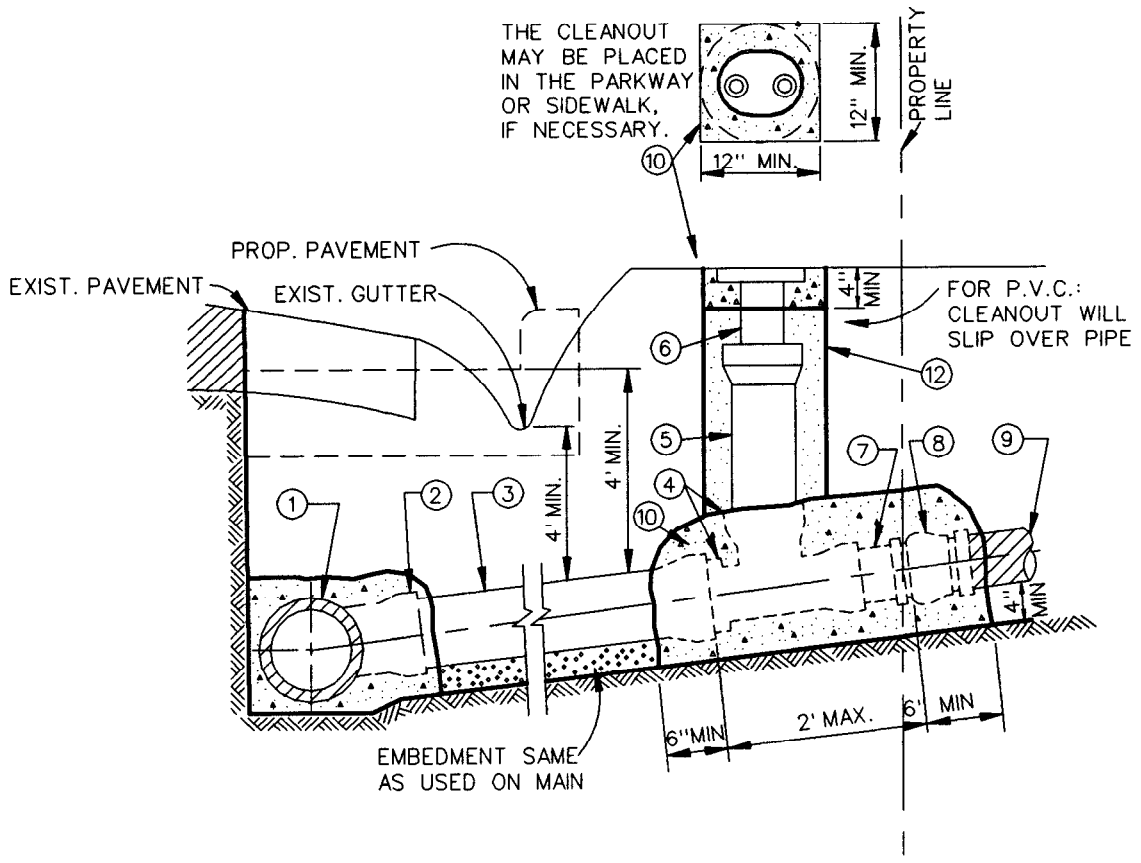
| WASTEWATER MAIN CLEANOUT | | DWU | (Page No.) 317 |
|---|---|---|---|
| | | DATE JAN.2001 | |




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

KEY:

1. WASTERWATER MAIN
2. 6" WYE OR TAPPING SADDLE
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.

# WASTEWATER LATERALS WITH CLEANOUT

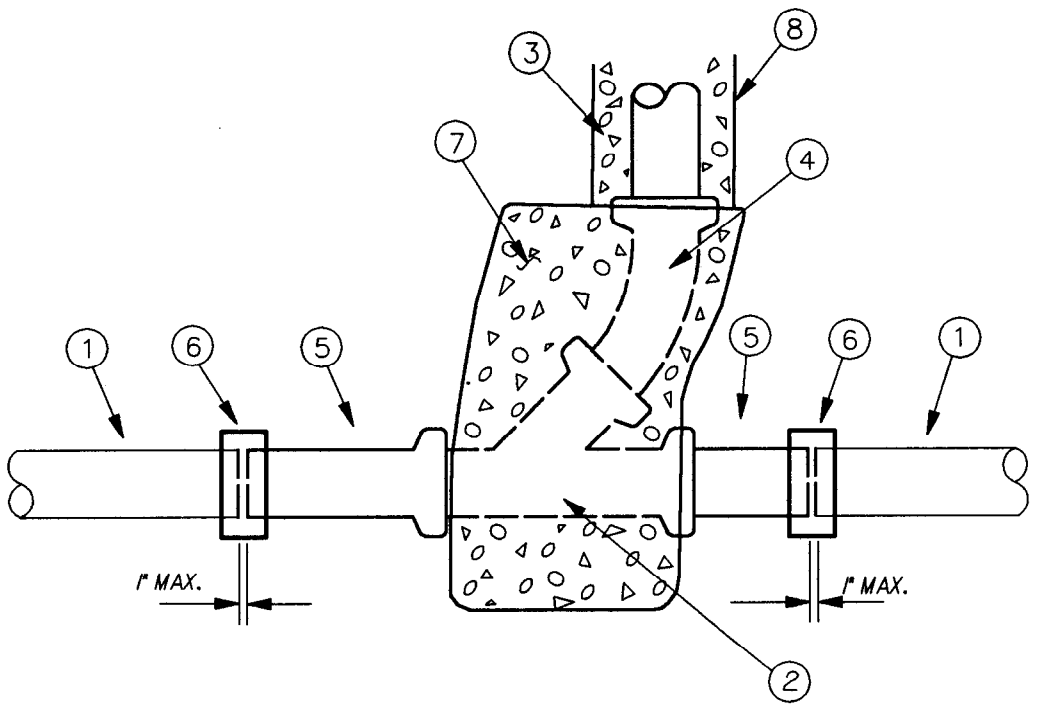
DWU

DATE JAN.2001

(Page No.) 319

# KEY

1. WASTEWATER MAIN
2. WYE (45° MAX.)
3. MAINLINE LATERAL
4. 45° BEND (MAX.)
5. ADAPTOR
6. RUBBER SLEEVE 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.

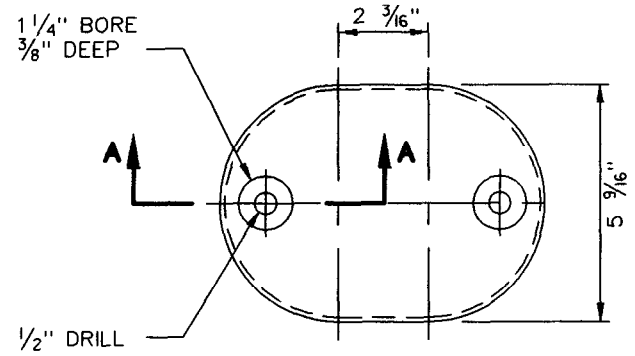
B) THE WYE AND ADAPTORS SHALL BE ASSEMBLED PRIOR TO INSTALLATION.

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.

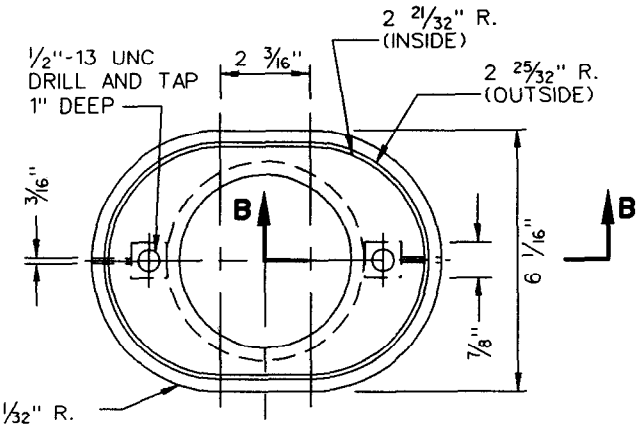
D) THE EMBEDMENT USED SHALL BE EQUAL TO THAT USED FOR THE MAINLINE SEWER.

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

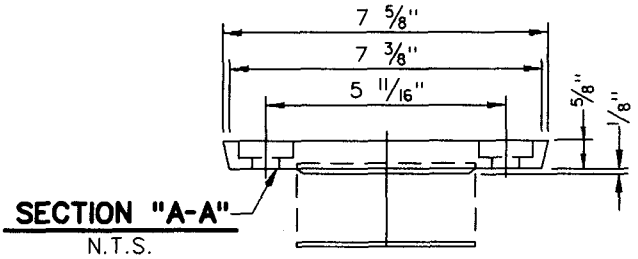
| | | | |
|---|---|---|---|
| **WASTEWATER LATERAL WYE CONNECTION TO THE EXISTING MAINLINE** | | DWU | (PAGE No.) 320 |
| | | DATE JAN. '98 | |



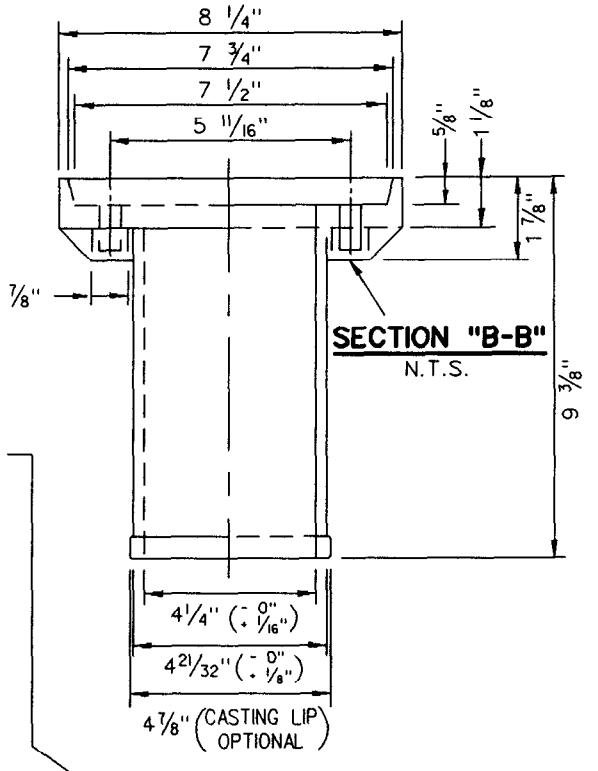

## COVER
N.T.S.



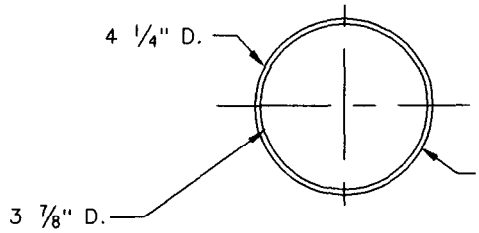

## CLEANOUT FRAME TOP
N.T.S.

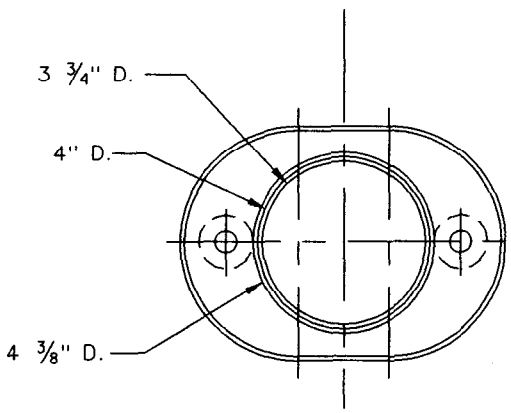



## SECTION "A-A"
N.T.S.

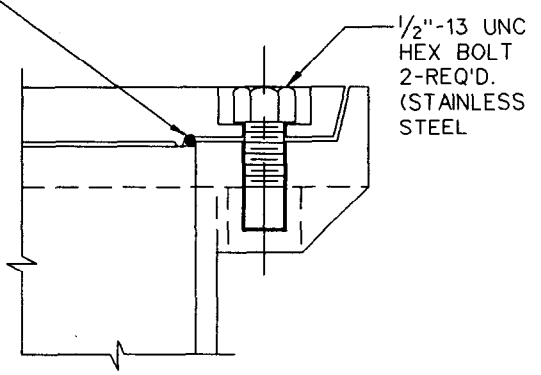



## SECTION "B-B"
N.T.S.




## CLEANOUT FRAME BOTTOM
N.T.S.




## ASSEMBLY VIEW
N.T.S.

NOTES:

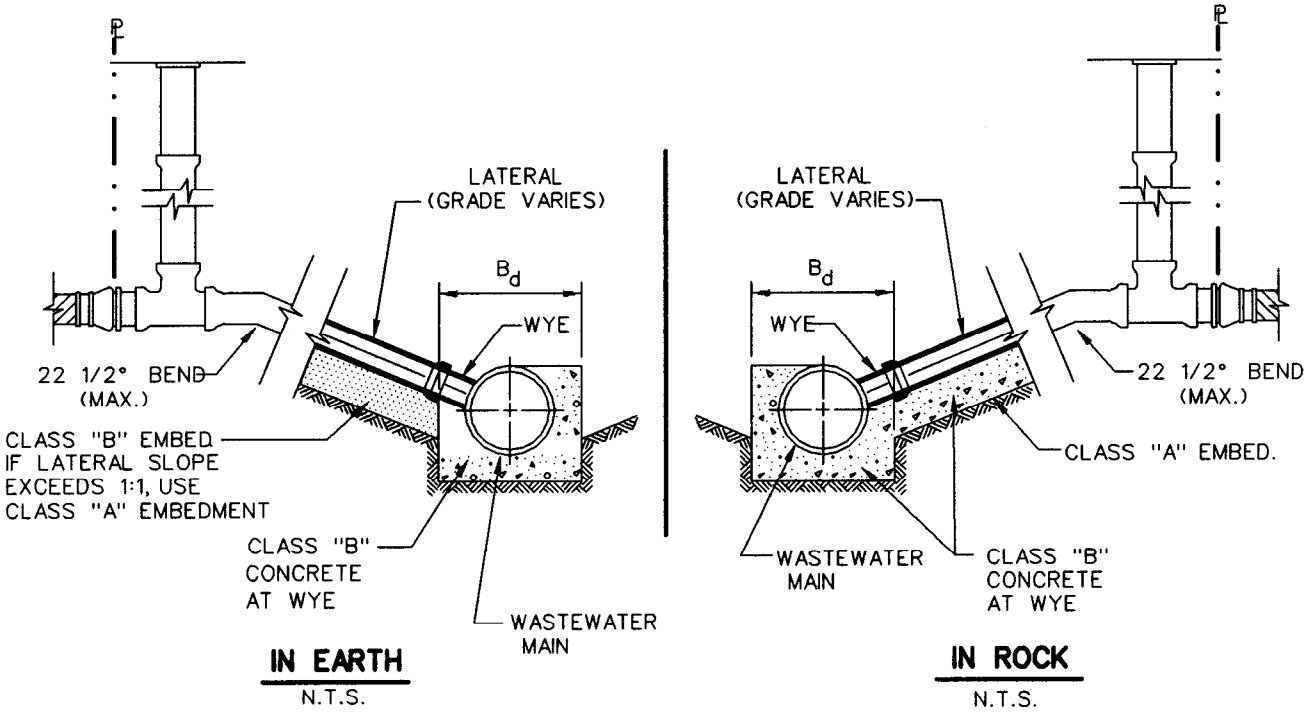
1. THE WORDS "WASTEWATER LATERAL CLEANOUT" SHALL BE CAST INTO TOP OF COVER.
2. MATERIALS TO BE CAST IRON, P.V.C. OR ABS PLASTIC.

# WASTEWATER LATERAL CLEANOUT FRAME & COVER

DWU

(Page No.) 321

DATE JUNE 2002



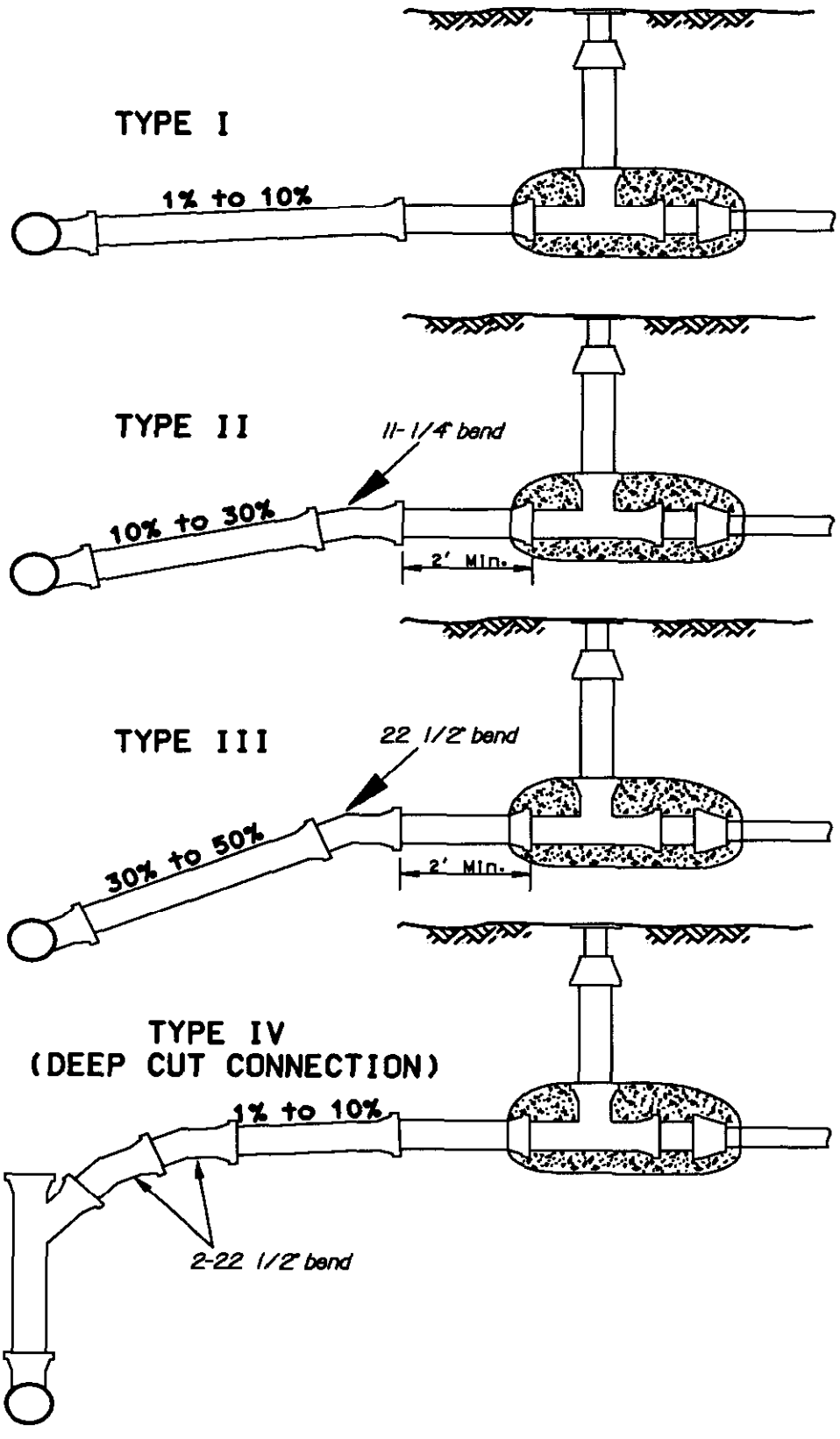

## TRENCH WITH SLOPING SIDES

N.T.S.

NOTES:

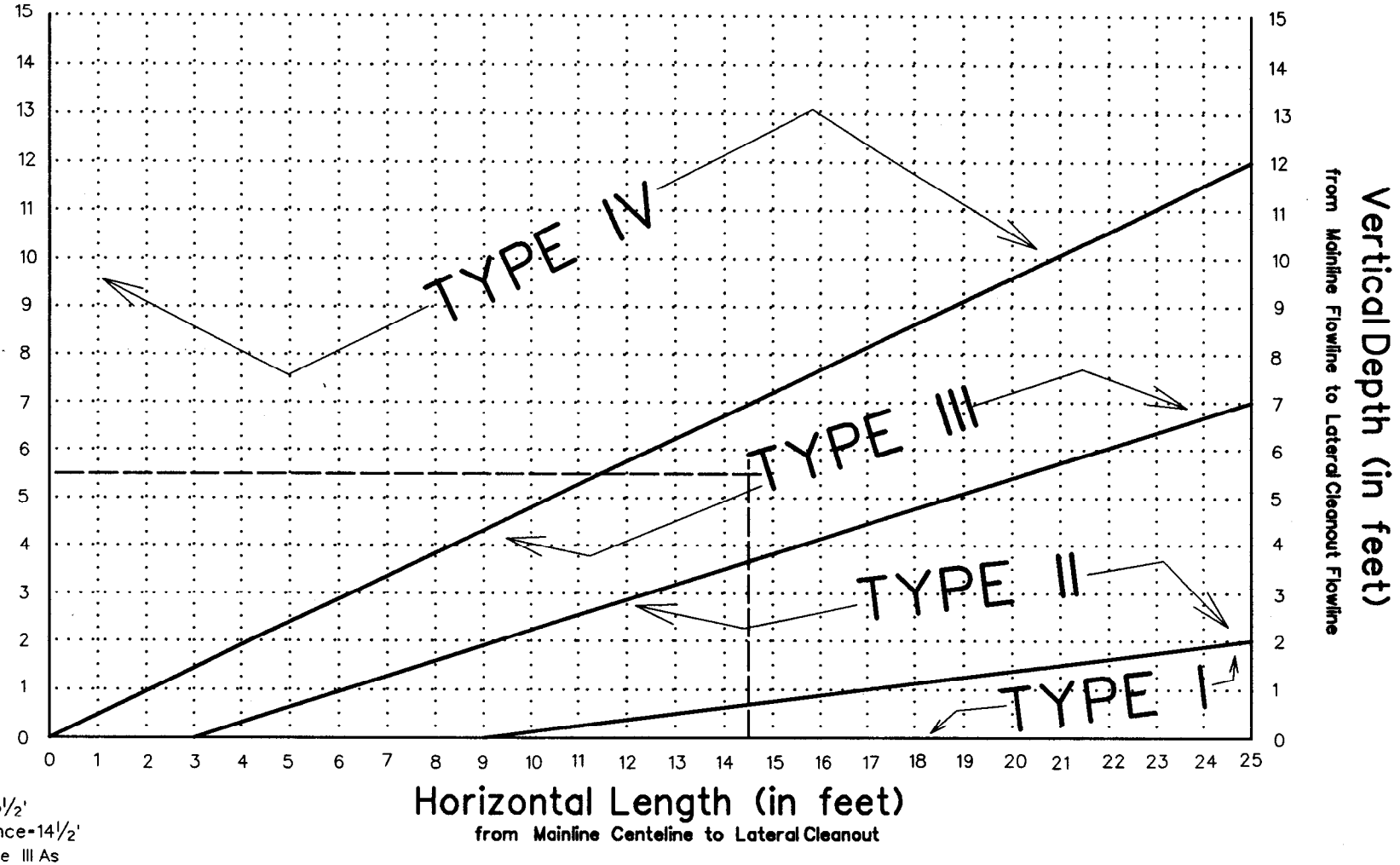
1. WYE SHALL BE SUPPORTED AS SHOWN FOR WYE CONNECTION SUPPORT.
2. LATERALS ARE TO CLEAR ALL EXISTING UTILITIES. 11 1/4" OR 22 1/2° BEND, ONLY, MAY BE REQUIRED.

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




# LATERALS TYPES

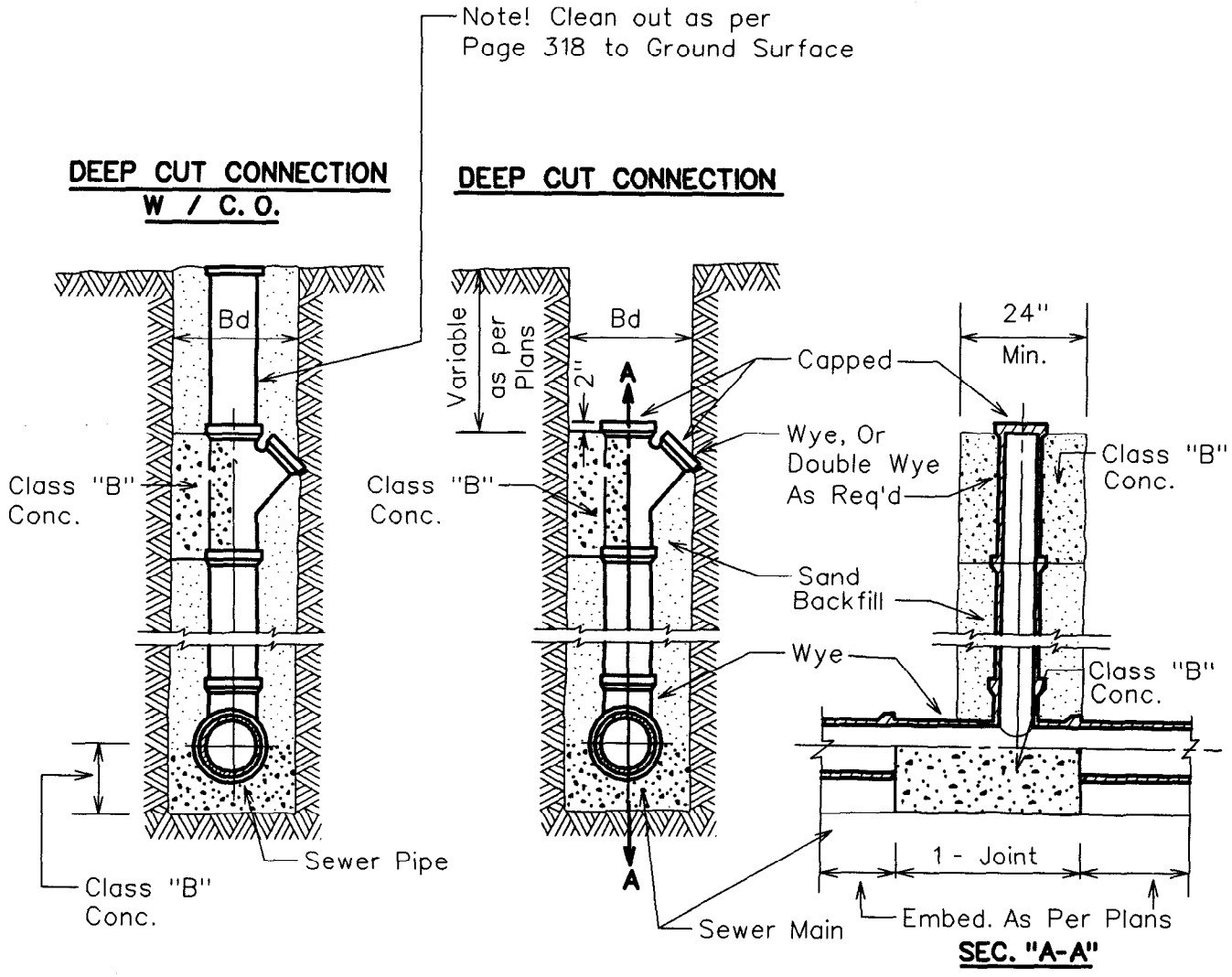
| | | |
|---|---|---|
| DWU | | (PAGE NO.) 323 |
| DATE JAN.'98 | | |




Example:
Vertical Depth-5½'
Horizontal Distance-14½'
Use Lateral Type III As
Shown Above

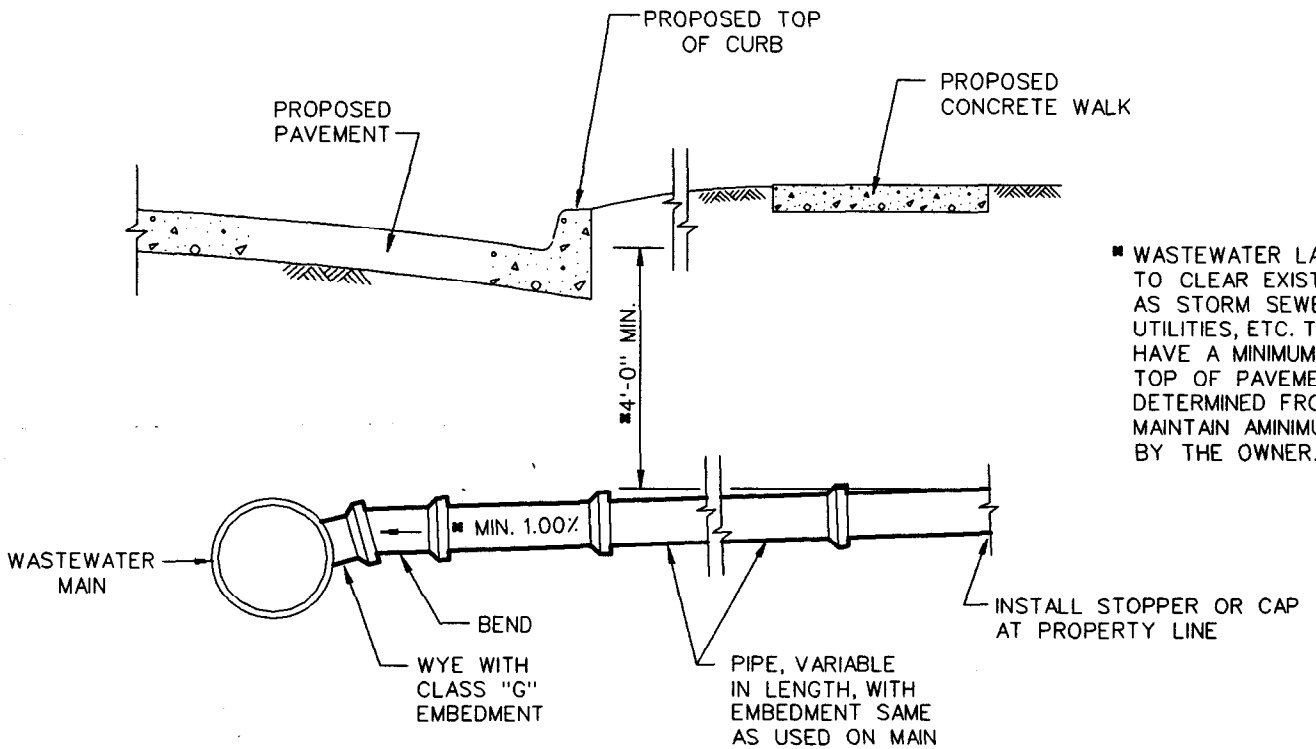
# LATERAL APPLICATION SCHEDULE

| | | | |
|---|---|---|---|
| | | DWU | (Page No.) 324 |
| | | DATE JAN. '98 | |




# DEEP - CUT CONNECTION

| | |
|---|---|
| DWU | (PAGE NO.) 325 |
| DATE JAN.'98 | |

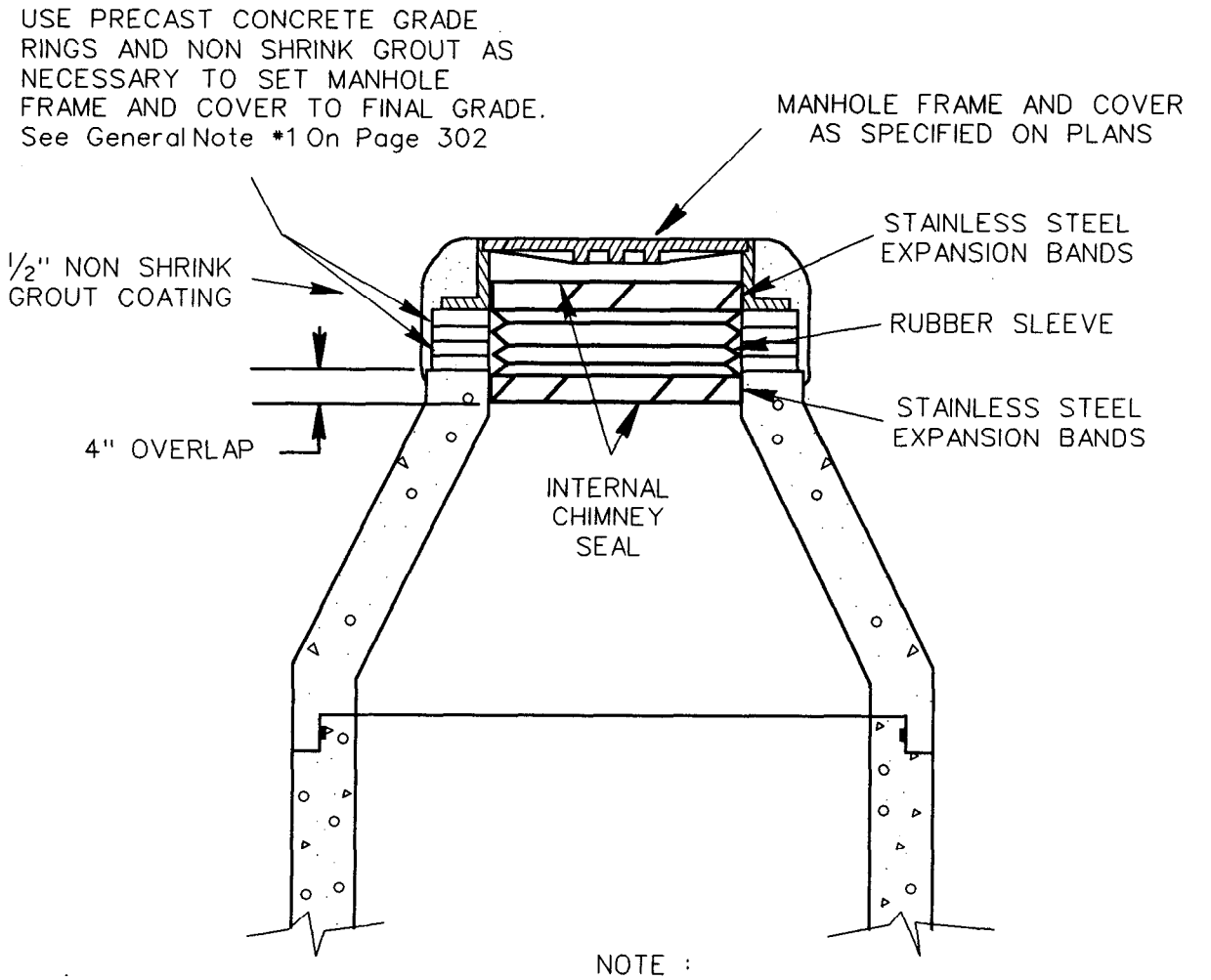



■ WASTEWATER LATERALS ARE TO BE CONSTRUCTED TO CLEAR EXISTING AND PROPOSED FACILITIES, SUCH AS STORM SEWER MAINS, RETAINING WALLS, OTHER UTILITIES, ETC. THE WASTEWATER LATERAL SHALL HAVE A MINIMUM COVER OF 4'-0" BELOW THE PROPOSED TOP OF PAVEMENT CURB GRADE AT THE PROPERTY LINE, DETERMINED FROM PAVING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

## WASTEWATER LATERAL STUBOUT

N.T.S.

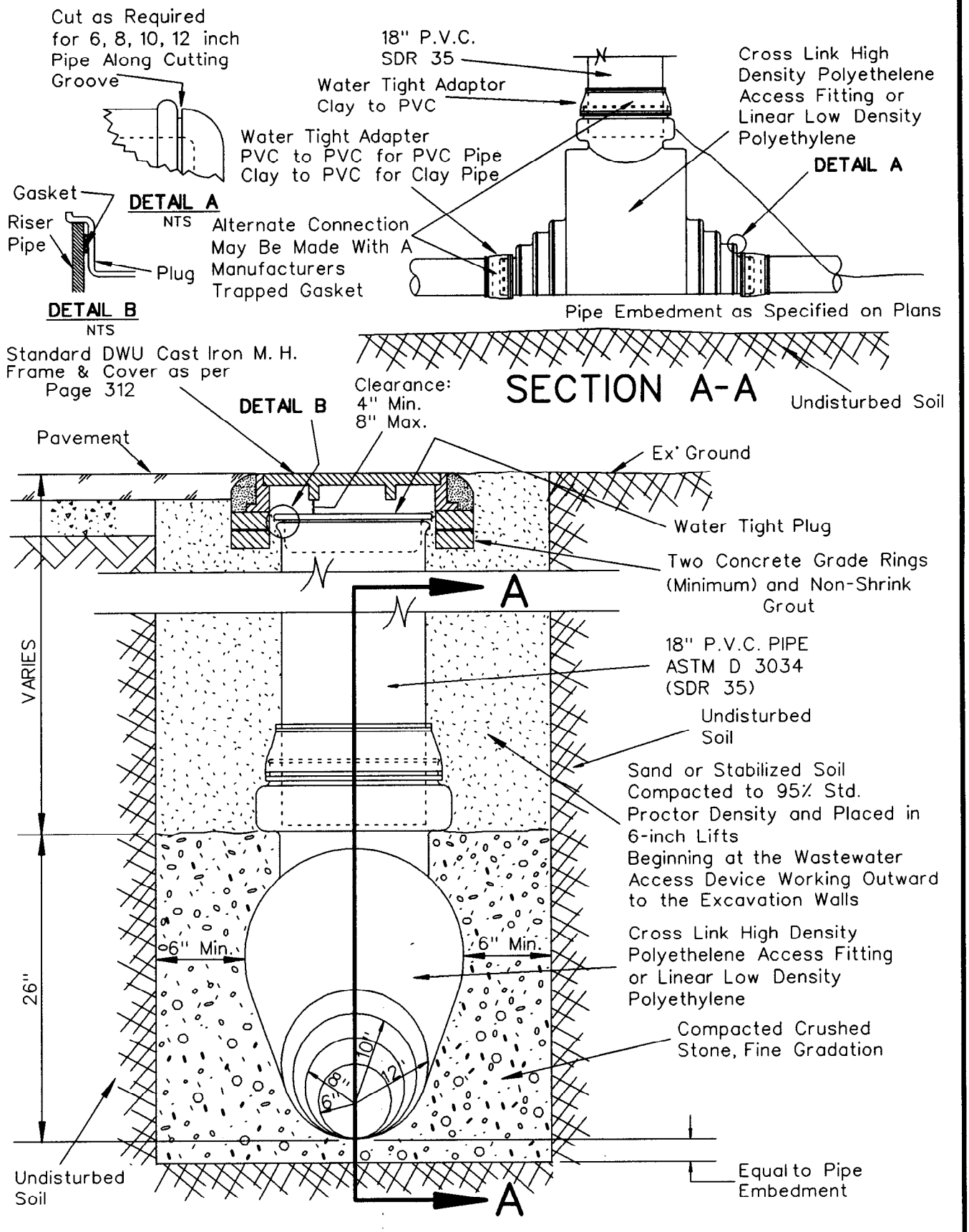
| WASTEWATER LATERAL STUBOUT | | DWU | (Page No.) 326 |
|---|---|---|---|
| | | DATE JAN '98 | |




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

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

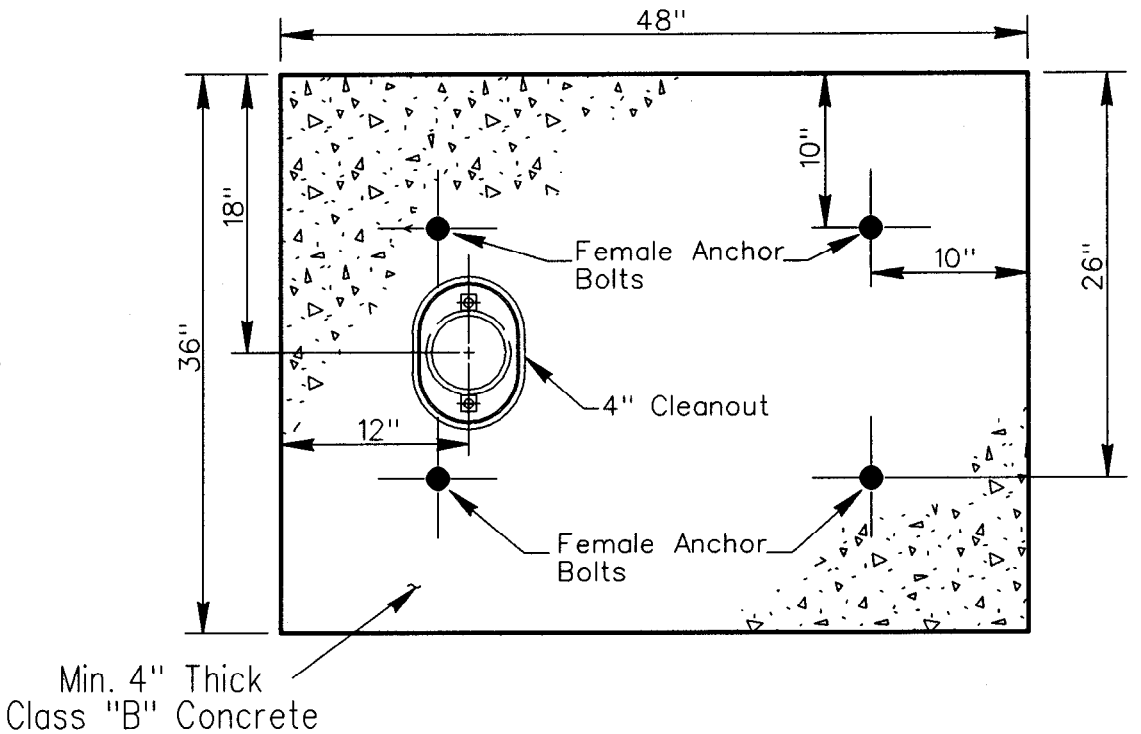
| WASTEWATER MANHOLE INTERNAL SEAL | | DWU | (Page No.) 327 |
|---|---|---|---|
| | | DATE MARCH 2001 | |




# WASTEWATER ACCESS DEVICE

| | |
|---|---|
| DWU | (Page No.) 328 |
| DATE OCT. '99 | |

# 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

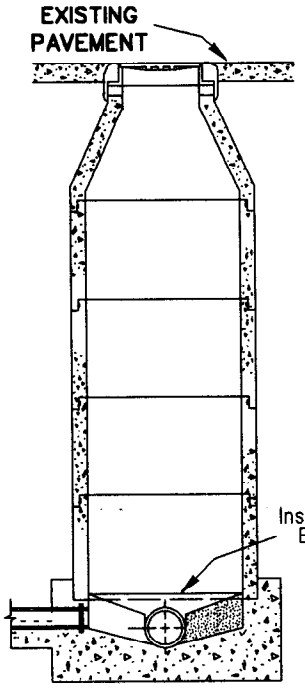



FIGURE 1

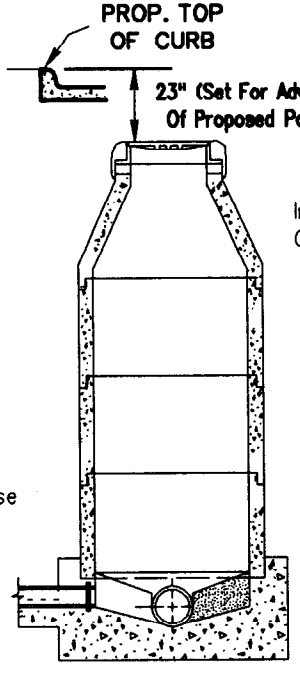



FIGURE 2
PRE-GRADING

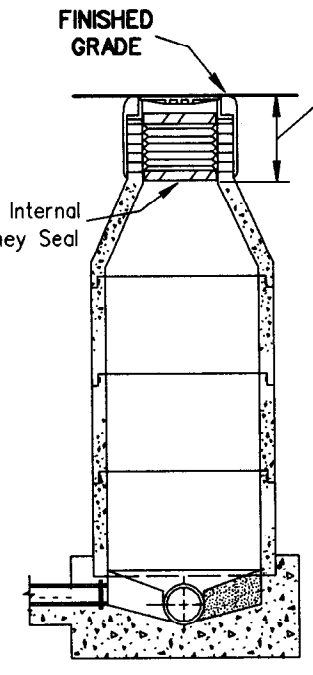



FIGURE 3
PRE-PAVING

**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**

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**

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

# ADJUSTMENT OF STANDARD PRECAST MANHOLE

| DWU | (Page No.) 401 |
|---|---|
| DATE DEC.2001 | |

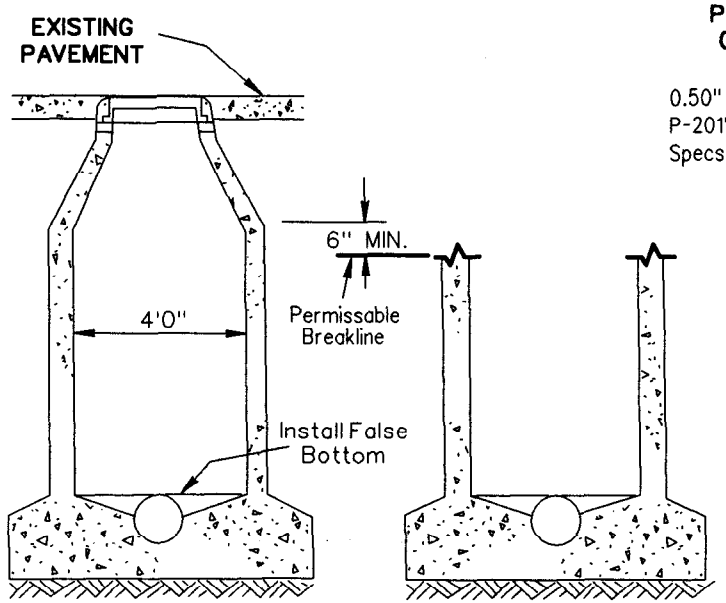



FIG. 1




FIG. 2

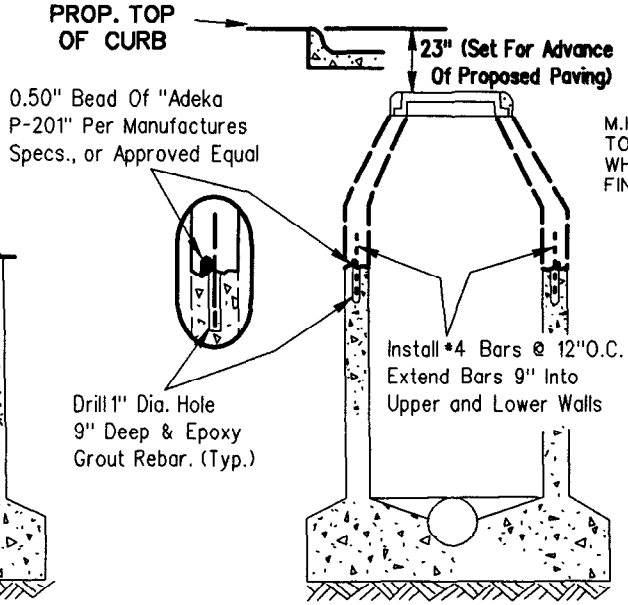



FIG. 3 PRE-GRADING

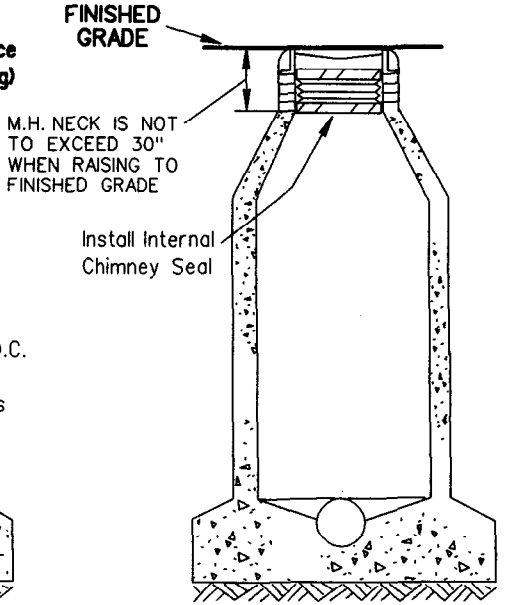



FIG. 4 PRE-PAVING

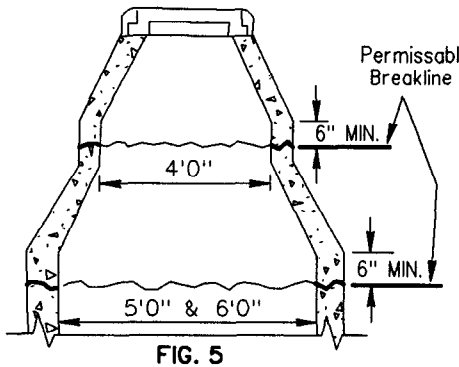



FIG. 5

**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

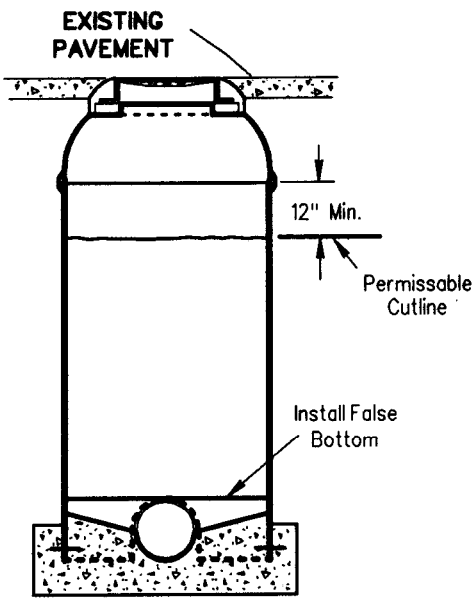



FIGURE 1

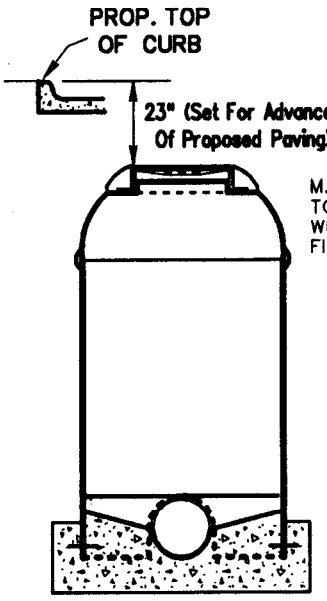



FIGURE 2
PRE-GRADING

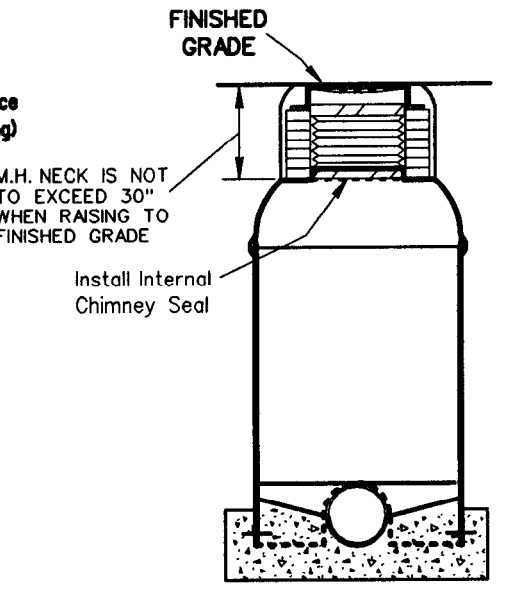



FIGURE 3
PRE-PAVING

**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 | |

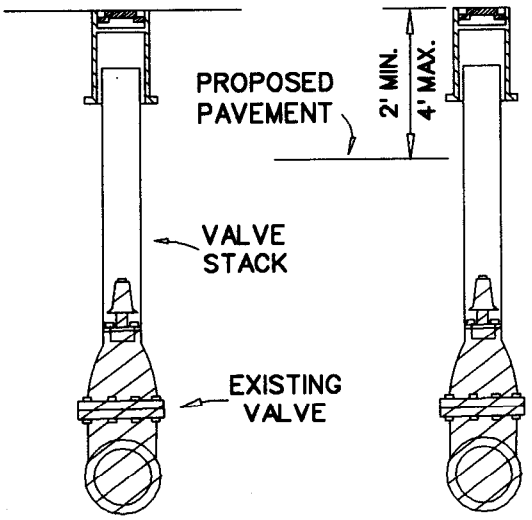



FIG. 1

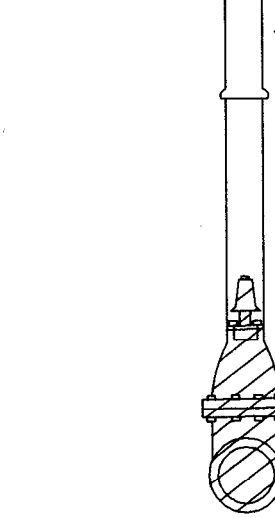



FIG. 2




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 cast iron 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 DEC.2001 | |

**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

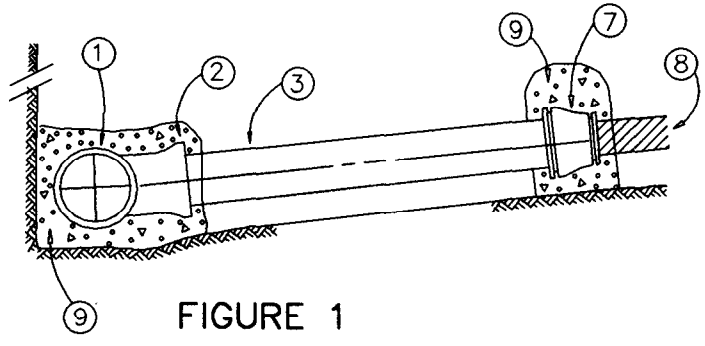



FIGURE 1

**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.

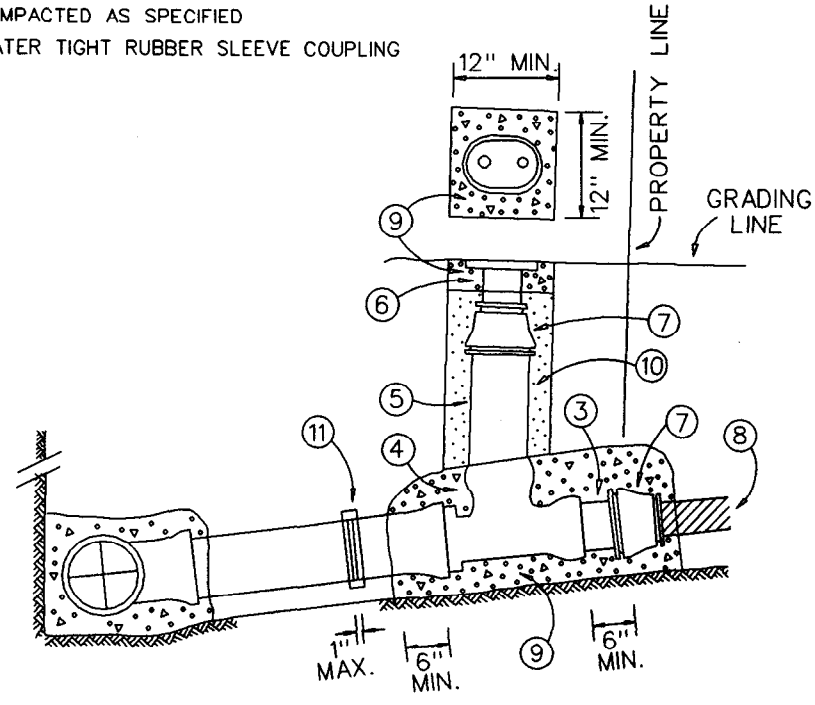



FIGURE 2

**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 | |

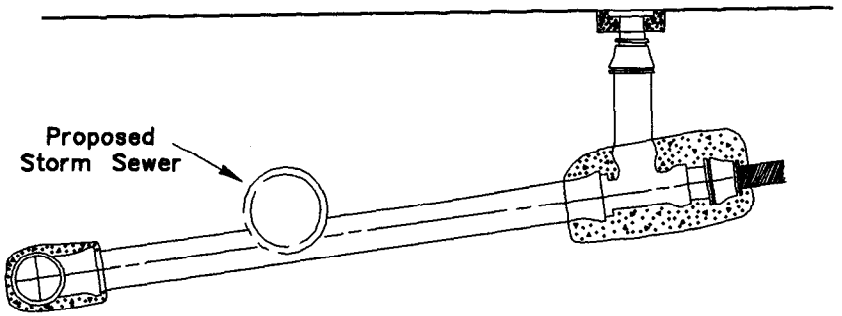



FIGURE 1

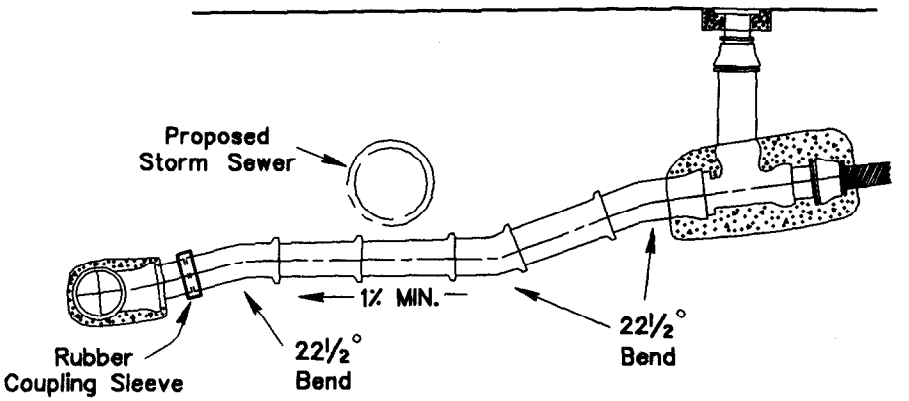



FIGURE 2

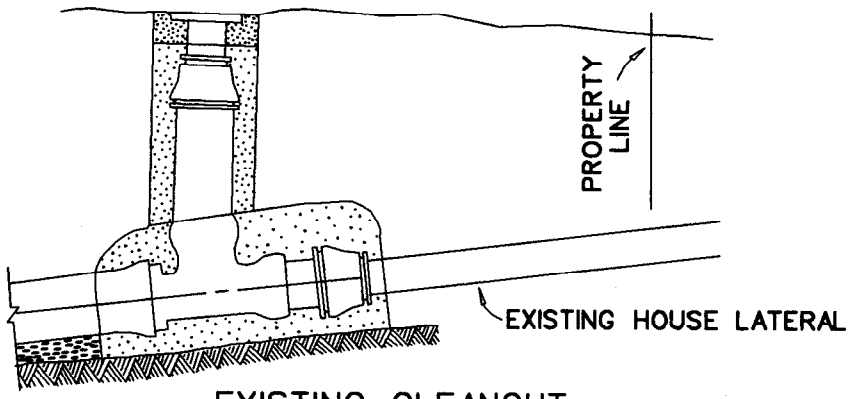
**FIGURE 1 EXISTING LATERAL**

1. Conflict with a proposed utility shown.

**FIGURE 2 PRE-PAVING**

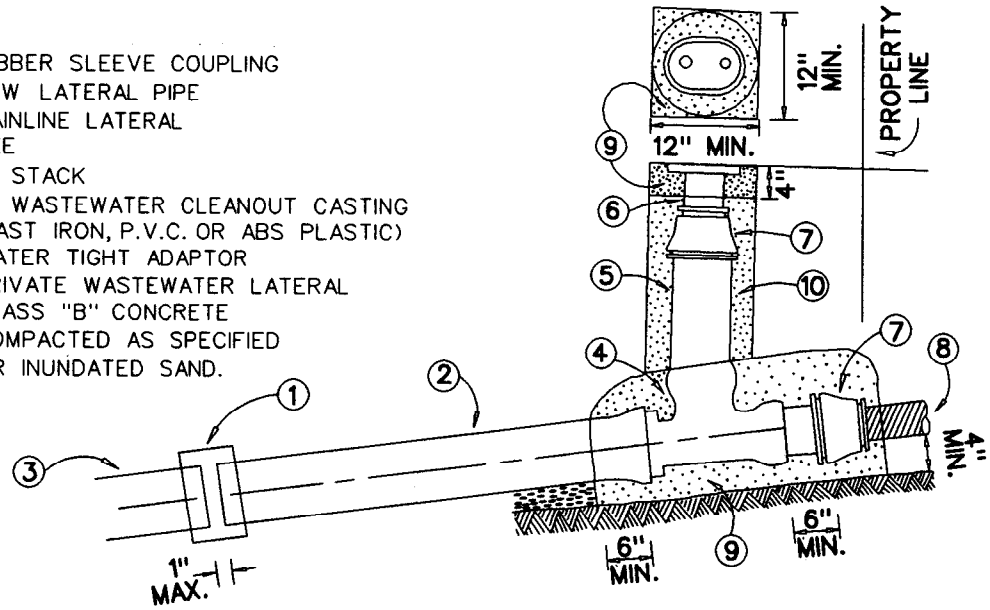
2. The new adjustment may be constructed over or under the proposed conflict:
   A. A downstream minimum grade of 1.0% must be maintained.
   B. Bends greater than 22-1/2 degrees are NOT permitted.
   C. The new pipe and embedment must be of the same type as the existing.(Unless the lateral is concrete 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.
   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 413, 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 DEC.2001 | |




EXISTING CLEANOUT

1. RUBBER SLEEVE COUPLING
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.

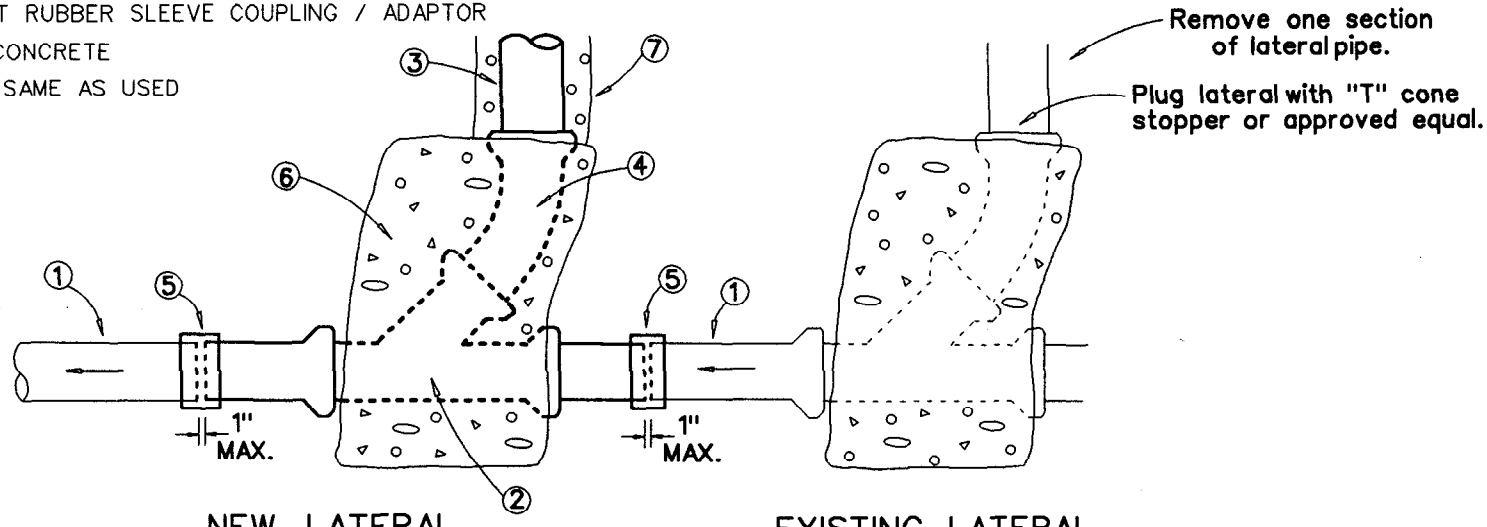
## PROCEDURE

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 DEC.2001 | |

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 / 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. 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.

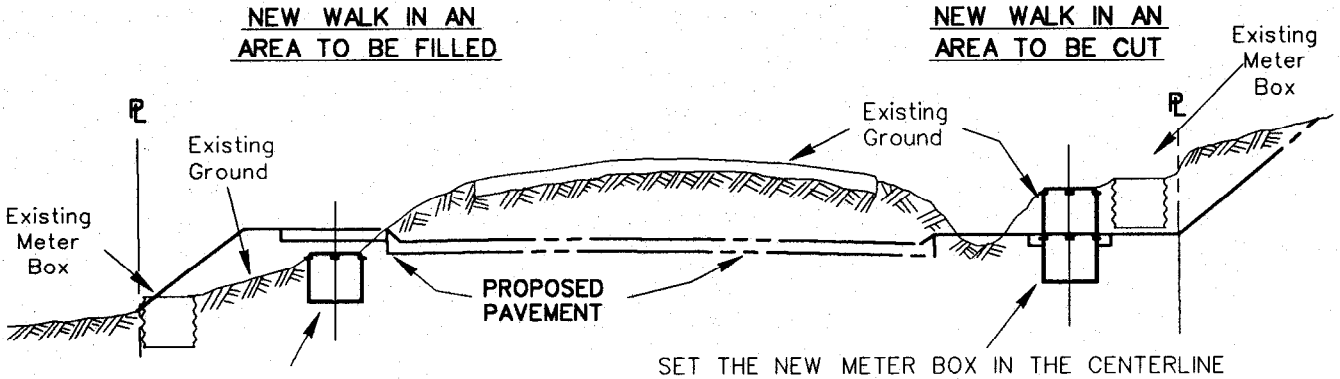
**CONCRETE CLASS ITEM 7.4.5**

# REPLACE EXISTING LATERAL TO EXISTING MAINLINE

| | | |
|---|---|---|
| DWU | | (Page No.) 408 |
| DATE DEC.2001 | | |

NEW WALK IN AN AREA TO BE FILLED

NEW WALK IN AN AREA TO BE CUT

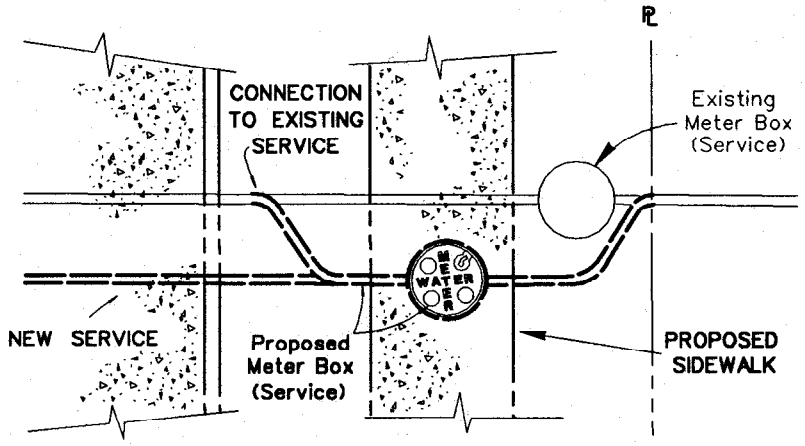



SET THE NEW METER BOX IN THE CENTERLINE OF THE PROP. NEW WALK. SET THE METER BOX AT THE EXISTING GROUND ELEVATION. IT WILL BE RAISED TO GRADE DURING PAVING OPERATIONS.

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

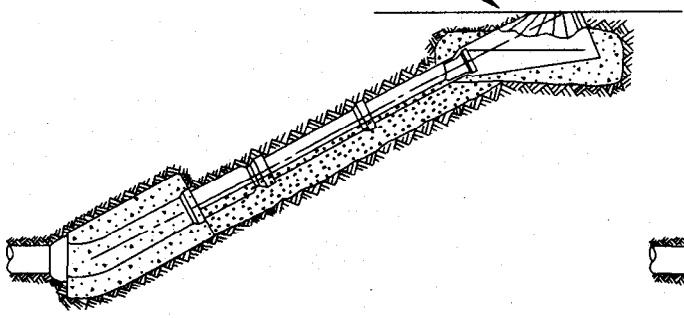



FIGURE 1

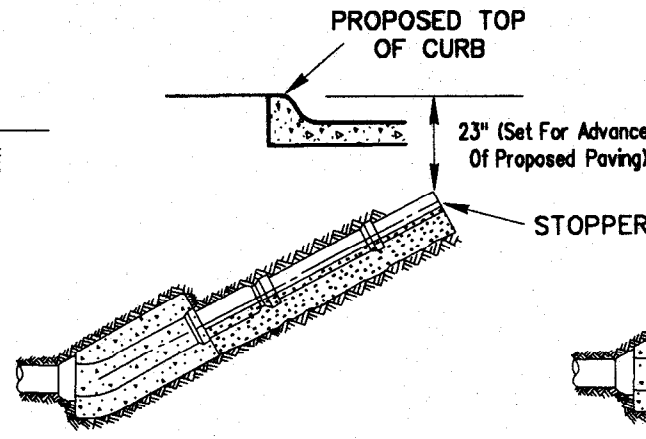



FIGURE 2
PRE - GRADING

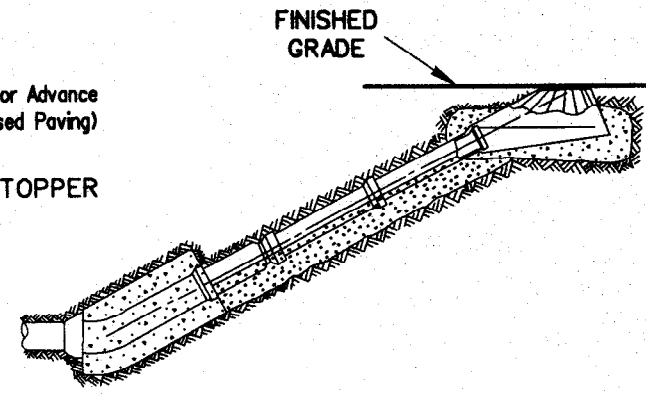



FIGURE 3
PRE - PAVING

**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**

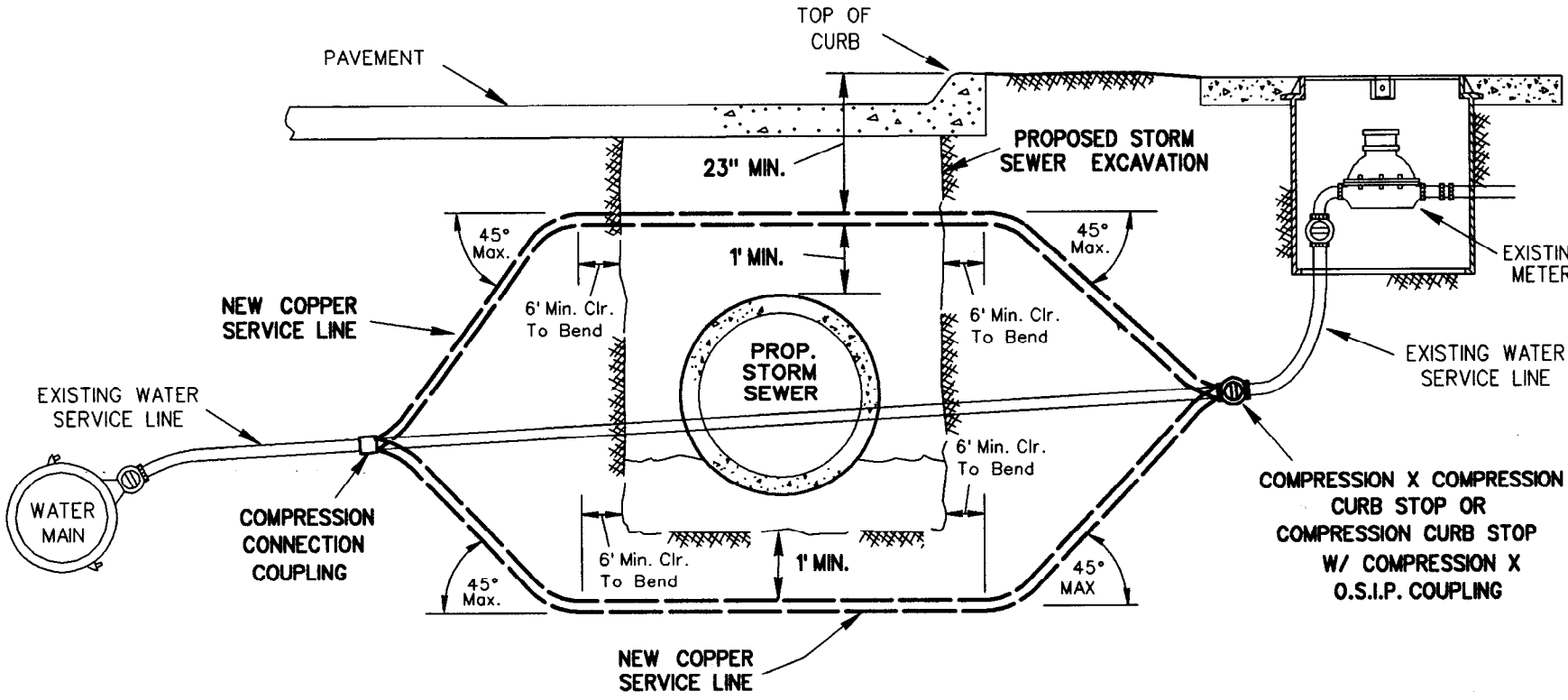
2. Remove the cleanout pipe to a point 23" below the proposed top of curb.
3. Plug the pipe with a "T" Cone Stopper or approved equal.

**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

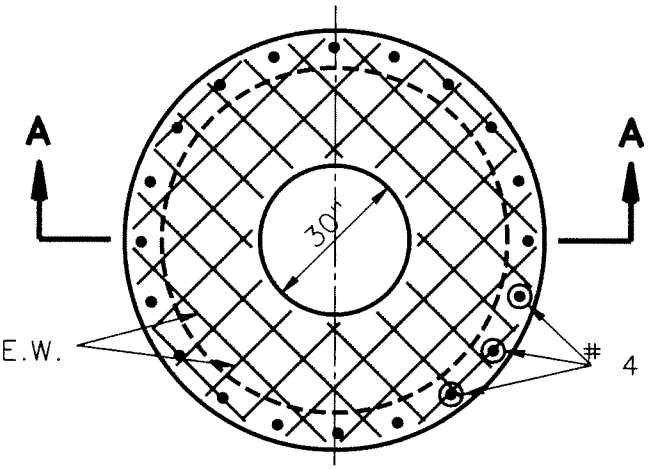
| ALTERATION & ADJUSTMENT OF STANDARD MAINLINE CLEANOUT | | DWU | (Page) 410 |
|---|---|---|---|
| | | DATE DEC.2001 | |



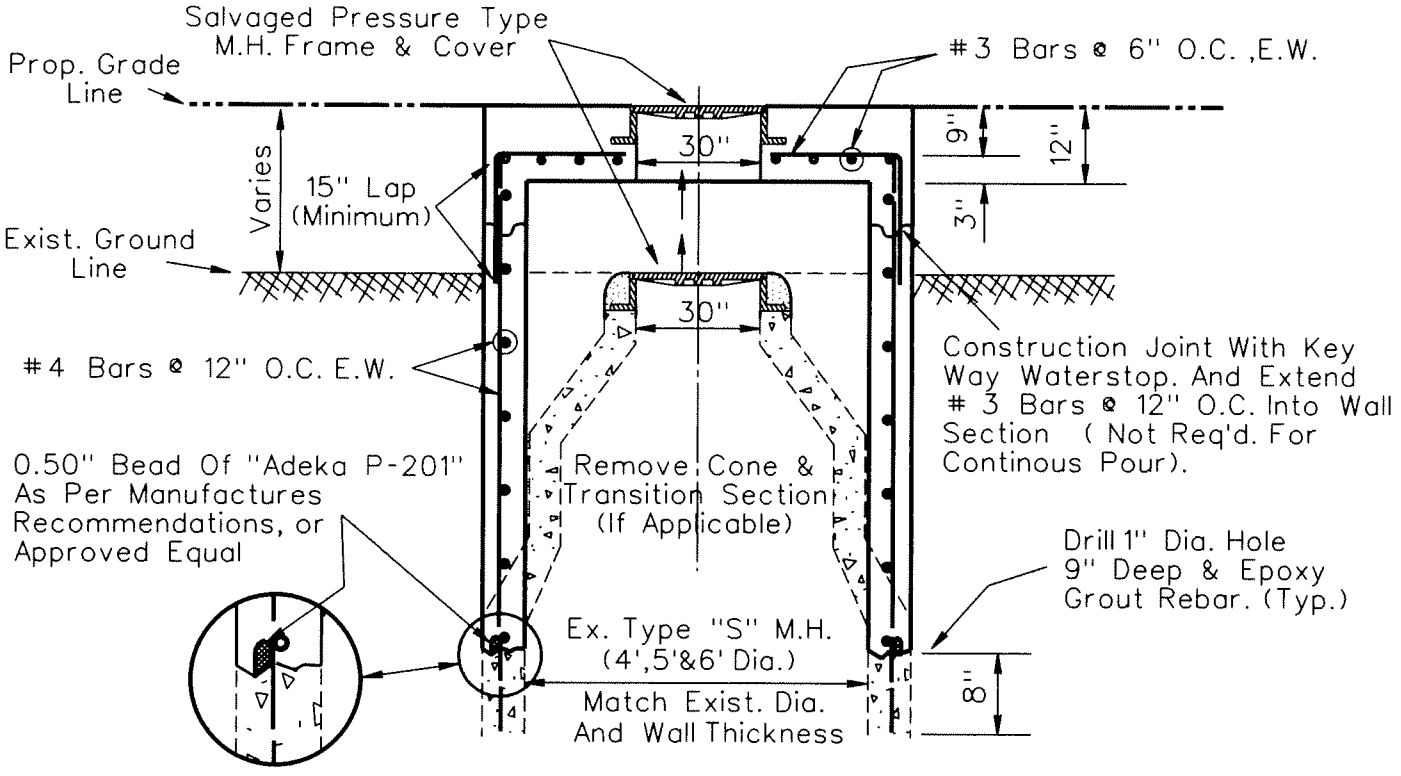

**NOTES:**

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

| ADJUSTMENT OF EXISTING WATER SERVICE | | DWU | (Page) 411 |
|---|---|---|---|
| | | DATE DEC.2001 | |




## 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.

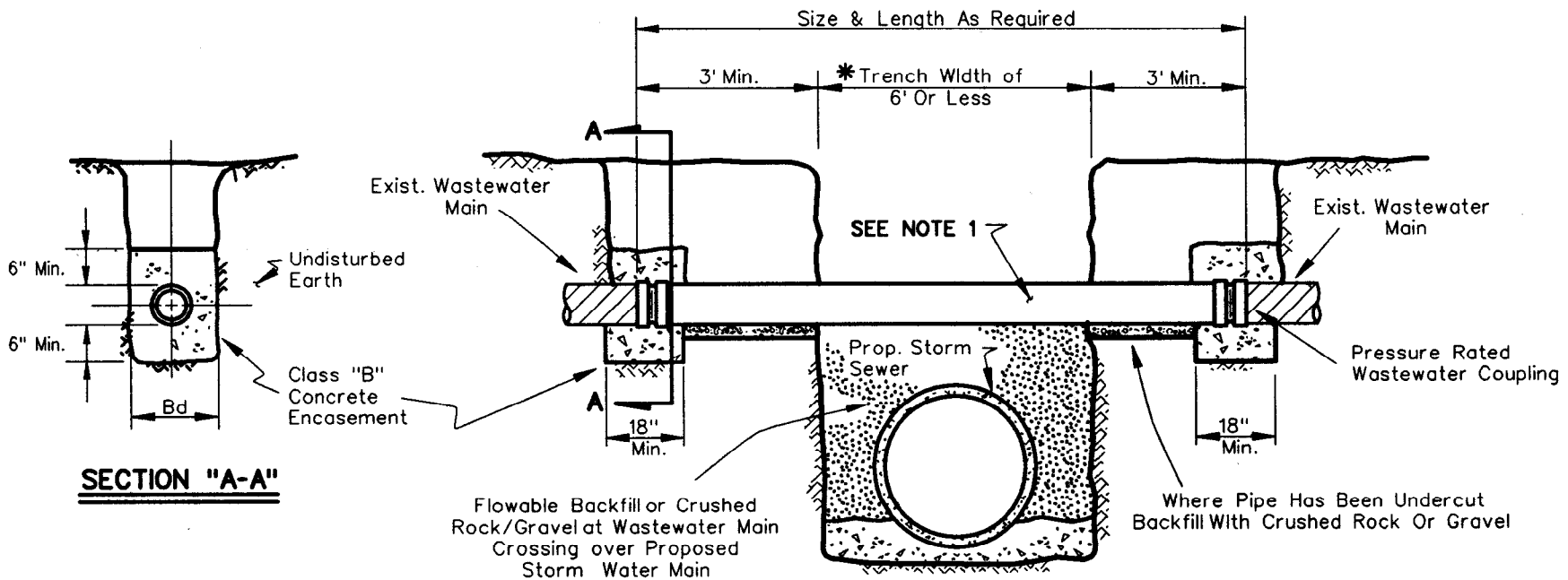
2) Epoxy grout to be a high strength rigid epoxy adhesive manufactured for the purpose of anchoring dowels into hardened concrete. Epoxy grout shall be "Sikadur Hi-Mod, LV No. 32" or approved equal.

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 FEB.2009 | |

✱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 129. If The Crossing Exceeds 25', A Special Utility Support Design Will Be Required.




**SECTION "A-A"**

**NOTE:**

1. REPLACE EX. R.C.P./CLAY PIPE WITH CLAY PIPE. REPLACE P.V.C. PIPE WITH P.V.C. PIPE.
2. RELAY NEW WASTEWATER MAIN AND 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.

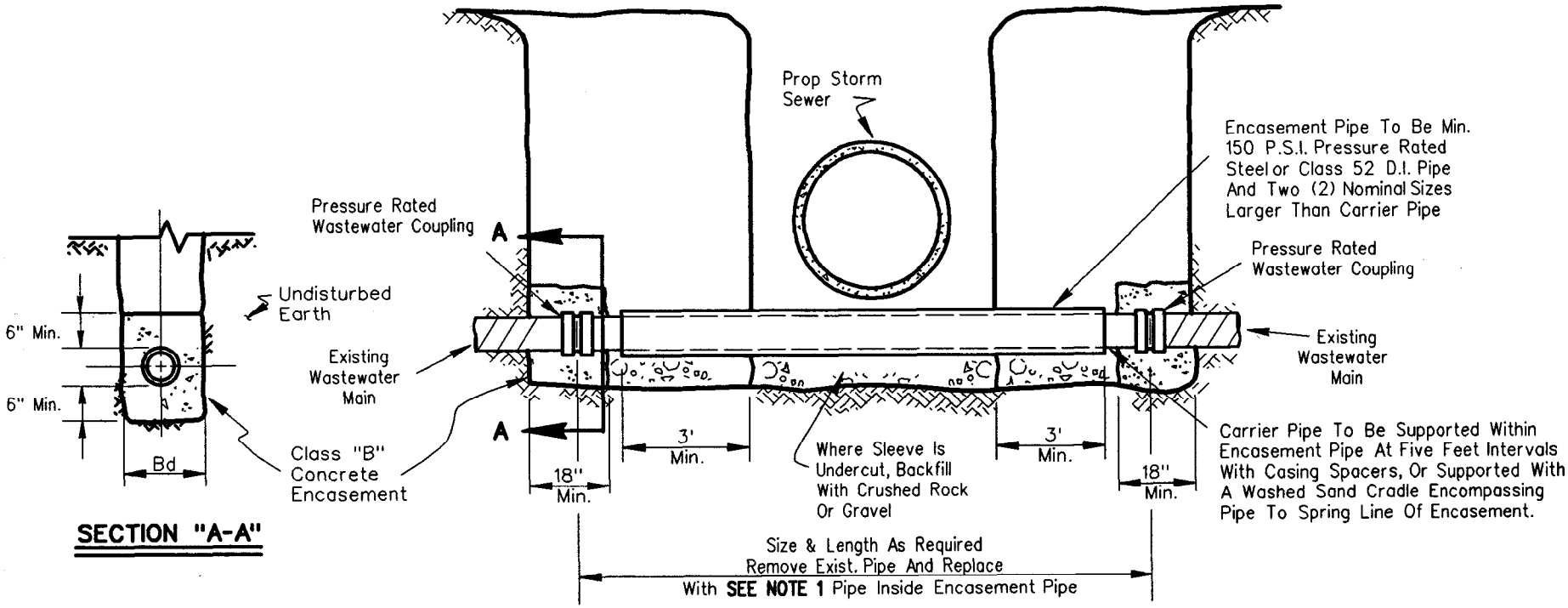
# WASTEWATER MAIN UNDERCUT BY PROPOSED STORMWATER MAIN

DWU

DATE DEC.2001

(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"**

**NOTE:**

1. REPLACE EX. R.C.P./CLAY PIPE WITH CLAY PIPE.
   REPLACE P.V.C. PIPE WITH P.V.C. PIPE.
2. RELAY NEW WASTEWATER MAIN AND ENCASEMENT PIPE TO MATCH EXISTING GRADE.

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

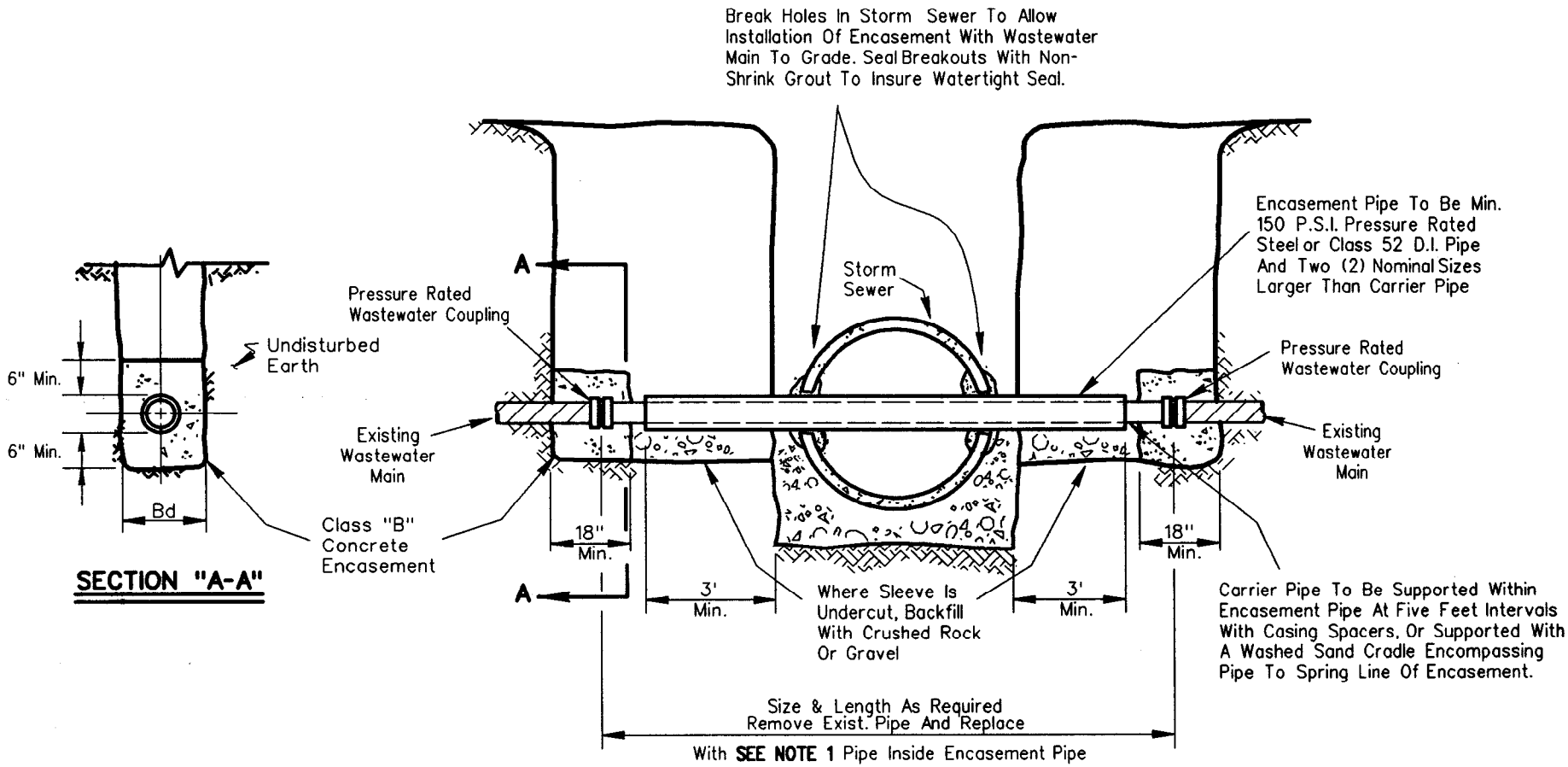
Steel Pipe Item 2.12.9.
D.I. Pipe Item 2.12.8.
P.V.C. Pipe Item 2.12.14.
Concrete Class Item 7.4.5.

# ENCASEMENT PROTECTION FOR WASTEWATER MAIN

DWU

DATE
DEC.2001

(Page No.)
414




**SECTION "A-A"**

**NOTE:**

1. REPLACE EX. R.C.P./CLAY PIPE WITH CLAY PIPE. REPLACE P.V.C. PIPE WITH P.V.C. PIPE.
2. RELAY NEW WASTEWATER MAIN AND ENCASEMENT PIPE TO MATCH EXISTING GRADE.

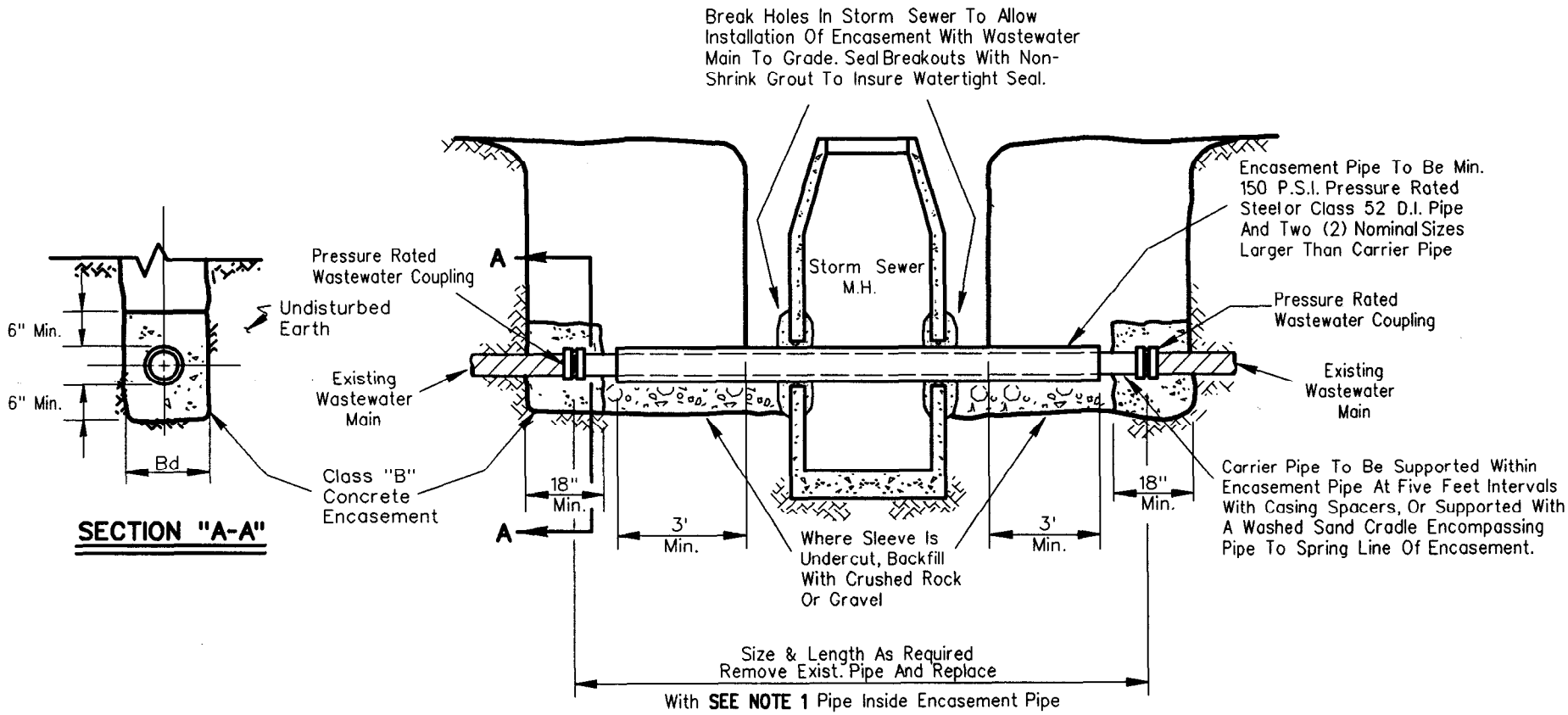
Contractor Must Contact Wastewater Collection Two Working Days Prior To Construction.

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 DEC.2001 | |

(TO BE INSTALLED BY PUBLIC WORKS
STORM SEWER CONTRACTOR)




NOTE:

1. REPLACE EX. R.C.P./CLAY PIPE WITH CLAY PIPE. REPLACE P.V.C. PIPE WITH P.V.C. PIPE.
2. RELAY NEW WASTEWATER MAIN AND ENCASEMENT PIPE 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
DEC.2001

(Page No.)
416

# 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) **A Standpipe Fireline Service**

   A) Definiton - Any system with fire hydrant, hose rack or other appurtenances, except test cock, from which water may be taken manually; may or may not contain automatic sprinkler heads.

   B) Metering - Metering with turbine meter with U.L. approved strainer.

3) **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.

4) **Domestic Water Service**

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

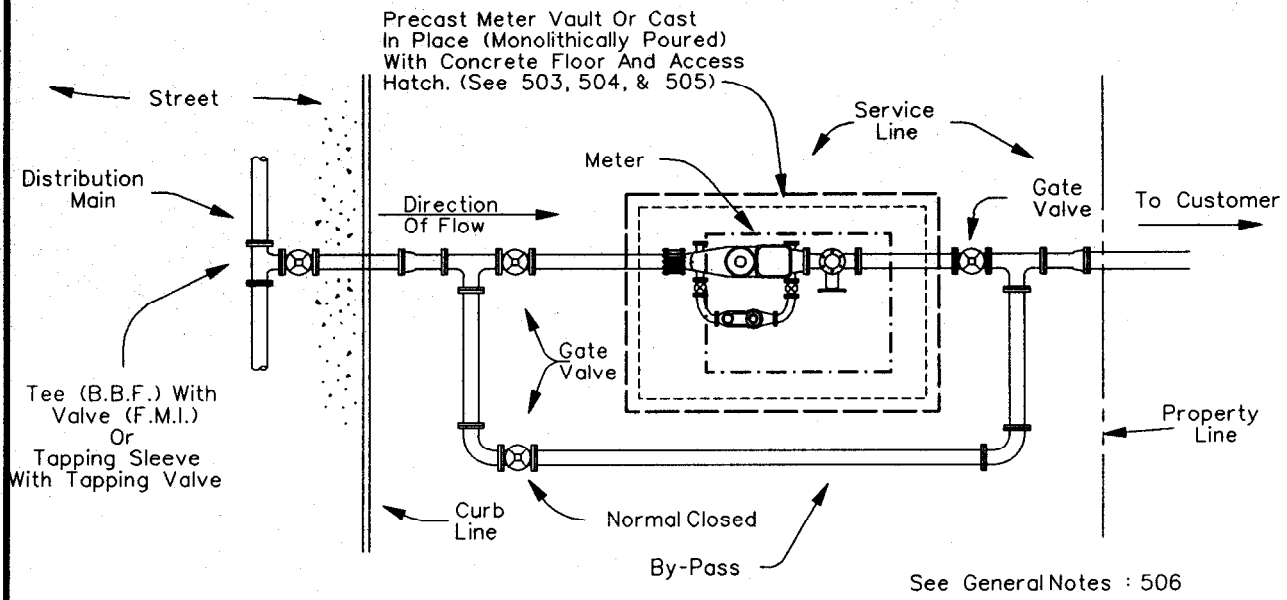
   B) Metering - Metered with C.T. meter or turbine meter with domestic type strainer.

5) **Irrigation Water Service**

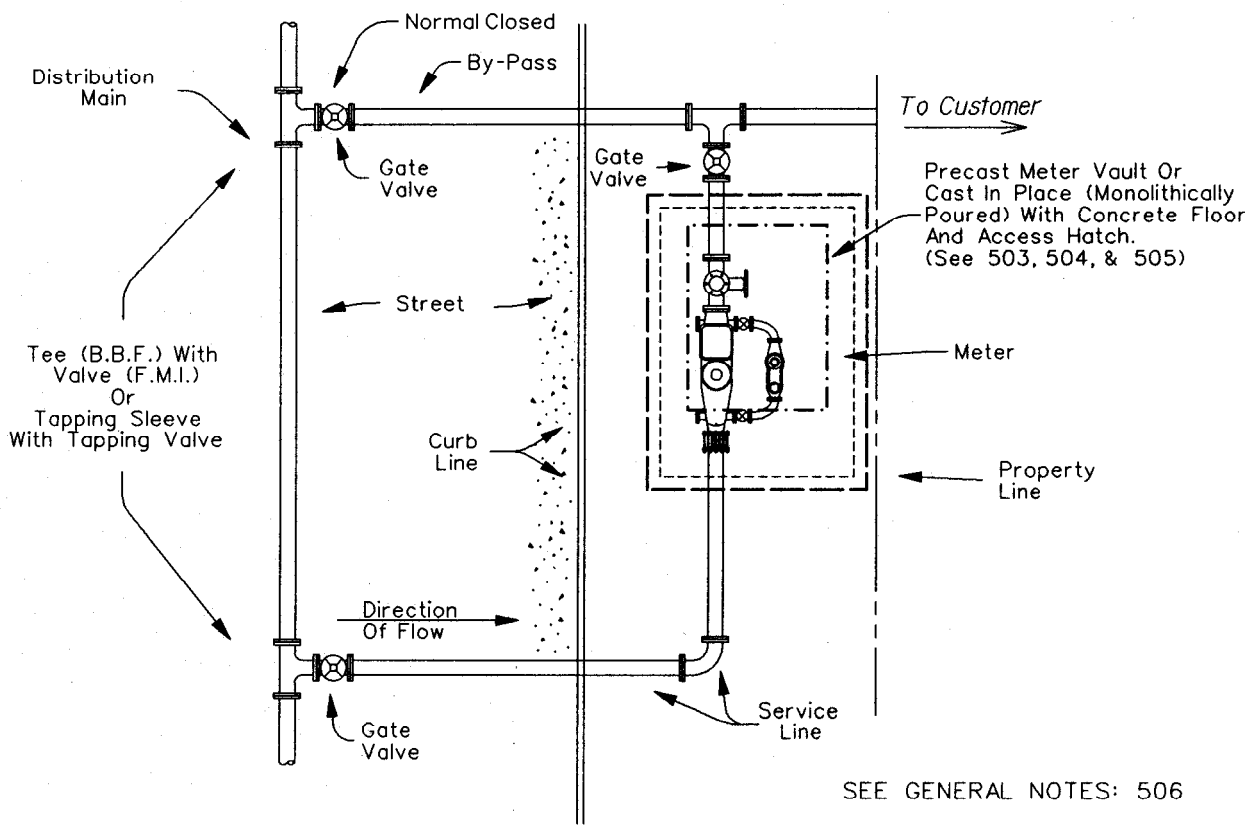
   A) Definition - Same as domestic water through a single water service and meter without a bypass and for irrigation purpose only.

   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 DEC.2001 | |

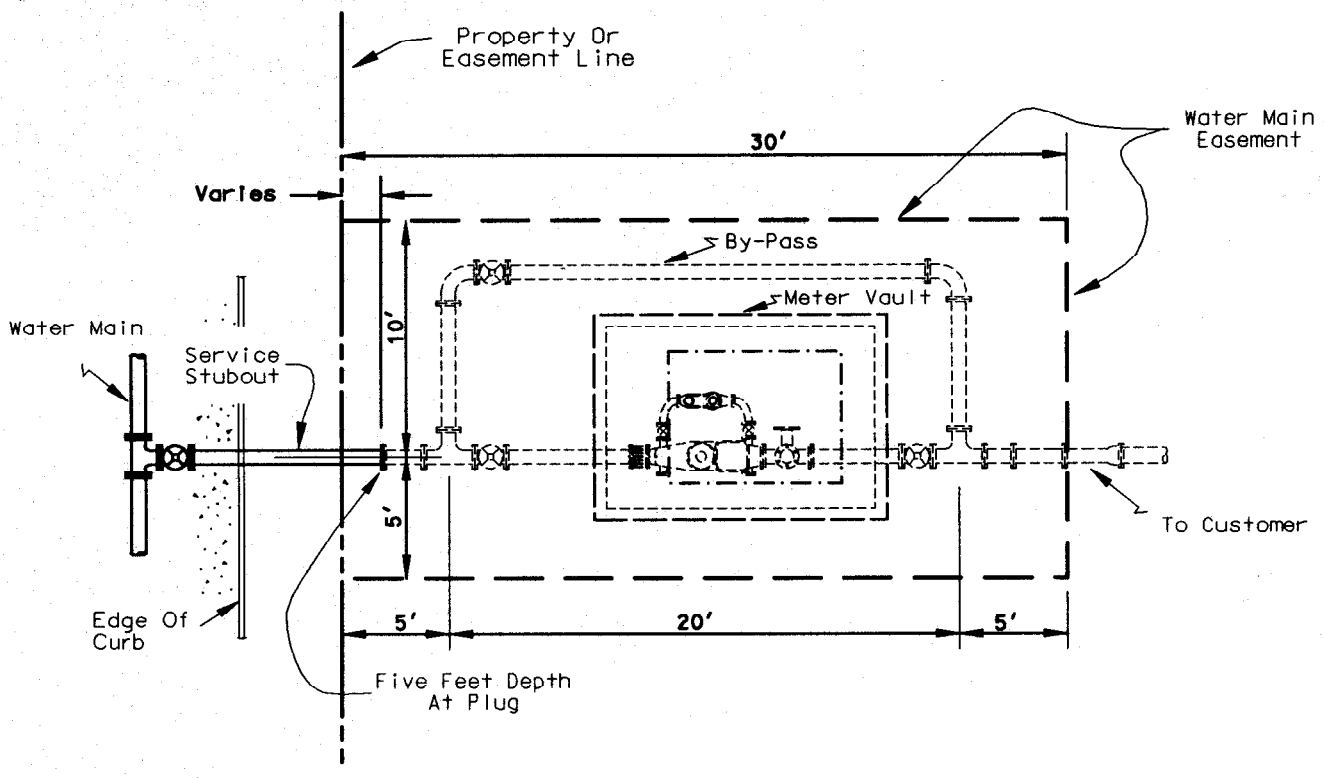



## TYPICAL METER ALIGNMENT (Combined Service Shown)

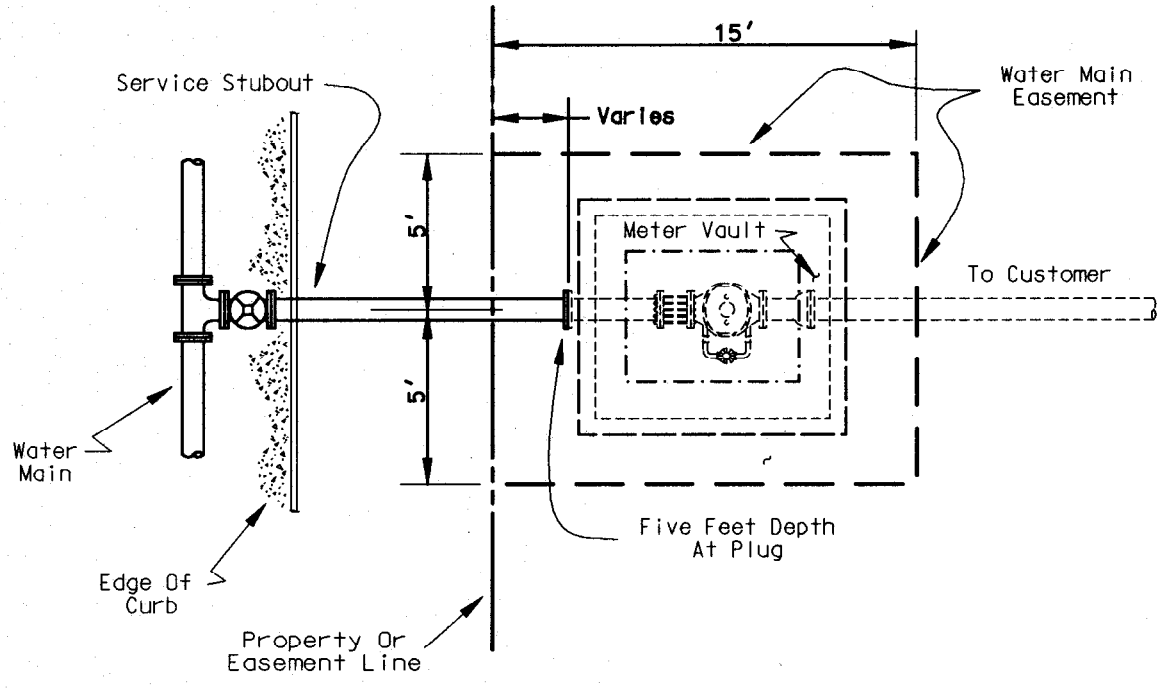



## ALTERNATE METER ALIGNMENT FOR LIMITED SPACE INSTALLATION (Combined Service Shown)

| | | | |
|---|---|---|---|
| **LARGE SERVICE INSTALLATION DETAILS PLAN VIEWS** | | DWU | (Page No.) 502 |
| | | DATE JUNE 2002 | |




COMBINED SERVICE - 15' x 30' EASEMENT



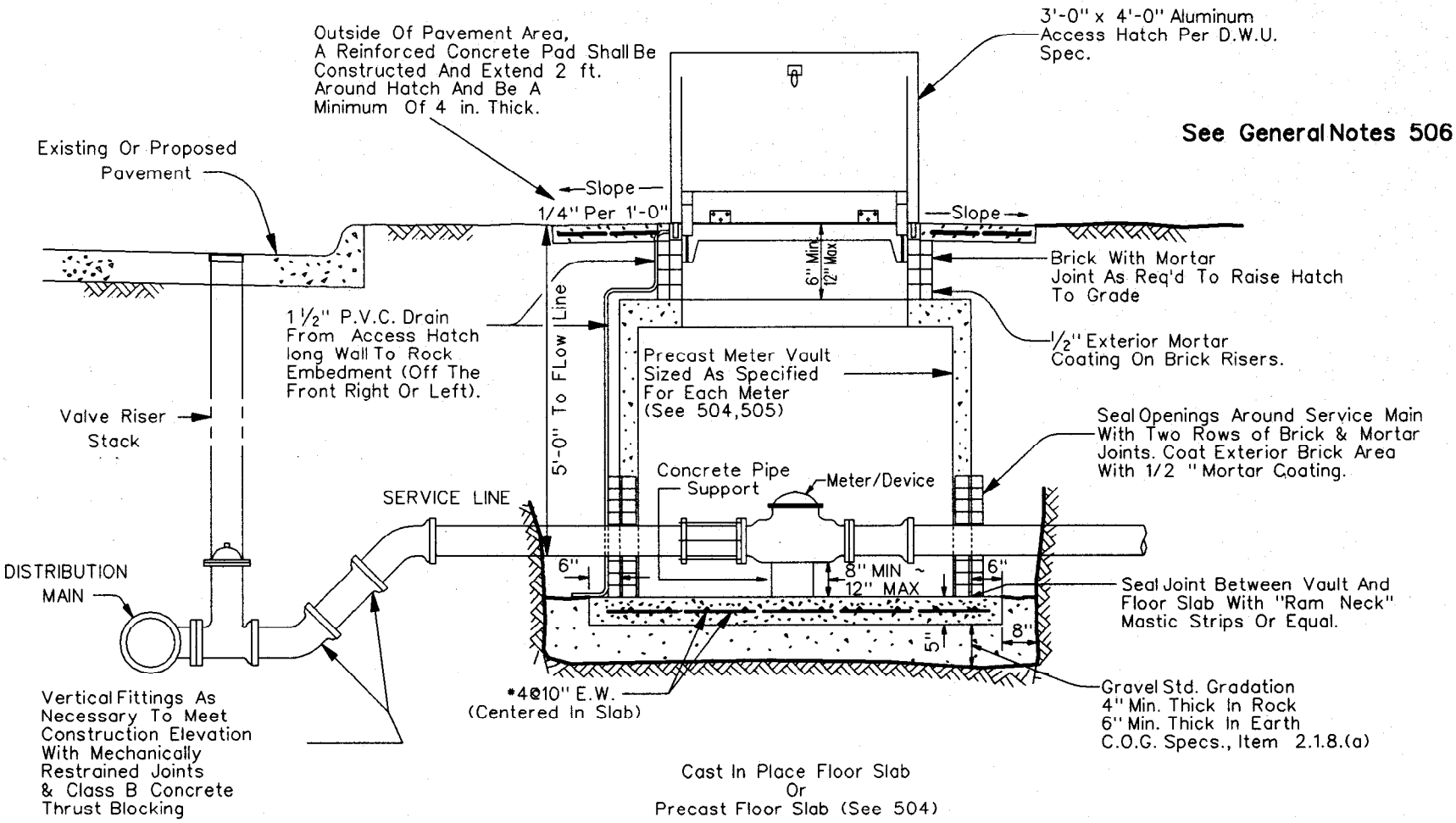

FIRE LINE SERVICE - 10' x15' EASEMENT

# MINIMUM EASEMENT SIZES FOR LARGE METER INSTALLATIONS

DWU

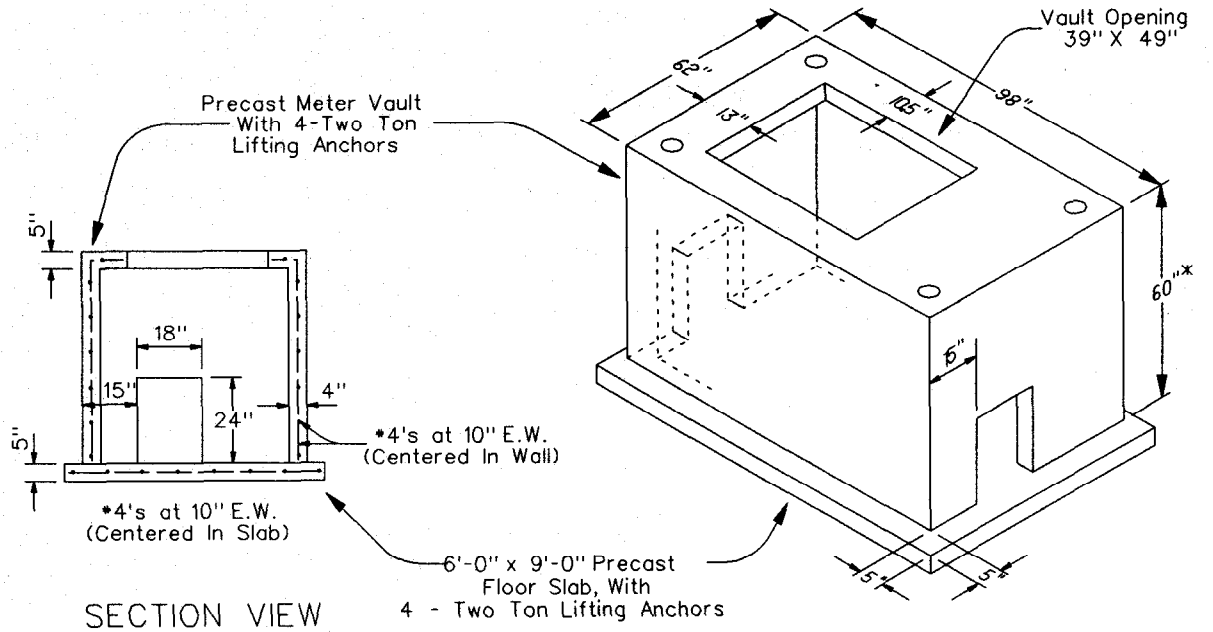
(PAGE NO.) 502A

DATE JUNE 2002




TYPICAL FOR ALL LARGE METER VAULTS

| | | | |
|---|---|---|---|
| LARGE SERVICE INSTALLATION DETAIL ELEVATION VIEW | | DWU | (Page No.) 503 |
| | | DATE OCT. '99 | |

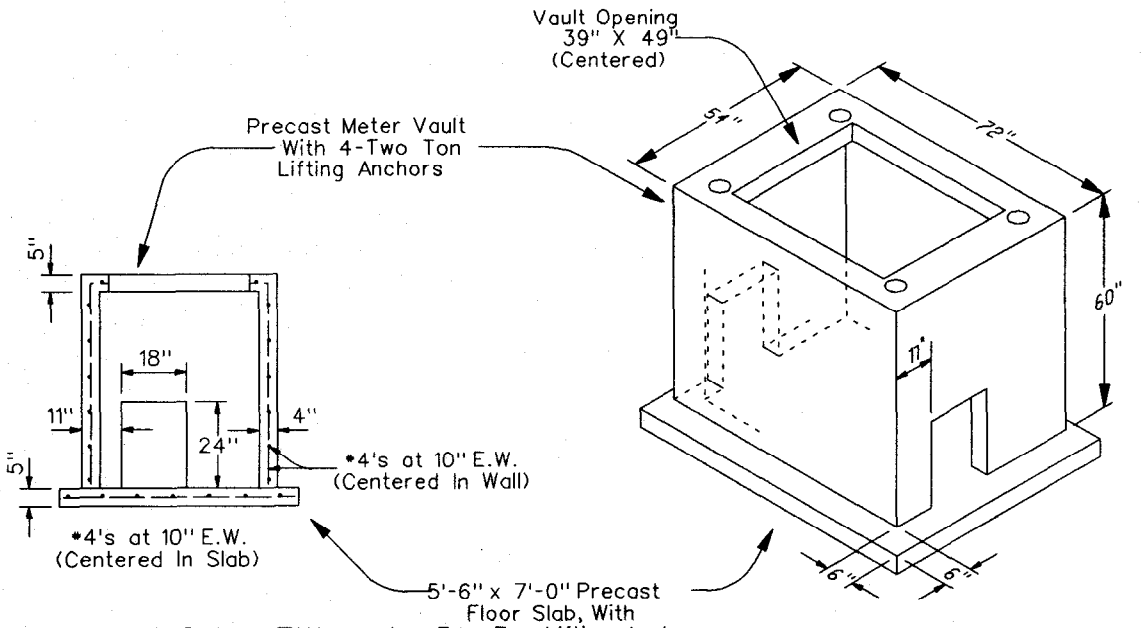



SECTION VIEW

* Available Heights
36", 48", 60"

F.M. VAULT

* Special Applications To Be Determined
By Engineer.



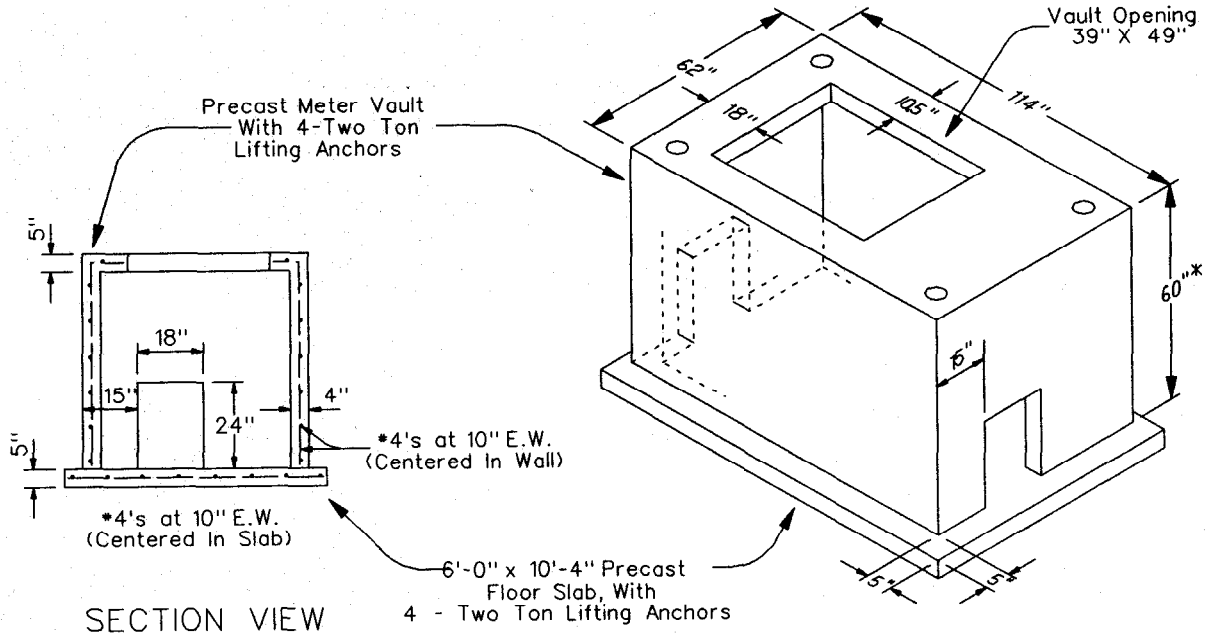

SECTION VIEW

* Available Heights
36", 48", 60"

D.C. VAULT

* Special Applications To Be Determined
By Engineer.

| LARGE SERVICE INSTALLATION DETAILS<br>PRECAST VAULTS | | DWU | (Page No.)<br>504 |
|---|---|---|---|
| | | DATE<br>JAN. '98 | |




SECTION VIEW

* Available Heights
36", 48", 60"

* Special Applications To Be Determined
By Engineer.

10" VAULT

| | | | |
|---|---|---|---|
| LARGE SERVICE INSTALLATION DETAILS<br>PRECAST VAULTS | | DWU | (Page No.)<br>505 |
| | | DATE<br>JAN. '98 | |

# GENERAL NOTES FOR MATERIAL AND CONSTRUCTION METHODS

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

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

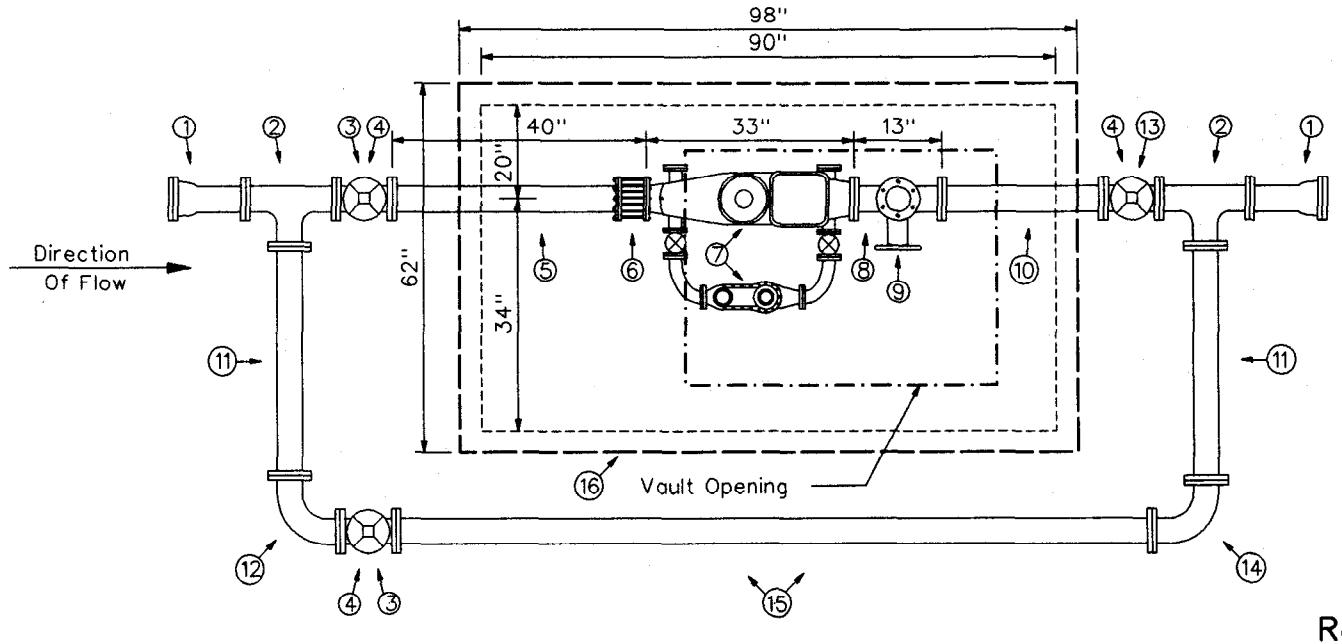
3.) Cast in place concrete shall be class "F" concrete, except for concrete used for thrust blocking, which shall be class "B" concrete.

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.)

| | | | |
|---|---|---|---|
| LARGE SERVICE INSTALLATION DETAILS<br>GENERAL NOTES | | DWU | (Page No.)<br>506 |
| | | DATE<br>DEC.2001 | |

| 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

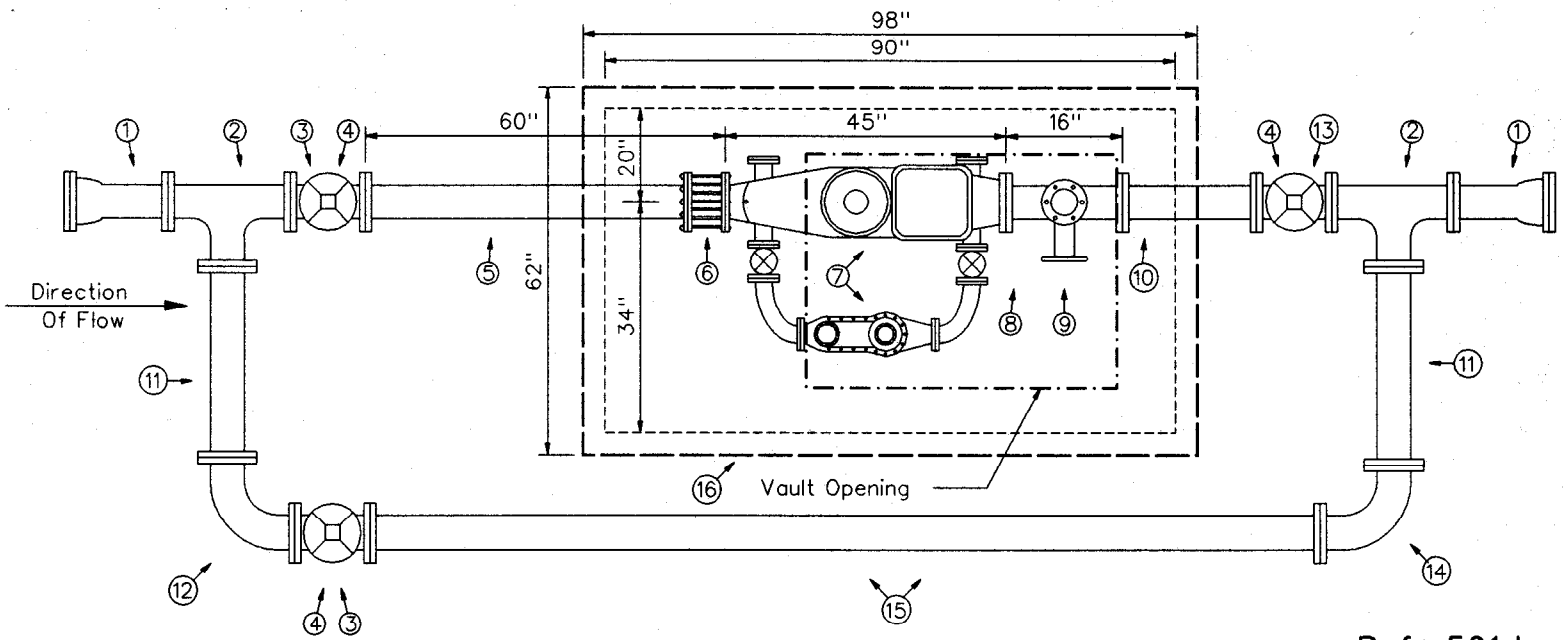
DWU

(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

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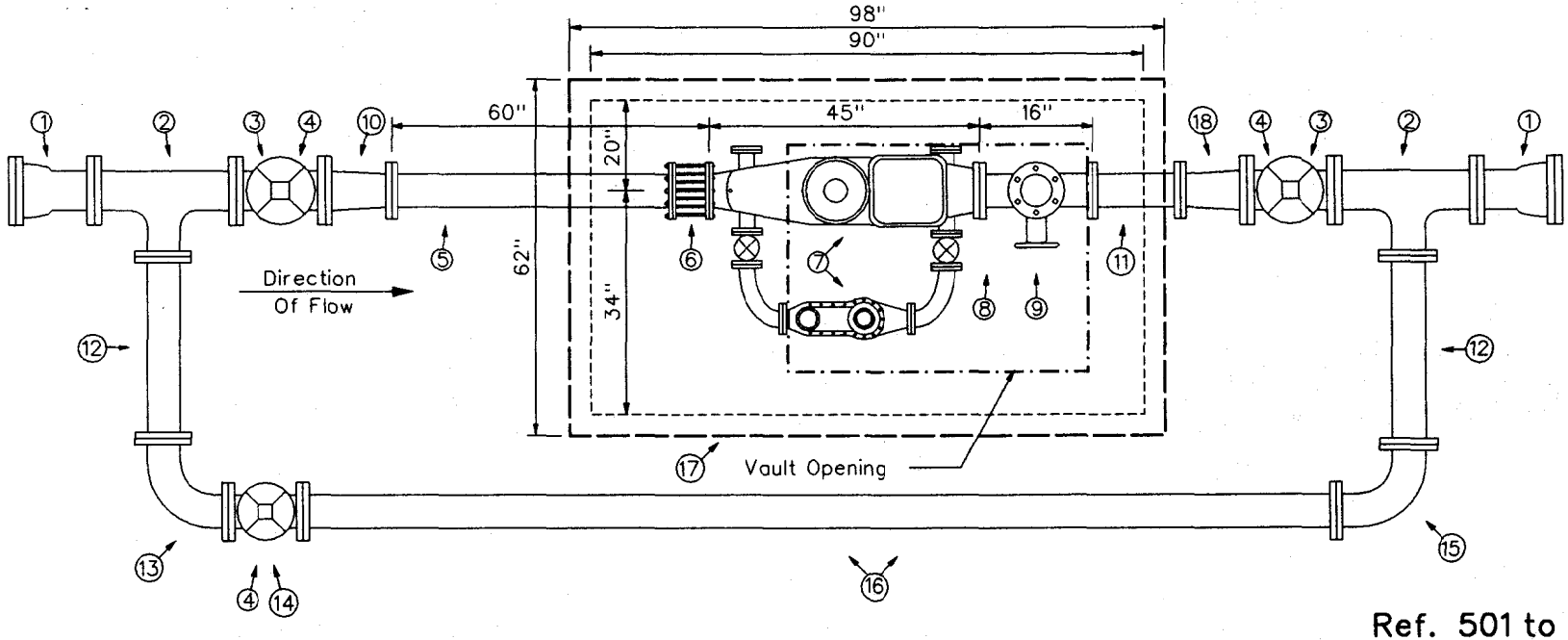
| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 2 Ea. | 8" x 8" Nipple M.J. x F. |
| ② | 2 Ea. | 8" x 6" Tee F. x F. |
| ③ | 2 Ea. | 8" Gate Valve F. x F. |
| ④ | 3 Ea. | Valve Stack Riser Cover & Lid |
| ⑤ | 1 Ea. | 6" x 60" Pipe S. x S. |
| ⑥ | 1 Ea. | 6" Flanged Coupling 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

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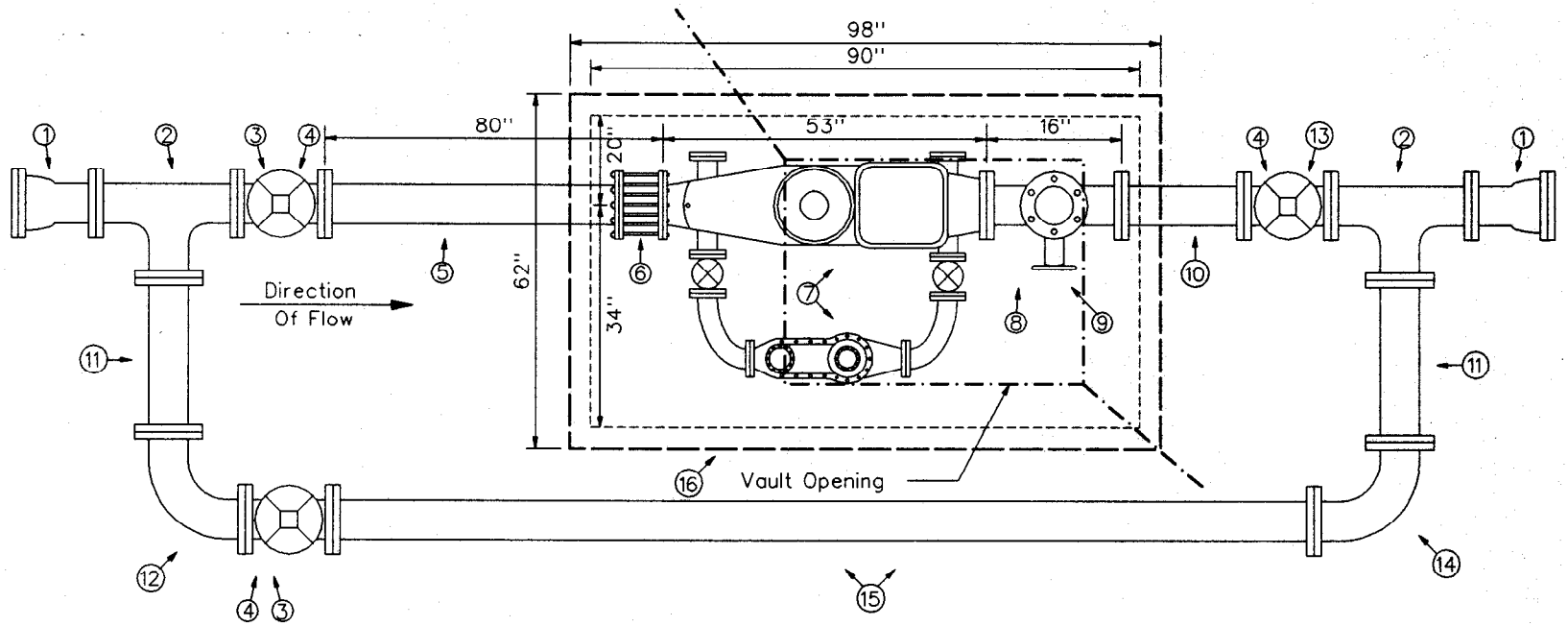
| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 2 Ea. | 8" x 8" Nipple M.J. x F. |
| ② | 2 Ea. | 8" x 8" Tee F. x F. |
| ③ | 2 Ea. | 8" Gate Valve F. x M.J. |
| ④ | 3 Ea. | Valve Stack Riser Cover & Lid |
| ⑤ | 1 Ea. | 8" x 80" Pipe S. x S. |
| ⑥ | 1 Ea. | 8" Flanged Coupling 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

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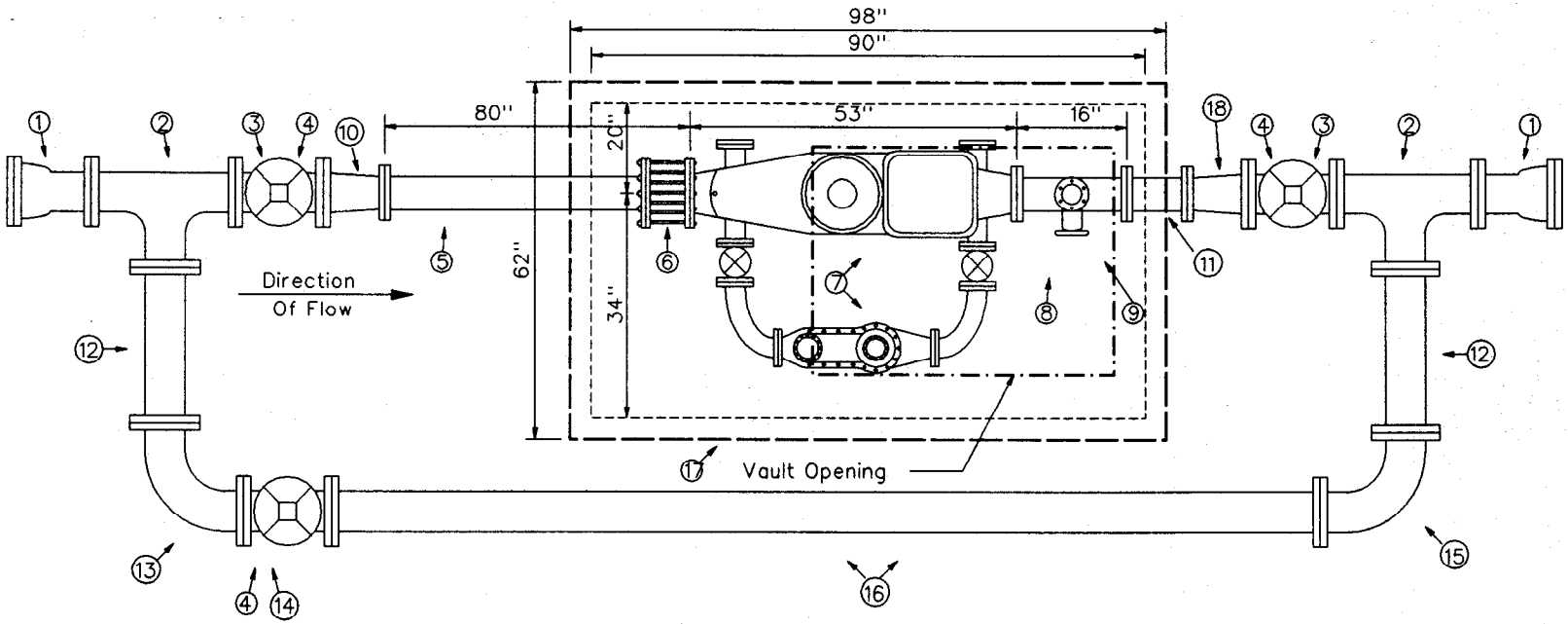
DATE JUNE 2002

| 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

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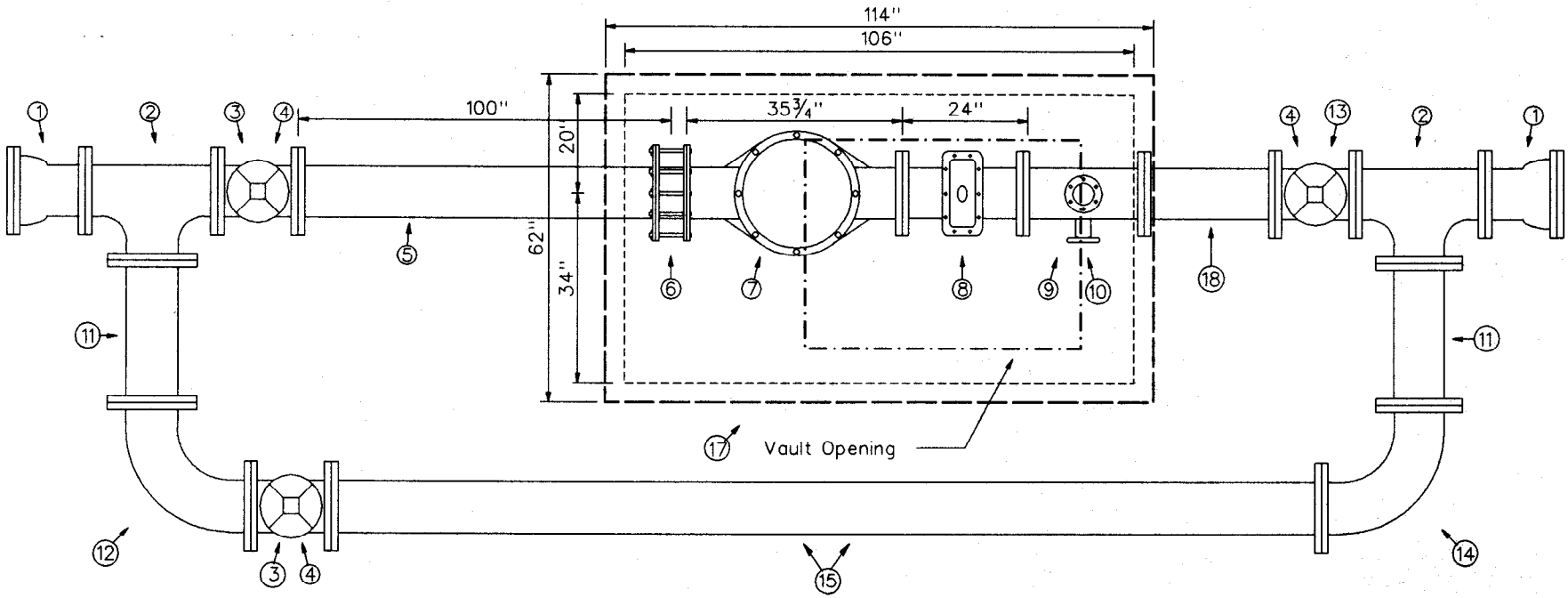
| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 2 Ea. | 10" x 8" Nipple M.J. x F. |
| ② | 2 Ea. | 10" x 10" Tee F. x F. |
| ③ | 2 Ea. | 10" Gate Valve F. x M.J. |
| ④ | 3 Ea. | Valve Stack Riser Cover & Lid |
| ⑤ | 1 Ea. | 10" x 100" Pipe S. x S. |
| ⑥ | 1 Ea. | 10" Flanged 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) |

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# 10" COMBINED SERVICE WITH 10" METER

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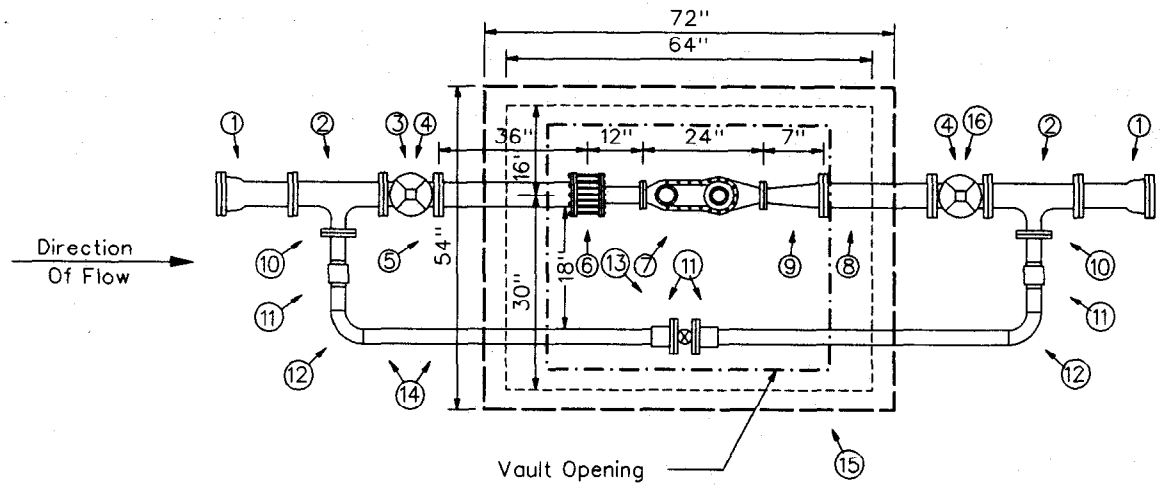
| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 2 Ea. | 4" x 8" Nipple M.J. x F. |
| ② | 2 Ea. | 4" x 2" Tee F. x F. |
| ③ | 1 Ea. | 4" Gate Valve F. x M.J. |
| ④ | 3 Ea. | Valve Stack Riser Cover & Lid |
| ⑤ | 1 Ea. | 4" x 36" Pipe S. x S. |
| ⑥ | 1 Ea. | 4" X 3" Reducing 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. |

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# 4" DOMESTIC SERVICE WITH 3" METER

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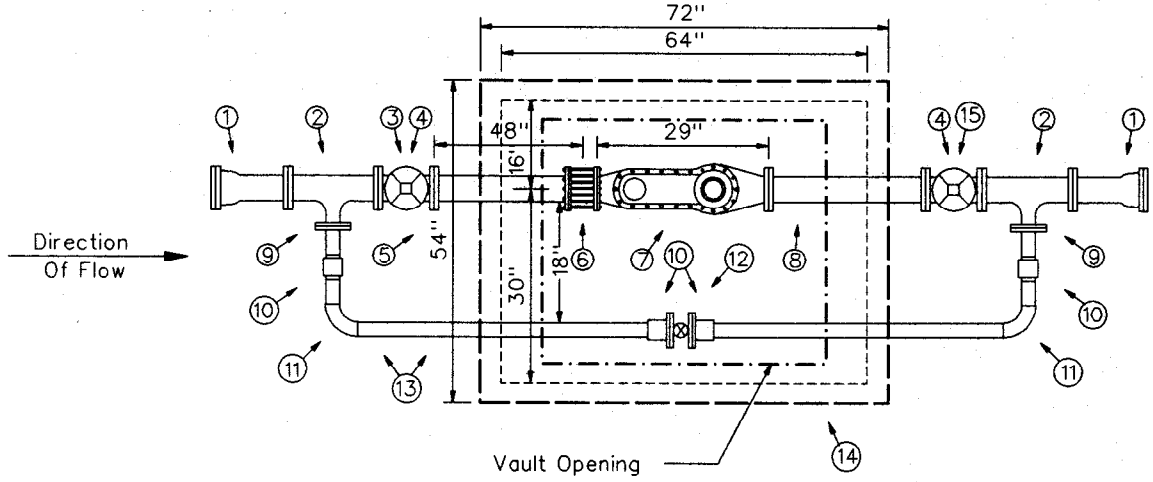
| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 2 Ea. | 4" x 8" Nipple M.J. x F. |
| ② | 2 Ea. | 4" x 2" Tee F. x F. |
| ③ | 1 Ea. | 4" Gate Valve F. x M.J. |
| ④ | 2 Ea. | Valve Stack Riser Cover & Lid |
| ⑤ | 1 Ea. | 4" x 36" Pipe S. x S. |
| ⑥ | 1 Ea. | 4" Flanged Coupling 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

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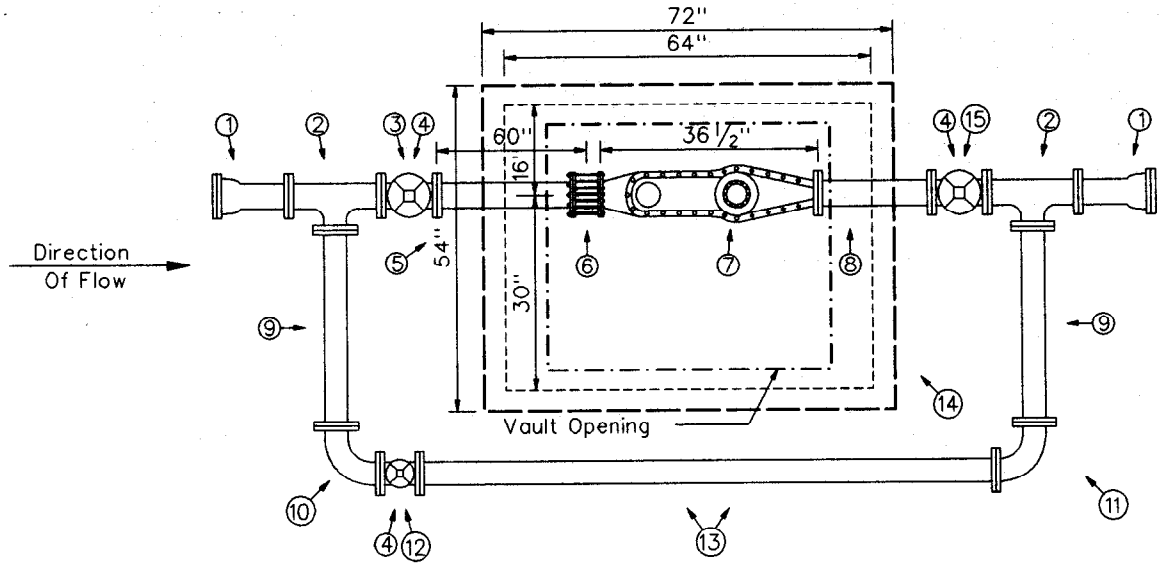
514

| 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

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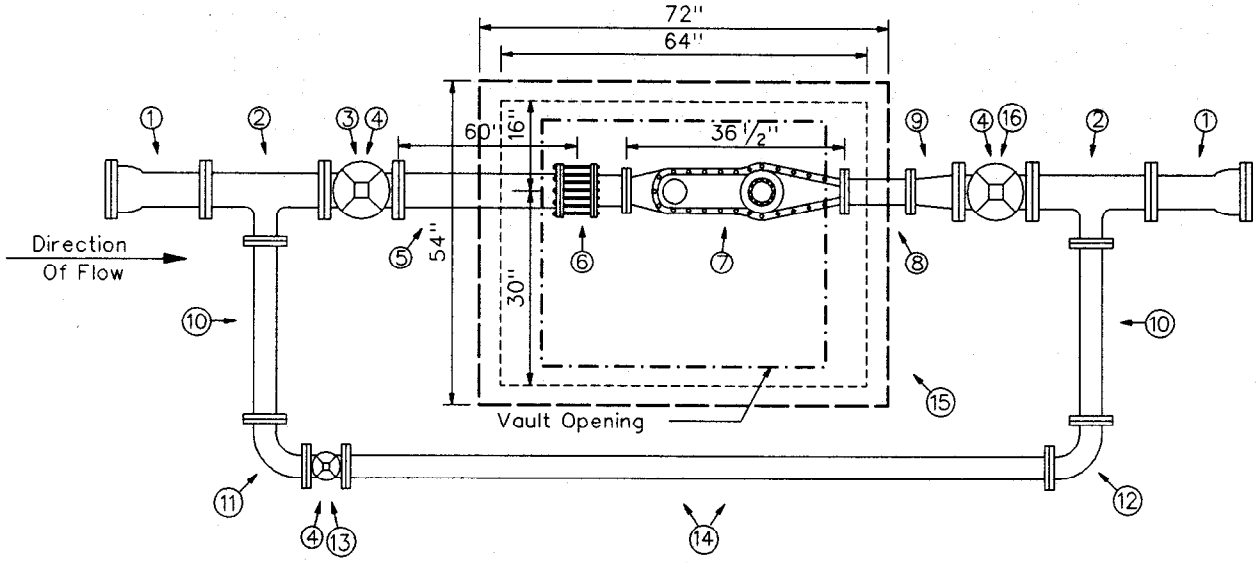
| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 2 Ea. | 8" x 8" Nipple M.J. x F. |
| ② | 2 Ea. | 8" x 4" Tee F. x F. |
| ③ | 1 Ea. | 8" Gate Valve F. x M.J. |
| ④ | 3 Ea. | Valve Stack Riser Cover & Lid |
| ⑤ | 1 Ea. | 8" x 24" Pipe S. x S. |
| ⑥ | 1 Ea. | 8" x 6" Reducing 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

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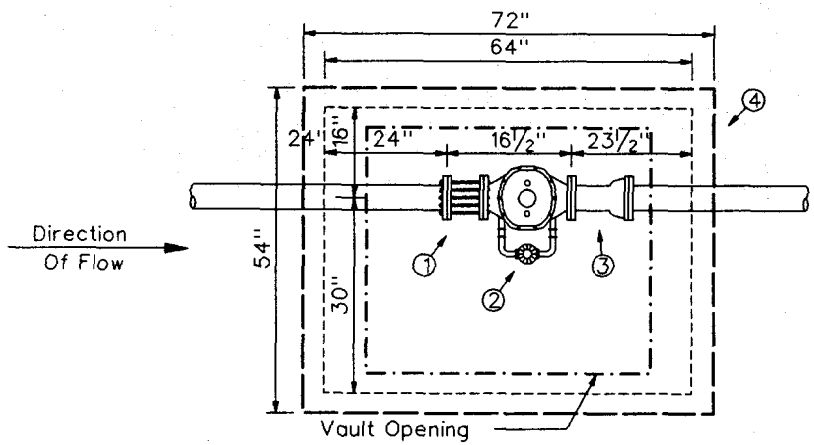
| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 1 Ea. | 4" Flanged Coupling Adaptor |
| ② | 1 Ea. | 4" Detector Check Device W/ By-Pass Meter |
| ③ | 1 Ea. | 4" x 8" Nipple M.J. x F. |
| ④ | 1 Ea. | Precast D.C. Vault |
| | 1 Ea. | D.C. Vault Floor (Not Shown) |
| | 1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




Ref. 501 to 506

# 4" CLOSED FIRELINE SERVICE WITH 4" DETECTOR CHECK DEVICE

DWU

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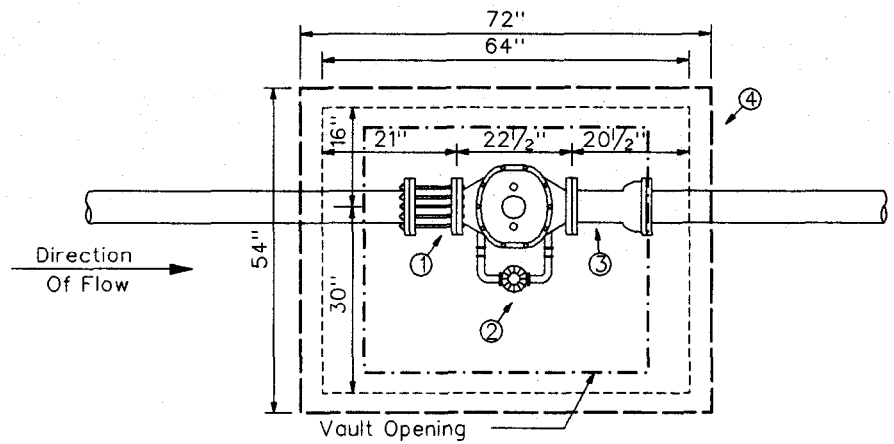
DATE JUNE 2002

| 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

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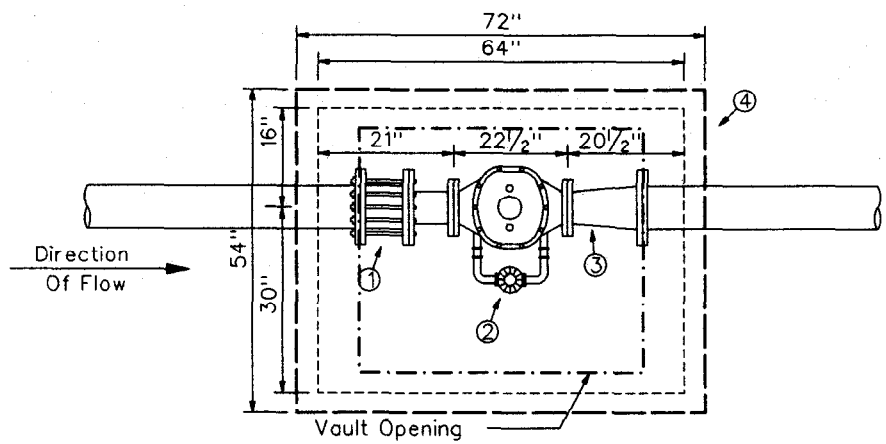
DATE JUNE 2002

| 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

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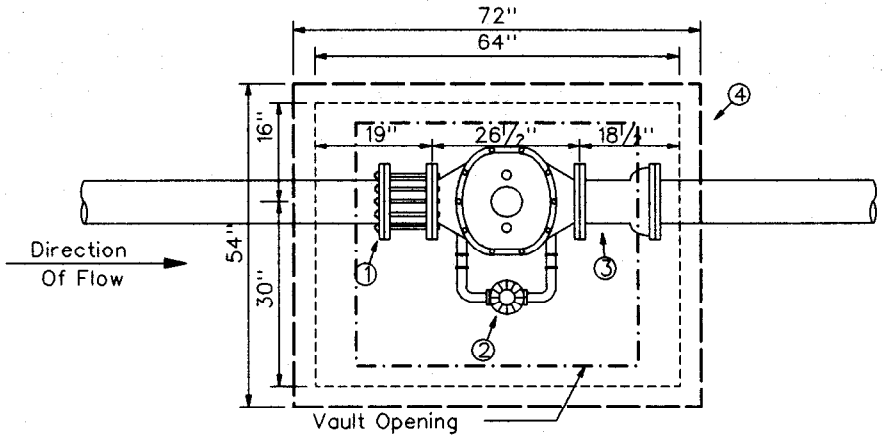
DATE JUNE 2002

| 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

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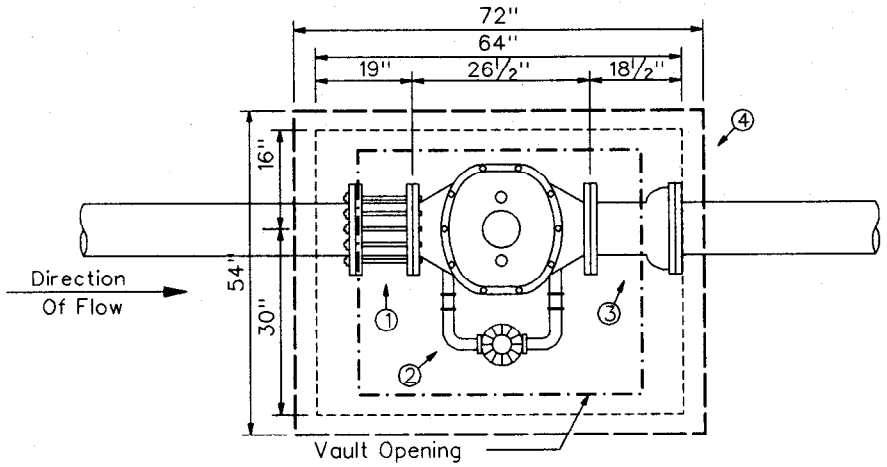
DATE JUNE 2002

| 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) |

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# 10" CLOSED FIRELINE SERVICE WITH 10" DETECTOR CHECK DEVICE

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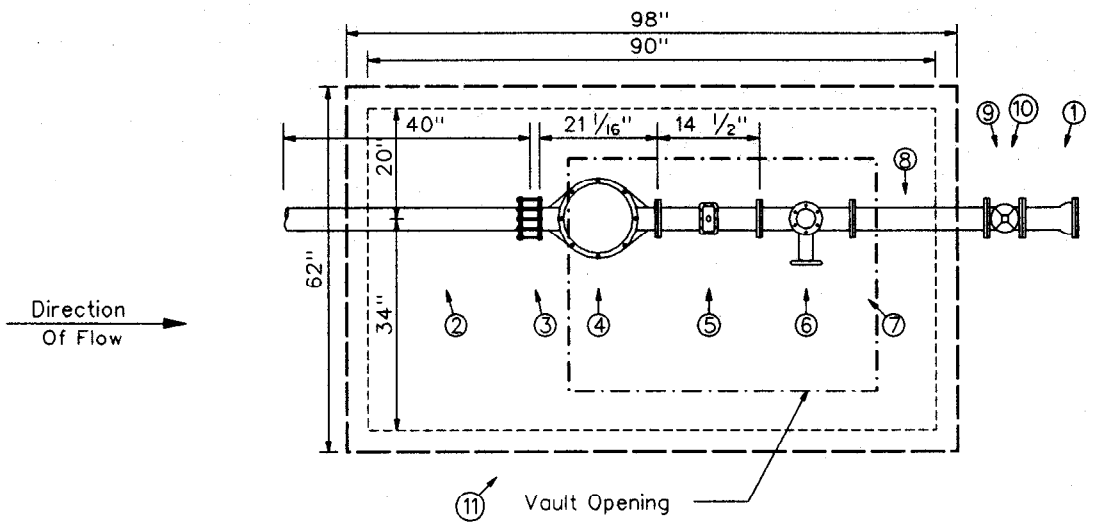
DATE JUNE 2002

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 1 Ea. | 4" x 8" Nipple M.J. x F. |
| ② | 1 Ea. | 4" x 40" Pipe S. x S. |
| ③ | 1 Ea. | 4" Flanged Coupling Adaptor |
| ④ | 1 Ea. | 4" U.L. Approved Strainer (For Turbine) |
| ⑤ | 1 Ea. | 4" Turbine Meter |
| ⑥ | 1 Ea. | 4" x 4" Tee F. x F. (Test Point) |
| ⑦ | 1 Ea. | 4" Gate Valve F. x F. (Test Point) |

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ⑧ | 1 Ea. | 4" x 24" Nipple F. x F. |
| ⑨ | 1 Ea. | 4" Gate Valve F. x F. |
| ⑩ | 1 Ea. | Valve Stack Riser Cover & Lid |
| ⑪ | 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" STANDPIPE FIRELINE SERVICE WITH 4" METER

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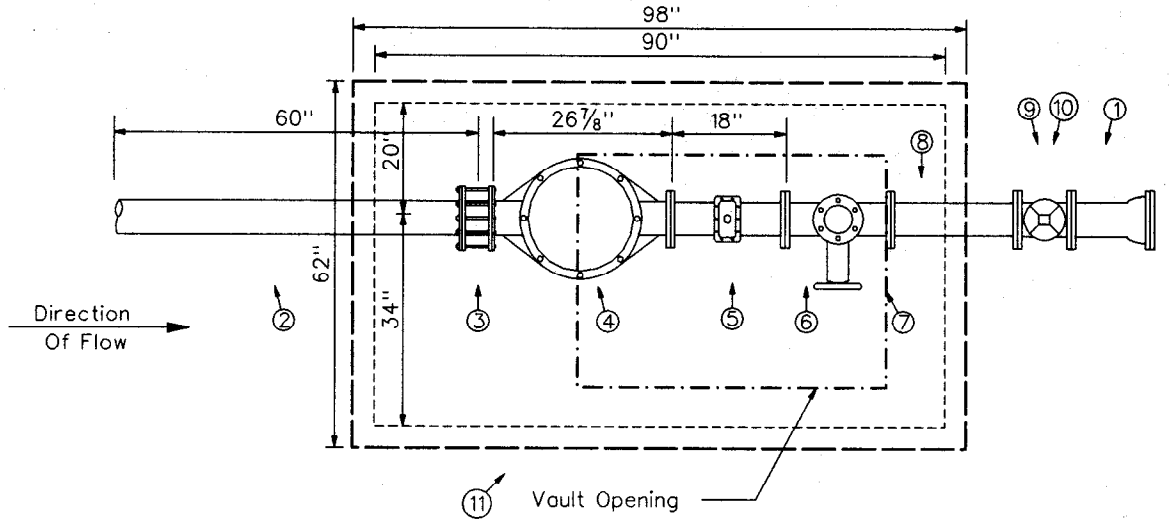
(Page No.) 522

DATE JUNE 2002

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 1 Ea. | 6" x 8" Nipple M.J. x F. |
| ② | 1 Ea. | 6" x 60" Pipe S. x S. |
| ③ | 1 Ea. | 6" Flanged Coupling Adaptor |
| ④ | 1 Ea. | 6" U.L. Approved Strainer (For Turbine) |
| ⑤ | 1 Ea. | 6" Turbine Meter |
| ⑥ | 1 Ea. | 6" x 4" Tee F. x F. (Test Point) |
| ⑦ | 1 Ea. | 4" Gate Valve F. x F. (Test Point) |

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ⑧ | 1 Ea. | 6" x 24" Nipple F. x F. |
| ⑨ | 1 Ea. | 6" Gate Valve F. x F. |
| ⑩ | 1 Ea. | Valve Stack Riser Cover & Lid |
| ⑪ | 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" STANDPIPE FIRELINE SERVICE WITH 6" METER

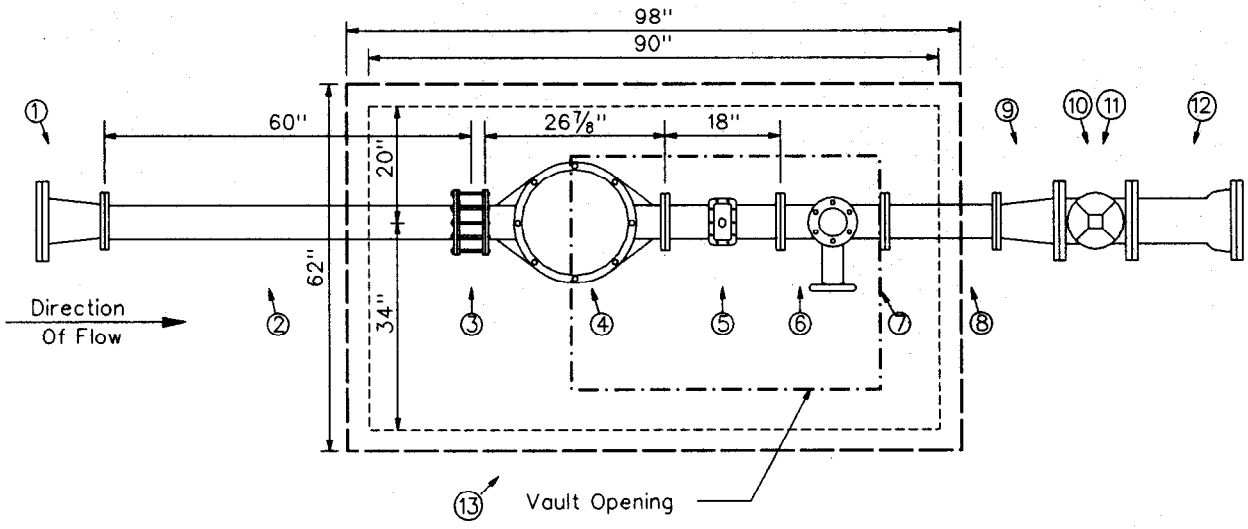
DWU

(Page No.) 523

DATE JUNE 2002

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 1 Ea. | 8" x 6" Reducer M.J. x M.J. |
| ② | 1 Ea. | 6" x 60" Pipe S. x S. |
| ③ | 1 Ea. | 6" Flanged Coupling Adaptor |
| ④ | 1 Ea. | 6" U.L. Approved Strainer (For Turbine) |
| ⑤ | 1 Ea. | 6" Turbine Meter |
| ⑥ | 1 Ea. | 6" x 4" Tee F. x F. (Test Point) |
| ⑦ | 1 Ea. | 4" Gate Valve F. x F. (Test Point) |
| ⑧ | 1 Ea. | 6" x 12" Nipple F. x F. |

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ⑨ | 1 Ea. | 8" x 6" Reducer F. x F. |
| ⑩ | 1 Ea. | 8" Gate Valve F. x F. |
| ⑪ | 1 Ea. | Valve Stack Riser Cover & Lid |
| ⑫ | 1 Ea. | 8" x 8" Nipple M.J. x F. |
| ⑬ | 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" STANDPIPE FIRELINE SERVICE WITH 6" METER

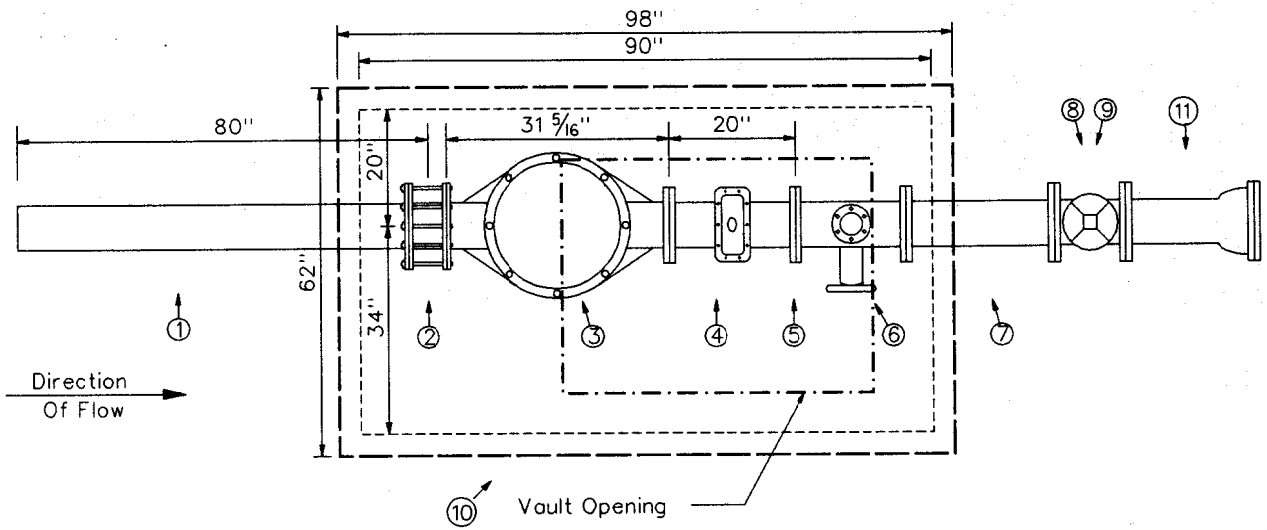
DWU

(Page No.) 524

DATE JUNE 2002

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 1 Ea. | 8" x 80" Pipe S. x S. |
| ② | 1 Ea. | 8" Flanged Coupling Adaptor |
| ③ | 1 Ea. | 8" U.L. Approved Strainer (For Turbine) |
| ④ | 1 Ea. | 8" Turbine Meter |
| ⑤ | 1 Ea. | 8" x 4" Tee F. x F. (Test Point) |
| ⑥ | 1 Ea. | 4" Gate Valve F. x F. (Test Point) |

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ⑦ | 1 Ea. | 8" x 24" Nipple F. x F. |
| ⑧ | 1 Ea. | 8" Gate Valve F. x F. |
| ⑨ | 1 Ea. | Valve Stack Riser Cover & Lid |
| ⑩ | 1 Ea. | Precast F.M. Vault |
| | 1 Ea. | F.M. Vault Floor (Not Shown) |
| | 1 Ea. | Access Hatch (Not Shown) |
| ⑪ | 1 Ea. | 8" x 8" Nipple F. x M.J. |




Ref. 501 to 506

# 8" STANDPIPE FIRELINE SERVICE WITH 8" METER

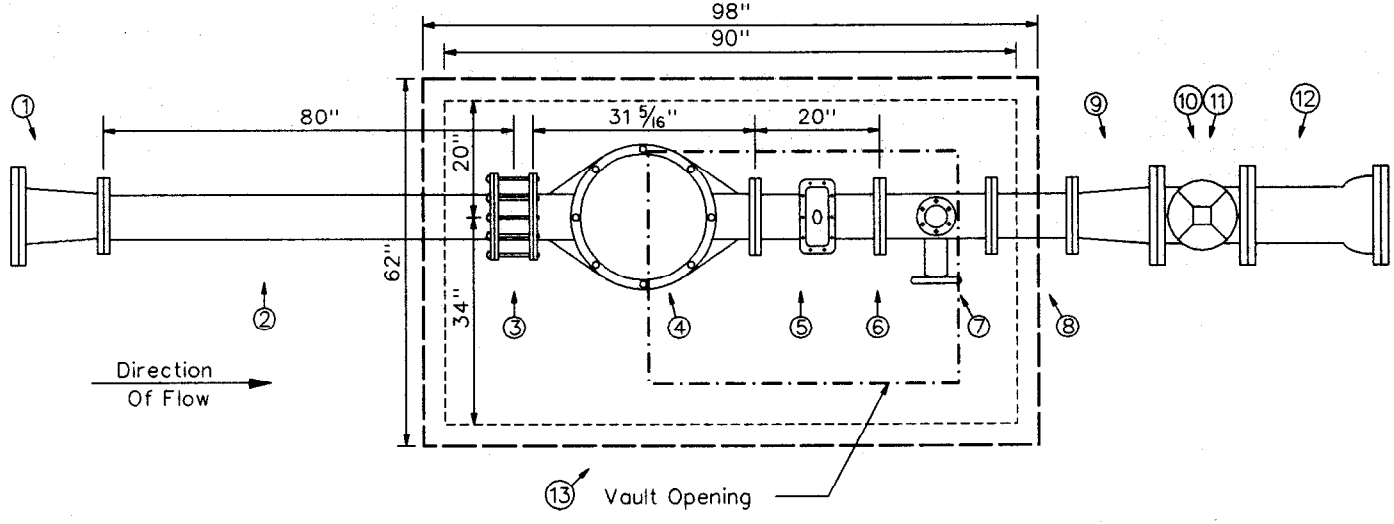
DWU

DATE
JUNE 2002

(Page No.)
525

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 1 Ea. | 10" x 8" Reducer M.J. x M.J. |
| ② | 1 Ea. | 8" x 80" Pipe S. x S. |
| ③ | 1 Ea. | 8" Flanged Coupling Adaptor |
| ④ | 1 Ea. | 8" U.L. Approved Strainer (For Turbine) |
| ⑤ | 1 Ea. | 8" Turbine Meter |
| ⑥ | 1 Ea. | 8" x 4" Tee F. x F. (Test Point) |
| ⑦ | 1 Ea. | 4" Gate Valve F. x F. (Test Point) |
| ⑧ | 1 Ea. | 8" x 12" Nipple F. x F. |

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ⑨ | 1 Ea. | 10" x 8" Reducer F. x F. |
| ⑩ | 1 Ea. | 10" Gate Valve F. x F. |
| ⑪ | 1 Ea. | Valve Stack Riser Cover & Lid |
| ⑫ | 1 Ea. | 10" x 8" Nipple M.J. x F. |
| ⑬ | 1 Ea. | Precast F.M. Vault |
| | 1 Ea. | F.M. Vault Floor (Not Shown) |
| | 1 Ea. | Access Hatch (Not Shown) |




Ref. 501 to 506

# 10" STANDPIPE FIRELINE SERVICE WITH 8" METER

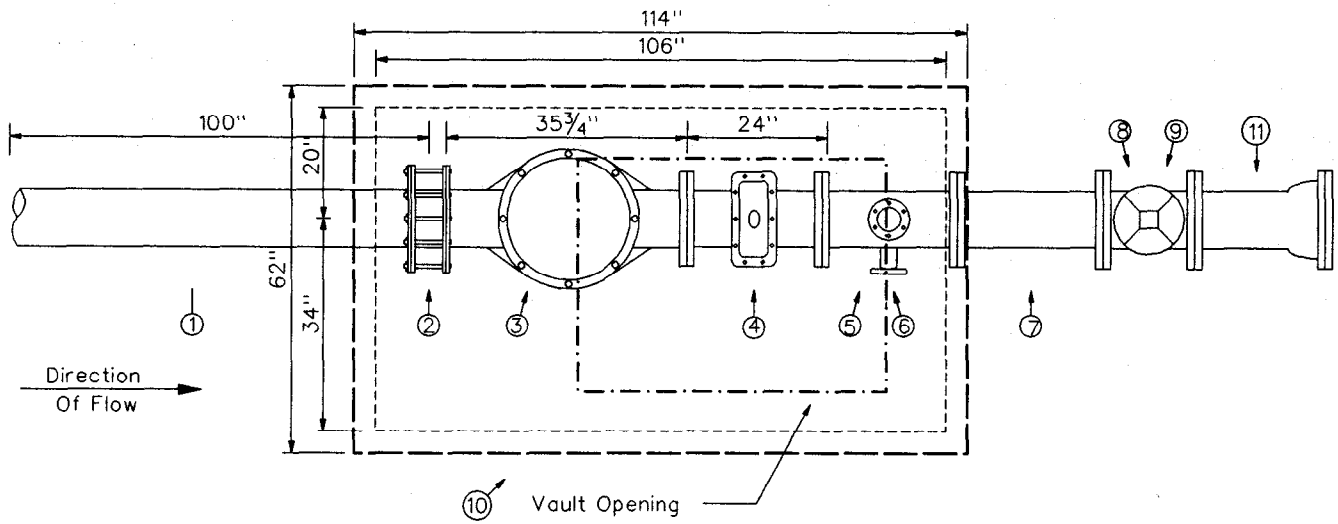
DWU

(Page No.) 526

DATE JUNE 2002

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ① | 1 Ea. | 10" x 100" Pipe S. x S. |
| ② | 1 Ea. | 10" Flanged Coupling Adaptor |
| ③ | 1 Ea. | 10" U.L. Approved Strainer (For Turbine) |
| ④ | 1 Ea. | 10" Turbine Meter |
| ⑤ | 1 Ea. | 10" x 4" Tee F. x F. (Test Point) |
| ⑥ | 1 Ea. | 4" Gate Valve F. x F. (Test Point) |

| Material List | | |
|---|---|---|
| Part No. | Quantity | Description |
| ⑦ | 1 Ea. | 10" x 24" Nipple F. x F. |
| ⑧ | 1 Ea. | 10" Gate Valve F. x F. |
| ⑨ | 1 Ea. | Valve Stack Riser Cover & Lid |
| ⑩ | 1 Ea. | Precast F.M. Vault |
| | 1 Ea. | F.M. Vault Floor (Not Shown) |
| | 1 Ea. | Access Hatch (Not Shown) |
| ⑪ | 1 Ea. | 10" x 8" Nipple F. x M.J. |




Ref. 501 to 506

# 10" STANDPIPE FIRELINE SERVICE WITH 10" METER

DWU

DATE
JUNE 2002

(Page No.)
527

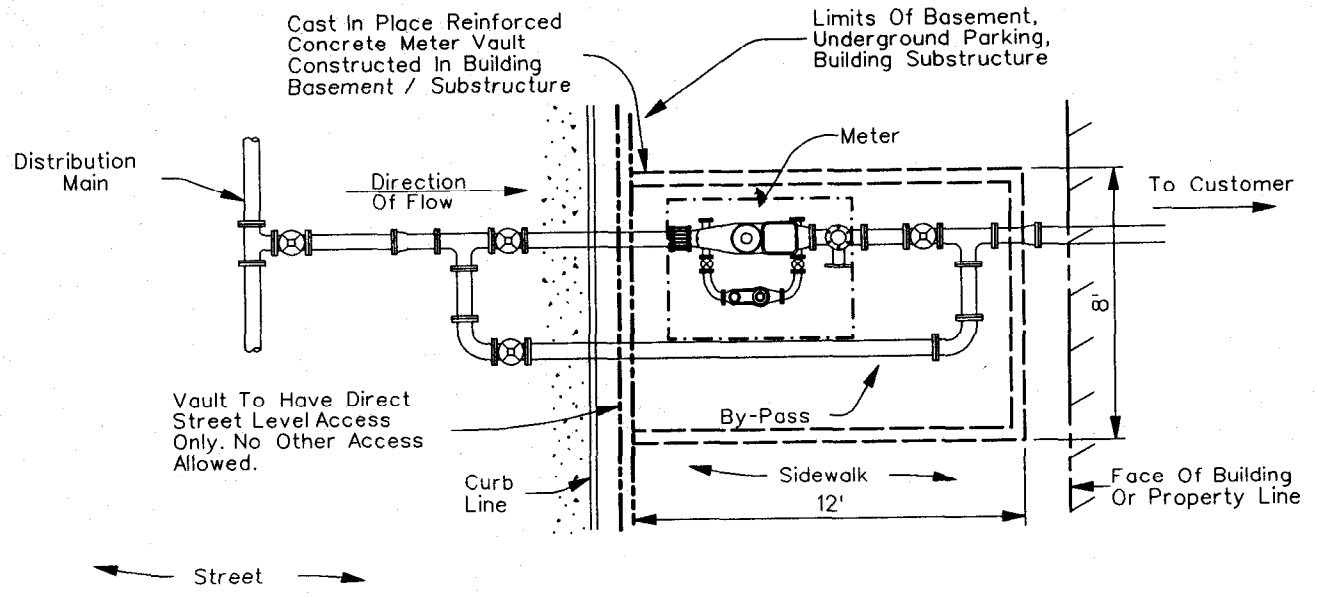
# GENERAL DESCRIPTIONS AND NOTES FOR SUSPENDED VAULT INSTALLATION

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.

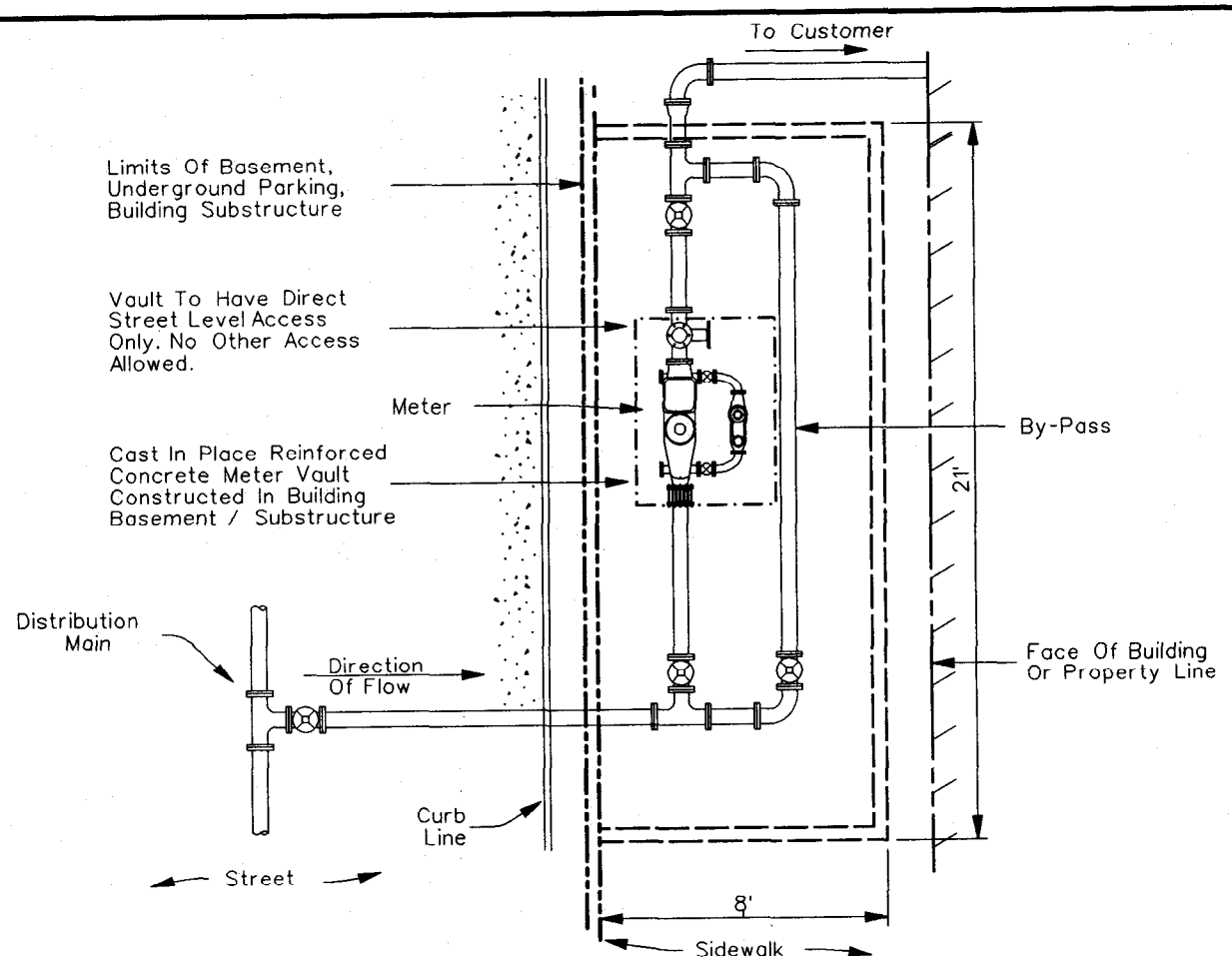
2.) The design of the cast-in-place reinforced concrete vault piping configuration and vault support system for the suspended vault installation is to be performed and sealed by a registered Professional Engineer at the expense of the Contractor or Developer. All plans are to be approved by Dallas Water 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.) 528 |
| | | DATE DEC.2001 | |



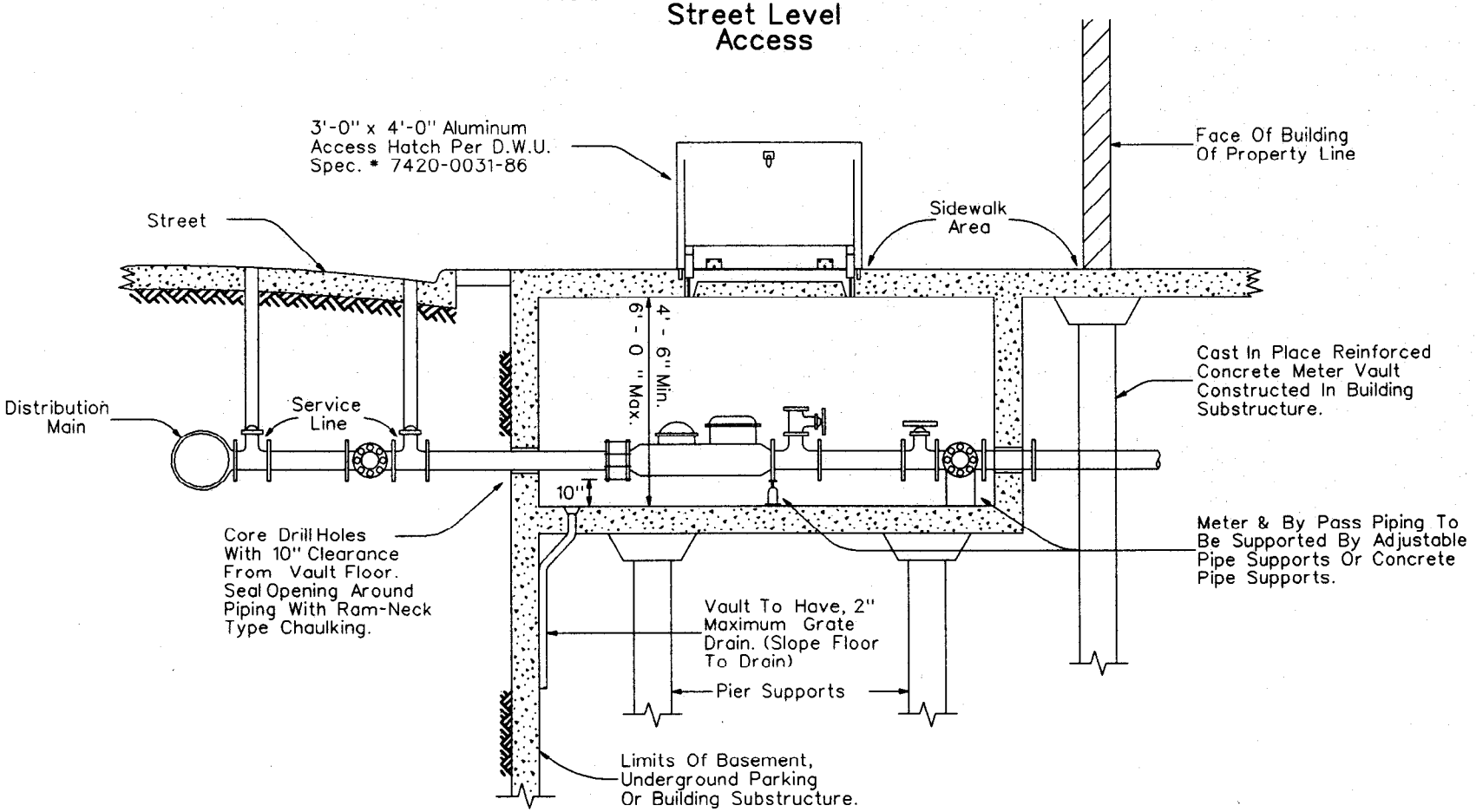

ALIGNED PERPENDICULAR TO DISTRIBUTION MAIN




ALIGNED PERPENDICULAR TO DISTRIBUTION MAIN

| SUSPENDED VAULT INSTALLATION DETAILS PLAN VIEWS | | DWU | (Page No.) 529 |
|---|---|---|---|
| | | DATE JUNE 2002 | |

# Meter Vault To Have Direct Street Level Access



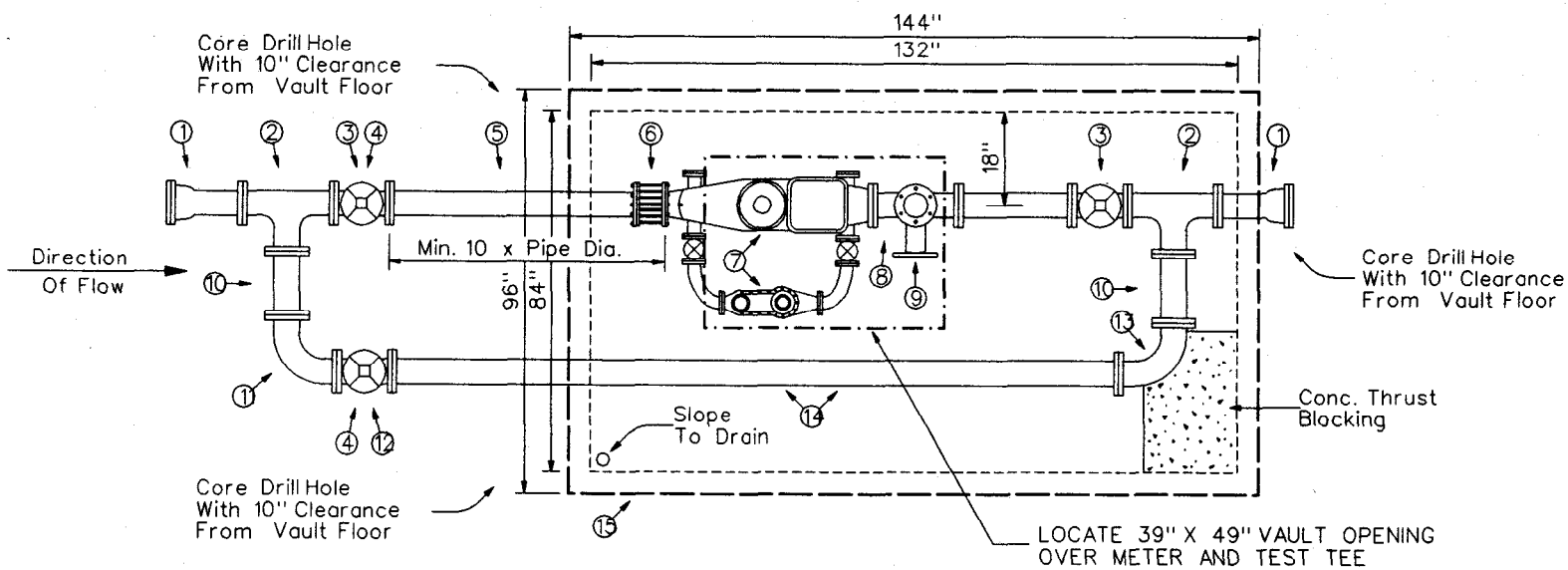

TYPICAL FOR ALL SUSPENDED VAULTS
(Combined Service, Perpendicular To Distribution Main Shown)

| SUSPENDED VAULT INSTALLATION DETAIL ELEVATION VIEW | | DWU | (Page No.) 530 |
|---|---|---|---|
| | | DATE JAN. '98 | |

| 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




Ref. 526 to 528

# TYPICAL SUSPENDED VAULT DETAIL METER PERPENDICULAR TO MAIN

DWU

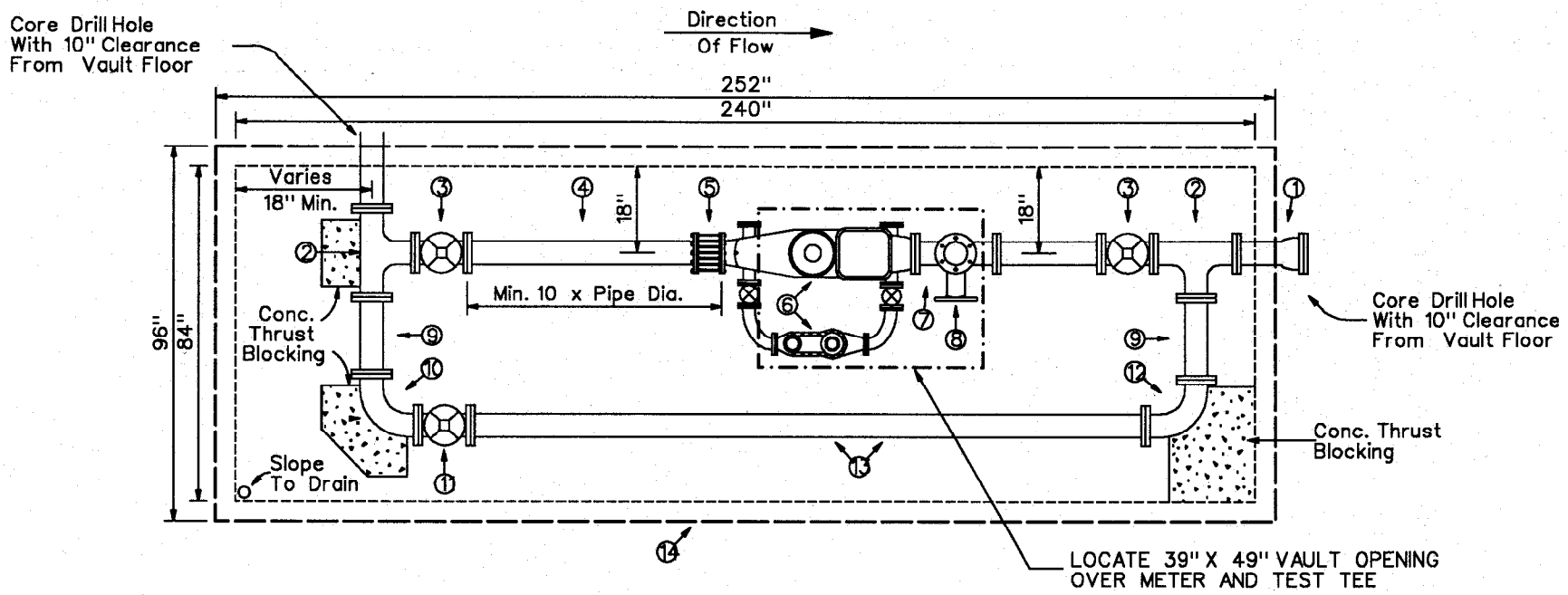
(Page No.) 531

DATE JUNE 2002

| 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




Ref. 526 to 528

# TYPICAL SUSPENDED VAULT DETAIL METER PARALLEL TO MAIN

DWU

(Page No.) 532

DATE JUNE 2002

# PART 6

( Series 600 )

# EROSION and SEDIMENT CONTROL

City of Dallas
Water Utilities Department

**EROSION & SEDIMENTATION**
(NCTCOG Division 1000)

Note: The erosion and sediment control drawings are not included with this set. They can be found in the NCTCOG's *Storm Water Quality Best Management Practices for Construction Activities* manual. Their drawing numbers in that manual are indicated in parenthesis. These drawings will be included in the upcoming *Public Works Construction Standards* document consisting of specifications and drawings.

| | | |
|---|---|---|
| 1010A | (2010A) | Straw Bale Dike |
| 1010B | (2010B) | Straw Bale Dike |
| 1020A | (2020A) | Silt Fence |
| 1020B | (2020B) | Silt Fence |
| 1030A | (2030A) | Interceptor Swale |
| 1030B | (2030B) | Interceptor Swale |
| 1040A | (2040A) | Diversion Dike |
| 1040B | (2040B) | Diversion Dike |
| 1050A | (2050A) | Triangular Sediment Filter Dike |
| 1050B | (2050B) | Triangular Sediment Filter Dike |
| 1060A | (2060A) | Rock Berm |
| 1060B | (2060B) | Rock Berm |
| 1070A | (2070A) | Stabilized Construction Fence |
| 1070B | (2070B) | Stabilized Construction Fence |
| 1080A | (2080A) | Sand Bag Berm |
| 1080B | (2080B) | Sand Bag Berm |
| 1090 | (2090) | Stone Outlet Sediment Trap |
| 1100 | (2100) | Sediment Basin |
| 1110 | (2110) | Pipe Slope Drain |
| 1120 | (2120) | Inlet Protection<br>*Filter Barrier* |
| 1130 | (2130) | Inlet Protection<br>*Block and Gravel* |
| 1140 | (2140) | Inlet Protection<br>*Wire Mesh and Gravel* |
| 1150 | (2150) | Inlet Protection<br>*Excavated Impoundment* |
| 1160A | (2160A) | Erosion Control Matting |
| 1160B | (2160B) | Erosion Control Matting |