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

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PART 2 – WATER MAIN CONSTRUCTION

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PART 1
(Series 100)

COMMON FOR WATER & WASTEWATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department
## PART 1
### COMMON FOR WATER & WASTEWATER CONSTRUCTION

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

When Bore\Tunnel Encounters Unstable
Soil Conditions, Encasement Pipe Or
TunnelLiner Plates Will Be Required

Access Pit

Face Of Access Pit

Carrier Pipe

Face Of Access Pit

All External Voids Shall Be
filled With Grout

LIMITS OF BY OTHER THAN OPEN CUT- SEE PLANS
This Portion To Be Installed By Boring, Jacking, Or Tunneling

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

Required Safety Distances
- Service Rd. (w/o Curb): 10 ft. (3.1 m.) Min.
- Service Rd. (w/ Curb): 5 ft. (1.5 m.) Min.
- Ramp: 20 ft. (6.1 m.) Min.

Existing High Volume Roads (Interstate Highways)
- Pavement Structure
  - Including Sub-Base: 30 ft. (9.1 m.) Min.

Normal Face Of Road
- Existing High Volume Roads
  - Service Rd. Or Ramp (Low Volume Service Road)
  - Including Sub-Base: 5 ft. (1.5 m.) Min.

- Normal Face Of Pavement Structure
  - Including Sub-Base: 30 ft. (9.1 m.) Min.

ENCASEMENT PIPE SPECIFICATIONS (See 104 & 105)

PLACE BY OTHER THAN OPEN CUT

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.
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.

REFER TO PAGES: 103 104 105 106 107 108 109

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

DATE
DEC. 2001

ITEM 6.6.2
Concrete Class Item 7.4.5.
TYPICAL FOR HIGHWAY CROSSING FOR WATER MAINS OVER 12in. (30.5cm.) DIAMETER

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.

2. In Tunnel Sections, Voids Between Earth Or Rock & Enc. Pipe Shall Be Filled With 2:7 Grout Including 5% Air Entrainment By Pressure Injection.

3. Carrier Pipe Shall Be Supported On A Continuous Class "B" (13,789.5 Kpa) Concrete Cradle, Within Corrugated Metal And Flange Liner Encasements.

4. When Standard Pipe Is Made Up Inside Larger Enc. Pipe, The Carrier Pipe Shall Be Laid To Grade On A Class "B" Concrete Embedment Which Shall Extend To The 1/4 Point Of The Diameter Of The Carrier Pipe. When Mechanical Joint Pipe Is Used As A Carrier Pipe In Larger Enc. Pipe, Precast Concrete Blocks May Be Placed Back Of Each Bell. Each Block Will Have Minimum Dimensions Of 9 in. (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.

5. Where Circumstances Necessitate The Excavation Of A Bore Pit Or Trench Closer To The Edge Of Pavement Than Set Forth On This Sheet, Guard Fence Or Other Approved Protective Devices Will Be Installed For The Protection Of The Traveling Public.

6. If Construction Site Is Wider Than Required Safety Distances And If Side Slopes Will Allow, Construction Of Bore Pits May Be Allowed (With Tx.D.O.T. Approval) But Access To Those Pits Must Be By Means Other Than Main Traffic Lanes.
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<th>2 FLNG. LINER H-20-L.L.</th>
<th>4 FLNG. LINER H-20-L.L.</th>
<th>CORRUGATED METAL</th>
<th>COUPLING BAND</th>
<th>R.C. CULVERT PIPE</th>
<th>STEEL PIPE</th>
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<tr>
<td></td>
<td>Ga. (mm.)</td>
<td>Ft. (M.)</td>
<td>Ga. (mm.)</td>
<td>Ft. (M.)</td>
<td>Ga. (mm.)</td>
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<tr>
<td>12&quot; (305.5)</td>
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<td>168</td>
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<td>15&quot; (38.1)</td>
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<tr>
<td>54&quot; (137.2)</td>
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<td>∞</td>
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<td>(2.66)</td>
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<td>∞</td>
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<td>(2.66)</td>
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<tr>
<td>66&quot; (167.6)</td>
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<td>∞</td>
<td>12</td>
<td>(2.66)</td>
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<td>∞</td>
<td>12</td>
<td>(2.66)</td>
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NOTE: 

a. Infinity

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

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

HIGHWAY CROSSING ENCASING PIPE, GAUGE, CLASS, COVER

DWU 104
DATE MARCH 2001

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<th>COUPLING BAND</th>
<th>R.C. CULVERT PIPE</th>
<th>STEEL PIPE</th>
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<td>Ga. (mm.)</td>
<td>Ft. (M.)</td>
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<td>28&quot;</td>
<td>(8.53)</td>
<td>22&quot;</td>
<td>(6.71)</td>
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**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.
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".
Encasement Pipe

Profile View

SECTION A-A

TUNNEL APPROACHES WITH CASING SPACERS

DWU 108
DATE DEC. 2001
**CASING SPACERS**

- Wooden Skids Strapped To Carrier Pipe With Steel Straps or Heavy Wire
- Notch Skids To Facilitate Strapping Operation And To Prevent Strap Or Wire Movement
- Skids To Run Length Of Pipe (With Exception Of Bell And Spigot Areas)
- Evenly Space Skids
  - 4 Skids For 12" Or Less Carrier Pipes
  - 6 Skids For Carrier Pipes Larger Than 12" to 20"
- Fill All Voids Between Carrier Pipe And Encasement Pipe With Grout.

**WOODEN SKIDS**

- Encasement Pipe
- Hold-Down-Jacks Minimum 2 Per Pipe Joint (See Fabrication Detail Pg 109A)
- FOR STEEL or R.C. ENCASEMENT PIPE
- Carrier Pipe Is To Rest On Bottom Of Encasement Pipe
- FOR FLANGED LINER PLATE or CORRUGATED METAL ENCASEMENT PIPE
- Carrier Pipe Is To Rest On A 6" Thick Concrete Pad.

**HOLD-DOWN-JACK**

**CARRIER PIPE SUPPORT (TUNNEL)**

<table>
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<th>DWU</th>
<th>DATE</th>
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<tr>
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</tbody>
</table>
ALL MATERIALS TO BE HOT DIPPED GALVANIZED AFTER FABRICATION

1/4" Steel Plate (Fabricate To Match I.D. Radius Of Encasement Pipe)

1 1/4" X 8" Std. Machine Bolt

1 1/4" Std. Nut (Adjusting Point For Hold-Down-Jack)

1 1/4" Heavy Steel Washer

2" Galv. Iron Pipe (Hold-Down-Jack Spacer, Length As Required For Installation Of Carrier Pipe In Encasement Pipe)

1 1/2" X 1" Galv. Iron Pipe (Centering Plug Welded To Base Plate To Secure Hold-Down-Jack Spacer)

1/4" Steel Plate (Fabricate To Match O.D. Radius Of Carrier Pipe)
PROPOSED NON-PRESSURE RATED WASTEWATER MAIN

STABILIZED SAND (MINIMUM 2.5 BAGS OF CEMENT PER CUBIC YARD OF SAND)

WATER MAIN

SECTIONAL PLAN VIEW

INITIAL BACKFILL OF CEMENT STABILIZED SAND (MINIMUM 2.5 BAGS OF CEMENT PER CUBIC YARD OF SAND)

SELECT BACKFILL AS WATER MAIN SPECIFIED ON PLANS

MIN. 18 FT CEMENT STABILIZED BACKFILL

CENTERED UNDER POTABLE WATER MAIN

SECTION A-A

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

NOTES:

FOR P.V.C. - FINE CRUSHED STONE
FOR V.C.T. - CRUSHED STONE OR ROCK CUTTINGS

3" MIN.
6" MIN. IN ROCK

PIPE O.D.

PROPOSED NON-PRESSURE RATED WASTEWATER MAIN

EMBEDMENT DETAIL FOR NON-PRESSURE RATED WASTEWATER MAINS BELOW WATER MAINS

DATE JAN.2001
PROPOSED NON-PRESSURE RATED WASTEWATER MAIN

Seal space between encasement pipe and carrier pipe with cement grout or with a manufactured seal to prevent soil migration into encasement pipe (required ea. end)

Carrier pipe to be supported within encasement pipe at five feet intervals with casing spacers, or supported with a washed sand cradle encompassing pipe to spring line of encasement pipe to be min. 150 P.S.I. pressure rated and two (2) nominal sizes larger than carrier pipe

SECTIONAL PLAN VIEW

Embedment and backfill as specified on plans

SECTION A-A

Encasement detail for non-pressure rated wastewater mains above water mains

DWU
DATE
DEC. 2001
SEAL SPACE BETWEEN ENCASEMENT PIPE AND CARRIER PIPE WITH CEMENT GROUT OR WITH A MANUFACTURED SEAL TO PREVENT SOIL MIGRATION INTO ENCASEMENT PIPE (REQUIRED EA. END)

CARRIER PIPE TO BE SUPPORTED WITHIN ENCASEMENT PIPE AT FIVE FEET INTERVALS WITH CASING SPACERS, OR SUPPORTED WITH A WASHED SAND CRADLE ENCOMPASSING PIPE TO SPRING LINE OF ENCASEMENT

ENCASEMENT PIPE TO BE MIN. 150 P.S.I. PRESSURE RATED AND TWO (2) NOMINAL SIZES LARGER THAN CARRIER PIPE

EMBEDMENT AND BACKFILL AS SPECIFIED ON PLANS

SECTION A-A

ENCASEMENT DETAIL FOR PROPOSED WATER MAINS BELOW WASTEWATER MAINS

DWU 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")
SELECT OR GRANULAR MATERIAL COMPACTED TO 90% OF STD. PROCTOR DENSITY.

CONCRETE CRADLE (CLASS "B" CONC.)

CLASS "A"

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

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

CLASS "A-1"

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

(REFER TO PAGE 112 FOR CALCULATION OF "Bd")
SELECT OR GRANULAR MATERIAL COMPACTED TO 90% OF STD. PROCTOR DENSITY

12" MIN. ABOVE PIPE BELL

VARIES

CLASS "B"
N.T.S.
L.F. = 1.9
E = 700

COMPACTED CRUSHED STONE, STD. GRADATION

CLASS "B+"
N.T.S.
BEDDING ANGLE 150°
L.F. = 1.9
E = 700

COMPACTED CRUSHED STONE, FINE GRADATION

CLASS "B-1"
N.T.S.

COMPACTED CRUSHED STONE, FINE GRADATION

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

DATE
FEB. 2009
COMPACTED SELECT OR GRANULAR MATERIAL COMPACTED TO 90% OF STD. PROCTOR DENSITY

12" MIN. ABOVE PIPE BELL

6" MIN. BELOW PIPE BELL

COMPACTED CRUSHED STONE FINE GRADATION

Bc

¾ Bc

CLASS "B-2"
N.T.S.

SAND COMPACTED TO 90% OF STD. PROCTOR DENSITY

12" MIN. ABOVE PIPE BELL

6" MIN. BELOW PIPE BELL

SAND, FINE GRADATION

Bc

CLASS "B-3"
N.T.S.

SAND, STD. GRADATION

Bc

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"
SELECT OR GRANULAR MATERIAL
COMPACTED TO 90% STD. PROCTOR DENSITY

GRANULAR MATERIAL COMPACTED TO
90% OF STD. PROCTOR DENSITY

CLASS "C"

N.T.S.
BEDDING ANGLE 75°
L.F. = 1.5
E' = 300

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. L.F. = 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")
SAND COMPACTED TO 90% STD. PROCTOR DENSITY.

CLASS "C-2"
N.T.S.

6" MIN. BELOW PIPE BELL
12" MIN. ABOVE PIPE BELL

CLASS "D++"
N.T.S.

SELECT MATERIAL COMPACTED TO 90% STD. PROCTOR DENSITY.

BEDDING ANGLE 30°
L.F. = 1.3
E' = 200

NOTES:
1. FOR MAINS 42" DIAMETER AND LARGER, \( \frac{1}{8} \) Bc SHALL BE TAKEN AS 6".
2. Bc = OUTSIDE DIAMETER OF PIPE BELL
3. Bd = TRENCH WIDTH
4. L.F. = 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")
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")
NOTES:
1. Bc = OUTSIDE DIAMETER OF PIPE BELL
2. Bd = TRENCH WIDTH
3. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

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

SELECT OR FINE GRANULAR MATERIAL COMPACTED TO 90% OF STD. PROCTOR DENSITY

COMPACTED CRUSHED STONE, FINE GRADATION
**OPTION**

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

**DETAILED SHOWN FOR CREEK CROSSING**
(TYPICAL FOR EMBANKMENT SLOPE PROTECTION)

- Ground Line -
- Design Station

**Stabilized Backfill & Rip-Rap Detail**
FOR EMBANKMENT SLOPE PROTECTION

**Dry Rip-Rap, Type "A"**
Construction Item 8.15.3.(a)
Material Item 2.1.6.

- Contour To Match Creek Channel
  (Or Slope of Embankment)
- 12'-Min.
- Stabilized Backfill
  Per C.O.G. Spec.
  6.2.10.(b)
- Stabilized Backfill
  Per C.O.G. Spec.
  6.2.10.(b)

- Proposed Water or Wastewater Main
- Proposed Embedment
  As Specified On Plans

**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 121
DATE DEC.2001
PART 2
(Series 200)

WATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department
PART 2
WATER MAIN CONSTRUCTION

TITLE

3/4" Water Service Installations (Sidewalk Adjacent to Curb) --- 201
1" Water Service Installations (Sidewalk Adjacent to Curb) --- 202
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SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

NOTE:
3/4" Service Lines To Have A Minimum Of 3' Separation.
**WATER MAIN IN STREET**

- **Taps On Mains As Per C.O.G. Specs., Item 6.7.3.(j):** Location Of Tap To Be At 45°. All Taps To Be Made With A.W.W.A Tapered Threads.
- **Bottom Of Plastic Meter Box**
- **Plastic Tape To Mark Deadhead Location**
- **REPLACEMENT MAINS:**
  - Contractor To Install New Deadhead In This Position.
  - Replace Meter Box, & Reconnect Service To Existing Meter.

---

**WATER MAIN IN PARKWAY**

- **Plastic Tape To Mark Deadhead Location**
- **1" Compression x F.I.P. Ball Valve**
- **Bottom Of Plastic Meter Box**
- **REPLACEMENT MAINS:**
  - Contractor To Install New Deadhead In This Position.
  - Replace Meter Box, & Reconnect Service To Existing Meter.

---

**SUBDIVISIONS (PRIVATE CONTRACTS)**

- Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

---

**NOTE:**

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

---

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

* See Page 206
Deadhead in this position, replace meter box, & reconnect service to existing meter.

Taps to be at 45°. Taps to be made with A.W.W.A tapered threads.

*3 Bars @ 24" O.C. (E.W.) & 4*3 Bars Diagonal @ Meter

Concrete sidewalk

Replacement mains:
Contractor to install new deadhead in this position, replace meter box, & reconnect service to existing meter.

Water main in street

WATER MAIN IN PARKWAY

1" water service installations (sidewalk 5' from curb)

NOTE:
1" service lines to have a minimum of 3' separation.
**WATER MAIN IN STREET**

*3 Bars @ 24" O.C. (E.W.) & 4-3 Bars Diagonal @ Meter

**REPLACEMENT MAINS:**
Contractor To Install New Deadhead In This Position, Replace Meter Box, & Reconnect Service To Existing Meter.

Taps On Mains As Per C.O.G. Specs., Item *6.7.3.(i).* Location Of Tap To Be At 45°. All Taps To Be Made With A.W.W.A Tapered Threads.

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

**1½" Or 2" WATER SERVICE INSTALLATIONS**
(SIDEWALK 5' FROM CURB)

**WATER MAIN IN PARKWAY**

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

**NOTE:**
1½" & 2" Service Lines To Have A Minimum Of 4' Separation.
Taps On Mains As Per C.O.G. Specs., Item *6.7.3.(j). Location Of Tap To Be At 45° Angle to the Horizon(Up). All Taps To Be Made With A.W.W.A Tapered Threads.

NOTE:
1) \( \frac{3}{4}'' \) & 1'' Service Lines To Have A Minimum Of 3' Separation.
2) 1\( \frac{1}{2}'' \) & 2'' Service Lines To Have A Minimum Of 4' Separation.

WATER MAIN IN STREET

WATER MAIN IN PARKWAY
THIS RISER SHALL BE AS NEAR AS PRACTICAL TO R.O.W. LINES, AT LEAST 6' BEYOND SHOULDER OF ROAD.

1/4" X 3/4" GALVANIZED STRAPS DRILLED TO D.I. PIPE

3' - 6''

NOTE:

30'' LARGE PLASTIC METER BOX

GROUND LINE

3/4'' X 3/4'' GALVANIZED STRAPS DRILLED TO D.I. PIPE

2'' BRASS SOIDER JOINT ELL

COMBINED AIR AND VACUUM GALLANIZED ELL

TREADHED GALLANIZED ELL

8'' BLIND FLANGE-DRILLED AND TAPPED FOR 2'' I.P. THREADS

INSULATED FLANGED CONNECTION ASSEMBLY

WATER MAIN

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.

N.T.S.

REFER TO PAGE 210

AIR RELEASE VALVE
TYPE "1"

DWU 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.

WARNING SIGN WITH TELEPHONE NUMBER ATTACHED BY STRAPS

1/4" X 3/4" GALVANIZED STRAPS DRILLED TO D.I. PIPE

THIS RISER SHALL BE AS NEAR AS PRACTICAL TO R.O.W. LINES, AT LEAST 6' BEYOND SHOULDER OF ROAD

NOTE:
2-Piece valves may be used on 4" and larger combination air valve

BLIND FLANGE, BORED-DRILLED AND TAPPED FOR VALVE ABOVE

FINISHED GRADE WHEN NOT IN EX. OR PROP. STREET

2-PIECE VALVES MAY BE USED ON 4" AND LARGER COMBINATION AIR VALVE

BLIND FLANGE, BORED-DRILLED AND TAPPED FOR VALVE ABOVE

PRECAST GRADE RINGS
PRECAST TOP

GROUND LINE

# 7 @ 12" O.C. - E.W. TOP

# 6 @ 12" O.C. - E.W. BOTTOM

RISING GRADE

COMBINED AIR AND VACUUM AIR VALVE FLANGE MOUNTING ON INLET SIDE

GATE VALVE WITH HAND WHEEL, FLG.x FLG.

INSULATED FLANGE CONN. ASSEMBLY

FLANGED OUTLET, STEEL BOLTS

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"

FINE CRUSHED ROCK POCKET ON CORNER (SEE TOP VIEW, PAGE 210)

CLASS "F" CONCRETE UNDISTURBED EARTH OR ROCK

32" P.V.C. DRAIN PIPE IF REQUIRED BY OWNER.
\textbf{AIR VENT}\n
\textbf{N.T.S.}\n
<table>
<thead>
<tr>
<th>AIR VALVE</th>
<th>GATE VALVE</th>
<th>FL.G. OUTLET</th>
<th>MIN. FITTING HEIGHT</th>
<th>VENT PIPE D</th>
<th>M.H. DIA.</th>
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\textbf{PLAN VIEW}\n
\textbf{N.T.S.}\n
\textbf{AIR RELEASE VALVE} \n\textbf{TYPE "2"}\n
\textbf{REFER TO PAGES 208, 209, & 211}
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>
<thead>
<tr>
<th>AIR VALVE SIZE</th>
<th>VALVE FITTING ASSEMBLY MIN. HEIGHT</th>
<th>MINIMUM REQUIRED DEPTH OF COVER</th>
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REFER TO PAGES 209 & 210

GENERAL NOTES
TYPE 2 AIR VALVE

DWU
DATE
JUNE 2002
HORIZONTAL GATE VALVE
WITH MANHOLE INSTALLATION

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

STD. 40" C.J. M.H. FRAME
AND COVER SEE PG.221

CLASS "F" REINFORCED
CONCRETE BASE

1" CURB STOPS
(TEST POINTS)

VALVE BONNET &
BOLTS SHALL BE
INSIDE MANHOLE

ECCENTRIC REDUCERS, IF REQUIRED, ARE
TO BE INSTALLED W/ STRAIGHT SIDE UP

CLASS "F" CONCRETE
SUPPORT BLOCK

1" I.P. THD. OUTLET
1" CORP. COCK
1" COPPER PIPING
(TEST POINTS
EACH SIDE)

CLASS "F" REINFORCED
CONCRETE BASE

12" MAX.

PAD EXTENSION FOR
BLOCKING UNDER
BY-PASS VALVE

INSTALL VALVES
W/ INSULATION
FLANGE KITS
SEE PG.223

CLASS "F" CONCRETE
SUPPORT BLOCK

12" MAX.

SEAL BROKEN OUT
PORTION OF MANHOLE
W/ BRICK AND MORTAR.
COAT INSIDE & OUTSIDE
W/ NON-SHRINK GROUT

12" MAX.
OPTIONAL BLOWOFF WITH MANHOLE
(AS SPECIFIED ON DESIGN PLANS)

CLASS "F" REINFORCED CONCRETE BASE

STD. 32" C.L. M.H. FRAME AND COVER SEE PG.222

90° BASE BEND
M.J. W/RETAINER GLAND X FLG. & BLIND FLANGE (UP)
CONNECTOR-ADAPTOR FLG. X M.J. W/ RETAINER GLAND

PIPE P.E. X P.E.

4" DIA. PRECAST MANHOLE

CLASS "F" REINFORCED CONCRETE BASE

NON-BLOWOFF INSTALLATIONS

GATE VALVE FLG. X FLG.
TEE FLG. X FLG.
INSTALL BLIND FLANGE PLUG
PIPE FLG. X P.E.
SOLID SLEEVE M.J. X M.J. W/ RETAINER GLAND
PIPE FLG. X P.E.
90° BEND FLG. X FLG.

GATE VALVE FLG. X FLG.
PIPE JOINT

FLG. OUTLETS WITH FLANGE INSULATION KITS. SEE PG. 223 (EACH SIDE)

INSTALL BUTTERFLY VALVE W/ INSULATION FLANGE KITS SEE PG.223

1" CURB STOPS

SEAL BROKEN OUT PORTION OF MANHOLE W/ BRICK AND MORTAR, COAT INSIDE & OUTSIDE W/ NON-SHRINK GROUT

CLASS "F" REINFORCED CONCRETE BASE

INSIDE OF M.H. TO FLUSH WITH OUTSIDE OF FLANGE

STD. 40" C.L. M.H. FRAME AND COVER SEE PG.221

6" DIA. PRECAST MANHOLE

BUTTERFLY VALVE WITH MANHOLE INSTALLATION

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

DWU

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.)

DATE
JUNE 2002

216
Concrete Slab, Size As Required By Size Of Valve. (Class "F" Conc.)

Standard Precast Manhole (See Note #4 Page 216)

1" I.P. Threaded Outlet & 1" Corp. Cock

1" Copper Pipe To Be Laid Close To Valve Body

By-Pass Valve See Pages 212 & 213 For Conc. Support

Backfill 12" Around Valve Body & Tapping Sleeve W/Cement Stabilized Sand @ 2 Sacks Per Cubic Yard or As Noted On Plans.

Cement / Mortar Coating For Protection Or Tapping Sleeve Assembly

Seal Broken Out Portion Of Manhole W/ Brick And Mortar. Coat Inside & Outside W/ Non-Shrink Grout

Prop. Water Main

1" Curb Stop

By-Pass Valve See Pages 212 & 213 For Conc. Support

Backfill 12" Around Valve Body & Tapping Sleeve W/Cement Stabilized Sand @ 2 Sacks Per Cubic Yard or As Noted On Plans.

Cement / Mortar Coating For Protection Or Tapping Sleeve Assembly

Seal Broken Out Portion Of Manhole W/ Brick And Mortar. Coat Inside & Outside W/ Non-Shrink Grout

Existing Water Main

1" Copper Pipe

Valve Actuator

Valve

Actuator

Break Concrete From The Side Of Precast Manhole Such That It Will Not Impose Any Dead Load On The Top Of The Existing Water Main, The New Water Main, Or The Tapping Valve.

Refer To General Notes For Large Valves With Manholes - Page 216

Large Tapping Valve Installation

DWU 217

Date Dec. 2002
OPERATING NUT RISER
(For Large Valve Installations)

6" MAXIMUM WITHOUT
OPERATING NUT RISER
EXTENSION LENGTH VARIES

TRENCH JACKS

2½" X 2½" CROSS

1½" DIA. PIPE WITH
½" WALL THICKNESS

2½" X 2½" X 2½"
SQUARE STOCK WITH
2" X 2" INSIDE CAVITY
PER AWWA SPECS.
• C 500

SECURE JACK WITH
¾" STAINLESS STEEL
BOLT ANCHORS INTO
M.H. WALL

ADDITIONAL BRACING REQUIRED EVERY 8 FT.

ADDITIONAL BRACING REQUIRED
FOR EVERY EIGHT (8) VERTICAL
FEET OF OPERATING NUT RISER
Remove Valve Cover Lid

Remove Valve Cover


BackFill Valve Stack With Min. 2 Sack Conc. Mix Or Sand

Existing Wood Block Spacers

Top Of Existing Pavement, Soil, Or Prop Pavement

Valve Stack

Remove Valve Stem Extension If Equipped

Existing Valve (To Remain)

NOT IN PAVEMENT
Match Existing Soil & Compact As Needed Or As Required By Construction Inspector.

IN PAVEMENT

4" to 16" GATE VALVE ABANDONMENT
Install Valve Cover Assembly Centered Over Valve Stack And Flush With Grade Surface.


6" Valve Stack To Be One Continuous Pipe Joint

Extension Stem to Be Fabricated So That Its Operating Nut Is Set 12" Below Finished Surface Grade.

Valve Extension Stem To Be Centered In Valve Stack.

Gate Valve

If Valve Operating Nut Is More Than 7' Below Surface Level, Then Extension Stem Must Be Installed.

Install 2" Thick Wooden Blocks Or Neoprene Bonnet To Valve Stack Spacers (VALVE STACK IS NOT TO REST DIRECTLY ON VALVE BODY OR VALVE BONNET)
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.
 SECTION THRU COVER

PLAN

SECTION THRU FRAME

STANDARD 40" MANHOLE
FRAME AND COVER
INSULATING MATERIAL (KIT)

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

R.C.C.P. FLANGED PIPE JOINT

FLANGED VALVE OR OTHER FLANGED FITTING

DETAIL "A"

ALL FLANGE BOLTS & FLANGES TO BE COVERED WITH CEMENT MORTAR AT LEAST \( \frac{1}{2} \)" THICK, UNLESS NOTED OTHERWISE ON DESIGN PLANS OR OTHER SPECIFIC INSTALLATION DETAILS

REINFORCED CONCRETE CYLINDER PIPE

BUTTERFLY VALVE ASSEMBLY W./M.H.

EXTERIOR CEMENT MORTAR APPLIED WITHIN STEEL BANDED AND FABRIC WRAPPER (DIAPER). THE WET MORTAR MIX IS TO BE POURED INTO TOP SIDE OF WRAPPER OPENING UNTIL MORTAR HAS advanced COMPLETELY AROUND PIPE JOINT.

PIPE BONDING STRAP TO BE TUCKED INTO JOINT AND COMPLETELY COVERED WITH MIN. \( \frac{1}{2} \)" THICK MORTAR COAT

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

DATE DEC. '2002

DWU 223
Install:
1 - 6'' F.H. Tee
1 - 6'' Valve
1 - F.H.

Install:
1 - ? x 6'' Tee, B.B.F.
1 - 6'' Valve, F.M.J.
1 - F.H.

Install:
1 - ? x 6'' Tee, B.B.F.
1 - 6'' 90º Bend
1 - 6'' Valve, F.M.J.
1 - F.H.

ELEVATION VIEW OF FIRE HYDRANT

GENERAL NOTES
1. Ø 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.

METHODS FOR SETTING FIRE HYDRANTS
45° Bend With Retainer Glands and Class "B" Concrete Thrust Blocking As Required.

Embedment As Specified In Plans

Prop. Main

Abandon In Place

Ex. Water

Solid Sleeve

Nipple

45° Bend With Retainer Glands and Class "B" Concrete Thrust Blocking As Required.

I.D. + 10 ft. Min.

Pipe Material As Specified on Plans

STANDARD WATER MAIN LOWERING

DWU

DATE

APRIL 2001
6" D.I. Post For Bracing Test Station

Leave Slack 2 ft. Of Conductor Coiled In Enclosure.

Hoffman-A8R84 Enclosure (8"x8"x4"
N.E.M.A. Type 3R Enclosure) With Screw Fastening Cover Mount To Post

1" Rigid Galv. Conduit Secure To Post With 2- Conduit Straps

No. 10 A.W.G. Single Strand Conductor Type R.H.W. Insulation With Neoprene Jacket. Connect To Nearest Spigot

See Page 228 For Connection Detail

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 INSIDE MANHOLE TYPE I

Leave Slack 2ft. Of Conductor Coiled In Enclosure. (8"x8"x4" N.E.M.A. Type Y3R Enclosure) With Screw Fasting Cover. Mount To Post.

No. 10 Conn. Wire

1-1/2" PVC. Conduit

Manhole Wall

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

NOTE: Contract To Provide Drainage At Manhole

3/8"- 10 Chat Pocket On corner

4" PVC. Drain Pipe At Construction Engineer Option

RCCP. Water Pipe

Conn. Cradle

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

TEST STATION IN METER BOX TYPE II

Leave Slack 2ft. Of Conductor Coiled In Enclosure. (8"x8"x4" N.E.M.A. Type Y3R Enclosure) With Screw Fasting Cover. Mount To Post.

No. 10 Conn. Wire

1-1/2" PVC. Conduit

Receptacle W/W.P. Cover Bolt To Pull Box

Ex. Ground

Pavement

No. 10 Conn. Wire

Small Plastic Meter Box & DLid

1-1/2" PVC. Conduit

Crushed Rock 3 cu. ft.

2"x6" Treated Wood Post

RCCP. Water Main

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

NOTE: Contract 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.
Apply 2 Layers Of 600V. Electrical Heat Shrink Tape From Base Of Weld Of Spigot To A 6" Overlap Of Conductor Insulation And Jacket.

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
HORIZONTAL THRUST BLOCK AT PIPE BEND

PLAN
N.T.S.

SECTION X-X
N.T.S.

REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

HORIZ.
T.S.

DEC.2001

DWU 229
### TABLES OF DIMENSIONS AND QUANTITIES

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**HORIZONTAL THRUST BLOCK AT PIPE BEND**

**DWU** 230

**DATE** DEC.2001

**REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234**
### TABLES OF DIMENSIONS AND QUANTITIES

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REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

HORIZONTAL THRUST BLOCK AT PIPE BEND

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(Page No.) 231
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REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

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HORIZONTAL THRUST BLOCK
AT TEES AND PLUGS

DWU 232
DATE DEC.2001
VERTICAL THRUST BLOCK AT PIPE BEND

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VERTICAL THRUST BLOCK - PAGE 234

REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234
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. Dimensions may be varied as required by field conditions where and as directed by the inspector. The volume of concrete blocking shall not be less than shown in tables.

7. The calculations are 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

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DEC.2001
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Slope To Drain

Fill With Class "B" Concrete W/ Domed Top

6" D.I. Pipe
Clean Metal And Apply
1 Coat Of Primer And
2 Coats Of Yellow Paint
To Visible Surfaces

Install Expansion Joint Sealing Compound At Concrete Penetrations

12" Dia. Class "B" Concrete Base

Ex. Grade

STEEL GUARD POST DETAIL

DWU 236

DATE OCT.'99
Install: 4 - 6" Dia. Steel Guard Posts Spaced 4'-6" Apart (Equal Distance From F.H.) See Page No. 235

GUARD POST PROTECTION FOR FIRE HYDRANTS
DETAIL FOR METER VAULTS

Install: 4-6" Diameter D.I. Guard Posts. See Page 235

DETAIL FOR METERS 2" AND SMALLER

Install: 2-6" Diameter D.I. Guard Posts. See Page 235
PART 3
WASTEWATER MAIN CONSTRUCTION

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MANHOLE UNDER PROPOSED PAVING WITHIN STREET R.O.W.
(IN ADVANCE OF PROPOSED PAVING IMPROVEMENT PROJECTS)

SET IN ADVANCE OF PROPOSED PAVING

PROP. TOP OF CURB

M.H. FRAME & COVER SIZE AS SPECIFIED ON PLANS

FINISHED GRADE

SET MANHOLE FRAME & COVER TO FINAL GRADE (NON ADVANCE OF PROPOSED PAVING AREAS).
See General Note *1 Pg. 302

½" NON SHRINK GROUT COATING

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

INTERNAL CHIMNEY SEAL

USE O-RING RUBBER GASKET (TYP.)

APPROVED RESILIENT PIPE-TO-MANHOLE CONNECTOR OR GASKET

PIECE STUBOUTS TO BE A MINIMUM OF 5 FT. LONG, AND FOR MANHOLES W/PRECAST BASES,
THE PIPE IS TO BE SUPPORTED BY THE PIPE EMBEDMENT AS SPECIFIED ON PLANS

SET BASE RISER WITH "BELL/BUTT END" INTEGRATED INTO THE CONCRETE POUR FOR M.H. BASE, BRUSH THE BASE RISER RING WITH CONCRETE BONDING AGENT

APPROVED RESILIENT PIPE-TO-MANHOLE CONNECTOR OR GASKET

CLASS "F" CONCRETE BASE AND CRADLE. See General Note *5 Pg. 302

CAST-IN-PLACE OPTIONAL BASE DETAIL

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE PRECAST

DWU

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 constructed with pipe to manhole connectors as per detail on page 310, or with a connector as approved by the DWU construction superintendent.

7) False manhole bottoms are required on all advance of paving projects. They shall be constructed, installed, and removed in accordance with details and instructions on page 311.
FOR CONSTRUCTION OF MANHOLES IN ADVANCE OF PROPOSED PAVING PROJECTS, See Detail On Pg. 301 & General Note *4 On Pg. 302.

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

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

CLASS "F" CONCRETE MONOLITHIC POUR

7" MIN. FROM TOP OF PIPE

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

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE CAST-IN-PLACE

DWU 303

DATE FEB. 2009
CONCRETE CONE ↔ ROOF OPTIONS ↔ REINFORCED CONCRETE SLAB

MANHOLE DETAIL

APPROVED RESILIENT PIPE-TO-MANHOLE CONNECTOR OR GASKET

FIRST MAIN LINE JOINT TO BE A MIN. OF 6' LONG, WITH CONC. CRADLE (POURED CONTIGUOUS WITH CONC. BASE) AND UNDER ENTIRE JOINT
See General Note 5 On Pg. 302

CONNECTION DETAIL

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

ROOF STEEL LAYOUT

TRANSITION DETAIL FOR 5' & 6' DIA. M.H.'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
TURBINE VENTILATOR—FIBERGLASS OR ALUMINUM WITH NYLON BUSHINGS

12 GAUGE STAINLESS STEEL STRAPS

6" P.V.C. SDR-35 PIPE

6" DIAMETER TREATED SUPPORT POLE.

APPROVED RESILIENT PIPE-TO-MANHOLE CONNECTOR OR GASKET.

HEIGHT TO BE 2' ABOVE 100 YEAR FLOOD PLAIN OR 6', WHICHEVER IS GREATER

WASTEWATER MANHOLE VENTED
MANHOLE TYPE AS SPECIFIED ON PLANS

GAS SEALED DROP CONNECTION
N.T.S.

STANDARD DROP CONNECTION
N.T.S.

REVERSE 45° WYE ONLY

FLAP GATE OR REMOVABLE CAP AS SPECIFIED ON PLANS

REVERSE 45° WYE ONLY

45° BEND

GRANULAR MATERIAL

6" MIN.

CLASS "F" CONCRETE

4" MIN.

90° LONG RADIUS BEND

CLASS "F" CONCRETE

12" MIN.

ROCK FOUNDATION

CLASS "F" CONCRETE BASE 12" THICK

GEOTEXTILE LINER MATERIAL

SEE GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302
MANHOLE TYPE-AS
SPECIFIED ON PLANS

INSIDE DROP CONNECTOR
"RELINER-DURAN "A" DROP BOWL"
OR APPROVED EQUAL

ROCK FOUNDATION

GEOTEXTILE LINER
MATERIAL

1/2" WIDE STAINLESS STEEL
PIPE STRAPS ANCHORED IN
CONCRETE WALL AT 4' MAX. SPACING
WITH MIN. OF 2 PER PIPE JOINT

TOP OF 90° BEND TO BE
PLACED LEVEL WITH TOP OF
MANHOLE DISCHARGE LINE, UNLESS
NOTED OTHER WISE ON PLANS.

12" MIN.

EROWE

PLAN

SEE GENERAL NOTES
FOR WASTEWATER MANHOLE
CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE
INSIDE DROP CONNECTION

DWU 308

DATE
JAN.2001
FORM MANHOLE BOTTOM TO SLOPE
SEE INVERT DETAILS PAGE 309A

MANHOLE FOOTING

MANHOLE WALL

FLOW

1:12 (TYP.)

3" R.

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

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

SEE INVERT BENCH DETAILS PAGE 309A

SECTION A-A
N.T.S.

WASTEWATER MANHOLE
INVERT INTERSECTION DETAIL

Page No. 1

DWU 309
DATE DEC. 2001
d - PIPE DIAMETER

\[ \frac{1}{2} d \]

FOR PIPE SMALLER THAN 15" IN DIAMETER

d - PIPE DIAMETER

\[ \frac{3}{4} d \]

FOR PIPE FROM 15" TO 24" IN DIAMETER

d - PIPE DIAMETER

FOR PIPE LARGER THAN 24" IN DIAMETER

WASTEWATER MANHOLE INVERT BENCH DETAIL

DWU 309A

DATE
JAN. 2001
DIMENSION FOR MANHOLE PIPE CONNECTOR A.S.T.M. C-923

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<td>4&quot; - 6&quot;</td>
<td>1 1/2&quot;</td>
<td>7/8&quot;</td>
<td>3/8&quot;</td>
<td>10°</td>
<td>0.10 ±</td>
</tr>
<tr>
<td>8&quot; - 21&quot;</td>
<td>2 1/8&quot;</td>
<td>1 3/8&quot;</td>
<td>5/8&quot;</td>
<td>10°</td>
<td>0.10 ±</td>
</tr>
<tr>
<td>24&quot; - 60&quot;</td>
<td>2 3/8&quot;</td>
<td>1 3/4&quot;</td>
<td>3/4&quot;</td>
<td>10°</td>
<td>0.25 ±</td>
</tr>
</tbody>
</table>

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

DATE
DEC.2001
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

NYLON ROPE HANDLES

$\frac{3}{4}$" PLYWOOD

METAL STRAP HINGES (MIN. 3" LONG) W/BOLTS

$\frac{5}{8}$" HOLE FOR $\frac{1}{2}$" NYLON ROPE HANDLES

$\frac{3}{8}$" HOLES FOR $\frac{1}{2}$" NYLON ROPE HANDLES

D - INSIDE DIAMETER OF MANHOLE

PLAN VIEW

WASTEWATER MANHOLE FALSE BOTTOM

DWU 311

DATE
DEC. 2001
1 1/2" LETTERS, TYP (RECESSED FLUSH)
(4) 1/2"-13 X 2" LG. SS HEX HEAD BOLTS W/ STL AND RUBBER WASHERS
1/2" LETTERS (RECESSED FLUSH)
(2) PICKBARS
(6) 1 1/8" DIA. BOLT HOLES ON 37" DIA. BOLT CIRCLE

COVER SECTION
32"
1 1/2"
1/4" DIA. NEOPRENE GASKET
33 3/16"
32 3/16"
1 9/16"
4 1/2"
30"
33 7/8"
40 3/4"

FRAME SECTION
EON LOCK® OR EQUAL POCKETS FOR 1/2"-13 SQ NUT ON A 29 3/8" DIA. B.C. (TYP)

PICKBAR DETAIL
3 3/4"
1 3/4" R
1" DIA. H.R.S. ROD

FRAME BOLTING DETAIL

32" PRESSURE TYPE
CAST-IRON MH. FRAME & COVER
NOTE: For seal between frame and cover use either 0" thick copper gasket or 0" diameter neoprene "O"-ring. Location of the "O"-ring is left to the manufacturer, but subject to approval by DWU Construction Engineer.

PLAN

WASTEWATER

INDEX NOTCHES - Engraved into the Casting 0.6" Deep

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 314
DATE DEC. 2001
Machined Bearing Surface

SECTION THRU COVER

1/2" Letters 1/4" Raised
(8) 1/4" Dia. Anchor Holes
3/8" Wide x 1/4" Deep Grooves
0 1/2" O.C.
See Pickbar Detail

WASTEWATER

SECTION THRU FRAME

PLAN
421/4"

Machined Bearing Surface

STEEL ROD

1/8" R.
23/8" R.

PICKBAR DETAIL

RING & COVER MATERIAL PER ASTM A48 CLASS 35B MIN.
GRAY IRON CASTINGS.

STANDARD 40" MANHOLE
FRAME AND COVER

DATE
DEC. 2001
OUT OF PAVEMENT

EX. M.H. FRAME & COVER TO BE REMOVED & SALVAGED
RESTORE SURFACE WITH TOP SOIL AND BLOCK SOD.

REMOVE TOP PORTION OF M.H. FOR 2' MINIMUM CLEARANCE FROM SURFACE OF EXISTING PAVEMENT, GROUND, OR PROPOSED PAVEMENT (WHICHEVER IS GREATER)

EXISTING PAVEMENT

EX. M.H. FRAME & COVER TO BE REMOVED & SALVAGED PAVING TO BE REPAIRED AS PER P.W.&T. PAVEMENT CUT AND REPAIR STANDARDS

SAND AND/OR GRAVEL COMPACTED TO 90% (95% IN PAVEMENT) OF THE MAXIMUM STANDARD PROCTOR DRY DENSITY AS PER STD. SPEC. ITEM 6.2.9.(b)(2)

PLUG WITH CLASS "B" CONCRETE

EXISTING CONC. BASE

TO BE PLUGGED PRIOR TO POURING CLASS "B" CONCRETE.

CLASS "B" CONC. TO A POINT ABOVE TOP OF PIPE.

TO BE PLUGGED PRIOR TO POURING CLASS "B" CONCRETE

EXISTING WASTEWATER MAIN

EXISTING WASTEWATER MAIN

ABANDONMENT OF MANHOLE IN OR OUT OF PAVEMENT

DATE

DEC. 2001
CLEANOUT CASTING OPENING TO BE INSTALLED CENTERED OVER THE CENTERLINE OF THE CLEANOUT STACK EXTENDED TO GROUND LEVEL.

CLASS "B" CONCRETE
2'-6" X 2'-0" X 6"
FOUNDATION

22 1/2 ° BEND
CLASS "B" CONCRETE

FOR EARTH DITCH:
USE CLASS "C" EMB. FOR CLAY PIPE
USE CLASS "B-1" EMB. FOR P.V.C.
FOR ROCK DITCH:
CLASS "A" EMB.

1ST. JOINT FROM 22 1/2 ° BEND TO BE A REDUCER TO 6" IF MAIN IS LARGER THAN 6".

PROFILE VIEW
N.T.S.

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

SECTION "X - X"
N.T.S.

WASTEWATER MAIN
CLEANOUT

DWU
317

DATE
JAN.2001
CAST IRON C.O. CASTING
FOR WASTEWATER MAINLINE

DATE
JAN. '98
KEY:
1. WASTEWATER 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 UTILITIES 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. SUBSTITUTE 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.
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.
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 CONNECTIONS
IN EARTH & IN ROCK

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.
LATERALS TYPES

TYPE I
1% to 10%

TYPE II
10% to 30%
11 1/4 bend
2' Min.

TYPE III
30% to 50%
22 1/2 bend
2' Min.

TYPE IV
(Deep Cut Connection)
1% to 10%
2-22 1/2 bend
Example:
Vertical Depth=5'/2''
Horizontal Distance=14'/2''
Use Lateral Type III As Shown Above

LATERAL APPLICATION SCHEDULE

DWU

DATE
JAN. '98
DEEP CUT CONNECTION

I - Note! Clean out as per Page 318 to Ground Surface

DEEP CUT CONNECTION

Class "B" Conc.

Class "B" Conc.

DEEP CUT CONNECTION

W / C. O.

Sewer Main Embedded As Per Plans

SEC. "A-A"

Wye, Or Double Wye As Req'd

Capped

24" Min.

Sand Backfill

1 - Joint

Sewer Pipe

Class "B" Conc.

Class "B" Conc.
PROPOSED PAVEMENT

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

WASTEWATER LATERAL STUBOUT

N.T.S.

WASTEWATER LATERAL STUBOUT

DWU
326

DATE
JAN '98
USE PRECAST CONCRETE GRADE RINGS AND NON SHRINK GROUT AS NECESSARY TO SET MANHOLE FRAME AND COVER TO FINAL GRADE. See General Note #10 on Page 302.

1/2" NON SHRINK GROUT COATING

4" OVERLAP

INTERNAL CHIMNEY SEAL

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

DATE
MARCH 2001
Cut as Required for 6, 8, 10, 12 inch PVC Along Cutting Groove

Gasket
Riser Pipe
Plug

DETAIL A

18" P.V.C.
SDR 35
Water Tight Adaptor
Clay to PVC

Water Tight Adaptor
PVC to PVC for PVC Pipe
Clay to PVC for Clay Pipe

Alternate Connection
May Be Made With A
Manufacturers Trapped Gasket

DETAILED NOTES

Standard DWU Cast Iron M.H. Frame & Cover as per Page 312

Clearance: 4" Min.
8" Max.

Ex' Ground

Water Tight Plug

Two Concrete Grade Rings
(Minimum) and Non-Shrink Grout

18" P.V.C. PIPE
ASTM D 3034
(SDR 35)

Undisturbed Soil

Sand or Stabilized Soil
Compacted to 95% Std.
Proctor Density and Placed in
6-inch Lifts

Beginning at the Wastewater Access Device Working Outward to the Excavation Walls

Cross Link High Density Polyethylene Access Fitting or Linear Low Density Polyethylene

Compacted Crushed Stone, Fine Gradation

Equal to Pipe Embedment

UNDISTURBED SOIL

26"

6" Min.

UNDISTURBED SOIL

WASTEWATER ACCESS DEVICE

DWU
328

DATE
OCT. '99
**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.


E. 1/2" 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.
PART 4
(Series 400)

WATER & WASTEWATER
ADJUSTMENTS
# PART 4
## WATER AND WASTEWATER ADJUSTMENTS

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<td>403</td>
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<td>416</td>
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</table>
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 with non-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.
FIGURE 1 EXISTING MANHOLE
1. Install 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.
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 12" 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.
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.
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.

2. Cut the existing laterals 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.
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 lateralis 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.
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.
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
SET THE NEW METER BOX IN THE CENTERLINE OF THE PROS. NEW WALK, SET THE METER BOX AT THE EXISTING GROUND ELEVATION. IT WILL BE RAISED TO GRADE DURING PAVING OPERATIONS.

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.

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
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.
NOTES:

1. All materials must be new.

2. Install new service with a minimum clearance of 1 foot below excavation of trench for proposed storm sewer and a minimum of 1 foot clearance from edge of trench excavation when service is installed laterally along proposed storm sewer.

3. Minimum bending radius or copper shall be 6 times the 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 be installed under proposed storm sewer excavation.

5. Bend angle is not to exceed 45° for any bend in new copper service line.
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.
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"

- **Class "B" Concrete Encasement**
- **Flowable Backfill or Crushed Rock/Gravel**

**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.

---

**WASTEWATER MAIN UNDERCUT BY PROPOSED STORMWATER MAIN**

<table>
<thead>
<tr>
<th>P.V.C. Pipe Item</th>
<th>DWU</th>
<th>Date</th>
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<tbody>
<tr>
<td>2.12.14.</td>
<td>413</td>
<td>DEC.2001</td>
</tr>
<tr>
<td>Concrete Class Item</td>
<td>7.4.5</td>
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</table>
Encasement Protection For Wastewater Mains
Under Proposed Storm Sewers Where Vertical Clearance Is Less Than 0.5' (To Be Installed By Public Works Storm Sewer Contractor).

Pressure Rated 6" Min. Wastewater Coupling

SECTION "A-A"

Existing Wastewater Main
Class "B" Concrete Encasement

Pressure Rated Wastewater Coupling

Where Sleeve Is Undercut, Backfill With Crushed Rock Or Gravel

Size & Length As Required
Remove Exist. Pipe And Replace With SEE NOTE 1 Pipe Inside Encasement Pipe

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.

ENCASEMENT PROTECTION FOR WASTEWATER MAIN

Steel Pipe Item 2.12.9.
D.I. Pipe Item 2.12.8.
Concrete Class Item 7.4.5.

DWU 414
DATE DEC.2001
Break Holes In Storm Sewer To Allow Installation Of Encasement With Wastewater Main To Grade. Seal Breakouts With Non-Shrink Grout To Insure Watertight Seal.

Pressure Rated Wastewater Coupling

6" Min.

With Crushed Rock Or Gravel

Size & Length As Required
Remove Exist. Pipe And Replace
With SEE NOTE 1 Pipe Inside Encasement Pipe

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.

WASTEWATER MAIN PASSING THROUGH STORM WATER MAIN

(see note 1)
Break Holes In Storm Sewer To Allow Installation Of Encasement With Wastewater Main To Grade. Seal Breakouts With Non-Shrink Grout To Insure Watertight Seal.

Encasement Pipe To Be Min. 150 P.S.I. Pressure Rated Steelor Class 52 D.I. Pipe And Two (2) Nominal Sizes Larger Than Carrier Pipe

Pressure Rated Wastewater Coupling

Existing Wastewater Main

Where Sleeve Is Undercut, Backfill With Crushed Rock Or Gravel

Size & Length As Required Remove Exist. Pipe And Replace With SEE NOTE 1 Pipe Inside Encasement Pipe

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
PART 5
(Series 500)

4" and LARGER WATER SERVICE INSTALLATIONS

City of Dallas
Water Utilities Department
# PART 5
## LARGE WATER SERVICE INSTALLATIONS

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<td>4&quot; Standpipe Fireline Service with 4&quot; Meter</td>
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<td>6&quot; Standpipe Fireline Service with 6&quot; Meter</td>
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<td>8&quot; Standpipe Fireline Service with 6&quot; Meter</td>
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<td>10&quot; Standpipe Fireline Service with 8&quot; Meter</td>
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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) Definition - 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 - Metered 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.
Typical Meter Alignment
(Combined Service Shown)

Alternate Meter Alignment
For Limited Space Installation
(Combined Service Shown)
COMBINED SERVICE - 15' x 30' EASEMENT

FIRE LINE SERVICE - 10' x 15' EASEMENT

MINIMUM EASEMENT SIZES FOR LARGE METER INSTALLATIONS

DATE: JUNE 2002
Outside Of Pavement Area, A Reinforced Concrete Pad Shall Be Constructed And Extend 2 ft. Around Hatch And Be A Minimum Of 4 in. Thick.

Existing Or Proposed Pavement

1 1/2" P.V.C. Drain From Access Hatch long Wall To Rock Embedment (Off The Front Right Or Left).

Valve Riser Stack

DISTRIBUTION MAIN

Vertical Fittings As Necessary To Meet Construction Elevation With Mechanically Restrained Joints & Class B Concrete Thrust Blocking

SERVICE LINE

Precast Meter Vault Sized As Specified For Each Meter (See 504,505)

Concrete Pipe Support Meter/Device

*4010" E.W. (Centered In Slab)

Cast In Place Floor Slab Or Precast Floor Slab (See 504)

Gravel Std. Gradation 4" Min. Thick In Rock 6" Min. Thick In Earth C.O.G. Specs., Item 2.1.8.(a)

Seal Joint Between Vault And Floor Slab With "Ram Neck" Mastic Strips Or Equal.

Seal Openings Around Service Main With Two Rows of Brick & Mortar Joints. Coat Exterior Brick Area With 1/2 " Mortar Coating.

1/2" Exterior Mortar Coating On Brick Risers.

Brick With Mortar Joint As Req'd To Raise Hatch To Grade

Valve Riser - & 1 Stack

1 1/2" Exterior Mortar Coating On Brick Riser

See General Notes 506

TYPICAL FOR ALL LARGE METER VAULTS

LARGE SERVICE INSTALLATION DETAIL ELEVATION VIEW

DWU 503

DATE OCT. '99
**Precast Meter Vault**

- 4's at 10" E.W. (Centered In Slab)
- 6'-0" x 9'-0" Precast Floor Slab, With 4 - Two Ton Lifting Anchors

**SECTION VIEW**

- 4 - Two Ton Lifting Anchors
- Available Heights: 36", 48", 60"
- Special Applications To Be Determined By Engineer.

---

**F.M. VAULT**

**D.C. VAULT**

- 4's at 10" E.W. (Centered In Wall)

**SECTION VIEW**

- 5'-6" x 7'-0" Precast Floor Slab, With 4 - Two Ton Lifting Anchors

- Available Heights: 36", 48", 60"
- Special Applications To Be Determined By Engineer.

---

**LARGE SERVICE INSTALLATION DETAILS**

**PRECAST VALEUTS**

**DWU**

**DATE**

**JAN. '98**
Precast Meter Vault With 4-Two Ton Lifting Anchors

4's at 10" E.W. (Centered In Wall)

*4's at 10" E.W. (Centered In Slab)

6'0" x 10'-4" Precast Floor Slab, With 4 - Two Ton Lifting Anchors

Available Heights
36", 48", 60"

Special Applications To Be Determined By Engineer.
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 will meet DWU specifications and must be on the approved materials list.

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

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

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2 Ea.</td>
<td>6&quot; x 8&quot; Nipple M.J. x F.</td>
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<tr>
<td>2</td>
<td>2 Ea.</td>
<td>6&quot; x 6&quot; Tee F. x F.</td>
</tr>
<tr>
<td>3</td>
<td>2 Ea.</td>
<td>6&quot; Gate Valve F. x M.J.</td>
</tr>
<tr>
<td>4</td>
<td>3 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>5</td>
<td>1 Ea.</td>
<td>6&quot; x 60&quot; Pipe S. x S.</td>
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<td>6</td>
<td>1 Ea.</td>
<td>6&quot; Flanged Coupling Adaptor</td>
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<td>7</td>
<td>1 Ea.</td>
<td>6&quot; Meter As Specified (Type F.M. Shown)</td>
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<td>6&quot; x 4&quot; Tee F. x F. (Test Point)</td>
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<td>9</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F. (Test Point)</td>
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<td>6&quot; 90° Bend M.J. x F.</td>
</tr>
<tr>
<td>15</td>
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<td>6&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>16</td>
<td>1 Ea.</td>
<td>Precast F.M. Vault</td>
</tr>
<tr>
<td>17</td>
<td>1 Ea.</td>
<td>F.M. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>18</td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

---

6" Combined Service with 6" Meter

Ref. 501 to 506

JUNE 2002
### Material List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 Ea.</td>
<td>8&quot; x 8&quot; Nipple M.J. x F.</td>
</tr>
<tr>
<td>2</td>
<td>2 Ea.</td>
<td>8&quot; x 6&quot; Tee F. x F.</td>
</tr>
<tr>
<td>3</td>
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<td>8&quot; Gate Valve F. x F.</td>
</tr>
<tr>
<td>4</td>
<td>3 Ea.</td>
<td>Valve Stack Reser Cover &amp; Lid</td>
</tr>
<tr>
<td>5</td>
<td>1 Ea.</td>
<td>6&quot; x 60&quot; Pipe S. x S.</td>
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<tr>
<td>6</td>
<td>1 Ea.</td>
<td>6&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>7</td>
<td>1 Ea.</td>
<td>6&quot; Meter As Specified (Type F.M. Showr)</td>
</tr>
<tr>
<td>8</td>
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<td>6&quot; x 4&quot; Tee F. x F. (Test Point)</td>
</tr>
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<td>9</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F. (Test Poin::</td>
</tr>
<tr>
<td>10</td>
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<td>8&quot; x 6&quot; Reducer F. x M. J.</td>
</tr>
<tr>
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<td>12</td>
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<td>1 Ea.</td>
<td>6&quot; 90° Bend F. x F.</td>
</tr>
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<td>1 Ea.</td>
<td>6&quot; Gte Valve F. x M.J.</td>
</tr>
<tr>
<td>15</td>
<td>1 Ea.</td>
<td>6&quot; 90° Bend M.J. x F.</td>
</tr>
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<td>6&quot; Pipe</td>
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<tr>
<td>17</td>
<td>1 Ea.</td>
<td>Precast F.M. Vault</td>
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<td>F.M. Vault Floor (Not Shown)</td>
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<td>19</td>
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<td>Access Hatch 'Not Shown'</td>
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**Ref. 501 to 506**

**8" COMBINED SERVICE WITH 6" METER**

[Diagram of 8" Combined Service with 6" Meter]
Material List

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<tr>
<th>Part No.</th>
<th>Quantity</th>
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<tbody>
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<td>8&quot; x 8&quot; Tee F. x F.</td>
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<tr>
<td>3</td>
<td>2 Ea.</td>
<td>8&quot; Gate Valve F. x M.J.</td>
</tr>
<tr>
<td>4</td>
<td>3 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>5</td>
<td>1 Ea.</td>
<td>8&quot; x 80&quot; Pipe S. x S.</td>
</tr>
<tr>
<td>6</td>
<td>1 Ea.</td>
<td>8&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>7</td>
<td>1 Ea.</td>
<td>8&quot; Meter As Specified (Type F.M. Shown)</td>
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<tr>
<td>8</td>
<td>1 Ea.</td>
<td>8&quot; x 4&quot; Tee F. x F. (Test Point)</td>
</tr>
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<td>9</td>
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<td>4&quot; Gate Valve F. x F. (Test Point)</td>
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<table>
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<tbody>
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<td>8&quot; x 24&quot; Nipple F. x F.</td>
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<td>2 Ea.</td>
<td>8&quot; x 36&quot; Nipple F. x F.</td>
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<td>12</td>
<td>1 Ea.</td>
<td>8&quot; C.I. 90° Bend F. x F.</td>
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<td>1 Ea.</td>
<td>8&quot; Gate Valve F. x F.</td>
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<td>1 Ea.</td>
<td>F.M. Vault Floor (Not Shown)</td>
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<td>18</td>
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Ref. 501 to 506

8" COMBINED SERVICE
WITH 8" METER

DWU 510
JUNE 2002
## Material List

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<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
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<td>11</td>
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<td>8&quot; x 12&quot; Nipple F. x F.</td>
</tr>
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<td>2</td>
<td>2 Ea.</td>
<td>10&quot; x 8&quot; Tee F. x F.</td>
<td>12</td>
<td>2 Ea.</td>
<td>8&quot; x 35&quot; Nipple F. x F.</td>
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<td>8&quot; 90° Bend F. x F.</td>
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<tr>
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<td>3 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
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<td>8&quot; Gate Valve F. x M.J.</td>
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<td>1 Ea.</td>
<td>8&quot; x 80&quot; Pipe S. x S.</td>
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<td>1 Ea.</td>
<td>8&quot; 90° Bend M.J. x F.</td>
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<td>6</td>
<td>1 Ea.</td>
<td>8&quot; Flanged Coupling Adaptor</td>
<td>16</td>
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<td>8&quot; Pipe</td>
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<td>7</td>
<td>1 Ea.</td>
<td>8&quot; Meter As Specified (Type FM. Shown)</td>
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<td>Precast FM. Vault</td>
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<td>8</td>
<td>1 Ea.</td>
<td>8&quot; x 4&quot; Tee F. x F. (Test Point)</td>
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<td>1 Ea.</td>
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<tr>
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<td>4&quot; Gate Valve F. x F. (Test Point)</td>
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<td>10&quot; x 8&quot; Reducer F. x M. J.</td>
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<td>10&quot; x 8&quot; Reducer F. x F.</td>
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**Diagram:**

- **10" COMBINED SERVICE WITH 8" METER**
- **Ref. 501 to 506**
- **DATE:** JUNE 2002
- **Page No.:** 511
- **DWU:** 511
### Material List

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<td>10&quot; x 10&quot; Tee F. x F.</td>
</tr>
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<td>③</td>
<td>2 Ea.</td>
<td>10&quot; Gate Valve F. x M.J.</td>
</tr>
<tr>
<td>④</td>
<td>3 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>⑤</td>
<td>1 Ea.</td>
<td>10&quot; x 100&quot; Pipe S. x S.</td>
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<td>10&quot; Flanged Coupling Adaptor</td>
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<td>⑦</td>
<td>1 Ea.</td>
<td>10&quot; U.L. Approved Strainer (For Turbine)</td>
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<tr>
<td>⑧</td>
<td>1 Ea.</td>
<td>10&quot; Meter As Specified (Type F.M. Shown)</td>
</tr>
<tr>
<td>⑨</td>
<td>1 Ea.</td>
<td>10&quot; x 4&quot; Tee F. x F. (Test Point)</td>
</tr>
<tr>
<td>⑩</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F. (Test Point)</td>
</tr>
<tr>
<td>⑪</td>
<td>1 Ea.</td>
<td>10&quot; x 24&quot; Nipple F. x F.</td>
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<td>⑫</td>
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<tr>
<td>⑬</td>
<td>1 Ea.</td>
<td>10&quot; 90° Bend F. x F.</td>
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<tr>
<td>⑭</td>
<td>1 Ea.</td>
<td>10&quot; Gate Valve F. x F.</td>
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<td>1 Ea.</td>
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<td>1 Ea.</td>
<td>10&quot; Pipe</td>
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<td>1 Ea.</td>
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<tr>
<td>⑱</td>
<td>1 Ea.</td>
<td>F.M. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>⑲</td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

### Diagram

- **Vault Opening**
- Dimension: 114" x 106"
- **10" COMBINED SERVICE WITH 10" METER**

**Ref. 501 to 506**
- **DATE:** JUNE 2002
### Material List

<table>
<thead>
<tr>
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<th>Description</th>
</tr>
</thead>
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<tr>
<td>2</td>
<td>2 Ea.</td>
<td>4&quot; x 2&quot; Tee F. x F.</td>
</tr>
<tr>
<td>3</td>
<td>1 Fn.</td>
<td>4&quot; Gate Valve F. x M.J.</td>
</tr>
<tr>
<td>4</td>
<td>3 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>5</td>
<td>1 Ea.</td>
<td>4&quot; x 36&quot; Pipe S. x S.</td>
</tr>
<tr>
<td>6</td>
<td>1 Ea.</td>
<td>4&quot; x 3&quot; Reducing Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>7</td>
<td>1 Ea.</td>
<td>3&quot; Meter As Specified (Type G.T. Shown)</td>
</tr>
<tr>
<td>8</td>
<td>1 Ea.</td>
<td>4&quot; x 24&quot; Nipple F. x F.</td>
</tr>
<tr>
<td>9</td>
<td>1 Ea.</td>
<td>4&quot; x 3&quot; Reducer F. x F.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
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<td>2&quot; Companion Flange</td>
</tr>
<tr>
<td>11</td>
<td>4 Ea.</td>
<td>2&quot; Comp X OSIP Adaptor</td>
</tr>
<tr>
<td>12</td>
<td>2 Ea.</td>
<td>2&quot; Comp 90 Deg. Ell</td>
</tr>
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<td>13</td>
<td>1 Ea.</td>
<td>2&quot; Ball Valve</td>
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<tr>
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<td>1 Ea.</td>
<td>2&quot; Copper Pipe</td>
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<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td>16</td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
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<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
<tr>
<td>18</td>
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<td>4&quot; Gate Valve F. x F.</td>
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**Vault Opening**

**Direction Of Flow**

**4" DOMESTIC SERVICE WITH 3" METER**

**Ref. 501 to 506**

**DWU 513**

**DATE**

**JUNE 2002**
### Material List

<table>
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<th>Quantity</th>
<th>Description</th>
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</thead>
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<td>2 Ea.</td>
<td>4” x 2” Tee F. x F.</td>
</tr>
<tr>
<td>3</td>
<td>1 Ea.</td>
<td>4” Gate Valve F. x M.J.</td>
</tr>
<tr>
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<td>2 Ea.</td>
<td>Valve Stock Riser Cover &amp; Lid</td>
</tr>
<tr>
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<td>1 Ea.</td>
<td>4” x 36” Pipe S. x S.</td>
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<tr>
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<td>1 Ea.</td>
<td>4” Flanged Coupling Adapter</td>
</tr>
<tr>
<td>7</td>
<td>1 Ea.</td>
<td>4” Meter As Specified (Type C.T. Shown)</td>
</tr>
<tr>
<td>8</td>
<td>1 Ea.</td>
<td>4” x 36” Pipe F. x F.</td>
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<table>
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<td>2” Companion Flange</td>
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<tr>
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<td>2” Comp X OSIP Adaptor</td>
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<td>11</td>
<td>2 Ea.</td>
<td>2” Comp 90 Deg. Ell</td>
</tr>
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<td>2” Ball Valve</td>
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<td>13</td>
<td>1 Ea.</td>
<td>2” Copper Pipe</td>
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<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td>15</td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
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<td></td>
<td>Access Hatch (Not Shown)</td>
</tr>
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**Direction of Flow**

**Ref. 501 to 506**

**4" DOMESTIC SERVICE WITH 4" METER**

**DWU** 514

**DATE** JUNE 2002
## Material List

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<tr>
<td>2</td>
<td>2 Ea.</td>
<td>6&quot; x 4&quot; Tee F. x F.</td>
<td>10</td>
<td>1 Ea. 4&quot; 90 Deg. Bend F. x F.</td>
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<td>1 Ea.</td>
<td>6&quot; Gate Valve M.J. x M.J.</td>
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<td>1 Ea. 4&quot; 90 Deg. Bend M.J. x F.</td>
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<tr>
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<td>3 Ea.</td>
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<td>1 Ea.</td>
<td>6&quot; x 24&quot; Pipe S. x S.</td>
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<td>1 Ea. 4&quot; Pipe</td>
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<tr>
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<td>1 Ea.</td>
<td>6&quot; Flanged Coupling Adapter</td>
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</tr>
<tr>
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<td>1 Ea.</td>
<td>6&quot; Meter As Specified (Type C.T. Shown)</td>
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</tr>
<tr>
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<td>1 Ea.</td>
<td>6&quot; x 24&quot; Pipe F. x F.</td>
<td></td>
<td>1 Ea. Access Hatch (Not Shown)</td>
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### Diagram

**6" Domestic Service with 6" Meter**

**Vault Opening**

- **Direction of Flow**

---

**Ref. 501 to 506**

**6" Domestic Service with 6" Meter**

**Page No.**

**DWU**

**DATE**

**JUNE 2002**
### Material List

<table>
<thead>
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<th>Part No.</th>
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<th>Quantity</th>
<th>Description</th>
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<td>2 Ea.</td>
<td>4&quot; x 36&quot; Nipple F. x F.</td>
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<td>1 Ea.</td>
<td>4&quot; 90 Deg. Bend F.x F.</td>
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<td>1 Ea.</td>
<td>4&quot; 90 Deg. Bend M.J. x F.</td>
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<td>4&quot; Gate Valve F. x M.J.</td>
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<td>5</td>
<td>1 Ea.</td>
<td>8&quot; x 24&quot; Pipe S. x S.</td>
<td>14</td>
<td>1 Ea.</td>
<td>4&quot; Pipe</td>
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<tr>
<td>6</td>
<td>1 Ea.</td>
<td>8&quot;x 6&quot; Reducing Flanged Coupling Adaptor</td>
<td>15</td>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td>7</td>
<td>1 Ea.</td>
<td>6&quot; Meter As Specified (Type C.T. Shown)</td>
<td>16</td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>8</td>
<td>1 Ea.</td>
<td>6&quot; x 24&quot; Pipe F. x F.</td>
<td></td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
<tr>
<td>9</td>
<td>1 Fn.</td>
<td>8&quot; x 6&quot; Reducer F. x F.</td>
<td></td>
<td>1 Ea.</td>
<td>8&quot; Gate Valve F. x F.</td>
</tr>
</tbody>
</table>

### Diagram

The diagram depicts an "8" Domestic Service with 6" Meter" system, with specific dimensions and a direction of flow indicated. The vault opening and related components are clearly labeled with numbers corresponding to the parts listed in the material list.

**Ref. 501 to 506**

**8" Domestic Service with 6" Meter**

**DWU 516**

**Date:** JUNE 2002
### Material List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>1 Ea.</td>
<td>4&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>②</td>
<td>1 Ea.</td>
<td>4&quot; Detector Check Device W/ By-Pass Meter</td>
</tr>
<tr>
<td>③</td>
<td>1 Ea.</td>
<td>4&quot; x 8&quot; Nipple M.J. x F.</td>
</tr>
<tr>
<td>④</td>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

---

### Diagram

- **Direction Of Flow**
- **Vault Opening**

---

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

Ref. 501 to 506

**DWU**: 517

**DATE**: JUNE 2002
<table>
<thead>
<tr>
<th>Part No.</th>
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<th>Description</th>
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<tbody>
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<td>6&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>2</td>
<td>1 Ea.</td>
<td>6&quot; Detector Check Device W/ By-Pass Meter</td>
</tr>
<tr>
<td>3</td>
<td>1 Ea.</td>
<td>8&quot; x 8&quot; Nipple M.J. x F.</td>
</tr>
<tr>
<td>4</td>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

6" CLOSED FIRELINE SERVICE
WITH 6" DETECTOR CHECK DEVICE

Ref. 501 to 506

JUNE 2002
Material List

<table>
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<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1 Ea.</td>
<td>8&quot; X 6&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>2</td>
<td>1 Ea.</td>
<td>6&quot; Detector Check Device W/ By-Pass Meter</td>
</tr>
<tr>
<td>3</td>
<td>1 Ea.</td>
<td>8&quot; X 6&quot; Reducer M.J. X F.</td>
</tr>
<tr>
<td>4</td>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

Ref. 501 to 506

8" CLOSED FIRELINE SERVICE
WITH 6" DETECTOR CHECK DEVICE

DWU

519

JUNE 2002
### Material List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
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<tr>
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<td>8&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>2</td>
<td>1 Ea.</td>
<td>8&quot; Detector Check Device W/ By-Pass Meter</td>
</tr>
<tr>
<td>3</td>
<td>1 Ea.</td>
<td>8&quot; X 8&quot; Nipple M.J. X F.</td>
</tr>
<tr>
<td>4</td>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td>5</td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>6</td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

8" CLOSED FIRELINE SERVICE WITH 8" DETECTOR CHECK DEVICE

Ref. 501 to 506

DATE
JUNE 2002
### Material List

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<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
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</thead>
<tbody>
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<td>10&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>2</td>
<td>1 Ea.</td>
<td>10&quot; Detector Check Device W/ By-Pass Meter</td>
</tr>
<tr>
<td>3</td>
<td>1 Ea.</td>
<td>10&quot; X 8&quot; Nipple M.J. X F.</td>
</tr>
<tr>
<td>4</td>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

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

Ref. 501 to 506

DWU 521

DATE JUNE 2002
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<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
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<tbody>
<tr>
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<td>4&quot; x 8&quot; Nipple M.J. x F.</td>
<td>(8)</td>
<td>1</td>
<td>4&quot; x 24&quot; Nipple F. x F.</td>
</tr>
<tr>
<td>(2)</td>
<td>1</td>
<td>4&quot; x 40&quot; Pipe S. x S.</td>
<td>(9)</td>
<td>1</td>
<td>4&quot; Gate Valve F. x F.</td>
</tr>
<tr>
<td>(3)</td>
<td>1</td>
<td>4&quot; Flanged Coupling Adaptor</td>
<td>(10)</td>
<td>1</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>(4)</td>
<td>1</td>
<td>4&quot; U.L. Approved Strainer (for Turbine)</td>
<td>(11)</td>
<td>1</td>
<td>Precast F.M. Vault</td>
</tr>
<tr>
<td>(5)</td>
<td>1</td>
<td>4&quot; Turbine Meter</td>
<td>(12)</td>
<td>1</td>
<td>F.M. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>(6)</td>
<td>1</td>
<td>4&quot; x 4&quot; Tee F. x F. (Test Point)</td>
<td>(13)</td>
<td>1</td>
<td>Access Hatch (Not Shown)</td>
</tr>
<tr>
<td>(7)</td>
<td>1</td>
<td>4&quot; Gate Valve F. x F. (Test Point)</td>
<td></td>
<td></td>
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**Material List**

**4" STANPIPE FIRELINE SERVICE WITH 4" METER**

Ref. 501 to 506

DWU 522

DATE JUNE 2002
### Material List

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<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
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<td>6&quot; x 8&quot; Nipple M.J. x F.</td>
</tr>
<tr>
<td>②</td>
<td>1 Ea.</td>
<td>6&quot; x 60&quot; Pipe S. x S.</td>
</tr>
<tr>
<td>③</td>
<td>1 Ea.</td>
<td>6&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>④</td>
<td>1 Ea.</td>
<td>6&quot; U.L. Approved Strainer (For Turbine)</td>
</tr>
<tr>
<td>⑤</td>
<td>1 Ea.</td>
<td>6&quot; Turbine Meter</td>
</tr>
<tr>
<td>⑥</td>
<td>1 Ea.</td>
<td>6&quot; x 4&quot; Tee F. x F. (Test Point)</td>
</tr>
<tr>
<td>⑦</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F. (Test Point)</td>
</tr>
<tr>
<td>⑧</td>
<td>1 Ea.</td>
<td>6&quot; x 24&quot; Nipple F. x F.</td>
</tr>
<tr>
<td>⑨</td>
<td>1 Ea.</td>
<td>6&quot; Gate Valve F. x F.</td>
</tr>
<tr>
<td>⑩</td>
<td>1 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>⑪</td>
<td>1 Ea.</td>
<td>Precast F.M. Vault</td>
</tr>
<tr>
<td>⑫</td>
<td>1 Ea.</td>
<td>F.M. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>⑬</td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
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</tbody>
</table>

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**Ref. 501 to 506**

**6" STANDPIPE FIRELINE SERVICE WITH 6" METER**
### Material List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>1 Ea.</td>
<td>8&quot; x 6&quot; Reducer M.J. x M.J.</td>
</tr>
<tr>
<td>②</td>
<td>1 Ea.</td>
<td>6&quot; x 60&quot; Pipe S. x S.</td>
</tr>
<tr>
<td>③</td>
<td>1 Ea.</td>
<td>6&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>④</td>
<td>1 Ea.</td>
<td>6&quot; U.L. Approved Strainer (For Turbine)</td>
</tr>
<tr>
<td>⑤</td>
<td>1 Ea.</td>
<td>6&quot; Turbine Meter</td>
</tr>
<tr>
<td>⑥</td>
<td>1 Ea.</td>
<td>6&quot; x 4&quot; Tee F. x F. (Test Point)</td>
</tr>
<tr>
<td>⑦</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F. (Test Point)</td>
</tr>
<tr>
<td>⑧</td>
<td>1 Ea.</td>
<td>6&quot; x 12&quot; Nipple F. x F.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
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<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1 Ea.</td>
<td>8&quot; x 6&quot; Reducer F. x F.</td>
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<tr>
<td>⑩</td>
<td>1 Ea.</td>
<td>8&quot; Gate Valve F. x F.</td>
</tr>
<tr>
<td>⑪</td>
<td>1 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>⑫</td>
<td>1 Ea.</td>
<td>8&quot; x 8&quot; Nipple M.J. x F.</td>
</tr>
<tr>
<td>⑬</td>
<td>1 Ea.</td>
<td>Precast F.M. Vault</td>
</tr>
<tr>
<td>⑭</td>
<td>1 Ea.</td>
<td>F.M. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>⑮</td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

### Diagram

8" STANDPIPE FIRELINE SERVICE WITH 6" METER

Ref. 501 to 506

DWU 524

DATE JUNE 2002
**8" STANDPIPE FIRELINE SERVICE WITH 8" METER**

Ref. 501 to 506
<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
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<tbody>
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<td>10&quot; x 8&quot; Reducer M.J. x M.J.</td>
<td>9</td>
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<td>10&quot; x 8&quot; Reducer F. x F.</td>
</tr>
<tr>
<td>2</td>
<td>1 Ea.</td>
<td>8&quot; x 80&quot; Pipe S. x S.</td>
<td>10</td>
<td>1 Ea.</td>
<td>10&quot; Gate Valve F. x F.</td>
</tr>
<tr>
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<td>1 Ea.</td>
<td>8&quot; Flanged Coupling Adaptor</td>
<td>11</td>
<td>1 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>4</td>
<td>1 Ea.</td>
<td>8&quot; U.L. Approved Strainer (For Turbine)</td>
<td>12</td>
<td>1 Ea.</td>
<td>10&quot; x 8&quot; Nipple M.J. x F.</td>
</tr>
<tr>
<td>5</td>
<td>1 Ea.</td>
<td>8&quot; Turbine Meter</td>
<td>13</td>
<td>1 Ea.</td>
<td>Precast F.M. Vault</td>
</tr>
<tr>
<td>6</td>
<td>1 Ea.</td>
<td>8&quot; x 4&quot; Tee F. x F. (Test Point)</td>
<td></td>
<td></td>
<td>F.M. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>7</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F. (Test Point)</td>
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<td>Access Hatch (Not Shown)</td>
</tr>
<tr>
<td>8</td>
<td>1 Ea.</td>
<td>8&quot; x 12&quot; Nipple F. x F.</td>
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**Material List**

- 10" STANDPIPE FIRELINE SERVICE WITH 8" METER

Ref. 501 to 506

**Ref. 501 to 506**

**DWU**

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(Pages No.)
Material List

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<tr>
<td>③</td>
<td>1 Ea.</td>
<td>10&quot; U.L. Approved Strainer (For Turbine)</td>
</tr>
<tr>
<td>④</td>
<td>1 Ea.</td>
<td>10&quot; Turbine Meter</td>
</tr>
<tr>
<td>⑤</td>
<td>1 Ea.</td>
<td>10&quot; x 4&quot; Tee F. x F. (Test Point)</td>
</tr>
<tr>
<td>⑥</td>
<td>1 Eu.</td>
<td>4&quot; Gate Valve F. x F. (Test Point)</td>
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<th>Quantity</th>
<th>Description</th>
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<tbody>
<tr>
<td>⑦</td>
<td>1 Ea.</td>
<td>10&quot; x 24&quot; Nipple F. x F.</td>
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<tr>
<td>⑧</td>
<td>1 Ea.</td>
<td>10&quot; Gate Valve F. x F.</td>
</tr>
<tr>
<td>⑨</td>
<td>1 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>⑩</td>
<td>1 Ea.</td>
<td>Precast F.M. Vault</td>
</tr>
<tr>
<td>⑪</td>
<td>1 Ea.</td>
<td>F.M. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>⑫</td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
<tr>
<td>⑬</td>
<td>1 Ea.</td>
<td>10&quot; x 8&quot; Nipple F. x M.J.</td>
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</tbody>
</table>

Diagram:

10" STANDPIPE FIRELINE SERVICE WITH 10" METER

Direction of Flow

Vault Opening

Ref. 501 to 506

JUNE 2002
GENERAL DESCRIPTIONS AND NOTES
FOR SUSPENDED VAULT INSTALLATION

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

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

3.) Refer to "General Notes" Page No. 506 for additional information on large water service installations.
Cast In Place Reinforced Concrete Meter Vault Constructed In Building Basement / Substructure

Limits Of Basement, Underground Parking, Building Substructure

Vault To Have Direct Street Level Access Only. No Other Access Allowed.

By-Pass

ALIGNED PERPENDICULAR TO DISTRIBUTION MAIN

Distribution Main

Direction Of Flow

Limit Of Basement, Underground Parking, Building Substructure

Vault To Have Direct Street Level Access Only. No Other Access Allowed.

Cast In Place Reinforced Concrete Meter Vault Constructed In Building Basement / Substructure

By-Pass

ALIGNED PERPENDICULAR TO DISTRIBUTION MAIN

SUSPENDED VAULT INSTALLATION DETAILS

PLAN VIEWS

DWU

529

DATE

JUNE 2002
Meter Vault To Have Direct Street Level Access

- 3'-0" x 4'-0" Aluminum Access Hatch Per D.W.U. Spec. #420-0031-86
- Cast In Place Reinforced Concrete Substructure.
- Meter & By Pass Piping To Be Supported By Adjustable Pipe Supports Or Concrete Pipe Supports.
- Vault To Have 2" Maximum Grate Drain (Slope Floor To Drain)
- Pier Supports
- Core Drill Holes With 10" Clearance From Vault Floor
- Seal Opening Around Piping With Ram-Neck Type Chaulking.

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

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2 Ea.</td>
<td>&quot; x 12&quot; C.I. Nipple M.J. x F.</td>
</tr>
<tr>
<td>2</td>
<td>2 Ea.</td>
<td>&quot; x &quot; C.I. Tee F. x F.</td>
</tr>
<tr>
<td>3</td>
<td>2 Ea.</td>
<td>&quot; Gate Valve F. x F.</td>
</tr>
<tr>
<td>4</td>
<td>3 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>5</td>
<td>1 Ea.</td>
<td>&quot; x &quot; C.I. Nipple F. x S.</td>
</tr>
<tr>
<td>6</td>
<td>1 Ea.</td>
<td>&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>7</td>
<td>1 Ea.</td>
<td>&quot;Meter As Specified (Type F.M. Shown)</td>
</tr>
<tr>
<td>8</td>
<td>1 Ea.</td>
<td>&quot; x 4&quot; C.I. Tee F. x F. (Test Point)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F. (Test Point)</td>
</tr>
<tr>
<td>10</td>
<td>3 Ea.</td>
<td>4&quot; x 24&quot; C.I. Nipple F. x F.</td>
</tr>
<tr>
<td>11</td>
<td>1 Ea.</td>
<td>&quot; C.I. 90° Bend F. x F.</td>
</tr>
<tr>
<td>12</td>
<td>1 Ea.</td>
<td>&quot; Gate Valve F. x M.J.</td>
</tr>
<tr>
<td>13</td>
<td>1 Ea.</td>
<td>&quot; C.I. 90° Bend M.J. x F.</td>
</tr>
<tr>
<td>14</td>
<td>1 Ea.</td>
<td>&quot; D.I. Pipe, Class 52, Approx. 10'</td>
</tr>
<tr>
<td>15</td>
<td>1 Ea.</td>
<td>Cast In Place Concrete Vault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Hatch (Not Shown)</td>
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</tbody>
</table>

?" = Size As Specified

### TYPICAL SUSPENDED VAULT DETAIL

**Meter Perpendicular to Main**

- Core Drill Hole With 10" Clearance From Vault Floor
- Direction Of Flow
- Min. 10 x Pipe Dia.
- Core Drill Hole With 10" Clearance From Vault Floor
- Core Drill Hole With 10" Clearance From Vault Floor
- LOCATE 39" X 49" VAULT OPENING OVER METER AND TEST TEE
- Conc. Thrust Blocking
- Slope To Drain
- LOCATE 39" X 49" VAULT OPENING OVER METER AND TEST TEE

Ref. 526 to 528

<table>
<thead>
<tr>
<th>DWU</th>
<th>531</th>
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<tr>
<td>DATE</td>
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Material List

<table>
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<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
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<tr>
<td>1</td>
<td>2 Ea.</td>
<td>2'' x 12'' C.I. Nipple M.J. x F.</td>
</tr>
<tr>
<td>2</td>
<td>2 Ea.</td>
<td>2'' x 6'' C.I. Tee F. x F.</td>
</tr>
<tr>
<td>3</td>
<td>2 Ea.</td>
<td>2'' Gate Valve F. x F.</td>
</tr>
<tr>
<td>4</td>
<td>3 Ea.</td>
<td>2'' x 1'' C.I. Nipple F. x S.</td>
</tr>
<tr>
<td>5</td>
<td>1 Ea.</td>
<td>2'' Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>6</td>
<td>1 Ea.</td>
<td>2'' x 4'' C.I. Tee F. x F. (Test Point)</td>
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<td>2'' C.I. 90° Bend M.J. x F.</td>
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<td>2'' x 24'' C.I. Nipple F. x F.</td>
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<td>2'' C.I. 90° Bend M.J. x F.</td>
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Core Drill Hole
With 10'' Clearance
From Vault Floor

LOCATE 39'' X 49'' VAULT OPENING
OVER METER AND TEST TEE

Typical Suspended Vault Detail
Meter Parallel to Main

Ref. 526 to 528

DWU 532
JUNE 2002
PART 6
(Series 600)

EROSION
and
SEDIMENT CONTROL
**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.

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