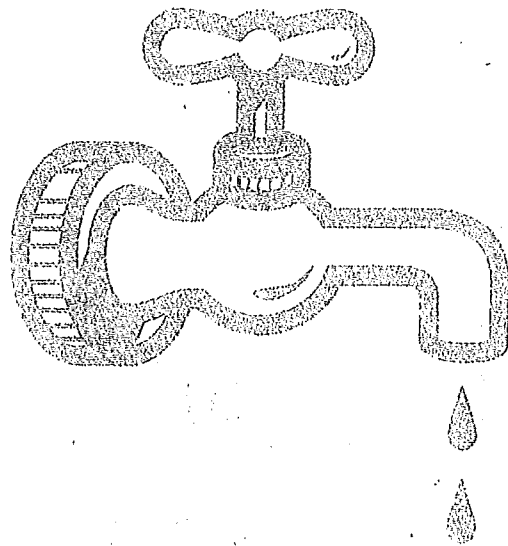


Bolivar Water Supply Corporation



DESIGN STANDARD AND
SPECIFICATIONS MANUAL

WATER SYSTEM SPECIFICATIONS

1.1 General:

The design and construction of the water distribution system to serve the development shall be in accordance with good engineering principles, with these Standards of Design, the Standard Specifications for Construction and the Standard Details and with the requirements of the Texas Commission on Environmental Quality (TCEQ). All off-site water mains shall be sized and located to conform to projected demands in accordance with the latest Water Master Plan and the computer model with regard to the impact of each development on the existing and proposed water distribution system. No construction shall commence prior to the approval of the complete construction plans and specifications by Bolivar WSC.

All facilities shall be of sufficient size to provide adequate capacity for ultimate development. The pipelines shall be sized to meet the maximum instant domestic requirements. The design criteria for water demand shall be submitted to Bolivar WSC with the plans and specifications. Bolivar WSC reserves the right to require larger pipelines than required for the proposed development in order to provide capacities for areas outside the development. The developer will be responsible to construct water lines adjacent to their property in accordance with the latest Water Master Plan, across the frontage of the tract, or as required by Bolivar WSC. All facilities that are to be public shall be constructed with domestically manufactured materials.

The minimum pipeline size to serve residential areas shall be six (6) inches in diameter, and the minimum pipeline size serving commercial, business, industrial, etc. shall be six inches (6"). In general, all lines shall be looped with no dead-ends. Dead-end lines will be considered on a case by case basis and shall be furnished with an approved flush valve arrangement.

1.2 Connections to Existing Distribution System:

Preliminary discussions concerning take-off points in the distribution system should be conducted with Bolivar Water Supply Corporation prior to finalizing the preliminary designs of the distribution system, which will serve the development. Connections to BWSC's existing system will be allowed only at locations where Bolivar WSC has determined that sufficient quantity and pressures are available to meet the projected requirements of the development. In general, the connections to the existing distribution system shall be made in such a manner to keep "shut-downs" to a minimum. Preference will be given to a tapping sleeve and valve connections.

In a proposed development where BWSC water is not adjacent to the property but is accessible, the developer shall provide, at his expense, an off-site water main of

sufficient size to serve his development or as shown on BWSC's Water Master Plan, whichever is larger. The proposed development will normally require a loop into the existing water distribution system in order to provide adequate water pressure. The loop will be at the developer's expense. In general, BWSC will not approve a development, which cannot be served by extensions to Bolivar WSC distribution system.

1.3 Location of Facilities:

A. Pipelines: Water pipelines shall be located in the parkways between the back of the curb and the street right-of-way. The location shall be two feet (2') from the back of curb on the north side of east-west streets and on the west side of north-south streets. The location of all water mains and valves are to be shown on the subdivision plans subject to the approval of Bolivar WSC.

B. Gate Valves: Gate valves shall be located outside the paved streets and shall be two feet (2') from back of curb of the intersecting street. In general, gate valves shall be located at street intersections. Unless otherwise approved by BWSC, valves shall be located in the northwest quadrant of the street intersection. All valve boxes shall be encased in a concrete pad that shall be twelve inches by twelve inches by six inches (12" x 12" x 6") and reinforced with No. 3 steel bars.

1.4 Water Service Connections:

A water service pipeline shall be laid to each lot with fittings and a meter box in accordance with the Standard Specifications for Construction and the Standard Details. All service pipelines, which supply water to each single-family lot, shall be constructed of SDR-9 (Polytube) having a minimum size of Three-fourths inch (3/4").

All water services under pavement shall be encased in a minimum 2" diameter SDR 21 PVC encasement pipe or approved equivalent, with no coupling being installed under the roadway. The ends of the encasement pipe shall be sealed with silicone

All residential services shall be tapped to the PVC water main using double strap brass saddle. Tapping tees are required for all services larger than 4-inch.

Meter box tops shall be set one-half inch to one and one-half inch (1/2" to 1 1/2") above the curb, and an angle meter stop shall be set six inches (6") below the meter box top. Meter boxes shall have a one-inch (1") wide slot from five inches (5") below the top of the box to the bottom of the box on the side facing the lot for service connection. All meter boxes shall be set at least two feet (2') behind the curb, with a "W" etched into the curb adjacent to the meter box.

A. Installation of Meter Boxes: Installation of model FYM241-233-T-G-NL Ford Meter Box Company, Inc., meter boxes for single family, multi-family, condominium and townhouse developments may be installed only at approved locations. Each single family residence shall have individual meter taps and boxes. Condominiums, townhouses, or multi-family developments may use alternate installations, approved on case-by-case basis. Service pipeline size for commercial and industrial developments shall be designed by the developer in accordance with the BWSC's adopted Uniform Plumbing Code.

1.5 Materials and Installation:

A. Pipe: Water pipelines shall be PVC pipe conforming to the Standard Specifications for Construction. In general, the water pipelines shall be AWWA Standard C-900 with cast-iron outside dimensions, and installed with a minimum of four feet (4') of cover from proposed final grade, unless otherwise approved by Bolivar WSC.

B. All water mains under pavement shall be encased as follows:

- a. 8-inch through 10-inch - encase in SDR 35 PVC or approved equal.
- b. 12-inch and larger - encase in steel pipe, size and thickness (1/4" min.) to be approved by Bolivar's Engineer.

C. All pipes not under pavement shall be installed in embedment material as shown on the Standard Details.

D. Gate Valves: All gate valves shall conform to AWWA C-509 standards manufactured by Mueller, Clow, or an approved manufacturer with resilient seat only and shall conform to and shall be installed according to the Design Standard.

G. Water Service Connections: Service pipeline shall be in accordance with the designs shown on the Standard Drawings. The materials shall be Mueller, Ford, or approved equal and shall be installed in accordance with the Standard Specifications for Construction. All connections shall be compression type or approved equal.

H. Bends: Mega-lugs or approved equal shall be installed at a horizontal change in the directions of 45° or greater and at all vertical change in direction that require a bend. The restraints shall be placed at the bend and at the next pipe joint in the direction from the bend.

I. All irrigation meters shall have a testable double check backflow preventer

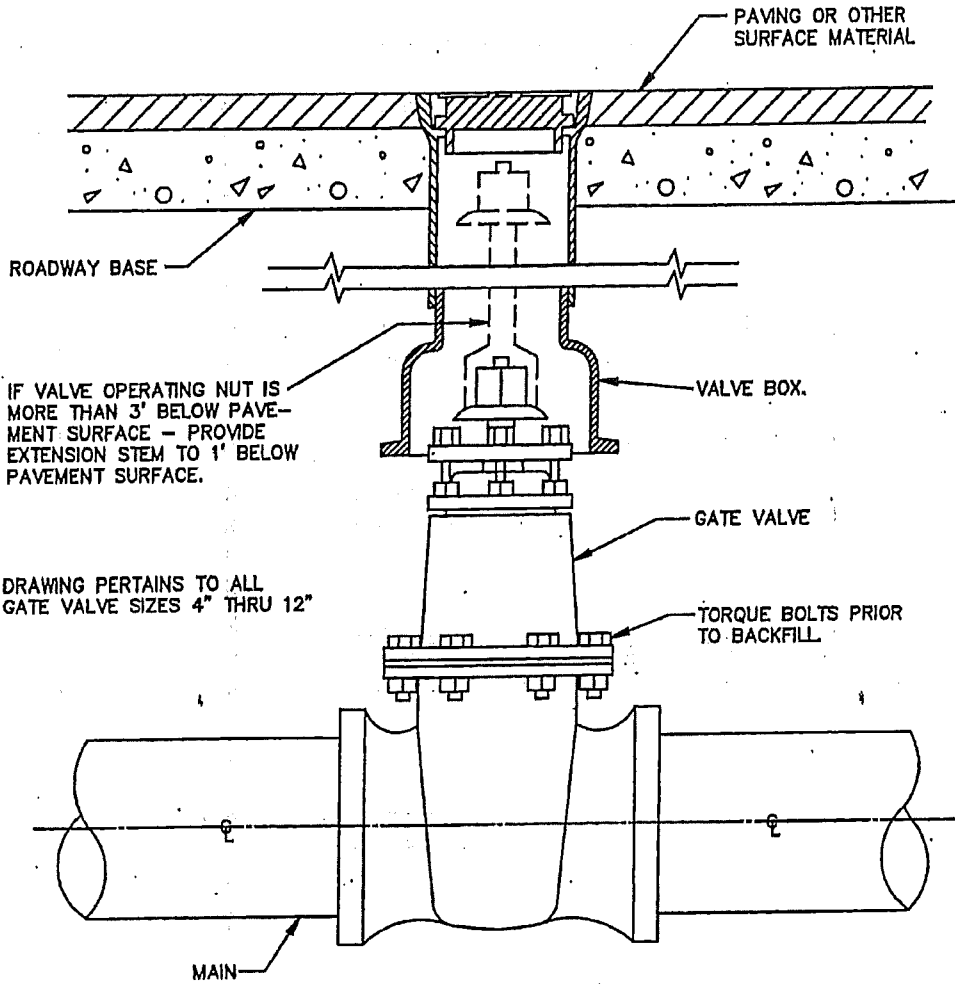
J. All iron fittings shall be covered and secured with plastic wrap prior to backfill being placed.

K. No imported materials.

H:\Projects\Anna\4007 General Services\120 - Design Manual\Water Details\Water Details.dwg Date: 10/22/12 -- RLOWE


NOTE:

IN UNPAVED AREAS, INSTALL 2' x 2' x 6" CONCRETE VALVE PAD FLUSH WITH THE TOP OF VALVE BOX. REINFORCE WITH #3 BARS ON 6" CENTERS BOTH WAYS.



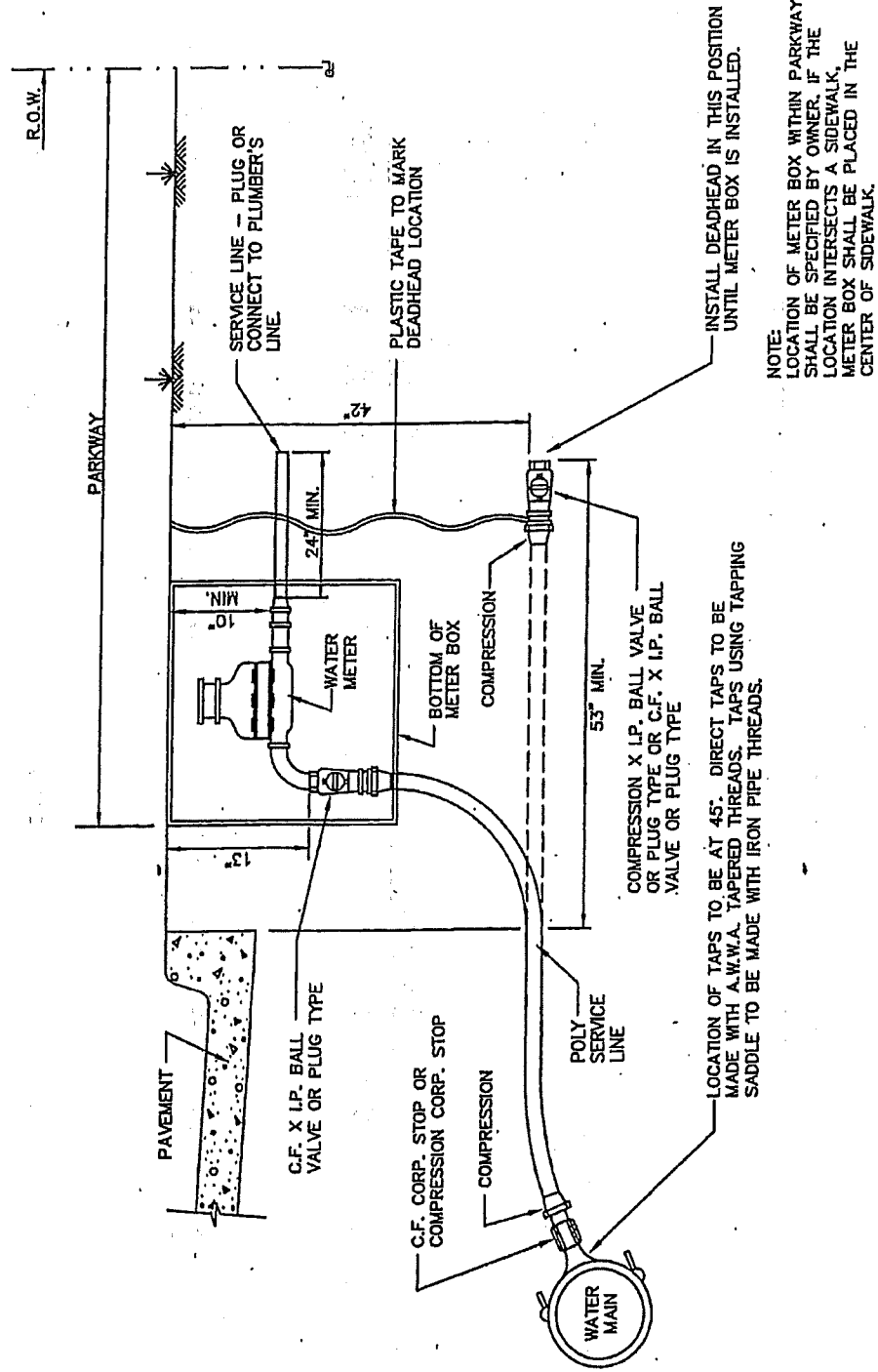
**GATE VALVE BOX AND
EXTENSION STEM**

N.T.S.

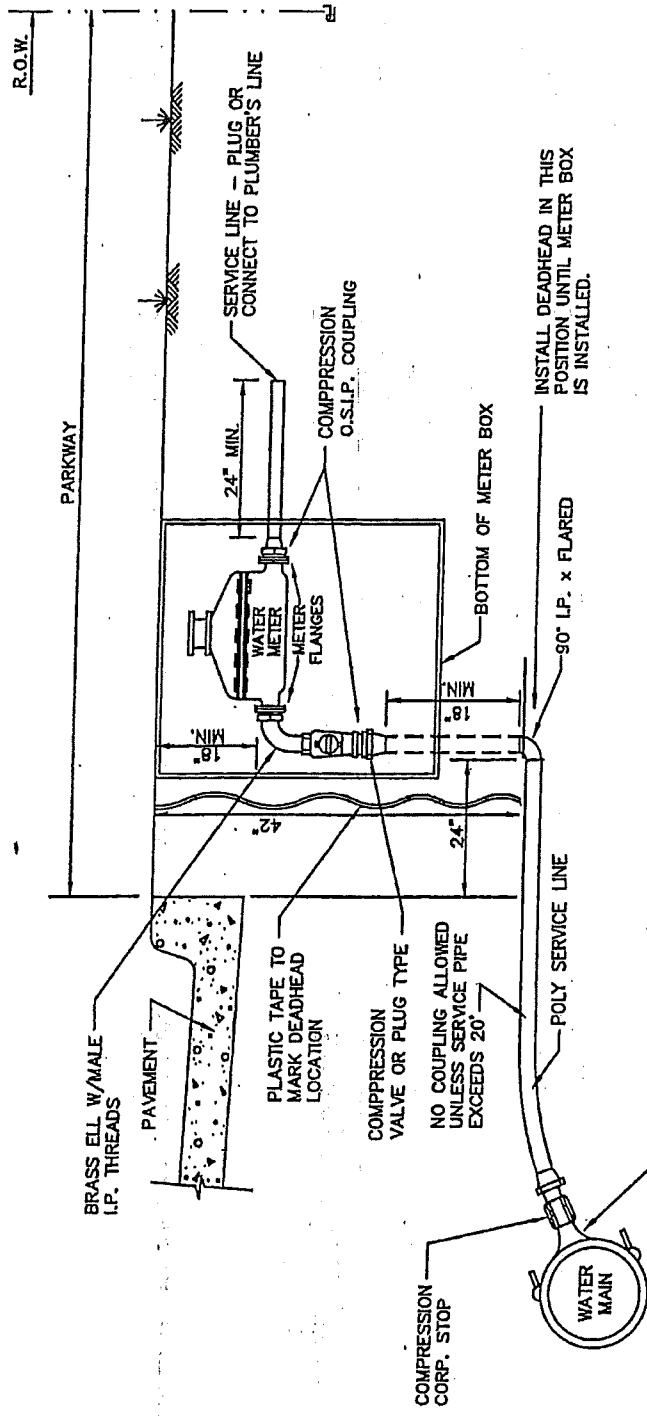
Gate Valve 4" To 12" Box & Extension Stem	 Bolivar Water Supply	Revision Date	Scale
		Date	Sheet No.
		Dec, 2012	WAT-01

PLOT SCALE: 1:1

PLOT STYLE: 11x17.ctb



Water Service Installation	 Bolivar Water Supply	Revision Date	Scale None
3/4" Or 1" Line		Date Dec,2012	Sheet No. WAT-13



NOTE:
 LOCATION OF METER BOX WITHIN THE AVAILABLE PARKWAY SHALL BE SPECIFIED BY OWNER. IF THE LOCATION INTERSECTS A SIDEWALK, METER BOX SHALL BE PLACED IN CENTER OF SIDEWALK.

LOCATION OF TAPS TO BE AT 45°. DIRECT TAPS TO BE MADE WITH A.W.W.A. TAPERED THREADS. TAPS USING TAPPING SADDLE TO BE MADE WITH IRON PIPE THREADS.

INSTALL DEADHEAD IN THIS POSITION UNTIL METER BOX IS INSTALLED.

NO COUPLING ALLOWED UNLESS SERVICE PIPE EXCEEDS 20"

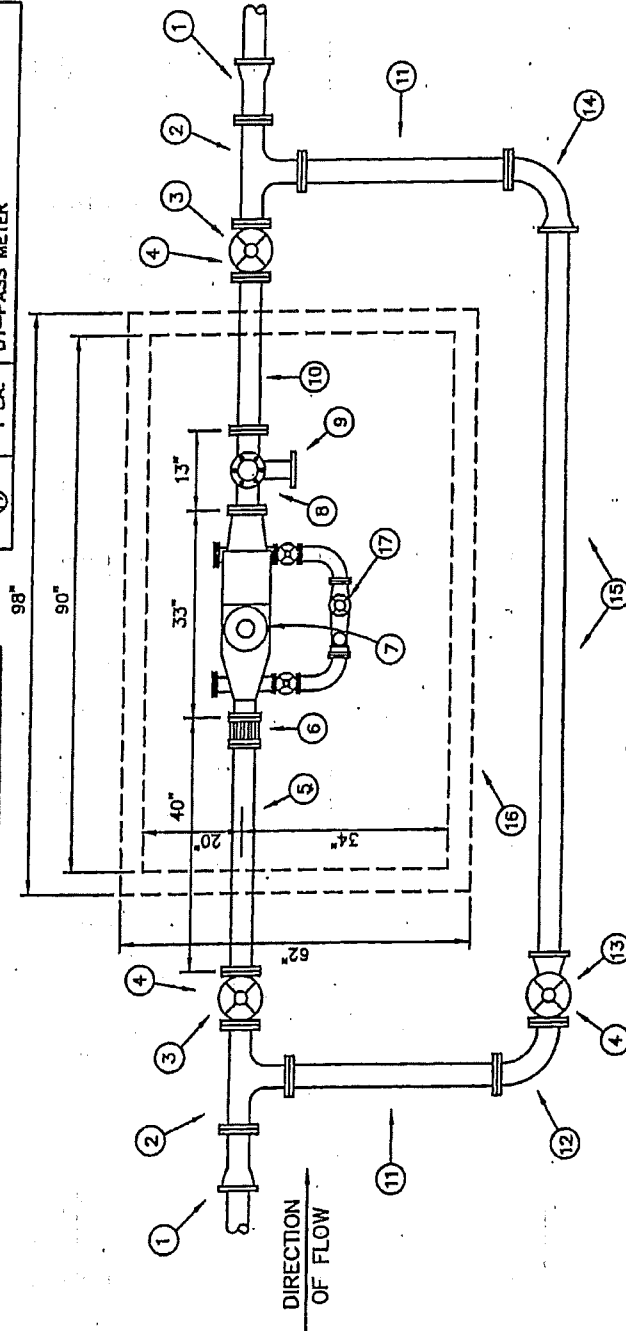
Water Service Installation
1-1/2" Or 2" Line



Revision Date	Scale
Date	None
Dec, 2012	Sheet No.
	WAT-14

MATERIALS LIST	
PART NO.	DESCRIPTION
10	4" X 24" D.I. NIPPLE F. X F.
11	4" X 36" D.I. NIPPLE F. X F.
12	4" D.I. 90° BEND F. X F.
13	4" GATE VALVE F. X F.
14	4" D.I. 90° BEND M.J. X F.
15	4" D.I. PIPE, CLASS 52, APPROX. 10'
16	PRECAST METER VAULT
17	VAULT FLOOR (NOT SHOWN)
	ACCESS HATCH (NOT SHOWN)
	BY-PASS METER

MATERIALS LIST	
PART NO.	DESCRIPTION
1	4" X 12" D.I. NIPPLE M.J. X F.
2	4" X 4" D.I. TEE F. X F.
3	4" GATE VALVE F. X F.
4	VALVE STACK RISER COVER & LID
5	4" X 40" D.I. NIPPLE F. X SLEEVE
6	4" FLANGED COUPLING ADAPTER
7	4" METER AS SPECIFIED (TYPE F.M. SHOWN)
8	4" X 4" D.I. TEE F. X F. (TEST POINT)
9	4" BLIND FLG.



4" Combination Water Service
With 4" Meter



Bolivar Water Supply

Revision Date

Scale

None

Date

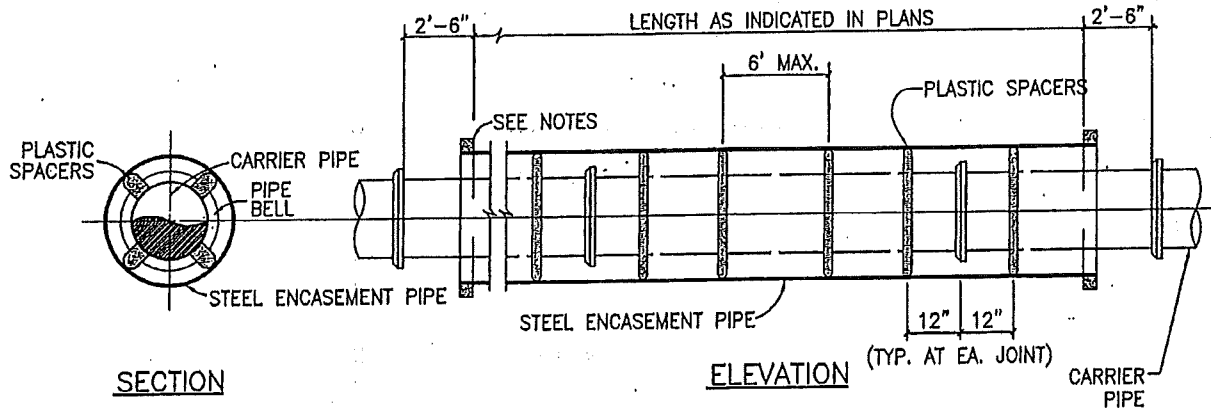
Sheet No.

Dec, 2012

WAT-15

Date: 12/12/12 - DSMITH

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NOTES:

- 1) PREFABRICATED PLASTIC SPACERS MUST BE APPROVED BY THE OWNER.
- 2) CONTRACTOR SHALL PROVIDE SUPPORT UNDER CARRIER PIPE TO HAVE MIN. 1" CLEARANCE BETWEEN PIPE BELL AND ENCASEMENT PIPE.
- 3) ENDS OF ENCASEMENT PIPE SHALL BE PLUGGED WITH BRICK AND MORTAR FOR ROADWAY AND RAILROAD CROSSINGS. PLUGS SHALL BE CONSTRUCTED WITH A WEEP HOLE.
- 4) STEEL ENCASEMENT PIPES SHALL BE WELDED.
- 5) EXTERIOR OF ENCASEMENT PIPE SHALL BE COATED WITH AN ASPHALT VARNISH.
- 6) MINIMUM YIELD STRENGTH OF THE ENCASEMENT PIPE SHALL BE 35,000 P.S.I.
- 7) CARRIER PIPE JOINTS SHALL BE RESTRAINED.

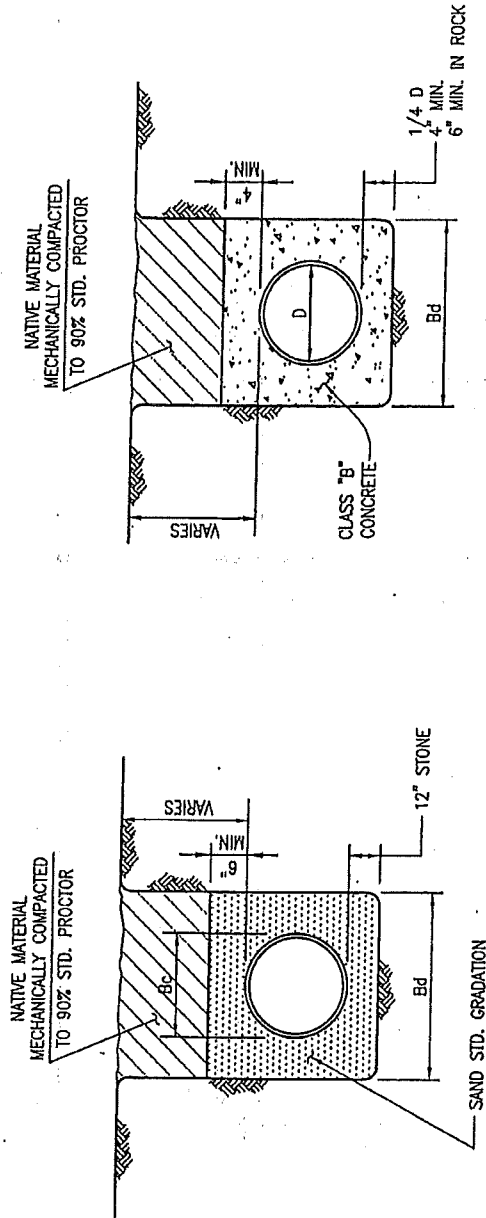
ENCASED BORE RAILROAD OR ROADWAY

NO SCALE

Encasement Pipe	 Bolivar Water Supply	Revision Date	Scale None
Water Line By Bore		Date Dec, 2012	Sheet No. WAT-17

PLOT SCALE: 1:1

PLOT STYLE: 11x17.ctb



**WATER LINE
EMBEDMENT**

N.T.S.

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. D = INSIDE DIAMETER OF PIPE

CLASS "G"

N.T.S.

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. D = INSIDE DIAMETER OF PIPE

Embedment	 Bolivar Water Supply	Revision Date	Scale None
Water Line Embed. & Class "G"		Date Dec,2012	Sheet No. EMB -01