



August 30, 2019

To: Shahab Biazar, P.E., City Engineer,
City of Albuquerque

From: David Laughlin, P.E., Chief Engineer, Planning & Engineering Division
Albuquerque Bernalillo County Water Utility Authority

Subject: **City of Albuquerque Standard Specifications for Public Works Construction
– 2019 Update Summary**
Albuquerque Bernalillo County Water Utility Authority
Revisions, Deletions, and Additions - Summary

The following is a brief summary of the Water Authority's 2019 changes to the City of Albuquerque Standard Specifications for Public Works Construction that will, upon approval, become adopted as the 2019 Specifications update. The summary items below represent changes that have been made after the publication of Update No. 9 in 2015, and after the January 2018 updated drawings/specifications that the Water Authority provided to the City of Albuquerque on January 10, 2018.

For this 2019 update summary, the section numbers are shown along with a very brief description of specific changes to the given specification or detail drawing.

SECTION 170 ELECTRONIC MARKING DEVICES

- 170.1 Contents of section updated to clarify EMD selection from the current Water Authority Approved Products List;
- 170.3 Contents of section updated to reflect correct installation for various types of EMDs, per manufacturer's (3M & Greenlee) product instructions;
- 170.4.1.9.2
& 170.4.2.3 Removed "stacked" fractions which can make font too small to read

SECTION 801 INSTALLATION OF WATER TRANSMISSION, COLLECTOR, AND DISTRIBUTION LINES

- 801.2 Updated References Section to reflect updated standards for water pipes and appurtenances;

801.9.12 Added new section 801.9.12 Trace Wire, with multiple subsections that summarize the requirements for installation of trace wire on all public potable and non-potable water mains.

801.9.12.7.1.16 Contents of section updated to eliminate grounding anode in meter boxes. Instead, excess/slack trace wire shall be folded in the meter box.

801.9.12.9.1 Contents of section updated to confirm grounding anodes are required for installation at termination points on the water main, but grounding anodes are not required or desired in the meter boxes.

801.22.1 Contents of section updated to clarify that EMDs, pipe locator tape, and trace wire system for pipe shall be included in the contract unit price of the pipe;

801.22.2.1 Contents of section updated to clarify that the contract unit price for pipe and appurtenances shall in all cases include trenching, installation, and compacted backfilling for all trench cuts.

801.22.12.4 Contents of section updated to clarify measurement and payment for waterline lowerings;

801.22.21 Added new section 801.22.21 Trace Wire to confirm that trace wire system installation shall be considered incidental to the installation cost of the pipeline;

SECTION 901 SANITARY SEWER COLLECTOR AND INTERCEPTOR FACILITIES

901.5.1.9 Added new section 901.5.1.9 Trace Wire, with multiple subsections that summarize the requirements for installation of trace wire on all public sanitary sewer interceptor, collector, and other lines;

901.9.6 Added new section 901.9.6 Trace Wire to confirm that trace wire system installation shall be considered incidental to the installation cost of the pipeline;

Section 2100 – STANDARD DETAILS FOR SANITARY SEWER

Index Added drawings 2103, 2110, 2111, 2120, 2190, 2191,

2101 Updated ball-type EMD location per manufacturer's recommendations

2102 Updated ball-type EMD location per manufacturer's recommendations. Updated manhole cross section, removing the incorrect vertical extension at the top of the cone.

- 2103 Added drawing (Sanitary sewer typical placement of manholes at intersections)
- 2110 Added drawing (Sanitary sewer manhole lift station and valve vault)
- 2111 Added drawing (Sanitary sewer manhole lift station details)
- 2116 Updated drawing. Added general notes and removed option for cross in drop.
- 2120 Added drawing (Sanitary Sewer Trap Manhole) for odor control
- 2125 Updated construction notes E and N
- 2134 Updated construction note M
- 2145 Updated EMD construction note.
- 2160 Updated manhole concrete collar graphic to include adjustment rings per Std Dwg 2460. Updated note K to read 4000 psi instead of 400. Updated location of EMD per spec section 170.
- 2181 Updated location of EMD, added reference to Std Dwg 2169
- 2183 Updated manhole geometry and location of EMD
- 2190, 2191 Added drawings for Trace Wire Details.

Section 2300 – STANDARD DETAILS FOR WATER

- Index Added drawings 2302, 2303, 2324, 2325, 2342, 2346, 2349, 2365, 2372, 2379, 2302, 2303, 2324, 2325, 2342, 2365, 2379 Trace Wire Details. This new and updated group of drawings provides direction for installation of trace wire on water lines and appurtenances.
- 2335 Updated general notes adding requirements for fall protection and hatches.
- 2340 Added stationary post detail to the drawing for hydrant installations without curb and gutter.
- 2341, 2341A Added drawings for water quality sampling stations
- 2344 Updated drawing for clarity.
- 2346 Added drawing (Water typical placement of valves at arterial intersections)

- 2347 Updated drawing and title for clarity.
- 2349 Added drawing (Water CAV valve vault for 12-inch and Smaller Dia. Water Mains)
- 2350 Updated drawing and title to read: "Water CAV Valve Vault for 14-inch and Larger Dia. Water Mains". Provided detailed notes and revised vault layout for improved maintenance/operation.
- 2351 Updated drawing for clarity on in-vault butterfly valve installation for concrete cylinder transmission lines
- 2352 Updated drawing for clarity on in-vault butterfly valve installation for ductile iron transmission lines
- 2354 Revised drawing for PRV vaults.
- 2355 Removed Drawing
- 2356 Removed Drawing
- 2357 Removed Drawing
- 2359 Updated drawing for clarity on direct-bury butterfly valve installation for ductile iron transmission lines
- 2360 Updated drawing for clarity on direct-bury butterfly valve installation for concrete cylinder transmission lines
- 2361 Updated drawing for clarity.
- 2362 Updated drawing for clarity
- 2363 Updated drawing with correct reference to meter box and cover.
- 2367 Updated drawing for clarity, correct note references, and details.
- 2370 Updated drawing for clarity, updated top slab detail.
- 2371 Updated drawing for clarity, updated top slab detail.
- 2372 Added drawing (Water Concrete Cylinder Pipe Butt Strap Connection)

Section 2400 – STANDARD DETAILS FOR PAVING

- 2460 Updated drawing and changed title block to indicate joint Water Authority-City of Albuquerque usage.
- 2461 Updated drawing and changed title block to indicate joint Water Authority-City of Albuquerque usage.



SECTION 170
ELECTRONIC MARKER DEVICES

<p>170.1 GENERAL: Electronic location markers shall consist of devices having a passive inductive device capable of reflecting a specifically designated impulse frequency, unique to the utility being installed. Devices shall be color-coded in accordance with the American Public Works Association's Utility Location and Coordinating Council Standards. Electronic Marker Devices (EMDs) shall be selected from the current Water Authority Approved Product List</p>	170.4.1.9.2	At pipe deflections and bends 11-1/4 degrees and larger.
	170.4.1.9.3	At capped or plugged ends.
	170.4.1.9.4	At tees over the main line.
	170.4.1.9.5	For single services, over the main line at the service tap.
170.2 REFERENCES	170.4.1.9.6	On runs of main line, the maximum spacing between EMDs shall be 100 feet.
<p>170.3 INSTALLATION: Marker devices shall be installed directly above the point to be located, and a minimum of 6-inches separation with clean fill from any metal object. Depth of burial varies per model of EMD used. Spherical/Ball Markers shall not be installed at a depth greater than 4-feet, or less than 2-feet to finished ground. Near-surface markers shall not be installed greater than 2-feet below finished ground. Ball markers shall be hand-backfilled to 1-foot above the device to prevent movement or damage.</p>	170.4.2	WATER LINES:
	170.4.2.1	At valves, one foot north or west of the valve over the main line.
	170.4.2.2	At flanged outlets on concrete cylinder pipes.
	170.4.2.3	At pipe deflections and bends 11-1/4 degrees and larger.
<p>170.4 PLACEMENT: Electronic Marker Devices shall be installed at the following locations:</p>	170.4.2.4	At capped or plugged ends.
170.4.1 SANITARY SEWER	170.4.2.5	At tees over the main line.
<p>170.4.1.1 At all manholes, one foot upstream of the manhole over the centerline of the main line.</p>	170.4.2.6	For single services, over the main line at the service tap.
170.4.1.2 At temporary dead ends of lines.	170.4.2.7	For double services, over the main line halfway between the service taps.
<p>170.4.1.3 At the property line for all service laterals, including service stubs from vacuum pits.</p>	170.4.2.8	On runs of main line, the maximum spacing between EMDs shall be 100 feet.
<p>170.4.1.4 At the centerline of the gravity main line over all taps, risers, wyes or deflections (points of curvature).</p>	170.5 CERTIFICATION	
170.4.1.5 At all plugged tees.	<p>170.5.1 The CONTRACTOR shall certify in writing that the Electronic Marker Device is in place, prior to paving over any of the above locations. Electronic Marker Devices that are found to be missing shall be installed at the CONTRACTOR's expense.</p>	
<p>170.4.1.6 At upper bend on vacuum sewer lifts.</p>	170.6 MEASUREMENT AND PAYMENT: No separate measurement or payment will be made for Electronic Marker Devices.	
<p>170.4.1.7 At wye for branch line connection to vacuum sewer main.</p>		
<p>170.4.1.8 At valves on vacuum sewer mains, one foot north or west of the valve over the line.</p>		
170.4.1.9 On Sanitary Sewer Force Mains:		
<p>170.4.1.9.1 At valves, one foot north or west of the valve over the main line.</p>		

SECTION 801

INSTALLATION OF WATER TRANSMISSION, COLLECTOR, AND DISTRIBUTION LINES

801.1 GENERAL: The water facilities and materials, specified herein, are associated with water transmission, collector and distribution lines.

801.2 REFERENCES:

801.2.1 American Water Works Association (Latest Edition) (AWWA):

C110 American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids

C203 Coal-Tar Protective Coatings and Linings for Steel Water Pipelines – Enamel and Tape-Hot-Applied

C206 Field Welding of Steel Water Pipe

C207 Steel Pipe Flanges for Waterworks Service Size 4-inch through 144-inch

C502 Dry Barrel Fire Hydrants

C504 Rubber-Seated Butterfly Valves

C509 Resilient-Seated Gate Valves for and Water Supply Service

C515 Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service

C600 Installation of Ductile-Iron Water Mains and Their Appurtenances

C604 Installation of Steel Water Pipe – 4-inch (100 mm) and Larger

C605 Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water

C651 Disinfecting Water Mains

C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-inch through 60-inch for Water Transmission and Distribution

M9 Concrete Pressure Pipe

M23 PVC Pipe-Design and Installation

801.2.2 This Publication

Section 18 Utilities

Section 121 Plastic Pipe

Section 127 Steel Water Pipe

Section 128 Concrete Cylinder Pipe

Section 129 Ductile Iron Pipe

Section 130 Gray Iron, Ductile Iron, and Steel Fittings

Section 161 Gray Iron Castings

Section 163 Ductile Iron Castings

Section 170 Electronic Marker Devices

Section 340 Portland Cement Concrete Curbs, Gutters, Walks, Driveways, Alley Intersections, Slope Paving, and Median Paving

Section 343 Removal and Disposal of Existing Pavement, Curbs, Gutters, Sidewalks, & Driveways

Section 701 Trenching, Excavation, and Backfill

Section 1502 Submittals

801.2.3 American Association of State Highway and Transportation Officials (AASHTO)

M 245 Standard Specification for Corrugated Steel Pipe, Polymer-Pre-coated for Sewers and Drains

M 246 Standard Specification for Steel Sheet, Metallic-Coated and Polymer-Pre-coated, for Corrugated Steel Pipe

801.2.4 American Society for Testing and Materials (ASTM)

A 742 Standard Specification for Steel Sheet, Metallic Coated and Polymer Pre-coated for Corrugated Steel Pipe

A 762 Standard Specification for Corrugated Steel Pipe, Polymer Pre-Coated for Sewers and Drains

801.3 MATERIALS

801.3.1 GENERAL

801.3.1.1 The CONTRACTOR shall submit certification from the manufacturer of the pipe as specified in Section 1502 as to the pipe material and that the pipe meets or exceeds the required testing. Only pipe listed on the Water Authority Approved Product List shall be accepted unless otherwise approved in writing by the Water Authority Field Division Manager.

801.3.1.2 Main line pipe and fittings shall be as specified in the Reference Section in this publication as listed above or as specified in the Supplemental Technical Specifications and/or as authorized by the ENGINEER.

801.3.2 PIPE

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801.3.2.1 Limitations of pipe materials versus pipe sizes will be as follows, unless otherwise specified on the plans or Supplemental Technical Specifications:

801.3.2.1.1

PIPE TYPE - SIZE

Ductile Iron - 4-inch to 64-inch

Concrete Cylinder - 24-inch and larger

Plastic (Blue - PVC-C900) - 4-inch to 24-inch

Plastic (Purple - PVC-C900) - 4-inch to 24-inch

801.3.2.2 The type of pipe used shall be approved by the ENGINEER. Steel pipe shall be used only where specified on the drawings. Unless otherwise approved by the ENGINEER, all pipe installed shall be identical from valve to valve.

801.3.3 GATE VALVES:

801.3.3.1 Gate valves shall only be used for pipe sizes of 12 inches and smaller, unless otherwise noted on the plans or in the Supplemental Technical Specifications.

801.3.3.2 All gate valves shall be resilient seat valves and shall conform to AWWA C515. The valve shall be a non-rising stem type with inside screw and "O" ring seals. The valve shall have a standard hub which opens counterclockwise. The valve ends shall be mechanical joints, unless otherwise specified on the plans. The "O" ring retainer shall be secured with nuts and bolts.

801.3.3.3 The resilient seat shall be mechanically retained or bonded on the valve gate (wedge disc).

801.3.3.4 All brass or bronze parts used on gate valves shall conform to AWWA C515.

801.3.3.5 The outside of the valve body shall be painted with a corrosion-resistant coating. The inside shall be protected with corrosion resistant coating, approved for potable water.

801.3.3.6 The valve stem shall comply with AWWA C515. The material for the valve stem shall be brass or bronze, and shall have a minimum yield strength of 20,000 psi and minimum tensile strength of 60,000 psi.

801.3.3.7 Gate valves shall have a 2-inch square operating hub nut. Gate valves in vaults with valve covers at ground level shall have a handwheel with the 2-inch nut welded to the center. For a 4-inch, 6-inch, 8-inch, 10-inch, and 12-inch valve, the minimum outside diameter of the handwheel will be 10-inch, 12-inch, 14-inch, 16-inch, and 16-inch respectively. Handwheel diameters shall not be less than those stated in AWWA C509, Table 5.

801.3.3.8 Maximum input torque to open and/or close the valve shall be 200 foot-pounds for a 4-inch valve and 300 foot-pounds for 6-inch through 12-inch under a working pressure of 200 psi.

801.3.3.9 No project shall be accepted by the OWNER

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until all valves are operational and accessible.

801.3.3.10 Before the work will be accepted, water valve GPS coordinates shall be provided on the Record Drawings. GPS coordinates obtained by a Professional Surveyor licensed in the state of New Mexico shall be taken at the valve operating nut. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate.

801.3.4 RUBBER SEATED BUTTERFLY VALVES:

801.3.4.1 Butterfly valves shall be used for sizes of 14 inches and larger, and shall comply with AWWA C504.

801.3.4.2 Only short body, Class 150B or 250B valves are acceptable. Wafer type valves are not acceptable. Valve ends may be either mechanical joint or flanged.

801.3.4.3 The rubber seat shall be field replaceable on valve sizes 24 inches and larger. The rubber seat may be mechanically retained or bonded on the disk or valve body.

801.3.4.4 Butterfly valves shall have a 3-inch square operating hub nut. Butterfly valves in vaults with valve covers at ground level shall have a hand wheel with the 3-inch nut welded to the center.

801.3.4.5 The valve shaft and disk shall be installed horizontally. The valve disc shall pivot and rotate on the horizontal axis.

801.3.4.6 The maximum input torque to open and/or close the valve shall not exceed 150 ft-lb on the wrench nut and 80 lbs. on the handwheel under a minimum working pressure of 150 psi. The butterfly operator shall be compatible with the pressure. Manual actuators shall be provided from the same manufacturer as the valve. Maximum operating torques shall be in accordance with AWWA C504.

801.3.4.7 No project shall be accepted by the OWNER until all valves are operational and accessible.

801.3.4.8 Before the work will be accepted, water valve GPS coordinates shall be provided on the Record Drawings. GPS coordinates obtained by a Professional Surveyor licensed in the state of New Mexico shall be taken at the valve operating nut. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate.

801.3.5 VALVE BOXES: Valve boxes shall consist of polymer coated steel pipe (CMP). The CMP pipe shall be polymer coated and conform to AASTO M 246 or ASTM A 742. Pipe galvanized material shall have a minimum coating thickness of 3 mils. Acceptable coating material is Trenchcoat Protective Film (Dow) or approved equal. Valve box shall be cut to accommodate the required depth. No joints shall be allowed in boxes less than 10 feet in depth. The pipe shall be manufactured in accordance with the applicable

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requirements of AASTO M 245 or ASTM A 762.

Pipe material shall have a 12 gauge minimum thickness and be 12 inches in diameter to accommodate the cover and lid specified herein. The pipe shall be centered and placed true to vertical around the axis of the operating nut. Valve covers and lids for re-use water shall be as shown in Standard Drawings and shall be shown on project construction plans.

801.3.6 COMBINATION AIR AND VACUUM VALVES: Air and vacuum valves shall be the type and size shown on the plans. Only combination air and vacuum valves listed on the Water Authority Approved Product List shall be used.

801.3.7 FIRE HYDRANTS

801.3.7.1 Hydrants shall be limited to those on the Water Authority Approved Product List.

801.3.7.2 Fire hydrants and their extensions shall be in accordance with AWWA C502, traffic type. Fire hydrants shall have one (1) 5 ¼-inch diameter valve opening; one (1) 6-inch mechanical joint inlet connection; two (2) 2 ½-inch hose nozzle connections; and one (1) 4 ½-inch steamer nozzle with National Standard Fire Hose Coupling Screw Threads. Fire hydrants shall have a bronze or cast iron pentagon operating nut, be designed for 150 psi working pressure service, and have a normal bury of 4 to 4 ½ feet unless field conditions require a deeper bury, in which case extensions will be used so as to bring the bottom of the break-off flange 2 to 8 inches above the top of finish grade.

801.3.7.3 The pipe fittings and fire hydrants starting at the street main and ending at the fire hydrant itself shall be lying in a line perpendicular to the water main, unless otherwise approved in writing by the Water Authority. Fire hydrants shall have no more than ½-inch variation from a vertical line between the breakaway flange and the top of the fire hydrant.

801.3.7.4 Hydrants shall be dry barrel, post-type with compression main valve closing with pressure. They shall have a field lubrication capability. Hydrants shall have a bronze seat ring threaded into a bronze drain ring, or bronze or cast iron bushing.

801.3.7.5 Exterior of hydrant, below the ground line, shall be coated with asphalt varnish, and the exterior painted from the top to a point one foot below the ground level flange, consisting of one coat rust inhibitive primer and one coat "safety yellow" enamel. The bonnet shall then be painted with a reflectorized paint using a color as close to "safety yellow" as possible.

801.3.7.6 The bottom plate of the main valve shall be epoxy coated. The shoe of the fire hydrant shall have a 6-inch mechanical joint connection and the inside shall be epoxy coated to prevent corrosion. The nozzle shall be threaded in place and retained by stainless steel locks.

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Hydrant body shall be threaded to receive the threaded nozzle. Nozzle shall be secured by a stainless steel locking device.

801.3.7.7 Fire hydrant shall contain two drain outlets. The drain outlets shall be constructed of bronze. Hydrant shall be provided with a pentagon operating nut to open counter clockwise and shall have an anti-friction washer between the hold-down nut and the operating nut.

801.3.7.8 To prevent loss of brass operating nuts due to theft or vandalism, the following shall be included in or on the fire hydrant:

801.3.7.8.1 The bonnet must be removed in order to remove the operating nut; or

801.3.7.8.2 Use a cast iron or bronze operating nut.

801.3.7.9 Fire hydrants shall be installed at locations as shown on construction plans and in accordance with Standard Detail Drawings.

801.3.7.10 Fire hydrants shall be fully restrained in accordance with Section 130.

801.3.7.11 All fire hydrant legs shall include an isolation valve.

801.3.7.12 Hydrants shall be functional and capable of being opened or closed without difficulty following application of an operating torque of 200-foot-pounds at the operating nut.

801.3.7.13 Removal of existing fire hydrants – Fire hydrants and appurtenances shall be removed and disposed of. The pipe from the main to the fire hydrant shall be removed back to the main and the tee capped per 801.12. The CONTRACTOR shall note this on the record drawings.

801.3.7.14 Before the work will be accepted, fire hydrant GPS coordinates shall be provided on the Record Drawings. GPS coordinates obtained by a Professional Surveyor licensed in the state of New Mexico shall be taken at the valve flange. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate.

801.3.8 PRESSURE REDUCING VALVE (PRV): Pressure reducing valves shall be limited to those on the Water Authority Approved Product List. Submittals for approval shall be made to the ENGINEER and approval must be received before installation. The following items are required in the PRV:

801.3.8.1 Materials

801.3.8.1.1 Main valve

801.3.8.2 Pilot Control System:

801.3.8.2.1 Adjustment from 20 psi to 105 psi

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801.3.8.2.2 Shut-off lever on all pilot control system lines

801.3.8.2.3 Inlet flow strainer

801.3.8.2.4 Closing speed control

801.3.8.2.5 Opening speed control

801.3.8.2.6 Flow stabilizer

801.3.8.2.7 Tubing shall be stainless steel.

801.3.8.3 Sizing shall be approved by the Water Authority with calculations provided and sealed by a New Mexico Professional Engineer. Installation shall be as per the construction plans. The Water Authority shall adjust final settings on the PRV.

801.3.8.4 PRV operating criteria of elevation and normal downstream pressure setting shall be engraved on a stainless steel plate and mounted inside the vault. Numerical values shall be verified and approved by the Water Authority prior to installation of plate.

801.3.8.5 Before the work will be accepted, PRV GPS coordinates shall be provided on the Record Drawings. GPS coordinates obtained by a Professional Surveyor licensed in the state of New Mexico shall be taken at the PRV. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate.

801.3.9 TAPPING SLEEVES: (For other than Concrete Cylinder Pipe) Only approved, long body, fully-gasketed tapping sleeves shall be allowed. They shall be ROMAC SST Series, or JCM 432 Series, or approved equal. During installation of the tapping sleeve, the pipe shall be fully supported to support the weight of the tapping sleeve and tapping machine. Taps greater than 2/3 of the line size will not be allowed unless otherwise approved in writing by the Water Authority

801.3.9.1 Tapping sleeves of heavy welded steel bodies shall meet the following requirements:

801.3.9.1.1 Epoxy Coated

801.3.9.1.2 Bolts and nuts to be stainless steel and shall be Grade 8 minimum

801.3.9.1.3 Gaskets to be Buna-N rubber

801.3.9.1.4 Flange to be flat face steel and comply with AWWA C-207

801.3.9.1.5 Class D-ANSI 150 lbs. drilling

801.3.9.1.6 Designed to sustain an operating pressure of 150 psi

801.3.9.1.7 May be used on all water mains, 4-inch and larger

801.3.9.2 Tapping sleeves of cast iron bodies shall meet

the following requirements:

801.3.9.2.1 Mechanical joint type with a working pressure of 200 psi

801.3.9.2.2 Outlet flange to be Class 125, ANSI B16.1

801.3.9.2.3 Sleeves to include side and end gaskets of Buna-N rubber

801.3.9.2.4 Eight high strength steel bolts and nuts to secure the halves of the sleeves to the pipe

801.3.9.2.5 May be used on all mains 4-inch and larger

801.3.9.3 Tapping sleeves of short sleeve cast iron shall meet the following requirements:

801.3.9.3.1 Working pressure of 150-psi

801.3.9.3.2 Outlet flange to be Class 125, ANSI B16.1

801.3.9.3.3 Outlet half to have an enclosed gasket in a groove for a pressure seal

801.3.9.3.4 Four high strength steel bolts to secure halves of tapping sleeve to pipe

801.3.9.3.5 May be used on all water mains, 4-inch and larger

801.4 CORROSION MONITORING STATIONS

801.4.1 When corrosion monitoring stations are encountered in the field or on the construction plans, the CONTRACTOR shall protect the station from damage.

801.4.2 The ENGINEER shall provide a design to the CONTRACTOR that will include relocations, if needed, adjustment to grade, and a testing plan to comply with the National Association of Corrosion Engineers (NACE) requirements.

801.4.3 The CONTRACTOR shall provide all materials, equipment, labor and supervision necessary for the completion of the installation, relocation, or adjustment, and testing. The CONTRACTOR shall employ a Corrosion Construction Supervisor, with experience in the installation of similar type systems, to supervise the corrosion monitoring facilities' installation, relocation, or adjustment. The Corrosion Construction Supervisor shall be under the direct supervision of a licensed professional Corrosion Engineer or a NACE certified Cathodic Protection Specialist. The Corrosion Construction Supervisor shall instruct the CONTRACTOR on site during the initial installation and shall revisit the site as required.

801.4.4 All construction projects within the vicinity of corrosion monitoring stations will coordinate with the Water Authority to ensure the integrity and functionality is preserved.

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801.5 RECLAIMED WATER HYDRANTS

801.5.1 Any water hydrants on a reuse, reclaimed, or other non-potable water system shall be purple in color.

801.5.2 Under no circumstances shall water hydrants on reuse, reclaimed, or other non-potable water system in the public right-of-way be used for fire protection.

801.5.3 The purpose of water hydrants on the non-potable systems is for draining the waterlines and/or for water quality sampling.

801.6 WATER LINE CONNECTIONS

801.6.1 GENERAL: All new water line tie-ins to the existing water system shall be directly inspected and approved by the ENGINEER. This includes non-pressurized or pressurized connections that will result in extension of the existing system.

801.7 LOCATIONS OF WATER MAINS AND SEWER LINES

801.7.1 Unless otherwise authorized by the ENGINEER, parallel water and sewer lines shall be installed at least 10-feet apart horizontally, and the water line shall be at a higher elevation than the sewer. Separate trenches will be required in all cases (this shall be effective even though one line has been installed prior to the other), and the water line shall be at least 18-inches above the sewer. When water and sewer lines cross each other, the water line shall be at least 18-inches above the sewer. Otherwise, the sewer shall be of pressure class pipe extending between manholes, or concrete encased for 10-feet on each side of the water line as shown in the Standard Detail Drawings. The crossings shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints.

801.7.2 Water mains shall not be constructed under walkways, sidewalks, curbs and gutters, driveways, or similar concrete structures by tunneling underneath them. Trenchless technologies may be allowed with prior approval by the Water Authority. The CONTRACTOR may cut concrete structures or remove and replace the section of the concrete structure to the nearest full expansion joint or edge.

801.8 TRENCHING AND BACKFILLING

801.8.1 All trenching, bedding, and backfilling activities shall conform to Section 701. Compaction shall be no less than 95% of maximum density as defined by ASTM D 1557 modified proctor.

801.9 GENERAL INSTALLATION ITEMS

801.9.1 The minimum cover over distribution lines shall be 3 feet; and 4 feet of cover over transmission and well collector lines at finished grade.

801.9.2 Pipe and accessories shall be new and unused and shall be handled in such a manner as to insure

delivery to the trench in sound, undamaged condition. Particular care shall be taken not to injure the pipe coating. No other pipe or material of any kind shall be placed inside of a pipe or fitting after the factory coating has been applied.

801.9.3 The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during operations by plugging or other approved methods. When work is not in progress, open ends of pipes and fittings shall be securely closed so that no other substances will enter the pipes or fittings. Any section of the pipe found to be defective before or after laying shall be replaced with sound pipe without additional expense to the OWNER.

801.9.4 All nuts and bolts utilized in underground pipe connections shall be stainless steel, high strength cast iron or high grade, high strength steel. The full length of each section of pipe shall rest solidly upon the bed, with recesses excavated to accommodate bells and joints. Any pipe that has the grade or joint disturbed after laying shall be taken up and re-laid. Pipes shall not be laid in water or when trench or weather conditions are unsuitable for the work except by as authorized by the ENGINEER. All unconnected ends of pipes shall have a valve, plug, or cap installed on it.

801.9.5 Pipe shall be laid to line and/or grade shown on the plans or as staked in the field. Changes in horizontal or vertical alignment of the pipe at a joint shall not exceed the manufacturer's recommended deflection for the type and size pipe being laid. When the change required is more than the recommended deflection, a fitting or several short joints of pipe shall be used.

801.9.6 When new pipe is to be connected to an existing pipe or when crossing an existing pipeline, the CONTRACTOR shall excavate the existing lines well in advance of the laying of the new pipe line to enable the ENGINEER to verify their elevation and placement and to make any changes in grade and/or alignment of the new pipeline that may be required.

801.9.7 On all push-on-joints (e.g., bell and spigot, fluid-tite, and ring-tite) the rubber gasket shall be removed, cleaned, the groove cleaned, the gasket replaced, and the bell or plain end cleaned before jointing. The gasket and the bell or plain end of the pipe to be jointed shall both be lubricated with a suitable soft vegetable soap compound to facilitate jointing. Care shall be taken to insure that neither the bell or collar, or the pipe being jointed is damaged as it is being pushed securely into place.

801.9.8 Flanged and mechanical joints shall be made with machine bolts and nuts of the proper size only. All components of these types of joints shall be cleaned before jointing. Only one (1) gasket will be permitted in a flange joint. In a mechanical joint, the plain end pipe shall be fully seated before the gasket and gland is slipped up to the bell. Nuts on both types of joints shall be tightened by alternating nuts 180-degrees

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apart. The CONTRACTOR shall be responsible for assuring that proper torque is achieved and shall have a torque wrench available for verification by the ENGINEER.

801.9.9 When laying pipe, a metalized detectable warning tape shall be installed a minimum of 1-foot above the top of pipe and 2 to 6 feet below the final surface. The tape shall be detectable with a standard metal pipe locator. The color of tape shall be safety precaution blue and will be inscribed at 10-foot intervals with the words, "CAUTION BURIED WATER LINE BELOW". Tape shall be two inches wide. The tape shall be constructed of material that is impervious to alkalis, acids, chemical reagents, and solvents found in the soils.

801.9.10 When laying pipe, Electronic Marker Devices (EMD's) shall be installed in accordance with Section 170.

801.9.11 TEMPORARY WATER MAIN

801.9.11.1 The CONTRACTOR may install a temporary water main (shoo-fly), if approved by the Water Authority, to provide a water service during replacement of the existing water main in a street or alley if authorized by the Water Authority. The shoo-fly shall be installed at locations as agreed with the Water Authority. The temporary water main size shall be determined by the ENGINEER and designed for traffic and above ground use. Access to all driveways shall be maintained. Cost shall be considered incidental to the work.

801.9.11.2 All temporary water mains shall be thoroughly cleaned and disinfected per 801.17 of this Section.

801.9.12 TRACE WIRE

801.9.12.1 GENERAL

801.9.12.1.1 Trace wire shall be installed on all public potable and non-potable water mains including water services, fire lines, and fire hydrant lines, sample station lines, and any other water line or portion considered public infrastructure that will be owned and maintained by the Water Authority.

801.9.12.1.2 Trace wire shall be installed in such a manner as to be able to properly trace all pipelines as applicable, without loss or deterioration of the signal.

801.9.12.2 MATERIALS: The CONTRACTOR shall submit the manufacturer's data on materials to be furnished that indicate compliance with the specifications regarding materials used. Only products or materials listed on the Water Authority Approved Product List shall be used.

801.9.12.2.1 For open trench installation, #12 AWG high strength copper clad steel wire with a minimum 450 pound break load and minimum 30 mil HDPE insulation thickness shall be used.

801.9.12.2.2 For directional drilling/boring installation, #12 AWG high strength copper clad steel wire with a minimum 1,150 pound break load minimum 45 mil HDPE insulation thickness shall be used.

801.9.12.2.3 For pipe bursting installation, high strength 7x7 stranded copper clad steel wire with 4,700 pound break load and minimum 50 mil HDPE insulation thickness shall be used.

801.9.12.3 CONNECTORS:

801.9.12.3.1 Tee Connections: Single 3-way locking waterproof connector for 12 AWG. Connectors shall be approved by the manufacturer for direct burial.

801.9.12.3.2 Cross Connectors: Two 3-way locking waterproof connectors for 12 AWG with a short jumper wire. Connectors shall be approved by the manufacturer for direct burial.

801.9.12.3.3 Necessary Splice Connections: Single 3-way direct bury lug locking connector rated up to 50 volts filled with dielectric silicone sealant to seal out moisture and corrosion and prevent uninsulated wire exposure. Connectors shall be approved by the manufacturer for direct burial. Splices shall only be used on the main line at the end of a trace wire spool or when a Tee Connection cannot be used. The CONTRACTOR shall not cut the main line trace wire.

801.9.12.3.4 Non-locking friction fit, twist on or taped connectors are prohibited.

801.9.12.4 TEST STATIONS

801.9.12.4.1 All trace wire test stations shall be made of corrosion-resistant materials and shall be equipped with two terminals, a roadway-rated flange to prevent the test station from sinking, and a locking cast iron cap with an encapsulated magnet for ease of locating the test station. The test station shall be specifically manufactured for trace wire access/testing.

801.9.12.4.2 All grade level/in-ground test stations shall be appropriately identified with "Test Station" and with "Water" for potable water installations, and "Test" for non-potable water system installations cast into the cap and color coded per Section 801.12.6.

801.9.12.4.3 All trace wire test stations must include a manually interruptible conducting/connection link (terminal jumper) between the terminal for the trace wire connection and terminal for the grounding anode wire connection.

801.9.12.5 GROUNDING ANODE: All grounding anodes shall be made of magnesium, with a pointed end to enable direct driving into the ground, specifically manufactured for this purpose. The anode shall come factory equipped with an HDPE cap and 20 feet of factory installed #12 AWG copper clad steel wire with 30 mil HDPE coating (red) rated for direct burial at 30 volts with 21% conductivity. The wire shall have a minimum 450 pound break load.

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801.9.12.6 COLOR CODING: The insulation of the trace wire and the color of the test station caps shall be blue for potable water lines and purple for non-potable water lines.

801.9.12.7 INSTALLATION:

801.9.12.7.1 TRACE WIRE INSTALLATION:

801.9.12.7.1.1 The trace wire shall be installed in the same trench and inside bored holes and casing with pipe during pipe installation.

801.9.12.7.1.2 The trace wire shall be securely bonded together at all wire joints with a locking waterproof connector that complies with this specification to provide electrical continuity.

801.9.12.7.1.3 Trace wire connectors shall be installed in a manner that prevents any uninsulated wire exposure.

801.9.12.7.1.4 Except for spliced-in repair or replacement connections, trace wire shall be continuous and without splices between each trace wire access point. For required splices, use splice connectors per this specification. Spliced wires must be knotted prior to being inserted in the connector to prevent separation from the connector in case the trace wires are stretched during backfilling operations.

801.9.12.7.1.5 Trace wire systems must be installed as a single continuous wire. No looping or coiling of wire is allowed.

801.9.12.7.1.6 No breaks or cuts in the trace wire or trace wire insulation shall be permitted.

801.9.12.7.1.7 Trace wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512 Hz) signal for distances in excess of 1,500 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.

801.9.12.7.1.8 Any damage occurring during installation of the trace wire must be immediately repaired by removing the damaged wire, and installing a new section of wire with connectors that comply with this specification. Taping and/or spray coating to repair trace wire or trace wire insulation shall not be allowed.

801.9.12.7.1.9 Trace wire shall be laid flat on top of the pipe and securely affixed in 6-foot intervals with tape or plastic ties to prevent shifting or damage during backfilling and excavation operations. Attach trace wire to PEXa (cross-linked polyethylene: peroxide process) service piping per the manufacturer's recommendations with plastic (zip) ties. Do not use adhesive tape on PEXa pipe.

801.9.12.7.1.10 In occurrences where an existing trace wire is encountered on an existing utility that is being extended or tied into, the new trace wire and existing trace wire shall be connected using splice connectors that comply with this specification.

801.9.12.7.1.11 Trace wire shall be attached to all appurtenances on the north or east side.

801.9.12.7.1.12 At service saddles, the trace wire shall not be placed between the saddle and the main.

801.9.12.7.1.13 For manhole or vault type structures, lay mainline trace wire continuously, by-passing around the outside of manholes/structures on the north or east side.

801.9.12.7.1.14 For main line intersections and for service line connections, the main line trace wire shall not be cut.

801.9.12.7.1.15 All main line trace wires must be interconnected at intersections, at main line tees and main line crosses. At tees, the three wires shall be joined using a single 3-way locking connector. At crosses, the four wires shall be joined using two 3-way connectors with a short jumper wire between them.

801.9.12.7.1.16 All conductive and non-conductive water and reuse service lines shall include trace wire with 3 feet of excess/slack trace wire folded in the corner of the meter box. Do not coil.

801.9.12.7.1.17 All trace wire termination points shall be terminated with a grounding anode.

801.9.12.7.1.18 For repairs and rehabilitations, trace wire shall be installed on the new line per this specification. The ends of rehabilitated/replaced pipeline segments shall be connected if existing trace wire exists or shall be terminated with a grounding anode.

801.9.12.7.1.19 If repairs are made to a line with a trace wire, Contractor must ensure trace wire is connected with an approved splice connector per this specification and test the trace to the next existing test station.

801.9.12.8 TEST STATIONS

801.9.12.8.1 Test stations shall be installed at the following locations as outlined in the Standard Detail Drawings:

801.9.12.8.1.1 At all fire hydrants on waterlines. If hydrants do not exist on a waterline, test stations shall be installed at water valves or at the stand-alone test stations.

801.9.12.8.1.2 At valves and as stand-alone test stations approximately every 1,000 feet in locations where valve spacing exceeds 1,500 feet.

801.9.12.8.2 A minimum of 6 inches of excess/slack wire is required in all trace wire test stations after meeting final elevation. Group and zip-tie excess wire. Do not coil.

801.9.12.8.3 Test stations shall be spaced approximately every 1,000 feet and shall not be spaced greater than 1,500 feet apart. Test stations do not need to be installed at each location identified above provided that the spacing between test stations does not exceed 1,500 feet.

801.9.12.9 GROUNDING

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801.9.12.9.1 Trace wire must be properly grounded at all termination points on the water main and at the edge of right-of-way for water lines.

801.9.12.9.2 Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod buried at the same depth as the trace wire.

801.9.12.9.3 Where the grounding anode wire will be connected to a trace wire test station, a minimum of 6 inches of excess/slack wire is required after meeting final elevation.

801.9.12.9.4 When grounding the trace wire in areas where the trace wire is continuous and neither the mainline trace wire nor the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and at the same depth as the trace wire. Do not coil excess wire from grounding anode. The grounding anode wire shall be trimmed to an appropriate length before connecting to trace wire with a splice connector. Install with spliced connection to main trace wire at beginning or endpoints of pipe runs, only when there is no test station box present. If test station is nearby/available, red trace wire from magnesium grounding anode shall be continuous to the terminal in the test station (no other connections or splices).

801.9.12.10 TESTING REQUIREMENTS

801.9.12.10.1 Contractor shall provide equipment for trace test and shall perform a trace test on all trace wire in the presence of the ENGINEER and WATER AUTHORITY INSPECTOR. If the trace wire is found to be not continuous upon testing, the CONTRACTOR shall repair or replace the failed segment of the wire, and shall be responsible for the cost of any trenching, backfill, repaving and other improvements necessary to complete the trace wire repair. Contractor is encouraged to test trace wire prior to backfill so any issues can be addressed prior to backfill. Passing test results shall be provided for all pipe segments within the Engineer of Record's as-built data and plan set. To pass the continuity test, the following conditions must be met:

801.9.12.10.1.1 Trace test shall be performed by using a metallic locator with audible tone and numeric values for certification of the facility locations and shall be identifiable between access points.

801.9.12.10.1.2 The wire shall be accessible at all access points and be identifiable between access points.

801.10 SPECIFIC PIPE LAYING REQUIREMENTS

801.10.1 Ductile iron pipe shall be installed in accordance with AWWA C600 and as herein specified.

801.10.2 Steel pipe shall be installed in accordance with AWWA C604, AWWA C206 for welded joint and as herein specified. All joint-welded joints shall have one coat of coal tar enamel of 3/32-inch thickness.

801.10.3 Plastic pressure pipe shall be installed in accordance with AWWA M23, C900, C605 and/or manufacturer's printed recommendations, whichever is

applicable. Trenching, excavation and backfill is specified in Section 701. Compaction shall be no less than 95% of maximum density as defined by ASTM D 1557 modified proctor. A reference mark (a distinct circumferential line) is placed on the pipe's spigot by the manufacturer to indicate the correct depth of the spigot penetration into the pipe's gasket joint. If the pipe is seated too deep or too shallow, the pipe may buckle or separate due to thermal expansion / contraction, therefore particular attention shall be exercised when jointing pipe. The reference mark must be showing and not farther than 1/2-inch from the leading edge of the bell. The CONTRACTOR shall verify that the manufacturer's reference mark is correct per manufacturer's literature.

801.10.4 All concrete cylinder pipe shall have two small bond wires of low resistance, or other approved method, welded across the joint to make the joint electrically continuous. Where rigid joints are specified, they shall be provided as specified herein. The outside joint recess shall be completely filled with a rich low shrinkage cement grout. The concrete surface in contact with the joint mortar shall be moistened with water just prior to pouring the joint recess. The mortar shall be poured into the joint recess against a water proof paper or cloth diaper laid around and lapping the outside field joint. The diaper shall completely and snugly enclose the joint recess, being held in place by metal box strapping or wire. The mortar shall be poured into an opening slightly to one side on the top of the pipe and rodded by a flexible wire rod onto place until it appears on the opposite side completely. After the joint recess has been filled with mortar, adjoining pipe section shall not be disturbed. After the joint has been made, the concrete lining surfaces of the joint shall be moistened and the interior recess tightly jointed and troweled flush and smooth with the inside pipe surface. Grout for painting the interior joints shall be of a stiff consistency and shall have low shrinkage characteristics. In sizes of pipe smaller than 24 inches, the mortar shall be buttered all around the shoulder inside the bell before the spigot is entered. A backing-up tool, such as an inflated rubber ball wrapped with burlap, shall be pulled through the joint to compact the mortar, completely fill the inside annular space and wipe off the excess mortar. Each joint will be inspected by the ENGINEER for proper and complete closure prior to final acceptance. Flanges shall be protected by "cocoon" type protection coating of coal tar and felt in accordance with AWWA C203. When moving individual pipe section, the pipe shall be lifted using two web or belt type slings which support the pipe between the third and outside quarter points.

801.10.5 All fittings and valves shall be installed as per the type of joint as stated herein and/or as shown on the plans.

801.10.6 All couplings, clamps, sleeves, etc. shall be installed as per the manufacturer's printed recommendations and as approved by the ENGINEER. The CONTRACTOR shall properly restrain all appurtenances as necessary.

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801.10.7 All water lines installed as part of a reuse, reclaimed, or other non-potable water system shall be purple in color or shall be encased in purple PVC wrap.

801.11 CUTTING: The cutting of any type of pipe shall be done as per the manufacturer's printed recommendations, as approved by the ENGINEER. Care shall be taken in cutting any pipe that has an internal and/or external lining or coating.

801.12 BLOCKING AND RESTRAINED JOINTS

801.12.1 All restrained joints shall be by mechanical means unless directed or approved otherwise by the ENGINEER.

801.12.2 All tees and bends shall be restrained by mechanical means. Valves in runs shall be mechanically restrained. Where rigid joints are called for on concrete cylinder pipe, the joints shall be flanged or field welded bell and spigot joints in accordance with the manufacturer's recommendation.

801.12.3 All caps and plugs on dead end lines shall be mechanically restrained when feasible. Blocking may also be required when adequate restrain length is not available.

801.12.4 Where restrained joints on ductile iron pipe or PVC pipe are called for on the plan, the mechanical restraining system employed shall conform to the recommendations of the pipe manufacturer.

801.13 RESTRAINING JOINTS FOR CONCRETE CYLINDER PIPE

801.13.1 Restrained joints in concrete cylinder pipe for thrust restraint shall be produced by continuous welding the pipe joints.

801.14 CONNECTIONS TO EXISTING CONCRETE CYLINDER PIPE

801.14.1 OBJECTIVE: The intent of this Subsection is to establish procedural and design criteria for making connections to existing concrete cylinder pipe for water distribution line extensions, and will be applicable to 4-inch and larger size connections.

801.14.2 NEW WATER LINES: Non-factory taps are prohibited.

801.14.3 EXISTING WATER LINES

801.14.3.1 New connections to existing concrete cylinder pipe must be approved in writing by the Water Authority Field Division Manager. Hot taps and service connections will not be allowed. The requester shall provide the following information:

801.14.3.1.1 Justification for the connection

801.14.3.1.2 Project name and number

801.14.3.1.3 Date connection to be performed

(Revised August 2019)

(Minimum 30-day notice)

801.14.3.1.4 Name of the CONTRACTOR who will be installing the connection

801.14.3.1.5 Scheduling of connections is subject to the moratorium requirements of the Water Authority

801.14.3.2 The CONTRACTOR shall coordinate the work with the Water Authority Field Division before commencing work. The Water Authority Field Division shall inspect and approve the entire installation of the connection prior to backfilling and returning to service.

801.15 Not used

801.16 HYDROSTATIC TESTS:

801.16.1 The CONTRACTOR shall be required to perform hydrostatic tests in all water mains, laterals, dead ends, and service lines in accordance with AWWA C600. The test shall be conducted in the presence of the ENGINEER, or his authorized representative. The testing of the lines shall be done without being connected to existing lines. The CONTRACTOR shall provide all temporary plugs required. Water used for disinfecting may be used for hydrostatic testing. Leakage through connections to the existing system, leaks in the existing lines, or leaking existing valves under the test pressure will invalidate the test. The lines shall be tested at 150 psi, or 1.5 times the normal working pressure of the line, whichever is greater, for not less than two hours. All taps, gauges, and necessary equipment shall be provided by the CONTRACTOR as approved by the ENGINEER, however, the ENGINEER may utilize gauges provided by himself if he so elects. Each section of the new line between valves shall be tested to demonstrate that each valve will hold the test pressure. No installed pipe shall be accepted if the leakage is greater than that determined by the Hydrostatic Test sheet calculations. If the total leakage is less than the allowable, the line can be accepted. All visible leaks shall be repaired regardless of the amount of leakage and the test re-conducted.

801.16.2 The CONTRACTOR shall submit a testing plan to the ENGINEER for approval. In cases where a new main is being connected to an existing main without the installation of a new valve, the end of the new main shall be temporarily capped and restrained and a hydrostatic test performed. Hydrostatic tests should not be made such that an existing valve or existing main is included in the test section. The Hydrostatic Test Sheet in this Section is the standard form which must be completed at the time of the test, signed by the ENGINEER and delivered to the Water Authority prior to acceptance of the Project

801.17 DISINFECTING, FLUSHING, AND BACTERIA TESTING OF WATER LINES:

801.17.1 New water lines and temporary water

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mains (shoo-fly) shall be installed in such a manner as to not require cleaning by flushing. This shall require capping stockpiled line, capping lines at night and any other time work is not in progress, visual inspection of interior of lines, and cleaning as necessary prior to placing in the trench. Every effort shall be made to prevent the entry of dirt and debris into pipelines under construction.

801.17.1.1 Mains shall be disinfected in accordance with AWWA C651 with chlorine liquid solution, which shall be added by an approved method at one end of the lines as water is drawn through the lines and service connections. The chlorine solution shall remain in the line for at least 24 hours. The lines shall then be flushed until the chlorine residual is equal to the normal residual in the existing system or at 0.5 parts per million for un-chlorinated water. Dry chlorine shall not be used for disinfection of water lines. The flushed water shall be disposed of by the CONTRACTOR appropriately. Should results of the bacteriological analysis be unsatisfactory, the disinfection procedure shall be repeated.

801.17.1.2 The CONTRACTOR shall be granted three free volumes of water for testing, disinfecting, and flushing the new installation. All water used for testing, disinfecting, and flushing shall be metered. If additional water is needed for these purposes, the water shall be paid for by the CONTRACTOR at the current water rates. An approved backflow prevention system shall be used when withdrawing water from any waterlines and hydrants. Unmetered connection to the water system shall not be used for providing water for disinfecting, testing, or flushing.

801.17.1.3 Water Authority or the ENGINEER will collect the water sample to test the water in the existing lines at the point of delivery for assurance of clean and potable water. The water in the existing lines will be used for testing and flushing.

801.18 INTERFERENCE WITH SERVICE AND SCHEDULE OR WORK

801.18.1 The CONTRACTOR shall obtain the permission of the ENGINEER before making any connections with existing mains. The required operation of existing valves will be performed by the Water Authority as per Section 18.

801.18.2 Work shall be started after authorization from the Water Authority and the ENGINEER and shall be completed in a prompt efficient manner in coordination and cooperation with other utilities concerned.

801.18.3 The CONTRACTOR shall be required to arrange his construction to maintain continuous service to water users, from existing facilities, to the fullest extent possible. CONTRACTOR shall, at all times, withhold construction work where any conflicts in the service requirements occur.

801.19 NOTIFICATION OF COMPLETION:

801.19.1 The CONTRACTOR shall notify the ENGINEER, in writing, when the CONTRACTOR has completed construction of a water line. This notification should be submitted immediately upon completion; the water line shall not be placed in service by the Water Authority before the sewer service and the paving, if applicable, are in place and until the Water Authority has received and accepted all adequate documentation submittals per 801.21. Water Authority inspection shall consider, on a case by case basis, exceptions for fire protection purposes.

801.20 VALVE BOX REHABILITATION

801.20.1 The rehabilitation of existing valve boxes as shown on the plans or as authorized by the ENGINEER shall include the following:

801.20.1.1 Removing and disposing the existing valve box, concrete collar, ring, and cover and installing the new type box, concrete collar, ring, and cover.

801.20.1.2 Installation of a new concrete collar is required in paved and unpaved areas. Main line pipe size and direction of the line shall be scribed on the collar.

801.20.1.3 Install a new electronic marker device.

801.20.1.4 Removal, disposal, and replacement of the pavement

801.20.1.5 Excavation, backfill, and compaction

801.20.1.6 All materials, labor, and equipment necessary to do the work

801.20.1.7 Trace wire test stations shall be protected in place from damage. Any damage to this system shall be repaired by the Contractor at no cost to the Water Authority.

801.20.2 The work under this item shall be constructed per the Standard Detail Drawings

801.21 DOCUMENTATION SUBMITTALS

801.21.1 At the time of the final inspection, the following documentation will be submitted to the ENGINEER and to the Water Authority:

801.21.1.1 Hydrostatic test data of the new water line system

801.21.1.2 Microbiological test reports which were taken at representative locations along the system

801.21.1.3 All valves at that time shall be in the open position, unless otherwise authorized by the ENGINEER and Water Authority

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801.21.1.4 A marked-up set of construction drawings reflecting as-built conditions. This does not supplant the requirements for record or as-built drawings.

801.22 MEASUREMENT AND PAYMENT

801.22.1 PIPE: Payment for all sizes and types of pipe shall be made on the basis of measurement per linear foot, including the length of fittings, valves, etc. The contract unit price of pipe shall include all jointing and coupling materials necessary for its installation and connections to other sections of pipe, except for fittings, valves or other appurtenances. The cost of hydrostatic testing, flushing and disinfecting of new water lines shall be included in the contract unit price for the item in place. Electronic Marking Devices, Pipe locator tape, and trace wire system for pipe shall be included in the contract unit price of the pipe. Joint restraint shall be paid for separately.

801.22.2 DEPTH OF TRENCH:

801.22.2.1 The contract unit price for pipe and appurtenances in all cases shall include the trenching, installation, and compacted backfilling for trench cuts as specified in Section 701.

801.22.2.2 Payment for additional excavation deeper than the specified limits shall be made on the contract unit price per vertical foot per linear foot, and shall include trenching, installation of pipe and appurtenances, and compacted backfilling in the deeper trench.

801.22.3 REMOVAL AND DISPOSAL OF PIPE

801.22.3.1 The payment for removal shall be made on a unit price per linear foot; there shall be no additional cost to the OWNER for disposal.

801.22.3.2 The payments for removal and disposal shall include trenching and compacted backfilling.

801.22.4 CAST IRON AND DUCTILE IRON FITTINGS:

801.22.4.1 All cast iron and ductile iron fittings shall be measured and paid for at the contract unit price per pound based on weights of an all mechanical joint ends fitting for the type and size of fitting used as specified in AWWA C110, regardless of the type of ends on the fitting installed. The contract unit price per pound of fittings shall include all gaskets, glands, bolts, and nuts required. No separate payment will be made for these items.

801.22.4.2 When the CONTRACTOR installs a Water Authority-furnished fitting and replaces that fitting in the Water Authority's inventory, the CONTRACTOR shall be paid the full contract unit price of that fitting as outlined above. If the CONTRACTOR does not replace the fitting in the Water Authority's inventory, the payment to the CONTRACTOR will be at the contract unit price of the fitting less the cost of the

fitting itself.

801.22.4.3 Fitting Insertion: The insertion of a fitting into an existing pipeline shall be measured and paid for at the contract unit price per pound based on weights of an all mechanical joint end fitting and if required on all mechanical joint connecting piece (coupling) of the type fitting and size used, as specified in AWWA C110, regardless of the type of ends on the fitting and coupling installed. This payment shall include all compensation for the excavation, cutting and removal of the existing pipe, installation of the fitting and coupling, if required, the re-cutting of the existing pipe or new pipe installed between the fitting and coupling, and backfill and compaction complete in place. In addition to the payment for the fitting insertion, the CONTRACTOR shall be paid for each non-pressurized connection and if pavement, curb and gutter, sidewalk, drive pad, etc., are removed, these items will be paid for as part of the appropriate item.

801.22.5 REMOVAL AND DISPOSAL OF PIPE AND APPURTENANCES:

801.22.5.1 The payment for removal and disposal shall include trenching and compacted backfilling.

801.22.6 CONCRETE CYLINDER FITTINGS: Concrete cylinder pipe fittings, such as flanged outlets, bends, reducers, etc., shall be considered as incidental to the contract unit price for installation of the pipe, as shown on the construction plans.

801.22.7 COUPLINGS: The measurement for steel or cast iron couplings shall include payment for all gaskets, bolts, and incidental materials as may be needed for its complete installation. Payment shall be made on the contract unit price per each size of coupling required.

801.22.8 STEEL FITTINGS: Steel fittings shall only be used when authorized by the ENGINEER and when needed to connect to an existing steel water line. Measurement and payment for steel fittings, when authorized, shall be made at the contract unit price per pound based on weights of an all mechanical joint ends fitting of the type fitting and size used, as specified in AWWA C110. This payment shall include all fabrication and welding required on the fitting.

801.22.9 VALVE AND VALVE BOXES:

801.22.9.1 Valves shall be measured and paid for at the contract unit price per each size of valve. The contract unit price for valves 24-inch and larger shall include the bypass valve, fittings and piping, complete in place.

801.22.9.2 Valve Boxes shall be measured and paid for at the contract unit price per each per type of valve box. Payment shall include the polymer coated corrugated metal pipe, new ring, cover, new concrete

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pad, and new EMD complete in place.

801.22.10 FIRE HYDRANTS

801.22.10.1 Fire Hydrants shall be measured and paid for at the contract unit price per each per depth of bury. Payment shall include excavation, gravel drain pocket, mechanical restraining system, backfilling, and compaction complete in place.

801.22.10.2 Measurement and payment for removal of existing fire hydrant shall be per each and shall include excavation and salvage or disposal of the existing fire hydrant, valve and pipe back to the water main, capping the tee, backfilling and compaction as required for the location of the fire hydrant and appurtenances. Removal and replacement of existing paving, curb, gutter, and sidewalk will be covered under those bid items.

801.22.11 VALVE BOX ADJUSTMENTS:

801.22.11.1 Valve box adjustment using the adjustment collar and insert shall be measured and paid for per each complete in place including the concrete pad and EMD. If existing ring and cover do not match current approved standards, a new ring and cover that does comply with the Standard Specifications shall be installed and the cost shall be considered incidental to the valve box adjustment.

801.22.11.2 When the adjustment height required on a valve box exceeds the height of the adjustment collar or the valve box has been previously adjusted, the valve box shall be rehabilitated. Measurement and payment shall be made as specified under Valve Box Rehabilitation.

801.22.12 WATER LINE CONNECTIONS:

801.22.12.1 Non-pressurized Connections: Non-pressurized connections shall be measured and paid for at the contract unit price per each for any size or type of pipe, complete in place, which shall include any extra excavation required, shut-off coordination, the removal of any caps or plugs or the cutting of the existing pipe any number of times required to make the connection, drainage plan (if required), pumping or handling of the water, backfilling and compaction. Fittings shall be measured and paid for per pound as specified herein, including all types of couplings.

801.22.12.2 Pressurized Connections: Pressurized connections shall be measured and paid for at the contract unit price per each per location shown on the plans, complete in place, which shall include excavation, the cleaning or removal of existing pipe coatings and coverings, hydrostatic testing, the tapping, any grouting required, backfilling and compaction. The installation of the tapping sleeve and gate valve is to be paid under separate item or as indicated on the plans.

801.22.12.3 Connection to Steel Water Lines: All connections to existing steel water lines shall be made by using a transition coupling. The measurement and payment for this type of connection shall be made per pound of fitting for a Mechanical-Joint Connecting Piece of the size used based on the weights specified in AWWA C110.

801.22.12.4 Waterline Lowering: Where specified on construction drawings and provided on the project bid tab, a waterline lowering shall be a separate bid item and shall not be measured nor paid for as a non-pressurized or pressurized connection.

801.22.13 THRUST RESTRAINTS:

801.22.13.1 CONCRETE BLOCKING: When concrete blocking is used, as authorized by the ENGINEER, the blocking shall be measured and paid for at the contract unit price per cubic yard placed to the neat lines shown on the plans or per the Standard Detail Drawings.

801.22.13.2 RESTRAINING JOINTS FOR CONCRETE CYLINDER PIPE: Measurement and payment for this item shall be at the contract unit price per linear inch of circumferential welded, complete in place, including protective coating of the weld.

801.22.13.3 MECHANICALLY RESTRAINED JOINTS: Mechanically restrained joint assemblies shall be measured and paid for at the contract unit price per each assembly per size of the pipe per each type (pipe to pipe, pipe to mechanical joint, pipe to fitting, etc.) complete in place.

801.22.13.4 VALVE ANCHORAGE: No separate measurement nor payment shall be made for valve anchorage as per Standard Detail Drawing. The cost of this work shall be included with the cost of the valve.

801.22.14 PRESSURE REDUCING VALVE (PRV): Measurement and payment for furnishing and installing a PRV shall be made at the contract unit price per each per size, complete in place as shown on the plans or in the Standard Detail Drawings. The payment shall include all labor, gauges, equipment and material required for the excavation, the PRV, all by-pass piping, fittings and valves both inside and outside the structure, the structure, backfilling and compaction.

801.22.15 AIR RELEASE VALVE (ARV): Measurement and payment for furnishing and installing an ARV shall be made at the contract unit price per each per size of ARV, complete in place as shown on the plans or in the Standard Detail Drawings. The payment shall include all labor, equipment and materials required for the excavation, ARV, piping, fittings, gate valve, structure, backfilling, compaction, EMD, valve box, and concrete collar.

801.22.16 VALVE BOX REHABILITATION: Valve box rehabilitation shall be measured and paid for at the

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contract unit price per each, complete in place which shall include the removal of the existing valve box, excavation, the new valve box installed, EMD, backfilling, compaction and the installation of the concrete collar. If existing ring and cover do not match current approved standards, a new ring and cover that does comply with the Standard Specifications shall be installed and the cost shall be considered incidental to the valve box rehabilitation.

801.22.17 CONCRETE STRUCTURES: The removal and replacement of concrete structures such as sidewalks, drive pads, wheelchair ramps, and curb and gutters, as required for the installation of water lines shall be measured and paid for as specified in Section 340 and 343.

801.22.18 BEDDING MATERIAL: No separate measurement nor payment shall be made for bedding material required when shown on the plans or when required due to the type of pipe supplied by the CONTRACTOR. The cost of the bedding material shall be included in the unit price of the pipe. If bedding material is not required by the conditions above, but is

required due to the conditions encountered during construction, then the bedding material shall be measured and paid for as specified in Section 701.

801.22.19 SURPLUS MATERIALS: No separate measure nor payment will be made for the removal and disposal of surplus material generated by the pipe, bedding material or the use of lean fill.

801.22.20 CORROSION MONITORING STATION ADJUSTMENTS TO FINISHED GRADE

801.22.20.1 Corrosion monitoring station adjustments to grade shall be measured and paid per each complete in place including electrical connections or extensions needed, pea gravel, concrete collar, and traffic rated box and cover to comply with current standard detail drawings.

801.22.21 TRACE WIRE: All work associated with the installation of the trace wire and system shall be considered incidental to the installation cost of the pipeline being traced.

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Test No.: _____

HYDROSTATIC TEST

PROJECT NAME: _____

DATE: _____

PROJECT NUMBER: _____ CONTRACTOR: _____

Location: _____

PIPE MATERIAL: _____ DIP _____ PVC _____ CCP _____ Fabricated Steel

Test: Length(S)= _____ ft.
 Size (D) = _____ inches
 Pressure (P) = _____ psi-gauge (average test pressure during the hydrostatic test)
 Leakage Allowed (L_{ALL}) = _____ gal / hr ($L_{ALL} = SD \sqrt{P} / 13320$ per AWWA C600-99)

Basis: Only resilient seated gate valves and/or rubber seated butterfly valves are used. No metal seated valves are allowed.

Total Leakage Allowed for 2 hour Test Period: $L_{ALL} * 2 \text{ hours} =$ _____ gallons

Actual Amount of Water ADDED to maintain 150 psi \pm 5 psi for 2 hours = _____ gallons

If actual amount of water added is LESS THAN total leakage allowed, test PASSED

If actual amount of water added is GREATER THAN total leakage allowed, test FAILED

_____ Test Passed _____ Test Failed

 Contractor Date

 Inspector Date

 Project Manager Date

COMMENTS: _____

Note: See Section 801.16 for the Specification for test procedures.

SECTION 901

SANITARY SEWER COLLECTOR AND INTERCEPTOR FACILITIES

901.1 GENERAL:

The construction items, specified in this section, are common to sanitary sewer collector and interceptor facilities.

901.2 REFERENCES

901.2.1 ASTM

D 2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

D 3034 Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings

F 679 Standard Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

F 794 Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

901.2.2 (intentionally left blank)

901.2.3 This publication per SECTIONS:

121 Plastic Pipe

131 Fiberglass Pipe

701 Trenching, Excavation and Backfill

901.3 MATERIALS

901.3.1 PIPE:

Sewer line pipe and fittings shall be as specified in other sections, as follows:

Section 121	Plastic Pipe
Section 131	Fiberglass Pipe

901.4 CERTIFICATION:

The OWNER / ENGINEER will be supplied with a certification on each item or type of material required in the sewer line, as to that item meeting the specifications and / or the reference specifications before that item is installed.

901.5 INSTALLATION

901.5.1 GENERAL

901.5.1.1 Pipe and appurtenances shall be new and unused. The type of pipe to be installed shall be as approved by these specifications or unless otherwise shown on the project construction drawings. Pipe and appurtenances shall be handled in such a manner as to ensure delivery to the trench in sound, undamaged condition. Particular care shall be taken to prevent damage to any pipe coating.

901.5.1.2 The interior of the pipe shall be thoroughly cleaned of foreign material before being lowered into the trench and shall be kept clean during construction operations. When work is not in progress, the open ends of pipe shall be securely closed so that no foreign materials will enter the pipe. Any section of pipe found to be defective before or after installation, shall be replaced with sound pipe, or repaired in a manner satisfactory to the ENGINEER, without additional expense to the OWNER.

901.5.1.3 The CONTRACTOR shall install a plug in the new sewer at any point of connection to an existing system. The CONTRACTOR shall not flush or otherwise discharge any flow into an existing system unless approved in writing by the ENGINEER and Water Authority.

901.5.1.3.1 The plug shall remain in place until the ENGINEER or Water Authority authorizes its removal in writing. Under all circumstances, the CONTRACTOR shall be required to remove all plugs prior to acceptance of the work.

901.5.1.3.2 The CONTRACTOR shall certify in writing the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor.

901.5.1.4 Pipe shall be laid to line and grade as shown on the project construction plans. The bedding of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. Suitable excavation shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustment to the line and grade shall be made by scraping away or filling in with pipe zone material under the body of the pipe, and not by wedging or blocking. When connections are to be made to any existing manhole, pipe, or other improvement, the actual elevation or position of which cannot be determined without excavation, the CONTRACTOR shall excavate for and expose the existing improvement before laying the connecting pipe or conduit. When existing underground improvements may reasonably be expected to conflict with the line or grade established for the new sewer line, the ENGINEER shall request the CONTRACTOR to excavate as necessary to expose and locate such potentially conflicting underground improvements prior to laying the new pipe. Any adjustment in line or grade which may be necessary to accomplish the intent of the construction plans will be made, and the CONTRACTOR will be paid for any additional work resulting from such change in line or grade in the manner provided for in the General Conditions.

901.5.1.5 Connections to existing sanitary sewer manholes shall be made by core drilling through the manhole wall. The CONTRACTOR shall take care to avoid unnecessary damage to the existing manhole.

SANITARY SEWER COLLECTOR AND INTERCEPTOR FACILITIES

901.5.1.6 Pipe shall be laid upgrade in a continuous operation from structure to structure, with the bell end of the pipe upgrade unless otherwise permitted by the ENGINEER.

901.5.1.7 Sanitary sewer mains shall not be constructed under walkways, sidewalks, curbs and gutters, drive pads, or similar concrete structures by tunneling underneath them. The CONTRACTOR will remove the section of the concrete structure to the nearest full expansion joint or edge.

901.5.1.8 Prior to completely backfilling the sewer excavation, install a green metalized detectable warning tape 12" to 18" below finished grade. The tape shall be detectable with a standard metal pipe locator. The tape shall be a minimum of 2 inches wide and inscribed at 10-foot intervals with the words, "CAUTION BURIED SEWER LINE BELOW". The tape shall be constructed of material that is impervious to alkalis, acids, chemical reagents, and solvents found in the soils.

901.5.1.9 TRACE WIRE

901.5.1.9.1 GENERAL

901.5.1.9.1.1 Trace wire shall be installed on all public sanitary sewer interceptor, collector, and any other lines considered public infrastructure that will be owned and maintained by the Water Authority.

901.5.1.9.1.2 Trace wire shall be installed in such a manner as to be able to properly trace all pipelines as applicable, without loss or deterioration of the signal.

901.5.1.9.2 MATERIALS: The CONTRACTOR shall submit the manufacturer's data on materials to be furnished that indicate compliance with the specifications regarding materials used. Only products or materials listed on the Water Authority Approved Product List shall be used.

901.5.1.9.2.1 For open trench installation, #12 AWG high strength copper clad steel wire with a minimum 450 pound break load and minimum 30 mil HDPE insulation thickness shall be used.

901.5.1.9.2.2 For directional drilling/boaring installation, #12 AWG high strength copper clad steel wire with a minimum 1,150 pound break load minimum 45 mil HDPE insulation thickness shall be used.

901.5.1.9.2.3 For pipe bursting installation, high strength 7x7 stranded copper clad steel wire with 4,700 pound break load and minimum 50 mil HDPE insulation thickness shall be used.

901.5.1.9.3 CONNECTORS:

901.5.1.9.3.1 Tee Connections: Single 3-way locking waterproof connector for 12 AWG. Connectors shall be approved by the manufacturer for direct burial.

901.5.1.9.3.2 Cross Connectors: Two 3-way locking waterproof connectors for 12 AWG with a short jumper wire. Connectors shall be approved by the manufacturer for direct burial.

901.5.1.9.3.3 Necessary Splice Connections: Single 3-way direct bury lug locking connector rated up to 50 volts filled with dielectric silicone sealant to seal out moisture and corrosion and prevent uninsulated wire exposure. Connectors shall be approved by the manufacturer for direct burial. Splices shall only be used on the main line at the end of a trace wire spool or when a Tee Connection cannot be used. The CONTRACTOR shall not cut the main line trace wire.

901.5.1.9.3.4 Non-locking friction fit, twist on or taped connectors are prohibited.

901.5.1.9.4 TEST STATIONS

901.5.1.9.4.1 All trace wire test stations shall be made of corrosion-resistant materials and shall be equipped with two terminals, a roadway-rated flange to prevent the test station from sinking, and a locking cast iron cap with an encapsulated magnet for ease of locating the test station. The test station shall be specifically manufactured for trace wire access/testing.

901.5.1.9.4.2 All grade level/in-ground test stations shall be appropriately identified with "Test Station" and with "Sewer" cast into the cap and color coded Green.

901.5.1.9.4.3 All trace wire test stations must include a manually interruptible conducting/connection link (terminal jumper) between the terminal for the trace wire connection and terminal for the grounding anode wire connection.

901.5.1.9.5 GROUNDING ANODE: All grounding anodes shall be made of magnesium, with a pointed end to enable direct driving into the ground, specifically manufactured for this purpose. The anode shall come factory equipped with an HDPE cap and 20 feet of factory installed #12 AWG copper clad steel wire with 30 mil HDPE coating rated for direct burial at 30 volts with 21% conductivity. The wire shall have a minimum 450 pound break load.

901.5.1.9.6 COLOR CODING: The insulation of the trace wire and the color of the test station caps shall be Green.

901.5.1.9.7 INSTALLATION

901.5.1.9.7.1 TRACE WIRE INSTALLATION

901.5.1.9.7.1.1 The trace wire shall be installed in the same trench and inside bored holes and casing with pipe during pipe installation.

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SANITARY SEWER COLLECTOR AND INTERCEPTOR FACILITIES

901.5.1.9.7.1.2 The trace wire shall be securely bonded together at all wire joints with a locking waterproof connector that complies with this specification to provide electrical continuity.

901.5.1.9.7.1.3 Trace wire connectors shall be installed in a manner that prevents any uninsulated wire exposure.

901.5.1.9.7.1.4 Except for spliced-in repair or replacement connections, trace wire shall be continuous and without splices between each trace wire access point. For required splices, use splice connectors per this specification. Spliced wires must be knotted prior to being inserted in the connector to prevent separation from the connector in case the trace wires are stretched during backfilling operations.

901.5.1.9.7.1.5 Trace wire systems must be installed as a single continuous wire. No looping or coiling of wire is allowed.

901.5.1.9.7.1.6 No breaks or cuts in the trace wire or trace wire insulation shall be permitted.

901.5.1.9.7.1.7 Trace wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512 Hz) signal for distances in excess of 1,500 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.

901.5.1.9.7.1.8 Any damage occurring during installation of the trace wire must be immediately repaired by removing the damaged wire, and installing a new section of wire with connectors that comply with this specification. Taping and/or spray coating to repair trace wire or trace wire insulation shall not be allowed.

901.5.1.9.7.1.9 Trace wire shall be laid flat on top of the pipe and securely affixed in 6-foot intervals with tape or plastic ties to prevent shifting or damage during backfilling and excavation operations.

901.5.1.9.7.1.10 In occurrences where an existing trace wire is encountered on an existing utility that is being extended or tied into, the new trace wire and existing trace wire shall be connected using splice connectors that comply with this specification.

901.5.1.9.7.1.11 Not used.

901.5.1.9.7.1.12 At service saddles, the trace wire shall not be placed between the saddle and the main.

901.5.1.9.7.1.13 Lay the mainline trace wire continuously by-passing around the outside of manholes, vaults and other structures on the north or east side.

901.5.1.9.7.1.14 For main line intersections, the main line

trace wire shall not be cut.

901.5.1.9.7.1.15 All main line trace wires must be interconnected at intersections, at main line tees and main line crosses. At tees, the three wires shall be joined using a single 3-way locking connector. At crosses, the four wires shall be joined using two 3-way connectors with a short jumper wire between them.

901.5.1.9.7.1.16 All trace wire termination points shall be terminated with a grounding anode.

901.5.1.9.7.1.17 For repairs and rehabilitations, trace wire shall be installed on the new line per this specification. The ends of rehabilitated/replaced pipeline segments shall be connected if existing trace wire exists or shall be terminated with a grounding anode.

901.5.1.9.7.1.18 If repairs are made to a line with a trace wire, Contractor must ensure trace wire is connected with an approved splice connector and test the trace to the next existing test station.

901.5.1.9.8 TEST STATIONS

901.5.1.9.8.1 Test stations shall be installed at the following locations as outlined in the Standard Detail Drawings:

901.5.1.9.8.1.1 At sanitary sewer manholes and sanitary sewer wet wells;

901.5.1.9.8.1.2 At sanitary sewer force main valves;

901.5.1.9.8.1.3 At sanitary sewer vacuum valves;

901.5.1.9.8.2 A minimum of 6 inches of excess/slack wire is required in all trace wire test stations after meeting final elevation. Group and zip-tie excess wire. Do not coil.

901.5.1.9.8.3 Test stations shall be spaced approximately every 1,000 feet and shall not be spaced greater than 1,500 feet apart. Test stations do not need to be installed at each location identified above provided that the spacing between test stations does not exceed 1,500 feet.

901.5.1.9.9 GROUNDING

901.5.1.9.9.1 Trace wire must be properly grounded at all termination points.

901.5.1.9.9.2 Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod buried at the same depth as the trace wire.

901.5.1.9.9.3 Where the grounding anode wire will be connected to a trace wire test station, a minimum of 6 inches of excess/slack wire is required after meeting final elevation.

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901.5.1.9.9.4 When grounding the trace wire in areas where the trace wire is continuous and neither the mainline trace wire nor the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and at the same depth as the trace wire. Do not coil excess wire from grounding anode. The grounding anode wire shall be trimmed to an appropriate length before connecting to trace wire with a splice connector. Install with spliced connection to main trace wire at beginning or endpoints of pipe runs, only when there is no test station box present. If test station is nearby/available, red trace wire from magnesium grounding anode shall be continuous to the terminal in the test station (no other connections or splices).

901.5.1.9.10 TESTING REQUIREMENTS

901.5.1.9.10.1 Contractor shall provide equipment for trace test and shall perform a trace test on all trace wire in the presence of the ENGINEER and WATER AUTHORITY INSPECTOR. If the trace wire is found to be not continuous upon testing, the CONTRACTOR shall repair or replace the failed segment of the wire, and shall be responsible for the cost of any trenching, backfill, repaving and other improvements necessary to complete the trace wire repair. Contractor is encouraged to test trace wire prior to backfill so any issues can be addressed prior to backfill. Passing test results shall be provided for all pipe segments within the Engineer of Record's as-built data and plan set. To pass the continuity test, the following conditions must be met:

901.5.1.9.10.1.1 Trace test shall be performed by using a metallic locator with audible tone and numeric values for certification of the facility locations and shall be identifiable between access points.

901.5.1.9.10.1.2 The wire shall be accessible at all access points and be identifiable between access points.

901.5.2 PLASTIC PIPE INSTALLATION:

901.5.2.1 Plastic sewer pipe shall be connected and placed in the trench in accordance with the manufacturer's recommendations. Where a conflict arises with this Specification, this Specification shall control. Trenching, embedment, and backfill shall be as specified in Section 701.

901.5.2.2 The reference mark (a distinct circumferential line) is placed on the pipe's spigot end by the manufacturer to indicate the correct depth of spigot penetration into the pipe gasket joint. If the pipe is seated too deep or too shallow, the pipe may buckle or separate due to thermal expansion / contraction. Spigot penetration shall be within ¼-inch of the manufacturer's recommended mark.

901.5.2.3 For plastic or fiberglass pipe connection to manholes the CONTRACTOR shall install an appropriately sized and approved press seal gasket. The gasket shall be installed per manufacturer's directions. No direct payment

shall be made for this item. This cost shall be incidental to the pipe's bid item.

901.5.2.4 Not less than thirty (30) days after the installation and backfilling of plastic or fiberglass sewers, including any service connections, the CONTRACTOR shall, in the presence of the ENGINEER, test deflection of the pipe with a mandrel. The mandrel shall be hand pulled. All pipe with deflections in excess of five (5) percent of the base internal diameter, as determined by ASTM D 3034, ASTM F 679, or ASTM F 794 shall be excavated, re-rounded, backfilled and retested after an additional period of at least thirty (30) days. Mandrels shall have nine (9) ribs and be only hand pulled through the test section. The CONTRACTOR shall furnish the mandrels. The length of the minimum radius portion of the mandrel shall not be less than the one-third (1/3) of the nominal diameter of the pipe tested. The minimum mandrel diameter shall be no less than ninety (90) percent of the pipe inside diameter. The pipe shall be flushed and cleaned by the CONTRACTOR prior to testing. No flow will be permitted in the pipe while testing for deflections.

901.5.2.5 All expense for trenching, backfill, compaction, paving, and related work that is required because of failure to meet deflection test requirements shall be borne by the CONTRACTOR.

901.5.2.6 Acceptance of plastic pipe or fiberglass pipe sewers will be made only after these deflection test requirements have been met.

901.5.2.7 Minimum Diameters of Mandrels

901.5.2.7.1

<u>Nominal Pipe Size</u> <u>Diameter</u>	<u>Min. Mandrel</u>
8 in.	7.2 in.
10 in.	9.0 in.
12 in.	10.8 in.
15 in.	13.5 in.
18 in.	16.2 in.
21 in.	18.9 in.
24 in.	21.6 in.
27 in.	24.3 in.

901.6 JOINTS FOR PIPE

901.6.1 (deleted section)

901.6.2 (deleted section)

SANITARY SEWER COLLECTOR AND INTERCEPTOR FACILITIES

901.6.3 JOINT FOR PLASTIC SEWER PIPE (PVC):

901.6.3.1 Refer to ASTM D 2321 and ASTM F 794 for pipe laying and joining of pipe guidelines.

901.6.3.2 Prior to the laying of pipe, each pipe component shall be inspected for damage and cleaned. Damaged components shall be rejected or repaired.

901.6.3.3 All joints will be assembled in accordance with manufacturer's published recommendations. If a lubricant is required to facilitate assembly, it shall have no detrimental effect on the gasket or on the pipe when subjected to prolonged exposure. Proper jointing may be verified by rotation of the spigot by hand or with a strap wrench. If unusual joining resistance is encountered or if the insertion mark does not reach the flush position, disassemble the joint components and repeat the assembly steps. Note that fitting bells may permit less insertion depth than pipe bells. When mechanical equipment is used to assemble joints, care should be taken to prevent over-insertion.

901.6.4 JOINT FOR FIBERGLASS PIPE

901.6.4.1 All joints shall be as specified in Section 131 FIBERGLASS PIPE

901.7 TESTING FOR LEAKAGE

901.7.1 GENERAL:

901.7.1.1 Unless otherwise shown on the construction drawings or specifically deleted by the ENGINEER, in writing, all sanitary sewers shall be tested for leakage.

901.7.1.2 The CONTRACTOR may Air Test the sanitary sewer line before backfilling the trench to aid the CONTRACTOR in checking the installation for any defects. Such testing is at the option of the CONTRACTOR and shall not constitute an acceptance test under these specifications.

901.7.1.3 The test for acceptance and compliance with these specifications shall be performed after the pipe zone backfilling has been completed. In the case of new sanitary sewer lines with house laterals included as an integral part of the project, the test for acceptance and compliance with these specifications shall be performed after the house laterals or stubs have been completed and backfilled. The CONTRACTOR has the option to leave the end of the service line exposed.

901.7.1.4 If the leakage, as shown by the test, is greater than allowed by these specifications, the pipe shall be overhauled at the CONTRACTOR's expense and, if necessary, re-laid until the pipe will satisfactorily pass the test.

901.7.1.5 The CONTRACTOR shall, at no additional expense to the OWNER, furnish all water, material, tools and labor for performing the required tests. All tests shall be made under observation of the ENGINEER.

901.7.2 INFILTRATION TEST:

901.7.2.1 An Infiltration Test shall be used only when excessive ground water prevents satisfactory testing by either the Exfiltration Test or the Air Test. In addition, the Infiltration Test must be performed after backfilling, before any service connections are functioning and at a time when the ground water is over the entire section of pipe and at or near its maximum level.

901.7.2.2 The procedure for conducting an Infiltration Test shall be as follows:

901.7.2.2.1 The pipe section shall be cleaned.

901.7.2.2.2 Determine the groundwater table. The groundwater table shall be determined for each section of sanitary sewer tested.

901.7.2.2.3 Plug the upstream pipe outlet from upstream manhole of the sections being tested with a plug which will assure a tight seal against flow from the upstream portion of the sewer system. Also plug all house laterals and any other connections to the section being tested.

901.7.2.2.4 Install a 90-degree V-notch weir in the downstream manhole of the section being tested. Weir must be installed plumb and sealed to the pipe wall surface.

901.7.2.2.5 A sufficient period of time must be allowed to permit the infiltrated waters to collect and flow over the weir. Water shall flow over the weir for at least 30-minutes prior to taking measurements.

901.7.2.2.6 The head (H) of water flowing over the weir must be measured accurately and the measurement taken at least 18-inches upstream from the crest of the weir.

901.7.2.2.7 Discharge over the 90-degree V-notch weir shall be calculated according to:

$$Q = 3240 H^{2.5}$$

H = Head in inches
Q = Discharge in gallons per day

901.7.2.3 The allowable infiltration shall be 200-gallons per inch of pipe diameter per mile of pipe per day. When there is significantly more than two feet of groundwater above the top of the pipe at the highest point of the section being tested, ten percent additional infiltration above the permitted 200 gal/in.-dia/mi/day limit will be allowed for every 2-foot of additional head.

901.7.2.4 Under all circumstances, the CONTRACTOR shall be required to remove all plugs prior to acceptance of

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the work. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor. The CONTRACTOR shall certify in writing to the Water Authority the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal.

901.7.3 EXFILTRATION TEST

901.7.3.1 An Exfiltration Test may be conducted wherever the groundwater level is below the crown of the pipe at the highest elevation of the section of sanitary sewer being tested. If the groundwater level is above the crown of the pipe either the Air Test, properly adjusted, or Infiltration Test should be used.

901.7.3.2 The procedure for conducting an Exfiltration Test shall be as follows:

901.7.3.2.1 The pipe section shall be cleaned.

901.7.3.2.2 Plug the downstream pipe outlet to the manhole with a plug which will assure a tight seal against water leakage. Also plug all house laterals and any other connections to the section being tested.

901.7.3.2.3 If the upstream manhole is to be used as a reservoir for maintaining the pressure head on the sewer pipe, the inlet sewer pipe of pipes must be plugged. If a standpipe is to be used as a reservoir for maintaining the pressure head on the sewer pipe, the standpipe must be connected to the sewer pipe in the upstream manhole by a tightly sealed connection.

901.7.3.2.4 The amount of water (volume required to fill the section of sewer under test plus the manhole or standpipe) shall be calculated.

901.7.3.2.5 Water shall then be introduced through the manhole or standpipe. The amount of water introduced shall be metered. The amount of water introduced to fill the sewer should be approximately equal to the calculated amount. If the amount of water required to fill the sewer pipe is significantly greater than the calculated amount, it is an indication of a leak or leaks and consequent saturation of the backfill around the sewer pipe. Saturation of the backfill will invalidate the test.

901.7.3.2.6 The level of water in the manhole or standpipe shall be at least two feet above the crown of the pipe at the highest section of the section of sanitary sewer being tested.

901.7.3.2.7 After filling the pipe at least one hour shall be allowed for water absorption in the pipe. For some materials, up to six hours may be required. After the absorption period, the manhole or standpipe shall be refilled to the established measuring mark and the test begun.

901.7.3.2.8 If the upstream manhole is used as a reservoir for maintaining the pressure head on the sewer pipe, the difference in water surface elevation from original to final level in a two hour period shall be used to calculate the water lost. The water lost in the two hour period shall be converted into gallons per day. If a standpipe is used as a reservoir for maintaining the pressure head on the sewer pipe, the standpipe shall be refilled periodically during the two-hour test period to maintain an essentially constant head on the test section of pipe. The amount of water added shall be measured and shall be used to calculate the loss in gallons per day.

901.7.3.2.9 The allowable exfiltration shall be computed based upon the average pressure head above the crown of the pipe for the section tested as follows:

$$\text{Allowable leakage} = \frac{\sqrt{h}}{\sqrt{3}} \times 200$$

Allowable leakage in gallons per inch of pipe diameter per mile of pipe per day

h = average pressure head above the crown of the pipe, in feet (elevation of water at center run)

901.7.3.2.10 When the upstream manhole is used as a reservoir for maintaining the pressure head, the allowable leakage from the manhole shall be added to the allowable leakage calculated for the sewer pipe.

901.7.3.3 If the sanitary sewer line fails to pass the Exfiltration Test, a re-test shall be permitted only after the groundwater conditions surrounding the pipe return to a condition similar to those existent at the beginning of the test period. The groundwater elevation shall be determined prior to initiation of a second test.

901.7.3.4 Under all circumstances, the CONTRACTOR shall be required to remove all plugs prior to acceptance of the work. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor. The CONTRACTOR shall certify in writing to the Water Authority the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal.

901.7.4 AIR TEST:

901.7.4.1 An Air Test may be conducted under all conditions of groundwater levels surrounding the sanitary sewer pipe. If the groundwater is above the crown of the pipe, the air pressure shall be increased by an increment equal to the pressure exerted by the groundwater over the pipe.

901.7.4.2 The procedure for conducting an Air Test shall be as follows:

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901.7.4.2.1 Clean the pipe section (manhole to manhole reach of sewer) being tested by propelling a snug-fitting inflated ball, or other adequate method, through the pipe with water. It is important that the pipe is thoroughly wetted if consistent results are to be expected.

901.7.4.2.2 Plug all pipe outlets with pneumatic plugs. The pneumatic plugs shall be able to resist internal testing pressures without requiring external bracing. Give special attention to house laterals.

901.7.4.2.3 Determine the groundwater level surrounding the section of sewer under test. If the groundwater level is above the crown of the pipe, the test pressures shall be increased by 0.43 psig for each foot of water above the average elevation of the crown of the pipe. If the average vertical height of groundwater above the pipe invert is more than 12.7 feet, the section so submerged shall be tested using 9.0 psig as the starting test pressure. In no case should the starting test pressure exceed 9 psig.

901.7.4.2.4 Introduce air slowly to the section of pipe under evaluation until the internal air pressure is raised to 4.0 psig plus any increase required by a high groundwater level.

901.7.4.2.5 Allow the air pressure to stabilize. Air may be added slowly to maintain a pressure in the 3.5 to 4.0 psig (plus groundwater allowance) for two minutes.

901.7.4.2.6 After the stabilization period, when the pressure reaches exactly 3.5 psig (plus groundwater allowance) the stopwatch is started and when the pressure

reaches exactly 2.5 psig (plus groundwater allowance) the stopwatch is stopped.

901.7.4.2.7 If the time required for a one pound pressure drop is not less than the allowable time for the pipe section under test to lose air, the section shall pass the leakage test.

901.7.4.2.8 If there has been no leakage (zero psi drop) after one hour of testing, the test section shall pass the leakage test.

901.7.4.3 In all cases where an Air Test is conducted, the manholes shall be tested separately as previously specified.

901.7.4.4 All persons conducting an Air Test must be aware that an Air Test may be dangerous if improperly conducted. It is extremely important and essential that all plugs be properly installed and braced by the CONTRACTOR in such a way that blowouts are prevented.

901.7.4.5 Under all circumstances, the CONTRACTOR shall be required to remove all plugs prior to acceptance of the work. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor. The CONTRACTOR shall certify in writing to the Water Authority the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal.

901.7.5 AIR TESTING TABLE: Table 901.7.5.1 will be used to determine the required test duration for the section of line being tested.

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TABLE 901.7.5.1
LOW-PRESSURE AIR TEST TIME SPECIFICATION
FOR A NON-PRESSURE SEWER LINE

901.7.5.2 EXPLANATION AND USE OF TABLE

Explanation of Tables

(A) Pipe Diameter (inches)	(B) Minimum Time (min:sec)	(C) Maximum Length for Minimum Time (feet)	(D) Time for Longer Length (seconds)	(E)							
				Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.38*L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854*L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.52*L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374*L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418*L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342*L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692*L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.47*L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674*L								102:3
			L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	3
27	25:30	88	17.306*L						100:5	115:2	129:4
			L	28:51	43:16	57:41	72:07	86:32	7	2	8
30	28:20	80	21.366*L						124:3	142:2	160:1
			L	35:37	53:25	71:13	89:02	106:50	8	6	5
33	31:10	72	25.852*L						150:4	172:2	193:5
			L	43:05	64:38	86:10	107:43	129:16	3	1	3
36	34:00	66	30.768*L						179:2	205:0	230:4
			L	51:17	76:55	102:34	128:12	153:50	9	7	6
42	39:48	57	41.883*L						244:1	279:1	314:0
			L	69:48	104:42	139:37	174:30	209:24	9	3	7
48	45:34	50	54.705*L						319:0	364:4	410:1
			L	91:10	136:45	182:21	227:55	273:31	6	2	7
54	51:02	44	69.236*L						403:5	461:3	519:1
			L	115:2	4	173:05	230:47	228:29	3	4	6
60	56:40	40	85.476*L						498:3	569:5	641:0
			L	142:2	8	213:41	284:55	356:09	7	0	4

Column A Nominal diameter of pipe (any pipe material)

Column B Minimum duration of air test up to a maximum of length of line being tested -
(e.g., 0-feet through 298-feet of 8-inch PVC:
Test Duration: 7 minutes 34 seconds)

Column C Maximum length of line associated with minimum duration of time for the air test shown
in Column B

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Column D of air test	L = length of line in feet; product of computation yields duration (e.g., 250-feet of 12-inch PVC where ground water is not present) Test Duration— $3.418 * (250) = 854.5 \text{ sec.} = 14 \text{ min. } 15 \text{ sec.}$
Column E	Duration of air test for given incremental lengths of line.

901.8 CLEANING AND INSPECTION

901.8.1 CLEANING: No pipe spalls, rocks, dirt, joint compounds, cement mortar and other trash or obstructions shall be left in a sewer pipe of any size or type. During the flushing operations the manhole outlet shall be bagged or plugged so that debris will not be carried into or contaminate an existing or active line.

901.8.1.1 Under all circumstances, the CONTRACTOR shall be required to remove all plugs prior to acceptance of the work. The Water Authority assumes no liability for damages caused by plugs inadvertently left in the line by the Contractor. The CONTRACTOR shall certify in writing to the Water Authority the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal.

901.8.2 TELEVISION:

901.8.2.1 All completed sewer lines shall be inspected by a television camera before lines become operational or final acceptance of the installation.

901.8.2.2 After the CONTRACTOR has cleaned, flushed, and retrieved all debris and plugs in the line, the CONTRACTOR will notify the project engineer that the line is ready for television inspection. The CONTRACTOR in the presence of the ENGINEER or the engineer's representative shall televise the line with televising equipment specifically designed and constructed for sewer line visual inspection.

901.8.2.2.1 The television camera shall be of color and equipped with a rotating lens capable of 360-degree rotation with zoom focus and a wide-angle optical lens permitting spontaneous focal adjustments, allowing viewing of service lateral connections, joints, pipe walls, etc.

901.8.2.2.2 A television report log, completed on the OWNER'S log form, shall be maintained during the television inspection. This log shall be completed to the OWNER'S satisfaction noting the location, project title, name of OWNER, date, type of pipe material, line size, location of services (live or stub-outs), manhole or station numbers, and any abnormal or line defects within the line segment.

901.8.2.2.3 The CONTRACTOR shall be responsible for subsequent televising when line repairs are required or when the previous televising is not satisfactory to the OWNER.

901.8.2.3 When the televising is complete, the CONTRACTOR shall turn over the complete television report logs and the recordings in a format acceptable to the Water Authority.

901.9 MEASUREMENT AND PAYMENT

901.9.1 SANITARY SEWER PIPE: Installed pipe shall be measured and paid for as follows:

901.9.1.1 For straight lines, the pipe length shall be the intervening distance between the centers of manholes along a line parallel to the pipe invert.

901.9.1.2 For curvilinear lines, the pipe length shall be the intervening arc distance between the centers of manholes along a line parallel to the pipe invert.

901.9.1.3 Payment for pipe will be in accordance with the unit price per linear foot per size and material as defined in the Bid Proposal, and shall include: pipe installed in the trench, jointing and coupling materials, and other materials necessary to connect to other sections of pipe, manholes, and other appurtenances.

901.9.2 CONNECTIONS: Connections, tying new sewer lines into existing manholes, shall be measured and paid for on a unit price per each within the size increments as specified in the Bid Proposal. Connections to the shelf section of the floor will not be considered for payment.

901.9.3 VERTICAL DROPS: Vertical drops at manholes shall be measured by the linear foot of pipe from the invert of the sewer line to be dropped to the spring line of the receiving main. Payment will be made on the unit price per linear foot per size and type of pipe as specified in the Bid Proposal.

901.9.4 TESTING:

901.9.4.1 Infiltration, exfiltration, and air tests of sewer mains shall include sewer service lines to the property lines, right-of-way lines, and easement lines as installed per the construction plans. No payment will be made for the initial test or subsequent tests.

SECTION 901

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901.9.4.2 Television inspection and documentation is considered incidental and shall be included in the construction item's unit cost unless otherwise specified in the Bid Proposal.

901.9.4.3 There will be no payment for required testing of sanitary sewer manholes.

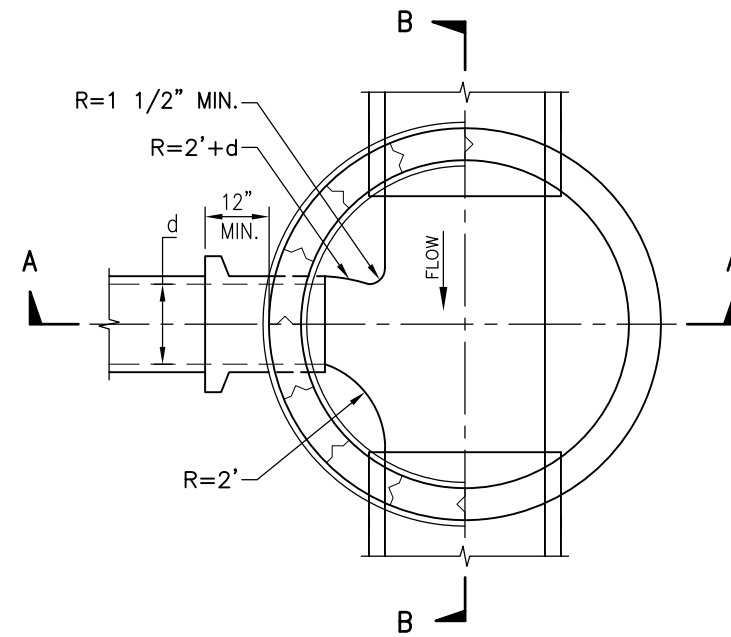
901.9.4.4 No payment will be made for deflection tests after the required waiting period for PVC sewer pipe installations.

901.9.5 REMOVAL AND DISPOSAL OF SANITARY SEWER PIPE: Removal and disposal of sanitary sewer lines shall be measured by the linear foot within the specified pipe size increments. Payment will be made on the unit price per linear foot of specified pipe size in the Bid Proposal. Trenching, backfilling, and pavement removal and replacement will be paid for based on the unit prices for each appropriate bid item in the Bid Proposal. If new pipe is to be installed in the same trench as the removed pipe, only one payment will be made for trenching backfilling, and pavement removal and replacement.

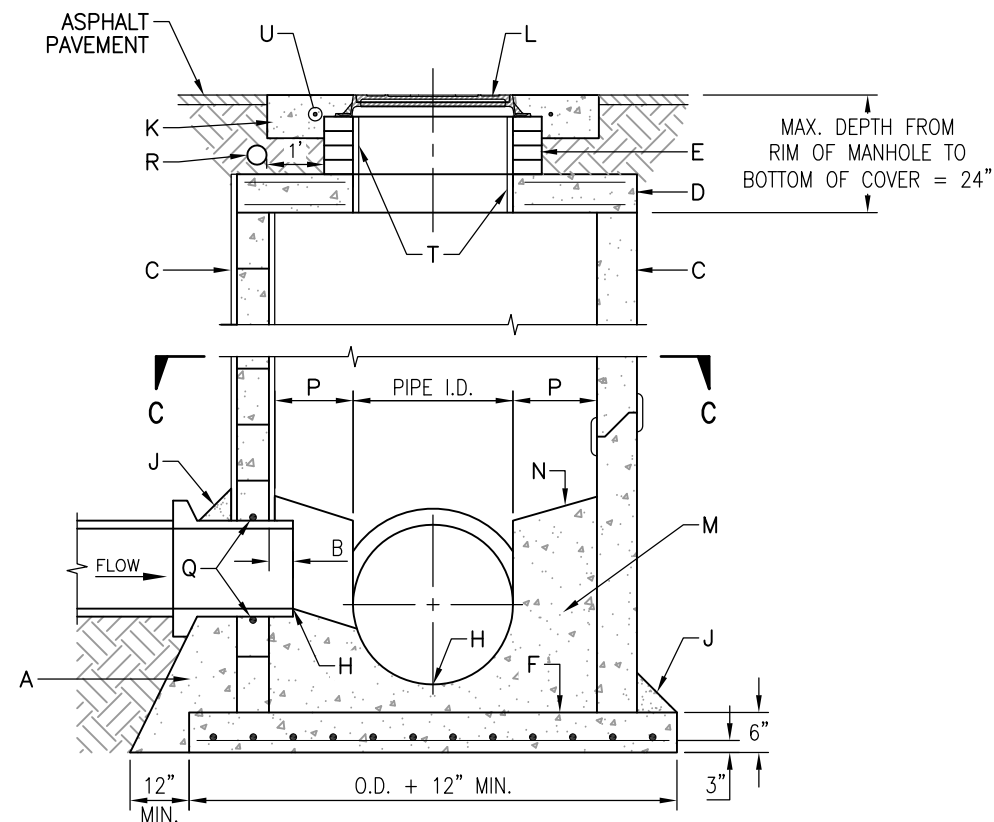
901.9.6 TRACE WIRE: Trace Wire: All work associated with the installation of the trace wire and system shall be considered incidental to the installation cost of the pipeline being traced.

SECTION 2100
STANDARD DETAILS FOR SANITARY SEWER

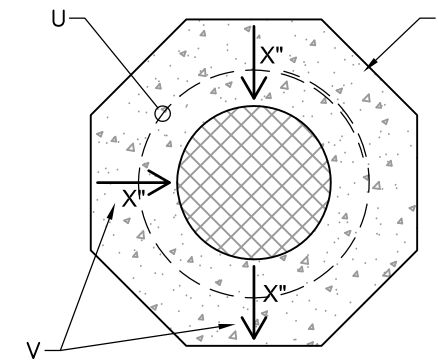
DWG. NO.	TITLE
2101	SANITARY SEWER MANHOLE TYPE “C”
2102	SANITARY SEWER MANHOLE TYPE “E”
2103	SANITARY SEWER TYPICAL PLACEMENT OF MANHOLES AT ARTERIAL INTERSECTIONS
2107	SANITARY SEWER CONCRETE MANHOLE TOP SLAB TYPE “C”
2109	SANITARY SEWER MANHOLE FRAMES AND COVERS
2110	SANITARY SEWER MANHOLE LIFT STATION AND VALVE VAULT
2111	SANITARY SEWER MANHOLE LIFT STATION DETAILS
2116	SANITARY SEWER VERTICAL DROP AT MANHOLE
2118	SANITARY SEWER SERVICE LINE CONNECTIONS AT MANHOLE
2120	SANITARY SEWER TRAP MANHOLE
2125	SANITARY SEWER SERVICE LINE DETAILS
2128	SANITARY SEWER RING AND COVER FOR VALVE BOX
2134	SANITARY SEWER SERVICE REPLACEMENT DETAIL
2135	SANITARY SEWER RISER DETAILS RIGID PIPE MAIN
2136	SANITARY SEWER RISER DETAILS FLEXIBLE PIPE MAIN
2140	SANITARY SEWER ENCASEMENT DETAILS
2145	SANITARY SEWER DEAD-END MARKER
2150	SANITARY SEWER SAMPLING AND METERING MANHOLE 6’ x 8’ RECTANGULAR
2160	SANITARY SEWER AIR RELEASE VALVE DETAIL
2162	VACUUM SEWER STANDARD DETAILS
2163	VACUUM SEWER VALVE AND PIT INSTALLATION WITH LIFT IN VACUUM SERVICE LATERAL
2164	VACUUM SEWER TYPICAL VACUUM BRANCH LINE CONNECTION
2165	VACUUM SEWER 3” VALVE AND PIT INSTALLATION WITH INTERNAL BREATHER
2167	VACUUM SEWER SINGLE BUFFER TANK 30 GALLON PER MINUTE MAX. FLOW
2168	VACUUM SEWER DUAL BUFFER TANK 60 GALLON PER MINUTE MAX. FLOW
2169	VACUUM SEWER VALVE STEM NUT AND SOCKET DETAILS
2170	VACUUM SEWER VALVE BOX
2171	VACUUM SEWER VACUUM VALVE PIT
2173	VACUUM SEWER BLOCKING AND SEEPAGE COLLAR DETAILS
2174	VACUUM SEWER SERVICE WYE ON EXISTING VACUUM MAIN
2180	VACUUM SEWER CASING DETAIL FOR BORE AND JACK
2181	FORCEMAIN SEWER VALVE BOX
2182	FORCEMAIN SEWER LOW PRESSURE SANITARY SEWER FLUSHING CONNECTION
2183	FORCEMAIN SEWER CONNECTION TO GRAVITY SEWER AT MANHOLE
2184	FORCEMAIN SEWER TYPICAL FORCEMAIN CONFIGURATION
2185	FORCEMAIN SEWER SERVICE LINE VALVE DETAIL
2190	SEWER TRACE WIRE SAMPLE PLAN AND DETAILS
2191	SEWER MANHOLE TRACE WIRE DETAILS



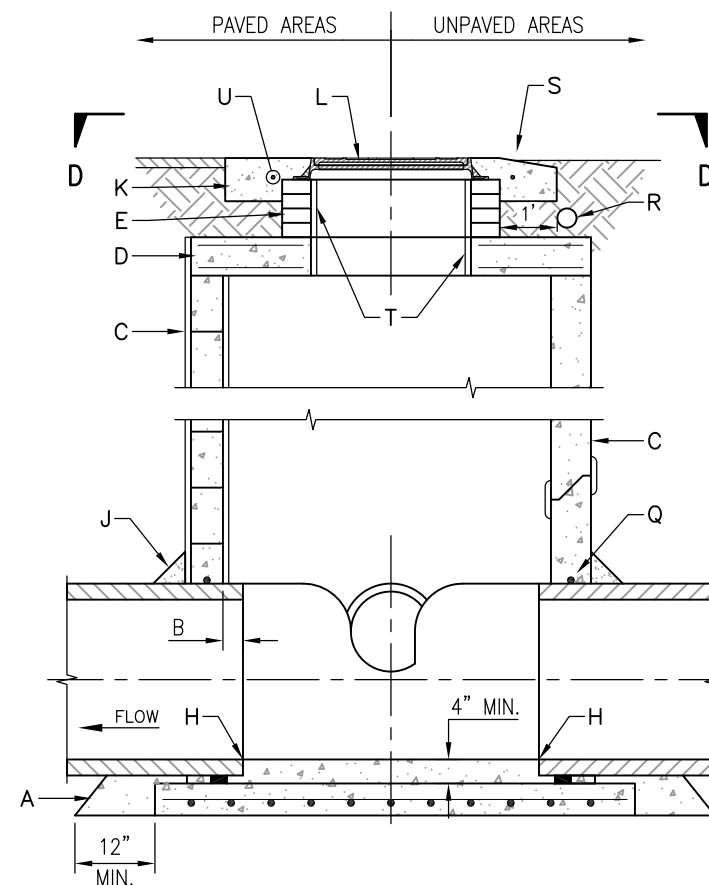
PLAN AT C-C



CROSS SECTION A-A



PLAN AT D-D



CROSS SECTION B-B

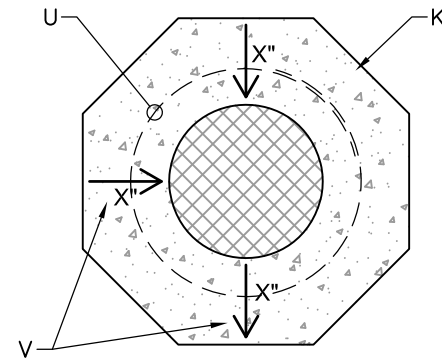
GENERAL NOTES

1. USE TYPE "C" MANHOLE FOR DEPTHS OF <6' MEASURED FROM INVERT TO RIM.
2. CONTRACTOR HAS OPTION TO CONSTRUCT TYPE "C" MANHOLE IN LIEU OF TYPE "E" MANHOLE FOR DEPTHS $\geq 6'$.
3. MANHOLES >18' IN DEPTH SHALL BE CONSTRUCTED OF PRECAST CONCRETE SECTIONS ONLY.
4. DESIGN APPLIES TO 4' TO 6' I.D. MANHOLES.
5. COMPACT ALL BACKFILL AROUND MANHOLE TO 95% (ASTM).
6. USE NON-SHRINK GROUT FOR JOINTS, FILLETS AND PIPE PENETRATIONS.
7. APPLY WATERPROOFING COATING TO EXTERIOR OF MANHOLE IN AREAS WHERE GROUNDWATER IS PRESENT.
8. AN INTERIOR COATING, WITH A WATER AUTHORITY APPROVED EPOXY RESIN-TYPE MATERIAL, SHALL BE APPLIED TO MANHOLES ON MAINS LARGER THAN 24" IN DIAMETER.
9. POSITION MANHOLE OPENING OVER THE CENTER OF MANHOLE.

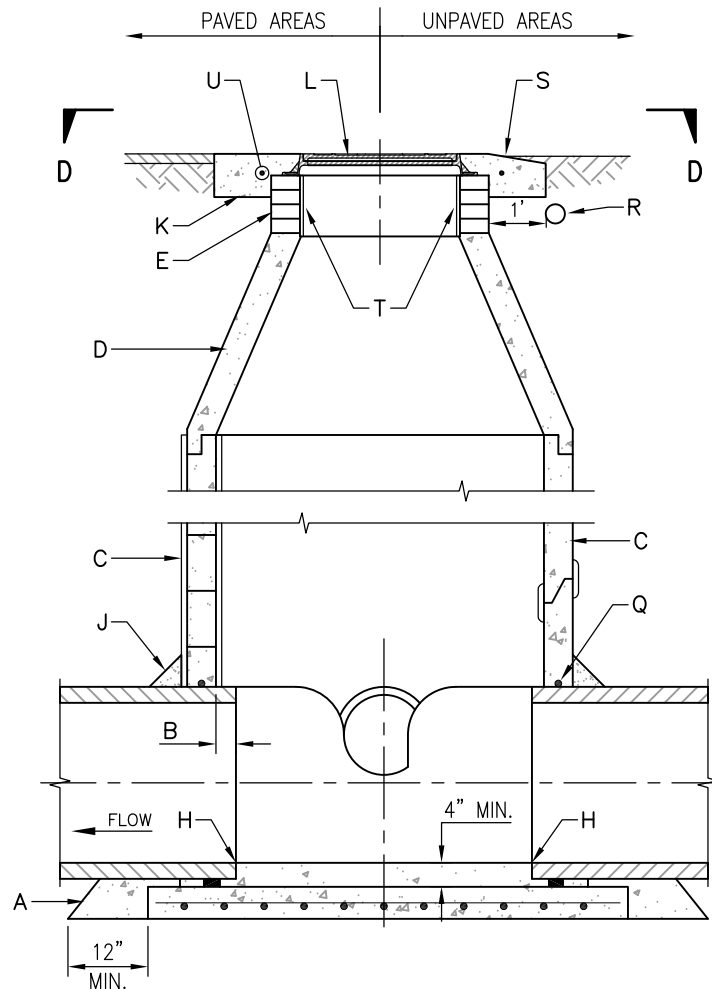
CONSTRUCTION NOTES

- A. CONCRETE PIPE SUPPORTS SHALL EXTEND OUTSIDE OF MANHOLE TO BELL OF FIRST JOINT AND SHALL CRADLE PIPE TO SPRING LINE. NOT APPLICABLE FOR FLEXIBLE PIPE.
- B. PIPE PENETRATION INTO MANHOLE SHALL BE FLUSH TO 2" MAX., MEASURED AT SPRINGLINE OF PIPE.
- C. MANHOLE MAY BE CONSTRUCTED OF CONCRETE BLOCK, POURED CONCRETE, OR PRECAST REINFORCED CONCRETE. IF PRECAST CONCRETE IS USED, USE MASTIC GASKETS AND APPLY NON-SHRINK GROUT TO EXTERIOR AND INTERIOR OF EXPANSION JOINTS. IF BLOCK IS USED, APPLY 1/2" THICK MORTAR COATING TO EXTERIOR AND INTERIOR OF MANHOLE.
- D. PRECAST CONCRETE TOP SLAB, SEE STANDARD DRAWING 2107.
- E. USE MAX. 4 COURSES GRADE MS BRICK ON UNPAVED STREET FOR FUTURE ADJUSTMENT OF MANHOLE FRAME TO PAVEMENT GRADE.
- F. CONCRETE BASE TO BE POURED IN PLACE USING NO. 4 BARS AT 6" O.C. EA. WAY FOR MANHOLE DEPTH OF $\geq 16'$. NO. 4 BARS AT 12" O.C. EA. WAY FOR MANHOLE DEPTH OF <16'.
- G. INVERT ELEVATION OF STUB OR LATERAL AS SHOWN ON PLANS.
- H. 6" GROUT FILLET ON UPPER HALF OF PIPE AND AROUND BASE.
- I. OCTAGONAL CONCRETE PAD, SEE STANDARD DWG. 2461 FOR REFERENCE.
- J. MANHOLE FRAME AND COVER, SEE DRAWING 2109. INSTALL A 24" COVER FOR SEWER LINE $\leq 24"$, AND A 32" COVER FOR SEWER LINE >24".
- K. CONCRETE, SEE SPECIFICATION SECTION 101.
- L. SLOPE 1" PER FT. FROM PIPE CROWN.
- M. SHELF TO BE 9" WIDE MIN.
- N. APPROVED WATERSTOP TO BE COMPATIBLE WITH TYPE OF PIPE.
- O. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.
- P. CONCRETE COLLAR IN UNPAVED AREAS, SEE STANDARD DRAWING 2461.
- Q. APPLY 1/2" THICK MORTAR COATING TO INTERIOR OF OPENING.
- R. #4 REBAR PER STANDARD DRAWING 2461.
- S. TOP OF CONCRETE COLLAR SHALL BE STAMPED WITH LINE SIZE AND FLOW DIRECTION ARROWS. MINIMUM LETTER SIZE SHALL BE 3" IN HEIGHT.

REVISIONS	WATER AUTHORITY
JAN. 2013	SANITARY SEWER MANHOLE TYPE "C"
	DWG. 2101 OCT. 2017



PLAN AT C-C

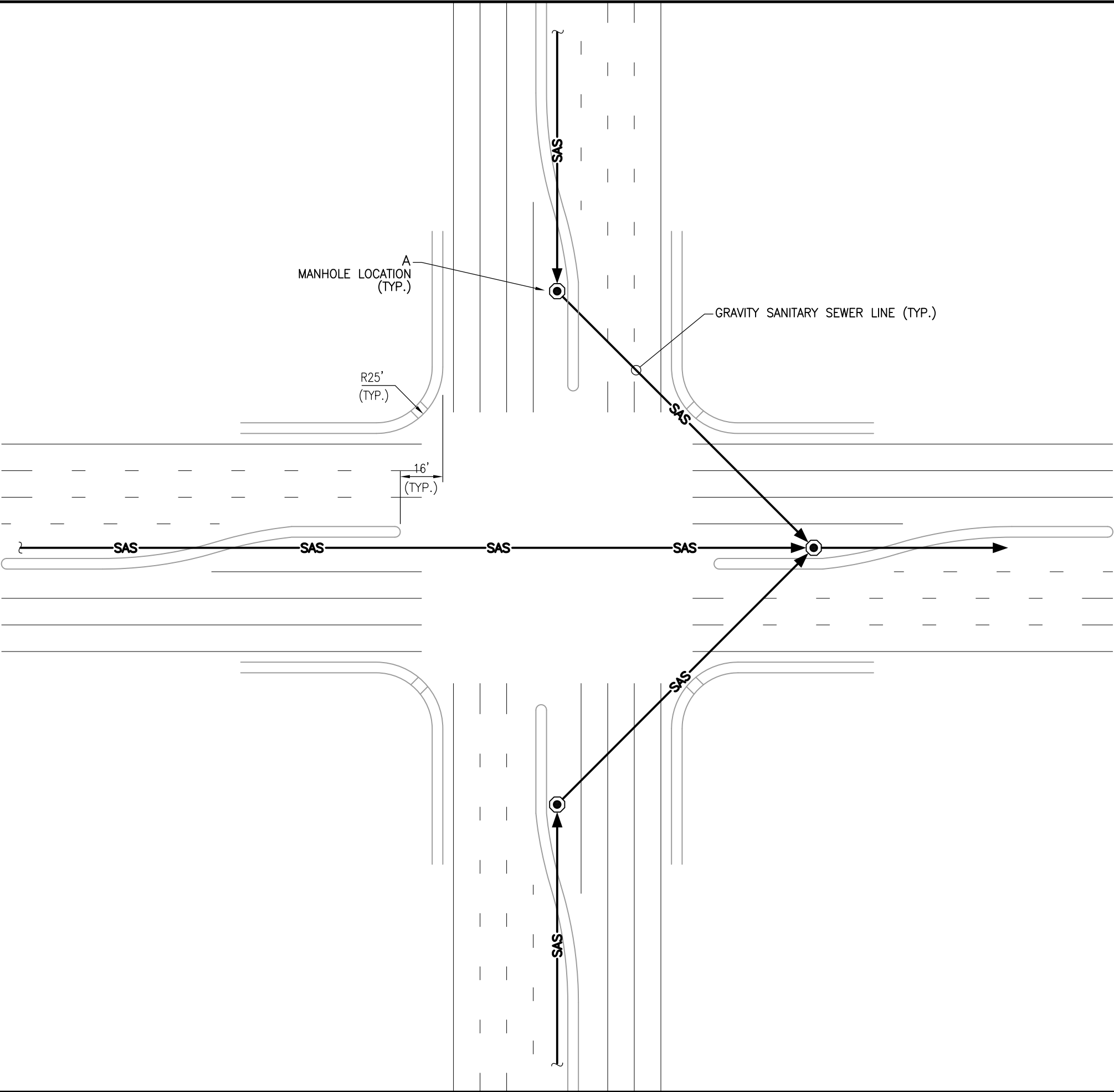


CROSS SECTION B-B

1. USE TYPE "E" MANHOLE FOR DEPTHS OF $\geq 6'$ MEASURED FROM INVERT TO RIM.
2. CONTRACTOR HAS OPTION TO CONSTRUCT TYPE "C" MANHOLE IN LIEU OF TYPE "E" MANHOLE FOR DEPTHS $\geq 6'$.
3. MANHOLES $> 18'$ IN DEPTH SHALL BE CONSTRUCTED OF PRECAST CONCRETE SECTIONS ONLY.
4. DESIGN APPLIES TO 4' TO 6' I.D. MANHOLES.
5. COMPACT ALL BACKFILL AROUND MANHOLE TO 95% (ASTM).
6. USE NON-SHRINK GROUT FOR JOINTS, FILLETS AND PIPE PENETRATIONS.
7. APPLY WATERPROOFING COATING TO EXTERIOR OF MANHOLE IN AREAS WHERE GROUNDWATER IS PRESENT.
8. AN INTERIOR COATING, WITH A WATER AUTHORITY APPROVED EPOXY RESIN-TYPE MATERIAL, SHALL BE APPLIED TO MANHOLES ON MAINS LARGER THAN 24" IN DIAMETER.
9. POSITION MANHOLE OPENING OVER THE CENTER OF MANHOLE.

- A. CONCRETE PIPE SUPPORTS SHALL EXTEND OUTSIDE OF MANHOLE TO BELL OF FIRST JOINT AND SHALL CRADLE PIPE TO SPRING LINE. NOT APPLICABLE FOR FLEXIBLE PIPE.
- B. PIPE PENETRATION INTO MANHOLE SHALL BE FLUSH TO 2" MAX., MEASURED AT SPRINGLINE OF PIPE.
- C. MANHOLE MAY BE CONSTRUCTED OF CONCRETE BLOCK, POURED CONCRETE, OR PRECAST REINFORCED CONCRETE. IF PRECAST CONCRETE IS USED, USE MASTIC GASKETS AND APPLY NON-SHRINK GROUT TO EXTERIOR AND INTERIOR OF EXPANSION JOINTS. IF BLOCK IS USED, APPLY 1/2" THICK MORTAR COATING TO EXTERIOR AND INTERIOR OF MANHOLE.
- D. PRECAST REINFORCED CONCRETE CONCENTRIC CONE. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR APPROVAL.
- E. USE MAX. 4 COURSES GRADE MS BRICK ON UNPAVED STREET FOR FUTURE ADJUSTMENT OF MANHOLE FRAME TO PAVEMENT GRADE.
- F. CONCRETE BASE TO BE POURED IN PLACE USING NO. 4 BARS AT 6" O.C. EA. WAY FOR MANHOLE DEPTH OF $\geq 16'$. NO. 4 BARS AT 12" O.C. EA. WAY FOR MANHOLE DEPTH OF $< 16'$.
- H. INVERT ELEVATION OF STUB OR LATERAL AS SHOWN ON PLANS.
- J. 6" GROUT FILLET ON UPPER HALF OF PIPE AND AROUND BASE.
- K. OCTAGONAL CONCRETE PAD, SEE STANDARD DWG. 2461 FOR REFERENCE.
- L. MANHOLE FRAME AND COVER, SEE DRAWING 2109. INSTALL A 24" COVER FOR SEWER LINE $\leq 24"$, AND A 32" COVER FOR SEWER LINE $> 24"$.
- M. CONCRETE, SEE SPECIFICATION SECTION 101.
- N. SLOPE 1" PER FT. FROM PIPE CROWN.
- P. SHELF TO BE 9" WIDE MIN.
- Q. APPROVED WATERSTOP TO BE COMPATIBLE WITH TYPE OF PIPE.
- R. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.
- S. CONCRETE COLLAR IN UNPAVED AREAS, SEE STANDARD DRAWING 2461.
- T. APPLY 1/2" THICK MORTAR COATING TO INTERIOR OF OPENING.
- U. #4 REBAR PER STANDARD DRAWING 2461.
- V. TOP OF CONCRETE COLLAR SHALL BE STAMPED WITH LINE SIZE AND FLOW DIRECTION ARROWS. MINIMUM LETTER SIZE SHALL BE 3" IN HEIGHT.

REVISIONS	WATER AUTHORITY
JAN. 2013	SANITARY SEWER MANHOLE TYPE "E"
	DWG. 2102 OCT. 2017



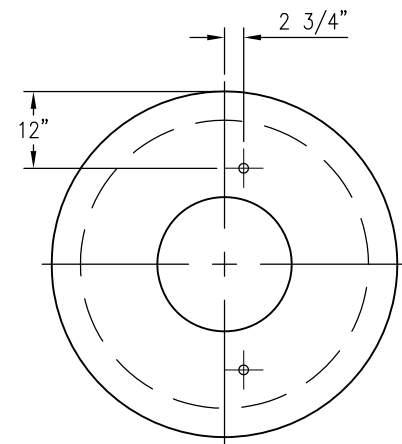
GENERAL NOTES

1. THIS DETAIL PERTAINS TO NEW INFRASTRUCTURE AND IS NOT TO BE USED AS A RELOCATION PLAN FOR EXISTING INFRASTRUCTURE. FINAL DESIGN AND LAYOUT OF MANHOLE LOCATIONS SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS. ENGINEER SHALL COORDINATE DESIGN WITH THE INTERSECTION AND ALL RELATED SYSTEMS. DESIGN MUST BE APPROVED BY THE WATER AUTHORITY AND ALL PARTIES INVOLVED WITH THE INTERSECTION PRIOR TO CONSTRUCTION.
2. SEE STANDARD DRAWINGS SECTION 2400 FOR PAVING, AND SECTION 2500 FOR TRAFFIC/INTERSECTION DETAILS.
3. GREY BACKGROUND LINEWORK REPRESENTS GUTTER FLOW LINES. DEPENDING ON THE INTERSECTION, THIS DESIGN WILL VARY.
4. PAVEMENT STRIPING SHOWN IS DIAGRAMMATIC ONLY.

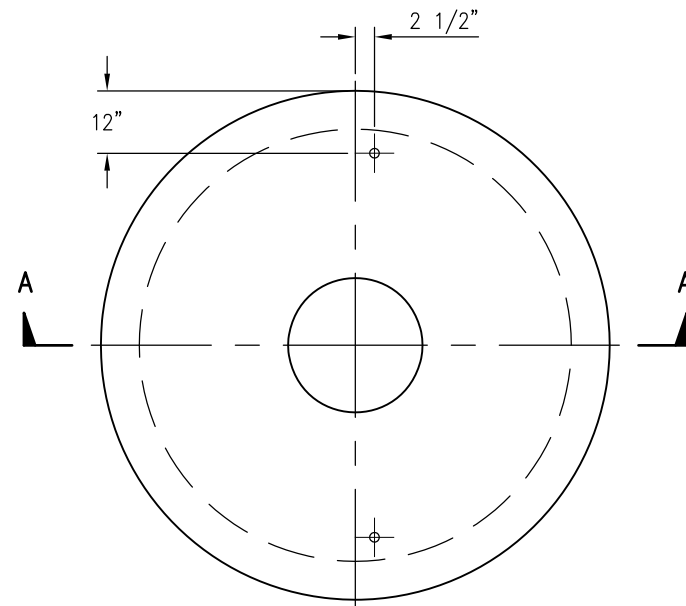
CONSTRUCTION NOTES

- A. MANHOLE PER STANDARD DRAWINGS 2101 OR 2102.

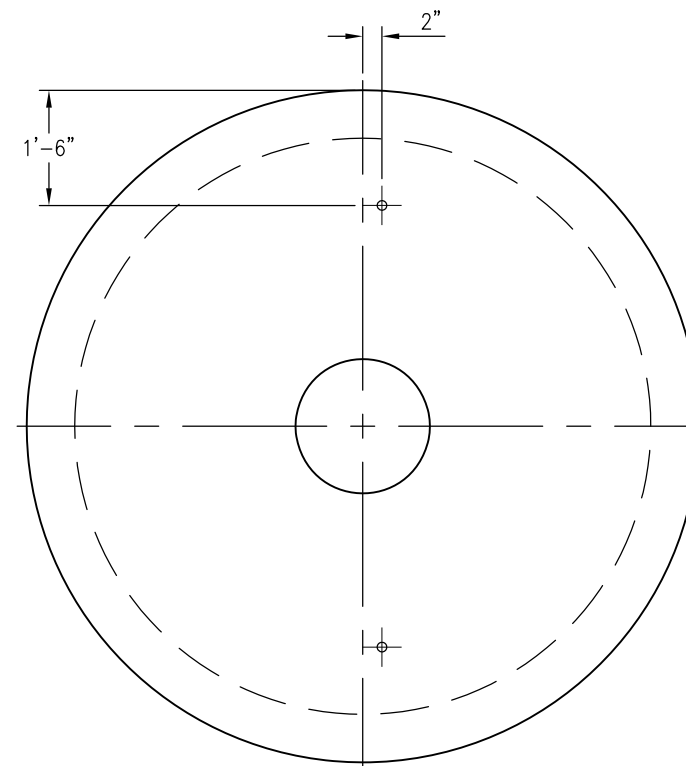
REVISIONS	WATER AUTHORITY
	SANITARY SEWER TYPICAL PLACEMENT OF MANHOLES AT ARTERIAL INTERSECTIONS DWG. 2103APR. 2018



4' I.D. MH

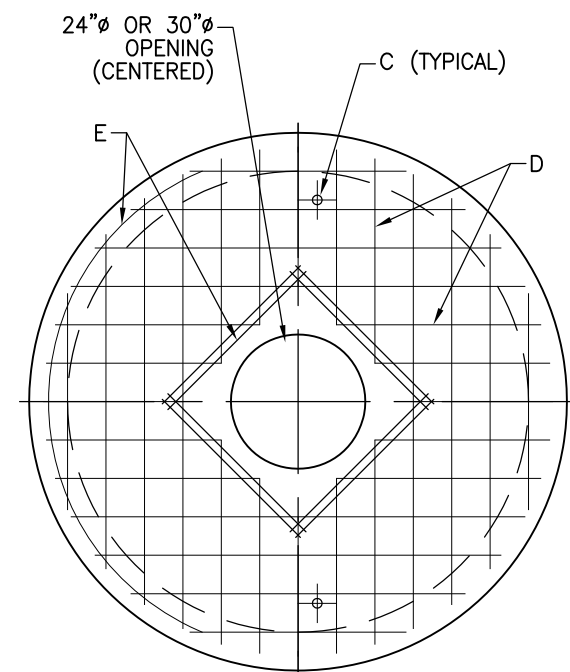


6' I.D. MH

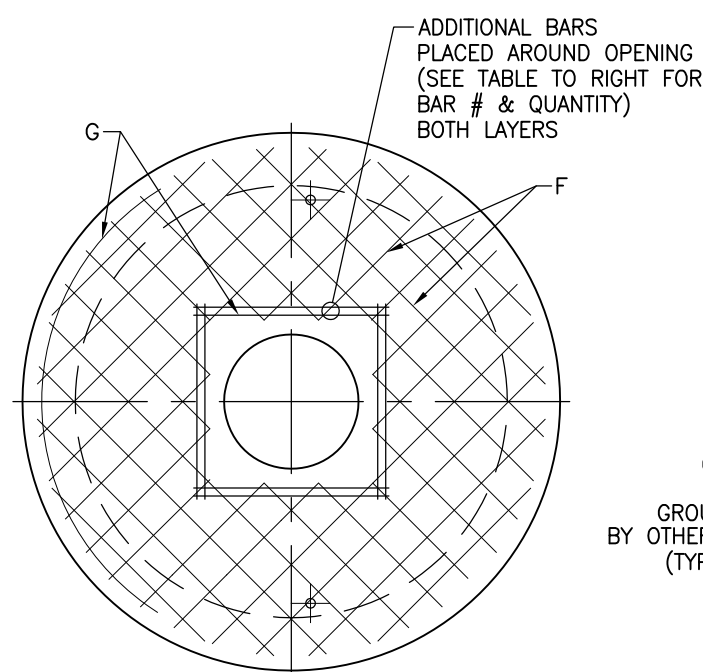


8' I.D. MH

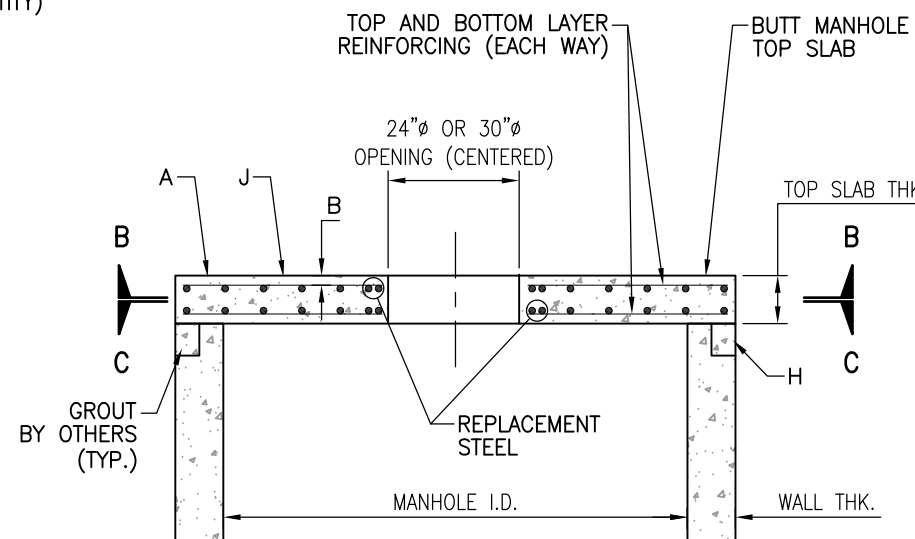
PLAN



SECTION B-B
TOP MAT



SECTION C-C
BOTTOM MAT



SECTION A-A
FLAT TOP SLAB REINFORCEMENT DETAIL

GENERAL NOTES

- ALL MANHOLES $\geq 20'$ IN DEPTH WILL REQUIRE AN INTERMEDIATE LANDING IN THE MANHOLE BARREL. TYPE "C" MANHOLE TOP SLABS SHALL BE USED AS INTERMEDIATE LANDINGS.
- INTERMEDIATE LANDINGS SHALL BE LOCATED AT THE MID POINT $\pm 2'$ OF THE HEIGHT OF THE MANHOLE. AT NO TIME SHALL AN INTERMEDIATE LANDING OR A SIZE ADJUSTMENT TOP BE INSTALLED CLOSER THAN 8' UP FROM THE INVERT OF THE MANHOLE.

CONSTRUCTION NOTES

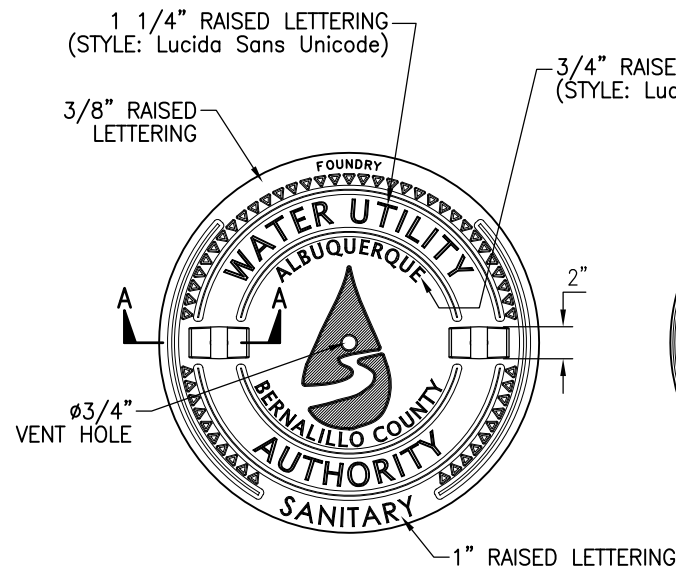
- PRECAST REINFORCED CONCRETE MANHOLE TOP SLAB.
- ALL BARS TO HAVE 1 1/2" MIN. COVER.
- 1" PIPE SLEEVE VERTICALLY THROUGH TOP SLAB.
- TOP MAT NO. 4 BARS 6" O.C. EACH WAY FOR 4', 6' AND 8' I.D. MANHOLES.
- NO. 4 BARS
- BOTTOM MAT NO. 4 BARS 6" O.C. EACH WAY FOR 4' AND 6' I.D. MANHOLES, NO. 8 BARS 8" O.C. EACH WAY FOR 8' I.D. MANHOLES.
- NO. 4 BARS FOR 4' AND 6' I.D. MANHOLES.
- WHEN PRECAST MANHOLE SECTIONS ARE USED, TOP SLAB SHALL BE MODIFIED TO SHAPE OF APPROPRIATE SIZE TONGUE AND GROOVE JOINT.
- CONCRETE, SEE SECTION 101.

MANHOLE I.D.	48"	60"	72"	96"	120"
TOP SLAB THK.	8"	8"	8"	10"	10"
WALL THK.	5"	6"	7"	9"	11"
TOP LAYER STEEL (IN ² /FT)	0.40	0.40	0.40	0.40	0.40
BTM LAYER STEEL (IN ² /FT)	0.40	0.43	0.50	1.19	1.19
REPLACEMENT STEEL (BAR #)	(8)#5's	(8)#5's	(8)#6's	(8)#8's	(8)#8's
APPROX. WEIGHT (LBS.)	1,521	2,513	3,720	8,468	13,355

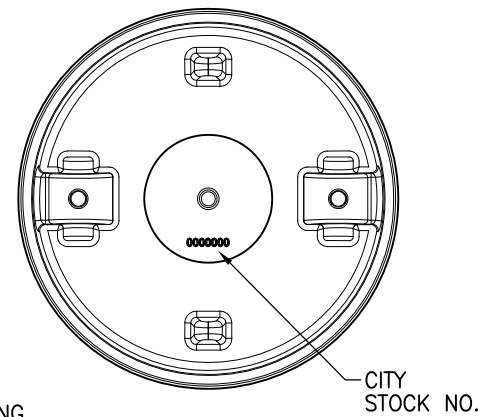
NOTES:

- $f'_c = 4000$ psi (MIN.)
- $f_y = 60,000$ (MIN.)
- 1 1/2" MINIMUM CLEAR CONCRETE COVER OVER REINFORCEMENT
- HS-20 LIVE LOAD
- SEE TABLE FOR APPROXIMATE WEIGHT

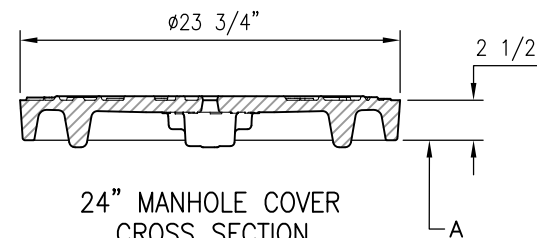
REVISIONS	WATER AUTHORITY
	SANITARY SEWER CONCRETE MANHOLE TOP SLAB TYPE "C"
	DWG. 2107 JAN. 2013



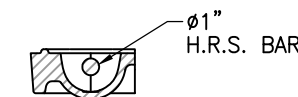
24" MANHOLE COVER
PLAN VIEW



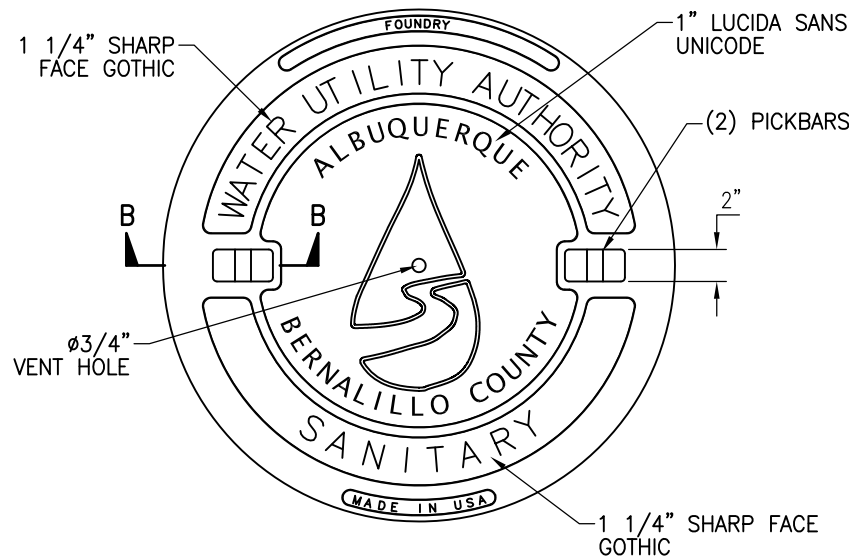
24" MANHOLE COVER
BOTTOM VIEW



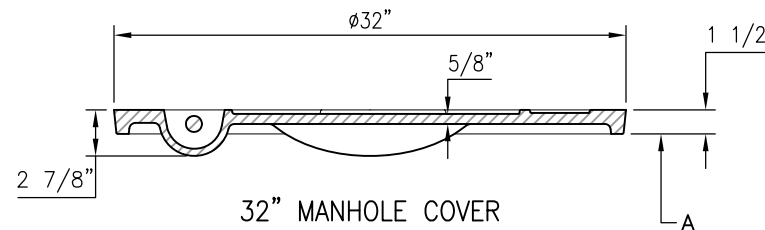
24" MANHOLE COVER
CROSS SECTION



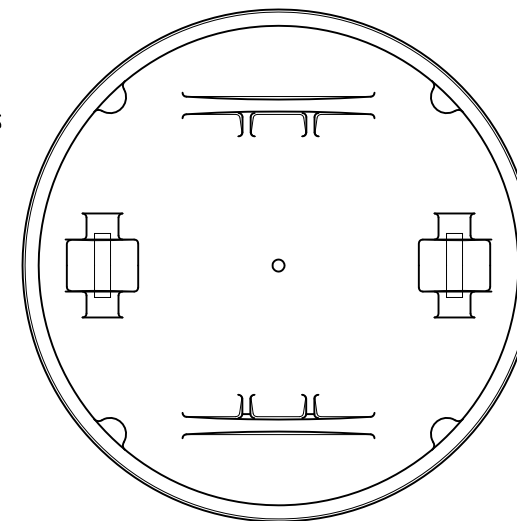
SECTION A-A



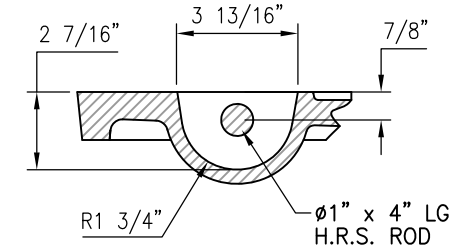
32" MANHOLE COVER
PLAN VIEW



32" MANHOLE COVER
CROSS SECTION

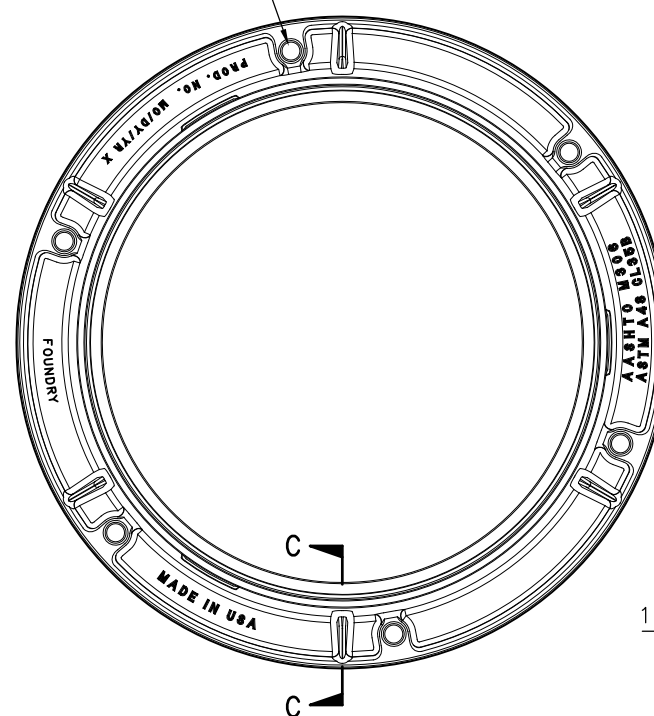


32" MANHOLE COVER
BOTTOM VIEW

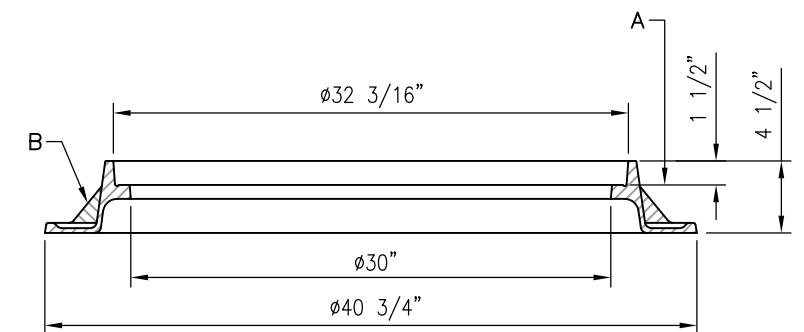


SECTION B-B

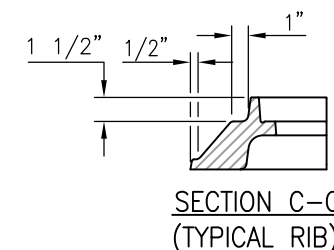
(6) Ø1 1/8" HOLES
ON A Ø37" B.C.



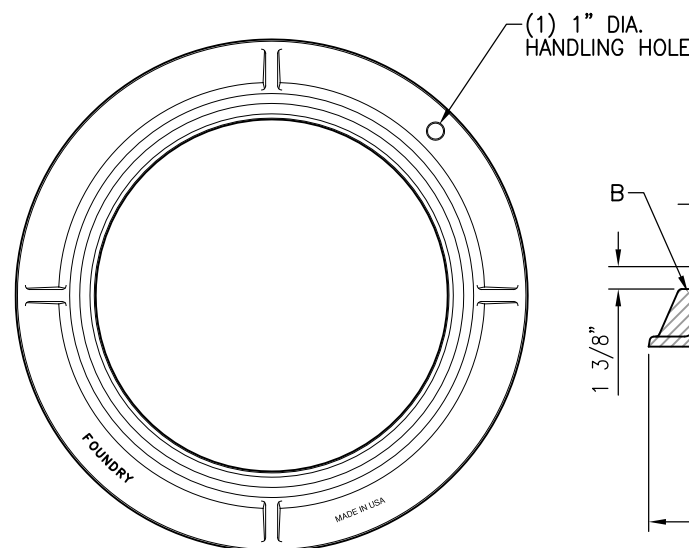
32" MANHOLE FRAME
PLAN VIEW



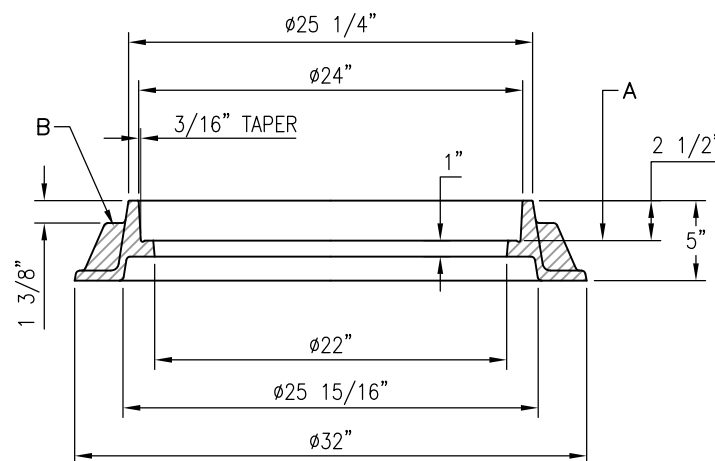
32" MANHOLE FRAME
CROSS SECTION



SECTION C-C
(TYPICAL RIB)



24" MANHOLE FRAME
PLAN VIEW



24" MANHOLE FRAME
CROSS SECTION

GENERAL NOTES

- REFERENCE SPECIFICATION SECTIONS 161 AND 163.
- ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

24" GENERAL NOTES

- STANDARD 24" GRAY IRON MANHOLE FRAME AND DUCTILE IRON COVER.
APPROXIMATE WEIGHTS:
COVER=127 LBS., FRAME=150 LBS.
TOTAL=277 LBS. (TOLERANCE= ±5%)

32" GENERAL NOTES

- STANDARD 32" GRAY IRON MANHOLE FRAME AND DUCTILE IRON COVER.
APPROXIMATE WEIGHTS:
COVER=187 LBS., FRAME=125 LBS.
TOTAL=312 LBS. (TOLERANCE= ±5%)

CONSTRUCTION NOTES

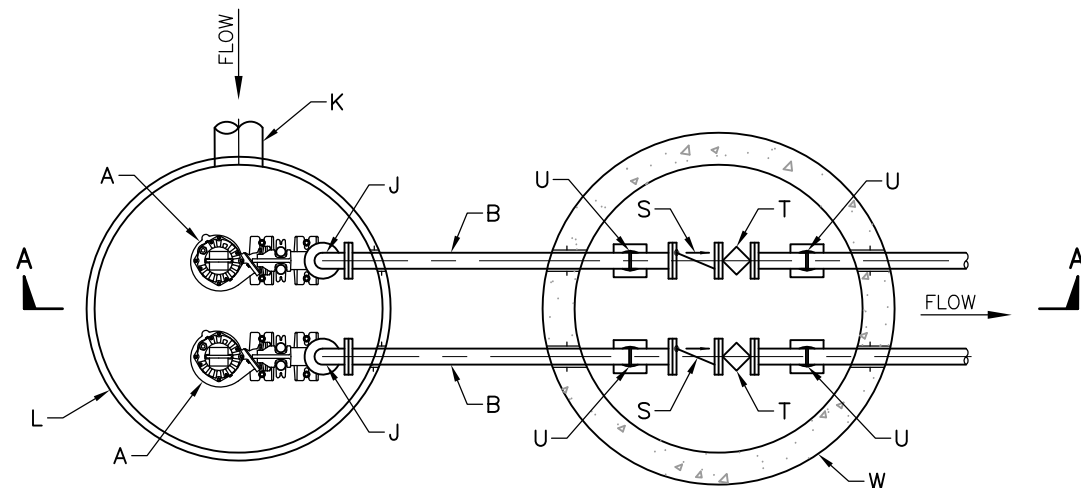
- MACHINED SURFACE.
- GUSSETS OPTIONAL IF REQUIRED BY MANUFACTURER.

REVISIONS

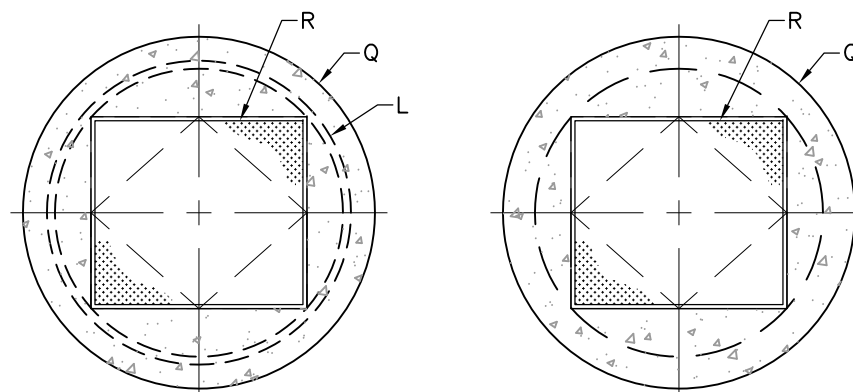
WATER AUTHORITY SANITARY SEWER MANHOLE FRAMES AND COVERS

DWG. 2109

JAN. 2013

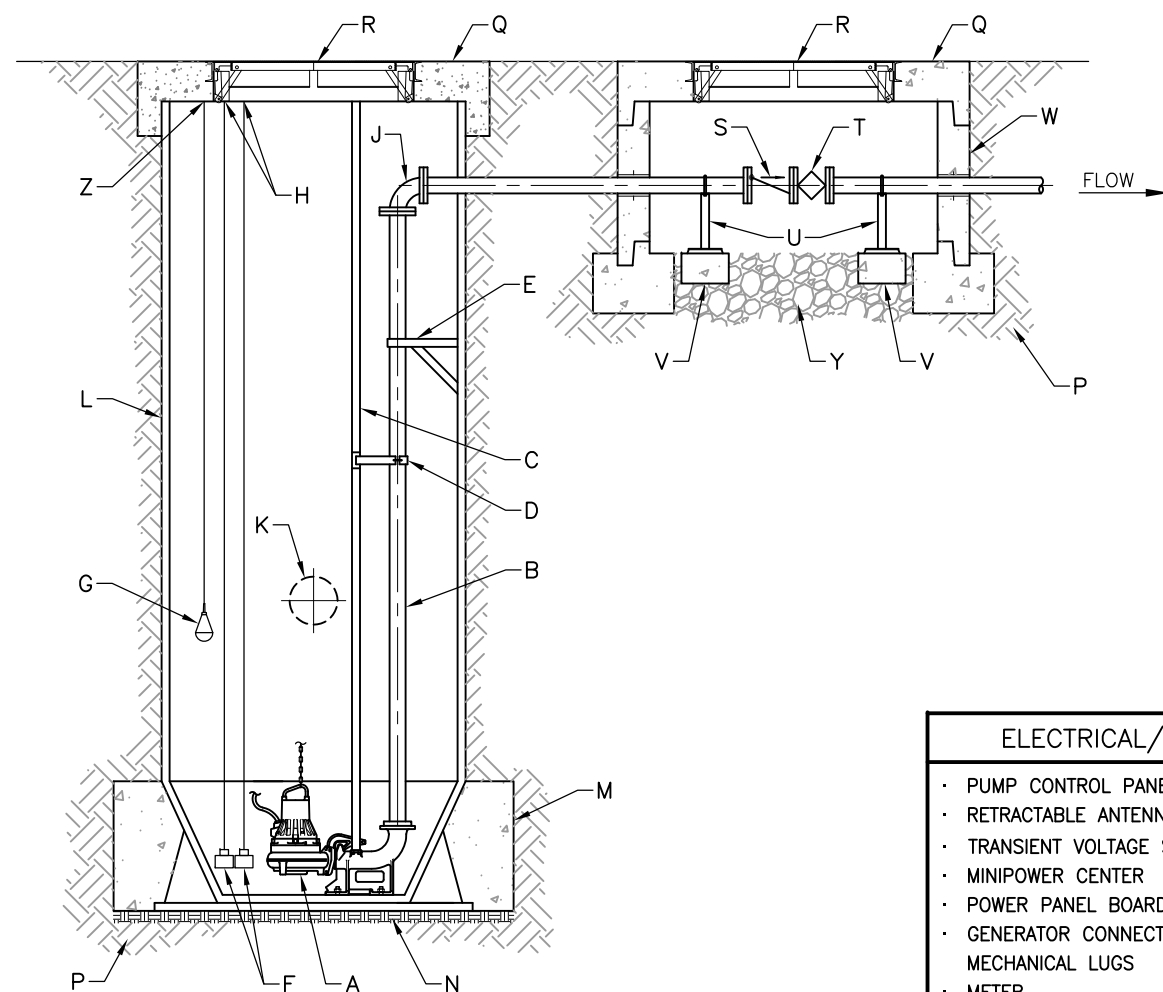


INTERIOR PLAN



NOTE:
ADD SAFETY SIGN FOR CONFINED
SPACE ON EACH ACCESS HATCH.

TOP PLAN



SECTION A-A

ELECTRICAL/I&C EQUIPMENT

- PUMP CONTROL PANEL WITH EXTERNAL AC
- RETRACTABLE ANTENNA POLE
- TRANSIENT VOLTAGE SURGE SUPPRESSOR (TVSS)
- MINIPOWER CENTER
- POWER PANEL BOARD
- GENERATOR CONNECTION CABINET WITH MECHANICAL LUGS
- METER
- DISCONNECT
- LIGHT POLE

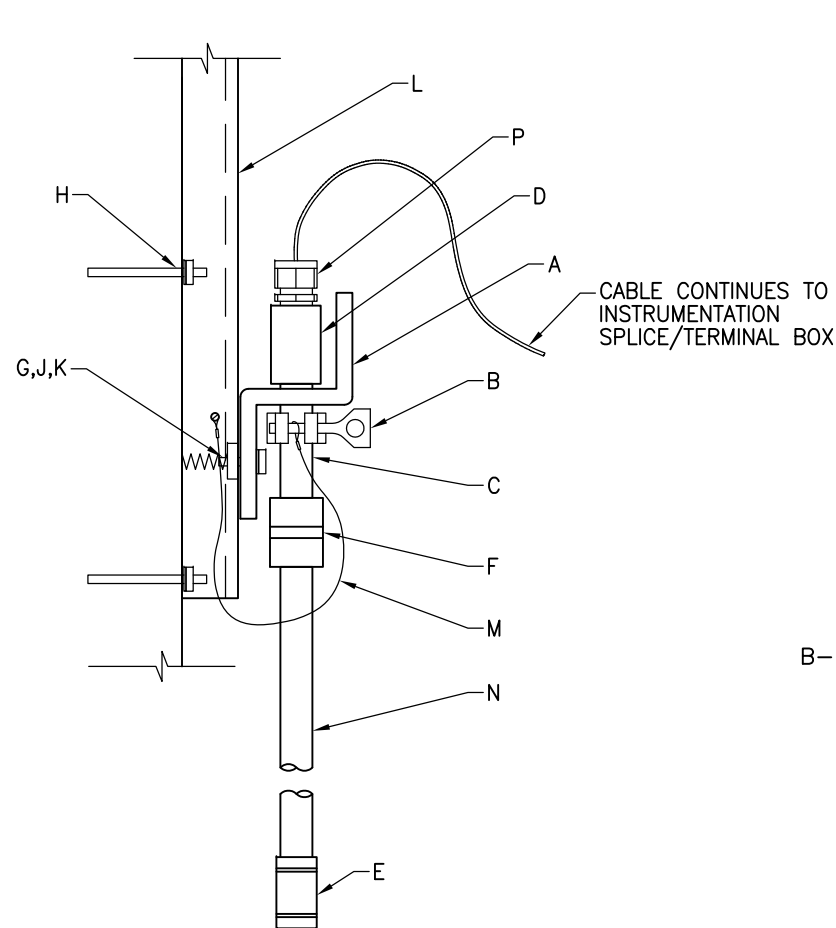
GENERAL NOTES

1. LIFT STATION AND VALVE VAULT LOCATION, FINAL DESIGN AND LAYOUT SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM TO SPECIFIC SYSTEM AND SITE REQUIREMENTS. ENGINEER SHALL SUBMIT A PROJECT SPECIFIC DETAIL. SUBMIT SHOP DRAWINGS OF LIFT STATION AND VALVE VAULT/MANHOLE, MAIN PIPING AND ASSEMBLY PRIOR TO VAULT FABRICATION AND PIPE INSTALLATION. IF LOCATED IN ROADWAY, COORDINATE THE PROPOSED LIFT STATION LOCATION WITH ANY FUTURE ROADWAY IMPROVEMENTS.
2. ALL PIPE TO BE FLANGE JOINT DUCTILE IRON PIPE (DIP), UNLESS NOTED OTHERWISE.
3. REMOVABLE AND/OR PERMANENT BOLLARDS SHALL BE REQUIRED WHEN REQUIRED BY THE ENGINEER OR THE WATER AUTHORITY.
4. ALL PARTS WITHIN THE LIFT STATION AND VALVE VAULT MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
5. DO NOT CONSTRUCT DRAIN WHEN IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.
6. IF DOUBLE LEAF ACCESS HATCH IS LOCATED IN ROADWAY, SPECIFY USF LOAD LEVEL 7 (ASTM C1802-14) FULL TRAFFIC RATED HATCH WITH CAST IRON LID. CONSTRUCT FLUSH WITH TOP OF MANHOLE OR VAULT.
7. ACCESS HATCH OPENING COVERS AND FRAMES FOR LOCATIONS OUT OF ROADWAYS SHALL BE ALUMINUM AND NOT SUBJECT TO TRAFFIC LOADINGS, SHALL BE DESIGNED TO WITHSTAND A LIVE LOAD OF 300 POUNDS PER SQUARE FOOT AND SHALL EXTEND 3 INCHES MINIMUM ABOVE TOP OF MANHOLE OR VAULT.
8. ANY STAINLESS STEEL ITEMS SHALL BE 316 GRADE UNLESS NOTED OTHERWISE.

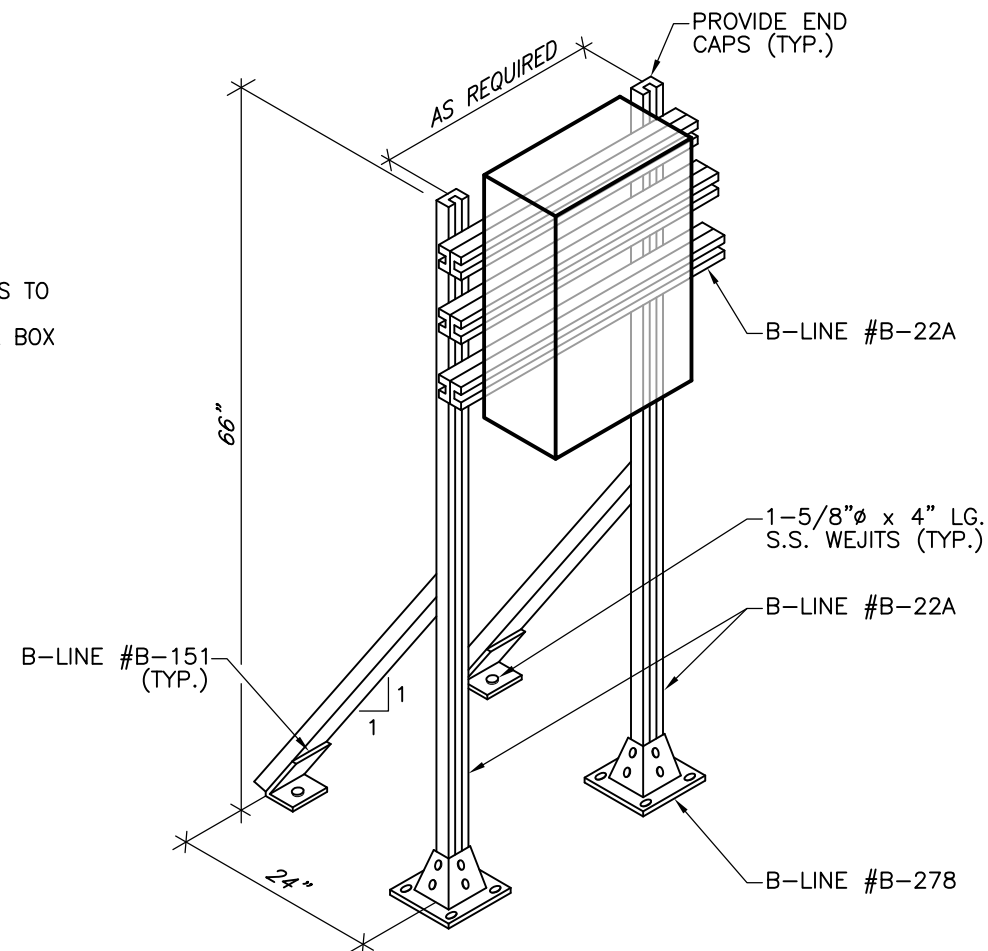
CONSTRUCTION NOTES

- | | |
|---|---|
| A. SUBMERSIBLE SEWAGE PUMP WITH MIX-FLUSH VALVE. SIZE, HORSEPOWER AND MANUFACTURER BASED ON DESIGN. | N. SLAB UNDER ENTIRE LIFT STATION BASE PER PROJECT SPECIFIC DESIGN. |
| B. DISCHARGE PIPE | P. COMPACTED SUBGRADE |
| C. STAINLESS STEEL GUIDE RAILS | Q. PRECAST CONCRETE COVER WITH CONCRETE PROTECTIVE COATING. |
| D. INTERMEDIATE BRACKETS AS REQUIRED BY MANUFACTURER. | R. DOUBLE-LEAF ACCESS HATCH WITH SAFETY GRATE AND INTRUSION ALARM. SEE GENERAL NOTES 6 AND 7. |
| E. STAINLESS STEEL PIPE SUPPORTS | S. SURGEbuster CHECK VALVE, SIZE PER DESIGN. |
| F. SUBMERSIBLE LEVEL TRANSMITTERS | T. PLUG VALVE, SIZE PER DESIGN. |
| G. HIGH WATER LEVEL ALARM | U. PIPE SUPPORT |
| H. LEVEL TRANSMITTER HANGER | V. CONCRETE BASE, TYPE PER DESIGN. |
| J. 90° VERTICAL BEND | W. PRECAST CONCRETE MANHOLE, TYPE PER DESIGN. |
| K. INFLUENT PIPE, LOCATION AND SIZE BASED ON DESIGN. | Y. GRAVEL BASE |
| L. FIBERGLASS MANHOLE, SIZE PER DESIGN. | Z. FLOAT MOUNTING |
| M. CONCRETE AROUND ENTIRE SUMP. THICKNESS AND REINFORCING PER STRUCTURAL CALCULATIONS. | |

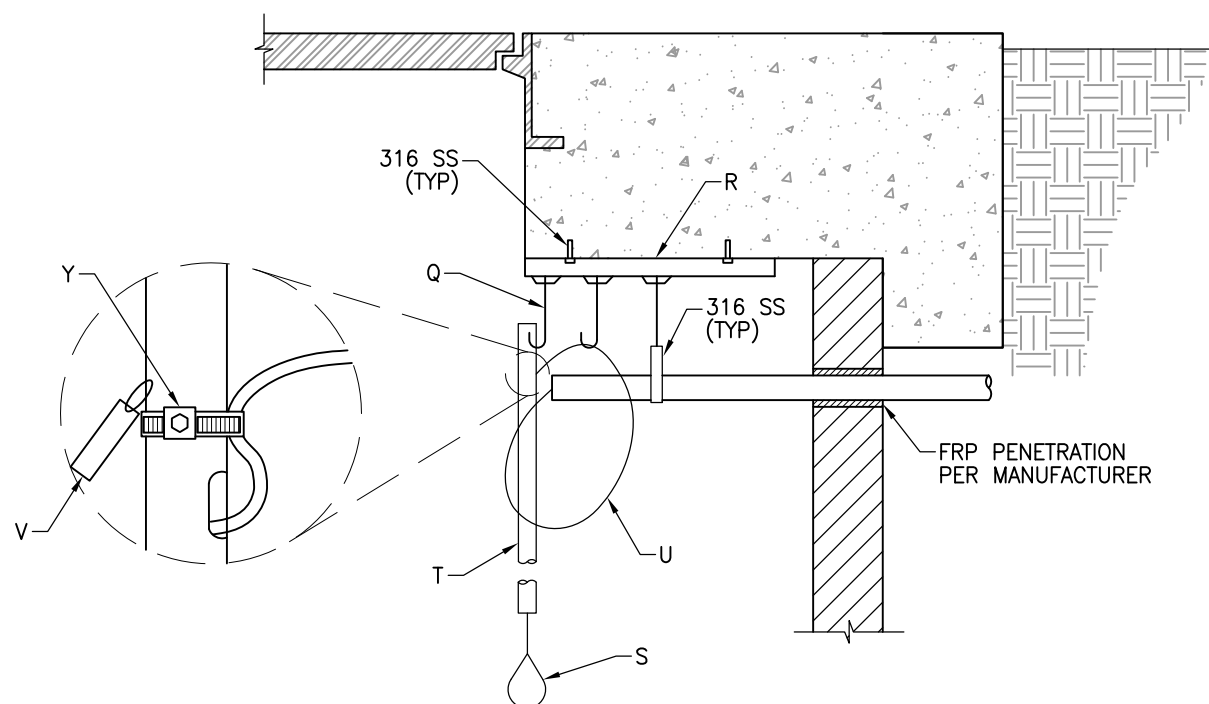
REVISIONS	WATER AUTHORITY
	SANITARY SEWER MANHOLE LIFT STATION AND VALVE VAULT
	DWG. 2110 AUG. 2019



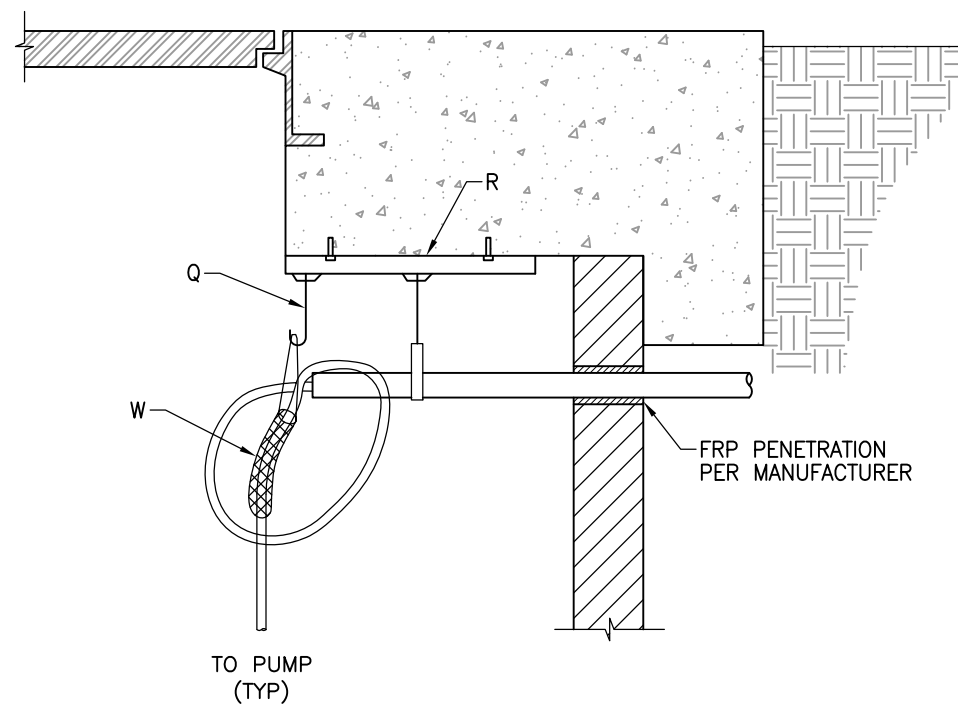
LEVEL TRANSMITTER HANGER



TYPICAL OUTDOOR PANEL MOUNTING



FLOAT SWITCH MOUNTING



MOTOR LEAD CABLE SUPPORT

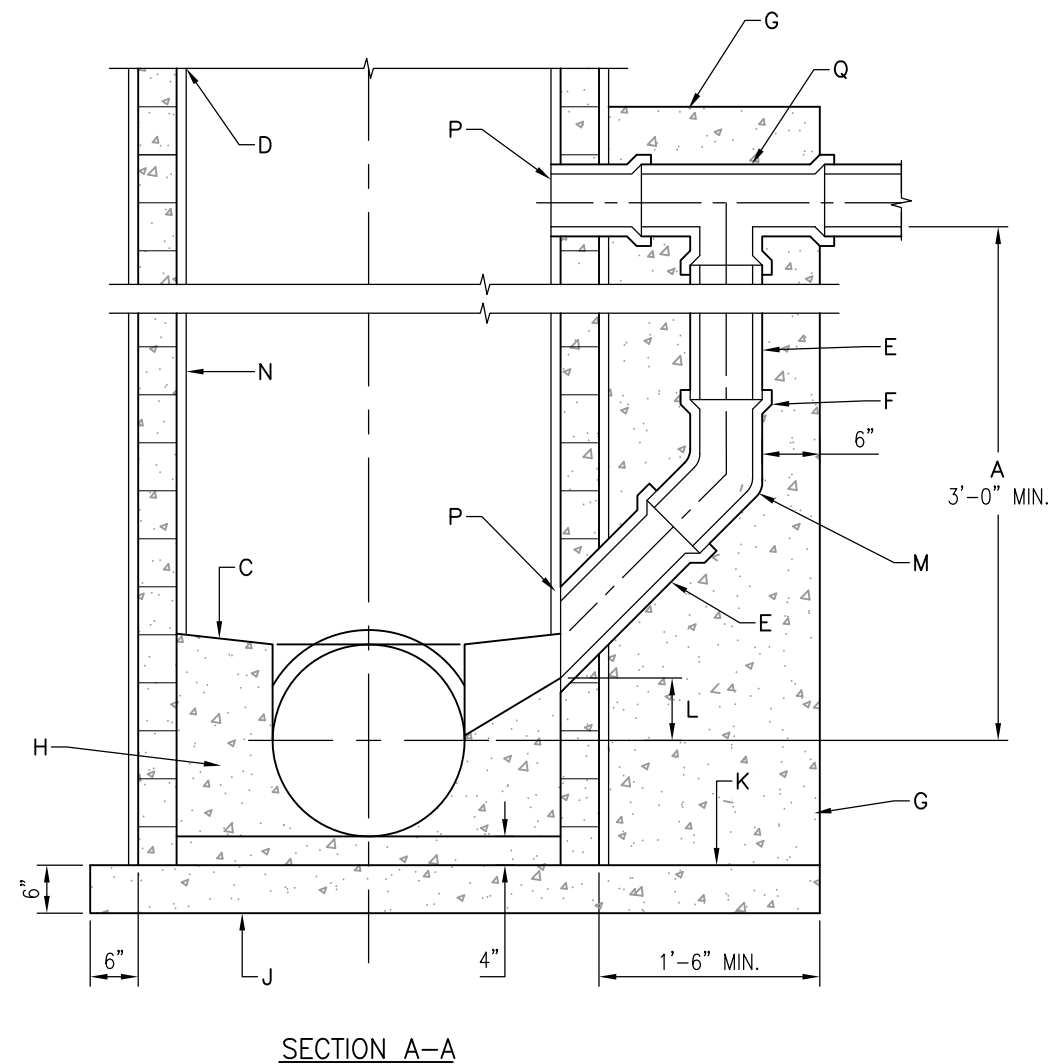
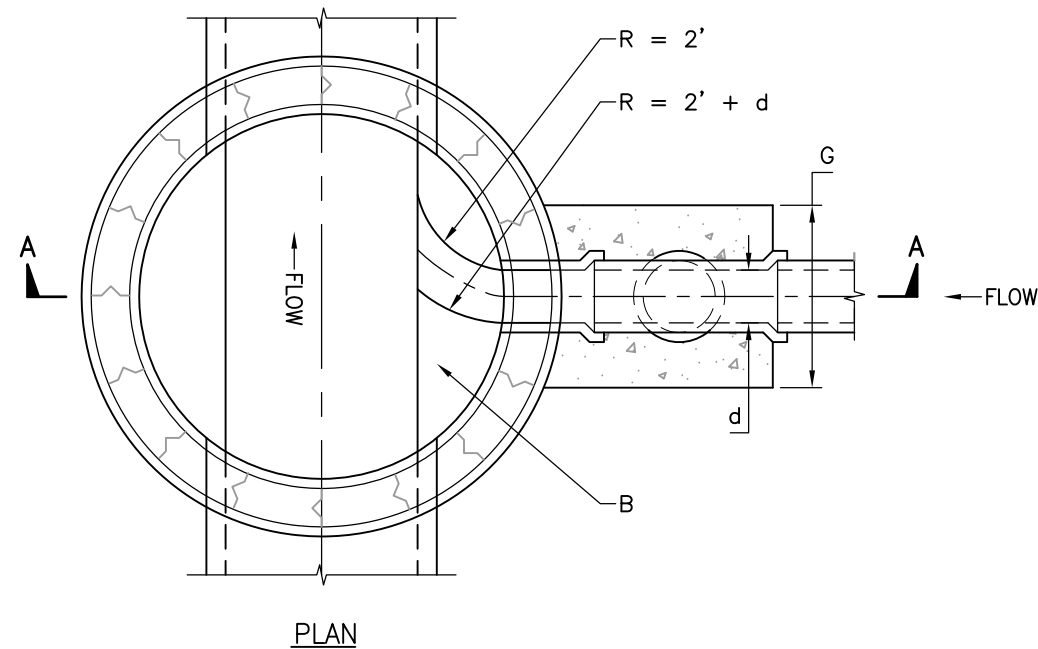
LEVEL TRANSMITTER HANGER CONSTRUCTION NOTES:

- A. 316 STAINLESS STEEL "Z" BRACKET WITH CUSTOM MACHINED SLOT.
- B. 1/2" 316 STAINLESS STEEL TRI-CLAMP
- C. 1/2" x 4" 316 STAINLESS STEEL NIPPLE
- D. 1/2" 316 STAINLESS STEEL COUPLING
- E. 1/2" PLASTIC BUSHING
- F. 1/2" SCHEDULE 80 REINFORCED COUPLING
- G. 3/8" 316 STAINLESS STEEL SPRING NUT
- H. 3/8" x 3 1/2" 316 STAINLESS STEEL STUD ANCHOR WITH NUT AND WASHER.
- J. 3/8" x 1 1/2" 316 STAINLESS STEEL BOLT
- K. 3/8" STAINLESS STEEL WASHER
- L. 2' 316 STAINLESS STEEL UNISTRUT.
- M. 12" STAINLESS STEEL LANYARD
- N. 1/2" x 20' SCHEDULE 80 PIPE
- P. 1/2" 316 STAINLESS STEEL .25 TO .31 CGB

FLOAT SWITCH MOUNTING AND MOTOR LEAD CABLE SUPPORT CONSTRUCTION NOTES:

- Q. J-HOOK. MOUNT CONDUIT AND 316 SS J-HOOKS FOR PVC MOUNTING SO THEY ARE VISIBLE WHEN WETWELL HATCH COVER IS OPENED. NOT TO OBSTRUCT PATH FOR PUMP REMOVAL. NUMBER OF HOOKS TO BE PROVIDED SHALL BE BASED ON PROJECT REQUIREMENTS.
- R. 316 SS FRAMING CHANNEL FOR MOUNTING OF J-HOOKS AND PIPE HANGERS, 3/8" 316 SS ROD SUPPORT. ANCHOR TO WET WELL AS NEEDED.
- S. MOUNT FLOAT AS SHOWN ON ELEVATION TABLE PROVIDED BY PROJECT.
- T. 1/2" SCH 80 PVC. PROVIDE PVC SLOT FOR CABLE ENTRY AND MOUNTING ON J-HOOK. PVC CONDUITS TO BE COUPLED BY THREADING OF PVC ONLY. NO GLUE ALLOWED. 5' SECTIONS MAX.
- U. PROVIDE MINIMUM OF 10' OF LOOPED CABLE ON HOOKS, TYPICAL.
- V. INSTRUMENT NAMEPLATE, TYPICAL FOR EACH FLOAT SWITCH. 316 SS.
- W. PIN/ROD TYPE BASKET CABLE GRIP. CABLE GRIP 316 SS MESH WRAPS AROUND OUTSIDE OF PUMP CABLE AND PIN/ROD IS USED TO INTERWEAVE THE LEFT AND RIGHT HAND MESH SIDES TOGETHER.
- Y. 316 STAINLESS STEEL HOSE CLAMP
- Z. PIPE FOR LT STILLING WELL. MAKE UP IN 5 FT SECTIONS, THREADED, NOT GLUED.

REVISIONS	WATER AUTHORITY
	SANITARY SEWER MANHOLE LIFT STATION DETAILS
	DWG. 2111 MAR. 2019



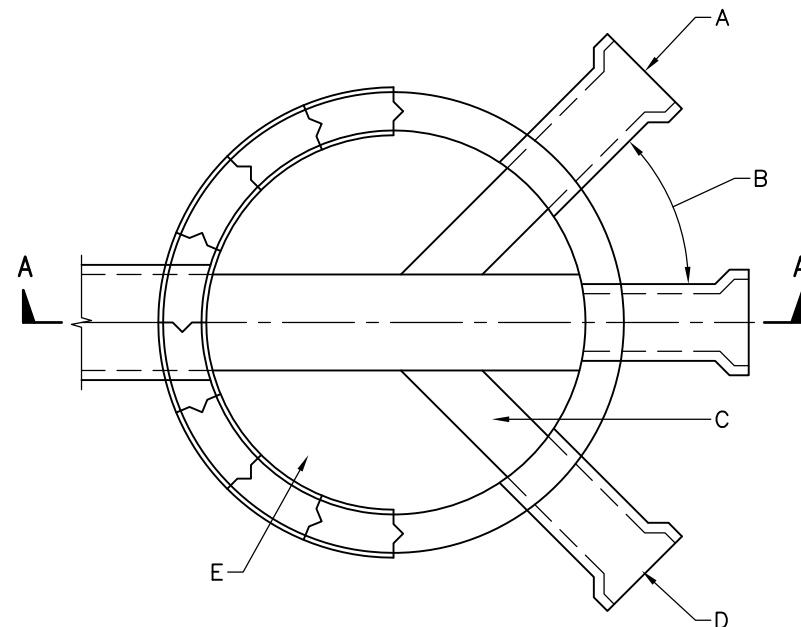
GENERAL NOTES

1. MANHOLE LOCATION, FINAL DESIGN AND LAYOUT SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS. ENGINEER SHALL SUBMIT A PROJECT SPECIFIC DETAIL. SUBMIT SHOP DRAWINGS OF VAULT OR MANHOLE AND MAIN PIPING, PRIOR TO FABRICATION AND PIPE INSTALLATION. IF LOCATED IN ROADWAY, COORDINATE THE PROPOSED MANHOLE LOCATION WITH ANY FUTURE ROADWAY IMPROVEMENTS.
2. MINIMUM MANHOLE INNER DIAMETER = 48 IN
3. MANHOLE MAY BE CONSTRUCTED OF CONCRETE BLOCK, POURED CONCRETE, OR PRECAST REINFORCED CONCRETE. IF PRECAST CONCRETE IS USED, USE MASTIC GASKETS AND APPLY NON-SHRINK GROUT TO EXTERIOR AND INTERIOR OF EXPANSION JOINTS. IF BLOCK IS USED, APPLY 1/2" THICK MORTAR COATING TO EXTERIOR AND INTERIOR OF MANHOLE.
4. ALL PARTS WITHIN THE MANHOLE MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.

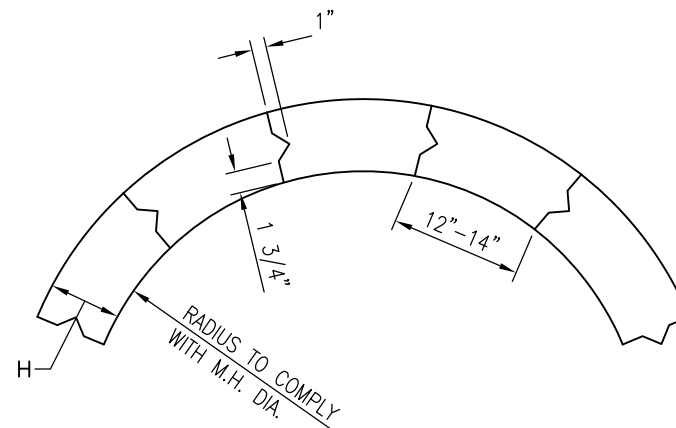
CONSTRUCTION NOTES

- A. VERTICAL DROP
- B. FORM PIPE INVERT IN SHELF
- C. SLOPE, 1" PER FT.
- D. MANHOLE TYPE FOR UPPER PORTION WILL BE SPECIFIED ON DESIGN PROFILE.
- E. USE DUCTILE IRON OR PVC (SDR 35) PIPE THROUGHOUT DROP.
- F. USE BELL AND SPIGOT 45° SHORT OR LONG RADIUS BEND.
- G. CONCRETE SUPPORT WIDTH EQUALS PIPE O.D. PLUS 6" MIN. EACH SIDE.
- H. CONCRETE, SEE SECTION 101.
- J. REINFORCED CONCRETE BASE. SEE CONSTRUCTION NOTE F. ON DRAWINGS 2101 & 2102.
- K. FOR NEW DROP ON EXISTING MANHOLE, CONSTRUCT 3' x 3' CONCRETE BASE BEFORE CONSTRUCTING DROP SUPPORT.
- L. 4" ABOVE SPRING LINE OR AS SHOWN ON PLAN.
- M. 8" MIN. DIAMETER, 2~ 22 1/2' OR 1~ 45' ELBOW.
- N. INTERIOR OF DROP MANHOLE MUST BE COATED WITH APPROVED SEALER IN ACCORDANCE WITH SPEC. SECTION 920.4.
- P. CORE DRILL FOR ALL WALL PENETRATIONS ON EXISTING MANHOLES.
- Q. TEE

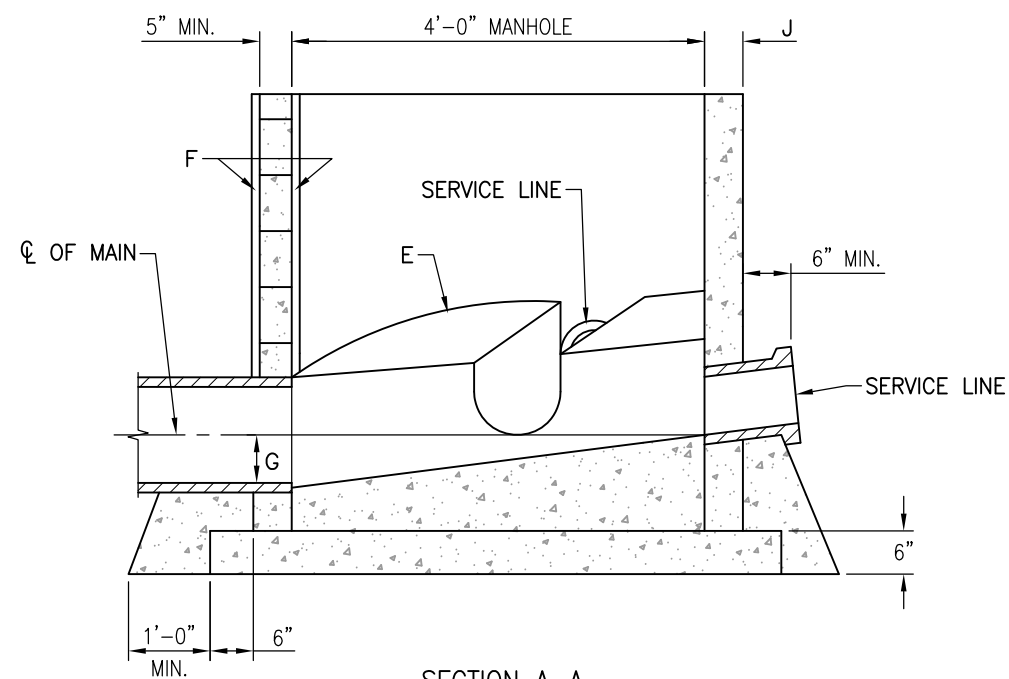
REVISIONS	WATER AUTHORITY
	SANITARY SEWER VERTICAL DROP AT MANHOLE
	DWG. 2116 MAR. 2019



SERVICE LINE AT DEAD END
OR CUL-DE-SAC



TYPICAL CONCRETE BLOCK DETAIL



SECTION A-A

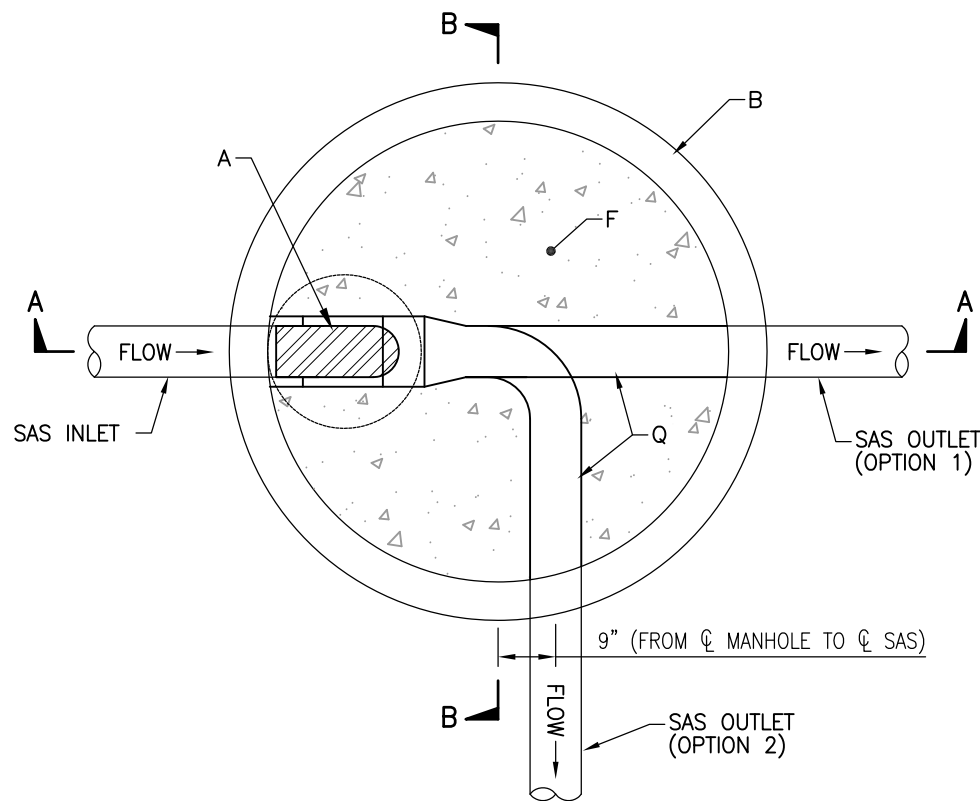
GENERAL NOTES

1. ALL CONCRETE SHELF SLOPES TO BE 1" PER FT.
2. 1/4" PER FT. MIN. SLOPE FOR 4" OR 6" SERVICE LINE.
3. NEW SERVICE CONNECTIONS TO EXISTING MANHOLES MUST BE CORE DRILLED.
4. 8" OR LARGER SERVICE CONNECTIONS MUST BE MADE TO A MANHOLE.

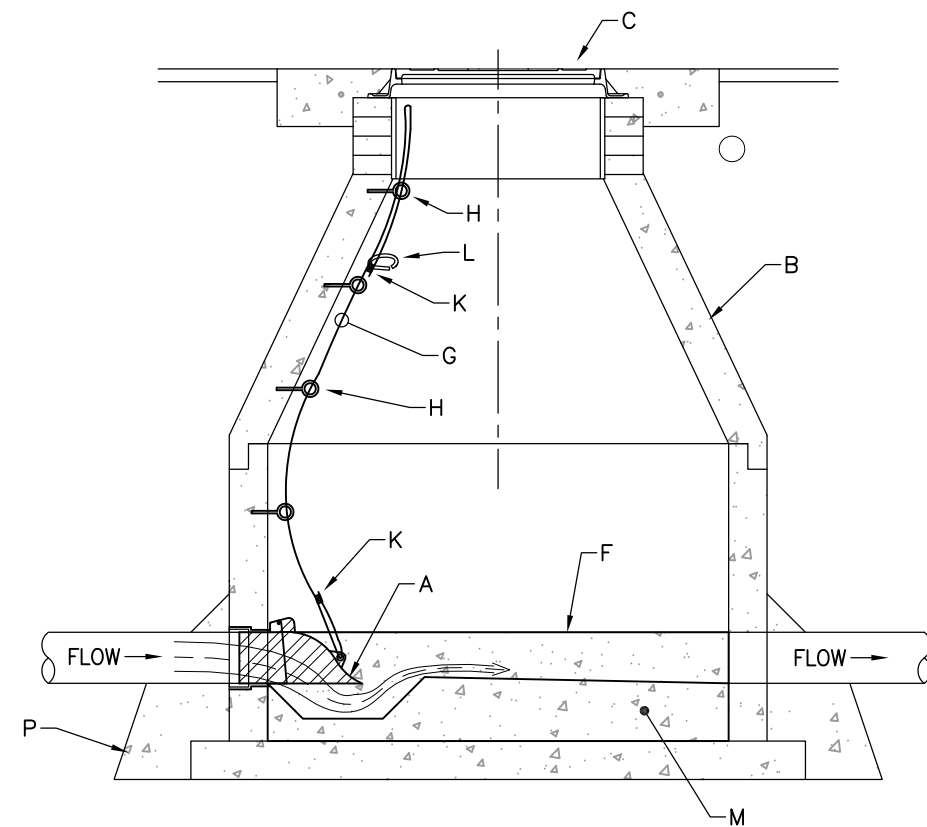
CONSTRUCTION NOTES

- A. CAST IRON SERVICE STUB.
- B. VARIABLE WITH MAX. ANGLE OF 90°.
- C. FORM INVERT IN SHELF.
- D. BELL END.
- E. CONCRETE, SEE SECTION 101.
- F. MANHOLE MAY BE CONSTRUCTED OF CONCRETE BLOCK, POURED CONCRETE, OR PRECAST REINFORCED CONCRETE. IF PRECAST CONCRETE IS USED, USE MASTIC GASKETS AND APPLY NON-SHRINK GROUT TO EXTERIOR AND INTERIOR OF OF EXPANSION JOINTS. IF BLOCK IS USED, APPLY 1/2" THICK MORTAR COATING TO EXTERIOR AND INTERIOR OF MANHOLE.
- G. INVERT ELEVATIONS OF SERVICE LINES SHALL BE THE SAME AS THE SPRING LINE ELEVATION OF THE SEWER MAIN.
- H. MIN. 5" BLOCK FOR 4' I.D. MANHOLE, 8" BLOCK OR DOUBLEWALL OF 2~5" BLOCKS FOR 6' OR 8' DIAMETER MANHOLES.
- J. PRECAST WALL THICKNESS:
4' I.D. MANHOLE - 5" MIN.
6' I.D. MANHOLE - 7" MIN.
8' I.D. MANHOLE - 9" MIN.

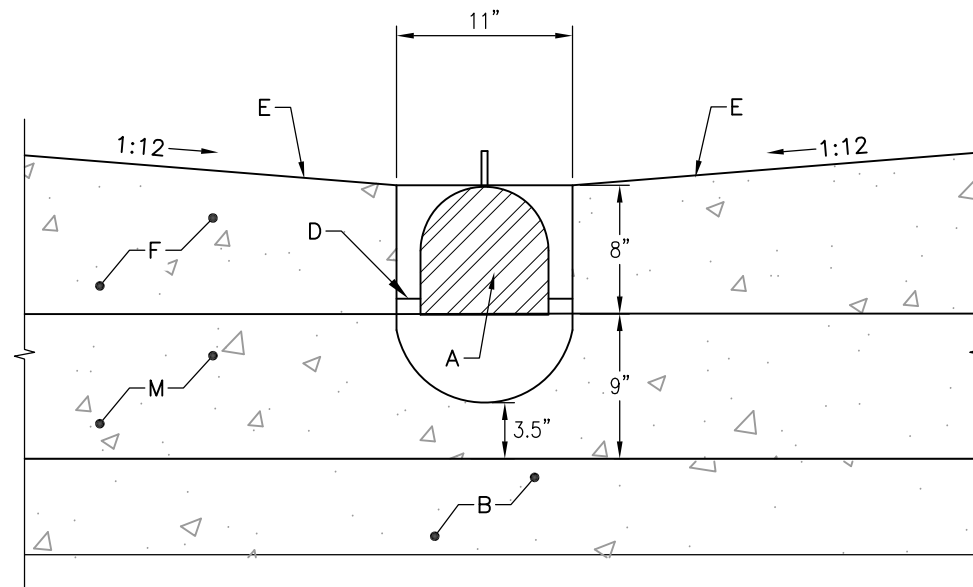
REVISIONS	WATER AUTHORITY
	SANITARY SEWER SERVICE LINE CONNECTIONS AT MANHOLE
	DWG. 2118 JAN. 2013



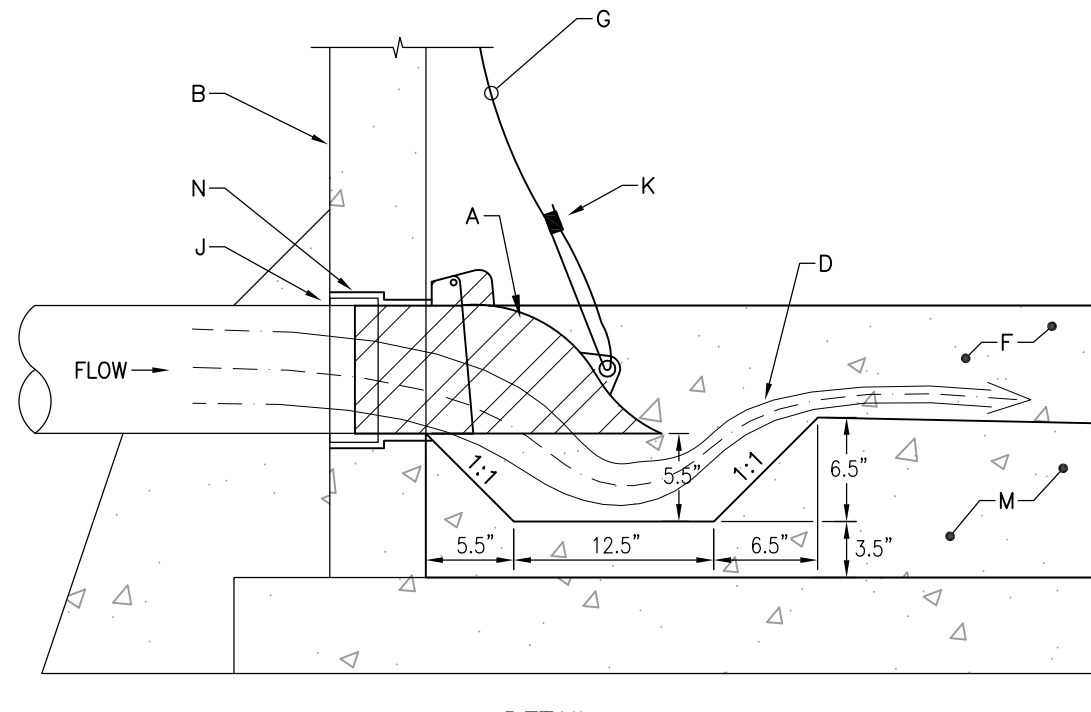
PLAN
TRAP MANHOLE



SECTION A-A
TRAP MANHOLE



SECTION B-B
GAS TRAP



DETAIL
GAS TRAP

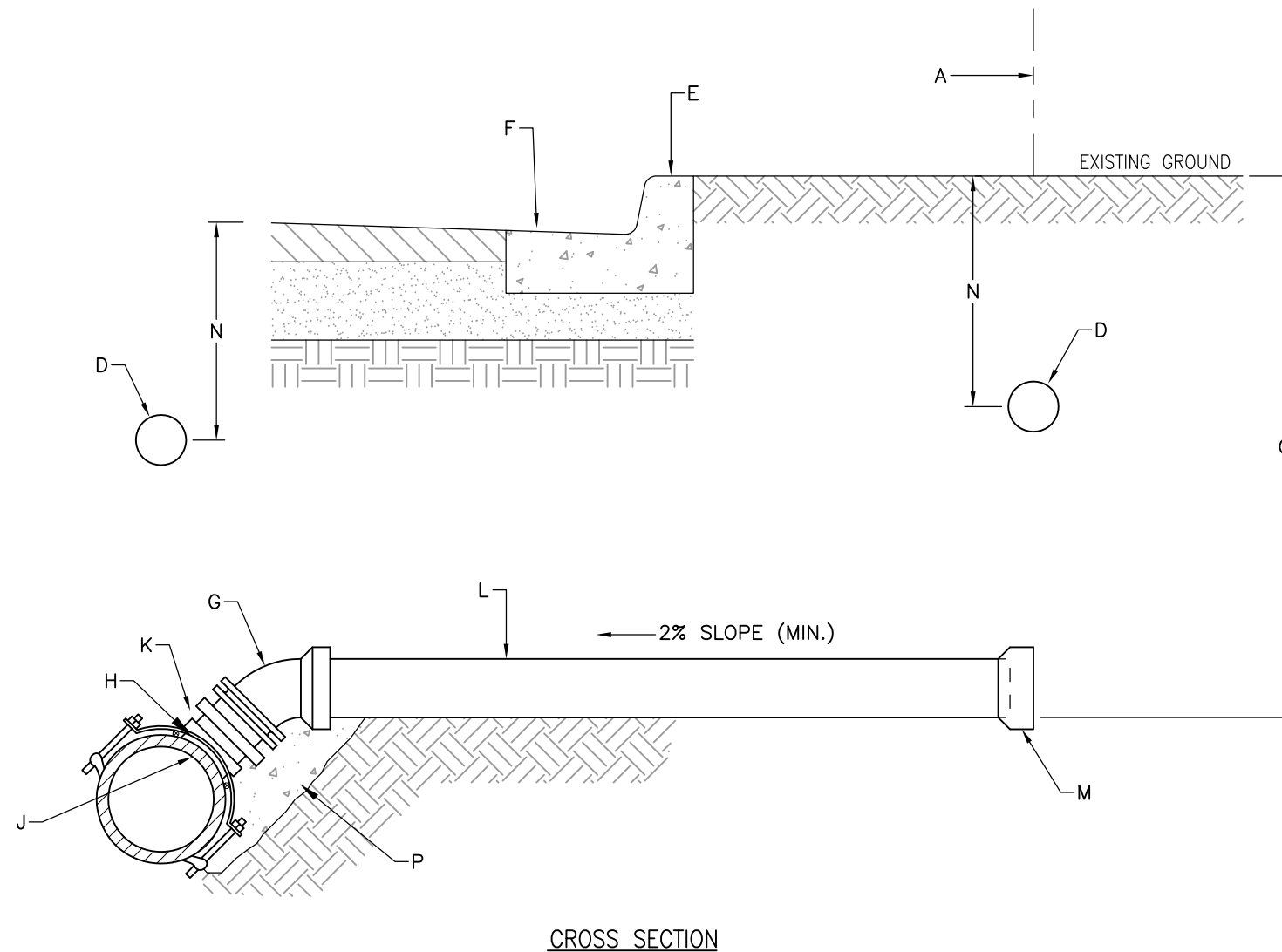
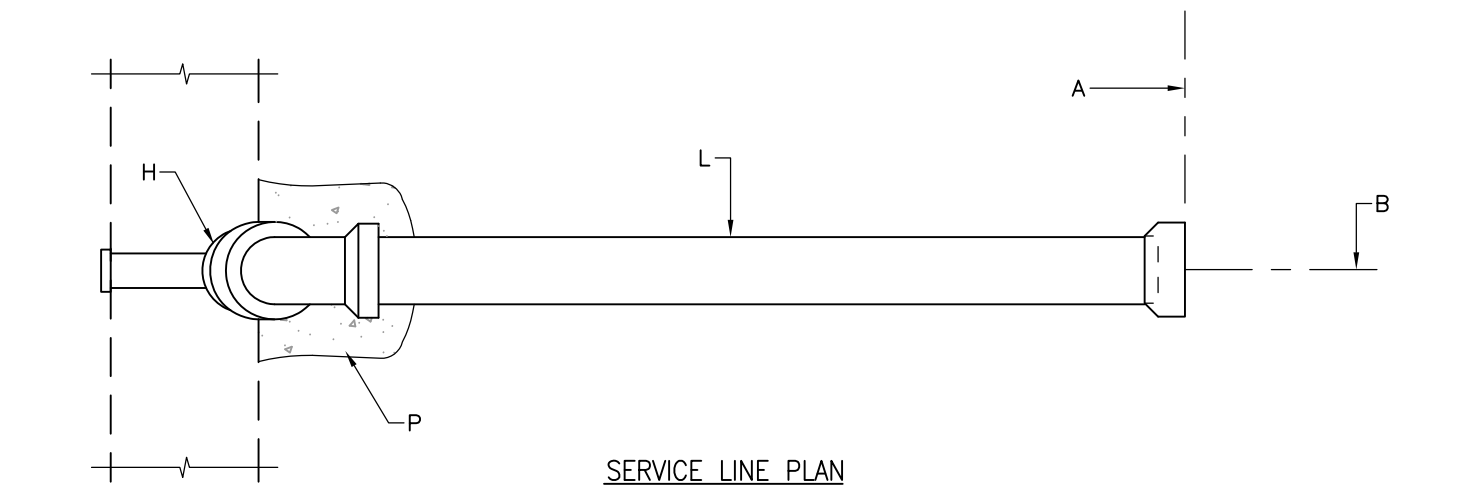
GENERAL NOTES

1. MANHOLE LOCATION, FINAL DESIGN AND LAYOUT SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS. ENGINEER SHALL SUBMIT A PROJECT SPECIFIC DETAIL. SUBMIT SHOP DRAWINGS OF MANHOLE, MAIN PIPING, AND GAS TRAP ASSEMBLY PRIOR TO MANHOLE FABRICATION AND PIPE INSTALLATION. IF LOCATED IN ROADWAY, COORDINATE THE PROPOSED MANHOLE LOCATION WITH ANY FUTURE ROADWAY IMPROVEMENTS.
2. ALL PARTS WITHIN THE MANHOLE MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
3. TRAP MANHOLE TO BE INSTALLED ON 8" TO 12" GRAVITY SANITARY SEWER COLLECTOR LINE WHEN CONNECTED UPSTREAM OF INTERCEPTOR SEWER LINE, TO MITIGATE SEWER GAS FROM TRAVELING UPSTREAM.

CONSTRUCTION NOTES

- A. STAINLESS STEEL GAS TRAP (LBIW INC. PRODUCT LB S-2017 A,B,C,D) OR ENGINEER APPROVED EQUAL.
- B. TYPE C OR TYPE E MANHOLE PER STANDARD DRAWINGS 2101 OR 2102 (DIAMETER AS DIRECTED). USE 4 FT DIAMETER ONLY WITH STRAIGHT THROUGH PIPE (PLAN VIEW OPTION 1). USE MINIMUM 6 FT DIAMETER WITH (ANY ANGLE) BEND AT MANHOLE (OPTION 2).
- C. FRAME AND COVER, SEE STANDARD DRAWING 2110.
- D. WATER SURFACE WHEN FLOWING.
- E. SLOPE 1 INCH PER FOOT FROM PIPE CROWN.
- F. CONCRETE FILL SHELF (3000 PSI). EXTEND TO PIPE CROWN.
- G. TYPE 316 STAINLESS STEEL 1/8 INCH WIRE ROPE, SUFFICIENT LENGTH TO EXTEND FROM TRAP TO TOP OF MANHOLE WITH 4 FT LOOP FOR HANDLE AT TOP (AS SHOWN).
- H. TYPE 316 STAINLESS STEEL 1/2 INCH x 4 INCH EYEBOLTS (1/4 INCH 20 THREAD) ANCHORED TO MANHOLE SIDE AT LOCATION SHOWN. MINIMUM 4 EYEBOLTS REQUIRED.
- J. TRANSITION COUPLING (FIELD VERIFY EXISTING PIPE CONFIGURATION, SIZE, TYPE, AND OTHER FIELD CONDITIONS IN ADVANCE OF CONSTRUCTION TO ESTABLISH CORRECT ADAPTERS AND FITTINGS).
- K. 2~ COMPRESSION SLEEVES OR CLAMPS.
- L. STAINLESS STEEL SPRING SNAP ATTACHED TO ROPE AS SHOWN FOR FASTENING TO EYEBOLT FOR HOLDING TRAP OPEN DURING MAINTENANCE.
- M. TRAP AND CHANNEL BASE (3000 PSI CONCRETE).
- N. GROUT SEAL
- P. PIPE SUPPORT (SEE STANDARD DRAWINGS 2101 AND 2102).
- Q. MANHOLE TROUGH. SLOPE FROM INLET TO OUTLET.

REVISIONS	WATER AUTHORITY
	SANITARY SEWER TRAP MANHOLE
	DWG. 2120
	AUG. 2019



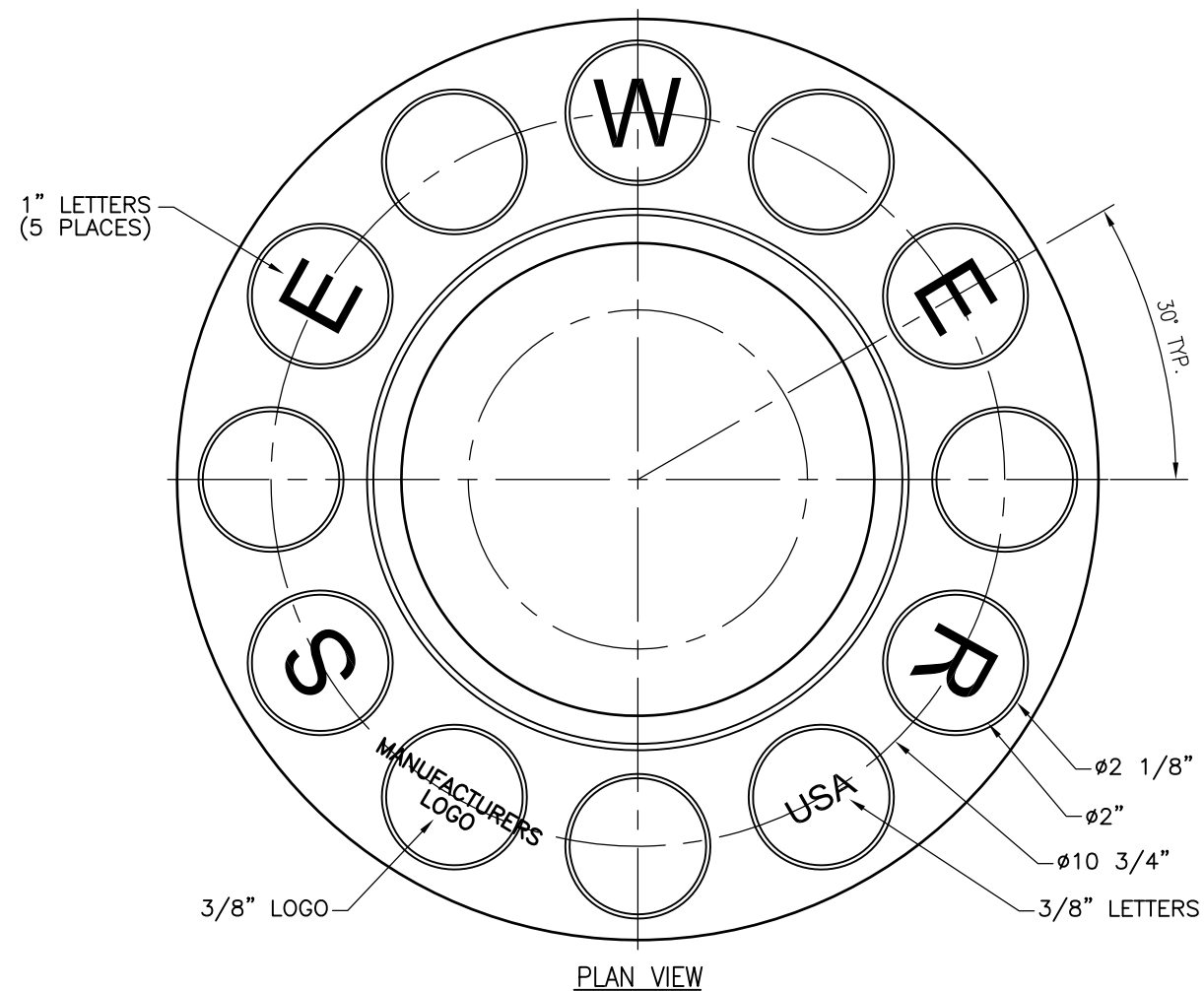
GENERAL NOTES

1. ALL SERVICE LINES SHALL CONFORM TO THE PLUMBING CODE OF THE CITY OF ALBUQUERQUE.
2. THE SANITARY SEWER SERVICE LATERAL IS CONSIDERED 'PRIVATE' FROM THE MAIN LINE, INCLUDING THE SERVICE TEE TO THE PROPERTY LINE AND BEYOND. ALL MAINTENANCE AND/OR REPLACEMENT IS THE RESPONSIBILITY OF THE PROPERTY OWNER FOR WHICH IT IS PROVIDING THE SERVICE.

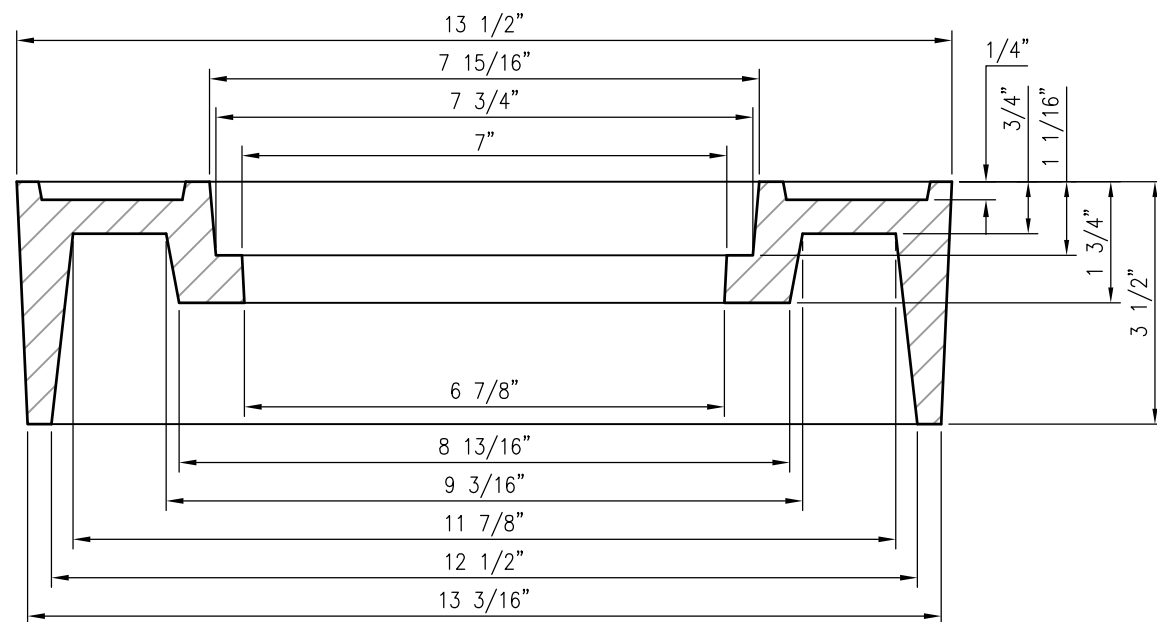
CONSTRUCTION NOTES

- A. RIGHT-OF-WAY LINE.
- B. CENTER LINE OF SERVICE LINE.
- C. MINIMUM OF 4' TO 6' FROM INVERT TO TOP OF CURB AT RIGHT-OF-WAY LINE. MINIMUM DEPTH WILL DEPEND ON THE DEPTH OF THE MAIN SEWER LINE, THE MINIMUM SERVICE LINE SLOPE, THE DEPTH OF THE LOT BEING SERVED, LOCATION OF THE HOUSE ON THE LOT, AND THE GRADE OF THE LOT.
- D. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.
- E. STAMP OR CHISEL PIPE DIAMETER, AND "S" ON TOP OF CURB OVER LOCATION OF SERVICE LINE, MINIMUM 1/4" DEEP.
- F. CURB & GUTTER.
- G. 22.5° OR 45° BEND.
- H. CORE DRILL.
- J. SERVICE LINE SHALL NOT PROTRUDE INTO SEWER MAIN.
- K. SANITARY SEWER TAPPING TEE PER WATER AUTHORITY APPROVED PRODUCTS LIST. DO NOT OVER TIGHTEN SADDLE BOLTS WHICH WOULD PREVENT FREE PASSAGE OF REQUIRED MANDREL. IN-LINE WYE CONNECTIONS ARE ALSO ACCEPTABLE FOR NEW CONSTRUCTION.
- L. SERVICE LINE, AND NEW SERVICE CONNECTIONS TO EXISTING SEWER MAINS.
- M. PLUG OR CAP UNTIL LATERAL IS PLACED IN SERVICE.
- N. DEPTH PLACEMENT PER SECTION 170, AND MANUFACTURER'S RECOMMENDATIONS.
- P. BACKFILL UNDER SERVICE WITH MINIMUM 1 CUBIC FOOT OF CONCRETE.

REVISIONS	WATER AUTHORITY
JAN. 2013 JAN. 2018	SANITARY SEWER SERVICE LINE DETAILS
	DWG. 2125 MAY 2019

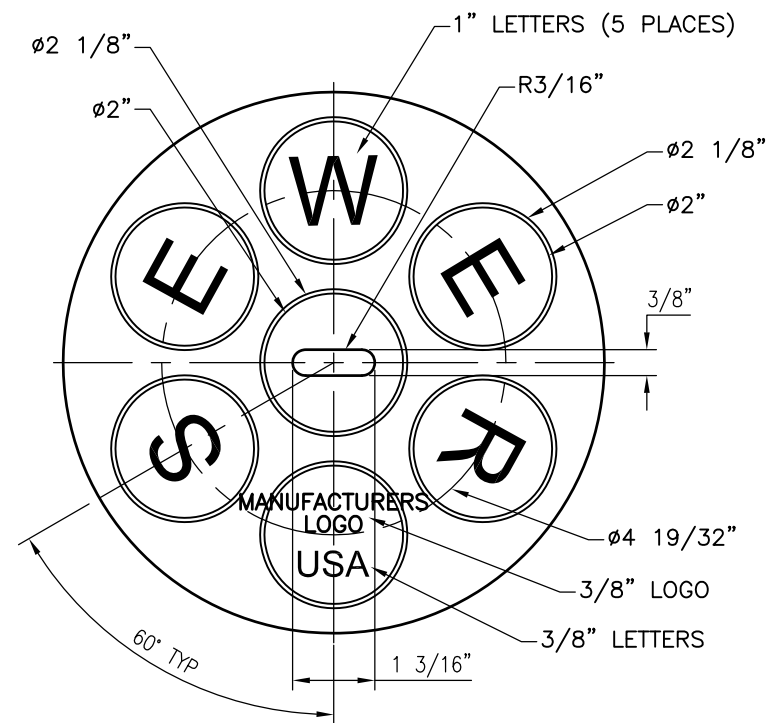


PLAN VIEW

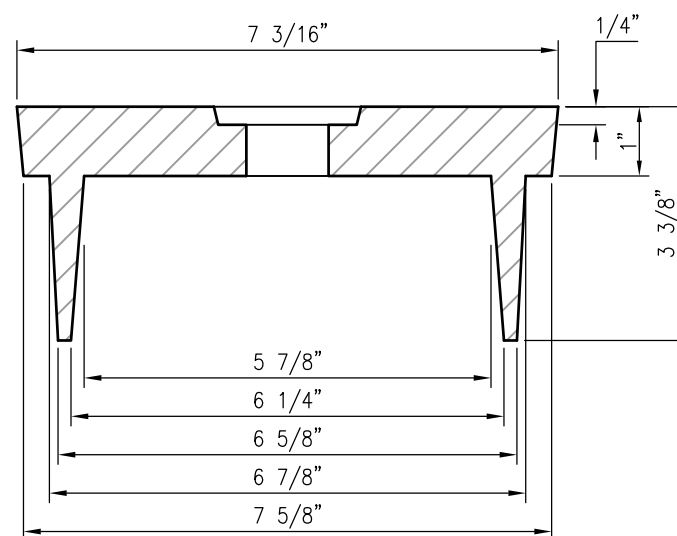


SECTION

VALVE BOX RING



PLAN VIEW



SECTION

VALVE BOX COVER

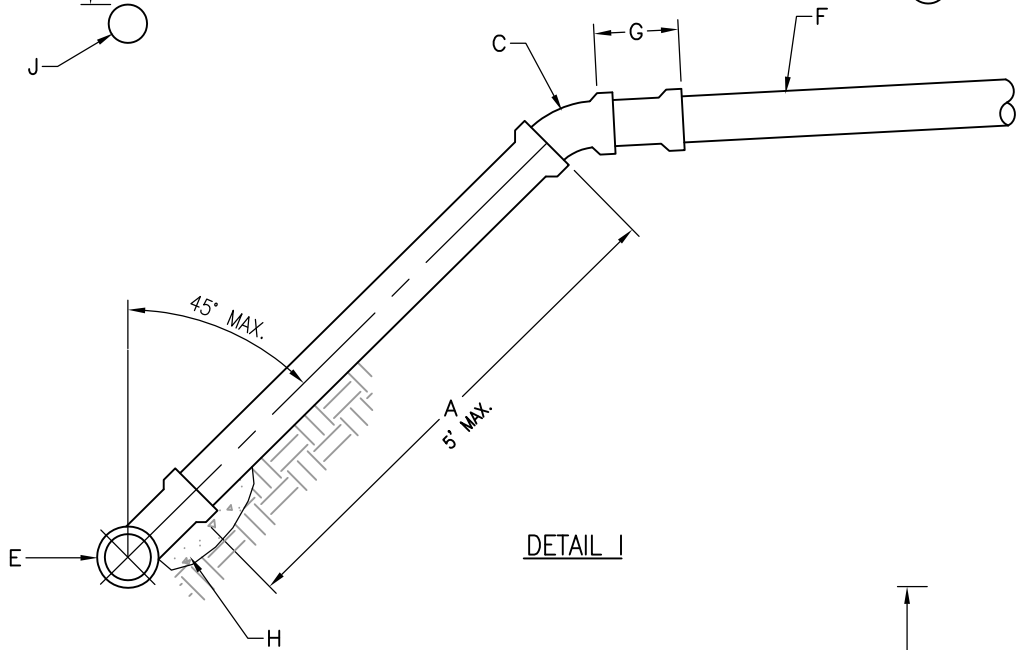
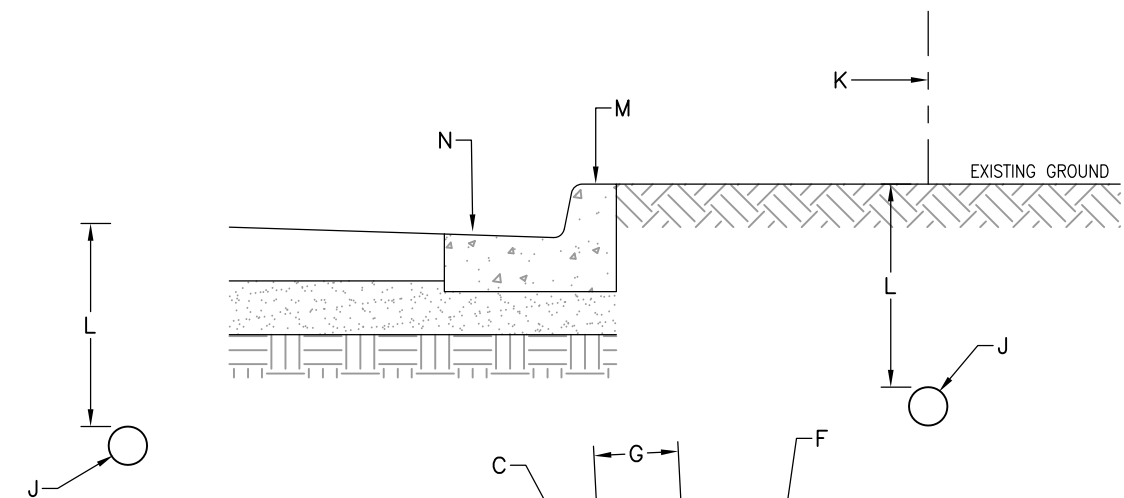
GENERAL NOTES — RING

1. ALBUQUERQUE VALVE BOX RING DESIGNED TO ACCEPT AN ALBUQUERQUE VALVE BOX COVER.
2. THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
3. FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
4. A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
5. FINISH: REMOVE EXCESS IRON AND FINIS.
6. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

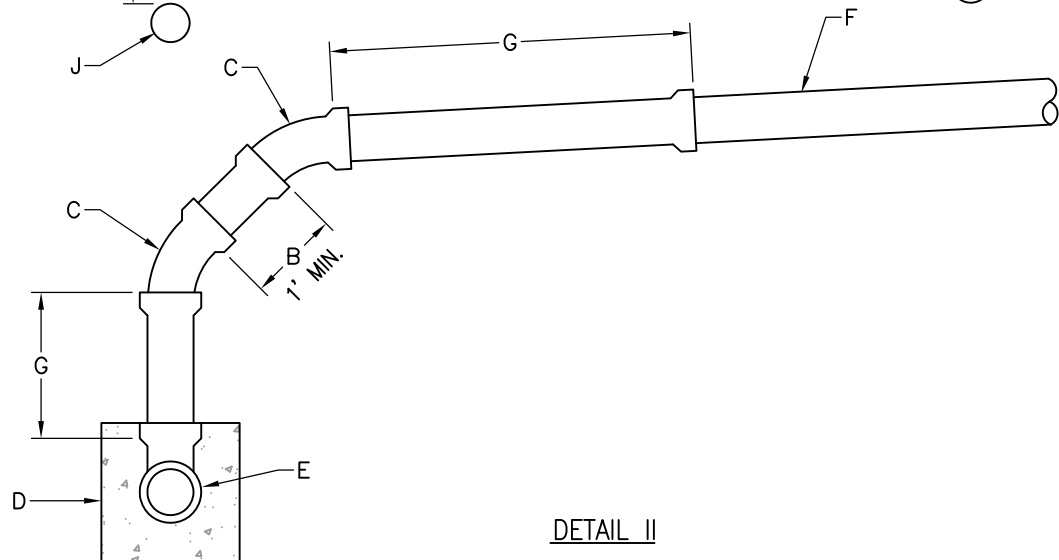
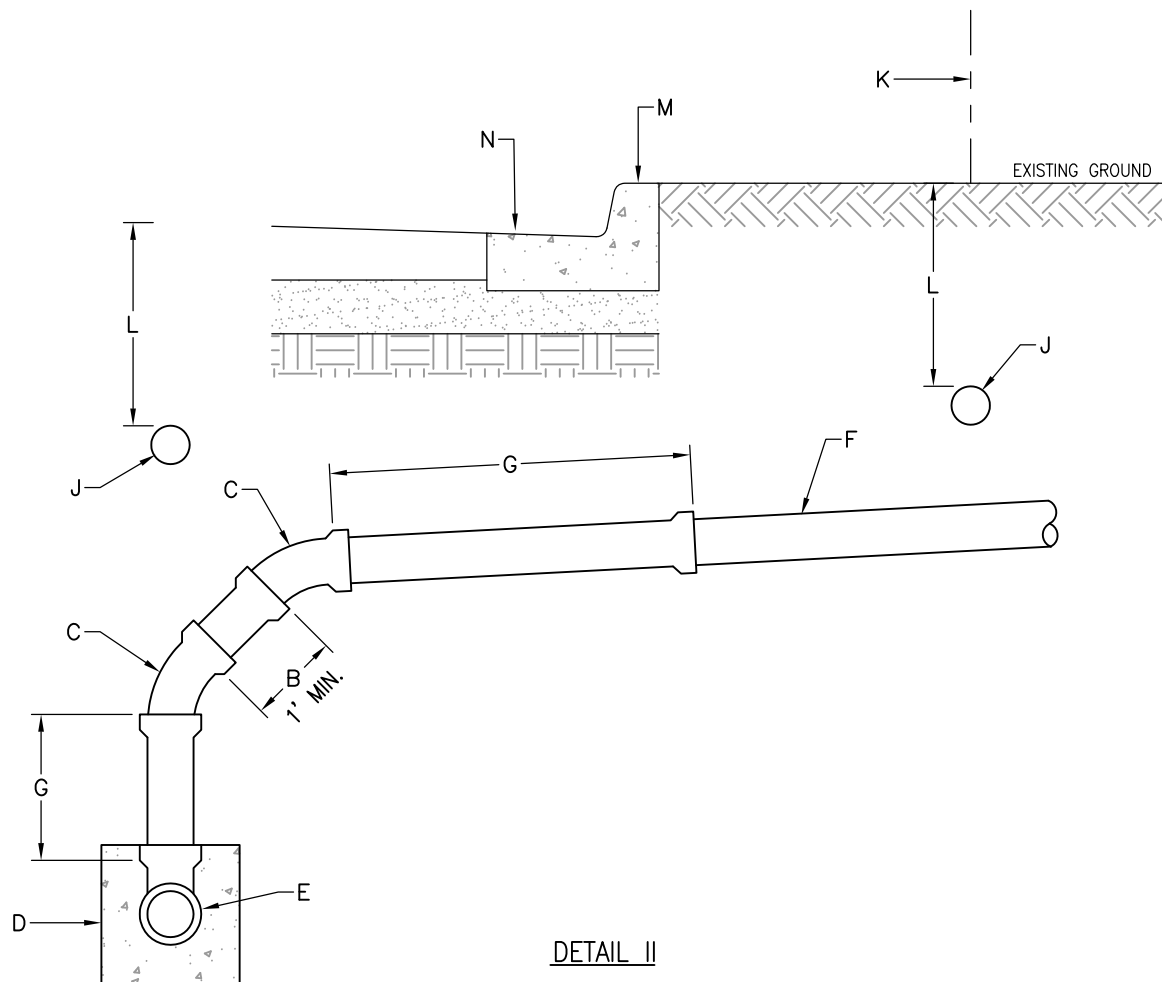
GENERAL NOTES — COVER

1. ALBUQUERQUE VALVE BOX COVER DESIGNED TO FIT INTO AN ALBUQUERQUE VALVE BOX RING.
2. THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
3. FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
4. A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
5. FINISH: REMOVE EXCESS IRON AND FINIS.
6. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

REVISIONS	WATER AUTHORITY
	SANITARY SEWER RING AND COVER FOR VALVE BOX
	DWG. 2128 JAN. 2013



DETAIL I



DETAIL II

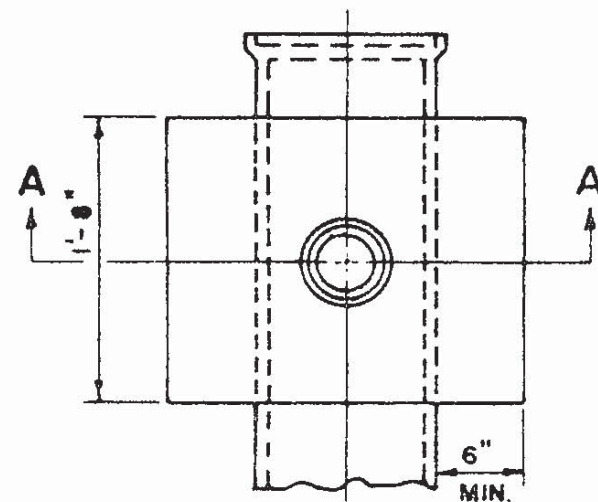
GENERAL NOTES

1. IF DISTANCE 'A' IS 5' OR LESS, ROTATE MAIN SERVICE TEE AND RECONNECT SERVICE AS PER DETAIL I. IF DISTANCE 'A' IS GREATER THAN 5', INSTALL RISER AS PER DETAIL II.
2. WHERE DEPTH IS INSUFFICIENT TO ALLOW RECONNECTION AS SHOWN IN DETAIL I OR II, RECONNECT SERVICE AS DIRECTED BY ENGINEER.
3. THE SANITARY SEWER SERVICE LATERAL IS CONSIDERED 'PRIVATE' FROM THE MAIN LINE, INCLUDING THE SERVICE TEE TO THE PROPERTY LINE AND BEYOND. ALL MAINTENANCE AND/OR REPLACEMENT IS THE RESPONSIBILITY OF THE PROPERTY OWNER FOR WHICH IT IS PROVIDING THE SERVICE.

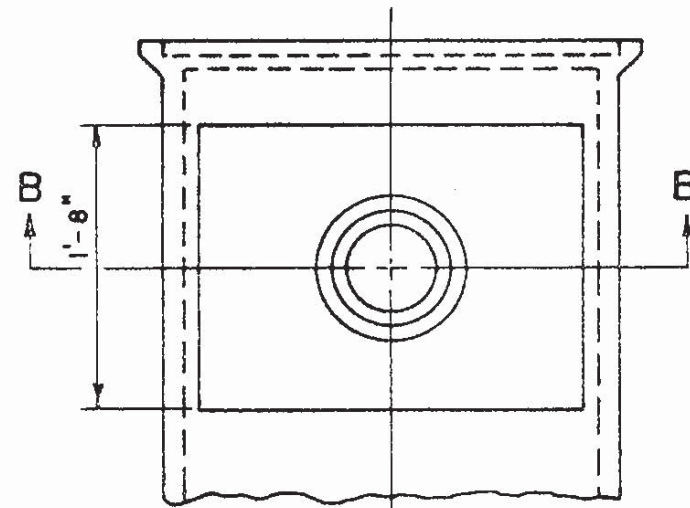
CONSTRUCTION NOTES

- A. VARIABLE WITH A MAX. OF 5'.
- B. 1' MIN., 1.5' MAX.
- C. ELBOWS, 45° DEFLECTION MAX.
- D. INSTALL CONCRETE CRADLE ON TEE AS PER DWG. 2135, RIGID PIPE ONLY.
- E. SERVICE TEE.
- F. SERVICE LINE.
- G. VARIABLE LENGTH.
- H. BACKFILL UNDER SERVICE WITH MIN. 1 CUBIC FOOT OF CONCRETE.
- J. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.
- K. RIGHT-OF-WAY LINE.
- L. DEPTH PLACEMENT PER MANUFACTURER'S RECOMMENDATIONS.
- M. STAMP OR CHISEL PIPE DIAMETER, AND "S" ON TOP OF CURB OVER LOCATION OF SERVICE LINE, MINIMUM 1/4" DEEP.
- N. CURB & GUTTER.

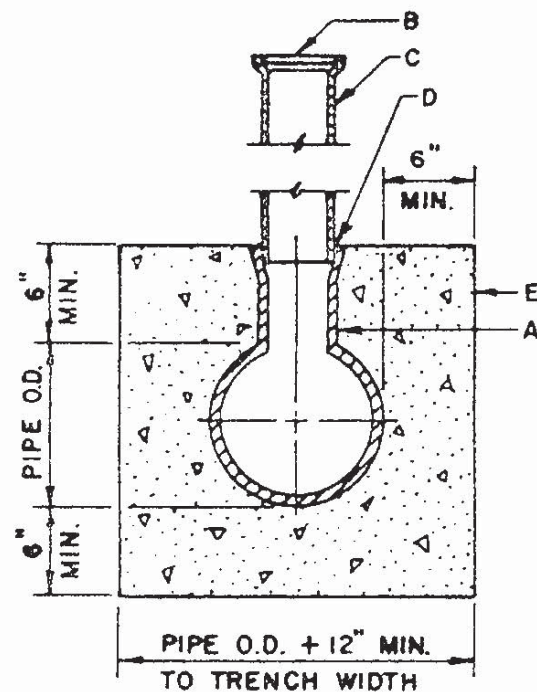
REVISIONS	WATER AUTHORITY
JAN. 2013	SANITARY SEWER SERVICE REPLACEMENT DETAIL
	DWG. 2134 JAN. 2018



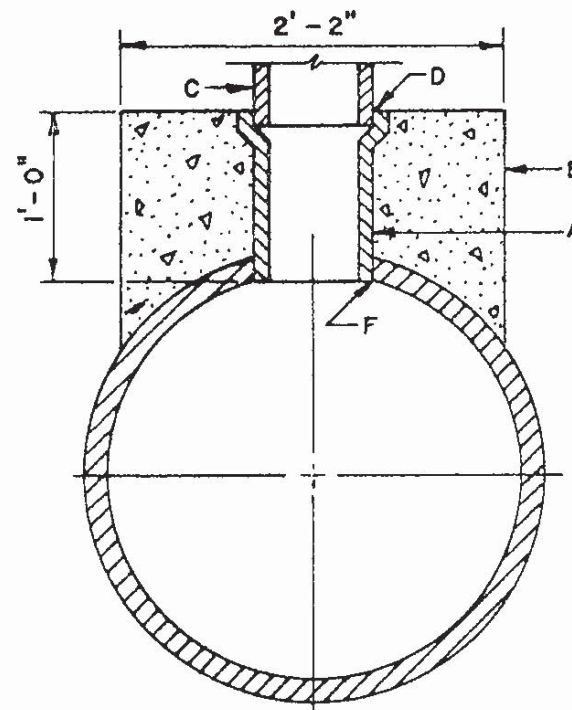
PLAN
FOR 8" TO 24" PIPE



PLAN
FOR GREATER THAN 24" PIPE



SECTION A-A



SECTION B-B

GENERAL NOTES:

1. RISERS WILL BE USED WHERE SEWER IS OVER 14 FT. IN DEPTH OR WHERE WATER TABLE IS ABOVE SEWER LINE. TOP OF RISER SHALL BE 10 FT. BELOW THE PAVEMENT OR GROUND SURFACE WHEN SEWER MAINS ARE INSTALLED DEEPER THAN 14 FT. OR SHALL BE 2 FT. ABOVE WATER TABLE.
2. BRACE RISER PIPE SECURELY BEFORE BACK-FILLING. LAY EACH JOINT OF RISER PIPE AS BACKFILLING PROGRESSES. CAREFULLY TAMP BACKFILL AROUND EACH JOINT OF RISER PIPE. EXTREME CARE MUST BE TAKEN IN ORDER TO PREVENT SHOVING OF PIPE OUT OF PLUMB.
3. ELECTRONIC MARKER DISK SHALL BE PROVIDED OVER RISER AT A DEPTH OF APPROX. 4 FT. TO LOCATE PIPE.

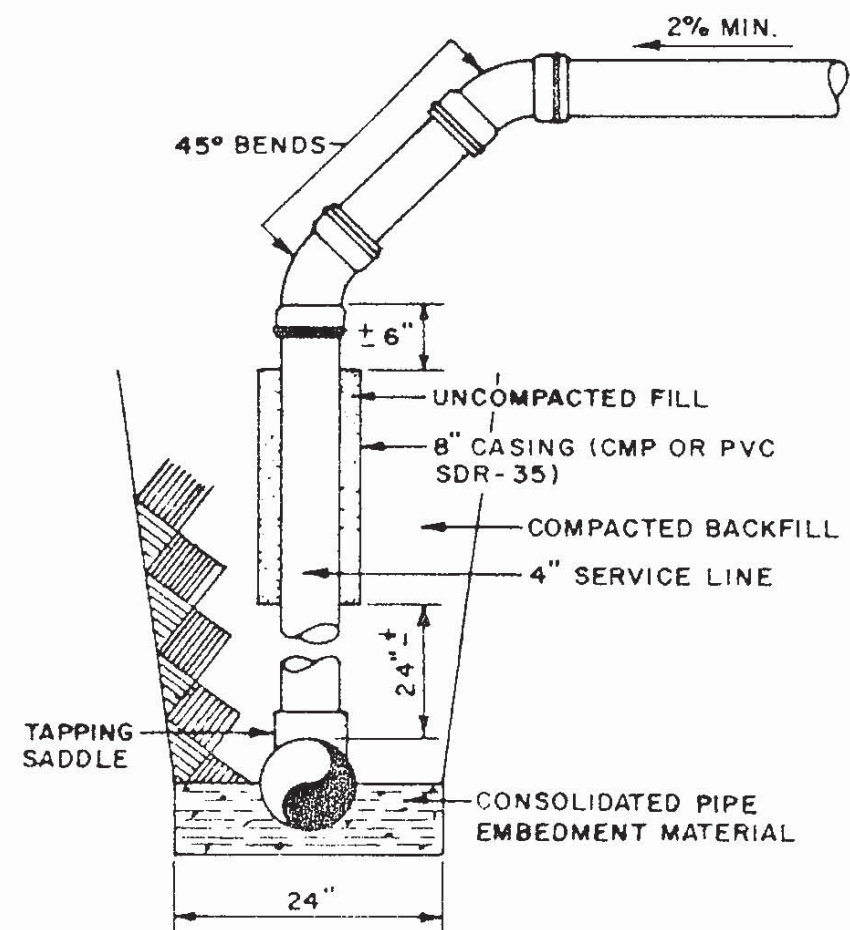
CONSTRUCTION NOTES:

- A. TAPPING TEE, FOR CONNECTION TO EXIST. LINES WHERE NO EXIST. TEE IS AVAILABLE OR STD. PIPE TEE FOR NEW CONSTRUCTION. SEE NOTE K, DWG. 2125.
- B. PROVIDE CONC. OR CLAY PLUG.
- C. 4" OR 6" RISER, (C.I.P.)
- D. WATER TIGHT GASKET PRESSURE RING JOINT.
- E. CONC. CRADLE & SUPPORT.
- F. CORE DRILLED TAP.

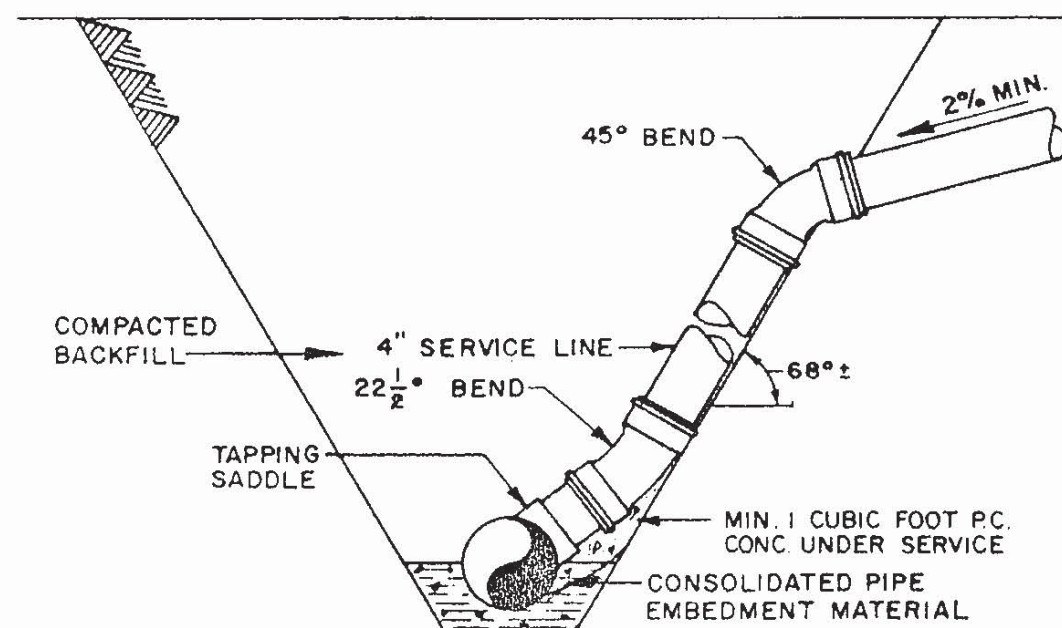
REVISIONS		WATER AUTHORITY	
		SEWER	
		RISER DETAILS	
		RIGID PIPE MAIN	
		DWG. 2135	
		AUG. 1986	

GENERAL NOTES

1. THESE DETAILS REFER ONLY TO INSTALLATIONS ON FLEXIBLE PIPE MAINS. REFER TO OTHER APPROPRIATE STANDARDS FOR RIGID PIPE MAINS.
2. DETAIL "A" SHALL BE USED WHEN A TRENCH BOX, SHORING OR OTHER MEANS OF EXCAVATION BRACING IS USED, OTHERWISE IT SHALL BE THE CONTRACTOR'S OPTION TO USE EITHER DETAIL "A" OR DETAIL "B".
3. REFER TO SPECIFICATION SECTION 905 FOR MATERIAL REQUIREMENTS.
4. TRENCH SLOPES SHALL BE AS PER THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS.



DETAIL "A"



DETAIL "B"

REVISIONS
11-14-91

WATER AUTHORITY

SEWER
RISER DETAILS
FLEXIBLE PIPE MAIN
DWG. 2136

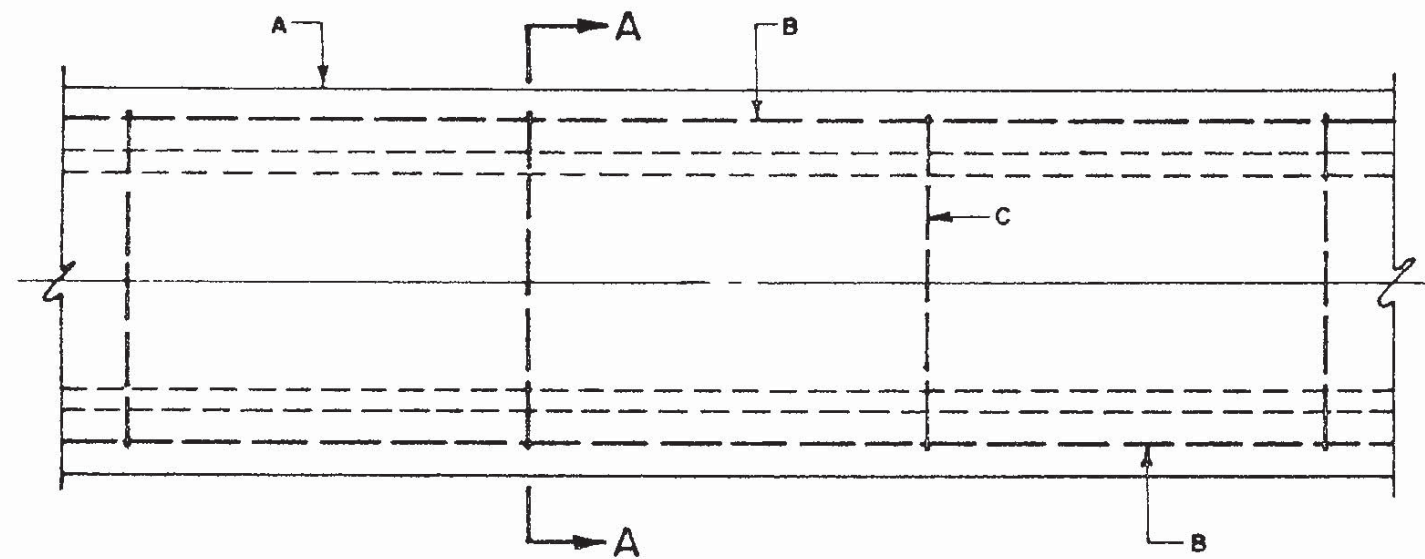
AUG. 1986

GENERAL NOTES:

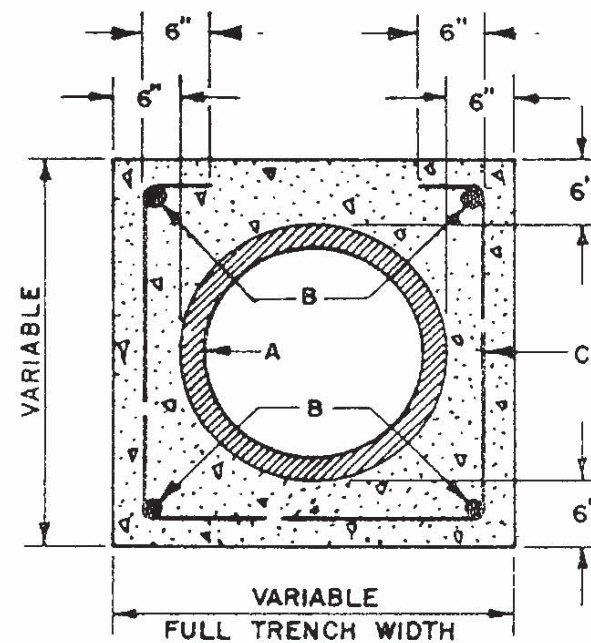
1. WHERE A WATER LINE PASSES BENEATH OR LESS THAN 18 IN. ABOVE AN EXIST. SEWER LINE, THE SEWER LINE SHALL BE ENCASED IN CONC. 6" THICK AS DETAILED, FOR AT LEAST 10FT. ON EACH SIDE OF THE WATER LINE, OR THE SEWER LINE SHALL BE D.I. OR C-900 PVC PIPE WITH PRESSURE-TYPE JOINTS FOR AT LEAST 10FT. ON EACH SIDE OF THE WATER LINE. THIS SHALL ALSO APPLY WHERE A PARALLEL WATER LINE IS LESS THAN 10FT. HORIZONTALLY AND LESS THAN 2FT. ABOVE THE SEWER LINE.

CONSTRUCTION NOTES:

- A. SANITARY SEWER LINE AS SHOWN ON PLANS.
- B. 4-NO. 4 BARS, CONT. WITH 3" CLEARANCE.
- C. NO. 4 BARS, AT 36" O.C.

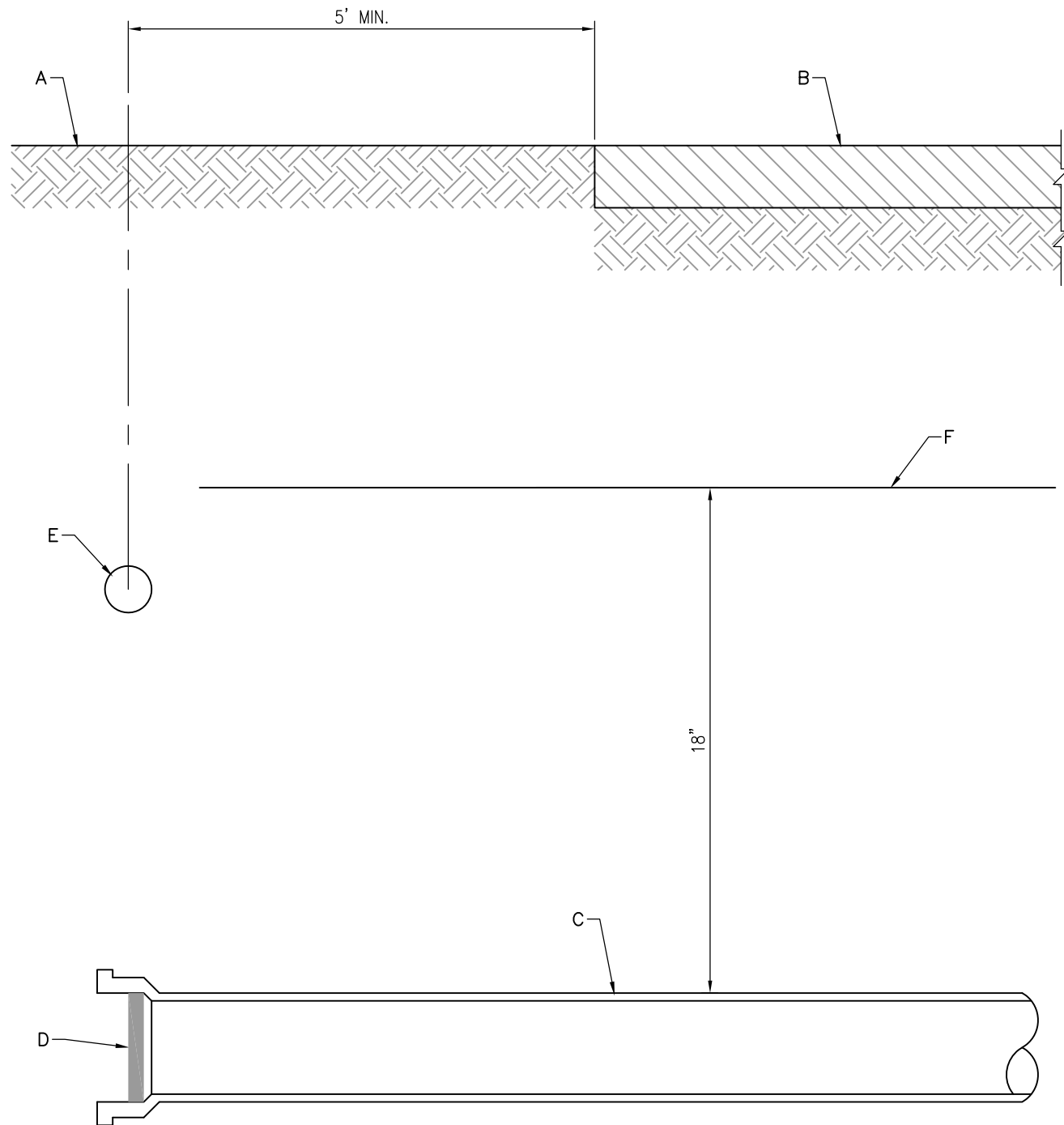


PLAN
CONCRETE ENCASEMENT



SECTION A-A

	WATER AUTHORITY
REVISIONS	SEWER ENCASEMENT DETAILS DWG. 2140 AUG. 1986



ELEVATION

GENERAL NOTES

1. PRIOR TO BACKFILLING, INVERT ELEVATION AND LOCATION WILL BE MEASURED. THIS INFORMATION WILL BE RECORDED ON AS-BUILT DRAWINGS.

CONSTRUCTION NOTES

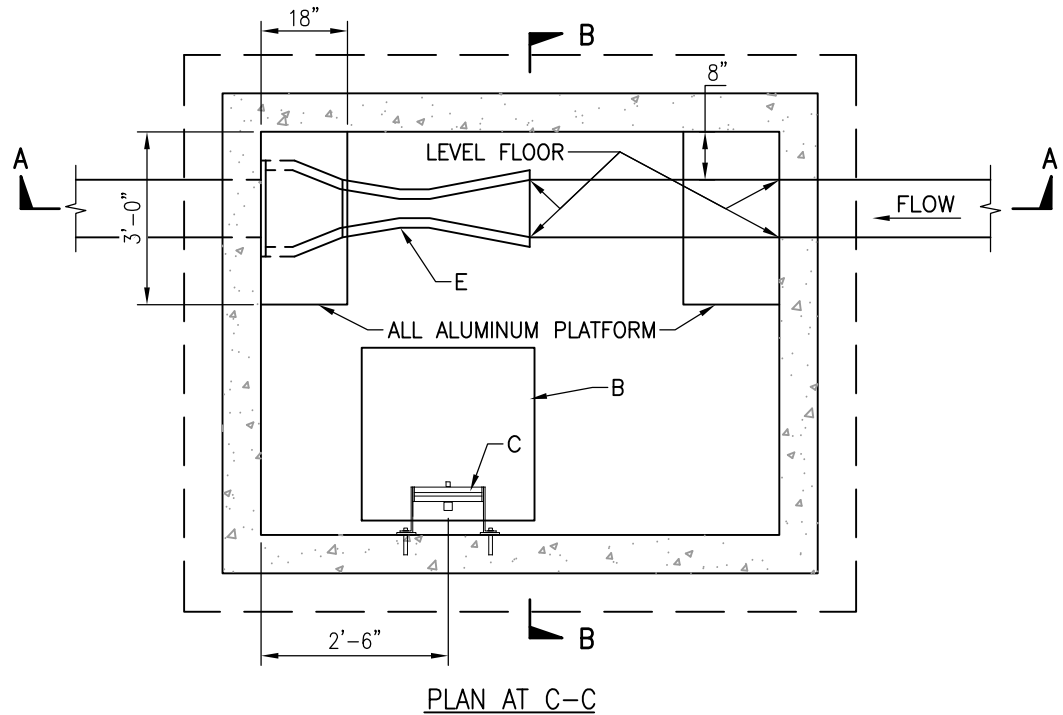
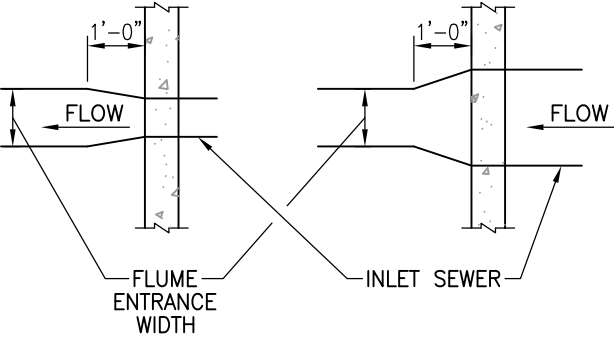
- A. EXISTING GROUND
- B. NEW PAVING
- C. SEWER LINE
- D. PLUG
- E. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170 FOR PLACEMENT DETAILS.
- F. WARNING TAPE TO BE INSTALLED ON ALL SANITARY SEWER LINES.

REVISIONS	WATER AUTHORITY
JAN. 2013	SANITARY SEWER DEAD-END MARKER
	DWG. 2145 MAY 2019

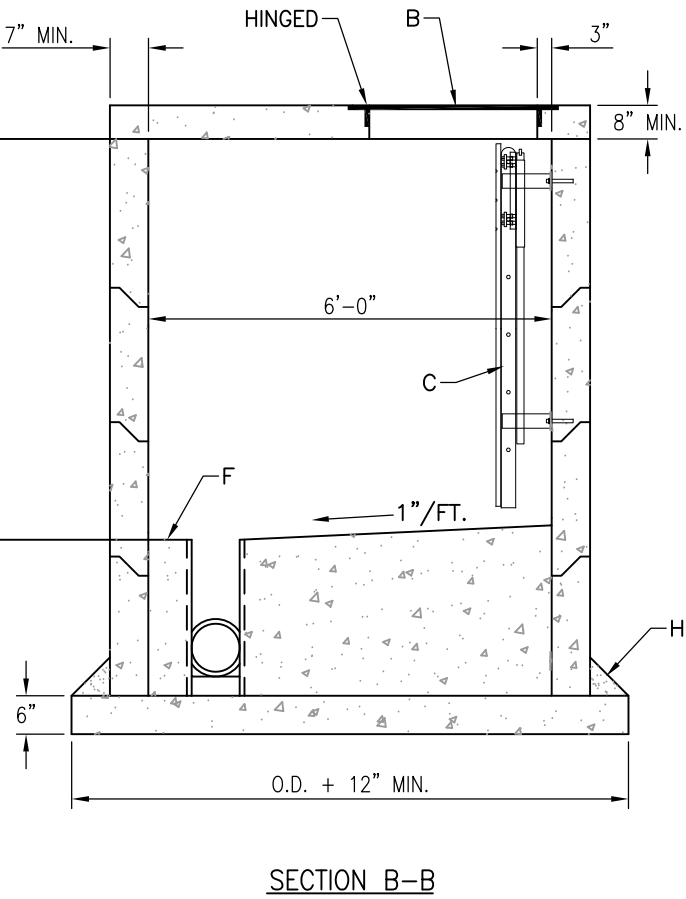
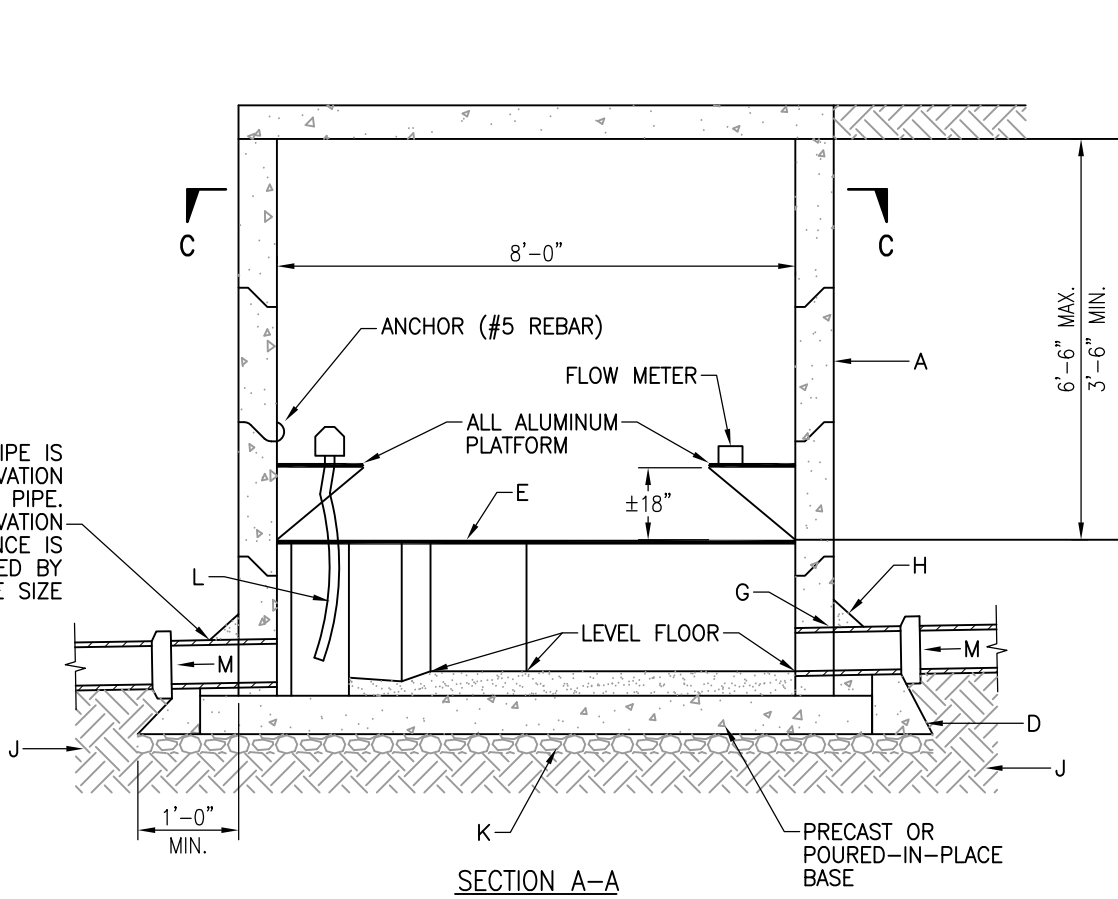
TABLE 1

PIPE SIZE (IN)	REQUIRED INLET SLOPE (FT/FT)
4	0.0060
6	0.0050
8	0.0040
10	0.0028
12	0.0022
15	0.0015
18	0.0012

NOTE: WHEN THE INLET SEWER IS SMALLER OR LARGER, IN DIAMETER THAN THE FLUME ENTRANCE WIDTH, A SMOOTH TRANSITION SHALL BE PROVIDED CHANGING FROM THE INLET SEWER DIAMETER TO THE FLUME ENTRANCE CHANNEL WIDTH OVER THE FIRST FOOT INSIDE THE MH.



NOTE: OUTLET PIPE IS AT A LOWER ELEVATION THAN THE INLET PIPE. MINIMUM ELEVATION DIFFERENCE IS DETERMINED BY THE FLUME SIZE



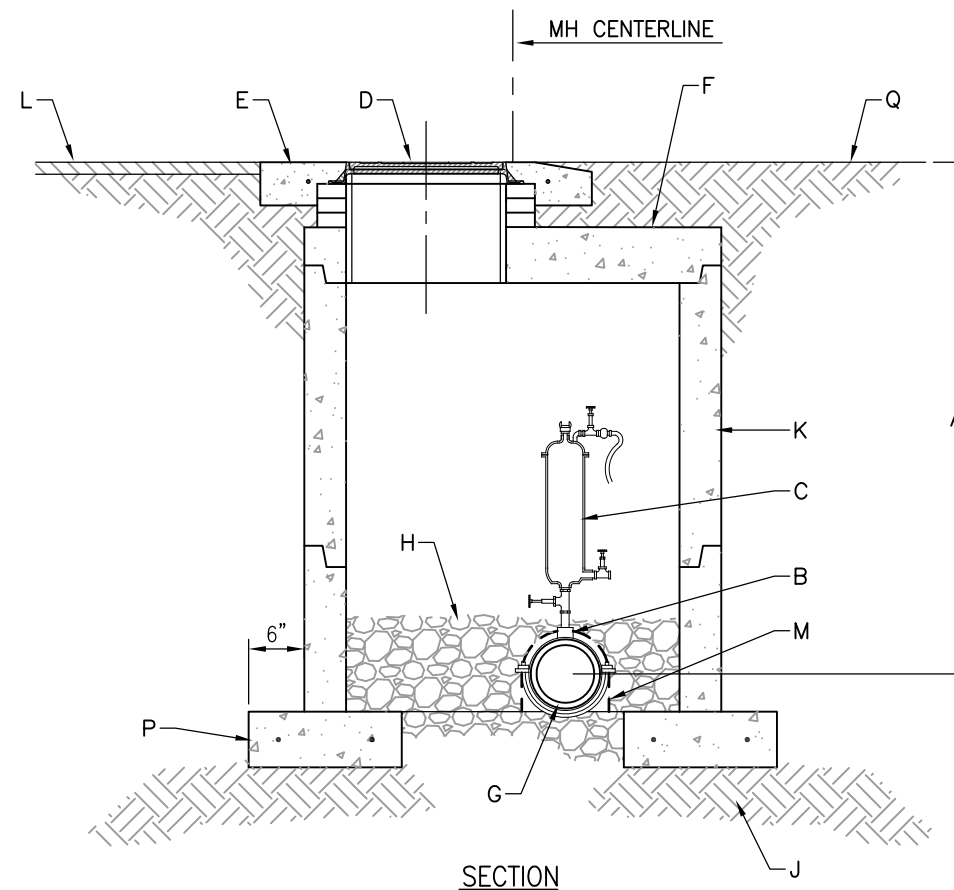
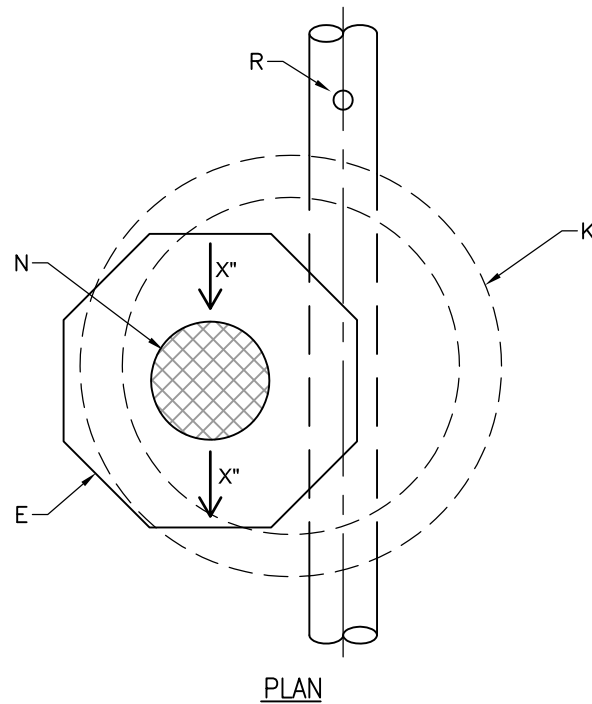
GENERAL NOTES

1. THIS DESIGN IS APPLICABLE FOR MANHOLES $\leq 6.5'$ IN DEPTH, MEASURED FROM FLOOR TO CONCRETE COVER. DEPTHS $> 6.5'$ WILL REQUIRE DESIGN BY A REGISTERED ENGINEER IN NM.
2. INDUSTRIAL MANHOLE SHALL BE LOCATED ON PRIVATE PROPERTY OUTSIDE OF CITY RIGHT-OF-WAY. THE WATER AUTHORITY SHALL HAVE ACCESS TO THE MANHOLE AT ALL TIMES OF THE DAY OR NIGHT.
3. NOT ALL INSTALLATIONS WILL REQUIRE THE ALUMINUM PLATFORMS. SAMPLER AND FLOW METERING APPARATUS TO BE PROVIDED BY THE INDUSTRIAL USER. FINAL DECISIONS RELATIVE TO THE REQUIREMENT FOR MONITORING EQUIPMENT AND THE SPECIFIC TYPE OF FLUME WILL BE MADE BY THE WATER AUTHORITY FOR EACH INDIVIDUAL CASE.
4. A PARSHALL FLUME OR PALMER BOWLUS FLUME SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THIS DETAIL. THE FLUME MUST BE SIZED TO ACCURATELY MEASURE ALL ANTICIPATED FLOW LEVELS. PRIOR TO INSTALLATION, THE FLUME SIZE AND TYPE MUST BE APPROVED BY THE WATER AUTHORITY.
5. IN ORDER TO CONTROL VELOCITIES AT A LEVEL THAT ALLOWS FOR ACCURATE FLOW MEASUREMENT, SLOPES ON THE INLET SEWER LINES FOR 20' OUTSIDE OF THE MANHOLE MUST BE AS SPECIFIED IN TABLE 1 FOR THE VARIOUS SIZE LINES. OUTLET SEWER LINES MUST BE DESIGNED TO CONVEY THE MAXIMUM DESIGN FLOWS WITHOUT CREATING A SURCHARGED CONDITION IN THE FLUME.

CONSTRUCTION NOTES

- A. ALL MANHOLE BASES, RISERS SECTIONS AND FLAT SLAB TOP SECTIONS SHALL BE PRECAST REINFORCED CONCRETE.
- B. 3'-0" SQ. ALUMINUM FLOOR DOOR WITH RECESSED HASP COVERED BY A HINGED LID FLUSH WITH TOP SURFACE. HARDWARE AND HINGES SHALL BE 316 STAINLESS STEEL. BILCO TYPE J, OR EQUAL. HS-20 LIVE LOAD RATED WHERE APPLICABLE.
- C. LADDER PER STANDARD DRAWING 2335.
- D. CONCRETE PIPE SUPPORTS SHALL EXTEND OUTSIDE THE MANHOLE TO BELL OF FIRST JOINT AND SHALL CRADLE PIPE TO THE SPRING LINE.
- E. PREFABRICATED MONITORING FLUME TO BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. A PARSHALL FLUME OR A PALMER BOWLUS FLUME SHALL BE INSTALLED AS DIRECTED BY THE WATER AUTHORITY.
- F. CONCRETE FILLETS. FILLETS TO MATCH TOP OF FLUME AND SLOPE ONE INCH PER FOOT.
- G. MANHOLE PIPE CONNECTIONS TO BE PER ASTM C-923; STANDARD SPEC. FOR RESILIENT CONNECTORS BETWEEN REINFORCED CONCRETE MANHOLE STRUCTURES AND PIPES.
- H. 6" GROUT FILLET ON UPPER HALF OF PIPE AND AROUND BASE.
- J. BACKFILL PER SECTION 501.
- K. 2" GRAVEL CRUSHED STONE LEVELING COURSE.
- L. FLUME OUTLET END ADAPTER.
- M. SLOPE PER TABLE 1.

REVISIONS	WATER AUTHORITY
	SANITARY SEWER SAMPLING AND METERING MANHOLE 6'x8' RECTANGULAR DWG. 2150 JAN. 2013



GENERAL NOTES

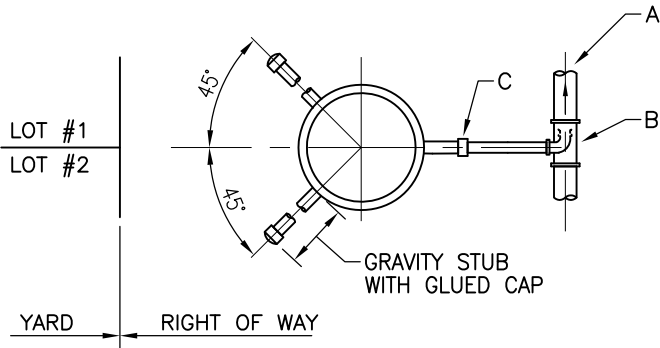
- ALL COMPACTION FOR INSTALLATION OF ARV MANHOLE TO BE 95% OF MAXIMUM DRY DENSITY PER ASTM D 1557.
- INTERIOR OF MANHOLE SHALL BE COATED IN ACCORDANCE WITH SECTION 920.4.6.2 OF THE SPECIFICATIONS.

CONSTRUCTION NOTES

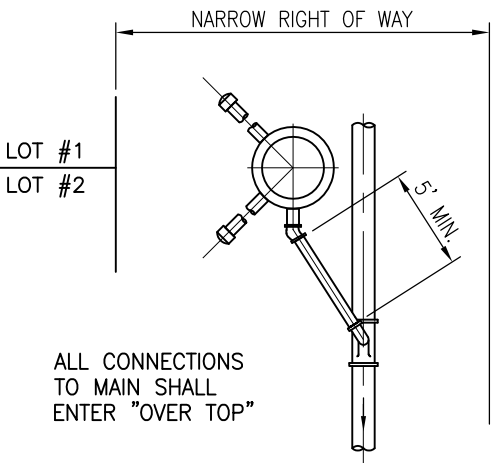
- SEE CONSTRUCTION PLANS FOR DEPTH REQUIRED.
- 2" TAPPING SADDLE
- SEWAGE AIR RELEASE VALVE PER APPROVED PRODUCTS LIST AND CONSTRUCTION PLANS AND SPECIFICATIONS.
- CAST IRON MANHOLE FRAME AND COVER. SEE STANDARD DRAWING 2109.
- CONCRETE COLLAR PER STANDARD DRAWINGS 2101 AND 2461.
- PRECAST CONCRETE TOP SLAB FOR MANHOLE WITH 2'-0" DIA. OPENING PER STANDARD DRAWING 2107.
- FORCE MAIN
- 12" DEEP 3/4" GRAVEL, ASTM C33, NO. 57 GRAVEL
- COMPACTED SUBGRADE, OVEREXCAVATED TO 12" BELOW FOUNDATION.
- USE 4'-0" I.D. CONCRETE MANHOLE SECTIONS (PER SECTION 101, SAS CONCRETE. $f'c=4000$ psi AT 28 DAYS). ADDITIONAL SECTIONS MAY BE ADDED.
- FINISH GRADE IN PAVED AREAS
- SLOTTED OPENING 1" LARGER THAN FORCE MAIN WITH APPROVED GASKET. GROUT INTERIOR AND EXTERIOR OF OPENING.
- LOCATION OF LID
- 2~CONCRETE ANTI-FLOATATION COLLAR HALVES. SEE STANDARD DRAWING 2171, OR CAST-IN-PLACE CONCRETE OF SIMILAR DESIGN
- FINISH GRADE IN UNPAVED AREAS
- ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.

REVISIONS	WATER AUTHORITY
JAN. 2013	SANITARY SEWER AIR RELEASE VALVE DETAIL
	DWG. 2160 MAR. 2019

NOTE:
EACH HOUSE GRAVITY LATERAL
MUST BE DIRECTLY CONNECTED
TO HOLDING TANK.



PLAN SHOWING HOLDING TANK
WITH TWO HOUSE CONNECTIONS



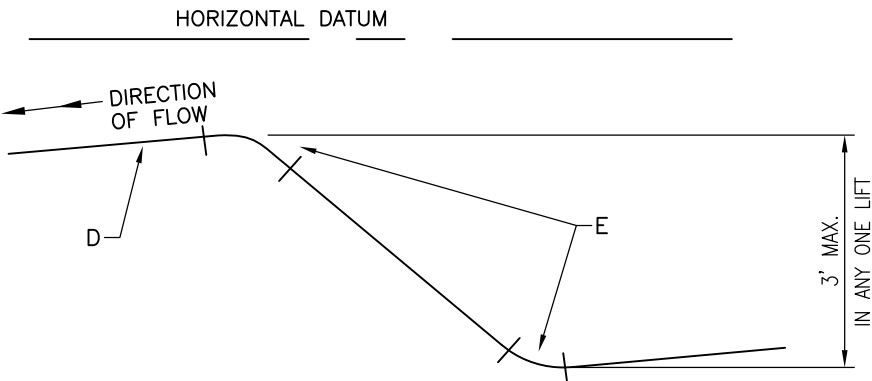
VALVE PIT INSTALLATION
IN NARROW RIGHT OF WAY

GENERAL NOTES

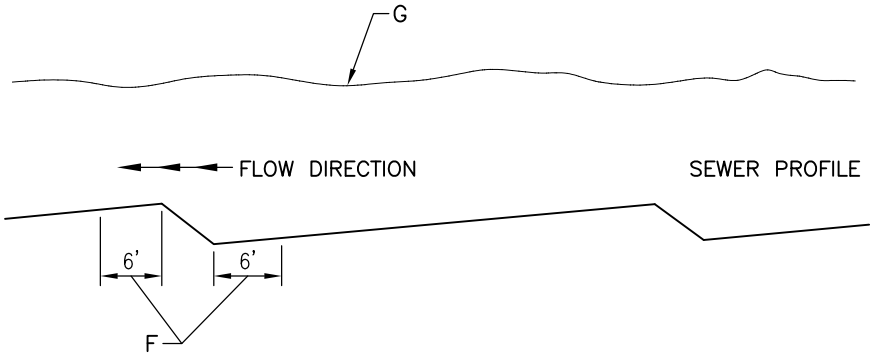
1. ONLY HOMES AND APARTMENTS WHOSE LOWER FLOOR ELEVATION ARE THE SAME SHOULD BE CONNECTED TO A COMMON VACUUM VALVE PIT INSTALLATION. WITH MULTIPLE FLOOR APARTMENTS EACH FLOOR SHOULD BE SERVICED BY ITS OWN VACUUM VALVE PIT INSTALLATION.
2. NOT LESS THAN 20' BETWEEN SUCCESSIVE LIFTS.
3. LOWER PORTION OF VALVE PIT IS A WASTE HOLDING TANK.

CONSTRUCTION NOTES

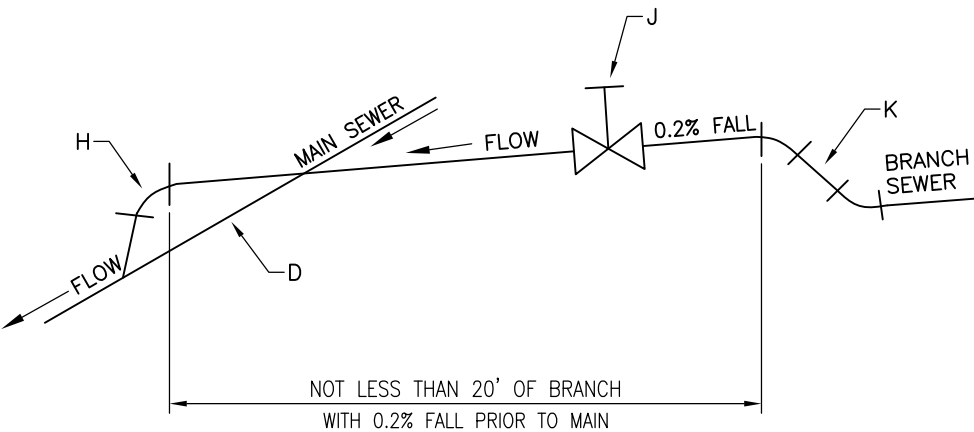
- A. 4", 6", 8" OR 10" VACUUM SEWER
- B. 10"x10"x3" OR 8"x8"x3" OR 6"x6"x3" OR 4"x4"x3" D.W.V. WYE
- C. 3" SCHEDULE 40 PVC
- D. SLOPE: CONSULT DESIGN MANUAL
- E. LONG TURN 45° BENDS IN TWO POSITIONS.
- F. DO NOT MAKE ANY INLET CONNECTIONS IN THIS AREA
- G. GRADE
- H. ELL 90° AND WYE. IMPORTANT: WYE SHALL BE IN VERTICAL POSITION.
- J. ISOLATION VALVE
- K. LIFT
- L. WYE AND ST. 45° IN VERTICAL POSITION.



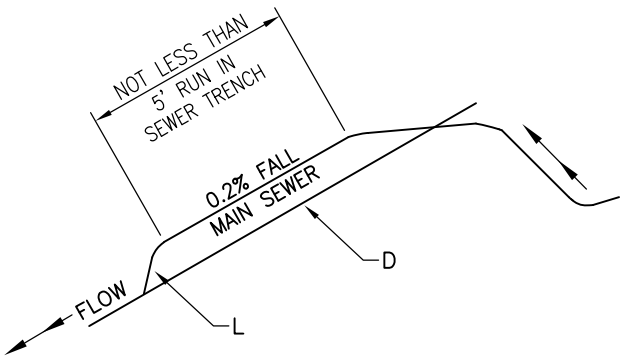
LIFT DETAILS



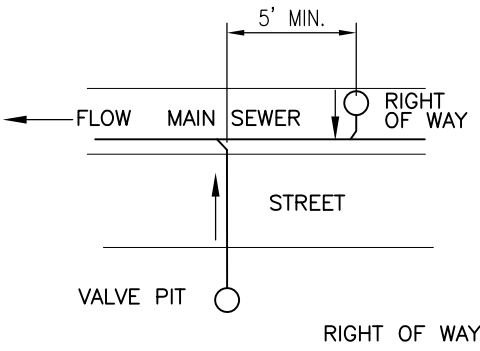
RECOMMENDED POSITIONS FOR CONNECTIONS TO MAIN



DIAGRAMMATIC OF BRANCH
CONNECTION TO MAIN



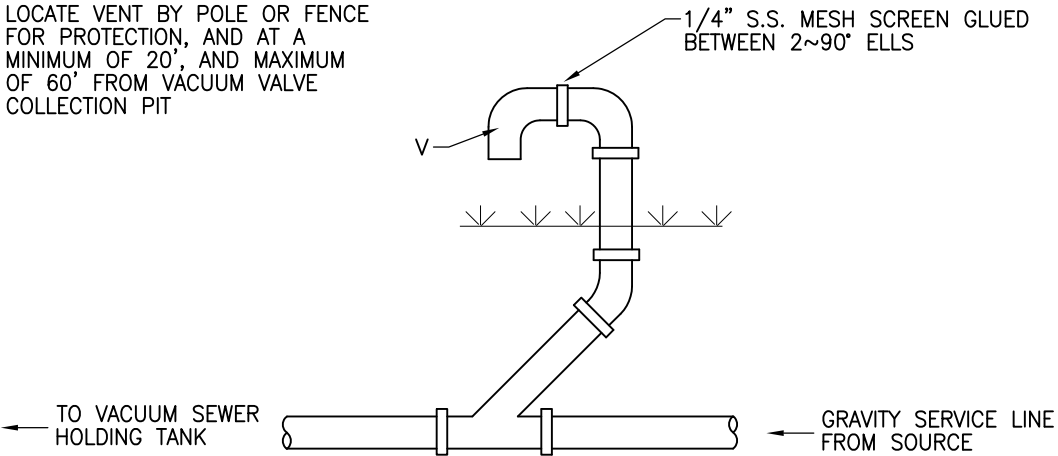
ALTERNATE METHOD OF CONNECTING
BRANCH OR VACUUM SERVICE LATERAL TO MAIN



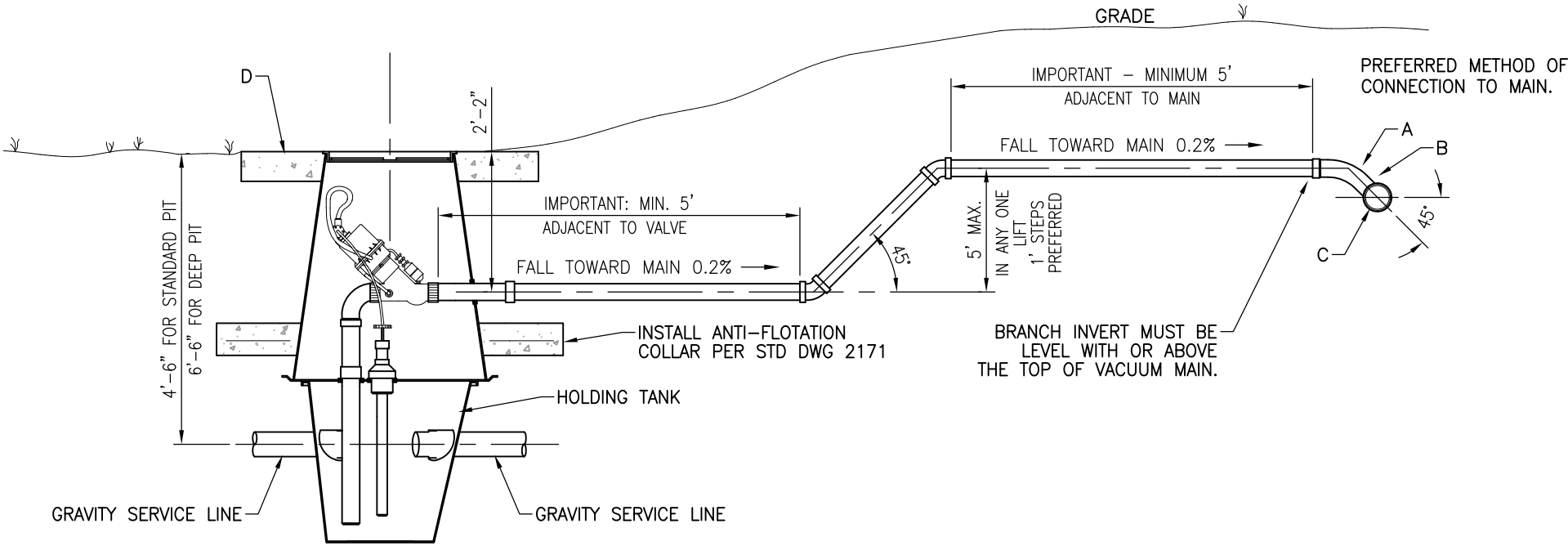
SKETCH SHOWING MINIMUM
SPACING OF VACUUM SERVICE LATERALS

REVISIONS	WATER AUTHORITY
	VACUUM SEWER STANDARD DETAILS
	DWG. 2162 JAN. 2013

LOCATE VENT BY POLE OR FENCE
FOR PROTECTION, AND AT A
MINIMUM OF 20', AND MAXIMUM
OF 60' FROM VACUUM VALVE
COLLECTION PIT



VENT INLET DETAIL



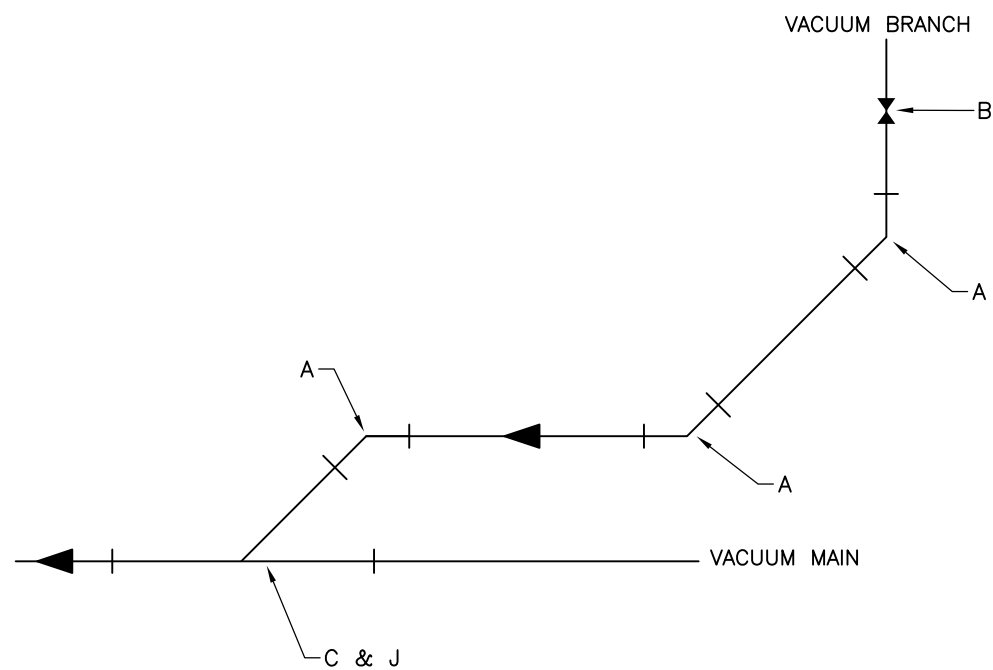
GENERAL NOTES

1. GRAVITY LINES: IN ALL INSTALLATIONS, SEWAGE SHALL FLOW BY GRAVITY TO THE HOLDING TANK.
2. INSTALL GRAVITY LINES IN ACCORDANCE WITH WATER AUTHORITY STANDARDS AND LOCAL CODES.
3. PRIVATE GRAVITY SERVICE LINE MUST INCLUDE A VENT AT A MINIMUM OF 20', AND A MAXIMUM OF 60' FROM THE VACUUM VALVE COLLECTION PIT. VENT PIPING SHALL BE THE SAME DIAMETER OF THE PRIVATE GRAVITY SERVICE LINE.

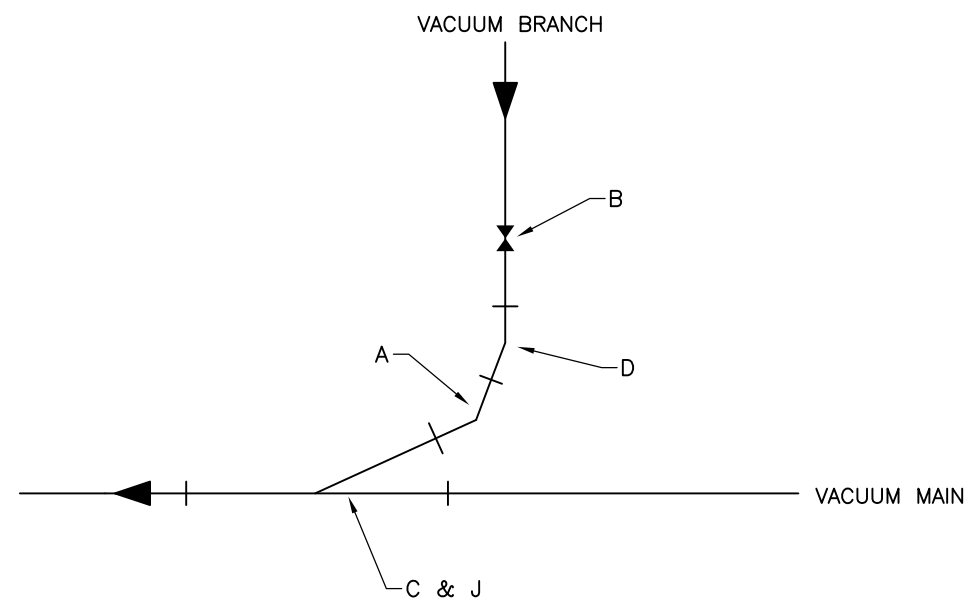
CONSTRUCTION NOTES

- A. 45° ELL
- B. WYE IN VERTICAL POSITION
- C. VACUUM SEWER MAIN
- D. CONCRETE COLLAR PER STANDARD DRAWING 2461.

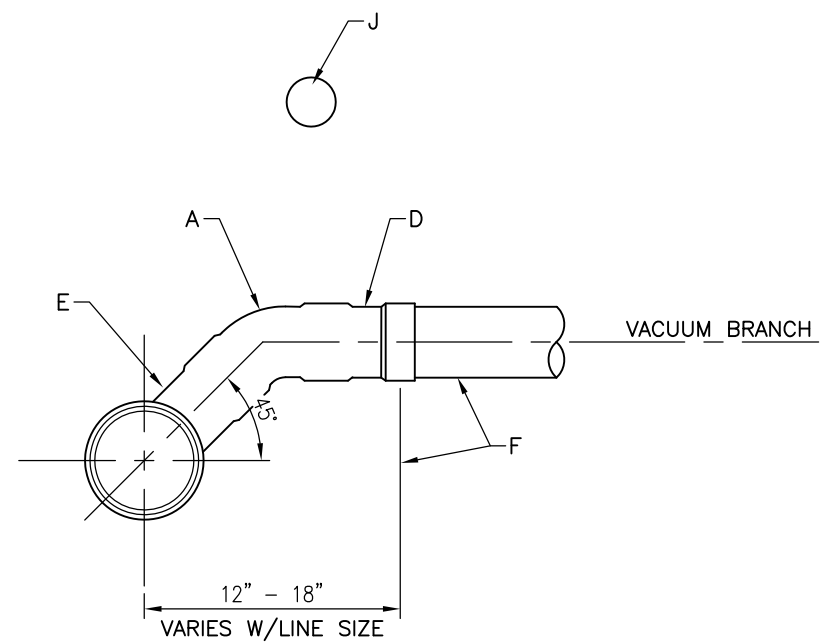
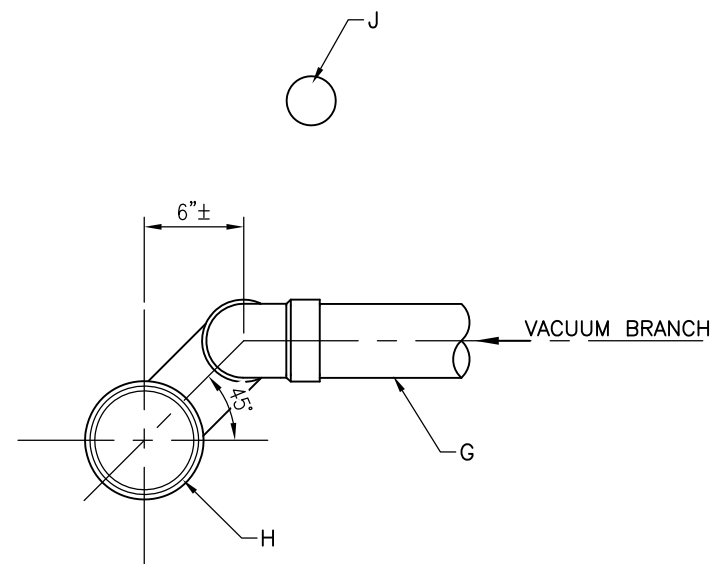
REVISIONS	WATER AUTHORITY
	VACUUM SEWER VALVE AND PIT INSTALLATION WITH LIFT IN VACUUM SERVICE LATERAL DWG. 2163 JAN. 2013



ALTERNATE "A"



ALTERNATE "B"



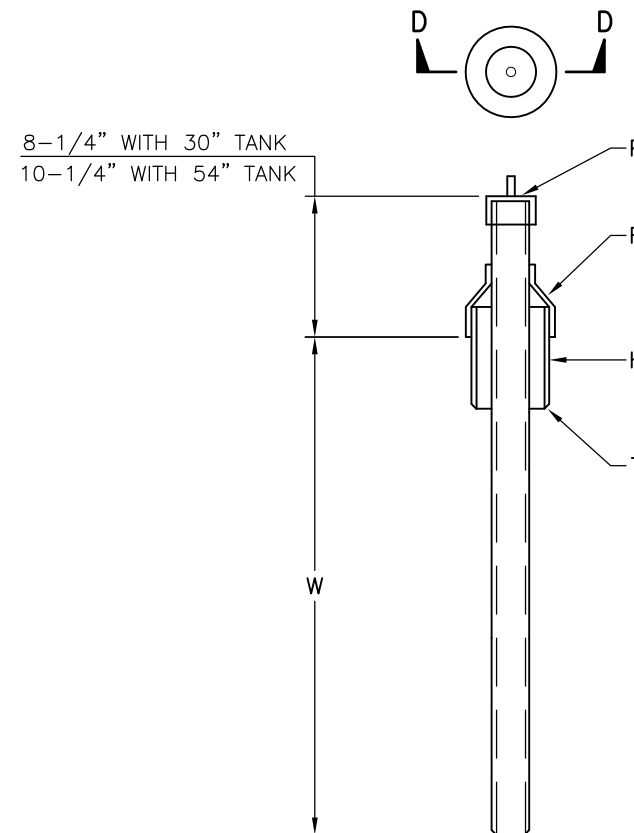
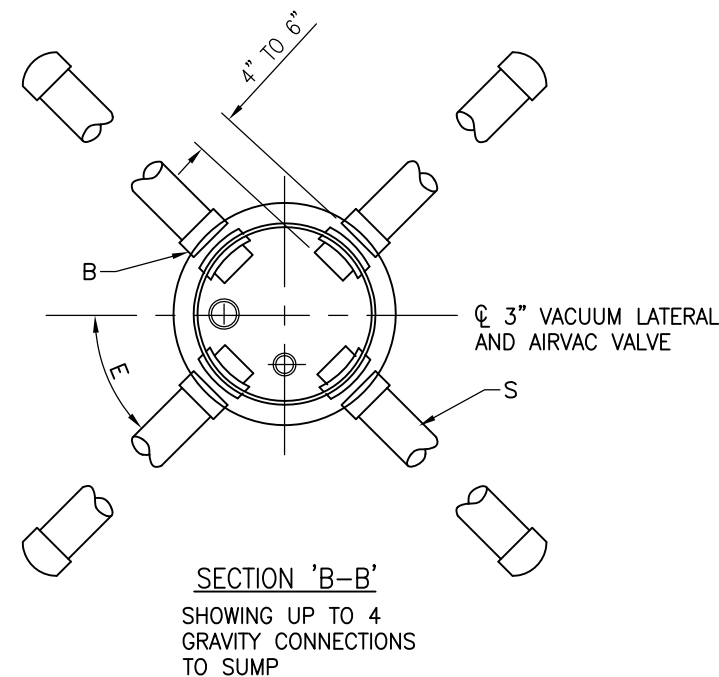
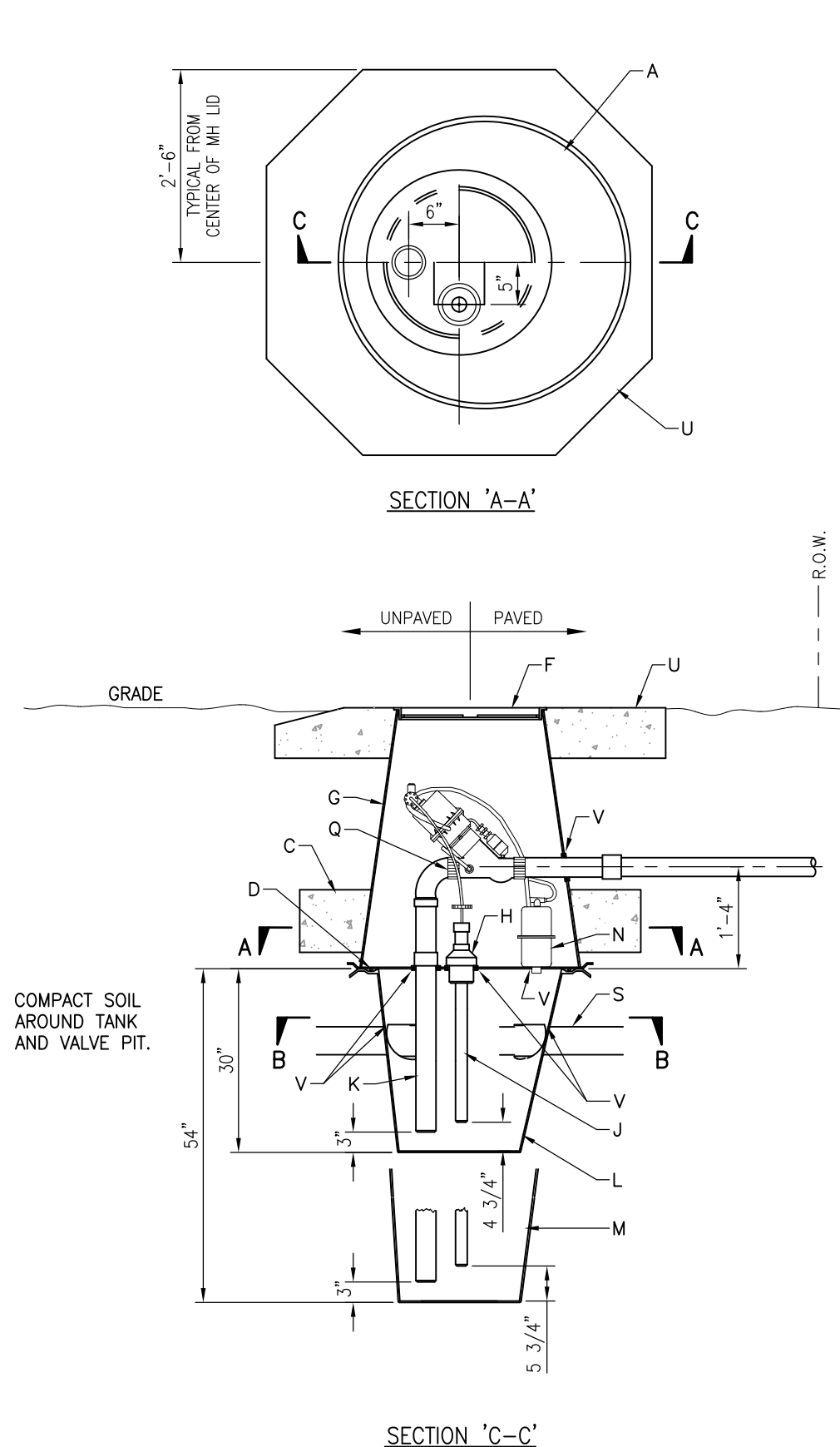
GENERAL NOTES

- UNLESS SHOWN ON CONSTRUCTION DRAWINGS, DIVISION VALVES WILL NOT BE INSTALLED FOR SERVICE CONNECTIONS.

CONSTRUCTION NOTES

- 45° ELBOW
- DIVISION VALVE AS SHOWN ON CONSTRUCTION DRAWINGS
- REDUCTION WYE AT 45°
- 22 1/2° ELBOW
- MAIN LINE WYE AT 45°
- BOTTOM OF BRANCH IS AT TOP OF MAIN
- BOTTOM OF BRANCH IS 1" TO 2" ABOVE TOP OF MAIN
- VACUUM MAIN
- ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.

REVISIONS	WATER AUTHORITY
	VACUUM SEWER TYPICAL VACUUM BRANCH LINE CONNECTION
	DWG. 2164 JAN. 2013



GENERAL NOTES

1. THE FOLLOWING HOLES IN VALVE PIT AND SUMP TO BE FIELD CUT: 5" GRAVITY (SUMP)
2. ONLY HOMES OR APARTMENTS WHOSE LOWER FLOOR ELEVATIONS ARE THE SAME SHOULD BE CONNECTED TO A COMMON VACUUM VALVE PIT INSTALLATION. WITH MULTIPLE FLOOR APARTMENTS, EACH FLOOR SHOULD BE SERVICED BY ITS OWN VACUUM VALVE PIT PACKAGE.
3. FOR ANTI-FLOATATION RING, GRADE-LEVEL PAD, PIPING FROM VALVE PIT TO VACUUM MAIN AND GRAVITY SERVICE STUBS. VALVE TO BE INSTALLED BY OWNER. ALL OTHER INSTALLATION AND TESTING BY CONTRACTOR.

CONSTRUCTION NOTES

- A. RTM MOLDED FIBERGLASS VALVE PIT BOTTOM WITH HOLES FACTORY CUT.
- B. GLUE HALF OF A SLIP COUPLING IN PLACE AT 4" TO 6" FROM END OF GRAVITY LINE TO ACT AS A STOP.
- C. ANTI-FLOTATION RING (TYP), SEE STANDARD DRAWING 2171.
- D. JOINT SEALED WITH NEOPRENE RUBBER O-RING. HOLDING TANK BOLTED TO VALVE PIT BOTTOM WITH 6 S.S. NUTS, BOLTS AND WASHERS.
- E. OFFSET 45° TO AVOID CONFLICT BETWEEN PIPES.
- F. CAST IRON MANHOLE FRAME AND COVER RATED FOR H2O LOADING.
- G. SPIRAL WOUND, H2O LOADING RATED, FIBERGLASS VALVE PIT. 27" I.D. AT TOP, 36" I.D. AT BOTTOM.
- H. 4" CLEANOUT/SENSOR ASSEMBLY
- J. 2" SENSOR LINE
- K. 3" SUCTION LINE
- L. FIBERGLASS SUMP 30" DEEP. SUMP 30" I.D. AT TOP, 16" I.D. AT BOTTOM.
- M. FIBERGLASS SUMP 54" DEEP TO ALLOW CONNECTION OF DEEP GRAVITY LINES. DIAMETERS SAME AS 30" SUMP.
- N. SUMP BREATHER ASSEMBLY
- P. 2" AIRVAC PVC SENSOR CAP
- Q. 3" NO-HUB COUPLINGS
- R. 2"x4" REDUCER COUPLING W/INDEX REMOVED. (GLUE JOINTS)
- S. 4" PVC GRAVITY STUB. EXTEND TO PROPERTY LINE UNLESS OTHERWISE DIRECTED AND GLUE CAP.
- T. END BEVELED
- U. CONCRETE COLLAR PER STANDARD DRAWING 2461.
- V. GROMMET
- W. 26" LONG, WITH 30" DEEP HOLDING TANK OR 49" LONG, WITH 54" DEEP HOLDING TANK. FULLY INSERT THROUGH PIT BOTTOM TO STOP.

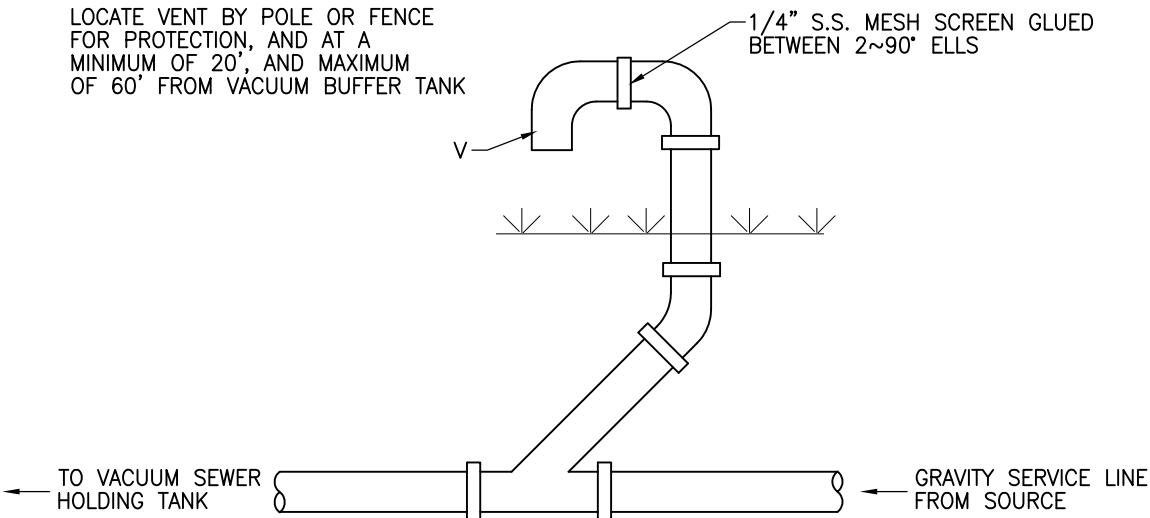
REVISIONS	WATER AUTHORITY
	VACUUM SEWER 3" VALVE AND PIT INSTALLATION WITH INTERNAL BREATHER
	DWG. 2165 JAN. 2013

GENERAL NOTES

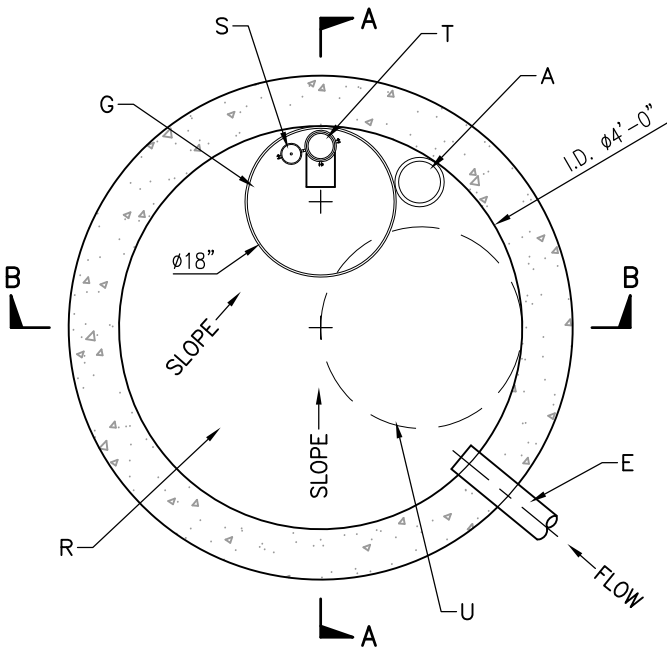
- 1. ANY LIFT EXCEEDING 6' MUST BE ADDED TO HEAD LOSSES ON VACUUM MAIN AND SERVICE LINE TO DETERMINE IF SUFFICIENT VACUUM HEAD IS AVAILABLE.
- 2. ALL MATERIALS AND HARDWARE FOR INSTALLING VALVE TO BE FURNISHED BY CONTRACTOR. ALL INSTALLATION AND TESTING BY CONTRACTOR, EXCEPT VALVE, TO BE INSTALLED BY OWNER. ALL PVC FITTINGS TO BE GLUED EXCEPT WHERE NOTED. DRILL HOLE IN WALL FOR MOUNTING SCREW FOR SUMP BREATHER.

CONSTRUCTION NOTES

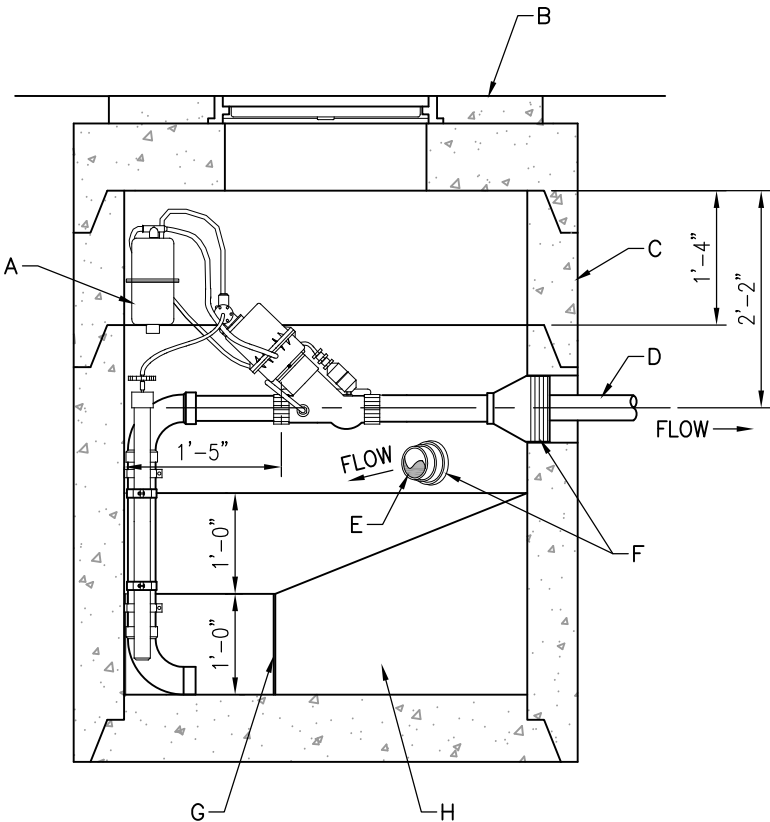
- A. SUMP BREATHER ASSEMBLY
- B. CONCRETE COLLAR, SEE STANDARD DRAWING 2461.
- C. CONCRETE MANHOLE SECTION
- D. 3" VACUUM SERVICE LINE
- E. GRAVITY INLET MUST BE LOCATED BETWEEN THE VACUUM SERVICE LINE AND THE START OF SLOPE TO SUMP. MIN. 4" GRAVITY SEWER WITH MATCHING DIAMETER VENT, MIN. 20', MAX. 60' FROM VACUUM BUFFER TANK.
- F. STANDARD FLEXIBLE CONNECTIONS. ALL CONNECTIONS TO BUFFER TANK MUST BE WATER TIGHT.
- G. 1 FT LONG, 18" I.D. PVC PIPE MAY BE USED TO FORM SUMP AREA.
- H. MASS CONCRETE
- J. SEWER FRAME & COVER PER STANDARD DRAWING 2109.
- K. PRECAST CONCRETE FLAT TOP FOR MANHOLE WITH 2'-0" DIA. OPENING.
- L. 3" MODEL "D" VALVE BY AIRVAC OR EQUAL.
- M. 2" PVC SENSOR CAP SUPPLIED WITH VALVE
- N. 2" PVC SENSOR PIPE
- P. PRECAST CONCRETE BOTTOM IN MANHOLE SECTION.
- Q. 3" STREET ELL TOUCHING BASE OF SUMP WITH PLAIN END. NO CONNECTION.
- R. VALVE AND PIPING REMOVED FOR CLARITY.
- S. SENSOR PIPE
- T. VALVE CONNECTION
- U. LOCATION OF LID
- V. VENT FABRICATED WITH 90° ELLS.; HEIGHT MUST BE ABOVE FLOOD WATER LEVEL, BUT BELOW FINISHED FLOOR LEVEL OF LOWEST RESIDENCE SERVED.
- W. USE 4'-0" I.D. CONCRETE MANHOLE SECTIONS. ADDITIONAL SECTIONS MAY BE ADDED TO ALLOW CONNECTION OF DEEP GRAVITY LINES OR FOR ADDED STORAGE CAPACITY.



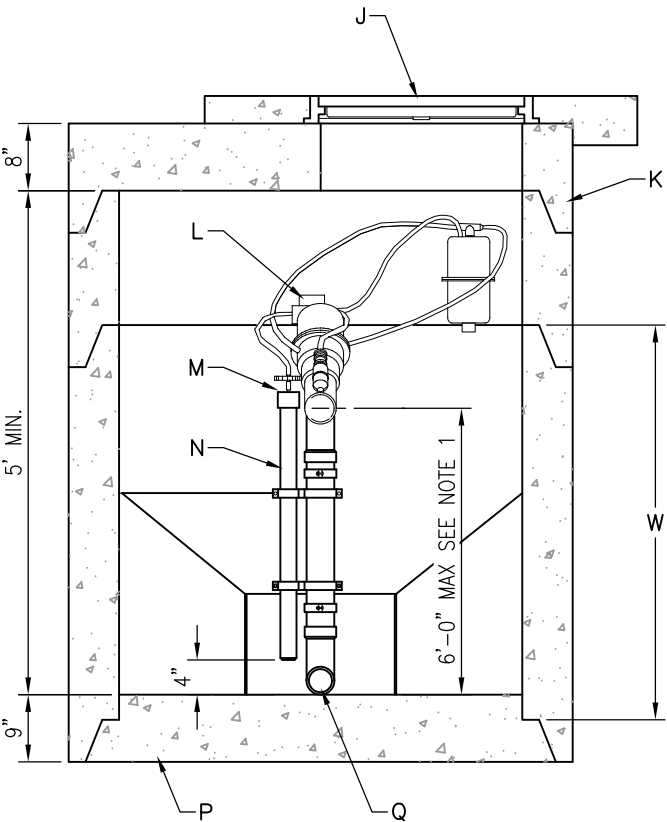
VENT INLET DETAIL



PLAN

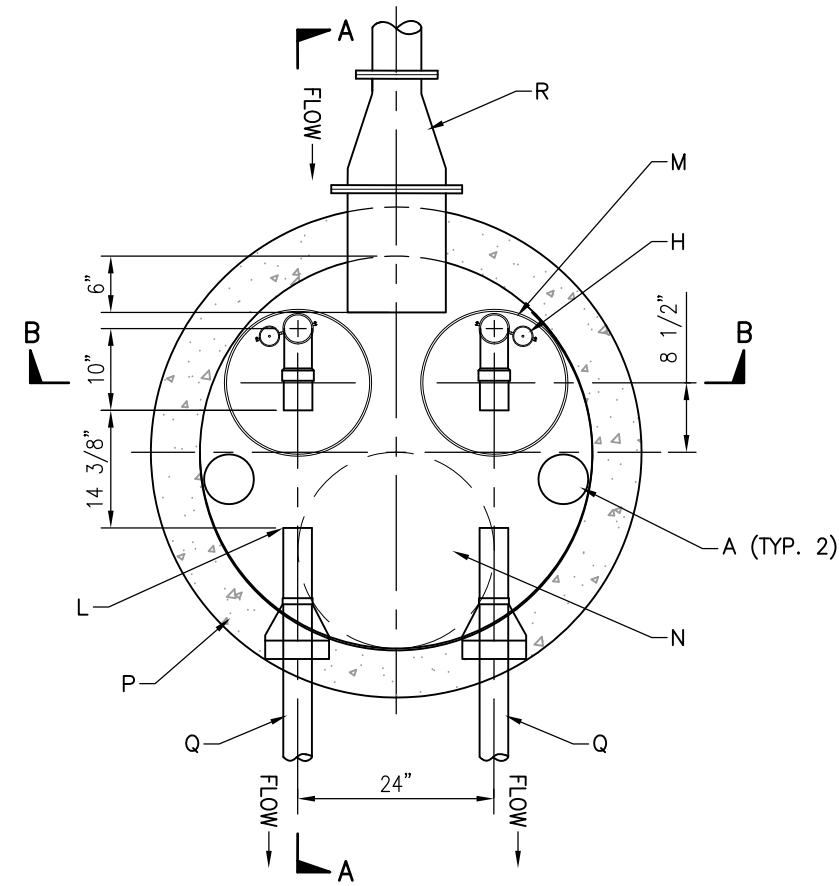


SECTION A-A

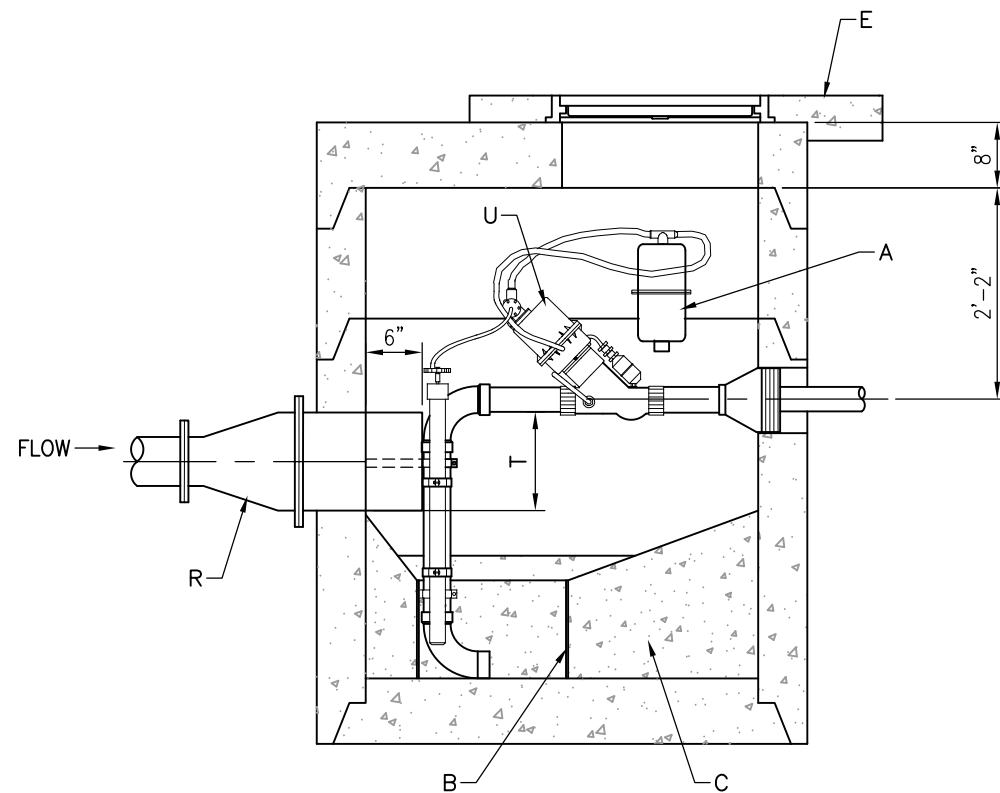


SECTION B-B

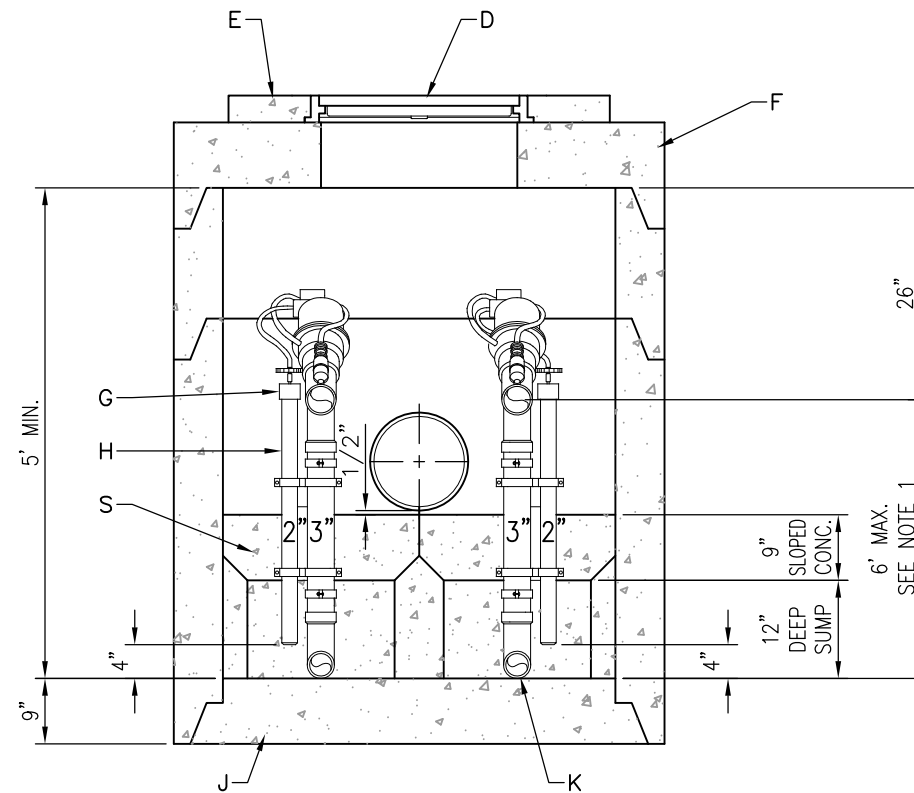
REVISIONS	WATER AUTHORITY
	VACUUM SEWER SINGLE BUFFER TANK 30 GAL./MINUTE MAX. FLOW DWG. 2167 JAN. 2013



PLAN



SECTION A-A



SECTION B-B

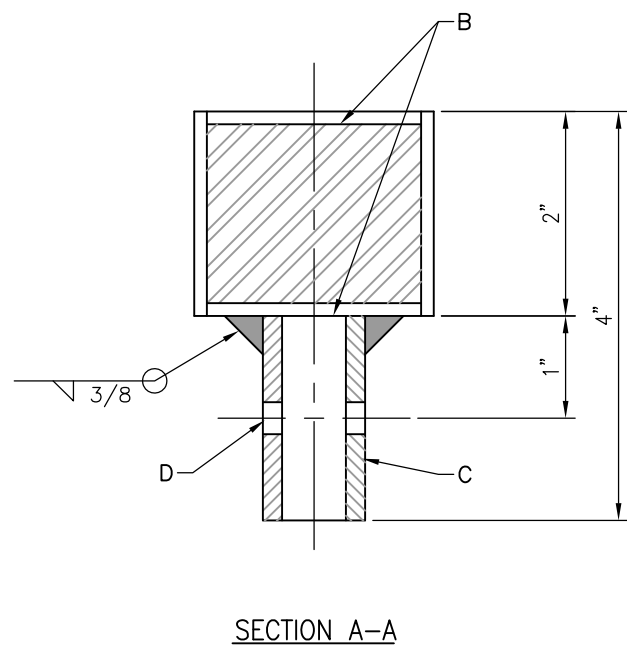
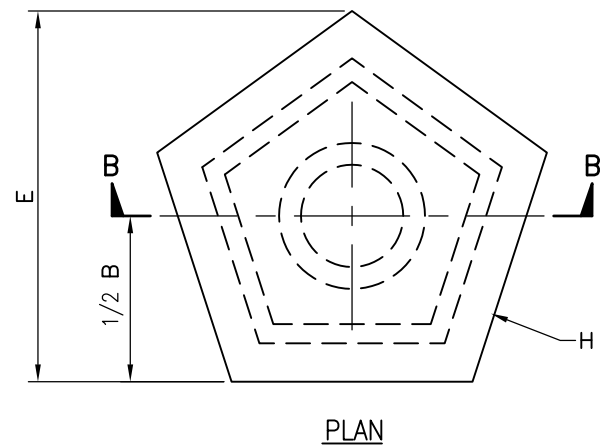
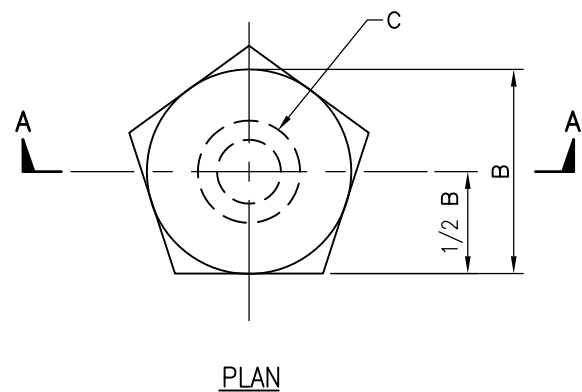
GENERAL NOTES

1. ANY LIFT EXCEEDING 6' MUST BE ADDED TO HEAD LOSSES ON VACUUM MAIN AND SERVICE LINE TO DETERMINE IF SUFFICIENT VACUUM HEAD IS AVAILABLE.
2. ALL MATERIALS AND HARDWARE FOR INSTALLING VALVE, TO BE FURNISHED BY CONTRACTOR. ALL INSTALLATION AND TESTING BY CONTRACTOR, EXCEPT VALVE TO BE INSTALLED BY OWNER. ALL PVC FITTINGS TO BE GLUED EXCEPT WHERE NOTED. DRILL HOLE IN WALL FOR MOUNTING SCREW FOR SUMP BREATHER.

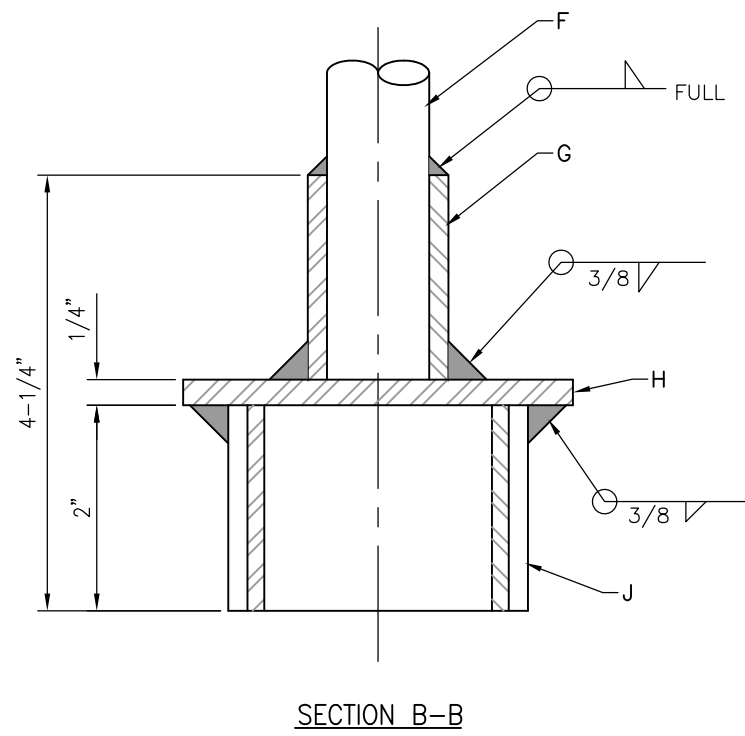
CONSTRUCTION NOTES

- A. SUMP BREATHER ASSEMBLY (ONE PER VALVE).
- B. 1 FT LONG, 18" I.D. PVC PIPE MAY BE USED TO FORM SUMP AREAS.
- C. MASS CONCRETE CENTER DIVIDER WALL
- D. SEWER MANHOLE FRAME & COVER PER STANDARD DRAWING 2109.
- E. CONCRETE COLLAR PER STANDARD DRAWING 2461.
- F. PRECAST CONCRETE FLAT TOP FOR MANHOLE WITH 2'-0" DIA. OPENING.
- G. 2" PVC SENSOR CAP SUPPLIED WITH VALVE.
- H. 2" PVC SENSOR PIPE
- J. PRECAST CONCRETE BOTTOM IN MANHOLE SECTION
- K. 3" STREET ELL TOUCHING BASE OF SUMP WITH PLAIN END. NO CONNECTION.
- L. VALVE AND PIPING REMOVED FOR CLARITY
- M. 18" DIAMETER SUMP (2)
- N. LOCATION OF LID
- P. USE 4'-0" I.D. CONCRETE MANHOLE SECTIONS. ADDITIONAL SECTIONS MAY BE ADDED TO ALLOW CONNECTION OF DEEP GRAVITY LINES OR FOR ADDED STORAGE CAPACITY.
- Q. 3" VACUUM SERVICE LINES MUST (EACH) CONNECT DIRECTLY TO A 6" MINIMUM SEPARATION AT MAIN. SERVICE LINES FITTED WITH STANDARD FLEXIBLE CONNECTORS AT THE HOLE IN THE MANHOLE SECTION TO INSURE THAT THE BUFFER TANK IS WATER TIGHT.
- R. MINIMUM 6" GRAVITY LINE WITH MATCHING DIAMETER VENT, MIN. 20', MAX. 60' FROM BUFFER TANK. CONNECT 6" LINE TO 12" x 6" REDUCER. CONNECT REDUCER TO 12" PIPE ENTERING MANHOLE. CENTER 12" PIPE OVER CENTER DIVIDER WALL 'C'. 12" LINE SHALL BE FITTED WITH STANDARD FLEXIBLE CONNECTORS AT THE HOLE TO INSURE THAT BUFFER TANK IS WATERTIGHT.
- S. SHAPE SLOPED CONCRETE TO DISTRIBUTE FLOW EVENLY BETWEEN SUMPS.
- T. GRAVITY INLET MUST BE LOCATED BETWEEN THE VACUUM SERVICE LINE AND THE START OF SLOPE TO SUMP.
- U. 3" MODEL "D" VALVE, BY AIRVAC OR EQUAL, TO BE INSTALLED BY OWNER.

REVISIONS	WATER AUTHORITY
	VACUUM SEWER DUAL BUFFER TANK 60 GAL./MINUTE MAX. FLOW DWG. 2168 JAN. 2013



EXTENSION NUT



EXTENSION SOCKET

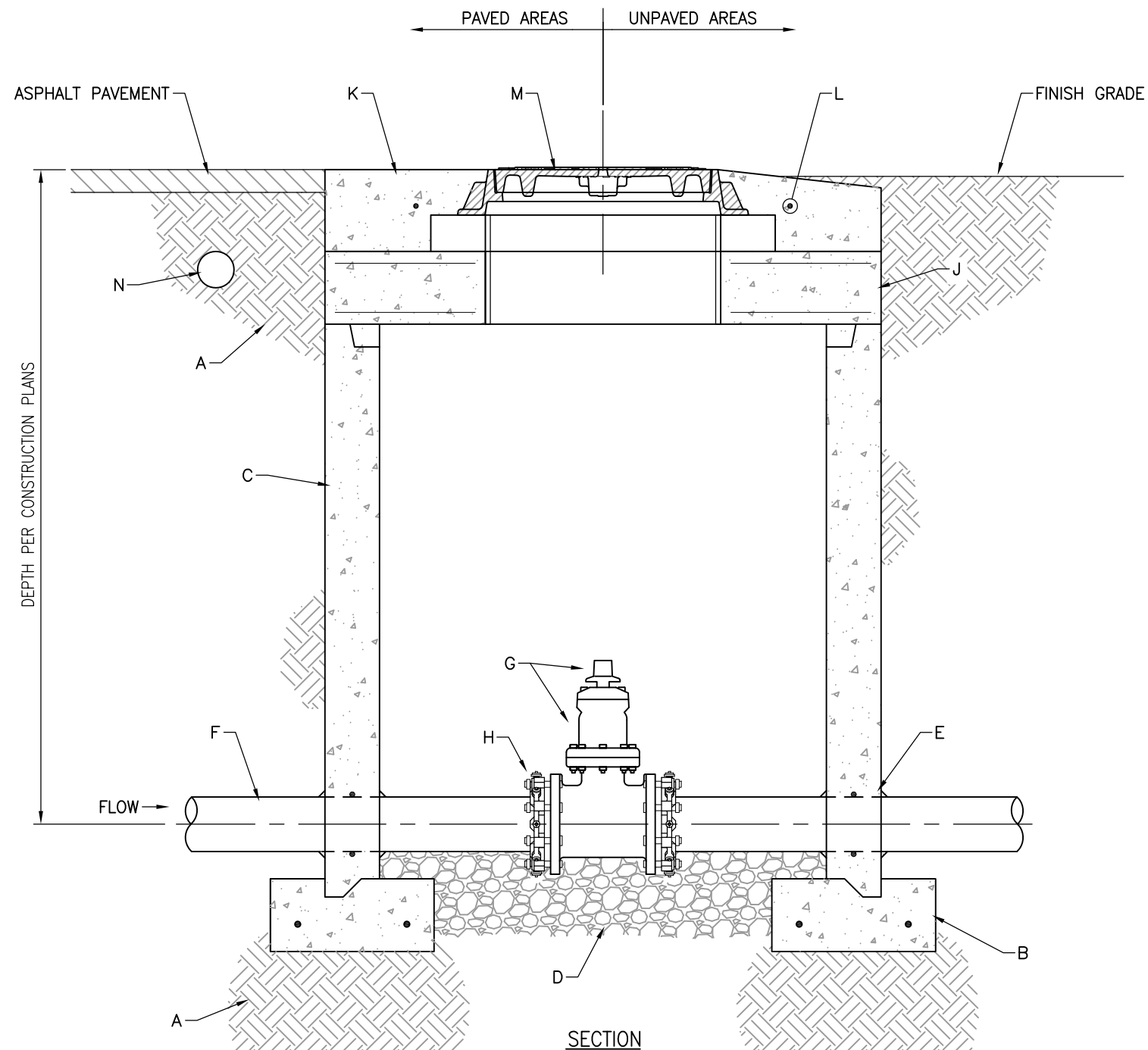
GENERAL NOTES

1. THESE NUTS AND SOCKETS ARE A PART OF THE VALVE STEM EXTENSION, SEE VACUUM SEWER VALVE BOX DWG. 2170.

CONSTRUCTION NOTES

- A. 2" LONG H.R. STEEL BAR, 2" x 2"
- B. 2" DIA. STEEL CIRCLE WITH PENTAGON CIRCUMSCRIBED ABOUT CIRCLE
- C. 1" DIA. SCHEDULE 40 PIPE x 2" (1.315 O.D. x 1.049 I.D.)
- D. DRILL 0.312 DIAMETER HOLE THROUGH PIPE FOR 0.31 DIAMETER CLEVIS PIN/COTTER PIN.
- E. 3 1/4"
- F. 1" DIAMETER EXTENSION BAR, 6 FEET LONG. WITH T HANDLE.
- G. 1" DIAMETER, SCH 40 x 2" (1.315 O.D. x 1.049 I.D.)
- H. PENTAGONAL SHAPED x 1/4" H.R. STEEL PLATE 1/2" LARGER THAN TUBULAR SECTION BELOW
- J. 2" LONG H.R. STEEL PENTAGONAL SHAPED TUBULAR SECTION x 0.1875 WALL WITH 1/8" TOTAL CLEARANCE TO EXTENSION NUT.

REVISIONS	WATER AUTHORITY
	VACUUM SEWER VALVE STEM NUT AND SOCKET DETAILS
	DWG. 2169 JAN. 2013



GENERAL NOTE

1. LABEL REQUIREMENTS: BEFORE THE WORK WILL BE ACCEPTED, SEWER VALVE GPS COORDINATES SHALL BE PROVIDED ON THE RECORD DRAWINGS. GPS COORDINATES OBTAINED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF NEW MEXICO SHALL BE TAKEN AT THE VALVE OPERATING NUT. USE THE NAD 1983 NM STATE PLANE CENTRAL ZONE FOR X AND Y COORDINATES AND NAVD 1988 FOR Z COORDINATE.

CONSTRUCTION NOTES

- A. COMPACTED SUBGRADE (95% COMPACTION) SEE SECTION 701. OVEREXCAVATE TO 12" BELOW FOUNDATION.
- B. 8" x 18" CONCRETE FOUNDATION WITH 2~ #5 BARS SPACED 3" FROM SIDES AND BOTTOM.
- C. 4 FT I.D. PRECAST CONCRETE MANHOLE SECTIONS.
- D. 6" DEEP, 3/4" GRAVEL
- E. SLOTTED OPENING 1" LARGER THAN VACUUM MAIN WITH APPROVED WATERSTOP. GROUT INTERIOR AND EXTERIOR OF OPENING.
- F. VACUUM MAIN LINE
- G. RESILIENT COATED WEDGE GATE VALVE PER APPROVED PRODUCTS LIST. PROVIDE 2" x 5 SIDED NUT PER STANDARD DRAWING 2169.
- H. MEGALUG, OR EQUAL, RESTRAINING GLAND
- J. PRECAST REINFORCED CONCRETE TOP SLAB WITH 24" DIA. OPENING PER STANDARD DRAWING 2107.
- K. OCTAGONAL CONCRETE COLLAR PER STANDARD DRAWING 2461. INSCRIBE CONCRETE SURFACE WITH SIZE OF VACUUM LINE AND DIRECTION OF FLOW PER STANDARD DRAWING 2181. IN PAVED AREAS, INSTALL COLLAR FLUSH WITH PAVEMENT. IN UNPAVED AREAS, SET RING 1" ABOVE GRADE AND SLOPE TOP OF CONCRETE DOWN TO 1" BELOW GRADE.
- L. #4 REBAR PER STANDARD DRAWING 2461.
- M. 24" MANHOLE FRAME AND COVER PER STANDARD DRAWING 2109.
- N. ELECTRONIC MARKER DEVICE (EMD), SEE STANDARD SPECIFICATION SECTION 170.

REVISIONS	WATER AUTHORITY
	VACUUM SEWER VALVE BOX
	DWG. 2170 JAN. 2013

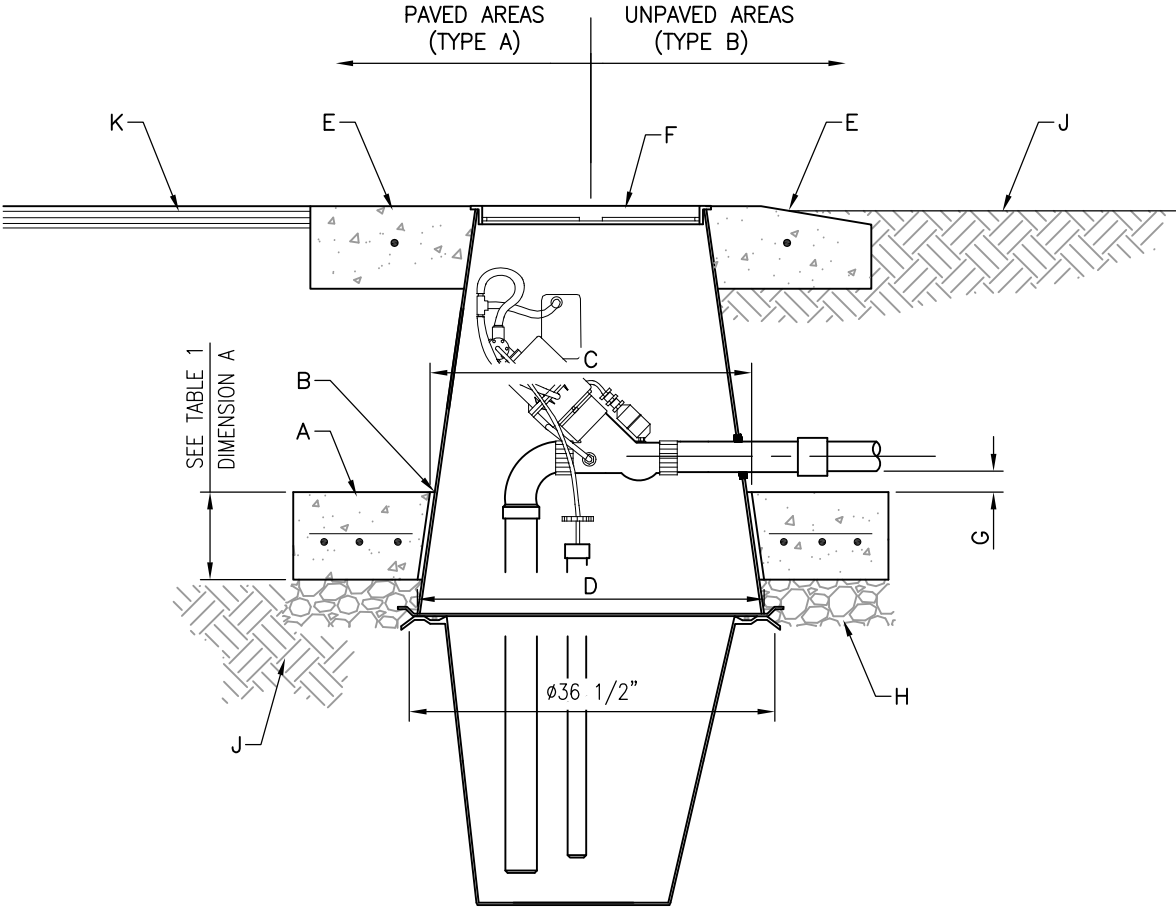


TABLE 1

DESCRIPTION	DIMENSION A
30" SUMP PACKAGE	7 1/2"
54" SUMP PACKAGE	9 1/2"

(SEE STANDARD DRAWING 2165)

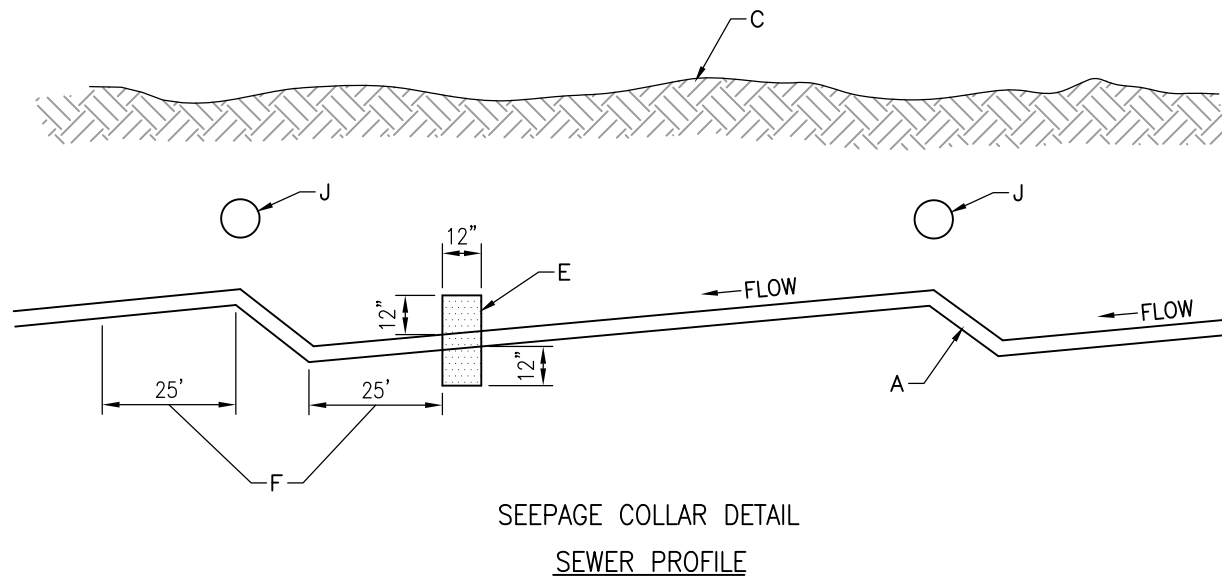
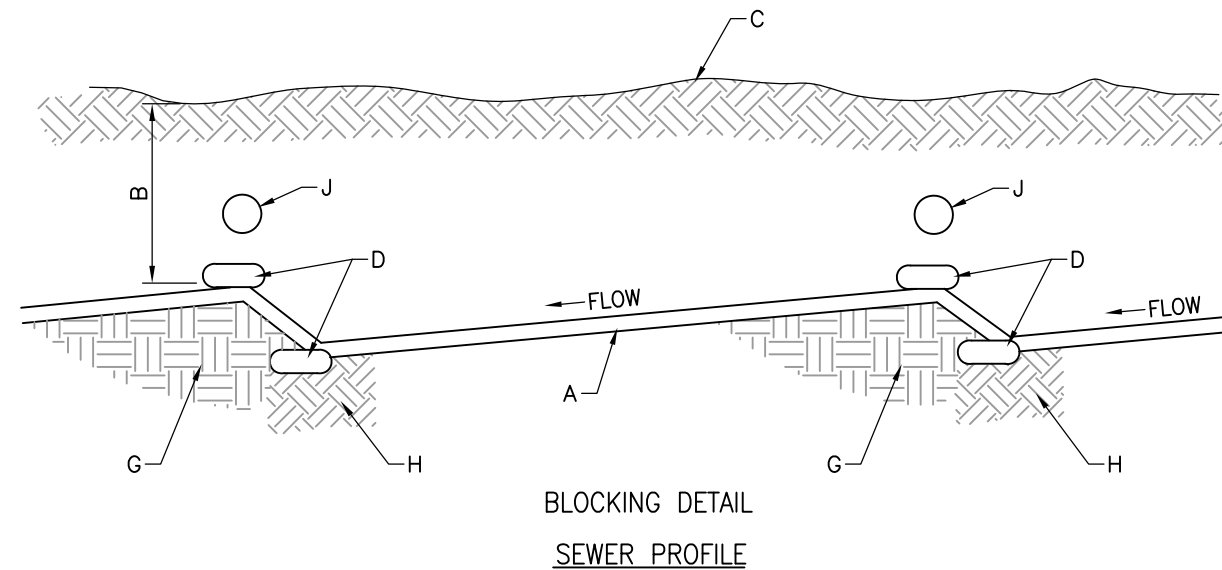
GENERAL NOTES

1. ALL COMPACTION OF SUBGRADE AND AND BACKFILL FOR INSTALLATION OF VACUUM VALVE PIT TO BE 95% OF MAXIMUM DRY DENSITY PER ASTM D 1557.
2. AVOID EXCESSIVE EXPOSURE TO SUNLIGHT OF OPEN VACUUM VALVE PITS. CLOSE & COMPLETE WITHIN 3 DAYS TO INSURE INTEGRITY OF RUBBER O-RING.
3. SEE STANDARD DRAWING 2165 FOR ADDITIONAL DETAILS.

CONSTRUCTION NOTES

- A. 62" SQUARE CONCRETE ANTI-FLOATATION COLLAR, WITH #4 REBAR AT 6" E.W. 3" FROM EDGE OF CONCRETE. SEE TABLE 1 THIS SHEET FOR THICKNESS. CONCRETE PER SECTION 101, HYDRAULIC STRUCTURAL CONCRETE, f'c=4000 psi AT 28 DAYS.
- B. CLEARANCE BETWEEN CONCRETE COLLAR AND FIBERGLASS PIT.
- C. 35" DIA. OPENING AT TOP OF SLAB.
- D. 35 1/2" DIA. OPENING AT BOTTOM OF SLAB.
- E. INSTALL CONCRETE COLLAR PER STANDARD DRAWING 2461.
- F. CAST IRON MANHOLE FRAME AND COVER RATED FOR H2O LOADING.
- G. 1" CLEARANCE TO BOTTOM OF 3" LATERAL
- H. 3" THICK 3/4" GRAVEL, ASTM C33, NO. 57 GRAVEL
- J. COMPACTED SUBGRADE
- K. FINISH PAVING SURFACE

REVISIONS	WATER AUTHORITY
	VACUUM SEWER VACUUM VALVE PIT
	DWG. 2171 JAN. 2013



GENERAL NOTES

- BENTONITE COLLAR TO BE INSTALLED EVERY 250' ALONG VACUUM SEWER RUN AND FORCE MAIN.
- BENTONITE SEEPAGE COLLARS ARE FOR VACUUM SEWER MAINS AND FORCE MAINS INSTALLED IN MRGCD IRRIGATION RIGHT-OF-WAY OR AS SHOWN ON CONSTRUCTION DRAWINGS.
- COST OF COLLARS IS INCIDENTAL TO PIPE CONSTRUCTION.

CONSTRUCTION NOTES

- 4", 6", 8" OR 10" VACUUM SEWER
- DEPTH PER PLANS
- FINISH GRADE
- 80 LB BAG OF REDI-MIX CONCRETE WITH CUT ON TOP.
- BENTONITE SEEPAGE COLLAR; SEE SPECS. BELOW
- MIN. DISTANCE FROM 45° BENDS
- UNDISTURBED EARTH
- 95% COMPACTED SUBGRADE
- ELECTRONIC MARKER DEVICE (EMD) 12" ABOVE TOP OF PIPE. SEE STANDARD SPECIFICATION SECTION 170.

BENTONITE SPECIFICATIONS:

HYDROGEL BENTONITE BY WYO-BEN, INC. OR APPROVED EQUAL

BARREL YIELD	92
VISCOMETER READING AT 600 R.P.M.	39 ± 5
WATER LOSS	13.5 ± 1
% THRU 200 MESH SCREEN	80 ± 2
WET SCREEN ANALYSIS RESIDUE ON U.S. SIEVE NO. 200	3.0 ± .5
% MOISTURE	7 ± 1
pH	9.1 ± .1
GEL STRENGTH - 10 SEC.	18 ± 2
GEL STRENGTH - 10 MIN. PLASTIC VISCOSITY	14 ± 2
YIELD POINT, LB/200 FT.	16 ± 4
MIX 80 LBS. PER 100 GALLONS OF MAKE-UP WATER.	

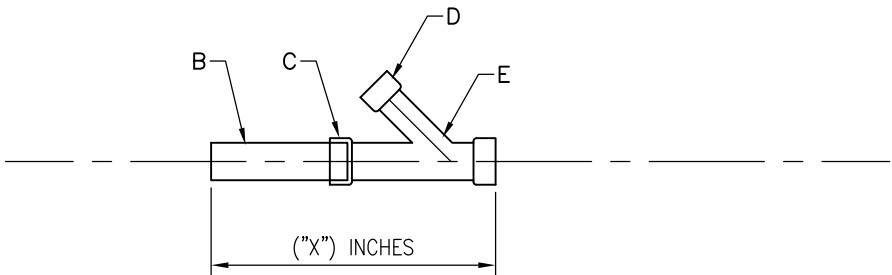
REVISIONS	WATER AUTHORITY
JAN. 2013	VACUUM SEWER BLOCKING AND SEEPAGE COLLAR DETAILS
	DWG. 2173 MAY 2019

GENERAL NOTES

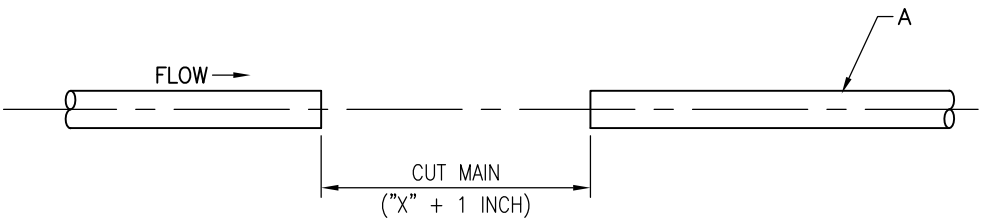
1. ALL SOIL COMPACTION FOR INSTALLATION OF SERVICE WYE TO BE 95% OF MAXIMUM DRY DENSITY PER ASTM D 1557.

CONSTRUCTION NOTES

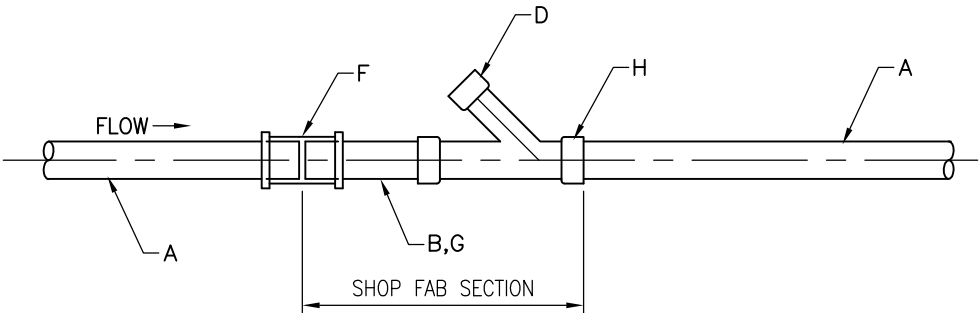
- A. EXISTING VACUUM SEWER MAIN
- B. SCHEDULE 40 PVC PIPE. LENGTH TO BE GREATER THAN COMPRESSION COUPLING.
- C. SOLVENT WELD AT SHOP
- D. SEE STANDARD DRAWING 2163
- E. SCHEDULE 40 PVC WYE (P x P x P)
SEE STANDARD DRAWING 2163
- F. COMPRESSION COUPLING AS PER AUTHORITY SPECIFICATION
- G. SLIDE COMPRESSION COUPLING ONTO THIS PIECE OF PIPE BEFORE INSERTING IN TRENCH
- H. SOLVENT WELD IN FIELD



SHOP FAB SECTION



PIPE CUT IN FIELD



COMPLETED INSTALLATION IN FIELD

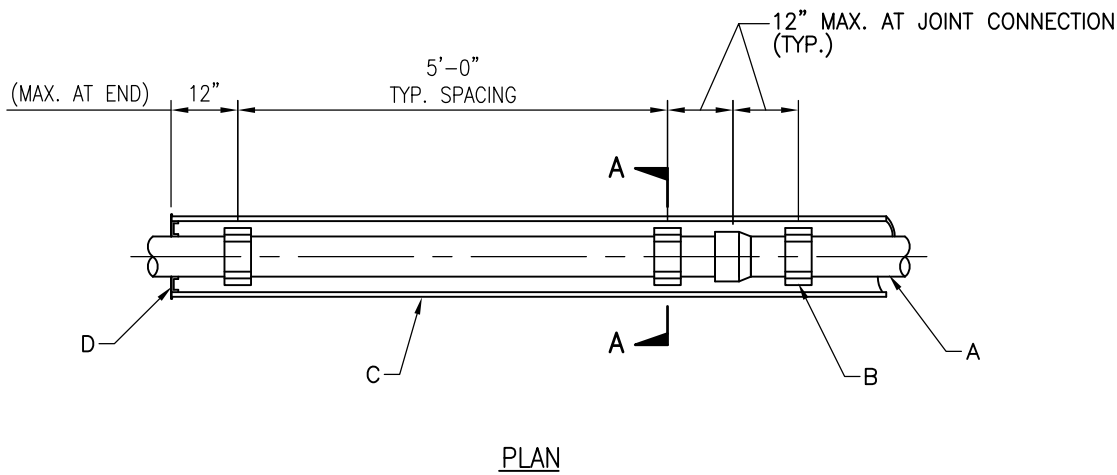
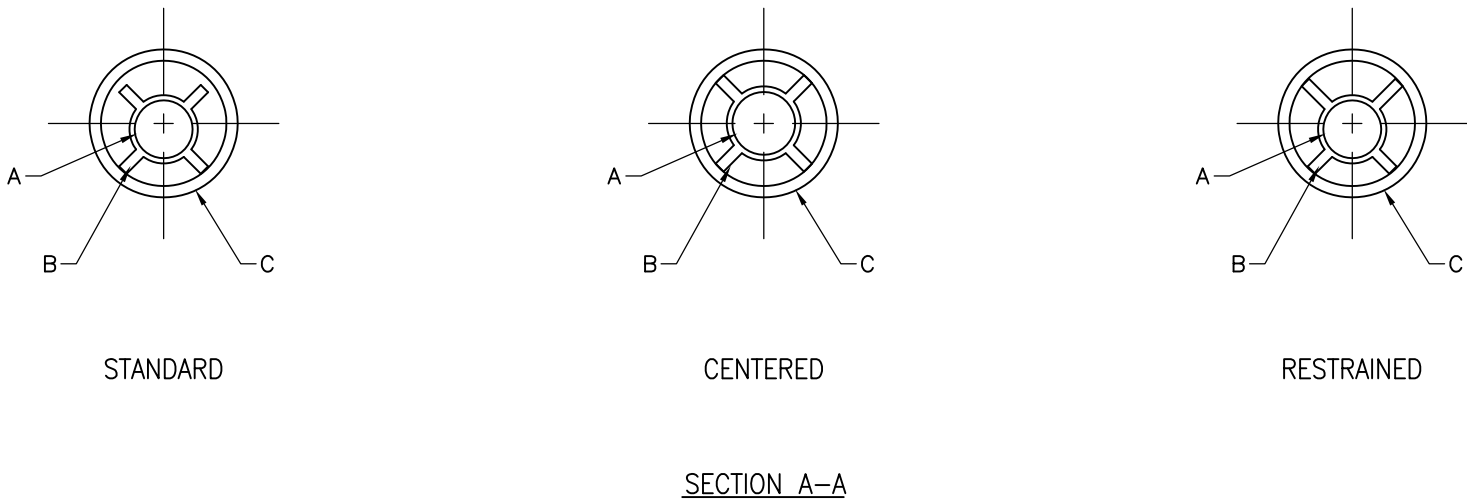
REVISIONS	WATER AUTHORITY
	VACUUM SEWER SERVICE WYE INSTALLATION ON EXISTING VACUUM MAIN
	DWG. 2174 JAN. 2013

GENERAL NOTES

1. SEE CONSTRUCTION PLANS AND SPECIFICATIONS FOR SKID TYPE AND SECTION CONFIGURATION (STANDARD, CENTERED AND RESTRAINED) AS SHOWN PER SECTION A-A.

CONSTRUCTION NOTES

- A. CARRIER PIPE
- B. PIPELINE SUPPORT SKID (SEE CONSTRUCTION PLANS AND SPECIFICATIONS FOR SIZES AND MODEL NUMBERS).
- C. STEEL CASING (SIZE AND THICKNESS PER CONSTRUCTION PLANS AND SPECIFICATIONS).
- D. CASING END SEAL; (SEE CONSTRUCTION PLANS AND SPECIFICATIONS FOR SIZES AND MODEL NUMBERS).



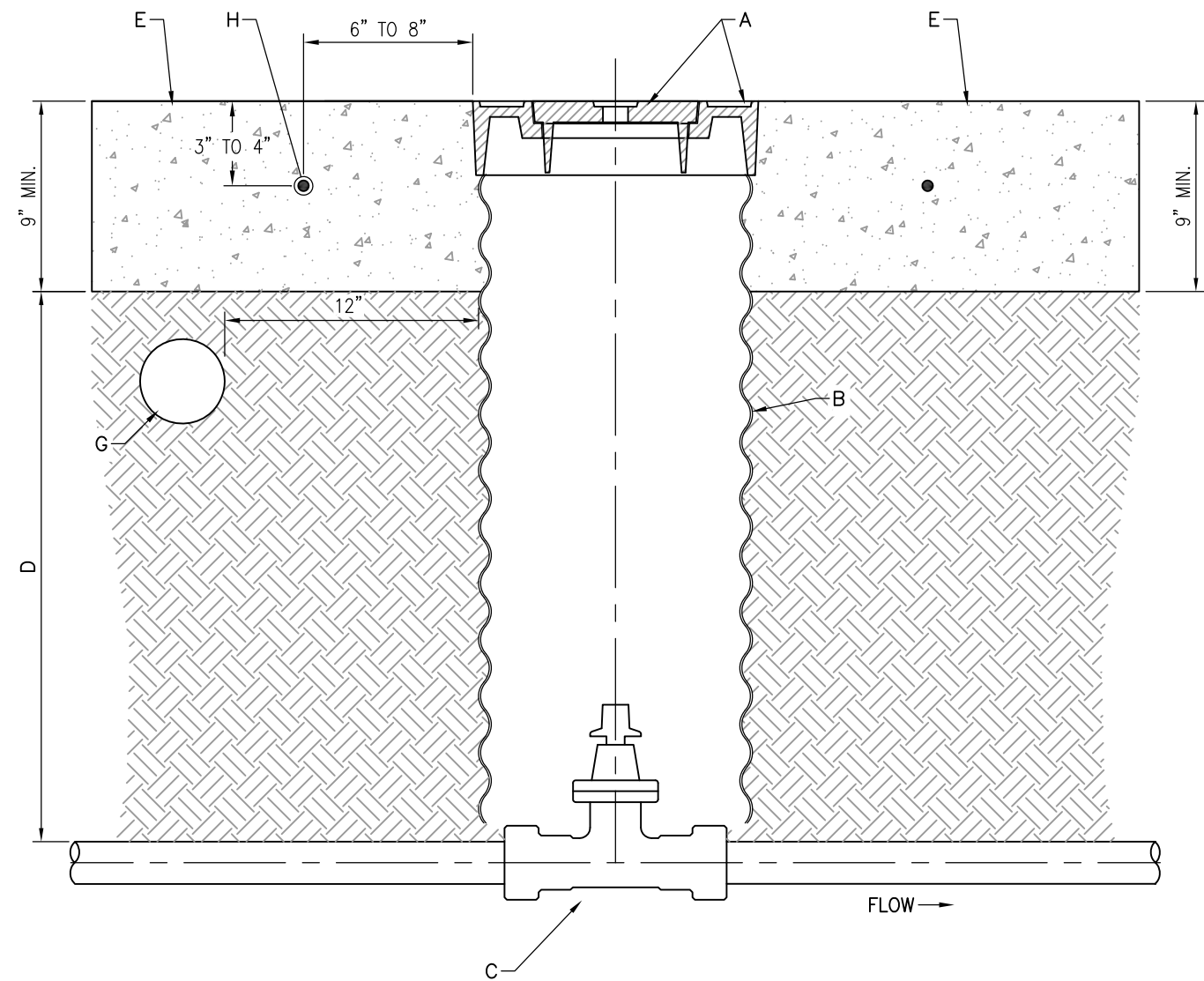
REVISIONS	WATER AUTHORITY
	VACUUM SEWER CASING DETAIL FOR BORE AND JACK
	DWG. 2180 JAN. 2013

GENERAL NOTES

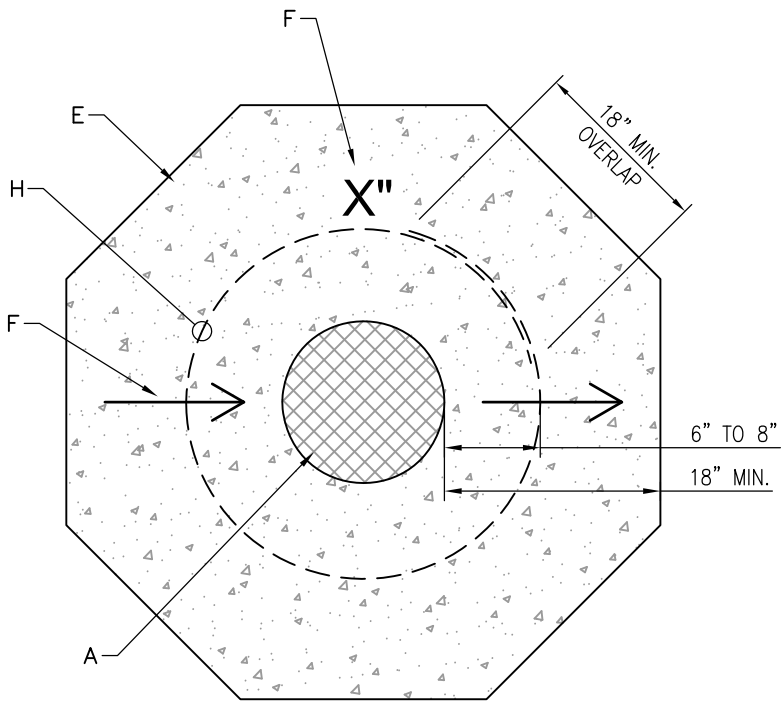
1. LABEL REQUIREMENTS: BEFORE THE WORK WILL BE ACCEPTED, SEWER VALVE GPS COORDINATES SHALL BE PROVIDED ON THE RECORD DRAWINGS. GPS COORDINATES OBTAINED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF NEW MEXICO SHALL BE TAKEN AT THE VALVE OPERATING NUT. USE THE NAD 1983 NM STATE PLANE CENTRAL ZONE FOR X AND Y COORDINATES AND NAVD 1988 FOR Z COORDINATE.

CONSTRUCTION NOTES

- A. RING AND COVER FOR VALVE BOX PER STANDARD DRAWING 2128.
- B. 12" DIAMETER POLYMER COATED STEEL PIPE CMP
- C. GATE VALVE WITH PENTAGONAL OPERATING NUT, SEE STANDARD DRAWING 2169.
- D. COMPACTED BACKFILL. SOIL OR BASE COURSE MATERIAL (95% COMPACTION). SEE SECTION 701
- E. CONCRETE COLLAR PER STANDARD DRAWING 2461.
 $f'_c = 4000$ psi
- F. TOP OF CONCRETE COLLAR SHALL BE STAMPED WITH LINE SIZE AND FLOW DIRECTION ARROWS. MINIMUM LETTER SIZE SHALL BE 3" IN HEIGHT.
- G. ELECTRONIC MARKER DEVICE (EMD), SEE STANDARD SPECIFICATION SECTION 170.
- H. #4 REBAR, SEE STANDARD DRAWING 2461.



SECTION



PLAN

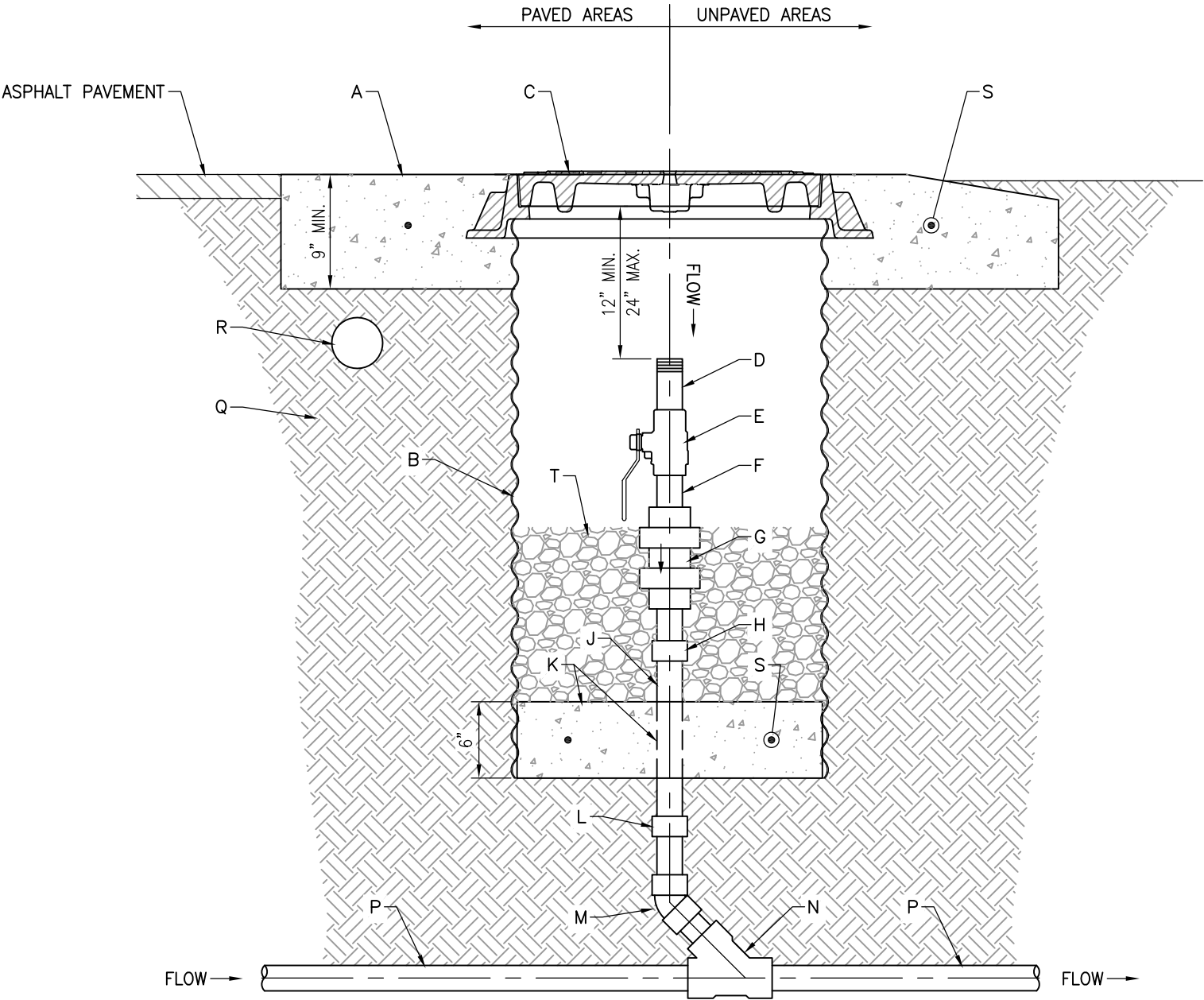
REVISIONS	WATER AUTHORITY
JAN. 2013 OCT. 2017	FORCEMAIN SEWER VALVE BOX
	DWG. 2181 MAY 2019

GENERAL NOTES

1. LABEL REQUIREMENTS: BEFORE THE WORK WILL BE ACCEPTED, SEWER VALVE GPS COORDINATES SHALL BE PROVIDED ON THE RECORD DRAWINGS. GPS COORDINATES OBTAINED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF NEW MEXICO SHALL BE TAKEN AT THE VALVE OPERATING NUT. USE THE NAD 1983 NM STATE PLANE CENTRAL ZONE FOR X AND Y COORDINATES AND NAVD 1988 FOR Z COORDINATE.

CONSTRUCTION NOTES

- A. CONCRETE COLLAR PER STANDARD DRAWING 2461 (f'c=4000 psi). INSCRIBE CONCRETE SURFACE WITH SIZE OF FORCEMAIN LINE AND DIRECTION OF FLOW PER STANDARD DRAWING 2181. IN PAVED AREAS, INSTALL COLLAR FLUSH WITH PAVEMENT. IN UNPAVED AREAS, SET RING 1" ABOVE GRADE AND SLOPE TOP OF CONCRETE DOWN TO 1" BELOW GRADE.
- B. 24" DIAMETER POLYMER COATED STEEL PIPE CMP
- C. 24" MANHOLE FRAME AND COVER PER STANDARD DRAWING 2109.
- D. VACTOR FLUSH POINT (GALVANIZED)
- E. BALL VALVE (NORMALLY CLOSED)
- F. PIPE ADJUSTMENT FOR LINE DEPTH (PVC)
- G. BALL CHECK VALVE
- H. THREADED TO GLUED ADAPTER
- J. GALVANIZED PIPE
- K. 24"x6" CONCRETE COLLAR WITH SAFETY WRAP AROUND PIPE
- L. GLUE TO THREADED ADAPTER
- M. 45° ELBOW
- N. WYE
- P. FORCEMAIN SEWER LINE
- Q. COMPACTED BACKFILL. SOIL OR BASE COURSE MATERIAL (95% COMPACTION). SEE SECTION 701
- R. ELECTRONIC MARKER DEVICE (EMD), SEE STANDARD SPECIFICATION SECTION 170.
- S. #4 REBAR, SEE STANDARD DRAWING 2461.
- T. 1/2" TO 3/4" GRAVEL. FILL BOX TO BELOW VALVE HANDLE IN OPEN POSITION.

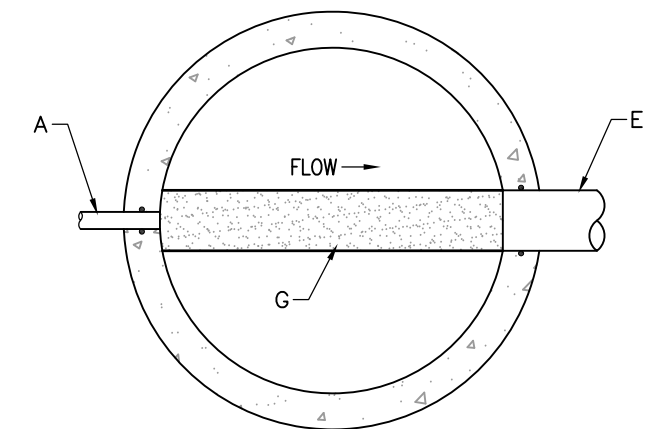
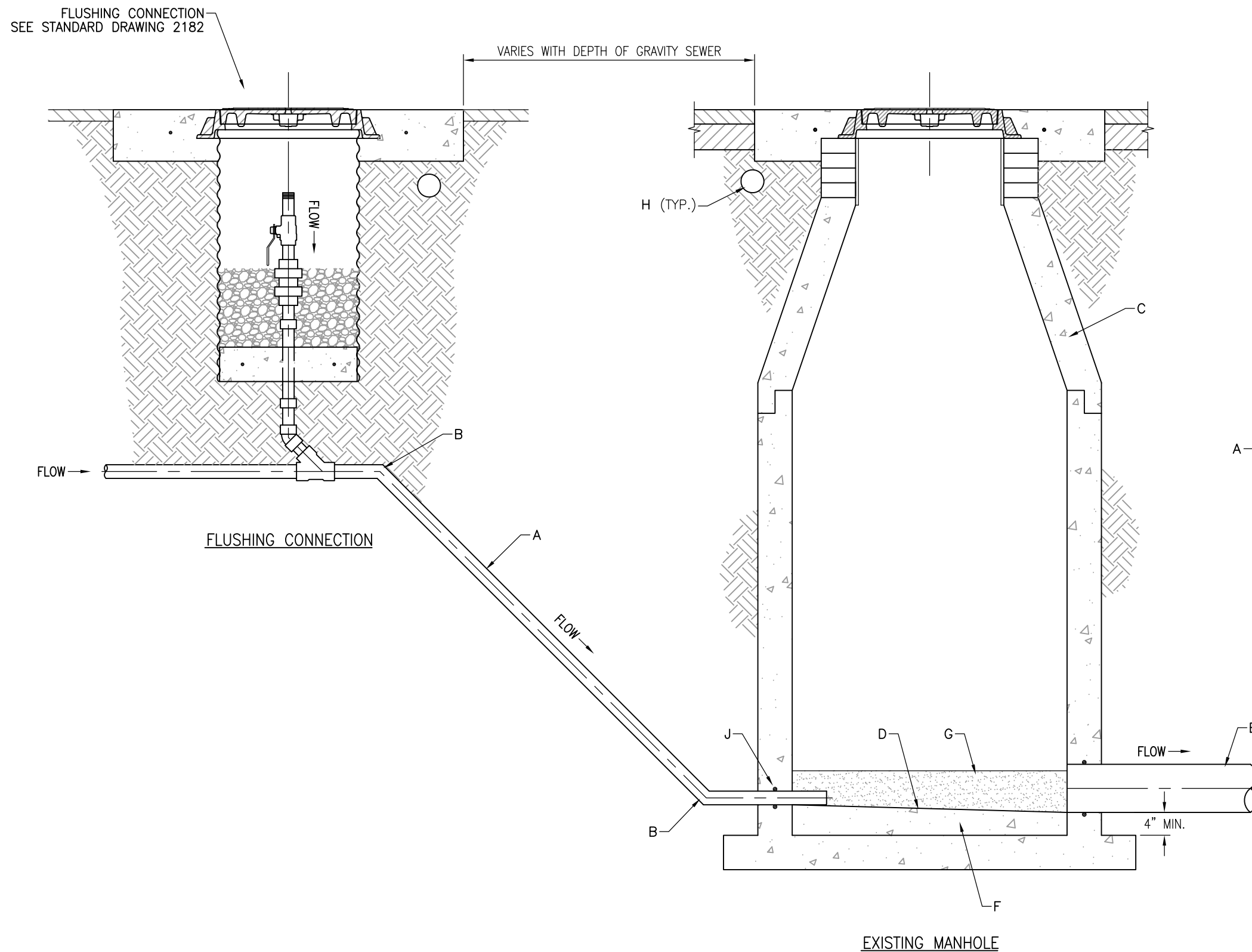


- NOTES: 1) SCHEDULE 40 PVC NOT ALLOWED
2) FLUSH POINT ADAPTERS SHOULD MATCH SIZE OF MAIN LINE (2"Ø PIPE SHOWN)

FLUSHING CONNECTION
SECTION

REVISIONS	WATER AUTHORITY
	FORCEMAIN SEWER LOW PRESSURE SANITARY SEWER (LPSAS) FLUSHING CONNECTION DWG. 2182 JAN. 2013

A. PVC LOW PRESSURE SANITARY SEWER MAIN (LPSAS)
SCHEDULE 40 NOT ALLOWED.

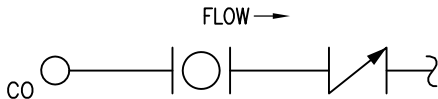


GROUT CHANNEL
PLAN

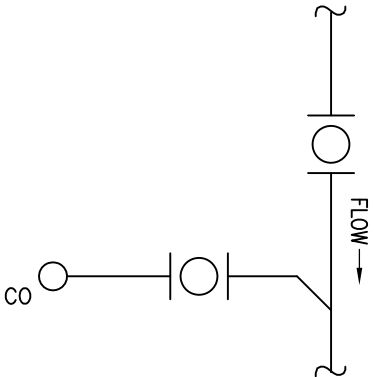
REVISIONS	WATER AUTHORITY
JAN. 2013	FORCEMAIN SEWER CONNECTION TO GRAVITY SEWER AT MANHOLE DWG. 2183
	OCT. 2017

LEGEND

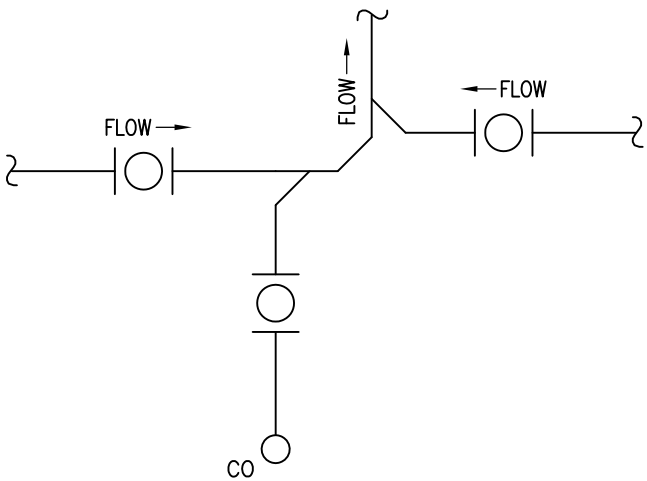
- 2" PVC PIPE
- BALL VALVE
- CLEANOUT
- CHECK VALVE



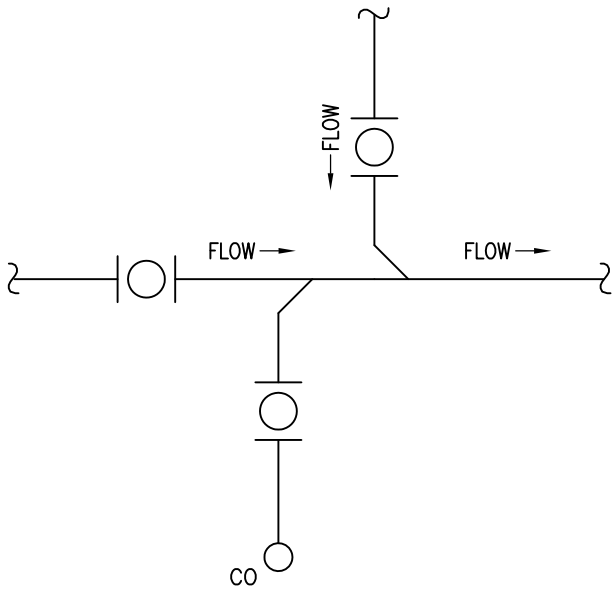
TERMINAL CLEANOUT



INLINE CLEANOUT (TYPE B)



JUNCTION CLEANOUT (TYPE C)



JUNCTION CLEANOUT (TYPE D)

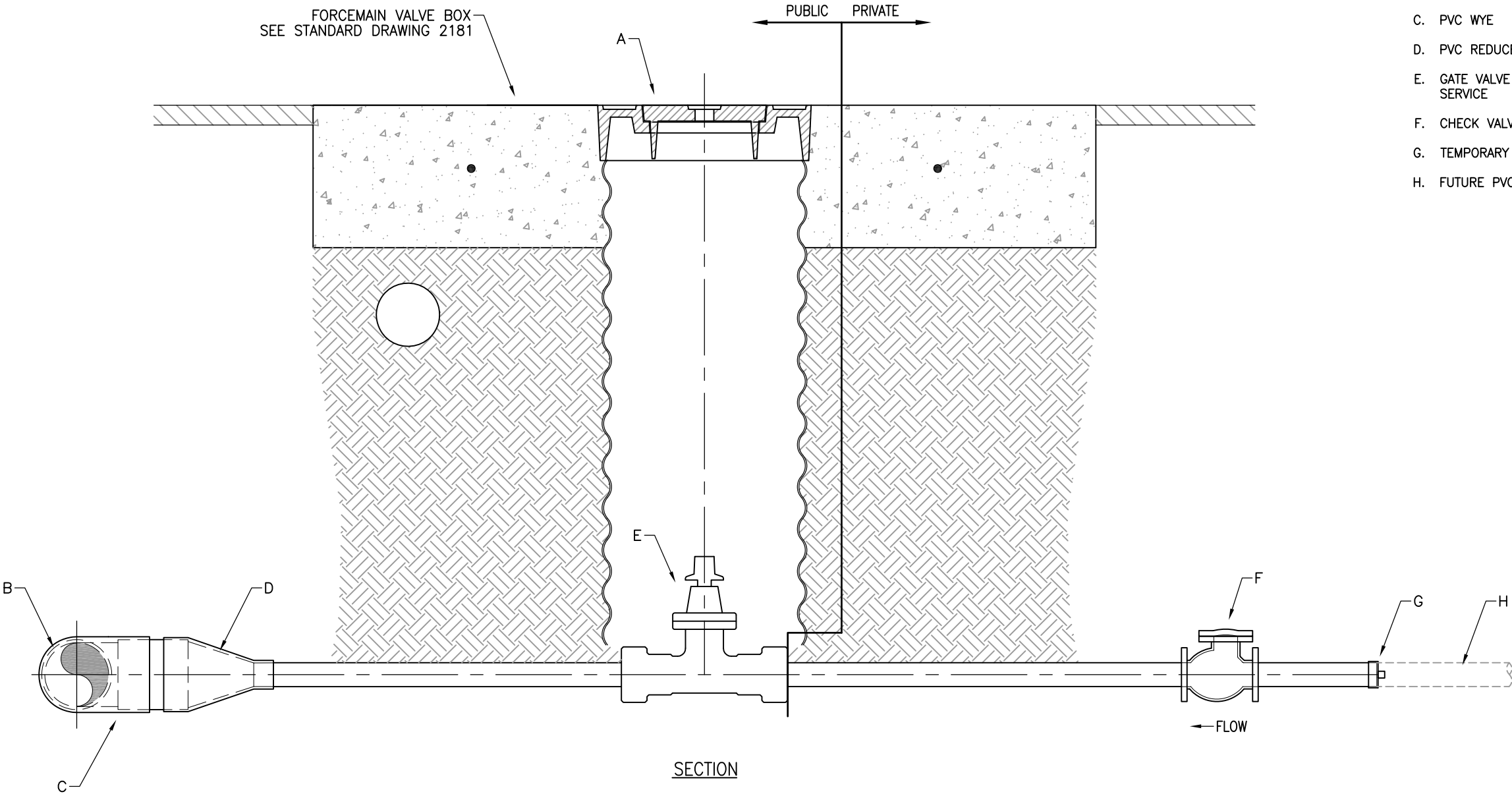
REVISIONS	WATER AUTHORITY
	FORCEMAIN SEWER TYPICAL FORCEMAIN CONFIGURATION
	DWG. 2184JAN. 2013

GENERAL NOTE

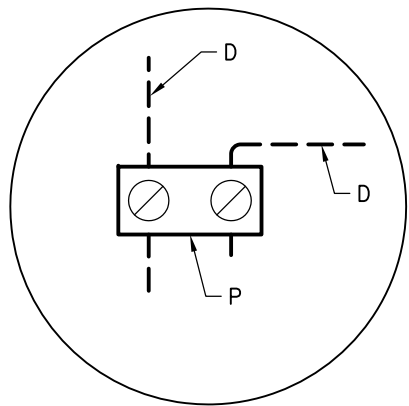
1. SAS SERVICE LINES SHALL BE CONSTRUCTED USING SCHEDULE 80 PVC PIPE.

CONSTRUCTION NOTES

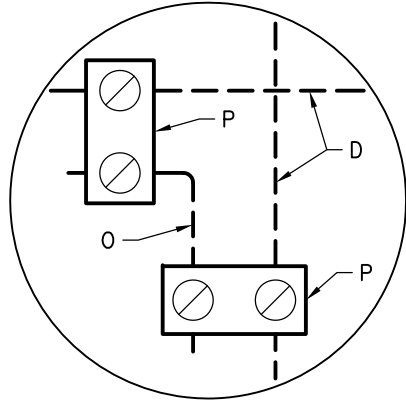
- A. SANITARY SEWER RING AND COVER FOR VALVE BOX PER STANDARD DRAWING 2128.
- B. PVC LOW PRESSURE SANITARY SEWER MAIN (LPSAS)
- C. PVC WYE
- D. PVC REDUCER (AS REQUIRED)
- E. GATE VALVE WITH PENTAGONAL OPERATING NUT. SIZE PER SERVICE
- F. CHECK VALVE, SIZE PER SERVICE
- G. TEMPORARY CAP
- H. FUTURE PVC LINE FROM OWNER FURNISHED GRINDER PUMP



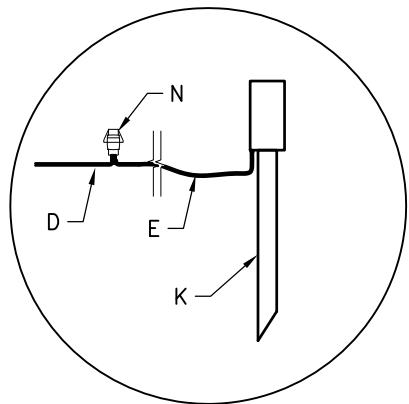
REVISIONS	WATER AUTHORITY
	FORCEMAIN SEWER SERVICE LINE VALVE DETAIL
	DWG. 2185 JAN. 2013



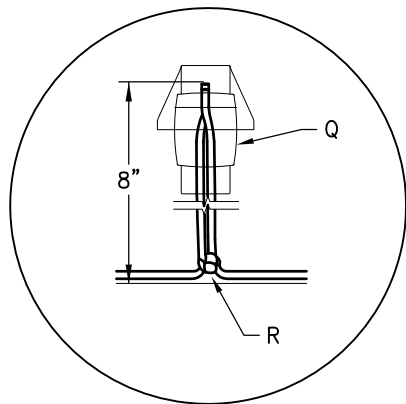
TEE CONNECTION DETAIL
NOT TO SCALE



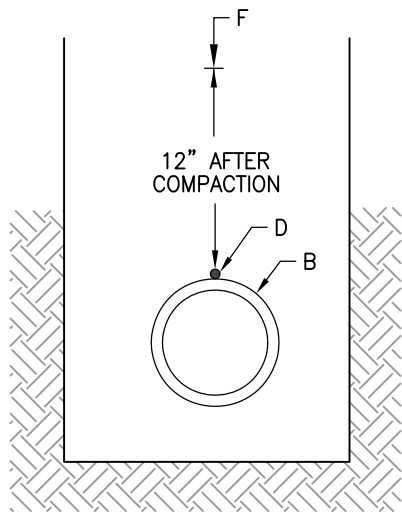
CROSS CONNECTION DETAIL
NOT TO SCALE



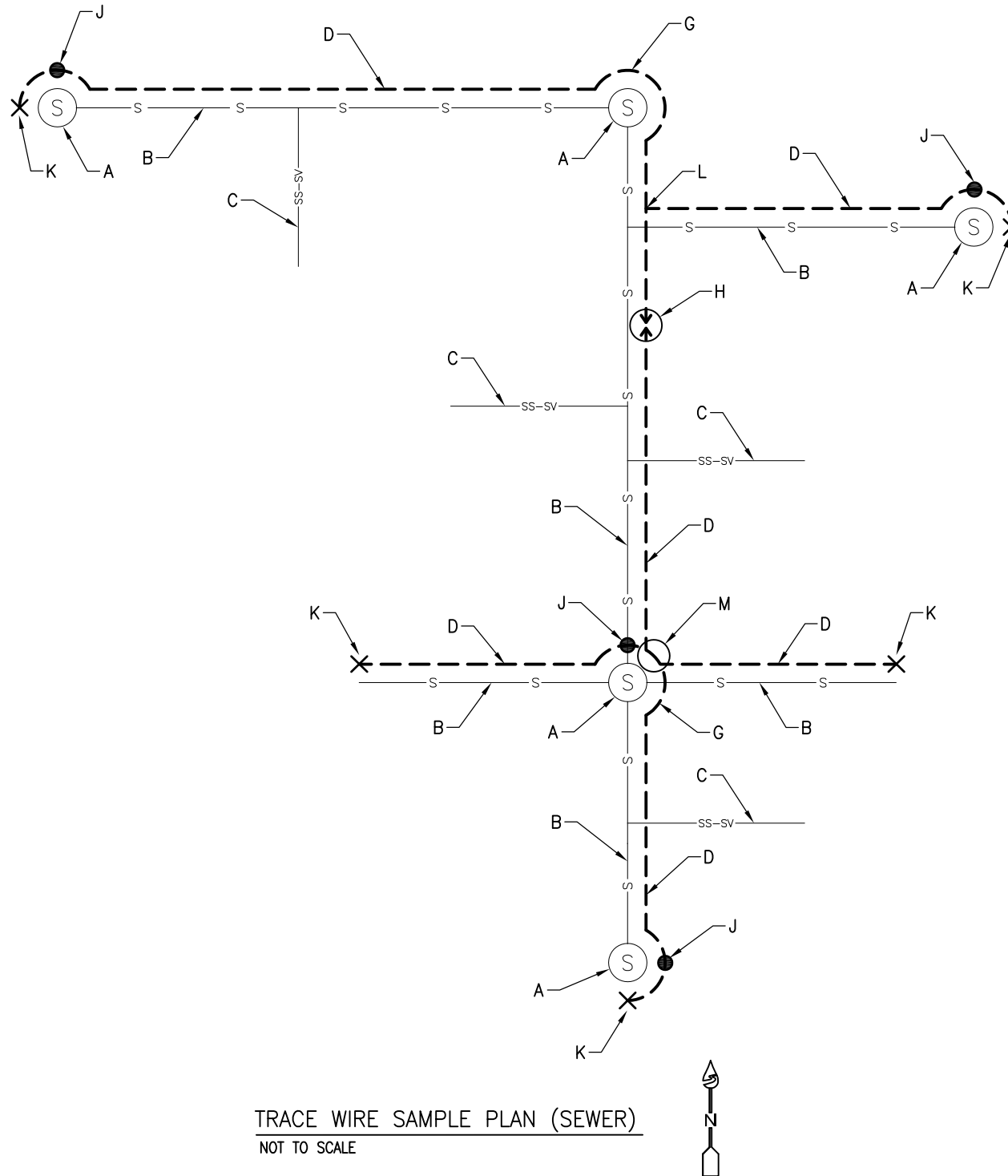
ANODE DETAIL



SPLICE DETAIL



TRACE WIRE DETAILS: SECTION A-A
NOT TO SCALE



TRACE WIRE SAMPLE PLAN (SEWER)
NOT TO SCALE

LEGEND

(S)	SEWER MANHOLE
X	DRIVE-IN MAGNESIUM GROUNDING ANODE
●	TEST STATION
---	TRACE WIRE
—S—	SEWER MAIN/LATERAL
—SS-SV—	SEWER SERVICE

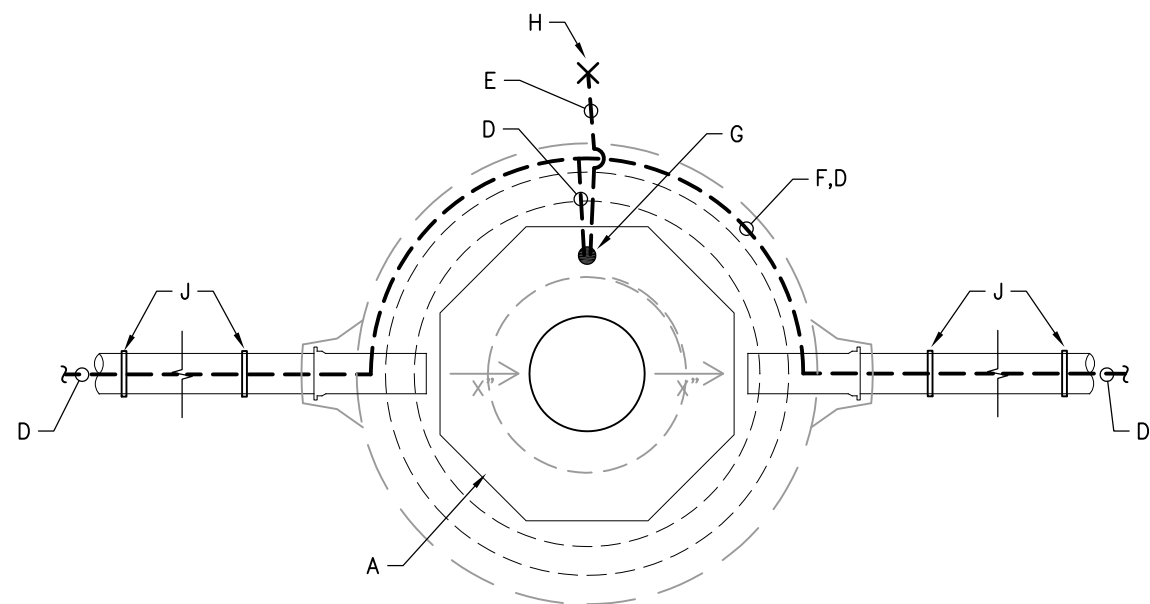
GENERAL NOTES

- TRACE WIRE SHOWN AWAY FROM PIPE FOR CLARITY. TRACE WIRE SHALL BE INSTALLED ON TOP OF PIPE AS SHOWN IN SECTION A-A.
- THE TRACE WIRE SHALL BE FASTENED TO THE PIPE WITH TAPE OR PLASTIC TIES AT 6' INTERVALS.
- TEST STATION CAP AND TRACE WIRE SHALL BE COLOR CODED GREEN (APWA STANDARD).

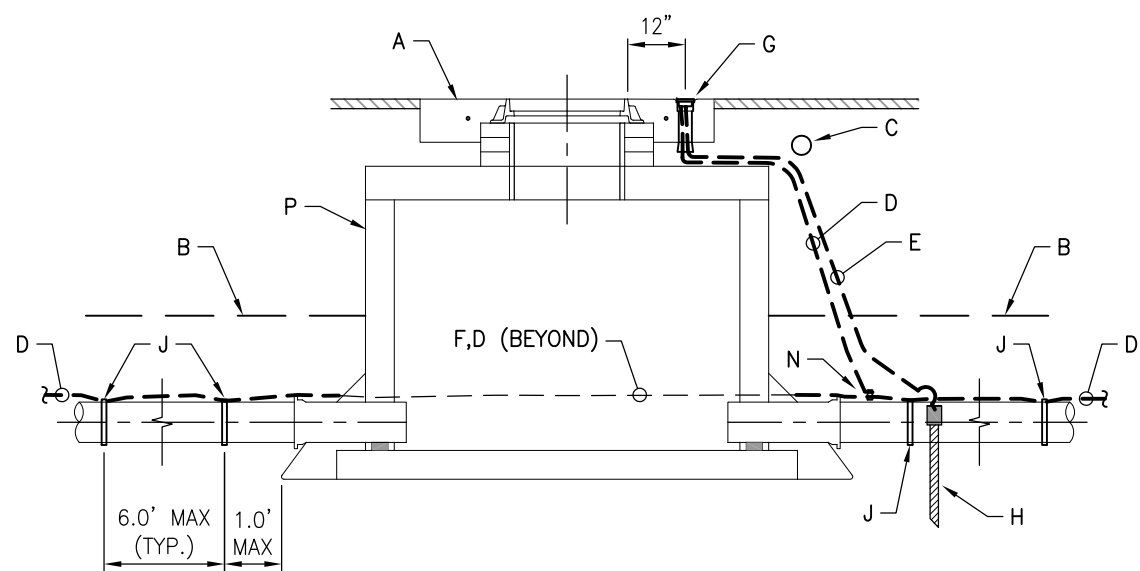
CONSTRUCTION NOTES

- MANHOLE
- SEWER MAIN
- SEWER SERVICE NO TRACE WIRE
- TRACE WIRE #12 AWG COPPER CLAD STEEL – GREEN FASTENED TO TOP OF PIPE (SEE GENERAL NOTES). SEE SECTION A-A
- TRACE WIRE #12 AWG COPPER CLAD STEEL – RED, FACTORY CONNECTED TO GROUNDING ANODE.
- MARKER TAPE
- TRACE WIRE SHALL BE ROUTED AROUND MANHOLES ON THE NORTH OR EAST SIDE (SEE STANDARD DRAWING 2191)
- MAIN LINE SPLICE: ONLY USE AS NEEDED AT END OF TRACE WIRE SPOOL. CONTRACTOR SHALL INSTALL EMD AT ALL SPLICE CONNECTIONS. (SEE SPLICE DETAIL, THIS SHEET)
- TEST STATION ACCESS BOX WITH GREEN COLOR CODED (APWA STANDARD) CAP SHALL BE INSTALLED IN CONCRETE COLLAR, ON NORTH OR EAST SIDE OF MANHOLES. TEST STATIONS SHALL BE INSTALLED APPROXIMATELY 1000' APART. (SEE STANDARD DRAWING 2191)
- DRIVE-IN MAGNESIUM GROUNDING ANODE AT ALL TERMINATION/DEAD ENDS (INCLUDING EDGE OF RIGHT-OF-WAY AND CONNECTION POINTS/TERMINAL ENDS OF REHABBED SECTIONS). CONNECT TO MAIN LINE TRACE WIRE USING SPLICE CONNECTION (SEE ANODE DETAIL, THIS SHEET)
- TEE CONNECTION. 3-WAY LOCKING WATERPROOF CONNECTOR. DO NOT CUT MAIN LINE TRACE WIRE. (SEE TEE CONNECTION DETAIL, THIS SHEET)
- CROSS CONNECTION. TWO 3-WAY LOCKING WATERPROOF CONNECTORS WITH SHORT TRACE WIRE JUMPER. DO NOT CUT AND SPLICE MAIN LINE TRACE WIRES. (SEE CROSS CONNECTION DETAIL, THIS SHEET)
- SPLICE CONNECTION (SEE SPLICE DETAIL, THIS SHEET)
- TRACE WIRE JUMPER
- LOCKING WATERPROOF CONNECTOR
- WATERPROOF DIRECT BURY LUG LOCKING CONNECTOR
- KNOT TWO CONNECTING TRACE WIRES TOGETHER

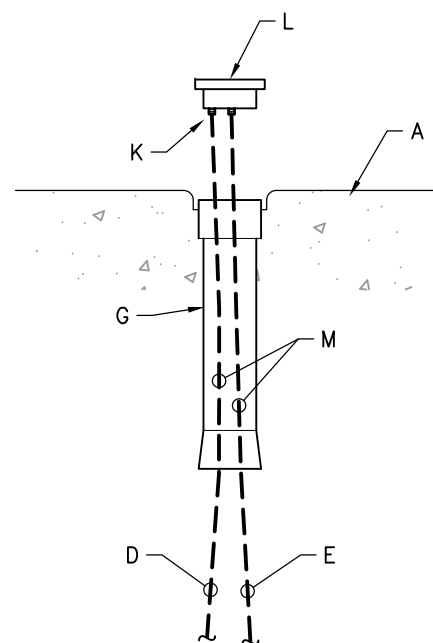
REVISIONS	WATER AUTHORITY
SEP. 2017	SEWER TRACE WIRE SAMPLE PLAN AND DETAILS
	DWG. 2190 MAY 2019



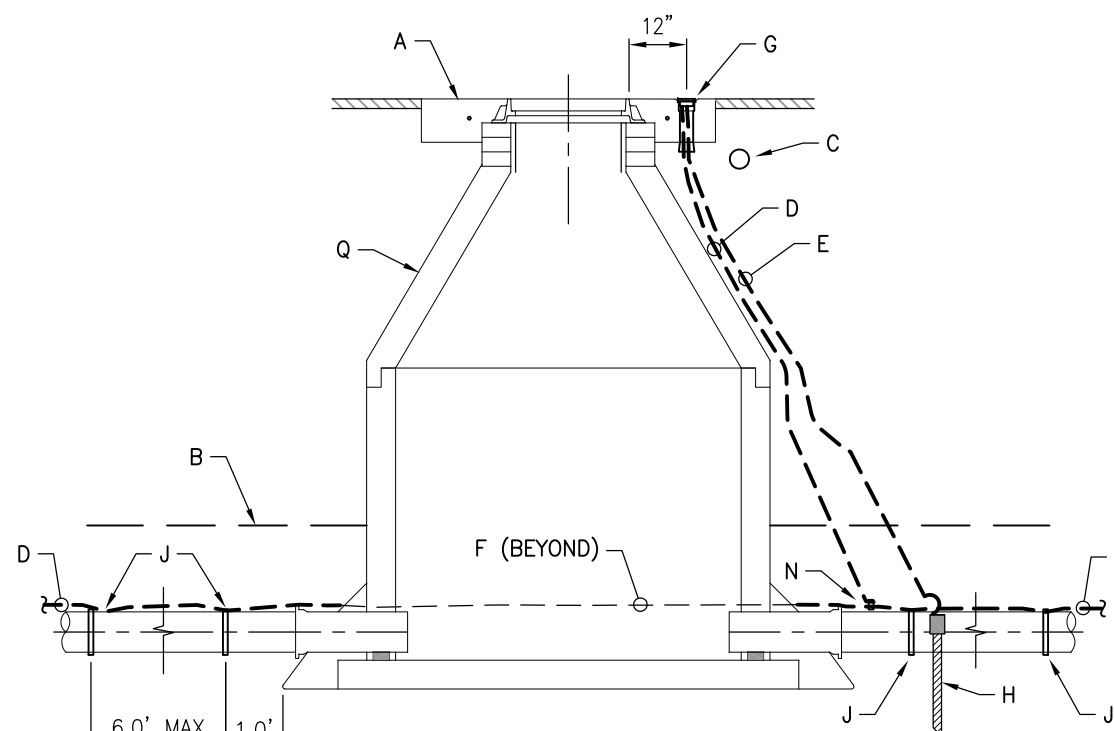
SEWER MANHOLE - PLAN VIEW
NOT TO SCALE



SEWER MANHOLE - SECTION VIEW
NOT TO SCALE (TYPE C)



TEST STATION - SECTION VIEW
NOT TO SCALE



SEWER MANHOLE - SECTION VIEW
NOT TO SCALE (TYPE E)

GENERAL NOTES

- TRACE WIRE SHALL BE INSTALLED ON TOP OF PIPE AS SHOWN IN SECTION A-A ON STANDARD DRAWING 2190.
- TRACE WIRE SHALL BE FASTENED TO THE PIPE WITH TAPE OR PLASTIC TIES AT 6' INTERVALS.
- TEST STATION CAP AND TRACE WIRE SHALL BE COLOR CODED GREEN (APWA STANDARD).

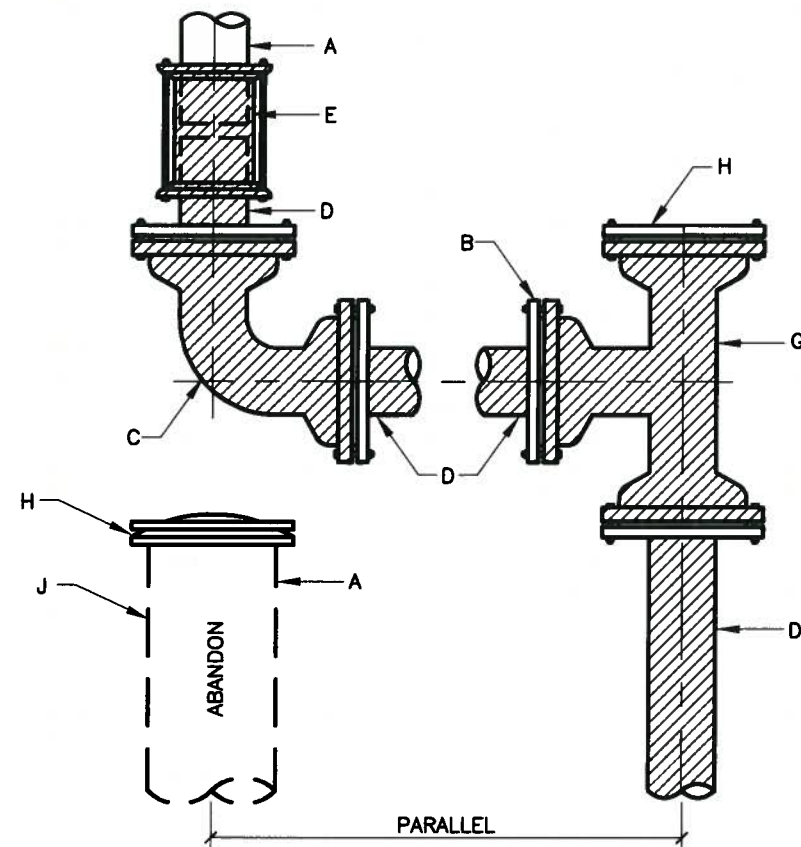
CONSTRUCTION NOTES

- CONCRETE COLLAR PER STANDARD DRAWING 2461
- MARKER TAPE
- ELECTRONIC MARKER DEVICE (EMD), SEE STANDARD SPECIFICATION SECTION 170.
- TRACE WIRE #12 AWG COPPER CLAD STEEL - GREEN
- TRACE WIRE #12 AWG COPPER CLAD STEEL - RED, FACTORY CONNECTED TO GROUNDING ANODE.
- TRACE WIRE SHALL BE ROUTED AROUND MANHOLES ON THE NORTH OR EAST SIDE
- TEST STATION ACCESS BOX WITH GREEN COLOR CODED (APWA STANDARD) CAP SHALL BE INSTALLED IN CONCRETE COLLAR, ON NORTH OR EAST SIDE OF MANHOLE. AVOID CONFLICT WITH REBAR RING IN COLLAR. TEST STATIONS SHALL BE INSTALLED APPROXIMATELY 1000' APART. TEST STATIONS SHALL BE APPROPRIATE FOR CAST IN PLACE CONCRETE APPLICATIONS. MAIN TRACE WIRE AND LEAD GROUND TRACE WIRE FROM THE MAGNESIUM GROUNDING ANODE SHALL BE CONTINUOUS TO THE TERMINALS IN THE TEST STATION. DO NOT CUT MAIN LINE TRACE WIRE. TEST STATION SHALL BE FLUSH WITH TOP OF CONCRETE TO PREVENT POOLING OF WATER. (SEE TEST STATION SECTION VIEW, THIS SHEET)
- DRIVE-IN MAGNESIUM GROUNDING ANODE. INSTALL WITH MINIMUM 1FT HORIZONTAL SEPARATION FROM TEST STATION ACCESS BOX. INSTALL AT DEPTH OF MAIN TRACE WIRE. (SEE ANODE DETAIL, STANDARD DRAWING 2190)
- TAPE OR PLASTIC TIE (SEE GENERAL NOTE 2).
- TERMINAL JUMPER SHALL REMAIN DISCONNECTED UNDER NORMAL OPERATIONS. THE TERMINALS MAY BE USED TO CONNECT TRACE EQUIPMENT FOR TRACE AND FOR GROUND. THE JUMPER SHALL BE CONNECTED AT THE EXTREME ENDS OF THE AREA TO BE TRACED TO PROPERLY GROUND THAT AREA. THE TERMINAL JUMPER SHALL BE DISCONNECTED WHEN TRACE IS COMPLETED.
- 2-TERMINAL GREEN COLOR CODED (APWA STANDARD) CAP. APPROPRIATE FOR CAST IN PLACE CONCRETE APPLICATIONS
- LEAVE 6 INCHES OF EXCESS SLACK RED AND BLUE TRACE WIRE INSIDE TEST STATION ACCESS BOX.
- TEE CONNECTION. 3-WAY LOCKING WATERPROOF CONNECTOR. DO NOT CUT MAIN LINE TRACE WIRE. (SEE TEE CONNECTION DETAIL, STANDARD DRAWING 2190)
- TYPE "C" MANHOLE PER STANDARD DRAWING 2101.
- TYPE "E" MANHOLE PER STANDARD DRAWING 2102.

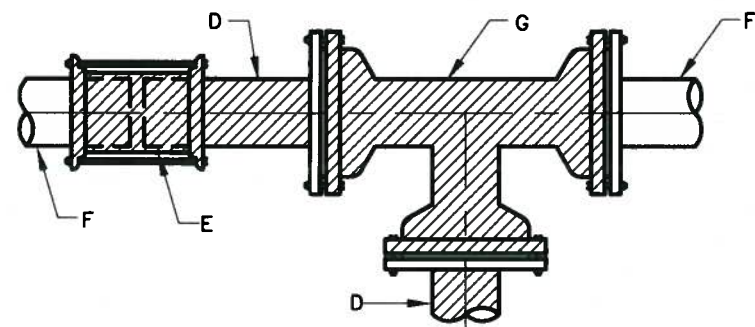
REVISIONS	WATER AUTHORITY
SEP. 2017	SEWER MANHOLE TRACE WIRE DETAILS
	DWG. 2191
	AUG. 2019

SECTION 2300
STANDARD DETAILS FOR WATER

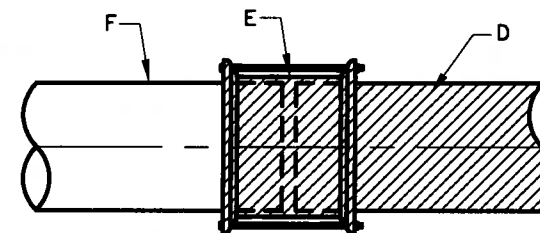
<i>DWG. NO.</i>	<i>TITLE</i>
2301	WATERLINE CONNECTION DETAILS
2302	WATER TRACE WIRE SAMPLE PLAN AND DETAILS
2303	NON-POTABLE WATER TRACE WIRE SAMPLE PLAN AND DETAILS
2305	WATER CONCRETE CYLINDER PIPE RIGID JOINT DETAIL
2310	WATER MANHOLE FRAME AND COVER
2315	WATER PIPE TRENCH TERMINOLOGY
2320	WATER CONCRETE BLOCKING DESIGN
2321	WATER CONCRETE ENCASEMENT DETAILS
2322	WATER STATIONARY GUARD POST DETAIL
2324	WATER TRACE WIRE SAMPLE PLAN AND DETAILS FOR WATERLINES WITHOUT FIRE HYDRANTS
2325	NON-POTABLE WATER LATERAL AND VALVE TRACE WIRE DETAILS
2326	WATER VALVE BOX
2328	WATER RING AND COVER FOR VALVE BOX
2329	FIRE LINE RING AND COVER FOR VALVE BOX
2330	NON-POTABLE WATER RING AND COVER FOR VALVE BOX
2333	WATER VALVE INSERTION ANCHORAGE
2334	WATER LARGE DIAMETER ISOLATION VALVE VAULT
2335	WATER LADDER DETAIL
2340	WATER FIRE HYDRANT INSTALLATION
2341	WATER SAMPLING STATION
2341-A	WATER SAMPLING STATION ALTERNATE
2342	FIRE HYDRANT TRACE WIRE DETAILS
2344	WATER AIR RELEASE FIRE HYDRANT CONNECTION
2346	WATER TYPICAL PLACEMENT OF VALVES AT ARTERIAL INTERSECTIONS
2347	WATER TYPICAL FIRE HYDRANT LOCATIONS
2348	WATER CONCRETE CYLINDER PIPE BUTT STRAP AND WELD DETAILS
2349	WATER CAV VALVE VAULT FOR 12-INCH AND SMALLER DIA. WATER MAINS
2350	WATER CAV VALVE VAULT FOR 14-INCH AND LARGER DIA. WATER MAINS
2351	WATER CONCRETE CYLINDER PIPE IN-VAULT BUTTERFLY VALVE INSTALLATION
2352	WATER DUCTILE IRON PIPE IN-VAULT BUTTERFLY VALVE INSTALLATION
2353	WATER SURGE RELIEF VALVE STATION
2354	WATER STANDARD PRV STATION NO METER
2358	WATER THRUST TIE DETAILS
2359	WATER DUCTILE IRON PIPE DIRECT BURY BUTTERFLY VALVE INSTALLATION
2360	WATER CONCRETE CYLINDER PIPE DIRECT BURY BUTTERFLY VALVE INSTALLATION
2361	WATER TYPICAL METER BOX INSTALLATIONS
2362	WATER 3/4" TO 1" METERED SERVICE LINE INSTALLATION
2363	WATER 1-1/2" TO 2" METERED SERVICE LINE INSTALLATION
2365	WATER SERVICE AND VALVE TRACE WIRE DETAILS
2366	WATER METER BOX FOR 3/4" TO 1" METERS
2367	WATER METER BOX, COVER AND LID FOR 1-1/2" TO 2" METERS
2368	WATER METER BOX, COVER AND LID FOR 3/4" TO 1" METERS
2370	WATER LARGE DIAMETER METER VAULT FOR 3" TO 6" SERVICE
2371	WATER LARGE DIAMETER METER VAULT FOR 8" TO 12" SERVICE
2372	WATER CONCRETE CYLINDER PIPE BUTT STRAP CONNECTION
2379	PIPE CASING TRACE WIRE DETAILS
2380	WATER BORING INSTALLATION
2381	WATER TYPICAL LINE RELOCATION
2385	WATER REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY (RPBA)
2386	WATER DOUBLE CHECK VALVE ASSEMBLY (DCVA)
2387	WATER DOUBLE CHECK – DETECTOR CHECK ASSEMBLY (DCDA)
2388	LANDSCAPE PRESSURE VACUUM BREAKER (PVB)
2389	WATER ENCLOSURES
2390	WATER INSTALLATION FOR CONTINUOUS SERVICE
2394	WATER RESIDENTIAL WATER PRIVATE FIRE PROTECTION SYSTEMS
2395	WATER APPROVED METHODS FOR FILLING TANKS
2396	WATER CORROSION MONITORING DETAILS – 1
2397	WATER CORROSION MONITORING DETAILS – 2
2398	WATER CORROSION MONITORING DETAILS – 3



REPLACEMENT OF STEEL LINES 4"-12"
CONNECTION DETAILS



TEE INSERTION D.I., P.V.C. OR A.C. PIPE



TRANSITION COUPLING
FROM D.I., P.V.C., OR A.C.
TO D.I. OR P.V.C.

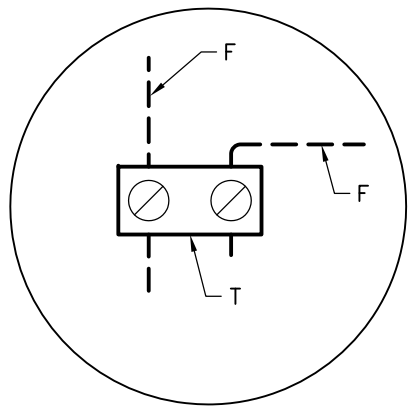
GENERAL NOTES:

- 1 ALL NEW PIPE AND FITTINGS SHALL BE PROVIDED WITH THRUST CONTROL.
- 2 THRUST CONTROL SHALL BE BY RESTRAINED JOINTS ONLY UNLESS DIRECTED OTHERWISE BY ENGINEER.
- 3 EMD'S ARE REQUIRED AT VALVES, TEES, FLANGED OUTLETS (ON CONCRETE CYLINDER PIPES), AND CAPPED OR PLUGGED ENDS. SEE SPECIFICATION SECTION 170 FOR LOCATIONS.

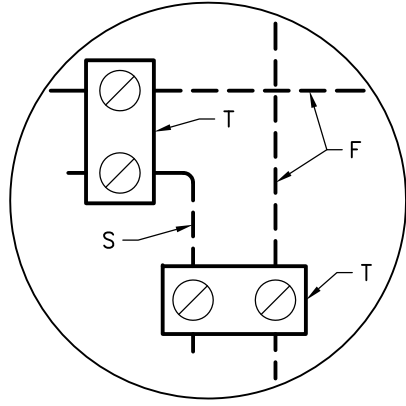
CONSTRUCTION NOTES:

- A EXISTING STEEL PIPE.
- B REDUCE AT TEE, IF EXISTING LINE IS SMALLER THAN NEW LINE.
- C M.J., C.I. ELBOW WITH JOINT RESTRAINT.
- D NEW D.I. OR P.V.C., WITH VALVE AS DIRECTED.
- E RESTRAINED TRANSITION COUPLING FOR A.C. RESTRAINED SOLID SLEEVE FOR D.I., C.I. AND PVC.
- F EXISTING D.I., C.I., P.V.C., OR A.C.. IF A.C., USE ADAPTER APPROVED BY ENGINEER OR AS APPROVED ON THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
- G M.J. D.I. TEE WITH JOINT RESTRAINT.
- H M.J., C.I. PLUG OR CAP WITH JOINT RESTRAINT.
- J REMOVE AT LEAST 10' OF PIPE TO BE ABANDONED AND CAP OR PLUG.

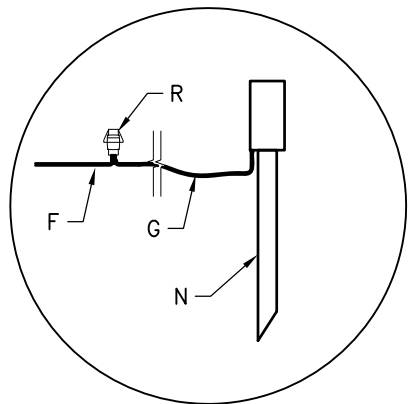
REVISIONS	WATER AUTHORITY
	WATER WATERLINE CONNECTION DETAILS
	DWG. 2301 JANUARY 2011



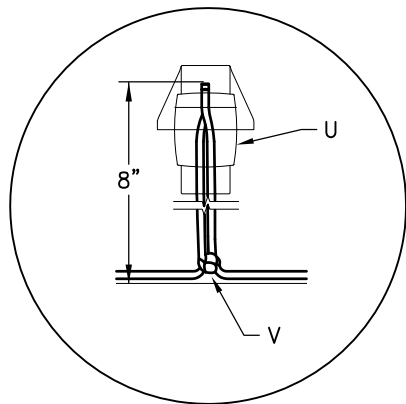
TEE CONNECTION DETAIL
NOT TO SCALE



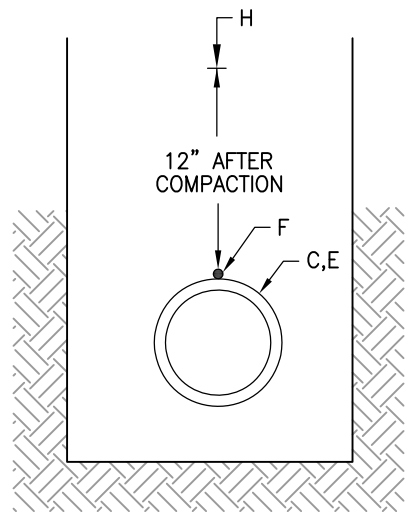
CROSS CONNECTION DETAIL
NOT TO SCALE



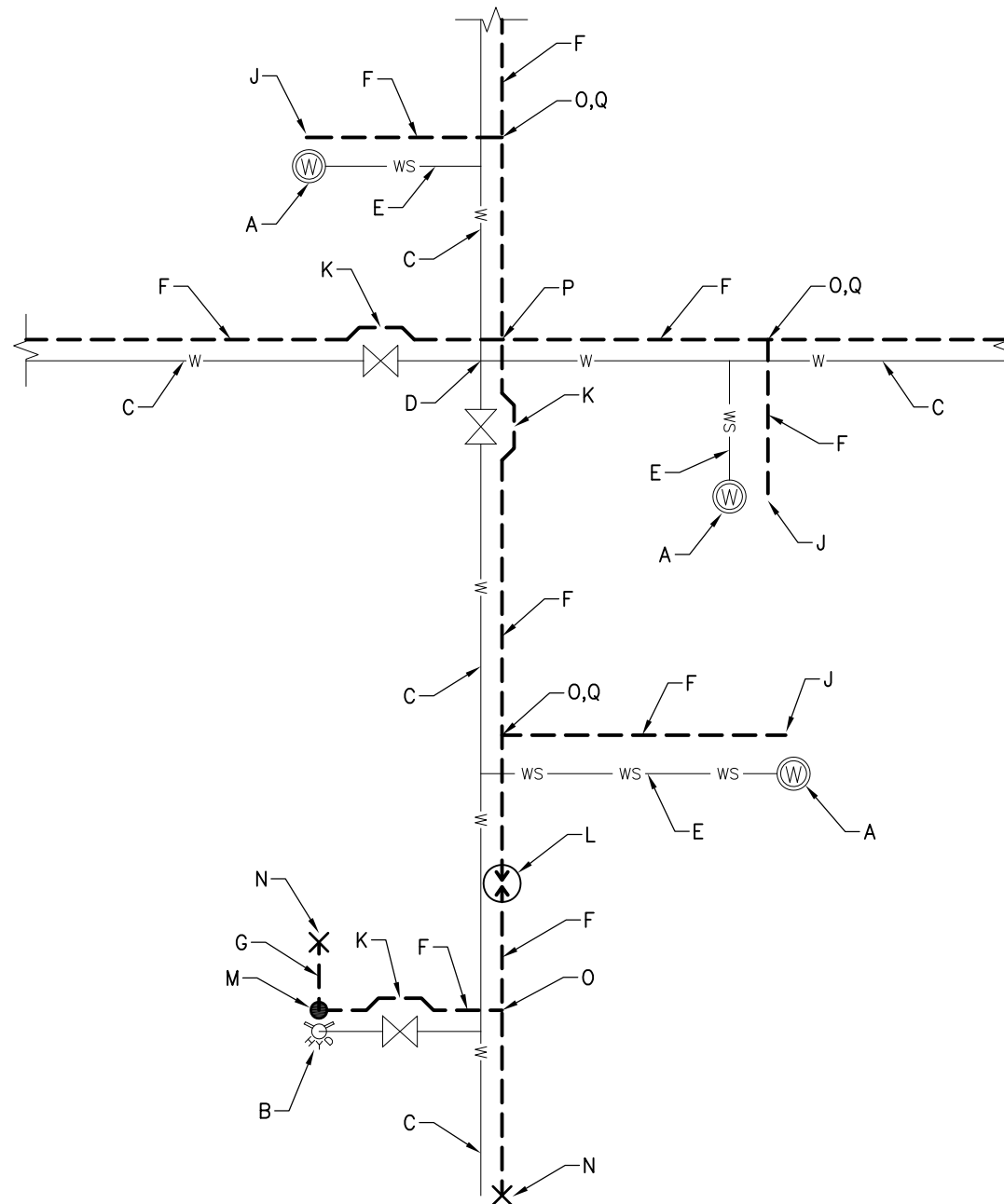
ANODE DETAIL



SPICE DETAIL



TRACE WIRE DETAILS: SECTION A-A
NOT TO SCALE



TRACE WIRE SAMPLE PLAN (WATER)
NOT TO SCALE

LEGEND	
	WATER METER
	HYDRANT
	VALVE
	DRIVE-IN MAGNESIUM GROUNDING ANODE
	TEST STATION
	TRACE WIRE
	WATER MAIN
	WATER SERVICE



GENERAL NOTES

- TRACE WIRE SHOWN AWAY FROM PIPE FOR CLARITY. TRACE WIRE SHALL BE INSTALLED ON TOP OF PIPE AS SHOWN IN SECTION A-A.
- TRACE WIRE SHALL BE FASTENED TO NON-PEX PIPE WITH TAPE OR PLASTIC TIES AT 6' INTERVALS.
- ATTACH TRACE WIRE TO PEX SERVICE LINES WITH PLASTIC (ZIP) TIES. DO NOT USE ADHESIVE TAPE ON PEX SERVICE LINES.
- TEST STATIONS SHALL BE VISIBLE FROM ROAD.
- TEST STATION CAP AND TRACE WIRE SHALL BE COLOR CODED BLUE (APWA STANDARD).

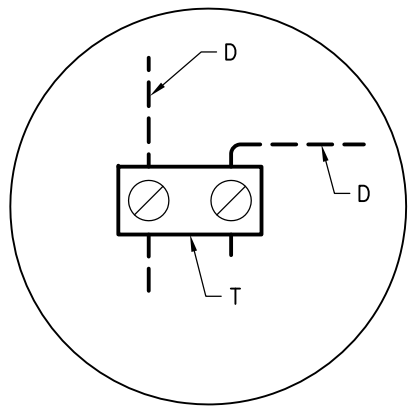
CONSTRUCTION NOTES

- WATER METER BOX
- HYDRANT
- WATER MAIN
- WATER MAIN CROSS
- WATER SERVICE
- TRACE WIRE #12 AWG COPPER CLAD STEEL - BLUE FASTENED TO TOP OF PIPE (SEE GENERAL NOTES). SEE SECTION A-A
- TRACE WIRE #12 AWG COPPER CLAD STEEL - RED, FACTORY CONNECTED TO GROUNDING ANODE.
- MARKER TAPE
- TRACE WIRE INSIDE WATER METER BOX/Vault WITH 3' OF EXCESS/SLACK TRACE WIRE FOLDED IN THE CORNER OF THE METER BOX - DO NOT COIL. (SEE STANDARD DRAWING 2365)
- TRACE WIRE SHALL BE ROUTED AROUND VALVES ON THE NORTH OR EAST SIDE (SEE STANDARD DRAWING 2365)
- MAIN LINE SPLICE: ONLY USE AS NEEDED AT END OF TRACE WIRE SPOOL. CONTRACTOR SHALL INSTALL EMD AT ALL SPLICE CONNECTIONS. (SEE SPLICE DETAIL, THIS SHEET)
- TEST STATION ACCESS BOX WITH BLUE COLOR CODED (APWA STANDARD) CAP SHALL BE INSTALLED ON NORTH OR EAST SIDE OF FIRE HYDRANTS, DEPENDING ON ORIENTATION. TEST STATIONS SHALL BE INSTALLED APPROXIMATELY 1000' APART. (SEE STANDARD DRAWING 2342). IF HYDRANTS DO NOT EXIST ON A WATERLINE, TEST STATION SHALL BE INSTALLED AT WATER VALVES OR AT A STAND-ALONE TEST STATION, APPROXIMATELY EVERY 1000 FEET. (SEE STANDARD DRAWING 2324).
- DRIVE-IN MAGNESIUM GROUNDING ANODE AT ALL TERMINATION/DEAD ENDS (INCLUDING EDGE OF RIGHT-OF-WAY AND CONNECTION POINTS/TERMINAL ENDS OF REHABBED SECTIONS). CONNECT TO MAIN LINE TRACE WIRE USING SPLICE CONNECTION (SEE ANODE DETAIL, THIS SHEET)
- TEE CONNECTION. 3-WAY LOCKING WATERPROOF CONNECTOR. DO NOT CUT MAIN LINE TRACE WIRE. (SEE TEE CONNECTION DETAIL, THIS SHEET)
- CROSS CONNECTION. TWO 3-WAY LOCKING WATERPROOF CONNECTORS WITH SHORT TRACE WIRE JUMPER. DO NOT CUT AND SPLICE MAIN LINE TRACE WIRES. (SEE CROSS CONNECTION DETAIL, THIS SHEET)
- FOR TAPPING PERMITS - IF TRACE WIRE EXISTS ON MAIN LINE, INSTALL TRACE WIRE ON SERVICE LINE AND CONNECT TO MAIN LINE TRACE WIRE WITH 3-WAY LOCKING WATERPROOF CONNECTOR (SEE TEE CONNECTION DETAIL, THIS SHEET)
- SPLICE CONNECTION (SEE SPLICE DETAIL, THIS SHEET)
- TRACE WIRE JUMPER
- LOCKING WATERPROOF CONNECTOR

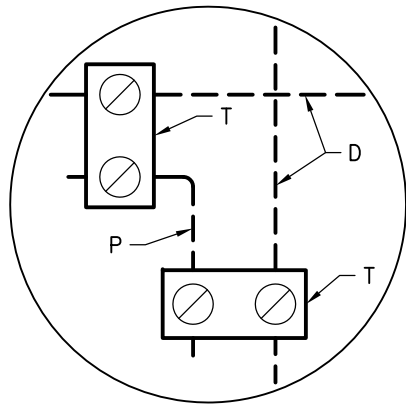
U. WATERPROOF DIRECT BURY LUG LOCKING CONNECTOR

V. KNOT TWO CONNECTING TRACE WIRES TOGETHER

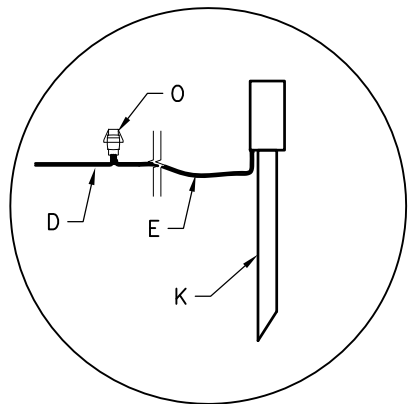
REVISIONS		WATER AUTHORITY	
SEP. 2017		WATER TRACE WIRE SAMPLE PLAN AND DETAILS	
		DWG. 2302	AUG. 2019



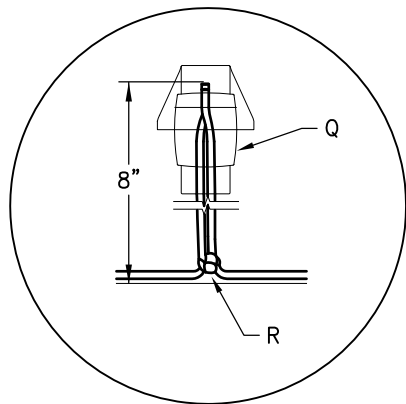
TEE CONNECTION DETAIL
NOT TO SCALE



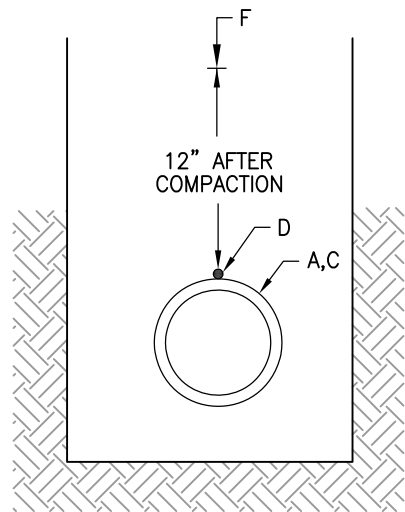
CROSS CONNECTION DETAIL
NOT TO SCALE



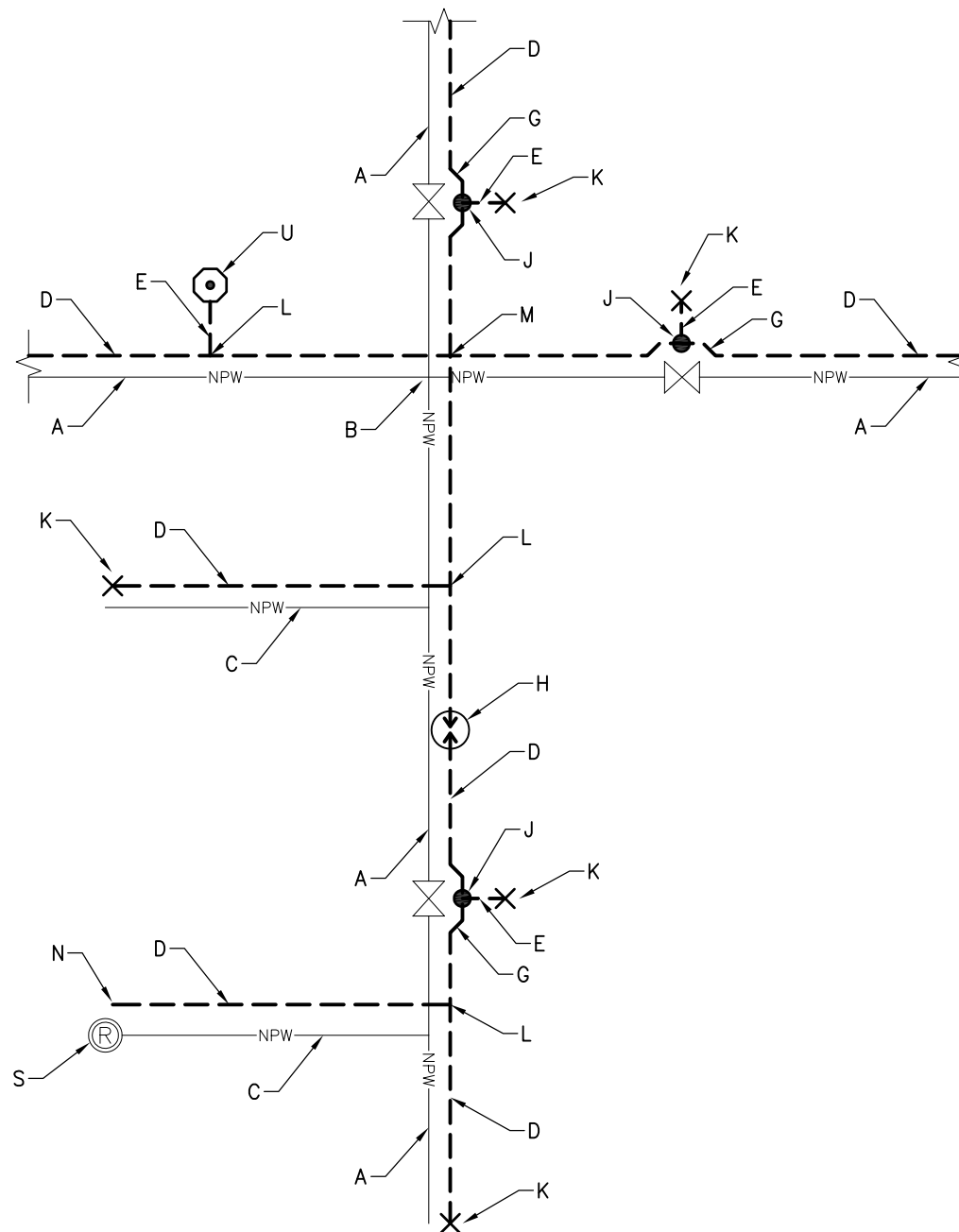
ANODE DETAIL



SPICE DETAIL



TRACE WIRE DETAILS: SECTION A-A
NOT TO SCALE



TRACE WIRE SAMPLE PLAN (NON-POTABLE WATER)
NOT TO SCALE

LEGEND

- Ⓡ NON-POTABLE WATER METER
- ⊗ VALVE
- ⊙ TEST STATION WITH CONCRETE COLLAR
- ✕ DRIVE-IN MAGNESIUM GROUNDING ANODE
- TEST STATION
- TRACE WIRE
- NPW — NON-POTABLE WATER MAIN/LATERAL

GENERAL NOTES

- TRACE WIRE SHOWN AWAY FROM PIPE FOR CLARITY. TRACE WIRE SHALL BE INSTALLED ON TOP OF PIPE AS SHOWN IN SECTION A-A.
- TRACE WIRE SHALL BE FASTENED TO THE PIPE WITH TAPE OR PLASTIC TIES AT 6' INTERVALS.
- TEST STATION CAP AND TRACE WIRE SHALL BE COLOR CODED PURPLE (APWA STANDARD).

CONSTRUCTION NOTES

- NON-POTABLE WATER MAIN
- NON-POTABLE WATER MAIN CROSS
- NON-POTABLE WATER LATERAL
- TRACE WIRE #12 AWG COPPER CLAD STEEL - PURPLE, FASTENED TO TOP OF PIPE (SEE GENERAL NOTES) SEE SECTION A-A
- TRACE WIRE #12 AWG COPPER CLAD STEEL - RED, FACTORY CONNECTED TO GROUNDING ANODE.
- MARKER TAPE
- TRACE WIRE SHALL BE ROUTED AROUND VALVES ON THE NORTH OR EAST SIDE (SEE STANDARD DRAWING 2325)
- MAIN LINE SPICE: ONLY USE AS NEEDED AT END OF TRACE WIRE SPOOL. CONTRACTOR SHALL INSTALL EMD AT ALL SPICE CONNECTIONS. (SEE SPICE DETAIL, THIS SHEET)
- TEST STATION ACCESS BOX WITH PURPLE COLOR CODED (APWA STANDARD) CAP SHALL BE INSTALLED IN CONCRETE COLLAR, ON NORTH OR EAST SIDE OF VALVE. TEST STATIONS SHALL BE INSTALLED APPROXIMATELY 1000' APART. TEST STATIONS SHALL BE APPROPRIATE FOR CAST IN PLACE CONCRETE APPLICATIONS. MAIN TRACE WIRE AND LEAD GROUND TRACE WIRE FROM THE MAGNESIUM GROUNDING ANODE SHALL BE CONTINUOUS TO THE TERMINALS IN THE TEST STATION. DO NOT CUT MAIN LINE TRACE WIRE. (SEE STANDARD DRAWING 2325)
- DRIVE-IN MAGNESIUM GROUNDING ANODE AT ALL TERMINATION/DEAD ENDS (INCLUDING EDGE OF RIGHT-OF-WAY AND CONNECTION POINTS/TERMINAL ENDS OF REHABBED SECTIONS). CONNECT TO MAIN LINE TRACE WIRE USING SPICE CONNECTION (SEE ANODE DETAIL, THIS SHEET)
- TEE CONNECTION. 3-WAY LOCKING WATERPROOF CONNECTOR DO NOT CUT MAIN LINE TRACE WIRE. (SEE TEE CONNECTION DETAIL, THIS SHEET)
- CROSS CONNECTION. TWO 3-WAY LOCKING WATERPROOF CONNECTORS WITH SHORT TRACE WIRE JUMPER. DO NOT CUT AND SPICE MAIN LINE TRACE WIRES. (SEE CROSS CONNECTION DETAIL, THIS SHEET)
- TRACE WIRE INSIDE NON-POTABLE WATER WATER METER BOX/VAULT WITH 3' OF EXCESS/SKACK TRACE WIRE FOLDED IN THE CORNER OF THE METER BOX. DO NOT COIL (SEE STANDARD DRAWING 2325)
- SPICE CONNECTION (SEE SPICE DETAIL, THIS SHEET)
- TRACE WIRE JUMPER
- WATERPROOF DIRECT BURY LUG LOCKING CONNECTOR
- KNOT TWO CONNECTING TRACE WIRES TOGETHER
- NON-POTABLE WATER WATER METER BOX
- LOCKING WATERPROOF CONNECTOR
- STAND ALONE TEST STATION (SEE STAND ALONE TEST STATION TRACE WIRE DETAIL, STANDARD DRAWING 2325)

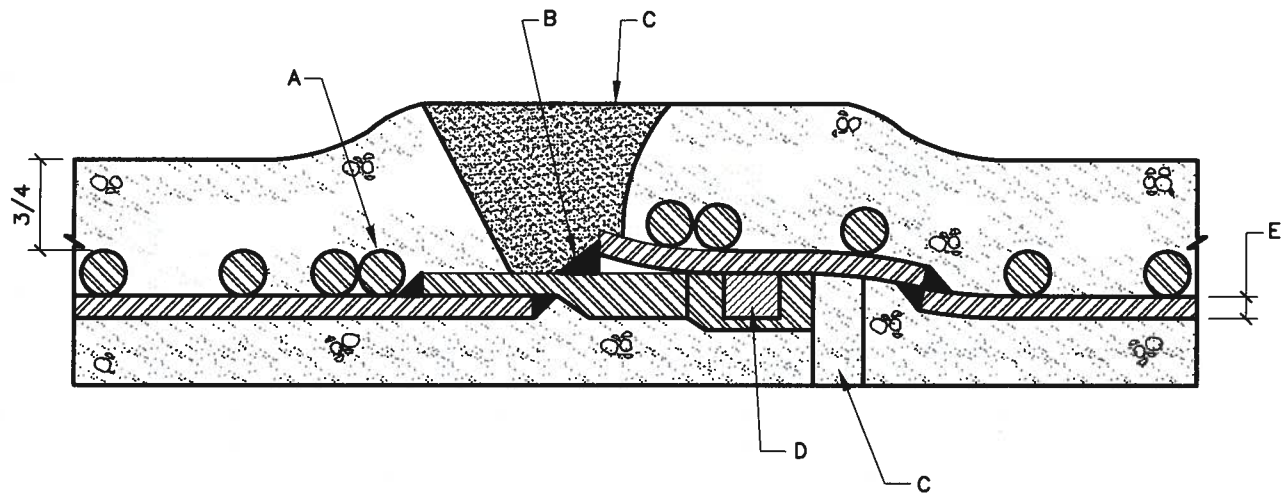
REVISIONS	WATER AUTHORITY
SEP. 2017	NON-POTABLE WATER TRACE WIRE SAMPLE PLAN AND DETAILS
	DWG. 2303 MAY 2019

GENERAL NOTES:

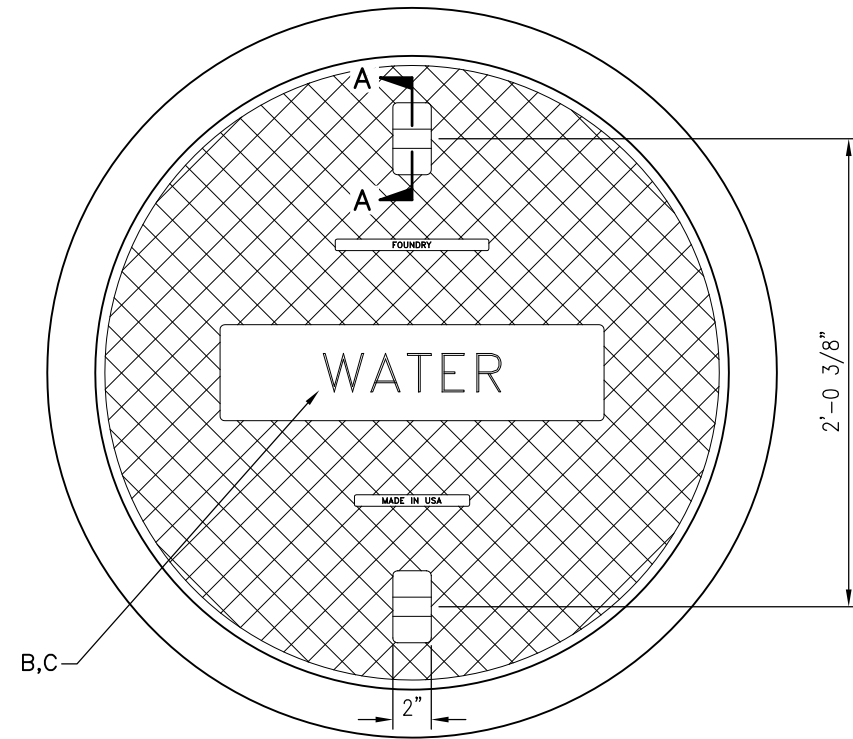
- 1 SEE PLAN AND PROFILE SHEETS FOR LENGTH IN FEET OF RIGID PIPE ON EITHER SIDE OF BEND.
- 2 CARE MUST BE EXERCISED NOT TO OVERHEAT RUBBER GASKET WHEN WELDING.

CONSTRUCTION NOTES:

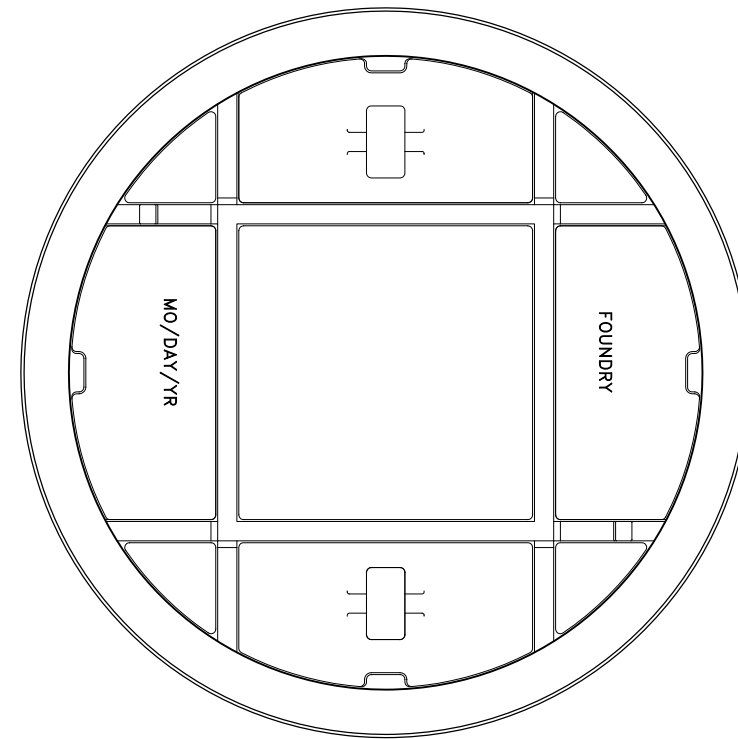
- A COMPLETE COIL PARALLEL TO END OF PIPE.
- B FIELD WELD, CONTINUOUS.
- C FIELD-APPLIED CEMENT MORTAR COATING.
- D RUBBER GASKET.
- E STEEL CYLINDER PORTION OF PIPE.



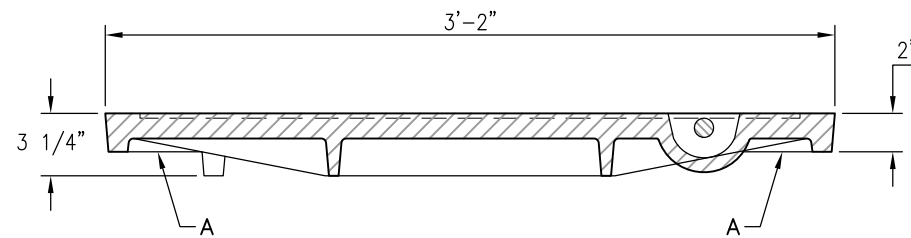
REVISIONS	WATER AUTHORITY
	WATER CONCRETE CYLINDER PIPE RIGID JOINT DETAIL
	DWG. 2305 JANUARY 2011



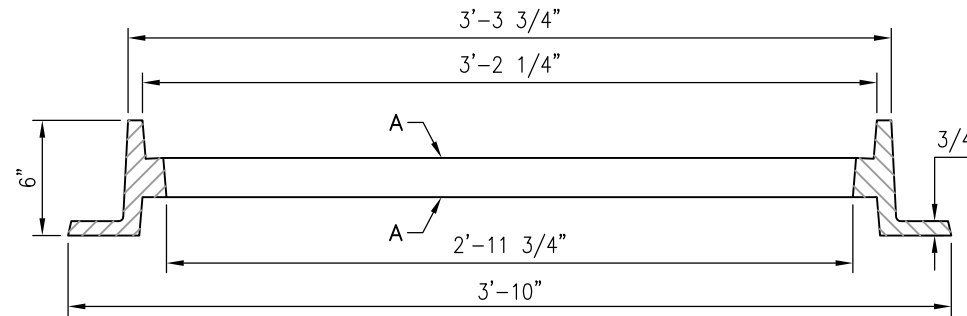
36" MANHOLE COVER
PLAN VIEW



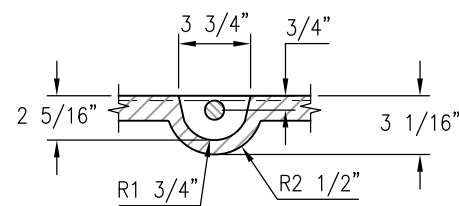
36" MANHOLE COVER
BOTTOM VIEW



36" MANHOLE COVER
CROSS SECTION



36" MANHOLE FRAME
CROSS SECTION



SECTION A-A

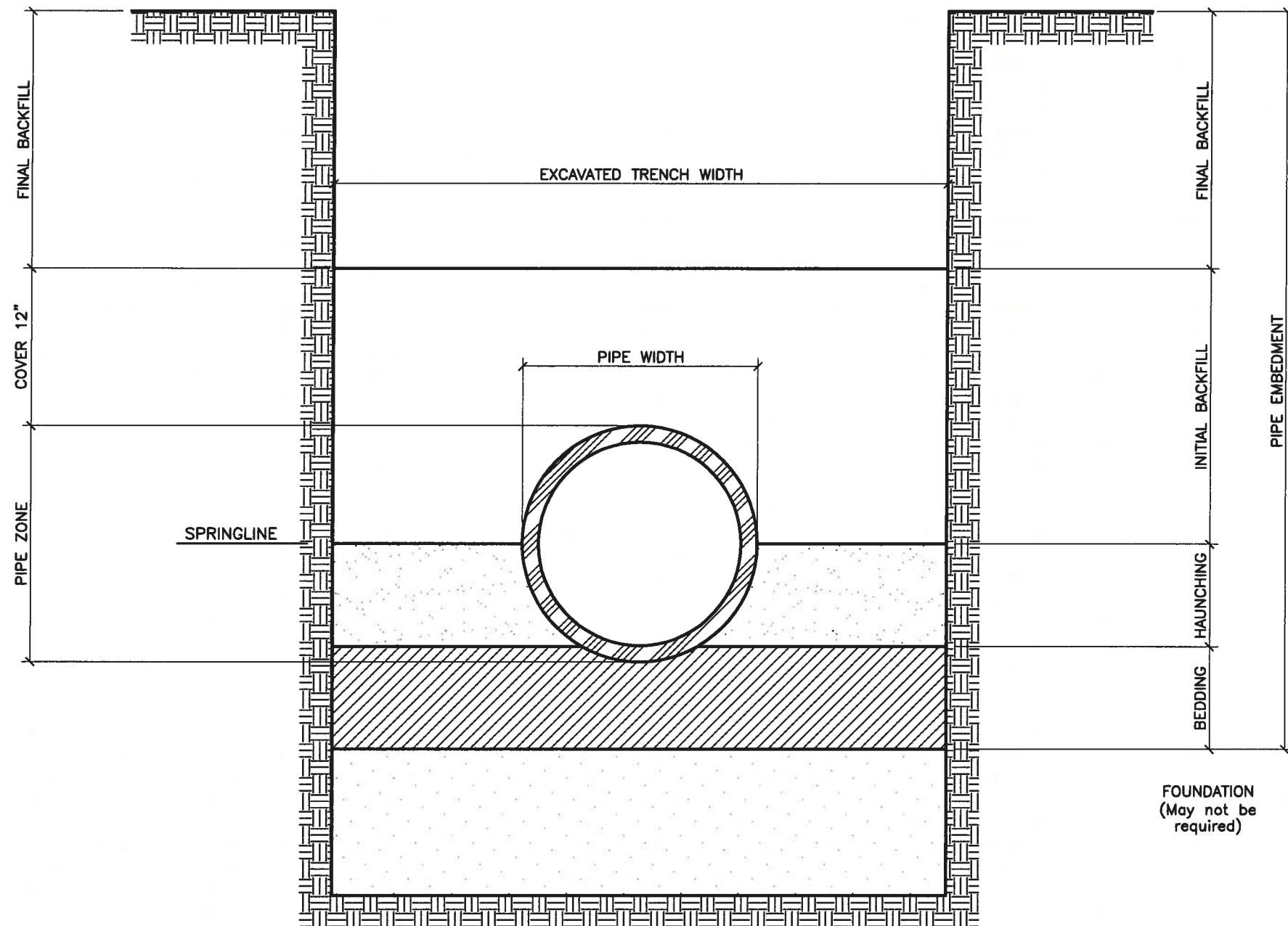
GENERAL NOTES

1. STANDARD 36" CAST IRON M.H. FRAME AND COVER.
WEIGHTS: COVER = 355 LBS., FRAME = 315 LBS.
TOTAL = 670 LBS. (TOLERANCE = $\pm 5\%$)
2. REFERENCE SPEC. SECTION 130.
3. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE

CONSTRUCTION NOTES

- A. MACHINED OR GROUND BEARING SURFACES.
- B. "WATER" CAST ON COVER TO IDENTIFY WATERLINE.
- C. 2" LETTERS (RECESSED FLUSH).

REVISIONS	WATER AUTHORITY
	WATER MANHOLE FRAME AND COVER
	DWG. 2310 JAN. 2013

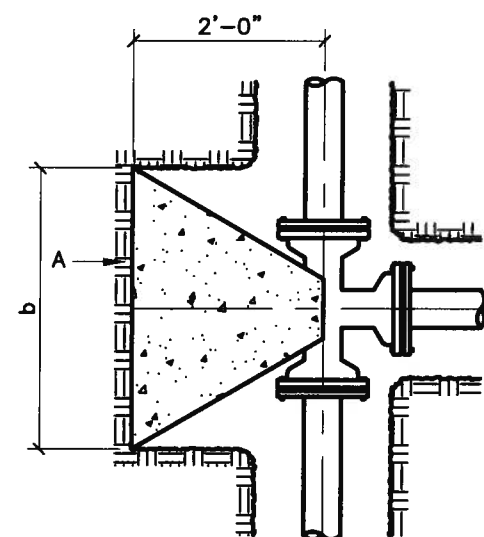


TRENCH CROSS-SECTION
SHOWING TERMINOLOGY

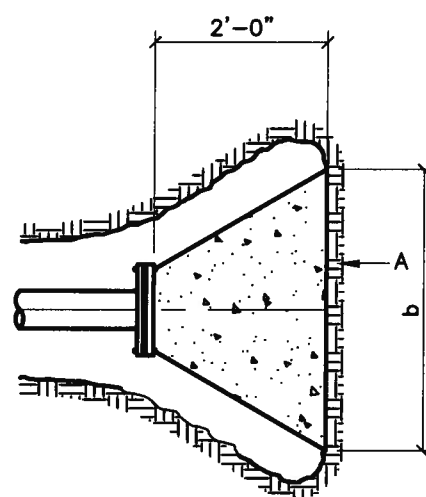
GENERAL NOTES:

- 1 MECHANICAL TAMPERS SHALL NOT BE USED IN THE INITIAL BACKFILL REGION FOR FLEXIBLE PIPE. WHEN FLEXIBLE PIPE IS USED, CONTRACTOR SHALL, PRIOR TO THE START OF CONSTRUCTION, PROVIDE THE PROPOSED COMPACTION METHOD IN THE INITIAL BACKFILL REGION TO THE WATER AUTHORITY FOR APPROVAL.
- 2 MINIMUM CLASS "C" BEDDING WILL BE USED.
- 3 ALL COMPACTION WILL BE TO 95% OF THE STANDARD PROCTOR.

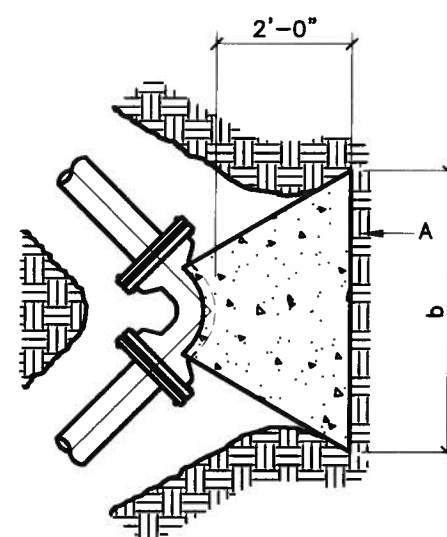
REVISIONS	WATER AUTHORITY
	WATER PIPE TRENCH TERMINOLOGY
	DWG. 2315 JANUARY 2011



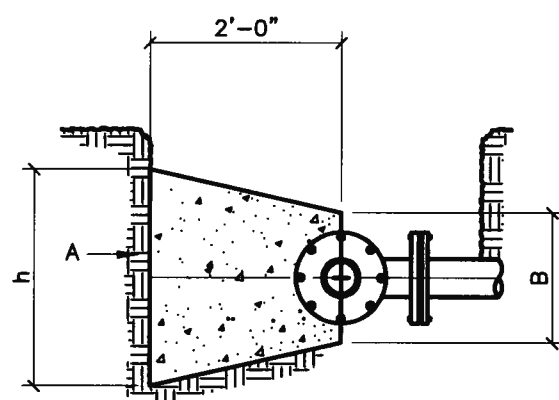
PLAN



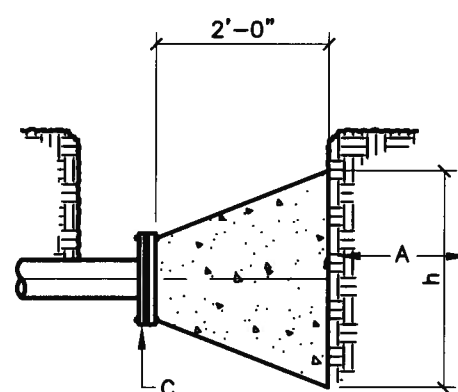
PLAN



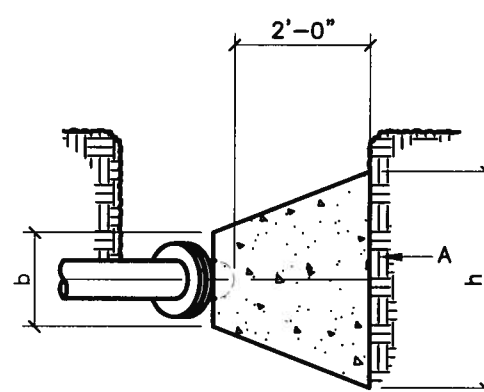
PLAN



ELEVATION
CONCRETE BLOCKING
FOR TEE



ELEVATION
CONCRETE BLOCKING
FOR PLUG OR CAP



ELEVATION
CONCRETE BLOCKING
FOR ELBOW

GENERAL NOTES:

- 1 ALL THRUST CONTROL BY RESTRAINED JOINTS ONLY UNLESS DIRECTED BY ENGINEER, AND FOR "SPECIAL" SITUATIONS SPECIFIED BY THE WATER AUTHORITY.
- 2 PIPE SIZE GREATER THAN 14" REQUIRES DESIGN BY ENGINEER TO BE SUBMITTED TO THE WATER AUTHORITY FOR APPROVAL.
- 3 CONCRETE BLOCKING PER SEC. 101 EXTERIOR CONCRETE, $f'_c=3000$ psi @ 28 DAYS.

PIPE SIZE	ELBOW ANGLE	ELBOW (b) DIM.	ELBOW (h) DIM.	TEE OR PLUG (b) DIM.	TEE OR PLUG (h) DIM.
4"				2'	1'
4"	90° 45°	2'	2'		
4"	$22 \frac{1}{2} \frac{1}{4}$	2'	2'		
6"				2'	2'
6"	90° 45°	2'	2'		
6"	$22 \frac{1}{2} \frac{1}{4}$	2'	2'		
8"				3'	3'
8"	90°	3'	3'		
8"	45°	2'	2'		
8"	$22 \frac{1}{2} \frac{1}{4}$	2'	2'		
10"				3'	3'
10"	90°	3'-6"	3'-6"		
10"	45°	3'	3'		
10"	$22 \frac{1}{2} \frac{1}{4}$	2'	2'		
12"				3'-6"	3'-6"
12"	90°	4'	4'		
12"	45°	3'-6"	3'-6"		
12"	$22 \frac{1}{2} \frac{1}{4}$	2'	2'		
14"				4'	4'
14"	90°	5'	5'		
14"	45°	3'-6"	3'-6"		
14"	$22 \frac{1}{2} \frac{1}{4}$	3'	3'		

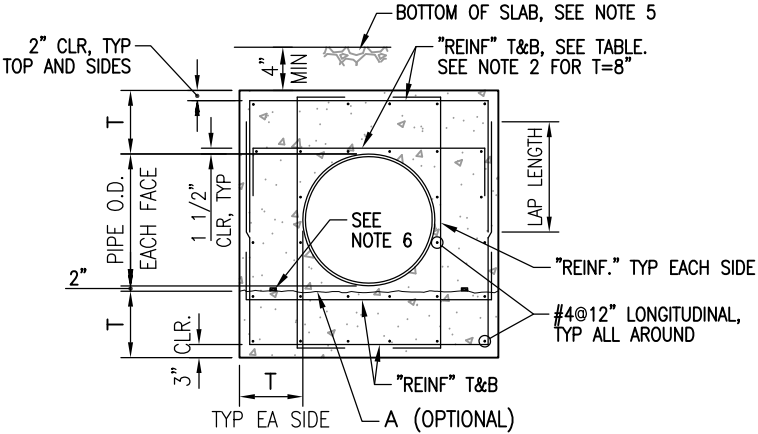
CONSTRUCTION NOTES:

- A UNDISTURBED EARTH.
- B O.D. OF PIPE + 8".
- C O.D. OF CAP OR PLUG, MIN. 12"x12".
- D ONLY FOR EXCEPTIONAL SITUATIONS, USE OF MECHANICAL RESTRAINTS TAKES PRECEDENCE.

REVISIONS	WATER AUTHORITY
	WATER CONCRETE BLOCKING DESIGN
	DWG. 2320 JANUARY 2011

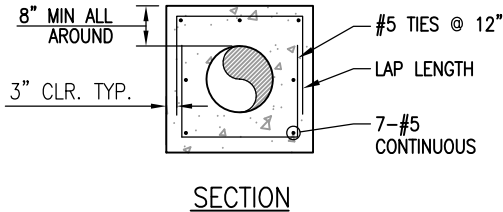
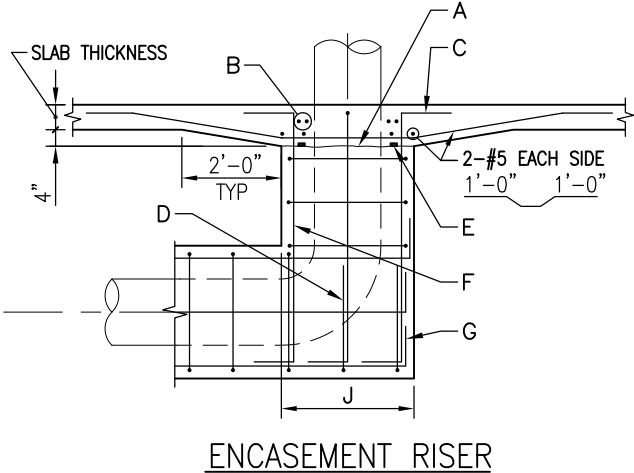
PIPE ENCASEMENT TABLE								
PIPE DIA (IN.)	H=10 FEET		H=20 FEET		H=30 FEET		H=40 FEET	
	T (in)	REINF	T (in)	REINF	T (in)	REINF	T (in)	REINF
20 THRU 30	8	#5@12"	10	#5@12"	10	#5@12"	10	#6@12"
36 THRU 42	10	#5@12"	10	#6@12"	10	#7@12"	10	#6@6"
48 THRU 54	10	#6@12"	10	#7@12"	10	#7@6"	12	#7@6"
UP TO 60	10	#6@12"	10	#6@6"	14	#7@6"	14	#7@6"

DARK LINE INDICATES BREAK BETWEEN ONE LAYER OF REINFORCING AND TWO.
SEE NOTE 2 BELOW.



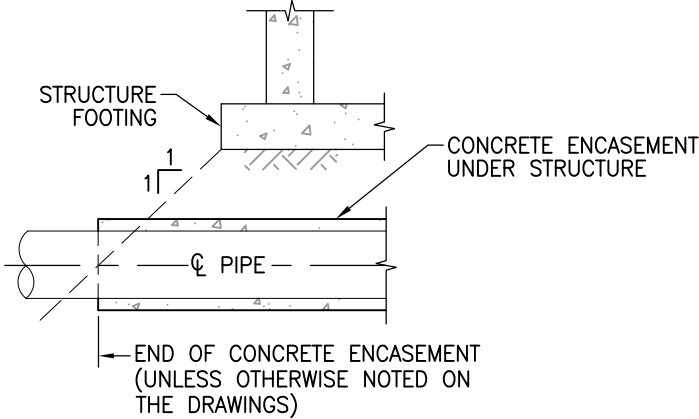
- NOTES:
- THIS DETAIL APPLIES TO PIPE DIAMETERS OF 20" THROUGH 60". FOR $\leq 18"\phi$, SEE DETAIL 2.
 - FOR T=8" REINFORCING SHALL BE ONE LAYER AND CENTERED IN SLABS OR WALLS, SEE DETAIL 2.
 - FOR ENCASEMENT AT PIPE RISER, SEE DETAIL 2.
 - "H" IS FILL HEIGHT OR WATER DEPTH OR COMBINATION ABOVE PIPE.
 - WHEN PIPE ENCASEMENT CLOSER THAN 4" TO SLAB ABOVE, TIE SLAB & ENCASEMENT TOGETHER. SEE DETAIL 3.
 - HYDROPHILIC WATERSTOP CONTINUOUS ALL AROUND IN ALL CONSTRUCTION JOINTS.
 - EXTEND PIPE ENCASEMENT BEYOND STRUCTURE PER DETAIL 4.

DETAIL 1
PIPE ENCASEMENT (20"φ-60"φ)

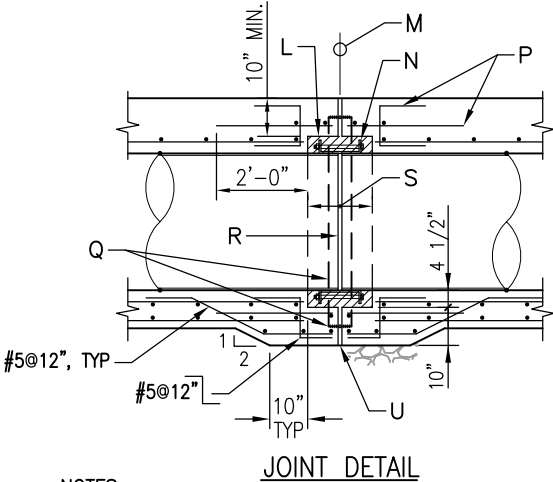
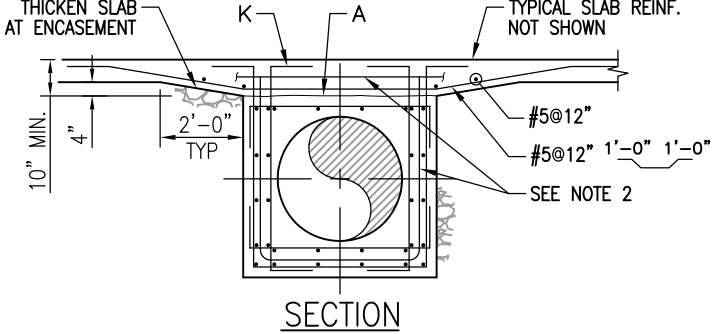


- NOTES:
- SECTION APPLIES TO PIPES $\leq 18"\phi$. FOR $\geq 20"\phi$, SEE DETAIL 1.
 - WHEN PIPE ENCASEMENT IS CLOSER THAN 4" TO SLAB ABOVE, TIE SLAB AND ENCASEMENT TOGETHER. SEE DETAIL 3.
 - EXTEND PIPE ENCASEMENT BEYOND STRUCTURE PER DETAIL 4.

DETAIL 2
PIPE ENCASEMENT ($\leq 18"\phi$)



DETAIL 4
END OF PIPE ENCASEMENT
UNDER STRUCTURES



- NOTES:
- TIE PIPE ENCASEMENT TO SLAB AS SHOWN WHEN DISTANCE BETWEEN PIPE ENCASEMENT AND BOTTOM OF SLAB IS LESS THAN 4".
 - 6" PLASTIC WS IN ENCASEMENT JOINTS. WELD TO WS IN SLAB JOINTS.
- EXTEND PIPE ENCASEMENT BEYOND STRUCTURE PER DETAIL 4.

DETAIL 3
PIPE ENCASEMENT AT SLAB

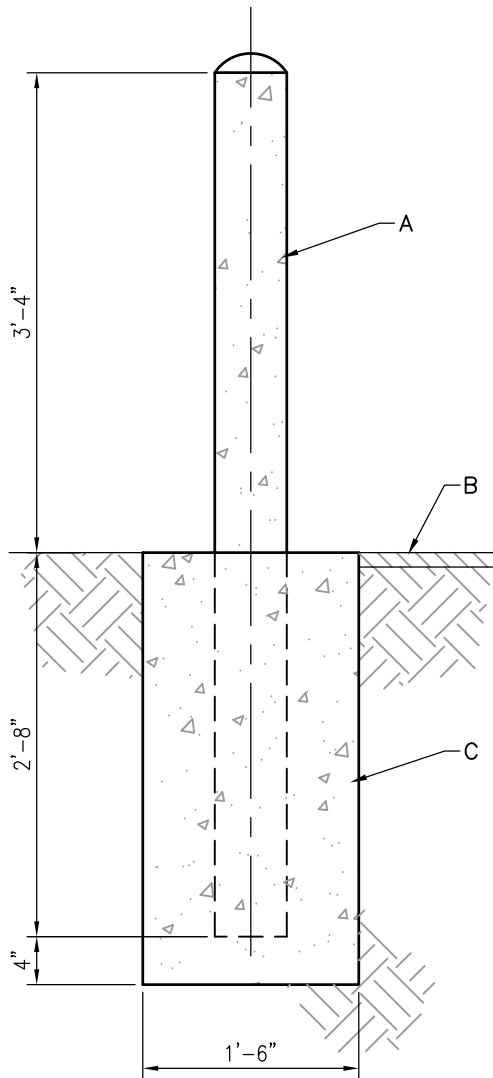
CONSTRUCTION NOTES

- CONSTRUCTION JOINT
- TYPICAL OPENING REINF. AROUND PIPE
- EXTEND ENCASEMENT VERTS. AND BEND 1'-0" INTO TOP OF SLAB
- BOTTOM "U" SECTION OF TIES CONT. TO END OF ENCASEMENT
- HYDROPHILIC WATERSTOP CONTINUOUS ALL AROUND IN ALL CONSTRUCTION JOINTS.
- TYPICAL PIPE ENCASEMENT REINF.
- BEND & LAP PIPE ENCASEMENT REINF. 1'-0", TYP
- PROVIDE LEVEL BEARING AREA BELOW VERT. PIPE RISER EQUAL TO ENCASEMENT GROSS END AREA
- PIPE ENCASEMENT REINF. SEE DETAILS 1 AND 2. EXTEND VERTS. AND BEND 1'-0" INTO TOP OF SLAB ABOVE.
- CLOSED CELLULAR SPONGE RUBBER ALL AROUND COUPLING TO ALLOW JT MOVEMENT (1" MIN)
- CL SLAB EXP, CONTRACTION OR CONTROL JT, SEE PLANS FOR LOCATION & JT TYPE
- LOCATE PIPE FLEX COUPLING (WITHOUT THRUST TIES) AT ALL SLAB EXPANSION & CONTROL JOINTS
- #5@12" TYPICAL ENCASEMENT REINF. DISCONTINUOUS AT JOINT
- 6" PLASTIC WATERSTOP IN ENCASEMENT JOINT. WELD TO WATERSTOP IN SLAB JOINT FOR CONTINUOUS SEAL
- PIPE JOINT CENTERED ON SLAB JOINT
- COUPLING LENGTH +6"
- ENCASEMENT JOINT TYPE SAME AS SLAB JOINT, SEE SLAB JOINT DETAILS

REVISIONS	WATER AUTHORITY
	WATER CONCRETE ENCASEMENT DETAILS
	DWG. 2321 JAN. 2013

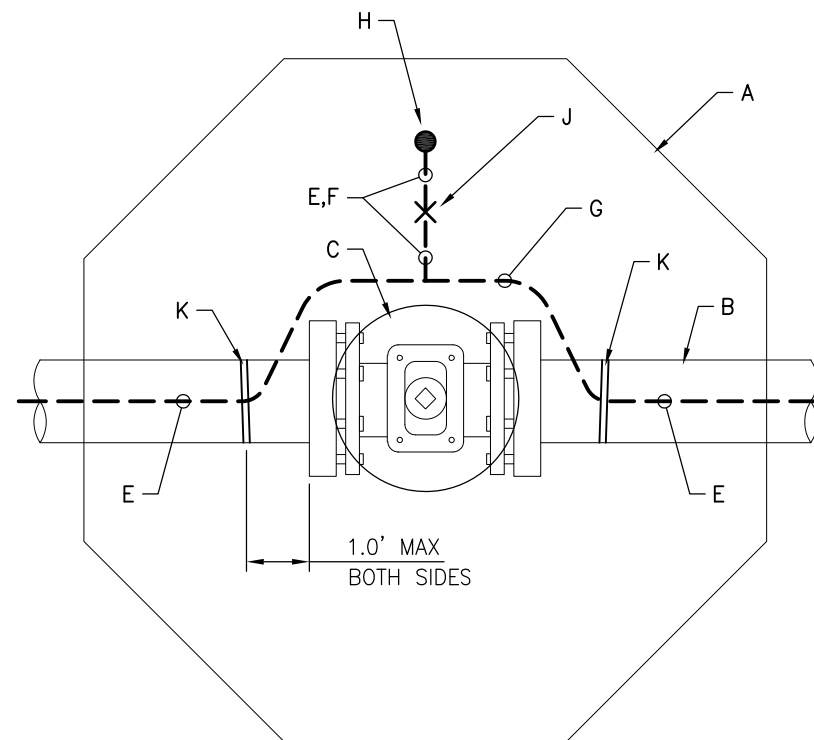
CONSTRUCTION NOTES

- A. 6"Ø SCHEDULE 40 GALVANIZED STEEL PIPE. 6' LONG, FILLED WITH CONCRETE. EXPOSED STEEL SHALL BE PAINTED WITH AN OIL BASE ALKYD PRIMER AND AN OIL BASE ALKYD ENAMEL TOP COAT. COLOR SHALL BE "SAFETY YELLOW".
- B. PAVEMENT, OR FINISHED GRADE.
- C. 18"Ø CONCRETE FOOTING, SEC. 101 EXTERIOR CONCRETE, f'c=3000 PSI AT 28 DAYS, WITH SMOOTH OR BROOM FINISH WHEN ADJACENT TO PAVEMENT.

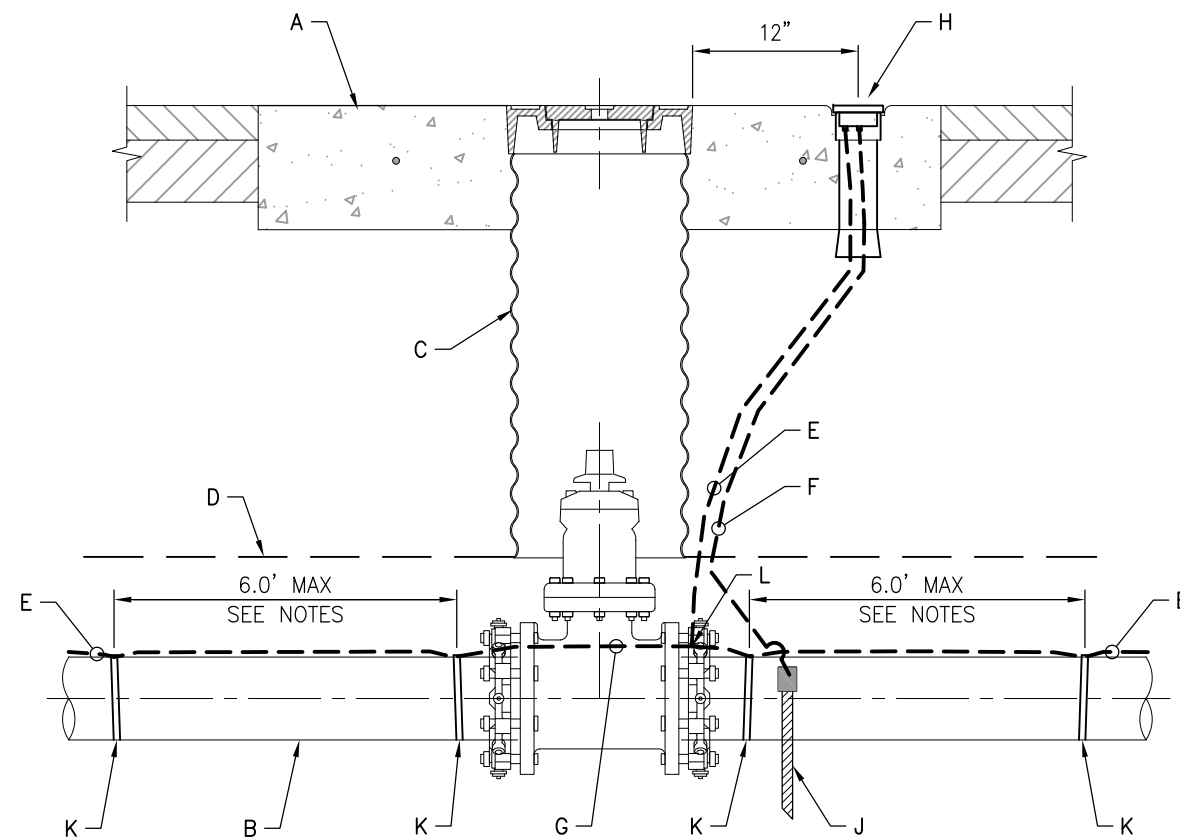


SECTION

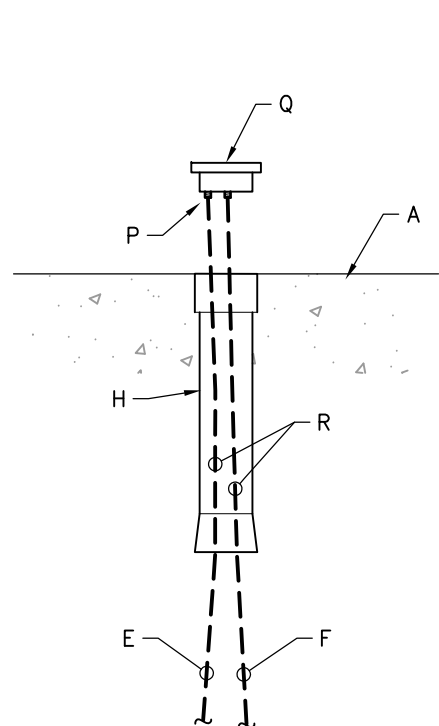
REVISIONS	WATER AUTHORITY
APR. 2015	WATER STATIONARY GUARD POST DETAIL
	DWG. 2322 JAN. 2013



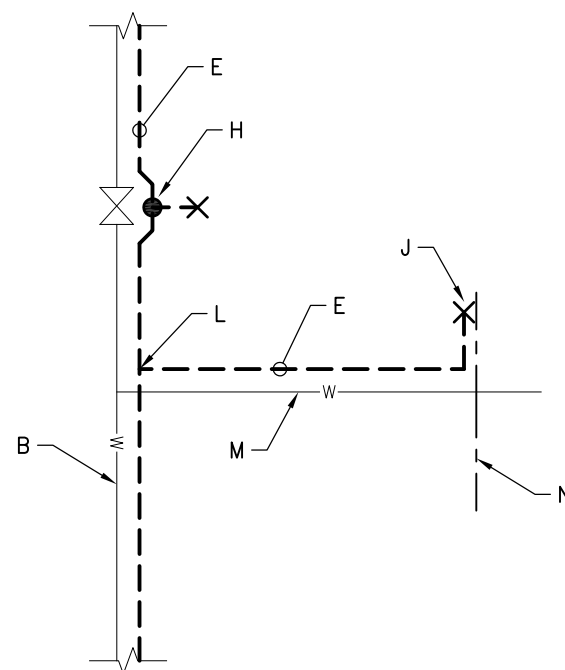
WATER VALVE – PLAN VIEW
NOT TO SCALE



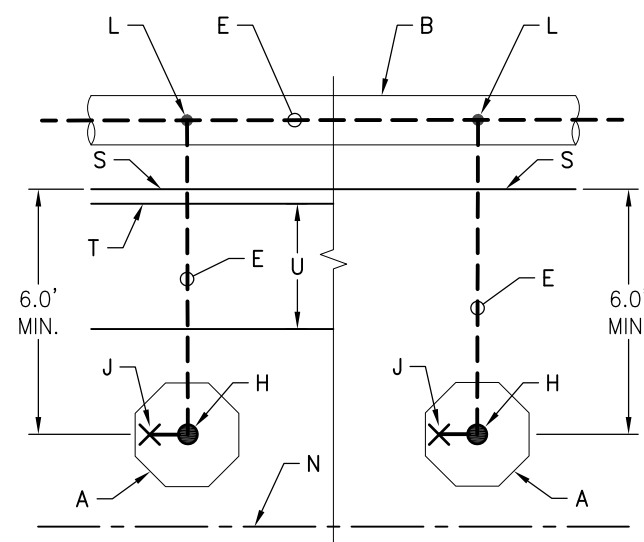
WATER VALVE – SECTION VIEW
NOT TO SCALE



TEST STATION – SECTION VIEW
NOT TO SCALE



TRACE WIRE SAMPLE PLAN
(WATER MAIN LINE WITHOUT HYDRANTS)
NOT TO SCALE



STAND ALONE TEST STATION TRACE WIRE DETAIL
NOT TO SCALE

GENERAL NOTES

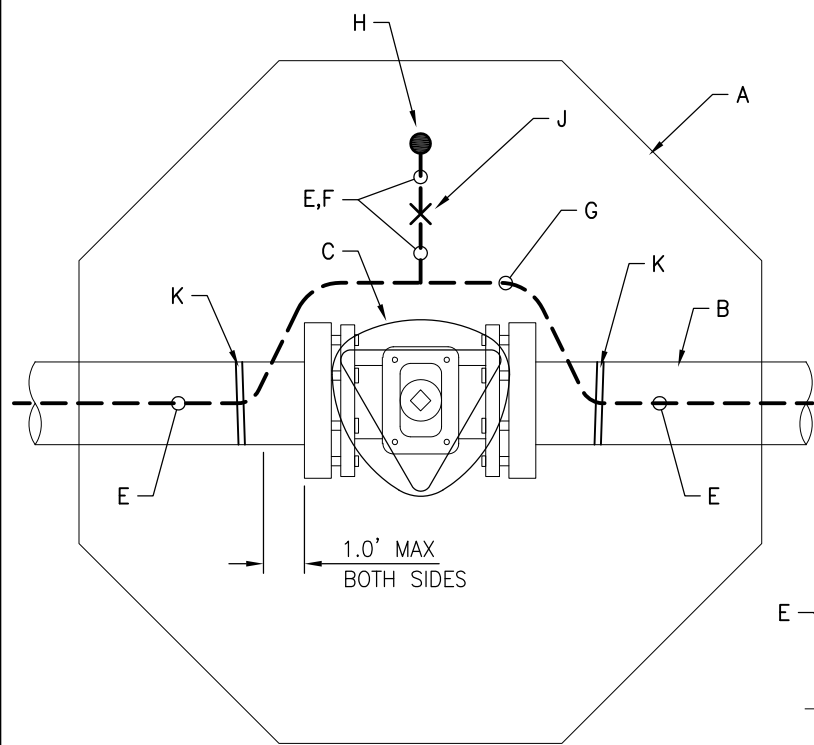
1. WATER VALVE WITH TEST STATION SHALL ONLY BE USED IN AREAS THAT DO NOT HAVE ADEQUATE FIRE HYDRANT SPACING TO PROVIDE TEST STATIONS EVERY 1000'. IF FIRE HYDRANTS ARE ADEQUATELY SPACED, REFER TO STANDARD DRAWING 2342.
2. TRACE WIRE SHOWN AWAY FROM PIPE FOR CLARITY. TRACE WIRE SHALL BE INSTALLED ON TOP OF PIPE AS SHOWN IN SECTION A-A, ON STANDARD DRAWING 2302.
3. TRACE WIRE SHALL BE FASTENED TO THE TOP OF PIPE WITH TAPE OR PLASTIC TIES AT 6' INTERVALS.
4. TEST STATION CAP AND TRACE WIRE SHALL BE COLOR CODED BLUE (APWA STANDARD).

CONSTRUCTION NOTES

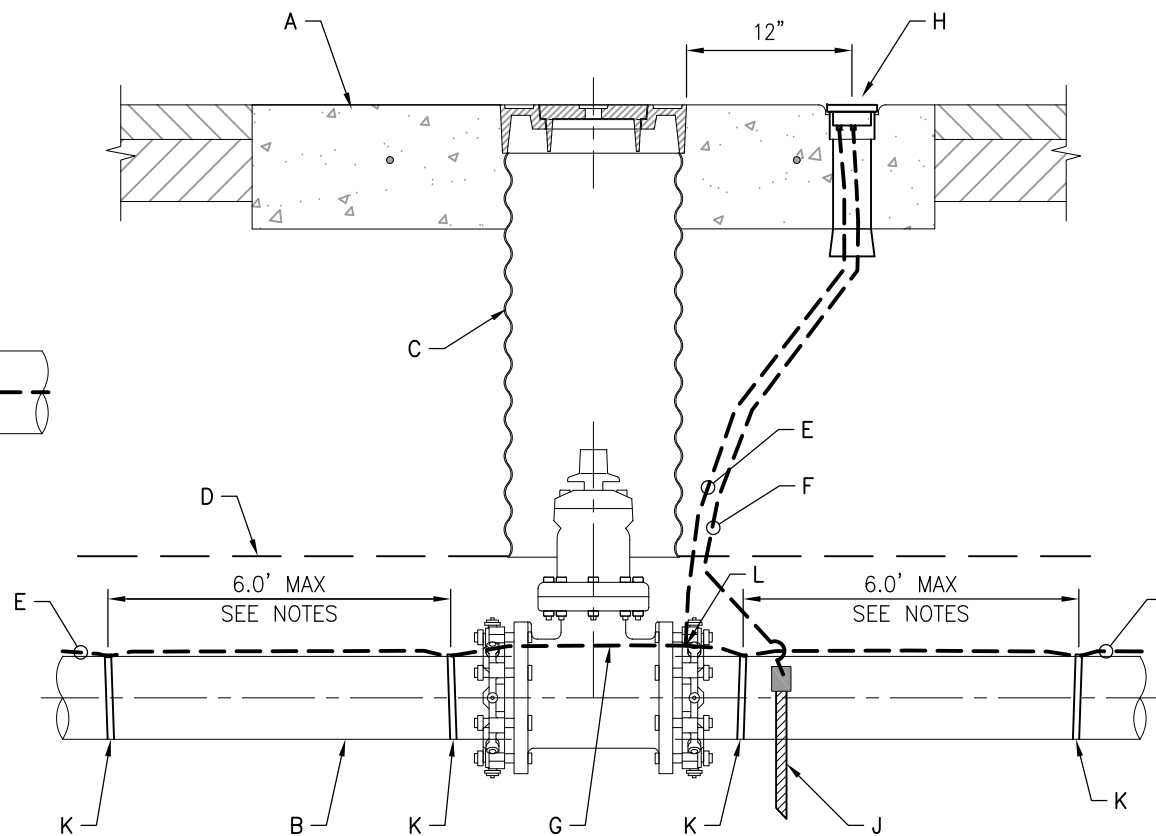
- A. CONCRETE COLLAR PER STANDARD DRAWING 2461
- B. WATER MAIN
- C. VALVE BOX PER STANDARD DRAWINGS 2326 AND 2328
- D. MARKER TAPE
- E. TRACE WIRE #12 AWG COPPER CLAD STEEL – BLUE (SEE SECTION A-A ON STANDARD DRAWING 2302)
- F. TRACE WIRE #12 AWG COPPER CLAD STEEL – RED FACTORY CONNECTED TO GROUNDING ANODE.
- G. TRACE WIRE SHALL BE ROUTED AROUND VALVES ON THE NORTH OR EAST SIDE
- H. TEST STATION ACCESS BOX WITH BLUE COLOR CODED (APWA STANDARD) CAP. INSTALL IN CONCRETE COLLAR, ON NORTH OR EAST SIDE OF VALVE. AVOID CONFLICT WITH REBAR RING IN COLLAR. TEST STATIONS SHALL BE INSTALLED APPROXIMATELY 1000' APART. TEST STATIONS SHALL BE APPROPRIATE FOR CAST IN PLACE CONCRETE APPLICATIONS. MAIN TRACE WIRE AND LEAD GROUND TRACE WIRE FROM THE MAGNESIUM GROUNDING ANODE SHALL BE CONTINUOUS TO THE TERMINALS IN THE TEST STATION. TEST STATIONS SHALL BE FLUSH WITH TOP OF CONCRETE TO PREVENT POOLING OF WATER. (SEE TEST STATION SECTION VIEW, THIS SHEET)
- J. DRIVE-IN MAGNESIUM GROUNDING ANODE. INSTALL WITH MINIMUM 1FT HORIZONTAL SEPARATION FROM TEST STATION ACCESS BOX. INSTALL AT DEPTH OF MAIN TRACE WIRE. (SEE ANODE DETAIL, STANDARD DRAWING 2302)
- K. TAPE OR PLASTIC TIE (SEE GENERAL NOTES).
- L. TEE CONNECTION. 3-WAY LOCKING WATERPROOF CONNECTOR. DO NOT CUT MAIN LINE TRACE WIRE. (SEE TEE CONNECTION DETAIL, STANDARD DRAWING 2302)
- M. SERVICE/LATERAL LINE
- N. EDGE OF RIGHT-OF-WAY
- P. TERMINAL JUMPER SHALL REMAIN DISCONNECTED UNDER NORMAL OPERATIONS. THE TERMINALS MAY BE USED TO CONNECT TRACE EQUIPMENT FOR TRACE AND FOR GROUND. THE JUMPER SHALL BE CONNECTED AT THE EXTREME ENDS OF THE AREA TO BE TRACED TO PROPERLY GROUND THAT AREA. THE TERMINAL JUMPER SHALL BE DISCONNECTED WHEN TRACE IS COMPLETED.
- Q. 2-TERMINAL BLUE COLOR CODED CAP (APWA STANDARD) APPROPRIATE FOR CAST IN PLACE CONCRETE APPLICATIONS
- R. LEAVE 6 INCHES OF EXCESS SLACK RED AND BLUE TRACE WIRE INSIDE TEST STATION ACCESS BOX.

- S. EDGE OF PAVEMENT
- T. CURB
- U. SIDEWALK

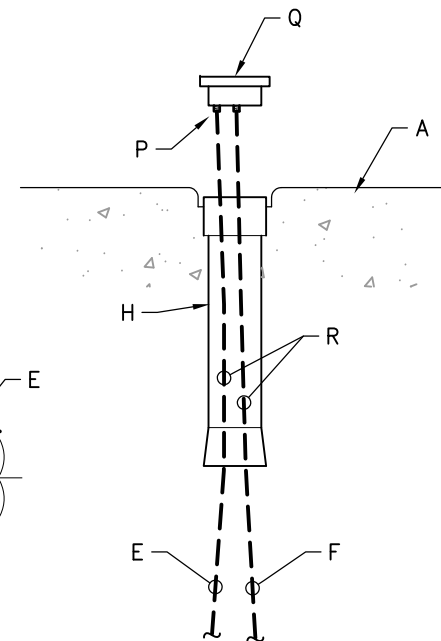
REVISIONS	WATER AUTHORITY
SEP. 2017	WATER TRACE WIRE SAMPLE PLAN AND DETAILS FOR WATERLINES WITHOUT FIRE HYDRANTS
	DWG. 2324 AUG. 2019



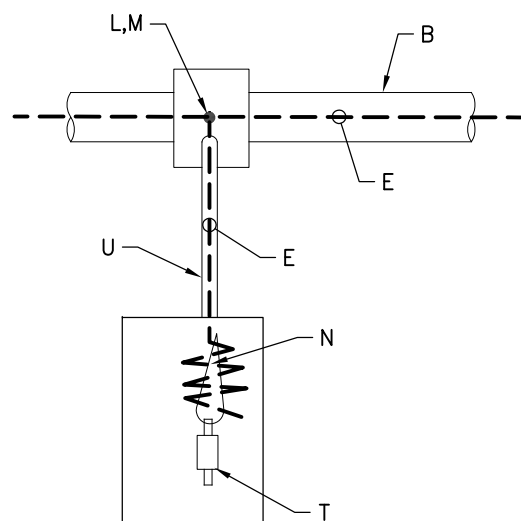
NON-POTABLE WATER VALVE – PLAN VIEW
NOT TO SCALE



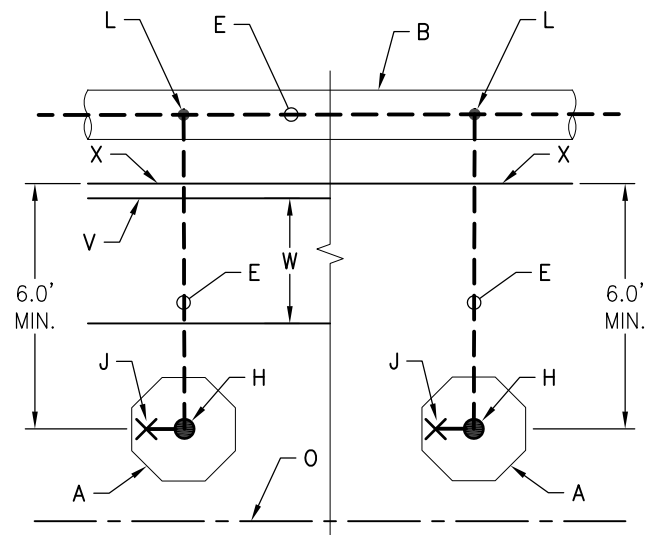
NON-POTABLE WATER VALVE – SECTION VIEW
NOT TO SCALE



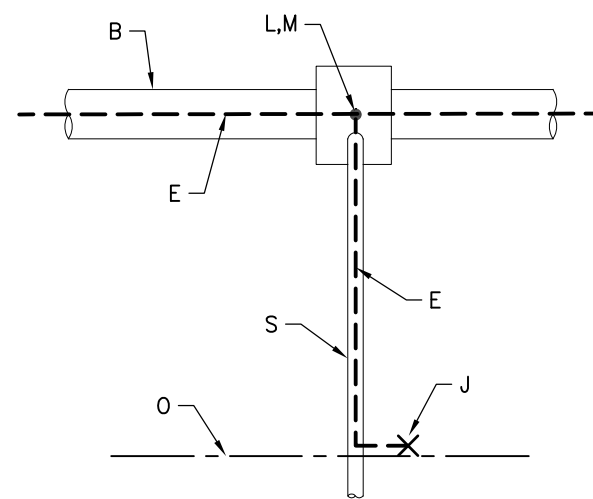
TEST STATION – SECTION VIEW
NOT TO SCALE



NON-POTABLE WATER
SERVICE TRACE WIRE DETAIL
NOT TO SCALE



STAND ALONE TEST STATION
TRACE WIRE DETAIL
NOT TO SCALE



NON-POTABLE WATER
LATERAL TRACE WIRE DETAIL
NOT TO SCALE

NOTE:

- THIS DETAIL IS TO BE USED WHERE NON-POTABLE WATER LINE CROSSES RIGHT-OF-WAY LINE WITHOUT NON-POTABLE WATER METER. ALL LINES SHALL BE TRACED TO RIGHT-OF-WAY WITH GROUNDING ANODE AT RIGHT-OF-WAY.

GENERAL NOTES

- TRACE WIRE SHALL BE INSTALLED ON TOP OF PIPE AS SHOWN ON SECTION A-A ON STANDARD DRAWING 2303.
- TRACE WIRE SHALL BE FASTENED TO NON-PEX PIPE WITH TAPE OR PLASTIC TIES AT 6' INTERVALS.
- ATTACH TRACE WIRE TO PEX SERVICE LINES WITH PLASTIC (ZIP) TIES. DO NOT USE ADHESIVE TAPE ON PEX SERVICE LINES.
- TEST STATIONS SHALL BE VISIBLE FROM ROAD.
- TEST STATION CAP AND TRACE WIRE SHALL BE COLOR CODED PURPLE (APWA STANDARD).

CONSTRUCTION NOTES

- CONCRETE COLLAR PER STANDARD DRAWING 2461
- NON-POTABLE WATER MAIN
- VALVE BOX PER STANDARD DRAWINGS 2326 AND 2330
- MARKER TAPE
- TRACE WIRE #12 AWG COPPER CLAD STEEL – PURPLE (SEE SECTION A-A ON STANDARD DRAWING 2303)
- TRACE WIRE #12 AWG COPPER CLAD STEEL – RED FACTORY CONNECTED TO GROUNDING ANODE.
- TRACE WIRE SHALL BE ROUTED AROUND VALVES ON THE NORTH OR EAST SIDE
- TEST STATION ACCESS BOX WITH PURPLE COLOR CODED (APWA STANDARD) CAP SHALL BE INSTALLED IN CONCRETE COLLAR, ON NORTH OR EAST SIDE OF VALVE. AVOID CONFLICT WITH REBAR RING IN COLLAR. TEST STATIONS SHALL BE INSTALLED APPROXIMATELY 1000' APART. TEST STATIONS SHALL BE APPROPRIATE FOR CAST IN PLACE CONCRETE APPLICATIONS. MAIN TRACE WIRE AND LEAD GROUND TRACE WIRE FROM THE MAGNESIUM GROUNDING ANODE SHALL BE CONTINUOUS TO THE TERMINALS IN THE TEST STATION. TEST STATIONS SHALL BE FLUSH WITH TOP OF CONCRETE TO PREVENT POOLING OF WATER. (SEE TEST STATION SECTION VIEW, THIS SHEET)
- DRIVE-IN MAGNESIUM GROUNDING ANODE. INSTALL WITH MINIMUM 1FT HORIZONTAL SEPARATION FROM TEST STATION ACCESS BOX. INSTALL AT DEPTH OF MAIN TRACE WIRE. (SEE ANODE DETAIL, STANDARD DRAWING 2303)
- TAPE OR PLASTIC TIE (SEE GENERAL NOTES).
- TEE CONNECTION. 3-WAY LOCKING WATERPROOF CONNECTOR. DO NOT CUT MAIN LINE TRACE WIRE. (SEE TEE CONNECTION DETAIL, STANDARD DRAWING 2303)
- FOR TAPPING PERMITS – IF TRACE WIRE EXISTS ON MAIN LINE, INSTALL TRACE WIRE ON NON-POTABLE WATER LATERAL AND CONNECT TO MAIN LINE TRACE WIRE WITH 3-WAY LOCKING WATERPROOF CONNECTOR (SEE TEE CONNECTION DETAIL, STANDARD DRAWING 2303)
- TRACE WIRE WITH MIN. 3' OF SLACK SECURED TO FRONT OF METER SETTER. GROUP AND ZIP-TIE, BUT DO NOT COIL.
- EDGE OF RIGHT-OF-WAY
- TERMINAL JUMPER SHALL REMAIN DISCONNECTED UNDER NORMAL OPERATIONS. THE TERMINALS MAY BE USED TO CONNECT TRACE EQUIPMENT FOR TRACE AND FOR GROUND. THE JUMPER SHALL BE CONNECTED AT THE EXTREME ENDS OF THE AREA TO BE TRACED TO PROPERLY GROUND THAT AREA. THE TERMINAL JUMPER SHALL BE DISCONNECTED WHEN TRACE IS COMPLETED.

- 2-TERMINAL PURPLE COLOR CODED CAPS (APWA STANDARD) APPROPRIATE FOR CAST IN PLACE CONCRETE APPLICATIONS
- COIL 2' OF EXTRA RED AND PURPLE TRACE WIRE INSIDE TEST STATION
- NON-POTABLE LATERAL
- NON-POTABLE METER
- NON-POTABLE SERVICE
- CURB
- SIDEWALK
- EDGE OF PAVEMENT

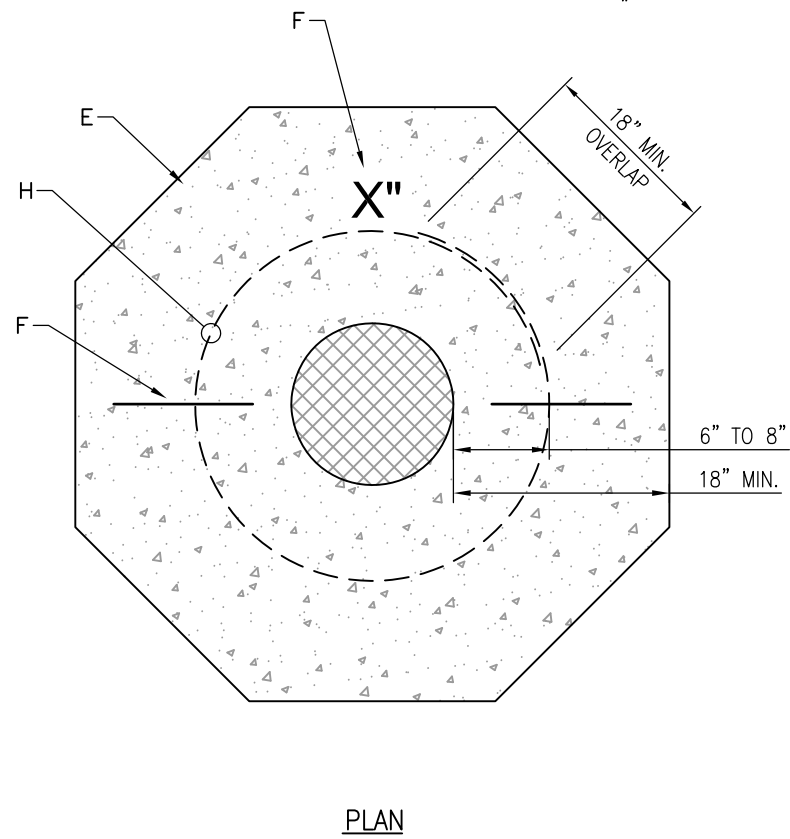
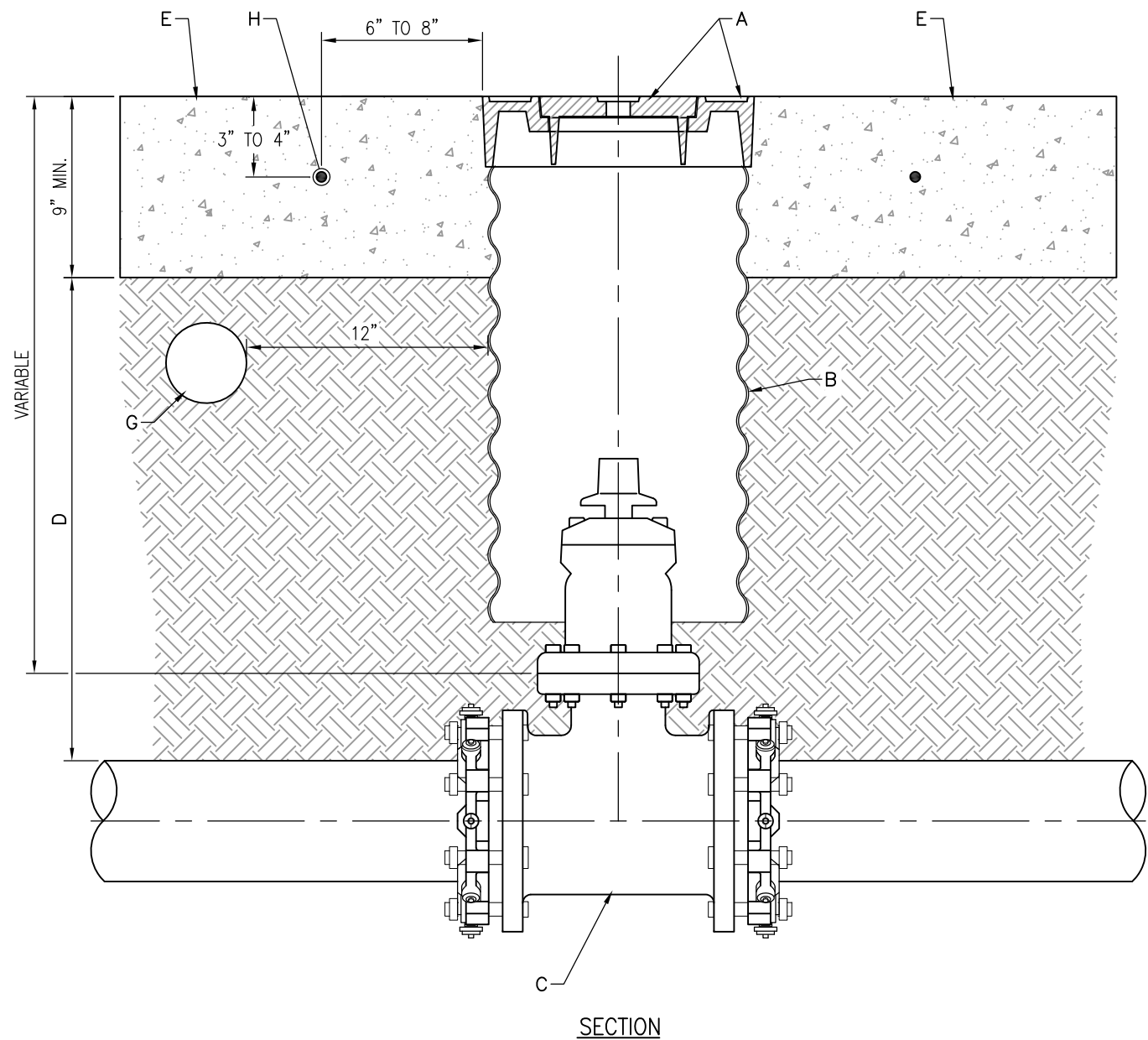
REVISIONS	WATER AUTHORITY
SEP. 2017	NON-POTABLE WATER LATERAL AND VALVE TRACE WIRE DETAILS
	DWG. 2325
	AUG. 2019

GENERAL NOTES

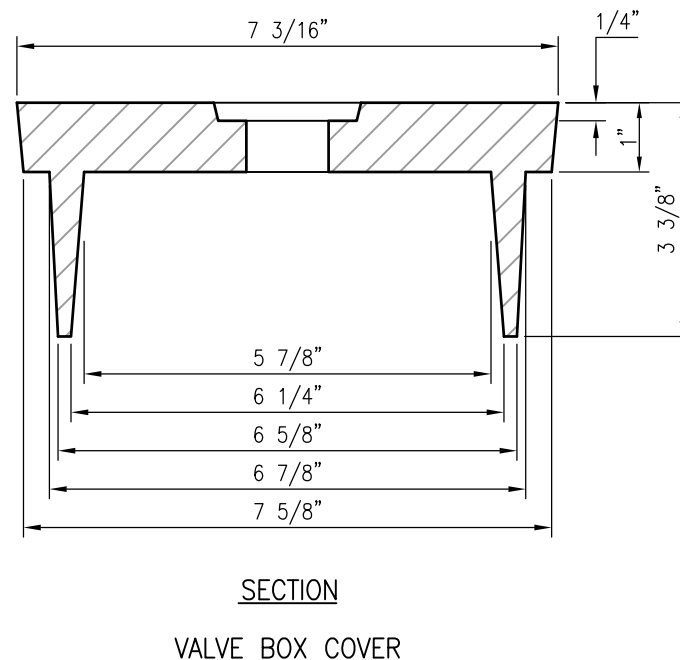
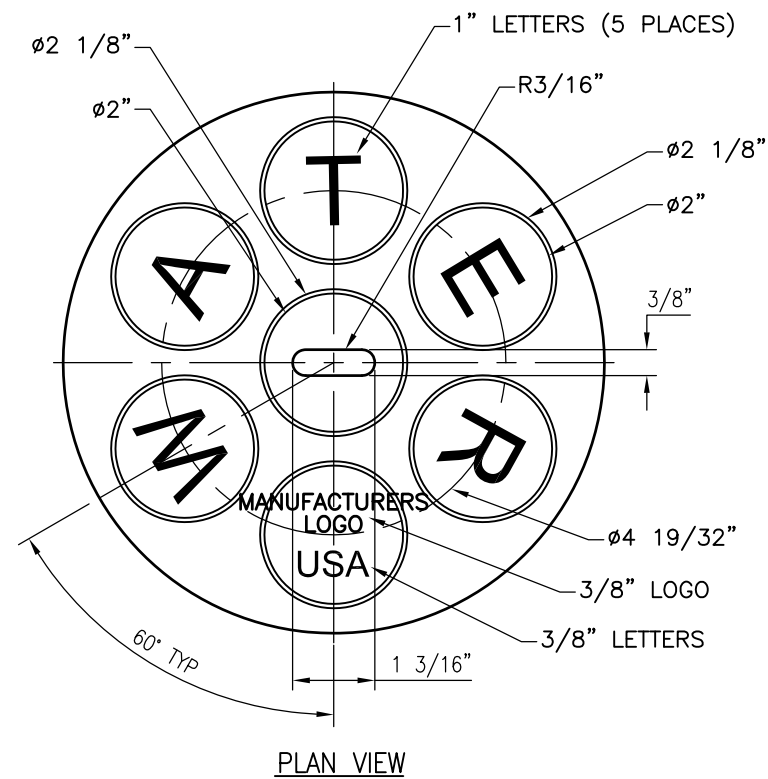
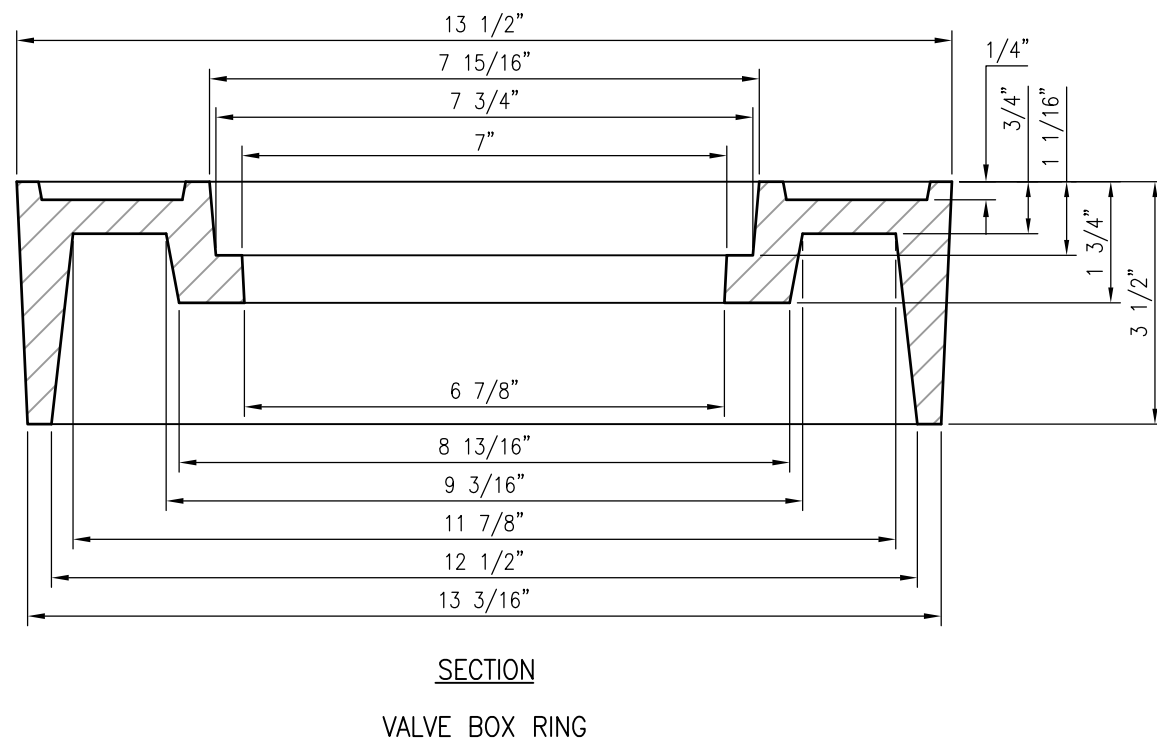
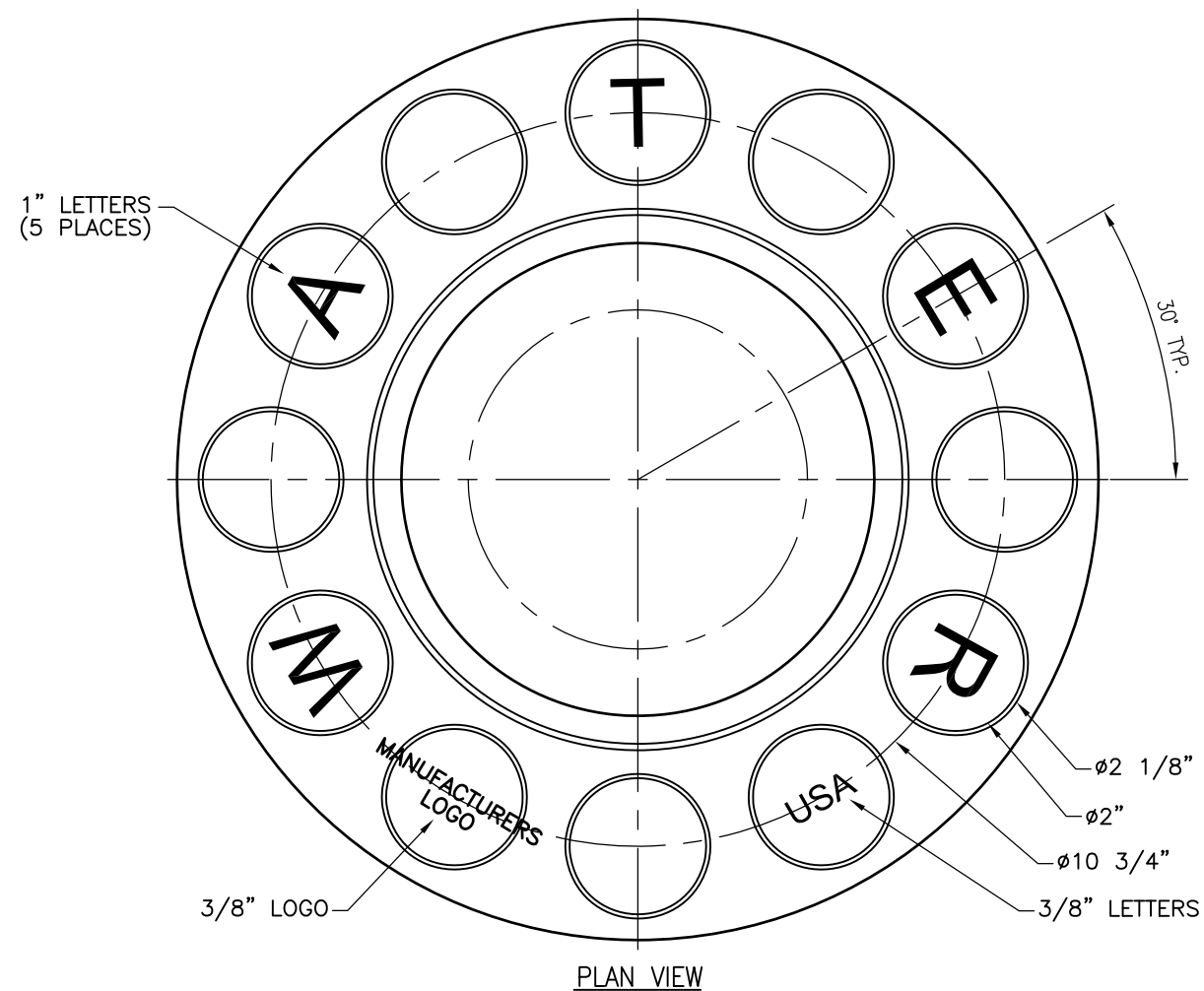
1. LABEL REQUIREMENTS: BEFORE THE WORK WILL BE ACCEPTED, WATER VALVE GPS COORDINATES SHALL BE PROVIDED ON THE RECORD DRAWINGS. GPS COORDINATES OBTAINED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF NEW MEXICO SHALL BE TAKEN AT THE VALVE OPERATING NUT. USE THE NAD 1983 NM STATE PLANE CENTRAL ZONE FOR X AND Y COORDINATES AND NAVD 1988 FOR Z COORDINATE.

CONSTRUCTION NOTES

- A. RING AND COVER FOR VALVE BOX PER STANDARD DRAWING 2328. INSTALL FIRE LINE RING AND COVER ON FIRE LINES PER STANDARD DRAWING 2329, AND NON-POTABLE RING AND COVER ON NON-POTABLE LINES PER DRAWING 2330.
- B. 12" DIAMETER POLYMER COATED STEEL PIPE CMP
- C. NEW OR EXISTING VALVE
- D. COMPACTED BACKFILL. SOIL OR BASE COURSE MATERIAL (95% COMPACTION). SEE SECTION 701
- E. CONCRETE COLLAR PER STANDARD DRAWING 2461.
f'c = 4000 psi
- F. TOP OF CONCRETE COLLAR SHALL BE STAMPED WITH WATERLINE SIZE AND DIRECTION. MINIMUM LETTER SIZE SHALL BE 3" IN HEIGHT. ADD THE LETTERS "NPW" FOR NON-POTABLE WATER VALVE INSTALLATIONS.
- G. ELECTRONIC MARKER DEVICE (EMD), SEE STANDARD SPECIFICATION SECTION 170.
- H. #4 REBAR PER STANDARD DRAWING 2461.



REVISIONS	WATER AUTHORITY
JAN. 2015	WATER VALVE BOX
	DWG. 2326 OCT. 2017



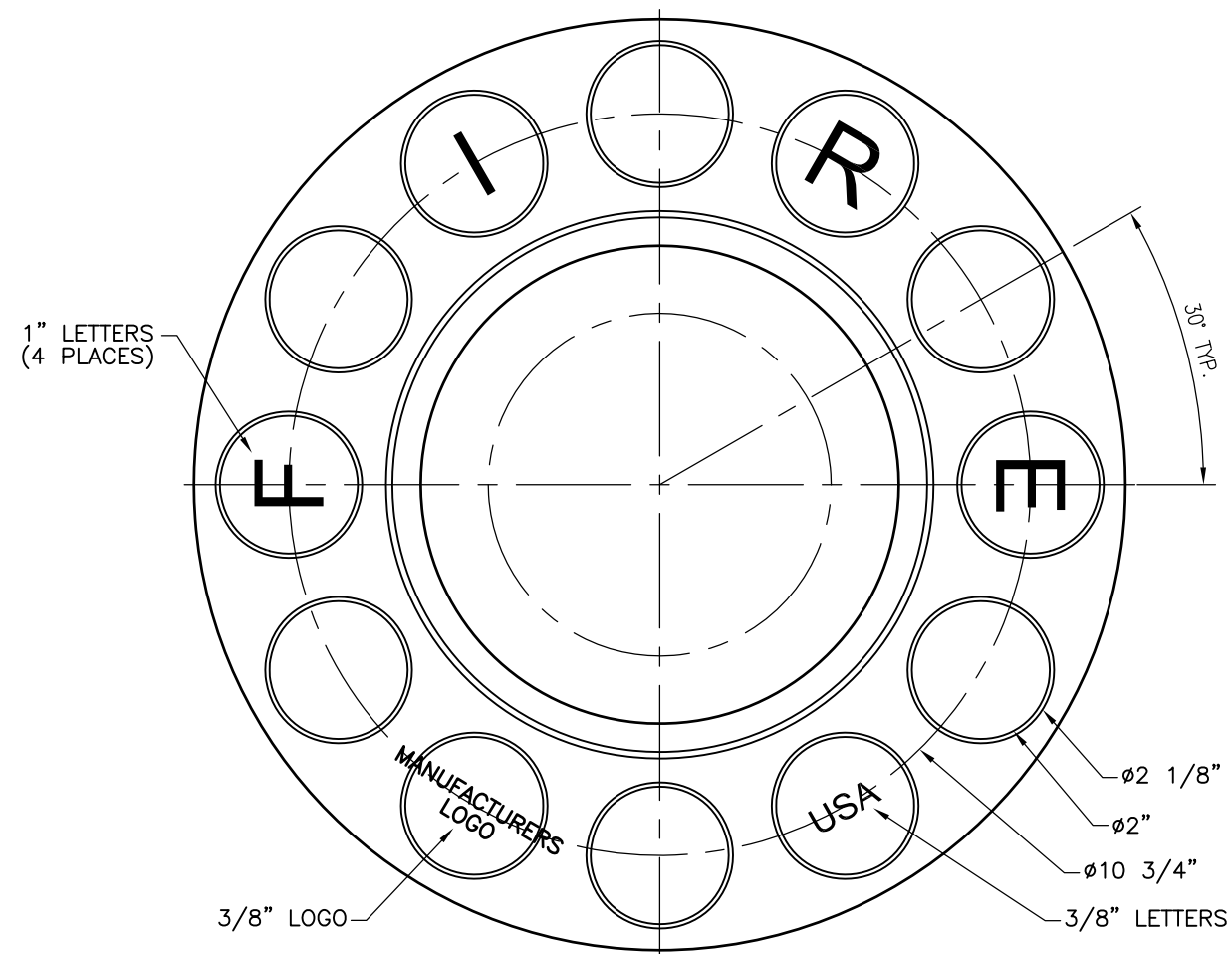
GENERAL NOTES — RING

1. ALBUQUERQUE VALVE BOX RING DESIGNED TO ACCEPT AN ALBUQUERQUE VALVE BOX COVER.
2. THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
3. FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
4. A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
5. FINISH: REMOVE EXCESS IRON AND FINIS.
6. THIS DETAIL DOES NOT APPLY FOR VALVE BOX RING AND COVER TO BE USED ON REUSE OR NON-POTABLE WATER SYSTEMS.
7. SEE STANDARD DRAWING 2329 FOR FIRE LINE RING AND COVER.
8. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

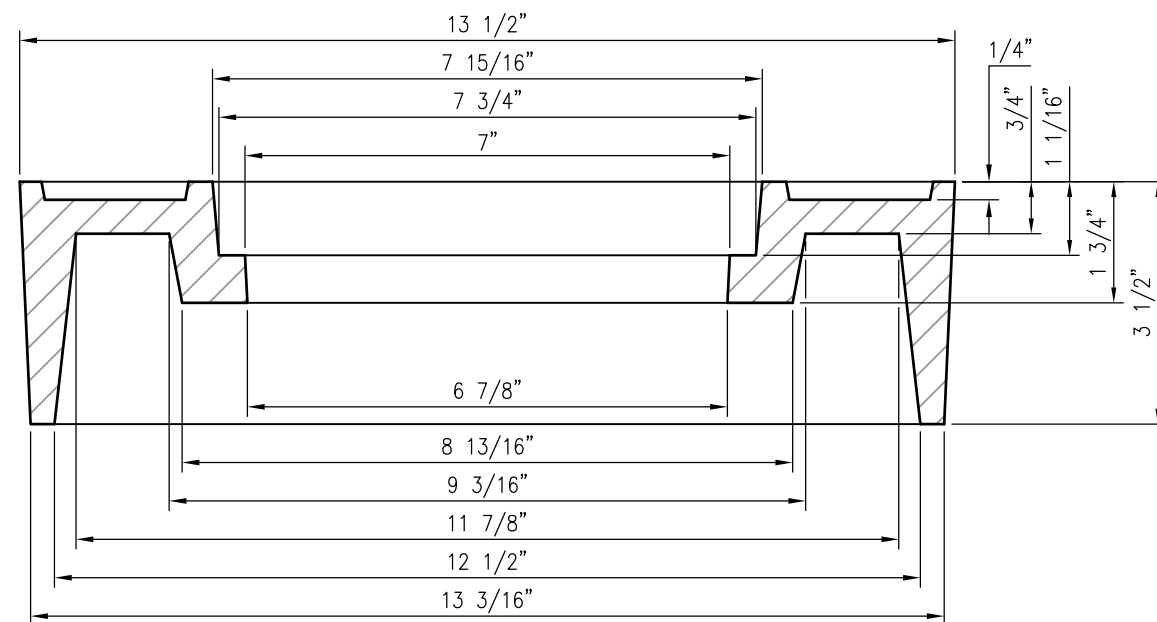
GENERAL NOTES — COVER

1. ALBUQUERQUE VALVE BOX COVER DESIGNED TO FIT INTO AN ALBUQUERQUE VALVE BOX RING.
2. THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
3. FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
4. A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
5. FINISH: REMOVE EXCESS IRON AND FINIS.
6. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

REVISIONS	WATER AUTHORITY
	WATER RING AND COVER FOR VALVE BOX
	DWG. 2328 JAN. 2013

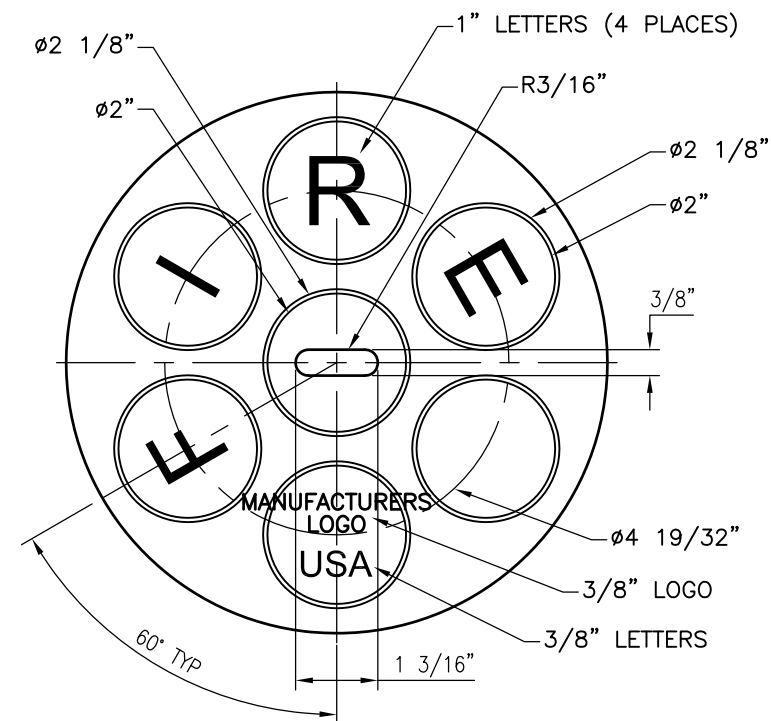


PLAN VIEW

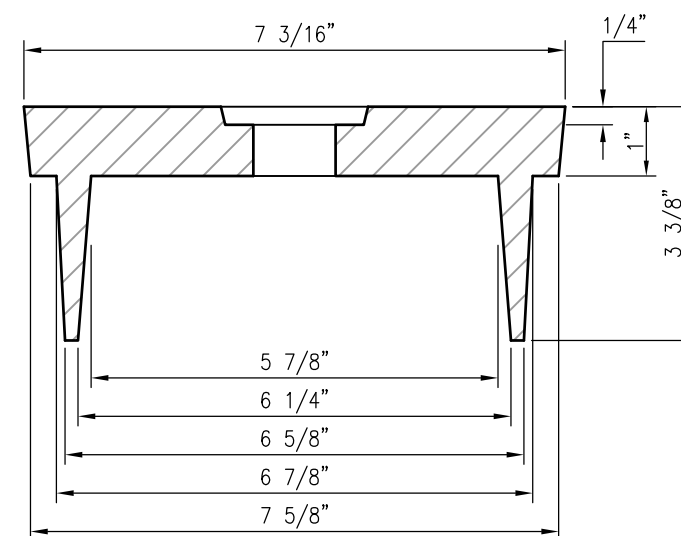


SECTION

VALVE BOX RING



PLAN VIEW



SECTION

VALVE BOX COVER

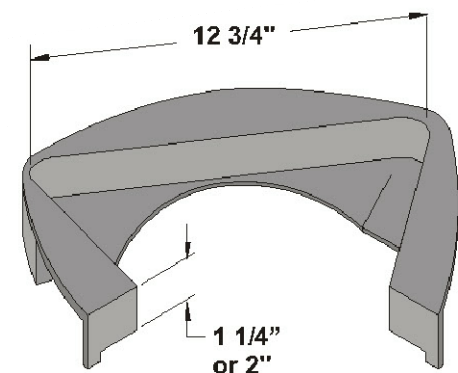
GENERAL NOTES — RING

1. ALBUQUERQUE VALVE BOX RING DESIGNED TO ACCEPT AN ALBUQUERQUE VALVE BOX COVER.
2. THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
3. FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
4. A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
5. FINISH: REMOVE EXCESS IRON AND FINIS.
6. THIS DETAIL DOES NOT APPLY FOR VALVE BOX RING AND COVER TO BE USED ON REUSE OR NON-POTABLE WATER SYSTEMS.
7. SEE STANDARD DRAWING 2328 FOR WATER LINE RING AND COVER.
8. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

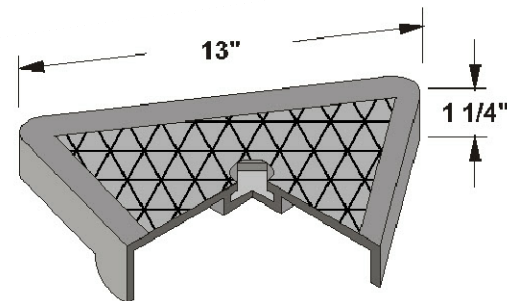
GENERAL NOTES — COVER

1. ALBUQUERQUE VALVE BOX COVER DESIGNED TO FIT INTO AN ALBUQUERQUE VALVE BOX RING.
2. THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
3. FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
4. A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
5. FINISH: REMOVE EXCESS IRON AND FINIS.
6. ONLY PRODUCTS CAST IN THE USA WILL BE ACCEPTABLE.

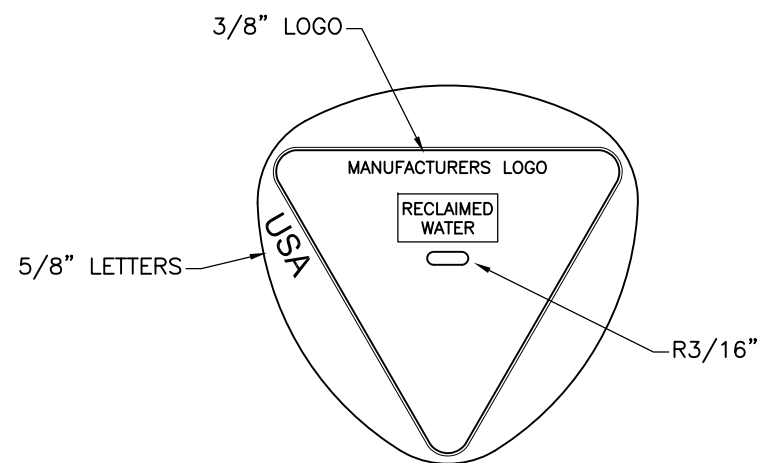
REVISIONS	WATER AUTHORITY
	FIRE LINE RING AND COVER FOR VALVE BOX
	DWG. 2329 JAN. 2011



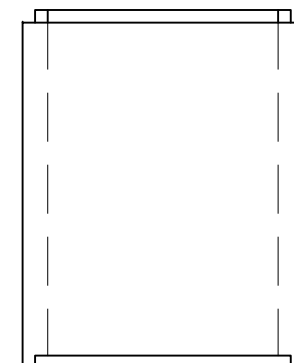
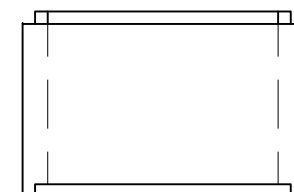
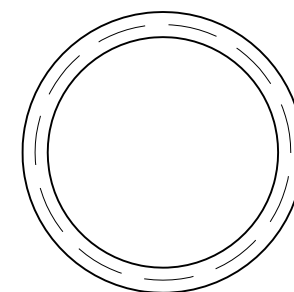
RISER RING



COVER



RING AND COVER ASSEMBLY



CONCRETE EXTENSION

GENERAL NOTES — RING

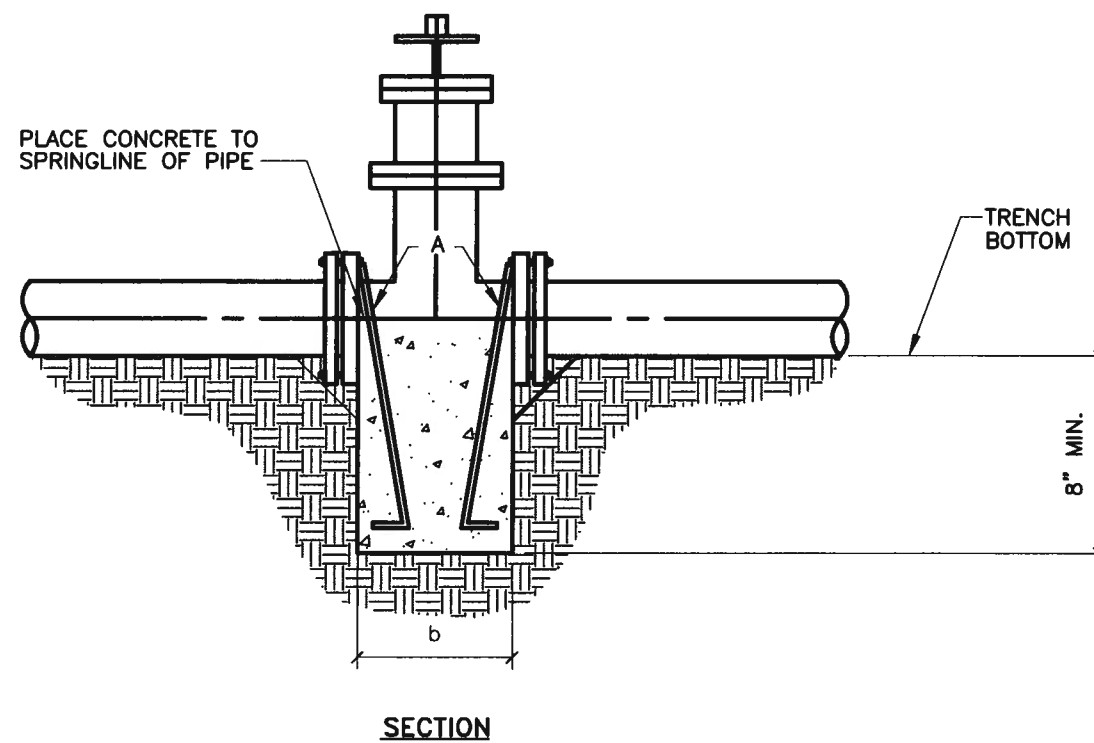
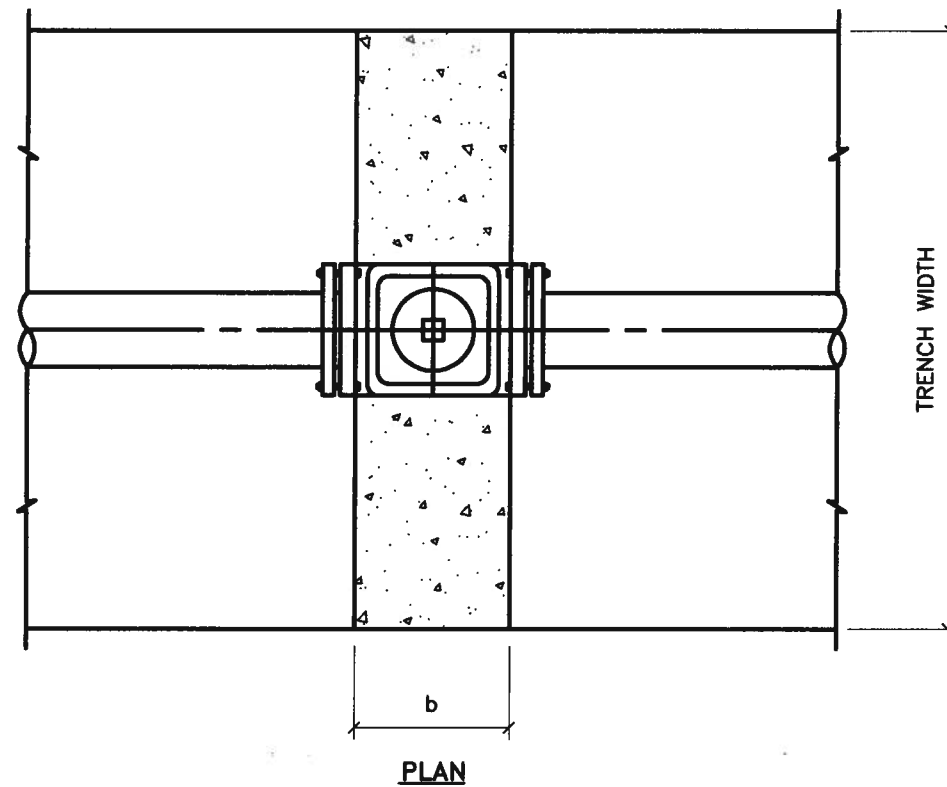
1. VALVE BOX RING DESIGNED TO ACCEPT A VALVE BOX COVER.
2. THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
3. FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
4. A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
5. FINISH: REMOVE EXCESS IRON AND FINIS.
6. THIS DETAIL DOES NOT APPLY FOR VALVE BOX RING AND COVER TO BE USED ON POTABLE WATER SYSTEMS.
7. SEE STANDARD DRAWING 2328 FOR WATER RING AND COVER.
8. ONLY PRODUCTS CAST IN THE USA AND ON THE WATER AUTHORITY APPROVED PRODUCTS LIST WILL BE ACCEPTABLE.

GENERAL NOTES — COVER

1. VALVE BOX COVER DESIGNED TO FIT INTO VALVE BOX RING.
2. THE CASTING NUMBER, MANUFACTURER'S LOGO, DATE OF MANUFACTURE AND "USA" SHALL BE CAST IN A CONSPICUOUS LOCATION ON BOTH THE RING AND THE COVER.
3. FILLETS SHALL BE 1/4"R UNLESS OTHERWISE SPECIFIED.
4. A DRAFT ANGLE OF 3°-5° SHALL BE APPLIED UNLESS OTHERWISE SPECIFIED.
5. FINISH: REMOVE EXCESS IRON AND FINIS.
6. ONLY PRODUCTS CAST IN THE USA AND ON THE WATER AUTHORITY APPROVED PRODUCTS LIST WILL BE ACCEPTABLE.

REULEAUX TRIANGLE

REVISIONS	WATER AUTHORITY
	NON-POTABLE WATER RING AND COVER FOR VALVE BOX
	DWG. 2330 JAN. 2015



GENERAL NOTES:

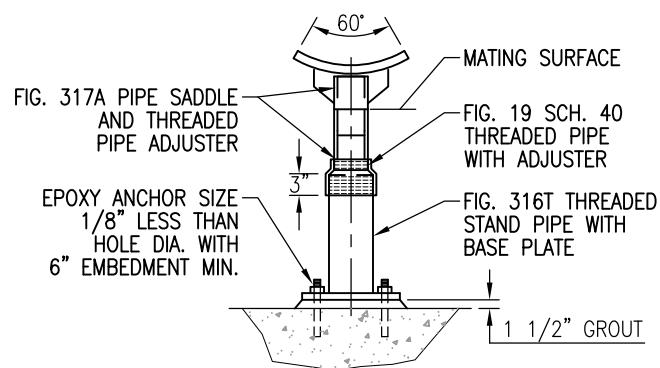
- 1 THE ENGINEER SHALL PROVIDE DESIGN FOR ALL VALVES GREATER THAN 12" AND BUTTERFLY VALVES.
- 2 ALL THRUST CONTROL BY RESTRAINED JOINTS ONLY UNLESS OTHERWISE DIRECTED BY ENGINEER.
- 3 USE FOR VALVE INSERTION INTO EXISTING LINES ONLY.
- 4 CONCRETE USED FOR VALVE ANCHORAGE PER SEC. 101 HYDRAULIC STRUCTURAL CONCRETE, $f'_c=3000$ psi @ 28 DAYS.
- 5 ALL JOINTS ARE TO BE MECHANICALLY RESTRAINED. THE MINIMUM RESTRAINED JOINT LENGTH SHALL BE 5 FEET ON EITHER SIDE OF THE VALVE.
- 6 NOT NEEDED FOR E-Z VALVE OR OTHER VALVE INSERTION THAT DOES NOT CUT THROUGH THE ENTIRE SECTION OF PIPE.
- 7 BEFORE THE WORK WILL BE ACCEPTED, WATER VALVE GPS COORDINATES SHALL BE PROVIDED ON THE RECORD DRAWINGS. GPS COORDINATES OBTAINED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF NEW MEXICO SHALL BE TAKEN AT THE VALVE OPERATING NUT. USE THE NAD 1983 NM STATE PLANE CENTRAL ZONE FOR X AND Y COORDINATES AND NAVD 1988 FOR Z COORDINATE.

CONSTRUCTION NOTES:

- A TWO NO. 4 BARS FOR VALVE STRAPS WITH 3" HOOKS. HOOKS TO BE EMBEDDED BELOW BOTTOM OF PIPE. BARS TO BE COATED WITH BITUMINOUS MATERIAL TO PREVENT CORROSION.

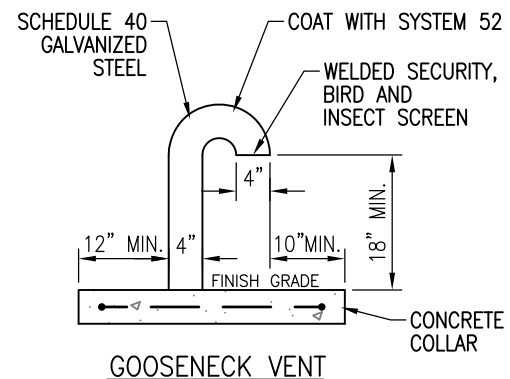
PIPE SIZE	DIM. b
6"	8"
8"	9"
10"	10"
12"	10"

REVISIONS	WATER AUTHORITY
	WATER WATER VALVE INSERTION ANCHORAGE
	DWG. 2333 JANUARY 2011



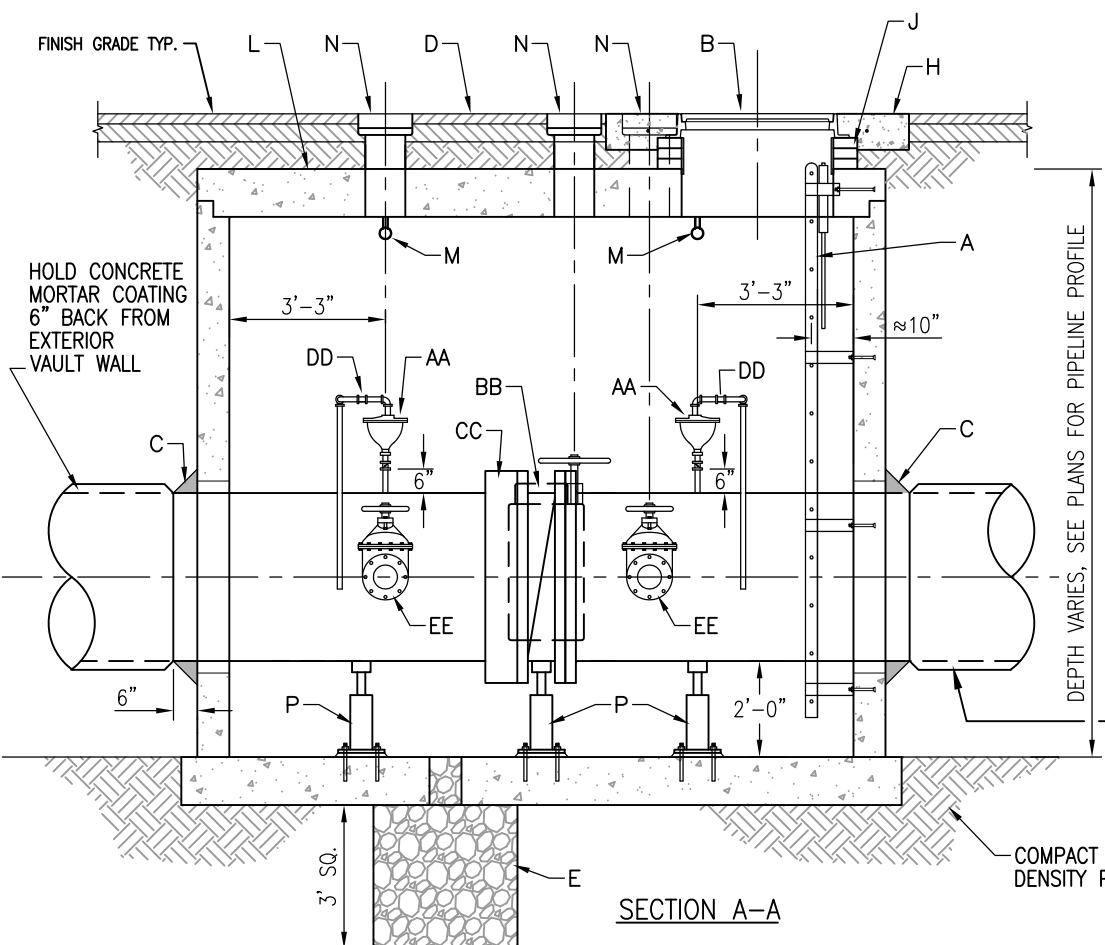
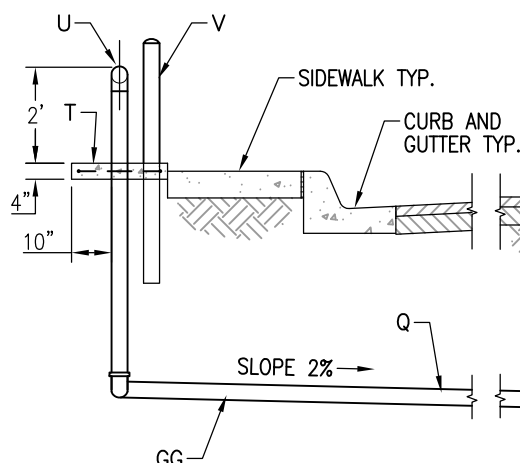
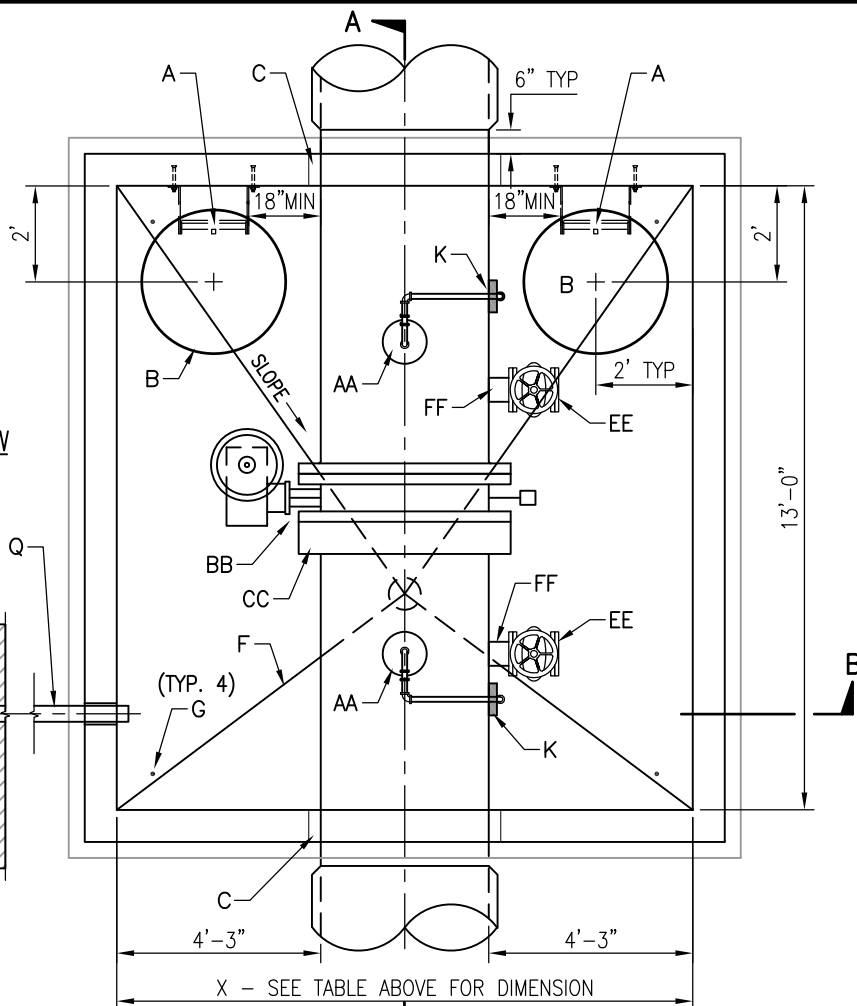
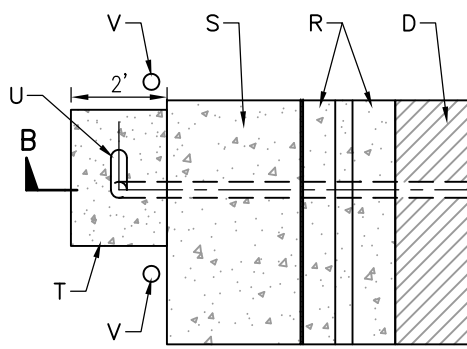
NOTE:
ALL COMPONENTS BY TOLCO OR ENGINEER
APPROVED EQUAL. GALVANIZE AFTER FABRICATION.
DESIGN TO MATCH PIPE OR VALVE DIAMETER.
PROVIDE SHOP DRAWINGS SPECIFIC TO EACH
VALVE AND PIPE SIZE.

PIPE SUPPORT



Ø	X
24"	10'-6"
30"	11'-0"
36"	11'-6"
42"	12'-0"
48"	12'-6"

PLAN VIEW



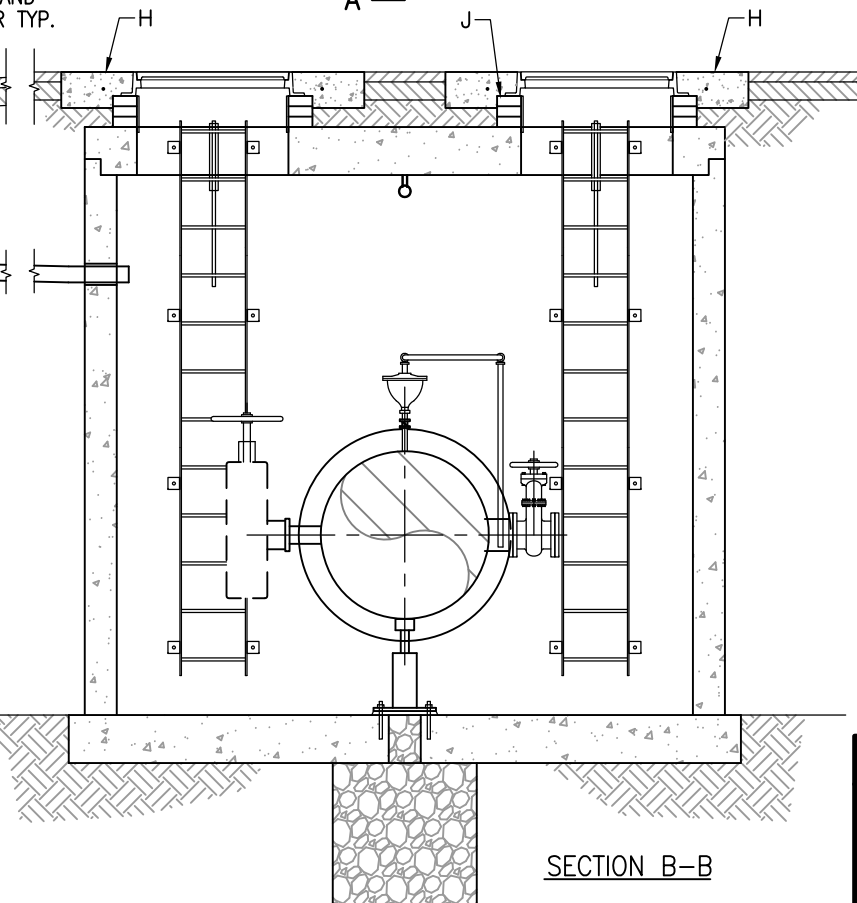
SECTION A-A

ELEVATION VARIES
BASED ON PIPELINE
PROFILE GRADES

FIELD APPLY MORTAR
COATING AFTER PIPE
INSTALLATION

COMPACT TO 95% MAXIMUM
DENSITY PER ASTM D1557

ISOLATION VALVE VAULT



SECTION B-B

GENERAL NOTES

1. VALVE VAULT SHALL NOT BE USED IN GROUND WATER CONDITIONS OR IN CLAY SOILS.
2. BACKFILL MATERIAL SHALL BE CLASS II OR CLASS III IN ACCORDANCE WITH SPECIFICATION SEC. 501.
3. PIPE DIA. VARIES FROM 24" DIA. TO 48" DIA.
4. HOLD CENTERLINE OF TAP LOCATIONS AND CENTER OF BUTTERFLY VALVE.
5. INTERIOR PIPING SHALL BE STEEL PIPE, DUCTILE IRON PIPE, OR CCP.
6. CONCRETE VAULT SHALL BE PRECAST WITH REMOVABLE CONCRETE LID.
7. LOCATE ACCESS MANHOLE FRAME, ADJUSTMENT RINGS AND COVER ON REMOVABLE CONCRETE LID TO ALLOW LID REMOVAL WITH THESE APPURTENANCES IN PLACE.
8. SUBMIT SHOP DRAWINGS OF VAULT, PIPING, AND AIR AND VACUUM VALVE ASSEMBLY PRIOR TO VAULT FABRICATION AND PIPE INSTALLATION.
9. OWNER WILL SELECT PAINT COLORS FOR PIPING AND APPURTENANCES INSIDE VALVE VAULTS.
10. ENGINEER SHALL SUBMIT A PROJECT SPECIFIC DETAIL AND A FLOOR AND PIPING PLAN.

CONSTRUCTION NOTES

- A. 1'-4" ALUMINUM LADDER PER STANDARD DRAWING 2335. INSTALL LADDER-UP SAFETY POST SYSTEM MODEL LU-4 BY BILCO OR ENGINEER APPROVED EQUAL.
- B. 36" DIAMETER MANHOLE FRAME AND COVER MARKED "WATER" PER STANDARD DRAWING 2110.
- C. LINK SEAL, GROUT PENETRATION AROUND EXTERIOR CIRCUMFERENCE.
- D. REMOVE AND REPLACE PAVEMENT.
- E. 4" DIAMETER DRAIN WITH 3'x3'x3" GRAVEL DRAIN POCKET WITH CLEAN GRAVEL, ASTM C33, NO. 57. LINE DRAIN POCKET WITH GEOTEXTILE FABRIC, CLASS 3.
- F. SLOPE VAULT FLOOR TO DRAIN TYPICAL.
- G. RECESSED LIFTING EYE, 4 REQUIRED. FLUSH W/TOP OF CONCRETE LID.
- H. CONCRETE COLLAR PER STANDARD DRAWING 2461.
- J. ADJUSTMENT RINGS PER STANDARD DRAWINGS 2461 AND 2111.
- K. UNISTRUT PIPE BRACKET TYPICAL FOR COMBINATION AIR VALVE VENT. (2 EACH TYPICAL)
- L. TACK COAT.
- M. 1 1/4" STAINLESS STEEL THREADED EYEBOLT, CENTERED ON COMBINATION AIR VALVE ASSEMBLY. 1300 POUNDS LIFT CAPACITY.
- N. RING AND COVER FOR VALVE BOX PER STANDARD DRAWING 2328.
- P. PIPE SUPPORT, SEE DETAIL THIS SHEET.
- Q. COORDINATE VENT PIPE ORIENTATION DURING SHOP DRAWING SUBMITTAL.
- R. REMOVE AND REPLACE CURB AND GUTTER PER STANDARD DRAWING 2415A.
- S. REMOVE AND REPLACE SIDEWALK PER STANDARD DRAWING 2430.
- T. CONCRETE COLLAR WITH 1-#4 REBAR EACH WAY CENTERED. SEE GOOSENECK VENT DETAIL, THIS SHEET.
- U. 4" DIA GOOSENECK VENT. SCHEDULE 40 GALVANIZED STEEL, SEE DETAIL THIS SHEET.
- V. STATIONARY PIPE BOLLARD, SEE STANDARD DRAWING 2250.
- AA. COMBINATION AIR VALVE ASSEMBLY (FL). SIZE PER PLANS. ROUTE AIR RELEASE VENT PIPING AS SHOWN AND SUPPORT WITH UNISTRUT. TERMINATE 3.5' ABOVE FF.
- BB. AWWA C504 BUTTERFLY VALVE (FLxFL) WITH 3" OPERATING NUT AND HANDWHEEL. ORIENT SHAFT HORIZONTAL. VERIFY VALVE ACTUATOR ORIENTATION AND CLEARANCES PRIOR TO PIPE AND VAULT FABRICATION.
- CC. MEGAFLANGE
- DD. UNION TYPICAL, ALL AIR AND VACUUM RELEASE VALVES
- EE. 6" GATE VALVE WITH HANDWHEEL (FLxFL), 2" WELDED OPERATING NUT AND BLIND FLANGE (24" TO 30" PIPING). 8" GATE VALVE WITH HANDWHEEL (FLxFL), 2" WELDED OPERATING NUT AND BLIND FLANGE (36" TO 48" PIPING).
- FF. TAPPING SADDLE OR FLANGED OUTLET
- GG. 4" DIA SCHEDULE 40 GALVANIZED STEEL FOR VAULT VENT. ROUTE TO BACK OF SIDEWALK, SEE SECTION B-B, THIS SHEET.

REVISIONS

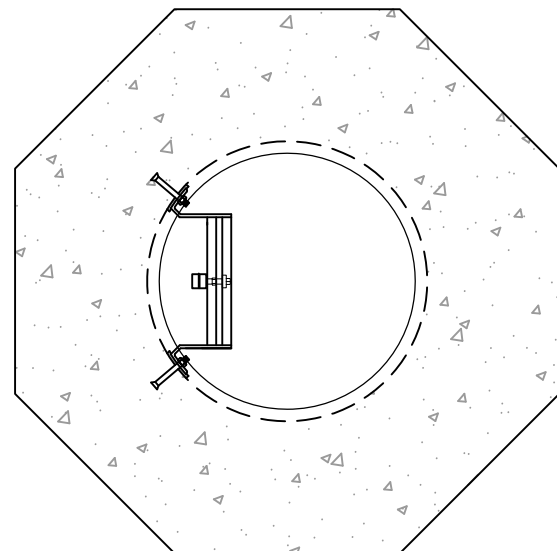
JAN. 2013
APR. 2015

WATER AUTHORITY

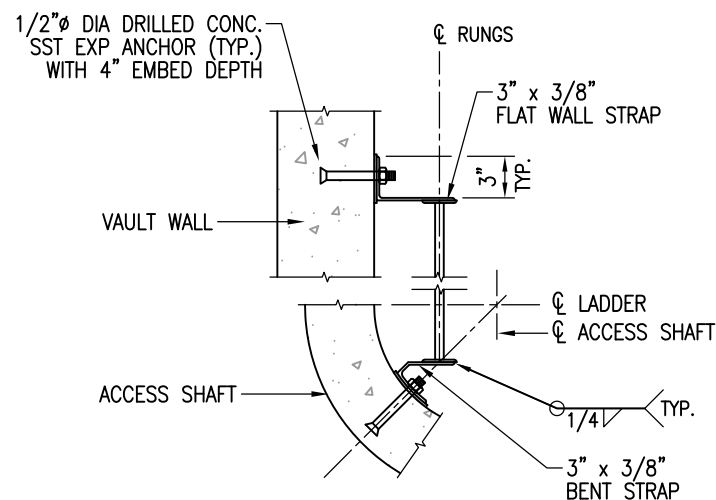
WATER
LARGE DIAMETER
ISOLATION VALVE VAULT

DWG. 2334

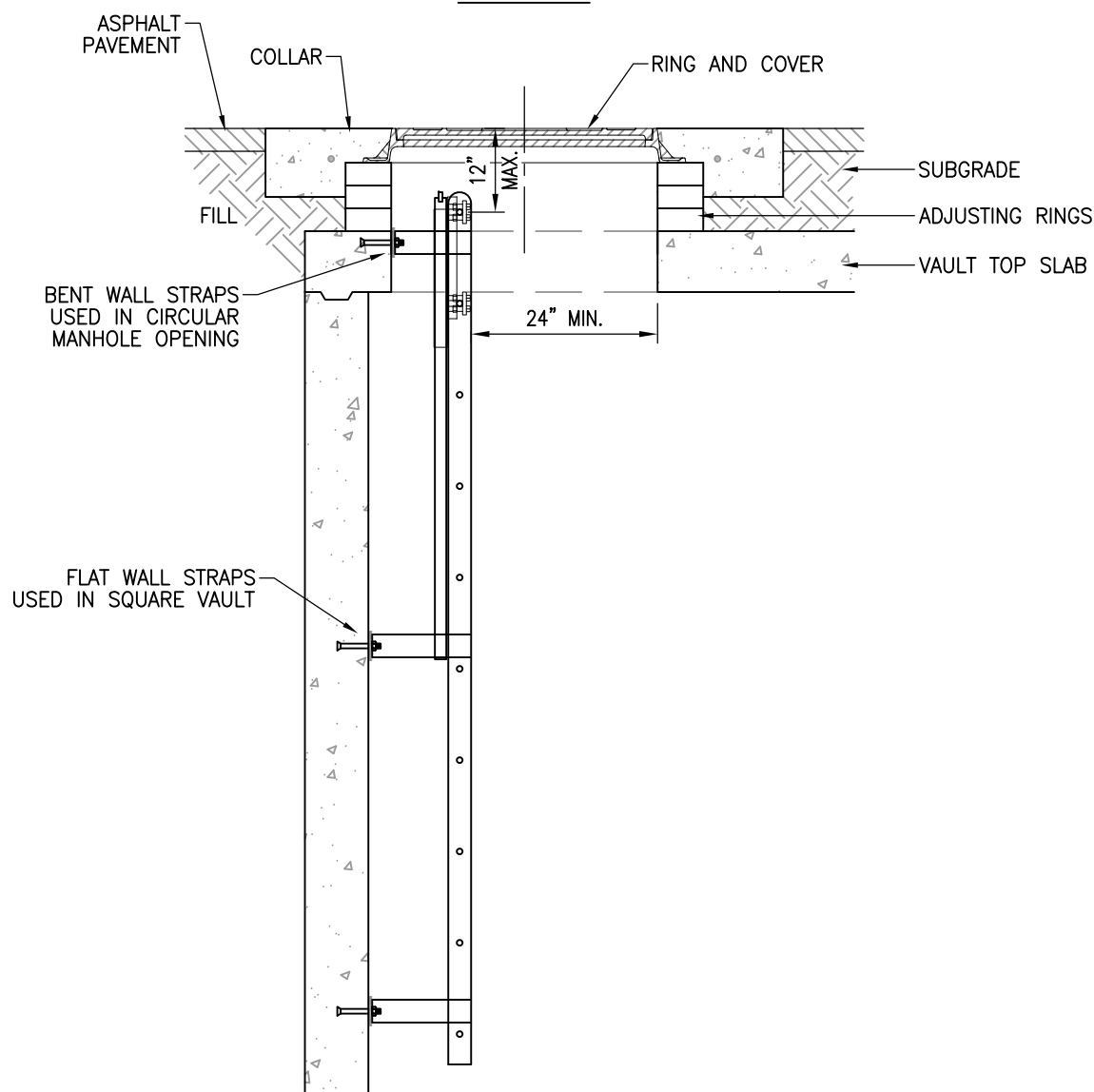
AUG. 2019



PLAN VIEW

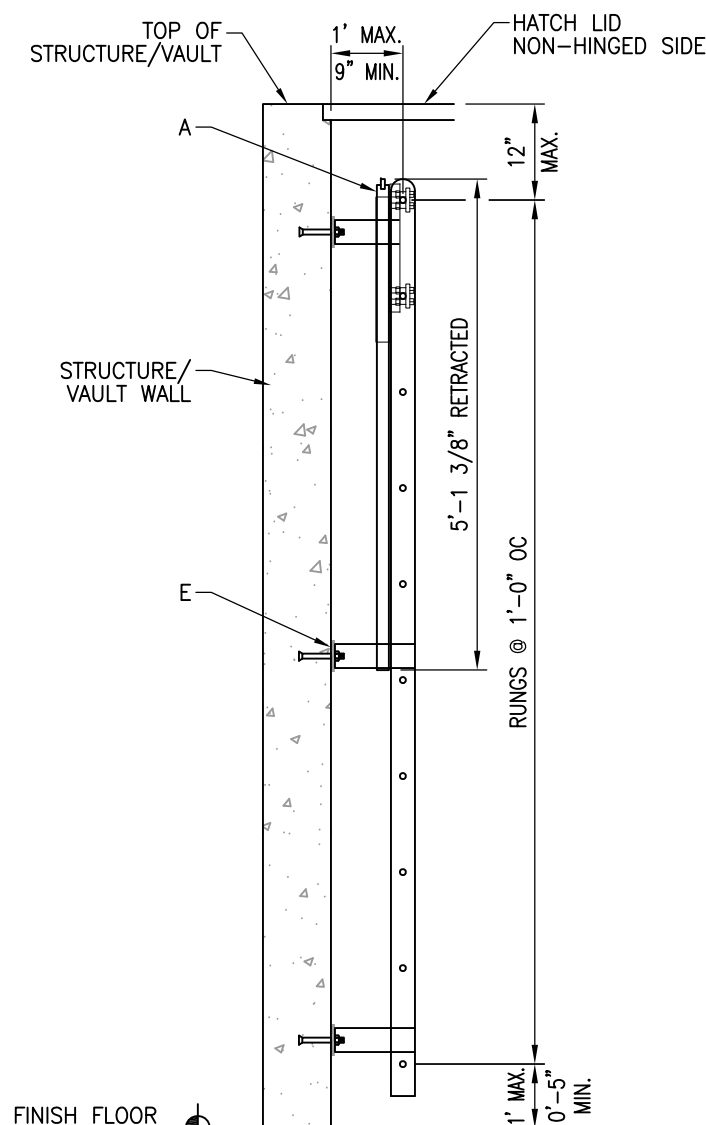


LADDER ANCHOR DETAIL



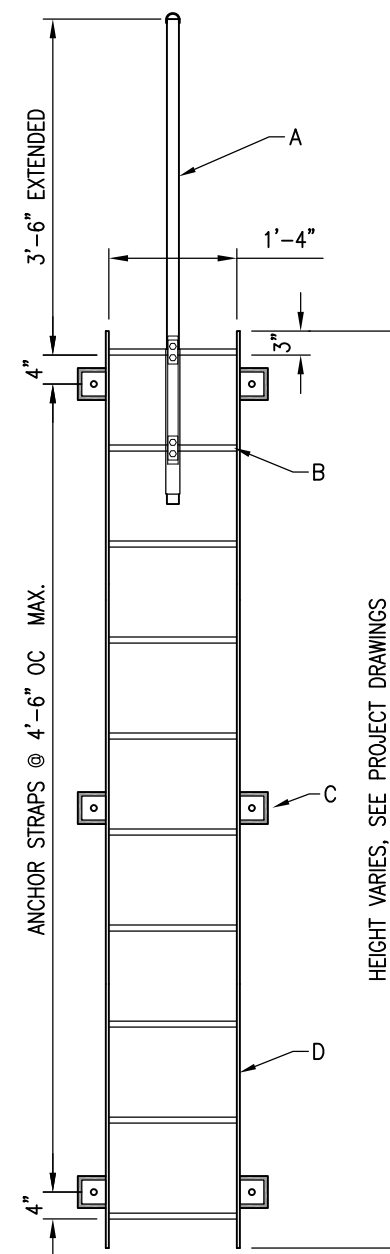
SIDE VIEW

VAULT WITH MANHOLE ACCESS



SIDE VIEW

VAULT WITH HATCH ACCESS



FRONT VIEW

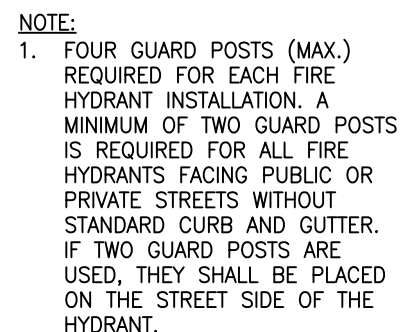
GENERAL NOTES

1. LADDER AND SUPPORTS SHALL BE ALUMINUM.
2. DIMENSIONS SHOWN ARE MINIMUMS. CONTRACTOR SHALL COORDINATE DESIGN AND DIMENSIONS OF THE LADDER AND SUPPORTS WITH THE MANUFACTURER AND OWNER.
3. LADDERS ARE NOT REQUIRED FOR INSTALLATIONS LESS THAN 4 FT DEPTH. INSTALLATIONS GREATER THAN OR EQUAL TO 17' DEPTH REQUIRE A FALL PROTECTION LADDER SAFETY SYSTEM, DBI SALA MODEL LAD-SAF OR ENGINEER APPROVED EQUAL.
4. THE LADDER MANUFACTURER SHALL DESIGN THE LADDER FOR THE SPECIFIC INSTALLATION CONDITIONS SUCH AS DEPTH, TYPE OF VAULT OR MANHOLE, OFFSET DISTANCE FROM THE WALL, AND OTHER PROJECT SPECIFIC ASPECTS SHOWN ON THE PROJECT DRAWINGS AND TECHNICAL SPECIFICATIONS. THE LADDER DESIGN SHALL COMPLY WITH OSHA REQUIREMENTS.
5. LADDER DETAIL IS APPLICABLE FOR VAULTS WITH ACCESS HATCH OR MANHOLE RING AND COVER, AS SPECIFIED BY THE ENGINEER.

CONSTRUCTION NOTES

- A. LADDER UP SYSTEM, MODEL LU-4 BY BILCO OR APPROVED EQUAL.
- B. 1 1/8 inch MAX. RUNGS WITH 1 inch WIDE NON-SLIP GRIP SURFACE @ 12 inch OC, PLUG WELD TO SIDE BARS (TYP.).
- C. 3 inch x 3/8 inch FLAT, OR BENT WALL STRAP WITH 1/2 inch STAINLESS STEEL EXPANSION ANCHORS. EMBED 4 inch. COAT ANCHORS WITH BITUMEN WHERE IN CONTACT WITH ALUMINUM. SEE LADDER ANCHOR DETAIL TO LEFT.
- D. 3 inch x 3/8 inch SIDEBARS MIN. ROUND ALL CORNERS SMOOTH 1/8 inch RADIUS
- E. INSTALL CHLOROPRENE PADS BETWEEN CONCRETE WALL AND ALUMINUM LADDER SUPPORTS.

REVISIONS	WATER AUTHORITY
JAN. 2015 APR. 2016	WATER LADDER DETAILS
	DWG. 2335
	MAR. 2019



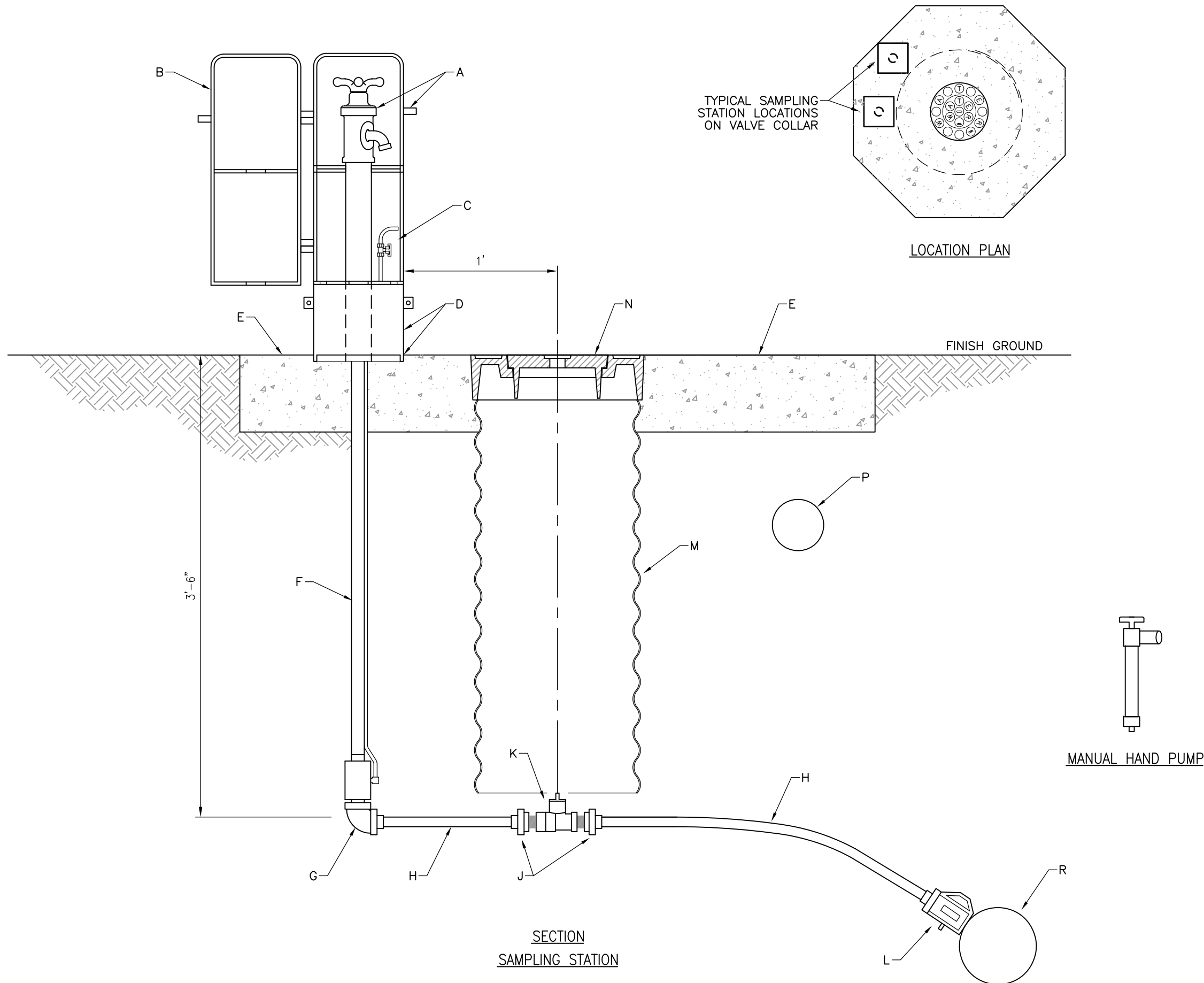
FIRE HYDRANT GUARD POST DETAIL
FOR INSTALLATIONS WITHOUT CURB & GUTTER



1. NO OBSTRUCTIONS WILL BE PERMITTED WITHIN 3'-0" OF FIRE HYDRANT.
2. HYDRANT LEG SHALL BE VALVED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR SETTING THE TOP FLANGE OF THE FIRE HYDRANT TO THE CONTROLLED ELEVATION LINE.
4. FOR FIRE HYDRANT LOCATIONS, SEE STANDARD DRAWING 2347.
5. WHEN NEW OR EXISTING SIDEWALK ABUTS CURB, RECONSTRUCT SIDEWALK PER STANDARD DRAWINGS 2430 AND 2431.
6. PUMPER NOZZLE TO BE SET FACING THE TRAVELED WAY, UNLESS OTHERWISE NOTED ON PLANS.
7. HYDRANTS INSTALLED IN SIDEWALK AREAS SHALL MAINTAIN A FIVE FOOT CLEAR PEDESTRIAN PATH PER ADA STANDARD.
8. BEFORE THE WORK WILL BE ACCEPTED, FIRE HYDRANT GPS COORDINATES SHALL BE PROVIDED ON THE RECORD DRAWINGS. GPS COORDINATES OBTAINED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF NEW MEXICO SHALL BE TAKEN AT THE FLANGE. USE THE NAD 1983 NM STATE PLANE CENTRAL ZONE FOR X AND Y COORDINATES AND NAVD 1988 FOR Z COORDINATE.
9. HYDRANTS INSTALLED WITHOUT STANDARD CURB AND GUTTER SHALL BE PROTECTED WITH STATIONARY POSTS/BOLLARDS. SEE DETAIL ON THIS SHEET.

- A. FIRE HYDRANT PER SPECIFICATIONS
- B. PUMPER NOZZLE 4 1/2"
- C. HOSE NOZZLE 2 1/2"
- D. 1/2" EXPANSION JOINT MATERIAL
- E. MATCH SIDEWALK SLOPE, OR SLOPE 1/4" PER FOOT.
- F. 3'x3'x6" SQUARE CONCRETE PAD, TO BE CONSTRUCTED AROUND FIRE HYDRANT'S CENTER LINE WHEN NOT LOCATED WITHIN SIDEWALK OR CONCRETE AREA. CONCRETE PER SEC. 101 EXTERIOR CONCRETE, $f_c=3000$ psi @ 28 DAYS.
- G. BACK OF CURB
- H. CONTROLLED ELEVATION LINE, LEVEL IN ALL DIRECTIONS.
- J. USE OF RESTRAINED JOINTS IS MANDATORY. ALL FIRE HYDRANT LEG PIPING AND FITTINGS INCLUDING TEE ON MAIN SHALL BE RESTRAINED JOINT.
- K. 3'x3'x18" GRAVEL DRAIN POCKET WITH CLEAN GRAVEL, ASTM C33, NO. 57. LINE DRAIN POCKET WITH GEOTEXTILE FABRIC NMDOT CLASS 3.
- L. STANDARD CURB AND GUTTER. IF NO CURB AND GUTTER IS PRESENT, BOLLARDS ARE REQUIRED. FOR OTHER TYPES OF CURB AND GUTTER, SPECIAL DESIGN IS REQUIRED.
- M. INSTALL FIRE HYDRANT ISOLATION GATE VALVE AT TEE ON MAIN. INSTALL VALVE BOX PER STANDARD DRAWING 2326.
- N. ELECTRONIC MARKER DEVICE (EMD), SEE STANDARD SPECIFICATION SECTION 170.
- P. STATIONARY GUARD POST PER STANDARD DRAWING 2322

REVISIONS	WATER AUTHORITY
DEC. 2014 MAY 2013	WATER FIRE HYDRANT INSTALLATION DWG. 2340 APR. 2019



GENERAL NOTES

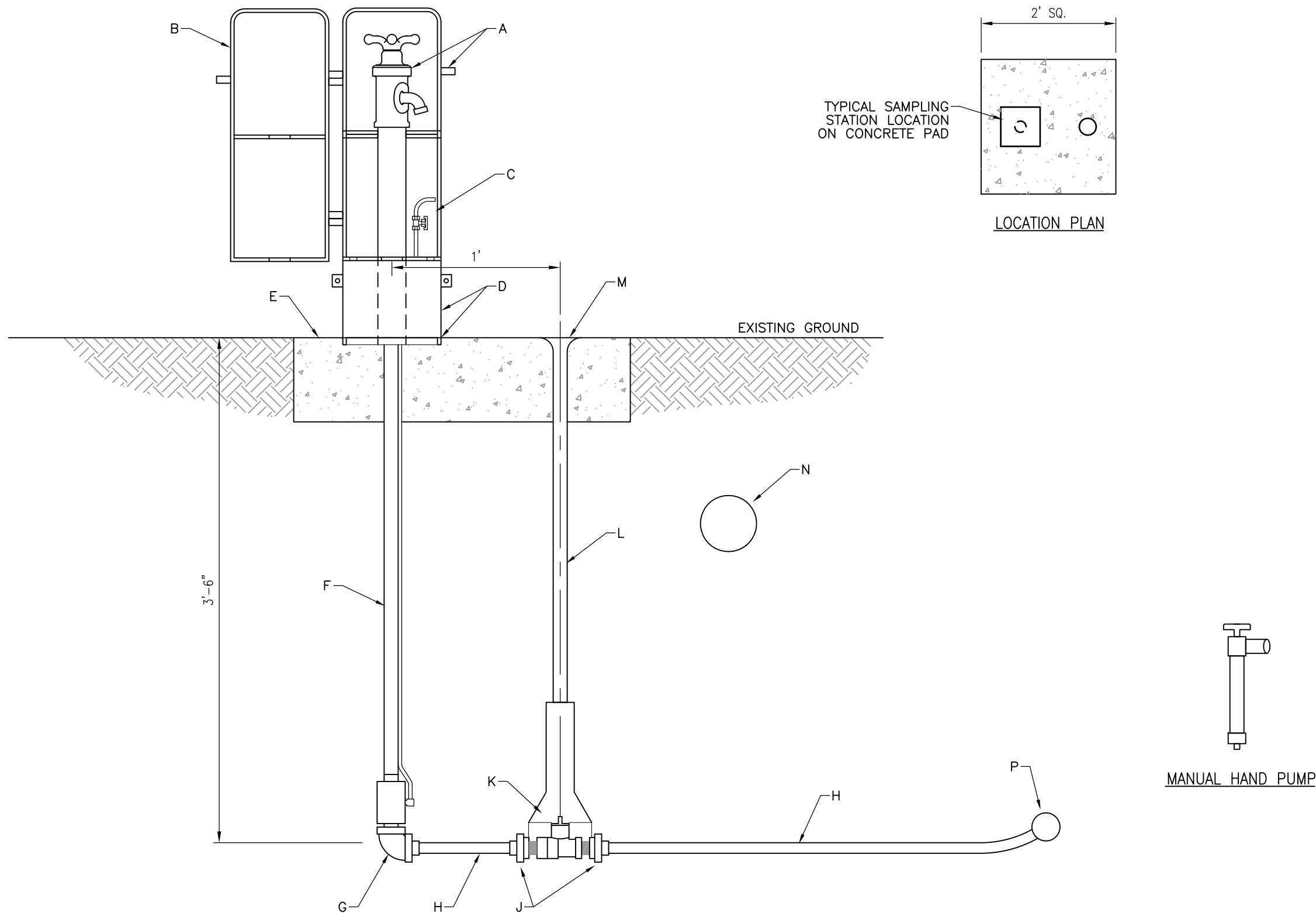
1. SAMPLING STATIONS SHALL BE BURIED TO A DEPTH OF 3'-6" \pm 1", WITH A 1" MIP INLET, AND A 1" FIP DISCHARGE.
2. ALL STATIONS SHALL BE ENCLOSED IN A LOCKABLE, NON-REMOVABLE, ALUMINUM-CAST HOUSING.
3. ALL WORKING PARTS SHALL BE BRASS AND BE REMOVABLE FROM ABOVE GROUND WITH NO DIGGING.

CONSTRUCTION NOTES

- A. ECLIPSE #88 SAMPLING STATION*, OR WATER AUTHORITY APPROVED EQUAL. SEE LOCATION PLAN TO LEFT FOR PLACEMENT ON A STANDARD VALVE BOX CONCRETE COLLAR.
- B. ALUMINUM HOUSING (SHOWN OPEN)
- C. COPPER VENT TUBE WITH 1/4" PET COCK (OPTIONAL 1/4" BALL VALVE) FOR DRAINING WITH MANUAL HAND PUMP
- D. ALUMINUM BASE. EMBED IN CONCRETE MIN. 1/4" MAX. 1/2"
- E. 6" THICK CONCRETE COLLAR. f'_c = 3000 psi IN UNPAVED AREAS. USE STANDARD 9" COLLAR IF VALVE IS INSTALLED AWAY FROM SAMPLING STATION IN PAVED AREA.
- F. 1" GALVANIZED STEEL EXTERIOR CASING PIPE
- G. 3/4" MIPT x COPPER ELBOW
- H. 3/4" DOMESTIC COPPER K-TYPE, OR WATER AUTHORITY APPROVED EQUAL.
- J. 3/4" MIPT x COPPER FLARE. FORD C28-33 OR WATER AUTHORITY APPROVED EQUAL.
- K. CURBSTOP PER WATER AUTHORITY APPROVED PRODUCTS LIST.
- L. CORPORATION STOP PER WATER AUTHORITY APPROVED PRODUCTS LIST.
- M. VALVE BOX PER STANDARD DRAWING 2326.
- N. RING AND COVER FOR VALVE BOX PER STANDARD DRAWING 2328.
- P. ELECTRONIC MARKER DEVICE (EMD), SEE STANDARD SPECIFICATION SECTION 170.
- R. CONNECT TO MAIN

* THE ECLIPSE #88 IS A NON-DRAINING UNIT THAT COMES STANDARD WITH AN ALL SURGICAL STAINLESS STEEL WATERWAY AND A LOCKABLE CAST-ALUMINUM ENCLOSURE. UNIT IS MANUAL-DRAINING, NON-FREEZING WITH USE OF AN ATTACHABLE MANUAL HAND PUMP (SEE DETAIL TO LEFT). THE ECLIPSE #88 IS FULLY SERVICEABLE FROM ABOVE GROUND.

REVISIONS	WATER AUTHORITY
JAN. 2015	WATER SAMPLING STATION
	DWG. 2341 JAN. 2013



GENERAL NOTES

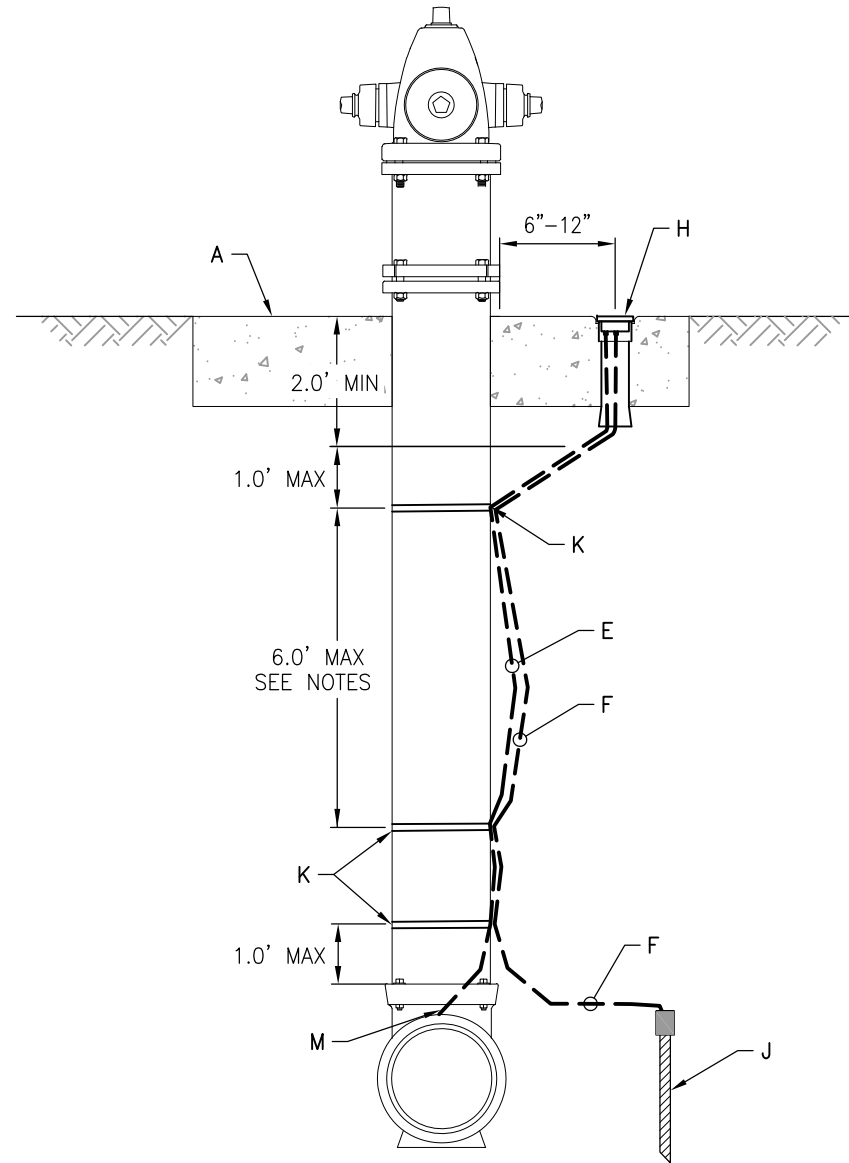
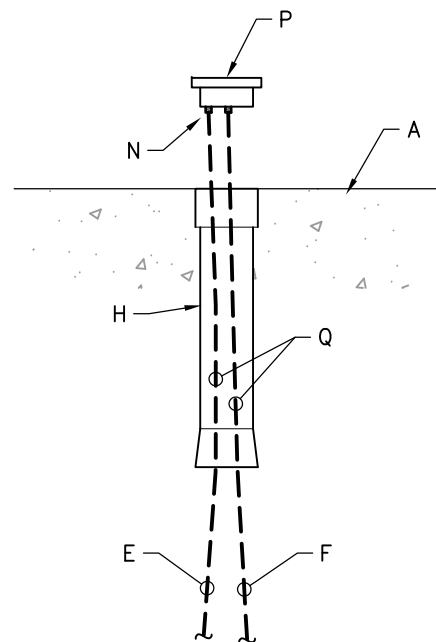
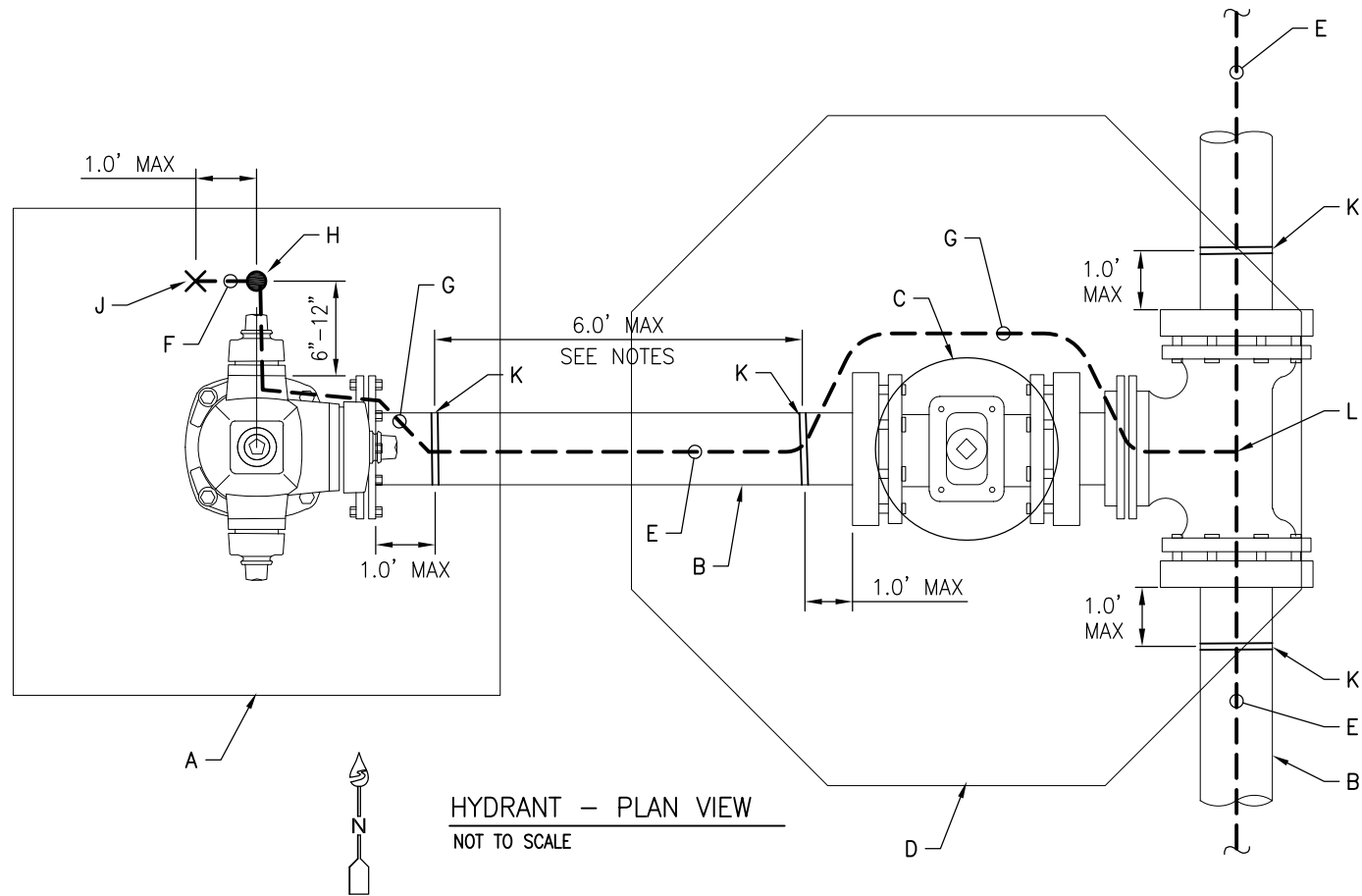
1. SAMPLING STATIONS SHALL BE BURIED TO A DEPTH OF 3'-6" \pm 1", WITH A 1" MIP INLET, AND A 1" FIP DISCHARGE.
2. ALL STATIONS SHALL BE ENCLOSED IN A LOCKABLE, NON-REMOVABLE, ALUMINUM-CAST HOUSING.
3. ALL WORKING PARTS SHALL BE BRASS AND BE REMOVABLE FROM ABOVE GROUND WITH NO DIGGING.

CONSTRUCTION NOTES

- A. ECLIPSE #88 SAMPLING STATION*, OR WATER AUTHORITY APPROVED EQUAL.
- B. ALUMINUM HOUSING (SHOWN OPEN)
- C. COPPER VENT TUBE WITH 1/4" PET COCK (OPTIONAL 1/4" BALL VALVE) FOR DRAINING WITH MANUAL HAND PUMP
- D. ALUMINUM BASE. EMBED IN CONCRETE MIN. 1/4" MAX. 1/2"
- E. 2'x2'x6" THICK CONCRETE PAD. $f'_c = 3000$ psi
- F. 1" GALVANIZED STEEL EXTERIOR CASING PIPE
- G. 3/4" MIPT x COPPER ELBOW
- H. 3/4" DOMESTIC COPPER K-TYPE, OR WATER AUTHORITY APPROVED EQUAL.
- J. 3/4" MIPT x COPPER FLARE. FORD C28-33 OR WATER AUTHORITY APPROVED EQUAL.
- K. CURBSTOP PER WATER AUTHORITY APPROVED PRODUCTS LIST.
- L. VALVE BOX / CURB BOX EXPANDABLE
- M. APPROVED PRODUCT VALVE BOX OR CURB BOX – FORD PL EA2-30-50 OR WATER AUTHORITY APPROVED EQUAL.
- N. ELECTRONIC MARKER DEVICE (EMD), SEE STANDARD SPECIFICATION SECTION 170.
- P. CONNECT TO SERVICE LINE

* THE ECLIPSE #88 IS A NON-DRAINING UNIT THAT COMES STANDARD WITH AN ALL SURGICAL STAINLESS STEEL WATERWAY AND A LOCKABLE CAST-ALUMINUM ENCLOSURE. UNIT IS MANUAL-DRAINING, NON-FREEZING WITH USE OF AN ATTACHABLE MANUAL HAND PUMP (SEE DETAIL TO LEFT). THE ECLIPSE #88 IS FULLY SERVICEABLE FROM ABOVE GROUND.

REVISIONS	WATER AUTHORITY
JAN. 2015	WATER SAMPLING STATION ALTERNATE
	DWG. 2341-A JAN. 2013



GENERAL NOTES

- TRACE WIRE SHALL BE FASTENED TO THE PIPE WITH TAPE OR PLASTIC TIES AT 6' INTERVALS.
- TEST STATIONS SHALL BE VISIBLE FROM ROAD.
- TEST STATION CAP AND TRACE WIRE SHALL BE COLOR CODED BLUE (APWA STANDARD).

CONSTRUCTION NOTES

- CONCRETE COLLAR PER STANDARD DRAWING 2340
- WATER MAIN
- VALVE BOX PER STANDARD DRAWING 2326
- CONCRETE COLLAR PER STANDARD DRAWING 2461
- TRACE WIRE #12 AWG COPPER CLAD STEEL - BLUE (SEE SECTION A-A ON STANDARD DRAWING 2302)
- TRACE WIRE #12 AWG COPPER CLAD STEEL - RED FACTORY CONNECTED TO GROUNDING ANODE.
- TRACE WIRE SHALL BE ROUTED AROUND VALVES/HYDRANTS ON THE NORTH OR EAST SIDE
- TEST STATION ACCESS BOX WITH BLUE COLOR CODED (APWA STANDARD) CAP SHALL BE INSTALLED ON NORTH OR EAST SIDE OF FIRE HYDRANT. TEST STATIONS SHALL BE INSTALLED APPROXIMATELY 1000' APART. TEST STATIONS SHALL BE APPROPRIATE FOR CAST IN PLACE CONCRETE APPLICATIONS. MAIN TRACE WIRE AND LEAD GROUND TRACE WIRE FROM THE MAGNESIUM GROUNDING ANODE SHALL BE CONTINUOUS TO THE TERMINALS IN THE TEST STATION. DO NOT CUT MAIN LINE TRACE WIRE. TEST STATION SHALL BE FLUSH WITH TOP OF CONCRETE TO PREVENT POOLING OF WATER. (SEE TEST STATION SECTION VIEW, THIS SHEET)
- DRIVE-IN MAGNESIUM GROUNDING ANODE. INSTALL WITH MINIMUM 1FT HORIZONTAL SEPARATION FROM TEST STATION ACCESS BOX. INSTALL AT DEPTH OF MAIN TRACE WIRE. (SEE ANODE DETAIL, STANDARD DRAWING 2302)
- TAPE OR PLASTIC TIE (SEE GENERAL NOTES).
- TEE CONNECTION. 3-WAY LOCKING WATERPROOF CONNECTOR. DO NOT CUT MAIN LINE TRACE WIRE. (SEE TEE CONNECTION DETAIL, STANDARD DRAWING 2302)
- TRACE WIRE CONTINUES ON TOP OF HYDRANT LEAD AND CONNECTS TO MAIN LINE TRACE WIRE (SEE PLAN VIEW)
- TERMINAL JUMPER SHALL CONNECT TRACE WIRE TERMINAL TO GROUNDING ANODE TERMINAL UNDER NORMAL OPERATIONS. THE TERMINAL JUMPER CAN BE DICONNECTED AND TERMINALS MAY BE USED TO CONNECT TRACE EQUIPMENT FOR TRACE AND FOR GROUND. THE TERMINAL JUMPER SHALL BE RECONNECTED WHEN TRACE IS COMPLETE.
- 2-TERMINAL BLUE COLOR CODED CAPS (APWA STANDARD) APPROPRIATE FOR CAST IN PLACE CONCRETE APPLICATIONS
- COIL 2' OF EXTRA RED AND BLUE TRACE WIRE INSIDE TEST STATION

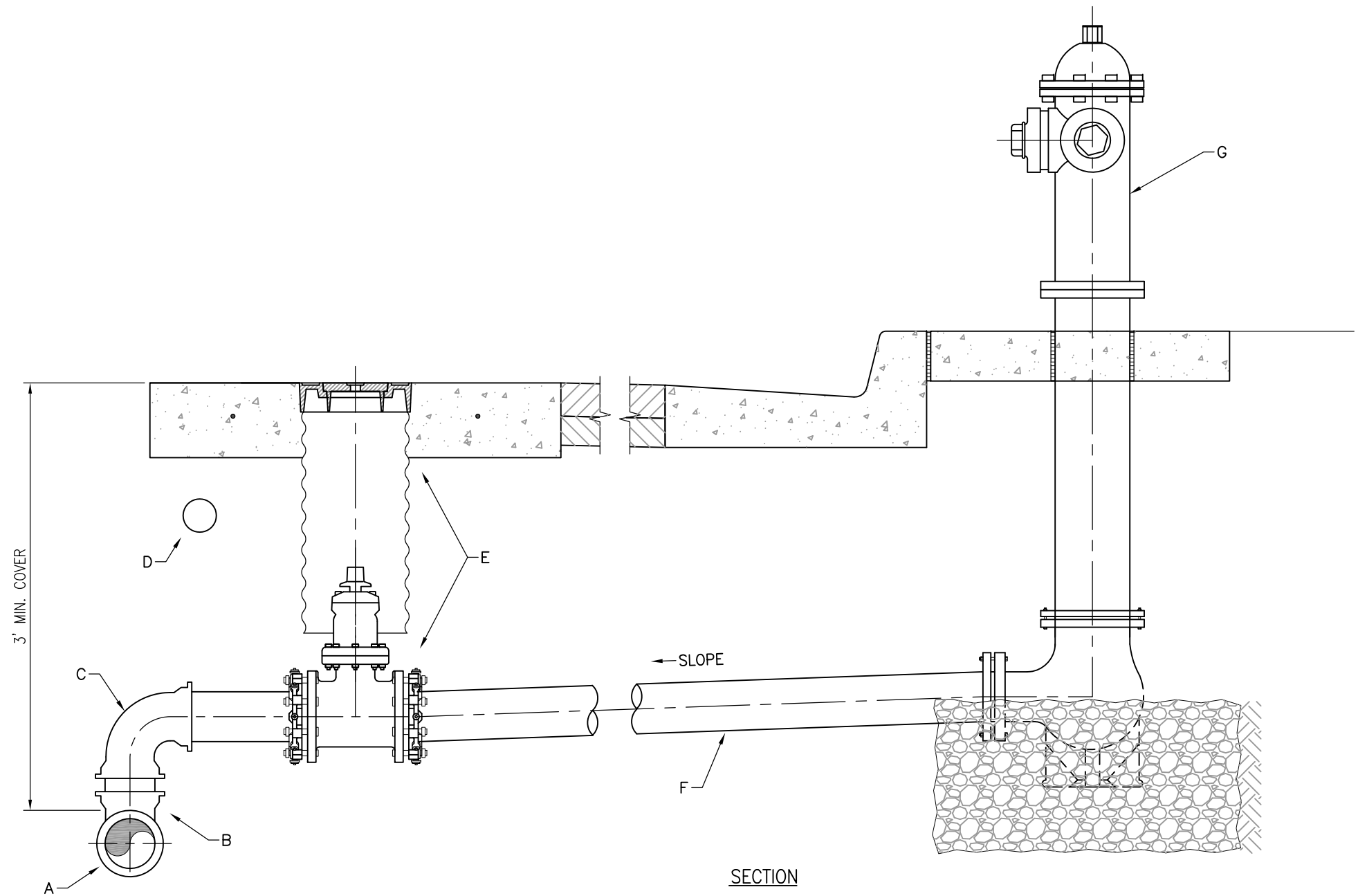
REVISIONS	WATER AUTHORITY
SEP. 2017	FIRE HYDRANT TRACE WIRE DETAILS
	DWG. 2342 AUG. 2019

GENERAL NOTES

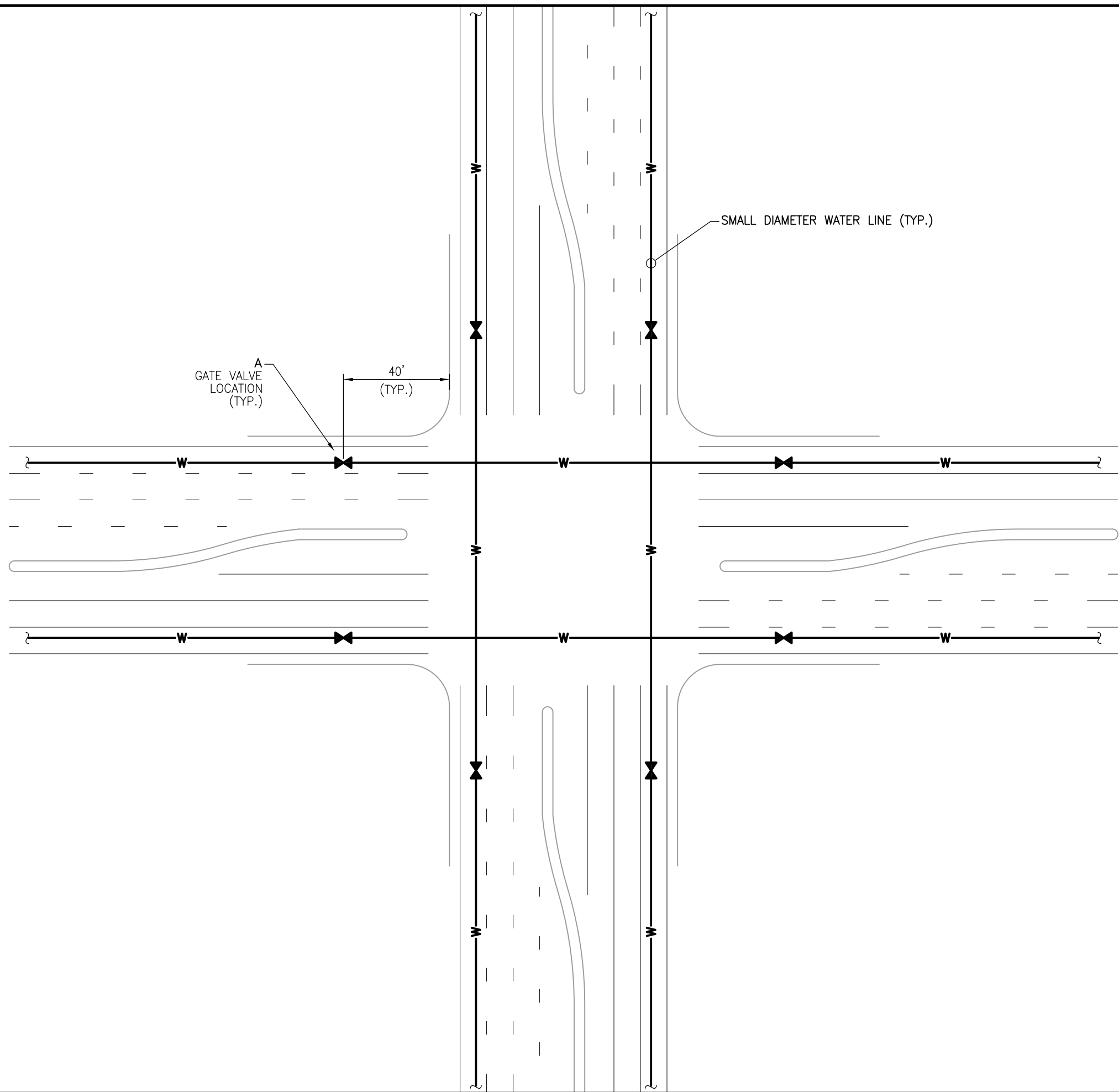
- 1. INSTALL AIR RELEASE HYDRANT AS REQUIRED BY ENGINEERS DESIGN PLANS.
- 2. REFER TO STANDARD DRAWING 2340 FOR COMPLETE FIRE HYDRANT INSTALLATION DETAILS.
- 3. USE OF RESTRAINED JOINTS IS MANDATORY. ALL FIRE HYDRANT LEG PIPING AND FITTINGS INCLUDING TEE ON MAIN SHALL BE RESTRAINED JOINT.

CONSTRUCTION NOTES

- A. WATER MAIN
- B. FLANGED OUTLET OR MECHANICAL JOINT TEE
- C. DUCTILE IRON 45 DEG. OR 90 DEG. BEND
- D. ELECTRONIC MARKER DEVICE (EMD), SEE STANDARD SPECIFICATION SECTION 170.
- E. GATE VALVE WITH VALVE BOX PER STANDARD DRAWING 2326
- F. SLOPE WATER LINE UP TO AIR RELEASE/HYDRANT
- G. FIRE HYDRANT PER STANDARD DRAWING 2340



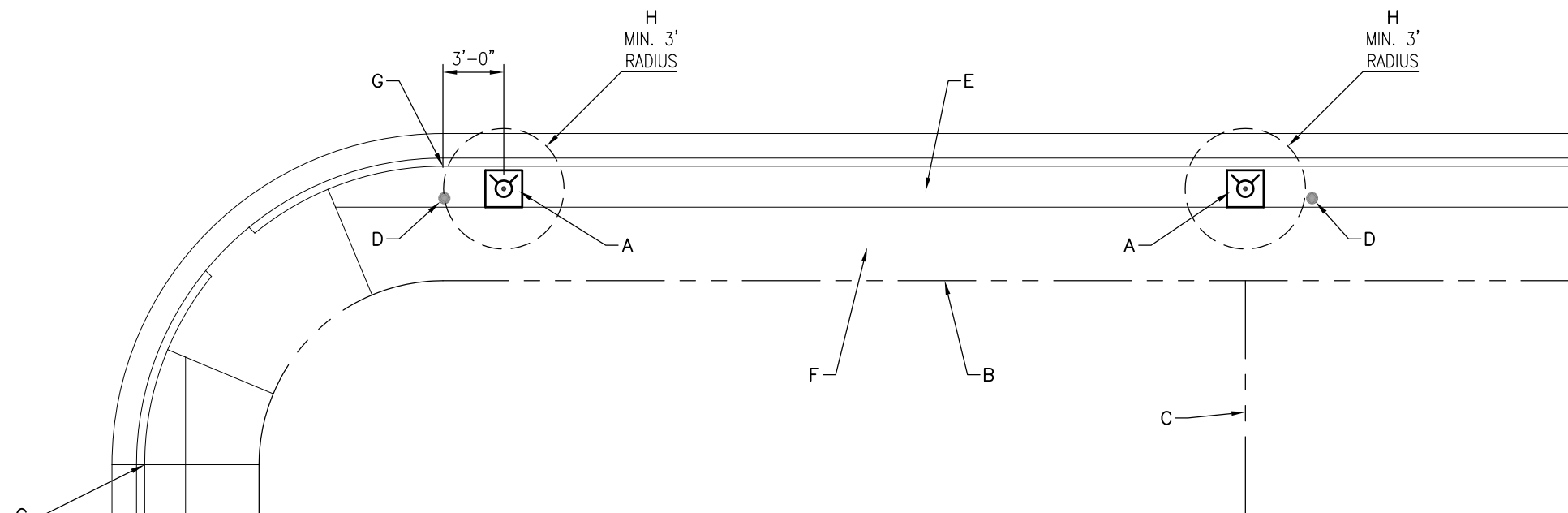
REVISIONS	WATER AUTHORITY
JAN. 2011	WATER AIR RELEASE FIRE HYDRANT INSTALLATION
	DWG. 2344 APR. 2019



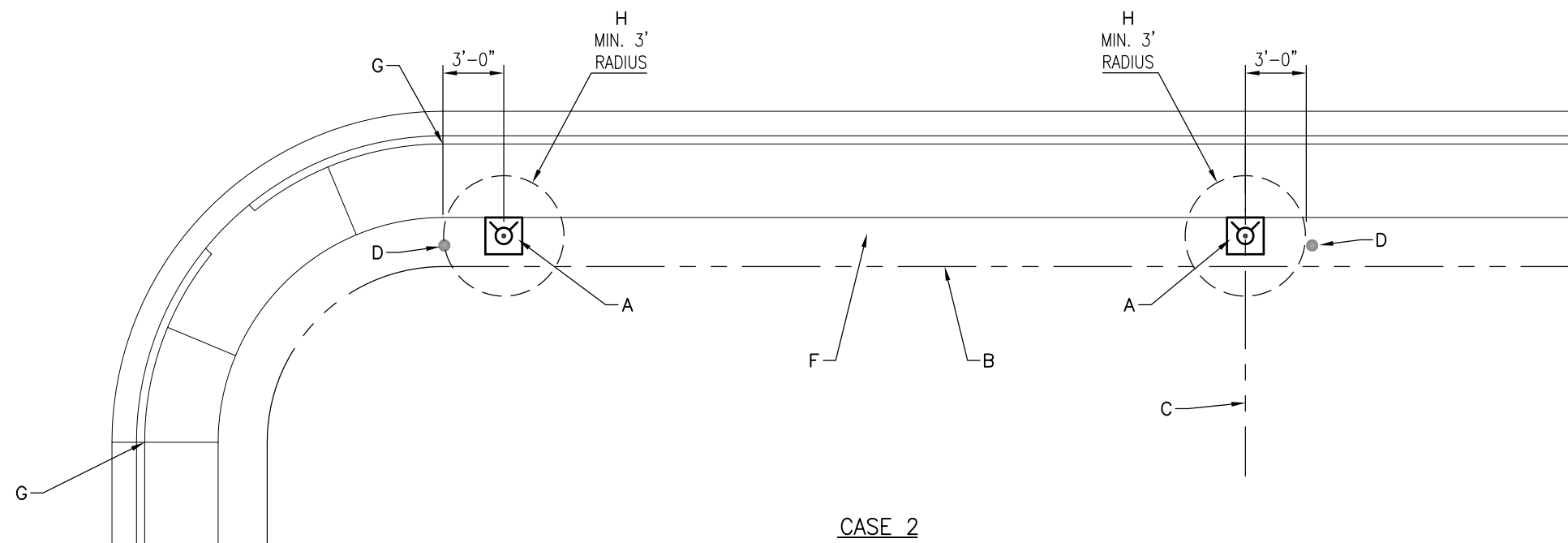
- GENERAL NOTES**
1. THIS DETAIL PERTAINS TO NEW INFRASTRUCTURE AND IS NOT TO BE USED AS A RELOCATION PLAN FOR EXISTING INFRASTRUCTURE. FINAL DESIGN AND LAYOUT OF VALVE LOCATIONS SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS. ENGINEER SHALL COORDINATE DESIGN WITH THE INTERSECTION AND ALL RELATED SYSTEMS. DESIGN MUST BE APPROVED BY THE WATER AUTHORITY AND ALL PARTIES INVOLVED WITH THE INTERSECTION PRIOR TO CONSTRUCTION.
 2. SEE STANDARD DRAWINGS SECTION 2400 FOR PAVING, AND SECTION 2500 FOR TRAFFIC/INTERSECTION DETAILS.
 3. GREY BACKGROUND LINEWORK REPRESENTS GUTTER FLOW LINES. DEPENDING ON THE INTERSECTION, THIS DESIGN WILL VARY.
 4. PAVEMENT STRIPING SHOWN IS DIAGRAMMATIC ONLY.

- CONSTRUCTION NOTES**
- A. VALVE INSTALLATION PER STANDARD DRAWING 2326 AND RELATED.

REVISIONS	WATER AUTHORITY
	WATER TYPICAL PLACEMENT OF VALVES AT ARTERIAL INTERSECTIONS DWG. 2346APR. 2018



CASE 1
(PARKWAY BEHIND CURB AND GUTTER)



CASE 2
(SIDEWALK BEHIND CURB AND GUTTER)

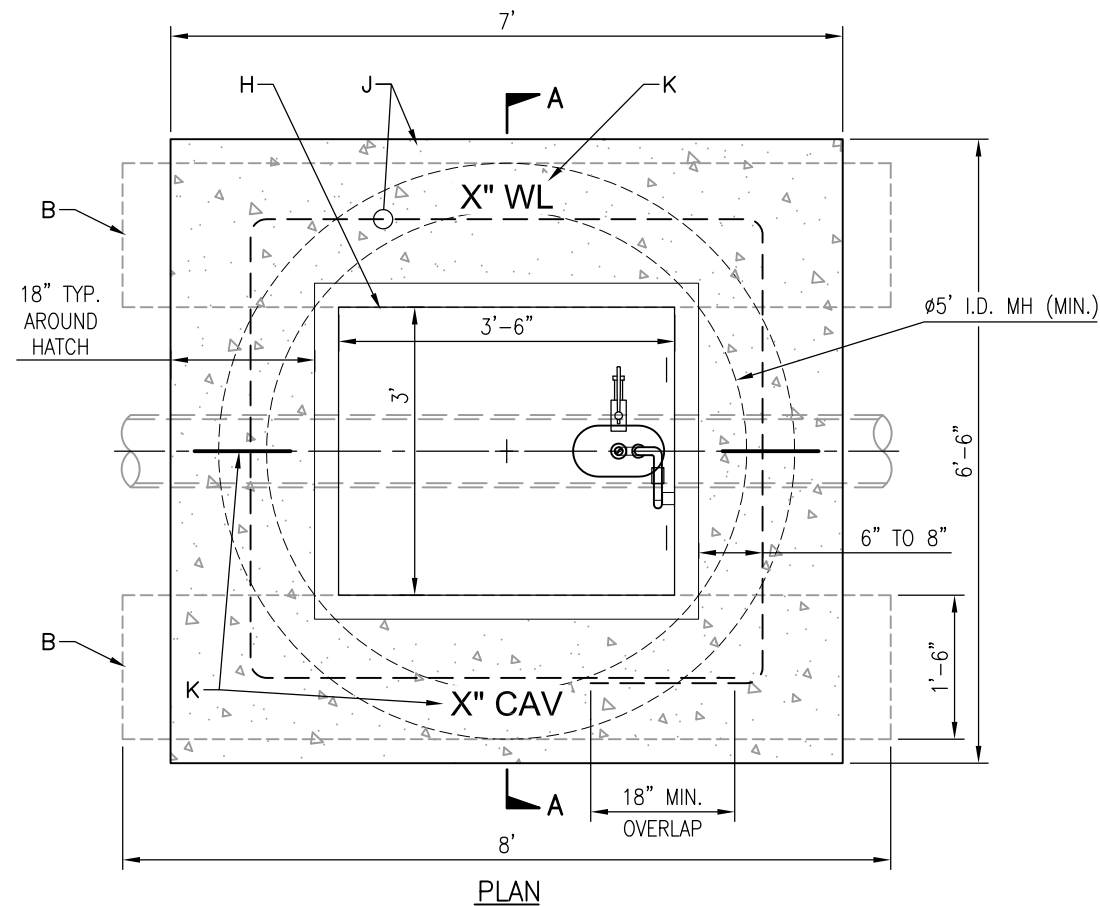
GENERAL NOTES

1. FIRE HYDRANTS ARE NOT TO BE LOCATED WITHIN THE CURB RETURN AREA. FIRE HYDRANTS LOCATED IN THE MID BLOCK LENGTH SHALL BE CENTERED ON ADJOINING PROPERTY LINES, UNLESS OTHERWISE SPECIFIED.
2. A MINIMUM CLEARANCE OF 3' SHALL BE PROVIDED BETWEEN FIRE HYDRANT AND ANY PERMANENT OBSTRUCTION (UTILITY POLE, LIGHT STANDARD, TRAFFIC SIGNAL, ETC.).
3. FOR FIRE HYDRANT INSTALLATION DETAILS, SEE STANDARD DRAWING 2340.

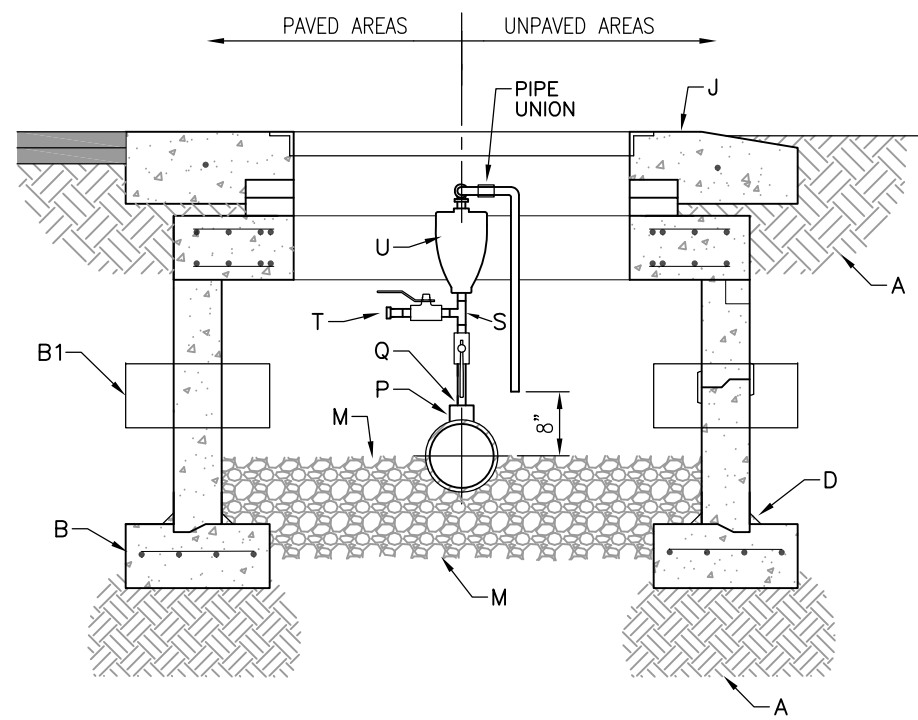
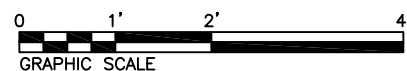
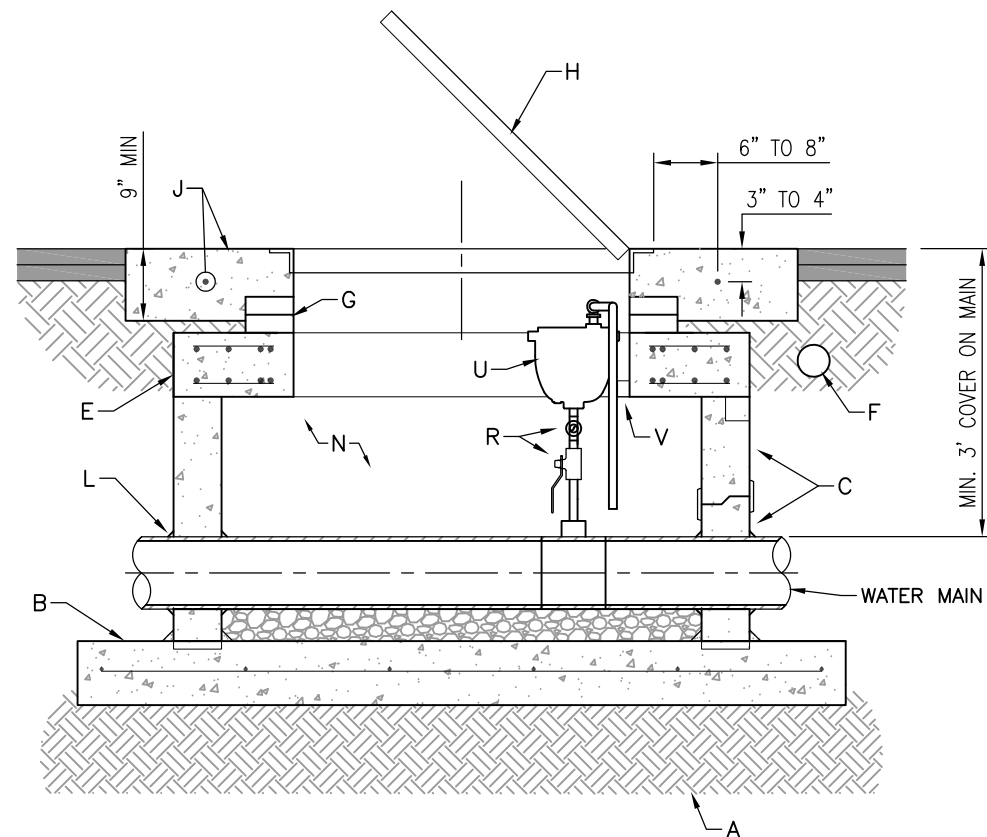
CONSTRUCTION NOTES

- A. FIRE HYDRANT AND PAD
- B. RIGHT-OF-WAY OR EASEMENT LINE
- C. PROPERTY LINE
- D. PERMANENT OBSTRUCTION
- E. PARKWAY
- F. SIDEWALK
- G. PC OR PT OF CURB RETURN
- H. MAINTAIN A MINIMUM CLEARANCE OF 3' RADIUS FROM CENTER OF HYDRANT TO ANY AND ALL OBSTRUCTIONS.

REVISIONS	WATER AUTHORITY
JAN. 2011	WATER TYPICAL FIRE HYDRANT LOCATIONS
	DWG. 2347 APR. 2019



NOTE: DETAIL SHOWN IS AN 8" MAIN WITH 3' OF COVER, 60" I.D. MANHOLE, 1" CAV ASSEMBLY WITH 1" BALL VALVES, AND TRAFFIC RATED 3'x3.5' HATCH



CAV = COMBINATION AIR/VACUUM RELEASE VALVE

GENERAL NOTES

1. CAV LOCATION, FINAL DESIGN AND LAYOUT SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS. ENGINEER SHALL SUBMIT A PROJECT SPECIFIC DETAIL. SUBMIT SHOP DRAWINGS OF VAULT OR MANHOLE, MAIN PIPING, AND CAV VALVE ASSEMBLY PRIOR TO VAULT FABRICATION AND PIPE INSTALLATION. IF LOCATED IN ROADWAY, COORDINATE THE PROPOSED VAULT LOCATION WITH ANY FUTURE ROADWAY IMPROVEMENTS.
2. MINIMUM MANHOLE INNER DIAMETER = 60 IN
3. ALL PARTS WITHIN THE MANHOLE MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
4. WATER MAIN INTERIOR PIPING SHALL BE STEEL PIPE, DUCTILE IRON PIPE, OR CONCRETE CYLINDER PIPE.
5. ALL CAV VALVE ASSEMBLY PIPING AND FITTINGS SHALL BE SCH. 40 THREADED, TYPE 316 STAINLESS STEEL. DIAMETER SHALL MATCH SPECIFIC CAV VALVE TO BE INSTALLED.
6. IN SHALLOW GROUNDWATER CONDITIONS: ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN THAT ACCOMMODATES FOR BUOYANCY AND INFILTRATION. FOR EXAMPLE, WITH FLOOR SLAB AND WITHOUT DRAIN POCKETS. DO NOT CONSTRUCT WITH OPEN BOTTOM. DESIGN SHALL BE APPROVED BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

CONSTRUCTION NOTES

- A. COMPACTED SUBGRADE, SEE SECTION 701. OVER-EXCAVATE TO 12" BELOW FOUNDATION. 95% DENSITY PER ASTM D 1557.
- B. 8" x 18" x 8 FT CONCRETE FOUNDATIONS. STRUCTURAL DESIGN TO BE PROVIDED BY CONSULTANT.
- B1. ALTERNATIVE OPTION 1: INSTALL FOUNDATIONS ABOVE PIPE AND SET PRECAST 5 FT DIA. MANHOLE SECTION(S) ON TOP.

ALTERNATIVE OPTION 2: INSTALL CONCRETE BASE PER STANDARD DWG 2101. IF CONCRETE BASE IS USED, INSTALL A GRAVEL DRAIN POCKET PER STANDARD DWG 2334.
- C. 5 FT I.D. (MIN.) PRECAST CONCRETE MANHOLE SECTIONS. USE MASTIC GASKETS AND APPLY NON-SHRINK GROUT TO EXTERIOR AND INTERIOR OF EXPANSION JOINTS.
- D. GROUT FILLET AROUND BASE(S).
- E. PRECAST CONCRETE TOP SLAB FOR MANHOLE PER STANDARD DRAWING 2107. EXCEPT OPENING SHALL BE 42 IN. DIAMETER MINIMUM.
- F. ELECTRONIC MARKER DEVICE (EMD), SEE STANDARD SPECIFICATION SECTION 170.
- G. USE CONCRETE ADJUSTMENT RINGS FOR ADJUSTMENT OF MANHOLE FRAME TO PAVEMENT GRADE.
- H. 3' x 3.5' SINGLE LEAF ACCESS HATCH WITH AIR HOLES. IF LOCATED IN ROADWAY, SPECIFY USF LOAD LEVEL 7 (ASTM C1802-14) FULL TRAFFIC RATED HATCH WITH CAST IRON LID. SPECIFY SPRING ASSISTED LIFT MECHANISM. ORIENT HATCH OPENING SIDE AS SHOWN TO ALLOW ACCESS TO CAV.
- J. RECTANGULAR CONCRETE COLLAR WITH NO.4 REBAR. REFER TO STANDARD DRAWING 2461, EXCEPT FOR SHAPE OF COLLAR. $f'_c = 4000$ psi
- K. TOP OF CONCRETE COLLAR SHALL BE STAMPED WITH WATER LINE SIZE AND DIRECTION, AS WELL AS THE LETTERS "CAV" WITH THE AIR RELEASE VALVE SIZE. SEE EXAMPLE IN PLAN VIEW THIS SHEET. MINIMUM LETTER SIZE SHALL BE 3 IN. IN HEIGHT. ADD THE LETTERS "NPW" FOR NON-POTABLE WATER INSTALLATIONS.
- L. FILL ANNULAR SPACE WITH NON-SHRINK GROUT OR WATER AUTHORITY APPROVED EQUAL. UTILIZE WALL FLANGE IN SHALLOW GROUNDWATER CONDITIONS.
- M. 1 IN. CLEAN (PEA) GRAVEL, ASTM C33, NO. 57. FILL MANHOLE UP TO SPRINGLINE OF MAIN PIPE.
- N. LADDER TO BE INSTALLED IN MANHOLES GREATER THAN OR EQUAL TO 4 FT. IN DEPTH, PER STD DRAWING 2335. IF INSTALLED, LADDER SHALL BE PLACED OPPOSITE OF HINGED SIDE OF HATCH TO ALLOW ACCESS TO CAV.
- P. TAPPING SADDLE (PREFERRED), OR FLANGED OUTLET. IF FLANGED OUTLET IS USED, PROVIDE BLIND FLANGE TAPPED FOR THREADED NIPPLE.
- Q. THREADED NIPPLE, TYPE 316 STAINLESS STEEL.
- R. BALL VALVES. SIZE THE SAME AS CAV VALVE.
- S. TEE. SIZE THE SAME AS CAV VALVE.
- T. THREADED NIPPLE FOR HOSE, DRAIN, OR GAUGE CONNECTION.
- U. COMBINATION VALVE ASSEMBLY (FL). SIZE PER CONSTRUCTION PLANS. ERECT STRUCTURAL SUPPORTS AS NECESSARY, IF A HORIZONTAL CONFIGURATION IS USED.
- V. ROUTE AIR VALVE VENT PIPING AGAINST MANHOLE WALL OR TOP SLAB, AND MOUNT WITH UNISTRUT PIPE BRACKET.

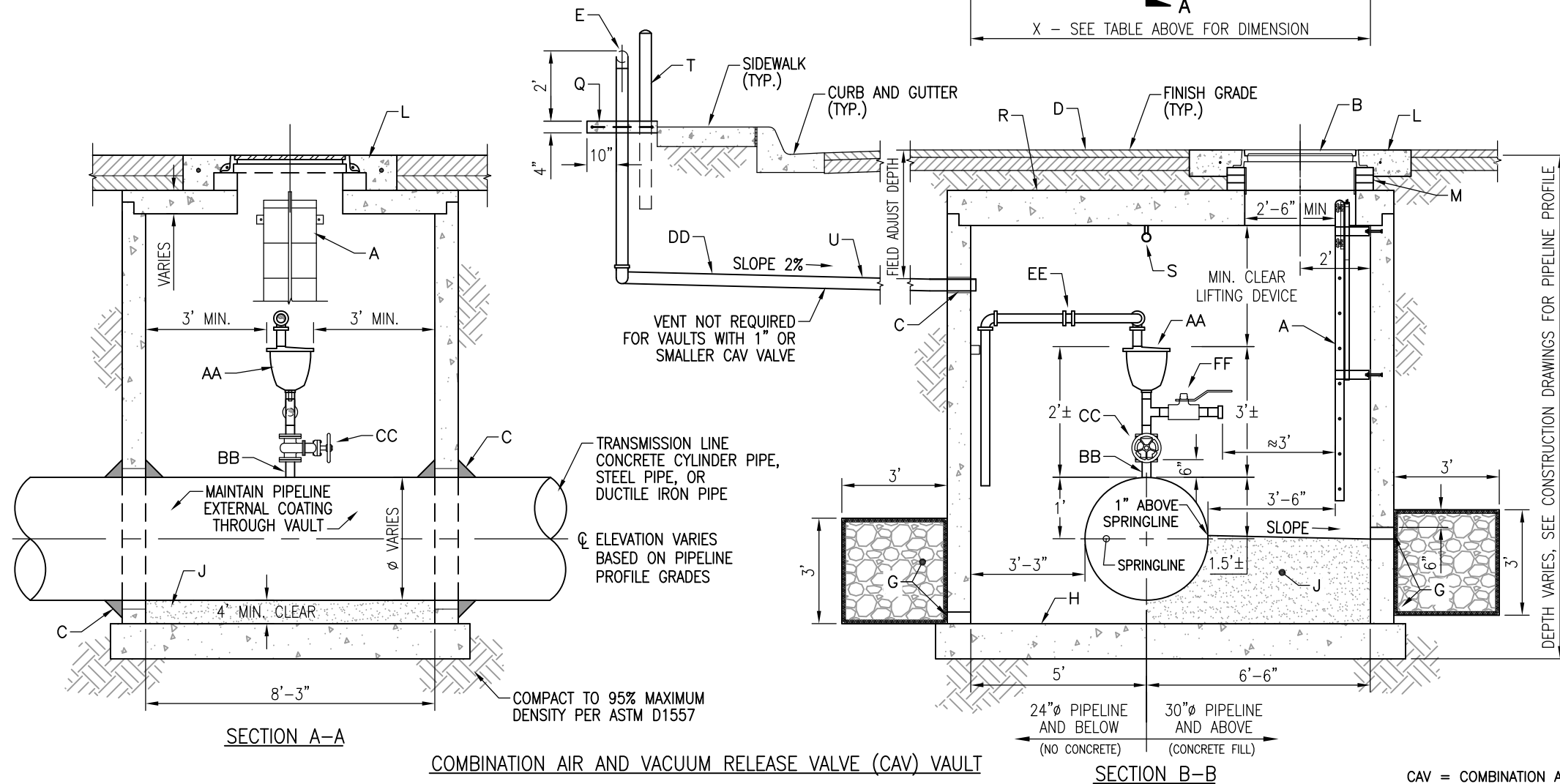
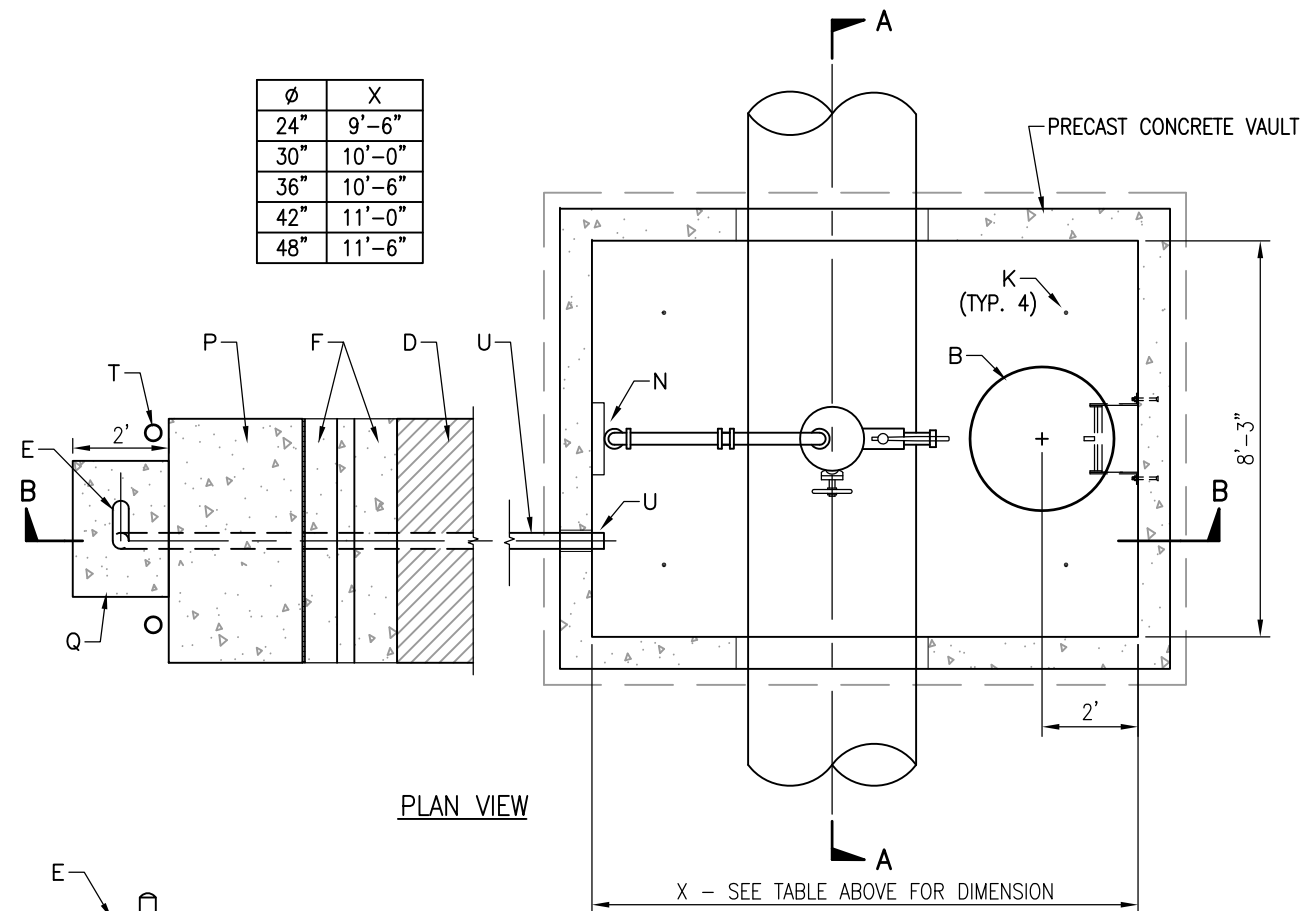
REVISIONS	WATER AUTHORITY
FEB. 2019	WATER CAV VALVE VAULT FOR 12-INCH AND SMALLER DIA. WATER MAINS DWG. 2349
	MAR. 2019

MATERIAL:
STRUCTURAL CONCRETE $f'c = 4000$ psi
REINFORCING SHALL BE ASTM 615 GRADE 60
CONCRETE SHALL MEET SPECIFICATION SEC. 512 AND SEC. 101

LOADING:
VAULT LID = HS25 LIVE LOAD PLUS 1.3 IMPACT PLUS DEAD LOADS
VAULT WALLS EQUIVALENT FLUID PRESSURE = 60 psf
SURCHARGE (VEHICLE) = 2 FEET
VAULT BASE SLAB ALLOWABLE BEARING PRESSURE = 1500 psf

9. IN SHALLOW GROUNDWATER CONDITIONS: ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN THAT ACCOMMODATES FOR BUOYANCY AND INFILTRATION. FOR EXAMPLE, WITH FLOOR SLAB AND WITHOUT DRAIN POCKETS. DO NOT CONSTRUCT WITH OPEN BOTTOM. DESIGN SHALL BE APPROVED BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

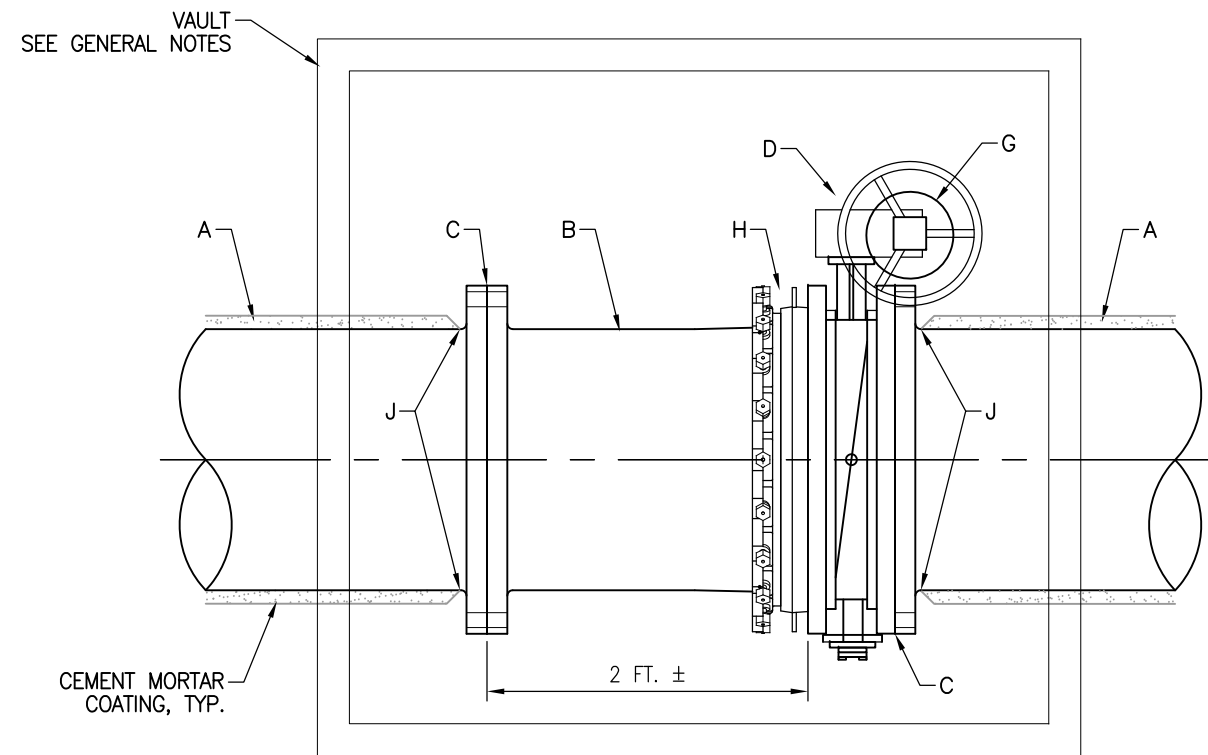
\emptyset	X
24"	9'-6"
30"	10'-0"
36"	10'-6"
42"	11'-0"
48"	11'-6"



1. INTERIOR MAIN PIPING SHALL BE STEEL PIPE, DUCTILE IRON PIPE, OR CONCRETE CYLINDER PIPE. ALL CAV VALVE ASSEMBLY PIPING AND FITTINGS SHALL BE SCH. 40 THREADED, TYPE 316 STAINLESS STEEL. DIAMETER SHALL MATCH SPECIFIC CAV VALVE TO BE INSTALLED.
2. ALL PARTS WITHIN THE VAULT MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
3. CONCRETE VAULT SHALL BE PRECAST WITH REMOVABLE CONCRETE LID.
4. LOCATE ACCESS MANHOLE FRAME, ADJUSTMENT RINGS AND COVER ON REMOVABLE CONCRETE LID TO ALLOW LID REMOVAL WITH THESE APPURTENANCES IN PLACE.
5. SUBMIT SHOP DRAWINGS OF VAULT AND PIPING, AND AIR AND VACUUM VALVE ASSEMBLY PRIOR TO VAULT FABRICATION AND PIPE INSTALLATION.
6. OWNER WILL SELECT PAINT COLORS FOR PIPING AND APPURTENANCES INSIDE VALVE VAULTS.
7. BACKFILL MATERIAL SHALL BE 95% DENSITY PER ASTM D 1557.
8. DESIGN ENGINEER SHALL SUBMIT A PROJECT SPECIFIC DETAIL AND A FLOOR AND PIPING PLAN.

- A. LADDER TO BE INSTALLED IN VAULTS GREATER THAN OR EQUAL TO 4 FT. IN DEPTH, PER STANDARD DRAWING 2335. INSTALL LADDER-UP SYSTEM, MODEL LU-4 BY BILCO OR EQUAL.
- B. 36" DIAMETER MANHOLE FRAME AND COVER MARKED "WATER" PER STANDARD DRAWING 2310. FOR VAULT INSTALLATIONS IN R.O.W., ADJUST MANHOLE FRAME AND COVER PER STANDARD DRAWING 2460. FOR ABOVE GROUND VAULTS, INSTALL FLUSH ALUMINUM HATCH AND SLEEVE FOR DAVIT MAST ARM.
- C. LINK SEAL. GROUT PENETRATION AROUND EXTERIOR CIRCUMFERENCE.
- D. REMOVE AND REPLACE PAVEMENT.
- E. GOOSENECK VENT, 4 IN Ø SCHEDULE 40 GALVANIZED STEEL. SEE STANDARD DRAWING 2334
- F. REMOVE AND REPLACE CURB AND GUTTER PER STANDARD DRAWING 2415A.
- G. 4 IN DIAMETER DRAIN WITH 3'x3'x3' GRAVEL DRAIN POCKET WITH CLEAN GRAVEL, ASTM C33, NO. 57. LINE DRAIN POCKET WITH GEOTEXTILE FABRIC NMDOT CLASS 3.
- H. SLOPE VAULT FLOOR TO DRAIN TYPICAL.
- J. CAST IN PLACE CONCRETE FILL. CONCRETE PROVIDES WORKING SURFACE.
- K. RECESSED LIFTING EYE, 4 REQUIRED. FLUSH W/TOP OF CONCRETE LID.
- L. CONCRETE COLLAR PER STANDARD DRAWING 2461.
- M. ADJUSTMENT RINGS (IF NEEDED) PER STANDARD DRAWING 2460.
- N. UNISTRUT PIPE BRACKET TYPICAL FOR COMBINATION AIR VALVE VENT.
- P. REMOVE AND REPLACE SIDEWALK PER STANDARD DRAWING 2430.
- Q. CONCRETE COLLAR WITH 1~#4 REBAR EACH WAY CENTERED. SEE STANDARD DRAWING 2334
- R. TACK COAT.
- S. 1 1/4" STAINLESS STEEL THREADED EYEBOLT, CENTERED ON COMBINATION AIR VALVE ASSEMBLY. 1300 POUNDS LIFT CAPACITY.
- T. STATIONARY PIPE BOLLARD, SEE STANDARD DRAWING 2322.
- U. COORDINATE VENT PIPE ORIENTATION FOR EACH VAULT LOCATION DURING SHOP DWG SUBMITTAL.
- AA. COMBINATION AIR VALVE ASSEMBLY, SIZE PER PLANS.
- BB. TAPPING SADDLE OR FLANGED OUTLET.
- CC. GATE VALVE. SIZE THE SAME AS COMBINATION AIR AND VACUUM RELEASE VALVE.
- DD. 4 IN SCHEDULE 40 GALVANIZED STEEL PIPE FOR VAULT VENT. ROUTE TO BACK OF SIDEWALK. FIELD ADJUST DEPTH AND ROUTING TO AVOID EXISTING UTILITIES.
- EE. UNION TYPICAL, ALL AIR AND VACUUM RELEASE VALVES.

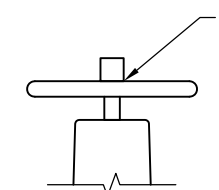
REVISIONS	WATER AUTHORITY
JAN. 2013 JUNE 2018 APR. 2019	WATER CAV VALVE VAULT FOR 14-INCH AND LARGER DIA. WATER MAINS DWG. 2350 AUG. 2019



PLAN

BUTTERFLY VALVE INSTALLATION DETAIL IN NEW CONCRETE CYLINDER PIPELINE

PIPE SCHEDULE	
SIZE	HAND HOLE
30"	3"
36"	3"
42"	6"
48"	6"



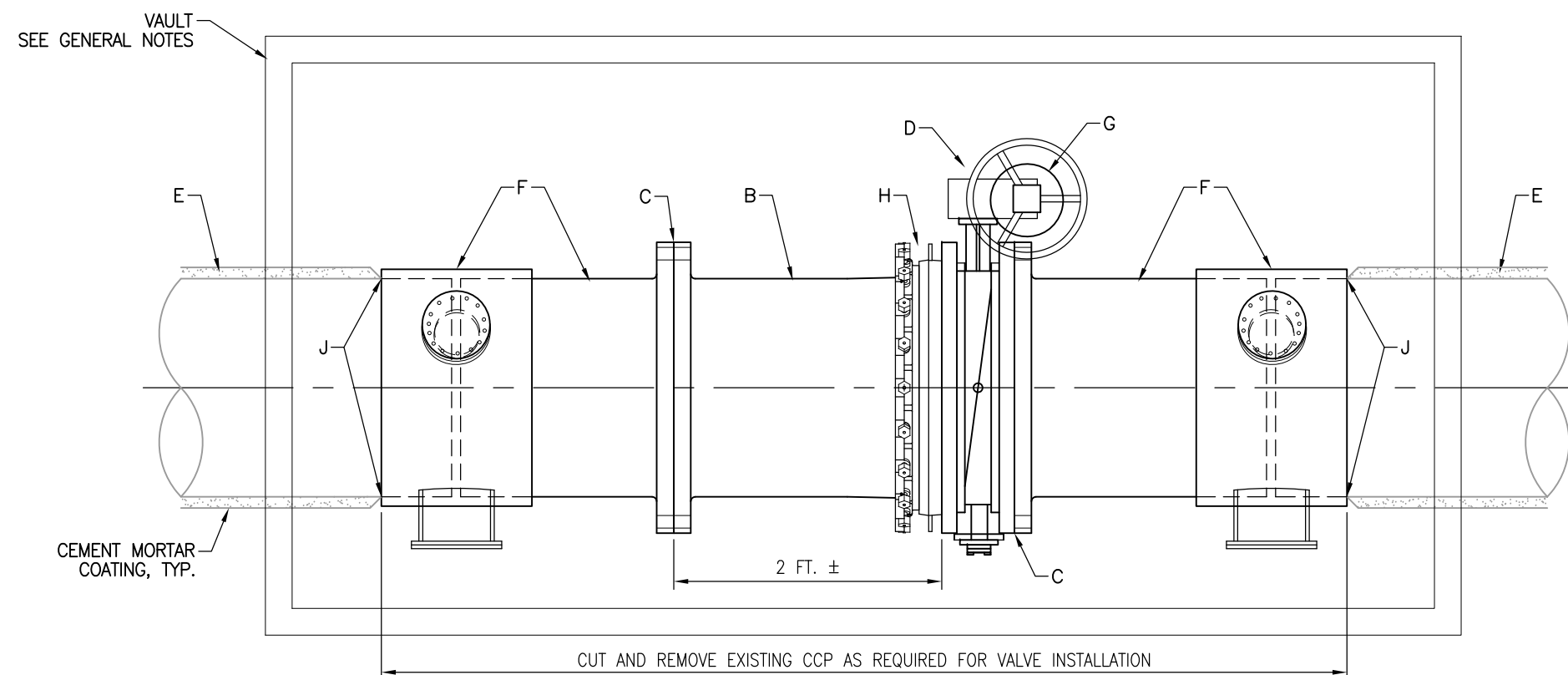
SIDE VIEW
HAND WHEEL WITH 3"
OPERATING NUT DETAIL

GENERAL NOTES

1. VAULT LOCATION, FINAL DESIGN AND LAYOUT SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS. ENGINEER SHALL SUBMIT A PROJECT SPECIFIC DETAIL. SUBMIT SHOP DRAWINGS OF VAULT, MAIN PIPING, AND VALVE ASSEMBLY PRIOR TO VAULT FABRICATION AND PIPE INSTALLATION. IF LOCATED IN ROADWAY, COORDINATE THE PROPOSED VAULT LOCATION WITH ANY FUTURE ROADWAY IMPROVEMENTS.
2. THIS DETAIL IS TO BE USED FOR NEW OR EXISTING CONCRETE CYLINDER PIPE ONLY.
3. PRIOR TO CONSTRUCTION OF REPAIRS OR VALVE INSTALLATIONS ON EXISTING CONCRETE CYLINDER PIPE, ALL REPAIR AND/OR VALVE INSTALLATION DETAILS SHALL BE SUBMITTED TO, AND APPROVED BY THE WATER AUTHORITY.
4. SEE STANDARD DRAWING 2334 FOR LARGE DIAMETER ISOLATION VALVE VAULT DETAILS.
5. IN SHALLOW GROUNDWATER CONDITIONS: ENGINEER SHALL PROVIDE A WATERPROOF VAULT DESIGN THAT ACCOMMODATES FOR BUOYANCY AND INFILTRATION. FOR EXAMPLE, WITH FLOOR SLAB AND WITHOUT DRAIN POCKETS. DO NOT CONSTRUCT WITH OPEN BOTTOM. DESIGN SHALL BE APPROVED BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

CONSTRUCTION NOTES

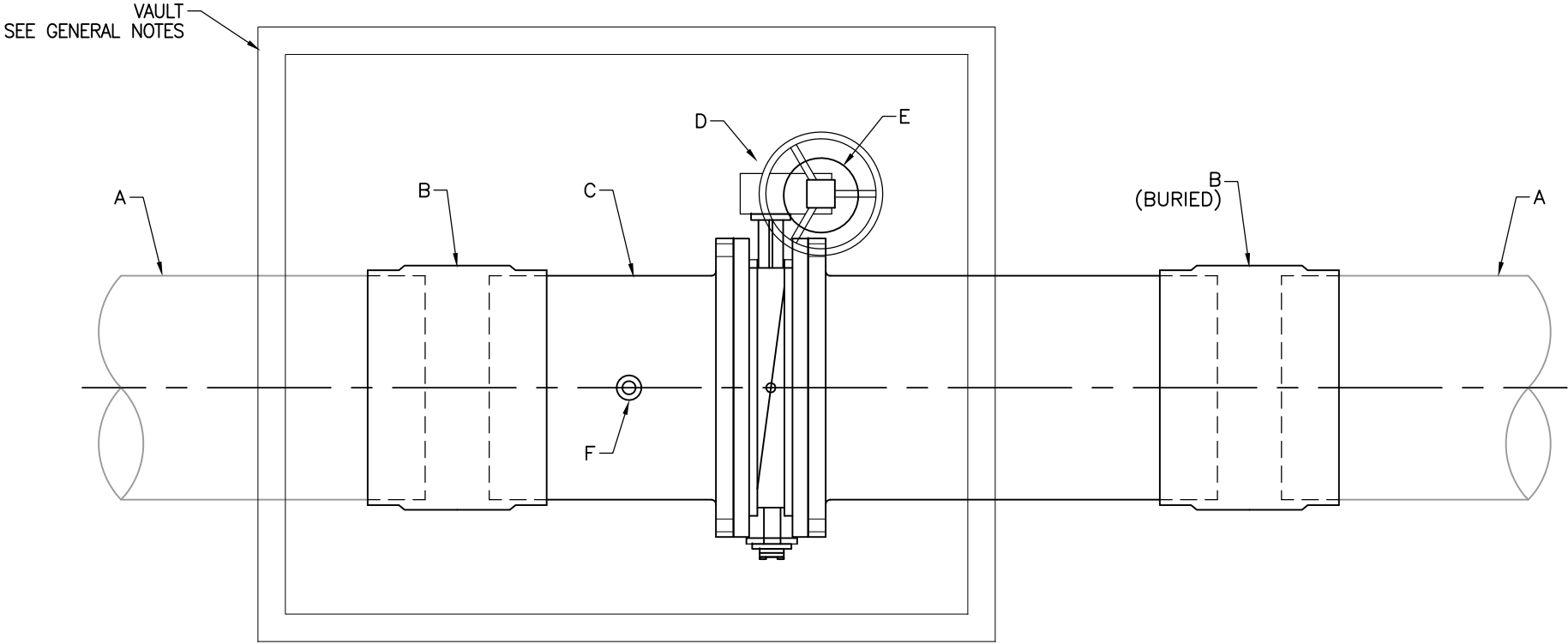
- A. NEW CONCRETE CYLINDER PIPE (CCP) WITH FLANGED END
- B. NEW 2 FT LONG DUCTILE IRON PIPE (DIP) SPOOL (FLxPE) WITH THICKENED PLAIN END FOR MEGAFLANGE CONNECTION
- C. INSULATING FLANGE KIT, IF REQUIRED.
- D. BUTTERFLY VALVE (FLxFL) AND VALVE OPERATOR WITH HAND WHEEL. WELD 3 IN SQUARE OPERATING NUT TO HAND WHEEL. SEE SIDE VIEW DETAIL BELOW.
- E. EXISTING CCP WITH PLAIN END (PE)
- F. BUTT STRAP x FLANGED END STEEL SPOOL. SEE DETAIL ON STANDARD DRAWINGS 2360 AND 2372 FOR BUTT STRAP ON CCP PIPE. DO NOT INSTALL IF EXISTING FLANGE EXISTS AT NEW VALVE LOCATION.
- G. VALVE BOX AND COVER PER WATER AUTHORITY STANDARD DRAWING 2326
- H. MEGA-FLANGE FLANGE ADAPTOR, SERIES 2100 AS MANUFACTURED BY EBBA IRON, OR EQUAL PER WATER AUTHORITY APPROVED PRODUCTS LIST.
- J. COAT ALL EXPOSED STEEL SURFACES WITH AN ENGINEER APPROVED PRODUCT, OR ONE FROM THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.



PLAN

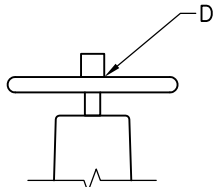
BUTTERFLY VALVE INSTALLATION DETAIL IN EXISTING CONCRETE CYLINDER PIPELINE

ABBREVIATIONS	REVISIONS	WATER AUTHORITY
CCP = CONCRETE CYLINDER PIPE DIP = DUCTILE IRON PIPE FL = FLANGED MJ = MECHANICAL JOINT PE = PLAIN END ST = STEEL	JAN. 2011 JUN. 2019	WATER CONCRETE CYLINDER PIPE IN-VAULT BUTTERFLY VALVE INSTALLATION DWG. 2351 AUG. 2019



PLAN

BUTTERFLY VALVE INSTALLATION DETAIL IN EXISTING DUCTILE IRON PIPELINE



SIDE VIEW

HAND WHEEL WITH 3"
OPERATING NUT DETAIL

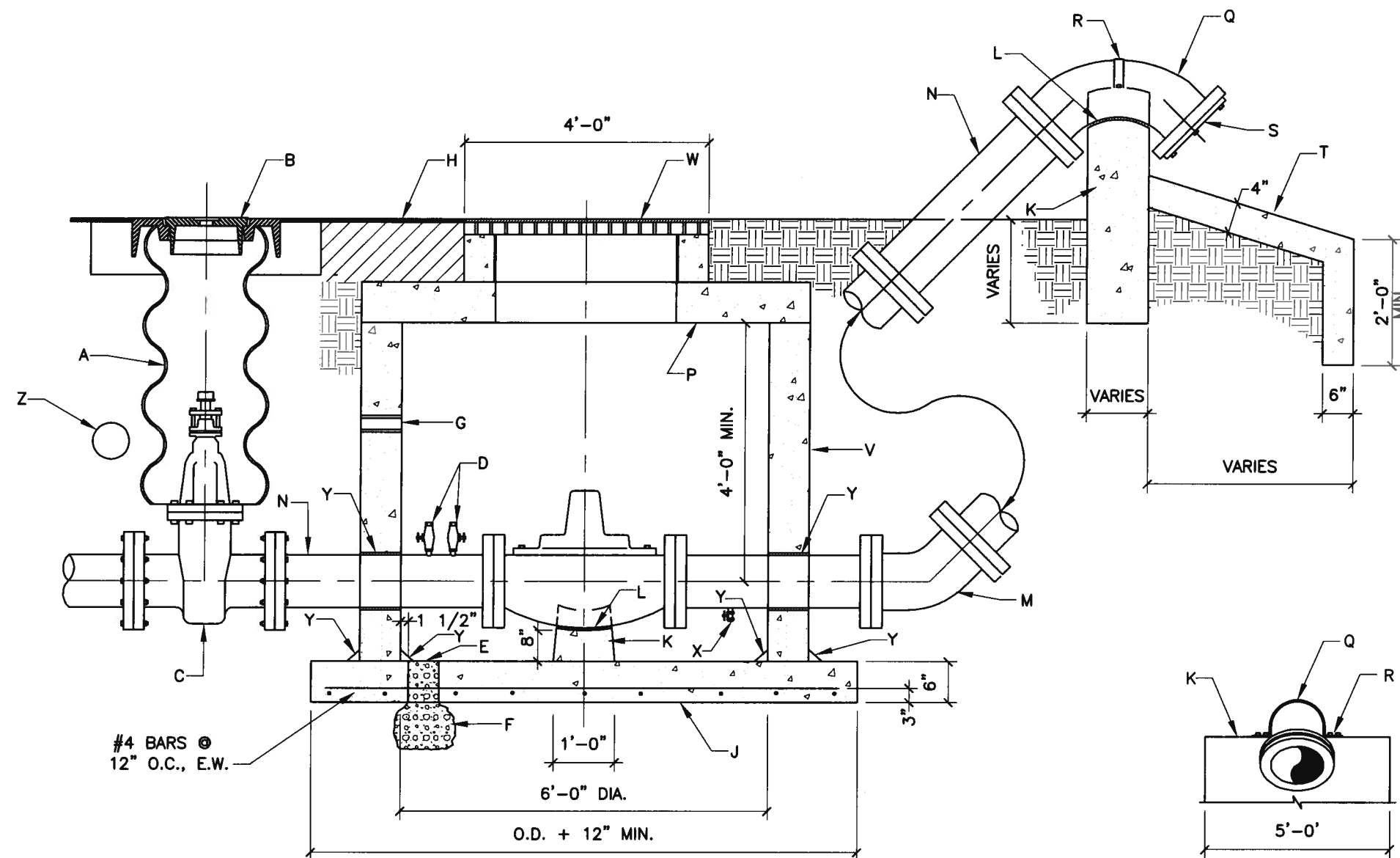
GENERAL NOTES

1. VAULT LOCATION, FINAL DESIGN AND LAYOUT SHALL BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS. ENGINEER SHALL SUBMIT A PROJECT SPECIFIC DETAIL. SUBMIT SHOP DRAWINGS OF VAULT, MAIN PIPING, AND VALVE ASSEMBLY PRIOR TO VAULT FABRICATION AND PIPE INSTALLATION. IF LOCATED IN ROADWAY, COORDINATE THE PROPOSED VAULT LOCATION WITH ANY FUTURE ROADWAY IMPROVEMENTS.
2. THIS DETAIL IS TO BE USED FOR NEW OR EXISTING DUCTILE IRON PIPE ONLY.
3. PRIOR TO CONSTRUCTION OF REPAIRS OR VALVE INSTALLATIONS ON EXISTING DUCTILE IRON PIPE, ALL REPAIR AND/OR VALVE INSTALLATION DETAILS SHALL BE SUBMITTED TO, AND APPROVED BY THE WATER AUTHORITY.
4. SEE STANDARD DRAWING 2334 FOR LARGE DIAMETER ISOLATION VALVE VAULT DETAILS.
5. IN SHALLOW GROUNDWATER CONDITIONS: ENGINEER SHALL PROVIDE A WATERPROOF VAULT DESIGN THAT ACCOMMODATES FOR BUOYANCY AND INFILTRATION. FOR EXAMPLE, WITH FLOOR SLAB AND WITHOUT DRAIN POCKETS. DO NOT CONSTRUCT WITH OPEN BOTTOM. DESIGN SHALL BE APPROVED BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

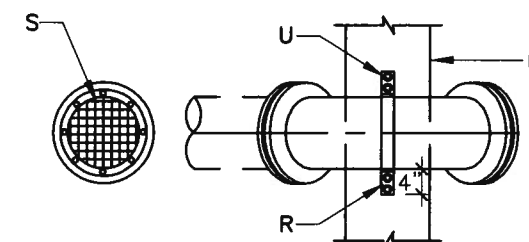
CONSTRUCTION NOTES

- A. EXISTING DIP WITH PLAIN END (PE)
- B. SOLID SLEEVE (MJ)
- C. DUCTILE IRON PIPE (DIP) SPOOL (FLxPE)
- D. BUTTERFLY VALVE (FLxFL) AND VALVE OPERATOR WITH HAND WHEEL. WELD 3 IN SQUARE OPERATING NUT TO HAND WHEEL. SEE SIDE VIEW DETAIL BELOW.
- E. VALVE BOX AND COVER PER WATER AUTHORITY STANDARD DRAWING 2326.
- F. AIR RELEASE NIPPLE WITH BALL VALVE

ABBREVIATIONS	REVISIONS	WATER AUTHORITY
DIP = DUCTILE IRON PIPE FL = FLANGED MJ = MECHANICAL JOINT PE = PLAIN END ST = STEEL	JAN. 2011 JUN. 2019	WATER DUCTILE IRON PIPE IN-VAULT BUTTERFLY VALVE INSTALLATION DWG. 2352 AUG. 2019



**ELEVATION
TYPICAL**



PIPE OUTLET

FRONT VIEW

PLAN VIEW

ANCHOR DETAILS

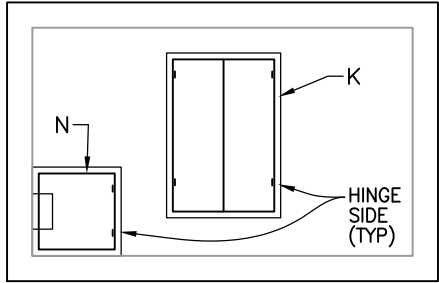
GENERAL NOTES:

- 1 SIZE, ELECTRIC AND MECHANICAL APPURTENANCES AND OUTLET DISCHARGE POINT AS REQUIRED BY THE WATER AUTHORITY.
- 2 ALL ABOVE SURFACE PIPING SHALL BE PAINTED SAFETY YELLOW.
- 3 BOLLARDS WILL BE REQUIRED WHEN REQUIRED BY THE ENGINEER OR THE WATER AUTHORITY.
- 4 NOT TO BE USED IN TRAFFIC AREAS.
- 5 DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.

CONSTRUCTION NOTES:

- A VALVE BOX PER C.O.A. STD. DWG. 2326.
- B VALVE BOX RING AND COVER PER C.O.A. STD. DWG. 2328.
- C GATE VALVE (FL. - FL.).
- D 1/2" CONNECTIONS WITH PETCOCK FOR PRESSURE MEASURING DEVICES.
- E 6" DIAMETER FLOOR DRAIN HOLE THROUGH SLAB.
- F 1/2 CU. YD. COARSE GRAVEL, ASTM C33, NO. 57 GRAVEL.
- G 2" SLEEVE FOR CONDUIT.
- H PAVEMENT.
- J REINFORCED CONCRETE SLAB, SLOPE TO DRAIN. CONCRETE PER SEC. 101, HYDRAULIC STRUCTURAL CONCRETE, $f'_c=3000$ psi @ 28 DAYS.
- K REINFORCED CONCRETE PEDESTAL. CONCRETE PER SEC. 101, EXTERIOR CONCRETE, $f'_c=3000$ psi @ 28 DAYS.
- L 30 LB. FELT BETWEEN FITTING OR VALVE AND PEDESTAL.
- M C.I./D.I. 45° ELL. (FL. - FL.).
- N C.I./D.I. PIPE (FL. - FL.).
- P PRECAST CONCRETE COVER, SEE DWG. 2107, EXCEPT OPENING SHALL BE 34" DIAMETER MINIMUM.
- Q C.I./D.I. 90° ELL. (FL. - FL.).
- R ANCHOR STRAPS 3/8"x2".
- S COVER OPENING WITH 1/2" HARDWARE CLOTH, SECURE TO END OF ELL WITH 6- 3/8"x2" BOLTS, NUTS, AND WASHERS.
- T CONCRETE SPLASH PAD TO BE DESIGNED FOR EACH SITE, WITH WELDED WIRE FABRIC REINFORCEMENT. CONCRETE PER SEC. 101, EXTERIOR CONCRETE, $f'_c=3000$ psi @ 28 DAYS.
- U 4- 5/8"x10" ANCHOR BOLTS.
- V 6'-0" DIA. TYPE "C" MANHOLE, PER C.O.A. STD. DWG. 2101.
- W 4'x4' BILCO DOOR AS APPROVED BY THE ENGINEER OR THE WATER AUTHORITY.
- X 1" TAP AND VALVE FOR DRAIN.
- Y NON-SHRINK GROUT.
- Z ELECTRONIC MARKER DEVICE (EMD), SEE COA STANDARD SPECIFICATION SECTION 170.

REVISIONS	WATER AUTHORITY
	WATER SURGE RELIEF VALVE STATION
	DWG. 2353 JANUARY 2011



TOP PLAN

TABLE 1: REQUIRED INFO. FOR ALL PRV VAULT DESIGN PLANS:

- GROUND WATER LEVEL (CONSIDERED FOR BUOYANCY CALCULATIONS/COUNTERMEASURES AND SUMP TYPE)
- TRAFFIC AREA (YES/NO)
- BYPASS REQUIRED (AS REQ'D BY MANUFACTURERS REP.)
- METER REQUIRED (AS REQ'D BY WUA OPERATIONS)
- FIRE FLOW RATE (IN GPM, FOR MAIN LINE VALVE SIZING)
- DAILY FLOW RATE (IN GPM, FOR BYPASS VALVE SIZING)
- RELIEF VALVE CRITERIA (AS A PERCENTAGE OF FIRE FLOW)
- MAXIMUM UPSTREAM PRESSURE (IN PSI)
- MINIMUM DOWNSTREAM PRESSURE (IN PSI)

CONSTRUCTION NOTES CONT.

- W. PRESSURE RELIEF VALVE (CLA-VAL). SAME DIAMETER AS BYPASS PIPING.
- X. RESILIENT SEAT GATE VALVE WITH HANDWHEEL. INSTALL VALVE SO THAT HANDWHEEL IS ACCESSIBLE.
- Y. DIP TEE (FL). TURNED UP
- Z. VENT PIPE, TEE AND CAP WITH 1/4" DIA. WEEP HOLE. SAME DIAMETER AS BYPASS PIPING. VENT PIPING SHALL BE ROUTED SUCH THAT THE ABOVE GROUND PIPING IS LOCATED OUT OF VEHICULAR OR PEDESTRIAN TRAFFIC AREAS. INSTALL INSECT SCREEN AT OUTSIDE OPENING, AND INSTALL 3'x3'x6" CONCRETE COLLAR AT GROUND LEVEL WITH 1~#4 REBAR EACH WAY.
- AA. STATIONARY POSTS/BOLLARDS, SEE STANDARD DRAWING 2322.

GENERAL NOTES

1. STRUCTURAL DETAILS, VAULT DIMENSIONS AND REINFORCING TO BE PROVIDED AND PE-STAMPED BY DESIGN ENGINEER.
2. PRV LOCATION, FINAL DESIGN AND LAYOUT SHALL PROVIDE INFORMATION IN TABLE 1, THIS SHEET, AND BE APPROVED BY THE WATER AUTHORITY TO CONFORM WITH SPECIFIC SYSTEM AND SITE REQUIREMENTS. ENGINEER SHALL PROVIDE INFORMATION IN TABLE 1, THIS SHEET, AND SUBMIT A PROJECT SPECIFIC DETAIL AND A FLOOR AND PIPING PLAN. SUBMIT SHOP DRAWINGS OF VAULT AND PIPING AND PRV VALVE ASSEMBLY PRIOR TO VAULT FABRICATION AND PIPE INSTALLATION. COORDINATE THE PROPOSED VAULT LOCATION WITH ANY FUTURE ROADWAY IMPROVEMENTS.
3. ALL PIPE TO BE FLANGE JOINT DUCTILE IRON PIPE (DIP), UNLESS OTHERWISE NOTED.
4. ALL EXTERIOR PIPING SHALL BE PAINTED SAFETY YELLOW.
5. STATIONARY POSTS/BOLLARDS WILL BE REQUIRED WHEN SPECIFIED BY THE ENGINEER OR THE WATER AUTHORITY.
6. IN NON-TRAFFIC AREAS, THE TOP ELEVATION OF THE VAULT WILL BE 12" ABOVE FINISHED GRADE WITH BOLLARDS PAINTED SAFETY YELLOW AT EACH CORNER. THIS DETAIL DEPICTS THE NON-TRAFFIC AREA SCENARIO.
7. ALL PARTS WITHIN THE VAULT MUST COINCIDE WITH THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.
8. A PLASTIC NAMEPLATE SHALL BE INSTALLED ON THE VAULT WALL THAT SHOWS THE ELEVATION OF THE TOP OF PIPE ADJACENT TO THE PRV VALVE.
9. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.
10. PRV VAULT MUST BE EQUIPPED WITH USF LOAD LEVEL 7 (ASTM C1802-14) FULL TRAFFIC RATED ACCESS HATCHES WITH CAST IRON LIDS. CONSTRUCT HATCHES FLUSH WITH TOP OF VAULT.
11. IF REDUCERS ARE REQUIRED, THEY MUST BE INSTALLED INSIDE OF VAULT.

CONSTRUCTION NOTES

- A. PRESSURE REDUCING VALVE, AS SPECIFIED (CLA-VAL) *SEE VALVE NOTES TO LEFT FOR DETAILS
- B. CLA-VAL H STYLE STRAINER.
- C. VALVE WITH HAND WHEEL OPERATOR. GATE VALVE FOR DIA. < 14", BUTTERFLY VALVE FOR DIA. > 14".
- D. ROMAC DJ400 DISMANTLING JOINT, OR ENGINEER APPROVED EQUAL.
- E. DIP TEE (FL), ONLY REQUIRED IF BYPASS IS SPECIFIED.
- F. FLEXIBLE COUPLING WITH THRUST TIES. SEE THRUST TIE DETAIL ON STANDARD DRAWING 2358.
- G. ADJUSTABLE PIPE SUPPORT
- H. GATE VALVE WITH HAND WHEEL OPERATOR, ONLY REQUIRED IF BYPASS IS SPECIFIED.
- J. ALUMINUM LADDER PER STANDARD DRAWING 2335, ONLY REQUIRED IF VAULT IS ≥ 4' IN DEPTH. INSTALL LADDER-UP SAFETY POST SYSTEM MODEL LU-4 BY BILCO OR ENGINEER APPROVED EQUAL.
- K. 4'x4' DOUBLE LEAF ACCESS HATCH (WITHOUT BYPASS) AND 4'x6' DOUBLE LEAF (WITH BYPASS). SPECIFY USF LOAD LEVEL 7 (ASTM C1802-14) FULL TRAFFIC RATED HATCH WITH HINGED CAST IRON LID FLUSH WITH TOP VAULT SURFACE. HARDWARE AND HINGES SHALL BE 304 STAINLESS STEEL. SPECIFY SPRING ASSISTED LIFT MECHANISM. CENTER HATCH OVER PRV, OR PRV'S IF WITH BYPASS PIPING.
- L. GRAVEL PER ASTM C33, NO. 57 WITH FILTER FABRIC LINER, MIRAFI TYPE 140NL OR EQUAL.
- M. 6" STEEL VENT PIPES W/GOOSENECK AND INSECT SCREEN. 6" VENT PIPING SHALL BE ROUTED SUCH THAT THE ABOVE GROUND GOOSENECK IS LOCATED OUT OF VEHICULAR OR PEDESTRIAN TRAFFIC AREAS. EXTEND INTAKE VENT TO 1' ABOVE VAULT FLOOR, AND TERMINATE EXHAUST VENT AT INTERIOR OF VAULT WALL, 16" BELOW CEILING. INSTALL 2'x2'x4" CONCRETE COLLARS AT GROUND LEVEL WITH 1~#4 REBAR EACH WAY.
- N. 3'-0" SQUARE ACCESS HATCH. SPECIFY USF LOAD LEVEL 7 (ASTM C1802-14) FULL TRAFFIC RATED HATCH WITH HINGED CAST IRON LID FLUSH WITH TOP OF VAULT SURFACE. HARDWARE AND HINGES SHALL BE 304 STAINLESS STEEL. SPECIFY SPRING ASSISTED LIFT MECHANISM. ORIENT HINGED SIDE OF HATCH OPPOSITE OF WALL MOUNTED LADDER.
- P. WALL PIPE. THRUST COLLAR CENTERED IN WALL, DIP SPOOL WITH FLANGE - PLAIN END (FL x PE) INSTALLED WITH NON-SHRINK GROUT OR WATER AUTHORITY APPROVED EQUAL.
- Q. MECHANICALLY RESTRAINED BURIED VALVE. GATE VALVE FOR DIA. < 14", BUTTERFLY VALVE FOR DIA. > 14".
- R. 2" BALL VALVE AND SADDLE TAP. ORIENT DOWN TO DRAIN VAULT PIPING.
- S. DIP SPOOL (FL x FL)
- T. DIP 90 DEG ELBOW (LONG RADIUS, FL x FL)

NOTE:

DETAIL SHOWN IS A 12" MAIN WITH 4' OF COVER, 12" PRV & 4" BY-PASS

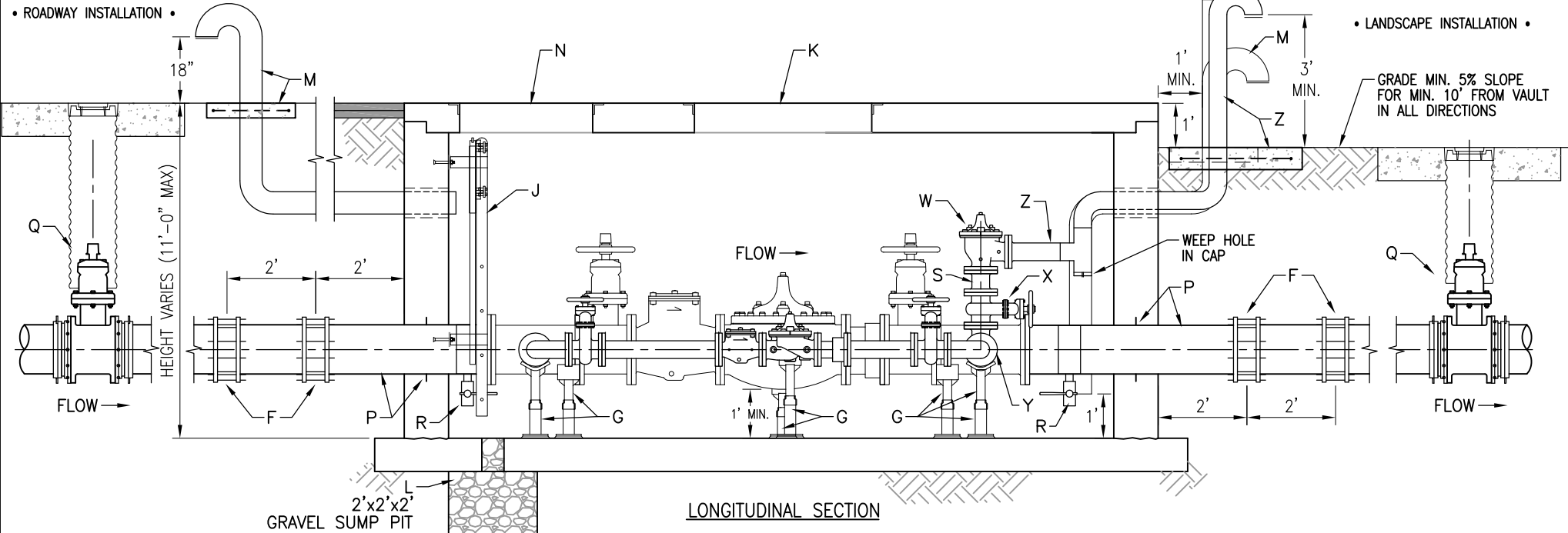
INTERIOR PLAN

*PRESSURE REDUCING VALVE NOTES:

PRESSURE REDUCING VALVE (CLA-VAL) SHALL INCLUDE THE FOLLOWING FEATURES:

1. CK2 ISOLATION VALVE
2. ALL PRV PILOT SYSTEMS MUST BE STAINLESS STEEL HIGH PRESSURE TUBING.
3. X101 VALVE POSITION INDICATOR
4. X43 "Y" STRAINER
5. KO ANTI-CAVITATION TRIM (IF REQ'D BY MANUFACTURERS REPRESENTATIVE)

LONGITUDINAL SECTION



REVISIONS

AUG. 2017
DEC. 2018
APR. 2019

WATER AUTHORITY

WATER
STANDARD PRV STATION
NO METER

DWG. 2354

NOV. 2019

*SEE NOTES TIE ROD SCHEDULE			
TEST PRESSURE		150 PSI	
PIPE DIA. (IN.)	MINIMUM PIPE WALL THICKNESS (IN.)*	TIE RODS	
		DIA. (IN.)	NO. REQ'D
6	3/16	5/8	2
8	3/16	5/8	2
10	3/16	5/8	2
12	3/16	5/8	2
14	3/16	3/4	2
16	3/16	7/8	2

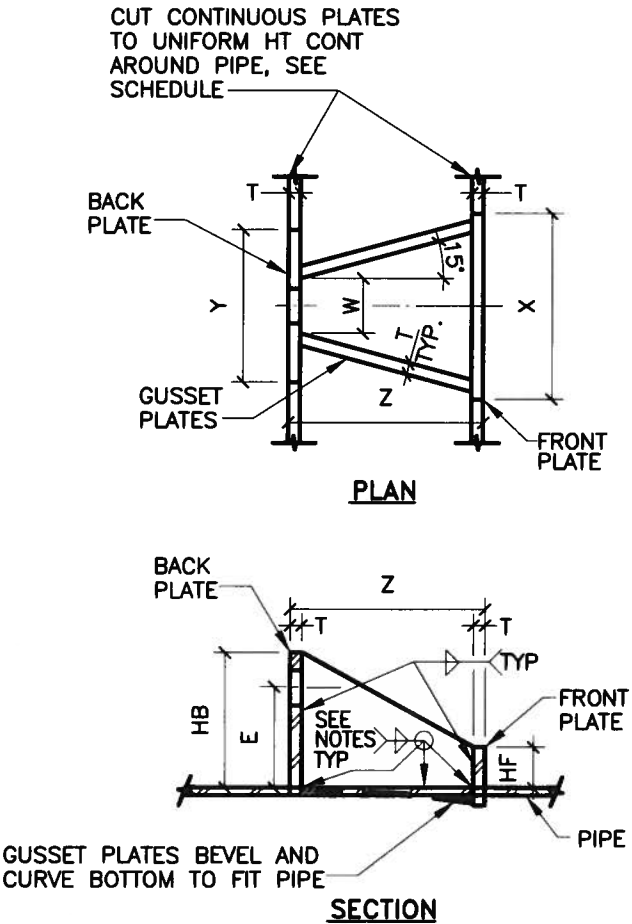
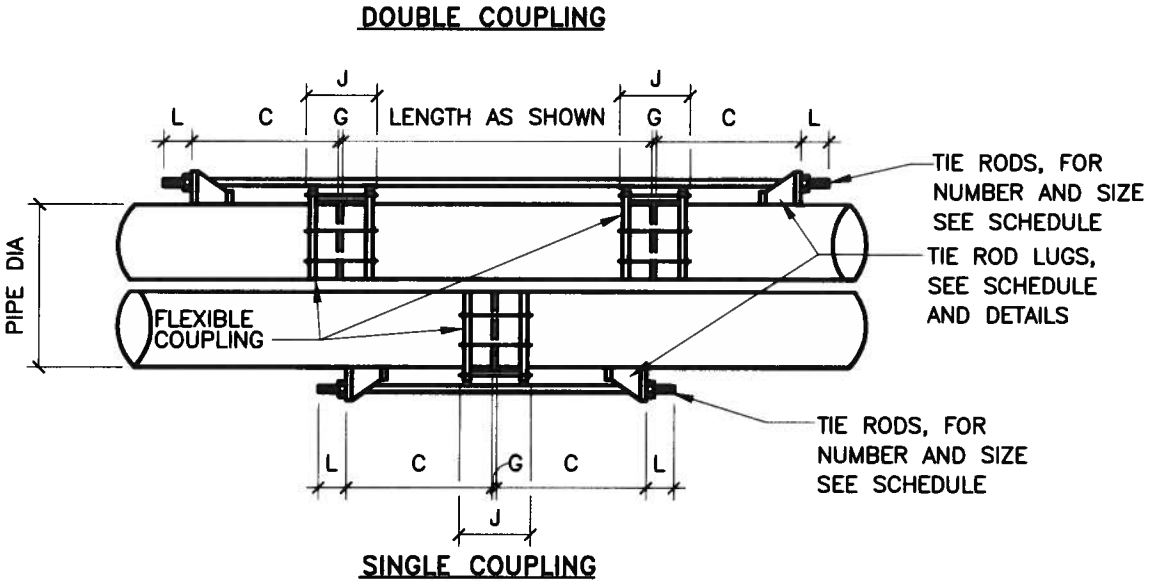
NOTES:

- THE CONTRACTOR SHALL DETERMINE THE LENGTH "J" (COUPLING BOLT LENGTH) FROM MANUFACTURER'S CATALOGS USING THE SPECIFIED MIDDLE RING LENGTH.
- "G" = MANUFACTURER'S RECOMMENDED SPACE BETWEEN ENDS OF PIPE.
- "C" = J+Z+1 INCH, (ROUND THIS VALUE UP TO NEXT EVEN INCH), MINIMUM. (FOR Z DIMENSIONS, SEE LUG SCHEDULE.)
- TIE ROD LENGTH = 2L+2C+G.

LUG SCHEDULE									
STUD DIA	T	W	X	Y	Z	HB	E	HF	L
5/8	3/8	1-3/8	4-1/16	4-1/2	3-3/8	3-7/8	3	1-3/4	3
3/4	3/8	1-1/2	5	4-1/2	5	4-1/8	3-1/8	1-3/4	3
7/8	1/2	1-5/8	5-1/2	4-1/2	5-1/8	4-1/4	3-1/8	1-3/4	4

NOTES:

- LUG SCHEDULE DIMENSIONS IN INCHES.
- TIE RODS SHALL CONFORM TO ASTM A193 GRADE B7.
- NUTS SHALL CONFORM TO ASTM A194 GRADE 2H.
- PLATE SHALL CONFORM TO ASTM A283 GRADE D.
- TIE ROD NUTS SHALL BE TIGHTENED GRADUALLY AND EQUALLY IN STAGES TO PREVENT UNEVEN ALIGNMENT AND TO ALLOW EQUAL STRESS ON ALL TIE RODS UNDER PRESSURE. TIGHTEN UNTIL SNUG. THREADS SHALL PROTRUDE FROM NUTS. PEEN THREADS AFTER TIGHTENING NUTS.
- TIE ROD LUGS SHALL BE SPACED EQUALLY AROUND PIPE.
- FILLET WELDS SHALL MEET THE MINIMUM REQUIREMENTS OF THE AISC SPECIFICATION EXCEPT AS FOLLOWS: FILLET WELDS SHALL BE 1/4-INCH MINIMUM EXCEPT WHEN WELDING 3/16-INCH PLATE WHERE THEY SHALL BE 3/16-INCH.
- TIE RODS SHALL NOT BE ATTACHED TO A PIPE WHEN THE WALL THICKNESS IS LESS THAN THE MINIMUM SHOWN ON THE TIE ROD SCHEDULE.
- FOR ALL BURIED ASSEMBLIES, COAT WITH AN ENGINEER APPROVED PRODUCT OR AS APPROVED ON THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.



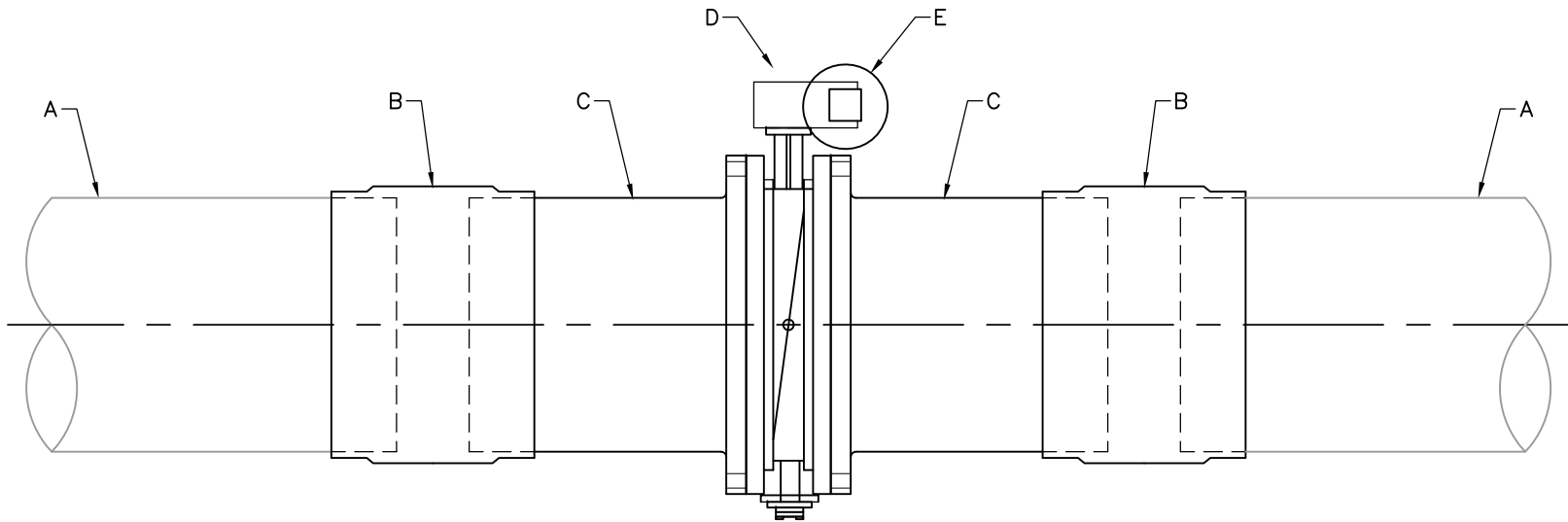
REVISIONS	WATER AUTHORITY
	WATER
	THRUST TIE DETAIL
	DWG. 2358 JANUARY 2011

GENERAL NOTES

1. THIS DETAIL IS TO BE USED FOR NEW OR EXISTING DUCTILE IRON PIPE ONLY.
2. PRIOR TO CONSTRUCTION OF REPAIRS OR VALVE INSTALLATIONS ON EXISTING DUCTILE IRON PIPE, ALL REPAIR AND/OR VALVE INSTALLATION DETAILS SHALL BE SUBMITTED TO, AND APPROVED BY THE WATER AUTHORITY.

CONSTRUCTION NOTES

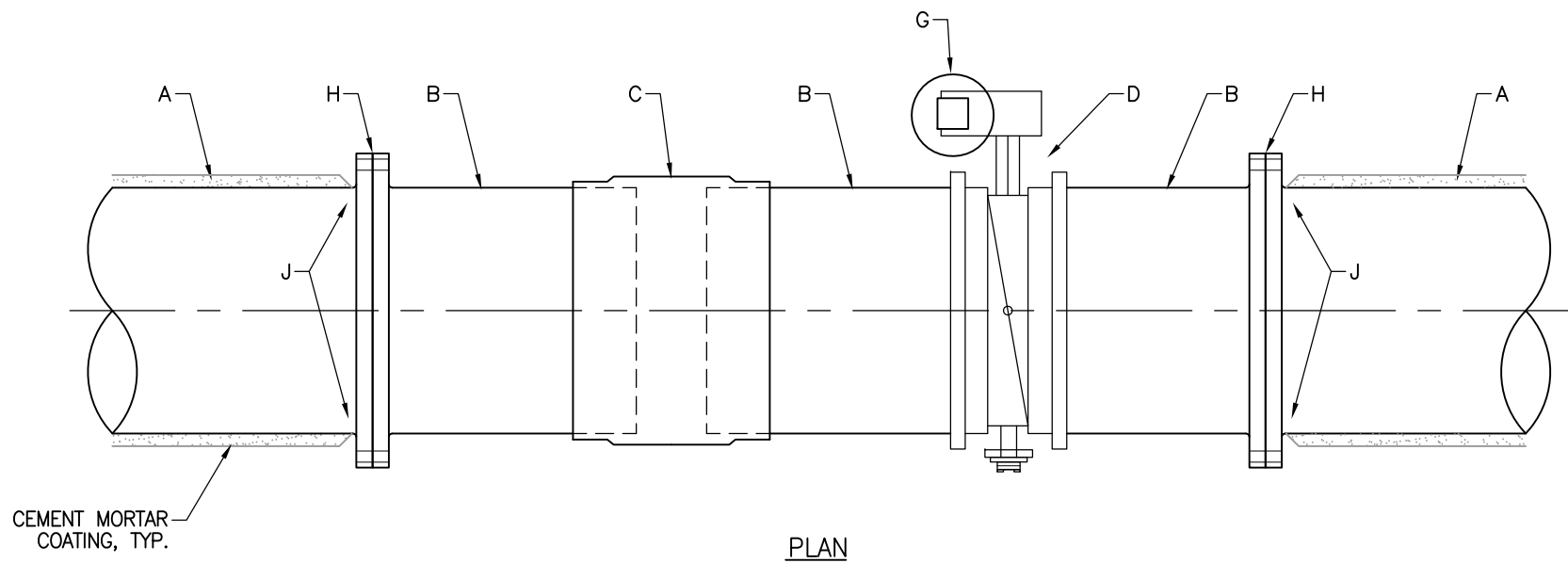
- A. EXISTING DIP WITH PLAIN END (PE)
- B. SOLID SLEEVE (MJ)
- C. DUCTILE IRON PIPE (DIP) SPOOL (FLxPE)
- D. BUTTERFLY VALVE (FLxFL) AND VALVE OPERATOR WITH 3 IN SQUARE OPERATING NUT.
- E. VALVE BOX AND COVER PER WATER AUTHORITY STANDARD DRAWING 2326.



PLAN

BUTTERFLY VALVE INSTALLATION DETAIL IN NEW OR EXISTING DUCTILE IRON PIPELINE

ABBREVIATIONS	REVISIONS	WATER AUTHORITY
DIP = DUCTILE IRON PIPE FL = FLANGED MJ = MECHANICAL JOINT PE = PLAIN END ST = STEEL	JAN. 2011 JUN. 2019	WATER DUCTILE IRON PIPE DIRECT BURY BUTTERFLY VALVE INSTALLATION DWG. 2359AUG. 2019



PLAN

BUTTERFLY VALVE INSTALLATION DETAIL IN NEW CONCRETE CYLINDER PIPELINE

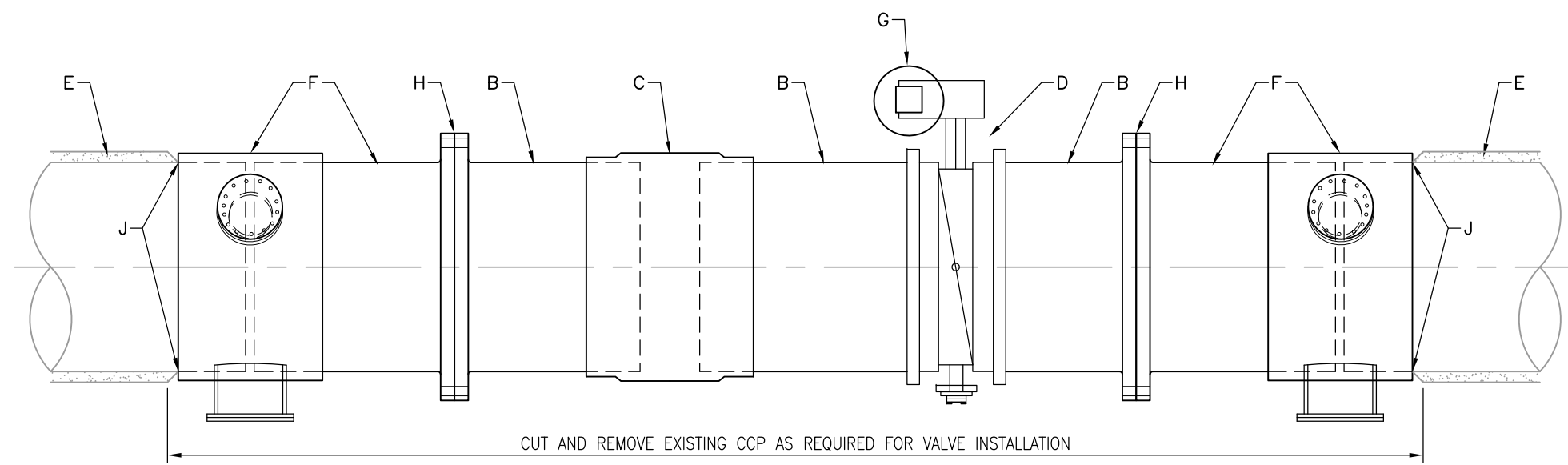
PIPE SCHEDULE	
SIZE	HAND HOLE
30"	3"
36"	3"
42"	6"
48"	6"

GENERAL NOTES

1. THIS DETAIL IS TO BE USED FOR NEW OR EXISTING CONCRETE CYLINDER PIPE ONLY.
2. PRIOR TO CONSTRUCTION OF REPAIRS OR VALVE INSTALLATIONS ON EXISTING CONCRETE CYLINDER PIPE, ALL REPAIR AND/OR VALVE INSTALLATION DETAILS SHALL BE SUBMITTED TO, AND APPROVED BY THE WATER AUTHORITY.

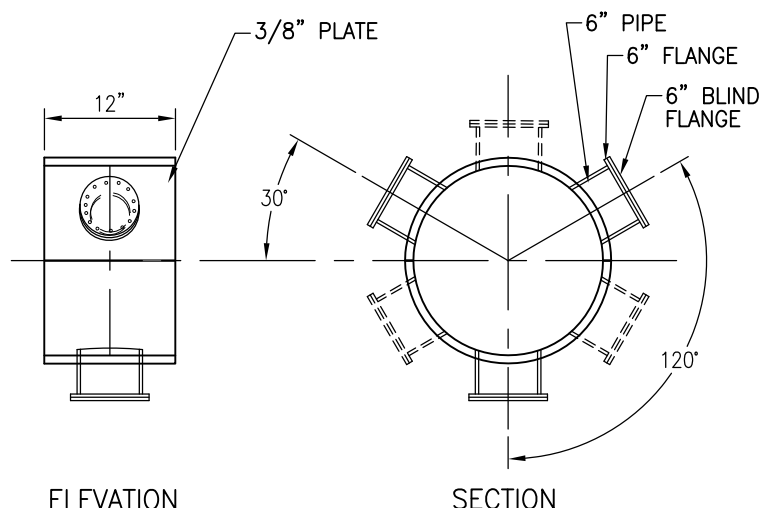
CONSTRUCTION NOTES

- A. NEW CONCRETE CYLINDER PIPE (CCP) WITH FLANGED END.
- B. DUCTILE IRON PIPE (DIP) SPOOL (FLxPE)
- C. SOLID SLEEVE
- D. BUTTERFLY VALVE (MJxMJ) AND VALVE OPERATOR WITH 3 IN SQUARE OPERATING NUT.
- E. EXISTING CCP WITH PLAIN END
- F. BUTT STRAP x FLANGED END STEEL SPOOL. SEE DETAIL THIS SHEET FOR BUTT STRAP ON CCP PIPE, AND STANDARD DRAWING 2372.
- G. VALVE BOX AND COVER PER WATER AUTHORITY STANDARD DRAWING 2326.
- H. INSULATING FLANGE KIT, IF REQUIRED.
- J. COAT ALL EXPOSED STEEL SURFACES WITH AN ENGINEER APPROVED PRODUCT, OR ONE FROM THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.



PLAN

BUTTERFLY VALVE INSTALLATION DETAIL IN EXISTING CONCRETE CYLINDER PIPELINE



ELEVATION

SECTION

BUTT STRAP
(FOR CCP PIPE)

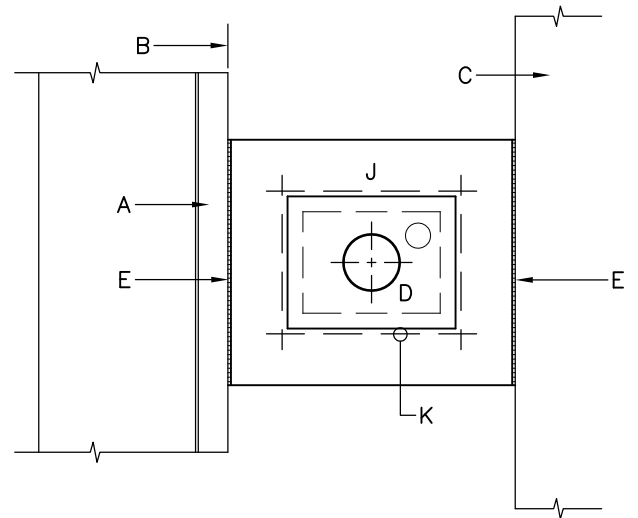
ABBREVIATIONS	REVISIONS	WATER AUTHORITY
CCP = CONCRETE CYLINDER PIPE DIP = DUCTILE IRON PIPE FL = FLANGED MJ = MECHANICAL JOINT PE = PLAIN END ST = STEEL	JAN. 2011 JUN. 2019	WATER CONCRETE CYLINDER PIPE DIRECT BURY BUTTERFLY VALVE INSTALLATION DWG. 2360 AUG. 2019

GENERAL NOTES

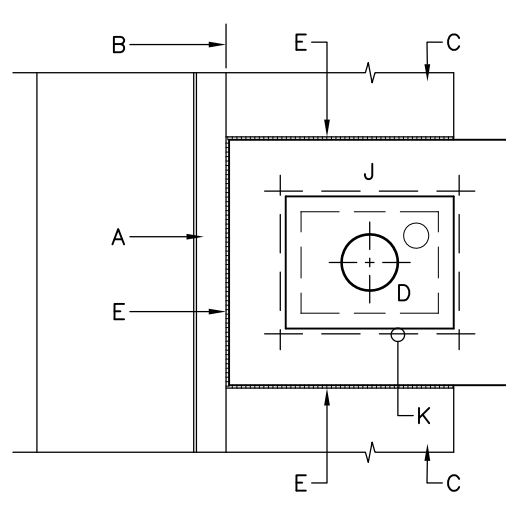
- 1. FOR CONSTRUCTION AND DIMENSIONS OF WATER METER BOX AND CONCRETE PAD, SEE STANDARD DRAWINGS 2362, 2363 & 2368.
- 2. BECAUSE OF LIMITED SPACE, METER BOXES MAY BE ROTATED 90°. CONNECTIONS TO BE MADE PER WATER AUTHORITY APPROVAL.
- 3. DOUBLE METER BOXES SHALL BE CENTERED ON ADJOINING PROPERTY LINES.
- 4. DOUBLE METER BOX CONFIGURATIONS SHALL BE USED TO THE EXTENT POSSIBLE.
- 5. METER BOXES SHALL NOT BE CONSTRUCTED IN DRIVEWAYS OR DRIVEPADS UNLESS AUTHORIZED IN WRITING BY THE WATER AUTHORITY.
- 6. WHERE METER BOXES EXIST WITHOUT THE DRIVEWAY OR DRIVEPAD IN PLACE, CONSTRUCTION OF NEW DRIVEWAYS AND/OR DRIVEPADS SHALL INCLUDE RELOCATION OF THE EXISTING METER BOXES.
- 7. WHERE CURB AND GUTTER EXISTS WITHOUT SIDEWALK, CONCRETE PAD SHALL MATCH THE TOP OF CURB ELEVATION, AND SLOPE DOWNWARDS TOWARD CURB AT 2% (MAX) IN CONFORMANCE WITH STANDARD DRAWING 2430.

CONSTRUCTION NOTES

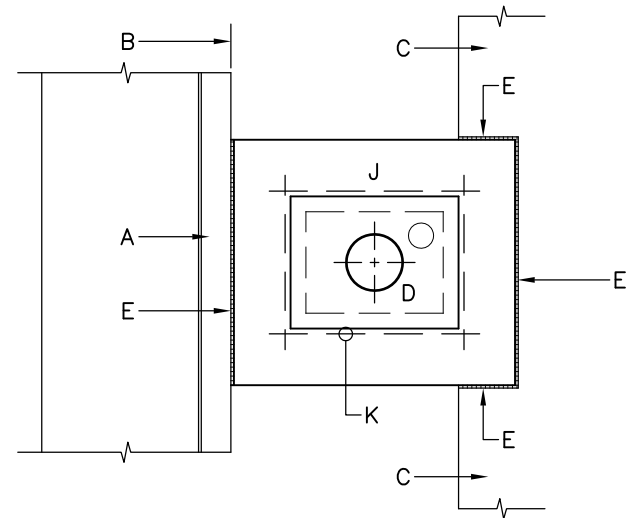
- A. CURB
- B. BACK OF CURB
- C. SIDEWALK
- D. METER BOX COVER, SEE STANDARD DRAWING 2368
- E. 1/2" EXPANSION JOINT
- F. EDGE OF UNCURBED STREET OR GRADED STREET
- G. PROPERTY LINE
- H. DRIVEPAD
- J. CONCRETE PAD, SEE STANDARD DRAWING 2362
- K. #4 REBAR CONTINUOUS ALL AROUND METER BOX



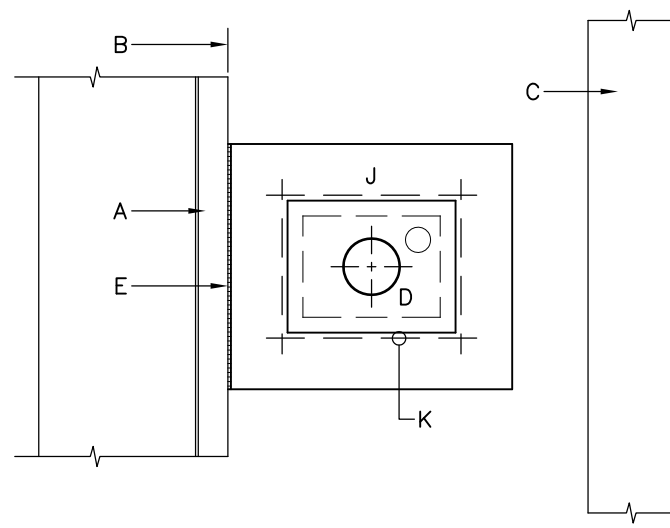
CASE 1
(IN LANDSCAPE BUFFER)
3 FT. IN WIDTH



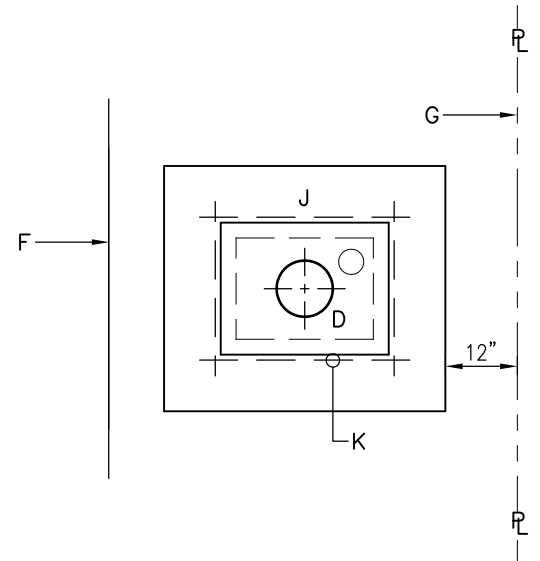
CASE 2
(IN SIDEWALK)



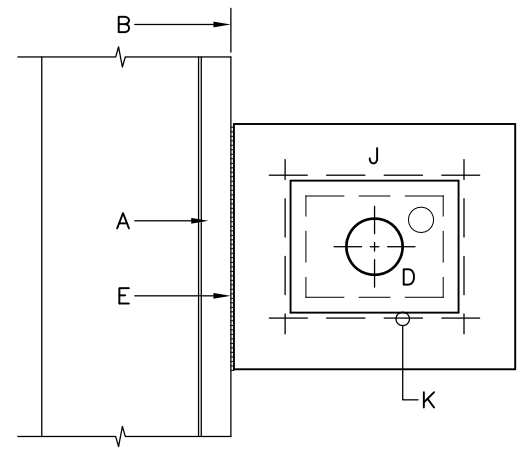
CASE 3
(IN LANDSCAPE BUFFER)
<3 FT. IN WIDTH



CASE 4
(IN LANDSCAPE BUFFER)
>3 FT. IN WIDTH



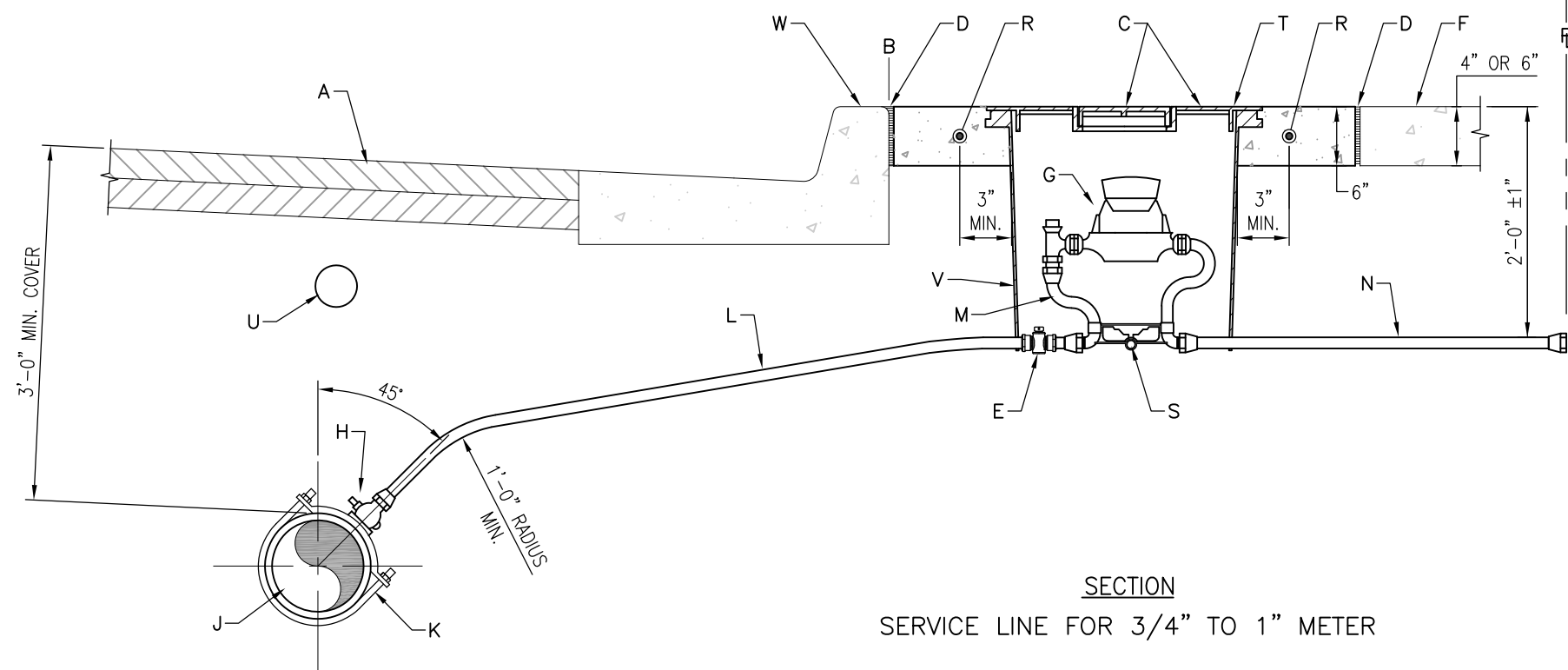
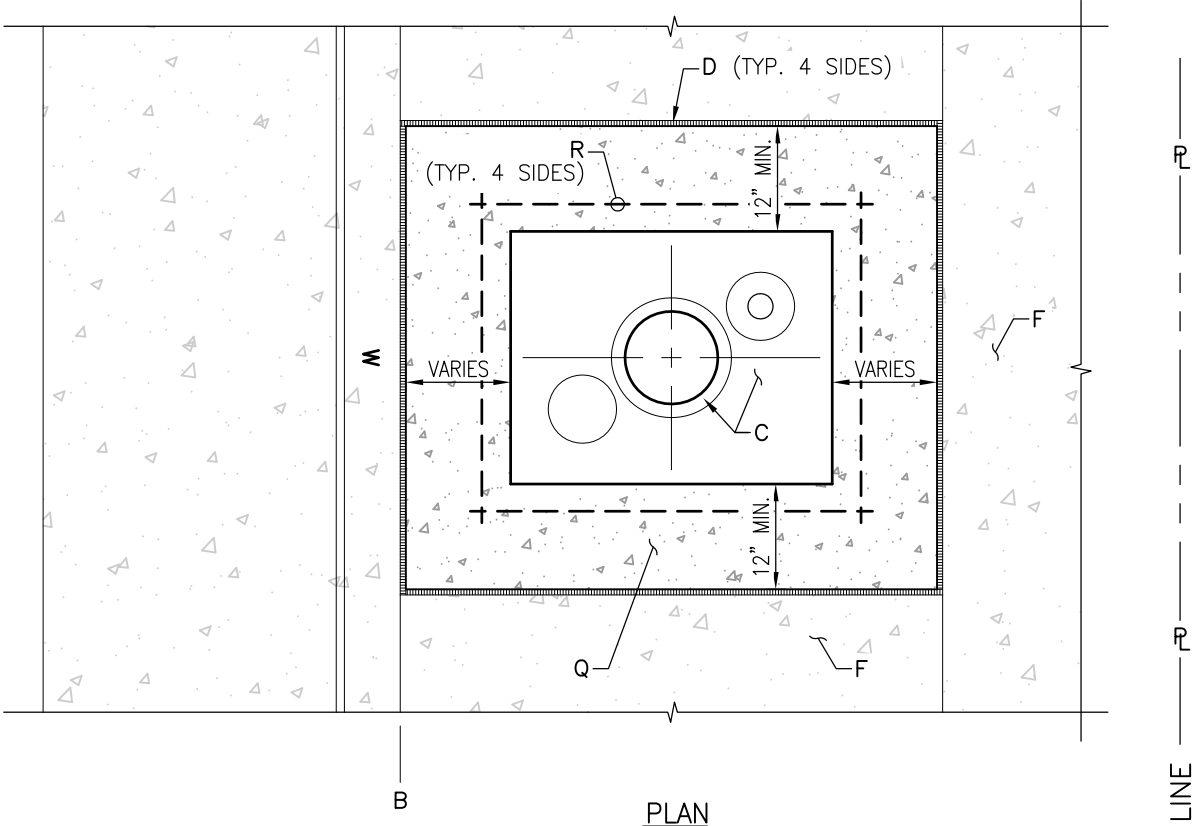
CASE 5
(NO CURB AND GUTTER OR SIDEWALK)



CASE 6
(CURB AND GUTTER)
NO SIDEWALK

TYPICAL INSTALLATIONS 3/4" - 1" METERS

REVISIONS	WATER AUTHORITY
AUG. 2013	WATER TYPICAL METER BOX INSTALLATIONS DWG. 2361 AUG. 2013



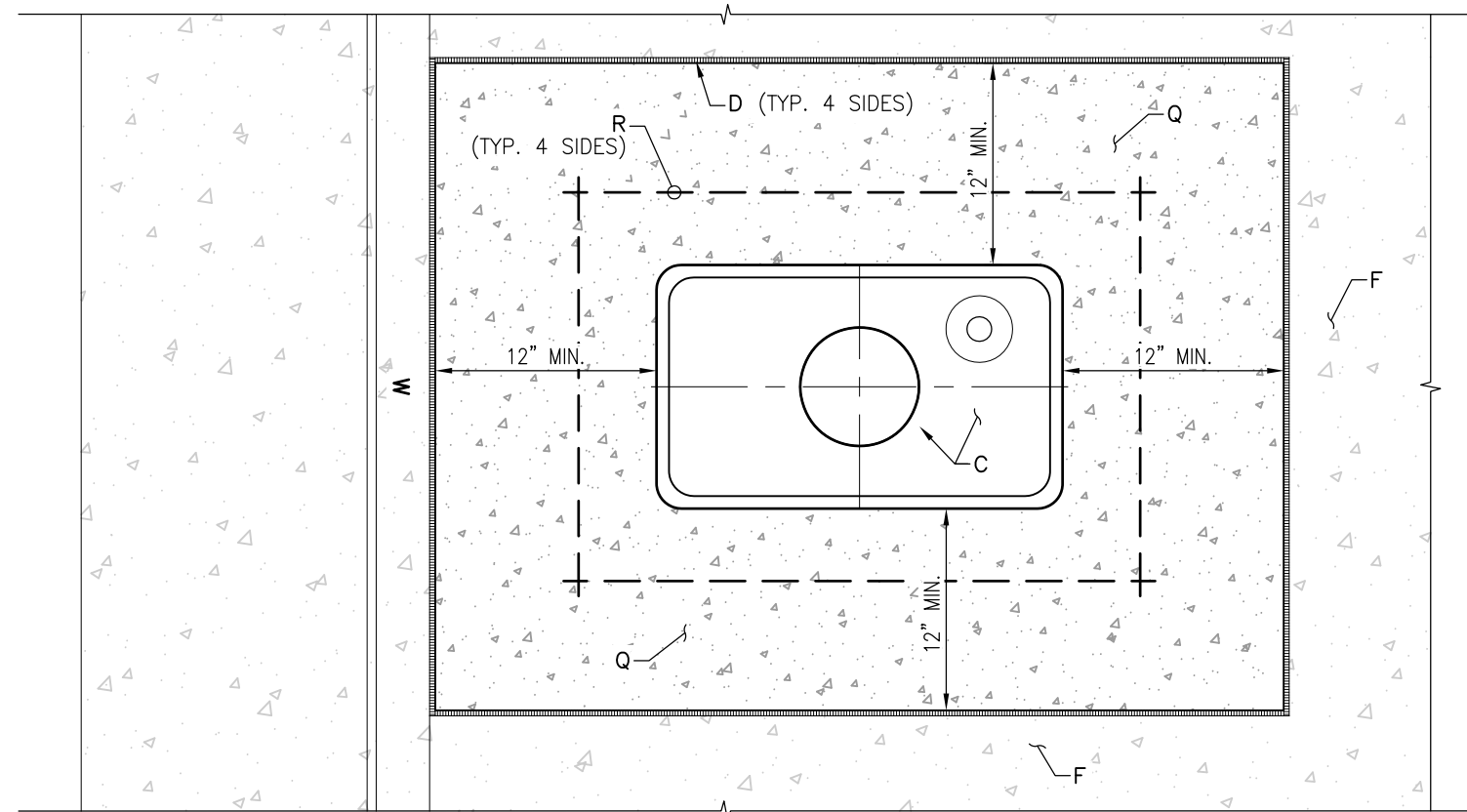
GENERAL NOTES

1. THE METER SHALL BE SET UTILIZING A COPPER-SETTER. COPPER-SETTER HEIGHT 10" FOR 1" METER. 7" FOR 3/4" METER.
2. THE VALVE AND METER REGISTER SHALL BE LOCATED UNDER THE LID OPENING. WHERE TWO METERS ARE TO BE INSTALLED IN A SINGLE METER BOX, THE METER REGISTERS SHALL BE WITHIN READING RANGE OF THE LID OPENING.
3. METER BOX LOCATION SHALL CONFORM TO STANDARD DRAWING 2361.
4. WHEN CONTRACTOR DOES NOT INSTALL METER, CONTRACTOR SHALL PROVIDE REMOVABLE PLUGS FOR END OF COPPER-SETTER.
5. EXISTING CONCRETE SHALL BE SAWCUT.
6. CROSS CONNECTION CONTROL. SEE STANDARD SPECIFICATION SECTION 802.3.9
7. THE (PRIVATE) TAILPIECE IS TO BE INSTALLED BY THE CONTRACTOR AND IS TO BE OWNED AND MAINTAINED BY THE CUSTOMER PER WATER AUTHORITY ORDINANCE.

CONSTRUCTION NOTES

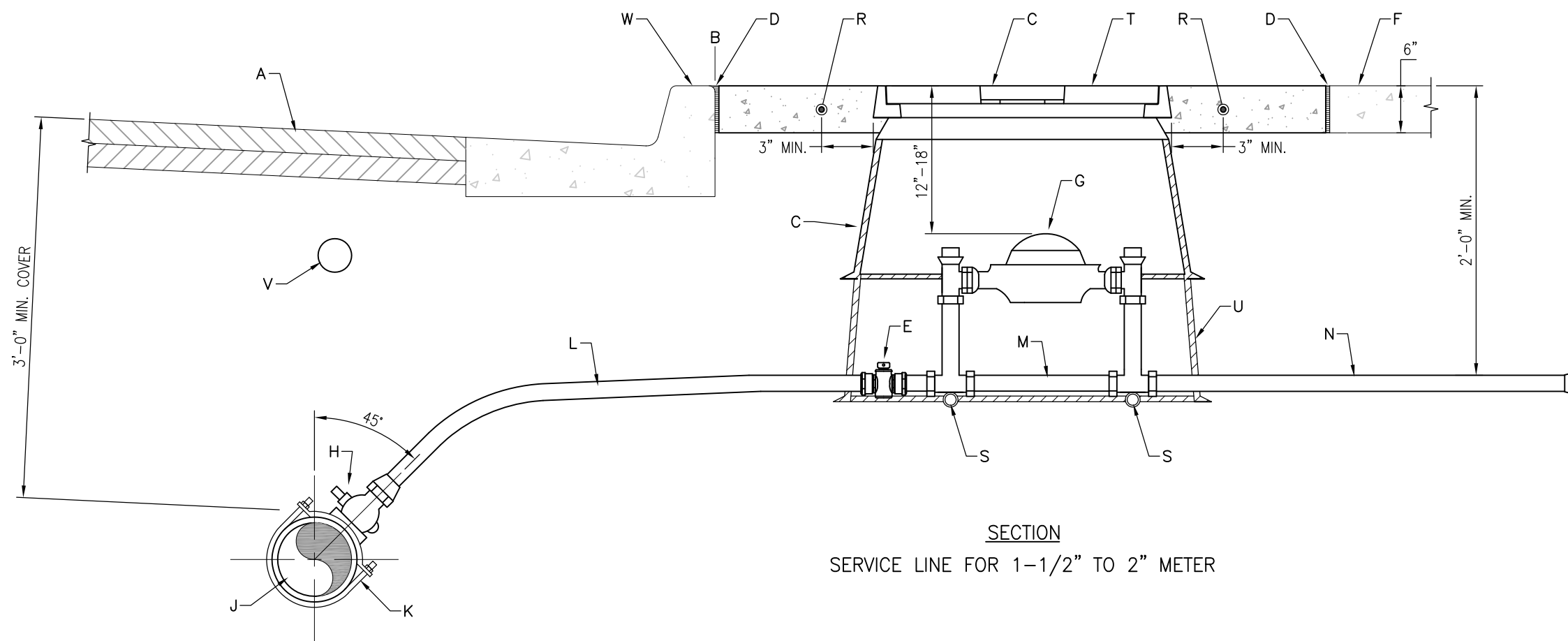
- A. STREET SURFACE
- B. BACK OF CURB
- C. METER BOX COVER AND LID. SEE STANDARD DRAWING 2368.
- D. 1/2" EXPANSION JOINT
- E. CURB STOP, LOCATE INSIDE METER BOX.
- F. SIDEWALK OR DRIVEPAD
- G. METER. TOP OF METER SHALL BE 12" TO 18" BELOW COVER.
- H. CORP STOP
- J. MAIN WATER LINE
- K. TAPPING SADDLE
- L. COPPER SERVICE LINE
- M. COPPER SETTER. PROVIDE WITH DUAL CHECK VALVE IN PRESSURE ZONES OW, 1W, 1E, AND FOR PRIVATE WELLS. SEE SPECIFICATION SECTION 802.3.9 FOR PRIVATE WELL PROVISIONS.
- N. TAILPIECE. 3 FT LONG, APPROVED COPPER TUBING WITH A CLEAN CUT AT END AND WITH A TEMPORARY PLUG. DUAL CHECK VALVE SHALL BE INSTALLED IN WATER ZONES OW, 1W, 1E AND FOR PRIVATE WELLS. SEE SPECIFICATION SECTION 802.3.9 FOR PRIVATE WELL PROVISIONS.
- Q. CONCRETE PAD REQUIRED IN ALL AREAS PER SECTION 101. EXTERIOR CONCRETE, f'c = 3000 psi AT 28 DAYS.
- R. #4 REBAR CONTINUOUS ALL AROUND METER BOX.
- S. STABILIZER BAR. USE FOR SINGLE METER ONLY. 12" LONG x 1/2" DIA. GALVANIZED STEEL PIPE.
- T. METER BOX LID SHALL BE FLUSH WITH SURROUNDING SIDEWALK.
- U. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.
- V. METER BOX PER STANDARD DRAWING 2366.
- W. "W" STAMP ON CURB WHERE SERVICE LINE CROSSES.

REVISIONS	WATER AUTHORITY
JAN. 2011	WATER 3/4" TO 1" METERED SERVICE LINE INSTALLATION DWG. 2362
	MAY 2019



PLAN

SERVICE LINE FOR 1-1/2" TO 2" METER



GENERAL NOTES

1. METER BOX LOCATION TO CONFORM TO STANDARD DRAWING 2361.
2. THE (PRIVATE) TAILPIECE IS TO BE INSTALLED BY THE CONTRACTOR AND IS TO BE OWNED AND MAINTAINED BY THE CUSTOMER PER WATER AUTHORITY ORDINANCE.

2. THE (PRIVATE) TAILPIECE IS TO BE INSTALLED BY THE CONTRACTOR AND IS TO BE OWNED AND MAINTAINED BY THE CUSTOMER PER WATER AUTHORITY ORDINANCE.

CONSTRUCTION NOTES

- A. STREET SURFACE
- B. BACK OF CURB
- C. METER BOX, COVER AND LID, SEE DRAWING 2367. COVER FLUSH WITH SURFACE AND CENTERED OVER METER REGISTER
- D. 1/2" EXPANSION JOINT
- E. CURB STOP, LOCATE INSIDE METER BOX.
- F. SIDEWALK OR DRIVEPAD
- G. METER. TOP OF METER TO BE 12" TO 18" BELOW COVER.
- H. CORP STOP
- J. MAIN WATER LINE
- K. TAPPING SADDLE
- L. COPPER SERVICE LINE
- M. COPPER SETTER. PROVIDE WITH DUAL CHECK VALVE IN PRESSURE ZONES OW, 1W, 1E, AND FOR PRIVATE WELLS. SEE SPECIFICATION SECTION 802.3.9 FOR PRIVATE WELL PROVISIONS.
- N. TAILPIECE 3 FT LONG, APPROVED COPPER TUBING WITH A CLEAN CUT AT END AND WITH A TEMPORARY PLUG. DUAL CHECK VALVE SHALL BE INSTALLED IN WATER ZONES OW, 1W, 1E AND FOR PRIVATE WELLS. SEE SPECIFICATION SECTION 802.3.9 FOR PRIVATE WELL PROVISIONS.
- Q. CONCRETE PAD REQUIRED IN ALL AREAS PER SECTION 101. EXTERIOR CONCRETE, f'c = 3000 psi AT 28 DAYS.
- R. #4 REBAR CONTINUOUS ALL AROUND METER BOX.
- S. STABILIZER BAR. 1/2" X 12" LONG GALVANIZED STEEL PIPE.
- T. METER BOX LID SHALL BE FLUSH WITH SURROUNDING SIDEWALK.
- U. METER BOX EXTENSION AS REQUIRED.
- V. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.
- W. 3" TALL "W" STAMP ON CURB WHERE SERVICE LINE CROSSES.

- B. BACK OF CURB

- C. METER BOX, COVER AND LID, SEE DRAWING 2367. COVER FLUSH WITH SURFACE AND CENTERED OVER METER REGISTER

- D. 1/2" EXPANSION JOINT

- E. CURB STOP, LOCATE INSIDE METER BOX.

- F. SIDEWALK OR DRIVEPAD

- G. METER. TOP OF METER TO BE 12" TO 18" BELOW COVER.

- H. CORP STOP

- ## J. MAIN WATER LINE

- ### K. TAPPING SADDLE

- L. COPPER SERVICE LINE

- M. COPPER SETTER. PROVIDE WITH DUAL CHECK VALVE IN PRESSURE ZONES OW, 1W, 1E, AND FOR PRIVATE WELLS. SEE SPECIFICATION SECTION 802.3.9 FOR PRIVATE WELL PROVISIONS.

- N. TAILPIECE 3 FT LONG, APPROVED COPPER TUBING WITH A CLEAN CUT AT END AND WITH A TEMPORARY PLUG. DUAL CHECK VALVE SHALL BE INSTALLED IN WATER ZONES OW, 1W, 1E AND FOR PRIVATE WELLS. SEE SPECIFICATION SECTION 802.3.9 FOR PRIVATE WELL PROVISIONS.

- Q. CONCRETE PAD REQUIRED IN ALL AREAS PER SECTION 101. EXTERIOR CONCRETE, $f'_c = 3000$ psi AT 28 DAYS.

- R. #4 REBAR CONTINUOUS ALL AROUND METER BOX.

- S. STABILIZER BAR. 1/2" X 12" LONG GALVANIZED STEEL PIPE.

- T. METER BOX LID SHALL BE FLUSH WITH SURROUNDING SIDEWALK.

- U. METER BOX EXTENSION AS REQUIRED.

- V. ELECTRONIC MARKER DEVICE (EMD). SEE STANDARD SPECIFICATION SECTION 170.

- W. 3" TALL "W" STAMP ON CURB WHERE SERVICE LINE CROSSES.

REVISIONS	WATER AUTHORITY
JAN. 2011	WATER 1-1/2" TO 2" METERED SERVICE LINE INSTALLATION DWG. 2363
	MAY 2019

REVISIONS	WATER AUTHORITY
JAN. 2011	WATER 1-1/2" TO 2" METERED SERVICE LINE INSTALLATION DWG. 2363
	MAY 2019

REVISIONS	WATER AUTHORITY
JAN. 2011	WATER 1-1/2" TO 2" METERED SERVICE LINE INSTALLATION DWG. 2363
	MAY 2019

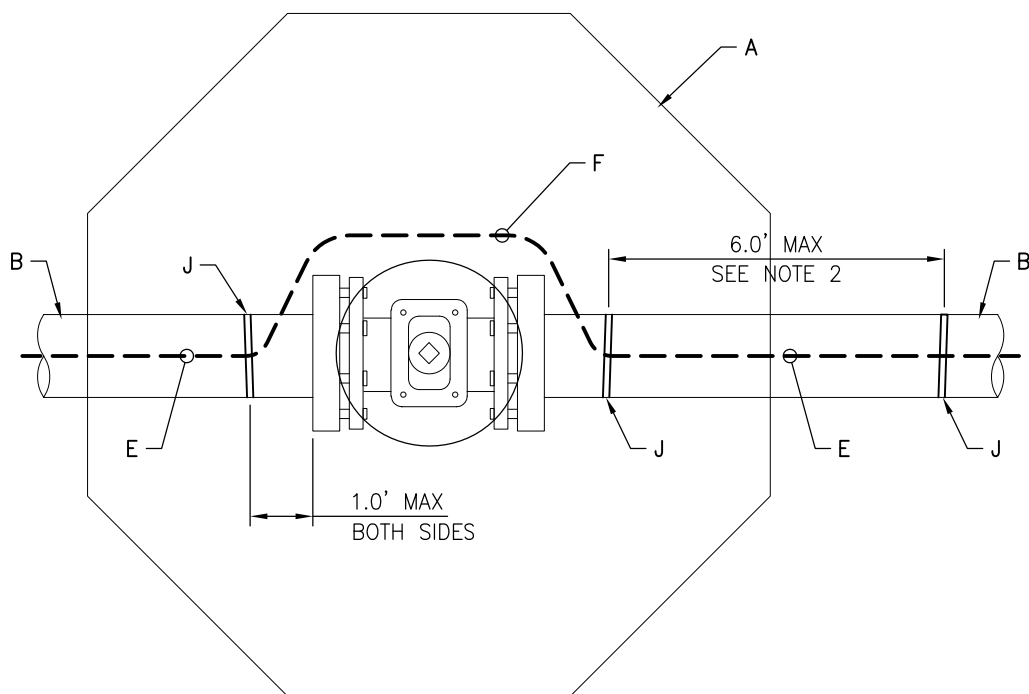
REVISIONS	WATER AUTHORITY
JAN. 2011	WATER 1-1/2" TO 2" METERED SERVICE LINE INSTALLATION DWG. 2363
	MAY 2019

REVISIONS	WATER AUTHORITY
JAN. 2011	WATER 1-1/2" TO 2" METERED SERVICE LINE INSTALLATION DWG. 2363
	MAY 2019

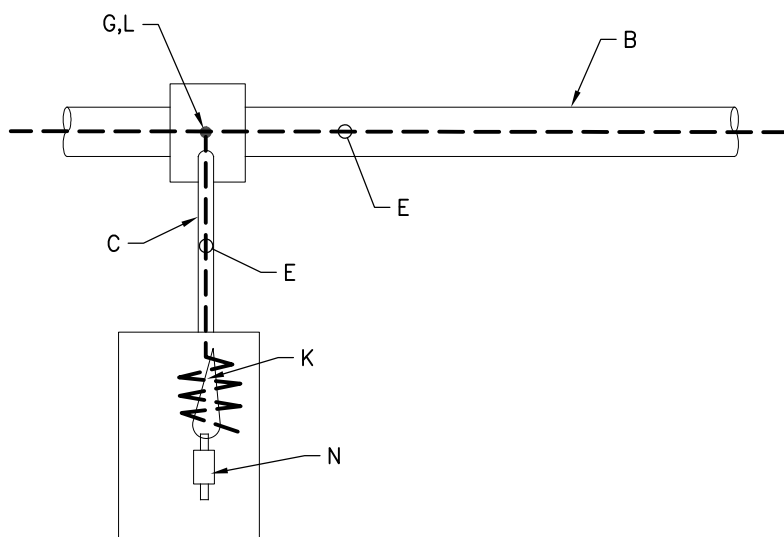
REVISIONS	WATER AUTHORITY
JAN. 2011	WATER 1-1/2" TO 2" METERED SERVICE LINE INSTALLATION DWG. 2363
	MAY 2019

REVISIONS	WATER AUTHORITY
JAN. 2011	WATER 1-1/2" TO 2" METERED SERVICE LINE INSTALLATION DWG. 2363
	MAY 2019

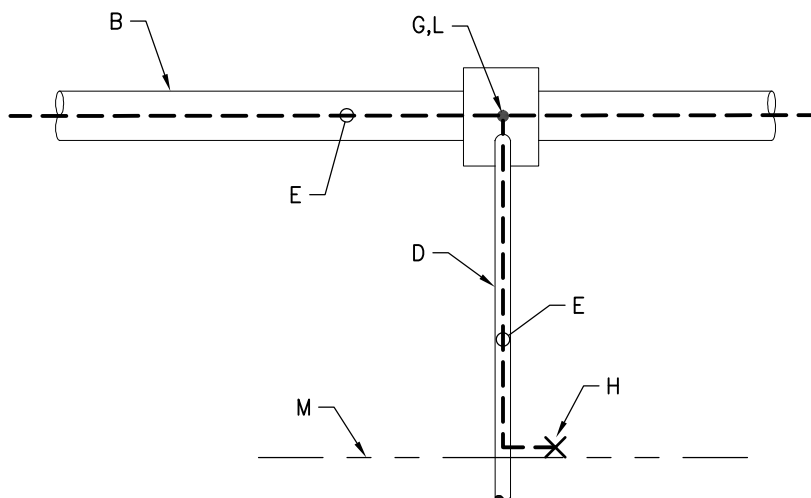
REVISIONS	WATER AUTHORITY
JAN. 2011	WATER 1-1/2" TO 2" METERED SERVICE LINE INSTALLATION DWG. 2363
	MAY 2019



WATER VALVE – PLAN VIEW
NOT TO SCALE



**WATER SERVICE
TRACE WIRE DETAIL**
NOT TO SCALE



**WATER LATERAL
TRACE WIRE DETAIL**
NOT TO SCALE

GENERAL NOTES

- TRACE WIRE SHALL BE INSTALLED ON TOP OF PIPE AS SHOWN IN SECTION A-A ON STANDARD DRAWING 2302.
- TRACE WIRE SHALL BE FASTENED TO THE NON-PEX PIPE WITH TAPE OR PLASTIC TIES AT 6' INTERVALS. USE PLASTIC (ZIP) TIES TO FASTEN TRACE WIRE TO PEX SERVICE LINES. DO NOT USE ADHESIVE TAPE ON PEX SERVICE LINES.
- TRACE WIRE SHALL BE COLOR CODED BLUE (APWA STANDARD).

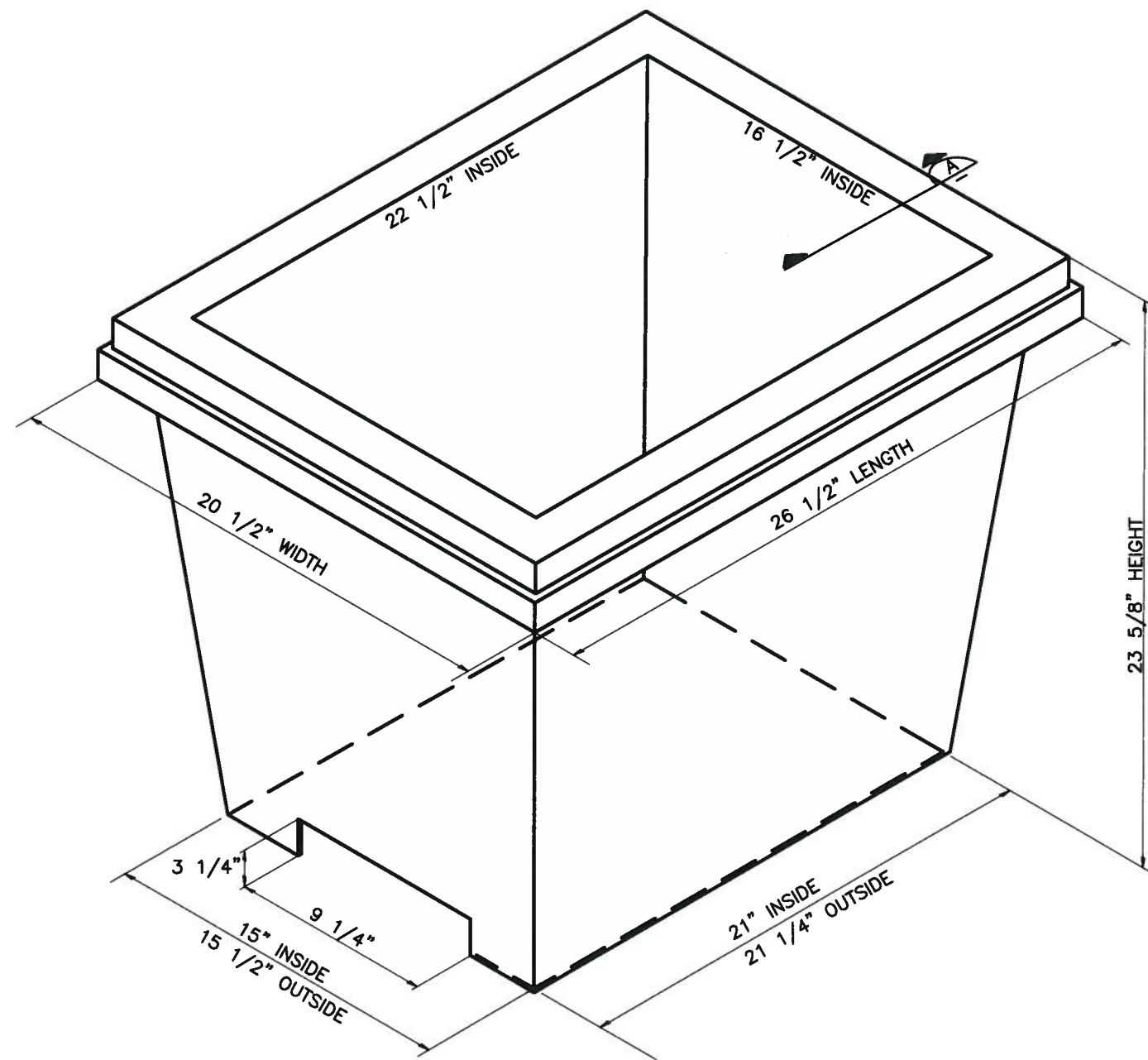
CONSTRUCTION NOTES

- CONCRETE COLLAR PER STANDARD DRAWING 2461
- WATER MAIN
- WATER SERVICE
- WATER LATERAL
- TRACE WIRE #12 AWG COPPER CLAD STEEL – BLUE FASTENED TO TOP OF PIPE. (SEE SECTION A-A STANDARD DRAWING 2302)
- TRACE WIRE SHALL BE ROUTED AROUND VALVES ON THE NORTH OR EAST SIDE
- FOR TAPPING PERMITS – IF TRACE WIRE EXISTS ON MAIN LINE, INSTALL TRACE WIRE ON SERVICE LINE AND CONNECT TO MAIN LINE TRACE WIRE WITH 3-WAY LOCKING WATERPROOF CONNECTOR. DO NOT CUT MAIN LINE TRACE WIRE. (SEE TEE CONNECTION DETAIL, STANDARD DRAWING 2302)
- DRIVE-IN MAGNESIUM GROUNDING ANODE CONNECT TO TRACE WIRE USING SPLICE CONNECTION (SEE ANODE DETAIL, STANDARD DRAWING 2302)
- TAPE OR PLASTIC TIE (SEE GENERAL NOTES).
- TRACE WIRE WITH MIN. 3' OF SLACK SECURED TO FRONT OF METER SETTER. GROUP AND ZIP-TIE, BUT DO NOT COIL.
- CONNECT SERVICE/LATERAL LINE TRACE WIRE USING TEE CONNECTION – 3-WAY LOCKING WATERPROOF CONNECTOR. DO NOT CUT MAIN LINE TRACE WIRE. (SEE TEE CONNECTION DETAIL, STANDARD DRAWING 2302)
- EDGE OF RIGHT-OF-WAY
- METER

NOTE:

- THIS WATER LATERAL DETAIL SHALL BE USED WHERE WATERLINE CROSSES RIGHT-OF-WAY LINE WITHOUT WATER METER. ALL LINES SHALL BE TRACED TO RIGHT-OF-WAY WITH GROUNDING ANODE AT RIGHT-OF-WAY.

REVISIONS	WATER AUTHORITY
SEP. 2017	WATER SERVICE AND VALVE TRACE WIRE DETAILS
	DWG. 2365 AUG. 2019



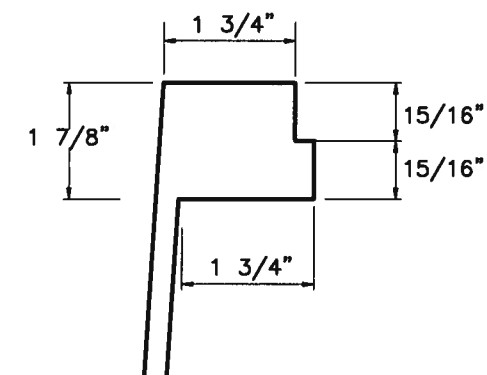
BOX
N.T.S.

GENERAL NOTES:

- 1 METER BOX LOCATION TO CONFORM TO DWG. 2361.
- 2 CONSTRUCTION OF METER BOX TO CONFORM TO SECTION 802 FOR WATER METER BOX, 3/4" AND 1" METERS.
- 3 SEE DWG 2368 FOR METER BOX COVER AND LID.

CONSTRUCTION NOTES:

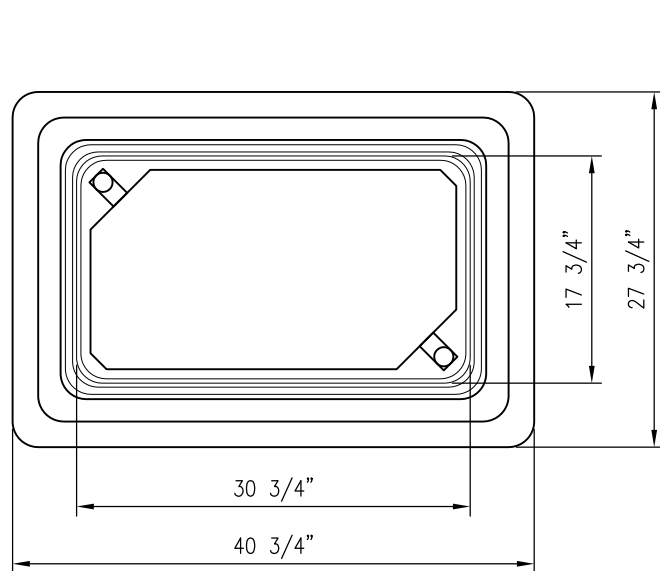
- A PIPE HOLE, 1 AT EACH END, 9 1/4" WIDE BY 3 1/4" HIGH.



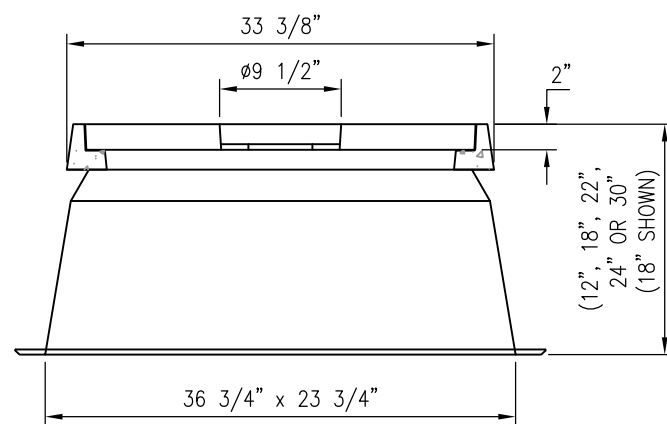
SECTION
N.T.S. A

*METER BOX FOR ONE OR TWO METER INSTALLATIONS

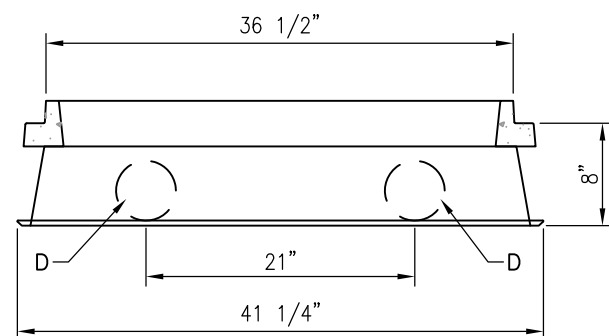
REVISIONS	WATER AUTHORITY
	WATER METER BOX FOR 3/4" AND 1" METERS DWG. 2366 JANUARY 2011



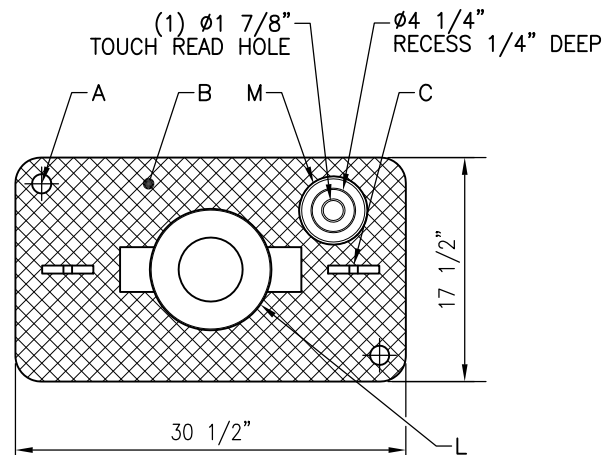
TOP VIEW



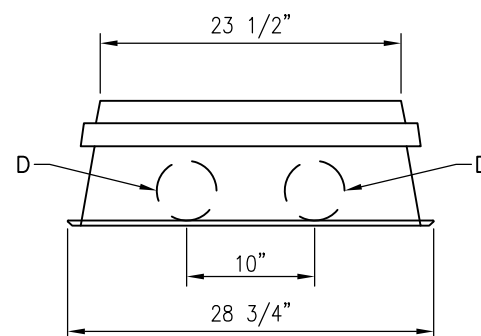
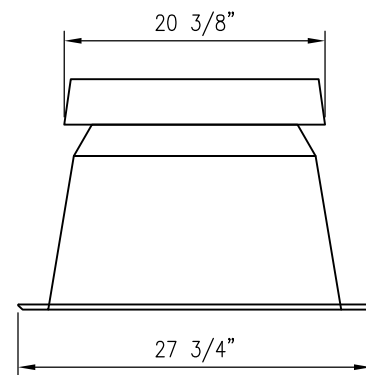
BOX & COVER SECTION



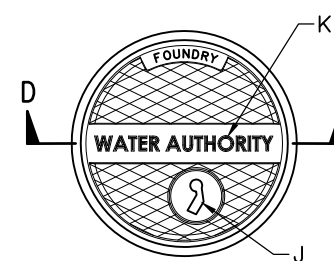
EXTENSION SECTION



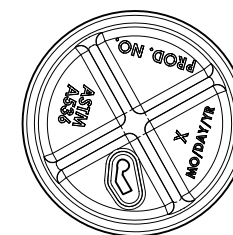
COVER



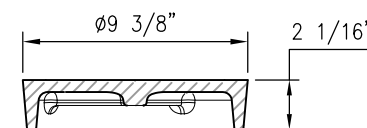
END VIEWS



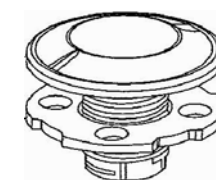
METER LID PLAN



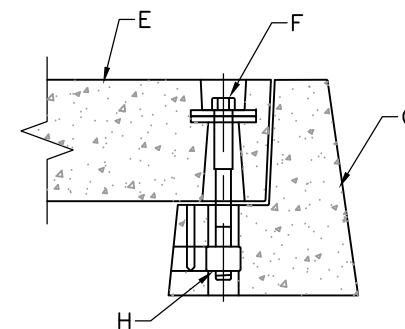
BOTTOM VIEW



SECTION D-D



ENDPOINT CAP AND NUT



COVER BOLTDOWN OPTION

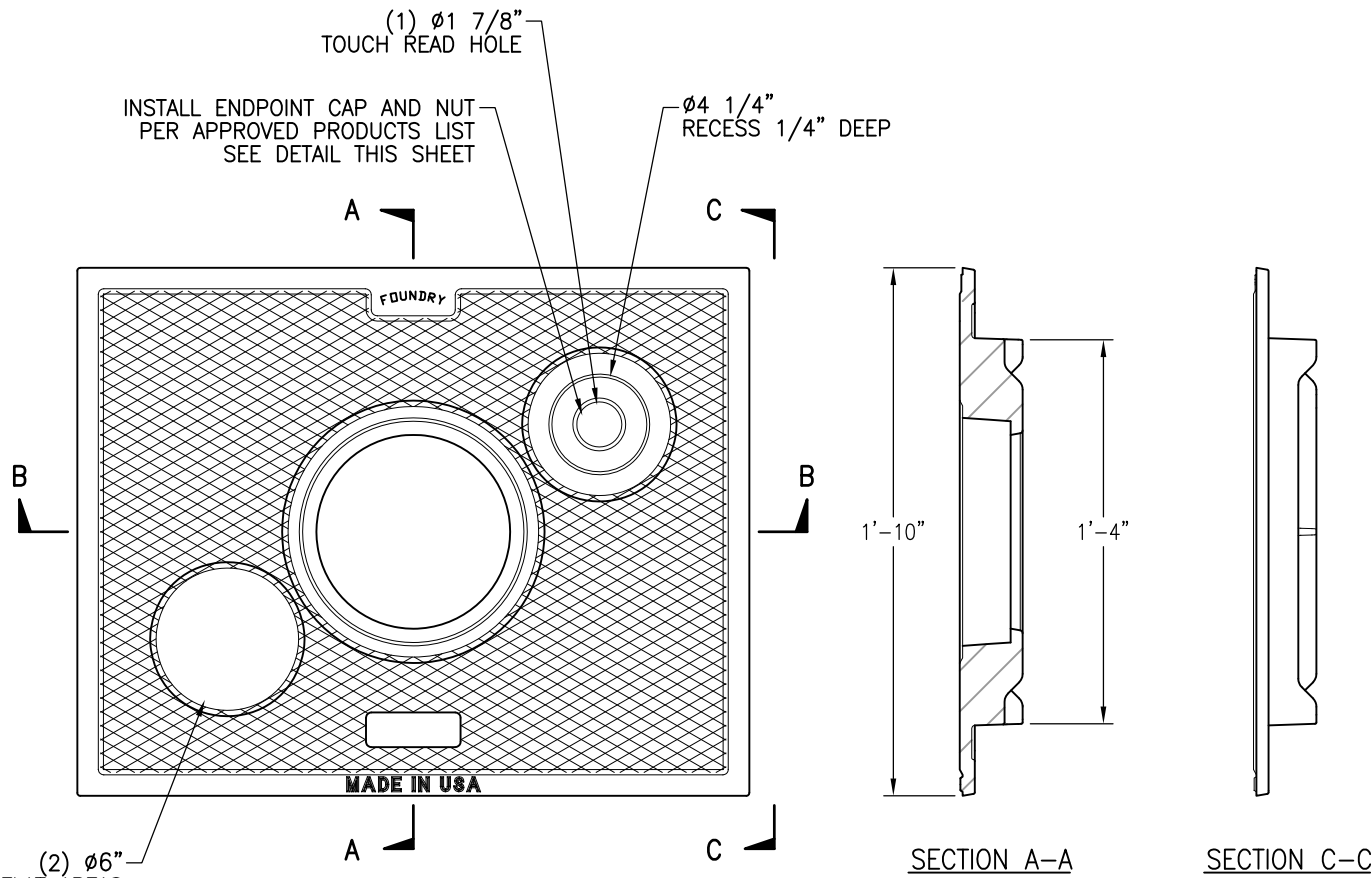
GENERAL NOTES

1. BOX AND COVER MATERIAL: FIBERGLASS REINFORCED POLYMER CONCRETE AND FIBERGLASS REINFORCED POLYMER.
LID MATERIAL: DUCTILE IRON
IF LOCATED IN ROADWAY, SPECIFY USF LOAD LEVEL 7 (ASTM C1802-14) FULL TRAFFIC RATED HATCH/COVER WITH STRUCTURAL VAULT DESIGN TO BE PROVIDED BY CONSULTANT.
2. STANDARD COLOR: CONCRETE GRAY (OPTIONAL COLORS ARE AVAILABLE FOR COVER AND COLLAR).
3. FLARED WALL BOXES ARE NESTABLE.

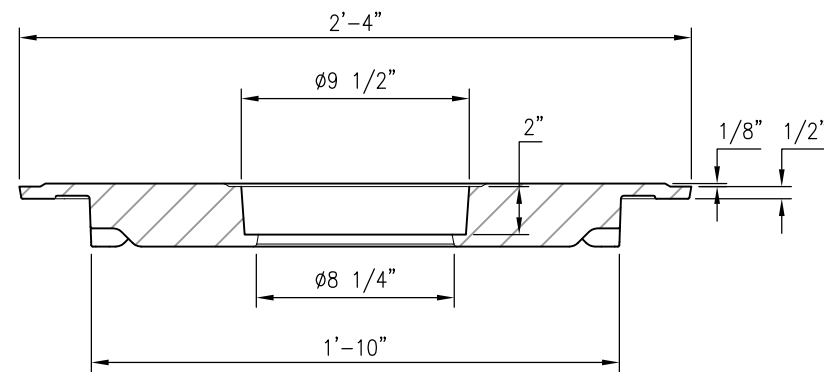
CONSTRUCTION NOTES

- A. COVER BOLTDOWN OPTION
- B. SKID RESISTANT SURFACE
- C. 5/8" x 4" LIFTING SLOTS
- D. OPTIONAL KNOCKOUTS OR TERMINATORS
- E. COVER
- F. STAINLESS STEEL CAPTIVE BOLT
- G. BOX
- H. SELF-CENTERING CORROSION RESISTANT NUT
- J. METER LID KEYHOLE
- K. 1/2" RAISED LETTERING (FLUSH)
- L. LID
- M. INSTALL AUTOMATIC METER READER ENDPOINT CAP AND NUT PER APPROVED PRODUCTS LIST. SEE DETAIL THIS SHEET

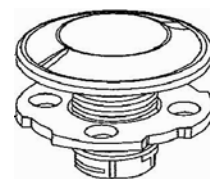
REVISIONS	WATER AUTHORITY
JAN. 2013	<p>WATER</p> <p>METER BOX, COVER AND LID</p> <p>FOR 1-1/2" TO 2" METERS</p> <p>DWG. 2367</p>
	AUG. 2019



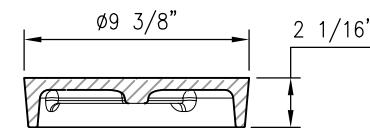
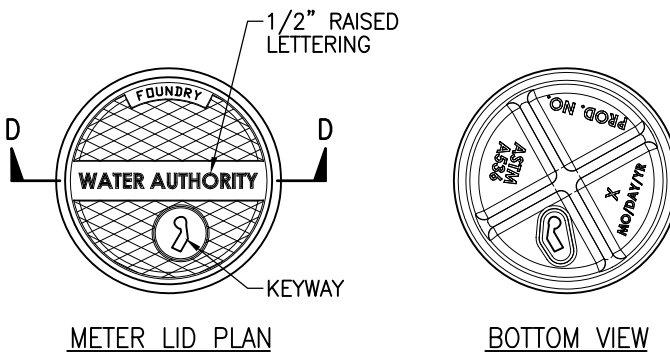
PLAN VIEW
BOX COVER FOR $\frac{3}{4}$ " TO 1" METERS



SECTION B-B



ENDPOINT CAP AND NUT

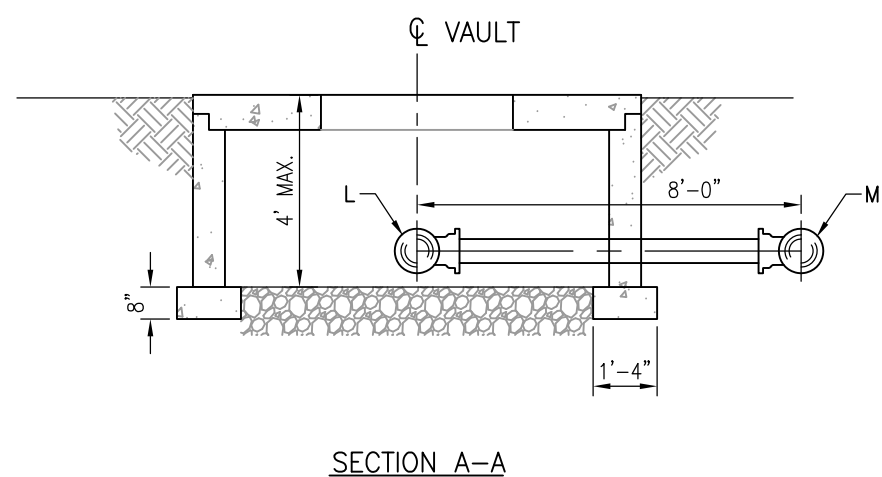
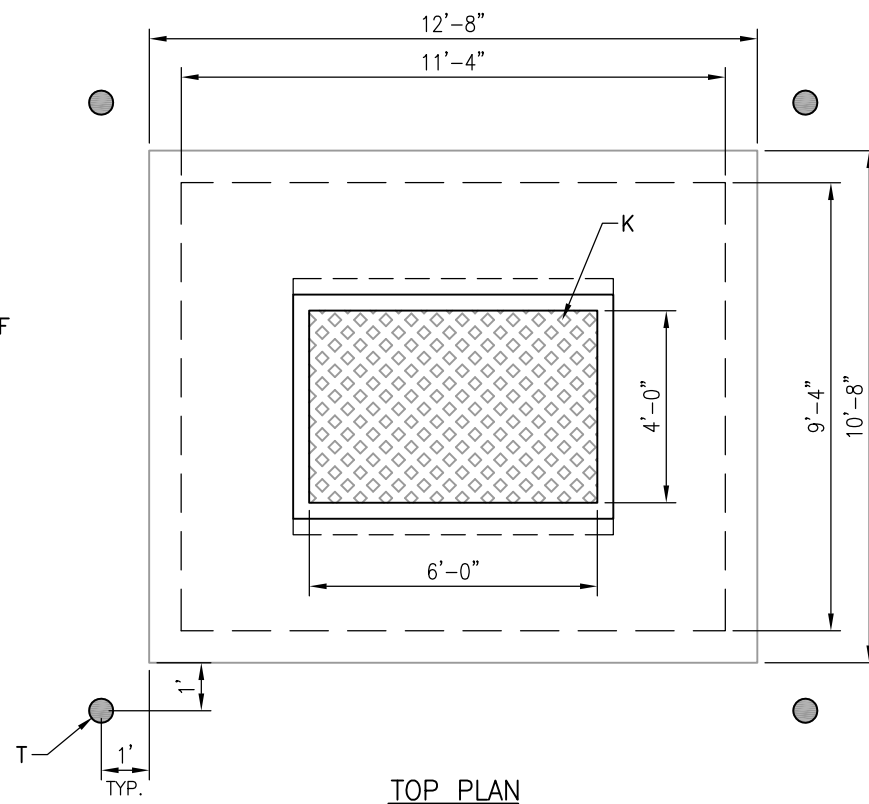
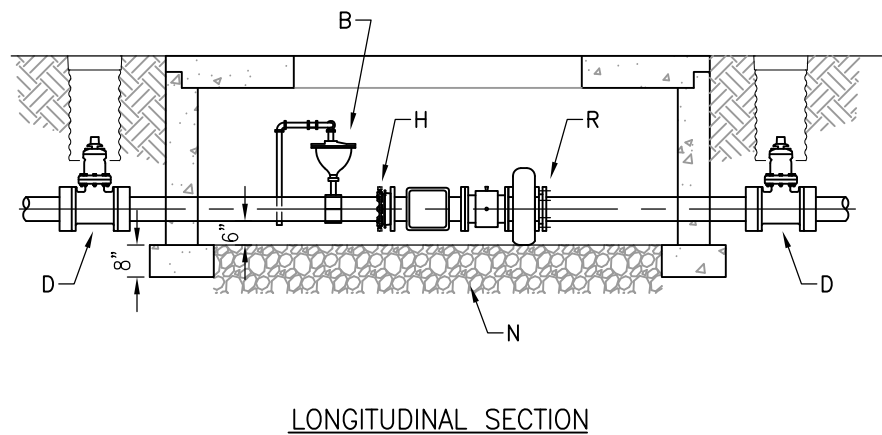
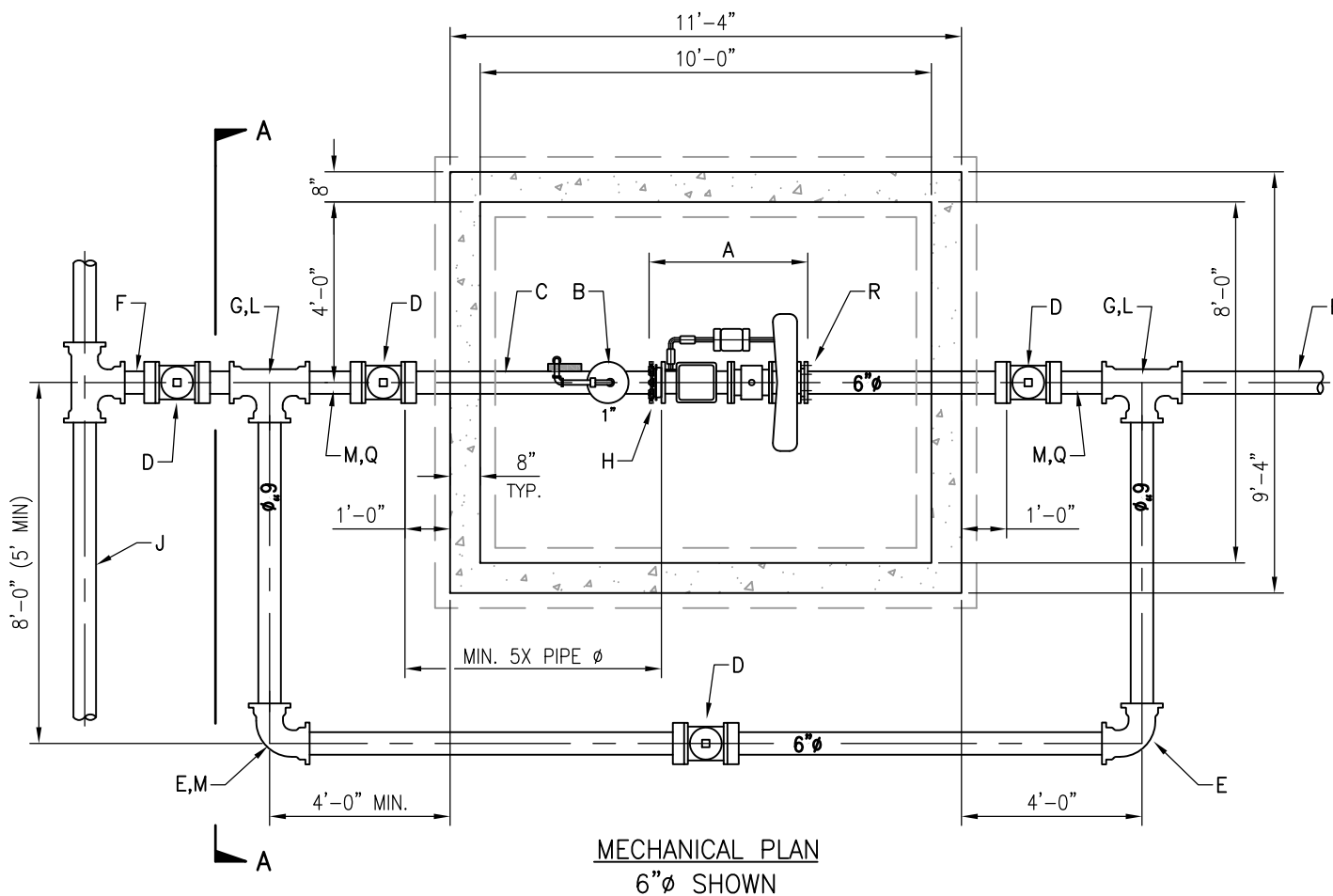


SECTION D-D

GENERAL NOTES

- TO BE USED IN SIDEWALKS, MOUNTABLE CURB OR IN UNPAVED AREAS.
- MATERIAL: DUCTILE IRON.
- ROUND ALL EDGES.
- TOP OF COVER SHALL HAVE AN INTEGRATED CORRUGATED DESIGN TO PREVENT SLIPPING.
- MATERIAL: DUCTILE IRON.
- ROUND ALL EDGES.
- TOP OF LID SHALL HAVE INTEGRATED CORRUGATED DESIGN TO PREVENT SLIPPING.
- TOP OF LID SHALL HAVE INTEGRATED WORDS "WATER AUTHORITY".
- LID SHALL NOT ROCK ON COVER AND SHALL BE EASILY OPENED.
- THE TOP SURFACE OF THE LID SHALL BE FLUSH WITH THE TOP OF COVER.

REVISIONS	WATER AUTHORITY
	WATER METER BOX COVER AND LID FOR $\frac{3}{4}$ " TO 1" METERS DWG. 2368 JAN. 2013



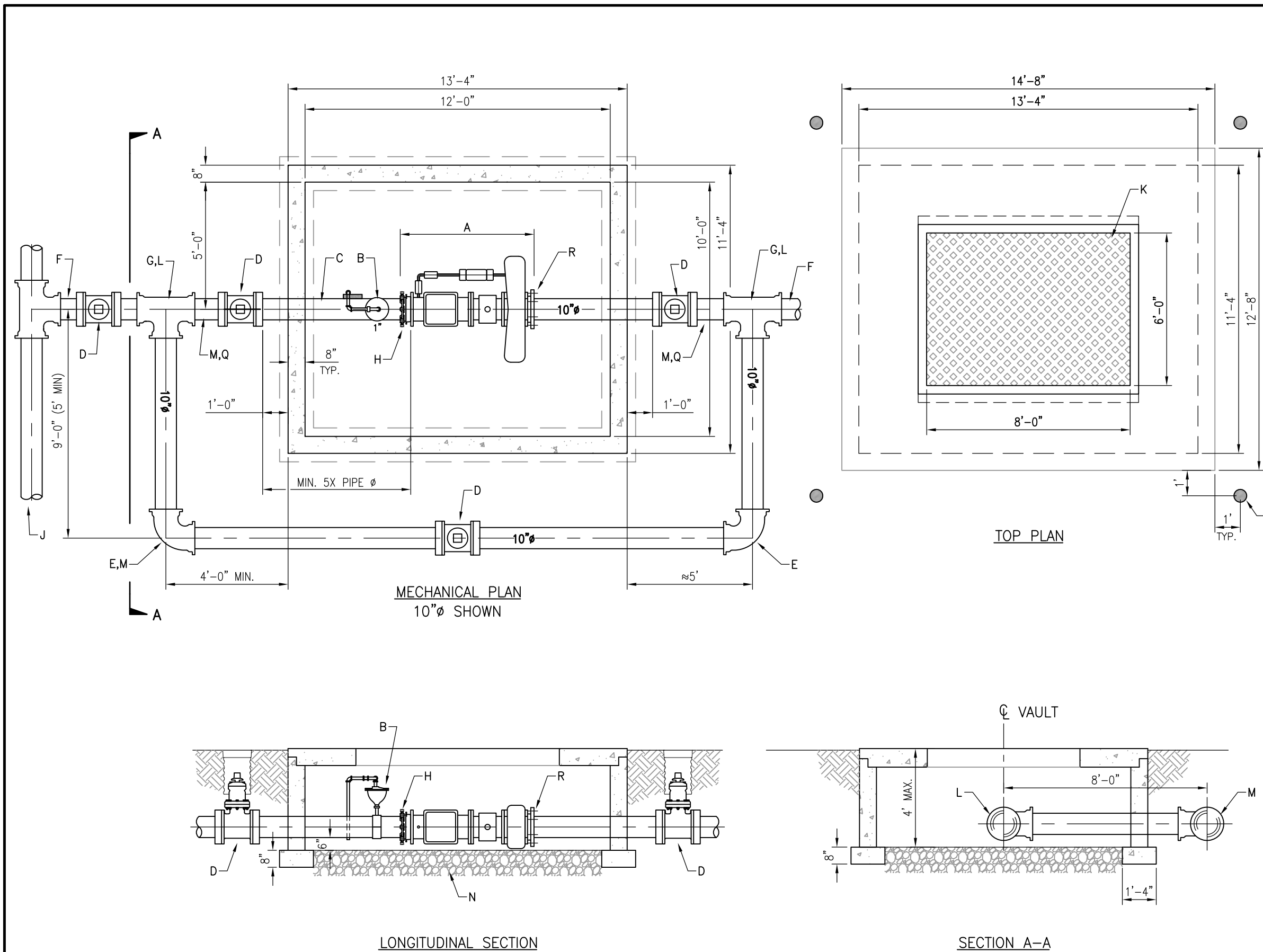
GENERAL NOTES

1. THIS IS A TYPICAL STANDARD DETAIL TO BE USED AS REFERENCE. THE ENGINEER IS RESPONSIBLE FOR DESIGNING AND PUBLISHING DIMENSIONED AND SCALED DETAILS SPECIFIC TO A PROJECT, USING THE NECESSARY CALCULATIONS AND DEVELOPING SPECIFICATIONS TO SUPPORT THE DESIGN AND THE ENGINEER-STAMPED CONTRACT DOCUMENTS.
2. VAULT NOT TO BE PLACED IN TRAFFIC AREAS.
3. THE MAXIMUM DEPTH IS 4 FT FROM FINISH FLOOR TO ROOF HATCH. IF NEW VAULT IS CONSTRUCTED AROUND EXISTING PIPING THAT IS AT GREATER DEPTH, EXCAVATE AND BRING PIPING UP THE CORRECT GRADE USING VERTICAL BENDS.
4. PRECAST CONCRETE VAULT MAY BE USED IN LIEU OF CMU. CONSTRUCTION WITH WATER AUTHORITY APPROVAL. SUBMIT DETAILS FOR REVIEW.
5. COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 3000 PSI PER EXTERIOR CONCRETE SPEC SEC. 101.
6. COMPACT SUBGRADE UNDER AND 12" EITHER SIDE OF FOOTING TO 95% MAXIMUM DENSITY, PER ASTM D-1557 TO 6" MIN. DEPTH.
7. NO BYPASS IS TO BE INSTALLED FOR IRRIGATION WATER USES. (PARKS, MEDIANS, LANDSCAPING, ETC.)
8. DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR VAULT DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.
9. FILL PIPE PENETRATION VOIDS WITH NON-SHRINK GROUT OR WATER AUTHORITY APPROVED EQUAL.

CONSTRUCTION NOTES

- A. METER LAY LENGTH, VARIES WITH METER SIZE AND MAY INCLUDE BY-PASS, CHECK VALVE AND STRAINER. METER ASSEMBLY TO BE PROVIDED AND INSTALLED BY THE WATER AUTHORITY.
- B. 1" SADDLE TAP, 1" GATE VALVE AND 1" AIR RELEASE VALVE. AIR RELEASE VALVE SHALL BE APCO MODEL NO. 200A OR APPROVED EQUAL.
- C. D.I. SPOOL (FLxPE) LENGTH AS REQUIRED. MINIMUM LENGTH SHALL BE 5 TIMES THE PIPE DIAMETER.
- D. GATE VALVE (MJ) WITH MEGALUGS AND VALVE BOX PER STANDARD DRAWING 2326.
- E. 90° ELBOW (MJ) WITH MEGALUGS
- F. MAIN SERVICE LINE MUST BE DUCTILE IRON PIPE FROM MAIN DISTRIBUTION LINE THROUGH METER VAULT PIPING ASSEMBLY.
- G. MJ TEE WITH MEGALUGS
- H. MEGA-FLANGE FLANGE ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- J. MAIN DISTRIBUTION LINE
- K. 4'-0" x 6'-0" ALUMINUM FLOOR DOOR, WITH SPRING OPEN ASSIST HINGE, BILCO TYPE JD OR APPROVED EQUAL.
- L. ROLL TEE UP AS REQUIRED
- M. ROLL 90° ELBOW DOWN AS REQUIRED
- N. 3/4" GRAVEL FILL PER ASTM C33, NO. 57 GRAVEL, 12" DEPTH
- Q. D.I. PIPE (FLxPE) LENGTH AS REQUIRED
- R. FLANGE COUPLING ADAPTER (FCA)
- T. 6" CONCRETE FILLED GUARD POST, TYPICAL OF 4 WHEN REQUIRED BY OWNER. SEE STANDARD DWG 2322

REVISIONS	WATER AUTHORITY
APR. 2015	WATER LARGE DIAMETER METER VAULT 3" TO 6" SERVICE DWG. 2370
	AUG. 2019



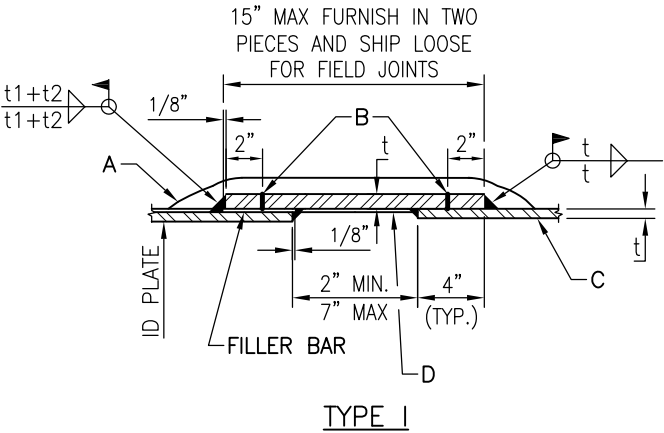
GENERAL NOTES

- THIS IS A TYPICAL STANDARD DETAIL TO BE USED AS REFERENCE. THE ENGINEER IS RESPONSIBLE FOR DESIGNING AND PUBLISHING DIMENSIONED AND SCALED DETAILS SPECIFIC TO A PROJECT, USING THE NECESSARY CALCULATIONS AND DEVELOPING SPECIFICATIONS TO SUPPORT THE DESIGN AND THE ENGINEER-STAMPED CONTRACT DOCUMENTS.
- Vault NOT TO BE PLACED IN TRAFFIC AREAS.
- THE MAXIMUM DEPTH IS 4 FT FROM FINISH FLOOR TO ROOF HATCH. IF NEW Vault IS CONSTRUCTED AROUND EXISTING PIPING THAT IS AT GREATER DEPTH, EXCAVATE AND BRING PIPING UP THE CORRECT GRADE USING VERTICAL BENDS.
- PRECAST CONCRETE Vault MAY BE USED IN LIEU OF CMU. CONSTRUCTION WITH WATER AUTHORITY APPROVAL. SUBMIT DETAILS FOR REVIEW.
- COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 3000 PSI PER EXTERIOR CONCRETE SPEC SEC. 101.
- COMPACT SUBGRADE UNDER AND 12" EITHER SIDE OF FOOTING TO 95% MAXIMUM DENSITY, PER ASTM D-1557 TO 6" MIN. DEPTH.
- NO BYPASS IS TO BE INSTALLED FOR IRRIGATION WATER USES. (PARKS, MEDIANS, LANDSCAPING, ETC.)
- DO NOT CONSTRUCT DRAIN POCKETS WHEN CONSTRUCTING IN SHALLOW GROUNDWATER CONDITIONS. ENGINEER SHALL PROVIDE A WATERPROOF MANHOLE OR Vault DESIGN FOR APPROVAL BY THE WATER AUTHORITY PRIOR TO INSTALLATION.
- FILL PIPE PENETRATION VOIDS WITH NON-SHRINK GROUT OR WATER AUTHORITY APPROVED EQUAL.

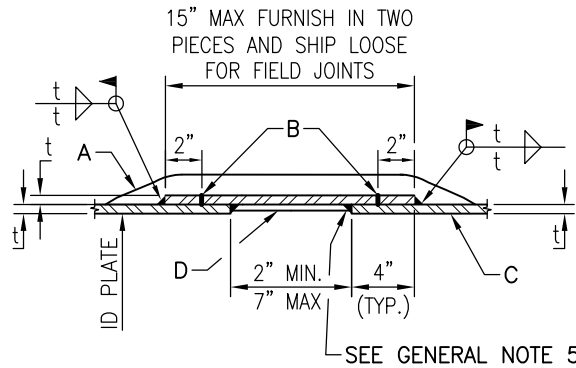
CONSTRUCTION NOTES

- METER LAY LENGTH, VARIES WITH METER SIZE AND MAY INCLUDE BY-PASS, CHECK VALVE AND STRAINER. METER ASSEMBLY TO BE PROVIDED AND INSTALLED BY THE WATER AUTHORITY.
- 1" SADDLE TAP, 1" GATE VALVE AND 1" AIR RELEASE VALVE. AIR RELEASE VALVE SHALL BE APCO MODEL NO. 200A OR APPROVED EQUAL.
- D.I. SPOOL (FLxPE) LENGTH AS REQUIRED. MINIMUM LENGTH SHALL BE 5 TIMES THE PIPE DIAMETER.
- GATE VALVE (MJ) WITH MEGALUGS AND VALVE BOX PER STANDARD DRAWING 2326.
- 90° ELBOW (MJ) WITH MEGALUGS
- MAIN SERVICE LINE MUST BE DUCTILE IRON PIPE FROM MAIN DISTRIBUTION LINE THROUGH METER Vault PIPING ASSEMBLY.
- MJ TEE WITH MEGALUGS
- MEGA-FLANGE FLANGE ADAPTER, SERIES 2100 AS MANUFACTURED BY EBAA IRON SALES, OR APPROVED EQUAL.
- MAIN DISTRIBUTION LINE
- 4'-0" x 6'-0" ALUMINUM FLOOR DOOR, WITH SPRING OPEN ASSIST HINGE, BILCO TYPE JD OR APPROVED EQUAL.
- ROLL TEE UP AS REQUIRED
- ROLL 90° ELBOW DOWN AS REQUIRED
- 3/4" GRAVEL FILL PER ASTM C33, NO. 57 GRAVEL, 12" DEPTH
- D.I. PIPE (FLxPE) LENGTH AS REQUIRED
- FLANGE COUPLING ADAPTER (FCA)
- 6" CONCRETE FILLED GUARD POST, TYPICAL OF 4 WHEN REQUIRED BY OWNER. SEE STANDARD DWG 2322

REVISIONS	WATER AUTHORITY
APR. 2015	WATER LARGE DIAMETER METER Vault 8" TO 12" SERVICE DWG. 2371
	AUG. 2019



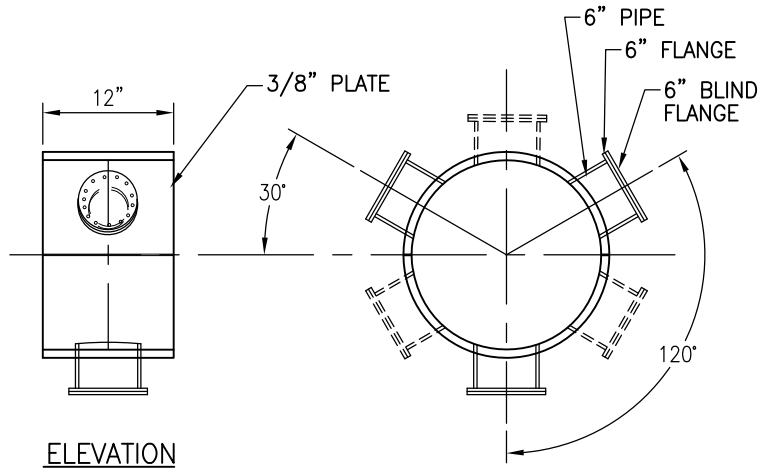
TYPE I



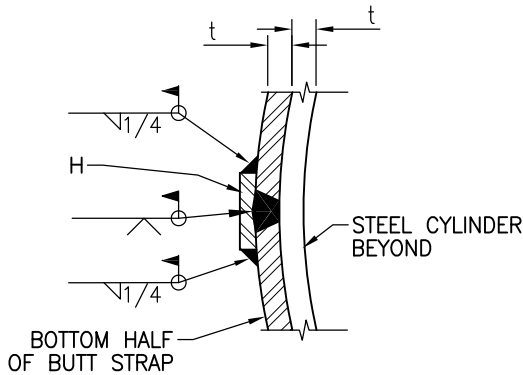
TYPE II

BUTT STRAP JOINT DETAIL
SCALE: NTS

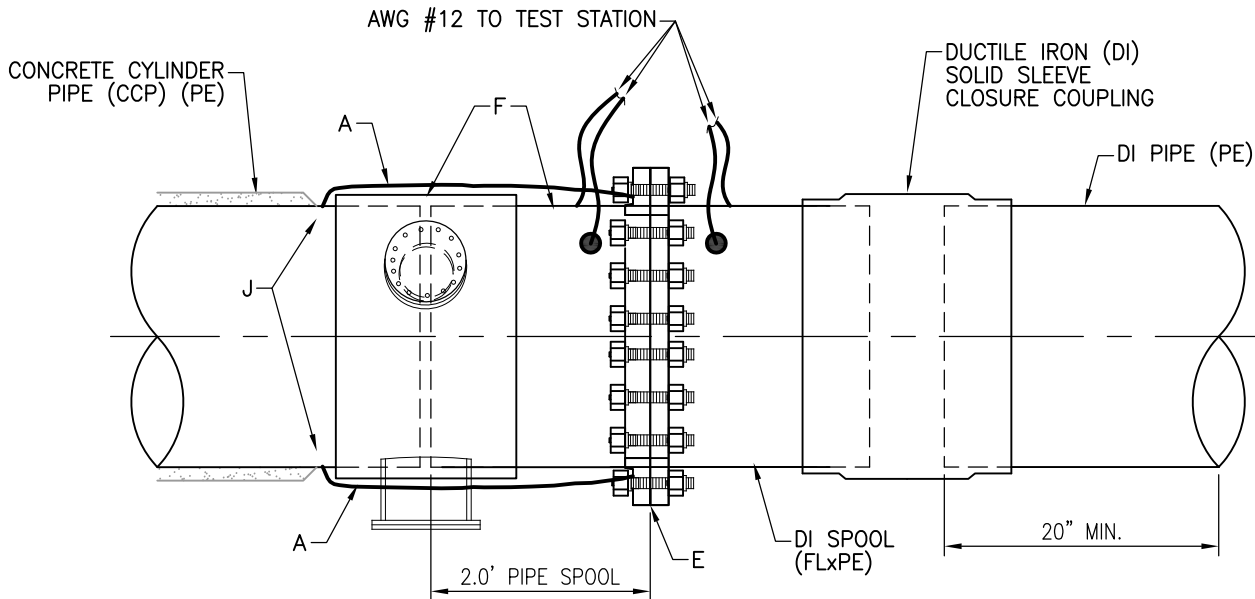
PIPE SCHEDULE	
SIZE	HAND HOLE
30"	3"
36"	3"
42"	6"
48"	6"



BUTT STRAP
(FOR CCP PIPE)



BUTT STRAP SPLICE DETAIL
SCALE: NTS



PLAN

CCP TO DI TRANSITION AT STORM DRAIN CROSSINGS
SCALE: NTS

GENERAL NOTES

- ALL DUCTILE IRON INSTALLED SHALL BE BONDED PER WATER AUTHORITY STANDARD DRAWINGS 2396 TO 2398.
- ALL DUCTILE IRON SHALL BE WRAPPED IN POLYETHYLENE PER SPECIFICATIONS.
- APPLY WAX TAPE TO ALL FLANGED JOINTS. CLEAN SURFACE OF ANY DIRT, LOOSE COATING AND LOOSE RUST. FORM THE WAX TAPE TO ELIMINATE AIR POCKETS OR VOIDS UNDER WAX TAPE. PRESS AND SMOOTH OUT THE LAP SEAMS TO ENSURE PROPER SEAL.
- REMOVE EQUIVALENT LENGTH OF EXISTING PIPE TO ACCOMMODATE NEW SPOOL.
- ISOLATING FLANGE KIT SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO USE EXTRA CARE TO ENSURE BOLTS ARE NOT OVER TIGHTENED.
- CONTRACTOR SHALL FIELD MEASURE PIPE DIMENSIONS FOR BUTT STRAP FIT. PROVIDE MEASURED DIMENSIONS IN SHOP DRAWING SUBMITTAL. ALL MATERIAL TO BE ASTM A36 STEEL WITH STAINLESS STEEL HARDWARE.
- ALL PIPE TO BE ASTM A53 STEEL GRADE B.
- LENGTH FOR BUTT STRAP PC'S ARE FOR FULL HOOP ROLL FULL HOOP AND CUT IN HALF.
- SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.
- PIPE AND BUTT STRAP DESIGN SHALL BE BASE ON 10 FT MINIMUM BURY DEPTH. PIPE INSTALLATION DEPTH SHALL MATCH DEPTH OF EXISTING PIPE.
- CEMENT MORTAR LINING AND COATING NOT SHOWN FOR CLARITY. MINIMUM PIPE AND BUTT STRAP THICKNESS SHALL BE 3/8". MINIMUM COATING THICKNESS SHALL BE 1.0". MINIMUM CONCRETE LINING THICKNESS SHALL BE 3/4".
- TYPE I IS FOR THE CONNECTING PIPES WITH DIFFERENT PIPE WALL THICKNESS'.
- BEFORE WELDING, DRILL AND TAP HOLES AS NOTED FOR 1/4" PIPE NIPPLE. CONDUCT AIR AND SOAP TEST AFTER WELDING IS COMPLETED. PLUG WELD HOLES AFTER SUCCESSFUL COMPLETION OF JOINT TEST.
- TYPE II IS FOR CONNECTING PIPES WITH THE SAME PIPE WALL THICKNESS.
- BEVEL ENDS OF BACKING PLATE AT BUTT-STRAP PRIOR TO WELDING OR BACGOUGE AT CONTACT WITH ADJACENT CYLINDER PRIOR TO COMPLETING INSIDE FILLET WELD.
- DO NOT WELD CCYL WIRE TO THE PIPE BARREL.
- MORTAR TYPE SHALL BE FAST SET PROPOXY EPOXY INFUSED GROUT.
- PIPE SHALL BE DISINFECTED BY SWABBING METHOD WITH 1% OR STRONGER SOLUTION OF SODIUM HYPOCHLORITE PRIOR TO CONNECTION TO EXISTING PIPE.
- JOIN NEW SPOOL TO EXISTING PIPE WITH WELDED BUTT STRAPS AND GROUT INTERIOR JOINTS WITH FAST SETTING PROPOXY EPOXY INFUSED GROUT. ALL AREAS OF HAND HOLES THAT CANNOT BE GROUTED ON THE INTERIOR, INCLUDING THE INTERIOR OF THE OUTLETS AND INTERIOR SIDE OF THE FLANGES SHALL BE EPOXY COATED. CONTRACTOR TO COORDINATE WITH WATER AUTHORITY PRIOR TO INSTALLING BLIND FLANGE. CLOSE HAND HOLES W/ BLIND FLANGE AND STAINLESS STEEL BOLTS (304).
- NO EXTERIOR GROUT UNTIL 2 HOUR VISUAL TEST BY WATER AUTHORITY IS COMPLETED.
- CONTRACTOR SHALL COORDINATE WITH WATER AUTHORITY FOR LINE FILLING OPERATION AND SUBMIT A PLAN TO THE WATER AUTHORITY FOR REVIEW AND APPROVAL PRIOR TO FILLING THE LINE. THE PLAN SHALL DISCUSS THE NEED FOR AIR RELEASE AS WELL AS ANY ANCILLARY EQUIPMENT REQUIRED TO FILL THE LINE.
- PIPE SHALL BE HYDROSTATICALLY TESTED WITH LINE PRESSURE FOR A 2-HOUR PERIOD AND VISUALLY INSPECTED FOR LEAKS BY THE WATER AUTHORITY. PIPE MUST HAVE NO VISIBLE SIGNS OF LEAKAGE TO PASS INSPECTION. CONTRACTOR SHALL NOTIFY THE WATER AUTHORITY WHEN PIPE IS READY FOR INSPECTION AND LEAVE TRENCH OPEN AND PIPE UNCOVERED TO FACILITATE INSPECTION. HANG HOLE PLUGS SHALL BE TIGHTENED UNTIL NO LEAKS APPEAR WITH FULL LINE PRESSURE; THEN WELDED SHUT.
- AFTER SUCCESSFUL HYDROSTATIC TESTING, THOROUGHLY COVER BUTT STRAP CONNECTION INCLUDING HAND HOLES WITH 1" THICK MORTAR. USE A FAST SETTING "DRY-MIX" MORTAR OR CONCRETE "DIAPER" TO ENSURE MORTAR DOES NOT SLOUGH OFF PIPE WHILE DRYING.

CONSTRUCTION NOTES

- "DIAPER" COATED WITH CEMENT MORTAR TO MATCH THICKNESS OF EXISTING EXTERIOR CEMENT MORTAR COATINGS.
- DRILL AND TAP 4 HOLES EQUALLY SPACED FOR AIR-SOAP TEST. SEE GENERAL NOTE 3 (TYP 2 PLACES).
- REMOVE MORTAR COATING TO MAKE CONNECTION, THICKNESS UNKNOWN, REPLACE MORTAR.
- BACKING \bar{P} AT SPLICE
- ISOLATION FLANGE KIT INCLUDING TEST STATION PER WATER AUTHORITY STANDARD DRAWINGS 2396 TO 2398.
- BUTT STRAP x FLANGED END STEEL SPOOL. SEE DETAIL THIS SHEET FOR BUTT STRAP ON CCP PIPE.
- CONCRETE COATED AND LINED STEEL PIPE (AWWA C200) PRESSURE CLASS 150, MATCH EXISTING PIPE. (CONTRACTOR SHALL MEASURE EACH PIPE AND PROVIDE TO FABRICATOR)
- 1/4" X 1" BACKING PLATE IN GAP FOR FULL WIDTH OF JOINT (SEE GENERAL NOTE 6).
- COAT ALL EXPOSED STEEL SURFACES WITH AN ENGINEER APPROVED PRODUCT, OR ONE FROM THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.

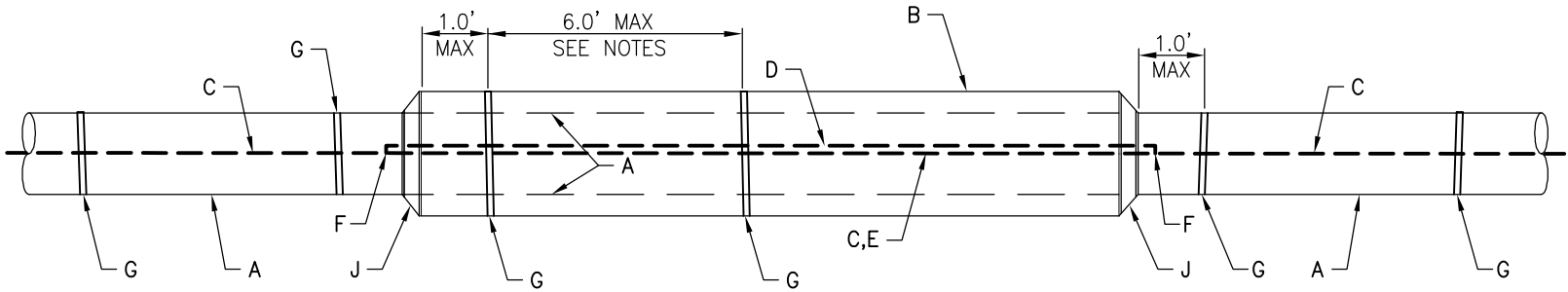
REVISIONS	WATER AUTHORITY
	WATER CONCRETE CYLINDER PIPE BUTT STRAP CONNECTION DWG. 2372
	AUG. 2019

GENERAL NOTES

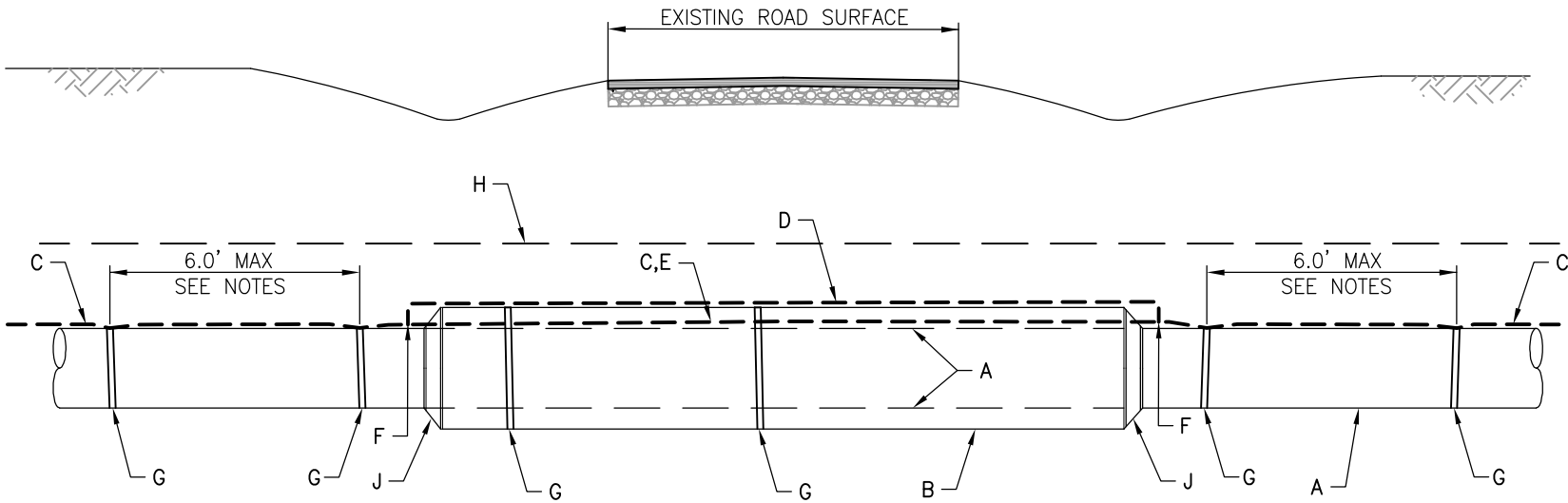
1. TRACE WIRE SHALL BE FASTENED TO THE TOP OF PIPE WITH TAPE OR PLASTIC TIES AT 6' INTERVALS.

CONSTRUCTION NOTES

- A. UTILITY MAIN
- B. PIPE CASING
- C. TRACE WIRE #12 AWG COPPER CLAD STEEL – COLOR CODED PER APWA FOR OPEN TRENCH (SEE SECTION A-A ON STANDARD DRAWING 2302 FOR WATER, 2190 FOR SEWER, AND 2303 FOR NON-POTABLE WATER)
- D. TRACE WIRE #12 AWG COPPER CLAD STEEL – COLOR CODED PER APWA FOR DIRECTIONAL DRILLING/BORING
- E. MAINTAIN TRACE WIRE CONTINUITY WITHIN CASING
- F. TEE CONNECTION. 3-WAY LOCKING WATERPROOF CONNECTOR. DO NOT CUT MAIN LINE TRACE WIRE. (SEE TEE CONNECTION DETAIL, STANDARD DRAWING 2302 FOR WATER, 2190 FOR SEWER, AND 2303 FOR NON-POTABLE WATER)
- G. TAPE OR PLASTIC TIE (SEE GENERAL NOTES).
- H. MARKER TAPE
- J. CASING END SEAL

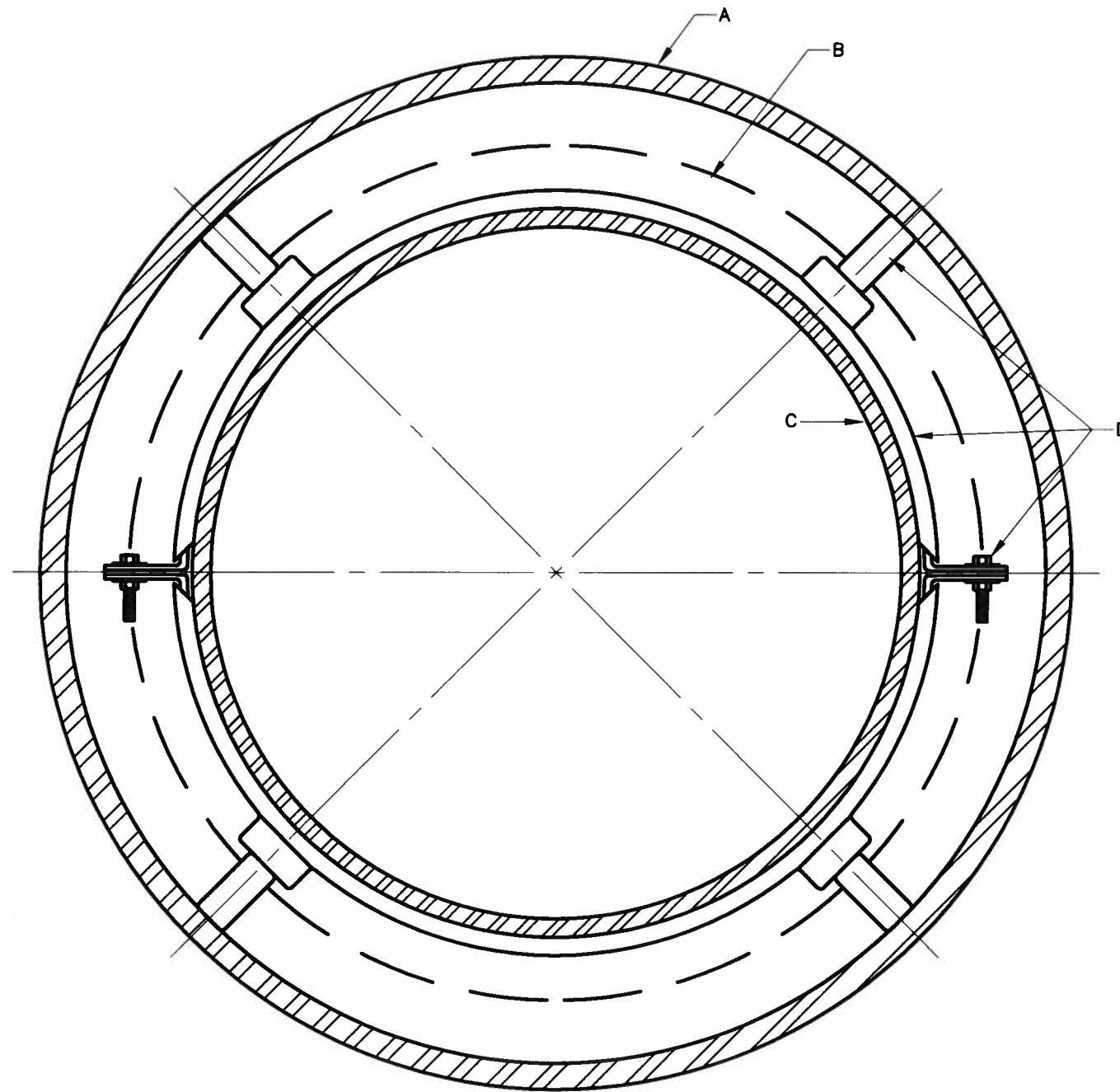


PIPE CASING – PLAN VIEW
NOT TO SCALE



PIPE CASING – SECTION VIEW
NOT TO SCALE

REVISIONS	WATER AUTHORITY
SEP. 2017	PIPE CASING TRACE WIRE DETAILS
	DWG. 2379 MAY 2019



TYPICAL SECTION

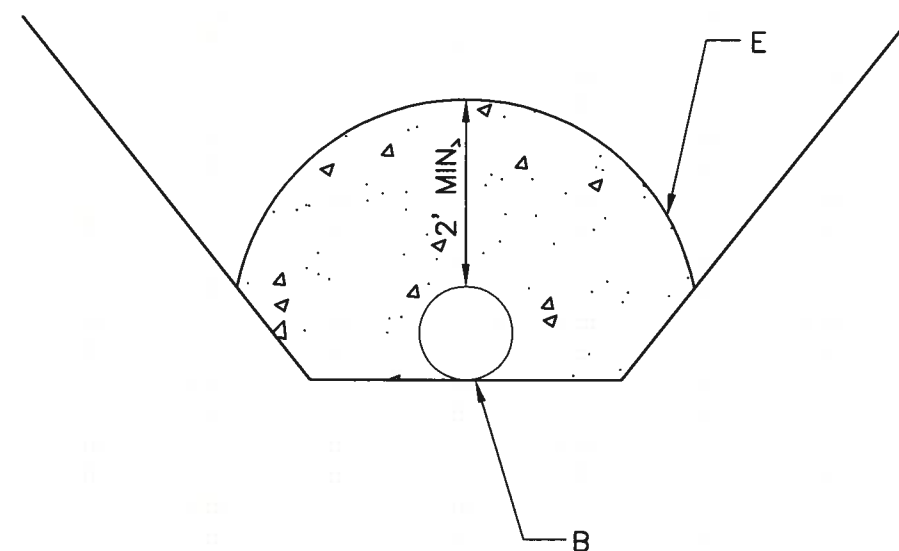
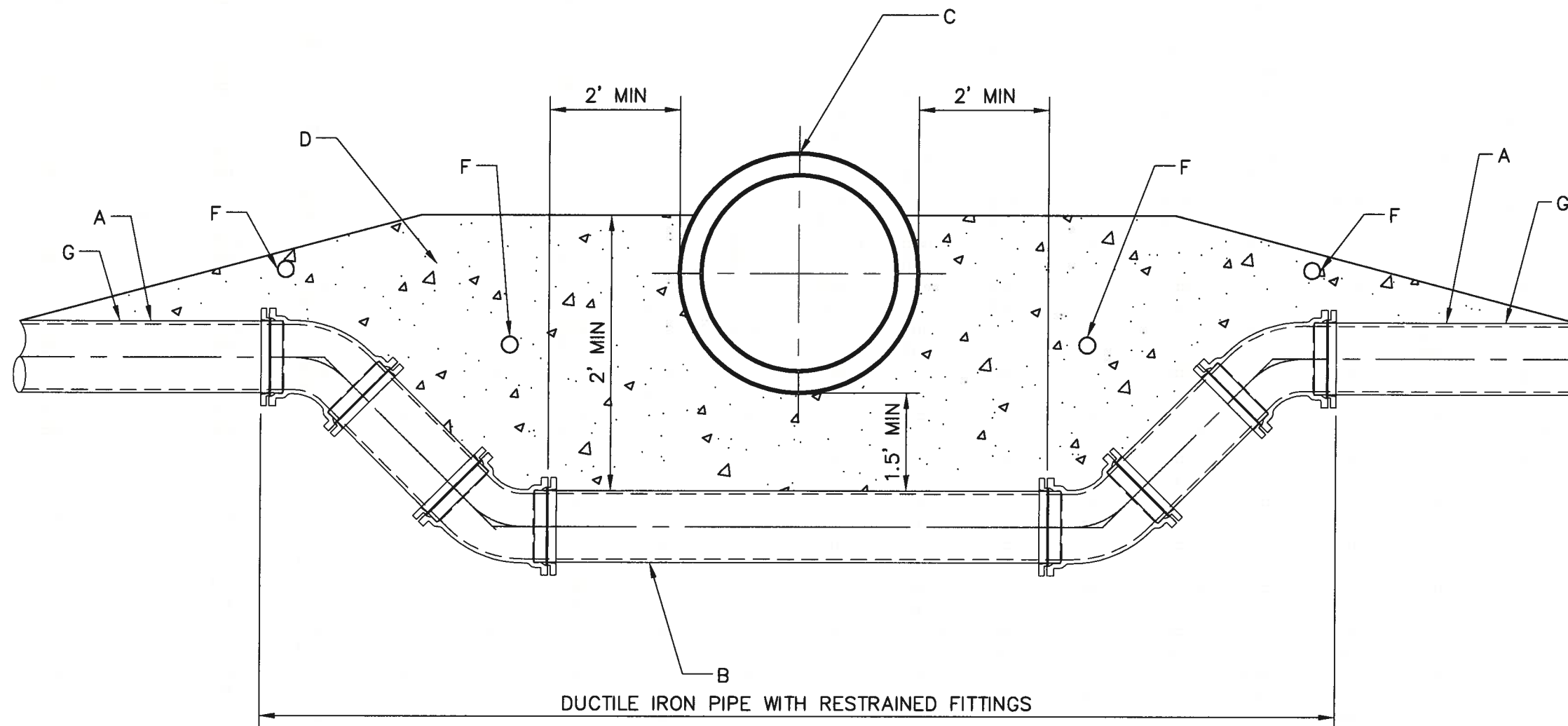
GENERAL NOTES:

- 1 METHOD OF END CLOSURE TO BE DESIGNED TO SUIT CONDITIONS.
- 2 FOR A METALLIC CARRIER PIPE (OTHER THAN DUCTILE IRON), CONTRACTOR SHALL ADD CORROSION MONITORING AND PROTECTION STATION PER STANDARD DRAWINGS 2396, 2397, AND 2398.
- 3 USE FULLY RESTRAINED PIPE JOINTS THROUGH THE CASING OR USE APPROPRIATE PIPE MATERIALS WITH INTERNAL RESTRAINTS AS APPROVED ON THE CURRENT WATER AUTHORITY APPROVED PRODUCTS LIST.

CONSTRUCTION NOTES:

- A WELDED STEEL PIPE CASING. DIAMETER AND WALL THICKNESS TO BE DESIGNED PER STANDARD SPECIFICATION SECTION 700 TO SUIT CONDITIONS.
- B BELL DIA. OF CARRIER PIPE.
- C CARRIER PIPE.
- D MANUFACTURED CASING SPACER. INSTALLATION AND SPACING PER MANUFACTURER'S RECOMMENDATIONS.

REVISIONS	WATER AUTHORITY
	WATER
	BORING INSTALLATION
	DWG. 2380 JANUARY 2011



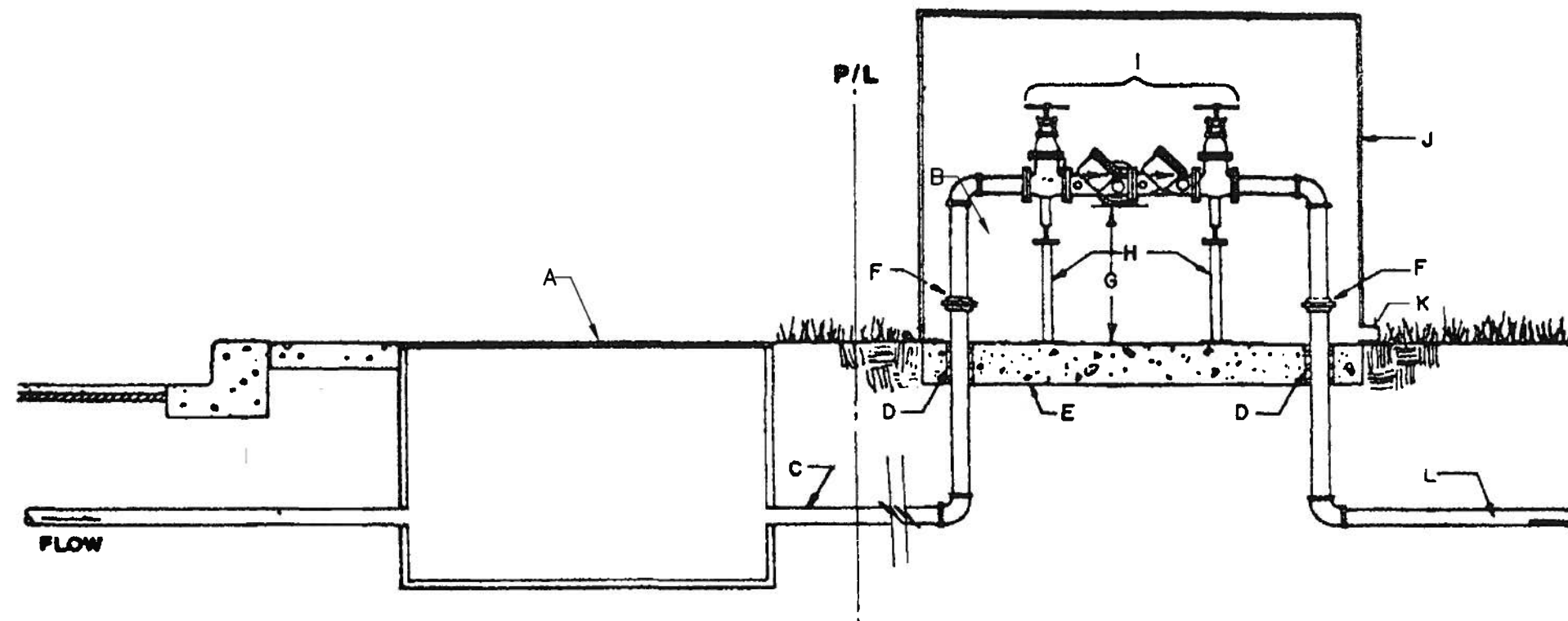
GENERAL NOTES:

1. ENTIRE ASSEMBLY MUST HAVE ADEQUATE THRUST RESTRAINT PER STANDARD DRAWING 2320. CONCRETE BLOCKING SHALL BE INSTALLED ONLY WHEN MECHANICAL RESTRAINT IS NOT POSSIBLE.

CONSTRUCTION NOTES:

- A. EXISTING WATERLINE.
- B. RELOCATED WATERLINE.
- C. NEW LINE.
- D. LEAN FILL.
- E. LEAN FILL 24" OVER PIPE
- F. ELECTRONIC MARKER DEVICE (EMD), SEE COA STANDARD SPECIFICATION SECTION 170.
- G. IF ANY EXISTING CCP JOINTS FALL WITHIN 10' OF THE PLANNED CUT, REMOVE CCP TO THE JOINT AND REPLACE WITH DIP.

REVISIONS	WATER AUTHORITY
	WATER
	TYPICAL LINE RELOCATION
	DWG. 2381 JANUARY 2011

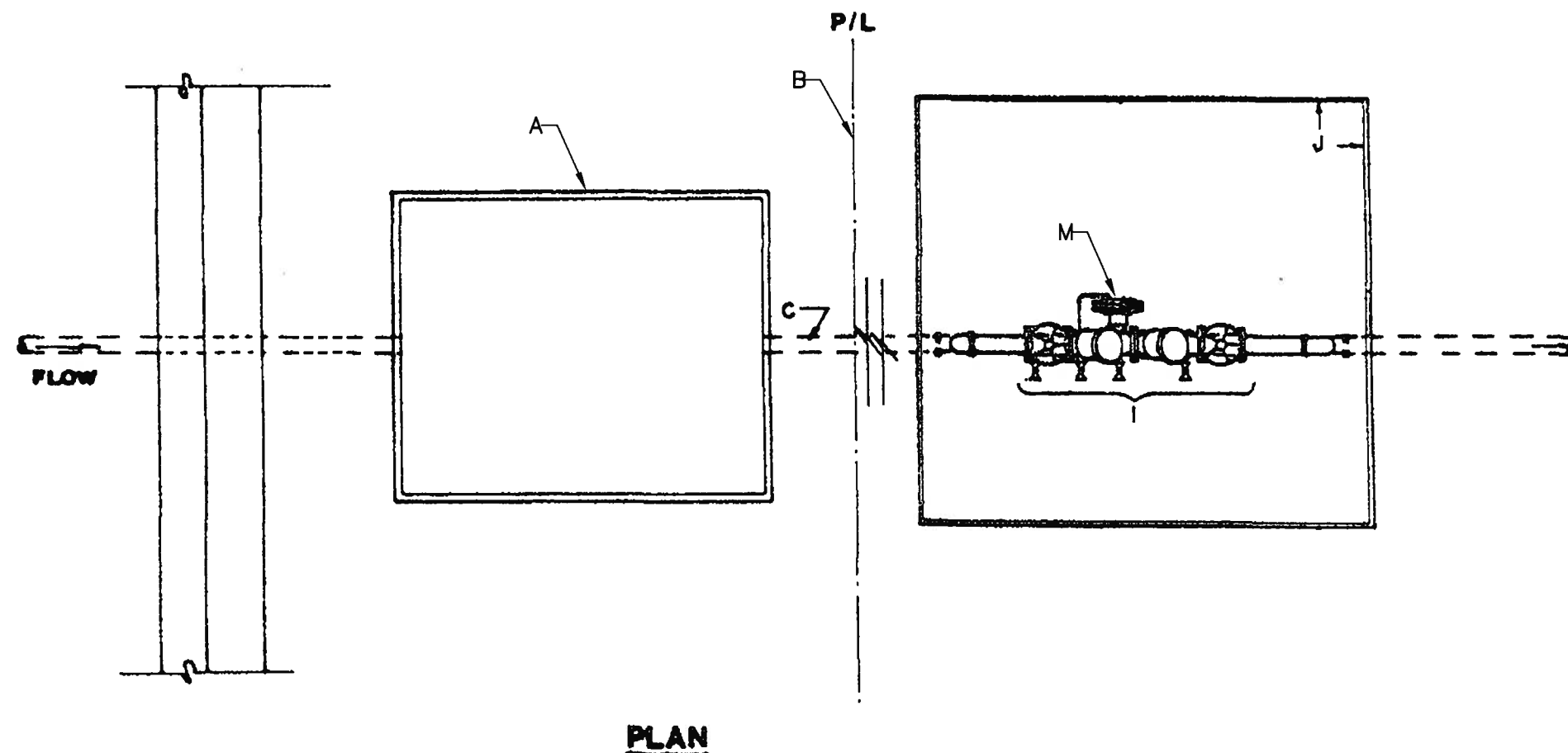


GENERAL NOTES:

1. HORIZONTAL RPBA INSTALLATION REQUIRED.
2. ABOVE GRADE RPBA INSTALLATION REQUIRED.
3. WATER LINE PRESSURE AND TEMPERATURE MUST NOT EXCEED RATED CAPACITY OF RPBA.
4. PROTECT FROM FREEZING WITH POSITIVE HEAT SOURCE AND INSULATION.
5. MINIMUM RPBA SIZE MUST BE THE BUILDING SERVICE LINE SIZE.
6. DO NOT INSTALL IN FLOOD PRONE AREAS OR IN STORM RETENTION OR DETENTION BASINS.
7. INSTALL WATER HAMMER ARRESTORS & THERMO EXPANSION PROTECTION, AS NECESSARY.
8. METALLIC RISER PIPING REQUIRED.
9. JOINTS TO BE ADEQUATELY RESTRAINED.
10. DEVIATIONS FROM THESE SPECIFICATIONS MUST HAVE PRIOR WRITTEN APPROVAL FROM THE WATER AUTHORITY CROSS CONNECTION OFFICE.
11. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

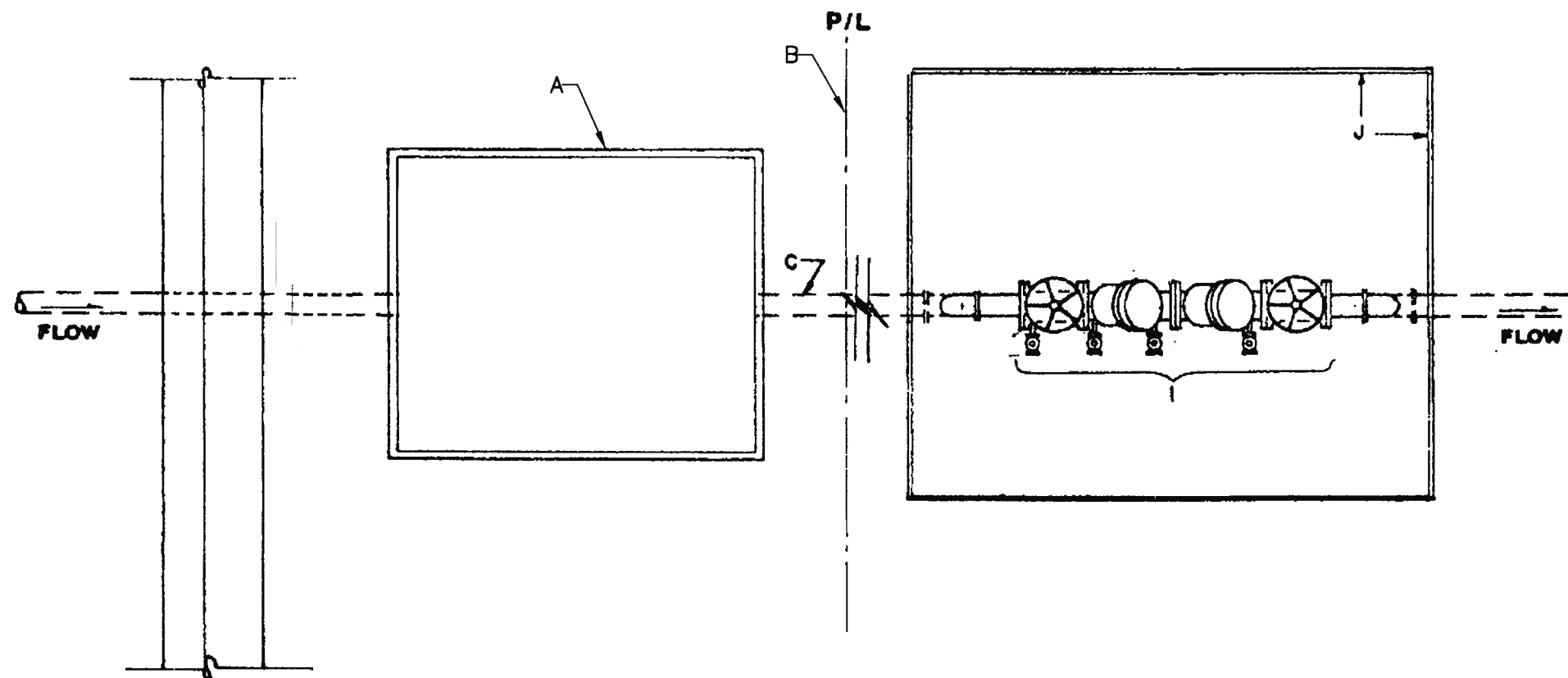
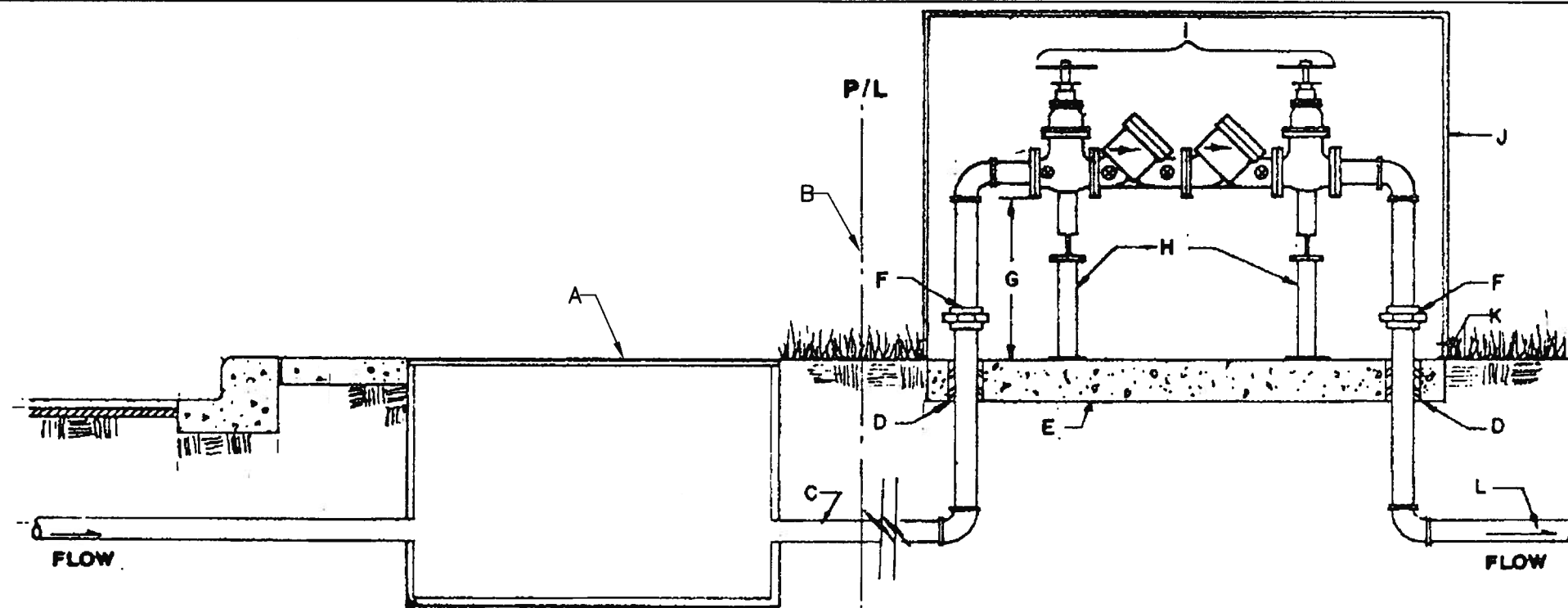
CONSTRUCTION NOTES:

- A. METER BOX PER STANDARD DRAWING 2362 OR 2363.
- B. PROPERTY LINE.
- C. SERVICE LINE WITHOUT TAPS OR TEES BETWEEN THE METER AND THE BACKFLOW PREVENTION ASSEMBLY.
- D. ADEQUATE SLEEVE & INSULATION. INSULATION SHALL BE (AT MINIMUM) 1" THICK.
- E. MINIMUM 4" CONCRETE (3000 PSI) SLAB.
- F. UNIONS OR FLANGED FITTINGS INSTALLED A MINIMUM OF 4" ABOVE GRADE.
- G. 36" MAXIMUM, 12" MINIMUM (FROM LOWEST POINT OF ASSEMBLY TO TOP OF CONCRETE SLAB).
- H. PROVIDE ADJUSTABLE METALLIC SUPPORTS ON UNITS 2.5" AND GREATER DIAMETER (TYPICAL).
- I. USC APPROVED RPBA, AS SHOWN
- J. PROTECTIVE ENCLOSURE, SEE STANDARD DRAWING 2389 FOR DESIGN CRITERIA.
- K. DRAIN: SIZE DRAIN TO HANDLE FULL DISCHARGE OF RELIEF VALVE. DRAIN TO DAYLIGHT. SCREEN RECOMMENDED TO PREVENT RODENT AND INSECT ENTRY.
- L. BUILDING SERVICE LINE.
- M. RELIEF VALVE.



PLAN

REVISIONS	WATER AUTHORITY
	WATER
	REDUCED PRESSURE PRINCIPLE
	BACKFLOW PREVENTION ASSEMBLY
	(RPBA)
	DWG. 2385 JANUARY 2011



PLAN

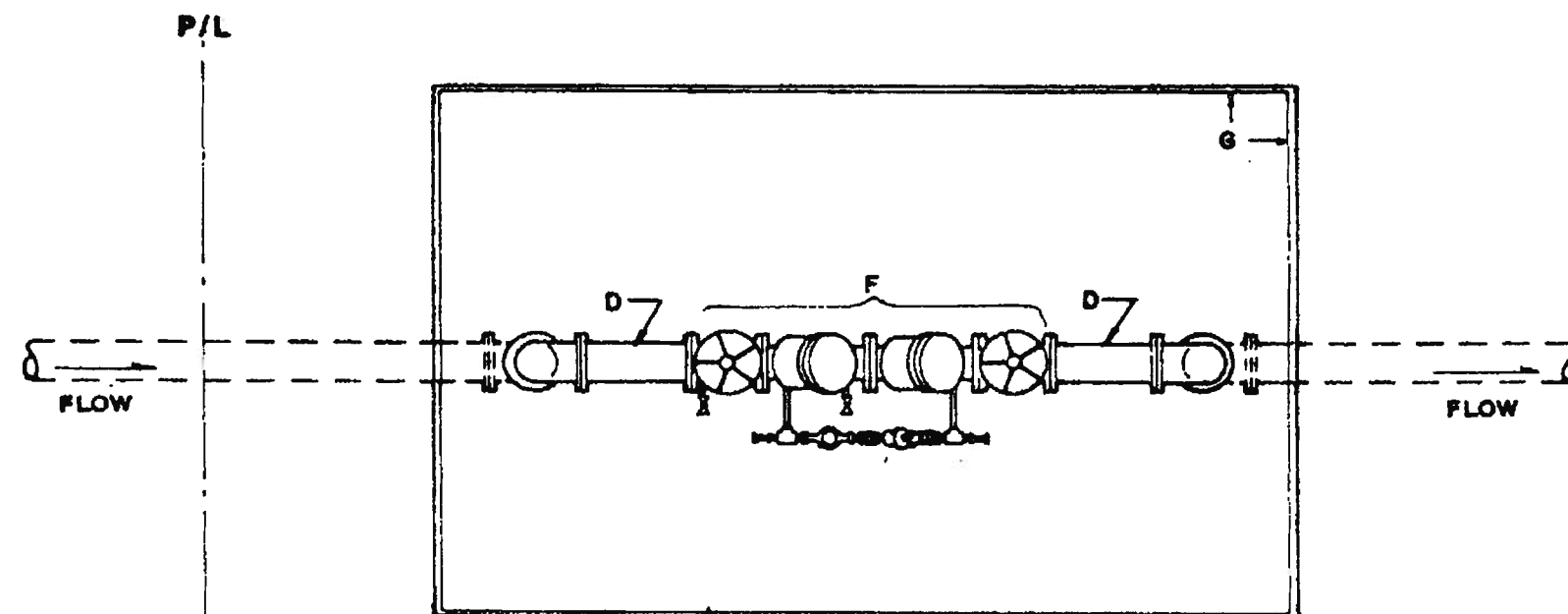
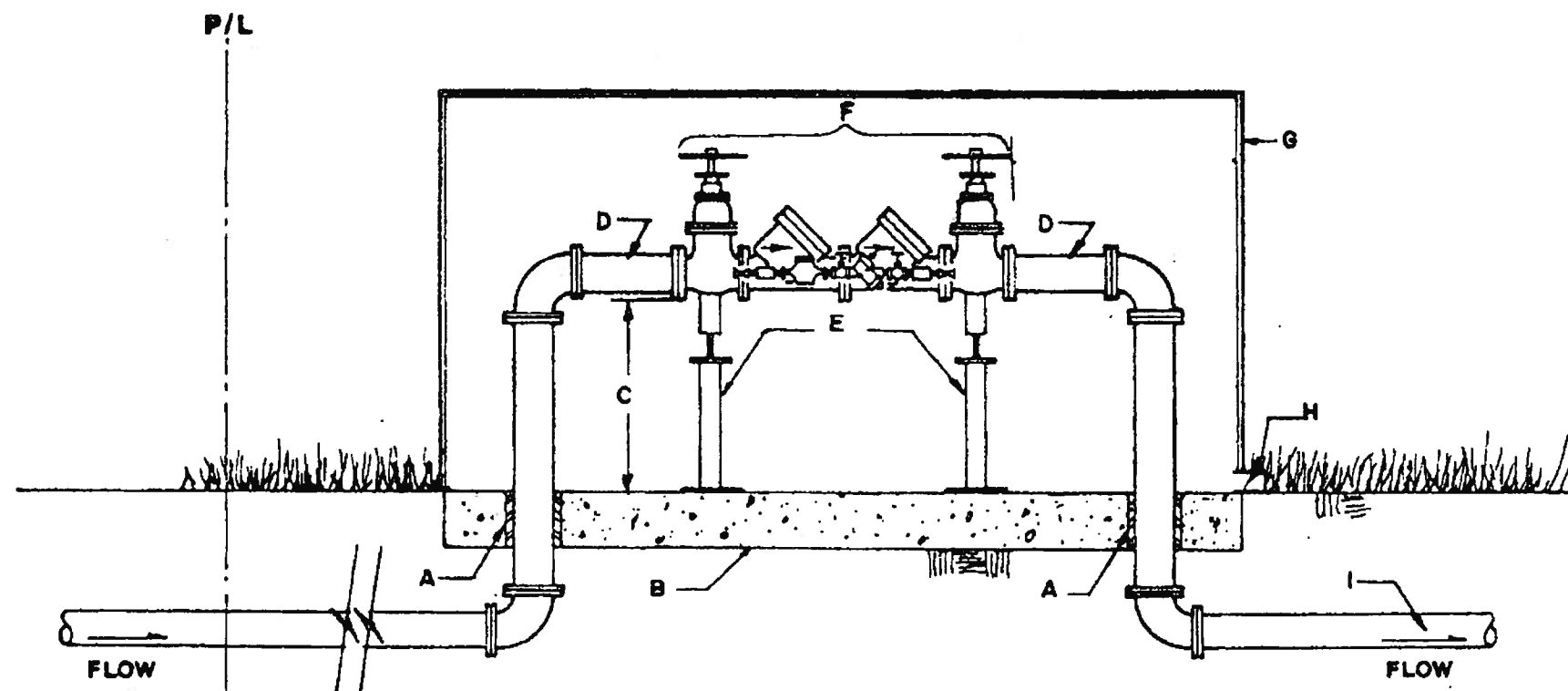
GENERAL NOTES:

1. DCVA'S ARE NOT APPROVED FOR LANDSCAPE IRRIGATION SYSTEMS.
2. HORIZONTAL DCVA INSTALLATION REQUIRED.
3. ABOVE GRADE DCVA INSTALLATION REQUIRED.
4. WATER LINE PRESSURE AND TEMPERATURE MUST NOT EXCEED RATED CAPACITY OF DCVA.
5. PROTECT FROM FREEZING WITH POSITIVE HEAT SOURCE AND INSULATION.
6. MINIMUM DCVA SIZE MUST BE THE BUILDING SERVICE LINE SIZE.
7. DO NOT INSTALL IN FLOOD PRONE AREAS OR IN STORM RETENTION OR DENTENTION BASINS.
8. INSTALL WATER HAMMER ARRESTORS & THERMO EXPANSION PROTECTION, AS NECESSARY.
9. JOINTS TO BE ADEQUATELY RESTRAINED.
10. METALIC RISER PIPING REQUIRED.
11. DEVIATIONS FROM THESE SPECIFICATIONS MUST HAVE PRIOR WRITTEN APPROVAL FROM THE WATER AUTHORITY CROSS CONNECTION OFFICE.
12. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

CONSTRUCTION NOTES:

- A. METER BOX PER STANDARD DRAWING 2362 OR 2363.
- B. PROPERTY LINE.
- C. SERVICE LINE WITHOUT TAPS OR TEES BETWEEN THE METER AND THE BACKFLOW PREVENTION ASSEMBLY.
- D. ADEQUATE SLEEVE & INSULATION. INSULATION SHALL BE (AT MINIMUM) 1" THICK.
- E. MINIMUM 4" CONCRETE (3000 PSI) SLAB.
- F. UNION OR FLANGED FITTINGS INSTALLED A MINIMUM OF 4" ABOVE GRADE.
- G. 36" MAXIMUM, 12" MINIMUM (FROM LOWEST POINT OF ASSEMBLY TO TOP OF CONCRETE SLAB).
- H. PROVIDE ADJUSTABLE METALIC SUPPORTS ON UNITS 2.5" AND GREATER DIAMETER (TYPICAL).
- I. USC APPROVED DCVA, AS SHOWN
- J. PROTECTIVE ENCLOSURE, SEE STANDARD DRAWING 2389 FOR DESIGN CRITERIA.
- K. DRAIN: DRAIN TO DAYLIGHT. SCREEN RECOMMENDED TO PREVENT RODENT AND INSECT ENTRY.
- L. BUILDING SERVICE LINE.

REVISIONS	WATER AUTHORITY
	WATER DOUBLE CHECK VALVE ASSEMBLY (DCVA)
	DWG. 2386 JANUARY 2011



PLAN

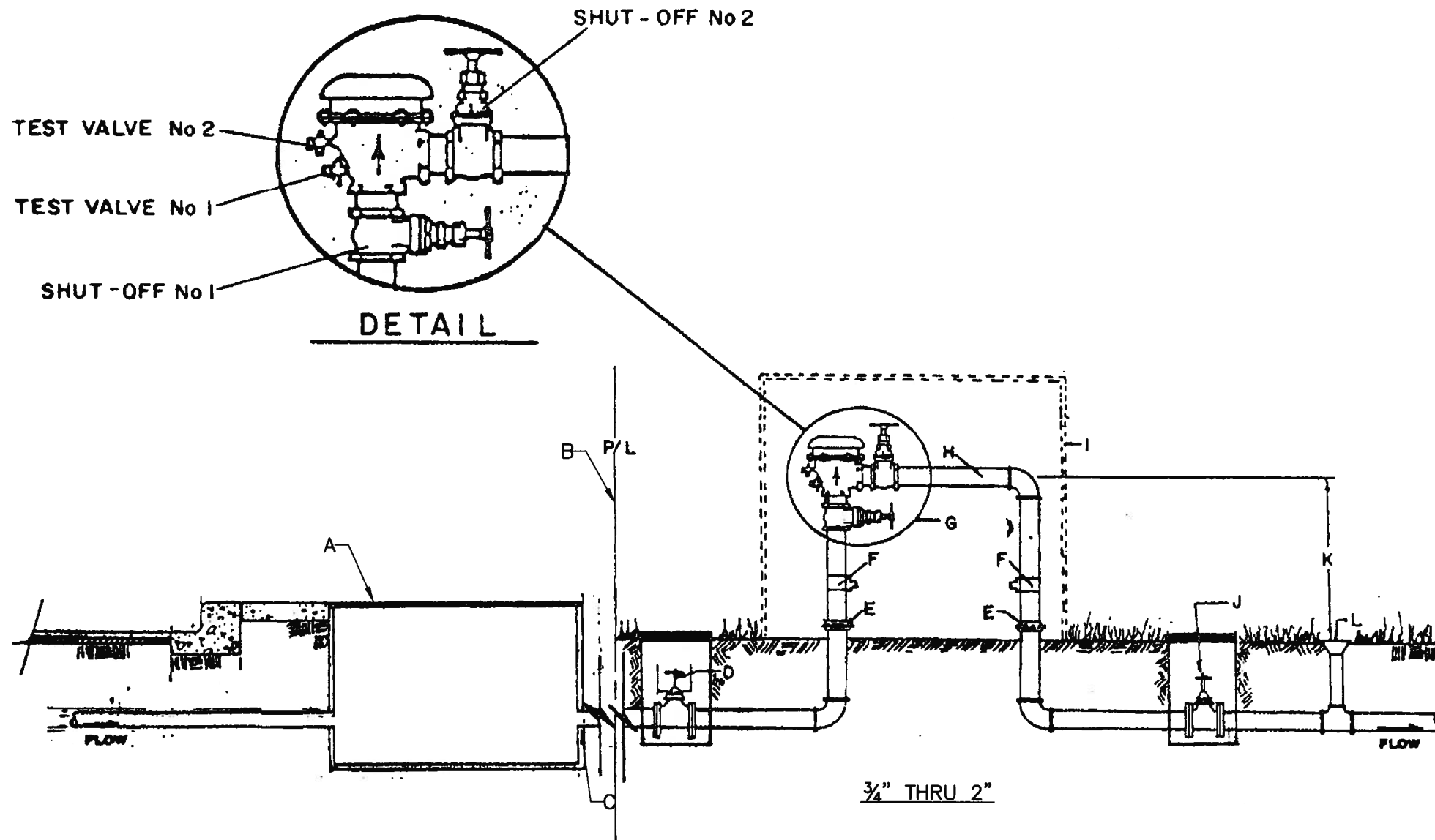
GENERAL NOTES:

1. SEE MANUAL OF PROCEDURES FOR THE TYPE OF BACKFLOW PREVENTION ASSEMBLY REQUIRED ON PRIVATE FIRE PROTECTION SYSTEMS.
2. HORIZONTAL DCDA INSTALLATION REQUIRED.
3. PROTECT FROM FREEZING WITH A POSITIVE HEAT SOURCE AND INSULATION.
4. MINIMUM DCDA SIZE MUST BE THE BUILDING SERVICE LINE SIZE.
5. METALLIC RISER PIPING REQUIRED.
6. ABOVE GRADE DCDA INSTALLATION REQUIRED.
7. FLANGED FITTINGS REQUIRED. JOINTS TO BE ADEQUATELY RESTRAINED.
8. WATER LINE PRESSURE AND TEMPERATURE MUST NOT EXCEED THE CAPACITY OF DCDA.
9. INSTALL WATER HAMMER ARRESTORS & THERMO EXPANSION PROTECTION, AS NECESSARY.
10. DEVIATIONS FROM THESE SPECIFICATIONS MUST HAVE PRIOR WRITTEN APPROVAL FROM THE WATER AUTHORITY CROSS CONNECTION OFFICE.
11. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

CONSTRUCTION NOTES:

- A. ADEQUATE SLEEVE & INSULATION. INSULATION SHALL BE (AT MINIMUM) 1" THICK.
- B. MINIMUM 4" CONCRETE (3000 PSI) SLAB.
- C. 36" MAXIMUM, 12" MINIMUM (FROM LOWEST POINT OF ASSEMBLY TO TOP OF CONCRETE SLAB).
- D. PIPE SPOOL (OPTIONAL).
- E. PROVIDE ADJUSTABLE METALLIC SUPPORTS..
- F. USC APPROVED DCDA, AS SHOWN.
- G. PROTECTIVE ENCLOSURE, SEE STANDARD DRAWING 2389 FOR DESIGN CRITERIA.
- H. DRAIN: DRAIN TO DAYLIGHT. SCREEN RECOMMENDED TO PREVENT RODENT OR INSECT ENTRY.
- I. BUILDING SERVICE LINE.

REVISIONS	WATER AUTHORITY
	WATER DOUBLE CHECK-DETECTOR CHECK ASSEMBLY (DCDA)
	DWG. 2387 JANUARY 2011



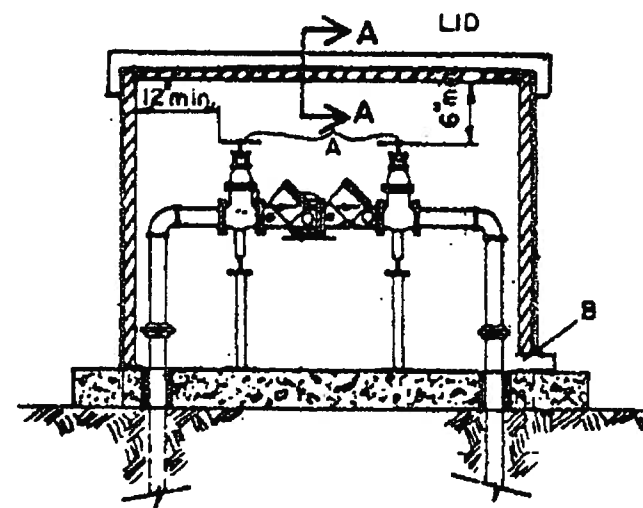
GENERAL NOTES:

1. PVB'S UNAPPROVED FOR CONTAINMENT PROTECTION, EXCEPT FOR LAWN IRRIGATION SYSTEMS.
2. DO NOT INSTALL IN FLOOD PRONE AREAS OR IN STORM RETENTION OR DETENTION BASINS.
3. DO NOT INSTALL PVB'S > 5' ABOVE GROUND LEVEL.
4. PROTECT PVB'S FROM FREEZING WITH A POSITIVE HEAT SOURCE.
5. HORIZONTAL INSTALLATION REQUIRED AS SHOWN.
6. JOINTS TO BE ADEQUATELY RESTRAINED.
7. METALLIC RISER PIPING REQUIRED.
8. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

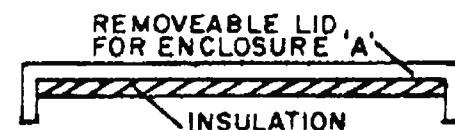
CONSTRUCTION NOTES:

- A. METER BOX PER STANDARD DRAWING 2362 OR 2363.
- B. PROPERTY LINE.
- C. SERVICE LINE WITHOUT TAPS OR TEES BETWEEN THE METER AND THE BACKFLOW PREVENTION ASSEMBLY.
- D. ISOLATION VALVE (GATE VALVE OR BALL VALVE).
- E. UNIONS, MINIMUM 4" ABOVE GRADE.
- F. TEE WITH DRAIN PLUG OR BALL DRAIN VALVE, MINIMUM 6" ABOVE GRADE.
- G. USC APPROVED PVB, AS SHOWN.
- H. SPOOL, 12" MAXIMUM LENGTH.
- I. ENCLOSURE, OPTIONAL. SEE WATER STANDARD DRAWING 2389 FOR DESIGN CRITERIA IF ENCLOSURE IS USED.
- J. CONTROL VALVE (ELECTRIC OR MANUAL), OPTIONAL.
- K. 12" MINIMUM ABOVE ALL DOWNSTREAM PIPING & OUTLETS.
- L. SPRINKLER.

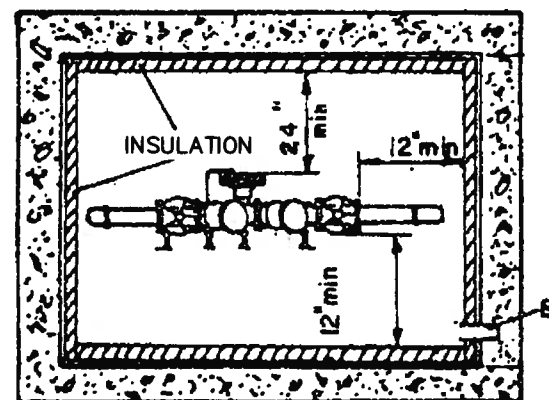
REVISIONS	WATER AUTHORITY
	LANDSCAPE PRESSURE VACUUM BREAKER (PVB)
	DWG. 2388 JANUARY 2011



PROFILE

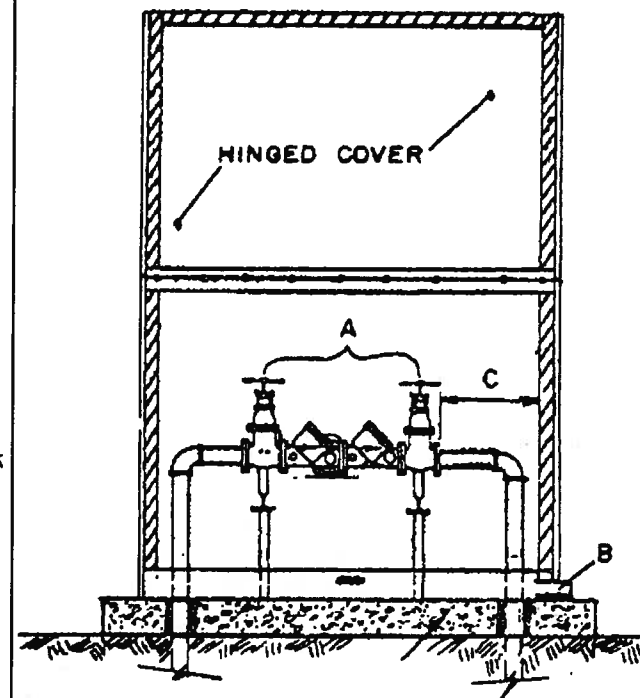


SECTION A-A

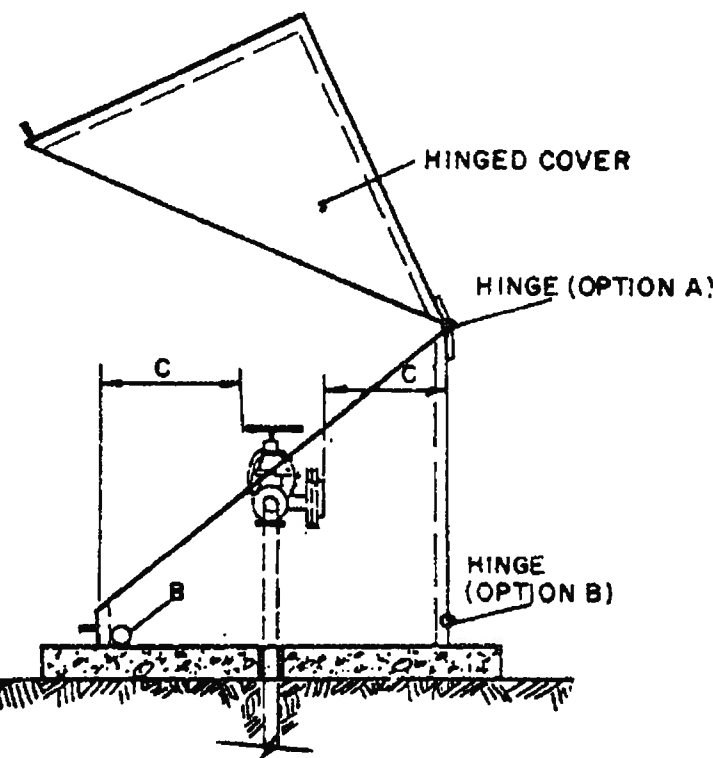


PLAN VIEW

TYPE A. ENCLOSURE: WITH
PERMANENT SIDE WALLS

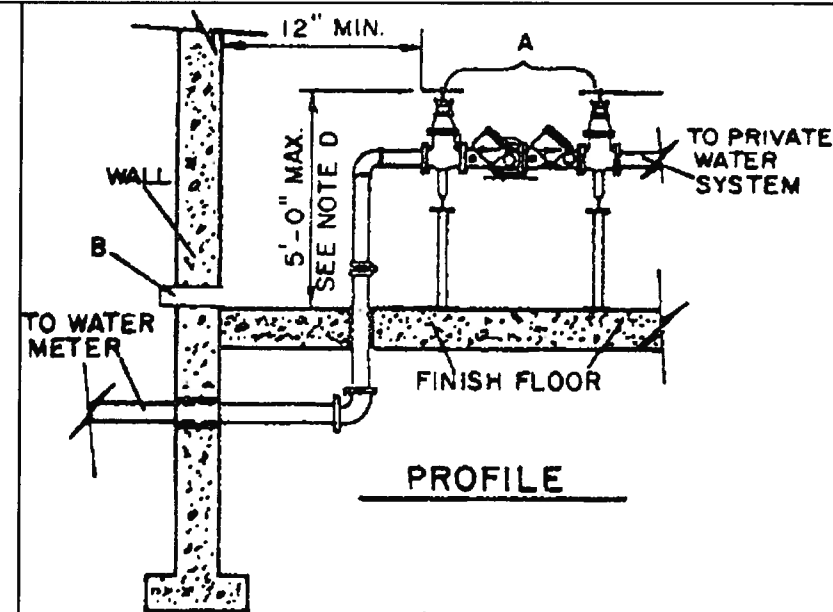


FRONT VIEW

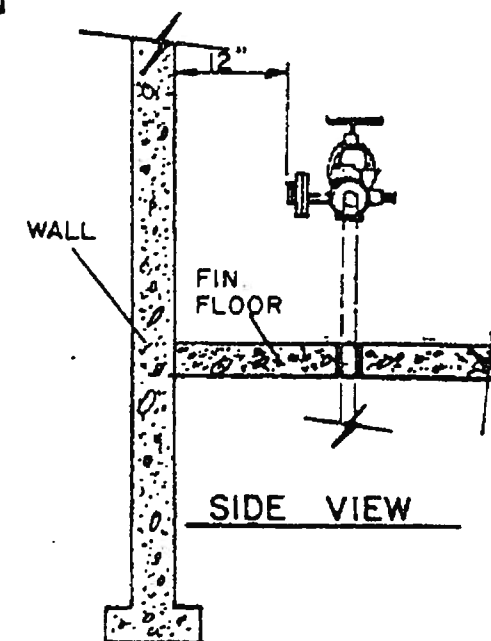


SIDE VIEW

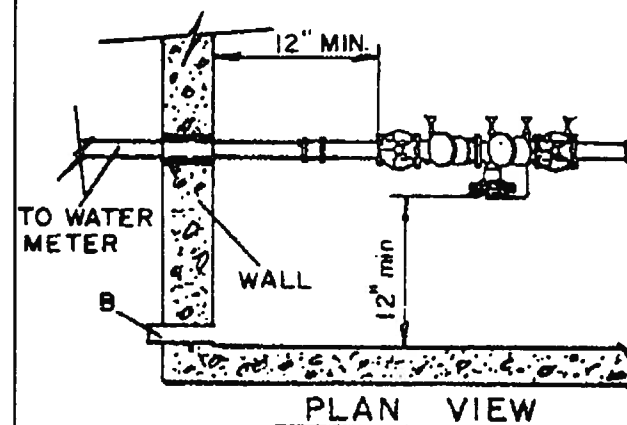
TYPE B. ENCLOSURE: WITH
HINGED COVER



PROFILE



SIDE VIEW



PLAN VIEW

TYPE C. ENCLOSURE: AND
TYPICAL INSTALLATION
INDOOR STRUCTURE

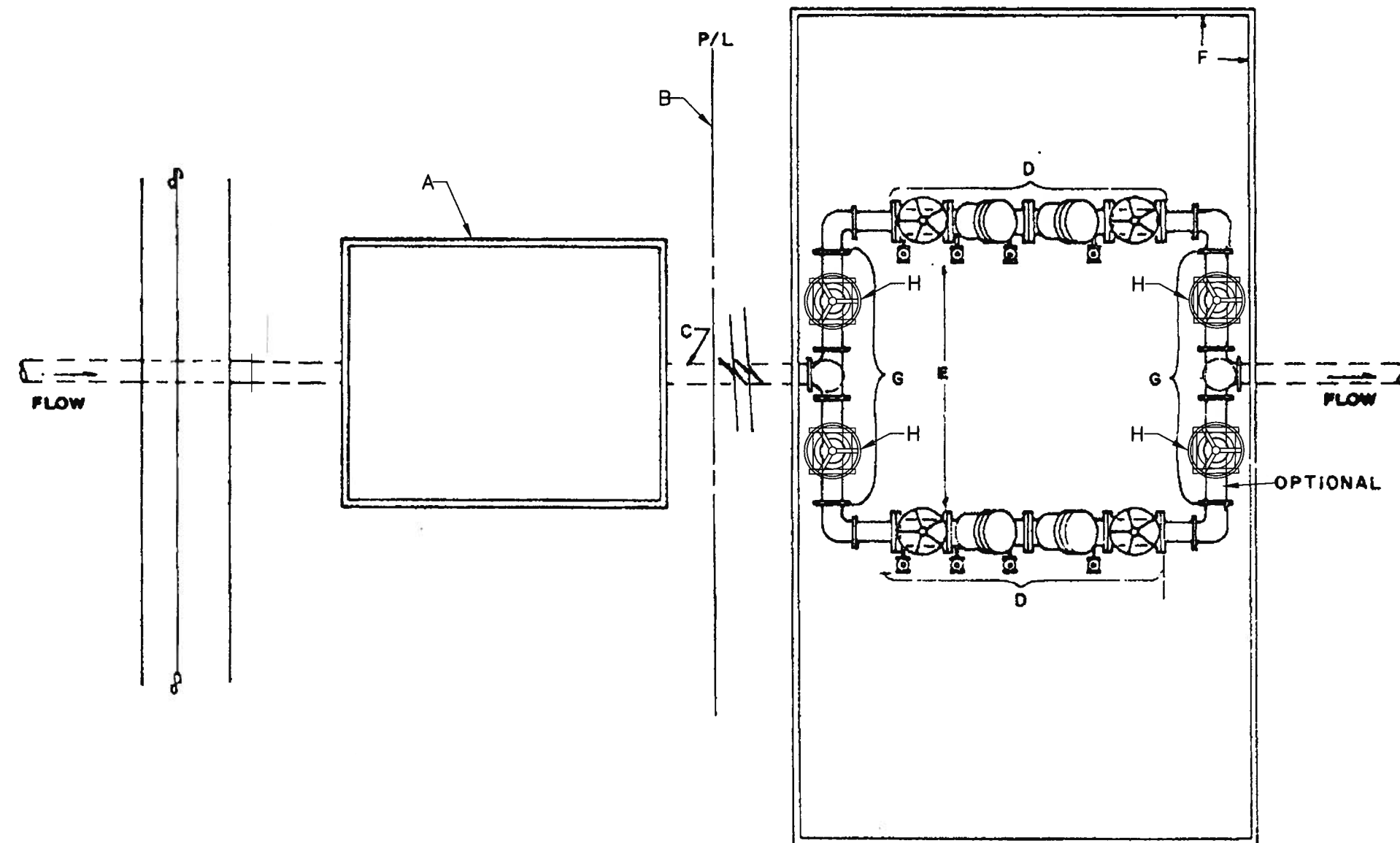
GENERAL NOTES:

1. ENCLOSURE DESIGN: CONSTRUCTION AND MAINTENANCE IS THE RESPONSIBILITY OF THE CONSUMER. THE DESIGN ENCLOSURES MUST MEET THESE MINIMUM SPECIFICATIONS. CONSUMER MAY SELECT THE USE OF TYPE A., B. OR C. ENCLOSURE.
2. INSTALLATION MUST BE PROTECTED FROM FREEZING.
3. ENCLOSURES MUST BE INSTALLED AND MAINTAINED SO THAT UNITS ARE SAFELY & READILY ACCESSIBLE FOR TESTING, MAINTENANCE & REPAIRS.
4. FOR TYPE B. ENCLOSURE, THE HINGE MAY BE LOCATED AT OPTION A. OR B. AS SHOWN.
5. ALTERNATE DESIGNS MAY BE USED WITH PRIOR WRITTEN APPROVAL FROM THE WATER AUTHORITY CROSS CONNECTION OFFICE.
6. IF FLOOR DRAIN IS USED, FLOOR SLAB SHALL BE SLOPED TOWARD DRAIN HOLE.

CONSTRUCTION NOTES:

- A. USC APPROVED RPBA, DCVA, DCDA OR PVB.
- B. DRAIN: DRAIN OF ADEQUATE SIZE TO ALLOW FOR PROPER DRAINAGE. SHIELD IS RECOMMENDED FOR SIDE DISCHARGING RELIEF VALVES. FOR TYPE C. ENCLOSURE, SWING CHECK IS RECOMMENDED WHEN DRAINING TO DAYLIGHT.
- C. ADEQUATE CLEARANCES REQUIRED FOR TESTING, MAINTENANCE & REPAIR.
- D. 5' MAXIMUM FROM HANDWHEEL TO FINISH FLOOR, AS SHOWN. UNITS INSTALLED HIGHER THAN 5', CONSUMER MUST PROVIDE PERMANENT ACCESS PLATFORM/LADDER.

REVISIONS	WATER AUTHORITY
	WATER ENCLOSURES
	DWG. 2389 JANUARY 2011



PLAN

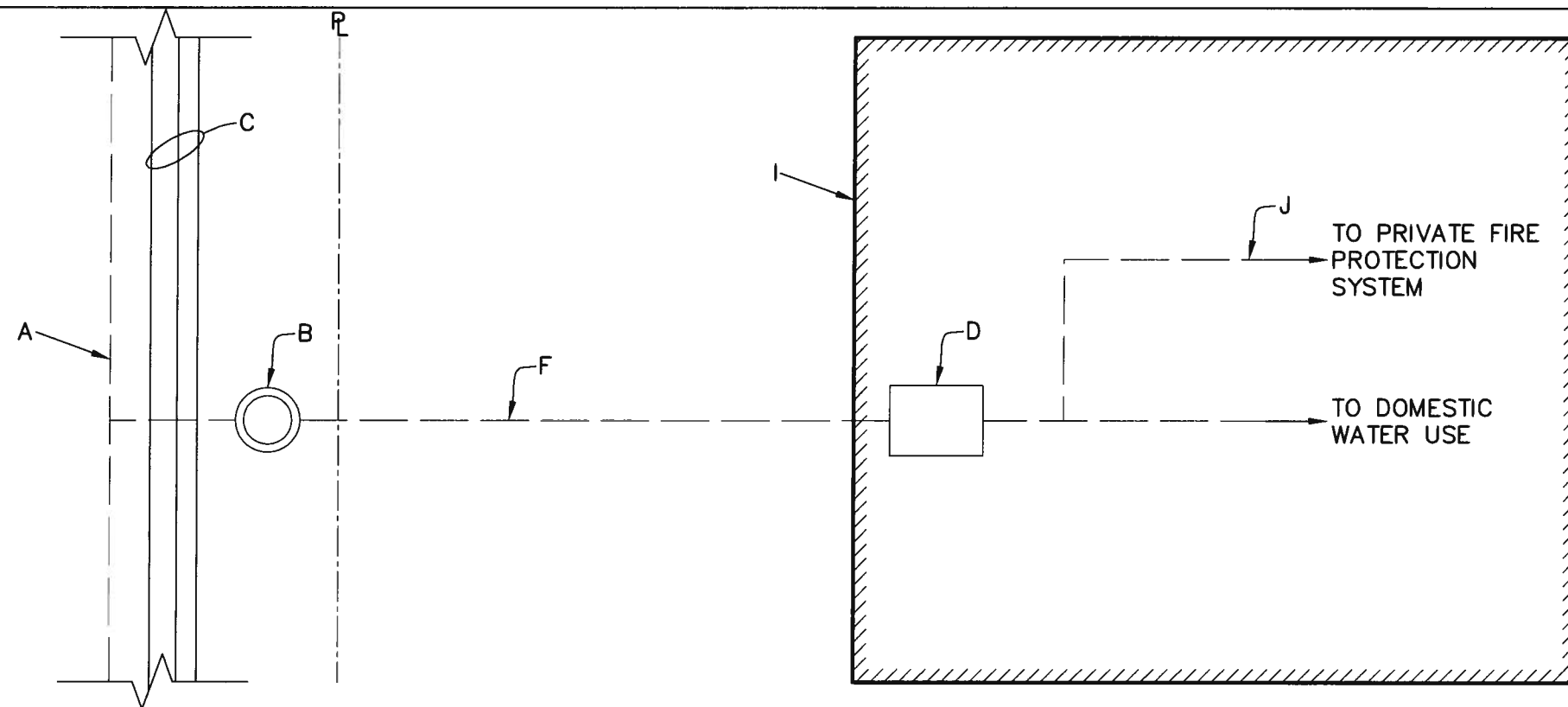
GENERAL NOTES:

1. SEE STANDARD DRAWINGS 2385, 2386 AND 2387.
2. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

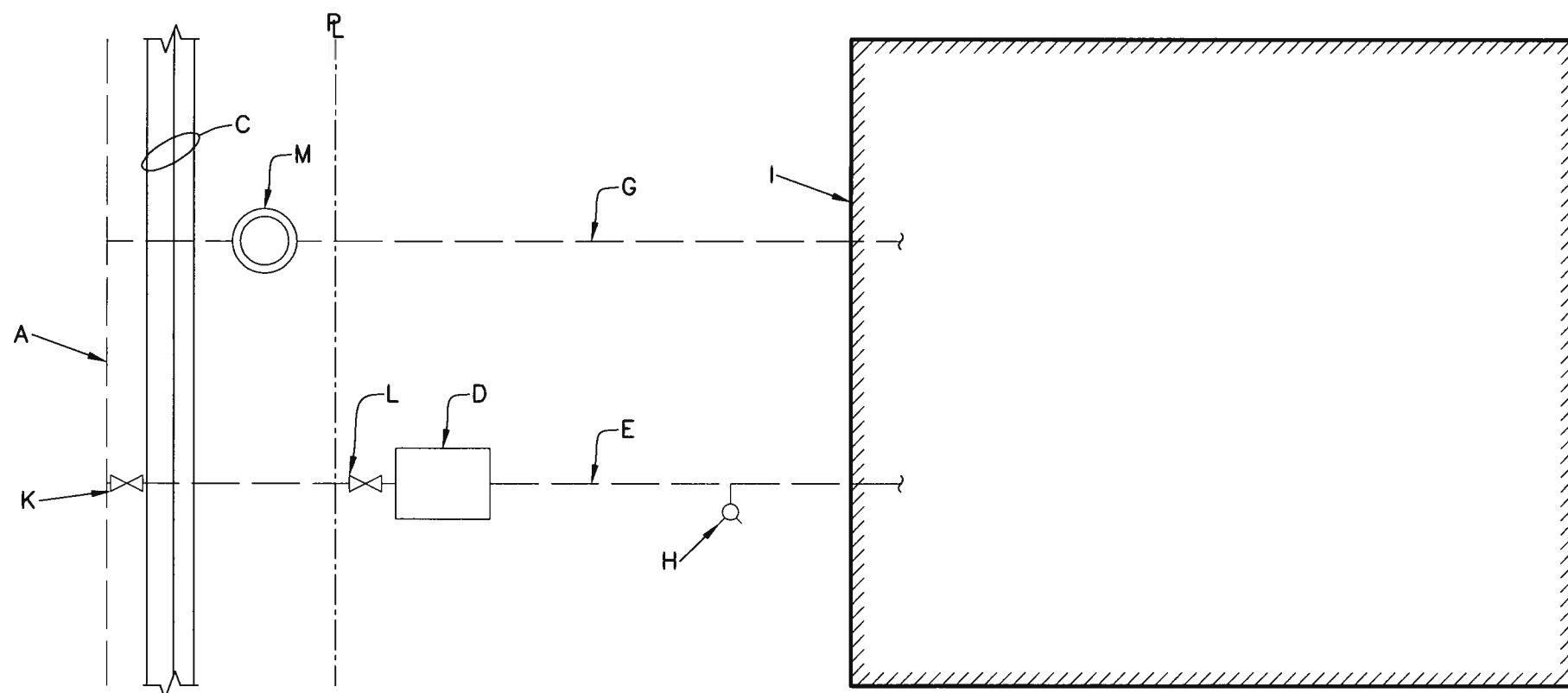
CONSTRUCTION NOTES:

- A. METER BOX PER STANDARD DRAWING 2362 OR 2363.
- B. PROPERTY LINE.
- C. SERVICE LINE WITHOUT TAPS OR TEES BETWEEN THE METER AND THE BACKFLOW PREVENTION ASSEMBLY.
- D. USC APPROVED RPBA, DCVA OR DCDA.
- E. ADEQUATE CLEARANCE REQUIRED FOR TESTING & MAINTENANCE.
- F. PROTECTIVE ENCLOSURE. SEE STANDARD DRAWING 2389 FOR DESIGN CRITERIA.
- G. PIPING AND FITTINGS MAY BE ABOVE OR BELOW GRADE.
- H. GATE VALVE WITH HAND WHEEL.

REVISIONS	WATER AUTHORITY
	WATER INSTALLATION FOR CONTINUOUS SERVICE
	DWG. 2390 JANUARY 2011



**CROSS-CONNECTION CONTROL CONTAINMENT
WITH MULTI-USE DOMESTIC & FIRE SERVICE LINE**



**CROSS-CONNECTION CONTROL CONTAINMENT
WITH UNMETERED FIRE SERVICE LINE**

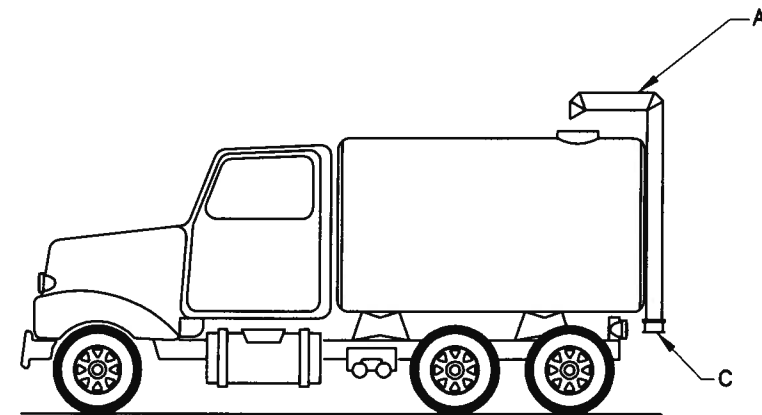
GENERAL NOTES:

1. IF METERED MULTI-USE SYSTEM IS USED, THE RPBA MUST BE THE FIRST CONNECTION FROM THE METER. NO TAPS WILL BE ALLOWED BETWEEN THE METER AND THE RPBA.
2. THE BACKFLOW PREVENTION ASSEMBLY MAY BE INSTALLED INDOORS OR OUTDOORS.
3. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO ADEQUATELY SIZE THE METER FOR THE SERVICE TO SUSTAIN SIMULTANEOUSLY THE PRIVATE FIRE PROTECTION SYSTEM AND THE DOMESTIC WATER DEMANDS. THE METER SHOULD BE APPROPRIATELY SIZED TO ACCOMMODATE LOW (DOMESTIC) AND HIGH (FIRE + DOMESTIC) FLOWS.
4. THE INSTALLATION OF A BACKFLOW ASSEMBLY MAY CREATE A CLOSED LOOP SYSTEM. THE CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH CURRENT PLUMBING CODES WHICH MAY REQUIRE INSTALLATION OF (PRIVATE) PRESSURE RELIEF DEVICES AND/OR EXPANSION TANKS.

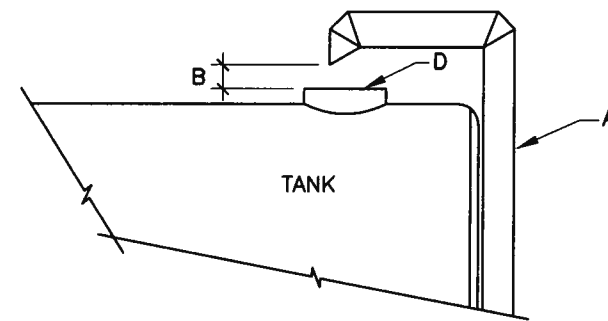
CONSTRUCTION NOTES:

- A. WATER MAIN.
- B. METER.
- C. CURB AND GUTTER.
- D. RPBA.
- E. UNMETERED FIRE LINE.
- F. SERVICE LINE FOR DOMESTIC FIRE.
- G. DOMESTIC SERVICE LINE.
- H. PRIVATE FIRE HYDRANT.
- I. BUILDING STRUCTURE.
- J. INTERNAL FIRE PROTECTION SYSTEM.
- K. PUBLIC GATE VALVE PER STANDARD DRAWING 2326.
- L. PRIVATE VALVE TO BE OWNED AND MAINTAINED BY THE CUSTOMER.
- M. METER WITH DUAL CHECK VALVE (PRIVATE) TO OWNED AND MAINTAINED BY THE CUSTOMER.

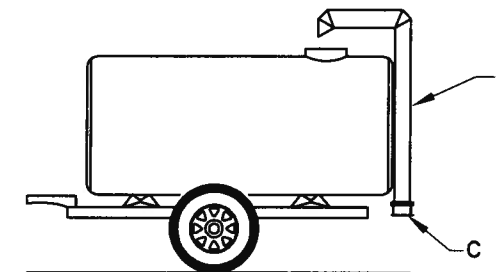
REVISIONS	WATER AUTHORITY
	WATER RESIDENTIAL WATER PRIVATE FIRE PROTECTION SYSTEMS
	DWG. 2394 JANUARY 2011



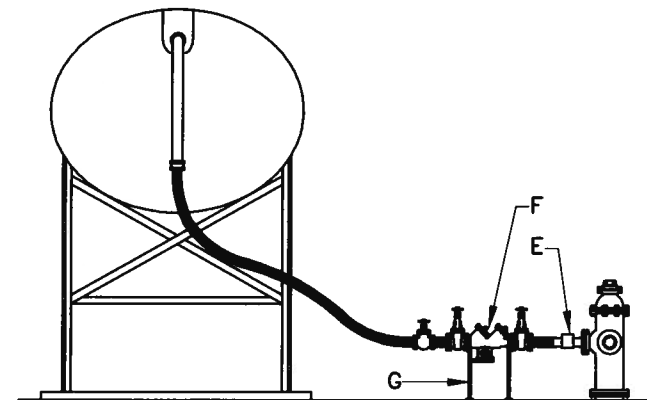
WATER TRUCK WITH AIR GAP



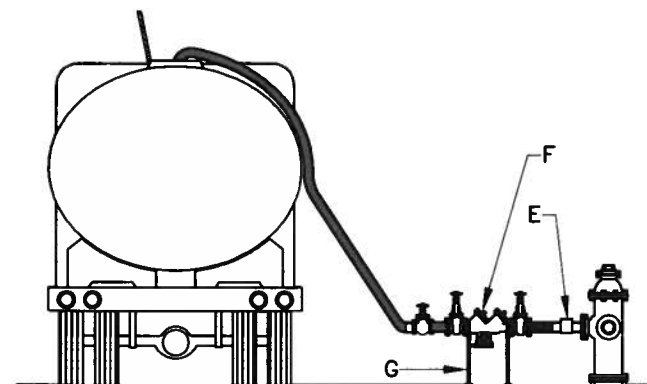
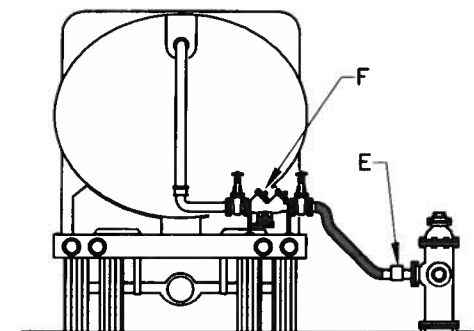
FILL PIPE DETAIL WITH AIR GAP



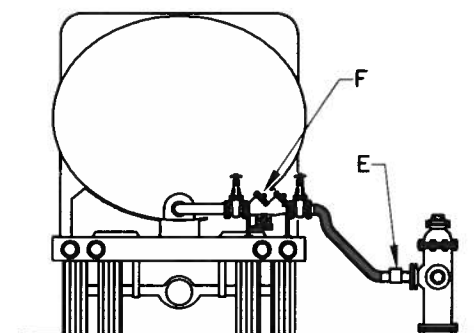
WATER WAGON WITH AIR GAP



ELEVATED TANK WITH RPBA'S



TANK TRUCKS WITH RPBA'S



GENERAL NOTES:

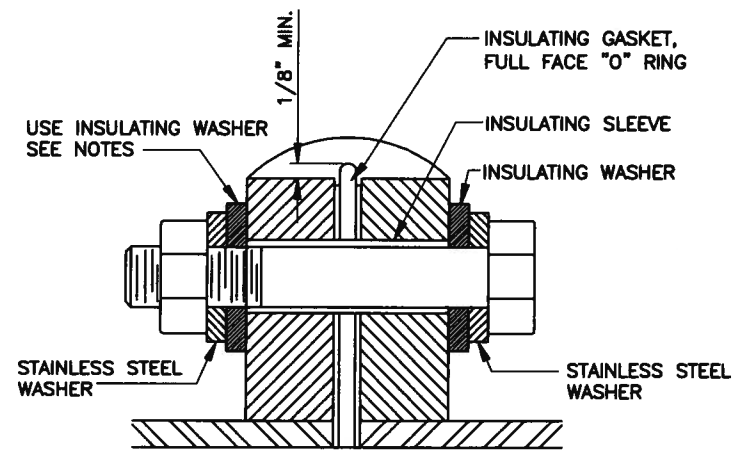
1. THERE SHALL BE NO TAPS OR TEES BETWEEN THE HYDRANT AND THE RPBA.
2. IN ALL CASES, A FIRE HYDRANT METER MUST BE USED AT ALL TIMES.
3. FIRE HYDRANT METER PERMIT MUST BE PRESENT WITH THE METER AT ALL TIMES.
4. ONLY APPROVED HYDRANTS CAN BE USED AS STATED IN THE FIRE HYDRANT METER PERMIT.

KEYED NOTES:

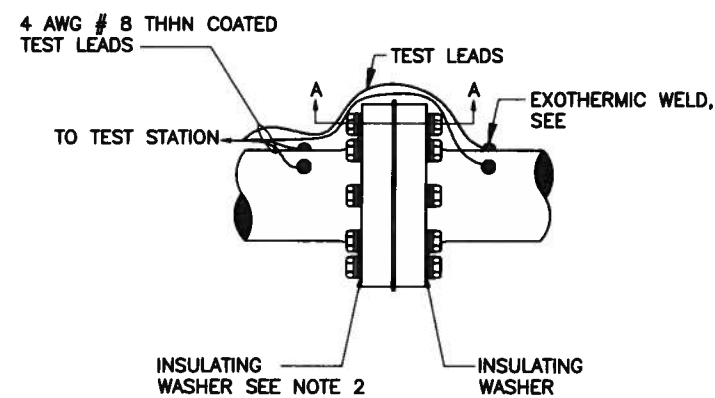
- A. FILL PIPE. PERMANENTLY MOUNTED ON TANK. SEE FILL PIPE DETAIL.
- B. AIR GAP. AIR GAP IS TWICE THE DIAMETER OF FILL PIPE ABOVE FLOOD RIM.
- C. HOSE CONNECTION.
- D. FLOOD RIM.
- E. FIRE HYDRANT METER.
- F. USC APPROVED RPBA.
- G. SUPPORTS REQUIRED.

RPBA = REDUCED PRESSURE BACKFLOW ASSEMBLY

REVISIONS	WATER AUTHORITY
	WATER APPROVED METHODS OF FILLING TANKS
	DWG. 2395 JANUARY 2011



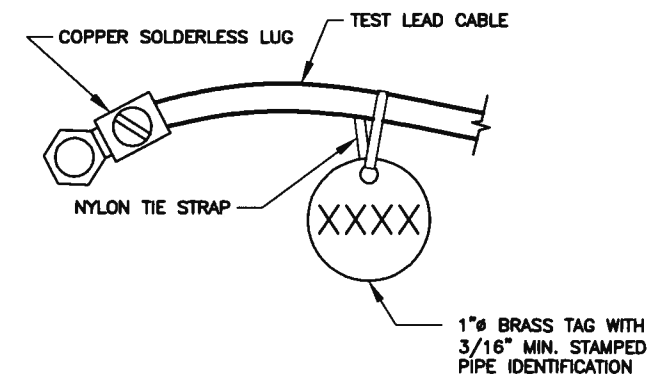
SECTION A-A



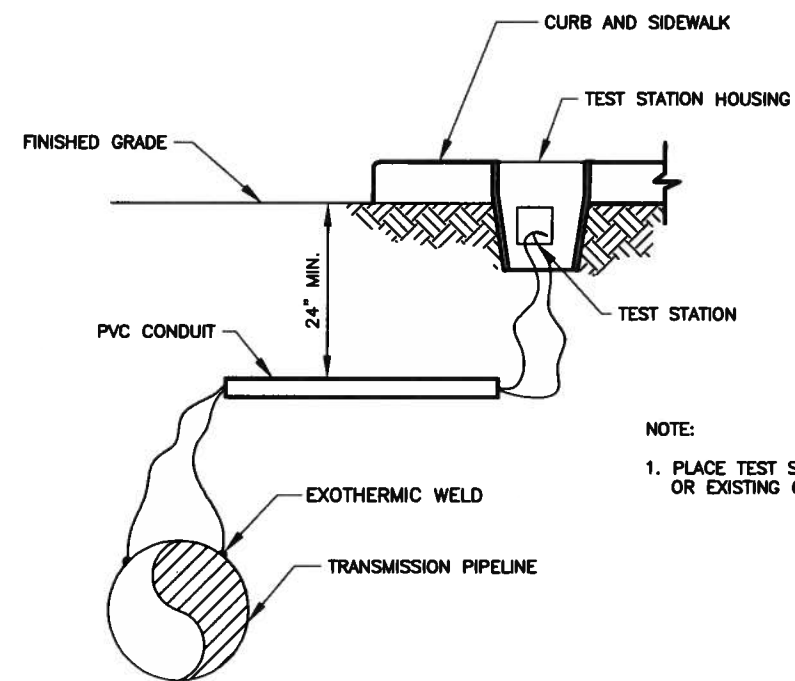
ISOLATION FLANGE DETAIL

NOTES:

1. HARDWARE QUANTITIES IN INSULATING FLANGE KIT WILL VARY BASED ON GASKET PATTERN AND PIPE SIZE.
2. SEE SPECIFICATIONS FOR ISOLATION GASKET, SLEEVE AND WASHER MATERIALS.
3. FOR CONNECTIONS TO FOREIGN INSTALLATIONS, INSTALL SINGLE-WASHER KITS WITH THE ISOLATING WASHERS ONLY ON THE FOREIGN SIDE OF THE FLANGES.
4. FOR NON-FOREIGN INSTALL DOUBLE WASHER KITS WITH ISOLATING WASHERS ON BOTH SIDES OF THE FLANGES.
5. DO NOT APPLY METALLIC OR OTHER NON-INSULATING PAINTS TO INSULATING PARTS OR OTHER EDGES OF FLANGES.
6. INSULATING SLEEVE TO BE 1/64" SHORTER THAN DISTANCE BETWEEN SST WASHERS WHEN BOLT IS FULLY TIGHTENED.



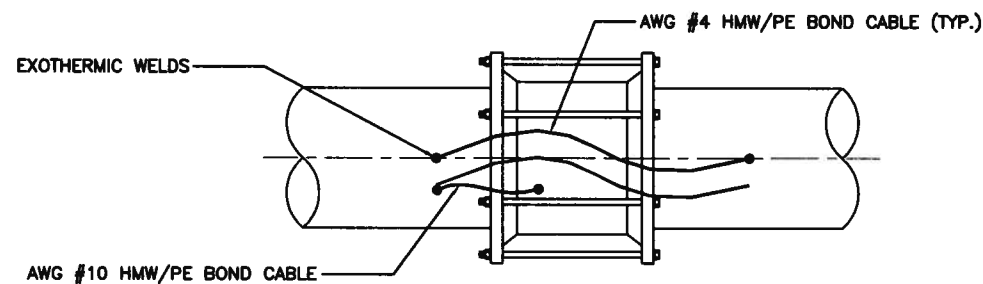
CABLE IDENTIFIER



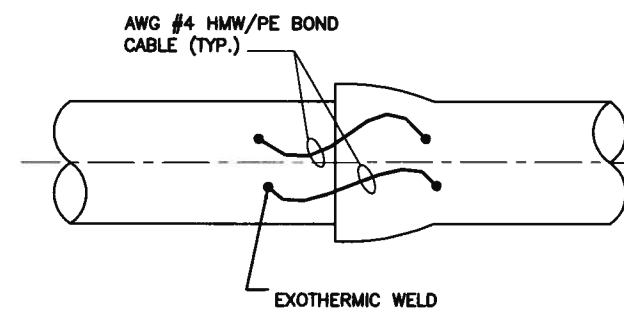
NOTE:

1. PLACE TEST STATION HOUSING BEHIND NEW OR EXISTING CURB IN THE SIDEWALK.

TEST STATION INSTALLATION (TYP.)



FLEXIBLE COUPLING BONDING



DIP PIPE BONDING

ABBREVIATIONS:

- THHN = THERMOPLASTIC HIGH HEAT-RESISTANT NYLON
- AWG = AMERICAN WIRE GAUGE
- HMW/PE = HIGH MOLECULAR WEIGHT POLYETHYLENE
- SST = STAINLESS STEEL

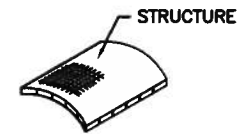
REVISIONS

WATER AUTHORITY

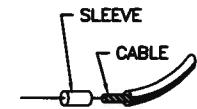
**WATER
CORROSION MONITORING
DETAILS - 1**

DWG. 2396

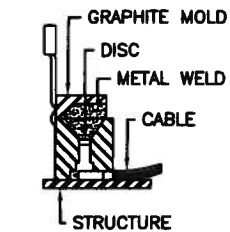
JANUARY 2011



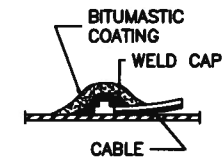
1) FILE STRUCTURE TO BARE METAL AND CLEAN SURFACE



2) STRIP INSULATION FROM WIRE AND ATTACH SLEEVE



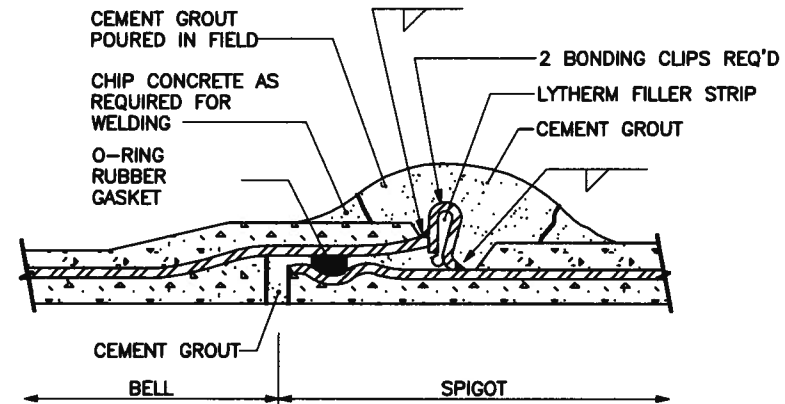
3) HOLD MOLD FIRMLY WITH OPENING AWAY FROM OPERATOR. IGNITE WITH FLINT GUN



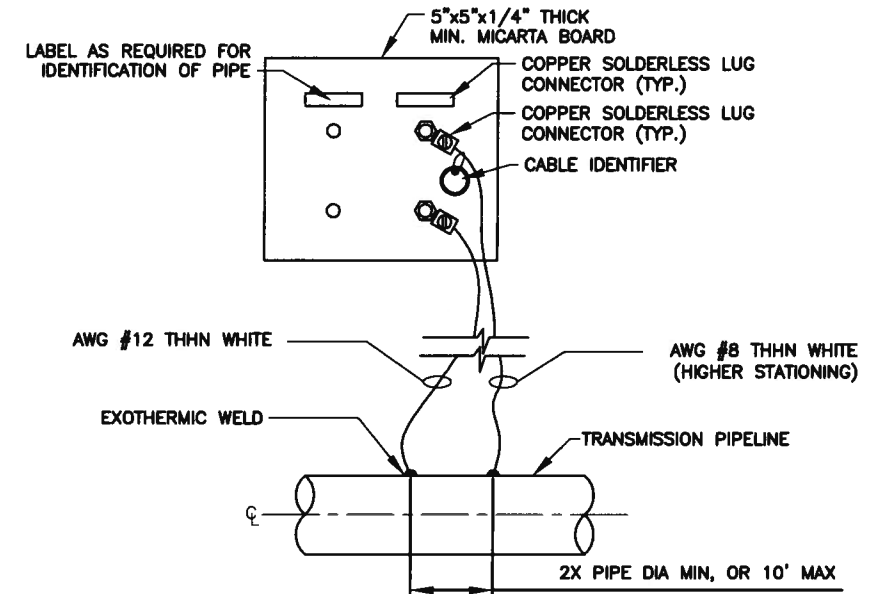
4) REMOVE SLAG FROM CONNECTION WITH CHIPPING HAMMER

5) COVER CONNECTION WITH BITUMASTIC COATING OVER ALL EXPOSED METAL

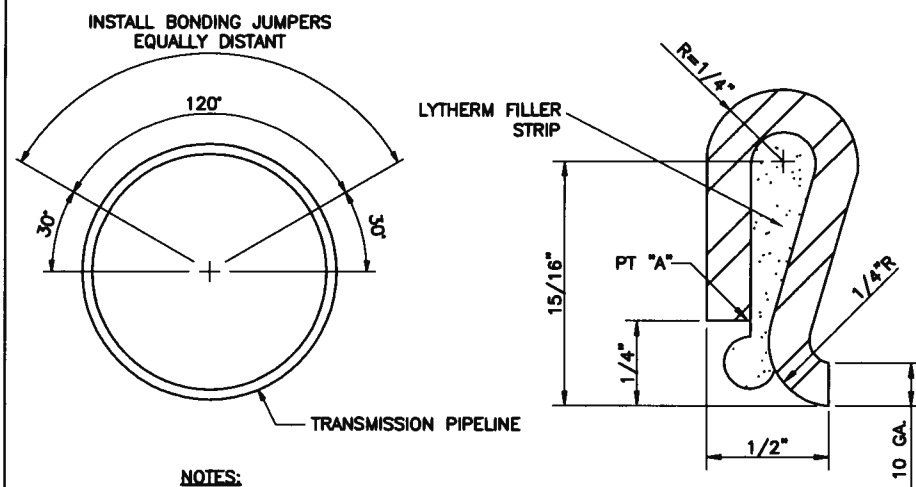
EXOTHERMIC WELD DETAIL



CCP OR CML&C STEEL PIPE BONDING INSTALLATION



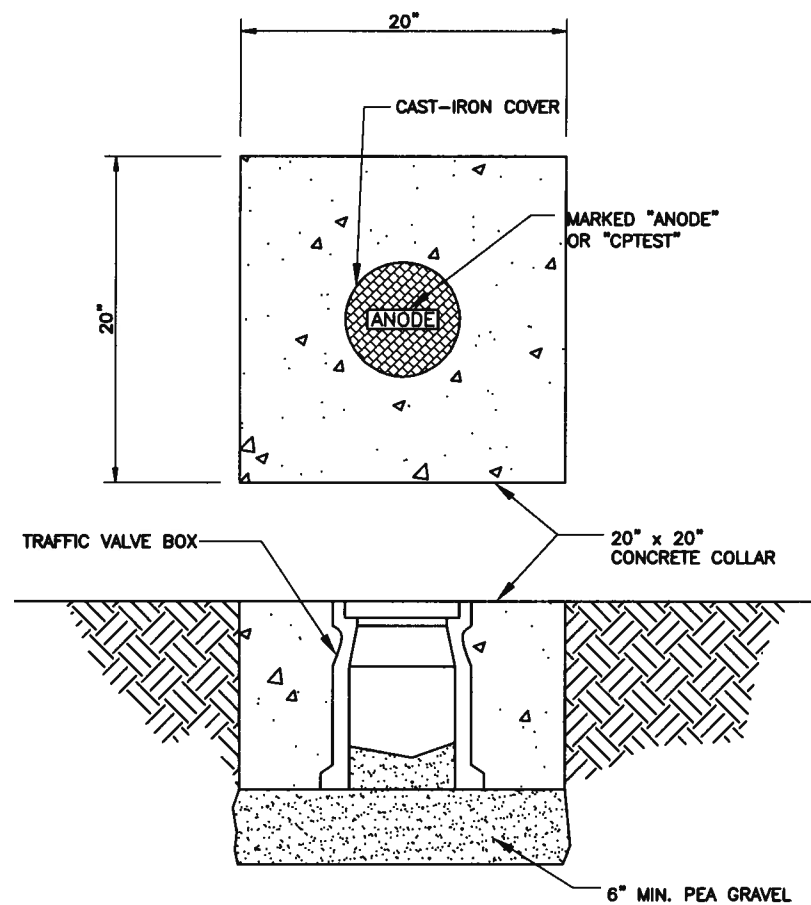
2 WIRE TEST STATION



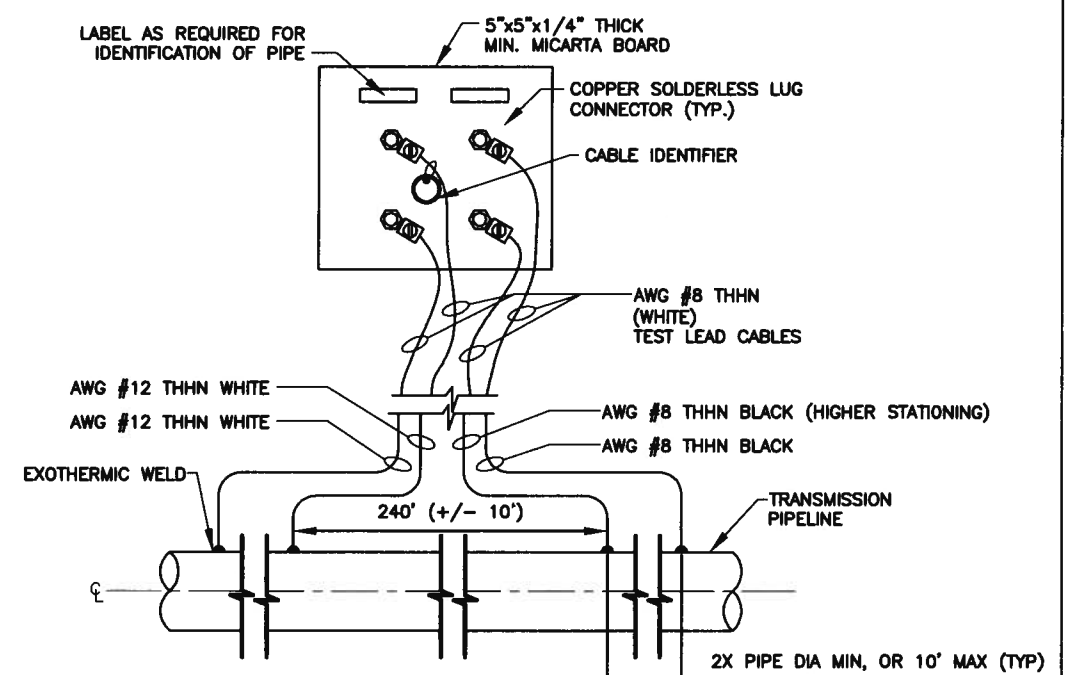
NOTES:

1. MATERIAL SPECIFICATION - ASTM A336 (COMMERCIAL QUALITY)
CUT LENGTH - $2 \frac{1}{2} \pm \frac{1}{16}$ "
WIDTH - $1 \frac{1}{4} \pm \frac{1}{16}$ "
2. LYTHERM FILLER STRIP TO BE $1" \times 1 \frac{1}{2}"$ WIDE TO OVERLAP SIDES OF JUMPER.
3. CRIMP BONDING JUMPER OVER FILLER AT PT "A" TO COMPRESS FILLER.

BONDING CLIPS



TEST STATION HOUSING



4 WIRE TEST STATION

ABBREVIATIONS:

- THHN = THERMOPLASTIC HIGH HEAT-RESISTANT NYLON
- AWG = AMERICAN WIRE GAUGE

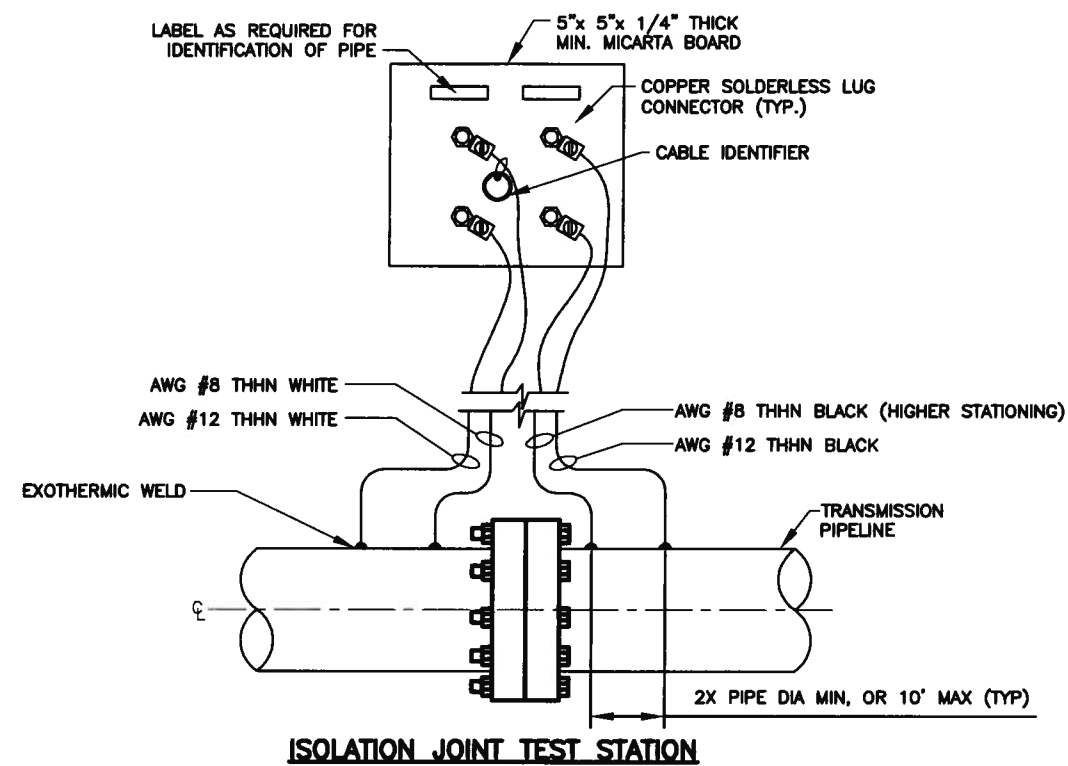
REVISIONS

WATER AUTHORITY

WATER CORROSION MONITORING DETAILS - 2

DWG. 2397

JANUARY 2011

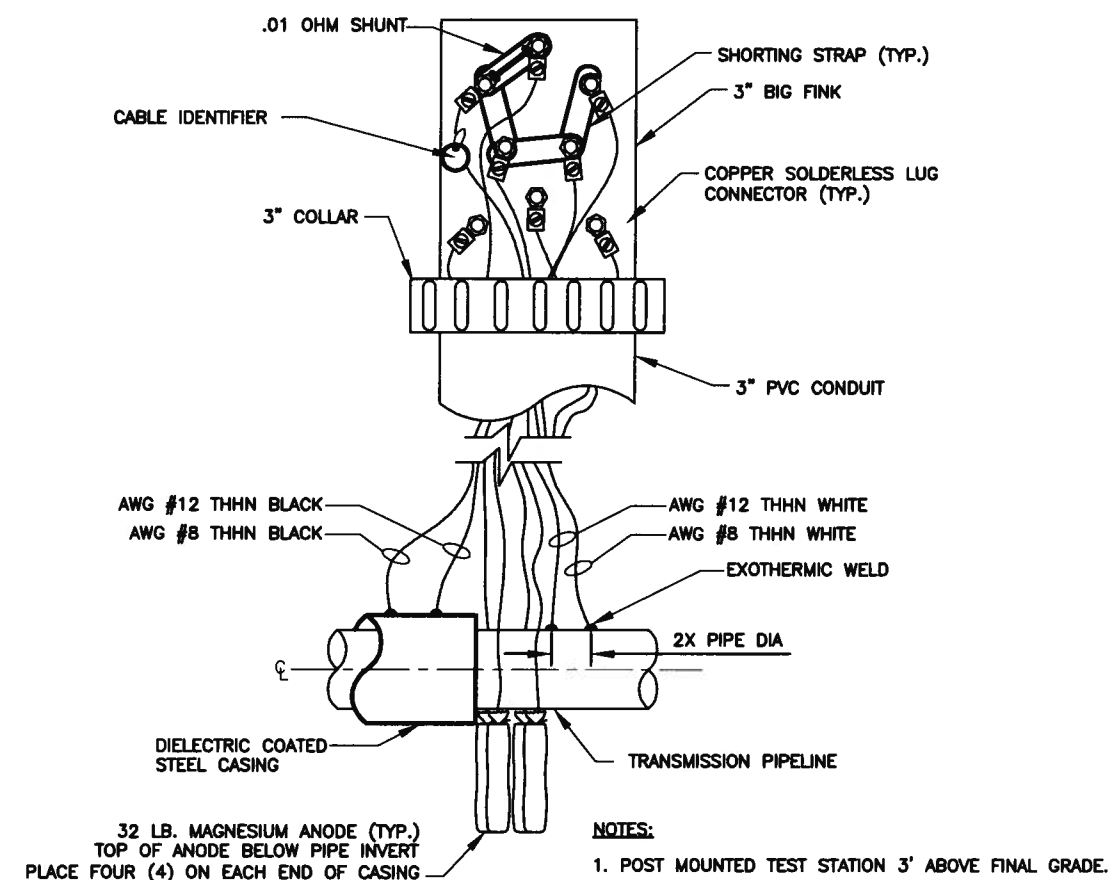


NOTES:

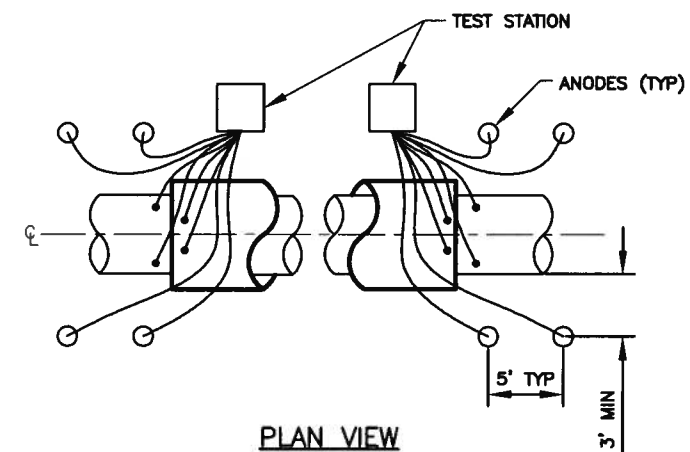
1. ENGRAVE LABEL ON MICARTA BOARD 3/16" THICK MIN.
2. FOR CASING TEST STATIONS SCREEN PRINT LABEL 1/2" MIN. ON TEST STATION CAP.

PROJECT #	6811-03
STATION #	XXX+XX

TEST BOARD LABEL



ELEVATION VIEW



CASING TEST STATION

ABBREVIATIONS:

- THHN = THERMOPLASTIC HIGH HEAT-RESISTANT NYLON
- AWG = AMERICAN WIRE GAUGE

REVISIONS

WATER AUTHORITY

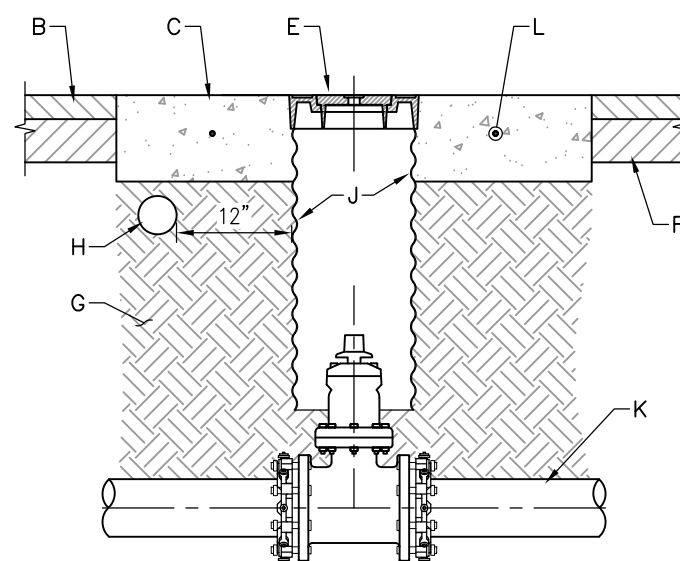
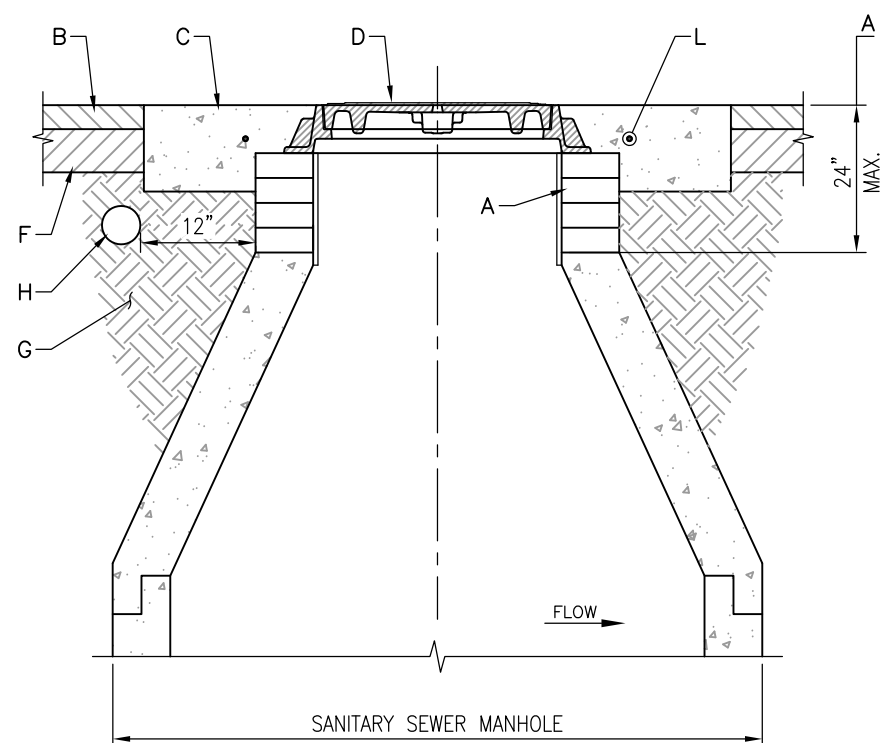
**WATER
CORROSION MONITORING
DETAILS - 3**

DWG. 2398

JANUARY 2011

SECTION 2400
STANDARD DETAILS FOR PAVING

DWG. NO.	TITLE
2460	PAVING MANHOLE AND VALVE BOX REGRADING
2461	PAVING MANHOLE/VALVE CONCRETE COLLAR DETAIL



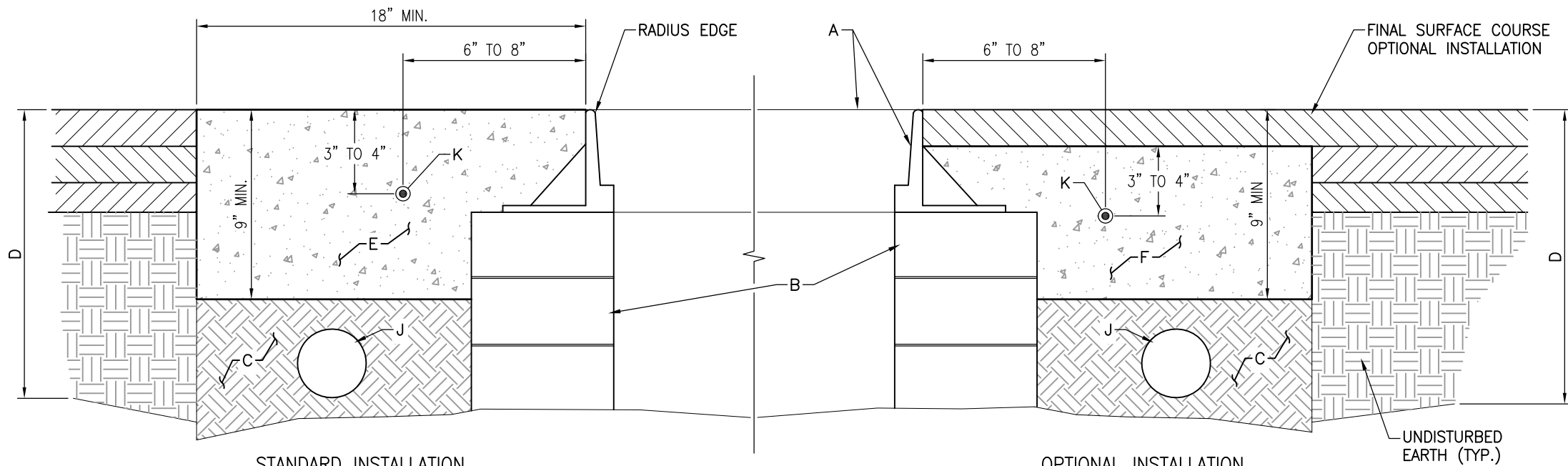
		<p align="center">WATER AUTHORITY & CITY OF ALBUQUERQUE</p>	
<p align="center">REVISIONS</p>			
<p>JAN. 2013 JAN. 2015 SEP. 2017</p>	<p align="center">PAVING MANHOLE AND VALVE BOX REGRADING</p>		
		<p>DWG. 2460</p>	<p align="right">MAY 2019</p>

GENERAL NOTES

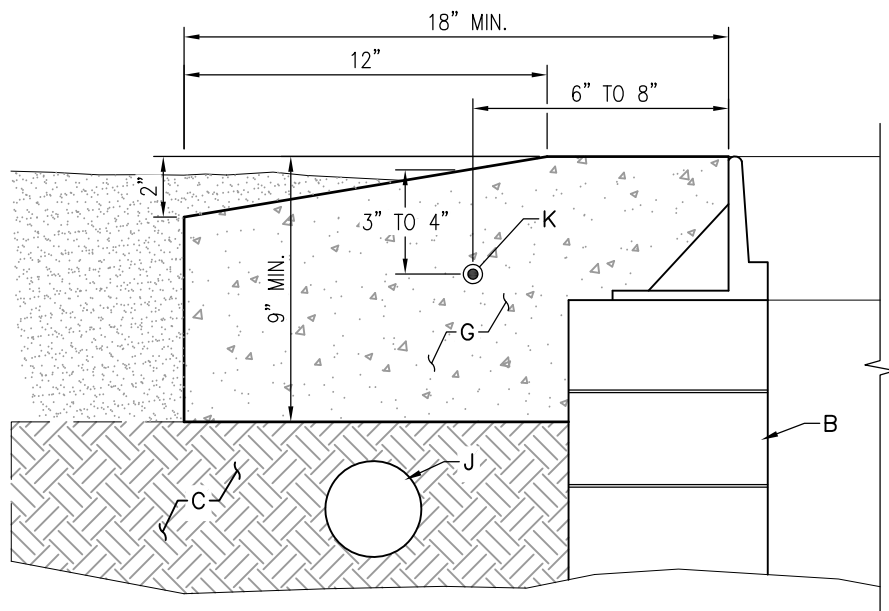
1. ALL MATERIALS MUST COMPLY WITH THE CURRENT WATER AUTHORITY OR CITY APPROVED PRODUCTS LISTS.
2. CONCRETE COLLAR SHALL BE PORTLAND CEMENT CONCRETE ($f'_c = 4000$ PSI)

CONSTRUCTION NOTES

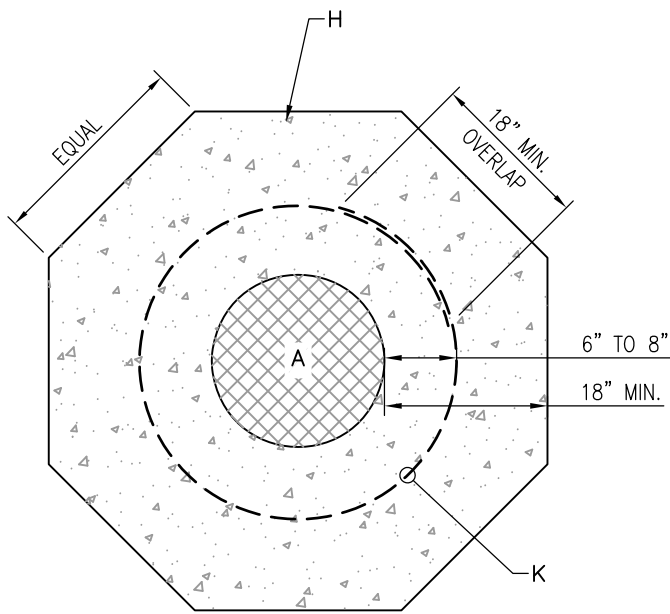
- A. MANHOLE OR VALVE FRAME AND COVER. SEE WATER AUTHORITY STANDARD DRAWINGS 2109, 2128, 2310, 2328, 2329, 2330, AND 2350.
- B. INSTALL CONCRETE ADJUSTMENT RINGS OR CONCRETE BRICKS FOR MANHOLES, INSTALL POLYMER COATED STEEL CORRUGATED METAL PIPE (CMP) FOR VALVE BOXES. SEE STANDARD DRAWING 2460 FOR CONTINUATION.
- C. 12" SUBGRADE, 95% COMPACTION (ASTM).
- D. PAVING SECTION PER APPROVED DRAWINGS.
- E. CONCRETE COLLAR IN PAVED AREAS. TYPICAL INSTALLATION.
- F. CONCRETE COLLAR IN PAVED AREAS WITH ASPHALT CAP. TO BE USED WHEN CALLED FOR ON PLANS OR AS DIRECTED BY THE ENGINEER. WATER AUTHORITY APPROVAL MUST BE OBTAINED PRIOR TO INSTALLATION ON SANITARY SEWER AND/OR WATER APPLICATIONS.
- G. CONCRETE COLLAR IN UNPAVED AREAS. SET RING 1" ABOVE GRADE AND SLOPE CONCRETE DOWN AS SHOWN TO 1" BELOW GRADE.
- H. SANITARY SEWER MANHOLE INSTALLATIONS SHALL HAVE CONCRETE COLLAR STAMPED WITH LINE SIZE AND FLOW DIRECTION ARROWS PER STANDARD DRAWINGS 2101 AND 2102. SEE STANDARD DRAWING 2181 FOR FORCEMAIN SEWER VALVE INSTALLATIONS, AND STANDARD DRAWING 2326 FOR WATER VALVE INSTALLATIONS.
- J. ELECTRONIC MARKER DEVICE (EMD) REQUIRED FOR ALL SANITARY SEWER VALVES AND MANHOLES, AND WATER VALVES. SEE STANDARD SPECIFICATION SECTION 170.
- K. #4 REBAR FORMED INTO RING. EMBED 3" TO 4" IN CONCRETE, AND INSTALL 6" TO 8" FROM EDGE OF MANHOLE FRAME OR VALVE BOX RING. PROVIDE 18" MIN. OVERLAP AS SHOWN.



PAVED AREAS
SECTION



STANDARD INSTALLATION
UNPAVED AREAS
SECTION



PLAN

REVISIONS		WATER AUTHORITY & CITY OF ALBUQUERQUE	
JAN. 2013		MANHOLE/VALVE CONCRETE COLLAR DETAIL	
JAN. 2015			
MAY 2019			
		DWG. 2461	AUG. 2019