

**MATERIALS SPECIFICATIONS FOR SEWAGE COLLECTION**

- Pipe Material for Sewers (shall be as specified on the plans)
  - Polyvinyl Chloride (PVC) sewer pipe shall conform to ASTM-D-3034, SDR26 and shall be manufactured and supplied in accordance with UNI-B-81 (Uni-Bell Plastic Pipe Association). Unless otherwise called for all pipe through 15" shall meet this specification. Joints shall be rubber gasketed in accordance with ASTM D-3212.
  - Class 52 ductile iron pipe (AWWA C151), with AWWA C-111 joints shall be used where the minimum separation cannot be maintained between water and sewer lines, within casing pipe installations, or for other special conditions as directed by Illinois-American.

**2. Manhole Materials**

Sanitary sewer manholes shall be of precast concrete unit construction (ASTM- C478) with an offset cone and joints sealed with butyl based material. Concrete adjustment rings shall be used where adjustment is necessary. Adjustment sections shall not exceed 12" vertically overall. All joints shall be sealed with Rubber-Nec, or approved equal Butyl based material. Cement grouting of the seams and joints should not be completed.

Butyl material shall total a minimum width of 2" wide as applied, in two pieces. Manholes shall be 48" inside diameter on sewers 24" and smaller, and shall be 60" inside diameter for sewers 27" through 48".

Sanitary sewer manholes shall have poured-in-place or precast inverts. The inverts shall conform to the sewer grades with smooth, well rounded junctions and transitions. A flexible union between the pipe and manhole wall, meeting ASTM C-823, cast integrally into the manhole wall, shall be provided for each pipe connection to the manhole. Unions shall be the Interpace Lock Joint Flexible Manhole Sleeve, the A-Lok Manhole Pipe Connector, or approved equal. Such unions shall be selected and installed in accordance with the manufacturer's specifications for the specific type of pipe used. Sanitary manhole castings shall be Neenah R-1772-B or approved equal and shall have concealed pick holes. Lids shall be Neenah Foundry Type B "Self Sealing" with the word "SANITARY" imprinted. Manhole steps shall be M-A Industries plastic coated.

Manholes located in areas subject to flooding, or located in open fields, shall be furnished with waterproof frames and lids, Neenah Foundry F-1916-C complete with stainless steel anchor bolts or approved equal.

**3. Drop Manholes**

An exterior drop pipe shall be provided for a sewer entering a manhole at an elevation of 24" or more above the manhole invert. The entire drop assembly shall be cast in concrete monolithically with the manhole barrel section. The diameter of the drop pipe shall be smaller than the diameter of the entering sewer by two diameters, provided that the minimum diameter of the drop pipe shall not be less than 6" diameter.

**4. Service Lead Material**

Service leads shall be a minimum of 6" diameter. Pipe shall be PVC SDR35, Resin #12454B, or ductile iron. Where ductile iron pipe is called for on the plans, the lead shall be Class 52 ductile iron with push-on joints (AWWA C-111).

All pipes for leads shall include end stoppers for all stubs capable of withstanding a standard low pressure air test on the main sewer without leaking. Stoppers may be of an integrally cast breakout design.

Joining of dissimilar pipes will be with use of a "Band Seal", using a flexible rubber sleeve sealed tightly to each pipe with a stainless steel clamp.

**INSTALLATION SPECIFICATIONS FOR SEWAGE COLLECTION**

**1. Protection of Water Main Lines from Sanitary Sewers and Storm Sewers**

Water mains shall be protected for horizontal and vertical separation in accordance with the requirements of the "Technical Policy Statements", or the requirements of MWRDGC, whichever applies.

**2. Depth of Pipe Cover**

**NOTE: THE MINIMUM SANITARY BURY DEPTH IS THE SAME AS THE MINIMUM WATER BURY DEPTH. SEE MINIMUM BURY DEPTHS IN ILAW STANDARDS BY DISTRICT**

A minimum depth of 5'-0" shall be maintained for all sanitary sewer pipes. The 5'-0" depth shall be from proposed ground elevation to the crown of the pipe.

**3. Pipe Installation**

PVC plastic pipe shall be installed in accordance with the requirements of ASTM Standard D-2321. Only Class I embedment materials shall be allowed.

**4. Unsuitable Soil**

If unsuitable soil conditions are encountered under sanitary sewer mains which require removal of unsuitable material below the depth of the standard bedding, the material removed shall be replaced with granular material of the gradation approved by Illinois-American.

**5. Service Lines**

All sanitary sewer service lines must be inspected by Illinois-American Water Company prior to back filling. Illinois-American must be provided with a minimum of 48 hours advanced notice (630/739-8839) to arrange for inspection. Notice is not considered valid until acknowledged by the Illinois-American representative. Sanitary sewer service connections shall be a minimum of 6" diameter unless otherwise noted on the plans.

Tee or wye fittings shall be provided on the sanitary sewer main for all sanitary sewer service connections, except those which are made directly to a manhole. Wyes shall be laid so that material discharge is compatible with the direction of flow in the main.

Service connections into manholes shall be made with uniform circular flow channels at the crown elevation of the sewer main, using a flexible sleeve (ASTM C-823), or approved equal. The service connection shall enter the manhole no more than two feet above the manhole invert for mains 24 inch and smaller. The invert shall match the crown of the main sewer when the main is larger than 24 inch.

**Risers shall be provided on service lines where the sewer main is greater than 12 feet below the proposed ground elevation and shall extend from the sewer main up to a point 9 feet below the proposed ground elevation.**

All sanitary sewer service lines must have a clean-out installed at the property line in Right-of-Way. To be installed per Clean-out detail.

**6. Connecting to an Existing Main**

When it is necessary to connect a new sewer service to an existing sewer main by means other than an existing wye, tee or at an existing manhole, one of the following methods shall be used:

- Saw out the sewer main by means of a Sewer Tap or similar device, and properly install a hub wye saddle or hub tee saddle, using a two-part epoxy glue compound.
- With a pipe cutter, neatly and accurately cut out desired length of pipe for insertion of proper wye fitting using "Band Seal" or similar couplings to hold it firmly in place.
- When a manhole is required to be installed on an existing main, a section of the main is to be removed and the new manhole is to be "spliced" into the line using mission couplings. The manhole is to be supplied with flexible manhole sleeves for connection to the main. A "doughnut" style manhole is not allowed.

**7. Connection to an Existing Manhole**

A direct connection to an existing manhole is to be made by core drilling the manhole and connecting the new main to the manhole by use of a flexible manhole sleeve ("boot") or a concrete manhole adapter (Ferno concrete manhole adapter, or approved equal).

**8. Cleaning**

In preparation for final inspection, all sanitary sewers shall be jet rod cleaned. Jet cleaning may also be required prior to testing.

**9. Unauthorized Connections**

Connections to the sanitary sewer system with the following items shall not be permitted: down-spouts or roof drains; sump pumps; footing drains or drainage ties; window wells or area drains; driveway drains, etc. No storm water or groundwater shall be allowed to enter the sanitary sewer system.

**TESTING**

**1. Testing of Sanitary Sewers**

Testing for sanitary sewers for leakage will be witnessed by an Illinois-American representative or approved site inspector after all service connections have been stubbed to the property line. Infiltration, exfiltration or air pressure tests will be required at Illinois-American's discretion. Note that the sewer must be clean to the satisfaction of Illinois-American at the time of testing. If additional clearing is required, the cost for this will not be borne by Illinois-American Water Company, and shall be paid by the contractor.

All sanitary sewers, including manholes, will be tested for leakage and shall satisfactorily meet the tests and requirements prior to acceptance of the work. Illinois-American or approved site inspector may order leakage tests made on sections of sewer as they are completed. Right is reserved to order the tests performed before back fill is placed over the pipe joints.

The Developer / Contractor shall furnish all labor, testing materials, and equipment (such as plugs and standpipes) and shall perform the tests described herein under the supervision and to the satisfaction of Illinois-American. There are five tests which will be employed for gravity sewers:

- Infiltration test, exfiltration test or air pressure test
- Deflection testing for thermoplastic pipe
- Sonar Television
- Manhole vacuum test

**2. Air Pressure Tests**

The section of sewer to be tested shall have been trench back filled and cleared. The sewer pipe shall be pressurized to 5 PSIG above the average back pressure of groundwater over the sewer pipe and the air pressure allowed to stabilize for at least two minutes.

After the stabilization period, the line shall be pressurized to 3.5 PSIG and the time, in minutes, measured for a pressure drop to 2.5 PSIG. If ground-water is present, the air pressure within shall be increased to 3.5 PSIG above the level of the groundwater at the highest elevation of the sewer and the drop of one pound of air pressure measured in minutes (2.31 ft. of water = 1 PSIG).

Air leakage test results shall not be less than the time per inch of pipe diameter per length of sewer pipe as specified in the table entitled "Air Test Table" as shown in Standard Specifications for Water and Sewer Main Construction in Illinois, and as shown within the standard details.

**3. Infiltration Test**

This test may be used only when groundwater levels are at least 2.0 feet above the crown of the pipe for the entire length of the section to be tested during the entire period of the test. Groundwater levels may be measured in an open trench, in standpipes previously placed in back filled trenches during the back filling operations, or with piezometers installed in the manhole wall. Infiltration through joints shall be measured by using a watertight weir or any other approved device for volumetric measurement installed at the lower end of the section under the test.

The maximum allowable rate of infiltration shall not exceed 100 gallons per twenty-four (24) hours per mile per inch diameter of the sewer pipe, for any section of the system.

Manholes will be tested by saturating the soil around the manhole. Test will be satisfactory if there are no visible leaks.

**4. Deflection Testing for Flexible Thermo-Plastic Pipe**

The entire length of the main shall be tested for excessive deflection by pulling a "Go-No-Go" mandrel through the main from manhole to manhole.

Whenever possible and practical, the testing shall initiate at the downstream line and proceed toward the upstream lines.

Where deflection is found to be in excess of the allowable testing limits, the developer shall excavate the point of excess deflection and carefully compact around the point where the deflection was found. The line shall then be retested for deflection. However, after the initial testing, should the deflected pipe fail to return to the original size (inside diameter) the line shall be replaced.

The deflection limits for flexible pipes shall not exceed 5% of the "Base I.D." of the pipe. A period of time will be required for the trench and pipe to come to equilibrium before the deflection test is performed. In all sewer systems the deflection test shall be performed no sooner than 30 days after the trench is back filled over the pipe.

**5. Telesighting**

The Contractor shall produce a record video using a pan-and-tilt, radial viewing, pipe inspection camera that pans 275 degrees and rotates 360 degrees. The television camera used for the inspection shall be specifically designed and constructed for such inspection. The camera shall be operative in 100% humidity conditions. The Contractor shall use a camera with an accurate footage counter which displays on the monitor the exact distance of the camera from the centerline of the starting manhole. The Contractor shall use a camera with camera height adjustment so that the camera lens is always centered at one-half the inside diameter, or higher, in the pipe being telesighted. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. A reflector in front of the camera may be required to enhance lighting in dark or large diameter pipe. The video camera shall be capable of showing on the tape the City name, Project name, Contractor name, date, line size and material, line identification (plan manhole numbers at both ends) and ongoing footage counter. The camera, television monitor, and other components of the video system shall be capable of producing picture quality to the satisfaction of the Owner, and if unsatisfactory, equipment shall be removed and replaced with adequate equipment. DVD video shall be supplied for all television surveys. All videos shall be submitted to the Owner and will become the property of the Owner. Videotapes shall be labeled with the above referenced information. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. In no case will the television camera be pulled at a speed greater than 15 feet per minute. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. During the internal inspection, the television camera shall be temporarily stopped at each defect along the line. The nature and location of the defect shall be recorded by the Contractor. The camera shall also be stopped at all service connections and identified by address or lot number. The camera operator shall slowly pan and tilt at beginning and ending manhole connections, each service connection, joints, visible defects and at pipe material transitions. TV inspection shall be continuous for pipe segments between manholes. Do not leave gaps in the video of a segment between manholes and do not show a single segment on more than one video, unless specifically approved by the Owner. The purpose of recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed. Video recordings shall include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected (i.e. location, depth, diameter, pipe material), as well as describing connections, defects and unusual conditions observed during the inspection.

**6. Manhole Testing**

Vacuum testing of each manhole shall be carried out immediately after assembly, after all connections are made, and prior to backfilling. All lift holes shall be plugged with an approved non-shrink grout. No grout will be placed in the horizontal joints before testing. All pipes entering the manhole shall be plugged, taking care to securely brace the plugs from being drawn into the manhole. The test head shall be placed at the inside of the top of the frame and the seal inflated in accordance with the manufacturer's recommendation. If using a "plate" style manhole tester, position the plate on the frame. A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, that time shall be measured for the vacuum to drop to 9 inches. The manhole shall pass if the time is greater than 60 seconds for a 10" diameter manhole, 75 seconds for a 60" manhole and 90 seconds for a 72" manhole. If the manhole fails the test, complete necessary repairs and repeat test procedures until a satisfactory test is obtained.

**ILLINOIS-AMERICAN WATER COMPANY STANDARD**

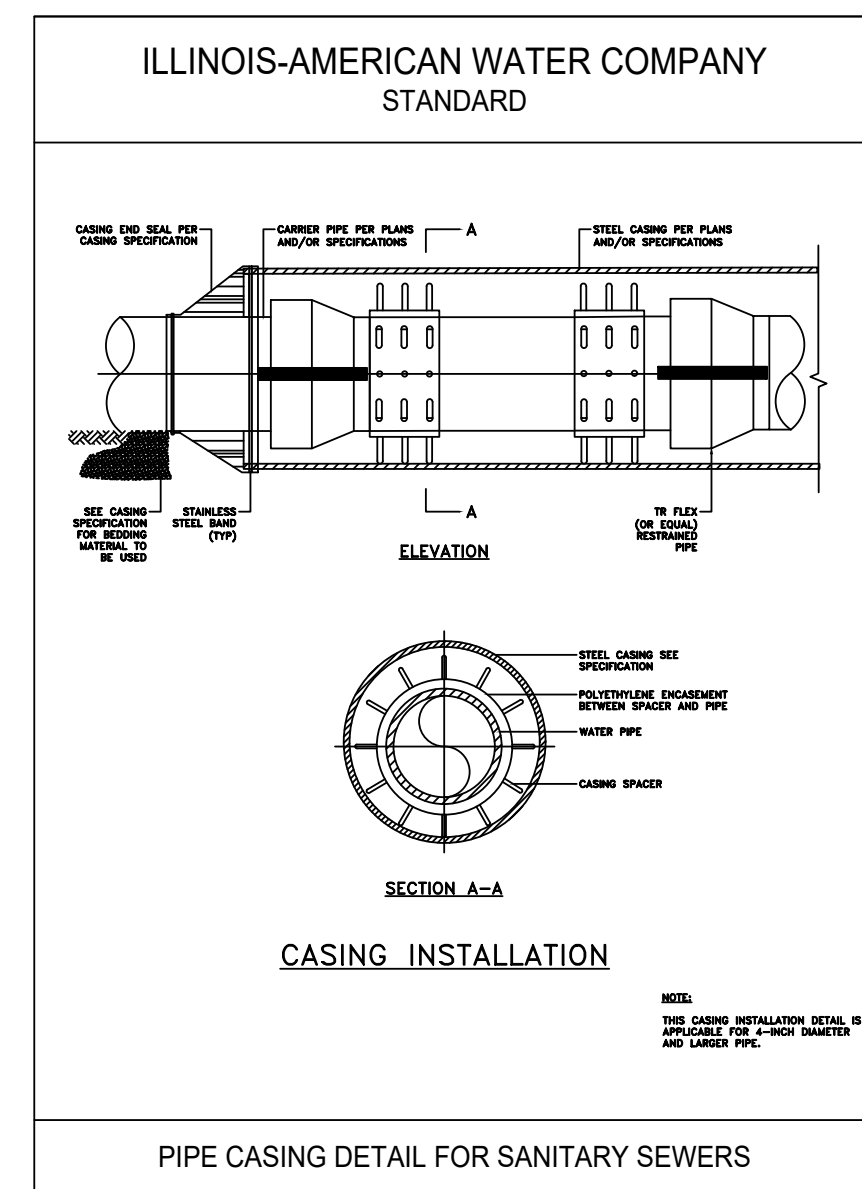
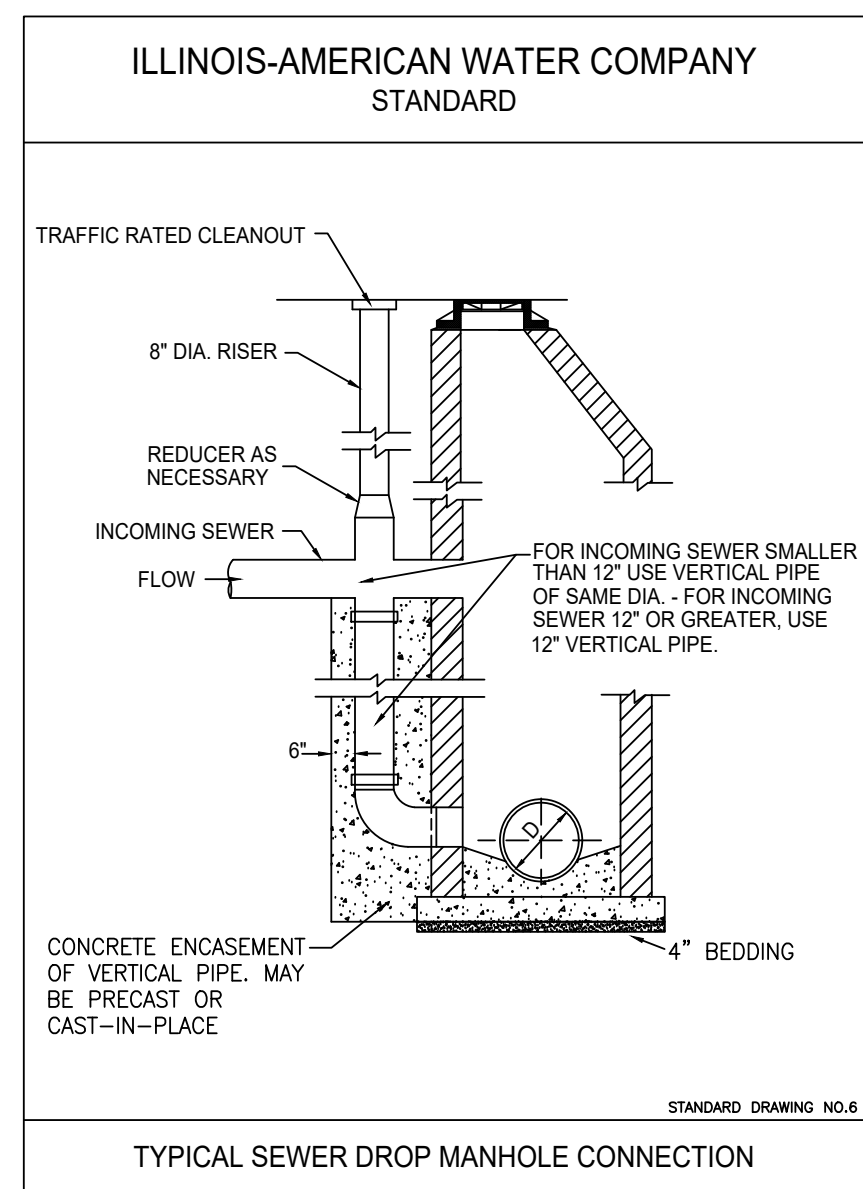
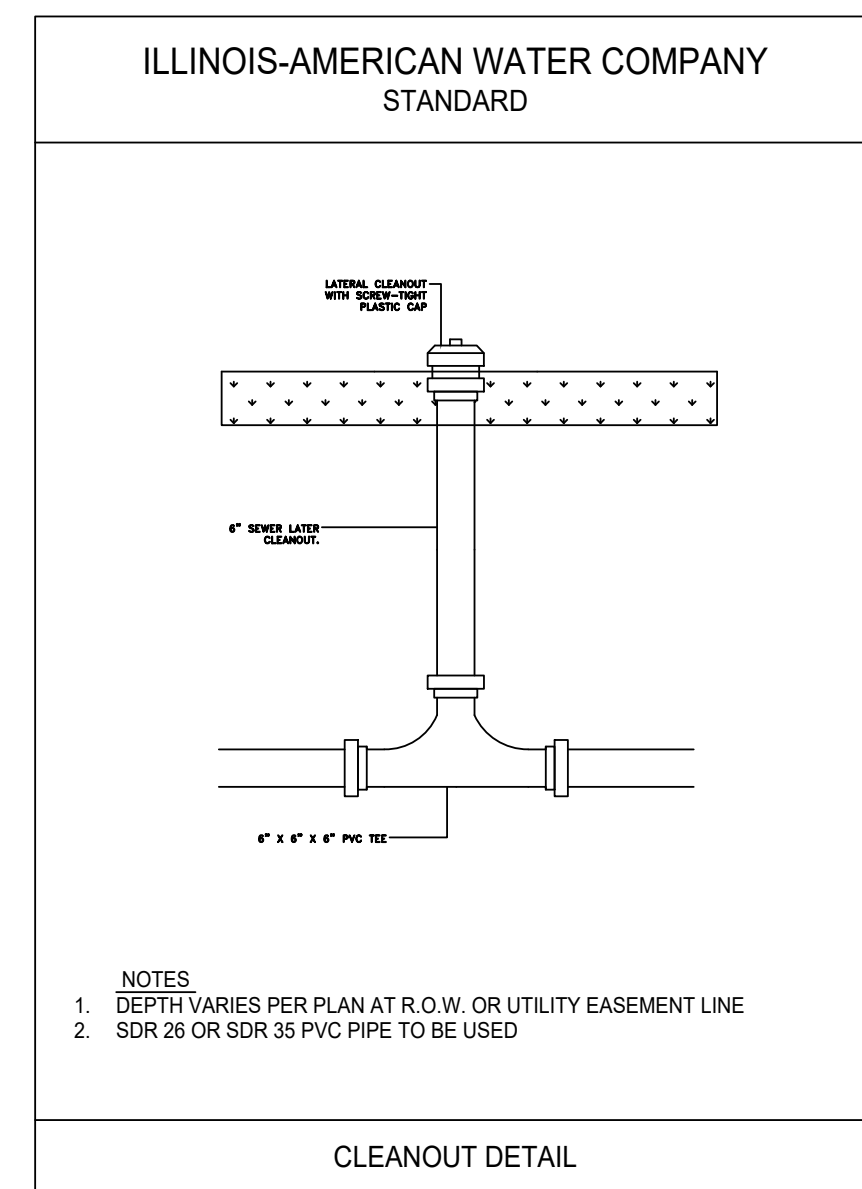
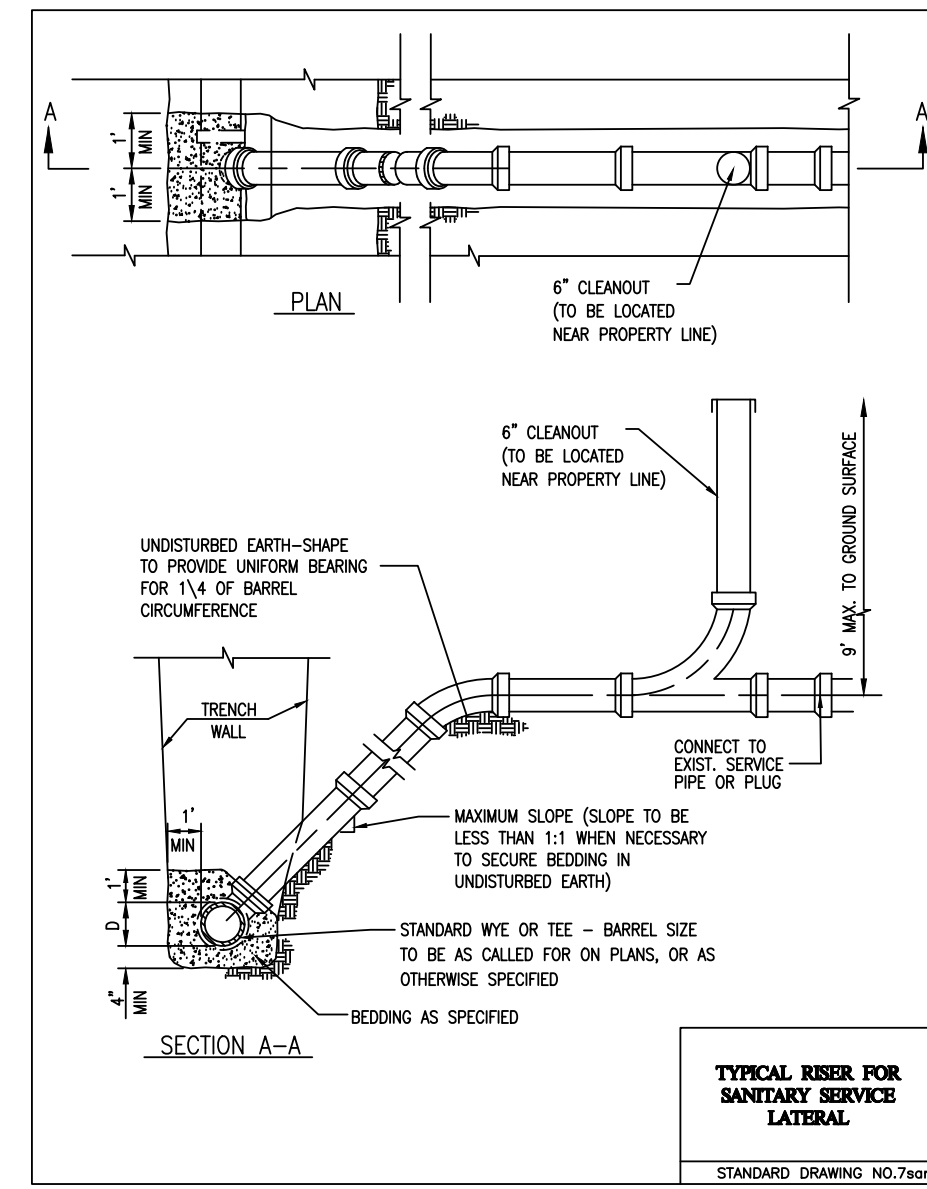
BASED ON EQUATIONS FROM ASTM C828 SPECIFICATION TIME (MIN) REQUIRED FOR PRESSURE DROP FROM 3 1/2 TO 2 1/2 PSIG WHEN TESTING ONE PIPE DIAMETER ONLY

	4"	6"	8"	10"	12"	15"	18"	21"	24"
25	0.04	0.10	0.18	0.28	0.40	1.02	1.29	2.01	2.38
50	0.09	0.20	0.35	0.55	1.19	2.04	2.56	4.03	5.17
75	0.13	0.30	0.53	1.23	1.59	3.06	4.27	6.04	7.55
100	0.18	0.40	1.10	1.50	2.38	4.08	5.56	8.05	10.34
125	0.22	0.50	1.28	2.18	3.18	5.09	7.26	9.55	11.20
150	0.26	0.59	1.46	2.45	3.58	6.11	8.30		
175	0.31	0.69	1.63	2.81	4.07	7.05			
200	0.35	1.19	2.21	3.40	5.17				12.06
225	0.40	1.29	2.38	4.08	5.40				
250	0.44	1.39	2.56	4.35		8.31	11.35	15.07	
275	0.48	1.49	3.14	4.43		9.21	12.44	16.38	
300	0.53	1.59	3.31			10.12	13.53	18.09	
350	1.02	2.19	3.47			8.16	11.54	16.12	21.10
400	1.10	2.38		6.03	9.27	12.38	18.31	24.12	
450	1.19	2.50		6.48	10.38	15.19	20.50	27.13	
500	1.28		5.14	7.34	11.49	17.01	23.09	30.14	

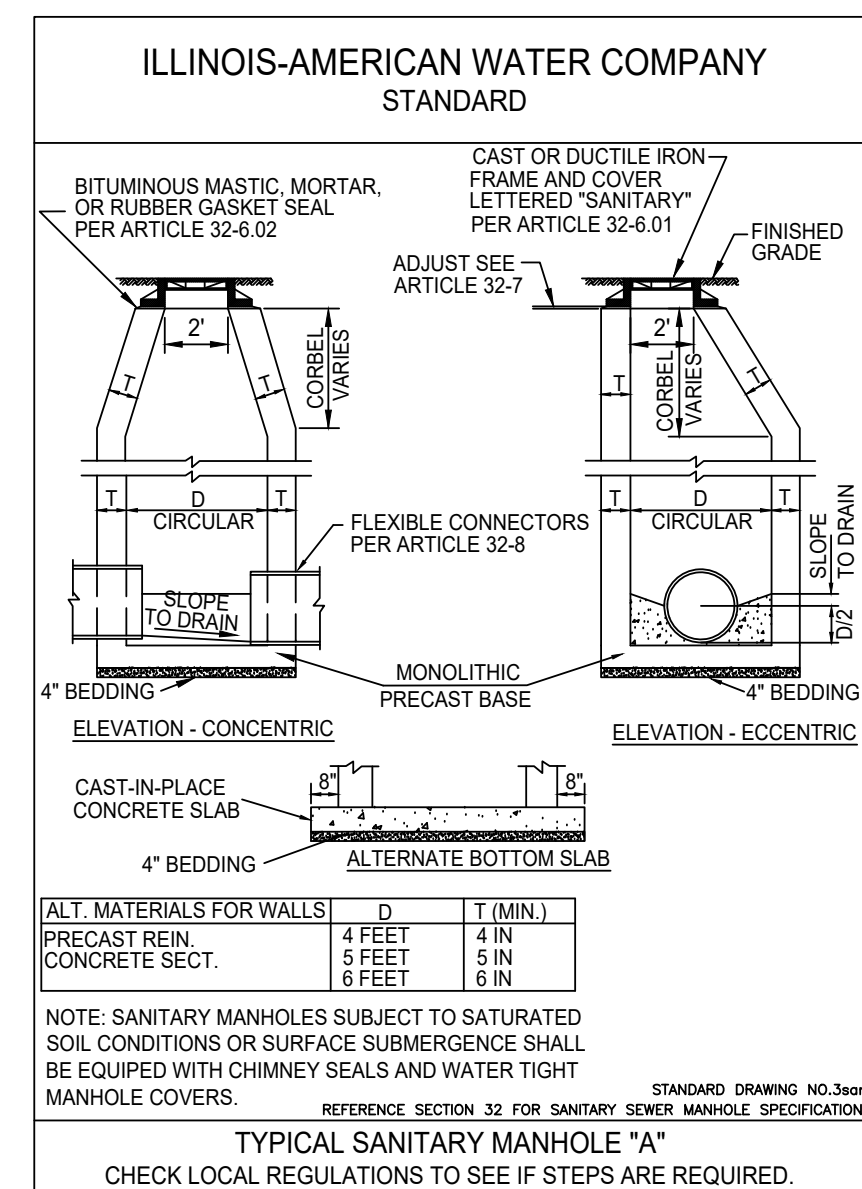
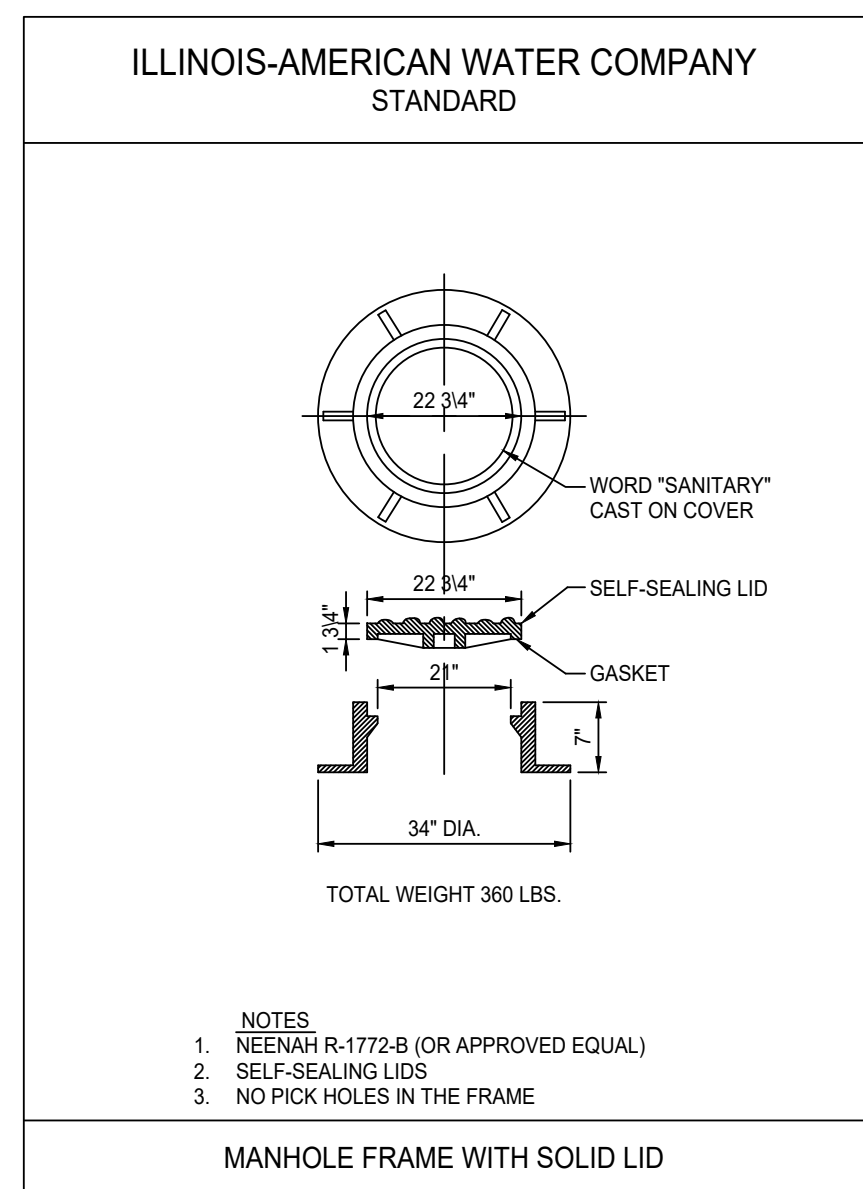
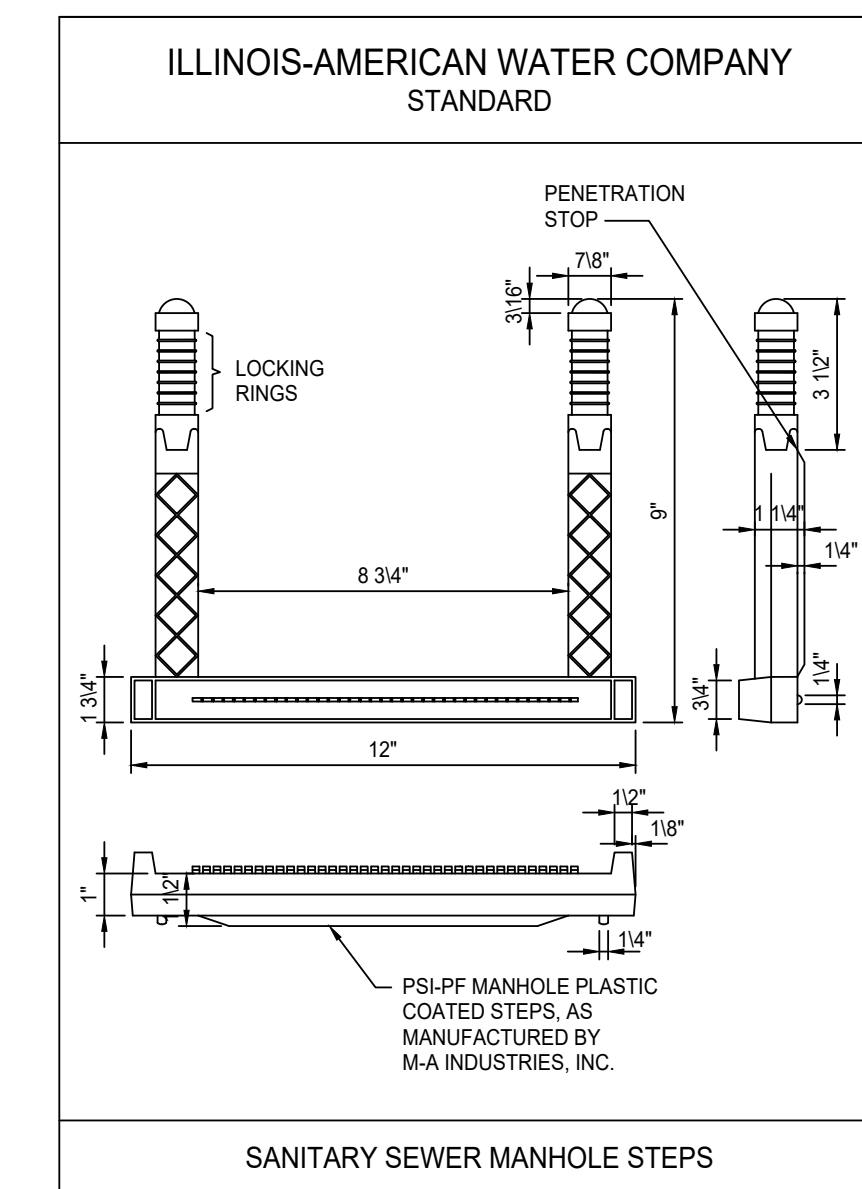
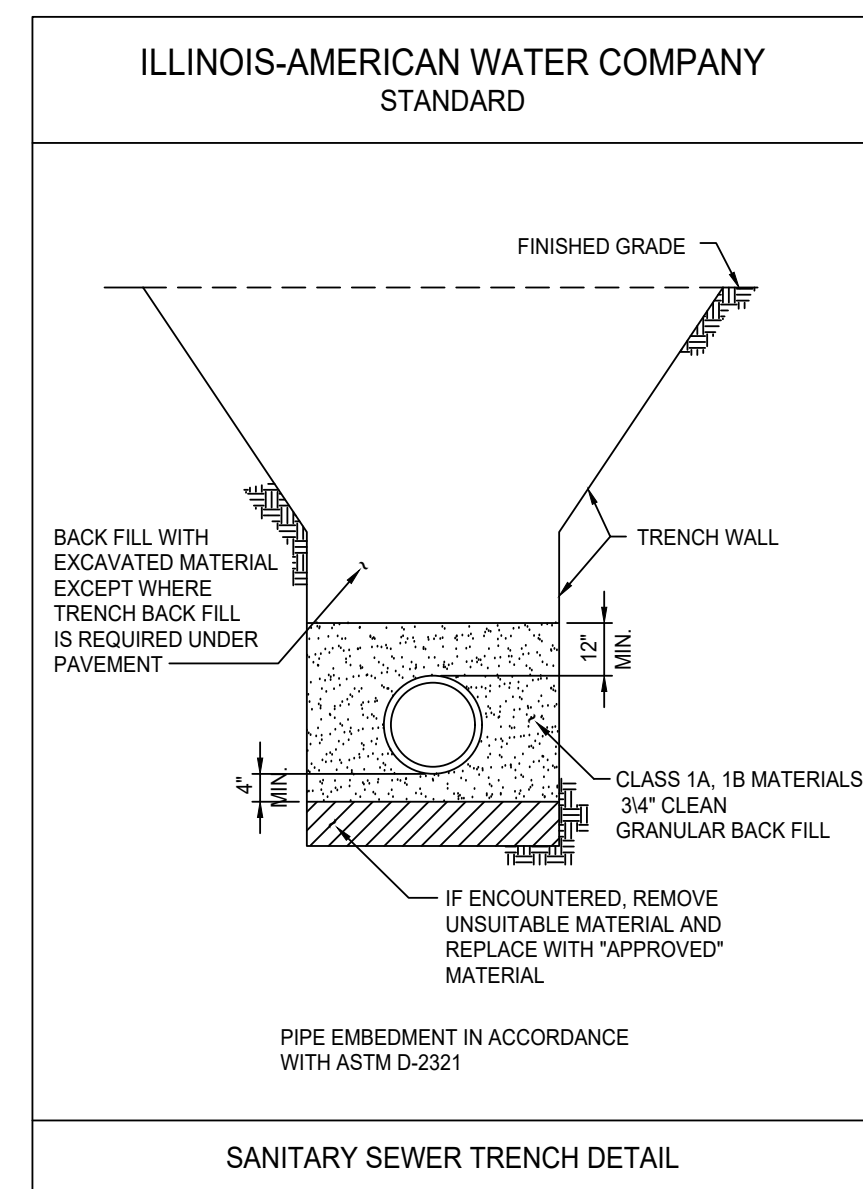
**DEFLECTION CRITERIA**

DIAMETER	BASE I.D. PER UNIBELL	5% MANDREL O.D.
6 IN.	5.79 IN.	5.50 IN.
8 IN.	7.76 IN.	7.37 IN.
10 IN.	9.71 IN.	9.23 IN.
12 IN.	11.56 IN.	10.98 IN.
15 IN.	14.14 IN.	13.43 IN.

**SANITARY SEWER MAIN AIR TEST TABLE**



CONTACT LOCAL DISTRICT FOR MANHOLE STEPS. SOME REQUIRE STEPS AND OTHERS REQUIRE THE STEPS TO BE REMOVED.



**E. ALPHA STREET**  
**STO. AND SAN. SEWER EXTENSION**

CITY  
**XXXXX DISTRICT**

PROJECT  
DISTRICT

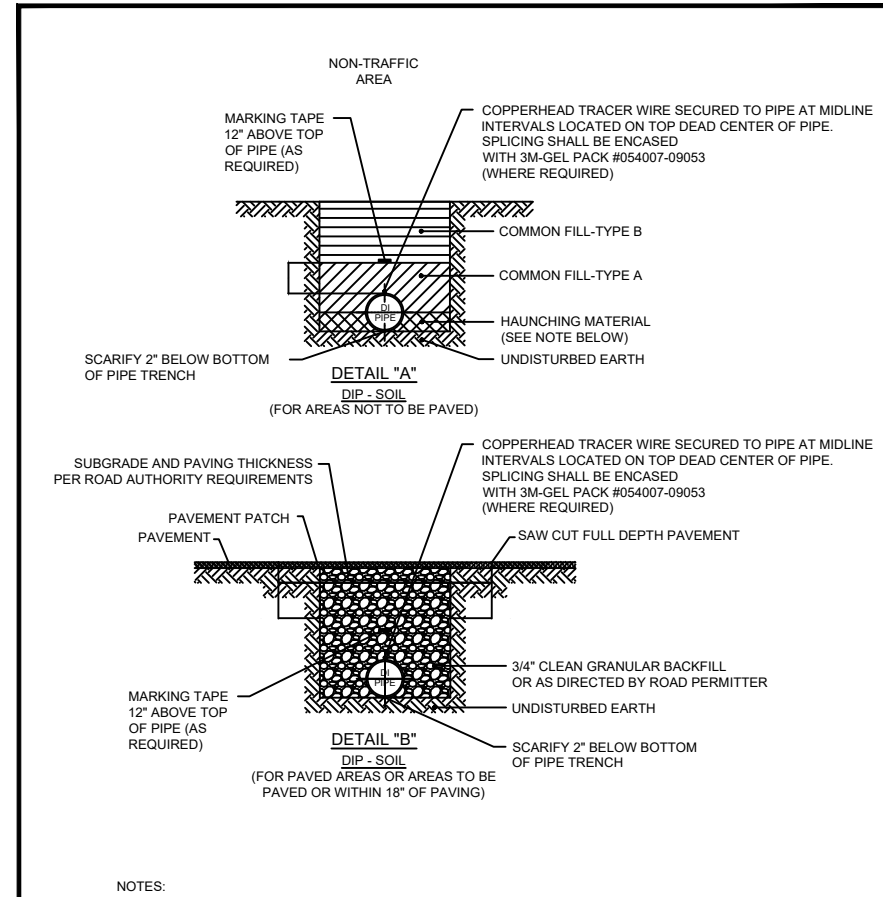
NO. DATE INIT. REVISIONS

SCALE

ENGINEERING DEPARTMENT  
201 DEVONSHIRE DRIVE  
CHAMPAIGN, IL 61820

**ILLINOIS AMERICAN WATER**

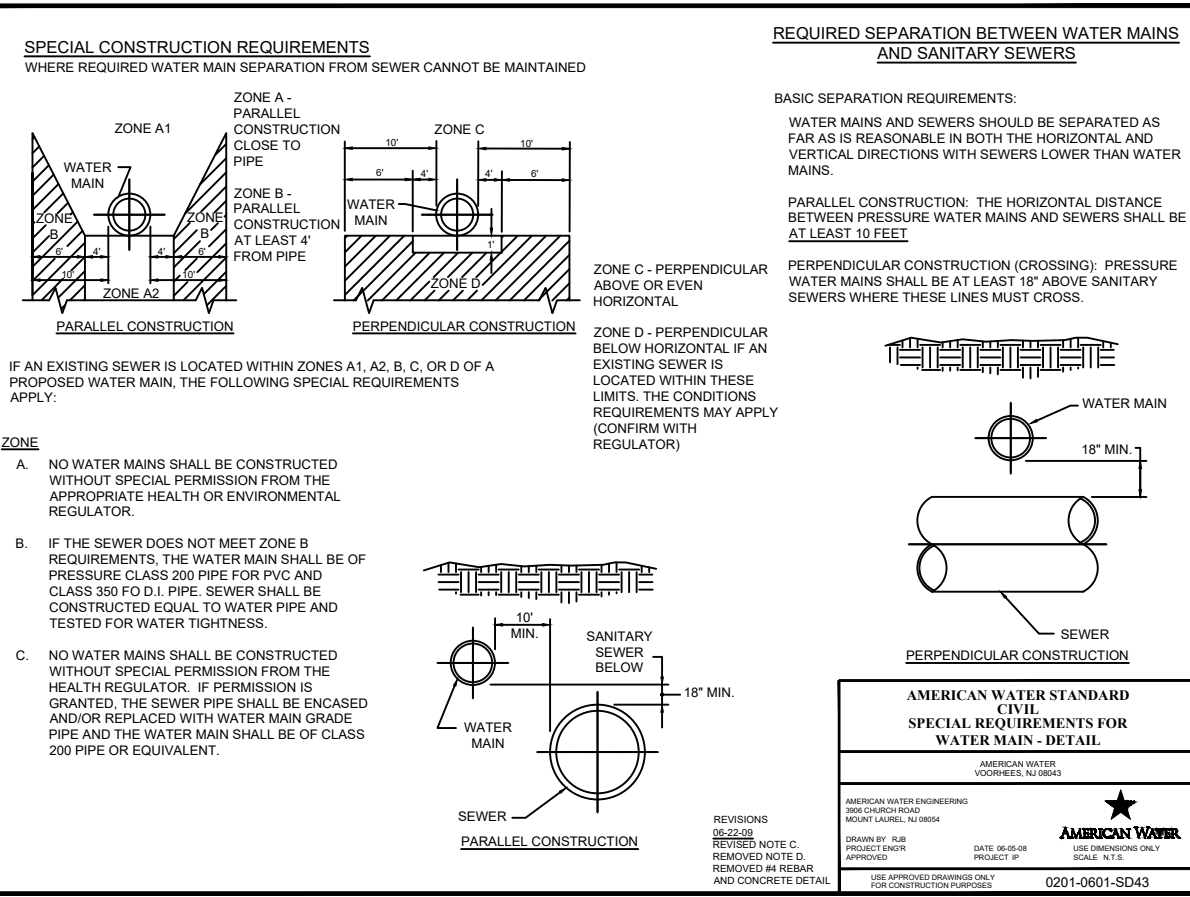
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JOB NO. xxx  
DATE 06/22/22  
DRAWN BY CAM  
APP. BY  
SCALE AS SHOWN  
XREF xxx  
SHEET 7 OF 8



NOTES:  
 1. CAUTION MUST BE EXERCISED TO ENSURE PROPER PLACEMENT OF EMBEDMENT MATERIAL UNDER THE HANGERS OF THE PIPE. NATIVE SOIL IS ACCEPTABLE UNLESS DIRECTED BY COMPANY.  
 2. POLYETHYLENE ENCASEMENT SHALL BE USED FOR FITTINGS, VALVES & APPURTENANCES IN CORROSIVE SOILS.  
 3. SEE SPECIFICATION SECTION 02230 FOR DESCRIPTION OF BACKFILL AND BEDDING MATERIAL.

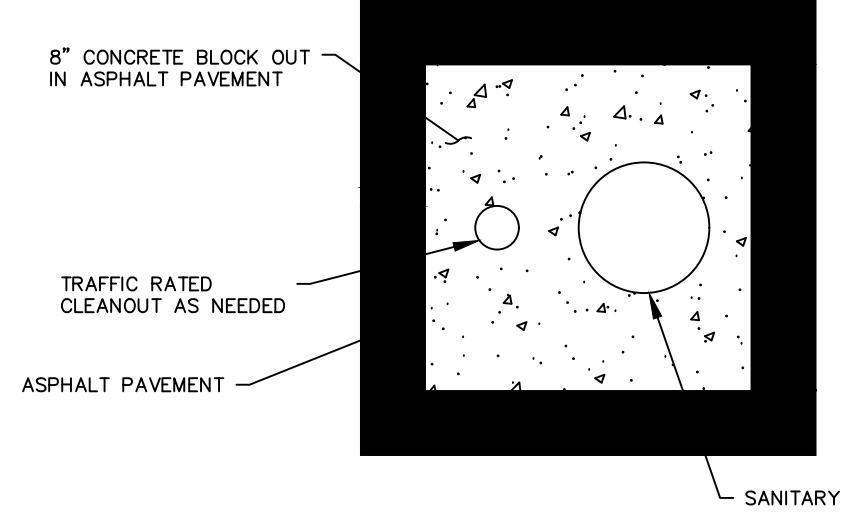
AMERICAN WATER STANDARD  
 CIVIL  
 TRENCH - 60" PIPE IN SOIL  
 DETAIL

AMERICAN WATER  
 12000 N. WISCONSIN AVE  
 CHICAGO, IL 60642  
 (773) 399-1000

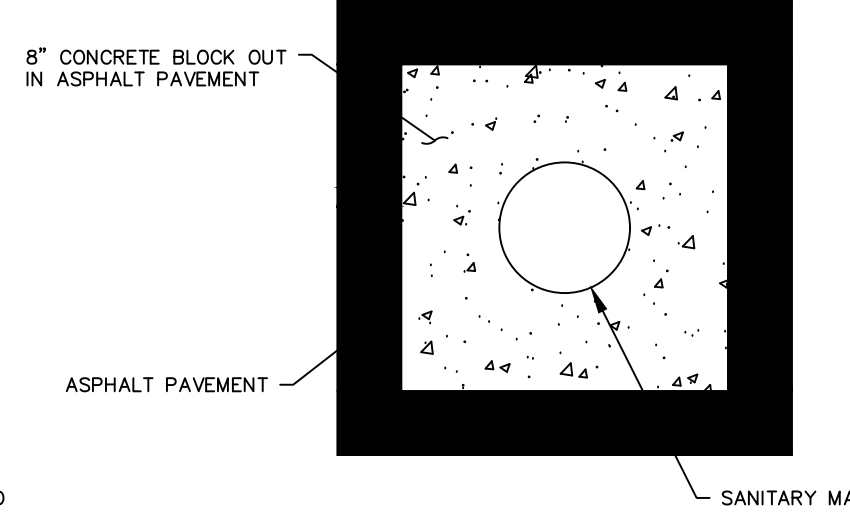


AMERICAN WATER STANDARD  
 CIVIL  
 TRENCH - 60" PIPE IN SOIL  
 DETAIL

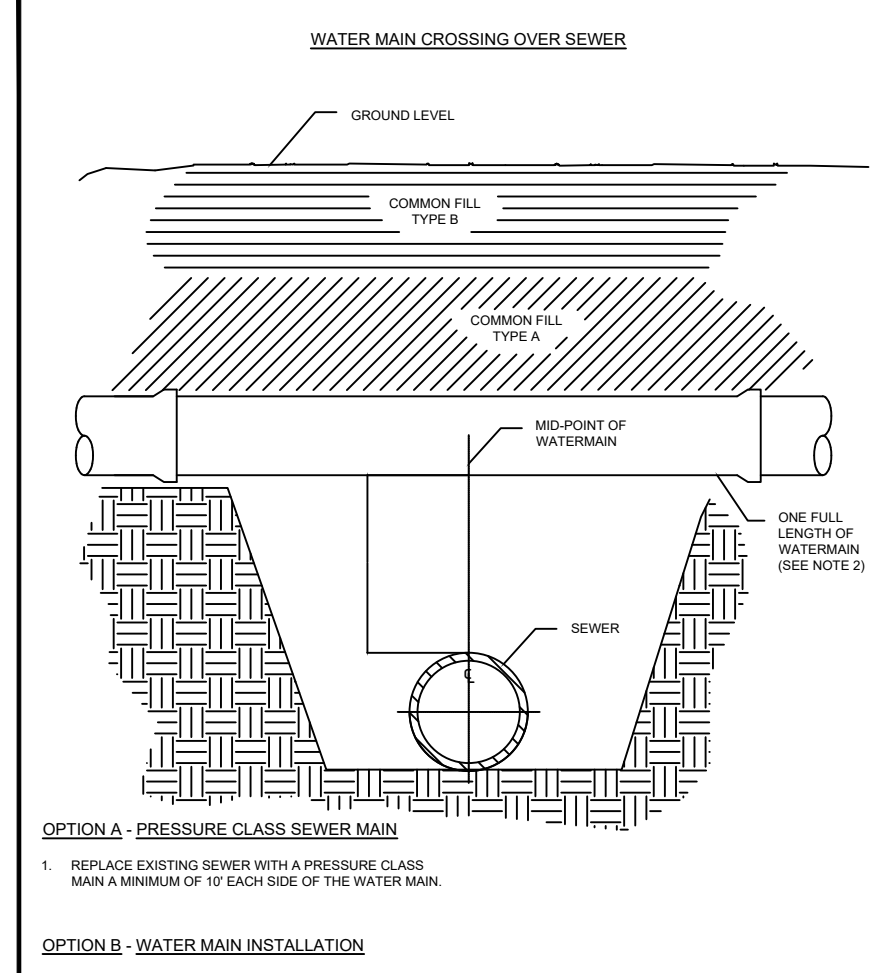
AMERICAN WATER  
 12000 N. WISCONSIN AVE  
 CHICAGO, IL 60642  
 (773) 399-1000



MANHOLE BLOCK OUT WITH CLEANOUT DETAIL  
 SCALE: NOT TO SCALE



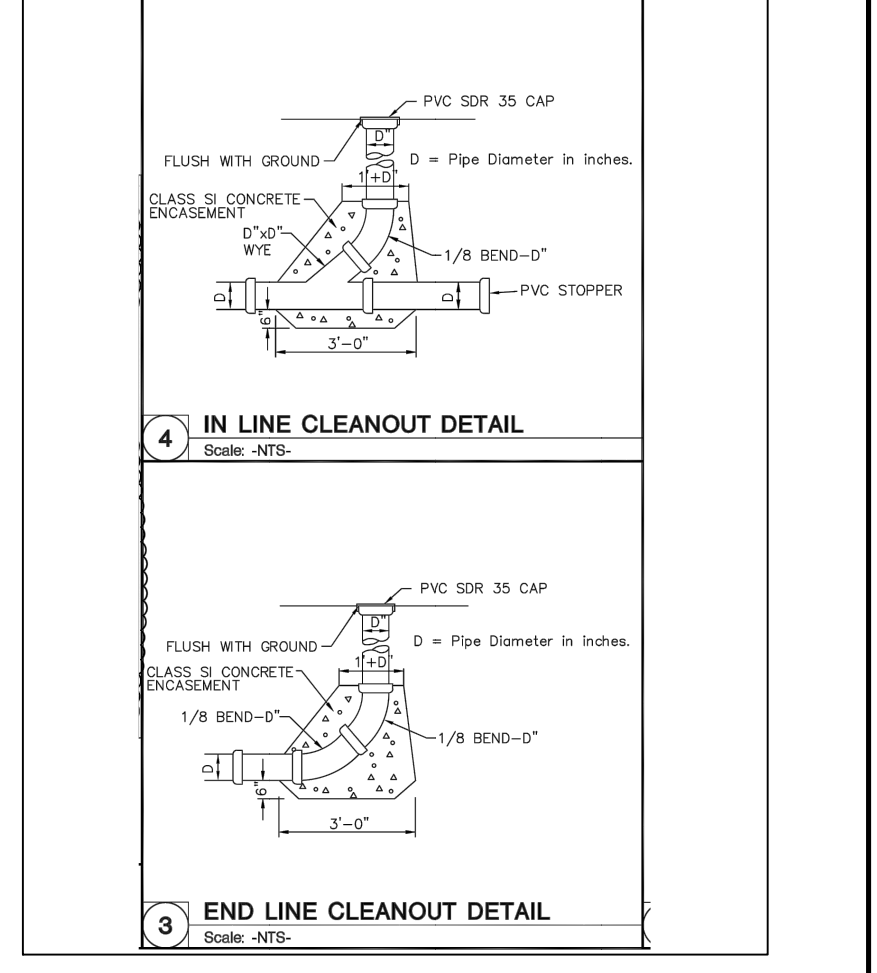
MANHOLE BLOCK OUT WITHOUT CLEANOUT DETAIL  
 SCALE: NOT TO SCALE



NOTES:  
 1. FOLLOW TRENCH MATERIAL DETAIL WHEN BACK-FILLING WATER MAIN.  
 2. THE SELECTED OPTION MUST BE APPROVED BY AN A.W.W. REPRESENTATIVE.

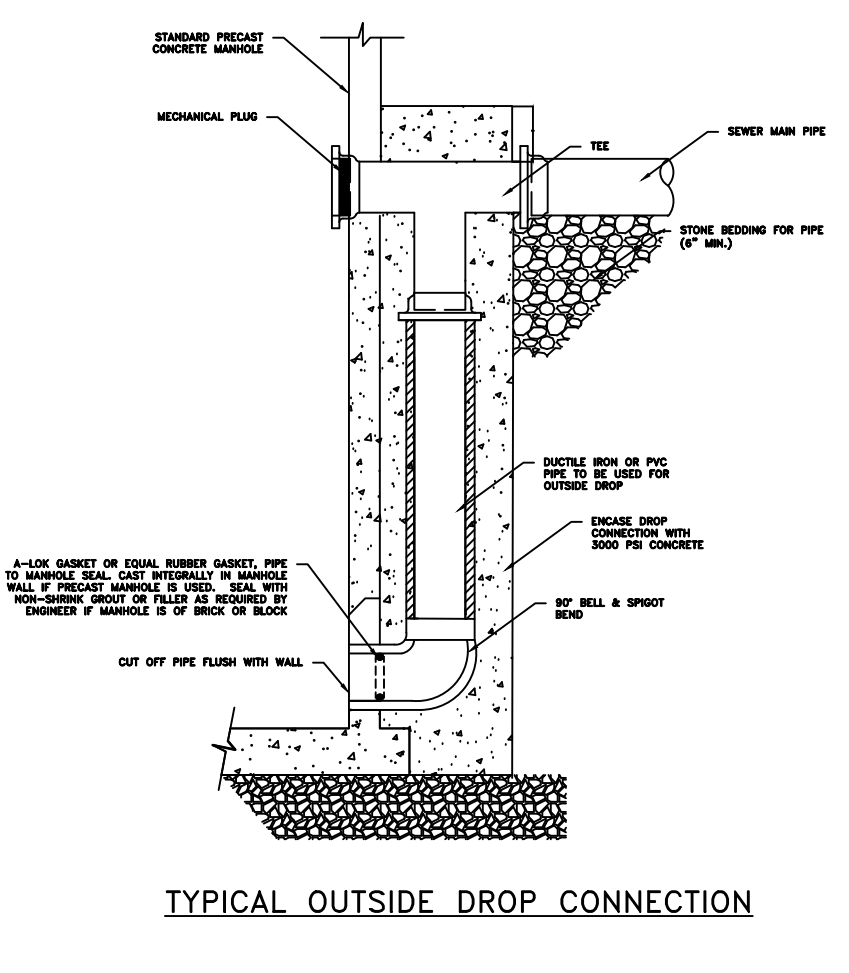
AMERICAN WATER STANDARD  
 CIVIL  
 WATER MAIN CROSSING OVER SEWER  
 DETAIL

AMERICAN WATER  
 12000 N. WISCONSIN AVE  
 CHICAGO, IL 60642  
 (773) 399-1000



AMERICAN WATER STANDARD  
 CIVIL  
 TYPICAL OUTSIDE DROP CONNECTION  
 DETAIL

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 12000 N. WISCONSIN AVE  
 CHICAGO, IL 60642  
 (773) 399-1000



AMERICAN WATER STANDARD  
 CIVIL  
 TYPICAL OUTSIDE DROP CONNECTION  
 DETAIL

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 12000 N. WISCONSIN AVE  
 CHICAGO, IL 60642  
 (773) 399-1000

PROJECT  
**E. ALPHA STREET  
 STO. AND SAN. SEWER EXTENSION**

DISTRICT  
**CITY  
 XXXXX DISTRICT**

NO.	DATE	INIT.	REVISIONS

SEAL

EXPIRATION DATE

ILLINOIS  
**AMERICAN WATER**

ENGINEERING DEPARTMENT  
 201 DEVONSHIRE DRIVE  
 CHAMPAIGN, IL 61820

FILE NO. xx-xxx  
 JOB NO. xxx  
 DATE 06/22/22  
 DRAWN BY CAM  
 APP. BY  
 SCALE AS SHOWN  
 XREF xxx  
 SHEET 8 OF 8