

Lewisburg Water & Wastewater

P.O. Box 2787- 100 Water Street

Lewisburg, Tennessee

Standard

Water Line Specifications

Revised July 10, 2023



Approved by

A handwritten signature in blue ink, which appears to read "Trigg Cathey", written over a horizontal line.

Trigg Cathey, P.E. General Manager

TO: Contractors, Developer, Any Persons Involved with the Installation of Water/Sewer Mains
Whereas Such Mains are requested to Become Property of the Department.

FROM: Trigg Cathey, General Manager Lewisburg Water

RE: Standard Specification for Water Lines

DATE: June 29, 2023

1. You are reminded that all lines (mains), appurtenances which are requested to be accepted by and/or dedicated to this Department shall conform to the standard specifications and policies as have been adopted and whereby regulate such construction. An extension of a water line that has any potential for future development must be a 6-inch line or larger.
2. All policies are available for public inspection, and you are advised to familiarize yourself with those policies and specifications which may pertain to your construction prior to commencement of work.
3. The following policies are specifically noted:

Construction Policy #2	SUBDIVISION
Construction Policy #5	UTILITIES ENCROACHMENT
General Policy #2	INSTALLATION OF LINES
General Policy #3	FIRE HYDRANTS

4. Construction Policy #6—development within subdivisions shall require a **contract/agreement** to be signed between the developer and the utility.
5. Any questions regarding policies and/or specifications should be directed to the supervisor over distribution and if necessary, the General Manager.
6. No person nor persons shall authorize any modification to such policies until such approval is first obtained by action of the Water and Sewer Board.
- 7.** Any exceptions to the specifications stated here shall be made only with the approval of the General Manager.

Revised specifications for extending the water distribution system of the LEWISBURG, TENNESSEE, WATER AND WASTEWATER DEPARTMENT, hereinafter referred to as the “DEPARTMENT”.

I. Pipeline Materials for Water Lines

(1) General

The pipe for underground water lines shall be SDR-21 pressure class 200 polyvinyl chloride (PVC) water pipe with standard gasketed joints or ductile iron pipe.

a. Ductile Iron Pipe

(1) Materials, Manufacture and Joints

Ductile iron pipe shall be centrifugally cast, manufactured and tested in accordance with the ANSI/AWWA Standard C150/A21.50-02 for Ductile Cast Iron, Grade 60-42-10.

The pipe shall be manufactured and tested in accordance with the requirements of ANSI Specification A21.51.

Pipe shall be push-on type joint incorporating a single molded rubber ring gasket unless otherwise indicated and shall be furnished tar coated outside and the manufacturer's standard cement lined inside to comply with ANSI Specification A21.4.

(2) Joint Lengths and Joint Deflection

Standard joint length shall be 20 feet; however, shorter lengths may be used in order to achieve the alignment or grade required. The maximum allowable joint deflection for DIP pipe is 5 degrees (21 inches per 20-foot length, regardless of the layout shown on the Plans); in order to achieve the alignment or grade, shorter lengths or extra fittings will be required. The maximum joint deflection will be strictly enforced. Bending of the pipe will not be allowed.

(3) Ductile Iron Fittings

All fittings for ductile iron pipe shall be Class 350 mechanical joint single gasket ductile iron conforming to ANSI/AWWA C153/A21.53, and shall meet the current requirements for the manufacturer's standards. Fittings shown on the Plans are intended to convey the general configuration, but the Contractor shall furnish all fittings required.

Each fitting shall be certified by the manufacturer to have been tested and to have met the requirements of the governing standard specifications.

All fittings shall use thrust restraint devices in lieu of the standard glands. Thrust restraint devices shall be Series 1100 Megalug as manufactured by EBAA Iron, Inc. unless otherwise noted. Series 3800 Megalug as manufactured by EBAA Iron, Inc. shall be used to connect to existing ductile iron pipe with new polyvinyl chloride pipe as noted.

All fittings shall be furnished tar coated outside and the manufacturer's standard cement lined inside to comply with ANSI Specification A21.4.

(4) Markings

Each length of pipe and fittings shall have the following information plainly marked on the pipe's exterior:

- a. Nominal Size
- b. Class
- c. Manufacturer
- d. Independent Testing Laboratory Stamp
- e. Quality Control Code
- f. NSF (National Sanitation Foundation) Standard 61 Stamp Seal of Approval

(5) Restrained Joint Pipe

Ductile iron pipe with restrained joints shall be Class 350 and confirm to the latest revisions of ANSI Specification A21.10, A21.11 and A21.51. The pipe shall be installed where shown on the Plans or directed by the Engineer and shall utilize American Fast Grip gaskets or approved equal.

b. Polyvinyl Chloride (PVC) Pressure Pipe

(1) Materials, Manufacturer and Joints

Polyvinyl chloride (PVC) pressure pipe for water pipelines installed by excavated trench and backfill methods shall be made from Class 12454-B polyvinyl chloride plastic (PVC 1120) as defined at the latest revision of ASTM Standard D1784.

Additives and fillers, including but not limited to stabilizers, non-poly (vinyl chloride) resin modifiers, lubricants, pigments and inorganic fillers shall not exceed ten (10) parts by weight per 100 parts of PVC resin in the compound.

The pipe shall meet all the requirements of the latest revision of ASTM Standard D2241 for standard thermoplastic pipe dimension ratio SDR 21 rated for 200 psi water pressure at 73°F. The pipe shall have push-on elastomeric gasket bell end joints designed so that the pipe and fittings may be connected on the job without the use of solvent cement or any special equipment. Push-on joints and lubricants shall conform to the requirements of ASTM Standard 3139. Gaskets shall be natural or synthetic rubber conforming to the requirements of ASTM Standard F477.

The pipe shall be furnished in nominal lengths of 18 or 20 feet. The pipe shall be supported at least every 10 feet of its length during storage. If the pipe is to be stored for more than 30 days, it shall be shielded from direct sunlight.

The manufacturer of the pipe shall furnish to the Engineer an affidavit that all delivered materials comply with the requirements of ASTM Standard D2241 and Standard D3139 for standard thermoplastic pipe dimension ratio SDR 21 (PR 200).

All PVC pipe for water pipelines shall bear identification markings that will remain legible during normal handling, storage, and installation. Marking on pipe shall include the following and shall be applied at intervals of not more than five feet:

- Nominal size (for example, 10 in.).
- Type of plastic pipe material in accordance with the designation code (for example, PVC 1120).
- Dimension ratio (for example, SDR 21).
- ASTM D2241.
- Manufacturer's name or trademark and production-record code.

(2) Fittings

Fittings shall be ductile iron as specified herein.

(3) Joint Requirements

Joints shall be push-on type compatible with ductile iron fittings. Joints and gaskets shall meet the requirements of Section 4.5 and the applicable provisions of Section 5 of ANSI/AWWA C905.

(4) Joint Lengths and Joint Deflection

Standard joint length shall be 20 feet; however, shorter lengths may be used in order to achieve the alignment or grade

required. The maximum allowable joint deflection for PVC pipe is 1 degree (4 inches per 20-foot length, regardless of the layout shown on the Plans); in order to achieve the alignment or grade, shorter lengths or extra fittings will be required. The maximum joint deflection will be strictly enforced. Bending of the pipe will not be allowed.

(5) Pipe Locators

Pipe tracer wire with water proof ties shall be placed in the trench above all pipe approximately along the longitudinal axis of the pipeline. The wire shall be laid continuously and terminated in each line valve box or 1,000 feet if the valve spacing is above 1,000 feet. The wire shall be connected to the steel casing pipe at bored or tunneled encased roadway crossings. The tracer wire shall be manufactured by Copperhead Industries, LLC of Monticello, MN. Tracer wire for water pipeline installed by open trench methods shall be #12CCS 1055 High Strength Soft Drawn 380#. Tracer wire for water pipeline installed by directional bore (HDD) shall be #12CCS 1055 Extra High Strength Hard Drawn 1150#. Wire jacket shall be blue 30 mil HDPE, ASTM-D1248, 30 volt rating. Junction boxes shall be Lite Duty, "SnakePit" magnetized Tracer Box, with blue top at each valve or individual to maintain maximum spacing of 1,000 feet.

(6) Markings

Each length of pipe shall have the following markings as called for in Section 6.1 of ANSI/AWWA C-900.

- a. Nominal diameter and O.D. base
 - b. PVC
 - c. Dimension Ratio
 - d. AWWA pressure rating
 - e. AWWA C905
 - f. Manufacturer's name or trademark and production record code
 - g. Stamp of independent testing laboratory indicating inspection and approval
 - h. NSF (National Sanitation Foundation) Standard 61 Stamp Seal of Approval
- a. Gate Valves: All valves shall meet the requirements of the latest specifications of AWWA for working pressures up to and including 200 PSI. Valves shall be iron

bodied, bronze mounted, gate valves with double disc parallel seats, non-rising stems, with connecting fittings as described above. Valves shall be provided with two-inch operating nuts marked to show the direction of opening which shall always be counterclockwise (OPL). Gate valves shall be installed at all outlets of any tee or cross (except on the main hydrants—see “hydrants”) with valve boxes of the appropriate size in place. The piping connecting the fitting to the valve shall never be less than 3 feet in length.

- b. Valve Boxes: Valve boxes shall be cast iron with an inside diameter of not less than 5 inches, with the top section adjustable for elevation. The base shall be of sufficient size that it will not contact the valve nor the pipe near any joint. Valve boxes shall be suitable for installation on mains laid at depths specified and shall be M & H 2602 or approved equivalent. All valve box covers shall have “Water” cast in raised letters on their top.

- c. Thrust Blocks: Thrust blocks of Class B Concrete (3000 lb. test) of adequate size and proper shape shall be provided at each hydrant, bend, plugged tee and cross, dead-end, and at reducers and fittings where changes in pipe diameters or directions occur. At hydrants, thrust blocks shall be so located that they will not prevent the speedy draining of the hydrant, nor ready access to the drain. Thrust blocks should always bear against an undisturbed trench face.

- d. Hydrants inside the city limits:
 - 1. Hydrants will be located so that no reasonably expected building will be more than 500 feet from a hydrant, measured along the route fire-fighting equipment would move between the hydrant and the water main.

 - 2. Fire hydrants shall be iron bodied, fully bronze mounted, and suitable for working pressures of 200 PSI. They shall meet all requirements and have connections to 6” and larger mains, two 2½ brass nozzles, and a 5 ¼ inch steamer nozzle, with caps threaded to fit the nozzles, fastened securely to each hydrant.

The bottom valve of the hydrant shall not be less than 5 ¼” in diameter with a 7” ID riser barrel. All connection threads shall comply with standard specifications of the National Board of Fire Underwriters and the City of Lewisburg. Operating nuts shall comply with the standard of the City of Lewisburg. The main valve of the hydrant shall be of the compression type; the valve shall be faced with heavy impregnated waterproof gaskets. The hydrants shall have a safety “breakable flange” section located above the

ground line. The distance from the ground line at the hydrant to the top of the hydrant shall not to be less than 30". Exposed unpainted surfaces shall be painted with one coat of red lead and two coats of Sonneborn's hydrant enamel. Approved brands: M & H Mueller, American Darling and American AVK.

"Fire hydrants accepted by the department will be pre-painted manufacturers "red" to include barrel and bonnet. The bonnet will be "color coded" and painted by the department following acceptance and proper flow testing to meet department policy."

3. Hydrant thrust block must bear against an undisturbed trench face. Care must be taken that the drain (weep hole) is not obstructed but can drain into the crushed rock bedding (see drawing No.1).

II. CONSTRUCTION

- A. Trenching must be done in a neat and workmanlike manner, maintaining proper alignment except where necessary to make deviations to miss obstructions. Trenching shall be such that the pipe will have a minimum cover of 30 inches and the deflection between joined sections of pipe shall not exceed the allowable recommended by the manufacturer. The Contractor shall deepen the trench when approaching creeks, roadways, sub-surface obstructions to avoid the unnecessary use of fitting. Blocking shall not be used. Crushed rock shall be used to backfill 6" above the top of the pipe, and this backfill must be properly tamped.
- B. Where rock is encountered, the contractor shall use all precautions necessary to protect adjacent property against damage resulting from these operations, all damage caused by rock removal shall be promptly repaired by the contractor at his expense. A written statement that no claims are outstanding against the contractor may be required by the Department before the work is accepted.
- C. All pipes shall be laid according to the manufacturer's recommendations concerning handling, jointing and deflections.
- D. In backfilling trenches, #7 or #67 crushed rock will always be used to bed the pipe (6' minimum) and will be used to 6" above the top of the pipe and be properly tamped. The remaining depth of the trench may be filled with dirt, free of rock no more than 3" in any dimension, pushed into the trench by power equipment and then properly compacted. Where the trench crosses streets and other places of possible high stress, the trench shall be machine tamped for the entire depth and width of the trench in 4"-6" layers.

- E. Trenches alongside streets and roads and across private property should be overfilled (mounded), and it shall be the responsibility of the contractor to see that the mounding is sufficient to maintain normal ground level after 12 months. All trenches in State and
- F. Federal roadbeds shall be backfilled and tamped in 6" layers up to the top of the trench. It shall be the responsibility of the contractor to see that such crossings are regularly inspected and crushed stone used to fill any "chuckholes" that develop until the paving removed during the trenching operation can be replaced.
- G. When work is suspended for the night, or for any other reason, open ends of the pipe shall be securely plugged to prevent entrance of water and foreign materials. The contractor shall take precautions to prevent flotation of the plugged or capped pipe in case the trench is flooded.

III. TESTING

Testing of Lines

Testing of lines shall comply with the provisions listed below, or similar approved procedures which will insure equal or better results. Leakage shall be tested in accordance with ANSI/AWWA C600.

The Contractor shall furnish all gauges, meters, pumps, and other equipment required and shall maintain said equipment in condition for accurate testing as determined by the Engineer. Where leaks are visible at exposed joints and/or evident on the surface when joints are covered, the pipe shall be rejoined and leakage minimized regardless of total leakage as shown by test.

Duration of test shall be not less than 2 hours where joints are exposed and not less than 8 hours where joints are covered. Lines which fail to meet the leakage requirements shall be repaired and retested until test requirements are met. All pipe, fittings, and other materials found to be defective under test shall be removed and replaced at the Contractor's expense.

Pipelines shall be held under normal operating pressures for at least three (3) days before testing.

IV. DISINFECTION

Water lines shall be disinfected as required by ANSI/AWWA C651 as amended and expanded herein. The new water lines shall not be placed in service--either temporarily or permanently--until they have been thoroughly disinfected in accordance with the following requirements and to the satisfaction of the department.

All water lines, including pipe, valves, meters, etc., shall be disinfected prior to being placed in use.

Calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500-ft (150-m) intervals.

The quantity of granules at each location shall be as shown in Table 1.

Table 1 Weight of calcium hypochlorite granules to be placed at beginning of main and at each 500-ft (150-m) interval

Pipe Diameter (<i>d</i>)		Calcium Hypochlorite Granules	
<i>in.</i>	<i>(mm)</i>	<i>oz</i>	<i>(g)</i>
4	(100)	1.7	(48)
6	(150)	3.8	(108)
8	(200)	6.7	(190)
10	(250)	10.5	(298)
12	(300)	15.1	(428)
14 and larger	(350 and larger)	$D^2 \times 15.1$	$D^2 \times 428$

Where *D* is the inside pipe diameter, in feet $D = d/12$

For this work, the contractor shall furnish suitable plugs or caps for the pipe, pipe connections and other equipment together with all labor required. While the disinfectant is being applied to any section of the system, the water shall be allowed to escape at all extremities of this section until a chlorine residual test shows a 50 ppm dosage of chlorine. The disinfectant shall be allowed to remain in the pipe for 24 hours, with a residual of at least 25 ppm present, after which the lines shall be thoroughly flushed and refilled. Then after sitting for 48 hours, a bacteriological sample will be taken at the appropriate sites. If tests indicate that the lines are not completely disinfected, the disinfection procedure shall be repeated on that part of the system until a negative sample is obtained. When a **negative** sample is obtained, the line shall be thoroughly flushed and then may be connected to the water system. The cost of the bacteriological test will be borne by the developer. The City shall pay for water required for initial filling and first refill after flushing. The developer/owner shall pay for any other water required.

V. INSPECTION OF WORK IN PROGRESS

All lines, valves, etc., must be inspected by a Water Department inspector before backfilling begins. If not, lines must be dug back up for inspection at the contractor's expense.

VI. EASEMENTS

Proper easements for right-of-way across private property must be obtained and recorded before construction work begins. Copies of final drawings submitted for Department approval must include designation of classes of pipe, either on the drawing or in attached specification sheets.

VII. SEPARATION OF WATER AND SEWER LINES AND MAINS

- a. Horizontal Separation: Whenever possible, sewers should be laid at least 10 feet horizontally, from any existing or proposed water main. Should local conditions prevent a lateral a lateral separation of 10 feet, a sewer may be laid closer than 10 feet to a water main if it is laid in a separate trench and if the elevation of the top (crown) of the sewer is at least 18" below the bottom (invert) of the water main.
- b. Vertical Separation: Whenever sewers must cross water mains, the sewer shall be laid at such elevation that the top of the sewer is at least 18" below the bottom of the water main. When the elevation of the sewer cannot be varied to meet the above requirement, the water main shall be relocated to provide this separation or reconstructed with mechanical-joint pipe for a distance of 10 feet on each side of the sewer. One full length of water main should be centered over the sewer so that both joints will be as far from the sewer as possible.

When it is impossible to obtain proper horizontal and vertical separation as stipulated above, both the water main and sewer main shall be constructed of mechanical-joint cast-iron pipe. Any exceptions to these specifications shall be approved by the general manager.

VIII. SLOPE PROTECTION AND EROSION CONTROL

Detailed procedures for erosion control are found in other specification sheets and can be provided by Lewisburg Water. Erosion Control must be done properly to be in compliance with city and county regulations. These are enforced by storm water officials and codes inspectors.

This section shall apply and be enforced by the department's inspector only when work is under contract directly for the Department. Developers and contractors working on private property shall conform to such regulations as are required by city, county, State and or federal agencies.

IX. TRENCH BACKFILLING

MAINS:

When mains are installed in non-pavement areas, selected earth and/or selected rock backfill will be allowed in the 24” section as shown in diagram DWG NO 1.

When mains are installed in pavement or areas to be paved (roadway), trench shall be completely filled with TDOT #7 or #67 crushed stone.

Mains installed in existing pavement where cutting of pavement is permitted, shall comply with the **City of Lewisburg ordinance for “open cut trenching, backfilling and pavement replacement of streets and alleys”**.

The trench shall be straight and uniform to permit laying pipe to the proper lines and grades. If wet, mucky and/or unstable or unsuitable material is encountered in trench bottom, it shall be excavated and backfilled as specified to ensure a firm foundation for the pipe.

SERVICE LINES:

Copper and PEX service lines shall be installed below the frost line depth of 18 inches. The trench shall be backfilled with dirt or approved material. Cutting in existing pavement or roadways shall comply with the City “open cut trenching” as noted above.

TRACER WIRE:

Department-approved tracer wire (HDPE 30 mil tracer wire 12 AWG solid CU - direct bury, or approved equivalent) shall be installed within the ditch line during pipeline installation. Tracer wire should not be attached to the pipe. It should be in the ditch beside or below the pipe, not on top of the pipe. Specifications must be obtained from the department. This wire will permit the owner to attach locating equipment to the wire for future locating of the water main.

LOCATOR TAPE:

Detectable underground utility marking tape shall be installed in the ditch on top of the gravel that is placed on top of the pipe. Tape shall be colored as follows:

Water line: safety precaution blue

Sanitary sewer line: safety green

SHOP DRAWINGS:

The developer/contractor shall submit shop drawings for all materials, appurtenances to be installed within subdivisions, etc. approval of shop drawings must be signed by the Department General Manager prior to order. The Department inspector shall approve all materials on site prior to installation.

SPECIFICATIONS:

All specifications contained herein are considered standard for “normal conditions”. If specific conditions exist which would require modifications greater than listed within the standard specifications, approval must be received from the General Manager prior to continuance of utility construction.

Specifications for meter setters:

¾" x 5/8" FORD series 70 Copper Setter Model VBHH72-7W-41-33-NL dual check valve

OR Department approved equivalent model.

All must have ¾" coupling inlet side and ¾" double purpose outlet side and,

Include a DOUBLE CHECK VALVE FOR BACK FLOW PREVENTION.

Specifications for plastic meter boxes:

12 inch high color BLACK

TOP 16" x 10 ¾"

BASE 18 ½" x 13 ¼"

Standard cover - no reader lid required.

Specifications for service tap on PVC main:

Ford Saddle #FC202 or approved equivalent

with Ford Ball Corp. Stop FB1000-3-NL for standard ¾" residential tap.

OR Department approved equivalent model.

with Ford Ball Corp. Stop FB1000-4-NL for standard 1" residential tap.

OR Department approved equivalent model.

HIGHWAY CROSSINGS- WATER SEWER STANDARD SPECIFICATIONS

a. General

Where shown on the Plains, highway crossings for water and sewer lines shall be bored to prevent interruption to traffic and to prevent later settlement of the roadway or roadbed.

The contractor must be fully equipped and experienced in the installation of pipelines using approved boring methods. Road bore will not be accepted by the utility until the proper road-way owner has given approval noting that no damages have resulted from boring construction.

Should the awarded Contractor choose to use a sub-contractor for highway boring, such sub-contractor shall be prior approved by the Utility before construction commences.

A MINIMUM OF 3 SETS OF S.S. BANDED CASING SPACERS PER PIPE JOINT WILL BE INSTALLED ON CARRIER PIPE. REFERENCE DETAIL SHEET FOR BORED HIGHWAY CROSSING. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SIZE AND INSTALL IN ADEQUATE QUANTITY THE CASING SPACERS TO PREVENT PIPE FLOATATION AND BUCKING.

b. Bored Highway Crossings

1. General

Where shown on the Plans and/or where open cutting of roadways are not allowed, crossing of U.S., State of Tennessee, City of Lewisburg or Marshall County Highways shall be made by boring with a steel casing pipe as specified in Subparagraph b. (2) hereinafter. The pipe shall be jacked through a bored hole. Holes shall be bored under the highway at least four (4) feet below the surface with no disturbance to the surface.

2. Steel Casing Pipe

Black steel casing pipe shall be manufactured and tested in accordance with ASTM Designation A 139-84 or A 53-84a, Grade b, 35,000 psi yield strength, and shall meet the American Railway Engineering Association (AREA) Specification for Metal Pipe and Arches, Chapter 1, Part 5. Steel casing pipe where shown shall be as follows:

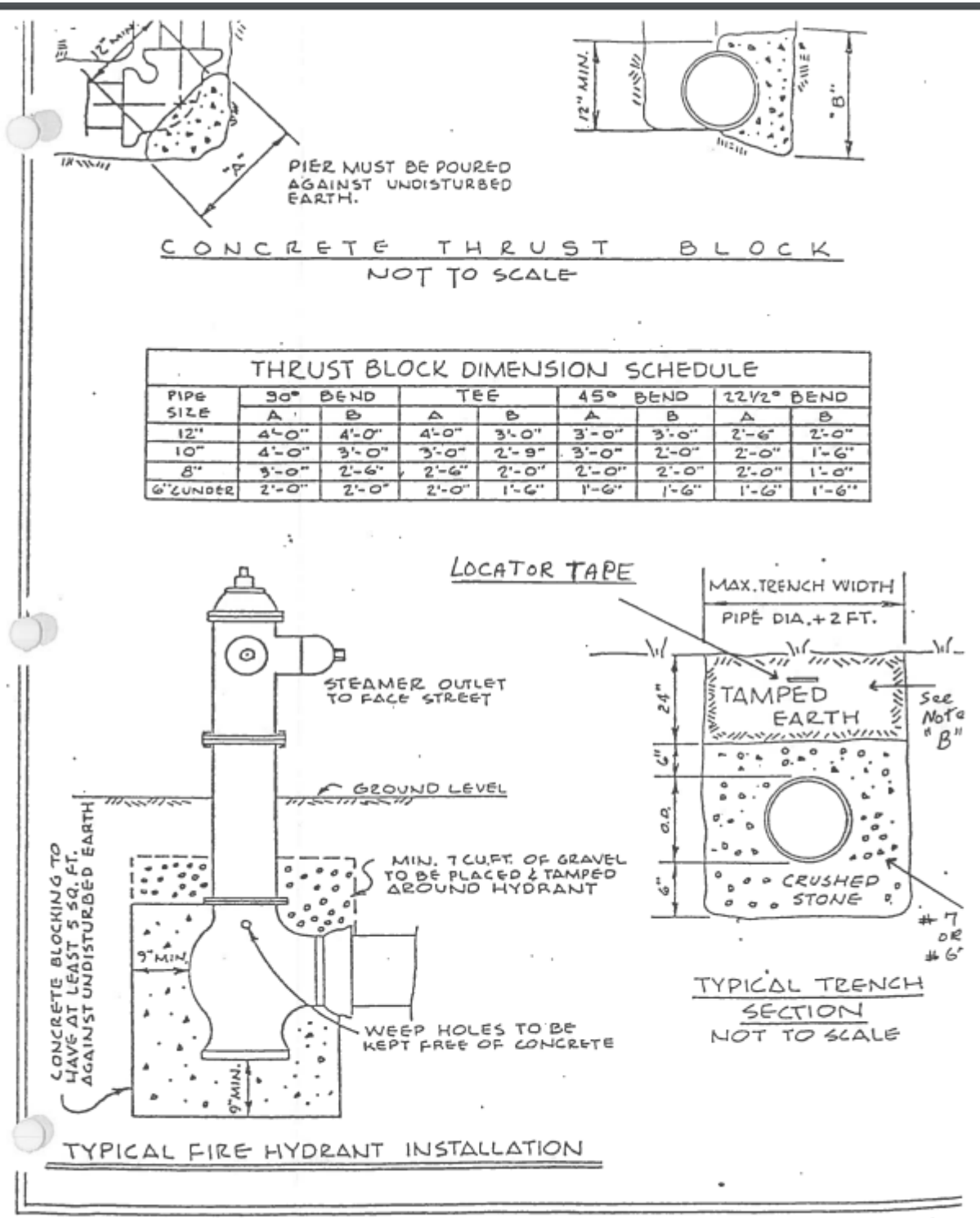
Page 9

Diameter Carrier in inches	O.D. Diameter Casing in inches	Minimum wall Thickness of Casing in inches
4	12-3/4	0.219
6	12-3/4	0.219
8	16	0.250
10	18	0.281
12	20	0.312

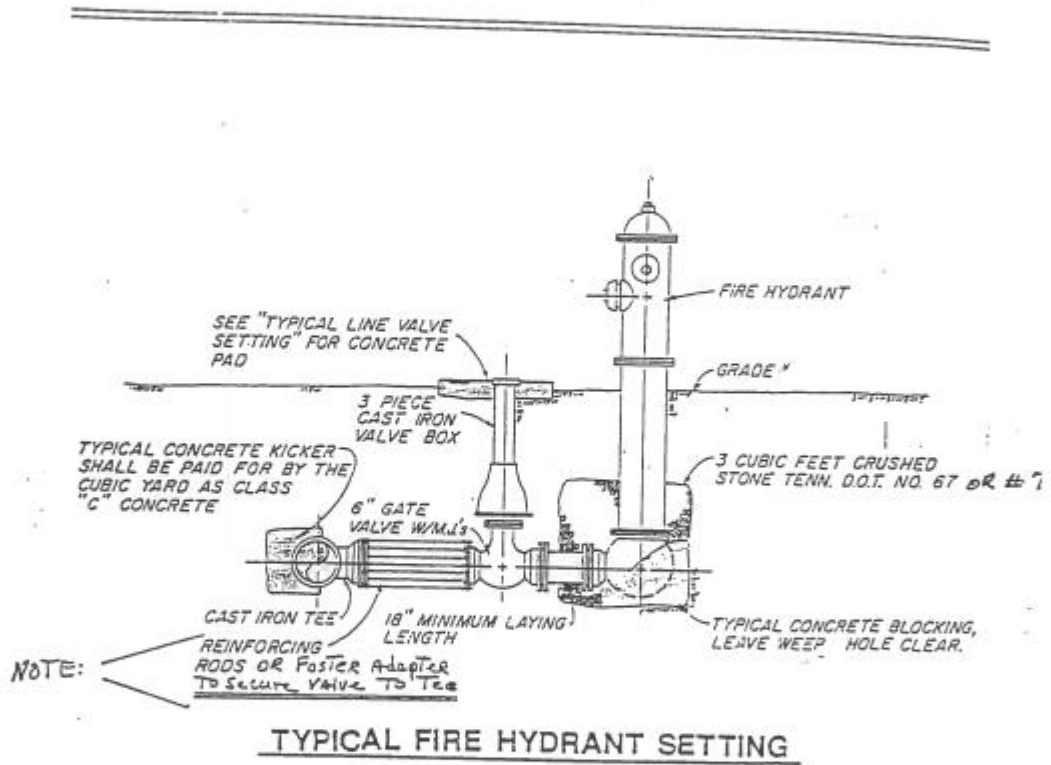
Note: Published tap fees do not include the boring and casing of public roadways. When any water or sewer extension project undertaken by a private company, person and/or developer requires highway boring, such cost shall be borne by persons other than the named utility.

The utility (Lewisburg Water and Wastewater) will assist the Developer, Company or Persons in applications for all required permits for bores within state, city and county roadways/rights-of-way when the subject project has been approved by the utility.

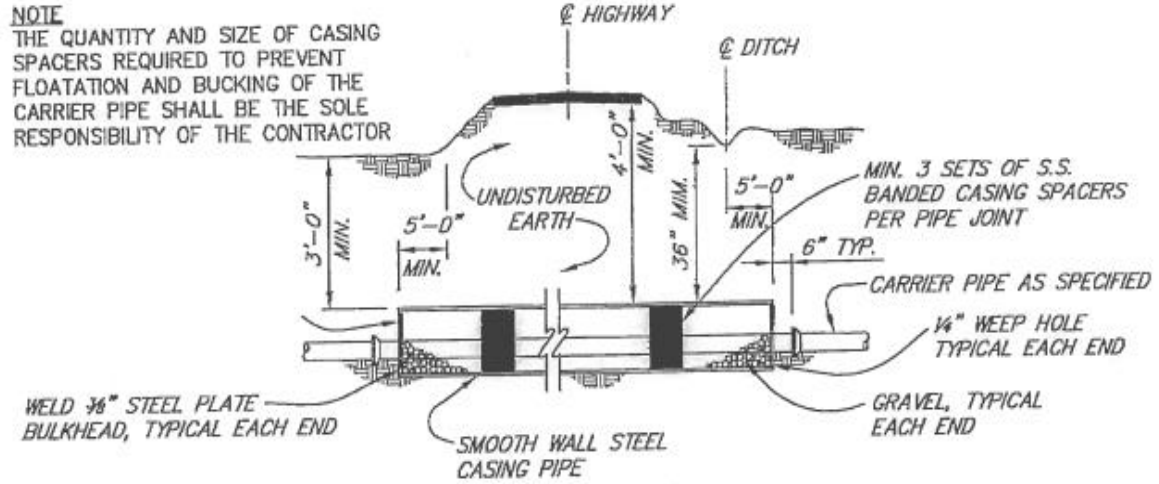
Any or all fees of any nature required by governmental agencies in connection with the road bore project shall also be borne by the Developer, Contractor and/or persons desiring the project to be constructed. Shop commencement of boring/construction. The utility will assign an inspector to co-coordinate and ensure compliance.



DWG. NO. 1



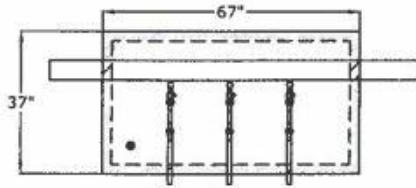
DWG. NO 1-A



BORED HIGHWAY CROSSING

LEWISBURG WATER & WASTEWATER
100 WATER STREET - P.O. BOX 2787
LEWISBURG, TENNESSEE 37091

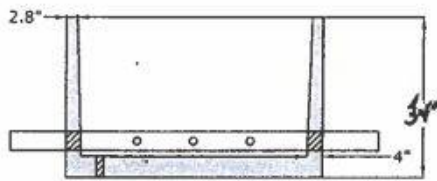
Top View



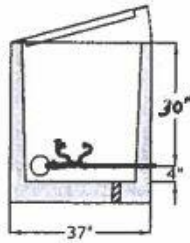
NOTES:

- 1) Concrete : 5000 psi minimum strength (28 days)
- 2) 30" x 60" opening single leaf aluminum door , pedestrian rated
- 3) Pipe penetrations placed according to job requirements

Side View



End View



WATER METER VAULT SPEC.

LEWISBURG WATER WILL ONLY APPROVE
PREFABRICATED UNITS BUILT BY AN
APPROVED SUPPLIER.