CITY OF PATASKALA

CONSTRUCTION AND MATERIAL SPECIFICATIONS

and

STANDARD DRAWINGS

2016 EDITION

Effective January, 2016

CITY OF PATASKALA

CONSTRUCTION & MATERIAL SPECIFICATIONS 2016 EDITION

CONSTRUCTION AND MATERIAL SPECIFICATIONS

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CITY OF PATASKALA

CONSTRUCTION AND MATERIAL SPECIFICATIONS

CHAPTER 1

GENERAL PROVISIONS

101 DEFINITIONS: Whenever the words defined in this section, or pronouns used in their stead, occur in these specifications or the contract documents, they shall have the meaning given herein:

101.01 Abbreviations: Whenever the following abbreviations are used in these Specifications or on the Construction Drawings, they are to be construed as Meaning the same as the following specifications:

American Association of State Highway and Transportation Officials	AASHTO
American Concrete Institute	ACI
American National Standard Institute	ANSI
American Public Works Association	APWA
American Society of Testing and Materials	ASTM
American Water Works Association	AWWA
State of Ohio Department of Transportation Construction and Material Specifications	ODOTCMS

101.02 Construction Drawings: The plans and drawings approved by the City, or exact reproductions thereof, which show or describe through notes, details, supplemental and standard drawings, and by reference, the location, character, dimensions, quantity, quality, and detail of the work.

101.03 Engineer: The engineer, and his official representatives, authorized by the City to fulfill the professional engineering requirements as described by the City.

101.04 Field Technician: A person authorized by the City to observe the work for general compliance with the construction drawings and these specifications.

101.05 City: The City of Pataskala and any duly authorized representatives legally empowered to act on the City's behalf.

101.06 Specifications: Written descriptions of materials, equipment, construction systems, standards and workmanship, enumerated as construction and material specifications, supplemental specifications, special provisions, or reference specifications.

101.07 Work: All labor, equipment and materials necessary to provide all elements of the Project including all appurtenances, in accordance with the Construction Drawings, these Specifications and Supplemental documents in such a manner as to provide complete, usable improvements.

101.08 Developer/Land Owner: Person, corporation who is proposing to develop or improve the property.

101.09 Contractor: Person or company who is installing the improvements.

102 CONSTRUCTION DRAWINGS AND SPECIFICATIONS: The location and nature of the Work is shown in a set of Construction Drawings approved by the City. These Specifications, the Construction Drawings prepared for the Work, and all supplementary documents, are intended to be complimentary and to describe and provide for a complete usable improvement. Anything called for in the Specifications and not shown on the Construction Drawings or shown on the Construction Drawings and not called for in the Specifications must be furnished by the Contractor as through appearing in both the Construction Drawings and Specifications. In case of discrepancy, calculated dimensions shall govern over scaled dimensions. If there is an apparent conflict or a conflict in fact between sections of the Specifications or the Specifications and the Construction Drawings as approved by the City, the most stringent information and interpretation shall prevail.

103 REFERENCE DRAWINGS AND SPECIFICATIONS: When the American Society of Testing and Materials (ASTM) Specifications, State of Ohio Department of Transportation Construction and Material Specifications (ODOTCMS). American Water Works Associations (AWWA) Specifications, American Association of State Highway and Transportation Officials (AASHTO) Specifications, and other specifications and/or standard drawings are referenced, unless stated otherwise, the latest revision or edition of said specifications and drawings shall become part of these Contract Documents on the date the construction drawings are approved by all approving agencies.

104 DEVELOPER/LANDOWNER TO MEET CONTRACTOR RESPONSIBILITIES: When a developer/landowner wishes to develop land by constructing or installing, or causing the construction or installation of Work, all or part of which is intended to be owned, operated, or maintained by the City, the developer/landowner shall be responsible to the City for compliance with these specifications by all parties performing the Work.

105 SUBMITTALS:

105.01 Required Submissions: A list of all material suppliers, material samples, and such shop drawings, sketches, specifications, and description as are determined by the Engineer to be required to establish compliance with the Contract Documents shall be submitted to the Engineer for review. The material sample submission shall be of the size and amount required by the Engineer for testing. The material sample and four sets of the information must be submitted at least fourteen days prior to the date that the project components represented by the submitted material or information are to be incorporated into the Work. No equipment or materials shall be ordered or work begin prior to the completion of the review of the submitted material or information.

The developer shall provide a Soils Engineer registered in the state of Ohio for the purpose of inspecting and certifying to the City of Pataskala acceptable soil bearing conditions prior to the placement of improvements within the right of way and easements in accordance with the appropriate Ohio Department of Transportation specifications. Test results need to be submitted to City of Pataskala prior to onset of any construction.

105.02 Final Acceptance Submissions: Prior to final acceptance of the Project, the Contractor shall submit three (3) sets of all technical data, brochures, manufacturer's specifications, operating and maintenance instructions, wiring and flow diagrams, guarantees and warranties for the equipment and materials incorporated in the Project. Each set shall be indexed and submitted in a three ring binder. Upon request by the Contractor, the City may waive this submission requirement for certain materials and equipment.

106 QUALITY OF MATERIALS: Wherever particular brands or makes of material, devices or equipment is shown or specified, such items shall be regarded as standard and shall be read as being followed by "or approved equivalent". Prior to incorporating an item that is not specified into the Project, information must be submitted and reviewed in accordance with Section 105 of these Specifications. Any other brand or make of material, device or equipment which, in the opinion of the City, is the equivalent of that specified in quality, workmanship, economy of operation, and suitability for the purpose intended shall be accepted. Acceptances of such items shall not be construed to remove the Contractor's responsibility to provide a complete, usable facility as specified herein and shown on the construction drawings.

107 PROJECT CONTROL:

107.01 Authority of the Engineer: The Engineer shall observe the progress and quality of the Work and determine, in general, if the results of the Work are in general conformity with the contract documents. On the basis of the Engineer's on-site observations, the Engineer shall endeavor to guard the City against apparent defects and deficiencies in the permanent Work constructed by the Contractor, but does not guarantee the performance of the Contractor. The Engineer is not responsible for construction means, methods, techniques, sequences, procedures, time of performance, programs, or compliance with any Occupational Safety and Health Act (OSHA) requirements or for any safety precautions in connection with the construction work. The Engineer is not responsible for the Contractor's failure to execute the Work in accordance with these Construction Drawings and these Specifications. In making the construction observations as described herein, the Contractor agrees to the following:

107.011 The Engineer shall receive and make recommendations to the City on all questions of fact which may arise, including the quantity, quality, or suitability of materials and equipment furnished, work performance, and rate of progress of the work.

107.012 The Engineer may correct any apparent or actual errors or omissions when such corrections are necessary for the proper fulfillment of the intention of the Construction Drawings and these Specifications.

107.013 Failure of the Engineer to observe or recommend rejection of any defective, unauthorized or nonconforming Work shall not in any way prevent later rejection when such defective, unauthorized or nonconforming Work is discovered, nor obligate the City to final acceptance.

107.02 Control of Work and Material: All Work shall be subject to review by the Engineer. The Engineer or their representatives shall be provided access to all parts of the Work and shall be provided such information and assistance by the Contractor as is required to complete their review. The Engineer shall call the attention of the Contractor to any observed failure of the Work to conform to the Contract Documents. Should the Contractor fail to comply with these Specifications or Construction Drawings, fail to provide certifications and/or proof of the suitability of materials or fail to prosecute the Work in a diligent and good workmanlike manner; the Engineer may recommend to the City that the Contractor's operation be suspended on any or all portions of the Project until such unauthorized, un-reviewed or defective work, materials and/or equipment are corrected. Failure of the Contractor to comply with the City's directions is just cause for the City to have such corrections made and deduct the cost from the monies due the Contractor or terminate the contract as stipulated hereinafter, or both.

107.03 Testing of Equipment and Materials: Any tests required by the City due to lack of certification or proof of suitability of any equipment and/or materials to be incorporated in the Work shall be paid for by the Contractor. Unless stated otherwise, all tests required by these Specifications and Construction Drawings shall be paid for by the Contractor.

All equipment and materials that have passed the prescribed tests may be incorporated in the Work provided that said equipment and materials meet all other requirements.

107.04 Construction Layout Staking/Cut Sheets: Developer/Contractor responsible for stakes showing the lines and grades necessary for the completion of the Work shall be provided by a Surveyor licensed in the state of Ohio. The Contractor shall give a minimum of forty-eight (48) hours prior notice before requiring layout stakes. Cut sheets, using the City's format, shall be provided for all water and sewer line installations.

107.05 Grade Checks: Contractor shall make available equipment for grade checks during sanitary or water line installation and assist inspector in performing grade checks when requested. These checks will be performed to ensure proper placement of structures, proper installation of initial runs of pipe from structure, to check grade after overnight or longer shutdown, or at any other time the inspector has reason to question grade of installed pipe.

108 WATERTIGHT STRUCTURES: All structures to be used for holding water shall be made watertight and shall be tested by filling with water before they will be accepted. Tests of concrete watertight basin shall be made before backfill is placed, however, where special reasons make this impractical the Engineer may permit backfilling to proceed before the test is made. Permission to backfill shall not relieve the Contractor from any responsibility for water tightness of the structure and, if upon making the test, the need to remove backfill and/or repair the structure arises; it shall be done by and at the expense of the Contractor.

109 GUARANTEE: All material and equipment placed and installed under these Specifications and Construction Drawings shall be guaranteed by the Contractor against defects of materials, workmanship, and design for a period of at least one year after the date of substantial or final completion of the Project and final acceptance by the City. A maintenance bond equal to 25% of the project cost shall be provided. Failure of the contractor to rectify damage, improper design, and faulty workmanship and/or materials as supplied by them and shown by test to be deficient after one year of operation, shall entitle the City to proceed against the Contractor for all costs related to making good on the obligation of the Contractor.

110 ACCEPTANCE OF PRIOR WORK: Prior to beginning any Work each tradesman, contractor, or subcontractor shall inspect the Work already in place and identify any observed defects or deficiencies. Beginning work on the Work already in place, constitutes acceptance of the in-place Work by the tradesman, subcontractor, or contractor doing the Work, except for the areas identified as being defective or having deficiencies. Once the observed defects and deficiencies are corrected and accepted by the tradesman, subcontractor, or contractor, the entire area is accepted. Any corrective actions required after the acceptance shall be the responsibility of the tradesman, subcontractor, or contractor or that accepted the work.

111 SERVICE OF MANUFACTURER'S REPRESENTATIVES: When required by the Construction Drawings or Specifications, the services of competent and experienced manufacturer's representatives shall be furnished to supervise the initial installation of material and equipment as well as to provide start-up and operational instructions to the City's personnel. Where the supervision by a manufacturer's representative is not called for, the Contractor is not relieved of their responsibility to properly construct or install material in accordance with the terms of these specifications or to provide start-up and operational instructions.

112 NOTICES: Notice shall mean written notice. Written notice shall be deemed to have been duly served when delivered in person to the person, firm, officer, agent or representative, or when delivered at the last known business address of such person, firm or corporation, or when enclosed in a postage prepaid wrapper or envelope addressed to such person, firm, or corporation at their or its last known business address and sent by registered mail with return receipt requested.

113 SANITARY REGULATIONS: Suitable sanitary conveniences for the use of all persons making the improvements, properly screened from public observation, shall be provided and maintained by the Contractor. The Contractor shall obey and enforce such other sanitary regulations and orders and shall take such precautions against infectious diseases as may be deemed necessary by the City.

114 ACCESS TO ABUTTING PROPERTIES: The Contractor shall provide and maintain temporary access to all properties where access is interrupted by their construction operations.

115 SPACE AVAILABLE FOR CONTRUCTION OPERATION: The Contractor shall confine their operations to the Project as shown on the construction Drawings and/or described herein. Private property shall not be used by the Contractor without the proper City's written consent. The Contractor shall confine their operations within the temporary and permanent easements or rights-of-way, or as stated otherwise in the Contract Documents.

116 INCLEMENT WEATHER CONDITIONS: All Work which will be adversely affected by climatic conditions such as rain, wind, frost or freezing shall be suspended unless permission is given by the City to proceed. Whenever work proceeds under such conditions, the Contractor shall provide approved facilities for protecting all the materials and the finished Work. This shall include heating of materials if required for proper installation.

117 TIMERING ORDERED LEFT IN PLACE: In the event any timbering, sheathing or bracing used in shoring trenches or other excavation is ordered left in place by the City, it shall be paid for at the rate of Eight Hundred Dollars ($800.00) per 1,000 feet board measures (M.F.B.M.). Such sheathing ordered left in place shall be cut off as directed by the City and measured in place without allowance for waste.

118 UTILITY COSTS: The Contractor shall pay for the installation and use of all utilities such as water, gas and electric service during construction until acceptance of the Project by the City.

119 SAFETY AND HEALTH PROVISIONS:

119.01 General: The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work or with any activities on or off the Project site associated with the Work, pursuant with the most current applicable sections of the Occupational Safety and Health Act (OSHA) or other safety or health regulations in effect throughout the contract period. Neither the City nor the Engineer shall assume, or have assigned them, responsibility or the authority for site safety for any area of the Project. The Contractor shall take all necessary measures to prevent damage, injury or loss to:

119.011 All employees on the Project and all other persons who may be affected thereby.

119.012 All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site.

119.013 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

119.014 Special care shall be taken during the entire duration of the Contract to prevent unauthorized persons from falling into, climbing upon, or entering any of the excavations, equipment, or work areas.

120 UTILITIES AND STRUCTURES SHOWN ON THE CONSTRUCTION DRAWINGS: The information shown on the Construction Drawings concerning existing utilities and structures, both surface and subsurface is not represented, warranted or guaranteed to be complete or correct. The Contractor shall contact a recognized utility locating service, or the appropriate utility City, at least forty-eight (48) hours prior to beginning work, pursuant to Section 153.64 of the Ohio Revised Code. The exact location and protection of utilities and structures is the responsibility of the Contractor.

During construction, the Contractor shall use due diligence in protecting from damage all existing utilities and structures whether shown on the Construction Drawings or not. If damage is caused, the Contractor shall be responsible for the repair or restoration of same in accordance with the directions of the Engineer, or the utility City, and for any resulting collateral damage.

121 PROTECTION OF FINISHED WORK: The Contractor will be held responsible for any and all materials or Work to the full amount of payments made thereon, and will be required to make good, at his own cost, any injury or damage which said materials or Work may sustain from any source, including any severe or inclement weather. The Contractor shall provide the necessary drainage, heating facilities and other protection for the Work to prevent any possible damage from frost action. It will also be necessary for the Contractor to provide protection for the excavation walls from earth slippage and ponding of water and mud that could cause structural or material damage, including from freeze/thaw action.

CITY OF PATASKALA
CONSTRUCTION AND MATERIAL SPECIFICATIONS

CHAPTER II

CONSTRUCTION MATERIALS

201 GENERAL: All material furnished by the Contractor shall conform to the minimum requirements of the latest revision or edition of any referenced specifications in effect on the date the construction drawings are approved by all approving agencies.

201.01 When requested by the City, the manufacturer, producer or supplier shall furnish a sworn statement that the inspections of all the specified materials have been made and that the results comply with the requirements of these specifications, or shall furnish certified copies of these test results. No material shall be used until approved by the City.

202 SAMPLES: The Contractor may be required to furnish samples of any or all materials they propose to use which are subject to these specifications. Approval of any samples shall not be taken in itself to change or modify any specification requirement. After a material has been approved, no change in brand or make shall be permitted without approval. Failure of any material to pass the specified tests will be sufficient cause for refusal to consider any further samples of the same brand of that material for use under these specifications. The City may take test samples from the various materials or equipment delivered to the site of the work by the Contractor whether previously approved for construction or not. Any materials or equipment which fails to meet the requirements of these specifications shall be subject to removal and replacement by the Contractor with material or equipment meeting the requirements of these specifications.

203 AGGREGATE: Aggregate shall conform to the following items:

203.01 Aggregate for Concrete shall meet the requirements of item 703.02 ODOTCMS.

203.02 Sand for mortar shall meet the requirements of Item 703.03 ODOTCMS.

203.03 Stone aggregate shall conform in all respects to the specific kind described under Item 703 ODOTCMS.

204 BRICK AND MASONRY UNITS: All units shall conform to the requirements of Item 704 ODOTCMS.

205 CEMENT AND CONCRETE:

205.01 Concrete shall conform to Items 499.02 and 499.03 ODOTCMS.

205.02 Cement for mortar shall be as specified under the appropriate requirement for Item 701 ODOTCMS.

205.03 Concrete incidentals shall conform to 705 ODOTCMS.

205.04 Reinforcing steel bar mats and wire fabric shall conform to Item 509.02 ODOTCMS.

206 FENCE: All fabric, posts, wire fasteners and incidental materials shall conform to Item 710 OCOTCMS.

207 IRON, STEEL, METALS AND INCIDENTAL MATERIALS

207.01 All iron casting, structural steel, miscellaneous metals and incidental materials shall meet the requirements of Item 711 ODOTCMS.

207.02 Manhole steps shall be made of aluminum allow conforming to Item 711.30 ODOTCMS or reinforced polypropylene plastic conforming to Item 711.31 ODOTCMS. The steps shall be spaced as shown on the standard drawings or the construction drawings and cast or driven into walls of pre-cast risers and concave sections, or mortared with a non-shrinking grout.

208 SEWER PIPE:

208.01 Concrete Pipe

a) All non-reinforced concrete pipe shall meet the requirements of Item 706.01 ODOTCMS.

b) Reinforced concrete pipe shall conform to the requirements of Items 706.02 706.03, 706.04, or 706.05 ODOTCMS.

c) Rubber gasket joints shall conform to ASTMC 443.

208.02 Clay Pipe

a) All vitrified clay pipe shall be extra strength pipe meeting the requirements of ASTM C 700 with rubber gasket joints meeting the requirements of ASTM C 425.

208.03 Polyvinyl Chloride (PVC)

208.031 Pipe

a) For sizes up to and including 15 inches in diameter, PVC pipe shall conform to ASTM D 3034 SDE 35.

b) For sizes 18 inches in diameter and larger, PVC pipe shall conform to

ASTM F 679 ASTM F794.

208.32 Fittings

a) For sizes up to and including 15 inches in diameter, PVC pipe fittings shall be Harco SDE 18 heavy wall gasketed sewer fittings meeting ASTM D 3034 and ASTM F 1336.

b) For sizes 18 inches in diameter and larger, PVC pipe Fittings shall be Harco SDE 18 heavy wall gasketed sewer fittings meeting ASTM F 679 and ASTM F 1336.

208.04 Ductile Iron Pipe: All ductile iron pipe shall conform to AWWA CI 51 with joints Conforming to AWWA CIII.

208.05 Adapters for connecting pipes of dissimilar material and size and adapters for Connecting broken or cut sewer pipe shall be equivalent to those supplied by Fernco, Inc.

208.06 All sanitary sewer services shall be supplied with a Hubsett Test cleanout as Manufactured by Hubsett Manufacturing, Inc., of Tacoma, Washington or approved equivalent.

209 MANOLES, CATCH BASINS, INLETS AND JUNCTION CHAMBERS: All materials used in the construction or fabrication of manholes, catch basins, inlets, junction chambers and other miscellaneous structures pertinent to water line and sewer construction shall conform to Item 604.02 ODOTCMS. All manholes and junction chambers for sanitary sewers shall be pre-cast in accordance with Item 706.13 ODOTCMS. All manholes shall be provided with Cretex Interior Chimney Seals from casting to concrete cone section. If in the opinion of the City due to wet conditions, a manhole catch basin needs additional joint seals, the Contractor will be required to install *Wripid Seal*. All vaults or meter pits are required to have all joints sealed using the *Wripid Seal*.

210 SEWER PRESSURE PIPE:

210.01 Ductile iron pipe shall conform to AWWA C 151 with a minimum working pressure of 150 psi and joints conforming to AWWA C 111.

210.02 Reinforced concrete pipe and fittings for force mains shall conform to AWWA C 300 or AWWA C 301. Normal maximum design pressure shall be no less than 150 psi.

210.03 Polyvinyl chloride pipe shall conform to ASTM 2241 SDR 26, or AWWA C 900 DR18.

210.04 High Density Polyethylene (HDPE) shall be PE 3408 HDPE MEETING ASTM d-3350 WITH A CELL CLASSIFICATION OF 345434c. The pipe shall be manufactured in accordance with ASTM F-714, Polyethylene (PE) Plastic Pipe (DR-II). All joints shall be butt fused together in a fashion approved by the manufacturer. HDPE PIPE SHALL MEET DUCTILE IRON PIPE INSIDE DIAMETERS. It is also required that all direct HDPE pipe must have two strands of 10 gauge location wire pulled with pipe to facilitate pipe location after installation.

210.05 Fittings shall be ductile iron conforming to either ANSI/AWWA C110/a21.10 OR ANSI/AWWA c153/A21.53 except for concrete pipe. Fittings shall have a standard asphaltic coating on the exterior. Tapping sleeves shall be per Section 213.07 of these specification, all valves to be used for sanitary application must be of plug type design with left hand opening (counter-clockwise). Fittings used for sanitary line installation to be domestic, made in USA only.

210.06 Metallic detectable underground marking tape shall be installed above all sewer force mains. Tape shall be green encased aluminum foil. The tape shall bear the words "CAUTION SEWER FORCE MAIN", permanently printed on the tape. The tape will meet APWA COLOR CODE AND SHALL BE THREE (3) INCHES IN WIDTH.

211 TUNNEL LINERS: Tunnel liners shall be strong enough to withstand loadings imposed now and in the foreseeable future in accordance with the design requirements of the specifications and/or of the private or public authority involved.

211.01 Corrugate metal pipe shall conform to Item 707.01 ODOTCMS.

211.02 Steel pipe tunnel liner shall be fusion welded steel pipe, ASTM 139, Grade B, galvanized with a minimum of two ounces per square foot and conforming to ASTM A 120.

211.03 Tunnel liner plates shall be furnished in black steel. The plates shall be formed from steel meeting the requirements of ASTM 139, Grade B. Individual liner plates shall be made of one piece of metal provided with flanges for both longitudinal and circumferential joints. The joints shall have sufficient bolt holes to fully develop the strength of the individual liner plate and so spaced in each liner plate that liner plates of the same curvature will be interchangeable and can be readily handled in the tunnel. Liner plates shall be of the design that, when bolted together, no opening shall exist large enough to permit inflow of granular material. The longitudinal bolts supplied with tunnel liner plates shall be ASTM A 307, 5/8 inch diameter by 1 ¼ inches long for 14 through 7 gauge structures or ASTM A 449, 5/8 inch diameter by 1 ½ inches long for 5 through 3 gauge structures. For center corrugation assembly, ¼-inch longer bolts shall be supplied. Liner plates shall be accurately curved to suit the tunnel cross-section, and when bolted together the finished casing pipe shall be fully round. Grouting plugs shall consist of two (2) inch standard half pipe couplings welded or tapped into a hole in the liner plate and furnished with a cast iron plug for closure.

211.04 Reinforced concrete pipe shall meet the requirements of Items 706.02, 706.03 or 706.05 ODOTCMS.

212 UNDERDRAINS: Underdrains shall conform to the following specifications.

212.01 Perforated Concrete Pipe, Item 706.06 ODOTCMS.

212.02 Concrete Drain Tile, Item 706.07 ODOTCMS.

212.03 Vitrified Clay Pipe, Item 706.08 ODOTCMS.

212.04 Clay Drain Tile, Item 706.09 ODOTCMS.

212.05 Perforated Polyvinyl Chloride Pipe, Item 707.41 ODOTCMS.

212.06 Corrugated Polyethylene Slotted Drain, Item 707.3 ODOTCMS.

213 WATER LINE PIPE: Water line materials shall meet the following specifications.

213.01 All Water lines must be eight (8) inches minimum unless approved by City of Pataskala.

a) Ductile iron pipe designed in accordance with ANSI/AWWA c150/a21.50 for a minimum 150 psi rated working pressure plus a 100 psi minimum surge allowance or a 2:1 factor of safety based on the sum of the project working pressure plus surge pressure.

Pipe shall have standard asphaltic coating on the exterior. Ductile iron pipe shall be manufactured in accordance with ANSI/AWWA c151/a21.51. Each pipe shall be subjected to a hydrostatic pressure test of at least 500 psi at the point of manufacture.

Pipe shall also have a cement mortar lining in accordance with ANSI/AWWA C104/A21.4.

The class or normal thickness, net weight without lining, and casting period shall be clearly marked on each length of pipe. Additionally, the manufacturer's mark, country where cast, year in which the pipe was produced, and the letter "DI" or "Ductile" shall be cast or stamped on the pipe.

b) PVC plastic pipe AWWA C900 DR 18 for 6" to 12", and AWWA C905 DR 18 for 14" and above.

c) High Density Polyethylene (HDPE) pipe shall be PE 3408 HDPE meeting AWWA C 906, SDR 11. All joints shall be butt fused together in a fashion approved by the manufacturer. All fittings shall be fusion welded. All bored in pipe to have two (2) 10 gauge strands of locator wire pulled with pipe, made in USA only.

d) Molecular Oriented PVC Plastic Pipe shall be AWWA C909 PC 150. The material Shall conform to ASTM D1784 and ASTM D 3139.

e) Metallic detectable underground marking tape shall be installed above all water lines. Tape shall be blue as specified by the APWA color code and shall be three (3) inches in width. The tape shall bear the words "CAUTION WATER LINE", permanently printed on the tape. Also add locate wire if City of Pataskala thinks it is needed.

213.02 Unless otherwise shown on the construction drawings, all pipe shall be furnished with push-on type joints, such as Tyton, Fastite, or approved equivalent. Joints shall be in accordance with ANSI/AWWA C111/21.10 OR ansi/AWWA C153/A21.53. Fittings shall have a standard asphaltic coating on the exterior. Fittings shall also have a cement mortar lining on the interior in accordance with ANSI/AWWA c104/a21.4. All fittings shall have JLM Sure-Grip Restrainers or approved equivalent.

Unless otherwise shown on the construction drawings, fittings and accessories shall be furnished with either mechanical or flanged joints and restraints in accordance with ANSI/AWWA c111/A21.11.

213.03 Valves shall be:

a) Gate valves shall have a non-rising stem, left hand open (counter-clockwise) with Double O-ring stem seals. Valves shall have end joints conforming to AWWA C 111. Valves shall pass a seat test at a pressure of 200 psi without leakage. The valve shell shall pass a shell test with the valve in the open position at a pressure

of 400 psi without leakage through metal, flanged joints or stem seals. Additionally, the valves shall conform to one of the following:

(1) AWWA C509 valves having a sealing mechanism that provides zero leakage at the water working pressure against line flow from either direction. No exposed metal seams, edges, screws, etc. shall be within the waterway in the closed position (all surfaces shall be rubber covered). The rubber covered gate shall not be wedged in a pocket nor slide across the seating surface to obtain tight closure. All internal and external ferrous surfaces, including the interior of the gate, bolt holes and flange faces, shall be coated, prior to assembly of the valve, with epoxy having a minimum thickness of 8 mils. There shall be an O-ring seal above the stem collar and an O-ring seal below the stem collar with the area between the O-ring seals filled with lubricant. There shall be anti-friction washers at the stem collar.

(2) Ductile Iron Gate Valves: Gate valves shall be manufactured in accordance with the applicable provisions of ANSI/AWWA C509. All ferrous parts of the valve shall be made of ductile iron, ASTM A 536, minimum of 65,000 psi tensile strength. Bonnet and body metal thickness shall exceed the minimum thickness permitted by ANSI/AWWA C 1531 A21.53-88. External bonnet and bonnet cover bolting shall be hex head bolt and nut type per ASTM A307.

External and internal surfaces of the valve body and bonnet shall have a fusion bonded epoxy coating complying with ANSI/AWWA C550, applied before assembly.

The valve shall be provided with two (2) O-rings above and one (1) O-ring below the thrust collar. O-rings above the thrust collar shall be replaceable without removing the stem. To minimize operating torque, thrust washers shall be used above and below the thrust collar. The valve shall have a non-rising stem, left hand opening (counter clockwise).

The seating mechanism shall be a one-piece wedge design. The single ductile iron wedge shall be encapsulated with a bonded-in-place Nitrile elastomer covering or approved equivalent. Minimum thickness of the rubber seating area shall be 114 inch. The wedge shall be symmetrical and be capable of sealing with flow in either direction and equal torque. The valve shall be designed so that no exposed metal seams, edges, or screws are within the waterway when the valve is in the closed position. The wedge shall engage the stem by use of a stem nut independent of the wedge. The stem shall be in full compliance with Section 4.7 of ANSI/AWWA C509, latest revision, and be removable without removing the valve bonnet. The waterway shall be smooth, with no bottom recesses.

The valve shall be available with various ends designed for connection to piping specified. Flanged joints shall be in compliance with ANSI B16.1 and ANSI/AWWA C110/A21.10. Mechanical joints and push-on joints shall be in compliance with ANSI/AWWA C153/A21.53.

Proof of design and production testing shall be provided in accordance with Section 6 of ANSI/AWWA C509 modified for a rated working

pressure of 250 psi. A notarized certificate confirming testing shall be furnished upon request by purchaser.

Manufacturer shall, at the request of purchaser, demonstrate evidence of mathematical analysis verifying design.

b) Butterfly valves shall conform to AWWA C 504 for Class ISOB. Valve bodies shall be of the short body design with 125 pound flanged ends faced and drilled per ANSI B16.1 standard for cast iron flanges. Mechanical joint ends shall meet the requirements of AWWA C110/AMSI A21.11. Discs shall be offset to provide an uninterrupted 360-degree seating edge and shall be cast iron per ASTM A 48, Class 40 or ductile iron per ASTM A 536. The disc shall be securely attached to the valve shaft using Type 304 stainless steel pins. The valve shaft shall be Type 304 stainless steel. The seal shall be acrylonitrile butadiene and shall be bonded or vulcanized in the valve body. The use of fillers to increase seat compression is not acceptable. Valve shaft seals for 3" to 24" valves shall be of self-compensating V-type packing. Unless otherwise specified, exterior cast iron or steel surfaces of each valve shall be shop painted per the latest revision of AWWA C 504. The interior of the body shall be lined with the same material as the seat. Each valve shall be factory tested per AWWA C 504 with the actuator assembled to the valve.

c) Levers with ten positions shall be installed where specified for 3" to 8" valves. Provision must be made for locking in any position using a standard padlock. Valves 3" to 24" shall have handwheel actuators in complete conformance with AWWA C504 and AWWA C540. Housings will be of cast iron, in both weatherproof and buriable constructions, with optional chainwheel or 2" square nut inputs. All units shall have adjustable open and closed position stops. Pneumatic and hydraulic cylinder actuators, where specified, shall be double acting and stationary mounted, with all working parts totally protected within weatherproof enclosures per AWWA C540. Cylinder tubes shall be fiberglass reinforced epoxy resin having a 16 mircro-inch or smoother internal finish. Piston seals shall be TFE with elastomeric backup. Cylinder actuators shall be installed where specified with pneumatic or electronic positioners and position transmitters, pilot valves, position indicating switches, and extended mounting provisions.

213.04 Service lines shall be:

a) Oil Creek, Endot, Driscopipe; or Silverline HDPE AWWA C901, SDR0; minimum 1.0" 200 psi.

b) Water line pipe material. (See Section 213.01)

213.05 Corporation stops shall be equivalent to Ford F1000-4-Q.

213.06 Curb stops shall be Ford B44-44Q or equivalent with boxes equivalent to Size 94E. A 6 foot 4" x 4" pole shall be placed next to the curb box extending 3 feet above the ground. The pole shall be painted blue.

213.07 Tapping sleeves shall be stainless steel designed for use on the class of pipe being tapped. Sleeves shall be Ford FTSS. Mueller H-304 or approved equivalent. The tapping valve shall be Clow, Mueller or approved equivalent with one side flanged and the other side mechanical joint meeting the requirements of Section 213.01.

213.08 Tapping saddles shall be Ford Style 2-bolt FS303 or equivalent for 1-inch services to 2-Inch services. Consult City of Pataskala for specifications for larger size taps.

213.09 All joints, fittings, valves, and appurtenances shall be furnished with all accessories.

213.10 Backflow Prevention devices shall be provided on all new water services and conform to the following, including the Utility Department's Backflow Prevention Policy:

a) All new water services in the City shall be equipped with an approved Backflow Prevention Device.

b) Two types of Backflow Preventors are acceptable:
   a. Reduced Pressure Principal (RPZ) and Double Check Valve (DCA). All industrial services must have a RPZ.

   b. All Backflow Preventors shall be approved by the Ohio Environmental Protection Agency (OEPA).

214 STEEL CASING PIPE: The steel casing pipe shall be steel pipe meeting ASTM Specifications 35,000 PSI (242 mpa) yield strength and 60,000 PSI (415 mpa) tensile strength, or approved equal, to serve as a casing for the water main and shall be installed within the limits and at the location shown on the plans. The casing pipe shall be galvanized with a minimum of two (2) ounces per square foot (620 g/m2) and conform to ASTM A-120. Steel casing pipe shall have a minimum wall thickness of 0.38 inches (9.6mm) unless otherwise approved by the Engineer.

215. FIRE HYDRANTS: All hydrants shall be American Darling, alternatives may be requested and reviewed for approval at the discretion of the Utility Director. Operating nuts and threads must meet the requirements of the Local Fire Department. All Bonnet bolts need to be stainless steel, all new fire hydrants will require Storz Type Adapter, or equivalent for steamer nozzle.

CITY OF PATASKALA

CONSTRUCTION AND MATERIAL SPECIFICATIONS

CHAPTER III

GENERAL CONSTRUCTION REQUIREMENTS

300 GENERAL: The work completed in accordance with the provision of this Chaper are also governed by the provision of Chapter I of these Specifications.

301 SITE CLEARING: this work shall include furnishing all labor, equipment, materials, and miscellaneous work necessary to fully and completely clear, grub, scalp, and remove vegetation, existing trees, stumps, root, fences, sewers, pipes, structures, and other underground or surface obstructions; except for such items as are to remain, all as shown on the Construction Drawings and described herein as necessary to properly prepare the site for the construction and installation work.

301.01 Reference Specifications: The work shall be performed and measured in accordance with Items 201 and 202 ODOTCMS.

302 EARTHWORK:

302.01 Excavation and Embankment: The excavation and embankment for the work site, including subgrade preparation, shall be as described in Item 203 ODOTCMS.

302.02 Topsoil: Furnishing, stockpiling, and placing topsoil shall be as described in Items 651, 652, and 653 ODOTCMS. The topsoil shall be stripped to the depth shown on the Construction Drawings or as described by City of Pataskala over the entire site unless shown otherwise on the Construction Drawings Erosion and Sediment Control measures described in Section 302.03 of these Specifications and shown on the Construction Drawings shall be installed and maintained as long as the stockpiles exist and until the areas have sufficient vegetation or improvements to remove the necessity of maintaining the erosion and sediment control measure.

302.03 Soil Erosion and Sendiment Control: The work shall be as described in Item 207, ODOTCMS, and as shown on the Construction Drawings.

303 SITE DRAINING: This work shall include the construction of storm sewers, culverts, paved gutters, inlets, end walls, and slope and channel protection as shown on the Construction Drawings in accordance with:

303.01 Item 601 ODOTCMS for slope and channel protection.

303.02 Item 602 ODOTCMS for masonry items.

303.03 Item 603 ODOTCMS for pipe culverts, storm sewers, and drains.

303.04 Item 604 ODOTCMS for manholes, catch basins, inlets, and similar structures.

303.05 Item 605 ODOTCMS for underdrains.

304 GENERAL REQUIREMENTS, UNDERGROUND CONDUITS: This section describes the general work required for furnishing and installing underground conduits, site drainage, and the associated equipment, material and labor necessary to provide complete and usable storm sewers, sanitary sewers, force mains, piping and water lines.

304.01 Trench Excavation: Except as stated in Section 304.071 (b) of these Specifications, or unless shown otherwise in the Construction Drawings, trenches shall be excavated vertical to a width at least eight (8) inches wider than the conduit exterior diameter, but less than two (2) feet wider than the conduit exterior diameter, to a point twelve (12) inches above the top of the conduit. When a trench box or other shoring methods are used the trench width may be widened to provide room for the trench box or shoring equipment.

304.02 Unsuitable Material: The foundation for the conduit bed shall be firm for its full length. Where unsuitable material is encountered it shall be removed to the depth directed by City of Pataskala and for a width on each side equal to the diameter or span of the conduit and replaced with Type A or Type B backfill as defined in Section 304.08 of these Specifications. Rock or boulders encountered at the conduit bed shall be removed at least four (4) inches below the bottom of the conduit and replaced with granular material.

304.03 Conduit in Embankment: When a conduit is to be placed within an embankment or the top of the conduit is above the existing ground, the embankment shall be constructed to a point at least two (2) feet above the top of the conduit, in accordance with the requirements of Item 203 ODOTCMS, before trenching for the conduit.

304.04 Excess Excavation: Unless otherwise stated on the construction drawings, the Contractor shall dispose of all excess excavation at his own expense.

304.05 Blasting Procedures: When it is necessary to resort to blasting with explosives, the Contractor shall use the highest degree of care and adequate protective measures so as not to endanger life, completed portions of the Project, and all other property, both public and private. Before conducting any blasting operations, the Contractor shall furnish City of Pataskala prior written notification of any changes in such schedule. The responsibility of the Contractor with respect to the use of explosives in blasting includes compliance with all laws, rules and regulations of the federal, state and local agencies, and the insurer, which govern the storage, use, manufacturing, sale, handling, transportation, and other dispositions of explosives. The Contractor's operations shall be conducted with every precaution by trained, reliable personnel under satisfactory, experienced supervision. No blast shall be fired until all persons in the vicinity have had notice and reached positions out of danger. The Contractor shall be responsible for any and all damages, resulting from the use of explosives. All firing shall be done by electric means only, and the Contractor shall make suitable provisions to prevent the scattering of broken rock, earth, stones, or other material during blasting operations.

304.51 All blasting operations shall be covered by public liability and property damage insurance.

304.52 Except in the case of continuous tunnel operations, all blasting shall be limited to specified daylight hours.

304.06 Removal of Water: The Contractor shall, at all times during construction, provide proper and satisfactory means and devices for the removal of all water entering the excavations and shall remove all such water as fast as it may collect in such a manner as shall not interfere with the prosecution of the work or the proper placing of masonry or other work. The Contractor shall not dispose of ground and/or surface water into newly constructed or existing water lines or sanitary sewers. The Contractor shall, at the end of each day, place a watertight plug or cap at the end of the last joint to prevent water and/or materials from entering into the system. The plug or cap shall not be removed until the excavation is dewatered.

304.07 Bedding: All conduits shall be laid on bedding as described in these Specifications and shown on the Construction Drawings. Unless otherwise shown, bedding shall be Class B. The bedding classifications are as follows:

304.071 Class A bedding shall be Class C concrete, plain or reinforced, as specified on the Construction Drawings and meeting the following minimum requirements:

a) The concrete shall extend from the bottom of the trench, which shall be no less than six (6) inches below the bottom of the conduit, to the springline of the conduit.
b) The concrete shall extend to the full width of the trench which shall be a minimum of four (4) inches horizontally beyond the outside diameter on each side of the conduit or have a minimum overall width centered on the conduit of one and one quarter times its outside diameter, whichever is greater.

304.072 Class B bedding shall be granular material ODOT 57, Limestone ¾" crushed or round aggregate, extending from a point four (4) inches below the bottom of the conduit.

304.073 Class C bedding shall be the natural undisturbed soil free from stones, topsoil, vegetation, debris, rubbish, peat or frozen material and shaped to fit the pipe with recesses shaped to receive the bell.

304.074 When the trench is excavated below the proposed grade, the excess depth shall be filled with Class A or B bedding material. When Class B or C bedding is permitted, Class B bedding shall be used in the areas of undercuts.

304.08 Backfill: All trenches and excavations shall be backfilled as specified herein as soon after the sewers, water line or other structures are completed and the particular type of construction and the circumstances will permit.

304.081 The type of backfill shall be:

a) Type A: Granular material; ODOT 57 Limestone, ¾" round washed gravel and 304 for granular material over places ¾" material.

b) Type B: Natural soil free from stones larger than two (2) inches across their greatest dimension, topsoil, vegetation, debris, rubbish or frozen material.

c) Type C: Natural soil free from stones larger than six (6) inches across their greatest dimension, vegetation, debris, rubbish or frozen material. When approved by City of Pataskala, stones no larger than one (1) cubic foot may be deposited at least three (3) feet above the top of the pipe; City of Pataskala approval granted only when ¾" of gravel cover is used over the top of the pipe.

304.082 Unless the type of backfill is specified herein or on the construction drawings as either Type A backfill or Type C backfill, or unless otherwise ordered by City of Pataskala, it shall be understood to mean that Type B backfill shall be used, whether actually specified on the Construction Drawings or not.

304.083 The backfill under and/or within five (5) feet of existing or proposed roadways, paved shoulders, curbs, existing parking areas and drives shall be Type A.

304.084 When Class A bedding or concrete encasement is used, the trench or excavation shall not be backfilled for at least twenty-four (24) hours after placing the concrete, except that the conduit may be covered to a depth not to exceed twelve (12) inches in order to afford protection. The method employed in depositing the backfill shall be such as to prevent damage to the concrete bedding, encasement, sewer or other structures.

304.085 All backfilling operations and placement of the backfill material shall be conducted so as to protect the conduit, its appurtenances and structures from damage. Equipment, which will cause the trench loads to exceed the pipe strength, shall be kept at least five (5) feet away from the trench.

304.086 When Class B bedding is required, for flexible conduit the Contractor shall fill the trench from the top of the previously placed Class B bedding to a horizontal plane twelve (12) inches above the top of the conduit with Type A backfill material, regardless of the backfill requirements for the remainder of the trench.

304.087 When Type A backfill is called for, the material shall be placed and compacted so as to obtain ninety-eight (98) percent of its maximum laboratory dry weight. When Type B backfill is called for, the backfill shall be carefully selected, carefully placed and compacted to ninety-six (96) percent of its maximum laboratory dry weight in accordance with Item 203 ODOTCMS. When Type C backfill is permitted, the backfill shall be carefully placed and compacted to nine-two (92) percent of its maximum laboratory dry weight in accordance with Item 203 ODOTCMS. Compaction tests shall be provided by the Contractor as requested by City of Pataskala to verify backfill compaction complies with City of Pataskala's requirements. The Contractor shall bear all costs for this work.

304.088 Regardless of the backfill method used or testing results obtained, the Contractor shall be responsible to correct any settlement or deterioration of the backfill and restore the area.

304.089 Concrete structures built in place shall not be backfilled until permitted by City of Pataskala.

304.09 Concrete Encasement: The Contractor shall provide and place Class C concrete from the bottom of the trench, which shall be no less than six (6) inches below the bottom of the conduit to the top of the conduit.

304.10 Tunneling, Boring and Jacking: This work shall include the furnishing of all labor, equipment and material necessary to install tunnels, boring and jacking as shown on the plans. Work includes all clearing and grubbing; removal and restoration of fences, sidewalks, pavements and other property; excavation; grouting and pumping sand or other granular material inside and outside the tunnel or bore as described herein; providing all liner plates, steel pipe or conduit, grout, sand or granular material; providing and removing all dewatering and pumping systems; all shoring, cribbing and sheathing; testing; and any other work required to provide a complete, usable tunnel, bore or jacking of pipe, conduit or sleeves.

304.101 All work within the right-of-way of private companies and public agencies shall confirm to the requirements and regulations of the respective companies or agencies. The Contractor shall obtain permits for any railroad or local, state or federal highway crossing, shall coordinate scheduling of construction of such crossings with railroads and highway departments, and shall pay any charges established by those companies or agencies. Special construction requirements defined by railroads or highway departments shall be adhered to by the Contractor.

304.102 Tunnel liners shall conform to Section 211 of these Specifications. In excavating the tunnel, care shall be exercised to trim the surface of the excavated section to a true line and grade with the excavation conforming to the outside of the tunnel plates as nearly as possible. In the installation of the tunnel or shaft liner, the length of unsupported tunnel or shaft shall be no greater than one and one-half (1 ½) times the laying length of a liner plate or pipe. Liners shall be placed as promptly as excavation permits. Upon the completion of any ring of liner plates, bolts shall be retightened in the two rings previously completed. Should the top half of the tunnel excavation be supported by cutting shield, excavation shall not advance beyond this support. The vertical face of the excavation shall be supported as necessary to prevent sloughing and interruptions to the tunneling operations.

304.103 Installation of steel casing pipe or conduit by the boring method shall be done using an auger type boring machine or a machine of such a design as to meet the individual requirements of the railroad or the local, state or federal highway system being crossed. The Contractor shall provide an approach pit, completely sheathed and of sufficient size to accommodate the lengths of conduit and the operation of the boring equipment. The operation of the boring equipment shall be subject to continuous checking by the Contractor to insure proper alignment of the casing pipe.

304.104 The Contractor shall provide an approach pit for the jacking operation, excavated so that the jacking face is a minimum of three (3) feet above the conduit. This open face will be shored securely to prevent displacement of the embankment. The pit shall include a backstop of sufficient size to take the thrust of the jack. Care shall be exercised in placing the guide rails to insure that the conduit will be accurately constructed to line and grade. The entire approach pit shall be sheathed. Hydraulic or mechanical jacks may be used in this operation. The number and capacity of the jacks shall be adequate to complete the operation. A jacking head shall be used to transfer the pressure from the

jacks and the jacking frame to the pipe. If an auger is used, the pipe shall be jacked simultaneously with the augering. The Contractor shall check the construction work at frequent intervals to insure proper line and grade of the installation.

304.105 Any space existing outside the tunnel liner shall be grouted at low pressure through holes provided in a sufficient quantity in the liner. The pressure grouting shall preferably begin at the lowest middle hole of each grout section, the grout holes above being open, and proceed upward progressively and simultaneously on both sides of the tunnel. Grouting shall be done as near the end of the liner as practicable and, if deemed necessary, grout stops shall be placed behind the sections at or near the end of the erected lining to permit grouting to or near the end. Unless shown otherwise on the Construction plans, the space between the conduit and the liner will be filled with clean sand conforming to item 703.02 ODOTCMS. An end dam shall be constructed at both ends of the tunnel liner.

304.106 The space between the conduit and the casing pipe shall remain empty of sand or grout. The conduit shall be separated in the casing pipe on spacers. The spacers and end dams shall be as shown on the Standard Construction Drawings.

304.11 Miscellaneous Work: All items of work called for on the Construction Drawings or in these specifications for which no specific method of payment is provided shall be performed by the Contractor and the cost of same shall be included in the price bid for the various related items.

304.12 Field Tile: All field tile and storm sewer broken during excavation shall be replaced by conduit of the same size and with material equal to or better than the original conduit unless otherwise authorized by the City.

304.13 Temporary Pavement Replacement: Temporary pavement replacement shall be provided for all pavement damaged or removed by the Contractor. Temporary pavement shall be installed as soon as the trench has been backfilled. Jefferson Water and Sewer City may require that all materials and equipment incidental to providing the temporary pavement be on the job site prior to removing the existing pavement. Unless otherwise approved by City of Pataskala, the temporary pavement shall consist of two (2) inches of bituminous cold mix, Item 405 ODOTCMS, placed upon six (6) inches of compacted aggregate base, Item 304 ODOTCMS. The Contractor shall maintain temporary pavement until permanent pavement is installed, at no additional cost to City of Pataskala.

304.14 Permanent Pavement Replacement: The pavement shall be replaced by first removing the temporary pavement down to the clean granular material and removing the existing pavement for at least twelve (12) inches beyond the trench limits on each side. The pavement to be removed shall be neatly sawed not more than seventy-two (72) hours prior to the placing of permanent pavement materials. The permanent pavement replacement materials and workmanship shall be at least equivalent to the existing pavement being replaced, as determined by City of Pataskala. After removal of the temporary pavement and sawing of the existing pavement edges and prior to the placing of the permanent pavement, Tack Coat, Item 407 ODOTCMS, shall be applied to the exposed existing pavement edges, and Prime Coat, Item 408 ODOTCMS, shall be applied to the base material.

304.15 Traffic Control: The Contractor shall submit a plan and schedule for detouring traffic fourteen days prior to the closing of any road. Any temporary closing of a road does not relieve the Contractor of the responsibility to provide access to the property by emergency vehicles and the City s.

Where it is anticipated that work will close a road, the Contractor shall inform the agency in control of the right-of-way, the local law enforcement agency, the local fire department, the County Engineer and the City of Pataskala as to the extent, nature, and time of the closing. The Contractor shall post pre-closing notification signs along the road(s) to be closed one week in advance and shall have a notice printed in a local newspaper three days prior to the closing, stating the extent, nature and time of the closing. Adequate lights, signs, flagmen and barricades shall be used as required in Item 614 ODOTCMS to safeguard the traveling public at all times. All trenches shall be backfilled or have steel plates securely fastened during non-working hours. No road shall be closed until the schedule is approved by the City of Pataskala and the agency in control of the right-of-way. No existing traffic flow shall be altered until the Contractor submits in writing a request for approval of the alteration of traffic. The request shall be directed to the City of Pataskala and the agency in control of the right-of-way. Approval shall be considered only when received in writing.

304.16 Restoration of Surfaces: All surfaces, including grass or lawn, pavement, sidewalk, curbing, and other surfaces disturbed or destroyed during and as a result of the construction shall be replaced by the Contractor as specified herein.

304.161 The Contractor shall, before starting trench excavation, remove the top soil to a depth shown on the Construction Drawings or six inches, whichever is greater within the limits to be excavated and store the top soil separate from other soil as described in Section 302 of these Specifications. If necessary, he/she shall acquire additional area to provide for such separate storage of topsoil.

304.162 After the completion of conduit construction and basic trench backfill, the Contractor shall replace and redistribute top soil in the affected areas to a depth of six inches, shall make due allowance where embankment is required and shall re-excavate the basic trench backfill where necessary to allow for the top soil fill. Unless otherwise provided, the Contractor shall perform restoration of surfaces as the work progresses and will be directed to cease excavation and the laying of conduit until such restoration is accomplished. After topsoil is replaced, any settlement below the original ground surface occurring within the guarantee period shall be refilled with topsoil equivalent to the original material. The Soil Erosion and Sediment Control requirements of Section 302.03 of these Specifications shall be followed throughout the restoration process.

304.163 All sod replacement, seeding and plantings work shall be performed as required and in accordance with Section 310 of these Specifications.

304.164 All pavement damaged or removed during construction shall be replaced per the Construction Drawings and the requirements of these Specifications.

304.165 All sidewalks damaged or removed during construction shall be replaced in kind.

304.166 All curbs damaged or removed during construction shall be replaced in kind.

304.167 Any other surfaces or property damaged or removed during construction shall be replaced in kind.

304.17 Directional Bore: Water line and Sewer Force Main may be directional bored with approval from the City of Pataskala. Approval of material and installation technique must be obtained prior to the beginning of construction. The City of Pataskala may approve or disapprove any proposed directional boring at its discretion. Any damage created by the directional bore shall be repaired by the directional bore contractor. Only High Density Polyethylene shall be used for directional bores; other materials must have prior City of Pataskala approval before installation.

304.18 Service Free Bore: Sanitary Sewer Services may be free bored with approval from the City of Pataskala. The City of Pataskala may approve or disapprove any directional bore at its discretion.

305 SANITARY SEWER INSTALLATION: This section describes the work required to install sanitary sewers, force mains, including the pipe, fittings, valves, manholes, and structures. The work includes all clearing and grubbing; removal and restoration of fences, sidewalks, pavements, and other property; trenching; bedding and backfill, construction; providing and removing all dewatering and pumping systems; all shoring, cribbing and sheathing; testing; and any other work associated with installing complete, usable conduits, including tees, wyes, manholes, and structures. The requirements stated in this chapter are in addition to those stated in Chapter I and Section 304, whether or not a specific section is referenced herein.

305.01 Materials: The sanitary sewer line, force mains, and associated materials and equipment shall be shown on the construction drawings and specified in Chapter 11 of these specifications as follows:

305.011	Sewer Pipe	Section 208 (Page 12)
305.012	Manholes	Section 209 (Page 13)
305.013	Sewer Pressure Pipe	Section 210 (Page 13)
305.014	Tunnel Liners	Section 211 (Page 14)
305.015	Steel Casing Pipe	Section 212 (Page 14)

305.02 Trench Excavation: Trenches shall be excavated in accordance with Section 304.01 of these specifications.

305.03 Bedding and Cover: Bedding and Cover shall be placed in accordance with Section of these specifications; bedding will be minimum 4.0” under and cover will be minimum of 12.0” over the pipe.

305.04 Laying Conduit: Except where otherwise directed by the City of Pataskala, the conduit shall be laid starting at the lowest point with the bell or groove end laid upgrade. The bottom segment of the conduit shall be in contract with the shaped bedding throughout its full length. All conduit shall be laid with ends abutting and true to line and grade. Line and grade for sanitary sewer conduit shall be established by the Contractor using batter boards, laser beam or other approved methods. Any method used shall provide a means to periodically check the accuracy of the method being used.

305.041 The method of joining conduit sections shall be such that the ends are fully entered and sealed. The inner surfaces shall be reasonably flush

and even with all possible care being used when joining the conduit to insure that the conduit ends are clean. Gaskets shall be installed in accordance with the manufacturer's recommendations. All connections with structures shall be made watertight, using an approved flexible watertight joint.

305.042 Concrete blocking, supports and buttresses shall be provided at all tees, bends, valves and at any other location shown on the construction drawings or directed by the City of Pataskala. These concrete structures shall be Class C concrete per Section 205 of these Specifications and shall be built to the lines, grades and dimensions shown on the Construction Drawings.

305.043 During any construction where the outside temperature is below forty (40) degrees Fahrenheit all rubber gaskets and lubricants shall be kept in an area heated to at least forty (40) degrees Fahrenheit until needed. No gasket or lubricant shall be out of the heated area more than five (5) minutes before being placed in the bell or on the spigot of the pipe. The Contractor shall lubricate all joints according to the manufacturer's recommendations.

305.044 The Contractor shall furnish and install, prior to testing, all fittings, air release valves, wyes and service taps in the number and sizes shown on the construction drawings, or at locations selected by the Engineer. All appurtenances are to be furnished and installed by the Contractor.

305.045 The Contractor, in connection with the laying of the sewer line, shall furnish and install all valves as shown or as directed by the City of Pataskala. Valves will be provided with mechanical joint ends, unless otherwise shown or approved by the City of Pataskala. The Contractor shall furnish and lay any special casting necessary to make the valve installation as shown on the construction drawings.

305.046 The Contractor shall furnish and lay all closure pieces, special bends and fittings necessary for construction of the pipe along the route shown by the construction drawings.

305.05 Backfill: All trenches and excavations shall be backfilled in accordance with Section 304.08 of these specifications. Metallic detectable underground marking tape shall be installed above all sewer force mains.

305.06 Trench Dams: Trench dams shall consist of predominately clay soil or a mixture of predominately clay soil and bentonite. Trench dams are to be constructed on all sanitary sewer gravity main lines at intervals not to exceed four hundred (400) feet and shall be located approximately twenty-five (25) feet upstream of manholes, lift stations and other structures. Trench dams shall also be located twenty-five (25) feet downstream of storm ditch crossings or underground water sources, or as directed by the City of Pataskala. Trench dams shall not be installed at wyes, risers, laterals, utility crossings, or pavement crossings, or in granular backfill areas. The minimum length of an individual trench dam shall be five (5) feet. The width shall extend fully from the excavated trench wall to the opposite excavated trench wall. The height of trench dams shall extend from the excavated trench bottom t within two (2) feet of the existing ground surface.

305.061 Trench bottoms within the proposed trench dam area may be excavated by machine to the proposed pipe spring line. The area shall then be carefully excavated by hand or similar means so as to accommodate and

properly support the pipe without the use of bedding aggregate and properly support the pipe with a predominately clay material.

305.062 The area above the installed pipe shall be backfilled with clay and/or bentonite materials. The placement and compaction of the backfill shall be in accordance with Item 203 ODOTCMS. The method of installation shall also conform to the pipe manufacturer's published recommendations.

305.063 Deviations from any of the above listed requirements shall not be allowed without a written request from the Contractor and consequent written approval by the City of Pataskala. The cost for this work shall be included in the price bid for other various related items.

305.064 Trench dams shall also be provided immediately upstream of the mainline sewer on all service connections at the time of the construction of the service connection.

305.07 Manholes and Special Structures:

305.071 Construction for the item specified shall conform to the Construction Drawings and be placed at the locations and elevations shown or ordered except that the height of any unit may be changed to meet finished grade.

Adequate precautions shall be taken to prevent concrete or mortar from freezing. Brick, concrete block, etc., having a temperature of forty (40) degrees Fahrenheit or less shall not be set with mortar until heated for a period of sufficient to insure a temperature of fifty (50) degrees Fahrenheit to eighty (80) degrees Fahrenheit throughout the entire mass of the material.

Iron frames, taps and covers shall be of the type and set as called for on the construction drawings or standard drawings. Special care shall be exercised to prevent the entrance of earth or debris into the pipe lines connecting with the manhole or special structure. All such earth or debris resulting from the construction operations shall be removed.

305.072 Manholes shall conform to Section 209 of these Specifications. The precast bottoms and sections shall be provided with lifting lugs and reinforced for handling. Bottoms shall be set so as to have a uniform bearing on at least four (4) inches of granular material as shown on Table No. 703-1 ODOTCMS, No. 67 aggregate. The invert channel shall be the true shape of the lower half of the sewer conduit. The sewer shall be connected to the manhole with a flexible watertight joint of approved manufacturer using a rubber sleeve with stainless steel banding or a rubber gasket that seals through compression or expansion. All manholes placed in a subdivision being developed shall be supplied with 4" x 4" long Marking Post. Post shall be three (3) feet above grade, be made of lumber, and be painted green. All end of service locations and manholes shall have 4" x 4" wye poles. Also all manholes will use con-seal on all joints on assembly.

305.073 Concrete structures poured in place or constructed of brick or masonry units shall be constructed in accordance with Item 604 ODOTCMS.

305.074 Excavation shall be such that ample room for construction is provided and shall include the removal of any obstruction, which is necessary to provide ample room.

305.075 The backfilling shall follow the completion of the work as closely as the type of construction will permit. The backfill material for all manholes *and* structures shall be Type A backfill in accordance with Section 304.081 of these Specifications.

305.08 Force Main Testing: A hydrostatic test shall be pe4rformed in accordance with Section 306.07 of these specifications as required in applicable sections of AWWA C600 shall be applied to the whole or to individually isolated sections of the force main either before or after the trench is backfilled. The pressure during the test shall be maintained at one hundred and fifty (150) psi or one and a half (1 ½) times the working pressure, whichever is greater, in any section being tested. The duration of each pressure test shall be at least two (2) hours. The Contractor shall furnish all gauges, materials make all taps required and furnish a pump, piping, all other equipment and all assistance necessary for conducting the tests. Before applying the specified pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made by the Contractor at points of highest elevation or as required. Taps shall be of the sizes as shown on the construction drawings or as directed by the City of Pataskala.

305.081 Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within five (5) psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. No pipe installation will be accepted until this leakage evaluated on a pressure basis of one hundred and fifty (150) psi is less than 1.99 U.S. gallons per hour per one hundred joints of twelve inch nominal diameter pipe and correspondingly varied for other sizes of pipe as provided in the AWWA Specifications.

305.082 Any testing performed against existing valves shall be at the Contractor's risk and in strict compliance with the requirement of the City of Pataskala. If unable to achieve the required test results the Contractor shall disconnect from the existing valve, plug the line and retest until satisfactory results are obtained. Any damage caused to existing facilities shall be repaired at the Contractor's expense.

305.09 Sewer Testing: The Contractor shall furnish all labor, equipment, and materials, which are required to test the sections of the sanitary sewer conduit and manholes for tightness. The Contractor shall perform the air/vacuum test unless infiltration or exfiltration testing is approved by the City of Pataskala, prior to the beginning of the construction of the sewer to be tested by an infiltration or exfiltration test. All tests shall be conducted in the presence of the City of Pataskala. The tests for leakage shall include all portions of the sanitary sewer system, including manholes and service lines that are installed by the Contractor. The sewer shall be tested in sections, each section extending between two (2) consecutive manholes or from the end of the sewer to the nearest manhole. No test shall be performed until the sewer line has been backfilled for at least sixty (60) days.

305.091 When using the air test the inlet end of the upstream and downstream manhole shall be closed with an airtight bulkhead. The sewer shall then be put under pressure to 3.5 psig. The minimum time requirements for the 0.5 psig pressure drop from 3.5 psig to 3.0 psig shall not be less than the following:

Pipe Size (inches)	Time
4	1 mm. 53 sec.
6	2 mm. 51 sec.
8	5 mm. 04 sec.
10	7 mm. 54 sec.
12	11 mm. 24 sec.
15	17 mm. 48 sec.
18	25 mm. 38 sec.
21	34 mm. 54 sec.
24	45 mm. 35 sec.
27	57 mm. 42 sec.

An air pressure correction is required when the prevailing ground water is above the sewer line being tested. Under this condition, the air test pressure must be increased 0.5 psig for each foot the ground water level is above the invert of the pipe.

305.092 All manholes shall be vacuum tested in accordance with ASTM C 1244-93. The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.

A vacuum of ten (10) inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop one (1) inch.

The manhole shall pass if the time for the vacuum reading to drop from ten (10) inches of mercury to nine (9) inches of mercury meets or exceeds the values indicated in the following table.

If the manhole fails the initial test, necessary repairs shall be made by an approved method. The manhole shall then be re-tested until a satisfactory test result is obtained.

Minimum Test Times for Various Manhole Diameters Diameter (Inches)									
Depth (Feet)	**30**	**33**	**36**	**42**	**48**	**54**	**60**	**66**	**72**
Time (Seconds)									
8	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	34	41	46	51	57
16	22	24	28	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	58	65	72	81
22	31	33	38	46	55	64	72	79	89
24	33	36	42	51	59	70	78	87	97
26	36	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

305.093 When PVC pipe is used, a deflection test shall be made by pulling through the sewer a rigid ball or mandrel having a diameter equal to ninety-five percent (95%) of the inside diameter of the pipe. The mandrel shall have an odd number of runners, with seven (7) as the minimum number. This test shall be run no sooner than sixty (60) days after the sewer is backfilled.

305.094 Upon receiving approval from the City of Pataskala, the Contractor may use infiltration or exfiltration test. The allowable leakage shall not exceed one hundred (100) gallons per day, per mile of pipe per inch of pipe diameter. No test shall run for less than sixty (60) minutes.

a) If the infiltration test is selected, each section of pipe to be tested shall be covered with not less than two (2) feet of ground water above the top of the pipe at the incoming sewer or sewers in the upper end of the test section shall be securely sealed. The quantity of ground water infiltration into the test section shall be measured and shall not exceed allowable leakage.

b) If the exfiltration test is selected, the inlet end of the upstream and downstream manhole shall be closed with a watertight bulkhead. Then the sewer along with the upstream manhole shall be filled with water until the elevation of the water in the upstream manhole conduit in the section being tested or two feet above the existing ground water in the trench, whichever is the high elevation. The length of the section to be tested shall be filled and maintained full of water for a period of approximately twenty-four (24) hour period, the level shall be raised to the test elevation mark and the test made. The exfiltration amount will be determined by measuring the volume of water required to keep the water level in the upstream manhole at the test elevation mark.

305.095 Sewer services shall be tested in accordance with Section 305.091. The service shall be tested from the Hubsett cleanout under the structure to the last section of pipe before the connection piece. The test shall be performed in front of the Utility Department personnel and the

test plugs removed in their presence. No service shall be accepted until the service lines passed the appropriate test.

305.10 Wye Poles: The Contractor shall furnish and place, as directed, approved wye poles should be 4" x 4" lumber at all wye locations, ends of extended services, or at the end of each riser where risers are required. The wye poles shall extend above the ground at least three (3) feet. In addition, the Contractor shall anchor a section of rebar, eighteen (18) inches in length, to the wye pole for detection. The rebar shall be installed vertically in such a manner so as to provide six (6) inches of cover over the top. The cost of these poles shall be included in the price bid for the various sewer items. Wye Poles shall be pained Fluorescent Green.

305.11 Risers: Risers, if called for on the construction drawings, shall be placed at the mainline sewer to the lengths specified.

305.12 Service Connections and Lines: The requirements for Chapter III of these Specifications are modified for service connections and lines as follows:

305.121 Service or house connections shall not be connected to the lateral or mainline sewers until full approval of said lateral or mainline sewer has been received.

305.122 The sewer lines shall be PVC as specified in Section 208 of these specifications, with watertight joints and proper fittings for all changes in alignment or grade. Only adapters approved the the City of Pataskala shall be used to change from one pipe material to another in any sewer line. Sewer service lines shall be no less than six (6) inches in diameter and shall be laid at a minimum slope of one-quarter (1/4) per inch per linear foot. The City of Pataskala may, by special permission in each case, authorize the building sewer to be laid at a minimum slope of one-eighth (1/8) inch per linear foot if it is determined to be necessary. The interior of each length of pipe shall be made perfectly clean and free from offsets, fins, and projections before the next length is connected thereto. The City of Pataskala may require that the watertightness of the sewer service line be demonstrated by the testing procedures established in Section 305.09 of these Specifications.

305.123 Existing sewers may be used in connection with new buildings or alterations to existing buildings only when it can be demonstrated that such sewers conform in all respects to the requirements contained herein for new building sewer services. The City of Pataskala may make an exception as to the size of old building sewers provided they are not less than four (4) inches in internal diameter, and otherwise meet the requirements of this section. Sewer service lines constructed parallel to any exterior wall, cellar, basement or cistern shall be at least three (3) feet away. Sewer service lines shall have at least two (2) feet of earth or stone cover.

305.124 All excavation for sewer lines shall be by open cut from the surface. The sides of the trench shall be vertical, using such sheathing and bracing as necessary to accomplish this result. The bottom of the excavation shall be shaped to fit the lower half of the sewer pipe so that the pipe will have uniform bearing. Adequate bell holes shall be excavated at each joint. In the event the trench is excavated below required grade of the pipe, the excess space shall be filled with the stone specified for the Class B

bedding. The width of the trench at the top of the pipe shall not exceed two (2) feet plus the outside diameter of the pipe nor shall the width be less than one (1) foot, plus the outside diameter of the pipe. When unstable, soft or spongy conditions are encountered at the trench bottom, such material shall be removed and replaced with clean, crushed stone sufficient to stabilize the trench bottom to support the pipe to a true line and grade. **Water, gas, telephone, electric or cable lines shall be not laid in the same trench as the building sewer.**

305.125 The building sewer shall be backfilled to an elevation at least twelve (12) inches over the top of the pipe by tamping in finely graded soil or granular material in six (6)-inch layers. Soil containing stones larger than two (2) inches in the greatest dimension shall not be used for this portion of the backfill. The balance of the backfill shall be made in accordance with requirements of Type C backfill, Section 304.08 of these Specifications.

305.126 Connection to existing wye branches shall be made carefully to avoid damage to the bell of the branch or to the lateral sewer. Such damage as may occur shall be repaired as directed by the City of Pataskala. Connections to a sewer at a point where no wye branch has been provided shall be made. After consultation with the City of Pataskala, no exceptions.

305.127 The Contractor shall repair or restore any drains or service lines damaged or disturbed during the construction of the sewer service line.

305.128 Surface water, which collects in basement or foundation excavations, shall NOT be discharged at any time into the sewer service line. If the sewer service line is completed before the plumbing is connected thereto, the integrity of the installed Hub-Sett must be maintained thru all phases of construction in order to prevent surface or ground water from entering the sanitary sewer system.

305.13 Water Connections: No downspouts, surface inlets, foundation drains, sump pumps, or any other source of ground or surface water shall be connected either directly or indirectly to or discharged into any part of the sanitary sewer system.

306 WATER LINE INSTALLATION: This section describes the work required to install water lines including the pipe, valves, fittings, and appurtenances. Work includes all clearing and grubbing; removal and restoration of fences, sidewalks, pavements, and other property; trenching; bedding and backfill; construction; providing and removing all dewatering and pumping systems; all shoring, cribbing and sheathing; testing; and any other work associated with installing complete, usable water lines, including taps, fire hydrants, air releases, and structures. The requirements stated in this section are in addition to those stated in Chapter 1 and Section 304 of these Specifications whether or not a specific section is referenced herein.

306.01 Materials: The water line and associated materials and equipment shall be as shown on the construction drawings and specified in Chapter II of these specifications as follows:

306.11	Water Line Pipe	Section 213 (Page 14)
306.012	Steel Casing Pipe	Section 214 (Page 18)
306.013	Valves	Section 213 (Page 14)

306.014	Waterline Accessories	Section 213 (Page 14)
306.015	Tunnel Liners	Section 211 (Page 14)
306.016	Cement & Concrete	Section 205 (Page 12)

306.02 Trench Excavation: Trenches shall be excavated in accordance with Section 304.01 of these Specifications.

306.03 Bedding: Bedding shall be placed in accordance with Section 304.07 of these Specifications.

306.04 Laying the Conduit: The general location of the water line and fittings are shown on the construction drawings. If unforeseen conditions arise during construction, the horizontal location of the water line may be changed as directed by the City of Pataskala. If it is necessary to change the grade of the water line, it shall be lowered unless specific approval, to raise the water line is given by the City of Pataskala. Unless otherwise shown or approved, the water line is to be installed with a minimum of four (4) feet of cover to the top of the water line from the existing or proposed ground or finished curb grade.

306.041 Concrete blocking, supports and buttresses shall be provided at all tees, bends, valves and at any other location shown on the construction drawings or as directed by the City of Pataskala. These concrete structures shall be Class C concrete per Section 205 of these Specifications and shall be built to the lines, grades and dimensions shown on the Standard Construction Drawings.

306.042 During any construction where the outside temperature is below forty (40) degrees Fahrenheit, all rubber gaskets and lubricants shall be kept in an area heated to at least forty (40) degrees Fahrenheit until needed. No gasket or lubricant shall be out of the heated area more than five (5) minutes before being placed in the bell or on the spigot of the pipe. The Contractor shall lubricate all joints according to the manufacturer's recommendations.

306.043 The Contractor shall furnish and install, prior to testing, all fittings, air release valves and water service taps in the number and sizes shown on the construction drawings or at locations selected by the City of Pataskala. The Contractor shall furnish and lay any special casting necessary to make the valve installation as shown on the construction drawings.

306.044 The Contractor, in connection with the laying of the water lines hall furnish and install all valves as shown or as directed by the City of Pataskala. Valves shall be provided with mechanical joint ends, unless otherwise shown or approved by the City of Pataskala. The Contractor shall furnish and lay any special casting necessary to make the valve installation as shown on the construction drawings.

306.045 The Contractor shall furnish and lay all closure pieces, special bends and fittings necessary for construction of the pipe along the route shown by the construction drawings.

306.05 Backfill: All trenches and excavations shall be backfilled in accordance with Section 304.08 of these specifications.

306.06 Hydrostatic Tests: A hydrostatic test as required in applicable sections of AWWA C600 shall be applied to the whole or to individually isolated sections of the water lines and fire hydrant leads either before or after the trench is backfilled. The pressure during the test shall be maintained at one hundred and fifty (150) psi or one and a half (1 ½) times working pressure, whichever is greater, in any section being tested. The duration of each pressure test shall be at least two (2) hours. The Contractor shall furnish all materials, make all taps required and furnish a pump, piping, all other equipment and all assistance necessary for conducting the tests. Before applying the specified pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made by the Contractor at points of highest elevation or as required. Taps shall be of sizes as shown on the construction drawings or as directed by the City of Pataskala.

306.061 Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within five (5) psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. No pipe installation will be accepted until this leakage (evaluated on a pressure basis of one hundred and fifty (150) psi) is less than 1.99 U.S. gallons per hour per one hundred (100) joints of twelve (12) inch nominal diameter pipe and correspondingly varied for other sizes of pipe as provided in the AWWA Specifications.

306.062 Any testing performed against existing valves shall be at the Contractor's risk and in strict compliance with the requirements of the Engineer. If unable to achieve the required test results, the Contractor shall disconnect from the existing valve, plug the line and retest until satisfactory results are obtained. Any damage caused to existing facilities shall be repaired at the Contractor's expense.

306.07 Disinfection of Potable Water Facilities: The completed potable water facilities shall be disinfected by the Contractor in accordance with the applicable sections of AWWA C651 (water mains, valves and fire hydrants); C652 (storage facilities); C653 (water plants); and C654 (wells). All labor, material, and equipment required for disinfection and testing will be furnished and paid for by the Contractor, including disinfection taps, blow-off taps, tapping valves, sufficient tubing or pipe to extend outside the trench, and an operable valve above ground. Blow-offs will be installed at the end of all runs, one (1) foot from each plug, and at the connection point where connection to a live line is made. After all tests have passed, the Contractor shall remove the blow-off assembly and shall leave the corporation stop in the off position. Bacteria tests shall be taken by the City of Pataskala at locations of the City's choice. Failure of any test will require retesting of the system on supply side of the test location. All costs of tests are the responsibility of the Contractor. The Contractor shall coordinate this work with the City of Pataskala. The time of the testing and section of line or facility to be disinfected shall be approved by the City of Pataskala.

306.08 Valves: Valves larger than two (2) inches shall conform to Section 213.03 of these Specifications. Valves two (2) inches and small shall conform to Sections 213.03 and 213.05 of these Specifications.

306.081 If the top of the operating nut is more than thirty-six (36) inches below the finished grade, an extension stem shall be provided to place the operating wrench nut between twenty-four (24) inches and thirty-six (36)

inches of the finished grade. Cost of extension items shall be included in the unit price bid for the various valve types and sizes.

306.082 Unless otherwise noted on the construction drawings or directed by the City of Pataskala, all valves larger than two (2) inches shall be provided with Standard Valve Boxes. Covers for the boxes shall be marked "WATER". All boxes shall be provided with the necessary extensions to bring the top of the box to the finished grade. All valve boxes shall be installed such that they are centered vertically over the valve operating nut and such that the box provides maximum cover of the operating housing. Boxes that are to be installed in areas subject to vehicular travel shall be the Traffic Type Valve Boxes. All valve boxes shall be as shown on the Standard Construction Drawings.

306.083 Concrete piers or supports shall be provided under all valves per Section 306.051 of these Specifications.

306.084 All valves which affect the flow of water through active lines are to be operated by the City of Pataskala's personnel only.

306.09 Tapping Water Lines, Water Service: Tapping sleeves and saddles shall conform to Sections 213.07 and 213.08 of these Specifications and valves shall conform to Section 213.03 of these specifications except that the inlet joints of the valves shall be designed for the sleeve provided and be designed to permit free passage of the tapping machine cutters.

306.091 For installation of taps larger than two (2) inches the sleeves and valves shall be tested under one hundred and fifty (150) psi water pressure, for a minimum of fifteen (15) minutes after the sleeves and valves are installed, but before any cut is made or any concrete supports or backers installed. When the valves and sleeves show no leaks, the Contractor shall make the cut through the wall of the pipe to be tapped under pressure, and pour the concrete supports and backers as required. All tapping valves shall be provided with Standard Valve Boxes as provided under Section 306.082 of these Specifications unless otherwise specified.

306.092 For a water service two (2) inches or smaller, the control valves and box shall be located one (1) foot from the edge of the proposed sidewalk between the sidewalk and the curb or one (1) foot inside the proposed right-of-way or easement line. In new developments, taps shall be made and the service line laid within the right-of-way and/or under proposed pavement areas after these areas are rough graded, prior to the installation of the proposed pavement. If service line is laid in an open cut, the trench shall be backfilled in accordance with Section 304.08 of these Specifications. Prior to backfilling, all water service taps shall be pressure tested from the water line connection to the control valve and all leaks shall be repaired.

306.093 The control valve may, with the City of Pataskala approval, be the tapping valve for water services larger than two (2) inches, which do not cross under existing or proposed pavement.

306.094 Water service lines and water lines larger than two (2) inches shall be tested, in accordance with Section 306.06 of these Specifications, between the tap and the last valve or between the meter inlet and the

valve on the bypass line. Water service lines two (2) inches and small shall be tested at normal water pressure unless they are installed with the water line in which case they will be tested per Section 306.06 of these specifications. All service lines or water lines shall be disinfected and tested per Section 306.07 of these Specifications.

306.095 No service line shall be less than one (1) inch internal diameter. If necessary to provide adequate supply and pressures, larger size lines may be required by the City of Pataskala.

306.096 When a water service is installed in a right-of-way or easement which has storm drainage ditches, the control valves, including curb stops, shall be located so that the top of the valve box is horizontal and flush or within two (2) inches of surrounding ground and at least one (2) foot above and two (2) feet outside of the one hundred (100) year storm water level. When the valve box top cannot be installed above the one hundred (100) year flood elevation, the City of Pataskala shall direct the Contractor as to the location of the valve.

306.097 All water service lines shall be laid forty-two (42) inches below the ground or pavement surface. No water service line shall be laid in the same trench with a sewer, sewer service, gas, electric, telephone or cable line. All water services to be constructed in or across existing paved roads shall be done by boring or jacking the line under the road unless written permission is given to open cut the paved road from the agency having control of the right-of-way. The jacking procedure used shall not bend or kink the service pipe, nor strain the pipe joints. All long water services should be in one (1) trench, no placement of two (2) lines in same trench is allowed.

306.10 Water Line Cleaning: All water lines, six (6") inches and larger in diameter, installed in the City of Pataskala shall be cleaned with an Aqua-Pig by Girard or approved equal prior to pressure testing the lines. The lines shall be cleaned by a method approved by the City of Pataskala.

307 SITE PIPING: This Work shall include the furnishing of all labor, equipment and materials necessary to install the sanitary piping, water lines, and drain lines, including fittings, valves and appurtenances. Said installation shall conform to the lines, grades and details shown on the Construction Drawings. Work includes all clearing and grubbing unless otherwise shown as a separate item; trenching; installing, operating and removing all dewatering and pumping systems; all shoring, cribbing and sheathing; backfill and bedding; testing; and all other work associated with installing complete and usable piping systems. The requirements stated in this section are in addition to those stated in Chapter 1 and Section 304 of these Specifications, whether or not a specific section is referenced herein. The limits of the site piping shall be from the first pipe joint or connection outside the face of the building, plant, tank or other structure to the boundary lines of the site. Manholes, inlets, end walls, headwalls, and similar structures shall be included with the site piping unless shown as separate pay items. Furnishing and installing through-the-wall piping in tanks, building, or other structures, shall be included in the price of the structure.

307.01 Materials: The site piping shall be of the size and kind shown on the construction drawings and constructed of the materials described in Chapter II of these Specifications.

307.011 Underground Piping:

a)	Gravity Wasterwater	Section 208 (Page 12)
b)	Pressure Wastewater	Section 210 (Page 13)

c) Waterline Section 213 (Page 14) or ASTM D2241, SDR 18, with ductile iron fittings meeting AWWA C153, cement-lined per AWWA C104.

307.012 Manholes Section 209 (Page 13) of these Specifications.

307.013 Valves Section 213 (Page 14).

307.014 Water line accessories Section 213 (Page 14).

307.015 Air Piping Section 213 (Page 14).

307.016 Above-Ground Piping: Notwithstanding the material specified in 307.011 through 307.015, all of the above-ground piping shall be standard weight steel pipe with flanged joints and fittings per AWWA C207 and C208; or flanged ductile iron pipe, Class 350, AWWA CISCO, with cement lining per AWWA C104.

307.02 Underground Construction: Underground construction shall conform to Sections 304, 305 and 306 of these Specifications.

307.03 Testing: Testing shall be in accordance with Section 305.09 for sewers and Section 306.06 for water and air piping.

307.04 Chlorination: The completed potable water facilities shall be disinfected by the Contractor in accordance with Section 306.07.

308 STONE AND PAVED ROADS AND AREAS: Roads and stone areas shall be constructed as shown on the Construction Drawings and in accordance with referenced sections of the ODOTCMS.

309 FENCE: Description: Fence shall be constructed in accordance with Item 607 ODOTCMS. Type CL, except that the fence shall be six (6) feet high. Fencing shall be erected at the location and as shown on the Construction Drawings. Detailed erection drawings shall be submitted on fence material, posts, and gates.

310 SEEDING, SODDING, AND PLANTINGS: This item shall include seeding, sodding, planting and fertilizing all unimproved areas, and planting trees and shrubs as shown on the Construction Drawings or as directed by the Engineer.

310.01 Reference Specifications: The work shall be performed as required and in accordance with the following specifications, except as modified herein:

310.011 Seeding and Mulching – Item 659 ODOTCMS – All areas disturbed during construction shall be restored to their original condition and elevation. These areas shall be seeded and mulched. The Contractor shall provide a seed bed free of stones and other deleterious materials. If the equipment used to prepare the seed bed is not capable of removing the stones or deleterious materials, the Contractor shall hand rake the seed bed. If this does not remove adequate deleterious material from the seed bed, the Contractor shall be required to supplement the seed bed with suitable material to provide the proper seed bed. All areas shall be seeded as per the urban seed mix of Item 659.09 ODOTCMS unless otherwise directed by the City of Pataskala.

310.012 Sodding – Item 660 ODOTCMS.

310.013 Planting Trees and Shrubs – items 661 ODOTCMS.

310.014 Fertilizer – Item 659 ODOTCMS.

311 RESTORATION OF DRAINAGE CONDUITS: The restoration of drainage conduits shall be in accordance with Item 603 ODOTCMS and shall be restored whether directed or not. The replacement material shall be equivalent to or better than the original material. The cost of the removal, disposal and replacement of any damaged conduit shall be included in the unit price bid for various other related items.

312 RESTORATION OF BRICK OR CONCRETE HEADWALLS AND ENDWALLS: All headwalls and endwalls that are damaged or removed shall be constructed in accordance with Item 602 ODOTCMS. The cost of the removal, disposal or restoration of headwalls or endwalls shall be included in the unit price bid for various other related items.

313 FINAL CLEAN-UP: All disturbed areas shall be graded and have all debris removed. All property, pavements, and other surfaces shall be restored to a condition equivalent to that, which existed before the work was started, or as shown on the plans. Pavement and base replacement shall be two (2) feet wider than the trench at subgrade.

314 DEVELOPERS OF PAVED SUB-DIVISIONS: Shall mark lot numbers of all lots with numbers painted on curb in front of each individual lot.

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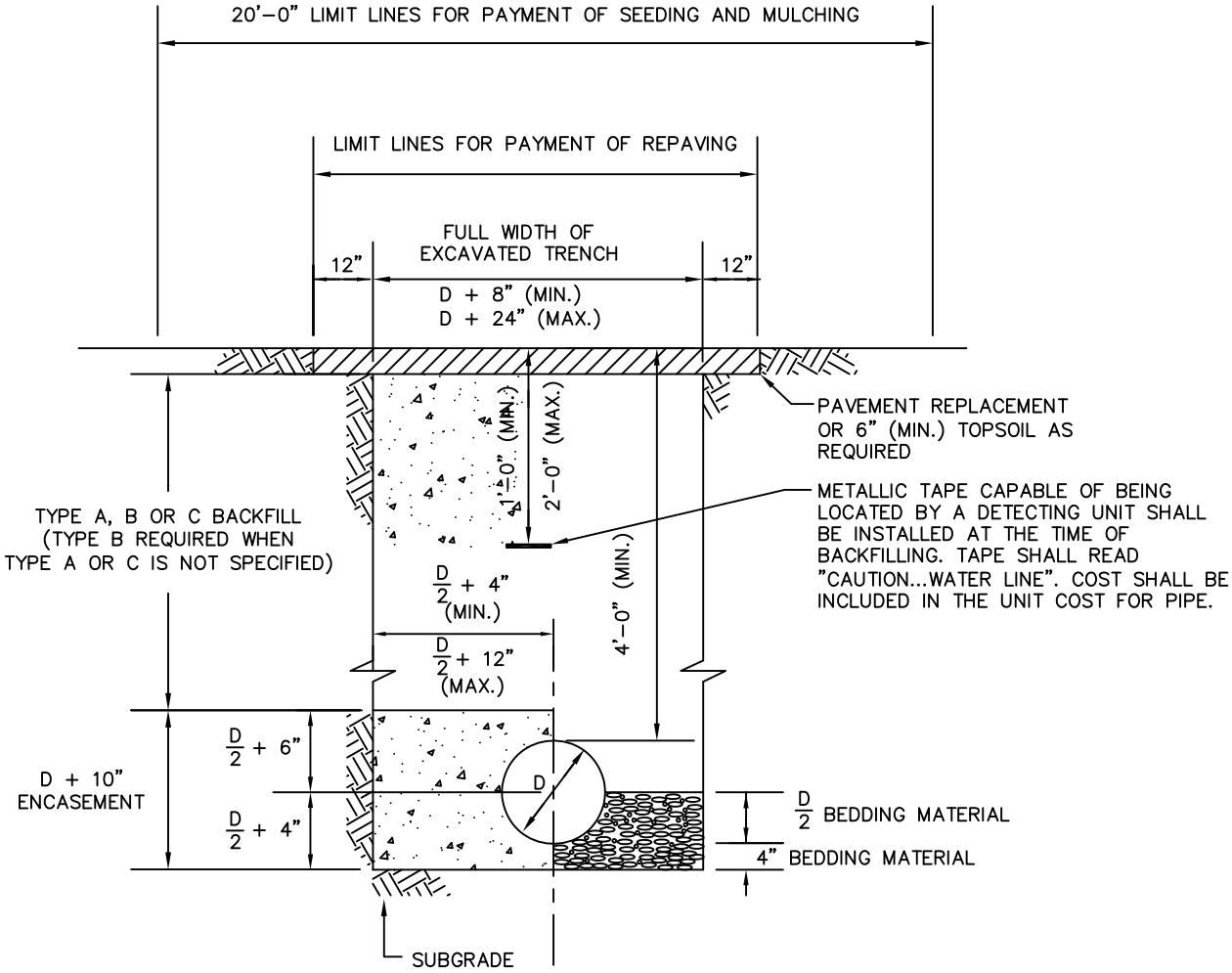
CHAPTER I – WATER STANDARD DRAWINGS



SECTION WITH ENCASEMENT

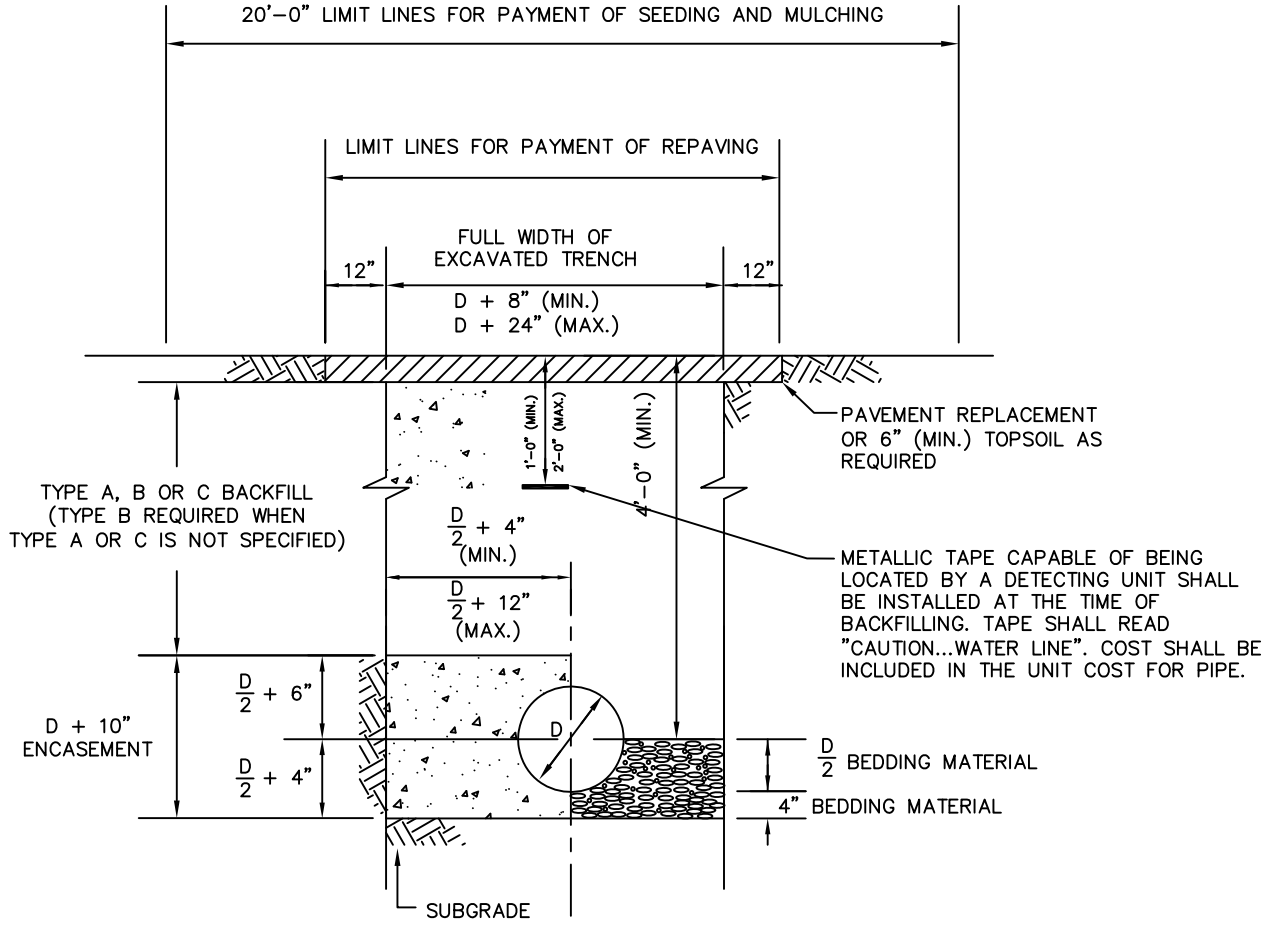
SECTION WITH BEDDING MATERIAL

NOTES:

1. ITEM NUMBERS REFER TO THE STATE OF OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS.
2. AGGREGATE FOR BEDDING SHALL BE NO. 57, ITEM 703.
3. TYPE A BACKFILL SHALL BE GRANULAR MATERIAL ITEM 304, GRADE A. TYPE A BACKFILL SHALL BE USED WHEN THE TRENCH IS 5' OR LESS FROM ANY PAVED OR GRAVEL SURFACE OR BENEATH THE PAVEMENT OR GRAVEL. COMPACTION SHALL MEET THE REQUIREMENTS OF ITEM 203.
4. TYPE B BACKFILL SHALL BE NATURAL SOIL FREE FROM STONES LARGER THAN 2" ACROSS THEIR GREATEST DIMENSION. TOPSOIL, VEGETATION, DEBRIS, RUBBISH OR FROZEN MATERIAL, COMPACTED TO 95% OF IT'S MAXIMUM LABORATORY DRY WEIGHT.
5. TYPE C BACKFILL SHALL BE NATURAL SOIL FREE FROM STONES LARGER THAN 6" ACROSS THEIR GREATEST DIMENSION. VEGETATION, DEBRIS, RUBBISH OR FROZEN MATERIAL, COMPACTED TO 90% OF IT'S MAXIMUM LABORATORY DRY WEIGHT. WHEN APPROVED BY THE ENGINEER, STONES NO LARGER THAN ONE CUBIC FOOT MAY BE DEPOSITED AT LEAST 3' ABOVE THE TOP OF THE PIPE.
6. THE EXCAVATED TRENCH WIDTH 12" ABOVE THE CONDUIT MAY BE INCREASED WITHOUT ADDITIONAL COMPENSATION.
7. RIGID PIPE SHALL INCLUDE DUCTILE IRON.
8. ENCASEMENT SHALL BE CLASS C CONCRETE.
9. SECTIONS ARE SYMMETRICAL ABOUT THE CENTERLINE.

TYPICAL TRENCH FOR RIGID PIPE

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W–1



NOTES:

1. AGGREGATE FOR BEDDING AND COVER SHALL BE #57 LIMESTONE OR 3/4 #57 ROUND WASHED GRAVEL.
2. TYPE A BACKFILL SHALL BE GRANULAR MATERIAL ITEM 304, GRADE A. TYPE A BACKFILL SHALL BE USED WHEN THE TRENCH IS 5' OR LESS FROM ANY PAVED OR GRAVEL SURFACE OR BENEATH THE PAVEMENT OR GRAVEL. COMPACTION SHALL MEET THE REQUIREMENTS OF ITEM 203.
3. TYPE B BACKFILL SHALL BE NATURAL SOIL FREE FROM STONES LARGER THAN 2" ACROSS THEIR GREATEST DIMENSION. TOPSOIL, VEGETATION, DEBRIS, RUBBISH OR FROZEN MATERIAL, COMPACTED TO 95% OF IT'S MAXIMUM LABORATORY DRY WEIGHT.
4. TYPE C BACKFILL SHALL BE NATURAL SOIL FREE FROM STONES LARGER THAN 6" ACROSS THEIR GREATEST DIMENSION. VEGETATION, DEBRIS, RUBBISH OR FROZEN MATERIAL, COMPACTED TO 90% OF IT'S MAXIMUM LABORATORY DRY WEIGHT. WHEN APPROVED BY THE ENGINEER, STONES NO LARGER THAN ONE CUBIC FOOT MAY BE DEPOSITED AT LEAST 3' ABOVE THE TOP OF THE PIPE.
5. THE EXCAVATED TRENCH WIDTH 12" ABOVE THE CONDUIT MAY BE INCREASED WITHOUT ADDITIONAL COMPENSATION.
6. FLEXIBLE PIPE SHALL INCLUDE PVC AND POLYETHYLENE.

TYPICAL TRENCH FOR FLEXIBLE PIPE

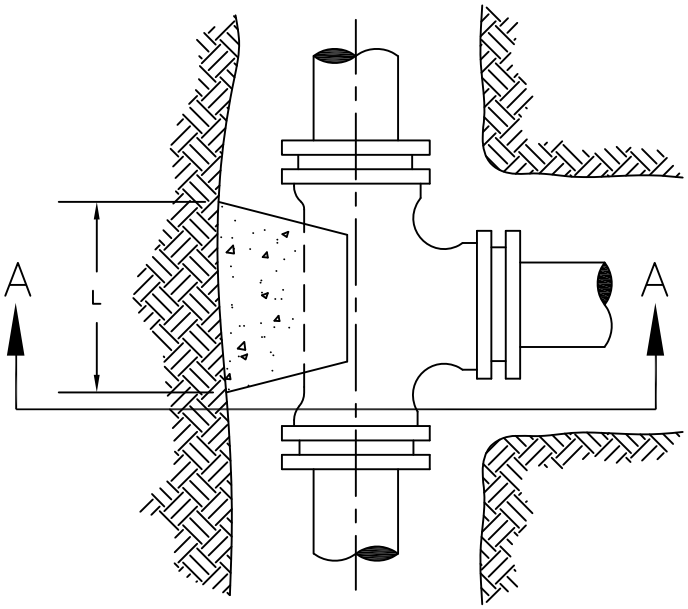
CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

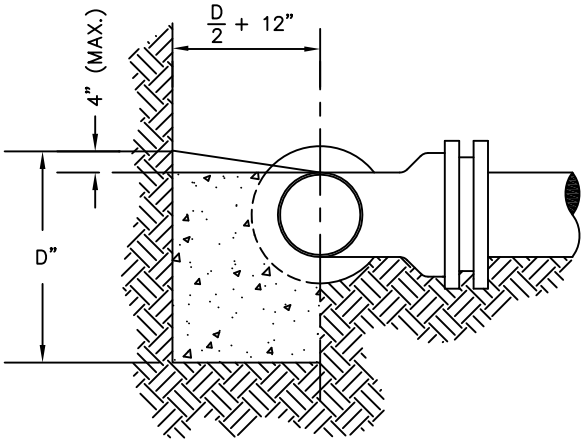
REVISED:	DRAWING NO.
12/18/15	W–2

RUN	BRANCH																							
	3"			4"			6"			8"			12"			16"			20"			24"		
	L	D	V	L	D	V	L	D	V	L	D	V	L	D	V	L	D	V	L	D	V	L	D	V
3"	12	5	0.5																					
4"	10	6	0.5	11	8	0.8																		
6"	9	7	0.5	11	8	0.8	18	12	1.9															
8"	8	8	0.5	10	9	0.7	18	12	1.9	23	16	3.5												
12"	6	12	0.6	8	12	0.8	18	12	1.9	23	16	3.5	38	22	8.7									
16"	6	16	0.8	6	16	0.8	14	16	2.0	20	18	3.3	36	23	8.7	49	30	13.6						
20"	6	20	1.0	6	20	1.0	11	20	1.9	18	20	3.3	35	24	8.7	46	32	13.6	60	38	26.5			
24"	6	24	1.2	6	24	1.2	9	24	1.9	15	24	3.3	30	28	8.7	42	36	14.0	54	42	26.3	68	48	45.4

V = VOLUME OF CONCRETE IN CUBIC FEET



PLAN VIEW



SECTION A-A

NOTES:

1. CONCRETE FOR BACKING SHALL BE CLASS C.
2. BACKING SHALL BE DESIGNED FOR 3000 PSF SOIL BEARING.
3. REINFORCING STEEL SHALL BE USED AS DIRECTED BY THE ENGINEER.
4. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED EARTH.
5. PROVIDE CLEARANCE FOR REMOVAL OF BOLTS.

BACKING FOR TEES

CITY OF PATASKALA

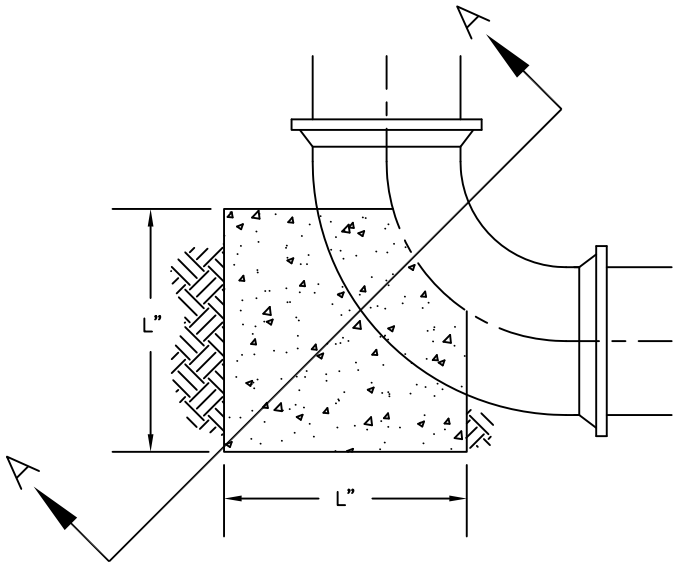
STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

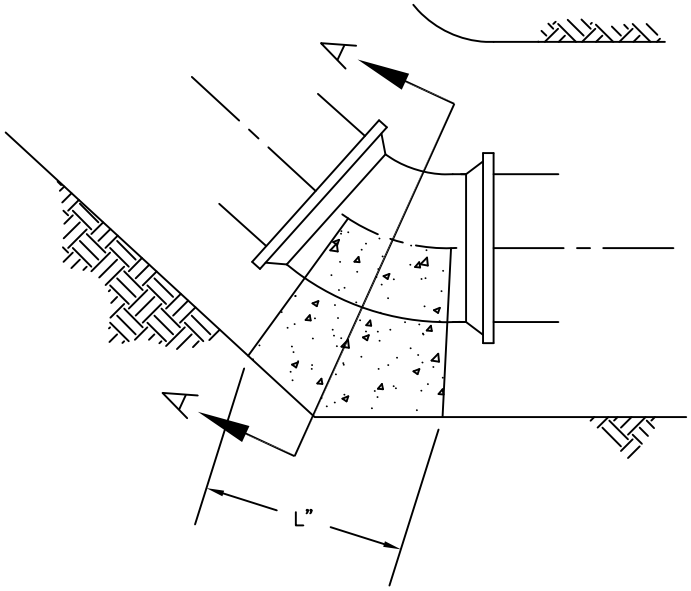
DRAWING NO. W-3

SIZE OF PIPE	DEGREE OF BEND											
	11–1/4°			22–1/2°			45°			90°		
	L	D	V	L	D	V	L	D	V	L	D	V
3"	4	3	0.1	6	4	0.2	10	4	0.3	10	4	0.3
4"	5	4	0.2	9	5	0.4	14	5	0.6	14	5	0.6
6"	8	6	0.5	12	7	0.7	20	8	1.4	18	9	1.7
8"	9	8	0.7	16	9	1.4	24	12	2.7	25	11	4.0
12"	14	12	1.8	24	14	3.6	36	18	6.8	32	18	10.7
16"	18	16	3.4	32	18	6.7	36	32	13.4	41	26	25.4
20"	25	20	6.4	30	30	11.5	49	36	20.5	50	32	46.5
24"	27	24	9.0	39	34	18.4	60	42	35.0	58	40	77.7

V = VOLUME OF CONCRETE IN CUBIC FEET



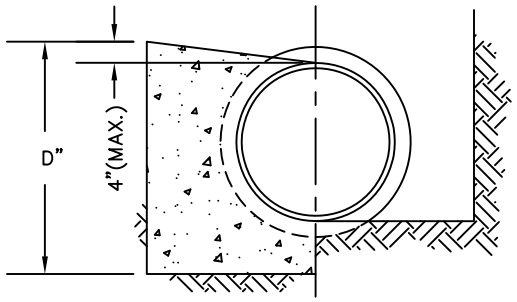
90° BENDS



BENDS LESS THAN 90°

NOTES:

1. CONCRETE FOR BACKING SHALL BE CLASS C.
2. BACKING SHALL BE DESIGNED FOR 3000 PSF SOIL BEARING.
3. REINFORCING STEEL SHALL BE USED AS DIRECTED BY THE ENGINEER.
4. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED EARTH.
5. PROVIDE CLEARANCE FOR REMOVAL OF BOLTS.



SECTION A-A

BACKING FOR BENDS

CITY OF PATASKALA

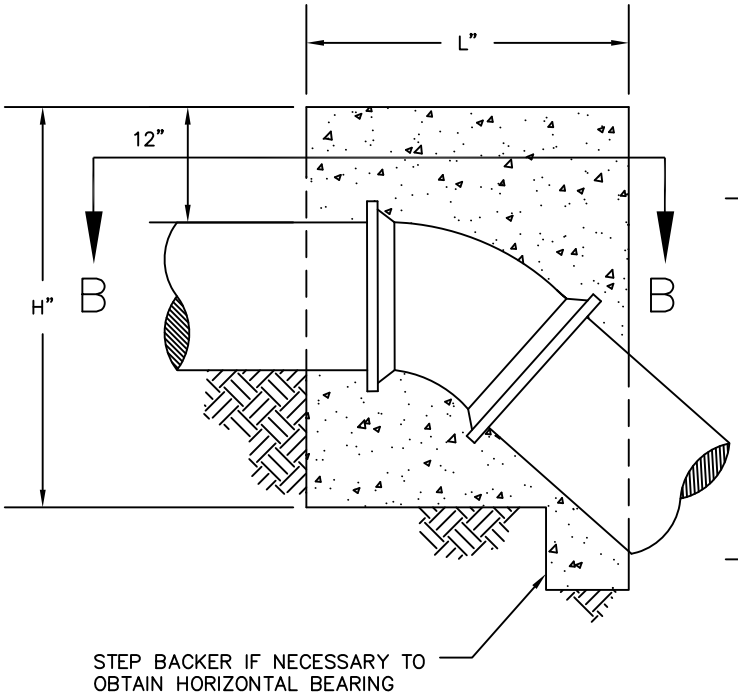
STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

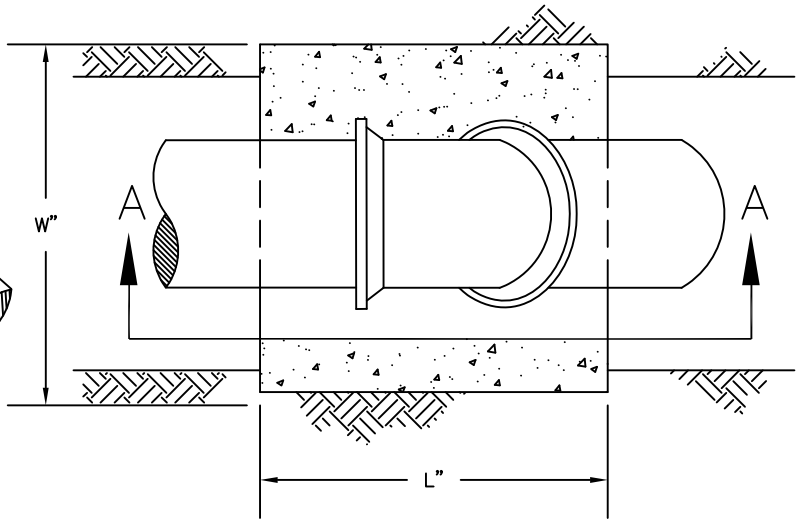
DRAWING NO. W–4

SIZE OF PIPE	DEGREE OF BEND															
	11–1/4°				22–1/2°				45°				90°			
	L	W	H	V	L	W	H	V	L	W	H	V	L	W	H	V
3"	12	18	12	1.5	13	25	16	3.0	18	30	19	5.9	25	30	24	10.4
4"	12	24	16	2.6	16	30	18	5.0	22	36	24	11.0	27	48	25	18.7
6"	12	48	18	6.0	15	43	36	13.4	30	55	24	22.9	37	54	36	41.6
8"	12	63	24	10.5	18	57	34	20.2	36	57	33	39.2	47	60	46	75.0
12"	20	54	36	22.6	37	62	37	49.0	48	62	51	87.9	66	66	66	166.4
16"	31	65	38	44.3	60	65	39	88.1	65	65	65	159.2	72	96	72	288.0
20"	45	70	40	72.8	56	70	60	136.2	72	76	78	247.0	86	108	84	451.8
24"	41	72	54	92.3	67	74	69	198.0	88	84	84	359.1	96	120	96	640.0

V = VOLUME OF CONCRETE IN CUBIC FEET



SECTION A-A



SECTION B-B

NOTES:

1. CONCRETE FOR BACKING SHALL BE CLASS C.
2. BACKING SHALL BE DESIGNED FOR 3000 PSF SOIL BEARING.
3. REINFORCING STEEL SHALL BE USED AS DIRECTED BY THE ENGINEER.
4. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED EARTH.
5. BACKING SHALL BE CENTERED HORIZONTALLY ON BEND.
6. ANY PIPE WHICH COMES IN CONTACT WITH THE CONCRETE ENCASEMENT SHALL BE DUCTILE IRON.

BACKING FOR VERTICAL BENDS (OVER BENDS ONLY)

CITY OF PATASKALA

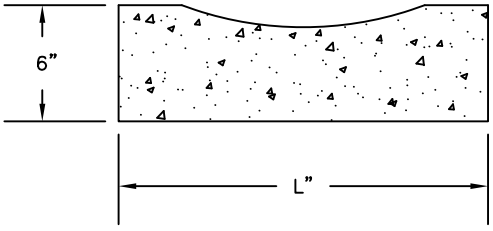
STANDARD CONSTRUCTION DWG.

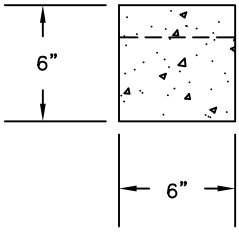
REVISED: 12/18/15

DRAWING NO. W–5

	SIZE	L	V
GATE VALVES	3"	15	0.31
	4"	16	0.33
	6"	17	0.36
	8"	20	0.42
	12"	24	0.50
	16"	30	0.63
BUTTERFLY VALVES	20"	36	0.75
	24"	42	0.88
	30"	48	1.00

V = VOLUME OF CONCRETE IN CUBIC FEET





NOTES:

1. CONCRETE FOR BACKING SHALL BE CLASS C.
2. BACKING SHALL BE DESIGNED FOR 3000 PSF SOIL BEARING.
3. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED EARTH.
4. PROVIDE CLEARANCE FOR REMOVAL OF BOLTS.

CONCRETE VALVE SUPPORTS

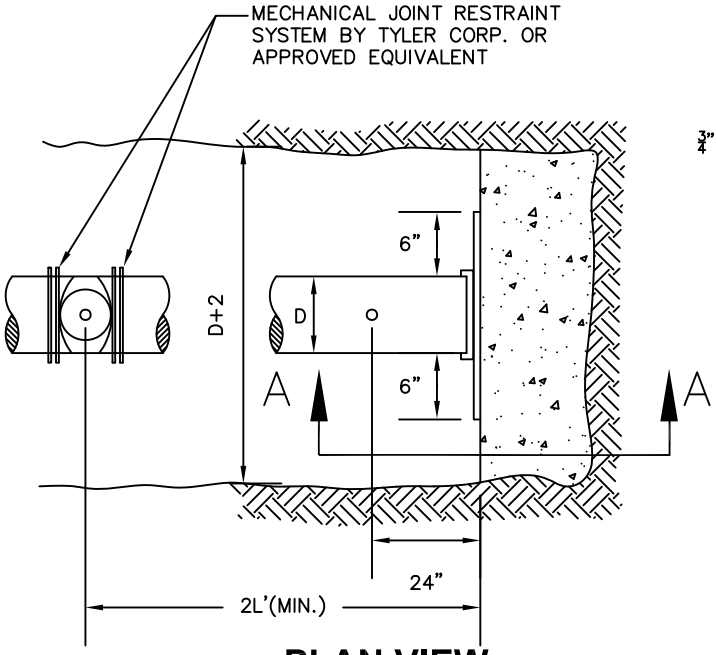
CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

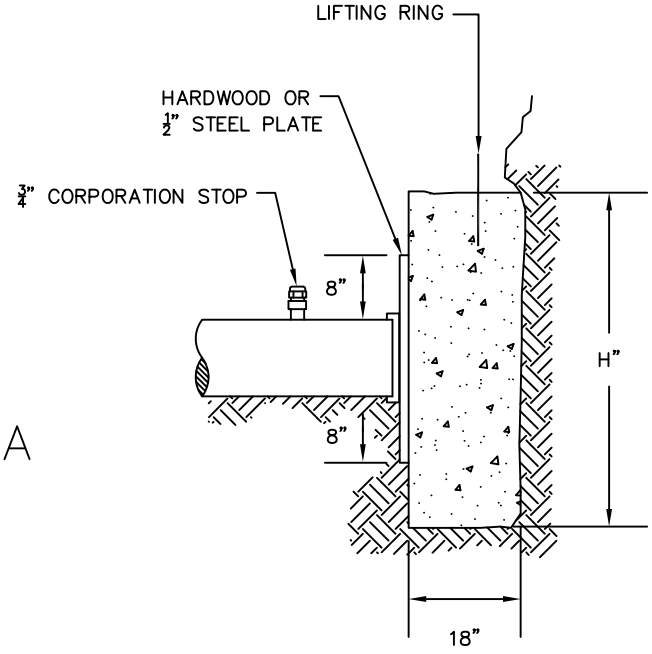
REVISED: 12/18/15

DRAWING NO. W-6

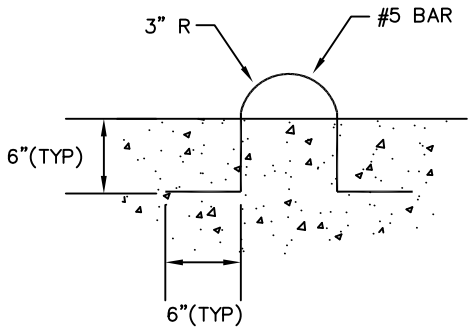
SIZE OF PIPE	H	B	L (PVC)	L (DIP)	B
6"	8	1	20	18	2.52
8"	12	1	20	18	4.00
12"	23	3	20	18	8.64
16"	37	3	20	18	15.39



PLAN VIEW



SECTION A-A



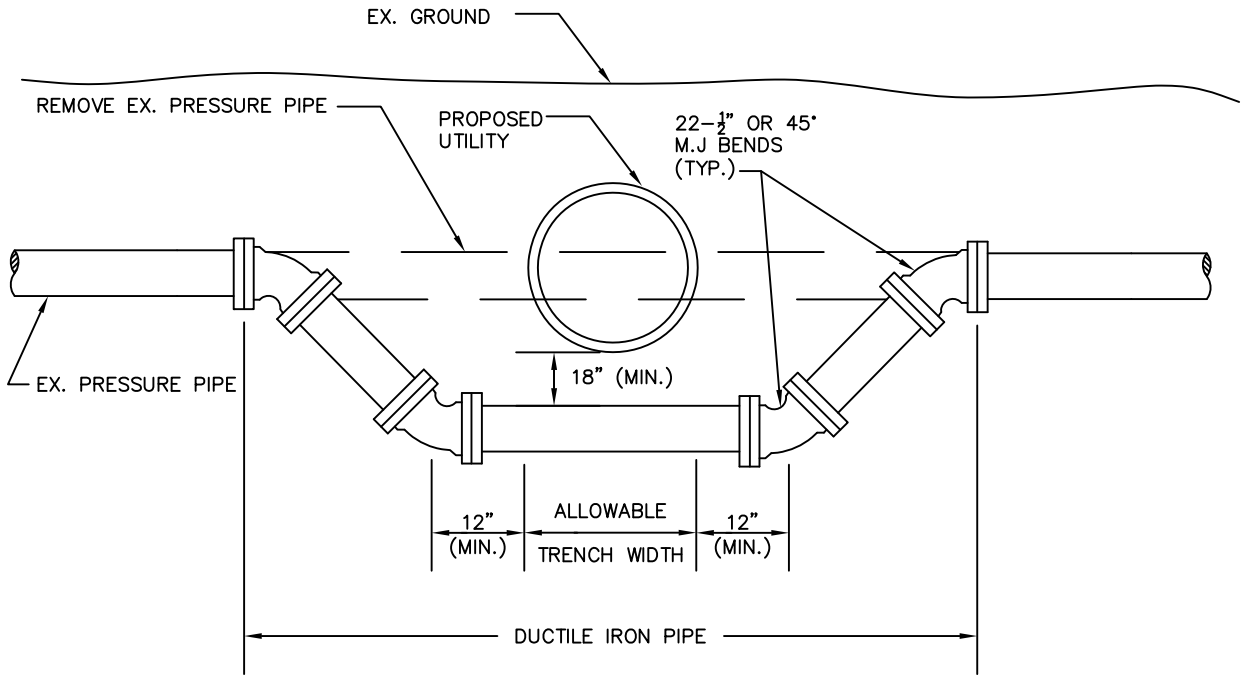
LIFTING RING DETAIL

NOTES:

1. CONCRETE FOR BACKING SHALL BE CLASS C.
2. BACKING SHALL BE DESIGNED FOR 3000 PSF SOIL BEARING.
3. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED EARTH.
4. PROVIDE CLEARANCE FOR REMOVAL OF BOLTS.
5. END OF PIPE SHALL BE CAPPED OR PLUGGED.
6. STEEL PLATE SHALL BE GREASED WHERE IN CONTACT WITH CONCRETE BACKING.
7. PLUG HOLES SHALL BE INSTALLED AT ALL END-OF-LINE STUBS AT THE THRUST BLOCK.

THRUST BLOCK DETAIL

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W-7



NOTES:

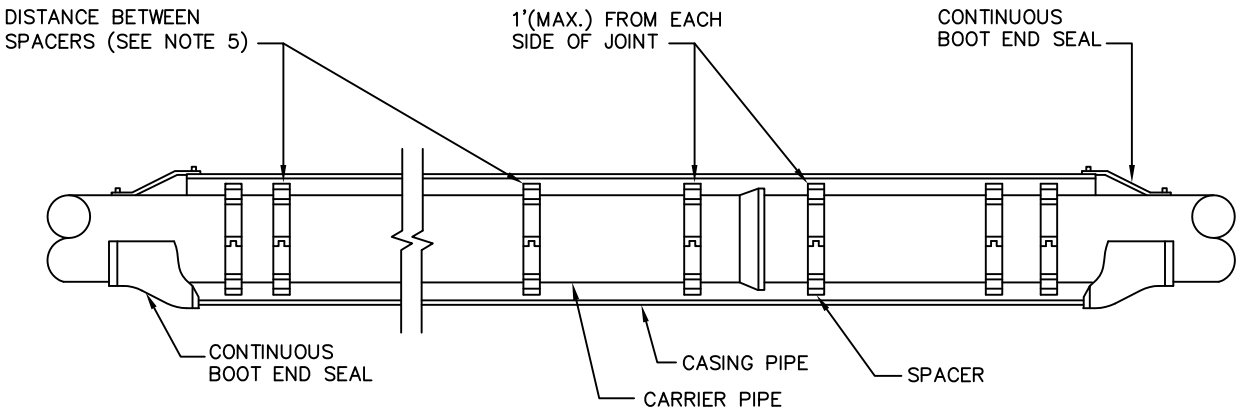
1. TIME AND DURATION OF SHUTDOWN SHALL BE DETERMINED OR APPROVED BY THE OWNER OF THE PRESSURE PIPE.
2. THE CONTRACTOR SHALL NOTIFY ANY CUSTOMERS AFFECTED BY THE PROPOSED WORK AT LEAST 24 HOURS IN ADVANCE OF SHUTDOWN.
3. ALL BENDS SHALL BE SECURED BY RESTRAINING GLANDS, RODDING OR OTHER METHODS AS APPROVED BY THE ENGINEER TO RESTORE MAIN SERVICE AS SOON AS POSSIBLE.
4. THE RELOCATED LINES SHALL BE LAID TO THE NEW LINE AND GRADE, TESTED AND DISINFECTED AS REQUIRED PRIOR TO SHUTDOWN OF EXISTING MAIN AND CONNECTION OF THE RELOCATED LINES TO THE EXISTING MAIN.
5. ALL WATER LINES SHALL BE DISINFECTED BE SWABBING WITH A 5% HYPOCHLORITE SOLUTION IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF AWWA C651.

TYPICAL PRESSURE PIPE LOWERING

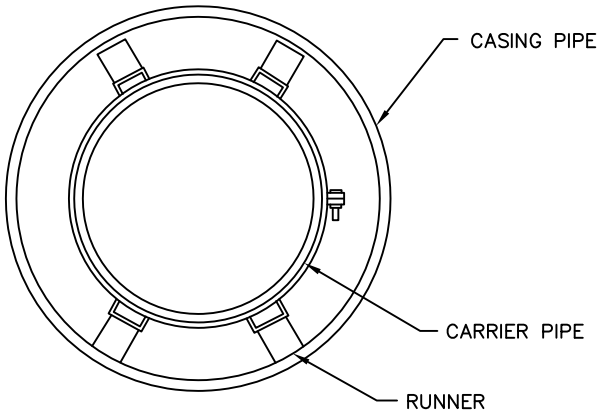
CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED:	DRAWING NO.
12/18/15	W-8



TYPICAL CASING SPACER CONFIGURATION



SECTION

NOTES:

1. CASING PIPE SHALL BE BITUMINOUS COATED INSIDE AND OUT, INSTALLED BY JACKING, WITH A MINIMUM WALL THICKNESS AS SHOWN IN THE TABLE OR MEETING THE REQUIREMENTS OF THE RECEIVING AUTHORITY.
2. CASING SPACERS SHALL BE CCI MODELS CSS8 AND CSS12, CONSTRUCTED OF CIRCULAR STAINLESS STEEL BANDS, THAT BOLT TOGETHER TO FORM A SHELL AROUND THE CARRIER PIPE. THE CASING SPACER SHALL BE LINED WITH A RIBBED EPDM EXTRUSION DESIGNED TO OVERLAP THE EDGES OF THE SHELL AND PREVENT SLIPPAGE. THE SPACER SHALL BE DESIGNED WITH RISERS AND RUNNERS TO SUPPORT THE CARRIER PIPE WITHIN THE CASING AND MAINTAIN A MINIMUM CLEARANCE OF 1.00" BETWEEN THE CASING ID AND THE CARRIER PIPE OD. SPACERS SHALL BE INSTALLED 3 PER EVERY 20' MIN. AND 1' INSIDE EACH END. RECOMMENDED POSITIONING OF THE SPACERS IS ONE PLACED 1–2 FEET ON EITHER SIDE OF THE BELL JOINT AND ONE EVERY 6–8 FEET APART THEREAFTER FOR A TOTAL OF THREE CASING SPACERS PER JOINT.
3. END SPACERS SHALL BE ADVANCE PRODUCTS & SYSTEMS, INC. OR APPROVED EQUIVALENT.
4. WHEN DUCTILE IRON PIPE IS USED, THE JOINTS SHALL BE RESTRAINED WITH FIELDLOK GASKETS OR APPROVED EQUIVALENT.
5. WHEN PVC PIPE IS USED, THE JOINTS SHALL BE RESTRAINED WITHJCM SUR–GRIP RESTRAINERS OR APPROVED EQUIVALENT.
6. DIMENSIONS BETWEEN SPACERS FOR PVC PIPE SHALL BE 6 FEET MAXIMUM. DIMENSIONS BETWEEN SPACERS FOR DUCTILE IRON PIPE SHALL BE 8 FEET MAXIMUM.
7. THE QUANTITY OF RUNNERS IS IN ACCORDANCE WITH THE SIZE OF THE CARRIER PIPE AS FOLLOWS:
   - TO 14" DIA.–4 RUNNERS
   - 16"–36" DIA.–6 RUNNERS
   - 38"–48" DIA.–8 RUNNERS
8. THE MAXIMUM GAP BETWEEN RUNNERS & CASING PIPE SHALL BE 1".

CARRIER	CASING	
INSIDE DIAMETER	MINIMUM DIAMETER	MAXIMUM WALL THICKNESS
2"	8"	0.188"
3"	10"	0.188"
4"	10"	0.188"
6"	14"	0.219"
8"	16"	0.219"
10"	18"	0.250"
12"	20"	0.281"
15"(PVC)	24"	0.344"
16"	24"	0.344"
18"	28"	0.406"
20"	28"	0.406"
24"	36"	0.469"
27"(PVC)	42"	0.500"
30"	42"	0.500"
36"	48"	0.675"

CASING PIPE

CITY OF PATASKALA

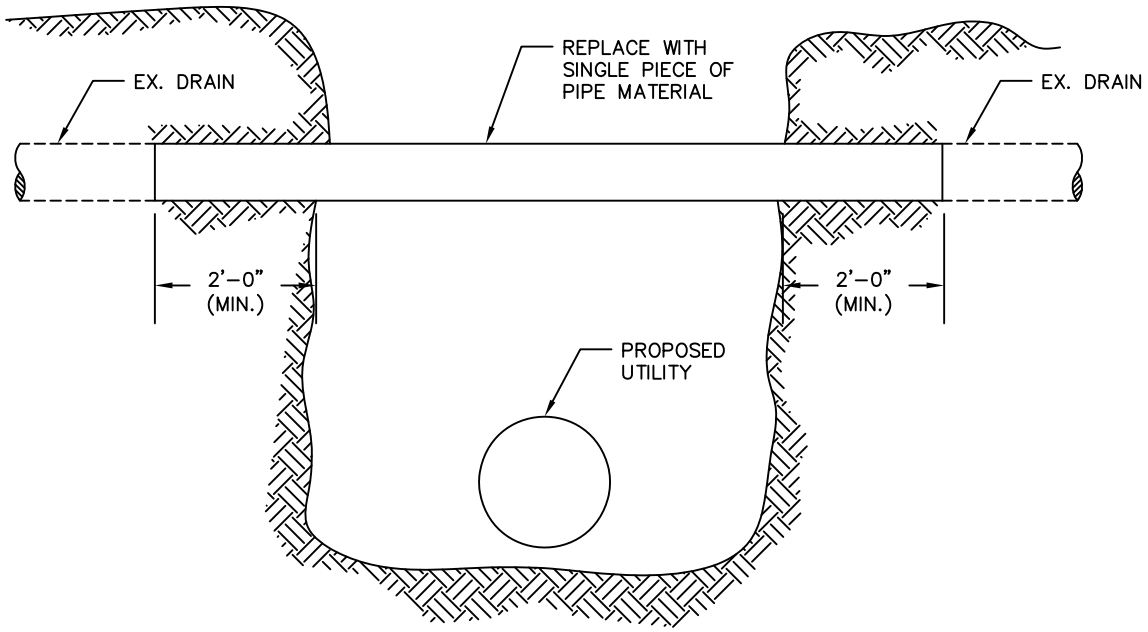
STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

DRAWING NO. W–9

MINIMUM ROAD & CURB UNDERDRAIN REPLACEMENT MATERIAL SHALL BE: PERFORATED CONCRETE: ITEM 706.06 (ODOTCMS) CONCRETE DRAIN TILE: ITEM 706.07 (OOOTCMS) VITRIFIED CLAY: ITEM 706.08 (OOOTCMS) PERFORATED PVC: ITEM 707.17 (ODOTCMS) HEAVY DUTY CORRUGATED POLYETHYLENE SLOTTED DRAIN: ITEM 707.16 (ODOTCMS)

MINIMUM DRAIN TILE REPLACEMENT MATERIAL SHALL BE: PVC: ASTM 2241. SDR 26 DUCTILE IRON: AWWA C151, CLASS 50 STEEL PIPE: ASTM 1J39–B CONCRETE: ITEM 706.02 (OOOTCMS) POLYETHYLENE: ITEM 707.16. S.S. 944 (OOOTCMS)

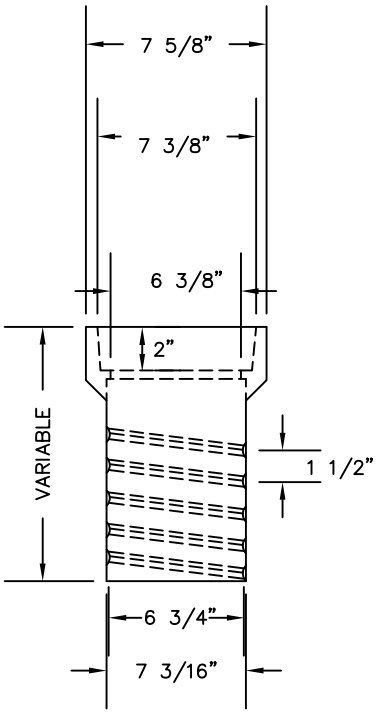


NOTES:

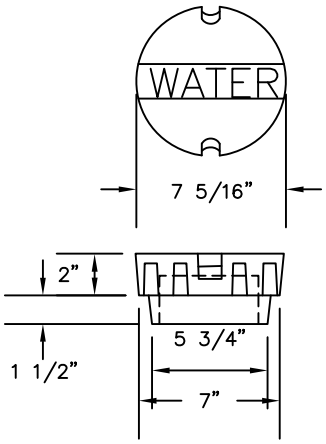
1. INSIDE DIAMETER OF REPLACEMENT PIPE SHALL BE EQUAL TO OR GREATER THAN INSIDE DIAMETER OF EXISTING TILE OR UNDERDRAIN.
2. REPLACEMENT MATERIAL USED SHALL BE EQUAL TO OR BETTER THAN THE EXISTING TILE OR UNDERDRAIN AS DIRECTED BY THE ENGINEER OR HIS REPRESENTATIVE.
3. PROVIDE FERNCO FITTINGS OR APPROVED EQUIVALENT WHERE EXISTING TILE OR UNDERDRAIN HAS WATERTIGHT JOINTS. PROVIDE 30# FELT OR CONCRETE MORTAR OVER THE UPPER HALF OF THE JOINT WHERE OPEN JOINTS ARE ENCOUNTERED.
4. BACKFILL BETWEEN THE PROPOSED UTILITY AND THE REPLACEMENT TILE OR UNDERDRAINSHALL BE GRANULAR AND COMPACTED TO COMPLETELY ELIMINATE SETTLEMENT.

DRAIN TILE & UNDERDRAIN REPLACEMENT

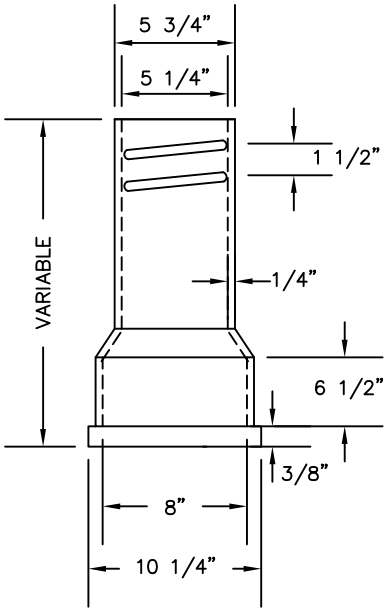
CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W–10



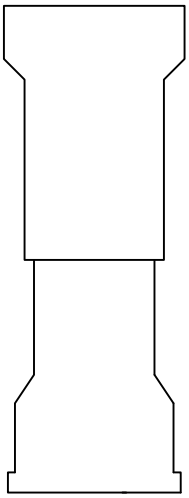
TOP



DROP LID



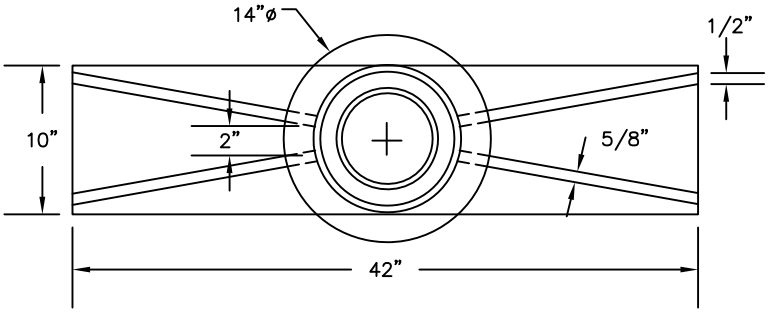
BOTTOM

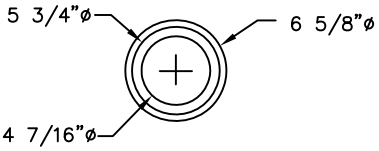


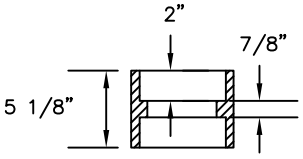
BOX COMPLETE

STANDARD VALVE BOX

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W-11

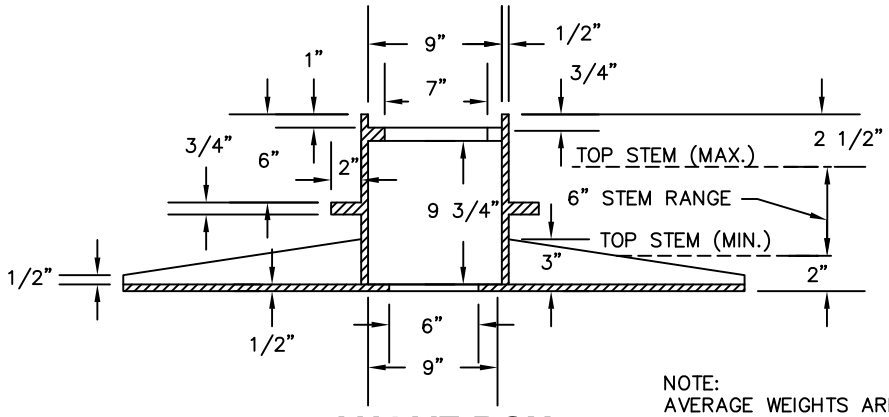






VALVE STEM SLEEVE

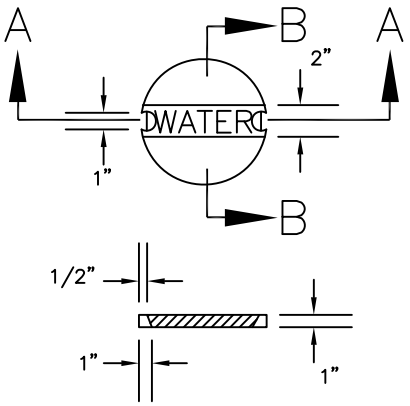
14 LBS.



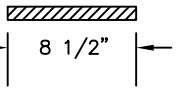
VALVE BOX

133 LBS.

NOTE:
AVERAGE WEIGHTS ARE TO THE NEAREST EVEN POUND
CALCULATED USING 0.26 LBS. PER CUBIC INCH.



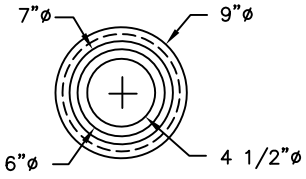
SECTION A-A

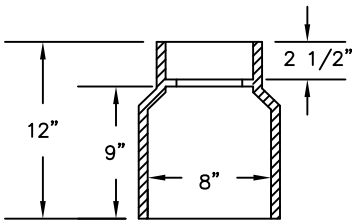


SECTION B-B

VALVE BOX LID

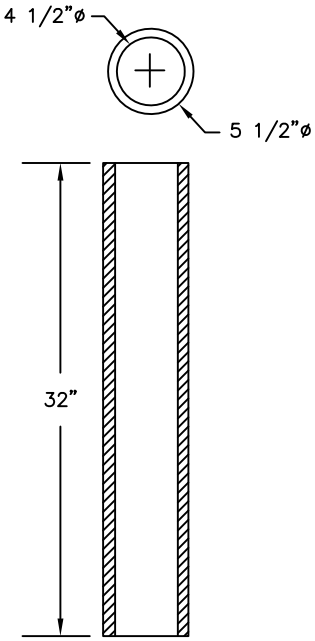
15 LBS.





VALVE BOX BASE

41 LBS.

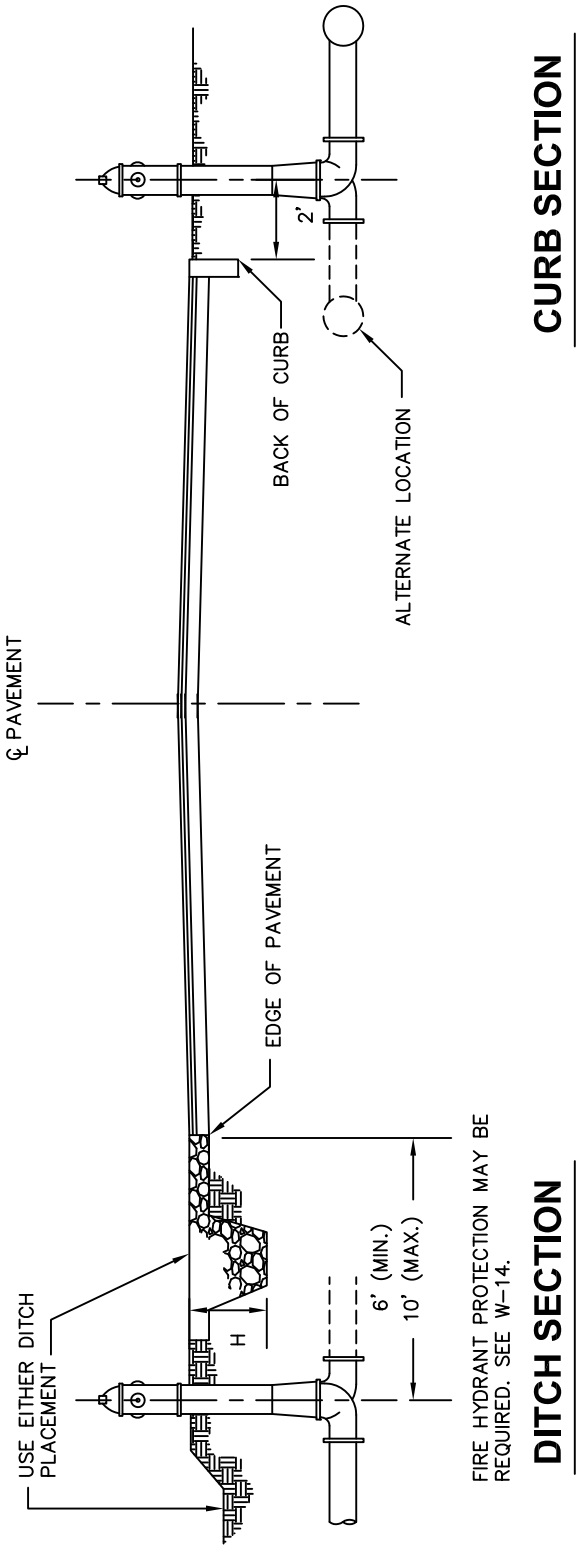


VALVE STEM

65 LBS.

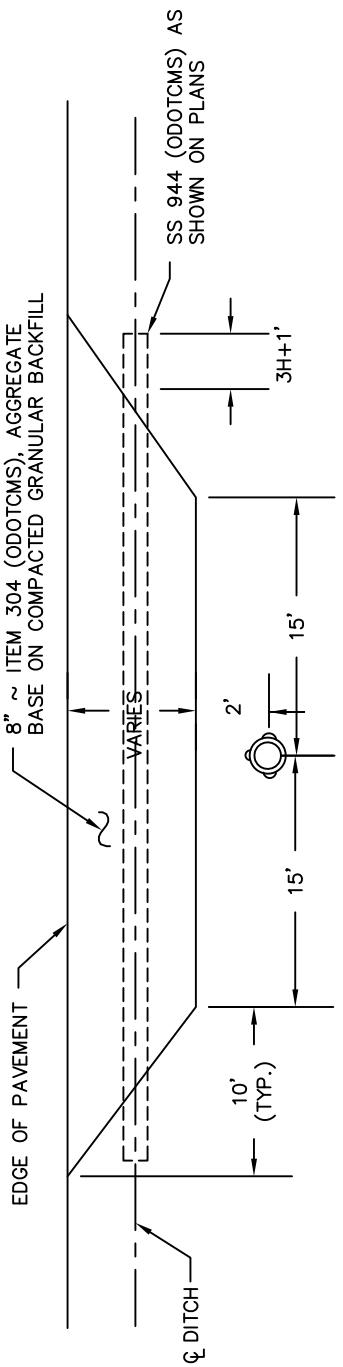
HEAVY DUTY VALVE BOX (TRAFFIC TYPE)

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W-12



CURB SECTION

DITCH SECTION



PLAN VIEW

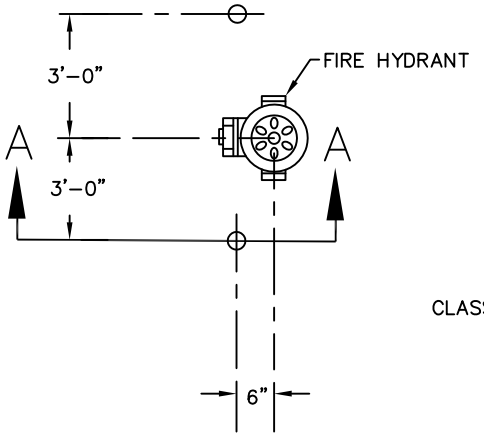
(DITCH SECTION)

NOTES:

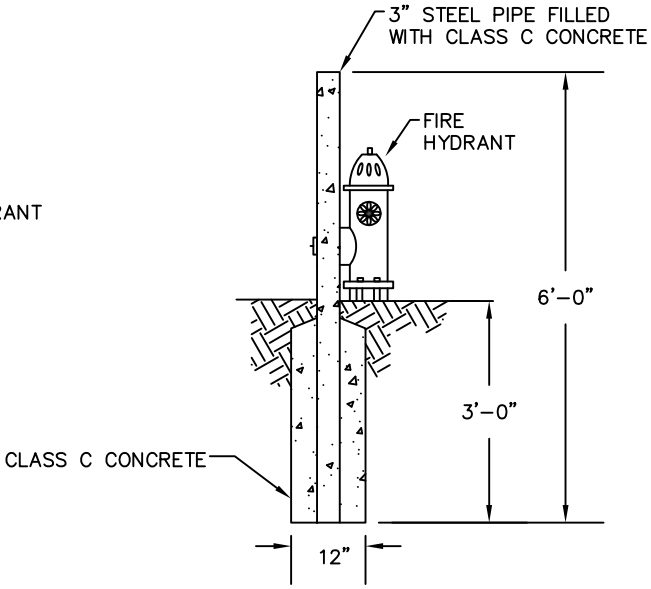
1. THIS DETAIL IS TO BE USED IN CONJUCTION WITH THE FOLLOWING STANDARD DRAWINGS AS APPLICABLE: W–15 ~ STANDARD FIRE HYDRANT DETAIL, W–16 ~ TYPICAL HYDRANT SETTING (TYPE A), W–17 ~ TYPICAL HYDRANT SETTING (TYPE A MODIFIED) AND W–18 ~ TYPICAL HYDRANT SETTING (TYPE B & TYPE B MODIFIED).
2. NO FIRE HYDRANT SHALL BE LOCATED WITHIN SIX (6) FEET OF THE EDGE OF ANY RESIDENTIAL DRIVE APPROACH NOR SHALL ANY HYDRANT BE LOCATED WITHIN EIGHT (8) FEET OF ANY ALLEY, COMMERCIAL DRIVE OR ACCESS ROAD.

FIRE HYDRANT LOCATION DETAIL

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W–13



PLAN VIEW



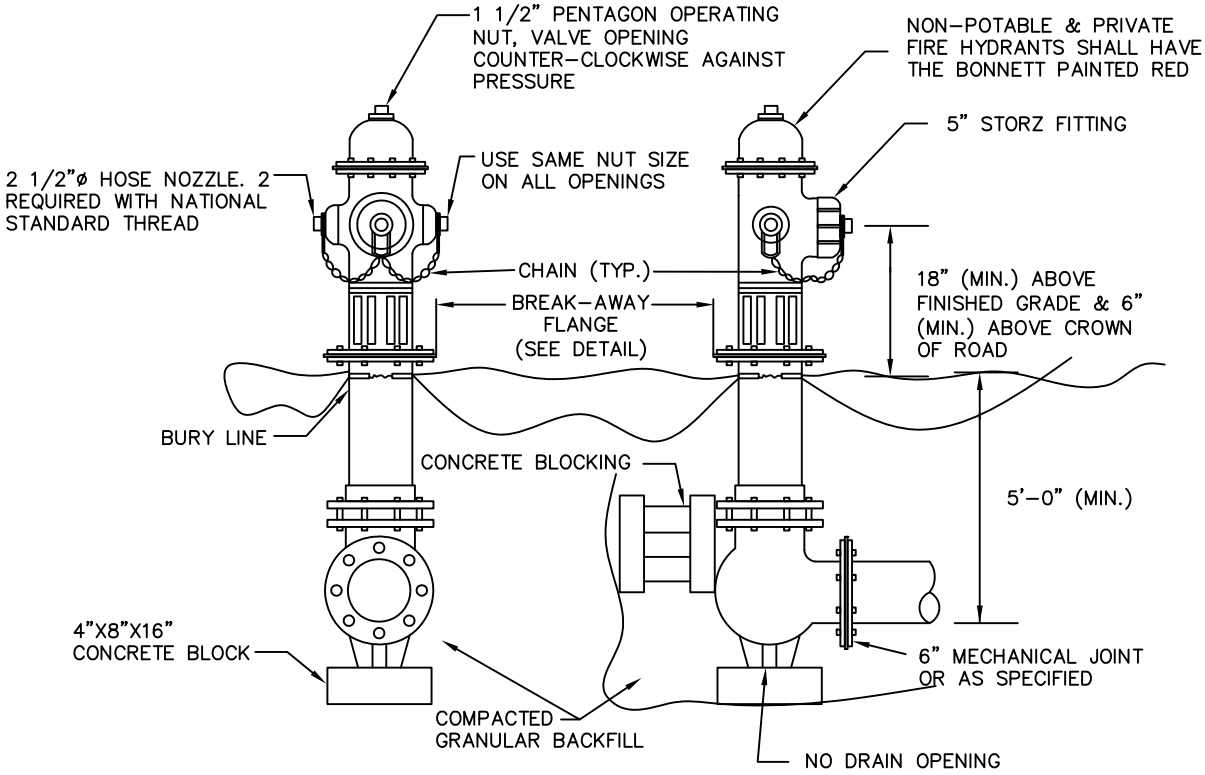
SECTION A-A

NOTES:

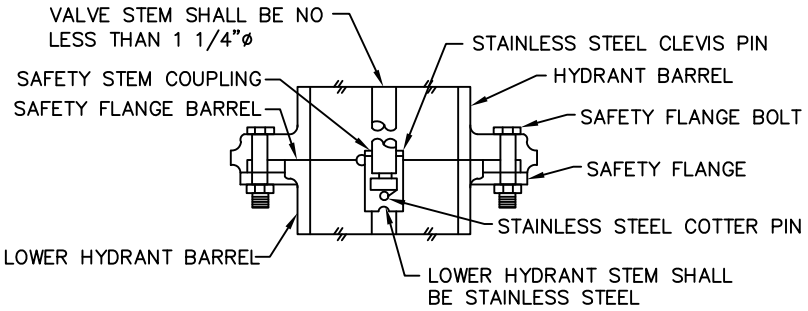
1. 3" STEEL PROTECTION POSTS SHALL BE WIRE–BRUSHED, CLEANED AND PAINTED WITH ONE COAT OF PRIMER AND TWO COATS OF FEDERAL SAFETY YELLOW ENAMEL, EACH COAT BEING THOROUGHLY DRY BEFORE THE NEXT COAT IS APPLIED.
2. FIRE HYDRANT PROTECTION SHALL BE REQUIRED AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED.

FIRE HYDRANT PROTECTION DETAIL

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W–14



FRONT VIEW **SIDE VIEW**



BREAK-AWAY FLANGE & SAFETY COUPLING SECTION

NOTES:

1. BACKFILL SHALL BE GRANULAR MATERIAL CONFORMING TO ITEM 310, GRADE A (ODOTCMS), OR APPROVED SUITABLE EXCAVATED MATERIAL POWER TAMPED IN LAYERS NOT EXCEEDING 4" IN THICKNESS, LOOSE MEASUREMENT. BACKFILL SHALL EXTEND FROM THE BOTTOM OF THE PIT OR TRENCH TO 6" BELOW THE EXISTING OR PROPOSED SURFACE. COST OF FURNISHING AND PLACING BACKFILL SHALL BE INCLUDED IN THE PRICE BID FOR EACH FIRE HYDRANT.
2. ALL FIRE HYDRANTS SHALL BE INSTALLED WITH CONCRETE BLOCKING AGAINST UNDISTURBED EARTH.
3. ALL FIRE HYDRANTS SHALL HAVE STAINLESS STEEL SHAFTS.

STANDARD FIRE HYDRANT DETAIL

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W-15

FIRE HYDRANT NOTES:

TYPE OF HYDRANT: THE HYDRANT SHALL BE THE POST TYPE TRAFFIC MODEL MADE OF CAST IRON AS SHOWN HERON. IT SHALL HAVE A BREAKING CONNECTION THAT PREVENTS LOSS OF WATER WHEN THE UPPER AND LOWER SECTIONS ARE SEPARATED BY A SMASHING IMPACT. THE HYDRANT SHALL BE OF THE COMPRESSION TYPE WITH THE VALVE OPENING IN A COUNTERCLOCKWISE DIRECTION AGAINST THE PRESSURE AND CLOSING WITH THE PRESSURE. THE VALVE END OF THE STEM OR VALVEROD SHALL BE SO CONSTRUCTED AS TO ELIMINATE CONTACT OF DISSIMILAR METALS IN THE PRESENCE OF MOISTURE.

THE STEM OR VALVE ROD BETWEEN THE VALVE AND OPERATING NUT SHALL BE MADE OF STAINLESS STEEL STOCK AND HAVE A 1 1/4" MINIMUM DIAMETER AFTER MACHINING. THE UPPER STEM OR VALVE ROD SHALL BE CONSTRUCTED IN ONE CONTINUOUS LENGTH FROM THE VALVE TO THE BREAKING COUPLING OR TO THE BOTTOM OF THE EXTENSION PIECE WHERE EXTENSIONS ARE REQUIRED. THE BREAKING COUPLING SHALL FIT OVER THE VALVE ROD AND BE LOCATED AT THE PROPER POINT TO CONFORM TO THE BREAKING CONNECTION IN THE STANDPIPE. THE LOWER STEM SHALL BE 304 STAINLESS STEEL.

THE BARREL SHALL HAVE AN AREA OF NOT LESS THAN 120 PERCENT OF THE VALVE OPENING. THE TYPE OF VALVE SEAL SHALL BE RUBBER WITH THE DIAMETER OF THE PORT IN THE SEAL RING BEING A MINIMUM OF 4 1/4".

ALL INTERIOR WORKING PARTS OF THE HYDRANT INCLUDING THE VALVE AND VALVE SEAT SHALL BE SUCH THAT THEY CAN BE REMOVED THROUGH THE TOP OF THE STANDPIPE WITHOUT EXCAVATION. THE UPPER SECTION OF THE STANDPIPE ABOVE THE GROUND LINE SHALL BE ADJUSTABLE SO THAT THE NOZZLES CAN BE ROTATED TO ANY DESIRED POSITION. ALL DRIP OR DRAIN OPENINGS SHALL BE PLUGGED.

REFERENCE SPECIFICATIONS: ALL FIRE HYDRANTS SHALL CONFORM TO THE LATEST AMERICAN WATER WORKS ASSOCIATION SPECIFICATIONS 0502, THE REQUIREMENTS OF THE OWNER AND APPLICABLE LOCAL FIRE DEPARTMENT. ALL SPECIFICATIONS SHALL BE THE LATEST EDITION IN EFFECT ON THE DATE THE CONSTRUCTION DRAWINGS ARE APPROVED (SIGNED) BY THE OWNER, UNLESS OTHERWISE NOTED.

APPROVALS AND CERTIFICATION: THE SUPPLIER OR MANUFACTURER SHALL SUBMIT TO THE OWNER SIX (6) COPIES OF THE RESULTS OF CERTIFIED FLOW TESTS RUN BY AN INDEPENDENT TESTING LABORATORY AND SHOP DRAWINGS WITH DIMENSIONS, MATERIALS AND NOMENCLATURE OF PARTS FOR EACH TYPE OR MODEL OF HYDRANT PROPOSED FOR USE IN THE PROJECT AREA.

UPON APPROVAL OF THE ABOVE INFORMATION BY THE OWNER, IT SHALL REMAIN ON FILE WITH THE OWNER. SUBMISSION OF THE ABOVE MATERIALS WITH EACH ORDER OF FIRE HYDRANTS IS NOT NECESSARY IF APPROVED MATERIAL IS ALREADY ON FILE. SUBMISSION OF NEW MATERIAL IS REQUIRED WHEN A DEVIATION IN THE PRODUCT, ITS MANUFACTURER, OR THE STANDARDS IS REQUESTED.

ANY FIRE HYDRANTS DELIVERED TO A PROJECT WHICH FAIL TO CONFORM TO THE APPROVED INFORMATION ON FILE WITH THE OWNER SHALL BE REJECTED.

WITH EACH DELIVERY SHIPMENT OF FIRE HYDRANTS, THE HYDRANT MANUFACTURER SHALL CERTIFY THAT THE HYDRANTS CONFORM TO THE INFORMATION APPROVED AND ON FILE WITH THE OWNER. THIS CERTIFICATE SHALL INCLUDE THE MODEL OR IDENTIFICATION NUMBERS OF THE HYDRANTS BEING DELIVERED AND THE APPROVAL DATE OF THE INFORMATION ON FILE WITH THE OWNER. THIS DOCUMENTATION DOES NOT CONSTITUTE APPROVAL OF FINAL ACCEPTANCE OF THE SPECIFIC HYDRANTS DELIVERED.

STANDARD FIRE HYDRANT DETAIL

CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

DRAWING NO. W-15

FIRE HYDRANT NOTES: (CONTINUED)

INSPECTION: PRIOR TO INSTALLATION, ALL FIRE HYDRANTS SHALL BE INSPECTED BY THE OWNER AND BY THE CHIEF OF THE APPLICABLE FIRE DEPARTMENT OR HIS REPRESENTATIVE. THE HYDRANTS SHALL RECEIVE EITHER A CONDITIONAL ACCEPTANCE OR A REJECTION. CONDITIONAL ACCEPTANCE SHALL MEAN THAT THE HYDRANTS MAY BE INSTALLED.

UPON INSTALLATION, EACH HYDRANT SHALL BE TESTED FOR OPERATION, LEAKS AND FLOW WITH A MEMBER OF THE JWSD DURING THE TEST AND SHALL RECIEVE EITHER OPERATIONAL ACCEPTACE OR A REJECTION.

THE OWNER RESERVES THE RIGHT TO REJECT ANY AND ALL FIRE HYDRANTS FOUND TO BE IN NON-COMPLIANCE WITH ANY OF THE REQUIREMENTS STATED HEIRIN AT ANYTIME DURING THE ACCEPTANCE OR ABOVE DESCRIBED APPROVAL PROCESS. ANY HYDRANTS WHICH ARE REJECTED AND WHICH CANNOT BE BROUGHT INTO COMPLIANCE WITH THE REQUIREMENTS AS STATED HERIN SHALL BE REMOVED FROM THE PROJECT SITE, STORAGE SITE OR THE WORK SITE AT NO EXPENSE TO THE OWNER.

THE FINAL FIELD ACCEPTANCE SHALL GOVERN OVER ANY DOCUMENT APPROVAL AND SHALL BE BASED ON ALL WORK BEING COMPLETED INCLUDING INSTALLATION, TESTING, OPERATION AND PAINTING.

INSTALLATION: THE FIRE HYDRANTS SHALL BE INSTALLED AS SPECIFIED HEREIN AND IN ACCORDANCE WITH THE FOLLOWING STANDARD DRAWINGS: W-18 ~ FIRE HYDRANT LOCATION DETAIL, W-19 ~ FIRE HYDRANT PROTECTION DETAIL, W-21 -TYPICAL HYDRANT SETTING (TYPE A), W-22 ~ TYPICAL HYDRANT SETTING (TYPE A MODIFIED), AND W-23 ~ TYPICAL HYDRANT SETTING (TYPE B AND TYPE B MODIFIED).

THE BASE SECTION OF ALL FIRE HYDRANTS SHALL BE SET TO AN ELEVATION WHICH WILL BE CORRECT FOR THE PROPOSED GRADE OF THE STREET. THE ELEVATION OF THE TOP BARREL SECTION SHALL BE SET SO THAT THE GRADE LINE OF THE HYDRANT IS AT THE ESTABLISHED OR PROPOSED FINISHED GRADE AS INDICATED ON THE CONSTRUCTION DRAWINGS, THROUGH THE INSTALLATION OF HYDRANT EXTENSION SECTIONS AS NEEDED.

PRIOR TO OPERATIONAL ACCEPTANCE, THE HYDRANT NOZZLES SHALL BE TURNED AWAY FROM THE STREET AND BAGGED. UPON RECIEVING OPERATIONAL ACCEPTANCE, THE HYDRANT SHALL BE TURNED WITH THE STEAMER NOZZLE FACING THE ROAD OR STREET AND THE HYDRANT EXERCISED TO CHECK THE OPERATION AND FOR LEAKS.

PAINTING: FINAL PAINT COLOR SHALL BE SAFTEY YELLOW. PRIOR TO PAINTING, SAMPLES SHALL BE SUBMITTED TO THE OWNER FOR APPROVAL. AFTER OPERATIONAL ACCEPTANCE, ALL HYDRANT SURFACES ABOVE THE GROUND LINE SHALL BE CLEANED, WASHED AND WIRE BRUSHED. ALL SURFACES OR SPOTS THAT REQUIRE TOUCHING UP SHALL HAVE ONE (1) COAT OF UNIVERSAL METALLIC PRIMER. WHEN ALL THE SURFACES HAVE BEEN PRIMED AND ARE DRY, ALL HYDRANT SURFACES SHALL RECEIVE TWO (2) COATS OF THE APPROVED ENAMEL.

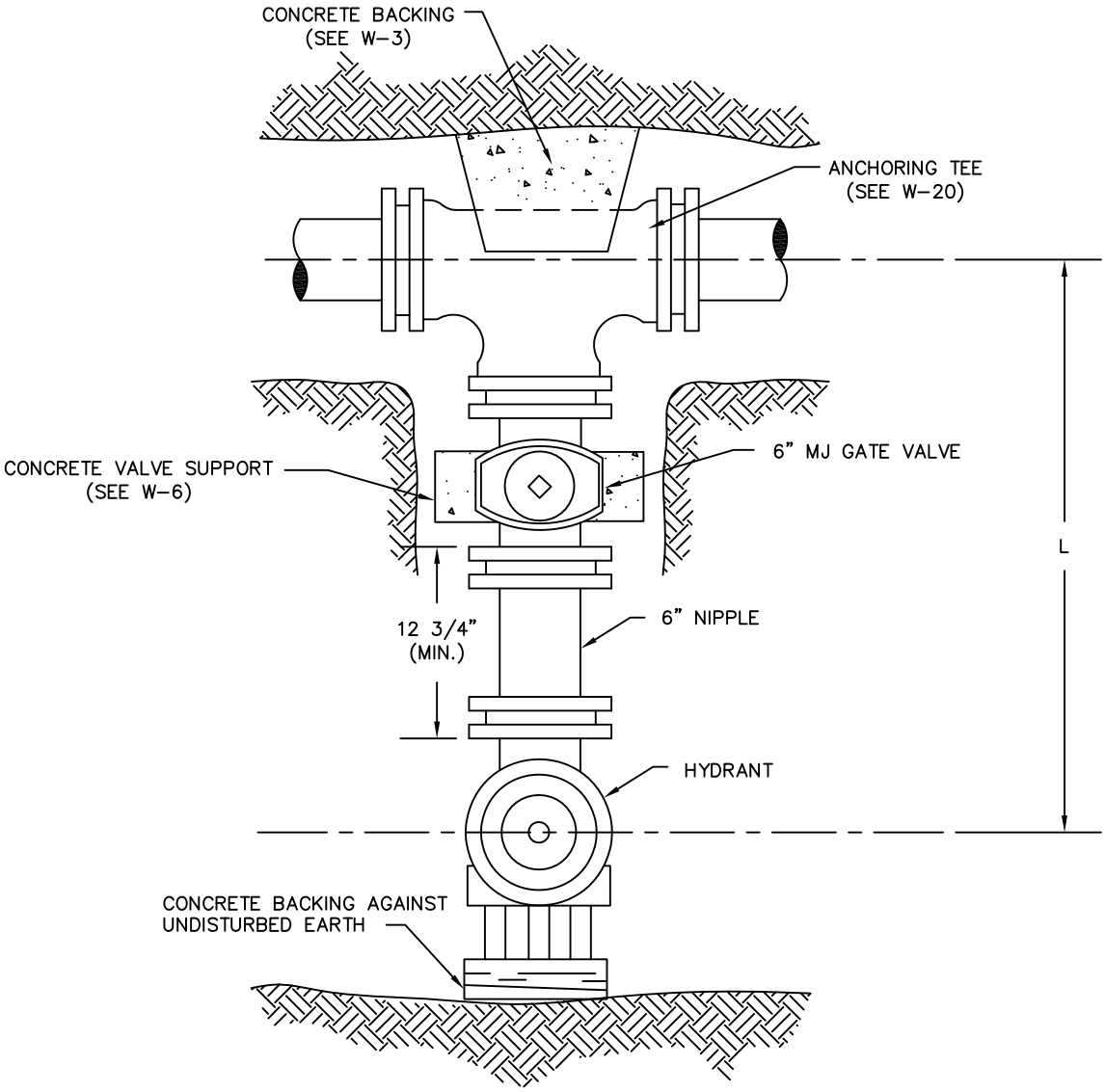
MATERIALS AND WORKMANSHIP: ALL MACHINED PARTS SHALL BE TRUE TO GUAGE SO THAT THEY WILL BE INTERCHANGEABLE BETWEEN HYDRANTS OF THE SAME MAKE AND SIZE. ALSO REQUIRED, NON-ADJUSTABLE HYDRANT WRENCHES, PROPERLY SIZED TO THE SPECIFIED OPERATING NUT DIMENSIONS AND FABRICATED BY THE HYDRANT MANUFACTURER SHALL BE SUPPLIED.

STANDARD FIRE HYDRANT DETAIL

CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED:	DRAWING NO.
12/18/15	W-15



MAIN LINE	MINIMUM L
6"	35"
8"	36"
12"	39"
16"	42"

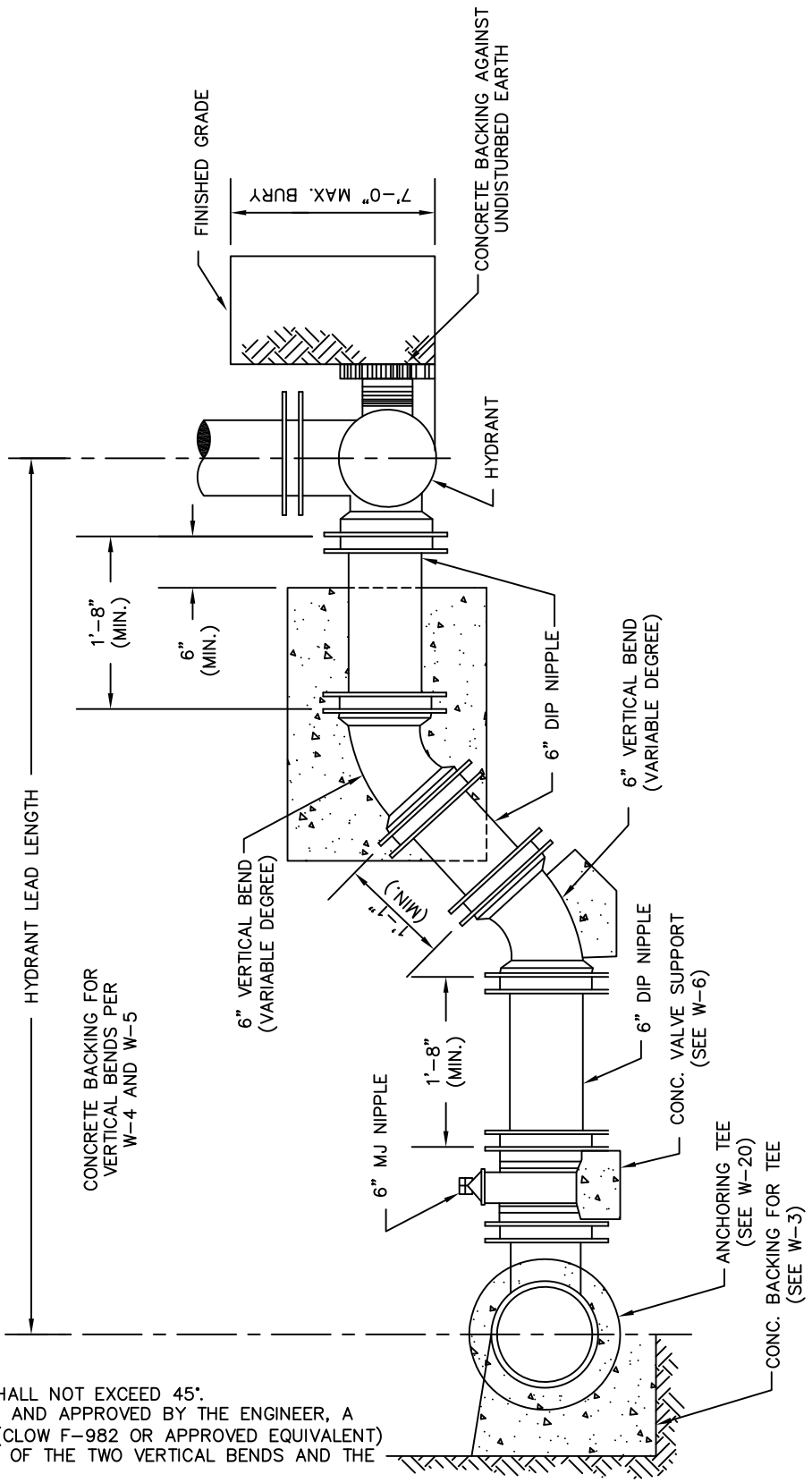
TYPICAL HYDRANT SETTING (TYPE "A")

CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

DRAWING NO. W-16



MINIMUM HYDRANT LEAD LENGTH				
SIZE OF MAIN	VERTICAL BENDS			
	11-1/4"	22-1/2"	45°	
6"	8'-3"	8'-1"	7'-8"	
8"	8'-2"	8'-2"	7'-9"	
12"	8'-6"	8'-5"	8'-0"	
16"	8'-9"	8'-8"	8'-3"	

NOTES:

1. VERTICAL BENDS SHALL NOT EXCEED 45°.
2. WHERE APPLICABLE AND APPROVED BY THE ENGINEER, A COMMERCIAL OFFSET (CLOW F-982 OR APPROVED EQUIVALENT) MAY BE USED IN LIEU OF THE TWO VERTICAL BENDS AND THE INCLINED NIPPLE.
3. CONCRETE BACKING FOR VERTICAL BENDS SHALL BE PROVIDED PER W-4 AND W-5.
4. USE ANCHOR PIPE FOR ALL PIPE, FITTINGS, AND APPURTENANCES.

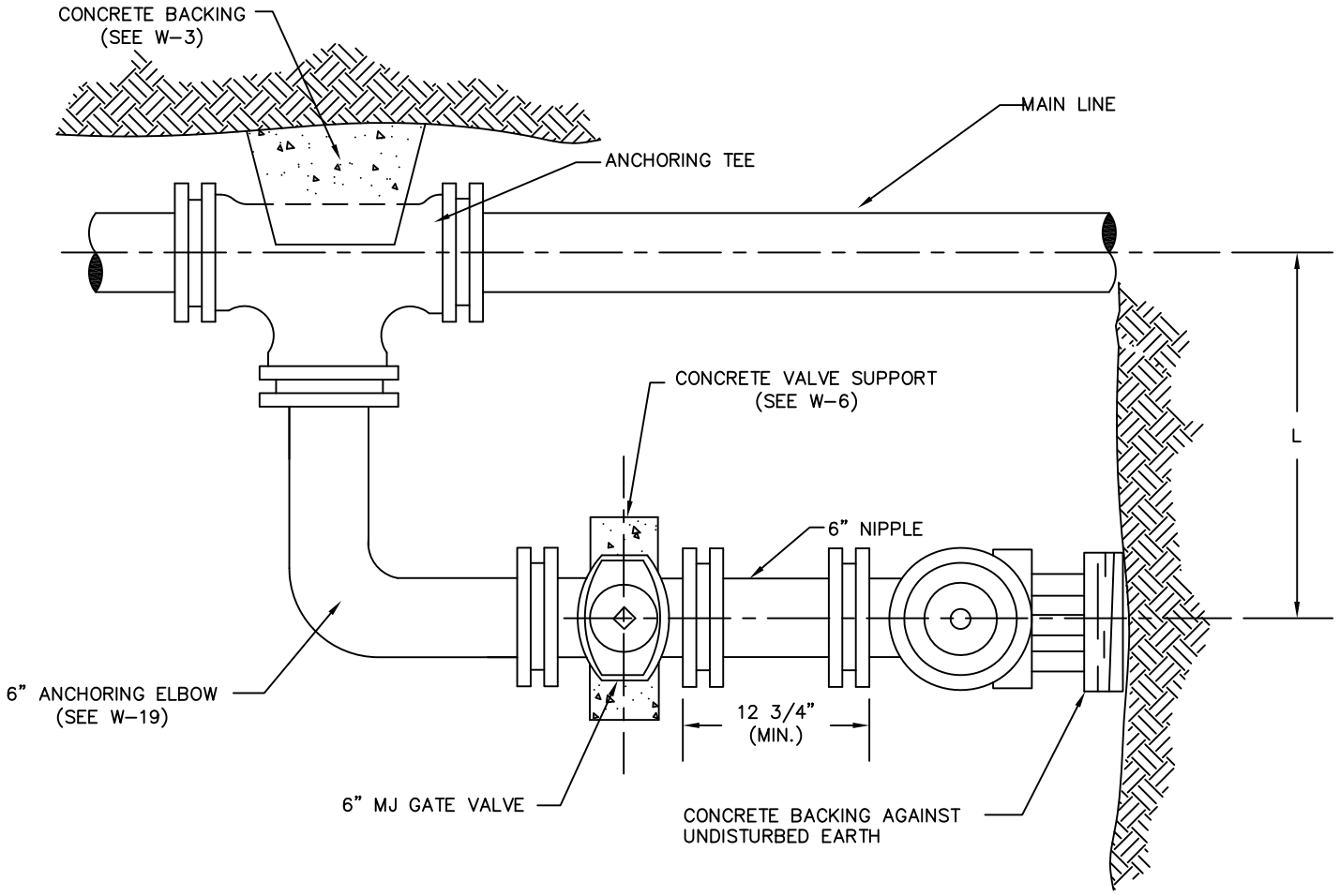
TYPICAL HYDRANT SETTING (TYPE "A" MODIFIED)

CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

DRAWING NO. W-17



MAIN LINE	MINIMUM L	
	TYPE B	TYPE B MODIFIED
6"	24"	19"
8"	25"	20"
12"	28"	23"
16"	31"	26"

NOTES:

1. TYPE B: LONG SIDE OF BEND TO TEE
TYPE B MODIFIED: SHORT SIDE OF BEND TO TEE.
2. FIRE HYDRANTS SHALL HAVE A MAXIMUM BURY OF 7'-0". MODIFICATION OF THE HYDRANT LEAD TO MEET THIS REQUIREMENT SHALL BE IN THE SECTION FROM THE VALVE TO THE HYDRANT PER W-17.
3. USE ANCHOR PIPE FOR ALL PIPE, FITTINGS, AND APPURTENANCES.

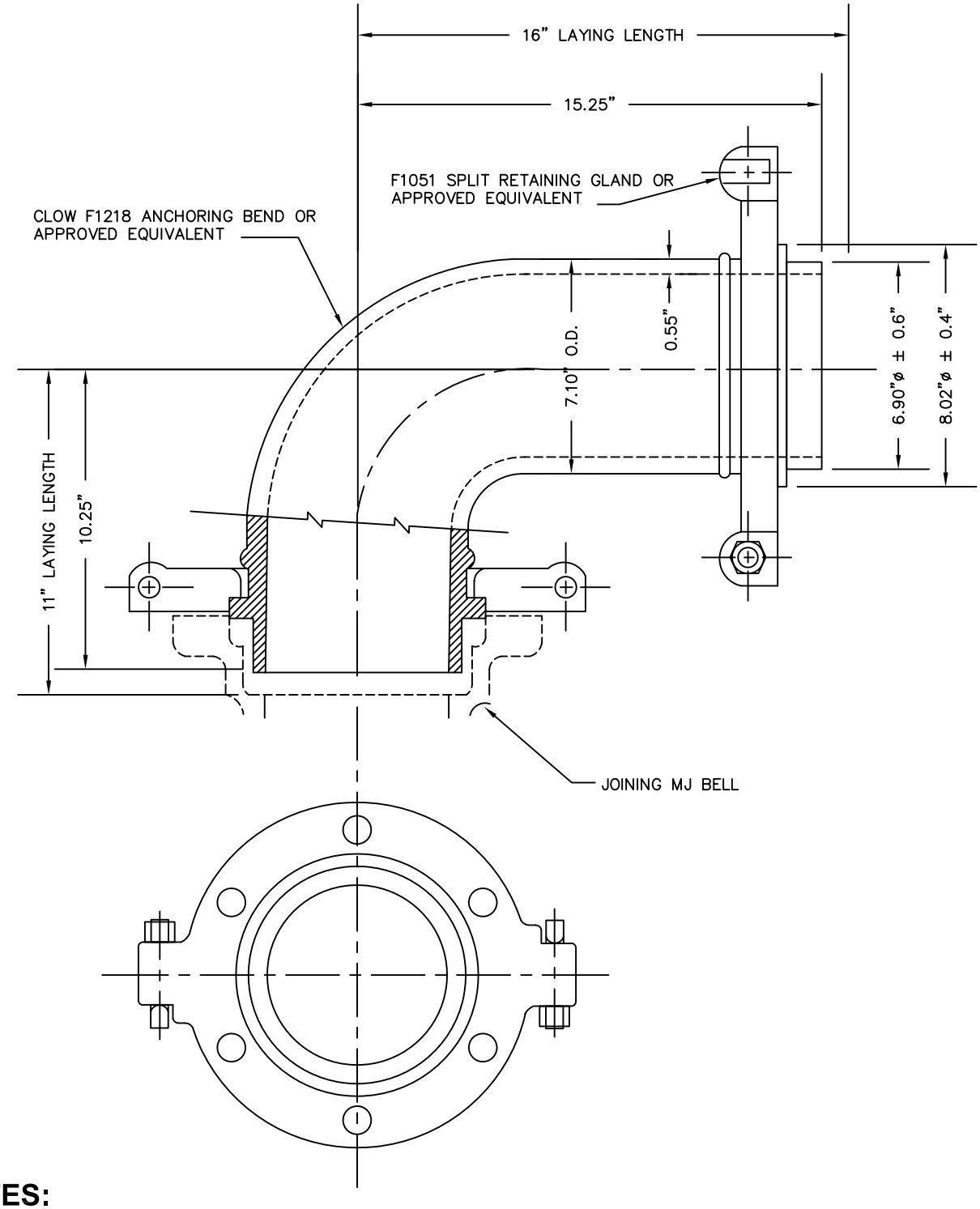
TYPICAL HYDRANT SETTING (TYPES "B" & B MODIFIED)

CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

DRAWING NO. W-18



NOTES:

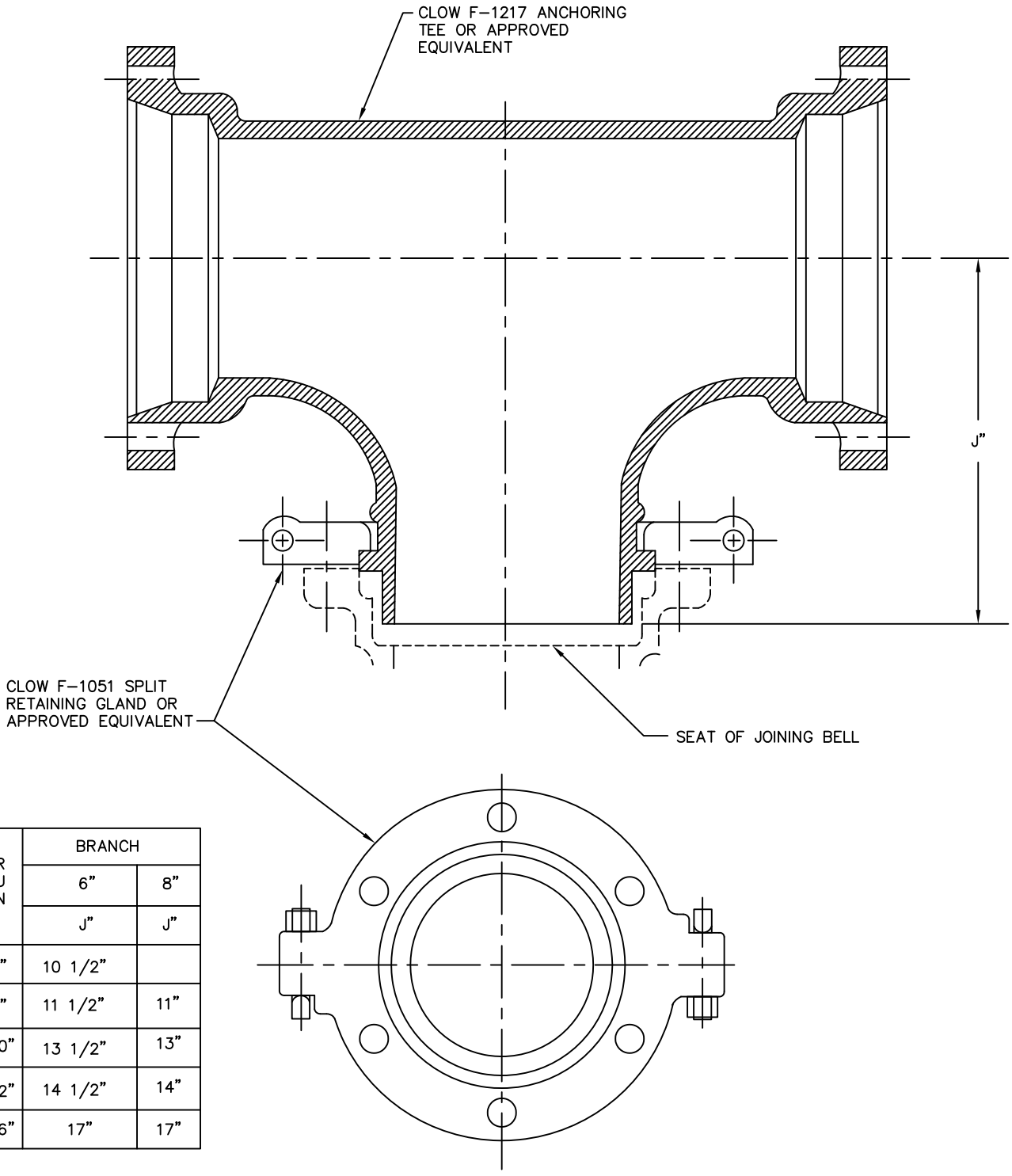
1. THIS BEND IS TO BE USED WITH TYPE B AND B MODIFIED FIRE HYDRANT INSTALLATIONS. SEE W–18.

6" ~ 90° HYDRANT BEND

CITY OF PATASKALA

STANDARD
CONSTRUCTION DWG.

REVISED:	DRAWING NO.
12/18/15	W–19



RUN	BRANCH	
	6"	8"
	J"	J"
6"	10 1/2"	
8"	11 1/2"	11"
10"	13 1/2"	13"
12"	14 1/2"	14"
16"	17"	17"

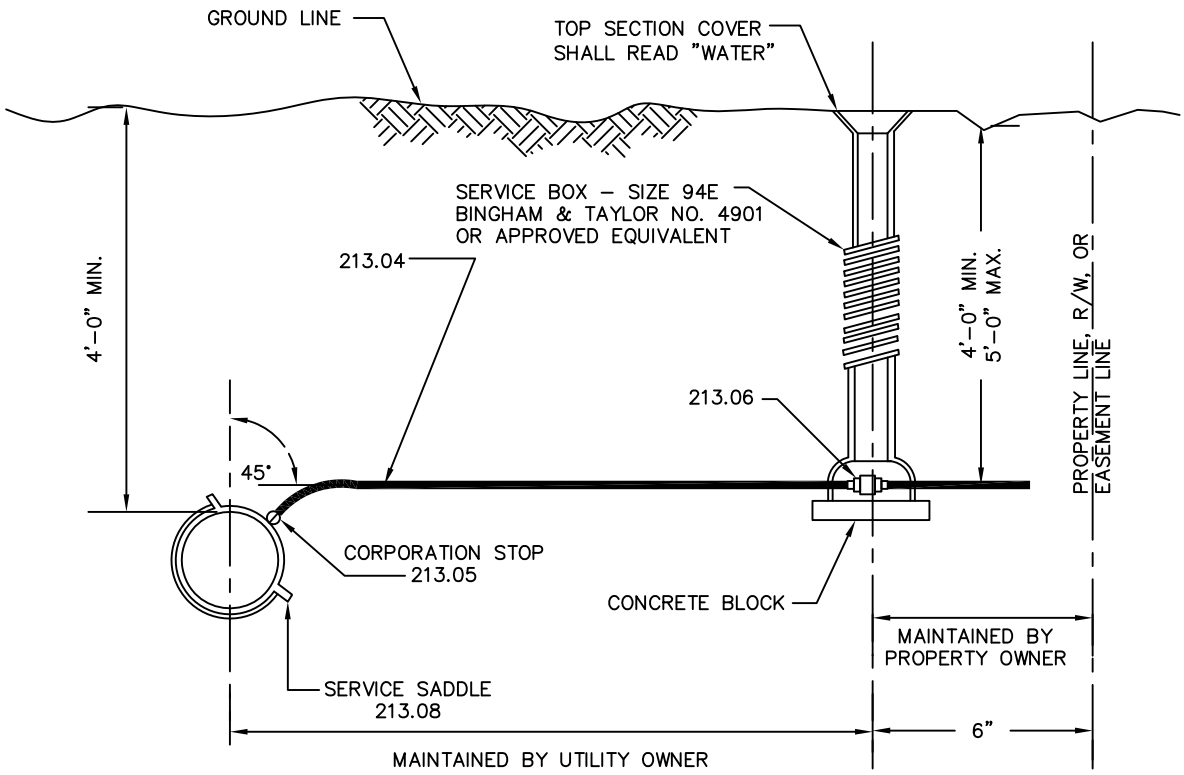
ANCHORING TEE

CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

DRAWING NO. W-20

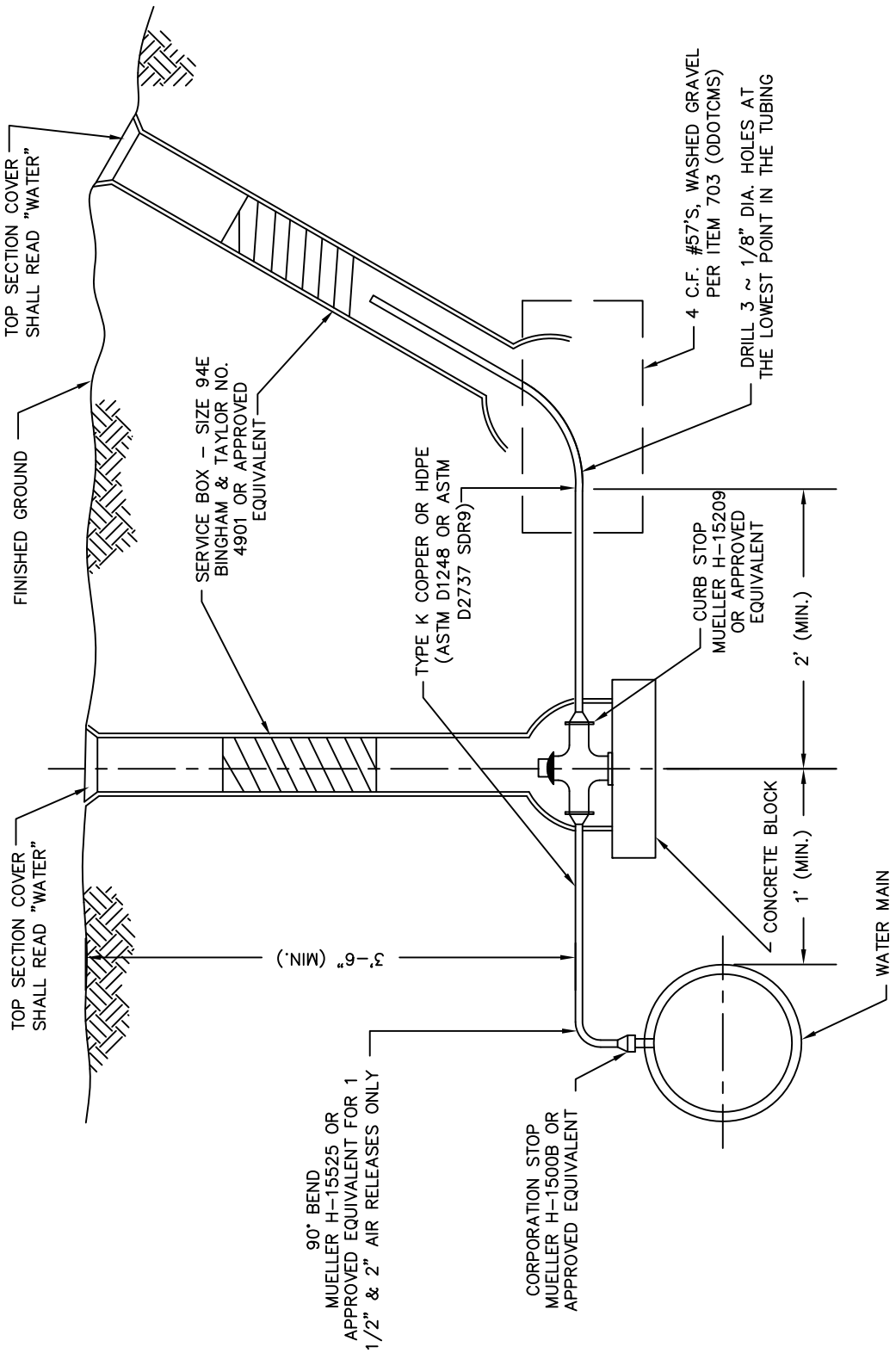


NOTES:

1. THE WATER SERVICE LINE SHALL BE A SINGLE PIECE OF PIPE WITHOUT JOINTS, COUPLINGS OR UNIONS BETWEEN:
   (a) THE CORPORATION STOP AND THE CURB STOP
   (b) THE CURB STOP AND THE METER SETTING.
2. THE WATER SERVICE LINE SHALL BE BEDDED USING TYPE 'A' BACKFILL.
3. AT THE TIME BUILDING CONSTRUCTION, SITE GRADING AND LANDSCAPING IS COMPLETED, THE VALVE BOX OVER THE CURB BOX SHALL:
   (a) BE SET VERTICALLY OVER THE CURB STOP SO THAT A KEY CAN BE PLACED ON THE CURB STOP AND THE CURB STOP EASILY OPERATES TO THE FULLY OPEN AND CLOSED POSITIONS
   (b) HAVE THE TOP SET AT FINISHED GRADE
   (c) BE UNBROKEN
4. ALL NEW WATER SERVICE INSTALLATIONS AND ALL REPAIRED OR REPLACED WATER SERVICE INSTALLATIONS SHALL BE INSPECTED PRIOR TO ACCEPTANCE OR TRANSFER OF OWNERSHIP. FAILURE TO REQUEST AN INSPECTION OR TO CORRECT THE NOTED DEFICIENCIES PRIOR TO OCCUPYING A BUILDING OR CHANGING OWNERSHIP MAY CAUSE THE SERVICE TO BE DISCONTINUED. THE SERVICE LINE TO BE DISCONNECTED FROM THE WATER SYSTEM, AND/OR PENALTIES TO BE IMPOSED, ALL AS PROVIDED IN THE CURRENT WATER REGULATIONS.

STANDARD WATER SERVICE

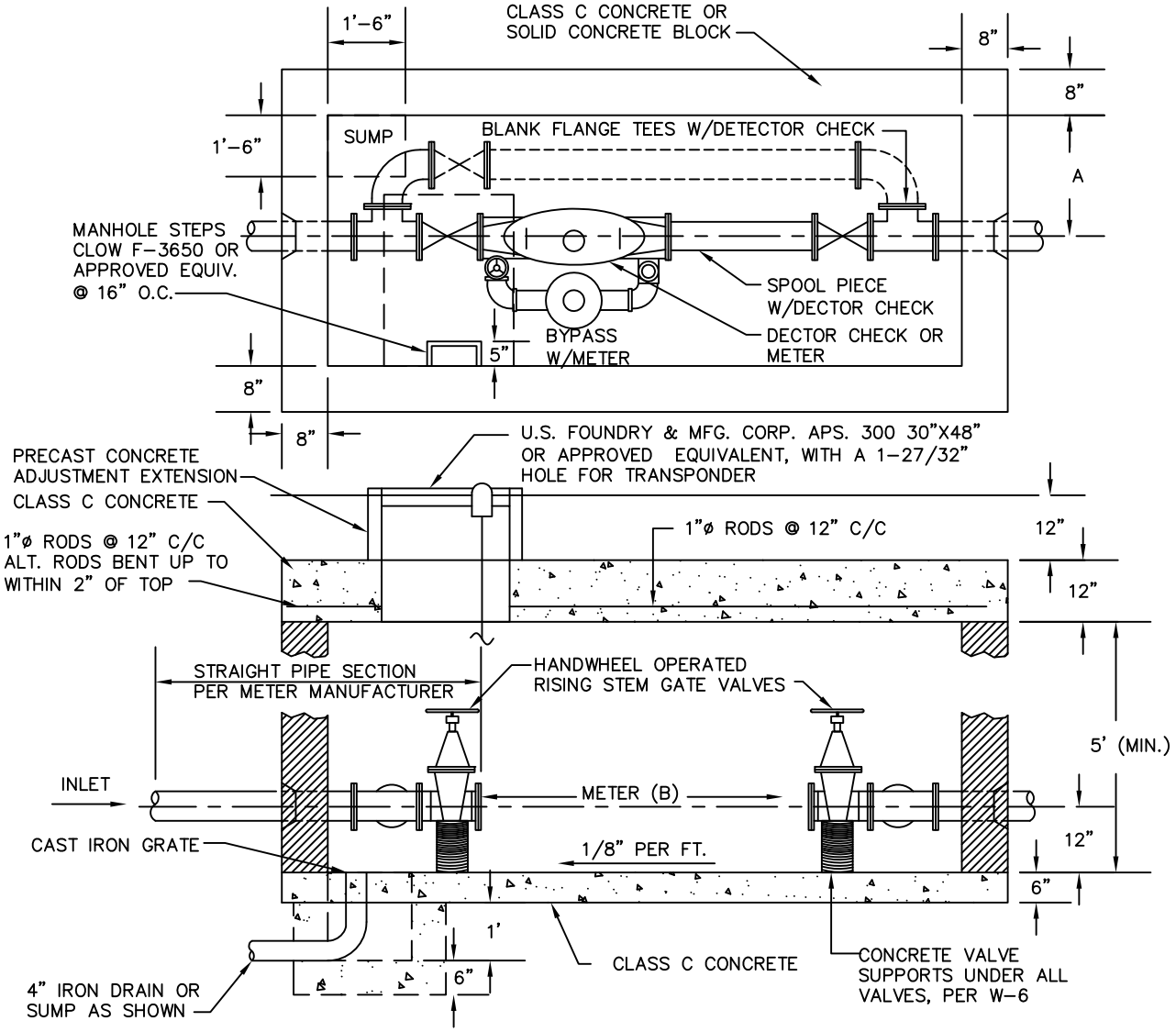
CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W–21



TYPICAL AIR RELEASE
3/4" THRU 2"

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W-22

*DIAMETER = SIZE OF METER OR SERVICE LINE; NOT TO BE INSTALLED W/DETECTOR CHECK OR SERVICES LESS THAN 2"



METER PITS WITH SUMPS SHALL BE EQUIPPED WITH SUMP PUMPS. ALL METER PITS SHALL HAVE A WEATHERPROOF 110V, 20 AMP OUTLET ADJACENT TO THE PIT.

SIZE			INSIDE VAULT DIMENSIONS		METER LENGTH				A	B
METER	FM-CT BYPASS	DETECTOR BYPASS	LENGTH	WIDTH	FM-CT	DETECTOR	COMPOUND	DISC		
1 1/2"			6'-0"	4'-0"				12 5/8"	1'-6"	
2"			7'-0"	4'-0"			1'-5"		1'-6"	1'-5"
3"			8'-0"	4'-0"			2'-0"		1'-6"	2'-0"
4"	2"	1"	8'-0"	5'-0"	2'-9"	1'-4 1/2"	2'-5"		2'-0"	2'-9"
6"	3"	1 1/2"	10'-0"	6'-3"	3'-9"	1'-10 1/2"			2'-8"	3'-9"
8"	4"	2"	11'-0"	7'-3"	4'-5"	2'-2 1/2"			3'-0"	5'-8"
10"	6"	2"	14'-6"	8'-0"	5'-8"	3'-0"			3'-0"	5'-8"
10X12	8"		14'-6"	8'-0"	5'-8"				3'-0"	5'-8"

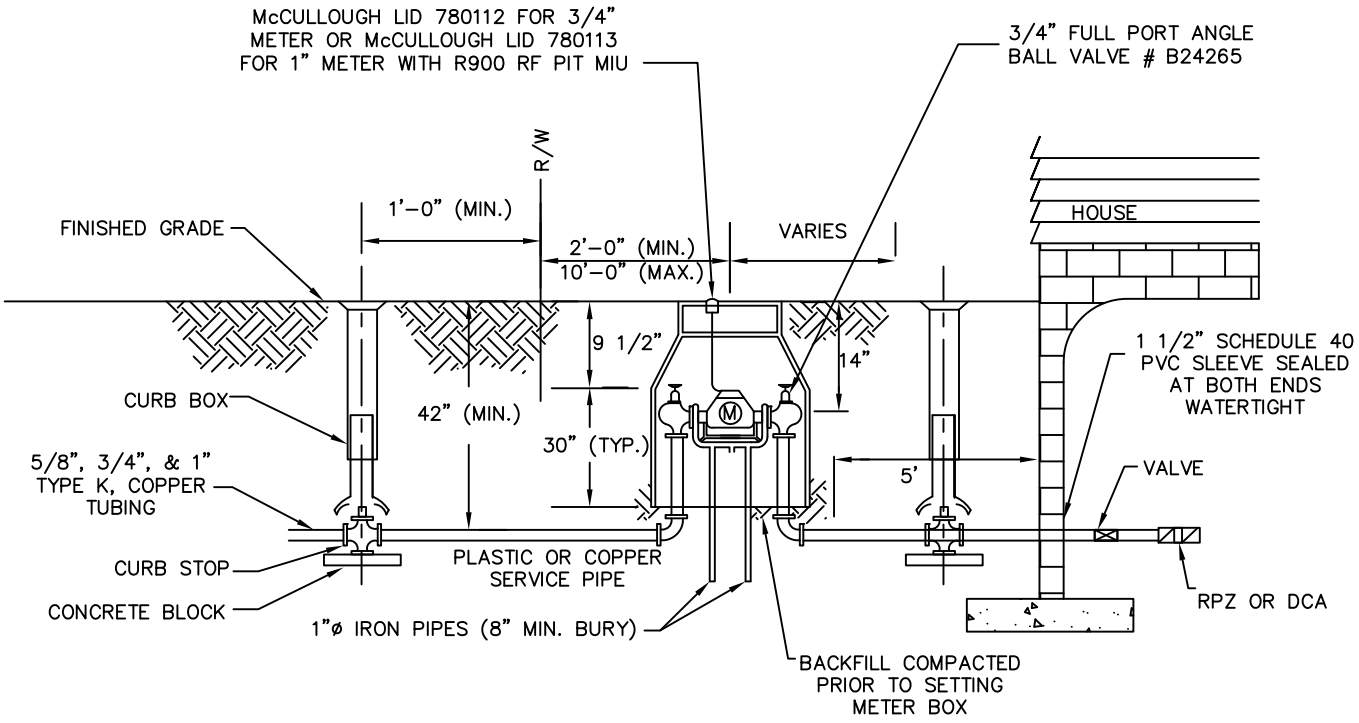
STANDARD METER PIT

CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

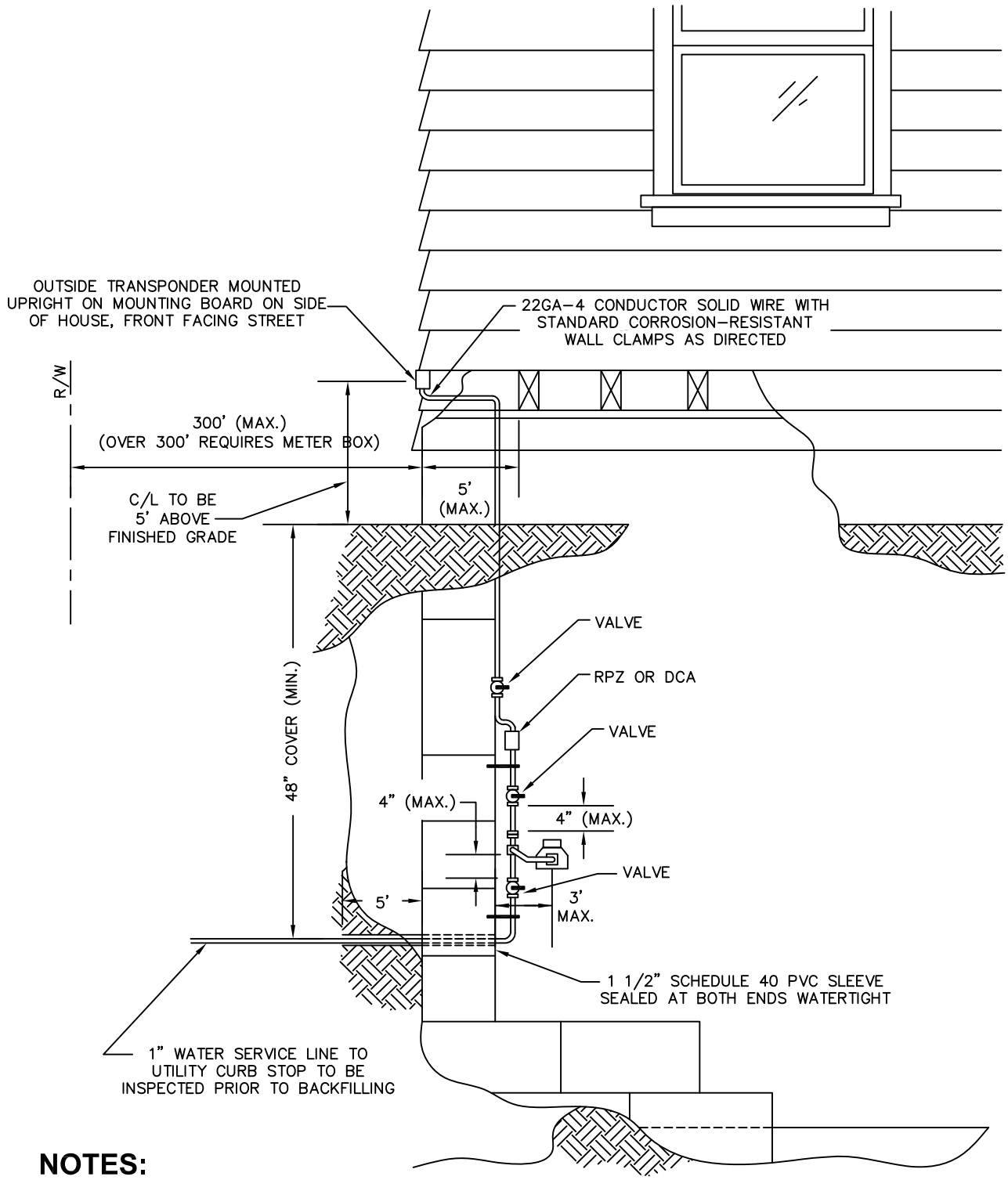
DRAWING NO. W-23



NOTE: METER INSTALLATION SHALL BE INSPECTED AND APPROVED BY THE CITY

TYPICAL METER BOX (5/8" TO 1" METERS)

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W-24

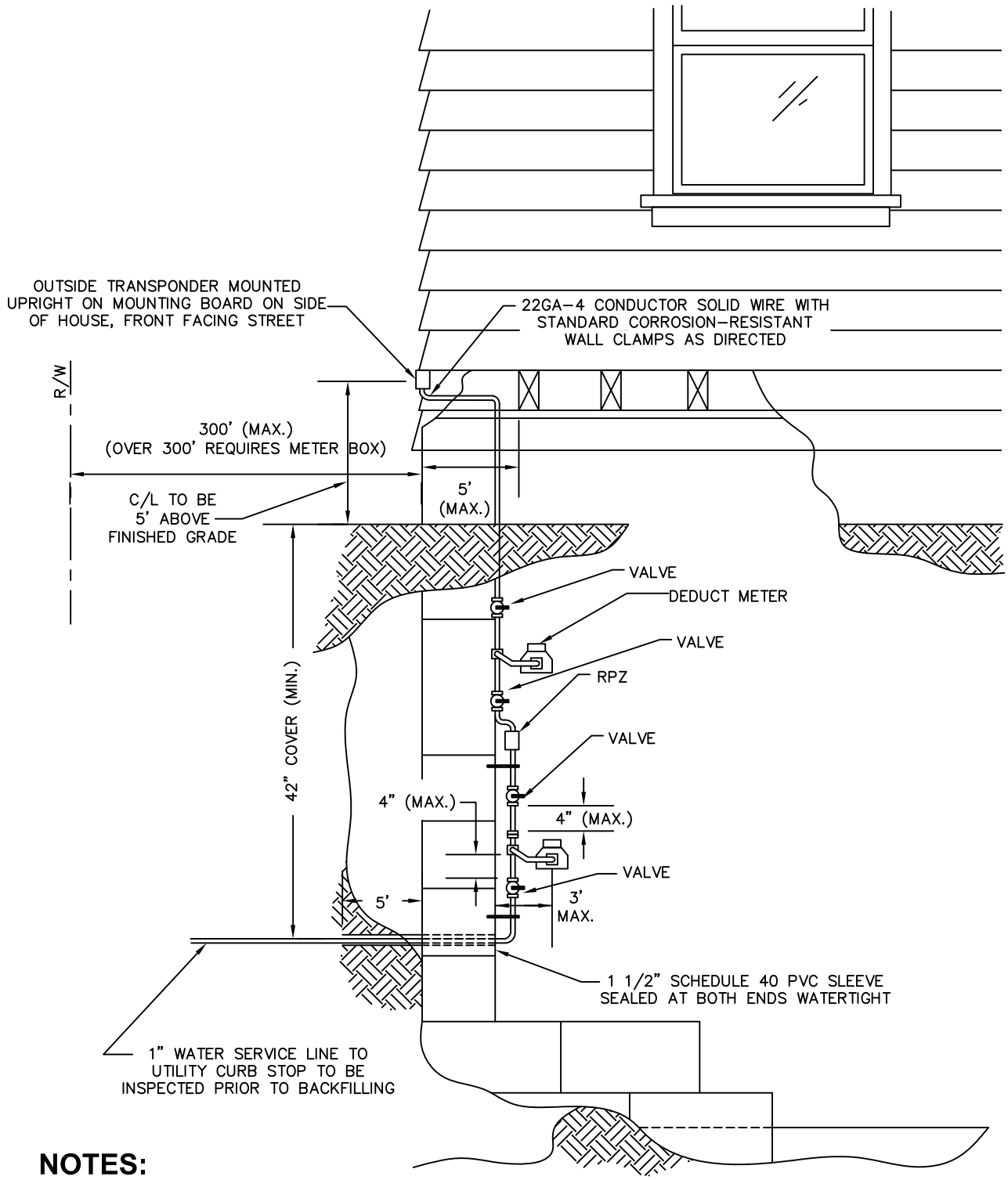


NOTES:

1. INSTALATION SHALL BE DONE AND INSPECTED AND APPROVED BY THE CITY.
2. NO METER BYPASSES ARE PERMITTED.
3. EXTERIOR METER SHALL BE INSTALLED ON THE FRONT OF THE HOUSE FACING THE STREET OR WITHIN 1'–0" OF A CORNER FACING THE STREET.
4. ALL CONDUIT AND PIPING SHALL BE PROPERLY SUPPORTED.

TYPICAL WATER METER (BASEMENT INSTALLATION)

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W–25

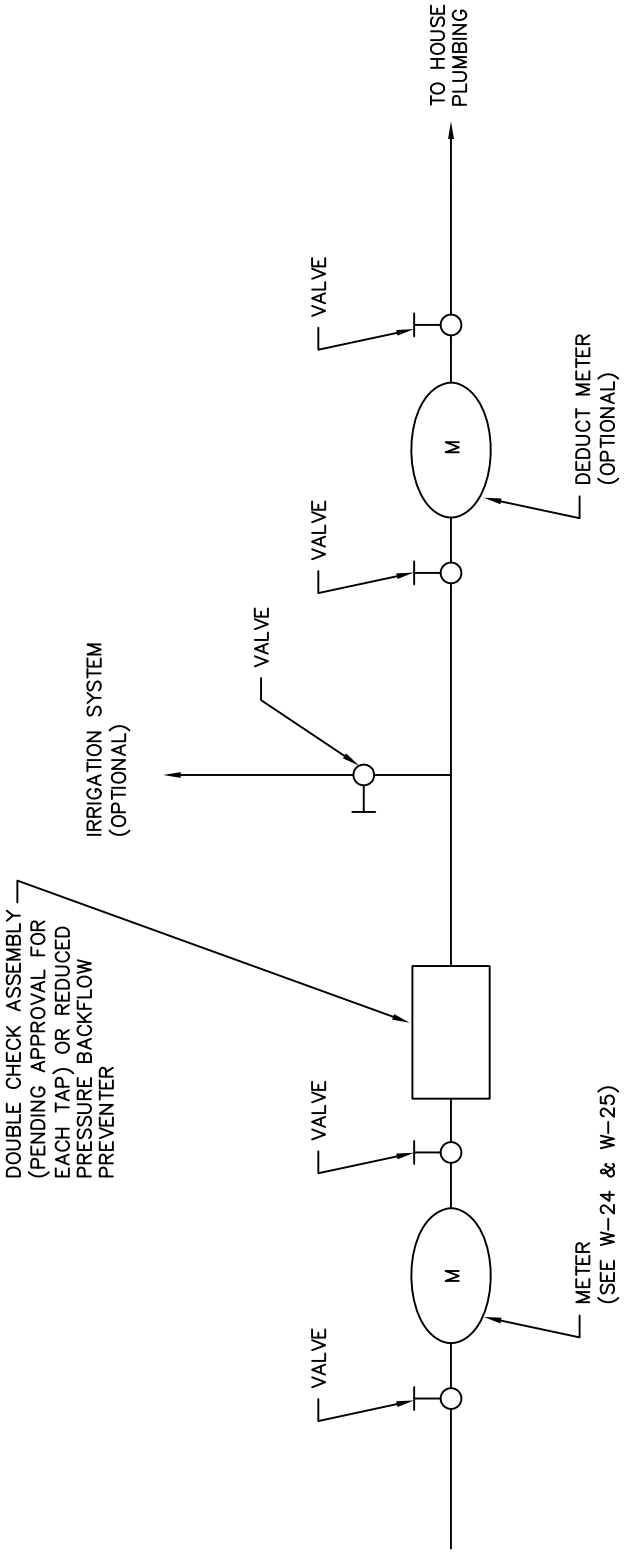


NOTES:

1. INSTALATION SHALL BE DONE AND INSPECTED AND APPROVED BY THE CITY.
2. NO METER BYPASSES ARE PERMITTED.
3. EXTERIOR METER SHALL BE INSTALLED ON THE FRONT OF THE HOUSE FACING THE STREET OR WITHIN 1'–0" OF A CORNER FACING THE STREET.
4. ALL CONDUIT AND PIPING SHALL BE PROPERLY SUPPORTED.

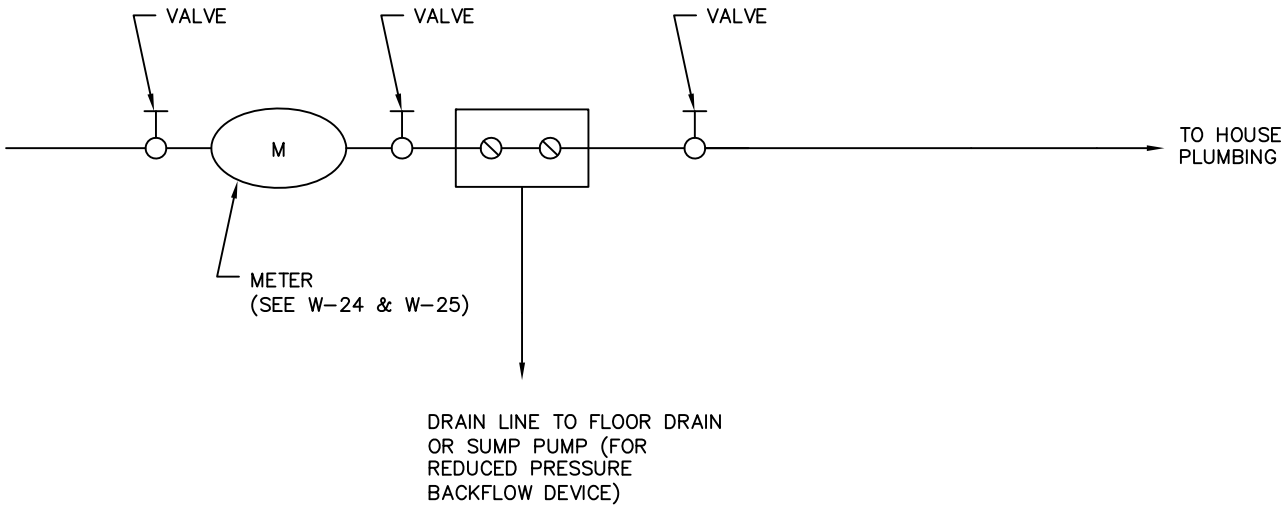
TYPICAL DEDUCT METER (BASEMENT INSTALLATION)

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W–26



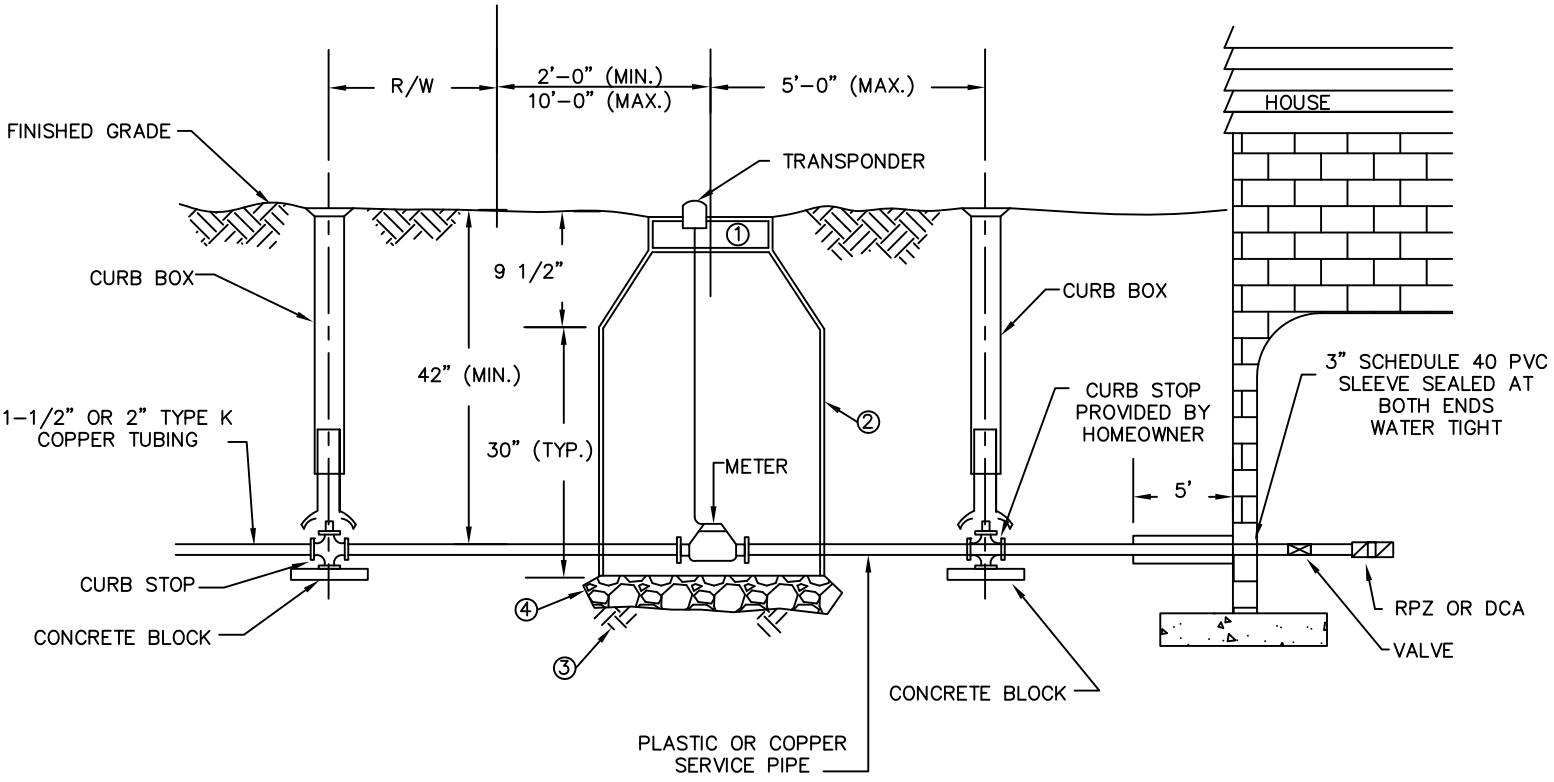
BACKFLOW DEVICE INSTALLATION WITH DEDUCT METER

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W-27



BACKFLOW DEVICE INSTALLATION

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W-28

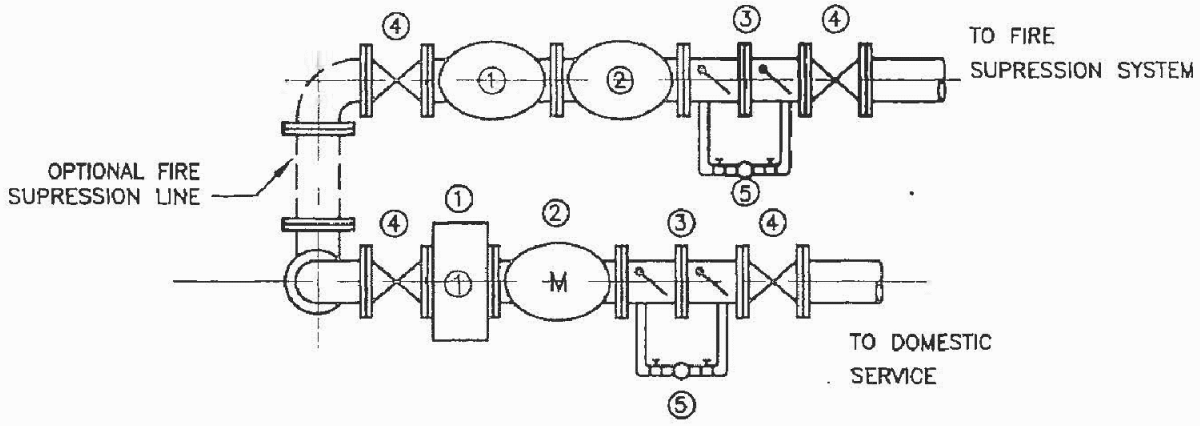


NOTE: METER INSTALLATION SHALL BE INSPECTED AND APPROVED BY THE CITY

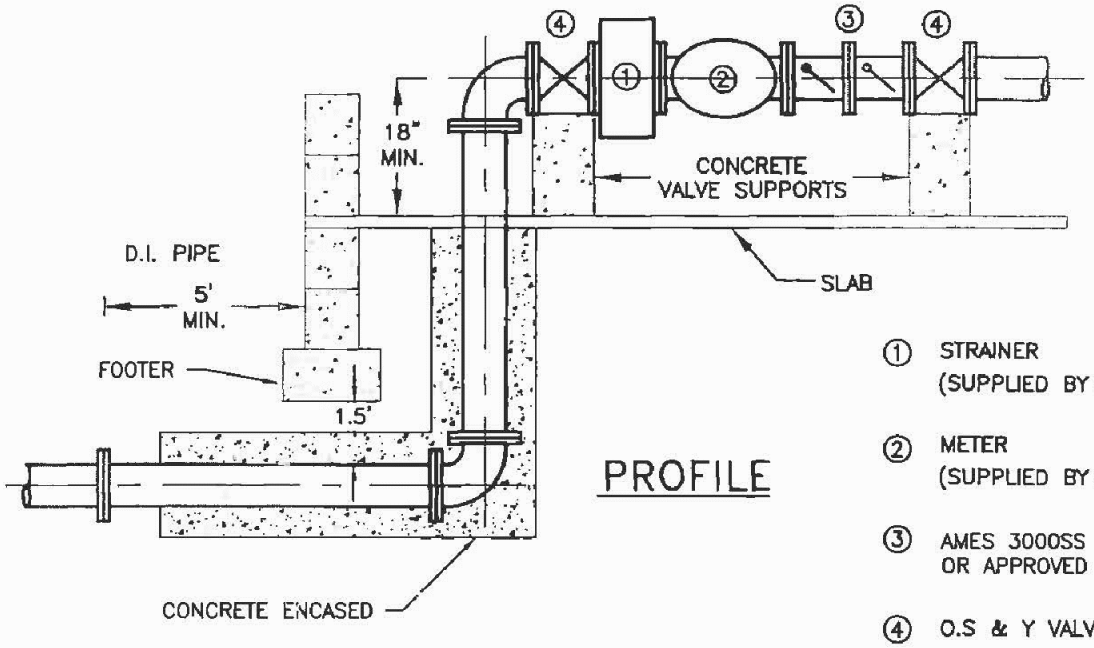
① FROSTPROOF, SINGLE LID METER BOX COVER, FORD C32-T OR APPROVED EQUIVALENT WITH A 1-27/32" HOLE FOR TRANSPONDER
② 36" I.D. VIKING ENVIRONMENTAL RIB BOX, 36" I.D. HANCOR PLASTIC METER BOX, OR APPROVED EQUIVALENT
③ BACKFILL COMPACTED PRIOR TO SETTING
④ 6" ITEM 304 GRAVEL
⑤ INSTALL OUT OF TRAFFIC AREAS

TYPICAL METER BOX
1-1/2" & 2" METERS

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W-29



PLAN



PROFILE

① STRAINER
(SUPPLIED BY CITY)

② METER
(SUPPLIED BY CITY)

③ AMES 3000SS DCDA
OR APPROVED EQUAL

④ O.S & Y VALVE

⑤ DETECTOR ASSEMBLY

TYPICAL WATER METER
(2–1/2" TO 12")

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. W–30

NUMBER OF JOINTS	GALLONS PER HOUR		
	6" PIPE	8" PIPE	12" PIPE
1	.01	.01	.02
2	.02	.03	.04
3	.03	.04	.06
4	.04	.05	.08
5	.05	.07	.10
6	.06	.08	.12
7	.07	.09	.14
8	.08	.11	.16
9	.09	.12	.18
10	.10	.13	.20
11	.11	.15	.22
12	.12	.16	.24
13	.13	.17	.26
14	.14	.18	.28
15	.15	.20	.30
16	.16	.21	.32
17	.17	.22	.34
18	.18	.24	.36
19	.19	.25	.38
20	.20	.26	.40
21	.21	.28	.42
22	.22	.29	.44
23	.23	.30	.46
24	.24	.32	.48
25	.25	.33	.50
26	.26	.34	.52
27	.27	.36	.54
28	.28	.37	.56
29	.29	.38	.58
30	.30	.40	.60
31	.31	.41	.62
32	.32	.42	.64
33	.33	.44	.65
34	.34	.45	.67
35	.35	.46	.70
36	.36	.48	.72
37	.37	.49	.73
38	.38	.50	.75
39	.39	.52	.77
40	.40	.53	.79

NUMBER OF JOINTS	GALLONS PER HOUR		
	6" PIPE	8" PIPE	12" PIPE
41	.41	.54	.81
42	.42	.56	.83
43	.43	.57	.85
44	.44	.58	.87
45	.45	.60	.89
46	.46	.61	.91
47	.47	.62	.93
48	.48	.64	.95
49	.49	.65	.97
50	.50	.66	.99
51	.51	.67	1.01
52	.52	.69	1.03
53	.53	.70	1.05
54	.54	.71	1.07
55	.55	.73	1.09
56	.56	.74	1.11
57	.57	.75	1.13
58	.58	.77	1.15
59	.59	.78	1.17
60	.60	.79	1.19
61	.61	.81	1.21
62	.62	.82	1.23
63	.63	.83	1.25
64	.64	.85	1.27
65	.65	.86	1.29
66	.66	.87	1.31
67	.66	.89	1.33
68	.67	.90	1.35
69	.68	.91	1.37
70	.69	.93	1.39
71	.70	.94	1.41
72	.71	.95	1.43
73	.72	.97	1.45
74	.73	.98	1.47
75	.74	.99	1.49
76	.75	1.01	1.51
77	.76	1.02	1.53
78	.77	1.03	1.55
79	.78	1.05	1.57
80	.79	1.06	1.59

NUMBER OF JOINTS	GALLONS PER HOUR		
	6" PIPE	8" PIPE	12" PIPE
81	.80	1.07	1.61
82	.81	1.09	1.63
83	.82	1.10	1.65
84	.83	1.11	1.67
85	.84	1.12	1.69
86	.85	1.14	1.71
87	.86	1.15	1.73
88	.87	1.16	1.75
89	.88	1.18	1.77
90	.89	1.19	1.79
91	.90	1.20	1.81
92	.91	1.22	1.83
93	.92	1.23	1.85
94	.93	1.24	1.87
95	.94	1.26	1.89
96	.95	1.27	1.91
97	.96	1.28	1.93
98	.97	1.30	1.95
99	.98	1.31	1.97
100	.99	1.32	1.99
200	1.99	2.65	3.97
300	2.98	3.97	5.96
400	3.97	5.30	7.94
500	4.97	6.62	9.93

FORMULA: $L = \frac{ND\sqrt{P}}{7400}$

WHERE L = LEAKAGE (GAL./HR.)
N = NUMBER OF JOINTS
D = NOMINAL DIAMETER (IN.)
P = TEST PRESSURE (150 PSI)

THESE CALCULATIONS ARE BASED ON CURRENT AWWA C600 SPECIFICATIONS, SECTION 4.1 – HYDROSTATIC TESTING. PRESSURE DURING TESTING SHALL BE MAINTAINED AT 150 PSI AS SHOWN HEREIN OR AT ONE AND ONE HALF TIMES THE WORKING PRESSURE, WHICHEVER IS GREATER.

ALLOWABLE LEAKAGE PER HOUR (WATER LINE)

CITY OF PATASKALA

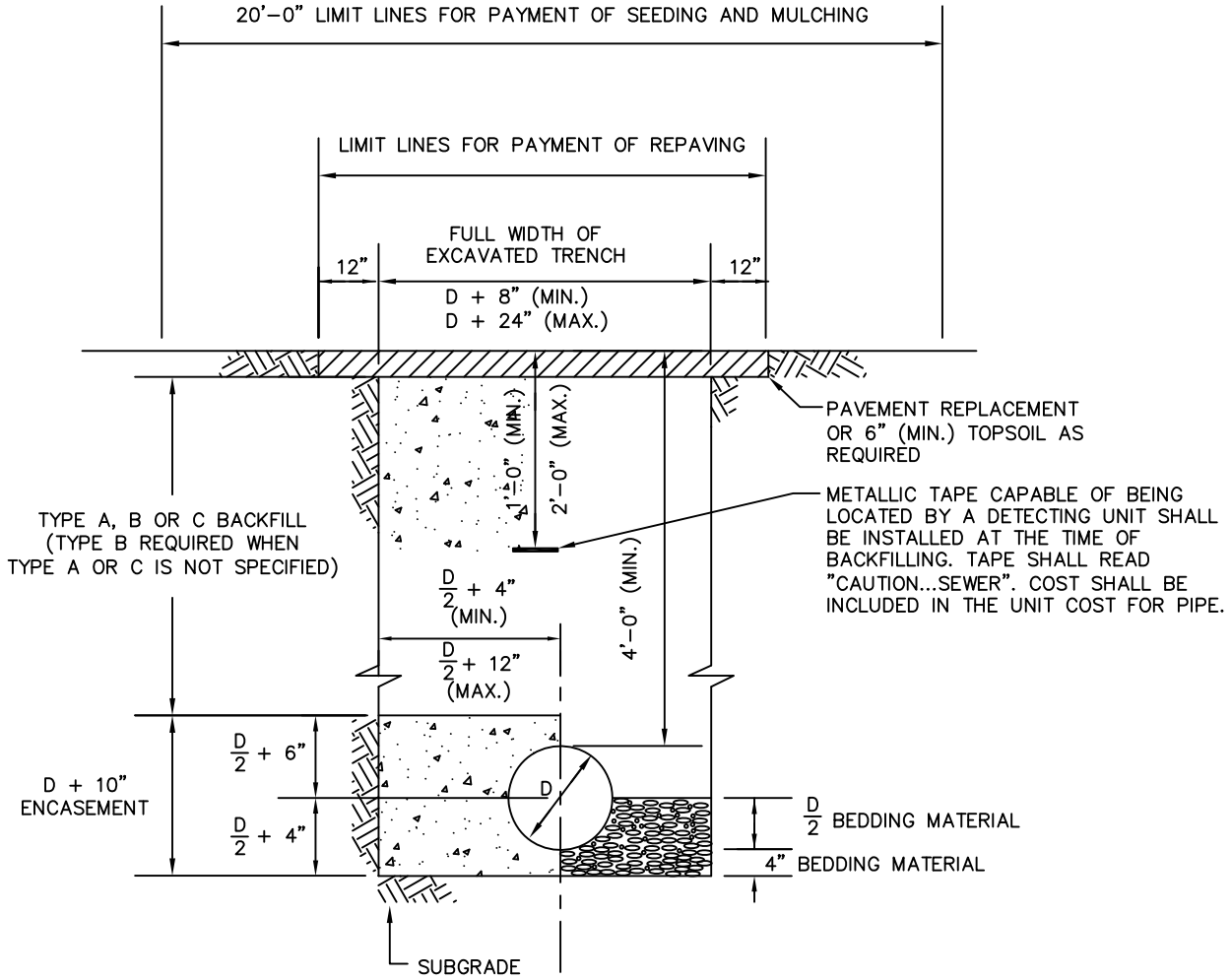
STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

DRAWING NO. W-31

TABLE OF CONTENTS

CHAPTER II – SANITARY SEWER STANDARD DRAWINGS



SECTION WITH ENCASEMENT

SECTION WITH BEDDING MATERIAL

NOTES:

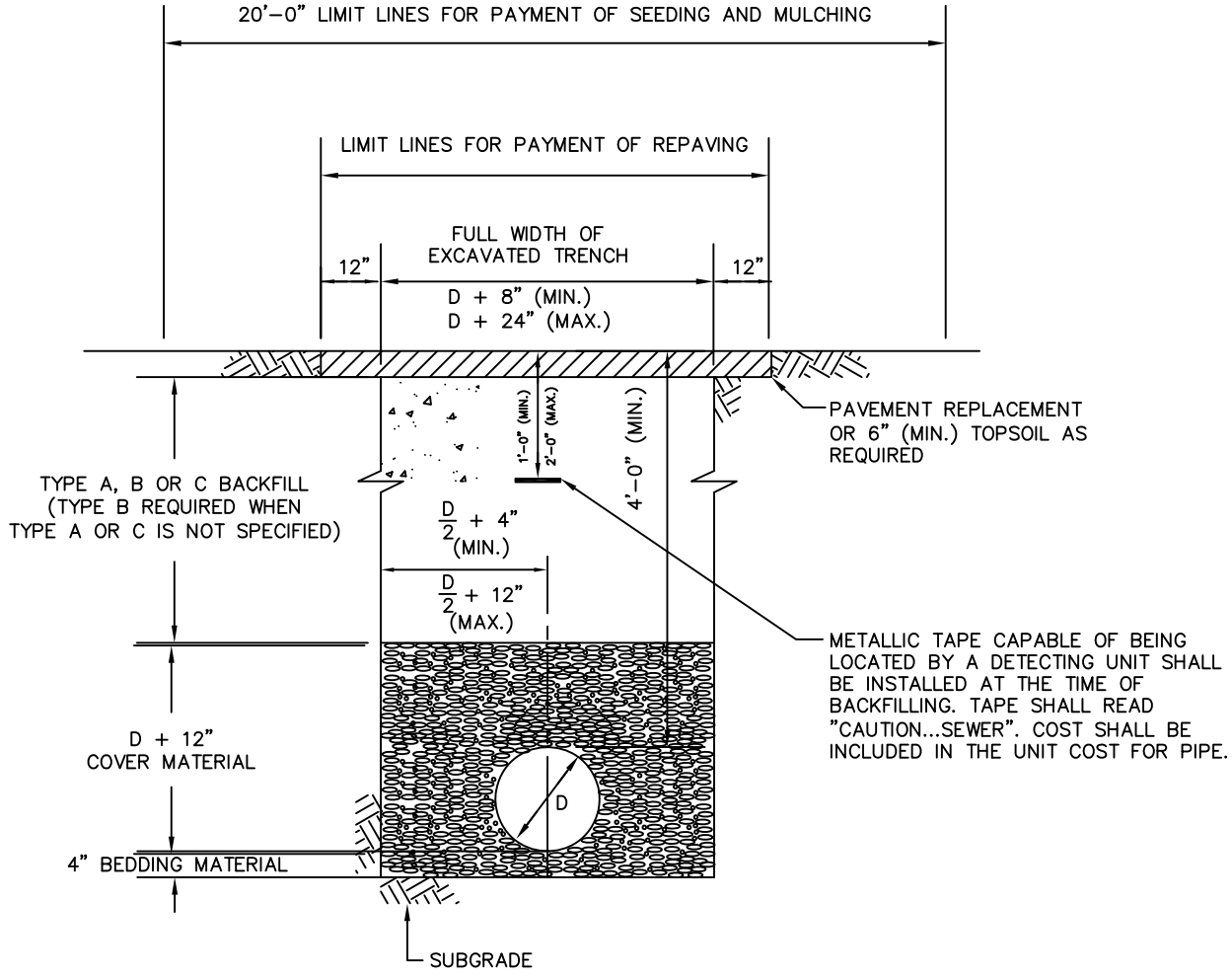
1. ITEM NUMBERS REFER TO THE STATE OF OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS.
2. AGGREGATE FOR BEDDING SHALL BE NO. 57, ITEM 703.
3. TYPE A BACKFILL SHALL BE GRANULAR MATERIAL AS SPECIFIED IN ITEM 304, GRADE A. TYPE A BACKFILL SHALL BE USED WHEN THE TRENCH IS 5' OR LESS FROM ANY PAVED OR GRAVEL SURFACE OR BENEATH THE PAVEMENT OR GRAVEL. COMPACTION SHALL MEET THE REQUIREMENTS OF ITEM 203.
4. TYPE B BACKFILL SHALL BE NATURAL SOIL FREE FROM STONES LARGER THAN 2" ACROSS THEIR GREATEST DIMENSION. TOPSOIL, VEGETATION, DEBRIS, RUBBISH OR FROZEN MATERIAL, COMPACTED TO 95% OF IT'S MAXIMUM LABORATORY DRY WEIGHT.
5. TYPE C BACKFILL SHALL BE NATURAL SOIL FREE FROM STONES LARGER THAN 6" ACROSS THEIR GREATEST DIMENSION. VEGETATION, DEBRIS, RUBBISH OR FROZEN MATERIAL, COMPACTED TO 90% OF IT'S MAXIMUM LABORATORY DRY WEIGHT. WHEN APPROVED BY THE ENGINEER, STONES NO LARGER THAN ONE CUBIC FOOT MAY BE DEPOSITED AT LEAST 3' ABOVE THE TOP OF THE PIPE.
6. THE EXCAVATED TRENCH WIDTH 12" ABOVE THE CONDUIT MAY BE INCREASED WITHOUT ADDITIONAL COMPENSATION.
7. RIGID PIPE SHALL INCLUDE DUCTILE IRON.
8. ENCASEMENT SHALL BE CLASS C CONCRETE.
9. SECTIONS ARE SYMMETRICAL ABOUT THE CENTERLINE.

TYPICAL TRENCH FOR RIGID PIPE

CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED:	DRAWING NO.
12/18/15	SAN-1



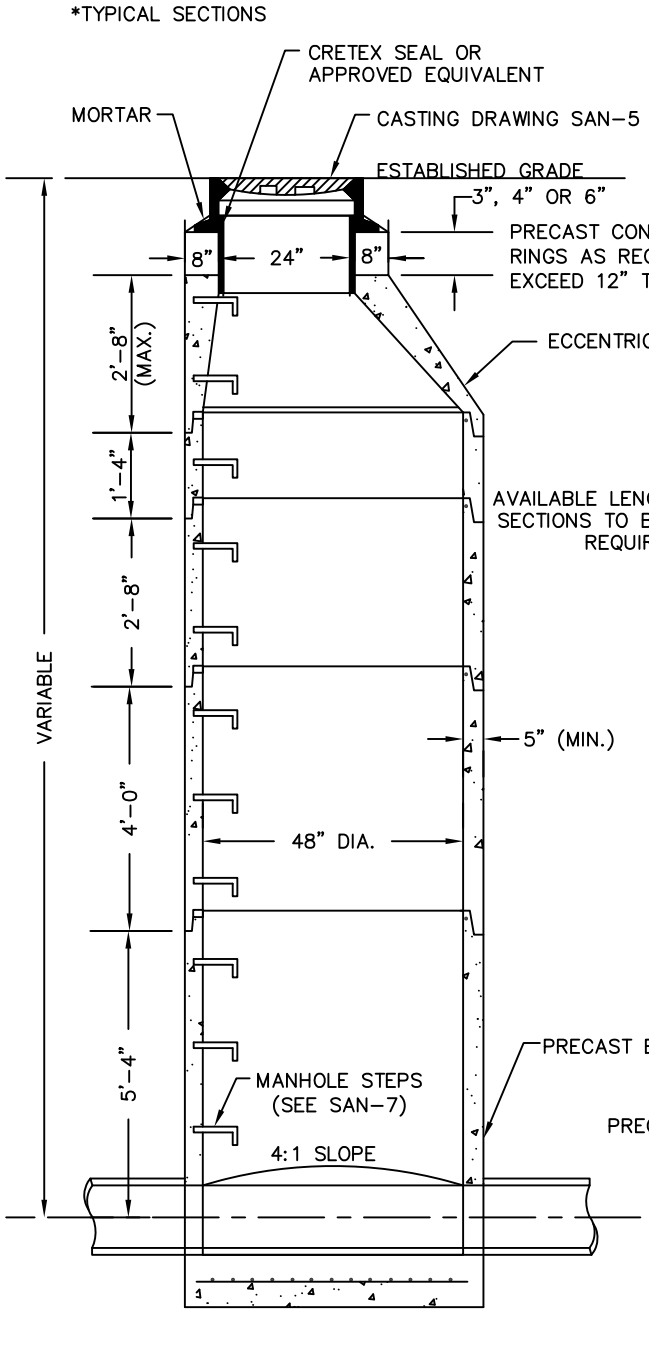
NOTES:

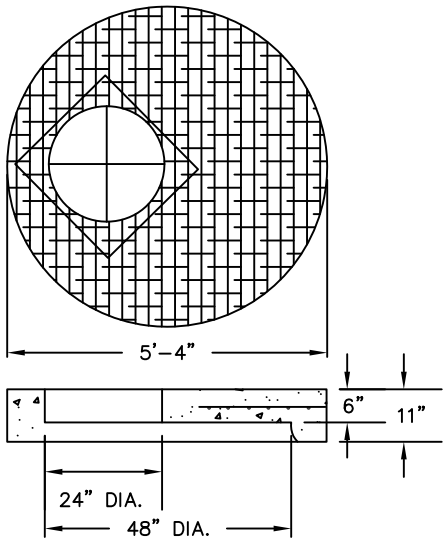
1. AGGREGATE FOR BEDDING AND COVER SHALL BE #57 LIMESTONE OR 3/4 #57 ROUND WASHED GRAVEL.
2. TYPE A BACKFILL SHALL BE GRANULAR MATERIAL AS SPECIFIED IN ITEM 304, GRADE A. TYPE A BACKFILL SHALL BE USED WHEN THE TRENCH IS 5' OR LESS FROM ANY PAVED OR GRAVEL SURFACE OR BENEATH THE PAVEMENT OR GRAVEL. COMPACTION SHALL MEET THE REQUIREMENTS OF ITEM 203.
3. TYPE B BACKFILL SHALL BE NATURAL SOIL FREE FROM STONES LARGER THAN 2" ACROSS THEIR GREATEST DIMENSION. TOPSOIL, VEGETATION, DEBRIS, RUBBISH OR FROZEN MATERIAL, COMPACTED TO 95% OF IT'S MAXIMUM LABORATORY DRY WEIGHT.
4. TYPE C BACKFILL SHALL BE NATURAL SOIL FREE FROM STONES LARGER THAN 6" ACROSS THEIR GREATEST DIMENSION. VEGETATION, DEBRIS, RUBBISH OR FROZEN MATERIAL, COMPACTED TO 90% OF IT'S MAXIMUM LABORATORY DRY WEIGHT. WHEN APPROVED BY THE ENGINEER, STONES NO LARGER THAN ONE CUBIC FOOT MAY BE DEPOSITED AT LEAST 3' ABOVE THE TOP OF THE PIPE.
5. THE EXCAVATED TRENCH WIDTH 12" ABOVE THE CONDUIT MAY BE INCREASED WITHOUT ADDITIONAL COMPENSATION.
6. FLEXIBLE PIPE SHALL INCLUDE PVC AND POLYETHYLENE.

TYPICAL TRENCH FOR FLEXIBLE PIPE

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN–2

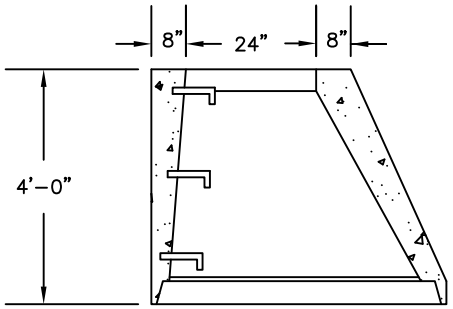
*TYPICAL SECTIONS



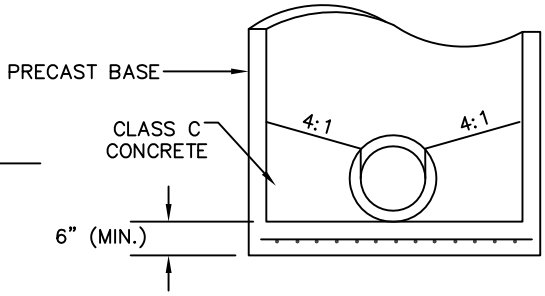


ALTERNATE TOP SLAB

(SEE NOTE #1)



ALTERNATE ECCENTRIC CONE SECTION

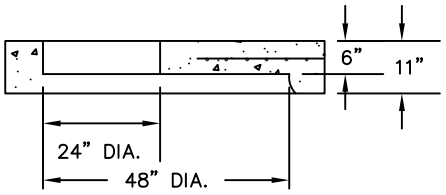


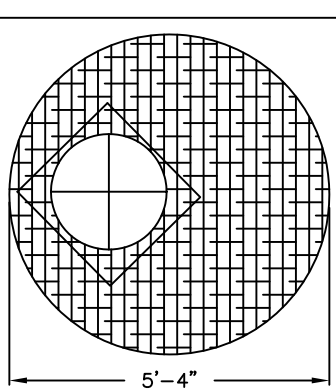
NOTES:

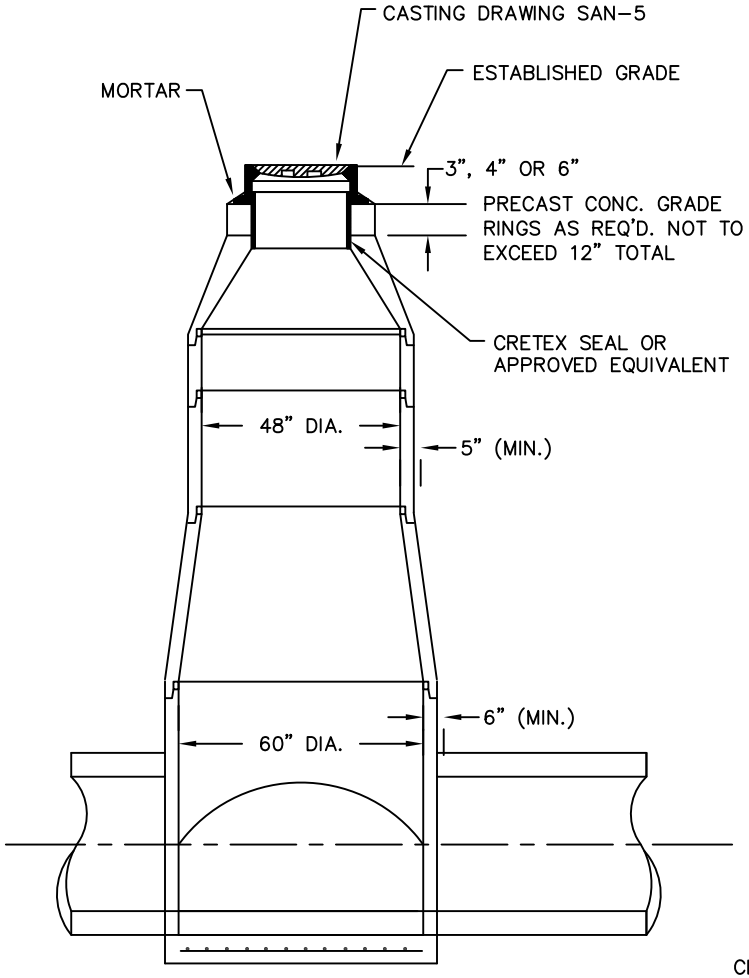
1. WHEN SHOWN IN TRAFFIC AREAS, THE ALTERNATE TOP SLAB SHALL BE DESIGNED FOR TRAFFIC LOADING.
2. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO ASTM C478-70 UNLESS OTHERWISE SHOWN.
3. ALL FIELD CUT OPENINGS SHALL BE DONE ONLY AS DIRECTED BY THE ENGINEER.
4. PRECAST CONCRETE GRADE RINGS, GROUTED IN PLACE, SHALL BE USED IF NEEDED BETWEEN THE SLAB OR CONE TOP AND THE ACCESS FRAME CASTING AND COVER. NO MANHOLE BRICK SHALL BE PERMITTED FOR USE.
5. SEWER PIPE SHALL BE SECURED THROUGH THE MANHOLE WALL BY KOR-N-SEAL BOOT, PRESS WEDGE II GASKET OR APPROVED EQUIVALENT MEETING ASTM C923.
6. ALL JOINTS TO BE CON-SEAL 305.072.
7. ALL JOINTS TO BE WRAPPID SEALED 305.072.

PRECAST CONCRETE MANHOLE (24" PIPE & UNDER)

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN-3

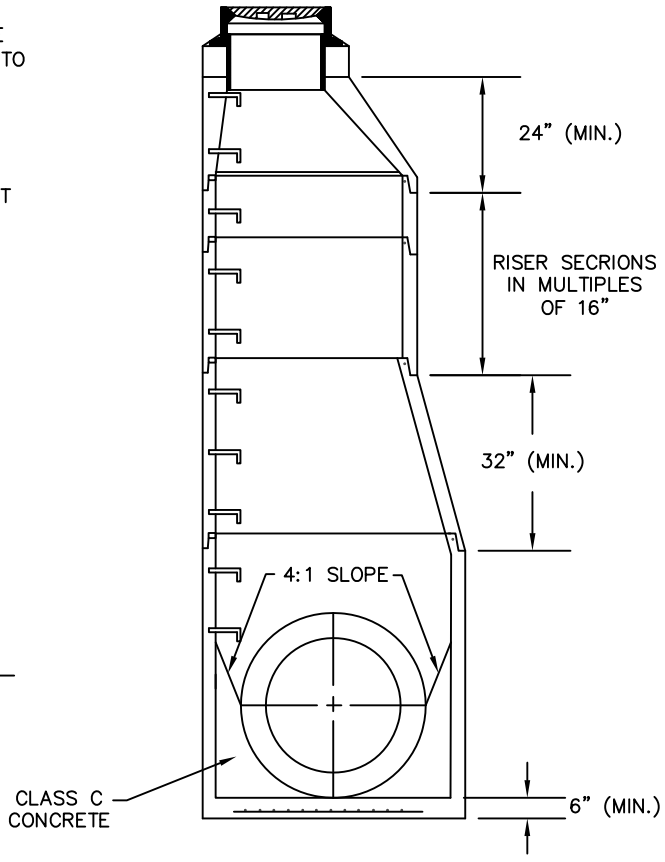






ALTERNATE TOP SLAB

(SEE NOTE #1)

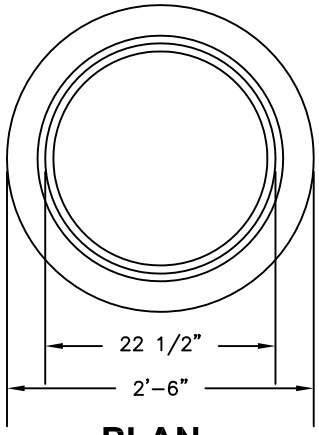


NOTES:

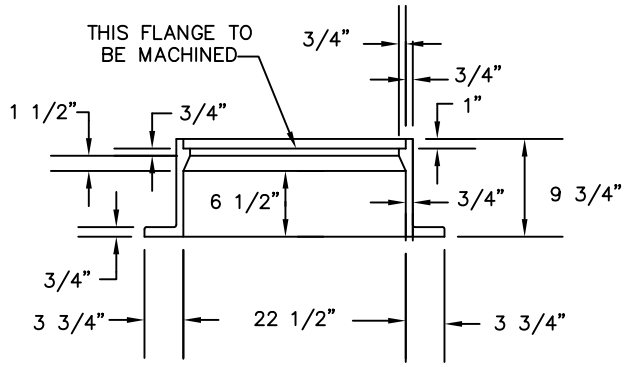
1. WHEN SHOWN IN TRAFFIC AREAS, THE ALTERNATE TOP SLAB SHALL BE DESIGNED FOR TRAFFIC LOADING.
2. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO ASTM C478-70 UNLESS OTHERWISE SHOWN.
3. ALL FIELD CUT OPENINGS SHALL BE DONE ONLY AS DIRECTED BY THE ENGINEER.
4. PRECAST CONCRETE GRADE RINGS, GROUTED IN PLACE, SHALL BE USED IF NEEDED BETWEEN THE SLAB OR CONE TOP AND THE ACCESS FRAME CASTING AND COVER. NO MANHOLE BRICK SHALL BE PERMITTED FOR USE.
5. SEWER PIPE SHALL BE SECURED THROUGH THE MANHOLE WALL BY KOR-N-SEAL BOOT, PRESS WEDGE II GASKET OR APPROVED EQUIVALENT MEETING ASTM C923.
6. ALL JOINTS TO HAVE CON-SEAL 305.072.
7. ALL JOINTS TO BE WRAPPID SEAL 305.072.

PRECAST CONCRETE MANHOLE (27" - 42" PIPE)

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN-4

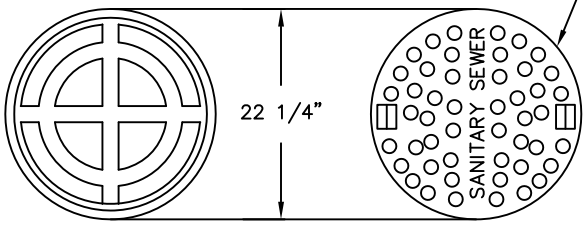


PLAN

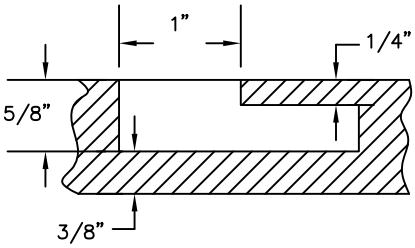


SECTION

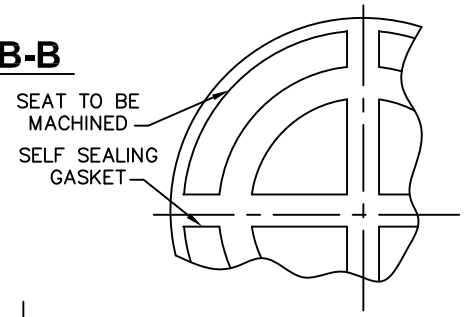
GROUND RIM DETAILS



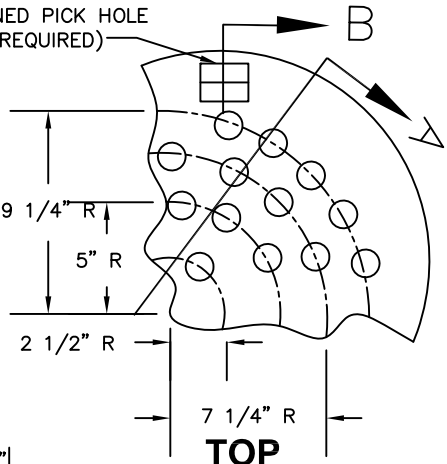
FOUNDRY NAME SHALL BE CAST ON THE UNDERNEATH OR UNEXPOSED SURFACE OF BOTH LID AND GROUND RIM



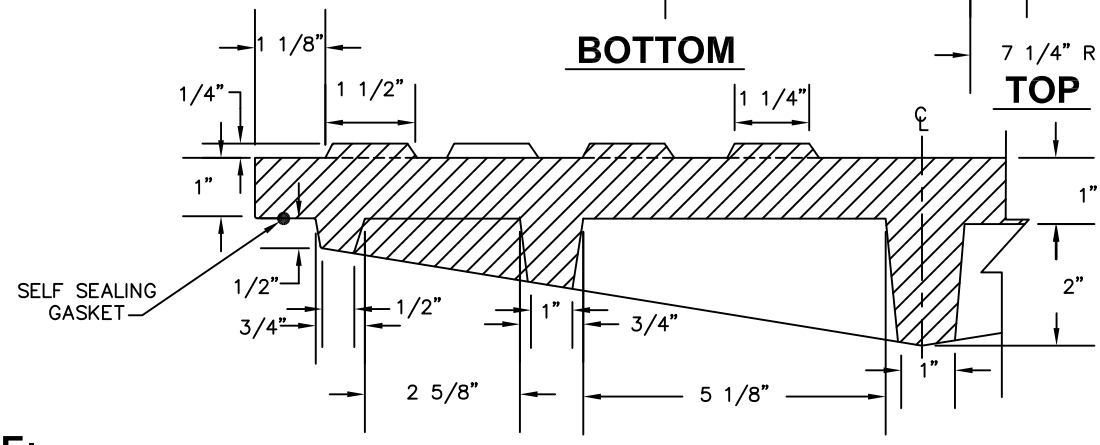
SECTION B-B



BOTTOM



TOP



SECTION A-A

NOTE:

1. LID SHALL BE EAST JORDAN MODEL #1660042GS AND FRAME SHALL BE JORDAN MODEL #1661Z1 OR APPROVED EQUAL.

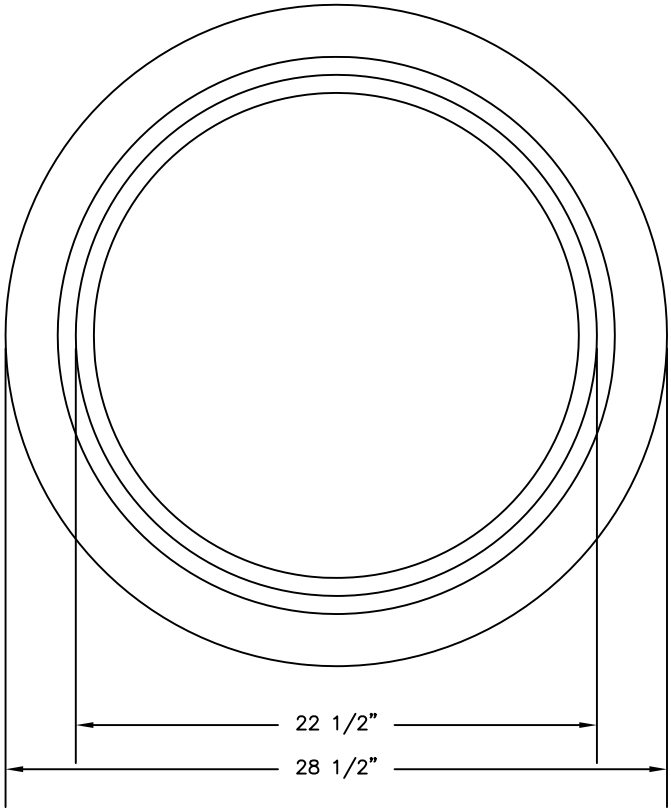
LID DETAILS

24" MANHOLE FRAME & COVER

CITY OF PATASKALA

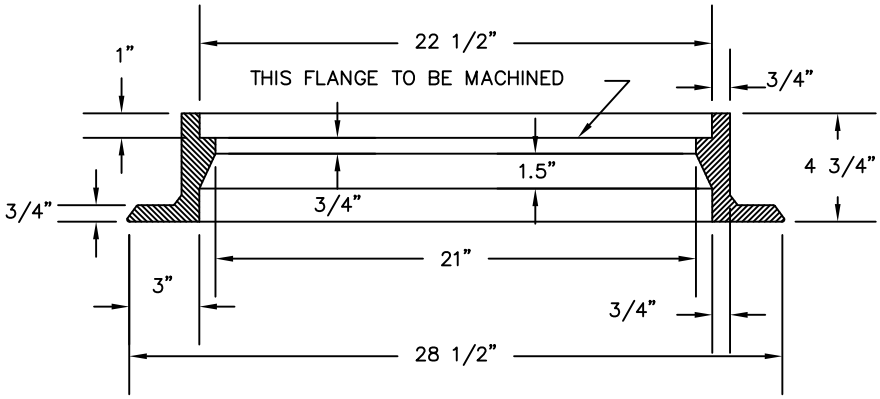
STANDARD CONSTRUCTION DWG.

REVISED:	DRAWING NO.
12/18/15	SAN-5



PLAN VIEW

APPROXIMATE WEIGHT 125 LBS.

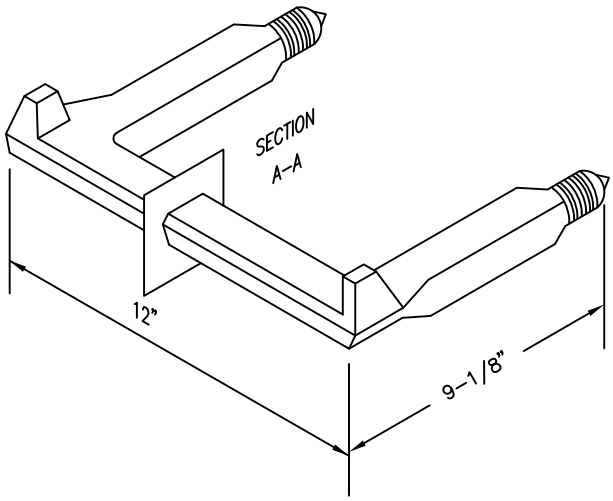


SECTION

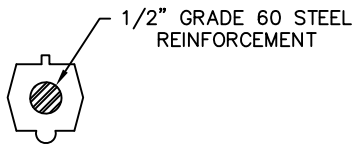
NOTE: FOR COVER DETAILS, SEE SAN–5.

MODIFIED HEIGHT 24" MANHOLE FRAME

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN–6



POLYPROPOLENE STEP



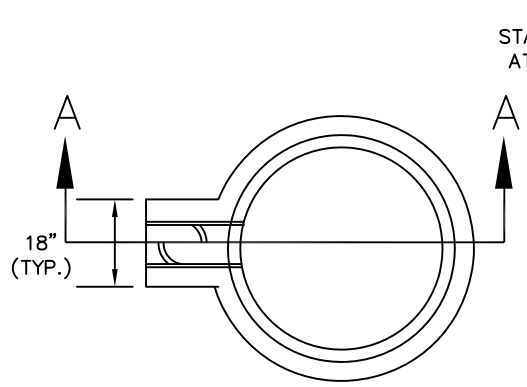
SECTION A-A

NOTES:

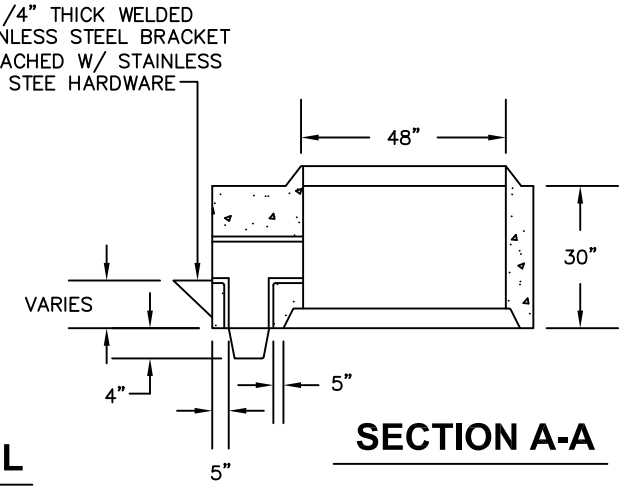
1. STEPS SHALL BE CAREFULLY DRIVEN INTO THE STRUCTURE BY PRESSURE OR VIBRATION BEFORE INITIAL SET OCCURS, CAST IN PLACE, OR MORTARED WITH A NON-SHRINKING GROUT.
2. STEPS MAY NOT BE REQUIRED WHEN HEIGHT OF STRUCTURE IS 48" OR LESS.
3. SEE SAN-3 AND SAN-4 FOR SPACING REQUIREMENTS.

MANHOLE STEPS

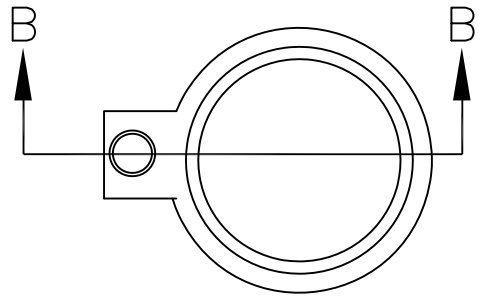
CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN-7



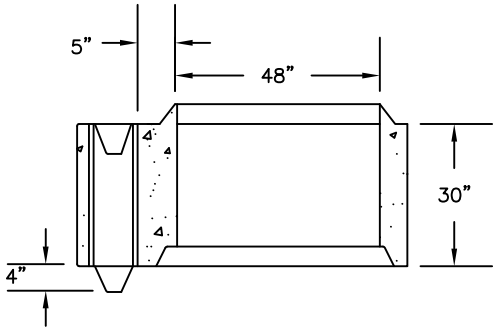
PRECAST DROP BARREL



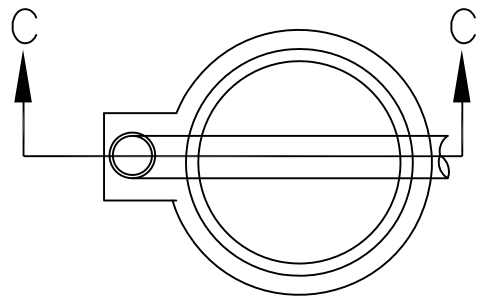
SECTION A-A



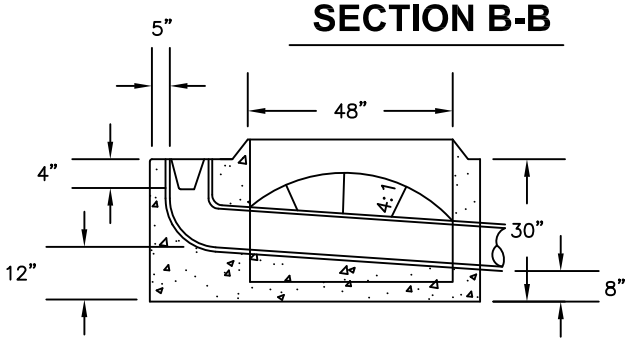
PRECAST CENTER DROP



SECTION B-B



PRECAST BASE DROP



SECTION C-C

NEW DROP MANHOLE

NOTES:

1. FOR SECTIONS ABOVE THE DROP BARREL SECTION, SEE SAN–3 AND SAN–4.
2. SEWER PIPE SHALL BE SECURED THROUGH THE WALL BY KOR–N–SEAL BOOT, PRESSED WEDGE II GASKET OR AN APPROVED EQUIVALENT MEETING C923.
3. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO ASTM C–478–70 UNLESS OTHERWISE SHOWN.
4. FOR MANHOLE STEP SPACING AND DETAILS, SEE SAN–3 , SAN–4, AND SAN–7.

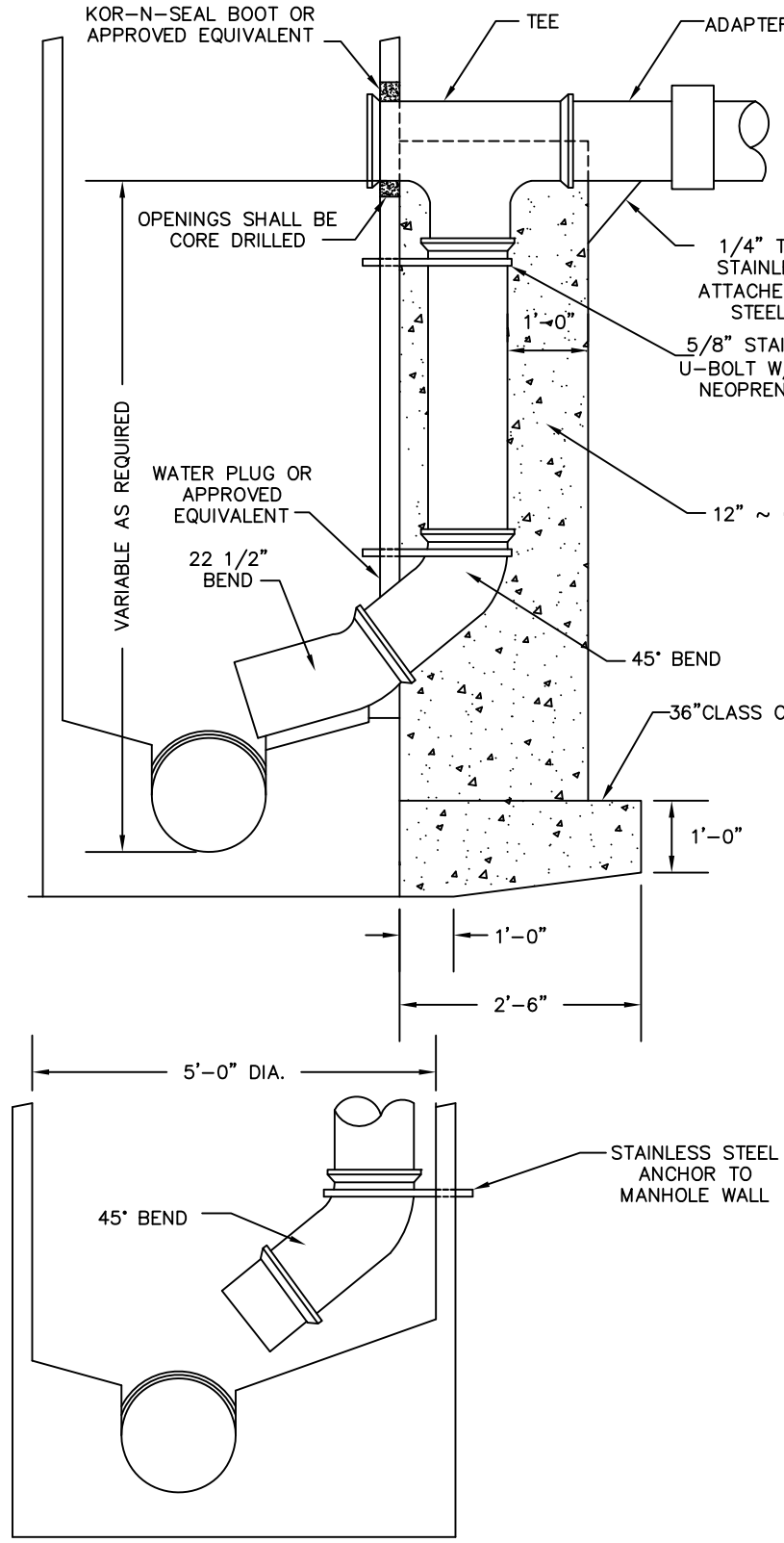
DROP PIPE AT MANHOLE

CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

DRAWING NO. SAN–8



SIZE REQUIREMENTS	
SEWER MAIN	DROP PIPE
8"	8"
10"	8"
12"	8"
14"	10"
15"	10"
16"	10"
18"	10"
21"	12"
24"	12"

NOTES:

1. CONCRETE ENCASEMENT SHALL BE USED ONLY WITH CONCRETE PIPE. COMPACTED GRANULAR MATERIAL SHALL BE USED WITH ALL OTHER PIPE MATERIAL.
2. SEALS THROUGH THE MANHOLE WALL SHALL BE WATER PLUG OR APPROVED EQUIVALENT FOR CONCRETE ENCASEMENT OR THE PIPE SEAL DESCRIBED IN SAN-3 AND SAN-4 WHEN GRANULAR MATERIAL IS USED.

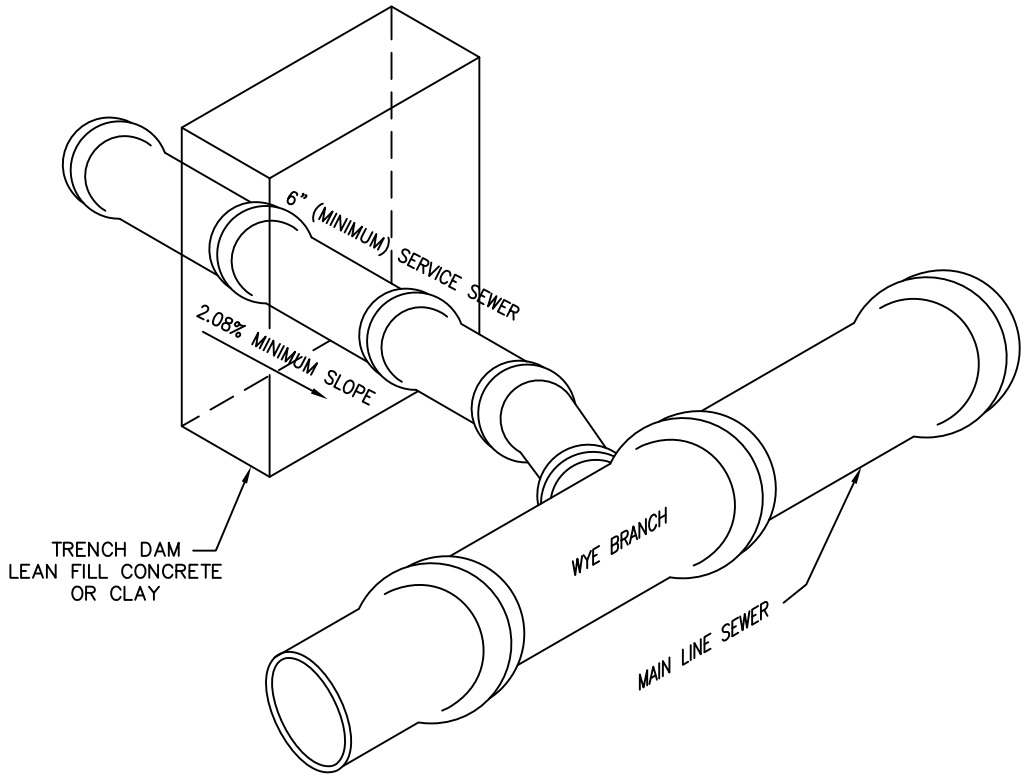
DROP PIPE AT MANHOLE

CITY OF PATASKALA

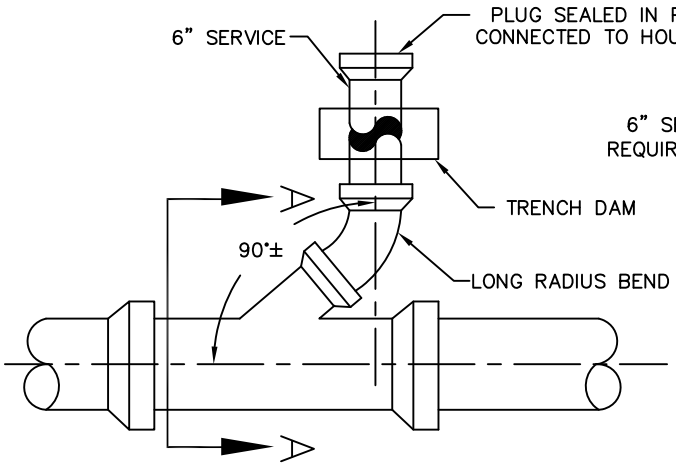
STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

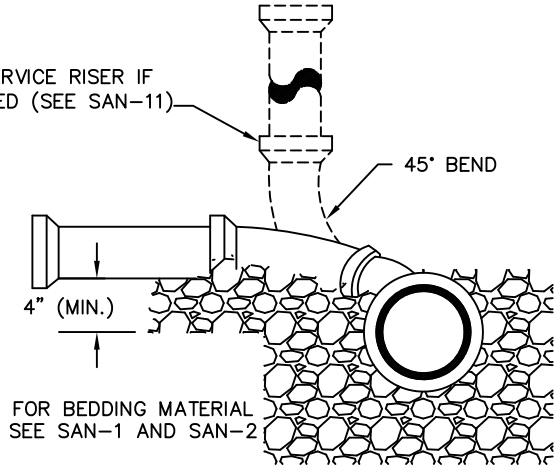
DRAWING NO. SAN-8



ISOMETRIC VIEW



PLAN VIEW



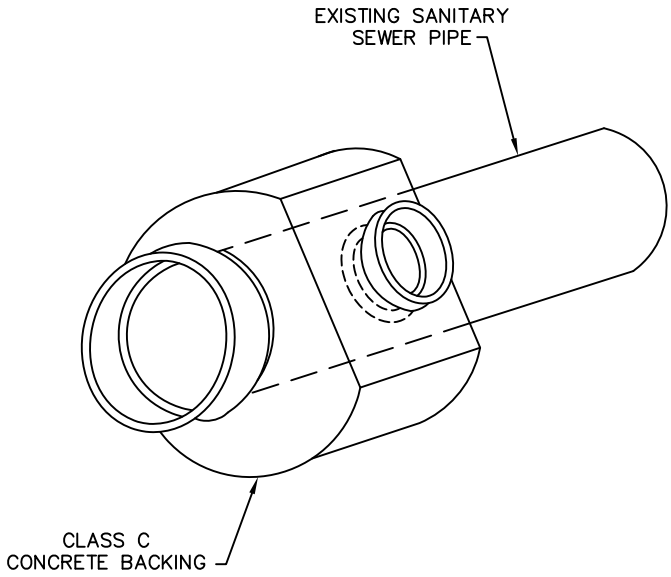
SECTION A-A

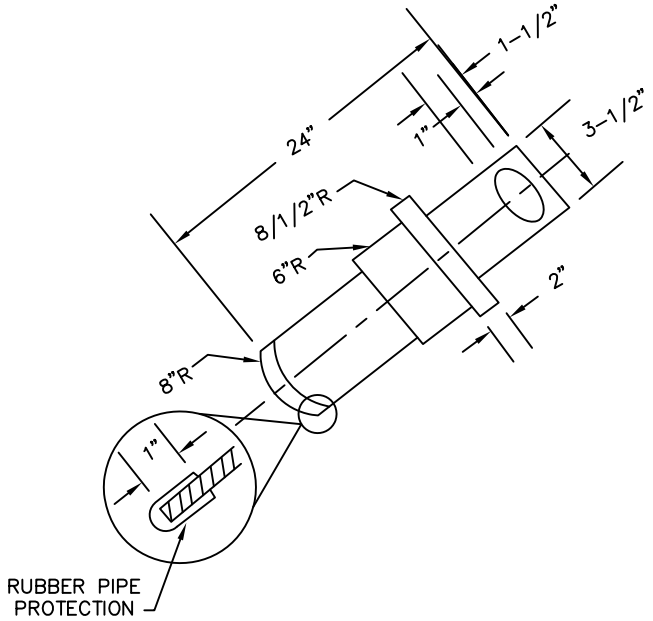
6" SANITARY SEWER SERVICE (MAIN LINE TO R/W)

CITY OF PATASKALA

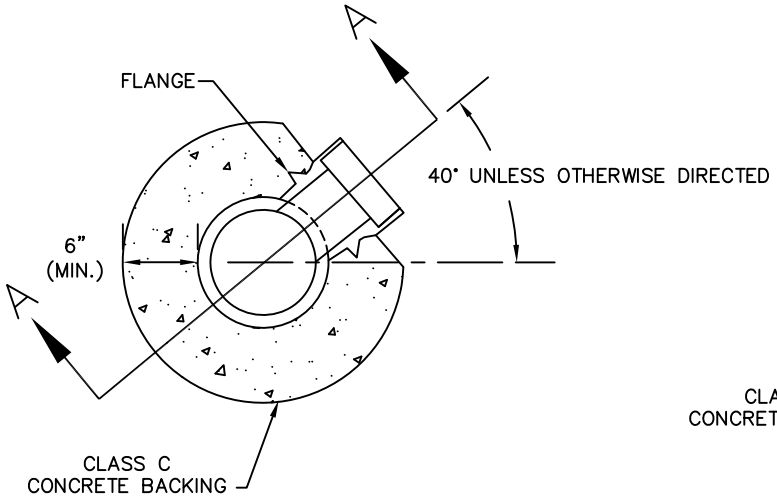
REVISED: 12/18/15

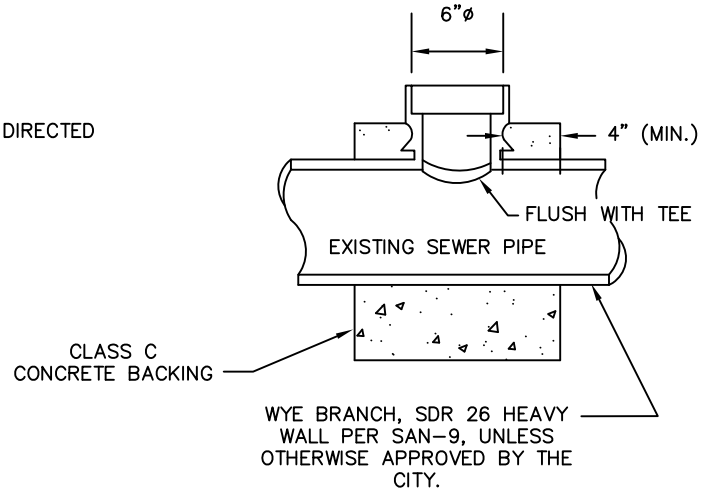
DRAWING NO. SAN-9





TEE TAP SUPPORT





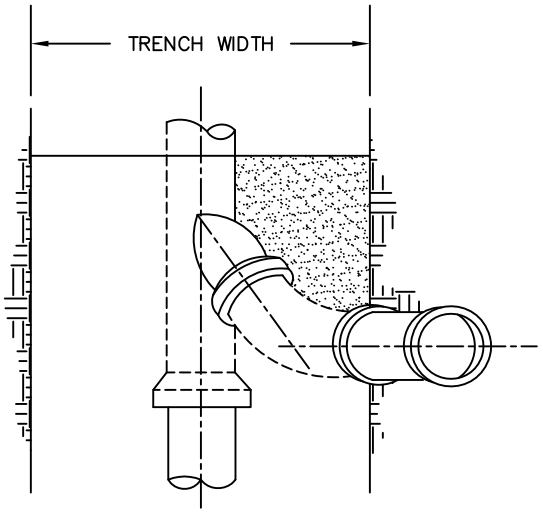
SECTION A-A

NOTES:

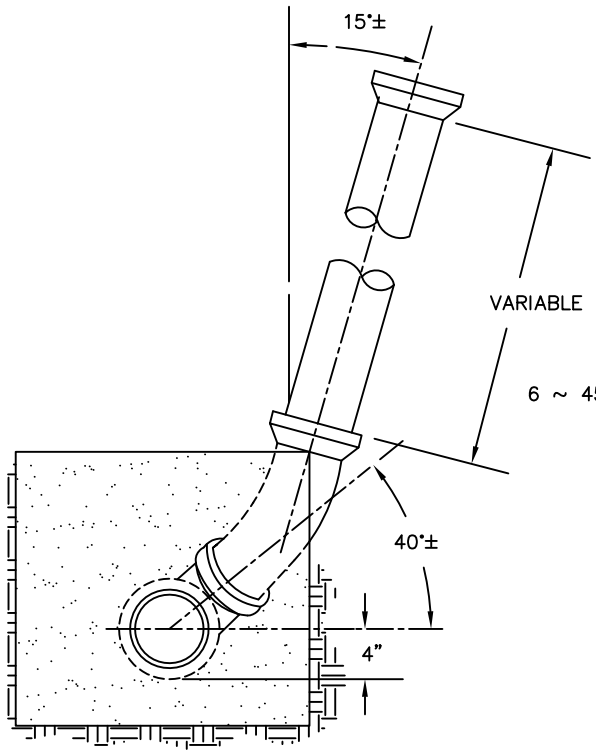
1. BYPASS PUMP OR PLUG UPSTREAM INVERT; CONDITIONS VARY AND APPROVAL BY CITY IS REQUIRED.
2. CUT OUT PIPE SECTION; INSTALL SDR 26 HEAVY WALL WYE BRANCH; BEVEL EDGES ON EXISTING PIPE; FERNCO HARD COUPLERS ARE REQUIRED FOR CONNECTION OF THE WYE TO THE MAIN LINE.
3. INSERT-A-TEE IS ACCEPTABLE FOR MAINS 10" AND LARGER. HOLES SHALL BE VIA HOLE SAW.
4. BEDDING AROUND CONNECTION ODOT 703.01-1, AND AS SHOWN.
5. FOR USE ONLY WITH CONCRETE PIPE. FOR OTHER MATERIALS, USE FITTINGS AND ADAPTERS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
6. A 6" HOLE SHALL BE SAWED INTO THE SEWER WITH A CIRCULAR SAW.
7. PUNCHING OR CHIPPING THE HOLE INTO THE PIPE WILL NOT BE PERMITTED.
8. ONLY TEE TAP CONNECTIONS WITH FLANGES WILL BE APPROVED.
9. IF CONNECTION TO THE HOUSE IS NOT MADE IMMEDIATELY, A STOPPER SHALL BE PROVIDED.

SERVICE CONNECTION FOR EXISTING SANITARY SEWER PIPE

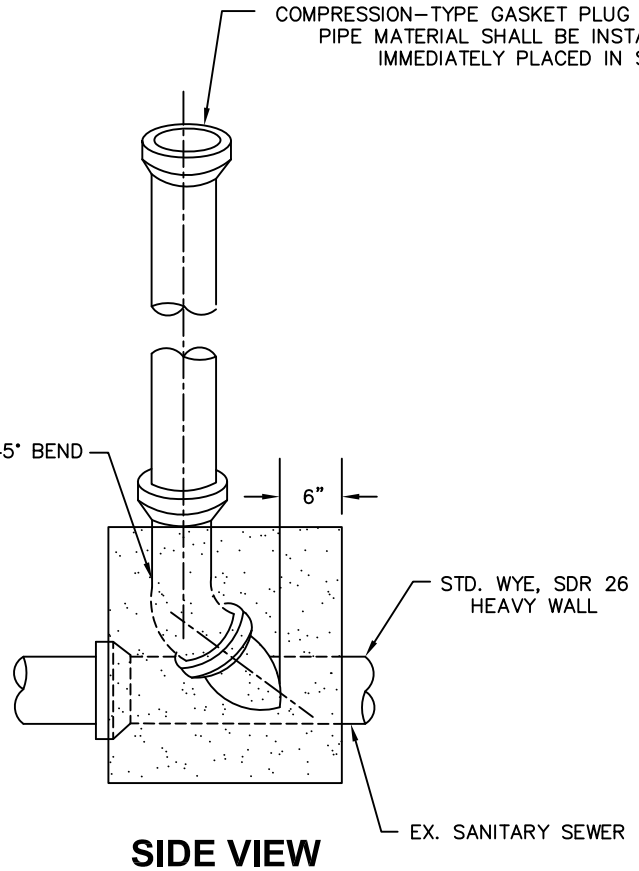
CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN-10



PLAN VIEW



END VIEW



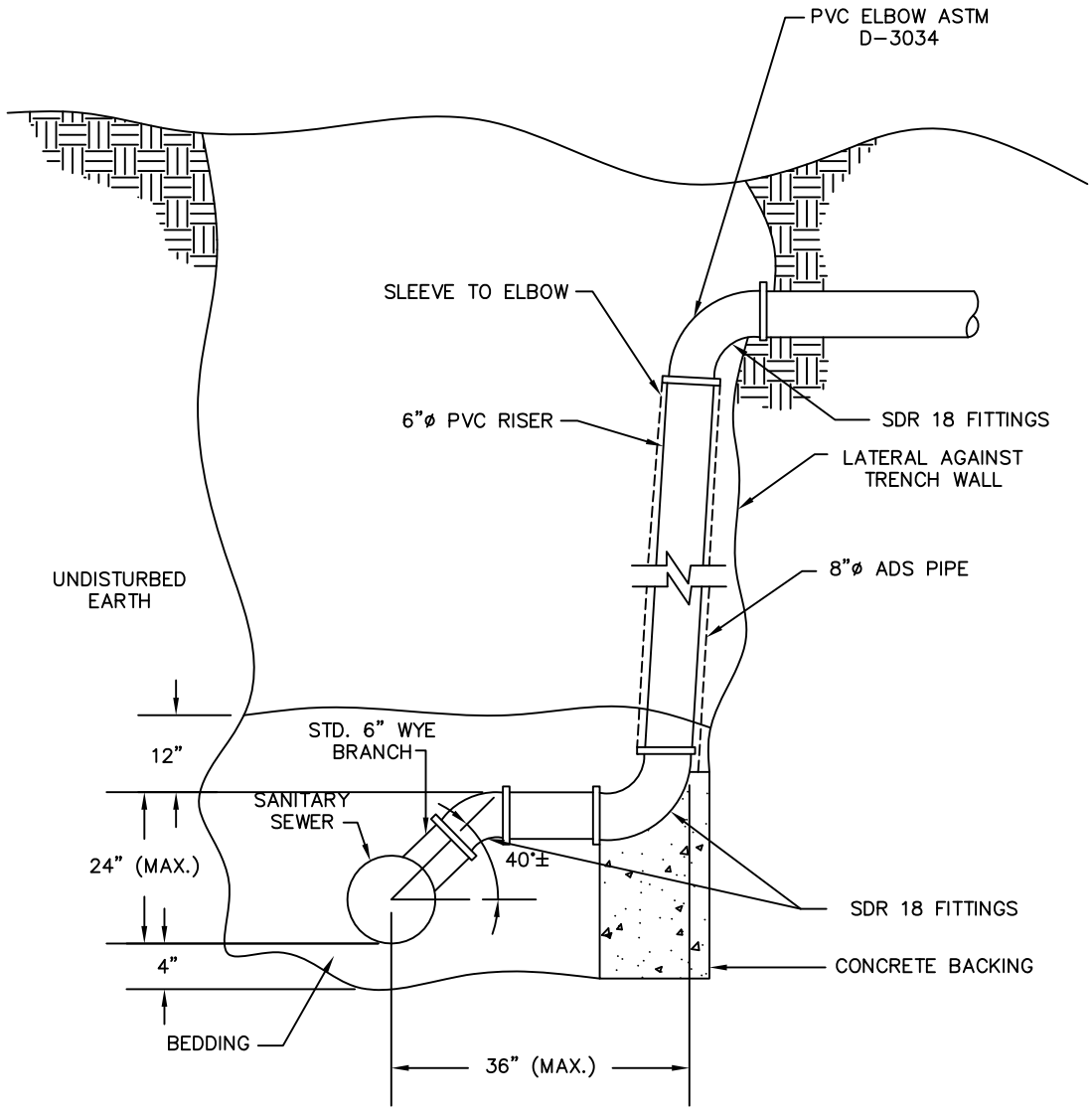
SIDE VIEW

NOTES:

1. FOR WYE BRANCH INSTALLATION, SEE SAN–9.
2. CONCRETE BACKING SHALL BE USED ONLY WITH CONCRETE PIPE. COMPACTED GRANULAR MATERIAL SHALL BE USED FOR ALL OTHER PIPE MATERIAL.

TYPICAL RISER (LESS THAN 8')

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN–11

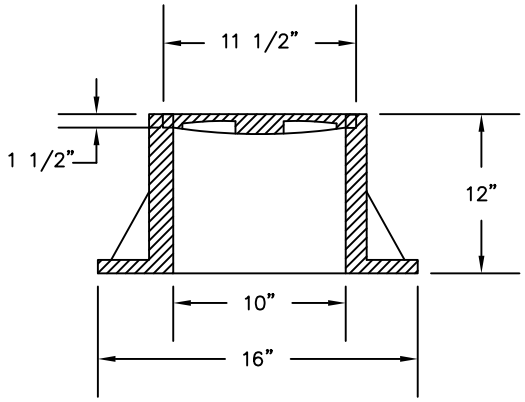


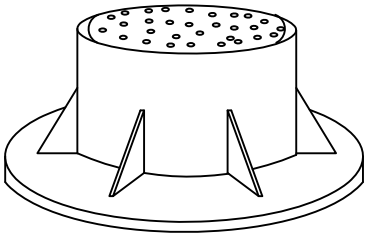
NOTES:

1. CONCRETE BACKING SHLL BE USED ONLY TO SUPPORT PVC ELBOW. COMPACTED GRANULAR MATERIAL SHALL BE USED ON ALL OTHER PIPE MATERIAL. AGGREGATE SHALL BE MATERIAL SUITABLE FOR CLASS A BEDDING.

TYPICAL RISER (MORE THAN 8')

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN-11

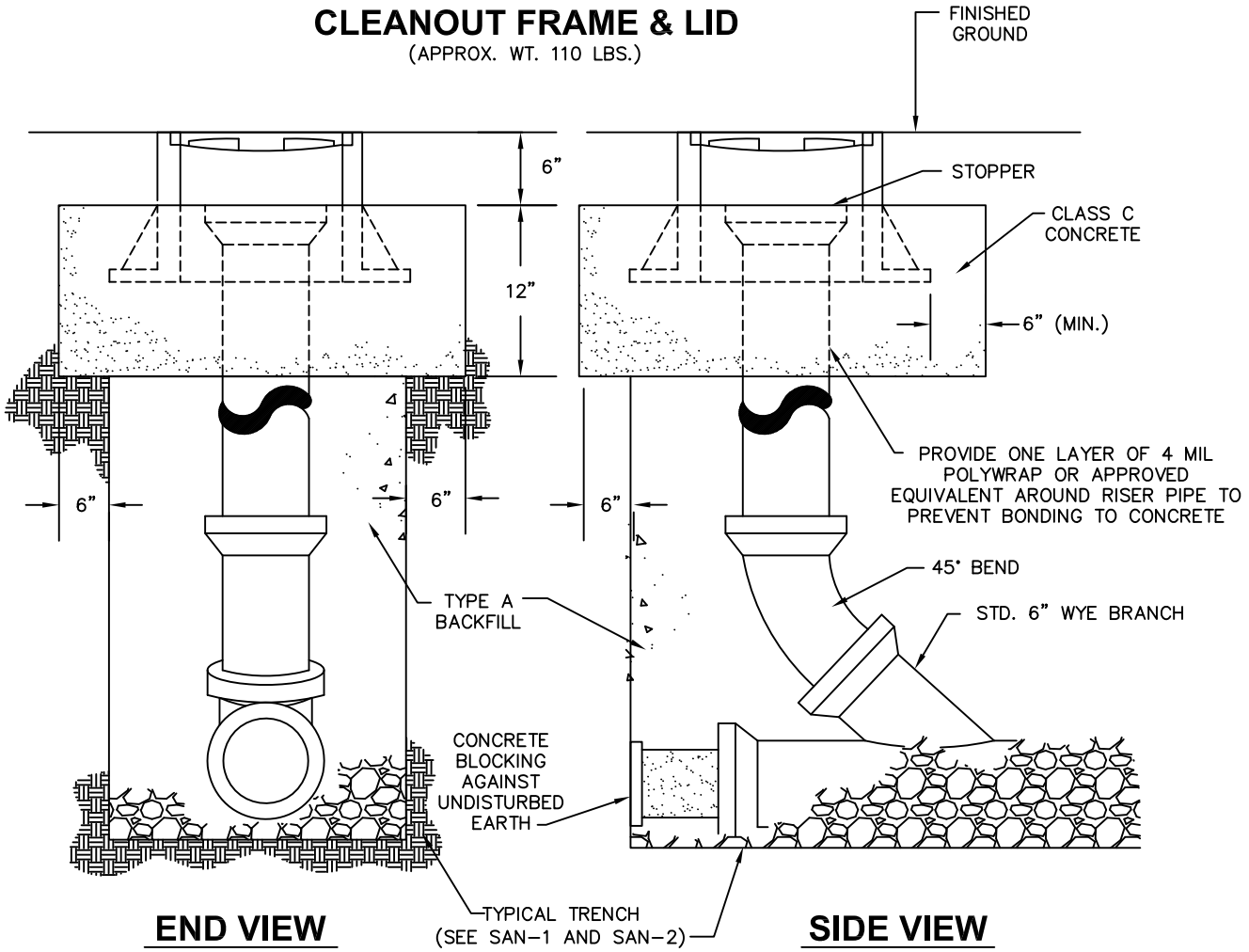




PLAN VIEW **AXONOMETRIC VIEW**

CLEANOUT FRAME & LID

(APPROX. WT. 110 LBS.)



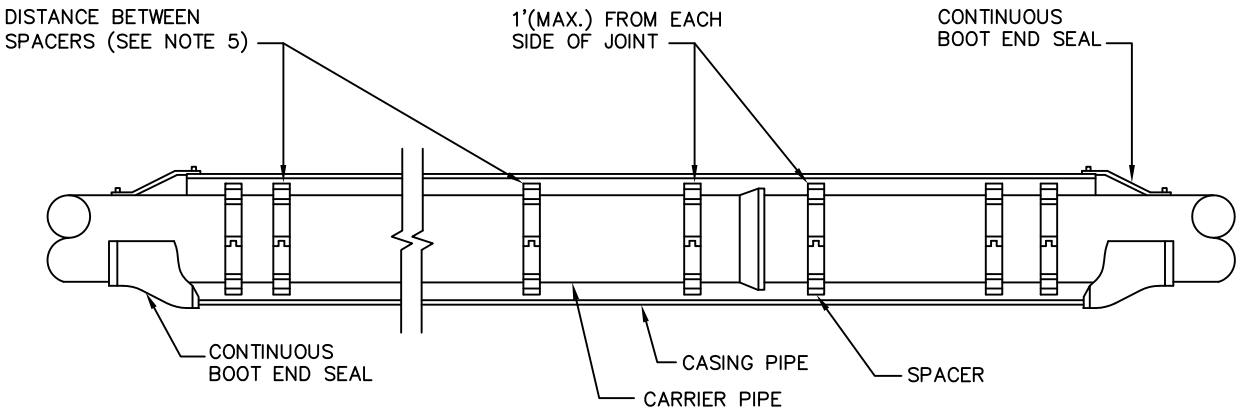
END VIEW **SIDE VIEW**

NOTES:

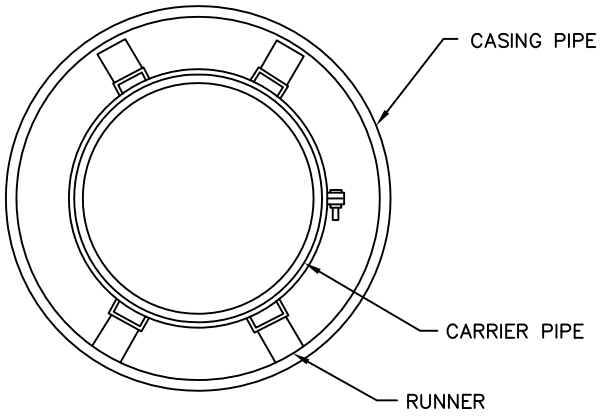
1. CLEANOUT FRAME AND LID SHALL BE NEENAH R-1977 OR APPROVED EQUIVALENT.
2. CLEANOUT TOP OF CASTING SHALL BE SET FLUSH WITH FINISHED GRADE.
3. THE WORD "SEWER" SHALL BE EMBOSSED ON THE TOP OF THE LID.
4. COMPACTED ITEM 304 MAY BE USED INSTEAD OF CONCRETE FOR CLEANOUT INSTALLATIONS IN NON-TRAFFIC AREAS, AND AS APPROVED BY THE CITY.

TYPICAL CLEANOUT DETAIL

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN-12



TYPICAL CASING SPACER CONFIGURATION



SECTION

NOTES:

1. CASING PIPE SHALL BE BITUMINOUS COATED INSIDE AND OUT, INSTALLED BY JACKING, WITH A MINIMUM WALL THICKNESS AS SHOWN IN THE TABLE OR MEETING THE REQUIREMENTS OF THE RECEIVING AUTHORITY.
2. CASING SPACERS SHALL BE CCI MODELS CSS8 AND CSS12, CONSTRUCTED OF CIRCULAR STAINLESS STEEL BANDS, THAT BOLT TOGETHER TO FORM A SHELL AROUND THE CARRIER PIPE. THE CASING SPACER SHALL BE LINED WITH A RIBBED EPDM EXTRUSION DESIGNED TO OVERLAP THE EDGES OF THE SHELL AND PREVENT SLIPPAGE. THE SPACER SHALL BE DESIGNED WITH RISERS AND RUNNERS TO SUPPORT THE CARRIER PIPE WITHIN THE CASING AND MAINTAIN A MINIMUM CLEARANCE OF 1.00" BETWEEN THE CASING ID AND THE CARRIER PIPE OD. SPACERS SHALL BE INSTALLED 3 PER EVERY 20' MIN. AND 1' INSIDE EACH END. RECOMMENDED POSITIONING OF THE SPACERS IS ONE PLACED 1–2 FEET ON EITHER SIDE OF THE BELL JOINT AND ONE EVERY 6–8 FEET APART THEREAFTER FOR A TOTAL OF THREE CASING SPACERS PER JOINT.
3. END SPACERS SHALL BE ADVANCE PRODUCTS & SYSTEMS, INC. OR APPROVED EQUIVALENT.
4. WHEN DUCTILE IRON PIPE IS USED, THE JOINTS SHALL BE RESTRAINED WITH FIELDLOK GASKETS OR APPROVED EQUIVALENT.
5. WHEN PVC PIPE IS USED, THE JOINTS SHALL BE RESTRAINED WITHJCM SUR–GRIP RESTRAINERS OR APPROVED EQUIVALENT.
6. DIMENSIONS BETWEEN SPACERS FOR PVC PIPE SHALL BE 6 FEET MAXIMUM. DIMENSIONS BETWEEN SPACERS FOR DUCTILE IRON PIPE SHALL BE 8 FEET MAXIMUM.
7. THE QUANTITY OF RUNNERS IS IN ACCORDANCE WITH THE SIZE OF THE CARRIER PIPE AS FOLLOWS:
   - TO 14" DIA.–4 RUNNERS
   - 16"–36" DIA.–6 RUNNERS
   - 38"–48" DIA.–8 RUNNERS
8. THE MAXIMUM GAP BETWEEN RUNNERS & CASING PIPE SHALL BE 1".

CARRIER	CASING	
INSIDE DIAMETER	MINIMUM DIAMETER	MAXIMUM WALL THICKNESS
2"	8"	0.188"
3"	10"	0.188"
4"	10"	0.188"
6"	14"	0.219"
8"	16"	0.219"
10"	18"	0.250"
12"	20"	0.281"
15"(PVC)	24"	0.344"
16"	24"	0.344"
18"	28"	0.406"
20"	28"	0.406"
24"	36"	0.469"
27"(PVC)	42"	0.500"
30"	42"	0.500"
36"	48"	0.675"

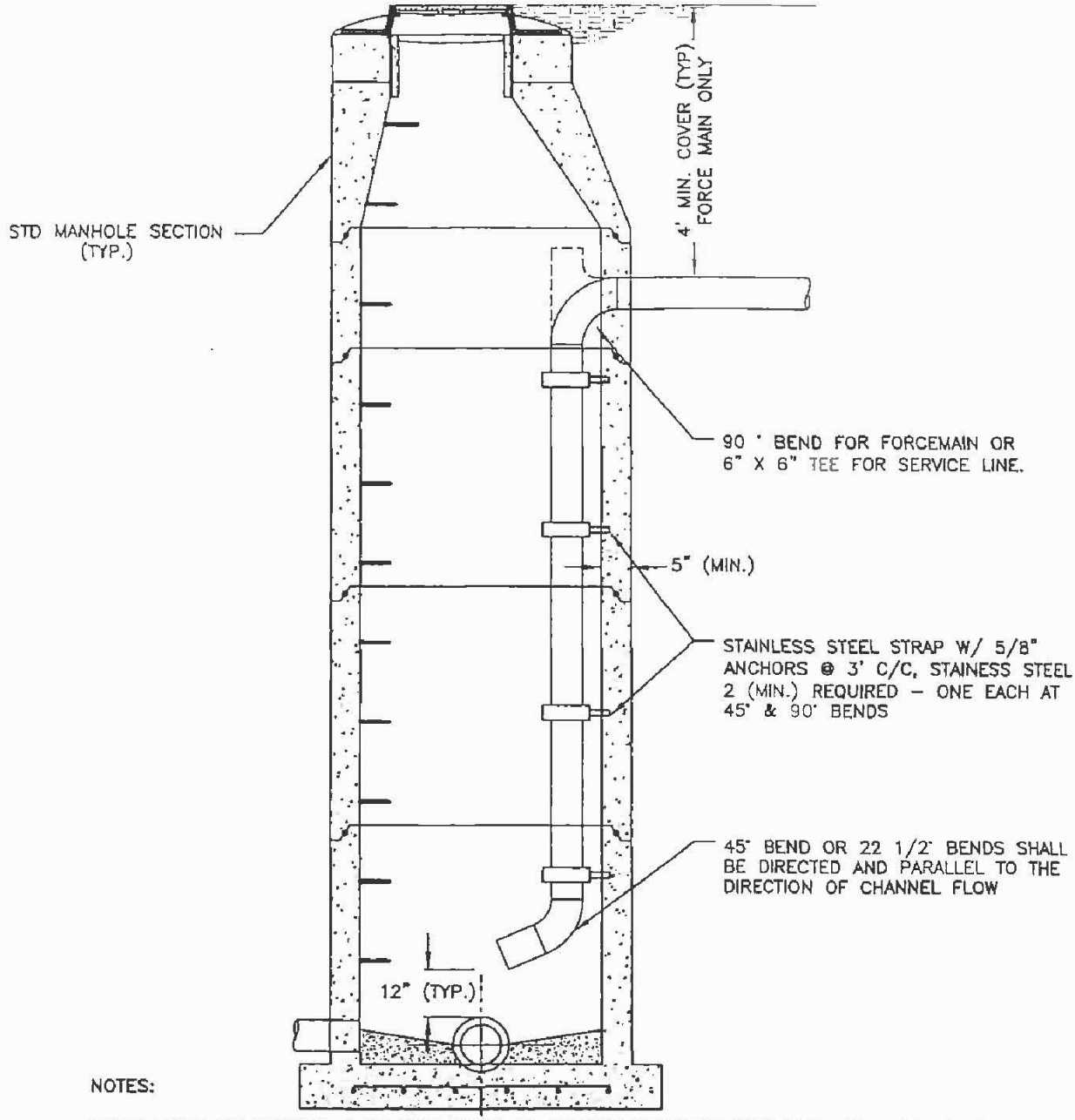
CASING PIPE

CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

DRAWING NO. SAN–13

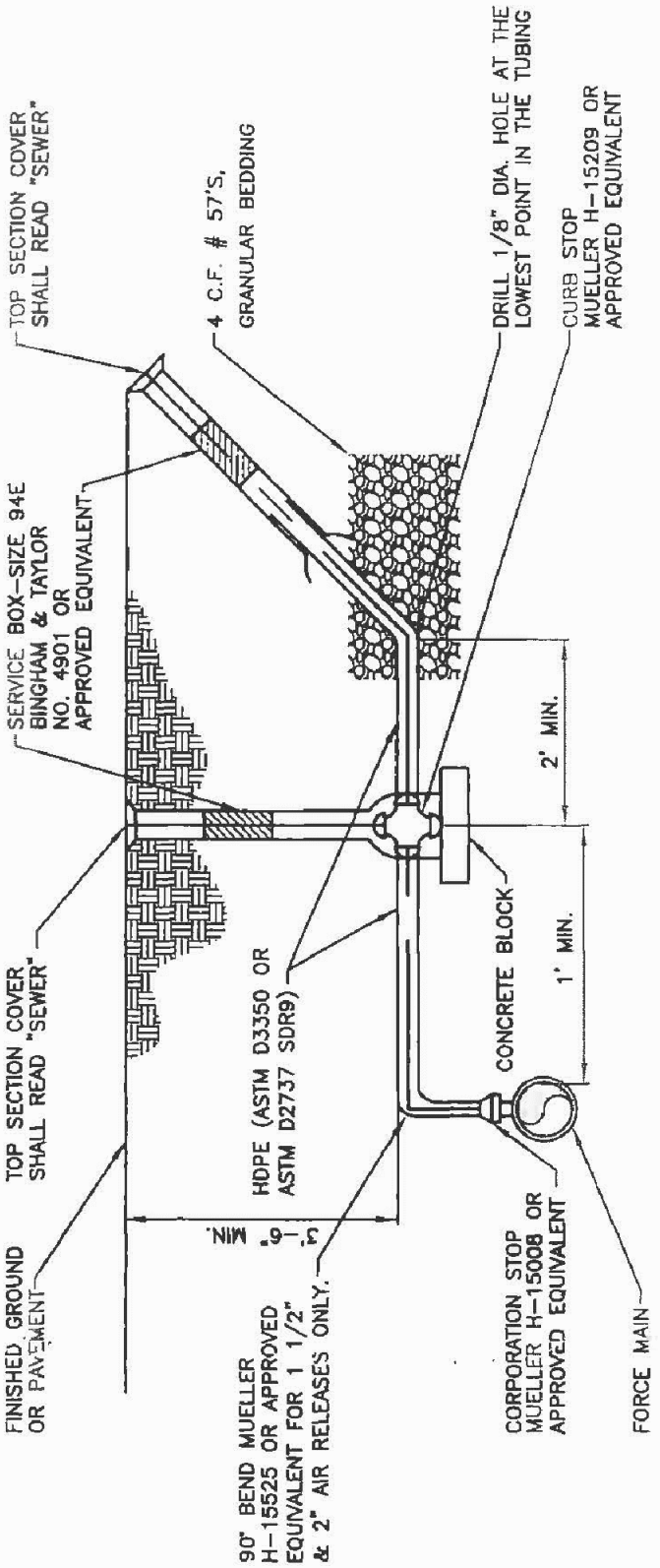


NOTES:

1. FORCE MAIN OR SERVICE DROP PIPE SHALL IN NO WAY INTERFERE WITH THE STEPS OR OTHER ACCESS TO THE BOTTOM OF THE STRUCTURE.
2. THE VERTICLE SECTION OF PIPE SHALL BE ONE CONTINUOUS LENGTH.
3. PIPE SHALL BE PVC (ASTM 2241 SDR21) FOR FORCEMAIN WITH UNIFLANGE OR APPROVED EQUIVALENT AT ALL INTERIOR OR VERTICAL JOINTS OR PVC SDR35 D3034 FOR SERVICE LINE.
4. STRUCTURE PENETRATIONS SHALL BE WATERTIGHT WITH FLEXIBLE CONNECTION METTING ASTM C 923.
5. WHEN CONNECTING FORCE MAIN OR SERVICE LINE TO AN EXISTING MANHOLE, THE WALL PENETRATION SHALL BE CORE DRILLED WITH FLEXIBLE BOOT AS NEEDED.
6. AN INSIDE DROP ON SERVICE LINES IS ONLY REQUIRED IF THE PROPOSED CONNECTION IS 2 FEET OR GREATER ABOVE THE CHANNEL.

FORCE MAIN & SERVICE LINE DROP PIPE DETAIL

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN–14

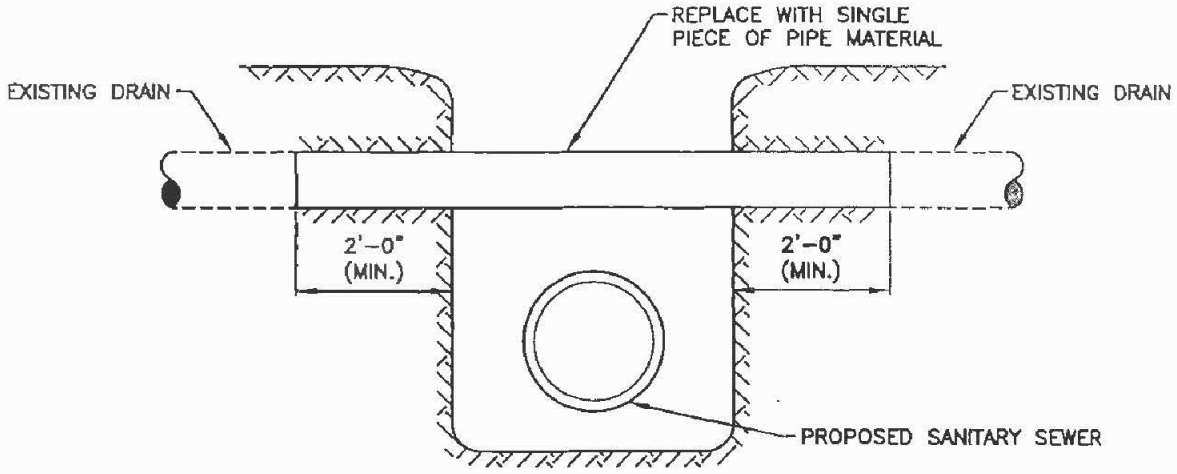


TYPICAL AIR RELEASE (3/4" TO 2")

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN-15

MINIMUM ROAD AND CURB UNDERDRAIN REPLACEMENT MATERIAL SHALL BE:
PERFORATED CONCRETE: ITEM 706.06 (ODOTCMS)
CONCRETE DRAIN TILE: ITEM 706.07 (ODOTCMS)
VITRIFIED CLAY: ITEM 706.08 (ODOTCMS)
PERFORATED PVC: ITEM 707.41 (ODOTCMS)
HEAVY DUTY CORRUGATED POLYETHYLENE
SLOTTED DRAIN: ITEM 707.32 (ODOTCMS)

MINIMUM DRAIN TILE REPLACEMENT MATERIAL SHALL BE:
PVC: ASTM 2241, SDR 21 OR SDR 35 D3034.
DUCTILE IRON: AWWA C151, CLASS 50
STEEL PIPE: ASTM 139-B
CONCRETE: ITEM 706.02 (ODOTCMS)
POLYETHYLENE: ITEM 707.33 (ODOTCMS)



NOTE:

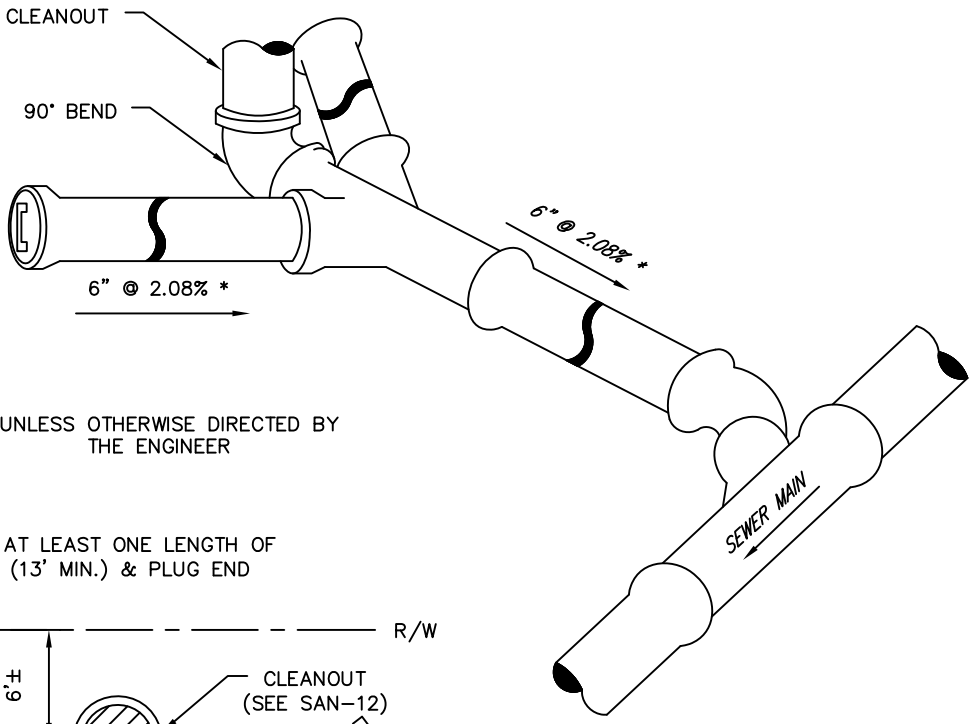
1. INSIDE DIAMETER OF REPLACEMENT PIPE SHALL BE EQUAL TO OR GREATER THAN INSIDE DIAMETER OF EXISTING TILE OR UNDERDRAIN.
2. REPLACEMENT MATERIAL USED SHALL BE EQUAL TO OR BETTER THAN THE EXISTING TILE OR UNDERDRAIN AS DIRECTED BY THE ENGINEER.
3. PROVIDE FERNCO FITTING OR APPROVED EQUIVALENT WHERE EXISTING TILE OR UNDERDRAIN HAS WATERTIGHT JOINTS. PROVIDE 30# FELT OR CONCRETE MORTAR OVER THE UPPER HALF OF THE JOINT WHERE OPEN JOINTS ARE ENCOUNTERED.
4. BACKFILL BETWEEN SANITARY SEWER PIPE AND REPLACEMENT TILE OR UNDERDRAIN SHALL BE GRANULAR BACKFILL.
5. SANITARY SEWER SHALL BE INSTALLED IN ACCORDANCE WITH SAN-1 AND SAN-2.

DRAIN TILE AND UNDERDRAIN REPLACEMENT

CITY OF PATASKALA

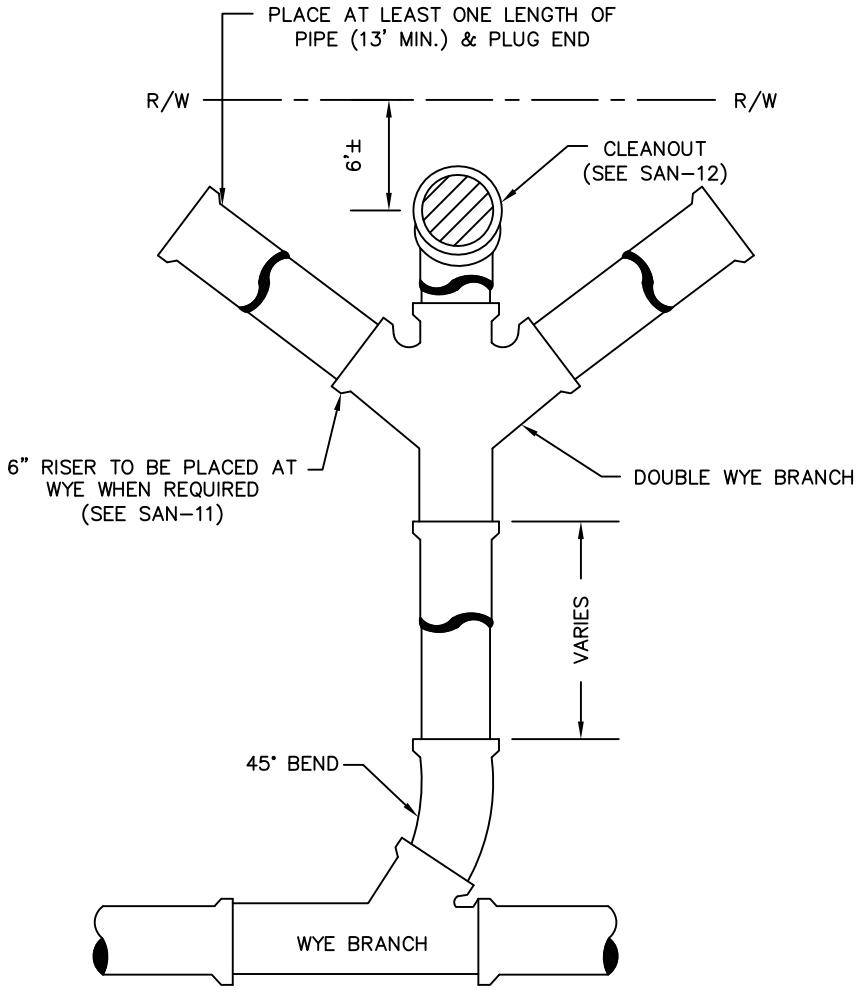
STANDARD CONSTRUCTION DWG.

REVISED:	DRAWING NO.
12/18/15	SAN-16



* UNLESS OTHERWISE DIRECTED BY THE ENGINEER

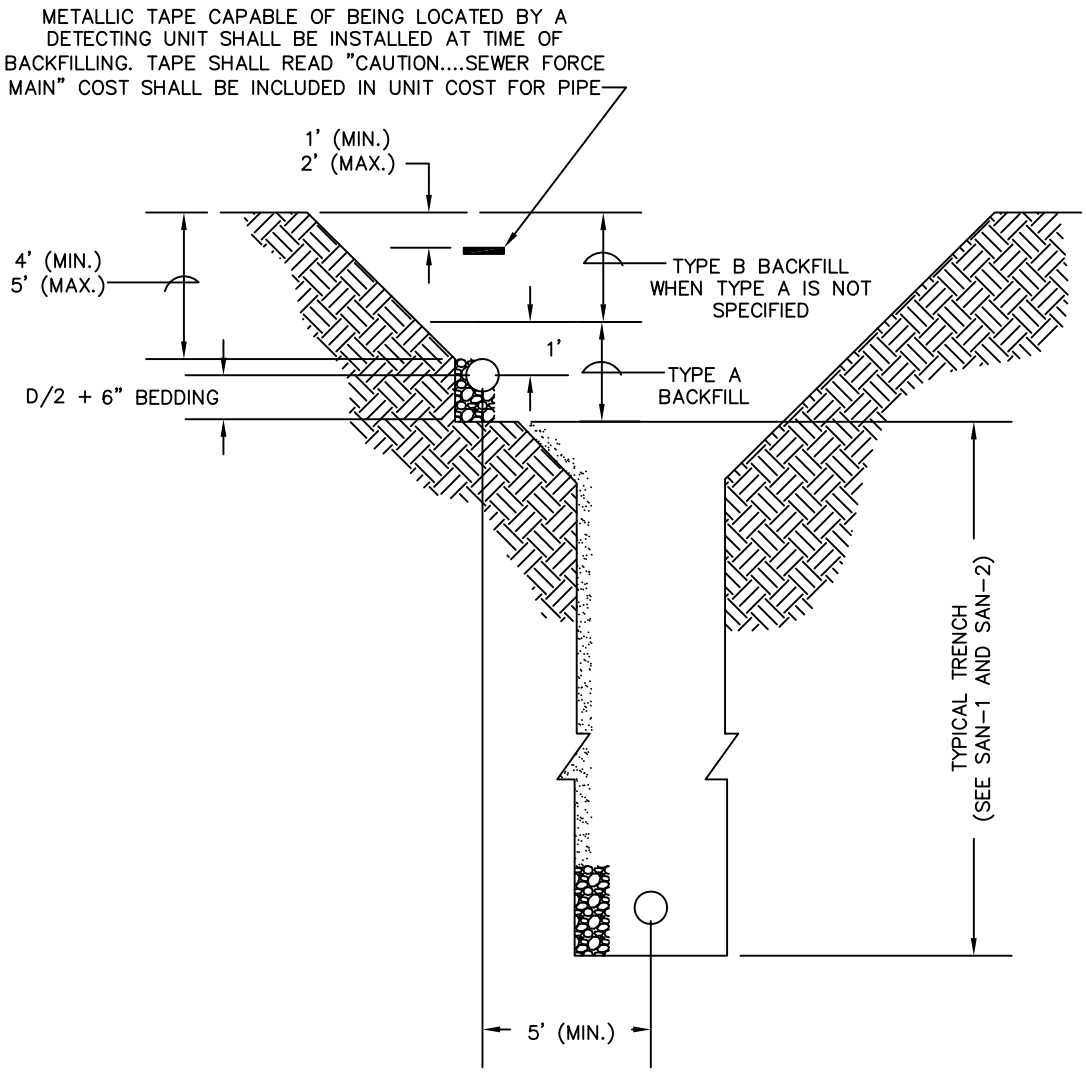
ISOMETRIC VIEW



PLAN VIEW

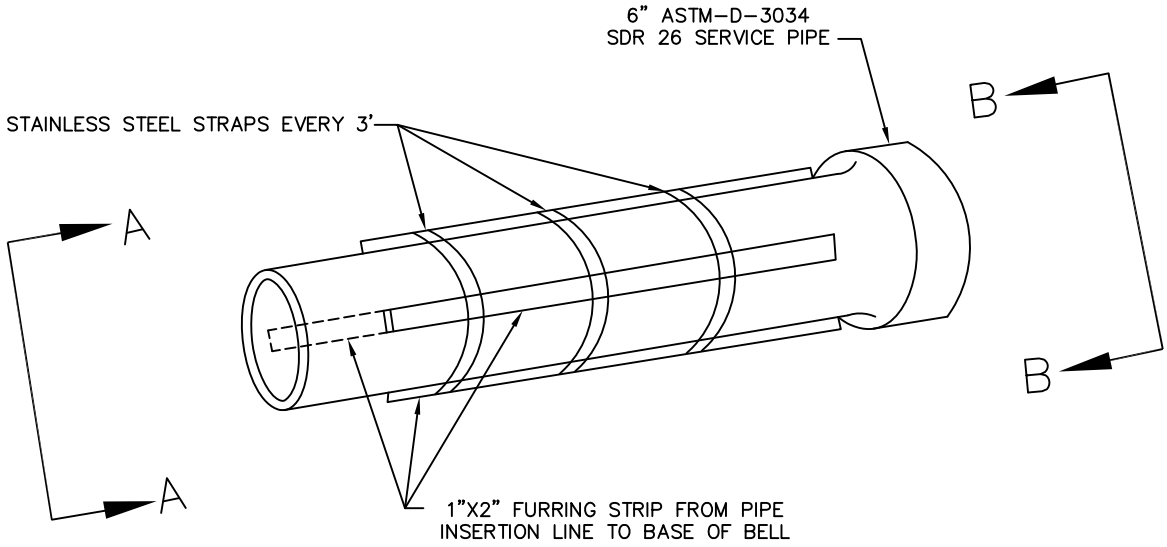
DOUBLE SERVICE CONNECTION

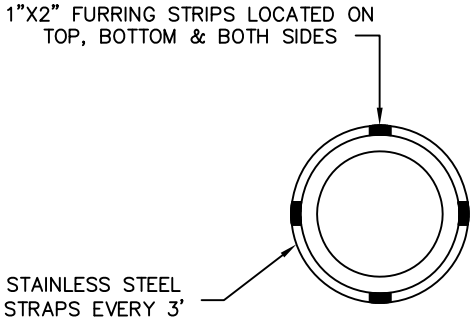
CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN-17



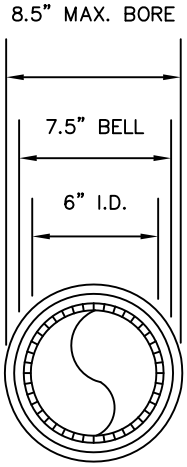
FORCE MAIN & SANITARY SEWER TRENCH

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN-18





SECTION A-A



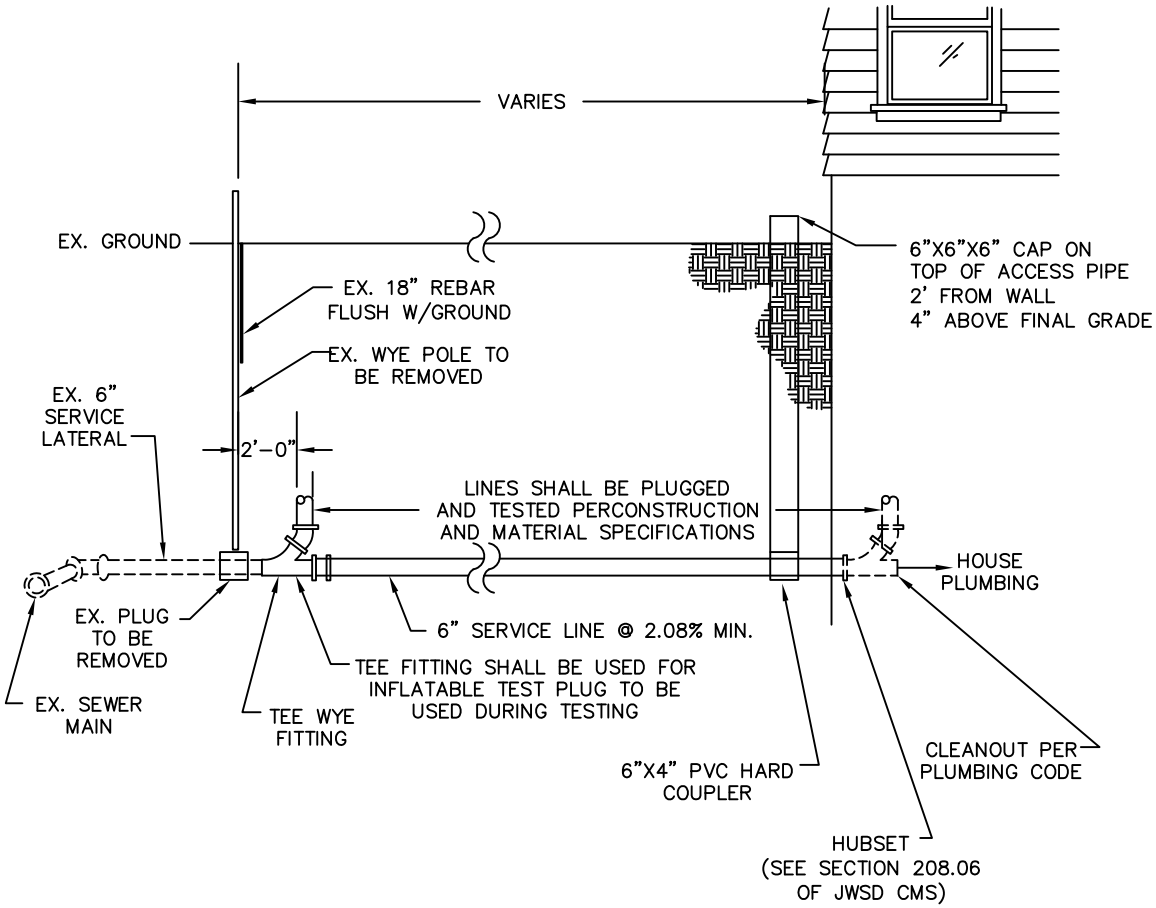
SECTION B-B

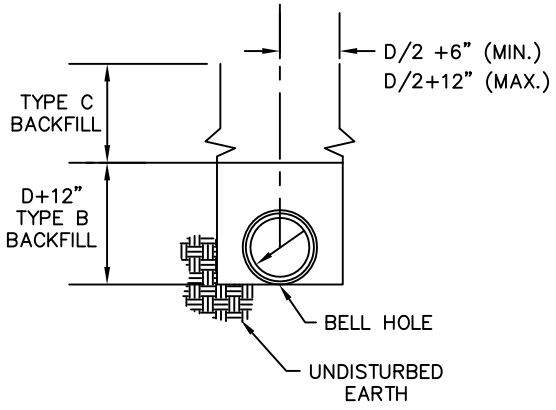
NOTES:

1. FREE BORES SHALL NOT EXCEED 80 FEET IN LENGTH WITHOUT PRIOR APPROVAL OF THE CITY.
2. UNIT PRICE FOR 6" FREE BORE SHALL INCLUDE PIPE AND ALL MATERIAL NECESSARY TO PROVIDE A COMPLETE AND USEABLE FREE BORE.
3. ALL JOINTS SHALL BE RESTRAINED WITH JCM SUREGRIP RESTRAINERS, OR APPROVED EQUIVALENT.

6" SERVICE FREE BORE

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN-19





TYPICAL TRENCH

NOTES:

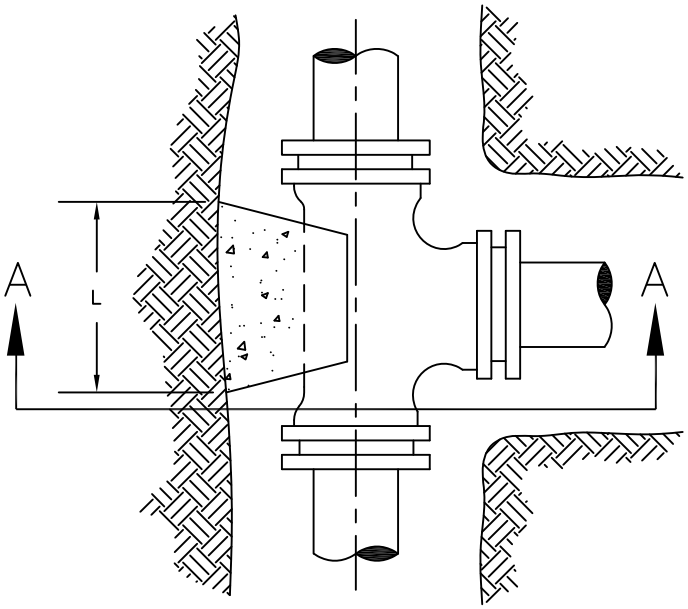
1. CONDUIT SHALL BE SHALL BE ASTM D-3034 SDR 35 PVC PIPE AND FITTINGS SHALL BE SDR 26 PVC PIPE.
2. AN AIR TEST SHALL BE PERFORMED IN ACCORDANCE WITH THE UTILITY OWNERS STANDARDS.
3. CLEANOUT SHALL BE A REMOVABLE PLUG FITTING AS MANUFACTURED BY HUBSETT MANUFACTURING, INC. OF TACOMA WASHINGTON OR APPROVED EQUIVALENT.

6" SANITARY SEWER SERVICE (R/W TO BUILDING)

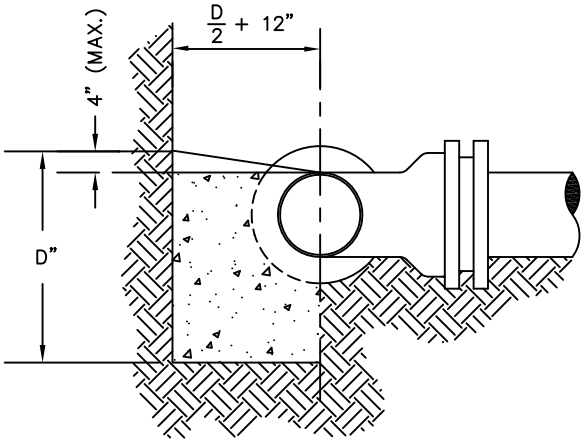
CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN-20

RUN	BRANCH																							
	3"			4"			6"			8"			12"			16"			20"			24"		
	L	D	V	L	D	V	L	D	V	L	D	V	L	D	V	L	D	V	L	D	V	L	D	V
3"	12	5	0.5																					
4"	10	6	0.5	11	8	0.8																		
6"	9	7	0.5	11	8	0.8	18	12	1.9															
8"	8	8	0.5	10	9	0.7	18	12	1.9	23	16	3.5												
12"	6	12	0.6	8	12	0.8	18	12	1.9	23	16	3.5	38	22	8.7									
16"	6	16	0.8	6	16	0.8	14	16	2.0	20	18	3.3	36	23	8.7	49	30	13.6						
20"	6	20	1.0	6	20	1.0	11	20	1.9	18	20	3.3	35	24	8.7	46	32	13.6	60	38	26.5			
24"	6	24	1.2	6	24	1.2	9	24	1.9	15	24	3.3	30	28	8.7	42	36	14.0	54	42	26.3	68	48	45.4

V = VOLUME OF CONCRETE IN CUBIC FEET



PLAN VIEW



SECTION A-A

NOTES:

1. CONCRETE FOR BACKING SHALL BE CLASS C.
2. BACKING SHALL BE DESIGNED FOR 3000 PSF SOIL BEARING.
3. REINFORCING STEEL SHALL BE USED AS DIRECTED BY THE ENGINEER.
4. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED EARTH.
5. PROVIDE CLEARANCE FOR REMOVAL OF BOLTS.

BACKING FOR TEES

CITY OF PATASKALA

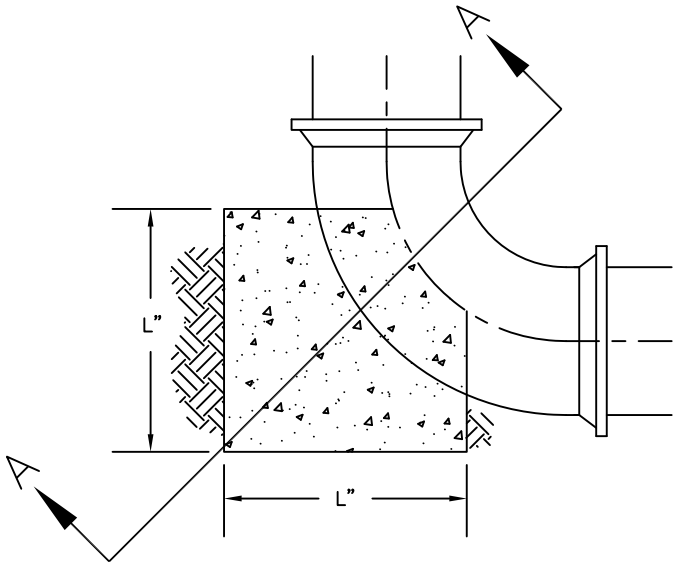
STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

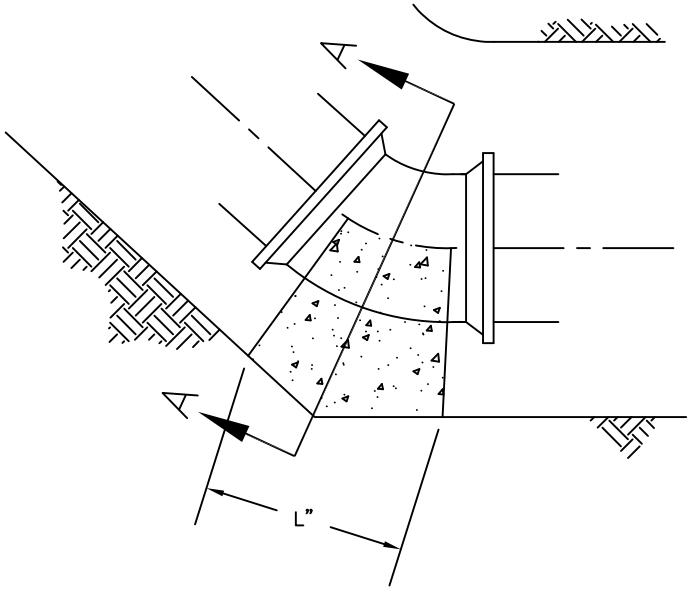
DRAWING NO. SAN–21

SIZE OF PIPE	DEGREE OF BEND											
	11–1/4°			22–1/2°			45°			90°		
	L	D	V	L	D	V	L	D	V	L	D	V
3"	4	3	0.1	6	4	0.2	10	4	0.3	10	4	0.3
4"	5	4	0.2	9	5	0.4	14	5	0.6	14	5	0.6
6"	8	6	0.5	12	7	0.7	20	8	1.4	18	9	1.7
8"	9	8	0.7	16	9	1.4	24	12	2.7	25	11	4.0
12"	14	12	1.8	24	14	3.6	36	18	6.8	32	18	10.7
16"	18	16	3.4	32	18	6.7	36	32	13.4	41	26	25.4
20"	25	20	6.4	30	30	11.5	49	36	20.5	50	32	46.5
24"	27	24	9.0	39	34	18.4	60	42	35.0	58	40	77.7

V = VOLUME OF CONCRETE IN CUBIC FEET



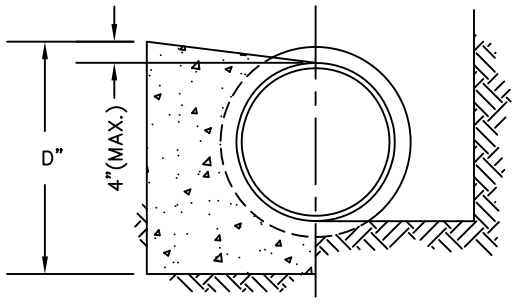
90° BENDS



BENDS LESS THAN 90°

NOTES:

1. CONCRETE FOR BACKING SHALL BE CLASS C.
2. BACKING SHALL BE DESIGNED FOR 3000 PSF SOIL BEARING.
3. REINFORCING STEEL SHALL BE USED AS DIRECTED BY THE ENGINEER.
4. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED EARTH.
5. PROVIDE CLEARANCE FOR REMOVAL OF BOLTS.



SECTION A-A

BACKING FOR BENDS

CITY OF PATASKALA

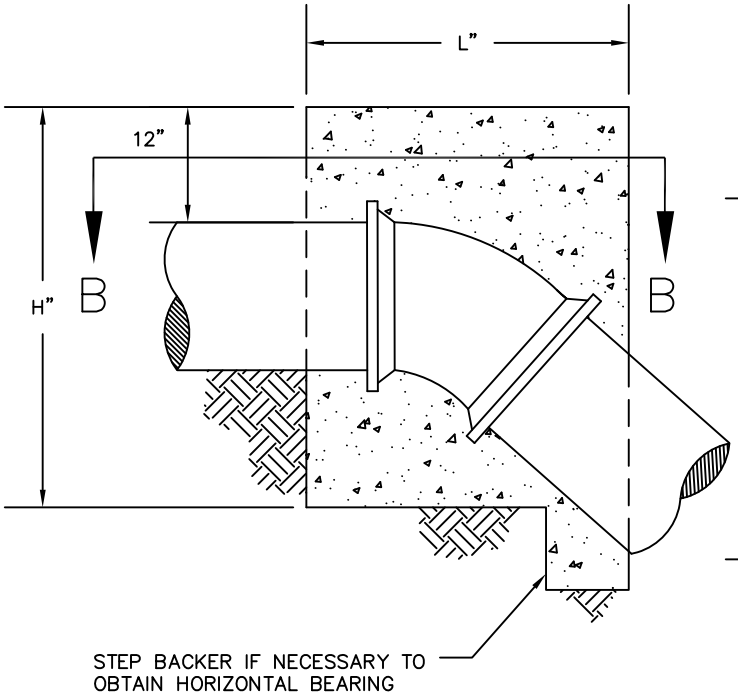
STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

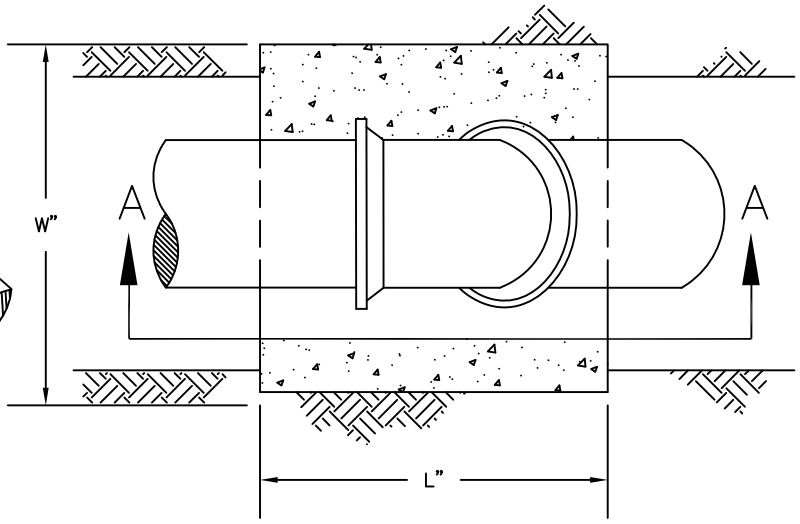
DRAWING NO. SAN–22

SIZE OF PIPE	DEGREE OF BEND															
	11–1/4°				22–1/2°				45°				90°			
	L	W	H	V	L	W	H	V	L	W	H	V	L	W	H	V
3"	12	18	12	1.5	13	25	16	3.0	18	30	19	5.9	25	30	24	10.4
4"	12	24	16	2.6	16	30	18	5.0	22	36	24	11.0	27	48	25	18.7
6"	12	48	18	6.0	15	43	36	13.4	30	55	24	22.9	37	54	36	41.6
8"	12	63	24	10.5	18	57	34	20.2	36	57	33	39.2	47	60	46	75.0
12"	20	54	36	22.6	37	62	37	49.0	48	62	51	87.9	66	66	66	166.4
16"	31	65	38	44.3	60	65	39	88.1	65	65	65	159.2	72	96	72	288.0
20"	45	70	40	72.8	56	70	60	136.2	72	76	78	247.0	86	108	84	451.8
24"	41	72	54	92.3	67	74	69	198.0	88	84	84	359.1	96	120	96	640.0

V = VOLUME OF CONCRETE IN CUBIC FEET



SECTION A-A



SECTION B-B

NOTES:

1. CONCRETE FOR BACKING SHALL BE CLASS C.
2. BACKING SHALL BE DESIGNED FOR 3000 PSF SOIL BEARING.
3. REINFORCING STEEL SHALL BE USED AS DIRECTED BY THE ENGINEER.
4. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED EARTH.
5. BACKING SHALL BE CENTERED HORIZONTALLY ON BEND.
6. ANY PIPE WHICH COMES IN CONTACT WITH THE CONCRETE ENCASEMENT SHALL BE DUCTILE IRON.

BACKING FOR VERTICAL BENDS (OVER BENDS ONLY)

CITY OF PATASKALA

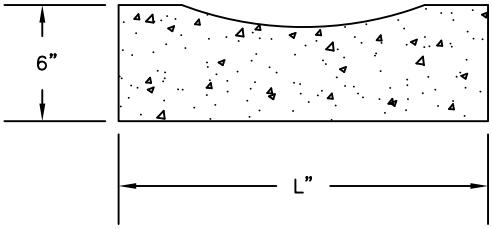
STANDARD CONSTRUCTION DWG.

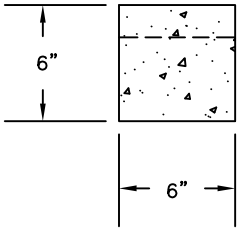
REVISED: 12/18/15

DRAWING NO. SAN–23

	SIZE	L	V
GATE VALVES	3"	15	0.31
	4"	16	0.33
	6"	17	0.36
	8"	20	0.42
	12"	24	0.50
	16"	30	0.63
BUTTERFLY VALVES	20"	36	0.75
	24"	42	0.88
	30"	48	1.00

V = VOLUME OF CONCRETE IN CUBIC FEET





NOTES:

1. CONCRETE FOR BACKING SHALL BE CLASS C.
2. BACKING SHALL BE DESIGNED FOR 3000 PSF SOIL BEARING.
3. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED EARTH.
4. PROVIDE CLEARANCE FOR REMOVAL OF BOLTS.

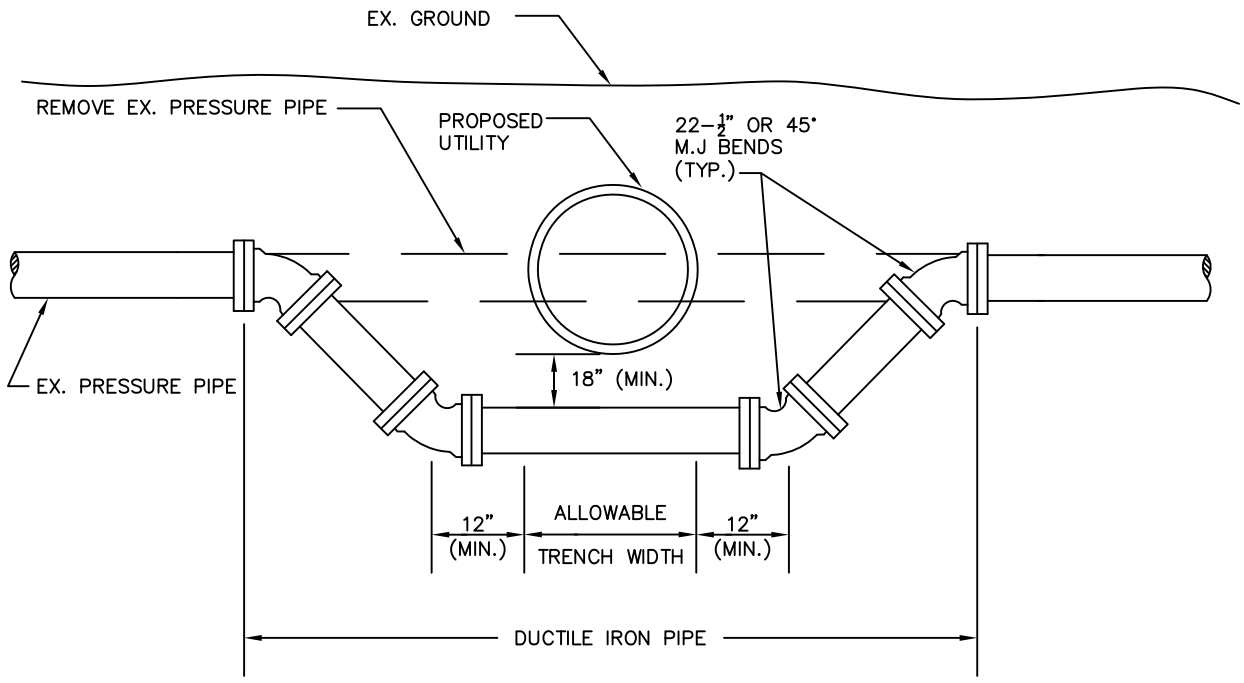
CONCRETE VALVE SUPPORTS

CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

REVISED: 12/18/15

DRAWING NO. SAN-24



NOTES:

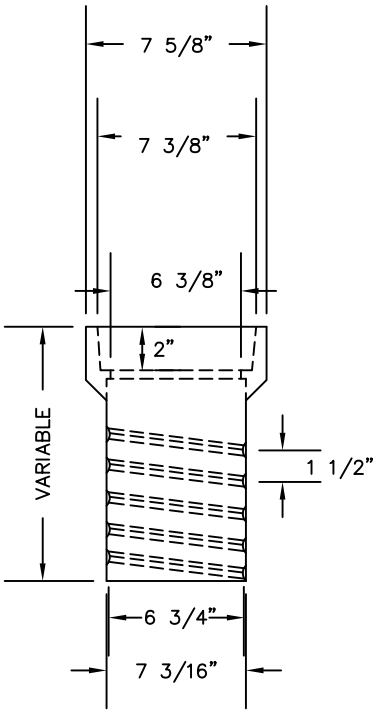
1. TIME AND DURATION OF SHUTDOWN SHALL BE DETERMINED OR APPROVED BY THE CITY.
2. THE CONTRACTOR SHALL NOTIFY ANY CUSTOMERS AFFECTED BY THE PROPOSED WORK AT LEAST 48 HOURS IN ADVANCE OF SHUTDOWN.
3. ALL BENDS SHALL BE SECURED BY RESTRAINING GLANDS, RODDING OR OTHER METHODS AS APPROVED BY THE ENGINEER TO RESTORE MAIN SERVICE AS SOON AS POSSIBLE.
4. THE RELOCATED LINES SHALL BE LAID TO THE NEW LINE AND GRADE, AND TESTED AS REQUIRED PRIOR TO SHUTDOWN OF EXISTING MAIN AND CONNECTION OF THE RELOCATED LINES TO THE EXISTING MAIN.
5. ALL WATER LINES SHALL BE DISINFECTED BY SWABBING WITH A 5% HYPOCHLORITE SOLUTION IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF AWWA C651.

TYPICAL PRESSURE PIPE LOWERING

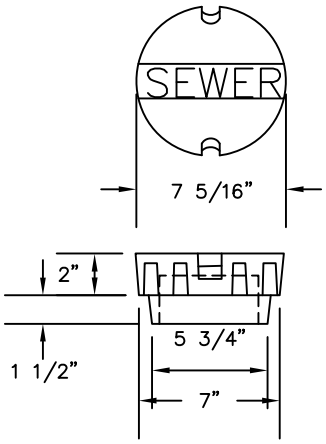
CITY OF PATASKALA

STANDARD CONSTRUCTION DWG.

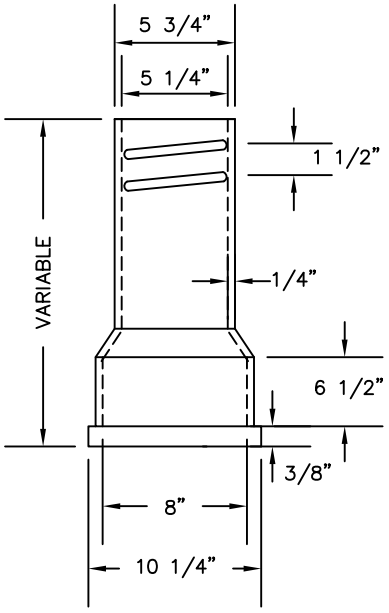
REVISED:	DRAWING NO.
12/18/15	SAN-25



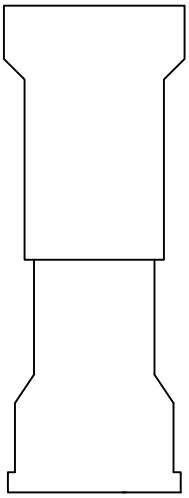
TOP



DROP LID



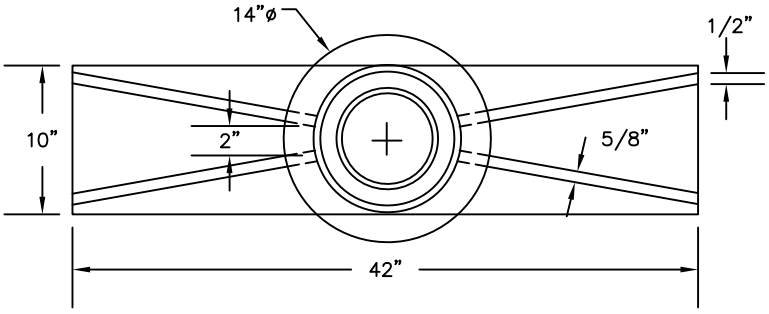
BOTTOM

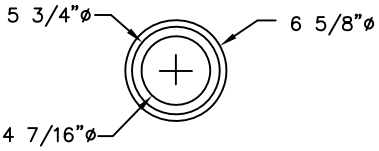


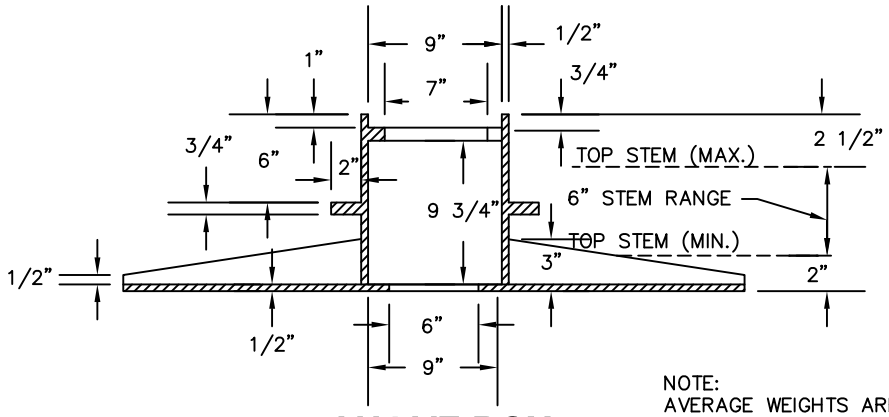
BOX COMPLETE

STANDARD VALVE BOX

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN–26

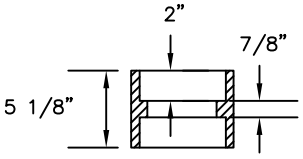






VALVE BOX

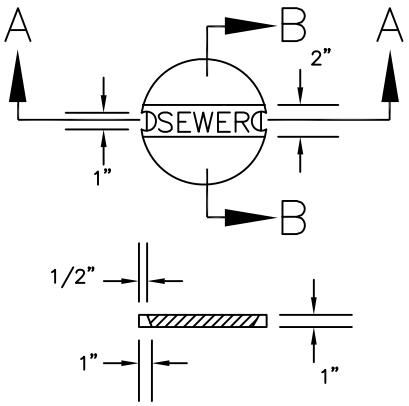
133 LBS.



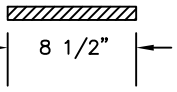
VALVE STEM SLEEVE

14 LBS.

NOTE:
AVERAGE WEIGHTS ARE TO THE NEAREST EVEN POUND
CALCULATED USING 0.26 LBS. PER CUBIC INCH.



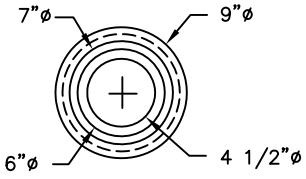
SECTION A-A

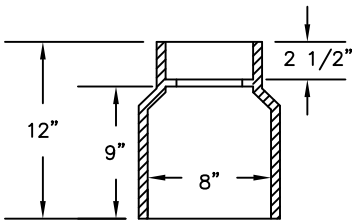


SECTION B-B

VALVE BOX LID

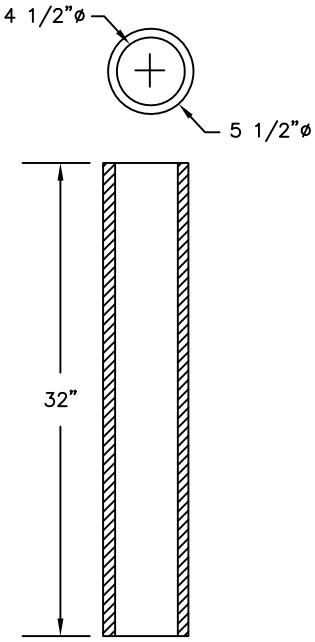
15 LBS.





VALVE BOX BASE

41 LBS.

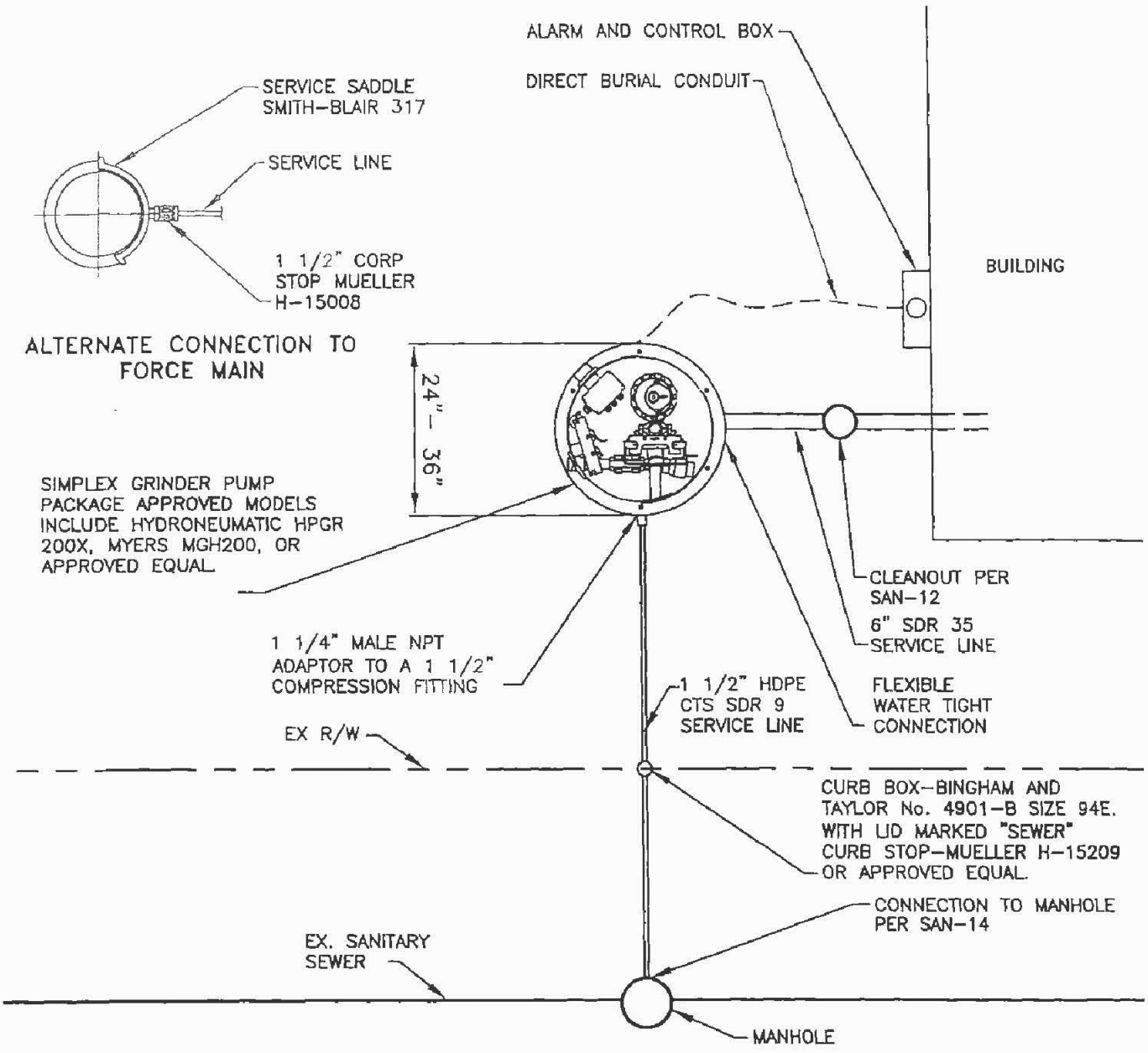


VALVE STEM

65 LBS.

HEAVY DUTY VALVE BOX (TRAFFIC TYPE)

CITY OF PATASKALA	
STANDARD CONSTRUCTION DWG.	
REVISED: 12/18/15	DRAWING NO. SAN–27



NOTES:

1. POWER SUPPLY OF 240V, SINGLE PHASE, 60 Hz PROVIDED TO THE ALARM AND CONTROL BOX BY PROPERTY OWNER.
2. DUPLEX GRINDER UNIT MAY BE REQUIRED FOR COMMERCIAL INSTALLATION OR AT HOMEOWNER'S DISCRETION.
3. OPERATION AND MAINTENANCE INCLUDING ELECTRICAL COSTS ARE RESPONSABILITY OF THE PROPERTY OWNER.
4. ALARM AND CONTROL BOX SHALL CONTAIN AT A MINIMUM AN AUDIBLE AND VISUAL ALARM.
5. EACH INSTALLATION SHALL BE REVIEWED AND APPROVED BY THE CITY.

GRINDER PUMP INSTALLATION

CITY OF PATASKALA

STANDARD
CONSTRUCTION DWG.

REVISED:	DRAWING NO.
12/18/15	SAN-28