YORK TOWNSHIP WATER & SEWER AUTHORITY
YORK COUNTY, PENNSYLVANIA

CONSTRUCTION AND MATERIAL SPECIFICATIONS FOR SANITARY SEWERS

AND

PLAN, DESIGN, AND CONSTRUCTION STANDARDS FOR SANITARY SEWERS

2002

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YORK TOWNSHIP WATER AND SEWER AUTHORITY
CONSTRUCTION AND MATERIALS SPECIFICATIONS
FOR THE INSTALLATION OF SANITARY SEWERS AND APPURTENANCES

A. SCOPE

The work covered by this specification consists in furnishing all plant, labor, equipment, appliances and materials, and in performing all operations in connection with the furnishing and installation of gravity sanitary sewer mains, laterals, force mains, manholes, drop connections, joint materials, pipe plugs (stoppers), cleanouts and/or appurtenances, connecting to existing facilities and the furnishing of all tests required.

All public sanitary sewer work and private sanitary sewers (serving twenty-five (25) EDU's or more) installed in York Township shall be constructed in accordance with the York Township Water and Sewer Authority (hereinafter referred to as "Authority") Standards below.

B. MATERIALS

1. Standard Specifications and Quality

Wherever the specifications, tests, standards, or recommendations of a nationally recognized testing labortory, professional society, or industrial association are referred to, the latest applicable specification, test, standard or recommendation shall be met. For brevity, the words "conforming to", "specification", "designation", and "latest" are omitted hereafter, and society or association names are abbreviated by use of initials only.

Where no specification is given, materials shall be of the best grade and quality and shall be subject to the approval of the Authority. Where substituted materials are permitted, prior approval by the Authority is required. Neither the Authority's Engineer or Township personnel are authorized to grant these approvals. All work shall be inspected by the Authority's Engineer or Township employees. All tests shall be performed in the presence of the Authority's Engineer or Township employees. For brevity, the word "Authority's Engineer" shall mean "Authority's Engineer and/or designated representative of the Engineer".

2. Gravity Sewer Pipe, Fittings and Joints

a. Poly (Vinyl Chloride) (PVC) Plastic Sewer Pipe

1) PVC Sewer Mains, Laterals and Fittings - Pipe and premolded fittings shall be SDR-35 and meet ASTM D3034 specifications.
2) Joints for PVC Mains and Laterals - The PVC sewer pipe shall have rubber ring joints meeting ASTM D3212 specifications. PVC sewer pipe installation and testing shall comply with all requirements of the specifications together with elastomeric seals (gaskets) for joining plastic pipe (ASTM F477). Solvent cement joints will not be permitted.

3) PVC Cleanouts and Fittings - Pipe and premolded fittings shall be Schedule 40, meeting ASTM D1785 and ASTM D2466 requirements or SDR 35, meeting ASTM D2241 and D3212 requirements.
4) Joints for 4" PVC Cleanouts - Solvent cemented joints shall be utilized. Solvent cement materials shall meet ASTM D2564 standards.
5) Cleanout caps - PVC or brass, to fit the pipe used.

b. Ductile Iron (DI) Sewer Pipe and Fittings

1) DI Pipe Gravity Sewer Mains and Laterals - shall be a minimum thickness Class 50 or greater where conditions warrant; coal tar or asphalt-base bitumen coated; conforming to current ANSI A21.51. Cement lined DI pipe is not permitted.
2) Joints - shall either be of the push-on type, employing single rubber gasket to effect the joint seal; or mechanical joint. Joints shall conform to ANSI A21.11. The selection of either of these joint types is optional with the Contractor.
3) Fittings - shall be In accordance with ANSI A21.10 and A21.11.

3. Pressure Sewer Pipe, Fittings and Joints

a. Ductile Iron (DI) Force Main Pipe & Fittings

1) DI Pipe Gravity Sewer Mains and Laterals - shall be of the thickness required for a rated working pressure of not less than 200 psi.; coal tar or asphalt-base bitumen coated; conforming to current ANSI A21.51. Cement lined DI pipe is not permitted.
2) Joints - shall either be of the push-on type, employing single rubber gasket to effect the joint seal; or mechanical joint. Joints shall conform to ANSI A21.11. The selection of either of these joint types is optional with the Contractor.
3) Fittings - shall be in accordance with ANSI A21.10 and A21.11.

b. Poly (Vinyl Chloride) (PVC) Force Main Pipe and Fittings

1) PVC Sewer Force Main Pipe and Joints - Pipe and fittings shall be SDR-18 and meet AWWA C-900 specifications, with integral bell and spigot joints. Solvent cement joints will not be permitted.
2) Fittings - All pipe shall be mechanical joint, cast iron fittings and meeting AWWA C-110 or ANSI A21.10.
3) Detectable Warning Tape for PVC Pressure Sewers - The Contractor shall furnish and install a metallic warning tape in all pressure sewer trenches to assist in locating these underground facilities in the future. This detectable identifying tape shall be orange or green, 2" wide minimum, and be imprinted as follows: "CAUTION BURIED SEWER LINE BELOW" or similar wording. The warning tape shall be installed twelve (12") inches below the finished ground or street surface. Warning tape shall be Terra Tape "D" as manufactured by the Griffolyn Company, Inc., of Houston, Texas or Seton Detection Tape as manufactured by Seton Name Plate Corporation, New Haven, CT 06505 or an approved equal.

4. Poly (Vinyl Chloride) (PVC) Gravity Lateral Pipe Installation by Boring

a. PVC Sewer Laterals and Couplings - Pipe and fittings shall meet the requirements of paragraph B.2.a.(1) above, except that bell and spigot ends shall be removed to accommodate boring installation. Approved pipe couplings shall be used to complete all pipe connections.

b. Joints for PVC Pipe - Solvent cemented joints shall be utilized. Solvent cement materials shall meet ASTM D2564 standards.

5. Cement, Stone, Concrete and Masonry

a. Portland Cement - shall conform to ASTM C150 Type I. Where specifically authorized or required, High Early Strength (Type 3) shall be used.
b. Sand - shall be clean, sharp and free from loam or other impurities, conforming to ASTM C144.
c. Crushed Aggregate and/or Granular Materials -

1) For concrete - shall conform to ASTM C33.
2) For pipe bedding - shall be clean, hard limestone or gravel, free from dust, graded from 1/4 to 1" in size (maximum size AASHTO No. 57).
3) For backfill or temporary pavement repairs - shall be run-of-the-bank gravel or limestone crusher-waste (PennDOT No. 2RC), all material passing 5/8" sieve and no more than 25% shall be finer than a No. 100 sieve.

d. Concrete - shall be either certified transit-mixed concrete having a 28 day compressive strength of 3,000 psi or, if site-mixed, shall consist of one (1) part Portland Cement, two (2) parts sand, and three (3) parts stone, by volume. This concrete specification does not apply to items of precast manufacture.
e. Mortar - shall consist of one (1) part Portland Cement and two (2) parts sand. For plastering, lime may be added up to 25% of the volume of cement.
f. Mixing water - for cement and concrete shall be clean and of potable quality.
g. Reinforcing steel - shall be deformed, either intermediate billet ASTM A615, hard rail ASTM A616 or hard axle-grade steel ASTM A617. Metal shall be clean and free from rust, scale or coatings that will reduce bond.
h. Non-shrink grout - shall be Waterplug®, manufactured by Thoro Systems Products, Inc., of Miami, Florida, or approved equal.

6. Precast Reinforced Concrete Manholes

Concrete manholes shall be four (4) foot inside diameter (minimum) and shall conform to ASTM C478. Joints between manhole base and riser, between risers, between riser and cone, between cone and cast iron frame, and at the entrance of all pipes into the manhole shall be made of RAM-NEK or RUB'R-NEK, a flexible plastic gasket-type sealant manufactured by K.T. Snyder Company, Inc., of Houston, Texas, or approved equal. Both materials shall be used in accordance with the recommendations of the manufacturer. The choice of jointing material at the Contractor's option but he is required to deliver structurally sound watertight manholes before acceptance. All leaks shall be sealed with a non-shrink grout. The use of brick manholes are not permitted in the Township.

7. Manhole Frames, Covers, Steps, and Gaskets

Frames and covers shall be of soft, gray cast iron, true to pattern, smooth, straight and free from defects impairing strength, conforming to ASTM A48, Class 35B specifications and be capable of withstanding an HS-25 loading. Frames and covers (i.e. not watertight) shall be substantially of the design shown in Figure No. 3 and shall be marked "York Twp San Sewer". Frames and covers (heavy duty, 3" thick cover) shall be substantially similar to Model No. 1255B manufactured by Bridgestate Foundry Corp. or Model No. 1835 manufactured by East Jordon Iron Works, or approved equal.

Standard manhole frames and covers (1½" thick cover at edges, thicker at center) shall be similar to Model No. 1032 manufactured by Bridgestate Foundry Corp. or Model No. 1120Z1 manufactured by East Jordon Iron Works, or approved equal.

Watertight frames and covers shall have suitable clamp, employing a rubber gasket seal, having a minimum twenty-one (21") inch clear opening, similar to Model No. 6539 frame and cover, manufactured by the Bridgestate Foundry Corp., or approved equal.

Manhole steps shall be made of non-corrosive, aluminum (alloy 6061-T6) or reinforced rubber, fiberglass, or polypropylene materials. Aluminum steps shall be Model No. F-140, manufactured by Washington Aluminum Company, Inc., Baltimore, Maryland, or approved equal. Reinforced rubber steps shall be Model No. WL-11 manufactured by Delta Pipe Products, of Atlanta, Georgia or approved equal. Steel reinforced fiberglass steps shall be Model No. 115 manufactured by R.J. Manufacturing, Inc., of San Antonio, Texas, or approved equal. Steel reinforced copolymer polypropylene plastic shall be Model No. PS-2-B or PS-2-PFS, manufactured by M.A. Industries, Inc., of Peachtree City, Georgia, or approved equal. Steps in precast walls shall terminate 1" from outer face and shall be cast in place wherever possible or mortared with a water proof, non-shrink grout. Manhole steps shall be placed perpendicular to the hole channel.

Precast manholes shall have a rubber gasket or seal to provide watertight, flexible pipe connections (ASTM C923). A positive seal gasketing system (PSX) gasket manufactured by the Press-Seal Gasket Corporation of Ft. Wayne, Indiana or A-LOK connector manufactured by A-LOK Products, Inc., Tulleytown, PA, are acceptable.

8. Manhole Lining

Lining systems for new manholes shall be extruded PVC or HDPE liner cast integral with the inside wall of manhole. Acceptable lining systems are as follows:

a) Ameron T-Lok PVC manufactured by Ameron International, Brea, CA
b) AGRU Sure Grip HDPE manufactured by Agru America, Inc. Kingswood, TX

Walls, cone section and base (channels) shall be lined with same material. Joints between sections will be welded in the field by manufacturer certified welders.

Lining systems applied to existing manholes for rehabilitation shall be PVC sheet or a PVC-fiberglass composite material. Acceptable lining for manhole rehabilitation are as follows:

a) Ameron Arrow Lock, manufactured by Ameron International, Brea, CA
b) Multiplexx Liner manufactured by Terre Hill Concrete Products, Terre Hill, PA.

Field welding and all liner installation will be performed by certified welders.

9. Casing Pipes

Casing pipes shall be installed at all transverse sewer main crossings under State Highways. The inside pipe diameter of the casing pipe shall exceed the outside diameter of the carrier pipe (including joints) by twelve (12 ") inches.

a) Steel Casing Pipe - Casing pipe for crossings under State Highways installed by boring, tunneling, or jacking shall conform to ASTM A53, Grade B, minimum 35,000 psi yield

strength. Pipe shall be new and unused with minimal wall thickness of 0.375 inches (standard weight).

b) Corrugated Metal Casing Pipe - Casing pipes for crossings under State Highways installed by open excavation shall be 16 gage and shall meet the requirements of AASHTO M245, Type 1. Polymer-coating shall meet the requirements of AASHTO M246 and shall be 10 mils inside and 3 mils outside.

10. Pipe Saddles

The use of pipe saddles to tap into existing mains is generally not permitted by the Authority. All requests for waivers shall include a written justification from the Developer's Engineer and submission of construction details for review and approval by the Authority.

C. EXCAVATION AND TRENCHING

1. Grades

The grade shown on the approved profiles is that of the invert of the pipe, and to which all work must conform. The Developer's Engineer shall set control points for line and grade, to which the Contractor shall maintain and keep so that they may be examined at any time. The Contractor shall be responsible to lay the pipe to the line and grade defined by the control points set by the Developer's Engineer. The Contractor's shall use laser equipment for construction control. The Contractor is responsible the surveys necessary to accurately establish this control and the use of laser facilities. Grade or cut sheets shall be provided to the Authority's Engineer three (3) working days prior to beginning work. No changes in the final approved plans and profiles, or cut sheets shall be made by any party without prior approval from the Authority or Authority's Engineer.

2. Excavation

All excavations shall be made by open cut except where boring is required by the Pennsylvania Department of Transportation. Side walls of trenches shall be kept as nearly vertical as possible and shall be adequately sheeted and braced. Trenches shall be excavated true in line so that a clear space not less than six (6) inches in width is provided on each side of the bell, or the pipe joint, but the trench width measured at the top of the pipe shall not exceed the width given for the applicable nominal pipe diameter in the following table:

Nominal Pipe Diameter (inches)	Maximum Trench Width (inches)
6	24
8	24
10	27
12	30

If the maximum trench width above is exceeded for any reason, the Contractor shall install such concrete cradle or other bedding as may be specified by the Authority's Engineer to support the additional load on the pipe. Care shall be taken in trench excavation so that proper bedding as specified in Paragraph D2 can be accomplished.

3. Excavation Through Quicksand or Yielding Material

When quicksand or yielding material is encountered, the Contractor shall drive either tight tongue and groove wooden sheet piling, or steel sheet piling to a depth which will effectively cut off the flow of sand, and provide safe conditions for work in the trenches. The trench shall then be dewatered by pumping, by well points, or by other methods. Excavation and construction shall follow as rapidly as possible thereafter. To secure a satisfactory foundation, crushed stone bedding as hereinafter described, shall be provided where required by the Authority's Engineer.

4. Rock Excavation

Rock to be excavated shall be fully taken out at least twenty-five (25) feet in advance of the laying of pipe. Rock shall be removed to provide a clearance of at least eight (8") inches below and on each side of all pipe and tings.

5. Blasting

The use of explosives shall be governed by the "Regulations for the Storage, Handling and Use of Explosives" of the Pennsylvania Department of Labor and Industry and "Blasting and Use of Explosives" of the "Safety and Health Regulations for Construction" by the U.S. Department of Labor. if blasting is required, the Contractor shall place such operations in charge of experienced persons only and they shall be carried out in strict accordance with existing Federal, State, County or Municipal laws or regulations governing the same. Care shall be taken to protect from injury all persons, new pipes, railway tracks, all underground structures encountered, and all structures and highways along the lines of the work. The qualification of personnel charged with the use, handling, transportation and storage of explosives; the selection of type of explosives and detonating devices; the use, handling, transportation and storage of explosives including, but not limited to, drilling patterns, depths and sizes of charges, adequacy of protective cover (mats) and warning devices, seismographic monitoring, precautions against accidental and unauthorized detonation; and adequacy of storage facilities are the sole responsibility of the Contractor. Blasting is a technique of construction which is the Contractor's responsibility as a function of control and direction of the work. The Authority's Engineer, in their on-site observation of the progress and quality of the executed work, may recommend blasting operations be stopped when deemed necessary for the public safety, for the safety of the workmen, for protection of public and private property and of the work or for any reason deemed to be in the best interest of the Owner, but the Authority's Engineer shall have no responsibility to stop or require the alteration of blasting operations.

When blasting is anticipated within one hundred fifty feet (150') of any structure within a Pennsylvania Department of Transportation Highway Right-of-Way, the Contractor shall furnish to the State District Engineer a detailed plan of excavating, shoring, blasting and backfilling procedures and secure approval prior to initiating any blasting.

If applicable, a blasting permit shall be obtained from the Pennsylvania Department of Environmental Protection under the Explosive Acts of 1937 or 1957 and any amendments thereto, and a copy provided to the Township.

6. Shoring

All excavations shall be adequately and properly sheeted and braced at all times to prevent accidents, cave-ins, or the shifting or breaking of ground outside the trench limits, and to prevent damage and injury. Sheeting and shoring material shall be of adequate quality, size and strength and shall be properly placed and braced to perform the above functions.

All sheeting and shoring shall be placed by persons especially skilled in such work, and shall be so arranged that it can be withdrawn as the trenches are backfilled without injury to workers, to the work or to adjacent structures. In withdrawing sheeting, special care shall be taken to ensure that all voids or holes left by the plank as they are withdrawn are filled with satisfactory material and thoroughly rammed with a thin rammer, designed especially for that purpose.

The adequacy of the design of sheeting, shoring and bracing installations; of the quality, size, strength and placement of materials; conclusions relative to the nature of material to be encountered and retained and the decision as to whether shoring and/or special precautions are required are the sole responsibility of the Contractor. Shoring is a technique of construction which is the Contractor's responsibility as a function of control and direction of the work. The Authority's Engineer, in their on-site observations of the progress and quality of the executed work, may recommend that work be stopped when deemed necessary for the public safety, for the safety of the workmen, for protection of public and private property and of the work or for any reason deemed to be in the best interests of the Owner, but the Authority's Engineer shall have no responsibility to pass upon the design, installation or quality of shoring or to stop work or require the alteration of a shored installation or to require that shoring be used and/or special precaution taken.

D. INSTALLATION

1. General

Pipes shall be laid true to the lines and grades established by the Developer's Engineer and properly bedded. Any pipe that has its alignment or grade disturbed after laying shall be taken up, relaid and rejointed. The interior of all pipes and manholes shall be kept clean of foreign matter during laying operations. Under no circumstances shall pipe be laid in water, and pipe shall not be laid nor manholes built when trench conditions or the weather is unsuitable in the opinion of the Authority's Engineer. Water shall be kept out of trenches until joint materials and concrete have hardened. Every precaution shall be taken to obtain watertight construction, and pipe joints, manholes, and connections of pipes to manholes and other appurtenances shall be made in such a manner as to minimize infiltration.

2. Bedding and Pipe Laying

Extreme care shall be taken in all pipe laying to provide proper support for the full length of the barrel of the pipe. Bell holes shall be dug to assure that the trench load is not being supported by the bells.

Mechanical excavation shall be carried to a point six (6) inches below invert grade, bell holes shall be dug as required, and the trench bottom carefully backfilled with granular material, so that when the pipe is laid to the proper invert grade, the granular backfill will provide circumferential support for the bottom and sides of the barrel of the pipe or no less than six (6") inches whichever is greater. In all instances, the granular backfill material shall be carried to a point twelve (12") inches above the top of the pipe.

Pipe laying shall generally be done only in the presence of the Authority's Engineer. In his absence, pipe installed shall be exposed for period of up to one (1) hour prior to initiating backfill, unless conditions warrant a quicker backfill.

All pipe before being lowered into the trench shall be inspected and both ends shall be cleaned. The Contractor shall not have more than one hundred (100) feet of trench open at any one time unless otherwise permitted by the Authority. Unless otherwise specified, the pipe shall be laid uphill without

any break in the line or grade from manhole to manhole. Care shall be taken to lay the pipe to true lines and grades. Care must be taken to fit the joints together properly so that the centers of the pipes shall be in one and the same straight line and so as to give an opening of even thickness all around between spigot and socket.

3. Joints - DI Pipe

a) If joints of the push-on-type are employed, the joint shall be assembled as recommended by the manufacturer so as to effect the joint's seal.
b) If mechanical joints are used, the spigot end of the pipe shall be centrally located in the bell so that the rubber gasket is evenly seated. All loose rust or foreign matter shall be removed from the inside surface of the bell and the outside surface of the spigot prior to assembly.

Bolts shall be tightened uniformly with a rachet wrench so as to effect the joint seal. The normal range of bolt torques to be applied to standard cast iron bolts are:

Size - Inches	Torque - Ft. Lbs.
5/8	40 - 60
3/4	60 - 90
1	70 - 100
1 1/4	90 - 120

If effective sealing is not attained at the maximum torque indicated above, the joint shall be disassembled and reassembled after thorough cleaning.

4. Trenching in Advance of Pipe Laying

Trenches shall always be open at least 25 feet in advance of pipe laying, except in quicksand where pipe laying shall follow as closely as the best interests of the work may require.

5. Protecting and Keeping Pipe Clean

During construction, the mouth of the completed pipe shall always be kept properly closed with a watertight plug to prevent the entrance thereto of any water, earth, stones or other debris. The Contractor shall also take any and all measures to keep the pipe clean and free from deposits, and protect the pipe from injury until finally inspected and accepted.

If the pipe is damaged from any cause, or becomes either partly or completely filled with dirt, stones, sand or other debris, the Contractor shall make all necessary repairs, and remove at his expense all such material to the satisfaction of the Authority.

PVC sewer pipe and fittings which are damaged due to improper storage and/or handling practices, i.e. breakage, sunlight-induced changes (ultraviolet rays), adverse effects of heat or cold, etc. shall not be reintroduced for use.

6. Ground Water

In the construction of the entire sewer system every effort shall be made to reduce the infiltration of ground water to a minimum. Every precaution shall be taken to accomplish this end. In case it is discovered at any point that there is an excess of ground water entering the sewer, the Contractor shall be required to make the necessary repairs to correct the condition.

7. Keeping Trench Dry

All pipe laying shall be done in dry trenches. In case a trench is wet, the Contractor shall be required to provide additional crushed stone under the pipe, in addition to the Pipe Bedding.

8. Inadequate Foundation Support

Where unsuitable bearing material is encountered in the trench bottom, continue excavation until suitable material is found, as directed by the Authority's Engineer. Place and compact crushed aggregate to 6 inches below invert and place 6 inch pipe bedding to fully support pipe.

9. Subbase Drain

Four (4) inch perforated polyethylene pipe shall be furnished and placed where required by the Authority's Engineer to provide for wet trench conditions. The top of the drain tile shall be laid approximately three (3) inches below the grade of the sewer, and at the side of the trench. It shall be laid end to end and shall extend on a grade to a sump. The drain pipe shall be wrapped with Class 1 geotextile and AASHTO No. 8 crushed stone.

10. Stream Crossings

Where sewers cross streams, or run within the stream bed, complete encasement with concrete shall be required as shown on Figures Nos. 9 and 10. The concrete encasement shall completely surround the pipe with a minimum thickness of six (6) inches from the outside of the barrel of the pipe, as shown in Figure No. 11. The pipe shall extend a minimum of five (5') feet into each side of the stream embankments.

Concrete encasement shall not be placed under water, and water shall not be permitted to rise upon it or flow over it for forty-eight (48) hours after placement.

The Contractor shall use due care in preserving the regimen of streams and in the prevention of siltation and pollution. Practices which are prohibited include, but are not limited to, (1) dumping of soil into a stream and/or on the banks where it will slide or wash into the stream, (2) unnecessary operation of equipment in the bed of or on the banks of a stream, (3) dumping of trees, brush, or construction debris into a stream, (4) changing the course of a stream (except when provision for such change shall have been made by permit from the Pennsylvania Department of Environmental Protection, (5) leaving cofferdams to be removed by high water, and (6) pumping of muddy, silt-laden water directly into a stream.

The top of all sewers entering or crossing streams shall be at a sufficient depth below the natural bottom of the stream bed to protect the sewer line. In general, one (1') foot of cover should be provided where the sewer is located in rock and three (3') feet of cover in other material. Pipes laid parallel to the stream shall have a twenty (20') foot horizontal separation distance. Where possible, no pipe joints shall be constructed under the stream channel.

Cleanup, grading and seeding of the work area shall follow construction as closely as orderly prosecution of the work will permit.

The following construction practices shall be followed in and adjacent to all streams and water courses:

a) Stream crossings through consolidated beds shall be backfilled so as to present a non-erodible bottom.
b) The backfill of stream banks shall be adequately compacted to prevent erosion. Siltation control shall be practiced during construction and bank stabilization shall be undertaken by planting grasses, shrubbery, or trees immediately after completion of each phase of the project.
c) Pre-construction conditions notwithstanding the work area of stream crossings shall be graded to the satisfaction of the Engineer and, at the earliest practicable time, seeded with a cover crop of annual rye grass (conforming to Pennsylvania Seed Act of 1965). Reseeding of lawn and pasture areas shall be done with appropriate care and materials to restore the work area to its original condition.

Work in and adjacent to streams is subject to supervision and inspection by representatives of the Pennsylvania Department of Environmental Protection and shall be prosecuted in accordance with the terms of any permit issued therefor.

11. Laying Pipe Through Rock

Wherever pipe is to be laid where rock is excavated, the rock shall be removed as specified in Paragraph C3. The bottom of the ditch will then be brought up to proper grade by backfilling with thoroughly compacted crushed aggregate material.

12. Special Fittings and Laterals

Four (4") inch or six (6") inch "Y" branches shall be used for all lateral connections. All laterals shall extend to the street right-of-way line, unless otherwise permitted by the Authority. The specifications for lateral installation, workmanship and watertight construction shall be the same as for public sewers. Should the Contractor also undertake to lay house connections (building sewer) for private owner or developer, such work shall also be inspected and installed in accordance with the York Township Plumbing Code. In cases where these specifications conflict with the Township Code, these specifications shall apply. All lateral installations have a cleanout and shall be plugged with DI or PVC stoppers. Laterals shall terminate no less than five (5') feet behind the curb line, shoulder, or curb line projected, whichever is greater. See Figure No. 6.

Four (4") inch diameter laterals shall be laid on a grade of not less than one-quarter (¼") of an inch per foot. Six (6") inch diameter laterals shall be laid on a grade of not less than one-eighth (⅛") of an inch per foot. Lateral alignment shall be as direct as possible. Changes in direction shall be made with "Y's", combination "Y" and eighth-bends or half "Y's", or one-eighth bends. Changes in size where the house plumbing is connected to the lateral shall be made only with fittings. Trenches upstream of the cleanout shall be promptly backfilled after inspection and approval by the Township Plumbing Inspector. Care shall be taken to prevent damage to the pipe in backfilling and to secure a well compacted and firm trench.

13. Manhole Construction

a) General - Manholes shall be constructed at the points shown on the plans or at such intermediate points as may be specified by the Developer's Engineer. Precast reinforced concrete manholes shall conform to ASTM C478. Details are shown on Figure No. 2.

Precast reinforced concrete manhole bases shall conform to Figure No. 7. A minimum 8" thick bed of thoroughly compacted crushed aggregate (PennDOT No. 2RC) material shall be placed below the precast manhole base. Precast manhole bases shall be manufactured in

accordance with the angles and elevations shown on the Developer's Engineer grade sheets and shall accommodate lateral hookups in the field, if required.

All manholes less than five (5') feet in vertical height, measured from the lowest pipe invert to the top rim elevation, shall have a flat top section without a cone transition section. All flat top sections for shallow manholes shall conform to Figure No. 8 and be capable of withstanding AASHTO HS-25 loading.

Manhole openings shall be constructed to match the approved design and stakeout. All wall penetrations shall be core bored in the field to match changed conditions. Field modifications for manholes improperly ordered will not be permitted.

Where special gaskets or waterstops are recommended by pipe manufacturers for connections at manhole walls, these facilities shall be provided. All pipe connection joints shall be watertight.

Manholes shall be constructed promptly as the sections of the sewer between them are completed, and unless this is done, the Authority's Engineer shall have the authority to stop trenching and pipe laying until manhole construction is brought up properly. All ground water shall be kept away from newly poured concrete until concrete has properly set and until a watertight job is obtained. Any noticeable ground water leakage into the manhole shall be repaired in a manner satisfactory to the Authority's Engineer and repaired at such time as directed. As soon as the manhole is completed, the Contractor shall remove all loose mortar, joint material, and debris. The Contractor shall use extra care in embedding pipes in the concrete floor to obtain watertight joints.

Compaction testing is required on fill areas prior to manhole construction on fill. See Paragraph E.2.a.3 for compaction requirements. Number of compaction tests will be determined by the Authority Engineer.

The Authority's Engineer shall observe all connection work to existing sanitary sewers. No materials, construction debris, and ground or surface water shall enter the existing sewer line. Upon completion of the connections, an adequately sized plumber's stopper shall be placed in the new line and be adequately braced to prevent a "blow-out". The stopper shall not be removed until directed by the Authority's Engineer.

b) Adjusting Rings - The use of brick manholes or brick adjustments is not permitted. Metal or HDPE extension rings are not allowed. All manholes shall be adjusted to finished sheet grades utilizing no more than two (2) two (2") inch thick concrete adjusting rings (4" maximum thickness). If the proper adjustment cannot be achieved by the use of two rings, the cone section shall be removed and the proper barrel section inserted. The elevation of the manhole frame and cover shall be ⅛" to ¼" below the adjoining roadway surface.

Recycled rubber adjusting rings, manufactured by GNR Technologies, Inc., Quebec, Canada may be used with prior approval. Rings shall be tapered to suit field conditions and result in cover elevation ⅛" below roadway surface.

c) Precast Bases - Precast manhole bases shall be constructed specifically for the job intended. Precast manholes shall be constructed from the measurements obtained from grade sheet information as prepared by the Developer's Engineer. Precast channels are allowed, provided that they can accommodate the Township's video inspection equipment. Precast bases shall

be constructed to permit connection of laterals, if required. Only poured-in-place manhole bases shall be installed over existing sanitary sewers.

d) Plastering - The outside and inside surface of all concrete adjusting rings shall be plastered with cement mortar one-half (½") inch in thickness, carefully spread and thoroughly troweled to a smooth, waterproof surface.

e) Waterproofing - The exterior of the precast manhole shall have a factory-applied, bitumastic or coal-tar coating. The Authority's Engineer shall inspect each manhole and may reject any manhole with factory applied waterproofing covering defective construction.

Waterproofing may be field-applied by Contractor using similar bitumastic or coal tar epoxy coating Drycoat Heavyduty Undercoating manufactured by Castrol Oil, Bitumastic 300M manufactured by Carboline or other approved coating. 15 mils dry film thickness.

f) Joints - Joints between manhole base and riser, between risers, between riser and cone, between cone or flat top section and cast iron frame shall be sealed with RAM-NEK or RUB'R NEK material to provide a watertight seal. Joints at the entrance of all pipes into the manhole shall be made with an approved gasketed joint installed in accordance with the recommendations of the manufacturer. Leaks at these joints shall be sealed with a non-shrink grout, waterplug, or approved equal to produce a watertight installation.

g) Anchor Bolts - All frames and covers shall be bolted to the manhole cone in accordance with Figure No. 2. Anchor bolts shall extend five (5") inches into the cone section. Thirteen (13") inch long bolts are required if a second two inch thick adjusting ring is installed.

h) Repairs - Repairs to manhole cracks, joints, and the parging of pipe joints on the inside of manholes shall be performed with an expanding hydraulic cement (e.g., Waterplug®) or approved equal to produce a watertight installation.

14. Lined Manholes

All new wetwells for pump stations will be lined. The Authority's Engineer will review shop drawings for lined wetwells.

New manholes which will be downstream of force main discharges must be lined. The number of manholes will be established by the Authority Engineer. The Authority will determine all other locations for lined manholes.

Existing manholes to be lined in the field must be cleaned with a high-pressure water jet sprayer and spalled areas shall be repaired with approved cementitious mortar. Reconstruct or repair channels as needed prior to liner installation.

A representative from the liner manufacturer shall be on site during preparation and installation of liner in existing manholes. Only certified installers and welders will perform the installation.

Both new and rehabilitated manholes and wetwells shall be visually inspected and tested with an approved electrical holiday detector. All defects shall be repaired.

15. Drop Connections

Outside drop connections shall be installed wherever the grade of an entering sewer is more than thirty (30") inches above the invert of the discharging sewer. Drop connections shall be made in accordance with Figure No. 4. Inside drop connections will not be permitted, unless approved by the Authority. Inside splash connections will be permitted up to nine (9") inches. Piping and fitting materials shall conform to these specifications. Precast drop connections are not permitted.

16. Lampholes and Lateral Risers

The use of lampholes and lateral risers is not allowed.

17. Pipe Saddles

The use of pipe saddles is not permitted, unless approved by the Authority. All new connections to existing sewer mains shall be made at existing fittings or at new pipe fittings, installed in the existing line. The construction of all tap-ins to existing facilities shall be performed under the direct observation of the Authority's Engineer or Township employees. Sewage flow shall be maintained at all times by the Contractor utilizing bypass pumping.

E. TESTS, BACKFILLING, PAVEMENT REPAIRS AND CLEANUP

1. Tests

The Authority's Engineer shall observe all tests prior to acceptance by the Authority (provide 48 hours notice to Authority Engineer). Clean and flush pipelines with water to remove debris and place backfill six (6") inches above pipe, including any thrust restraints, prior to testing.

a) Tests For Gravity Sewers

1. Alignment - A light will be flashed between manholes or manhole locations to determine whether the alignment of the sewer is true and whether any pipe has been displaced, broken or otherwise damaged subsequent to laying. This test will again be conducted before final acceptance of the sewer. Each section (manhole to manhole) of sewer shall show a good light circle throughout its length and any and all defects shall be corrected by the Contractor, to the satisfaction of the Authority's Engineer, before the work shall proceed and before acceptance therefore shall be made.

2. Leakage - Leakage into the sewer shall not exceed 100 gallon per one (1) inch diameter per mile of pipe per 24 hours. If, in the opinion of the Authority's Engineer, infiltration (leakage) appears excessive, the amount of leakage shall be measured by a suitable weir or other device specified by the Authority's Engineer. When leakage exceeds the specified amount, corrective action shall be taken by the Contractor to bring it within said limits before acceptance of the sewer system. The tests shall be conducted on the system as a whole or any portion thereof, at the discretion of the Authority's Engineer.

3. Air Testing - The Authority requires the performance of a low pressure air test on all sewer pipe in accordance with the following procedure:

a) Plug all pipe outlets with suitable test plugs. Brace each plug securely.

b) If the pipe to be tested is submerged in ground water, insert a pipe probe by boring or jetting, into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to ground water submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.
c) Add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to 4.0 psig.
d) After an internal pressure of 4.0 psig is obtained, allow at least two (2) minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
e) When pressure decreases to 3.5 psig, start stopwatch. Determine the time in seconds that is required for the internal air pressure to reach 2.5 psig. Minimum permissible pressure holding times are indicated in the Air Test Table.
f) The air test may be dangerous if, because of ignorance or carelessness, a line is improperly prepared. It is extremely important that the various plugs be installed and braced in such a way as to prevent blowouts. Inasmuch as a force of 250 pounds is exerted on an eight (8) inch plug by an internal pipe pressure of 5 psi, it should be realized that sudden expulsion of a poorly installed plug or of a plug that is partially deflated before the pipe pressure is released can be dangerous.

As a safety precaution, pressurizing equipment should include a regulator set at perhaps 10 psi to avoid over-pressurizing and damaging an otherwise acceptable line. No one shall be allowed in the manholes during testing.

Pipe sections which do not pass the above specified test shall be retested after checking all capped and plugged fittings with a soap solution or the introduction of smoke into the pipe to detect points of leakage and such repairs must be made, as required, to obtain acceptance of each pipe section.

The Contractor shall furnish all equipment, materials and personnel required to perform the low pressure air test. The Air Test Table is located at the end of this section. In no case shall a test of less than five (5) minutes be considered satisfactory evidence of compliance with this section.

4. Deflection Testing For PVC Mains - All PVC sewer mains shall pass a deflection test prior to acceptance by the Authority's Engineer. Maximum allowable pipe deflection (reduction in vertical inside diameter) shall be five (5%) percent. Deflection shall be tested by the use of a "go-no-go" mandrel supplied by the Authority and sized as follows:

Pipe Size	Base I.D.*	Ball Size**
6"	5.742"	5.45"
8"	7.665"	7.28"
10"	9.563"	9.08"
12"	11.361"	10.79"

*ASTM D3034 for SDR-35 pipe. **95% of Base I.D.

a) Any cleaning of the sewers necessary to ensure accurate deflection testing prior to initial acceptance by the Authority, shall be performed by the Developer's Contractor. Cleaning of the sewers necessary to ensure an accurate second deflection testing prior to expiration of the maintenance guarantee period, will be at the Township's expense.

b) The Contractor shall furnish all other equipment (except mandrel), miscellaneous materials, and personnel to perform this test.

c) PVC sewer pipe and fittings which do not pass both deflection tests shall be excavated and replaced or rebedded, so as to provide an installation which does pass the test at the sole expense of the Developer, including both low pressure air and deflection retesting.

5. Hydrostatic Testing For Force Mains or Pressure Sewers - After DI or PVC force mains or pressure sewers have been laid and backfilled, the pipe shall be subjected to a hydrostatic test. Test pressure will be specific for each section of main, based on elevation difference and friction losses, but shall not be less the 35 psi. After the Authority's Engineer has inspected and approved all joints at this pressure, the test may be stopped and backfilling commenced, as hereinafter specified. The Contractor shall furnish all labor,, equipment, water and materials necessary for this test.

6. Testing Manholes - All new manholes shall be tested for exfiltration utilizing the vacuum test method and equipment developed by NPC Systems, Inc., of Milford, NH, or approved equal. The Contractor shall provide the necessary labor, equipment, or materials to conduct the vacuum test as follows:

a) The testing shall be done after complete assembly of the manhole.
b) The manhole-to-pipe connection shall be a flexible connector, such as the Kor-N-Seal or approved equal. A sixty (60) inch/lb. torque wrench shall be used to tighten the external clamps of the Kor-N-Seal connector.
c) All lift holes shall be plugged with a non-shrinking grout.
d) The seal between the manhole sections shall be in accordance with ASTM C923.
e) The Contractor shall plug the pipe openings, taking care to securely brace the plugs and the pipe.
f) With the vacuum tester set in place:
   1) Inflate the compression band to effect a seal between the vacuum base and the structure.
   2) Connect the vacuum pump to the outlet port with the valve open.
   3) Draw a vacuum to 10" of Hg. and close the valve.
g) A vacuum of 9" Hg. or more shall be maintained for at least the period of time on the Vacuum Test Table for Manholes located at the end of this section.
h) If the manhole fails the initial test, the Contractor shall locate the leak and make proper repairs. All leaks shall be filled with a non-shrink grout.

2. <u>Backfilling and Temporary Restoration</u>

a) Backfilling

1) Material - All backfill material shall be free of cinders, ashes, refuse, vegetable or organic material, stones or rubble more than six (6") inches in diameter, frozen clods, or any other material which, in the opinion of the Authority's Engineer, is unsuitable for backfill use. If excavated material is used for backfill, and there is a deficiency due to a rejection of part or all thereof, the Contractor shall furnish material approved by the Authority's Engineer.

2) Methods - Backfilling shall be done as soon as pipe joints have properly set, but only after inspection and approval of pipe installation by the Authority's Engineer. Bedding material shall be carefully deposited by hand at the sides and over the pipe in layers not

exceeding six (6") inches (uncompacted) in thickness, and thoroughly compacted by hand-held tampers, care being taken not to disturb the pipe, so that all voids are completely and solidly filled. Backfill in this manner shall be carried from the bedding at the springline of the pipe to a point twelve (12") inches above the top of the pipe.

For all types and locations of pipes installed by open excavation, the backfill shall be carried out in strict accordance with the foregoing specifications up to the point twelve (12") inches above the top of the pipe. From the point twelve (12") inches above the top of pipe to finished or subgrade, backfilling shall be completed as follows:

a) Backfill material shall be placed in the trench by hand shoveling or it may be placed with power-operated equipment, provided a sufficient number of men are employed in the trench to spread and thoroughly tamp the material in successive nine (9") inch (uncompacted thickness) layers with hand-held mechanical tampers to the top of the trench.

3) Compaction Requirements - All backfill compaction shall meet the following minimum requirements:

Maximum Dry Weight of backfill material (as determined in accordance with AASHTO T99)	Minimum Field Compaction Requirements (percent of maximum Dry Weight) ASTM D1157
Less than 95.0 lb./cu. ft.	Unsuitable material
95.0 - 99.9 lb./cu. ft.	100%
100.0 - 109.9 lb./cu. ft.	100%
110.0 lb./cu. ft. or more	95%

Compaction described herein as "Thorough compaction", "thorough tamping", etc. shall be understood to mean that which complies with the above requirements. Tests to establish the degree of compaction will be performed only upon specific direction of the Authority at the Developer's expense.

b) Temporary Trench Restoration

1) General - All temporary and permanent paving restoration in York Township Street rights-of-way shall be completed in accordance with Township regulations unless modified or changed by the Township Public Works Supervisor. All temporary and permanent paving restoration work in State Highway rights-of-way shall be completed in accordance with PA Code Title 67, Chapter 459 Regulations entitled "Occupancy of Highways by Utilities", latest revision, unless modified in the permit issued specifically for the work intended.

2) In Cartway of Existing Township Streets and State Highways Materials obtained in trench excavation in the cartways of existing Township Streets and State Highways shall not be utilized for backfill. Granular material (PennDOT No. 2RC, minimum) shall be used to backfill the pipe within two (2") inches of the road surface in Township Streets and within seven (7") to ten (10") inches of the road surface on State Highways (depending on the type of temporary materials and method utilized). Temporary repaving of the existing macadam surface on Township Streets shall consist of 2" thick "cold patch" applied and

rolled prior to opening traffic. Temporary paving repairs shall be maintained and repaired or replaced as needed until such time as permanent paving restoration is made.

3) In Cartway of New Streets - Pipe shall be backfilled with crushed aggregate material (maximum size AASHTO No. 57) to a point at least twelve (12") inches above the top of the pipe. Backfill from this point to subgrade may consist of suitable excavated material approved by the Authority's Engineer.

4) In Areas Outside of Existing Streets - Material obtained in trench excavation may be used for backfill. Material shall be placed in layers not to exceed four (4") inches and thoroughly compacted using mechanical tampers. Special care shall be taken to ensure adequate compaction under the haunches and along the sided of the pipe. Puddling or jetting may be considered if test demonstrations indicate that compaction requirements can be met. The top two (2') feet of trench (measured to finished grade) may be compacted by a hydro-hammer upon approval by the Authority's Engineer. Compaction of more than two (2') of trench depth by use of a hydro-hammer is specifically prohibited.

5) Concrete Sidewalk Areas - shall be temporarily replaced with not less than two (2") inches of raked and leveled crushed aggregate material (PennDOT No. 2RC, minimum) and two (2") inches of bituminous materials to provide safe access to properties served.

3. Cleaning Up

Immediately after completing backfilling and temporary pavement repairs, surplus or discarded materials, excess excavation, tools, rubbish and equipment shall be removed from the site by the Contractor. Paved surfaces shall be hand broomed clean of all mud and dust, and, if necessary, washed down with water. During the temporary paving maintenance, the Contractor shall diligently maintain the site in a clean condition, rebrooming when necessary to keep dust and dirt from his work to a minimum.

4. Maintenance of Temporary Restoration

Temporary paving shall be maintained by the Contractor at his own expense so that the normal flow of traffic is not impeded, and public safety is adequately protected for a period not to exceed six (6) months, or until the Developer causes final repairs to be made, whichever is sooner. Any chuck holes, depressions, or unevenness shall promptly be corrected by the Contractor by the placing of additional crushed aggregate materials or screenings, and the grading and rolling thereof. Any mud or soft, spongy spots which may develop shall be removed and replaced with crushed stone, and the street surface shall at all times be kept clean of mud, earth or excess screening. Excessive dust conditions shall be controlled by application of dust oil, or calcium chloride as required.

The Contractor shall also be required to reseed and maintain grass along the sewer construction route.

5. Permanent Surface Restoration

a) Flexible Base Pavements - Permanent surface restoration within the cartway of existing streets shall consist of excavation to a depth of eight (8") inches below finished grade over the trench, and width sufficient to provide a one foot wide bearing on undisturbed subgrade on each side of the trench. The sides of this excavation shall be neatly sawcut and shall be vertical throughout their complete eight (8") inch depth. Upon completion of the cut back and on a properly prepared subbase, the Contractor shall construct a five (5") inch thick, when

compacted, bituminous concrete base course, a two (2") inch thick, when compacted, ID-2 bituminous binder course, and 1½" inch thick ID-2 bituminous wearing surface course. All edges shall be sealed. All work on State Highways shall conform to PennDOT Regulations and the permit issued for the work

Construction shall be in accordance with PennDOT Form 408 Specifications, latest revision. In no case shall permanent paving repairs be made in less than sixty (60) days after completion of temporary repairs on Township Streets and ninety (90) days on State Highways.

b) Plain or reinforced Cement Concrete Pavements - Prior to replacement of the base, one foot from each edge of the trench shall be cut with a masonry saw, in a neat straight line, to a depth of at least three (3") inches, and the detached material shall be removed. Drilling shall not be permitted where sawing or cutting is required.

The replacement base shall consist of high early strength concrete equal in depth to the original concrete pavement. On existing reinforced cement concrete pavements, reinforcing steel and expansion tie bolts shall be placed in accordance with PennDOT standards.

The surface shall be cured in accordance with PennDOT Form 408. After surface corrections have been completed and just before concrete becomes non-plastic, the surface shall be given a textured finish.

Bituminous binder and wearing surface restoration of a cement concrete pavement which has a bituminous surface shall be done in accordance with paragraph (a) above. All work on State Highways shall conform to PennDOT Regulations.

c) Concrete Sidewalks - All concrete sidewalks shall be replaced in accordance with York Township Regulations.

The Township may require the removal of additional sidewalk in order to produce a more satisfactory repair. The removal and/or cut-back of concrete sidewalks shall only be done by sawing with a masonry saw, and sidewalk replacement shall follow a neat, straight line in joining old work.

d) Surface Restoration of Unpaved Areas - Unpaved areas shall be restored to a condition equal to that prior to the commencement of the work. Driveways constructed of earth or crushed stone, unpaved roadways or streets, and Township Road shoulders shall be considered to be permanently restored by the placement of the four (4") to six (6") Inches of crushed aggregate materials or stone screenings, as required for temporary repaving under Paragraph E4; provided, however, that the Contractor shall be responsible for and shall continue to maintain the same for a one (1) year guarantee period. This maintenance work shall include grading, shaping, rolling, and replacing crushed aggregate material as may be required to properly maintain the surface.

In shoulder areas along Township Streets and Roads, where the shoulders are to be stabilized with oil and stone, oil shall be applied to the stone at the rate of 0.35 to 0.50 gallons per square yard of stabilized area.

6. Township Television Inspection

a) At the developer's expense all sewer mains shall be televised by York Township maintenance personnel prior to the Authority's acceptance of new facilities.

b) At the Township's or Authority's expense all sewer mains shall be cleaned, flushed, televised, and deflection tested by York Township maintenance personnel prior to release of any maintenance security posted for the new facilities.

AIR TEST TABLE FOR PIPES

MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP FROM 3.5 PSIG TO 2.5 PSIG. IN ALL CASED THE MINIMUM TIME FOR TESTING SHALL BE FIVE (5) MINUTES.

	TIME (sec)				
	PIPE DIAMETER (in)				
Pipe Length (ft)	4"	6"	8"	10"	12"
25	4	10	18	29	40
50	9	20	35	35	79
75	13	30	53	83	119
100	18	40	70	110	158
125	22	50	88	138	198
150	26	59	106	165	236
175	31	69	123	193	277
200	35	79	141	220	317
225	40	89	158	248	340
250	44	99	176	275	340
275	48	109	194	283	340
300	53	119	211	283	340
350	62	139	227	283	340
400	70	158	227	283	340
450	79	170	227	283	340
500	88	170	227	283	340
550	97	170	227	283	340
600	106	170	227	283	340
650	113	170	227	283	340

VACUUM TEST TABLE FOR MANHOLES

Depth of Manhole	Time (sec) Diameter of Manhole (in)		
(ft)	48"	60"	72"
up to 8	14	18	23
10	17	23	28
12	21	28	34
14	25	32	40
16	28	37	45
18	32	41	51
20	35	46	57
22	39	51	62
24	42	55	68
26	46	60	74
28	49	64	80
30	53	69	85

F. CONNECTION TO EXISTING FACILITIES

1. Plan Approval

Where connections to sewer mains or manholes are proposed and no openings or fittings were provided, a sketch design shall be submitted to the Authority Engineer or Township for review and approval. The plan shall show sufficient detail and meet the Authority's Plan, Design, and Construction Standards.

2. Methods of Connection

a) For tap-ins to existing clay mains, a section of clay pipe shall be removed and a new PVC wye shall be inserted with the use of Fernco couplings. No concrete encasement will be allowed.

b) For tap-ins to existing plastic lines, the main shall be cut and a new PVC wye inserted with Fernco coupling. PVC tap-ins shall utilize a slip mechanical joint. No concrete encasement will be allowed.

c) For tap-in to existing ductile iron mains, the pipe shall be cut and a ductile iron wye fitting with mechanical joints shall be inserted. No concrete encasement will be allowed.

d) For connections to existing manholes, all wall penetrations shall be core bored and a booted, watertight pipe gasket shall be inserted (ASTM C923). Repairs to manhole and pipe joints

shall be performed with an expanding hydraulic cement (e.g., Waterplug®) or an approved equal to produce a watertight installation.

e) Construct manholes on existing mains using cast-in-place concrete bases.

YORK TOWNSHIP WATER & SEWER AUTHORITY

STANDARD DETAILS

October, 2002

Detail No.	Detail Description	Figure No.
YT2221-2	Payment Limits - Pipe payment by Depth	1
YT2221-3	Pipe Bedding Details	9
YT2221-4	Stream Crossing Detail	10
YT2221-5	Clay Dike Detail	
YT2221-6	Subbase Drain Detail	
YT2575-1	Pavement Payment Limits	
YT2575-2	Trench Paving Payment Limits	
YT2601-1	Cast-in-Place Manhole Base Details	
YT2601-2	Precast Manhole Base Detail	7
YT2601-3	Shallow Manhole Detail	8
YT2601-4	Standard Deep Manhole Detail	2
YT2601-5	Aluminum Manhole Step Detail	
YT2601-6	Heavy Duty Manhole Frame and Cover	3
YT2601-7	Watertight Manhole Frame and Cover	
YT2601-8	Drop Connection Detail	4
YT2601-9	Manhole Channel	5
YT2610-1	Lateral Payment Detail	6
YT2610-2	Lateral Detail	6
YT2640-1	Air Release Valve	
YT2640-2	Fire Hydrant Setting Detail	
YT2640-3	Blowoff Detail	
YT3300-1	Concrete Encasement Detail	11
YT3300-2	Concrete Anchor Details	
YT3300-3	Thrust Blocking Details	
YT3300-4	Thrust Blocking Details for Sanitary Sewer Force Mains	
YT3300-5	Concrete Encasement for Frost Protection Detail	

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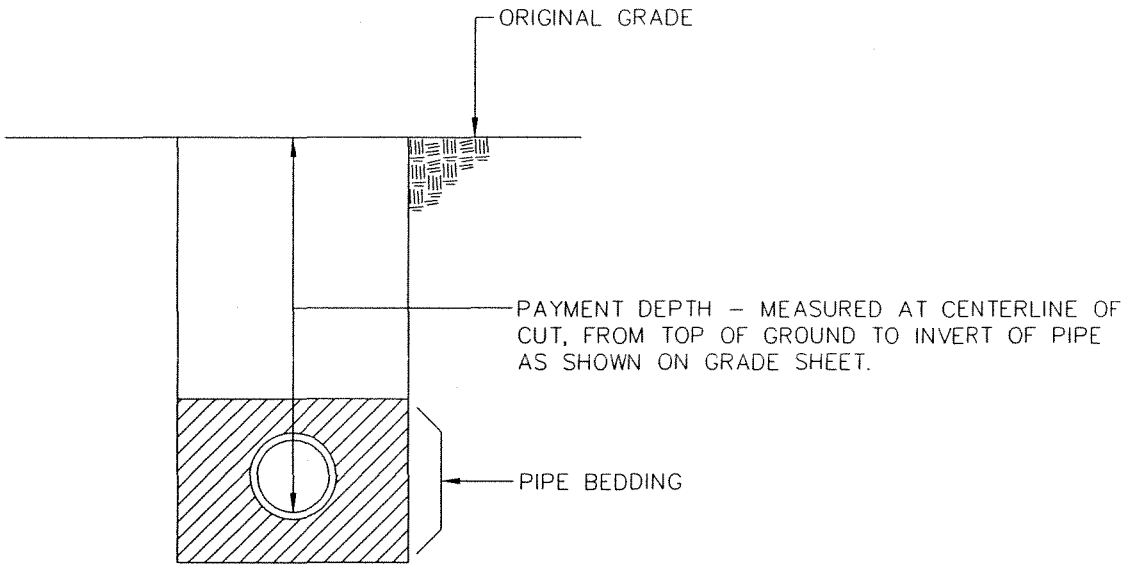
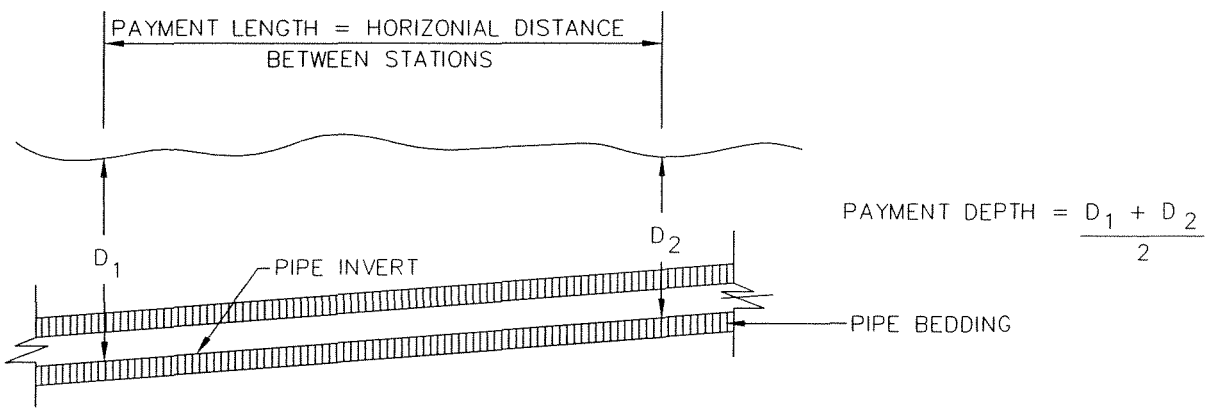


SECTION



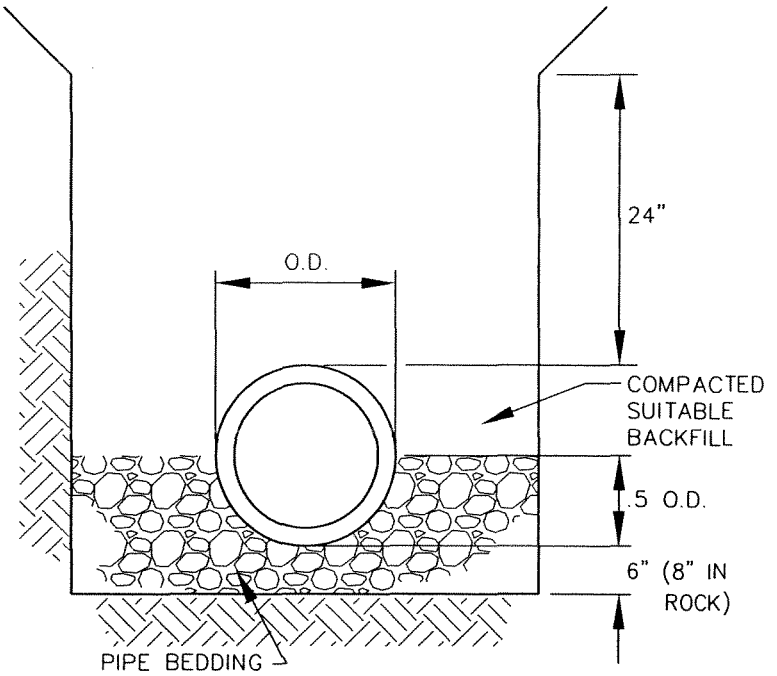
PROFILE

PAYMENT SHALL BE MADE AT UNIT COST PER LINEAR FOOT AT AVERAGE OF DEPTHS AT STATIONS SHOWN ON GRADE SHEETS.

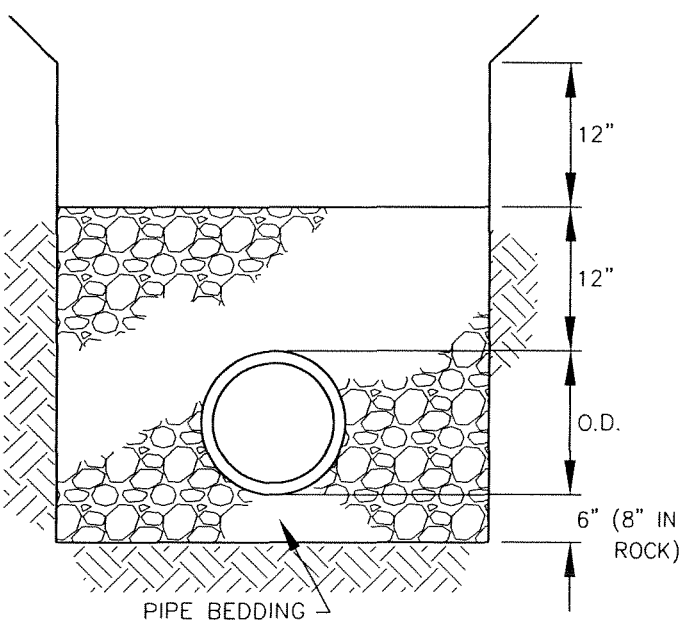
PAYMENT LENGTH WILL BE MEASURED TO CENTERLINE OF MANHOLES OR TERMINATION.

NOTE: NOT TO SCALE

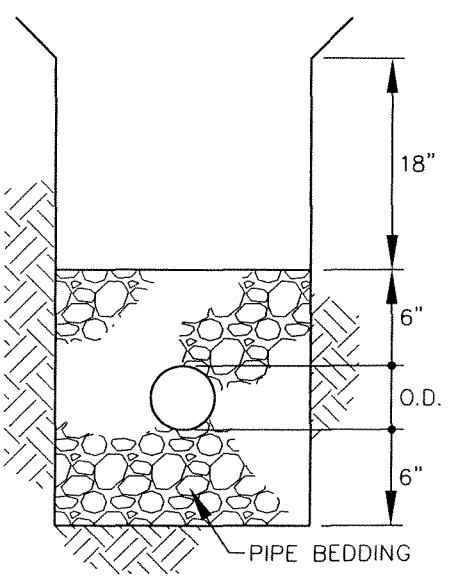
CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	PAYMENT LIMITS – PIPE PAYMENT BY DEPTH	DATE: 7/31/96 DRAWN BY: J.M.B CHK. BY: SBS NO. YT2221-2



TYPE III
(RCP ONLY)



TYPE IV

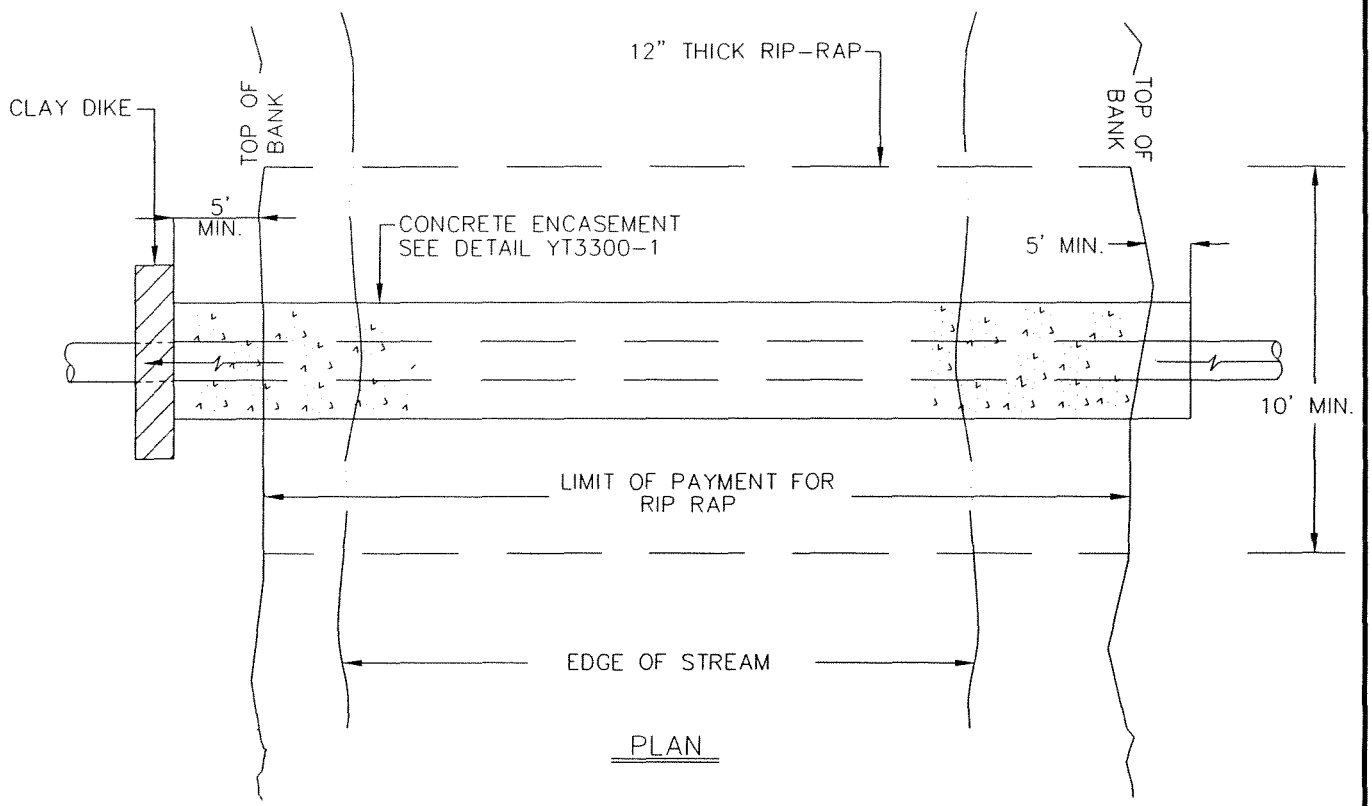


TYPE V
(2" DIA. AND SMALLER)

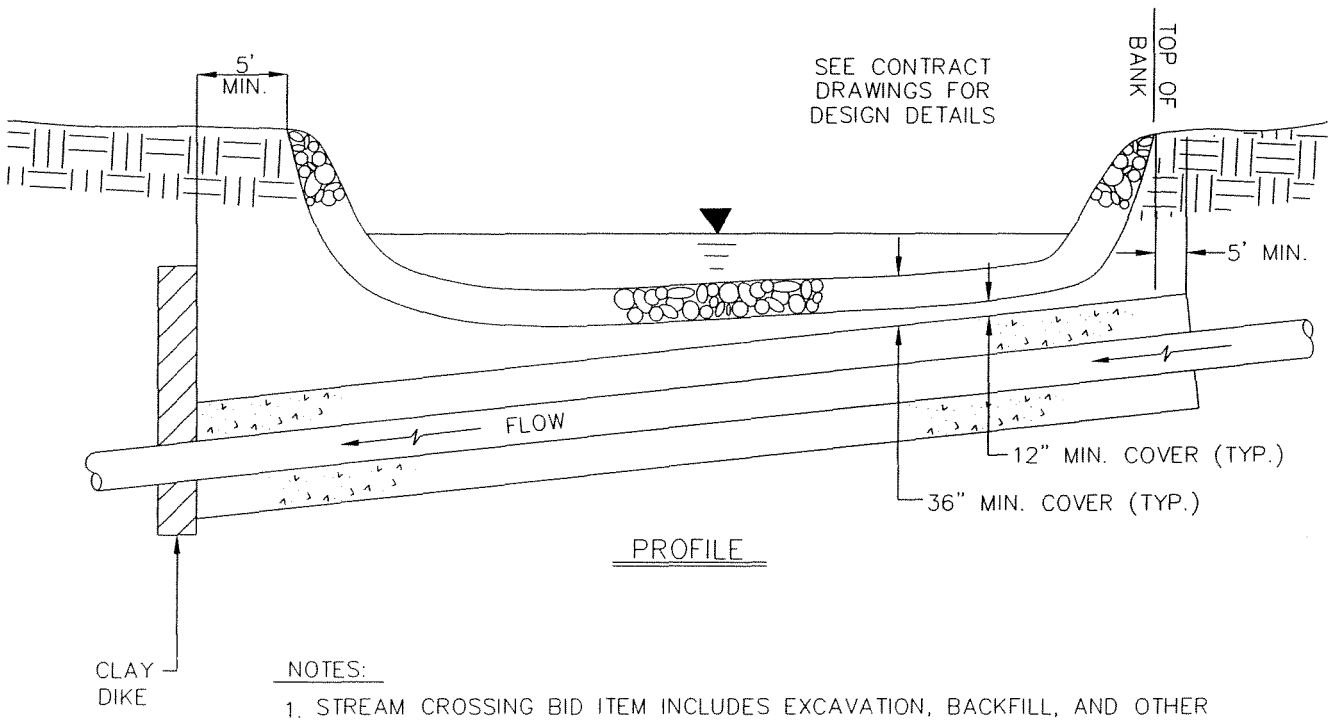
NOTE: TYPE I AND II NOT PERMITTED.

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	PIPE BEDDING DETAILS FIGURE: 1	DATE: 1/22/01 DRAWN BY: J.S.L. CHK. BY: SKS NO. YT2221-3



PLAN



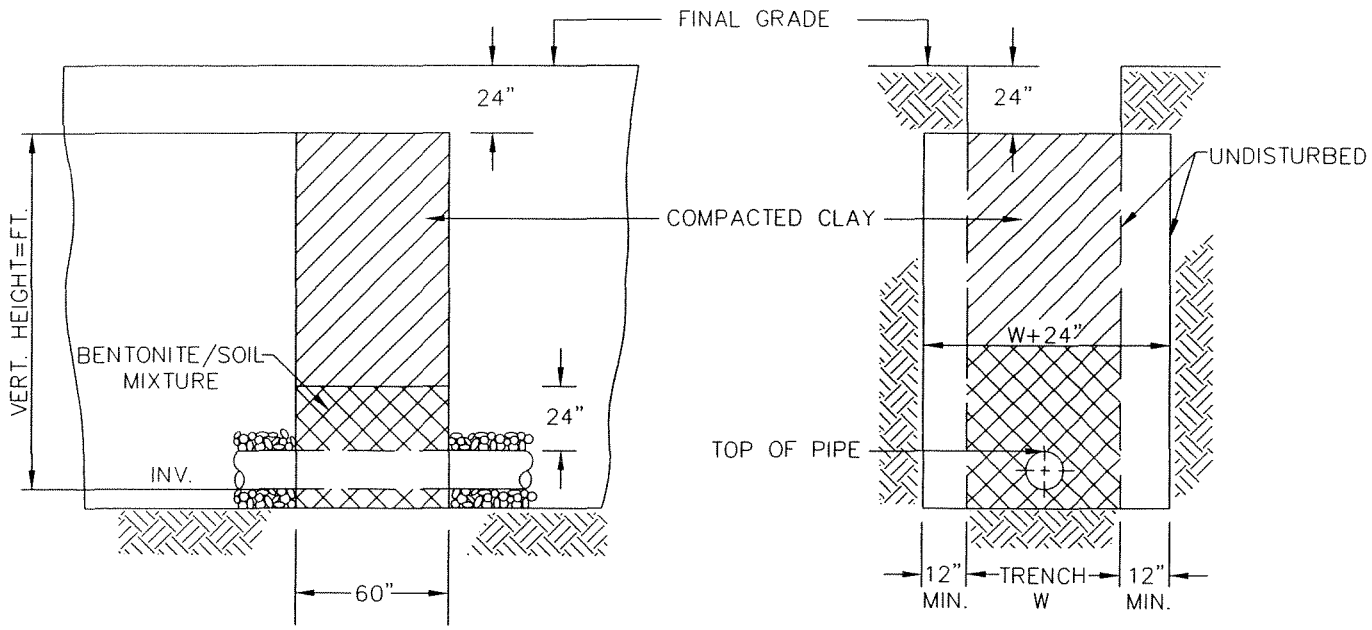
PROFILE

NOTES:

1. STREAM CROSSING BID ITEM INCLUDES EXCAVATION, BACKFILL, AND OTHER WORK INCIDENTAL TO STREAM CROSSING CONSTRUCTION.
2. PIPE, RIP-RAP, CONCRETE ENCASEMENT, AND CLAY DIKE WILL BE PAID UNDER THEIR RESPECTIVE BID ITEMS.

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	STREAM CROSSING DETAIL FIGURE: 9	DATE: 7/31/96 DRAWN BY: J.M.B. CHK. BY: SFS NO. YT2221-4



NOTES:

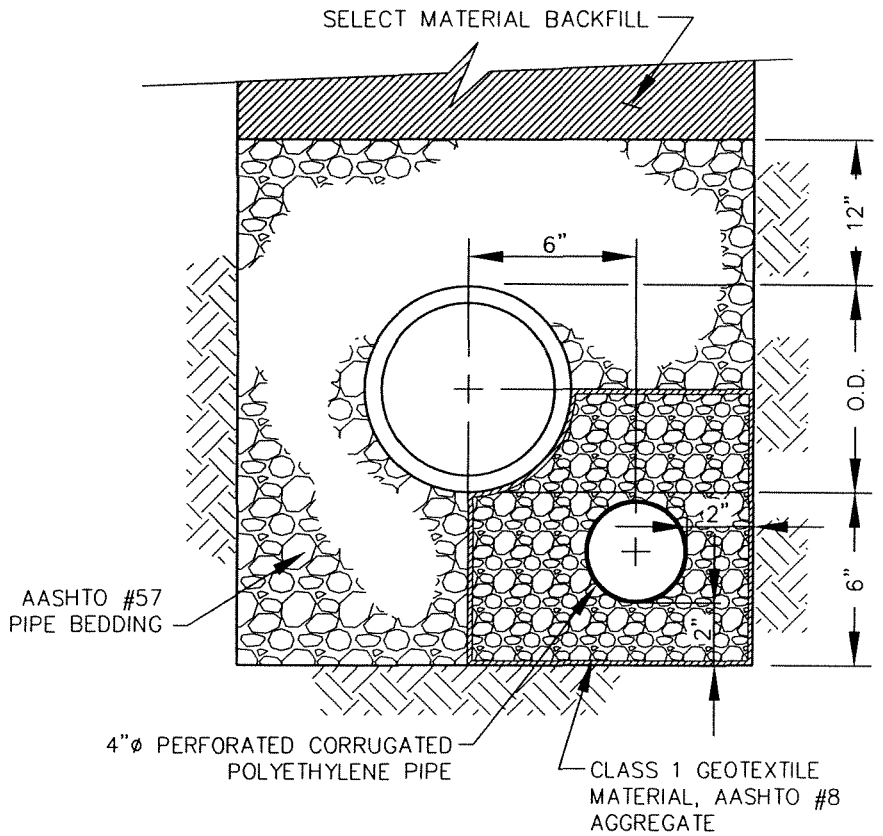
1. COMPACTED CLAY DIKES SHALL EXTEND VERTICALLY FROM UNDISTURBED GROUND AT BOTTOM OF TRENCH TO WITHIN TWO (2') FEET OF FINAL GRADE, AND FROM UNDISTURBED GROUND ON TRENCH SIDES FOR WIDTH OF TRENCH AND 12" BEYOND EACH SIDE OF TRENCH.

2. CLAY BACKFILL TO A POINT TWO (2') FEET OVER THE PIPE SHALL CONSIST OF A BENTONITE /SOIL MIXTURE AT A 5:1 MIX.

3. REMAINING BACKFILL SHALL CONSIST OF CLAY CONTAINING NO MORE THAN 15% (BY VOLUME) STONE NOT LARGER THAN TWO (2") INCHES IN DIAMETER. CLAY SHALL BE PLACED IN SIX (6") INCH LIFTS AND COMPACTED BY MECHANICAL TAMPER TO NOT LESS THAN 95% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT.

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	CLAY DIKE DETAIL FIGURE: 10	DATE: 7/31/96 DRAWN BY: J.M.B. CHK. BY: SKS NO. YT2221-5

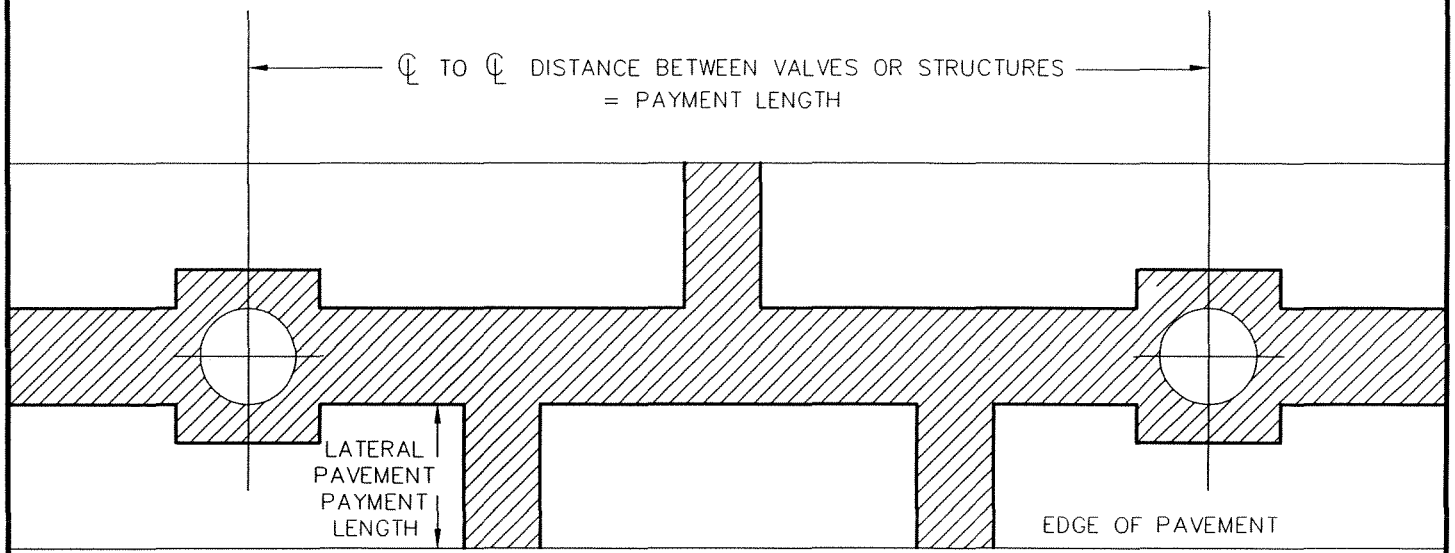


NOTE:

LOCATION OF SUBBASE DRAIN IN TRENCH TO BE MODIFIED TO SUIT FIELD CONDITIONS AND TIE INTO INLETS MANHOLES, OR OTHER EXISTING PIPING. POSITIVE FLOW MUST BE MAINTAINED.

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	SUBBASE DRAIN DETAIL	DATE: 1/22/01 DRAWN BY: J.S.L. CHK. BY: NO. YT2221-6



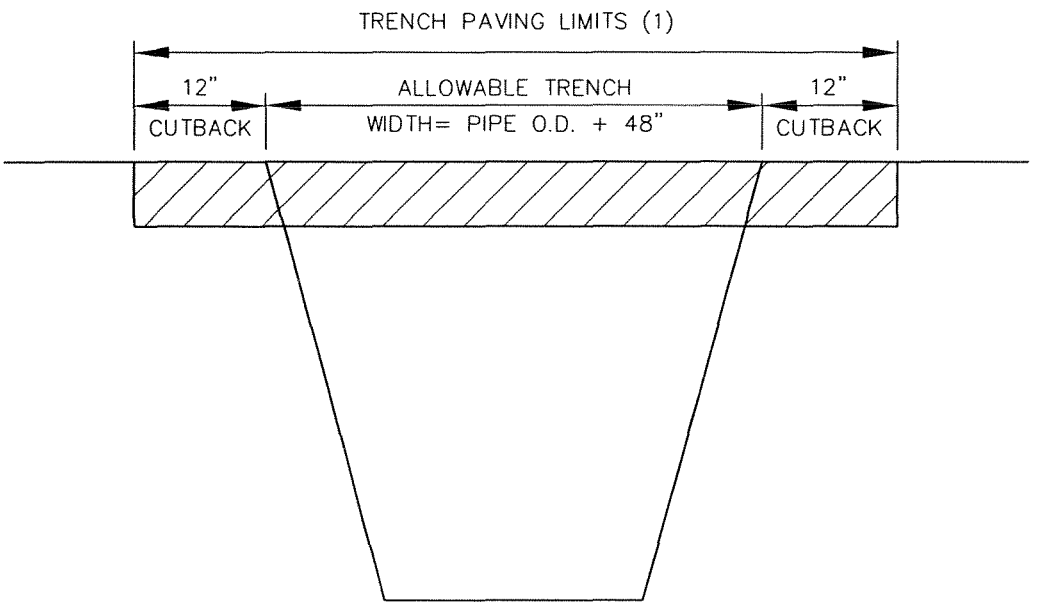
NOTE:

1. PAYMENT FOR PAVEMENT BETWEEN CENTERLINES OF VALVES OR STRUCTURES WILL INCLUDE ALL REQUIRED PAVEMENT AROUND VALVES OR STRUCTURES. NO ADDITIONAL PAYMENT WILL BE MADE FOR REPAVEMENT OF AREAS EXCAVATED FOR VALVES OR STRUCTURES.

2. REFER TO STANDARD DETAIL YT2575-2 FOR TRENCH WIDTH PAVING LIMITS.

NOTE: NOT TO SCALE

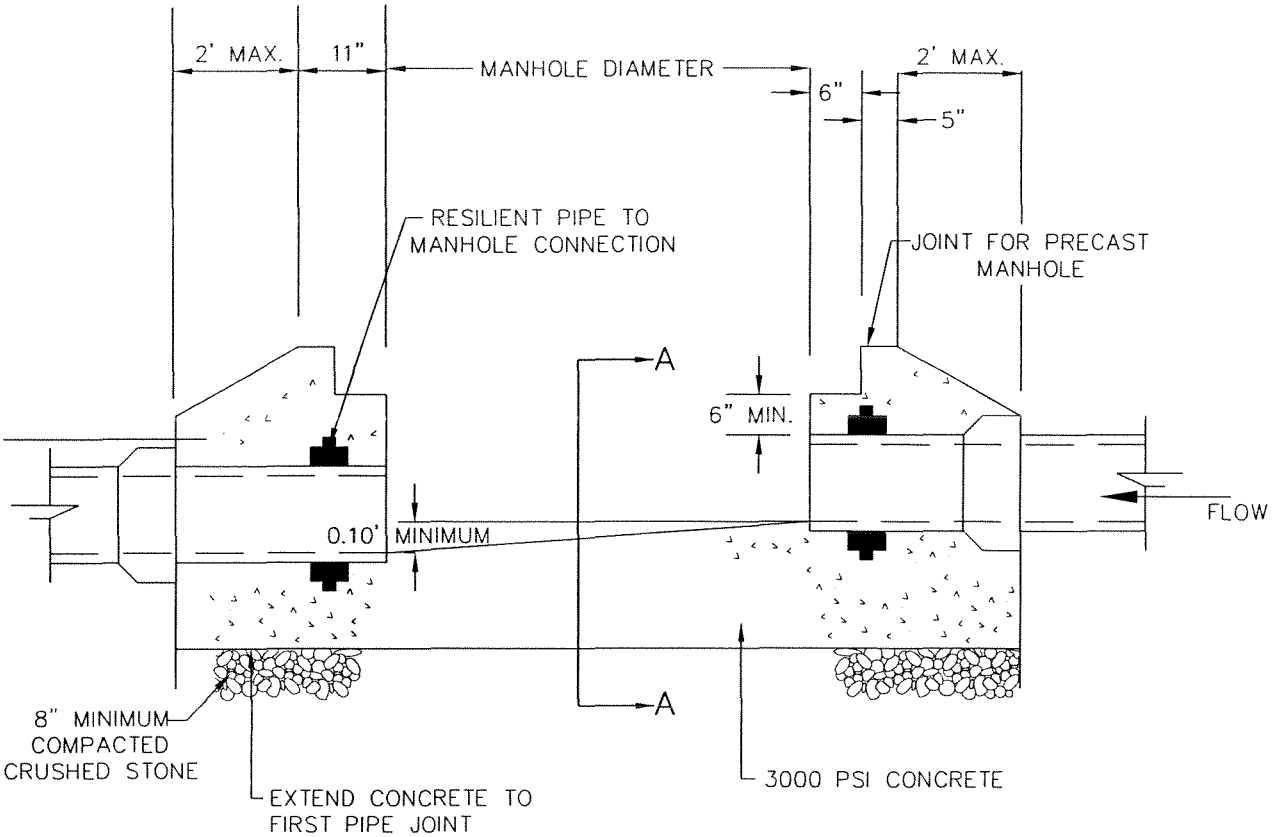
CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET, YORK, PA 17402	PAVEMENT PAYMENT LIMITS	DATE: 7/31/96 DRAWN BY: J.M.B. CHK. BY: SKS NO. YT2575-1



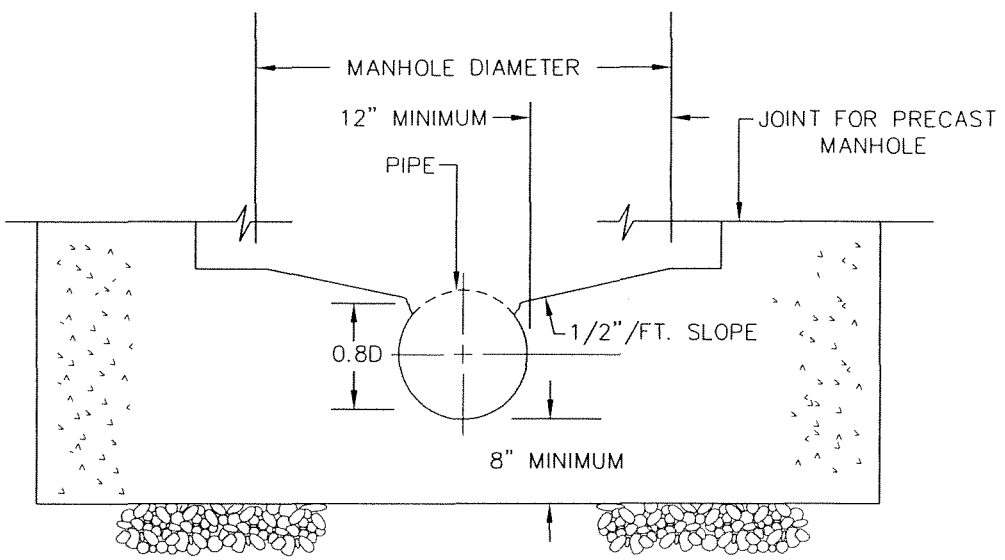
(1) NOTE: TRENCH PAVING LIMITS FOR PAYMENT = ALLOWABLE TRENCH + CUTBACKS (IF REQUIRED) OR LIMIT OF PAVING ACTUALLY PLACED, WHICHEVER IS LESS.

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	TRENCH PAVING PAYMENT LIMITS	DATE: 1/22/01 DRAWN BY: J.S.L. CHK. BY: SKS NO. YT2575-2



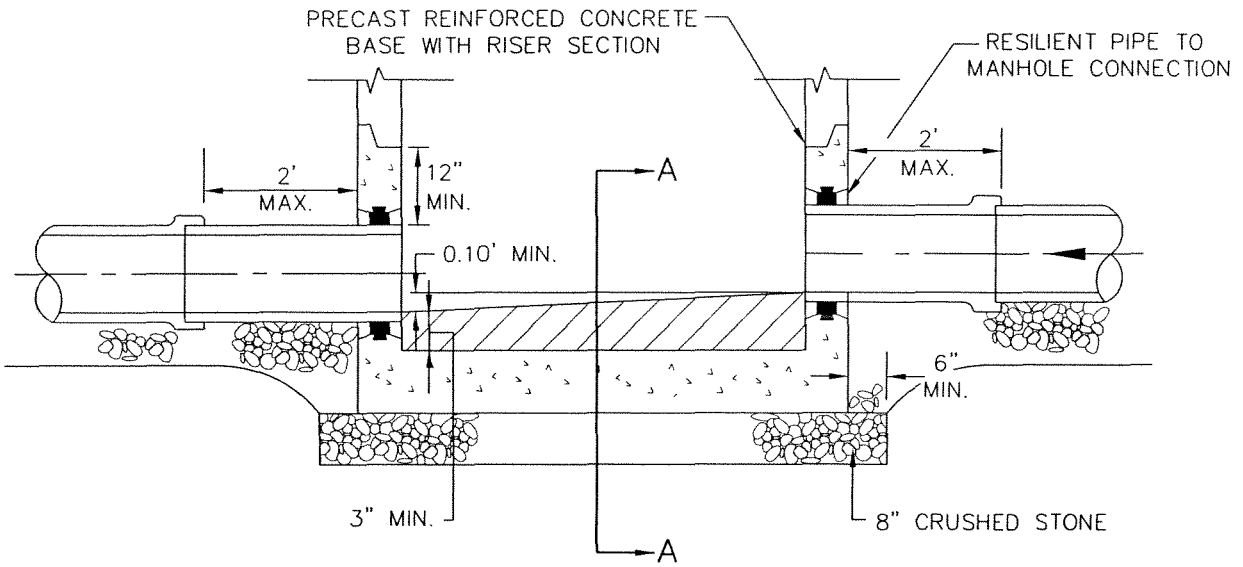
ELEVATION



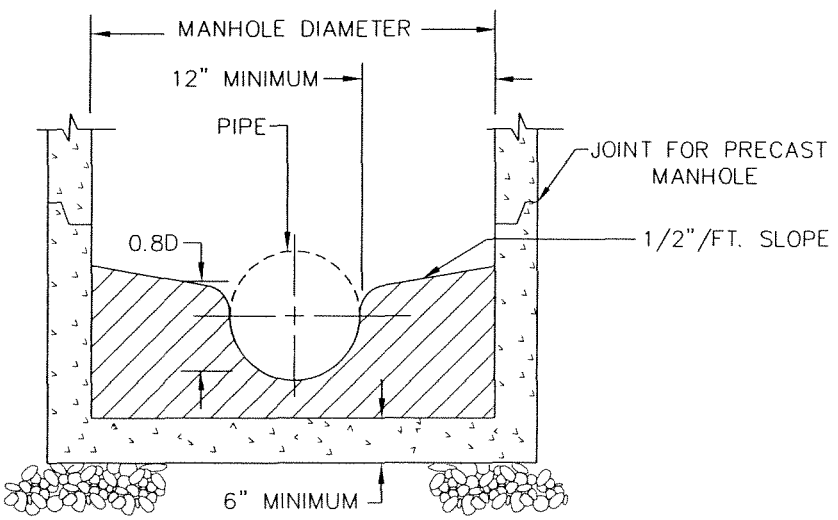
SECTION A–A

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	CAST–IN–PLACE MANHOLE BASE DETAILS	DATE: 10/2/02 DRAWN BY: J.M.B. CHK. BY: NO. YT2601–1



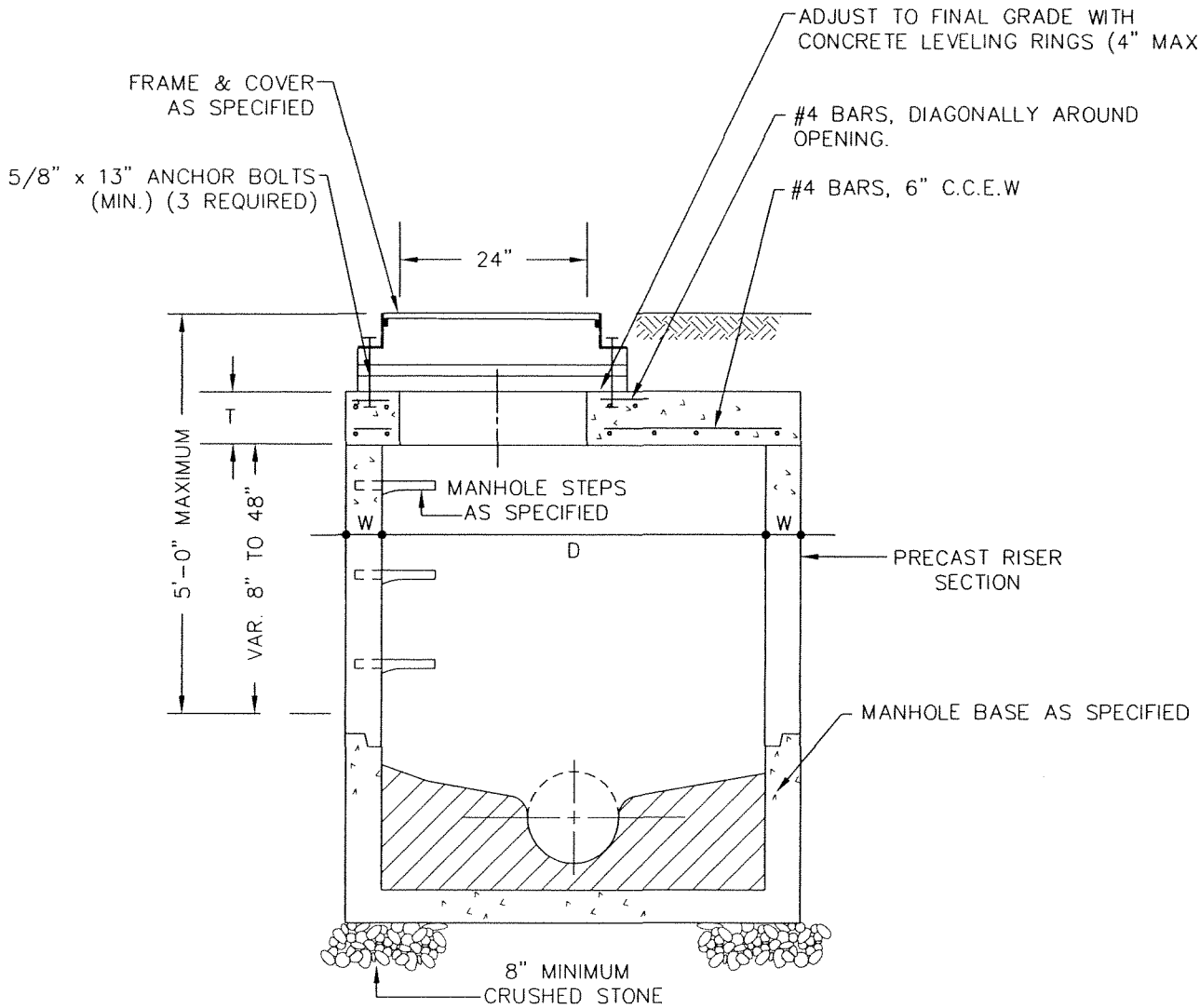
ELEVATION



SECTION A–A

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREE. YORK, PA 17402	PRECAST MANHOLE BASE DETAIL FIGURE: 7	DATE: 10/2/02 DRAWN BY: J.M.B. CHK. BY: SKS NO. YT2601–2



D	W	T
4'-0"	5"	6"
5'-0"	6"	8"
6'-0"	7"	8"

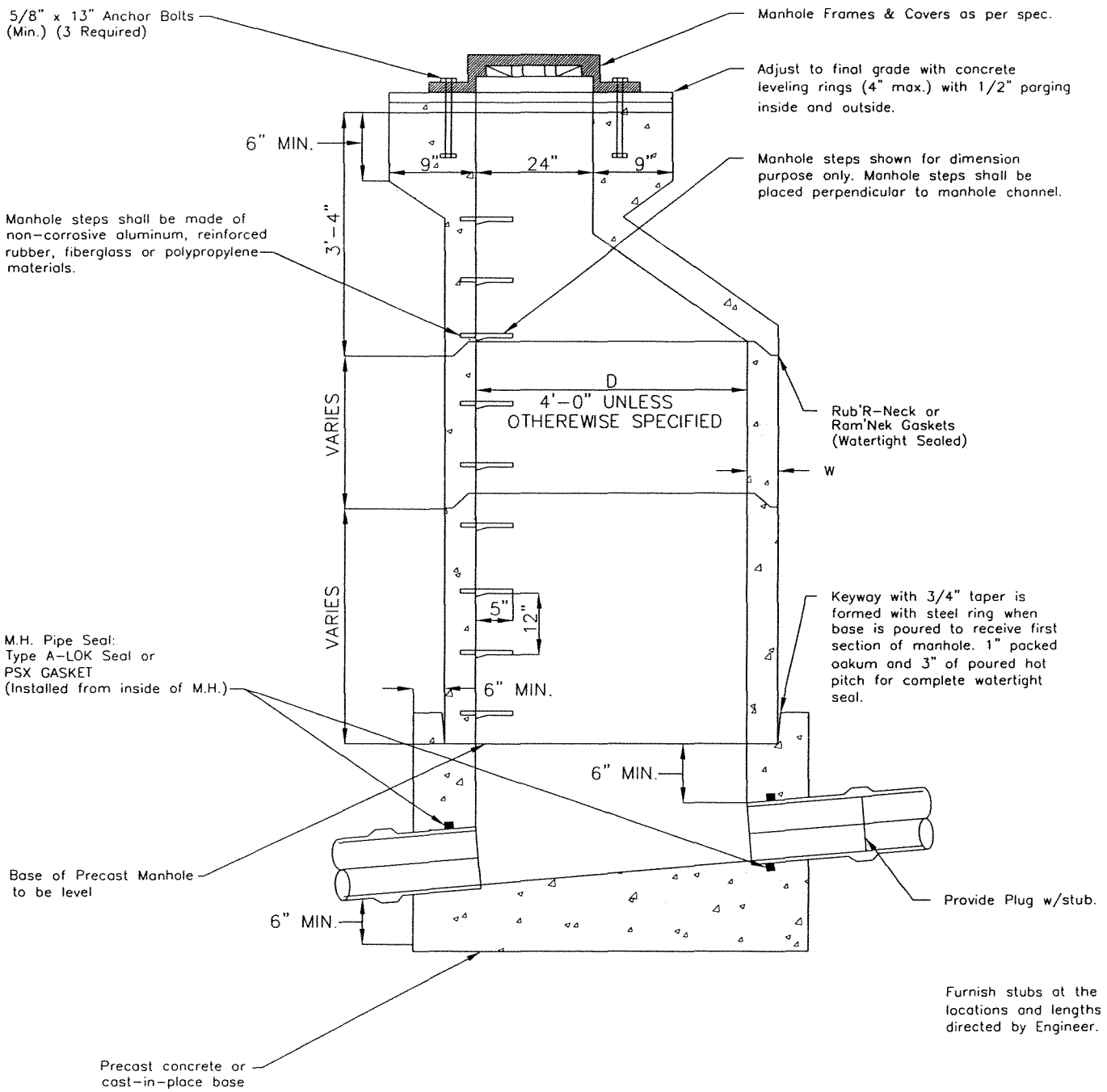
NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS
YORK TOWNSHIP WATER AND SEWER AUTHORITY
25 OAK STREET. YORK, PA 17402

SHALLOW MANHOLE DETAIL FIGURE: 8

DATE: 10/2/02
DRAWN BY: J.M.B.
CHK. BY: SKE
NO. YT2601-3

NOTES:
1. Mechanically vibrated precast reinforced concrete. Manufactured in accordance with ASTM Designation C478.
2. All manholes shall be waterproofed.



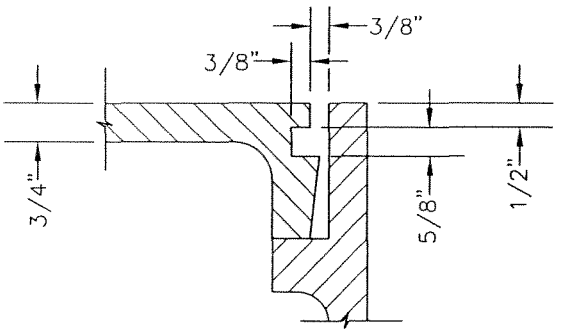
D	W
4'-0"	5"
5'-0"	6"
6'-0"	7"

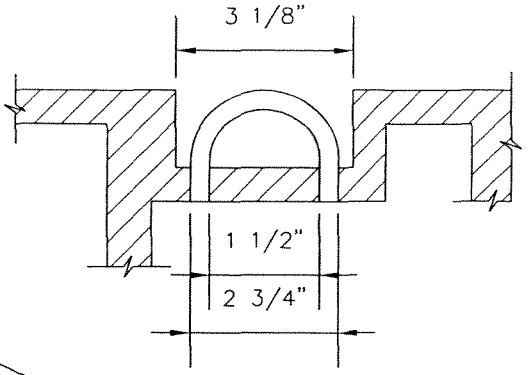
NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS
YORK TOWNSHIP WATER AND SEWER AUTHORITY
25 OAK STREET. YORK, PA 17402

STANDARD DEEP MANHOLE DETAIL FIGURE: 2

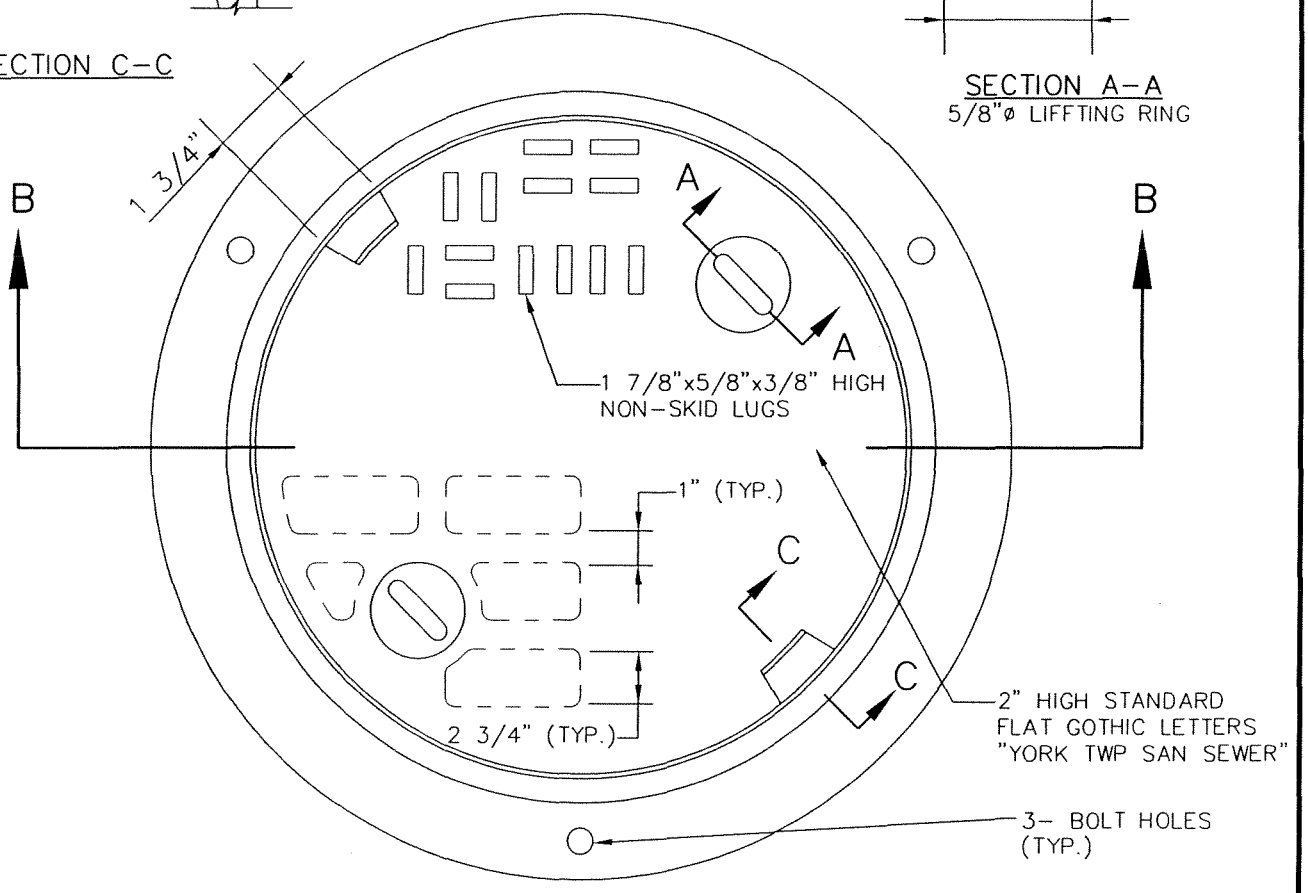
DATE: 10/2/02
DRAWN BY: J.M.B.
CHK. BY: SKS
NO. YT2601-4



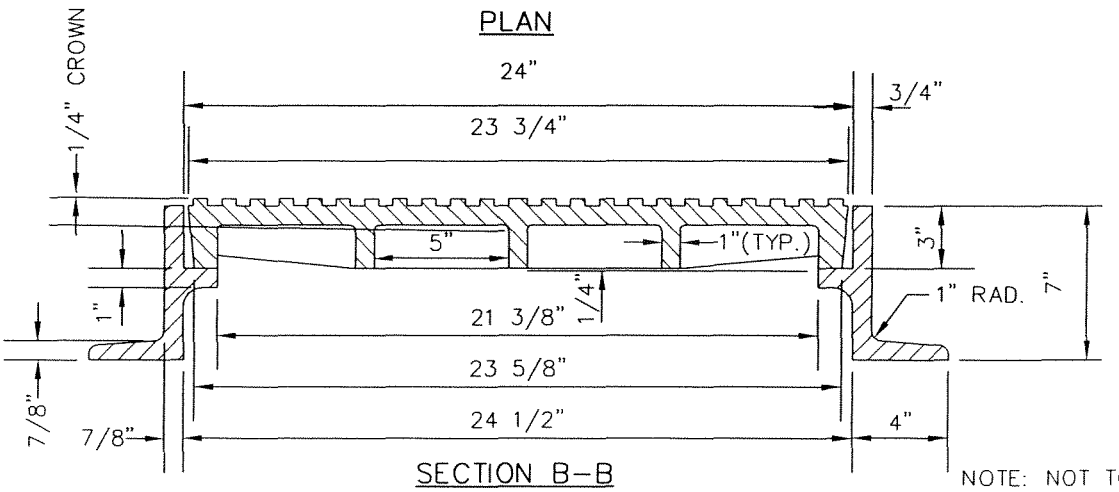


SECTION A–A
5/8"ø LIFFTING RING

SECTION C–C



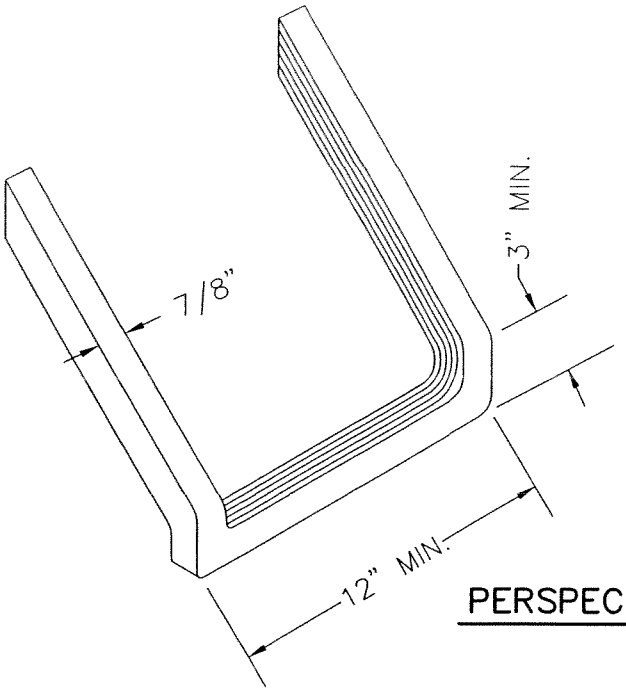
PLAN



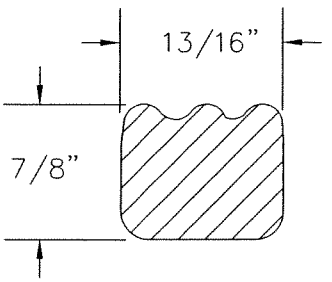
SECTION B–B

NOTE: NOT TO SCALE

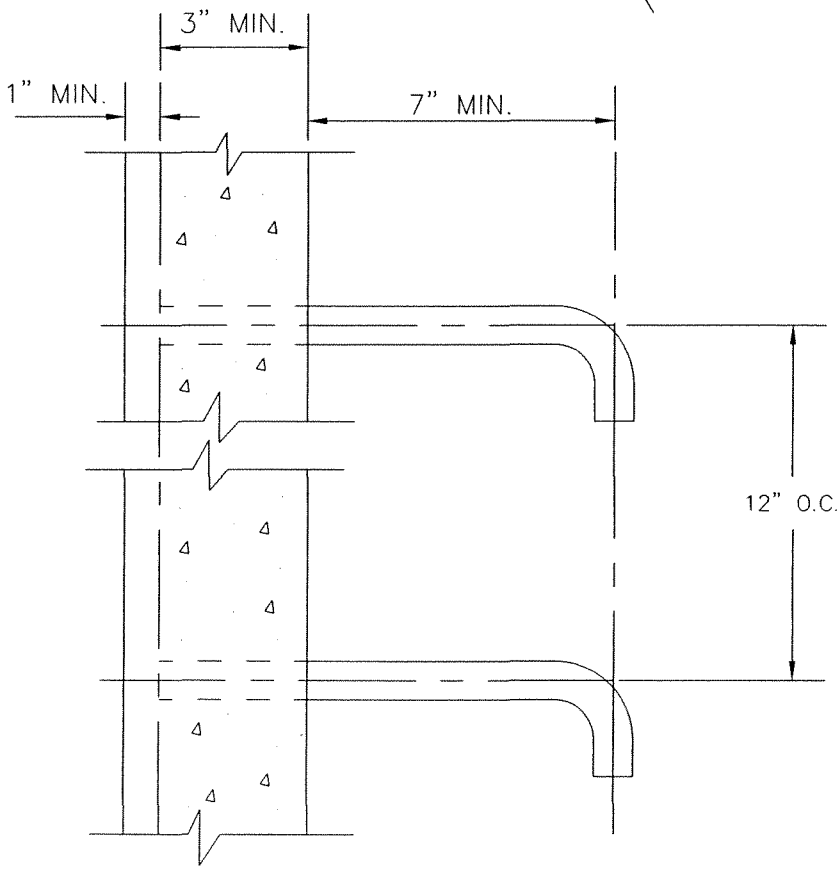
CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	HEAVY DUTY MANHOLE FRAME AND COVER FIGURE : 3	DATE: 10/2/02 DRAWN BY: J.M.B. CHK. BY: SKS NO. YT2601–6



PERSPECTIVE



FULL SIZE SECTION



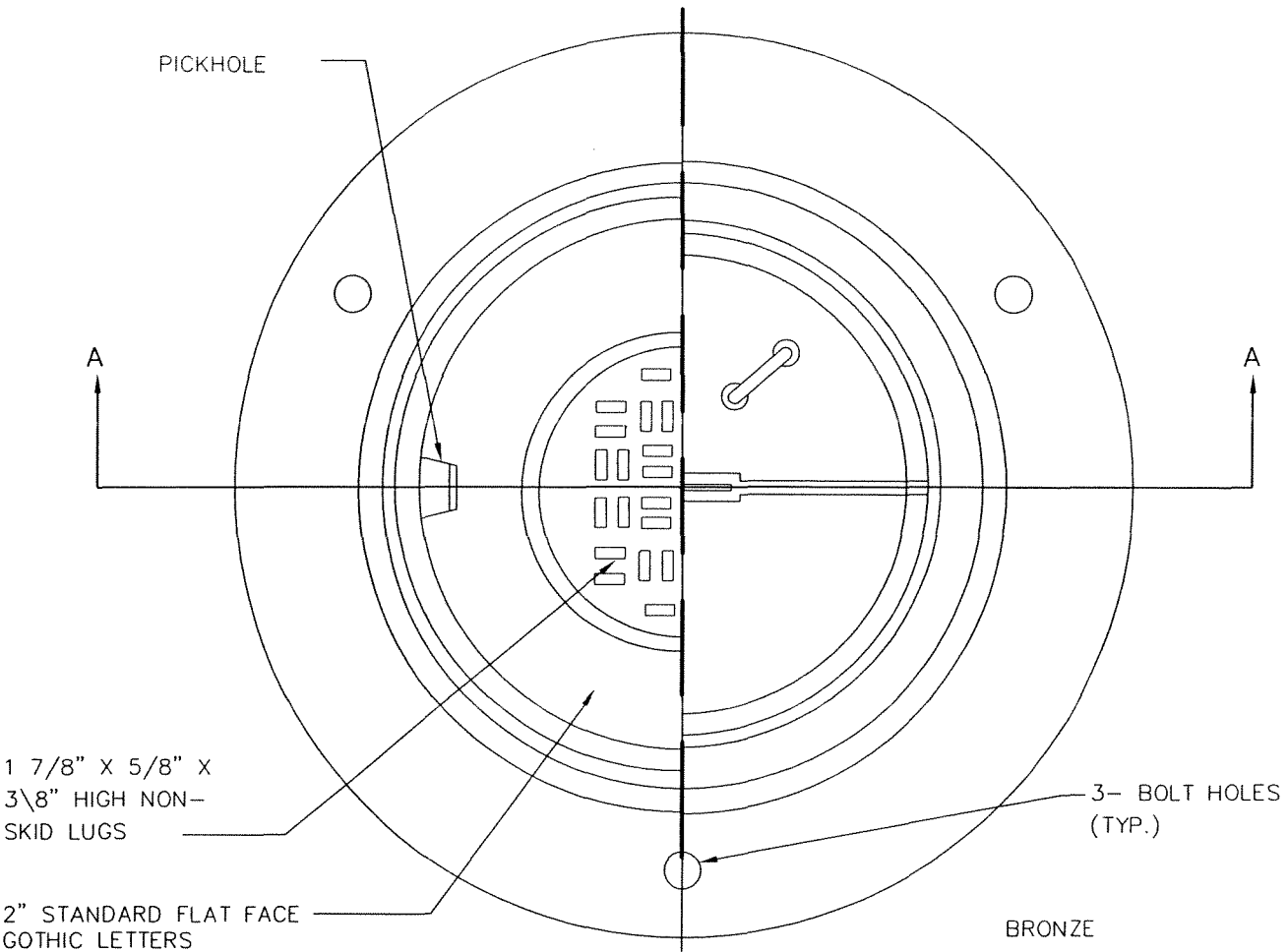
ELEVATION

NOTES:

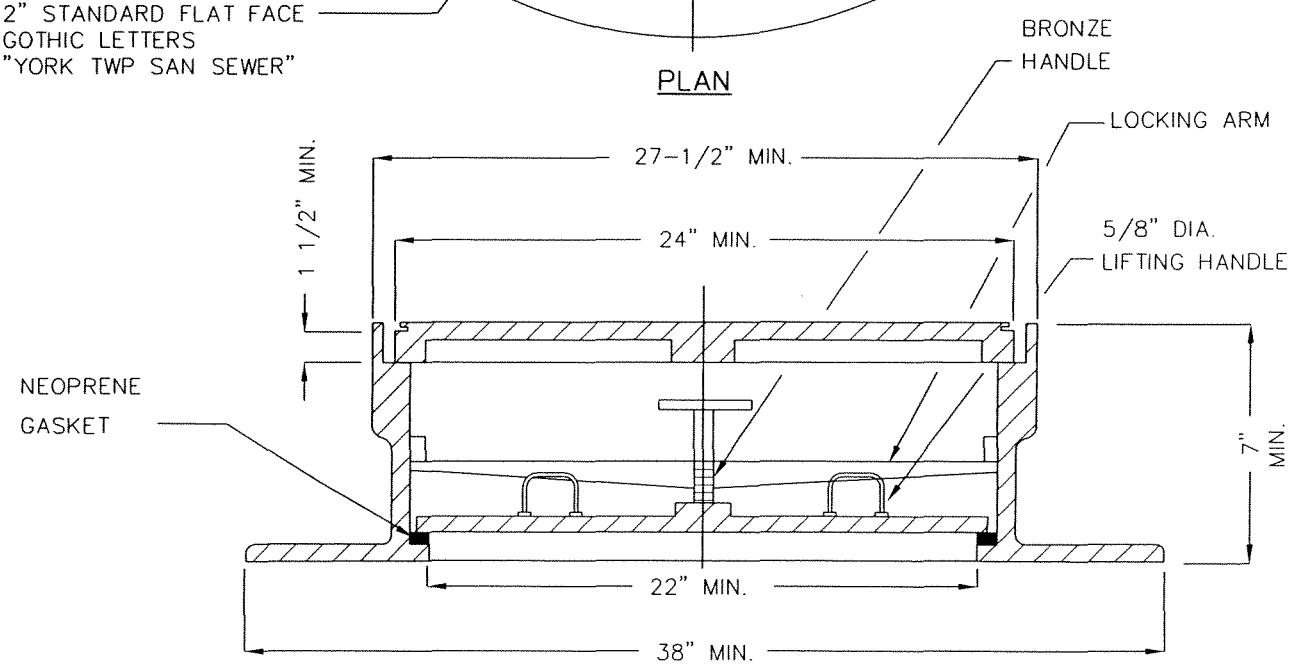
1. DISTANCE FROM RIM OF MANHOLE TO TOP STEP SHALL NOT BE GREATER THAN 30".
2. DISTANCE FROM BOTTOM STEP TO FLOOR OF MANHOLE SHALL NOT BE GREATER THAN 2 FEET.
3. EMBEDDED PORTION OF STEP TO BE COATED WITH ASPHALT CONFORMING TO AASHTO M-190.
4. DO NOT LOCATE STEPS OVER CHANNELS

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	ALUMINUM MANHOLE STEP DETAIL	DATE: 7/31/96 DRAWN BY: J.M.B. CHK. BY: SDS NO. YT2601-5



PLAN



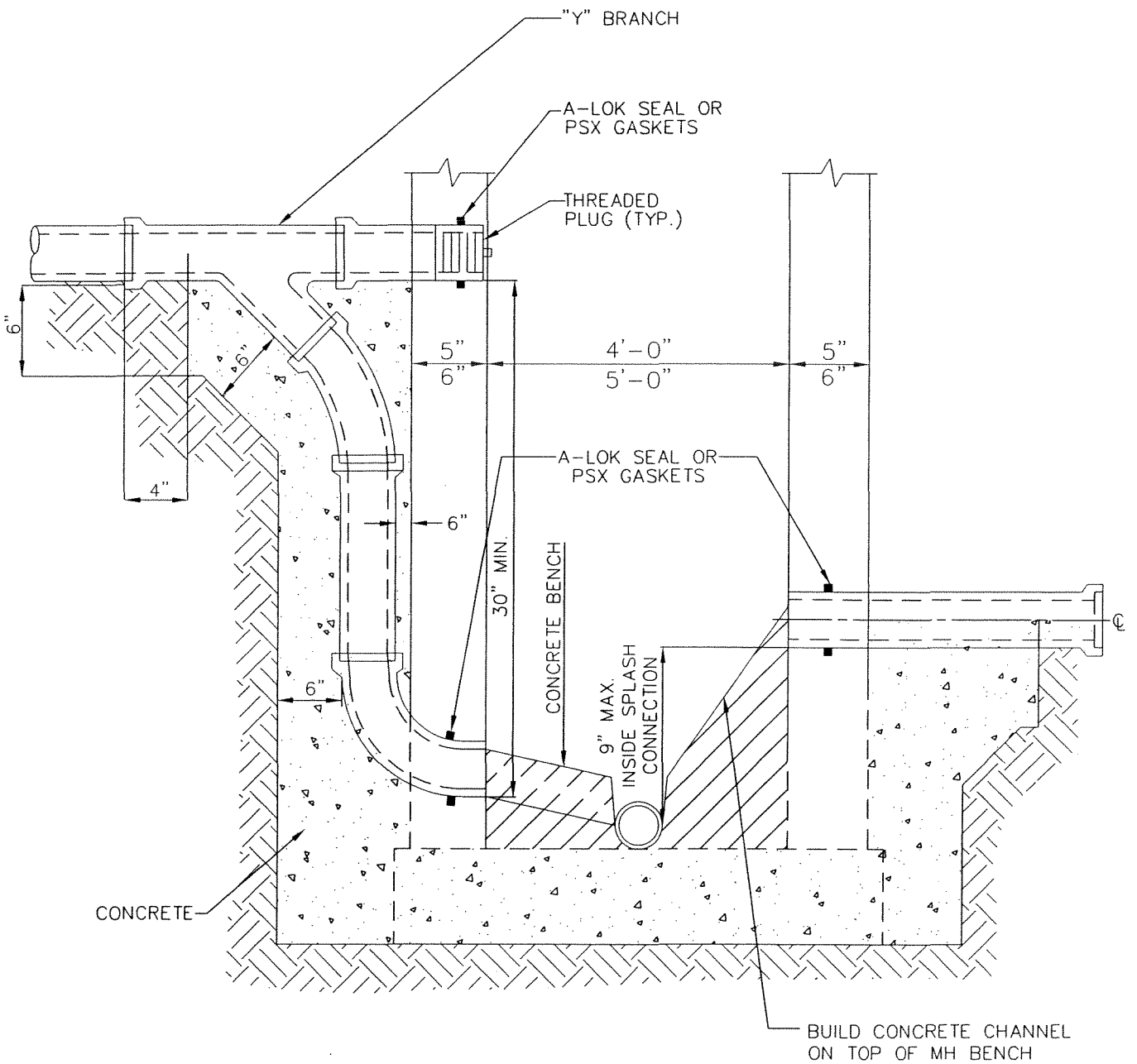
SECTION A-A

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	WATERTIGHT MANHOLE FRAME AND COVER	DATE: 10/2/02 DRAWN BY: J.M.B. CHK. BY: SLS NO. YT2601-7

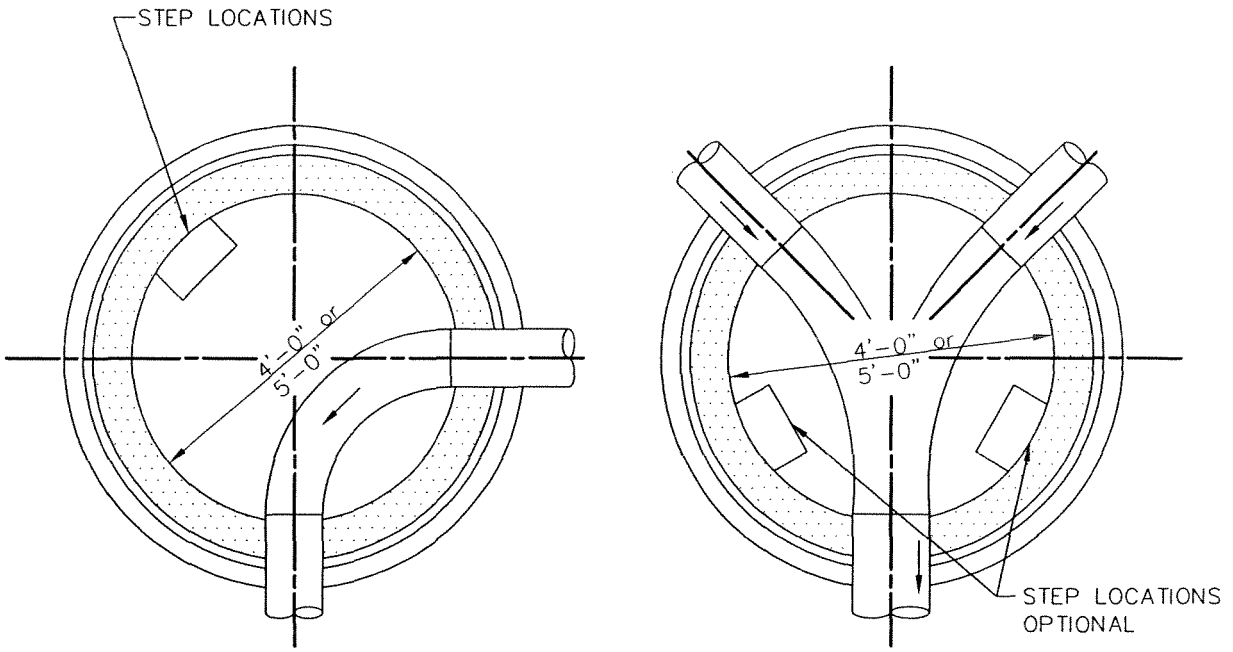
NOTES

1. SEE FIGURE NOS. 2 AND 7 FOR MANHOLE CONSTRUCTION REQUIREMENTS.
2. PRECAST DROP CONNECTIONS ARE NOT PERMITTED.
3. VERTICAL PIPE SHALL BE SAME SIZE AS SEWER MAIN.

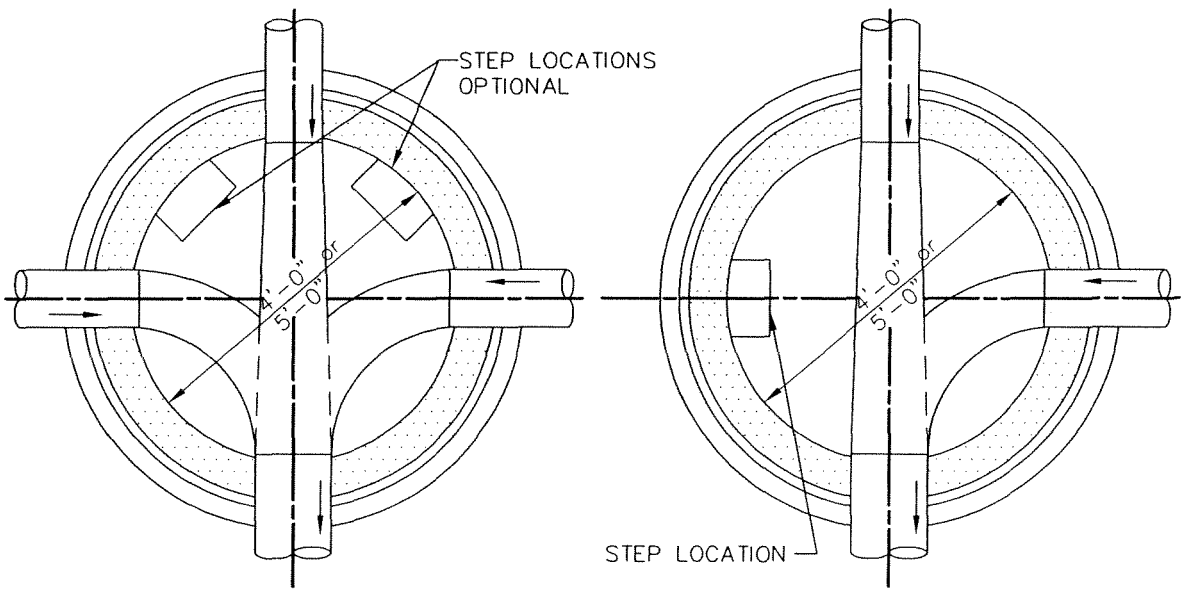


NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	DROP CONNECTION DETAIL FIGURE: 4	DATE: 8/30/96 DRAWN BY: J.M.B. CHK. BY: SKS NO. YT2601-8



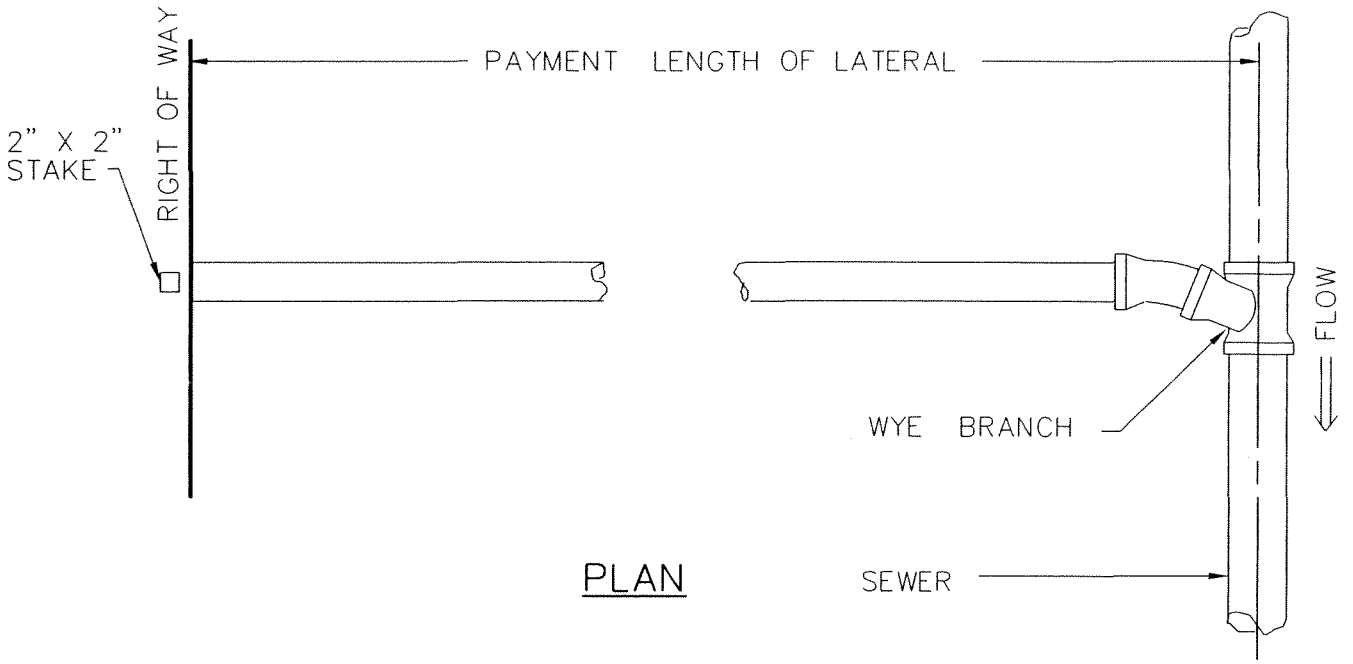
NOTE: ALL BENCHES SHALL
SLOPE @ 1/8" / 1' TOWARD
FLOW CHANNEL



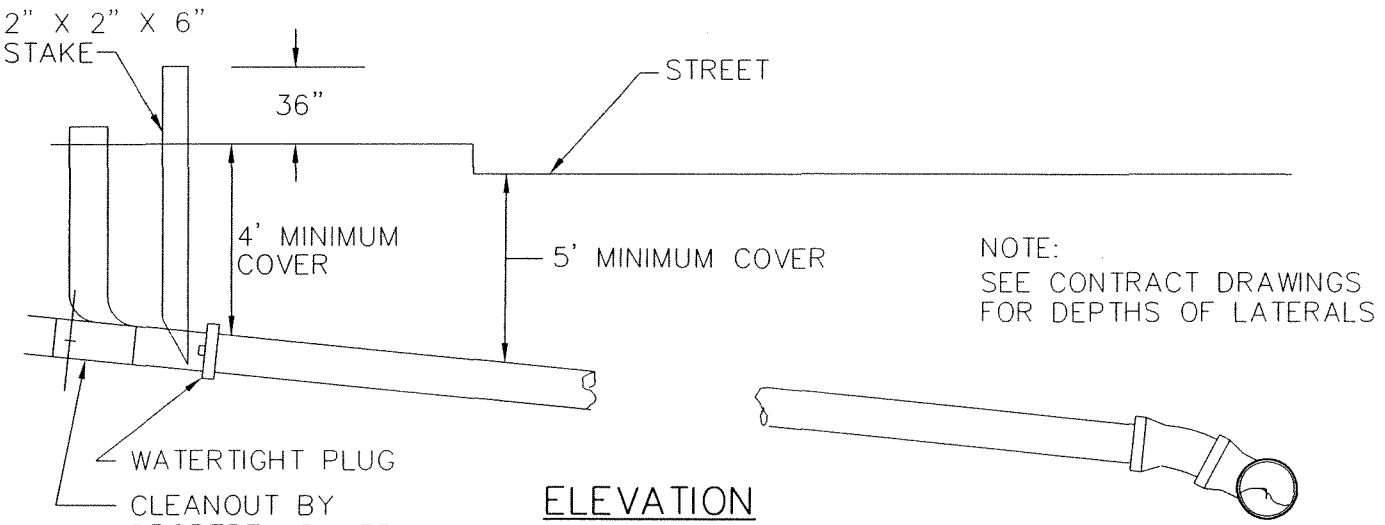
PLANS OF MANHOLES
TYPICAL

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	MANHOLE CHANNEL FIGURE: 5	DATE: 7/12/96 DRAWN BY: J.M.B. CHK. BY: SKS NO. YT2601-9

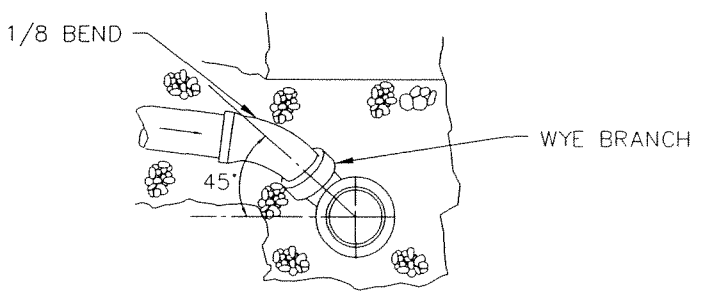


PLAN



NOTE:
SEE CONTRACT DRAWINGS
FOR DEPTHS OF LATERALS

ELEVATION

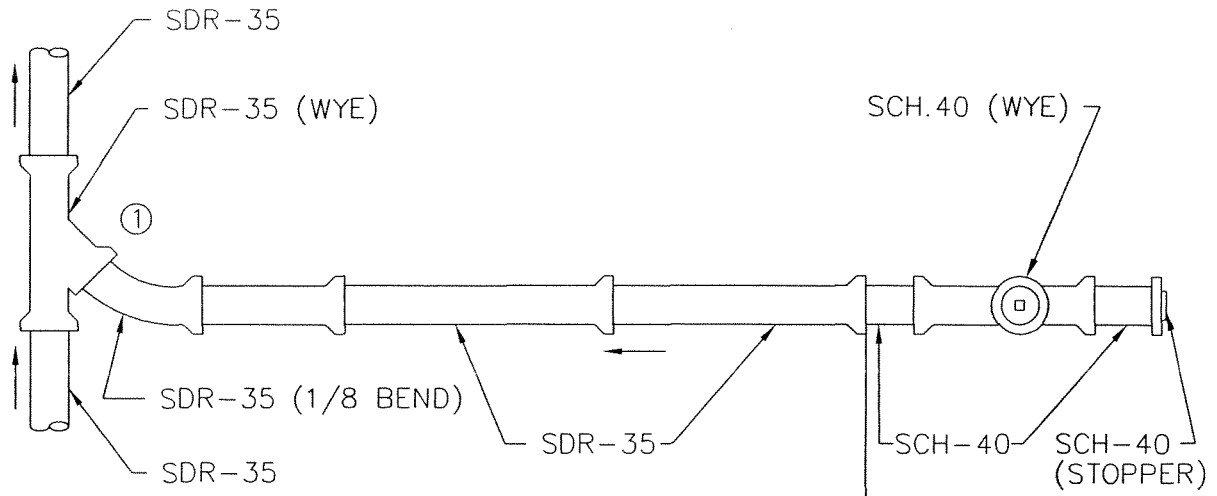


DETAIL

(FOR AUTHORITY "BID WORK")

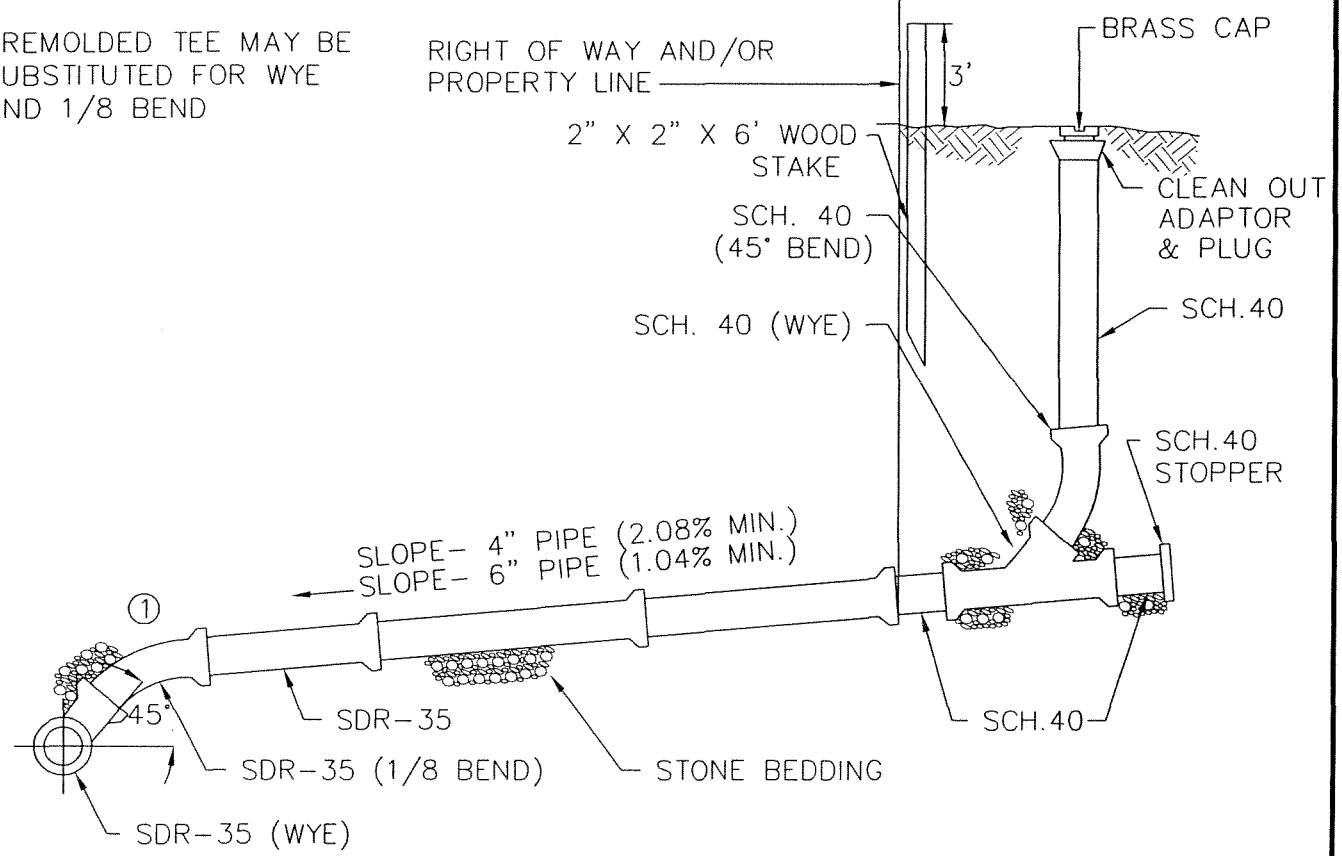
NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET, YORK, PA 17402	LATERAL PAYMENT DETAIL FIGURE: 6	DATE: 7/31/96 DRAWN BY: J.M.B. CHK. BY: SKS NO. YT2610-1



PLAN

① PREMOLDED TEE MAY BE SUBSTITUTED FOR WYE AND 1/8 BEND



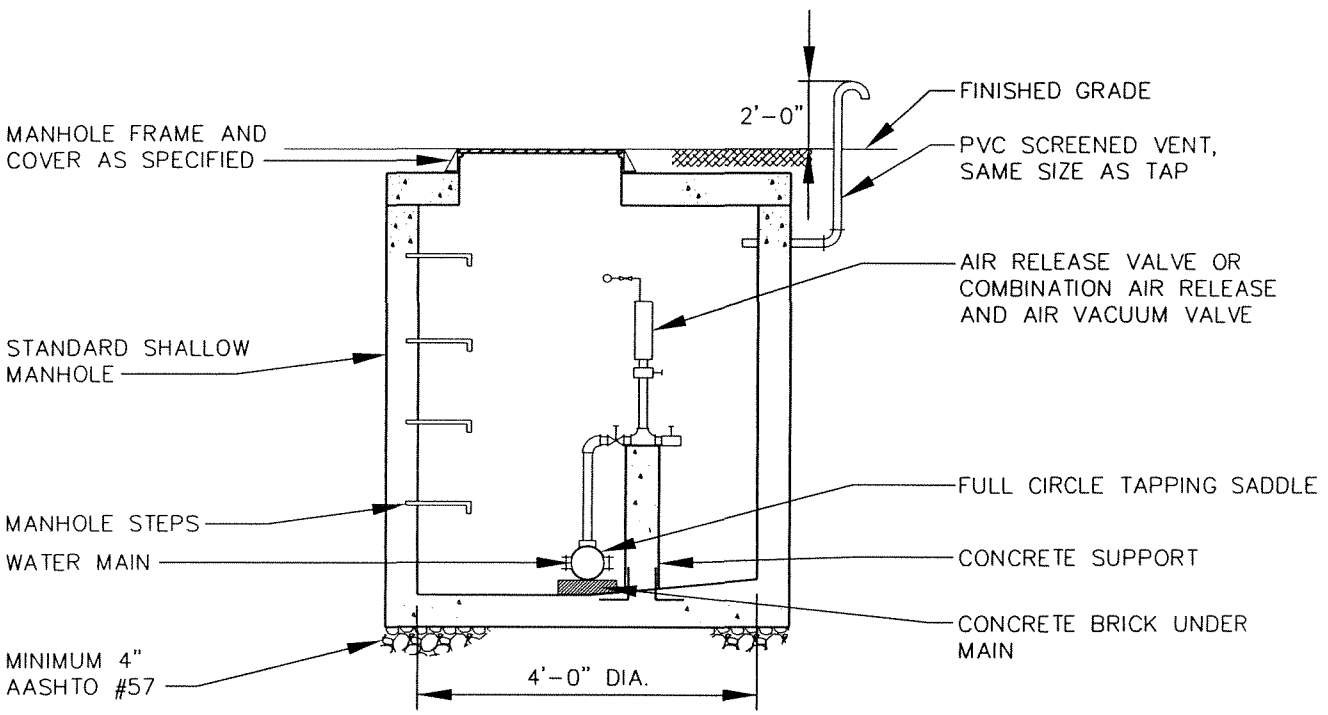
ELEVATION

NOTE: SDR-35 MATERIALS MAY BE SUBSTITUTED FOR SCH. 40 SHOWN ON THIS LATERAL DETAIL

(FOR DEVELOPERS)

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AITHORITY 25 OAK STREET. YORK, PA 17402	LATERAL DETAIL FIGURE: 6	DATE: 10/2/02 DRAWN BY: J.M.B. CHK. BY: SES NO. YT2610-2



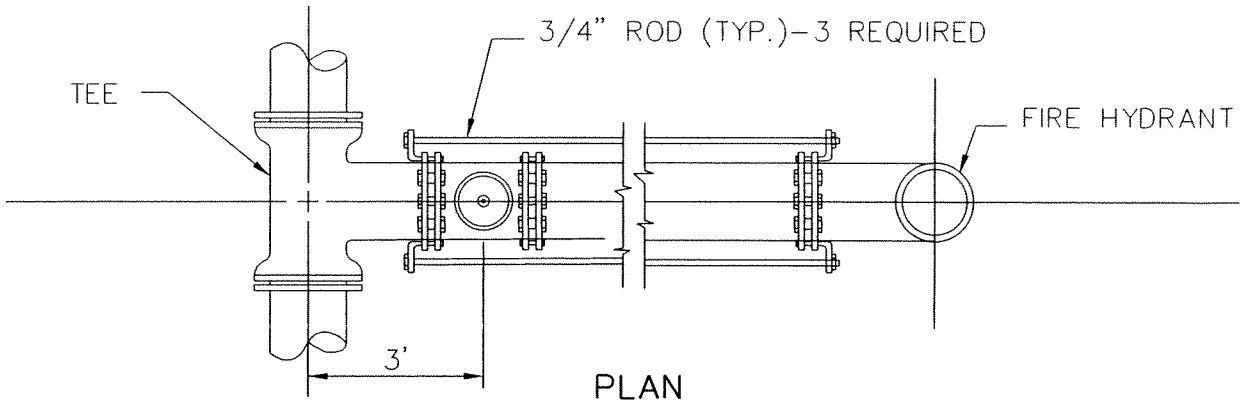
MAIN SIZE	TAP SIZE
4"-12"	2"
14"-20"	3"
24"-36"	4"

NOTE: NOT TO SCALE

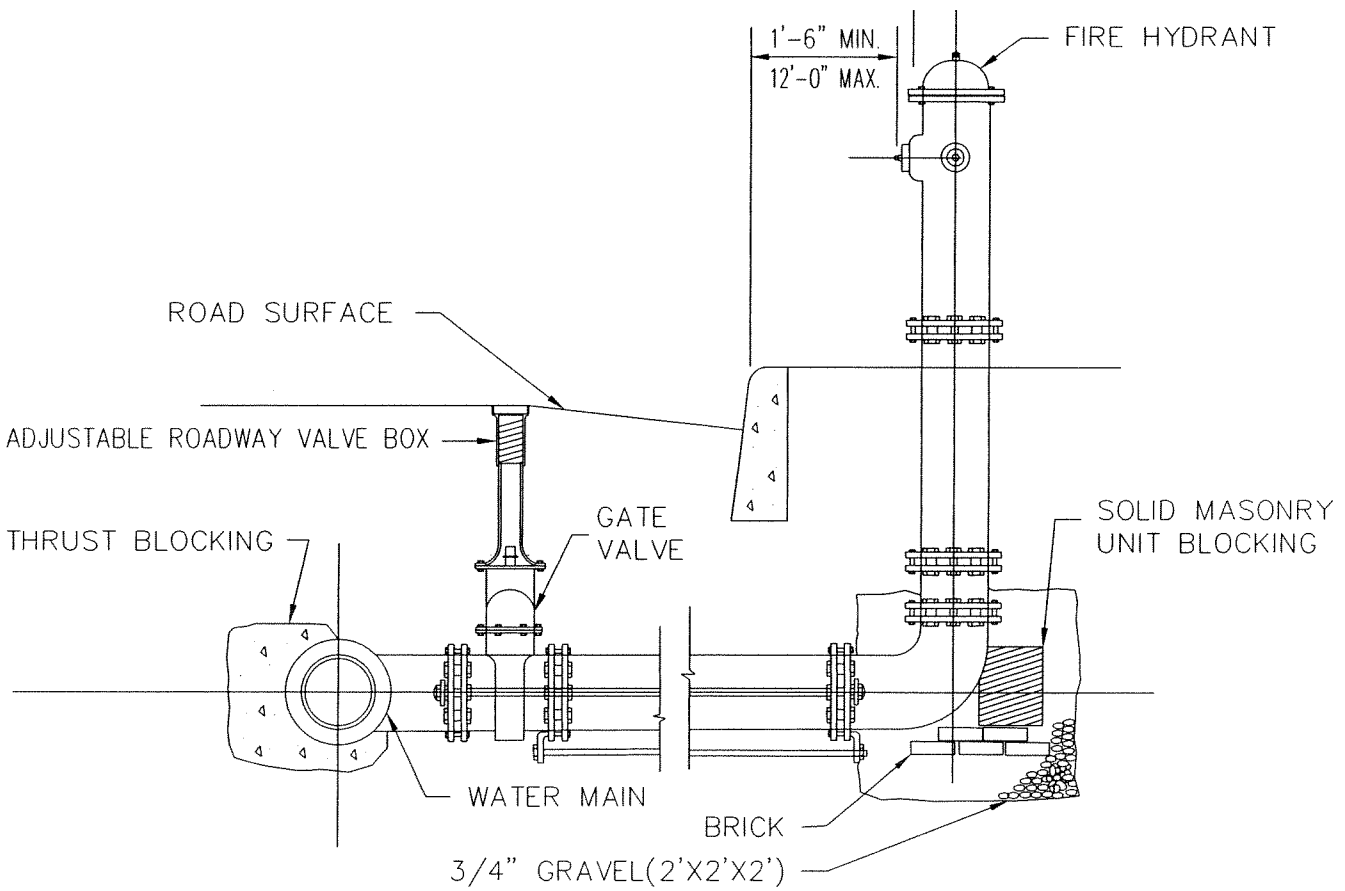
CONSTRUCTION AND MATERIAL SPECIFICATIONS
YORK TOWNSHIP WATER AND SEWER AUTHORITY
25 OAK STREET. YORK, PA 17402

AIR RELEASE VALVE

DATE:	1/22/01
DRAWN BY:	J.S.L.
CHK. BY:	SKS
NO.	YT2640-1



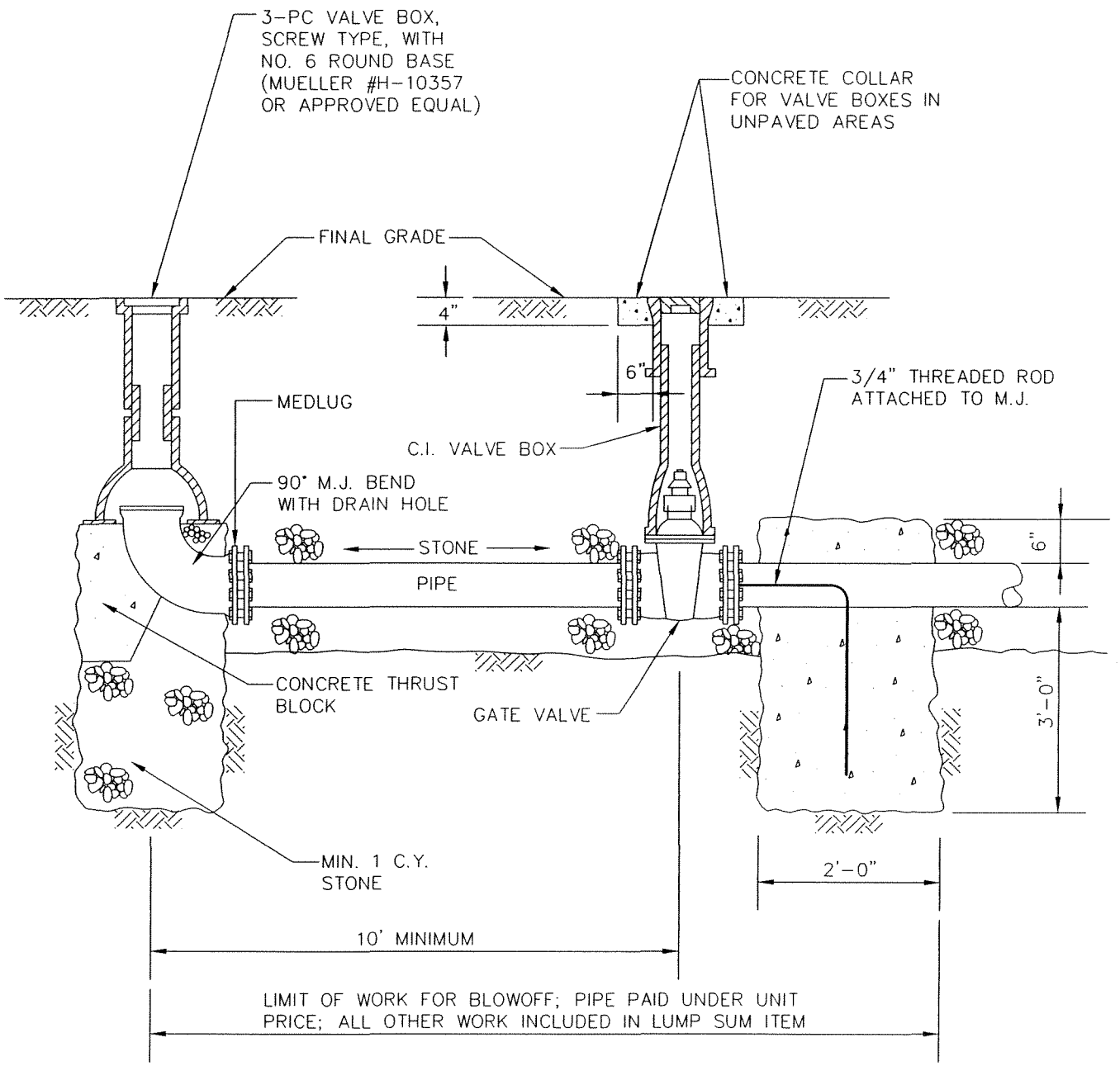
PLAN



ELEVATION

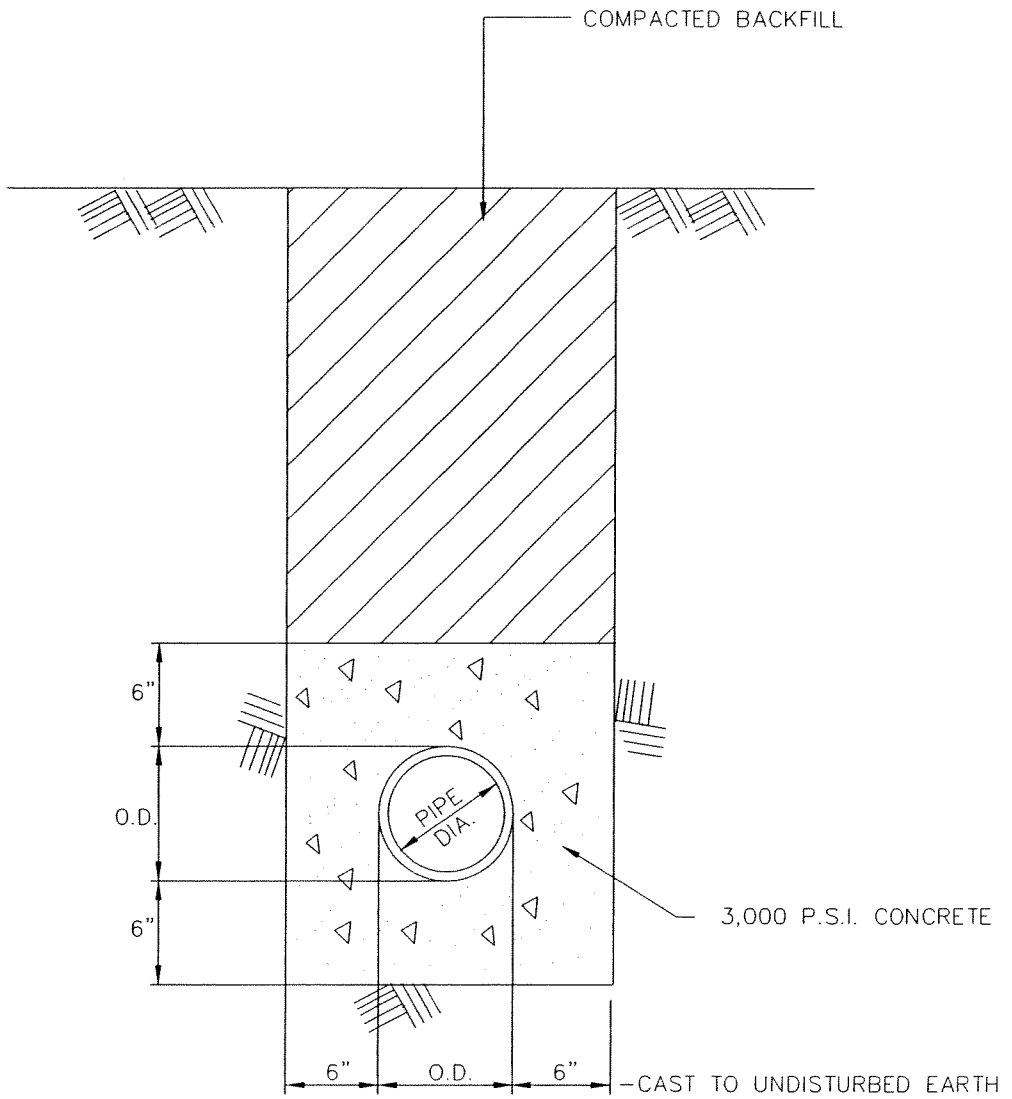
NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATION YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	FIRE HYDRANT SETTING DETAIL	DATE: 7/31/96 DRAWN BY: J.M.B. CHK. BY: SPS NO. YT2640-2



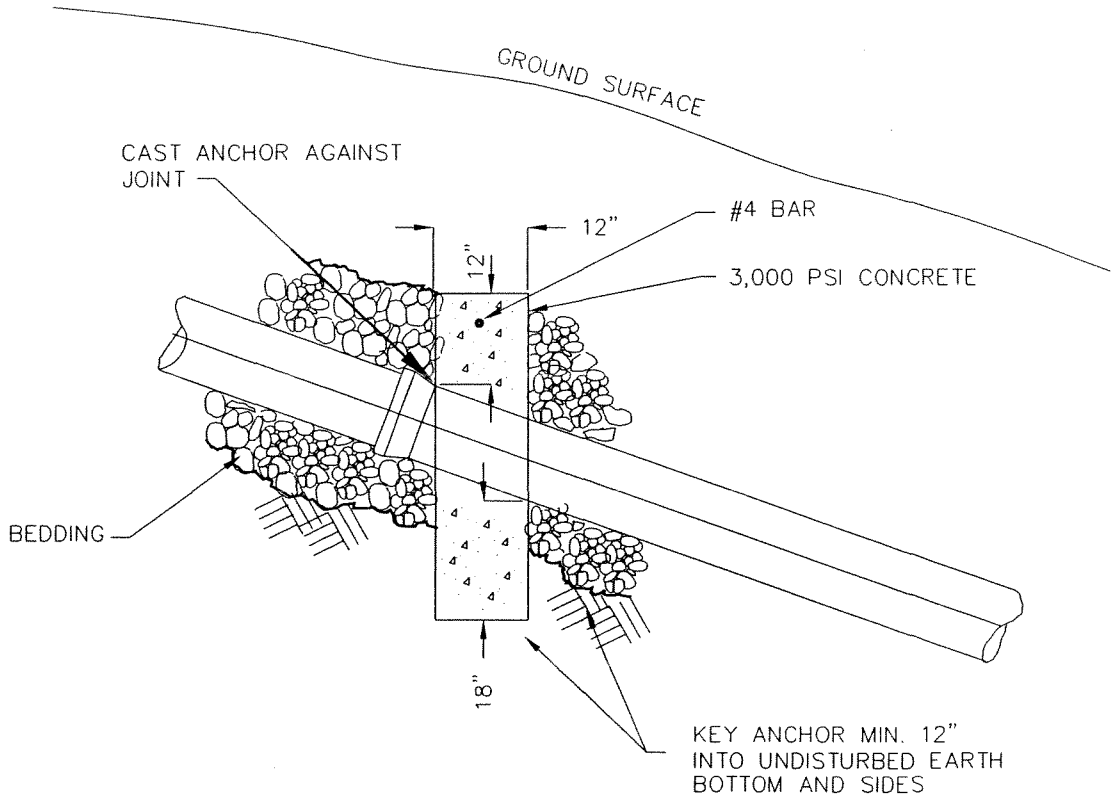
NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	BLOWOFF DETAIL	DATE: 7/31/96 DRAWN BY: J.M.B. CHK. BY: SFS NO. YT2640-3

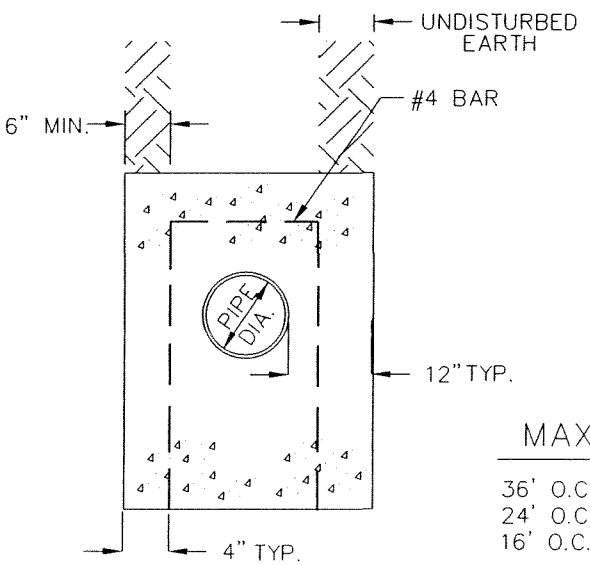


NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	CONCRETE ENCASEMENT DETAIL FIGURE: 11	DATE: 7/31/96 DRAWN BY: J.M.B. CHK. BY: SICS NO. YT3300-1



SECTION



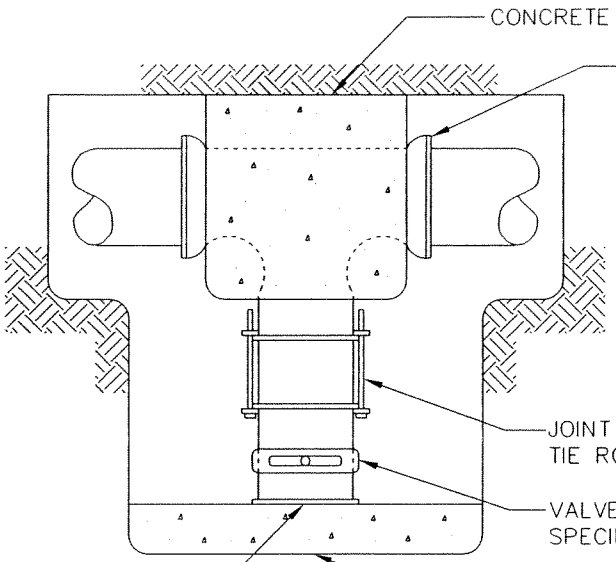
MAXIMUM SPACING

36' O.C. 20% TO 35% SLOPES
24' O.C. OVER 35% TO 50% SLOPES
16' O.C. OVER 50% SLOPES

ELEVATION

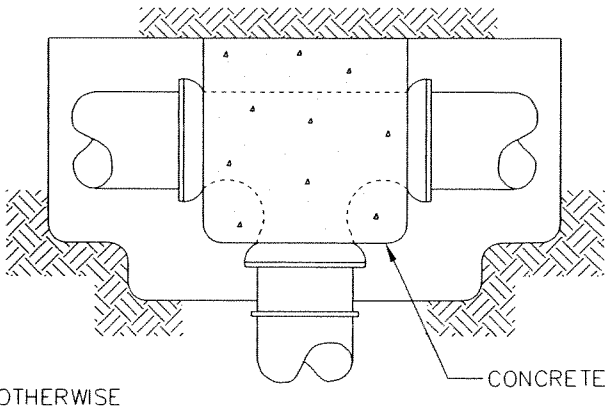
NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	CONCRETE ANCHOR DETAILS	DATE: 7/31/96 DRAWN BY: J.M.B. CHK. BY: SFS NO. YT3300-2

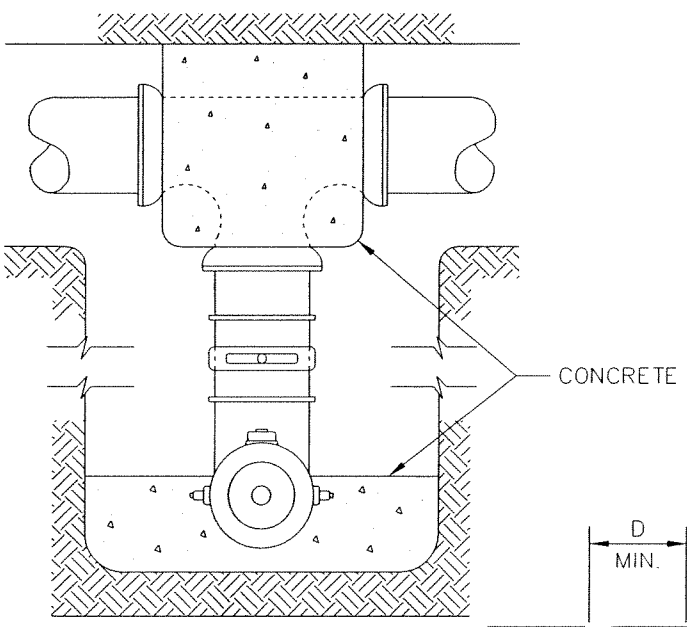


PLAN – CAPPED TEE

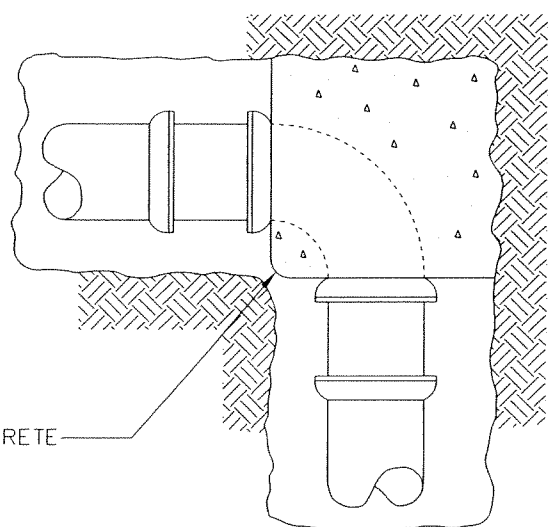
(CAPPED RUN OF TEE SIMILAR)



PLAN – TEE

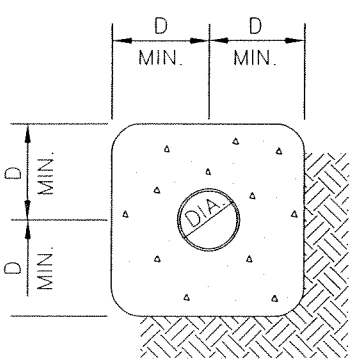


PLAN – HYDRANT



PLAN – 90° BEND

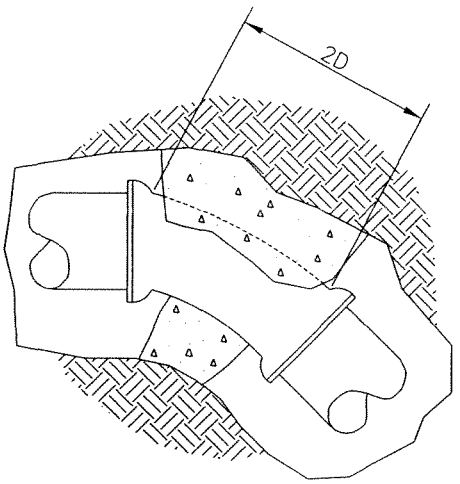
(LESSER BENDS SIMILAR)



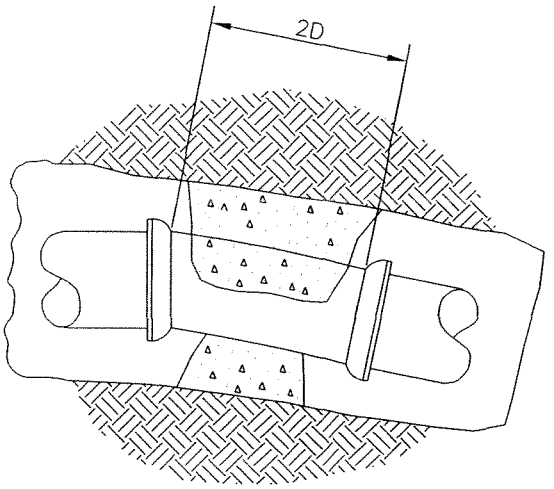
TYPICAL SECTION

NOTE: NOT TO SCALE

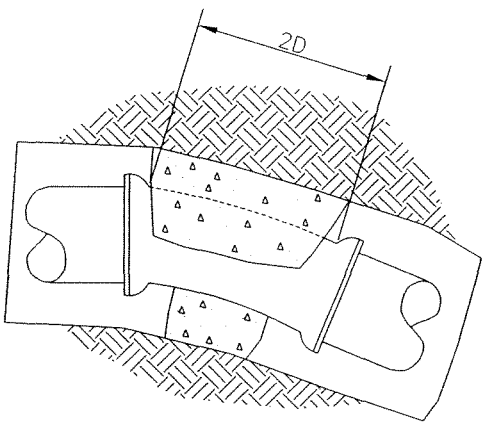
CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	THRUST BLOCKING DETAILS	DATE: 7/31/96 DRAWN BY: J.M.B. CHK. BY: SKS NO. YT3300-3



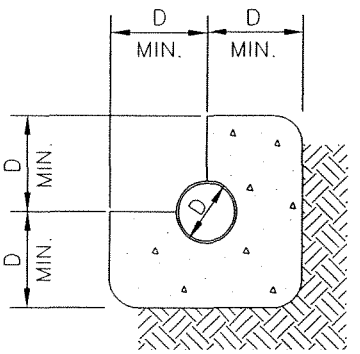
PLAN – 45° BEND



PLAN – 11 1/4° BEND



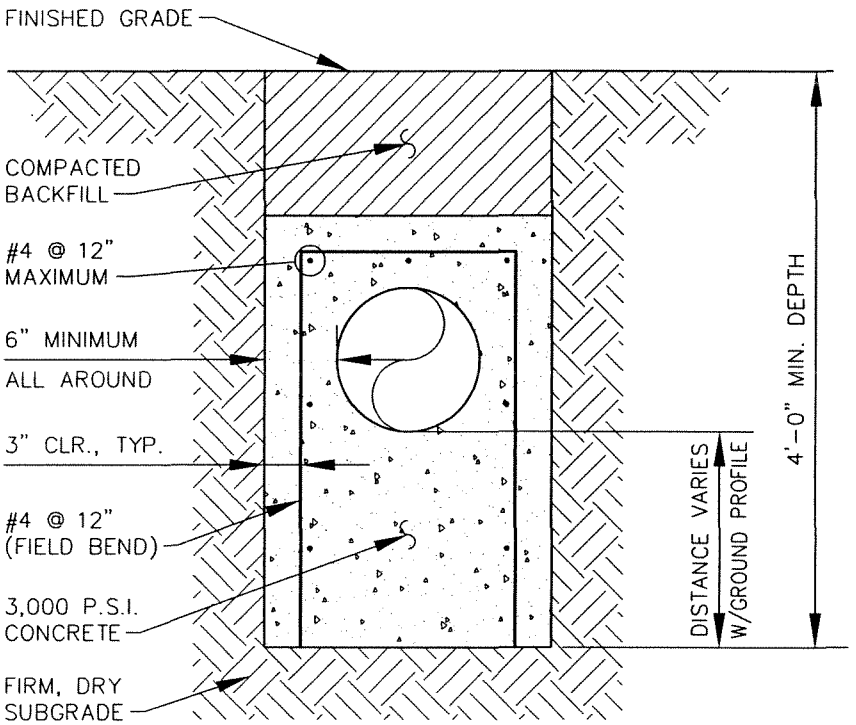
PLAN – 22 1/2° BEND



TYPICAL SECTION

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	THRUST BLOCKING DETAILS FOR SANITARY SEWER FORCE MAINS	DATE: 7/31/96 DRAWN BY: J.M.B. CHK. BY: SKS NO. YT3300-4



NOTES:

- STABILIZE PIPE & REINFORCEMENT WITHIN EXCAVATION TO PREVENT MOVEMENT DURING CONCRETE PLACEMENT.

NOTE: NOT TO SCALE

CONSTRUCTION AND MATERIAL SPECIFICATIONS YORK TOWNSHIP WATER AND SEWER AUTHORITY 25 OAK STREET. YORK, PA 17402	SPECIAL CONCRETE ENCASEMENT FOR FROST PROTECTION DETAIL	DATE: 1/22/01 DRAWN BY: J.S.L. CHK. BY: SKS NO. YT3300-5

PLAN STANDARDS FOR SUBMISSION TO YORK TOWNSHIP WATER AND SEWER AUTHORITY

PLAN STANDARDS FOR SUBMISSION TO
YORK TOWNSHIP WATER & SEWER AUTHORITY

I. SKETCH PLAN STANDARDS

A. Index or Key Map
   1. Maximum Drawing Size: None
   2. Scale: 1" = 50' or 1" = 100'
   3. Details To Be Shown:
      a. Street Layout with Names
      b. Lot Layout with Numbers
      c. Existing Sanitary Sewers with Pipe Sizes
      d. Proposed Sanitary Sewers with Pipe Sizes
      e. Direction of Flow
      f. Pump Station Location and Force Main with Pipe Size
      g. Topography with 5' Contour Intervals
      h. Streams, Springs, Wetlands, and Marshes
      i. Accurate Location Map with North Arrow
      j. State Highway Route Numbers
      k. Public versus Private Streets
      l. Public versus Private Sewers
      m. Phases of Construction
      n. Existing and Proposed Manholes with Numbers

B. Plans and Profiles - Not Required

II. PRELIMINARY AND FINAL DESIGN PLAN STANDARDS

A. Index or Key Map
   1. Maximum Drawing Size: 24" x 36"
   2. Scale: Adjusted to Meet Maximum Drawing Size
   3. Details To Be Shown:
      a. Same as Sketch Plan Requirements
      b. Manhole Numbers (to be assigned by Public Works Supervisor)
      c. References to Plan and Profile Indicated Along Sewer Routes
      d. B.W.Q.M. Permit Number of Connecting Sewers
      e. Street Address on Each Lot
      f. Soil Erosion and Sedimentation Control (SESC) Facilities
      g. Sanitary Sewer and Other Utility Easements
      h. Stormwater Management Facilities
      i. State Highway Segments

B. Plans and Profiles
   1. Maximum Drawing Size: 24" x 36"
   2. Plan Scale: 1" = 50'
   3. Profile Scale: 1" = 50' Horizontal; 1" = 5' Vertical
   4. Profiles shall be shown on same Drawing as Plan Portion
   5. Plan Details to be Shown:
      a. Same as Index Map, excluding Topography and SESC Facilities
      b. Adjoining Sheet Numbers at Sewer Intersections
      c. Match Lines, if Utilized
      d. Existing and Proposed Utilities with Pipe Sizes
      e. Storm Drainage Facilities with Pipe Sizes
      f. Stormwater Detention Facilities with Limits of Impoundment and Maximum Water Elevation

g. Pertinent Physical Features such as Buildings, Fences, Driveways, Landscaping, Poles, Street Lighting, etc.
h. Lateral Locations and Depth of Cover at Right-of-Way
i. Lateral Invert Elevation at Building Line
j. Topography with 2' Contour Intervals

6. Profile Details to be Shown:
   a. Existing Ground Profile
   b. Finished Grade Profile
   c. Sanitary Sewer Design and Manhole Numbers
   d. Pipe Size, Pipe Material, Pipe Length, and Slope
   e. Manhole Invert and Top Rim Elevations
   f. All Utility and Storm Pipe Crossings Showing Separation Distances to Sanitary Sewers
   g. Indicate Watertight Frames and Covers
   h. Parallel Water Mains, Storm Drainage, and Stream Profiles
   i. Topography with 1' Contour Intervals

C. Plan Notes
1. Plans shall clearly indicate the differences between existing and proposed facilities.
2. Access to the sanitary sewer lines must be maintained at all times. One of the following notes shall be added to subdivision plans prior to recording:
   a. "The Owner(s) shall not construct, plant, or maintain any structures, sheds, buildings, fences, trees, shrubbery, stormwater management facilities, wiring, etc. within the sanitary sewer rights-of-way, to ensure a free and clear access to all facilities. Bituminous paving, installation of utilities or changes in ground contours within the sanitary sewer rights-of-way may be permitted by written consent of York Township."
   b. "The Owner(s) shall not construct, plant, or maintain any structures, sheds, buildings, trees, stormwater facilities, parallel or near parallel utilities, or similar items within the sanitary sewer rights-of-way. The Owner(s) at his/her or their own risk may install wiring, construct fences, or plant shrubbery (less than 6' high) within said rights-of-way without any future claims against York Township or the York Township Water & Sewer Authority, because of fence or shrubbery removal. Any fences installed within said rights-of-way shall be constructed in such a way that two sections can be easily removed, with the maximum fence section not less than eight (8) feet in width per section. In lieu of the two removable sections, one sixteen (16) foot wide or two eight (8) foot wide gates at each fence crossing of the sanitary rights-of-way may be substituted."
3. Where applicable, the following notes shall be added:
   a. "All work shall be installed and tested in accordance with the latest edition of the York Township Water & Sewer Authority Construction and Materials Specifications and shall conform to the Authority's Plan, Design and Construction Standards for Sanitary Sewers unless specific waivers have been granted. It is the contractor's responsibility to be aware of applicable standards and specifications as well as the required methods of construction. All deviations from the plans must be approved prior to construction."
   b. "The owner hereby grants York Township or its representative a general access easement across the entire lot for access to the public sewer and sampling manholes."
   c. "Approval of "as-built" sanitary sewer plans by the Authority Engineer shall be required prior to occupancy of any building. These Record Drawings shall be submitted to the Authority Engineer thirty (30) days prior to occupancy."
   d. "The Developers shall furnish three (3) extra sets of approved plans, showing the locations and depths of all laterals, and final specifications to Authority Engineer for future inspection use."

e. "The Developer shall submit three (3) sets of all grade (or cut) sheets, conforming to approved plans, to the Authority Engineer prior to beginning work. Any proposed changes in the approved design shall be indicated in red on the plans submitted in reference to the note above."
f. "The Developer shall give the Authority Engineer at least three (3) working days (72 hours) notice prior to beginning work to assign an inspector to the project and review plans and grade sheets. No work may begin until grade sheets have been reviewed by the Authority Engineer."
g. "Sanitary sewer costs and engineering expenses shall be tabulated separately by manhole section to accommodate calculations under PA Act No. 203, if the developer desires reimbursement at a later date."
h. "Developer offers for dedication to the York Township Water & Sewer Authority all sanitary sewer collector and/or interceptor lines constructed by the developer with appurtenances and a twenty-foot wide perpetual easement consisting of ten feet on either side of the centerline thereof for the maintenance, repair, replacement or enlargement thereof, together with the right of ingress, egress and regress therefore."

4. Where appropriate, one of the following notes shall be utilized if the project involves public sewers:
   a. "The depth of sanitary sewer design is based upon providing basement service by gravity flow."
   b. "The depth of sanitary sewer design is based upon providing first floor service by gravity flow only."
   c. Either comment above may be modified to identify any exceptions.

D. Connection Details
1. A top and side view of each manhole connection to existing sewers shall be provided. The detail shall show existing and proposed channel configuration, pipe sizes and types, and no conflict with existing steps.
2. A detail of all lateral tap-ins to existing manholes or sewer mains shall be provided.

E. Record Drawings (As-Builts)
1. Final sewer design and location as constructed, including bearings and distances along sanitary sewer rights-of-way.
2. The following information shall be shown for the end of all laterals:
   a. Pipe Station, Measured from Closest Downstream Manhole.
   b. Depth of Lateral, Measured from the Ground Surface to the Top of Pipe.
   c. Length of Lateral, Measured from the Sewer Main.
   d. Distance to Closest Property Corner.
   e. Swing Ties Referenced to at Least Two (2) Permanent Points.
   f. Elevation of Lateral Pipe, if available.
3. As-Built survey of entire pump station site with spot elevations.
4. Before the work will be accepted by the Township, applicants shall submit one copy of the record plan in digital electronic format compatible with the Geographical Information System technical specifications of York Township showing the as-built conditions. This digital copy shall contain an exact replica of the final plans approved by York Township, modified to reflect any field changes. A metafile which lists all details of the digital file shall accompany the digital map.

F. Cut Off Dates for Submittal
1. The cutoff date for plan and application submissions or resubmissions to the Authority shall be fifteen (15) days prior to each scheduled Authority meeting.

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DESIGN STANDARDS FOR SUBMISSION TO YORK TOWNSHIP WATER AND SEWER AUTHORITY

DESIGN STANDARDS FOR SUBMISSION TO YORK TOWNSHIP WATER & SEWER AUTHORITY

I. PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (PA DEP) DESIGN STANDARDS

A. All Public Sewer Systems shall be designed in accordance with standards published by PA DEP in the Domestic Wastewater Facilities Manual, latest revision.

B. In case of conflict between the PA DEP Design Standards and Authority Design Standards, the PA DEP Design Standards generally overrule, provided the most restrictive and conservative design criteria is applied.

II. SUPPLEMENTAL AUTHORITY DESIGN STANDARDS

A. Unless ductile iron (DI) pipe is utilized, all other pipes shall have the following minimum cover:
   1. Sixty (60") inches under streets and driveways.
   2. Forty-eight (48") inches under non-traffic areas.
   3. Thirty-six (36") inches with DI pipe and concrete encasement.

B. Watertight manholes and covers shall be provided in and along all drainage swales.

C. Where justified and recommended by the Township Engineer, DI piping shall be furnished at no additional cost by the Developer. The minimum cover for DI piping is forty-two (42") inches.

D. The following limitations apply to the use of drop connections:
   a. No drop connections on interceptors.
   b. No inside splashes permitted.
   c. Inside drop connections not allowed.

E. A minimum of six (6') feet horizontal separation shall be maintained between sanitary sewers and storm drainage pipes, inlets, curbs, and other utilities, except for public water, where ten (10') feet is preferred.

F. A minimum of twelve (12") inches vertical separation shall be maintained between the top of the sanitary sewer pipe and all other pipes crossing above, except that eighteen (18") inches of vertical separation shall be maintained at public water crossings, with sewer line under the water main.

G. Special design provisions shall be submitted for other pipes crossing under existing sanitary sewers.

H. Sanitary sewers constructed through fill shall be constructed of ductile iron pipe.

I. Compaction tests in accordance with the York Township Water & Sewer Authority Construction and Material Specifications shall be required for manholes installed on fill ground.

J. Sanitary sewers shall be constructed with at least thirty-six (36") inches of cover over pipe nearby streams in order to facilitate stream crossings.

K. Manhole Channel Slope - For the same size pipe, the fall through each manhole or the difference between the influent and effluent pipes at each manhole shall be 0.10' to 0.12'. In situations involving different size piping, the 0.8 point shall be matched in accordance with the PA DEP Design Standards. Precast manhole bases shall be constructed accordingly.

L. Where possible, all Public Sewer Systems shall be constructed within the street cartway. Manholes in easements shall be constructed in driveways or parking areas to provide proper access. Driveways and parking areas shall therefore be constructed to the Township's minimum roadway standards (excluding curbs and sidewalks) in order to support the weight of the sewer maintenance equipment. The entire easement area must be accessible to Municipal equipment and to the Authority's equipment. Where proposed designs include stream crossings, culverts must be designed and permitted to allow for maintenance vehicle access. Neither the Authority, nor the Municipality, shall assume responsibility for damages to private property as a result of performing sanitary sewer maintenance operations.

M. If required, control manholes, to accommodate periodic sampling of industrial wastes, shall be installed. The design and construction details must be approved by appropriate wastewater treatment facility personnel.

N. Major residential, commercial, and industrial service connections involving more than 5,000 GPD shall be made at manholes.

O. The use of lampholes and lateral risers is not permitted.

P. The use of 6" diameter sewer mains and smaller between manholes shall not be permitted, since York Township maintenance equipment cannot inspect these facilities. York Township's Subdivision and Land Development Ordinance also requires an 8" diameter minimum pipe size.

Q. The use of pipe saddles is prohibited.

R. All pumping facilities offered for public use shall be designed to be compatable with existing municipal pumping facilities and have a minimum pumping capacity of 80 gallons per minute.

S. Private sanitary sewers involving 25 EDU's or more shall be designed in accordance with the standards above.

T. All terminal manhole runs shall have a 1.00% minimum grade.

U. Additional standards that the Authority's Engineer deems appropriate after reviewing the final design may be required.

III. SOIL EROSION AND SEDIMENTATION CONTROL (SESC) DESIGN STANDARDS

A. All facilities shall be designed in accordance with standards developed by the York County Conservation District.

IV. PENNSYLVANIA DEPARTMENT OF TRANSPORTATION (PennDOT) DESIGN STANDARDS

A. All facilities to be constructed within State Highway rights-of-way shall be designed in accordance with standards developed by PennDOT.

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CONSTRUCTION STANDARDS FOR THE YORK TOWNSHIP WATER AND SEWER AUTHORITY

CONSTRUCTION STANDARDS FOR THE YORK TOWNSHIP WATER & SEWER AUTHORITY

I. PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (PA DEP) CONSTRUCTION STANDARDS

A. All Public Sewer Systems shall be constructed in accordance with the standards published by PA DEP in the Domestic Wastewater Facilities Manual, latest revision.

B. All Public Sewer Systems shall be installed in accordance with the conditions of the Bureau of Water Quality Management (B.W.Q.M.) Permit or planning module approval letter issued by PA DEP and as modified below:

1. During construction, no changes affecting any engineering design parameter shall be made from the plans, designs, and other approved data unless the Developer shall first receive written approval thereof from PA DEP. The sewerage facilities shall be constructed under the Developer's expert engineering supervision and competent inspection.

2. The Public Sewer System shall have adequate foundation support as soil conditions require. Trenches shall be backfilled such that the sewers will have proper structural stability, with minimum settling and adequate protection against breakage. Concrete used in connection with these sewers shall be protected from injury by water, freezing, drying or other harmful conditions until cured.

3. Manhole inverts shall be so formed as to facilitate the flow of the sewage and to prevent the standing of sewage solids, and the whole manhole structure shall have proper structural strength and be so constructed as to prevent undue infiltration, entrance of the street wash or grit, and to provide convenient and safe means of access and maintenance.

4. No stormwater from pavements, area ways, roofs, foundation drains or other sources shall be admitted to the sanitary sewers.

5. The Developer shall file with PA DEP "As-Built" plans showing the correct plan of all sewers and sewerage structures as actually constructed.

6. The Developer shall construct the sewerage facilities in a manner compatible with good conservation methods in order to minimize the adverse effect on the environment.

7. The local waterways patrolman of the Pennsylvania Fish Commission shall be notified by letter when the construction of a stream crossing and outfall is started and completed. A permit must be secured from the Pennsylvania Fish Commission if the use of explosives is required. The Developer shall notify the local waterways patrolman by telephone when explosives are to be used.

8. Cross connections between the potable water supply and the Public Sewer System constitute a potential danger to the public health. Therefore, all direct and indirect connections whereby under normal or abnormal conditions the potable water supply may become contaminated from an inferior water supply from any part of a sewerage system is hereby specifically prohibited. The Developer is further warned against permitting to be made permanent or temporary connection with a potable supply designed to be held in place while being used for flushing or other purposes, and is also cautioned against the danger of back siphonage through portable hose lines and similar avenues of possible contamination.

C. The Developer shall secure a National Pollutant Discharge Elimination System (NPDES) Storm Water Permit for construction sites over one acre.

D. The Developer shall secure all applicable PA DEP permits for earth disturbance, stream crossings, and encroachments.

II. AUTHORITY CONSTRUCTION STANDARDS

A. No public sanitary sewer work can begin until a B.W.Q.M. Permit or planning module approval letter is secured by PA DEP. No design changes are permitted without approval from the Authority and/or its Engineer.

B. All work shall be installed and tested in accordance with the latest edition of the York Township Water & Sewer Authority Construction and Material Specifications.

C. The Developer shall furnish three (3) extra sets of approved plans, showing the locations and depths of all laterals, and final specifications to Authority's Engineer for future inspection use.

D. The Developer shall submit three (3) sets of all grade (or cut) sheets, conforming to approved plans, to the Authority's Engineer prior to beginning work. Any proposed changes in the approved design shall be indicated in red on the plans submitted above.

E. The Developer shall give the Authority's Engineer at least three (3) working days (72 hours) notice prior to beginning work to assign an inspector to the project and review plans and grade sheets. No work may begin until grade sheets have been reviewed by the Authority's Engineer.

F. All manholes shall be adjusted to finished street grades utilizing no more than two (2) two (2") inch thick concrete adjusting rings (4" maximum adjustment) or recycled rubber rings. Brick manholes or adjustments are not permitted. If the proper adjustment cannot be achieved by the use of two rings, the cone section shall be removed and the proper barrel section inserted. The elevation of the manhole frame and cover shall be 1/8" to 1/4" below the adjoining roadway surface.

G. The Authority's Engineer or his designated representative shall observe all connection work to existing sanitary sewers. Only poured in place manhole bases shall be constructed on existing sewers. No materials, construction debris, and ground or surface water shall enter the existing sewer line. Upon completion of the connections, a plumber's stopper shall be placed in the new line and be adequately braced to prevent a "blow-out". The stopper shall not be removed until directed by the Authority's Engineer.

H. After all site work has been completed, should any sanitary sewers be subject to inflow, the Authority will require the Developer to furnish plastic manhole inserts.

I. All eight (8") inch diameter sanitary sewer main and six (6") inch diameter lateral work will be subject to periodic observations by representatives of Authority's Engineer or designated representatives and Township sewer maintenance personnel. All testing will be conducted in the presence of the Authority's Engineer or his designated representative. The cost of all inspections will be borne by the Developer.

J. If the project is constructed in phases or sections, each portion of the eight (8") inch diameter sanitary sewer shall terminate with a manhole and stub and stopper. Stubs may not extend more than seven (7') feet from the center of any manhole.

K. Where possible, manhole steps shall be placed perpendicular to the manhole channel.

L. The use of precast drop connections is prohibited.

M. Precast manhole bases shall be constructed specifically for the job intended. Precast manholes shall be constructed from the measurements obtained from grade sheet information.

N. All sewerage facilities offered to the Authority for public use shall be subject to a 18 month warranty period. A maintenance bond shall be furnished to the Authority in a form and amount acceptable to the Authority's Solicitor.

O. All sewer mains shall be cleaned, flushed, televised, and deflection tested by York Township maintenance personnel prior to release of the maintenance bond.

P. Upon completion of the project or each phase, one set of sepia mylar "As-Built" tracings and three (3) direct line prints shall be furnished by the Developer to Authority's Engineer. Occupancy of any dwelling will be denied if these plans have not been submitted.

Q. Upon completion of the project or each phase, one copy of the record plan in digital electronic format shall be submitted to York Township.

III. SOIL EROSION AND SEDIMENTATION CONTROL (SESC) CONSTRUCTION STANDARDS

A. At least seven (7) days before earth moving will begin, the Developer, by telephone or certified mail, shall notify PA DEP or its designee of the date for beginning of construction and invite the County Conservation District Representative to attend a preconstruction conference with the Developer's Contractor.

B. All applicable soil erosion and sedimentation control facilities shall be in place and approved by the County Soil Conservation District prior to the Public Sewer System installation.

C. By approval of the plans, neither the the Commonwealth of Pennsylvania, PA DEP, the Authority, or the Township assumes any responsibility for the feasibility of the plans or the operation of the measures and facilities to be constructed thereunder.

D. If at any time the erosion and sedimentation activities undertaken pursuant to this permit or the discharge of the effluent therefrom is causing or contributing to pollution of the waters of the Commonwealth, the Developer shall forthwith adopt such remedial measures as are acceptable to the Department.

E. A permit does not authorize any earth disturbance controlled by an ordinance enacted by a local municipality. Additional permits must be secured from local municipalities where earthmoving activities are covered by local ordinances.

F. The Developer's Contractor shall have his erosion control plan available at the site of the activity at all times. All earthmoving activities shall be undertaken in the manner set forth in the erosion and sedimentation control plan identified with this permit. Revisions to the plan shall be approved by PA DEP.

G. The erosion control measures and facilities shall be constructed under the supervision and competent inspection of an individual trained and experienced in erosion control, and in accordance with plans, designs and other data as herein approved or amended, and with the conditions of this permit. Control facilities shall be frequently inspected to insure effective control.

H. When erosion control measures and facilities are completed, the Developer shall notify PA DEP so that an inspection of the measures and facilities may be made by a representative of the County Soil Conservation District.

I. No stormwater, sewage or industrial wastes shall be admitted to the erosion and sedimentation measures and facilities without the approval of PA DEP.

J. Sediment shall at no time be permitted to accumulate in sedimentation basins to a depth sufficient to limit storage capacity or interfere with the settling efficiency thereof. The sediment removed shall be handled and disposed of in a manner that will not create pollution problems and so that every reasonable and practical precaution is taken to prevent the said material from reaching the waters of the Commonwealth.

K. All slopes, channels, ditches or any disturbed area shall be stabilized as soon as possible after the final grade or final earthmoving has been completed. Where it is not possible to permanently stabilize a disturbed area immediately after the final earthmoving has been completed or where the activity ceases for more than twenty (20) days, interim stabilization measures shall be implemented promptly.

L. Upon completion of the project, all areas which were disturbed by the project shall be stabilized so that accelerated erosion will be prevented. Any erosion and sedimentation control facility required or necessary to protect areas from erosion during the stabilization period shall be maintained until stabilization is completed. Upon completion of stabilization, all unnecessary or unusable control measures and facilities shall be removed, the areas shall be graded and the soils shall be stabilized.

M. The responsibility of carrying out the permit conditions shall rest with the Developer or other responsible manager of earthmoving that affects the approved erosion controls. Such responsibility passes with each control succession.

N. The Developer shall be responsible to implement, without charge, any additional soil erosion and sedimentation control measures as may be directed by the County Soil Conservation District.

IV. PENNSYLVANIA DEPARTMENT OF TRANSPORTATION (PennDOT) CONSTRUCTION STANDARDS

A. No public sanitary sewer work in State Highway rights-of-way may begin until a Highway Occupancy Permit is secured from PennDOT by the Developer in name of the York Township Board of Commissioners.

B. All work in State Highway rights-of-way shall comply with the permit and PA Code Title 67, Chapter 459 Regulations entitled "Occupancy of Highways by Utilities", latest revision.

C. All construction materials and techniques shall comply with PennDOT Publication 408 Specifications, latest revision.

D. All traffic control procedures shall comply with PennDOT Publication, No. 203 entitled "Work Zone Traffic Control", latest revision.

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