RULES, REGULATIONS, SPECIFICATIONS, AND DETAILS GOVERNING THE CONSTRUCTION OF SANITARY SEWERS

for

MONROE TOWNSHIP MUNICIPAL AUTHORITY
CUMBERLAND COUNTY, PENNSYLVANIA

March 2008
Revised October 2013
Revised January 2014
Revised February 2015
Revised February 2016

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NOTICE

The Rules and Regulations are subject to change without notice. Please contact the Monroe Township Municipal Authority Office to verify their applicability.

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PART I
DEFINITIONS

GENERAL:

Unless the context specifically and clearly indicates otherwise the meaning of terms and phrases used in the documents contained herein shall be as follows:

1. **A.A.S.H.T.O:** shall mean the American Association of State Highway and Transportation Officials.

2. **A.N.S.I:** shall mean the American National Standards Institute.

3. **A.S.T.M:** shall mean the American Society of Testing Materials.

4. **Authority:** shall mean Monroe Township Municipal Authority, a Municipal Authority of the Commonwealth of Pennsylvania.

5. **A.W.W.A:** shall mean the American Water Works Association.

6. **Board of Supervisors:** shall mean the Board of Supervisors of Monroe Township.

7. **Building:** shall mean a structure built, erected and framed of component structural parts designed for the housing, shelter, enclosure of support of persons, animals or property of any kind.

8. **Building Sewer:** shall mean the sewage drainage system from a building constructed on any Improved Property to the Lateral serving such Improved Property, including any grinder pump or pressure sewer or similar apparatus or facilities installed by the Township or the Authority or the Owner and which are located on such Improved Property. Also known as Customer Facilities.

9. **Code:** when used alone shall mean these regulations, subsequent amendments thereto, or any emergency rule of regulation which the authority may lawfully adopt.

10. **Commercial Establishment:** shall mean any room, group of rooms, building or enclosure, or group thereof, connected, directly or indirectly, to the Sewer System and used or intended for use in the operation of a business enterprise for the sale and distribution of any product, commodity, article or service, which maintains separate toilet, sink or other plumbing facilities in the room or group of rooms utilized for such business enterprise.

11. **Commonwealth:** shall mean the Commonwealth of Pennsylvania.

12. **Connection Fee:** shall mean the cost of the connection from the sewer main to the property line (See Act 57, Capital Charges Study).

13. **Customer Facilities Fee:** shall mean the cost of facilities from the property line to the proposed dwelling or building (See Act 57 Calculations, Capital Charges Study).

14. **Developer:** shall mean any landowner, agent of such landowner, contractor, or tenant with the permission of such landowner, who makes or causes to be made a subdivision of land or a land development.

15. **Equivalent Dwelling Unit (E.D.U.):** shall be construed to mean a sewage flow per Act 57 Calculation, with an average strength of two hundred (200) milligrams per liter of Biochemical Oxygen Demand (B.O.D.) and suspended solids or equivalent. The number of EDU's per connection will be based on capital fees section of this regulation, Part XI, paragraph B.

16. **Improved Property:** shall mean any property within the Municipality upon which there exists a structure intended for continuous or periodic habitation, occupancy or use by human beings or animals and from which structure Sanitary Sewage and/or Industrial wastes shall be or may be discharged.

17. **Industrial Establishment:** shall mean any Improved Property located within the Municipality and used or intended for use, wholly or in part, for the manufacturing, processing, cleaning, laundering or assembling of any product, commodity or article, beauty shop/barber shop, or any other Improved Property/Business located within the Municipality, from which wastes, in addition to or other than Sanitary sewage, shall be discharged.

18. **Industrial Wastes:** shall mean any and all wastes discharged from an Industrial Establishment, and/or any wastewater having characteristics which may have the potential to be detrimental to the Treatment Plant, other than Sanitary Sewage.

19. **Land Development:**

    (i) shall consist of the improvement of one lot or two or more continuous lots, tracts or parcels of land for any purpose involving:

        (a) a group of two or more buildings, or

        (b) the division or allocation of land or space between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups or other features;

    (ii) or shall consist of a subdivision of land.

    (iii) Any type of development which is regulated by the SALDO and/or the municipalities planning code

20. **Landowner:** shall mean the legal, equitable or beneficial owner or owners of land including the holder of an option or contract to purchase (whether or not such option or contract is subject to any condition), a lessee if he/she is authorized under the lease to exercise the rights of the landowner, or other person having a proprietary interest in land, shall be deemed to be a landowner for the purposes of this act.

21. **Lateral:** shall mean that part of the sewer system extending from the Authority Sewer to the edge of easement, right of way line or curb line, or, if there shall be no curb line, to the property line or, if no such lateral shall be provided, then "Lateral" shall mean that portion of, or place in, a sewer which is provided for connection of any Building Sewer.

22. **Low Pressure Sewer System:** collection and conveyance sewer system that operates under low pressure conditions.

23. **Municipality:** shall mean Monroe Township, Cumberland County, Pennsylvania; a Municipal Subdivision of the Commonwealth.

24. **Municipalities Planning Code (MPC):** shall refer to Act of 1968, P.L. 805, No. 247 as reenacted and amended.

25. **Owner**: shall mean any person vested with ownership, legal or equitable, sole or partial, of any improved property.

26. **Person:** shall mean any individual, partnership, company, association, society, trust, corporation or other group or legal entity, including municipalities, municipality authorities, school district and other units of government.

27. **Sanitary Sewage:** shall mean normal water-carried household and toilet wastes from any improved property.

28. **Septage:** Septage includes liquid or solid material removed from a septic tank, cesspool or similar device that receives only waste or wastewater from humans or household operations. The term includes processed residential septage from a residential septage treatment facility. The term does not include liquid or solid material removed from portable toilets, or marine sanitation devices or similar devices that receive either commercial wastewater or industrial wastewater. The term also does not include grease or liquid of any kind removed from an oil & grease trap.

29. **Sewer:** shall mean any pipe or conduit constituting a part of the Sewer System used or usable for sewage collection or conveyance purposes.

30. **Sewer System:** shall mean all facilities, as of any particular time, for collecting, pumping, transporting, treating and disposing of Sanitary Sewage and/or Industrial Wastes, situate in or adjacent to the Municipality and owned by the Authority.

31. **Street:** shall mean and shall include any street, road, land, court, cul-de-sac, alley, public way or public square.

32. **Subdivision:** shall mean the consolidation, division or re-division of a lot, tract or parcel of land by any means into two or more lots, tracts, parcels of other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, transfer of ownership or building or lot development:

    Provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than ten acres, not involving any new street or easement of access or residential dwellings, shall be exempted.

33. **Tapping Fee:** shall mean the cost of four separate components which are separately calculated (See Capital Charges Study, Act 57 as amended):

    1. **Capacity Part:** shall mean the cost of capacity-related facilities, which would typically include wastewater treatment plant and certain related facilities. These facilities may either be existing or future facilities which are planned to be constructed or acquired.

    2. **Collection Part:** shall refer to those costs required to provide collection and conveyance of wastewater, such as pressure sewers, force mains, and pumping stations.

    3. **Special Purpose Parts:** shall refer to fees for special purpose facilities applicable only to a particular group of customers, or serving a particular purpose or specific area, such as specific pump stations, sewers, industrial waste water treatment facilities, etc.

    4. **Reimbursement Component:** shall mean where appropriate, a component to recapture the allocable portion of expenses of line extensions constructed at the expense of another party other than Authority, in accordance with HB51.

34. **Township:** shall mean the Township of Monroe, Cumberland County, Pennsylvania.

35. **Treatment Plant (Wastewater Treatment Plant):** facilities where sanitary sewage is conveyed for processing or treatment.

ADMINISTRATIVE PROCEDURES

PART II
GENERAL INFORMATION

A. GENERAL:

1. These Rules, Regulations and Specifications serve to provide administrative and technical guidance to any and all applicants desiring public sewerage services of the Monroe Township Municipal Authority. The Authority reserves the right to amend or change these Rules and Regulations at any time deemed necessary. Owners, Contractors and Developers shall be responsible to understand and abide by these rules and regulations.

2. It will be the responsibility of owner, contractor and/or developer to contact the Authority prior to construction to determine if any Rules, Regulations or Specifications have changed.

B. APPLICATIONS, PERMITS & FEES

1. CONNECTION PERMIT – No work on a building sewer for the purpose of connecting or abandoning a building shall begin before the Owner of the property on which the work is to be done, or the contractor who is to do the work as the Owner's representative, shall have made application to the Authority for a permit.

2. EXCEPTIONS – No permit shall be required for repair of leaks or clearance of stoppages, provided this work does not require excavation on the line. For any such work requiring excavation, a permit shall be required.

3. CONNECTION PERMIT APPLICATION – An application for a connection permit must be filed before any work is begun for which a permit is required. The application is to be filed by the Owner of the improved property on which the work is to be done or by the contractor who is to do the work as the representative of the Owner. Blanks and forms to be used in preparing the application are provided by the Authority and may be secured from the Authority.

4. DISCONNECT PERMIT – An application for a permit to disconnect from the system must be filed before any work is begun. The application is to be filed by the Owner of the improved property on which the work is to be done or by the contractor who is to do the work as the representative of the Owner. Blanks and form to be used in preparing the application are provided by the Authority and may be secured from the Authority.

5. DISCONNECT/RECONNECT – A Building must be disconnected from the sewer system as a result of the building being demolished by the owner thereof or destroyed

by fire of other naturally caused calamity. The disconnection must be permitted and inspected by the Authority. The property owner will have the option to pay user fees for one year if connection is re-established within one year, of disconnection and/or the property owner will have the option to pay the tapping fee in effect at the time of reconnection. In either case, a connection permit must be issued, an inspection fee paid and the reconnection inspected by the Authority.

6. ABANDONMENT OF BUILDING SEWER – Where upon the building sewer is to be disconnected from the public sewer system; the building sewer shall be disconnected at Right-of-Way or edge of easement and securely capped to prevent inflow of water into the public sewer system. Disconnections shall be in accordance with this manual.

7. FILING OF APPLICATION – The application for Connection Permit or Permit to disconnect in the form prescribed must be filed with the Authority.

8. APPROVAL OF THE APPLICATION – The approval or rejection of the application filed shall be issued by the Authority. Approval will be expressed in the form of a "permit" issues to the Applicant upon payment of the connection and inspection fees as set forth in these regulations.

9. REJECTION OF THE APPLICATION – If a permit application is rejected, written notice of the reasons for rejection shall be provided to the applicant who may submit such revised plans and specifications as are necessary to obtain approval.

10. CONNECTION FEE AND INSPECTION FEE – No connection permit shall be issued to an applicant until such time as the connection and inspection fees are paid. Each building sewer which is connected to the public sewer system shall be required to pay connection and inspection fees as established. These fees shall cover the costs of processing the application, issuing the permit and up to two inspections of the installation. Additional inspections will require additional inspection fees. Connection and Inspection fees shall be made payable to the Authority.

11. DISPLAY OF PERMIT – When the work begins, while installation continues and until the final inspection has been made and approved, the permit shall be publicly displayed on the property, at a location visible for the outside and reasonably protected from weather.

12. Penn D.O.T. PERMITS – If construction of the sewer system will be within the Pennsylvania Department of Transportation (Penn D.O.T.) Right-of-Way, all Penn D.O.T. Permitees shall be obtained by the Authority. However, applications and all fees for such permits shall be prepared for and paid by the Owner(s) of the improved properties.

C. METERED RATE SCHEDULE

1. Meters or other measuring devices which shall be required or permitted for use in

determining water consumed shall be furnished and installed by the Owner of the Improved Property as his expense, shall be under the control of this Authority and may be tested, inspected or repaired by this Authority whenever necessary. The Owner of the Improved Property upon which such meter shall be installed shall be responsible for its maintenance and safekeeping and all repairs thereto shall be made necessary by ordinary wear and tear or other causes. Bills for such repairs, if made by this Authority, shall be due and payable immediately upon completion of such repairs and shall be collected in the same manner as quarterly bills for sewer rentals or charges.

2. METER CALIBRATION – All sewer meters shall be tested and/or recalibrated upon notification by the Authority and at the following times under the following circumstances:

   a. Whenever the monthly flow rate per EDU varies more than twenty-five (25) percent from the annual average per EDU flow rate;

   b. Whenever the Authority after reviewing all conditions and circumstances surrounding the operation of any sewer meter has good reason to believe that said sewer meter is not functioning properly.

   As to circumstances requiring testing as set forth in item numbers 1 and 2, said testing and/or recalibration is required to be completed within forty-eight (48) hours of notice being given by the Authority. Said test results shall be submitted, in writing, to the Authority within twenty-four (24) hours after the completion of the testing and/or recalibration. The owner and/or party or parties benefiting from said sewer meter shall be solely responsible for the costs of any and all testing and/or recalibration.

3. METERED WATER CONSUMPTION – Rate charge per 1000 gallons a Quarter, plus meter reading charge will be established by Township Resolution.

D. CONNECTION FEE

1. Each Owner of Improved Property who is compelled to connect to a lateral constructed under the Contracts for the construction of the Sewer System by the Authoirty, shall pay a connection fee to the Authority.

   If the connection is to be made to a lateral constructed by others with no cost to the Authority, there will bne no connection fee required.

   If the Authority agrees to make a lateral connection for an Improved Property which does not currently have a lateral, the Authority may construct lateral and shall be reimburdsed by Owener for the actual cost of connection, or allow property owner to construct at Authorities descretion..

E. BILLING & COLLECTION OF RATES & CHARGES

1. BILLING PERIOD - Bills for the payment of sewer user charges be rendered in accordance with the following schedule:

Month of Billing	Months of Service Covered by Billing
February 15th	January 1st to March 31st
May 15th	April 1st to June 30th
August 15th	July 1st to September 30th
November 15th	October 1st to December 31st

2. PAYMENT OF BILLS – If any bill for sewer use is not paid within forty-five (45) days of the billing date, it shall be delinquent and a penalty of ten percent (10%) shall be added.

   Failure of any owner to receive quarterly bills for sewer use due to the failure of such owner to notify the Authority of his correct address, or failure of any owner to receive a correct bill for sewer use by reason of the failure of such owner to notify the Authority of the use or occupancy of an Improved Property or any portion thereof shall not excuse non-payment or failure to pay the amount which would be property applicable to the use or occupancy of said Improved Property shall not result in an extension of the period of time during which the net bill shall be payable. Payment made or mailed and postmarked, on or before the last day of such forty-five (45) calendar day period shall constitute payment within such period. If the end of such 45 calendar day period shall fall on a Sunday or legal holiday, payment made, or mailed and postmarked, on the next succeeding weekday which is not a legal holiday shall constitute payment within such period.

3. TERMINATION OF SERVICE – In the event a sewer rental bill remains delinquent for more than thirty (30) days beyond its due date, the Authority shall have the right to cause public water service to the property be cut off, in accordance with state regulations. In the event public water service is cut-off as provided herein, public water service shall not be restored until all delinquent bills and the cost of cutting off and restoring service shall have been paid.

4. LIEN FOR USER CHARGES – The sewer user charges imposed by these Rules and Regulations promulgated by the Authority shall be a lien on any of the Improved Properties served from the date the charge therefore first becomes due and payable. In addition to all other rights of the Authority herein established, if such sewer user charges are not paid, the Authority may file such liens and collect the same in the manner provided by law for the filing and collection of Municipal liens and claims, or may proceed to collect such sewer user charges by action in assumpsit in the name of the Authority against the owner of the property charged or the user of the service.

   a. The Authority may take any other action to collect such sewer user charges as permitted in law or equity.

b. Authority may report to the Credit Bureaus delinquent payments over sixty (60) days past due.

c. Authority may, in connection with private or public water companies, cause water services to be terminated to property.

5. APPORTIONMENT – Whenever sewer service to any Sewer Rental Unit begins after the first day or terminates before the last day of any quarter, the sewer rentals for such Sewer Rental Unit for such quarter shall be for that portion of the quarter during which the Sewer Rental Unit is served. However, in making such apportionment, a fraction of a month amounting to one-half or more of a month shall be counted as a full month and a fraction of a month amounting to less than one-half of a month shall be disregarded.

6. Once property is connected, billing starts from date of connection.

7. No credit is given for no use of service.

F. PROHIBITED WASTES

1. ENTRY OF SURFACE OR GROUNDWATER PROHIBITED – No person shall discharge or permit to be discharged, into the Sewer System, or any part thereof, any storm water either from street or gutter inlets or from roof or other rainwater connections, surface or subsurface water, exhaust water, exhaust steam or any other unpolluted drainage.

   No person shall construct or permit to be constructed any apparatus which is intended for or shall render possible the entry of such prohibited matter into the Sewer System or any part thereof.

2. DISCHARGE OF INDUSTRIAL WATER PROHIBITED – The Authority reserves the right to refuse permission to connect to the Sewer System, to compel discontinuance of use of the Sewer System, or to compel pretreatment of Wastewaters by any Nonresidential Establishment in order to prevent discharges deemed harmful, or to have a deleterious effect upon any portion of the Sewer System. No Wastewaters shall be discharged to the Sewer System:

   a) Having a temperature higher than 150°F;

   b) Containing more than 50 ppm by weight of fats, oils, and grease;

   c) Containing any gasoline, benzene, naphta, fuel oil, or other flammable or explosive liquids, solids, or gases;

   d) Containing any garbage that has not been ground by household-type of other suitable garbage grinders;

e) Containing any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, paunch manure, or any other solids or viscous substances capable of causing obstructions or other interferences with proper operation of the Sewer System;

f) Having a pH lower than 6.5 or higher than 9.0, or having any other corrosive property capable of causing damage or hazards to structures, equipment, or personnel of the Sewer System;

g) Containing toxic or poisonous substances in sufficient quantity to injure or interfere with any wastewater treatment process, or constitute hazards to humans or animals, or to create any hazard in waters which receive treated effluent from the Sewer Treatment Plant. Toxic wastes shall include, but not by way of limitation, wastes containing arsenic, cyanide, chromium, cadmium, mercury, copper, and nickel ions;

h) Containing noxious or malodorous gases or substances capable of creating a public nuisance; or

i) Containing solids of such character and quantity that special and unusual attention is required for their handling.

Upon demand of the Authority, wastewater pretreatment facilities shall be installed at the sole cost of customer to meet Authority requirements.

The Authority reserves the right to require Nonresidential Establishments having large variations in rates of wastewater discharge to install suitable regulating devices for equalizing wastewater flows to the Sewer System.

When directed by the Authority, owners of Nonresidential Establishments shall install, at the sole cost and expense of such Nonresidential Establishment, and maintain a manhole and such other devices as may be approved by the Authority to facilitate observation, measurement, and sampling of wastewater discharged to the Sewer System and to any meters used for establishing or determining water consumption, water excluded from the Sewer System, and wastewater discharged into the Sewer System. The Authority or its duly authorized representatives shall, at all reasonable times, be permitted to enter upon any and all properties for the purpose of inspecting, observing, measuring, and sampling wastewater discharged to the Sewer System and to any meters used for establishing or determining water consumption, water excluded from the sewer system and wastewater discharged into the Sewer System. Any Nonresidential Establishment which is connected to the Sewer System planning to change operations so as to materially alter the characteristics and volumes of wastewater discharged to the Sewer System shall notify the Authority in writing at least ten (10) days before making such connections or changing its operations.

Any owner of a Nonresidential Establishment desiring to discharge wastewater containing industrial wastes to the Sewer System shall obtain a permit from the Authority to do so. Application for a permit to discharge wastewater containing industrial wastes shall be accompanied by all information requested by the Authority for the determination of wastewater and industrial waste volumes, characteristics, and constituents. The cost for obtaining such information shall be borne by the Nonresidential Establishment.

The Authority may require a user of the Sewer System to provide information needed to determine compliance with these Rules and Regulations or permits applicable to the Sewer System, including, but not limited to, wastewater rates of flow, chemical analyses, raw materials, processes and products affecting wastewater and quantities and disposition of specific liquids and materials important to Sewer System use control.

G. CONNECTION TO EXISTING SEWERS

Upon the Township's plumbing inspector's approval of the testing of the building sewer, and the Authorities Inspector approval of the connection of lateral to sewer main as applicable, the property owner or the property owner's connection to the existing public sewer will be considered complete. In no instance will the property owner be allowed to connect through the septic tank or holding tank, nor shall he connect to any piping which discharges out of the existing septic tank.

The connection to the existing sewer shall conform to one of the following methods.

1. Connection to Existing Lateral Connection

    a. A reducer fitting shall be installed matching the two sizes of pipe. The fitting and joints shall conform to the requirements of these regulations. The fittings shall be pitched at 45° downward.

    b. Adaptors shall be installed in strict accordance with the manufacturer's requirements. All types or proposed adaptors shall be approved by the Township's plumbing inspector prior to installation.

    c. In all cases, the joints of the connection shall be made permanently gas and watertight.

    d. Immediately adjacent to the end of the lateral provided by the Authority, or as close thereto as practical, a standard double wye with a vertical cleanout to the surface shall be constructed.

2. Connection to Existing Sewer Main

    a. The same requirements of Section G.1.a-c must be followed for Building Sewers.

b. A standard double wye cleanout and riser shall be installed at edge of right-of-way or sewer easement.

c. A lateral shall be constructed from cleanout to sewer main in accordance with these specifications.

d. Inspection of the lateral and connection to main must be performed by representative of the Authority.

3. No roof drainage, cellar seepage, surface water, waste from hydrants, ground water or water from underground drainage fields shall be permitted to drain into the public sewer system. The public sewer system is intended to convey sanitary sewage and approved industrial wastes only. Sumps for groundwater must clearly discharge to ground.

4. The Authority shall have the right to close up or disconnect from the public sewer system any service lateral or building sewer used for carrying rain, surface water, ground water or any prohibited matter or whenever any violation of this document is committed.

5. Same two (2) connection options occur for proposed Low Pressure Sewer connections as specified elsewhere in these specifications.

H. EXTENSIONS TO SEWER SYSTEM

1. ACCEPTANCE OF DEDICATIONS – Provided that the Authority possesses sufficient capacity in the Regional Sewage Treatment Plant to accommodate the increased flow and provided that all the following requirements are met, The Authority will accept dedications of sewer lines extending the Sewer System. Such acceptance will be only upon written request and formal resolutions of the Authority.

2. PLANS AND SPECIFICATIONS – The design of the sewers must be approved by the Authority and the construction must be to the Authority's specifications. Plans shall be prepared by a Registered Engineer or Registered Land Surveyor, on plan and profile paper, 24" x 36": in size. The drawing shall be to a scale of 1" = 50' horizontal and 1" = 5' vertical. All plan submissions will be consistent with Monroe Township Municipal Authorities Rules, Regulations, Specifications and Details Governing the Construction of Sanitary Sewers, latest edition. Extensions should be designed to accommodate further extension. Plans shall include manhole numbers, elevation datum, stationing, and all other pertinent information, in accordance with Part IV of these regulations.

3. INSPECTION – Inspections of the construction and testing of a lateral shall be performed by the Authority's Engineer at the property Owner's expense. A sum sufficient to cover the estimated cost of such inspection must be deposited, in escrow, prior to construction. The Authority's Engineer must be notified two (2) working days in advance of any construction inspection or testing needs.

4. SEWER LATERALS - An 8" x 4" wye and sewer lateral shall be provided to accommodate each improved property and each building lot accessible to the sewer extension. No connection fee will subsequently be imposed for connection of the properties served by developer installed sewer laterals. The lateral shall be securely sealed with solvent weld cap. A print of the drawing of the extension, locating the wyes in plan or the lateral in plan with the elevation of the lateral at the property line shall be deposited with the Authority prior to acceptance.

5. SUBDIVISION ESCROWS OR BONDS – The Monroe Township Subdivision Ordinance provides, in certain cases, that proposed subdivisions or Land Development be provided with a Sewage Collection System and be connected with the Sewer System. The Supervisors will not approve subdivisions or Land Development plans until the applicant has made satisfactory arrangements for such sewering.

   The Authority will agree in advance to accept a dedication and to connect to the Sewer System, if the Subdivider constructs the sewers in accordance with these Rules and Regulations and any special conditions imposed by the Authority.

   To assure such construction, the Subdivider must either submit a bond with a nationally recognized surety company as surety or escrow money or acceptance securities. The amount of the bond of escrow should be equal to the estimated cost

to the Authority performing the construction. The Developer should secure the concurrence of the Authority's Engineer in the cost estimate and the approval of the Authority's Solicitor of the developer's agreement.

6. STATE PERMITS – State Law provides that sewers may not be constructed except under a permit issued by the Department of Environmental Protection. The policy of the Department is to issue permits for an extension to a Municipal System only to the owner of the Sewer System. The Authority will execute an application on behalf of a Developer – Subdivider, but only on forms prepared by the Developer – Subdivider.
7. Penn D.O.T. PERMITS – If the proposed extension is to be constructed in a State Highway, the Developer – Subdivider must secure a permit from Penn DOT, in the Authorities name.

8. EASEMENT AGREEMENTS – If the proposed extension is to be constructed, in whole or in part, in privately owned land, the Developer shall prepare and deposit with the Authority an Agreement, in recordable form, conveying an easement for maintenance purposes to the Authority. Unless special circumstances exist, the width of the easement shall be 30 feet.

9. "AS BUILT" PLANS – All sewer extensions must provide "As Built" plans of extension after inspection and testing completed and prior to acceptance of dedication by Township/Authority. Three (3) sets of "As Built" plans must be submitted in accordance with drafting standards outlined in Part IV of these regulations and approved by Township/Authority.

10. BUILDING SEWER CONNECTIONS - No building sewer may be connected until sewer system accepted per Part IX by Township/Authority.

I. SINGLE HOUSE PUMPS

1. Where first floor service to public sewer system cannot be made, or the property is serviced by a low pressure sewer system operated and installed by the Authority, the property shall be serviced with a single house pump designed to pump raw, unscreened sewage.

2. GRINDER PUMP MAINTENANCE AND REPAIR

   a) The homeowner will bear the complete financial responsibility for the maintenance and repairs to their grinder pump;

   b) The Authority will provide a loaner pump, for E-ONE System, for a period not to exceed 21 days while the homeowner has their pump serviced. At the homeowner's direction, the Township/Authority can reinstall the property owner's prepared grinder pump at the homeowner's expense using the current hourly rate in effect.

3. The Authority shall not be required to provide or maintain single house pumps for new connections to existing public sewer systems. The owner shall provide and install the single house pump in accordance with these regulations.

4. The Authority shall not maintain any single house pumps.

5. The Authority shall, at its discretion, determine which properties require single house pumps for future sewer extensions.

J. MANDATORY CONNECTIONS

1. The owner of any Improved Property that is adjoining and adjacent to and whose principal building is within one hundred fifty (150) feet from the Sewer System shall connect such Improved Property with and use such Sewer System, in such manner as this Township and/or Authority may require, within sixty (60) days after notice to such Owner from the Township/Authority to make such connection, for the purpose of discharging all Sanitary Sewage and Industrial Wastes for such Improved Property; Subject, however, to such limitations and restrictions as shall be established herein or otherwise shall be established by this Township and/or the Authority, from time to time per Ordinance 2000-7, as amended.

K. MISCELLANEOUS

1. VARIANCE FROM RULES – No officer or employee of the Authority is authorized to vary these rules without official action for the Authority.

2. ACCESS – For the purpose of enforcing the provisions of these regulations of the Authority with respect to the operation of the Sewer System and for the purpose of advancing and protecting the public health, the Authority reserves the right to enter upon the premises of any person, firm, or corporation connected to the system for the purpose of inspecting the sewer facilities located thereon and for the purpose of determining compliance with the requirements of the Authority. In the event that the Authority's duly authorized representatives are denied access to any customer's premises for these purposes, the Authority reserves the right to discontinue sewer service to such premises until inspection is permitted and compliance with the requirements of the Rules and Regulations has been determined.

3. ENFORCEMENTS – Notwithstanding any other provisions or implications of these regulations of the contrary, the Authority reserves the right at all times to refuse to render or to continue to render sewer service to any property or through any lines whenever it appears that the connection of the property to the Sewer System has been improperly made or whenever it appears there has been a violation of rules and regulation of the Authority with respect to the installation of the sewage disposal facilities. In the event that the Authority shall elect to discontinue service to any User connected to its lines, except as provided in Article II, the Authority shall give ten (10) days written notice by Certified Mail to the property Owner prior to

disconnecting the property from the Sewer System.

4. RESPONSIBILITY OF OWNERS – The Owner of any Improved Property connected to the Sewer System shall be responsible for all acts of tenants or other occupants of such Improved Property insofar as such acts shall be governed by provisions of these Rules and Regulations.

5. MAINTENANCE AND REPAIR OBLIGATION FOR BUILDING SEWER AND LATERALS – The maintenance and repair of building sewers, as defined herein, shall be the sole obligation of the property owner. All repairs to or the maintenance and repair of laterals shall be the sole obligation of the Authority.

6. DEFECTIVE PLUMBING – Wherever there is reason to believe the drainage system of any building has become defective, it shall be subject to test and inspection. Any defects found must be corrected as required in writing by the Authority.

7. MAINTENANCE – The plumbing and drainage system of any premises within the limits of the sewer are/shall be maintained in a sanitary, safe and watertight operating condition by the Owner or his/her agent.

8. SEPARATE LATERALS AND BUILDING SEWERS – A separate and independent building sewer shall be provided for every building whether constructed as a detached unit or as one (1) of a pair or row, but a single building sewer will be permitted to serve a school, a factory, an apartment house or other permanent multiple unit structure whose individual units may not be subject to separate ownership as a condominium unit. Where one (1) building stands at the rear of another or on the interior lots that may, in the future, be subdivided and no separate building can be provided to the rear of the building, the front building sewer may be extended to the rear building provided that an easement at least twenty feet (20') in width with a plan attached showing the common building sewer line is recorded in the Recorder of Deeds Office of Cumberland County, Pennsylvania, listing the property owner of the front parcel as grantor and the property owner of the rear parcel as grantee, even though it is the same as the owner of the front parcel.

9. JOINT OCCUPANCY OF SEWER TRENCH – The building sewer servicing one (1) property may not occupy the same trench with the lateral and building sewer of an adjoining property. The installation of a single lateral and building sewer to serve two (2) adjoining properties or dwellings is prohibited.

10. COST OF INSTALLING BUILDING SEWER – All costs and expenses of construction of a building sewer shall be borne by the Owner of the improved property to be connected; and such Owner shall indemnify and save harmless this Authority from all loss or damage that may be occasioned, directly or indirectly, as a result of construction of a building sewer or of connection of a building sewer to the service lateral..

11. LIABILITY FOR DAMAGES – The Authority shall not be liable to any damage or

expense resulting from leaks, stoppages or defective plumbing or from any other cause occurring to any premises or within any house or building; and it is expressly stipulated by and between the Authority and the Owner that no claims shall be made against the said Authority on account of the breakage or stoppage of, or any damage or expense to, any service lateral, building sewer or house connection when the cause thereof is found to be in the service lateral, building sewer or house connection.

12. DEFICIENCY OR FAILURE OF SERVICE - The Authority shall not be liable for a deficiency or failure of service when occasioned by an emergency, required repairs or failure from any cause beyond its control. The Authority reserves the right to restrict the use of the sewer service whenever the public welfare may require it. In consideration of the right to connect to the public sewer system, the Authority shall not be liable for any damage or expense resulting from leaks, stoppages, or defective plumbing or from any other cause occurring to any premises or within any building, and it is hereby expressly agreed by all persons making connection with the public sewer system that no claims shall be made against the Authority on account of the breaking or stoppage of, or any damage or expense to, any service lateral or building sewer where the cause thereof is found to be in such service lateral or building sewer.

13. DISCHARGE RESTRICTIONS – All persons using the public collection sewer shall be subject to the prohibited discharge requirements of South Middleton Township Authority and the Borough of Mechanicsburg, as applicable.

14. USE OF PUBLIC SEWER – The Authority reserves the right to refuse permission to connect to the public sewer system, to compel discontinuance of use of the public sewer system, or to compel treatment of wastewaters by any person using the public sewer system in order to prevent discharges deemed harmful, or to have a deleterious effect upon any establishments are subject to the additional requirements of these regulations.

15. REPAIR OF UNSATISFACTORY CONDITIONS – If any person shall fail or refuse, upon receipt of a notice from the Authority in writing, to remedy any unsatisfactory condition with respect to a building sewer within sixty (60) days of receipt of such notice, the Authority may refuse to permit such persons to discharge sanitary and/or industrial wastes into the public sewer system until such unsatisfactory condition shall have been remedied to the satisfaction of the Authority.

16. ABANDONMENT OF BUILDING SEWERS – Where upon the building sewer is to be disconnected from the public sewer system. The building sewer shall be disconnected before existing cleanout if cleanout exists within Right-of-Way or easement or disconnected at Right-of-Way or edge of easement if no cleanout exists and solvent weld capped to prevent inflow of water into the public system. Capped end shall be backfilled and marked per standard lateral detail SD-12.

17. ABANDONMENT OF EXISTING DISPOSAL SYSTEM – All holding and septic tanks, cesspools and seepage pits being removed from service shall be pumped dry. Contents of structures shall be disposed of in a manner acceptable to the local

municipal government. The Authority will require that all abandoned holding and septic tanks, cesspools and seepage pits be physically removed from ground or filled with crushed stone, gravel or shale to prevent said facilities from being used again or caving in or from in any other way becoming a health or safety hazard in the future. The existing lid must be crushed.

18. SMOKE TESTING & FLUSHING OR AUTHORITY SEWERS – Prior to any public sewer line is required to be flushed or smoke tested the residents along line to be flushed and/or tested must be notified three (3) days in advance of activity by placing a "Door Tag" Public Notice (See Details SD-37 & 38). The Cumberland County Communications Center must be contacted at (717) 243-4121 one (1) day prior to conducting smoke testing to make them aware of activity and area to be tested.

19. CHANGES IN RULES AND REGULATIONS – The Authority and/or Supervisors reserves the right to adopt and promulgate, from time to time, additional classifications and sewer rates or charges therefore, or modifications of the schedule of sewer rates or charges as set forth in these Rules and Regulations, which additional classifications and sewer rates or charges, or modifications, as the case may be, shall be construed as a part of these Rules and Regulations.

    The Authority and/or Supervisors reserves the right to adopt, from time to time, such additional rules and regulations as it shall deem necessary and proper in connection with use and operation of the Sewer System, and discharge of Wastewaters and other substances thereto, which additional rules and regulations shall be, shall become, and shall be construed as part of these Rules and Regulations.

PART III
WHO IS COVERED

These Regulations and specifications shall apply to any person, corporation, or other legal entity who desires to construct sewer lines, or connect to the existing sewer lines including, but not limited to, residences, more than one residence facility in a residential development or non-residential use, prior to their use or sale.

PART IV
SUBDIVISION AND LAND DEVELOPMENT PLAN REQUIREMENTS

A. The developer must submit eight (8) sets of plans showing the proposed location of the residence(s) or facilities to be connected with first floor elevations, together with topography, and grade of lines, prepared in compliance with these specifications herein. The developer (applicant) may employ any Professional Engineer competent in the field of sanitary engineering to develop the necessary plans and specifications or the sewer extension(s).

All plans of submission must have the following notes on them:

(1) Public sewer service is available from Monroe Township Municipal Authority. However, prospective grantees of any lot(s) are warned that they should make inquiry of the Monroe Township Municipal Authority to determine if sewer capacity for the lot(s) to be acquired is/are available. **Due to the fact the Monroe Township Municipal Authority serves on a first-come, first-served basis, it shall be the sole responsibility of prospective grantee to verify the availability of sewer service prior to building, design, and/or construction.**

(2) All sanitary sewer construction will be performed by the Contractor in accordance with the Monroe Township Municipal Authority, Rules, Regulations, Specifications and Details Governing the Construction of Sanitary Sewers (current edition).

(3) Prospective grantees of commercial lot(s) must submit plans (with explanatory narrative) describing potential uses prior to building and/or construction.

B. When a subdivision utilizes a pressurized system, the plans must specify the grinder pump manufacturer for which the lot or subdivision was designed. Additionally, grinder pump/pressure sewer system submittals shall include a design report with appropriate calculations, signed and sealed by an engineer, licensed to practice in the Commonwealth, to assure that the proposed system can work properly. In addition, the plans must state the following:

(1) In accordance with the Authority Regulations, the property owner shall be responsible for and provide perpetual maintenance and replacement of all sanitary sewage customer facilities (Building Sewers) including the Grinder Pumping Station, controls, pipes, valves, fittings, appurtenances, and etc.

(2) Construction shall be performed in accordance with the Authority Rules and Regulations.

The Authority reserves the right to request additional comments or information on the plans as warranted. The completed plans and specifications shall be submitted to the Authority for its consideration and action. The applicant shall reimburse the Authority for all review fees as billed by the Authority Engineer and/or Solicitor.

(3) The Authority Engineer and Solicitor shall review the plans for conformity to the planning module. Approval of the planning module by the Authority does not guarantee the availability of sewer capacity. The Authority's approval of the planning module does not constitute approval of the plans for purposes of subdivision/land development requirements, nor does same constitute approval to record said plans, sell, transfer or otherwise convey rights to lots or property, or approve the construction of sewer lines or facilities.

(4) Upon approval of the planning module and/or attached supporting information, such as a preliminary design report, by the Authority, and the Pennsylvania Department of Environmental Protection (PADEP), the developer shall submit detailed construction plans that comply with the technical specifications provided in these Regulations and those of Commonwealth and Federal laws, rules and regulations. At this time, the developer shall advise the Authority of which option he would like to use (Refer to Paragraph 5).

(5) Before final approval of the construction plans is granted by the Authority, the developer shall choose from the following options, notifying the Authority in writing of the option they choose, and furnish the Authority with the necessary items accordingly:

(a) The Developer shall install all sewer lines, manholes, laterals, and all other sewer apparatus, and dedicate them to the Authority upon Authority acceptance. The Developer must furnish the Authority with a signed Deed of Easement and a signed Construction Agreement. After completion and dedication, the Authority will stamp the plans and forward them to the Monroe Township Board of Supervisors.

(b) The Developer shall furnish the necessary financial security (as set forth herein Part V) in accordance with requirements of the Authority Rules and Regulations, signed Deed of Easement, and signed Construction Agreement. With this option, and upon receipt of the above, the Authority will approve and stamp the plans and forward them to the Monroe Township Board of Supervisors.

(6) No subdivision or land development of any lot, tract or parcel of land shall be made, nor any street, sanitary sewer, storm sewer, water main, or any other improvements in connection therewith, shall be laid out, constructed, opened,

or dedicated for public use travel or, for the common use of occupants of buildings abutting thereon, prior to approval of the construction plans by the Authority.

(7) The standard "call before you dig" note (Pennsylvania One Call) must be placed on all plans.

(8) The sanitary sewer plans must be prepared with the plan view of the sewer lines on the top of the sheet and the profile of the sanitary sewer lines on the bottom of the sheet. When the subdivision's sewer lines exceed 1,500, feet an index plan must be included showing the location of each sheet. The designer shall show other adjacent utilities on the plans and profiles to ascertain that all sewer lines are built in accordance with the Rules and Regulations and that no utility conflicts exist, prior to plan approval.

(9) Plans shall provide all applicable details on the plan sets.

(10) All Plans must be submitted in accordance with minimum Plan requirements of Township's Subdivision and Land Development Ordinance, Article 4.

PART V
FINANCIAL REQUIREMENT FOR SUBDIVISION PLANS

The Developer shall furnish financial security in accordance with the procedures set forth in Act 247 (the Pennsylvania Municipalities Code P.L. 805, July 31, 1968) as reenacted and amended by Act 170 (P.L. 1329, December 21, 1988). Specifically, the Developer shall post financial security to insure the completion, (in accordance with the approved construction plans, and with the Rules and Regulations of the Authority) of any sanitary sewer lines and related apparatus and facilities, required to be installed by or on behalf of a developer pursuant to approved land development or subdivision plans. If financial security is required by the Authority, and without limitation as to other types of financial security which the Authority may approve, which approval shall not be unreasonably withheld, Federal or Commonwealth chartered lending institution irrevocable letters of credit shall be posted with a bonding company or Federal or Commonwealth chartered lending institution chosen by the party posting the financial security, if the bonding company or lending institution is authorized to conduct such business within the Commonwealth. Such security shall provide for, and secure to the Authority, the completion of any improvements, which may be required within one (1) year from the date of posting of the security. The amount of financial security shall be equal to one hundred ten percent (110%) of the cost of the required improvements for which financial security is to be posted.

The amount of financial security required shall be based upon an estimate of the cost of completion of the required improvements, submitted by an applicant or developer and prepared by the required improvements, submitted by and applicant or developer and prepared by a professional engineer licensed as such in this Commonwealth and certified by such engineer to be a fair and reasonable estimate of such cost at Prevailing Wage, if applicable. The Authority upon the recommendation of the Authority Engineer may refuse to accept such estimate for good cause shown. If the applicant or developer and the municipality are unable to agree upon an estimate, then the estimate shall be recalculated and recertified by another professional engineer licensed as such in this Commonwealth and chosen mutually by the municipality and the applicant or developer. The estimate certified by the third engineer shall be presumed fair and reasonable and shall be the final estimate. In the event that a third engineer is so chosen, fees for the services of said engineer shall be paid equally by the Authority and the applicant or developer.

If the party posting the financial security requires more than one (1) year from the date of posting of such financial security to complete the required improvements the amount of financial security may be increased by an anniversary date from the posting of financial security or to one hundred ten percent (110%) of the cost of completing the required improvements re-established on or about the expiration of the preceding one (1) year period by using the above bidding procedure.

As the work of installing the required improvements proceeds, the party posting the financial security may request the Authority to release or authorize the release, from time to time, such portions of the financial security necessary for payment to the contractor or contractors performing the work. Any such requests shall be in writing addressed to the Authority, and Authority shall have forty-five (45) days from receipt of such request within which time to allow

the Authority Engineer to certify, in writing, to the Authority that such portion of the work upon the improvements has been completed in accordance with the approved plat. Upon such certification, the Authority shall authorize release by the bonding company or lending institution of an amount as estimated by the Authority Engineer fairly representing value of the improvements completed or, if the Authority fails to act within said forty-five (45) day period, the Authority shall be deemed to have approved the release of funds as requested. The Authority may, prior to final release at the time of completion and certification by its Engineer, require retention of ten percent (10%) of the estimated cost of the aforesaid improvement.

After all of the Improvements have been installed, inspected, and meets the Authority's satisfaction, where the Authority will accept dedication of all of the required improvements following completion, the Authority will require the posting of financial security to secure structural integrity of the Authority's Rules and Regulations for a term not to exceed eighteen (18) months from the date of acceptance of dedication. Said financial security shall be of the same type as set forth in this clause with regard to installation of improvements, and the amount of financial security shall not exceed fifteen percent (15%) of the actual cost of installation of said improvements. The Authority may accept fifteen percent (15%) of the original estimate of cost if the applicant requested this method.

PART VI
DEED OF EASEMENT AND AGREEMENTS FOR SEWERS

The individual, builder or developer shall arrange and pay for a 30' permanent easement, and record the same with the County Recorder of Deeds in the name of the Authority. Easement plans and deed description as recorded, shall be submitted to the Authority for their permanent record with a notation as to the date and/or deed book instrument number in which recorded. All Deed of Easements shall contain the following clause: "the Grantor does hereby covenant and agree that they will not erect or permit the erection of any building or plant any trees or shrubs on the right-of-way or perform any excavation work including, but not limited to, anchoring, augering, backfilling, blasting, digging, ditching, drilling, driving-in, grading, plowing-in, pulling-in, ripping, scraping, trenching and tunneling; after the execution and delivery of this Agreement which will endanger or interfere with the operation of the said sewer line or lines of the Authority." Easements that shall be conveyed to this Authority shall provide for a thirty foot (30') permanent easement, the centerline of which shall be the location of the collection line, with a full fifteen feet (15') right-of-way available on both sides of the sewer line. All such easements shall be obtained in advance of commencement of construction and shall be free and clear of all liens and encumbrances including mortgages. The easement shall be reviewed and approved by the Solicitor of the Authority.

Developer must present a Title Search to the Authority performed by a Title Search company certifying that the Title is free and clear as set forth above.

When a Developer wishes to construct and/or connect a sewerage system within the Municipality comprising the service area of Monroe Township Municipal Authority, there shall be required an Agreement binding the developer and Authority to certain terms and/or conditions relative to the proposed project. The Authority and the Municipality (typically Monroe Township) within, which the project is located, shall determine the need for and/or terms and/or conditions of such an Agreement.

All sewer facilities must be centered in the easement for the facilities. Should the Authority need to work upon or maintain their sewer infrastructure, any damage to surface improvements (paving, curbing, etc.) will be the responsibility of the property owners in areas where improvements exist in the sewer easement. The presence of trees, perennial shrubs, temporary structures, buildings, sheds, recreational or playground equipment on Authority easements is forbidden.

PART VII
PUMPING STATIONS/GRINDER PUMPS

Should the proposed project contain either a pumping station or a treatment facility, the Authority shall have final approval (subject to PADEP approval, rules and regulations, etc.) with regard to all aspects of the pumping station or treatment facility, including but not limited to location, size, capacity, type, nature of power supply (3-phase mandated), specifications, method, cost of operation and etc. Monroe Township Municipal Authority must accept dedication of a Pump Station associated with an approved Subdivision or Land Development prior to any public connections to the facilities. The developer is responsible for all costs associated with this facilities operation and maintenance until fifty percent (50%) of proposed connections are made to facilities.

Should the proposed project consist of a low pressure system, the developer, at the time of submitting the subdivision plans, will utilize Environmental One Grinder Pumps. Upon approval from the Authority, all lots in the subdivision must utilize the E-One grinder pump unit that was approved when the subdivision plans were submitted. There will be no intermixing of grinder pumps. Furthermore, when a developer extends or constructs a new line to service private property or development, and this line goes past any existing homes serviced by On Lot Disposal Systems (OLDS), it will be at the Monroe Township Municipal Authority or Board of Supervisors' discretion whether or not these individuals will be compelled to connect. The developer shall provide connection to the Right-of-Way or easement with termination with a service valve to facilitate these future connection. If a grinder pump is necessary in these cases, it will be at the property owners' sole expense and responsibility. The Monroe Township Municipal Authority will not furnish grinder pumps or any other apparatus to any property owners in these cases regardless whether these connections are voluntary or mandated.

PART VIII
INSPECTION

The cost of any State, Municipal or other permits and inspection fees shall be borne by the individual, builder, or developer. Applicable Federal, State, and Municipal Rules and Regulations regarding construction within public streets and roads shall be strictly adhered to. Upon receipt of the necessary permits and approvals, the recording of necessary easements, and/or rights-of-way, in favor of the Authority, the filing of the appropriate lien releases, and upon seventy-two (72) hours notice, the construction of the sewer facility may commence at the expense of the developer.

An Authority representative will be present to inspect construction, at an established hourly rate, which will be determined on an annual basis. It will be the developer's responsibility to contact the Authority to obtain the hourly rate. In the event an Authority Representative is unavailable, then the Authority Engineer will be present to inspect the construction and the developer will be billed at the Authority Engineer's hourly rate.

Posting of escrow by developer, owner and applicant in the amount of four percent (4%) of the bonded amount of improvements must be established with the Authority prior to recording plan to cover construction inspection services as may be required for the project.

Building sewers construction must be inspected by the Township’s building codes official per building code requirements and lateral construction must be inspected by an Authority representative based on these Rules and Regulations. No building sewer connections can be made until sewer lines have been tested and approved by respective representative.

PART IX
DEDICATION AND ACCEPTANCE OF FACILITIES

Any extension of a public sewer shall, after final inspection and approval by Authority Engineer and the completion of the total area to be served, as specified by approved plans, shall be offered to the Authority by a Deed of Dedication, free of all liens and encumbrances, complete with any and all easements, rights-of-way, and land ownership deemed necessary and appropriate by the Authority. The extension shall also be accompanied by a Maintenance Agreement and required financial security as provided under financial requirements herein, for a period of eighteen (18) months from the time the Authority formally accepts dedication of such lines. In addition, the Authority must be furnished with approved "as-built" drawings consisting of four (4) sets of prints.

Any permits for such extensions shall be made in the name of the Authority. Any permits obtained for the extension must be approved or "closed out" by the corresponding permitting agency prior to acceptance of dedication.

All construction, engineering, and legal expenses associated with the extension, including engineering, legal, construction inspection, costs of dedication and connection expenses, of the Authority applicant shall be borne by the applicant, prior to the Authority accepting dedication of system.

All easements must be identified by metes and bounds on final subdivision and land development plans and as-built drawings.

"As Built" Plans must be submitted in same form as plans approved for construction with elements (length, slope invert elevations, locations of facilities) that changed illustrated, with single line through design information and as built information added next to original information.

"As Built" submission shall include two (2) sets of paper plans and DVD of each plan in PDF format.

All gravity sewer lines offered for dedication must be video inspected by NASSCO Certified Third Party Contractor to provide DVD record of lines to be dedicated to MTMA. The DVD recording will be accompanied by a written report noting the footage of system inspected, any sewer connections encountered with proper location, and any defects observed must also be included. All lines must be clean and free of defects before accepted for dedication.

No building sewer connections will be permitted by the Authority until the following items are complete:

1. Any permits for project are "closed out", as related to sewer construction (i.e. PennDOT permit for sewers).

2. The Deed of Dedication of Easements for facilities have been recorded.

3. “As-Built” Plans have been approved by Authority Engineer.

4. Facilities are inspected and tested in accordance with these regulations.

PART X
EXTENSIONS OF MAINLINES

1. SPECIFIC DETERMINATIONS:

Requests for service shall first be reviewed to determine if there is any possibility of service to future development either up-slope or between the specific location of the structure to be serviced by the request for service and the present termination of the collection line.

A. Where such review reveals no justification or possible additional up-slope service, the request may be considered utilizing the Regulations and policies associated with a six (6) inch service line.

B. Where the review reveals the possibility of service either up-slope or between the location of the structure to be serviced, and the present termination of the collection line, either of two possible considerations shall be pursued:

1. When a property to be serviced by an applicant's request for service is located immediately adjacent to the last property serviced by the present limits of the collection line, the applicant shall extend the public collection line from its present termination, at the direction of the Authority, to a point ten (10) feet past the applicant's property line. Should such extension be made on private property instead of within the road right-of-way/easement, the Applicant shall convey to the Authority sufficient additional easement to enable further extension to the next up-slope property. The Applicant shall obtain any and all necessary easements and rights-of-way and convey same to the Authority prior to commencing construction.

2. The Authority shall determine if any extension of the collection line is feasible with regard to the subdivision and/or land development associated with the request for service to the Authority.

PART XI
CAPITAL FEES/SEWER PERMIT APPLICATION

CAPITAL FEES:

A. TAPPING FEE, COLLECTION PART:

It is the position and policy of the Monroe Township Municipal Authority that if an individual, builder, or developer constructs AT HIS SOLE EXPENSE, a sewage collection line or system (including service laterals) to service buildings, lots or parcels of land to be developed, whether or not such lines, or systems are dedicated to the Authority, there shall be a tapping fee, (collection part) required for the facilities thus serviced, unless sewer service is extended directly into another municipalities system.

B. TAPPING FEE, CAPACITY PART:

It is the position and policy of the Monroe Township Municipal Authority to charge all individuals, builders, and/or developers a capacity component of the Tapping Fee, upon connection of a building, lot, or other facilities to the Authority's system. This Tapping Fee, (Capacity Part), is for the cost of capacity related facilities including, but not limited to, treatment, pumping stations, interceptor mains, meter chambers and sludge disposal, etc., pursuant to most current Act 57 Calculations.

For purposes of administration, the Tapping Fee, Capacity Part, shall be made for each Equivalent Dwelling Unit (E.D.U.) or part thereof, proposed for connection to the Authority's system. For purposes of definition, an E.D.U. shall be as follows:

1. Residential Connection:

    a. Each single family residence (1 EDU).

    b. Each apartment, condominium, townhouse, or living unit contained within or under a common roof of an individual or separate building (1 EDU).

    c. Miscellaneous uses are defined by Resolution Annually for user’s fees.

2. Non Residential (Commercial, Industrial, or Institutional) Connection:

    a. The initial determination of the number of EDU’s shall be based upon information provided by the applicant. Such information shall be reasonably accurate, and if found to be in error by more than ten percent (10%), the Authority shall have the right to make suitable upward adjustments in all applicable fees. No refunds, however, shall be available

for any decrease in estimated E.D.U. consumption of sewerage capacity. The Authority's present method of computing EDU's is based upon current Act 57 Calculations of flow with an average strength of 200 milligrams per liter of Biochemical Oxygen Demand (BOD) and 240 milligrams per liter of suspended solids for each unit.

b. The daily EDU rate for non-residential uses will be calculated as follows:

$$\frac{\text{Daily Flow (gallons per day)}}{\text{Act 57 gallons/EDU}} = \text{Number of EDU's per day}$$

Example: Daily flow rate of 325 gallons per day (assume Act 57 EDU=225 gpd/EDU)

$$\frac{325\text{gpd}}{225\text{ gpd./EDU}} = 1.44\text{ EDU's}$$

3. Changes in Use:

If an applicant shall change the intensity of use of the Authority's system by direct, or indirect action such as sale of and change in use or expansion of use of the connected property to the Authority's system, the Authority shall have the right of adjusting the computation of the number of EDUs connected to the system and charge additional capital fees in accordance with the method of computation in effect at the time of the change in intensity of use. No rebates of previously paid fees shall be made by the Authority.

C. SEWER PERMIT APPLICATION

Any person requiring or desiring to connect to an existing sanitary sewer system, operated by the Monroe Township Municipal Authority, or private system connecting to the Authority's system, shall secure an application and permit from the Authority. The existing/ proposed dwelling must have a sewer permit as a part of acquiring building permit issued by the Township prior to installing sewers. No building sewers may be connected to Authority sewers until the Authority sewer has been dedicated to the Authority by the Owner/Developer. Applications and permits shall be of two (2) types: Residential and Non-Residential. All paperwork must be completed; and all applicable Capital Fees must be paid, prior to issuance of permit. Contractor/Plumbers are required to provide the Authority with a minimum of 72 hours notice, prior to starting work.

PART XII
MAINTENANCE

A. SEWERS AND LATERALS:

The Owner of an Improved Property shall be responsible for the operation and maintenance of their building sewer.

In the case of a low pressure sewer system, the Owner of the improved property shall also be responsible for the operation, maintenance, and repair of the grinder pump and its appurtenances, within the limits of the building sewers.

The Authority shall be responsible for the operation, maintenance, and repair, of the Authority lateral and the Authority sewer.

In the event that a property owner installs a driveway or other impervious surface over an existing lateral or proposes to install a new lateral within an existing or proposed driveway or other impervious surface, the property owner will be responsible for any surface repairs (paving) needed due to the Authority's maintenance or repair of Authority's lateral.

Should the Building Sewer, or any portion of the service piping between the structure (or structures) being serviced and the lateral or system of the Authority become non-functional (partially or completely including blockages, leakage, failure of pipe material, or in any manner not complying with the requirements of the Townships building code with regard to the intended function of such sewer), the Owner shall perform or have performed such remedial measures necessary to restore the Building Sewer; and where appropriate, to restore the service piping, and/or Building Sewer, to a condition meeting the requirements of the Townships building code. Corrective action shall be accomplished by the Owner within sixty (60) days after written notice of the deficiency to the Owner of the Improved Property. If remedial repair or restoration shall not be performed by the Owner within sixty (60) days, the Authority may enter upon the property of the Owner, perform or cause to be performed (through private contractors or otherwise), the corrective measures, and shall bill the Owner of all costs (including inspection fees, engineering fees, attorney fees, and overhead of the Authority incident thereto). The Authority, after performing said remedial measures, shall bill the Owner for all aforementioned costs associated with the corrective work. The Authority or Township, after performing said remedial measurers, shall collect from the Owner, all costs and expenses, thereof by a Municipal claim or an action at law or such other legal proceedings as may be permitted by law.

Should the Owner of an improved property desire, or be required to uncover a Building Sewer, or should the Owner desire to change the alignment grade and/or extent of service of an existing Building Sewer for whatever reason, the Owner shall obtain a permit to

make such changes from the Authority, and upon the granting of approval for the requested changes, shall pay the inspection fee of approval for the requested changes, shall pay the current inspection fee, established by the Authority. Any such changes shall be in accordance with the Rules, Regulations, and Specifications in effect at the time of proposed change. No Building Sewer or Lateral shall be covered or uncovered without inspection or approval by the Authority or Township as appropriate.

B. METERS:

The Authority shall give notice to any users if meters are not in order, or in disrepair, to repair said meter within thirty (30) days. Upon the passage of thirty (30) days without said repair, the Authority shall be empowered to enter onto the premises, make the necessary repairs, and charge any and all costs or charges to the user.

SITE WORK

SECTION 02100
CLEARING AND GRUBBING

PART 1 GENERAL

1.01 Description

A. The work of this section includes but is not limited to clearing, grubbing, stripping and stockpiling of top soil plus debris disposal.

1.02 Submittals

A. Permits for Disposal of Debris:

Arrange for the disposal of debris resulting from clearing and grubbing to locations outside the Authority's Right-of-Way and obtain written agreements with the owners of the property where the debris will be deposited.

Submit two copies of the agreement with each property owner releasing the Authority from responsibility in connection with the disposal of the debris.

PART 2 EXECUTION

2.01 Preparation

A. Protect benchmarks, utilities, and other features designated for preservation with temporary fencing or barricades.

2.02 Clearing

A. Confine clearing to within the limits of the right-of-way or easement.

B. Remove trees in a manner that will avoid damage to trees adjacent to work, easement, or right-of-way.

2.03 Grubbing

A. Grub areas within the construction limits to remove stumps, roots and other objectionable material to a minimum depth of 8".

2.04 Stripping and Stockpiling Topsoil

A. Strip topsoil to whatever depth it may occur from areas to be excavated, filled, or graded and stockpile for use in finish grading. Do not use topsoil as backfill or remove it from the project site.

2.05 Debris Disposal

A. Remove from the project site and legally dispose of all trees, logs, branches, brush, stumps, and other debris resulting from clearing and grubbing operations. Do not bury debris on site.

2.06 Restoration

Restore any damage to original condition.

END OF SECTION

SECTION 02221
TRENCHING, PIPE LAYING, BACKFILLING AND COMPACTING

PART 1 GENERAL

1.01 Description

A. The work of this Section includes, but is not limited to:

Trench Excavation, Backfill and Compaction: Pipe bedding requirements; rough grading; restoration of unpaved surfaces.

B. Applicable Standard Details:

SD-12 Standard Lateral/Building Sewer
SD-17 Typical Pipe Trench (Gravity)
SD-18 Pressure Trench and Bedding
SD-19 Permanent Pavement Trench
SD-22 Township Road Pavement Restoration

C. Applicable Rules and Regulations:

1. Monroe Township Municipal Authority requires two (2) working days notice before starting any work.

2. State Roads - All work within state road and Right-of-Ways shall meet PennDOT Rules and Regulations.

3. Township Roads - All work within Township Roads and Right-of-Ways shall meet Monroe Township Rules and Regulations.

1.02 Quality Assurance

A. Referenced Standards:

1. Pennsylvania Department of Transportation (PennDOT):

a. Regulations Governing Occupancy of Highways by Utilities 67 PA Code, Chapter 459)

b. PennDOT Publication 408 Specifications, latest edition

c. PennDOT Publication 203, Work Zone Traffic Control, latest edition

2. American Society for Testing and Materials (ASTM):

a. D698 - Tests for Moisture-Density Relations of Soils

b. D1556 - Test for Density of Soil-In-Place by the Sand-Cone Method

c. D2992 - Test for Density of Soil and Soil Aggregate in Place by Nuclear Methods

B. Testing Agency:

Compaction testing shall be performed by a Soils Testing Laboratory engaged and paid for by the Contractor and approved by the Authority's Representative.

C. Compaction Testing:

Contractor shall conduct one compaction test for each 500 linear feet of pipelines, or fraction thereof. Contractor shall conduct compaction tests at locations as directed by the Authority's Representative and/or Engineer during backfilling operations. Contractor shall conduct additional compaction tests as necessary and noted on approval drawings when pipe installation occurs in fill areas.

1.03 Submittals

A. Certificates:

Contractor shall submit certification from aggregate producers attesting that the composition analysis of pipe bedding and stone backfill materials meet specification requirements.

Contractor shall submit soils laboratory certified compaction testing reports to both Authority and Authority Engineer.

1.04 Job Conditions

A. Control of Traffic:

Contractor shall employ traffic control measures in accordance with Pennsylvania Department of Transportation Publication 203 "Work Zone Traffic Control". Contractor shall maintain

copies of applicable highway occupancy permits at the job site during the course of the work.

B. Materials and Equipment Storage:

Contractor shall confine construction equipment, the storage of materials and equipment, and operations of workmen to within the permanent and temporary rights-of-way. Contractor shall not restrict public access or infringe on private property.

C. Protection of Existing Utilities and Structures:

Contractor shall take all precautions and utilize all facilities required to protect existing utilities and structures. The Contractor shall comply with all Pennsylvania One Call and utility notification requirements, including Act 287 of the General Assembly of Pennsylvania, advising each Utility at least three (3) working days in advance of job locations, intent to excavate, do demolition work or use explosives. Contractor shall coordinate all work with applicable utilities.

Contractor shall immediately report to the affected Utility and Authority's Representative and Engineer, any apparent break, leak or other damage or irregularity made or discovered during the work. Contractor shall further notify and immediately alert the occupants of affected premises of any emergency created or discovered.

Contractor shall allow free access to rights-of-ways and easements to allow Utility personnel to access infrastructure for maintenance, repair and inspection, etc.

D. Cleaning Up:

Contractor shall continuously keep rights-of-way, easements, storage areas, streets, roads, highways and adjacent properties free from accumulations of waste materials, excess excavation, rubbish and windblown debris resulting from construction operations.

Where daily work remains in progress, Contractor shall provide daily broom cleaning and/or water cleaning paved surfaces, as well as removal of surplus materials, tools, construction equipment and machinery as each work area is completed. Contractor shall provide adequate temporary paving during the period prior to permanent paving in paved areas.

PART 2 TRENCH EXCAVATION GRAVITY SEWERLINES

A. Depth of Excavation:

Gravity Sewers:

All gravity sewer lines shall have a minimum of four (4) feet of cover over the top of the pipe. Contractor shall excavate trenches to the depth and grade shown on the Authority approved construction drawings for the invert of the pipe plus that excavation necessary for placement of pipe bedding material as per details.

Excavation for laterals shall provide a straight uniform grade from the main pipeline to the elevation at the right-of-way line, plus that excavation necessary for placement of pipe bedding material.

Where unsuitable bearing material is encountered in the trench bottom, Contractor shall continue excavation until the unsuitable material is removed, solid bearing is obtained or can be established, or concrete cradle can be placed. If no concrete cradle is to be installed, refill the trench to required pipeline grade with pipe bedding material.

Where rock is encountered in the trench bottom, Contractor shall remove the rock to depth of 6" below design trench bottom and backfill to the required pipeline grade with pipe bedding material.

Where the Contractor, by error or intent, excavates beyond the minimum required depth, Contractor shall backfill and compact the trench to the required pipeline grade with pipe bedding material.

B. Width of Excavation:

Contractor shall excavate trenches, including laterals, to a width necessary for placement and assembly of the pipe. Contractor shall shape trench walls vertical from trench bottom to at least 24" above the top of the pipe.

C. Length of Open Trench:

Contractor shall not advance trenching operations more than two hundred feet (200') ahead of completed pipeline. No more than ten (10') of trench shall be left open at the end of any work day, unless authorized by the Authority's Representative.

PART 3 LAYING GRAVITY SEWER

3.01 Laying Pipe in Trenches

A. Contractor shall use laser alignment instruments between adjoining manholes during pipe laying operations.

3.02 Wye Branches and Tees

A. Contractor shall install wye branches at locations indicated on the approved construction drawings concurrently with pipe laying operations. Use standard fittings of the same material and joint type as the pipeline into which they are installed.

B. For taps into existing pipe, Contractor shall cut the sewer line and install a wye, using SDR 35 PVC fittings (with proper lubricated gaskets). The Contractor shall provide bypass pumping as necessary to assure that the sewer continues to operate during construction.

The use of fittings, couplings and saddles that require metallic bands and clamping devices will not be permitted by the Authority, unless a special exception is granted for some reason. Under such special conditions, the Authority mandates the use of cathodic protection (such as zinc caps or magnesium anodes) on all metallic fasteners.

3.03 Additional Provisions

A. Horizontal Separation:

Sewers, including manholes, shall be separated at least 10 feet, horizontally, from any existing or proposed water mains. Should conditions prevent a horizontal separation of 10 feet, a sewer may be closer than 10 feet to a water main if:

a. It is laid in a separate trench; and

b. The elevation of the top (crown) of the sewer is at least 18 inches below the bottom of the bottom (invert) of the water line.

B. Vertical Separation:

Whenever sewers cross under water mains, the top of the sewer shall be at least 18 inches below the bottom of the water main. When the elevation of the sewer cannot be varied to provide the required 18 inches vertical separation, relocate the water main, for a distance of 10 feet extending on each side of the

sewer, with one full length of water main centered over the sewer so that both joints will be as far from the sewer as possible.

Sewers shall be constructed of SDR35 PVC or Class 52 Ductile Iron with slip-on gasket type joints. The Contractor shall not mandrel test, pressure-test sewer or vacuum-test manholes prior to backfilling.

The Contractor shall not install sewers of any kind above potable water lines. The Contractor shall not install water line appurtenances, such as valves, hydrants etc. in close proximity (10 feet) of a sewer line of any kind.

C. Special Conditions:

Where it is impossible to obtain proper horizontal and vertical separation as specified, Contractor shall construct the pipelines as specified above and, in addition, encase the sewer line with a minimum of 6 inches of concrete 10 feet beyond either side of the water main.

3.04 Dewatering

A. The Contractor shall keep excavations and general work areas relatively free of water in accordance with local, County and Commonwealth law, rules and regulations.

B. The Contractor shall not utilize a sewer or allow customers to utilize a sewer until all work and inspections have been satisfactorily completed.

3.05 Pipe Bedding Requirements

A. The type of bedding utilized shall provide the required pipe support for the soil and load conditions encountered. The Contractor shall provide the type of pipe bedding as indicated on approved Standard Details for various types of trench restorations, including paved areas in Township and State highway Rights-of-Ways.

3.06 Cold Weather Curing

A. Poured concrete used for sewers, including manhole bases, thrust blocks etc. shall be maintained at 50°F or above for at least seven (7) days.

3.07 Cradles and Encasement

A. Contractor shall provide concrete cradles and encasement for pipeline where indicated on approved construction drawings in accordance with Standard Detail SD-20.

3.08 Stream Crossing

A. The Contractor shall construct sanitary sewer pipeline stream crossings in accordance with local, County, and Commonwealth guidelines and permits, as well as Standard Details.

B. Contractor shall encase sewers with minimum 6" of concrete between the limits of the stream crossing.

C. Contractor shall not backfill until concrete has achieved its initial set strength.

PART 4 BACKFILLING - GRAVITY SEWERS

4.01 General

A. After pipe installation and inspection, Contractor shall backfill trenches with specified backfill material deposited in 8" layers, with each layer thoroughly and carefully compacted by mechanical tampers to minimum 90% of the maximum dry weight density (Proctor).

B. Contractor shall backfill trenches in State Highway Rights-of-Way as specified in applicable PennDOT Highway Occupancy Permit. Contractor shall satisfy Monroe Township roads and highway requirements within all Township rights-of-way.

C. Exposed Joints for Testing:

The Contractor has the option to test the pipe prior to backfilling the trench. If this option is selected, install reaction blocks where required, per Detail SD-33, 34 and 35, and place 24" of thoroughly compacted backfill over the pipe leaving pipe joints partially exposed.

D. Un-compacted Backfill:

Where un-compacted backfill is indicated on approved construction drawings, Contractor shall backfill the trench from one foot above the pipe to the top of the trench with material excavated from the trench, crowned over the trench to a

sufficient height to allow for settlement to grade after consolidation.

E. Unsuitable Backfill Material:

Where the Authority's Representative deems backfill material to be unsuitable and rejects all or part thereof due to conditions prevailing at the time of construction, the Contractor shall remove the unsuitable material and replace with select material stone backfill or suitable foreign backfill material.

F. Disposal of Excavated Material

The Contractor shall lawfully remove and dispose of excavated material remaining after completion of backfilling.

G. Rough Grading

1. The Contractor shall provide rough-grading of areas disturbed by construction activities to a uniform finish within 72 hours of backfilling. Rough grading activity includes but is not limited to the forming of bases for terraces, banks, lawns and paved areas.

2. The Contractor shall grade areas to be paved to depths required for placing sub-base and paving materials. The Contractor shall rough grade areas to be seeded 3" below finish contours.

H. Restoration of Unpaved Surfaces

1. The Contractor shall restore unpaved surfaces disturbed by construction to equal or better than the condition prior to construction.

2. The Contractor shall restore grassed areas in accordance with Section 02485, Finish Grading and Seeding.

END OF SECTION

SECTION 02485
FINISH GRADING AND SEEDING

PART 1 GENERAL

1.01 Description

A. This work shall consist of furnishing, spreading, fine grading, raking and otherwise preparing of topsoil and furnishing and placing of grass seed and soil supplements on the prepared seed bed on all disturbed areas proposed for lawn and grass restoration. Lawn seeding treatment shall be applied to all unpaved areas disturbed by construction operations.

1.02 Reference Standards

A. The materials and performance of the work of this Section shall comply with the requirements of those industry standards hereinafter mentioned and the applicable provision of Pennsylvania Department of Transportation Specifications, Publication 408 and all applicable amendments and updates, and detailed Specifications outlined herein.

PART 2 MATERIALS

2.01 Materials

A. The materials in these Specifications shall be obtained from a dealer or manufacturer whose product is shown by analysis to fulfill the warranty claimed by the producer. All materials shall be subject at any time and at any place to the inspection and approval of the Authority. Samples of all materials are required by the Authority. Upon approval of samples, delivery of material may begin. Approved samples shall be stored on site and protected until furnishing of materials is complete.

2.02 Topsoil

A. Topsoil shall be as stockpiled for reuse in finish grading. If quality or quantity of topsoil is insufficient, new or additional topsoil shall be provided to complete work.

B. If new topsoil is required, obtain topsoil from local sources or from areas having similar soil characteristics to that at the project site. Topsoil must be obtained only from naturally, well drained sites where topsoil occurs in a depth of not less

than 4". The Contractor shall not obtain topsoil from wetlands, bogs or marshes, etc. All topsoil shall be friable. Topsoil shall not contain unsuitable stones (>0.5" any dimension), any subsoil, clay lumps, brush, roots trash, debris, or other plant material, or toxic matter that is harmful to plant growth. Topsoil shall meet PennDOT Form 408 Specifications, section 802.

2.03 Soil Supplements

A. Pulverized limestone shall meet the requirements of the latest Commonwealth of Pennsylvania Specifications L-36 for Group 1, Class B, Type MO.

B. All fertilizers shall conform to the requirements of the Pennsylvania Fertilizer Law of 1956, P.L. 1795 and be in accordance with PennDOT Form 408, Section 804.

C. Commercial fertilizers shall be 10-10-10 or 0-10-02-or as specified. Chemical analysis shall be guaranteed and clearly shown on each bag. Fertilizer for use in hydraulic seeders shall be in pellet or granular form highly soluble in water and shall, in addition, contain one percent (1%) magnesium oxide and five (5) pounds of borate per ton. The derivation of fertilizer elements shall be as follows:

Nitrogen . . .	Ammonium Sulfate, Ammonium Nitrate, or Ammonium Phosphate
Phosphorus . . .	Phosphoric Acid, Calcium Phosphate, Ammonium Phosphate
Potassium . . .	Muriate of Potash

D. Liquid formulations may be used in lieu of dry formulations provided that the formulations are provided in a 1-2-2 ratio.

2.04 Seed

A. All seeds, as specified, shall conform to the Pennsylvania Seed Act of 1965, as amended and regulations of the Pennsylvania Department of Agriculture, Bureau of Plant Industry and be in accordance with PennDOT Publication 408 Specifications, Section 804. The percentage of pure seed present shall represent the freedom of such agriculture seeds from inert matter and from other seeds distinguishable by their appearance. The percentage of germination shown shall be actual sprouts, and shall not include "hard seeds" unless specifically permitted. All seeds proposed under this item shall

be subject to analysis test by the Commonwealth of Pennsylvania, Department of Agriculture, Bureau of Plant Industry, and shall meet these Specifications. No seed shall be accepted with a date of test of more than six (6) months prior to the date of sowing and shall be of the most recent crop.

2.05 Mulching

A. Mulch shall be hay or straw in accordance with PennDOT Publication 408, Section 805.2a and secured with Emulsified Asphalt in accordance with Section 805 2.B.

PART 3 EXECUTION

3.01 Topsoil

A. After the areas to receive top soil have been brought to sub-grade, and immediately prior to dumping and spreading of the topsoil, the subgrade shall be loosened by scarifying and disking to a minimum depth of 4" to permit bonding of the topsoil to the subsoil.

B. The topsoil shall be spread on the areas to be seeded, to give a final settled topsoil depth of at least 4". Topsoil shall be as specified. Final grading shall be to such tolerances that will allow the cutting of the lawn areas by normal tractor drawn moving equipment (such as gang mowers) without damage to the turf and without any water ponds or puddles. Any irregularities in the surface resulting from top soil applications or other operations shall be corrected in order to prevent the formation of depressions or water pockets. Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed seeding.

C. Prior to application of seed, the Owner shall, at his expense, satisfy the Authority, if requested, by random test holes, that the 4" minimum compacted thickness topsoil is on the site.

D. After the topsoil has been spread and final grades approved, it shall be cleared of all grade stakes, surface trash, and other objects that would hinder maintenance of seeded and planted areas. The Owner shall machine rake or hand rake in small confined areas, all areas to be seeded to provide a seed bed ready for liming, fertilizing, and seeding.

3.02 Seeding

A. General

Areas to be seeded shall include areas specified excluding areas to be paved or occupied by structures. In addition, all other areas in which the existing turf has been disturbed by the Owner's operations shall be seeded. All areas in which the existing turf has not been disturbed but which is indicated as being in the limit of site work shall be bush-hogged, mowed, or otherwise cleared, and limed, fertilized, and over-seeded at 1/2 the rate specified for new seeding.

B. Temporary seeding activity can be conducted at any time. Permanent seeding activity shall be conducted only between March 1st- June 15th, and August 15th – October 15th, unless irrigation is provided.

C. Prior to seeding, all areas shall be brought to proper finished grades and, if necessary, previously graded areas shall be repaired.

3.03 Site Preparation (All Types Cover)

A. The Contractor shall install all applicable surface water and erosion control facilities as required by local, County and State law, rules and regulations.

B. The Contractor shall perform all agricultural operations at right angles to the slope, initiating contour-type method.

C. The Contractor shall smooth and firm seed bed with culti-packer or other similar equipment.

D. The Contractor shall select applicable seed mixtures and corresponding rates of seeding from an approved Authority listing.

E. Specifications:

1. All areas to be final covered and final graded before application of permanent type seeding.

2. Temporary cover shall be administered on areas remaining untouched for one month or more.

3. Erosion control facilities and swale detention areas shall be administered a mixture of temporary and permanent cover upon installation.

3.04 Establishment (All Type Cover)

A. The Contractor shall apply lime fertilizer, and seed uniformly at the rates shown by means of dropping, drilling, broadcasting or hydraulic application. (Hydraulic application is recommended for use on applicable erosion control facilities and excessive slopes and shall be as stated herein.)

B. Using appropriate equipment, the Contractor shall work lime and/or crushed limestone and fertilizer into the soil to a depth of 4" and cover seed mixture with at least 1/4" of soil.

C. Apply lime at a rate of four (4) tons of ground limestone per acre.

1. Temporary cover, apply two (2) tons of ground limestone per acre (100 lbs., per 1,000 square feet).

2. Apply hydrated lime in accordance with manufacturer's directions, with the written approval of the Authority.

D. Apply fertilizer (0-10-10) at a rate of: Permanent Seeding (200 lbs./1,000 S.Y.); and Temporary Seeding (100 lbs./1,000 S.Y.).

E. Seed according to rates shown.

F. Mulch shall be secured with emulsified asphalt in accordance with PennDOT Section 805.2a and be of the material specified. Mulch shall be applied over temporary and permanent in accordance with PennDOT Form 408, Section 805.3.

3.05 Maintenance

A. All seeded, disturbed areas shall be producing a healthy growth of specified vegetation at least two (2) months after completion of the project. If eroded areas appear, they shall be replanted as per these specifications.

B. All work shall meet the requirements set forth as noted by PennDOT Specifications, the Cumberland County Conservation District or as noted on the plans and specifications.

3.06 Clean-Up

A. In State Highways, Municipal and Private Roads, and improved private property, the Contractor shall "clean up" as the work progresses and shall maintain his construction areas in a "clean" condition until acceptance by the Authority, without regard to who caused the need for "clean up." In unimproved areas, the Contractor shall "clean up" before acceptance of the work by the Authority.

END OF SECTION

SECTION 02575
PAVING RESTORATION

PART 1 GENERAL

1.01 Description

A. All road surfaces, road shoulders, driveways, sidewalks, or curbs which the Owner or Contractor disturbs shall be replaced in the same manner (or better) than the original installation or as specified by the Authority. The Owner shall satisfy himself as to any requirements other than those herein set forth which may affect the type, quality, and manner of workmanship for the restoration of surfaces.

B. The Authority accompanied by the Owner or Contractor, shall make an examination of all surfaces where sewers have been constructed. The Owner shall repair all breakage, settlements, washouts, or other deficiencies that may be attributed to the construction of sewers.

PART 2 MATERIALS

2.01 Materials

A. All materials used in restorations and in replacing paved areas, shoulders, walks, curbs, drains, and gutters, etc. shall be equal to or better than the quality as those in the original construction or as called for in the PennDOT 408 Regulations, latest edition. No material shall be used until approved by the Authority.

PART 3 EXECUTION

3.01 Construction Methods for State Municipal and Private Roads or Paved Areas

A. Temporary Surfacing (PennDOT): After the sewer trenches have been backfilled and properly compacted , the Contractor shall provide (over all areas where existing paving has been removed), temporary paving in accordance with the Pennsylvania Department of Transportation Publication 408 and/or per permit requirements from PennDOT.

B. Temporary Surfacing of Township Private or Paved Areas: Shall be performed in accordance with Township Ordinance 2007-2 and 2007-9 as amended, and/or as depicted on approved plans or contract documents.

C. Permanent Paving for State, Municipal, Private Roads or Other Paved Areas: Shall be performed in accordance with a PennDOT Highway Occupancy Permit for State Roads or in accordance with Township Ordinance's 2007-2 and 2007-9 as amended or as depicted on approved plans or contract documents.

3.02 Restoration of Road Shoulders:

A. Shall be performed in accordance with a PennDOT Highway Occupancy Permit for State Roads or in accordance with Township Ordinance 2007-2 and 2007-9 as amended or as depicted on approved plans or contract documents.

B. If in the opinion of the Township, the shoulders were made of material better than specified above, the Contractor shall repair the shoulder to original materials and appearance. In no case shall the shoulders be made less than as specified above.

3.03 Inspection

A. Final inspection of municipal road surfaces shall be performed by the Authority and/or Township. No such surface shall be considered complete until it has been approved by the Authority and/or Township (as applicable) or PennDOT (as applicable).

B. A final inspection will be held at the completion of the job. All deficiencies noted by the Authority shall be corrected. All permanent sewer trench restoration shall be the responsibility of the Developer for a period of eighteen (18) months from date of acceptance by the Authority.

3.04 State Highway Requirements

A. On State Highways, all repaving, resurfacing, shoulder work, and similar items shall be in accordance with PennDOT's 408, current edition.

END OF SECTION

SANITARY SEWER SYSTEM

SECTION 02601
SANITARY SEWER PIPE (GRAVITY)

PART 1 GENERAL

1.01 Unless otherwise specified, all materials used in the work shall conform to the requirements of the current Specifications of the American Society for Testing Materials, and shall be tested in accordance with the current Specifications or current methods of testing of the American Society for Testing Materials, where Specifications and methods of testing have been adopted, revised, or proposed for such materials. It is understood and agreed that wherever the word "current" is used relative to the Specifications and methods of testing of the American Society for Testing Materials, it refers to the Standard or Tentative Standards of that Society bearing the latest date.

No material shall be used until it has been inspected and approved on the site of the work. When required by the Authority, any or all materials entering into the construction of any work shall be tested by a reputable testing laboratory. Such inspection shall not relieve the Contractor of any of his obligations in this respect, and any defective material or workmanship which may have been passed by the Authority shall be at all times liable to rejection when discovered, until the final completion of the project and expiration of the maintenance bond.

Where a manufacturer's name is used in these Regulations it is used to designate a standard of quality. The use of said manufacturer's name does not eliminate other manufacturer's equipment and materials equally as good and efficient.

PART 2 MATERIALS

2.01 Polyvinyl Chloride (PVC) Pipe and Fittings

Polyvinyl chloride pipe (PVC) shall be rigid, tough corrosion resistant, of the high-strength, low creep type and shall conform in all respects to the dimensions, tolerances and other requirements of the "Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe", of American Society for Testing Materials, ASTM Designations of Group B. Pipe fittings shall be produced from a compound the basic resin of which shall be virgin PVC. The compound shall not contain any reclaimed material whatsoever.

A. PVC Gravity Sewer

PVC Gravity sewer pipe and fittings for use under these specifications shall be SDR 35 with bell and spigot push-on elastomeric ring gasket joints in accordance with ASTM D-2672, D-3212 and F-477.

B. Ductile Iron Pipe:

Ductile Iron Pipe shall be used for all stream crossings, fill areas of installation, railroad crossings and other areas subject to high traffic loadings or high depth of cover loadings. Concrete encased PVC pipe may be used for stream crossing subject to the Authority's Engineers Approval.

Ductile Iron Pipe shall be minimum Class 52 meeting the requirements of ANSI 21.51 and joints shall be push-on or mechanical joint and conform to ANSI A21.11. Fittings shall conform to ANSI A21.10 and ANSI 21.11. Lubricants, glands bolts and nuts shall meet ANSI 21.11.

All Ductile Iron Pipe and fittings shall be cement lined in accordance with AWWA/ANSI - C104/A21.4 and seal coated inside and outside with asphaltic material.

The Authority reserves the right to mandate other piping coatings for ductile iron pipe (such as epoxy), where in the opinion of the Authority, such coatings appear necessary.

Loading Conditions:

The Developers Engineer shall analyze pipe loading conditions and identify on the drawings where stronger pipe is required.

Certificates:

Submit certificates from material suppliers that certify that the materials supplied meet the above requirements.

PART 3 EXECUTION

3.01 Laying Pipe

All sewer pipe shall be laid and maintained to the required lines and grade, with "WYE" branches and openings left for manholes at the required locations. Following the trench preparation, pipe installation shall proceed upgrade from the lower manhole with pipe laid carefully

to lines and grades approved by Authority. Every length or section of pipe shall be carefully inspected by Contractor before installation. Any pipe containing cracks or other defects shall not be used. The Contractor shall exercise extreme care to prevent breakage when the pipe is handled. Joints shall be carefully cleaned before pipes are lowered into trenches. Each section of pipe shall be firmly held in position so that the invert forms a continuous grade with the invert of the pipe previously placed. The interior of all pipe shall be thoroughly cleaned of all foreign matter before being lowered into the trench, and shall be kept clean during laying operations by means of plugs or other approved devices.

Under no conditions shall pipe be installed in water or on subgrade containing frost. No pipe shall be laid when trench conditions are unsuitable for such work. In all cases water shall be kept out of the trench until concrete encasements or supports where used have hardened.

All pipe shall be carefully installed to the lines and grades as shown on the project Drawings, without offset or unevenness at the joints. Line and grade shall be set utilizing a laser with appurtenances.
Walking or working on the completed pipeline except as may be necessary in tamping or backfilling will not be permitted until the trench has been backfilled to a height of two feet (2') over the top of the pipes.

Any pipe that has its grade or joint disturbed shall be taken up and laid again. Any section of pipe already laid and found to be defective shall be replaced with new pipe without expense to the Authority.

Satisfactory means shall be used to hold the pipe in line while the pipes are being joined, and due precaution shall be taken to insure that the pipe being laid is pushed into the joint of the preceding pipe as outlined by recommendations of pipe manufacturer. An approved hoisting lift and hook shall be used to lower pipe into the trench.

Defects in alignment of the pipe as a result of settlement and other causes shall be replaced by the Contractor at no expense to the Authority.

In applying the lubricant to the pipe joints, no admixtures of any kind shall be added. The lubricant shall be used in strict accord with the Manufacturer's directions. Proper precautions shall be taken to prevent water, mud, or other foreign substances from coming into contact with the lubricant during jointing operations. All pipe joints must be dry when the lubricant is applied.

Previous to being lowered into the trench, each pipe shall be carefully inspected by Contractor and those not meeting the specified requirements shall be immediately removed from the work site.

No pipe shall be laid within ten feet (10') of the machine excavating the trench nor within twenty-five feet (25') of any place where blasting is being performed. In all cases the opening of the pipe shall be provided with a stopper or plug carefully fitted to the pipe to prevent all earth or other substances from entering the pipe. In rock excavating the pipe shall be carefully protected from all blasts. No more than 100 feet of open trench will be allowed at any one time.

In placing concrete encasements or fill, the methods used shall be such as to prevent mud, earth, clay, or other foreign materials from becoming mixed with the concrete.

3.02 Joints

All joints shall be watertight. Any leaks or defects discovered shall be immediately repaired. After joints are made any superfluous material inside the pipe shall be removed. The joints in sewer lines shall be constructed as follows:

a. All pipe for main sewers and service connections shall be jointed by means of compression type O-ring gaskets. The joint shall be cleaned of all foreign material. After the O-ring has been put in place, the pipe shall then be joined and adjusted to exact line and grade without disturbing the position of previously laid pipe. Care shall be taken in storing pipe to prevent contact of joints with the ground and prolonged exposure to weather and sunlight.

b. All future connections to existing manholes shall be provided with 4’ stub of 8" diameter pipe with solvent weld cap in accordance with these specifications and details.

3.03 Wye Branches/Laterals

All house service connections to the sewer line shall be made with commercially manufactured wye branches and one-eighth (1/8) bends. Wye branches shall be set at such vertical angle as required to bring the service connection to the proper depth.

All laterals must extend from main at 90 degrees until R.O.W. or easement limit where cleanout or curb stop is placed.

When rock is encountered at the end of a lateral, the rock must be removed for a distance of two (2') feet beyond the end of the lateral.

If rock is encountered in a service connection excavation within ten feet (10') of any building, it must be removed by drilling and wedging or methods other than blasting.

When required, on account of the depth of the sewer, branches shall be built up on an angle upwards, no greater than 45 degrees from horizontal.

Contractor shall install a solvent weld end cap, braced to withstand the pipe test pressure at the termination of the lateral. Contractor shall install a temporary marker stake (minimum of 2" x 4") painted green extending from the end of the lateral to 4 feet above finished grade (See Standard Detail SD-12).

Residential laterals may not be connected directly into a manhole, however commercial or industrial or other non-residential use may connect into manhole or provide sampling manhole at edge of row or easement if standard lateral connection utilized.

3.04 Manhole Stubs

Where directed by the Authority, or when indicated on the project Drawings, a stub or single length of pipe shall be built into manholes for connection to accommodate future extensions as indicated in Section 3.02.b. The outer end of each connection shall be sealed with a solvent weld cap.

3.05 Stoppers/Plugs

When building sewer connections are not made at the time the laterals or mains are laid, the, free end of such laterals or branches shall be terminated with a solvent weld cap. (See Detail SD-12).

3.06 Concrete Encasement

Where required or directed by the Authority, pipes shall be encased in concrete. Concrete encasement shall be composed of Class B Concrete. All encasement shall conform to the dimensions shown on Standard Detail Drawing SD-12.

3.07 Drop Connections

The Contractor shall build drop connections where shown on the Authority approved plans or where directed by the Authority. Construction of drop connections shall be in accordance with the Standard Detail Drawing SD-3.

3.08 Slopes

Maximum slopes shall be designed so as not to exceed a velocity of 10 feet/second.

All pipe grades shall meet the requirement of the Pennsylvania Department of Environmental Protection –Domestic Wastewater Facilities Manual – current edition, but in no case shall slope be less than the following:

PIPE SIZE	FALL PER 100 FEET	SLOPE (%)
4 Inch	2.0 Feet (24 inches)	2%
6 Inch	1.0 Feet (12 inches)	1%
8 Inch	0.40 Feet (4 3/4 inches)	0.4%
10 Inch	0.28 Feet (3 3/8 inches)	0.28%
12 Inch	0.22 Feet (2 1/2 inches)	0.22%
15 Inch	0.15 Feet (2 inches)	0.15%

Pipe grades extending from a terminal manhole shall be installed at a minimum slope of one percent (1%).

3.09 Sewer Pipe Repairs

Repairs to sewer pipe lines installed under this Project shall be made in accordance with the directions of the Authority.

3.10 Sewer Construction Stake Out

The Contractor shall establish bench marks adjacent to and through-out the Project which conforms in elevation with existing bench mark data and elevations of the Authority. All subsequent stake out datum shall be referenced to and conform to those elevations. The Contractor, prior to start of construction, shall deliver to the Authority two (2) copies of sewer cut sheet data for each manhole run to be installed under this Project.

3.11 Sewer Line Extensions

All mainline sewer extensions connecting to an existing sewer line must be made at an existing manhole, or an additional manhole must

be constructed in the existing main sewer line. All mainline sewer extensions shall begin with and end with a manhole.

3.12 Accessing Existing Manholes

Manhole adapters or sealing components (as supplied by a local supply company satisfactory to the Authority) shall be installed where pipes are inserted into the walls of existing manholes. The specifications shall depend upon the type of pipe material being installed and shall conform to the details as shown on standards for manhole pipe connections. The Contractor shall neatly cut an opening into the existing manhole by methods approved by the Authority and shall (if necessary) grout in place the above approved watertight adaptor to accept new sewer pipe. Pipe shall be laid on top of existing bench or as otherwise shown on drawings in the manhole. A new bench and flow channel shall be shaped to the top of the new pipe. The manhole shall then be repaired and made watertight to the satisfaction of the Authority representative.

3.13 Inspection of Lateral Sewers

It shall be the duty of the permittee or his representative to give at least two (2) working days' notice to the Authority when lateral sewer is to be connected to the public sewer system and ready for testing. It shall also be the duty of the Permittee to provide at least two (2) working days' notice to the Authority when the building sewer is to be disconnected for the sewer system such that the proper procedure may be observed.

END OF SECTION

SECTION 02602
BUILDING SEWERS

PART 1 GENERAL

1.01 Description

A. The work of this Section includes, but is not limited to: Installation of Building Sewers.

B. No building floor drain, roof drain, sump pump, or any device permitting storm water, groundwater, or surface water to enter the system shall be permitted.

C. Minimum slopes for 4" lines shall be 0.020' per foot (2%). Minimum slopes for 6” lines shall be 0.006’ per foot (0.6%).

D. Clean outs shall be provided at minimum 75' intervals or as required by building code;

E. All directional changes shall be provided with a clean out.

F. Commercial and industrial facilities shall utilize Authority-approved manholes in lieu of cleanouts at right-of-way or edge of easements if not connected directly into a manhole.

G. All building sewers shall be bedded and backfilled with a minimum 6" PA 1B Material.

H. A minimum cover from top of pipe to finished grade of four (4) feet shall be maintained.

I. Meters

This Authority may require (at its discretion), the Owner of an establishment to install, to pay for and to maintain an approved meter (or multiple meters if necessary) for the purpose of measuring flow to the sewer system.

J. Clean Out Wyes

Each building sewer shall be equipped with a minimum four-inch (4") clean out double wye at right-of-way or easement line where the Public Sewer is located in a roadway bordering the property. If the Public Sewer is located in a side or rear lot

easement, the double clean out wyes shall be located as close as practical to the Authority sewer easement line. An additional double clean out wye shall be located as close as practical to the outside wall or basement of the structure being served, in accordance with building code requirements.

K. Sand, Grit and Grease Traps

1. The Authority shall mandate the utilization of oil & grease traps and/or other preliminary wastewater treatment processes, mechanisms, or devices to remove nuisance contaminants from institutional, commercial, or industrial wastewaters. Nuisance contaminants include, but are not limited to: grit, sand, oil, grease, floating materials, and etc.

2. Oil & grease traps shall be of the concrete vault type, minimum one thousand (1,000) gallon. Larger traps may be mandated if necessary. Sanitary waste shall not be conveyed to or otherwise allowed to flow to an oil & grease trap under any circumstances.

3. All car washes and other commercial or institutional washing facilities shall provide and utilize a properly-sized and maintained sediment trapping system to the satisfaction of the Authority.

4. Traps shall be pumped and cleaned semi-annually or at the discretion of the Authority. The Authority shall be notified by Owner seven (7) days in advance of any pumping and cleaning so as to have Authority personnel present for inspection. Pumping and cleaning of interceptors is done by the property owner at his expense.

5. All Commercial and industrial sewer customers shall maintain copies of maintenance and waste disposal records (in duplicate) for grease and sediment traps on their premises of business. Copies of the same shall be forwarded to the Authority on a regular basis, complete with dates and maintenance actions, etc.

6. The Authority prohibits the discharge of flammable, toxic, or otherwise hazardous wastes to the sewers. Furthermore the Authority reserves the right to inspect and regulate the discharge of commercial or industrial wastewater to the Authority sewers in accordance with Commonwealth and Federals laws, rules and regulations.

L. Connection of Existing Sewage Disposal System Piping to Sewers

When evaluating a public sewer connection to a previously existing building, the Authority (unless conclusively proven otherwise through quality-control tests and television camera inspection, etc.) assumes that all existing on-lot sewage disposal system piping at various buildings, dwellings or places of business, do not meet the requirements of the Authority, and therefore must be considered unusable. The service connection for the building being served to the lateral (defined herein) connection terminus shall be of new pipe meeting the requirements of these Rules and Regulations.

M. Building Sewer Line Connections

No physical connection to Authority Sewer System can be made without an Authority representative present. Building sewers installations must be inspected by Township building code representative.

No sump pump or any device that allows runoff, storm water, ground water, condensate, or any kind of rain or surface water to enter the sewer system shall be permitted under any circumstances.

N. Driveway Installation

Any line passing under the driveways or other areas of potential heavy traffic, weight, or loading must be constructed of Class 52 ductile iron pipe, or protected by a proper steel casing when deemed necessary by the Authority.

O. Encasement

All clean-out wyes in potential traffic or heavy weight or loading areas must be constructed of Class 52 ductile iron pipe and/or protected by concrete encasement to undisturbed ground.

P. Venting and/or Traps

In order to protect against the possibilities of sewer gas and odors, all internal plumbing of buildings connected to the sewer system shall be provided with suitable traps and vents in accordance with the requirements of the Township Building Code. The responsibility of ascertaining the existence and/or need of vents and traps shall remain with the Township building code inspector.

Q. Inspection

The Authority or their representative shall from time to time have the right to inspect the plumbing of all properties, buildings, systems, etc., connected to its sewer system to insure compliance to its Rules, Regulations and/or Ordinances of the Township. All inspections shall be performed during normal business hours or at other times mutually acceptable to the property owner and the Township and/or Authority. All plumbing or other items found not to be in conformity with the Rules or Regulations of the Authority and/or Ordinances of the Township shall within thirty (30) days after receipt of written notice be corrected to conform to said Rules, Regulations and/or Ordinances.

R. State and Township Roads

If construction involves State or Township Right-of-Ways, additional permits will be required. It will be the Owner/Contractor's responsibility to comply with any and all requirements stated in the permit, and to have both temporary and final road restoration requirements completed in accordance with Township and State Regulations.

PART 2 MATERIALS

A. Pipe for Building Sewer

Pipe for gravity building sewers shall be a minimum of 4 inches (normal inside diameter), Pipe material shall be PVC schedule 40 with solvent welded fittings, or Class 50 (or better) modern coated ductile iron pipe with push on gasket joints (6” or greater).. All PVC pipe shall meet ASTM D1785 Standards. Fittings for Schedule 40 PVC solvent welded pipe shall meet ASTM D-2466 Standards. All materials shall be installed in accordance with manufacturer’s directions, with weather conditions and cure time (if applicable) noted on all installation and inspection notes.

PART 3 EXECUTION

A. Point of Connection

A building sewer shall be connected to a collection sewer only at a sewer lateral unless no lateral exists, then point of connection would be at sewer main. No person shall make a connection directly to or tamper with a collection sewer without approval and inspection by Authority.

B. Location of Sewer Lateral

The end of a sewer lateral must first be uncovered and inspected before building sewer trenching operations are begun. The approximate location of the sewer lateral, if available, may be obtained from the sewer plans on file with the Authority.

C. Transfer from Existing Disposal System to Public Sewer System

When connection is to be made to the public sewer system, the existing main building sewer shall be broken at the building, attachment made thereto with proper fittings to continue the sewer undiminished in inside diameter, but no less than four (4) inches inside diameter, to the four (4) inch diameter sewer lateral. See Standard Detail SD-24A.

D. House Service Connections (Building Sewers)

The Owner or Contractor shall construct all service connections complete to the property line, or edge of sewer easement or Right-of-Way line. These connections shall be built of the materials required by these Specifications. The ends of all service connections shall be laid and joined in every respect in the manner called for in these Regulations for sewer pipe installation. All building sewers shall be a minimum of 4" diameter. All house service laterals must be shown on the plans (see Standard Details). The depths of service connections will vary, depending upon the elevation of the first floor of the properties to be served. Unless otherwise notified in writing, service connections shall be installed at an elevation sufficiently deep to service the first floor of the property, while maintaining minimum 4’ of cover.

For connections into existing gravity sewers, the Contractor shall cut the sewer line and install wye fitting, using SDR35 PVC fittings or couplings, as necessary, (with gaskets). The Contractors shall practice bypass pumping as necessary to assure that the sewer continues to operate during construction. Under these conditions, the new Authority lateral shall be constructed in accordance with Authority rules and regulations for laterals.

The use of fittings, couplings and saddles that require metallic bands and clamping devices will not be permitted by the Authority, unless a special exception is granted under extraordinary circumstances. Under such special conditions, the Authority mandates the use of cathodic protection (such as zinc caps or magnesium anodes) on all metallic fasteners.

E. Backfilling House Service Connections (Building Sewers)

After pipe installation and inspection, the Contractor shall backfill trenches with specified backfill material deposited in 8" layers, with each layer thoroughly and carefully compacted by mechanical tampers to minimum 90% of the maximum dry weight density (Proctor).

Where non-compacted backfill is indicated on the approved construction drawings, the Contractor shall backfill the trench from 12" above the pipe to the top of the trench with material excavated from the trench, crowned over the trench to a sufficient height to allow for settlement to grade after consolidation. Where the Authority's Representative deems backfill material to be unsuitable and rejects all or part thereof due to conditions prevailing at the time of construction, the Contractor shall remove the unsuitable material and replace with select material stone backfill or suitable foreign backfill material.

F. Testing

Building sewers shall be tested in accordance with Township building codes.

G. Inspection of Building Sewers

It shall be the responsibility of the holder of a permit to contact the Township for the inspection of Building Sewers to Lateral Sewers. Construction, materials, testing and inspection must meet requirement of Township Building Codes.

H. Abandonment of Existing Disposal System

All septic tanks being removed from service shall be pumped dry. Contents of the septic tank shall be disposed of in a manner acceptable to Monroe Township. The Authority will require that all abandoned septic tanks, cesspools and seepage pits have lids removed or crushed and then be filled with crushed stone, gravel, or shale to prevent said facilities from caving in or from in any other way becoming a health or safety hazard in the future.

END OF SECTION

SECTION 02610
MANHOLES

PART 1 GENERAL

1.01 Description

A. The work of this section includes, but is not limited:

Precast concrete manholes, covers and frames.

B. Related work specified elsewhere:

Trenching, Backfilling and Compacting	Section 02221
Sanitary Sewer Pipe (Gravity)	Section 02601

1.02 Quality Assurance

A. Reference Standards:

Pennsylvania Department of Transportation (Penn DOT) Publication 408 Specification 1983, as amended

American Society for Testing and Materials (ASTM):

A48	Specification for Gray Iron Casting
C32	Specification for Sewer and Manhole Brick
C270	Specifications for Mortar for Unit Masonry
C478	Specifications for Precast Reinforced Concrete Manhole Sections
C923	Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes

1.03 Submittals

A. Certificates:

Submit certification from material suppliers attesting that materials meet or exceed specifications requirements.

B. Manufacturer's Literature:

Submit manufacturer's product literature of manhole sections, and precast bases if used.

Submit manufacturer's product literature of manhole steps, and manhole frames and covers.

PART 2 PRODUCTS

2.01 Materials

A. Crushed Stone Subbase:

AASHTO #10

B. Masonry Mortar: ASTM C270, Type S

2.02 Manholes

A. Precast Concrete Manhole Sections:

Conforming to ASTM C478, with 5.5% 1% air-entrained cement concrete, with 4000 PSI 28 day concrete strength.

Eccentric cone top section; minimum 30" access opening.

Precast riser sections of length to suit; precast bases of a design similar to the precast riser sections, or High Density Polyethylene (HDPE) grade adjustment rings as produced by LADTECH, or approved equal. Steps must be provided at maximum of 16 inches and no more than two risers will be permitted.

B. Precast concrete manholes with AGRU Sure Grip HDPE/PP-R concrete liner.

1. Materials

a. Liner shall be AGRU Sure Grip HDPE (High Density Polyethylene) or Polypropylene

Random Copolymer (PP-R) with a minimum thickness of 2 mm. All HDPE liner sheets and anchors shall be extruded during a single manufacturing process. The minimum anchoring stud concentration shall be 39 studs per square foot. The anchoring studs shall not be welded or mechanically attached to the liner. The anchoring stud shall have a pull out resistance of 112.5 lbs/stud.

b. Flat liner sheet, non-anchored, used for overlapping joints, shall have a minimum thickness of 3 mm. All joints shall be sealed by means of thermal welding performed by AGRU certified welders.

c. The lining shall be able to span across ¼" setting cracks. This may occur in the joint after installation, without damage to the lining.

d. The lining shall be repairable at any time during the life of the structure.

e. An AGRU certified fabricator shall custom fit the liner to the form work in order to protect the concrete surfaces from sewer gases. The interior surfaces to be protected shall include the walls, ceiling, pipe entries and structure chimney.

2. Physical Properties

a. The AGRU Sure Grip CPL systems and welding rod shall be manufactured from the same resins and meet the following properties:

Property	Testing Method	Units	HDPE	PP-R
Density	ASTM D792-86	g/cm^3	0.0945	1.78
MFI (Melt Flow Index)	ASTM D1238-88	g/10min	(190/5)	(190/5)
Heat Reversion (Dimensional Stability)	ASTM D1638-83	%	<2	<2

Property	Testing Method	Units	HDPE	PP-R
Yield Stress	ASTM D638-89	PSI	≥2320	≥2320
Elongation of yield	ASTM D638-89	%	≥12	≥10
Elongation	ASTM D638-89	%	≥200	≥50
Fire Classification	UL-94		V2	V2
Maximum Working Temperature		C° F°	60 140	90 194

b. Upon request, the manufacturer shall provide written certification that the liner used meets or exceeds the requirements of this specification.

3. Welding

a. All welding shall be performed in accordance with the published directives and procedures of the manufacturer and by welders certified by the manufacturer. Completion of welding will provide a one piece monolithic concrete protective liner that will provide excellent resistance to hydrogen sulfide attack and will resist push off from the wall by external hydrostatic pressure. Infiltration and inflow shall not occur through the lined surfaces.

The following welding techniques are acceptable:

i. Extrusion Welding
ii. Wedge Welding
iii. Butt Welding
iv. Hot Air Welding

b. Qualified staff shall supervise and test the welded installation. The joint areas shall be cleaned and scraped with abrasive tools and the welded edges shall be beveled for maximum fusion of the extrusion weld. The area shall be dry, clean, free of oil and lubricants, free from chips and free of notches. Visual inspection

shall confirm that a smooth double bead of welding seam is present. All welded joints shall be Spark Tested for leaks. The certified installer shall be Terre Hill Concrete Products or other certified installation Contractor.

C. Manhole Steps: Polypropylene coated steel.

1. Copolymer Polypropylene: Must be provided in manholes which may be subjected to hydrogen sulfate activity as directed by Authority (See Details). All Polypropylene manhole steps must meet the requirements of ASTM C-478 and AASHTD ASSHTO M-199. The Polypropylene must conform to ASTM D-4101. The 1/2" grade 60 deformed reinforcing bar meets ASTM A-615. Step shall be as manufactured by Parson's Environmental Products or equal.

D. Manhole Fames and Covers:

1. Cast Iron Castings; ASTM A48, Class 35 or better; free of bubbles, sand and air holes, and other imperfections. Contact surfaces machined and matched. Cover cast with inscription "sanitary sewer".

2. Paving risers will not be permitted on new or reconstructed manholes. One paving riser will be permitted for road resurfacing only. Rings shall be manufactured from domestic A-36 Steel, solid style, factory welded in accordance with AWS D1-5 certified welders with factory applied protective coating as supplied by Parsons Environmental Products or approved equal.

E. Joint Sealant Compound:

FS SS-S-00210, preformed, flexible, self-adhering, cold-applied.

F. Resilient Pipe-to-Manhole Connection:
Shall meet requirements of ASTM C923

G. Extrudable Preformed Gasket Material:

Nominal 1/2 - inch thick butyl rubber gasket material, conforming to AASHTO M-198 and Federal Specification SS-S-210A, shall be used for adjusting ring grooves. The gasket material shall be as manufactured by Hamilton Kent-Seal, RUB'R-NEK-L-T-M by Snyder Company, or an approved

equal. A compatible solvent as recommended by the manufacturer of butyl base material shall be used to prepare surfaces prior to application of butyl base material.

PART 3 EXECUTION

3.01 Excavation

A. Location and depth of manholes as indicated on the approved construction drawings. Perform excavation as specified in Section 02221.

3.02 Construction

A. Construct precast concrete watertight manholes of the type indicated on the approved construction drawings. Construct manholes with a minimum four (4) feet inside diameter with a minimum of five (5) inches wall thickness (See Standard Detail) Manholes in excess of 14 feet in depth shall be five (5) feet inside diameter. Manhole bases shall be either pre-cast or cast-in-place, per Standard Details. The Authority reserves the right to require larger diameter manholes, based on site conditions.

B. Construct exterior drop connections of the required type as indicated on Standard Details.

C. Construct cast-in-place bases as indicated on Standard Details, . Install on a minimum of 6" of 1B crushed stone subbase.

Provide concrete to support the full length of the pipe section cast into the base.

Cast-in-place bases may be constructed with a special form for a joint to match the manhole cylinder, sections.

D. Install precast bases as shown on Standard Detail. Set the precast base on 6” of 1B crushed stone subbase.

Provide a sealed flexible resilient connection between pipe and precast base section.

E. Form flow channels in manhole bases as indicated on the Standard Details. Slope channels uniformly from influent invert to effluent invert; minimum 1" drop. Construct bends of the largest possible radius. Form channel sides and inverts smooth and uniform; free of cracks, holes or protrusions. (See Detail SD-10).

F. Maintain temperature of manhole bases at 50 F or above for at least seven (7) days after pouring and obtain a minimum concrete strength of 3,000 psi.

G. Manhole Size Parameter: The typical diameter of manholes is set at four feet. Larger diameter manholes shall be required where one of the following conditions prevail:

1. The angle of pipes entering the manhole is such that the wall space between the pipe opening is less than one foot.

2. The manhole is scheduled to contain flow measuring instrumentation or other flow measuring devices.

3. Where the depth of the manhole is greater than 15 feet.

H. Install manholes sections with steps in proper vertical alignment. Seal joints between precast concrete manhole sections with joint sealant compound as indicated on Standard Detail SD-1. Apply joint sealant compound in accordance with instructions of the manufacturer. Place compound on the interior and exterior sides of the joint to be squeezed out by the weight of the upper section. Trowel sealant compound smooth with manhole interior. Do not apply rigid mortar to the joints between manhole sections.

I. Install manhole frames and covers. Use precast manhole rings to achieve indicated elevation of frame and cover. Do not adjust elevation more than 1 foot with grade rings. Seal joints between manhole frame and cover and precast rings and manhole and between rings with ram-nek or approved equal.

Anchor bolt manhole frames installed in unpaved areas.

J. Where new manholes are to be constructed on existing pipelines, carefully excavate around existing pipeline for placement of the new manhole base. Take all measures necessary to control flow through the existing pipeline and to prevent leakage into the new base. After completion of the manhole, carefully remove the top portion of the existing pipeline.

K. Where new sewer pipes are to be connected into existing manholes, the existing manhole walls must be bored or saw cut. No jack hammering, "breaking" or "busting" of manhole walls shall be allowed. Existing channel materials shall be

removed where necessary and new channels formed to accommodate the new sewer pipes.

L. Manhole Adapter: All inlets and outlets shall have a watertight manhole adapter as supplied by L/B Water Supply Company placed in the concrete manhole to facilitate connection of lines.

M. All gravity sewer line construction shall terminate with a manhole.

N. The entire outer surface of all manholes shall be coated with two (2) coats of bitumastic protective coating consisting of one (1) coat of coal tar epoxy conforming to PennDOT Publication 408 with dry film thickness of 25 mils.

3.03 Backfilling

A. Perform backfilling as shown on Standard Drawing . Place backfill in approximately equal lifts on opposite sides of manhole to equalize opposing horizontal pressures.

3.04 Manhole Inserts

A. All manholes shall be fitted with a manhole insert meeting the requirements of ASTM D1248 Class "A" Category 5 with a finish thickness of 1/8". Ventilation shall be provided using a valve-type method. Provide nylon strap for 1 man operation. Install gasket if necessary to stop leakage. Manhole inserts shall be as manufactured by Parson Environmental Products or equal.

3.05 Manhole Testing

All manholes must be tested in accordance with Section 02651 of these Specifications entitled "Sewer and Manhole Testing".

END OF SECTION

SECTION 02622
PRESSURE SEWER LINES

PART 1 GENERAL

1.01 Description

A. The work in this Section includes, but is not limited to:

1. Force mains.
2. Low pressure sanitary sewer pipe, fittings and connections.

B. Reference Standards:

ASTM	D1784 Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC)
ASTM	D1785 Polyvinyl Chloride (PVC) and Chlorinated Polyvinyl Chloride (CPVC) Plastic Pipe Sch. 40
ASTM	D2241 Polyvinyl Chloride (PVC) Plastic Pipe (SDR)
ASTM	D2466 Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40
ASTM	D2564 Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings
ASTM	D3139 Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM	DF477 Elastomeric Seals (Gaskets) for Joining Plastic Pipe

PART 2 TRENCH EXCAVATION

2.01 General

A. Perform trench excavation to the line and grade indicated on the Authority approved construction drawings and as specified in Section 02221.

B. Unless otherwise indicated on the approved construction drawings, provide for a minimum cover of four (4) feet above the top of piping laid in trenches.

2.02 Bedding

A. Provide pipe bedding as indicated on Standard Detail SD-18. Place aggregate in a manner to avoid segregation, and compact to the maximum practical density so that the pipe can be laid to the required tolerances.

PART 3 PRESSURE LINE MATERIALS

3.01 Pressure Pipe (Force Mains):

A. Force mains shall be at least 4" (inside diameter). Force mains shall be cement coated ductile iron pipe, with push-on joints, and meet the requirements of ANSI A21.51, Thickness Class 52 (or better). Pipe thickness Class for special highway, railroad or stream crossing or other conditions must be stated on the plans.

All ductile iron pipe and fittings shall be cement lined in accordance with AWWA/ANSI-C-104/A-21.4 and seal coated inside and outside with asphaltic material. The Authority and/or the engineer may mandate the use of mechanical joints for ductile iron pipe in some instances where mechanical joints appear warranted and necessary.

B. Pressure Pipe Fittings (Force Mains):

Ductile iron pipe joints shall conform to ANSI A21.11. Fittings shall conform to ANSI A21.20 and ANSI 21.11.

C. Low Pressure Pipe:

Low pressure force mains shall be sized by the design engineer to maintain at least a velocity of two (2) feet per second. Low pressure force mains shall be SDR21 PVC (or stronger/better) push-on gasket joint, pressure rated pipe that meets all current ASTM standards.

D. Low Pressure Pipe Fittings:

Low pressure pipe fittings shall be the same as those for low pressure pipe.

3.02. Main Line Ball Valves and Service Connection Valves

Force main and low pressure sewer valves shall consist of eccentric plug valves (open left), manufactures for wastewater applications. Approved valves include DeZurik, Val-matic or equal.

Small diameter (<3.0”) service connection valves shall be of cast bronze or red brass ball-type valve, with Teflon-coated ball. Ball valves shall be held in position and sealed off against a seat of Buna-N-Rubber that is held securely in place with epoxy adhesive. The flow way shall be no smaller than the nominal size of the valve, be smooth with no abrupt changes in size to create resistance to flow.

3.03 Valve Boxes

A. Valve boxes shall be provided at all underground valves installed. Valve boxes shall be 2-1/2" or 4-1/4" shaft size CIP boxes and be two (2) piece sliding type. The valve box length shall be as required per Manufacturer's specifications. The castings shall be made of light grey cast iron, true to pattern and free from flaw, They shall be thoroughly coated with two coats of asphaltum varnish. Valve box shall be Bibby Ste-Croix or Engineer approved equal. The valve boxes shall conform to the following requirements.

1. The valve box top section shall be in accordance with Bibby Ste-Croix Manual Specifications

2. The valve box cover section shall have the word "Sewer" cast in the cover, and an arrow with the word "Open". The arrow shall point in a counterclockwise direction.

3. The valve box bottom section shall be sized in accordance with Bibby Ste-Croix Manual Specifications and shall be able to interlock into a round or an oval base.

4. The valve box base shall be round or oval, sized to fit the valve to which it will protect.

5. The valve box extension shall be slide friction type and shall fit and be made of the same material as the above described valve boxes. It shall be sized according to Bibby Ste-Croix Manual Specifications. The minimum depth of cover shall be 4-1/2" or the depth of the pipe. Valve box extensions may be required where depth of cover exceeds 4-1/2'.

B. Valves shall be set plumb and jointed in the same manner as that specified for jointing mechanical joint pipe. Valve boxes shall be firmly supported and shall be kept centered and plumb over the operating nut of the valve. All valve box covers shall be approximately one inch above the surrounding surface, or as directed by the Engineer.

3.04 Air Release Valves

A. Automatic air-release valve for sewage service, with backflushing and cleaning accessories of a type made for wastewater applications. (G.A. Industries of Val-matic or equal).

B. The Authority may mandate the use of combination air release and vacuum breaker valves, should these appear warranted and necessary in the opinion of the Authority and/or the Engineer.

PART 4 INSTALLATION OF PRESSURE PIPE

4.01 Installation

A. Pipe cover shall be minimum of 48 inches unless otherwise noted on the plans.

B. The Contractor shall route pipe within manufacturer's recommendations for joint deflection and to allow for expansion and contraction without stressing pipe or joints.

C. Pipe shall be installed with bell ends facing in the direction of proceeding work.

D. Open ends of the pipe shall be closed by a watertight plug or other means approved by the Engineer when installation is not in progress.

E. Changes in direction of force mains must be made by the use of one-quarter (1/4) long-sweep bends, or by use of one-eighth (1/8), or one sixteenth (1/16) bends. Changes in direction of 45 degrees or greater require installation of thrust blocks.

4.02 Installation - Fittings, Valves

A. Set valves on solid bearing. (See Details SD-27, 28, 29 and 30)

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

C. All fittings shall be adequately braced against pressure thrust by concrete blocking, non-corrosive tie rods, or by the use of fittings with integral cast flanges, set screw devices, or restraint devices.

D. The Contractor shall provide cathodic protection on all exposed fastener bolt threads on valves and fittings in the form of zinc caps (Mars or equal). Magnesium anodes may be considered by the Authority in some instances.

4.03 Installation of Thrust Blocks

A. Thrust blocks shall be made of concrete (minimum 3,000 PSI) and shall be placed at all bends, dead ends, tees, etc., at appropriate locations where direction changes occur. Thrust blocks shall be poured in place against undisturbed earth. Concrete shall be furnished and cured (50° F - 7 days) by the Contractor. Thrust blocks shall be installed in such a way as not to interfere with the bolts and joints of the force main or fittings. When installed on plugged pipe ends, they shall be constructed in such a way as not to interfere with force main extension. When thrust blocks are constructed in trenches; with disturbed earth or unstable soil backing, the rod clamps and fittings shall be installed as part of the thrust blocks construction.

4.04 Air Release and Vacuum Breaker Valves

A. Install automatic air release and/or vacuum breaker valves and vaults where indicated on the approved construction drawings and as shown on Standard Detail.

4.05 Service Valves and Clean Outs

A. Provide service valves, in-line clean outs (low pressure lines), and terminal clean outs where indicated on the approved construction drawings. Construct as indicated on Standard Details. Contractor shall install clean outs on low pressure line at 500 feet (or less) intervals.

4.06 Pressure Sewer to Gravity Sewer Connections

A. Connect low pressure sewer system to gravity sewer system where indicated on the approved construction drawings.

B. Connect force main to gravity sewer manhole as indicated on the approved Construction Drawings.

C. When a force main or low pressure line connects into an existing or new manhole, said manhole plus the next two (2) manholes for low pressure sewer connection and four (4) manholes for forcemain shall be replaced with HDPE manholes for protection against deterioration from sewer gas.

PART 5 BACKFILLING TRENCHES

A. Backfilling pipelines trenches is permissible only after examination in accordance with Section 02221.

B. Contractor shall install detectable utility marking tape above all force mains and low pressure sewer pipelines, 12” to 18” below final grade.

PART 6 MISCELLANEOUS

6.01 Hydrostatic Leakage Test

A. Hydrostatically test each newly laid force main and low pressure sewer pipelines, including any valved section thereof, in accordance with Section 02651.

6.02 See Section 02221 for

- Compaction Testing
- Control of Traffic
- Protection of Existing Utilities and Traffic
- Cleaning Up
- Maintenance and Protection of Traffic
- Cutting Paved Surfaces
- Sewer and Water Main Separation
- Control of Excavated Material
- Dewatering
- Disposal of Excavated Material
- Rough Grading
- Restoration of Unpaved Surfaces

6.03 Work within Township Right-of-Way

A. This work shall comply with all Township Requirements.

6.04 Work within PennDOT Right-of-Way

A. This work shall comply with all PennDOT Requirements.

6.05 The Developer Shall Provide Manufactures Certification

A. That all materials meet the requirements of Monroe Township Municipal Authorities Rules, Regulations, Specifications and Details Governing the Construction of Sanitary Sewers, latest revisions.

6.06 Connection to Manhole

A. When a force main or low pressure line connects into an existing or new manhole, said manhole plus the next manhole downstream shall be protected against deterioration from sewer gas.

For existing manholes the Contractor shall clean and remove all foreign materials from surfaces to be finished, and repair, patch and touch up surfaces. Contractor shall eliminate any leakage prior to application, and provide as a minimum MS-2 Strong Seal Liner or Approved Equal Mix as per the Manufacturers Requirements to all walls and base. Prior to starting work submit the specification for work to the Monroe Township Municipal Authority for their review and approval. The developer shall maintain and control traffic at all times

END OF SECTION

SECTION 02623
PUMP STATIONS

PART 1 GENERAL

1.01 Description

A. Developer/Contractor shall make himself aware of Monroe Township Municipal Authority's policy regarding self-sufficiency of pump stations.

B. The Developer shall furnish, install and place into satisfactory operation as shown and described herein a waste water pumping station having the following features:

C. A well water supply and submersible pump and pressure tank suitable for providing wash down water.

D. An insulated frame construction building, in accordance with the Pennsylvania Uniform Construction Code, complete with foundation including minimum 8" thick concrete slab (signed and stamped by a licensed Pennsylvania Professional Engineer) and constructed of a low maintenance exterior finish of either, aluminum, vinyl or metal siding. Building will be provided to house the following:

1. Landline telephone service

2. Automatic dialer.

3. Interior lighting shall be enclosed fluorescent T8 Type and a minimum of 1 power receptacle located on each wall.

4. Electric heat with thermostat.

5. Stand-by diesel generator with integral radiator, exterior exhaust and separate light mounted above unit. Generator shall be sized to handle all loads that are typically associated with the pump station. Including but not limited to: all lighting and receptacles, potable water supply pump, etc. The intent is to create normal working conditions during a power outage.

6. Main control panel and separate light mounted above panel.

7. Storage for spare parts & equipment.

8. Two doors with one of adequate size and location for easy removal of generator. Each door to have locks with 2 sets of master keys cut to match existing Authority master keys.

9. Water pressure tank inside building.

10. An exterior mounted emergency light and siren.

11. A fire extinguisher mounted in the interior of the building.

12. Exterior security lighting per plan.

13. A minimum 10 feet wide paved drive in accordance with Final Paving Detail.

14. A 6 feet high vinyl coated or galvanized chain link fence topped with 3 strand barbed wire. Fence shall have a 20 feet wide double swing gate at the paved entrance. Provide lock with 2 keys to the Authority. Keys shall be cut to match existing Authority master keys.

15. A portable hoist or rotating boom with winch and stainless steel cable. Cable shall be of sufficient strength to safely remove and/or install equipment, appurtenances and a person from the wet well. Portable hoist shall be Thern, Inc. Series 5124 Portable Davit Crane, Vestil Manufacturing, or equal.

16. Install 4 inches thick x 3 feet wide treated mulch to catch roof drippings around the entire perimeter of the building.

17. Provide site drainage with a minimum of 2% grades in non-paved areas. All slopes within 10 feet of building to be sloped away from the building.

18. Provide l set of D size reproducible as-built drawings and a compact disc (CD) with a digital copy (PDF

format) of the as-built drawings. Provide l laminated mounted drawing of process and instrumentation schematic. Provide 2 copies of operations and maintenance manuals.

19. Provide operations and maintenance training of Authority personnel by individuals trained and certified in the operation of said system.

20. Provide an 18 month maintenance bond.

21. Provide design certifications for the pump station that are signed and sealed by the following professionals:

    a. An Engineer professionally registered in Pennsylvania with experience in structures, sanitary engineering and foundations. In Karst topography, provide at least l boring to a depth of at least 10 feet below the bottom of the lift station.

    b. An Engineer professionally registered, in Pennsylvania with experience in electrical design.

22. The Developer's design Engineers shall meet with the Authority's Engineer to insure that commonality of equipment is obtained and thereby minimize the variety of equipment, parts and skills required for replacement and repairs.

PART 2 EQUIPMENT

2.01 Description

A. The Developer shall furnish, install, test, and place in satisfactory operation all equipment as specified herein and all ancillary equipment required for a complete operating system.

B. The principal items of equipment shall include 2 or more submersible non-clog sewage pumps, level controls, valves, piping, control panel, automatic pump controller, lighting, ventilator, and all wiring.

2.02 Pumps

A. Furnish and install a minimum of two submersible, non-clog, centrifugal wastewater pumps. Pumps shall be designed for continuous operating service and constructed as follows to meet the intended service. Pumps shall be Flygt by Xylem Inc., ABS by Sulzer Ltd., or approved equal. The pump manufacturer shall have a minimum of 500 similar submersible installations installed in the United States of the specified horsepower or greater. Pump manufacturer shall have manufacturer representation within the Commonwealth of Pennsylvania for parts and service. Four (4) copies of the following information shall be provided:

PUMPS SHALL BE

Design Basis Make/Model Number:		Constant Speed Or Variable Frequency	
Design Capacity	USGPM	Discharge Size Inches	
Design Total Head	Feet	Minimum Solids Capacity	Inches
Secondary Capacity	USGPM	Minimum Shut Off Head	Feet
Secondary Head	Feet	Maximum Shut Off Head	Feet
Maximum Speed	RPM	Maximum Motor HP	
Minimum Efficiency Design Point	%	Impeller Type/Size	
Secondary Efficiency	%		

B. The Developer will supply the Township with four (4) copies of design calculations for the rating of the pump motor and pump assembly to assure adequate sizing. Pump versus total dynamic head curves will be furnished with l pump running, 2 pumps running and all pumps running. Where additional growth will occur, the design will provide a description on how increased capacity will be obtained with minimum modifications.

C. The pumps shall be submersible, non-clog, centrifugal type, and all major components shall be grey cast iron ASTM A-48, Class 35B.

D. MOTOR: Pump motors shall be designed for the electrical service at the site or as indicated on the drawings. Pump motors on Variable Frequency Drives shall be explosion-proof and inverter duty design suitable for continuous operation on IGBT type PWM inverter output waveform. Constant Speed Pump Motors shall be explosion-proof. Each pump motor shall be housed in a watertight grey cast iron (ASTM A-48, Class 35B) enclosure capable of continuous operation to a depth of at least 65 feet.

All exterior metal surfaces coming in contact with sewage other than stainless steel shall be protected by a factory applied spray coating of high solids two part epoxy paint finish. All external bolts and nuts shall be of stainless steel.

The pump motor shall be a NEMA B Design, induction type with squirrel cage rotor. The stator windings shall be insulted with moisture resistant Class H or better insulated windings rated for 180°C. The motor service factor shall be a minimum of 1.15, have a voltage tolerance of +/- 10% from nominal, and NEMA B or better, maximum operating temperature rise of 80°C.

Motors shall be equipped with at least a moisture detection and three pilot thermal switches embedded in such a way as to shut down the pump if the internal temperature exceeds a given point. These thermal switches shall be used in conjunction with external motor overload protection. The leakage sensor shall be present to detect the presence of water in the stator chamber. When activated, the leakage sensor shall send an alarm to the pump control panel.

Pump shall be capable of running dry without harming the ump motor. Pump motor cables shall be of adequate length (with sufficient slack to allow pump removal) to reach the above-grade control panel or terminal point as shown on the Contract Drawings.

E. BEARINGS: The pump/motor shaft shall rotate on two bearings. Motor bearings shall be sealed and permanently grease lubricated with high temperature grease. The upper bearing shall be a single roller bearing. The lower bearing shall be a minimum of two row angular contact ball bearing to compensate for axial thrust and radial forces. The minimum L10 bearing life shall be 50,000 hours while pump is operate

within the usable portion of the pump curve. Single row lower bearings or upper ball bearings are not acceptable.

F. MECHANICAL SEALS: Each pump shall be provided with a minimum of a tandem double mechanical seal, running in an oil reservoir. The seal oil provided shall be FDA approved, non-toxic and safe to the environment. The lower mechanical seal shall be constructed of tungsten carbide/tungsten carbide or silicon carbide/silicon carbide and the upper seal of tungsten carbide/carbon or ceramic/carbon. Seals shall be two total independent seal assemblies. Seal shall preclude any material from entering and contaminating the lower bearings and/or motor. Lower mechanical seals with springs located within or subject to pump media are not acceptable.

G. PUMP SHAFT: The pump and motor shaft shall be a single piece unit made of stainless steel and shall be adequately designed to meet the maximum torque required at any normal start-up conditions or operating point.

H. IMPELLER: The impeller shall be a mixed flow multi-vane semi-open design or a double shrouded, non-clog single vane impeller design. Either impeller type shall be capable of passing a three inch solid. It shall be dynamically balanced and shall be designed for solids handling. The inlet edge of the impeller vanes shall be angled toward the impeller periphery so as to facilitate the release of objects that might otherwise clog the pump. Impellers shall be direct connected to the motor shaft with a slip fit, key driven, and secured with an impeller bolt. The design shall include a replaceable cast iron suction cover. The suction cover shall be designed such that it may be adjusted to maintain working clearances and hydraulic efficiencies.

I. PUMP VOLUTE: The pump volute shall be single piece grey cast iron, minimum of ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solid that may enter the impeller. The pump volute/suction cover shall have a replaceable wear ring or insert ring of a single piece of grey cast iron of a minimum of ASTM A-48, Class 35B.

J. PUMP DISCHARGE: The design shall be such that pumping units will be automatically connected to the discharge piping when lowered into place on the discharge connection.

K. The pumps shall be easily removable for inspection or service, requiring no bolts, nuts or other fastenings to be removed for this purpose, and no need for personnel to enter the pump wells. The pump manufacturer shall supply, along with the pumps, the required fittings to accomplish the above connection including a base elbow, stainless steel rails, and a stainless steel lifting chain. The discharge connection shall be securely fastened to the pump station wet well floor and no portion of the pump shall bear directly on the floor of the wet well. All anchor bolts, nuts, washers and sleeves shall be stainless steel furnished by the contractor and shall be of ample size and strength for the purpose intended.

L. Each pump shall be fully tested and certified on water at the factory before shipment. Tests shall consist of laboratory testing at shutoff and five points over the operating range of the pump. One of the points will be the specified primary design point. Certified test data will include head, capacity, motor output HP, RPM, pump efficiency and be charted and graphed. All tests will be under the direction of a Pennsylvania Registered Engineer and be conducted in accord with the applicable Hydraulic Institute Standards and Procedures and be submitted as requested.

M. Warranty: The manufacturer shall warrant all pumps against defects in workmanship and materials for a period of five (5) years under normal use, operation and service. In addition, the manufacturer shall replace parts which shall become defective through normal use and wear on a progressive (linear) schedule of cost for a period of five (5) years, except that said parts shall be replaced at no cost to the Owner during the first year; parts included are the mechanical seal, impeller, pump housing, and ball bearings. The warranty shall be in published form and apply to all similar units.

2.03 Pump Controls

Each pump station control system shall be assembled by a qualified "System Integrator" who shall have a minimum of three (3) years' experience in constructing similar control systems. The "System Integrator" shall be solely responsible for coordinating the interfacing of the system to other indicated systems. A field service engineer shall provide installation and start-up assistance and provide Owner instruction. The System Integrator shall be responsible for the performance and accuracy of all equipment and each system and components.

A. Electrical Control System: The electrical control equipment shall be mounted and wired in a wall mounted NEMA 12 steel enclosure with continuous heavy gauge piano hinge. Panels shall be UL listed and labeled.

All operating controls and indicators shall be door mounted. It shall not be necessary to expose any internal components to perform normal operating procedures.

Where required, a control transformer is to be supplied to provide 120 V Control Voltage.

Horsepower rated across-the-line magnetic contactors with adjustable ambient compensated overload relay for each pump motor. Contactors shall be Class 10, equipped with 3-leg overloads with reset buttons. Starters that require removal of entire overload relay to change heaters will not be acceptable.

Thermal magnetic molded case circuit breakers shall be provided for branch disconnect service and overload protection of all motors, controls and auxiliary circuits. Pump motor circuit breakers shall be "E" frame or greater. Starters and breakers shall be sized according to pump station horsepower requirements.

A hand off auto, 3 position heavy duty type selector switch shall be furnished for each pump. When the switch is in “hand” position, the pump shall start and stop manually by cover-mounted start-stop push buttons on the duplex drive control panel. When the H-O-A switch is in the “auto” position, the pump shall start and stop automatically by an integral level control system.

The control panel will have an external alarm consisting of a top of panel mounted, red Lexan alarm light. Also an audible horn with silence relay and button will be provided. The alarm light and horn shall be 120 VAC.

An interior light shall also be provided with the panel.

All control wiring within the control panel shall conform to the national electric code. All wiring shall be neatly installed and run in plastic raceways to prevent interference with any operating devices.

All door mounted devices shall be labeled as to functions with permanently attached phenolic name plates and all internal wiring, terminal strips, etc. shall be properly identified for filed connections and trouble shooting.

Other equipment to be installed in the control panel shall be as follows:

1. Non-resettable six digit run time meters for each pump to indicate hours and tenths of hours.

2. Lightening arrestor.

3. Dim glow alarm light feature with flasher for high water alarm condition. High water alarm condition shall send alarm to dialer and lock in until it is manually reset.

4. A green pilot light operated from a respective starter auxiliary contact shall be provided to indicate a "pump running" condition. The pilot light shall have a replaceable bulb.

5. Through-panel motor starter rest buttons.

6. All door-mounted controls, pilot lights, etc., shall have nameplate indicating function.

7. Relaying circuitry for pump overheat and moisture detection sensors for each pump (Flygt Corporation Mini-CAS II, or equal). Pump overheat shall shutdown pump. Door mounted seal failure and high temperature red alarm lights for each pump.

8. Intrinsically safe barrier for float switches and level transducer.

9. Dry contacts shall be wired to the automatic dialer to signal: Power failure, generator fault, high water alarm, seal failure, motor heat sensor, and (1) spare.

10. Uninterruptible power supply, sized to maintain power and provide full operation of the control panel for a minimum of one hour (not including branch breaker loads).

11. If applicable, a phase monitor shall be supplied to protect three-phase equipment against phase loss, undervoltage and phase reversal conditions. When a fault is sensed, the monitor output relay opens within two seconds or less to turn the equipment off and/or cause an audio or visual alarm. Both Delta and Wye systems may be monitored. The monitor shall have an automatic reset and shall also include an adjustable voltage delay. The monitor shall have an indicator LED (glows when the conditions are normal and shall monitor phase sequence: ABD operate (will not operate CBA)). The phase monitor shall be UL approved and CSA certified.

12. A secondary arrestor shall be provided. Housing shall be Noryl and be ultrasonically sealed. Valve blocks shall be metal oxide with an insulating ceramic collar. Gap design shall be annular. The lead wire shall be permanently crimped to the upper electrode forming part of the gap structure. Arrestors shall be UL and CSA listed Lightning Protective Devices.

13. Emergency Generator Monitoring: The Main Control Panel shall monitor automatic transfer switch status (normal power/power failure/generator power) and stand-by generator status (on/off) and a common "generator trouble" alarm. A user adjustable time delay shall be incorporated within the control panel to prevent simultaneous pump starts during emergency generator operation. Alarm signals shall be output to the alarm dialer internally for utility power failure, generator start and generator trouble.

B. Pump Controller: Pump controller shall sense the liquid level over a calibrated range, display it on an alphanumeric LED bar graph on the face of the controller, digitally displayed adjustments for automatic pump control and abnormal level alarm and provide automatic operation of the two pumps and alarms as hereinafter or otherwise described.

The pump/alarm controller shall accept a single, level-proportional analog input signal and provide level-differential automatic operation of two pumps and alarms.

The controller shall display the sensed control level on a 20-segment LED bar graph display. The level shall be displayed

in a 0-15 foot range with each bar representing approximately 5% of the full scale. This scale shall be a minimum.

Pump controller shall be capable of recording run times for each pump, automatically alternating pump starts, and delay starts after loss of normal power.

A 3-position "raise-auto-lower" manual level simulator shall allow the manual creation of a "false signal" when the switch is raised or lowered from the central auto position. By use of this switch, the effective operation of each pump shall be confirmed and the station returned to normal without danger of leaving the station in a "non-automatic" condition.

The pump controller shall be Model SP6R-LSC as manufactured by SJE Rhombus Controls, or equal.

C. REAL VOICE AUTO DIALER:

The automatic telephone system alarm dialer shall dial up to eight (8) alarms. The dialer shall be capable of dialing up to sixteen (16) 60 digit numbers. The unit shall be capable of interfacing with pager systems and beepers. The unit shall call each of the programmed numbers in sequence until an acknowledge response is received. The unit shall be capable of analog input monitoring as well as contact closure input monitoring and shall transmit discrete alarms for high temperature, power failure, high wet well level and low wet well level. The automatic telephone system alarm dialer shall be RACO Verbatim, or equal.

The automatic telephone system dialer shall be connected to the provided land line telephone service.

Alarm inputs to the autodialer shall be as indicated by the Authority, but shall include, as a minimum:

wet well high level;
pump failure (high temperature);
pump failure (seal leak);
utility power off; and;
generator fault.

D. Submersible Transducer: Submersible pressure transducer shall be U.S. Filter Model 157GSCD or KPSI Series 750, or equal. Submersible transducers and pump power cords are to be run

directly to the pump control panel. The submersible transducer shall be of the head pressure sensing type, suitable for continuous submergence and operation and shall be installed in accordance with manufacturer's instructions. The bottom diaphragm face of the sensor shall be installed approximately six (6) inches above the wet well floor.

The transducer shall be factory-equipped with surge protection. The transducer housing shall be fabricated of Type 316 stainless steel. The diaphragm shall be 2-5/8 inch diameter heavy-duty nylon reinforced molded Buna N synthetic rubber with a bonded Teflon external surface for interfacing with the process media.

The internal pressure of the lower transducer assembly shall be relieved to atmospheric pressure through a heavy-duty urethane jacketed hose/cable assembly and a slack PVC bellows mounted in the control panel.

E. Float Switches: The controls shall include redundant float activated high level/lower level alarm/emergency pump activation. Float-based pump operation shall occur independently of liquid level/pump controller device operations. If the wet well level reaches the high level float and all of the pumps are already operating, then all pumps shall be started and operated until the wet well level reaches the low-level float. Should this condition occur, the high wet well level alarm light shall be activated. Floats shall be non-mercury type Flygt ENM-10, or equal.

F. Float Switches Adjustment: Float Switch adjustment shall be accomplished by mounting a NEMA 4 x junction box on the outside top of the wet well. Float cables shall pass from the junction box and through the top of the wet well with sufficient excess length so that the wet well switches can be raised and lowered at will without entering the wet well.

G. Spare Parts for control panel:

(2) Two general purpose relays.
(6) spare fuses
(10) Spare peanut control lights
(1) Spare float switch (as specified above)

H. Operation of the Pump Station shall be as follows: As the wet well waste level rises to the "Lead Pump On" level, it shall

start the lead pump and continue pumping until the "Pumps Off" is reached. Should the lead pump fail or not keep up with the influent flow rate, and the level rises to the "Lag Pump On", it shall start the lag pump such that the "Lead" and "Lag" pumps operate simultaneously. The lag pump shall continue pumping until the "Pumps Off" level is reached.

2.04 Generator System

The system shall include a diesel engine generator set with a system capacity that shall be determined exclusive for each site by the design engineer.

Engine generator system shall be as manufactured by Kohler Emergency Standby System or equal.

The engine shall be a water cooled in-line diesel with sufficient power to operate under ten (10%) percent overload for one hour at an ambient temperature of ninety (90) degrees Fahrenheit. The engine shall be designed to operate on #2 diesel fuel. The engine shall have an isochronous type governor to maintain engine speed within five-tenths (.5%) percent, steady state, and five (5%) percent, no load to full load, with recovery to steady state within two (2) seconds following sudden load changes.

The unit shall be equipped with the following safety devices:

1. engine shutdown on high water temperature
2. low oil pressure
3. overspeed
3. engine overcrank
4. limits as selected by manufacturer

The unit shall be equipped with the following accessories: a critical type exhaust silencer with muffler companion flanges and flexible stainless steel exhaust fitting, sized in accordance with engine manufacturer's instructions. A heavy duty diesel starting type lead-acid storage battery shall also be provided. The battery shall be rated for one hundred seventy (170) ampere-hours minimum capacity. Match battery voltage to starting system. Include necessary cables and clamps. Provide a battery tray that is treated for electrolyte resistance and constructed to contain spillage. Provide a battery charger. Charger shall be a current limiting type designed to float at 2.17 volts per cell and equalized at 2.33 volts per cells. Include overload protection, full wave rectifier, DC voltmeter and ammeter, and one hundred twenty (120) volts AC fused input. Provide wall-

mounted enclosure to meet NEMA 250, Type 1, requirements. A line circuit breaker shall also be provided. The line circuit breakers shall be a NEMA AB1, molded case circuit breakers on generator output with integral thermal and instantaneous magnetic trip in each pole, sized in accordance with NFPA70. Include battery-voltage operated shunt trip, connected to open circuit breaker on engine failure. Unit mount in enclosure to meet NEMA 250, Type 1 requirements.

Provide an engine-generator control panel. Panel shall be a NEMA 250, Type 1 generator mounted control panel enclosure with engine and generator controls and indicators. Include provisions for padlock and the following equipment and features:

1. Frequency Meter: 45-65 Hz range, 3.5 inch dial.

2. AC output voltmetic: 3.5 inch dial, 2 percent accuracy with phase selector switch.

3. AC output ammeter: 3.5 inch dial, 2 percent accuracy with phase selector switch.

4. Output voltage adjustment.

5. Push-to-test indicator lamps, one each for low oil pressure, high water temperature, overspeed, and overcrank.

6. Engine start/stop selector switch.

7. Engine running time meter.

8. Oil pressure gauge.

9. Water temperature gauge.

10. Auxiliary relay: 3 PDT, operates when engine runs, with contact terminals pre-wired to terminal strip.

11. Additional visual indicators and alarms as required by NFPA 110.

12. Remote alarm contacts: Pre-wire SPDT contacts to terminal strip for remote alarm functions.

Provide a remote annunciator panel. Panel shall be surface-mounted with brushed stainless steel finish. Provide alarm horn and indicators and alarms as follows:

1. High battery voltage (alarm)
2. Low battery voltage (alarm)
3. Low fuel (alarm)
4. System Ready
5. Anticipatory - high water temperature
6. Anticipatory - low oil pressure.
7. Low coolant temperature.
8. Switch in off position (alarm)
9. Overcrank (alarm)
10. Emergency stop (alarm)
11. High water temperature (alarm)
12. Overspeed (alarm)
13. Low oil pressure (alarm)
14. Line power available
15. Generator power available
16. Lamp test and horn silence switch.

Each diesel engine generator set shall also be equipped with an automatic transfer switch. The transfer switch shall be designed, built tested and warranted by the manufacturer of the generator to ensure one source responsibility. The transfer switch shall be fully rated to match the designed generator output or meet or exceed rating of line breaker. Transfer switch shall be Contractor (NEMA Type A, IEC Type PC) UL listed for total system load. Switch shall have manual transfer capability test switch, auto-exercising capability programmed transition and auxiliary contacts for emergency and normal condition.

Also, if needed, lift stations shall be equipped with a phase converter, only at sole discretion of the Authority. (Three-phase power is highly preferred). Phase converter size shall be determined exclusively for each site by the Design Engineer. The phase converter shall include an exterior disconnect switch, exterior wiring and exterior conduit. The auto-transformer capacitor shall be a NEMA 250-NFPA 70 housed inside a NEMA 3R enclosure. The phase connecter shall be rated for continuous operation under the design operation horsepower with individual sections capable of operating the motor independently or simultaneously at the motor service factor from a single-phase source. The input single-phase with the output three-phase voltage regulator shall be within plus or minus one (1%) percent with an eighteen (18%) percent no loaded to full load transient regulator. Output frequency shall be plus or minus one Hz. Phase converter shall have the following accessories:

1. Output Voltmeter and Output Ammeter each with two (2%) percent accuracy including a four-position selection switch for each unit.

2. Output Frequency Meter pointer-type with range of 58 to 62 Hz.

All units shall be installed in compliance with NEC and, all units shall be installed and tested in accordance with equipment manufacturer's instructions.

2.05 Spare Parts and Tools

A. The following extra parts shall be of the same manufacturer as installed equipment and shall comply with these regulations. The Developer shall supply these parts with each lift station.

1. One set of each style of bearings.

2. Two impellers, per station.

3. One set of each mechanical seal.

4. Replacement wear rings for each pump.

5. All gaskets and hardware required, and any special tools required to perform recommended maintenance in accordance with the manufacturer’s operation and maintenance manual and/or for the installation of the above items.

2.06 Piping and Fittings

A. All pipe to be furnished and installed in the work, except as otherwise specified, shall be Class 52 ductile iron cement-lined pipe. All fittings shall be cement-lined ductile iron or cement-lined cast iron with a 250 psi rating. Joints for all straight buried pipe shall be of the push-on self-centering, rubber-gasket type. Joints on buried fittings shall be of the mechanical joint type. Two metallic wedges, sufficient to assure electrical conductivity, shall be provided for each joint. Exposed pipe and fittings shall have flanged joints unless otherwise noted. Transition gaskets shall be provided as required at mechanical joint fittings and pipe ends when a pipe of material other than ductile iron is inserted into the mechanical joint.

B. The discharge line from each pump shall be fitted with a check valve, isolation valve, and 3/4-inch tap with pressure gauge.

C. Steel pipe will not be accepted as an "or-equal" substitute to the ductile iron pipe specified.

D. The valves shall be as specified herein and sized by the Developer's Engineer and approved by the Authority.

2.07 Isolation Valves

A. Isolation valves shall be of the resilient wedge gate valve type. All gate valves shall be of the non-rising stem, resilient seated type in accordance with the requirements of the latest revision of AWWA C509 unless otherwise specified.

B. Resilient seated gate valves for underground use shall have mechanical joint end with accessories. Resilient seated gate valves for aboveground use shall have flanged joint end with accessories.

C. Resilient seated gate valves shall open by turning counterclockwise. The body shall be ductile iron.

D. Operating nuts for resilient seated gate valves to be used underground shall be 2 inches square and shall be loosely fitted on the stems. Resilient seated gate valves for use aboveground shall be equipped with a high strength cast iron handwheel 12 inches in diameter.

E. Valve boxes shall be provided at all underground gate valves installed. Valve boxes shall be 5-1/4" shaft size and be the iron three (3) piece screw type. The valve box length shall be as required.

F. All resilient seated gate valves shall be noted for 200 psi working pressure and 400 psi test pressure.

2.08 Check Valves

A. Swing Check Valves (Outside Lever and Spring): Horizontal swing check valves, sized as shown on the plans shall be installed in the discharge piping. The valve shall permit flow in one direction only and close tightly without slamming when the discharge pressure exceeds the inlet pressure. The valve shall be provided with an outside lever and spring to accomplish quicker closing and to minimize slamming when rapid flow reversal is encountered. The valve in the full open position shall permit full flow through the valve equal to the nominal pipe diameter. The valve body shall be of high quality cast iron construction, bronze fitted stainless steel hinge pins and with O-ring packing. All check valves shall have removable covers for access to the disc.

2.09 Pressure Gauges

A. Pressure gauges shall be provided to indicate discharge pressure. The gauges shall have 4-1/2" minimum diameter faces with molded black phenolic case, turret type with snap ring face mounting. The gauge internal construction shall include phosphor bronze bourbon tube with bronze movement and shall be liquid filled. Gauges shall have 1/4" N.P.T. bottom connections and provided with a brass needle isolation valve and vent cock.

2.10 Bypass Hydrant

A. Bypass Hydrant shall be provided on the common discharge line after the valve vault. Hydrant shall be Kennedy K81, United Model F-06, or approved equal. Hydrants shall conform in all respects to AWWA Specification C-502 latest edition and manufacturer’s most recent improved design including hydrant extension pieces complete. 2 The hydrant main valve shall have a minimum size of 5 inches and shall be open counterclockwise. Each hydrant shall be equipped with two 2-1/2 inch hose nozzles and one 4-1/2 inch pumper nozzle.

The inlet shall be 6-inch mechanical joint type with accessories. Nozzle caps, gaskets, and chains shall be provided.

B. The hydrant shall be painted black.

2.11 Inspection and Test

A. Prior to factory assembly, all station components shall be inspected for quality and tested for proper function and freedom from defects. Upon completion, the station shall be connected to a test tank and an operational test performed under simulated field conditions while a final inspection is conducted. Any deficiencies or irregularities shall be corrected at the factory. Automatic controls shall be adjusted to approximate job requirements.

2.12 Precast Concrete Structures (Wet Well and Valve Vault)

A. Concrete: Concrete mix design shall conform with latest edition of the American Concrete Institute Building Code Requirements for Reinforced Concrete (ACI 318) and Code Requirements for Environmental Engineering Concrete Structures (ACI 350). Concrete shall have a minimum compression strength at twenty-eight (28) days of 4,000 psi conforming to ASTM Specifications C478. Joints between precast reinforced concrete vault sections shall be the rubber gasket type and watertight. The thickness of walls and slabs shall not be less than 8 inches.

B. Reinforcing: Reinforcing bars shall be fabricated from new billet steel meeting the requirements of ASTM A615 and having a minimum yield strength not less than 60,000 psi.

C. Wall Penetrations: Wall penetrations for pipes shall be located as shown on the drawings and shall be of the proper dimensions for the pipe sizes involved. Wall penetrations shall be either cast-in-place steel sleeves with continuous waterstop and mechanical seal (“Link Seal”, or equal), or cast in flexible pipe sleeves (“Lock Joint”, or equal) as shown on the drawings. The penetrations shall have a smooth surface. Mechanical seals shall be grouted flush on both faces of the wall.

D. The roof slab shall have a steel vent terminated with a 180° bend and bird screen. Vent shall be 4-inch painted Schedule 40 steel and shall penetrate slab with wall sleeve and water stop.

E. Access Hatches: Access hatches shall be cast into concrete top frames and sized and located per plan or as approved by Authority. The access hatch shall be constructed of 1/4-inch aluminum channel frame or stainless steel with an anchor flange around the perimeter. The access door(s) shall be 1/4-inch aluminum or stainless steel to withstand a 150 psf live load and shall be equipped with heavy forged brass hinges with stainless steel pins, an automatic hold open arm (s) with release handle and compression spring operators. A snap lock with two (2) removable handles with a recessed hasp covered by a hinged lid flush with surface shall be provided. A bituminous coating shall be applied to the exterior of the frame as applicable. A 1-1/2 inch drainage coupling shall be located in the front right corner of the channel frame, piped to the structure sump or wet well. Unless otherwise specified, all hardware shall be 304 stainless steel. A hinged safety grate shall be powder-coated aluminum, and shall be compatible with the provided access hatch. Safety grates shall have a lockable pull arm and shall accommodate the pump power cable.

F. The entire outer surface of all structures shall be coated with two (2) coats of bituminous protective conforming to PennDOT Publication 408 with dry film thickness of 25 mils.

G. Interior surfaces of wet well shall be lined with AGRU sure Grip HDPE/PP-R concrete line per Section 02610, Part 2, paragraph 2.02.B.

H. Structures shall have minimum clear inside dimensions as approved by the Authority. The wet well shall be properly sized to keep the number of pump starts per hour under the manufacturer's recommended specifications. Storage from the high level alarm float to the lowest gravity sewer invert shall allow for a minimum response time of 60 minutes under the design average flow.

I. Design Calculations: Calculations shall reflect design in accordance with the latest edition of the American Concrete Institute Building Code Requirements for Reinforced Concrete (ACI 318) and Code Requirements for Environmental Engineering Concrete Structures (ACI 350). In the event that these two codes conflict on a specific requirement, the more stringent requirement shall be used. For purposes of determining the lateral earth pressure on the walls of the vault

and buoyant forces on the vault, groundwater level shall be assumed to be at a depth of equal to the surrounding finish grade. Each unit shall be of adequate strength so as to be able to safely withstand AASHTO H-20 wheel loads.

J. The Developer shall furnish complete structural calculations prepared and stamped by a Pennsylvania Registered Professional Engineer. Calculations should reflect the structure as having a safety factor of at least 1.5 to prevent flotation. The developers Engineer shall also furnish calculations showing the structure empty and saturated backfill conditions as well as calculations that show the capacity of the wet well.

2.13 Basket Screen

Wet well shall have a manually cleaned basket screen installed under each influent line. Basket screen shall be fabricated out of aluminum with bar spaces of at least 1 inch in width. The basket screen must be placed on a slope of either 30 to 45 degrees to the horizontal. Velocities through basket screen should be no less than 1.25 feet per second and no greater than 3.0 feet per second.

Basket Screen may be replaced with a comminutor at the discretion of the Authority.

2.14 Comminutor

A. General

1. This section of the specification describes the sewage grinder(s) and motor controller(s). The equipment shall be installed as recommended by the supplier, and in compliance with all OSHA, local, state, and federal codes and regulations.

2. Grinder(s), and motor controller(s) shall be in compliance with these specifications and plans and shall be supplied by one of the following manufacturers:

a. JWC Environmental®: Muffin Monster®

3. The manufacturer must certify that the unit can be returned for maintenance to the factory or a local repair facility. The certification shall include a statement that there will be no charge for repair labor.

4. Supplier shall submit four (4) set(s) of shop drawings. Shop drawings shall include equipment descriptions, specifications, dimensional and assembly drawings, parts lists, and job specific drawings.

5. Supplier shall submit four (4) set(s) of Operation and Maintenance manuals. The manuals shall include equipment descriptions, operating instructions, drawings, troubleshooting techniques, a recommended maintenance schedule, and the recommended lubricants.

6. Regulatory Requirements: Motor controllers shall, as applicable, meet the requirements of the following Regulatory Agencies.

    a. National Electrical Manufacturer's Association (NEMA) Standards.

    b. National Electrical Code (NEC).

    c. Underwriters Laboratory (UL and cUL).

7. Grinder(s) shall, as applicable, meet the requirements of the following industry standards:

    a. American Society for Testing and Materials (ASTM) A 36: Standard Specification for Carbon Steel Plate

    b. American Society for Testing and Materials (ASTM) A 536-84: Standard Specification for Ferritic Ductile Iron Castings

    c. American Iron and Steel Institute (AISI) 303 Stainless Steel

    d. American Iron and Steel Institute (AISI) 304 Stainless Steel

    e. American Iron and Steel Institute (AISI) 4130 Heat Treated Alloy Steel

f. American Iron and Steel Institute (AISI) 4140 Heat Treated Hexagon Steel

g. Rockwell C

8. Each unit of equipment shall be identified with a corrosion resistant nameplate, securely affixed in a conspicuous place. Nameplate information shall include equipment model number, serial number, supplier's name, and location.

B. Support System(s)

1. General

a. Provide channel frame of suitable dimension and strength to support grinder in place and direct flows toward cutters. The channel frame shall be of stainless steel Type 304 construction and firmly anchored to the wet well wall.

b. An overflow bar rack shall be provided to assure screening upon possible failure of grinder.

c. A guide rail system shall be provided to permit easy removal of grinder for maintenance. There shall be no need for personnel to enter the wet well.

d. An Aluminum basket strainer shall be provided for installation in the channel frame to insure continued screening when the grinder is removed for maintenance or inspection.

2. Components

a. Individual Cutters and Spacers

i. The cutting chamber shall be a nominal height of 8 inches.

ii. Individual cutters and spacers shall be 4130 heat treated alloy steel, surface ground for uniformity and through-hardened to a minimum 45-50 Rockwell C.

iii. The inside configuration of both the individual cutters and the individual spacers shall be hexagonal so as to fit the shafts with a total clearance not to exceed 0.015 inch (0.38 mm) across the flats to assure positive drive, minimize wear on the cutters, and increase the compressive strength of the spacers.

iv. Cutter configuration shall consist of 11 tooth cam cutters. To maintain particle size, the height of the tooth shall not exceed 1/2 inch (13 mm) above the root diameter. Cutter to cutter root diameter overlap shall be not less than 1/16 inch (1.6 mm) or greater than 1/4 inch (6 mm) to maintain the best possible cutting efficiency while incurring the least amount of frictional losses.

v. The cutters shall exert a minimum force at the tooth tip of 1,641 lbs./hp (9,787 N/kW) during momentary load peaks.

b. Shafts

i. Grinder drive and driven shafts shall be made of 4140 heat treated hexagon steel with a tensile strength rating of not less than 149,000 psi (1,027 kPa).

ii. Each hexagonal shaft shall measure a nominal 2 inches (51 mm) across parallel surfaces.

c. Intermediate Shaft Support

i. An intermediate shaft support shall be provided in the center of the cutter stack for all grinders with 40 inch (1,016 mm) cutter stacks. Grinders with 50 inch (1,270 mm) or 60 inch (1,524 mm) cutter stacks shall have two intermediate shaft supports.

ii. The intermediate shaft support shall provide additional support for heavier than normal influent grinder demand loads and protection for the seal assemblies.

iii. The intermediate shaft support shall be made of a cast 303 stainless steel collar and two bushings. The bushings shall act as bearings to allow the free rotation of the shafts.

d. Shaft Bearings and Seals

i. The radial and axial loads of the cutter shafts shall be borne by sealed, oversized, deep-groove ball bearings at each end.

ii. The bearings shall be protected by a combination of a replaceable and independent tortuous path device and mechanical seals.

iii. Face materials shall be of tungsten carbide to tungsten carbide.

iv. O-rings shall be made of Buna-N elastomers.

v. Products requiring continuous or occasional lubrication or flushing shall not be accepted.

vi. The mechanical seal shall be rated at 90 psi (620 kPa) continuous duty by the seal supplier.

vii. The bearings shall be housed in a replaceable cartridge that supports and aligns the bearings and seals, as well as protects the shafts and end housings. The seal elements shall be independent of the stack height, therefore cutter stack tightness shall not affect seal performance. The seal elements shall

maintain their factory set preload independent of the cutter stack tightness.

viii. Seals shall meet required pressure rating regardless of cutter stack fit. The seal cartridge shall provide seal protection against axial loading on shafts and bearings during shaft deflection.

ix. Each seal element shall be positively locked to its corresponding rotating or static cartridge element. This positive lock on the seal elements is critical to long seal life in applications where grit or other abrasive materials are present.

e. Side Rails

i. The inside profile of the cutter side rails shall be concave to follow the radial arc of the cutters.

ii. Clearance between the major diameter of the cutters and the concave arc of the side rails shall not exceed 5/16 inch (7.9 mm).

iii The side rails shall have evenly-spaced slots that increase flow and decrease head loss.

iv. The side rails shall be cast of A 536-84 ductile iron.

f. End Housings and Covers

i. Grinder end housings shall be of cast A 536-84 ductile iron with a cast-in-place flow deflector, designed to protect the bushings while guiding particles directly into the cutting chamber.

ii. Top covers shall be A 536-84 ductile iron and bottom covers shall be A 36 hot rolled plates.

g. Reducer

i. The speed reducer shall be a grease-filled planetary-type of reducer with a 500% shock load capacity. The reduction ratio shall be 29:1.

ii. The input shaft of the reducer shall be directly coupled to the motor using a three-piece coupling, and the output shaft of the reducer shall be directly coupled with the grinder using a two-piece coupling.

h. Motor

i. The motor shall be 3 hp Baldor Immersible XPNV, 1,770 rpm, 230/460 volt, 3 phase, 60 Hz.

ii. Motor service factor shall be 1.0, the efficiency factor not less than 89.5% at full load and the power factor not less than 67% at full load.

i. Required Running Torque per Horsepower (kW):

i. At Momentary Load Peaks: 3,805 in-lbs/hp (576 Nm/kW)

C. Motor Controller(S)

1. General

a. The controller shall provide independent control of the grinder.

b. Controller shall be the supplier's standard UL/cUL listed Model PC2200.

c. The controller shall be rated for 3 hp, 208/230 volts, 3 phase, 60Hz.

2. Operation

a. The controller shall be equipped with a GRINDER ON-OFF/RESET-AUTO three (3) position selector switch.

i. In the OFF/RESET mode the grinder shall not run. In the ON mode the grinder will run.

ii. In the AUTO mode the grinder shall start and stop as controlled by a remotely-located dry contact.

iii. The grinder shall only be reset by switching the GRINDER ON-OFF/RESET-AUTO switch to the OFF/RESET position.

3. Safety Features

a. When a grinder jam condition occurs in the grinder ON or AUTO mode the controller shall stop the grinder, then reverse the grinder rotation to clear the obstruction. If the jam is cleared, the controller shall return the grinder to normal operation. Up to two (2) additional reversing cycles (3 times total) may occur within 30 seconds before the controller de-energizes the grinder motor and activates the grinder fail indicator and relay.

b. If a power failure occurs while a grinder is running, operation will resume when power is restored.

c. If a power failure occurs while the grinder is in a fail condition the fail indicator shall reactivate when power is restored.

d. The controller shall provide overload protection for the motor through an overload relay mounted directly on the grinder starter.

e. Short-circuit protection requires that a properly-sized circuit breaker or fuses be installed by others.

f. Controller reset shall be from the local panel controls only.

4. Components

a. Enclosure

i. Enclosures shall be NEMA 4X, fabricated of fiberglass-reinforced polyester resins, and shall be suitable for wall mounting. Doors shall have hinges and corrosion-resistant latches.

ii. Enclosure shall house the control devices, relays, terminal blocks and reversing motor starters.

b. Control Devices

i. Pilot devices shall be mounted on the enclosure front panel door.

ii. The controller shall have indicator lights for POWER ON, RUN, and FAIL.

iii. Indicator lights are LED pilot lights. Lights and the selector switches shall be heavy duty NEMA 4X type.

iv. Control transformer shall be protected by two primary fuses and one secondary fuse. The 120 volt secondary shall have one leg grounded.

v. One normally open (Form A) 2 ampere relay contact is provided for a FAIL signal and another is provided for a RUN signal.

c. Motor Starter

i. Starter shall be a full-voltage reversing type with 120 volt operating coils.

ii. Forward and reverse contactors on the starters shall have both mechanical and electrical interlocks.

iii. Overload relays (OL) shall be adjustable so that the range selected includes the FLA (full load amperes) rating and service factor.

D. Source Quality Control

1. Each grinder and controller shall be factory tested to ensure satisfactory operation.

E. Installation

1. Grinder(s) and motor controller(s) shall be installed in accordance with the supplier's installation instructions, and in compliance with all OSHA, local, state, and federal codes and regulations.

F. Field Quality Control

1. Supplier shall provide the services of a factory-trained representative to check the installation and to start up each grinder and controller. The factory representative shall have complete knowledge of proper installation, operation, and maintenance of equipment supplied. Representative shall inspect the final installation and supervise a start-up test of the equipment.

PART 3 EXECUTION

3.01 Installation

A. Install all components of the pumping station in accordance with their manufacturer's standard installation instructions.

3.02 Initial Operation

A. After the job installation is complete, a qualified factory representative shall place the station in operation, conduct a

complete function check, and make all necessary adjustments for regular service.

3.03 Guarantee

A. Unless otherwise specified, the manufacturer of the equipment shall guarantee, for eighteen (18) months from the date of owners acceptance that the entire station and all equipment therein shall be free from defects in design, materials, and workmanship. In the event a component fails or is proven defective during the guarantee period, the manufacturer will provide a replacement part including installation without cost, to the Authority. Normal use items such as grease, light bulbs, mechanical seals, packing, and belts are excluded.

END OF SECTION

SECTION 02624-E-1 (E-ONE)
ON-LOT SEWAGE GRINDER PUMPING UNITS

PART 1 GENERAL

1.01 Description

A. The Work of this section includes, but is not limited to:

On-lot sewage grinder pumping units in fiberglass reinforced plastic basins for use in conjunction with low-pressure sewer systems.

B. Related work specified elsewhere:

Trenching, Pipe Laying, Backfilling & Compacting	Section 02221
Building Sewers	Section 02602
Low-Pressure Sewer System	Section 02622.

C. The manufacturer shall furnish complete factory-built and tested Grinder Pump Station(s), each consisting of grinder pump(s) suitably mounted in a basin constructed of high density polyethylene (HDPE) for simplex stations and HDPE or Fiberglass Reinforced Polyester Resin for duplex stations, NEMA 6P electrical quick release disconnect (EQD), pump removal system, shut-off valve, anti-siphon valve, check valve, each assembled in the basin, electrical alarm panel, and all necessary internal wiring and controls. Component type grinder pump systems that require field assembly will not be acceptable, due to the potential problems that can occur during field assembly. All components and materials shall be in accordance with section 2.0 of this Product Specification. For ease of serviceability, all pump, motor/grinder units shall be of like type and horsepower throughout the system.

D. Design Criteria:

Site conditions will determine whether a simplex or duplex grinder pumping unit will be required. The Monroe Township Municipal Authority will advise the property owner as to which type of grinder pumping unit to use.

1.02 Manufacturer

Grinder pump stations, complete with all appurtenances, form an integral system, and as such, shall be supplied by one grinder pump station manufacturer. The Contractor shall be responsible for the satisfactory operation of the entire system. The equipment specified shall be a product of a company experienced in the design and manufacture of grinder pumps for specific use in low pressure sewage systems. The company shall submit detailed installation and user instructions for its product, submit evidence of an established service program including complete parts and service manuals, and be responsible for maintaining a continuing inventory of grinder pump replacement parts. The manufacturer shall provide a reference and contact list from ten of its largest contiguous grinder pump installations of the type of grinder pumps described within this specification.

The manufacturer of the grinder pump station shall be Environment One Corporation with no substitutions allowed.

1.03 Operating Conditions

The pumps shall be capable of delivering 15 GPM against a rated total dynamic head of 0 feet (0 PSIG), 11 GPM against a rated total dynamic head of 92 feet (40 PSIG), and 7.8 GPM against a rated total dynamic head of 185 feet (80 PSIG). The pump(s) must also be capable of operating at negative total dynamic head without overloading the motor(s). Under no conditions shall in-line piping or valving be allowed to create a false apparent head.

1.04 Warranty

The grinder pump manufacturer shall provide a part(s) and labor warranty on the complete station and accessories, including, but not limited to, the panel for a period of twenty-four (24) months after notice of Owner's acceptance, but no greater than twenty-seven (27) months after receipt of shipment. Any manufacturing defects found during the warranty period will be reported to the manufacturer by the Owner and will be corrected by the manufacturer at no cost to the Owner.

PART 2 PRODUCTS

2.01 Pump

The pump and controls (core unit) shall be installed in the basin by the manufacturer. Field assembly of the pump and controls into the basin is not acceptable because of potential workmanship issues and increased installation time. In some cases, stations taller than 96" may

be shipped on their side without the cores assembled in the basin for freight purposes but this is the only exception. The pump shall be a custom designed, integral, vertical rotor, motor driven, solids handling pump of the progressing cavity type with a single mechanical seal. Double radial O-ring seals are required at all casting joints to minimize corrosion and create a protective barrier. All pump castings shall be cast iron, fully epoxy coated to 8-10 mil Nominal dry thickness, wet applied. The rotor shall be through-hardened, highly polished, precipitation hardened stainless steel. The stator shall be of a specifically compounded ethylene propylene synthetic elastomer. The material shall be suitable for domestic wastewater service. Its physical properties shall include high tear and abrasion resistance, grease resistance, water and detergent resistance, temperature stability, excellent aging properties, and outstanding wear resistance. Buna-N is not acceptable as a stator material because it does not exhibit the properties as outlined above and required for wastewater service.

2.02 Grinder

The grinder shall be placed immediately below the pumping elements and shall be direct-driven by a single, one-piece motor shaft. The grinder impeller assembly shall be securely fastened to the pump motor shaft by means of a threaded connection attaching the grinder impeller to the motor shaft. Attachment by means of pins or keys will not be acceptable. The grinder will be a one-piece, forged 4140 cutter wheel of the rotating type with inductively hardened cutter teeth (Rockwell 55-58c) for abrasion resistance. A stationary quench hardened and ground shredding ring shall be provided. The shredding ring will have a staggered tooth pattern with only one edge engaged at a time, maximizing the cutting torque.

This assembly shall be dynamically balanced and operate without objectionable noise or vibration over the entire range of recommended operating pressures. The grinder shall be constructed so as to eliminate clogging and jamming under all normal operating conditions including starting. Sufficient vortex action shall be created to scour the tank free of deposits or sludge banks which would impair the operation of the pump. These requirements shall be accomplished by the following, in conjunction with the pump:

1. The grinder shall be positioned in such a way that solids are fed in an upward flow direction.

2. The maximum flow rate through the cutting mechanism must not exceed 4 feet per second. This is a critical design element to prevent jamming and as such must be adhered to.

3. The inlet shroud shall have a diameter of no less than 5 inches. Inlet shrouds that are less than 5 inches in diameter will not be

accepted due to their inability to maintain the specified 4 feet per second maximum inlet velocity which by design prevents unnecessary jamming of the cutter mechanism and eliminates blinding of the pump by large objects blocking the inlet shroud.

4. The impeller mechanism must rotate at a nominal speed of no greater than 1800 rpm.

The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of "foreign objects," such as paper, wood, plastic, glass, rubber and the like, to finely-divided particles which will pass freely through the passages of the pump and the 1-1/4" diameter stainless steel discharge piping.

2.03 Electric Motor

As a maximum, the motor shall be a 1 HP, 1725 RPM, 240 Volt 60 Hertz, 1 Phase, capacitor start, ball bearing, air-cooled induction type with Class F installation, low starting current not to exceed 30 amperes and high starting torque of 8.4 foot pounds. The motor shall be press-fit into the casting for better heat transfer and longer winding life. Inherent protection against running overloads or locked rotor conditions for the pump motor shall be provided by the use of an automatic-reset, integral thermal overload protector incorporated into the motor. This motor protector combination shall have been specifically investigated and listed by Underwriters Laboratories, Inc., for the application. Non-capacitor start motors or permanent split capacitor motors will not be accepted because of their reduced starting torque and consequent diminished grinding capability. The wet portion of the motor armature must be 300 Series stainless. To reduce the potential of environmental concerns, the expense of handling and disposing of oil, and the associated maintenance costs, oil-filled motors will not be accepted.

2.04 Mechanical Seal

The pump/core shall be provided with a mechanical shaft seal to prevent leakage between the motor and pump. The seal shall have a stationary ceramic seat and carbon rotating surface with faces precision lapped and held in position by a stainless steel spring.

2.05 Tank and Integral Accesway

(Model DH071) High Density Polyethylene Construction. The tank shall be a wetwell/drywell design made of high density polyethylene, with a grade selected to provide the necessary environmental stress cracking resistance. Corrugated sections are to be made of a double wall construction with the internal wall being generally smooth to promote scouring. Corrugations of the outside wall are to be of a

minimum amplitude of 1 1/2" to provide necessary transverse stiffness. Any incidental sections of a single wall construction are to be a minimum .250 inch thick. All seams created during tank construction are to be thermally welded and factory tested for leak tightness. Tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure.

The tank shall be furnished with one EPDM grommet fitting to accept a 4.50" OD DWV or Schedule 40 pipe. Tank capacities shall be as shown on the contract drawings.

The drywell accessway shall be an integral extension of the wet well assembly and include a lockable cover assembly providing low profile mounting and watertight capability. Accessway design and construction shall enable field adjustment of station height in increments of 4" or less without the use of any adhesives or sealants requiring cure time before installation can be completed.

The station shall have all necessary penetrations molded in and factory sealed. To ensure a leak free installation no field penetrations shall be acceptable.

All discharge piping shall be constructed of 304 Series Stainless Steel. The discharge shall terminate outside the accessway bulkhead with a stainless steel, 1 1/4 inch female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 235 psi WOG; PVC ball valves or brass ball/gate will not be accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P electrical quick disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The EQD will be supplied with a minimum of 32’, 25’ of useable electrical supply cable (ESC) outside the station, to connect to the alarm panel. The ESC shall be installed in the basin by the manufacturer. Field assembly of the ESC into the basin is not acceptable because of potential workmanship issues. The EQD requires no tools for connecting, seals against water before the electrical connection is made, and includes radial seals to assure watertight seal regardless of tightening torque. Plug-type connections of the power cable onto the pump housing will not be acceptable due to the potential for leaks and electrical shorts. A junction box shall not be permitted in the accessway. The EQD shall be so designed to be conducive to field wiring as needed. The accessway shall also include an integral 2-inch vent to prevent sewage gases from accumulating in the tank.

2.06 Tank & Integral Accessway

(Models DH151 & DH152) High Density Polyethylene Construction. The tank shall be a wetwell/drywell design made of high density polyethylene, with a grade selected to provide the necessary environmental stress cracking resistance. Corrugated sections are to be made of a double wall construction with the internal wall being generally smooth to promote scouring. Corrugations of the outside wall are to be of minimum amplitude of 1 1/2" to provide necessary transverse stiffness. Any incidental sections of a single wall construction are to be a minimum .250 inch thick. All seams created during tank construction are to be thermally welded and factory tested for leak tightness. Tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure.

The tank shall be furnished with one EPDM grommet fitting to accept a 4.50" OD DWV or Schedule 40 pipe. Tank capacities shall be as shown on the contract drawings.

The drywell accessway shall be an integral extension of the wet well assembly and include a lockable cover assembly providing low profile mounting and watertight capability. Accessway design and construction shall enable field adjustment of station height in increments of 4" or less without the use of any adhesives or sealants requiring cure time before installation can be completed.

The station shall have all necessary penetrations molded in and factory sealed. To ensure a leak free installation no field penetrations shall be acceptable.

All discharge piping shall be constructed of 304 Series Stainless Steel. The discharge shall terminate outside the accessway bulkhead with a stainless steel, 1 1/4 inch female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 235 psi WOG; PVC ball valves or brass ball/gate valves will not be accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P electrical quick disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The EQD will be supplied with a minimum of 32', 25' of useable electrical supply cable (ESC) outside the station, to connect to the alarm panel. The (ESC) shall be installed in the basin by the manufacturer. Field assembly of the ESC into the basin is not acceptable because of potential workmanship issues. The EQD

requires no tools for assembly, seals against water before the electrical connection is made, and includes radial seals to assure watertight seal regardless of tightening torque. Plug-type connections of the power cable onto the pump housing will not be acceptable due to the potential for leaks and electrical shorts. A junction box shall not be permitted in the accessway. The accessway shall also include an integral 2-inch vent to prevent sewage gases from accumulating in the tank.

2.07 Tank & Integral Accessway

(DH272 & DH502) Fiberglass reinforced polyester resin. The tank shall be a wet-well/dry-well design custom molded of fiberglass reinforced polyester resin. Tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to 150 percent maximum external soil and hydrostatic pressure.

The tank shall be furnished with one EPDM grommet fitting to accept a 4.50" OD DWV or schedule 40 pipe. Tank capacities shall be as shown on the contract drawings.

The drywell accessway shall be an integral extension of the wet well assembly and include a lockable cover assembly providing low profile mounting and watertight capability. Accessway design and construction shall facilitate field adjustment of station height in increments of 3” without the use of any adhesives or sealants requiring cure time before installation can be completed.

The station shall have all necessary penetrations molded in and factory sealed. To ensure a leak free installation no field penetrations shall be acceptable.

All discharge piping shall be constructed of 304 Series Stainless Steel. The discharge shall terminate outside the accessway bulkhead with a stainless steel, 1 1/4 inch female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 235 psi WOG; PVC ball valves or brass ball/gate valves will not be accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P electrical quick disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The EQD will be supplied with a minimum of 32’, 25’ of useable electrical supply cable (ESC) outside the station, to connect to the alarm panel. The ESC shall be installed in the basin by the manufacturer. Field assembly of the ESC into the basin is not acceptable because of potential workmanship issues. The EQD requires no tools for assembly, seals against water before the electrical

connection is made, and includes radial seals to assure watertight seal regardless of tightening torque. Plug-type connections of the power cable onto the pump housing will not be acceptable due to the potential for leaks and electrical shorts. A junction box shall not be permitted in the accessway. The accessway shall also include an integral 2-inch vent to prevent sewage gases from accumulating in the tank.

2.08 Check Valve

The pump discharge shall be equipped with a factory installed, gravity operated, flapper-type integral check valve built into the stainless steel discharge piping. The check valve will provide a full-ported passageway when open, and shall introduce a friction loss of less than 6 inches of water at maximum rated flow. Moving parts will be made of a 300 series stainless steel and fabric reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A nonmetallic hinge shall be an integral part of the flapper assembly providing a maximum degree of freedom to assure seating even at a very low back-pressure. The valve body shall be an injection molded part made of an engineered thermoplastic resin. The working pressure of the valve shall be at least 235 psi. Ball type check valves are unacceptable due to their limited sealing capacity in slurry applications.

2.09 Anti-Siphon Valve

The pump discharge shall be equipped with a factory-installed, gravity-operated, flapper-type integral anti-siphon valve built into the stainless steel discharge piping. Moving parts will be made of 300 series stainless steel and fabric-reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A nonmetallic hinge shall be an integral part of the flapper assembly, providing a maximum degree of freedom to ensure proper operation even at a very low pressure. The valve body shall be injection-molded from an engineered thermoplastic resin. Holes or ports in the discharge piping are not acceptable anti-siphon devices, due to their tendency to clog from the solids in the slurry being pumped. Anti-siphon port diameter shall be no less than 60% of the inside diameter of the pump discharge piping.

2.10 Core Unit

The grinder pump station shall have a cartridge type, easily removable core assembly consisting of pump, motor, grinder, all motor controls, check valve, anti-siphon valve, level control, electrical quick disconnect and wiring. The core unit shall be installed in the basin by the manufacturer. Field assembly of the pump and controls into the basin is not acceptable because of potential workmanship issues and increased installation time. In some cases, stations taller than 96” may

be shipped on their side without the cores assembled in the basin for freight purposes but this is the only exception. The core unit shall seal to the tank deck with a stainless steel latch assembly. The latch assembly must be actuated utilizing a single quick release mechanism requiring no more than a half turn of a wrench. The watertight integrity of each core unit shall be established by a 100 percent factory test at a minimum of 5 PSIG.

2.11 Controls

All necessary motor starting controls shall be located in the cast iron enclosure of the core unit secured by stainless steel fasteners. Locating motor starting controls in a plastic enclosure is not acceptable. Wastewater level sensing controls shall be housed in a separate enclosure from motor starting controls. Level sensor housing must be sealed via a radial type seal; solvents or glues are not acceptable. Level sensing control housing must be integrally attached to pump assembly so that it may be removed from the station with the pump and in such a way as to minimize the potential for the accumulation of grease and debris accumulation, etc. Level sensing housing must be a high-impact thermoplastic copolymer over-molded with a thermo plastic elastomer. The use of PVC for the level sensing housing is not acceptable.

Non-fouling wastewater level controls for controlling pump operation shall be accomplished by monitoring the pressure changes in an integral air column connected to a pressure switch. The air column shall be integrally molded from a thermoplastic elastomer suitable for use in wastewater and with excellent impact resistance. The air column shall have only a single connection between the water level being monitored and the pressure switch. Any connections are to be sealed radially with redundant O-rings. The level detection device shall have no moving parts in direct contact with the wastewater and shall be an integral to the pump core assembly in a single, readily-exchanged unit. Depressing the push to run button must operate the pump even with the level sensor housing removed from the pump.

All fasteners throughout the assembly shall be 300 Series stainless steel. High-level sensing will be accomplished in the manner detailed above by a separate air column sensor and pressure switch of the same type. Closure of the high-level sensing device will energize an alarm circuit as well as a redundant pump-on circuit. For increased reliability, pump ON/OFF and high-level alarm functions shall not be controlled by the same switch. Float switches of any kind, including float trees, will not be accepted due to the periodic need to maintain (rinsing, cleaning) such devices and their tendency to malfunction because of incorrect wiring, tangling, grease buildup, and mechanical cord fatigue. To assure reliable operation of the pressure switches, each core shall be equipped with a factory installed equalizer diaphragm that compensates for any atmospheric pressure or

temperature changes. Tube or piping runs outside of the station tank or into the tank mounted junction boxes providing pressure switch equalization will not be permitted due to their susceptibility to condensation, kinking, pinching, and insect infestation. The grinder pump will be furnished with a 6 conductor 14 gauge, type SJOW cable, pre-wired and watertight to meet UL requirements with a factory installed NEMA 6P EQD half attached to it.

2.12 Alarm Panel

Each grinder pump station shall include a NEMA 4X, UL-listed alarm panel suitable for wall or pole mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic polyester to ensure corrosion resistance. The enclosure shall include a hinged, lockable cover with padlock, preventing access to electrical components, and creating a secured safety front to allow access only to authorized personnel. The enclosure shall not exceed 10.5" W x 14" H x 7" D, or 12.5" W x 16" H x 7.5" D if certain options are included.

The alarm panel shall contain one (1) 15-amp, double-pole circuit breaker for the pump core's power circuit and one (1) 15-amp single-pole circuit breaker for the alarm circuit. The panel shall contain a push-to-run feature, an internal run indicator, and a complete alarm circuit. All circuit boards in the alarm panel are to be protected with a conformal coating on both sides and the AC power circuit shall include an auto resetting fuse.

The alarm panel shall include the following features: external audible and visual alarm; push-to-run switch; push-to-silence switch; redundant pump start; and high level alarm capability. The alarm sequence is to be as follows when the pump and alarm breakers are on:

1. When liquid level in the sewage wet-well rises above the alarm level, audible and visual alarms are activated, the contacts on the alarm pressure switch activate, and the redundant pump starting system is energized.
2. The audible alarm may be silence by means of the externally mounted, push-to-silence button.
3. Visual alarm remains illuminated until the sewage level in the wet-well drops below the "off" setting of the alarm pressure switch.

The visual alarm lamp shall be inside a red, oblong lens at least 3.75" L x 2.38" W x 1.5" H. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain NEMA 4X rating. The audible alarm shall be externally mounted on the bottom of the enclosure, capable of 93 dB @ 2 feet. The audible alarm shall be capable of being deactivated by depressing a push-type switch that is

encapsulated in a weatherproof silicone boot and mounted on the bottom of the enclosure (push-to-silence button).

For duplex stations, in addition to the above, two high level indicator lights shall be mounted within the enclosure on the duplex panel's alarm circuit board. During high level alarm indication on duplex stations, the appropriate indicator light will illuminate to indicate which core requires service.

The entire alarm panel, as manufactured and including any of the following options, shall be listed by Underwriters Laboratories, Inc.

2.13 Serviceability

The grinder pump core, including level sensor assembly, shall have two lifting hooks complete with lift-out harness connected to its top housing to facilitate easy core removal when necessary. The level sensor assembly must be easily removed from the pump assembly for service or replacement. All mechanical and electrical connections must provide easy disconnect capability for core unit removal and installation. Each EQD half must include a water-tight cover to protect the internal electrical pins while the EQD in unplugged. A pump push-to-run feature will be provided for field trouble shooting. The push-to-run feature must operate the pump even if the level sensor assembly has been removed from the pump assembly. All motor control components shall be mounted on a readily replaceable bracket for ease of field service.

2.14 OSHA Confined Space

All maintenance tasks for the grinder pump station must be possible without entry into the grinder pump station (as per OSHA 191 0.146**,** permit-required confined spaces). *"Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space."*

2.15 Safety

The grinder pump shall be free from electrical and fire hazards as required in a residential environment. As evidence of compliance with this requirement, the completely assembled and wired grinder pump station shall be listed by Underwriters Laboratories, Inc., to be safe and appropriate for

the intended use. UL listing of components of the station, or third-party testing to UL standard are not acceptable.

The grinder pump shall meet accepted standards for plumbing equipment for use in or near residences, shall be free from noise, odor, or health hazards, and shall have been tested by an independent laboratory to certify its capability to perform as specified in either individual or low pressure sewer system applications. As evidence of compliance with this requirement, the grinder pump shall bear the seal of NSF International. Third-party testing to NSF standard is not acceptable.

PART 3 EXECUTION

3.01 Factory Test

Each grinder pump shall be submerged and operated for 5 minutes (minimum). Included in this procedure will be the testing of all ancillary components such as, the anti-siphon valve, check valve, discharge assembly and each unit's dedicated level controls and motor controls. All factory tests shall incorporate each of the above listed items. Actual appurtenances and controls which will be installed in the field, shall be particular to the tested pump only. A common set of appurtenances and controls for all pumps is not acceptable. Certified test results shall be available upon request showing the operation of each grinder pump at two (2) different points on its curve, with a maximum pressure of no less than 80 psi and a factory bearing vibration test. The Engineer reserves the right to inspect such testing procedures with representatives of the Owner, at the grinder pump manufacturer's facility.

All completed stations shall be factory leak tested to assure the integrity of all joints, seams and penetrations. All necessary penetrations such as inlets, discharge fittings and cable connectors shall be included in this test along with their respective sealing means (grommets, gaskets etc.).

3.02 Delivery

All grinder pump units will be delivered to the job site 100 percent completely assembled, including testing, ready for installation. Field installation of the pump in tanks under 96" is not allowed. Field installation of the level sensor into the tank is not allowed. Grinder pump stations will be individually mounted on wooden pallets.

3.03 Installation

Earth excavation and backfill are specified under Site Work, but are also to be done as a part of the work under this section, including any necessary sheeting and bracing.

The Contractor shall be responsible for handling ground water to provide a firm, dry subgrade for the structure, and shall guard against flotation or other damage resulting from general water or flooding.

The grinder pump stations shall not be set into the excavation until the installation procedures and excavation have been approved by the Engineer.

Remove packing material. Users instructions must be given to the Owner. Hardware supplied with the unit, if required, will be used at installation. The basin will be supplied with a standard 4" inlet grommet (4.50" OD) for connecting the incoming sewer line. Appropriate inlet piping must be used. The basin may not be dropped, rolled or laid on its side for any reason.

Installation shall be accomplished so that 1" to 4" of accessway, below the bottom of the lid, extends above the finished grade line. The finished grade shall slope away from the unit. The diameter of the excavated hole must be large enough to allow for the concrete anchor.

A 6" inch (minimum) layer of naturally rounded aggregate, clean and free flowing, with particle size of not less than 1/8" or more than 3/4" shall be used as bedding material under each unit.

A concrete anti-flotation collar, as detailed on the drawings, and sized according to the manufacturer’s instructions, shall be required and shall be pre-cast to the grinder pump or poured in place. Each grinder pump station with its pre-cast anti-flotation collar shall have a minimum of three (3) lifting eyes for loading and unloading purposes.

If the concrete is poured in place, the unit shall be leveled, and filled with water, to the bottom of the inlet, to help prevent the unit from shifting while the concrete is being poured. The concrete must be manually vibrated to ensure there are no voids. If it is necessary to pour the concrete to a level higher than the inlet piping, an 8" sleeve is required over the inlet prior to the concrete being poured.

The Contractor will provide and install a four (4) foot piece of four inch SCH 40 PVC pipe with water tight cap, to stub-out the inlet for the property owners’ installation contractor, as depicted on the contract drawings.

The electrical enclosure shall be furnished, installed and wired to the grinder pump station by the Contractor. An alarm device is required on every installation, there shall be no exceptions. It will be the responsibility of the Contractor and the Engineer to coordinate with the individual property owner(s) to determine the optimum location for the Alarm Panel.

The Contractor shall mount the alarm device in a conspicuous location, as per national and local codes. The alarm panel will be connected to the grinder pump station by a length of six (6) conductor 12 gauge type TC cable as shown on the contract drawings. The power and alarm circuits must be on separate power circuits. The grinder pump stations will be provided with a minimum of 32', 25' of useable electrical supply cable outside the station, to connect to the alarm panel. This cable shall be supplied with a Factory Installed EQD half to connect to the mating EQD half on the core.

3.04 Backfill Requirements

Proper backfill is essential to the long-term reliability of any underground structure. Several methods of backfill are available to produce favorable results with different native soil conditions. The most highly recommended method of backfilling is to surround the unit to grade using Class I or Class II backfill material as defined in ASTM 2321. Class 1A and Class 1B are recommended where frost heave is a concern, Class 1B is a better choice when the native soil is sand or if a high, fluctuating water table is expected. Class 1, angular crushed stone offers an added benefit in that it doesn't need to be compacted.

Class II, naturally rounded stone, may require more compactive effort, or tamping, to achieve the proper density. If the native soil condition consists of clean compactable soil, with less than 12 percent fines, free of ice, rocks, roots and organic material, it may be an acceptable backfill. Soil must be compacted in lifts not to exceed one foot to reach a final Proctor Density of between 85 percent and 90 percent. Heavy, non-compactable clays and silts are not suitable backfill for this or any underground structure such as inlet or discharge lines.

If you are unsure of the consistency of the native soil, it is recommended that a geotechnical evaluation of the material is obtained before specifying backfill.

Another option is the use of a flowable fill (i.e., low slump concrete). This is particularly attractive when installing grinder pump stations in augured holes where tight clearances make it difficult to assure proper backfilling and compaction with dry materials. Flowable fills should not be dropped more than 4 feet from the discharge to the bottom of the hole to avoid separation of the constituent materials.

Backfill of clean native earth, free of rocks, roots, and foreign objects shall be thoroughly compacted in lifts not exceeding 12" to a final Proctor Density of not less than 85 percent. Improper backfilling may result in damaged accessways. The grinder pump station shall be installed at a minimum depth from grade to the top of the 1 1/4" discharge line, to assure maximum frost protection. The finish grade

line shall be 1" to 4" below the bottom of the lid, and final grade shall slope away from the grinder pump station.

All restoration will be the responsibility of the Contractor. Per unit costs for this item shall be included in the Contractor's bid price for the individual grinder pump stations. The properties shall be restored to their original condition in all respects, including, but not limited to, curb and sidewalk replacement, landscaping, loaming and seeding, and restoration of the traveled ways, as directed by the Engineer.

3.05 Start-Up and Field Testing

The Manufacturer shall provide the services of qualified factory trained technician(s) who shall inspect the placement and wiring of each station, perform field tests as specified herein, and instruct the Owner's personnel in the operation and maintenance of the equipment before the stations are accepted by the Owner.
Upon completion of the installation, the authorized factory technician(s) will perform the following test on each station:

1. Make certain the discharge shut-off valve in the station is fully open.
2. Turn ON the alarm power circuit and verify the alarm is functioning properly.
3. Turn ON pump power circuit. Initiate pump operation to verify automatic "on/off" controls are operative. Pump should immediately turn ON.
4. Consult the Manufacturer's Service Manual for detailed start-up procedures.

Upon completion of the start-up and testing, the Manufacturer shall submit to the Engineer the start-up authorization form describing the results of the tests performed for each grinder pump station. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed and any installation deficiencies corrected.

END OF SECTION

SECTION 02651
SEWER AND MANHOLE TESTING

PART 1 GENERAL

1.01 Description

A. The installation of all sewers shall be tested by the Owner at his expense in the field, in the presence of Monroe Township Municipal Authority together with a representative of the Owner in the manner prescribed herein.

PART 2 TESTING

2.01 Gravity Sewers

A. General

All sewers shall be tested by the following four (4) methods:

1. Mandrel Testing

To be performed on all PVC gravity sewers

2. Air Test

To be performed following completion of mandrel test on each section of sewer lines between manholes.

3. Exfiltration

To be performed when and where described by the Authority in sections following completion of a street or area sewered.

4. Infiltration

To be performed when and where described by the Authority in sections following completion of a street or area sewered.

B. If, at anytime before the completion of the Project or within the 18 month maintenance period after completion, any broken pipes, or any defects are found in lines or in any of their appurtenances, Owner shall cause same to be removed and replaced by proper material and workmanship at no cost to the Authority even though such injury or damage may not have been due to any act, default, or negligence on part of Owner.

C. Prior to final inspection by the Authority, all sewers, pipe lines, and appurtenances shall be thoroughly flushed and cleaned by the Owner to remove all foreign material which may have entered during construction.

D. In addition to the above specified tests, the Authority reserves the right to inspect the inside of all sewer lines by the TV camera method. The Authority will arrange and pay for such inspection, but all defects found by such inspection will be replaced by the Owner at his expense, to the full satisfaction of the Authority.

2.02 Mandrel Test

A. Deflection tests shall be successfully performed on the complete installation of PVC pipe by means of a mandrel test.

B. The Contractor shall utilize a 5% deflection mandrel to ensure that PVC pipe deflection during installation has not been exceeded. Mandrel test shall be conducted no earlier than 30 (thirty) days after compaction of trench backfill.

C. Mandrel Test Procedure

1. Completely flush the line making sure the pipe is clean of any mud or debris that would hinder the passage of the mandrel.

2. During the final flushing of the line, attach a floating block or ball to the end of the mandrel rope and float the rope through the line (A nylon rope is recommended).

3. After the rope is threaded through the line to be tested, connect the pull rope to the mandrel and place the mandrel in the entrance to the pipe.

4. Connect a retrieval rope to the back of the mandrel to pull it back if necessary.

5. Remove all the slack in the rope and place a tape marker on the rope at the ends of pipe.

6. Draw the mandrel through the sewer line. If any irregularities or obstructions are encountered, corrective measures shall be taken as required.

7. If a section with excessive deflection is found, it shall be located and excavated. The pipe shall be inspected for damage; if any damage pipe is found, it shall be replaced at the Contractor's expense; if pipe is not damaged, replace and thoroughly tamp the haunching and initiate backfill; replace remainder of backfill.

2.03 Air Test (Low Pressure)

A. Following completion of the laterals and backfill of a section of sewer main between manholes, the Contractor shall conduct a low pressure air test. The test shall be performed using the below stated equipment and procedures and under the observation of the Authority.

B. Low pressure air testing equipment, as manufactured by Cherne Industrial, Inc., or approved equal, as determined by the Authority. Equipment used shall meet the following minimum requirements:

1. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.

2. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.

3. All air used shall pass through a single control panel.

C. All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psig. The plugs shall hold against this pressure without bracing and without movement of the plugs out of the pipe.

D. After a manhole to manhole section of pipe has been backfilled and cleaned, and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psig. Low pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psig greater than the average back pressure of any groundwater that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period (3.5 psig minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed "Acceptable" if the time required for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any

groundwater that may be over the pipe) shall be more than the time shown for the given diameters in the following table:

PIPE DIAMETER	MINUTES	LENGTH (feet)
6 inches	3	400
8 inches	4	400
10 inches	5	400
12 inches	6	400
15 inches	7	400
16 inches	7	400
18 inches	9	400

E. To determine the static pressure of the groundwater, the Owner shall install a one-half inch (1/2") diameter capped pipe nipple, approximately ten inches (10") long, through the manhole wall on top of one of the sewer lines entering the manhole. Immediately prior to the performance of the Air Test, the height of the groundwater shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The hose shall be held vertically and a measurement of the height in feet of water over the invert of the pipe rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. In no case shall the pipe be subjected to an internal pressure greater than 10 psi. If the installation fails to meet this requirement, the Owner shall at his own expense determine the source of leakage. He shall then repair or replace all defective materials or workmanship.

2.04 Exfiltration Test Method

A. Following Completion of sewer installation in a specified area, the sewer mains shall be tested for exfiltration. This method will be made by plugging lower manhole and filling pipe section between manholes with water and measuring quantity of water drop in the upper manhole over one (1) hour continuous period.

2.05 Infiltration Test Method

A. Infiltration tests shall be made by observing and measuring the infiltration of water into the completed sewer pipe lines over a continuous period of seventy two (72) hours. The Owner shall provide and install in the terminal manhole of the section under test a weir of approved design which shall allow the Authority to determine the rate of infiltration.

B. In either testing for infiltration or for exfiltration the allowable volume will be based on one hundred (100) gallons per inch of diameter pipe per mile pipe per day.

C. The details of testing shall be in accordance with A.S.T.M. Specification C425.

2.06 Force Mains - Sanitary Sewer

A. After the pipe has been laid, properly anchored and the anchors having reached prescribed strength, the pipe shall be partially backfilled between joints, each section of pipe between valves shall receive the following hydrostatic test.

1. The pipe shall be slowly filled with water and tested to 150 psi, based on the elevation of the lowest point of the line or section under test. The pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Authority. A meter to measure make-up water shall also be installed. The pump, pipe connections, taps in to the pipe, all necessary apparatus and necessary labor shall be furnished by the Owner.

2. Before applying the specified test pressure, all air shall be expelled from the pipe.

3. All exposed pipe, fittings, valves, and joints shall be carefully examined during the open-trench test. Any cracked or defective pipes, fittings, or valves discovered in consequence of this pressure test shall be removed and replaced by the Owner with new material and the test shall be repeated until satisfactory to the Authority. Should the Owner elect to backfill the entire trench, or any portion thereof, prior to testing, it shall be his responsibility to locate and repair any leaks which occur during this test.

4. While the test pressure is being maintained, all exposed pipe, fittings, valves, and joints shall be inspected for leaks which shall not exceed the ratio of two (2) gallons per hour per inch of pipe diameter per mile of pipe (See Exhibit I - Page 7). The test pressure shall be maintained for a period of not less than one (1) hour if joints are exposed and four (4) hours when joints are covered. During the testing period the drop in static pressure shall be carefully measured and shall not exceed ten (10) psi per hour.

5. The force main under test shall be considered defective if refill water exceeds the allowable limits specified above.

2.07 Vacuum Testing of Manholes

A. The testing shall be done after assembly of the manhole is completed. Manholes located in non-pavement areas shall be set to finished grade and backfilled prior to testing. Manholes located within pavement areas shall be set to finished grade and base course of asphalt shall be in place over flange prior to testing.

Manholes may be vacuum tested for dedication prior to installation of streets. However, if street construction occurs around and adjacent to the manholes, they may need to be re-tested to ensure continued integrity of the manhole even though they may have been previously tested and/or approved. This will be done at the discretion of the Authority.

Likewise, any other parts of the sewer facility system (pipe, clean-outs, etc.) that have been exposed to construction activities or may have been impacted by heavy equipment in some way, may also need to be re-tested at the discretion of the Authority.

B. The manhole-to-pipe connection shall be a flexible connector, such as the Kor-N-Seal or approved equal. A 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 mortar, as approved by the Authority's Engineer.

D. The seal between the manhole sections shall be in accordance with ASTM C990 or C443.

E. The contractor shall plug the pipe openings, taking care to securely brace the plugs and the pipe.

F. With the vacuum testing unit 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. The test shall pass if the vacuum remains at 10" Hg. or does not drop below 9" Hg. within a time of one minute. If the manhole fails the initial test, the contractor shall locate the leak and make proper repairs. Leaks may be filled with wet slurry of accepted quick setting material.

2.08 Testing Fees

A. Payment for all costs for the above specified testing shall be paid by the Developer. The Developer or his representative shall furnish all necessary labor, equipment and material necessary or incidental to performance of specified tests at no cost to the Monroe Township Municipal Authority. An Authority representative must be present when all tests are conducted.

2.09 Exfiltration Testing of Manholes

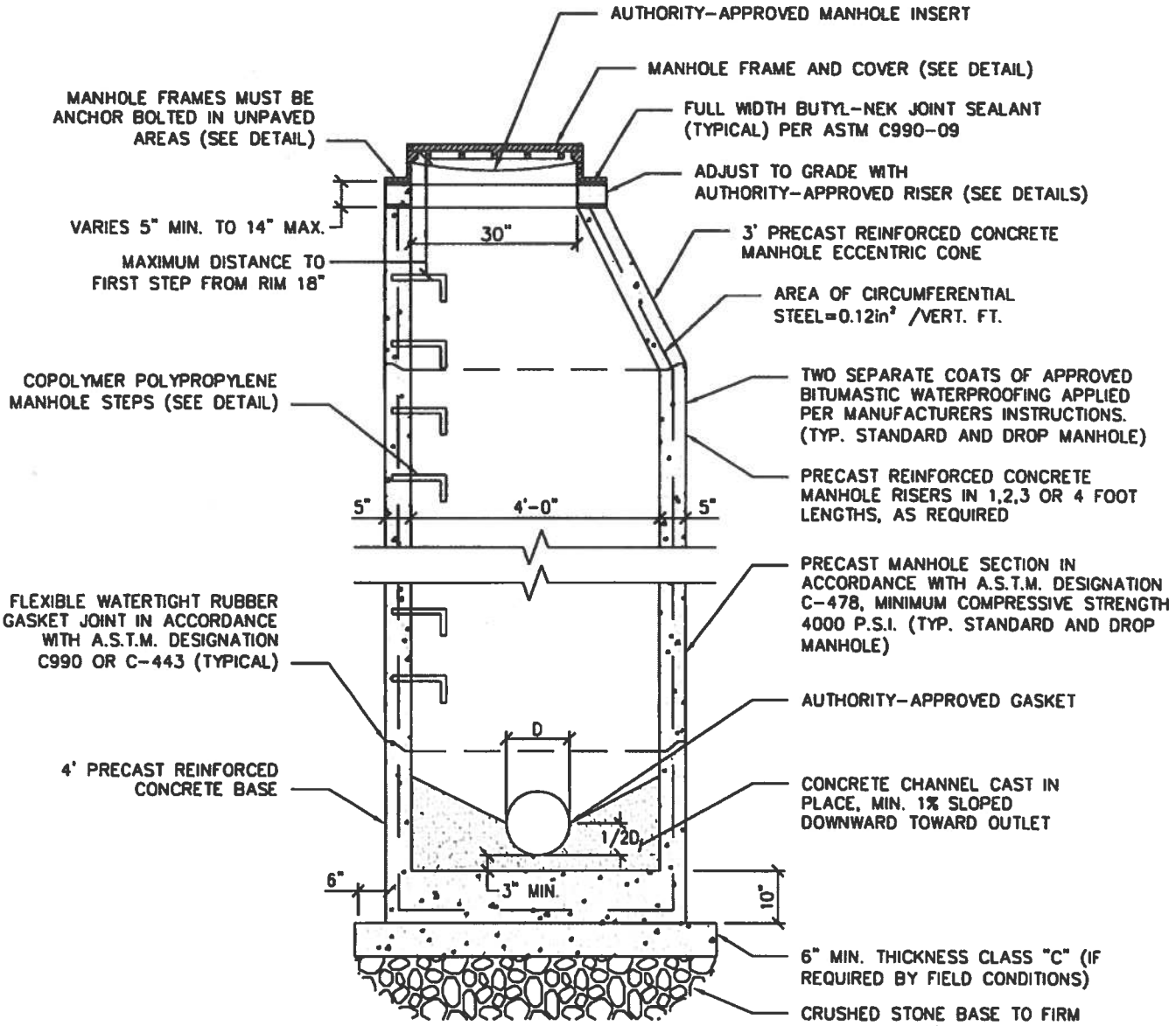
A. The allowable water drop in the manhole shall not exceed the equivalent of 100 gallons per inch pipe diameter per mile per day.

EXHIBIT I

PIPE SIZE (inches)	ALLOWABLE LEAKAGE PER MILE OF PIPE PER HOURS (gallons)
4	8
6	12
8	16
10	20
12	24
15	30
18	36
21	42
24	48
27	54
30	60
33	66
36	72
39	78

END OF SECTION

STANDARD DETAILS



NOTES:
1. ALL MANHOLES SHALL BE CONSTRUCTED WATERTIGHT.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTING ADEQUATE BALLAST TO OFFSET FLOATATION FORCES ACTING ON MANHOLES INSTALLED IN WET AREAS.

REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

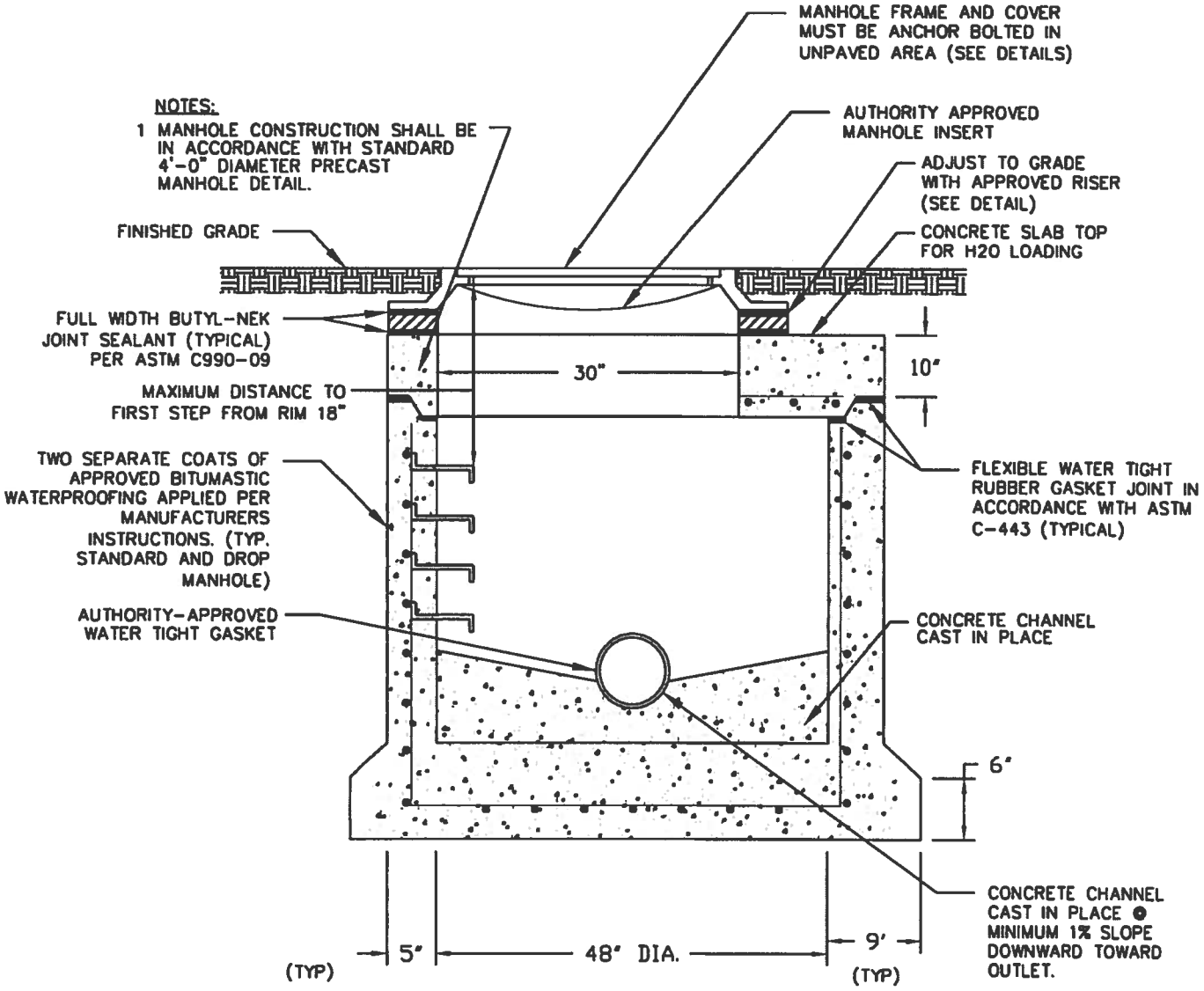
TYPICAL PRECAST MANHOLE

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
6/11/07	NOT TO SCALE

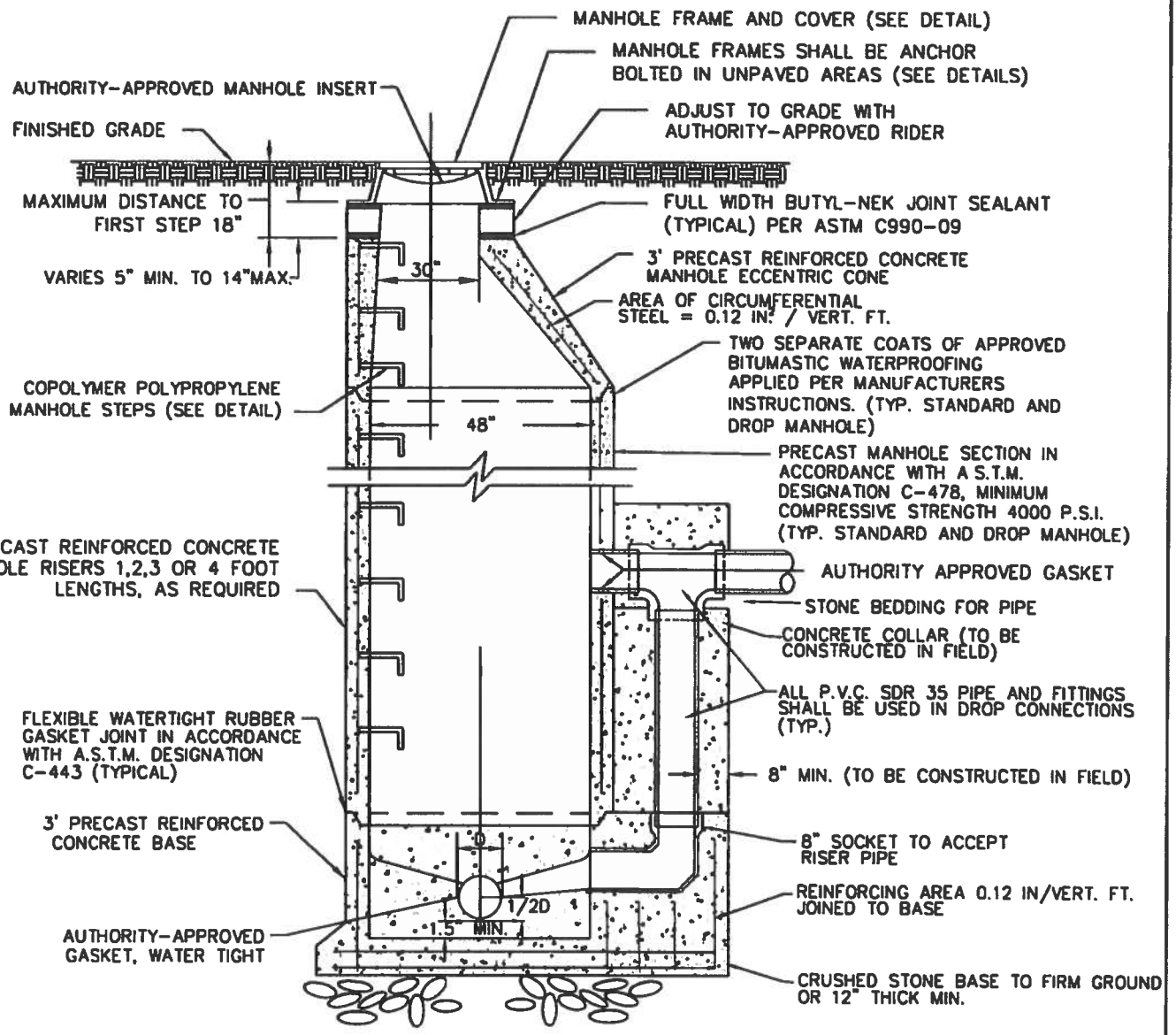
Drawing Number: SD-1

Project Number: 1547.001.008



REV: 10/13

Barton & Loguidice, P.C.	MONROE TOWNSHIP MUNICIPAL AUTHORITY		Drawing Number SD-2
Date 6/11/07	Scale NOT TO SCALE	SHALLOW MANHOLE	Project Number 1547.001.008
		MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA	



REV: 10/13

Barton & Loguidice, P.C.	MONROE TOWNSHIP MUNICIPAL AUTHORITY		Drawing Number SD-3
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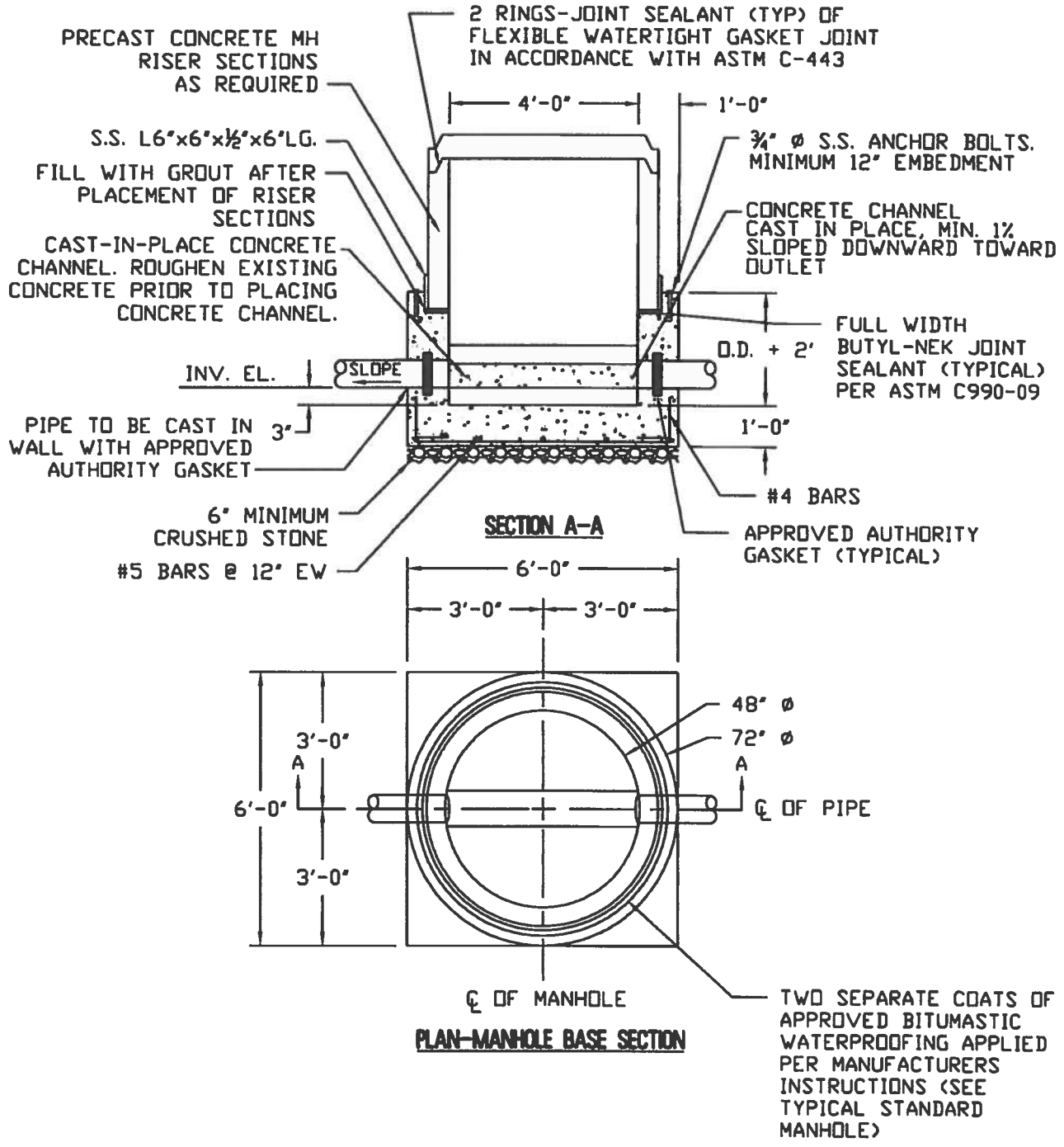
		MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA	



REV: 10/13

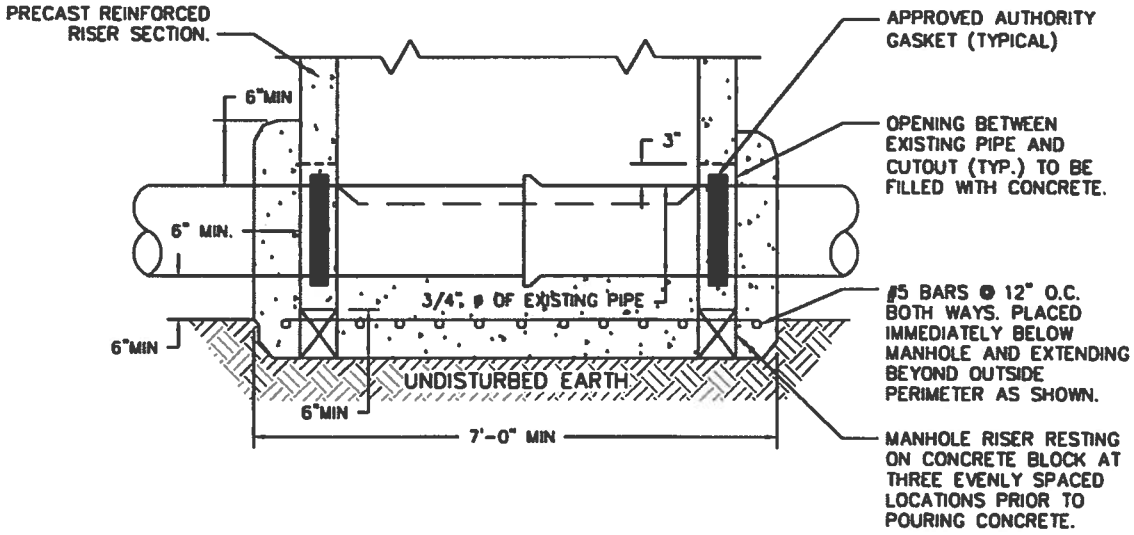
Barton & Loguidice, P.C.

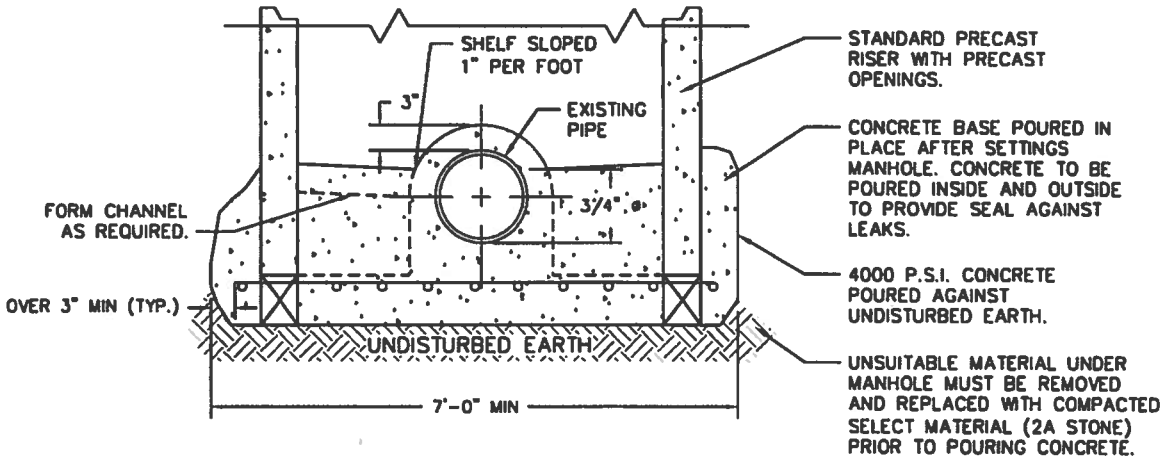
MONROE TOWNSHIP MUNICIPAL AUTHORITY

CAST-IN-PLACE MANHOLE BASE

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale	Drawing Number	Project Number
6/11/07	NOT TO SCALE	SD-4	1547.001.008





NOTES:
1. EXISTING PIPE TO REMAIN UNDISTURBED UNTIL SATISFACTORY COMPLETION OF MANHOLE TESTING
2. REMOVE CROWN OF EXISTING PIPE FLUSH WITH CONCRETE SHELF.

REV: 10/13

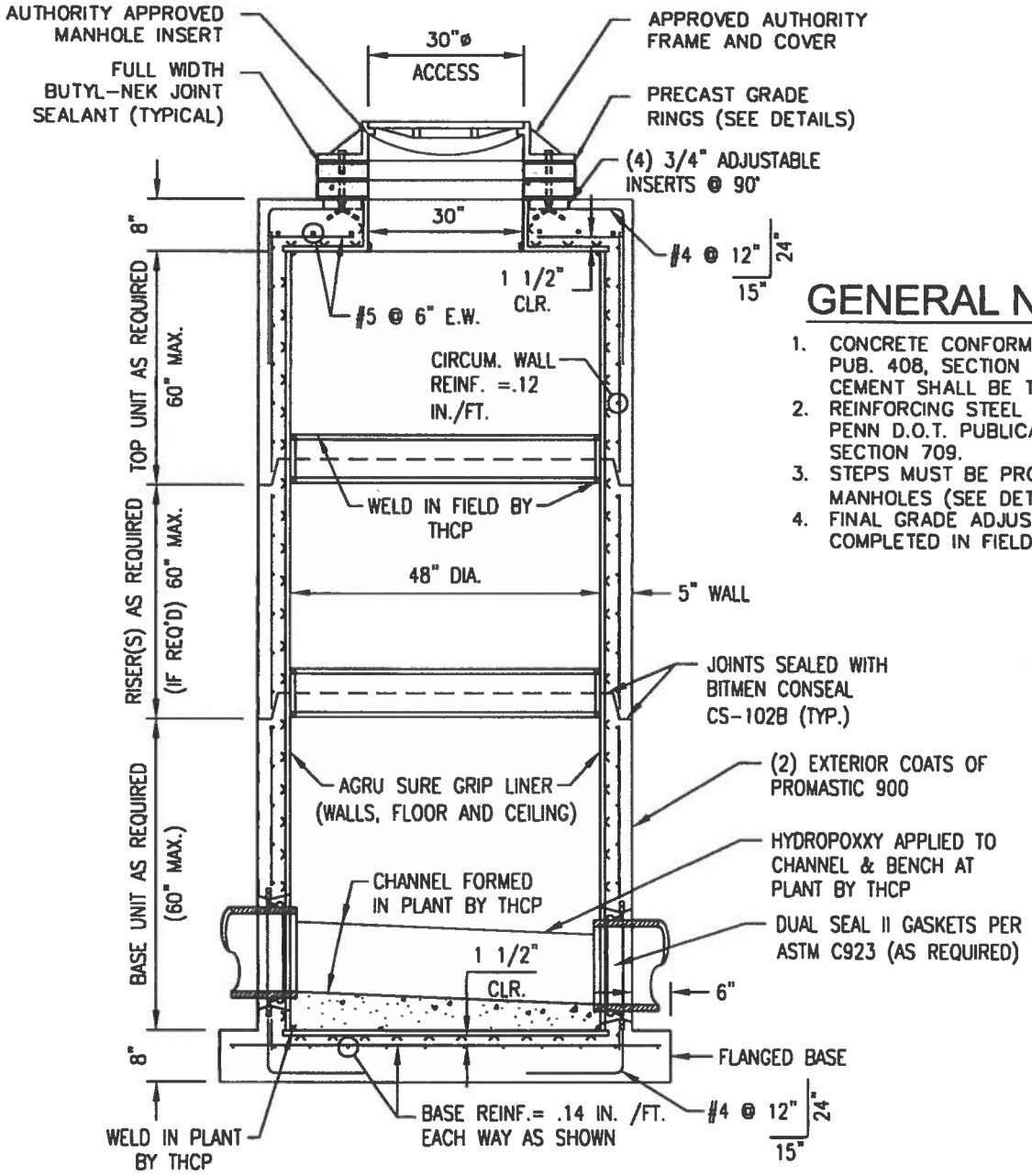
Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

SANITARY SEWER "DOG HOUSE" MANHOLE

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale	Drawing Number	Project Number
6/11/07	NOT TO SCALE	SD-5	1547.001.008



GENERAL NOTES:

1. CONCRETE CONFORMS TO PENN D.O.T. PUB. 408, SECTION 704, CLASS AA. CEMENT SHALL BE TYPE II OR EQUAL.
2. REINFORCING STEEL CONFORMS TO PENN D.O.T. PUBLICATION 408, SECTION 709.
3. STEPS MUST BE PROVIDED IN LINED MANHOLES (SEE DETAILS)
4. FINAL GRADE ADJUSTMENT SHALL BE COMPLETED IN FIELD.

ALL MANHOLES MEET THE REQUIREMENTS OF ASTM C478

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

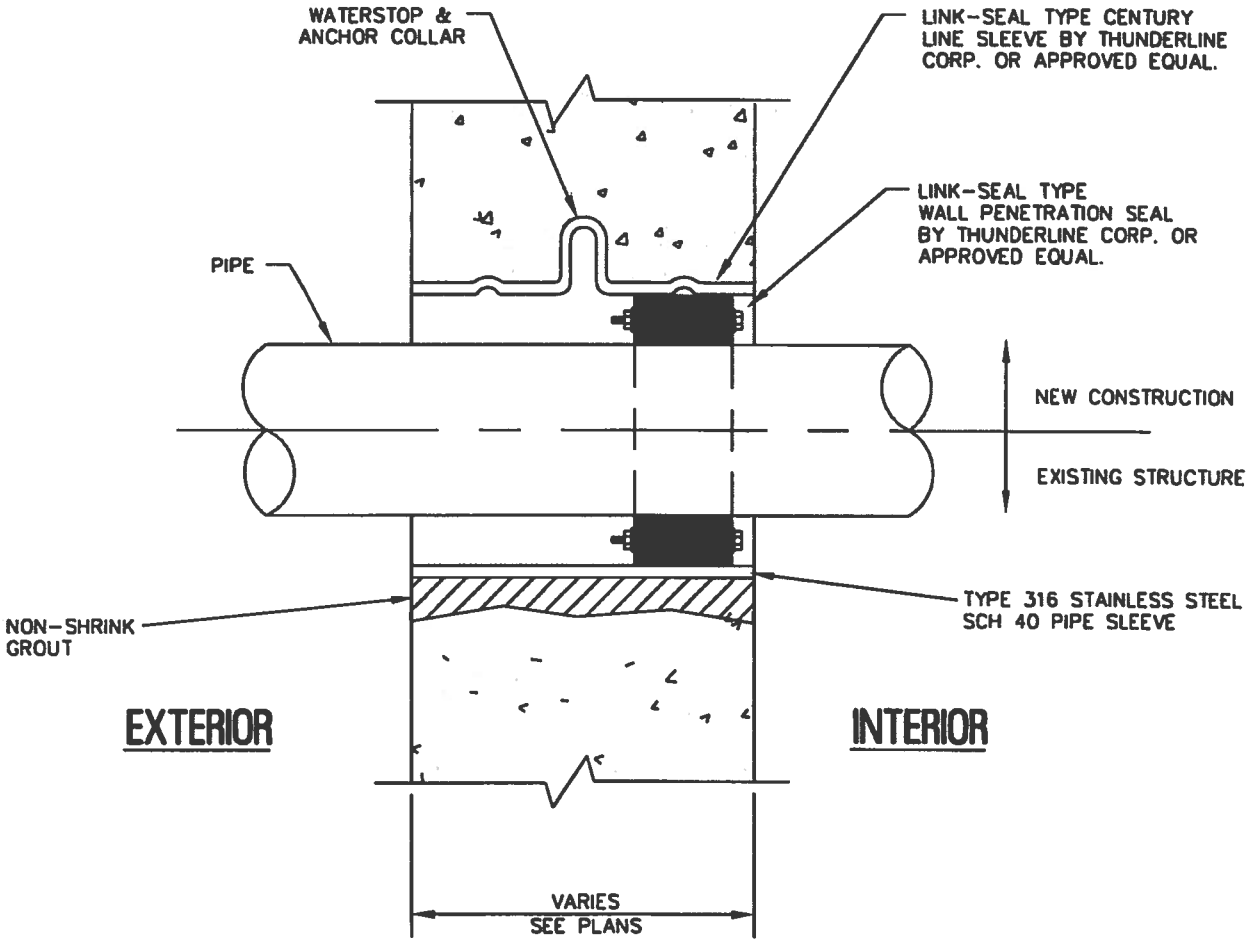
48" DIA. PRECAST SANITARY AGRU-LINED MANHOLE W/CHANNEL

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
10/1/13	NOT TO SCALE

Drawing Number: SD-6

Project Number: 1547.001.008



REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

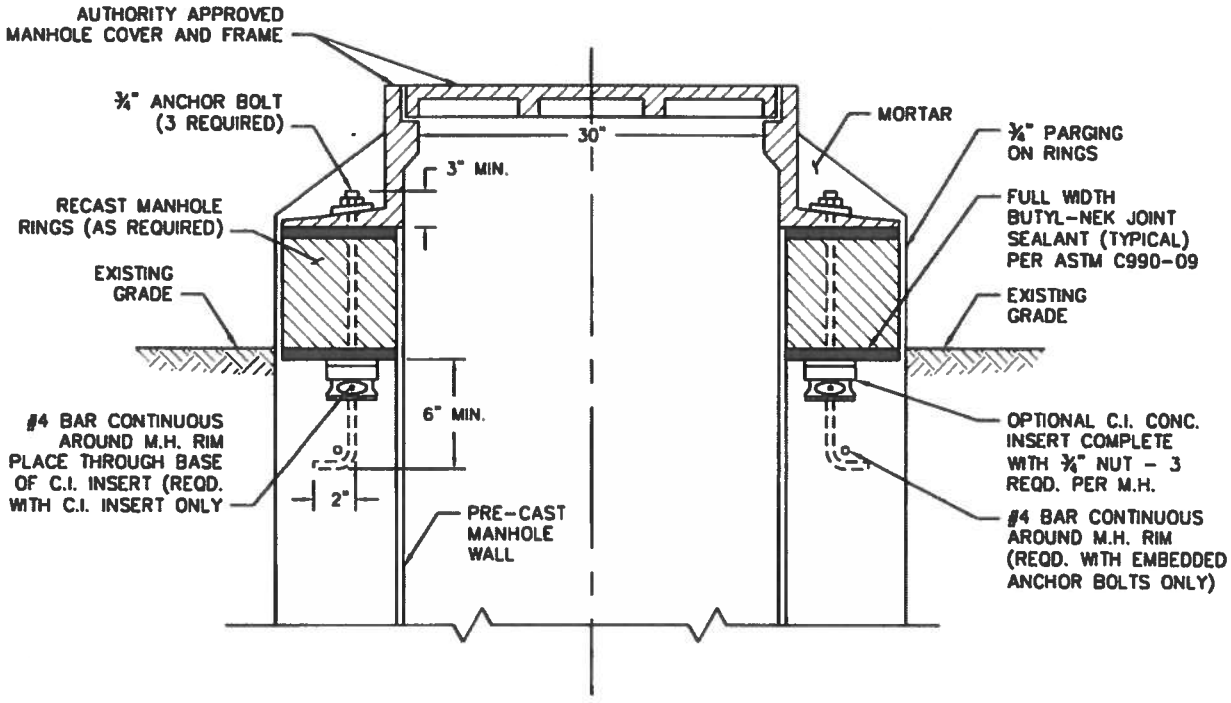
WALL PIPE PENETRATION

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
6/11/07	NOT TO SCALE

Drawing Number: SD-7

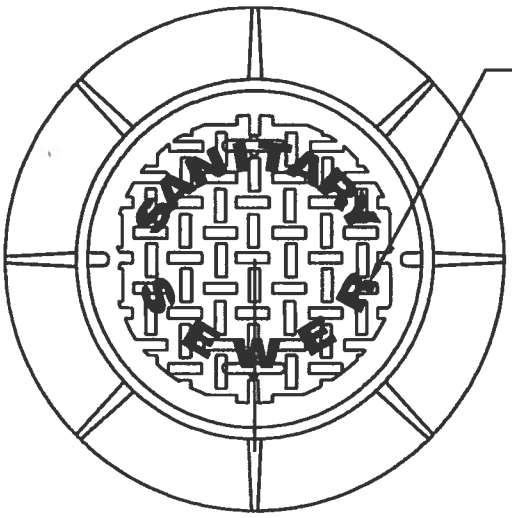
Project Number: 1547.001.008



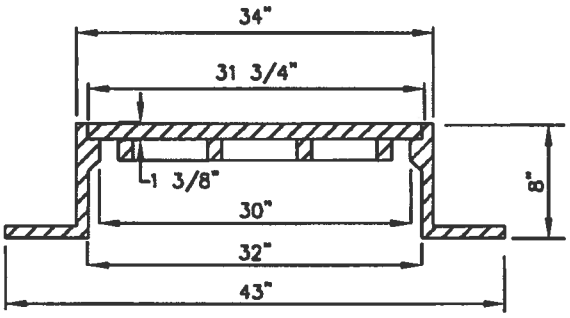
NOTE:
SIX (6) INCH EMBEDMENT OF ANCHOR BOLTS INTO PRE-CAST MANHOLE WALL MAY BE PROVIDED BY FACTORY-CAST RECEIVING UNITS PROVIDING SIMILAR PULL-OUT CHARACTERISTICS.

REV: 10/13

Barton & Loguidice, P.C.	MONROE TOWNSHIP MUNICIPAL AUTHORITY		Drawing Number SD-8
Date 6/11/07	Scale NOT TO SCALE	ANCHOR BOLT DETAIL FOR MANHOLE FRAME	Project Number 1547.001.008
		MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA	



PLAN



SECTION

NOTES:

1. STANDARD MANHOLE FRAMES COVERS SHALL BE USED ON ALL MANHOLES NOT LOCATED WITHIN EASEMENTS UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
2. STANDARD MANHOLE FRAME & COVER SHALL BE BRIDGESTATE PATTERN #1012B, OR APPROVED EQUAL, WITH NON-PENETRATING PICK HOLES
3. AUTHORITY APPROVED INSERT SHALL BE USED ON ALL MANHOLES.
4. ALL MANHOLE FRAME & COVERS SHALL BE MADE IN THE U.S.A.

REV: 10/13

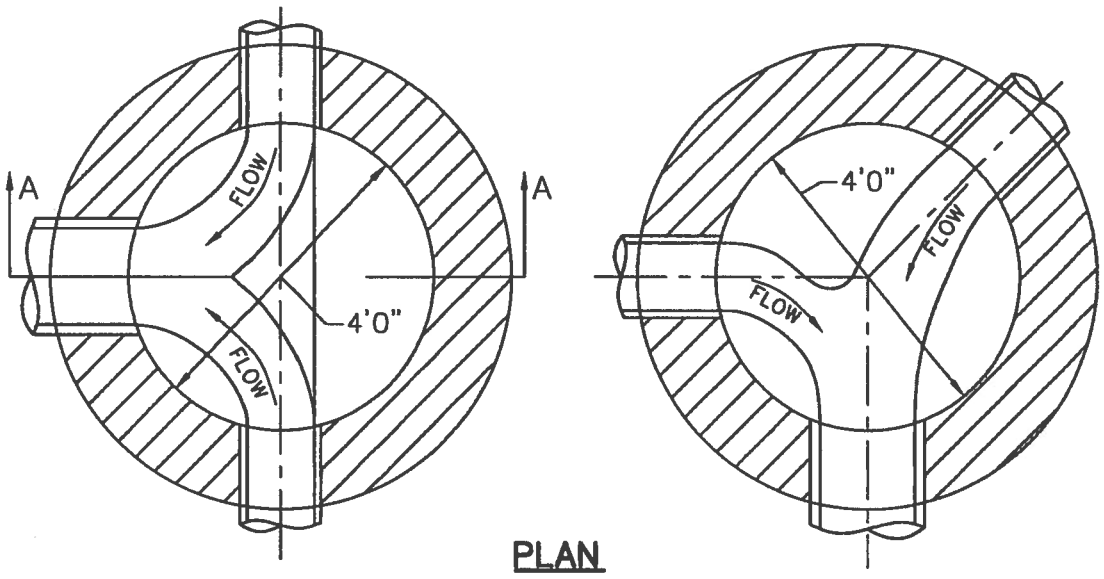
Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

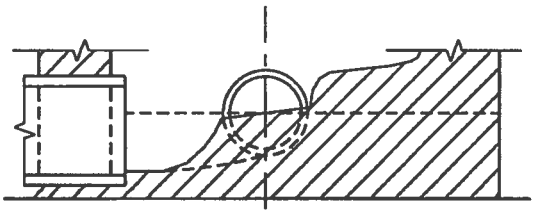
STANDARD MANHOLE FRAME AND COVER

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

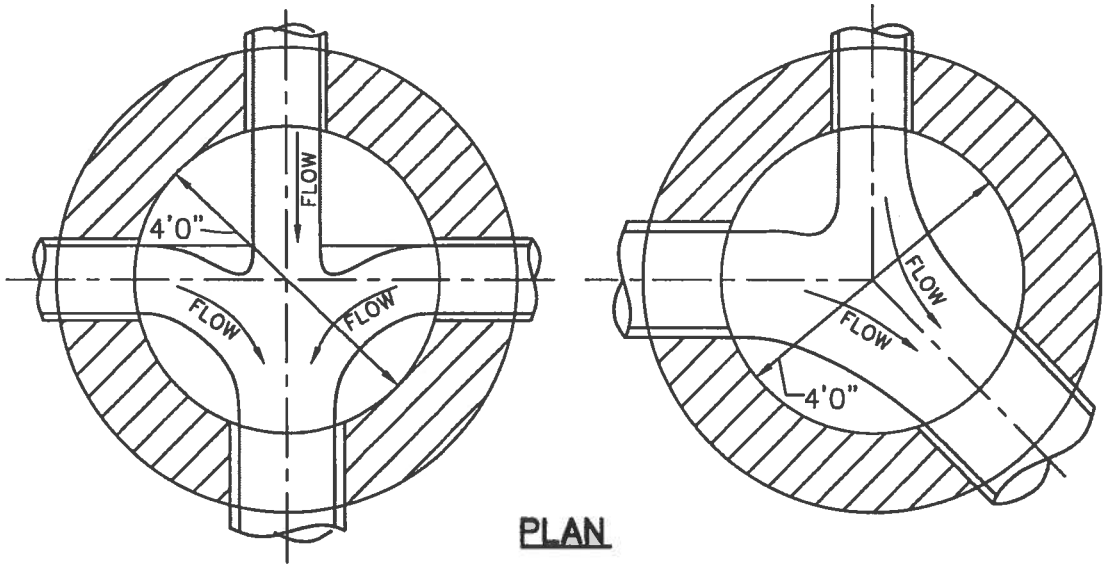
Date	Scale	Drawing Number	Project Number
6/11/07	NOT TO SCALE	SD-9	1547.001.008



PLAN



SECTION A–A



PLAN

REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

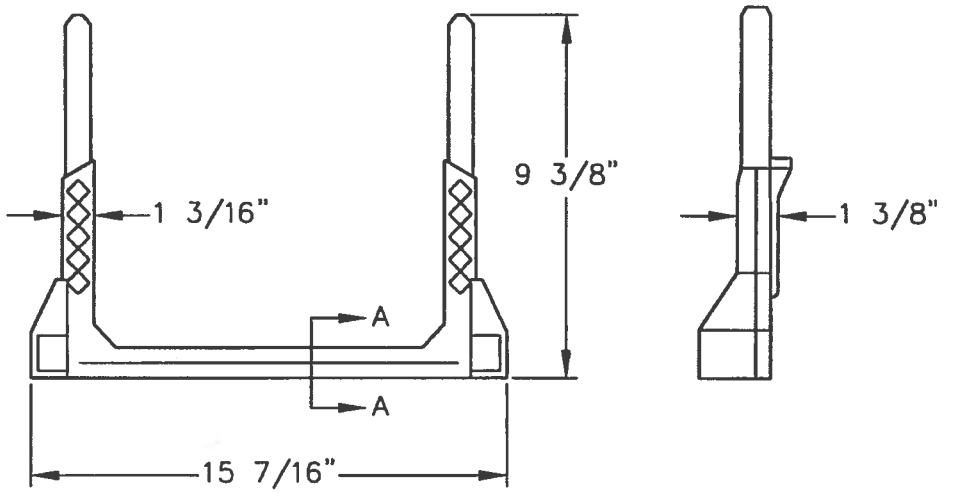
TYPICAL MANHOLE INVERT

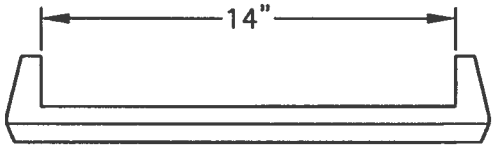
MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

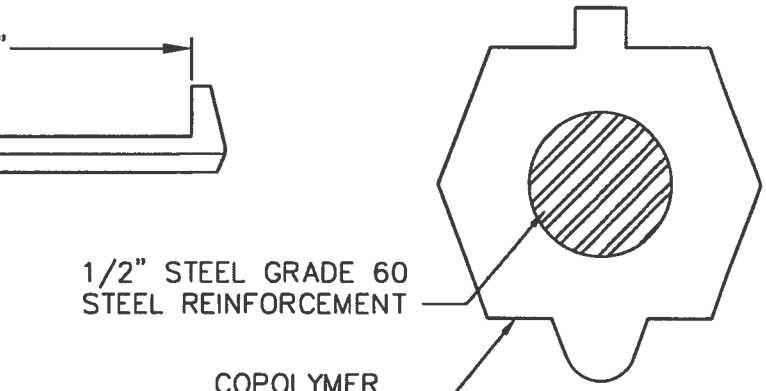
Date	Scale
6/11/07	NOT TO SCALE

Drawing Number: SD–10

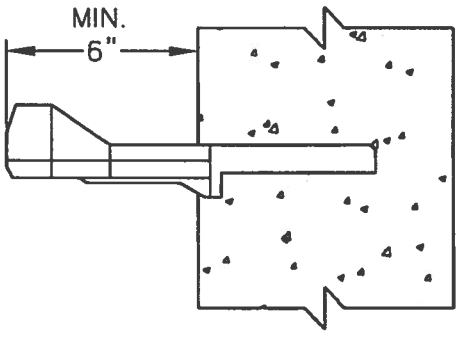
Project Number: 1547.001.008







SECTION A–A

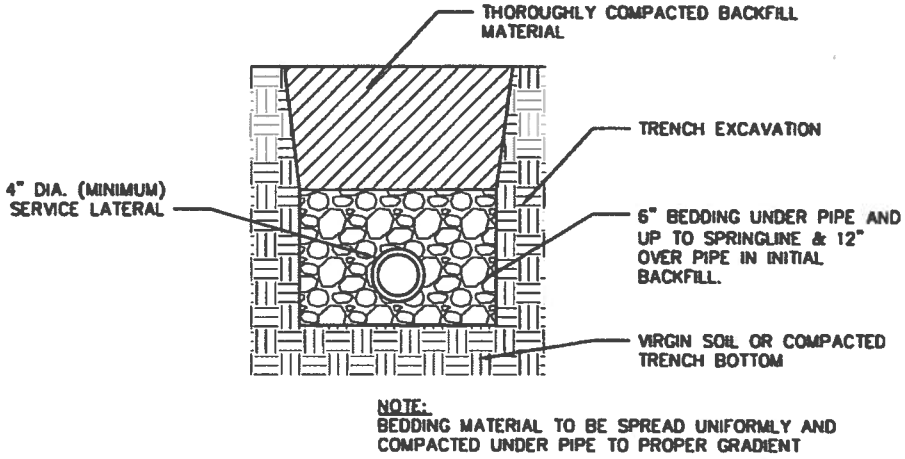


NOTES:

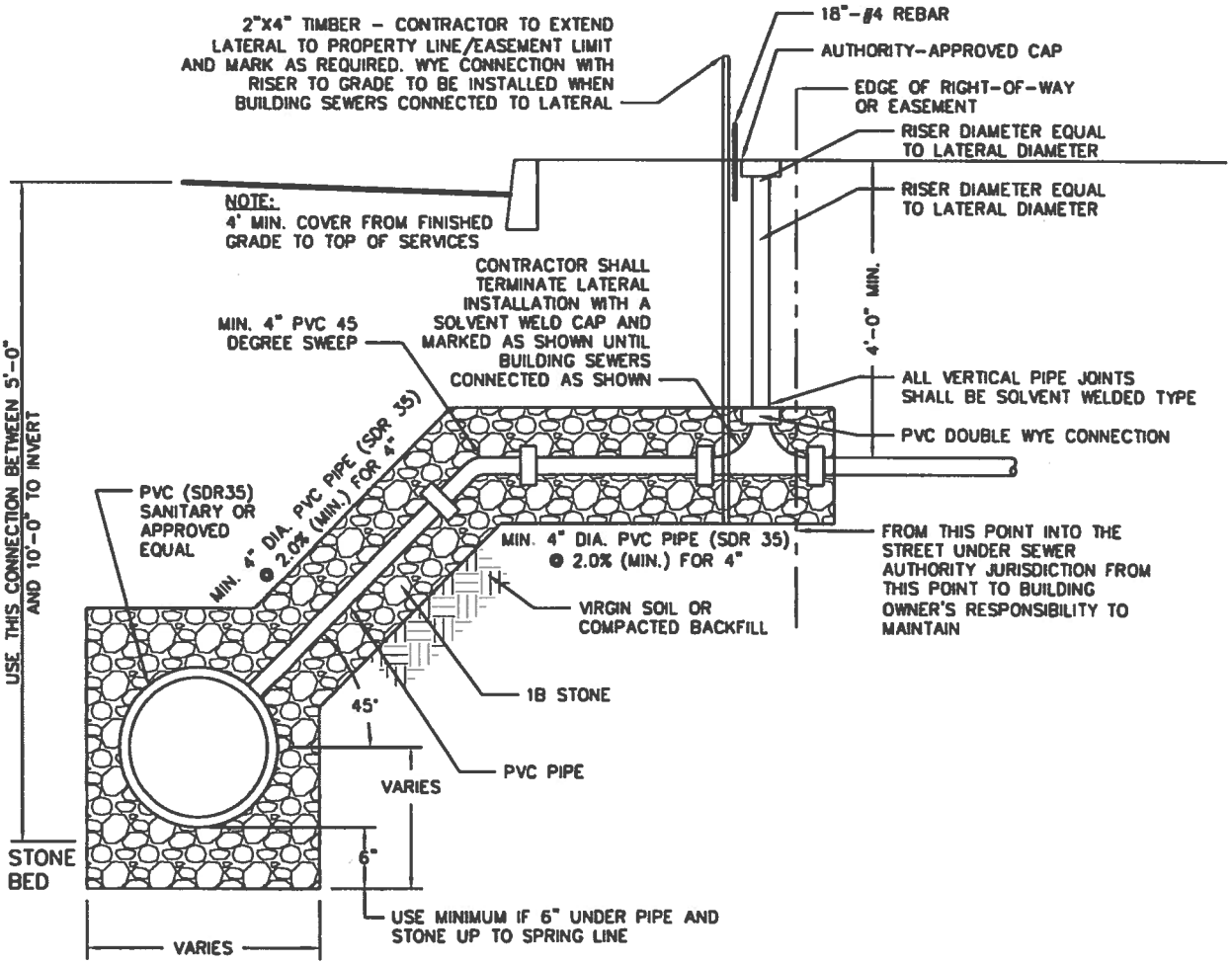
1. STEP SPACING SHALL BE UNIFORMLY SPACED AT MINIMUM OF 6" OR MAXIMUM OF 18 INCHES
2. COPOLYMER POLYPROPYLENE STEPS AS MANUFACTURED BY PARSONS ENVIRONMENTAL OR APPROVED EQUAL

REV: 10/13

Barton & Loguidice, P.C.	MONROE TOWNSHIP MUNICIPAL AUTHORITY		Drawing Number SD–11
Date 6/11/07	Scale NOT TO SCALE	MANHOLE STEP	Project Number 1547.001.008
		MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA	



NOTE:
BEDDING MATERIAL TO BE SPREAD UNIFORMLY AND COMPACTED UNDER PIPE TO PROPER GRADIENT



REV: 1/16
REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

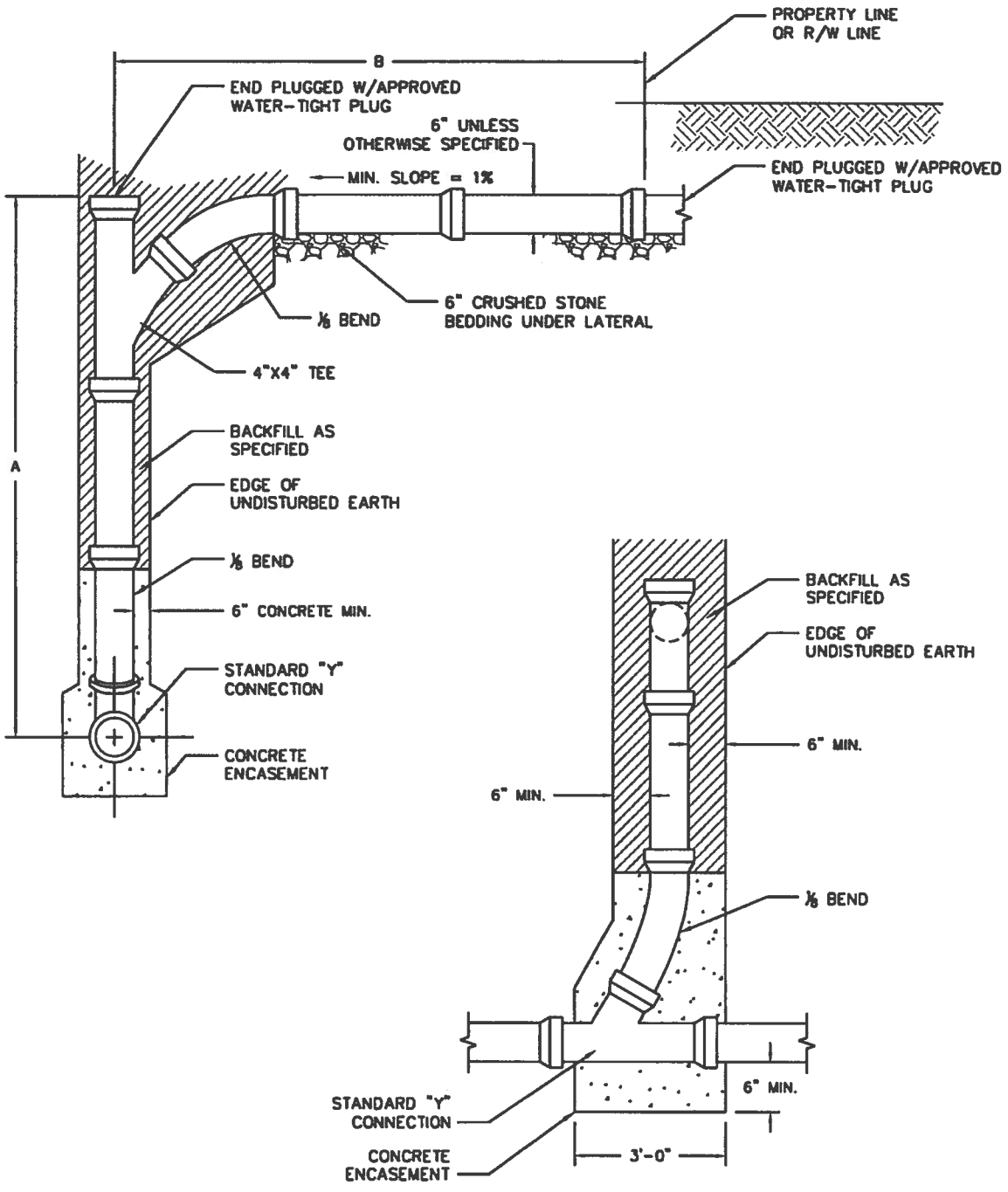
STANDARD GRAVITY LATERAL/BUILDING SEWER

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
6/11/07	NOT TO SCALE

Drawing Number
SD-12

Project Number
1547.001.008



NOTE:
THE REQUIREMENT FOR A VERTICAL DROP LATERAL SHALL BE DETERMINED BY THE ENGINEER FOR EACH SERVICE CONNECTION.

REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

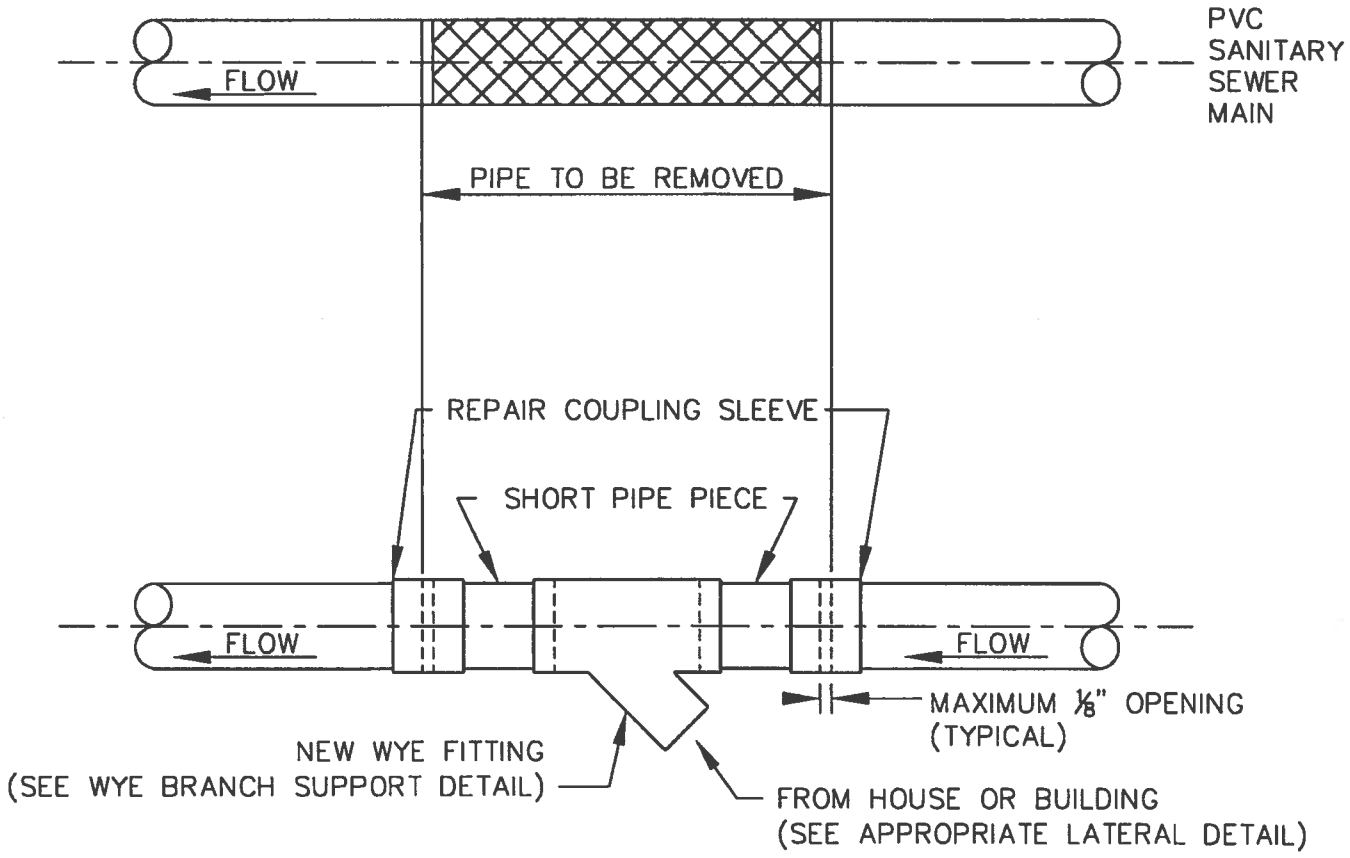
VERTICAL DROP LATERAL

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
6/11/07	NOT TO SCALE

Drawing Number
SD-13

Project Number
1547.001.008



INSTALLATION PROCEDURE:

(A) LOCATE MAIN WHERE NEW WYE WILL BE INSTALLED.
(B) CUT OUT PVC MAIN FOR NEW WYE AND TWO (2) REPAIR COUPLINGS (SLEEVES) WITH RUBBER GASKETS AND TWO (2) SMALL PIECES OF PIPE.
(C) INSTALL NEW WYE AND FITTINGS AND TEST PER AUTHORITY STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF SANITARY SEWERS.
(D) CONTINUE INSTALLATION OF SANITARY SEWER LATERAL PER AUTHORITY REQUIREMENTS.

REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

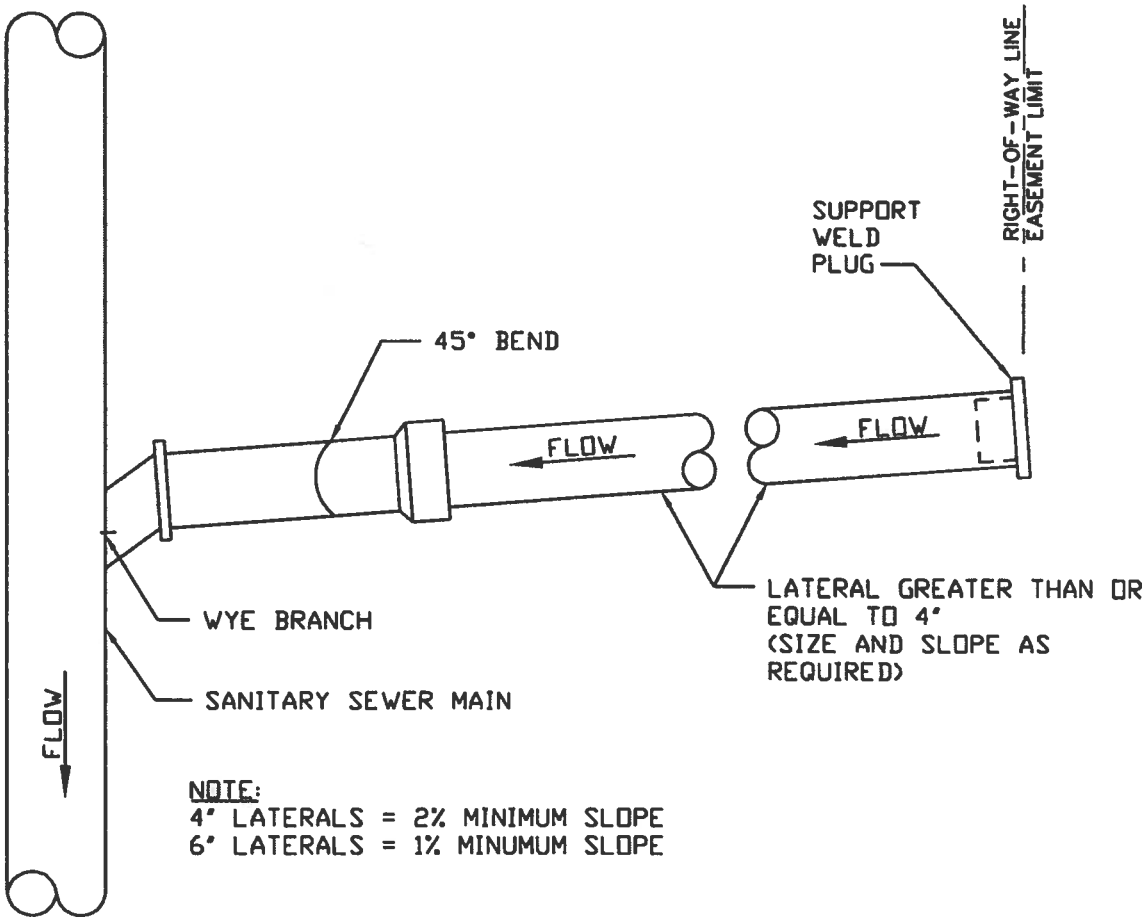
LATERAL CONNECTION TO EXISTING PVC GRAVITY MAIN

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
11/05/07	NOT TO SCALE

Drawing Number: SD-14

Project Number: 1547.001.008



NOTE:
4" LATERALS = 2% MINIMUM SLOPE
6" LATERALS = 1% MINUMUM SLOPE

REV: 10/13

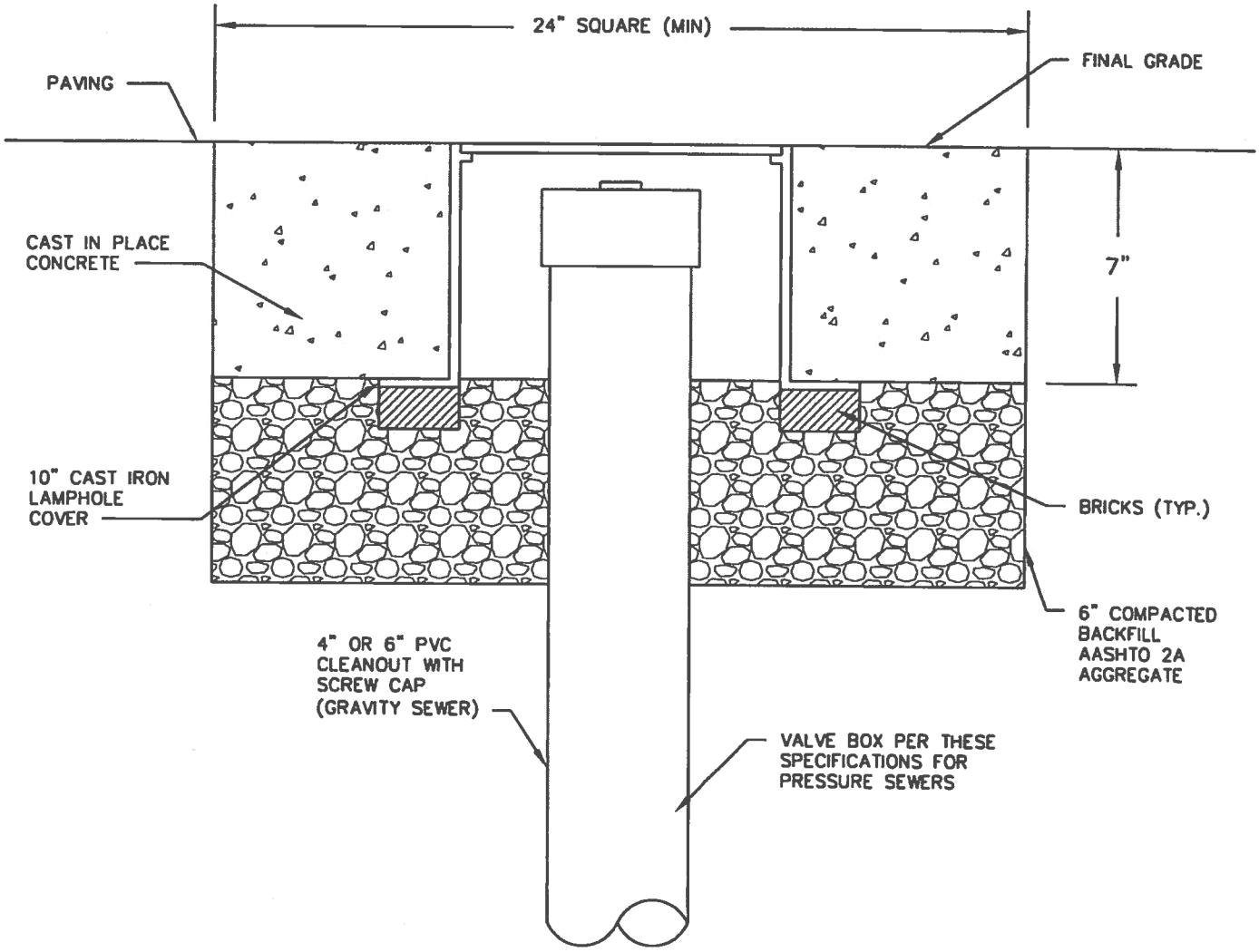
Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

STANDARD GRAVITY LATERAL CONNECTION

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale	Drawing Number	Project Number
6/11/07	NOT TO SCALE	SD-15	1547.001.008



REV: 1/16
REV: 10/13

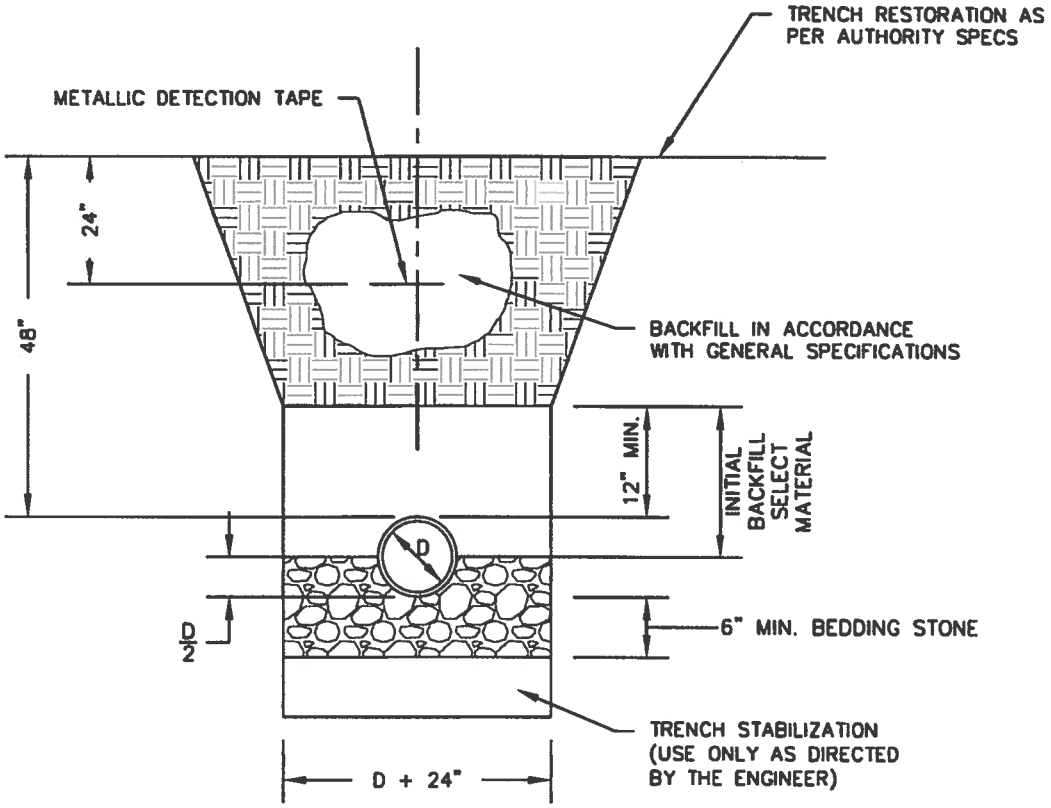
Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

TYPICAL SANITARY SEWER CLEAN OUT (GRAVITY) OR SERVICE VALVE (PRESSURE) IN PAVED AREAS

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale	Drawing Number	Project Number
6/11/07	NOT TO SCALE	SD-16	1547.001.008



NOTE:
MAXIMUM WIDTH OF TRENCH SHALL NOT EXCEED THE DEPTH TO THE INVERT OF THE PROPOSED PIPELINE.

REV: 10/13

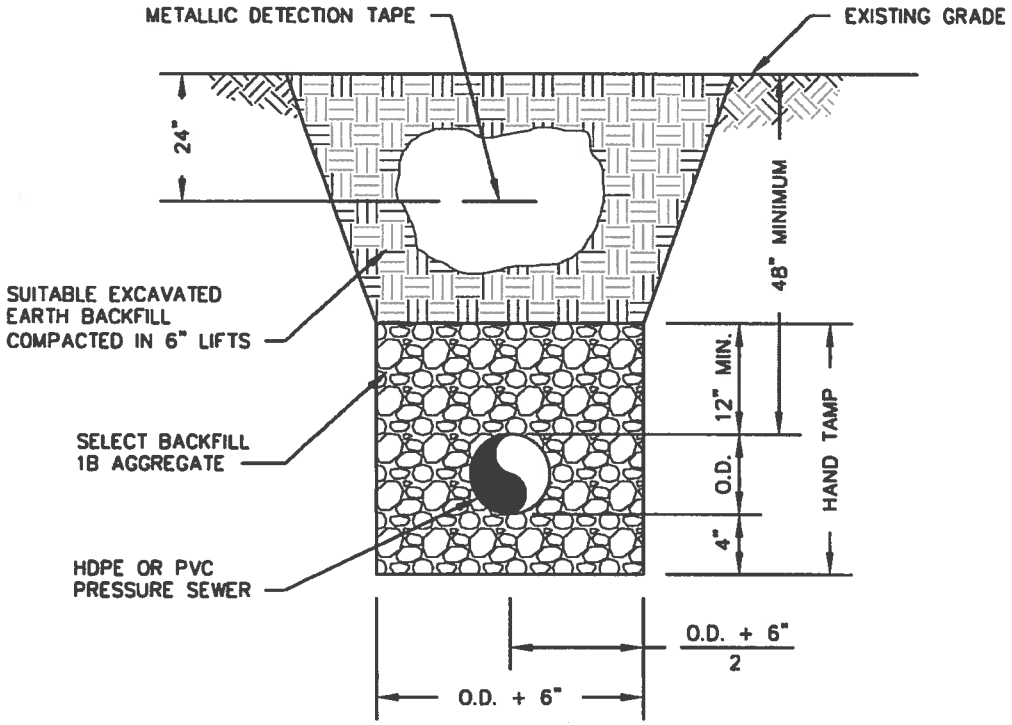
Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

TYPICAL PIPE TRENCH (GRAVITY)

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale	Drawing Number	Project Number
6/11/07	NOT TO SCALE	SD–17	1547.001.008



REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

PRESSURE TRENCH AND BEDDING

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale	Drawing Number	Project Number
11/05/07	NOT TO SCALE	SD–18	1547.001.008

Plotted: Fe 2014 - 11:27AM SYR By: JGS2
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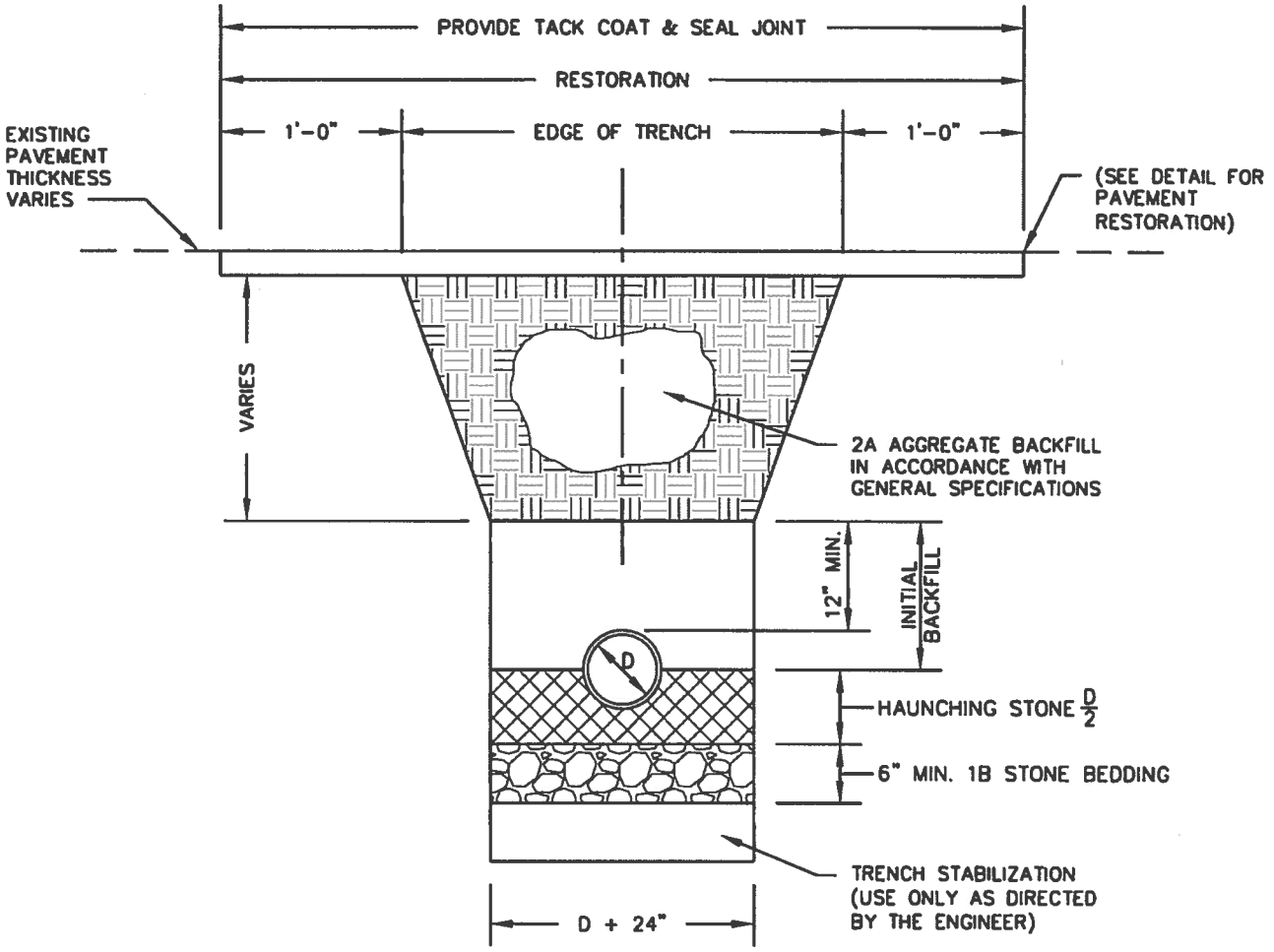
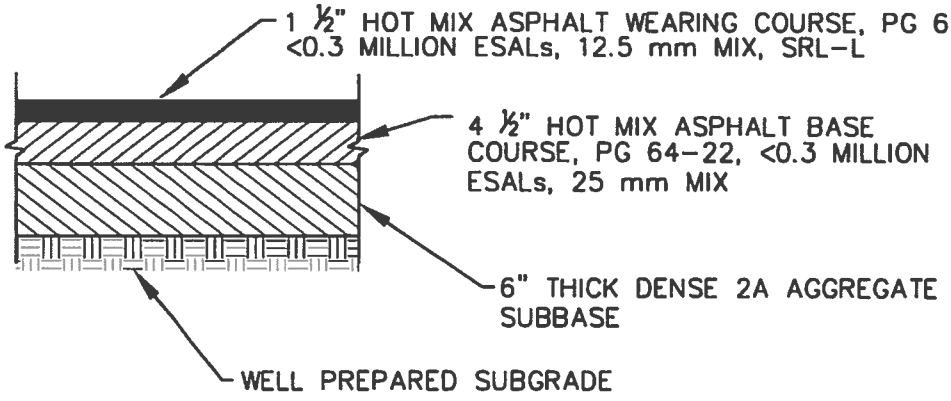


NOTE:
MAXIMUM WIDTH OF TRENCH SHALL NOT EXCEED THE DEPTH TO THE INVERT OF THE PROPOSED PIPELINE.

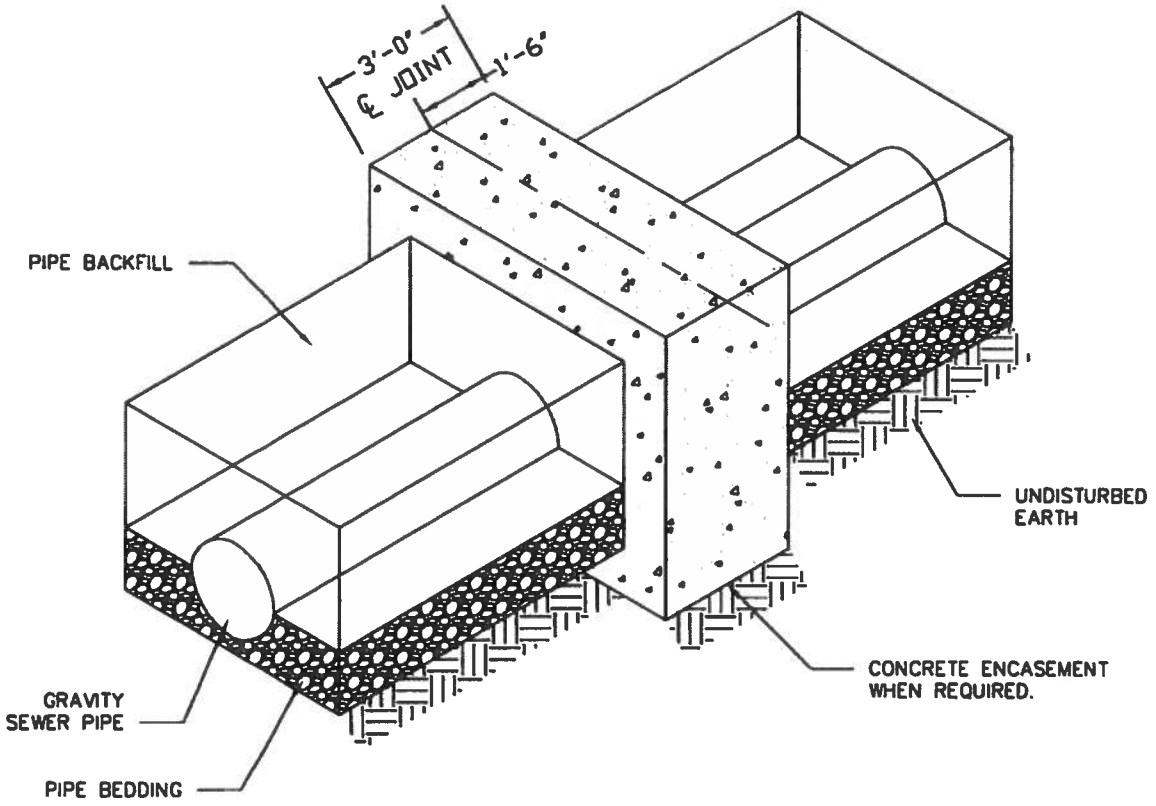
REV: 10/13

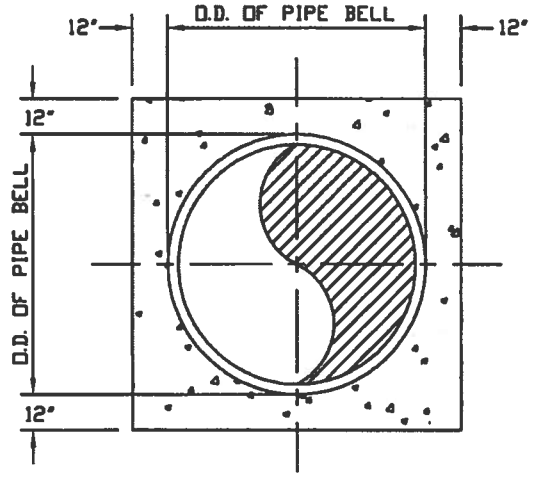
Barton & Loguidice, P.C.	MONROE TOWNSHIP MUNICIPAL AUTHORITY PERMANENT PAVEMENT TRENCH		Drawing Number SD-19
Date 6/11/07	Scale NOT TO SCALE	MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA	Project Number 1547.001.008



REV: 10/13

Barton & Loguidice, P.C.	MONROE TOWNSHIP MUNICIPAL AUTHORITY TOWNSHIP ROAD PAVEMENT RESTORATION MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA	Drawing Number SD-20	
Date 6/11/07	Scale NOT TO SCALE		Project Number 1547.001.008





Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

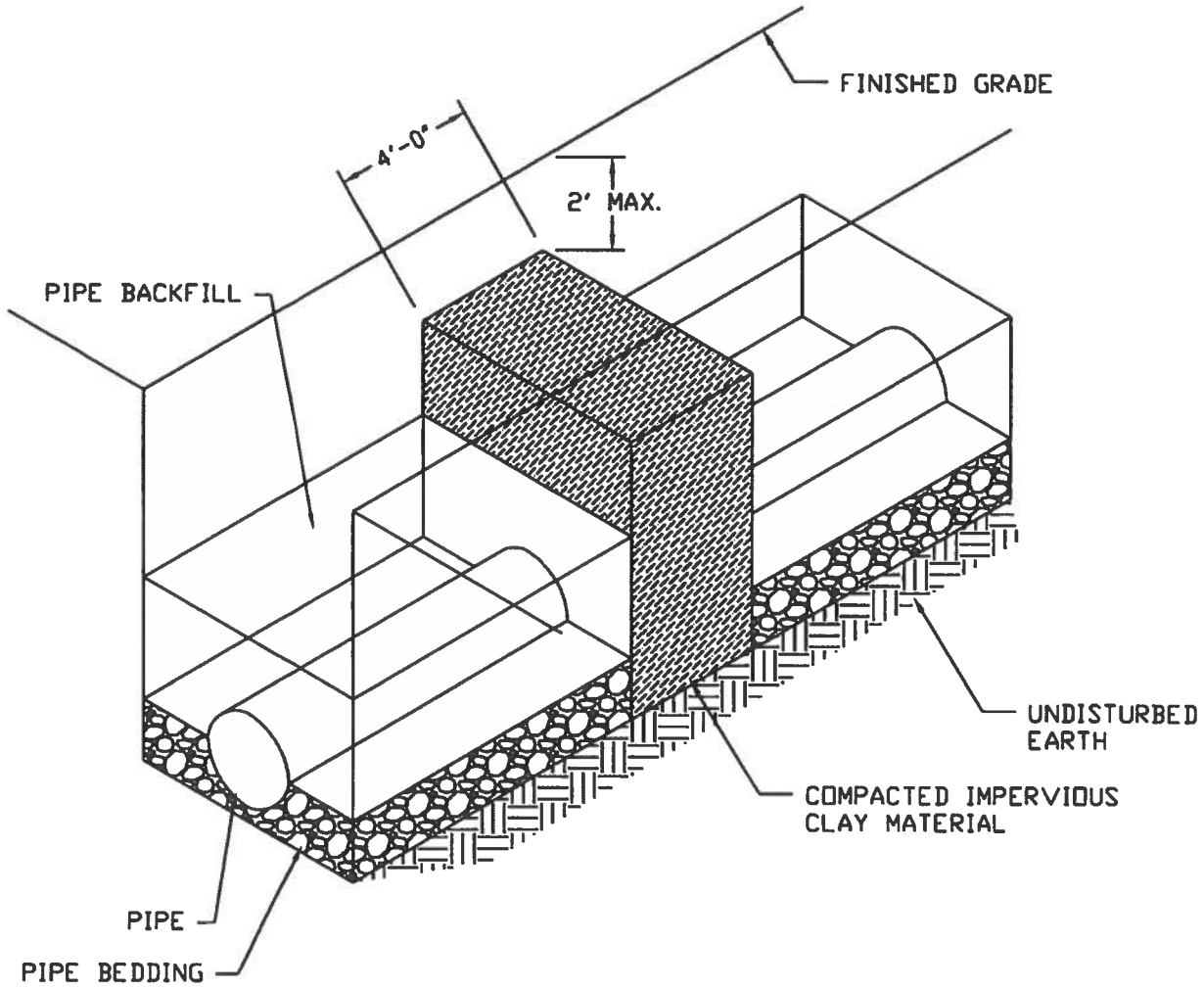
CONCRETE ENCASEMENT

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
6/11/07	NOT TO SCALE

Drawing Number: SD-21

Project Number: 1547.001.008



NOTES:

1. COMPACTED CLAY DIKES SHALL EXTEND VERTICALLY FROM BOTTOM OF TRENCH TO WITHIN TWO (2) FEET FROM FINISHED GRADE FOR THE FULL WIDTH OF THE TRENCH.

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

3. CLAY DIKES TO BE CONSTRUCTED ALONG THE PIPE LOCATIONS AS SHOWN ON THE PLANS.

REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

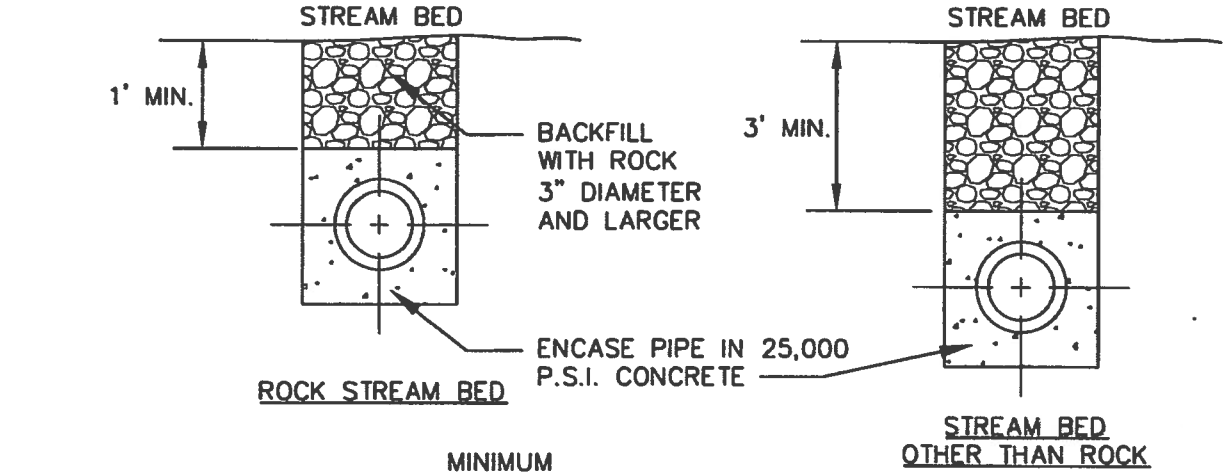
IMPERVIOUS TRENCH DIKE

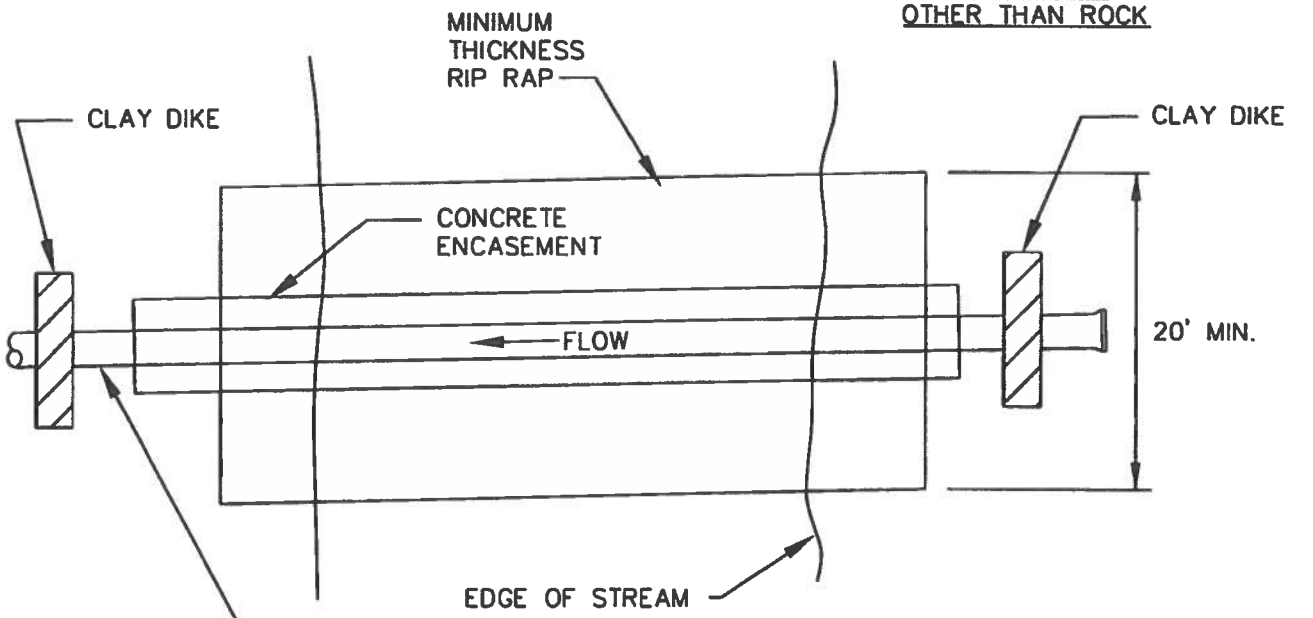
MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

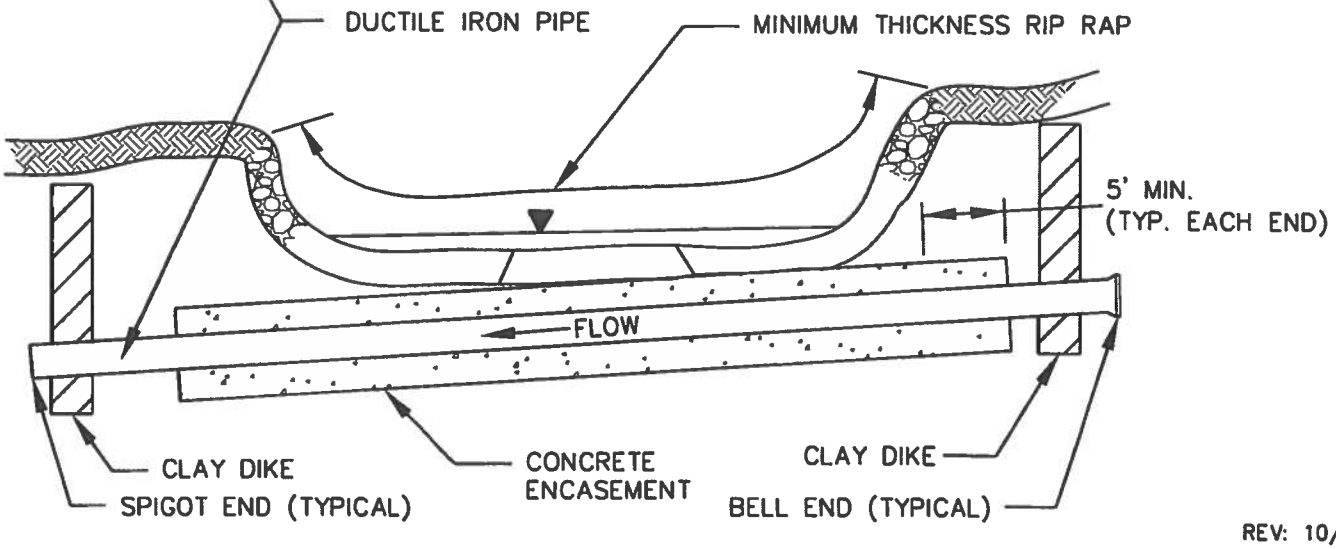
Date	Scale
6/11/07	NOT TO SCALE

Drawing Number: SD-22

Project Number: 1547.001.008







REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

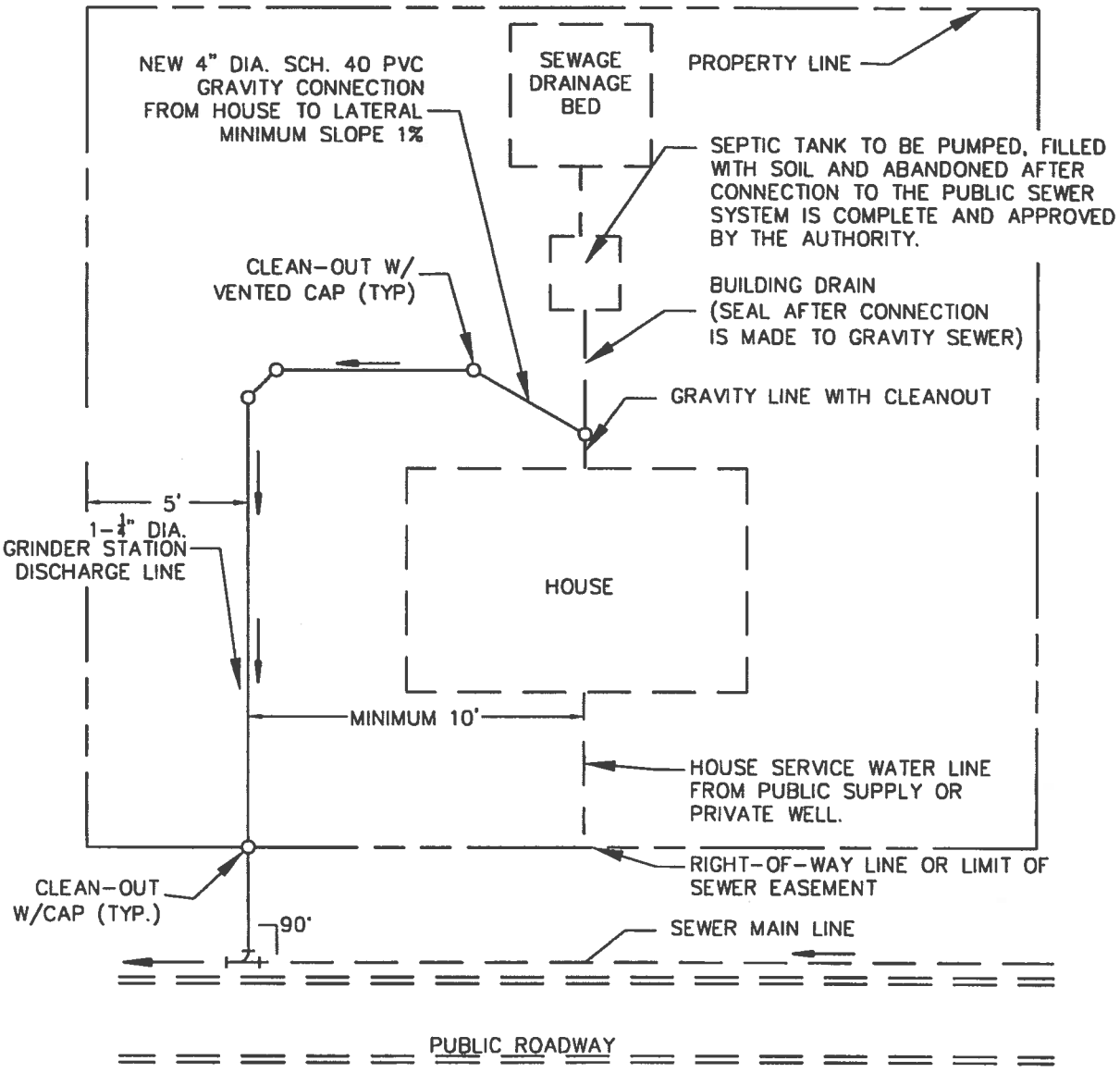
STREAM CROSSING

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
6/11/07	NOT TO SCALE

Drawing Number: SD-23

Project Number: 1547.001.008



NOTES:
1. ALL DASHED LINES INDICATE EXISTING FEATURES.
2. ALL DIMENSIONS SHOWN ARE MINIMUM DISTANCES.
3. PROPERTY OWNER'S ARE RESPONSIBLE FOR ALL BUILDING SEWER INSTALLATION BETWEEN THE GRAVITY HOUSE SERVICE LINE AND SERVICE VALVE.
4. LATERAL SHALL EXTEND FROM SEWER MAINLINE TO SERVICE VALVE ASSEMBLY AT 90° TO SEWERMAIN.

REV: 10/13

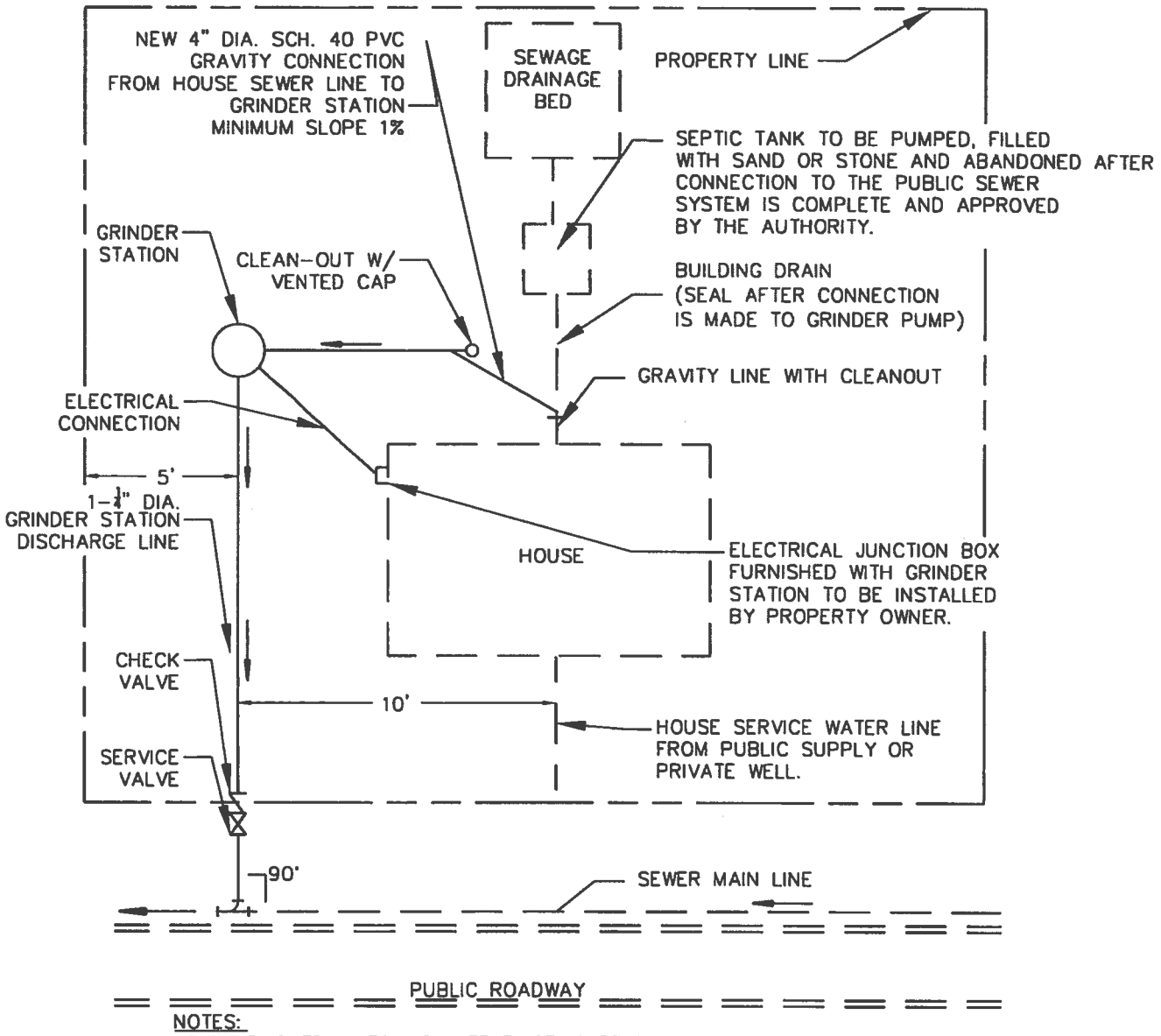
Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

HOUSE SERVICE GRAVITY SEWER CONNECTION

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale	Drawing Number	Project Number
11/5/07	NOT TO SCALE	SD-24	1547.001.008



NOTES:

1. ALL DASHED LINES INDICATE EXISTING FEATURES.
2. ALL DIMENSIONS SHOWN ARE MINIMUM DISTANCES.
3. PROPERTY OWNER'S ARE RESPONSIBLE FOR ALL BUILDING SEWER INSTALLATION BETWEEN THE GRAVITY HOUSE SERVICE LINE AND SERVICE VALVE.
4. ALL PVC SEWER PIPE SHALL BE SOLVENT WELDED JOINTS.

REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

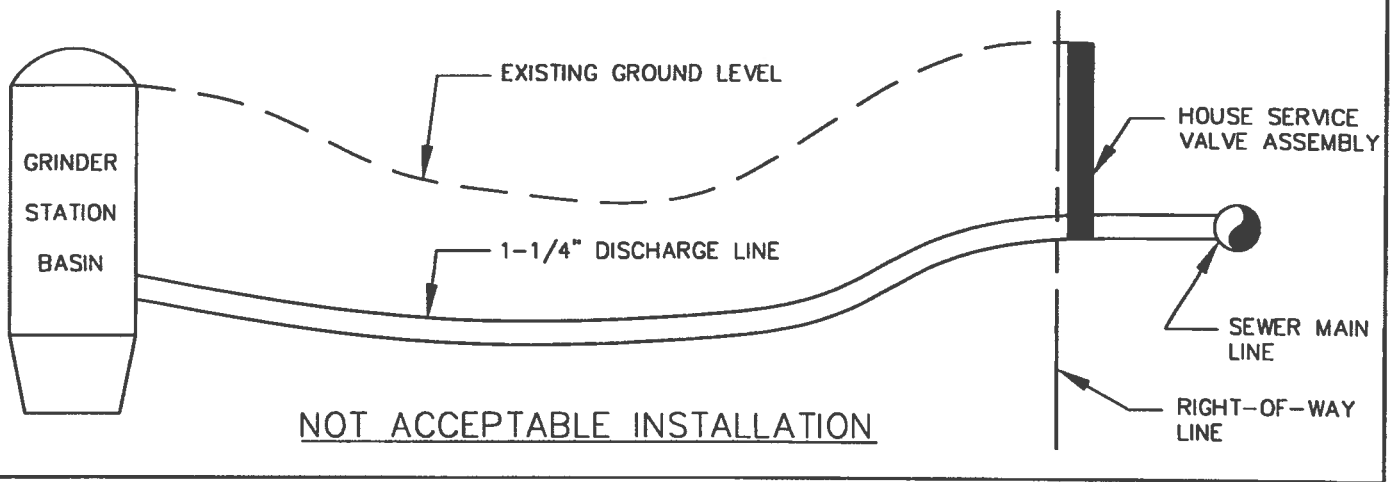
HOUSE SERVICE LOW PRESSURE SEWER LINE CONNECTION

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

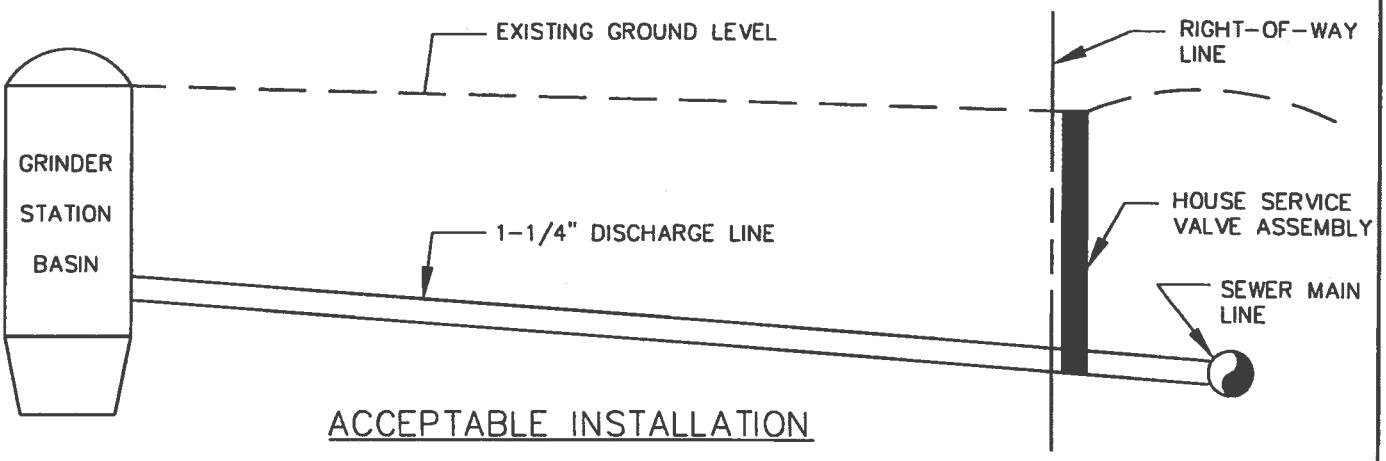
Date	Scale
11/5/07	NOT TO SCALE

Drawing Number: SD-24A

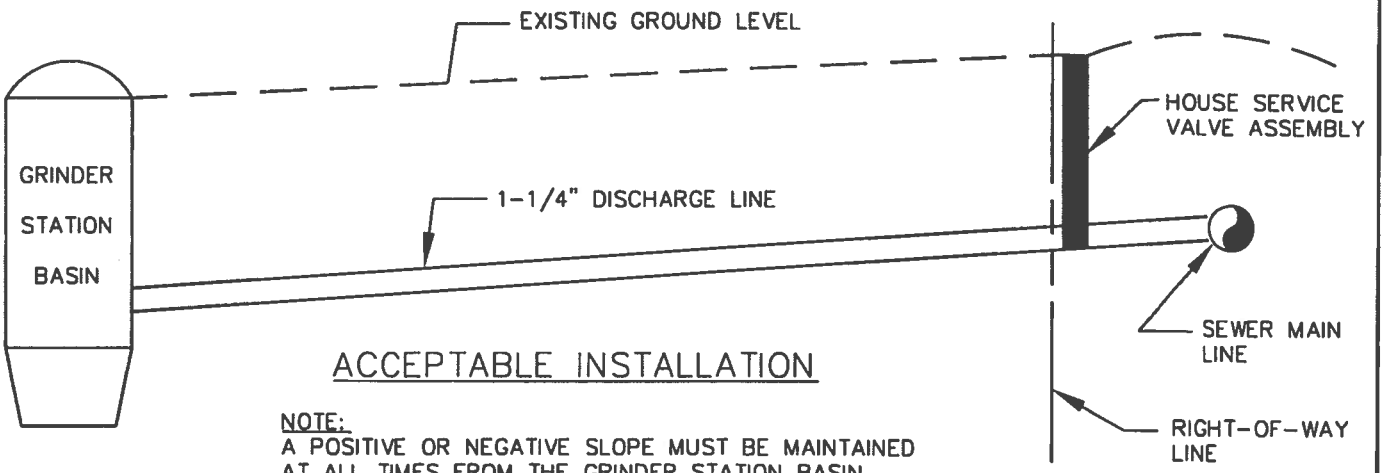
Project Number: 1547.001.008



NOT ACCEPTABLE INSTALLATION



ACCEPTABLE INSTALLATION



ACCEPTABLE INSTALLATION

NOTE:
A POSITIVE OR NEGATIVE SLOPE MUST BE MAINTAINED AT ALL TIMES FROM THE GRINDER STATION BASIN TO THE HOUSE SERVICE SHUT-OFF.

REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

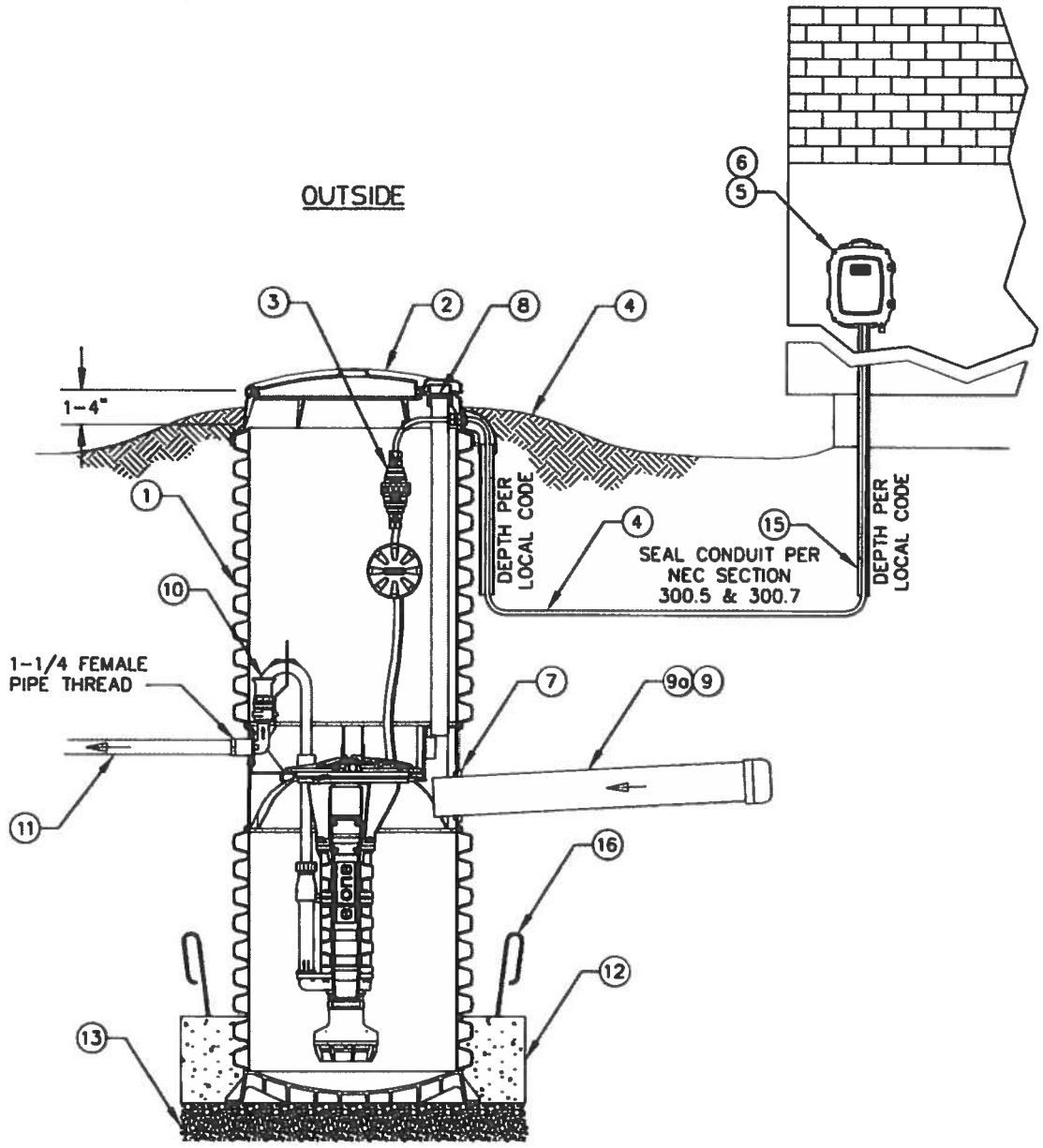
TYPICAL PROFILES FOR HOUSE SERVICE LOW PRESSURE SEWER CONNECTIONS

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
11/5/07	NOT TO SCALE

Drawing Number: SD-25

Project Number: 1547.001.008



NOTES:

1. GRINDER PUMP BASIN – HIGH DENSITY POLYETHYLENE (HDPE)
2. ACCESSWAY COVER – FRP
3. ELECTRICAL QUICK DISCONNECT (EQD) – CABLE FROM PUMP CORE TERMINATES HERE.
4. POWER AND ALARM CABLE – CIRCUITS TO BE INSTALLED IN ACCORDANCE WITH LOCAL CODES.
5. ALARM PANEL – NEMA 4X ENCLOSURE. EQUIPPED WITH CIRCUIT BREAKERS. LOCATE ACCORDING TO LOCAL CODES.
6. ALARM DEVICE – EVERY INSTALLATION IS TO HAVE AN ALARM DEVICE TO ALERT THE HOMEOWNER OF A POTENTIAL MALFUNCTION. VISUAL DEVICES SHOULD BE PLACED IN VERY CONSPICUOUS LOCATIONS.
7. INLET – EPDM GROMMET (4.5" ID). FOR 4.5" OD DWV PIPE.
8. WET WELL VENT – 2.0" TANK VENT, SUPPLIED BY FACTORY IN UNITS WITH ACCESSWAYS.
9. GRAVITY SERVICE LINE – 4" DWV, (4.5" OD)
9a. STUB-OUT – 4"X5' LONG WATERTIGHT STUB-OUT, TO BE INSTALLED AT TIME OF BURIAL UNLESS THE GRAVITY SERVICE LINE IS CONNECTED DURING INSTALLATION.
10. DISCHARGE VALVE – 1-1/4" FEMALE PIPE THREAD
11. DISHCARGE LINE – 1-1/4" NOMINAL PIPE SIZE
12. CONCRETE ANCHOR – SEE BALLAST CALCULATIONS FOR SPECIFIC WEIGHT FOR STATION HEIGHT.
13. BEDDING MATERIAL – 6" MINIMUM DEPTH, ROUND AGGREGATE, (GRAVEL).
14. FINISHED GRADE – GRADE LINE TO BE 1" TO 4" BELOW REMOVABLE LID AND SLOPE AWAY FROM THE STATION.
15. CONDUIT – 1" OR 1-1/4", MATERIAL AND BURIAL DEPTH AS REQUIRED PER NATIONAL AND LOCAL CODES. CONDUIT MUST ENTER PANEL FROM BOTTOM AND BE SEALED PER NEC SECTION 300.5 & 300.7
16. REBAR – REQUIRED TO LIFT TANK AFTER BALLAST (CONCRETE ANCHOR) HAS BEEN ATTACHED, 4 PLACES, EVENLY SPACED AROUND TANK.

REV: 10/13

Barton & Loguidice, P.C.

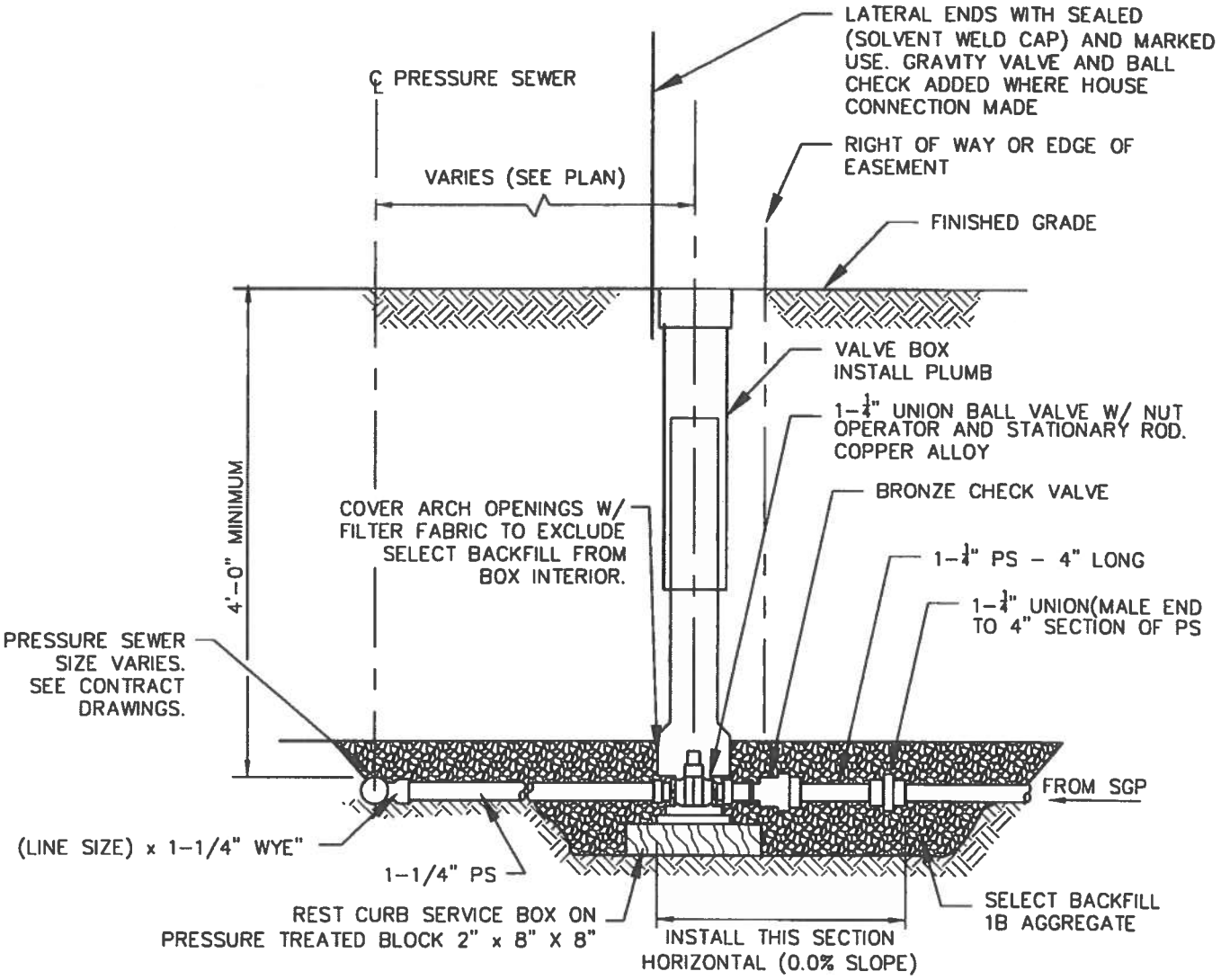
MONROE TOWNSHIP MUNICIPAL AUTHORITY

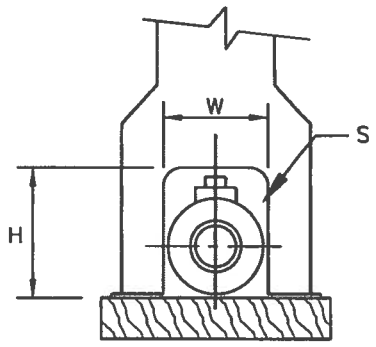
ENVIRONMENTAL ONE GRINDER STATION INSTALLATION REQUIREMENTS

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Drawing Number	Project Number
SD-26	1547.001.008

Date	Scale
6/3/13	NOT TO SCALE





VALVE BOX DETAIL

NOTES:
1. MAINTAIN A 4 FT. MINIMUM COVER OVER PRESSURE SEWER.
2. OAK BOARDS TO REST ON UNDISTURBED EARTH OR FIRM SUBGRADE.
3. SGP - SEWER GROUND PUMP.
4. CUT ARCH OPENING IN LOWER SECTION.
5. PROVIDE ALL FITTINGS, ETC. TO CONNECT PIPING TO VALVES.

VALVE SIZE	H	W
1-1/4"	6"	4-1/2"
1-1/2"	6"	4-1/2"
2"	6"	4-1/2"
2-1/2"	6-1/2"	5-1/2"
2"	6-1/2"	6-1/2"

REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

LOW PRESSURE SEWER SERVICE VALVE ASSEMBLY

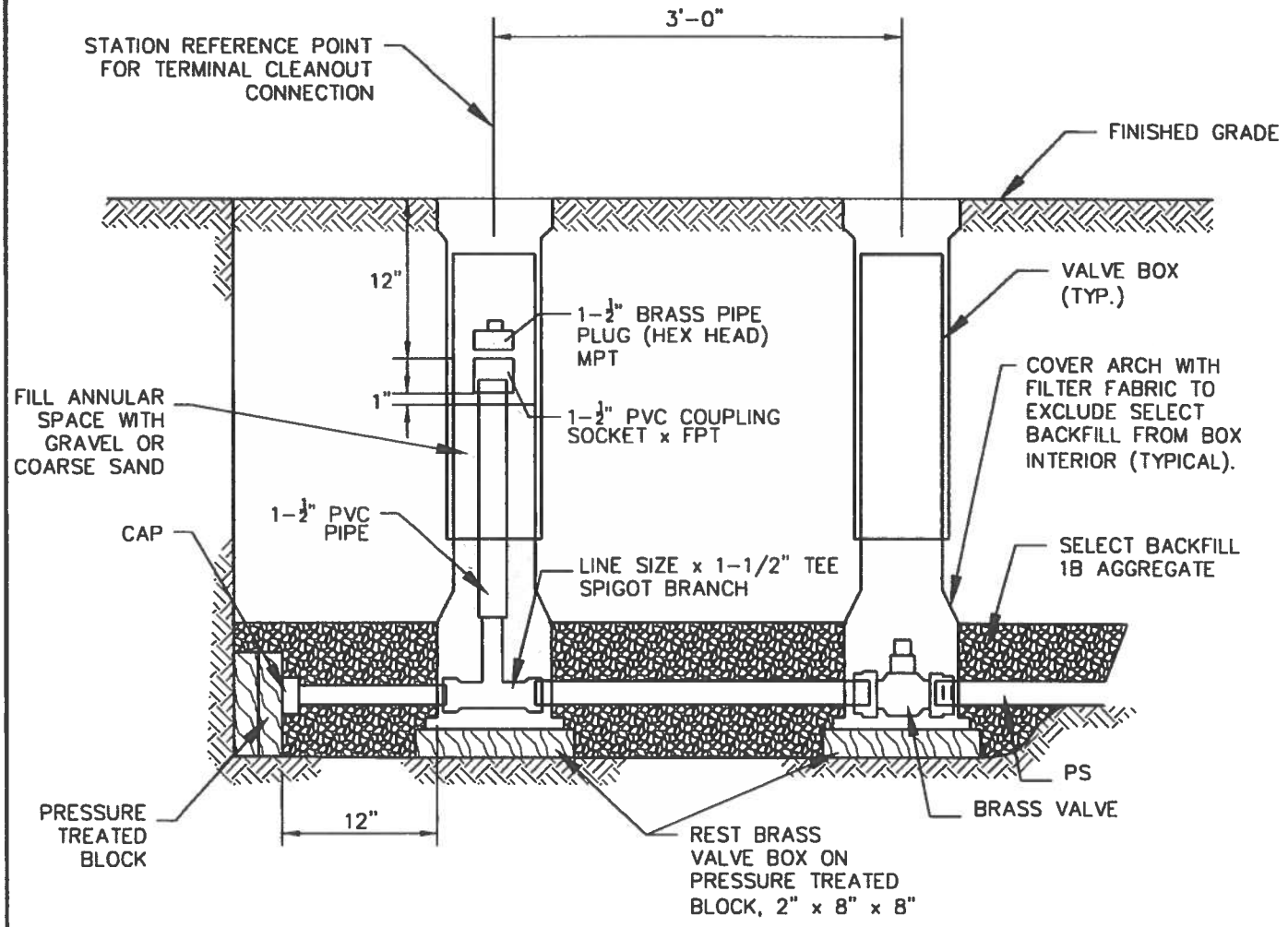
MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Drawing Number SD-27

Project Number 1547.001.008

Date 11/5/07

Scale NOT TO SCALE



NOTES:
1. PRESSURE TREATED BLOCK TO REST ON UNDISTURBED EARTH OR FIRM SUBGRADE
2. BLOCK FOR CAP TO REST AGAINST UNDISTURBED EARTH.
3. VALVE SHALL BE METALLIC. PVC SHALL NOT BE USED.
4. PROVIDE ALL FITTINGS, ETC. TO CONNECT PIPING TO VALVES.

REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

LOW PRESSURE SEWER TERMINAL CLEANOUT ASSEMBLY

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
11/5/07	NOT TO SCALE

Drawing Number: SD-28

Project Number: 1547.001.008

Barton & Loguidice, P.C.

Date 11/5/07

Scale NOT TO SCALE

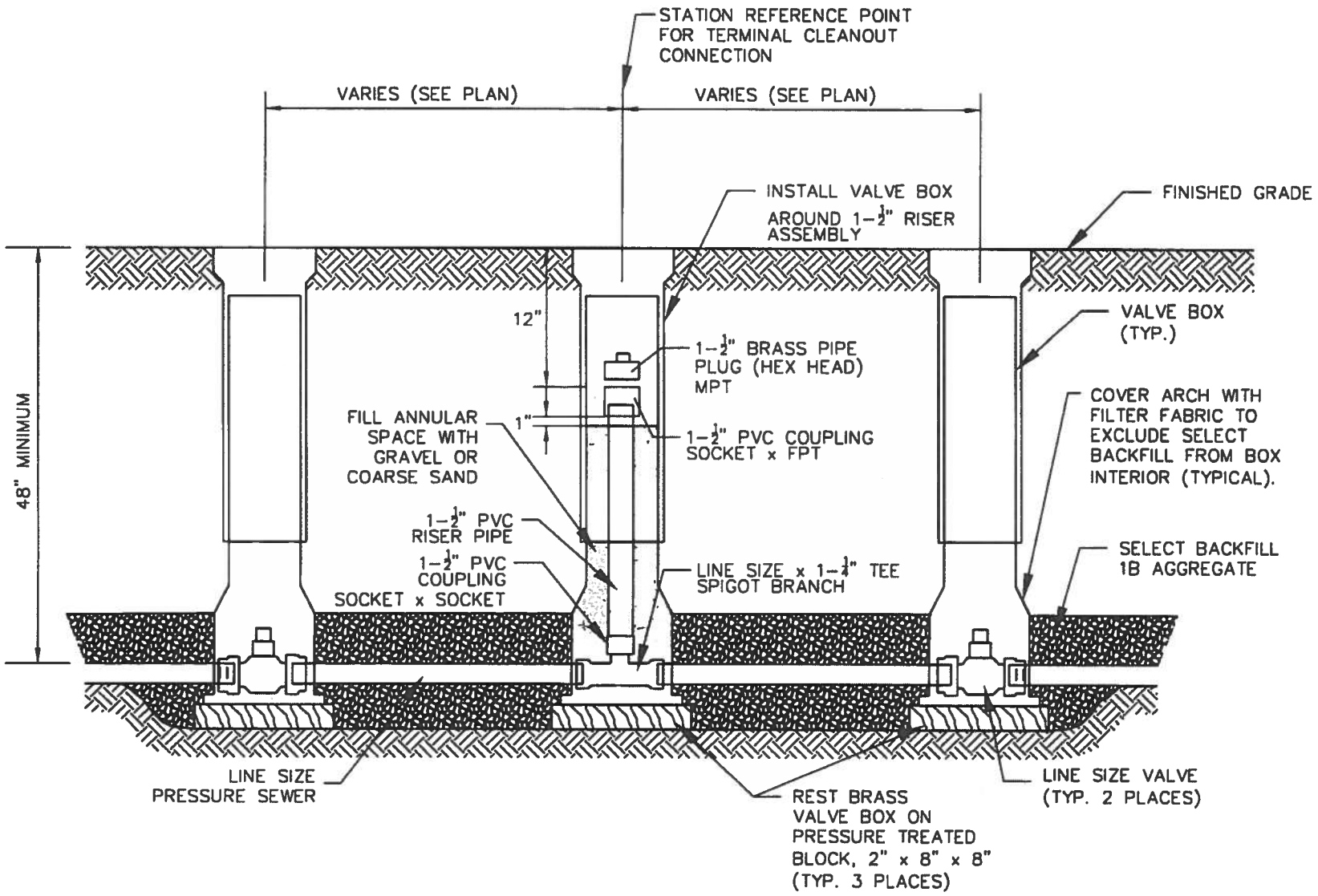
MONROE TOWNSHIP MUNICIPAL AUTHORITY
MECHANICSBURG
CUMBERLAND COUNTY, PENNSYLVANIA

LOW PRESSURE SEWER
IN-LINE CLEANOUT ASSEMBLY

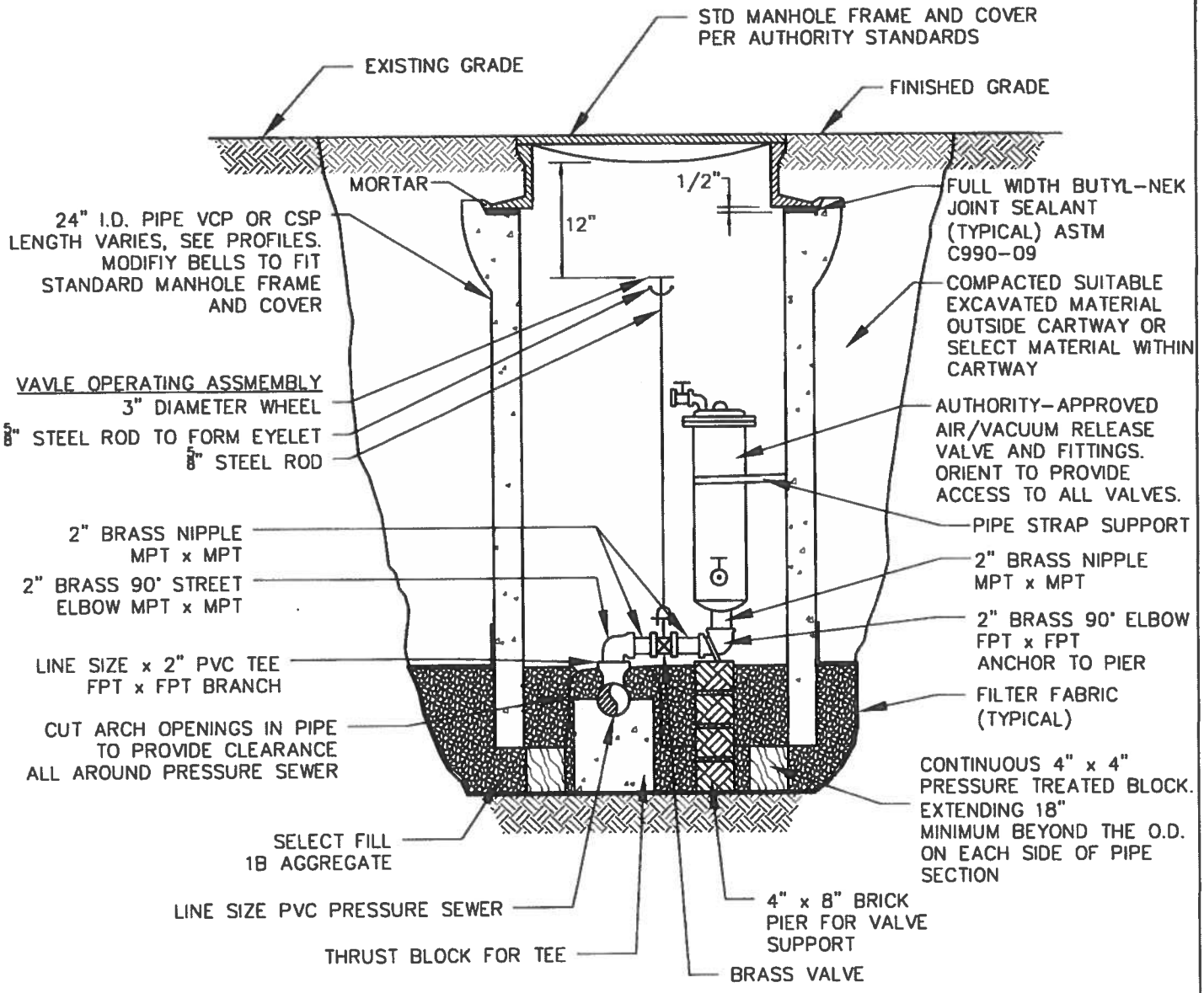
Drawing Number SD-29

Project Number 1547.001.008

REV: 10/13



NOTES:
1. OAK BOARDS TO REST ON UNDISTURBED EARTH OR FIRM SUBGRADE.
2. VALVE SHALL BE METALLIC. PVC SHALL NOT BE USED.
3. PROVIDE ALL FITTINGS, ETC. TO CONNECT PIPING TO VALVES.



NOTES:
1. PAINT VAULT INTERIOR, FRAME, COVER AND APPURTANANCES EXCEPT PVC WITH BITUMINASTIC COATING.
2. PRESSURE TREATED BLOCK, BRICK PIER AND THRUST BLOCK TO REST ON UNDISTURBED EARTH OR FIRM SUBGRADE.
3. FORM EYELET TO ALLOW REMOVAL OF VALVE OPERATING ASSEMBLY FOR OPERATION OF OTHER VALVES IN VAULT.
4. VALVE SHALL NOT BE PLASTIC.

REV: 10/13

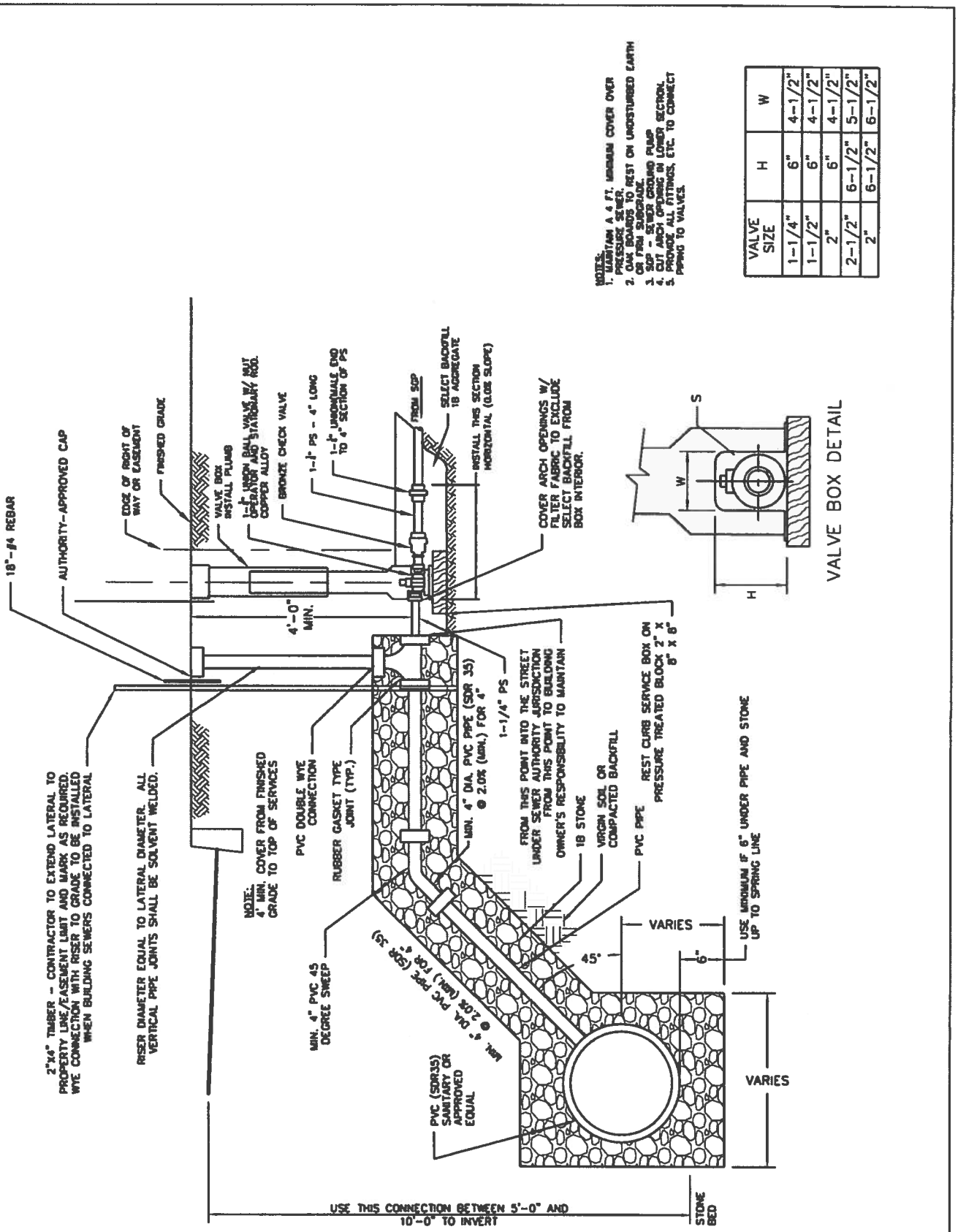
Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

PRESSURE SEWER AIR/VACUUM RELEASE VALVE AND CHAMBER ASSEMBLY

MECHANICSBURG — CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale	Drawing Number	Project Number
11/5/07	NOT TO SCALE	SD-30	1547.001.008



REV: 1/16
REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

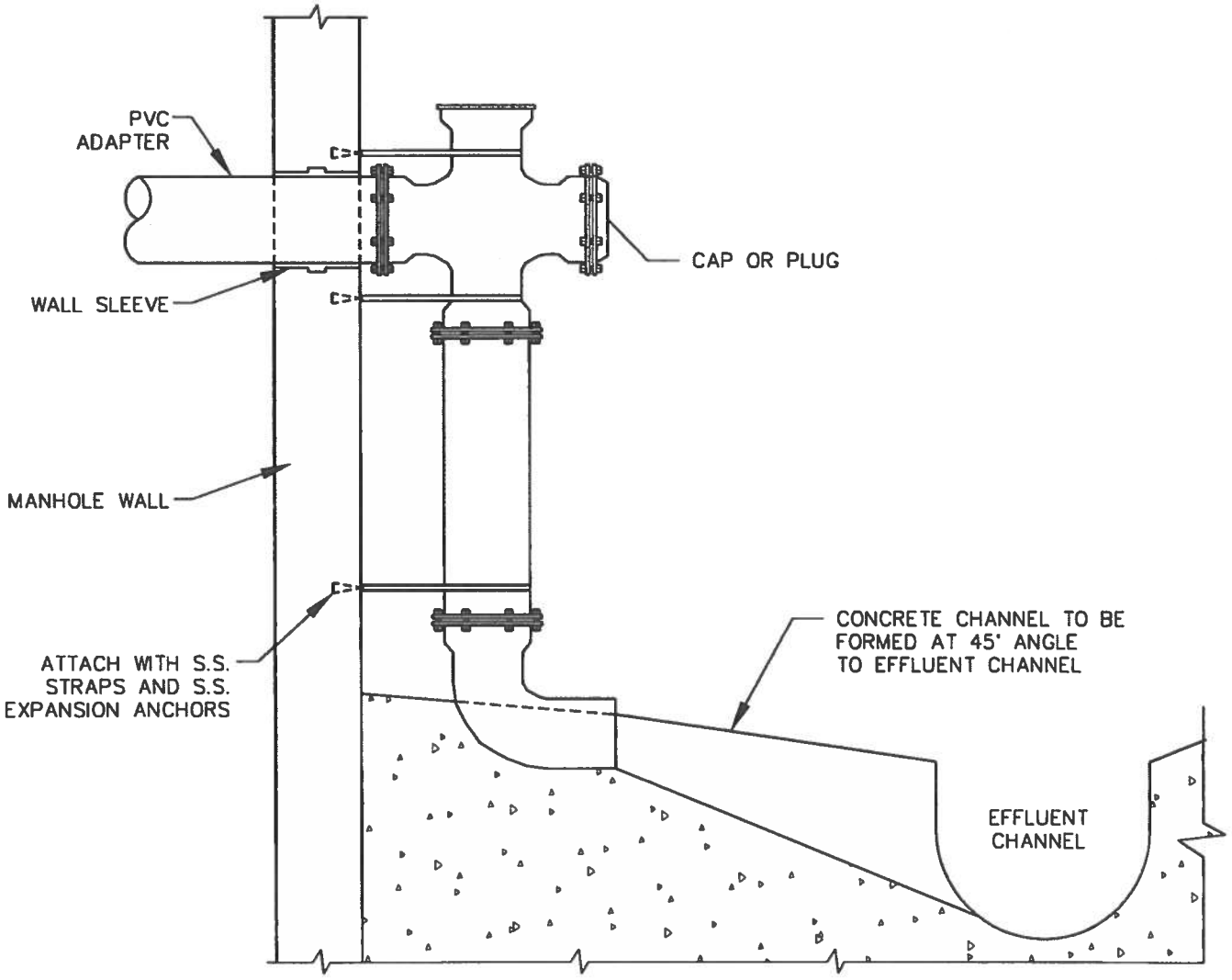
STANDARD LATERAL/ LOW PRESSURE BUILDING SEWER

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
6/11/07	NOT TO SCALE

Drawing Number
SD-31

Project Number
1547.001.008



1. EXISTING MANHOLES WHERE LOW PRESSURE SEWER CONNECTION MUST BE LINED OR NEW AGRU-LINED MANHOLE PLACED AT CONNECTION LOCATION (SEE DETAIL).

REV: 10/13

Barton & Loguidice, P.C.		MONROE TOWNSHIP MUNICIPAL AUTHORITY	Drawing Number SD-32
Date 11/5/07	Scale NOT TO SCALE	LOW PRESSURE SYSTEM CONNECTION INTO GRAVITY SEWER MANHOLE	Project Number 1547.001.008
		MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA	

Date 6/11/07

Scale NOT TO SCALE

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

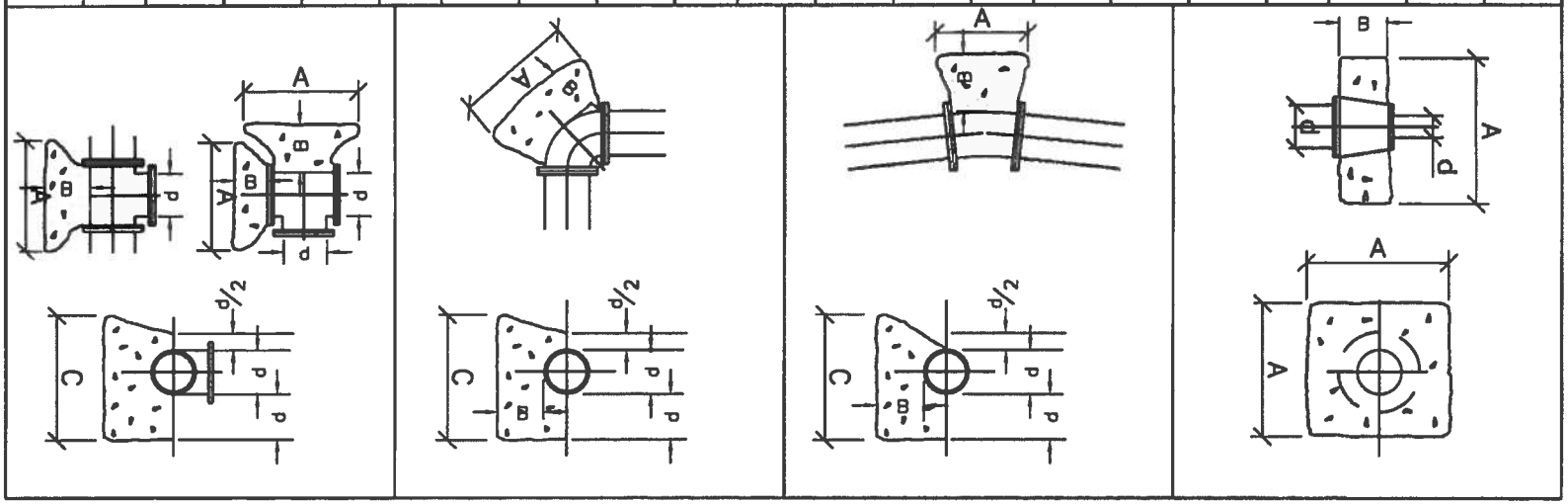
MECHANICSBURG

CUMBERLAND COUNTY, PENNSYLVANIA

THRUST BLOCK DETAIL
150 P.S.I. OR LESS

MINIMUM SIZE OF CONCRETE THRUST BLOCKS

d	TEES & CROSSES A	TEES & CROSSES B	TEES & CROSSES C	90° BENDS A	90° BENDS B	90° BENDS C	45° BENDS A	45° BENDS B	45° BENDS C	22-1\2° 11-1\4° BENDS A	22-1\2° 11-1\4° BENDS B	22-1\2° 11-1\4° BENDS C	REDUCERS A	REDUCERS B	REDUCERS C	REDUCERS dxd	REDUCERS B	REDUCERS C
2" OR LESS	1'-0"	6"	1'-0"	1'-3"	6"	1'-3"	1'-3"	6"	1'-3"	1'-0"	6"	1'-0"						
4"	1'-6"	8"	1'-6"	1'-9"	8"	1'-9"	1'-3"	8"	1'-3"	1'-3"	8"	1'-3"						
6"	2'-0"	8"	1'-9"	2'-6"	8"	2'-0"	1'-6"	8"	1'-3"	1'-6"	8"	1'-3"				6"x4"	1'-6"	1'-0"
8"	2'-6"	8"	2'-0"	3'-0"	10"	2'-8"	2'-0"	10"	2'-3"	1'-6"	10"	1'-9"				8"x4"	2'-0"	1'-6"
10"	3'-0"	10"	2'-9"	3'-6"	12"	3'-6"	3'-0"	12"	2'-3"	1'-6"	12"	2'-0"				10"x6"	2'-4"	1'-9"
12"	3'-6"	10"	3'-9"	4'-6"	12"	3'-9"	3'-6"	12"	2'-6"	1'-6"	12"	3'-0"				10"x8"	2'-6"	2'-0"
14"/16"	5'-0"	15"	4'-0"	5'-6"	15"	4'-6"	4'-6"	15"	3'-3"	2'-6"	15"	3'-6"						



1. THRUST BLOCKS TO BE USED FOR ALL PRESSURIZED PIPE AT ALL BENDS, WYES, TEES, REDUCERS AND PLUGS.
2. BEARING AREAS FOR THRUST BLOCKS ARE BASED ON THE UNDISTURBED SOIL WITH BEARING CAPACITY OF 2000 PSF. PER SQ. FT. FOR OTHER SOILS OF LESS BEARING CAPACITY, THE AREAS SHALL BE ADJUSTED ACCORDINGLY, (FIG. 14, ASCE "PIPELINE DESIGN FOR WATER AND WASTEWATER, 1975").
3. ALL CONCRETE FOR THRUST BLOCKS SHALL BE 3000 PSI COMPRESSIVE STRENGTH WITHIN 28 DAYS.
4. THE THRUST BLOCKS SHALL BE POURED FROM FITTING SUCH THAT THEY BEAR ON THE UNDISTURBED WALL OF THE TRENCH.
5. THE TABULATED CONTACT BEARING AREAS LISTED ARE FOR HORIZONTAL AND DOWNWARD THRUST ONLY AND ARE NOT APPLICABLE FOR UPWARD THRUST.

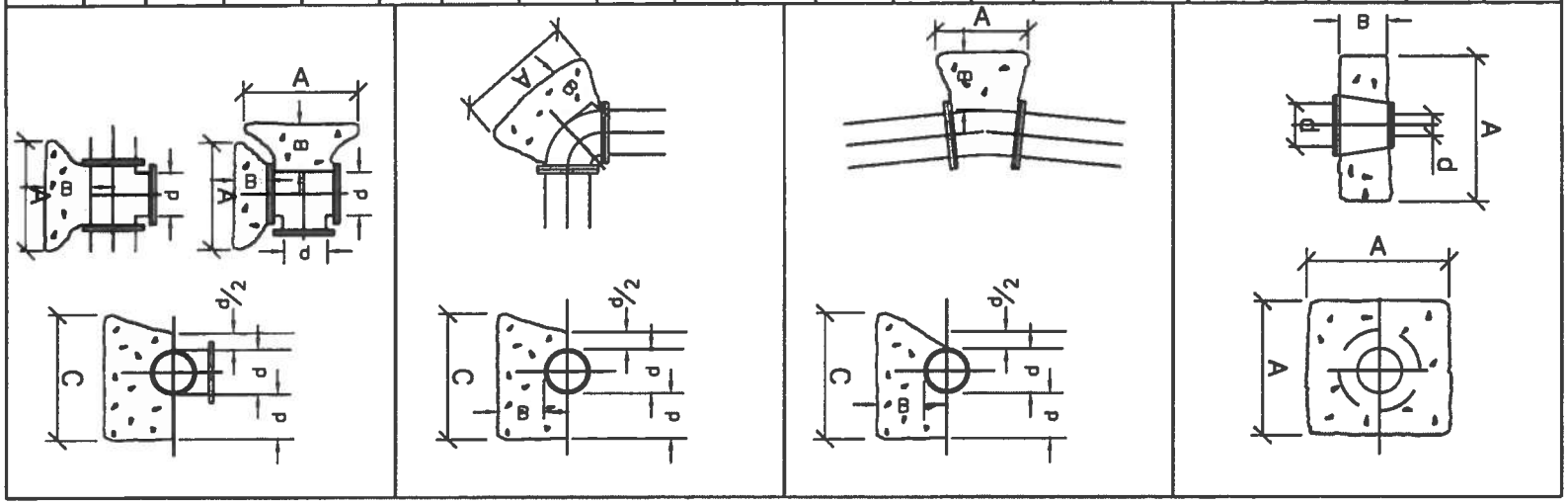
REV: 10/13

Drawing Number SD-33

Project Number 1547.001.008

MINIMUM SIZE OF CONCRETE THRUST BLOCKS

d	TEES & CROSSES A	TEES & CROSSES B	TEES & CROSSES C	90° BENDS A	90° BENDS B	90° BENDS C	45° BENDS A	45° BENDS B	45° BENDS C	22-1\2° 11-1\4° BENDS A	22-1\2° 11-1\4° BENDS B	22-1\2° 11-1\4° BENDS C	REDUCERS A	REDUCERS B	REDUCERS C	REDUCERS dxd	REDUCERS B	REDUCERS C
2" OR LESS	1'-0"	6"	1'-0"	1'-3"	6"	1'-3"	1'-3"	6"	1'-3"	1'-0"	6"	1'-0"						
4"	1'-6"	8"	1'-6"	1'-9"	8"	1'-9"	1'-3"	8"	1'-3"	1'-3"	8"	1'-3"						
6"	2'-0"	8"	1'-9"	2'-6"	8"	2'-0"	1'-6"	8"	1'-3"	1'-6"	8"	1'-3"				6"x4"	1'-6"	1'-0"
8"	2'-6"	8"	2'-0"	3'-0"	10"	2'-8"	2'-0"	10"	2'-3"	1'-6"	10"	1'-9"				8"x4"	2'-0"	1'-6"
10"	3'-0"	10"	2'-9"	3'-6"	12"	3'-6"	3'-0"	12"	2'-3"	1'-6"	12"	2'-0"				10"x6"	2'-4"	1'-9"
12"	3'-6"	10"	3'-9"	4'-6"	12"	3'-9"	3'-6"	12"	2'-6"	1'-6"	12"	3'-0"				10"x8"	2'-6"	2'-0"
14"/16"	5'-0"	15"	4'-0"	5'-6"	15"	4'-6"	4'-6"	15"	3'-3"	2'-6"	15"	3'-6"						



1. THRUST BLOCKS TO BE USED FOR ALL PRESSURIZED PIPE AT ALL BENDS, WYES, TEES, REDUCERS AND PLUGS.
2. BEARING AREAS FOR THRUST BLOCKS ARE BASED ON THE UNDISTURBED SOIL WITH BEARING CAPACITY OF 2000 PSF. PER SQ. FT. FOR OTHER SOILS OF LESS BEARING CAPACITY, THE AREAS SHALL BE ADJUSTED ACCORDINGLY, (FIG. 14, ASCE "PIPELINE DESIGN FOR WATER AND WASTEWATER, 1975").
3. ALL CONCRETE FOR THRUST BLOCKS SHALL BE 3000 PSI COMPRESSIVE STRENGTH WITHIN 28 DAYS.
4. THE THRUST BLOCKS SHALL BE POURED FROM FITTING SUCH THAT THEY BEAR ON THE UNDISTURBED WALL OF THE TRENCH.
5. THE TABULATED CONTACT BEARING AREAS LISTED ARE FOR HORIZONTAL AND DOWNWARD THRUST ONLY AND ARE NOT APPLICABLE FOR UPWARD THRUST.

Barton & Loguidice, P.C.

Date 6/11/07

Scale NOT TO SCALE

MONROE TOWNSHIP MUNICIPAL AUTHORITY

THRUST BLOCK DETAIL 200 P.S.I. OR LESS

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Drawing Number SD-34

Project Number 1547.001.008

REV: 10/13

MINIMUM SIZE OF CONCRETE THRUST BLOCKS																										
d	TEES & CROSSES			90° BENDS			45° BENDS			22-1/2° & 11-1/4° BENDS			REDUCERS													
	A	B	C	A	B	C	A	B	C	A	B	C	dxd	A	B	C	dxd	A	B	C	dxd	A	B	C	
6"	3'-6"	15"	2'-6"	4'-3"	15"	3'-0"	2'-6"	12"	3'-0"	2'-3"	12"	1'-6"	6"x4"	2'-6"	12"	1'-6"	6"x4"	2'-6"	12"	1'-6"	6"x4"	2'-6"	12"	1'-6"	6"x4"	2'-0"
8"	5'-0"	18"	3'-0"	5'-0"	18"	3'-6"	3'-0"	18"	4'-0"	2'-0"	18"	2'-6"	8"x4"	3'-0"	18"	2'-6"	8"x4"	3'-0"	18"	2'-6"	8"x4"	3'-0"	18"	2'-6"	8"x4"	1'-9"
10"	5'-3"	24"	3'-6"	6'-3"	18"	4'-0"	3'-6"	18"	4'-3"	2'-6"	18"	3'-0"	10"x6"	3'-6"	18"	3'-0"	10"x6"	3'-6"	18"	3'-0"	10"x6"	3'-6"	18"	3'-0"	10"x6"	2'-0"
12"	6'-0"	26"	4'-6"	7'-3"	24"	5'-5"	4'-3"	24"	5'-0"	3'-0"	24"	4'-3"	10"x8"	4'-3"	24"	3'-0"	10"x8"	4'-3"	24"	3'-0"	10"x8"	4'-3"	24"	3'-0"	10"x8"	2'-0"
14"/16"	7'-6"	36"	6'-0"	8'-3"	24"	6'-0"	7'-0"	24"	5'-9"	3'-6"	24"	5'-0"		5'-0"	24"	4'-3"		5'-0"	24"	4'-3"		5'-0"	24"	4'-3"		

1. THRUST BLOCKS TO BE USED FOR ALL PRESSURIZED PIPE AT ALL BENDS, WYES, TEES, REDUCERS AND PLUGS.
2. BEARING AREAS FOR THRUST BLOCKS ARE BASED ON THE UNDISTURBED SOIL WITH BEARING CAPACITY OF 2000 PSF. PER SQ. FT. FOR OTHER SOILS OF LESS BEARING CAPACITY, THE AREAS SHALL BE ADJUSTED ACCORDINGLY, (FIG. 14, ASCE "PIPELINE DESIGN FOR WATER AND WASTEWATER, 1975").
3. ALL CONCRETE FOR THRUST BLOCKS SHALL BE 3000 PSI COMPRESSIVE STRENGTH WITHIN 28 DAYS.
4. THE THRUST BLOCKS SHALL BE POURED FROM FITTING SUCH THAT THEY BEAR ON THE UNDISTURBED WALL OF THE TRENCH.
5. THE TABULATED CONTACT BEARING AREAS LISTED ARE FOR HORIZONTAL AND DOWNWARD THRUST ONLY AND ARE NOT

REV: 10/13

Barton & Loguidice, P.C.

MONROE TOWNSHIP MUNICIPAL AUTHORITY

THRUST BLOCK DETAIL
350 P.S.I. OR LESS

MECHANICSBURG CUMBERLAND COUNTY, PENNSYLVANIA

Date	Scale
6/11/07	NOT TO SCALE

Drawing Number: SD-35

Project Number: 1547.001.008

PUBLIC NOTICE

Smoke Testing Activity

To All Occupants and Residents: On: _____

Monroe Township Municipal Authority will be conducting smoke test survey on the sanitary sewer system by blowing white to gray colored smoke into the public sewer system. This smoke will reveal sources of sewer cracks in your neighborhood as well as places where storm and other surface waters are entering the sanitary system.

A special, non-toxic smoke will be used in these tests. This smoke is manufactured for this purpose, leaves no residuals or stains and has no effects on plant and animal life. The smoke has a distinctive, but not unpleasant odor. Visibility and odor last only a few minutes, where there is adequate ventilation.

Because the plumbing appliances in your house or building that are connected to the sanitary sewer system, some of this smoke may enter your house if the:

- Vents connected to your building's sewer pipes are inadequate, defective or improperly installed.
- Traps under sinks, tubs, basins, showers and other drains are dry, defective, improperly installed or missing.
- Pipes, connections and seals or the wastewater drain system in and under your building are damaged, defective, have plugs missing or are improperly installed.

It is advisable for the home owner to pour approximately a gallon of water into each sink and tub prior to our testing so that smoke cannot come up through the trap. All residents are advised that if traces of this smoke or its odor enter your house or building, it is an indication that gasses and odors from the sewer also may enter. These can be both unpleasant and dangerous as well as a health hazard to the occupants. Location, identification and correction of the source of smoke that enters your house are advised. The Cumberland County Communications Center (717) 243-4121 is aware of the project and they can be contacted if help is needed to ventilate your home.

While the township will render all possible cooperation, the correction of any defects in the pipes and sewer on private property is the responsibility of the owner. The services of a professional plumber are advised.

If you suffer from respiratory ailments such as emphysema, and/or if you have any questions before or during the test please contact the Monroe Township Municipal Authority at (717) 697-4613

PUBLIC NOTICE

Sanitary Sewer Line Flushing Activity

To All Occupants and Residents: On: _____

Monroe Township Municipal Authority will be conducting line flushing of the sanitary sewer system by pulling a pressurized water nozzle through the public sewer system to remove debris from the line.

Because your house or building is connected to the sanitary sewer system, some drain water may enter your home or building if the:

- Vents connected to your building's sewer pipes are inadequate, defective or improperly installed.
- Traps under sinks, tubs, basins, showers and other drains are dry, defective, improperly installed or missing.
- Pipes, connections and seals or the wastewater drain system in and under your building are damaged, defective, have plugs missing or are improperly installed.

All residents are advised that if drain water enters your house or building that you contact the Monroe Township Municipal Authority at (717) 697-4613.