

12.11.2 Prohibited Discharge Standards

A user shall have an affirmative defense to an enforcement action brought against it for noncompliance with the general provisions in Section 12.05.1 of these Rules and Regulations or the specific prohibitions in Sections 12.05.2 (A) through (R) excluding (P) of these Rules and Regulations if it can prove that it did not know, or have reason to know, that its discharge, alone or in conjunction with discharges from other sources, would cause pass through or interferences and that either:

- A. A local limit exists for each pollutant discharges and the user was in compliance with each limit directly prior to, and during, the pass through or interference; or
- B. No local limit exists, but the discharge did not change substantially in nature or constituents from the user's prior discharge when MACM was regularly in compliance with its NPDES permit, and in the case of interference, was in compliance with applicable sludge use or disposal requirements.

12.11.3 Bypass

- A. For the purpose of this section,
 - (1) "Bypass" means the intentional diversion of waste streams from any portion of a user's treatment facility.
 - (2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
- B. A user may allow any bypass to occur which does not cause pretreatment standards or requirements to be violated, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provision of paragraphs C and D of this section.

C. (1) If a user knows in advance of the need for a bypass, it shall submit prior notice to MACM, at least ten (10) days before the date of the bypass, if possible.

(2) A user shall submit oral notice to MACM of an unanticipated bypass that exceeds applicable pretreatment standards within twenty-four (24) hours from the time it becomes aware of the bypass. A written submission shall also be provided within five (5) days of the time the user becomes aware of the bypass. The written submission shall contain a description of the bypass and its cause; the duration of the bypass, including exact dates and times, and, if the bypass has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass. MACM may waive the written report on a case-by-case basis if the oral report has been received within twenty-four (24) hours.

D. (1) Bypass is prohibited, and MACM may take enforcement action against the user for a bypass, unless

(a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and

(c) The user submitted notices as required under paragraph C of this section

(2) MACM may approve an anticipated bypass, after considering its adverse effects, if MACM determines that it will meet the three conditions listed in paragraph D(1) of this section.

12.12 **Costs**

Any User found by the Authority to be in violation of any provision of this Section 12 inclusive of Appendix E of these Rules and Regulations shall pay to the Authority immediately upon demand by it an amount equal to all overhead, administrative, engineering, legal and other costs incurred by the Authority, in connection with or as a result of, directly or indirectly, any such violation, including without limitation, all fines and penalties imposed against the Authority by EPA or DEP or any court or any other governmental body having jurisdiction over the Authority.

12.13 **Fees**

12.13.1 **Purpose**

It is the purpose of this Subsection to provide for the recovery of costs from Users of the Wastewater System for the implementation and operation of the pretreatment program established in this Section 12. The applicable charges or fees shall be set forth in the Authority's Schedule of Rates and Charges.

12.13.2 **Charges and Fees**

The Authority may adopt charges and fees which may include:

- (a) fees for reimbursement of costs of setting up and operating the Authority's pretreatment program;
- (b) fees for monitoring, inspections and surveillance procedures; including the cost of collection and analyzing a user's discharge, and reviewing monitoring reports submitted by users
- (c) fees for reviewing and responding to accidental discharge procedures and construction;
- (d) fees for permit applications including the cost of processing such applications;
- (e) fees for filing appeals;

- (f) fees for consistent removal (by the Authority) of pollutants otherwise subject to Federal Pretreatment Standards and
- (g) other fees as the Authority may deem necessary to carry out the requirements contained herein.

Fees and charges established hereunder relate solely to the matters covered by this Section 12 and are separate from all other fees fines, and penalties chargeable by the Federal or State governmental agencies which may be imposed by the Authority upon Users of the Wastewater System.

12.14 Severability

If any provision, paragraph, word, Section, Subsection or article of this Section 12 inclusive of Appendix E of these Rules and Regulations is invalidated by any court of competent jurisdiction, the remaining provisions, paragraphs, words, Sections and Subsections shall not be affected and shall continue in full force and effect.

12.15 Conflict

All other provisions, Sections or Subsections of these Rules and Regulations inconsistent or conflicting with any part of this Section 12 inclusive of Appendix E of these Rules and Regulations are hereby repealed to the extent of such inconsistency or conflict.

12.16 Effective Date

This Section 12 inclusive of Appendix E of these Rules and Regulations shall become effective immediately upon its adoption by the Board of the Authority.

SECTION 13 - MISCELLANEOUS REGULATIONS

- 13.01 Authorized employees of the Authority shall have access to the customer's premises at all reasonable hours and after the provision of reasonable notice for the purpose of inspection, repair and/or replacement of service lines, service line extensions, building sewers, manholes and other appurtenances; observation, measurement, sampling and testing of sewage or industrial wastes; and any other justifiable purposes.
- 13.02 The Authority shall have the right to make such excavations as are required for the proper execution of the work.
- 13.03 No workmen, owner or tenant, or other unauthorized person shall interfere with the Authority's property, or do work on service line connections, service line extensions, building sewers and such other facilities, except in accordance with requirements as previously set forth. The violation of the foregoing may result in termination of service, at the option of the Authority.
- 13.04 No unauthorized person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment which is part of the Authority's sewage works facilities, including the building sewers and such other service facilities. Any person violating this provision of these Rules and Regulations shall be subject to immediate arrest under applicable provisions of the Pennsylvania Criminal Code.
- 13.05 The Authority will consider a request to discontinue billing for sewer services in the event any premises is going to be vacant, or if the premises is unlivable and/or will be demolished or repaired.
- 13.06 In order for billing to be discontinued for a vacant home, a premises owner must discontinue and cap all sink drains; remove the toilet and cap or plug opening; and verify that water service has been disconnected. The premises owner must then notify the Authority to schedule an inspector to visit the site to confirm that all of the appropriate measures have been taken.
- 13.07 In the case of any dilapidated premises, the inspector will visit the site and make a determination as to whether it is in a livable condition. In situations where a premises owner is reducing the number of rental units, the inspector may also request that separate kitchen facilities be removed and capped.
- 13.08 In all situations, the premises owner will be given a form to sign, agreeing to notify the Authority in the event the premises is re-occupied. The form also states that the premises owner will be responsible for all billing, back to the

original date, in the event the unit is occupied without notifying the Authority. All notifications to the Authority must be by Certified Mail. Billing will be discontinued as of the date of the inspector's visit and approval. No credits will be issued for service prior to that date.

- 13.09 No agent or employee of the Authority shall have the power to bind the Authority by any promise, agreement or representation not provided for in these Rules and Regulations without approval of the Board of the Authority.
- 13.10 All notices and bills relating to the Authority or its business shall be deemed to have been properly served if left upon the premises, or if mailed to the premises owner, or directed to or left at the address for the premises or the owner, as shown on the records of the Authority.
- 13.11 The Authority will send all such notices and bills to the address given on the application for sewer service until a notice of change of address, in writing, has been filed with the Authority by the applicant.
- 13.12 All notices of general character, affecting or likely to affect a large number of customers or owners of premises, shall be deemed to have been properly given or served if advertised in the newspaper designated by the Authority.
- 13.13 Complaints concerning service or of bills rendered must be made in writing and delivered to the main office of the Authority.
- 13.14 Nothing in these Rules, nor any contract, nor representation, verbal or written, of the Authority or any of its employees shall be taken or construed in any manner to be or constitute a guarantee to provide unreasonable sewer capacities or facilities, whether for domestic, commercial, industrial, manufacturing or other general uses, or for any other special purposes; but the Authority will at all times and under all conditions endeavor to maintain the efficiency of its service.
- 13.15 The Authority shall have the right to restrict the use of sewers as to capacity and character of sewage.
- 13.16 The Commonwealth of Pennsylvania and any agency thereof is entitled to a 30-day period from the due date of any bill, within which it may pay for water or sewage service without the imposition of a penalty.
- 13.17 Any person violating any of the provisions of these Rules and Regulations shall become liable to the Authority for any expense, loss or damage occasioned the Authority by reason of such violation.

13.18

Any of the preceding rules and regulations relating to design criteria, construction and installation specifications, advance deposits and the payment of costs and expenses incurred by the Authority, including but not limited to costs and expenses for the review of plans and specifications, resident engineering and inspection and legal services shall apply to all privately owned sewerage systems within the jurisdiction of the Authority.

APPENDIX A

SPECIFICATONS FOR THE CONSTRUCTION OF SANITARY SEWER LINES AND APPURTENANCES

**The Municipal Authority of the City of McKeesport
100 Atlantic Avenue
McKeesport, PA
15132**

**THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT
SEWER USE RULES AND REGULATIONS**

APPENDIX A

**SPECIFICATIONS FOR THE CONSTRUCTION OF SANITARY SEWER LINES
AND APPURTENANCES**

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**THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT
SEWER USE RULES AND REGULATIONS**

APPENDIX A

**SPECIFICATIONS FOR THE CONSTRUCTION OF
SANITARY SEWER LINES AND APPURTENANCES**

PART I - GENERAL REQUIREMENTS

1. Introduction

- A. These specifications cover the requirements for construction of all of the Authority's sewer line facilities. These specifications are intended for and apply to all such projects whether directly constructed by (a) Contractor(s) under contract to the Authority, or constructed by a land developer who in turn employs (a) construction Contractor(s).
- B. These specifications are to be used in conjunction with a companion document – “Sewer Use Rules and Regulations”.
- C. The Rules and Regulations describe and identify procedural requirements, relative to engineering work, payment of fees, certain facility design criteria and parameters, private sewer service facility requirements, time restraints, certain terms which will be incorporated in an agreement with the Authority before the commencement of construction and other factors relating to the sewage system facilities desired to be constructed.
- D. This document covers the construction work.
- E. Where the term "Authority" is used herein, it shall mean the Municipal Authority of the City of McKeesport, its employees, management, or Board, as is appropriate for each occurrence of use of the term. When necessary or appropriate the Authority may call upon its engineering and/or legal consultants for advice and direction.

2. Inspection of Construction Work

- A. All work performed in connection with the extension, modification or improvement of public wastewater facilities within the Municipality shall be required to conform with all Authority rules and regulations and shall be inspected during construction by an authorized representative of the Authority.

- B. All completed work shall be required to meet the approval of the Authority and shall be changed, modified, replaced, removed or otherwise corrected by the Contractor to such extent as directed by the Authority. Top of manholes are to remain visible at all times and are under no circumstances to be backfilled over.
- C. The work will be periodically or continuously inspected during its progress and when completed, shall be inspected jointly, by the Authority and the Contractor. If the work is declared to be substantially complete and is accepted by the Authority, the eighteen-month maintenance bond period shall commence. During the term of the maintenance bond the Contractor shall return when and as required to reconcile any problems resulting from construction, such as leakage, mechanical malfunctions, trench settlement, pavement failure, surface restorations, drainage, etc. In addition, a maintenance bond inspection shall be made by the Authority at a date between twelve (12) and eighteen (18) months following the date of declaration of completion of construction. The Contractor will be notified in advance of that inspection date and shall participate therein.
- D. The Contractor shall keep on site, and make available upon request by the Authority, a surveyor's rod and level for the purpose of spot-checking elevations as the work progresses.
- E. The Contractor shall also keep and make available a 300' surveyors tape for the purpose of spot checking distances and for the purpose of the Contractor providing off-set measurements as the work progresses.

3. Rights-of-Way

- A. The alignments and locations of the proposed pipelines and appurtenances are shown on the plans on which street, highway and/or other acquired rights-of-way limits have also been superimposed. No pipeline shall be relocated outside of the street or other right-of-way within which it is shown without obtaining the formal written approval for such change from the Authority.
- B. Where a special pipe line right-of-way is obtained through private property, the minimum permanent width for operation and maintenance purposes shall be 20 feet; the width of the temporary right-of-way obtained through such private properties for initial pipe line installation and construction purposes shall be 40 feet, 10 feet of which shall be located adjacent to and on the outside of both limits of the permanent right-of-way. The minimum distance between the center of any longitudinal pipe line and the right-of-way limit line shall be 5 feet. All construction activities shall be confined within the 40 feet wide construction right-of-way as much as possible.

- C. The Contractor shall make his own arrangements for office space, materials storage yards, change trailers, sanitary facilities, utility services, debris disposal sites, and; for ingress and egress to any location along the pipeline project for which the Contractor desires or requires use and, for which the Authority has been granted no such right-of-way.
- D. Contractor is directed to the provisions of the Underground Utility Line Protection Law Act 287 (1974), as amended, by Act 187 of 1996 and full compliance therewith is required of the Contractor. The Contractor is required to notify facility owners through PA One Call System not less than three (3) working days or more than ten (10) working days prior to excavation or demolition work.
- E. The position of sewer lines proposed to be constructed in connection with land development projects shall be such that, regardless of the sequencing of various utility line construction (gas, power, telephone, water, storm sewer, sanitary sewers, etc.) no pipe line shall be aligned longitudinally, along the sanitary sewer lines, any closer than three (3) feet. It is imperative that such minimum distance be maintained along all sanitary sewer and water lines to provide space required for future maintenance and/or repairs.
- F. In accordance with the regulations of the Pennsylvania Department of Environmental Protection, the separation between water and sewer pipe shall be as is shown in Appendix A-2.

4. Control of Pipe Line Elevations and Alignments

- A. The elevations of all Authority facilities shown on record drawings and on plans and profiles of proposed work, are on the Datum of the United States Geological Survey. The Contractor shall confirm the elevation of all existing facilities to which proposed facilities will connect, as well as the profile of the existing and/or finished (in the case of land development projects) ground lines, prior to commencement of construction, to confirm compatibility.
- B. All sewer lines shall be required to be constructed and the elevations and alignment shall be controlled by the use of laser equipment. Sewer line construction shall begin at the manhole with the lowest invert elevation unless prior approval is granted by the Authority.
- C. The Contractor shall employ competent field survey personnel as may be required to control grades and/or alignment of proposed facilities and to assist the Authority by obtaining information during construction progress, and for purposes of preparing as-built record drawings.

5. Existing Utility Lines - Location, Protection and Hazards

- A. The plans show those underground water lines, gas lines, electric lines, cable TV lines, telephone lines, sanitary sewers, storm drains, conduits and other similar utility lines and appurtenances for which said location information was either made available to the designer, or was observed in the field. Neither the number of such underground facilities nor their respective types, sizes and/or locations can be assured or guaranteed and it is, therefore, the responsibility of the Contractor to obtain such additional information as is required to properly complete the work in compliance with the specifications, and; to contact the owners of the various utilities in the area prior to starting and during performance of the work in accordance with PA Act No. 287 of 1972 and as amended by PA Act 187 of 1996 known as the Underground Utility Line Protection Act. Full compliance therewith is required. The PA One Call telephone number is 1-800-242-1776.
- B. The approximate location of any power and telephone poles and guy poles along the route of the work is shown on the drawings and the overhead lines supported by all such poles shall be observed and located by the Contractor prior to commencement of the work.
- C. The Contractor shall be completely and solely responsible for any and all property damages, bodily injuries, financial losses and interruption of service that results from or are attributable to his construction activities and, which affect water lines, gas lines, electric lines, telephone lines, drain lines, sanitary and storm sewer lines and all appurtenances and service facilities connected thereto. Restoration of all such disturbed facilities shall be accomplished immediately after incurrence thereto.
- D. Water, sewer, gas, power and telephone service to dwellings or places of business shall be maintained with a minimum of interruption throughout the construction of the contract work. No such service shall be intentionally interrupted without the approval of the respective utility company concerned, and without first giving due warning to the occupants of said dwelling or business establishment. At least three (3) days notice of an interruption in service shall be given to the Authority so that the Authority may notify its customers.
- E. In some cases, it may be found that existing pipelines are in a location where construction of the proposed work cannot reasonably proceed until the utility has been relocated. The Contractor shall make all necessary sub-surface investigations and shall locate such utility mains far enough in advance of the trenching work so that work progress is not unnecessarily interrupted.

- F. Attention is directed to the fact that the proposed work could be in close proximity to overhead power lines which transmit electric current at high voltages and which, if disturbed or contacted during construction, would be hazardous to construction personnel and/or other persons. The Contractor shall, therefore, properly protect such wires, pole supports or other power line appurtenances to avoid disturbance to those facilities, and shall operate all machinery and conduct all other construction activities in a manner which will assure protection of all construction personnel and other persons against said hazards.
- G. Work in the vicinity of the existing underground gas lines and appurtenances is also hazardous because, under certain conditions, such materials are flammable and/or explosive and, the Contractor shall avoid all temporary and permanent supports and other required protection to prevent exposure of the same to construction personnel and/or other persons. Where such lines are exposed during construction and leakage is detected, construction work in those areas shall be immediately suspended, the owner of the pipe line shall be immediately advised of the condition and the construction work shall not resume until all repairs have been properly completed.
- H. The construction activities required to be performed in the conduct of the work may necessitate the inter-connection, interception, surveying, inspection, removal, replacement and repair of certain existing manholes, sewer pipes and appurtenances. Said items are conveying all wastes and runoff discharged to and infiltrating into the public sewer system within the area served, which wastes may contain and/or generate toxic, noxious, oxygen depleting or other liquid or gaseous substances harmful to human beings.
- I. The Contractor shall also provide all personnel with all tools, clothing and other devices necessary for such safe practice, including appropriate waterproof clothing, respirators, protective glasses, mechanical air blowing equipment to pre-ventilate manholes and other chambers, explosive atmosphere detectors, ladders, safety harnesses, etc. No work shall be performed under any unsafe conditions and if same is detected at any time, the Contractor shall, therefore, thoroughly instruct all personnel involved in such work so that appropriate and complete safety practices are observed at all times.

6. Traffic Warning Signs, Barricades, Lights and Control

- A. Where pipe lines and/or other facilities are constructed along State Highways and/or Township Streets, and where construction activities may otherwise impede normal vehicular traffic patterns on said highways or streets, the control of traffic shall be accomplished in accordance with the details set forth in Publication 213 of the Pennsylvania Department of Transportation, the title of which is "Temporary Traffic Control Guidelines Publication".

- B. The position of work zone signs, erection of signs, sizes of signs, details and configuration of signs, traffic channelizing, tapered lengths/spacing, cones, drums, vertical panels, lighting devices, arrow boards and all flagging conduct and activities shall conform to the details described therein. The location and configuration of traffic control methods shall conform to those graphically illustrated in the publication on Figures 5 through 23 for Short Term Operations, and Figures 24 through 42 for Long Term Operations shown in the publication. The Contractor shall submit a traffic control plan and procedure (conforming to the above referenced Publication 213) to the Authority for approval, prior to commencing with field construction.

7. Exploratory Excavations

- A. Some of the proposed pipelines and appurtenant structures are somewhat flexible with respect to alignment. Therefore, in those existing streets, roadways, berms or other areas expected to have a number of underground utility lines, where there are large trees which may be saved by realignment, and where the Authority so directs, the contractor shall make appropriate exploratory excavations for the purpose of locating said lines.
- B. In all instances, the costs associated with exploratory excavations shall be the responsibility of the Contractor, and any realignment of pipelines shall be approved by the Authority.

8. Shop Drawings and Materials Submittals

- A. All materials proposed to be utilized for construction of any Authority facilities are required to be approved for use, in advance of shipment to the job site. No materials shall be incorporated in any sewer lines or appurtenances which have not received the prior approval of the Authority.
- B. Such approvals shall be obtained by submitting five (5) copies of shop drawings, catalog cuts, materials specifications, bills of materials and/or such other printed information which clearly illustrates the details of all pipe, joints, pipe line structures and appurtenances, supports, mechanical details, specific installation requirements, etc.
- C. The Authority will review, make corrections on, reject and/or approve said submitted shop drawings and materials information and will return one (1) copy to the developer/contractor within fourteen (14) calendar days; resubmittal shall be made by the Contractor as required to obtain approvals – prior to installation of the material in the construction work.

- D. The review and approval of any separate submittal item shall not eliminate, alter or otherwise affect the responsibility of the Contractor to coordinate all of such submittals with the performance and progress of the work to assure completion of the intended project.

9. Record Drawings

- A. The Contractor shall retain one (1) reasonably clean set of drawings of the proposed improvements at the job site, on which he shall note changes in pipe line alignments and elevations and, any other changes from the pre-construction approved plans. He shall also reference the locations of the ends of sewer service laterals so that the same may be uncovered and connected at future times.
- B. The set of prints on which such field information is recorded shall be turned over to the Authority providing a daily construction progress record and identify all noted changes to the project, prior to Authority acceptance of the facilities.
- C. One (1) set of Record reproducible mylar, four (4) 24" x 36" paper sets, four (4) laminated 11" x 17" paper sets, and a disk containing record drawings of as-built conditions in a software format approved by the Authority (AutoCAD Version 2002 or higher) shall be provided to the Authority by the Contractor having the following information described. The Record information shall include, but not be limited to, manhole inverts, line lengths, slopes, wye locations, offset dimensions, and detailed information on all other aspects of the construction of the facilities.

END OF PART I

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PART II - SITE WORK AND PREPARATION

1. Clearing and Grubbing

- A. Certain work to be performed will require clearing. The Contractor shall cut, clear and remove all brush, sapling, scrub and other wild growth along the route of the pipelines.
- B. Brush, scrub growth, stumps, saplings and tree limbs and trunks so directed to be cut and removed, shall be placed into piles and/or completely removed from the site of the work. No such debris shall be included in any backfill and as part of the clean-up work shall be required to be removed and transported away from the site to the contractors dump site.

2. Open Excavation and Backfill

- A. CONTRACTOR is directed to the provisions of the Underground Utility Line Protection Law Act 287 (1974), as amended by Act 187 of 1996, and full compliance therewith is required of the CONTRACTOR.
- B. Limit daily trench excavation to a length of pipe placement and backfilling that can be completed the same day.
- C. The width of all trenches shall not exceed the maximum of four feet or the outside diameter of the pipe, plus two feet, from the bottom of the respective pipe trench to a horizontal plane located one foot above the top of the pipe. That section of the trench is identified as the pipe zone and its configuration is graphically illustrated in Appendix A-2. In the event that the Contractor's construction methods/activities result in a trench wider than four feet or the pipe diameter plus two feet within that pipe zone, he shall install concrete bedding or encasement or shall make such other provisions as may be directed by the Authority to protect and assure the structural integrity of the pipe.
- D. All ductile iron pipe shall, regardless of the character of the exposed trench bottom, be installed on bedding material at least 6" in thickness, except where concrete cradle and/or encasement is required.
- E. Where the exposed trench bottom consists of rock or other unyielding material the trench shall be overcut a minimum of 6" prior to installing bedding material which is specified later within this manual.

- F. When soft and/or unstable trench bottoms are exposed, they shall also be overcut and stabilized to the satisfaction of the Authority with the same bedding material before the pipe is installed. Trench bottoms shall be overcut at joints where pipe bells will occur to assure that all pipe barrels are continuously supported for the entire barrel lengths. If this method does not provide adequate pipe support, as determined by the Authority, concrete caissons shall be installed as required at no expense to the Authority.
- G. All polyvinyl chloride pipe shall, regardless of the character of the exposed trench bottom, be installed on bedding material at least 6" in thickness, except where concrete cradle and/or encasement is required.
- H. The excavation material from the trench may be stored along its alignment on rights-of-way obtained for construction purposes. It may not, however, prohibit traffic flows along the streets and roadways, access to private properties, or access to existing utility lines by the respective utility companies. Pennsylvania Department of Transportation rights of way prohibits stockpiling of excavated material.
- I. The temporary storage of excavated material shall not obstruct or alter the flow of surface water runoff to the detriment of the operation of existing surface water drainage facilities and ditches and, shall be placed at a location which will not superimpose excessive loading on the trench walls and/or the sheeting, shoring or bracing installed within the trenches.
- J. At all locations along ductile iron pipelines, the backfill material placed in the pipe zone (that is, that material located above the top of the trench bottom or bedding material to an elevation located one foot above the top of the pipe), shall be selected excavated material which shall be thoroughly compacted and placed in such a manner to avoid disturbance or displacement of the pipe and other appurtenances. The pipe zone material shall contain no rocks or hard shale which have a maximum dimension exceeding two inches. Pipe barrels shall be continuously supported on trench bottoms for their entire length and no rocks, bricks, on edges or other point supports will be permitted. Bedding material shall be used along all pipelines, and especially where necessary to compensate for irregular trench bottoms and provide such continuous support.
- K. At all locations along polyvinyl chloride pipelines the backfill material placed within the pipe zone to an elevation of twelve (12) inches above the top of the pipe shall be the same as that material specified hereinafter for the bedding of the pipe as depicted in Appendix A-2.
- L. Backfill material placed in trenches above the pipe zone, where such trenches are located within Municipal, County, Streets or State Highways shall consist (for the

entire trench width and depth) of material conforming to the requirements specified for bedding and as required by the Township and the Pennsylvania Department of Transportation.

- M. Backfill material in trenches above the pipe zone in traveled ways, road shoulders or berms and at all other locations where trench settlement must be avoided, shall be 2 RC from an approved Pennsylvania Department of Transportation supplier placed in lifts not exceeding eight inches in thickness and shall be thoroughly and mechanically compacted by the use of vibratory or reciprocating tamping equipment - for the full depth of trench.
- N. At other locations along the alignment of the pipes where trench settlement is not of concern and, where designated by the Authority during construction progress, backfill above the pipe zone may be loosely placed by machine mounded over the trench. After settlement has satisfactorily occurred, and subject to a time approved by the Authority, the excess material shall be leveled and blended with the slope of adjacent ground surfaces in a manner which does not adversely impede the flow of surface water or otherwise have a deleterious affect on the finished landscape. See Appendix A-2 Standard Detail SD-003.
- O. When the trench excavation is being backfilled, the disturbed area shall be graded to final contours and appropriate temporary erosion and sediment pollution control measures/facilities shall be installed. Seeding and mulching of all disturbed areas shall be done as per the requirements of the County Erosion and Sediment Pollution Control Program.
- P. If daily backfilling is delayed, the disturbed area shall be graded to final contours, appropriate temporary erosion and sediment control measures/facilities shall be installed as per the requirements of the County Erosion and Sediment Pollution Control Program.
- Q. No material shall be used for backfill at any location which, in the opinion of the Authority, is too wet, frozen, mucky or contains debris, tree stumps or an excessive amount of rocks.
- R. All excess excavated material resulting from the construction of the pipelines and appurtenances shall be disposed at a location and in a manner which shall be the Contractor's responsibility to determine.
- S. The Contractor shall schedule construction activities and provide all required equipment and personnel such that the backfilling of trenches located along or crossing streets, street berms, roadways, driveways and other traveled ways, results in resumption of normal traffic patterns immediately after pipe construction has been completed for the day.

3. Construction Site Safety

- A. Safety on the construction site shall be the absolute responsibility of the Contractor.**
- B. Where necessary to maintain the required trench configuration in the pipe zone, in confined areas where trench walls above the pipe zone cannot be sloped, or for the protection and safety of construction personnel, sheeting, shoring and/or bracing shall be installed in accordance with the requirements of the appertaining regulatory agencies.**
- C. Said sheeting, shoring and/or bracing shall be designed by the Contractor and shall be adequate to withstand the loads to be imposed during the construction operations. Its placement and removal shall be carefully performed to avoid displacement or disturbance of the entrenched pipe. All trench supports shall also be required to provide complete safety to construction personnel working within. Trench boxes may be utilized; however, their design, fabrication, structural adequacy, handling, placement and removal shall be the responsibility of the Contractor.**
- D. Trenches at any and all locations where pedestrian or vehicular traffic hazards would result, shall not be left open during non-construction hours, unless they are suitably covered with a steel plate which is adequately anchored and reinforced to sustain pedestrian and/or vehicular traffic loads which may be imposed. All excavations within road rights-of-way shall be closed over night and over weekends and marked with a flashing traffic marker to warn motorists and pedestrians. No roadway, street, alley or driveway shall be left impassable overnight except in case of emergencies.**
- E. All structure excavations and open trenches shall be constructed in accordance with the regulations set forth under subpart P, "Excavation, Trenching and Shoring" published as a part of the Safety and Health Regulations for construction by the U.S. Department of Labor, as amended, as the same pertains to the shape of trenches, trench side-wall supports, the construction methods employed, the general protection requirements, the general excavation requirements, and the minimum requirements for the respective contractor for the conditions encountered. Methods of installation shall be compatible with assuring the protection against disturbance of adjacent facilities and/or grounds and, the safety of construction and other personnel.**

4. Bedding and Specially Graded Backfill Material

- A. All pipe line bedding material, all material placed within the pipe zone of trenches in which PVC pipe is constructed and, all material placed above the trench bottom**

and below the concrete trench slab (where trenches cross or are located within Township Streets or State Roads) shall be 2B limestone, complying with the gradation and classification of the Pennsylvania Department of Transportation.

5. Compaction Testing

- A. The Contractor is informed that in those areas where the excavated material is utilized as backfill where shown on the construction drawings that the compacted backfill achieve a density of 95% as determined by the Standard Method A, Proctor Test.
- B. Tests will be performed to assure that such compacted densities prevail, at the discretion of the Authority and at the expense of the Contractor. Generally, tests shall be performed as deemed necessary by the Authority on the trench so backfilled and compacted by the Contractor. In the event that the placed backfill does not comply with the 95% density requirement, the work shall be re-excavated and re-compacted and the costs of the subsequent re-testing after replacement shall be the Contractors responsibility.

6. Blasting

- A. When rock, hard shales or other unyielding material is encountered in the trenches and/or structural excavation operations and cannot reasonably be moved by the machines on the job, it may be fractured by pre-drilling and blasting, in a manner which will enable the Contractor to remove the material and complete the excavation in accordance with the specified trench widths and/or shapes, and in a manner that will produce the least practicable disturbance or displacement whatsoever to existing aboveground or underground structures and pipe lines.
- B. All blasting shall be done by licensed blasters and shall be performed in accordance with all applicable Federal, State and local laws, rules and regulations regarding registration, transportation, storage, handling and otherwise using explosives. Blasting permits are required to be obtained in advance from the Municipality.
- C. The Contractor shall have a plan of his proposed blasting procedures prior to commencing with same, and shall continually adjust his operations when materials of varying and/or different characteristics are encountered in order to obtain specified and desired trench or other structural excavation shapes. Hole spacing, size and loading; offset benching; ignition sequencing; type of equipment utilized, and all other procedures and operations shall be especially adapted at each location in order to produce relatively smooth, unshattered and completely safe back slopes and/or trench walls, and, in order to assure protection of all personnel employed in connection with the work and other persons.

- D. At the beginning of the blasting operations in any particular area, a short test line of holes shall be used for the purpose of determining optimum spacing, sizing and loading of the holes in order to ascertain best practicable and safe procedures.
- E. Attention is directed to the fact that water utilized for sanitary facilities by certain of the local citizens and commercial and institutional establishments, is obtained from separate and private on lot water wells. Therefore, blasting as well as all other construction activities shall be conducted in a manner to assure that no damage is imposed upon any of the well facilities and/or well water supplies.

7. Dewatering

- A. All excavation shall be dewatered thoroughly in advance of the installation of any of the construction work. No facilities shall be constructed in any excavation where water flows or is pooled, or where groundwater infiltration or surface water inflow is not immediately removed.
- B. Water which accumulates in the open trench shall be completely removed by pumping before pipe placement and/or backfilling begins.
- C. Where dewatering does occur, the Contractor shall conduct those operations in a manner which complies with regulations on the subject from the County Conservation District and Soil Erosion and Sediment Pollution Control as promulgated by The Pennsylvania Department of Environmental Protection. No such discharges shall be permitted to erode or otherwise adversely effect any public or private property and all such discharges shall be trapped, settled, rough-filtered, retained and/or checked (depending upon the clarity, turbidity, and concentration of suspended solids within such discharges) in accordance with detailed requirements of Pennsylvania Department of Environmental Protection, Office of Resources Management, Bureau of Soil and Water Conservation, Division of Soil Resources and Erosion Control.

8. Minimizing Water Pollution from Soil Erosion

- A. All Contractors shall conduct their activities and shall program trenching and restoration operations in such a manner as to minimize pollution of the ditches, streams and creeks and their tributaries from erosion of the freshly excavated and/or backfilled material during periods of excavation and surface water runoff.
- B. Depending on the size of the area disturbed, the Contractor may be required to execute NPDES Permit for Discharge of Storm Water from Construction Activities. Unless otherwise notified, it is the Contractor's responsibility to acquire any and all permits related with storm water discharge or with stream/waterway crossings.

- C. The Contractor shall reduce the area and duration of exposure of all erodible soils by the greatest extent practicable and to that end, hydro-mulching, reseeding and other surface restoration shall be required to closely follow backfilling operations. Where the Authority so directs in the field, sediment traps, hay bales, and/or other means to retard runoff rates shall be installed; similar holding basins or other sediment trap arrangements shall also be required to be installed at the discharge of dewatering pumps.
- D. Temporary erosion control measures shall be established prior to or concurrent with clearing and grubbing.
- E. Discretion shall be exercised in selecting the number and location for encroachments during construction both in and along the creeks such that a minimum of stream disturbance and erosion pollution results. As previously referenced, the appended Supplemental Detail drawings illustrate the temporary facilities which will be required to be installed.
- F. Prior to earthmoving activities the Contractor shall install the necessary erosion protection devices required as outlined below, and as detailed in the latest edition of the Erosion and Sediment Pollution Control Program Manual, as published in the Bureau of Soil and Water Conservation of the Pennsylvania Department of Environmental Protection.
 - 1. Immediately downstream of stream or creek crossings and where directed by Authority, the Contractor shall install a temporary short-term stream disturbance sedimentation check.
 - 2. For equipment stream crossings, the Contractor shall use the same criteria as established for channel disturbance.
 - 3. Where the pipeline is located in wooded or planted areas the downstream side of the area to be excavated will be protected by installation of fabric fence or straw bales.
 - 4. Where the pipeline is located in traveled roadways or road berms, drainage facilities and ditches immediately downstream of the construction area to be protected by constructing a straw bale debris filter in the existing drainage ditch. After construction, the ditch is to be removed of straw bales and all silt and debris and returned to its original condition.

- G. During construction, there shall be no discharge of petroleum products from construction equipment into ditches, streams, creeks, storm sewers or on ground surfaces and, water removed during the trench dewatering operation shall be free of suspended material and/or mud, or shall be pumped to sediment trap before conveyance to the stream.
- H. All excavation and grading shall be accomplished in a manner that complies with all requirements and standards set forth in the Erosion and Sediment Pollution Control Manual published by the Pennsylvania Department of Environmental Protection and the County Soils Conservation Services, unless more stringent requirements are indicated herein.

9. Dust and Mud Control on Streets and Other Traveled Ways

- A. Dust control palliatives shall be utilized where and when necessary and as directed by the Authority to satisfactorily maintain roads, streets, berms and other traveled ways for vehicular traffic. In addition, the accumulation of mud and/or dirt from the excavation, backfill and trenching operations shall be cleaned off the surfaces to properly maintain the roadway in a condition satisfactory to the Authority.

10. Stream Crossing

- A. All requirements and standards set forth in the Erosion and Sediment Pollution Control Manual published by the Pennsylvania Department of Environmental Protection and the Westmoreland County Soils Conservation Services, unless more stringent requirements are indicated herein shall be adhered to.
- B. Where sanitary sewer lines cross creeks or streams, such crossing shall be accomplished by using ductile Iron pipe encased in a minimum of 6" of concrete all around the pipe, and fittings conforming to the requirements of the appertaining sections of these specifications.
- C. The pipe shall be tied to 8" concrete blocks laid on the trench bottom and shall be encased in concrete all around the pipe. The concrete encasement shall be at least six (6) inches thick. The minimum depths of pipe; that is, the vertical distance between the lowest elevation of the stream along the pipe alignment and the top of the pipe, shall be three (3) feet. Where rock is encountered within the trench bottom, bedding material (as also specified herein) shall be utilized.

- D. The concrete encasement of the pipe shall extend between the tops of the stream on creek banks, or where such banks are not evident, a minimum distance of 5 feet each side beyond the normal stream channel.
- E. Backfill around the stream crossing shall consist of the excavated material unless the same is deemed unsuitable by the Authority at the time of excavation.
- F. Disturbed bank areas shall be stabilized immediately upon completion of the crossing.
- G. As shown on the construction drawings, rip-rap or other indicated stream bank protection shall be installed to prevent erosion of the slopes, stone shall be minimum weight of 155 lbs per cubic foot durable rock, as computed by multiplying the specific gravity (bulk saturated, surface dry basis, ASSHTO Test T 85) times 62.3 pounds per cubic foot. The rip-rap shall meet NSA requirements and shall be placed on a filter blanket meeting the requirements of the Department of Environmental Protection. Installation of rip-rap or other indicated stream bank protection shall be per Pennsylvania Department of Environmental Protection requirements and regulations.

11. Erosion Control Turf Reinforcement Mat

- A. The erosion control turf reinforcement mat shall consist of a rolled erosion control product manufactured from long lasting natural fibers mechanically formed and/or bonded into synthetic nettings to produce a permanent three dimensional structure. The erosion control turf reinforcement mat in a fully vegetated state shall be capable of permanently reducing average annual soil loss to 0.03 in (0.08 cm) on a 2:1, 25 ft (7.6 m) slope consisting of Silt Loam soil.
- B. Erosion Control Turf Reinforcement Mat shall be constructed of 100% coconut fiber stitch bonded between a heavy duty UV stabilized bottom net, and a heavy duty UV stabilized cusped (crimped) middle netting overlaid with a heavy duty UV stabilized top net. The cusped netting forms prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.5 inch centers with UV stabilized polyester thread to form a permanent three dimensional structure. The Erosion Control Turf Reinforcement Mat shall be North American Green C350 or approved equivalent. The Erosion Control Turf Reinforcement Mat shall have the following physical properties:

<u>Property</u>	<u>Test Method</u>	<u>Value</u>	<u>Unit</u>
Ground Cover	Image Analysis	93	%
Thickness	ASTM D1777	63	in
Mass Per Unit Area	ASTM D3776	92	lb./sy
Tensile Strength	ASTM D5035	480	lb./ft
Elongation	ASTM D5035	49	%
Tensile Strength	ASTM D5035	960	lb./ft
Elongation	ASTM D5035	31	%
Tensile Strength	ASTM D1682	177	lbs
Elongation	ASTM D1682	22	%
Resiliency	ASTM D1777	>80	%
UV Stability	ASTM D4355	151	lbs.
		86	%
Color (permanent net)		UV Black	
Porosity (permanent net)	Calculated	>95	%
Minimum Filament Diameter (permanent net)	Measured	.03	in.

12. Tunneling, Jacking or Boring

- A. At those locations indicated on the plans and/or profiles open cut excavation will not be permitted and, therefore, the Contractor shall tunnel, jack or bore the casing pipes and/or sewers, or force mains.
- B. After installation of casing pipes or tunnel liners, the carrier pipe shall be threaded within. The method of placement shall be determined by the Contractor, however, care shall be exercised to not displace or disturb the interior pipe. The Contractor shall submit to the Authority for approval his method of placement.
- C. Where tunneling is employed, the tunnel liner plate shall be designed by the Contractor for the particular diameter or shape which he elects to use. The plate shall be designed and assembled in accordance with the manufacturer's published recommendations for the material encountered in the tunnel excavation.
- D. Tunnels shall be carefully excavated by experienced tunnel workers and shall be trimmed to such a size and shape as to allow the proper placing of the sanitary sewers and force main to the lines and grades shown on the plans after the liner is in place. Care shall be exercised in excavating tunnels so that voids outside the casing and disturbance of the surrounding material are kept to a minimum. Large voids are to be filled immediately with grout. The space between the tunnel bore and the casing shall be completely filled with an approved sand-cement mortar.

- E. All sheeting, shoring, bracing, lining, etc., required for the construction of tunnels, shafts, portals, etc. shall be furnished and installed by the Contractor. All work relative to the installation of liners and carrier pipes by means of jacking, boring, or tunneling shall be performed in accordance with regulations set forth under Subpart S, "Tunnels and Shafts, Caissons, Cofferdams and Compressed Air" published as a part of the Safety and Health Regulations for Construction by the U. S. Department of Labor.
- F. The Contractor shall make all arrangements necessary for the location, construction and operation of any intermediate shafts and/or drifts he may require.
- G. The Contractor shall excavate the tunnel and support the surrounding earth so that no movement of the earth over or adjacent to the work shall occur at any time. In case, due to unforeseen conditions or otherwise, any such movement does occur, the Authority may order the Contractor to stop any and all work except that which assists in making the tunnel secure and in preventing further movement of the ground over or adjacent to the work.
- H. The Contractor shall resume tunneling at the place at which such movement occurred only when, in the opinion of the Authority, he has taken all necessary precautions to prevent movement.
- I. Where boring and jacking is employed, a minimum 1/2" thick steel shield at least 24" long shall be required to extend beyond the forward end of the casing pipe, liner or plate, or conduit being jacked. The outside radius of the shield shall not exceed the outside diameter of the pipe by more than 1". Excavation ahead of the casing, liner plate, or conduit shall not progress beyond the end of the shield being used.
- J. The casing pipe shall at all times follow immediately behind the boring auger at a distance no greater than 2 feet. The method of auguring the entire hole and then pushing the pipe through will not be permitted.
- K. The ends of the casing pipe shall be sealed using neoprene boot seals with stainless steel clamps.
- L. It is the intent of these specifications to permit the Contractor to select either of the three above-mentioned methods of installing pipe lines where open cut is not permitted, provided construction details and methods employed comply with the requirements of the authorities having jurisdiction, in addition to the requirements of these specifications.

- M. Regardless of whether tunneling, jacking or boring is employed, the Contractor shall be responsible for construction of the various pipe lines true to line and grade and shall be held fully responsible for protection against surface subsidence, damages or disturbances to the satisfaction of the Authority.
- N. The Contractor shall be responsible for reimbursing all agencies owning property where boring, jacking or tunneling is required for any inspection and/or flagmen costs incurred and deemed necessary by those agencies at any and all locations where work under this contract is performed, to ensure safe traffic conditions and safe conduct of the work. Submission of the previously described details, subsequent approvals and responsibility for inspection costs for either parallel or longitudinal occupancies shall be required and shall also be provided for in the bid prices.
- O. Failure to comply with any of the foregoing, as well as all damages to facilities and highway traffic interference or impedance, shall be the responsibility of this Contractor and he shall be required to rectify all such conditions to the satisfaction of the Authority.

13. Cast-in-Place Concrete for Structures, Bedding, Paving, Thrust Restraints, Trench Caps in Roadways, Encasements, Underpinning, Etc.

- A. Construction of all concrete work shall be in accordance with the applicable portions of "Specifications for Structural Concrete for Buildings" ACI 301 of the latest revision, except as modified hereinafter. Concrete shall be ready-mixed and shall be batched, mixed and transported with sufficient facilities to deliver the concrete at the rate required and in accordance with the standards set forth in ASTM Specification C-94.
- B. Mixing and flushing water in transmit mixtures shall be equipped with a calibrated glass gage. The ready-mix concrete supplier shall furnish the Authority a certified statement that the concrete furnished to the job conforms to the provisions of these specifications.
- C. All concrete shall be dense and workable and shall be placed utilizing pneumatic vibrators.
- D. Concrete shall be required to develop a comprehensive strength of 3500 psi in 28 days.
- E. Reinforcing steel shall conform to the requirements of ASTM A-615, Grade 60; mesh reinforcement shall conform to ASTM A-185 requirements.

14. Underground Detectable Marking Tape

- A. Marking tape shall be installed a minimum of two (2) feet above the pipe along the alignment of all sewer lines, including sewer services. It shall be a minimum of three (3) inches wide, vivid green with foil backing and marked "Gravity Sewer Line" at Gravity Sewers or marked "Intermittent Pressure Sewer" at Force Main Sewers. The marking tape for sewer lines shall be green with a foil back.
- B. The tape shall be magnetically detectable with conventional location equipment and therefore shall be encased aluminum foil or other similar materials.

15. Pavement Removal and Restoration

- A. All roads, driveways, streets, traveled ways, berms, sidewalks, etc. disturbed during construction shall be reconstructed by the Contractor to their original condition, unless noted otherwise.
- B. At all locations where trenching, excavation, and/or other construction activities destroy or damage pavement surfaces of Municipal roads and streets, restoration shall be in accordance with Municipal road specifications.
- C. All roads under the jurisdiction of the Commonwealth of Pennsylvania shall be restored in accordance with the requirements of the Pennsylvania Department of Transportation.
- D. All bituminous material shall be installed and compacted by methods and with equipment approved by the Pennsylvania Department of Transportation.
- E. All painted traffic lines and markings destroyed during the construction of the project shall be replaced. All painted traffic lines and markings shall be installed according to the Commonwealth of Pennsylvania Department of Transportation Specifications, Section 962, and all other applicable sections.
- F. The CONTRACTOR shall protect newly paved areas keeping traffic off of the area until adequate curing and stability is attained and as directed by the ENGINEER.
- G. Pavement restoration shall be in accordance with and approved by the Municipal Public Works Director or their Designee.

16. Top Soil in Cultivated Areas

- A. In lawns and gardens, and in other improved areas (except for streets, roadways, and traveled ways), the top of the backfill material shall be placed to an elevation approximately 6" below the finished ground surface.

- B. Commercial topsoil shall be placed and lightly rolled in the top 6" of all excavated areas and other places where construction equipment and activities impose damage to ground surfaces.
- C. Commercial topsoil shall be obtained by the CONTRACTOR from a local garden supplier or nurseryman for areas where topsoil is not of adequate quantity.

17. Restoration of Lawns and Other Improved or Cultivated Areas

- A. After the topsoil has been spread, all lawns shall be restored by properly rolling, tilling and hand raking the area disturbed during construction and an application of an approved fertilizer at a rate of 50 lbs. per 1,000 square feet shall be made. Said area then shall be completed with mushroom manure, or other approved mulch material, after which an approved grass seed shall be sown in accordance with an approved Erosion and Sedimentation Pollution Control Plan and the specifications herein. The Contractor shall be responsible for restoration of all settlements and for properly preparing the topsoil, applying fertilizer and mulch and planting the seed, but will not be required to water those restored areas.
- B. Grass seed shall match that planted or shall be of same type that already exists. The Authority shall retain the right to select the seed. Seeding and mulching of disturbed areas shall be accomplished by the end of each week.
- C. Where the pipeline is located within road rights-of-way, or where indicated on the Construction Drawings, the Contractor shall place jute mats for erosion control where directed by the Authority.
- D. All shrubbery which is removed temporarily to accommodate construction of pipe lines shall be promptly replaced after backfilling is completed and shall be fertilized and otherwise treated to insure restoration to a condition existing prior to the installation of the sewer. Shrubby which is not successfully removed and replaced, and hence, does not survive, shall be subsequently replaced or otherwise made good by the Contractor by replacing the shrubs/ornamental trees with similar type nursery stock size plantings for the period of the 18-month Maintenance Bond.
- E. Where the proposed sewer crosses existing asphalt driveways all bituminous paving shall be restored by neatly and uniformly cutting the edges and placing a binder course and surface course over the trench fill in accordance with requirements contained herein. The binder course shall be a minimum of 4-inches, after compaction, of Superpave 25.0 mm Base Course. The surface course shall be Superpave 9.5 mm Fine-Grade installed in one wearing course totaling one and one-half inch after compaction. Seal edges with hot bituminous liquid. All

bituminous material shall be installed and compacted by methods and with equipment approved by the Pennsylvania Department of Transportation.

- F. Where the proposed sewer crosses existing concrete driveways all concrete paving shall be restored by neatly and uniformly cutting the edges and placing a 6" thick reinforced concrete slab. The concrete shall be reinforced with 6x6x10 gauge wire mesh. If the proposed paving limit (trench width plus 12 inches each side) is within 3 feet of an existing joint in the concrete driveway the existing pavement shall be saw cut at the joint and replaced to the existing joint. If the proposed paving limit is not within 3 feet of an existing joint in the concrete driveway the CONTRACTOR shall saw cut to the width as described herein and replace the concrete as described above placing a new joint on one side of the new concrete paving where it matches the existing concrete.
- G. Where the proposed sewer crosses existing stone, slag, or gravel driveways the driveway shall be restored by placing a 4" thick lift of crushed limestone for the full width of the disturbed area. The limestone shall consist of hard, tough, durable stone free from slaty texture or cleavage planes. The limestone shall be secured from a Pennsylvania Department of Transportation approved supplier. Sandstone, shale, slag, etc., will not be an acceptable substitute.
- H. All properties damaged due to construction operations and restored in accordance with the foregoing, shall be inspected by the Contractor and the respective property owner, and when determined satisfactory by that Owner, the Contractor shall obtain a signed release by such Owner and file copy of same with the Authority. Contracts will not be considered final until all such releases have been obtained.

END OF PART II

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PART III - MATERIALS AND INSTALLATION

1. Gravity Sewer Pipe

- A. Building lateral sanitary sewers shall be installed as indicated on the applicable supplemental detail drawings and shall be a minimum of 6" in diameter for commercial properties and 4" in diameter for residences. Where building lateral sanitary sewers are to be connected to an existing sewer, they shall consist of a wye and repair sleeve conforming to these specifications. The work shall be scheduled with the Authority and the existing line cored and saddle installed by Authority Staff. No "Break-in" connections will be permitted.
- B. All main line sewer pipe shall be a minimum of 8" in diameter and have a minimum laying length of not less than 10 feet.
- C. All building lateral sanitary sewer pipe and fittings and all collector or interceptor sewer pipe fittings 27" diameter and smaller, unless otherwise indicated on the plans and profiles shall be extruded polyvinyl chloride (PVC) conforming to ASTM D3034, SDR-35 for 4" through 15" pipe sizes, and ASTM F679 for 18" through 27" pipe sizes (4" service laterals shall be Schedule 40 PVC pipe). Flexible elastomeric seals shall be provided conforming to ASTM D3212 and ASTM F477. Each section of pipe shall be stamped with a manufacturer's certification of conformance to the referenced specification.
- D. All gravity sewer pipe larger than 27" in diameter shall be large diameter polyvinyl chloride (PVC) sewer pipe and shall conform to ASTM F 794.
- E. PVC pipe shall be bell and spigot type furnished in standard lengths of approximately thirteen feet (13').
- F. Where determined by the Authority that a hazard would be created, sewer pipe shall not be removed from shipping pallets until ready for installation.
- G. The fittings for PVC pipe shall be made of PVC plastic having a cell classification of 12454-B, 12454-C or 13343-C as defined in ASTM D1784. All pipe and fittings shall utilize rubber gasketed joints conforming to ASTM Standards D3212 and F477. Pipe and fittings shall be installed in accordance with ASTM D-2321.
- H. As an alternate to the above specified SDR-35 PVC pipe, the Contractor may substitute ductile iron pipe; however, 2B limestone bedding and pipe zone material must still be provided. Said pipe shall conform to the ANSI A21.51 specifications – Pressure Class 350. Fittings shall also be fabricated of ductile iron conforming to ANSI A21.10 (gray iron fittings are not acceptable). All pipe and fittings shall be furnished with a standard cement mortar lining – ANSI A21.4.

- I. All sewer extensions requiring connection to existing facilities shall be plugged and blocked in the manhole from which the extension originates to prevent extraneous material (water, dirt, debris, etc.) from entering the existing sewer system. The system shall be blocked and plugged by an inflatable ball plug chained to the manhole steps or by means approved by the Authority. The plug shall remain in place until the Authority approves the sewer for use. Where an inflatable plug is utilized, the plug shall be checked daily by the Contractor for proper pressure and seal. Once Authority approval is provided, all extraneous water, dirt, debris, etc. shall be removed from the sewer by the Contractor at his own cost and consistent with the requirements of all other governing regulatory agencies.
- J. The minimum cover for pipelines conveying sewage shall be 4 feet unless otherwise indicated on plans approved by the Authority.
- K. Under no circumstances is raw sewage to be discharged. The Contractor shall provide sufficient materials and equipment to pump or otherwise convey raw sewage if necessary to avoid discharge of sewage.
- L. All gravity sewers shall be installed in general conformance to ASTM D2321 and as required by these specifications.

2. Assembly of PVC Sewer Pipe

- A. The installation of gravity sewers shall start at the lower end of the line and proceed upgrade so that spigot ends point in the direction of flow. The pipe shall be carefully laid to line and grade. Grade shall be maintained with the use of a laser directed through the center of the pipe. The handling, placing and jointing of pipe shall be in strict accordance with the pipe manufacturer's recommendations. Completed sewers shall show a full circle of light between manholes.
- B. Pipe joints shall be carefully lowered into the excavated trenches to avoid damage to the pipe barrel and the bell and spigot pipe ends. All rubber gaskets shall be examined to assure there is no apparent damage during handling and shipment.
- C. Both the bell and spigot ends shall be wiped clean with a reasonably dry cloth. The spigot end of the pipe shall then be lubricated by application of a suitable grease-like product which will not adversely affect either the gasket or pipe wall. The entire circumference of the spigot shall be coated and the lubricated spigot shall be inserted into the bell.
- D. The pipe shall be shoved home by hand or by use of a bar and block. A representative of the pipe manufacturer shall, when the Authority so directs, spend a reasonable amount of time on the job site (at the beginning of the work) demonstrating pipe laying techniques and instructing the Contractor's personnel on proper construction methods.

3. Force Main

- A. All wastewater force mains shall be fabricated of ductile iron pipe conforming with the ANSI A21.50 and A21.51 specifications, Thickness Class 52, or Polyvinyl Chloride (PVC) Pressure Pipe meeting the requirements of AWWA C900. PVC Pipe shall be class 200 Pipe meeting the requirements of DR14.
- B. All PVC pipe suitable for use as pressure conduit shall be standard laying lengths 20 feet (plus or minus 1") for all sizes. At least 85% of the total footage of pipe of any class and size shall be furnished in standard lengths. The remaining 15% can be furnished in random lengths. Random lengths shall not be less than 10 feet long. Each standard and random length of pipe shall be tested to four times the class pressure of the pipe for a minimum of 5 seconds. The integral bell shall be tested with the pipe. The bell shall consist of an integral wall section with a locked in solid cross section elastomeric ring which meets the requirement of ASTM F-477. The bell section shall be designed to be at least as hydrostatically strong as the pipe wall and meet the requirements of AWWA C900.
- C. The ductile iron pipe shall be furnished with a double cement mortar lining coated per ANSI A21.4, and shall be coated with a standard bituminous coating.
- D. Fittings shall also be fabricated of ductile iron conforming to ANSI A21.10 or A21.53 (short body) (gray iron fittings are not acceptable). All pipe fittings shall be furnished with a double cement mortar lining per ANSI A21.4. Fittings shall be rated for at least 350 pounds per square inch (psi) service.
- E. Unless otherwise approved by the Authority, all Force Mains shall be installed at a depth of 4 to 4.5 feet cover over the top of the pipe and shall maintain a positive grade where possible. Air/Vacuum relief valves shall be installed at all high points subject to air accumulation.
- F. Manholes shall be provided for all valves required along force mains. The construction of the manholes shall conform to the requirements of this document.
- G. Where determined by the Authority that a hazard would be created, pipe shall not be removed from shipping pallets until ready for installation.

4. Assembly of Ductile Iron Pipe

- A. Pipe joints shall be carefully lowered into the excavated trenches to avoid damage to the pipe barrel and the bell and spigot ends.
- B. After the bell hole has been prepared and the joint is ready for assembly and where push-together joints are specified, the bell and spigot shall be wiped clean and a non-toxic lubricant shall be applied.

- C. The pipe may be shoved home by use of a bar and block or some other suitable tools.
- D. Gaskets shall be furnished and handled as recommended by the pipe manufacturer.
- E. When mechanical joints are specified, thorough cleaning of the surface to be mated shall be done after which the gland and the gasket shall be slipped over the plain end. The gasket shall then be inserted into the socket and the gasket shall be evenly seated. The gland shall then be inserted and the bolts and nuts drawn finger-tight. The joint shall then be completed by uniformly tightening the bolts in such a manner that the distance between the gland and the face of the flange is maintained approximately uniform.
- F. In general, ductile iron pipelines shall be installed in conformance with the standards set forth in AWWA C600.
- G. In areas where the pipes are installed in fill, or in tight locations where the installation of thrust blocking will not be practical, pipes will be secured with the use of Field-Loc Gaskets or EBAA Iron Mega-Lug Restraint Fittings at the discretion of the Authority.

5. Assembly of PVC Pressure Pipe

- A. Pipe is to be inspected for defects and cleanliness. All foreign matter and dirt is to be removed from the Pipe interior.
- B. Pipe section shall be carefully lowered into the prepared trench bed in such a manner as to prevent damage to the pipe. Pipe should never be dropped into the trench.
- C. Inspect bell end and wipe clean and insert rubber ring gasket.
- D. Clean pipe spigot end and lubricate as recommended by the manufacturer.
- E. Pipe may be shoved home by the use of a bar and block or other suitable tools.
- F. When connecting PVC pipe to ductile iron fittings use mechanical joint rubber ring with M.J. fittings. Do not use PVC rubber ring in a cast iron bell or fitting.

6. Thrust Restraints

- A. Concrete blocks shall be cast in place in accordance with the configurations shown in Appendix A-2. Such blocks shall be required to be poured, after installation of the adjacent piping at all fittings installed along the pipeline.

- B. The concrete shall be placed such that it is supported against undisturbed earth along the excavated trench wall and the trench bottom and shall be thoroughly worked and vibrated to insure complete contact with the walls of the fittings being restrained.
- C. No trench backfill shall be placed at the locations of the thrust blocks until twenty four hours after placement, and/or until the Authority has inspected the installation. Refer to cast-in-place concrete specification for minimum strength of concrete.
- D. Where existing conditions and/or available space do not permit the installation of concrete thrust blocks, restraining fittings as described in III.4.G above shall be used.

7. Steel Casing Pipe

- A. All steel casing pipe furnished where boring and jacking is required or, where otherwise required, shall conform to the ASTM A53 specifications and shall have a minimum yield strength of 35,000 psi.
- B. Joints shall be full-circumference welded and the pipe shall be the diameter indicated on the plans and/or profiles. Wall thicknesses and minimum diameters shall conform to those listed in Appendix A-2. All casing pipe shall be new.
- C. Casing Spacers located within the casing pipe and supporting the carrier pipe shall be properly sized to accommodate the two pipes. Casing spacers shall be as manufactured by Advance Products & Systems, Inc., Power Lone Star, Inc., or approved equivalent. Spacers shall be PVC or Neoprene liner. Spacers shall be installed as recommended by the manufacturer to provide proper support of carrier pipe. Unit shall have abrasion resistant dielectric runners and dielectric inner liner. The use of timber skids and stainless steel bands is not acceptable.
- D. Provide and install neoprene boot seals, with stainless steel attachment bands, as described previously in this Specification.

8. Manholes

- A. Manholes constructed on Authority pipelines shall be fabricated of precast concrete in accordance with the requirements of ASTM C478. The manhole structures may be furnished with prefabricated base sections or, the bases may be cast-in-place of reinforced concrete as shown on the appertaining Supplemental Detail drawings in Appendix A-2. Bases shall be "extended bottom" unless the Authority specifically approves the use of "mono-bottom" manhole base sections.

- B. Manhole barrel sections shall be sealed with bitumastic materials placed in the field, as manufactured by Concrete Sealants, Inc. Two rings of said material shall be installed - one on the inside of the joint in the groove and the other on the outside of the tongue.
- C. Manholes furnished with prefabricated base sections shall be installed on 6" minimum thickness crushed stone or washed gravel conforming to the requirements of "Bedding and Specially Graded Backfill Material" as specified elsewhere herein. Said material shall also be placed in the bottom of the manhole excavation - between the limits of the influent and effluent pipe trenches - to an elevation one foot above the top of the connecting pipes. In other words, all sewer pipe connections to manholes shall be completely supported (to the bottom of the excavation) on bedding and, shall be enveloped in the same material to an elevation located one foot above the top of the pipe.
- D. Manholes where the largest connecting sewer is 18" diameter or less shall have a 4 feet diameter barrel section; where any connecting sewer exceeds 18" diameter, manhole barrel sections shall be 5 feet diameter. All manholes with a depth greater than 20 feet shall have a minimum inside diameter of 5 feet.
- E. All manholes shall be provided with steps located 12" on center, which shall conform, in general, to the configuration shown in Appendix A-2; the steps shall be ASTM A 615, Grade 60 deformed steel encapsulated with injection molded Copolymer Polypropylene.
- F. Frames and covers conforming to Appendix A-2 shall be fabricated of cast Iron Class 30 or better, conforming to the most recent revision of ASTM A48 and shall be free of bubbles and other sand or air imperfections. Contact surfaces shall be machined, and hatches and covers shall be inscribed with "NHTMA". Frames and covers shall be coated with a corrosion resistant bitumastic material, where directed by the Authority, that will be subject to the approval of the Authority, which shall be smooth and durable, and will not scale or chip off. The standard manhole frame and cover shall conform to Allegheny Foundry No. 109 and 110, Neenah Pattern R-1753, or approved equal. On each manhole two (2) complete rings of a ½ diameter approved flexible butyl rubber joint sealant shall be installed between the bottom of the frame and the top of the concrete of the manhole. Four (4) ¾" anchor bolts shall be provided for all frames. The lid on the last manhole in a run, that with the highest invert elevation, shall have one center vent hole not larger than one (1) inch in diameter. Watertight covers shall be installed on all manholes located in areas subject to submergence by water. Watertight manhole frame and cover shall conform to Allegheny Foundry No. 299 and 110 and seal plate 300, or approved equal. In unimproved areas, manhole lids shall be set to an elevation one (1) feet above the ground surface.

- G. Grade adjustments for manholes located outside of Road Paving and/or Road Berms shall be accomplished with maximum one-foot high precast concrete rings and/or cast iron paving rings as shown in Appendix A-2.
- H. Grade adjustments for manholes located in Road Paving and/or Road Berms shall be accomplished utilizing injection molded high-density polyethylene (HDPE) adjustment rings as manufactured by LADTECH, Inc. or an approved equal. The adjustment rings shall be manufactured from polyethylene plastic as identified in ASTM Designation D-1248. Installation shall be per manufacture's recommendations. The annular space between the rings and cone basin, the rings, and the cover frame shall be sealed utilizing an approved butyl sealant.
- I. Invert channels shall be smooth and accurately shaped to a semi-circular bottom conforming to the inside of the adjacent sewer section. Inverts may be formed directly in the concrete of the structure base, or where reinforced concrete culvert pipe is used, may be built up of mortar or may be constructed by laying full section of sewer pipe straight through the structure and breaking out the top half after the base is constructed. Where necessary, invert channels in manhole bottoms shall be shaped and smoothed with Parson's Parsonpoxy or approved equivalent.
- J. The size and depth of the inverts will vary to suit the size of the pipe used and shall have a height of at least 6 inches higher than the springline or to the top of the inlet pipe, whichever is higher.
- K. Changes in grade shall be made gradually and evenly. Changes in the direction of the sewer and entering branch or branches shall have a true curve of as large a radius as the size of the structure will permit. Changes in the pipe size shall be made gradually and evenly by dropping the invert in the manhole a distance equal to the difference in diameter of the pipe entering and leaving the manhole.
- L. Elevations shown on the plans indicate invert elevations of the center of manhole unless indicated otherwise. No manhole bottoms which result in collection of solids or in pooling of wastewater will be accepted. Gradients in manholes which accommodate smooth gravity flows must be provided. All manholes shall have a minimum fall of 0.08 feet between the inlet and outlet inverts.
- M. All prefabricated manhole bases/barrels shall, where pipes connect, be furnished with resilient and/or flexible connectors to accommodate the respective pipe diameters per Appendix A-2.
- N. All manholes shall also be furnished with manhole inserts or inflow protectors which shall be fabricated to fit the specified frames and covers. All manholes located in Road Paving and/or Road Berms shall have stainless steel Inflow Protectors. Inflow Protectors at all other manholes shall be Polypropylene Plastic

Inflow Protectors. Stainless Steel Inflow Protectors shall be fabricated to fit the specified frames and covers, and shall have two stainless steel handles and be provided with a gas relief valve. They shall be Southwestern Packing and Seals (800-843-4950) Model BST27 304 Stainless Steel Rain Stopper or an approved equivalent. Polypropylene Plastic Manhole inserts shall be 28-1/2" in diameter with a minimum lip size of 1". The inserts shall not be more than 6" deep, and shall be fabricated of a material which will not corrode or otherwise be adversely affected by the sewerage atmosphere and, shall be provided with a gas relief valve. They shall be similar to the sewer guard model manufactured by Parsons Environmental Products Co., or approved equivalent, all inserts shall be installed per the manufacturer's recommendation.

- O. The exterior surfaces of all Precast Concrete Manhole Barrel Sections shall be waterproofed. Furthermore, the interior surfaces of all Precast Concrete Manhole Barrel Sections receiving flows from a discharging force main shall also be waterproofed. Waterproof coating shall be two coats bitomastic material or coal tar solution such as a foundation sealer or other material suitable for this application per the requirements of the PADEP. Each coat shall have a minimum dry film thickness of eight mils.
- P. Connection of new sewers to existing or new manholes where a cast in place boot has not been provided, shall be core drilled. The opening shall be provided with a rubber water stop and shall be sealed with concrete on both the inside and the outside of the manhole.
- Q. At locations where new manholes are constructed over existing clay pipe sewers, the clay pipe shall be removed for one equivalent length of PVC Pipe (thirteen feet). The new manhole shall be set with one full length of PVC Pipe placed through the manhole pipe openings. Pipe connections shall be made utilizing dresser couplings. The Manhole invert shall be formed around the PVC pipe and upon satisfactory vacuum testing of the manhole the crown of the PVC pipe shall be cut and removed.
- R. Any developer or public agency adjusting topographic grades, whether through road paving or site development, shall provide two (2) weeks notice to the Authority to allow for manhole grades to be adjusted. All costs to adjust manhole grades shall be borne by the developer.

9. Sewer Drop and Splash Connections

- A. Wherever sewers enter manholes, such that the invert exceeds 2'-0" feet above the invert of a manhole, a drop connection is required.

- B. Where drop connections are indicated on the plans and profiles they shall be installed in accordance with the details shown in Appendix A-2. In general, drop connections should be avoided except for extreme changes in elevations and in any event, will not be permitted for application on sewer pipes greater than 15" diameter.
- C. The type of drop connection used shall be as shown on the construction drawings. Inside drop connections shall require the use of a manhole 5 feet in diameter. The drop pipe shall be secured with stainless steel straps.
- D. Whenever sewers enter manholes such that the invert of the sewer is less than 2'-0" above the manhole bottom, a channeled concrete fillet shall be constructed to prevent the flow from splashing into the manhole.
- E. Sewer connections to existing manholes shall be performed by neatly core drilling manhole and installing an approved watertight flexible boot.

10. Marking Sewer Services

- A. All ends of service lines and service sewers, not permanently connected, shall be marked by installing an inspection port, in accordance with these specifications, at the property line.

11. Inspection Ports

- A. Inspection ports shall be installed at the property line by the developer/contractor at the time when the wye connection is installed at the sewer main. The inspection port shall consist of a tee, a riser pipe with a minimum diameter of 6" and a tamper-resistant cap (male end). Where inspection ports are installed on slopes that may compromise pipe stability, the tee and one foot of riser pipe shall be encased in concrete.

12. Grinder Pumps

- A. Grinder pumps shall only be used where connection to the main sewer cannot be accomplished by gravity and shall be subject to approval by the Authority.
- B. Design of sewers shall be performed in such manner as to minimize conditions under which grinder pumps must be utilized.
- C. Grinder pumps shall be purchased, operated and maintained by the property owner.
- D. Building sewer installations discharging from grinder pumps shall conform to the requirements of Appendix B: Specifications for the Construction of Building Sewers.

E. In general, grinder pump units shall be factory built and tested and shall consist of a grinder pump suitably mounted in a basin constructed of fiberglass or high density polyethylene (HDPE), electrical quick disconnect (NEMA 4X), pump removal system, shut-off valve, anti-siphon valve, and check valve assembled within the basin, remote electrical Alarm/Disconnect Panel, and all necessary internal wiring and controls. The Alarm/Disconnect Panel shall consist of a NEMA 3R, UL listed enclosure suitable for wall or pole mounting. The NEMA 3R enclosure shall be manufactured of thermoplastic to assure corrosion resistance. The Alarm/Disconnect Panel shall include an audio and visual alarm, push-to-run switch, and high level (redundant) pump starting control. Alarm sequence shall be as follows:

1. When liquid level in the sewage wet-well rises above the alarm level, visual and audio alarms will be activated. The contacts on the alarm pressure switch will close. The redundant pump starting system will be energized.
2. The audio alarm may be silenced 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.

Visual alarm lamp shall be inside a red fluted lens at least 2 5/8" in diameter and 1-11/16" in height. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain NEMA 3R rating.

The audio alarm shall be a printed circuit board in conjunction with an 86 dB buzzer with quick mounting terminal strip mounted in the interior of the enclosure. The audio alarm shall be capable of being de-activated by depressing a push-type switch which is encapsulated in a waterproof silicone boot and mounted on the bottom of the enclosure.

An overflow indicator lamp assembly requiring 120 volts and suitable for remote installation in a standard device box shall be furnished. This indicator shall be mounted on a decorative wall plate 2-3/4" x 4-1/2" and marked "Grinder Pump Monitor." Recommended location of indicator lamp shall be in the kitchen or bathroom and shall be the decision of the homeowner.

F. The station shall have all necessary penetrations molded in and factory sealed. No field penetrations shall be acceptable.

END OF PART III

PART IV - TESTING AND ACCEPTANCE

1. Testing of Gravity Sewers

- A. All gravity sewer pipes shall be tested by inducing low pressure air into the pipe. The air shall be slowly introduced into the pipe and the pressures shall gradually be increased with the test section to 5.0 psi.
- B. All such pipe so tested shall be required to sustain the 5.0 psi test pressure without loss or drop in pressure for a time period of 5 minutes. In the event that the loss does occur, appropriate repairs or reconstruction shall be made and the test procedure shall be rerun until the test criteria (5.0 psi for 5 minutes) are successfully accomplished.
- C. In the event where ground water elevations prevail higher than the top of the sewer pipe being tested, 0.5 psi per foot of hydrostatic head above the top of the sewer pipe shall be added to the test pressure.
- D. All PVC pipes shall also be tested for pipe deflection. Said tests shall not be performed until the backfill has been in place for at least 30 days. The maximum acceptable deflection shall be 5% of the vertical internal diameter. Said testing shall be performed with a mandrel similar or equal to that manufactured by Cherne Industries, Inc. Mandrels are to bear ASTM certification for the pipe size being tested. It is required that deflection testing equipment receive the prior approval of the Authority.
- E. The Authority will lamp each section of sewer pipe between manholes by placing a light at one end and observing the pipe at the other end. Sewers not constructed on uniform line and grade, and therefore not showing a full circle of light during lamping, will not be accepted by the Authority.

2. Hydrostatic Testing of Force Mains

- A. All force mains shall be hydrostatically tested for leakage after installation is completed. Said testing shall be performed in accordance with the applicable sections of the AWWA C standards. Prior to performance of the testing work the CONTRACTOR shall submit to the ENGINEER the following:
 - 1. A testing schedule.
 - 2. A listing of equipment intended to be used, including general information on the pump, pressure gauge, pressure relief and water meter.
 - 3. Certification that the pressure gauge has been calibrated to 0.1 psi.

- B. The CONTRACTOR will provide the water required for testing purposes and shall provide all required temporary fittings to complete testing prior to connection to the existing force main including temporary removal of air relief valves for testing purposes.
- C. Each section of pipe to be tested shall be slowly filled with water during which time air shall be expelled from the pipeline through the air release valves (where high points in the line exist at which there are no air release valves, CONTRACTOR shall install corporation cocks for that purpose). After all air is expelled, the air release devices shall be closed and line pressures shall be raised to the test pressure directed by the ENGINEER. Test pressures shall be 1.5 times the expected working pressure predicated upon the elevation of the lowest point in the line, corrected to the elevation of the lowest point in the line, corrected to the evaluation of the test gauge. Any joint, cracked pipe or other appurtenances revealing leakage during the pressure test shall be corrected after which the pressure test shall be rerun. Pressure tests shall be conducted for a 30 minute time period.
- D. After performance of the successful pressure test, a leakage test shall be performed over a duration period of two hours at a pressure to be determined by the ENGINEER. Leakage is defined as the quantity of water supplied to the test section of pipe, which is required to maintain pressure within 5 psig of said test pressure during the entire testing period. Pipe construction so tested shall be deemed to have failed the leakage test if the leakage resulting is greater than 10 gallons per inch diameter per mile of pipe per day.

3. Vacuum Testing of Manholes

- A. After erection of the manholes, connection of the sewers, and placement of the backfill to approximately the finished ground elevation, each manhole shall be vacuum-testing for water tightness. Connecting pipes shall be securely plugged and a vacuum testing device similar to that manufactured by Cherne Industries, or equal, shall be placed and sealed within the manhole frame/cover section.
- B. A vacuum of 10" of mercury (Hg) shall be drawn after which the vacuum pump shall be shut off. If the indicated vacuum pressure drops to 9" in less than one minutes, the test apparatus shall be removed and appropriate repairs/plugging shall be performed. The test shall be repeated, as necessary, until a time period of a minimum of one minute occurs before the vacuum pressure drops one inch (1") and/or there is no visual indication of water leakage.
- C. Appropriate repairs/plugging is defined as sealing the grade rings and inside joints with Parsons Epoxy Compound, Parsonpoxy FG, or approved equivalent.

- D. A vacuum test will be required for existing manholes if the manhole structure is altered to extend sewers out of the manhole.
- E. The contractor may elect to complete the required testing of new manholes utilizing a water exfiltration test in lieu of performing the aforementioned vacuum test.
 - 1. All pipe openings to each manhole shall be plugged prior to testing.
 - 2. The water level in the manhole shall be at the rim of the casting on which the manhole lid rests. After initial filling of water, the manhole under test shall be given a minimum one (1) hour pretest period for allowance of manhole maximum absorption of water. After this initial absorption period, the water level shall be returned to its original elevation to commence the test period.
 - 3. The length of test period shall be eight (8) hours.
 - 4. For the test, the manhole shall be considered vertical sections of pipe and the allowable leakage rate is 100 gallons per inch diameter per mile per day.
 - 5. If exfiltration leakage exceeds the specified amount, the CONTRACTOR shall make the necessary repairs or replacements required to permanently reduce the leakage to within the specified limits and testing shall be repeated until the manhole passes the test.
 - 6. In situations where the manhole is in saturated ground, the pipes entering and leaving the manhole shall be plugged and the amount of water leaking into the manhole measured and calculated directly.

4. Televising and Internal Inspection of Sewers

- A. The Authority reserves the right to require television inspection of any and all sewer lines. After cleaning, and at the discretion of the Authority, and prior to acceptance of the sewers by the Authority, 10% of the pipe shall be televised. The Authority shall determine the locations. Based upon the results of the television inspection, the Authority may require additional inspection.
- B. Television inspection and videotaping shall be in accordance with the latest industry standards as developed by NASSCO.
- C. The Contractor is permitted to attach a mandrel to the camera, for a camera so equipped, to perform the television inspection and mandrel test simultaneously.

- D. The television camera used for the inspection shall be one specifically designed and constructed for such inspection and shall be capable of pan and tilt direction movement to view lateral connections and defects. Lighting for the camera shall be suitable to allow a clear color picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, television monitor and other components of the video system shall be capable of producing a color picture quality to the satisfaction of the Authority; and if unsatisfactory, equipment shall be removed and the line inspected when equipment and conditions are suitable to providing a satisfactory inspection.
- E. The camera shall be utilized to record the condition of all manhole interior conditions.
- F. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary and at lateral connections and shall tilt and pan each lateral connection to permit proper documentation of the sewer's condition. In no case will the television camera be pulled at a speed greater than 30 feet per minute.
- G. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the television camera will not pass through the entire manhole section, the Contractor shall set up his equipment so that the inspection can be performed from the opposite manhole.
- H. Any section of gravity sewer that is found by internal TV inspection to be defective; to contain silt and/or debris; or to be otherwise unacceptable to the Authority, shall be corrected and re-televised at the expense of the Contractor.
- I. When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be set up between the two manholes of the section being inspected to ensure good communications between members of the crew.
- J. The importance of accurate distance measurements is emphasized. Measurement for location of defects shall be above ground by means of a meter device. Marking on the cable or the like, which would require interpolation for depth of manhole, will not be allowed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device, and the accuracy shall be satisfactory to the Authority.

- K. Documentation of the television results shall be as follows:
- a. Television Inspection Logs: Printed location records shall be kept by the Contractor and will clearly show the location in relation to an adjacent manhole of each infiltration point observed during inspection. In addition, other points of significance such as locations of building sewers, unusual conditions, broken pipe, and other discernible features will be recorded and a copy of such records will be supplied to the Authority.
 - b. Videotape Recordings: The purpose of video recording shall be to supply a visual and audio record of condition of the lines. Video recording playback shall be at the same speed that it was recorded. Slow motion or stop-motion playback features may be supplied at the option of the Contractor. All original videos shall become the property of the Authority. The format of the video recording shall be either color VHS format or color DVD at the Authority's discretion.

END OF PART IV

END OF APPENDIX A

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APPENDIX A-1

LISTING OF REFERENCED STANDARDS AND PUBLICATIONS USED IN PREPARING THESE SPECIFICATIONS

APPENDIX A-1

LISTING OF REFERENCED STANDARDS AND PUBLICATIONS USED IN PREPARING THESE SPECIFICATIONS

Pennsylvania Department of Transportation (PennDOT):

Publication 408	Specifications, 1993
Publication 203	Work Zone Traffic Control

Pennsylvania Department of Environmental Protection (DEP):

1991 Edition	Domestic Wastewater Facilities Manual
Latest Edition	Erosion and Sediment Pollution Control Program Manual
Publication No. 45	Water Obstructions Manual (stream crossings)

American National Standards Institute (ANSI):

A21.4	Cement-Mortar Lining for Cast Iron (AWWA C104) and Ductile Iron Pipe and Fittings
A21.10 (AWWA C110)	Ductile Iron Fittings, 3" through 48", for Water and Other Liquids
A21.11 (AWWA C111)	Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings
A21.50 (AWWA C 150)	Ductile Iron Pipe, Design Requirements
A21.51 (AWWA C151)	Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
A21.53 (AWWA C153)	Ductile Iron Compact Fittings, 3" and 16" for Water and Other Liquids

American Concrete Institute

301 Specifications for Structural Concrete for Buildings

American Society for Testing and Materials (ASTM):

A36 Specifications for Structural Steel

A48 Specification for Gray Iron Castings

A53 Specifications for Pipe, Steel, Black and Hot Dipped Zinc-Coated, Welded and Seamless

A185 Reinforcing Mesh for Concrete Structures

A536 Specifications for Ductile Iron Castings

A615 Reinforcing Steel for Concrete Structures

B43 Specification for Seamless Red Brass Pipe, Standard Sizes

B62 Specification for Composition Bronze or Ounce Metal Castings

B88 Specification for Seamless Copper Water Tube

C31 Making and Curing Concrete Test Specimens in the Field

C33 Specification for Concrete Aggregate

C39 Test for Compressive Strength of Cylindrical Concrete Specimens

C42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

C76 Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

C94 Ready Mixed Concrete

C150 C172	Specification for Portland Cement Sampling Fresh Concrete
C443	Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
C478	Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
C923	Specification for Resilient Connections Between Reinforced Concrete Manhole Structures and Pipes
D1785	Specification for Polyvinylchloride (PVC) Plastic Pipe, Schedules 40, 80 and 120
D2241	Specification for Polyvinylchloride (PVC) Plastic Pipe (SDR-PR)
D2412	Test for External Loading Properties of Plastic Pipe by Parallel-Plate Loading
D2583	Test for Indentation Hardness of Rigid Plastics by Means of Barcol Impresser
D2855	Standard Practice for Making Solvent-Cemented Joints with Polyvinylchloride (PVC) Pipe and Fittings
D3034	Specification for Type PSM Polyvinylchloride (PVC) Sewer Pipe and Fittings
D3139	Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
D3212	Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
F477	Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
F679	Specification for Polyvinylchloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

American Water Works Association (AWWA):

B300	Standard for Hypochlorites
C104	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
C110	Ductile-Iron Fittings, 3" through 48", for Water and Other Liquids
C111	Rubber-Gasket Joints for Ductile-Iron and Pressure Pipe and Fittings
C115	Flanged Ductile-Iron Pipe with Threaded Flanges
C150	Thickness Design of Ductile-Iron Pipe
C151	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
C500	Gate Valves, 3" through 48" NPS, for Water and Systems
C600	Installation of Ductile Cast-Iron Water Mains and Appurtenances
C800	Threads for Underground Service Line Fittings
C900	Polyvinylchloride (PVC) Pressure Pipe, 4" through 12", for Water

Miscellaneous References:

Pennsylvania Act 287 of 1974 as Amended by Act 187 of 1996 - Underground Utility Line Protection Act

Occupational Safety and Health Regulations of the U. S. Department of Labor for Construction

Ordinances of the Township of North Huntingdon Relevant to Burning, Blasting with Explosives, Excavating in Township Streets and the Obtaining of Permits therefore

Pennsylvania Seed Act of 1965, Act 187, as Amended

Pennsylvania Agricultural Liming Materials Act of 1978, P.L. 15, No. 9 (3P.S.132-1) as Amended

Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258 (3P.S.68.2) as Amended

Rules for Testing Seeds - Association of Official Seed Analysts

Steel Products Procurement Act - Pennsylvania Senate Bill No. 1068 effective May 2, 1978

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APPENDIX A-2

SUPPLEMENTAL DETAILED DRAWINGS

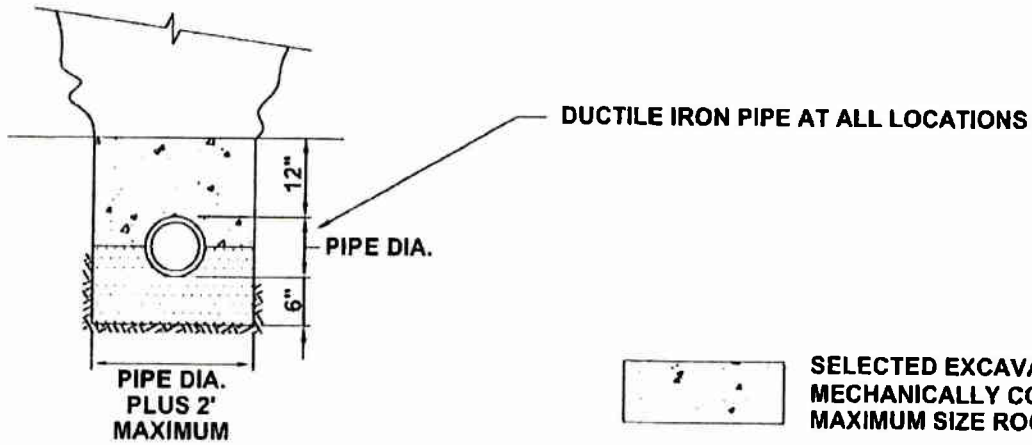
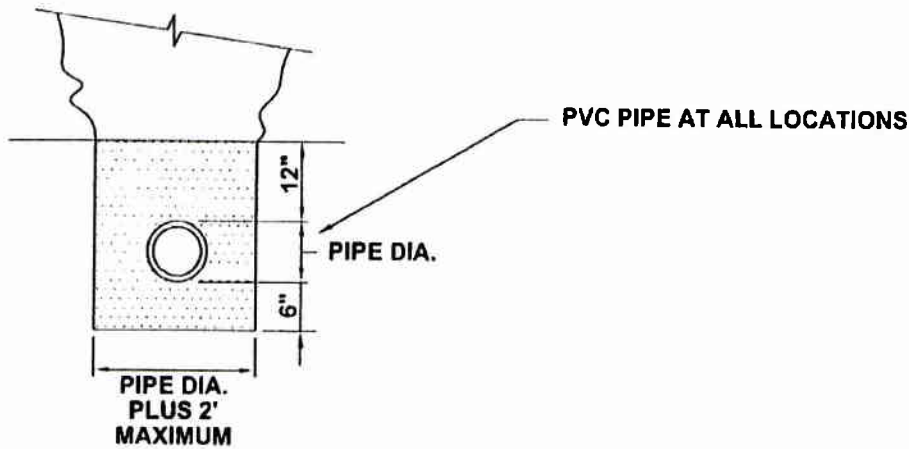
APPENDIX A-2

THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT SUPPLEMENTAL DETAILED DRAWINGS

<u>DRAWING NUMBER</u>	<u>DESCRIPTION</u>
SD-001	Trench Pipe Zone Details
SD-002	Pipe Bedding Details
SD-003	Trench Backfill Through Woods, Fields, or Other Unimproved Locations
SD-004	Trench Backfill Within Roadway or Street Berms
SD-005	Trench Backfill and Pavement Replacement Requirements for Municipal Roads
SD-006	Desired Distances Between Water and Sewer Pipes
SD-007	Gravity Sewer and Force Main Constructed Parallel in Common Trench
SD-008	Steel Casing Pipe and D.I. or PVC Carrier Pipes Installed By Boring
SD-009	Precast Concrete Manhole For Sewers 8" to 18"
SD-010	Precast Concrete Manhole For Sewers 20" to 33"
SD-011	Manholes For Sewers For Depths Greater Than 5 Feet
SD-012	Manhole Connection For PVC Pipe (Precast Base)
SD-013	Manhole Connection For PVC Pipe (Cast In Place Base)
SD-014	Outside Manhole Drop Connection
SD-015	Inside Manhole Drop Connection
SD-016	Standard Cast Iron Manhole Frame and Cover
SD-017	Watertight Manhole Frame and Cover
SD-018	Manhole Inflow Preventer
SD-019	Manhole Step Polypropylene Plastic
SD-020	Service Line Connections
SD-021	Typical Service Lateral Connections
SD-022	Service Connection to Sanitary Sewer From A New Installation
SD-023	Concrete Anchors and Method of Laying Forcemains Under Obstructions
SD-024	Concrete Thrust Blocks
SD-025	Sewage Air and Vacuum Release Valve and Manhole
SD-026	Precast Concrete Manhole Vault
SD-027	Concrete Anchors For Pipelines
SD-028	Pipe Support Piers For Alignments Above Ground
SD-029	Grinder Pump (Outside Installation)
C-1	Infiltration and Inflow Testing Detail


Details pertaining to Soil Erosion and Sediment Pollution Control shall be as depicted in the latest edition of the Erosion and Sediment Pollution Control Program Manual as published by the Bureau of Soil and Water Conservation of the Pennsylvania Department of Environmental Resources.

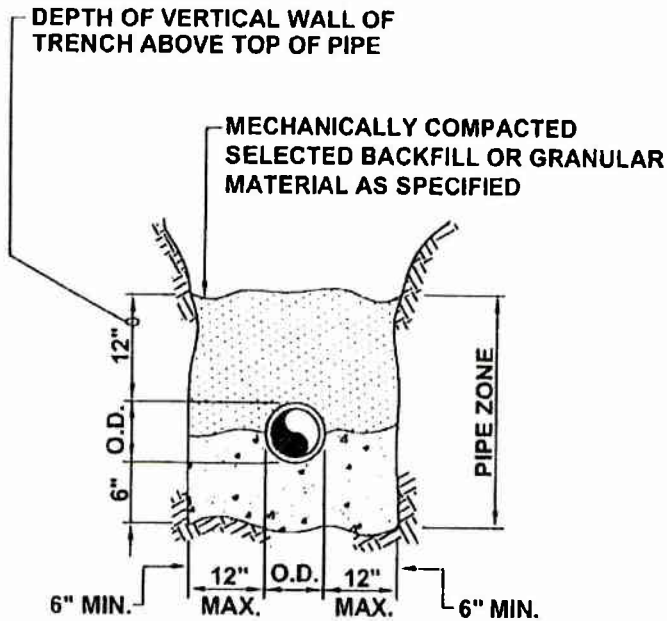
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 SELECTED EXCAVATED MATERIAL
MECHANICALLY COMPACTED
MAXIMUM SIZE ROCKS- 3"

 2B LIMESTONE

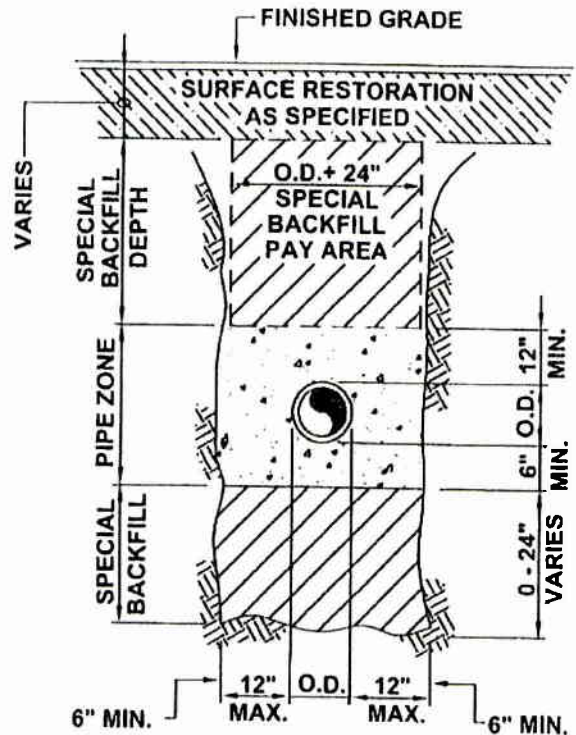
 <p>THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEEBPORT</p>		<p>TRENCH PIPE ZONE DETAILS</p>
<p>Not to scale</p>	<p>March 2012</p>	<p>Standard Detail SD-001</p>



PIPE SHALL BE SUPPORTED BY A GRANULAR MATERIAL APPROVED BY THE ENGINEER

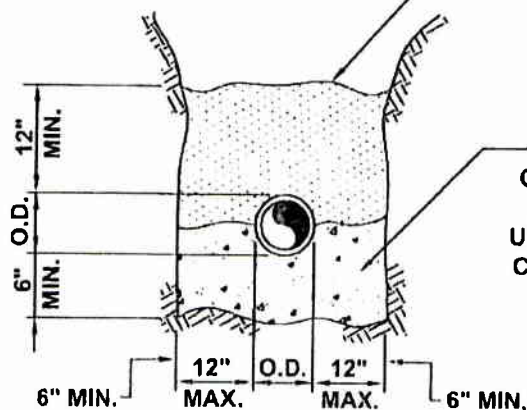
GRANULAR MATERIAL SHALL BE PLACED TO HORIZONTAL CENTER LINE OF PIPE

TYPICAL BEDDING



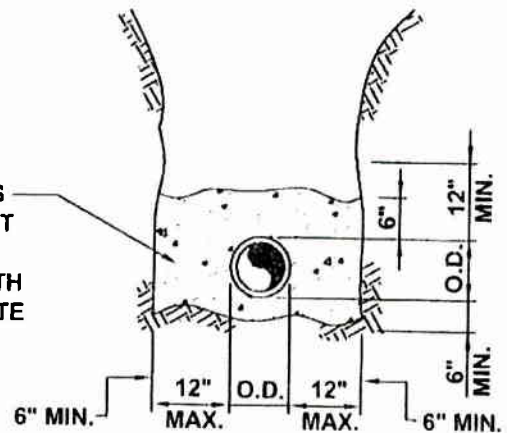
SPECIAL BACKFILL

MECHANICALLY COMPACTED BACKFILL




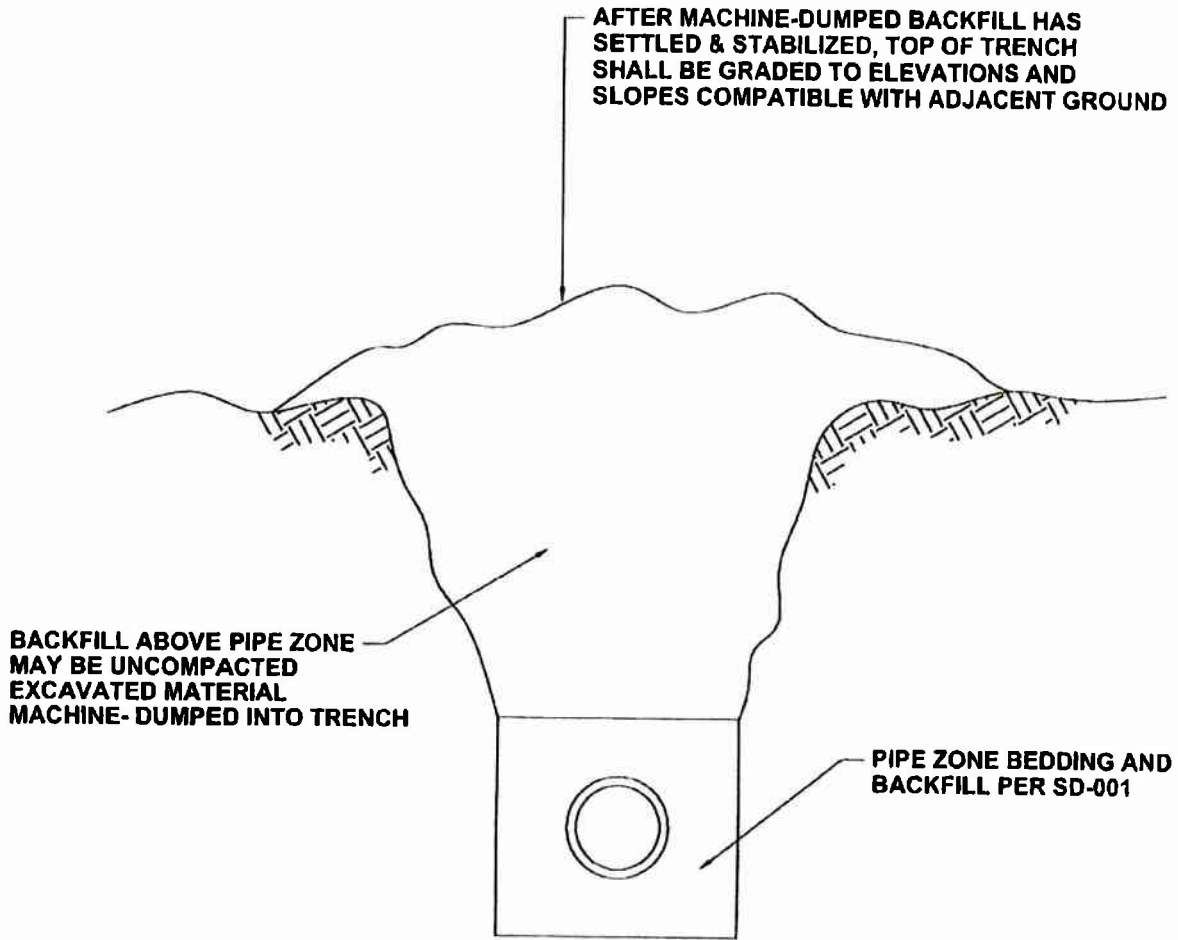
TYPICAL CONCRETE CRADLE


6" MIN. THICKNESS CONC. ENCASEMENT
POURED AGAINST UNDISTURBED EARTH
CLASS "C" CONCRETE

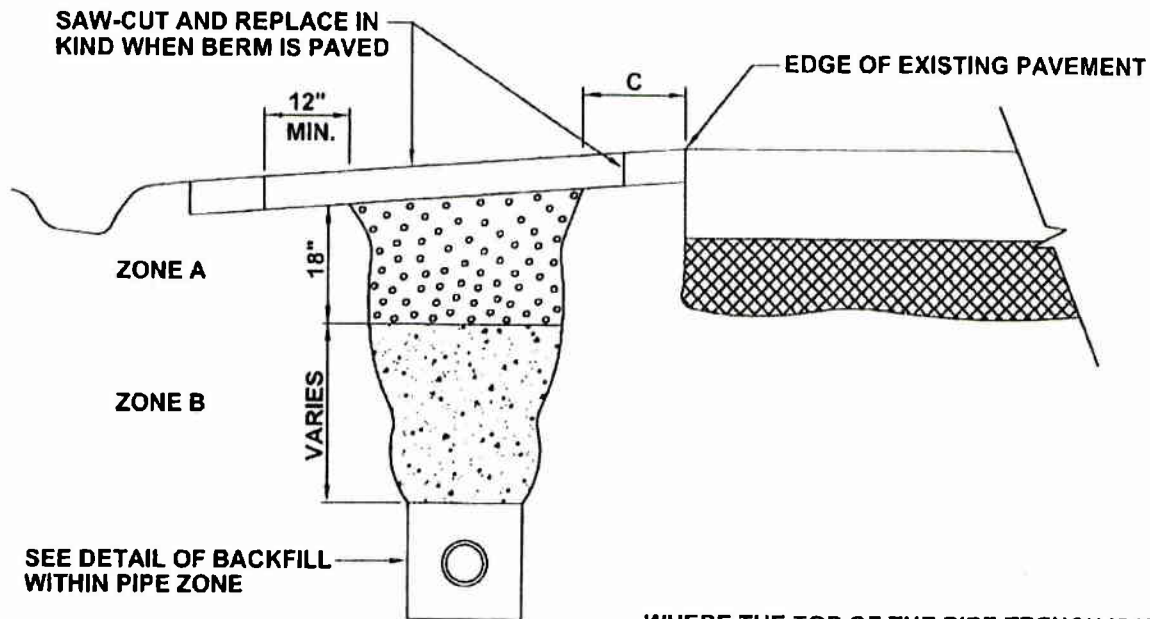


TYPICAL CONCRETE ENCASEMENT

 <p>• THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT •</p>		<p>PIPE BEDDING DETAILS</p>
<p>Not to scale</p>	<p>March 2012</p>	<p>Standard Detail SD-002</p>



 • THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT •		TRENCH BACKFILL THROUGH WOODS, FIELDS OR OTHER UNIMPROVED LOCATIONS
Not to scale	March 2012	Standard Detail SD-003



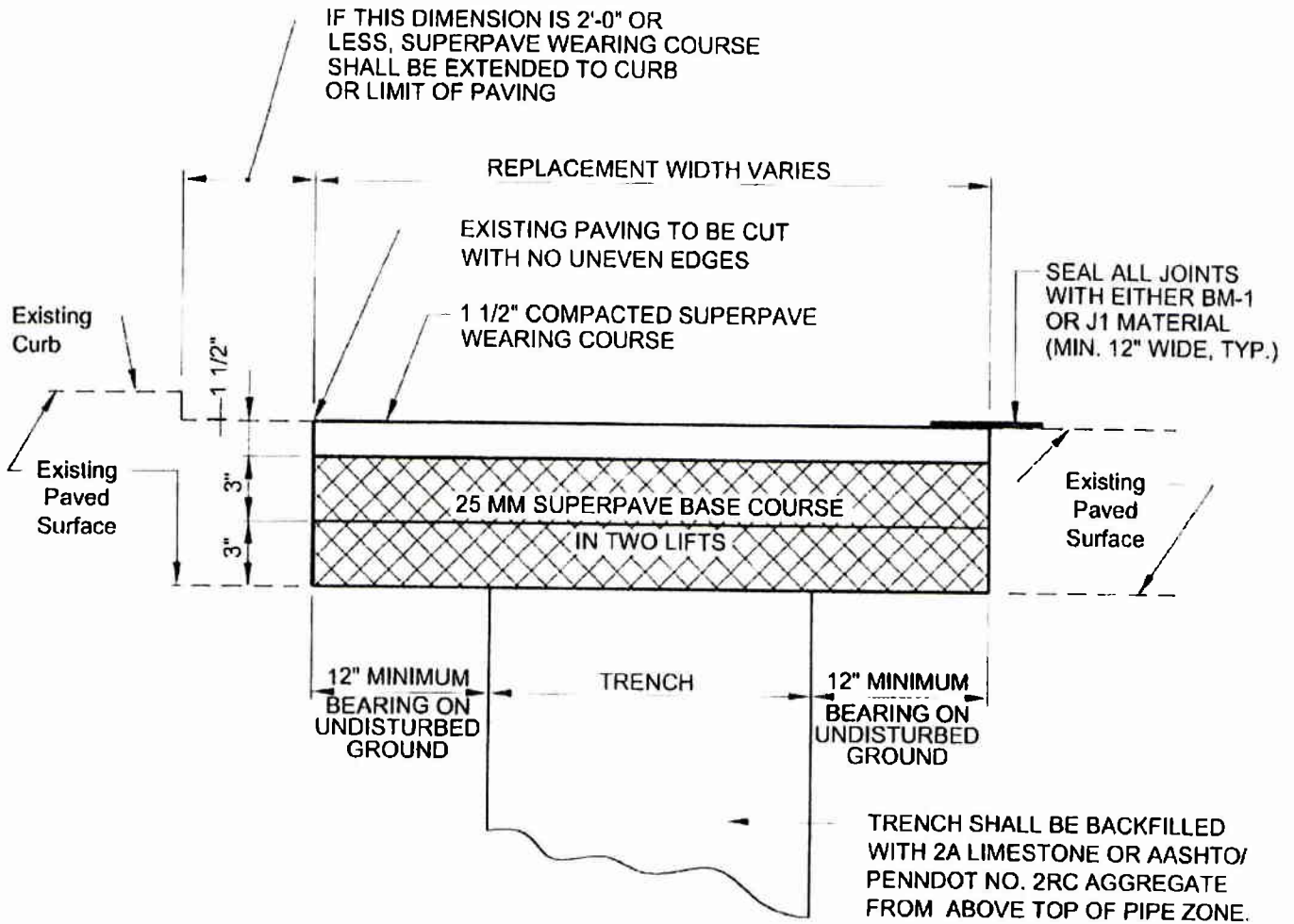
WHERE THE TOP OF THE PIPE TRENCH IS WITHIN 3 FT. OF THE EDGE OF THE PAVED ROADWAY OR STREET (DISTANCE C) THE ENTIRE TRENCH BACKFILL ABOVE THE PIPE ZONE, THAT IS THE BACKFILL PLACED IN ZONES A AND B SHALL CONSIST OF 2-A LIMESTONE MATERIAL MECHANICALLY COMPACTED IN 6" LAYERS.

WHERE THE TOP OF THE PIPE TRENCH IS GREATER THAN 3 FT. FROM THE EDGE OF THE PAVED ROADWAY (DISTANCE C) BACKFILL PLACED IN ZONE B SHALL BE EXCAVATED MATERIAL FROM THE TRENCH, FREE OF ROCKS LARGER THAN 3" AND MECHANICALLY COMPACTED IN 6" LAYERS. BACKFILL MATERIAL PLACED IN ZONE A (THE TOP 18" OF THE TRENCH) SHALL BE 2-A LIMESTONE MATERIAL MECHANICALLY COMPACTED IN 6" LAYERS.

WHERE THE BERM IS NOT PAVED IT SHALL BE RESTORED FOR ITS ENTIRE WIDTH TO THE REQUIREMENTS OF PA DOT PUBLICATION 408.


		TRENCH BACKFILL WITHIN ROADWAY OR STREET BERMS
Not to scale	March 2012	Standard Detail SD-004

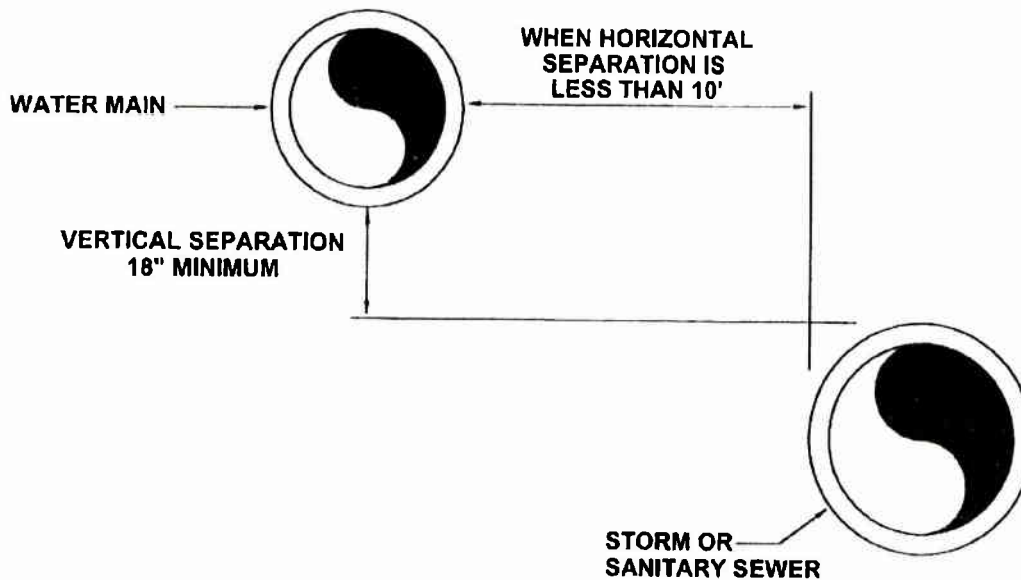
NOTE:
 REFERENCE SUPERPAVE
 PER PA DOT SECTION 409,
 MIXTURE & DESIGN STANDARDS



NOTE:
 DURING COLD WEATHER WHEN SUPERPAVE MATERIAL IS NOT AVAILABLE FROM THE ASPHALT PLANTS THE TRENCH SHALL BE BACKFILLED WITH BEDDING MATERIAL TO AN ELEVATION WITHIN 3" OF THE ROAD SURFACE. THE TRENCH SHALL THEN BE SURFACED WITH A TEMPORARY PATCH OF COLD PATCH MATERIAL. AS SOON AS THE ASPHALT PLANTS OPEN IN THE SPRING, THE CONTRACTOR SHALL REMOVE THE COLD PATCH MATERIAL AND SAW-CUT THE REQUIRED BENCHES AND THE SUPERPAVE MATERIAL SHALL THEN BE PLACED AND SEALED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE ON THE TEMPORARY PATCH AND SHALL KEEP A SMOOTH RIDING SURFACE ON THE STREET.

* FOR CONCRETE SURFACED ROADWAYS, THE REQUIREMENTS OF PA DOT PUBLICATION 408 ARE REQUIRED.


 THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT		TRENCH BACKFILL AND PAVEMENT REPLACEMENT REQUIREMENTS FOR MUNICIPAL ROADS
Not to scale	March 2012	Standard Detail SD-005



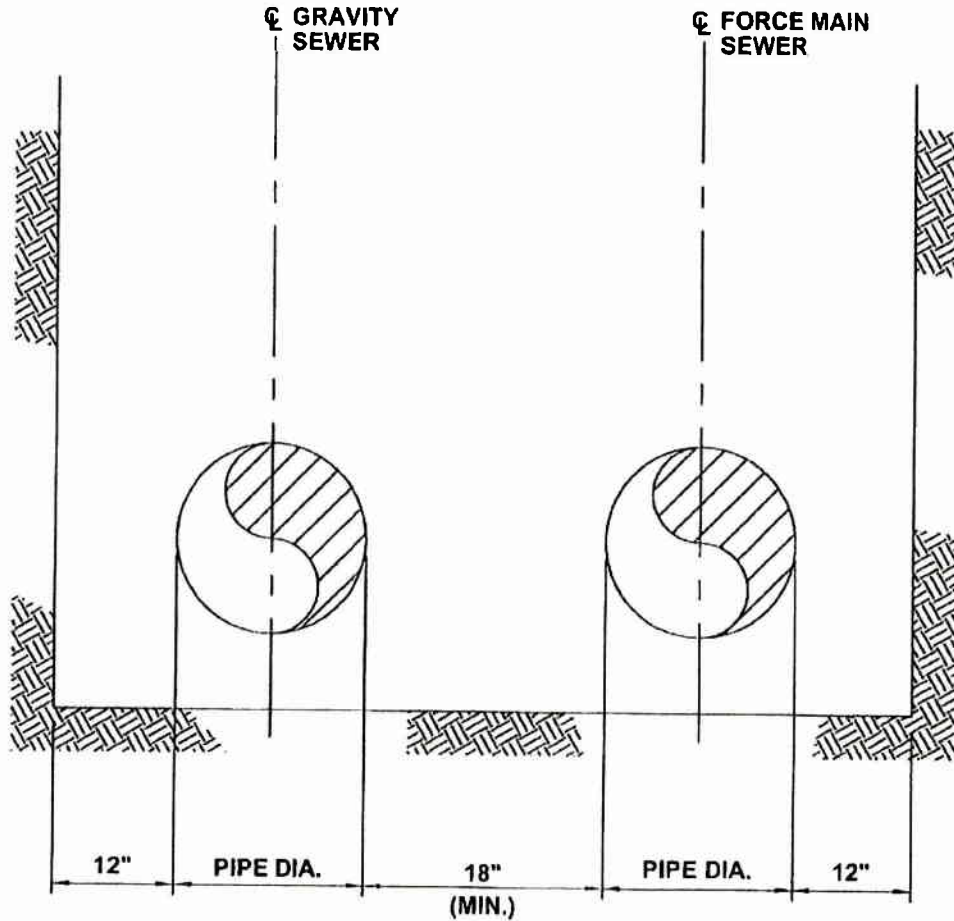
NOTES:

1. WHEN THE HORIZONTAL SEPARATION OF THE WATER MAIN AND SEWER LINE IS LESS THAN 10', THE VERTICAL SEPARATION BETWEEN THE TOP (CROWN) OF THE SEWER LINE AND THE BOTTOM (INVERT) OF THE WATER MAIN SHALL BE AT LEAST 18". SEWER LINE SHALL BE ENCASED IN CONCRETE WHERE SEWER/ WATER LINE CROSSINGS OCCUR AND WHERE CONDITIONS PREVENT AN 18" VERTICAL SEPARATION.

2. THERE SHALL BE AT LEAST A 10' HORIZONTAL SEPARATION BETWEEN WATER MAINS AND SANITARY SEWER FORCE MAINS. FORCE MAINS CROSSING WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18" BETWEEN THE OUTSIDE OF THE FORCE MAIN AND THE OUTSIDE OF THE WATER MAIN.

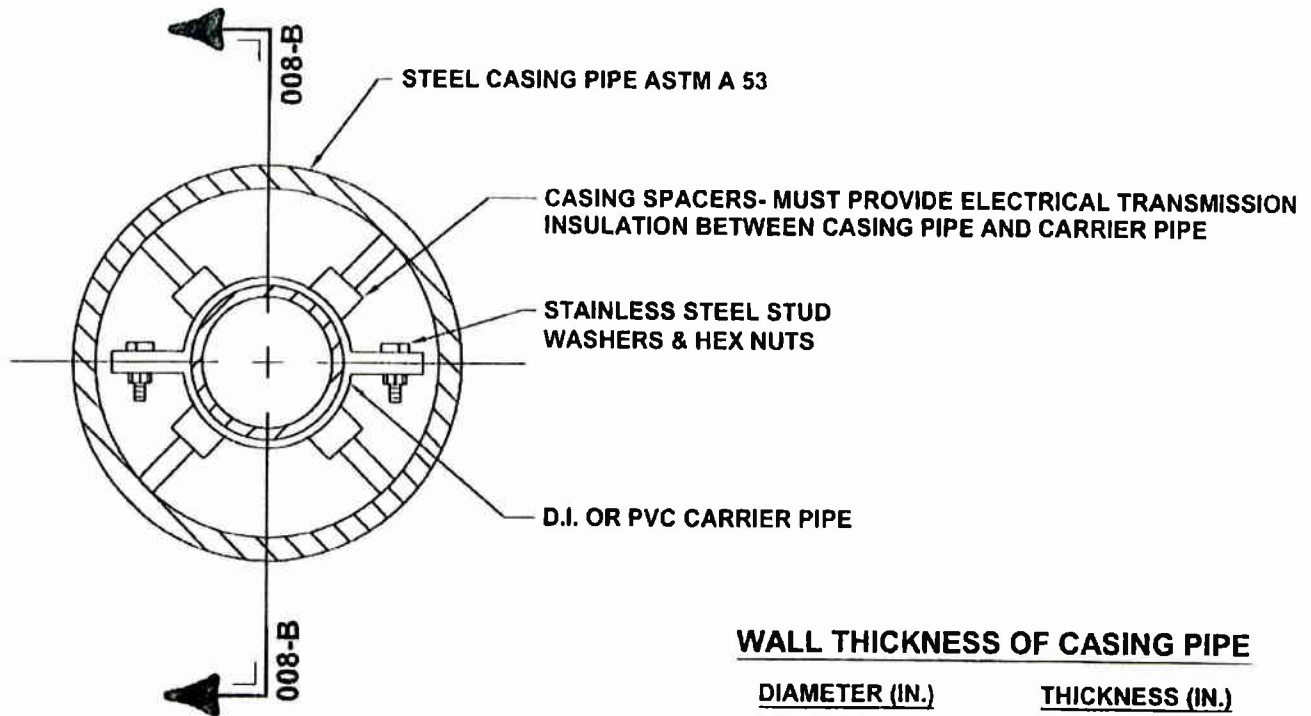
		DESIRED DISTANCES BETWEEN WATER AND SEWER PIPES
Not to scale	March 2012	Standard Detail SD-006

REFERENCE TRENCH ZONE DETAILS SD-001 AND PIPE BEDDING SD-002



NOTE:
FORCE MAIN TO BE INSTALLED
ON RISING GRADIENT

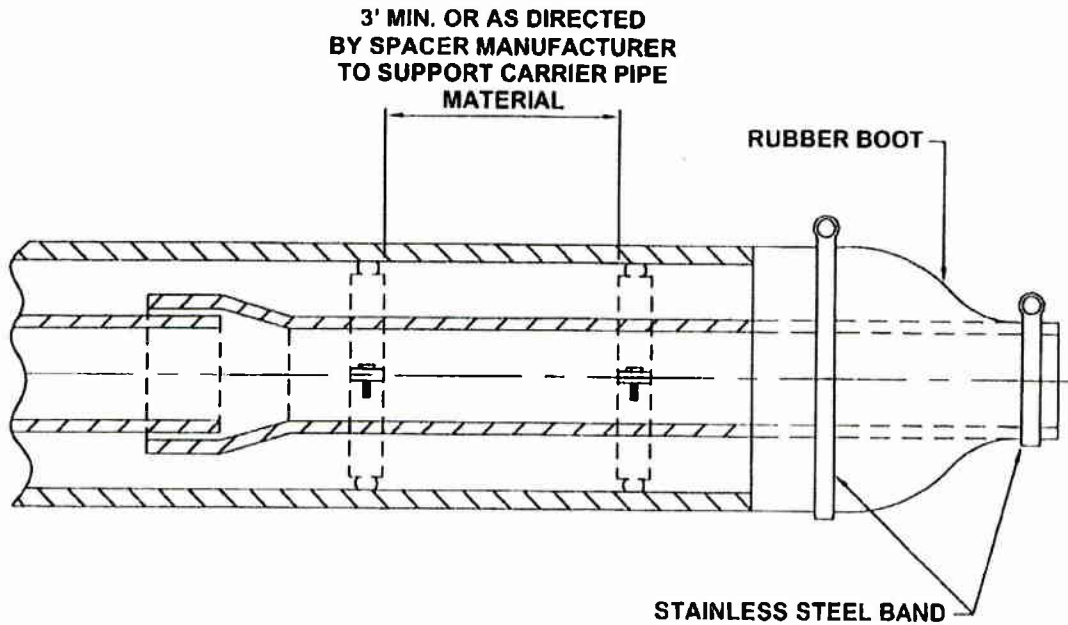
<p>MACM THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT</p>		<p>GRAVITY SEWER AND FORCE MAIN CONSTRUCTED PARALLEL IN COMMON TRENCH</p>
<p>Not to scale</p>	<p>March 2012</p>	<p>Standard Detail SD-007</p>




SECTIONAL PLAN 008-A

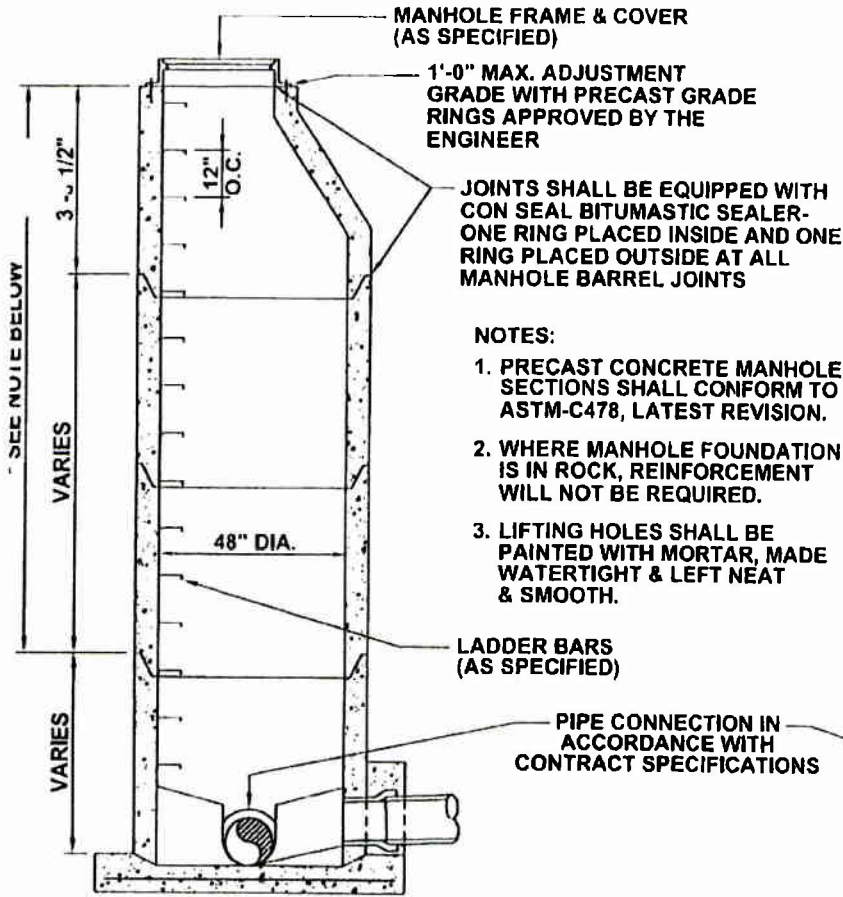
WALL THICKNESS OF CASING PIPE

DIAMETER (IN.)	THICKNESS (IN.)
24" OR LESS	1/4"
28" AND 32"	3/8"
42" AND LARGER	1/2"



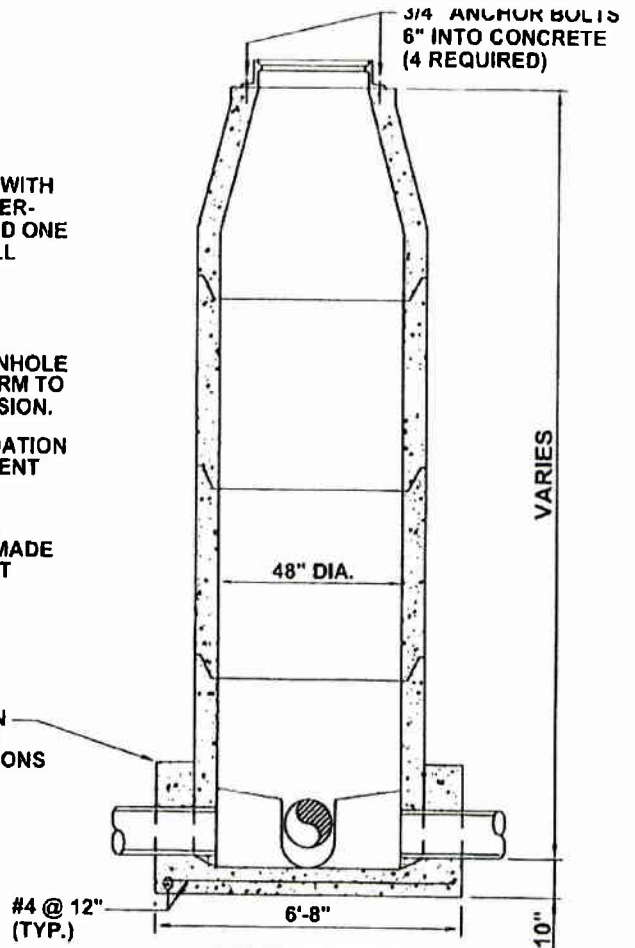
SECTION 008-B

 <p>THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT</p>		<p>STEEL CASING AND D.I. OR PVC CARRIER PIPES INSTALLED BY BORING</p>
Not to scale	March 2012	Standard Detail SD-008

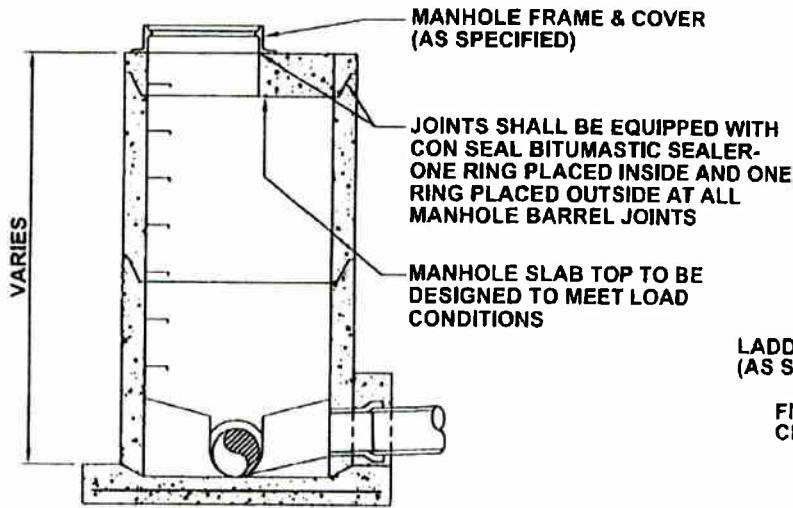


NOTE: THIS DIMENSION IS LESS THAN 5'-0" USE A CAST CONCRETE SLAB ON TOP AS SHOWN BELOW

SECTION 009-A

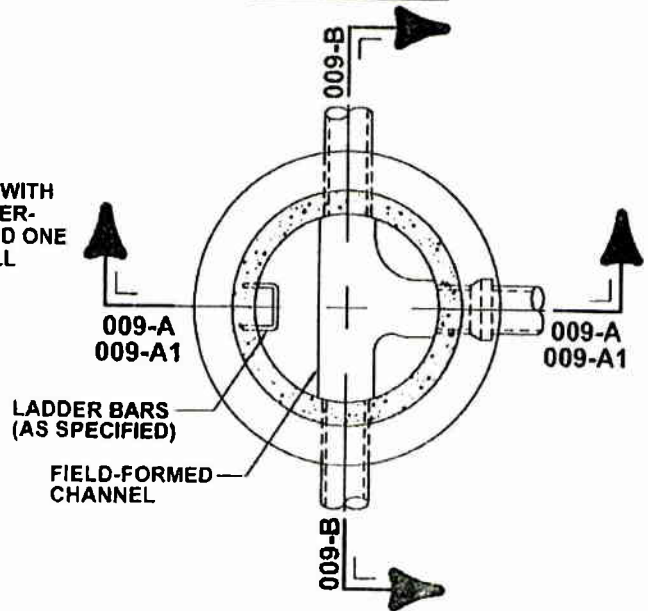


SECTION 009-B



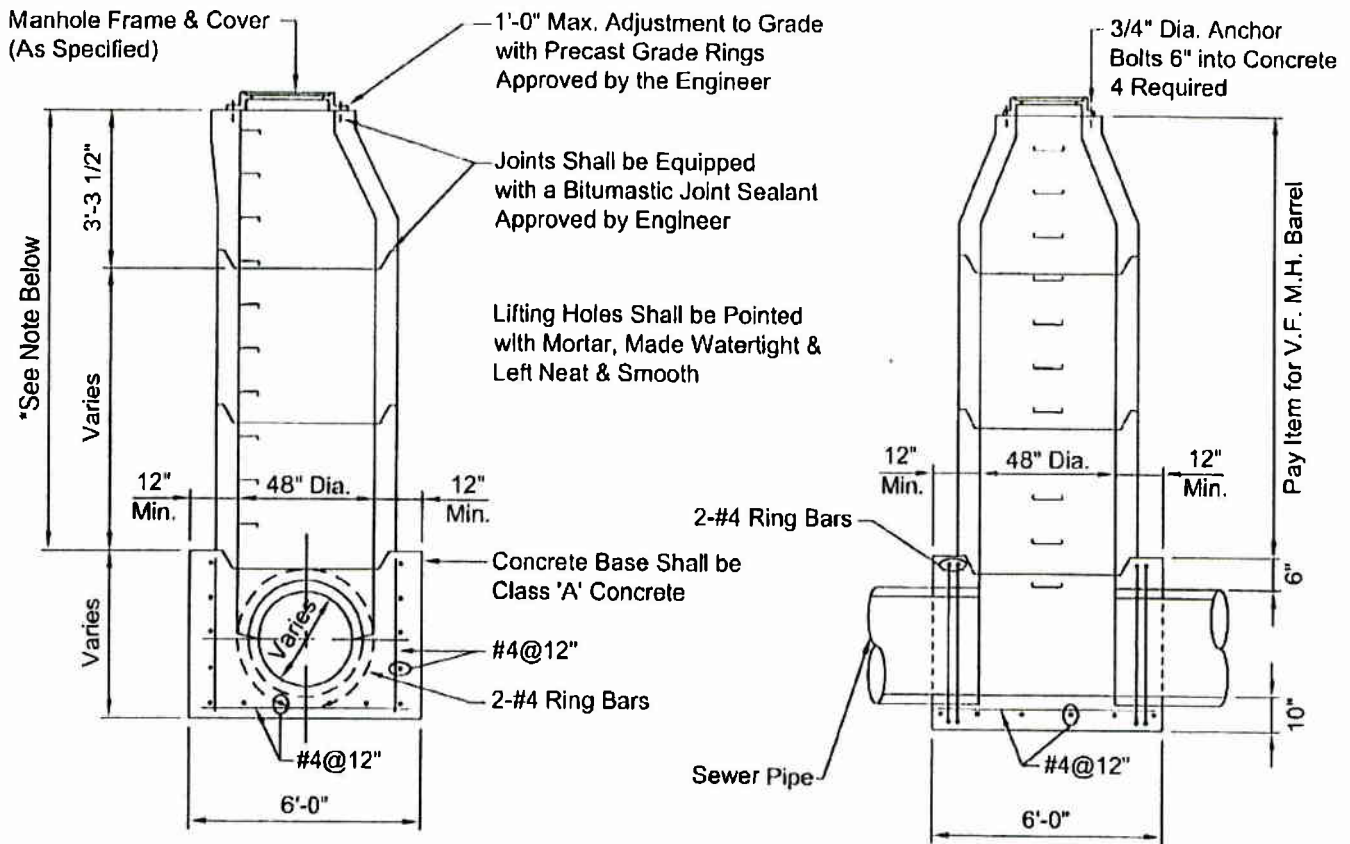
SECTION 009-A1

NOTE: WATERPROOF EXTERIOR SURFACES OF ALL MANHOLES



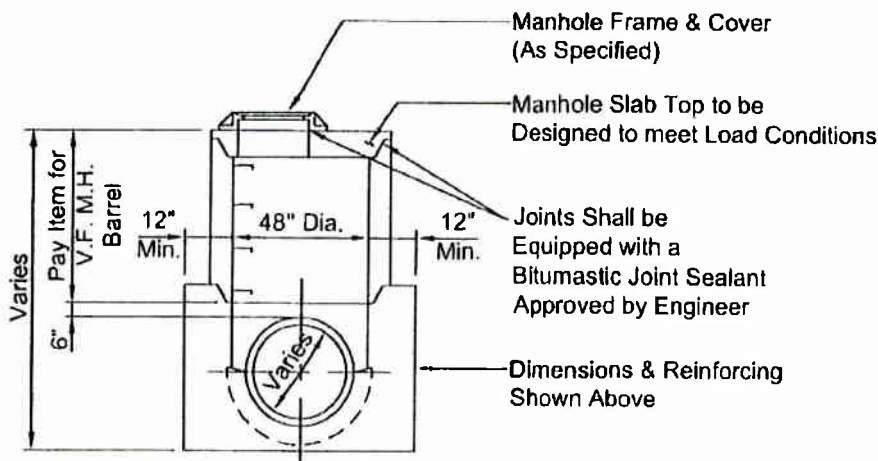
SECTIONAL PLAN 009-C

		<p>PRECAST CONCRETE MANHOLE FOR SEWERS 8" TO 18"</p>
Not to scale	March 2012	Standard Detail SD-009



*Note:
If this Dimension is Less than 3'-3"
Use a Precast Concrete Slab Top
Shown Below

- Note:
1. Precast Concrete Manhole Sections Shall Conform to ASTM C-478, Latest Revision.
 2. Where Manhole Foundation is in Rock, Reinforcement will not be Required.
 3. Waterproof Exterior Surface with Two Coats Bitumastic Material or Coal Tar Solution. 8 Mils per Coat.

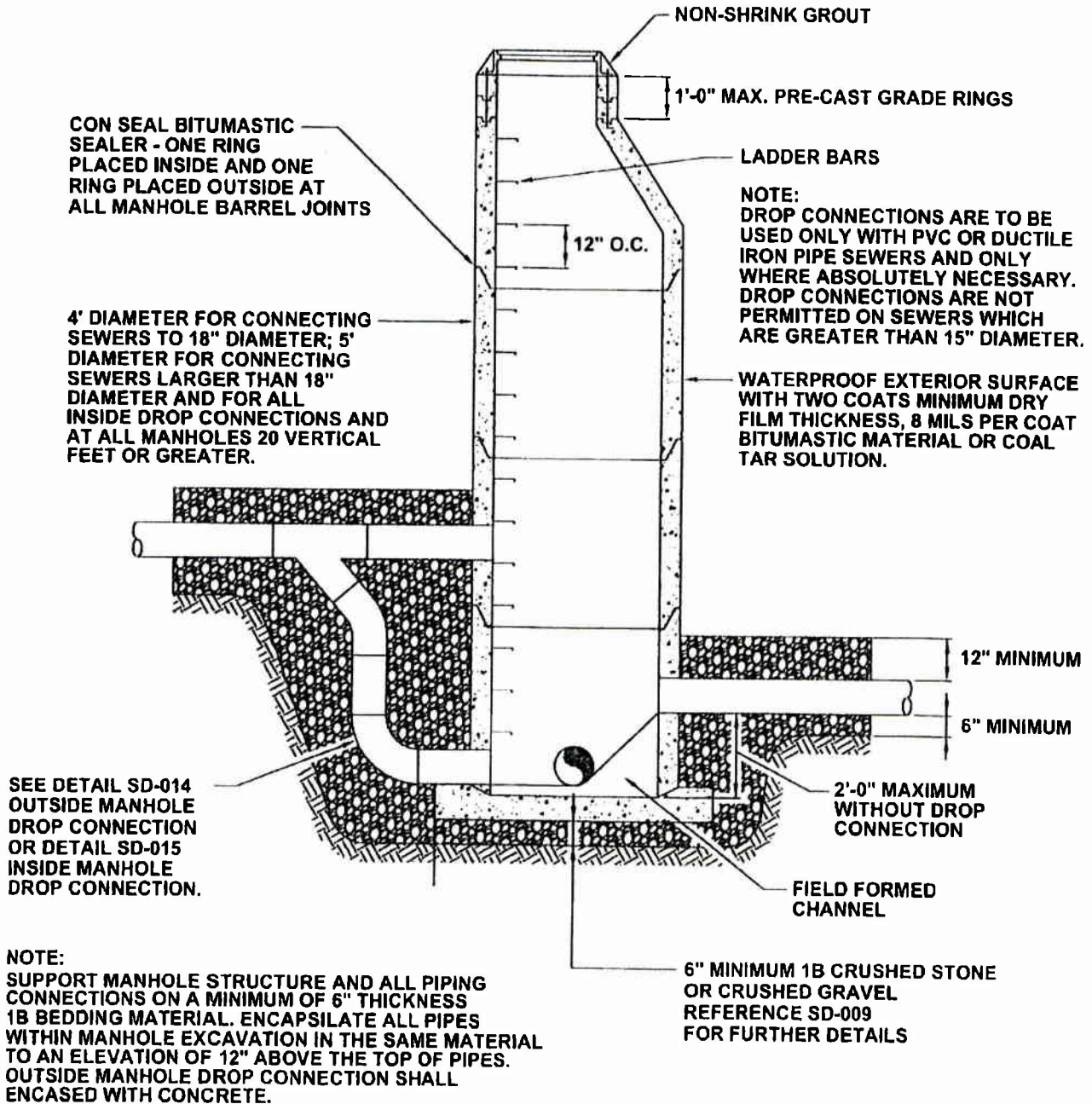



		<p>PRE-CAST CONCRETE MANHOLE FOR SEWERS 20" -33"</p>
<p>Not to scale</p>	<p>March 2012</p>	<p>Standard Detail SD-010</p>

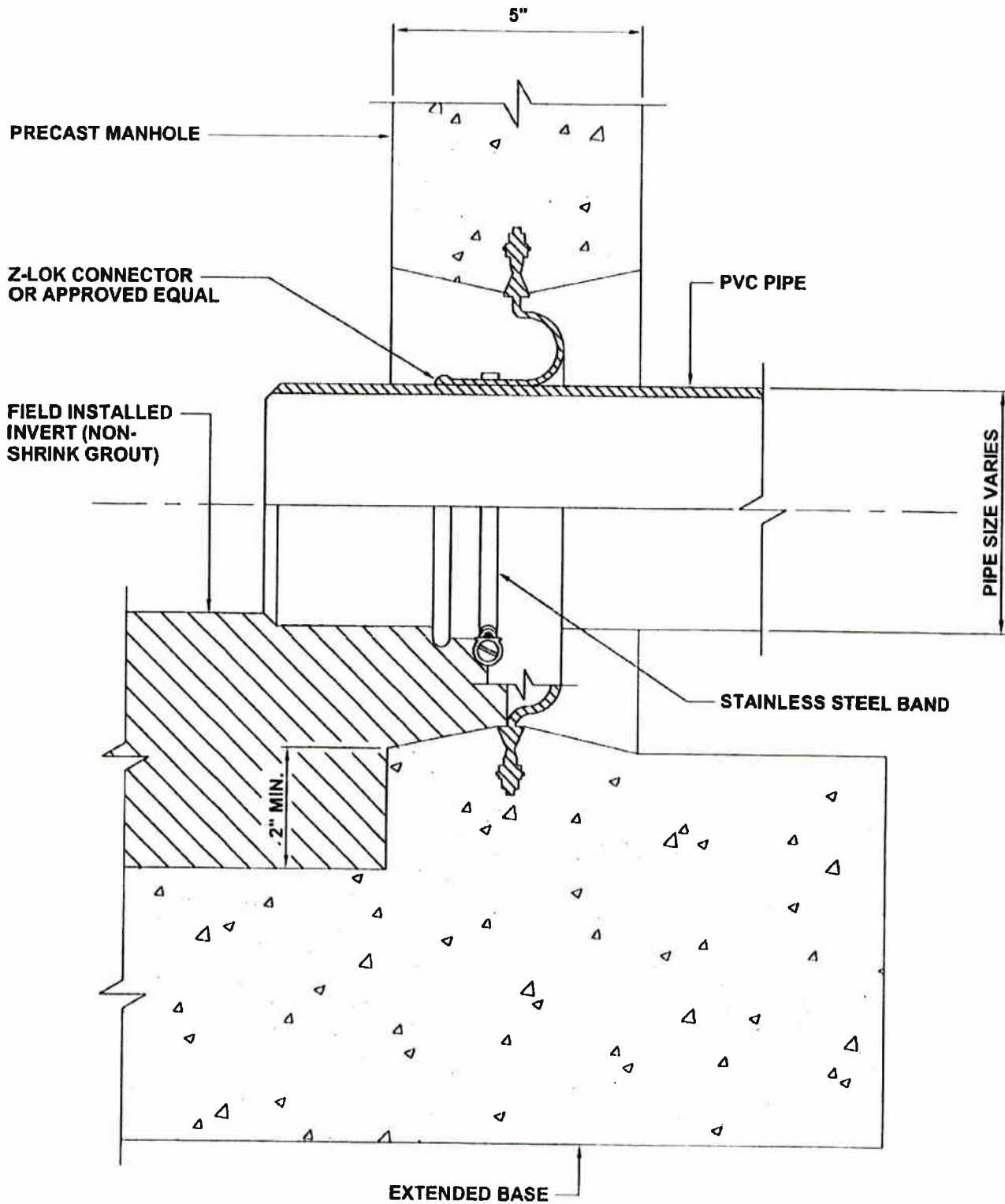
MANHOLE BARREL SHALL BE PRE-CAST CONCRETE ASTM C478 OR GLASS FIBER REINFORCED ASTM D3753. FOR CONNECTING PIPES 18" DIAMETER OR LESS, THE MANHOLE BARREL SHALL BE 4' DIAMETER; WHERE THERE ARE LARGER CONNECTING PIPES OR INSIDE DROP CONNECTIONS, THE DIAMETER SHALL BE 5'.


REFERENCE DETAILS

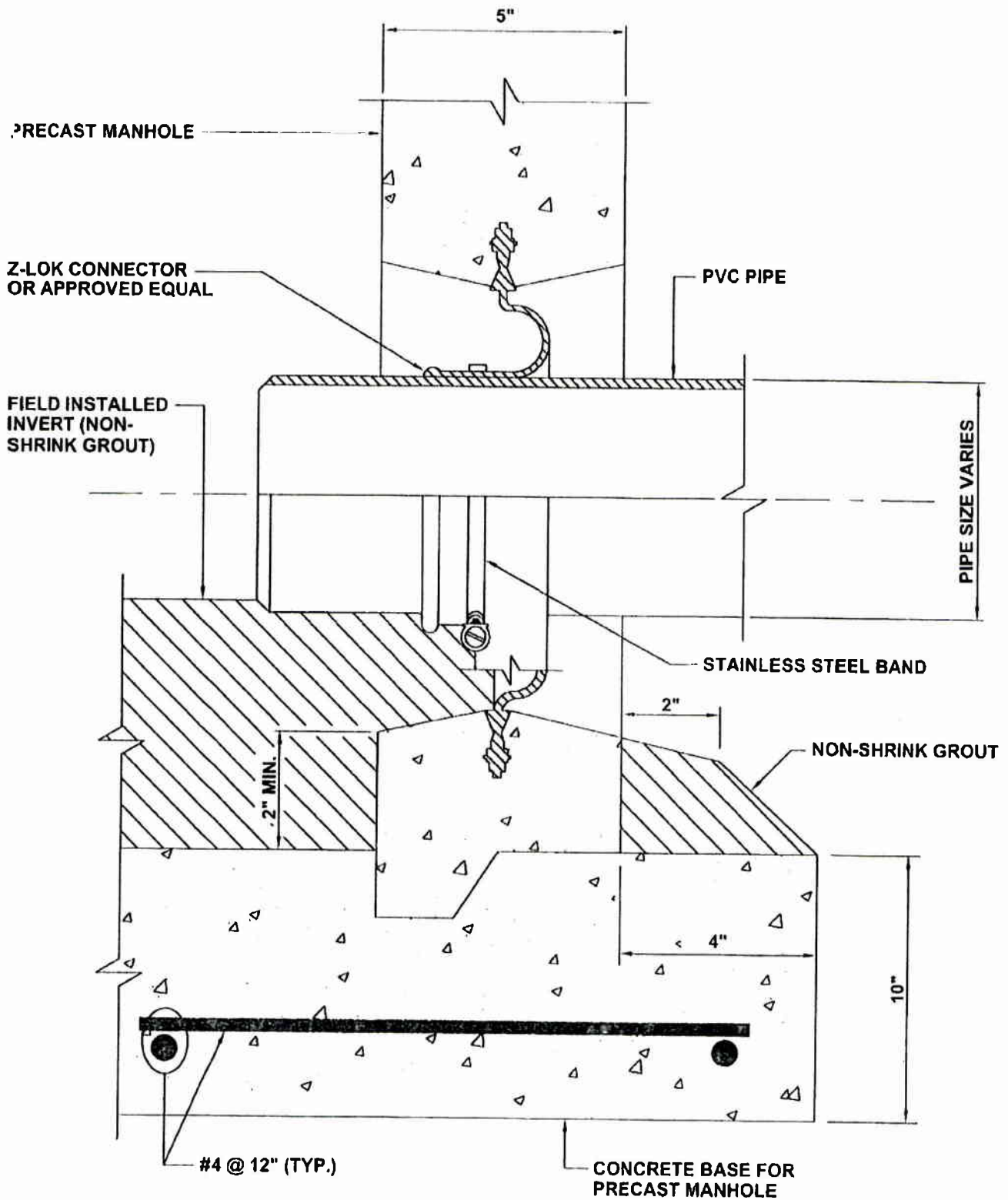
MANHOLE FRAME & COVER SD-016 OR SD-017
 INFLOW PROTECTOR SD-018
 STEPS SD-019
 PIPE CONNECTOR SD-012 OR SD-013



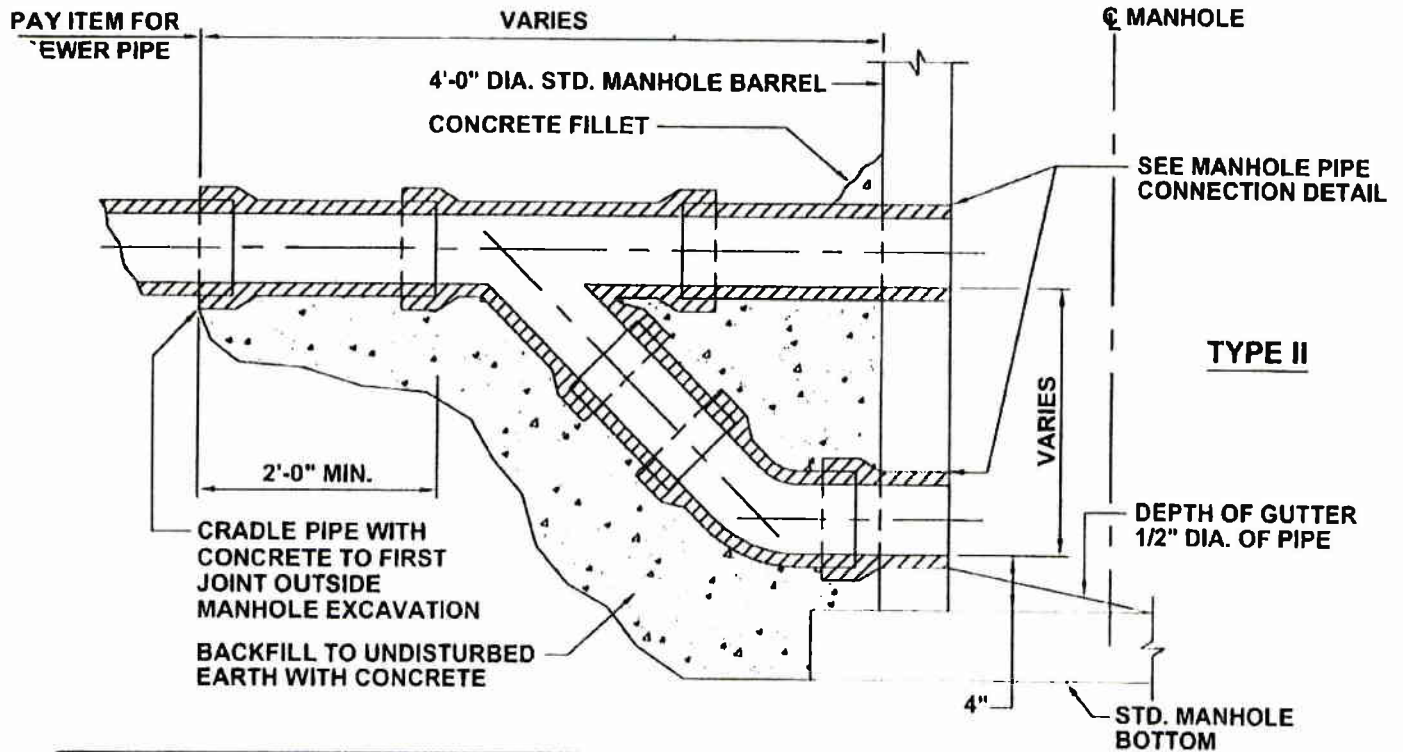
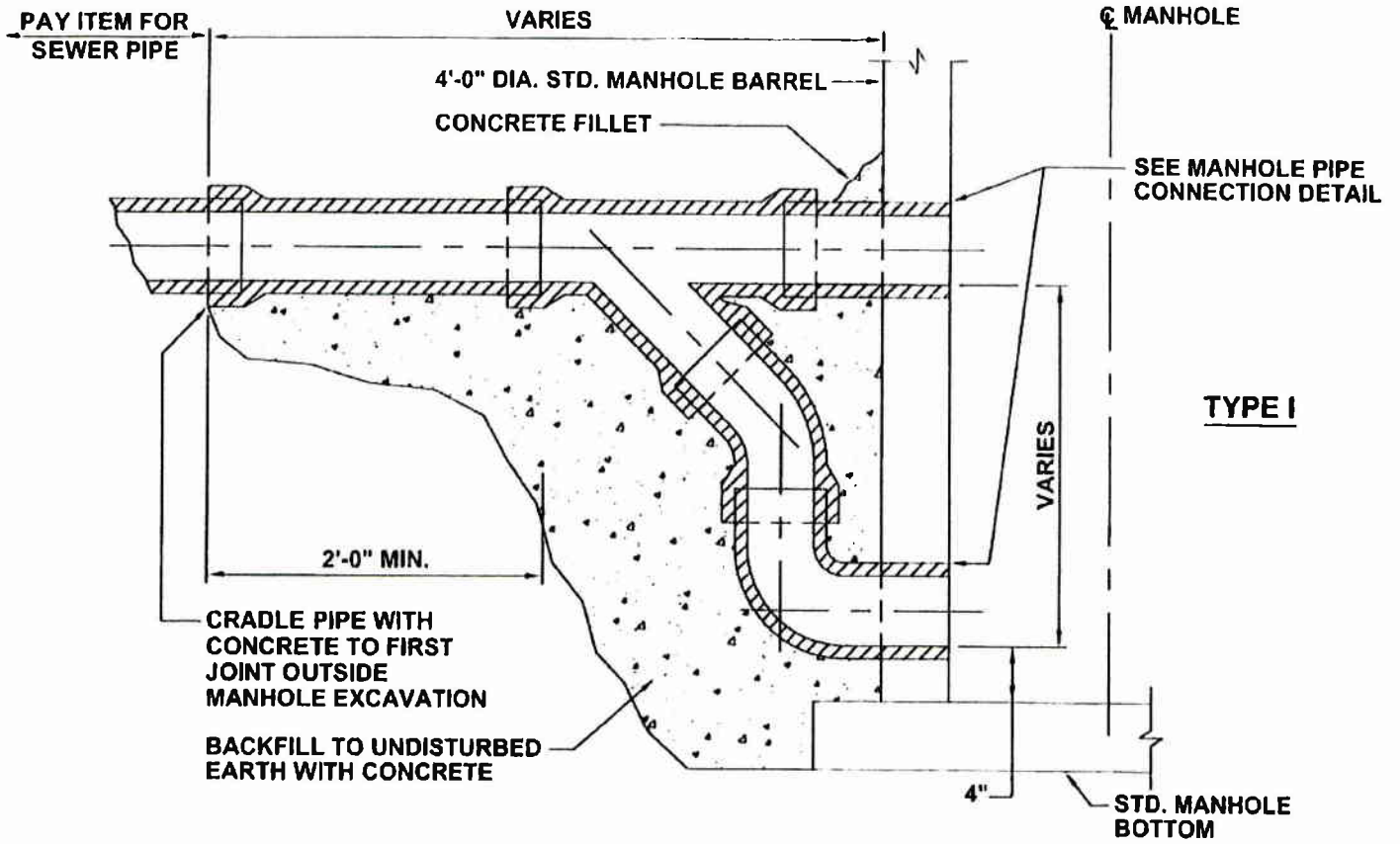
 <p>THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT</p>		<p>MANHOLE FOR SEWERS FOR DEPTHS GREATER THAN 5 FEET</p>
<p>Not to scale</p>	<p>March 2012</p>	<p>Standard Detail SD-011</p>



 <p>THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT</p>		<p>MANHOLE CONNECTION FOR PVC PIPE (PRECAST BASE)</p>
<p>Not to scale</p>	<p>March 2012</p>	<p>Standard Detail SD-012</p>



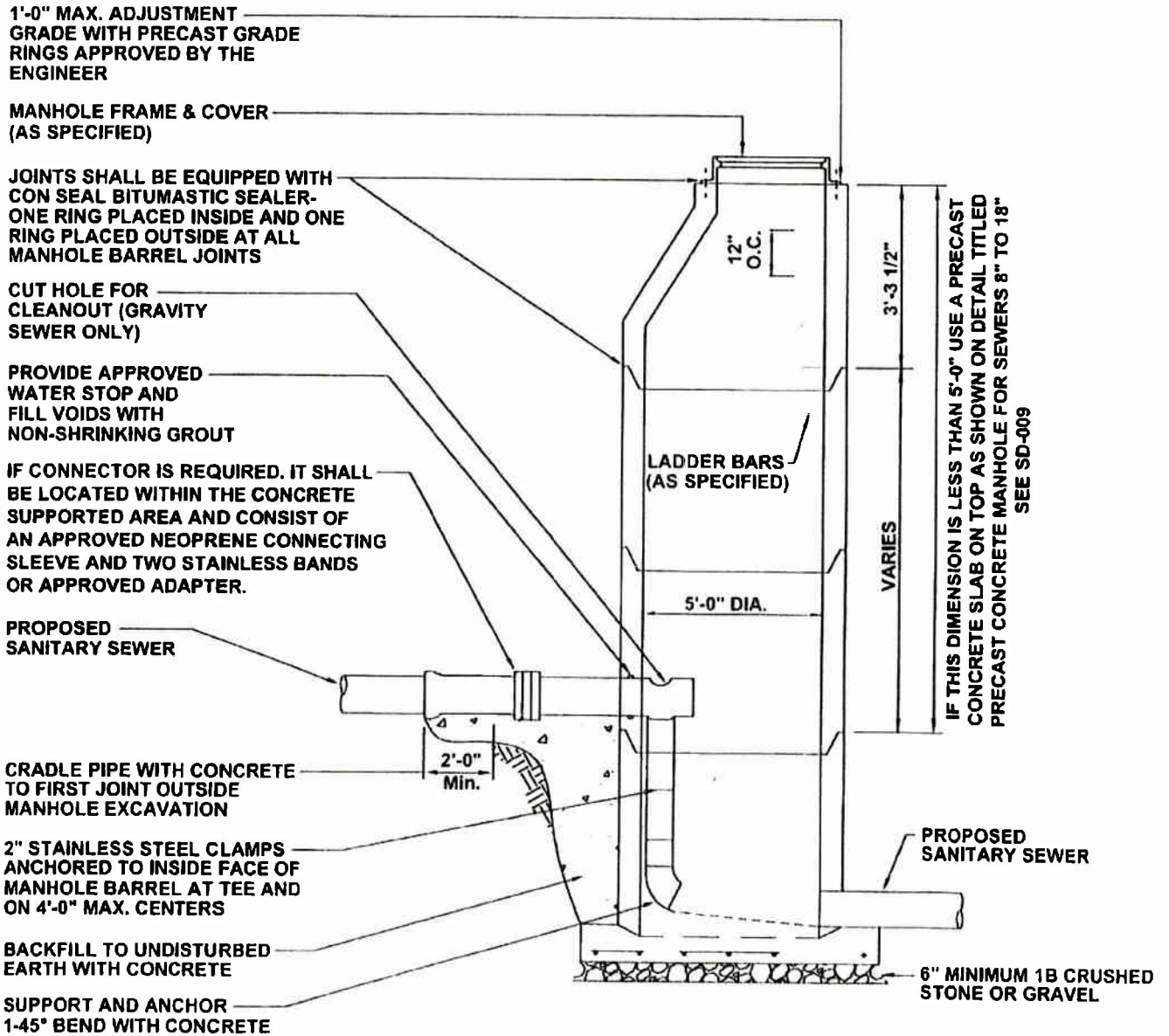
<p>MACM THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT</p>		<p>MANHOLE CONNECTION FOR PVC PIPE (CAST-IN-PLACE BASE)</p>
<p>Not to scale</p>	<p>March 2012</p>	<p>Standard Detail SD-013</p>




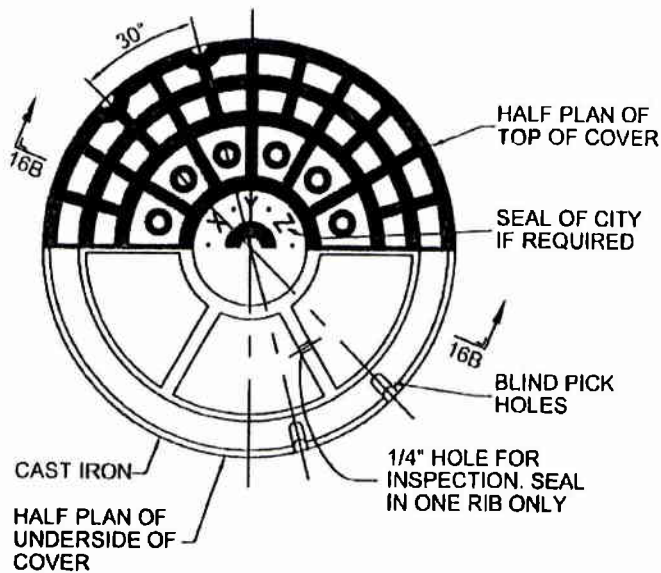
		OUTSIDE MANHOLE DROP CONNECTION
Not to scale	March 2012	Standard Detail SD-014

NOTES:

1. 5' DIA. PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO ASTM-C478, LATEST REVISION.
2. WHERE MANHOLE FOUNDATION IS IN ROCK, REINFORCEMENT WILL NOT BE REQUIRED.
3. LIFTING HOLES SHALL BE PAINTED WITH MORTAR, MADE WATERTIGHT & LEFT NEAT.
4. DROP CONNECTION INLET PIPE TEE AND BENDS SHALL BE PVC PIPE CONFORMING TO ASTM D-3034, SDR-35.
5. FOR FORCE MAINS, INSTALL RUN OF TEE IN VERTICAL POSITION.
6. ALL OTHER MANHOLE STANDARD DETAIL REQUIREMENTS APPLY.



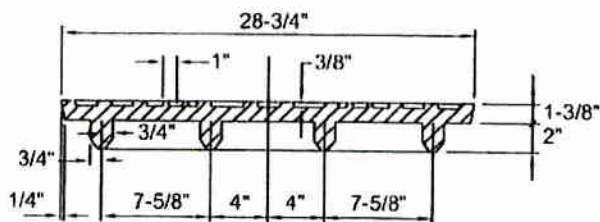
 <p>THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT</p>		<p>INSIDE MANHOLE DROP CONNECTION</p>
<p>Not to scale</p>	<p>March 2012</p>	<p>Standard Detail SD-015</p>



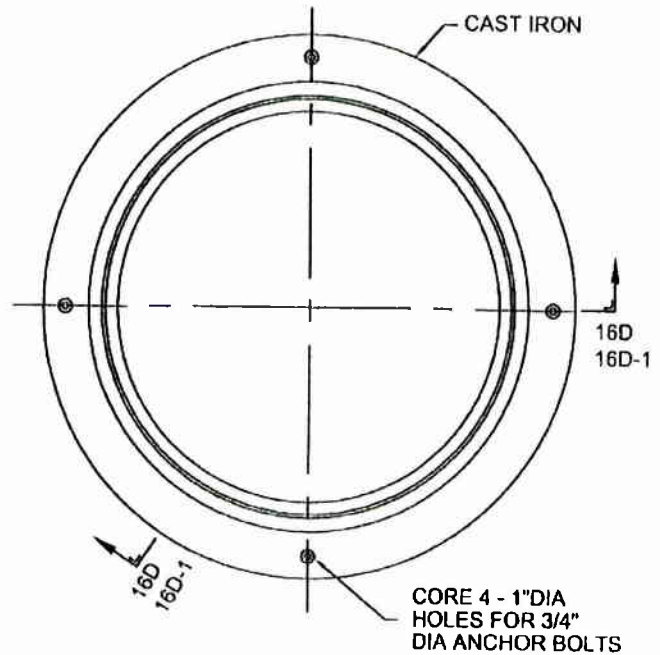
PLAN

SHADED PORTION - HIGH
PLAIN PORTION - LOW

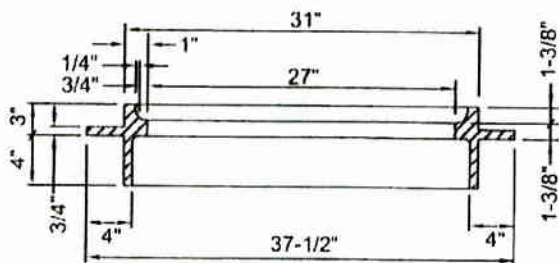
NAMES, LETTERS OR IDENTIFICATION MARK OF USER TO BE CAST IN CIRCLE IN CENTER OF COVER AS ORDERED. LETTERS X, Y, AND Z USED AS ILLUSTRATION ONLY.



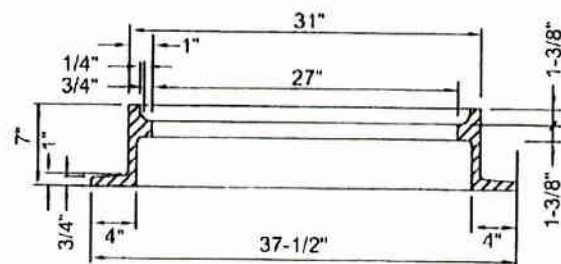
SECTION 16B



PLAN 16C

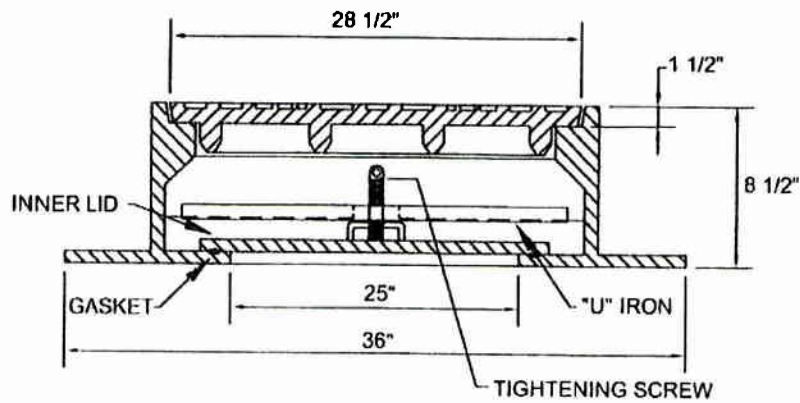
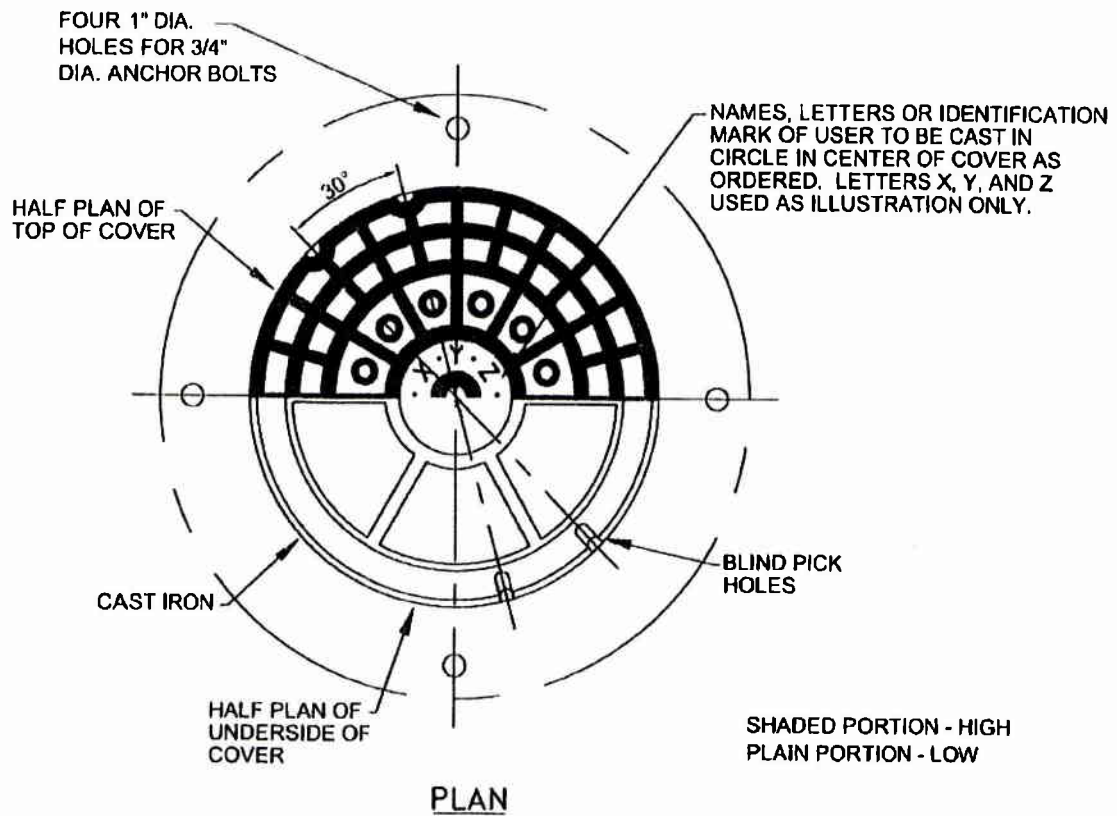


CAST IN PLACE - SECTION 16D-1




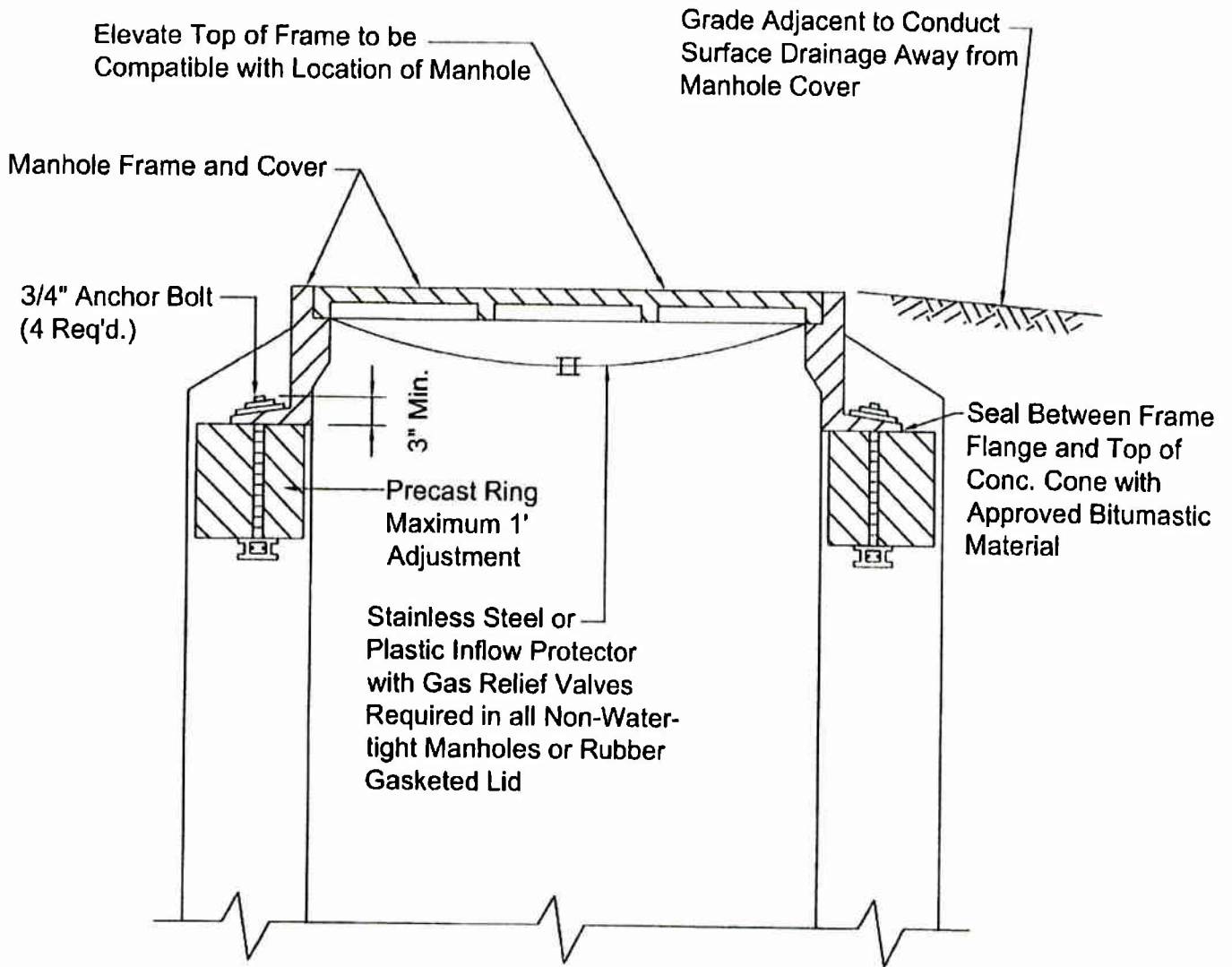
BOTTOM FLANGE - SECTION 16-D

<p>THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT</p>		<p>STANDARD CAST IRON MANHOLE FRAME AND COVER</p>
<p>Not to scale</p>	<p>March 2012</p>	<p>Standard Detail SD-016</p>




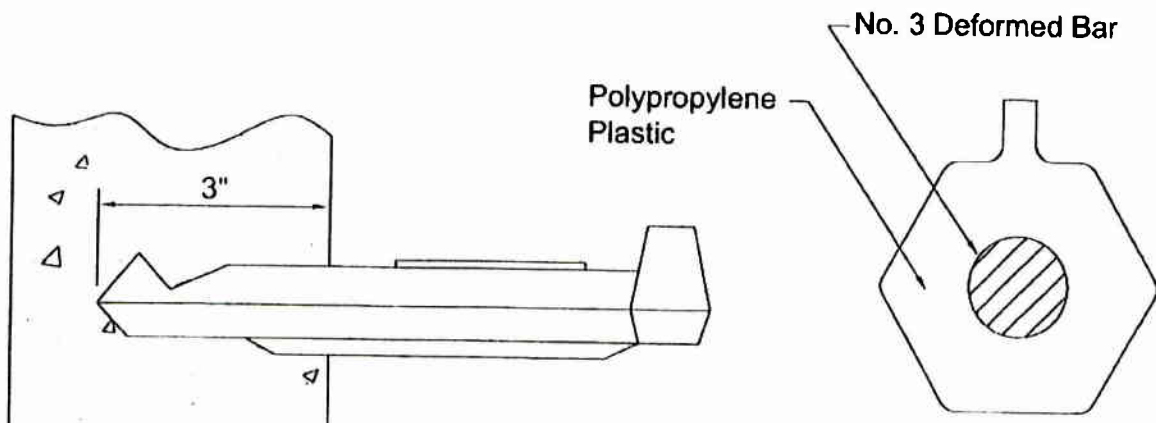
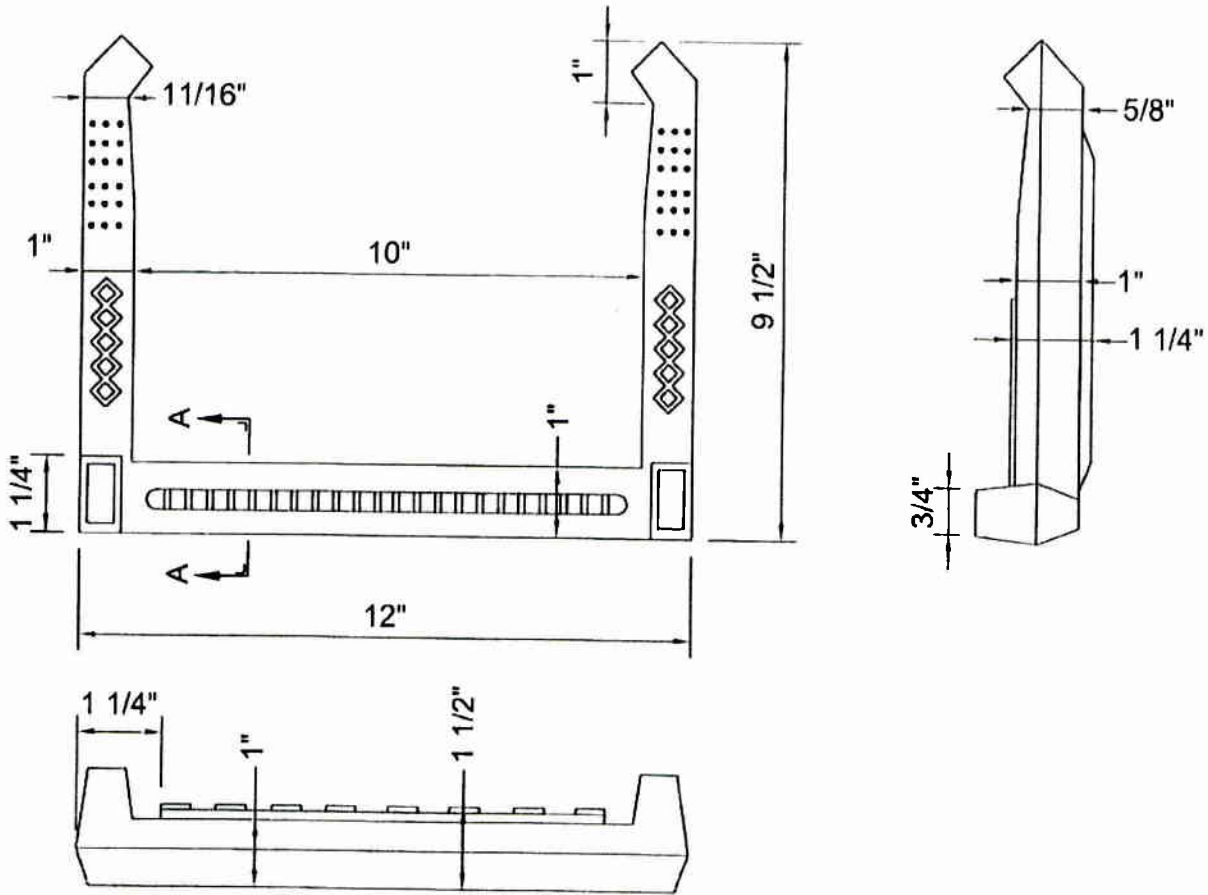
SECTION

 <p>THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT</p>		<p>WATERTIGHT MANHOLE (WT) FRAME AND COVER</p>
<p>Not to scale</p>	<p>March 2012</p>	<p>Standard Detail SD-017</p>



Note: Stainless Steel Inflow Protector to be Installed at all Manholes Located in Road Paving and Berms. Plastic Inflow Protectors to be Installed at all other Manholes

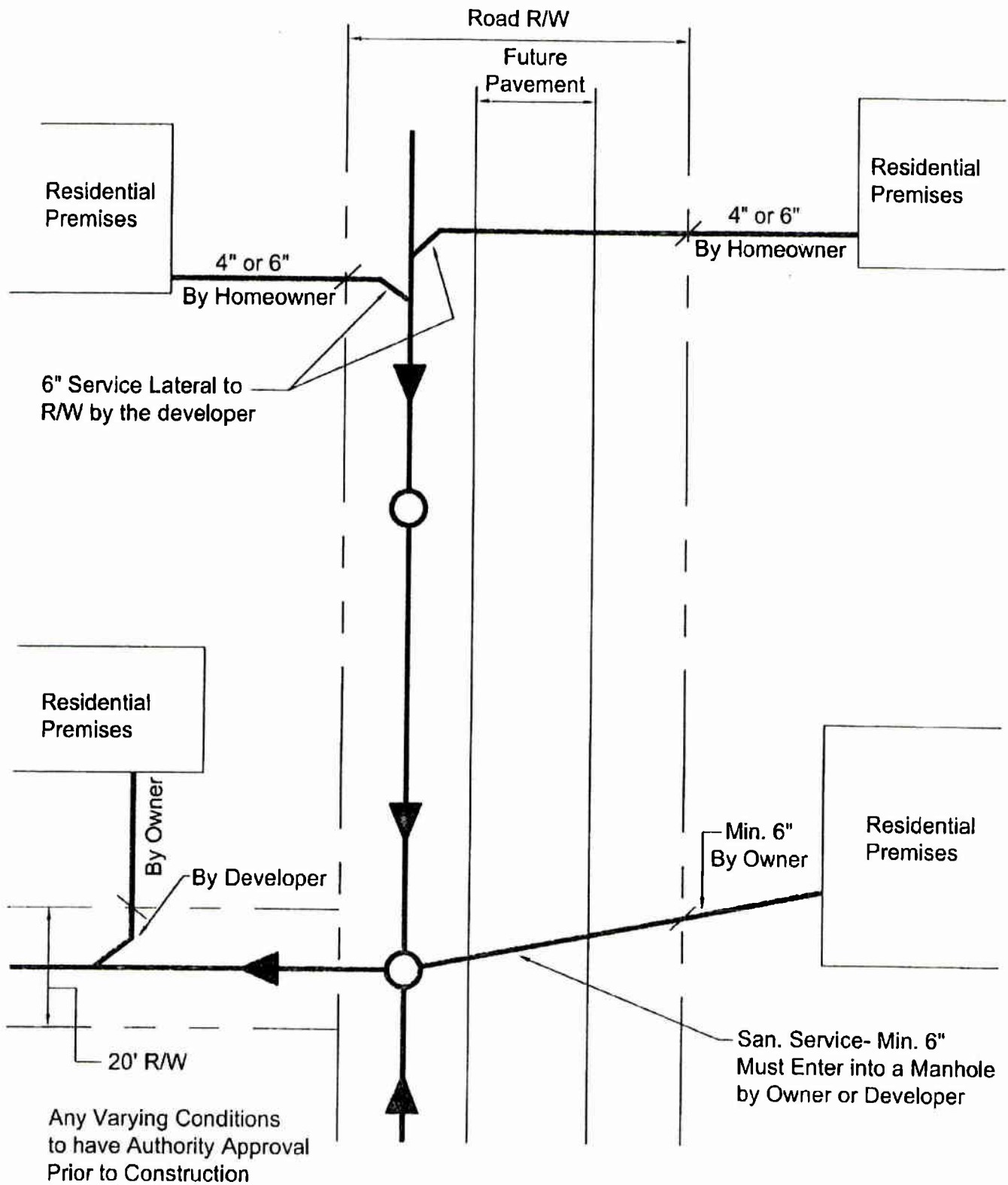
		MANHOLE INFLOW PROTECTOR
Not to scale	March 2012	Standard Detail SD-018




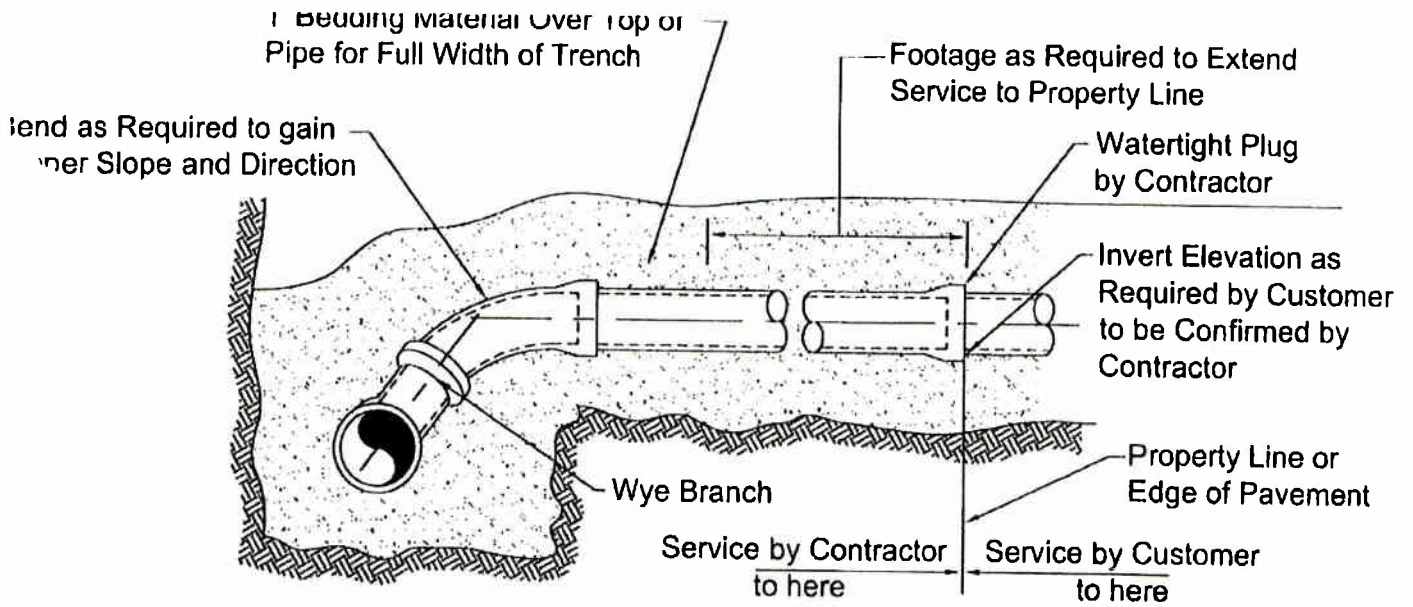
1. Steps grouted in place
2. Install steps on 12" c:c

SECTION A

		POLYPROPYLENE PLASTIC MANHOLE STEP
Not to scale	March 2012	Standard Detail SD-019

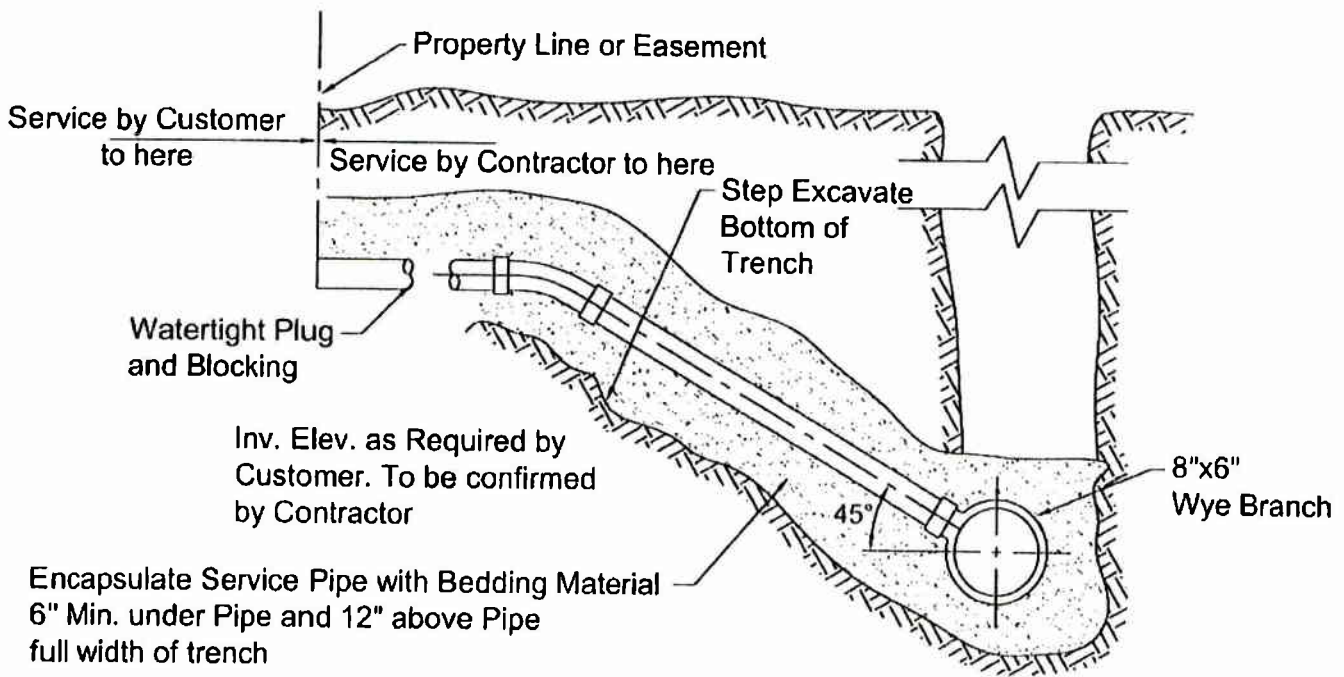


 THE MUNICIPAL AUTHORITY OF THE CITY OF MCKEESPORT		SERVICE LINE CONNECTIONS
Not to scale	March 2012	Standard Detail SD-020



NOTE: Where main sewer is in private property, footage of lateral pipe will extend to the edge of sewer right-of-way.

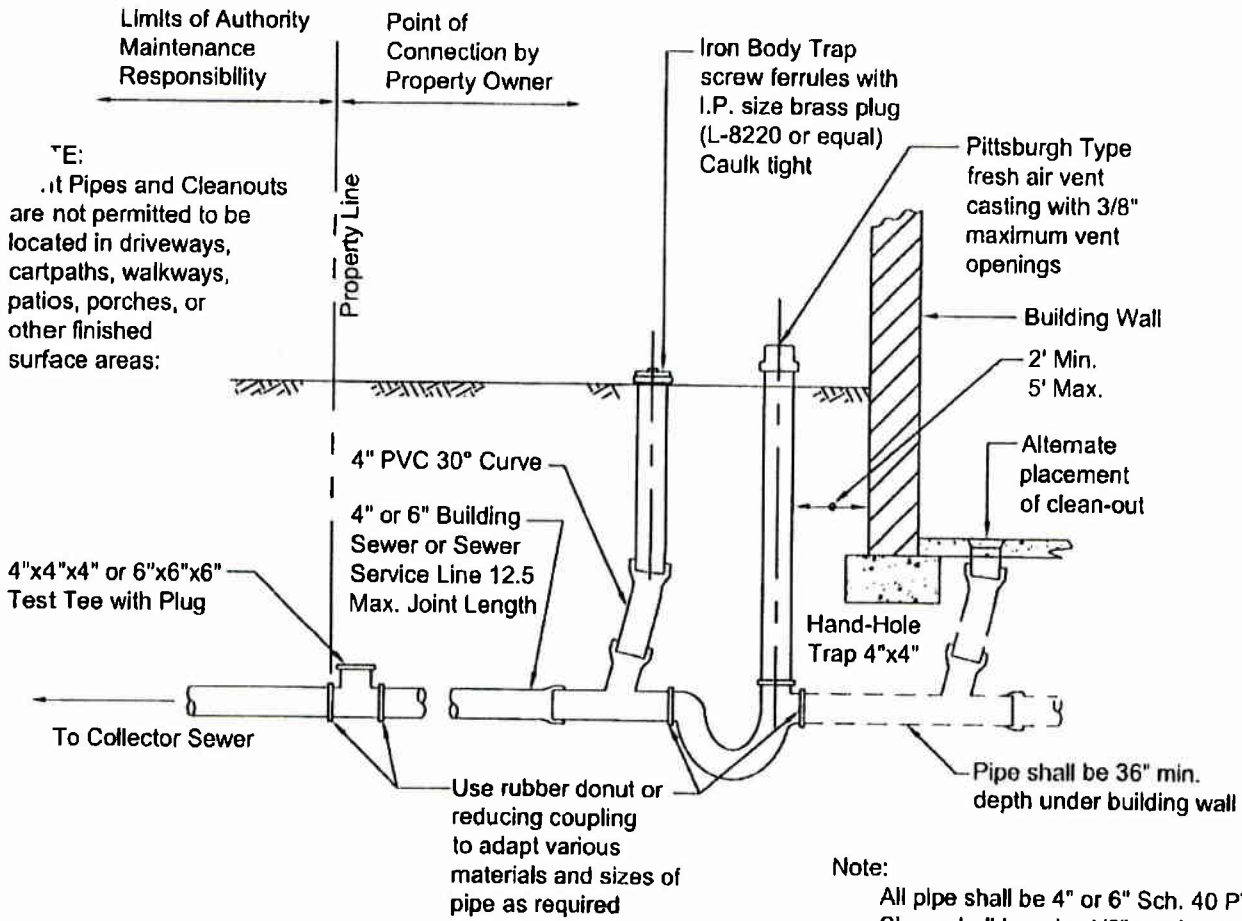
TYPE I



NOTE: Service sewers shall be a minimum of 6" diameter for commercial properties and 4" diameter for residences and shall be PVC pipe. Changes in alignment and connections to main sewer shall be accomplished with prefabricated fittings.

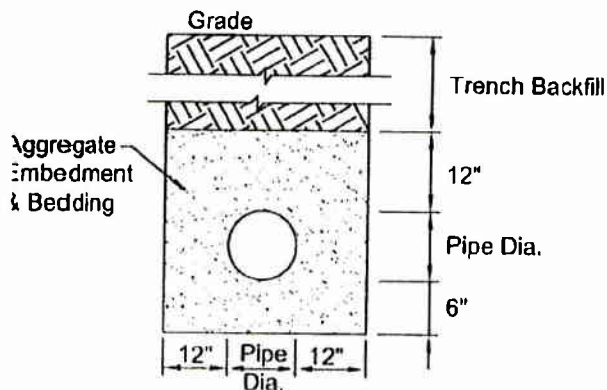
TYPE II

		TYPICAL SERVICE LATERAL CONNECTIONS
Not to scale	March 2012	Standard Detail SD-021




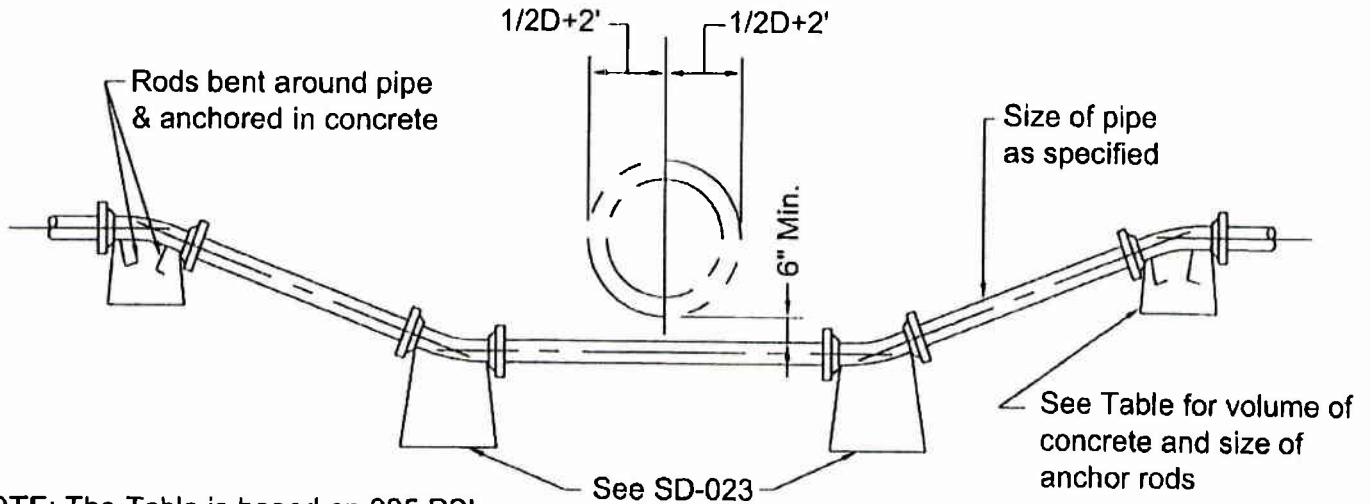
CONDENSED INSTALLATION SPECIFICATIONS

Sewer service line and sewer service connections shall be installed by skilled workmen at the cost of the customer in accordance with Appendix II of the Rules and Regulations and detailed specifications of the Authority.




SEWER SERVICE LINE PIPE:				ASTM
MATERIAL	ASTM SPECIFICATIONS		JOINT	SPEC.
ABS	D-2751	SCH-40	SOLVENT WELD	D-2751
PVC	D-3034	SDR-35	ELASTOMERIC	D-3212
PVC	D-1785	SCH-40	SOLVENT WELD	D-2564

		SERVICE CONNECTION TO SANITARY SEWER FROM A NEW INSTALLATION
Not to scale	March 2012	Standard Detail SD-022



NOTE: The Table is based on 225 PSI
 est pressure. All blocks having length of
 3'-0" or more to be reinforced with #4 @
 5" placed 3" from top of block.

PIPE SIZE	TOTAL FORCE (lbs)	VOLUME IN CUBIC FEET			SIZE AND NO. OF ANCHOR RODS		
		45 DEGREE BENDS	22 1/2 DEGREE BENDS	11 1/4 DEGREE BENDS	45 DEGREE BENDS	22 1/2 DEGREE BENDS	11 1/4 DEGREE BENDS
4	4275	22.7	11.6	5.9	1-#4	1-#4	1-#4
6	8550	45.5	23.3	11.9	2-#4	1-#4	1-#4
8	14625	77.8	39.6	20.3	2-#4	2-#4	1-#4
10	21825	116.1	59.1	30.3	2-#4	2-#4	2-#4
12	30825	164.0	83.5	42.8	2-#5	2-#4	2-#4
14	41400	220.2	112.1	57.5	2-#6	2-#4	2-#4
16	53550	284.9	145.0	73.4	2-#7	2-#5	2-#4
18	67275	357.9	182.2	93.4	2-#7	2-#5	2-#4
20	82575	439.2	223.6	114.7	2-#8	2-#6	2-#4
24	117675	626.0	318.7	183.4	2-#9	2-#7	2-#5

		CONCRETE ANCHORS AND METHOD OF LAYING MAINS UNDER OBSTRUCTIONS
Not to scale	March 2012	Standard Detail SD-023