ANTRIM TOWNSHIP MUNICIPAL AUTHORITY

SANITARY SEWER CONSTRUCTION SPECIFICATIONS

Antrim Township Municipal Building
10655 Antrim Church Road
Greencastle, Pennsylvania 17225

REVISED 2004

STANDARD REGULATIONS

SANITARY SEWER CONSTRUCTION

Antrim Township
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INTRODUCTION

Antrim Township is a Municipal Government located in Franklin County, South-Central Pennsylvania with its southern border being a part of the Mason-Dixon line. The 69.5 square mile area has a population of approximately 12,500 citizens. There are 104 miles of Township roads and 77 miles of State highways.

Farming is the main business of the area and in Pennsylvania. Industry includes Grove Worldwide Hydraulic Crane Manufacturing, Corning Glass, Jerr-Dan Roll-Back Truck Manufacturing, Food Lion Distribution Center, Strait Manufacturing, L & S Stone, Fresh Express, Beck Manufacturing and dozens of smaller industries.

Township Government's original responsibility included construction and maintenance of rural roads and small bridges. Today, five elected Board of Supervisors and appointed staff oversee not only transportation, but public sewer, public water, zoning, planning, the Antrim Township Community Park, Enoch Brown Park, and Martin's Mill Bridge Park and special projects concerning the health, safety and welfare of the citizens of Antrim Township.

In the mid 1970's Antrim Township Supervisors decided to construct a sewer collection system, which was located in the area of Shady Grove. Since the first phase of the sewer system sewer lines have been added and extended, 21 pumping stations have been added to the original 2, the wastewater treatment plant was constructed and upgraded a few times, which now makes us the plant a 2 million gallon plant. After the first phase of the collection system was under way the Antrim Township Supervisors decided to create the Antrim Township Municipal Authority (ATMA) to operate the Sanitary Sewage Collection and Treatment System. The ATMA currently operates 77 miles of sewer lines, 23 pumping stations, and a wastewater treatment plant that serves approximately 2600 customers.

The location of Antrim Township with its close proximity to Interstate 70 and Interstate 81 running down the middle of the Township has produced tremendous growth in the Township. With the growth trends over the years the Township Supervisors got a vision to build a "Connector Road" connecting exit 3 and exit 5 of interstate 81. This road is the extension of Grindstone Hill Road and has various zoning districts throughout such as Light Industrial, Professional, Highway Commercial II and Community Commercial II. With the construction of the first phase of the "Connector Road" being completed the Supervisors then decided they wanted to look for other sources of water instead of relying solely on the Greencastle Area Franklin County Water Authority.

Lincoln Investments was a group of residents that were developing an area just east of Interstate 81 and on the north side of Hykes Road, which is now known as Sherwood Manor. 1988 this corporation was drilling a well for water for their development when they hit a water supply that could serve 800,000 gallons of water per day. This then created Lincoln Utilities a private water supplier. Since 1988, Lincoln Utilities not only serves all of Sherwood Manor, but also Cedarbrook Estates, The PA Dept. of Transportation Welcome Center, Jerr Dan Corporation, and Nottingham Meadows. In the year 2001, Lincoln Utilities Inc. pumped 14 million gallons, which equates to 38,356 gallon per day.

In 2002, Antrim Township Supervisors approached Lincoln Utilities about purchasing the water company. After a short couple of months Antrim Township and Lincoln Utilities came to an agreement for a sale. On March 31, 2003, Antrim Township Municipal Authority bought Lincoln Utilities, a Water System consisting of a treatment plant and 2 miles of water lines. The water company is solely owned and operated by the Antrim Township Municipal Authority, which was originally created in the mid 1970's to operate the Sanitary Sewage Collection and Treatment System.

Chapter 1

GENERAL CONDITIONS

1 - 1 DEFINITIONS

Where in these Regulations the following words and expressions occur, they shall have the meanings herein given:

Township -- The Antrim Township Supervisors or Antrim Township Municipal Authority (ATMA) or their authorized representative.

Owner -- Title holder of Subdivision Parcel.

Project -- Work to be performed under approval granted by the Township.

Contractor -- Person, Firm, Partnership, or Corporation who, with approval of the Owner, intends to build, construct, and install a sewerage system project in the Township.

Approval -- The legal letter of approval issued by the Antrim Township Supervisors and Antrim Township Municipal Authority passed by motion at a legally scheduled meeting of each of the above municipal entities and further witnessed by the Solicitor(s) for same. Said letter of approval shall be addressed to the OWNER and shall be endorsed and ATTESTED to by the OWNER in a manner specified by law.

Sewer Inspector -- Representative of the Antrim Township Municipal Authority.

Sub-Contractor -- A person, firm, corporation, or partnership under contract to the CONTRACTOR.

Engineer -- The Independent Engineer retained by the Owner.

A.A.S.H.T.O. -- American Association of State Highway and Transportation Officials.

A.C.I. -- American Concrete Institute.

A.N.S.I. -- American National Standards Institute.

A.S.C.E. -- American Society of Civil Engineers.

A.S.T.M. -- American Society of Testing Materials.

A.T.M.A. -- Antrim Township Municipal Authority.

A.W.W.A. -- American Water Works Association.

B.P.R. -- Bureau of Public Roads.

O.S.H.A. -- Occupational Safety and Health Administration.

P.C.I. -- Prestressed Concrete Institute.

PennDOT -- Pennsylvania Department of Transportation.

1 - 2 INTENT OF SPECIFICATIONS

These specifications are for the purpose of illustrating the general character and extent of the work and are subject to such modifications as may be found necessary or advisable either before or during the prosecution of the work, and the Owner shall conform to and abide by whatever supplementary drawings and explanations may be required by the Township for the purpose of illustrating the work.

Should any incidental work or materials be necessary for the proper carrying out of the intent of the specifications, either directly or indirectly, the Owner agrees to perform all such work and furnish and install all such materials as if the same were fully specified.

All work within public right-of-ways, easements and/or private property shall be in accordance with these specifications. All permanent easements or right-of-ways shall be a minimum of 20 feet in width.

1 - 3 SCOPE OF WORK

The following specifications are for installation of sewer mains, sewer service lines and related appurtenances. These are presented as minimum specifications and may be changed only by the Antrim Township Municipal Authority as conditions warrant or when changes are in the best interest of Antrim Township Municipal Authority.

All plans for new sewer main installation or extension to the existing sewer mains must be submitted to and approved by The Antrim Township Municipal Authority prior to the start of construction. Profile of street(s) showing location of sewer mains and other utilities shall be included with the plans. Plans and profiles shall also include all existing or proposed utilities such as water, storm sewers, gas, electric, cable, and telephone lines.

No changes or substitutions shall be made to these specifications without approval by the Antrim Township Municipal Authority.

These specifications shall apply to all sewer main installations even though installation may not be in a public right-of-way, and shall also apply to those connecting to the existing sewer mains.

1 - 4 PERMITS, LICENSES, AND CERTIFICATES

The Owner shall procure all permits, licenses, and certificates, pay all taxes, charges and fees, and give all notices necessary and incidental to the proper and lawful prosecution of the work.

1 - 5 ARRANGING WORK

Owner shall arrange his work to the satisfaction of the Township so as not to interfere with the normal operation of the Community.

1 - 6 CONDUCTING THE WORK

The work shall be conducted so as not to interfere with the work of others, nor to obstruct any thoroughfare or access to property, nor to impede highway traffic, except as may be authorized by duly constituted authority. Fire hydrants adjacent to the

project shall be kept accessible at all times and no materials or obstructions shall be placed within twenty feet (20') of any such hydrants. Footways and storm sewer inlets shall not be obstructed.

1 - 7 OBSERVANCE OF LAWS

The Owner at all times shall observe and comply with all Federal, State, County, and Local Laws, by-laws, ordinances, codes and regulations, in any manner affecting the conduct of the work or applying to any employees on the project, as well as all orders or decrees which have been promulgated or enacted, or which may be promulgated or enacted during the progress of the work, by any legal bodies or tribunals having authority or jurisdiction over the work, materials, employees, or the project. The Owner shall indemnify and save harmless the Township and all its officers, employees, and agents, from all suits, actions, or claims of any character or description brought fourth, made an account of, or arising from the violations of any such law, by-law, ordinance, regulation, order or decree.

1 - 8 SAFETY REGULATIONS

The Owner shall comply with all current safety regulations of the Department of Labor and Industry, Department of Environmental Protection, and any other Departments of the Commonwealth, as well as any Local or Federal Government having jurisdiction over the same. The Contractor shall solely be in charge of safety and shall save the Township or its representatives harmless from any safety related litigation.

1 - 9 PROTECTION AND SAFEGUARDS

The Owner shall erect and maintain proper protection for all equipment and all parts of the work during all stages of construction, alteration or repair, and shall correct at his own expense any damage to the satisfaction of the Township.

The Owner shall protect all trees, shrubs, lawns, and landscape work from damage and shall provide such guards and covering as is necessary. Owner shall use proper and necessary precautions to protect all public and private streets, roads and walks, in and near the area of the Project. All damaged items shall be repaired or replaced at the Owner's expense. The Owner shall follow completely the provisions of approved Sedimentation and Erosion Control Plan regulations.

Regardless of the type of project, it will be the responsibility of the Owner, at all times, to protect all excavations, trenches, installations, structures, and all work performed from water damage of every kind, including damage by rainwater, groundwater, or surface water, and the backing up of drains, rain conductors or sewers, and to repair any such damage immediately at his own expense.

Owner shall remove all snow and ice and at all times provide for dust control as may be required for the proper protection and prosecution of the work under this project.

Owner shall furnish, erect, and maintain such barricades, railings, enclosures, guard lights, danger signals, and warnings, and take such precautions in the area of the work, as are necessary to insure the safety of the public and to avoid damage or injury to all persons and property.

Contractor shall maintain and enforce regulations covering all fire hazards, including smoking, and shall provide suitable fire extinguishers and/or other protective measures.

All underground utilities, service lines, and other facilities uncovered or exposed by the construction shall be protected by the Owner.

The owner/contractor shall carefully preserve bench marks, reference points, stakes and property pins and in the case of willful or careless destruction, he will be charged with any resulting expenses and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance. Prior to the final acceptance of the work by the Antrim Township Municipal Authority, the contractor shall re-establish and replace any disturbed property monuments within the work area at no cost to the property owners or the Township.

1 - 10 PUBLIC SAFETY

During the progress of the work, the Owner and/or Contractor shall provide red lights, fences, barriers, danger signals, warning and detour signs, and take such other precautions as may be necessary to protect life and property. The Owner shall be solely in charge of safety precautions and will save the Township or its representatives harmless of all safety litigation.

1 - 11 INSPECTION

All work and material shall be, at all reasonable times, subject to inspection by the Township. The Owner shall provide the necessary facilities for such inspection.

1 - 12 TOWNSHIP INSPECTION FEES

The Owner shall pay a fee to the Township for inspection of construction under this project. The fee shall be the current Township charge as shown on Attachment "A" of sewer mains proposed to be installed under this Project. Payment shall be made in advance of start of construction in a form and manner acceptable to the Township.

Any failed inspection shall require a separate fee to be paid to the Township prior to subsequent inspections.[1]

1 - 13 PENNSYLVANIA DEPARTMENT OF TRANSPORTATION SPECIFICATIONS

Work shall be performed in accordance with Specifications of the Commonwealth of Pennsylvania, Department of Transportation.

1 - 14 OTHER FEES

All fees arising from the review and/or construction of the Project shall be paid for by the Owner at no cost to the Township.

1 - 15 AS-BUILT DRAWINGS

The Owner shall supply to the Antrim Township Municipal Authority, Three (3) legible reproducible drawing of the approved sewer facilities for the use of the Authority's Engineer.[2] The Owner/Contractor shall keep as-built drawings on a print during construction. This print will be given to the Authority's Engineer after construction is complete. The Authority's Engineer will draft up the as-built sewerage facilities on the reproducible drawing and deliver the drawings to the Authority. The Owner shall pay a fee to the Township for the development of the as-built drawings. The fee shall be the current Township charge as shown on Attachment "A".

The fee shall be placed in an escrow account and drawn on as costs are incurred. All remaining amounts, if any, will be returned to the Owner. See Attachment "B" for minimum standards for As-Built Drawings.

[1] Added January 19, 2004
[2] Revised January, 19, 2004

1 - 16 COMPLAINTS AND DEFICIENCIES

The Owner shall satisfy all complaints and deficiencies with respect to the project and the Township will not release the Owner's bonds until said complaints and deficiencies are resolved.

1 - 17 SPECIAL CONSTRUCTION

Complete details of all special construction items such as, but not limited to, borings, railroad crossings, stream crossings, etc., must be shown on the plans. All plans and specifications submitted for review and approval must be in the scale form of vertical 1" = 5' and horizontal 1" = 50'.

1 - 18 PLANS AND SPECIFICATIONS

Plan and profile of the proposed sewer line shall appear on the same sheet with the profile of the sewer line located directly under the plan view.

1 - 19 ACT 287

The Owner/contractor shall comply with Act 287, commonly referenced to as the PA One Call, Call Before You Dig Act. Presently, the telephone number is 1-800-242-1776.

1 - 20 PROPERTY CORNERS

Prior to transferring easements, right-of-ways or deeded property over to the Antrim Township Municipal Authority, the Owner shall place permanent monuments at all corners and control points. These monuments shall be steel pins or concrete appropriately marked and must be easily identified.

1 - 21 GUARANTEE

The Owner/Contractor shall remedy any defects in the work and pay for any damage to other work resulting therefrom, which shall appear within a period of one (1) year from the date of final acceptance of the work by the Township unless a longer period is specified. The Township will give notice of observed defects with reasonable promptness.

Chapter 2

GENERAL REQUIREMENTS

2 - 1 GENERAL

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

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

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

Mortar conforming to the specifications shall be proportioned by volume within the limits of the types specified.

A. Sewer Manholes - One part cement, two parts fine aggregate and water.

B. Buildings:

1. Cement - One part cement, three parts fine aggregate, not more

than ten percent (10%) of the cement volume lime putty and water.

2. Lime Cement - One part cement, six parts fine aggregate, one part lime putty and water (stone masonry only).

C. Grouting - One part masonry cement, two parts fine aggregate and water or Embeco pre-mixed grout as manufactured by American-Marietta Company or equal to prevent shrinkage.

D. Pointing - One part cement, one part fine aggregate, and water with the use of hydrated lime prohibited.

When hydrant lime is permitted, the mortar shall be composed of one part of a combination of cement and hydrated lime, with two parts of fine aggregate and water. The combination shall be composed of 90 percent by volume of cement and 10 percent by volume of hydrated lime.

2 – 2 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the work. Does not include machinery and erection equipment used for preparation, fabrication, conveying and erection of the work. Products may also include existing materials or components required for reuse.

B. Provide interchangeable components of the same manufacturer for similar components.

2 – 3 TRANSPORT AND HANDLING

A. Transport and handle products in accordance with the manufacturer's instructions.

B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

2 – 4 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

B. For exterior storage of fabricated products, place on sloped supports, above ground.

C. Provide off-site storage and protection when Site does not permit onsite storage and protection.

D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter. Cover all storage's to prevent loss of material and fugitive emissions.

F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

G. Arrange storage of product to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

2 – 5 PRODUCT OPTIONS

A. Products specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products specified by naming one or more manufacturers: Products of manufacturers named and meeting specifications, no option or substitutes allowed.

C. Products specified by naming one or more manufacturers with a Provision for Substitution: Submit a request for substitution for any manufacturer not named.

2 – 6 SUBSTITUTIONS

A. Substitutions may be considered when a product becomes unavailable through No fault of the Contractor.

B. Document each request with complete data substantiating compliance of proposed Substitution.

C. A request constitutes a representation that the Contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same Warranty for the Substitution as for the specified product.
3. Will coordinate installation and make changes to other work, which may be required for the work to be complete with no additional cost to the Owner.
4. Waive claims for additional costs or time extension, which may subsequently become apparent.
5. Will reimburse Owner for review or redesign services associated with reapproval by authorities.
6. Demonstrates, thorough calculations or other acceptable means, that the proposed substitution will not increase the cost of operating or maintaining the equipment/system.
7. Shows or demonstrates the cost savings which would be realized by the Owner.

D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request.

E. Substitution Submittal Procedure:

1. The procedures for submitting a request for a substitution or alternate shall comply with the requirements of the Antrim Township Municipal Authority.

Chapter 3

EXCAVATION AND BACKFILL

3 - 1 GENERAL

The Owner shall grub and clear the area and remove all surface materials, of whatever nature, over the line of the trench; and he shall properly separate and classify the materials removed, store, guard, and preserve such of said materials as may be required for use in backfilling, or for other purposes. All rock, earth, curbing, gutter, concrete, flagstone, and all sectional paving units which may be excavated, together with all materials taken from the trenches shall be removed from the street, roadway, right-of-way, or such area at the Owner's expense subject to the approval of the Township.

The Owner shall remove paving for such width only as is necessary for the excavation of the trench, and in case he removes the paving for a greater width than is deemed necessary, or in case he removes or disturbs any paving on account of settlement, slides, or cave-ins or in making excavation outside the lines of the work, the Owner shall permanently replace same at his expense to satisfaction of the Township.

In business districts or in streets that are main thoroughfares, or in narrow streets, the material excavated from the first one hundred feet (100') of any opening, or from such additional length as may be required shall be removed from the area at the Owner's cost and expense. The material subsequently excavated and found satisfactory may be used to refill the trench with approval from the Township.

In case more material is excavated from any trench than can be backfilled over the completed sanitary sewer or can be stored on the street or within the limits of the right-of-way, leaving space for the traffic and drainage as herein provided, the excess material shall be removed to some convenient place, provided by the Owner. The Owner shall at his own cost and expense, bring back as much of the material so removed, as may be required to properly backfill the trench.

When it is necessary to haul soft or wet material over the streets, the Owner shall provide suitable tight vehicles, of a pattern approved by the Township.

3 - 2 EXCAVATION

3-2.1 Preparation

A. Identify required lines, levels, contours, and datum.

B. Notify all utility companies that serve the area of the impending excavation in accordance with the Pennsylvania Act 287 requirements.

C. Locate, Identify, and protect utilities that remain from damage.

D. Notify utility company to remove or relocate utilities.

E. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

F. Protect bench marks, existing structures, fences, sidewalks, paving, curbs, and any other features or structures not designated for removal from excavation equipment and vehicular traffic.

3-2.2 Execution

A. Underpin adjacent structures, which may be damaged by excavation work.

B. Excavate subsoil required to accommodate equipment support pads.

C. Excavate to working elevation(s).

D. Do not interfere with forty-five (45) degree bearing splay of foundation.

E. Grade top perimeter of excavation to prevent surface water from draining into excavation.

F. Hand trim excavation where applicable. Remove loose matter.

G. Remove lumped subsoil, boulders, and rocks.

H. Notify Engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

I. Correct unauthorized excavation in accordance with section on Backfilling.

J. Stockpile excavated material in area designated on site if directed by the Engineer. Remove excess material not being reused from site.

K. Direct surface water from excavations and stockpile site so as to prevent erosion or deterioration of area in accordance with Sedimentation and Erosion Control.

3-2.3 Field Quality Control

A. Field observation will be performed under provisions of Section on Quality Control.

B. Provide for visual inspection of bearing surfaces.

C. Dimensions
1. Excavate to elevations and dimensions indicated on the Drawings or as specified for structural fill areas; allow additional space as required for construction operations and inspection of foundations.
2. Make excavations large enough for working space, forms, damp-proofing, waterproofing, and inspection.
3. Notify Engineer as soon as excavation(s) are completed in order that subgrade may be observed. Engineer will observe and accept subgrade under compacted fill material, under foundations, under floor slabs on grade and under equipment support pads, and under retaining wall footings as being free of undesirable material, being of compaction density required by this Specification, and being capable of supporting superimposed foundation, fill, and building loads to be placed thereon. Observations will be made before fill is placed, concrete poured, framework is erected, or reinforcing is placed. Engineer will be given the opportunity to observe subgrade below fill material both before and after subgrade compaction. Therefore, fill material, foundations, retaining wall footings, floor slabs on grade, and equipment support pads shall not be placed until subgrade directly below has been observed and accepted by the Engineer.
4. Place fill material and equipment support pads as soon as weather conditions permit after excavation is completed, observed, and accepted and forms and reinforcing are observed and accepted. Before concrete or fill material is placed, protect accepted subgrade

from becoming loose, wet, frozen, or soft because of weather, construction operations, or other reasons.

D. Subgrade Stabilization

1. If subgrade under equipment support base becomes frozen, loose, wet, or soft, remove and replace with acceptable compacted materials. Compact replacement material as stated in this Specification. Loose, wet, or soft materials, when accepted by the Engineer, may also be stabilized by a compacted working mat of well-graded crushed stone. Remove frozen materials and replace with acceptable material. Method of stabilization will be accepted by Engineer and repaired subgrades will also be accepted by the Engineer before construction can be placed thereon.
2. Do not place equipment support pads until subgrade below has been accepted, embedded piping has been tested and accepted, reinforcement placement has been approved, and Contractor is permitted to commence slab construction. Do not place slabs on grade when temperature of air surrounding the slab is or is expected to be below 40˚F degrees before structure is completed.

E. Protection of Structures

1. Prevent new and existing structures from becoming damaged because of construction operations or other reasons. Prevent subgrade under new and existing foundations from becoming wet or undermined during construction.

3–2.4 Rock Excavation

All rock shall be fully taken out at least twenty-five feet (25') in advance of pipe laying, to a point at least six inches (6") below the outer bottom of the pipe, and to a width not to exceed the width of the trench, shown on Standard Details. Rock appearing in miscellaneous excavations or where future pipes are to connect with those laid under this project, shall be excavated in accordance with the directions of, and to the lines prescribed by the Township.

If rock below the specified grade is shattered due to excessive drilling or blasting, and, if in the opinion of the Township, it is unfit for foundations, such shattered rock shall be removed and the area backfilled to the proper grade with material acceptable to the Township at the expense of the Owner.

Where manholes are excavated in rock they shall be excavated twelve inches (12") outside the exterior lines of the manhole base and to a depth sufficient to include the stone bedding under the manholes.

All excavated material which is unfit for refilling shall be immediately removed from the site of the work.

3-2.5 Blasting

The Owner shall regulate the character and strength of explosives used, and the manner of their use and storage. Only small amounts of explosives should be kept at any place and they shall be kept under lock, the key to be only in the hands of a trustworthy person. Great care shall be taken in handling dynamite and similar explosives. Caps and exploders shall not be kept in the same place as explosives. Blasts shall be properly matted and securely covered. The ATMA shall be notified 24 hours in advance of any blasting that is to take place within fifty (50') feet of the water line or ATMA Sanitary Sewer line.

Blasting for excavation may be restricted by the Township who shall reserve the right to fix the time during which blasting may be performed. The Owner shall be responsible for any damage resulting from blasting. The Owner's method of procedure relative to blasting shall conform to State, Federal, and to the local Municipal Ordinances.

The Owner shall be solely responsible for injury to persons or property that may result from his use of explosives, and the exercise of, or failure to exercise, control on the part of the Township shall in no way relieve the Owner of his responsibility for injury or damage resulting from the use of explosives.

All blasting shall be performed under the supervision of a competent blasting expert, and subject to all Federal, State, County, and Local regulations for blasting. Whenever any pipe main or conduit is encountered in the trench area, the right is reserved to direct that all rock within eight feet (8') of the same shall be removed by methods other than blasting.

3-2.6 Condition of Excavation

The Owner shall be responsible for the condition of all excavations made by him. All slides and cave-ins shall be removed at whatever time and under whatever circumstances that may occur.

Any delay on the part of the Owner, or by any act of the Township, resulting in the keeping of an excavation open longer than would otherwise have been necessary shall not relieve the Owner from the necessity of properly and

adequately protecting the excavation from caving or slipping, nor from any of his obligation relating to injury of persons or property.

3 - 3 BACKFILLING

When backfilling, Contractor must follow the requirements pertaining to the amount of backfill needed in the area of the work. The backfilling requirements under Penn DOT roads shall follow Penn Dot standards, and under Township roads shall follow Township standards. Amount of backfill needed will be different depending on the surface material where the sewer pipe is being laid. Refer to the Drawings in the "Standard Drawings" chapter in this book.

3–3.1 Extent of Backfill

Backfilling water trenches shall include all material, compaction, tamping, or rolling, as required, the regrading of adjacent disturbed areas, the replacing of drains and other surface and subsurface structures, the placing and maintaining of temporary sidewalks and driveways, furnishing of suitable backfill material if necessary, reseeding lawns and replacing trees and shrubbery damaged by the Owner and all appurtenant work incidental thereto. **No trench shall be backfilled until the sewer pipe has been installed to proper line and grade, with all joints correctly formed, and the pipe has been inspected by Antrim Township Authority**. Any section of pipe backfilled prior to the Authority's inspection and approval shall be considered faulty, and such backfill shall be removed for proper inspection of the pipe. **There must be a minimum of five feet (5') of cover over all gravity sewer main line that will be owned by the ATMA.**

3–3.2 Backfill Material

Only 1B Stone shall be used for backfilling under and along the sides of the sewer pipe and to a height of two feet (2') over the top of the sewer pipe. The backfilling material shall be brought up evenly on both sides of the sewer pipe and thoroughly compacted by mechanical tamping. No backfilling shall be made when the material already in the trench is frozen, nor shall frozen material be used in backfilling.

After the sewer pipe and its appurtenance have been built and the trench refilled to a height of two feet (2') above the top of the sewer pipe, the remainder of the trench shall be backfilled by one of the following methods:

A. When the sewer is located within the State Highway right-of-way, backfill shall be in accordance with the requirements of Pennsylvania Department of Transportation.

B. When the sewer is located within the municipal roadway, parking lot, shoulder, or other roadway ROW, the trench shall be backfilled completely with 2RC aggregate stone above the 1B cover. (See Standard Detail). (This shall include all areas that are proposed to become municipal roadways, etc.)

C. When the sewer is located beneath an unpaved area, or area not subject to vehicular traffic, the backfilling may be accompanied by filling to the ground surface in one operation and compacting by trench roller or special heavy-duty tamping machine. Should these areas settle, the Owner will refill, regrade, and reseed such areas to original grade.

If, in the opinion of the Township, the material used for refilling is of such character that satisfactory results cannot be obtained, the Owner shall refill the trenches with suitable material in such a manner and at such times as the Township may direct.

As soon as the trench is refilled, the surface of the trench shall be regraded and in paved areas, the trench shall be temporarily repaved and all surplus earth shall be removed from the site.

Should there be a deficiency of proper material for refilling, the Owner shall furnish the same at his own expense.

No house ashes, putrescible refuse, rocks in excess of eight inches (8”), or other material of an unsatisfactory character shall be used in backfilling and the Owner shall not permit the trench to be used as a dumping ground for refuse.

Wye branches, house connections, or other points designated by the Township shall not be covered over or filled around until the same have been located and measured by the Antrim Township Municipal Authority, and permission given by him to refill the trenches at such points.

3-3.3 Preparation

A. Compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of adequate compaction. Backfill with Type 2RC fill and compact to density equal to or greater than requirements for subsequent fill material.

C. Scarify and proof roll subgrade surface to a depth of 12 inches to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3-3.4 Execution

A. Backfill areas to contours and elevations with unfrozen materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

C. Granular Fill Type 2RC: Place and compact materials in continuous layers not exceeding 6 inches compacted depth.

D. Employ a placement method that does not disturb or damage other work.

E. Contractor shall maintain moisture content at plus or minus two percent of the optimum moisture content of the backfill materials to attain the required compaction density.

F. Make grade changes gradual. Blend slope into level areas.

G. Remove surplus backfill materials from site.

H. Leave fill material stockpile areas completely free of excess waste materials.

I. Do not use in backfilling work putrescible refuse and such other materials considered unsatisfactory by the Engineer. Do not permit excavations to be used as dumping areas for refuse.

J. Do not use frozen backfill materials or place backfill materials on frozen subgrade or trench surfaces.

K. Stockpile backfill material in area designated on site and acceptable to the Engineer. Height of stockpile is not to exceed eight (8) feet.

L. Fill Under Grass Areas:
   1. Fill Type 2RC to 12 inches below finish grade, compacted to eighty (85%) percent of maximum dry density.

2. Fill material shall be placed in lifts not to exceed 12” uncompacted depth. Each lift shall be compacted prior to placing next lift. Engineer/Owner may consider alternate methods of compaction upon submission of means and methods and demonstration by the contractor.
3. Final 6” shall be topsoil type S3 or S4.

M. Fill Under Landscaped Areas:
1. Fill type 2RC, to 12 inches below finish grade, compacted to eighty-five (85%) percent of maximum dry density.
2. Fill material shall be placed in lifts not to exceed 12” uncompacted depth. Each lift shall be compacted prior to placing the next lift. Engineer/Owner may consider alternate methods of compaction upon submission of means and methods and demonstration by the Contractor.
3. Final 6” shall be topsoil.

N. Fill Under Asphalt or Concrete Paving to be Restored (State Roads and Shoulders)
1. Compact subsoil to ninety-five (95%) percent of its maximum dry density.
2. Fill Type 2RC, to a sufficient depth below finish paving elevation to facilitate reconstruction, compacted to ninety-five (95%) percent of maximum dry density as indicated on drawings.
3. Fill material shall be placed in lifts not to exceed 6” uncompacted depth. Each lift shall be compacted prior to placing the next lift. Engineer/Owner may consider alternate methods of compaction upon submission of means and methods and demonstration by the Contractor.

O. Fill Under Asphalt or Concrete not Requiring Restoration:
1. Backfill with Type 2RC aggregate compacted to ninety-five (95%) percent of maximum dry density.
2. Fill material shall be placed in lifts not to exceed 6” uncompacted depth. Each lift shall be compacted prior to placing the next lift. Engineer/Owner may consider alternate methods of compaction upon submission of means and methods and demonstration by the Contractor.

P. Fill to Correct Over-excavation
1. Fill Type 2RC, flush to required elevation, compacted to ninety (90%) percent of maximum dry density.
2. Fill material shall be placed in lifts not to exceed 6” uncompacted depth. Each lift shall be compacted prior to placing the next lift.

Engineer/Owner may consider alternate methods of compaction upon submission of means and methods and demonstration by the Contractor.

Q. Gravel Roads or Driveways
1. Compact subsoil to ninety-five (95%) percent of its maximum dry density.
2. Fill Type 2RC, to a sufficient depth below finish paving elevation to facilitate reconstruction, compacted to ninety-five (95%) percent of maximum dry density as indicated on drawings.
3. Fill material shall be placed in lifts not to exceed 6" uncompacted depth. Each lift shall be compacted prior to placing the next lift. Engineer/Owner may consider alternate methods of compaction upon submission of means and methods and demonstration by the Contractor.

3-3.5 Tolerances

A. Top Surface of Backfilling under Paved Areas: Plus or minus one inch from the required elevations.

B. Top Surface of General Backfilling: Plus or minus one inch from the required elevations.

3-3.6 Field Quality Control

A. Field testing will be performed under provisions of Section on Quality Control.

B. Compaction testing will be performed in accordance with ANSI/ASTM D1556, ANSI/ASTM D1557, ASTM D2922 and ASTM D3017.

C. If tests indicate Work does not meet specified requirements, remove, replace and retest the work.

D. Proof roll compacted fill surfaces under paving.

3 – 4 DEWATERING

The Contractor shall keep all excavations free from water while the pipe is being laid and while any class construction is in progress at the Contractors expense. Adequate pumps shall be provided and maintained if necessary to prevent the accumulation of

water in trenches until the backfill is placed to a depth of twenty-four (24) inches above the pipe. The Contractor shall not open more trench in advance of pipe laying than available pumping facilities are able to keep dewatered to the satisfaction of the Antrim Township Municipal Authority Representative. At no time shall ground water be allowed to enter the sewer main.

3 – 5 SHEETING, SHORING AND BRACING

Provide material for, and install, all sheeting, shoring and bracing according to Federal, State, and local laws, rules, regulations, requirements, precautions, orders and decrees. Sheeting, sheet piling, bracing and shoring shall be withdrawn and removed as the trenches are being backfilled, except where the Engineer shall require that the above be left in place or where the Authority Engineer permits the Contractor to leave sheeting, sheet piling, bracing and shoring in place at the Contractor's own request and cost. Voids or holes left by the sheeting or sheet piling shall be filled with compacted approved material.

3 - 6 PROTECTION OF FINISHED WORK

Reshape and recompact fills subjected to vehicular traffic.

3 - 7 PROTECTION OF PROPERTY

The Owner shall, at his own expense, protect from injury, all pipes, tracks, walls, buildings, and other structures or property in the vicinity of his work, whether above or below the ground. He shall at all times have a sufficient quantity of protective materials on the site and shall use them as necessary for sheeting his excavation and for protecting or supporting any structures that are uncovered, undetermined, or otherwise weakened.

The Owner shall be aware of all risks involved due to the proximity of pipes, poles, overhead wires, tracks, walls, buildings, and other structures and property, of every kind and description, in or over his trenches, whether above or below the surface of the ground; and he shall be responsible for all damages and assume all expenses for direct or indirect injury, caused by his work, to any of them, whether such structures are or are not shown on the drawings.

Where necessary, in order to keep one side of the street or roadway free from obstructions or to keep the material piles alongside of the trench from falling on private property outside the right-of-way, a safe and suitable fence shall be placed alongside the trench.

In the event of encountering quicksand, subsurface streams, excessive groundwater, or similar contingencies, or where passing buildings or any structures which by their construction or position might bring a great pressure upon the trenches, the right is reserved for the Township to direct that such buildings or structures, shall be under-pinned, or supported and protected, or that special sheeting shall be driven in such a manner and to such depth, as may be directed, or that only a short length of trench shall be opened at one time; and furthermore, if necessary, that the trench shall be surely sheeted and braced on all sides, after the manner of a shaft, and that the permanent work shall be constructed in the same and the shaft backfilled before another opening is made. Any work performed as above directed shall be at the cost and expense of the Owner.

The Township reserves the right under such conditions to require the Contractor to complete the sewer line and the back-filling up to such a point as the Township may direct before proceeding further with the excavation; and the Owner shall not thereby become entitled to demand or to receive any allowance or compensation.

3 - 8 OBSTRUCTIONS

Certain information regarding the presence, size, character, and location of existing underground structures may have been shown on the Project Drawings.

The location of underground structures shown may be inaccurate and other obstructions than those shown may be encountered. The Owner hereby distinctly agrees that the Township is not responsible for correctness or sufficiency of the information given, or on account of the insufficiency or absence of information regarding obstruction either revealed or not revealed by the Project Drawings; and that he shall have no claim for relief from any obligation or responsibility, in case the location, size or character of any pipe or other under-ground structure is not as indicated on the Project drawings, or in case any pipe or other underground structure is encountered that is not shown on the Project Drawings.

Should the position of any pipe, conduit, pole or other structures, above or below the ground be such as to require its removal, realignment, or change, the Owner shall realign, uncover, and/or sustain the structures, at his own expense. The Owner shall not be entitled to any claim for damage on account of any delay in the removal or rearrangement of the same.

The Owner shall, without compensation, break through and reconstruct, if necessary, the invert or arch of any water culvert, or conduit that may be encountered, if the said structure is in such a position that in the judgment of the Township, as not to require its removal, realignment, or complete reconstruction.

The Owner shall not interfere with any persons, firms, or corporations or with the Township in protecting, removing, changing, or replacing their pipes, conduits, poles, or other structures; but he shall acquiesce in said persons, firms, or corporations, or the Township to taking all such measures as they may deem necessary or advisable for the purpose aforesaid, and the Owner shall thereby be in no way relieved of any of his responsibilities. At railroad track crossing, any expense in shoring up tracks, or maintenance traffic shall be borne by the Owner, whether same is billed directly to him, or the Township. Should any such bill be unpaid by the Owner, the Township shall be empowered to pay said bill and charge the amount thereof, to the Owner.

3 - 9 BORINGS

Borings if required must be authorized by the ATMA and follow latest standards of Penn DOT, whether in Township right-of-way or Penn DOT's right-of-way.[1]

[1] Added January 19, 2004

Chapter 4

TRENCHES

4 - 1 WIDTH AND DEPTH OF TRENCHES

Walls of trenches shall be kept as nearly vertical as possible, and the trenches shall be twelve inches (12") wider on each side than the outside diameter, at the barrel, of the pipe to be laid therein. The trenches shall be excavated true to line so that there is a clear space of twelve inches (12") on each side of the barrel of the pipe and to a height of not less than the top of the pipe. If sheeting is required at the level of the pipe, the dimensions in the foregoing sentence shall be applicable to the inside faces of the sheeting.

The depth of the excavation for the sewer or other structure herein specified shall be such that they can be built to proper grade, due allowance being made for standard crushed stone bedding, complete stone backfill, and concrete encasement.

Except at locations where excavation of unsuitable material is required, excavation shall be to a depth of six inch (6") below the bottom of the pipe. A six inch (6") standard stone bedding type 1B Aggregate shall be provided under the sewer pipe and to a height of twenty four inches (24") over all sewer pipe installed under this project (see Standard Detail).

When the material encountered at sub-grade is unstable, it shall be removed from the trench. The excavation below sub-grade of such unsuitable material shall be backfilled with a 3 A Ballast. In rock excavation, if trenches are shattered by blasting below or beyond the lines of excavation specified herein, the trench shall be refilled and compacted as specified. If earth trenches are excavated beyond the specified depths, they shall be backfilled to the proper grade with 3 A Ballast at the expense of the Owner.

Wherever necessary to meet safety requirements, prevent cave-ins, and for excavation in sand, sandy soil, or other unstable material, the trench shall be adequately sheeted and braced. Where sheeting and bracing is used, the trench width shall be increased

accordingly. Trench sheeting shall remain in place until the pipe has been laid, backfilled, and compacted to a depth of two feet (2') over the top of the pipe. The Owner shall be solely responsible for the adequacy of all sheeting and bracing.

All trenches must comply with OSHA requirements.

4 - 2 FIELD MEASUREMENTS

A. Verify that survey bench marks and intended elevations for the Work are as shown on Drawings.

B. Excavate all test pits shown on the drawings and any others deemed necessary by the Contractor prior to layout of work and ordering of materials.

4 – 3 COORDINATION

A. Verify works associated with lower elevation utilities are complete before placing higher elevation utilities.

4 – 4 WORKMAN QUALIFICATIONS

A. Provide at least one person thoroughly trained and experienced in the skills required who readily understands the design and is completely familiar with the construction technique.

4 – 5 FEES

A. Inspection costs to Penn DOT having jurisdiction for all crossing and/or longitudinal occupancies shall be paid by the Developer

4 – 6 FILL MATERIALS

A. Refer to Backfill in Chapter 3.

4 – 7 PREPARATION

A. Identify required lines, levels, contours, and datum. Use Engineer's computed depths of cut as guides for excavation, allowing for excavation to accommodate the first class bedding, and for concrete cradles or concrete encasements where indicated or required by the Engineer. Mark station and depth of cut on stakes or paint on paved surface.

B. Inform all utility companies of the intention to excavate the site at least seventy-two (72) hours prior to start of construction and in accordance with Pennsylvania Act 287.

C. Protect plant life, lawns, landscaping, and other features remaining as a portion of final landscaping.

D. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

E. Locate, maintain and protect all existing above grade and subgrade utilities which are to remain.

F. Furnish and erect substantial barricades at crossings of trenches or along trenches to protect the traveling public.

G. Remove, realign or change the direction of the above or below grade utilities or their supports as directed by the utility owner and/or the Engineer. The Contractor shall not be entitled to claims for damage or extra compensation due to the presence of such obstruction or delay in the removal or rearrangement of same. Additional precaution concerning obstruction as follows:

1. Do not interfere with persons, firms, corporations or utilities employing protective measures, removing or replacing their property or structures, but allow said persons, firms, corporations or utilities to take such measures as they may consider necessary or advisable under the circumstances; which shall not relieve the responsibilities of the Contractor.

H. Provide effective dust control by sprinkling water, spraying calcium chloride or through the use of any other method reviewed and accepted by the Engineer.

I. Do not obstruct streets, roads, and highways except in locations where so authorized by the municipality or agency having jurisdiction. If the control agency authorizes closing of a street, obtain written notification for said closing and employ such measures at no expense to the Owner.

J. Maintain a straight and continuous passageway on sidewalks and over crosswalks at least three (3) feet wide and free from obstructions.

4 – 8 EXCAVATION

Refer to Chapter 3 of this book for complete details.

A. Remove all materials of every description existing in the spaces to be excavated with the exemption of the utilities, pipelines, and structures that are designed to remain.

B. Dig trenches to a uniform width required to properly install each pipe or utility. Trench widths are to be a minimum of outer pipe diameter plus 12 inches on each side of the pipe unless indicated otherwise on drawings.

C. Excavate trenches to the depths indicated and required. Carry the depth of trenches for piping to establish indicated flow lines, invert elevations and depth of cover.

D. Excavate subbase to depth indicated for pipes to minimum 6 inches below the bottom of the work to be supported.

E. Excavate trench so that the minimum depth of cover over mainline sewer pipe is 5 feet and cover over lateral pipe is 4 feet unless otherwise specifically indicated on the drawings.[2]

F. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Maintain sides and slopes of excavations in a stabilized condition until completion of backfilling.

G. Utilize a trench box or install shoring and bracing if required by code or ordinance or if needed to stabilize the excavation. Contractor is responsible for the design of any shoring and bracing used on the site.

H. Prevent surface water and subsurface or groundwater from entering excavations or flooding project site by enacting the measures outlined in Section on Sedimentation and Erosion Control.

I. Remove any accumulation of water within excavations to prevent softening of trench bottom, undercutting structures and destabilizing subgrade and

[2] Revised January 19, 2004

foundations. Provide and maintain pump, well points, sumps, suction and discharge lines and other dewatering system components necessary to convey water away from the excavations. Pumped water is to be conveyed and discharged where accepted by the Engineer and/or by PADEP.

J. Do not store any material within any street pavement or other right-of-way.

K. Adequately support any underground pipes or conduits exposed as a result of the excavation. Install such supports in such a manner that backfilling may be performed without dislodging the pipe or conduits. This support shall be provided at the Contractor's expense.

L. Do not interfere with the forty-five (45) degree bearing splay of any structural foundations unless directed by the Engineer.

M. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove all loose matter.

N. Correct areas over excavated. If excavations are carried below indicated or specified subgrade without written permission, refill to proper subgrade with thoroughly compacted backfill material at no expense to the Owner.

O. Stockpile excavated material in area designated on site. Height of the stockpile is not to exceed eight (8) feet. Remove excess material from site.

P. Protect stockpile in accordance with Section on Sedimentation and Erosion Control.

Q. When it is necessary to haul soft or wet soil material over roadways, use suitable watertight containers to prevent spillage. Clear away spillage of materials on roadways caused by hauling.

R. Where passing buildings or any structure which by their construction or position might bring a great pressure upon trenches, the right is reserved by the Engineer to require that such buildings or structures be underpinned or supported and protected or special sheeting be driven or that short lengths of trench be opened at one time.

S. The Contractor shall maintain all existing underground utilities in service during the construction period. If existing utility piping or other services are damaged during construction, it shall be repaired promptly at the Contractor's expense in a manner consistent with local utility policy and acceptable to the Engineer. Under no circumstances shall a customer service be interrupted for a period longer than eight (8) hours.

4 – 9 COMPACTION AND BACKFILLING

Refer to Chapter 3 of this book for complete details.

A. Do not commence with backfilling of any part of the excavation until such part has been observed by the ATMA.

B. Pipe bedding and pipe embedment are to be installed to the depths indicated in the appropriate specification section for that pipe and as indicated on the drawings.

C. Backfill each material at optimum moisture content and compact to a dry density of not less than ninety-five (95) percent maximum dry density for structural backfill and backfill under pavement, and not less than eighty-five (85) percent maximum dry density for open, unpaved areas as determined by the testing procedures specified.

D. Compaction to be performed using vibrating compaction equipment or mechanical tampers. Hand tamp around pipe bells, manholes and utilities, if necessary. Compaction by jetting or puddling or the use of Hydra-Hammer is not permitted.

E. Backfill trenches to contours and elevations with unfrozen materials.

F. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

G. Employ a placement method that does not disturb or damage pipe in trench.

H. Remove surplus backfill materials from site and dispose of in a lawful manner.

I. Leave fill material stockpile areas completely free of excess waste materials.

J. Backfill trenches with concrete where excavations pass within 18 inches of column or wall footings or other concrete structures and which are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing.

K. Encase pipe or conduit which passes within 18 inches in a horizontal or vertical plane of another pipe or conduit containing potable water in 6 inch thick concrete as indicated on the drawings for a minimum horizontal distance of five (5) feet to either side of the crossing.

L. Encase sewer pipes which travel within a horizontal distance of less than ten (10) feet from a water main or submain in 6 inch thick concrete along the entire section within that ten (10) foot distance as shown on the drawings

M. Encase sanitary sewer pipes which travel within a horizontal distance of less than fifty feet from a domestic water well in six (6") inch thick concrete.

N. Displacement of the pipeline and settlement of backfill shall be considered evidence of improper workmanship or inclusion of unsuitable backfill materials, or both, and will require regarding and realigning the pipeline and removing and recompacting settled materials at no expense to the Owner.

O. Do not use in backfilling work putrescible refuse and such other materials considered unsatisfactory by the Engineer. Do not permit excavations to be used as dumping areas for refuse.

P. Do not use frozen backfill materials or place backfill materials on frozen subgrade or trench surfaces.

4 – 10 TOLERANCES

A. Top Surface of Backfilling: Under paved areas and parking areas: plus or minus one half (1/2") inch from the required elevations.

B. Top Surface of General Backfilling: Plus or minus one half (1/2") inch from the required elevations.

4 – 11 FIELD QUALITY CONTROL

A. Field testing will be performed under provisions of Quality Control.

B. Compaction testing will be performed in accordance with ANSI/ASTM D1556, ANSI/ASTM D1557, ASTM D 2922, and ASTM D 3017.

C. If tests indicate work does not meet specified requirements, remove, replace and retest the work.

D. Frequency of Tests:
   1. Trench Backfill
      - 1 test per lift per 500 LF, or fraction thereof, of trench in open areas

- 1 test per 100 LF, or fraction thereof, of trench in roadway or adjacent to structures.

4 - 12 PROTECTION OF FINISHED WORK

A. Protect finished work as required.

B. Reshape and recompact fill subject to vehicular traffic during construction.

4 - 13 BACKFILLING

A. Refer to Chapter 3 for backfilling require

Chapter 5

MANHOLES

5 - 1 GENERAL

All manholes shall be constructed of Precast Reinforced Concrete Pipe having an inside diameter of 48". The riser section shall conform to the requirements of ASTM Designation C 478. The riser section shall have tongue and groove joints. Ram-Nek or approved equal shall be utilized as a sealant to produce watertight joints. The upper and lower surface of the manhole joints shall be sealed for the full circumference of the manhole.

The bottom section shall fit into the concrete base and the top section shall be an eccentric tapered section, tapering from 48" diameter to 30" in diameter.

The entire exterior surface of all manholes shall be coated with one (1) coat, producing a dry fill thickness of .016 inches (16 mils), of Bitumastic Super Service Black, as manufactured by Koppers Company, Inc., or an approved equal.

The Township may require Strong Seal, or an approved equal to be used when installing a manhole based on the review of the Township Engineer.

When a manhole is placed in a roadway the Township requires a seal joint to be placed around the rim of the manhole, where the pavement meets the manhole. The seal joint should consist of asphaltic oil (AC20), or asphalt emulsion (E3).

Manhole steps shall be set in the barrel of the manhole at the point of manufacture as indicated on the Detail Drawings.

5 - 2 MANHOLE BASE

All Manhole bases shall be precast reinforced concrete type approved by the Township.

Concrete manhole bases shall be placed on six (6") inches of stone on the undisturbed earth and shall meet the dimensional requirements shown on the Drawings.

The invert of the manhole shall be shaped to allow a smooth transition from inlet to outlet pipes. The dimensions shall meet the requirements shown on the Detailed Drawings. The base shall be twelve inches (12") thick. The wall section which receives the manhole barrel, shall also be twelve inches (12") thick.

5 - 3 MANHOLE FRAMES AND COVERS

Castings for Standard and watertight manhole frames and covers shall conform in design to the Standard Detail Drawings and shall meet the requirements of ASTM Designation A48, Class 30B loadings. All castings shall support A.A.S.H.T.O. "HS-20" loading and shall weigh minimum of 350 pounds, with a thirty (30") inch clear opening.

Castings shall be true to pattern in form and thickness, free from cracks, gas holes, flaws, excessive shrinkage, sound, cleaned by means of sand blast and neatly finished. Runners, fins, risers, and other cast-on pieces shall be removed. All parts of castings shall be thoroughly coated at the factory with one (1) coat of black asphaltum paint.

Castings shall be commercially machinable with the metal bearing areas machine ground, finished to insure satisfactory seating so that it will not rock after the cover has been set in the proper position in the frame

Frame and Cover: ASTM, Class 30B. Cast iron construction, machined flat bearing surface, removable self-sealing cover, closed lid design; lid molded with the words "Sanitary Sewer" in 2 inch (2") raised letters. The name of the manufacturer shall also appear on the cover in letter no larger than 1 inch (1"). Watertight lid shall have gasket and cover hold down bolts, and must be A48 class 30B. All lids which "rock" and do not lie solid after construction is finished will be condemned and must be replaced by perfect lids. All "cross-country" lid shall be bolted down with Anchor Bolts. The Anchor Bolts are to be ¾ inch (3/4") diameter by 6 inch (6") long galvanized to ASTM A123, for embedment in the manhole top and a minimum 2 inch (2") projection through the bars of the frame.

1. Two (2) bolt slots or inserts shall be cast into the manhole top, positioned at 180 degrees at the time of manufacture.

2. Sealing Compound: Two (2) rings of ½ inch diameter flexible butyl rubber joint sealant set between bottom of frame and top of concrete section or grade rings; also set between concrete manhole sections.

3. Precast Grade Rings: Concrete masonry units of 2 inches to 10 inches, thick conforming to ASTM C 478; hold down bolts matching the manhole frame; designed to provide for full bearing of manhole frame; Split Rings not permitted. No more than two (2) rings total, and no more than twelve inches (12") allowed.

5 - 4 MANHOLE STEPS

Manhole steps shall be 3/8 inch (3/8") diameter round steel encapsulated with copolymer polypropylene plastic, capable of withstanding design loading requirements of ASTM C478 at a temperature of 0 degrees F with no structural failure. Manhole steps shall be cast into the walls of base, risers and conical top sections, and shall be aligned vertically and spaced so as to be on equal centers in the assembled manhole at a maximum distance apart of 12 inches. Steps shall be located a minimum of 6 inches (6") from those ends of base, riser, and top sections. Manhole step dimensions shall meet the requirements of OSHA Standard 1910.27 for fixed ladders.

5 – 5 MANUFACTURERS

A. Monarch Products
B. C.R. Semler
C. York Concrete and Septic Tank Company
D. Terre Hill Concrete Products
E. Alternate manufacturers

5 - 6 SHOP DRAWINGS

The owner shall furnish the Township four (4) copies of Shop Drawings covering all manufactures products for use on and intended to remain as a permanent part of the Project. No Shop Drawing will be approved which substantially deviates from requirements of these regulations.

The Township after written approval, shall return one (1) copy of each Shop Drawing to the Owner. If more than one (1) copy is requested, by the owner, additional copies must be supplied.

5 – 7 MATERIALS

A. Manhole Sections: Reinforced commercially manufactured solid precast concrete masonry units in accordance with ASTM C478 with gaskets in accordance with ASTM C923. Sleeves for pipe openings to be factory cast.

B. Reinforcement: The circumferential steel reinforcement for risers, cone sections and base walls shall be a minimum of .12 sq. inches per vertical foot for 48" diameter manholes and .0025 times the inside diameter in inches per vertical foot for larger diameter manholes. Reinforcing Steel grade 60 in accordance with ASTM A615.

5 – 8 COMPONENTS

A. Frame and Cover: ASTM, Class 30B with a thirty (30") clear opening. Cast iron construction, machined flat bearing surface, removable self-sealing cover, closed lid design; lid molded with the words "Sanitary Sewer" in 2 inch (2") raised letters. The name of the manufacturer shall also appear on the cover in letter no larger than 1 inch (1"). Watertight lid shall have gasket and cover hold down bolts. All lids which "rock" and do not lie solid after construction is finished will be condemned and must be replaced by perfect lids. All "cross-country" lid shall be bolted down.

B. Manhole steps shall be 3/8 inch (3/8") diameter round steel encapsulated with copolymer polypropylene plastic, capable of withstanding design loading requirements of ASTM C478 at a temperature of 0 degrees F with no structural failure. Manhole steps shall be cast into the walls of base, risers and conical top sections, and shall be aligned vertically and spaced so as to be on equal centers in the assembled manhole at a maximum distance apart of 12 inches. Steps shall be located a minimum of 6 inches (6") from those ends of base, riser, and top sections. Manhole step dimensions shall meet the requirements of OSHA Standard 1910.27 for fixed ladders.

C. Base Pad: Pre-Cast.

D. Anchor Bolts are to be ¾ inch (3/4") diameter by 6 inch (6") long galvanized to ASTM A123, for embedment in the manhole top and a minimum 2 inch (2") projection through the bars of the frame.
   1. Two (2) bolt slots or inserts shall be cast into the manhole top, positioned at 180 degrees at the time of manufacture.

E. Sealing Compound: Two (2) rings of ½ inch diameter flexible butyl rubber joint sealant set between bottom of frame and top of concrete section or grade rings; also set between concrete manhole sections.

F. Precast Grade Rings: Concrete masonry units of 2 inches to 10 inches thick conforming to ASTM C 478; hold down bolts matching the manhole frame; designed to provide for full bearing of manhole frame; Split Rings not permitted.

G. Pipe Opening Seals: Resilient gasket-type, factory cast integrally with precast manhole components conforming to ASTM C923; size as indicated on drawings.

5 – 9 CONFIGURATION

A. Shaft Construction: Concentric with eccentric cone top section; lipped male/female dry joints; sleeved to received pipe and sealant sections.

B. Manhole Shape: Cylindrical

C. Clear Inside Dimensions: Minimum 48 inch diameter for pipe size less than 18".[2]

D. Design Depth: As indicated on the drawings, and verified from measurements by the Contractor.

E. Clear Manway Opening: 30 inches diameter.

F. Pipe Openings: Custom performed openings as required.

G. Steps: 12 inches wide, spaced 12 inches on center vertically, set into manhole wall. Locate a minimum distance of 6 inches below end of risers and top sections.

H. Manhole Lid Diameter: As required for a 30 inch manway opening.

I. Drop Manhole: Manhole type used at locations where there is a drop between inlet and outlet invert elevations of 2.0 feet or more; inlet piping to be fitted with 90 degree elbows encased in 4000 psi concrete adjacent to manhole, to bring invert elevation to .10 feet above invert of outlet piping as shown on drawings.

[2] Revised January 19, 2004

5 - 10 PLACING MANHOLE SECTIONS

A. Install bases on a six inch (6") deep layer of Type 57 granular aggregate.

B. Place manhole sections, plumb and level, trim to correct elevations.

C. For cast-in-place manhole bases, use template provided by precast manufacturer to form and pour manhole joint monolithically in manhole base top to match joint of adjoining riser section, to correct dimensions and elevations. As work progresses, install built-in resilient wall sleeved with installed carrier piping.

D. Make excavations for manholes to a nearly vertical plane beginning at the bottom of the excavation one foot beyond the manhole base outside diameter (6 inches each side) to two (2) feet beyond manhole base outside diameter dimensions and elevations. As work progresses, install built-in resilient wall sleeves with installed carrier piping.

E. If rock is encountered, take rock out to limits specified.

F. If surface pavement of any type is encountered (vehicle or pedestrian ways), cut such pavement to rectangular shape as opposed to circular shape of manhole. Make limits of cut not to exceed one foot beyond "top of excavation limit" as specified previously.

G. Should "bottom of excavation limit" be exceeded, provide concrete cradle or encasement for pipes entering or leaving manhole.

H. Backfill spaces outside manhole using backfill material as specified. Hand tamp if necessary.

I. Install sealing compound into annular spaces to completely fill any voids in wall openings or joints and render the installation watertight.

J. Pour Class A Concrete (4,000 psi) within manhole base to achieve proper channel and fillets. Accurately shape invert of channel to a semi-circular bottom conforming to the inside of the connecting pipes and steel trowel to a smooth finish. Make changes in size and grade gradually, utilizing a minimum drop of .10 feet between the inverts of the inlet and outlet piping where indicated on the drawings. Make changes in direction of sewer branches to a true curve of as large a radius as manhole will allow. The minimum depth of flow channel shall be equal to one-half (1/2) the diameter of the pipe to which it connects. The channel shall be graded to give a smooth, uninterrupted flow through the manhole.

K. Note that final manhole rim elevations shown on drawings are approximate. Contractor is to set cover frames and covers level on grade rings, if necessary, as determined by finished grade. Set grade rings in waterproof mortar immediately before installing manhole frame.

L. Coordinate with other sections of work to provide correct size, shape, and location.

M. Form and pour concrete for cast-in-place manhole base in accordance with requirements:
   1. Install bases on a six inch (6") deep compacted layer of Type 57 aggregate. Poured concrete shall be vibrated using vibrators of the type capable of transmitting vibration to concrete in frequencies of not less than 5,000 impulses per minute.
   2. Form and pour joint monolithically in manhole base top to match joint of adjoining precast riser section. Use template as obtained from precast concrete manhole component manufacturer of manhole components used in the Project.
   3. Install sewer piping in cast-in-place manhole bases prior to pouring the concrete.

5 - 11 MANHOLE LEAKAGE TESTING (Sanitary Sewer Only)

A. Visibly inspect each manhole after all pipe sections are connected to discover any infiltration.

B. Provide tools, materials (including water), equipment and instruments necessary to conduct manhole testing specified herein using either a hydrostatic or vacuum test.

C. Plug pipe inlet and outlets in manhole.

D. Vacuum Testing:
   1. The test head shall be placed at the inside of the top of the cone section and the seal inflated in accordance with the manufacturer's recommendations.
   2. A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured by the vacuum to drop to 9 inches. The manhole shall pass if the time is greater than sixty (60) seconds for forty-eight (48) inches diameter, seventy-five (75) seconds for sixty (60) inches and ninety (90) seconds for seventy-two (72) inches diameter manholes.

F. Repair and Retest: Determine source or sources of leaks in manholes failing acceptable limits referenced above.
   1. Repair or replace defective materials and workmanship, as is the case, and conduct such additional Manhole Acceptance Test and such subsequent repairs and retesting as required until manholes meet test requirements.
   2. Materials and methods used to make manhole repairs must meet with Engineer's approval prior to use.
   3. Make repairs, replacements and retests.

ALL TESTING, MUST BE WITTNESSED BY THE A.T.M.A.

Chapter 6

SEWER PIPE

6 – 1 POLYVINYL CHLORIDE (PVC) PIPE FITTINGS

Polyvinyl chloride pipe (PVC) shall be rigid, tough, corrosion resistant, of the high-strength, low creep type and shall conform in all respects to the dimensions, tolerances and other requirements of the "Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe" of American Society for Testing Materials, ASTM Designations Group B. Pipe fittings shall be produced from a compound the basic resin of which shall be virgin material. Foam core, cell core or equvalent pipe is not permitted to be used.[1]

1. Plastic Pipe: ANSI/ASTM D2241, SDR21 (Forcemain/Gravity), SDR 35 (Gravity only), Class 200, Polyvinyl Chloride (PVC) Material; bell and spigot style gasket end joint. Use rubber gasket suitable for conveying domestic sewage.

    a. Pipe Joints: elastometric gasket type meeting the requirements of STM D3212 using restrained gasket meeting the requirements of ASTM F477 or solvent cement joints meeting the requirements of ASTM D2241, SDR21.
    b. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanout, reducers, traps, and other configurations required.

2. Plastic Pipe: ANSI/ASTM D1784/D1785/D2467, Schedule 80, Polyvinyl Chloride (PVC) material; bell and spigot style gasket end joint. Use rubber gasket suitable for conveying domestic sewage.

    a. Force Mains to be a minimum of 4 inches (4").
    b. All main lines to be a minimum of eight inches (8").
    c. When a house lateral needs to be bored it shall be constructed using Schedule 40 pipe.

[1] Added January 19, 2004

6 – 2 DUCTILE IRON PIPE

Unless otherwise on the Plan Drawings, ductile iron pipe shall meet the requirements of ANSI-A 21.51. Thickness Class 52. Pipe thickness Class for special highway, railroad, stream, or other condition shall be as stated on the plans.

Ductile iron pipe joints shall conform to ANSI A21.11. Fittings shall conform to ANSI A21.10 and ANSI 21.11.

All ductile iron pipe and fittings shall be cement lined in accordance with ANSI/AWWA - C-104/A21.4 and seal coated inside and outside with asphaltic material.

1. Ductile Iron Pipe: ANSI 21.51 Class 52 and ASTM 746

    a. Fittings: Ductile iron; ANSI A21.11; minimum 250 pounds per square inch (psi) rating. Fittings shall be internally lined as specified below and the exterior shall be coated with bituminous paint.
    b. Joint: ANSI A21.11 mechanical joints. Joints shall be Griffin Snap-lok or approved equal.
    c. Gaskets: Suitable for conveying domestic sewage.
    d. Coating: The exterior of the pipe shall be painted with a minimum of 1 mil of bituminous paint.
    e. Lining: The interior of the iron pipe shall be lined with a calcium aluminate mortar. The mortar shall be made of fused calcium aluminate cement and fused calcium aluminate aggregates. A seal coat shall be applied to the lining. The thickness shall be 0.125 inches for 6 inch to 12 inch pipe and 0.1875 inches for 14 inch to 24 inch pipe. Coat the interior and exterior of the spigot of the pipe with a minimum of 8 mils of epoxy. Cracks and areas of loose cement lining shall not be acceptable. Product shall be SuperCoat as manufactured by LaFarge Calcium Aluminates or approved equal.

6 - 3 SHOP DRAWINGS

The owner shall furnish the Township four (4) copies of Shop Drawings covering all manufactures products for use on and intended to remain as a permanent part of the Project. No Shop Drawing will be approved which substantially deviates from requirements of these regulations.

The Township after written approval, shall return one (1) copy of each Shop Drawing to the Owner. If more than one (1) copy is requested, by the owner, additional copies must be supplied.

Chapter 7

GENERAL CONDITIONS

7 - 1 SUBMITTALS

A. Shop Drawings and Product Data: Provide data on pipe materials, pipe fittings, valves and accessories. Submit detailed certified dimensional shop drawings for material and equipment. Show complete information concerning materials of construction, fabrication, protective coatings, installation and anchoring requirements, fasteners, and other details.

B. Manufacturer's Installation Instruction: Indicate special procedures required to install Products specified.

C. Manufacturer's Certificate: At the time of submitting shop drawings, submit certification from each product manufacturer whose product include but not limited to, pipe, pipe fittings, joints, joint gaskets, lubricants, meet or exceed specified requirements.

D. Submit test reports for Field Quality Control tests as specified herein.

E. Record Drawings upon completion of the project.

7 - 2 PROJECT RECORD DRAWINGS

A. Accurately record actual locations of pipe runs, connections, manholes, catch basins, cleanout, and invert elevations.

B. Identify and describe unexpected subsoil conditions or discovery of uncharted utilities.

7 - 3 REGULATORY REQUIREMENTS

A. Conform to applicable code for installation of the work of this section.

7 - 4 FIELD MEASUREMENTS

A. Verify the locations, invert elevations, sizes and materials of all utilities. Excavate tests pits required on the drawings and any others deemed necessary by the Contractor or utility companies as approved by the Engineer/Owner.

B. The Drawings are in general indicative of the work, with symbols and notations for clarity. However, the Drawings are not exact representation of all conditions involved, therefore, layout piping to suit actual field measurements.

C. Submit details of proposed departures necessitated by field conditions or other causes to the ATMA for approval.

7 - 5 QUALITY ASSURANCE

A. Perform Work in accordance with State and Local building codes.

B. Pipe and Fittings: Weight; class designation; sampling period; manufacturer's name and trademark; year of production; on bends, the angle turned thereby, identification of fittings to show proper location; on beveled pipe, amount of bevel and point of maximum bevel; thickness.

C. Products shall be new, the latest standard product of reputable manufacturers, and shall have replacement parts available.

D. Materials contaminated with gasoline, lubricating oil, liquid or gaseous fuels, aromatic compounds, paint solvent, paint thinner or acid solder will be rejected.

E. Inspect each section of pipe and each fitting before laying for conformance with the inspection requirements of the appropriate reference standard.

F. Remove rejected pipe from the project.

7 - 6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During loading, transporting, unloading, and storage on-site, exercise care to prevent damage to piping materials.

B. Deliver and store pipe, fittings, valves and accessories in manufacturer's shipping containers with labeling in place or in accordance with manufacturer's recommendations.

C. Protect pipe coatings and linings from damage during delivery and handling. Do not stack pipe for storage. Do not drop pipe or fittings.

D. Store materials and accessories in areas protected from weather, moisture and possible damage. Assure materials are left clean and dry. Do not permit PVC pipe to be exposed to sunlight for extended periods of time.

E. Do not store materials directly on the ground.

7 - 7 JOB CONDITIONS

A. PVC SDR 35 shall be used for pipe material except for forcemain and borings, and within the pump stations where ductile iron pipe will be used. PVC SDR 21 shall be used for pipe material except borings, and within the pump stations where ductile iron pipe will be used. Railroad borings shall be per railroad specifications, and Penn DOT borings/crossings shall be per Penn DOT specifications and approval.

B. It will be the discretion of Township personnel to determine if a crossing will be open cut or a bore.

C. Keep trenches dewatered until pipe joints have been made and concrete cradle and encasement, if any, have cured.

D. Under no circumstances lay pipe in water or on bedding containing frost.

E. Do not lay pipe when weather conditions are unsuitable for pipe laying work, as determined by the Engineer.

7 – 8 SEWER PIPE MATERIALS

A. Plastic Pipe: ANSI/ASTM D 3034, SDR 35, Type PSM, Polyvinyl Chloride (PVC) material; bell and spigot style gasket end joint. Use rubber gasket suitable for conveying domestic sewage.
   1. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanout, reducers, traps, and other configurations required.

B. Ductile Iron Pipe: ANSI 21.51 Class 52 and ASTM 746Fittings: Ductile iron; ANSI A21.11; minimum 250 pounds per square inch (psi) rating.
   1. Fittings shall be internally lined as specified below and the exterior shall be coated with bituminous paint.
   2. Joint: ANSI A21.11 mechanical joints. Joints shall be Griffin Snap-lok or approved equal.
   3. Gaskets: Suitable for conveying domestic sewage.
   4. Coating: The exterior of the pipe shall be painted with a minimum of 1 mil of bituminous paint.
   5. Lining: The interior of the iron pipe shall be lined with a calcium aluminate mortar. The mortar shall be made of fused calcium aluminate cement and fused calcium aluminate aggregates. A seal coat shall be applied to the lining. The thickness shall be 0.125 inches for 6 inch to 12 inch pipe and 0.1875 inches for 14 inch to 24 inch pipe. Coat the interior and exterior of the spigot of the pipe with a minimum of 8 mils of epoxy. Cracks and areas of loose cement lining shall not be acceptable. Product shall be SuperCoat as manufactured by LaFarge Calcium Aluminates or approved equal.

7 – 9 PIPE MATERIALS

A. Detectable Tape: Magnetic detectable conductor, brightly colored plastic covering, imprinted with “Sewer Service” in large letters.

B. Clean-outs shall be installed directly behind the right-of-way with a 13’ section of pipe beyond the cleanout.[2]

[2] Revised January 19, 2004

7 – 10 BEDDING MATERIALS

Bedding: Coarse aggregate Type 57 stone.[2]

7 – 11 EXAMINATION

Verify the trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

7 – 12 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with coarse aggregate.

B. Remove debris and dirt, on inside and outside, before assembly.

C. Cut pipe accurately to measurements established in the field.

D. Examine all pipe, fittings, adapter, and accessories. Remove any defective pipe and fittings from the job site.

E. Remove large stones or other hard matter which could damage pipe or impede consistent backfilling or compaction.

7 – 13 BEDDING

A. Excavate pipe trench in accordance with detail. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level materials in continuous layer not exceeding six (6) inches uncompacted depth, compact to ninety-five (95) percent.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

[2] Revised January 19, 2004

7 – 14 INSTALLATION – PIPE

A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal joints watertight.

B. Lay pipe to slope gradients noted on drawings.

C. Install bedding at sides and over top of pipe to minimum compacted thickness of twelve (12) inches compact to ninety-five (95) percent.

D. Refer to chapter on Trenching for trenching requirements. Do not displace or damage pipe when compacting.

E. Refer to Chapter on Manholes for manhole requirements.

F. Connect to municipal sewer system.

G. Install detectable marking tape continuous over top of pipe, buried eighteen (18) inches below finish grade above pipe line; coordinate with Chapter on Trenching.

H. Install pipe to indicated elevation.

I. Lay pipe proceeding upgrade true to line and grades given. Lay bell and spigot pipe with bell end upgrade.

J. Exercise care to insure that each length abuts against the next in such manner that no shoulder or unevenness of any kind occurs along inside bottom half of pipe line.

K. No wedging or blocking permitted in laying pipe unless by written order of Engineer.

L. Before joints are made, bed each section of pipe full length of barrel with recesses excavated so pipe invert forms continuous grade with invert of pipe previously laid. Do not bring succeeding pipe into position until the proceeding length is embedded and securely in place.

M. Dig bell holes sufficiently large to permit proper joint making and to insure pipe is firmly bedded full length of its barrel.

N. Walking or working on completed pipe line, except as necessary in tamping and backfilling, is not permitted until trench is one (1) foot deep over top of pipes.

O. Take up and replace pipe that is out of alignment or grade, or pipe having disturbed joints after laying.

P. Take up and replace with new, such in-place pipe sections found to be defective. Replacement work at Contractor's expense.

Q. Bedding materials and concrete work for pipe bedding as specified in sections.

R. Exercise care when making pipe joints and make joints in accordance with the pipe material manufacturer's recommendations and the following requirements. In each instance of pipe joining, those portions of pipe involved must be absolutely clean just prior to assembly. If a joint is extremely difficult to assemble or sealing is not effective, disassemble the joint and correct the difficulty if possible. Remake the joint using new materials when necessary.

S. Push-on Joints: To make PVC and D.I. pipe push-on joints, properly seat sealing gasket, evenly and sufficiently lubricate the spigot end of pipe, and fully enter joint until joint line is visible. Make deflection, if required, only after the joint has been assembled properly.

T. Establish elevations of buried piping to ensure not less than four (4) feet of cover.

7 – 15 FIELD QUALITY CONTROL

A. Field Inspection and testing will be performed in accordance with ANSI/ASTM D1557, ASTM D2922, and ASTM D3017.

B. General Requirements: Conduct tests specified herein so that each pipe line installed in the project is tested to the satisfaction of the Engineer.
   1. Provide tools, materials (including air and water), apparatus and instruments necessary for pipe line testing.
   2. Conduct test of every kind in the presence of and to the satisfaction of the Antrim Township Municipal Authority.
      a. Underground pipe lines shall be backfilled prior to testing. The Contractor may desire to perform a pressure test for his own purposes prior to backfilling; however, the "acceptance test" shall be performed after backfilling has been completed.

C. Safety Requirements: Observe the following safety requirements when conducting air tests.
   1. Securely brace pipe plugs to prevent blowouts.

2. Completely relieve air pressure from pipe line under test before removing temporary pipe line seals.
3. Completely relieve air pressure in isolated joint space between bladder seals of Joint Tester prior to deflating bladders.
4. Permit no one in manholes during testing.

D. Testing Equipment for Sanitary Sewer:
1. Use air compressing apparatus equipped with a control panel with necessary piping, control valves and gauges to control air flow rate to piping test section; and to monitor air pressure within piping test section and air pressure within test section seal plugs. To prevent accidental overloading of piping test section, provide air compressing apparatus with an approved pressure relief device set to relieve at ten pounds per square inch (10 psi).
2. Provide an extra pressure gauge of known accuracy to frequently check test equipment and apparatus.
3. Air testing equipment and associated testing apparatus subject to approval of the Engineer.
4. Provide GO-NO-GO Mandrel and incidental equipment for Deflection Test. Mandrel to conform to following requirements:
   a. Cylindrical in shape with odd number of arms not less than nine, spaced evenly around the mandrel.
   b. Minimum twelve (12) inches contact length of mandrel arms with pipe wall.
   c. Mandrel diameter ninety-five (95% percent of inside pipe diameter.

E. Cleaning Prior to Tests: Before tests are conducted, clean piping including sewers, branches and service connections until free of dirt or silt or construction debris.

F. Initial Section Test: To demonstrate acceptability of installed pipe materials and workmanship, construct and air test the first installed sewer section from manhole to manhole (or cleanout), using the pipe provided in the Contract.
1. Conduct Initial Section Test in same manner as Line Acceptance Test specified in a following paragraph.
2. Failure of an “Initial Section Test” will be sufficient cause for the Engineer to reject manufacturer and supplier of pipe regardless of cause of failure

G. Line Acceptance Test: (Gravity Sewer)
1. Plug free ends of branch (if any) and service connections.
2. After a section of sewer and its service connections is constructed between adjacent manholes, sufficiently backfilled and successfully cleaned, performed a low pressure air “Line Acceptance Test” in accordance with ASTM C828 and the following.

a. Seal sewer piping at upstream and downstream manholes with pneumatic type plugs. Test plug seal before actual use by testing plugs outside the trench in one length of pipe pressurized to maximum anticipated testing pressure. Plugs shall hold without bracing and show no movement.
b. Introduce low pressure air slowly into sealed sewer section until internal air pressure is four (4) pounds per square inch gauge (psig) greater than the average ground water pressure acting on the pipe as determined by the Engineer,
c. Allow two minutes minimum for air temperature to stabilize, adding only required air to maintain pressure.
d. After stabilization period three and one-half (3 ½) psig minimum in pipe disconnect air supply and determine rate of air loss by measuring time interval required for 3 ½ psig to decrease to two and one-half (2 ½) psig greater than the average groundwater acting on the pipe.
e. To determine the groundwater pressure acting on the pipe being tested, divide the height in feet of the groundwater above the invert of the pipe by two and three-tenths (2.3). Add the result of the previously specified test pressure (i.e., if maximum groundwater height is eleven and one-half (11 ½) feet above the pipe invert, the groundwater pressure is five (5) psig. This increases the three and one-half (3 ½) psig and two and one-half (2 ½) psig to eight and one-half (8 ½) psig and seven and one-half (7 ½) psig, respectively. Test pressure not to exceed ten (10) psig regardless of height of groundwater over the pipe.
f. Consider sewer line "Acceptable" when a one (1) psig pressure drop does not occur within the test time specified in the AIR TEST TABLE immediately following this section.

H. Deflection Test: In addition to air testing to air tests and infiltration test, conduct deflection tests on PVC pipe. Test each PVC pipe sewer main installed.
1. Conduct deflection testing no less than fifteen (15) days after section of pipe sewer main and service connection between adjacent manhole is backfilled,
a. Pull mandrel through pipe section manually; powered pulling devices not permitted.
b. Consider sewer line section which mandrel cannot pass through, to have more than maximum allowable deflection of five (5%) percent.

I. Repair and Retest: When section or sections of sewer fails to meet test requirements specified previously.
1. Determine source or sources of leakage.

2. Repair or replace defective material, and if a result of improper workmanship, correct such.
3. Take up and relay pipe sewer line section that has more than the maximum allowable.
4. Conduct additional tests required to demonstrate that sewer line meets specified test requirements.

J. Request inspection prior to and immediately after placing bedding.

K. Compaction testing will be performed in accordance with ANSI/ASTM D1557, ASTM D2922, and ASTM D3017.

L. If tests indicate work does not meet specified requirements, remove work, replace and retest.

7 – 16 PROTECTION

A. Protect pipe and aggregate cover from damage or displacement until backfilling operation has been completed.

Chapter 8

FORCEMAIN

8 - 1 SUBMITTALS

A. Submit under provision of Chapter 7.

B. Shop Drawings and Product Data: Provide data on pipe materials, pipe fittings, valves and accessories. Submit detailed certified dimensional shop drawings for material and equipment. Show complete information concerning materials of construction, fabrication, protective coatings, installation and anchoring requirements, fasteners, and other details.

C. Manufacturer's Certificate: At the time of submitting shop drawings, submit certification from each product manufacturer whose product include but not limited to, pipe, pipe fittings, joints, joint gaskets, lubricants, meet or exceed specified requirements.

D. Thrust calculations for all fittings and associated restrained lengths.

E. Manufacturer's Operation and Maintenance Manual and complete parts list.

F. Manufacturer's Instructions - Submit manufacturer's instructions for the installation and assembly of restrained joint pipe, fittings and valves.

8 – 2 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Closeout.

B. Accurately record actual longitudinal locations of piping mains, relief valves, fitting, connections, inverts, and elevations.

8 – 3 QUALITY ASSURANCE

A. Perform work in accordance with these Specifications and Project Plans and Municipality requirements.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

C. Pipe and Fittings: Weight; class designation; sampling period; manufacturer's name and trademark; year of production; on bends, the angle turned thereby, identification of fittings to show proper location; on beveled pipe, amount of bevel and point of maximum bevel; thickness.

D. Products shall be new, the latest standard product of reputable manufacturers, and shall have replacement parts available.

E. Materials contaminated with gasoline, lubricating oil, liquid or gaseous fuels, aromatic compounds, paint solvent, paint thinner or acid solder will be rejected.

8 – 4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Chapter 2 General Requirements.

B. During loading, transporting, unloading, and storage on-site, exercise care to prevent damage to piping materials.

C. Deliver and store pipe, fittings, valves and accessories in manufacturer's shipping containers with labeling in place or in accordance with manufacturer's recommendations.

D. Protect pipe coatings and linings from damage during delivery and handling. Do not stack pipe for storage. Do not drop pipe or fittings.

E. Mark each valve as to size, type and installation location.

F. Seal valve ends to prevent entry of foreign matter into valve body.

G. Store materials and accessories in areas protected from weather, moisture and possible damage. Assure materials are left clean and dry. Do not permit PVC pipe to be exposed to sunlight for extended periods of time.

H. Do not store materials directly on the ground.

I. Handle valves and accessories to prevent damage to interior and exterior surfaces.

8 – 5 JOB CONDITIONS

A. Use the following schedule for selecting pipe material, unless otherwise noted:

Size Range	Pipe Material
< 4" (Grinder Installations)	PVC Schedule 80 or approved equal
4" - 8"	PVC Pressure Pipe, Ductile Iron, CL 52
8" Railroad Crossing	Ductile Iron-with casing two times (2x) the size of the pipe

B. Investigate conditions affecting this work and coordinate with other contractors to prevent interference between architectural, structural, and mechanical and electrical features.

C. The Contract Drawings for small diameter pipe are generally diagrammatic and it is not possible to indicate all fittings, valves, and other items required for a complete operating system. Provide all such valves, fittings and specialties to complete the system as intended.

D. Provide necessary valve wheels, keys, wrenches, levers and stem extensions. Locate to assure accessibility and operability throughout the operating range without interference. Install valve stem supports, guides and operators. For buried valves, provide valve boxes and stem extensions to grade. Key stem extensions to top of valve. Do not use PVC valves for buried service. Provide valve accessories of the same manufacturer as the valve unless specified otherwise.

E. Provide gear operators for valves four (4") inch size and larger.

F. Any mainline forcemain that enters directly into a manhole the manhole shall be a minimum of six (6') foot in diameter.[2] The ATMA may require a larger diameter based on the size of the pump station, design flows, etc. or any other conditions that may warrant a larger diameter.

[2] Revised January 19, 2004

8 – 6 PIPE MATERIALS

A. Plastic Pipe: ANSI/ASTM D2241, SDR21, Class 200, Polyvinyl Chloride (PVC) Material; bell and spigot style gasket end joint. Use rubber gasket suitable for conveying domestic sewage.
   1. Pipe Joints: elastometric gasket type meeting the requirements of STM D3212 using restrained gasket meeting the requirements of ASTM F477 or solvent cement joints meeting the requirements of ASTM D2241, SDR21.
   2. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanout, reducers, traps, and other configurations required.

B. Plastic Pipe: ANSI/ASTM D1784/D1785/D2467, Schedule 80,
Polyvinyl Chloride (PVC) material; bell and spigot style gasket end joint. Use rubber gasket suitable for conveying domestic sewage.
   1. Force Mains to be a minimum of 4 inches (4”).
   2. All main lines to be a minimum of eight inches (8”).
   3. When a house lateral needs to be bored it shall be constructed using Schedule 40 pipe.

C. Ductile Iron Pipe: ANSI 21.51 Class 52 and ASTM 746
   1. Fittings: Ductile iron; ANSI A21.11; minimum 250 pounds per square inch (psi) rating. Fittings shall be internally lined as specified below and the exterior shall be coated with bituminous paint.
   2. Joint: ANSI A21.11 mechanical joints. Joints shall be Griffin Snap-lok or approved equal.
   3. Gaskets: Suitable for conveying domestic sewage.
   4. Coating: The exterior of the pipe shall be painted with a minimum of 1 mil of bituminous paint.
   5. Lining: The interior of the iron pipe shall be lined with a calcium aluminate mortar. The mortar shall be made of fused calcium aluminate cement and fused calcium aluminate aggregates. A seal coat shall be applied to the lining. The thickness shall be 0.125 inches for 6 inch to 12-inch pipe and 0.1875 inches for 14 inch to 24-inch pipe. Coat the interior and exterior of the spigot of the pipe with a minimum of 8 mils of epoxy. Cracks and areas of loose cement lining shall not be acceptable. Product shall be SuperCoat as manufactured by LaFarge Calcium Aluminates or approved equal.

D. Polyethylene plastic pipe shall be high density polyethylene pipe and meet the applicable requirements of AWWA C909 and ASTM F714 Polyethylene (PE) plastic pipe (SDR-PR) Based on outside diameter.

1. All pipes shall be made of virgin material. No rework except that obtained from the manufacturer's owns production of the same formulation shall be used.
2. The pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters,

Chapter 9

CONNECTIONS

9 – 1 HOUSE SERVICE CONNECTIONS (LATERALS)

The Owner/Developer shall construct all service connections to extend behind the property line or outside the sewer/ road right-of-way with a complete thirteen foot (13') section of pipe, and with a six-inch (6") inspection "Tee" and six inch (6") cleanout, and then capped. A Six-inch (6") pipe should stick out of the ground a minimum of two feet (2'). The ends of all service connections shall be laid and joined in every respect in the manner called for in these Regulations for sewer pipe installation. All lateral service lines constructed within the right-of-way cut shall be a minimum of six inches (6") in diameter.[2] All house service laterals must be shown on the plans. Cleanouts and Tees maybe cut off after the property that it services is improved, but they must remain a minimum of ground level after it is cut.[2]

Whenever a stone or concrete sidewalk or curb exists, witness signs cut into the curb or sidewalk and painted shall indicate service connections.

The depths of service connections will vary, depending upon the elevation of the first floor of the properties to be served. Unless otherwise notified in writing, service connections shall be installed at an elevation sufficiently deep to service the first floor of the property at a grade of two feet (2') in one hundred feet (100'). **The depths to top of the service connection lines shall not be less than four feet (4') below existing grade.**

When rock is encountered at the end of a lateral. The rock must be removed for a distance of five feet (5') beyond the end of the lateral.

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

[2] Revised January 19, 2004

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

Detectable locator tape for non-metallic piping: Polyethylene plastic tape, acid and alkali resistant, with a minimum thickness of .005 inch with no less than 50 gauge (.0005) solid aluminum foil core six inches (6") wide. The foil shall be visible from both sides and the adhesives that bond the protective plastic jacket to both sides of the foil must be applied directly to the film and foil layers with no inks or printing extending to the edges of the tape. APWA color-coded and imprinted with the standard legend for sewer lines. All printing shall be encased to avoid ink rub-off. Tape shall have a minimum strength of 5480 pi lengthwise and 3090 pi crosswise.

9 – 2 STOPPERS

When the service lines or connections are not made to Wye-branches at the time the service lines or mains are laid, the upper, free end of such service lines or branches shall be provided within a carefully fitted stopper. The stoppers shall be braced against internal pressure induced during sewer testing requirements of these Regulations.

9 – 3 CONCRETE ENCASEMENT

Where required or directed by the Township, pipes shall be encased in concrete. Concrete encasement shall compose of Class B Concrete. All encasement shall conform to the dimensions shown on the Standard Details.

9 – 4 DUPLEX CONNECTIONS

All duplexes must have a separate lateral to the main line, and conform to the House Service Connection Regulations of this chapter. Connecting the duplex to the main line any other way must be approved by the ATMA

9 – 5 BEDDING

All house laterals must be laid on six inches (6") of stone bedding. Only Type #57 stone

shall be used for bedding.

9 – 6 BACKFILL

There must be a minimum of two feet (2') of Type 57 stone backfill covering the entire pipe.

Areas that will have vehicular traffic (i.e. paved, stoned etc.) there must be an additional two feet (2') of 2RC stone placed over the initial two feet (2') of backfill for a total of four feet (4') of stone cover. Please refer to the standard details.[2]

There must be a total cover of at least four feet (4') over the entire pipe. No backfill may be placed over the pipe until it has been inspected by a representative of ATMA

Any backfilling done within PA Dot's right-of-way must follow PA DOT's specifications along with ATMA's specifications.[1]

9 – 7 CLEANOUTS

A cleanout must be placed every eighty-foot (80') interval of line. Any line that exceeds eighty feet (80') in length shall have an additional cleanout in the middle of the line. A cleanout, vent and a trap must be located directly outside of the house or as close as possible.

9 – 8 CONNECTION

A. When connection to the main line a Fernco may be used but it must be approved by the ATMA.

B. When the connection is to be made the Township requires at least twenty-four (24) hours notice for the inspection.

C. When making the connection the lateral is required to have a one fourth inch (1/4") drop per every foot of pipe for a 4" line or one eighth inch (1/8") drop per every foot of pipe for a 6" pipe.

[1] Added January 19, 2004
[2] Revised January 19, 2004

9 – 9 LOCATION

A sewer lateral must remain on the property on which it serves. If there is no way possible for this then a waiver must be approved by the ATMA for an easement to be recorded for the sewer lateral with the owner of the service line and the owner for which property it encroaches upon.[2] Laterals may not be placed under any foundation of any structure, and must be relocated if a structure is to be erected where the service line is currently located.

Any lateral that will have to cross a railroad must follow the railroads guidelines for crossings. Any lateral that will have to cross a state road must follow Penn Dot standards for crossings. Any lateral that will cross a Township road will follow the Township standards for crossings, and will be determined by the Township whether it will be an open cut or a bore.

9 – 10 NON-RESIDENTIAL CONNECTION

These standards may differ for non-residential connections, based on the type of business. It will be the discretion of the ATMA and their Engineer to determine the standards for the connection of the non-residential business

All non-residential connections must have a minimum of a 6" six inch laterals and an inspection manhole, that is to be located on the right-of-way line with the street. They must also have a water meter and follow the requirements below.[1] The inspection manhole and the water meter must be able to be accessed at all times by the ATMA. The property owner of the property that it serves will own and maintain the inspection manhole. It will be the discretion of the ATMA and their Engineer to determine if this requirement should be waived based on the type of business of which it is to serve.

The meter manufacturer or vendor shall certify that the meters comply with the AWWA Standard for the particular meter being furnished and that each meter complies with accuracy and capacity requirements of the AWWA Standard for Testing Cold-Water Meters, C705. The meter shall be an Invensys SRII unit as manufactured by Invensys Metering Systems. The model number for a ¾" house service line is SRII Meter with a remote TouchRead System and appurtenances shall be purchased and installed by the Contractor/Developer, and then owned by the Municipal Authority after it is approved for

[1] Added January 19, 2004
[2] Revised January 19, 2004

service. The meter shall be equipment with a “remote” head mounted in the curb box for quick access by the utility meter reader.[1]

If a business changes its operation at any time then the ATMA may require the business to install an inspection manhole, grease trap, and or increase the size of the lateral.

[1] Added January 19, 2004

Chapter 10

TESTING

10 – 1 GENERAL

The installation of all sewers shall be tested by the Owner at his expense in the field, and in the presence of a representative of ATMA together with a representative of the Owner in the manner prescribed herein.

10 – 2 GRAVITY SEWERS

A. Laterals[1]

(1) System test. All of the piping of a building sewer shall be tested with water or air. The property owner shall have the right to select the method of testing to be used.

(2) Water test. The water test shall be applied to the building sewer in its entirety or in sections. If applied to the entire system, all opening in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to a point five (5) feet above the portion of the building sewer under test. The water test shall be conducted for a period of fifteen (15) minutes. If the building sewer is to be tested in sections, each opening shall be tightly plugged, except the highest opening of the section under test, and each section shall be tested with no less than a five-foot head of water for a period of fifteen (15) minutes. The maximum allowable volume of water lost during the fifteen (15) minute period shall be based on one hundred (1/2) gallons per inch of diameter of pipe per 1,000 lineal feet of pipe. [Example: A four-inch building sewer one hundred (100) feet long could infiltrate 25.6 ounces and pass the test **{Formula - loss=64oz.(diameter of pipe)/1,000 ∗(Length of pipe)}**].[2]

[1] Added January 19, 2004
[2] Revised January 19, 2004

(3) Air test. The air test shall be made by attaching an air compressor or test apparatus to any suitable opening and closing all other inlets and outlets to the system, then forcing the air into the system until there is a uniform pressure sufficient to balance a column of mercury ten (10) inches in height or five (5) pounds per square inch on the entire system. The pressure shall be allowed two (2) minutes to stabilize, at which time the pressure shall be brought back up to five (5) pounds per square inch. All air hoses shall be disconnected and if after four (4) minutes the pressure registers three and five-tenths (3.5) pounds per square inch or greater, the system will have passed the test.

B. Mainline

Following completion of the laterals and backfill of a section of sewer main between manholes, the Contractor shall conduct a low-pressure air test. The test shall be performed using the below stated equipment and procedures and under the observation of the Township.

Low Pressure air testing equipment, as manufactured by Cherne Industrial, Inc., or approved equal, as determined by the Township. Equipment used shall meet the following minimum requirements:

D. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.

E. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.

F. All air used shall pass through a single control panel.

G. Three (3) individual hoses shall be used for the following connections:
1. From control panel to pneumatic plugs for inflation.
2. From control panel to sealed line for introducing the low-pressure air.
3. From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

All Pneumatic plugs shall be sealed tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psig. The plugs shall hold against this pressure without bracing and without movement of the plugs out of the pipe.

After a manhole to manhole section of pipe has been backfilled and cleaned, and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psig. Low pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psig greater than the average back pressure of any groundwater that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period (3.5 psig minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of the line being tested shall be termed "acceptable" if the time required for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any groundwater that may be over the pipe) shall be more than the time shown for the given diameters in the following table:

Pipe Diameter	Minutes	Seconds	Length
8 inches	3	47	400 feet
10 inches	4	43	400 feet
12 inches	5	40	400 feet
15 inches	7	5	400 feet

10 – 3 FORCEMAINS – Sanitary Sewer

After the pipe has been laid, properly anchored and the anchors having reached prescribed strength, the pipe shall be partially backfilled between joints, each section of pipe between valves shall receive the following hydrostatic test.

The pipe shall be slowly filled with water and tested to 1 ½ times or 150% the TDH pressure, based on the elevation of the lowest point of the line or section under test. The pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Township. A meter to measure make-up water shall be installed. The pump, pipe connections, taps into the pipe; the Owner shall furnish all necessary apparatus and necessary labor.

Before applying the specified test pressure, all air shall be expelled from the pipe.

All exposed pipe, fitting, valves, and joints shall be carefully examined during the open-trench test. Any cracked or defective pipes, fittings, or valves discovered in consequence of this pressure test shall be removed and replaced by the Owner with new material and the test shall be repeated until satisfactory to the Township. Should

the Owner elect to backfill the entire trench or any portion thereof, prior to testing, it shall be his responsibility to locate and repair any leaks, which occur during this test.

While the test pressure is being maintained, all exposed pipe, fittings, valves, and joints shall be inspected for leaks which shall not exceed the ratio of two (2) gallons per hour per inch of pipe diameter per mile of pipe. The test pressure shall be maintained for a period of not less than one (1) hour if joints are exposed and four (4) hours when joints are covered. During the testing period the drop in static pressure shall be carefully measured and shall not exceed those limits set by AWWA.

The force main under test shall be considered defective if refill water exceeds the allowable limits specified above.

10 – 4 SANITARY SEWER MANHOLES

All manholes shall be tested for exfiltration by plugging the sewer lines entering or leaving the manhole and filling the manhole to the top of the manhole frame with water. This water level shall be observed for one (1) hour during which time period no leakage or drop in water shall be allowed.

10 – 5 VACUUM TESTING MANHOLES

1. The testing shall be done after the assembly of the manhole.
2. The manhole-to-pipe connection shall be a flexible connector, such as Kor-N-Seal or approved equal. A sixty-inch (60”) per pound torque wrench shall be used to tighten the external clamps of the Kor-N-Seal connector.
3. All lift holes shall be plugged with a non-shrinking mortar, as approved by the Engineer.
4. The seal between the manhole sections shall be in accordance with ASTM C923.
5. The Contractor shall plug the pipe openings, taking care to securely brace the plugs and the pipe.
6. With the vacuum tester set in place:
    a. Inflate the compression band to effect a seal between the vacuum base and the structure.
    b. Connect the vacuum pump to the outlet port with the valve open.
    c. Draw a vacuum to ten inches (10”) of Hg. And close the valve.

The test shall pass if the vacuum remains at ten inches (10”) Hg. Or does not drop below nine inches (9”) Hg. within a time of one minute. If the manhole fails the initial

test, the Contractor shall locate the leak and make proper repairs. Leaks may be filled with a wet slurry of accepted quick setting material.

The Owner may test manholes by exfiltration or vacuum; however, the Township has the right to choose which test to use.

10 – 6 TESTING FEES

The Owner for all costs relative to testing specified herein shall pay for payment. The Owner shall furnish all necessary labor, equipment, and material necessary or incidental to performance of specified tests at no cost to the Township. A Township Inspector must be present when all tests are conducted.

10 – 7 AS-BUILT DRAWINGS

To be completed as per Antrim Township current standards. See Attachment “B”.

Chapter 11

SINGLE HOUSE PUMPS

11 – 1 GENERAL

The Owner shall furnish and install a single house pump which is designed to pump raw, unscreened sewage. The single house pump must include the following accessory items:

A. Shall be an Environment One Pump unless another pump is approved by the A.T.M.A. The tank must be furnished with an inlet flange to accept a four-inch (4") nominal diameter PVC drain-waste-vent pipe. The socket fittings shall be securely fastened to the tank and shall be leak tight. All joints, pipe accessories, openings, and lid shall be watertight. Anti-floatation devices must be provided.

B. A check valve and a gate valve.

C. Mercury float control switches or equal with electrical control panel including audible and visual alarm. (Control panel with alarms to be located outside the house.)

D. Quick disconnect or approved equal, so pump unit can be remove without personnel entering the tank.

E. Galvanized lifting chains or approved equal.

F. All necessary pipes and fittings and all necessary electrical cable and wiring for motor and controls.

A solids handling sewage pump or a grinder pump can be used when one pump discharges into a gravity sewer main; however, when a pump discharges into a pressurized main or when more than one pump is discharging into a single sewer line, the pumping unit or units shall be a grinder pump.

Design calculations must be submitted with the drawings.

11 – 2 PUMPS AND MOTORS

11-2.1 Solids Handling/Sewer Ejector Pump

The Owner shall furnish and install a solids handling/sewer ejector pump when it is necessary to elevate the sewage to a sewer line. The minimum size pump shall be a hydromatic SK50 that will handle up to two-inch (2") spherical solids and lint and shall have a three-inch (3") discharge. Other pumps meeting these minimum specifications will be approved if proven equal.

11-2.2 Grinder Pump

Complete package submersible sewage grinder pump systems shall be manufactured or supplied by Environment One Corporation.

11 – 3 FORCE MAINS

Force mains shall be placed in accordance with Chapter 8 of these regulations. Minimum diameter of force main shall be one and one half inches (1 ½"). Larger diameter required for solids handling pump.

11 – 4 SHOP DRAWINGS

Four (4) sets of detailed manufacture's drawings as well as four (4) sets of installation and site drawings shall be submitted to the Township for their review. Upon written approval of these drawings, the Owner may proceed with installation of the house pump.

The owner of any property requiring a house pump will have to submit pump specifications to the Authorities Engineer for review along with a plan to be approved. After pump is approved by the Authorities Engineer the owner will need to enter a "Sewer Pump Agreement" with the Antrim Township Municipal Authority and the Antrim Township Board of Supervisors.

Chapter 12

GREASE TRAPS

12 – 1 GENERAL

Grease, oil, and sand interceptors or traps shall be provided by a User when the Township determines that such devices are necessary for the proper handling of Wastewaters containing greases, oils, or settable solids. Interceptors and traps shall be installed, operated, maintained and cleaned properly, so that they will consistently remove the grease, oil, or settable solids. Interceptors and traps shall be properly designed to accommodate the maximum flow rate expected to occur, and shall be located as to be readily and easily accessible for cleaning and inspection.

12 – 2 GREASE TRAPS

A. Grease Traps shall be provided when, in the opinion of the ATMA, they are necessary for the proper handling of liquid wastes containing floatable grease in such amounts as to cause obstruction to the flow in a sewer or other interference with the operation of the wastewater treatment facilities. In general, grease traps shall be required at eating and drinking establishments, and food or beverage manufacturing, processing, and merchandising establishments.

B. All interceptors shall be of a type and capacity approved by the ATMA and shall be located as to be readily and easily accessible for cleaning and inspection. All systems shall be designed, constructed and operated in accordance with the manufacturer's specifications.

C. Grease traps shall be equipped with devices to control the rate of water flow so that the manufacturer's rating is not exceeded. The minimum capacity of a grease trap shall be such that the Grease Retention Capacity measured in pounds of grease shall be at least two (2) times the Total Flow-through Rating measured in gallons per minute (gpm).

D. All grease traps shall be from a manufacturer with a minimum of five (5) years experience in the manufacturing of grease traps and/or shall conform to the Plumbing and Drainage Institute (PDI) standard G101.

12 – 3 SEPARATOR

A. Separators shall be provided when, in the opinion of the ATMA, they are necessary for the proper handling of liquid wastes containing oil, sand, any flammable wastes, or other harmful ingredients in such amounts as to cause obstruction to the flow in a sewer or other interference with the operation of the wastewater treatment facilities.

B. All separators shall be of a type and capacity approved by the ATMA and shall be located as to be readily and easily accessible for cleaning and inspection. All systems shall be designed, constructed and operated in accordance with the manufacturer's specifications.

C. Separators required: At repair garages, gasoline stations with grease racks, grease pits, or work racks, and at factories where oily and flammable liquid wastes are produced, separators shall be installed into which all oil-bearing, grease-bearing, or flammable wastes shall be discharged before emptying in the building drainage system or other point of disposal.

D. Separation of liquids: A mixture of treated or untreated light and heavy liquids having various specific gravity's shall be separated in any approved receptacle.

E. Designed of oil and liquid separators: Liquid separators shall be designed as provided below:

12-3.1 Overall Requirements:

Oil separators shall have a depth of not less than two feet (2') below the invert of the discharge drain. The outlet opening of the separator shall have not less than an eighteen inches (18") water seal.

12-3.2 Garages and Service Stations:

Where automobile are serviced, greased, repaired, washed or where gasoline is dispensed, separators shall have a minimum capacity of six (6) cubic feet for the first one hundred (100) square feet of area to be drained, plus one (1) cubic foot for each additional one hundred (100) square feet

of area to be drained into the separator. Parking garages in which servicing, repairing, or washing is not done, and in which gasoline is not dispensed, shall not require a separator. Areas of commercial garages, which are used for storage of automobiles only, are not required to be drained through the separator.

12 – 4 INSPECTION

The ATMA shall have the right to inspect the grease traps and/or separators to ensure that the systems are in working order and that the systems are being properly maintained and cleaned. The sewer inspector shall have the right to inspect the records at the time of the inspection.

12 – 5 MAINTENANCE AND RECORDS

The Owner of an improved property, which utilizes a grease trap and/or separator, shall at all times keep the system in good working condition. The traps or separators shall be cleaned periodically to keep them in good working order. All traps or separators shall be cleaned at least once every three months. The records shall include the date of disposal, the means of disposal, the name and signature of the person responsible for supervising the cleaning of the separators and grease traps and the proper disposal of the accumulated material. Annually the Owner shall transmit a copy of the cleaning records to the ATMA. Records of each cleaning shall be maintained by the establishment for a period of three (3) years.

12 – 6 DISPOSAL OF ACCUMULATED MATERIAL

All material, which is removed from the separators and/or grease traps shall be properly disposed of by the Owner. Under no circumstances shall accumulated material be allowed to enter into the sanitary sewer system. Any removal and hauling of the collected materials not preformed by Owner's (Owners') personnel must be performed by currently licensed waste disposal firms.

ATTACHMENT "A"

A – 1 INSPECTION FEES

The Township cost per lineal foot of sewer line tested will be set by a resolution of the Board of Supervisors, and may be reviewed from time to time.

A – 2 As-Built Drawings

The Township cost per lineal foot of sewer line will be set by a resolution of the Board of Supervisors, and maybe reviewed from time to time.

Any construction such as Lift Stations, Treatment Plants, Metering Chambers, etc. the cost of inspection and the cost of as-built drawings will be estimated prior to approval and the estimated amount will be duly approved.

ATTACHMENT "B"

A. Three (3) Drawings are to be submitted on twenty four inch by thirty-six inch (24" x 36") reproducible Mylar.[2] It shall be labeled as to contract number and sheet number to correspond with existing township drawings. The drawing shall show direction of north and shall be scaled at one inch equals fifty feet horizontal (1"=50'), and one inch equals five feet vertical (1"=5'). A reduced 11" x 17" copy of the "As-builts" shall be provided to enable the A.T.M.A. to have them with them in the field.

B. Drawing is to show plan and profile (on the same sheet) of sewer line run from manhole to manhole, with the length of the manhole run shown as measured from center of lid to center of lid. Also indicated shall be the slope percent (%) of the main line, the invert elevation grade entering and exiting manholes, the depth of the manhole, and the profile of existing ground.

C. The sewer line plan shall show the following:
   1. Manhole numbers
   2. Lateral wye stations and depths (in block)
   3. Lateral end shall be located with its station along the main sewer line and the distance to the end measured perpendicular to the main sewer line. The depth of the lateral end from existing ground surface shall be noted
   4. Existence of all culvert pipes, gas lines, water lines, electric, etc. as it relates to crossing sewer installation.
   5. Road profile and existing homes shall be included for proper field determination
   6. Matchline to existing drawings
   7. Proper deflection angle from one manhole run to another

As-Built drawings shall be reviewed by the Antrim Township Municipal Authority or its representatives for proper compliance with inspectors notes.

[2] Revised January 19, 2004

STANDARD DETAILS

SANITARY SEWER SYSTEM