SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY
CUMBERLAND COUNTY, PENNSYLVANIA

SUBDIVISION AND LAND DEVELOPMENT POLICIES AND SPECIFICATIONS FOR CONSTRUCTION OF EXTENSIONS TO THE SANITARY SEWER SYSTEM AND WATER DISTRIBUTION SYSTEM

PREPARED BY:

GLACE ASSOCIATES, INC.
Consulting Engineers
3705 TRINDLE ROAD
CAMP HILL, PA 17011
(717) 731-1579
FAX: (717) 731-1348

AND

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY
345 CRISWELL DRIVE
BOILING SPRINGS, PA 17007
(717) 258-6476
FAX: (717) 258-3599

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POLICIES, INFORMATION AND SPECIAL CONDITIONS FOR CONSTRUCTION OF EXTENSIONS TO THE SANITARY SEWER SYSTEM

POLICIES FOR SEWER MAIN EXTENSIONS

1. All mains shall be extended at the sole expense of the person or persons requesting such extension.

2. All mains shall be extended to the furthermost property lines of the person or persons requesting such extension. The only exception shall be where lines cannot be further extended.

3. The size and location of the mains shall be determined by the Authority's Engineer so as to comply with the Authority's long-range facilities plan.

4. If planning is required, the Developer shall deposit with the Authority ample monies to cover all costs the Authority may incur in the furtherance of the proposed extension.

5. If a Subdivision or Land Development Plan is approved which will result in an extension to the sewer system, a copy of the Plan, as recorded at the Court House, shall be provided to the Authority on an acceptable format CD or DVD.

6. Design:

   A. Should the Developer elect to have the Authority design the extension, a Design Extension Agreement shall be signed and security placed in escrow for the design and legal costs the Authority may incur in the furtherance of the proposed extension.

   B. Should the Developer elect to have his Engineer design the extension, a Construction Agreement shall be signed and security placed in escrow for the review and any legal costs the Authority may incur in the furtherance of the proposed extension, as more fully discussed herein.

7. All Extension Plans shall consist of the following:

   A. Size of the plans and scale shall match the existing Authority Plans.

   B. Title Sheet, Sheet 1.

   C. Location Plan, Sheet 2.

   D. General Plan, Sheet 3.

   E. Construction Details, Sheet 4.

   F. Design Details, Sheet 5 through ___.

   All Plan Sheets shall be done on computer in a file format conforming to AutoCAD, using or saved-to the current version in use by the Authority's consulting engineer. The

layers, colors and line types shall conform to the attached listing of RECORD DRAWING LAYERS.

The Authority's datum (USGS Datum of 1929) must be used for establishing elevations. Developer shall contact the Authority's Engineer to obtain a General Plan for the area encompassing the proposed extension. All Plan Sheets shall be oriented with the north arrow pointing the same direction as the General Plan. In accordance with Act 287 and any subsequent legislation, all existing utilities shall be indicated on the Plans.

8. In many cases, the Authority has digitized mapping available for purchase through the Authority's consulting engineer.

9. After the proposed extension is designed and has been approved by the Authority's Engineer, the Authority's Engineer will apply for all applicable permits, as required. All permits shall be approved under the name of the Authority in accordance with applicable regulations.

10. A Construction Agreement shall be signed and security placed in escrow for applicable engineering fees, inspection services, as-constructed drawings and legal fees incurred or reasonable anticipated costs to be incurred in connection with the proposed construction. In addition, a "Letter of Credit", or bond executed by a surety named in the current list of "Companies Holding Certificates of Authority as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department shall be provided. Said security shall be in an amount acceptable to the Authority, to guarantee the satisfactory and timely completion of all sewer facilities as set forth in a cost estimate that has been reviewed and approved by Authority's engineer.

11. Construction:

The construction can be done under one of the following procedures:

A. Developer can utilize his own construction forces to perform the work, providing, however, that the following is submitted and approved by the Authority:

(1) Name of Contractor performing the work.

(2) A minimum of four copies of Shop Drawings and pipe certifications shall be submitted prior to the start of any construction.

(3) Estimated length of time for construction to be used for estimating the initial amount of security to be placed in escrow.

(4) Submit insurance certificates and Hold-harmless Agreements naming the Authority, Township and Engineer as co-insureds and certificate holders.

(5) The limits of liability shall be as determined by the Authority's insurance carrier.

(6) Submit a one-and-one-half year (1½ year) Performance and Maintenance Bond to the Authority after construction is complete and final acceptance and certification is received from the Authority and/or Authority's Engineer.

B. The Developer can elect to have the Authority advertise for competitive bids. Should the Developer select this alternate, an agreement with the Authority will be required and the following procedures shall be undertaken:

(1) Since the Developer is providing all the funds for the project, prevailing wages would not apply.

(2) The Authority will advertise for competitive bids in local newspapers, Harrisburg Builder's Exchange, and the Pennsylvania Dodge Reports and establish a date for the bid opening.

(3) All bidders will be required to provide a Bid Bond in the amount of five percent of the base bid and a letter of commitment from an acceptable licensed surety company.

(4) After bids are received, the following procedures will apply:

(a) The fiscal report, outlining all costs of the project, including construction cost, contingencies, inspection, construction management, stakeout, and any other costs, will be submitted to the Developer for his approval.

(b) Should the developer elect to proceed with the project, the following will apply:

i. A letter accepting the fiscal report and authorization to the Authority to proceed with the project shall be submitted by the Developer to the Authority.

ii. The total project cost as outlined in the fiscal report shall be deposited with the Authority, either directly or made available through a local lending institution for monthly draws.

iii. As construction proceeds, monthly draws on the funds shall be made through the process of requisitions which shall include the following:

a. Designated payee.

b. Purpose.

c. Amount certified by the Authority's Engineer.

d. Authorization by the Authority.

e. Acceptance by representatives of the Developer.

After requisitions are executed by all parties, the Authority will issue the payments to the payee.

iv. After construction is complete, the Contractor shall submit the following:

a. One-and-one-half year (1 ½ year) Performance and Maintenance Bond.

b. Contractor's Affidavit stating to the Authority that all labor, material and outstanding claims and indebtedness of whatever nature arising out of the performance of the contract, have been paid in full.

c. Statement of Surety and Power of Attorney.

v. After finalization of the project, the Authority's Engineer will prepare the necessary as-constructed drawings and a complete itemized breakdown of the project and submit all pertinent data to the Authority and the Developer.

12. As work proceeds on the project and additional funds may be required by the Developer, the Authority will inform the Developer of any deficiencies, and additional monies must be deposited with the Authority or in the lending institution selected by the Developer. After completion of the project, if any monies remain in the construction account, all monies will be returned to the Developer.

13. After completion, testing, and preparation of as-built drawings, the utilities shall be dedicated to the Authority and a Bill of Sale shall be prepared by the Authority for execution by the Authority and the Developer. As a further condition of the Bill of Sale, any easements and/or rights-of-way through or on private property required for the sewer extension shall be provided by the Developer, or shall be prepared by the Authority at the Developer's expense.

INFORMATION AND SPECIAL CONDITIONS – SEWER

GENERAL

It shall be the intent of the South Middleton Township Municipal Authority to have the Developer provide a complete sewer system installation. All work and materials specified or intended shall be supplied by the developer.

DEFINITIONS

"Authority" shall mean the South Middleton Township Municipal Authority.

"Owner" shall mean the South Middleton Township Municipal Authority.

"Developer" shall mean the party or parties constructing improvement to a tract of land, or his agent.

"Contractor" shall mean the agent of the Developer.

"Engineer" shall mean the Engineer of the South Middleton Township Municipal Authority.

DESIGN CRITERIA

The sewerage system including all sewer mains, manholes, pumping stations, force mains, and appurtenances, shall be designed in accordance with the latest revision of the Department of Environmental Protection Guidelines and these specifications.

It shall further be the responsibility of the Developer to comply with all local, county, state and federal regulations.

SPECIAL CONDITIONS

1. These specifications are intended as a guide to the Developer, and the Authority reserves the right to make necessary corrections, additions or deductions to these specifications.

2. The Authority reserves the right to request additional work and materials where, in its opinion, conditions warrant such work and materials.

3. Prior to the start of construction the Developer shall submit a minimum of four (4) copies of shop drawings to the Authority for all materials to be utilized and receive approval of such materials.

AUTHORITY REQUIREMENTS

1. All work on this project shall be done in compliance with all applicable federal, state, county or local laws and regulations whether herein stated or not. In the event of conflict between the requirements herein stated and the rules and regulations of other federal, state, county or local agencies, the more stringent shall apply.

2. Developer and/or Contractor shall obtain insurance in an amount specified by the Authority. See Page ISC-3 for insurance requirements. This insurance should include, but not be limited to, coverage for bodily injury (BI) and property damage (PD) caused by blasting.

3. Proof of all necessary insurance coverages shall be submitted to the Authority in the form of a Certificate of Insurance prior to the inception of any construction activities conducted by the Developer and/or Contractor.

4. Furthermore, the South Middleton Township Municipal Authority, South Middleton Township and the Authority's Engineer shall be listed on the Developer's and/or Contractor's General Liability Policy as an additional insured, in respect to this project.

OSHA REQUIREMENTS

All work on this project must be done in compliance with state and federal Occupational Health and Safety Regulations. Applicable regulations shall include but not be limited to the following examples:

1. If rock drilling machinery is used, it must be equipped with an integral water or exhaust ventilation dust suppression device.

2. Potential noise exposures shall be evaluated and control measures implemented as necessary. Where noise levels exceed standards, employees shall have audiometric tests.

3. Potential dust exposures shall be evaluated and control measures implemented as necessary. Where silica dust levels exceed standards, employees shall have chest X-ray (14" X 17") examinations.

4. Where confined spaces (manholes, etc.) must be entered, the atmosphere must be tested for combustible gases (as a minimum) and mechanical ventilation used prior to entry and during occupancy. A worker must also be stationed outside the confined space to offer assistance should a problem occur. Procedures for entry must be submitted to the Department where the employer is subject to Commonwealth regulations.

5. Lasers used for alignment work must be registered with the Department and any injuries resulting from the use of lasers must be reported.

INSURANCE

Insurance coverages are required to be written on an "occurrence basis." Furthermore, coverage should be written through an insurance company rated as A- or better by AM Best. The limits of liability for insurance coverages shall be, at the minimum, as follows:

1. Workers' Compensation:

a. All state requirements for Workers' Compensation coverage shall be met, including:

(1) Employer's liability:

Bodily Injury by Accident:	$100,000 each accident
Bodily Injury by Disease:	$500,000 policy limit
Bodily Injury by Disease:	$100,000 each employee

2. Comprehensive General Liability:

(Includes Premises – Operations, Independent Contractors Protection, Contractual Liability, Products and Completed Operations, Broad Form Property Damage):

a. Bodily Injury (including Completed Operations and Products Liability):

$1,000,000 each occurrence
$2,000,000 annual aggregate

b. Property Damage:

$1,000,000 each occurrence
$2,000,000 annual aggregate

c. Comprehensive General Liability Insurance will provide coverage at the limits indicated above for the exposures of:

Explosion
Collapse
Underground

d. If operations involve or require the use of blasting, the Contractor will provide blasting coverage to protect bodily injury and property damage per the above minimum general liability limits.

3. Comprehensive Automobile Liability:

Bodily Injury and Property Damage:

$1,000,000 each person/occurrence

4. Owner's Protective Liability:

Bodily Injury/Property Damage:

$1,000,000 each occurrence
$2,000,000 annual aggregate

5. Excess/Umbrella Liability:

Limit of Liability:

$1,000,000 Products/Completed Operations Aggregate
$1,000,000 General Aggregate
$1,000,000 BI/PD Any One Occurrence

6. As stated under Authority requirements:

Prior to the initiation of any construction activities all Developers and/or Contractors shall have submitted an approved Certificate of Insurance outlining the required insurance coverages. Submit insurance certificates and Hold-harmless Agreements naming the Authority, Township and Engineer as co-insureds and certificate holders. The certificates shall contain a provision that coverages will not be cancelled or non-renewed unless at least thirty (30) days' written notice has been provided to the Authority.

END OF SECTION

TECHNICAL SPECIFICATIONS FOR THE SANITARY SEWER SYSTEM

SECTION 01010

SUMMARY OF WORK

PART 1 – GENERAL

1.01 SITE LOCATION

A. The project site is located in Cumberland County Pennsylvania; exact area as indicated on the drawings.

1.02 WORK INCLUDED

A. Without intending to limit or restrict the volume of Work required, the project includes but is not limited to the following:

1. Construction of sanitary sewer mains, laterals and valves.
2. Pipeline testing, sewer main and manholes.
3. Soil erosion control.
4. Private right-of-way restoration.
5. Street restoration.
6. Preparation of record drawings for completed project area.

1.03 ENGINEERING STAKES

A. The Contractor shall furnish, set and maintain suitable stakes, grade boards, temporary structures, templates and other materials for establishing and maintaining points, marks and lines, and is responsible for setting or checking such points, marks or lines, and in making or checking measurements necessary in the prosecution of the Work.

B. The Contractor shall be responsible for the preservation of all stakes and marks.

1.05 PROJECT COORDINATION

A. The Contractor shall inform the Authority as soon as delay in the Work is occasioned, or is likely to occur due to delays in the manufacture or delivery of the specified equipment.

1.06 SCHEDULING OF OPERATIONS

A. In the phases of Work or schedules of operations that follow, it is not essential that one operation be completely finished before another is started.

B. All Work required by the Contractor to maintain his schedule of operations will be considered incidental to the other items of Work of this contract.

C. Phases of Work

1. General

The Work shall be divided into the following phases:

a. Installation of sanitary sewer main and appurtenances.
b. Installation of sewer house laterals.
c. Restoration and paving.

2. It should be noted that all phases of Work involve the installation of pipelines below grade and shall follow relatively the same schedule of operations.

D. Schedule of Operations

1. Locate all underground utilities and existing physical features that are not to be removed during the Work. Notify the Authority if any discrepancies exist between the actual conditions and contract drawings.

2. Perform excavation at required areas and elevations. Place appropriate piping embedment, install pipe in correct alignment and backfill trench as required.

3. Restore any unpaved surfaces, perform final grading and cleanup.

END OF SECTION

Section 01015

CONTRACTOR USE OF PREMISES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section includes general use of the site including properties inside and outside of rights-of-way, work affecting road, ramps, streets and driveways and notification to adjacent occupants.

B. Comply with Township Ordinance 02 of 2006.

1.02 RIGHTS-OF-WAY

A. Confine access and operations and storage areas to rights-of-way provided by the Owner; trespassing on abutting lands or other lands in the area is not allowed.

B. Contractor may make arrangements, at Contractor's cost, for temporary use of private properties, in which case Contractor and Contractor's surety shall indemnify and hold harmless the Authority and the Township against claims or demands arising from such use of properties outside of rights-of-way. Submit copy of agreement between private property owner and Contractor for materials storage prior to use of the area.

C. Obtain appropriate permits for storage of materials within rights-of-way. Submit copies of permits prior to use of the area.

D. Restrict total length which materials may be distributed along the route of the construction at any one time as approved in writing by the Authority.

1.03 PROPERTIES OUTSIDE OF RIGHTS-OF-WAY

A. Altering the condition of properties adjacent to and along rights-of-way will not be permitted.

B. Means, methods, techniques, sequences, or procedures which will result in damage to properties or improvements in the vicinity outside of rights-of-way will not be permitted.

C. Any damage to properties outside of rights-of-ways shall be repaired or replaced to the satisfaction of the Authority.

1.04 USE OF SITE

A. Comply with Township Ordinance 02 of 2006.

B. Obtain approvals of governing authorities (i.e. Township and/or PennDOT) prior to impeding or closing public roads or streets. Do not close more than two consecutive intersections at one time.

C. Notify Owner 48 hours prior to closing a street or a street crossing. Permits for street closures are required in advance and are the responsibility of the Contractor.

D. Maintain access for emergency vehicles including access to fire hydrants.

E. Avoid obstructing drainage ditches or inlets; when obstruction is unavoidable due to requirements of the Work, provide grading and temporary drainage structures to maintain unimpeded flow.

F. Locate and protect private lawn sprinkler systems which may exist on rights-of-ways within the site. Repair or replace damaged systems to condition equal to or better than that existing at start of Work.

G. Perform daily clean-up of dirt outside the construction zone, and debris, scrap materials, and other disposable items. Keep streets, driveways, and sidewalks clean of dirt, debris and scrap materials. Do not leave building, roads, streets or other construction areas unclean overnight.

1.05 NOTIFICATION TO ADJACENT OCCUPANTS

A. Notify individual occupants in areas to be affected by the Work of the proposed construction and time schedule. Notification shall be not less than 72 hours or more than 2 weeks prior to work being performed within 200 feet of the homes or businesses.

B. Include in notification names and telephone numbers of two company representatives for resident contact, who will be available on 24-hour call. Include precautions which will be taken to protect private property and identify potential access or utility inconvenience or disruption.

C. Submit proposed notification to the Authority for approval.

1.06 PUBLIC, TEMPORARY, AND CONSTRUCTION ROADS AND RAMPS

A. Construct and maintain temporary detours, ramps, and roads to provide for normal public traffic flow when use of public roads or streets is closed by necessities of the Work.

B. Provide mats or other means to prevent overloading or damage to existing roadways from tracked equipment or exceptionally large or heavy trucks or equipment.

1.07 EXCAVATION IN STREETS AND DRIVEWAYS

A. Avoid hindering or needlessly inconveniencing public travel on a street or any intersecting alley or street for more than two blocks at any one time, except by permission of the Authority and Township.

B. Obtain Authority and Township approval when the nature of the Work requires closing of an entire street. Permits required for street closure are the Contractor's responsibility. Avoid unnecessary inconvenience to abutting property owners.

C. Remove surplus materials and debris and open each block for public use as work in that block is complete.

D. Acceptance of any portion of the Work will not be based on return of street to public use.

E. Avoid obstructing driveways or entrances to private property.

F. Provide temporary crossing or complete the excavation and backfill in one continuous operation to minimize the duration of obstruction when excavation is required across drives or entrances.

G. Provide barricades and signs in accordance with the Pennsylvania Department of Transportation.

1.08 TRAFFIC CONTROL

A. Comply with traffic regulation as specified by the Authority, Township and/or PennDOT, as applicable.

1.09 SURFACE RESTORATION

A. Restore site to condition existing before construction to satisfaction of the Authority and Township.

B. Repair paved areas per the requirements of Section 02575 - Paving and Resurfacing and applicable road opening or highway occupancy permits.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01060

REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDE

A. Comply with requirements of permits obtained by the Authority.

B. Obtain and pay for all other permits required to perform the Work in compliance with applicable local, state and federal laws and regulations.

C. Pay all inspection fees related to permits or requirements of governing agencies, utilities, railroads, etc.

D. If, throughout the process of the Work within state highways, it is deemed necessary by the Pennsylvania Department of Transportation to post field inspectors on that portion of the project within their right of way, the Contractor/Developer shall reimburse the Pennsylvania Department of Transportation for the cost of the inspection so applied.

1.02 PERMITS TO BE ACQUIRED BY THE SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

A. PennDOT "Highway Occupancy Permit"

B. Cumberland County Conservation District "Erosion and Sediment Pollution Control Plan" approval

C. Department of Environmental Protection "Notice of Intent for Coverage under the General NPDES Permit"

NOTICE: The General NPDES Permit will be transferred to the Contractor prior to the beginning of construction.

END OF SECTION

Section 01300

SUBMITTALS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Submittal procedures for:

1. Shop Drawings, Product Data, and Sampler
2. Manufacturer's Certificates
3. Design Mixes

1.02 SUBMITTAL PROCEDURES

A. Scheduling and Handling

1. Schedule submittals well in advance of the need for the material or equipment for construction. Allow time to make delivery of material or equipment after submittal is approved.

2. Develop a submittal schedule that allows sufficient time for initial review, correction, resubmission and final review of all submittals. The Authority's Engineer will review and return submittals to the Developer's Contractor as expeditiously as possible but the amount of time required for review will vary depending on the complexity and quantity of data submitted. In no case will a submittal schedule be acceptable which allows less than 10 days for initial review by the Engineer.

3. The Engineer's review of submittals covers only general conformity to the Drawings, specifications and dimensions which affect the layout. The Contractor is responsible for quantity determination. No quantities will be verified by the Engineer. The Contractor is responsible for any errors, omissions or deviations from the requirements; review of submittals in no way relieves the Contractor from his obligation to furnish required items according to the Drawings and Specifications.

4. Submit a minimum of 4 copies of documents unless otherwise specified in the following paragraphs or in the Specifications.

5. Revise and resubmit submittals as required. Identify all changes made since previous submittal.

6. The Contractor shall assume the risk for material or equipment which is fabricated or delivered prior to approval. No material or equipment shall be incorporated into the Work until approval has been obtained in the specified manner.

B. Transmittal Form and Numbering

1. Transmit each submittal to the Engineer with a Transmittal Letter.

2. Sequentially number each submittal beginning with the number 1. Re-submittals shall use the original number with an alphabetic suffix (i.e., 2A for first re-submittal of Submittal 2 or 15C for third re-submittal of Submittal 15). Each submittal shall only contain one type of work, material, or equipment. Mixed submittals will not be accepted.

3. Identify variations from requirements of Specifications and identify product or system limitations.

C. Contractor's Stamp

1. Apply Contractor's stamp, certifying that the items have been reviewed in detail and are correct and in accordance with Specifications, except as noted by any requested variance.

2. As a minimum, Contractor's Stamp shall include:

a. Contractor's name
b. Job number
c. Submittal number
d. Certification statement that the Contractor has reviewed the submittal and it is in compliance with the Contract Documents
e. Signature line for Contractor

1.03 MANUFACTURER'S CERTIFICATES

A. When specified in Specification sections, submit manufacturer’s certificate of compliance for review by Engineer.

B. Contractor's Stamp, as described in paragraph 1.02C, shall be placed on front page of the certification.

C. Submit supporting reference data, affidavits, and certifications as appropriate.

D. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

1.04 DESIGN MIXES

A. When specified in Specifications, submit design mixes for review.

B. Contractor's Stamp, as described in paragraph 1.02C, shall be placed on front page of each design mix.

C. Mark each design mix to identify proportions, gradations, and additives for each class and type of design mix submitted. Include applicable test results on samples for each mix.

D. Maintain a copy of approved design mixes at mixing plant.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01410

DIGITAL AUDIO-VIDEO RECORDING OF PROJECT SITE

PART 1 - GENERAL

1.01 DIGITAL AUDIO-VIDEO RECORDING

A. Pre-Construction

1. Digital audio-video recording along the project line route shall be submitted prior to the start of any construction activities. The recording equipment used must be of professional grade as rated by the manufacturer, and meet the requirements listed below under “Products”.

B. Post-Construction

1. Following the completion of the project and all restoration and paving, a second audio-video shall be taken and submitted. The video shall be taken either immediately following a rain event or upon introduction of an external water source to indicate drainage characteristics.

1.02 QUALIFICATIONS

A. Required recording shall be performed by an independent third party firm actively engaged, experienced and knowledgeable in video taping existing conditions on utility projects. The Authority reserves the right to request sample work and investigate the qualifications of any firm chosen to perform this work.

B. The recording shall be scheduled in advance with the Authority, in the event the Authority may wish to be present.

PART 2 - PRODUCTS

2.01 Audio-Video digital media shall be of the DV or Mini-DV format and have been manufactured by a recognized manufacturer, (i.e. Panasonic, MAXELL, SONY, FUJI, TDK, JVC, etc.) No used media or “seconds” shall be allowed.

2.02 All digital video shall be in color and conform to NTSC standards, 720 x 480 minimum resolution and in DVC format (DVD-R) for playback on most recognized DVD set-top units and PC DVD players.

2.03 Audio portion of recording shall contain verbal information relevant to the conditions, items, locations and direction of travel appearing in the video.

PART 3 - EXECUTION

3.01 All digital recording to be done during periods of good visibility and not during periods of visible precipitation or while ground is covered by snow.

3.02 Control direction of travel, panning rates, and zoom in-out rates in a manner that produces clarity of subject during playback. When a conventional wheeled vehicle is used, approximately 9 foot lens to ground distance should be maintained. In areas not accessible by conventional wheeled vehicles recording shall be conducted on foot along R.O.W’s and areas of influence plus 15 feet on either side at 100 feet intervals minimum.

3.03 Include in recorded coverage driveways, sidewalks, curbs, ditches, (to show drainage patterns), streets (as full width as possible), landscaping, trees, shrubs, culverts, catch basins, retaining walls, headwalls, fences, visible utilities, and building exteriors within the zones of influence. Easements should be given consideration where deemed necessary by the Authority. Houses and buildings should be identified both audibly and visibly when possible.

3.04 Properly identify all DVD's by number, date, locations, and project name. Begin the audio narrative portion of each recording with current date, project name and municipality, starting location and direction of travel.

3.05 Unless waived by the Authority, all recording shall be done in their presence or the presence of an authorized representative.

3.06 Supply an index run sheet with a record of each DVD contents and identify locations, station numbers, line numbers, etc., referenced to time and date encoded on DVD's main program screen allowing the viewer to view designated reference points as needed.

3.07 DELIVERY AND DOCUMENTATION

A. DVD's are to be delivered to the Authority prior to the start of any construction within the zones of influence unless waived by the Authority.

END OF SECTION

Section 01564

WASTE MATERIAL DISPOSAL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Disposal of waste material and salvageable material.

1.02 SUBMITTALS

A. Obtain and submit disposal permits for proposed disposal sites if required by local ordinances.

B. Submit a copy of written permission from property owner, along with description of property, prior to disposal of excess material adjacent to the Project. Submit a written and signed release from property owner upon completion of disposal work.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 SALVAGEABLE MATERIAL

A. Excavated material: When indicated on Drawings, load, haul, and deposit excavated material at a location or locations shown on Drawings outside the limits of Project.

3.02 EXCESS MATERIAL

A. Vegetation, rubble, broken concrete, debris, asphaltic concrete pavement, excess soil, and other materials not designated for salvage shall be removed from the job site and legally disposed of.

B. Excess soil may be deposited on private property adjacent to the Project when written permission is obtained from property owner. See Paragraph 1.02 B. above.

C. Verify the flood plain status of any proposed disposal site. Do not dispose of excavated materials in an area designated as within the 100-year Flood Hazard Area unless a Permit has been obtained.

D. Waste materials shall be removed from the site on a daily basis, such that the site is maintained in a neat and orderly condition.

END OF SECTION

Section 01570

TRAFFIC CONTROL AND REGULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Requirements for signs, signals, control devices, flares, lights and traffic signals, as well as construction parking control, designated haul routes and bridging of trenches and excavations.

B. Requirement for and qualifications of flagmen.

1.02 SUBMITTALS

A. The Contractor shall submit a traffic control plan for the project area.

B. The Contractor shall provide such information and records regarding the use of qualified flagmen to verify that the Contractor's use of flagmen is in compliance with the Specifications and PennDOT Publication No. 43 and Publication No. 90.

1.03 FLAGMEN

A. Use flagmen, qualified as described below, to control, regulate and direct the even flow or movement of vehicular or pedestrian traffic when construction operations encroach on public traffic lanes.

PART 2 - PRODUCTS

2.01 SIGNS, SIGNALS, AND DEVICES

A. Comply with PennDOT and local municipality guidelines.

B. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.

PART 3 - EXECUTION

3.01 PUBLIC ROADS

A. Comply with PennDOT Publication No. 43 and Publication No. 90. Abide by laws and regulations of governing authorities when using public roads. If the Contractor's work requires that public roads be temporarily impeded or closed, approvals shall be obtained from governing authorities and permits paid for before starting any work. Coordinate activities with the Authority.

B. Wherever possible, maintain a 10-foot-wide all-weather lane adjacent to work areas which shall be kept free of construction equipment and debris and shall be for the use of emergency vehicles, or as otherwise provided in the traffic control plan.

C. Contractor shall not obstruct the normal flow of traffic from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. on designated major arterials or as directed by the Authority or Township.

D. Contractor shall maintain local driveway access to residential and commercial properties adjacent to work areas at all times.

E. Cleanliness of Surrounding Streets:

1. Keep streets used for entering or leaving the job area free of excavated material, debris, and any foreign material resulting from construction operations.

3.02 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and municipal operations.

B. Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.

C. Prevent parking on or adjacent to access roads or in non-designated areas.

3.03 FLARES AND LIGHTS

A. Provide flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.04 HAUL ROUTES

A. Utilize haul routes designated by authorities or shown on the Drawings for construction traffic.

B. Confine construction traffic to designated haul routes.

C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

3.05 TRAFFIC SIGNS AND SIGNALS

A. Install traffic control devices at approaches to the site and on site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

B. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.

C. Relocate traffic signs and signals as Work progresses to maintain effective traffic control.

3.06 BRIDGING TRENCHES AND EXCAVATIONS

A. Whenever necessary, bridge trenches and excavation to permit an unobstructed flow of traffic.

B. Secure bridging against displacement by using adjustable cleats, angles, bolts or other devices whenever bridge is installed:

1. On an existing bus route;
2. When more than five percent of daily traffic is comprised of commercial or truck traffic;
3. When more than two separate plates are used for the bridge; or
4. When bridge is to be used for more than five consecutive days.

C. Install bridging to operate with minimum noise.

D. Adequately shore the trench or excavation to support bridge and traffic.

E. Extend steel plates used for bridging a minimum of one foot beyond edges of trench or excavation. Use temporary paving materials (premix) to feather edges of plates to minimize wheel impact on secured bridging.

F. Use steel plates of sufficient thickness to support H-20 loading, truck or lane, that produces maximum stress.

3.07 REMOVAL

A. Remove equipment and devices when no longer required.

B. Repair damage caused by installation.

C. Remove post settings to a depth of 2 feet.

END OF SECTION

SECTION 01721

RECORD DRAWINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Maintenance and submittal of record drawings for sewer system projects.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Maintain one record copy of documents at the site.

B. Label each document "RECORD DRAWING" in neat, large, printed letters.

C. Maintain record documents in a clean, dry, and legible condition. Do not use record documents for construction purposes.

D. Keep record documents available for inspection by the Authority.

1.03 RECORDING

A. The Contractor shall maintain a complete set of record drawings which shall be corrected daily with date notations. Notations shall show every change from the original Drawings. Changes shall include but not be limited to:

1. Field changes of dimension and detail. This includes changes in sewer main lengths and depths and manhole placement and depths. Measure main length at the surface. Reference manholes to poles, house corners, or any other permanent features.

2. Show all sewer laterals which are connected to the new sewer main. At sewer main, record station (0+00 format) of sewer laterals, length of sewer lateral to cleanout, depth of sewer lateral at cleanout, and manhole locations and depths. Use design drawings as sample.

B. All of this information shall be noted in red (hand drawn) on the Record Set of Drawings and shall be kept on the job site. Review the record documents with the Authority monthly. Provide the record set to the Authority for verification and approval.

1.04 SUBMITTALS

A. The record set of documents shall be delivered to the Authority and/or the Authority's Engineer in two formats: hard copy on 27 x 40 inch paper and on CD or DVD in AutoCAD using or saved to the current version in use by the Authority's consulting

engineer. The layers, colors, and line types shall conform to the attached listing of Record Drawing Layers. The delivery of the "record drawing" prints and CD's/DVD's for the Authority's and Engineer's use are a condition of Final Acceptance.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 02100

CLEARING AND GRUBBING

PART 1 – GENERAL

1.01 DESCRIPTION

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

1. Clearing
2. Grubbing
3. Stripping and stockpiling topsoil
4. Debris disposal

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compacting – Section 02221
2. Finish Grading and seeding – Section 02485

C. Definitions:

1. Clearing is defined as the removal of trees, brush, down timber, rotten wood, rubbish, any other vegetation and objectionable material at or above original ground elevation not designated to be saved. Clearing also includes removal of fences, walls, guard posts, guard rails, signs and other obstructions interfering with the proposed Work.

2. Grubbing is defined as the removal from below the surface of the natural ground of stumps, roots and stubs, brush, organic materials and debris.

1.02 JOB CONDITIONS

A. The Contractor may clear all obstructions within the permanent and construction rights-of-way except those specifically designated to be saved or restored in the Specifications.

1.03 SUBMITTALS

A. Burning Permits:

1. Submit one copy of each on-site burning permit to the Authority if such permits are required by local jurisdictional authorities.

B. Permits for Disposal of Debris:

1. Arrange for disposal of debris resulting from clearing and grubbing to locations outside the right-of-way and obtain written agreements with the owners of the property where the debris will be deposited.

2. Submit one copy of the agreement with each property owner releasing the Authority from responsibility in connection with the disposal of the debris.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Temporary Fencing:

1. Undamaged picket snow fence, 4’ high.

2. Soil-set fence posts, studded “T” type, 6’ high.

B. Tree Wound Dressing:

1. Antiseptic and waterproof, asphalt based.

PART 3 – EXECUTION

3.01 PREPARATION

A. Notify the Authority at least 48 hours prior to beginning any clearing work.

B. Protect benchmarks, utilities, existing trees, shrubs and other landscape features designated for preservation with temporary fencing or barricades satisfactory to the Authority. No material shall be stored or construction operation carried on within 4 feet of any tree to be saved or within the tree protection fence.

3.02 UTILITY RELOCATIONS

A. Inform all companies, individuals and others owning or controlling facilities or structures within the limits of the work which have to be relocated, adjusted or reconstructed in sufficient time for the utility to organize and perform such work in conjunction with or in advance of the Contractor’s operations.

B. Comply with the provisions of PA Act 287 of 1974 as amended by Act 187 of 1996.

3.03 CLEARING

A. Confine clearing to within the limits of the Developer’s property or the right-of-way or easement.

B. Fell trees in a manner that will avoid damage to trees, shrubs and other installations which are to be retained.

C. Where stumps are not required to be grubbed, flush-cut with ground elevation.

3.04 GRUBBING

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

B. Remove all stumps within the cleared areas unless otherwise authorized by the Authority.

3.05 DEBRIS DISPOSAL

A. Trees, logs, branches, brush, stumps and other debris resulting from clearing and grubbing operations shall be legally disposed of.

B. Do not deposit or bury on the site debris resulting from the clearing and grubbing work.

C. Debris may be burned on site if local ordinances allow open-air burning, if required permits are obtained, and if burning operations are conducted in compliance with local ordinances and regulations.

3.06 RESTORATION

A. Repair all injuries to bark, trunk, limbs and roots of remaining plants by properly dressing, cutting, tracing and painting, using approved arboricultural practices and materials.

B. Replace trees, shrubs and plants designated to be saved which are permanently injured or die as a result of construction operations.

C. Remove protective fences, enclosures and guards upon the completion of the project.

D. Restore guard posts, guard rails, signs and other interferences to the condition equal to that existing before construction operations.

END OF SECTION

SECTION 02110

EROSION CONTROL BLANKET

PART 1 – GENERAL

1.01 MATERIAL SPECIFICATION

A. The erosion control blanket shall be a machine-produced mat of 100% agricultural straw with a functional longevity of approximately 12 months.

B. The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a lightweight photodegradable polypropylene netting having an approximate 0.50 X 0.50 inch (1.27 X 1.27 cm) mesh and be sewn together on 1.50 inch (3.81 cm) centers (50 stitches per roll width) with degradable thread.

C. The blanket shall be manufactured with a colored line or thread stitched along both outer edges (approximately 2 – 5 inches [5 – 12.5 cm] from the edge) to ensure proper material overlapping.

PART 2 – PRODUCTS

1.01 MANUFACTURERS

A. Straw erosion control blanket shall be S75 as manufactured by North American Green, or equivalent.

B. Another acceptable manufacturer may be used upon approval.

1.02 MATERIALS AND SPECIFICATIONS

A. The S75 erosion control blanket shall have the following properties:

MATERIAL CONTENT

Matrix	100% Straw Fiber (0.50 lbs/yd^2) (0.26 kg/m^2)
Netting	One side only, lightweight photodegradable (2.10 lbs/1,000 ft^2 [1.02 kg/100m^2] approximate weight)
Thread	Degradable

PHYSICAL SPECIFICATIONS (PER ROLL)

	English	**Metric**
Width	6.67 ft	2.03 m
Length	108.00 ft	32.92 m
Weight	40.00 lbs ±10%	18.14 kg
Area	80.00 yd^2	66.89 m^2
Stitch Spacing	1.50 inches	3.81 cm

END OF SECTION

SECTION 02150

BORING AND CASING

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Approach trench excavation

2. Installation of casing pipe

3. Installation of carrier pipe

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling & Compacting: Section 02221

C. Applicable Standard Details:

1. Boring Detail

1.02 QUALITY ASSURANCE

A. Contractor Qualifications:

1. Construction operations shall be undertaken only by a contractor well experienced in operations of similar magnitude and condition under transportation arteries and surface areas which cannot be disturbed.

B. Design Criteria:

1. Pipe and joints of leak-proof construction, designed for the earth and/or other pressures present, plus highway H20 loading or railway E80 loading with the associated recommended impact loading.

2. Design bracing, backstops, and use jacks of sufficient rating so that the jacking can proceed without stoppage, except for adding pipe sections and as conditions permit, to minimize the tendency of the ground material to 'freeze' around the casing pipe.

C. Allowable Tolerances:

1. Do not overcut excavation by more than 1" greater than the outside diameter of the casing pipe.

2. Install casing pipe with the determined vertical and horizontal alignment prior to installation of the carrier pipe.

D. Reference Codes and Specifications:

1. Comply with applicable federal, state and local ordinances, codes, statutes, rules and regulations, and affected jurisdictional bodies.

2. Pennsylvania Department of Transportation Publication 408 Specifications.

1.03 SUBMITTALS

A. Submit history of previous work completed of equivalent nature and scope. Include qualification and experience of key personnel.

B. Submit description of proposed construction methods, including methods to establish and maintain vertical and horizontal alignment.

C. Submit manufacturer's data on casing pipe.

1. Highway Crossings: Design casing pipe for earth and/or other pressure loads present, plus AASHTO H20 live loading.

2. Railroad Crossings: Design casing pipe for earth and/or other pressure loads present, plus Cooper's Railroad E80 live loading with 50-percent added for impact.

1.04 JOB CONDITIONS

A. Conduct operations so as not to interfere with, interrupt, damage, destroy, or endanger the integrity of surface or subsurface structures or utilities, and landscape in the immediate or adjacent areas.

B. When boring under state highways and railroads, comply with applicable right-of-way occupancy permits.

C. If boring is obstructed, relocate or jack crossing as approved by the Authority's Engineer.

PART 2 - PRODUCTS

2.01 STEEL CASING PIPE

A. ASTM A139, Grade B; 35,000 psi min. yield strength.

B. Full circumference welded joints.

C. Diameter as shown on the Drawings.

D. Minimum wall thickness as listed below:

Nominal Dia. (inches)	Coated or Cath. Protected	Uncoated and Unprotected
Under 14	0.188	0.251
14, 16	0.219	0.282
18	0.250	0.313
20	0.281	0.344
22	0.312	0.375
24	0.344	0.407
26	0.375	0.438
28, 30	0.406	0.469
32	0.438	0.501
34, 36	0.469	0.532
38, 40, 42	0.500	0.563
48	0.563	0.626
54	0.625	0.688

Smooth wall steel pipe with nominal diameter over 54" will not be permitted.

2.02 CASING SPACERS

A. Casing spacers shall be RACI Casing Spacers as manufactured by Public Works Marketing, Inc., or approved equal. Installation shall be in accordance with the manufacturer.

B. Other approved methods for cradling and anchoring pipe may be used. Spacing and end seals as required by manufacturer.

PART 3 - EXECUTION

3.01 APPROACH TRENCH

A. Excavate approach trench using methods as site conditions require.

B. Ensure pipe entrance face as near perpendicular to alignment as conditions permit.

C. Establish a vertical entrance face at least 1 foot above top of casing or tunnel lining.

D. Install adequate excavation supports as specified in Section 02221 - Trenching.

3.02 CASING PIPE DIAMETER

A. Casing pipe diameter shall be as specifically indicated on the crossing plan or profile drawings for all bored crossings.

B. Casing pipe diameter shall comply with the requirements of the Specifications and Drawings and as otherwise stated herein.

C. Contractor has option to utilize larger casing pipe to facilitate anticipated rock/boulder removal; subject to the approval of the Authority's Engineer and any regulatory agency having jurisdiction.

D. Contractor shall advise the Authority's Engineer of his proposed casing pipe diameter and provide suitable shop drawings prior to ordering materials and initiating work. This shall be done sufficiently ahead of time to obtain regulatory approvals as required.

3.03 CASING PIPE INSTALLATION METHODS

A. BORING:

1. Push the pipe into the ground with a boring auger rotating within the pipe to remove the spoil. Do not advance the cutting head ahead of the casing pipe except for that distance necessary to permit the cutting teeth to cut clearance for the pipe. The machine bore and cutting head arrangement shall be removable from within the pipe. Arrange the face of the cutting head to provide a barrier to the free flow of soft material.

2. If unstable soil is encountered during boring retract the cutting head into the casing to permit a balance between the pushing pressure and the ratio of pipe advancement to quantity of soil.

3. If voids should develop greater than the outside diameter of the pipe by approximately one inch, grout to fill voids.

B. JACKING:

1. Construct adequate thrust wall normal to the proposed line of thrust.

2. Impart thrust load to the pipe through a suitable thrust ring that is sufficiently rigid to ensure distribution of the thrust load on the pipe.

C. DRILLING AND JACKING:

1. Use an oil field type rock roller bit or plate bit made up of individual roller cutter units solidly welded to the pipe which is turned and pushed for its entire length by the drilling machine to give the bit the necessary cutting action.

2. Inject a high density slurry (oil field drilling mud) to the head as a cutter lubricant. Inject slurry at the rear of the cutter units to prevent jetting action ahead of the pipe.

D. MINING AND JACKING:

1. Utilize manual hand-mining excavation from within the casing pipe as it is advances with jacks, allowing minimum ground standup time ahead of the casing pipe.

3.04 DEWATERING:

A. Intercept and divert surface drainage precipitation and groundwater away from excavation through the use of dikes, curb walls, ditches, pipes, sumps or other means.

B. Develop a substantially dry subgrade for the performance of subsequent operations.

C. Comply with Federal and State requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

3.05 PRESSURE GROUTING:

A. Pressure grout the annular space between the casing pipe and surrounding earth.

3.06 CARRIER PIPE INSTALLATION:

A. All provisions regarding cleaning, inspection and handling specified under pipe material sections apply to this work.

B. Place the carrier as shown on the Drawings. Exercise care to prevent damage to pipe joints when carrier pipe is placed in casing.

C. Support pipeline within casing so that no external loads are transmitted to carrier pipe. Attach casing spacers to barrel of carrier pipe; do not rest carrier pipe on bells.

3.07 CARRIER PIPE ANTIFLOTATION

A. Upon completion of the carrier pipe installation, provide anti-flotation as follows:

1. For encasement diameter up to 36 inches: provide sand or pea gravel fill for full crossing length to a point at least 1.5 times the full carrier pipe diameter above the top of the carrier pipe or to the crown of the encasement pipe; whichever is lesser.

2. For encasement diameter of 36 inches or larger: provide anti-flotation as above or provide brick bulkheads or anchored tie roads at each bell of carrier pipe for full crossing length.

3.08 ENCASEMENT SEALS

A. Seal encasement pipes at each end with either brick and mortar, concrete bulkheads or end seals as required by manufacturer.

END OF SECTION

SECTION 02221

TRENCHING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Cutting paved surfaces
2. Blasting
3. Trench excavation, backfill and compaction
4. Support of excavation
5. Pipe bedding requirements
6. Control of excavated material
7. Rough grading
8. Restoration of unpaved surfaces

B. Related Work specified elsewhere:

1. Clearing and Grubbing – Section 02100
2. Boring – Section 02150
3. Finish Grading and Seeding – Section 02485
4. Paving and Resurfacing – Section 02575

C. Applicable Standard Details:

1. Pipe embedment and trench backfilling
2. Typical trench width at top of pipe

D. Definitions:

1. Subgrade: Trench or excavation bottom prepared as specified herein to receive pipe bedding, concrete cradle or encasement, or structures.

2. Unclassified Excavation: Excavation of all material encountered including soil, shale, rock, boulders, fill or other material on-site.

3. Rock Excavation: Excavation of solid mineral rock greater than one-half cubic yard in volume requiring, with the Authority's Engineer's approval, drilling, blasting and wedging for its removal.

4. Pipe Bedding: Placement of material as specified herein for full trench width from the subgrade a minimum of six (6) inches or one-fourth the internal diameter of the pipe, whichever is greater, below the pipe invert to half-way up the outside diameter of the pipe.

5. Pipe Embedment: Placement of material as specified herein for full trench width from the top of the pipe bedding (halfway up pipe) to a point a minimum of six (6) inches above the pipe.

6. Backfill: Placement of material as specified herein for full width of excavation from the top of the pipe embedment to the ground surface or, in the case of paved areas, to the bottom of replacement base course or paving.

1.02 QUALITY ASSURANCE

A. Testing Agency:

1. Compaction testing shall be performed by a Soils Testing Laboratory engaged and paid for by the Contractor and approved by the Engineer.

B. Reference Standards:

1. Pennsylvania Department of Transportation:

a. Regulations Governing Occupancy of Highways by Utilities (67 PA Code, Chapter 459)
b. Publication 408 Specifications
c. Pennsylvania Test Method, PTM 106
d. Pennsylvania Test Method, PTM 402
e. Publication 203, Work Zone Traffic Control

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

ASTM C33	Specifications for Concrete Aggregates
ASTM D698	Tests for Moisture-Density Relations of Soils
ASTM D2922	Test for Density of Soil and Soil Aggregate in Place by Nuclear Methods

C. Compaction Testing:

1. Conduct one test for each 1,000 linear feet of pipeline. Conduct compaction tests at locations as directed by the Authority's Engineer during backfilling operations.

2. Determine compaction in state highways and shoulders by the testing procedure contained in Pennsylvania Test Method PTM 106, Method B or PTM 402.

3. Determine compaction in areas other than state highways and shoulders by the testing procedure contained in ASTM D698 or ASTM D2922.

1.03 SUBMITTALS

A. Certificates:

1. Submit certification attesting that the composition analysis of pipe bedding and select backfill materials meet specification requirements.

2. Submit certified compaction testing results from the soils testing laboratory.

B. Compaction Equipment List:

1. Submit a list of all equipment to be utilized for compacting, including manufacturers' lift thickness limitations.

1.04 JOB CONDITIONS

A. Control of Traffic:

1. Employ traffic control measures in accordance with Pennsylvania Department of Transportation Publication 203, "Work Zone Traffic Control." Refer to Section 01570 of the Specifications.

2. Comply with all local authorities. Obtain approval of traffic control plan from the Authority and Township prior to start of excavation.

B. Protection of Existing Utilities and Structures:

1. Take all precautions and utilize all facilities required to protect existing utilities and structures. Advise each Utility at least 3 working days in advance of intent to excavate, do demolition work or use explosives and give the location of the job site. Request cooperative steps of the Utility and suggestions for procedures to avoid damage to its lines.

2. Advise each person in physical control of powered equipment or explosives used in excavation or demolition work of the type and location of utility lines at the job site, the Utility assistance to expect, and procedures to follow to prevent damage.

3. Immediately report to the Utility and the Authority any break, leak or other damage to the lines or protective coatings made or discovered during the work and immediately alert the occupants of premises of any emergency created or discovered.

4. Allow free access to Utility personnel at all times for purposes of maintenance, repair and inspection.

5. The Contractor shall be held liable for any damage done by reason of breaking of water, sewer, gas, telephone, electrical, or other utility service. In case, during the course of his work, he shall damage any of the aforementioned utilities, he shall immediately begin to repair the same and send notice to the proper authorities. Whenever the Contractor, during the progress of the excavation shall uncover service pipes or lines, which because of age or injury, are in poor condition, he shall immediately notify the proper Authority in order that steps may be taken for replacement or repair. To prevent dispute with property owners as to cause of damages, the Contractor shall notify his foreman to carefully note and properly report such damage.

6. Keep all fire hydrants, water valves, gas valves, fire alarm boxes, and letter boxes accessible for use.

PART 2 - PRODUCTS

2.01 PIPE BEDDING MATERIAL

A. Standard Pipe Bedding:

1. AASHTO No. 8 (formerly 1B) crushed stone or gravel aggregate, Table C, Section 703.2, Publication 408 Specifications. Do not use slag or cinders.

B. Alternate Pipe Bedding only where Approved by the Engineer:

1. AASHTO No. 57 (formerly 2B) crushed stone or gravel aggregate, Table C, Section 703.2, Publication 408 Specifications. Do not use slag or cinders.

2.02 PIPE EMBEDMENT MATERIAL

A. Standard Pipe Embedment:

1. AASHTO No. 8 crushed stone or gravel aggregate. Do not use slag or cinders.

B. Alternate Pipe Embedment (Only where approved by the Authority's Engineer):

1. AASHTO No. 57 crushed stone or gravel aggregate. Do not use slag or cinders.

2.03 BACKFILL MATERIAL

A. Native Backfill (Not permitted within existing paved road areas):

1. Material excavated from the site if free of stones larger than 6" in size and free of wet, frozen, and organic materials and refuse.

B. Clean Earth Backfill:

1. Material excavated from the trench if free of stones larger than 2" in size and free of wet, frozen, or organic materials and refuse.

C. Select Backfill:

1. Type 2A aggregate shall be limestone or shall demonstrate a weight in pounds per cubic foot equivalent to or greater than limestone.

PART 3 - EXECUTION

3.01 MAINTENANCE AND PROTECTION OF TRAFFIC

A. Coordinate the work with the Authority and the Township to insure the least inconvenience to traffic and maintain traffic in one or more unobstructed lanes unless closing the roadway is authorized.

B. Maintain access to all streets and private drives by hauling of excavated and backfill materials, if necessary, in suitably covered and leakproof trucks.

C. Provide and maintain signs, flashing warning lights, barricades, markers, and other protective devices as required to conform with construction operations and to keep traffic flowing with minimum restrictions.

D. Comply with state and local codes, permits and regulations.

3.02 STRIPPING

A. The Contractor shall remove all paving, subpaving, curbing, gutters, brick, paving block, granite curbing or flagging, or grub and clear the surface over the area to be excavated and shall properly classify the materials removed, separating them as required. Where pipe trenches underlie permanent resurfacing, the surface material shall be machine cut before excavation is begun.

B. He shall properly store, guard, and preserve material as may be required for future use in backfilling, surfacing, repaving, etc. All materials which may be removed and all rock, earth, and sand taken from the excavation shall be stored, if practical, in certain parts of the roadway or such other suitable place and in such manner as the Authority shall approve. The Contractor shall be responsible for any loss or damage to the said materials because of careless removal or neglectful or wasteful storage, disposal, or use of these materials.

C. In case more materials are created from any trench that can be backfilled over the completed pipe or stored in the street, leaving space for traffic, the excess material shall be removed to some convenient place provided by the Contractor or as directed by the Authority. The Contractor shall bring back as much of the material so removed as may be required to properly refill the trench, if of the proper kind, or if so directed by the Authority, he shall furnish such other material as may be necessary.

3.03 TEST PITS

A. The Contractor shall excavate test pits at such points and of such dimension and depths as indicated on the Drawings or as the Authority's Engineer may direct. It is understood that the purpose of these test pits is to verify, so far as practical, the location of various subsurface structures or utilities.

3.04 CUTTING PAVED SURFACES

A. Where installation of pipelines, miscellaneous structures, and appurtenances necessitate breaking a paved surface, make saw cuts using a diamond wheel or similar instrument in a neat uniform fashion forming straight lines parallel with the centerline of the trench. Cut offsets at right angles to the centerline of the trench.

B. Protect edges of cut pavement during excavation to prevent raveling or breaking; square edges prior to pavement replacement.

3.05 ROCK EXCAVATION BY BLASTING

A. Blasting will be permitted except in areas where the proximity of structures, underground facilities, or public safety preclude the use of explosives. Nothing in this section shall relieve the Contractor of his responsibilities for damages, nor shall it result in any liability to the Authority or the Engineer.

B. All blasting operations shall be conducted in a safe and satisfactory manner. Any rock excavation within five feet of underground utilities shall be done with a very light charge of explosives and the utmost care shall be used to avoid disturbing the mains. All exposed pipe lines and other structures shall be carefully protected from the effects of blasts and any damage done to them by blasting shall be properly repaired by the Contractor. Sufficient written notice shall be given to all persons in the vicinity of the work before blasting. The Contractor shall be required to place seismographs in nearby structures when blasting is to occur. The site of the blast shall be covered with heavy timbers, blasting mats, or other devices to prevent damage from flying rock. The time of blasting and the number and size of charges must be satisfactory to the Authority's Engineer.

C. All rock excavation shall be conducted by a licensed blaster. Handling explosive materials and conducting blasting operations shall be in accordance with all of the safety regulations of the Commonwealth of Pennsylvania and OSHA. Obtain approval and/or permit from the Township prior to start of blasting.

D. Written notice to residents shall include the applicable scheduling for blasting and shall inform the residents of their rights to submit a claim for damages resulting from the blasting operations for a minimum period of one year from the completion of the excavation portion of construction activities.

3.06 TRENCH EXCAVATION

A. Depth of Excavation:

1. Gravity Pipelines:

a. Excavate trenches to the depth and grade required for the invert of the pipe plus a minimum excavation of six (6) inches or one-fourth the internal pipe diameter, whichever is greater, for placement of pipe bedding material.

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

2. Pressure Pipelines:

a. Excavate trenches to the minimum depth necessary to place required pipe bedding material as above and to provide 4' from the top of the pipe to the finished ground elevation, except where specific depths are otherwise shown on the drawings.

3. Care shall be taken not to excavate below the depths required. Any such excessive excavation shall be refilled with crushed stone and compacted to the satisfaction of the Authority's Engineer.

4. When the material encountered at subgrade is unsuitable and in the opinion of the Authority's Engineer does not afford a sufficiently firm foundation, the Contractor shall excavate to such increased depth as directed. The bottom of the trench shall be brought to the required elevation with crushed stone compacted to the satisfaction of the Engineer.

5. When the pipe is to be laid in fill, the embankment shall be brought to a height of at least nine inches above the proposed top of the pipe before the trench is excavated.

6. If rock below the specified grade is shattered due to excessive drilling or blasting or other negligence of the Contractor, and if in the opinion of the Engineer it is unfit for foundations, such shattered rock shall be removed and the area backfilled to the proper grade with crushed stone.

B. Width of Excavation:

1. Pipe trenches shall be sufficiently straight between designated angle points to permit the pipe to be laid true to line in the approximate center of the trench. The trench widths shall be such as to provide a free working space on each side of the pipe as laid, but shall not exceed the outside diameter of the barrel of the pipe plus sixteen inches at a point one foot above the top of the pipe.

2. Where sheeting and shoring are used, the maximum allowable width shall be measured between the closest interior faces of the sheeting or shoring as placed. Whenever, for any reason, the maximum trench width is exceeded, the Contractor may be ordered by the Engineer to encase the pipe in a concrete cradle.

3. For pressure pipeline fittings, excavate trenches to a width that will permit placement of concrete thrust blocks. Provide earth surfaces for thrust blocks that are perpendicular to the direction of thrust and are free of loose or soft material.

4. If the Contractor is required to excavate the trench to a width greater than that specified above, because of slides, caves, obstructions or by reason of the condition and character of the material, he shall refill any cavities so caused with suitable and satisfactory material, including concrete or other masonry if so directed.

C. Length of Open Trench:

1. The Engineer reserves the right to limit the length of distance that a trench may be opened in advance of the pipe laid at all times.

2. Do not advance trenching operations more than 200 feet ahead of completed pipeline, except where approved by the Engineer or otherwise specified in the State Highway Occupancy Permit.

3. Where rock excavation is encountered, all trenches must be opened at least 30 feet in advance of any pipe being laid.

4. If the work is stopped on the whole or any part of the trench and the same is left open for an unreasonable length of time in advance of the construction of the pipe line, the Contractor shall, when directed, refill such trench and he shall not again open the trench or part thereof until he is ready to proceed with construction of the pipe line.

3.07 SUPPORT OF EXCAVATION

A. Support excavations with sheeting, shoring, and bracing or a "trench box" as required to comply with Federal and State laws and codes.

B. Install adequate excavation supports to prevent ground movement or settlement to adjacent structures, pipelines or utilities. Damage due to settlement because of failure to provide support or through negligence or fault of the Contractor in any other manner, shall be repaired by the Contractor.

C. Withdraw shoring, bracing, and sheeting as backfilling proceeds unless otherwise directed by the Engineer.

D. All voids caused by withdrawal shall be immediately filled with concrete, sand, current ASTM Designation C-33 or other satisfactory material and compacted by ramming or other methods satisfactory to the Engineer.

3.08 CONTROL OF EXCAVATED MATERIAL

A. Keep the ground surface, within a minimum of 2' of both sides of the excavation free of excavated material.

B. Provide temporary barricades to prevent excavated material from encroaching on private property, walks, gutters, and storm drains.

C. Maintain accessibility to all fire hydrants, valve pit covers, valve boxes, curb boxes, fire and police call boxes, and other utility controls at all times. Keep gutters clear or provide other satisfactory facilities for street drainage. Do not obstruct natural water courses. Where necessary, provide temporary channels to allow the flow of water either along or across the site of the work.

D. In areas where pipelines parallel or cross streams, ensure that no material slides, is washed, or dumped into the stream course. Remove cofferdams immediately upon completion of pipeline construction.

E. Conform to all applicable soil erosion and sediment control regulations.

3.09 DEWATERING

A. Keep excavations dry and free of water. Dispose of precipitation and subsurface water clear of the work.

B. Maintain pipe trenches dry until pipe has been jointed, inspected, and backfilled, and concrete work has been completed. Prevent trench water from entering pipelines under construction.

C. Intercept and divert surface drainage away from excavations. Design surface drainage systems so that they do not cause erosion on or off the site, or cause unwanted flow of water.

D. Comply with Federal and State regulations for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

3.10 PIPE BEDDING AND EMBEDMENT

A. Prepare trench bottom as shown on Standard Detail.

B. Place and compact Standard Pipe Bedding of AASHTO No. 8 in accordance with Standard Detail and specifications.

C. Shape bedding recesses for joints and bells to assure pipe is supported on barrel for entire length.

D. Lay pipe as specified in Section 02610 of these Specifications.

3.11 THRUST RESTRAINT

A. Provide pressure pipe with concrete thrust blocking or use restrained joint fittings at all bends, tees, valves, and changes in direction, in accordance with the Specifications and Standard Details.

3.12 BACKFILLING TRENCHES

A. Unless otherwise directed by the Authority's Engineer, backfilling shall be started immediately after preliminary alignment inspection is made and shall continue without interruption to completion.

B. The satisfactory compaction of all backfills shall be the responsibility of the Contractor regardless of the methods used and he shall protect the Authority from any loss, damage, or claims occasioned by trench settlement.

C. Compaction:

1. From the height of 6" inches above the top of the pipe, the backfill material shall be placed in 6" inch vibrator layers mechanically tamped to obtain maximum compaction.

2. Tamping shall proceed from the center of the trench to the sides to prevent arcing.

3. Backfill shall be compacted to a dry density at least equal to 95 percent of the maximum dry density obtained in the modified reactor tests, ASTM D1557-70.

4. Backfill shall be placed and compacted to within 6 ½ inches of the existing road grad, unless otherwise directed by the Authority. Refer to Section 02575, Paving and Resurfacing.

D. Open Fields or Grassed Areas:

The initial backfill above the pipe embedment shall be a minimum of one foot in depth and shall be filled with clean earth placed in six-inch layers and carefully compacted with pneumatic hand tampers, except in rock where a suitable material approved by he Engineer shall replace the excavated rock. Above this point to a depth of 18 inches below the finished grade, the backfill material may contain small stones not larger than six inches in their greatest dimension in an amount not greater than 20 percent of the volume of backfill and well-distributed throughout the mass. The remaining 18 inches of backfill shall consist of clean earth. Clean earth shall be considered the original material taken from the ditch less any stones, rocks or foreign materials.

In open fields or grass areas, the trench shall be mounded as shown on the Standard Details.

E. Streets(State Highways and other than State Highways):

The entire depth of trench above the pipe embedment to a point six and one-half (6 ½") inches below the existing surface (two inches if temporary resurfacing is to be used), or as directed by the Authority's Engineer shall be filled with Select Granular Material in conformance with PENNDOT 408 Specifications, Section 703.3. Such backfill shall be placed for the entire width of the trench in six-inch (6") maximum layers and well compacted by approved vibratory compactor, in conformance with Section 601.3(e).

F. Unsuitable Backfill Material:

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

3.13 BACKFILLING AND GRADING AROUND STRUCTURES

A. The ground around structures shall be brought to the grades shown on the plans or as directed by the Authority's Engineer. Generally, backfilling shall be made in accordance with the specifications for trench backfilling to open fields or grass areas, except where practical, compacting may be performed by rolling. Grading shall be done by ploughing, harrowing, scraping, or by other methods to bring the ground to the required elevations in preparing the ground for the deposition of the topsoil. When the site has been properly graded to provide drainage, the topsoil shall be placed to a depth of four inches and then harrowed to provide a reasonably smooth surface, ready for seeding. Where compaction is made by rollers, the rollers shall weigh not less than ten tons and shall not be permitted within eight feet of any wall or structure or where, in the opinion of the Engineer, damage may result to existing underground piping.

B. The Contractor shall be responsible for the stability of the fill and shall replace any portion thereof damaged by natural causes, or by careless or negligent work.

C. Sufficient grading shall be done during the progress of the work so that no water is allowed at any time to flow toward the wall or structures or to accumulate in large puddles on the project site.

3.14 DISPOSAL OF EXCAVATED MATERIAL

A. Excavated material remaining after completion of backfilling shall remain the property of the Contractor, removed from the construction area, and disposed of in accordance with Section 01564.

3.15 ROUGH GRADING

A. Rough grade areas disturbed by construction to a uniform finish. Form the bases for terraces, banks, lawns and paved areas.

B. Grade areas to be paved to depths required for placing sub-base and paving materials.

C. Rough grade areas to be top-soiled and seeded to 3" below indicated finish contours.

3.16 FINAL LEVELING AND CLEANUP

A. Whenever the trenches have not been properly filled, or if settlement occurs, they shall be refilled, compacted, leveled, and finally graded to conform to the surface of the ground. Trenches in streets, sidewalks, alleys, etc., shall be refilled with crushed stone, graded as shown on the plans. Trenches in open fields or unpaved plant areas shall be mounded with clean earth to a minimum depth of three inches.

B. As the work is completed, the Contractor shall remove and dispose of all surplus earth, stone, or other material on-site or distant from the work in such manner and at such point or points as he may select or provide, subject to the approval of the Authority's Engineer, and shall leave all roads, sidewalks, and other places free, clear, and in good order.

C. The level of trench fill is to be maintained for a period of one year within dedicated and pre-existing legal roads and right-of-ways.

3.18 DUST CONTROL

A. Where dust or wind erosion is a problem, the unstable surface shall be lightly sprinkled with water or a dust suppressor shall be applied as necessary or as directed by the Authority's Engineer. Care shall be taken so as not to cause any water erosion to the unstable surface.

END OF SECTION

SECTION 02485

FINISH GRADING AND SEEDING

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Placing topsoil
2. Soil conditioning
3. Finish grading
4. Seeding
5. Maintenance

B. Restore unpaved surfaces to a condition similar to that prior to excavation as specified and indicated on the Drawings.

C. The "Seeding Restoration Tables" at the end of this section list specific seeding restoration requirements. Refer to Drawings and Special Conditions for seeding restoration requirements at each specific location of Work.

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation Publication 408 Specifications.
2. Pennsylvania Seed Act of 1965, Act 187, as amended.
3. Agricultural Liming Materials Act of 1978, P.L. 15, No. 9 (3P.S. 132-1), as amended.
4. Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258, No. 86 (3P.S. 68.2), as amended.
5. Rules for Testing Seeds of the Association of Official Seed Analysts.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Seed:

1. Deliver seed fully tagged and in separate packages according to species or seed mix. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be accepted.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Having a pH of between 6.0 and 7.0; containing not less than 2% nor more than 10% organic matter as determined by AASHTO T194.

B. Fertile friable loam, sand loam, or clay loam which will hold a ball when squeezed with the hand, but which will crumble shortly after being released.

C. Free of clods, grass, roots, or other debris harmful to plant growth.

D. Free of pests, pest larvae, and matter toxic to plants.

2.02 FERTILIZER

A. Basic Dry Formulation Fertilizer:

1. Analysis 0-20-20 and as defined by the Pennsylvania Soil Conditioner and Plant Growth Substance Law.

B. Starter Fertilizer:

1. Analysis 10-5-5 or 12-6-6 and as defined by the Pennsylvania Soil Conditioner and Plant Growth Substance Law.

2.03 LIME

A. Raw ground limestone conforming to Section 804.2(a), Publication 408 Specifications.

2.04 SEED

A. Fresh, clean, dated material from the last available crop and within the date period specified, with a date of test not more than 9 months prior to the date of sowing. Percentage of pure seed present shall represent freedom from inert matter and from other seeds distinguishable by their appearance. All seeds will be subject to analysis and testing.

TABLE 1 - GRASS AND AGRICULTURAL SEEDS

Species	Minimum Guaranteed Purity (Percent)	Maximum Weed Seed (Percent)	Minimum Guaranteed Germination (Percent)
Kentucky Bluegrass (Poa pratensis) Domestic origin; min. 21 lb. per bushel	90	0.20	80
Perennial Ryegrass (Lolium perenne, var. Pennfine)	95	0.15	90
Kentucky 31 Fescue (Festuca elatior arundinacea)	98	0.25	85
Crownvetch (Coronilla varia, var. Penngift)	99	0.10	70
Pennlawn Red Fescue (Festuca rubra, var. Pennlawn)	98	0.25	90
Annual Ryegrass (Lolium multiflorum)	95	0.15	90
Timothy (Phleum pratense)	98	0.25	95

2.05 SEED MIXTURES

A. See "Seeding Restoration Table" at end of this Section.

2.06 INOCULANT

A. Inoculate leguminous seed before seeding with nitrogen fixing bacteria culture prepared specifically for the species.

B. Do not use inoculant later than the date indicated by the manufacturer.

C. Protect inoculated seed from prolonged exposure to sunlight prior to sowing.

D. Re-inoculate seed not sown within 24 hours following initial inoculation.

2.07 MULCHING MATERIALS

A. Mulches for seeded area shall be one, or a combination of, the following:

1. Hay:

a. Cured to less than 20% moisture content by weight.

b. Contain no stems of tobacco, soybeans, or other coarse or woody material.

c. Timothy hay or mixed clover and timothy hay.

2. Straw:

a. Cured to less than 20% moisture content by weight.

b. Contain no stems of tobacco, soybeans, or other coarse or woody material.

c. Wheat or oat straw.

3. Wood Cellulose:

a. No growth or germination inhibiting substances.

b. Green, air dried. Packages not exceeding 100 pounds.

c. Requirements:

Moisture Content:	12% $\pm$ 3%
Organic Matter:	98.6% + 0.2% on the oven dry basis.
Ash content:	1.4% $\pm$ 0.2%
Minimum Water-Holding Capacity:	1,000%

4. Mushroom Manure:

a. Organic origin, free of foreign material larger than 2" and substances toxic to plant growth.

b. Organic Matter: 20% minimum.

c. Water-Holding Capacity: 120% minimum.

d. pH: 6.0.

PART 3 - EXECUTION

3.01 TIME OF OPERATIONS

A. Spring Seeding:

1. Preliminary operations for seed bed preparation may commence as soon after February 15 as ground conditions permit.

B. Fall Seeding:

1. Preliminary operations for seed bed preparation may commence after July 15.

3.02 PREPARATION OF SUBGRADE

A. "Hard Pan" or heavy shale:

1. Plow to a minimum depth of 6".

2. Loosen and grade by harrowing, discing, or dragging.

3. Hand-rake subgrade. Remove stones over 2" in diameter and other debris.

B. Loose loam, sandy loam, or light clay:

1. Loosen and grade by harrowing, discing, or dragging.

2. Hand-rake subgrade. Remove rocks over 2" in diameter and other debris.

3.03 PLACING TOPSOIL

A. Replace topsoil and spread over the prepared subgrade to obtain the required depth and grade elevation. Final compacted thickness of topsoil not less than 3- 1/2".

B. Hand-rake topsoil and remove all materials unsuitable or harmful to plant growth.

C. Do not place topsoil when the subgrade is frozen, excessively wet, or extremely dry.

D. Do not handle topsoil when frozen or muddy.

3.04 TILLAGE

A. After seed bed areas have been brought to proper compacted elevation, thoroughly loosen to a minimum depth of 5" by discing, harrowing, or other approved methods. Do not work topsoiled areas when frozen or excessively wet.

B. Liming:

1. Distribute limestone uniformly at a rate of 50 pounds per 1,000 square feet.
2. Thoroughly incorporate into the topsoil to a minimum depth of 4".
3. Incorporate as a part of the tillage operation.

C. Basic Fertilizer:

1. Distribute basic fertilizer uniformly at a rate of 50 pounds per 1,000 square feet.
2. Incorporate into soil to depth of 4" by approved methods.
3. Incorporate as part of tillage operation.

D. Liming and Fertilizer rates may be decreased if lesser rates are indicated by soil tests provided by the Contractor.

3.05 FINISH GRADING

A. Remove unsuitable material larger than 2" in any dimension.

B. Uniformly grade surface to the required contours without the formation of water pockets.

C. Rework areas which puddle by the addition of topsoil and fertilizer. Re-rake.

D. Distribute starter fertilizer at the following rates:

10-5-5: 50 pounds per 1,000 square feet.
12-6-6: 33 pounds per 1,000 square feet.

E. Incorporate starter fertilizer into the upper 1" of soil.

3.06 SEEDING

A. Uniformly sow specified seed mix by use of approved hydraulic seeder, power-drawn drill, power operated seeder, or hand-operated seeder or by hand. Do not seed when winds are over 15 mph.

B. Upon completion of sowing, cover seed to an average depth of 1/4" by hand re-raking or approved mechanical methods.

3.07 MULCHING

A. Mulch within 48 hours of seeding.

B. Place hay and straw mulch in a continuous blanket at a minimum rate of 1,200 pounds per 1,000 square yards.

1. Anchor hay or straw mulch by use of twine, stakes, wire staples, paper, or plastic nets.

2. Emulsified asphalt may be used for anchorage provided it is applied uniformly at a rate not less than 31 gallons per 1,000 square yards.

3. Apply approved chemical mulch binders at the manufacturer's recommended rate.

C. Chemical mulch binders or a light covering of topsoil may be used for anchorage when the size of the area precludes the use of mechanical equipment.

D. Apply wood cellulose fiber hydraulically at a rate of 320 pounds per 1,000 square yards.

1. Incorporate as an integral part of the slurry after seed and soil supplements have been thoroughly mixed.

E. Spread mushroom manure uniformly to a minimum depth of 1/2" or to the depth indicated on drawings.

F. When mulch is applied to grass areas by blowing equipment, the use of cutters in the equipment will be permitted to the extent that a minimum of 95% of the mulch is 6" or more in length. For cut mulches applied by the blowing methods, achieve a loose depth in place of

not less than 2".

G. When mulching by the asphalt mix method, apply the mulch by blowing. Spray the asphalt binder material into the mulch as it leaves the blower. Apply the binder to the mulch in the proportion of 1.5 to 2.0 gallons per 45 pounds of mulch.

1. Protect structures, pavements, curbs, and walls to prevent asphalt staining.

2. Erect warning signs and barricades at intervals of 50 feet or less along the perimeter of the mulched area.

3. Do not spray asphalt and chemical mulch binders onto any area within 100 feet of a stream or other body of water.

3.08 MAINTENANCE

A. Maintenance includes watering, weeding, cleanup, edging and repair of depressions, washouts or gullies.

SEEDING RESTORATION TABLE

RESTORATION CONDITION	TOPSOIL	LIME*	BASIC FERTILIZER	STARTER FERTILIZER	SEED MIX & SOWING RATE (% BY WEIGHT)
Temporary Cover (**)	N/A	N/A	N/A	N/A	100% Annual Ryegrass Sow 9# per 1,000 Sq Yds Mar thru May/Aug thru Sept
Roadside; Non-mowed	Yes	100# per 1,000 Sq. Ft.	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per 1,000 Sq. Ft.	80% Kentucky 31, Fescue 20% Pennlawn Red Rescue Sow 21# per 1,000 Sq. Yds Mar thru May/Aug thru Sept
Roadside; Mowed	Yes	100# per 1,000 Sq. Ft.	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per 1,000 Sq. Ft.	50% Kentucky BlueGrass 30% Pennlawn Red Fescue 20% Perennial Ryegrass Sow 21# per 1,000 Sq. Yds Mar thru May/Aug thru Sept
Bank Areas	Yes	100# per 1,000 Sq. Ft.	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per Sq. Ft.	45% Crownvetch 55% Annual Ryegrass Sow 9# per 1,000 Sq. Yds Anytime except Sept & Oct
Lawns	Yes	100# per 1,000 Sq. Ft.	0-20-20 @ 50# per 1,000 Sq. Ft.	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per Sq. Ft.	50% Kentucky Bluegrass 30% Pennlawn Red Fescue 20% Perennial Ryegrass Sow 21# per 1,000 Sq. Yds Mar thru May/Aug thru Sept
Open Fields; Non-cultivated, Pasture	No	No	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per Sq. Ft.	100% Timothy Sow 9# per 1,000 Sq. Yds. Mar thru May/Aug thru Sept
Open Fields; Cultivated	No	No	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per Sq. Ft.	100% Annual Ryegrass Sow 9# per 1,000 Sq. Yds Mar thru May/Aug thru Sept
Woods; Sparse	No	No	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per Sq. Ft.	100% Red Fescue Sow 36# per 1,000 Sq. Yds. Mar thru May/Aug thru Sept

* Unless lesser rate indicated by soils tests.

** Unless otherwise specified in the Erosion and Sedimentation Control Plan

Note: Refer to Drawings and Special Conditions for seeding restoration requirements at each specific location of Work.

END OF SECTION

SECTION 02575

PAVING AND RESURFACING

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Temporary Paving
2. Permanent Paving
3. Shoulder Restoration

B. Paving and resurfacing requirements for project roads are as indicated on the resurfacing schedules and miscellaneous details provided on the Standard Details sheets. All paving shall comply with the local ordinances and PennDOT Specifications, where applicable.

C. Related work specified elsewhere:

1. Trenching, Backfilling and Compacting – Section 02221
2. Concrete for Utility Construction – Section 03300

1.02 QUALITY ASSURANCE

A. Referenced Standards:

1. Pennsylvania Department of Transportation:

a. Publication 408 Specifications
b. Publication 27 - Specification for Bituminous Materials (Bulletin 27)
c. Publication 37 - Specification for Bituminous Materials (Bulletin 25)
d. Publication 203 - Work Zone Traffic Control (See Special Conditions - Section 01570)
e. Chapter 459 - Occupation of Highways by Utilities (See Supplemental General Conditions - Section OHU)

B. South Middleton Township Ordinance No. 02 of 2006.

1.03 SUBMITTALS

A. Certificates:

1. Submit certification from bituminous and aggregate suppliers attesting that materials conform to the state specifications.

1.04 JOB CONDITIONS

A. Control of Traffic:

1. Take measures to control traffic during repaving operations. Do not allow traffic on repaved areas until authorized by the Authority and the Township.

2. Employ traffic control measures in accordance with Publication 203 - "Work Zone Traffic Control."

B. Restore existing paving outside the limits of the work that is damaged by the Contractor's operations to its original condition.

PART 2 - PRODUCTS

2.01 CONCRETE

A. See Section 03300

2.02 BITUMINOUS PAVING MATERIALS AND AGGREGATES

A. Refer to Publication 408 Specifications and Township Ordinance No. 02 of 2006. All bituminous materials and aggregates used in paving and resurfacing are designated in these Specifications by and shall conform to the applicable portions of the Publication 408 Specifications and Township Ordinance No. 02 of 2006.

PART 3 - EXECUTION

3.01 WORK WITHIN STATE HIGHWAY RIGHT-OF-WAY

A. Inspection: If throughout the progress of the work within state highways, it is deemed necessary by the Pennsylvania Department of Transportation (PennDOT) to post field inspectors on that portion of the project within their right-of-way, the Developer shall reimburse PennDOT for the cost of the inspection so applied.

B. Blasting if necessary: All blasting shall be conducted in accordance with applicable PennDOT, state and local regulations.

C. Detour: If a state highway detour is required, application must be made to District Office Traffic Unit and approval received for rerouting traffic before detour is put into effect.

3.02 TEMPORARY PAVING

A. Place 2" compacted thickness temporary paving immediately upon completion of trench backfilling.

B. Shape and compact subgrade material, then place and compact crushed stone base course to the required thickness.

C. Place temporary paving material. Compact to 2" minimum thickness with trench roller having minimum 300 pounds per inch-width of compaction roll.

D. Continuously maintain temporary paving to the satisfaction of the Township's Engineer and the state and local road departments. Temporary paving on state roads must remain in place for a minimum of ninety (90) days. On Township roads, permanent restoration must be completed within thirty (30) days after substantial completion of piping work, unless otherwise approved by the Township Engineer.

3.03 PERMANENT PAVING

A. The Authority and/or Township reserve the right to delete any and all permanent paving from the Contract.

B. Saw cut back 12” from the limit of the trench using a diamond wheel or similar instrument. Cut straight joint lines and right angle offsets.

C. Remove temporary paving material. Construct permanent base and surface courses to the required compacted thicknesses shown on the standard details and in accordance with Publication 408 Specifications and Township Ordinance No. 02 of 2006.

D. Maintain permanent paving to the satisfaction of the Authority and the local and state road departments throughout the contract maintenance period.

3.04 BITUMINOUS OVERLAY

A. Where indicated on the Drawings, standard details, Surface Restoration Tables or directed by the Authority Engineer or Township, place a bituminous overlay.

B. Construct in accordance with Section 401.3, Publication 408 Specifications.

3.05 PAVED SHOULDER RESTORATION

A. At the expiration of the appropriate time period, unless otherwise directed by the Pennsylvania Department of Transportation or the Township Engineer, the temporary restoration and the compacted trench fill shall be removed to a minimum depth of six and one-half inches (6 ½”) below the surface of the roadway. A Super Pave base course with a minimum depth of five inches (5") shall be constructed and shall be topped with one-and-one-half inch (1½”) minimum of Super Pave wearing course ID-2.

B. All Paved Shoulder Restoration shall be in accordance with the Pennsylvania Department of Transportation, Form 408.

C. All edges of the existing roadway surface disturbed during construction shall be cut in a straight line. Cutting of edges shall be done prior to placing of the wearing surface and shall be as directed by the Pennsylvania Department of Transportation on state roads and Township Ordinance No. 02 of 2006 on Township roads.

3.06 BITUMINOUS TACK COAT

A. Bituminous Tack Coat shall conform to PennDOT Form 408 for materials and construction requirements, including all revisions.

B. Bituminous Tack Coat shall be applied on the surface of the base course prior to the construction of a bituminous binder course and/or bituminous wearing course.

3.07 SCRATCH COAT

A. Scratch Coat or leveling course placement shall consist of Super Pave wearing course and shall be placed on a roadway where it is necessary to remove any irregularities, at the locations and depth as determined by the Authority Engineer.

3.08 MILLING OF ROADWAY

A. Paving shall be removed to a depth below the roadway surface to allow construction of the specified pavement course. Milling shall be performed to a depth as shown on the "Construction Details" and in accordance with requirements of PennDOT Form 408, Specifications, current edition.

B. Prior to Milling, all edges of existing roadway surface that are to be disturbed shall be cut or sawed in a straight line with a diamond wheel or similar instrument, as directed by the Authority Engineer.

3.09 SEAMS

A. When the road surface is disturbed all seams shall be sealed with PG 64-22 or equal, in accordance with PennDOT Form 408.

3.10 PAINT IDENTIFICATION

A. Upon completion of temporary and permanent resurfacing, the resurfacing date shall be painted on the pavement immediately adjacent to the cut. The painted date shall indicate the month and year numerically. The numerals shall be at least six inches in height. The paint shall be of a durable wearing quality and shall be green in color.

B. All new pavement shall be re-striped by the Contractor where previously painted. All traffic lines and markers shall be in accordance with applicable requirements of PennDOT Publication 408, current edition.

3.11 DRIVEWAYS

A. Trim concrete and bituminous driveway surfaces to removed damaged areas. Saw cut straight joint lines parallel to the centerline of the trench. Cut offsets at right angles to the trench centerline.

B. Restore existing concrete driveways trenched through with a 6” layer of concrete reinforced with 6 X 6 10/10 wire mesh.

C. Restore existing blacktop driveways trenched through in kind or with minimum 1 ½” layer wearing course over 6” layer of 2A aggregate.

D. Restore earth driveways with a 6” layer of 2A stone backfill.

E. Restore stone or gravel driveways in kind.

END OF SECTION

SECTION 02601

MANHOLES

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Precast Concrete Manholes
2. Concrete Manhole Bases
3. Manhole Steps
4. Manhole Covers and Frames

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Structural Concrete: Section 03300

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation Publication 408 Specifications.
2. American Society for Testing and Materials (ASTM):

A48	Specification for Gray Iron Castings
C32	Specification for Sewer and Manhole Brick
C139	Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes
C270	Specification for Mortar for Unit Masonry
C443	Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
C478	Specification for Precast Reinforced Concrete Manhole Sections
C923	Specification for Resilient Connections Between Reinforced Concrete Manhole Structures and Pipes

1.03 SUBMITTALS

A. Certificates:

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

B. Shop Drawings:

1. Submit detail shop drawings of Precast Concrete Manhole Sections, and Precast Concrete Manhole Bases if used.

2. Submit detail shop drawings of Manhole Frames and Covers, including rubbings of inscription.

3. Submit detail shop drawings of Manhole Steps.

4. Submit manufacturer's descriptive literature for the pipe to Manhole Flexible Connections.

PART 2 - PRODUCTS

2.01 BASIC MATERIALS

A. Crushed Stone Subbase:

1. Size 57, Type C, Section 703.2, Publication 408 Specifications

B. Concrete Masonry Units: ASTM C139

C. Masonry Mortar: ASTM C270, Type S

D. Structural Concrete: Section 03300

E. Joint Sealant Compound: FS SS-S-00210, performed, flexible, self-adhering, cold-applied.

F. Rubber Gaskets: ASTM C443

G. Resilient Pipe-to-Manhole Connection: ASTM C923

2.02 FABRICATED PRODUCTS

A. Precast Concrete Manhole Sections: ASTM C478

1. 5.5% $\pm$ 1% air entrained cement concrete.

2. Eccentric cone or flat slab top sections; minimum 24" access opening unless otherwise indicated.

3. Precast Concrete riser sections of length to suit.

4. Precast Concrete bases of a design similar to the precast riser sections.

5. Minimum internal diameter of 48" with tongue and groove joints between sections.

6. Precast Manhole Coating – Exterior:

    a. The exterior surfaces of all manhole sections, bases, risers and tops shall be coated with a coal tar epoxy compound manufactured by Kop-Coat, Inc., Pittsburgh, Pennsylvania, 15219, Type Bituminous No. 300-M or equal approved by the Engineer. The dry coat thickness shall be a minimum of twenty (20) mils. Application of the product shall be in accordance with the manufacturer's recommendations, but in all cases the final dry coating shall be without runs, sags, misses, pinholes, or other defects and shall adhere properly to the substrate.

B. Manhole Steps:

1. Polypropylene conforming to ASTM D-4101 injection molded around a ½" ASTM A-615 grade 60 steel reinforcing bar. Step to meet ASTM C-478, AASHTO M-199 and OSHA instruction STD 1-1.9. Step to resist pullout forces of over 1,500 pounds. Step to be 14" wide with end lugs to minimize risk of slipping sideways. Include self cleaning tread design. Step to be Part Number 108.14850 by Press-Seal Gasket Corporation.

2. Install Manhole steps in vertical alignment at 12" spacing.

C. Manhole Frames and Covers:

1. General:

    a. Domestic cast iron castings: ASTM A48, Class 35B or better; free of bubbles, sand and air holes, and other imperfections.

    b. Contact surfaces: Machined and matched.

    c. Cast Manhole cover inscriptions as follows:

        (1) "SEWER" for sanitary sewer piping.

    d. Provide Manhole covers suitable for HS-25 highway loads.

    e. Provide gasketed Manhole covers.

    f. Paint at factory with water-based asphalt paint.

2. Frame and Cover:

    a. Minimum combined weight of 260 pounds with dimensions as indicated on Drawings, 22" minimum clear opening.

    b. Provide solid cover as standard.

    c. Provide one piece O-ring gasket factory installed in machined rectangular or dovetailed groove in cover bearing surface. Neoprene gasket of 40 durometer hardness, abrasion resistant, field replaceable. Gluing not permitted.

    d. Frame East Jordan Iron Works, Inc., 00111910 or equal

    e. Cover East Jordan Iron Works, Inc., 00112183 or equal.

f. Watertight manhole frame and cover shall be as specified for manhole frame and covers above. In addition, the casting shall be equipped with an internal watertight cover with a one-inch diameter bronze locking screw, forged steel lock bar, lock clamp and rubber gasket.

PART 3 - EXECUTION

3.01 GENERAL

A. Construct Manholes or other structures at the points shown on the Drawings and at such points as directed by the Engineer.

B. Make Manholes watertight. Keep ground water away from the newly poured concrete until it is properly set and a watertight condition is obtained. Repair structures which admit ground water after completion to the satisfaction of the Engineer.

3.02 EXCAVATION

A. Perform excavation to the line and grade shown on the Drawings and as specified in Section 02221. Provide minimum 6" beyond footer for ease of construction.

B. Location and depth of Manholes is as shown on the Drawings and as directed by the Engineer.

3.03 CONSTRUCTION

A. Construct Manholes of precast concrete or glass fiber-reinforced polyester sections.

B. Construct drop connections of the required type. Encase drop connection in concrete.

C. Install a minimum of 6" of crushed stone subbase.

D. Provide cast-in-place concrete or precast concrete bases.

1. Construct cast-in-place bases as shown on the Drawings.

a. Construct cast-in-place bases with a special form for a joint to match the manhole cylinder sections.

b. Form base with pipe opening resilient seals at proper elevation, alignment and diameter.

2. Install precast bases as shown on the Drawings.

a. Set the precast base on a crushed stone subbase.
b. Provide a watertight, flexible resilient connection between pipe and precast base section.

E. Form semi-circular flow channels in Manhole Bases. Slope channels uniformly from influent invert to effluent invert. Construct bends of the largest possible radius. Form channel sides and invert smooth and uniform, free of cracks, holes or protrusions, channel depth shall be at least one-half diameter of pipe.

F. Pipe openings in Precast Manholes with different influent and effluent sewer: Set pipes to match pipe crowns. At no time should crown of influent sewer be lower than that of effluent sewer. Invert elevations on Drawings indicate center of Manhole.

G. Do not permit pipe to project more than 2" into the Manhole.

H. Seal joints between precast concrete Manhole sections with performed rubber gaskets or joint sealant compound.

1. Place joint sealant compound on lower section to be squeezed by the weight of the upper section. Remove excess sealer and refill any voids.

2. Place rubber gasket in groove formed in spigot end. Equalize gasket tension. Install upper section slowly and evenly to form seal. Check gasket for proper seating.

I. Install Manhole sections with steps in proper vertical alignment.

J. Use masonry or precast Manhole rings set in a full bed of non-shrink grout to achieve elevation shown for frame and cover. Do not adjust elevation more than one foot with masonry or precast rings. Use one precast two-inch ring as minimum.

K. Install Manhole Frames and Covers:

1. Set top of frames at finished grade elevation or other elevation shown on the Drawings.

2. Anchor Manhole Covers installed in unpaved areas.

3. Seal joint between Manhole Frame and Manhole with joining sealant compound.

L. Where new Manholes are constructed on existing pipelines, carefully excavate around existing pipelines for placement of the new Manhole Base. Take measures necessary to control flow through the existing pipeline and to prevent leakage into the new base. After completion of the Manhole, carefully remove the top portion of the existing pipeline.

M. Core pipe openings in existing concrete Manholes. Provide a PVC waterstop and neatly patch with nonshrink grout. Form new channel with length of pipe through opening and 1:2 cement.

N. When Manhole is completed, remove all loose mortar and debris.

3.04 BACKFILLING

A. Backfill after examination of the Manhole by the Engineer.

B. Perform backfilling as specified in Section 02221.

C. Construct Manholes with the tops of Manholes at grade and not covered by overburden.

END OF SECTION

SECTION 02610

GRAVITY SEWER PIPE AND APPURTENANCES

PART 1- GENERAL

1.01 DESCRIPTION

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

1. Sanitary sewer gravity pipelines
2. Laterals/service connections

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling & Compaction: Section 02221
2. Boring and Casing: Section 02150
3. Manholes: Section 02601
4. Sewer Pipeline Testing: Section 02651

1.02 QUALITY ASSURANCE

A. Reference Standards:

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

D3033 Specification for Type PSP Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
D3034 Specification for Type PMS Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
D3139 Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
D3212 Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
F477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
F679 Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

B. Reject materials contaminated with gasoline, lubricating oil, liquid or gaseous fuel, aromatic compounds, paint solvent, paint thinner, or acid solder.

C. All pipe and appurtenances shall be inspected upon delivery at the site and before laying. Unsuitable materials shall be rejected and replaced.

1.03 SUBMITTALS

A. Certificates:

1. Submit a minimum of four (4) copies of each manufacturer's certification attesting that the pipe, pipe fittings, joints, joint gaskets and lubricants meet or exceed specification requirements.

2. Submit a minimum of four (4) copies of each manufacturer's recommended load table for determination of pipe class required for range of depth of cover, pipe diameter and pipe bedding specified throughout the project.

3. All submissions shall be reviewed and stamped "Approved" by the Contractor prior to

forwarding to the Authority's Engineer.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery and Handling:

1. Do not place materials on private property without written permission of the property owner.

2. During loading, transporting and unloading, exercise care to prevent damage to materials.

3. Do not drop pipe or fittings. Avoid shock or damage at all times.

4. Take measures to prevent damage to the exterior surface or internal lining of the pipe.

B. Storage:

1. Pipe may be strung along alignment where approved by the Engineer.

2. Do not stack pipe higher than recommended by the pipe manufacturer.

3. Store gaskets for mechanical and push-on joints in a cool, dry location out of direct sunlight and not in contact with petroleum products.

PART 2 - PRODUCTS

2.01 GRAVITY SEWER PIPE, PIPE FITTINGS AND LATERALS

A. Polyvinylchloride (PVC) Sewer Pipe

1. Gravity Sewer Pipe and Fittings:

a. Pipe 15" diameter and smaller: ASTM D3033 or ASTM D3034, SDR-35

b. Flexible Elastomeric Seals: ASTM D3212
Seal Material: ASTM F477

2.02 IDENTIFICATION TAPE FOR PVC SEWERS

A. Identification tape, as manufactured by Reef Industries, Inc., or equal, shall be placed over all PVC sewer mains and laterals. This tape shall be of the detectable type and be made of polyethylene with a one-mil metallic foil core, highly resistant to alkalis, acid, or other destructive chemical components likely to be encountered in soils. The tape shall be brightly colored to contrast with soil and shall bear an imprint reading on one side as follows: "Caution - Sewer Line Buried Below". The tape shall be two inches or greater in width with the identification lettering repeated continuously the entire length of the tape.

PART 3 - EXECUTION

3.01 PREPARATION

A. Perform trench excavation as specified in Section 02221.

B. Unless otherwise indicated on the drawings, provide for a minimum cover of 4-feet above the top of piping laid in trenches.

C. Provide pipe bedding as specified in Section 02221, Part 3.10 for each type of pipe used. Place aggregate in a manner to avoid segregation, and compact to the maximum practical density so that the pipe can be laid to the required tolerances.

3.02 LAYING PIPE IN TRENCHES

A Give ample notice to the Authority in advance of pipe laying operations.

B. Utilize laser alignment instruments to accurately position pipe in the trenches.

C. Lower pipe into trench using handling equipment designed for the purpose to assure safety of personnel and to avoid damage to pipe. Do not drop pipe.

D. Lay pipe proceeding up-grade with the bell or groove pointing upstream.

E. Lay pipe to a true uniform line with the barrel of the pipe resting solidly in bedding material throughout its length. Excavate recesses in bedding material to accommodate joints, fittings and appurtenances. Do not subject pipe to a blow or shock to achieve solid bearing or grade.

F. Lay each section of pipe in such a manner as to form a close concentric joint with the adjoining section and to avoid offsets in the flow line.

G. Clean and inspect each section of pipe before joining. Assemble to provide tight, flexible joints that permit movement caused by expansion, contraction, and ground movement. Use lubricant recommended by the pipe or fitting manufacturer for making joints. If unusual joining resistance is encountered or if the pipe can not be fully inserted into the bell, disassemble joint, inspect for damage, re-clean joint components, and reassemble joint.

H. Assemble joints in accordance with recommendations of the manufacturer.

1. Push-on Joints:

a. Clean the inside of the bell and the outside of the spigot. Insert rubber gasket into the bell recess.

b. Apply a thin film of gasket lubricant to either the inside of the gasket or the spigot end of the pipe, or both.

c. Insert the spigot end of the pipe into the socket using care to keep the joint from contacting the ground. Complete the joint by forcing the plain end to the bottom of the socket. Mark pipe that is not furnished with a depth mark before assembly to assure that the spigot is fully inserted.

I. Disassemble and remake improperly assembled joints using a new gasket.

J. Check each pipe installed as to line and grade in place. Correct deviation from line and grade immediately. A deviation from the designed grade as shown on the contract drawings, or deflection of pipe joints, will be cause for rejection and replacement.

K. Place sufficient compacted backfill on each section of pipe, as it is laid, to hold firmly in place.

L. Clean interior of the pipe as work progresses. Where cleaning after laying is difficult because of small pipe size, use a suitable swab or drag in the pipe and pull forward past each joint immediately after the jointing has been completed.

M. Keep trenches and excavations free of water during construction.

N. When the work is not in progress, and at the end of each work day, securely plug open ends of pipe and fittings to prevent trench water, earth, or other substances from entering the pipes or fittings.

O. Deflection:

1. When it is necessary to deflect pressure sewer mains from a straight alignment horizontally or vertically, do not exceed the following limits:

PVC Pipe:

Per manufacturer's recommendations.

3.03 WYE BRANCHES AND TEES

A. Install wye branches or pipe tees at locations designated by the Authority's Engineer concurrent with pipe laying operations. Use standard fittings of the same material and joint type as the pipeline into which they are installed.

B. Wherever so directed and approved by the Authority, install an approved type saddle where no y-branch exists. In general, the saddle shall consist of a saddle, straps and shall be cradled in a minimum of 6" of concrete from undisturbed earth to the springline of the main. All saddles shall have watertight and airtight joints as hereinbefore specified.

C. For taps into an existing pipeline, use a saddle wye or tee with stainless steel clamps or core drill pipe and install watertight resilient boot. Mount saddles with solvent cement or gasket and secure with metal bands. Layout holes with a template and cut holes with a mechanical hole cutter.

3.04 HORIZONTAL HOUSE LATERALS

A. Wherever so directed, the Contractor shall construct such house laterals as may be designated. In general, house laterals shall consist of six inch (6") pipe laid on as steep a grade as conditions will permit to drain the lowest level of the building, but not less than one percent. All house lateral pipes must have watertight joints as hereinbefore specified. All house laterals shall be reconnected as shown on the Drawings.

B. Any lateral installed will have a new cleanout and test tee field-located near the curb or right-of-way.

C. In connecting house laterals to the Y-branch in the main sewer, or to the line extending from the building, an approved fitting shall be used as shown on the Drawings.

3.05 LATERAL CLEANOUTS AND TEST TEES

A. Where directed by the Engineer and in accordance with the details shown on the Standard Details, four-inch in diameter cleanouts and test tees shall be constructed behind the curb line or at the property line.

B. All pipe shall conform to the specifications for main line pipe and laterals. The cleanout and test tee shall be constructed as shown on the Drawings.

C. All cleanouts in traffic areas shall be provided with suitable cast iron valve box and covers as shown in the Drawings.

3.06 BACKFILLING TRENCHES

A. Backfill pipeline trenches only after examination of pipe laying by the Authority's representative.

B. Backfill trenches as specified in Section 02221.

3.07 INSTALLING IDENTIFICATION TAPE FOR PVC SEWERS

A. The tape shall be placed over the center line of the pipe at a depth of twelve to eighteen inches below the finished grade or as directed by the Engineer. The tape shall be placed in the trench with the printed side up and shall be essentially parallel to the finished surface. Caution shall be taken during the completion of backfilling to prevent the tape from being pulled, distorted, or otherwise displaced in the trench.

END OF SECTION

SECTION 02611

FORCE MAIN PIPE AND APPURTENANCES

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. Prior to any construction, the Contractor shall submit to the Authority's Engineer, for approval, names of manufacturers and suppliers he intends to use on the project. The Engineer may require complete catalog data and/or samples of materials for the purpose of determining if such materials meet the intent of these Specifications.

B. The force main shall be ductile iron cement-lined pipe.

PART 2 – PRODUCTS

2.01 DUCTILE IRON CEMENT-LINED PIPE

A. Ductile iron pipe shall be centrifugally cast , annealed, and manufactured in accordance with the latest revision of ANSI/AWWA C151/A21.51. The pipe shall be cement mortar lined inside and bituminous-coated outside. The bituminous coating shall be in accordance with the requirements of the latest revisions of ANSI A21.4 (AWWA C104). The pipe length shall be in nominal 16', 18' or 20' lengths. The minimum wall thickness shall be in accordance with the latest revision of ANSI A21.50 (AWWA C150), Class 50, with the exception of the 4" size which shall be Class 51.

B. Ductile Iron Pipe Joints

1. All pipe to be installed underground shall have mechanical or push-on joints conforming to the latest revision of ANSI A21.11 (AWWA C111/A21.11-90). Where concrete reaction backings cannot be installed due to other pipes in the area, restrained joints shall be used.

2. All exposed pipe (within structures, etc.) shall have flanged joints unless otherwise noted. The flange shall be faced and drilled to the 125# standard in accordance with the latest revision of ANSI B16.1 or A21.10.

C. Compact Ductile Iron Fittings

1. All Compact D.I. Pipe Fittings shall conform to the latest revision of ANSI A21.10, Class 350.

2. All underground Pipe Fittings shall be of the mechanical type conforming to the latest revision of ANSI A21.10 (AWWA C111/A21.11-90).

3. All exposed pipe (within structures, etc.) shall have flanged joints unless otherwise noted. The flange shall be faced and drilled to the 125# standard in accordance with the latest revision of ANSI B16.1 or A21.10.

D. Combination Air Release and Air/Vacuum Valve Manhole

1. See Construction Detail Drawing for make and model.

2. Chamber for valve shall be precast concrete manhole.

PART 3 – EXECUTION

3.01 LAYING FORCE MAIN

A. All pipe shall be laid in strict accordance with the details shown on the Drawings, as directed by the Engineer. The laying of pipes in finished trenches shall be commenced at the lowest points so that the spigot end is pointing in the direction of flow. All pipes shall be laid with ends abutting and true to line and grade. They shall be fitted and matched so that when laid in the work, they will form a sewer with a smooth and uniform invert. Sockets shall be carefully cleaned before pipes are lowered into trenches.

B. At all times when the work is not in progress, all open ends of the pipes and fittings shall be securely closed with tight stoppers so that no water, earth or other substances will enter the pipe or fittings. Any section of pipe already laid and found to be defective shall be taken up and replaced with a new pipe.

3.02 PIPE EMBEDMENT

A. Bedding

1. All pipe shall be laid on a granular bedding of AASHTO #8 (formerly 1B) crushed stone or gravel. The bedding shall be well compacted, as directed by the Engineer, and shall be a minimum depth of 6 inches or one-fourth the internal diameter, whichever is greater. The bedding shall provide uniform longitudinal support to the pipe and shall be laid to provide the pipe grade and line as shown on the Drawings or as directed by the Engineer.

B. Haunching

1. Haunching is the area from the bottom of the pipe to the springline of the pipe as shown on the construction details. Material shall conform to PennDOT No. 1B crushed stone or gravel. This area shall be compacted to a minimum of 90 percent Standard Proctor Density by hand or mechanical tamping as directed by the Engineer.

C. Final Embedment

1. Final Embedment shall extend from the springline of the pipe to a depth of 6 inches minimum above top of the pipe. It shall be PennDOT No. 1B stone or gravel and shall be well compacted as directed by the Engineer.

D. Cradles and Encasement

1. Provide concrete cradles and encasement for pipe line where indicated on the Drawings, or as directed by the Engineer, and in accordance with the Standard Details.

3.03 INSPECTION

A. The Authority shall have the right to require tests to be made of each shipment of pipe. These physical tests shall include crushing test, hydrostatic test, and absorption test. The manner of making these tests shall be as set forth by the American Society for Testing Materials.

B. The specimens to be tested shall be selected by the Engineer. The manufacturer or seller shall furnish specimens for test, without separate charge, up to one percent of the number of pipes to be delivered or furnished in each size of pipe, except that in no case shall the number of specimens furnished be less than five.

C. Failure of twenty percent of the specimens to meet the requirements of any of the test imposed shall result in rejection of all pipe in the shipment of delivery corresponding to the sizes thus failing to comply, except that in the event of twenty percent of the specimens in any size failing to meet the requirements, the manufacturer or seller may, with the consent of the Engineer, furnish for test without charge, additional specimens from the same shipment to be selected and specified in the preceding paragraph. In case more than eighty percent of the specimens tested, including those first tested, shall show substantial compliance for each of the various tests performed, then the entire shipment of delivery for this size shall be accepted; otherwise it shall be rejected.

D. In addition to the foregoing requirements, failure of individual specimens to develop seventy-five percent of the average crushing strength requirements will be cause for rejection of the shipment, but the seller may cull the pipe and submit the balance of the shipment for retest, and if the shipment then passes all of the requirements of these specifications, it shall be accepted.

E. All pipe shall be inspected upon delivery at the trench and before laying. The purpose of the inspection shall be to cull and reject pipe which, independent of the physical tests herein specified, fail to comply with the requirements of these specifications.

F. All pipe accepted may be plainly marked by the inspector. Rejected pipe shall not be marked so as to be defaced or to impair its value, but shall be replaced by the manufacturer or seller with pipe that meets the requirements of these specifications, without additional cost to the purchaser.

G. Tests for Ductile Iron Pipe (D.I.P.) shall conform to current ANSI/AWWA Designation C600.

END OF SECTION

SECTION 02651

TESTING OF SEWER PIPE AND MANHOLES

PART 1 – GENERAL

1.01 DESCRIPTION

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

1. Testing Gravity Sewer Pipelines:

a. Low-pressure air test
b. Infiltration test

2. Testing Pressure Pipelines:

a. Hydrostatic leakage test

3. Deflection Testing of Plastic Pipe

4. Testing Manholes:

a. Vacuum testing
b. Exfiltration testing

B. Related Work specified elsewhere:

1. Gravity Sewer Pipe and Appurtenances: Section 02610
2. High Density Polyethylene Sanitary Sewer Force Main: Section 02620
3. Manholes: Section 02601

1.02 QUALITY ASSURANCE

A. Test acceptance:

1. No test will be accepted until the results are below the specified maximum limits.

2. The Contractor shall determine and correct the causes of test failure and retest until successful test results are achieved.

1.03 SUBMITTALS

A. Testing procedures

B. List of test equipment

C. Testing sequence schedule

D. Provisions for disposal of flushing and test water

E. Certificate of test gauge calibration

F. Deflection mandrel drawings and calculations

1.04 JOB CONDITIONS

A. Do not allow personnel in manholes during pressure testing.

B. Provide relief valves set at 10 psig to avoid accidentally over-pressurizing gravity sewer line during low-pressure air testing.

PART 2 – PRODUCTS

2.01 AIR TEST EQUIPMENT

A. Air compressor
B. Air supply line
C. Shut-off valve
D. Pressure regulator
E. Pressure relief valve
F. Stop watch
G. Plugs
H. Pressure gauge, calibrated to 0.1 lbs./sq. in.

2.02 INFILTRATION TEST EQUIPMENT

A. Weirs

2.03 HYDROSTATIC TEST EQUIPMENT

A. Hydro pump
B. Pressure hose
C. Water meter
D. Test connections
E. Pressure gauge, calibrated to 0.1 lbs./sq. in.
F. Pressure relief valve

2.04 DEFLECTION TEST EQUIPMENT

A. Go, No-Go mandrels
B. Pull/retrieval ropes

PART 3 – EXECUTION

3.01 PREPARATION

A. Backfill trenches in accordance with Section 02221.

B. Provide pressure pipeline with concrete reaction support blocking.

C. Flush pipeline to remove debris. Collect and dispose of flushing water and debris.

D. Clean pipelines by propelling a snug-fitting rubber ball through the pipeline with water from the upstream manhole to the downstream manhole. Investigate and correct any stoppage of the cleaning ball. Collect and dispose of cleaning water and debris.

3.02 TESTING GRAVITY SEWER PIPELINES

A. Low-Pressure Air Test:

1. Test each newly installed section of gravity sewer line between manholes, including all laterals from the main to property line or behind curb.

2. Slowly introduce air pressure to approximately 4.0 psig.

a. If groundwater is present, determine its elevation above the springline of the pipe by means of a piezometric tube or other suitable means as directed by the Engineer. For every foot of groundwater above the springline of the pipe, increase the starting air test pressure reading by 0.43 psig. Do not increase pressure above 10 psig.

3. Allow pressure to stabilize for at least five minutes. Adjust pressure to 3.5 psig or the increased test pressure as determined above if groundwater is present. Start the test.

4. Test:

a. Determine the test duration for a sewer section with a single pipe size from the table below:

Nominal Pipe Size	T (Time) Min/100 Ft.
4	.3
6	.7
8	1.2
10	1.5
12	1.8
15	2.1
18	2.4
21	3.0
24	3.6
27	4.2
30	4.8
33	5.4
36	6.0

b. Record the drop in pressure during the test period. If the air pressure has dropped more than 1.0 psig during the test period, the line is presumed to have failed. If the 1.0 psig air pressure drop has not occurred during the test period, the test shall be discontinued and the line will be accepted.

c. If the line fails, determine the source of the air leakage, make corrections and retest. The Contractor has the option to test the section in incremental stages until the leaks are isolated. After the leaks are repaired, retest the entire section between manholes.

B. Testing Pipe Over 36" Diameter:

1. Pipe over 36" diameter shall be subjected to a visual interior inspection.

C. Infiltration Test:

1. Use only when gravity pipeline is submerged in groundwater. Obtain prior approval of the Engineer.

2. Maximum Allowable Infiltration: 100 gallons per inch of pipe diameter per mile per day for any one section under test, including the allowances for leakage from manholes.

3.03 HYDROSTATIC LEAKAGE TEST FOR PRESSURE SEWER PIPELINES

A. Initial Expansion Phase:

1. Test each newly laid pressure pipeline, including any valved section thereof, hydrostatically at 1.5 times the working pressure of the pipeline based on the elevation of the lowest point in the pipeline corrected to the elevation of the test gauge. Obtain test pressure from the Engineer.

2. Slowly fill the section to be tested with water, expelling air from the pipeline at the high points. Install corporation stops at high points if necessary. After all air is expelled, close air vents and corporation stops and raise the pressure to the specified test pressure. Add sufficient make-up water at hourly intervals for three hours. After four hours, initial expansion should be complete.

B. Test Phase:

1. Commence testing at the same test pressure for an additional three hours to determine the leakage rate. Maintain pressure within ± 5.0 psi of test pressure. Leakage is defined as the quantity of water supplied to the pipeline necessary to maintain test pressure during the period of the test.

2. The allowable leakage, or make-up water, shall be 0.15 gallons per 100 feet of pipe for the duration of the test.

3. If the test of the pipe indicates leakage greater than that allowed, locate the source of the leakage, make corrections and retest until leakage is within allowable limits. Correct visible leaks regardless of the amount of leakage.

3.04 DEFLECTION TESTING OF PLASTIC SEWER PIPE

A. After backfilling has been in place for at least 30 days but not longer than 12 months, perform vertical ring deflection testing on all sections of PVC and ABS pipe of 8" diameter and larger, in the presence of the Engineer.

B. The maximum allowable deflection for installed plastic sewer pipe shall be limited to 5% of the original vertical internal diameter.

C. Perform deflection testing with a deflectometer, calibrated television, or a properly sized "Go, No-Go" mandrel. The mandrel(s) shall be constructed at the Contractor's expense and subject to the approval of the Engineer.

D. Pipe exceeding the allowable deflection shall be located, excavated, replaced and retested at the sole expense of the Contractor.

3.05 AIR VACUUM TESTING OF MANHOLES

Perform the testing as described in this section for every manhole installed.

A. Plug all pipe connections and manhole openings; securely brace the plugs and pipe.

B. Install the test equipment and seal the structure.

C. Draw a vacuum of 10 inches of mercury (4.9 psi or 11.3 feet of water) and close the valve connection to the structure.

D. The test shall pass if the vacuum remains between 9 and 10 inches of mercury for a time greater than one minute.

E. If the manhole fails the initial test, locate the leak and make proper repairs with a settling material approved by the Engineer. Retest the manhole until it passes.

EXFILTRATION TESTING OF MANHOLES

Perform as an alternate to air vacuum testing, if approved by the Engineer

A. Plug all pipes in the manhole. Remove any water that has accumulated in the manhole. Observe plugs over a period of not less than 2 hours to ensure that there is no leakage into the manhole.

B. Determine ground water level outside the manhole.

C. Fill the manhole with water to within 4" of the top of the cover frame. Prior to test allow the manhole to soak for a minimum of 4 hours to maximum of 72 hours. After the soak period, adjust the water level inside the manhole to within 4" of the top of the cover frame.

D. Measure the water level from the top of the manhole frame. At the end of the 4-hour test period, again measure the water level from the top of the manhole frame. Compute the drop in the water level during the test period.

E. The exfiltration test of a manhole shall be considered satisfactory if the drop in water level is less than the values listed in the table below:

Manhole Depth (Feet)	Allowable Drop In Water Level (Feet) In 24" Diameter Section	
	4' Dia. MH	5' Dia. MH
4	0.11	0.14
6	0.17	0.21
8	0.23	0.28
10	0.28	0.35
12	0.34	0.43
14	0.40	0.50
16	0.45	0.57
18	0.51	0.64
20	0.57	0.71
22	0.62	0.78
24	0.68	0.85
26	0.74	0.92
28	0.79	0 99
30	0.85	1.06

Based on an allowable exfiltration of 4 gallons per day per foot of depth of a 4-foot diameter manhole with a conical top and a 24" diameter opening. For purposes of the tests, the manhole depth shall be the depth from invert to the bottom of the cover frame, or the depth from the ground water surface to the bottom of the cover frame, whichever is less.

F. In case of unsatisfactory test results, the Contractor shall repair the manhole and retest as often as necessary until satisfactory results are achieved. Repair visible leaks regardless of the amount of leakage.

END OF SECTION

SECTION 03300

CONCRETE FOR UTILITY CONSTRUCTION

PART 1 – GENERAL

1.01 DESCRIPTION

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

1. Cast-in-place cement concrete construction
2. Reaction and support blocking
3. Cradles and encasement

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling & Compaction: Section 02221
2. Paving and Resurfacing: Section 02575

C. Applicable Standard Details:

1. Concrete Encasement
2. Concrete Cradle
3. Thrust Blocks
4. Concrete Pipe Anchor
5. Stream Crossing

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation:

   Publication 408 Specifications

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

   C31 Making and Curing Concrete Test Specimens in the Field
   C39 Test for Compressive Strength of Cylindrical Concrete Specimens
   C42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
   C172 Sampling Fresh Concrete

1.03 SUBMITTALS

A. Certificates:

1. Submit certification from the concrete producer attesting that the cement concrete conforms to Section 704, Publication 408 Specifications for the class of concrete being used.

2. Submit certified results of compressive strength tests performed by an independent testing laboratory.

B. Shop Drawings:

1. Submit detailed shop drawings of reinforcing steel.

PART 2 – PRODUCTS

2.01 CEMENT CONCRETE

A. Ready-mixed, conforming to Section 704, Publication 408 Specifications.

1. Requirements for state approved batch plants, design computations and plant inspection shall not apply. The acceptability of concrete will be based on conformance with the cement concrete criteria specified blow and the results of the specified tests.

B. Cement Concrete Criteria:

1. Class A

a. 28-day compressive strength: 3300 psi
b. Slump: 1 to 3 inches

2. Class C

a. 28-day compressive strength: 2000 psi
b. Slump: 2 to 6 inches

3. High Early Strength

a. 3-day compressive strength: 3000 psi
b. Slump: 1 to 3 inches

4. Cement factor and maximum water-cement ratio conforming to Table A. Section 704.1(b), Publication 408 Specifications.

2.02 REINFORCEMENT STEEL

A. Reinforcement Bars:

1. New billet-steel conforming to Section 709.1, Publication 408 Specifications.

2. Deformed, Grade 40.

B. Steel Wire Fabric:

1. Conforming to Section 709.3, Publication 408 Specifications.

PART 3 – EXECUTION

3.01 CONSTRUCTION

A. Comply with Section 1001, Publication 408 Specifications for construction requirements including formwork, curing, protection and finishing of cement concrete.

B. Excavate and shape trench bottoms and sides to accommodate thrust block forms, encasement, manhole bases, inlets and vaults.

C. Support pipe, valves and fittings at the required elevation with brick or concrete block. Do not use earth, rock, wood or organic material as supports.

D. Construct manhole bases, reaction and support blocking, cradles, encasements, and miscellaneous mass concrete of Class C concrete.

E. Construct cast-in-place vaults, inlets, endwalls, curbs, sidewalks and miscellaneous reinforced structures of Class A concrete.

F. Construct reinforced and plain cement concrete pavements and base courses of High Early Strength concrete as specified in Section 02575, Paving and Resurfacing.

G. Provide spacers, chairs, bolsters, ties and other devices for properly placing, spacing, supporting and fastening reinforcement in place.

H. Place concrete utilizing all possible care to prevent displacement of pipe or fittings. Return displaced pipe or fittings to line and grade immediately.

I. Insure tie rods, nuts, bolts and flanges are free and clear of concrete.

J. Do not backfill structures until concrete has achieved its initial set, forms are removed and concrete work is inspected by the Engineer.

K. Perform backfilling and compaction as specified in Section 02221.

3.02 FIELD TESTS OF CONCRETE DURING CONSTRUCTION

A. Test each 50 cubic yards or fraction thereof of each class of concrete for compressive strength. Retain an independent testing laboratory to test cylinders.

1. Sample concrete in accordance with ASTM C172.

2. Prepare and cure two test cylinders in accordance with ASTM C31.

3. Test cylinders in accordance with ASTM C39.

B. If test cylinders fail to meet strength requirements, the Engineer may require additional core tests in accordance with ASTM C42.

END OF SECTION

POLICIES, INFORMATION AND SPECIAL CONDITIONS FOR CONSTRUCTION OF EXTENSIONS TO THE WATER DISTRIBUTION SYSTEM

POLICIES FOR WATER MAIN EXTENSIONS

1. All mains shall be extended at the sole expense of the person or persons requesting such extension.

2. All mains shall be extended to the furthermost property lines of the person or persons requesting such extension. The only exception shall be where lines cannot be further extended.

3. The size and location of the mains shall be determined by the Authority's Engineer so as to comply with the Authority's long-range facilities plan.

4. If planning is required, the Developer shall deposit with the Authority ample monies to cover all costs the Authority may incur in the furtherance of the proposed extension.

5. If a Subdivision or Land Development Plan is approved which will result in an extension to the water system, a copy of the Plan, as recorded at the Court House, shall be provided to the Authority on an acceptable format CD or DVD.

6. Design:

   A. Should the Developer elect to have the Authority design the extension, a Design Extension Agreement shall be signed and security placed in escrow for the design and legal costs the Authority may incur in the furtherance of the proposed extension.

   B. Should the Developer elect to have his Engineer design the extension, a Construction Agreement shall be signed and security placed in escrow for the review and any legal costs the Authority may incur in the furtherance of the proposed extension, as more fully discussed herein.

7. All Extension Plans shall consist of the following:

   A. Size of the plans and scale shall match the existing Authority Plans.

   B. Title Sheet, Sheet 1.

   C. Location Plan, Sheet 2.

   D. General Plan, Sheet 3.

   E. Construction Details, Sheet 4.

   F. Design Details, Sheet 5 through ___.

   All Plan Sheets shall be done on computer in a file format conforming to AutoCAD, using or saved-to the current version in use by the Authority's consulting engineer. The

layers, colors and line types shall conform to the attached listing of RECORD DRAWING LAYERS.

The Authority's datum (USGS Datum of 1929) must be used for establishing elevations. Developer shall contact the Authority's Engineer to obtain a General Plan for the area encompassing the proposed extension. All Plan Sheets shall be oriented with the north arrow pointing the same direction as the General Plan. In accordance with Act 287 and any subsequent legislation, all existing utilities shall be indicated on the Plans.

8. In many cases, the Authority has digitized mapping available for purchase through the Authority's consulting engineer.

9. After the proposed extension is designed and has been approved by the Authority's Engineer, the Authority's Engineer will apply for all applicable permits, as required. All permits shall be approved under the name of the Authority in accordance with applicable regulations.

10. A Construction Agreement shall be signed and security placed in escrow for applicable engineering fees, inspection services, as-constructed drawings and legal fees incurred or reasonable anticipated costs to be incurred in connection with the proposed construction. In addition, a "Letter of Credit", or bond executed by a surety named in the current list of "Companies Holding Certificates of Authority as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department shall be provided. Said security shall be in an amount acceptable to the Authority, to guarantee the satisfactory and timely completion of all water facilities as set forth in a cost estimate that has been reviewed and approved by Authority's engineer.

11. Construction:

The construction can be done under one of the following procedures:

A. Developer can utilize his own construction forces to perform the work, providing, however, that the following is submitted and approved by the Authority:

(1) Name of Contractor performing the work.

(2) A minimum of four copies of Shop Drawings and pipe certifications shall be submitted prior to the start of any construction.

(3) Estimated length of time for construction to be used for estimating the initial amount of security to be placed in escrow.

(4) Submit insurance certificates and Hold-harmless Agreements naming the Authority, Township and Engineer as co-insureds and certificate holders.

(5) The limits of liability shall be as determined by the Authority's insurance carrier.

(6) Submit a one-and-one-half-year (1½ year) Performance and Maintenance Bond to the Authority after construction is complete and final acceptance and certification is received from the Authority and/or Authority's Engineer.

B. The Developer can elect to have the Authority advertise for competitive bids. Should the Developer select this alternate, an agreement with the Authority will be required and the following procedures shall be undertaken:

(1) Since the Developer is providing all the funds for the project, prevailing wages would not apply.

(2) The Authority will advertise for competitive bids in local newspapers, Harrisburg Builder's Exchange, and the Pennsylvania Dodge Reports and establish a date for the bid opening.

(3) All bidders will be required to provide a Bid Bond in the amount of five percent of the base bid and a letter of commitment from an acceptable licensed surety company.

(4) After bids are received, the following procedures will apply:

(a) The fiscal report, outlining all costs of the project, including construction cost, contingencies, inspection, construction management, stakeout, and any other costs, will be submitted to the Developer for his approval.

(b) Should the developer elect to proceed with the project, the following will apply:

i. A letter accepting the fiscal report and authorization to the Authority to proceed with the project shall be submitted by the Developer to the Authority.

ii. The total project cost as outlined in the fiscal report shall be deposited with the Authority, either directly or made available through a local lending institution for monthly draws.

iii. As construction proceeds, monthly draws on the funds shall be made through the process of requisitions which shall include the following:

a. Designated payee.

b. Purpose.

c. Amount certified by the Authority's Engineer.

d. Authorization by the Authority.

e. Acceptance by representatives of the Developer.

After requisitions are executed by all parties, the Authority will issue the payments to the payee.

iv. After construction is complete, the Contractor shall submit the following:

a. One-and-one-half-year (1½ year) Performance and Maintenance Bond.

b. Contractor's Affidavit stating to the Authority that all labor, material and outstanding claims and indebtedness of whatever nature arising out of the performance of the contract, have been paid in full.

c. Statement of Surety and Power of Attorney.

v. After finalization of the project, the Authority's Engineer will prepare the necessary as-constructed drawings and a complete itemized breakdown of the project and submit all pertinent data to the Authority and the Developer.

12. As work proceeds on the project and additional funds may be required by the Developer, the Authority will inform the Developer of any deficiencies, and additional monies must be deposited with the Authority or in the lending institution selected by the Developer. After completion of the project, if any monies remain in the construction account, all monies will be returned to the Developer.

13. After completion, testing, and preparation of as-built drawings, the utilities shall be dedicated to the Authority and a Bill of Sale shall be prepared by the Authority for execution by the Authority and the Developer. As a further condition of the Bill of Sale, any easements and/or rights-of-way through or on private property required for the water extension shall be provided by the Developer, or shall be prepared by the Authority at the Developer's expense.

INFORMATION AND SPECIAL CONDITIONS – WATER

GENERAL

It shall be the intent of the South Middleton Township Municipal Authority to have the Developer provide a complete water distribution system installation. All work and materials specified or intended shall be supplied by the developer.

DEFINITIONS

"Authority" shall mean the South Middleton Township Municipal Authority.

"Owner" shall mean the South Middleton Township Municipal Authority.

"Developer" shall mean the party or parties constructing improvement to a tract of land, or his agent.

"Contractor" shall mean the agent of the Developer.

"Engineer" shall mean the Engineer of the South Middleton Township Municipal Authority.

DESIGN CRITERIA

The water system including all water mains and appurtenances, shall be designed in accordance with the latest revision of the Department of Environmental Protection Guidelines and these specifications.

It shall further be the responsibility of the Developer to comply with all local, county, state and federal regulations.

SPECIAL CONDITIONS

1. These specifications are intended as a guide to the Developer, and the Authority reserves the right to make necessary corrections, additions or deductions to these specifications.

2. The Authority reserves the right to request additional work and materials where, in its opinion, conditions warrant such work and materials.

3. Prior to the start of construction the Developer shall submit a minimum of four (4) copies of shop drawings to the Authority for all materials to be utilized and receive approval of such materials.

AUTHORITY REQUIREMENTS

1. All work on this project shall be done in compliance with all applicable federal, state, county or local laws and regulations whether herein stated or not. In the event of conflict between the requirements herein stated and the rules and regulations of other federal, state, county or local agencies, the more stringent shall apply.

2. Developer and/or Contractor shall obtain insurance in an amount specified by the Authority. See Page ISC-3 for insurance requirements. This insurance should include, but not be limited to, coverage for bodily injury (BI) and property damage (PD) caused by blasting.

3. Proof of all necessary insurance coverages shall be submitted to the Authority in the form of a Certificate of Insurance prior to the inception of any construction activities conducted by the Developer and/or Contractor.

4. Furthermore, the South Middleton Township Municipal Authority, South Middleton Township and the Authority's Engineer shall be listed on the Developer's and/or Contractor's General Liability Policy as an additional insured, in respect to this project.

OSHA REQUIREMENTS

All work on this project must be done in compliance with state and federal Occupational Health and Safety Regulations. Applicable regulations shall include but not be limited to the following examples:

1. If rock drilling machinery is used, it must be equipped with an integral water or exhaust ventilation dust suppression device.

2. Potential noise exposures shall be evaluated and control measures implemented as necessary. Where noise levels exceed standards, employees shall have audiometric tests.

3. Potential dust exposures shall be evaluated and control measures implemented as necessary. Where silica dust levels exceed standards, employees shall have chest X-ray (14" X 17") examinations.

4. Where confined spaces (manholes, etc.) must be entered, the atmosphere must be tested for combustible gases (as a minimum) and mechanical ventilation used prior to entry and during occupancy. A worker must also be stationed outside the confined space to offer assistance should a problem occur. Procedures for entry must be submitted to the Department where the employer is subject to Commonwealth regulations.

5. Lasers used for alignment work must be registered with the Department and any injuries resulting from the use of lasers must be reported.

INSURANCE

Insurance coverages are required to be written on an "occurrence basis." Furthermore, coverage should be written through an insurance company rated as A- or better by AM Best. The limits of liability for insurance coverages shall be, at the minimum, as follows:

1. Workers' Compensation:

a. All state requirements for Workers' Compensation coverage shall be met, including:

(1) Employer's liability:

Bodily Injury by Accident:	$100,000 each accident
Bodily Injury by Disease:	$500,000 policy limit
Bodily Injury by Disease:	$100,000 each employee

2. Comprehensive General Liability:

(Includes Premises – Operations, Independent Contractors Protection, Contractual Liability, Products and Completed Operations, Broad Form Property Damage):

a. Bodily Injury (including Completed Operations and Products Liability):

$1,000,000 each occurrence
$2,000,000 annual aggregate

b. Property Damage:

$1,000,000 each occurrence
$2,000,000 annual aggregate

c. Comprehensive General Liability Insurance will provide coverage at the limits indicated above for the exposures of:

Explosion
Collapse
Underground

d. If operations involve or require the use of blasting, the Contractor will provide blasting coverage to protect bodily injury and property damage per the above minimum general liability limits.

3. Comprehensive Automobile Liability:

Bodily Injury and Property Damage:

$1,000,000 each person/occurrence

4. Owner's Protective Liability:

Bodily Injury/Property Damage:

$1,000,000 each occurrence
$2,000,000 annual aggregate

5. Excess/Umbrella Liability:

Limit of Liability:

$1,000,000 Products/Completed Operations Aggregate
$1,000,000 General Aggregate
$1,000,000 BI/PD Any One Occurrence

6. As stated under Authority requirements:

Prior to the initiation of any construction activities all Developers and/or Contractors shall have submitted an approved Certificate of Insurance outlining the required insurance coverages. Submit insurance certificates and Hold-harmless Agreements naming the Authority, Township and Engineer as co-insureds and certificate holders. The certificates shall contain a provision that coverages will not be cancelled or non-renewed unless at least thirty (30) days' written notice has been provided to the Authority.

END OF SECTION

TECHNICAL SPECIFICATIONS FOR THE WATER DISTRIBUTION SYSTEM

SECTION 01010

SUMMARY OF WORK

PART 1 – GENERAL

1.01 SITE LOCATION

A. The project site is located in Cumberland County Pennsylvania; exact area as indicated on the drawings.

1.02 WORK INCLUDED

A. Without intending to limit or restrict the volume of Work required, the project includes but is not limited to the following:

1. Construction of water mains, laterals and valves.
2. Water main testing and disinfecting.
3. Soil erosion control.
4. Private right-of-way restoration.
5. Street restoration.
6. Preparation of record drawings for completed project area.

1.03 ENGINEERING STAKES

A. The Contractor shall furnish, set and maintain suitable stakes, grade boards, temporary structures, templates and other materials for establishing and maintaining points, marks and lines, and is responsible for setting or checking such points, marks or lines, and in making or checking measurements necessary in the prosecution of the Work.

B. The Contractor shall be responsible for the preservation of all stakes and marks.

1.05 PROJECT COORDINATION

A. The Contractor shall inform the Authority as soon as delay in the Work is occasioned, or is likely to occur due to delays in the manufacture or delivery of the specified equipment.

1.06 SCHEDULING OF OPERATIONS

A. In the phases of Work or schedules of operations that follow, it is not essential that one operation be completely finished before another is started.

B. All Work required by the Contractor to maintain his schedule of operations will be considered incidental to the other items of Work of this contract.

C. Phases of Work

1. General

The Work shall be divided into the following phases:

a. Installation of water main and appurtenances.
b. Installation of water house laterals.
c. Restoration and paving.

2. It should be noted that all phases of Work involve the installation of pipelines below grade and shall follow relatively the same schedule of operations.

D. Schedule of Operations

1. Locate all underground utilities and existing physical features that are not to be removed during the Work. Notify the Authority if any discrepancies exist between the actual conditions and contract drawings.

2. Perform excavation at required areas and elevations. Place appropriate piping embedment, install pipe in correct alignment and backfill trench as required.

3. Restore any unpaved surfaces, perform final grading and cleanup.

END OF SECTION

CONTRACTOR USE OF PREMISES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section includes general use of the site including properties inside and outside of rights-of-way, work affecting road, ramps, streets and driveways and notification to adjacent occupants.

B. Comply with Township Ordinance 02 of 2006.

1.02 RIGHTS-OF-WAY

A. Confine access and operations and storage areas to rights-of-way provided by the Owner; trespassing on abutting lands or other lands in the area is not allowed.

B. Contractor may make arrangements, at Contractor's cost, for temporary use of private properties, in which case Contractor and Contractor's surety shall indemnify and hold harmless the Authority and the Township against claims or demands arising from such use of properties outside of rights-of-way. Submit copy of agreement between private property owner and Contractor for materials storage prior to use of the area.

C. Obtain appropriate permits for storage of materials within rights-of-way. Submit copies of permits prior to use of the area.

D. Restrict total length which materials may be distributed along the route of the construction at any one time as approved in writing by the Authority.

1.03 PROPERTIES OUTSIDE OF RIGHTS-OF-WAY

A. Altering the condition of properties adjacent to and along rights-of-way will not be permitted.

B. Means, methods, techniques, sequences, or procedures which will result in damage to properties or improvements in the vicinity outside of rights-of-way will not be permitted.

C. Any damage to properties outside of rights-of-ways shall be repaired or replaced to the satisfaction of the Authority.

1.04 USE OF SITE

A. Comply with Township Ordinance 02 of 2006.

B. Obtain approvals of governing authorities (i.e. Township and/or PennDOT) prior to impeding or closing public roads or streets. Do not close more than two consecutive intersections at one time.

C. Notify Owner 48 hours prior to closing a street or a street crossing. Permits for street closures are required in advance and are the responsibility of the Contractor.

D. Maintain access for emergency vehicles including access to fire hydrants.

E. Avoid obstructing drainage ditches or inlets; when obstruction is unavoidable due to requirements of the Work, provide grading and temporary drainage structures to maintain unimpeded flow.

F. Locate and protect private lawn sprinkler systems which may exist on rights-of-ways within the site. Repair or replace damaged systems to condition equal to or better than that existing at start of Work.

G. Perform daily clean-up of dirt outside the construction zone, and debris, scrap materials, and other disposable items. Keep streets, driveways, and sidewalks clean of dirt, debris and scrap materials. Do not leave building, roads, streets or other construction areas unclean overnight.

1.05 NOTIFICATION TO ADJACENT OCCUPANTS

A. Notify individual occupants in areas to be affected by the Work of the proposed construction and time schedule. Notification shall be not less than 72 hours or more than 2 weeks prior to work being performed within 200 feet of the homes or businesses.

B. Include in notification names and telephone numbers of two company representatives for resident contact, who will be available on 24-hour call. Include precautions which will be taken to protect private property and identify potential access or utility inconvenience or disruption.

C. Submit proposed notification to the Authority for approval.

1.06 PUBLIC, TEMPORARY, AND CONSTRUCTION ROADS AND RAMPS

A. Construct and maintain temporary detours, ramps, and roads to provide for normal public traffic flow when use of public roads or streets is closed by necessities of the Work.

B. Provide mats or other means to prevent overloading or damage to existing roadways from tracked equipment or exceptionally large or heavy trucks or equipment.

1.07 EXCAVATION IN STREETS AND DRIVEWAYS

A. Avoid hindering or needlessly inconveniencing public travel on a street or any intersecting alley or street for more than two blocks at any one time, except by permission of the Authority and Township.

B. Obtain Authority and Township approval when the nature of the Work requires closing of an entire street. Permits required for street closure are the Contractor's responsibility. Avoid unnecessary inconvenience to abutting property owners.

C. Remove surplus materials and debris and open each block for public use as work in that block is complete.

D. Acceptance of any portion of the Work will not be based on return of street to public use.

E. Avoid obstructing driveways or entrances to private property.

F. Provide temporary crossing or complete the excavation and backfill in one continuous operation to minimize the duration of obstruction when excavation is required across drives or entrances.

G. Provide barricades and signs in accordance with the Pennsylvania Department of Transportation.

1.08 TRAFFIC CONTROL

A. Comply with traffic regulation as specified by the Authority, Township and/or PennDOT, as applicable.

1.09 SURFACE RESTORATION

A. Restore site to condition existing before construction to satisfaction of the Authority and Township.

B. Repair paved areas per the requirements of Section 02575 - Paving and Resurfacing and applicable road opening or highway occupancy permits.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01060

REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDE

A. Comply with requirements of permits obtained by the Authority.

B. Obtain and pay for all other permits required to perform the Work in compliance with applicable local, state and federal laws and regulations.

C. Pay all inspection fees related to permits or requirements of governing agencies, utilities, railroads, etc.

D. If, throughout the process of the Work within state highways, it is deemed necessary by the Pennsylvania Department of Transportation to post field inspectors on that portion of the project within their right of way, the Contractor/Developer shall reimburse the Pennsylvania Department of Transportation for the cost of the inspection so applied.

1.02 PERMITS TO BE ACQUIRED BY THE SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

A. PennDOT "Highway Occupancy Permit"

B. Cumberland County Conservation District "Erosion and Sediment Pollution Control Plan" approval

C. Department of Environmental Protection "Notice of Intent for Coverage under the General NPDES Permit"

NOTICE: The General NPDES Permit will be transferred to the Contractor prior to the beginning of construction.

END OF SECTION

Section 01300

SUBMITTALS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Submittal procedures for:

1. Shop Drawings, Product Data, and Sampler
2. Manufacturer's Certificates
3. Design Mixes

1.02 SUBMITTAL PROCEDURES

A. Scheduling and Handling

1. Schedule submittals well in advance of the need for the material or equipment for construction. Allow time to make delivery of material or equipment after submittal is approved.

2. Develop a submittal schedule that allows sufficient time for initial review, correction, resubmission and final review of all submittals. The Authority's Engineer will review and return submittals to the Developer's Contractor as expeditiously as possible but the amount of time required for review will vary depending on the complexity and quantity of data submitted. In no case will a submittal schedule be acceptable which allows less than 10 days for initial review by the Engineer.

3. The Engineer's review of submittals covers only general conformity to the Drawings, specifications and dimensions which affect the layout. The Contractor is responsible for quantity determination. No quantities will be verified by the Engineer. The Contractor is responsible for any errors, omissions or deviations from the requirements; review of submittals in no way relieves the Contractor from his obligation to furnish required items according to the Drawings and Specifications.

4. Submit a minimum of 4 copies of documents unless otherwise specified in the following paragraphs or in the Specifications.

5. Revise and resubmit submittals as required. Identify all changes made since previous submittal.

6. The Contractor shall assume the risk for material or equipment which is fabricated or delivered prior to approval. No material or equipment shall be incorporated into the Work until approval has been obtained in the specified manner.

B. Transmittal Form and Numbering

1. Transmit each submittal to the Engineer with a Transmittal Letter.

2. Sequentially number each submittal beginning with the number 1. Re-submittals shall use the original number with an alphabetic suffix (i.e., 2A for first re-submittal of Submittal 2 or 15C for third re-submittal of Submittal 15). Each submittal shall only contain one type of work, material, or equipment. Mixed submittals will not be accepted.

3. Identify variations from requirements of Specifications and identify product or system limitations.

C. Contractor's Stamp

1. Apply Contractor's stamp, certifying that the items have been reviewed in detail and are correct and in accordance with Specifications, except as noted by any requested variance.

2. As a minimum, Contractor's Stamp shall include:

a. Contractor's name
b. Job number
c. Submittal number
d. Certification statement that the Contractor has reviewed the submittal and it is in compliance with the Contract Documents
e. Signature line for Contractor

1.03 MANUFACTURER'S CERTIFICATES

A. When specified in Specification sections, submit manufacturer’s certificate of compliance for review by Engineer.

B. Contractor's Stamp, as described in paragraph 1.02C, shall be placed on front page of the certification.

C. Submit supporting reference data, affidavits, and certifications as appropriate.

D. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

1.04 DESIGN MIXES

A. When specified in Specifications, submit design mixes for review.

B. Contractor's Stamp, as described in paragraph 1.02C, shall be placed on front page of each design mix.

C. Mark each design mix to identify proportions, gradations, and additives for each class and type of design mix submitted. Include applicable test results on samples for each mix.

D. Maintain a copy of approved design mixes at mixing plant.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01410

DIGITAL AUDIO-VIDEO RECORDING OF PROJECT SITE

PART 1 - GENERAL

1.01 DIGITAL AUDIO-VIDEO RECORDING

A. Pre-Construction

1. Digital audio-video recording along the project line route shall be submitted prior to the start of any construction activities. The recording equipment used must be of professional grade as rated by the manufacturer, and meet the requirements listed below under “Products”.

B. Post-Construction

1. Following the completion of the project and all restoration and paving, a second audio-video shall be taken and submitted. The video shall be taken either immediately following a rain event or upon introduction of an external water source to indicate drainage characteristics.

1.02 QUALIFICATIONS

A. Required recording shall be performed by an independent third party firm actively engaged, experienced and knowledgeable in video taping existing conditions on utility projects. The Authority reserves the right to request sample work and investigate the qualifications of any firm chosen to perform this work.

B. The recording shall be scheduled in advance with the Authority, in the event the Authority may wish to be present.

PART 2 - PRODUCTS

2.01 Audio-Video digital media shall be of the DV or Mini-DV format and have been manufactured by a recognized manufacturer, (i.e. Panasonic, MAXELL, SONY, FUJI, TDK, JVC, etc.) No used media or “seconds” shall be allowed.

2.02 All digital video shall be in color and conform to NTSC standards, 720 x 480 minimum resolution and in DVC format (DVD-R) for playback on most recognized DVD set-top units and PC DVD players.

2.03 Audio portion of recording shall contain verbal information relevant to the conditions, items, locations and direction of travel appearing in the video.

PART 3 - EXECUTION

3.01 All digital recording to be done during periods of good visibility and not during periods of visible precipitation or while ground is covered by snow.

3.02 Control direction of travel, panning rates, and zoom in-out rates in a manner that produces clarity of subject during playback. When a conventional wheeled vehicle is used, approximately 9 foot lens to ground distance should be maintained. In areas not accessible by conventional wheeled vehicles recording shall be conducted on foot along R.O.W’s and areas of influence plus 15 feet on either side at 100 feet intervals minimum.

3.03 Include in recorded coverage driveways, sidewalks, curbs, ditches, (to show drainage patterns), streets (as full width as possible), landscaping, trees, shrubs, culverts, catch basins, retaining walls, headwalls, fences, visible utilities, and building exteriors within the zones of influence. Easements should be given consideration where deemed necessary by the Authority. Houses and buildings should be identified both audibly and visibly when possible.

3.04 Properly identify all DVD's by number, date, locations, and project name. Begin the audio narrative portion of each recording with current date, project name and municipality, starting location and direction of travel.

3.05 Unless waived by the Authority, all recording shall be done in their presence or the presence of an authorized representative.

3.06 Supply an index run sheet with a record of each DVD contents and identify locations, station numbers, line numbers, etc., referenced to time and date encoded on DVD's main program screen allowing the viewer to view designated reference points as needed.

3.07 DELIVERY AND DOCUMENTATION

A. DVD's are to be delivered to the Authority prior to the start of any construction within the zones of influence unless waived by the Authority.

END OF SECTION

Section 01564

WASTE MATERIAL DISPOSAL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Disposal of waste material and salvageable material.

1.02 SUBMITTALS

A. Obtain and submit disposal permits for proposed disposal sites if required by local ordinances.

B. Submit a copy of written permission from property owner, along with description of property, prior to disposal of excess material adjacent to the Project. Submit a written and signed release from property owner upon completion of disposal work.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 SALVAGEABLE MATERIAL

A. Excavated material: When indicated on Drawings, load, haul, and deposit excavated material at a location or locations shown on Drawings outside the limits of Project.

3.02 EXCESS MATERIAL

A. Vegetation, rubble, broken concrete, debris, asphaltic concrete pavement, excess soil, and other materials not designated for salvage shall be removed from the job site and legally disposed of.

B. Excess soil may be deposited on private property adjacent to the Project when written permission is obtained from property owner. See Paragraph 1.02 B. above.

C. Verify the flood plain status of any proposed disposal site. Do not dispose of excavated materials in an area designated as within the 100-year Flood Hazard Area unless a Permit has been obtained.

D. Waste materials shall be removed from the site on a daily basis, such that the site is maintained in a neat and orderly condition.

END OF SECTION

Section 01570

TRAFFIC CONTROL AND REGULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Requirements for signs, signals, control devices, flares, lights and traffic signals, as well as construction parking control, designated haul routes and bridging of trenches and excavations.

B. Requirement for and qualifications of flagmen.

1.02 SUBMITTALS

A. The Contractor shall submit a traffic control plan for the project area.

B. The Contractor shall provide such information and records regarding the use of qualified flagmen to verify that the Contractor's use of flagmen is in compliance with the Specifications and PennDOT Publication No. 43 and Publication No. 90.

1.03 FLAGMEN

A. Use flagmen, qualified as described below, to control, regulate and direct the even flow or movement of vehicular or pedestrian traffic when construction operations encroach on public traffic lanes.

PART 2 - PRODUCTS

2.01 SIGNS, SIGNALS, AND DEVICES

A. Comply with PennDOT and local municipality guidelines.

B. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.

PART 3 - EXECUTION

3.01 PUBLIC ROADS

A. Comply with PennDOT Publication No. 43 and Publication No. 90. Abide by laws and regulations of governing authorities when using public roads. If the Contractor's work requires that public roads be temporarily impeded or closed, approvals shall be obtained from governing authorities and permits paid for before starting any work. Coordinate activities with the Authority.

B. Wherever possible, maintain a 10-foot-wide all-weather lane adjacent to work areas which shall be kept free of construction equipment and debris and shall be for the use of emergency vehicles, or as otherwise provided in the traffic control plan.

C. Contractor shall not obstruct the normal flow of traffic from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. on designated major arterials or as directed by the Authority or Township.

D. Contractor shall maintain local driveway access to residential and commercial properties adjacent to work areas at all times.

E. Cleanliness of Surrounding Streets:

1. Keep streets used for entering or leaving the job area free of excavated material, debris, and any foreign material resulting from construction operations.

3.02 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and municipal operations.

B. Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.

C. Prevent parking on or adjacent to access roads or in non-designated areas.

3.03 FLARES AND LIGHTS

A. Provide flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.04 HAUL ROUTES

A. Utilize haul routes designated by authorities or shown on the Drawings for construction traffic.

B. Confine construction traffic to designated haul routes.

C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

3.05 TRAFFIC SIGNS AND SIGNALS

A. Install traffic control devices at approaches to the site and on site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

B. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.

C. Relocate traffic signs and signals as Work progresses to maintain effective traffic control.

3.06 BRIDGING TRENCHES AND EXCAVATIONS

A. Whenever necessary, bridge trenches and excavation to permit an unobstructed flow of traffic.

B. Secure bridging against displacement by using adjustable cleats, angles, bolts or other devices whenever bridge is installed:

1. On an existing bus route;
2. When more than five percent of daily traffic is comprised of commercial or truck traffic;
3. When more than two separate plates are used for the bridge; or
4. When bridge is to be used for more than five consecutive days.

C. Install bridging to operate with minimum noise.

D. Adequately shore the trench or excavation to support bridge and traffic.

E. Extend steel plates used for bridging a minimum of one foot beyond edges of trench or excavation. Use temporary paving materials (premix) to feather edges of plates to minimize wheel impact on secured bridging.

F. Use steel plates of sufficient thickness to support H-20 loading, truck or lane, that produces maximum stress.

3.07 REMOVAL

A. Remove equipment and devices when no longer required.

B. Repair damage caused by installation.

C. Remove post settings to a depth of 2 feet.

END OF SECTION

SECTION 01721

RECORD DRAWINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Maintenance and submittal of record drawings for water distribution projects.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Maintain one record copy of documents at the site.

B. Label each document "RECORD DRAWING" in neat, large, printed letters.

C. Maintain record documents in a clean, dry, and legible condition. Do not use record documents for construction purposes.

D. Keep record documents available for inspection by the Authority.

1.03 RECORDING

A. The Contractor shall maintain a complete set of record drawings which shall be corrected daily with date notations. Notations shall show every change from the original Drawings. Changes shall include but not be limited to:

1. Field changes of dimension and detail. This includes changes in water main lengths. Measure main length at the surface. Reference main line valves to poles, house corners, or any other permanent feature.

2. Show all services which are connected to the new water main. At water main, record station (0+00 format) of water services, length of water service to curb stop, depth of water service at curb stop, fittings, fire hydrants and gate valves using station 0+00 at each tee as starting point. Use design drawings as sample.

B. All of this information shall be noted in red (hand drawn) on the Record Set of Drawings and shall be kept on the job site. Review the record documents with the Authority monthly. Provide the record set to the Authority for verification and approval.

1.04 SUBMITTALS

A. The record set of documents shall be delivered to the Authority and/or the Authority's Engineer in two formats: hard copy on 27 x 40 inch paper and on CD or DVD in AutoCAD, using or saved to the current version in use by the Authority's consulting engineer. The layers, colors, and line types shall conform to the attached listing of

Record Drawing Layers. The delivery of the "record drawing" prints and CD's/DVD's for the Authority's and Engineer's use are a condition of Final Acceptance.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 02100

CLEARING AND GRUBBING

PART 1 – GENERAL

1.01 DESCRIPTION

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

1. Clearing
2. Grubbing
3. Stripping and stockpiling topsoil
4. Debris disposal

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compacting – Section 02221
2. Finish Grading and seeding – Section 02485

C. Definitions:

1. Clearing is defined as the removal of trees, brush, down timber, rotten wood, rubbish, any other vegetation and objectionable material at or above original ground elevation not designated to be saved. Clearing also includes removal of fences, walls, guard posts, guard rails, signs and other obstructions interfering with the proposed Work.

2. Grubbing is defined as the removal from below the surface of the natural ground of stumps, roots and stubs, brush, organic materials and debris.

1.02 JOB CONDITIONS

A. The Contractor may clear all obstructions within the permanent and construction rights-of-way except those specifically designated to be saved or restored in the Specifications.

1.03 SUBMITTALS

A. Burning Permits:

1. Submit one copy of each on-site burning permit to the Authority if such permits are required by local jurisdictional authorities.

B. Permits for Disposal of Debris:

1. Arrange for disposal of debris resulting from clearing and grubbing to locations outside the right-of-way and obtain written agreements with the owners of the property where the debris will be deposited.

2. Submit one copy of the agreement with each property owner releasing the Authority from responsibility in connection with the disposal of the debris.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Temporary Fencing:

1. Undamaged picket snow fence, 4’ high.

2. Soil-set fence posts, studded “T” type, 6’ high.

B. Tree Wound Dressing:

1. Antiseptic and waterproof, asphalt based.

PART 3 – EXECUTION

3.01 PREPARATION

A. Notify the Authority at least 48 hours prior to beginning any clearing work.

B. Protect benchmarks, utilities, existing trees, shrubs and other landscape features designated for preservation with temporary fencing or barricades satisfactory to the Authority. No material shall be stored or construction operation carried on within 4 feet of any tree to be saved or within the tree protection fence.

3.02 UTILITY RELOCATIONS

A. Inform all companies, individuals and others owning or controlling facilities or structures within the limits of the work which have to be relocated, adjusted or reconstructed in sufficient time for the utility to organize and perform such work in conjunction with or in advance of the Contractor’s operations.

B. Comply with the provisions of PA Act 287 of 1974 as amended by Act 187 of 1996.

3.03 CLEARING

A. Confine clearing to within the limits of the Developer’s property or the right-of-way or easement.

B. Fell trees in a manner that will avoid damage to trees, shrubs and other installations which are to be retained.

C. Where stumps are not required to be grubbed, flush-cut with ground elevation.

3.04 GRUBBING

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

B. Remove all stumps within the cleared areas unless otherwise authorized by the Authority.

3.05 DEBRIS DISPOSAL

A. Trees, logs, branches, brush, stumps and other debris resulting from clearing and grubbing operations shall be legally disposed of.

B. Do not deposit or bury on the site debris resulting from the clearing and grubbing work.

C. Debris may be burned on site if local ordinances allow open-air burning, if required permits are obtained, and if burning operations are conducted in compliance with local ordinances and regulations.

3.06 RESTORATION

A. Repair all injuries to bark, trunk, limbs and roots of remaining plants by properly dressing, cutting, tracing and painting, using approved arboricultural practices and materials.

B. Replace trees, shrubs and plants designated to be saved which are permanently injured or die as a result of construction operations.

C. Remove protective fences, enclosures and guards upon the completion of the project.

D. Restore guard posts, guard rails, signs and other interferences to the condition equal to that existing before construction operations.

END OF SECTION

SECTION 02110

EROSION CONTROL BLANKET

PART 1 – GENERAL

1.01 MATERIAL SPECIFICATION

A. The erosion control blanket shall be a machine-produced mat of 100% agricultural straw with a functional longevity of approximately 12 months.

B. The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a lightweight photodegradable polypropylene netting having an approximate 0.50 X 0.50 inch (1.27 X 1.27 cm) mesh and be sewn together on 1.50 inch (3.81 cm) centers (50 stitches per roll width) with degradable thread.

C. The blanket shall be manufactured with a colored line or thread stitched along both outer edges (approximately 2 – 5 inches [5 – 12.5 cm] from the edge) to ensure proper material overlapping.

PART 2 – PRODUCTS

1.01 MANUFACTURERS

A. Straw erosion control blanket shall be S75 as manufactured by North American Green, or equivalent.

B. Another acceptable manufacturer may be used upon approval.

1.02 MATERIALS AND SPECIFICATIONS

A. The S75 erosion control blanket shall have the following properties:

MATERIAL CONTENT

Matrix	100% Straw Fiber (0.50 lbs/yd^2) (0.26 kg/m^2)
Netting	One side only, lightweight photodegradable (2.10 lbs/1,000 ft^2 [1.02 kg/100m^2] approximate weight)
Thread	Degradable

PHYSICAL SPECIFICATIONS (PER ROLL)

	English	**Metric**
Width	6.67 ft	2.03 m
Length	108.00 ft	32.92 m
Weight	40.00 lbs ±10%	18.14 kg
Area	80.00 yd^2	66.89 m^2
Stitch Spacing	1.50 inches	3.81 cm

END OF SECTION

SECTION 02150

BORING AND CASING

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Approach trench excavation

2. Installation of casing pipe

3. Installation of carrier pipe

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling & Compacting: Section 02221

C. Applicable Standard Details:

1. Boring Detail

1.02 QUALITY ASSURANCE

A. Contractor Qualifications:

1. Construction operations shall be undertaken only by a contractor well experienced in operations of similar magnitude and condition under transportation arteries and surface areas which cannot be disturbed.

B. Design Criteria:

1. Pipe and joints of leak-proof construction, designed for the earth and/or other pressures present, plus highway H20 loading or railway E80 loading with the associated recommended impact loading.

2. Design bracing, backstops, and use jacks of sufficient rating so that the jacking can proceed without stoppage, except for adding pipe sections and as conditions permit, to minimize the tendency of the ground material to 'freeze' around the casing pipe.

C. Allowable Tolerances:

1. Do not overcut excavation by more than 1" greater than the outside diameter of the casing pipe.

2. Install casing pipe with the determined vertical and horizontal alignment prior to installation of the carrier pipe.

D. Reference Codes and Specifications:

1. Comply with applicable federal, state and local ordinances, codes, statutes, rules and regulations, and affected jurisdictional bodies.

2. Pennsylvania Department of Transportation Publication 408 Specifications.

1.03 SUBMITTALS

A. Submit history of previous work completed of equivalent nature and scope. Include qualification and experience of key personnel.

B. Submit description of proposed construction methods, including methods to establish and maintain vertical and horizontal alignment.

C. Submit manufacturer's data on casing pipe.

1. Highway Crossings: Design casing pipe for earth and/or other pressure loads present, plus AASHTO H20 live loading.

2. Railroad Crossings: Design casing pipe for earth and/or other pressure loads present, plus Cooper's Railroad E80 live loading with 50-percent added for impact.

1.04 JOB CONDITIONS

A. Conduct operations so as not to interfere with, interrupt, damage, destroy, or endanger the integrity of surface or subsurface structures or utilities, and landscape in the immediate or adjacent areas.

B. When boring under state highways and railroads, comply with applicable right-of-way occupancy permits.

C. If boring is obstructed, relocate or jack crossing as approved by the Authority’s Engineer.

PART 2 - PRODUCTS

2.01 STEEL CASING PIPE

A. ASTM A139, Grade B; 35,000 psi min. yield strength.

B. Full circumference welded joints.

C. Diameter as shown on the Drawings.

D. Minimum wall thickness as listed below:

Nominal Dia. (inches)	Coated or Cath. Protected	Uncoated and Unprotected
Under 14	0.188	0.251
14, 16	0.219	0.282
18	0.250	0.313
20	0.281	0.344
22	0.312	0.375
24	0.344	0.407
26	0.375	0.438
28, 30	0.406	0.469
32	0.438	0.501
34, 36	0.469	0.532
38, 40, 42	0.500	0.563
48	0.563	0.626
54	0.625	0.688

Smooth wall steel pipe with nominal diameter over 54" will not be permitted.

2.02 CASING SPACERS

A. Casing spacers shall be RACI Casing Spacers as manufactured by Public Works Marketing, Inc., or approved equal. Installation shall be in accordance with the manufacturer.

B. Other approved methods for cradling and anchoring pipe may be used. Spacing and end seals as required by manufacturer.

PART 3 - EXECUTION

3.01 APPROACH TRENCH

A. Excavate approach trench using methods as site conditions require.

B. Ensure pipe entrance face as near perpendicular to alignment as conditions permit.

C. Establish a vertical entrance face at least 1 foot above top of casing or tunnel lining.

D. Install adequate excavation supports as specified in Section 02221 - Trenching.

3.02 CASING PIPE DIAMETER

A. Casing pipe diameter shall be as specifically indicated on the crossing plan or profile drawings for all bored crossings.

B. Casing pipe diameter shall comply with the requirements of the Specifications and Drawings and as otherwise stated herein.

C. Contractor has option to utilize larger casing pipe to facilitate anticipated rock/boulder removal; subject to the approval of the Authority's Engineer and any regulatory agency having jurisdiction.

D. Contractor shall advise the Authority's Engineer of his proposed casing pipe diameter and provide suitable shop drawings prior to ordering materials and initiating work. This shall be done sufficiently ahead of time to obtain regulatory approvals as required.

3.03 CASING PIPE INSTALLATION METHODS

A. BORING:

1. Push the pipe into the ground with a boring auger rotating within the pipe to remove the spoil. Do not advance the cutting head ahead of the casing pipe except for that distance necessary to permit the cutting teeth to cut clearance for the pipe. The machine bore and cutting head arrangement shall be removable from within the pipe. Arrange the face of the cutting head to provide a barrier to the free flow of soft material.

2. If unstable soil is encountered during boring retract the cutting head into the casing to permit a balance between the pushing pressure and the ratio of pipe advancement to quantity of soil.

3. If voids should develop greater than the outside diameter of the pipe by approximately one inch, grout to fill voids.

B. JACKING:

1. Construct adequate thrust wall normal to the proposed line of thrust.

2. Impart thrust load to the pipe through a suitable thrust ring that is sufficiently rigid to ensure distribution of the thrust load on the pipe.

C. DRILLING AND JACKING:

1. Use an oil field type rock roller bit or plate bit made up of individual roller cutter units solidly welded to the pipe which is turned and pushed for its entire length by the drilling machine to give the bit the necessary cutting action.

2. Inject a high density slurry (oil field drilling mud) to the head as a cutter lubricant. Inject slurry at the rear of the cutter units to prevent jetting action ahead of the pipe.

D. MINING AND JACKING:

1. Utilize manual hand-mining excavation from within the casing pipe as it is advances with jacks, allowing minimum ground standup time ahead of the casing pipe.

3.04 DEWATERING:

A. Intercept and divert surface drainage precipitation and groundwater away from excavation through the use of dikes, curb walls, ditches, pipes, sumps or other means.

B. Develop a substantially dry subgrade for the performance of subsequent operations.

C. Comply with Federal and State requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

3.05 PRESSURE GROUTING:

A. Pressure grout the annular space between the casing pipe and surrounding earth.

3.06 CARRIER PIPE INSTALLATION:

A. All provisions regarding cleaning, inspection and handling specified under pipe material sections apply to this work.

B. Place the carrier as shown on the Drawings. Exercise care to prevent damage to pipe joints when carrier pipe is placed in casing.

C. Support pipeline within casing so that no external loads are transmitted to carrier pipe. Attach casing spacers to barrel of carrier pipe; do not rest carrier pipe on bells.

3.07 CARRIER PIPE ANTIFLOTATION

A. Upon completion of the carrier pipe installation, provide antiflotation as follows:

1. For encasement diameter up to 36 inches: provide sand or pea gravel fill for full crossing length to a point at least 1.5 times the full carrier pipe diameter above the top of the carrier pipe or to the crown of the encasement pipe; whichever is lesser.

2. For encasement diameter of 36 inches or larger: provide antiflotation as above or provide brick bulkheads or anchored tie roads at each bell of carrier pipe for full crossing length.

3.08 ENCASEMENT SEALS

A. Seal encasement pipes at each end with either brick and mortar, concrete bulkheads or end seals as required by manufacturer.

END OF SECTION

SECTION 02221

TRENCHING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Cutting paved surfaces
2. Blasting
3. Trench excavation, backfill and compaction
4. Support of excavation
5. Pipe bedding requirements
6. Control of excavated material
7. Rough grading
8. Restoration of unpaved surfaces

B. Related Work specified elsewhere:

1. Clearing and Grubbing – Section 02100
2. Boring – Section 02150
3. Finish Grading and Seeding – Section 02485
4. Paving and Resurfacing – Section 02575

C. Applicable Standard Details:

1. Pipe embedment and trench backfilling
2. Typical trench width at top of pipe

D. Definitions:

1. Subgrade: Trench or excavation bottom prepared as specified herein to receive pipe bedding, concrete cradle or encasement, or structures.

2. Unclassified Excavation: Excavation of all material encountered including soil, shale, rock, boulders, fill or other material on-site.

3. Rock Excavation: Excavation of solid mineral rock greater than one-half cubic yard in volume requiring, with the Authority's Engineer's approval, drilling, blasting and wedging for its removal.

4. Pipe Bedding: Placement of material as specified herein for full trench width from the subgrade a minimum of six (6) inches or one-fourth the internal diameter of the pipe, whichever is greater, below the pipe invert to half-way up the outside diameter of the pipe.

5. Pipe Embedment: Placement of material as specified herein for full trench width from the top of the pipe bedding (halfway up pipe) to a point a minimum of six (6) inches above the pipe.

6. Backfill: Placement of material as specified herein for full width of excavation from the top of the pipe embedment to the ground surface or, in the case of paved areas, to the bottom of replacement base course or paving.

1.02 QUALITY ASSURANCE

A. Testing Agency:

1. Compaction testing shall be performed by a Soils Testing Laboratory engaged and paid for by the Contractor and approved by the Engineer.

B. Reference Standards:

1. Pennsylvania Department of Transportation:

a. Regulations Governing Occupancy of Highways by Utilities (67 PA Code, Chapter 459)
b. Publication 408 Specifications
c. Pennsylvania Test Method, PTM 106
d. Pennsylvania Test Method, PTM 402
e. Publication 203, Work Zone Traffic Control

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

ASTM C33	Specifications for Concrete Aggregates
ASTM D698	Tests for Moisture-Density Relations of Soils
ASTM D2922	Test for Density of Soil and Soil Aggregate in Place by Nuclear Methods

C. Compaction Testing:

1. Conduct one test for each 1,000 linear feet of pipeline. Conduct compaction tests at locations as directed by the Authority's Engineer during backfilling operations.

2. Determine compaction in state highways and shoulders by the testing procedure contained in Pennsylvania Test Method PTM 106, Method B or PTM 402.

3. Determine compaction in areas other than state highways and shoulders by the testing procedure contained in ASTM D698 or ASTM D2922.

1.03 SUBMITTALS

A. Certificates:

1. Submit certification attesting that the composition analysis of pipe bedding and select backfill materials meet specification requirements.

2. Submit certified compaction testing results from the soils testing laboratory.

B. Compaction Equipment List:

1. Submit a list of all equipment to be utilized for compacting, including manufacturers' lift thickness limitations.

1.04 JOB CONDITIONS

A. Control of Traffic:

1. Employ traffic control measures in accordance with Pennsylvania Department of Transportation Publication 203, “Work Zone Traffic Control.” Refer to Section 01570 of the Specifications.

2. Comply with all local authorities. Obtain approval of traffic control plan from the Authority and Township prior to start of excavation.

B. Protection of Existing Utilities and Structures:

1. Take all precautions and utilize all facilities required to protect existing utilities and structures. Advise each Utility at least 3 working days in advance of intent to excavate, do demolition work or use explosives and give the location of the job site. Request cooperative steps of the Utility and suggestions for procedures to avoid damage to its lines.

2. Advise each person in physical control of powered equipment or explosives used in excavation or demolition work of the type and location of utility lines at the job site, the Utility assistance to expect, and procedures to follow to prevent damage.

3. Immediately report to the Utility and the Authority any break, leak or other damage to the lines or protective coatings made or discovered during the work and immediately alert the occupants of premises of any emergency created or discovered.

4. Allow free access to Utility personnel at all times for purposes of maintenance, repair and inspection.

5. The Contractor shall be held liable for any damage done by reason of breaking of water, sewer, gas, telephone, electrical, or other utility service. In case, during the course of his work, he shall damage any of the aforementioned utilities, he shall immediately begin to repair the same and send notice to the proper authorities. Whenever the Contractor, during the progress of the excavation shall uncover service pipes or lines, which because of age or injury, are in poor condition, he shall immediately notify the proper Authority in order that steps may be taken for replacement or repair. To prevent dispute with property owners as to cause of damages, the Contractor shall notify his foreman to carefully note and properly report such damage.

6. Keep all fire hydrants, water valves, gas valves, fire alarm boxes, and letter boxes accessible for use.

PART 2 - PRODUCTS

2.01 PIPE BEDDING MATERIAL

A. Standard Pipe Bedding:

1. AASHTO No. 8 (formerly 1B) crushed stone or gravel aggregate, Table C, Section 703.2, Publication 408 Specifications. Do not use slag or cinders.

B. Alternate Pipe Bedding only where Approved by the Engineer:

1. AASHTO No. 57 (formerly 2B) crushed stone or gravel aggregate, Table C, Section 703.2, Publication 408 Specifications. Do not use slag or cinders.

2.02 PIPE EMBEDMENT MATERIAL

A. Standard Pipe Embedment:

1. AASHTO No. 8 crushed stone or gravel aggregate. Do not use slag or cinders.

B. Alternate Pipe Embedment (Only where approved by the Authority's Engineer):

1. AASHTO No. 57 crushed stone or gravel aggregate. Do not use slag or cinders.

2.03 BACKFILL MATERIAL

A. Native Backfill (Not permitted within existing paved road areas):

1. Material excavated from the site if free of stones larger than 6" in size and free of wet, frozen, and organic materials and refuse.

B. Clean Earth Backfill:

1. Material excavated from the trench if free of stones larger than 2" in size and free of wet, frozen, or organic materials and refuse.

C. Select Backfill:

1. Type 2A aggregate shall be limestone or shall demonstrate a weight in pounds per cubic foot equivalent to or greater than limestone.

PART 3 - EXECUTION

3.01 MAINTENANCE AND PROTECTION OF TRAFFIC

A. Coordinate the work with the Authority and the Township to insure the least inconvenience to traffic and maintain traffic in one or more unobstructed lanes unless closing the roadway is authorized.

B. Maintain access to all streets and private drives by hauling of excavated and backfill materials, if necessary, in suitably covered and leakproof trucks.

C. Provide and maintain signs, flashing warning lights, barricades, markers, and other protective devices as required to conform with construction operations and to keep traffic flowing with minimum restrictions.

D. Comply with state and local codes, permits and regulations.

3.02 STRIPPING

A. The Contractor shall remove all paving, subpaving, curbing, gutters, brick, paving block, granite curbing or flagging, or grub and clear the surface over the area to be excavated and shall properly classify the materials removed, separating them as required. Where pipe trenches underlie permanent resurfacing, the surface material shall be machine cut before excavation is begun.

B. He shall properly store, guard, and preserve material as may be required for future use in backfilling, surfacing, repaving, etc. All materials which may be removed and all rock, earth, and sand taken from the excavation shall be stored, if practical, in certain parts of the roadway or such other suitable place and in such manner as the Authority shall approve. The Contractor shall be responsible for any loss or damage to the said materials because of careless removal or neglectful or wasteful storage, disposal, or use of these materials.

C. In case more materials are created from any trench that can be backfilled over the completed pipe or stored in the street, leaving space for traffic, the excess material shall be removed to some convenient place provided by the Contractor or as directed by the Authority. The Contractor shall bring back as much of the material so removed as may be required to properly refill the trench, if of the proper kind, or if so directed by the Authority, he shall furnish such other material as may be necessary.

3.03 TEST PITS

A. The Contractor shall excavate test pits at such points and of such dimension and depths as indicated on the Drawings or as the Authority's Engineer may direct. It is understood that the purpose of these test pits is to verify, so far as practical, the location of various subsurface structures or utilities.

3.04 CUTTING PAVED SURFACES

A. Where installation of pipelines, miscellaneous structures, and appurtenances necessitate breaking a paved surface, make saw cuts using a diamond wheel or similar instrument in a neat uniform fashion forming straight lines parallel with the centerline of the trench. Cut offsets at right angles to the centerline of the trench.

B. Protect edges of cut pavement during excavation to prevent raveling or breaking; square edges prior to pavement replacement.

3.05 ROCK EXCAVATION BY BLASTING

A. Blasting will be permitted except in areas where the proximity of structures, underground facilities, or public safety preclude the use of explosives. Nothing in this section shall relieve the Contractor of his responsibilities for damages, nor shall it result in any liability to the Authority or the Engineer.

B. All blasting operations shall be conducted in a safe and satisfactory manner. Any rock excavation within five feet of underground utilities shall be done with a very light charge of explosives and the utmost care shall be used to avoid disturbing the mains. All exposed pipe lines and other structures shall be carefully protected from the effects of blasts and any

damage done to them by blasting shall be properly repaired by the Contractor. Sufficient written notice shall be given to all persons in the vicinity of the work before blasting. The Contractor shall be required to place seismographs in nearby structures when blasting is to occur. The site of the blast shall be covered with heavy timbers, blasting mats, or other devices to prevent damage from flying rock. The time of blasting and the number and size of charges must be satisfactory to the Authority's Engineer.

C. All rock excavation shall be conducted by a licensed blaster. Handling explosive materials and conducting blasting operations shall be in accordance with all of the safety regulations of the Commonwealth of Pennsylvania and OSHA. Obtain approval and/or permit from the Township prior to start of blasting.

D. Written notice to residents shall include the applicable scheduling for blasting and shall inform the residents of their rights to submit a claim for damages resulting from the blasting operations for a minimum period of one year from the completion of the excavation portion of construction activities.

3.06 TRENCH EXCAVATION

A. Depth of Excavation:

1. Gravity Pipelines:

a. Excavate trenches to the depth and grade required for the invert of the pipe plus a minimum excavation of six (6) inches or one-fourth the internal pipe diameter, whichever is greater, for placement of pipe bedding material.

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

2. Pressure Pipelines:

a. Excavate trenches to the minimum depth necessary to place required pipe bedding material as above and to provide 4' from the top of the pipe to the finished ground elevation, except where specific depths are otherwise shown on the drawings.

3. Care shall be taken not to excavate below the depths required. Any such excessive excavation shall be refilled with crushed stone and compacted to the satisfaction of the Authority's Engineer.

4. When the material encountered at subgrade is unsuitable and in the opinion of the Authority's Engineer does not afford a sufficiently firm foundation, the Contractor shall excavate to such increased depth as directed. The bottom of the trench shall be brought to the required elevation with crushed stone compacted to the satisfaction of the Engineer.

5. When the pipe is to be laid in fill, the embankment shall be brought to a height of at least nine inches above the proposed top of the pipe before the trench is excavated.

6. If rock below the specified grade is shattered due to excessive drilling or blasting or other negligence of the Contractor, and if in the opinion of the Engineer it is unfit for foundations, such shattered rock shall be removed and the area backfilled to the proper grade with crushed stone.

B. Width of Excavation:

1. Pipe trenches shall be sufficiently straight between designated angle points to permit the pipe to be laid true to line in the approximate center of the trench. The trench widths shall be such as to provide a free working space on each side of the pipe as laid, but shall not exceed the outside diameter of the barrel of the pipe plus sixteen inches at a point one foot above the top of the pipe.

2. Where sheeting and shoring are used, the maximum allowable width shall be measured between the closest interior faces of the sheeting or shoring as placed. Whenever, for any reason, the maximum trench width is exceeded, the Contractor may be ordered by the Engineer to encase the pipe in a concrete cradle.

3. For pressure pipeline fittings, excavate trenches to a width that will permit placement of concrete thrust blocks. Provide earth surfaces for thrust blocks that are perpendicular to the direction of thrust and are free of loose or soft material.

4. If the Contractor is required to excavate the trench to a width greater than that specified above, because of slides, caves, obstructions or by reason of the condition and character of the material, he shall refill any cavities so caused with suitable and satisfactory material, including concrete or other masonry if so directed.

C. Length of Open Trench:

1. The Engineer reserves the right to limit the length of distance that a trench may be opened in advance of the pipe laid at all times.

2. Do not advance trenching operations more than 200 feet ahead of completed pipeline, except where approved by the Engineer or otherwise specified in the State Highway Occupancy Permit.

3. Where rock excavation is encountered, all trenches must be opened at least 30 feet in advance of any pipe being laid.

4. If the work is stopped on the whole or any part of the trench and the same is left open for an unreasonable length of time in advance of the construction of the pipe line, the Contractor shall, when directed, refill such trench and he shall not again open the trench or part thereof until he is ready to proceed with construction of the pipe line.

3.07 SUPPORT OF EXCAVATION

A. Support excavations with sheeting, shoring, and bracing or a "trench box" as required to comply with Federal and State laws and codes.

B. Install adequate excavation supports to prevent ground movement or settlement to adjacent structures, pipelines or utilities. Damage due to settlement because of failure to provide support or through negligence or fault of the Contractor in any other manner, shall be repaired by the Contractor.

C. Withdraw shoring, bracing, and sheeting as backfilling proceeds unless otherwise directed by the Engineer.

D. All voids caused by withdrawal shall be immediately filled with concrete, sand, current ASTM Designation C-33 or other satisfactory material and compacted by ramming or other methods satisfactory to the Engineer.

3.08 CONTROL OF EXCAVATED MATERIAL

A. Keep the ground surface, within a minimum of 2' of both sides of the excavation free of excavated material.

B. Provide temporary barricades to prevent excavated material from encroaching on private property, walks, gutters, and storm drains.

C. Maintain accessibility to all fire hydrants, valve pit covers, valve boxes, curb boxes, fire and police call boxes, and other utility controls at all times. Keep gutters clear or provide other satisfactory facilities for street drainage. Do not obstruct natural water courses. Where necessary, provide temporary channels to allow the flow of water either along or across the site of the work.

D. In areas where pipelines parallel or cross streams, ensure that no material slides, is washed, or dumped into the stream course. Remove cofferdams immediately upon completion of pipeline construction.

E. Conform to all applicable soil erosion and sediment control regulations.

3.09 DEWATERING

A. Keep excavations dry and free of water. Dispose of precipitation and subsurface water clear of the work.

B. Maintain pipe trenches dry until pipe has been jointed, inspected, and backfilled, and concrete work has been completed. Prevent trench water from entering pipelines under construction.

C. Intercept and divert surface drainage away from excavations. Design surface drainage systems so that they do not cause erosion on or off the site, or cause unwanted flow of water.

D. Comply with Federal and State regulations for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

3.10 PIPE BEDDING AND EMBEDMENT

A. Prepare trench bottom as shown on Standard Detail.

B. Place and compact Standard Pipe Bedding of AASHTO No. 8 in accordance with Standard Detail and specifications.

C. Shape bedding recesses for joints and bells to assure pipe is supported on barrel for entire length.

D. Lay pipe as specified in Section 02610 of these Specifications.

3.11 THRUST RESTRAINT

A. Provide pressure pipe with concrete thrust blocking or use restrained joint fittings at all bends, tees, valves, and changes in direction, in accordance with the Specifications and Standard Details.

3.12 BACKFILLING TRENCHES

A. Unless otherwise directed by the Authority's Engineer, backfilling shall be started immediately after preliminary alignment inspection is made and shall continue without interruption to completion.

B. The satisfactory compaction of all backfills shall be the responsibility of the Contractor regardless of the methods used and he shall protect the Authority from any loss, damage, or claims occasioned by trench settlement.

C. Compaction:

1. From the height of 6" inches above the top of the pipe, the backfill material shall be placed in 6" inch vibrator layers mechanically tamped to obtain maximum compaction.

2. Tamping shall proceed from the center of the trench to the sides to prevent arcing.

3. Backfill shall be compacted to a dry density at least equal to 95 percent of the maximum dry density obtained in the modified reactor tests, ASTM D1557-70.

4. Backfill shall be placed and compacted to within 6 ½ inches of the existing road grad, unless otherwise directed by the Authority. Refer to Section 02575, Paving and Resurfacing.

D. Open Fields or Grassed Areas:

The initial backfill above the pipe embedment shall be a minimum of one foot in depth and shall be filled with clean earth placed in six-inch layers and carefully compacted with pneumatic hand tampers, except in rock where a suitable material approved by he Engineer shall replace the excavated rock. Above this point to a depth of 18 inches below the finished grade, the backfill material may contain small stones not larger than six inches in their greatest dimension in an amount not greater than 20 percent of the volume of backfill and well-distributed throughout the mass. The remaining 18 inches of backfill shall consist of

clean earth. Clean earth shall be considered the original material taken from the ditch less any stones, rocks or foreign materials.

In open fields or grass areas, the trench shall be mounded as shown on the Standard Details.

E. Streets(State Highways and other than State Highways):

The entire depth of trench above the pipe embedment to a point six and one-half (6 ½") inches below the existing surface (two inches if temporary resurfacing is to be used), or as directed by the Authority's Engineer shall be filled with Select Granular Material in conformance with PENNDOT 408 Specifications, Section 703.3. Such backfill shall be placed for the entire width of the trench in six-inch (6") maximum layers and well compacted by approved vibratory compactor, in conformance with Section 601.3(e).

F. Unsuitable Backfill Material:

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

3.13 BACKFILLING AND GRADING AROUND STRUCTURES

A. The ground around structures shall be brought to the grades shown on the plans or as directed by the Authority's Engineer. Generally, backfilling shall be made in accordance with the specifications for trench backfilling to open fields or grass areas, except where practical, compacting may be performed by rolling. Grading shall be done by ploughing, harrowing, scraping, or by other methods to bring the ground to the required elevations in preparing the ground for the deposition of the topsoil. When the site has been properly graded to provide drainage, the topsoil shall be placed to a depth of four inches and then harrowed to provide a reasonably smooth surface, ready for seeding. Where compaction is made by rollers, the rollers shall weigh not less than ten tons and shall not be permitted within eight feet of any wall or structure or where, in the opinion of the Engineer, damage may result to existing underground piping.

B. The Contractor shall be responsible for the stability of the fill and shall replace any portion thereof damaged by natural causes, or by careless or negligent work.

C. Sufficient grading shall be done during the progress of the work so that no water is allowed at any time to flow toward the wall or structures or to accumulate in large puddles on the project site.

3.14 DISPOSAL OF EXCAVATED MATERIAL

A. Excavated material remaining after completion of backfilling shall remain the property of the Contractor, removed from the construction area, and disposed of in accordance with Section 01564.

3.15 ROUGH GRADING

A. Rough grade areas disturbed by construction to a uniform finish. Form the bases for terraces, banks, lawns and paved areas.

B. Grade areas to be paved to depths required for placing sub-base and paving materials.

C. Rough grade areas to be top-soiled and seeded to 3" below indicated finish contours.

3.16 FINAL LEVELING AND CLEANUP

A. Whenever the trenches have not been properly filled, or if settlement occurs, they shall be refilled, compacted, leveled, and finally graded to conform to the surface of the ground. Trenches in streets, sidewalks, alleys, etc., shall be refilled with crushed stone, graded as shown on the plans. Trenches in open fields or unpaved plant areas shall be mounded with clean earth to a minimum depth of three inches.

B. As the work is completed, the Contractor shall remove and dispose of all surplus earth, stone, or other material on-site or distant from the work in such manner and at such point or points as he may select or provide, subject to the approval of the Authority's Engineer, and shall leave all roads, sidewalks, and other places free, clear, and in good order.

C. The level of trench fill is to be maintained for a period of one year within dedicated and pre-existing legal roads and right-of-ways.

3.18 DUST CONTROL

A. Where dust or wind erosion is a problem, the unstable surface shall be lightly sprinkled with water or a dust suppressor shall be applied as necessary or as directed by the Authority's Engineer. Care shall be taken so as not to cause any water erosion to the unstable surface.

END OF SECTION

SECTION 02485

FINISH GRADING AND SEEDING

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Placing topsoil
2. Soil conditioning
3. Finish grading
4. Seeding
5. Maintenance

B. Restore unpaved surfaces to a condition similar to that prior to excavation as specified and indicated on the Drawings.

C. The "Seeding Restoration Tables" at the end of this section list specific seeding restoration requirements. Refer to Drawings and Special Conditions for seeding restoration requirements at each specific location of Work.

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation Publication 408 Specifications.
2. Pennsylvania Seed Act of 1965, Act 187, as amended.
3. Agricultural Liming Materials Act of 1978, P.L. 15, No. 9 (3P.S. 132-1), as amended.
4. Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258, No. 86 (3P.S. 68.2), as amended.
5. Rules for Testing Seeds of the Association of Official Seed Analysts.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Seed:

1. Deliver seed fully tagged and in separate packages according to species or seed mix. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be accepted.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Having a pH of between 6.0 and 7.0; containing not less than 2% nor more than 10% organic matter as determined by AASHTO T194.

B. Fertile friable loam, sand loam, or clay loam which will hold a ball when squeezed with the hand, but which will crumble shortly after being released.

C. Free of clods, grass, roots, or other debris harmful to plant growth.

D. Free of pests, pest larvae, and matter toxic to plants.

2.02 FERTILIZER

A. Basic Dry Formulation Fertilizer:

1. Analysis 0-20-20 and as defined by the Pennsylvania Soil Conditioner and Plant Growth Substance Law.

B. Starter Fertilizer:

1. Analysis 10-5-5 or 12-6-6 and as defined by the Pennsylvania Soil Conditioner and Plant Growth Substance Law.

2.03 LIME

A. Raw ground limestone conforming to Section 804.2(a), Publication 408 Specifications.

2.04 SEED

A. Fresh, clean, dated material from the last available crop and within the date period specified, with a date of test not more than 9 months prior to the date of sowing. Percentage of pure seed present shall represent freedom from inert matter and from other seeds distinguishable by their appearance. All seeds will be subject to analysis and testing.

TABLE 1 - GRASS AND AGRICULTURAL SEEDS

Species	Minimum Guaranteed Purity (Percent)	Maximum Weed Seed (Percent)	Minimum Guaranteed Germination (Percent)
Kentucky Bluegrass (Poa pratensis) Domestic origin; min. 21 lb. per bushel	90	0.20	80
Perennial Ryegrass (Lolium perenne, var. Pennfine)	95	0.15	90
Kentucky 31 Fescue (Festuca elatior arundinacea)	98	0.25	85
Crownvetch (Coronilla varia, var. Penngift)	99	0.10	70
Pennlawn Red Fescue (Festuca rubra, var. Pennlawn)	98	0.25	90
Annual Ryegrass (Lolium multiflorum)	95	0.15	90
Timothy (Phleum pratense)	98	0.25	95

2.05 SEED MIXTURES

A. See "Seeding Restoration Table" at end of this Section.

2.06 INOCULANT

A. Inoculate leguminous seed before seeding with nitrogen fixing bacteria culture prepared specifically for the species.

B. Do not use inoculant later than the date indicated by the manufacturer.

C. Protect inoculated seed from prolonged exposure to sunlight prior to sowing.

D. Reinoculate seed not sown within 24 hours following initial inoculation.

2.07 MULCHING MATERIALS

A. Mulches for seeded area shall be one, or a combination of, the following:

1. Hay:

a. Cured to less than 20% moisture content by weight.

b. Contain no stems of tobacco, soybeans, or other coarse or woody material.

c. Timothy hay or mixed clover and timothy hay.

2. Straw:

a. Cured to less than 20% moisture content by weight.

b. Contain no stems of tobacco, soybeans, or other coarse or woody material.

c. Wheat or oat straw.

3. Wood Cellulose:

a. No growth or germination inhibiting substances.

b. Green, air dried. Packages not exceeding 100 pounds.

c. Requirements:

Moisture Content:	12% $\pm$ 3%
Organic Matter:	98.6% + 0.2% on the oven dry basis.
Ash content:	1.4% $\pm$ 0.2%
Minimum Water-Holding Capacity:	1,000%

4. Mushroom Manure:

a. Organic origin, free of foreign material larger than 2" and substances toxic to plant growth.

b. Organic Matter: 20% minimum.

c. Water-Holding Capacity: 120% minimum.

d. pH: 6.0.

PART 3 - EXECUTION

3.01 TIME OF OPERATIONS

A. Spring Seeding:

1. Preliminary operations for seed bed preparation may commence as soon after February 15 as ground conditions permit.

B. Fall Seeding:

1. Preliminary operations for seed bed preparation may commence after July 15.

3.02 PREPARATION OF SUBGRADE

A. "Hard Pan" or heavy shale:

1. Plow to a minimum depth of 6".

2. Loosen and grade by harrowing, discing, or dragging.

3. Hand-rake subgrade. Remove stones over 2" in diameter and other debris.

B. Loose loam, sandy loam, or light clay:

1. Loosen and grade by harrowing, discing, or dragging.

2. Hand-rake subgrade. Remove rocks over 2" in diameter and other debris.

3.03 PLACING TOPSOIL

A. Replace topsoil and spread over the prepared subgrade to obtain the required depth and grade elevation. Final compacted thickness of topsoil not less than 3- 1/2".

B. Hand-rake topsoil and remove all materials unsuitable or harmful to plant growth.

C. Do not place topsoil when the subgrade is frozen, excessively wet, or extremely dry.

D. Do not handle topsoil when frozen or muddy.

3.04 TILLAGE

A. After seed bed areas have been brought to proper compacted elevation, thoroughly loosen to a minimum depth of 5" by discing, harrowing, or other approved methods. Do not work topsoiled areas when frozen or excessively wet.

B. Liming:

1. Distribute limestone uniformly at a rate of 50 pounds per 1,000 square feet.

2. Thoroughly incorporate into the topsoil to a minimum depth of 4".

3. Incorporate as a part of the tillage operation.

C. Basic Fertilizer:

1. Distribute basic fertilizer uniformly at a rate of 50 pounds per 1,000 square feet.

2. Incorporate into soil to depth of 4" by approved methods.

3. Incorporate as part of tillage operation.

D. Liming and Fertilizer rates may be decreased if lesser rates are indicated by soil tests provided by the Contractor.

3.05 FINISH GRADING

A. Remove unsuitable material larger than 2" in any dimension.

B. Uniformly grade surface to the required contours without the formation of water pockets.

C. Rework areas which puddle by the addition of topsoil and fertilizer. Re-rake.

D. Distribute starter fertilizer at the following rates:

10-5-5: 50 pounds per 1,000 square feet.
12-6-6: 33 pounds per 1,000 square feet.

E. Incorporate starter fertilizer into the upper 1" of soil.

3.06 SEEDING

A. Uniformly sow specified seed mix by use of approved hydraulic seeder, power-drawn drill, power operated seeder, or hand-operated seeder or by hand. Do not seed when winds are over 15 mph.

B. Upon completion of sowing, cover seed to an average depth of 1/4" by hand re-raking or approved mechanical methods.

3.07 MULCHING

A. Mulch within 48 hours of seeding.

B. Place hay and straw mulch in a continuous blanket at a minimum rate of 1,200 pounds per 1,000 square yards.

1. Anchor hay or straw mulch by use of twine, stakes, wire staples, paper, or plastic nets.

2. Emulsified asphalt may be used for anchorage provided it is applied uniformly at a rate not less than 31 gallons per 1,000 square yards.

3. Apply approved chemical mulch binders at the manufacturer's recommended rate.

C. Chemical mulch binders or a light covering of topsoil may be used for anchorage when the size of the area precludes the use of mechanical equipment.

D. Apply wood cellulose fiber hydraulically at a rate of 320 pounds per 1,000 square yards.

1. Incorporate as an integral part of the slurry after seed and soil supplements have been thoroughly mixed.

E. Spread mushroom manure uniformly to a minimum depth of 1/2" or to the depth indicated on drawings.

F. When mulch is applied to grass areas by blowing equipment, the use of cutters in the equipment will be permitted to the extent that a minimum of 95% of the mulch is 6" or more in length. For cut mulches applied by the blowing methods, achieve a loose depth in place of not less than 2".

G. When mulching by the asphalt mix method, apply the mulch by blowing. Spray the asphalt binder material into the mulch as it leaves the blower. Apply the binder to the mulch in the proportion of 1.5 to 2.0 gallons per 45 pounds of mulch.

1. Protect structures, pavements, curbs, and walls to prevent asphalt staining.

2. Erect warning signs and barricades at intervals of 50 feet or less along the perimeter of the mulched area.

3. Do not spray asphalt and chemical mulch binders onto any area within 100 feet of a stream or other body of water.

3.08 MAINTENANCE

A. Maintenance includes watering, weeding, cleanup, edging and repair of depressions, washouts or gullies.

SEEDING RESTORATION TABLE

RESTORATION CONDITION	TOPSOIL	LIME*	BASIC FERTILIZER	STARTER FERTILIZER	SEED MIX & SOWING RATE (% BY WEIGHT)
Temporary Cover (**)	N/A	N/A	N/A	N/A	100% Annual Ryegrass Sow 9# per 1,000 Sq Yds Mar thru May/Aug thru Sept
Roadside; Non-mowed	Yes	100# per 1,000 Sq. Ft.	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per 1,000 Sq. Ft.	80% Kentucky 31, Fescue 20% Pennlawn Red Rescue Sow 21# per 1,000 Sq. Yds Mar thru May/Aug thru Sept
Roadside; Mowed	Yes	100# per 1,000 Sq. Ft.	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per 1,000 Sq. Ft.	50% Kentucky BlueGrass 30% Pennlawn Red Fescue 20% Perennial Ryegrass Sow 21# per 1,000 Sq. Yds Mar thru May/Aug thru Sept
Bank Areas	Yes	100# per 1,000 Sq. Ft.	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per Sq. Ft.	45% Crownvetch 55% Annual Ryegrass Sow 9# per 1,000 Sq. Yds Anytime except Sept & Oct
Lawns	Yes	100# per 1,000 Sq. Ft.	0-20-20 @ 50# per 1,000 Sq. Ft.	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per Sq. Ft.	50% Kentucky Bluegrass 30% Pennlawn Red Fescue 20% Perennial Ryegrass Sow 21# per 1,000 Sq. Yds Mar thru May/Aug thru Sept
Open Fields; Non-cultivated, Pasture	No	No	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per Sq. Ft.	100% Timothy Sow 9# per 1,000 Sq. Yds. Mar thru May/Aug thru Sept
Open Fields; Cultivated	No	No	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per Sq. Ft.	100% Annual Ryegrass Sow 9# per 1,000 Sq. Yds Mar thru May/Aug thru Sept
Woods; Sparse	No	No	No	10-5-5 @ 50# per 1,000 Sq. Ft. or 12-6-6 @ 33# per Sq. Ft.	100% Red Fescue Sow 36# per 1,000 Sq. Yds. Mar thru May/Aug thru Sept

* Unless lesser rate indicated by soils tests.

** Unless otherwise specified in the Erosion and Sedimentation Control Plan

Note: Refer to Drawings and Special Conditions for seeding restoration requirements at each specific location of Work.

END OF SECTION

SECTION 02575

PAVING AND RESURFACING

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Temporary Paving
2. Permanent Paving
3. Shoulder Restoration

B. Paving and resurfacing requirements for project roads are as indicated on the resurfacing schedules and miscellaneous details provided on the Standard Details sheets. All paving shall comply with the local ordinances and PennDOT Specifications, where applicable.

C. Related work specified elsewhere:

1. Trenching, Backfilling and Compacting – Section 02221
2. Concrete for Utility Construction – Section 03300

1.02 QUALITY ASSURANCE

A. Referenced Standards:

1. Pennsylvania Department of Transportation:

a. Publication 408 Specifications
b. Publication 27 - Specification for Bituminous Materials (Bulletin 27)
c. Publication 37 - Specification for Bituminous Materials (Bulletin 25)
d. Publication 203 - Work Zone Traffic Control (See Special Conditions - Section 01570)
e. Chapter 459 - Occupation of Highways by Utilities (See Supplemental General Conditions - Section OHU)

B. South Middleton Township Ordinance No. 02 of 2006.

1.03 SUBMITTALS

A. Certificates:

1. Submit certification from bituminous and aggregate suppliers attesting that materials conform to the state specifications.

1.04 JOB CONDITIONS

A. Control of Traffic:

1. Take measures to control traffic during repaving operations. Do not allow traffic on repaved areas until authorized by the Authority and the Township.

2. Employ traffic control measures in accordance with Publication 203 - "Work Zone Traffic Control."

B. Restore existing paving outside the limits of the work that is damaged by the Contractor's operations to its original condition.

PART 2 - PRODUCTS

2.01 CONCRETE

A. See Section 03300

2.02 BITUMINOUS PAVING MATERIALS AND AGGREGATES

A. Refer to Publication 408 Specifications and Township Ordinance No. 02 of 2006. All bituminous materials and aggregates used in paving and resurfacing are designated in these Specifications by and shall conform to the applicable portions of the Publication 408 Specifications and Township Ordinance No. 02 of 2006.

PART 3 - EXECUTION

3.01 WORK WITHIN STATE HIGHWAY RIGHT-OF-WAY

A. Inspection: If throughout the progress of the work within state highways, it is deemed necessary by the Pennsylvania Department of Transportation (PennDOT) to post field inspectors on that portion of the project within their right-of-way, the Developer shall reimburse PennDOT for the cost of the inspection so applied.

B. Blasting if necessary: All blasting shall be conducted in accordance with applicable PennDOT, state and local regulations.

C. Detour: If a state highway detour is required, application must be made to District Office Traffic Unit and approval received for rerouting traffic before detour is put into effect.

3.02 TEMPORARY PAVING

A. Place 2" compacted thickness temporary paving immediately upon completion of trench backfilling.

B. Shape and compact subgrade material, then place and compact crushed stone base course to the required thickness.

C. Place temporary paving material. Compact to 2" minimum thickness with trench roller having minimum 300 pounds per inch-width of compaction roll.

D. Continuously maintain temporary paving to the satisfaction of the Township's Engineer and the state and local road departments. Temporary paving on state roads must remain in place for a minimum of ninety (90) days. On Township roads, permanent restoration must be completed within thirty (30) days after substantial completion of piping work, unless otherwise approved by the Township Engineer.

3.03 PERMANENT PAVING

A. The Authority and/or Township reserve the right to delete any and all permanent paving from the Contract.

B. Saw cut back 12” from the limit of the trench using a diamond wheel or similar instrument. Cut straight joint lines and right angle offsets.

C. Remove temporary paving material. Construct permanent base and surface courses to the required compacted thicknesses shown on the standard details and in accordance with Publication 408 Specifications and Township Ordinance No. 02 of 2006.

D. Maintain permanent paving to the satisfaction of the Authority and the local and state road departments throughout the contract maintenance period.

3.04 BITUMINOUS OVERLAY

A. Where indicated on the Drawings, standard details, Surface Restoration Tables or directed by the Authority Engineer or Township, place a bituminous overlay.

B. Construct in accordance with Section 401.3, Publication 408 Specifications.

3.05 PAVED SHOULDER RESTORATION

A. At the expiration of the appropriate time period, unless otherwise directed by the Pennsylvania Department of Transportation or the Township Engineer, the temporary restoration and the compacted trench fill shall be removed to a minimum depth of six and one-half inches (6 ½”) below the surface of the roadway. A Super Pave base course with a minimum depth of five inches (5") shall be constructed and shall be topped with one-and-one-half inch (1½”) minimum of Super Pave wearing course ID-2.

B. All Paved Shoulder Restoration shall be in accordance with the Pennsylvania Department of Transportation, Form 408.

C. All edges of the existing roadway surface disturbed during construction shall be cut in a straight line. Cutting of edges shall be done prior to placing of the wearing surface and shall be as directed by the Pennsylvania Department of Transportation on state roads and Township Ordinance No. 02 of 2006 on Township roads.

3.06 BITUMINOUS TACK COAT

A. Bituminous Tack Coat shall conform to PennDOT Form 408 for materials and construction requirements, including all revisions.

B. Bituminous Tack Coat shall be applied on the surface of the base course prior to the construction of a bituminous binder course and/or bituminous wearing course.

3.07 SCRATCH COAT

A. Scratch Coat or leveling course placement shall consist of Super Pave wearing course and shall be placed on a roadway where it is necessary to remove any irregularities, at the locations and depth as determined by the Authority Engineer.

3.08 MILLING OF ROADWAY

A. Paving shall be removed to a depth below the roadway surface to allow construction of the specified pavement course. Milling shall be performed to a depth as shown on the "Construction Details" and in accordance with requirements of PennDOT Form 408, Specifications, current edition.

B. Prior to Milling, all edges of existing roadway surface that are to be disturbed shall be cut or sawed in a straight line with a diamond wheel or similar instrument, as directed by the Authority Engineer.

3.09 SEAMS

A. When the road surface is disturbed all seams shall be sealed with PG 64-22 or equal, in accordance with PennDOT Form 408.

3.10 PAINT IDENTIFICATION

A. Upon completion of temporary and permanent resurfacing, the resurfacing date shall be painted on the pavement immediately adjacent to the cut. The painted date shall indicate the month and year numerically. The numerals shall be at least six inches in height. The paint shall be of a durable wearing quality and shall be green in color.

B. All new pavement shall be re-striped by the Contractor where previously painted. All traffic lines and markers shall be in accordance with applicable requirements of PennDOT Publication 408, current edition.

3.11 DRIVEWAYS

A. Trim concrete and bituminous driveway surfaces to removed damaged areas. Saw cut straight joint lines parallel to the centerline of the trench. Cut offsets at right angles to the trench centerline.

B. Restore existing concrete driveways trenched through with a 6” layer of concrete reinforced with 6 X 6 10/10 wire mesh.

C. Restore existing blacktop driveways trenched through in kind or with minimum 1 ½” layer wearing course over 6” layer of 2A aggregate.

D. Restore earth driveways with a 6” layer of 2A stone backfill.

E. Restore stone or gravel driveways in kind.

END OF SECTION

SECTION 02601

MANHOLES

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Precast Concrete Manholes
2. Concrete Manhole Bases
3. Manhole Steps
4. Manhole Covers and Frames

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Structural Concrete: Section 03300

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation Publication 408 Specifications.
2. American Society for Testing and Materials (ASTM):

A48	Specification for Gray Iron Castings
C32	Specification for Sewer and Manhole Brick
C139	Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes
C270	Specification for Mortar for Unit Masonry
C443	Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
C478	Specification for Precast Reinforced Concrete Manhole Sections
C923	Specification for Resilient Connections Between Reinforced Concrete Manhole Structures and Pipes

1.03 SUBMITTALS

A. Certificates:

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

B. Shop Drawings:

1. Submit detail shop drawings of Precast Concrete Manhole Sections, and Precast Concrete Manhole Bases if used.

2. Submit detail shop drawings of Manhole Frames and Covers, including rubbings of inscription.

3. Submit detail shop drawings of Manhole Steps.

4. Submit manufacturer's descriptive literature for the pipe to Manhole Flexible Connections.

PART 2 - PRODUCTS

2.01 BASIC MATERIALS

A. Crushed Stone Subbase:

1. Size 57, Type C, Section 703.2, Publication 408 Specifications

B. Concrete Masonry Units: ASTM C139

C. Masonry Mortar: ASTM C270, Type S

D. Structural Concrete: Section 03300

E. Joint Sealant Compound: FS SS-S-00210, performed, flexible, self-adhering, cold-applied.

F. Rubber Gaskets: ASTM C443

G. Resilient Pipe-to-Manhole Connection: ASTM C923

2.02 FABRICATED PRODUCTS

A. Precast Concrete Manhole Sections: ASTM C478

1. 5.5% $\pm$ 1% air entrained cement concrete.

2. Eccentric cone or flat slab top sections; minimum 24" access opening unless otherwise indicated.

3. Precast Concrete riser sections of length to suit.

4. Precast Concrete bases of a design similar to the precast riser sections.

5. Minimum internal diameter of 48" with tongue and groove joints between sections.

6. Precast Manhole Coating – Exterior:

   a. The exterior surfaces of all manhole sections, bases, risers and tops shall be coated with a coal tar epoxy compound manufactured by Kop-Coat, Inc., Pittsburgh, Pennsylvania, 15219, Type Bituminous No. 300-M or equal approved by the Engineer. The dry coat thickness shall be a minimum of twenty (20) mils. Application of the product shall be in accordance with the manufacturer's recommendations, but in all cases the final dry coating shall be without runs, sags, misses, pinholes, or other defects and shall adhere properly to the substrate.

B. Manhole Steps:

1. Polypropylene conforming to ASTM D-4101 injection molded around a ½" ASTM A-615 grade 60 steel reinforcing bar. Step to meet ASTM C-478, AASHTO M-199 and OSHA instruction STD 1-1.9. Step to resist pullout forces of over 1,500 pounds. Step to be 14" wide with end lugs to minimize risk of slipping sideways. Include self cleaning tread design. Step to be Part Number 108.14850 by Press-Seal Gasket Corporation.

2. Install Manhole steps in vertical alignment at 12" spacing.

C. Manhole Frames and Covers:

1. General:

   a. Domestic cast iron castings: ASTM A48, Class 35B or better; free of bubbles, sand and air holes, and other imperfections.

   b. Contact surfaces: Machined and matched.

   c. Cast Manhole cover inscriptions as follows:

      (1) "WATER" for use as air/vacuum release chamber, or other use in the water system.

   d. Provide Manhole covers suitable for HS-25 highway loads.

   e. Provide gasketed Manhole covers.

   f. Paint at factory with water-based asphalt paint.

2. Frame and Cover:

   a. Minimum combined weight of 260 pounds with dimensions as indicated on Drawings, 22" minimum clear opening.

   b. Provide solid cover as standard.

   c. Provide one piece O-ring gasket factory installed in machined rectangular or dovetailed groove in cover bearing surface. Neoprene gasket of 40 durometer hardness, abrasion resistant, field replaceable. Gluing not permitted.

   d. Frame East Jordan Iron Works, Inc., 00111910 or equal

e. Cover East Jordan Iron Works, Inc., 00112183 or equal.

f. Watertight manhole frame and cover shall be as specified for manhole frame and covers above. In addition, the casting shall be equipped with an internal watertight cover with a one-inch diameter bronze locking screw, forged steel lock bar, lock clamp and rubber gasket.

PART 3 - EXECUTION

3.01 GENERAL

A. Construct Manholes or other structures at the points shown on the Drawings and at such points as directed by the Authority Engineer.

B. Make Manholes watertight. Keep ground water away from the newly poured concrete until it is properly set and a watertight condition is obtained. Repair structures which admit ground water after completion to the satisfaction of the Engineer.

3.02 EXCAVATION

A. Perform excavation to the line and grade shown on the Drawings and as specified in Section 02221. Provide minimum 6" beyond footer for ease of construction.

B. Location and depth of Manholes is as shown on the Drawings and as directed by the Engineer.

3.03 CONSTRUCTION

A. Construct Manholes of precast concrete or glass fiber-reinforced polyester sections.

B. Install a minimum of 6" of crushed stone subbase.

C. Provide cast-in-place concrete or precast concrete bases.

1. Construct cast-in-place bases as shown on the Drawings.

a. Construct cast-in-place bases with a special form for a joint to match the manhole cylinder sections.

b. Form base with pipe opening resilient seals at proper elevation, alignment and diameter.

2. Install precast bases as shown on the Drawings.

a. Set the precast base on a crushed stone subbase.

b. Provide a watertight, flexible resilient connection between pipe and precast base section.

D. Seal joints between precast concrete Manhole sections with performed rubber gaskets or joint sealant compound.

1. Place joint sealant compound on lower section to be squeezed by the weight of the upper section. Remove excess sealer and refill any voids.

2. Place rubber gasket in groove formed in spigot end. Equalize gasket tension. Install

upper section slowly and evenly to form seal. Check gasket for proper seating.

E. Install Manhole sections with steps in proper vertical alignment.

F. Use masonry or precast Manhole rings set in a full bed of non-shrink grout to achieve elevation shown for frame and cover. Do not adjust elevation more than one foot with masonry or precast rings. Use one precast two-inch ring as minimum.

G. Install Manhole Frames and Covers:

1. Set top of frames at finished grade elevation or other elevation shown on the Drawings.

2. Anchor Manhole Covers installed in unpaved areas.

3. Seal joint between Manhole Frame and Manhole with joining sealant compound.

H. Where new Manholes are constructed on existing pipelines, carefully excavate around existing pipelines for placement of the new Manhole Base. Take measures necessary to control flow through the existing pipeline and to prevent leakage into the new base.

I. When Manhole is completed, remove all loose mortar and debris.

3.04 BACKFILLING

A. Backfill after examination of the Manhole by the Engineer.

B. Perform backfilling as specified in Section 02221.

C. Construct Manholes with the tops of Manholes at grade and not covered by overburden.

END OF SECTION

SECTION 02630

WATER PIPE, VALVES, HYDRANTS, APPURTENANCES AND INSTALLATION METHOD

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Prior to any construction, the Contractor shall submit to the Engineer, for approval, names of manufacturers and suppliers he intends to use on the project. The Engineer may require complete catalog data and/or samples of materials for the purpose of determining if such materials meet the intent of these Specifications.

B. All water mains shall be Ductile Iron Cement Lined Pipe.

C. All pipes, valves and other equipment shall be certified for potable water contact in conformance with ANSI/NSF Standard No. 61 as prescribed in Section 109.606(C) of Chapter 109 of the Pennsylvania Safe Drinking Water Regulations.

D. All fittings to be compact unless otherwise noted.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE

A. Ductile Iron Pipe shall be centrifugally cast, annealed and manufactured in accordance with the latest revisions of American National Standard Institute (ANSI) and American Water Works Association (AWWA).

B. For location and details of water lines, valves, and fire hydrants see construction drawings.

2.02 REFERENCE STANDARDS

A. WATER PIPE

Ductile Iron-Centrifugally Cast	ANSI A21.51 AWWA C-151
Flanged Ductile with Threaded Flange	ANSI A21.15 AWWA C-115
Nominal Pipe Lengths - 18' and 20'	

B. THICKNESS DESIGN

3” - 4" Thickness Class 52	ANSI A21.50 AWWA C-150
6” - 54" Thickness Class 52	ANSI A21.50 AWWA C-150

C. DUCTILE IRON JOINTS & ACCESSORIES

Mechanical Joint	ANSI A21.11 AWWA C-111
Push-On Joint	ANSI A21.11 AWWA C-111
Flange Joint	ANSI A21.15 AWWA C-115
Snap-Lok (or equal) Restrained Joint (Highway, Creek Crossings as indicated on Drawings)	ANSI A21.11 AWWA C-111

D. DUCTILE IRON FITTINGS

CLASS 350

Compact Fittings 3" Through 24"	ANSI A21.53 AWWA C-153
Conventional Fittings 3" Through 48"	ANSI A21.10 AWWA C-110
Flange Fittings	ANSI A21.15 AWWA C-115
All Fittings shall have Megalug Restrained Joint Glands	ANSI A21.15 AWWA C-153
Use Field Lok Gaskets according to "Joint Restraint Lengths" detail and engineer's recommendations	ANSI A21.11 AWWA C-111

E. DUCTILE IRON PIPE GASKETS

Rubber Gasket Joints - Pressure Pipe & Fittings	ANSI A21.11
Nonmetallic Gaskets Pipe Flanges	ANSI B16.21

F. BOLTS AND NUTS

Bolts shall conform to latest revision of ANSI B18.21
Nuts shall conform to latest revision of ANSI B18.22

G. COATING D.I. PIPE AND FITTINGS

1. Ductile Iron Pipe factory seal coated inside and outside with a bituminous coat 1 mil thick and inside with a cement lining as per ANSI A21.4 AWWA C-104.

H. MAIN LINE GATE VALVES

1. Main Line Gate Valves shall conform to the latest revisions of AWWA Specifications C-509 and in addition, shall have the following features of construction:

a. Type - Resilient Seat. Generally, underground valves shall be of the non-rising stem and exposed valves in pits or structures shall be of the open rising stem and yoke type.

b. Seals - "O-ring" unless stuffing box and gland are required by the Engineer. Gland, bushing, and bolts, where required, shall be of bronze.

c. End Connections - Bell, mechanical joint, flanged (American Standard), or "Ring-Tite" to suite the type of pipe in which the valve is installed.

d. Disc And Seat Ring - Grey Iron - internally reinforced molded natural rubber with stainless steel retaining screws.

e. Pressure Rating - 200 psi for valves 3 inches to 16 inches, 150 psi for valves over 16 inches. All valves shall be tested for 300 psi.

f. Coating - Interior of gate valve to be coated with a protective epoxy as per AWWA 550 Specifications, latest edition.

g. Acceptable Manufacturers

(1) American Darling Company, American Flow Control ARC-2500 D.I. Resilient Wedge Valve.

(2) Mueller Company, Super Seal Resilient Seat Gate Valve, Catalog No. A-2370.

(3) No other will be accepted.

I. MAIN LINE VALVE BOXES

1. Main Line Valve Boxes to be cast iron, complete with covers. The boxes shall be centered over the operating nut of the valve and shall be set absolutely plumb and flush with the finished surface. Boxes shall rest on bedding of stone, not directly on valve.

2. Each Main Line Valve Box shall be furnished with a suitable cover of cast iron material. This cover shall have the word **WATER** cast in it. Operating wrench to be furnished.

3. Acceptable Manufacturers

a. Tyler Company
b. No other will be accepted.

J. FIRE HYDRANT - TRAFFIC TYPE

1. Fire Hydrant shall be the dry-barrel break-away type conforming to AWWA Specification C-502, latest revision.

a. Bury Depth - Minimum 5' Longer bury depth may be required as field conditions warrant. It is the Contractor's responsibility to familiarize himself with field conditions and provide proper depth hydrants.

b. Hub Inlet - 6"

c. Hydrant Valve Opening - 5-1/4"

d. Mechanical Joints.

e. One 4-1/2" Pumper Nozzle, Two 2-1/2" Hose Nozzles.

(1) Nozzle threads to be National Standard Threads.

(2) Attach nozzle caps by separate chains. Interior of Fire Hydrant to be coated with a protective epoxy as specified in AWWA 550 Specifications, latest revision.

(3) Provide “Storz” nozzle adapter.

f. Fire Hydrant shall be coated with an approved finish paint. Color of Fire Hydrant shall be “YELLOW”.

g. Acceptable Manufacturers:

(1) American Darling, American Flow Control B-62-B Type.

(2) Mueller Company, Super Centurion 200, Catalog No. A-4-23.

(3) No other will be accepted.

K. 3/4" AND 1" COPPER WATER TUBING (All new residential construction to consist of 1" minimum water services unless otherwise approved by owner)

1. Copper Water Tubing shall conform to latest revision of ASTM Designation B88, Type K-Seamless (soft in 60 or 100 foot coils). Match fittings to be compression type.

L. MAIN LINE SERVICE (All new residential construction to consist of 1" minimum water services unless otherwise approved by owner)

1. Corporation Stop Assembly:

a. Brass or red brass alloy body conforming to ASTM B62.

b. Inlet end threaded for tapping according to AWWA C-800.

c. Outlet end suitable for service pipe specified.

d. Acceptable Manufacturers:

(1) Ford Meter Company, Catalog No. F1000 3-G - For 3/4"
Ford Meter Company, Catalog No. F1000 4-G - For 1"
Ford Meter Company, Catalog No. FB1000 6-G - For 1-1/2"
Ford Meter Company, Catalog No. FB1000 7-G - For 2" Only

(2) Mueller Company, Catalog No. H15008, ¾" – 1".
Mueller Company, Catalog No. H15013, 1 ½" – 2".

(3) No other will be accepted.

M. CURB LINE SERVICE CONNECTION (All new residential construction to consist of 1" minimum water services unless otherwise approved by owner)

1. Curb Stop Assembly:

a. Brass or red brass alloy body conforming to ASTM B-62.

b. Plug Type Valve

c. Position Pressure Sealing

d. Acceptable Manufacturers:

(1) Ford Meter Company, B44-333-G, 3/4"
Ford Meter Company, B44-444-G, 1"

Ford Meter Company, B44-666-G, 1-1/2"
Ford Meter Company, B44-777-G, 2"

(2) Mueller Company, Catalog No. H15042, ¾" – 1"
Mueller Company, Catalog No. H15209, 1" – 1 ½".

(3) No other will be accepted.

2. Curb Stop Valve Guard / Curb Box Alignment Fitting (All new residential construction to consist of 1" minimum water services unless otherwise approve by owner)

a. Evr-Strate fitting

b. ABS Plastic or like material

c. ¾" Curb line service connection only

d. Acceptable Manufacturers:

(1) Evr-Strate Corporation

(2) No other will be accepted

3. Curb Box and Cover Assembly:

a. Cast Iron Body Extension Buffalo Type

b. Minneapolis or Arch Pattern Base

c. Lid With Inscription "WATER" with Pentagon Plug

d. Size 93-D, 3'-4" Length, 2-1/2" in diameter

e. Acceptable Manufacturers:

(1) Tyler Pipe Company, Subsidiary of Tyler Corporation.
(2) No other will be accepted.

N. WATER SERVICE METER PITS

1. All residential water services shall be equipped with 1" minimum meter pit setters.

a. Acceptable Manufacturers:

(1) The Ford Meter Box Co., Inc., Wabash, Indiana
(2) No other will be accepted

2. All non-residential installations will be reviewed in accordance with the attached details on a case-by-case basis.

O. AIR VACUUM AND PRESSURE RELEASE VALVE - WATER

1. The Air Vacuum and Pressure Release Valve shall conform to the latest AWWA C-512 Specifications.

a. Acceptable Manufacturers:

(1) Multiplex Manufacturing Co. - Crispin Model No. UL-10 for 1"
Multiplex Manufacturing Co. - Crispin Model No. UL-20 for 2"

(2) APCO Valve & Primer Company - Model No. 143-C for 1"
APCO Valve & Primer Company - Model No. 145-C for 2"

(3) Valmatic Valve & Manu. Corp - Model No. 101 for 1"
Valmatic Valve & Manu. Corp - Model No. 102 for 2"

(4) Or Approved Equal.

P. AIR VACUUM AND PRESSURE RELEASE VALVE MANHOLE

1. Air Vacuum and Pressure Release Valve Manhole to be furnished and installed by the Contractor as shown on the Construction Detail.

Q. CUT-IN SLEEVE AND VALVE

1. Cut-In Sleeve shall meet all applicable parts of ANSI A21-10, AWWA C-110, latest revision.

2. Gate Valve shall meet all applicable parts of AWWA C-509, latest revision.

3. Acceptable Manufacturers

a. American Darling, American Flow Control.
b. Mueller Company.
c. No other will be accepted.

R. REPAIR SLEEVE

1. The Repair Sleeve shall be mechanical joint solid sleeve and shall conform to latest ANSI A21.10/AWWA C-110.

2. Acceptable Manufacturers

a. Tyler Pipe Company.
b. Mueller Company.
c. No other will be accepted.

S. TAPPING SLEEVE AND TAPPING VALVE

1. Tapping Sleeve shall be ductile iron and shall conform to latest ANSI A21.10/AWWA C-110.

2. Tapping Valve shall be resilient seat type and meet all applicable parts of AWWA C-509.

3. Acceptable Manufacturers:

a. American Darling, American Flow Control.
b. Mueller Company.
c. No other will be accepted.

T. MECHANICAL JOINT COUPLINGS (SOLID SLEEVES)

1. Cast iron mechanical couplings of the gasketed, sleeve type shall be furnished and installed where shown on the Drawings. The couplings shall be of the proper diameter to fit the cast iron, and make a tight joint. The couplings shall not have stops. All couplings shall be of Class 350.

2. Each-coupling shall consist of one middle ring of a thickness and length suitable for the proposed application and test pressures; two MJ Glands; two MJ rubber compounded wedge section gaskets and sufficient trackhead bolts to properly compress the gaskets. The couplings shall be of the mechanical type conforming to the latest revisions of A.N.S.I. A21.11 (A.W.W.A. C111).

U. REPAIR CLAMPS

1. Repair Clamps shall be stainless steel with 360° gasket and clamping pressure. It shall provide a 360° seal while accommodating pipe O.D. variations. Clamps shall be minimum length of 12". They shall be Mueller 500 Series Single Section Full-Seal Pipe Repair Clamps, Dresser 360 "All-Around" Repair Clamps, Ford Stainless Steel FSI, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLING CORPORATION AND SERVICE CONNECTIONS

A. Corporation and Service Connections shall be installed after the water pipe has been installed, tested and disinfected in accordance with Section 02640 (Testing & Disinfecting Water Mains).

3.02 BLOWOFF

A. Blowoffs shall be constructed as shown on the Construction Details. The pipe material shall be as shown on the Construction Details. The Blowoff shall be placed on the end of the main line as shown on the Construction Details.

3.03 LAYING WATER PIPE

A. Water Pipe shall be laid at such places as shown on the plans, as called for in these Specifications or as may be directed by the Authority Engineer.

B. The interior of all pipe shall be thoroughly cleaned of all foreign matter before being lowered into the trench, shall be kept clean during laying operations by means of plugs or other approved methods. No trench water shall be allowed to enter the pipe fittings. Before lowering and while suspended, the pipe shall be inspected for defects.

C. Except where necessary in making connections with other lines and as authorized by the Engineer, pipe shall be laid with the bells facing in the direction of laying and for lines on an appreciable slope, the bell shall, at the discretion of the Engineer, face upgrade. Not less than two lengths of pipe shall be in position with packing installed and earthfill tamped alongside the pipe, ahead of each joint before it is completed, except at closures. Pipelines or runs intended to be straight shall be so laid. Deflections from a straight line or grade made necessary by vertical curves or horizontal curves or

offsets shall not exceed l/2-inch per linear foot of pipe between the centerlines extended of any two connected pipes.

D. All gasketed joints shall be made in strict accordance with the recommendations of the joint manufacturer.

3.04 PIPE EMBEDMENT

A. Bedding

1. All pipe shall be laid on a granular bedding of crushed stone or gravel aggregate, in accordance with AASHTO No. 8 (formerly PennDOT No. lB). The bedding shall be well compacted, as directed by the Engineer, and shall be a minimum depth of 6 inches or one-fourth the internal diameter, whichever is greater. The bedding shall provide uniform longitudinal support to the pipe and shall be laid to provide the pipe grade and line as shown on the Drawings or as directed by the Authority Engineer.

B. Final Embedment

1. Final Embedment shall extend from the springline of the pipe to a depth of 6 inches minimum above the top of the pipe. It shall be AASHTO No. 8 (formerly PennDOT No. 1B) stone or gravel and shall be well compacted as directed by the Authority Engineer.

C. Service Connection

1. All Service Connections installed on State Highways shall be either punched or bored under roadway.

3.05 IDENTIFICATION TAPE - WATER

A. Identification Tape, as manufactured by Reef Industries, Inc., or equal, shall be placed over all Water Mains. This tape shall be of the detectable type and be made of polyethylene with a one-mil metallic foil core, highly resistant to alkalis, acid, other destructive chemical components likely to be encountered in soils. The tape shall be colored blue and shall bear an imprint reading on one side as follows: **"Caution - Water Line Buried Below"**. The tape shall be two inches (2") or greater in width with the identification lettering repeated continuously the entire length of the tape.

B. The tape shall be placed 12” to 18” deep above the D.I. (cement lined) or other type of water pipe and, or as directed by the Engineer. The tape shall be placed in the trench with the printed side up, and shall be essentially parallel to the finished surface. Caution shall be taken during the completion of backfilling to prevent the tape from being pulled, distorted or otherwise displaced in the trench.

END OF SECTION

SECTION 02640

TESTING AND DISINFECTING WATER MAINS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall make tests as may be directed by the Authority. The Contractor shall furnish all apparatus that may be necessary in testing and disinfecting the water mains. The Authority Engineer shall review the test.

PART 2 – PRODUCTS

Not applicable

PART 3 - EXECUTION

3.01 PREPARATION

A. Provide the water line under test with reaction thrust blocking. Hydrostatic testing shall not begin until the concrete under thrust blocking has set. Allow 2,000 psi 28-day strength concrete to set (cure) for a minimum of 7 days prior to testing. If (H.E.S.) 3,000 spi 3-day strength concrete is used, hydrostatic testing may not being until the concrete has set a minimum of 2 days.

B. Provide pumps, piping, tanks, connections, polyurethane plugs, and appurtenances. The Authority will provide access to the necessary water.

3.02 TESTING OF WATER LINES

A. Hydrostatic Testing

1. Test each newly installed section of water line by hydrostatic test procedure in accordance with the recommended practice established by AWWA, Standard C600.

2. Conduct pressure tests for a period of not less than 2 hours at a pressure of not less than 150 psi or 50 psi greater than the stated pressure, whichever is greater, based upon the elevation of the lowest point in line under test corrected to the elevation of the test gauge. Obtain test pressure from the Authority Engineer.

3. Slowly fill the section to be tested with water, expelling air from the pipeline at the high points. Install corporation stops at high points if necessary. After all air is expelled, close air vents and corporation stops and raise the pressure to the specified test pressure.

B. Leakage Tests

1. After completion of successful pressure testing, conduct the leakage test for a 2-hour period at the test pressure indicated in the Specifications.

2. Expel air from the line under test, close the air vents and/or corporation stops and raise pressure to the specified test pressure. The leakage in the section under test is defined as the quantity of water supplied to maintain pressure within 5 psig of the specified test pressure during the entire testing period. Water pipe installation is deemed to have failed the leakage test if the leakage obtained is greater than that determined by the following formula:

$$L = (ND/7400)(P)^{0.5}$$

Where: L - is allowable leakage in gallons/hour
N - is number of joints in the section tested
D - is nominal diameter of pipe in inches
P - is average test pressure in pounds per square inch gauge

If the line under test contains sections of various diameters, the allowable leakage shall be the sum of the computed leakage for each size.

3. If test results indicate that the pipe laid has leakage greater than specified, locate and repair the defective joints, fittings, pipe or valves and retest until leakage is within allowable limits. Repair visible leaks regardless of amount of leakage.

4. Bacteriological testing shall be performed by a testing laboratory engaged and paid for by the Contractor and approved by the Authority Engineer. No test will be accepted until the results are below the specified maximum limits.

C. Test Procedures

1. Submit a testing sequence schedule including a list of testing equipment to be used.

2. Submit, prior to starting testing, certification attesting that the pressure gauges to be used have been calibrated and are accurate to the degree specified in Part 2, Products.

3. Submit certification attesting that the chlorine form composition is as specified.

D. Test Reports

1. Submit two copies of laboratory test reports of each bacteriological test.

3.03 DISINFECTION

A. After completion of satisfactory pressure and leakage testing, disinfect the water pipelines in accordance with the recommended practice established in AWWA Standard C501. Conduct water line disinfection in the following steps:

1. Preliminary flushing

2. Chlorine application

3. Final flushing

4. Bacteriological tests

B. During construction, place calcium hypochlorite granules at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500-foot intervals. Refer to AWWA 601 for quantity of granules to be used.

1. **WARNING**: This procedure must not be used on solvent welded plastic pipe or in screwed joint steel pipe because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

3.04 PRELIMINARY FLUSHING

A. Prior to disinfection, except when the tablet method is used, fill the line to eliminate air pockets and flush the line at a rate of flow of 2.5 feet per second to remove particulate. Refer to AWWA 601 for rate of flow to produce 2.5 fps in pipe of various sizes.

3.05 CHLORINE FORM

A. The chlorine form to be applied to the system shall be either chlorine gas solution, calcium hypochlorite or sodium hypochlorite. The Authority's written approval of the chlorine form to be used is required.

3.06 CHLORINE APPLICATION

A. Continuous Feed Method:

1. The continuous feed method consists of placing calcium hypochlorite granules in the main during construction, completely filling the main to remove air pockets, flushing to remove particulate, and filling the main with potable water chlorinated so that after a 24-hour period in the main there will be a free chlorine residual of not less than 10 mg/l.

2. Feed water and chlorine to the line at a constant rate such that the water will have not less than 25 mg/l free chlorine. Chlorine application shall not cease until the entire line is filled with heavily chlorinated water.

3. During chlorine application, take precautionary measures to prevent the concentrated treatment solution from flowing back into the existing distribution system and/or supply source.

B. Tablet Method:

1. The tablet method consists of placing calcium hypochlorite granules and tablets in the water main as it is being installed and then filling the main with potable water when installation is completed.

a. **NOTE**: Since the preliminary flushing step must be eliminated, this method may be used only when scrupulous cleanliness has been exercised and only with approval of the Engineer. It shall not be used if trench water or foreign material has entered the main, or if the water temperature is below 41^{o}F.

2. During construction, place sufficient number of 5 g. calcium hypochlorite tablets in each section of pipe, in hydrants, hydrant branches, and other appurtenances to obtain a minimum of 25 mg/l available chlorine. Attach tablets to the crown of pipe sections with adhesive. Apply adhesive only to the broad side of the tablet next to the pipe surface.

Refer to AWWA C601 for the proper number of 5 g. calcium hypochlorite tablets required.

3. When pipeline installation is completed, fill the main with water at a minimum velocity of one foot per second. This water shall remain in the pipe for at least 24-hours. Manipulate valves so that the chlorine solution does not flow back into the line supplying the water.

C. During the 24-hour treatment, operate all valves, curb stops, and hydrants in the section treated.

D. At the completion of the 24-hour treatment, the treated water in all portions of the main shall have a residual of not less than 10 mg/l free chlorine.

E. Repeat the disinfection process until the minimum available chlorine is present at the end of the treatment sequence. The tablet method cannot be used in these subsequent disinfections.

3.07 FINAL FLUSHING

A. Flush the heavily chlorinated water from the system under treatment until the chlorine concentration in the water leaving the system is no higher than that generally prevailing in the system or is acceptable for domestic use.

B. Comply with federal, state and local laws when discharging the flushed chlorine solution.

3.08 BACTERIOLOGICAL TESTING

A. After final flushing is completed and before the water main in placed in service, test the line for bacteriologic quality. Perform two tests 24 hours apart.

B. Collect a minimum of one sample at the end of each line for each test, and one sample of the incoming water from the existing water system for comparison.

C. Collect samples in sterile bottles treated with sodium thiosulphate.

D. Sampling tap shall consist of corporation stop installed in the main with copper tube gooseneck assembly. No hose or fire hydrant shall be used to collect samples.

E Provide bacteriological test reports to the Authority and the Engineer. Failure to meet state health requirements will be cause for the Contractor to rechlorinate and retest the system.

END OF SECTION

SECTION 03300

CONCRETE FOR UTILITY CONSTRUCTION

PART 1 – GENERAL

1.01 DESCRIPTION

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

1. Cast-in-place cement concrete construction
2. Reaction and support blocking
3. Cradles and encasement

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling & Compaction: Section 02221
2. Paving and Resurfacing: Section 02575

C. Applicable Standard Details:

1. Concrete Encasement
2. Concrete Cradle
3. Thrust Blocks
4. Concrete Pipe Anchor
5. Stream Crossing

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. Pennsylvania Department of Transportation:

   Publication 408 Specifications

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

   C31 Making and Curing Concrete Test Specimens in the Field
   C39 Test for Compressive Strength of Cylindrical Concrete Specimens
   C42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
   C172 Sampling Fresh Concrete

1.03 SUBMITTALS

A. Certificates:

1. Submit certification from the concrete producer attesting that the cement concrete conforms to Section 704, Publication 408 Specifications for the class of concrete being used.

2. Submit certified results of compressive strength tests performed by an independent testing laboratory.

B. Shop Drawings:

1. Submit detailed shop drawings of reinforcing steel.

PART 2 – PRODUCTS

2.01 CEMENT CONCRETE

A. Ready-mixed, conforming to Section 704, Publication 408 Specifications.

1. Requirements for state approved batch plants, design computations and plant inspection shall not apply. The acceptability of concrete will be based on conformance with the cement concrete criteria specified blow and the results of the specified tests.

B. Cement Concrete Criteria:

1. Class A

a. 28-day compressive strength: 3300 psi
b. Slump: 1 to 3 inches

2. Class C

a. 28-day compressive strength: 2000 psi
b. Slump: 2 to 6 inches

3. High Early Strength

a. 3-day compressive strength: 3000 psi
b. Slump: 1 to 3 inches

4. Cement factor and maximum water-cement ratio conforming to Table A. Section 704.1(b), Publication 408 Specifications.

2.02 REINFORCEMENT STEEL

A. Reinforcement Bars:

1. New billet-steel conforming to Section 709.1, Publication 408 Specifications.

2. Deformed, Grade 40.

B. Steel Wire Fabric:

1. Conforming to Section 709.3, Publication 408 Specifications.

PART 3 – EXECUTION

3.01 CONSTRUCTION

A. Comply with Section 1001, Publication 408 Specifications for construction requirements including formwork, curing, protection and finishing of cement concrete.

B. Excavate and shape trench bottoms and sides to accommodate thrust block forms, encasement, manhole bases, inlets and vaults.

C. Support pipe, valves and fittings at the required elevation with brick or concrete block. Do not use earth, rock, wood or organic material as supports.

D. Construct manhole bases, reaction and support blocking, cradles, encasements, and miscellaneous mass concrete of Class C concrete.

E. Construct cast-in-place vaults, inlets, endwalls, curbs, sidewalks and miscellaneous reinforced structures of Class A concrete.

F. Construct reinforced and plain cement concrete pavements and base courses of High Early Strength concrete as specified in Section 02575, Paving and Resurfacing.

G. Provide spacers, chairs, bolsters, ties and other devices for properly placing, spacing, supporting and fastening reinforcement in place.

H. Place concrete utilizing all possible care to prevent displacement of pipe or fittings. Return displaced pipe or fittings to line and grade immediately.

I. Insure tie rods, nuts, bolts and flanges are free and clear of concrete.

J. Do not backfill structures until concrete has achieved its initial set, forms are removed and concrete work is inspected by the Engineer.

K. Perform backfilling and compaction as specified in Section 02221.

3.02 FIELD TESTS OF CONCRETE DURING CONSTRUCTION

A. Test each 50 cubic yards or fraction thereof of each class of concrete for compressive strength. Retain an independent testing laboratory to test cylinders.

1. Sample concrete in accordance with ASTM C172.

2. Prepare and cure two test cylinders in accordance with ASTM C31.

3. Test cylinders in accordance with ASTM C39.

B. If test cylinders fail to meet strength requirements, the Engineer may require additional core tests in accordance with ASTM C42.

END OF SECTION

APPENDIX

- **RECORD DRAWING LAYERS**
- **SOUTH MIDDLETON TOWNSHIP ORDINANCE NO. 02 of 2006**
- **CONSTRUCTION AGREEMENT SAMPLE**
- **CONSTRUCTION DETAILS**

RECORD DRAWING LAYERS

SOUTH MIDDLETON TOWNSHIP RECORD DRAWING LAYERS

LAYER	COLOR	LINETYPE	COMMENTS
0	WHITE	CONTINUOUS	
DATUM	MAGENTA	CONTINUOUS	PROFILE DATUM TEXT: L120
EX-BLDG	YELLOW	CONTINUOUS	BUILDINGS:LARGE PERMANENT STRUCTURES
EX-BRIDGE	RED	CONTINUOUS	BRIDGES
EX-CEM	CYAN	CONTINUOUS	CEMETARIES
EX-CONC	14	CONTINUOUS	SMALL CONCRETE SLABS & STRUCTURES
EX-CURB	WHITE	CONTINUOUS	CURB LINES
EX-DAM	RED	CONTINUOUS	DAMS
EX-DIRTROAD	14	DASH	UNPAVED ROADS
EX-DRIVE	8	HIDDEN	DRIVEWAYS
EX-ELEC	CYAN	CONTINUOUS	ELECTRIC BOXES:ELECTRIC LINES:ETC
EX-EOP	WHITE	CONTINUOUS	EDGE OF PAVEMENT:ROADS
EX-ESMT	YELLOW	PHANTOM2	EASEMENTS
EX-FENCE	RED	GENERAL FENCE	FENCE LINES
EX-FM	RED	DASHED2	SEWER FORCE MAINS
EX-GAS	CYAN	CONTINUOUS	GAS LINES
EX-GP	RED	DASHED2	GRINDER PUMP LINES
EX-GRAIL	RED	EDGE_GRAIL	GUIDERAILS
EX-MH	YELLOW	CONTINUOUS	SEWER MANHOLES
EX-MISC	14	CONTINUOUS	MISCELLANEOUS PERMANENT LOCATED OBJECTS
EX-PATH	14	CONTINUOUS	PATHS
EX-PL	CYAN	PROPERTY	PROPERTY LINES
EX-POLE	CYAN	CONTINUOUS	UTILITY POLES
EX-PONDLAKE	CYAN	STREAM	PONDS:LAKES:BODIES OF WATER
EX-REC	CYAN	CONTINUOUS	RECREATIONAL AREAS & RELATED OBJECTS
EX-RIPRAP	RED	CONTINUOUS	RIPRAP
EX-RR	RED	CONTINUOUS	RAILROADS
EX-RUNWAY	8	CONTINUOUS	AIRPORT RUNWAYS
EX-RW	GREEN	ROW	RIGHT-OF-WAY
EX-S	RED	CONTINUOUS	SEWER LINES
EX-SD	CYAN	HIDDEN2	STORM DRAIN LINES & STRUCTURES
EX-SDWK	14	CONTINUOUS	SIDEWALKS
EX-SHOULD	14	CONTINUOUS	ROAD SHOULDERS
EX-SIGN	CYAN	CONTINUOUS	SIGNS
EX-SLAT	RED	CONTINUOUS	SEWER LATERALS
EX-STREAM	CYAN	STREAM	STREAMS:RIVERS
EX-SWAMP	CYAN	STREAM	SWAMPS
EX-TREE	14	CONTINUOUS	TREES & TREE LINES
EX-TUNNEL	RED	CONTINUOUS	TUNNELS
EX-UTIL	CYAN	CONTINUOUS	VARIOUS UTILITIES
EX-VALVE	RED	CONTINUOUS	WATER VALVES:BENDS:FIRE HYDRANTS:ETC.
EX-W	RED	CONTINUOUS	WATER LINES
EX-WALL	RED	CONTINUOUS	RETAINING WALLS
EX-WET	CYAN	STREAM	WETLANDS
EX-WLAT	RED	CONTINUOUS	WATER LATERALS
F-S	RED	DASHED2	FUTURE SEWER LINES

F-W	RED	DASHED2	FUTURE WATER LINES
NORTH	YELLOW	CONTINUOUS	NORTH ARROW
NOTES	WHITE	CONTINUOUS	GENERAL PAPERSPACE NOTES
PR-BSMT	YELLOW	CONT./HIDDEN2	PROFILE BASEMENTS
PR-FG	MAGENTA	CONTINUOUS	PROFILE FINISH GRADE LINE
PR-GRID	15	CONTINUOUS	PROFILE GRID LINES
PR-GRIDH	MAGENTA	CONTINUOUS	PROFILE GRID LINES HIGHLIGHTED
PR-LBL	RED	CONTINUOUS	MISCELLANEOUS PROFILE TEXT
PR-S	YELLOW	CONTINUOUS	PROFILE SEWER LINES
RP-SLBL	YELLOW	CONTINUOUS	PROFILE SEWER LABELS;L100
PR-STN	MAGENTA	CONTINUOUS	PROFILE STREET NAMES;L140
RP-W	MAGENTA	CONTINUOUS	PROFILE WATER LINES
PR-WLBL	YELLOW	CONTINUOUS	PROFILE WATER LABELS;L100
TX-BLDG	RED	CONTINUOUS	BUILDING TEXT:ADDRESSES, OWNER NAMES, ETC
TX-MISC	14	CONTINUOUS	MISCELLANEOUS EXISTING OBJECT TEXT:L60
TX-S	YELLOW	CONTINUOUS	SEWER TEXT (ARROWS IN SITE DWG.)
TX-SD	RED	CONTINUOUS	STORM DRAIN TEXT (ARROWS IN SITE DWG.)
TX-SHN	YELLOW	CONTINUOUS	SHEET NUMBER NOTE;L120
TX-SLAT	RED	CONTINUOUS	SEWER LATERAL TEXT; L80
TS-STN	MAGENTA	CONTINUOUS	STREET NAMES;L140
TX-STREAM	YELLOW	CONTINUOUS	TEXT FOR STREAMS, LAKES ETC.;L120S
TX-TEXT	WHITE	CONTINUOUS	MISCELLANEOUS TEXT& CENTERLINE STA'S,SEGMENTS
TX-W	YELLOW	CONTINUOUS	WATER TEXT
TX-WLAT	RED	CONTINUOUS	WATER LATERAL TEXT;L80
VPORT	WHITE	CONTINUOUS	VIEWPORTS
XBOUND	WHITE	CONTINUOUS	XREF CLIP BOUNDARY
XSEC	CYAN	CONTINUOUS	CROSS SEC DETAILS

SOUTH MIDDLETON TOWNSHIP
ORDINANCE NO. 02 OF 2006

SOUTH MIDDLETON TOWNSHIP
CUMBERLAND COUNTY, PENNSYLVANIA

ORDINANCE NO. 02 OF 2006

AN ORDINANCE OF THE TOWNSHIP OF SOUTH MIDDLETON, CUMBERLAND COUNTY, PENNSYLVANIA, PROVIDING THAT NO PUBLIC ROADS OF THE TOWNSHIP OF SOUTH MIDDLETON BE OPENED OR CUT BY ANY PERSON, FIRM, CORPORATION, OR UTILITY WITHOUT FIRST SECURING A PERMIT IN ACCORDANCE WITH ORDINANCE AND REGULATIONS PURSUANT THERETO; PROVIDING FOR CONSTRUCTION OF AND MODIFICATION OF DRIVEWAYS ENTERING TOWNSHIP ROADS; PROVIDING PENALTIES FOR VIOLATION THEREOF.

BE IT ORDAINED BY THE TOWNSHIP OF SOUTH MIDDLETON, Cumberland County, as follows:

SECTION 1. DEFINITIONS

a) Person: Individual, partnership, corporation, municipal corporation, or authority, or any utility public or private.

b) Road or Roadways: Any road, street, alley or way accepted by Township.

c) Driveway: Any private road or means of entry or exit adjacent to or abutting a township Road intended or available for access to township Road.

d) Work: Work required or performed in opening, construction, tunneling, excavating, disturbing, altering, or modifying township Road.

e) Plan: Plan of sketch of Work showing dimensions such as location of facility or intended facility requiring opening or disturbing Road, width of traveled Roadway, right-of-way lines, and dimension to nearest intersecting Road; and where required for purposes of this Ordinance, profile of grades, depths of materials, utility poles, cuts and fills, and obstacles and structures inhibiting observation.

f) Township: Township of South Middleton, in Cumberland County, Pennsylvania.

SECTION 2. OPENING TOWNSHIP ROAD

a) In accordance with the provisions of Section 2322 of Article XI of the Second Class Township Code, as amended, no railroad or street railway shall hereafter be constructed upon any township Road, nor shall any railroad or street railway crossing, nor any gas pipe, water pipe, electric conduits, cable TV or other piping, be laid upon or in nor shall any telephone, telegraph, or electric light or power poles, or any coal tipples or any other obstructions be erected upon or in any portion of a township Road except under such conditions, restrictions, and regulations relating to the installation and

maintenance thereof, as may be prescribed in Road Occupancy Permits granted by the Township for such purpose.

b) The application for a Permit shall be on a form prescribed by the Township in triplicate, and shall be accompanied by:

1) A fee in accordance with the Schedule of Fees for Road Occupancy Permits;

2) Three (3) copies of a sketch showing such dimensions as the location of the intended facility, width of the traveled Roadway, right-of-way lines and the distance to the nearest intersecting public street, road or highway; and

3) The Restoration and Maintenance Security required under Section 3 herein below.

c) A Permit shall be issued to the applicant after all the aforementioned requirements have been filed and reviewed by Township Roadmaster, Codes Officer and the Municipal Authority.

d) Upon completion of the Work, the applicant shall give written notice thereof to the Township.

e) Upon completion of the Work authorized by the Permit, the Township (Roadmaster, Codes Officer, Township Engineer, etc.) shall inspect the Work and, when necessary, enforce compliance with the conditions, restrictions and regulations prescribed by the Permit. Where any settlement or defect in the Work occurs, if the applicant shall fail to rectify any such settlement or other defect within thirty (30) days after written notice from the Township to do so, the Township may do the work and shall impose upon the applicant the costs thereof, together with an additional twenty (20%) per centum of such costs for administrative fees.

SECTION 3. RESTORATION AND MAINTENANCE SECURITY

Any person seeking a Permit to do Work on a Road shall provide Restoration and Maintenance Security pursuant to the following standards and rules:

a) The amount of security shall be determined by the Township Engineer to assure restoration of the Road and maintenance of the restored area for a period of 6 months in the event of permittee's default to so restore or maintain the Work area as required in this Ordinance.

b) The security shall be submitted in the name of the Township in the form of cash, letter of credit issued by a bank maintaining an office in the Commonwealth of Pennsylvania, or surety bond issued by a corporation duly registered as a surety company in good standing with the Pennsylvania Insurance Department, all such instruments to be in form and substance acceptable to Township.

c) Cash security shall be held by the Township in a non-interest-bearing escrow bank account, and shall be returned to the permittee upon successful fulfillment of all restoration and maintenance obligations without interest.

d) The Board of Township Supervisors shall have the power to forfeit or otherwise seize and use the Restoration and Maintenance Security upon satisfactory proof of the permittee's default to be supplied by the Township Engineer. Said Board shall also have authority to reduce the amount of security upon successful completion of initial restoration on the recommendation of the Township Engineer.

e) The Board of Township Supervisors shall have the authority to waive the posting of Restoration and Maintenance Security hereunder where adequate provisions have been made otherwise for restoration and maintenance of the Work area, such as, but without limitation, Work performed under a public works contract with the South Middleton Township Municipal Authority which requires such security as part of the contract.

SECTION 4. TRENCHING ACROSS IMPROVED AREA

a) Trenching shall not be permitted across the improved area of a Road unless authorized by the Permit.

b) Trenching across the improved area of a Road may be authorized by the Permit where drilling, boring, driving or tunneling are not feasible because:

(1) The subsurface is solid rock.

(2) There are other facilities located longitudinally under the improved area and their location precludes methods other than trenching.

(3) Adjacent development in a very congested urban area makes the construction of a tunneling or boring shaft impossible.

SECTION 5. TEMPORARY RESTORATION

a) Cold or hot (SuperPave, ID-2, or other as approved) mix shall be installed immediately after work is performed in Roadway and berm. Compacted thickness shall be minimum two (2) inches.

b) Maintain temporary paving in a condition satisfactory to the Township Engineer.

c) Thirty (30) days after issuance of substantial completion, permanent restoration must be completed.

SECTION 6. PERMANENT RESTORATION

a) Any person opening or disturbing any Road shall comply with the requirements of this Section.

b) Where macadam is disturbed, the excavation or opening shall be made by a clean cut with a diamond wheel or similar instrument. Openings shall be saw cut back twelve (12) inches from the limit of the trench.

c) Any person opening or disturbing any Road shall backfill any resulting excavation with Type 2A aggregate as specified in the Pennsylvania Department of Transportation Publication 408, Section 703 (2) (c) – Table C. Backfill shall be limestone or shall demonstrate a dry weight in pounds per cubic feet equivalent to or greater than limestone. Compaction of the aggregate shall be in lifts of no more than six (6) inches. Backfill shall be placed and compacted to within six and one-half (6 ½) inches of the existing road grade.

d) Five (5) inches of SuperPave asphalt mixture Base Course shall be placed over the backfill in accordance with the Pennsylvania Department of Transportation Publication 408, Section 305**,** and shall conform to the most recent calculation methodology available from PennDOT. Unless otherwise directed, the design shall be HMA Base Course, PG 64-22, 0.3 to <3.0 million ESALS, 25 mm mix, SRL-G.

e) One and one-half (1 ½) inches of SuperPave asphalt mixture Wearing Course shall be placed over the Base Course (see b above) in accordance with the Pennsylvania Department of Transportation Publication 408, Section 421, and shall conform to the most recent calculation methodology available from PennDOT. Unless otherwise directed, the design shall be HMA Wearing Course, PG 64-22, 0.3 to <3.0 million ESALS, 9.5 mm mix, SRL-G.

f) The joints at all Road openings shall be cleaned and sealed in accordance with the Pennsylvania Department of Transportation Publication 408, Section 469. Joint sealer shall be PG 64-22, or approved equal.

SECTION 7. MULTIPLE ROAD CUTS

If more than two (2) cross cuts are made in a Road within one (1) block or less than 300 feet, contractor must overlay entire section, curb to curb or full Roadway width.

SECTION 8. EQUIPMENT DAMAGING ROADWAY

a) To protect the pavement and shoulders of existing Road surface, all equipment shall have rubber wheels or runners and shall have rubber, wood or similar protective pads between the outriggers and the surface unless otherwise authorized by the permit.

b) In the event that other than rubber-equipped machinery is authorized for use, the pavement and shoulders shall be protected by the use of matting, wood or other suitable protective material having a minimum thickness of four (4) inches, unless the permit requires the permittee to repave the roadway full width.

c) If the equipment damages the pavement or shoulders of the Roadway, the permittee shall restore the pavement or shoulders to their former condition, at the permittee's expense.

SECTION 9. TRAFFIC PROTECTION AND MAINTENANCE

a) Maintenance and protection of traffic during Road Work shall be carried out in accordance with the requirements of the Pennsylvania Department of Transportation, as set forth in Publication No. 43 and Publication No. 90.

b) The permittee shall provide and maintain all necessary precautions to prevent injury or damage to persons and property in accordance with instructions furnished by the PA DOT District Office. A traffic control plan shall be submitted to and approved by the Township Engineer before detouring any traffic.

c) Warning signs shall be placed in advance of the actual operation in such a manner as to be visible to the traveling public, and substantial barricades with adequate illumination shall be provided and maintained for any open trench or hole in the improved area. Blinking lights and/or barricades shall be used for overnight protection of area.

d) Designated employees shall be assigned by the permittee to direct one-lane traffic. Flagmen shall be provided as specified in the permit and in accordance with Publication No. 43 and Publication No. 90.

SECTION 10. APPROVAL BY INSPECTOR

Approval by the Township's inspector(s) of all or part of any permitted Work shall not constitute acknowledgment that the Work was performed in accordance with the Permit, nor shall such approval of the inspector act as a release of the permittee or waiver by the Township of its right to seek performance or restitution from the permittee.

SECTION 11. TOWNSHIP STANDARDS

Work is to conform to Township standards. The Work shall be done at such time and in such manner as shall be consistent with the safety of the public and shall conform to all requirements and standards of the Township. If at any time it shall be found by the Township that the Work is not being done or has not been performed properly, the permittee, upon being notified in writing by the Township, shall immediately take the necessary steps, at its own expense, to place the Work in condition to conform to such requirements or standards. In case any dispute arises between the permittee and the Township's inspector, the Township's inspector shall

have the authority to suspend Work until the question at issue can be referred to and be decided by the Township Engineer.

SECTION 12. TEMPORARY DRIVEWAYS

Whenever a construction or demolition operation requires the movement of a vehicle from the property during the construction period, it shall be the responsibility of the permittee to install and maintain a stone-based driveway on the premises so as to prevent the tracking of mud and other debris onto the public Roadway. In the event that mud or other debris is transmitted onto the Roadway, it shall be the responsibility of the permittee to remove said mud and debris immediately from said Roadway.

SECTION 13. DRIVEWAYS

a) No person shall construct, improve, modify or alter in any way a driveway, in the area where said driveway enters a Township Road, without first obtaining a Road Occupancy Permit and complying with this Ordinance and regulations issued hereunder.

b) Any driveway presently constructed or constructed hereunder shall be maintained in compliance with this Ordinance and regulations issued hereunder.

c) Application for Road Occupancy Permit for driveway work shall be by owner or person with legal interest in property and authority to so apply, to Township accompanied by plans and fees as set forth by the Schedule of Fees for Road Occupancy Permits.

d) At point of entry of driveway into Road right-of-way and paved or improved portion thereof, the surface and grade of Road shall not be altered; no material of any kind, temporary or permanent, shall be placed within the improved portion of the Road or gutter where the paved or improved area meets the berm; and the work shall not interfere with maintenance, snowplowing and drainage.

e) Within twenty (20) days after submission of an application for Road Occupancy Permit for driveway, the Township shall approve or disapprove with reasons and send by certified mail notice of action to applicant. Upon approval, notice shall be given by applicant as set forth above and Roadmaster or other agent of the Township shall inspect work to ensure compliance with approved application, entering approval of work on both Township's copy and applicant's copy, if available.

SECTION 14.

All Roads, driveways or streets, whether public or private, shall comply with all standards imposed by Section 706 of the Subdivision/Land Development Ordinance. The standards imposed on Roads, streets and driveways by the Subdivision/Land Development Ordinance shall prevail over any inconsistent standards imposed by this Ordinance.

SECTION 15.

Any persons aggrieved with the literal enforcement of this ordinance, due to unreasonable hardship because of peculiar conditions pertaining to the land in questions, shall submit in writing grounds for such unreasonableness or hardship on which the waiver request is based. Any such waiver requests shall not be contrary to public interest and the spirit of these regulations and shall afford the minimum modification necessary. Such requests shall be acted upon by the Board of Supervisors at a regularly scheduled meeting of the Board. All waiver requests shall be accompanied by an automatic thirty (30) day extension of time for Township action in order that sufficient time is allowed for Board of Supervisor's action.

SECTION 16.

a) Any person who shall violate any provision of this Ordinance shall be liable, upon summary conviction for a first offense and upon summary conviction for each subsequent offense, to a fine not exceeding $300.00 for each violation, together with costs of prosecution in each case. Upon judgment against any person by summary conviction or proceedings by summons, on default of payment of fine or penalty imposed and costs, defendant may be sentenced and committed to the County Prison for a period not exceeding thirty (30) days.

b) Any Ordinance or part of Ordinance inconsistent herewith is hereby repealed insofar as it is inconsistent herewith.

TO BE ENACTED AND ORDAINED by the Board of Supervisors of South Middleton Township, Cumberland County, Pennsylvania, on the 10th day of August, 2006.

BOARD OF SUPERVISORS
SOUTH MIDDLETON TOWNSHIP

_____
BRYAN A. GEMBUSIA, Chairman

ATTEST:

_____
THOMAS E. FALEY, Vice Chairman

_____
SANDRA A. QUICKEL, SECRETARY

_____
JAMES N. BAKER

_____
RONALD L. REEDER

_____
WALTER G. REIGHARD

CONSTRUCTION AGREEMENT
SAMPLE

CONSTRUCTION AGREEMENT FOR
SANITARY SEWER AND/OR WATER LINE EXTENSION

This Agreement made and entered into this ____ day of_____ 20___, by and between:

DEVELOPER
DEVELOPER'S ADDRESS
DEVELOPER'S CITY, STATE ZIPCODE

party of the first part, whether singular or plural, hereinafter called the "**Developer**", and **SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY**, a municipal corporate authority organized and existing under the laws of the Commonwealth of Pennsylvania and organized under the Municipality Authorities Act of 1945, as amended, having its principal office at 345 Criswell Drive, Boiling Springs, Cumberland County, Pennsylvania, party of the second part, hereinafter called "**Authority**";

Whereas, Authority is the owner and operator of municipal sanitary sewerage and water facilities within South Middleton Township, Cumberland County, Pennsylvania; and

Whereas, Developer has requested Authority for permission to construct the sanitary sewer and/or water service to Developer's project known or to be known as **Name of Development**, located in South Middleton Township, Cumberland County, Pennsylvania; and

Whereas, Authority has explained to Developer its terms and conditions for construction of extending its system to Developer's project and the policies, requirements, standards and specifications of any such extension;

Now, Therefore, in consideration of the promises, terms and conditions of this Agreement more fully herein below set forth and intending to be legally bound hereby, the parties agree as follows:

1. Developer shall design the extension or extensions in accordance with Authority's rules and

specifications, which design shall be subject to Authority's review and approval. Upon completion of the design of the extension or extensions and upon Authority's receipt of all necessary permits from appropriate governmental agencies, the Developer agrees to construct the sanitary sewer and/or water extension or extensions on the following terms and conditions.

2. All construction shall be completed in strict conformity to the plans and specifications approved by the Authority and in compliance with Authority's rules and regulations.

3. Unless otherwise approved by the Authority in writing, Developer shall install or cause the installation of the sewer and/or water extension or extensions to be completed within one (1) year from the date hereof.

4. Within ten (10) days of the signing of this Agreement, and prior to starting work:

(a) Developer hereby agrees to provide Authority with financial security acceptable to Authority in the form of a "Letter of Credit", or bond executed by a surety named in the current list of "Companies Holding Certificates of Authority as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. Said security shall be in the amount shown in **Exhibit A**, to guarantee the satisfactory and timely completion of all sewage and water facilities as set forth in the attached cost estimate that has been reviewed and approved by Authority's engineer and;

(b) Developer hereby agrees to deposit with Authority a sum of money to be held by Authority in an escrow deposit ("Deposit") for the payment of all costs and expenses, charges and fees as set forth below, and as detailed in the attached **Exhibit B**, within ten (10) days of the date of this Agreement. In the event the balance of the escrow account at any time shall fall below fifteen percent (15%) of the original amount and it appears that costs will be in excess of the remaining balance, Authority shall have the

right to require an additional escrow deposit sufficient to restore the account balance to such amount as designated by Authority. Such additional escrow amount shall be paid by Developer within ten (10) days of the request by Authority. In the event said sums deposited are in excess of the cost of such work, Authority shall refund such excess money to Developer upon Authority's acceptance of the extension or extensions as finally completed. The following charges shall apply:

i) Authority's Engineer's charges and fees for review of Developer's plans and modules;

ii) Reasonable legal fees for review by Authority's Solicitor, or other legal consultants, relating to any legal documents, plans, modules or any other legal work authorized by the Authority relating to the performance of any of the construction as applied for by Developer;

iii) Administrative costs and expenses which Authority may incur by reason of this project;

iv) Inspection costs and expenses which Authority may incur by reason of this project;

v) Engineering costs and expenses for updating of Authority's drawings to incorporate Developer's as –constructed drawings.

(c) Developer and/or Contractor shall obtain insurance in accordance with the Authority's Subdivision and Land Development Policies and Specifications for Construction of Extensions to the Sanitary Sewer System and Water Distribution System. This insurance should include, but not be limited to, coverage for bodily injury (BI) and property damage (PD) caused by blasting. Proof of all necessary insurance coverages shall be submitted to the Authority in the form of a Certificate of Insurance prior to the inception of any construction activities conducted by the Developer and/or

Contractor. The South Middleton Township Municipal Authority, South Middleton Township and the Authority's Engineer shall be listed on the Developer's and/or Contractor's General Liability Policy as an additional insured, in respect to this project.

5. At the completion of the project, Developer will finalize contract drawings to record the project as actually constructed ("record drawings"), and Authority's engineer will update the Authority's drawings to incorporate Developer's record drawings, make a final inspection of the entire project, prepare the necessary closing documents and, if the work is satisfactory, recommend that the project be accepted by Authority. Developer will provide Authority with as constructed drawings in hard copy and electronic form (current version of AutoCAD in use by the Authority's consulting engineer).

6. Upon completion of the construction and prior to Authority's acceptance of the extension or extensions, Developer shall furnish to Authority a maintenance bond and obligation in the amount of fifteen (15%) percent of the actual cost of said improvements and with surety acceptable to Authority for the faithful maintenance of the said extension or extensions for a period of one and one-half (1-½) years from the date of Authority's acceptance of said extension or extensions.

7. Prior to and as a condition precedent to Authority's final acceptance of the completed extension or extensions, Developer shall by a Bill of Sale tender the full and absolute ownership to Authority, free and clear of all liens and encumbrances, all sanitary sewer and/or water lines, pipes, fittings, machinery and appurtenances as required to be constructed in the construction plans and specifications, and title to all easements and rights-of-way through, in or on private property for ingress, egress, maintenance and replacement of the constructed facilities together with any lands in fee simple required for location of pumping facilities, or for any other purpose whatsoever required by said plans and specifications, all of which

shall be subject to the approval of Authority's solicitor.

8. Consideration for the Bill of Sale shall be based on the sum of One and 00/100 ($1.00) Dollar in hand paid by Authority to Seller.

9. Authority shall have the right to suspend work pending receipt of the sum(s) billed and/or failure to adhere to the project plans or the Authority's specifications, rules and procedures, and Developer covenants and agrees to indemnify and hold Authority harmless for any damage, cost or loss which may be assessed, billed, incurred or owed by Authority as result of Developer's delay or failure to pay any sums billed or to adhere to the project plans or the Authority's specifications, rules and/or procedures.

10. It is Authority's intent to enter into an additional agreement with the developer which will relate to the reimbursement of a portion of the tapping fees paid by owners of improved properties who connect to the extension financed by the developer, or other matters as authorized by the Municipality Authorities Act.

In Witness Whereof, the parties have caused these presents to be duly executed the day and year first above written.

DEVELOPER

By:_____
Developer's Representative & Title

ATTESTED:_____

SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

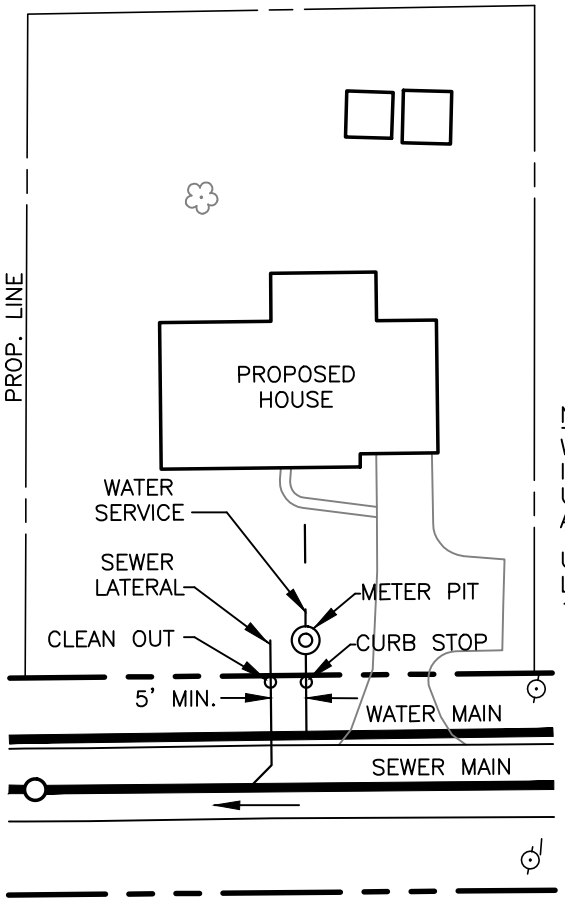
By:_____
(Vice) Chairman

ATTESTED:_____
(Secretary)

CONSTRUCTION DETAILS FOR THE SANITARY SEWER SYSTEM AND THE WATER DISTRIBUTION SYSTEM

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY
DEVELOPER'S STANDARD CONSTRUCTION DETAILS

PLAN NO.	DESCRIPTION
1	SEWER AND WATER HOUSE LATERAL LOCATIONS
1A	OPTIONAL RESIDENTIAL WATER SERVICE WITH SEPARATE DOMESTIC AND SPRINKLER FEEDS
2	TYPICAL TRENCH BACKFILL—SEWER OR WATER
3	INSTALLATION OF INDENTIFICATION TAPE
4	WATER—SEWER SEPARATION DETAILS
5	BORING DETAILS
6	CONNECTION TO EXISTING LINE W/ TAPPING SLEEVE AND VALVE
7	WATER HOUSE CONNECTION WITH EVR-STRATE FITTING AT CURB STOP
8	1 ½" OR 2" WATER CONNECTION
9	TYPICAL FIRE HYDRANT ASSEMBLY
10	TEMPORARY BLOWOFF INSTALLATION
11	PERMANENT BLOWOFF INSTALLATION
12	JOINT RESTRAINT DETAIL
13	WATER AIR RELEASE/VACUUM RELIEF VALVE AND MANHOLE
14	PRECAST REINFORCED CONCRETE MANHOLE
15	TYPICAL DROP PRECAST REINFORCED CONCRETE MANHOLE
16	STANDARD MANHOLE FRAME AND COVER
16A	MANHOLE FRAME & COVER RAISING & PAVING RESTORATION
17	PIPE TO MANHOLE GASKET DETAIL
17A	CONNECTION TO EXISTING MANHOLE
18	CAST IRON BOX FOR 4" LATERAL CLEAN OUT RISER
19	SEWER AIR RELEASE/VACUUM RELIEF VALVE AND MANHOLE
20	SERVICE LATERAL AND CLEANOUT AT SHALLOW SEWER MAIN
21	SERVICE LATERAL AND CLEANOUT AT DEEP SEWER MAIN
22	STREET RESURFACING OTHER THAN STATE HIGHWAYS
23	MONITORING MANHOLE
24	SEWAGE METERING VAULT
24A	SEWAGE METERING VAULT NOTES
25	WATER METERING VAULT
25A & B	STANDARDS FOR SETTING OF FIRE LINE WATER METERS
25C	PRIVATELY-OWNED FIRE SUPPRESSION METER AND DOMESTIC CONSUMPTION METER
26	1,000 GALLON GREASE INTERCEPTOR
27	¾" WATER SERVICE METER PIT
28	1" WATER SERVICE METER PIT
28A	WATER SERVICE METER PIT FOR OPTIONAL RESIDENTIAL SPRINKLER INSTALLATION
29	1 ½" WATER SERVICE METER PIT
30	2" WATER SERVICE METER PIT
31	CONNECTION OF NON-RESIDENTIAL SPRINKLER SYSTEM AND DOMESTIC WATER USING A COMMON FEED LINE
32	SEWER SADDLE CONNECTION



NOTES:

WATER & SEWER LATERALS TO BE INSTALLED IN CENTER OF PROPERTY, UNLESS GRAVITY FLOW REQUIRES ALTERNATE DOWNSTREAM CONNECTION.

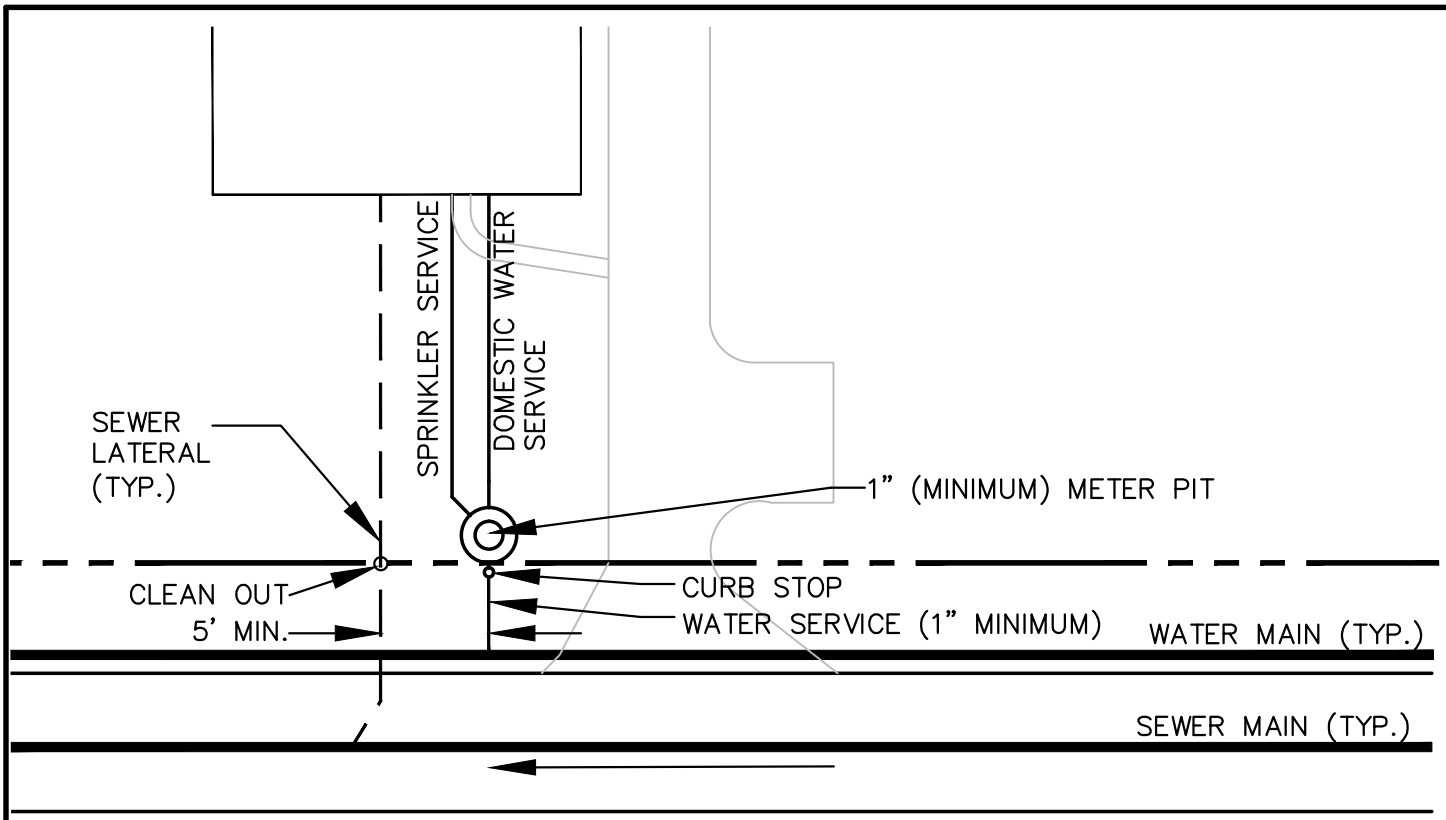
UNDER NO CIRCUMSTANCES SHALL LATERALS BE INSTALLED LESS THAN 10' FROM PROPERTY BOUNDARY.

SEWER & WATER HOUSE LATERAL LOCATIONS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. | 1



1. FOR RESIDENTIAL PROPERTIES TO BE SERVICED WITH A SPRINKLER SYSTEM, WATER SERVICES SUPPLYING A RESIDENTIAL SPRINKLER SYSTEM WILL BE A MINIMUM OF 1" DIAMETER FROM THE WATER MAIN TO THE METER PIT, AS DESCRIBED IN ITEMS 4 AND 5, BELOW.
2. THE PROPERTY OWNER HAS THE RESPONSIBILITY OF DETERMINING THE FLOW AND PRESSURE CAPABILITIES AT THE SPECIFIC POINT OF CONNECTION TO THE AUTHORITY WATER SYSTEM. UNDER NO CIRCUMSTANCE SHALL THE AUTHORITY BE HELD RESPONSIBLE FOR THE VOLUME OR PRESSURE OF WATER THAT IS AVAILABLE AT THE POINT OF CONNECTION TO THE WATER SYSTEM.
3. THE PROPERTY OWNER SHALL DETERMINE WHETHER A 1" DIAMETER SERVICE IS ADEQUATE FOR THE MINIMUM VOLUME AND PRESSURE NEEDED TO SUPPLY THE RESIDENTIAL SPRINKLER REQUIREMENTS IN ADDITION TO THE DOMESTIC NEEDS OF THE DWELLING.
4. A WATER METER PIT IS REQUIRED TO BE INSTALLED, AT THE PROPERTY OWNER'S EXPENSE, AT THE PROPERTY LINE ADJACENT TO THE WATER MAIN. THE RESIDENTIAL SPRINKLER METER PIT SHALL BE A 1" (MINIMUM) PIT SETTER WITH 48" SERVICE DEPTH. IT SHALL BE A SINGLE METER STYLE WITH DUAL OUTLETS AND A 24" TILE. THE METER PIT SHALL BE AS CONSTRUCTED BY THE FORD METER BOX CO., INC., AND SHALL BE MODEL PDBL-488-C12484-001, LATEST REVISION, ACCORDING TO DRAWING NO. B-C12484-001, LATEST REVISION, OR EQUAL.
5. UNLESS OTHERWISE APPROVED, THERE SHALL BE A 1" MINIMUM DIAMETER TYPE K COPPER WATER SERVICE, INSTALLED FROM THE MAIN TO THE METER PIT. A CORPORATION STOP SHALL BE INSTALLED ON THE WATER MAIN AND A CURB STOP SHALL BE INSTALLED JUST PRIOR TO THE METER PIT, IN ACCORDANCE WITH AUTHORITY SPECIFICATIONS.
6. TWO SEPARATE WATER LINES SHALL BE INSTALLED FROM THE METER PIT TO THE DWELLING, ONE FOR THE DOMESTIC FEED, WHICH WILL INCLUDE A BALL VALVE WITH LOCK WING WITHIN THE PIT, AND ONE FOR THE SPRINKLER FEED. THE DIAMETER OF EACH WATER LINE SHALL BE AS REQUIRED BY APPLICABLE CODES AND LOCAL MUNICIPALITY REQUIREMENTS.

OPTIONAL RESIDENTIAL WATER SERVICE WITH SEPARATE DOMESTIC AND SPRINKLER FEEDS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. | 1A

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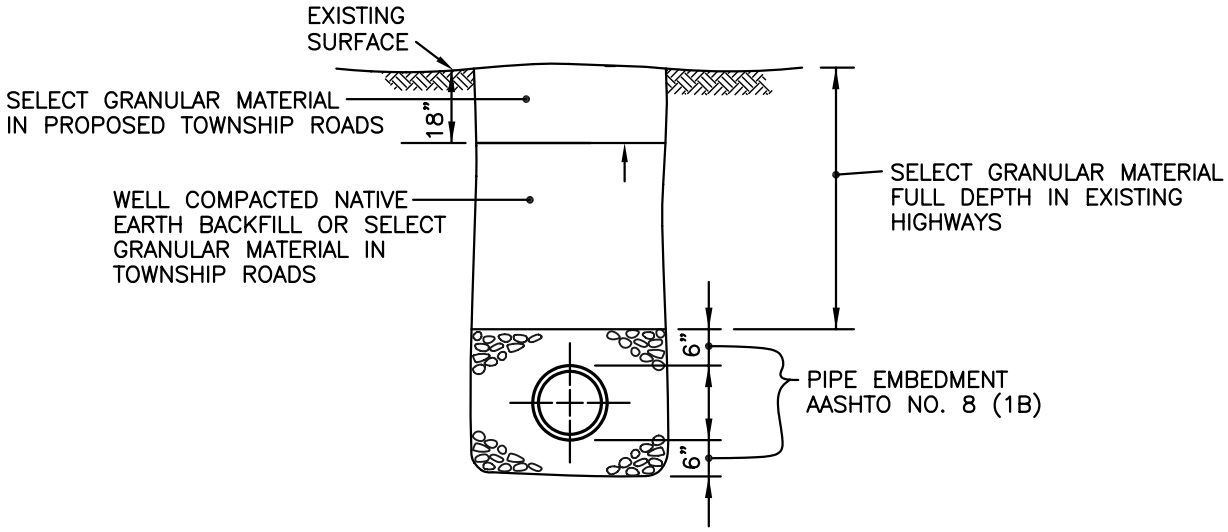


TYPICAL TRENCH BACKFILL
SEWER OR WATER
MAIN LINE AND SERVICE LATERALS

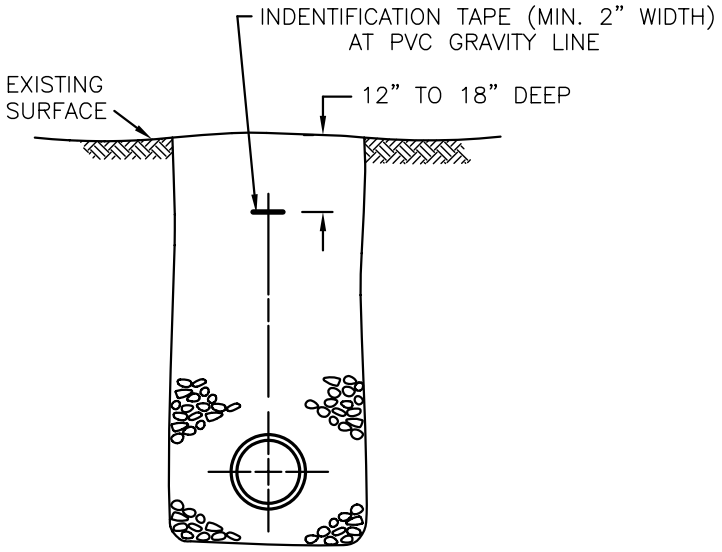
NATIVE BACKFILL: MATERIAL EXCAVATED FROM THE SITE IF FREE OF STONES LARGER THAN 6" IN SIZE AND FREE OF WET, FROZEN, AND ORGANIC MATERIALS AND REFUSE.

SELECT GRANULAR MATERIAL: TYPE 2A AGGREGATE, AS SPECIFIED IN PENNDOT PUBLICATION 408, SECTION 703 (2)(C)–TABLE C. BACKFILL SHALL BE LIMESTONE OR SHALL DEMONSTRATE A DRY WEIGHT IN POUNDS PER CUBIC FEET EQUIVALENT TO OR GREATER THAN LIMESTONE.

SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD
CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. | 2



INSTALLATION OF IDENTIFICATION TAPE

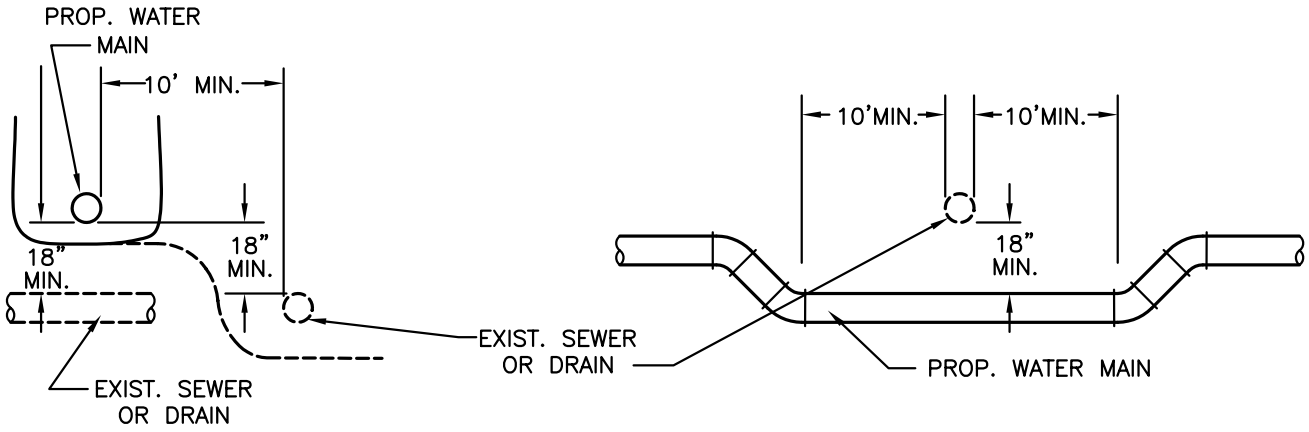
TYPICAL SEWER OR WATER

SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

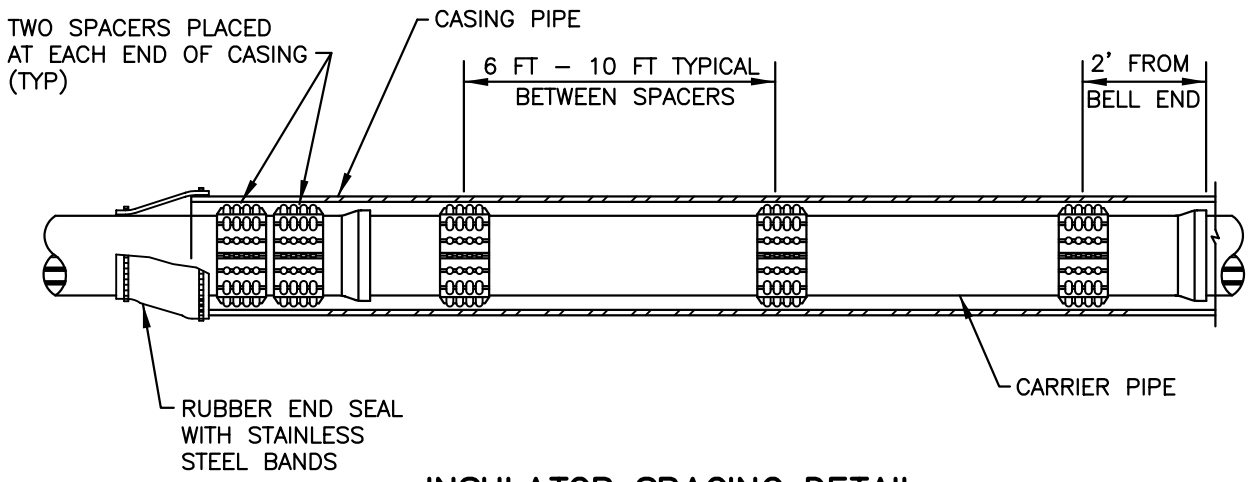
NOTE:
WHERE CONDITIONS PREVENT A SEPARATION OF 10' THE WATER MAIN SHALL BE LAID ON AN UNDISTURBED SHELF THAT IS AT LEAST 18" ABOVE THE TOP OF THE SEWER.

NOTE:
WATER PIPE TO BE CENTERED SO THAT THE JOINTS ARE AN EQUAL DISTANCE FROM THE SEWER



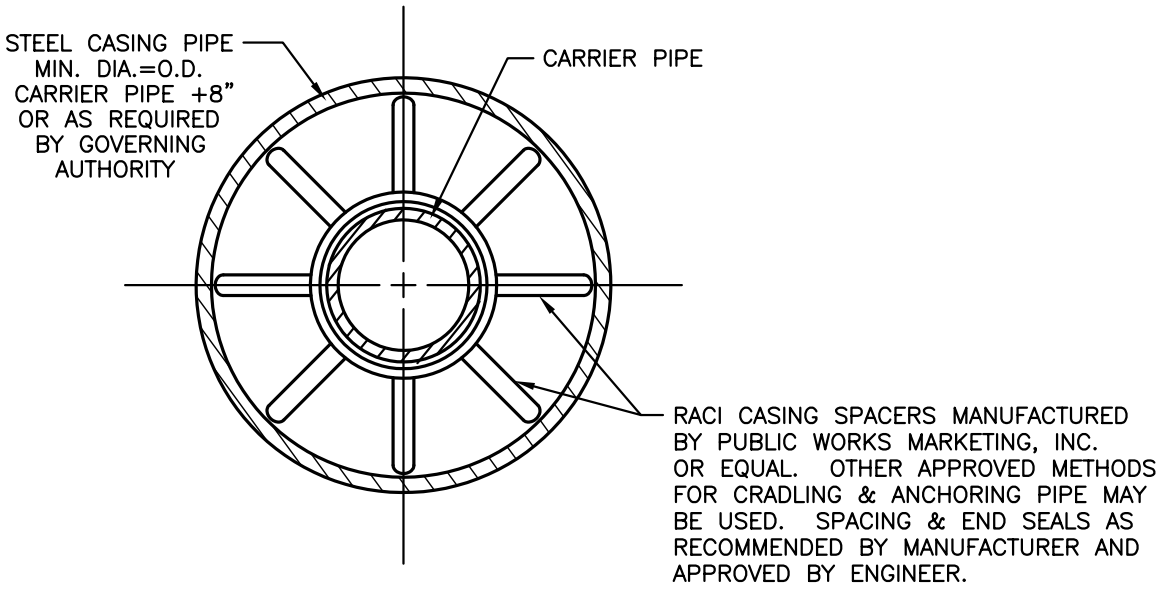
WATER – SEWER SEPARATION DETAILS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY	
DEVELOPER'S STANDARD CONSTRUCTION DETAIL	
GLACE ASSOCIATES, INC., CAMP HILL, PA.	4



INSULATOR SPACING DETAIL

SPACERS SHALL BE RACI HIGH DENSITY POLYETHYLENE OR ENGINEER PRE–APPROVED EQUAL.

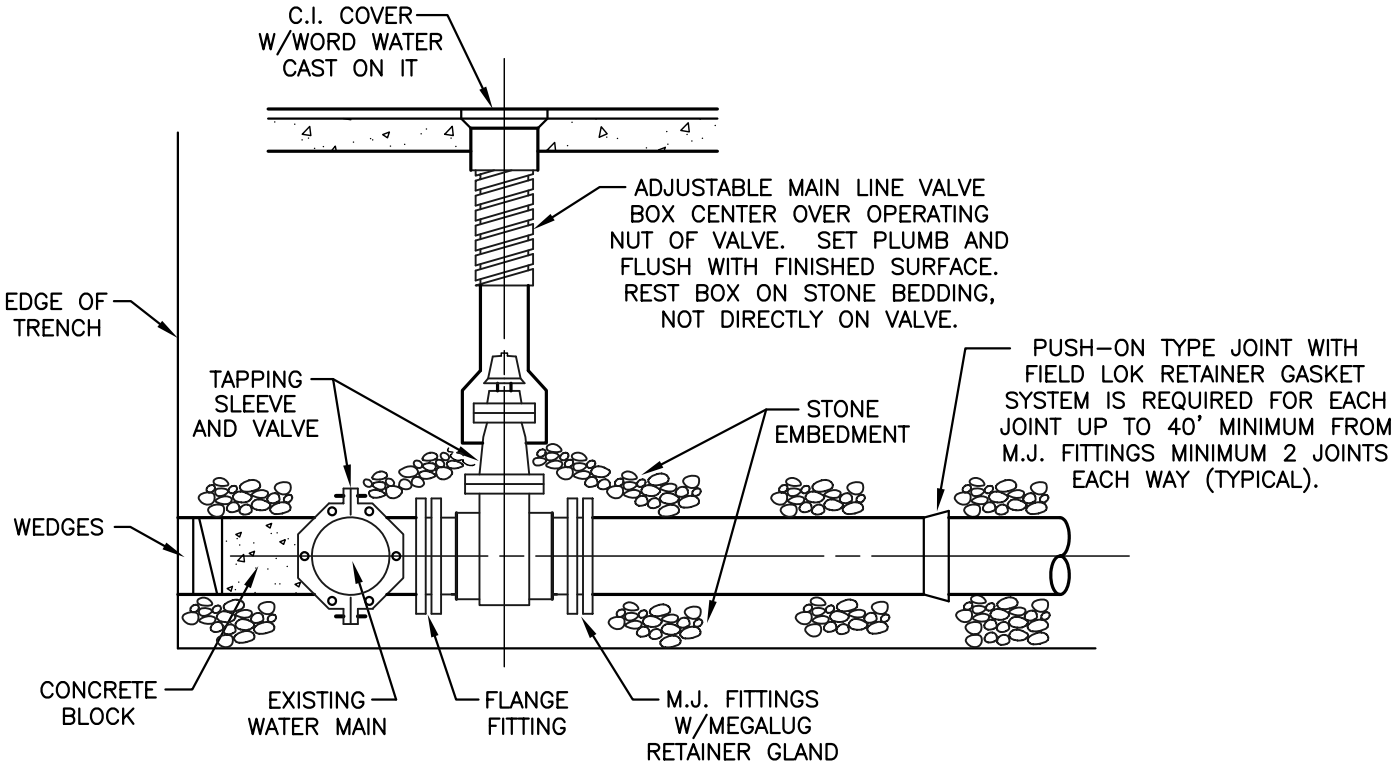


BORING DETAIL

TYPICAL SEWER OR WATER

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL



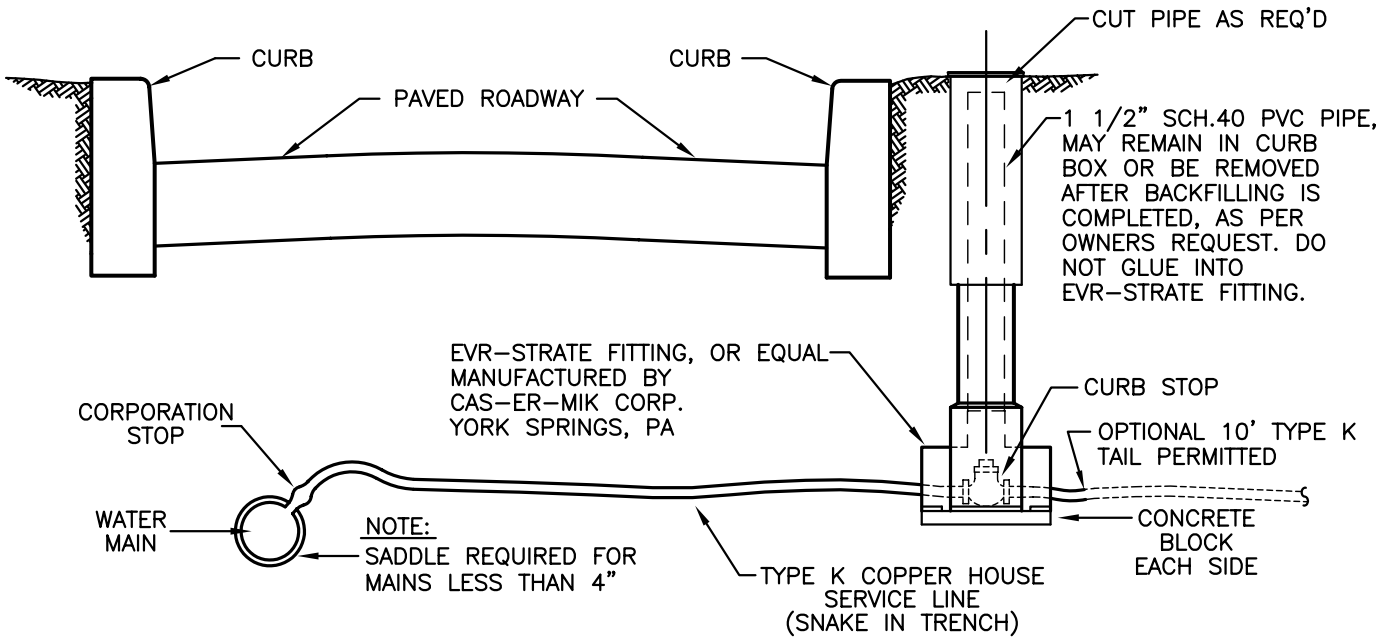
CONNECTION TO EXISTING LINE WITH TAPPING SLEEVE AND VALVE

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

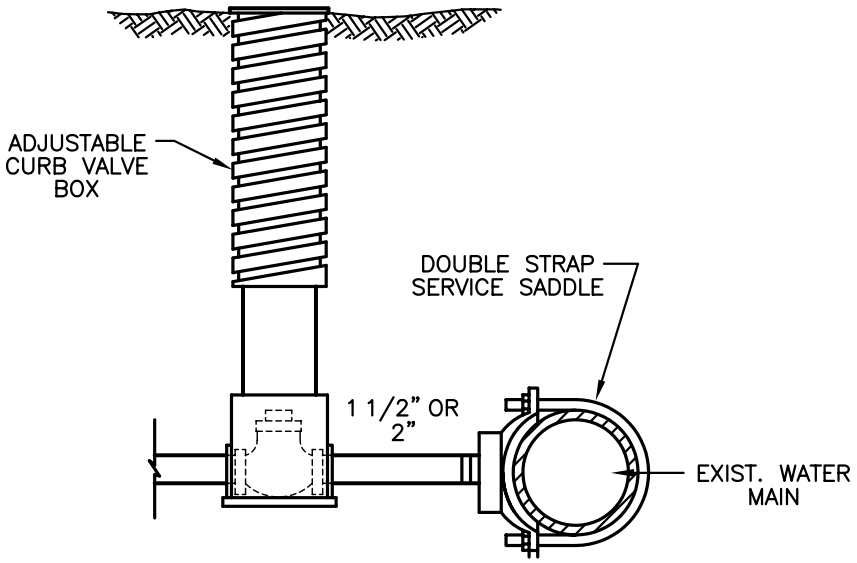
GLACE ASSOCIATES, INC., CAMP HILL, PA. | 6

CENTER ADJUSTABLE CURB VALVE BOX OVER OPERATING NUT OF VALVE. SET PLUMB AND FLASH WITH FINISHED SURFACE. REST BOX AND EVR-STRATE FITTING ON STONE BEDDING, OR CONCRETE BLOCK.



TYPICAL WATER HOUSE CONNECTION
WITH EVR-STRATE FITTING AT CURB STOP.

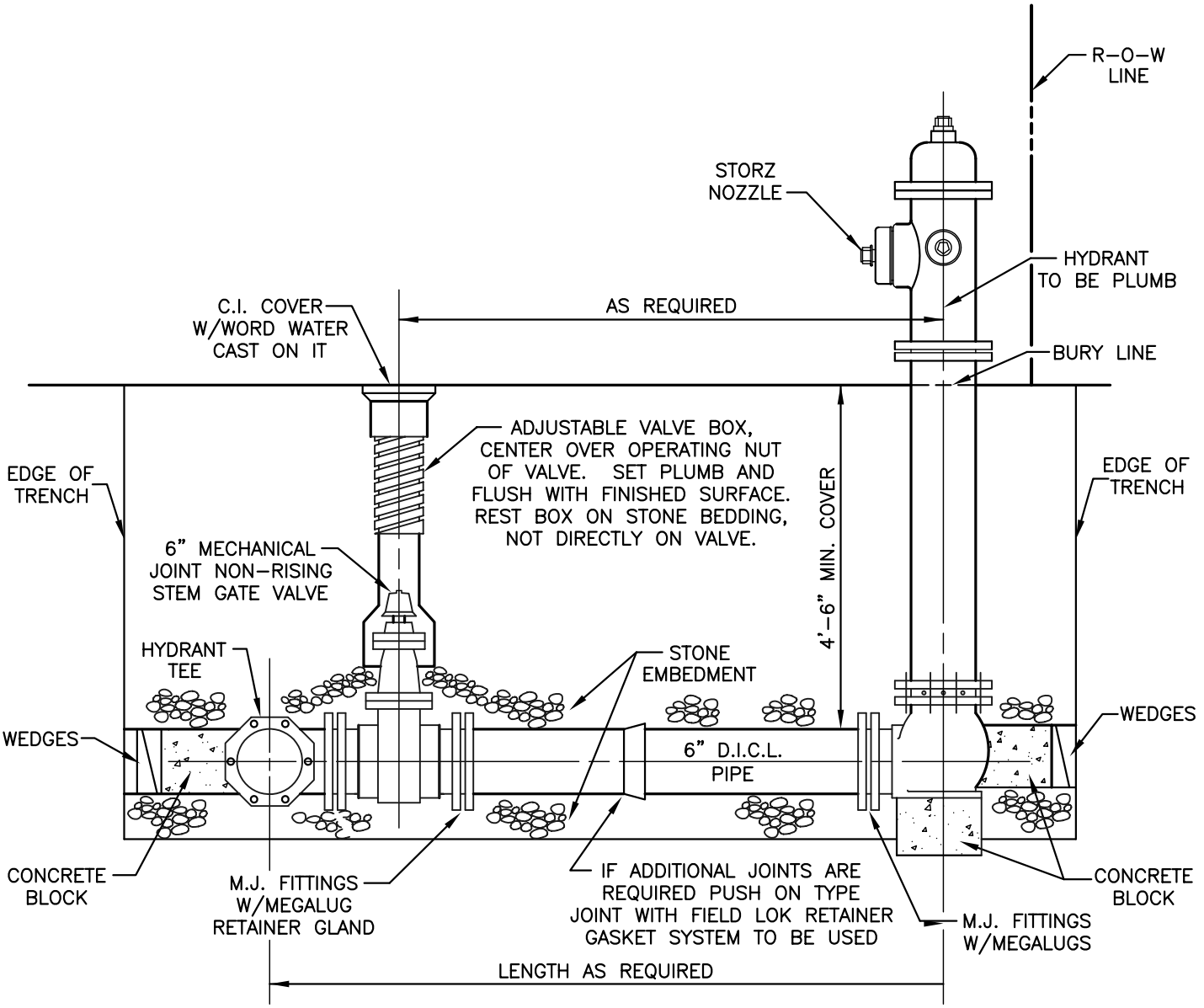
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY	
DEVELOPER'S STANDARD CONSTRUCTION DETAIL	
GLACE ASSOCIATES, INC., CAMP HILL, PA.	7



1 1/2" OR 2" WATER CONNECTION

SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

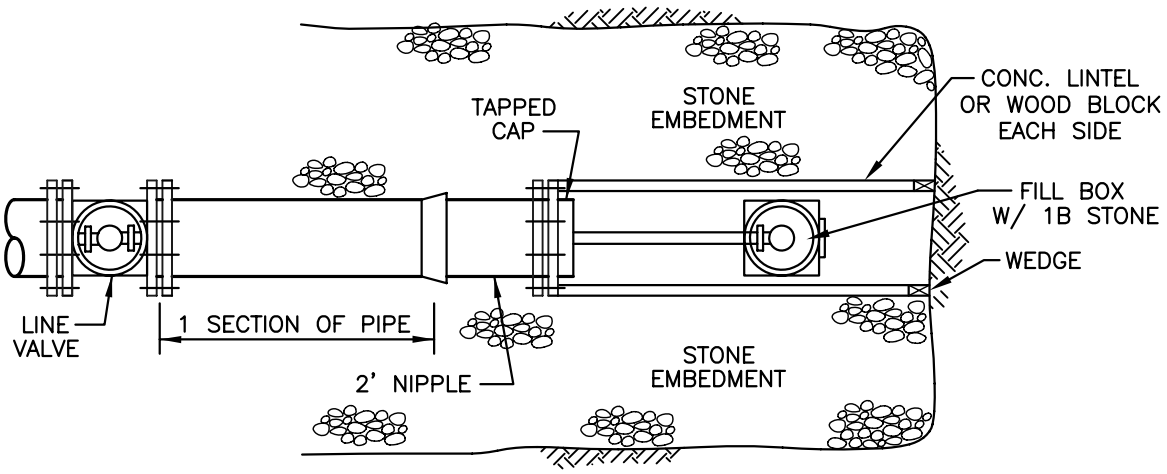


TYPICAL FIRE HYDRANT ASSEMBLY

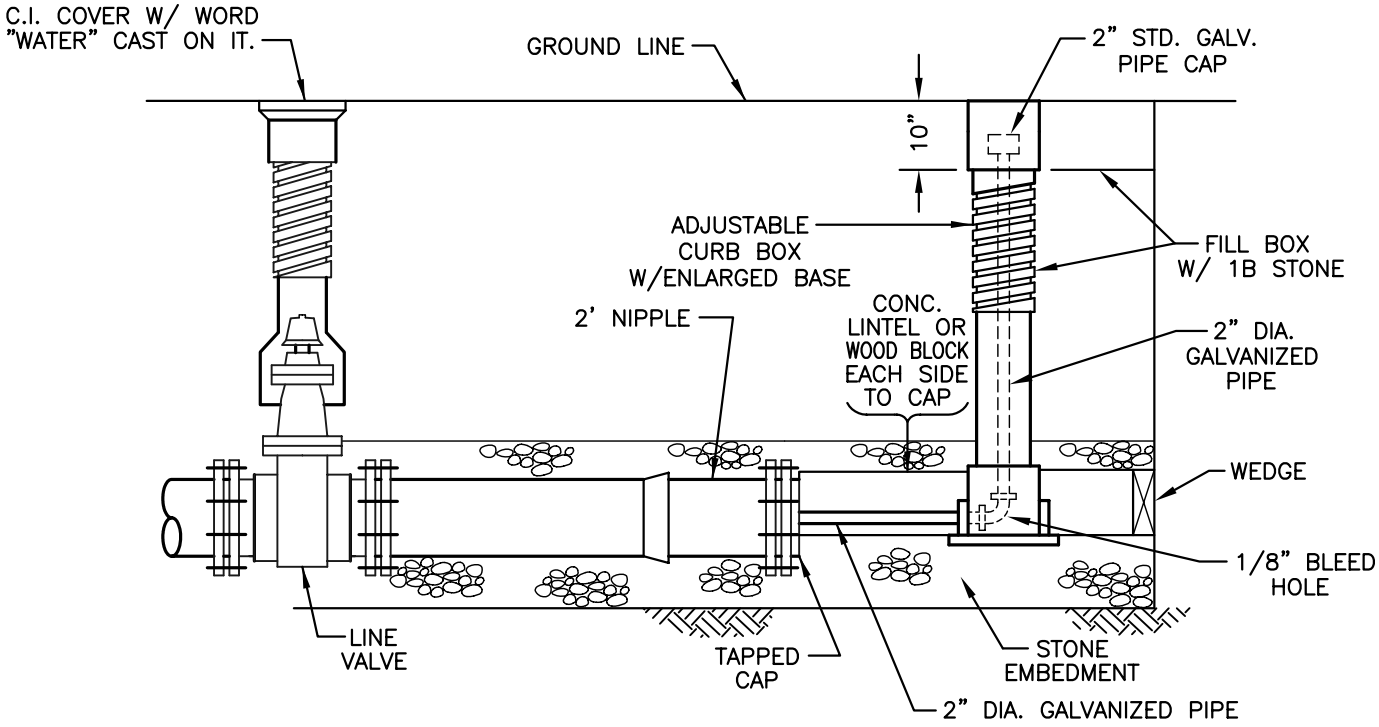
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. | 9



PLAN



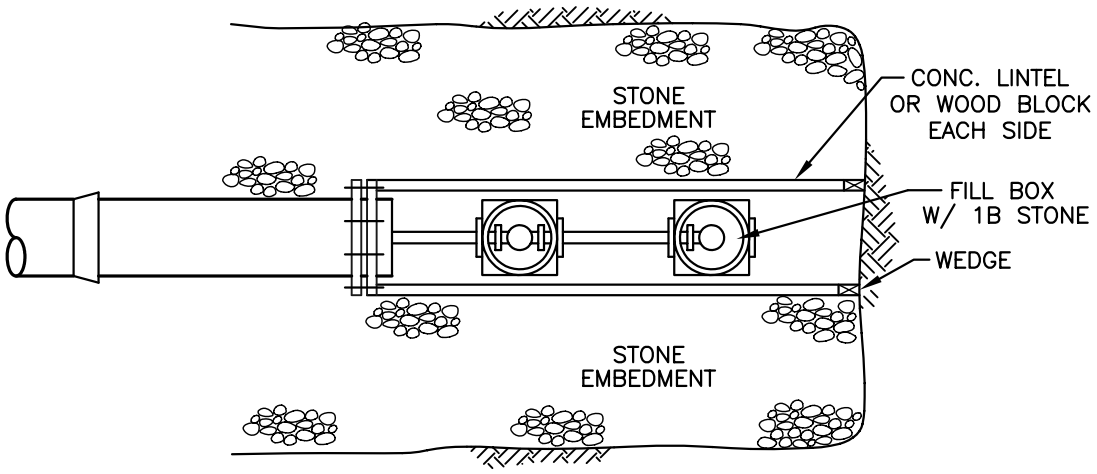
PROFILE

TEMPORARY BLOWOFF INSTALLATION

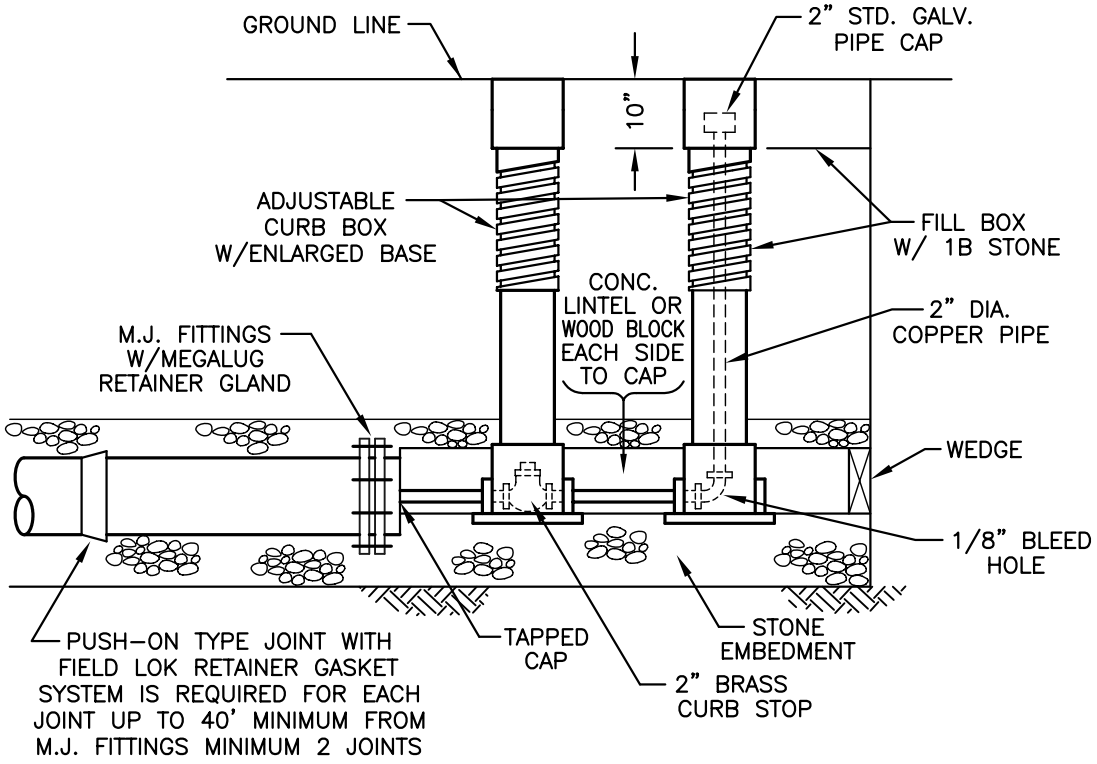
SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. | 10



PLAN



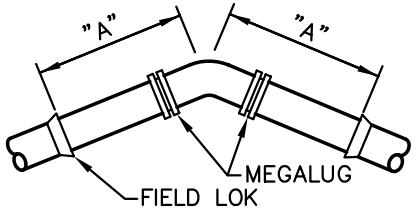
PROFILE

PERMANENT BLOWOFF INSTALLATION

SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

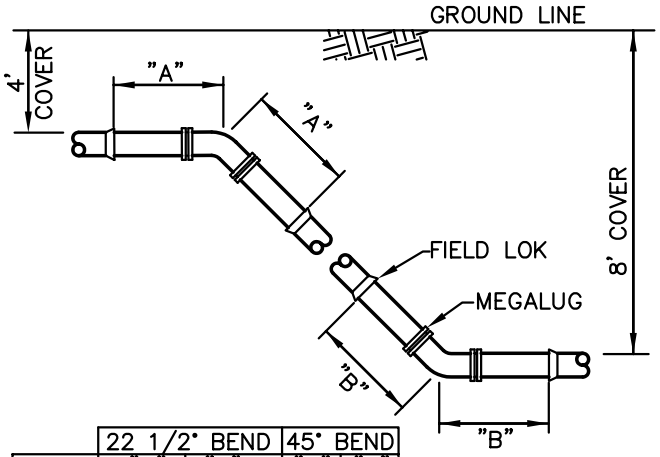
DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. | 11



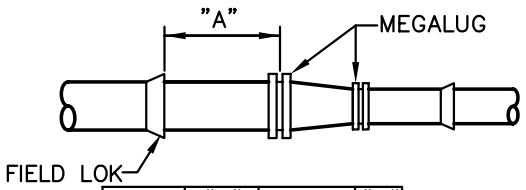
D.I.C.L.	"A" DIMENSION			
	11 1/4° BEND	22 1/2° BEND	45° BEND	90° BEND
4"	1'	2'	4'	10'
6"	2'	3'	6'	14'
8"	2'	4'	8'	18'
10"	3'	5'	9'	21'
12"	3'	5'	11'	25'
16"	4'	7'	14'	32'

HORIZONTAL BENDS



D.I.C.L.	22 1/2° BEND		45° BEND	
	"A"	"B"	"A"	"B"
4"	4'	1'	9'	3'
6"	6'	2'	12'	3'
8"	8'	2'	16'	4'
10"	9'	3'	19'	5'
12"	11'	3'	22'	6'
16"	14'	4'	28'	7'

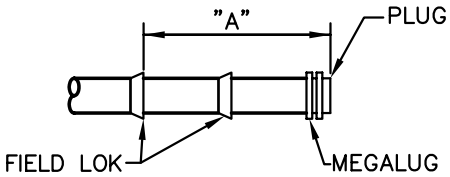
VERTICAL BENDS



D.I.C.L.	"A"	D.I.C.L.	"A"
6"X4"	15'	12"X6"	39'
8"X4"	27'	12"X8"	28'
8"X6"	16'	12"X10"	16'
10"X4"	37'	16"X4"	63'
10"X6"	28'	16"X6"	57'
10"X8"	15'	16"X8"	50'
12"X4"	46'	16"X10"	41'
		16"X12"	29'

REDUCERS

NOTE:
1. SCHEDULES INDICATE THE DISTANCE OF PIPE LENGTHS TO BE RESTRAINED ON EACH SIDE OF FITTING.
2. FOR CONDITIONS OTHER THAN THOSE PRESENTED ON THESE TABLES, CONSULT ENGINEER.



JOINT RESTRAINT LENGTHS

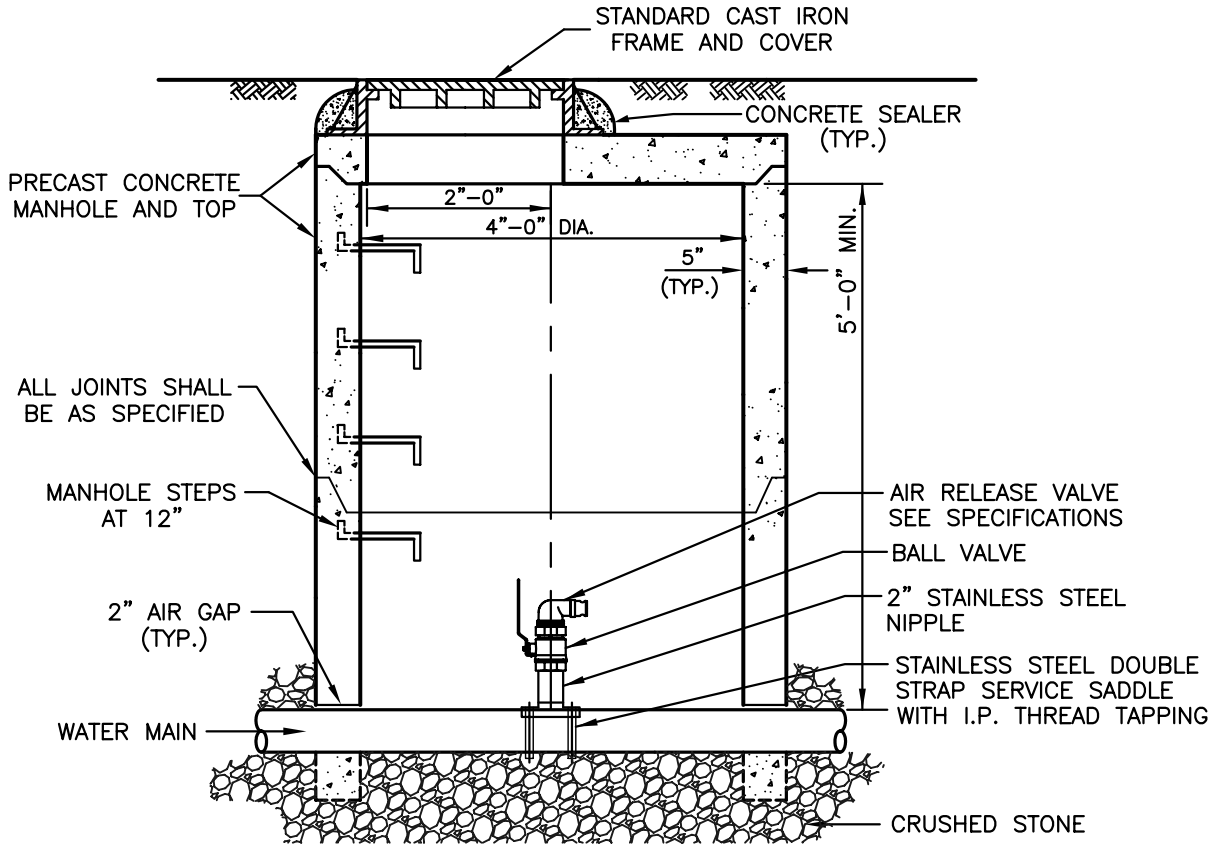
D.I.C.L.	"A"
4"	20'
6"	29'
8"	38'
10"	45'
12"	53'
16"	68'

DEAD ENDS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

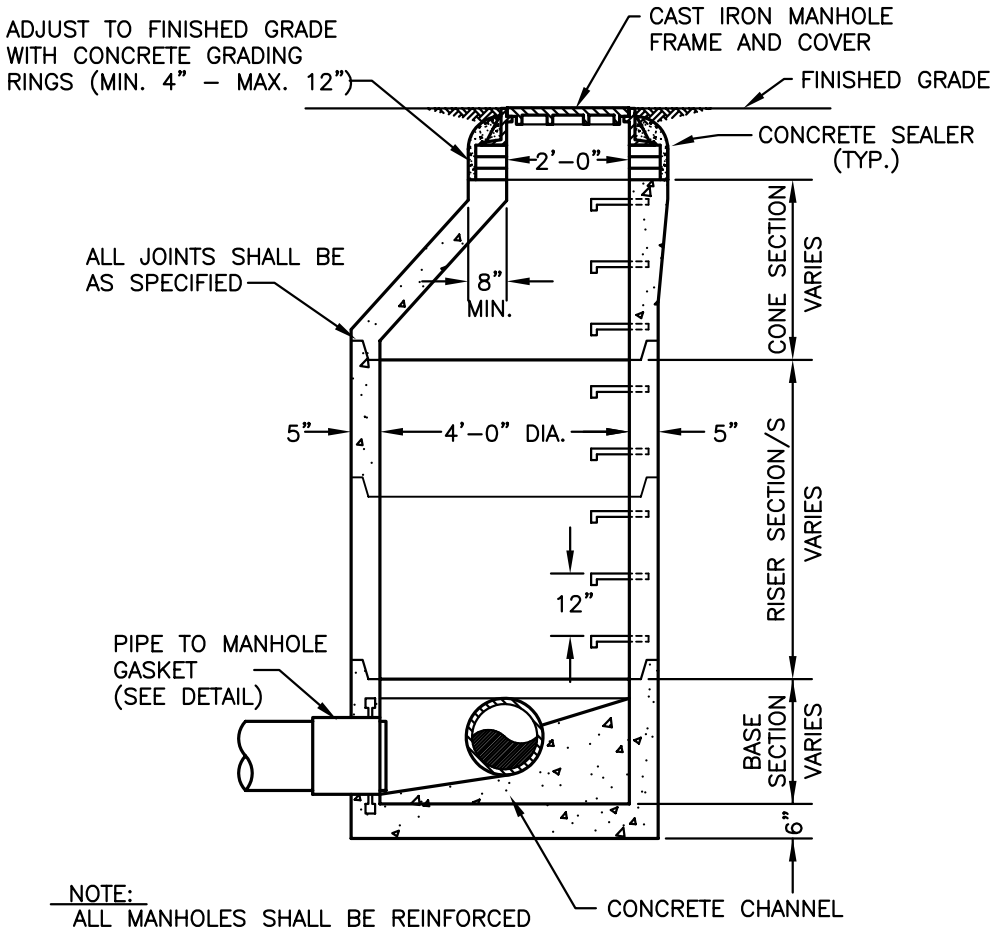
GLACE ASSOCIATES, INC., CAMP HILL, PA. | 12



WATER AIR RELEASE/VACUUM RELIEF VALVE AND MANHOLE

SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL



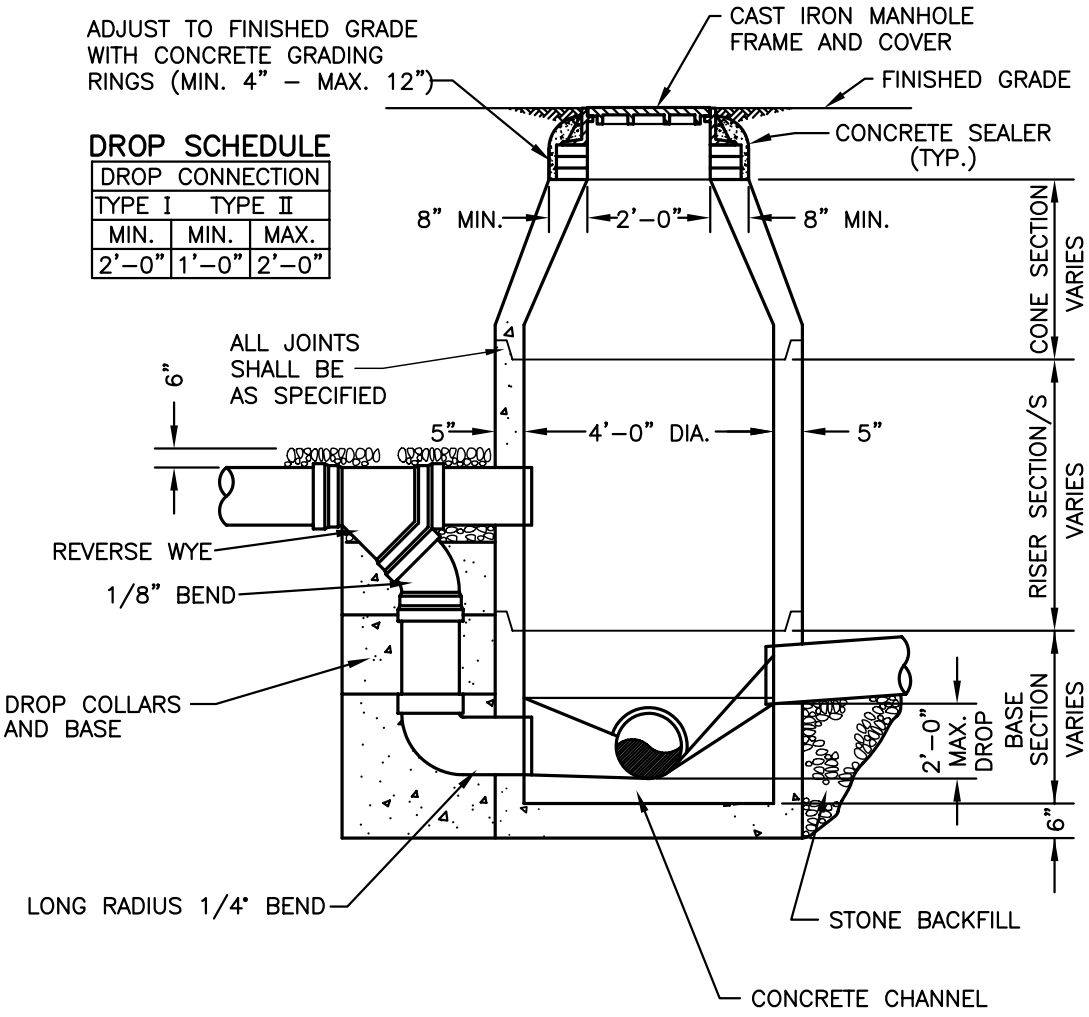
NOTE:
ALL MANHOLES SHALL BE REINFORCED MECHANICALLY VIBRATED PRECAST CONCRETE AND CONFORM TO ASTM SPEC. C478

PRECAST REINFORCED CONCRETE MANHOLE

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. | 14

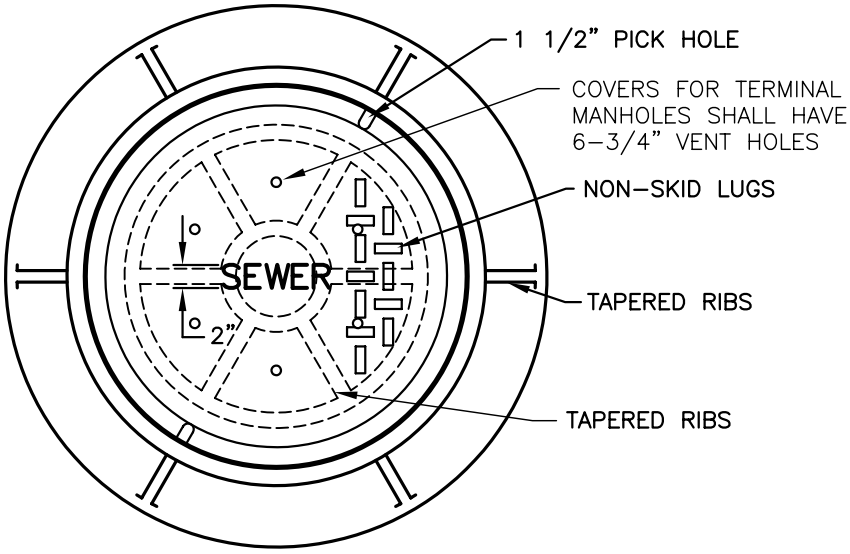


TYPICAL DROP PRECAST REINFORCED CONCRETE MANHOLE

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

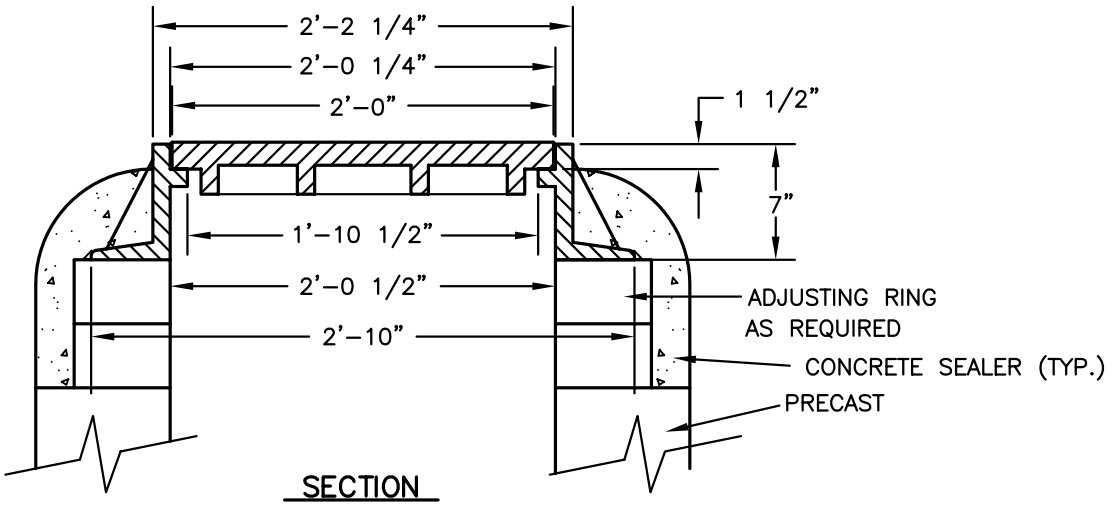
DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. 15



PLAN

NOTE:
ALL BEARING SURFACES OF FRAME AND COVER TO BE MILLED. MIN. WT. 260 LBS., COVER SUITABLE FOR HS-25 HIGHWAY LOADS. TOP TO BE SLOPED TO MEET FINISHED GRADE.

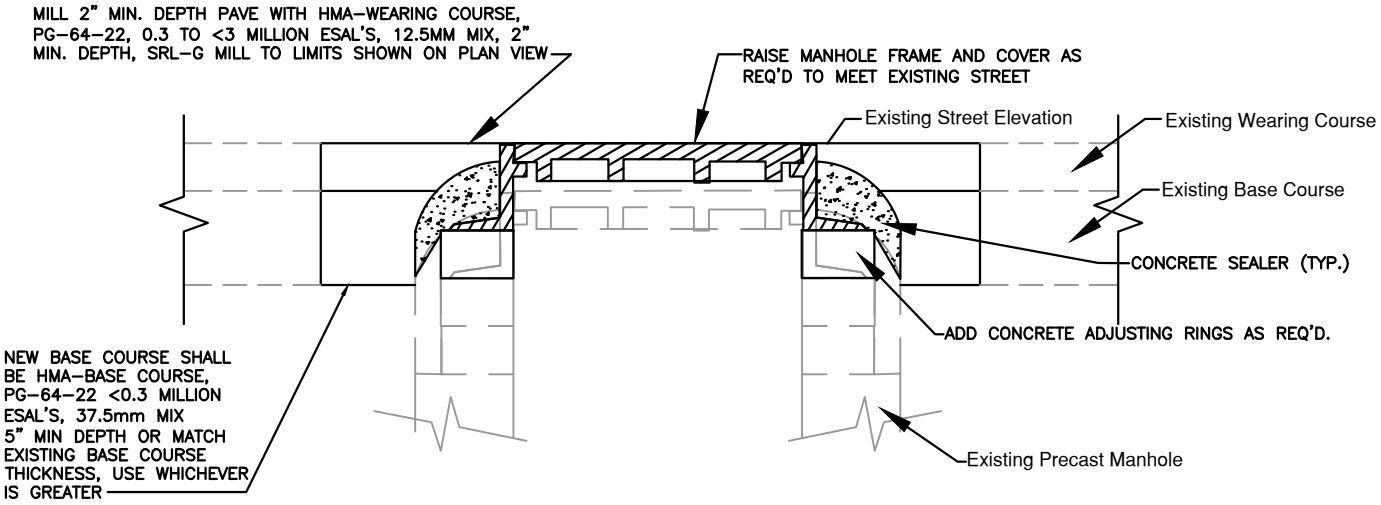


SECTION

STANDARD MANHOLE FRAME AND COVER

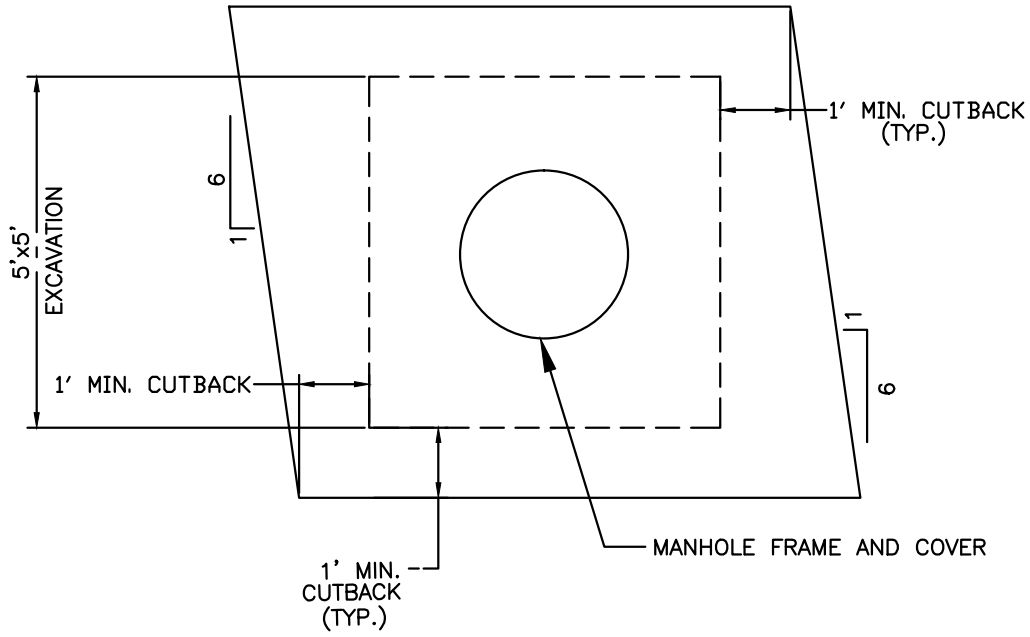
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL



RAISING OF MANHOLE FRAME & COVER TO STREET LEVEL

N.T.S.



RESURFACING PLAN VIEW

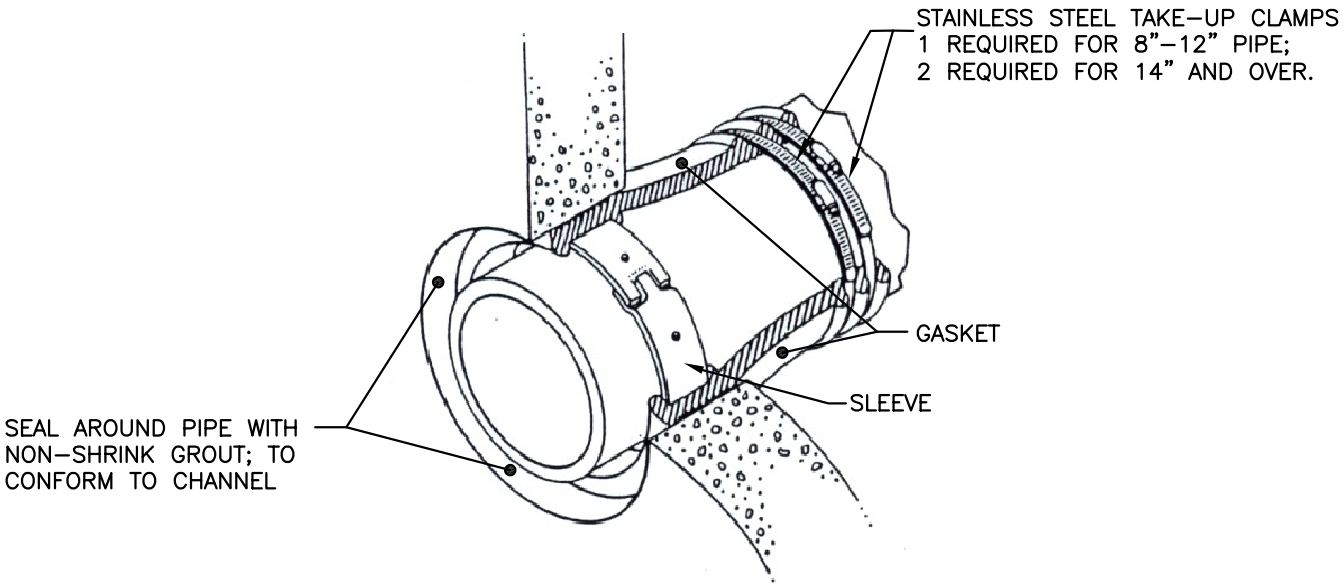
N.T.S.

MANHOLE FRAME & COVER RAISING & PAVING RESTORATION

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. **16A**

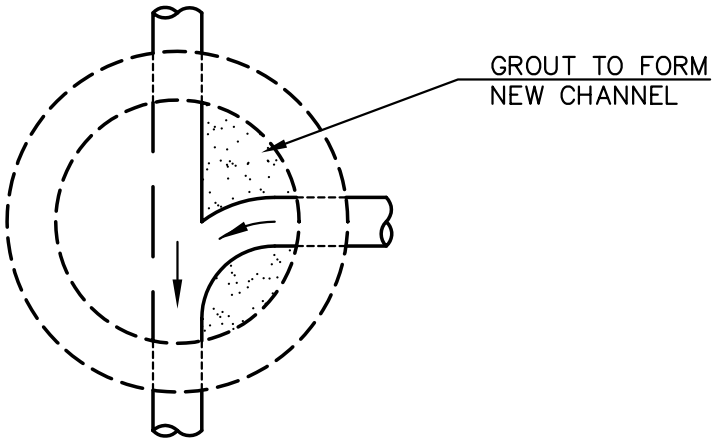


PIPE TO MANHOLE GASKET DETAIL

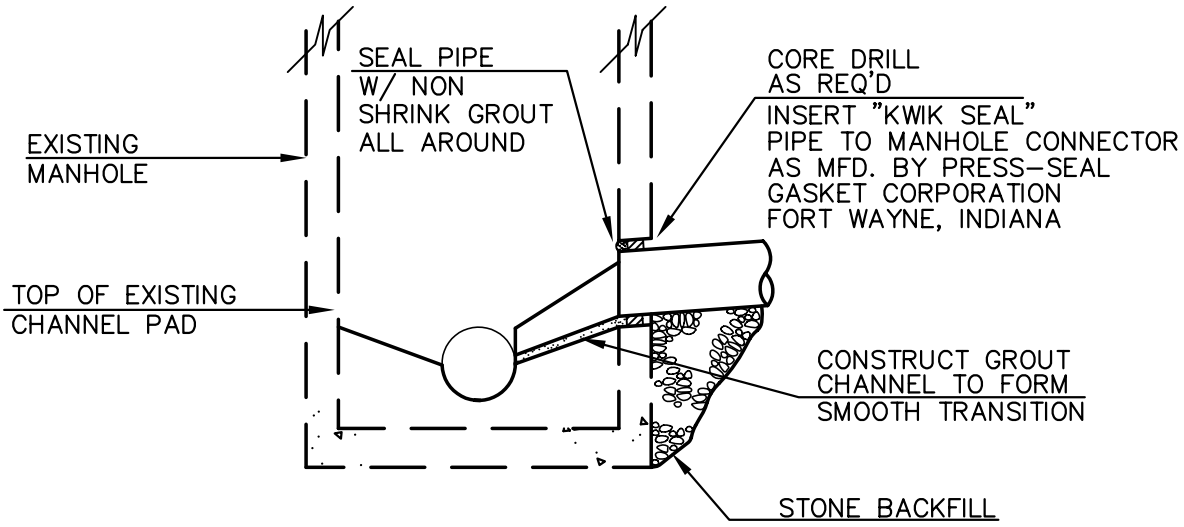
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. | 17



PLAN



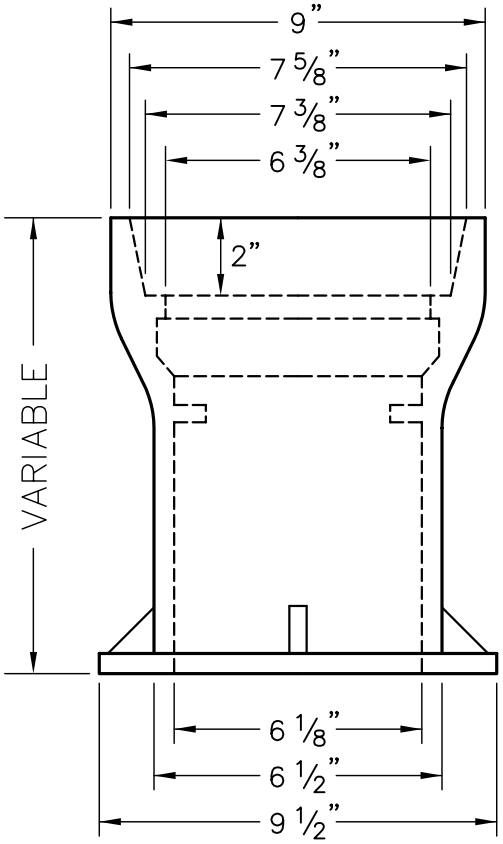
SECTION

CONNECTION TO EXISTING MANHOLE

SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD
CONSTRUCTION DETAIL

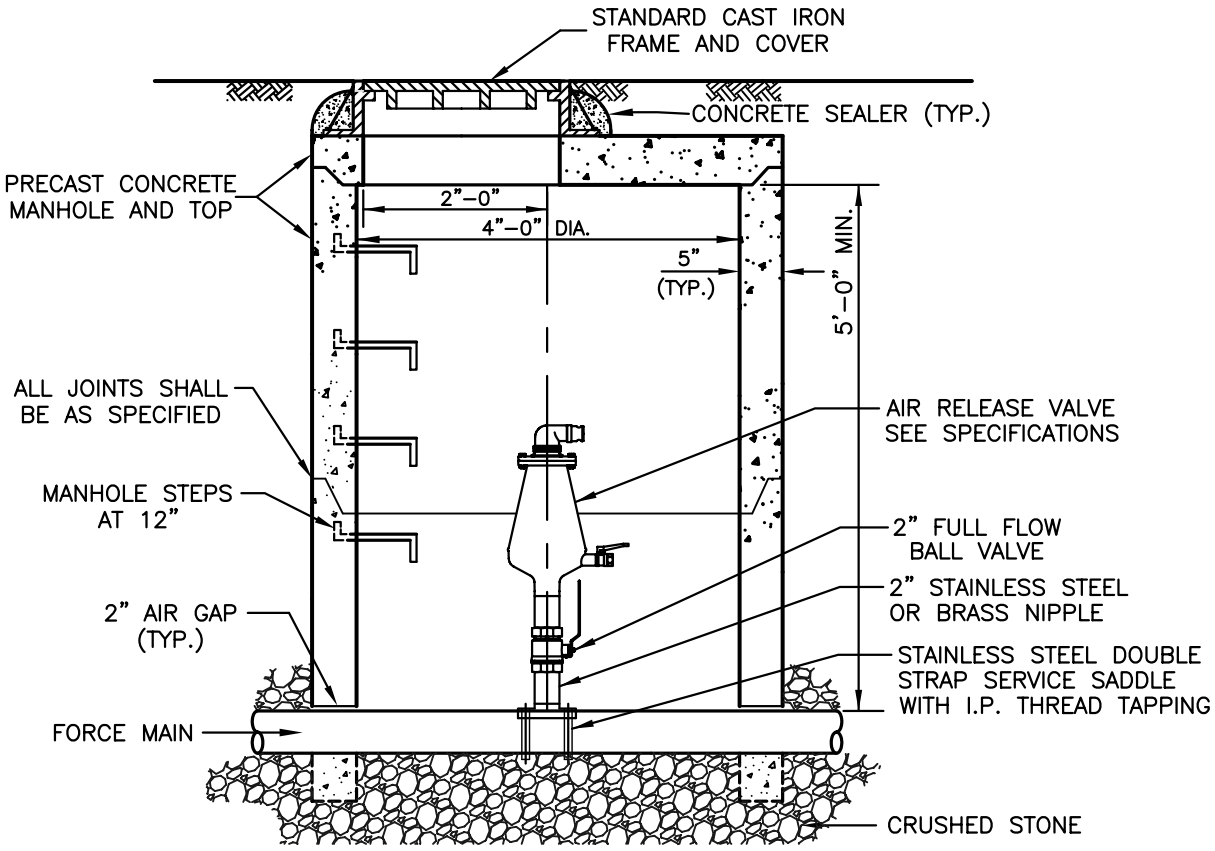
GLACE ASSOCIATES, INC., CAMP HILL, PA. | 17A



CAST IRON BOX FOR
4" LATERAL CLEAN OUT RISER

SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

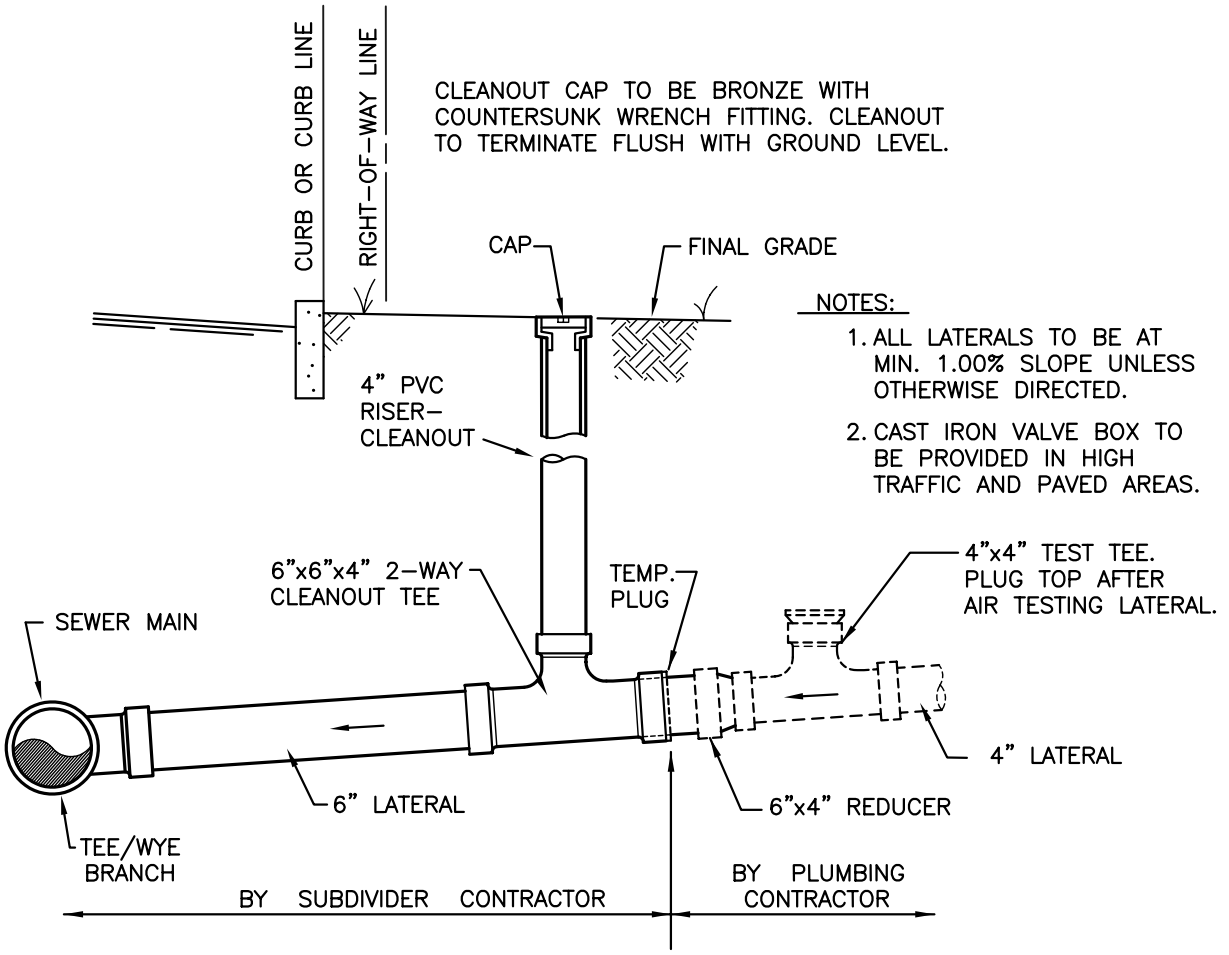
DEVELOPER'S STANDARD CONSTRUCTION DETAIL



SEWER AIR RELEASE/VACUUM RELIEF VALVE AND MANHOLE

SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL



NOTES:

1. ALL LATERALS TO BE AT MIN. 1.00% SLOPE UNLESS OTHERWISE DIRECTED.
2. CAST IRON VALVE BOX TO BE PROVIDED IN HIGH TRAFFIC AND PAVED AREAS.

NOTE:

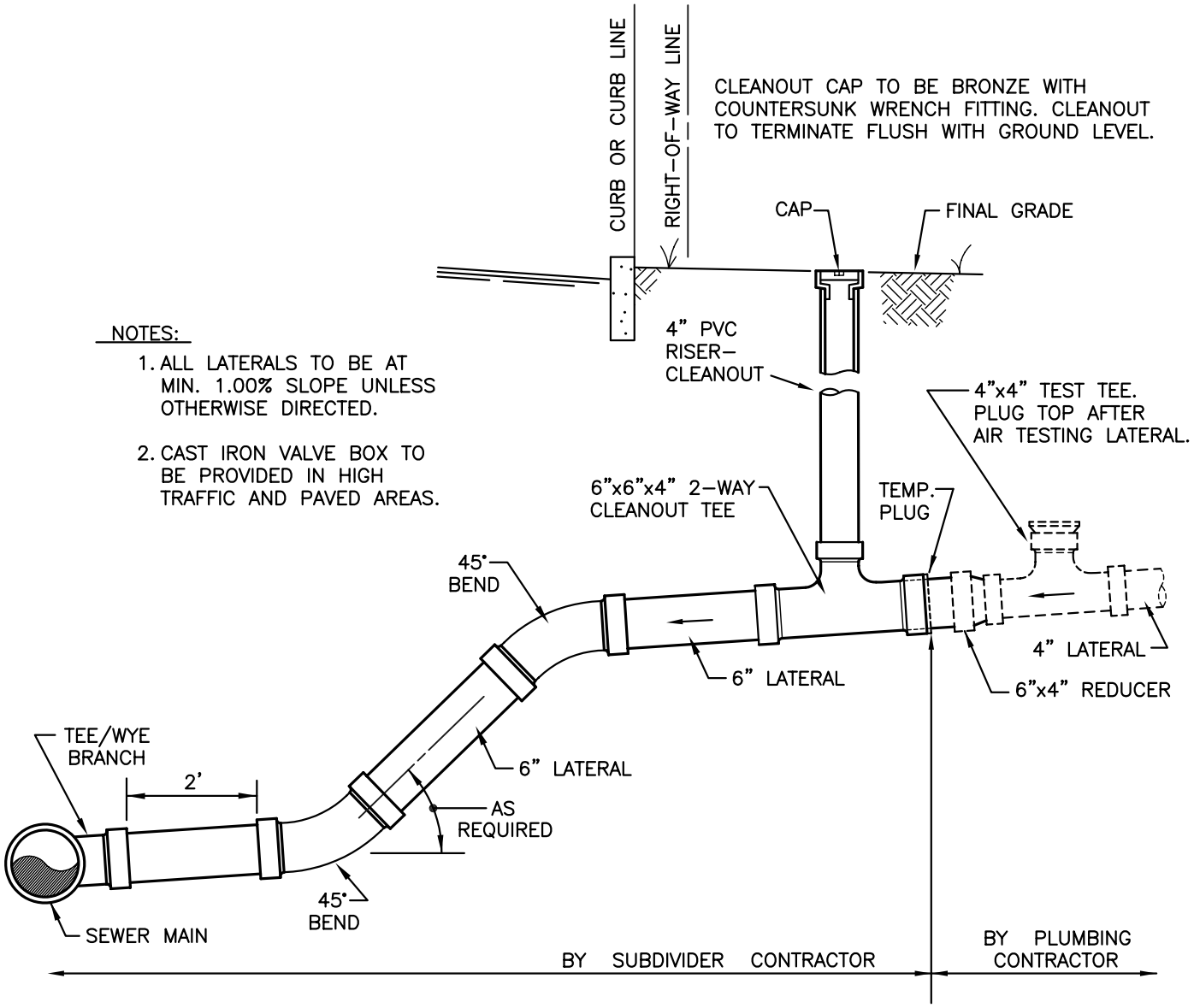
COMMERCIAL/INDUSTRIAL INSTALLATION TO BE ALL 6" FITTINGS AND PIPE, EXCEPT CLEAN OUT RISERS.

SERVICE LATERAL AND CLEANOUT AT SHALLOW SEWER MAIN

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. **20**



NOTES:

1. ALL LATERALS TO BE AT MIN. 1.00% SLOPE UNLESS OTHERWISE DIRECTED.
2. CAST IRON VALVE BOX TO BE PROVIDED IN HIGH TRAFFIC AND PAVED AREAS.

NOTE:

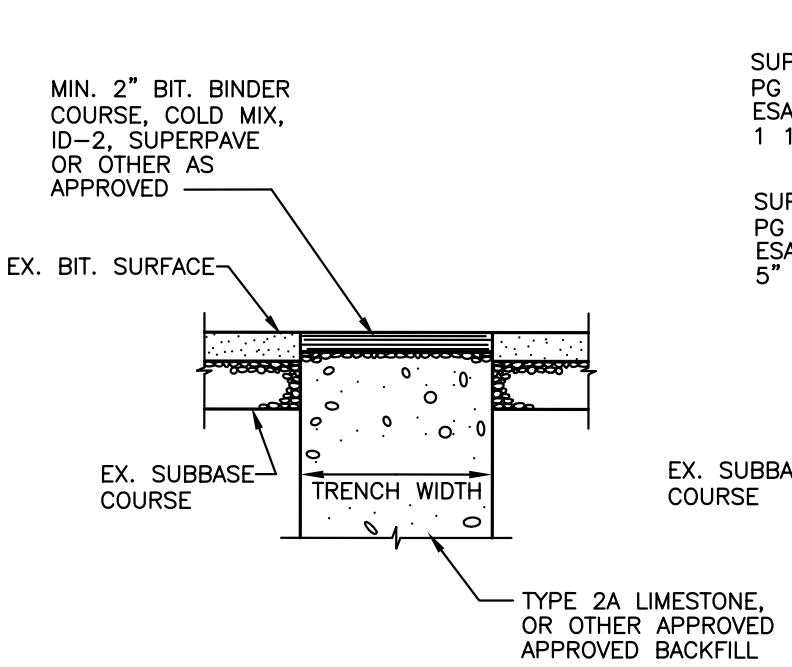
COMMERCIAL/INDUSTRIAL INSTALLATION TO BE ALL 6" FITTINGS AND PIPE, EXCEPT CLEAN OUT RISERS.

SERVICE LATERAL AND CLEANOUT AT DEEP SEWER MAIN

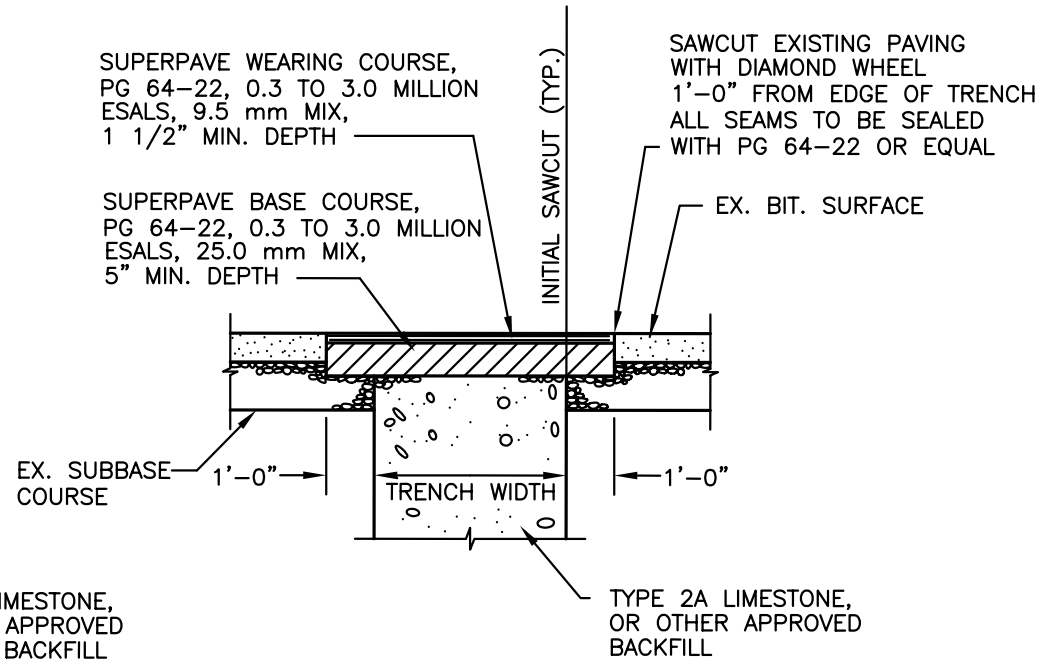
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. | 21



TEMPORARY



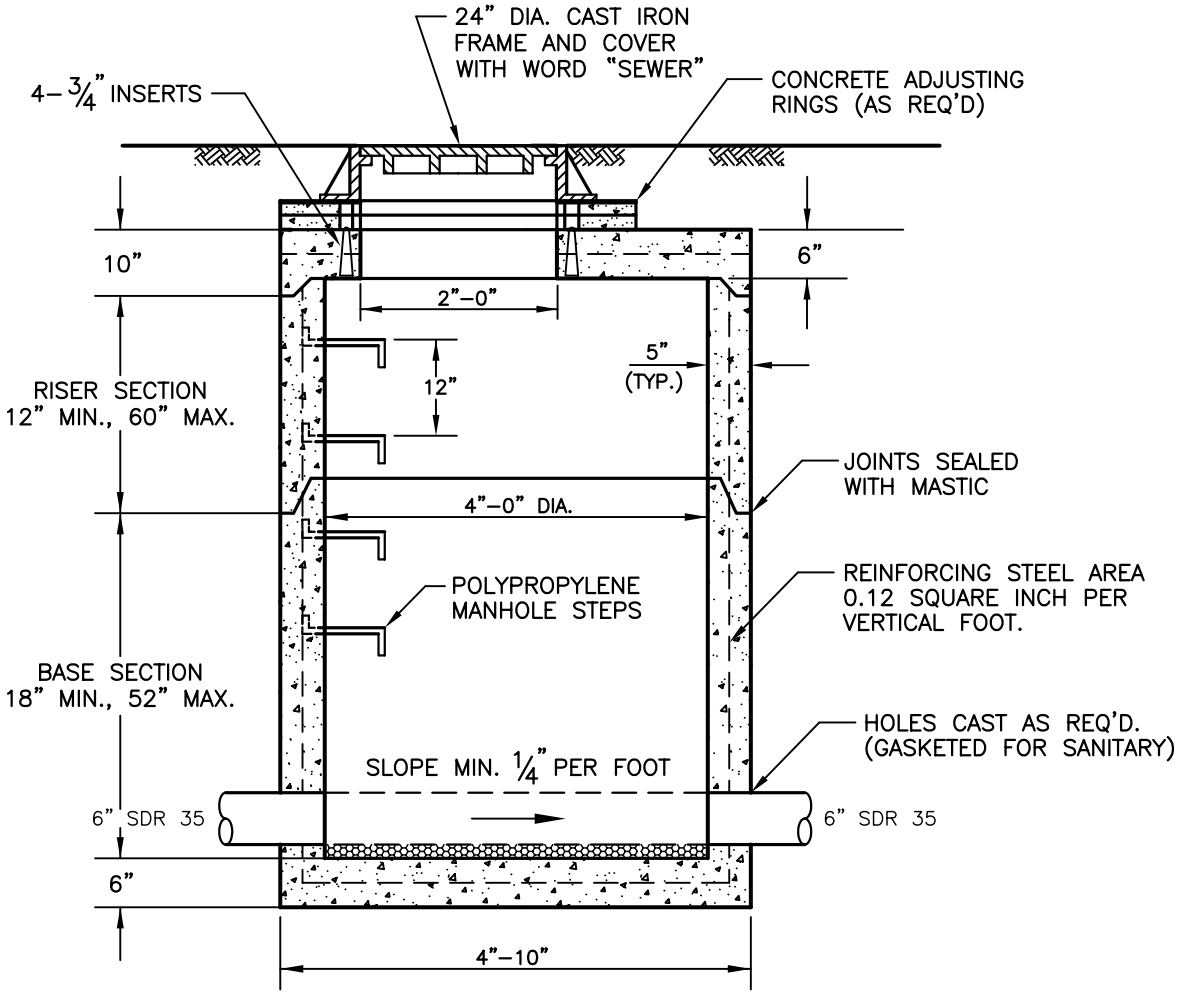
PERMANENT

STREET RESURFACING OTHER THAN STATE HIGHWAYS

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. | 22



MONITORING MANHOLE

NOTES:

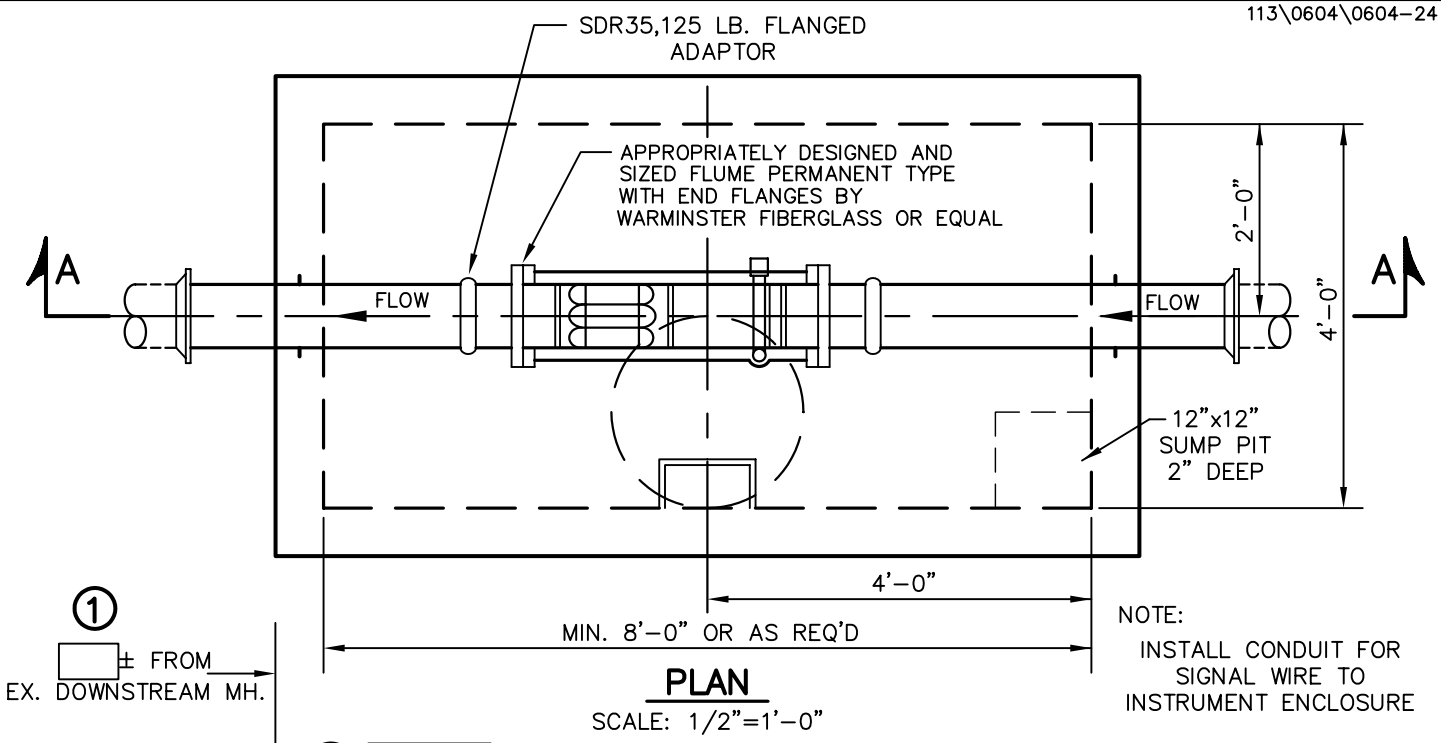
1. THE LAND DEVELOPMENT OR SUBDIVISION PLAN SHALL INCLUDE THE FOLLOWING LANGUAGE:

"THE OWNER OR OWNERS OF THE PREMISES DESCRIBED ON THE PLAN HEREBY GRANT TO SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY AND/OR TOWNSHIP OF SOUTH MIDDLETON, THEIR SUCCESSORS AND ASSIGNS, A PERMANENT, PERPETUAL, FREE AND UNINTERRUPTED EASEMENT FOR PASSAGE AND RIGHT-OF-WAY FOR INGRESS, EGRESS AND REGRESS TO AND FROM THE MONITORING MANHOLE SHOWN ON THE PLAN FOR THE PURPOSES OF PERFORMING OFFICIAL DUTIES, SAMPLING AND METERING OF WASTEWATER ORIGINATING ON THE PREMISES DESCRIBED ON THE PLAN."

SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

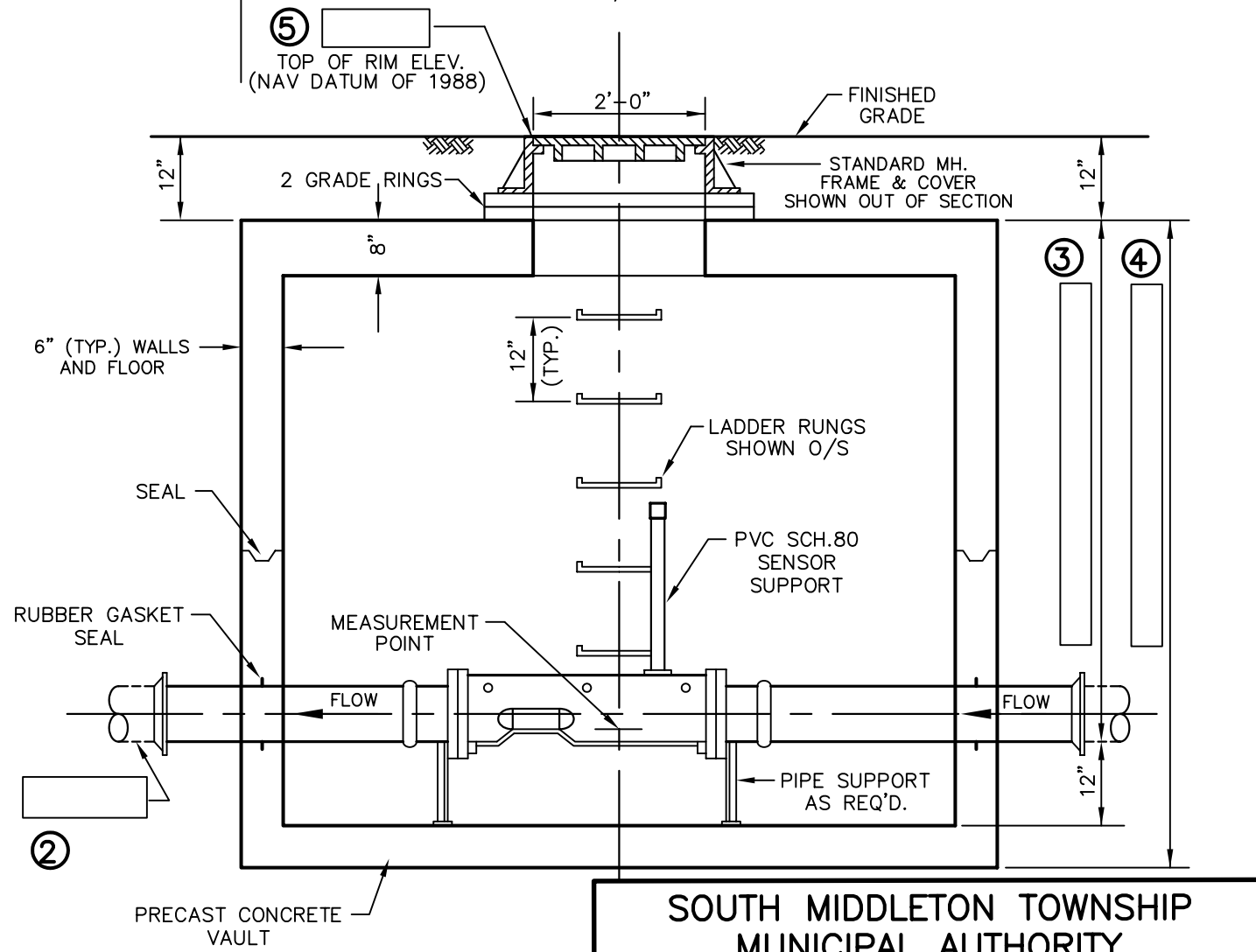
DEVELOPER'S STANDARD
CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. 23



PLAN

SCALE: 1/2"=1'-0"



SECTION AA

SCALE: 1/2"=1'-0"

SEWAGE METERING VAULT

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. **24**

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

SEWAGE METERING VAULT

TO COMPLETE THE ATTACHED SEWAGE METERING VAULT DETAIL ADD THE FOLLOWING INFORMATION AT THE APPROPRIATE LOCATIONS INDICATED:

(1) ENTER DISTANCE TO NEAREST DOWNSTREAM MANHOLE IN FEET.

(2) ENTER PIPE SIZE AND TYPE (EXAMPLE: 8" PVC).

(3) ENTER DEPTH TO INVERT OF INCOMING PIPE FROM TOP OF VAULT (FEET AND INCHES).

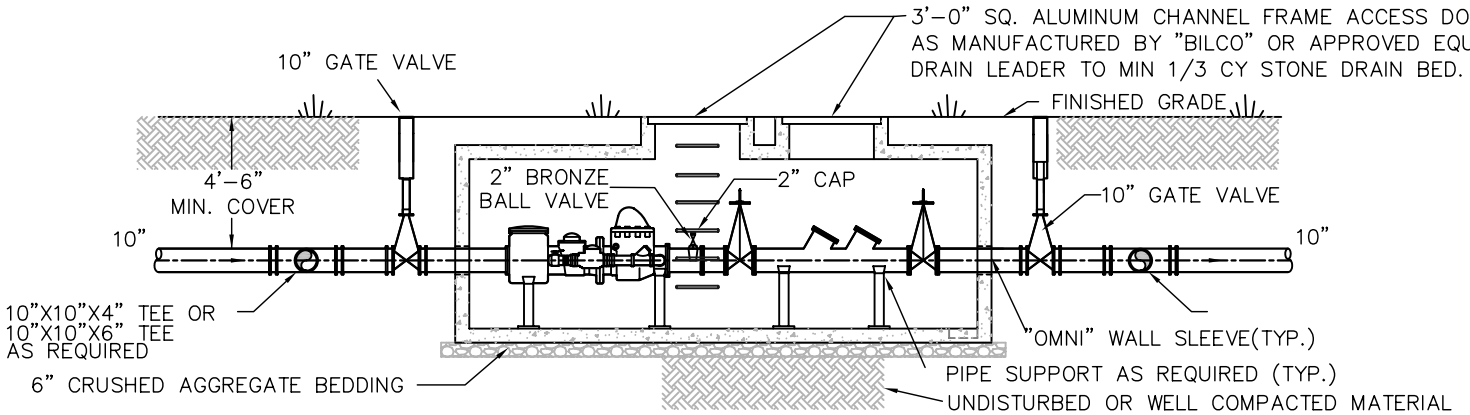
(4) ENTER TOTAL DEPTH OF CONCRETE VAULT (FEET AND INCHES).

(5) ENTER FINISHED TOP OF RIM ELEVATION OF VAULT MANHOLE (FEET MSL NORTH AMERICA VERTICAL DATUM OF 1988).

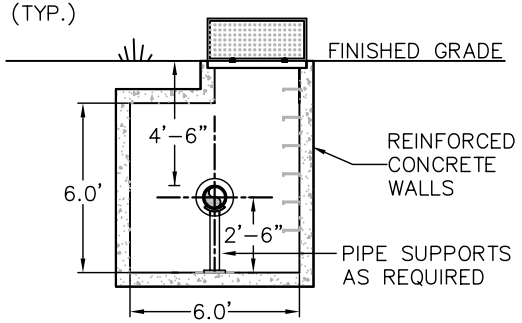
NOTES:

1. WHEN THE SEWAGE METERING VAULT IS PROPOSED TO BE LOCATED ON PRIVATE PROPERTY, THE LAND DEVELOPMENT OR SUBDIVISION PLAN SHALL INCLUDE THE FOLLOWING LANGUAGE:

   "THE OWNER OR OWNERS OF THE PREMISES DESCRIBED ON THE PLAN HEREBY GRANT TO SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY AND/OR TOWNSHIP OF SOUTH MIDDLETON, THEIR SUCCESSORS AND ASSIGNS, A PERMANENT, PERPETUAL, FREE AND UNINTERRUPTED EASEMENT FOR PASSAGE AND RIGHT-OF-WAY FOR INGRESS, EGRESS AND REGRESS TO AND FROM THE SEWAGE METERING VAULT SHOWN ON THE PLAN FOR THE PURPOSES OF PERFORMING OFFICIAL DUTIES, SAMPLING AND METERING OF WASTEWATER ORIGINATING ON THE PREMISES DESCRIBED ON THE PLAN."

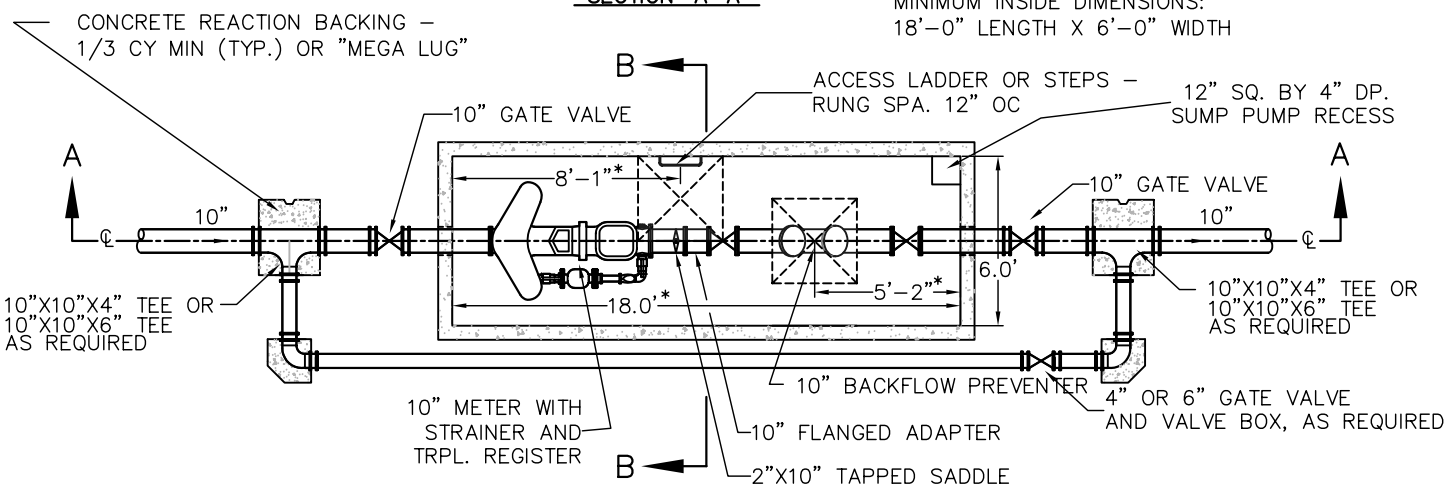


SECTION 'A-A'



SECTION 'B-B'

NOTE: PRECAST CONCRETE METER CHAMBER
MINIMUM INSIDE DIMENSIONS:
18'-0" LENGTH X 6'-0" WIDTH



WATER METERING VAULT

* THE ABOVE DEPICTED METER VAULT IS SIZED FOR 10" METER.
MAKE APPROPRIATE DIMENSIONAL CHANGES AS REQUIRED FOR OTHER SIZE METERS.

NOTES:

1. REFER TO "STANDARDS FOR SETTING OF FIRE LINE WATER METERS".
2. WHEN THE WATER METERING VAULT IS PROPOSED TO BE LOCATED ON PRIVATE PROPERTY, THE LAND DEVELOPMENT OR SUBDIVISION PLAN SHALL INCLUDE THE FOLLOWING LANGUAGE:

   "THE OWNER OR OWNERS OF THE PREMISES DESCRIBED ON THE PLAN HEREBY GRANT TO SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY AND/OR TOWNSHIP OF SOUTH MIDDLETON, THEIR SUCCESSORS AND ASSIGNS, A PERMANENT, PERPETUAL, FREE AND UNINTERRUPTED EASEMENT FOR PASSAGE AND RIGHT-OF-WAY FOR INGRESS, EGRESS AND REGRESS TO AND FROM THE WATER METERING VAULT SHOWN ON THE PLAN FOR THE PURPOSES OF PERFORMING OFFICIAL DUTIES TO THE WATER METER AND APPURTENATES ON THE PREMISES DESCRIBED ON THE PLAN."

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. 25

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

STANDARDS FOR SETTING OF FIRE LINE WATER METERS

GENERAL

1. Set meters over a concrete pad or floor sufficiently sized to support the required meter and provide a minimum 6" clearance around the bare meter.

2. Provide that the centerline of the meter/piping is 2'-6" above the pad/floor.

3. Provide and install a backflow preventer, including two gate valves, after the meter.

4. Provide 1'-6" clearance around all piping/valves/backflow preventer, etc.

5. Provide and install gate valves for isolation of the meter and backflow preventer, as shown on the detail. Include a 2' spool piece with 2" IPS tapping saddle with threaded bronze nipple and ball valve and cap, for test connection.

6. Properly restrain all lines to prevent separation.

7. Meter must be properly sized.

8. Piping shall be ductile iron pipe to meet pressure rating of utility.

9. All ferrous items shall receive the manufacturer's recommended coats/thickness of epoxy paint.

10. All piping/valves shall be pressure tested and made tight to prevent leaks.

11. Meters will be supplied by the Authority. The Authority will be using Sensus Compact Fireline assemblies - catalog data attached hereto.

12. Provide any and all required items to prevent freezing.

FLOODPLAIN

1. All buildings and vaults must meet all requirements for the 100-year floodplain.

2. All vaults with the floor level below the 100-year floodplain shall be of sufficient weight to prevent flotation.

BUILDINGS

1. Provide adequately sized access doors to allow for ease of installation of the meter by the utility. At a minimum the door should be 6" wider than the widest dimension of the meter.

2. Provide any and all required, properly sized and anchored lifting devices required for installation/maintenance at the meter.

VAULTS

1. Vaults shall be 5,000 psi (minimum) precast concrete and sized as required by the requirements listed herein.

2. Floor shall be level. Provide a 12"-square, 4"-deep pit as shown on the detail. In no case, shall the floor slope away from the sump.

3. Provide two access doors. One hatch must be centered over the backflow preventer; the other to be centered over ladder.

   Hatches are to be aluminum with stainless steel hardware, weatherproof, insulated, and designed for H-20 loading. Hatches must be piped to drain to grade. Provide confined space entry warning sign.

4. Include an aluminum ladder to the bottom of the vault complete with a ladder-up safety post.

5. Meet sizing criteria listed under GENERAL above as well as provide a minimum headroom of 7'-0", floor to underside of top.

6. Include all necessary and required items to permit two remote meter reading devices to be installed in the top; coordinate with the utility.

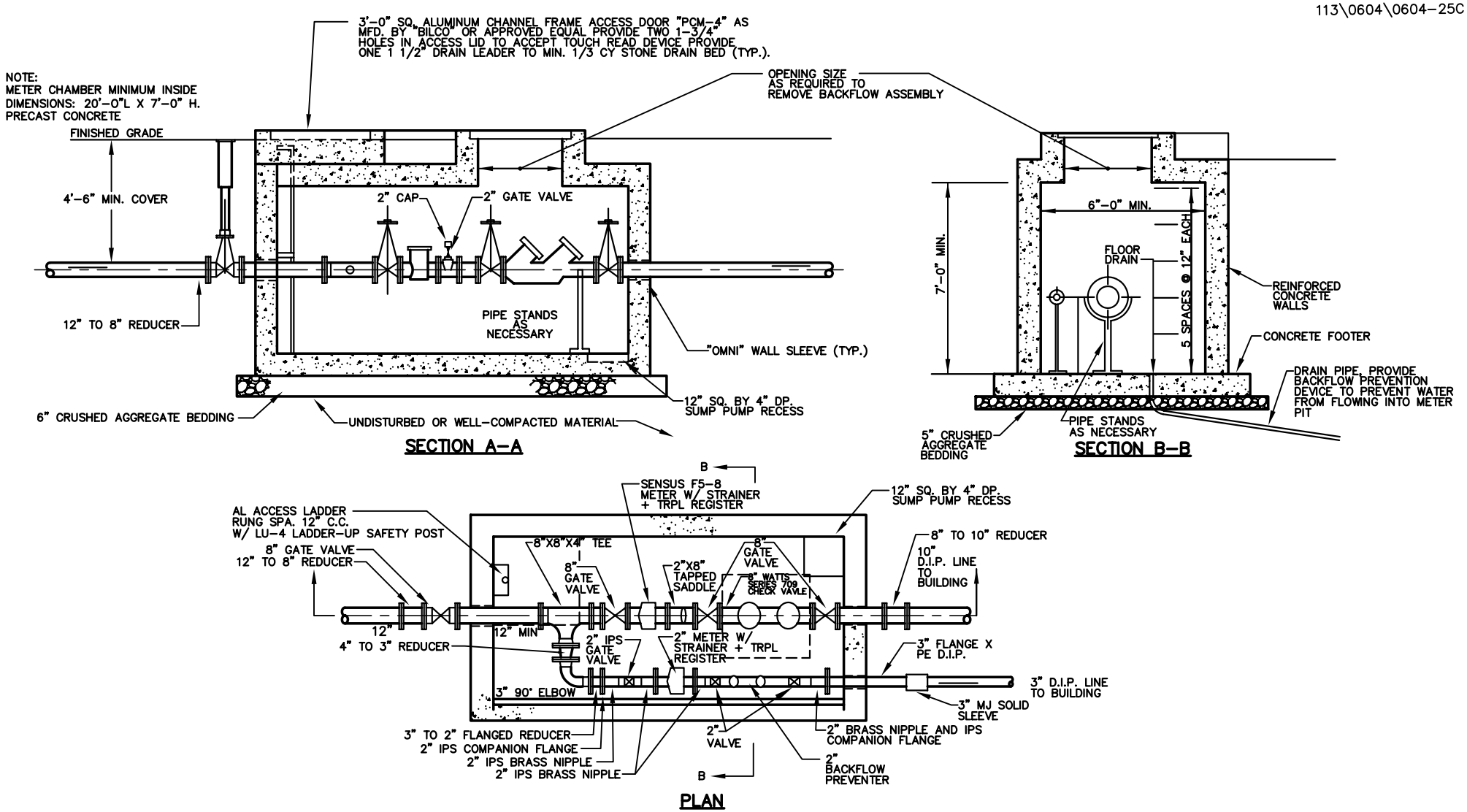
7. All pipe penetrations shall be either wall pipes or cored and made watertight with a linkseal.

8. Water service will not be provided until vault construction is completed.

RIGHT-OF-WAY EASEMENT

1. Where the metering vault is proposed to be located on private property, the Land Development Plan or Subdivision Plan shall include the following language:

   "The owner or owners of the premises described on the plan hereby grant to South Middleton Township Municipal Authority and/or Township of South Middleton, their successors and assigns, a permanent, perpetual, free and uninterrupted easement for passage and right-of-way for ingress, egress and regress to and from the water meter vault shown on the plan for the purposes of performing official duties to the water meter on the premises described on the plan."



WATER METER PIT NOTES:

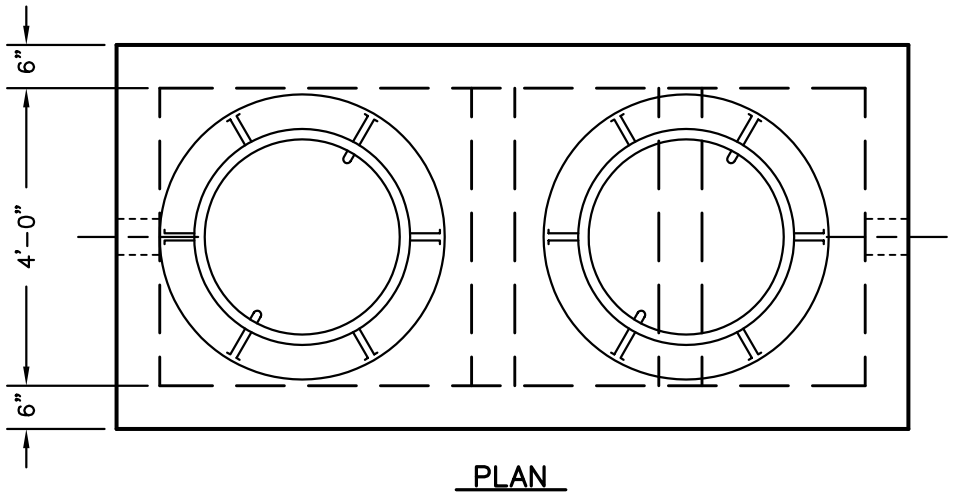
1. PROVIDE PIPE SUPPORTS, TIE RODS, ANCHORS AND THRUST BRACING AT FITTINGS AND VALVES CAPABLE OF ALLOWING PIPING TO STAND WITH REMOVAL OF METERS. FRICTION CLAMPS ARE NOT PERMITTED FOR RESTRAINT OF PIPING SYSTEM.
2. THE CONNECTION TO THE EXISTING WATER MAIN AND VALVE WILL BE INSTALLED BY SITE CONTRACTOR AND INSPECTED BY SMTMA.
3. DOUBLE CHECK BACKFLOW PREVENTION DEVICE IS REQUIRED AS SHOWN AND/OR BACKFLOW PREVENTION DEVICE OF REDUCED PRESSURE PRINCIPAL DESIGN MAY BE REQUIRED. THIS TYPE OF DEVICE IS TO BE INSTALLED ON THE SERVICE LINE, INSIDE AND AT THE POINT WHERE IT ENTERS THE BUILDING. (TYPE AND MANUFACTURERS OF BACKFLOW DEVICE MAY AFFECT DIMENSIONS.)
4. 2" VALVES AND UNDER ARE I.P.S. 4" VALVES AND OVER ARE FLANGED 124 P.S.I. CLASS FLANGE W/ 125 P.S.I. DRILLING.
5. GATE VALVES MUST BE O.S. & Y. TYPE AND SAME SIZE AS METERS.
6. BILCO TYPE DOOR TO BE CENTERED OVER METER ASSEMBLY AND ACCESS LADDER.
7. METER ASSEMBLIES CONSISTING OF METER AND BACKFLOW PREVENTER WILL BE SUPPLIED BY SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY AND INSTALLED BY CONTRACTOR.
8. SPACE MUST BE PROVIDED TO CLEAR BREAK IN PIPING W/ DRESSER COUPLING RING.
9. TIE RODS TO BE EMBEDDED IN CONCRETE OR BOLTED TO STEEL PLATES ON EXTERIOR WALLS.
10. PIPE & METER SIZES VARY BY PROJECT.

PRIVATELY-OWNED FIRE SUPPRESSION METER AND DOMESTIC CONSUMPTION METER

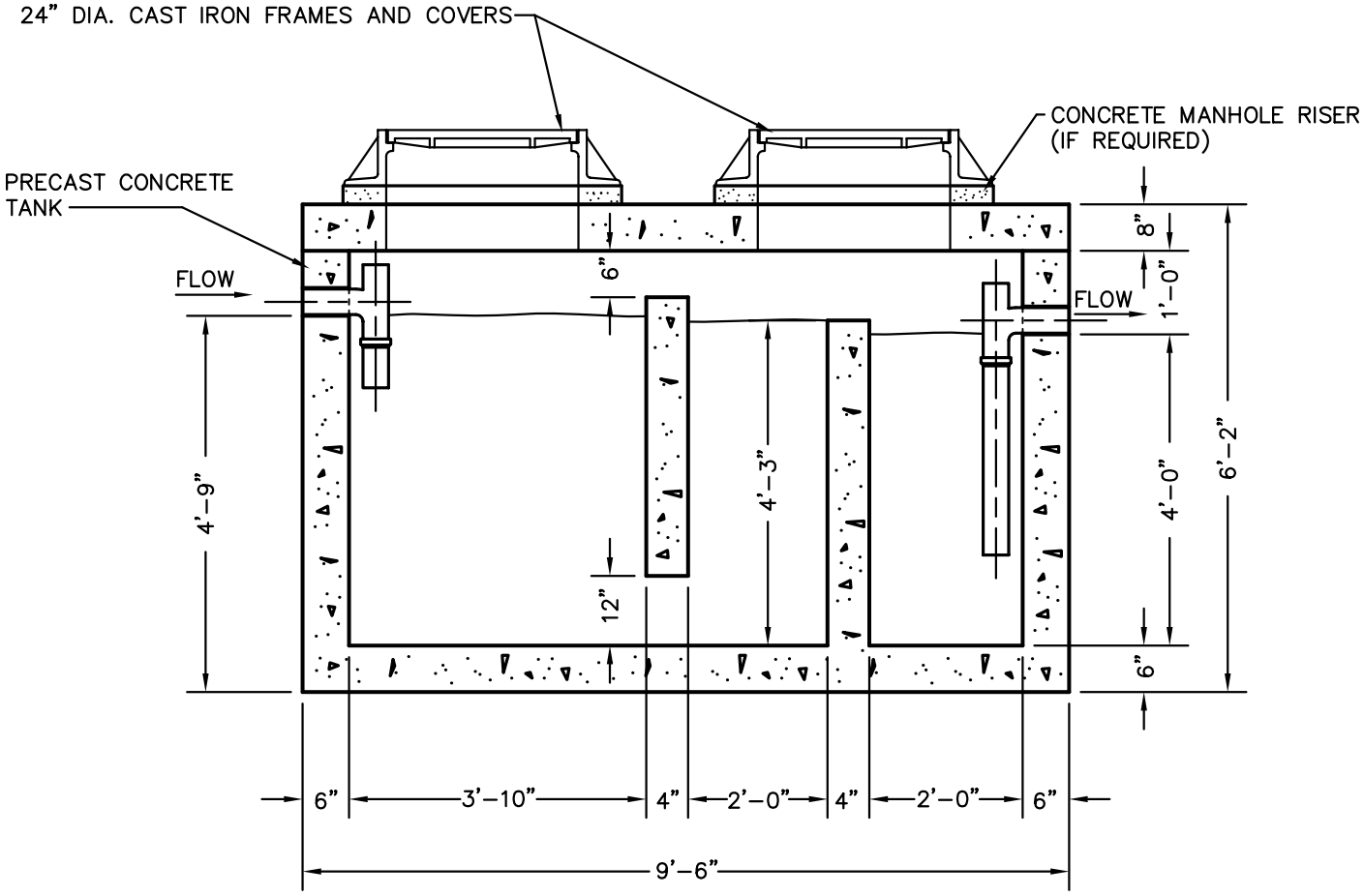
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. | 25C



PLAN



SECTION

1,000 GALLON GREASE INTERCEPTOR*

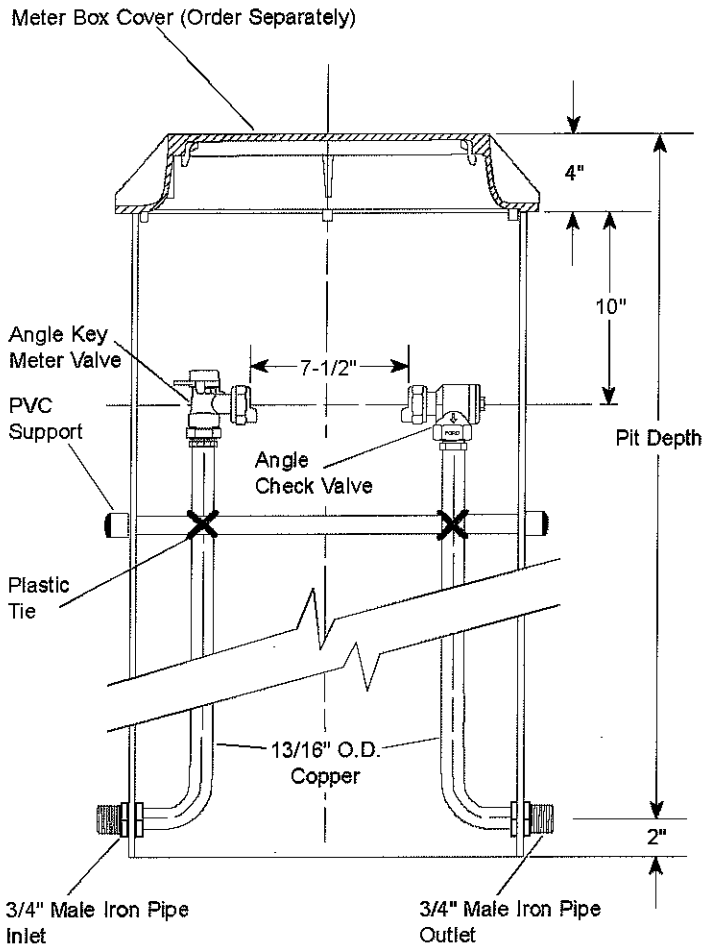
NO SCALE

* SIZE ACCORDING TO ACTUAL USAGE
(1,000 GALLON MINIMUM).

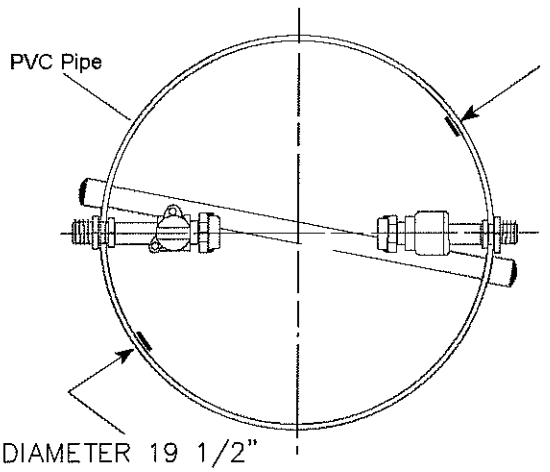
SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

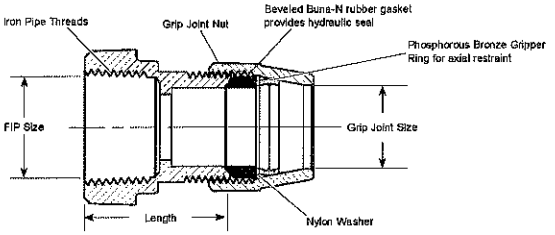
DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. 26

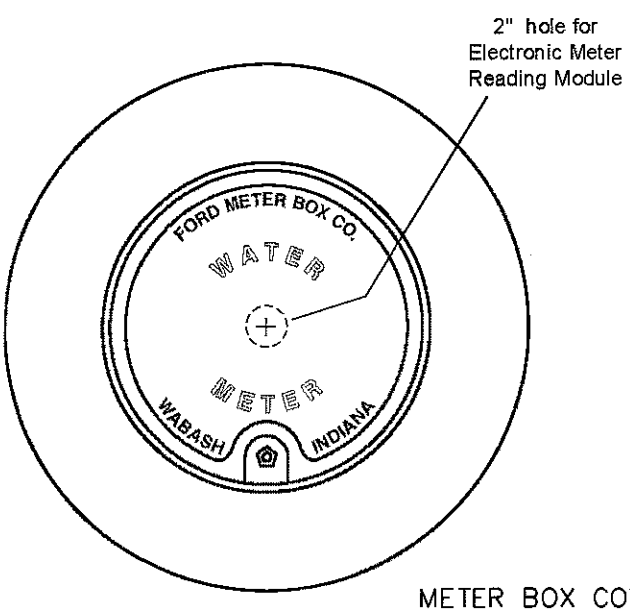


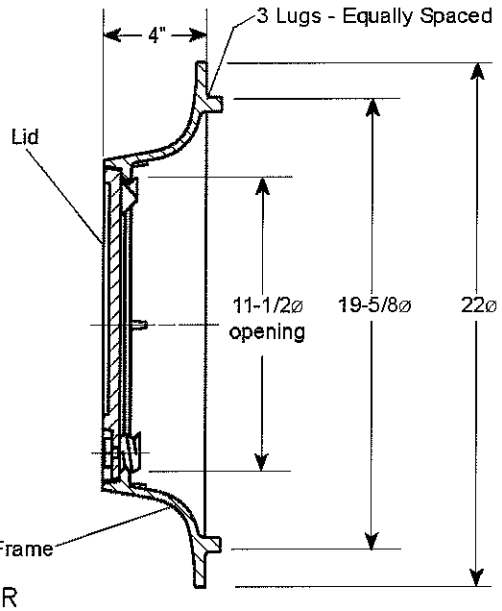
PLASTIC PITSETTER





GRIP JOINT COUPLING





METER BOX COVER

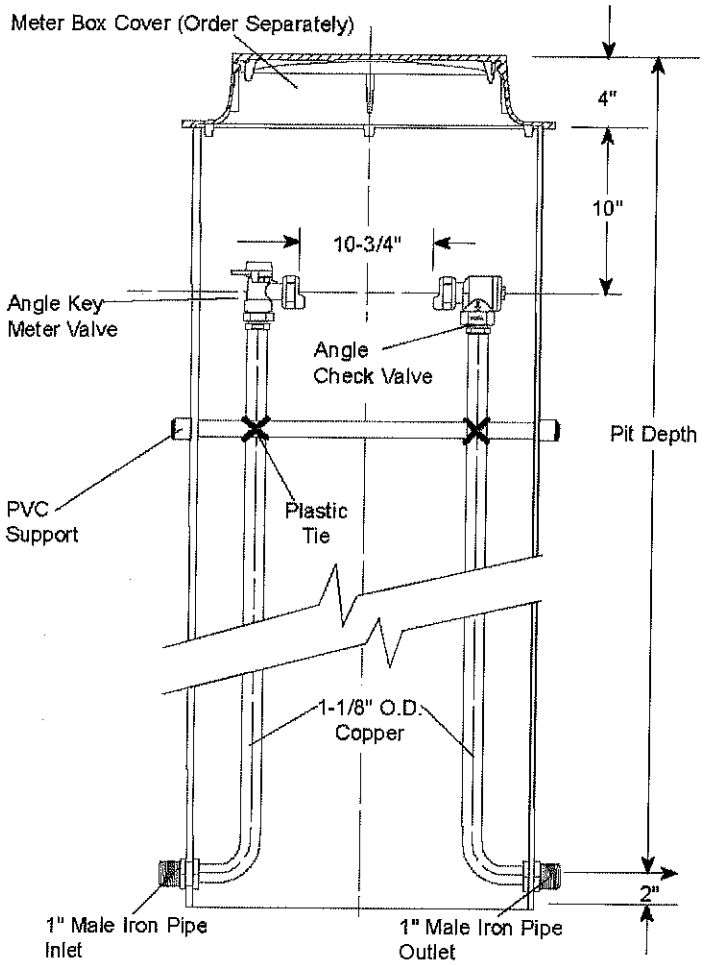
MATERIALS LIST
FORD METER BOX COMPANY, INC.

QUANTITY	DESCRIPTION	PART NUMBER
1	PLASTIC PITSETTER	PSVH-288-20-48
1	METER BOX COVER	A3-T
2	GRIP JOINT COUPLINGS	C14-33-G

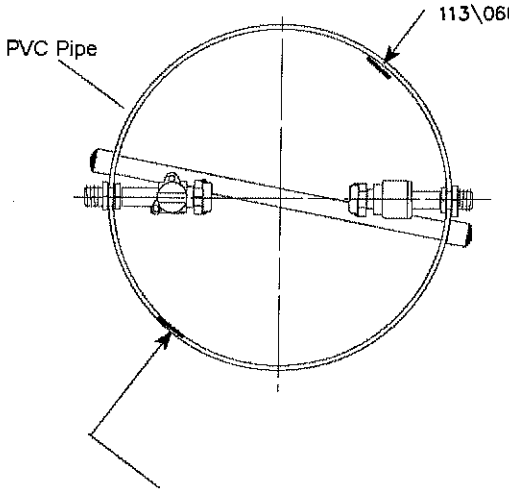
3/4" WATER SERVICE METER PIT

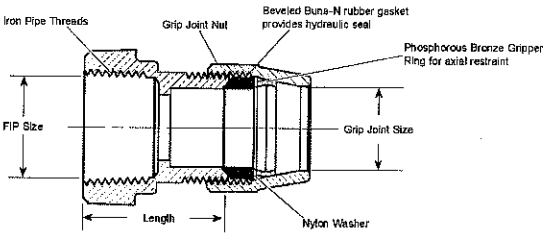
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

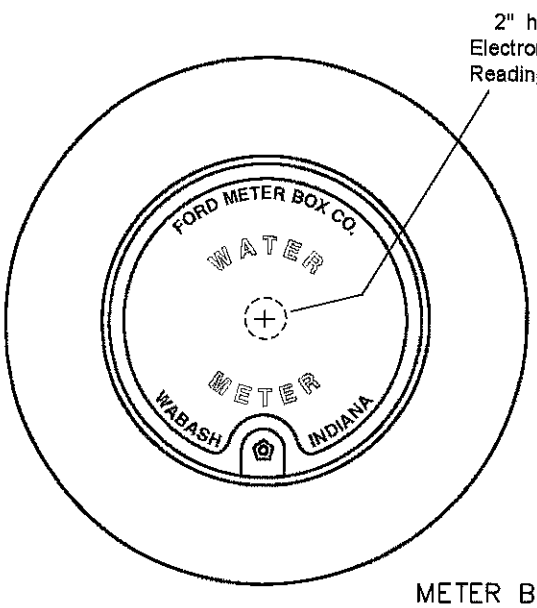


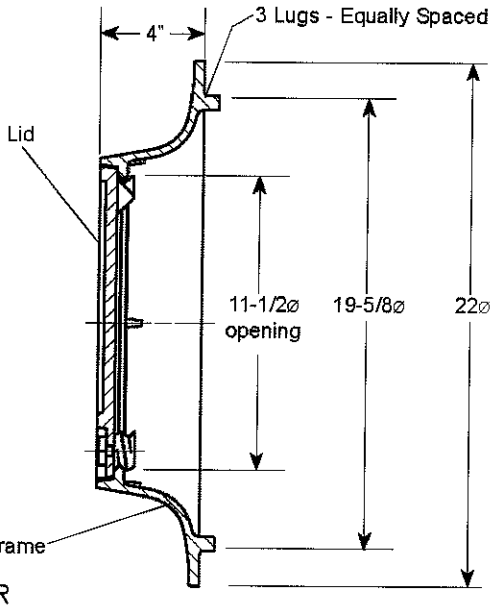
PLASTIC PITSETTER





GRIP JOINT COUPLING





METER BOX COVER

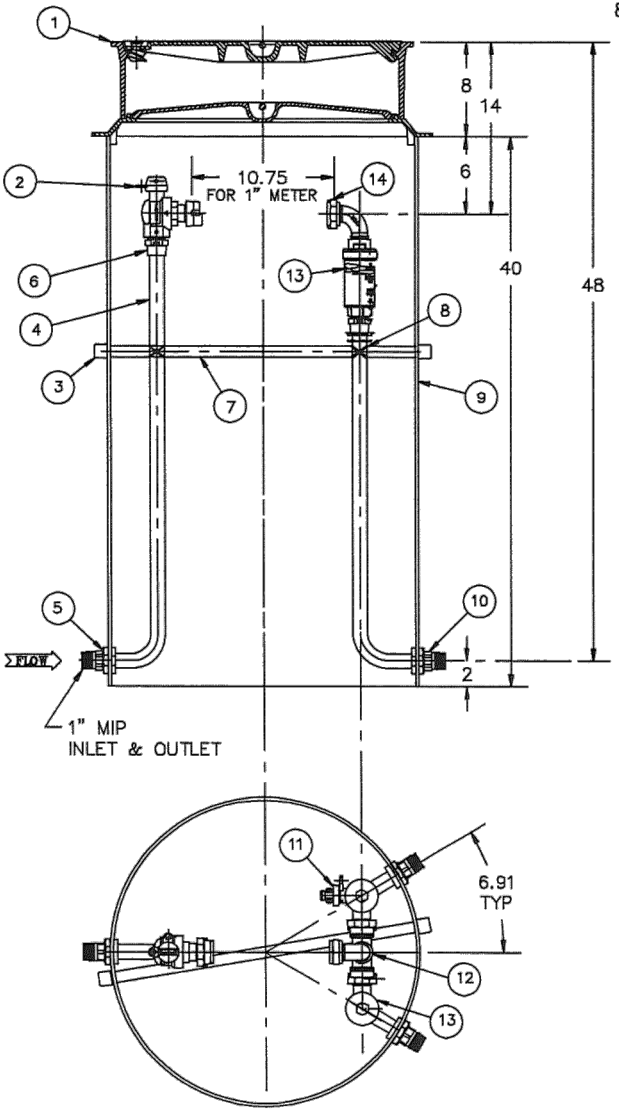
MATERIALS LIST
FORD METER BOX COMPANY, INC.

QUANTITY	DESCRIPTION	PART NUMBER
1	PLASTIC PITSETTER	PSVH-488-20-48
1	METER BOX COVER	A3-T
2	GRIP JOINT COUPLINGS	C14-44-G

1" WATER SERVICE METER PIT

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

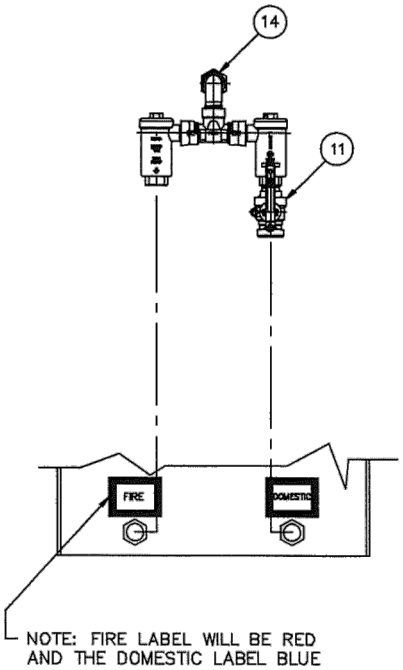
DEVELOPER'S STANDARD CONSTRUCTION DETAIL



ALL BRASS OF
85-5-5-5 RED BRASS
UNS C83600
AWWA C800-05
ASTM B62-02

MATERIAL:

CAST GRAY IRON,
ASTM A48-94, CLASS 25
E-COAT



NOTE: FIRE LABEL WILL BE RED
AND THE DOMESTIC LABEL BLUE

PARTIAL OUTLET VIEW DETAIL

ITEM	DESCRIPTION	QTY.	DWG. OR P/N
* 1	METER BOX COVER	1	MC-24-MB-T
2	ANGLE BALL VALVE	1	BA13-444W-SN
3	1/2" PVC CAP	2	050405
4	1 1/8" OD COPPER TUBE	3	
5	LOCK NUT	3	NOLN-1-02
6	SOLDER BUSHING	3	CS8-44
7	1/2" PVC BRACE BAR	1	PS-BB-24
8	PLASTIC TIES	2	300370
9	24" PVC TILE	1	300245
10	INLET/OUTLET	3	B-32009-001
11	BALL VALVE	1	B81-444W-HB-34
12	TEE	1	T444-444Q-006
13	ANGLE CART CHECK (ASSE 1024)	2	HHCA31-444-SN
14	ELL	1	L38-44

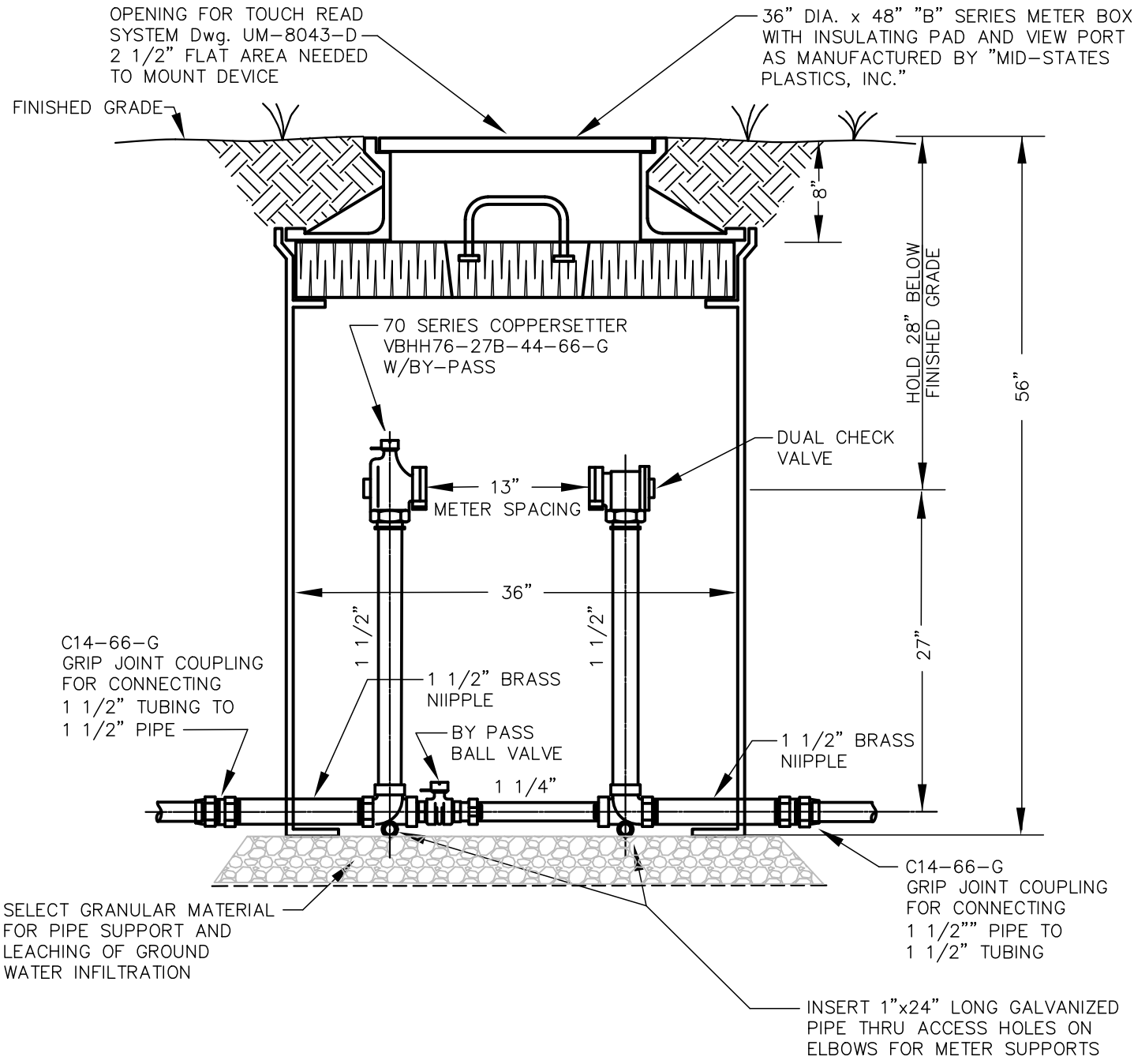
* ORDER SEPARATELY

WATER SERVICE METER PIT FOR OPTIONAL RESIDENTIAL SPRINKLER INSTALLATION

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. **28A**



1 1/2" WATER SERVICE METER PIT

NO SCALE

MATERIALS LIST FOR 1 1/2" METER PIT

FORD METER BOX COMPANY, INC.

QUANTITY	DESCRIPTION	PART NUMBER
1	36" MONITOR COVER	MC-36-T
1	70 SERIES COPPERSETTERS	VBHH76-27B-44-66-G
2	GRIP JOINT COUPLINGS	C14-66-G
2	12" LONG, 1 1/2" BRASS PIPE NIPPLES	
2	24" LONG, 1" GALV. PIPE	

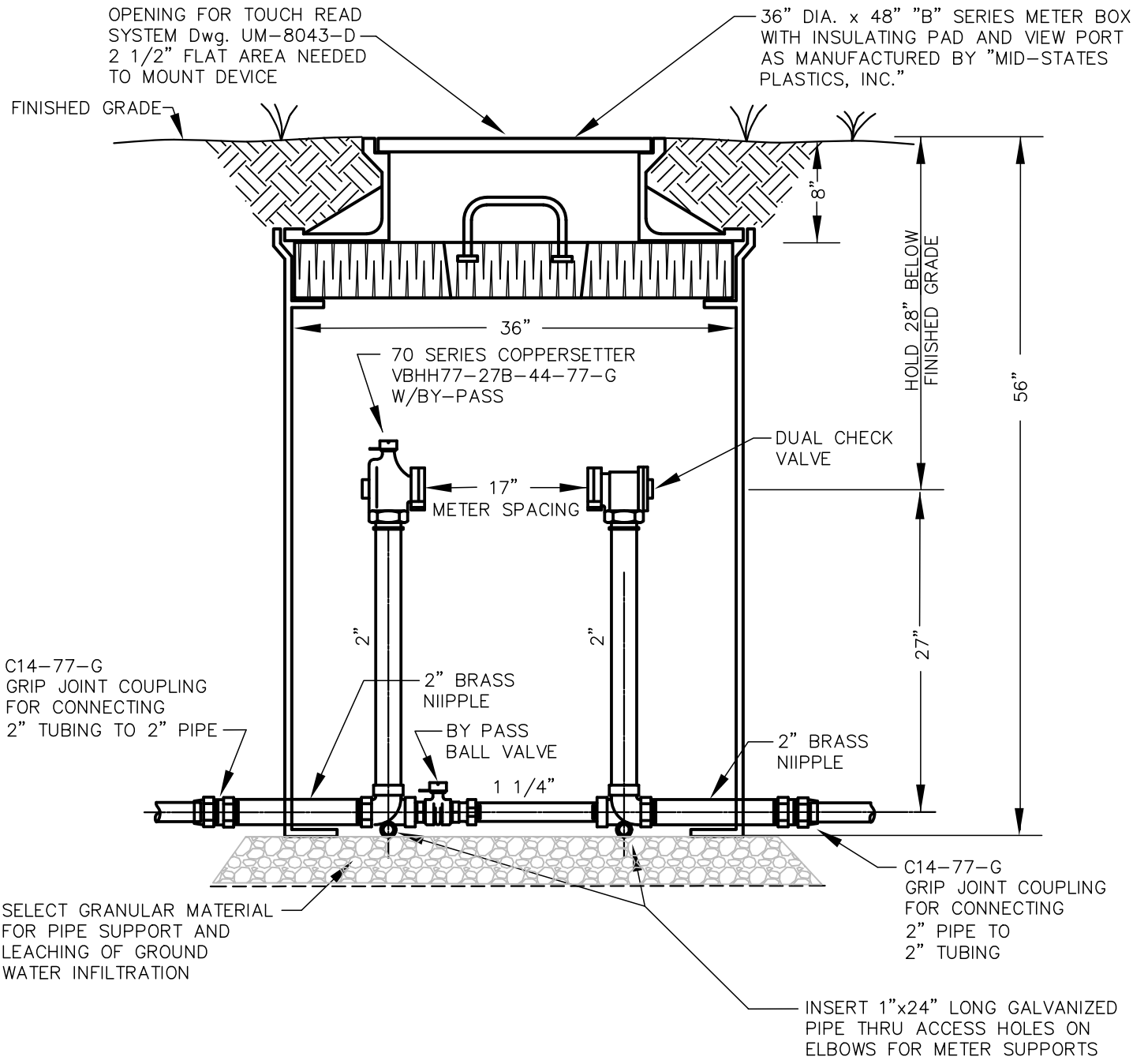
MID-STATE PLASTICS, INC.

QUANTITY	DESCRIPTION	PART NUMBER
1	B SERIES METER BOX WITH INSULATING PAD	MS3648B

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. 29



2" WATER SERVICE METER PIT

NO SCALE

MATERIALS LIST FOR 2" METER PIT

FORD METER BOX COMPANY, INC.

QUANTITY	DESCRIPTION	PART NUMBER
1	36" MONITOR COVER	MC-36-T
1	70 SERIES COPPERSETTERS	VBHH77-27B-44-77-G
2	GRIP JOINT COUPLINGS	C14-77-G
2	12" LONG, 2" BRASS PIPE NIPPLES	
2	24" LONG, 1" GALV. PIPE	

MID-STATE PLASTICS, INC.

QUANTITY	DESCRIPTION	PART NUMBER
1	B SERIES METER BOX WITH INSULATING PAD	MS3648B

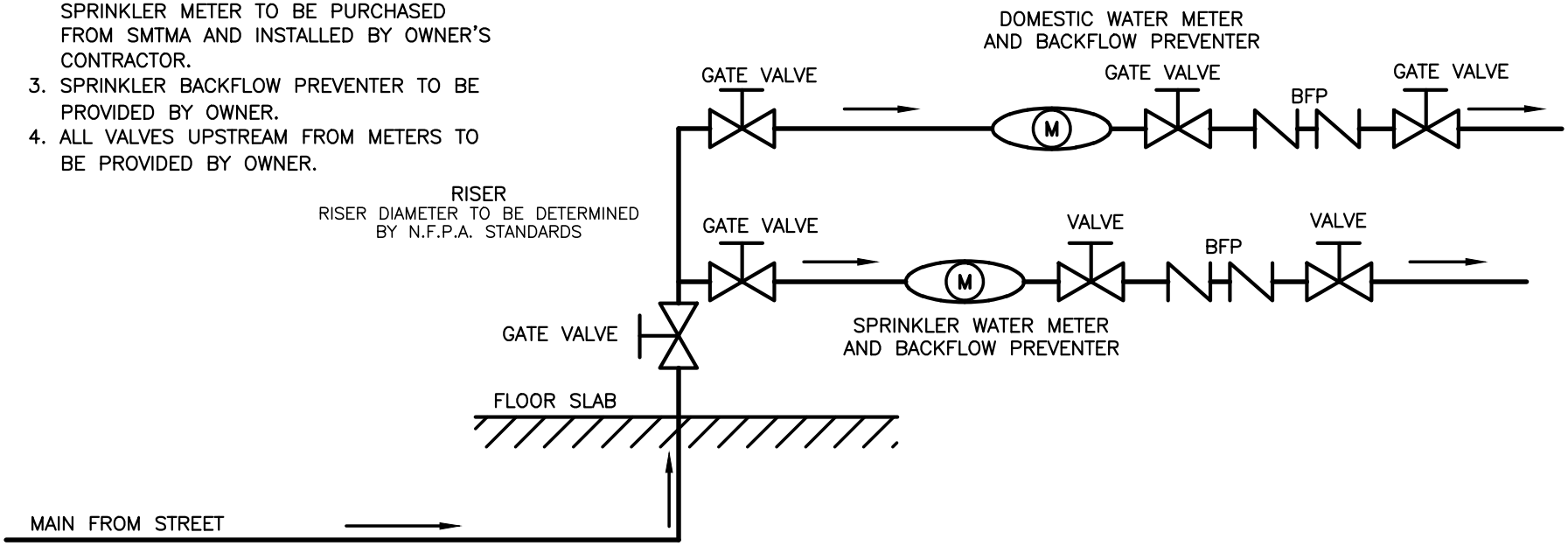
SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL

GLACE ASSOCIATES, INC., CAMP HILL, PA. **30**

NOTES:

1. INSTALLATION TO BE IN ACCORDANCE WITH LATEST AWWA STANDARDS.
2. DOMESTIC METER/BACKFLOW PREVENTERS AND SPRINKLER METER TO BE PURCHASED FROM SMTMA AND INSTALLED BY OWNER'S CONTRACTOR.
3. SPRINKLER BACKFLOW PREVENTER TO BE PROVIDED BY OWNER.
4. ALL VALVES UPSTREAM FROM METERS TO BE PROVIDED BY OWNER.

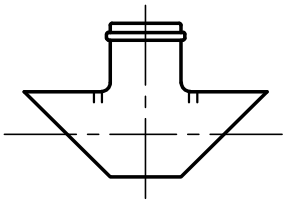


SCHEMATIC OF TYPICAL ARRANGEMENT FOR CONNECTION OF NON-RESIDENTIAL SPRINKLER SYSTEM AND DOMESTIC WATER USING A COMMON FEED LINE

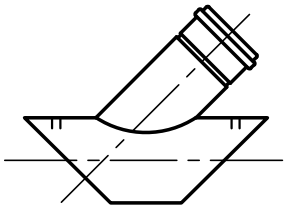
NO SCALE

SOUTH MIDDLETON TOWNSHIP MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD CONSTRUCTION DETAIL



MOLDED SADDLE TEE
GASKET BRANCH



MOLDED SADDLE WYE
GASKET BRANCH

SADDLE CONNECTION

1. PLACE SADDLE ON PIPE IN THE DESIRED LOCATION. DRAW THE HOLE SIZE BY PLACING MARKING PENCIL INSIDE THE BRANCH OPENING AND MARKING THE PIPE.
2. USING A SAW (KEY HOLE OR ELECTRIC SABRE), CUT 1/4" OUTSIDE THE LINE. REMOVE COUPON FROM INSIDE OF PIPE. SCRAPE ANY BURRS THAT APPEAR AROUND THE HOLE WITH A POCKET KNIFE OR SIMILAR SCRAPING TOOL.
3. PLACE SADDLE ON PIPE TO ASSURE THAT THE PIPE OPENING IS LARGE ENOUGH TO PREVENT OBSTRUCTION. ENLARGE HOLE IF NECESSARY.
4. REMOVE DIRT AND FOREIGN MATERIAL FROM SADDLE GASKET AND WIPE PIPE AS CLEAN AS CONDITIONS WILL ALLOW.
5. POSITION SADDLE OVER HOLE, PLACE STRAPS INTO PLACE AND LIGHTLY TIGHTEN.
6. PULL SIDE SKIRTS OF SADDLE OUTWARD TO ALLOW GASKET TO SEAT ITSELF PROPERLY ON THE PIPE.
7. ALTERNATE TIGHTENING OF BOTH CLAMPS, USING EQUAL PRESSURES, UNTIL SADDLE IS PULLED DOWN SECURELY. DO THIS UNTIL A DESIRED 60 INCH-POUNDS IS REACHED FOR EACH STRAP.
8. CHECK SADDLE FOR ALIGNMENTS TO ASSURE THAT SERVICE LINE IS CLEAR OF OBSTRUCTION.
9. WAIT 5 MINUTES AND RETIGHTEN STRAPS, IF NECESSARY, SO THAT EACH BAND IS TIGHTENED TO 60 INCH-POUNDS.
10. SADDLE CONNECTION SHALL BE CRADLED IN 6"(MIN.) OF CONCRETE, FROM UNDISTURBED EARTH TO SPRINGLINE OF PIPE.
11. INSPECTION OF TAP AND SADDLE INSTALLATION IS REQUIRED BY S.M.T.M.A. PRIOR TO ANY PIPE BEING INSTALLED. COUPON MUST BE PRESENTED TO S.M.T.M.A. REPRESENTATIVE AT TIME OF INSPECTION.

SOUTH MIDDLETON TOWNSHIP
MUNICIPAL AUTHORITY

DEVELOPER'S STANDARD
CONSTRUCTION DETAIL