ON CALL UTILITY SERVICES AND
MISCELLANEOUS CONSTRUCTION FOR SEWER AND
WATER LINES

CONTRACT NO. IFB SA-1703

PROJECT MANUAL

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SECTION 02020
EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01. Section Summary:

This Section is concerned with the procedures, methods and materials required to control the erosion of soil from the work site. It is intended to minimize the movement of soil from the work areas onto adjacent property or into watercourses to the fullest extent possible.

1.02. Referenced Standards

In installing devices and performing other procedures, comply fully with applicable provisions of Virginia Erosion and Sedimentation Control Handbook, latest edition (The Handbook).

1.03. Related Work Specified Elsewhere:

Section 02820 - GRASSING (FESCUE)

PART 2 - PRODUCTS

Comply with standards and specifications of The Handbook regarding materials and implements employed.

PART 3 - EXECUTION

3.01. Stockpiles

Incorporate sedimentation and erosion control considerations into stockpile site selection and design to prevent potential production and delivery of sediment to waterways and onto adjacent property. If safety conditions do not preclude it, stockpile excavated material on the uphill side of any excavation. Apply sedimentation and erosion control measures to all stockpiles promptly, as prescribed in The Handbook, and to all areas of denuded earth that will not be used within twenty (20) days.

3.02. Trenching

Construction of trenches for pipelines, except within VDOT rights of way, is subject to the following restrictions:

A. Where consistent with safety and space considerations, place excavated material on the uphill side of any trench.
B. Grade backfilled areas across the entire work area and install temporary erosion control measures regularly as the work progresses prior to excavation. Do not leave any disturbed areas untreated overnight.

C. Direct discharge from pumps or other ditch dewatering devices in a way that will not adversely affect any flowing stream, drainage way or off site property. Use silt bags at the pump discharge to reduce sediment laden runoff in discharged water. See Par. 3.05, below.

3.03. Graded or Excavated Areas

Install all temporary erosion control measures prior to excavation. Stabilize all slopes, channels, ditches or any other disturbed area after grading or backfilling. Implement interim measures daily and comprehensive measures immediately after final earthwork is completed or whenever a section will remain inactive.

Maintain any temporary facilities to insure adequate functioning until final stabilization is effective. Immediately before establishment of effective permanent control measures, remove unneeded or unusable temporary facilities.

3.04. Stream Protection

Where construction is close to existing streams or other waterways, perform construction in a way that will not contribute to stream pollution. Include the following as a minimum:

A. Keep construction debris, excavated materials, brush, rocks, refuse and topsoil as distant from the stream bank as possible. Where excavating in a streambed, conform to the detail shown on the Plans to prevent stream flow from passing through the excavation.

B. Regular movement of machinery and other equipment across or along any streambed is prohibited. Provide temporary culverts or bridges to carry vehicles and equipment across flowing streams. Under no circumstances will a streambed be permitted to become a thoroughfare for machinery traffic.

C. Use properly installed silt fences or straw bales along entire stream frontage affected by grading and/or excavation operations

3.05. Pump Discharge

Pump discharge will be managed to reduce the production of sediment. Discharge water through sediment bag and onto stabilized surfaces and then allows it to be filtered by appropriate temporary measures such as straw bales. Ditches required to remove pumped water from excavations will be stabilized and pumping discontinued if erosion of the soils is observed by the Project Representative.

3.06. Final Grading and Seeding
Perform finish grading, top soiling, seeding and sodding as specified in Section 02820 - GRASSING. Install sod on all slopes steeper than 3:1.

After construction operations are complete, reestablish vegetation, and install temporary cover. In any instance, install effective measures promptly and maintain until permanent measures have become fully established.

3.07. Maintenance

Maintain erosion and sedimentation control measures and facilities in condition adequate to insure proper functioning as designed. Make inspections daily and after any precipitation event to detect any deficiency in the structural stability, capacity or other requisites of the facilities that might impair their effectiveness. Take immediate steps to correct any deficiency found.

Site to be maintained in a neat and orderly manner free of dirt and debris on parking and roadways. Dirt and mud to be removed from trucks prior to entering roadway. Storm drain inlets and systems to be protected at all times from dirt mud and other debris entering the system from construction activities. Contractor is responsible for cleaning and removal of any debris entering storm system as the result of Contractor activities associated with the construction of the project.

END OF SECTION
SECTION 02110
CLEARING AND GRUBBING

PART 1 - GENERAL

1.01. Section Summary

Provide work under this section as shown or specified and according to the Contract Documents. This section relates to furnishing all labor, equipment and materials required to remove vegetation and other existing personal property from areas to be graded, subject to excavation or affected by the work. It also relates to furnishing all labor, equipment and materials required to restore other existing personal property to its original location.

A. Description of Work:

Remove other existing personal property, trees, shrubs, sod and other organic materials from the area affected by construction of pipelines and structures. After restoration of overlaying surface, restore other existing personal property to original location(s) according to property owners’ requests and as approved by the Project Representative.

B. Extent of Work:

Limits of clearing and grubbing coincide with limits of easements for construction of pipelines and appurtenances and of areas designated on the Plans for buildings and similar structures. The Contractor shall establish surveying controls as necessary and mark the limits of clearing. The Contractor shall not clear beyond these limits.

1.02. Related Work Specified Elsewhere

A. Section 02020 - EROSION AND SEDIMENTATION CONTROL: Soil Erosion.

B. Section 02220 - EXCAVATION, BEDDING AND BACKFILL FOR PIPELINES: Removal of peat, moss, lignite and vegetable matter below ground level other than as specified in this section.

1.03. Requirements of Regulatory Agencies

State and local code requirements shall control the disposal of trees, shrubs and debris.

PART 2 - PRODUCTS (Not used)
PART 3 - EXECUTION

3.01. Protection

A. Protect streets, roads, adjacent property and other works to remain throughout the work as defined in the General Conditions and Special Conditions.

B. Protect any other existing personal property and its contents from damage during movement. C. Protect individual trees, groups of trees and shrubs or other vegetation designated to remain within the work as follows:

   1. Protect trees by fencing, barricades, or wrapping as approved by the Project Representative.
   2. Protect shrubs and bushes by fences or barricades as approved by the Project Representative.
   3. Protect shallow-rooted plants at ground surface under, and in some cases outside, the spread of branches by fences, barricades or ground cover protection as approved by the Project Representative.

3.02. Clearing

A. Move other existing personal property to a location outside the limits of clearing that is suitable for storage and will not damage it. Contractor is responsible for documentation of any and all personal property that is moved during the clearing process. The Contractor will remove, relocate and replace personal property as required at no additional expense to Owner and shall keep appropriate records of activities involving personal property within the project site.

B. Remove trees, saplings, shrubs, bushes, vines and undergrowth within the limits of clearing to heights above ground as follows:

   1. Trees over six (6) inches in diameter: twelve (12) inches.
   2. Shrubs, saplings, bushes and trees under six (6) inches in diameter: three (3) inches.
   3. Vines and undergrowth: two (2) inches.

3.03. Grubbing

Remove all stumps, roots over four inches in diameter, and matted roots, within the limits of grubbing, to a depth of twenty-four (24) inches below any proposed finished
3.04. Salvage

A. If required elsewhere in the Contract Documents, salvage the following items and turn them over to the property owner:

1. Live plants suitable for replanting.

B. Remove all cleared and grubbed material not wanted by the property owner. Stockpile any approved topsoil for use during seeding operations.

3.05. Disposal

A. Remove waste material and demolition debris from the site daily as it accumulates.

B. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property. Contractor to retain documentation of proper disposal of material removed from site in conformance with local, state and federal regulations. Disposal of material is incidental to other items and the Contractor will receive no additional compensation for disposal of material related to the site.

3.06. Restoration

A. Restore other existing personal property to original location(s) as requested by the property owner and approved by the Project Representative.

B. Fill all holes and depressions caused by clearing and grubbing with material that is comparable to surrounding soil or better.

No additional payment will be owed to the contractor for any of the above activities listed. All activities are incidental to other items as listed in the measurement and payment section of the Contract

END OF SECTION
SECTION 02220
EXCAVATION, BEDDING AND BACKFILL FOR PIPELINES

PART 1 - GENERAL

1.01. Scope

Description of Work

Provide all labor, material and equipment to saw cut pavement, excavate trenches, construct bedding and backfill after installation of the pipe according to the plans and as specified herein.

Related Work Specified Elsewhere

Section 02020 - SEDIMENTATION AND EROSION CONTROL.

Section 02110 - CLEARING AND GRUBBING.

Section 02820 - GRASSING (FESCUE).

All excavation is Unclassified.

1.02. Submittals

Provide certification that aggregate bedding and backfill materials meet the requirements of this specification. Certification shall be by commercial aggregate provider or independent soils laboratory acceptable to the Project Representative.

1.03. Lines and Grades

The locations of the proposed piping and appurtenances are shown on the Plans.

Contours, if shown on the Contract Drawings, are for bidding and construction estimates only. Contours are not guaranteed.

Changes in line and grade of pipelines and appurtenances may be ordered by the Project Representative whenever such changes are advantageous or necessary for the betterment of the project. No claims for additional compensation resulting from changes in line or grade will be allowed, unless such changes are ordered after trenching has been completed. In such cases, the Contractor and the Project Representative shall agree on the value of the completed trenching to be abandoned at the time the change is ordered. If the Contractor fails to notify the Project Representative, so the Project Representative can observe the completed trenching to evaluate the cost of the work to be abandoned, the Contractor’s claim for this work shall not be allowed by the Owner.

1.04. General Requirements
A. Trenching Regulations

Conform to conditions, restrictions, and regulations made by federal, state, city, town and county agencies for open trenching.

B. Underground Utilities

The locations of underground utilities shown on the drawings are not guaranteed to be correct or to represent all facilities that may be present. Call “Miss Utility” (1-800-257-7777), and have all utilities in the work area located 48 hours before any digging. Dig test holes to verify all crossings between new and existing facilities and at critical grade and alignment changes. Mark on the record set of drawings locations of all existing underground facilities found at variance with the drawings.

C. Dust Control

Conduct construction activities and maintain area to minimize the creation and dispersion of dust. Use calcium chloride and other methods for dust control as directed by the Project Representative.

D. Explosives

Use of explosives will not be allowed.

**PART 2 - PRODUCTS**

2.01. Backfill

Use suitable material excavated during construction for backfill unless other material is indicated on the drawings, specified elsewhere or otherwise required.

Use backfill material free from cinders, ashes, refuse, organic material or other deleterious material. Use backfill material free of stones larger than one (1) inch for initial backfill above the bedding to a point two (2) feet above the top of the pipe. The remainder of the backfill shall be free from stones larger than five (5) inches for gravity sewers and eight (8) inches for water mains and force mains.

2.02. Granular Bedding Material

For other installations, conform to *Virginia Department of Transportation Road and Bridge Specifications*, latest edition, Size No. 57 or No. 78 stone.

2.03. Select Backfill

Conform to *Virginia Department of Transportation Road and Bridge Specifications*, latest edition, Type I material. Under roadways and elsewhere as ordered by the
Project Representative, use dense graded aggregate conforming to Size No. 21-B.

2.04. Concrete

Conform to *Virginia Department of Transportation Road and Bridge Specifications*, latest edition, Class A3 concrete unless noted differently in other sections of the specifications or on the plans.

**PART 3 - EXECUTION**

3.01. Excavation

A. General

Perform all excavation of all materials of every description and of whatever substance encountered to the depths shown on the drawings or as directed by the Project Representative. Carefully remove topsoil from areas to be excavated and store separately for reuse. Otherwise, furnish, without additional compensation, topsoil at least equal in quantity and quality to that excavated.

Asphalt pavement shall be saw cut. Make all excavations by open cut unless otherwise directed or approved by the Project Representative. Keep side walls of trenches as nearly vertical as possible and properly sheathed and braced. Excavate trenches true to line and to widths of dimensions shown in the bedding details or the drawings. Do not excavate below depth specified or disturb material in the base of the trench.

B. Excavation Below Specified Grade

Where soft and yielding soil conditions are encountered that are judged by the Project Representative to be unsuitable for bedding pipe and/or appurtenances, Project Representative will order Contractor in writing to Excavate Unsuitable Material below specified grade to a depth of 2 ft. where, in the judgment of the Project Representative, suitable soil conditions exist. Backfill the resultant over excavation to the specified grade using #57 stone or other materials approved by the Project Representative.

Where over excavation occurs bring the excavation to specified grade using granular bedding material acceptable to the Project Representative at no cost to the Owner. Do not use excavated material to bring the bottom of the trench to proper grade.

3.02. Excavation Near Existing Structures

Conduct all excavation near pipes, conduits or other underground structures with extreme care. If manual excavation is required to locate utilities and/or underground structures, or if excavation by hand is required in the installation of any piping or
other structures included in the project, no extra compensation is authorized. Protection of existing utilities and structures is the responsibility of the Contractor.

3.03. Protection of Existing Structures

Carefully support and protect from damage all existing pipes, poles, wires, fences, curbs, property line markers, or other structures that, in the opinion of the Project Representative, must be preserved in place without being temporarily or permanently relocated. In case of damage, notify the appropriate party so that proper steps may be taken to repair all damage done. Whenever the Contractor damages property the Contractor shall immediately restore it to its original condition at the Contractor expense in accordance with the Special Conditions.

Support all utility services by suitable means to prevent damage during and after construction.

Provide all protective and damage prevention work required to prevent harm to utilities and structures crossing the trench line transversely above or below the pipe.

3.04. Care and Restoration of Property

Operate all machinery with care to prevent damage to existing structures and/or wires, located above or below grade.

On paved surfaces, use or operate only such power-operated equipment with treads or wheels so shaped as to not cut or otherwise damage such surfaces.

Restore all sidewalks, storm inlets, gutters, poles, curbs, fences, landscaped areas and other structures/surfaces damaged by the Contractor's operations to a condition at least equal to that immediately prior to beginning operations. Restore lawns and grassed areas to their condition immediately prior to beginning operations or according to Section 02820 - Grassing, whichever is more stringent. Use suitable materials and methods for such restoration.

3.05. Trenching

Dig trenches to at least the minimum depth given by approved cut sheets, adding to such depths the required thickness of any pipe bedding to be placed in the trench. Limit trench widths to the dimensions shown on the Bedding and Backfill Details on the Drawings.

A. Trenching Safety and Security

Do not leave the trench open at the end of the working day. All trenching to be backfilled at the end of the day and appropriate measures taken to secure the site for pedestrian and vehicle traffic.

B. Dewatering Trench
Remove water from the trench so that the trench is dry during pipe laying and any other operations. Use well points if required when the trench bottom is below the water table or if other methods do not remove the water and provide a dry bottom for the placement of bedding material and piping within the trench.

C. Shoring

Always, properly and adequately brace trenches to prevent accidents, caving of the sides of the trench or breaking of the ground outside the lines of the trenches proper, or damage to pavement, or other structures along the line of construction. Protect underground structures of all types using all necessary shoring, bracing or other appropriate means for the protection of same. Do not damage in any way water mains, water service pipes, drain pipes, sanitary or storm water sewers, gas mains, oil mains, electric conduits or other structures encountered on the lines of the work.

Retain or carefully remove all shoring in such a manner as not to endanger the construction or other structures. Immediately backfill all voids left or caused by removing shoring with well-compacted material.

Comply with all conditions, restrictions, and regulations of State and Federal Occupational Safety and Health Administrations particularly those requirements relating to shoring, bracing and sloping of excavation.

3.06. Pipe Bedding

A. Application

Bedding material shall be placed in accordance with the Contract Documents. Where the trench bottom is in rock, it shall be excavated to at least 4 inches below the bottom of the pipe and backfilled with approved bedding material. Pipe shall have a uniform bearing on a solid foundation for its entire length. Bedding shall be classified as Granular and it shall extend from the bottom of the excavated trench to a level not less than six inches above the top of the pipe in each instance.

B. Standard Bedding

Excavate foundation as required in Paragraph 3.01, and then form a positive cradle fitting the radius of the pipe barrel as shown in the Standard Bedding Detail on the Plans. Provide uniform support along the length of the pipe at the required line and grade. Provide suitable recesses in the bedding to permit adequate clearance for bells, couplings, or similar projections.

Following installation of the pipe, complete embedment by placing Granular bedding carefully around and beneath the haunches of the pipe, tamping
thoroughly in four inch layers until the material extends at least six inches above the top of pipe.

C. Granular Bedding

Install granular bedding when required by the Project Representative. Construct the foundation of crushed stone of the sizes indicated in Paragraph 2.02 of this Section. Excavate the trench to four (4) inches or the manufacturer’s recommendation below the barrel of the pipe, whichever is greater. Place granular material in the trench for its full width to support the pipe uniformly at the required line and grade. Provide suitable recesses in the bedding to permit adequate clearance for bells, couplings, or similar projections. Extend the bedding initially upward 1/6 of the pipe outside diameter above the base of the pipe, to form a positive cradle fitting the pipe as shown on the Bedding Detail. Provide uniform support along the entire length of the pipe section at the required line and grade.

After installing the pipe, place bedding material carefully on either side and over the top of the pipe in four inch layers, loose, and compact each layer with twenty-pound hand tampers or pneumatic tampers until the required total depth of bedding has been built up.

3.07. Backfilling

Backfill within public road rights-of-way according to the Virginia Department of Transportation Road and Bridge Specifications.

Regular and classified backfill shall be placed in uniform layers not more than 6 inches in thickness, loose measurement, before compaction. Each layer of Class I and regular backfill material shall be thoroughly compacted. Backfill operations shall not be performed without approval of the Project Representative.

Place and compact bedding as directed in paragraph 3.06 of this Section. Granular Bedding and Class I backfill material shall be placed and compacted at a moisture content of optimum to plus 2 percentage points of optimum. Class I backfill material shall be thoroughly compacted under the haunches of pipe culverts. Each layer of Class I and regular backfill material shall be compacted by rolling, tamping with mechanical rammers, or hand tamping with heavy metal tampers with a face of at least 25 square inches. If vibratory rollers are used in the backfill operations, vibratory motors shall not be activated until at least 3 feet of backfill has been placed and compacted over the pipe. Backfill and compaction shall be advanced simultaneously on both sides of the pipe.

Backfill above the Granular Bedding in unpaved areas can use excavated material conforming to Par 2.01. If sufficient excavated material is not available, secure and place imported material of comparable quality to complete the backfill in these areas.

In paved areas, use Class I backfill material conforming to Virginia Department of
Transportation requirements as shown on the Contract Documents.

Do not backfill in freezing weather except by permission of the Project Representative and do not use any frozen material. Make no fill where the material already in the trench is frozen.

After sufficient compaction and settlement has been obtained, complete the grading of the trench by smoothing off the trench surface and making it conform to the surface of the adjacent ground.

3.08. Compaction and Testing

In all areas, thoroughly compact the backfill over the pipe by use of vibratory tamping pads or, where these cannot be used, by mechanical or hand tamping. Compact backfill to within the following percentage ranges of maximum density at optimum moisture content:

Unpaved Areas - Not less than ninety percent (90%).

Paved Areas - Not less than ninety-five percent (95%).

State Highway - VDOT requirements if more stringent than the above.

Determine the optimum moisture content and the maximum density of each type of material used for backfill by using Virginia Testing Methods VTM-1 for Moisture-Density Relations of Soils in accordance with AASHTO T-180).

Determine the field moisture content of materials being compacted by "Laboratory Determination of Moisture Content of Soil," (ASTM D2216). Determine the field density of compacted material by "Test for Density of Soil in Place by Sand Cone Method," (ASTM D1556) or by Nuclear Density testing equipment.

Perform sufficient field density and field moisture content tests on each lift of material at locations specified by the Project Representative, to assure the Project Representative that compaction meets the requirements of this Section. Perform a minimum of one test daily per each one-foot (1-ft) lift of backfill. In cases where greater than 200 feet of pipe are installed in a day, perform compaction tests every 200 feet per each one-foot lift of backfill.

Submit reports verifying these test results to the Project Representative. The Project Representative may order additional compaction and testing if the above tests prove inadequate compaction is being obtained; complete additional compaction and testing at the Contractor's sole expense until compaction meets minimum standards.

The contractor shall obtain the services of a qualified geotechnical independent testing laboratory, acceptable to the Project Representative, to perform the above tests.
No additional payment will be owed to the contractor for any of the above activities listed. All activities are incidental to other items as listed in the measurement and payment section of the Contract.

3.09. Maintenance of Backfilled Excavations

Maintain backfilled and repaved areas in proper condition until the end of the maintenance period in accordance with Section 01700 for the project. Where backfilled excavation is in a roadway or used as a roadway and has a stone or dirt surface, the Contractor shall apply water to the backfill surface twice daily, at about 7:30 a.m. and 3:30 p.m., unless it is raining or otherwise directed by the Project Representative.

Promptly correct all defects. All repairs and defects shall be repaired in accordance with the General and Special Conditions.

The Contractor is responsible for any injury or damage that may result from improper maintenance of trenches or pavement any time before the end of the maintenance period in accordance with Section 01700.

3.10. Disposal of Material

Remove rock, macadam and other rock like street surfacing materials that are too large or use in backfill from the work site as the work progresses. Remove surplus materials of all types when performing final surface restoration. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property. Contractor to retain documentation of proper disposal of material removed from site in conformance with local, state and federal regulations. Disposal of material is incidental to other items and the Contractor will receive no additional compensation for disposal of material related to the site.

END OF SECTION
SECTION 02515
PAVEMENT RESTORATION

PART 1 - GENERAL

1.01.1 SECTION SUMMARY:
This section describes materials and methods required to restore pavement removed for pipeline installation. Location and details of the work are shown on the plans and specified herein and in the referenced standards.

1.02 RELATED WORK SPECIFIED ELSEWHERE:
A. Section 02220 - EXCAVATION, BEDDING, AND BACKFILL FOR PIPELINES

1.03 REFERENCED STANDARDS:
A. Virginia Department of Transportation Road and Bridge Specifications, latest edition and Land Use Permit (Open Cut) Regulations.
B. Special Provisions to Permit(s).
C. Subsequent Special Conditions to Permit(s).

1.04 MAINTENANCE:
A. Until expiration of the Maintenance Bond, maintain pavement placed under this Section. Promptly fill depressions or holes that occur, in order to keep the surface safe and in a condition satisfactory to VDOT.
B. Warranty of pavement in accordance with requirements of the VDOT Land Use Permit

PART 2 - PRODUCTS

2.01.1 AGGREGATE BASE AND SHOULDER MATERIAL:

2.01.2 ASPHALT CONCRETE:
Conform to Reference Standard A, for Types BM-25.

2.01.3 BITUMINOUS OVERLAY:
Conform to Reference Standard A, for Types SM-9.5.

2.01.4 PRIME AND TACK COAT MATERIAL:

Conform to Reference Standard A.

2.01.5 HYDRAULIC CEMENT CONCRETE:

Conform to Reference Standard A.

2.01.6 PAVEMENT MARKINGS, MARKERS, AND GLASS BEADS:

Conform to Reference Standard A.

**PART 3 – EXECUTION**

3.01 GENERAL

A. Paved surfaces necessary to be removed or disturbed in order to perform the installation of water, sewer and storm pipelines and private utilities shall be restored in accordance with the requirements specified herein or shown on the Drawings.

B. Compaction of the sub-grade and placement of pavement shall be performed in a manner as to prevent settlement of restored surfaces. Irregularities, which develop in the restored pavement section as a result of improper placement or compaction, shall be corrected by the Contractor at no additional expense to the Owner.

C. Any pavement undermined or otherwise disturbed shall be edged with a method acceptable to the Owner or sawed as straight as possible and removed so the patched pavement will be restored to a uniform surface conforming to the grade and section existing prior to commencement of Work without ragged edges, spalls or loose material. A backhoe cut will be acceptable if the entire roadway is to receive an overlay. If there has been settlement of the edge of pavement at the cut, the settled portion shall not be corrected by an overlap.

D. When, in the opinion of the Owner, the Work is detrimental to the comfort and safety of the citizens and the Contractor fails to provide an immediate correction, the Owner will order that the necessary repairs be made at the expense of the Contractor.
3.02 PAVEMENT REPLACEMENT:

A. Restore the base and surface of asphalt and hydraulic cement concrete roadways, commercial entrances, driveways, parking areas and sidewalks according to this document, referenced specifications, typical details and special details shown on the drawings. Cut pavement to neat, straight lines. Saw cut hydraulic cement concrete.

B. Replace hydraulic cement concrete with ten inches of compacted base and the prescribed thickness of 4000-psi air entrained concrete. Conform all operations to requirements of the Hydraulic Cement Concrete Pavement section of Reference Standard A. Match new surface finish to the existing adjacent surface.

C. All excavated paved areas shall be backfilled, compacted and paved per the Contract Documents at the end of each day prior to opening to vehicular traffic. This Work shall occur prior to the completion of Work on any day unless otherwise approved by the Owner or VDOT.

D. The base and sub-base materials must provide a smooth and uniform surface. In no case will the minimum base and sub-base depth be less than that shown on the construction plans.

E. A temporary surface course may consist of asphalt concrete cold-mix if an asphalt concrete surface is unavailable due to temperature or if directed by the Owner due to high traffic volumes. All excavated areas shall be backfilled with base stone and asphalt concrete prior to opening the roadway to traffic. All roadway areas shall be opened to traffic at the end of the workday unless otherwise directed by the Owner or VDOT.

F. In order to minimize the duration and frequency of disruption to streets and pavements, the Contractor shall conduct his operations such that installation of laterals and services shall closely follow installation of mains. The intent of this requirement shall be to insure that disruption of the pavement and traffic on any given street or area shall, as much as possibly, be limited to “one event” (i.e., disruption for installation of mains followed by a time delay and subsequent disruption for installation of mains followed by a time delay and subsequent disruption for installation of laterals will not be tolerated or permitted). Installation of the temporary surface course over mains and laterals shall proceed orderly behind the installation and backfill of the improvements.

G. The Contractor shall diligently and continuously maintain all temporary and/or semi-permanent pavement prior to the placement of the permanent
surface paving by grading, adding materials, removing and replacing materials or components, or any other measures necessary to provide a smooth and passable surface free from pot holes, depressions and irregularities.

H. Installation of the permanent surface course shall commence at the completion of the utility installation on each street, but not later than 30 calendar days after the initial cut has been made. VDOT reserves the right to require earlier permanent restoration, which will be provided at the CONTRACTOR’S expense.

3.03 ASPHALT CONCRETE BASE:

A. Replace asphalt concrete base material to original depth, depth required by details or, if they require greater depth, per VDOT or Service Authority inspector. Place asphalt concrete material according to Reference Standard A. Base material shall be finished to a surface at least as smooth as adjoining pavement, free from bumps and dips. Pavement shall be rolled with a smooth steel roller to provide a uniform smooth surface. The weight and number of rollers on site shall meet the minimum requirements as provided in Reference Standard A. Any asphalt placed not in accordance to the Reference Standard A shall be removed and replaced at the CONTRACTOR’S expense. Any base or surface asphalt found not to meet pavement density requirements as provided in Reference Standard A shall be removed and replaced at the CONTRACTOR’S expense.

3.04 MILLING PAVED SURFACES:

A. Where required by project plans, specifications, or as directed in writing by the Engineer, Owner or VDOT, mill paved surfaces to the width and depth directed. Use milling equipment acceptable to VDOT.

3.05 PRIMING OR TACK COATING:

A. Apply a tack or prime coat between existing surface and asphalt overlay. Apply tack or prime coat according to Reference Standard A.

3.06 OVERLAY:

A. Use paving equipment acceptable to VDOT to apply overlay. Place to the extent and thickness required by the details in the construction plans or as directed by a VDOT inspector, whichever is stricter. Conform all operations to requirements of the Asphalt Concrete Pavement section of Reference Standard A. Apply overlay only after proper restoration of pavement cuts as specified in Paragraph 3.1 above. When overlaying an unmilled surface, mill a twelve-inch wide groove to full overlay depth where overlay joins existing surface. Pavement shall be rolled with a smooth steel roller to provide a uniformed smooth surface.
3.07 TOLERANCES

A. Riding quality of the finished surface is very important. The completed pavement will be checked longitudinally and transversely for smoothness with a ten-foot (10’) straight edge. Surface tolerance will not vary more than \( \frac{1}{8} \)-inch in 10 feet parallel to the centerline and not more than \( \frac{1}{4} \)-inch in 10 feet at right angles to the centerline. All humps and/or depressions exceeding this specified tolerance shall be corrected or the defective Work removed and replaced with new material at no additional cost to the Owner.

B. The pavement section shall be in accordance with that shown on the Drawings.

3.08 SHOULDER:

A. Place shoulder material to the extent and thickness as shown on the Drawings and in conformance with Reference Standard A.

3.09 DRIVEWAYS AND PARKING AREAS:

Cut pavement to neat, straight lines. Saw cut hydraulic cement concrete. Pavement shall be rolled with a smooth steel roller to provide a uniformed smooth surface.

A. Asphalt Cement

Patch driveway and parking areas according to the details in the construction plans. Mill joints to existing pavement according to the details in the construction plans. Apply tack or prime coat according to the details in the construction plans. Overlay driveway from property line to edge of pavement or as required by Project Inspector. Pavement overlay shall match existing or shall be 1.5 inches thick after compaction unless shown otherwise on project plans.

B. Hydraulic Cement Concrete

Replace hydraulic cement concrete with 4000-psi air-entrained concrete. Match original concrete depth or four inches, whichever is greater. Conform all operations to requirements of the Hydraulic Cement Concrete Pavement section of Reference Standard A. Match new surface finish to the existing adjacent surface.

C. All other materials

Replace disturbed driveway and parking areas in kind and to depth of original material(s). Compact driveway material to a firm surface.
3.10  TEMPORARY SURFACES:

A. Replace excavated bituminous or hydraulic concrete surface material with an acceptable temporary bituminous material promptly after backfilling the trench, but not later than the end of the workday. Temporary surfaces shall have a smooth surface, free from bumps and dips. Maintain the temporary patch diligently, promptly replacing material flung out or compressed by traffic as necessary to maintain a safe riding surface pending completion of permanent surface restoration.

3.11  TESTING:

A. The Contractor shall perform and pay for all testing required by this Specification and VDOT requirements. The Contractor shall furnish representative samples of the materials prior to installation and provide as-installed samples of the placed material in the work for testing and analysis. The Contractor shall obtain the services of a qualified independent testing laboratory, acceptable to the Engineer, to perform all required testing.

3.12  PAVEMENT MARKING:

A. Replace all pavement marking and markers removed or obscured during the work with marking and markers meeting current VDOT requirements.

3.13  TEMPORARY PATCHING CONDITIONS

Depending on the location and nature of the cutting and trenching activity, there are three (3) potential phases that may be permitted to bridge the gap from initial pavement cut to final pavement restoration. These conditions are listed as:

A. Phase 1 – Temporary Patching (Up to 7 Days from trenching activity): Place stone in accordance with the details in the Construction Plans and in conformance with Reference Standard A. Place 2 to 4 inches of base asphalt.

B. Phase 2 – Semi-Permanent (7 Days+ to 30 Days): Place stone and base asphalt in accordance with the details in the Construction Plans but fill the entire elevation with base asphalt to match the existing surface level (do not install surface at this time). Stone and asphalt shall be placed and compacted in accordance with Reference Standard A.

C. Phase 3 – Final Paving (no later than 30 Days after trenching activity): Install pavement in accordance with the pavement details in the Construction Plans to include surface paving. Mill the existing surface to a depth and extent provided in the details of the Construction Plans. Place and finish surface mix in accordance with Reference Standard A.
SECTION 02510
SANITARY SEWER FORCE MAIN AND APPURTENANCES

PART 1 - GENERAL

1.01 Section Summary
Provide work under this Section as shown or specified and according to the Contract Documents. This Section relates to construction of sanitary sewer force mains and low pressure force mains, underground and above ground, and appurtenances thereto, intended to carry sewage water under pressure. Appurtenances include control valves, shutoff valves, and air relief and blow off valves. Removal and abandonment of existing sewer force mains and service connections is included in this Section.

1.02 Related Work Specified Elsewhere:
Section 01050 - FIELD PROJECT REPRESENTATIVE
Section 02220 - EXCAVATION, BEDDING AND BACKFILL FOR PIPELINES.
Section 02515 - PAVEMENT RESTORATION
Section 02665 - WATER SERVICE LINES AND WATER METER INSTALLATIONS.
Section 02820 - GRASSING (FESCUE)

1.04 REFERENCES
A. Codes and standards referred to in this Section are:

1. AWWA C105 Polyethylene Encasement for Ductile-Iron Pipe System
5. AWWA C151/ANSI A21.51 ANSI Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
7. AWWA C116/ANSI A21.16 Protective Fusion bonded Epoxy Coating for interior and exterior of ductile iron and gray-iron fittings for water
supply.
8. AWWA C500 Gate Valves for Water and Sewerage Systems
9. AWWA C504 Rubber Seated Butterfly Valves
10. AWWA C517 Resilient-Seated Cast Iron Eccentric Plug Valves
11. AWWA C550 Interior Coatings for Valves
12. AWWA C600 Installation of Ductile-Iron Water Mains and Their Appurtenances
14. AWWA C905 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. through 48 In.
15. ASTM A48 Specifications for Gray Cast Iron Castings
17. ASTM A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
19. Schedule 40 PVC ASTM D1795 and D2665 (Low Pressure system)

1.05 SUBMITTALS

A. General: Conform to Section 01300. Submit the following including as specified in the General Provisions.

B. Shop drawings and manufacturers product data including sworn statements of compliance with applicable specifications from manufacturers of:

1. Pipes, pipe joints, fittings, couplings, sleeves, valves, valve boxes, and sewage combination air valves (including vaults) Polyethylene Encasement Bituminous Coatings


C. Quality Control:

1. Certificate of compliance for pipe, fittings, gaskets, lining, coatings, specials, and sleeves in accordance with this Section.

2. Test Reports

1.06 QUALITY ASSURANCE

Use adequate numbers of skilled workers, thoroughly trained and experienced in the
necessary crafts, supervised by a crew foreman completely familiar with the specified requirements and the methods needed for the proper performance of the work of this Section.

Reference Standards:

American Water Works Association Standards - The most recent revision of all sections effective on the project bid date.

Virginia Department of Transportation Road and Bridge Specifications, latest edition.

Prince William County Service Authority Water and Sewer Utility Standards Manual, latest revision.

Requirements of Regulatory Agencies:

Commonwealth of Virginia Department of Environmental Quality (DEQ) and Department of Health (VDH) Regulations;

Cut sheets: Provide according to Section 02220.

Stakeout: Provide according to Section 01050.

1.07 DELIVERY, STORAGE AND HANDLING

Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending. Avoid deformation or other damage to pipe and appurtenances when unloading or handling. Do not place pipe within pipe of a larger size or roll or drag it over gravel or rock during handling. Store pipe and fittings on sills above storm drainage level and deliver for laying after the trench is excavated. Drain valves and protect them from freezing. Any joint or section of pipe damaged during transporting, unloading, handling or storing may be cut and the undamaged portion used where partial lengths are needed. If damaged sufficiently, remove the entire section from the site.

1.08 COMPLIANCE STATEMENT

A. Submit Certificate of Compliance for all products specified by reference standard.
PART 2 - PRODUCTS

2.01 INCIDENTALS

A. Concrete, temporary plugs/caps, hardware and all other items as shown on the Drawings, or necessary to complete the Work, accepted and suitable for the service.

2.02 MANUFACTURERS

A. All pipe, fittings, valves, equipment and appurtenances shall comply with latest USM Approved Products list contained in Appendices C and D.

2.03 FORCE MAIN PIPE

A. Low Pressure Polyvinyl Chloride (PVC) Pressure Pipe:
   1. Pipe Materials: PVC pipe shall meet the requirements of AWWA C905
      a. Schedule 40 PVC (200 PSI Rated) with solvent weld bell and spigot joints.
      b. PVC pipe shall be marked with nominal size, PVC, dimension ratio (PVC only), AWWA pressure class, AWWA standard designation number, and manufacturer’s name or trademark, and date.
      c. Fittings shall be Schedule 80 PVC (320 PSI rated)

B. Ductile Iron Pipe:
   1. Pipe Materials: Ductile iron pipe shall meet the requirements of ANSI Standards A21.51. Force mains 12-inches and smaller shall be Class 52. Force mains larger than 12” shall be Class 51. Ductile iron pipe installed in exposed locations shall be in accordance with Section 15052.
   2. If grinding or milling is necessary to meet the requirements for gauged pipe, only pipe having 2 pipe thickness classes greater than those called for in the purchase order shall be machined. In no case will the machined thickness of the pipe be less than the pipe thickness class shown on the Drawings or specified.
   3. The interior of all ductile iron pipe and fittings provided shall be lined with ceramic epoxy lining. The lining shall be shop applied in strict accordance with the manufacturer’s recommendations to cover the inner surface of the ductile iron pipe and fittings. The lining shall be 40 mils nominal thickness, 35 mils minimum thickness. The gasket and spigot end up to 6-inches from the end of the spigot on the outside of the pipe shall be coated with 6 mils nominal, 10 mils maximum, of Protecto Joint Compound. The joint compound shall be applied by brush to ensure coverage. Care must be taken that the
joint compound is smooth without excess buildup in the gasket seat or on the spigot ends. Coating of the gasket seat and spigot ends shall be done after application of the lining. The lining in each joint of pipe and fitting shall pass a 2,500-volt pin hole/holiday test. The lining material shall be Protecto 401 ceramic epoxy, or approved equal.

C. Fittings
   1. All fittings shall conform to the applicable requirements AWWA C110 or C153, and shall be ductile iron unless otherwise stated.
      a. Fitting shall be class 350 ductile iron fittings.
      b. Mechanical joint assemblies, including gaskets, glands, bolts, and nuts shall be in accordance with the requirements of ANSI Standard A21.11 and ASTM Standard A307 and shall be furnished with all fittings. Bolts and nuts shall be low-carbon steel. Mechanical joint bolt holes shall straddle the centerlines of the fittings.
      c. Mechanical Joint Retainer Glands. Mechanical joint restraint shall be designed to fit standard mechanical joint bells with standard T head bolts conforming to ANSI/WWA C 111/A21.11 and ANSI/AWWA C 153/A21. Glands shall be manufactured of ductile iron conforming to ASTM A 536-80 grade 60-42-10. Set-screws shall be of hardened ductile iron and require the same torque in all sizes. Steel set-screws shall not be permitted. Glands shall have minimum pressure rating listed below with a minimum safety factor of 2:1 and shall be listed with Underwriters Laboratories and/or approved by Factory Mutual. Mechanical joint assemblies are not permitted in restrained areas unless indicated on the Drawings. Mechanical joints may be used only at valves, fittings and where specified on the Drawings.
      d. Anchoring fittings shall meet the applicable requirements of ANSI standard A21-10. Gland shall have side flange ears only. Bolts and nuts shall be low-carbon steel, ASTM A307, grade B. Mechanical joint bolt holes shall straddle the centerline of fittings.
      e. Where special fittings are required, they shall be of an accepted design and shall have the same diameters and thickness as standard fittings, unless otherwise required. Their laying lengths and other functional dimensions shall be determined by their positions in the water mains and by the particular piping materials to which they connect.
      f. All fittings shall be lined with Protecto 401 ceramic epoxy lining in accordance with Section 2.3.B.3 below.
2.04 PROTECTIVE COATINGS

Provide all ductile iron pipe with bituminous outside coating according to ANSI A21.51 (AWWA C151), and Standard cement mortar lining according to ANSI A21.4 (AWWA C104), latest issue. Use polyethylene encasement conforming AWWA C105 where indicated by ground conditions or when ordered by the Project Representative. Roskote R28 rubberized mastic shall be applied to all water main appurtenance, water main valves, fasteners and other mechanical connections that are exposed during construction activities including bolts, operating nuts and any other items as required by the Project Representative. Roskote R28 shall be applied in accordance with manufacturer’s recommendations.

2.05 ECCENTRIC PLUG VALVES

A. Design Requirements

1. Valves shall have a working pressure of not less than 150 psi. Valve actuator shall be sized based upon the working pressure.
2. Valves shall be given bidirectional leakage test and low-pressure 5 psi seat test in accordance with the procedures outlined in AWWA C517. Certified copies of the Proof-of-Design test reports documenting that all requirements of AWWA C517 were successfully met shall be furnished to Owner prior to installation.
3. Valves shall operate in a horizontal position.
   a. Operator: Non-rising stem with standard 2 IN wrench nut, open left (counter-clockwise).
      i. Extension stems are not allowed
      ii. Gear cases and shafts shall be totally enclosed type, suitable for buried service.
4. Operator stems shall be provided with an enclosure that will protect the stem from being bent.
5. Port size shall be 100% of the adjacent pipe diameter throughout the entire length of the valve.

B. Materials: Furnish materials in full compliance with the following:

1. Valves shall conform to AWWA C517 and shall have an interior and exterior epoxy coating.
2. Valve body and plugs shall be ASTM A126 Class B cast iron.
3. Plugs shall be one piece with a cylindrical seating surface eccentrically offset from the center of the shaft. Plug facing shall be Buna-N with a minimum hardness (Shore A) of 70 durometer.
4. Seats shall be 1/8 IN thick nickel raised surface. Bearings shall be sintered, permanently lubricated 316 stainless steel.
5. Packing shall be multiple v-type or “U” cup type.
6. Washers at the top and bottom of the plug journal shall be provided to keep grit and debris out of the bearings and packing.
7. Plug valves in the horizontal position shall be installed so that the plug rotates upward as the valve opens.
8. Valves shall be furnished with a standard 2-inch wrench nut and shall open left (counter-clockwise).
9. Valve ends shall be mechanical joint unless otherwise specified.
10. Valve shall be oriented so the plug rotates 90 degrees to the top of the pipe when open.

2.06 RESILIENT WEDGE SEATED GATE

VALVES

A. Design Requirements:
   1. Valves shall be designed for a working pressure of not less than 150 psi and tested at a pressure of not less than 300 psi.
   2. Valves shall be capable of drip-tight, bidirectional shutoff.
   3. Valves shall operate in a vertical position.
      a. Operator: Non-rising stem with standard 2-inch wrench nut, open left (counter-clockwise).
         i. Extension stems are not allowed.
      b. Valves shall be approved by the manufacturer for buried service.
      c. Gear cases and shafts shall be totally enclosed type, suitable for buried service.
         i. Reduction gears are not permitted.
   2. Materials:
      a. Furnish materials in full compliance with the following requirements:
         i. Valves shall conform to AWWA C509 or AWWA C515.
         ii. Wedges: Ductile iron encapsulated with EPDM.
         iii. Body: Ductile iron with fusion bonded epoxy coating on interior and exterior in accordance with AWWA C550.
2.06 LOW PRESSURE FORCE MAIN VALVES

A. Design Requirements:
   1. Valves shall be True Union type constructed from PVC Type 1 ASTM 1784 Cell classification 12454
   2. Valves shall be designed for a working pressure of not less than 150 psi and tested at a pressure of not less than 300 psi

2.07 SEWER MAIN MARKING TAPE

A. Technical Requirements
   1. Tape shall have green background with “CAUTION – BURIED SEWER BELOW” in black letters.
   2. Colors shall not deteriorate with long-term exposure to soil, water, etc.
   3. Tape shall be detectable 6-inches wide, polyethylene, 3.5 mils minimum thickness.

2.08 VALVE BOXES

A. Technical Requirements:
   1. All valve boxes shall be cast iron in accordance with ASTM A48 and shall comply with PWCSA Standard Details.
   2. Valve boxes shall have outside ledge under top ring. Top, outside slip pipe shall not have flange at bottom.

2.09 AUTOMATIC AIR RELEASE AND INLET VALVES

A. Technical Requirements:
   1. Air vents shall have 316 stainless steel bodies with 2-inch connections.
   2. The contractor shall verify all valve vault dimensions with the selected valve and general materials and provide an adjustment in the height of vault if necessary based on materials selected.

2.10 AIR RELEASE VALVE VAULT

A. Technical Requirements:
   1. Air release or vacuum assembly and vault shall be in accordance with PWCSA USM Standard Details.

2.11 TRACER WIRES

A. Technical Requirements (Direct bury wire)
   1. Conductor: 12 AWG solid strand soft drawn copper per ASTM B-3, or B-8. The breaking pounds of the wire shall be a minimum of 124
2. Insulation: Conductor shall be insulated with low density high molecular weight polyethylene insulation suitable for direct bury applications per ASTM D-1248. The minimum insulation thickness shall be 0.045.

3. Splices and or Connectors: Splices and/or Connectors should be capable of handling from 2 to 4 wires per connector and designated as “waterproof”. PVC adhesives or sealing compounds are not acceptable.

**PART 3 - EXECUTION**

3.01 GENERAL

A. Handle pipe and appurtenances carefully when moving or lowering into trench. Abut spigot ends into bell openings so that there shall be no shoulder or unevenness inside the main. Use suitable tools and appliances and take great care to prevent damage to any pipe or appurtenance. Embed pipes on a solid foundation along entire length of barrel, but exercise special precautions to prevent any pipe from resting on rock. Dig bell holes sufficiently large to insure making up joints adequately.

Whenever pipe requires cutting to fit in line or to accommodate a fitting or other appurtenance, make square cuts and bevel edges thereof to eliminate damage to the gasket. Confine changes in direction at joints to the limits prescribed in AWWA C600 for the type of joint involved.

B. Backfilling and tamping specifications shall assure as a minimum that:

1. Trenches shall be carefully backfilled with excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand and gravel, soft shale, or other approved materials, free from large clods of earth or stones larger than one inch in diameter, deposited in six-inch layers, and thoroughly and carefully tamped until the pipe has a cover of not less than one foot.

2. The remainder of the backfill shall be placed in the trench in layers not exceeding two feet and thoroughly tamped. No stone or rock larger than 5 inches in its greatest dimensions shall be used in backfilling.

C. Take all precautions necessary to insure that pipe, valves, fittings, and related items are not damaged in unloading, handling and placing in trench. Examine each piece of material just prior to installation to determine that no damage has occurred. Remove any damaged material from the site and replace with undamaged material.

1. Keep pipe clean. Exercise care to keep foreign material and dirt from entering pipe during storage, handling and placing in trench. Close ends of in-place pipe at the end of any work period to
prevent entry of animals and foreign material.

2. Excavation, trenching, backfilling and bedding for all piping specified herein shall conform to the applicable requirements of Section 02220 and/or to details shown on the construction plans.

3. Do not lay pipe when weather or trench conditions are unsuitable.

D. The standard materials and installation procedures for polyethylene encasement to be applied to underground installations of ductile iron pipe and fitting shall meet ASTM A674. Polyethylene encasement/sleeve (polygraph) conforming to the requirements of AWWA C-105 Method-A, 8-mil thick, shall be placed on all Ductile Iron pipe and fitting to prevent corrosion and shall be installed so that no dirt or bedding material comes in contact with the pipe. All lumps of clay, mud, cinders, etc., on the pipe surface should be removed before the pipe is covered with polyethylene.

If the polyethylene is damaged, it must be repaired before the trench is backfilled. Small holes or tears can be repaired with a piece of tape placed over the hole.

Large holes or tears should be repaired by taping another piece of polyethylene over the hole. Overlaps, ends, and repairs can be held in place with tape or plastic tie straps until the trench is backfilled.

3.02 SEWAGE FORCE MAINS

A. Where it is necessary to cut the pipe to place special castings, care must be taken not to crack the pipe and to cut straight and true around it. Force mains shall be restrained at bends as shown on the Contract Drawings to prevent movement of lines under pressure. All joints shall be watertight, and any leaks or defects discovered shall be immediately repaired to the satisfaction of the Engineer. Any pipe which has been disturbed after being laid shall be taken up, the joints cleaned, and the pipe properly re-laid. Damaged or unsound pipe or fittings will be rejected. Before joining the pipe, all lumps, blisters, excess coating material and any dirt or sand shall be removed from the bell and spigot ends of pipes. Any superfluous material inside the pipe shall be removed by means of an approved follower or scraper after joints are made.

B. Where necessary to deflect the pipe from a straight line at joints, the deflection shall not exceed that recommended by the manufacturer. For PVC pipe installation, deflection or pipe bending shall be in strict accordance with the manufacturer’s recommendation. Permissible deflection shall not be greater than 2/3 of that listed in AWWA C600 or as recommended by the manufacturer. If the specified or required alignment requires deflections in excess of those recommended, the contractor shall either provide special bends as approved by the Project Representative or a sufficient number of shorter lengths of pipe to provide angular deflections within the limits set.
forth by the manufacturer. All force mains shall be installed so as to have a minimum earth cover of 42 inches, unless otherwise specified on the Contract Drawings.

C. Joining Pipe:

1. Join push-on joint ductile iron pipe as follows:
   a. Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating, and other foreign matter. Flex rubber gasket and insert in the gasket recess of the bell socket. Apply a thin film of gasket lubricant supplied by pipe manufacturer, to either the gasket or the spigot end of the joining pipe.
   
   b. Start spigot end of pipe into socket with care. The joint shall then be completed by forcing the plain end to the bottom of the socket with a forked tool or jack type device. Field cut pipe shall have the end filed to match the manufactured spigot end. Permissible deflection in push-on joint pipe shall not be greater than 2/3 of that listed in AWWA C600.

D. The force main shall be installed at the grade indicated on the contract drawings. No pipe shall be laid flat, except where air release valves are shown on the plans. Particular care shall be exercised so that no high points are created where air can accumulate. If contractor creates any high points other than those indicated on the plans, an air vent shall be installed, the air vent shall be set no more than two degrees from the true vertical at the ball valve.

E. Marking tape and tracer wire shall be installed in the trench approximately 12” below finished grade.

F. Marker balls shall be installed along the force main route. Marker balls shall be placed at a maximum interval of 50 feet and at all horizontal and vertical bends. Bury depth shall be per the manufacturer’s guidelines.

3.03 VALVES

A. Install valves in accordance with the manufacturer’s recommendations and approved shop drawings. Fully open and close each plug valve for one cycle, recording the number of turns, in the presence of Project Representative prior to installation.

B. Set valves and valve boxes plumb.

C. Place valve boxes directly over valves with top of box being brought to surface of finished grade. Valve boxes shall be adjusted with the tops at the proper grade. Valve boxes in unpaved areas shall be installed with a 12”
by 12” by 4” deep concrete pad. The top section of the valve box will overlap the lower section with a minimum lap of 2 inches.

3.04 AIR VENTS

A. Install air vents in accordance with the manufacturer’s recommendations and approved shop drawings.

3.05 LEAKAGE TESTING

Test pipes for leaks per Section AWWA Standard C600 and repair or tighten as required.

A. All force mains shall be given a hydrostatic test of at least 1.5 times the shutoff head of the connected pumps or 150 psi, whichever is greater. Loss of water pressure during test shall not exceed 5 psi in a 2-hour period.

B. Valves shall be given bidirectional leakage test and low-pressure 5 psi seat test in accordance with the procedures outlined in AWWA C517

END OF SECTION
SECTION 02520
SANITARY SEWER GRAVITY MAIN

PART I: GENERAL

1.01 SCOPE

A. Provide work under this Section as shown or specified and according to the Contract Documents. This Section relates to construction of gravity sanitary sewer, underground and above ground, and appurtenances thereto including manholes, intended to transmit sewage water by gravity methods. Removal and abandonment of existing gravity sewer mains is included in this section.

1.02 Work Specified Elsewhere:

Section 01050 - FIELD PROJECT REPRESENTATIVE

Section 02220 - EXCAVATION, BEDDING AND BACKFILL FOR PIPELINES.

Section 02515 - PAVEMENT RESTORATION

Section 02665 – WATER SERVICE LINES AND WATER METER INSTALLATIONS.

1.03 SUBMITTALS

A. Conform to requirements of Section 1300 Submittals.
B. Submit proposed methods, equipment, materials and sequence of operations for sewer construction as well as abandonment. Plan operations to minimize disruption of utilities to occupied facilities or adjacent property.
C. Cut sheets and Stakeout: Provide according to Section 02220 and 0150
D. Requirements of Regulatory Agencies:
   Commonwealth of Virginia Department of Environmental Quality (DEQ) and Department of Health (VDH) Regulations;

1.04 QUALITY ASSURANCE

A. Qualifications. Install sanitary sewer that is watertight both in pipe-to-pipe joints and in pipe-to-manhole connections. Perform testing in accordance with USM Acceptance Testing for Sanitary Sewers and manholes.
B. Lay gravity sewer lines in straight alignment and grade.
1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Inspect pipe and fittings upon arrival of materials at job site.

B. Handle and store pipe materials and fittings to protect them from damage due to impact, shock, shear or free fall. Do not drag pipe and fittings along ground. Do not roll pipe unrestrained from delivery trucks.

C. Use mechanical means to move or handle pipe. Employ acceptable clamps, rope or slings around outside barrel of pipe and fittings. Do not use hooks, bars, or other devices in contact with interior surface of pipe to lift or move lined pipe.

D. Manholes shall have lifting lugs or keyways. Lifting holes through the manhole wall shall not be permitted.

PART 2: PRODUCTS

2.01 PIPE MATERIAL

A. Provide piping materials for gravity sanitary sewers of sizes and types indicated on Drawings or as specified.

B. Polyvinyl Chloride Pipe (PVC) sewer main shall be manufactured in accordance with AWWA C900. Gravity sewer main shall be non-plasticized PVC with an integral rubber ring wall bell and spigot joints furnished in 18-foot nominal lengths.

C. DIP shall conform to AWWA C151 (ANSI A21.51). (Refer to Table 160-3.) Applicant shall use Class 52. pipe shall be supplied with push-on joints conforming to AWWA C111 (ANSI A21.11). Applicant shall use mechanical joint pipe for aerial crossings. Applicant shall provide and install fittings to conform to ANSI A21.10 using ductile iron with mechanical or push-on joints. Install interior coating for pipe and fittings of a minimum 40 mils (dry film thickness) ceramic epoxy lining. Contractor shall protect the gasket area and spigot ends (6-inch maximum) with 6 mils nominal (10 mils maximum) Protecto Joint Compound.

D. Pipe materials other than those listed above shall not be used for gravity sanitary sewers.

2.02 MANHOLES

A. Sanitary sewer manholes shall consist of precast reinforced monolithic concrete sections, an eccentric conical section, and an expanded base section that conform to ASTM C478. The precast monolithic base section shall be installed on a compacted granular foundation prepared in a manner similar to that required for the proper installation of the sanitary sewer.

B. Joint design shall meet the requirements of ASTM C443, and gaskets shall meet the requirements of ASTM C361. Joints shall be formed entirely of concrete using a round rubber gasket and, when assembled, shall be self-
centering and make a uniform watertight joint. In addition to the O-ring
gasket, a cold-applied joint sealer shall be used by the Applicant to assist in
sealing the joint from either internal or external hydrostatic pressure

**PART 3: EXECUTION**

3.01 **GENERAL**

A. Handle pipe and appurtenances carefully when moving or lowering into
trench. Abut spigot ends into bell openings so that there shall be no shoulder
or unevenness inside the main. Use suitable tools and appliances and take
great care to prevent damage to any pipe or appurtenance. Embed pipes on a
solid foundation along entire length of barrel, but exercise special precautions
to prevent any pipe from resting on rock. Dig bell holes sufficiently large to
insure making up joints adequately.

Whenever pipe requires cutting to fit in line or to accommodate a fitting or
other appurtenance, make square cuts and bevel edges thereof to eliminate
damage to the gasket. Confine changes in direction at joints to the limits
prescribed in AWWA C600 for the type of joint involved.

B. Backfilling and tamping specifications shall assure as a minimum that:

1. Trenches shall be carefully backfilled with excavated materials
approved for backfilling, consisting of earth, loam, sandy clay,
sand and gravel, soft shale, or other approved materials, free from
large clods of earth or stones larger than one inch in diameter,
deposited in six-inch layers, and thoroughly and carefully tamped until
the pipe has a cover of not less than one foot.

2. The remainder of the backfill shall be placed in the trench in
layers not exceeding two feet and thoroughly tamped. No stone or
rock larger than 5 inches in its greatest dimensions shall be used in
backfilling.

C. Take all precautions necessary to insure that pipe, valves, fittings, and related
items are not damaged in unloading, handling and placing in trench. Examine
each piece of material just prior to installation to determine that no damage
has occurred. Remove any damaged material from the site and replace with
undamaged material.

1. Keep pipe clean. Exercise care to keep foreign material and dirt
from entering pipe during storage, handling and placing in trench.
Close ends of in-place pipe at the end of any work period to prevent
entry of animals and foreign material.

2. Excavation, trenching, backfilling and bedding for all piping
specified herein shall conform to the applicable requirements of

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ON CALL UTILITY SERVICES AND MISCELLANEOUS CONSTRUCTION FOR SEWER AND
WATER LINES

Section 02520-3
Section 02220 and/or to details shown on the construction plans.

3. Do not lay pipe when weather or trench conditions are unsuitable.

D. The standard materials and installation procedures for polyethylene encasement to be applied to underground installations of ductile iron pipe and fitting shall meet ASTM A674. Polyethylene encasement/sleeve (polygraph) conforming to the requirements of AWWA C-105 Method-A, 8-mil thick, shall be placed on all Ductile Iron pipe and fitting to prevent corrosion and shall be installed so that no dirt or bedding material comes in contact with the pipe. All lumps of clay, mud, cinders, etc., on the pipe surface should be removed before the pipe is covered with polyethylene.

E. If the polyethylene is damaged, it must be repaired before the trench is backfilled. Small holes or tears can be repaired with a piece of tape placed over the hole. Large holes or tears should be repaired by taping another piece of polyethylene over the hole. Overlaps, ends, and repairs can be held in place with tape or plastic tie straps until the trench is backfilled.

3.02 CLOSING ABANDONED SANITARY SEWER SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:

1. Close open ends of piping with at least 8-inch thick, brick masonry bulkheads.
2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Abandoned Manholes: Excavate around manhole as required and use either procedure below:

1. Remove manhole and close open ends of remaining piping.
2. Remove top of manhole down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

C. Backfill to grade according to Section 02220

3.07 INSPECTION AND TESTING

A. An acceptance test is required for all sanitary sewer mains. The testing methods utilize air testing for sewer mains with acceptability criteria in accordance with ASTM F1417.
B. An acceptance test is required for all manholes. The testing methods shall use vacuum testing for manholes. Vacuum testing methods and acceptability criteria shall be in accordance with ASTM C1244 except that vacuum testing shall be done after backfill has been placed around the structure.

END OF SECTION 02520
SECTION 02530

SANITARY SEWER SERVICES and LATERALS

PART 1: GENERAL

1.01 SECTION SUMMARY

A. Installation of service laterals in sanitary sewers serving areas where sanitary sewer service did not previously exist.

B. Reconnection of existing service connections along parallel or replacement, sanitary sewers.

1.02 PERFORMANCE REQUIREMENTS

A. Accurately locate in field all proposed service laterals along new sanitary sewer main.

B. Accurately locate in field existing service connections and proposed service laterals along alignment of new parallel or replacement sewer main.

1.03 SUBMITTALS

A. Conform to requirements of Section 01300 - Submittals.

B. Submit product data for each pipe product, fitting, coupling and adapter.

PART 2: PRODUCTS

2.01 SERVICE CONNECTION

A. Use sewer pipe of the same material as the main to which the lateral is connecting either Class 50 DIP, PVC sewer main conforming to AWWA C900 DR25 or Schedule 40 PVC marked as ASTM D1795 and ASTM D2665. For depths greater than 10’, use SDR 26.

B. PVC pipe shall be gasket jointed with gasket conforming to ASTM D3212.

C. Provide service connection pipe in sizes shown on Drawings. For reconnection of existing services, select service connection pipe diameter to match existing service diameter.

D. Subject to above limits, provide 6-inch service connection when more than one service discharges into single pipe.

E. Connect service laterals to new, parallel, or replacement sewer mains with prefabricated, full-bodied tee or wye fittings conforming to specifications for sewer main pipe material as specified in other Sections for sewers less than 10 inches in diameter.
F. Where sewers are installed using pipe augering or tunneling, or where sewer is 10 inches or greater in diameter, use an inserta tee to connect service to sewer main.

2.02 PIPE SADDLES

A. Use pipe saddles only on existing sanitary sewer mains.

B. Supply one-piece prefabricated saddle, either polyethylene or PVC, with neoprene gasket to accomplish complete seal. Use saddle fabricated to fit outside diameter of connecting pipe. Protruding lip of saddle must be at least 5/8-inch long with grooves or ridges to retain stainless steel band clamps.

C. Use 1/2-inch stainless steel band clamps for securing saddles to liner pipe.

2.03 COUPLINGS AND ADAPTERS

A. For connections between new PVC pipe stubouts and existing service, 4-, 6-, or 8-inch diameter, use flexible adapter coupling consisting of neoprene gasket and stainless steel shear rings with 1/2-inch stainless steel band clamps:

B. For connections between new PVC pipe stubout and new service, use rubber-gasket adapter coupling:

2.04 PLUGS AND CAPS

A. Seal upstream end of unconnected sewer service stubs with rubber gasket plugs or caps of same pipe type and size.

2.05 CLEANOUTS

A. Use SDR 35 PVC sewer pipe conforming to ASTM D1784 and ASTM D3034.

B. PVC pipe shall be gasket jointed with gasket conforming to ASTM D3212.

C. Cleanouts to be installed within areas of possible traffic loading shall have a cast iron sanitary tee, cast iron riser, and brass cap

PART 3: EXECUTION

3.01 PERFORMANCE REQUIREMENTS

A. Provide minimum of 72 hours’ notice to customers whose sanitary sewer service will potentially be interrupted.

B. Reconnect service connections, including those that go to unoccupied or abandoned buildings or to vacant lots, unless directed otherwise by Project Representative.
C. Reconnection shall include fittings and required pipe length to reconnect service line.

3.02 EXCAVATION AND BACKFILL

A. Excavate in accordance with Section 02020 – Excavation Bedding and Backfill for Pipelines.

B. Perform work in accordance with OSHA standards.

C. Install and operate necessary ground water and surface water control measures in accordance with requirements of the Contract Documents.

D. Determine locations where limited access, buildings or structure preclude use of mechanical excavation equipment. Obtain approval from Project Representative for hand excavation.

E. Restore all surfaces disturbed during the work according to Section 02515 - Pavement Restoration or Section 02820 - Grassing (Fescue).

3.03 INSTALLATION OF NEW SERVICE LATERALS

A. Install service connections on sanitary sewer main for each service connection. Provide length of lateral indicated on Drawings. Install plug or cap on upstream end of service lateral as needed.

B. Test service connections before backfilling.

C. Install service connection and service line as specified for sanitary sewer main, and as shown on Drawings. Install tracer wire in accordance with USM requirements.

END OF SECTION 02530
SECTION 02540
BYPASS PUMPING

PART I: GENERAL

1.01 SECTION SUMMARY

A. Contractor is required to furnish all materials, labor, equipment, power, maintenance, etc. to implement a temporary pumping system for the purpose of diverting the existing flow around the work area for the duration of the Project in accordance with PWCSA USM latest edition.

B. The design, installation, and operation of the temporary bypass pumping system shall be the Contractor’s responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

C. When directed by PWCSA, the Contractor shall put the affected sanitary sewer line back into service at the end of each working day.

D. All unmanned bypass pumping operations shall be fitted with an auto-dialer feature to monitor the operation of the pump and notify the Contractor in the event of a pump failure or overflow situation.

1.02 SUBMITTALS

A. Conform to the requirements of Section 01 33 00 – Submittal Procedures

B. The following additional items shall be submitted for approval in accordance with Section 01300:

Detailed Bypass Pumping Plan – Contractor shall submit to PWCSA detailed design plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows. The pumping system must be designed to provide adequate capacity for peak flows. The plan must be specific and complete, and shall include, but not be limited to, the following details:

1. Provide justification that bypass plan is sufficient to accommodate existing flows.

2. Capacities of pumping equipment.

3. Road crossing details, including paved or unpaved roads, driveways, entrances, or other travelways.

4. Protection against pipe breaks.

5. Sewer plugging methods and bypass time duration for each sewer section.

6. Size, length, material, and method of installation for suction and...
discharge piping.

7. Method noise control for each pump and/or generator.

8. Bypass pumping locations.

9. The pumping, piping, equipment and all ancillary components shall be designed and

10. The design shall be signed, dated and sealed by a registered Professional Engineer in the Commonwealth of Virginia.

**PART 2: PRODUCTS**

2.01 EQUIPMENT

A. All pumps (Xylem Godwin Pumps) used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric or diesel powered. All pumps used must be constructed to allow dry running for long periods of time to account for the cyclical nature of effluent flows.

B. Contractor shall provide the necessary stop/start controls for each pump.

C. Contractor shall include one stand-by pump for each size to be maintained on site. Back-up pumps shall be on-line, isolated from the primary system by a

D. Discharge and suction piping sizing shall be determined according to flow calculations and system operating calculations.

E. High Density Polyethylene (HDPE) – Piping shall be homogenous throughout, free of visible cracks, discoloration, pitting, varying wall thickness, holes, foreign material, or other deleterious faults. Pipe shall be assembled and joined on site using couplings, flanges or butt-fusion method to provide leak proof joint. Thread or solvent joints are not acceptable. Pipe fusion shall be carried out by personnel certified as fusion technicians by manufacturer of HDPE pipe and/or fusing equipment. Butt-fusion joints shall be true alignment and uniform roll-back beads resulting from use of proper temperature and pressure.

F. Flexible Hoses and Associated Couplings and Connectors – Flexible hose and couplings shall be abrasive resistant and suitable for the intended services (i.e., fire hoses are not permitted). They shall be rated for external and internal loads anticipated including test pressure. External load design shall incorporate anticipated traffic loadings, including traffic impact loading where applicable. When subjected to traffic loading, the system shall be composed of
traffic ramps and covers maintaining a H-20 loading requirement while in use or as directed by PWCSA.

G. All rigid or hard piping shall be constructed with positive restrained joints.

H. Under no circumstance will aluminum irrigation type piping or glued PVC pipe be allowed.

2.02 DESIGN REQUIREMENTS

A. Bypass pumping systems shall have sufficient capacity to pump the peak flow required. The Contractor shall provide all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow of the main can be safely diverted around the section to be repaired. Bypass pumping system may be required to be operated 24 hours a day. Contractor shall provide all necessary monitoring devices to notify the Contractor of any pump failure.

B. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each pump size utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.

C. Bypass pumping system shall be capable of bypassing flow around the Work area and of releasing any amount of flow up to the full available flow into the work area as necessary for satisfactory performance of the Work.

D. The Contractor shall make all arrangements for bypass pumping during the time when the main is shut down for any reason. The system must overcome any existing force main pressure on discharge.

1.03 PERFORMANCE REQUIREMENTS

A. It is essential to the operation of the existing sewerage system that there be no interruption in the flow of sewage throughout the duration of the project. To this end, the Contractor shall provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labor and equipment necessary to intercept the sewage flow before it reaches the point where it would interfere with work, carry it past the work area, and return it to the existing sewer downstream of the work area.

B. The design, installation, and operation of the temporary pumping system shall be the Contractor’s responsibility. The bypass system shall meet the requirements of all local, State, and Federal codes and regulations.

C. Contractor shall provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.
D. The Contractor shall maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers, and that will protect public and private property from damage and flooding.

E. The Contractor shall protect water resources, wetlands, and other natural resources.

F. Flow control shall include the operation of public and private pump stations to control flows in the system as well as performing work during nighttime conditions to control flow in the system.

**PART 3: EXECUTION**

3.01 FIELD QUALITY CONTROL AND MAINTENANCE

A. Test – Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to actual operation. The PWCSA Project Representative will be given 24 hours’ notice prior to testing.

B. Inspection – Contractor shall inspect bypass pumping system every two hours to ensure that the system is working properly.

C. Maintenance Service – Contractor shall insure that the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pump(s) is operating.

D. Extra Materials:

   1. Spare parts for pumps and piping shall be kept on site as required.
   2. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

3.02 REPARATION

A. Precautions

   1. Contractor is responsible for locating any existing utilities in the area the Contractor selects to locate the bypass pipelines. The Contractor shall locate his bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from Project representative. All costs associated with relocating utilities and obtaining approvals shall be the responsibility of the Contractor.

   2. During all bypass pumping operation, the Contractor shall protect the pumping station and main and all local sewer lines from damage inflicted by any equipment. The Contractor shall be responsible for any physical damage to the pump station and main and all local sewer lines caused by human or mechanical failure.
3.03 INSTALLATION AND REMOVAL
A. Contractor shall remove manhole sections or make connections to the existing sewer and construct temporary bypass pumping structures only at the access location indicated on the Drawings and as may be required to provide suction conduit.

B. Plugging or blocking of sewage flows shall incorporate primary and secondary plugging devices. When plugging or blocking is no longer needed for performance and acceptance of Work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging, or causing other major disturbances downstream.

C. When working inside a manhole or force main, the Contractor shall exercise caution and comply with OSHA requirements for working in the presence of sewer gases, combustible oxygen-deficient atmospheres, and confined spaces.

D. The installation of bypass pipelines is prohibited in all saltmarsh/wetland areas. The pipeline must be located off streets sidewalks, and on shoulders of the roads. When the bypass pipeline crosses local streets and private driveways, where roadway ramps cannot be used, the Contractor must place the bypass line in trenches and cover with temporary pavement.

E. Upon completion of the bypass pumping operations, and after the receipt of written permission from the PWCSA Project Management, the Contractor shall remove all piping, restore all property to pre-construction condition, and restore all pavement and roadways. The Contractor is responsible for obtaining any approvals for placement of temporary pipelines from local agencies.

3.04 CONTRACTOR’S RESPONSIBILITY FOR PROTECTION OF PUBLIC AND PRIVATE PROPERTY

A. In the event of a Sewage Spill occurring in connection with the work being performed by the Contractor, the Contractor shall promptly clean up all spilled solid material, disinfect the affected area, and repair any damage to property, and shall do so at the Contractor’s expense and at no cost to the Authority.

B. In the event of a Sewage Spill occurring in connection with the work being performed by the Contractor, the Contractor shall promptly notify the Service Authority and comply with the currently adopted version of all Federal, State and Local regulations to include required notifications at the Contractor’s expense and at no cost to the Authority. The Contractor shall provide an oral report to the Department of Environmental Quality (Department) within 24 hours from the time the Contractor becomes aware of the sewage spill and a written report to the Department within five (5) days of discovery at the following address and telephone number:

   Department of Environmental
Quality
Northern Virginia Regional Office
13901 Crown Court
Woodbridge, VA 22193
(703) 583-3800 (voice) or,
(703) 583-3821 (fax)

For reports to the Department outside normal working hours, leave a message to fulfill the immediate notification requirement. If a sewage spill is considered to be an “emergency”, based on volume, spill location, public health concerns, etc., and the sewage spill takes place after normal business hours, weekend or Holiday a call shall be made to the Virginia Department of Emergency Services at its 24-hour telephone service at 1-800-468-8892.

The written report shall contain: a description of the nature and location of the discharge; if the discharge reached State waters, the name of the affected water body; the cause of the discharge; the date on which the discharge occurred; the length of time that the discharge continued; the volume of the discharge, if the discharge is continuing, how long it is expected to continue, what the expected total volume of the discharge will be, and any steps planned or taken to reduce, eliminate and prevent a reoccurrence of the present discharge or any future discharges. The Contractor shall provide confirmation of immediate oral notification and a copy of the written report to the Service Authority.

The Contractor shall be charged back for any fines, penalties or other costs or damages incurred by the Service Authority as a result of a Sewage Spill occurring in connection with the work being performed by the Contractor.

END OF SECTION 02540
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SECTION 02550
GRINDER LIFT STATIONS

PART 1: GENERAL

1.01 SCOPE

A. This Section contains the requirements for a fully operational simplex grinder pump station.

1.02 SUBMITTALS

A. Conform to requirements of Section 01300 - Submittals.
B. Submit complete shop drawings and material certification(s) for wet well(s), grinder pumps, motors, valves, hatches, electrical materials, concrete, pipe materials, and coatings.

1.03 QUALITY OF EQUIPMENT

A. Equipment and appurtenances shall be designed for and constructed of materials for the conditions of exposure and of such strength to withstand all stresses which may occur during testing, installation, and all conditions of normal operation.
B. Exposed surfaces shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structure shapes shall be rounded or chamfered for personnel protection.
C. All machinery and equipment shall comply in all respects with the provisions of the Occupational Safety and Health Act of 1970, and other applicable Federal, State and local standards.

PART 2: PRODUCTS

2.01 GENERAL

A. Grinder pump stations, complete with all appurtenances shall be E One Model DH071 or DR071 or approved equal unless otherwise specified.
B. Flushing station in accordance with USM standards latest edition.

PART 3: EXECUTION

3.01 DELIVERY:

A. All grinder pump core units, including level controls, will be delivered to the job site 100 percent completely assembled, including testing, ready for installation.
3.02 INSTALLATION:

A. Earth excavation and backfill are specified under Section 02220.

B. The Contractor shall be responsible for handling ground water to provide a firm, dry subgrade for the structure, and shall guard against flotation or other damage resulting from general water or flooding.

C. The grinder pump station shall not be set into the excavation until the installation procedures and excavation have been approved by the AW Project Manager.

3.05 START-UP AND FIELD TESTING:

A. The Contractor shall provide the services of qualified factory trained technician(s) who shall inspect the placement and wiring of each station, perform field tests as specified herein

B. All equipment and materials necessary to perform testing shall be the responsibility of the Contractor. This includes, as a minimum, a portable generator and power cable (if temporary power is required), water in each basin (filled to a depth sufficient to verify the high level alarm is operating), and opening of all valves in the system. These steps shall be completed prior to the qualified factory trained technician(s) arrival on site.

C. Upon completion of the installation, the authorized factory technician(s) will perform the following test on each station:
   1. Make certain the discharge shut-off valve in the station is fully open.
   2. Turn ON the alarm power circuit and verify the alarm is functioning properly.
   3. Turn ON the pump power circuit. Initiate the pump operation to verify automatic “on/off” controls are operative. The pump should immediately turn ON.

D. Upon completion of the start-up and testing, the Contractor shall submit to the Project Representative, a start-up verification form confirming the results of the tests performed including a list of any installation deficiencies that have been corrected.

END OF SECTION 02550
SECTION 02660
WATER MAINS AND APPURTENANCES

PART 1 - GENERAL

1.01. Section Summary

Provide work under this Section as shown or specified and according to the Contract Documents. This Section relates to construction of pipelines, underground and above ground, and appurtenances thereto, intended to carry potable water under pressure. Appurtenances include control valves, meters, shutoff valves, hydrants, and air relief and blow off valves and enclosures intended to house and protect specialized control valves, meters and instrumentation. Removal and abandonment of existing water mains and service connections is included in this Section.

Locations and details of construction are shown on the Plans.

1.02. Related Work Specified Elsewhere

Section 01050 - FIELD PROJECT REPRESENTATIVE

Section 02220 - EXCAVATION, BEDDING AND BACKFILL FOR PIPELINES.

Section 02515 - PAVEMENT RESTORATION

Section 02665 - WATER SERVICE LINES AND WATER METER INSTALLATIONS.

Section 02820 - GRASSING (FESCUE)

1.03. Quality Assurance

Use adequate numbers of skilled workers, thoroughly trained and experienced in the necessary crafts, supervised by a crew foreman completely familiar with the specified requirements and the methods needed for the proper performance of the work of this Section.

Reference Standards:

American Water Works Association Standards - The most recent revision of all sections effective on the project bid date.

Virginia Department of Transportation Road and Bridge Specifications, latest edition.

Prince William County Service Authority Water and Sewer Utility Standards Manual, latest revision.
Requirements of Regulatory Agencies:

*Commonwealth of Virginia State Board of Health Waterworks Regulations; June 23, 1993; Article 6.*

Cut sheets: Provide according to Section 02220.

Stakeout: Provide according to Section 01050.

1.04. Submittals

Conform to Section 01300. Submit the following:

Sworn statements of compliance with applicable specifications from manufacturers of:

- Pipe
- Fittings
- Copper Tubing (if applicable)
- Valves & Fittings for Copper Tubing (if applicable)
- Hydrants
- Polyethylene Encasement
- Bituminous Coatings

Shop drawings and Manufacturer's Product Data for:

- Valves
- Valve Boxes
- Vaults
- Joint Restraint Materials
- Fire Hydrants
- Tapping Sleeves and Valves
- Polyethylene Encasement
- Bituminous Coatings

1.05. Delivery and Handling

Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending. Avoid deformation or other damage to pipe and appurtenances when unloading or handling. Do not place pipe within pipe of a larger size or roll or drag it over gravel or rock during handling. Store pipe and fittings on sills above storm drainage level and deliver for laying after the trench is excavated. Drain valves and protect them from freezing. Any joint or section of pipe damaged during transporting, unloading, handling or storing may be cut and the undamaged portion used where partial lengths are needed. If damaged sufficiently, remove the entire section from the site.
2.01. Pipe and Fittings

Pipe:

Ductile-Iron Pipe: Conform to "Ductile-Iron Pipe Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids," ANSI A21.51 (AWWA C151). Unless otherwise required by the Plans or the contract, use Thickness Class 52 for 3-inch through 12-inch pipe, Class 51 for greater than 12-inch. Bosses, as required or allowed for piping connections, shall be welded to the pipe by the pipe manufacturer and certified for the same working pressure as the pipe.

Copper Pipe: Conform to ASTM B-88 Specifications for Seamless Copper Water Tube. Use only Type K soft temper.

MUNICIPEX PEXa Pipe: Pipe shall conform and be third-party certified to AWWA C904, ASTM F876, CSA B137.5, NSF/ANSI 14 and NSF/ANSI 61. All pipe shall be crosslinked polyethylene manufactured using the high-pressure peroxide method of crosslinking (known as PEXa). Pipe shall be rated for continuous operation of 100 psi gauge pressure at 180°F temperature (690 kPa @ 82°C), and 160 psi gauge pressure at 73.4°F temperature (1105 kPa @ 23°C) as defined in AWWA C904. PEXa pipe shall be listed with a material designation code of “3306” per the ASTM F876 standard and PPI TR-3.

Pipe shall carry the following markings every three (3) feet: Manufacturer’s name and trademark, nominal size, PEXa 3306 (material designation code) SDR9 (standard dimension ratio), POTABLE TUBING, AWWA C904, ASTM F876/ F2023 / F2080, CSA B137.5, NSF-pw-g, U.P. Code 160psi/73°F 100psi/180°F 200psi/73°F at 0.63 Design Factor, manufacturing date and footage mark.

Casing Pipe:

Steel encasement pipe shall conform to the requirements of ASTM A139 with a minimum wall thickness of 0.500 inch or ASTM A53 Standard Weight Class and shall have beveled edges suitable for welding or be threaded. The hydrostatic test for such pipe will be waived.

Joints:

Buried Service: Joints shall be Mechanical Joints or Push-on Joints according to AWWA C111 or the manufacturer’s adaptation of the basic joint.

Aboveground Service: Joints shall be Flanged Ductile-Iron Pipe with Ductile-
Iron Threaded Flanges conforming to ANSI/AWWA C115/A21.15.

Fittings:


Copper Pipe Fittings: Use flared compression type fittings conforming to AWWA C800, latest edition, below ground and in meter boxes.

Crosslinked polyethylene (PEXa) pipe shall conform and be certified to AWWA C904, ASTM F876, and CSA B137.5. Fittings shall conform and be certified to AWWA C800, or, ASTM F2080 and CSA B137.5. with a 300 psi rating at the connection to the corporation stop.

Protective Coatings:

Provide all ductile iron pipe with bituminous outside coating according to ANSI A21.51 (AWWA C151), and Standard cement mortar lining according to ANSI A21.4 (AWWA C104), latest issue. Use polyethylene encasement conforming AWWA C105 where indicated by ground conditions or when ordered by the Project Representative. Royston Roskote R28 rubberized mastic shall be applied to all water main appurtenance, water main valves, fasteners and other mechanical connections that are exposed during construction activities including bolts, operating nuts and any other items as required by the Project Representative. Roskote R28 shall be applied in accordance with manufacturer’s recommendations.

2.02. Valves

Provide gate valves for pipelines of twelve (12) inches or less in diameter. Provide Butterfly valves for pipelines greater than twelve (12) inches in diameter.

Butterfly Valves:

Conform to ANSI/AWWA C504, Class 150-B. Provide with mechanical joint bell ends and underground operators with standard two-inch square operating nut. Open valve by turning nut counter clockwise. Supply valves with iron surfaces protected by a fusion-bonded epoxy coating, inside and out, conforming to AWWA C550. The following valves are acceptable:

- Henry Pratt Co. Ground Hog Butterfly Valve
- M&H Valve Co. #4500 and #1450 Butterfly Valves
- Mueller Company Lineseal III Butterfly Valve
Iron Body Gate Valves:

Unless restricted by drawing notes or other Contract Documents, use resilient wedge gate valves conforming to AWWA C509 or C515. Supply valves with "O" ring stem seals and mechanical joint ends. Supply valves with iron surfaces protected by a fusion bonded epoxy coating, inside and out, conforming to AWWA C550. All ferrous components of C515 valves shall be ductile iron and “D.I.” or “Ductile Iron” shall be cast on the valve or stamped on a permanently attached corrosion resistant metal tag. The following valves are acceptable:

Iron Body Gate Valves (C509):

- Kennedy Valve Resilient Seat Gate Valve RSGV-87
- Mueller Company A-2360 Resilient Wedge Gate Valve
- U S Pipe & Foundry Co. Metroseal 250 Resilient Seat Gate Valve

Ductile Iron Body Gate Valves (C515):

American Flow Control Series 2500 Resilient Wedge Gate Valve

Check Valves

Other sections of the Contract Documents and labeling on the plans supersede this specification except that all iron surfaces, inside and out, shall be fusion-bonded epoxy coated. Check valves shall be tilted [slanted] disc check valves. Valve bodies shall be cast iron or cast ductile iron. Valves shall be Apco 800 Series, Valmatic 9800 Series, or Golden Anderson Series 7125.

Control Valves

Other sections of the Contract Documents and labeling on the plans supersede this specification except that all iron surfaces, inside and out, shall be fusion-bonded epoxy coated. Control valves include, but are not limited to, altitude valves, pressure reducing valves, and backpressure sustaining valves. Altitude valves shall be single-acting altitude valves with an internal stop-check feature. Valve bodies shall be cast iron or cast ductile iron.

Control valves shall be manufactured by Golden Anderson, ClaVal, Singer Valve, Bermad, or OCV.

Brass body gate valves (less than 3"):

Use brass body valves rated for 200 psi WOG. Supply with iron pipe thread ends, non-rising stem, screwed bonnet and packing gland and handwheel operator.

2.03. Valve Boxes
Standard Buffalo type, two-piece, 5-¼ inch shaft, cast-iron slip type of adequate extension for depth and of suitable base for particular valve, as manufactured by Bingham & Taylor Dwg. 104, Tyler Pipe/Utilities Division, 6855 Series, or acceptable substitute. Valve box cover to read WATER.

2.04. Fire Hydrants

Brands of acceptable hydrants are restricted by the requirement to standardize units in the system and limit inventories of repair parts. Acceptable hydrants are limited to:

- Mueller Company - "Super Centurion 250"
- Kennedy Valve - K-81-A "Guardian"

Supply with the following:

- 1-½ inch point-to-flat pentagonal operating nut.
- 4-½ inch steamer nozzle.
- 2-½ inch hose nozzles.
- National Standard fire hose coupling threads.
- Restrained mechanical joint connection, conforming to Paragraph 2.06. Supply six-inch opening unless otherwise shown on plans or material lists.
- 5-¼ inch valve opening.
- 4 feet bury, or greater as required by depth of supporting pipeline.
- All below grade iron parts shall be protected with two coats of asphalt varnish conforming to Federal Specification TT-V-51a or Army Navy Specification HAN-P-450.
- Exposed parts above ground line painted chrome yellow.

Field painting fire hydrants:

- remove all dirt, grease, loose paint, and rust
- prime all surfaces with primer compatible with topcoat
- top coat entire hydrant with:
  - Rust-Oleum Professional High Performance Protective Enamel (oil-based), #7543 – Safety Yellow, or
  - McCormick Paint # 335031T – Accent Yellow, Alkyd Gloss Hydrant Paint

2.05. Tapping Sleeves and Valves

For large (over two inches) taps in existing water mains, use sleeves designed to enclose the entire area affected by the tap. Sleeves must be ductile iron. Supply sleeves with ductile cast iron bolts.

Use cast sleeves with a mechanical joint seal at each end. Use iron body gate valves conforming to this Paragraph 2.02, except body type will accommodate sleeve and tapping machine. The following tapping sleeves and valve are acceptable:
ON CALL UTILITY SERVICES AND MISCELLANEOUS CONSTRUCTION FOR SEWER AND WATER LINES
Section 02660-7

Mueller Company Resilient Wedge Tapping Valve T-2360
Clow Valve Company F5205 MJ Tapping Sleeve
Tyler Pipe 149-CI Tapping Sleeve

2.06. Joints for Pipe, Valves and Fittings

Iron Pipe (buried):

Conform to AWWA C111 (ANSI A21.11) for the types used in the work.

To restrain mechanical joints, use approved mechanical joint restraint accessories. To restrain push-on joints, use manufacturer’s proprietary adaptation of the basic joint. The following mechanical joint restraint accessories are acceptable:

- EBAA Iron Sales Inc. Series 1100 Megalug
- Ford Meter Box Co. Series 1400 Restraining Gland
- Mueller Co. AquaGrip
- Romac Industries GripRing Pipe Restraint
- Capital Industries EZ-Lok Restraining Gland

OneBolt mechanical joint fittings are acceptable restrained joints.

Flanged Joints:

Flanges for valves, fittings, and pipe shall be ANSI Class 125 flanges.

Valves, Hydrants and Fittings:

Supply with mechanical joint ends and employ retainer glands required above. Use swivel hydrant tees larger than 12-inches only where requested in writing by the Project Representative or required by Contract Drawings. Fire hydrants may be adjusted to grade using Assured Flow Sales, Inc. Fire Hydrant Gradelok or approved equal.

Copper Pipe:

Conform to ASTM B62 and AWWA C800 for types used in the work. Use only flare-type compression fittings for below grade installations.

2.07. Restrained Couplings

A. Above-ground Service:

Flanged ductile iron pipe shall be joined with one of the following restrained couplings:
2.08. Concrete

Use minimum Class B2 concrete conforming to the Virginia Department of Transportation Road and Bridge Specifications, for cradles, thrust blocks, or encasement concrete.

PART 3 - EXECUTION

3.01. Excavation

Make dimensions of excavations required to install various pipe sizes, valves, valve boxes, and appurtenances of depths and widths shown in the bedding details or the Plans. Keep sidewalls of trenches as nearly vertical as possible and properly sheathed and braced. Unless otherwise indicated, provide a minimum cover of forty-two (42) inches measured from finish grade to top of pipe.

When crossing under subsurface obstructions, increase cover to provide adequate clearance as shown on the plans or as directed by the Project Representative. When construction appears to be in close proximity to existing utilities, the trenches shall be opened a sufficient distance ahead of the work or test pits made to verify the exact locations and inverts of the utility to allow for changes in line or grade.

Service lines can be installed using a pneumatic soil penetrating device. Contractor to visually verify all crossings of existing lines by test hole at the crossing location. Depth to be verified as requested by the Project Representative. Contractor is responsible for any surface improvements lifted or damaged during the operation by use of the soil penetrating device. Any damage as determined by the Project Representative to have been caused by the installation of service lines using this method shall be repaired by the contractor at no additional expense to the Owner.

Existing water and service lines and appurtenances and manholes not required in the completed system shall be abandoned as approved by the Project Representative. Abandoned materials shall become the property of the Contractor, unless otherwise noted on the plans, upon satisfactory replacement with the new installation. Abandoned pipe that is not removed shall be cleaned of debris and plugged at open ends with Class A3 concrete. Abandoned service lines shall be cut and crimped to prevent water from entering the line.

3.02. Laying Pipe

Handle pipe and appurtenances carefully when moving or lowering into trench. Abut spigot ends into bell openings so that there shall be no shoulder or unevenness inside
the main. Use suitable tools and appliances and take great care to prevent damage to any pipe or appurtenance. Embed pipes on a solid foundation along entire length of barrel, but exercise special precautions to prevent any pipe from resting on rock. Dig bell holes sufficiently large to insure making up joints adequately.

Whenever pipe requires cutting to fit in line or to accommodate a fitting or other appurtenance, make square cuts and bevel edges thereof to eliminate damage to the gasket. Confine changes in direction at joints to the limits prescribed in AWWA C600 for the type of joint involved.

3.03. Pipe Cleanliness

While storing, handling, laying and backfilling pipe, Contractor shall take special care to prevent any foreign materials from entering the pipe, which may cause potential contamination problems. Pipe with any visible debris will not be accepted. At the end of workday, pipe ends shall be capped with a Push-On Joint Plug or Mechanical Joint Cap or Plug, to match pipe joint (Seal shall be watertight). Prior to joining pipe section and inserting gaskets, pipe joints and pipe ends shall be cleaned with potable water.

3.04. Joints

Make up all joints in strict conformance with AWWA C600, Section 3.4. When making up proprietary joints, conform to manufacturers' instructions.

3.05. Valves and Valve Boxes

Install gate and butterfly valves at locations shown on the Plans or at other locations as the Project Representative may direct. When installing valves at bends, crosses or tees, use 24” long pipe nipples or plain end by plain end (PE x PE) reducers. When one reducer will not make the transition satisfactorily, use one small end bell (SEB) reducer and one PE x PE reducer. Set the valve on suitable base support, and secure joint restraint devices.

Make sure axis of operating stem is vertical. Use extension pieces, as necessary, to insure that operating nut is no more than three (3) feet below finished grade.

Install valve box with Barrel continuous from base to cap. Adjust box so cap is flush with finished grade.

3.06. Setting Fire Hydrants

Install fire hydrants at locations and at such elevations as shown on the Plans or as Project Representative may direct, with the bury line on the barrel -0.0 foot to +0.3 foot of specified grade. Set each hydrant on a stabilized bed of Size No. 57 or Size No. 78 stone extending full width of trench from front of boot to end of trench, and from bottom of trench to a point six (6) inches above drip opening. Protect hydrant against horizontal movement by restrained joints extending back to the main.
3.07. Vaults and Other Equipment Enclosures

Conform to details on the Plans. Set all open bottomed enclosures on solid brick set at the quarter points of the barrel. Set brick in turn on a foundation of stone vibrated in place to resist settling under the weight of traffic.

Set vaults in a 6-inch bed of stone, hand graded and vibrated to the elevation required to have the hatch in the vault top at the prescribed elevation, ± 0.05 foot. Take care to see that vault floors slope to cause drainage to the sump [in the floor], but not more than 1 inch in 14 inches. Provide a sump pump or drain sump to daylight. Test with water before backfilling. If water stands more than 1 inch deep on the floor at any place, remove the vault and regrade the stone to correct the deficiency.

3.08. Blocking

In setting pipe, fittings, etc., use such blocking and wedges as may be required of material and dimensions as may be necessary to support pipe, fittings, etc., properly. Support valves as shown on the Plans or as approved by Project Representative. Do not use blocking for thrust restraint.

3.09. Connections

Coordinate with Project Representative at least two working days prior to making any connection to existing system. Complete connections in a timely manner in order to minimize public inconvenience. Contractor to provide a schedule of shutdowns and connections as part of the submitted Project Schedule at the beginning of the project.

3.10. Joint Restraint

Restrain all joints created by openings in fittings, valves, and hydrants. In addition, restrain all pipe joints that occur within any restraint zone shown on the Plans. If concrete thrust blocks are required, conform exactly to locations, dimensions, and construction requirements shown on the Plans.

3.11. Polyethylene Pipe Encasement

Conform to the requirements of AWWA C105.

3.12. Defective Work

Replace or repair any defective work revealed at any time through the bonded maintenance period following completion of the work.

3.13. Field Testing

Test completed sections in conformance with AWWA Standard C600, Section 4. Furnish all equipment and supplies and make all necessary connections for the tests.
Use hydrostatic and leakage test pressures equal to nominal operating pressure of the pipe plus 100 psi, with a minimum test pressure of 150 psi. Use the work sheet included at the end of this Section and on the Standard Water Details sheet to determine test pressure at any location.

Determine leakage allowance by the formulas given in AWWA C600, Section 4.2. In event of failure, correct deficiencies and repeat test until satisfactory results are obtained. Do tests in the presence of the Project Representative or his representative.

3.14. Disinfection

Disinfect pipelines in sections not more than 2,000 feet long. Disinfect according to AWWA C651. Use any of the three methods described in Section 5. At least two consecutive samples, obtained twenty-four (24) hours apart, from each section disinfected must be certified bacteriologically satisfactory by Owner's water testing laboratory before pipe can be placed in service. Take samples at regular intervals, not exceeding 2,000 feet, throughout the length of pipeline. Flush the sterilized line immediately after confirmation of acceptable test results.

Project Representative will arrange with Owner's water laboratory at the H. L. Mooney WWTP to take samples at the appropriate time. Be present and provide whatever assistance the technician requires for taking samples.

3.15. Restoration of Disturbed Surfaces

Restore all surfaces disturbed during the work according to Section 02515 - Pavement Restoration or Section 02820 - Grassing (Fescue).

3.15. Jacked and Bored Casing Pipe

The Contractor shall submit to the Engineer a complete plan and schedule for jack and bore pipe installation prior to beginning such work. The submission shall include complete details for dewatering; soil stabilization; jacking and receiving pits; jacks; reaction block; boring equipment; sheeting, shoring, and bracing for protecting the roadbed; installation sequence; materials; and equipment. The Contractor shall not proceed with pipe installation until the plan has been reviewed and accepted by the Project Representative.

3.16. Section Appendices

A. WATER MAIN TEST PRESSURE WORK SHEET
Select proper HGL El. from Table A. below.

This project, Balsam Street Water Main Replacement, is in the Woodbridge Low Service Level.

Determine ground elevation, in feet, at Test Site from drawings. (Topo or profile)

Subtract ground elevation from HGL El.

Add 233

Total

Divide Total by 2.31

Calculated Test Pressure (in psi)

Test Pressure = the greater of Calculated Test Pressure (above) or 150 psi.

### Table A. Service Level Hydraulic Grade Line Elevations

<table>
<thead>
<tr>
<th>Service Level</th>
<th>HGL El.</th>
<th>Service Level</th>
<th>HGL El.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bull Run Mountain</td>
<td></td>
<td>Hoadly</td>
<td>495</td>
</tr>
<tr>
<td>Lower Level</td>
<td>957</td>
<td>Lake Ridge</td>
<td>390</td>
</tr>
<tr>
<td>Bull Run Mountain</td>
<td></td>
<td>Manassas Southside</td>
<td>456</td>
</tr>
<tr>
<td>Upper Level</td>
<td>1293</td>
<td>Minnieville</td>
<td>526</td>
</tr>
<tr>
<td>Dumfries/Triangle</td>
<td>299</td>
<td>Montclair</td>
<td>390</td>
</tr>
<tr>
<td>Gainesville/Wellington</td>
<td>456</td>
<td>Oak Ridge/Ind. Hill</td>
<td>526</td>
</tr>
<tr>
<td>Greater Manassas</td>
<td>376</td>
<td>Woodbridge Low</td>
<td>299</td>
</tr>
<tr>
<td>Haymarket</td>
<td>535</td>
<td>Yorkshire</td>
<td>376</td>
</tr>
</tbody>
</table>

END OF SECTION
SECTION 02665
WATER SERVICE LINES AND METER INSTALLATIONS

PART 1 - GENERAL

1.01. Section Summary

Provide work under this Section as shown or specified and in accordance with the Contract Documents. This Section relates to construction or replacement of water service lines and water meter installations for service lines two inches and smaller in size.

1.02. Related Work Specified Elsewhere

Section 02220 - EXCAVATION, BEDDING AND BACKFILL FOR PIPELINES.

Section 02660 - WATER MAINS AND APPURTEANCES.

1.03. Typical Construction Details

Details listed below in the Utility Standards Manual USM provide pictorial detail of typical installations of various sizes of meters and related service lines.

A. Typical household (½” x ¾”) meter installation. (1)

B. Typical 1-inch meter installation. (2)

C. Typical 1 ½-inch meter installation. (3)

D. Typical 1 ½ and 2-inch meter in D.I.P. service installation. (4)

1.04. Quality Assurance

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts, and are supervised by a crew foreman completely familiar with the specified requirements and the methods needed for the proper performance of the work in this Section.

B. Referenced Standards


5. MunixiPEXa Pipe: AWWA C904, NSF/ANSI Standards 14 and 61, ASTM F876, CSA B137.5

C. Requirements of Regulatory Agencies


1.05. Submittals

A. Certified statements of compliance with applicable specifications from manufacturers of:

- Pipe
- Fittings
- Water Meters

B. Shop Drawings and Manufacturer's Product Data for:

- Meter Boxes
- Meter Box Covers
- Meter Yokes and Appurtenances
- Tapping Saddles
- Tapping Sleeves and Valves
- Valves

1.06. Delivery and Handling

Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending. Unload pipe and materials so as to avoid deformation and other injury thereto. Do not place pipe within pipe of a larger size nor roll or drag it over gravel or rock during handling. Store pipe, fittings and meter box materials or sills above storm drainage level and deliver for installation after trench is excavated. Drain valves; protect valves and meters from freezing and contamination. Joints or sections of pipe damaged during transporting, unloading, handling or storing may be cut and the undamaged portion used where partial lengths are needed. If damaged sufficiently, or rejected by the Project Representative or his representative, remove the entire pipe section from the site. Remove damaged or rejected valves, meters, or meter box material from the job site.
PART 2 - PRODUCTS

2.01. Pipe

Conform to Section 02660, Par. 2.01

2.02. Pipe Fittings

Conform to Section 02660, Par. 2.01. B.2.

2.03. Valves

A. Line Valves - Conform to Section 02660, Par. 2.02.

B. Corporation Stops - Supply Ford Meter Box Company F600 series or Mueller H15000 series corporation stop for use with ASTM B-88, Type K, copper tube.

C. Meter Valves - Supply two angle yoke valves per meter installation. Use Ford Meter Box Company AV92 series or Mueller Company equal designed for use with ASTM B-88, Type K, copper tube. Size angle valve equal to meter size. Install as designated in plans.

2.04. Water Meter Yokes

Use Ford Meter Box Company 500 series or Mueller Company equal sized for required meter for installations up to 1-inch meters. Supply with expander for installing meter.

2.05. Water Meter Box

Use one-piece construction concrete, PVC or rigid fiberglass meter boxes of dimensions shown in the Plans for meters up to 2 inches.

2.06. Meter Box Cover

Use covers made to incorporate Schlumberger Pro-Read Pad, as manufactured by Meter Box Covers, Inc., Southeastern Distributors, Inc. or acceptable substitute.

2.07. Water Meter

The Authority will provide and relocate water meters from existing meter crock to proposed crock.

2.08. Concrete

Conform to Section 02660, Par. 2.08.
PART 3 - EXECUTION

3.01. Trenches

Conform to Section 02220, Part III and Section 02660, Par. 3.01.

3.02. Installing Pipe

Conform to Section 02660, Par. 3.02. In so far as possible, install all services by pushing tube through passage created by pneumatic penetration tool. Trenching to install services will be allowed with no additional payment for curb and gutter restoration, sidewalk restoration or any other item required for installation of the service lines from the watermain to the service crock and meter, with the exception of pavement. Pavement over service line trench will be paid under full section asphalt pavement.

3.03. Joints

Conform to Section 02660, Par. 3.03. No joints are permitted in copper service lines between the main and the meter unless approved in writing by the Project Representative.

3.04. Blocking

Conform to Section 02660, Par. 3.05.

3.05. Joint Restraints

Conform to Section 02660, Par. 3.07.

3.06. Connections

A. 2-inch and smaller taps

Install corporation stops by direct tap into ductile iron pipe. Use tapping saddles for taps in all other pipe and for 1½ and 2-inch connections into all pipes.

B. 3-inch and larger taps

Install 3-inch and larger connections using either tapping sleeve and valve or ductile iron fittings and valve conforming to Section 02660.

3.07. Defective Work

Conform to Section 02660, Par. 3.08.
3.08. Field Testing

Conform to Section 02660, Par. 3.09

3.09. Disinfection

Conform to Section 02660, Par. 3.10.

3.10. Setting Water Meters

Service lines and meter crocks and assemblies to be furnished and installed by contractor. The meter box shall not transmit shock or stress to the meter and shall be centered and plumb over the meter. The top of the box shall be flush with the surrounding surface. Contractor to coordinate with Project Representative to relocate existing meters to new meter crock. Contractor to remove existing meter box, abandon existing service, backfill and restore ground to match existing surface.

END OF SECTION
SECTION 02670
TEMPORARY BYPASS WATER SERVICE

PART 1 - GENERAL

1.01. Section Summary

Provide work under this Section as shown or specified and in accordance with the Contract Documents. This Section relates to construction, operation and maintenance of a temporary above ground water system with a minimum working pressure of 150 psi to provide water to existing customers when existing water main is to be shut down or replaced in place.

1.02. Quality Assurance

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts, and are supervised by a foreman completely familiar with the specified requirements and the methods needed for the proper performance of the work in this Section.

B. Referenced Standards

American Water Works Association Standards - The most recent revision of all sections effective on the project bid date.

Virginia Department of Transportation Road and Bridge Specifications, latest edition.

Prince William County Service Authority Water and Sewer Utility Standards Manual, latest revision.

C. Requirements of Regulatory Agencies

Virginia Department of Transportation Road and Bridge Specifications, latest edition.

Prince William County Service Authority Water and Sewer Utility Standards Manual, latest revision.


1.03. Submittals

A. Submit schedule and phasing plan for temporary water services along with
ON CALL UTILITY SERVICES AND MISCELLANEOUS CONSTRUCTION FOR SEWER AND WATER LINES

Section 02

schematic diagrams for installation of proposed temporary water system as well as computations for pipe diameters to insure appropriate domestic capacity.

B. Shop Drawings and Manufacturer's Product Data for:

- Pressure pipe, hoses, fittings and valves;
- Service saddles, corporation stops and service lines;
- Hydrant adaptors and backflow preventers

1.04. Delivery and Handling

Unload pipe and materials so as to avoid deformation and other injury thereto. Store pipe, fittings and other materials above storm drainage level and deliver for installation when ready to assemble. Protect valves and from freezing and contamination. Joints or sections of pipe damaged during transporting, unloading, handling or storing may be cut and the undamaged portion used where partial lengths are needed. Remove damaged or rejected valves of other material from the job site.

**PART 2 – PRODUCT (not used)**

**PART 3 - EXECUTION**

3.01. Provide contact telephone numbers to Owner for designated after hours emergency work crew before installation of temporary system.

3.02. Before water main to be replaced is shut down, provide temporary bypass piping system of adequate size to provide domestic water service to affected properties. Hydrants that will be taken out of service are to be bagged and marked “out of service”. Fire department is to be notified 24 hours prior to removing hydrants from service.

3.03. Notify Service Authority Project Representative:

   A. A minimum of 72 hours in advance of putting temporary connections in service to allow for 2 days notification of affected customers prior to the installation of temporary connections.

   B. When additional bypass services are to be made

   C. When problems develop with any bypass or service.

3.04. Use nearest available fire hydrant for connection to temporary bypass system

   A. When fire hydrants cannot be used, excavate and tap existing water main at Service Authority Project Representative’s direction.
B. Provide backflow preventers on temporary bypass piping at connection to source (i.e., fire hydrant)

C. Make temporary bypass service attachments to fire hydrants in a manner that will allow the removal with a minimum of effort in case of an emergency.

3.05. Provide temporary service connection to each property affected by the required water main shut downs. No house to house connections.

3.06. Protection of Temporary Bypass Piping:

A. Provide protection against freezing.

B. Provide protection for bypass lines that cross driveways or sidewalks.

C. Place bypass lines at road crossings under the road surface or provide other approved means of protection from damage from being run over.

D. Install and support temporary bypass piping at storm drain inlet crossing so that piping and supports do not impede storm water from entering storm drain inlet.

3.07. Disinfect and perform bacteriological testing on temporary bypass piping in accordance with Section 02660, 3.14 Disinfection prior to putting bypass system in service.

END OF SECTION
PART 1 - GENERAL

1.01. Section Summary

A. This Section is concerned with the means and materials for establishing a dense stand of grass to retard the runoff of rainfall from the work area after construction has been completed.

1.02. Scope

A. Description of Work

1. Furnish all labor, equipment and materials and perform all work required to assure establishment of a dense permanent cover of fescue grass on all areas disturbed by construction operations except where established lawn turf is disturbed. In the latter case, remove and replace turf or replace in kind with nursery grown turf. Where sod is specified for restoration of disturbed areas, sod disturbed areas with nursery grown turf.

B. Extent

1. Limits of Grassing coincide with the area disturbed by excavation, filling or otherwise substantially damaging the existing ground cover. They include ruts, tracks or other marks formed by vehicles or stored materials although outside the active work area.

1.03. Submittals

Refer to Section 01300. Submit brand names and analysis of proposed fertilizers and seed to be incorporated into the work, together with certificates of approval on grass seed.

PART 2 - PRODUCTS

2.01. Seed

A. Certified by Virginia Department of Agriculture as to freedom from noxious weeds, true to variety and minimum germination.

B. Acceptable varieties are limited to:

1. Fescue: Shenandoah (preferred), Bonanza, Jaguar or Mustang
2. Rye: Annual

2.02. Lime
   A. Commercially produced ground agricultural limestone.

2.03. Fertilizer
   A. Commercially produced, analysis guaranteed as printed on the original container.

2.04. Nitrogen
   A. Obtain from Nitrate of Soda or Ammonium Sulfate:
      B. Nitrate of Soda will be a commercial product containing not less than sixteen percent (16%) available nitrogen.
      C. Ammonium Sulfate will be of similar manufacture, but with a nitrogen availability of twenty percent (20%), by weight.

2.05. Gypsum
   A. Commercially produced agricultural Calcium Sulfate or "Land Plaster."

PART 3 - EXECUTION

3.01. General
   A. The following paragraphs regarding pH adjustment and fertilization are intended to cover very General Conditions and Special Conditions prevailing in the area. Contractor is urged to submit representative samples of the indigenous soils from the work area, plus any imported soil that may be used, to the Agricultural Extension Agent for analysis and recommendation as to quantities and analysis of fertilization and seed to yield the best results. Samples should be submitted not less than four weeks before seeding is to take place. If not done, Contractor assumes all responsibility for using the amounts and types of materials named below to obtain the required results. No warranty of the adequacy of the application rates given below can be implied.

3.02. Seed Bed and Sodding Preparation
   A. Establish final grades as shown on the plans prior to any seed bed preparation. Even up washes, low spots and hillocks or windrows and smooth the bed to facilitate uniform drainage after establishment of the turf before any tillage is begun. Maintain graded surfaces in a smooth and even condition until the required cover is established.
B. After the areas to be seeded have been brought to an even and smooth grade, till them to a depth of at least six (6) inches by plowing, disk ing or harrowing. York rake areas to be seeded to remove all rocks, roots and other waste material that is 1-inch and larger in diameter to a depth of at least six (6) inches. Remove and properly dispose of all waste material from tilling and raking operations. Smooth out any surface irregularities before seeding operations are begun.

3.03. pH Adjustment

A. Have tests made on representative sample of soil taken from several locations in the area. Adjust pH by application of Gypsum or Lime at a rate sufficient to bring into acceptable range of 6.2 to 6.6.

3.04. Fertilization

A. Distribute fertilizer uniformly at a rate of 2,000 pounds of commercial 5.10.10 analysis fertilizer per acre, and incorporate into the soil to a depth of approximately three (3) inches by disk ing, harrowing, or other approved methods.

B. Apply Nitrate of Soda or Ammonium Sulfate to spring sown areas before the following September 15th. Uniformly spread Nitrogen fertilizer with approved equipment at a rate that will yield not less than sixty (60) pounds of available Nitrogen per acre. Other commercial types of nitrogenous material may be substituted so long as specified rate of available Nitrogen is provided.

3.05. Seeding

A. Unless otherwise specified, permanent grass cover will consist of Fescue seeded at a rate of 220 pounds per acre. Do not seed Fescue between October 15 and March 1. If seeding is delayed past October 15, temporarily seed annual Rye at a rate of 100 pounds per acre through the following February 1, and complete permanent seeding with Fescue before March 15. Apply seed by means of a Hydro-seeder or other means that will produce the required stand of grass.

3.06. Compaction

A. Immediately after seeding operations have been completed, compact the area by means of a cultipacker, roller, wood float, or other approved equipment, or by hand methods, to reduce air pockets to minimum. Leave the complete planted area with a firm, even surface, free from abrupt humps and hollows, and to the established grade.

3.07. Mulching
A. Mulch all planted areas uniformly with hay or straw at the rate of 1 ½ tons per acre. Commercially available mulch substitutes may be used.

3.08. Maintenance

A. Keep the surface of the ground uniformly moist until the grass shows uniform germination over the entire area. Wherever poor germination occurs in areas larger than three (3) square feet promptly reseed, roll, and water as necessary to obtain proper germination.

B. Water, weed, and otherwise maintain and protect seeded areas as necessary to produce a dense, healthy growth of grass.

3.09. Inspection-Acceptance

A. At the beginning of the next planting season following that in which the permanent grass was sown, the stand will be inspected. Grassed areas will be accepted if a ninety-five percent (95%) cover by permanent grasses is established and weeds are not excessive. Regrade, fertilize and reseed any areas not acceptably covered with dense grass or containing significant stands of weeks. Thereupon, continue to water, weed, fertilize and otherwise maintain the entire stand until the end of that planting season, when another inspection will be made. Only when a dense stand of weed-free grass is established will the planting be accepted.

END OF SECTION
SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 Section Summary:
   A. This Section is concerned with the procedures, methods and materials for cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.02 Referenced Standards:
   A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
   B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
      C. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
      D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
   E. 2008 VDOT Road and Bridge Standards

1.03 Related Work Specified Elsewhere:
   A. Section 02515 – Pavement Restoration

1.04 Action Submittals:
   A. Product Data: For each type of product indicated.
   B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   C. Indicate amounts of mixing water to be withheld for later addition at Project site.

1.05 Informational Submittals:
   A. Material Certificates: For each of the following, signed by manufacturers:
      1. Cementitious materials.
2. Steel reinforcement and accessories.

B. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

C. Aggregates

1.06 Quality Assurance:

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

**PART 2 – PRODUCTS**

2.01 Form-Facing Materials:

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Plywood, metal, or other approved panel materials.

C. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

1. High-density overlay, Class 1 or better.
2. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.

D. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.


F. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not
impair subsequent treatments of concrete surfaces.

G. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

2.02 Steel Reinforcement:
   A. Plain-Steel Welded Wire Reinforcement: ASTM A 185 plain, fabricated from as-drawn steel wire into flat sheets.

2.03 Concrete Materials:
   A. Concrete shall be VDOT Class A3: 4,000 psi for curb, gutters, road replacement and 3,000 psi for sidewalks.
   B. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
      1. Portland Cement: ASTM C 150, Type I. Supplement with the following:
      2. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

2.04 Admixtures
   B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   C. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2.05 Related Materials:
   A. Expansion and Isolation Joint Filler Strips: ASTM D 1751, asphalt saturated cellulosic fiber.

2.06 Concrete Mixtures, General:
   A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
B. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

2.07 Fabricating reinforcement

A. Fabricate steel reinforcement according to CRSI’s “Manual of Standard Practice”.

2.08 Concrete Mixing

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

B. When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

C. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 – EXECUTION

3.01 Formwork:

A. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Construct forms tight enough to prevent loss of concrete mortar.
2. Fabricate forms for easy removal without hammering or prying against concrete surfaces.
3. Install keyways, reglets, recesses, and the like, for easy removal.

B. Chamfer exterior corners and edges of permanently exposed concrete.

C. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

D. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

E. Coat contact surfaces of forms with form-release agent, according to manufacturer’s written instructions, before placing reinforcement.
3.02 Steel Reinforcement:

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.03 Joints:

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

3.04 Concrete Placement:

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

3.05 Miscellaneous Concrete Items:

A. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.06 Concrete Protecting and Curing:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Cure concrete according to ACI 308.1.

3.07 Joint Filling:

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.08 Concrete Surface Repairs:
   A. Defective Concrete: Repair and patch defective areas when approved by Project Representative. Remove and replace concrete that cannot be repaired and patched to Project Representative's approval.
   B. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   C. Repair materials and installation not specified above may be used, subject to Project Representative's approval.

3.09 Field Quality Control:
   A. Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
   B. Inspections:
      1. Steel Reinforcement placement
      2. Verification of use of required design mixture.
      3. Verification of concrete strength before removal of shores and forms from beams and slabs.
   C. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
      1. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
      2. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
      3. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 degrees F and below and when 80 degrees F and above, and one test for each composite sample.
   D. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
E. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.

F. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

G. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION
Commonwealth of Virginia

Department of Transportation

LAND USE PERMIT

12/2010

NOTICE OF PERMITTEE LIABILITY

Permittee Agreement for Land Use Permit Issuance

I the undersigned hereby acknowledge that I am fully cognizant of all of the following requirements associated with the issuance of a VDOT Land Use Permit:

Applicant Name:

____________________________________________________________________

Applicant Signature:

____________________________________________________________________

Project Name:

____________________________________________________________________

Route Number: ______ County:

____________________________________________________________________

Any of the following provisions that may apply, shall apply:

1. Permittee acceptance and use of a Virginia Department of Transportation (VDOT) Land Use Permit is prima facie evidence that the permittee has read and is fully cognizant of all required permit provisions, applicable traffic control plans and associated construction standards to be employed. ALL applicants to whom permits are issued shall at all times indemnify and save harmless the Commonwealth Transportation Board, members of the Board, the Commonwealth, and all Commonwealth employees, agents, and officers, from responsibility, damage, or liability arising from the exercise of the privileges granted in such permit to the extent allowed by law.
2. The permittee agrees to secure and carry insurance against liability for personal injury and property damage that may arise from the work performed under permit and/or from the operation of permitted activity up to one million dollars ($1,000,000) each occurrence to protect the Board members and the Department's agents or employees; seventy five thousand dollars ($75,000) each occurrence to protect the Board, the Department, or the Commonwealth in event of suit.

3. The permittee assumes full responsibility for any and all (downstream flooding, erosion, siltation, etc.) damages that may occur as a result of the work performed under this permit. Furthermore, the Department will in no way be responsible for any damage to the facility being placed as a result of future maintenance or construction activities performed by the Department.

4. The permittee agrees to move, remove, alter, or change any installation that interferes with the ultimate construction of the highway in alignment or grade at NO cost to the Department unless otherwise stipulated and agreed to by the Department.

5. The permittee shall immediately correct any situation that may arise as a result of these activities that the district administrator's designee deems hazardous to the traveling public.

6. Any and all highway signs, right-of-way markers, etc., disturbed as a result of work performed under this permit shall be accurately reset by the permittee immediately following the work in the vicinity of the disturbed facility. The services of a certified land surveyor with experience in route surveying may be required.

7. It shall be the permittee's responsibility to obtain ANY and ALL necessary permits that may be required by any other government agencies, i.e., U.S. Army Corp. of Engineers, Department of Environmental Quality, Department of Conservation and Recreation, etc.

8. A copy of the VDOT Land Use Permit shall be maintained at the work site at all times.

9. The permittee shall notify the local VDOT district permit office at least 48 hours prior to commencement of ANY work requiring inspection and/or testing as stipulated in VDOT’s Road and Bridge Standards (current edition) and VDOT’s Road and Bridge Specifications (current edition). Failure to carry out this requirement may result in permit revocation.

10. The permittee is required to notify the local VDOT district permit office and the Regional Traffic Engineering Section when planned excavation is within 1,000 feet of a signalized intersection. Failure to carry out this requirement may result in permit revocation.

11. The permittee shall to notify “Miss Utility” (or each operator of an underground utility where no notification center exists) of ANY planned excavation within state maintained right-of-way. This notification must be provided at least 48 hours (excluding weekends and holidays) in advance of commencing with ANY planned excavation within state maintained right-of-way. Failure to carry out this requirement may result in permit revocation.

12. It is the duty of the district administrator’s designate to keep all roads maintained in a safe and travelable condition at ALL times. Therefore, any permit may be denied, revoked or suspended.
when in the opinion of the district administrator’s designee, the safety, use or maintenance of the highway so requires.

13. The permittee shall at ALL times give strict attention to the safety and rights of the traveling public, their employees and themselves. VDOT reserves the right to stop work at any time due to safety problems and/or non-[illegible] compliance with the terms of the permit. The Department may, at its discretion, complete any of the work covered in the permit or restore the right-of-way to the Department’s standards and bill the permittee for the actual cost of such work. The permittee may be required to move, alter, change or remove from state maintained right-of-way, in a satisfactory manner, any installation made under this permit.

14. ALL work authorized under the auspices of a VDOT land use permit shall be subject to VDOT’s direction and be in accordance with VDOT’s Road and Bridge Standards (current edition) and VDOT’s Road and Bridge Specifications (current edition).

15. Design changes, specified material changes and/or field changes from the approved plans shall be submitted to the appropriate district administrator’s designee for review and approval prior to proceeding with the proposed changes. This submittal shall include written justification, supplemental documentation and/or engineering calculations that support the requested changes.

16. The permittee shall meet or exceed the existing pavement design and typical section when constructing pavement widening adjacent to an existing state maintained roadway. The proposed pavement design and typical section shall be approved by the district administrator’s designee prior to commencing with any work within state maintained right-of-way. ALL pavement widening shall be in accordance with VDOT Road and Bridge Standard 303.02.

Traffic Control and Safety

17. In accordance with the Virginia Department of Transportation (VDOT) Road and Bridge Specification, Special Provision 105.14, beginning July 1, 2009, all activities performed under the auspices of a VDOT Land Use Permit involving the installation, maintenance and removal of work zone traffic control devices must have at least one (1) person on site who, at a minimum, is verified by VDOT in Basic Work Zone Traffic Control. A person verified by VDOT in Intermediate Work Zone Traffic Control must be on site to provide supervision during work zone adjustments or changes to traffic control due to field conditions. These persons must have their verification card with them while on the work site. The permittee shall be exempt from this requirement if the permitted activity does not involve the installation, maintenance and removal of work zone traffic control devices.

18. Traffic shall NOT be blocked or rerouted (detoured) without written permission from the district Administrator’s designee.

19. During construction, the permittee shall furnish ALL necessary signs, flag persons and other devices (lights, barricades, etc.) providing protection for traffic and workers in accordance with the Virginia Work Area Protection Manual or as directed by the district administrator’s designee.
20. ALL signs shall be in accordance with the current edition of the Manual of Uniform Traffic Control Devices (MUTCD).

21. Trained, certified flag persons shall be provided in sufficient number and locations as necessary for control and protection of vehicular and pedestrian traffic in accordance with the MUTCD. The flag person shall carry their certification card while performing flagging duties within state maintained right-of-way. Any flag person found not in possession of his/her certification card shall be removed from the flagging site and the district administrator’s designee will suspend all permitted activities requiring flag persons. Furthermore, flag persons performing duties improperly shall have their certification revoked.

**Authorized Hours and Days of Work**

22. Normal hours for work under the authority of a permit single use or districtwide are from 9:00 a.m. to 3:30 p.m. for all highways classified as arterial or collector. All highways classified as local roads will have unrestricted work hours and days. The classifications for all state maintained highways can be found at the following link: http://www.virginiadot.org/projects/fxn_class/maps.asp

23. Permitted non-emergency work will not be allowed on arterial and collector highway classifications from noon on the preceding weekday through the following state observed holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. If the observed holiday falls on a Monday, the permit will not be valid from noon on the preceding Friday through noon on Tuesday.

24. The district administrator's designee may establish alternate time restrictions in normal working hours for single use permits.

25. The central office permit manager may establish alternate time restrictions in normal working hours for district wide permits.

**Emergency Repair**

26. In the event of an emergency situation that requires immediate action to protect persons or property, work may proceed within the right-of-way without authorization from the district administrator's designee; however, the permittee must contact the VDOT Emergency Operations Center as soon as reasonably possible but no later than 48 hours after the end of the emergency situation.

27. The permittee must apply for an after the fact emergency repair permit single use permit at the local VDOT permit office when the following actions are proposed: Stopping or impeding highway travel in excess of 15 minutes, or, Accessing facilities within limited access right-of-way, or, Cutting the highway pavement or shoulders. The district administrator’s designee shall determine the applicable permit fee and surety for emergency repair permits.

**Excavation**
28. All excavation within state maintained rights-of-way shall comply with OSHA Technical Manual, Chapter 2, and Title Excavation: Hazard Recognition in Trenching and Shoring. A professional engineer shall certify all shoring and/or trench boxes.

29. No excavated material is to be placed or tracked on the pavement without written permission from the District Administrator’s designee. When so authorized, the pavement shall be satisfactorily cleaned by a VDOT approved method. No cleated (track-mounted) equipment is to be used on the pavement without properly protecting the pavement from damage.

Inspection and Restoration

30. Inspection and testing of all backfill and pavement sections shall be performed in accordance with all applicable sections of VDOT’s Road and Bridge Specifications (current edition).

31. If during or before construction it is deemed necessary for the local VDOT district permit office to assign an inspector to the project, the permittee shall pay the Department an additional inspection fee in an amount that will cover the salary, expense allowance, and mileage allowance for the inspection(s) assigned by the Department for handling work covered by this permit. Said inspection fee shall be paid promptly each month on invoices rendered by the Department.

32. It shall be the decision of the district administrator’s designee whether to assign an inspector to monitor the placement of all backfill and pavement restoration activities.

33. The absence of a VDOT inspector does NOT in any way relieve the permittee of their responsibility to perform the work in accordance with the approved plans, provisions of the attached permit, VDOT’s Road and Bridge Standards (current edition) and VDOT’s Road and Bridge Specifications (current edition).

34. The permittee shall be responsible for any settlement of all backfill or pavement restoration necessitated by authorized excavation activities for a period of two (2) years after the completion date of permit, and for the continuing maintenance of the facilities placed within the highway right-of-way. A one (1) year restoration warranty period may be considered, provided the permittee adheres to the following criteria: The permittee retains the services of a professional engineer (or certified technician under the direction of the professional engineer) to observe the placement of all backfill and pavement restoration. The professional engineer (or certified technician under the direction of the professional engineer) performs any required inspection and testing in accordance with all applicable sections of VDOT’s Road and Bridge Specifications (see 24VAC30-151-760). The professional engineer submits all testing reports for review and approval, and provides written certification that all restoration procedures have been completed in accordance with all applicable sections of VDOT’s Road and Bridge Specifications prior to completion of the work authorized by the permit.

35. The excavated area to be backfilled shall be made as dry as practicable at the time of backfill placement by implementation of a VDOT approved dewatering method.
36. The edges of all authorized pavement cuts shall be trimmed to neat straight lines and a tack coat shall be applied in accordance with current VDOT’s Road and Bridge Specifications.

37. Daily trench excavation within pavement sections shall not exceed 500 feet in length and the trench shall be temporarily backfilled flush with the adjacent pavement surface with Type I, Size 21A or 21B aggregate until permanent pavement restoration. If the application of the bituminous courses is delayed due to adverse weather conditions, the contractor shall backfill the trench with a bituminous asphalt base course (BM 25.0) that is acceptable to VDOT until such time as installation of the underground facility is completed and the appropriate pavement restoration can occur.

38. Whenever existing pavement is permitted to be cut, not over one half of the roadway width shall be disturbed at one time and the first open cut trench section shall be satisfactorily restored to allow for the passage of traffic prior to the second half of the roadway surface can be disturbed.

39. The surface pavement restoration shall extend a minimum of 25\text{ft} on each side of the trench centerline for open cuts perpendicular to the roadway alignment (See LUP\text{OCPR} for details). The extent of pavement restoration for all other pavement cuts shall be determined by the district administrator’s designee.

40. The contractor shall complete all pavement restoration within 10 calendar days of completion of installation of the underground facility.

41. ALL crossing of existing pavement shall be bored, pushed or jacked an appropriate distance from the edge of pavement so as not to impede the normal flow of traffic or damage the existing pavement section. Existing pavement shall NOT be cut unless approved by the district administrator’s designee and then only if justifiable circumstances prevail or proof is shown that a thorough attempt has been made to push, bore or jack.

42. Where the pavement is disturbed or deemed weakened in its entirety or such portions as deemed desirable by the Department, the pavement shall be restored or replaced in a manner that is satisfactory to the district administrator’s designee.

Environmental

43. In accordance with the Virginia Department of Transportation (VDOT) Road and Bridge Specification \(\text{\textsuperscript{107.14 (a)}}\), Special Provision \(\text{107D}\), all contractors performing regulated land disturbing activities within VDOT right of way must have at least one (1) employee that has successfully completed the VDOT Erosion & Sediment Control Contractor Certification training. This person shall be on site during all land disturbance activities and will be responsible for insuring compliance with all applicable local, state and federal erosion and sediment control regulations during land disturbance activities. This person must have their certification card with them while on the project site. The land use permit will be suspended if proof of certification cannot be provided. Regulated land disturbing activities are defined as those activities that disturb 2,500 square feet or greater in Tidewater, Virginia (as defined in \(\text{\textsuperscript{10.12101}}\) of the Code of Virginia) or 10,000 square feet or greater in all other areas of the State. The Department will require evidence of this certification with any Land Use Permit application that involves utility and/or commercial right of
way improvement. Improper installation, maintenance and removal of erosion and sediment control devices may result in revocation of VDOT Erosion & Sediment Control Contractor Certification.

44. The permittee is responsible for pursuing and obtaining any and all environmental permits which may be required to pursue the proposed activity prior to any work beginning within state maintained right of way.

45. In the event hazardous materials or underground storage tanks are encountered within state maintained right of way during authorized activities, the permittee shall suspend all work immediately then notify the local VDOT district permit office and other responsible parties, i.e., the local fire department, emergency services, Department of Environmental Quality, etc. The permittee is responsible for coordination and completion of all required remediation necessary to complete the permitted activities within the state maintained right-of-way. The permittee shall provide evidence of such compliance to the local VDOT Residency Office or Permit Office prior to recommencement of permitted activities.

46. In the event cultural resources, archaeological, paleontological, and/or rare minerals are encountered within the right of way during authorized activities, the permittee shall suspend all work immediately then notify the local VDOT district permit office and the proper state authority charged with the responsibility for investigation and evaluation of such finds. The permittee will meet all necessary requirements for resolving any conflicts prior to continuing with the proposed activities within the state maintained right of way, and shall provide evidence of such compliance to the local VDOT district permit office.

47. Roadway drainage shall NOT be blocked or diverted. The shoulders, ditches, roadside, drainage facilities and pavement shall be kept in an operable condition satisfactory to the Department. Necessary precautions shall be taken by the permittee to insure against siltation of adjacent properties, streams, etc., in accordance with VDOT's current standards or as prescribed by the Departments Environmental Manual and the district administrator’s designee.

**Entrances**

48. VDOT’s authority to regulate highway entrances is provided in 33.1-197, 33.1-198, and 33.198.1 of the Code of Virginia and its authority to make regulations concerning the use of highways generally is provided in 33.1-12 (3) of the Code of Virginia. Regulations regarding entrances are set forth in VDOT’s regulations promulgated pursuant to 33.1-198.1 of the Code of Virginia (see 24VAC30-15-760).

49. The permittee shall be responsible for the design and installation of a private entrance under the auspices of a VDOT land use permit however the permittee may request that VDOT forces install the private entrance at the permittee’s expense.

50. Street connections, private entrances, and construction entrances shall be kept in satisfactory condition during ALL activities authorized under the auspices of a VDOT land use permit. Entrances shall NOT be blocked. Ample provisions must be made to provide safe ingress and egress to adjacent properties at ALL.
times. Entrances that are disturbed shall be restored to the satisfaction of the property owner and the district administrator’s designee.

Utilities

51. Prior to any excavation, the permittee shall comply with the terms of Title 56, Chapter 10.3 of the Underground Utility Damage Prevention Act and Section 56.1/265.14 through 56.1/265.20 of the Code of Virginia. This permit does NOT grant permission to grade on or near property of others, or, adjust or disturb in anyway existing utility poles or underground facilities within the permitted area. Permission to do so must be obtained from the impacted utility company and any expense involved shall be borne by the permittee. Any conflicts with existing utility facilities must be resolved between the permittee and the utility owner(s) involved.

52. ALL underground utility installations within limited access right-of-way shall have a minimum of 36 inches of cover. ALL underground utilities within non-limited access right-of-way will require a minimum of 36 inches of cover, except underground cables that provide telecommunications service shall be at a minimum of 30 inches of cover.

53. Where feasible, all aboveground installations (such as fire hydrants, telephone pedestals, markers, etc.) shall be located adjacent to the outside edge of the right-of-way line and in accordance with minimum clear zone requirements. All manhole covers, valve box, etc., shall be installed two inches below existing ground line and shall conform to existing contours.

54. NO poles, guys, anchors, etc., are to be placed on state maintained right-of-way unless authorized under the auspices of a VDOT land use permit. At no time will any such facilities be allowed between the ditch line and the traveled roadway.

55. ALL overhead installations crossing non-limited access highways shall provide a minimum of 18 feet of vertical clearance or at a minimum height as established by the National Electric Safety Code, whichever is greater. ALL overhead utility installations within limited access right-of-way shall maintain a minimum of 21 feet of vertical clearance. The vertical clearance for ALL new overhead parallel installations within non-limited access rights-of-way shall be in compliance with standards as specified in the National Electric Safety Code.

Final Inspection and Completion of Permit

56. Upon completion of the work covered by this permit all disturbed areas outside of the roadway prism shall be restored to their original condition as found prior to starting such work.

57. Completion of this permit is contingent upon the permittee's completion of the authorized work in accordance with the approved plan and compliance with ALL governing bodies involved in the total completion of work on state maintained right-of-way.

58. Upon completion of the work under permit, the permittee shall provide notification, documented in writing or electronic communication, to the district administrator's designee requesting final inspection. This request shall include the permit number, county name, route number and name of the party or parties to whom the permit was issued. The district
administrator's designee shall promptly schedule an inspection of the work covered under the permit and advise the permittee of any necessary corrections.