SANITARY SEWER SPECIFICATIONS

Master Sanitary Sewer Specifications Revised on August, 2025

PUBLIC UTILITIES DEPARTMENT
UNIFIED GOVERNMENT OF
ATHENS-CLARKE COUNTY
ACCGov
GEORGIA

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 02110
CLEARING AND GRUBBING

PART 1 GENERAL

1.01 SCOPE

A. Clearing and grubbing includes, but is not limited to, removing from the Project site, trees, stumps, roots, brush, structures, abandoned utilities, trash, debris, and all other materials found on or near the surface of the ground in the construction area and understood by generally accepted engineering practice not to be suitable for construction of the type contemplated. Precautionary measures that prevent damage to existing features to remain are part of the Work.

B. Clearing and grubbing is to take place only upon the Owner's easement, whether permanent or temporary, unless the Contractor is directed to do so in writing by the Owner.

C. Clearing and grubbing operations shall be coordinated with temporary and permanent erosion and sedimentation control procedures.

1.02 QUALITY ASSURANCE

A. The Contractor shall comply with applicable codes, ordinances, rules, regulations, and laws of local, municipal, state, or federal authorities having jurisdiction over the Project. All required permits of a temporary nature shall be obtained for construction operations by the Contractor.

B. Open burning will not be allowed.

1.03 JOB CONDITIONS

A. Location of the Work: The area to be cleared and grubbed is shown schematically on the Drawings. It includes all areas designated for construction.

B. The Contractor shall comply with conditions of special agreements and easements negotiated by the Owner with private property owners and public agencies.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. The Contractor shall furnish equipment of the type normally used in clearing and grubbing operations, including, but not limited to tractors, trucks, loaders and root rakes.

PART 3 EXECUTION

3.01 SCHEDULING OF CLEARING

A. The Contractor shall clear at each construction site only that length of the right-of-way, permanent, or temporary construction easement which would be the equivalent of 1 month's pipe laying.

B. The Engineer may permit clearing for additional lengths of the pipeline provided that temporary erosion and sedimentation controls are in place and a satisfactory stand of temporary grass is established. Should a satisfactory stand of grass not be possible, no additional clearing shall be permitted beyond that specified above.

C. A satisfactory stand of grass shall have no bare spots larger than 1 square yard. Bare spots shall be scattered and the bare area shall not comprise more than 1 percent of any given area.

3.02 CLEARING AND GRUBBING

A. The Contractor shall clear and grub the permanent easement or 5 feet on each side of the pipeline, whichever is greater, before excavating. The Contractor shall remove all trees, growth, debris, stumps, and other objectionable material. The Contractor shall clear the construction easement or road right-of-way only if necessary.

B. Materials to be cleared, grubbed, and removed from the Project site include, but are not limited to, all trees, stumps, roots, brush, trash, organic matter, paving, miscellaneous structures, houses, debris, and abandoned utilities.

C. Grubbing shall consist of completely removing roots, stumps, trash, and other debris from all graded areas so that topsoil is free of roots and debris. Topsoil is to be left sufficiently clean so that further picking and raking will not be required.

D. All stumps, roots, foundations, and planking embedded in the ground shall be removed and properly disposed. Piling and butts of utility poles shall be removed to a minimum depth of 2 feet below the limits of excavation for structures, trenches, and roadways or 2 feet below finish grade, whichever is lower.

E. Landscaping features shall include, but are not necessarily limited to, fences, cultivated trees, cultivated shrubbery, property corners, man-made improvements, and subdivision and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features. Existing structures shall be relocated such that they are off the permanent easement.

F. Surface rocks and boulders shall be grubbed from the soil and removed from the site if not suitable as rip-rap.

G. Where tree limbs interfere with utility wires, or where the trees to be felled are near utility wires, the tree shall be taken down in sections to eliminate the possibility of damage to the overhead utility.

H. Any work pertaining to utility poles shall comply with the requirements of the appropriate utility.

I. All fences adjoining any excavation or embankment that, in the Contractor's opinion, may be damaged or buried, shall be carefully removed, stored, and replaced. Any fencing that, in the Engineer's opinion, is significantly damaged shall be replaced with new fence material of equal design.

J. The Contractor shall exercise special precautions for the protection and preservation of trees, cultivated shrubs, sod, fences, retaining walls, and the like within the limits of the construction area but not directly within excavation and/or fill limits. The Contractor shall be held liable for any damage the Contractor's operations have inflicted on such property.

K. The Contractor shall be responsible for all damages to existing improvements resulting from the Contractor's operations.

3.03 DISPOSAL OF DEBRIS

A. The debris resulting from the clearing and grubbing operation shall be hauled to a disposal site secured by the Contractor and shall be disposed of in accordance with all requirements of federal, state, county, and municipal regulations. No debris of any kind shall be deposited in any stream or body of water, or in any street or alley. No debris shall be deposited upon any private property except with written consent of the property owner. In no case shall any material or debris be left on the Project site, shoved onto abutting private properties, or buried on the Project site.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 02125
EROSION, SEDIMENTATION, AND POLLUTION CONTROL

PART 1 GENERAL

1.01 SCOPE

A. The Work specified in this section consists of providing, maintaining, and removing temporary erosion and sedimentation controls.

B. The Contractor shall comply with all requirements of the erosion and sediment control permit or land disturbance activity permit (whichever is applicable) as well as the requirements of the Georgia Erosion & Sediment Control Act of 1975 and latest amended (the Act), Erosion & Sediment Control Manual of Practice (edition in effect on January 1st of the year in which this Agreement is executed), section 402 of the Federal Clean Water Act of 1987, and applicable Local Issuing Authority ordinances, rules, regulations, and laws.

C. The Contractor shall provide a Notice of Intent (NOI) to the Georgia Environmental Protection Division (GAEPD) in accordance with the provision of the National Pollutant Discharge Elimination System (NPDES) General Permit No. GAR100002 (Infrastructure Construction Project) (NPDES Permit). A copy of the general permit may be provided to the Owner at the preconstruction meeting. The Contractor shall comply with the requirements of this permit and the requirements as stated on the Drawings and herein throughout the entire Project. The Contractor will monitor for compliance in accordance with this permit.

D. The Contractor shall establish an individual as the individual in charge of erosion and sedimentation control on a 24-hour basis. His name and phone number shall be provided to the Owner at the preconstruction meeting. The Contractor shall ensure this individual is trained in erosion and sediment control, Level 1A, to oversee Contractor responsibilities and has a valid certification number issued by the Georgia Soil and Water Conservation Commission. This certificate number shall be provided to the Owner at the preconstruction meeting.

E. Temporary erosion controls include, but are not limited to, grassing, mulching, watering, and reseeding onsite surfaces and spoil and borrow area surfaces, and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the Act of 1975, Section 402 of the Federal Clean Water Act, and applicable codes, ordinances, rules, regulations, and laws of local and municipal authorities having jurisdiction.

F. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, filter stone, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the Federal Clean Water Act of 1987, as amended.

G. Land disturbance activity shall not commence until the Land Disturbance Permit has been issued, which authorizes land disturbance activities.

H. Basic Principles:

1. Conduct the earthwork and excavation activities in such a manner to fit the topography, soil type, and condition.
2. Minimize the disturbed area and the duration of exposure to erosion elements.
3. Stabilize disturbed areas immediately. Do not allow any undisturbed area to remain unstabilized for 14 days or more.
4. Safely convey runoff from the site to an outlet such that erosion will not be increased offsite.
5. Retain sediment onsite that was generated onsite.
6. No construction activities shall occur within a dedicated stream buffer, unless otherwise approved by the Unified Government of Athens-Clarke County (ACCGov) and the GAEPD.
7. All erosion and sedimentation control measures shall be designed for a minimum 25-year storm event.
8. Construct erosion and sedimentation control devices prior to or concurrent with land disturbing activities.
9. Minimize encroachment upon watercourses.

I. Temporary Erosion and Sedimentation Control: In general, temporary erosion and sedimentation control procedures shall be directed toward:

1. Preventing soil erosion at the source.
2. Preventing silt and sediment from entering any waterway if soil erosion cannot be prevented.
3. Preventing silt and sediment from migrating downstream in the event it cannot be prevented from entering the waterway.

J. Permanent Erosion Control: Permanent erosion control measures shall be implemented to prevent sedimentation of the waterways and to prevent erosion of the Project site.

1.02 QUALITY ASSURANCE

A. The Contractor shall perform all work under this section in accordance with all pertinent rules and regulations including, but not necessarily limited to, those stated herein and these Specifications.

B. Where provisions of pertinent rules and regulations conflict with these Specifications, the more stringent provisions shall govern.

C. The Contractor shall provide to ACCGov, prior to initiating land disturbance activities, the name and 24-hour phone number of the individual responsible for inspection, installation, and maintenance of erosion and sedimentation control devices on a 24-hour every-day basis.

1.03 QUALITY STANDARDS

A. Part III, Special Condition, Management Practices, Permit Violations, and Other Limitations of the General Permit, allows for the discharge of waterline flushing provided flows are not contaminated with process materials or pollutants. Chlorine shall be removed prior to discharging water from a waterline.

B. Fluids used for horizontal directional drilling shall not be discharged without treatment to reduce the turbidity to less 25 nephelometric turbidity units (NTU).

C. Erosion control features installed shall be effectively maintained to control erosion within the limits of the Project and to control the discharge of stormwater from disturbed areas such that turbidity of the stream shall not exceed 25 NTU higher than the turbidity level of the stream immediately up stream of construction. Turbidity testing will be done by the Engineer. Any erosion control devices damaged by the Contractor or any subcontractors either by neglect, by construction methods, or for any other reasons including acts of nature, shall be immediately repaired by the Contractor at no additional cost to the Owner.

1.04 DUST CONTROL

A. Dust from any of the Contractor's activities shall be controlled to keep dust pollution to a minimum. The Contractor shall comply with GAEPD Air Pollution Standards for Nuisance Dust Control. The Contractor may be directed to wet areas where dust may be or is a problem to achieve the desired results.

PART 2 PRODUCTS

2.01 TEMPORARY EROSION AND SEDIMENTATION CONTROL MATERIALS

A. Silt fence shall meet the requirements of Section 171-Temporary Silt fence shall conform to the requirements of the latest version of the Department of Transportation (GDOT), State of Georgia, Standard Specification.

B. Hay bales shall be clean, seed-free cereal hay type.

C. Stone Check Dams shall conform to the requirements of Section 805.01 of the GDOT Standard Specification, latest edition, for Stone Dumped Rip Rap, except that the stone shall be 8 inches or less at the greatest dimension.

2.02 RIP RAP

A. The Contractor shall use sound, tough, durable stones resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Specific gravity shall be 2.0 or greater. Rip rap shall have less than 66 percent wear when tested in accordance with American Association of State Highway and Transportation Officials (AASHTO) T-96. Unless shown or specified otherwise, stone rip rap shall be Type 1 rip rap.

B. Type 1 Rip Rap - The largest pieces shall have a maximum volume of 2 cubic feet. At least 35 percent of the mass shall consist pieces that weigh 125 pounds or more. The remainder shall be well graded down to the finest sizes. Rock fines shall comprise a maximum of 10 percent of the total mass. Rock fines are defined as material passing a No. 4 sieve. Rip rap size shall conform to GDOT Section 805.01 Stone Dumped Rip Rap, Type 1.

C. Type 3 Rip Rap - The largest pieces shall have a maximum approximate volume of 1 cubic foot. At least 35 percent of the mass shall consist of pieces which weigh 15 pounds or more. The remainder shall be well graded down to the finest sizes. Rock fines shall comprise a maximum of 10 percent of the total mass. Rock fines are defined as material passing a No. 4 sieve. Rip rap size shall conform to GDOT Section 805.01 Stone Dumped Rip Rap, Type 3.

D. 200 Pound Rip Rap - Minimum weight of individual stones shall be 200 pounds.

2.03 STONE

A. Crushed stone shall meet the requirements of the GDOT Specification 800.01, Group I (limestone, marble, or dolomite) or Group II (quartzite, granite, or gneiss). Stone size shall be between No. 57 and No. 4, inclusive.

2.04 FILTER FABRIC (GEOTEXTILE FABRIC)

A. Filter fabric for use under rip rap shall be a monofilament, polypropylene woven fabric or a non-woven fabric meeting the Specifications as established by Task Force 25 for the Federal Highway Administration. The filter fabric shall have an equivalent opening size (EOS) of 70.

2.05 CONCRETE

A. Concrete shall have a compressive strength of not less than 3,000 pounds per square inch (psi), with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5 inches. Ready-mixed concrete shall be mixed and

transported in accordance with ASTM International (ASTM) C94. Reinforcing steel shall conform to the requirements of ASTM A615, Grade 60.

2.06 SLOPE STABILIZATION

A. Matting and blankets shall meet the requirements of Section 713 and Section 716 of the GDOT Standard Specifications, latest edition. The Contractor shall use products listed on the GDOT QPL-49 for matting and GDOT QPL-62 for blankets.

2.07 GRASSING

A. Grassing materials shall meet the requirements of the following sections of the GDOT Standard Specifications, latest edition:

Material	Section
Topsoil	893.01
Seed and Sod	890
Fertilizer	891.01
Agricultural Lime	882.02
Mulch	893.02
Inoculants	893.04

B. Seed species shall be provided as shown on the approved Erosion Control Plan.

C. Mulch Binder on slopes exceeding 3 (horizontal) to 1 (vertical) shall be held in place by the use of a mulch binder, as approved by ACCGov. The mulch binder shall be non-toxic to plant and animal life and shall be approved by ACCGov.

D. Water shall be free of excess and harmful chemicals, organisms, and substances, which may be harmful to plant growth or obnoxious to traffic. Salt or brackish water shall not be used. Water shall be furnished by the Contractor through agreement with ACCGov.

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall provide all materials and promptly take all actions necessary to achieve effective erosion and sedimentation control in accordance with the Georgia Erosion and Sedimentation Act of 1975, as amended, Section 402 of the Federal Clean Water Act, and applicable codes, ordinances, rules, regulations, and laws of local and municipal authorities having jurisdiction.

B. The Contractor shall have the responsibility to actively take all steps necessary to control soil erosion and sedimentation.

C. Erosion and sedimentation controls shall be constructed in accordance with the Manual for Erosion and Sedimentation Control in Georgia, latest edition, these Specifications, and Standard Detail Drawings.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Temporary erosion and sedimentation control procedures should be initially directed toward preventing silt and sediment from entering waterways. The preferred method is to provide an undisturbed natural buffer, extending a minimal 25 feet from the top of the bank, to filter the runoff. Should this buffer prove infeasible due to construction activities being too close to the waterway, or if the amount of sediment overwhelms the buffer, the Contractor shall place silt fences to filter the runoff and, if necessary, place permanent rip rap to stabilize the creek banks.

B. Silt dams, silt fences, traps, barriers, check dams, appurtenances, and other temporary measures and devices shall be installed as indicated on the approved Drawings and working Drawings; shall be maintained until no longer needed; and shall then be removed. Deteriorated hay bales and dislodged filter stone shall be replaced with new materials.

C. Where permanent grassing is not appropriate, and where the Contractor's temporary erosion and sedimentation control practices are inadequate, the Engineer may direct the Contractor to provide temporary vegetative cover with fast-growing seedings.

D. All erosion and sedimentation control devices, including check dams, shall be inspected by the Contractor at least weekly, after each rainfall occurrence, and cleaned out and repaired by the Contractor as necessary.

E. Temporary erosion and sedimentation control devices shall be installed and maintained from the initial land disturbance activity until the satisfactory completion and establishment of permanent erosion control measures. At that time, temporary devices shall be removed.

3.03 PERMANENT EROSION CONTROL

A. Permanent erosion control shall include:

1. Restoring the work site to its original contours unless shown otherwise on the Drawings or directed by the Engineer.
2. Permanent vegetative cover shall be performed in accordance with paragraph 3.04 of this section.
3. Permanent stabilization of steep slopes and creeks shall be performed in accordance with paragraph 3.05 of this section.

B. Permanent erosion control measures shall be implemented as soon as practicable after the completion of pipe installation or land disturbance for each segment of the Project or up to 1,000 linear feet of pipe trench, whichever is smaller. In no event shall implementation be postponed when no further construction activities will impact that portion or segment of the Project. Partial payment requests may be withheld for those portions of the Project not complying with this requirement.

3.04 GRASSING

A. General:

1. Grassing shall be performed as shown on the approved Erosion Control Plan, and in accordance with the GDOT Standard Specification Section 700.
2. All references to grassing, unless noted otherwise, shall relate to establishing permanent vegetative cover as specified herein for seeding, fertilizing, mulching, and the like.
3. When final grade has been established, all bare soil, unless otherwise required by the Contract Documents, shall be seeded, fertilized, and mulched in an effort to restore to a protected condition. Critical areas shall be sodded as approved or directed by the Engineer.
4. Specified permanent grassing shall be performed at the first appropriate season following establishment of final grading in each section of the site.

B. The Contractor shall replant grass removed or damaged in residential areas using the same variety of grass and at the first appropriate season. Where sod is removed or damaged, replant such areas using sod of the same species of grass at the first appropriate season. Outside of residential or landscaped areas, grass the entire area disturbed by the work on completion of work in any area. In all areas, promptly establish successful stands of grass.

C. Grassing activities shall comply with the Manual for Erosion and Sediment Control in Georgia, specifically for the selection of species, (with the exception that kudzu shall not be permitted), planting dates, and application rates for seeding, fertilizer, and mulching. Where permanent vegetative cover (grassing) cannot be immediately established (due to season or other circumstances) the Contractor shall provide temporary vegetative cover. The Contractor must return to the site (at the appropriate season) to install permanent vegetation in areas that have received temporary vegetative cover.

D. Grassed areas will be considered acceptable when a viable stand of grass covers at least 98 percent of the total area with no bare spots exceeding 1 square foot, and the ground surface is fully stabilized against erosion.

3.05 RIP RAP

A. Unless shown otherwise on the Drawings, rip rap shall be placed where ordered by the Engineer, at all points where banks of streams or drainage ditches are disturbed by excavation, or at all points where natural vegetation is removed from banks of the streams or drainage ditches. The Contractor shall carefully compact backfill and place rip rap to prevent subsequent settlement and erosion. This requirement applies equally to construction alongside a stream or drainage ditch, as well as stream or drainage ditch crossings.

B. When trenching across a creek, the Contractor shall place rip rap a distance of 10 feet upstream and 10 feet downstream from the top of the trench excavation. Place rip rap across creek bottom, across creek banks, and extend rip rap placement 5 feet beyond the top of each creek bank.

C. The ground surface upon which the rip rap is to be placed shall be brought in reasonably close conformity to the correct lines and grades before placement is commenced. Where filling of depressions is required, the new material shall be compacted with hand or mechanical tampers. Unless at creek banks or otherwise shown or specified, rip rap shall begin in a toe ditch constructed in original ground around the toe of the fill or the cut slope. The toe ditch shall be 2 feet deep in original ground, and the side next to the fill or cut shall have that same slope. After the rip rap is placed, the toe ditch shall be backfilled and the excess dirt spread neatly within the construction easement.

D. The surface to receive fabric shall be prepared to a relatively smooth condition free from obstructions, depressions, and debris. The fabric shall be placed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The strips shall be placed to provide a minimum width of 1 foot of overlap for each joint. The filter fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within 3 inches of the centerline of the overlap. The fabric shall be placed so that the upstream strip overlaps the downstream strip. The fabric shall be placed loosely so as to give and therefore avoid stretching and tearing during placement of the stones. The stones shall be dropped no more than 3 feet during construction. The fabric shall be protected at all times during construction from clogging due to clay, silts, chemicals, or other contaminants. Any contaminated fabric or any fabric damaged during its installation or during placement of rip rap shall be removed and replaced with uncontaminated and undamaged fabric at no expense to the Owner.

E. Placement of Rip Rap:

1. Rip rap shall be placed on a 6-inch layer of soil, crushed stone, or sand overlaying the filter fabric. This 6-inch layer shall be placed to maximize the contact between the soil beneath the filter fabric and the

filter fabric. Rip rap shall be placed with its top elevation conforming to the finished grade or the natural slope of the stream bank and stream bottom.

2. Stone rip rap shall be dumped into place to form a uniform surface and to the thickness specified on the Drawings. The thickness tolerance for the course shall be minus 6 inches and plus 12 inches. If the Drawings or the Bid do not specify a thickness, the course shall be placed to a thickness of not less than 18 inches.

3.06 EROSION CONTROL MATTING

A. The erosion control matting shall be placed after areas have been seeded. Matting shall be installed in accordance with the manufacturer's recommendations. Matting shall be held in place by 6-inch long wire staples or wooden pegs. Staples or pegs shall be provided at all overlaps and ends, as well as throughout the mat, based on slope length and grade and soil type.

B. On slopes 2.5H:1V or steeper, the top of the matting shall be placed in an anchor trench a minimum of 6 inches deep.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 02225
TRENCH EXCAVATION AND BACKFILL

PART 1 GENERAL

1.01 SCOPE

A. The Work under this section consists of furnishing all labor, equipment, and materials and performing all operations in connection with the trench excavation and backfill required to install the pipelines shown on the Drawings and as specified.

B. Excavation shall include the removal of any trees, stumps, brush, debris, or other obstacles remaining after the clearing and grubbing operations which may obstruct the work, and the excavation and removal of all earth, rock, or other materials to the extent necessary to install the pipe and appurtenances in conformance with the lines and grades shown on the Drawings and as specified.

C. Backfill shall include the refilling and compaction of the fill in the trenches and excavations up to the surrounding ground surface or road grade at crossing.

D. The trench is divided into five specific areas:

1. Foundation - The area beneath the bedding, sometimes also referred to as trench stabilization;
2. Bedding - The area above the trench bottom (or foundation) and below the bottom of the barrel of the pipe;
3. Haunching - The area above the bottom of the barrel of the pipe up to a specified height above the bottom of the barrel of the pipe;
4. Initial Backfill - The area above the haunching material and below a plane 12 inches above the top of the barrel of the pipe; and
5. Final Backfill - The area above a plane 12 inches above the top of the barrel of the pipe.

E. The choice of method, means, techniques, and equipment rests with the Contractor. The Contractor shall select the method and equipment for trench excavation and backfill depending upon the type of material to be excavated and backfilled, the depth of excavation, the amount of space available for operation of equipment, storage of excavated material, proximity of man-made improvements to be protected, available easement or right-of-way, and prevailing practice in the area.

1.02 QUALITY ASSURANCE

A. Density - All references to “maximum dry density” shall mean the maximum dry density defined by ASTM International (ASTM) D698, except that for cohesionless, free draining soils “maximum dry density” shall mean the maximum index density as determined by ASTM D4253. Determination of the density of foundation, bedding, haunching, or backfill materials in place shall meet the requirements of ASTM D1556, ASTM D2922, or ASTM D2937.

B. Sources and Evaluation Testing - Testing of materials to certify conformance with the Specifications shall be performed by an independent testing laboratory.

1.03 SAFETY

A. The Contractor shall perform all trench excavation and backfilling activities in accordance with the Occupational Safety and Health Act of 1970 (Public Law 91-596), as amended. The Contractor shall pay particular attention to the Safety and Health Regulations, Part 1926, Subpart P, “Excavation, Trenching & Shoring” as described in Occupational Safety and Health Administration (OSHA) publication 2226.

PART 2 PRODUCTS

2.01 TRENCH FOUNDATION MATERIALS

A. Crushed stone shall be used for trench foundation (trench stabilization) and shall meet the requirements of the Georgia Department of Transportation (GDOT) Specification 800.01, Group I (limestone, marble or dolomite) or Group II (quartzite, granite, or gneiss). Stone size shall be between No. 57 and No. 4, inclusive.

2.02 BEDDING AND HAUNCHING MATERIALS

A. Unless specified otherwise, bedding and haunching materials shall be earth material as specified below.

B. Crushed stone used for bedding and haunching shall meet the requirements of the GDOT Specification 800.01, Group I (limestone, marble, or dolomite) or Group II (quartzite, granite, or gneiss). Stone size shall be between No. 57 and No. 4, inclusive.

2.03 INITIAL BACKFILL

A. Initial backfill material shall be earth materials or crushed stone as specified for bedding and haunching materials.

B. Earth materials used for initial backfill shall be suitable materials selected from materials excavated from the trench. Suitable materials shall be clean and free of rock larger than 2 inches at its largest dimension, organics, cinders, stumps, limbs, frozen earth or mud, man-made wastes, and other unsuitable materials. Should the material excavated from the trench be saturated, the saturated material may be used as earth material, provided it is allowed to dry properly and is capable of meeting the specified compaction requirements. When necessary, initial backfill materials shall be moistened to facilitate compaction by tamping. If materials excavated from the trench are not suitable for use as initial backfill material, provide select material conforming to the requirements of this section.

2.04 FINAL BACKFILL

A. Final backfill material shall be general excavated earth materials, shall not contain rock larger than 2 inches at its greatest diameter, cinders, stumps, limbs, man-made wastes, and other unsuitable materials. If materials excavated from the trench are not suitable for use as final backfill material, provide select material conforming to the requirements of this section.

2.05 SELECT BACKFILL

A. Select backfill shall be materials which meet the requirements as specified for bedding, haunching, initial backfill, or final backfill materials, including compaction requirements.

2.06 CONCRETE

A. Concrete for bedding, haunching, initial backfill, or encasement shall have a compressive strength of not less than 3,000 pounds per square inch (psi), with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5 inches. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C94. Reinforcing steel shall conform to the requirements of ASTM A615, Grade 60.

2.07 FLOWABLE FILL

A. Flowable fill, where required for trench backfill, shall meet the requirements of GDOT Standard Specifications, Section 600 for Excavatable or Non-Excavatable type.

2.08 GRANULAR MATERIAL

A. Granular material, where required for trench backfill, shall be sand, river sand, crushed stone or aggregate, pond screenings, crusher run, recycled concrete, or other angular material. Granular material shall meet gradation requirements for Size No. 57 or finer.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION

A. Topsoil and grass shall be stripped a minimum of 6 inches over the trench excavation site and stockpiled separately for replacement over the finished grading areas.

B. Trenches shall be excavated to the lines and grades shown on the Drawings or specified with the centerlines of the trenches on the centerlines of the pipes and to the dimensions which provide the proper support and protection of the pipe and other structures and accessories.

C. Trench Width for Pipelines:

1. The sides of all trenches shall be vertical, as much as possible, to a minimum of 1 foot above the top of the pipe. Unless otherwise indicated on the Drawings, the maximum trench width shall be equal to the sum of the outside diameter of the pipe plus 2 feet. The minimum trench width shall be that which allows the proper consolidation of the haunching and initial backfill material.
2. Excavate the top portion of the trench to any width within the construction easement or right-of-way which will not cause unnecessary damage to adjoining structures, roadways, pavement, utilities, trees, or private property. Where necessary to accomplish this, provide sheeting and shoring.
3. Where rock is encountered in trenches, excavate to remove boulders and stones to provide a minimum of 6 inches clearance between the rock and any part of the pipe or manhole. The maximum allowable width of rock excavation for payment shall be based on a trench width equal to the outside diameter of the pipe barrel plus 18 inches, but the total allowable rock excavation width for payment will not be less than 36 inches.
4. Wherever the prescribed maximum trench width is exceeded, the Contractor shall use the next higher class or type of bedding and haunching as shown on the Drawings for the full trench width as actually cut. The excessive trench width may be due to unstable trench walls, inadequate or improperly placed bracing and sheeting which caused sloughing, accidental over-excavation, intentional over-excavation necessitated by the size of the Contractor's tamping and compaction equipment, intentional over-excavation due to the size of the Contractor's excavation equipment, or other reasons beyond the control of the Engineer or the Owner.

D. Depth:

1. The trenches shall be excavated to the required depth or elevation which allow for the placement of the pipe and bedding to the dimensions shown on the Drawings.
2. Where rock is encountered in trenches for pipelines, excavate to the minimum depth which will provide clearance below the pipe barrel of 8 inches for pipe 21 inches in diameter and smaller and 12 inches for larger pipe and appurtenances. Remove boulders and stones to provide a minimum of 6 inches clearance between the rock and any part of the pipe or appurtenance.

E. Excavated Materials:

1. Excavated materials shall be placed adjacent to the work to be used for backfilling as required. Top soil shall be carefully separated and lastly placed in its original location.
2. Excavated material shall be placed sufficiently back from the edge of the excavation to prevent caving of the trench wall, to permit safe access along the trench, and not cause any drainage problems. Excavated material shall be placed so as to not damage existing landscape features or man-made improvements.

3.02 SHEETING, BRACING, AND SHORING

A. Sheeting, bracing, and shoring shall be performed in the following instances:

1. Where sloping of the trench walls does not adequately protect persons within the trench from slides or cave-ins.
2. In caving ground.
3. In wet, saturated, flowing, or otherwise unstable materials. The sides of all trenches and excavations shall be adequately sheeted, braced, and shored.
4. Where necessary to prevent damage to adjoining buildings, structures, roadways, pavement, utilities, trees, or private properties which are required to remain.
5. Where necessary to maintain the top of the trench within the available construction easement or right-of-way.

B. In all cases, excavation protection shall strictly conform to the requirements of the Occupational Safety and Health Act of 1970, as amended.

C. Timber for shoring, sheeting, or bracing shall be sound, free of large or loose knots, and in good, serviceable condition. Size and spacing shall be in accordance with OSHA regulations.

D. Steel Sheeting and Sheet Piling shall be the continuous interlock type. The weight, depth, and section modulus of the sheet piling shall be sufficient to restrain the loads of earth pressure and surcharge from existing foundations and live loads. Procedure for installation and bracing shall be so scheduled and coordinated with the removal of the earth that the ground under existing structures shall be protected against lateral movement at all times. The Contractor shall provide closure and sealing between sheet piling and existing facilities.

E. A trench shield or box may be used to support the trench walls. The use of a trench shield does not necessarily preclude the additional use of bracing and sheeting. When trench shields are used, care must be taken to avoid disturbing the alignment and grade of the pipe or disrupting the haunching of the pipe as the shield is moved. When the bottom of the trench shield extends below the top of the pipe, the trench shield shall be raised in 6-inch increments with specified backfilling occurring simultaneously. At no time shall the trench shield be "dragged" with the bottom of the shield extending below the top of the pipe.

F. Remove bracing and sheeting in units when backfill reaches the point necessary to protect the pipe and adjacent property. Leave sheeting in place when in the opinion of the Engineer it cannot be safely removed or is within 3 feet of an existing structure, utility, or pipeline. Cut off any sheeting left in place at least 2 feet below the surface.

G. Sheet piling within 3 feet of an existing structure or pipeline shall remain in place, unless otherwise directed by the Engineer.

3.03 TRENCH ROCK EXCAVATION

A. Definition of Trench Rock - Any material which cannot be excavated with conventional excavating equipment, and is removed by drilling and blasting, and occupies an original volume of at least 1 cubic yard.

B. Blasting - Exhaust other practical means of excavating prior to using blasting as a means of excavation. Provide licensed, experienced workmen to perform blasting. Conduct blasting operations in accordance with all existing ordinances and regulations. Protect all buildings and structures from the effects of the blast. Repair any resulting damage. If the Contractor repeatedly uses excessive blasting charges or blasts in an unsafe or improper manner, the Engineer may direct the Contractor to employ an independent blasting consultant to supervise the preparation for each blast and approve the quantity of each charge.

C. Removal of Rock - Dispose of rock offsite that is surplus or not suitable for use as rip rap or backfill.

D. The Contractor shall notify the Engineer prior to any blasting. Additionally, the Contractor shall notify the Engineer and local fire department before any charge is set. The Contractor is responsible for obtaining all required permits (including permit from local fire department) and paying all fees associated with each blast.

E. Following review by the Engineer regarding the proximity of permanent buildings and structures to the blasting site, the Engineer may direct the Contractor to employ an independent, qualified specialty sub-contractor, approved by the Engineer, to monitor the blasting by use of a seismograph, identify the areas where light charges must be used, conduct pre-blast and post-blast inspections of structures, including pre-blast and post-blast photographs and digital recordings, and maintain a detailed written log.

3.04 DEWATERING EXCAVATIONS

A. Dewater excavation continuously to maintain a water level 2 feet below the bottom of the trench.

B. Control drainage in the vicinity of excavation so the ground surface is properly pitched to prevent water running into the excavation.

C. There shall be sufficient pumping equipment, in good working order, available at all times, to remove any water that accumulates in excavations. Where the utility crosses natural drainage channels, the work shall be conducted in such a manner that unnecessary damage or delays in the prosecution of the work will be prevented. Provision shall be made for the satisfactory disposal of surface water to prevent damage to public or private property.

D. In all cases, accumulated water in the trench shall be removed before placing bedding or haunching, laying pipe, placing concrete, or backfilling.

E. Where dewatering is performed by pumping the water from a sump, crushed stone shall be used as the medium for conducting the water to the sump. Sump depth shall be at least 2 feet below the bottom of the trench. Pumping equipment shall be of sufficient quantity and/or capacity to maintain the water level in the sump 2 feet below the bottom of the trench. Pumps shall be a type such that intermittent flows can be discharged. A standby pump shall be required in the event the operating pump or pumps clog or otherwise stop operation.

F. Dewater by use of a well point system when pumping from sumps does not lower the water level 2 feet below the trench bottom. Where soil conditions dictate, the Contractor shall construct well points cased in sand wicks. The casing, 6 to 10 inches in diameter, shall be jetted into the ground, followed by the installation of the well point, filling casing with sand and withdrawing the casing.

3.05 TRENCH FOUNDATION AND STABILIZATION

A. The bottom of the trench shall provide a foundation to support the pipe and its specified bedding. The trench bottom shall be graded to support the pipe and bedding uniformly throughout its length and width.

B. If, after dewatering as specified above, the trench bottom is spongy, or if the trench bottom does not provide firm, stable footing and the material at the bottom of the trench will still not adequately support the pipe, the trench will be determined to be unsuitable. The Engineer shall then order trench stabilization by directing the Contractor to over-excavate the trench bottom and fill with crushed stone.

C. Where the replacement of unsuitable material with crushed stone does not provide an adequate trench foundation, the trench bottom shall be excavated to a depth of at least 2 feet below the specified trench bottom. The Contractor will place filter fabric in the bottom of the trench and support the fabric along the trench walls until the trench stabilization, bedding, haunching, and pipe have been placed at the proper grade. The ends of the filter fabric shall be overlapped above the pipe.

D. Where trench stabilization is provided, the trench stabilization material shall be compacted to at least 90 percent of the maximum dry density, unless shown or specified otherwise.

3.06 BEDDING AND HAUNCHING

A. Prior to placement of bedding material, the trench bottom shall be free of any water, loose rocks, boulders, or large dirt clods.

B. Bedding material shall be placed to provide uniform support along the bottom of the pipe and to place and maintain the pipe at the proper elevation. The initial layer of bedding placed to receive the pipe shall be brought to the grade and dimensions indicated on the Drawings. All bedding shall extend the full width of the trench bottom. The pipe shall be placed and brought to grade by tamping the bedding material or by removal of the excess amount of the bedding material under the pipe. Adjustment to grade line shall be made by scraping away or filling with bedding material. Wedging or blocking up of pipe shall not be permitted. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade shall not be permitted. Each pipe section shall have a uniform bearing on the bedding for the length of the pipe, except immediately at the joint.

C. At each joint, excavate bell holes of ample depth and width to permit the joint to be assembled properly and to relieve the pipe bell of any load.

D. After the pipe section is properly placed, add the haunching material to the specified depth. The haunching material shall be shovel sliced, tamped, vigorously chinked, or otherwise consolidated to provide uniform support for the pipe barrel and to fill completely the voids under the pipe, including the bell hole. Prior to placement of the haunching material, the bedding shall be clean and free of any water, loose rocks, boulders, or dirt clods.

E. Appurtenances - The Contractor shall excavate to a minimum of 12 inches below the planned elevation of the base of the manhole, vault, or other type of appurtenance. Place and compact crushed stone bedding material to the required grade before constructing the appurtenance.

F. Excessive Width and Depth - If the trench is excavated to excessive depth, provide crushed stone to place the bedding at the proper elevation or grade.

G. Compaction of bedding and haunching materials under pipe, manholes, and accessories shall be compacted to a minimum of 90 percent of the maximum dry density, unless shown or specified otherwise.

3.07 INITIAL BACKFILL

A. Initial backfill shall be placed to anchor the pipe, protect the pipe from damage by subsequent backfill, and ensure the uniform distribution of the loads over the top of the pipe.

B. The Contractor shall place initial backfill material carefully around the pipe in uniform layers to a depth of at least 12 inches above the pipe barrel. Layer depths shall be a maximum of 6 inches for pipe 18 inches in diameter and smaller and a maximum of 12 inches for pipe larger than 18 inches in diameter.

C. Backfill on both sides of the pipe simultaneously to prevent side pressures.

D. Compact each layer thoroughly with suitable hand tools or tamping equipment.

E. Initial backfill shall be compacted to a minimum 95 percent of the maximum dry density, unless shown or specified otherwise.

F. If materials excavated from the trench are not suitable for use as backfill materials, provide select backfill material conforming to the requirements of this Section for initial backfill.

3.08 CONCRETE ENCASEMENT FOR PIPELINES

A. Where concrete encasement is shown on the Drawings for pipelines, the Contractor shall excavate the trench to provide a minimum of 12 inches clearance from the barrel of the pipe. Lay the pipe to line and grade on solid concrete blocks or solid bricks. In lieu of bedding, haunching, and initial backfill, place concrete to the full width of the trench and to a height of not less

than 12 inches above the pipe bell. Do not backfill the trench for a period of at least 24 hours after concrete is placed.

B. Wrap all pipe with polyethylene film in accordance with AWWA C105 to prevent contact between the concrete and the pipe.

3.09 FINAL BACKFILL

A. Backfill carefully to restore the ground surface to its original condition or final design grade shown on the Drawings.

B. The top 6 inches shall be topsoil obtained as specified in paragraph 3.01A of this section.

C. Excavated material which is unsuitable for backfilling, and excess material, shall be disposed of in a manner approved by the Engineer. Surplus soil may be neatly distributed and spread over the site, if approved by the Engineer, except that surplus soil shall not be distributed and spread over the site in areas under U.S. Army Corps of Engineers (USACOE) jurisdiction. If such spreading is allowed, the site shall be left in a clean and sightly condition and shall not affect pre-construction drainage patterns. Surplus rock from the trenching operations shall be removed from the site.

D. If materials excavated from the trench are not suitable for use as backfill materials, provide select backfill material conforming to the requirements of this section.

E. After initial backfill material has been placed and compacted, the Contractor shall backfill with final backfill material. Place backfill material in uniform layers, compacting each layer thoroughly as follows:

1. In 6-inch layers, if using light power tamping equipment, such as a "jumping jack;"
2. In 12-inch layers, if using heavy tamping equipment, such as hammer with tamping feet; and
3. In 24-inch layers, if using a hydra-hammer.

F. If the trench settles, re-fill, compact, and grade the surface to conform to the adjacent surfaces.

G. Final backfill shall be compacted to a minimum 95 percent of the maximum dry density, unless specified otherwise.

3.10 ADDITIONAL MATERIAL

A. Where final grades above the pre-construction grades are required to maintain minimum cover, additional fill material will be as shown on the Drawings. Use excess material excavated from the trench, if the material is suitable. If excess

excavated materials are not suitable, or if the quantity available is not sufficient, provide additional suitable fill material.

3.11 BACKFILL WITHIN RIGHTS-OF-WAY

A. Compact backfill underlying pavement and sidewalks, and backfill under dirt and gravel roads to 100 percent of maximum dry density, within plus or minus 3 percent of optimum moisture content.

B. Backfill within the GDOT rights-of-way shall meet the requirements stipulated in the "Utility Accommodation Policy and Standards," published by GDOT, latest edition.

3.12 FLOWABLE FILL

A. Where flowable fill is required, The Contractor shall excavate the trench to provide a minimum of 4 inches clearance on both sides of the pipe barrel. Lay the pipe to line and grade on solid concrete blocks or bricks. In lieu of bedding, haunching, and initial backfill, place flowable fill to the full width and depth of the trench.

B. Flowable fill shall be protected from freezing for a period of 36 hours after placement. Minimum temperature of flowable fill at point of delivery shall be 50 degrees F.

C. The Contractor shall provide steel plates over flowable fill in road locations.

D. Wrap the pipes in polyethylene film. Polyethylene film shall be in accordance with AWWA C105.

3.13 COMPACTED GRANULAR MATERIAL

A. Where compacted granular material is required as initial and final backfill material, it shall be placed after bedding and haunching material specified elsewhere has been placed. Compacted granular material shall be compacted to a minimum 95 percent of the maximum dry density.

3.14 TESTING AND INSPECTION

A. The soils testing laboratory is responsible for the following:

1. Compaction tests in accordance with paragraph 1.02 of this section.
2. Field density tests for each 2 feet of lift, every 200 feet within road rights-of-way, or more frequently if ordered by the Engineer. The Owner shall direct where density tests will be performed along the Project route.
3. Inspecting and testing stripped site, subgrades, and proposed fill materials.

B. The Contractor's duties relative to testing include:

1. Notifying laboratory of conditions requiring testing.
2. Coordinating with laboratory for field testing.
3. Paying costs for additional testing performed beyond the scope of that required, and for re-testing where initial tests reveal non-conformance with specified requirements.
4. Providing excavation as necessary for laboratory personnel to conduct tests.

C. Inspection:

1. Earthwork operations, acceptability of excavated materials for bedding or backfill, and placing and compaction of bedding and backfill are subject to inspection by the Engineer.
2. Foundations and shallow spread footing foundations are required to be inspected by a geotechnical engineer, who shall verify suitable bearing and construction.

D. Comply with applicable codes, ordinances, rules, regulations, and laws of local, municipal, state, or federal authorities having jurisdiction.

END OF SECTION

SECTION 02229
JACK AND BORE CROSSINGS

PART 1 GENERAL

1.01 SCOPE

A. The Work covered by this section includes furnishing all labor, materials, and equipment required to jack and bore casings and/or pipe and to properly complete pipeline construction as described herein and/or shown on the Drawings.

B. Supply all materials and perform all work in accordance with applicable ASTM International (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI) or other recognized standards. Latest revisions of all standards are applicable. If requested by the Engineer, submit evidence that the manufacturer has consistently produced products of satisfactory quality and performance over a period of at least 2 years.

1.02 SUBMITTALS

A. If required by the Owner or Engineer, the Contractor shall submit Shop Drawings, product data, and experience.

B. If required by the Owner or Engineer, the Contractor shall provide Shop Drawings and other pertinent specifications and product data as follows:

1. Shop Drawings for casing pipe showing sizes and connection details,
2. Design mixes for concrete and grout, and
3. Casing Spacers.

C. Boring and jacking of casing is deemed to be specialty contractor work. If the Contractor elects to perform the work, the Contractor shall provide evidence of experience as required by the General Conditions when requested by the Owner or Engineer. A minimum of 5 continuous years of experience in jack and bore casing construction is required of the casing installer. Evidence of this experience must be provided with the Shop Drawings for review by the Engineer.

1.03 STORAGE AND PROTECTION

A. All materials shall be stored and protected in accordance with the manufacturer's recommendations and as approved by the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS AND CONSTRUCTION

A. Casing:

1. The casing shall be new and unused pipe. The casing shall be made from steel plate having a minimum yield strength of 36,000 pound force per square inch (psi). The steel plate shall also meet the chemical requirements of ASTM A36.
2. The thicknesses of casing shown in paragraph B below are the minimum thicknesses allowed. Actual thicknesses shall be determined by the casing installer, based on his evaluation of the required forces to be exerted on the casing when jacking. Any buckling of the casing due to jacking forces shall be repaired at no additional cost to the Owner.
3. The diameters of casing shown in paragraph B below and shown on the Drawings are the minimum allowed. Larger casings, with the Engineer's approval, may be provided at no additional cost to the Owner, for whatever reasons the Contractor may decide, whether casing size availability, line and grade tolerances, soil conditions, or other reasons.
4. Casing shall be furnished with a bituminous exterior coating.

B. Casing Sizes:

Under Railroads		
Carrier Pipe Size, inches	**Casing Pipe Size, inches**	**Casing Pipe Wall Thickness, inches (Uncoated)**
6	14	0.250
8	18	0.312
10	20	0.344
12	24	0.375
14	24	0.375
16	30	0.469
18	30	0.469
20	36	0.532
24	36	0.532
30	42	0.625
36	48	0.688
42	54	0.781
48	60	0.844
54	66	0.938
60	72	1.000
64	78	1.000

All Other Installations		
Carrier Pipe Size, inches	**Casing Pipe Size, inches**	**Casing Pipe Wall Thickness, inches**
6	12	0.250
8	16	0.250
10	18	0.250
12	18	0.250
14	20	0.250
16	24	0.250
18	24	0.250
20	30	0.312
24	36	0.375
30	42	0.500
36	48	0.500
42	54	0.500
48	60	0.500
54	66	0.500
60	72	0.500
64	78	0.500

C. Casing spacers shall meet one of the following requirements:

1. Type I casing spacers shall be flanged, bolt-on style with a two-section stainless steel shell lined with a polyvinyl chloride (PVC) liner, minimum 0.09-inch-thick also having a hardness of 85-90 durometer. Runners shall be attached to stainless steel risers which shall be properly welded to the shell. The height of the runners and risers shall be manufactured such that the pipe does not float within the casing.
2. Type II casing spacers shall be a two-section, flanged, bolt-on style constructed of heat-fused PVC coated steel, minimum 14-gauge band and 10-gauge risers, with 2-inch wide glass reinforced polyester insulating skids, heavy duty PVC inner liner, minimum 0.09-inch thick having a hardness of 85-90 durometer, and all stainless steel or cadmium plated hardware.

D. Cement shall conform to ASTM C150, Type I or Type II.

E. Grout shall have a minimum compressive strength of 100 psi attained within 24 hours.

F. All ductile iron pipe installed in casings shall be restrained joint pipe meeting requirements specified in Section 02730, Sanitary Sewers and Accessories, of these Specifications.

G. Surface settlement markers within pavement areas shall be P.K. nails. Surface settlement markers within non-paved areas shall be wooden hubs.

2.02 EQUIPMENT

A. A cutting head shall be attached to a continuous auger mounted inside the casing pipe.

PART 3 EXECUTION

3.01 GENERAL

A. Interpretation of soil investigation reports and data, investigating the site, and determination of the site soil conditions prior to bidding is the sole responsibility of the Contractor. Any subsurface investigation by the Bidder or Contractor must be approved by the appropriate authority having jurisdiction over the site.

B. Casing construction shall be performed so as not to interfere with, interrupt, or endanger roadway surface and activity thereon, and minimize subsidence of the surface, structures, and utilities above and in the vicinity of the casing. Support the ground continuously in a manner that will prevent loss of ground and keep the perimeters and face of the casing, passages, and shafts stable. The Contractor shall be responsible for all settlement resulting from casing operations and shall repair and restore damaged property to its original or better condition at no additional cost to the Owner.

C. The face of the excavation shall be protected from the collapse of the soil into the casing.

D. Design of the bore pit and required bearing to resist jacking forces are the responsibility of the Contractor. The excavation method selected shall be compatible with expected ground conditions. The lengths of the casing shown on the Drawings are the minimum lengths required. The length of the casing may be extended for the convenience of the Contractor, at no additional cost to the Owner. Due to restrictive right-of-way and construction easements, casing lengths less than the nominal 20-foot length may be necessary.

E. Highway Crossings:

1. The Contractor shall be held responsible and accountable for the coordinating and scheduling of all construction work within the highway right-of-way and posting of appropriate permits.
2. Work along or across the highway department rights-of-way shall be subject to inspection by such highway department.
3. All installations shall be performed to leave free flows in drainage ditches, pipes, culverts, or other surface drainage facilities of the highway, street, or its connections.
4. No excavated material or equipment shall be placed on the pavement or shoulders of the roadway without the express approval of the highway department and ACCGov.

5. In no instance will the Contractor be permitted to leave equipment (trucks, backhoes, and the like) on the pavement or shoulder overnight. Construction materials to be installed, which are placed on the right-of-way in advance of construction, shall be placed in such a manner as not to interfere with the safe operation of the roadway.
6. The Contractor shall be responsible for providing the Owner sufficient information to obtain a blasting permit in a timely manner. The Contractor or subcontractor shall provide evidence of proper licenses prior to performing any blasting.

F. Railroad Crossings:

1. The Owner will obtain the encroachment permit from the Railroad. However, the Contractor shall secure permission from the Railroad to schedule work so as not to interfere with the operation of the Railroad.
2. Additional insurance is required for each railroad crossing. The Contractor shall furnish the Railroad with such additional insurance as may be needed, cost of the same shall be borne by the Contractor.
3. All work on the Railroad right-of-way, including necessary support of tracks, safety of operations, and other standard and incidental operation procedures may be under the supervision of the appropriate authorized representative of the Railroad affected. Any decisions by this representative pertaining to construction and/or operations shall be final, and construction must be governed by such decisions.
4. If, in the opinion of the Railroad, it becomes necessary to provide flagging protection, watchmen, or the performance of any other work in order to keep the tracks safe for traffic, the Contractor shall coordinate such work and shall reimburse the Railroad, in cash, for such services, in accordance with accounting procedures agreed on by the Contractor and affected Railroad before construction is started.
5. No blasting shall be permitted within the Railroad right-of-way.

3.02 GROUNDWATER CONTROL

A. The Contractor shall control the groundwater throughout the construction of the casing.

B. Methods of dewatering shall be at the option and responsibility of the Contractor. Maintain close observation to detect settlement or displacement of surface facilities due to dewatering. Should settlement or displacement be detected, notify the Engineer immediately and take such action as necessary to maintain safe conditions and prevent damage.

C. When water is encountered, provide and maintain a dewatering system of sufficient capacity to remove water on a 24-hour basis keeping excavations free of water until the backfill operation is in progress. Dewatering shall be performed in such a manner that removal of soil particles is held to a

minimum. Dewater into a sediment trap and comply with requirements specified in Section 02125, Erosion and Sedimentation Control, of these Specifications.

3.03 SAFETY

A. Provide all necessary bracing, bulkheads, and shields to ensure complete safety to all traffic, persons, and property at all times during the work. Perform the work in such a manner as to not permanently damage the roadbed or interfere with normal traffic over it.

B. Observe all applicable requirements of the regulations of the authorities having jurisdiction over this site. Conduct the operations in such a manner that all work will be performed below the level of the roadbed.

C. Perform all activities in accordance with the Occupational Safety and Health Act of 1970 (Public Law 596), as amended, applicable regulations of the Federal Government, Occupational Safety and Health Administration (OSHA) Title 29, Code of Federal Regulations 1926 (CFR 1926), and applicable criteria of ANSI A10.16-81, "Safety Requirements for Construction of Tunnel Shafts and Caissons."

D. Bore pits shall not be left unattended unless proper safety barriers are in place.

E. Construction activities adjacent to roadways, including traffic control, shall meet the requirements of Section 02730, Sanitary Sewers and Accessories, paragraph 3.02 of these Specifications.

3.04 SURFACE SETTLEMENT MONITORING

A. Provide surface settlement markers for casings 24 inches in diameter and larger. Place marker as specified and as directed by the Engineer. The Contractor shall place settlement markers outside of pavement area, along the centerline of the casing at 20-foot intervals and offset 10 feet each way from the centerline of the casing. Markers shall also be placed at each shoulder of the roadway, at each edge of pavement, at the centerline of the pavement, and at 10 and 25 feet in each direction from the centerline of the casing. Tie settlement markers to bench marks and indices sufficiently removed as not to be affected by the casing operations.

B. Make observations of surface settlement markers, placed as required herein, at regular time intervals acceptable to the Engineer. In the event settlement or heave on any marker exceeds 1 inch, the Contractor shall immediately cease work and, using a method approved by the Engineer and the authority having jurisdiction over the Project site, take immediate action to restore surface elevations to that existing prior to start of casing operations.

C. Take readings and permanently record surface elevations prior to the start of dewatering operations and/or shaft excavation. The following schedule shall be used for obtaining and recording elevation readings: all settlement markers, once per week; all settlement markers within 50 feet of the casing heading, at the beginning of each day; more frequently at the Engineer's direction if settlement is identified. Make all elevation measurements to the nearest 0.01 foot.

D. The Contractor shall cooperate fully with jurisdictional personnel. Any settlement shall be corrected by, and at the expense of, the Contractor.

E. Promptly report any settlement and horizontal movement immediately to the Engineer and take immediate remedial action.

3.05 CASING INSTALLATION

A. Shaft:

1. Conduct boring and jacking operations from a shaft excavated at one end of the section to be bored. Where conditions and accessibility are suitable, place the shaft on the downstream end of the bore.
2. The shaft shall be rectangular and excavated to a width and length required for ample working space. If necessary, sheet and shore the shaft properly on all sides. Shaft sheeting shall be timber or steel piling of ample strength to safely withstand all structural loadings of whatever nature due to site and soil conditions. Keep preparations dry during all operations. Perform pumping operations as necessary.
3. The bottom of the shaft shall be firm and unyielding to form an adequate foundation upon which to work. If the shaft bottom is not stable, excavate to such additional depth as required and place a gravel sub-base or a concrete sub-base if directed by the Engineer due to soil conditions.

B. Jacking Rails and Frame:

1. Set jacking rails to proper line and grade within the shaft. Secure rails in place to prevent settlement or movement during operations. The jacking rails shall cradle and hold the casing pipe on true line and grade during the progress of installing the casing.
2. Place backing between the heels of jacking rails and the rear of the shaft. The backing shall be adequate to withstand all jacking forces and loads.
3. The jacking frame shall be of adequate design for the magnitude of the job. Apply thrust to the end of the pipe in such a manner as to impart a uniformly balanced load to the pipe barrel without damaging the joint ends of the pipe.

C. Boring and jacking of casing pipes shall be accomplished by the dry auger boring method without jetting, sluicing, or wet boring.

D. Auger the hole and jack the casing through the soil simultaneously.

E. Bored installations shall have a bored-hole diameter essentially the same as the outside diameter of the casing pipe to be installed.

F. Execute boring ahead of the casing pipe with extreme care, commensurate with the rate of casing pipe penetration. Boring may proceed slightly in advance of the penetrating pipe and shall be made in such a manner as to prevent any voids in the earth around the outside perimeter of the pipe. Make all investigations and determine if the soil conditions are such as to require the use of a shield.

G. Any casing pipe damaged in jacking operations shall be repaired, if approved by the Engineer, or removed and replaced at Contractor's own expense.

H. Lengths of casing pipe, as long as practical, shall be used except as restricted otherwise. Joints between casing pipe sections shall be butt joints with complete joint penetration, single groove welds, for the entire joint circumference, in accordance with American Welding Society (AWS) recommended procedures. Prior to welding the joints, the Contractor shall ensure that both ends of the casing sections being welded are square. Welded joints shall be coated and lined with coal tar enamel in accordance with AWWA C203.

I. The Contractor shall prepare a contingency plan which will allow the use of a casing lubricant, such as bentonite, in the event that excessive frictional forces jeopardize the successful completion of the casing installation.

J. Once the jacking procedure has begun, it should be continued without stopping until completed, subject to weather and conditions beyond the control of the Contractor.

K. Care shall be taken to ensure that casing pipe installed by the boring and jacking method will be at the proper alignment and grade.

L. The Contractor shall maintain and operate pumps and other necessary drainage system equipment to keep work dewatered at all times.

M. Adequate sheeting, shoring, and bracing for embankments, operating pits, and other appurtenances shall be placed and maintained to ensure that work proceeds safely and expeditiously. Upon completion of the required work, the sheeting, shoring, and bracing shall be left in place, cut off, or removed, as designated by the Engineer.

N. Trench excavation, all classes and type of excavation, the removal of rock, muck, debris, the excavation of all working pits, and backfill requirements of Section 02225, Trench, Excavation, and Backfill, are included under this section.

O. All surplus material shall be removed from the right-of-way and the excavation finished flush with the surrounding ground.

P. Grout backfill shall be used for unused holes or abandoned pipes.

Q. Any replacement of carrier pipe in an existing casing shall be considered a new installation, subject to the applicable requirements of these Specifications.

3.06 VENTILATION AND AIR QUALITY

A. Provide, operate, and maintain for the duration of casing project, a ventilation system to meet safety and OSHA requirements.

3.07 ROCK EXCAVATION

A. If rock is encountered during the installation of the casing pipe which, in the opinion of the Engineer, cannot be removed through the casing, the Engineer may authorize the Contractor to complete the crossing by a method established in a change order.

B. At the Contractor's option, the Contractor may continue to install the casing and remove the rock through the casing at no additional cost to the Owner.

3.08 INSTALLATION OF PIPE

A. After construction of the casing is complete, and has been accepted by the Engineer, install the carrier pipe in accordance with the Drawings and Specifications.

B. Check the alignment and grade of the casing and prepare a plan to set the carrier pipe at proper alignment, grade, and elevation, without any sags or high spots.

C. The carrier pipe shall be supported within the casing by use of casing spacers sized to limit radial movement to a maximum of 1 inch. Provide a minimum of one casing spacer per nominal length of pipe. Casing spacers shall be attached to the pipe at maximum 9- to 10-foot intervals.

1. The carrier pipe shall be held in the casing pipe by the use of hardwood blocks spaced radially around the pipe and secured together so that they remain firmly in place. The spacing of such blocks longitudinally in the casing pipe shall not be greater than 10 feet.

2. The pipe shall be supported within the casing by use of casing spacers sized to limit radial movement to a maximum of 1 inch. Provide a minimum of one casing spacer per nominal length of pipe. Casing spacers shall be attached to the pipe at maximum 18- to 20 foot intervals.

D. Close the ends of the casing with 4-inch brick and mortar walls.

3.09 SHEETING REMOVAL

A. Remove sheeting used for shoring from the shaft and remove it from the job site. The removal of sheeting, shoring, and bracing shall be done in such a manner as not to endanger or damage either new or existing structures, private or public properties, and also to avoid cave-ins or sliding in the banks.

END OF SECTION

SECTION 02575
REMOVING AND REPLACING PAVEMENT

PART 1 GENERAL

1.01 SCOPE

A. The work to be performed under this section shall consist of removing and replacing existing pavement, sidewalks, and curbs in paved areas where such have been removed for construction of utilities and appurtenances. The Work shall also include pavement resurfacing.

B. Existing pavement, sidewalks, and curbs shall be replaced to the current Owner standards or to match existing, whichever is more stringent.

1.02 SUBMITTALS

A. If required by the Owner or Engineer, the Contractor shall provide certificates stating that materials supplied comply with Specifications. Certificates shall be signed by the asphalt producer and the Contractor.

1.03 CONDITIONS

A. Weather Limitations:

1. Apply bituminous tack coat only when the ambient temperature in the shade has been at least 50 degrees F for 12 hours immediately prior to application.
2. Do not conduct paving operations when the surface is wet or contains excess moisture which would prevent uniform distribution and required penetration.
3. Construct asphaltic courses only when atmospheric temperature in the shade is above 40 degrees F, when the underlying base is dry, and when weather is not rainy.
4. Place the base course when air temperature is above 35 degrees F and rising.

B. Grade Control - Establish and maintain the required lines and grades for each course during construction operations.

PART 2 PRODUCTS

2.01 MATERIALS AND CONSTRUCTION

A. Graded Aggregate Base Course - The graded aggregate base course shall be of uniform quality throughout and shall meet the requirements of Section 815.01

of the Georgia Department of Transportation (GDOT) Standard Specifications.

B. The black base course shall be of uniform quality throughout and shall conform to the requirements of Section 828 of the GDOT Standard Specifications.

C. The bituminous tack coat shall conform to the requirements of Section 400 of the GDOT Standard Specifications.

D. The surface course for all asphaltic concrete pavement shall conform to the requirements of Section 400, 12.5 mm Superpave, of the GDOT Standard Specifications unless other types are noted on the Drawings or required by the Owner.

E. Provide concrete and reinforcing for concrete pavement or base courses in accordance with the requirements of the GDOT Standard Specifications, Section 430. Concrete shall be of the strength classifications shown on the Drawings.

F. Where driveways or roadways constructed of specialty type surfaces (such as brick or stone) are disturbed or damaged, these driveways and roadways shall be restored using similar, if not original, materials. Where dictated by the nature of these surfaces, a specialty contractor shall be used to restore the surfaces to their previous or better condition. Special surfaces shall be removed and replaced to the limits to which they were disturbed.

2.02 TYPES OF PAVEMENTS

A. All existing pavement removed, destroyed, or damaged by construction shall be replaced with the same type and thickness of pavement as that existing prior to construction, unless otherwise directed by the Engineer. Materials, equipment, and construction methods used for paving work shall conform to the GDOT Specifications applicable to the particular type required for replacement, repair or new pavements.

B. Aggregate base shall be constructed in accordance with the requirements of Section 310 of the GDOT Standard Specifications. The maximum thickness to be laid in a single course shall be 6 inches compacted. If the design thickness of the base is more than 6 inches, the base shall be constructed in two or more courses of approximately equal thickness. After the material placed has been shaped to line, grade, and cross section, it shall be rolled until the course has been uniformly compacted to at least 100 percent of the maximum dry density when Group 2 aggregate is used, or to at least 98 percent of maximum dry density when Group 1 aggregate is used.

C. Concrete pavement or base courses shall be replaced with concrete. The surface finish of the replaced concrete pavement shall conform to that of the existing pavement. The surface of the replaced concrete base course shall be left rough. The slab depth shall be equivalent to the existing concrete pavement or base course, but in no case less than 6 inches thick. Transverse and longitudinal joints removed from concrete pavement shall be replaced at the same locations and to the same types and dimensions as those removed. Concrete pavements or concrete base courses shall be reinforced.

D. Asphaltic concrete base, tack coat, and surface course construction shall conform to GDOT Standard Specifications, Section 400. The pavement mixture shall not be spread until the designated surface has been cleaned and prepared, is intact, firm, properly cured, dry, and the tack coat has been applied. Apply and compact the base in maximum layer thickness by asphalt spreader equipment of design and operation approved by the Engineer. After compaction, the black base shall be smooth and true to established profiles and sections. Apply and compact the surface course in a manner approved by the Engineer. Immediately correct any high, low, or defective areas by cutting out the course, replacing with fresh hot mix, and immediately compacting to conform and thoroughly bond to the surrounding area.

E. Bituminous penetration surface treatment pavement shall be replaced with a minimum thickness of 1 inch conforming to Section 424, GDOT Standard Specifications.

F. Existing gravel road, drive, and parking area replacement shall meet the requirements of graded aggregate base course. This surfacing may be authorized by the Engineer as a temporary surface for paved streets until replacement of hard-surfaced pavement is authorized.

G. During the time period between pavement removal and complete replacement of permanent pavement, maintain highways, streets, and roadways by the use of steel running plates anchored to prevent movement. The backfill above the pipe shall be compacted, as specified in Section 02225, Trench, Excavation and Backfill, of these Specifications, up to the existing pavement surface to provide support for the steel running plates. All pavement shall be replaced within 7 calendar days of its removal.

PART 3 EXECUTION

3.01 LOCATIONS FOR PAVEMENT REPLACEMENT

A. Type II Pavement Replacement (see Detail No. G-1) shall be used for asphalt pavement replacement.

B. “Graded aggregate” pavement repair shall be used only to replace existing gravel or crushed stone surfaces. Thickness of replacement stone shall be a minimum of 4 inches, regardless of the thickness of existing stone.

3.02 REMOVING PAVEMENT

A. Remove existing pavement as necessary for installing pipeline and appurtenances.

B. Before removing any pavement, mark the pavement neatly paralleling pipelines and existing street lines. Space the marks the width of the trench.

C. Break asphalt pavement and concrete pavement along the marks by cutting through with a rotary saw.

D. Do not pull pavement with machines until the pavement is completely broken and separated from pavement to remain.

E. Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement.

F. Remove and replace with equal or better any sidewalks disturbed by construction for their full width and to the nearest undisturbed joint.

G. Tunnel under or remove and replace any curb disturbed by construction to the nearest undisturbed joint with equal or better.

3.03 REPLACING PAVEMENT

A. Upon completion of backfilling and compaction of the backfill, arrange to have the compaction tested by an independent testing laboratory approved by the Engineer. After compaction testing has been satisfactorily completed, replace all pavement, sidewalk, and curb removed.

1. The existing street pavement or surface shall be removed along the lines of the work for the allowable width specified for the trench or structure. After the installation of the sewer or water mains and after the backfill has been compacted suitably, the additional width of pavement to be removed, as shown on the Drawings, shall be done immediately prior to replacing the pavement.
2. Trench backfill shall be compacted for the full depth of the trench as specified in Section 02225, Trench, Excavation and Backfill, of these Specifications.
3. Temporary trench backfill along streets and driveways shall include 6 inches of crushed stone or cherty clay as a temporary surfacing of the trenches. This temporary surface shall be maintained carefully at grade and dust-free by the Contractor until the backfill of the trench has thoroughly compacted in the opinion of the Engineer and permission is granted to replace the street pavement.
4. When temporary crushed stone or chert surface is considered by the Engineer to be sufficient surface for gravel pavement, the surface shall be graded smooth and to an elevation that will make the final permanent surfacing level with the adjacent surfacing that was undisturbed.

B. Pavement Replacement:

1. Prior to replacing pavement, make a final cut in asphalt and concrete pavement 12 inches back from the edge of the damaged pavement with a saw. Pavement cuts shall be parallel or perpendicular to the road centerline as much as practical. On parallel installations, the final cut shall be long and straight and consistent.
2. Replace all street and roadway pavement as shown on the Drawings. Replace driveways, sidewalks, and curbs with the same material, to nearest existing undisturbed construction joint and to the same dimensions as those existing.
3. If the temporary crushed stone or chert surface is to be replaced, the top 6 inches shall be removed and the crushed stone surfacing for unpaved streets or the base for the bituminous surface shall be placed.
4. Following this preparation, the chert or crushed stone base shall be primed with a suitable bituminous material and surfaced with the proper type of bituminous surface treatment.
5. Where the paved surface is to be replaced with asphaltic concrete pavement, concrete pavement, or a concrete base and a surface course, the temporary chert or crushed stone surface and any necessary backfill material, additional existing paving, and new excavation shall be removed to the depth and width shown on the Drawings. All edges of the existing pavement shall be cut to a straight, vertical edge. Care shall be used to get a smooth joint between the old and new pavement and to produce an even surface on the completed street. Concrete base slabs and crushed stone bases, if required, shall be placed and allowed to cure for 3 days before bituminous concrete surface courses are applied. Expansion joints, where applicable, shall be replaced in a manner equal to the original joint.
6. Where driveways or roadways, constructed of specialty type surfaces (such as brick or stone) are disturbed or damaged, these driveways and roadways shall be restored using similar materials. Where dictated by the nature of these surfaces, a specialty contractor shall be used to restore the surfaces to their previous or better condition. Special surfaces shall be removed and replaced to the limits to which they were disturbed.

C. Pavement Resurfacing:

1. Certain areas to be resurfaced are specified or noted on the Drawings. Where pavement to be resurfaced has been damaged with potholes, the Contractor shall remove all existing loose pavement material and fill the hole with black base, as specified, to the level of the existing pavement. After all pipeline installations are complete and existing pavement has been removed and replaced along the trench route, apply the tack coat and surface course as specified.

2. Resurfacing limits shall be perpendicular to the road centerline. The limits of resurfacing shall be 10 feet beyond the edge of the pavement replacement on the main road being resurfaced, and to the point of tangency of the pavement on the side streets. The limits of resurfacing in a cul-de-sac shall be the entire area of the cul-de-sac. For situations where the limit of resurfacing will be within a side street and parallel to the road centerline, the limit of resurfacing will extend to the edge of pavement beyond that centerline.
3. Pavement resurfacing shall be performed by a contractor certified by the GDOT.
4. Pavement resurfacing shall be a minimum of 1-1/4 inches of asphaltic concrete conforming to GDOT Standard Specifications, Section 400, 12.5 mm Superpave.
5. Mill existing asphalt pavement at the location of the limit of resurfacing to create a 1-1/4-inch butt joint for the pavement overlay. Milling must be 5 feet in width and taper from the top of existing pavement to a depth of 1-1/4 inch to create the butt joint for the pavement overlay.

D. Pavement striping removed or paved over shall be replaced with the same type, dimension, and material as original unless directed otherwise by the Engineer.

3.04 SIDEWALK AND CURB REPLACEMENT

A. Construction:

1. All concrete sidewalks and curbs shall be replaced with concrete.
2. Preformed joints shall be 1/2-inch thick, conforming to the latest edition of American Association of State Highway Transportation Officials (AASHTO) M 59 for sidewalks and AASHTO M 123 for curbs.
3. Forms for sidewalks shall be of wood or metal, shall be straight and free from warp, and shall be of sufficient strength when in place to hold the concrete true to line and grade without springing or distorting.
4. Forms for curbs shall be metal and of an approved section. They shall be straight and free from distortions, showing no vertical variation greater than 1/8 inch in 10 feet and no lateral variation greater than 1/4 inch in 10 feet from the true plain surface on the vertical face of the form. Forms shall be of the full depth of the structure and constructed to permit the inside forms to be securely fastened to the outside forms.
5. Securely hold forms in place true to the lines and grades indicated on the Drawings.
6. Wood forms may be used on sharp turns and for special sections, as approved by the Engineer. Where wooden forms are used, they shall be free from warp and shall be the nominal depth of the structure.
7. All mortar and dirt shall be removed from forms and all forms shall be thoroughly oiled or wetted before any concrete is deposited.

B. When a section is removed, the existing sidewalk or curb shall be cut to a neat line, perpendicular to both the centerline and the surface of the concrete slab. Existing concrete shall be cut along the nearest existing construction joints; if such joints do not exist, the cut shall be made 5 feet back.

C. Existing concrete sidewalks and curbs that have been cut and removed for construction purposes shall be replaced with the same width and surface as the portion removed. Sidewalks shall have a minimum uniform thickness of 4 inches. The new work shall be neatly jointed to the existing concrete so that the surface of the new work shall form an even, unbroken plane with the existing surfaces.

D. The subgrade shall be formed by excavating to a depth equal to the thickness of the concrete, plus 2 inches. Subgrade shall be of such width as to permit the proper installation and bracing of the forms. Subgrades shall be compacted by hand tamping or rolling. Soft, yielding, or unstable material shall be removed and backfilled with satisfactory material. Place 2 inches of porous crushed stone under all sidewalks and curbs and compact thoroughly, then finish to a smooth, unyielding surface at proper line, grade, and cross section.

E. Joint for Curbs:

1. Joints shall be constructed to match existing and as specified. Construct joints true to line with their faces perpendicular to the surface of the structure and within 1/4 inch of their designated position.
2. Thoroughly spade and compact the concrete at the faces of all joints filling all voids.
3. Install expansion joint materials at the point of curve at all street returns. Install expansion joint material behind the curb at the abutment to sidewalks and adjacent structures.
4. Place contraction joints every 10 feet along the length of the curbs and gutters. Form contraction joints using steel templates or division plates which conform to the cross section of the structure. Leave the templates in place until the concrete has set sufficiently to hold its shape, but remove them while the forms are still in place. Contraction joint templates or plates shall not extend below the top of the steel reinforcement or they shall be notched to permit the reinforcement to be continuous through the joint. Contraction joints shall be a minimum of 1-1/2 inches deep.

F. Expansion joints shall be required to replace any removed expansion joints or in new construction wherever shown on the Drawings. Expansion joints shall be true and even, shall present a satisfactory appearance, and shall extend to within 1/2 inch of the top of finished concrete surface.

G. Finishing:

1. Strike off the surface with a template and finish the surface with a wood float using heavy pressure, after which contraction joints shall be made and the surface finished with a wood float or steel trowel.
2. Finish the face of the curbs at the top and bottom with an approved finishing tool of the radius to match existing.
3. Finish edges with an approved finishing tool having a 1/4-inch radius.
4. Provide a final broom finish by lightly combing with a stiff broom after troweling is complete.
5. The finished surface shall not vary more than 1/8 inch in 10 feet from the established grade.

H. Driveway and Sidewalk Ramp Openings:

1. Provide driveway openings of the widths and at the locations indicated on the Drawings and as directed by the Engineer.
2. Provide sidewalk ramp openings to match existing in conformance with the applicable regulations and as directed by the Engineer.

I. Concrete shall be suitably protected from freezing and excessive heat. It shall be kept covered with burlap or other suitable material and kept wet until cured. Provide necessary barricades to protect the work. All damage caused by people, vehicles, animals, rain, the Contractor's operations, and the like shall be repaired by the Contractor at no additional expense to the Owner.

3.05 MAINTENANCE

A. The Contractor shall maintain the surfaces of roadways built and pavements replaced until the acceptance of the Project. Maintenance shall include replacement, scraping, reshaping, wetting, and rerolling as necessary to prevent raveling of the road material, to preserve reasonably smooth surfaces, and to repair damaged or unsatisfactory surfaces to the satisfaction of the Engineer. Maintenance shall include sprinkling as may be necessary to abate dust from the gravel surfaces.

3.06 SUPERVISION AND APPROVAL

A. Pavement restoration shall meet the requirements of the regulatory agency responsible for the pavement. The Contractor shall obtain agency approval of pavement restorations before requesting final payment.

B. Obtain the Engineer's approval of restoration of pavement, such as private roads and drives that are not the responsibility of a regulatory agency.

C. Complete pavement restoration as soon as possible after backfilling.

D. Should any pavement restoration or repairs fail or settle during the life of the Contract, including the bonded period, promptly restore or repair defects.

3.07 CLEANING

A. The Contractor shall remove all surplus excavation materials and debris from the street surfaces and rights-of-way and shall restore street, roadway, or sidewalk surfacing to its original or better condition.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 02730
SANITARY SEWERS AND ACCESSORIES

PART 1 GENERAL

1.01 SCOPE

A. This section describes products to be incorporated into sanitary sewers and accessories, and requirements for the installation and use of these items. Furnish all products and perform all labor necessary to fulfill the requirements of these Specifications.

B. The Contractor shall supply all products and perform all Work in accordance with applicable ASTM International (ASTM), American National Standards Institute (ANSI), or other recognized standards. Latest revisions of all standards are applicable.

1.02 QUALIFICATIONS

A. All products and materials provided or installed on any project must be pre-approved and included in the approved manufacturer's list for wastewater system construction (see Appendix A).

1.03 SUBMITTALS

A. If required by the Owner, complete product data and engineering data, including Shop Drawings, shall be submitted to the Owner for review.

1.04 TRANSPORTATION AND HANDLING

A. Furnish equipment and facilities for unloading, handling, distributing, and storing pipe, fittings, valves, and accessories. Make equipment available at all times for use in unloading. Do not drop or dump materials. Any materials dropped or dumped will be subject to rejection without additional justification. Pipe handling on skids shall not be rolled or skidded against the pipe on the ground.

B. Handle pipe, fittings, valves, and accessories carefully to prevent shock or damage. Handle pipe by rolling on skids, forklift, or front loader. Do not use material damaged in handling. Slings, hooks, or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior coatings or internal lining of the pipe. Do not use chains in handling pipe, fittings, and appurtenances.

C. Lined pipe shall be handled and transported to prevent damage to linings.

1.05 STORAGE AND PROTECTION

A. Store all pipe which cannot be distributed along the route. Make arrangements for the use of suitable storage areas.

B. Stored materials shall be kept safe from damage. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt or foreign matter at all times.

C. Pipe shall not be stacked higher than the limits recommended by the manufacturer. The bottom tier shall be kept off the ground on timbers, rails, or concrete. Pipe in tiers shall be alternated (bell, plain end; bell, plain end). At least two rows of timbers shall be placed between tiers and chocks, affixed to each other in order to prevent movement. The timbers shall be large enough to prevent contact between the pipes in adjacent tiers.

D. Store joint gaskets in a cool location, out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.

E. Mechanical joint bolts shall be handled and stored in such a manner that will ensure proper use with respect to types and sizes.

1.06 QUALITY ASSURANCE

A. Product manufacturers shall provide the Owner with written certification that all products furnished comply with all applicable provisions of these Specifications.

PART 2 PRODUCTS

2.01 DUCTILE IRON PIPE

A. Ductile iron pipe (DIP) shall be used where shown on the Drawings. All pipe, except specials, shall be furnished in nominal lengths of 18 to 20 feet, with a bituminous outside coating. Sizes will be as shown on the Drawings.

B. Ductile iron pipe shall be manufactured in accordance with American Water Works Association (AWWA) C151. All sewer pipe shall have a minimum pressure rating as indicated in the following table, and corresponding minimum wall thickness, unless otherwise specified or shown on the Drawings. Special Thickness Class 52 shall be an acceptable alternative for any pipe size with prior approval of the Engineer.

Pipe Sizes (inches)	Pressure Class (psi)	Special Thickness Class
4 - 12	350	52
14 - 18	350	52
20	300	52
24-64	250	52

C. Ductile iron pipe shall be used for any section (manhole to manhole) which has less than 4 feet of cover or more than 15 feet of cover for any portion of the run of pipe.

D. Fittings and Accessories shall be ductile iron and shall conform to AWWA C110/ANSI A21.10 or AWWA C153/ANSI A21.53 with a minimum rated working pressure of 250 pounds per square inch (psi), and shall be furnished with a bituminous outside coating.

E. Joints for Ductile Iron Pipe and Fittings:

1. General:
   a. Joints for ductile iron pipe and fittings shall be mechanical joint, flanged joint, ball joint, restrained joint, or push-on joint as shown on the Drawings or specified herein.
   b. Unless otherwise shown on the Drawings, specified, or directed, all ductile iron pipe laid underground shall be joined using push-on type joints.
   c. In all cases, gaskets shall be made of material that will not be damaged by the fluid being transported nor by the environment in which the pipe is installed.
   d. Provide the necessary bolts for connections. All bolts and nuts shall be threaded in accordance with ANSI B1.1, Coarse Thread Series, Class 2A external and 2B internal fit.

2. Mechanical Joints:
   a. Joints shall conform to AWWA C111/ANSI A21.11.
   b. Bolts and nuts shall be tee head bolts and nuts of high-strength low-alloy steel in accordance with ASTM A242 to the dimensions shown in AWWA C111/ANSI A21.11.
   c. Gaskets shall be in accordance with AWWA C111/ANSI A21.11 and shall be constructed of plain rubber.
   d. Mechanical joint glands shall be ductile iron.
   e. Mechanical joint accessory parts and glands shall be made in the United States of America.

3. Push-on joints and gaskets shall conform to AWWA C111/ANSI A21.11. Details of the joint design shall be in accordance with the manufacturer's standard practice such as American Cast Iron Pipe Company (ACIPCO) "Fastite" or U.S. Pipe "Tyton" joints.
4. Restrained Joints:
    a. Restrained joints shall be ACIPCO "FLEX-RING" or "FAST-GRIP," or U.S. pipe "TR-FLEX" or "FIELD LOK."
    b. Bolts and nuts shall be in accordance with the manufacturer's recommendations.
    c. Gaskets shall be in accordance with the manufacturer's recommendations.

F. Pipe and fittings shall be cement-lined, double thickness, in accordance with AWWA C104/ANSI/AWWA C104/A21.4. Seal coat is not required.

G. Where shown on the Drawings or Specified, ductile iron pipe shall be encased with polyethylene film. Polyethylene film shall be in accordance with AWWA C105.

2.02 POLYVINYL CHLORIDE TRUSS PIPE

A. Polyvinyl chloride (PVC) composite pipe (8 to 15 inches in diameter) shall conform to the requirements of ASTM D2680. Pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions, or other defects. Minimum pipe stiffness when measured in accordance with ASTM D2412 shall be 200 psi. The thermoplastic material shall be a rigid PVC plastic conforming to ASTM D1784, cell classification 12454B (PVC 1120). The Portland cement, mearlcrete concrete, or other inert filler material shall completely fill the truss annulus. No field fabrication of fittings will be allowed. Truss pipe shall be supplied in lengths not longer than 13 feet.

B. Joints for pipe and fittings shall be of the bell and spigot gasketed type in accordance with ASTM F477.

C. Acceptance will be on the basis of the Owner’s inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

2.03 PVC PIPE

A. PVC gravity sewer pipe (8 to 15 inches in diameter) shall be integral bell and spigot joint type. The pipe shall be manufactured in accordance with ASTM 3034. The pipe shall have a minimum wall thickness which provides a SDR 26 and a minimum pipe stiffness of 115 psi. The PVC compound shall be produced in accordance with ASTM D1784. PVC pipe shall be supplied in

lengths not longer than 13 feet. PVC pipe less than 8 inches in diameter shall not be used for public sanitary sewer.

B. Joints for pipe and fittings shall be of the bell and spigot gasketed type in accordance with ASTM F477.

C. Acceptance will be on the basis of the Owner's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

2.04 CASING (STEEL PIPE)

A. The casing pipe shall be made from steel plate having a minimum yield strength of 35,000 psi. The steel plate shall also meet the chemical requirements of ASTM A36.

1. The thicknesses of casing shown in paragraph B. below are minimum thicknesses. Actual thicknesses shall be determined by the casing installer, based on its evaluation of the required forces to be exerted on the casing when jacking. Any buckling of the casing due to jacking forces shall be repaired at no additional cost to the Owner. Pipe wall thickness for aerial spans exceeding 20 feet shall be designed by the Engineer of Record.
2. The diameters of casing shown in paragraph B. below and shown on the Drawings are minimum. Larger casings, with the Engineer's approval, may be provided at no additional cost to the Owner, for whatever reasons the Contractor may decide, whether casing size availability, line and grade tolerances, soil conditions, or other reasons.

B. Casing Sizes:

Aerial Spans		
Carrier Pipe Size, inches	**Casing Pipe Size, inches**	**Casing Pipe Wall Thickness, inches**
6	12	0.250
8	16	0.250
10	18	0.250
12	18	0.250
14	20	0.250
16	24	0.250
18	24	0.250
20	30	0.312
24	36	0.375
30	42	0.500
36	48	0.500
42	54	0.500

Aerial Spans		
Carrier Pipe Size, inches	**Casing Pipe Size, inches**	**Casing Pipe Wall Thickness, inches**
48	60	0.500
54	66	0.500
60	72	0.500
64	78	0.500

C. Coatings: Casing shall be furnished with a bituminous exterior coating.

1. Exposed installations:
   a. Two coats, factory applied.
   b. Total dry film thickness: 10 mils, minimum.
   c. Color: Standard Black High Gloss.

2. Buried installations:
   a. One coat, factory applied.
   b. Total dry film thickness: 1 mil, minimum.

2.05 CASING SPACERS

A. Casing spacers shall meet one of the following requirements:

1. Type I casing spacers shall be flanged, bolt-on style with a two-section stainless steel shell lined with a PVC liner, minimum 0.09-inch-thick also having a hardness of 85-90 durometer. Runners shall be attached to stainless steel risers which shall be properly welded to the shell. The height of the runners and risers shall be manufactured such that the pipe does not float within the casing.
2. Type II casing spacers shall be a two-section, flanged, bolt-on style constructed of heat-fused PVC coated steel, minimum 14-gauge band and 10-gauge risers, with 2-inch wide glass reinforced polyester insulating skids, heavy duty PVC inner liner, minimum 0.09-inch thick having a hardness of 85-90 durometer, and all stainless steel or cadmium plated hardware.

2.06 MANHOLES AND PRECAST CONCRETE PRODUCTS

A. Provide manholes and other precast concrete products in accordance with the following paragraphs.

B. Precast Concrete Sections:

1. Precast concrete sections shall meet the requirements of ASTM C478 or ASTM C913. The minimum compressive strength of the concrete in

precast sections shall be 4,000 psi.

2. The minimum wall thickness shall be one-twelfth of the inside diameter of the base, riser, or the largest cone diameter. Additionally, the wall thickness shall be sufficient for the proper installation of the rubber boots.
3. Transition slabs, which convert bases larger than 4 feet in diameter to 4-foot diameter risers, shall be designed by the manhole manufacturer to carry the live and dead loads exerted on the slab.
4. Seal joints between precast sections by means of rubber O-ring gaskets or flexible butyl rubber sealant. Butyl rubber sealants shall meet the requirements of American Association of State Highway and Transportation Officials (AASHTO) M-198. Sealant shall be pre-formed type with a minimum nominal diameter of 1 inch. Butyl rubber sealant shall be equal to Kent Seal No. 2 or Concrete Sealants CS202.

C. Brick shall be whole and hardburned, conforming to ASTM C32 Grade MS. Mortar shall be made of one part Portland cement and two parts clean sharp sand. Cement shall be Type 1 and shall conform to ASTM C150. Sand shall meet ASTM C144.

D. Iron Castings:

1. Cast iron manhole frames and covers shall meet the requirements of ASTM A48 for Class 30 gray iron and all applicable local standards. No casting will be accepted which weighs less than 95 percent of the design weight. Shop Drawings must indicate the design weight and provide sufficient dimensions to permit checking:
   a. Tensile strength of the cast iron shall be a minimum of 30,000 psi.
   b. Covers and frames shall be "Heavy Duty" type, rated for a minimum of H-20 loading.

2. All casting shall be tough, close grained, smooth, and free from blowholes, blisters, shrinkage, stains, cracks, cold shots, and other imperfections.
   a. Castings judged to be defective by the Owner's Representative will be rejected, and shall be replaced by the Contractor at no additional cost to the Owner.
   b. Casting tolerances shall be plus or minus 1/16 inch, with an additional 1/16 inch per foot of dimension.
   c. Covers shall not rock or chatter when in-place in frames.

3. Manhole frames and covers shall be as shown on the Standard Detail Drawings. Manhole covers shall be of either Standard Type or Bolt-Down Type, as indicated on the Plans or as otherwise specified. If not otherwise indicated, manhole covers shall be Standard Type.
4. All frames and covers shall have machined horizontal bearing surfaces.

5. Manhole covers shall be cast with 2 non-penetrating type pick-holes, located as indicated in the Detail Drawings.
   a. Pick-holes shall conform to the dimensions indicated in the Detail Drawings.
   b. Manhole covers shall not have vent holes.

6. The seating surfaces of frames and covers shall be machined flat to ensure contact between the cover and frame along the full perimeter.
7. Gaskets shall be provided and installed on all manhole frames.
   a. Gaskets shall be secured to the seating surface of the frame with non-degrading glue by the manufacturer.
   b. Gaskets shall be flat, 1/8-inch thick, black neoprene, with a tensile strength of 2,000 psi.

8. For manhole covers indicated as Bolt-Down Type, frames shall be cast and machined to accept 4 cover bolts, on the pattern shown in the Detail Drawings.
   a. Covers shall be cast with 4 holes, 3/4-inch diameter, for the bolts on the pattern shown in the Detail Drawings.
   b. Bolts shall be stainless steel hex-head cap screws, and shall be provided with all bolt-down type covers.
   c. Bolts shall include stainless steel washers and rubber sealing gaskets.

9. Manhole frames and covers shall always be replaced together for a suitable fit. Do not replace the manhole cover only.

E. Provide preformed rubber boots and fasteners equal to those listed in Appendix A.

F. Manhole steps of polypropylene molded around a steel rod equal to products of M.A. Industries shall be used. Manhole steps shall meet the requirements of ASTM C478 for design, materials of construction, dimensions, testing, and acceptance.

G. Sand-Cement Grout:

1. Miscellaneous small items of equipment shall be grouted in place using a sand-cement grout consisting of one part Portland cement, two parts fine aggregate, and a maximum of 4.5 gallons of water per sack (cubic foot) of cement. Portland cement shall be Type III conforming to ASTM C150. Fine aggregate shall be natural siliceous sand, consisting of hard, clean, sharp, dense, durable, and uncoated particles.
2. Fine aggregate shall be free from organic material and injurious amounts of deleterious substances and shall be graded as follows:

Sieve Size No.	Percent (by weight) Passing
4	100
8	95 – 100
16	60 – 100
30	35 – 70
50	15 – 35
100	2 – 15

3. Except as modified herein, fine aggregate shall conform to the requirements of ASTM C144.
4. Fine aggregate to be used with epoxy binders shall be dried prior to use to remove any free moisture.

H. Non-shrink grout shall show zero shrinkage from the placement volume or initial expansion volume as determined by ASTM C827, and shall have an initial set time at 70 degrees F of not less than 45 minutes as determined by ASTM C191. When tested in accordance with ASTM C109, non-shrink grout shall have a 1-day compressive strength of not less than 2,000 psi, and a 28-day compressive strength of not less than 9,000 psi at a flow of not less than 100 percent determined in accordance with U.S. Army Corps of Engineers (USACOE) Specification CRD-C-621. The grout shall contain no corrosive irons, calcium chloride, oxidizing catalysts, gas-forming agents, harmful aluminums, or corrosive chemicals and shall be resistant to oil, water, and sewage. The grout shall be premixed and shall require only the addition of water prior to placement. The grout shall be delivered to the job site in unopened plastic-lined bags and shall have the manufacturer's mixing instructions printed on the back of each bag. Non-shrink grout shall be EUCO N-S Grout as manufactured by the Euclid Chemical Company, Masterflow 713 Grout as manufactured by Master Builders Company, or Upcon High Flow Grout as manufactured by Emhart Chemical Company.

2.07 MANHOLE UTILITY MARKER

A. Each manhole outside paved areas shall be marked with a white 4-inch PVC pipe.

B. Pipe shall have a minimum wall thickness equivalent to Schedule 40 in accordance with ASTM D1785.

C. Pipe shall be buried at a depth equal to one-third of the overall pipe length and not less than 2 feet.

D. Top of the marker shall be 4 feet above the manhole rim.

E. Marker shall be painted bright green on the top 12 inches.

2.08 DETECTION TAPE

A. Detection tape shall be composed of a solid aluminum foil encased in a protective plastic jacket.

B. Tapes shall be color coded in accordance with American Public Works Association (APWA) color codes with the following legends: Sanitary sewerage systems, safety green, "Caution: Sewer Line Buried Below." Colors may be solid or striped.

C. Tape shall be permanently printed with no surface printing allowed. Tape width shall be a minimum of 3 inches, and shall be buried at a depth from 1 to 2 feet deep. Detection tape shall be installed over all sewer mains and service laterals.

PART 3 EXECUTION

3.01 EXISTING UTILITIES AND OBSTRUCTIONS

A. The Drawings shall indicate utilities or obstructions that are known to exist according to the best information available. The Contractor shall call the Utilities Protection Center (UPC) (325-5000 or 1-800-282-7411) as required by Georgia law (Official Code of Georgia Annotated [O.C.G.A.] Sections 25-9-1 through 25-9-13) and all utilities, agencies, or departments that own and/or operate utilities in the vicinity of the construction work site, at least 72 hours (3 business days) prior to construction, to verify the location of the existing utilities.

B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service.

1. Provide the required notice to the utility owners and allow them to locate their facilities according to Georgia law. Field utility locations are valid for only 10 days after original notice. The Contractor shall ensure, at the time of any excavation that a valid utility location exists at the point of excavation.
2. Expose the facility to verify its true location and grade for a distance of at least 200 feet in advance of pipeline construction to verify its true location and grade. Repair, or have repaired, any damage to utilities resulting from locating or exposing their true location.
3. Avoid utility damage and interruption by protecting it with means or methods recommended by the utility owner.

4. Maintain a log identifying when phone calls were made, who was called, area for which utility relocation was requested, and work order number issued, if any.

C. Conflict with Existing Utilities:

1. Horizontal Conflict: Horizontal conflict shall be defined as when the actual horizontal separation between a utility, main, or service and the proposed sewer main does not permit safe installation of the sewer by the use of sheeting, shoring, tying-back, supporting, or temporarily suspending service of the parallel or crossing facility. The Contractor may change the proposed alignment of sewer to avoid horizontal conflicts if the new alignment remains within the available right-of-way or easement and complies with regulatory agency requirements after a written request to and subsequent approval by the Owner. If, in the opinion of the Owner, the sewer's proposed location cannot be adjusted, thus requiring the relocation of an existing utility, the Owner will direct the Contractor to have the utility relocated.
2. Vertical Conflict: Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed sewer does not permit the crossing without immediate or potential future damage to the utility, main, service, or the sewer. The Contractor may change the proposed grade of the sewer to avoid vertical conflicts if the changed grade provides minimum required capacity, maintains adequate cover, and complies with regulatory agency requirements, after written request to and subsequent approval by the Owner. If, in the opinion of the Owner, the sewer's proposed location cannot be adjusted, thus requiring the relocation of an existing utility, the Owner will direct the Contractor to have the utility relocated.
3. Any delay or extra cost due to encountering underground utilities or obstructions, regardless of whether shown on the Drawings or found in locations different from those shown on the Drawings, or scheduling or coordination of relocation of utilities or services, shall not constitute a claim for additional payment or increase in contract time. No payment for utility relocation will be made for the temporary support of utilities being crossed or in danger of being disturbed by the Contractor’s activities. No payment for utility relocation will be made for the improvement of the Contractor’s pipe laying productivity. Payment for relocation of utilities shall be made only if the utility is in direct conflict, either in plan or elevation, with the proposed sewer alignment. Before relocation work is started, written approval from the Owner is required.

D. Water and Sewer Separation:

1. Sewers should maintain a minimum 10-foot edge-to-edge separation from water mains. Where the sewer crosses a water main, an 18-inch vertical separation shall be maintained where possible. Where possible, a full length of sewer pipe shall be centered on the water main. Any deviation shall be requested in writing to the Owner.
2. Where the sewer crosses over a water main, the water main shall be encased in concrete to the first joint in each direction.
3. No water main shall be permitted to pass through or come in contact with any part of a manhole.

3.02 CONSTRUCTION ALONG HIGHWAYS, STREETS, AND ROADWAYS

A. Install pipelines and appurtenances along highways, streets, and roadways in accordance with the applicable regulations of, and permits issued by, the Department of Transportation and the Unified Government of Athens-Clarke County with reference to construction operations, safety, traffic control, road maintenance, and repair.

B. Traffic Control:

1. The Contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient lights, and other traffic control devices; provide qualified flagmen where necessary to direct traffic; and take all necessary precautions for the protection of the work and the safety of the public. Flagmen shall be certified by a Georgia Department of Transportation approved training program.
2. Construction traffic control devices and their installation shall be in accordance with the current *Manual On Uniform Traffic Control Devices for Streets and Highways.*
3. Placement and removal of construction traffic control devices shall be coordinated with the Georgia Department of Transportation and the Unified Government of Athens-Clarke County a minimum of 48 hours in advance of the activity.
4. Placement of construction traffic control devices shall be scheduled ahead of associated construction activities. Construction in street right-of-way shall be conducted to minimize the length of time traffic is disrupted. Construction traffic control devices shall be removed immediately following their useful purpose. Traffic control devices used intermittently, such as "Flagmen Ahead," shall be removed and replaced when needed.
5. Existing traffic control devices within the construction work zone shall be protected from damage. Traffic control devices requiring temporary relocation shall be located as near as possible to their original vertical and horizontal locations. Original locations shall be measured from reference points and recorded in a log prior to relocation. Temporary locations shall provide the same visibility to

affected traffic as the original location. Relocated traffic control devices shall be reinstalled in their original locations as soon as practical following construction.

6. Construction traffic control devices shall be maintained in good repair and shall be clean and visible to affected traffic for daytime and nighttime operation. Traffic control devices affected by the construction work zone shall be inspected daily.
7. Construction warning signs shall be black legend on an orange background. Regulatory signs shall be black legend on a white background. Construction sign panels shall meet the minimum reflective requirements of the Georgia Department of Transportation and the Unified Government of Athens-Clarke County. Sign panels shall be of durable materials capable of maintaining their color, reflective character, and legibility during the period of construction.
8. Channelization devices shall be positioned preceding an obstruction at a taper length as required by the current *Manual On Uniform Traffic Control Devices for Streets and Highways*, as appropriate for the speed limit at that location. Channelization devices shall be patrolled to ensure that they are maintained in the proper position throughout their period of use.
9. Lane closure must be approved by the Unified Government of Athens-Clarke County Transportation and Public Works Department. Requests for such closures must be submitted at least 48 hours before closures are needed.

C. Construction Operations:

1. Perform all work along highways, streets, and roadways to minimize interference with traffic.
2. Stripping: Where the pipeline is laid along road right-of-way, strip and stockpile all sod, topsoil, and other material suitable for right-of-way restoration.
3. Trenching, Laying, and Backfilling: Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.
4. Shaping: Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod, and any other materials removed from shoulder.
5. Construction operations shall be limited to 400 feet along areas, including cleanup and utility exploration.

D. Excavated Materials: Do not place excavated material along highways, streets, and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off the pavement in a timely manner.

E. Drainage Structures: Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.

F. Landscaping Features: Landscaping features shall include but are not necessarily limited to, fences, property corners, cultivated trees and shrubbery, manmade improvements, and subdivision and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.

G. Maintaining Highways, Streets, Roadways, and Driveways:

1. Maintain streets, highways, roadways, and driveways in a suitable condition for movement of traffic until completion and final acceptance of the work.
2. During the time period between pavement removal and completing permanent pavement replacement, maintain highways, streets, and roadways by the use of steel running plates. The edges of running plates shall have asphalt placed around their periphery to minimize vehicular impact. The backfill above the pipe shall be compacted, as specified elsewhere up to the existing pavement surface to provide support for the steel running plates. Steel running plates shall be designed to support H-20 traffic loadings.
3. Furnish a road grader or front-end loader for maintaining highways, streets, and roadways. Make the grader or front-end loader available at all times.
4. Immediately repair all driveways that are cut or damaged. Maintain them in a suitable condition for use until completion and final acceptance of the work.

3.03 PIPE DISTRIBUTION

A. Pipe shall be distributed and placed in such a manner that will not interfere with traffic.

B. No pipe shall be strung further along the route than 1,000 feet beyond the area in which the Contractor is actually working without written permission from the Owner. The Owner reserves the right to reduce this distance to a maximum distance of 200 feet in residential and commercial areas based on the effects of the distribution on adjacent property owners.

C. No street or roadway may be closed for unloading of pipe without first obtaining permission from the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets, and roadways upon which pipe is distributed.

D. No distributed pipe shall be placed inside drainage ditches.

E. Distributed pipe shall be placed as far as possible from the roadway pavement, but no closer than 5 feet from the roadway pavement, as measured edge-to-edge.

3.04 LOCATION AND GRADE

A. The Drawings shall show the alignment and grade of the gravity sewer and the position of manholes and other appurtenances. The slope shown on the gravity sewer profile and/or called for in the Specifications shall be the slope of the invert of the pipe.

B. After the Contractor locates and marks the manhole centerlines or baselines of the gravity sewer, the Contractor shall perform clearing and grubbing.

C. Where the depth of cover of the gravity sewer is less than 4 feet or more than 15 feet, the sewer shall be constructed with ductile iron pipe from manhole to manhole.

D. Minimum drop across manholes is 0.2 foot unless site conditions dictate otherwise.

E. Sewers with a velocity of 15 FPS or higher or 20 percent slopes or greater shall be anchored securely with concrete anchors spaced not over 36 feet center to center on grades 20% and up. The maximum grade allowed by PUD is 15%.

F. A velocity of not less than 2.0 FPS is required to prevent solids from settling in the sewer. All sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2 FPS, based on the Mannings formula using an "n" for the material selected.

G. The following table identifies the minimum and maximum grades acceptable for all sanitary sewer lines.

Pipe Diameter (Inches)	Minimum Grade (%)	Maximum Grade (%)
8	0.5	15.0
10	0.4	10.0
12	0.3	10.0
15/16	0.25	8.0
18	0.22	6.0
20	0.20	5.0
24	0.15	4.0

3.05 LAYING AND JOINTING PIPE AND ACCESSORIES

A. Lay all pipe and fittings to accurately conform to the lines and grades established by the Owner.

B. Use the same pipe material from manhole to manhole. Transitioning from one pipe material to another between manholes shall not be allowed.

C. Pipe Installation:

1. Proper implements, tools, and facilities shall be provided for the safe performance of the Work. All pipe and fittings shall be lowered carefully into the trench by means of slings, ropes, or other suitable tools or equipment in such a manner as to prevent damage to sewer materials and protective coatings and linings. Under no circumstances shall sewer materials be dropped or dumped into the trench.
2. All pipe, fittings, and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Owner, who may prescribe corrective repairs or reject the materials.
3. All lumps, blisters, and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and free from dirt, sand, grit, or any foreign materials before the pipe is laid. No pipe that contains dirt shall be laid.
4. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing, or other materials shall be placed in the pipe at any time.
5. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.
6. Work shall progress from the low point of any sewer, and proceed up gradient. Lay pipe with the bells facing in the upstream direction in which work is progressing.
7. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade shall not be permitted.
8. Polyethylene Encasement: Installation shall be in accordance with AWWA C105 and the manufacturer's instructions. All ends shall be securely closed with tape and all damaged areas shall be completely repaired to the satisfaction of the Owner.

D. Alignment and Gradient:

1. Lay pipe straight in alignment and gradient.
2. Maintain a transit, level, and accessories on the job to lay out angles.

3. The Contractor shall check the invert elevation at each manhole and the gravity sewer invert elevation at least three times daily (start, mid-day and end of day). Elevations shall be checked more frequently if more than 100 feet of pipe is installed in a day or if the gravity sewer is being constructed at minimum slope.
4. The Contractor shall check the horizontal alignment of the gravity sewer on the same schedule as invert elevations checks.

E. Expediting of Work: Excavate, lay the pipe, and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed. Cover the exposed end of the installed pipe each day at the close of work and at all other times when work is not in progress. If necessary to backfill over the end of an uncompleted pipe or accessory, close the end with a suitable plug (either push-on, mechanical joint, restrained joint), or as approved by the Owner.

F. Joint Assembly: Push-on, mechanical, flange, and restrained type joints shall be assembled in accordance with the manufacturer's recommendations.

G. Cutting Pipe:

1. Cut ductile iron pipe using an abrasive wheel saw.
2. Cut PVC pipe using a suitable saw.
3. Remove all burrs and smooth the end before jointing.
4. The Contractor shall cut the pipe and bevel the end, as necessary, to provide the correct length of pipe necessary for installing the fittings, valves, accessories, and closure pieces in the correct location. Only push-on or mechanical joint pipe shall be cut.

H. House Connections: Install tees in locations designated by the Owner for future connection of service lines. Plug the branch of the tee. Record the location of fittings installed on the Record Drawings.

I. Provide detection tape for all PVC sewers. Detection tape (3 inches) shall be buried 1 to 2 feet deep. In no case shall detection tape be buried greater than 2 feet deep from the finish grade surface.

3.06 MANHOLE AND PRECAST CONCRETE PRODUCT CONSTRUCTION

A. Construct manholes as shown on the Standard Detail Drawings.

B. Precast Concrete: Handle sections carefully to prevent cracking or chipping. Provide uniform bedding of the bottom section to prevent uneven loading. Install gaskets and joint sealants in accordance with manufacturer's recommendations to produce a watertight structure.

C. Brick: Bed the bottom and sides of every brick in mortar. Apply a smooth coat of mortar, 3/4-inch thick, on the inside and outside.

D. Inverts: Form channels as shown on the Drawings (rounded, and troweled smooth). Maintain consistent grade through the invert. Use sand-cement grout. Precast concrete inverts may be used at the option of the contractor.

E. Top Elevations: Build manholes outside of paved areas to 18 inches above finished grade unless otherwise shown on the Drawings or directed by the Owner. Build manholes in paved areas to existing grades. Unless special easement stipulations require otherwise, build manholes within the 100- year flood plane to 3 feet above finished grade with bolt-down frame and cover.

F. Drop Connections: Manholes requiring drop connections are shown on the Drawings. Construct drop connections in accordance with the details shown on the Drawings. Drop connections (outside drops) are required at locations where the invert in elevation is greater than 2.0 feet above the invert out elevation.

G. Frames and Covers: For frames and covers in roadways, the frame shall not be cast into the cone section. For manholes outside of the roadway, the frame may be cast into the cone section.

H. Seal all manhole joints and lift holes, both inside and out, with grout. Between precast sections, this is in addition to joint sealant.

I. Invert Elevations: The invert elevations shown on the Drawings shall be for the invert at the centerline of the precast concrete manhole. Prior to setting the laser or other vertical alignment control system for the sewer upstream of the manhole, the Contractor shall verify the elevation of the sewer installed at the manhole.

J. Manholes shall be constructed such that their walls are plumb.

K. Floor doors shall be integrally cast into the top slab, and shall be cast into the concrete in accordance with the manufacturer's recommendations.

L. Sewer connections 6 inches and larger to main sewers shall be made to an existing or new manhole. Connections to existing pipe stub-outs or tee or wye connections shall not be allowed.

3.07 MANHOLE FRAME AND COVER INSTALLATION

A. Contractor Shall:

1. Prepare the manhole top cone for frame installation per manhole and manhole cover manufacturer recommendations.
2. Prepare and install manhole frames and covers per manufacturer recommendations.

3. Check the installation and condition of gaskets and replace all missing or damaged gaskets.
4. Install new frames and covers to the required elevations shown on the Plans or to the existing grade as directed by the Owner's Representative.
5. Check the manhole covers for fit in the frame.
    a. If a manhole cover is either excessively loose or tight in the frame, or rocks, wobbles, or otherwise moves in its frame, the frame and cover shall be removed and replaced by the Contractor at no additional cost to the Owner.

B. Install and tighten all Bolt-Down Type covers.

3.08 STREAM CROSSINGS

A. The top of all sewers entering or crossing streams must be at a sufficient depth below the natural bottom of the streambed to protect the sewer line. Sewer lines crossing streams should be designed to cross the stream as nearly perpendicular to the stream flow as possible and must be free from change in grade. Sewer systems must be designed to minimize the number of stream crossings. In general, the following cover requirements must be met:

1. One foot of cover where the sewer is located in rock.
2. Three feet of cover in other material. In a major stream, more than three feet of cover may be required. Buoyancy calculations should determine the potential for flotation. The design should also make provisions for stream erosion from high flow rates.
3. In paved stream channels, the top of the sewer line should be placed below the bottom of the channel pavement.

B. Buoyancy of sewers shall be considered and flotation of the pipe shall be prevented with additional soil cover and or concrete anchor blocks where high ground water conditions are anticipated.

C. All sewer pipes crossing streams, above or below grade, shall be enclosed in steel casing pipe and carrier pipe shall be ductile iron pipe with restrained joints.

D. Aerial spans shall avoid or minimize obstruction of stream flow during normal highwater events.

E. Installation of casing pipe:

1. Jack and bore under stream crossings in accordance with Section 02229, Jack and Bore Crossings. Where permitted or directed by the Owner, casing pipe shall be installed directly in an open cut ditch for subsequent installation of carrier pipe after backfill. Ditch preparation, backfill, and compaction shall be as required for direct-bury ductile iron pipe.

2. Lengths of casing pipe, as long as practical, shall be used except as restricted otherwise. Joints between casing pipe sections shall be butt joints with complete joint penetration, single groove welds, for the entire joint circumference, in accordance with American Welding Society (AWS) recommended procedures. Prior to welding the joints, the Contractor shall ensure that both ends of the casing sections being welded are square. Welded joints shall be coated and lined with coal tar enamel in accordance with AWWA C203.
3. Casing pipe shall extend a minimum of 10 feet into the soil at each end.

F. Installation of carrier pipe:

1. After construction of the casing is complete, and has been accepted by the Engineer, install the carrier pipe in accordance with the Drawings and Specifications.
2. Check the alignment and grade of the casing and prepare a plan to set the carrier pipe at proper alignment, grade, and elevation, without any sags or high spots.
3. The carrier pipe shall be supported within the casing by use of casing spacers sized to limit radial movement to a maximum of 1 inch. Provide a minimum of one casing spacer per nominal length of pipe. Casing spacers shall be attached to the pipe at maximum 9- to 10-foot intervals.
4. Close the ends of the casing with 4-inch brick and mortar walls.

3.09 CONCRETE PIERS

A. Construct piers as shown on the Drawings and in accordance with the following requirements.

B. The maximum spacing between piers shall be 30 feet for aerial crossings.

C. Bearing:

1. Earth: Where excavation reveals undisturbed earth subsurface, construct piers with spread footing foundations as shown on the Drawings.
2. Rock: Where excavation reveals level or benched rock having a minimum safe bearing value of 20,000 psf, construct piers with foundations bearing directly on rock. Drill a minimum of four holes into the rock under each pier and grout dowels into place to anchor the pier to the rock. Hole and dowel sizes are shown in the following

table.

Carrier Pipe Size	Grout Hole Diameter	Grout Hole Depth	Reinforcing Bar Dowel
8 - 24	2.5"	8.0'	5
27 - 36	4.0"	8.0'	6
42 - 48	4.0"	8.0'	6
54	4.0"	8.0'	6

3. Grout holes from the bottom up using a grout pump. Take extreme care to ensure that the entire hole is filled with grout prior to inserting the dowel.
4. Helical type pier foundations may be required by the Unified Government of Athens-Clarke County as an option on a case-by-case basis.

D. Installation:

1. Employ experienced formwork carpenters to construct forms. Build formwork sufficiently strong to resist movement and distortion during pouring and to protect the pier from caving in or lateral movement.
2. Before placing concrete, dewater the bottom of the hole and clean out all mud, loose earth, and extraneous matter.
3. Pour concrete as soon as possible after the forms have been approved. Do not leave the excavation open for prolonged periods of time. Protect the excavation from surface water. Do not allow water to accumulate in the excavation or in surrounding areas.
4. Take all necessary precautions to protect the work and personnel on the site. Cover open holes when work is not in progress. Examine all surrounding excavations and embankments for possible hazards.

E. Inspection: A consulting soil and foundation engineer shall perform the following:

1. Inspect the bearing material and evaluate its suitability.
2. Inspect pneumatically drilled grout holes where applicable.
3. Check dimensions of forms and verify that they are plumb to ensure conformity with Drawings and Specifications.
4. Evaluate material penetrated by excavation with regard to lateral stability and uplift resistance.
5. Recommend remedial measures should insufficient lateral stability or uplift resistance exist.

F. Construct aerial piers as shown on the Drawings and in accordance with the Engineer's design. Each pier must be individually designed by the Engineer

of record. When the typical pier detail is used, the Engineer of record must certify the design and disclose calculations showing the pier will stand up to the different forces acting upon it.

3.10 CONCRETE COLLARS

A. Construct collars as shown on the Drawings.

3.11 INSPECTION AND TESTING

A. Sewers and appurtenances shall be inspected and tested for:

1. Cleanliness,
2. Alignment,
3. Water tightness, and
4. Deflection.

B. Cleanliness: Sewers and manholes shall be televised by the Contractor. Sewers and manholes shall be free of all debris and obstructions. Sediment in bottom of sewer shall not exceed 0.25 inch in depth. Flush sewers and manholes where sediment exceeds this limit.

C. Alignment: Sewers shall be inspected for vertical and horizontal alignment by means of direct visual observation or by the use of mirrors, with sunlight or other light source. Sewers shall be straight in alignment, including no sags in the vertical alignment. Correct any misalignments discovered during inspection.

D. Water tightness: All sewers constructed shall be watertight to the maximum extent feasible. Infiltration and exfiltration tests shall both be performed on all new sewers constructed as indicated below, except for those new sewers constructed which have active services tied into it as the pipe is being installed. In such cases the water tightness of the sewers shall be based on a visual inspection. All visible or audible leaks, including those found via television inspection, shall be repaired.

E. Infiltration Tests (Only possible when groundwater is two feet above top of pipe and is only allowable on a case-by-case basis with approval from the Utilities Engineer):

1. Install suitable weirs in manholes selected by the Owner to determine the leakage of groundwater into the sewer. The maximum length of line for each infiltration test shall be 1,000 feet.
2. Temporarily plug the sewer at the upper end of the section being tested. Install weir for a minimum of four hours before measuring flow. If leakage in any section of the sewer line exceeds 25 gpd/inch diameter/mile, locate and repair leaks. Repair methods must be

approved by the Owner. After repairs are completed, re-test for leakage.

3. Furnish, install, and remove the necessary weirs, plugs, and bulkheads required to perform the leakage tests.
4. Weirs shall be V-notch type equal to Pollard Water, Inc.

F. Exfiltration Tests - Low-Pressure Air Test:

1. All sewers 8 through 24 inches shall be subjected to a low-pressure air test in accordance with ASTM F1417 and these Specifications. Prior to air testing, the section of sewer between manholes shall be thoroughly cleaned and wetted. Immediately after cleaning or while the pipe is water soaked, the sewer shall be tested with low-pressure air. At the Contractor's option, sewers may be tested in lengths between manholes or in short sections (25 feet or less) using inflatable balls pulled through the line from manhole to manhole. Air shall be slowly supplied to the plugged sewer section until internal air pressure reaches approximately 4.0 psi. After this pressure is reached and the pressure is allowed to stabilize (approximately 2 to 5 minutes), the pressure may be reduced to 3.5 psi before starting the test. If a 1.0 psi drop does not occur within the test time, then the line has passed the test. If the pressure drops more than 1.0 psi during the test time, the line is presumed to have failed the test, and the Contractor will be required to locate the failure, make necessary repairs, and retest the line. Minimum test time for various pipe sizes and types are as shown in the following table.

Nominal Pipe Size, inches	**Time (Min/100 feet) DIP, PVC**
6	5.7
8	7.6
10	9.4
12	11.3
15	14.2
18	17.0
20	19.8
24	22.8

2. Required test equipment, including inflatable balls, braces, air hose, air source, timer, rotameter as applicable, cut-off valves, pressure reducing valve, 0-15 psi pressure gauge, 0-5 psi pressure gauge with

gradations in 0.1 psi and accuracy of plus or minus 2 percent, shall be provided by the Contractor. Testing equipment shall be equal to Cherne Air-Loc Testing Systems.

3. The Owner shall witness and the Contractor shall keep records of all tests made. Copies of such records will be given to the Owner. Such records shall show date, line number and stations, upstream manhole and downstream manhole, operator, and such other pertinent information as required by the Owner.
4. The Contractor is cautioned to observe proper safety precautions in performance of the air testing. It is imperative that plugs are properly secured and that care is exercised in their removal. Every precaution shall be taken to avoid the possibility of over-pressurizing the sewer line.

G. Deflection Test: All PVC and PVC Truss Pipe and gravity sewers

1. Test PVC and PVC Truss Pipe gravity sewer for excessive deflection by passing a mandrel through the pipe. Deflection of the pipe shall not exceed 5 percent.
2. The mandrel shall have an odd number of legs, or vanes, with a quantity of such equal to or greater than nine. The legs of the mandrel shall be permanently attached to the mandrel. A mandrel with variable sizes shall not be allowed. The mandrel shall be constructed of steel, aluminum, or other material approved by the Owner, and shall have sufficient rigidity so the legs of the mandrel will not deform when pulling through a pipe. The mandrel dimensions shall be checked by the Owner before use by the Contractor. The following table shows minimum mandrel diameters for different pipe sizes.

Nominal Pipe Size, inches	**Minimum Mandrel Diameter, inches**
8	7.41
10	9.31
12	11.21
15	14.06

* Equal to 95% of base inside diameter as specified.

3. General Procedure:
   a. Flush the sewer to remove any mud or trash.
   b. During the final flushing of the sewer, attach a floating block or ball to the end of the mandrel pull rope and float the rope through the sewer.
   c. After the rope is threaded through the sewer, connect the pull rope to the mandrel and place the mandrel in the entrance of the

sewer segment.

d. Connect a second rope to the back of the mandrel in order to enable the mandrel to be retrieved if excessive deflection is encountered.
e. Remove all the slack in the pull rope by gently pulling the rope at the far manhole. After the slack has been removed, place a tape marker on the pull rope close to the pipe opening where the mandrel will exit to provide a means of measuring the travel distance of the mandrel so that any deflected area can be located.
f. Pull mandrel through the sewer.
g. This test shall be performed without any mechanical pulling device.
h. An increasing resistance to pull is an indication of excessive deflection. If this occurs, measure the distance from beginning marker on rope to manhole. Locate section and replace bedding or pipe if visual examination reveals damage. Re-test as required until satisfactory results are achieved.

4. If the mandrel can travel from one manhole to the next manhole, the sewer segment shall be considered as passing the deflection test.
5. This test shall be performed once no sooner than 30 days after installation.

H. Manhole Water tightness:

1. Manholes shall be tested for water tightness in accordance with ASTM C1244 and these Specifications. Prior to testing manholes for water tightness, all lift holes shall be plugged with a non-shrink grout, all joints between precast sections shall be properly sealed, and all pipe openings shall be temporarily plugged and properly braced.
2. Vacuum Tests: The manhole, after proper preparation as noted above, shall be vacuum tested prior to or after backfilling. The test head shall be placed at the inside of the top of the cone section and the compression head inflated to 40 psi to effect a seal between the vacuum base and the manhole structure. Connect the vacuum pump to the outlet port with the valve open. A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9 inches. The manhole shall pass if the time is greater than that specified in the table below. If the manhole fails the initial test, necessary repairs shall be made with non-shrink grout while the vacuum is still being drawn. Retesting shall proceed until a satisfactory test is obtained. Vacuum testing equipment shall be equal to that manufactured by P.A. Glazier, Inc.

Minimum Test Times (Seconds) for Various Manhole Diameters and Depths		
Depth, feet	**Manhole Diameter, feet**	
	4	**5**
8	20	26
10	25	33
12	30	39
14	35	46
18	40	52
18	45	59
20	50	65
22	55	72
24	59	78
26	64	85
28	69	91
30	74	98

I. Video Inspection:

1. The Contractor is required to record video footage of the existing sewer before the start of construction and record video footage of new sewer upon the completion of all grading, paving, compaction, and testing. The Owner inspector shall be present during video recording. The Contractor shall give the Owner 48-hour (minimum) notice before starting video recording. All video footage of existing and new sewer shall be submitted to the Owner for review and approval prior to acceptance of the work.
2. Immediately before video recording, dye tablets dissolved in water shall be introduced into the sewer. One tablet per gallon of water shall be used for the dye mixture. One gallon of dye mixture per 100 linear feet of sewer shall be introduced. Use tablets that will produce a fluorescent green- yellow color in water.
3. The video footage shall be in digital format with two copies. The television camera used for this purpose shall be operative in 100 percent moisture conditions. Lighting for the camera shall be sufficient to yield a clear picture of the entire periphery of the pipe.

The camera, television monitor, and other components of the video system shall be capable of producing a five hundred-line resolution picture. The camera's rate of travel shall not exceed 20 feet per minute. At each service, the camera shall come to a complete stop and the service shall be panned. The footage meter count shall be clearly visible. Logs shall include date, line size, length, manhole numbers, project number, direction of camera travel, direction of flow, and any observed defects or comments. For each service, the log should include the distance from manhole, its location (for example 9:00 or 2:00 o'clock), street address or parcel, and distance from mainline to cleanout. Videos between manhole segments shall be continuous; no breaks or "blink-outs" in the video shall be observed. Above-ground features adjacent to each segment's beginning manhole shall be videoed.

4. Video recording firms shall be on the Approved List of the Owner.

3.12 PROTECTION AND RESTORATION OF WORK AREA

A. General: Return all items and all areas disturbed, directly or indirectly by work under these Specifications, to their original condition or better as quickly as possible after work is started.

1. The Contractor shall plan, coordinate, and prosecute the work such that disruption to personal property and business is held to a practical minimum.
2. All restoration work, including grading, dressing, grassing, and pavement replacement shall be maintained within 2,000 feet of the pipe laying operation.
3. Prepare photographic documentation of sensitive areas along the project route/site to document conditions existing prior to project construction.
4. All construction areas abutting lawns and yards of residential or commercial property shall be restored promptly. Backfilling of underground facilities, ditches, and disturbed areas shall be accomplished on a daily basis as work is completed. Finishing, dressing, and grassing shall be accomplished immediately thereafter, as a continuous operation within each area being constructed and with emphasis placed on completing each individual yard or business frontage. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
5. Handwork, including raking and smoothing, shall be required to ensure that roots, sticks, rocks, and other debris are removed to provide a neat and pleasing appearance.
6. The Unified Government of Athens-Clarke County or the Georgia Department of Transportation will be authorized to stop all work by the

Contractor on its right-of-way when restoration and cleanup are unsatisfactory and to require appropriate remedial measures.

B. Man-Made Improvements: Protect, or remove and replace with the Owner's approval, all fences, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines and cables, property pins, and other improvements that may be encountered in the work.

C. Cultivated Growth: Do not disturb cultivated trees or shrubbery unless approved by the Owner. Any such trees or shrubbery which must be removed shall be heeled in and replanted under the direction of an experienced nurseryman.

D. Cutting of Trees: Do not cut trees for the performance of the work except as absolutely necessary. Protect trees that remain in the vicinity of the work from damage from equipment. Do not store spoil from excavation against the trunks. Remove excavated material stored over the root system of trees within 30 days to allow proper natural watering of the root system. Repair any damaged tree over 3 inches in diameter, not to be removed, under the direction of an experienced nurseryman. All trees and brush that require removal shall be promptly and completely removed from the work area and disposed of by the Contractor. No stumps, wood piles, or trash piles will be permitted on the work site.

E. Planting of new trees for restoration within the permanent easement shall not be allowed. Construction of permanent roadbeds, berms, drainage structures, or other structures shall not be allowed within the permanent sewer easement.

F. Disposal of Rubbish: Dispose of all materials cleared and grubbed during the construction of the project in accordance with the applicable codes and rules of the Unified Government of Athens-Clarke County and state and federal regulatory agencies.

G. Swamps and Other Wetlands:

1. The Contractor shall not construct permanent roadbeds, berms, drainage structures, or any other structures, which alter the original topographic features within the easement.
2. All temporary construction or alterations to the original topography will incorporate measures to prevent erosion into the surrounding swamp or wetland. All areas within the easement shall be returned to their original topographic condition as soon as possible after work is completed in the area. All materials of construction and other non-native materials shall be disposed of by the Contractor.

3. The Contractor shall provide temporary culverts or other drainage structures, as necessary, to permit the free migration of water between portions of a swamp, wetland, or stream, which may be temporarily divided by construction.
4. The Contractor shall not spread, discharge, or dump any fuel oil, gasoline, pesticide, or any other pollutant to adjacent swamps or wetlands.

H. Bypassing or spilling wastewater onto the ground, into the trench, or into adjacent waters is prohibited.

I. Dust Control: The Contractor shall use all means necessary to control dust on and near the work, and on and near all offsite borrow areas when dust is caused by the operations during performance of the work or if resulting from the condition in which the subcontractor leaves the site. The Contractor shall thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of work on the site.

J. Contractor shall be responsible for overall project site safety and the safety of employees on the project site and shall be responsible for complying with all applicable safety standards. The Unified Government of Athens-Clarke County will not be responsible for safety related to the Contractor's activities.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 02735
SANITARY SEWER SERVICE CONNECTIONS

PART 1 GENERAL

1.01 SCOPE

A. The Work covered by this section shall consist of furnishing and installing service connections in the sewers, of the size and type shown on the Drawings and specified herein.

PART 2 PRODUCTS

2.01 MATERIALS

A. Service connections shall be made from the side of sewer lines 12-inch diameter or less using minimum 4-inch diameter pipe as shown on the Drawings. For connecting to sewers larger than 12-inch diameter, the service line shall connect directly to a manhole. Service lines 6-inch diameter or larger connecting to any size sewer shall connect directly to a manhole.

B. Service pipe material shall be Standard Diameter Ratio (SDR) 26 polyvinyl chloride (PVC) when connecting to PVC or PVC truss pipe sewer. Service pipe material shall be ductile iron pipe when connecting to ductile iron sewer. A tee/wye (sweep tee) is required when connecting to SDR 26 PVC sewer.

C. The service connection shall extend from the sewer line to a minimum of 2 feet past the edge of the permanent easement or right-of-way, be plugged, and marked with a vertical piece of SDR-26 PVC exposed a minimum of 4 feet above finish grade.

D. If the service connection ends in rock, the Contractor shall excavate the rock an additional 10 feet beyond the plugged end.

E. Service connections on existing sewer lines shall be by means of a tapping saddle on ductile iron pipe, and a manufactured saddle on PVC truss pipe sewers. Connection of service lines or risers to new sewer lines shall be by means of standard tees, or as indicated on the Drawings.

F. Grease traps shall be connected to the sewer main by means of a 6-inch diameter service line with a “dog house” style manhole at the point of connection. A 4-inch diameter service line is acceptable only in cases where the service line is existing.

PART 3 EXECUTION

3.01 INSTALLATION

A. Laying of service connection lines shall be in accordance with Section 02730, Sewers and Accessories, of these Specifications.

END OF SECTION

SECTION 02740
TEMPORARY SEWER FLOW CONTROL

PART 1 GENERAL

1.01 SCOPE

A. The purpose of this section is to define the various methods of wastewater flow control including plugging/blocking and bypass/diversion pumping. Wastewater flow control shall maintain an efficient and uninterrupted level of service to the sewer system while performing investigative or construction operations.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Institute of Inspection, Cleaning, and Restoration Certification (IICRC): S500, Standard and Reference Guide for Professional Water Damage Restoration.
2. *"Standard Specifications for Wastewater System Construction", December* 2008 Edition, or most recent edition, Public Utilities Department, Unified Government of Athens-Clarke County, Georgia.

1.03 DEFINITIONS

A. Bypass Pumping: Temporary flow control accomplished by diverting flow away from the Work area using one or more pumps.

B. Temporary Flow Control: Reducing, limiting, or excluding flow in or to a sanitary sewer, storm sewer, pump station, force main, or other facility as required for performing the Work under the Contract. Draining, handling, and disposal of sanitary sewage and stormwater from pipelines and other facilities as required for performing the Work under the Contract is also part of temporary flow control.

1.04 SYSTEM DESCRIPTION

A. It is essential to operation of existing sewerage system that there be no interruption in flow of sewage throughout duration of Project.

B. Provide facilities and controls required to intercept, convey, and discharge flow to be controlled; include standby and emergency equipment.

C. Conform to regulatory requirements.

D. Protect water resources, wetlands, and other natural resources.

E. Temporary flow control shall be done in a manner that will not damage private or public property or create a nuisance or public menace. Flow shall be conveyed in enclosed pipes that are adequately protected from traffic or other hazards.

F. Discharge:

1. To sanitary sewer system.
2. Dumping or free flow on private or public property, gutters, streets, or sidewalks is prohibited.
3. Discharge or free flow to storm sewers, to surface waters or wetlands, or into the ground, is prohibited.
4. Any discharge of sanitary sewer to the environment in any manner must be reported to the Owner.

1.05 QUALITY ASSURANCE

A. Qualification documentation shall be submitted as required of the Contract Documents.

1. The Contractor must meet all of the following criteria to be considered qualified to propose and/or bid on the subject Contract:
   a. The Contractor, or their subcontractor, must document they, not their parent company, related company, or the experience of an individuals, have been in this line of business a minimum of 5 years.

2. The Contractor, or their subcontractor, must document they not their parent company, related company, or the experience of an individual/s, have performed gravity sewer bypass/diversion pumping for the sizes of sewer mains and flows expected under this Contract in the past 3 years. This documentation shall include locations, references (including names and phone numbers), pipe sizes, pump sizes and pumping rates. This documentation must include a minimum of ten different projects and must cover the range of sizes of sewer mains and flows expected under this Contract.

B. Experience:

1. Experience documentation will be submitted as required of the Contract Documents. The Contractor shall provide the Engineer with written documentation acknowledging the supervisor and field crew leaders responsible for this Work have received the proper training, are certified, and have the requisite experience. This documentation will include dates of hands-on experience, employer, description of duties/experience, contact name and phone number. Documentation on any person shall not be longer than one page.

2. Supervisor of the field crews must be properly trained in this function and have a minimum of 3 years of experience in performing gravity sewer bypass/diversion pumping, to include safe working practices for the types of equipment and operation of the equipment used for this Contract.
3. Field crew leaders must be properly trained in the function and have a minimum of 2 years of experience in performing bypass/diversion pumping, to include safe working practices for the types of equipment and operation of the equipment used for this Contract.
4. No crewmembers shall enter confined spaces without the necessary certified training and documentation.

1.06 SITE CONDITIONS

A. Obtain approval from Owner for placement of temporary flow control facilities within public right-of-ways.

B. Existing facilities in vicinity of bypass pumping are shown on Drawings.

1.07 SUBMITTALS

A. Temporary Flow Control Plan

1. Seven calendar days prior to any bypass/diversion pumping activity the Contractor shall submit electronic copies of the complete and detailed plan to the Engineer for review. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction. The Contractor may submit a general bypass/diversion pumping plan to be used when bypassing sewer mains. Once the Contractor has received written approval from the Engineer, the Contractor may use the plan without re-submittal.
2. Peak Amount of Flow to be controlled:
   a. Peak Dry Weather, XXXX gpm.
   b. Peak Wet Weather, XXXX gpm.

3. The bypass/diversion pumping plan submittal shall have sufficient detail to show the following:
   a. Drawings indicating the location of:
      1) Temporary sewer plugs and bypass discharge lines.
      2) Where flow will be intercepted and discharged.
      3) Layouts and configurations of temporary flow control facilities and also showing locations relative to right-of-way easement, and property boundaries.
      4) Lowest overflow point upstream of the bypass/diversion.
      5) Downstream discharge plan including pipe routing plan and profile views.

6) Sections showing suction and discharge pipe depth, embedment, joint restraints, thrust blocking and backfilling.
7) Standby power location, if utilized.
8) Location and position, in detail, where pipes cross roadways and driveways.
9) Traffic Control Plan specifically applicable to temporary flow control adhering to requirements of applicable agencies and as may be specified in Contract Documents.
10) Easement requirements for access, piping layout, and maintenance.

b. Pump stations upstream of the bypass/diversion.
c. Staging area for pumps.
d. Sewer plugging method and types of plugs.
e. Number, size, material, location and method of installation of suction piping.
f. Number, size, material, location and method of installation of discharge piping.
g. Bypass pump sizes, capacity, number of each size to be onsite and the power requirements.
h. System curve design calculations detailing the static lift, friction losses, velocity losses and flow velocities.
i. Pump curves with the system curves plotted showing the pump operation range and confirming the pump size, horsepower and impeller required.
j. Standby power generator size, if utilized.
k. Acoustical information for equipment to be used showing compliance with noise control requirements.
l. Noise control and abatement measures.
m. Method of protecting discharge manholes or structures from erosion and damage.

B. Emergency Response Plan

1. The Contractor will provide an emergency response plan for each bypass/diversion pumping installation. The plan shall be followed in the event of failure of the bypass/diversion pumping system.
2. The Contractor shall provide names and phone numbers for 24-hour emergency contact. The Contractor shall have field personnel onsite at all times (24-hours a day) while performing bypass operations. The bypass operation shall never be left unattended or unsupervised.

C. Emergency Cleanup Plan

1. Prepare and submit not less than 10 days before scheduled date of temporary flow control activities.
2. As a minimum plan shall include the following:

a. Procedures for removal of sewage.
b. Procedures for determining nature and extent of damage and required restoration where restoration is possible.
c. Coordinate with Engineer.

D. The Contractor must identify all pump stations and the lowest overflow point upstream of the plugging/block and/or bypass/diversion pumping. The Contractor may be required to station personnel at upstream pump stations and overflow points.

1.08 SAFETY

A. All Work shall be performed in accordance with OSHA standards and state and federal safety regulations.

B. No person shall enter a confined space without the documented requisite training, certification, and entry permit.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall notify the Engineer 48 hours prior to commencing any plugging/block and/or bypass/diversion pumping.

B. Prior to commencing each bypass/diversion pumping activity the Contractor must receive written approval from the Engineer.

C. Ensure all levels of sewage flow are continuously and effectively handled.

D. The Contractor shall use ingenuity and skill to develop a bypass/diversion pumping plan.

E. Install temporary flow control facilities only within public right-of-way, Owner's property, temporary construction easement, permanent easement, or easement obtained by Contractor.

F. During the entire time bypass pumping or plugging/blocking is engaged, the Contractor shall be required to man, operate, and maintain 24 hours per day, 7 days per week, including holidays, as required, to control flow and prevent spillage and/or leakage.

G. The back-up pump, appropriate piping, fuel, lubrication, and spare parts shall be incorporated into the bypass/diversion pumping arrangement at the site, ready for use in case of a breakdown.

H. At no cost to the Owner and Engineer, the Contractor will carry out a "trial run" of the bypass/diversion arrangement on all sewers greater than 12 inches. This trial run must be conducted before the Engineer will accept the arrangement. The "trial run" shall demonstrate the incorporation of all standby equipment to handle flows when the main pump set is switched off.

I. All materials used for bypass/diversion pumping shall be pre-approved by the Engineer prior to commencing pumping activities.

J. When wastewater flows at the upstream manhole of the sewer main being televised are above the maximum allowable requirements for television inspection, or do not allow the proper sewer or manhole repair, the flows shall be reduced to the levels required by one of the following methods: plugging/blocking or bypass/diversion pumping of the flows, as approved by the Engineer.

K. In some applications, the wastewater flow may be plugged/blocked and contained within the capacity of the collection system. This shall only be done when it has been determined by the Contractor and approved by the Engineer the system can accommodate the surcharging without any adverse impact.

L. The plan must keep the wastewater flowing without discharge or spills into any adjacent creeks or on to the ground. No bypassing to ground surface, receiving waters, storm drains, or bypassing resulting in groundwater contamination or potential health hazards shall be permitted. The Contractor will seek and obtain inspection of each section of newly laid sewer before removing the flow diversion from service and placing the newly installed or rehabilitated section into service.

M. All pipe materials utilized in wastewater flow control shall be in good condition, and free of defects, and leaks. The Contractor, at no cost to the Owner and Engineer, shall replace any defective material. Upon completion of the job, wastewater flow control materials shall be removed from the site.

N. Before any wastewater flow control equipment is installed, the Contractor shall de-silt the segment of sewer to be bypassed while it is still under flow. Subsequent jetting and final cleaning before inspection or repair shall be undertaken while the segment of sewer is bypassed.

O. The 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 disturbances to existing utilities and shall obtain approval of the pipeline locations from the Engineer. All costs associated with relocating utilities and obtaining all approvals shall be paid by the Contractor.

P. During all wastewater flow control operations, the Contractor shall protect manholes and all local sewer lines from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to mainlines, manholes, and all local sewer lines caused by human or mechanical failure.

Q. The Contractor shall complete all wastewater flow control activities with the minimum sound level compatible with accepted industry standards for sound attenuated temporary pumping systems.

3.02 EQUIPMENT AND MATERIALS

A. General:

1. Provide adequate capacity and size to handle existing flows plus additional flows that may occur during periods of rainstorm.
2. Provide bypass flow capacity of at least 125 percent of wet-weather peak flow estimate.
3. Provide materials and equipment that will ensure continuous and successful operation of temporary flow control systems.
4. Repair or modify systems as necessary.
5. Unless otherwise shown or specified, materials and equipment may be new or used at Contractor's option.

B. Plugs:

1. Provide with taps for connection of pressure gauges and air hoses, and flow-through capability.
2. Pipe Diameters 24 Inches and Smaller: Use mechanical plugs with rubber gaskets or pneumatic plugs with rubber boots.
3. Pipe Diameters Larger than 24 inches:
   a. Use inflatable bag stoppers made in two or more pieces.
   b. Manufacturer: Lansas, Cherne Industries.

C. Pumps:

1. Fully automatic, self-priming units that do not require use of foot valves or vacuum pumps in priming system.
2. Solids handling design with ability to pump minimum 3-inch diameter sphere.
3. Able to run dry for long periods of time to accommodate cyclical nature of flows.
4. Engine: Equipped to minimize noise. Noise levels shall not exceed 86 dBA at a distance of 50 feet from source.

D. Electric Power Generators:

1. Be able to simultaneously start and run electric powered pumps required for flow to be controlled.

2. Equipped to minimize noise. Noise levels shall not exceed 86 dBA at a distance of 50 feet from source.
3. Include automatic transfer switch if flow control system is to operate unattended.

E. Standby Equipment:

1. Standby Pump: One of each size to be available onsite.
[OR]
2. Peak dry weather, small pump. One to be available onsite.
3. Peak wet weather, large pump. One to be made available for delivery, installation and operation within 8 hours for any reason as required by Owner.
4. Electric Power Generators: Minimum of one if temporary flow control system contains electric powered pump. Able to simultaneously start and run electric powered pumps required for flow to be controlled.

3.03 PIPE FOR FLOW DIVERSION

A. Ductile Iron Pipe: Ductile iron pipe, as specified in the Athens-Clarke County Public Utilities Department Standard Specifications for Water Mains, is acceptable for use for flow diversion during construction.

B. Steel pipe is permitted for flow diversion.

C. High Density Polyethylene Pipe (HDPE) is permitted for flow diversion. Polyethylene material shall comply with the requirements for Type III polyethylene, C-5 and P-34 as tabulated in ASTM D1248 and has the Plastic Pipe Institute recommended designation PE3406. The material shall also have an average specific base resin density of between 0.94 g/cc and 0.955 g/cc (ASTM D1505). Pipe made from these resins must have a long-term strength (50 years) rating of 1,250 psi or more per hydrostatic design basis categories of ASTM D2837. The polyethylene resin shall contain antioxidants and be stabilized against ultraviolet degradation to provide protection during processing and subsequent weather exposure. The polyethylene resin shall have an environmental stress crack resistance condition C, as shown in ASTM D1693, to be greater than 500 hours, 20 percent failure. All pipes shall be made from virgin quality material. No rework compound, except when obtained from the manufacturer's own production of the same formulation shall be used. The polyethylene resin shall have an average melt flow index, condition E as shown in ASTM D1238, not in excess of 0.25 g/10 mm. Pipe shall be homogeneous throughout, and free of visible cracks, holes, foreign material, blisters, or other deleterious faults. Diameters and wall thickness shall be measured in accordance with ASTM D2122 and ASTM D3350. Pipe joining will be

done by thermal butt fusion method in accordance with ASTM D2657.

D. Polyvinylchloride (PVC) pipe is permitted for flow diversion. PVC pipe shall be rigid and securely coupled with a minimum number of connections. Glued PVC is not allowed.

E. Lay flat hose is permitted for use with 2 inches and 3-inch gas powered portable pumps.

F. Irrigation type piping is not allowed.

G. No more than two pump discharge hoses will be allowed at any given time. The length of these hoses shall be limited at the direction of the Engineer.

H. The Contractor, at a minimum, shall design all piping, joints and accessories to withstand twice the maximum operating pressure or 100 psi whichever is greater.

I. If required the Contractor must provide air relief (air relief valves, etc.) on bypass/diversion pumping discharge piping to insure proper operation.

J. All pumps used shall be fully automatic self-priming units and do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric, gas, or diesel powered, provided they meet all specified sound level requirements. If electric pumps are used, the combined generator/pump system shall meet the specified sound level requirements. All pumps used shall be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.

K. Maintain sufficient equipment and materials onsite to ensure continuous and successful operation of bypass and dewatering systems.

1. Keep standby pumps fueled and operational at all times.
2. Maintain sufficient number of valves, tees, elbows, connections, tools, sewer plugs, piping, and other parts or system hardware onsite to ensure immediate repair or modification of any part of system as necessary.

L. Unless specified otherwise in these Specifications or approved by the Engineer, all pumps (and generators if used) shall be fully sound attenuated and shall produce a noise level of 65 dB or less at a distance of 23 feet.

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

3.04 DEPTH OF FLOW

A. In performing television inspection, joint testing, and/or sealing and other sewer rehabilitation work, the Contractor shall control the depth of flow in the sewer within the following guidelines:

Maximum Pipe Flow Depth			
Television Inspection		**Sealing**	
Pipe Size	**% Pipe Dia.**	**Pipe Size**	**% Pipe Dia.**
6”-12”	15	6”-12”	20
15”-24”	25	15”-24”	25
27” or larger	25	27” or larger	30

B. When sewer line flows, as measured in the first manhole upstream of the sewer segment being inspected or rehabilitated, exceed the maximum depth listed above or inspection of the complete pipe periphery is necessary for effective testing, sealing, or line work, the Contractor shall implement wastewater flow control methods. The implementation of the flow control method shall be reviewed and approved by the Engineer.

3.05 PLUGGING AND BLOCKING

A. Flow control may consist of blocking flow with mechanical or pneumatic plugs if only a small amount of flow needs to be controlled and adequate storage is available.

B. The Contractor shall insert a sewer line plug into the line at a manhole upstream from the section being inspected or repaired. The plug shall be so designed so all or any portion of the flow can be released. Plugs should be secured to manhole to prevent movement downstream. Flows shall be shut off or reduced to within the maximum flow limits specified.

C. Use primary and secondary plugs for each flow control location.

D. When blocking flow is no longer needed for performance and acceptance of the Work, remove plugs in a manner that permits sewage flow to slowly return to normal without surcharging or causing other major disturbances downstream.

E. Remove temporary plugs at end of each working day and restore normal flow. If downstream work is not or cannot be completed during workday, provide, operate, and maintain bypass pumping system or other method of flow control to accommodate flows.

F. No Plumbers plugs will be allowed.

3.06 BYPASS/DIVERSION PUMPING

A. When bypass/diversion pumping is required, a pump size shall be recommended by the Contractor and approved by the Engineer. The Contractor shall supply the necessary pumps, conduits, and other equipment to divert the flow of wastewater around the sewer section where the Work is to be performed. The bypass system shall have sufficient capacity to handle existing flows plus additional flow potentially occurring during periods of rainstorms as indicated from the flow monitoring program. The Contractor shall be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing system. A "setup" consists of the necessary pumps, conduits, and other equipment required to divert the flow of wastewater from the start to finish of Work performed.

B. Wastewater shall be pumped directly into the nearest available downstream manhole, provided the existing sewer has the capacity to transport the flow. The Contractor shall request the Engineer to determine the capacity of the downstream existing system. The Contractor shall request this determination 14 calendar days prior to the planned bypass/diversion pumping.

C. The Contractor shall be responsible for keeping the pumps running continuously 24 hours a day, if required, until the bypass operation is no longer required. The Contractor shall have standby pumps at all times.

D. Bypass pumping systems shall have sufficient capacity to pump peak flows in the pipes being bypassed (flows in the existing interceptor sewers can increase dramatically during periods of wet weather). The Contractor shall provide all pipeline plugs, pumps of adequate size to handle wet weather peak flows, and temporary discharge piping to ensure the total flow of the interceptor sewer is safely diverted around the section to be repaired. Wastewater flow control system will be required to be operated 24 hours per day.

E. Maintenance personnel capable of starting, stopping, refueling, and maintaining the pumps and equipment during the bypass/diversion pumping operation shall continuously monitor pumps and equipment. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum.

3.07 FLOW CONTROL PRECAUTIONS

A. Where the wastewater flow is plugged/blocked, the Contractor shall be responsible for taking sufficient precautions to protect public health. The sewer lines shall also be protected from damage. The following shall apply:

1. No wastewater shall be allowed to back up into any homes or buildings.

2. No wastewater shall overflow any manholes, cleanouts, or any other outlet.
3. Customers upstream of the flow control area shall be able to use all their water and sewer utilities without interruption.
4. If any of the above occur or are expected to occur, the Contractor shall provide bypass/diversion pumping to alleviate one or all of the conditions. Additionally, the Contractor shall observe the conditions upstream of the plug and be prepared to immediately start bypass/diversion pumping, if needed.

B. Any sump pumps, bypass pumps, trash pumps, or any other type of pump, pulling wastewater or any type of material out of the manhole or sewer, shall discharge the material into another manhole, or appropriate vehicle or container approved by the Engineer. Under no circumstances shall this material be discharged, stored, or deposited on the ground, swale, road, or open environment.

C. The Contractor shall take appropriate steps to ensure all pumps, piping, and hoses carrying raw wastewater are protected from traffic. Traffic control shall be performed in accordance with the requirements of the governing agency.

D. Prior to any wastewater flow control operations the Contractor will identify the pump station/s and lowest overflow point upstream of the planned plugging/blocking or bypass/diversion. During operations the Contractor will monitor the pump stations and lowest points to ensure overflow does not occur.

E. In the event, during any form of "Sewer Flow Control," raw wastewater is spilled, discharged, leaked, or otherwise deposited in the open environment, the Contractor shall immediately stop overflow and shall immediately report overflows to the Engineer. The Contractor shall be responsible for any cleanup of solids and stabilization of the area affected. This Work shall be performed at the Contractor's expense with no additional cost to the Owner or Engineer. The Contractor shall also be responsible for notifying the Engineer and complying with any and all regulatory requirements for cleaning up the spill at no additional cost to the Owner. The Contractor shall be responsible for any fines assessed by regulatory agencies including the Georgia Environmental Protection Division (EPD).

F. During wastewater flow control operations, the Contractor shall take proper precautions to prevent damage to existing sanitary sewer facilities, flooding, or damage to public or private property.

G. The Contractor shall make repairs, replacements or rebuilds, as directed by the Engineer, to any portion of the sewer system damaged during any plugging or

bypass/diversion pumping operation. All such repairs, replacements, and rebuilding shall be paid for by the Contractor.

H. The Contractor shall make such provisions, as are necessary, for handling all flows in existing sewers, connections, and manholes by pipes, flumes, or by other approved methods at all times, when his operations would, in anyway, interfere with normal functioning of those facilities.

I. The Contractor shall be responsible for the removal of any debris and sedimentation in the existing sewers, laterals, and manholes, etc., attributable to his Work under this Contract. The Contractor is responsible for the proper disposal of these items. The debris and liquids are to be disposed of properly in accordance with all applicable laws.

3.08 FIELD QUALITY CONTROL

A. Hydrostatic Pressure Test for Pump Bypass System:

1. Prior to operation, test each section of discharge piping with maximum pressure equal to 1.5 times the maximum operating pressure of system.
2. Notify Engineer and Owner 48 hours prior to testing.

3.09 CLEANUP

A. Keep premises free from accumulations of waste materials, rubbish, and other debris resulting from the Work.

B. Disturbed Areas: Upon completion of bypass pumping operation, clean disturbed areas not designated for alterations by Contract Documents, restoring to condition, including pavement restoration, at least equal to that which existed prior to start of the Work.

C. Before bypass pumping system is broken down and moved to next section or removed at the completion of the Work, discharge sewage remaining in bypass discharge pipeline and pumping equipment to working sewer.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 02750
SEWER CLEANING

PART 1 GENERAL

1.01 SCOPE

A. This section includes Specifications for sewer line cleaning to remove foreign materials and debris from the mains and restore the pipe to a minimum of 95 percent of the through flow channel and cross section, for clear viewing of the interior surfaces of the lines during television inspection, or as required for other specified rehabilitation or purpose.

1.02 REFERENCES

A. Manual for Uniform Traffic Control Devices (MUTCD) standards.

1.03 SUBMITTALS

A. Submittals are to be in color PDF format for printed documents as well as other required formats when applicable for digital transfers.

B. Example database and report deliverable proposed for this Project.

C. Submit one example record database of cleaning in digital format of previous work.

1. Records will be reviewed by Engineer to determine if quality of submitted example is acceptable, and documented according to industry standards and the Engineer's requirements.
2. Modify equipment and/or cleaning procedures to achieve report material of acceptable quality.
3. Do not commence Work prior to approval of quality by the Engineer. Upon acceptance, record database shall serve as standard for remaining Work.

D. Catalog and manufacturer’s data sheets for camera equipment.

E. References: Contact names and telephone numbers.

F. List of staff, equipment and/or inspection technology to be used on this Project.

G. Supervisor and field crew leader’s qualifications including certification of required experience.

H. Supervisor and field crew leader's contact information including name and mobile telephone numbers.

I. Confined space entry certification that staff to be used on this Project have been properly trained should confined space entry be required.

J. Contractor's Safety Plan.

K. Training and inspection plan a minimum of 7 days prior to the first inspection.

L. Schedule: 14-day look ahead; weekly.

M. Traffic control plan.

N. Quality control plan.

O. Debris disposal plan.

P. Record database of cleaning.

Q. Landfill waste manifests and scale tickets.

R. Cleaning log; weekly.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Supervisor of the field crews shall have the proper training in this function and have a minimum of 3 years of experience in performing acoustic testing including safe working practices, familiarity with the inspection procedures and standards utilized, confined space safety procedures, the types of equipment being used, and products/materials being used.
2. Field crew leaders responsible for sewer cleaning shall have a minimum of 2 years of experience in this field.
3. Contractor shall provide, at all times, a competent field supervisor in charge of sewer cleaning on the site and who accompanies the field staff at all times. The field crew supervisor shall be responsible for the safety of the Contractor's workers and site installation conditions.
4. The Contractor shall not employ any procedure or utilize any equipment the Contractor's personnel do not have the above stated minimum experience.
5. No crew members shall enter confined spaces without the necessary certified training.
6. The Contractor shall provide a detailed account of satisfactory experience during the last 3 years. Those references shall include contact, agency, telephone number and address.

7. The Contractor shall provide the Engineer with written documentation (certification) that the supervisor, field crew leader and all crew members have received the proper training and the requisite experience and certifications.
8. The Contractor shall take appropriate action to ensure all employees are polite to the public in all aspects of the Work performed.

1.05 REGULATORY AND SAFETY REQUIREMENTS

A. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the General Conditions, Contractor's safety requirements shall conform to ANSI A10.6.

B. Any landfill disposal of materials removed from the project site shall be done in state-permitted landfills appropriate for the material being disposed.

PART 2 PRODUCTS

2.01 GENERAL

A. The Contractor shall provide all supervision, labor, material, supplies, equipment, transportation, traffic control, etc., necessary to satisfactorily clean the sewer main(s).

B. Hydraulically Propelled Equipment: The equipment used shall be of a movable dam type and be constructed so a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sewer. The movable dam shall be equal in diameter to the main being cleaned and shall provide a flexible scraper around the outer periphery to insure removal of grease. If sewer cleaning balls or other equipment, which cannot be collapsed, are used, special precautions to prevent flooding of the sewers and public or private property shall be taken.

C. High-Velocity Jet (Hydrocleaning) Equipment: All high-velocity sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size mains designated to be cleaned. Specialized nozzles capable of concentrating pressurized water either to the crown or lower quadrant of the pipe to be cleaned shall be available on site. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel.

D. Mechanically Powered Equipment: Bucket machines shall be in pairs with sufficient power to perform the Work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the main shall not be allowed. A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 500 feet of rod. The rod shall be specifically heat-treated steel. To insure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.

E. Large Diameter Cleaning: For cleaning large diameter sewer, storm or combination pipes, consideration should be given to a combination hydraulic high volume water and solids separation system. The flow from the sewer shall provide water for the pump operation so no potable water is necessary and treatment costs are not a factor. Water volume of up to 250 GPM at 2,000 psi plus shall move solids to the downstream manhole in high flow conditions. The separation system shall dewater solids to 95 percent (passing a paint filter test) and transfer them to a dump truck for transport to a approved landfill. Sewer water shall be filtered to a point where it can be used in the pump for continuous cleaning. No by-passing of sewer flows shall be necessary. The unit shall be capable of 24 hour operation and the unit shall not leave the manhole until a section is fully cleaned.

F. The flow of sewage in the sewer mains shall be utilized to provide the necessary pressures for hydraulic cleaning devices whenever possible. When additional quantities of water from fire hydrants are necessary to avoid delay in normal working procedures, the water shall be conserved and not used unnecessarily. The Contractor's truck/trailer must be permitted by the Owner as having the proper backflow prevention devices. The approval of the Owner shall be obtained before Owner's water is used. Hydrants shall only be operated under the supervision of the Owner. Contractor shall be responsible for obtaining a hydrant meter from the Owner for this water use as directed by the Engineer. Contractor shall be responsible for all costs associated with hydrant meter(s).

G. The Contractor shall be responsible for providing all other necessary hoses and tools for obtaining the water.

PART 3 EXECUTION

3.01 GENERAL

A. Cleaning Precautions: During cleaning operations, satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools (requiring water pressure to provide their cleaning force) or tools retarding the flow in the sewer main are used, precautions, including the direction of the cleaning operation, shall be taken to insure the water pressure created does not damage or cause flooding of public or private

property being served by the pipe.

B. Cleaning: The designated manhole sections shall be cleaned using hydraulically propelled, high-velocity jet, or mechanically powered equipment. Selection of the equipment used shall be based on the conditions of pipes at the time the Work commences. The equipment and methods selected shall be satisfactory to the Owner. The equipment shall be capable of cleaning a minimum of 1,200-foot linear feet and of removing dirt, grease, rocks, sand, and other materials and obstructions from the pipes and manholes. If cleaning an entire section cannot be successfully performed from one manhole, the equipment shall be set up on the other manhole and cleaning again attempted. Extreme care shall be taken when cleaning in a reverse setup so as not to cause flooding of service lines located along the sewer. If, again, successful cleaning cannot be performed or the equipment fails to traverse the entire manhole section, it will be assumed a major blockage exists and the cleaning effort shall be repeated with other types of equipment. All pipes shall be cleaned to the satisfaction of the Owner.

C. The term "clean", as used herein, shall mean the complete removal of all garbage, dirt, gravel, rocks, roots, grease, settled sludge and all other solid or semi-solid materials from the pipes and manholes.

1. Light Cleaning is defined as cleaning a pipe with an average depth of foreign material and debris equal to no more than 25 percent of the diameter of the main over the length of the manhole-to-manhole section. Rocks removed should be smaller than 3 inch in diameter. Additionally, the Contractor may encounter segments or groups of segments that have recently been cleaned through ongoing operations and maintenance. If the Contractor encounters a segment that he believes does not warrant Light Cleaning then the Contractor shall confirm the condition and submit justification not to perform Light Cleaning on the sewer segments for approval by the Engineer.
2. Heavy Cleaning is defined as cleaning a pipe with an average depth of foreign material and debris equal to more than 25 percent of the diameter of the main over the length of the manhole-to-manhole section. Rocks removed should be larger than 3 inch in diameter.
3. If Heavy Cleaning is encountered either at the start of the assessment or in progress of the assessment, the Contractor shall notify the Engineer of the condition and immediately submit supporting CCTV data or other photographic images of the condition. The Engineer will review the submitted information to confirm the condition and will advise the Contractor of further action. Heavy Cleaning, if deemed required by the Engineer, may be assigned to the Contractor. After Heavy Cleaning is performed on the segment length requiring Heavy Cleaning, the Contractor shall continue assessment of the entire sewer length.

4. As part of both Light and Heavy Cleaning, the Contractor shall scour debris or grease-laden manhole walls with high velocity water gun. No additional cost will be paid for such scour.

D. Conditions, such as broken mains and major blockages, may prevent cleaning from being accomplished, especially where additional damage would result if cleaning were attempted, or continued. Should such conditions be encountered, the Contractor shall not be required to clean those specific main sections unless the Owner removes the apparent obstruction.

E. Whenever mains to be cleaned show evidence of being more than one-half filled with solids, bucket machines and/or rodding machines shall be utilized to remove the major portion of the material before hydraulic equipment or high velocity, hydro-cleaning equipment is brought into use for finishing the cleaning work.

1. When bucket machines are used, the bucketing process shall be done in one main section at a time. A bucket of the proper size shall be placed into the downstream manhole and pulled, in intervals, towards the upstream manhole.
2. The bucket shall be retrieved and emptied at varying intervals depending upon the amount of materials being removed. When a bucket is retrieved and it is completely full or overflowing with materials, then the length of travel into the main shall be reduced to ensure total removal of debris. This process shall be repeated until the bucket has been pulled through the entire main section. Upon completion of the bucketing or rodding operation, hydraulically propelled cleaning equipment or high velocity hydro-cleaning equipment shall be used to complete the cleaning work.

F. Root Removal: Roots shall be removed from sections designated to be cleaned. Special attention shall be used during the cleaning operation to assure complete removal of roots from the joints. Procedures may include the use of mechanical equipment such as rodding machines, bucket machines and winches using root saws, chain-slingers, porcupines, and equipment such as high-velocity jet cleaners.

G. Material Removal: All sludge, dirt, sand, rocks, grease, and other solid or semisolid material resulting from the cleaning operation shall be removed at the downstream manhole of the section being cleaned. Passing material from manhole section to manhole section, potentially causing main stoppages, accumulations of sand in wet wells, or damage pumping equipment, shall not be permitted.

H. Disposal of Materials:

1. All solids, semisolids and/or liquids resulting from the cleaning

operations shall be removed from the work site and disposed of at a site approved by the Owner and approved to accept wastewater debris and liquids.

2. All materials shall be removed from the site no less often than at the end of each workday. Under no circumstances will the Contractor be allowed to accumulate debris, etc., on the site of work beyond the stated time, except in totally enclosed containers and as approved by the Owner.
3. Under no circumstances shall removed debris and/or liquids be dumped onto the ground or streets or into ditches, catch basins or storm drains for any length of time.
4. Contractor shall be responsible for legally disposing all debris and all disposal costs.
5. Debris disposal plan shall be approved by the Owner and Engineer in advance of cleaning operations.

I. Protruding Tap Removal: Service taps extending into the pipe shall be removed by means of hydraulically or mechanically operated equipment. Chain cutters, clamshell cutters, and robotic lateral reinstatement cutters are typical equipment used to remove protruding taps. Taps should be removed so the resulting protrusion is less than 1 inch at the greatest point, or 10 percent of sewer main diameter, whichever is smaller. All debris resulting from protruding tap removal shall be removed immediately from the pipe. Where protruding taps are vitrified clay, grinding wheels may be used on lateral reinstatement cutters to insure a smooth finish. Where protruding taps prevent the passage of equipment through the pipe, notify the Owner immediately for point repair execution. Note: All protruding taps must be verified via television inspection prior to inserting any type of cutting tool into the main.

J. Grease Removal: Grease shall be removed in designated sections where grease is a known problem and shall be considered part of the cleaning procedures. The Contractor shall provide a list of lines requiring grease removal to the Owner and the Project Manager so they may be added to the Owner's on-going maintenance list. Special attention should be given during the cleaning operations to ensure the complete removal of grease from the top of the pipe. Procedures may include the use of mechanical equipment such as rodding machines, bucket machines and winches using root cutter and porcupines, and equipment such as high-velocity jet cleaners, and hot water. Chemical means of grease removal will be allowed upon request by the Contractor; however, it is considered subsidiary to Line Cleaning, and no additional payment will be allowed.

K. Notifications: As required in Section 01011, Unique Requirements.

3.02 ACCEPTANCE

A. The Contractor shall CCTV up to 10 percent of the cleaned sewer length that the Engineer selects and observes to confirm the lines are cleaned. Condition assessment is not required for CCTV related to verification and acceptance. If the Engineer is not satisfied with the cleaning based on a review of the inspection's digital videos then an additional 10 percent will be required for review. Segments found to be not cleaned according to these Contract Documents will be required to be re-cleaned at the Contractor's sole expense.

B. The Engineer will select lines for verification and acceptance utilizing CCTV within a week after the cleaning has been performed and it shall be the Contractor's responsibility to CCTV the sewer(s) segment and provide the CCTV recording to the Engineer along with the respective application for periodic payment.

3.03 CLEANING PRECAUTIONS

A. Bucket machines or rodding machines shall be used very carefully because of their tendency to "hang-up" on or "wedge against" the sewer main and break it. Only experienced and well-trained operators shall operate the machines(s).

B. Whenever hydraulically propelled cleaning tools, or high velocity, hydro-cleaning equipment or any tools retarding the flow of water in the sewer mains are used, precautions shall be taken to ensure the water pressure created does not cause any damage or flooding to public or private property being served by the main involved.

C. Any damage to the sewer mains caused by the Contractor's operations shall be repaired in a manner approved by the Owner at the Contractor's expense. The Owner reserves the right to make said repairs itself and charge the Contractor accordingly.

D. Damage due to flooding of any public or private property being served by any main over-filled by Contractor's cleaning operations shall also be repaired or otherwise paid for by the Contractor.

3.04 DOCUMENTATION

A. The Contractor shall keep records (in a log-type Microsoft Access Database form) of the Work accomplished in the cleaning of the pipes. With each pay request, digital backup documentation is required. The following information shall be required as a minimum:

1. Location (street address) and type of surface cover.
2. Upstream Manhole ID Number to Downstream Manhole ID Number.
3. Pipe ID Number.
4. Date and Time.
5. Length of Pipe.
6. Condition and depth of manholes.

7. Size and type of main.
8. Type and condition of manhole.
9. Type of cleaning performed and various types of equipment used.
10. Meter readings (fire hydrant use).
11. Remarks as to type of materials removed, amount of materials removed, and number of hours spent on each pipe section.

B. Debris Disposal Plan:

1. Debris disposal plan shall provide for safe conduct of the Work and shall include:
   a. Detailed description of methods and equipment to be used for each operation;
   b. The Contractor's planned sequence of operations, including coordination with other work in progress;
   c. A description of the Contractor's plan for disposal of removed materials, including copies of any hauling, disposal, or related permits, if applicable.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX ___

APPROVED CONTRACTORS LIST FOR VIDEO INSPECTION

PUBLIC UTILITIES DEPARTMENT
UNIFIED GOVERNMENT OF ATHENS-CLARKE COUNTY

PART 1 GENERAL

A. Only approved Contractors shall be used for video inspection of sewers under the jurisdiction of the Unified Government of Athens-Clarke County (ACCGov), Georgia.

PART 2 APPROVED CONTRACTORS

A. Specialty Testing. Gainesville, Georgia.

B. TV Testing & Rounding. Macon, Georgia.

C. Lamar's Inspections, Inc. Jasper, Georgia.

D. All Pipeline TV & Air Testing, Inc. Hampton, Georgia.

E. Harmon's Pipe Service, LLC. Dallas, Georgia.

PART 3 APPLICATION PROCEDURES

A. Individuals who desire a Company to be listed as an "Approved Video Inspection Contractor" must submit a letter of consideration to the Public Utilities Department.

B. The letter must be submitted at least thirty days prior to intended use of Company.

C. The Application must include the following prior to evaluation:

1. Manufacturer of equipment, along with Manufacturer's representative and local distributor of equipment.
2. Specifications on model and equipment to be used.
3. List of three other municipal users in the State of Georgia. Include name and phone number of contact persons.
4. Other information deemed pertinent by the ACCGov.

D. Upon completion of evaluation by the ACCGov, written notification will be issued of said results. Not all applications will be approved, even if Contractors meet the Specifications. The ACCGov reserves the right to not approve Contractors where it is deemed in its best interest.

END OF APPENDIX ___

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX ___

APPROVED MANUFACTURERS LIST FOR WASTEWATER SYSTEM CONSTRUCTION

PUBLIC UTILITIES DEPARTMENT UNIFIED GOVERNMENT OF ATHENS-CLARKE COUNTY

PART 1 GENERAL

A. Where specific products are listed below, only products from the listed manufacturers shall be used for wastewater system construction under the jurisdiction of the Unified Government of Athens-Clarke County (ACCGov), Georgia. For those products identified in these Standard Specifications for which no specific manufacturer is listed below, products from any manufacturer, which meet the requirements of the Standard Specifications, may be used.

PART 2 APPROVED MANUFACTURERS

A. Section 02125 – Soil Erosion and Sediment Control

1. Silt Fence - Those manufacturers on the GDOT Qualified Products List.
2. Filter Fabric: Mirafi, Amoco, or Exxon.

B. Section 02229 – Jack and Bore Crossings

1. Casing Spacers:
   a. Type I - Cascade Waterworks Manufacturing Company, Advanced Products and Systems, Inc, Spider Manufacturing, Inc.
   b. Type II - Pipeline Seal and Insulator, Inc.

C. Section 02730 – Sanitary Sewers and Accessories

1. Ductile Iron Pipe: American Cast Iron Pipe Company, United States Pipe and Foundry Company, Griffin Pipe Company.
2. Ductile Iron Fittings: American Cast Iron Pipe Company, United States Pipe and Foundry Company, Union Foundry, Tyler.
3. PVC Truss Pipe: Contech.
4. SDR-26 PVC Pipe: JM Pipe, North American, Vulcan Plastics, Diamond Pipe, or P.W. Eagle.
5. Manhole Pre-cast Products: Hanson Pipe and Pre-Cast, Inc., Foley-Brogden, Atlantic Precast Concrete Products, Old Castle, Southeast Precast, Durham and Taylor Supply Company, Inc. or Tindall Corporation (round bases, risers and eccentric cones only).

6. Precast Concrete Joint Sealant: Kent Seal No. 2 or Concrete Sealants CS202.
7. Manhole Frames and Covers: East Jordan Iron Works/Higgins Foundry, U.S. Foundry (V-1360) with ACC on lid.
8. Rubber Boots: Kor-N-Seal, Press Seal Gasket Corporation, "A-Lok" gaskets shall be used at pipe connections within the 100-year floodplain.
9. Manhole Steps: M.A. Industries or Approved Equal.
10. Non-shrink Grout: EUCO N-S Grout as manufactured by the Euclid Chemical Company, Masterflow 713 Grout as manufactured by Master Builders Company, or Upcon High Flow Grout as manufactured by Emhart Chemical Company.
11. Detection Tape: Equal to Lineguard Type III Detectable or Allen Systems Detectatape.

D. Section 02910 – Manhole Rehabilitation

1. Diatomaceous earth: Celite 209 by Honeywell.
2. Cement Mortar (patching): QM-1s Restore by Quadex, Inc., Mainstay ML-72 by Madewell Products Corporation.
3. Cement Mortar (lining): QM-1s Restore by Quadex, Inc., MS-2A by Strong, Silatec MSM by CemTec (A.W. Cook Cements), SewperCoat by Kerneos.
4. Epoxy Coating: Mainstay DS-5 by Madewell Products Corporation, Raven 405 by Raven Lining Systems, Cor-Cote SC (Sewer Coat) by Sherwin- Williams.
5. Composite System:
6. Flexible Internal Rubber Sleeve: Cretex Specialty Products, Sealing Systems Inc.
7. Flexible Urethane Resin: Flex Seal Utility Sealant by Sealing Systems, Inc.

E. Section 02920 – Cured-In-Place Pipe Lining

1. Service Reinstatements, External Reconnection (to sewer mains 10-inch and larger): Inserta Tee.

F. Section 02958 – Pipe Bursting

1. Service Connections (to new PE pipes 10-inch and larger): Inserta Tee.

PART 3 APPLICATION PROCEDURES

A. Individuals who desire a manufacturer to be listed as an "Approved Manufacturer" may submit an application to the Public Utilities Department.

B. The Application must be submitted at least ninety days prior to intended actual use of product.

C. The Application must include the following prior to evaluation:

1. Generic name of product, including Specification Section, Article, and Paragraph number.
2. Manufacturer of product, along with local manufacturer representative and local distributor of product.
3. Statement, on manufacturer's letterhead, of total compliance with Specifications, or a statement with a list of exceptions to the Specifications.
4. Laboratory test results from independent testing laboratory stating that item meets stated Specifications.
5. Shop Drawings and Product Data.
6. Product Sample - Random sample selection by ACCGov.
7. Plant Visit.
8. Product availability.
9. List of three other municipal users (of comparable size) in the State of Georgia. Include name and phone number of contact persons.
10. Other information deemed pertinent by the ACCGov.

D. Upon completion of evaluation by the ACCGov, written notification will be issued of said results. Not all applications will be approved, even if products meet the Specifications. The Unified Government of Athens-Clarke County reserves the right to not accept products where it is deemed in its best interest.

END OF APPENDIX _____

THIS PAGE LEFT INTENTIONALLY BLANK

APPENDIX ___
POLICY AND/OR PROCEDURE STATEMENT

PUBLIC UTILITIES DEPARTMENT
UNIFIED GOVERNMENT OF ATHENS-CLARKE COUNTY

Policy Subject: Contractor's Warranty Obligations
Functional Area: Water and Sewer

PURPOSE

A. The following is a step by step outline of action required by the Contractor in regard to water and sanitary sewer line extension warranty work:

1. The Contractor performing the initial utility line extensions is responsible for a 1 year warranty period commencing with the date of written acceptance of same by the Public Utilities Department (PUD). All repairs performed under the warranty provision shall be the responsibility of the Contractor and made entirely at the Contractor's expense.
2. Emergency warranty repairs which require the immediate attention of the Contractor, as determined by the Public Utilities Director, shall be performed within the same day of notification with actual repair commencing within two hours from time of actual notification and completed within a maximum of 24 hours.
3. Repairs that are non-emergency in nature, as determined by the Public Utilities Director, must be repaired by the Contractor within 5 working days to the PUD's satisfaction.
4. Failure by the Contractor to respond in a manner acceptable to the Public Utilities Director and within the time frames identified will result in the Contractor being placed on probationary status for a 6-month period. At the end of said 6-month probationary period, the Contractor can request reinstatement to permanent status.
5. Any repetition of a failure to respond to an emergency repair request in accordance with this policy statement within any given 6-month time frame will result in the Contractor being removed from the PUD's list of qualified contractors for a 1 year period. At the end of said 1 year period, the Contractor can submit a written request for reinstatement on a probationary basis for a 6-month time frame. At the end of said 6-month probationary period, the Contractor can request reinstatement to a permanent status.
6. Should the Contractor be unable to perform the necessary repairs within the guidelines of this policy statement, the following action will be taken:
    a. The Public Utilities Director will direct the PUD work forces to make the necessary repairs.

b. A cost determination will be made as to the actual expense incurred by the PUD to make said repairs. The Contractor will be responsible for reimbursing the PUD 200 percent of said cost. Failure by the Contractor to reimburse the PUD in the amount established within 30 working days will result in the Contractor's immediate removal from the PUD's list of approved contractors for 1 year beginning no later than the date of actual remittance for cost incurred. Upon expiration of said 1 year time frame, the Contractor can request reinstatement on a probationary basis for 6 months.

NOTES

1. All repairs must be performed in compliance with the Unified Government of Athens-Clarke County standards and procedures.
2. The appropriate PUD representative must be notified prior to the commencement of any warranty work repairs.
3. The Contractor performing the warranty work repairs is responsible for obtaining the appropriate permits and any associated fees.

END OF APPENDIX ____