

02210 - TRENCHING, BACKFILLING AND COMPACTION OF UTILITIES

(Last revised 3/27/14)

SELECTED LINKS TO SECTIONS WITHIN THIS SPECIFICATION

Part 1- General	Compaction Requirements	Shoring
Part 2 – Products	Dewatering	Subdrain Construction
Part 3 – Execution	Erosion Control, NPDES	Testing Requirements
Backfilling Trenches	Foundation Preparation	Trenching
Bedding for Structures	Flowable Fill Concrete	Trench Backfill Material
Bedding for Pipe	Geotextile Separation Fabric	Trench Material Classification
Blasting	Minimum Pipe Cover	Unclassified Trench Excavation
Classified Excavation - Def	Pavement Repair	Undercut
Cleanup & Restoration	Rip Rap Placement	
Clearing and Grubbing	Rock Excavation (Trench)	
Common Trench Backfill-Def	Select Earth Backfill-Def	
Common Trench Backfill-Install	Select Earth Backfill-Install	

PART 1 - GENERAL

1.1 GENERAL

- A. The Contractor shall furnish all labor, materials, tools, equipment, and perform all work and services necessary for or incidental to the furnishing and installation, complete, of all operations in connection with excavation, trenching, and backfilling of underground utilities as shown on drawings and as specified, in accordance with provisions of the Contract Documents, and completely coordinated with work of all other trades.
- B. Work included in the project consists of, but is not limited to, methods of installation of the following:
 - 1) Storm drainage pipe
 - 2) Relocation of existing pipe
 - 3) Surface drainage conduit/pipe
- C. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure, complete and compatible installation.

1.2 RELATED DOCUMENTS

- A. Section 02700 – Storm Drainage
- B. NCDENR Division of Energy, Mineral and Land Resources, Land Quality Section's *North Carolina Erosion and Sedimentation Control Planning and Design Manual*.

- C. OSHA *Standard 29 CFR Part 1910.109*, NCDOT Rules for Transporting Explosives, and local Fire Department Regulations with regard to blasting.
- D. OSHA Standard 29 CFR Part 1926, "Safety and Health Regulations for Construction," Subpart P "Excavations," Standard Number 1926.650, latest revision.

1.3 SUMMARY

- A. This section includes:
 - 1) Excavating and backfilling trenches for buried water, sewer, storm drainage, buried utility structures, and appurtenances.
 - 2) Preparing subgrade for buried water and sewer, buried utility structures, and appurtenances.
- B. Construction and materials related to this section but covered elsewhere:
 - 1) Erosion Control: North Carolina Sediment Control Law.

1.4 DEFINITIONS

For the purposes of this specification, the following definitions refer to storm drainage systems that come under the authority of the Town of Wake Forest as specified within this section and other sections of this Manual.

- A. **Backfill:** Soil materials used to fill an excavated trench.
 - 1) **Initial Backfill** (Carefully Compacted Select Earth Backfill): Backfill placed beside and up to 12 inches above the top of the pipe in a trench, including haunches to support sides of pipe.
 - 2) **Final Backfill** (Common Trench Backfill): Backfill placed over the initial backfill to fill a trench.

In terms of volume, backfill is defined as a compacted post-construction volume in-place.

- B. **Bedding Course:** Layer of loosely placed select backfill material meeting NCDOT Class II, Type 1 (washed or unwashed crushed stone screenings) or Class III, Type 1 (NCDOT 2S or 2MS fine aggregate). See [Standard Detail 2.53](#) for visual description of bedding (layer B1).
- C. **Borrow:** Borrow shall consist of approved fill material imported from off-site.
- D. **Town Engineer:** The Town Engineer or his/her designated representative.
- E. **Town:** Refers to the Town of Wake Forest.
- F. **Classified Excavation (undercut):** Classified excavation shall consist of the removal and satisfactory disposal of all unsuitable material located below subgrade elevation. Where excavation to the finished grade section results in a subgrade or slopes of muck, peat, matted roots, etc., the Contractor shall remove such material below the

grade shown on the plans or as directed; and areas so excavated shall be backfilled with approved select fill or stone as ordered by the Town's Engineer. See also [paragraph U, Unclassified Excavation](#).

- G. **Clearing:** Clearing shall consist in the felling, cutting up, and satisfactory disposal of trees and other vegetation designated for removal in accordance with these specifications.
- H. **Competent Person:** Competent Person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- I. **Contractor:** Refers to a Contractor licensed in the State of North Carolina to perform public utility construction.
- J. **Easement:** A grant of one or more of the property rights by the property owner for limited use of private land for a public or quasi-public purpose and within which the owner of the property shall not erect any permanent structures except when authorized by the Town. Ownership of the land remains with the second party.
- K. **Foundation Stone:** Clean well-graded stone, authorized by the Town's Engineer, used to strengthen and/or provide support to an otherwise weak subgrade. Foundation stone is placed and the subgrade improved before bedding stone is placed. Where voids may cause migration of native or backfill material, use well graded material without voids (coarse sands; [Unified Soil Classification System] SC, SM). See [Standard Detail 2.53](#) for visual description of Foundation stone (layer "B2").
- L. **Grubbing:** Grubbing shall consist of the removal of roots 3 inch and larger, organic matter, debris and stumps and the disposal thereof.
- M. **Haunching:** Layer of clean coarse stone placed and compacted up to the springline of the pipe. Where voids may cause migration of native or backfill material, use well graded material without voids (coarse sands; [Unified Soils Classification System] SC, SM). See [Standard Detail 2.53](#) for visual description.
- N. **Rock Excavation for Trenches and Pits:** Rock excavation for trenches and pits includes removal and disposal off-site of materials and obstructions encountered that cannot be practically excavated with a track-mounted power excavator equivalent to a Caterpillar Model No. 325 or equivalent equipped with new rock teeth. Practical excavation is defined as the ability to remove at least 30 cubic yards during one hour of continuous digging. Trenches in excess of 10 feet in width and pits in excess of 30 feet in either length or width are classified as open excavation.
- O. **Rock in Open Excavation:** All boulder, solid ledges, bedded deposits, unstratified masses, and conglomerations of material so firmly cemented as to possess the characteristics of solid rock. Rock in open excavations includes removal and disposal on-site of materials and obstructions encountered in general excavation other than trenches and pits that cannot be dislodged and excavated with modern, track-mounted, heavy-duty excavating equipment without drilling, blasting, or ripping. Rock is defined as material which cannot be effectively excavated during general grading with a D-8 or equivalent dozer drawing a new single-tooth ripper. Effective excavation is defined as the ability to remove 10 cubic yards or more of material after

one hour of continuous ripping. Typical of materials classified as Rock in Open Excavation are boulders larger than 1-1/2 cubic yards or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits.

- P. **Shall:** Means a mandatory requirement.
- Q. **Structures:** Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- R. **Subgrade:** Surface or elevation remaining after completing the trench excavation or, the top surface of a backfill (stone or soil) immediately below the pipe conduit or pipe bedding, as applicable.
- S. **Topsoil:** A native, imported, or modified soil which is primarily organic in nature, free of rocks, clumps of clayey soils and otherwise friable in texture.
- T. **Trench Borrow:** Trench borrow shall consist of approved material imported from off-site for use as fill or backfill required to be placed in trenches either as initial carefully controlled select backfill or final common trench backfill. Trench borrow shall not be used until all suitable trench excavation material has been placed in the trench, unless authorized by the Town's Engineer. Unless otherwise designated on the plans and in the contract documents, the Contractor shall make his own arrangements for obtaining borrow and pay all costs involved.
- U. **Unclassified Excavation:** Removal and disposal of any and all material above subgrade elevation, except solid rock and undercut excavation, located within the limits of construction. See also [paragraph F, Classified Excavation](#).
- V. The following are industry abbreviation for various pipe materials:
 - 1) **CAP:** Corrugated Aluminum Pipe
 - 2) **PCP:** Plain Concrete Pipe
 - 3) **RCP:** Reinforced Concrete Pipe.

1.5 SUBMITTALS

- A. Submit respective pipe or conduit manufacturer's data regarding methods of installation, jointing and general recommendations.
- B. Submit product data and a sample of drainage fabric or separation fabric and fully document each with specific location or stationing information, date, and other pertinent information.
- C. Submit test reports and fully document each with specific location or stationing information, date and other pertinent information.
 - 1) See [paragraph 1.6.A](#) below regarding Geotechnical Testing Agency Qualifications.

- 2) **Material Test Reports:** Provide from a qualified testing agency which either indicate or interpret test results for compliance of the following requirements indicated:
 - a. Classification according ASTM D2487 of each select on-site or borrow soil proposed for backfill, unless otherwise directed by Town's Engineer.
 - b. Laboratory compaction curve according to ASTM D698 for each select on-site or borrow soil material proposed for backfill.

D. Blasting:

- 1) Contract the Town of Wake Forest Inspections Department.

E. Product Data:

- 1) Each type of plastic warning tape
- 2) Stabilization/Separation fabric
- 3) Drainage Fabric

1.6 QUALITY ASSURANCE

- A. **Geotechnical Testing Agency Qualifications:** An independent testing agency qualified according to ASTM E329 to conduct soil materials and rock-definition testing as documented according to ASTM D3740 and ASTM E548. Testing Lab to be AMRL (AASHTO Materials Reference Laboratory) and CCRL (Cement and Concrete Reference Laboratory) certified.

The testing laboratory shall be approved by the Town's Engineer and will be responsible for conducting and interpreting tests. The testing laboratory shall state in each report whether or not the test specimens conform to all requirements of the Contract Documents and specifically note any deviation.

Specific test and inspection requirements shall be as specified herein.

- B. Comply with all codes, laws, ordinances, and regulations of governmental authorities having jurisdiction over this part of the work.
- C. The Contractor shall comply with applicable requirements of NCDENR Division of Energy, Mineral and Land Resources, *North Carolina Erosion and Sedimentation Control Planning and Design Manual*, latest revisions.
- D. Comply with applicable requirements of NFPA 495, *Explosive Materials Code*, latest revisions.

1.7 QUALITY STANDARDS

- A. For convenience, reference is made in succeeding paragraphs to specific portions of various standards. Also, modifications and additions are made. Neither the reference nor the modifications are intended to de-emphasize any other portion of the standards.

- B. It is the intent of this specification that whenever a procedure or technique is not called out herein, that the industry standard, as represented by ACI, ASTM or other appropriate recommendation, shall be used.
- C. Materials and operations shall comply with the latest revision of the Codes and Standards listed below:

American Society for Testing and Materials

ASTM C33	Concrete Aggregates
ASTM D698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³) (Standard Proctor)
ASTM D1556	Standard Method of Test for Density of Soil in Place by the Sand-Cone Method
ASTM D1557	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³) (Modified Proctor)
ASTM D2049	Standard Method of Test for Relative Density of Cohesionless Soils
ASTM D2167	Standard Method of Test for Density of Soil in Place by the Rubber-Balloon Method
ASTM D2487	Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D2922	Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D3740	Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM D4253	Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
ASTM D4254	Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
ASTM D4318	Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
ASTM E329	Standard Specification for Agencies Engaged in Construction Inspection and/or Testing
ASTM E548	Standard Guide for General Criteria Used for Evaluating Laboratory Competence

American Association of State Highway & Transportation Officials

AASHTO T99	The Moisture-Density Relations of Soils using a 5.5-pound Rammer and a 12-inch drop.
AASHTO T180	The Moisture Density Relations of Soils using a 10-pound Rammer and an 18-inch drop.
AASHTO M145	The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.

D. Standard Abbreviations:

AASHTO	American Association of State Highway Transportation Officials.
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ANSI	American National Standards Institute
AREA	American Railway Engineers Association
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
FS	Federal Specifications
MSDS	Material Safety Data Sheets
NCDENR	NC Department of Environment and Natural Resources
NCDOT	North Carolina Department of Transportation
NCMA	National Concrete Masonry Association
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
USACOE	United States Army Corps of Engineers

1.8 PROJECT CONDITIONS

- A. **Demolition:** Demolish and completely remove from the site existing underground utilities indicated on the plans to be removed. Coordinate with applicable utility companies to shut off services if other active utility lines are involved.
- B. **Environmental - Wetlands:** Before crossing or entering into any jurisdictional wetlands, contractor shall verify whether or not a wetlands permit has been obtained for the encroachment and whether special restrictions have been imposed in that permit. Care shall be taken to prevent draining or otherwise destroying non-permitted wetlands. Restore as stated on either the project drawings, the contract

documents, and/or as noted in the permit. All crossings, disturbances, and encroachments into wetlands shall be subject to US Army COE and NC Division of Water Resources Water Quality Permitting Section approval and permitting requirements and conditions.

- C. **Environmental - Buffer Crossing Requirements:** Before crossing streams or ditches, buffers (verify specific buffer), lakes, or rivers, the Contractor shall verify whether either the line is exempt or a permit has been obtained to encroach into a nutrient sensitive river basin buffer and if so, to what extent work is permitted to occur. Unless otherwise permitted, shown on the contract drawings, or exempted by NCDENR or other proper authority, water and sewer crossing stream, river, pond, or lake buffers are to be as near perpendicular as possible (the crossing is considered to be perpendicular if it intersects the stream or surface water between an angle of 75 and 105 degrees). Do not disturb more than 40 linear feet (longitudinal) of riparian buffer. When permitted to encroach into zone 1 (the lower 30 feet beside the stream or water), adhere to all of the following minimum, but not necessarily limited to, Best Management Practices in during construction.

- 1) Woody vegetation is cleared by hand. No grading allowed.
- 2) Stumps to remain except in trench where trees are cut. Minimize disturbance to roots in buffer zone.
- 3) Backfill trench with the excavated soil immediately following installation.
- 4) Do not use fertilizer except for the one-time application to reestablish vegetation.
- 5) Minimize removal of woody vegetation, the amount of disturbed area, and the time the disturbed area remains disturbed.
- 6) Take measures to ensure diffuse flow of water through the buffer after construction.
- 7) In wetland areas, use mats to minimize soil disturbance.
- 8) Schedule work in buffers to ensure exposure of denuded surface in the buffer is kept to a minimum.
- 9) Wells: If buffer distance cannot be obtained at either a public or private water supply well, the well is to be abandoned per the requirements of the Wake County Health Department and NCAC 15A Subchapter 2C, Section .0100, *Well Construction Standards*.

D. **Geotechnical Investigation**

- 1) Where a Geotechnical report has been provided to the Contractor by the Town, the data on sub-surface soil conditions is not intended as a representation or warranty of the continuity of such conditions between borings or indicated sampling locations. It shall be expressly understood that the Town of Wake Forest will not be responsible for any interpretations or conclusions drawn there from by the Contractor. The data is made available for the convenience of the Contractor.

- 2) In addition to any report that may be made available to the Contractor, the Contractor is responsible for performing any other soil investigations felt necessary for proper evaluation of the site for the purposes of planning and/or bidding the project, at no additional cost to the Town of Wake Forest.

E. Protection of pavement

Debris from the site shall be removed in such a manner as to prevent spillage. Keep pavement and area adjacent to site clean and free from mud, dirt, dust, and debris at all times. Employ the necessary measures required to meet this requirement.

1.9 SERVICE INTERRUPTION

For service interruption, operation of valves, taps, fire hydrant operation, etc, contact the City of Raleigh Public Utilities Operations Division at 919.996.2737 between the hours of 7:30 AM and 4:00 PM. After 4:00 PM, call the after hour's emergency number at 919.829.1930. Provide a minimum of 48 hours notice or desired utility interruption or necessary operation of valves or hydrants.

Refer to the following link regarding service interruption:
<http://www.raleighnc.gov/home/content/PubUtilAdmin/Articles/WaterandSewerFAQs.html>

For any other utility, contact the applicable utility agency.

1.10 COORDINATION

- A. The City of Raleigh Public Utilities Department will be the sole operator of all valves and hydrants within the Town of Wake Forest. Coordinate all utility service interruptions with the City of Raleigh Public Utilities Department.
- B. Coordinate tie-ins to municipal roadway system with the Town of Wake Forest and to NCDOT roadways with Wake County Division Engineer's office.
- C. When traffic signals, loops, or their appurtenances are likely to be damaged or interfere with construction, coordinate temporary operation with the NCDOT and/or the applicable agency having jurisdiction of the signals. Provide a minimum of 1 weeks' notice prior to anticipated disturbance or interruption. At the discretion of the Town's Engineer, the notice may be required to be published in the newspaper.
- D. Repair of pavement markings: When cuts are made through any paved surface and the cuts extend through the pavement markings, the replaced pavement shall be marked to match the existing.
- E. Benchmark/Monument Protection: Protect and maintain benchmarks, monuments or other established reference points and property corners. If disturbed or destroyed, they must be replaced at Contractor's own expense by a Licensed Professional Surveyor and to the full satisfaction of Owner/Town of Wake Forest.
- F. Contact "NC One Call" at 811 before digging.



1.11 PUBLIC CONVENIENCE

The contractor shall at all times so conduct his work as to ensure the least possible inconvenience to the general public and the residents in the vicinity of the work. Fire hydrants on or adjacent to the work shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the Contractor to ensure the proper functioning of all gutters, sewer inlets, drainage ditches, and irrigation ditches, which shall not be obstructed except as approved by the Town's Engineer.

Refer to the Town of Wake Forest Noise Ordinance by visiting the following link: <http://www.wakeforestnc.gov/residents-noiseordinance.aspx>

1.12 TRAFFIC CONTROL

- A. When working within any NCDOT System road or highway, conform to the *Manual on Uniform Traffic Control Devices*, latest revision (MUTCD) as well as the NCDOT *Standard Specifications for Roads and Structures*, latest revision.
- B. Traffic Maintenance shall comply with the latest revision of the NCDOT *Standard Specifications for Roads and Structures*, Division 9 – *Signing* and Division 11 – *Work Zone Traffic Control*, as well as other applicable sections.
- C. A traffic control plan shall be submitted to the Town of Wake Forest Engineering and NCDOT (if applicable) for approval.
- D. When traffic signals or their appurtenances are likely to be damaged or interfere with construction, coordinate temporary operation with the NCDOT or the Town's Engineer. Provide a 1 week notice prior to anticipated disturbance or interruption.
- E. Whenever it becomes necessary to leave a section of trench open after completion of the day's work, the contractor shall provide barricades and lights to protect the public. Operate warning lights during hours from dusk to dawn each day and as otherwise required for inclement weather and visibility.

1.13 EROSION AND SEDIMENTATION CONTROL AND NPDES MONITORING, CONTROLS, AND LIMITATIONS FOR PERMITTED DISCHARGES

Refer to the Town of Wake Forest UDO for Erosion and Sedimentation Control requirements; Chapter 12.

<http://www.wakeforestnc.gov/Data/Sites/1/media/Residents/Planning/development%20services/currentudo.pdf>

1.14 SAFETY

- A. Ensure full compliance to applicable requirements of OSHA. Refer to 29 CFR 1926 OSHA "Construction Industry Regulations", latest revision.
- B. Comply with local requirements and specific requirements of State of North Carolina with regard to workplace safety.
- C. The contractor shall keep the surface over and along the trenches and other excavation in a safe and satisfactory condition during the progress of the work.

PART 2 - PRODUCTS

2.1 SOIL, BEDDING AND BACKFILL

2.1.1. TRENCH BACKFILL MATERIAL CLASSIFICATION (NCDOT CLASSES)

- A. **Select Earth Backfill for Concrete Pipe:** Select earth backfill shall be free of debris, roots, frozen materials, organic matter, rock, or gravel larger than 1-inch in any dimension, or other harmful matter and shall generally meet NCDOT *Standard Specifications for Roads and Structures*, Section 1016 – *Select Material* for properties and gradation, Class II or III unless otherwise approved by the Town's Engineer. Stone screenings meet the intent of this specification.
- B. **Common Trench Backfill:**
 - 1) **Satisfactory Soils:** ASTM D2487 soil classification group (Unified Soil Classification System) GW, GP, GM, SW, SM, SC, ML, and or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste frozen materials, vegetation, and other deleterious matter.
 - 2) **Unsatisfactory soils:** ASTM D 2487 soil classification group GC, CH, MH, OH, OL and PT; soils which contain rock or gravel larger than 3 inches in any dimension, debris, waste frozen materials, vegetation, clumps of clay larger than 3 inches in any dimension, and other deleterious matter. Unsatisfactory soils also include satisfactory soils not maintained within +/- 3% of optimum moisture content at time of compaction, unless otherwise approved by the Town's Engineer.
- C. When material is to be utilized for backfilling of undercut areas that are excessively wet, the material shall consist of NCDOT Select Material Class II, III or IV.

2.1.2. PIPE BEDDING

- A. **Bedding for Reinforced Concrete Storm Drainage Pipe:** See [Standard Detail 2.53](#).

2.1.3. STRUCTURES, BACKFILL AROUND:

- A. Backfill shall be approved by the Town's Engineer and shall be free from large or frozen lumps, wood, or rocks more than 3 inches in their greatest dimension or other extraneous material. The top 12 inches are to be free of material greater than 1-inch in their greatest dimension. Porous backfill shall be either #67 or #57 clean stone.

2.1.4. FOUNDATION STONE/TRENCH STABILIZATION:

- A. **Foundation/Trench Stabilization Material:** Select material meeting NCDOT Class V (#78M stone) or Class VI (#57 stone) for foundation conditioning. Encapsulate with engineering fabric as directed by the Engineer using [Type 4 soil stabilization fabric](#) (NCDOT Table 1056-1). Overlap all transverse and longitudinal joints in fabric a minimum of 18 inches.

2.1.5. FLOWABLE FILL CONCRETE BACKFILL

- A. **(Controlled Low Strength Material):** Concrete strength shall be liquid enough to flow, be self-leveling, excavatable, and have a minimum 28-day compressive strength

of 30-psi but not more than 100-psi. Non-excavatable flowable fill concrete shall have a minimum 28-day compressive strength of 125-psi but no more than 200-psi (to be excavatable by machine equipment). Materials shall comply with the recommendations within chapter 3 of ACI 229, latest revision, which include cement, aggregates, fly ash, water, admixtures, slag and other non standard materials).

Excavatable is an application where it may be necessary to remove the flowable fill at a later date. Non-excavatable is an application where it is not necessary to remove or otherwise excavate the flowable fill at a later date.

2.2 MISCELLANEOUS

2.2.1. GEOTEXTILE FABRIC

Geotextile fabric shall be protected from mud, dirt, dust, sunlight, and debris during transport and storage. Material shall be inert to commonly encountered chemicals; resistant to mildew, rot, insects, and rodents; and biologically and thermally stable. Geotextile fabric for subsurface installation shall not be exposed to direct sunlight for more than 24 hours before or during installation.

- A. **Filter Fabric for Rip Rap:** Filter Fabric for Rip Rap and Rip Rap Beddings shall conform to Section 1056 – *Engineering Fabrics of the NCDOT Standard Specifications for Roadways and Structures*, latest revision for Type 2 engineering fabric.
- B. **Soil Stabilization Fabric:** Generally, soil stabilization fabric shall conform to the requirements of Section 1056 – *Engineering Fabrics of the NCDOT Standard Specifications for Roadways and Structures*, latest revision for Type 4 engineering fabric. However, provide fabric meeting Geotechnical Engineers recommendations for the application and use intended.
- C. **Fabric for Subsurface Drains:** Non-woven needle-punched fabric shall conform to Section 1056 – *Engineering Fabrics of the NCDOT Standard Specifications for Roadways and Structures*, latest revision for Type 1 engineering fabric.
- D. **Silt Fence Fabric:** Refer to NCDENR, Division of Energy, Mineral and Land Resources Land Quality Section's *North Carolina Erosion and Sedimentation Control Planning and Design Manual*, latest revision.

PART 3 - EXECUTION

3.1 PREPARATION

3.1.1. GENERAL REQUIREMENTS APPLYING TO ALL AREAS

- A. Contractor shall plan construction to minimize disturbance to properties adjacent to the storm drain lines.
- B. **Access and/or Haul Roads:** Any grading or excavation required for equipment travel during the course of construction as well as erosion control, access or haul road removal, restoration, seeding and ground cover shall be provided by the Contractor. Refer to the UDO for other related requirements.

- C. The Contractor shall be responsible for damage to areas or items designated by the Town's Engineer to be protected. Repairs to, replacement of, or reparations for areas or items damaged shall be made to the satisfaction of the Town's Engineer and affected property owners before acceptance of the completed project.
- D. The Contractor shall protect all buildings or structures located along the drainage line, ditch or stream. Hand trenching, shoring, or other methods may be required.
- E. Any fences disturbed by the Contractor shall be repaired to a condition equal to or better than their original condition or to the satisfaction of the Town's Engineer. This may require the use of new material.
- F. Contractor shall obtain written permission from property owners for use of any access other than ones located within public rights-of-way or easements. Written permission shall contain conditions for use and restoration agreements between property owner and Contractor.
- G. All areas disturbed shall be restored to a condition equal to or better than their original condition and shall be graded to drain.
- H. The Contractor shall replace or repair all damaged or destroyed hedgerows and property corners using the services of a licensed Professional Surveyor.

3.1.2. CONSTRUCTION LIMITS

- A. The Town's Engineer reserves the right to limit the width of land to be disturbed and to designate on the drawings or in the field certain areas or items within this width to be protected from damage.
- B. Contractor shall not disturb any areas outside the permitted limits of disturbance contained in this section without express written permission from the Town's Engineer.
- C. Contractor shall make select cutting of trees, taking smallest trees first, that are mandatory for the construction of the drainage line or ditch. See UDO for specific guidelines.
- D. Should it become necessary to move the position of any underground structure, the Contractor may be required to do such work as directed by the Town's Engineer. Method of payment shall be agreed upon by the Town's Engineer and the Contractor prior to commencing work.
- E. If existing utilities are found to interfere with the permanent facilities being constructed under this section, immediately notify the Town's Engineer and secure instructions. Do not proceed with permanent relocation of utilities until instructions are received from the Town's Engineer.
- F. The widths measured from the centerline of the storm drainage lines shall be as shown on the contract drawings. The Contractor shall protect all areas outside these construction limits unless written variations are granted by the Town's Engineer.
- G. **Specific requirements applying to developed subdivision/lots**

- 1) Unless directed otherwise by the Town's Engineer, all trees, shrubs, hedges, or other ornamental plantings located outside of the construction limits, easements, or public rights-of-way shall be protected by the Contractor. The Town's Engineer reserves the right to designate certain trees located within the construction limits for protection where deemed desirable.
- 2) The contractor shall protect all reasonable septic systems or springs located outside the construction limits.
- 3) Excavated or blasted rock shall be removed from the site unless otherwise directed by the Town's Engineer.

H. Specific requirements applying to undeveloped areas

- 1) In wooded areas, the clearing shall be limited to the easement or right-of-way limits unless indicated differently on the Town of Wake Forest approved construction drawings, in which case, the work shall be confined to the limits defined on the plans. All permanent easements and rights-of-way shall be fully cleared as determined by the Town's Engineer. The Town's Engineer reserves the right to designate certain tree located within the construction limits for protection where deemed desirable.
- 2) In areas where livestock and pets are kept, the Contractor shall notify property owner prior to commencing work and keep owner advised of progress of work. Fences shall be kept secure at all times and livestock and pets protected from open ditches, machinery, blasting, and other hazards.

3.1.3. PROTECTION OF EXISTING UTILITIES AND UNDERGROUND STRUCTURES

- A. **Subsurface obstructions:** Take necessary precautions to protect existing utilities from damage due to any construction activity. The Contractor shall locate existing utilities, culverts, and structures (above or below ground), before any excavation starts and coordinate work with utility companies. The Contractor shall be responsible for notifying utility companies when working within the vicinity of the existing utilities. Omission from or inclusion of located utility items on plans does not constitute non-existent or definite location. Even though for convenience, the utility may be shown on the plans, the Contractor is responsible for and shall call for utility location a minimum of 48 hours prior to excavation. Contact underground damage protection services NC One Call or current locator service. Secure and examine local utility surveyor records for available location data including building service lines. Also, for storm sewer and electric location, call the Town of Wake Forest at 919.435.9570.
- B. Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to trenching. If damaged, repair or replace at no additional cost to the Town. In excavating, care must be taken not to remove or injure any subsurface structure. All existing gas pipes, water pipes, steam pipes, telephone lines, cable TV lines, electrical conduits, poles, sewers, drains, fire hydrants, and other structures which, in the opinion of the utility company, do not require relocation shall be carefully supported, shored up, the flow maintained, if applicable, and the line/main/obstruction protected from damage by the Contractor. If damaged, the Contractor shall give immediate notice to the proper authorities. The



utility shall be restored, at the Contractor's expense, by the appropriate utility to original or better condition. The Contractor shall be responsible for any damage to persons or property caused by such breaks. Assess no cost to Town, Engineer, or auxiliary party for any damages.

- C. The Contractor shall be responsible for anticipating and locating underground utilities and obstructions. When construction appears to be in close proximity to existing utilities, the trench(es) shall be opened a sufficient distance ahead of the work or test pits made to verify the exact locations and inverts of the utility to allow for changes in line and grade.
- D. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
- E. Should it become necessary to move the position of any underground structure, when approved by the Town's Engineer, the Contractor may be required to do such work.
- F. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Town's Engineer and secure instructions. Do not proceed with permanent relocation of utilities until written instructions are received from the Town's Engineer and the owner of the conflicting utility.

3.1.4. PROCEDURES FOR REPAIRING DAMAGED UTILITY SERVICES

- A. If a located service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Town. Notification shall be made to the Utility owner.
- B. House services: If any utility to an adjoining house is broken, the Contractor shall repair it at once and at his expense. The Town or the owner of the affected Utility Company/Agency may, at the Contractor's expense, repair any such service without prior notice to the Contractor.
- C. If damage results from the action of either a public or private party on a newly constructed project to be accepted by the Town of Wake Forest (e.g. water, sanitary sewer, storm sewer, or street), immediate notification shall be given to the Town's Engineer or Town Inspector. All damages or interruption shall be the responsibility of the party causing the damage.

3.1.5. PROTECTION OF SURFACE FEATURES

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, sediment deposition, project related sink holes, and other hazards created by operations under this or other related sections.
- B. The Contractor shall provide pads or take necessary precautions to protect the pavement from damage by the construction equipment. Pavement damaged by cleaned or tracked equipment, or by any other means, shall be repaired by the Contractor at his expense to the satisfaction of the Town's Engineer.

- C. Where a storm drainage line is placed in an existing paved area, the Contractor shall use care to cut in sharp, neat lines ahead of the excavating/ditching equipment and parallel to the pipe on each side as may be applicable. If the existing road to be cut is located within another jurisdiction other than the Town of Wake Forest or within NCDOT rights of way, the Contractor is responsible for contacting the local representative or NCDOT, respectively about pavement repair/replacement.
- D. Avoid overloading or surcharge by keeping equipment and material a sufficient distance back from edge of excavation to prevent slides or caving. Maintain and trim excavated materials in such manner to be as little inconvenience as possible to public and adjoining property.
- E. Provide full access to public and private premises, to fire hydrants, at street crossings, sidewalks and other points as designated by the Town's Engineer to prevent serious interruption of travel.
- F. Protect and maintain benchmarks, monuments, or other established points and reference points, and if disturbed or destroyed, items shall be replaced by a Licensed Professional Surveyor to the full satisfaction of the Town's Engineer and/or the jurisdictional agency.
- G. See [paragraph 1.10, Coordination](#) regarding traffic signals.

3.1.6. PROTECTION OF PERSONS AND PROPERTY

- A. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.
- B. The contractor shall not enter upon private property for any purpose without first obtaining permission. He shall use every precaution necessary to prevent damage or injury to any public or private property, trees, fences, monuments, and underground structures, etc., on and adjacent to the site of the work. He shall protect carefully from disturbance or damage all land monuments and property markers until an authorized agent has witnessed or otherwise referenced their locations, and shall not remove them until directed.

The Contractor shall be responsible for all damage or injury to property of any character resulting from any act, omission, neglect, or misconduct in his manner or method of executing said work, from his non-execution of work, or from defective work or materials, and he shall not be released from said responsibility until the work shall have been completed and accepted.

- C. The Contractor shall, at his own expense, sustain in their places and protect from direct or indirect injury all pipes, poles, conduits, walls, roadways, buildings, and other structures, utilities and property in the vicinity of his work. Such sustaining and supporting shall be carefully done by the Contractor and as required by the Company or party owning the structures or Agency controlling it. The Contractor shall take all risks attending the presence or proximity of pipes, poles, conduits, walls, thereof and any costs associated will be deducted from any monies due the Contractor. Failure of the Town's Engineer or his/her authorized representative to direct the correction of unsafe conditions or practices shall not relieve the Contractor of his responsibility hereunder.

- D. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, the contractor shall restore such property, at his own expense, to a condition equal to or better than that existing before such damage or injury was done. The contractor shall make good such damage or injury in an acceptable manner by repairing, rebuilding or otherwise restoring as directed.
- E. The Contractor shall provide barricades, fences, coverings, or other types of protection necessary to prevent damage to existing improvements, not indicated to be removed, and improvements on adjoining property. Trees and shrubs that are to remain within the construction limits will be indicated on the drawings or conspicuously marked on site.
- F. Contractor shall protect existing trees and other vegetation indicated by the Town's Engineer to remain in place against limb, bark or root damage such as cutting, breaking, or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line.

3.2 CLEARING AND GRUBBING

- A. See UDO Chapter 8, Tree Protection, Buffers and Landscaping for requirements.
- B. **Disposal:**
 - 1) Debris from the site shall be removed in such a manner as to prevent spillage. Keep pavement and area adjacent to site clean and free from mud, dirt, dust, and debris at all times.
 - 2) All brush, tree tops, stumps, and debris shall be hauled away from site or otherwise disposed of in a manner acceptable to the Town's Engineer. The contractor shall clean up debris resulting from clearing operations continuously with the progress of the work and remove promptly all salvageable material that becomes his property. Such material is not to be reused in construction. Sale of material at or on the site is prohibited.
 - 3) Stumps of trees cut down outside of the excavation area will be removed. Perishable material shall not be disposed of at the construction site.
 - 4) Unless removed from site for chipping/shredding and recycling, brush, tops, roots, and stumps from trees shall be disposed of in a NCDENR approved and permitted land clearing and inert debris type landfill. Disposal of cleared material shall be in accordance with all local and state laws.
 - 5) The Contractor will be responsible for obtaining all applicable permits and paying all fees for the disposal of excess material.

3.3 STRIPPING OF TOPSOIL:

- A. Remove the existing topsoil to a depth of 6 inches or to the depth encountered from all areas in which excavation will occur. The topsoil shall either be stored in stockpiles separate from the excavated trench material if the topsoil is to be respread or otherwise disposed of off-site. Topsoil stockpiles shall be graded to freely drain

surface water, and shall have a silt fence placed around the base of the stockpile and/or other measures required by the Erosion and Sedimentation Control Plan/Permit.

3.4 DEWATERING

- A. **Water in Trenches and Pits:** Do not allow water to accumulate in excavations. When ground water is encountered, the contractor shall remove the water that accumulates in the trenches or pits, which would affect the construction of the lines or their appurtenances, by pumping, bailing, well-pointing, or other approved dewatering method and shall perform all work necessary to keep the trenches or pits entirely clear from water while bedding is being placed, the pipe is being laid, masonry units are being placed, and structures are either being set or constructed. No drainage structure shall be constructed in water.
- B. All water removed from the trench shall be conveyed in a proper manner to a suitable point of discharge and shall comply with applicable erosion and sedimentation control laws. The contractor shall dispose of water from the trenches in such a manner to cause no injury to public health, public or private property, work completed or in progress, street surfaces, or where such effluent may cause any interference with the use of the streets. Water, if odorless and stable, may be discharged into an existing storm drain, channel, or street gutter in a manner approved by the Town's Engineer. When required by the Town's Engineer, a means shall be provided for de-silting (filtering) the water before discharge. Under no circumstances shall water be discharged to a sanitary sewer main or sewer related structure.
- C. Where underground streams or springs are encountered, provide temporary drainage, well pointing, or bailing. Notify the Town's Engineer of such conditions.
- D. Protect subgrade from softening, undermining, washout, and damage by rain or water accumulation. Include cost of de-watering in proposal for water or sewer lines. No additional remuneration for this item is permitted.
- E. Maintain dewatering systems until dewatering is no longer required.
- F. Prevent surface water from ponding on prepared subgrades and from flooding project site and the surrounding area. Reroute surface water runoff away from or around excavated areas.
- G. Unless otherwise directed by the Town's Engineer, the cost of shoring, sheeting, well pointing, gravel bedding and other dewatering devices shall be included in the unit price of each respective item bid. Do not use excavated trenches as temporary drainage ditches.
- H. Backfilling shall not take place when the trench contains water in an amount to create soupy conditions.
- I. Dewatering is not a pay item.

3.5 TRENCHING

3.5.1. GENERAL:

- A. **Unclassified Trench Excavation:** Remove all material of whatever nature, including but not limited to clay, silt, gravel, and hard pan, as directed by Town's Engineer and dispose of unsuitable material in either a NC DENR permitted demolition land fill or a site which legally can accept earthen fill (i.e. meeting all applicable laws such as erosion control, zoning, etc.). Material, of a compactible nature, that can be re-used as trench backfill shall be replaced and re-compacted to the requirements set forth in these specifications.

The cost of excavation is to include all costs for equipment, personnel, trenching, shoring, de-watering, well-pointing, removal and replacement of material, compaction, testing, or disposal if material is deemed unsuitable by the Town's Engineer or his representative. The cost of rock of [trench rock](#) removal by blasting or other mechanical means (except ripping) is not included in unclassified trench excavation cost.

- B. **Excavation for Drainage Structures:**

This item consists of the necessary excavation for the foundation of bridges, pipe and box culverts, and all other drainage structures for which foundation excavation is not otherwise provided under the individual items; necessary excavation for under drains; disposal of all excavated material of whatever nature (with the exception of rock by blasting or mechanical means other than ripping); all necessary bailing, drainage, pumping, sheeting, shoring and bracing; and the construction of cribs and cofferdams, including the furnishing of materials thereof, all as specified and in conformity with the requirements of these structures, as shown on the drawings.

- C. **OSHA Trench Protection:**

Excavation shall be performed in accordance with OSHA Standard 29 CFR Part 1926, "Safety and Health Regulations for Construction," Subpart P "Excavations," Standard Number 1926.650, latest revision., latest revision. The Contractor shall hold the Town of Wake Forest harmless for injuries and/or damages resulting from failure to properly adhere to trench protection regulations/requirements in force at the time of a failure or mishap.

3.5.2. TRENCHING (GENERAL)

- A. The trench for storm drainage pipe shall be excavated to conform to [Standard Detail 2.53](#).
- B. Unless given permission to do otherwise or shown as a bore, all excavation of trenches is to be by the open cut method to the depth and grade shown on drawings and as necessary to accommodate work.
- C. The contractor shall only open as much ditch as he can completely install pipe, backfill, compact, and cleanup within that working day. Do not open a greater length of trench than can be effectively utilized and maintained under existing conditions and with the forces at hand. The maximum allowable length of open trench shall be limited to 1000 LF per work crew.
- D. Once trench is opened, proceed immediately and with dispatch to place specified materials in trench, or to otherwise utilize trench for intended purpose. Schedule work and order materials so that trenches are not left open for a longer period than is

reasonably necessary. Any trench or portion of trench, which is opened and remains idle for seven calendar days or longer, as determined by the Town, may be directed to be immediately refilled, without completion of work, at no additional cost to Town. Said trench may not be reopened until Town is satisfied that work associated with trench will be prosecuted with dispatch.

- E. Containment of Sediment (solids and mud): The contractor shall at all times so conduct his work to ensure that all solids and mud are contained within the trench. See [paragraph 3.5.7, Surface or Groundwater In Trenches](#), below.

3.5.3. TRENCH PROTECTION: TRENCH SHAPING, BRACING & SHORING

- A. A Certified Competent Person designated by the Contractor shall be on-site at all times excavation or pipe installation is being conducted. OSHA standards must be adhered to.

3.5.4. PREPARATION OF TRENCHES FOR STORM DRAINAGE PIPELINES

- A. The bottom of the trench for storm drainage pipelines shall be excavated to a minimum over depth as shown on the construction drawings in accordance with the applicable type laying condition specified (as shown on [Standard Detail 2.53](#)) to provide for pipe bedding for the entire length of the gravity pipeline, including lateral connections if any, except in rock where foundation bedding shall be prepared as specified on [Standard Detail 2.53](#). Unless otherwise directed by the Town's Engineer, the bedding shall be shaped to conform to [Standard Detail 2.53](#). Bell holes and depressions as required of the joint shall be dug after the bedding has been graded and shaped, and shall be only of such length, depth, and width as required for properly making the particular type of joint. Rock larger than 3 inches shall be removed from the trench bottom and any voids filled with compacted NCDOT Class II or III material (Section 1016, *Select Material*, NCDOT Standard Specifications for Roads and Structures). The trench for storm drainage and lateral connections, if any, shall then be backfilled and compacted as indicated [Standard Detail 2.53](#), Table 2 taking care to compact in no more than 8-inch lifts with the fill brought up evenly on both sides of the pipe at the same time to avoid unbalanced pressures. The balance of the trench backfill up to pavement subgrade, or finished grade as applicable, shall conform to [Table 2210.1](#) and [paragraph 3.6.3.B](#) of this specification.
- B. Notify Town when unstable materials are encountered and define by drawing station locations and limits when encountered. Where an unsuitable foundation is encountered, provide a stone foundation with NCDOT [Type 4 soil stabilization fabric](#) in accordance with [Standard Detail 2.53](#).
- C. Over-excavation: Unauthorized over-excavation consists of removal of material beyond indicated subgrade elevations or side dimensions, without specific approval of the Town's Engineer. Exercise care to avoid excavations below established grade where firm earth conditions exist. Where unauthorized excavations have been carried beyond points required, restore these areas to the elevations and dimensions shown on the drawings with approved fill material and compact as specified (as noted in the preceding paragraph). In no case shall the pipe be brought to grade by blocking under the barrel of the pipe. A uniform support shall be provided for the entire length of the pipe. Unauthorized excavation shall be replaced at the Contractor's expense.

3.5.5. EXCAVATION FOR STRUCTURES

- A. Excavate to provide a minimum of 12 inches of horizontal clearance between outer surface of structure and trench wall.
- B. Excavating and Backfilling for Structures: See specification Section 02200 *Earthwork*, paragraph 3.4 *Structures: Excavation and Backfilling*.
- C. See [3.5.6.G Cushioning for Structures](#) for bedding requirements.
- D. See also [paragraph 3.5.3, Trench Protection](#).

3.5.6. ROCK:

- A. **Rock Excavation:** See [paragraph 1.4.N, Rock Excavation for Trenches and Pits](#) for definition of rock excavation.
- B. When rock is encountered in the trench, the Town's Engineer must be notified before any rock is blasted or removed. Do not perform rock excavation work until rock has been cross-sectioned, classified, and approved for removal by the Town's Engineer. The Town's Engineer will measure the rock, after which, the rock shall be excavated to a depth 6 inches below the grade of pipe and the bottom of trench brought back to grade by using an approved fill material. See [paragraph 3.16, Blasting](#) for other requirements regarding rock excavation.
- C. Intermittent drilling, blasting, or ripping performed to increase production and not necessary to permit excavation of material encountered will be deemed to be unclassified excavation
- D. All over-blasted rock which has been loosened must be removed prior to backfilling.
- E. The Contractor must use overburden, mats, or other means to minimize fly-rock. Any damage caused by flyrock or excessive vibration will be the responsibility of the Contractor.
- F. **Cushioning Pipe In Rock:** Special precautions shall be exercised to prevent any pipe from resting on rock or any other hard projection that might cause breakage of pipe. At no time shall the pipe bell or the pipe barrel rest on rock. A minimum of 6 inches of NCDOT Class V or VI (Section 1016, *Select Material*, NCDOT Standard Specifications for Roads and Structures) foundation cushioning is required between the outside barrel of the pipe and rock. A minimum of 12 inches of clearance is required between the sides of the pipe and the rock. Thicker cushioning may be required for deeper or large pipe on a case-by-case basis. See Table 2 on [Standard Detail 2.53](#).
- G. **Cushioning for Structures:** The bottom of manhole bases and other precast structures and appurtenances shall be excavated to minimum over depth of 8 inches below the bottom of the structure (or more if directed by the Town's Engineer), but no less than as indicated in the applicable standard details. The structures shall be placed on clean stone bedding (NCDOT Class VI [Section 1016, *NCDOT Standard Specifications for Roads and Structures*]) that has been firmly consolidated. Bedding material shall be shaped, graded, and compacted so that the entire bottom of the structure rests level on the material for its entire area.

- H. **Disposal of Rock:** Rock excavated from the trench shall be hauled off the site at the Contractor's expense. Borrow required to replace excavated rock shall be provided by the Contractor and shall be included in the unit price bid for rock excavation. No rocks or boulders shall be used as backfill in any part of the trench. Where rock has scattered over adjoining property as a result of blasting, the Contractor shall remove the rock and restore the area to its original condition at no cost to the Town.
- I. See also [paragraph 3.5.3, Trench Protection](#).
- 3.5.7. SURFACE OR GROUNDWATER IN TRENCHES/PIPE**
- A. See [paragraph 3.4 – Dewatering](#), of this specification.
- B. Existing or newly laid storm drainage pipe shall either be plugged and/or an appropriate sediment trap placed at the upstream end to prevent siltation at the end of a day's work.
- 3.5.8. TRENCH SIZE/SHAPE:**
- A. Trench size: Conform to the requirements of [Standard Detail 2.53](#).
- 3.5.9. PIPE EMBEDMENT**
- A. Observe drawing notations for specifics regarding embedment conditions.
- B. Refer to specific pipe material specifications for additional embedment requirements.
- C. Note special details for drain pipes and foundation drains.
- 3.5.10. BEDDING CONDITION**
- A. Refer to the following table.

Pipe Condition	Installation Type ^a
RCP in R/W (Paved Areas)	Type 1 or 2
RCP Outside R/W (Outside of Pavement or in Natural Areas)	Type 3 or 4

^aSee Table 2, [Standard Detail 2.53](#).

3.6 BACKFILLING (MATERIALS AND METHODS)

3.6.1. GENERAL:

- A. Except as otherwise specified or directed for special conditions, backfill trenches to the ground surface with select material approved by the Engineer.
- B. Reopen trenches that have been improperly backfilled, to a depth as required for proper compaction. Refill and compact as specified, or otherwise correct to the approval of the Engineer.

- C. Do not allow or cause any of the Work performed or installed to be covered up or enclosed by work of this Section prior to required inspections, tests, and approvals.
- D. Should any of the Work be so enclosed or covered up before it has been approved, uncover all such Work and , after approvals have been made, refill and compact as specified, all at no additional cost to the Town.
- E. No separate payment shall be made for the excavation or backfilling for storm drains.
- F. Observe specific pipe manufacturer's recommendations regarding methods of backfilling and compaction.
- G. Ensure compaction of each lift to requirements stated in these specifications.
- H. All pipe areas shall be graded and maintained in such a condition that erosion or saturation will not damage the pipe bed or backfill.
- I. Pipe and fittings shall be inspected before backfilling.
- J. Unless otherwise directed or permitted by the Town's Engineer, all pipe laid shall be backfilled during the same day, and prior to the completion of the day's work, to provide a firm continuous support and covering for the pipe.
- K. Heavy equipment shall not be operated over any pipe until it has been properly backfilled and compacted with a vibratory compaction device (i.e. Rammax walk behind or infrared remote controlled trench roller/compactor (24- to 33-inch drum), NOT A PLATE TAMP) and has a minimum cover as required by the plans. Pipe that is misaligned, shows excessive settlement, or has been otherwise damaged by the Contractor's operations, shall be removed and replaced at no cost to the Town.

3.6.2. MATERIALS:

- A. Use only backfill for trenches which is free from boulders, large roots, sod, other vegetation or organic matter and frozen material.
- B. See [paragraph 2.1.1 – Trench Backfill Material Classification](#) for Select Earth Backfill and Common Trench Backfill classification. In areas of extensive rock excavation, where there is a shortage of suitable backfill, the contractor shall, at his own expense, haul suitable material in to be placed over the pipe.

3.6.3. METHODS:

Provide backfill and compaction methods of following types:

- A. **Carefully Compacted SELECT EARTH BACKFILL:** Furnish carefully compacted select earth backfill where indicated on drawings and specified for trench embedment conditions and for compacted backfill conditions up to 12 inches above top of pipe. See paragraph [2.1.1.A Soil, Bedding, and Backfill for definition of Select Earth Backfill](#). Comply with the following:
 - 1) Do not backfill on muddy or frozen subgrade.

- 2) Exercise extreme care in backfilling operations to avoid displacing joints and appurtenances or causing any horizontal or vertical misalignment, separation, distortion or damage to newly made joints.
 - 3) The filling of the trench shall be carried on simultaneously on both sides of the pipe in such a manner that injurious side pressures do not occur such that the pipe could be displaced or dislodged.
 - 4) Repair damages, distortions, or misalignments to the full satisfaction of the Town's Engineer.
 - 5) Pipe shall be removed if broken or damaged during installation.
 - 6) Sheeting and shoring generally should be removed only when the trench below it has become substantially filled, and every precaution shall be taken to prevent any slides of material from the sides of the trench onto or against the pipe. See [paragraph 3.5.3 Trench Protection](#).
 - 7) Unless otherwise approved by the Town's Engineer, place backfill in lifts not exceeding 8 inches (loose thickness) up to 12 inches above top of pipe.
 - 8) Hand place, shovel slice, and hand tamp carefully compacted backfill solidly around pipe (see [Standard Detail 2.53](#)). Only hand tamping shall be used to compact earth around the pipeline. When the backfill has been brought to 12 inches above the top of the barrel, vibratory compaction devices (i.e. Rammax walk behind or infrared remote controlled trench roller/compactor (24- to 33-inch drum), NOT A PLATE TAMP) shall be used to compact the remainder of the soil.
- B. **COMMON TRENCH (FINAL) BACKFILL** Perform remaining backfill in accordance with drawings or as directed by the Town's Engineer. See [paragraph 2.1.1.B Trench Backfill Material Classification for definition of Common Trench Backfill](#). Comply with the following:
- 1) Unless otherwise specified or approved by the Town's Engineer, backfill the remainder of the trench, from 12 inches above the pipe to grade, with clean earth fill free of stones larger than 3 inches in diameter. Top 12 inches to be free of material greater than 1 inch. Material shall be free from all perishable and objectionable materials (organic). Before placing any backfill, all rubbish, forms, blocks, wires, or other unsuitable material shall be removed from excavation.
 - 2) The material for backfilling, unless otherwise specified, shall be Select Backfill of sand-clay mix or a material approved by the Engineer and free from stones larger than two inches (2 inches) in diameter.
 - 3) From 12 inches above the pipe to grade, the backfilling shall be placed in layers not over 8 inches thick in the street right of way and 12-inch layers outside of the street right of way compacted to a minimum density as specified in [Table 2210.2](#). See also [Table 2210.1](#).
 - 4) If permitted by the Engineer, after pipe has been covered to a depth of one foot, puddling may be used in the consolidation/compaction of granular backfill, and the trenches filled with water as backfilling progresses. Stones used in the

puddled backfill shall not be larger than three inches (3 inches) in diameter and enough earth shall be used to fill all voids completely.

- 5) Final backfill shall be tamped with a vibratory compaction device (i.e. Rammax walk behind or infrared remote controlled trench roller/compactor (24- to 33-inch drum), NOT A PLATE TAMP). See [Table 2210.2](#) below, for specific density requirements.
 - 6) All areas within the limits designated on the drawings, including adjacent transition areas, shall be uniformly graded. The contractor shall finish surfaces within the specified tolerances with uniform levels or slopes between points where elevations or existing grades are shown.
 - a. Finish subgrade areas that are to receive topsoil. Bring such areas to within 0.10 foot of required subgrade elevations.
 - b. Shape subgrade under sidewalks to line, grade, and cross-section. Subgrade is to be brought to within 0.10 foot of required subgrade elevations.
 - c. Shape subgrade under pavement to line, grade, and cross-section. Bring to within ½ inch of required subgrade elevations.
 - 7) **Surface Protection – Traffic:** The contractor shall protect newly graded areas from traffic and erosion, repair, and re-establish grade in settled, eroded, or rutted areas. Where compacted areas are disturbed by subsequent construction or adverse weather, the contractor shall scarify the surface, reshape, and re-compact to the required density.
 - 8) On Town funded projects, should the contractor fail to maintain any trench within 2 days after notice from the Town's Engineer, the Town may address/remediate the trench problem and the cost of such work may be retained from monies due the contractor. In case of emergency, the Town's Engineer may refill any dangerous trench failures or depressions without prior notice to the Contractor.
- C. **Structure Backfill:** Backfill placed within 2 feet of manholes and other special structures shall be of the same quality as that specified for backfill around water, sewer or storm drainage lines. Take care to prevent wedging action of the backfill against structure by carrying the material uniformly around the structure so approximately the same elevation is maintained in each lift. If necessary to prevent damage to structure, provide temporary bracing of structure walls. Material shall be solidly tamped with a mechanical or pneumatic tamper in such a way as to avoid damaging the structures or producing unequal pressures. The Contractor shall refill all excavations as rapidly as practical after completion of the structural work therein, or after the excavations have served their purpose.
- D. **Flowable Fill Concrete Backfill**
- 1) See [paragraph 2.1.5, Flowable Fill Concrete Backfill](#) for product specification.
 - 2) When directed by the Engineer, the Contractor shall backfill trenches or undercut areas with flowable fill concrete plant mix. Concrete strength shall be as specified by the Engineer based on the application (excavatable vs. non-excavatable).

Except for structural applications, traffic can be placed on mixture within an hour or two after placement. Final surfacing of pavements; however, should be delayed if possible at least 24 hours to allow for shrinkage and hydration of concrete. Settlement of 2" to 3" may occur.

- 3) The option to use flowable fill is open to the Contractor to reduce delay and inconvenience to traffic. However, payment for flowable fill backfill is considered incidental to the cost of construction unless either a pay item has been provided in the proposal, a change order has been approved or the Contractor is ordered by the Engineer to place flowable fill concrete as an emergency measure. Before placing flowable fill in NCDOT rights-of-way, obtain verbal approval from District Engineer's office.

E. Special Method Requirements.

- 1) Water flushing for consolidation is permitted with permission of Engineer only.

3.6.4. COMPACTION LIFTS:

- A. **Minimum Compaction Requirements:** Compaction percentages are percentages of maximum dry density as determined by indicated ASTM Standards. Unless noted otherwise on drawings or more stringently by other sections of these specifications, place and ensure degree of compaction of trench backfill and/or borrow material does not fall below the following percentages of the maximum density at optimum moisture content.

Table 2210.1	
Compaction Lift Thickness for Common Trench Backfill^a	
Lift Thickness (inches)	Location
8	Inside street rights-of-way
12	Outside street rights-of-way
^a Carefully Compacted Select Earth Backfill lifts shall not exceed 8 inches.	

- B. **Passing Test:** Average of 3 test results meeting the applicable provisions of [Table 2210.2](#) (above) with no one test failing by more than -3 percentage points. Moisture content tolerance is to be within +/- 3 percentage points of the optimum moisture content unless otherwise specified by the Town's Engineer or Geotechnical Engineer.
- C. **Failure of compactive efforts:** If compaction efforts should fail to provide a stable subgrade in accordance with the requirements in [paragraph 3.6.4.B, Passing Test](#) after subgrade materials have been shaped and brought to optimum moisture, such unstable materials shall be removed to the extent directed by the Geotechnical Engineer and/or the Town's Engineer and replaced and compacted using new material and must pass compaction test prior to proceeding to the next stage of construction and at no expense to the Town.
- D. The costs associated with excavation and re-compaction of areas that have failed will be the Contractors responsibility.

3.7 PIPE COVER

- 1) Where utility runs transverse public property or are subject to governmental or utility company jurisdiction, provide depth, bedding, cover, and other requirements as set forth by legally constituted authority having jurisdiction, but in no case less than the depth shown in the Contract Documents.
- 2) Provide minimum trench depth indicated in the Fill Height Table shown in [Standard Detail 2.53](#), over the top of the installed item below the finish grade or subgrade
- 3) Where the minimum cover is not provided, encase the pipe in concrete as indicated. Provide concrete with a minimum 28-day compressive strength of 2500 psi.

3.8 COMPACTION

- A. Soil shall be compacted using equipment suitable for the material and the work area location. Power driven hand tampers shall be used for compacting materials adjacent to structures. Use hand tamper for re-compaction over underground utilities.
- B. **Minimum Compaction Requirements:** Place and ensure backfill and fill materials achieve an equal or "higher" degree of compaction than undisturbed materials adjacent to the work. Compaction percentages are percentages of maximum dry density as determined by indicated ASTM Standards. Unless noted otherwise on drawings or more stringently by other sections of these specifications, place and ensure degree of compaction of trench backfill and/or borrow material does not fall below the following percentages of the maximum density at optimum moisture content.

Table 2210.2		
Minimum Compaction Limits (Cohesive Soils)		
Location	Density	
Beneath and within 5 feet of buildings	100% of the maximum dry density by ASTM D698 (standard Proctor), AASHTO T-99.	
Areas under roadway pavement surfaces, curb and gutter, and sidewalks	Top 12 inches	100% of the maximum dry density by ASTM D698 (standard Proctor), AASHTO T-99.
	Up to within 12 inches	95% of the maximum dry density by ASTM D698 (standard Proctor), AASHTO T-99.
Roadway shoulders	95% of the maximum dry density by ASTM D698 (standard Proctor), AASHTO T-99.	
Under turf, sodded, planted, or seeded non-traffic areas	85% of the maximum dry density by ASTM D698 (standard Proctor), AASHTO T-99.	

3.9 TESTING

- A. Tests shall be performed by a recognized independent testing laboratory approved by Town. The Contractor shall be responsible for excavation for testing.
- B. **Quality Assurance vs. Quality Control:**

- 1) Quality Assurance (QA) Testing, and the associated cost, is the responsibility of the Town. Quality Assurance testing by the Town is used to confirm that the Contractor is generally performing his/her work in compliance with these specifications and that the trench backfill complies with specified minimum compaction requirements.
- 2) **Quality Control (QC) Testing** is the necessary and required testing that is to be performed by the Contractor to assure that he/she is meeting and complying with the requirements of these specifications. The associated cost for QC testing is the Owner/Developer/Contractor's responsibility as directed by these specifications. The contractor is also responsible for "re-testing" costs incurred by the Town when the Town's test results (tests for Quality Assurance) results in a "failure."
- 3) **Quality Control (QC) Testing for Town Funded Projects:** For Town funded projects, the Town of Wake Forest shall pay for the cost of testing. However, where backfill compaction is suspect and questionable, the material shall be removed as directed by the Town's Engineer or his representative and the area tested. If the suspect area fails to meet the prescribed minimum moisture density test requirements, the soil shall be removed, replaced, compacted and re-tested, as directed by the Town's Engineer until the backfill meets or exceeds the minimum density requirements. The Contractor shall pay for all costs associated with re-testing.

C. **Quality Assurance (QA):**

In the course of backfilling trenches for utility installations, the Town's Engineer may require "Field Density Determinations" or compaction tests. When compaction tests are called for, the Town's Engineer will determine the location of the tests and the Town shall engage a qualified testing firm to perform the test. A representative of the Town will observe tests and a copy of the test results and inspection report will be submitted by the testing firm directly to the Town's Engineer. When the tests indicate that the density failed to meet the requirements of [Table 2210.2](#), the Contractor shall comply with [paragraph 3.6.4.C, Failure of Compactive Efforts](#).

Payment for failed QA density tests: For Town funded projects, payment for failed in-place density tests shall be made by the Contractor by deducting the testing cost from the forthcoming retainage. For other projects in which the Town will ultimately assume ownership and maintenance, the testing costs for failed in-place density tests shall be billed directly to the Contractor.

D. **Quality Control (QC):** The Contractor shall perform in-field density tests in accordance with [Table 2210.2](#). Inspection reports shall be submitted by the testing firm directly to the Town's Engineer. See [paragraph 3.6.4.B, Passing Test](#).

- 1) All test results shall be provided to the Town's Engineer as they become available from the testing agency.
- 2) The Geotechnical testing firm is to perform laboratory tests (ASTM D698, standard Proctor) to establish a moisture-density relationship for all materials that are proposed to be used as fill.

- 3) Contractor shall give a 24-hour notice to Geotechnical testing firm for subgrade testing, subgrade confirmation, or inspections.

E. **Testing Frequency:**

Table 2210.3	
Testing Frequency	
Location	Frequency
Trench areas in road crossings	1 test group ^a per road crossing, and/or
Trench areas	1 test per 100 linear feet per two feet of fill thickness
Exceptions: Where additional tests are required to determine the extent of unacceptable compaction (having been determined by the initial QA/QC test). In this case, the costs for these additional tests are the responsibility of the Contractor.	

- F. **Site Access For Testing:** Ensure the Town, at all times, has immediate access to the site for the testing of all soils related work. Ensure excavations are in a safe condition for testing personnel.
- G. Reference to Engineer in this section will imply Soils Engineer when employed by Town and directed by Engineer to undertake necessary inspections and approvals as necessary.

3.10 SUBSURFACE DRAINAGE

- A. Installation of subsurface drainage systems shall conform to the requirements of Section 815 – *Subsurface Drainage* of the NCDOT *Standard Specifications for Roadways and Structures*.

3.11 DEPOSITION OF EXCAVATED MATERIAL

- A. All excavated material shall be placed on one side of the trench (a minimum of 2 feet from the edge of excavation but no less than that specified/required by OSHA regulations) away from the roadway unless permission is given by the Town’s representative to place it on both sides. Excavated materials shall be so placed as not to endanger the work and so that free access may be had at all times to all parts of the trench and to all fire alarm boxes, fire hydrants and gate valves on water pipes, which are located in the vicinity. Excavated material shall be placed to in such a way as to inconvenience the public as little as possible. All fences and walls shall be protected and, if damaged, shall be repaired or replaced in as good or better condition as before it was disturbed. Protect shade trees from stockpiling of material.
- B. Exercise care when stockpiling excavated material on the bank in order to prevent surcharging the bank of the trench and potentially rendering the excavation unstable.
- C. **Disposal/Wasting of Unsuitable Material:** Material of an uncompactable nature, material unsatisfactory for backfill, trash, and excess material shall be removed from project site and disposed at the Contractor’s expense. Where removal of unsatisfactory material is due to negligence on the part of the Contractor (i.e. resulting from inadequate shoring or bracing, failure to dewater, improper material

storage exposing it to rain or flooding, or other failure to meet specified requirements), work shall be performed at no additional cost to the Town. If additional material is required, the contractor shall supply same from an approved borrow pit at no additional cost to the Town. Rock excavated from the trench shall be hauled off the site at the Contractors expense.

3.12 PLACEMENT OF RIP RAP AND RIP RAP BEDDING

Placement of Rip Rap and fabric shall conform to Section 876 – *Rip Rap* of the NCDOT *Standard Specifications for Roadways and Structures*, latest revision, to the requirements of NCDENR Division of Energy, Mineral and Land Resources, Land Quality Section's *North Carolina Erosion and Sedimentation Control Planning and Design Manual*, latest revision and to the details shown on the approved plans.

3.13 PAVEMENT REPAIR AND REPLACEMENT

- A. **General:** This work shall consist of replacing subbase stone, and bituminous material in the street in areas where it becomes necessary to remove the original pavement for sewer, water main, and storm drainage trenches. Pavement repair shall be as shown on the drawings or as determined by the Town's Engineer. However, the pavement surface repair shall conform to the minimum requirements shown on [Standard Detail 2.06](#). The pavement patch shall provide a uniform and smooth driving surface free of humps or depressions.
- B. **Construction in Public Rights of Way:** Storm drainage lines installed in or across NCDOT roads shall be installed in accordance with, if applicable, the requirements stipulated in the approved encroachment permit and the latest requirements of both the NCDOT *Standard Specifications for Roads and Structures* and the *Roadway Standard Drawings*. All storm drainage lines installed in or across Town streets shall be in accordance with these specifications and the applicable standard details.
- C. When it is necessary to remove the existing pavements, prepared road surfaces, sidewalks, or curbing, it shall be the responsibility of the Contractor to replace these surfaces to original or better condition. The Contractor shall be responsible for contacting the Town or the NCDOT, as applicable. Unless specified more stringently by the owner of the right of way, the backfill shall be compacted in accordance with [Table 2210.2](#).
- D. Contractor shall replace pavement base such that the trench backfill conforms to the requirements of [Standard Detail 2.06](#).
- E. When storm drainage lines are installed in or across roadways that have been macadamized or graveled, the Contractor shall save the gravel or stone, refill the upper 12 inches of the trench with the material, and supply sufficient new stone or gravel to return the roadway to the original grade. It shall be the Contractor's responsibility to maintain the original grade by adding gravel or ABC until the ditch is stable and the pipeline accepted by the Town. Maintain area as outlined in [paragraph 3.6.3.B.7 – Surface Protection – Traffic](#).
- F. **Cutting Pavement:** See also [Standard Detail 2.06](#) and [paragraph 3.1.5 – Protection of Surface Features](#). Perform cutting operations prior to installation of line to avoid excessive removal of asphalt.

G. **Protection of Pavement:** See [paragraph 3.1.5 – Protection of Surface Features](#).

3.14 RAILROAD CROSSING/TRACKS

Crossing of railroad tracks with storm drainage lines shall be by the method shown on the contract drawings and approved by the applicable Railroad Company. It is the responsibility of the Project Engineer and Contractor to contact the Railroad Company and to comply with all Railroad Company requirements for specifications, drawings, permits, etc. All storm drainage lines installed beneath railroad tracks shall be in accordance with the Railroad Company's policies, procedures, and permits requirements. The railroad right of way and track structure shall be fully restored to its original pre-existing condition and to the full satisfaction of the Railroad Company. The work shall not interrupt the use of the railroad tracks or in any way endanger the traffic on them.

3.15 GROUTING

A. Where designated on the plans or instructed by the Engineer, low strength tunnel slurry grouting shall be employed to fill voids, under floors, behind walls or behind tunnel liners.

B. Methods

- 1) Limestone Screening and Cement Method: The Contractor shall mix one part cement to 6 parts limestone screenings to form a slurry paste. Limestone dust or baghouse dust is best and may be obtained from quarry sources such as Georgia Marble. To this mixture add 1/3 lb. of a water reducing agent or super plasticizer to each 100 lbs. of cement. Keep water content low to minimize shrinkage. Pump or pour slurry into voids.
- 2) Fly Ash and Cement Method: The Contractor shall mix six parts fly ash with one part cement to form a flowable paste. To this mixture add 1/3 lb. of a water reducing agent or super plasticizer to each 100 lbs. of cement to reduce shrinkage. Do not add sand as it will segregate to the bottom of the slurry. Keep water content low to minimize shrinkage. Pump or pour slurry into voids.
- 3) Specco Polyurethane (Expanding Foam) Grout: Where directed by the Engineer, drill or core holes through floor or walls. Lightly spray or dampen the surface behind the structure with water, if it is not already damp. (Do not flood or pond water - a thin layer of moisture is all that is needed).

Using Specco Polyurethane Grout, pour slowly the premixed two-part mixture of urethane grout into the injection holes. The grout will begin to expand in about 30 to 60 seconds after contact with the water to 10 to 15 times its original volume. The volume of urethane used should not exceed 1/10 the total volume of the void being filled. Make sure that the hole and the area outside the hole is dry to prevent premature foaming or hole closure.

Hole placing should be coordinated with the Engineer and the foam manufacturer.

Specco "U-Mix" Polyurethane Grout can be obtained from Specco Industries, Chicago, Illinois. Approximate bearing strength is 100 psf.

- 4) Once the voids are full, clean out the ports or holes and seal off hole. For concrete floors or walls, use Five Star General Purpose Non-Shrink Grout. For steel tunnel liners, cap off with liner plate or plugs.

3.16 BLASTING

3.16.1. GENERAL

- A. Contact the town of wake forest inspections department.
- B. Payment: Rock excavation shall be paid for the actual excavation volume up to a maximum of 5 foot in width for pipes with an I.D. of 42" or less. For pipe I.D.'s greater than 42", add 18" to the pipe I.D. This method assumes that for pipes larger than 24" that the pipes are backfilled to the spring line with either #57 or #67 clean stone. See Trench Payment Detail.

Trench backfill replacing rock excavation shall be on-site select material or, if not available on-site, off-site select structural trench backfill. See [Standard Detail 2.53](#).

3.17 DUST CONTROL

The contractor shall control dust throughout the life of the project within the project area and at all other areas affected by the construction of the project, including, but not specifically limited to, unpaved roads, haul roads, access roads, disposal sites, borrow and materials sources and production sites. Dust control shall not be considered effective where the amount of dust creates a potential or actual unsafe condition, public nuisance, or condition endangering the value, utility, or appearance of any property.

The contractor shall be required to sprinkle with water or to apply dust-allaying materials. Dust control is considered incidental and shall be carried out at the contractor's expense.

3.18 MATERIAL OWNERSHIP ELECTIVE

- A. If the Town elects, all excess suitable material from excavation, which is not required for proper backfilling of the trenches, is the property of the Town of Wake Forest and such spoil shall be loaded and trucked by the Contractor to a designated dumping area as directed by the Town's Engineer. However, verify the Town's need and destination before bidding the project. If not stated elsewhere in the proposal, assume point of disposal is within a 5-mile radius of site of origin of excavation.
- B. If the Town advises that they will not want the material, dispose of material in accordance with the requirements outlined elsewhere in these specifications. The cost of off-site disposal is to be included in the cost of excavation. No extra pay for off-site disposal of material.
- C. Costs of disposal shall include all costs for permitting of waste site, erosion control, etc. as may be applicable in accordance with current laws in affect relating to waste disposal.
- D. No payment for overhaul will be allowed under 2,500 feet.
- E. A mining permit may be required.

3.19 CLEANUP AND RESTORATION OF SITE

- A. During the progress of the work, the Contractor shall keep the premises and the vicinity of the work clear from unsightly and disorderly piles of debris. Suitable locations shall be specified for the various construction materials and for debris. The materials shall be kept in their storage locations, except as needed for the work and debris shall be promptly and regularly collected and deposited in the specified location.
- B. Upon completion of section of pipeline and appurtenances, the Contractor shall fine grade the ground adjacent thereto, removing all surplus excavated material, leaving the area free from surface irregularities. He shall dispose of all surplus material, dirt, and rubbish from the site; and shall keep the site free of mud and dust to the satisfaction of the Town's Engineer. The contractor may be required to flush or sprinkle the street to prevent dust nuisance and/or sweep the street to remove mud or debris.
- C. When working on the shoulders of paved roads, the Contractor shall keep the pavement clean of all loose earth, dust, mud, gravel, etc., and shall restore road surfaces, shoulders, and ditches as required by either the NCDOT or the right-of-way owner.
- D. Grading Easements: Easements shall be graded to have cross slopes of 4% or less. The ground surfaces of easements shall be graded and cleared in such a way to promote proper drainage and allow mowing by vehicular equipment without damage to equipment from rock(s) and other debris.
- E. After all work is completed, the contractor shall remove all tools and other equipment, leaving the site free, clean, and in good condition.
- F. The contractor shall keep the surface over and along the trenches and other excavation in a safe and satisfactory condition during the progress of the work and for a period of one year after the work has been completed. He shall be held responsible for any accidents that may occur on the account of the defective condition of such surface.
- G. No area shall be disturbed until an Erosion Control Permit has been obtained and a preconstruction conference conducted. Once the site has been stabilized, the Contractor shall remove all erosion control measures and stabilize disturbed areas as required by the approved plans/permit.
- H. Work is only to be performed within a dedicated easement or right-of-way. No disturbance of private property shall be permitted without first obtaining written permission from the property owner.

3.20 SALVAGE OF USEABLE MATERIALS

All materials such as paving blocks, brick, castings, pipe etc., removed during excavation that is useable on this project shall be used after approval of its use by the Engineer. Such material shall be stockpiled on site. Unnecessary abuse and damage to these items shall be the Contractors responsibility and the cost of replacement deducted from the Contract. Any roadside driveway pipe in public or private streets belongs to the abutting property Towns.

End of Section 02210

[Back to Top](#)

bj.WakeForestSpecs.Specs.TOWF02210UtilTrench.doc