

North Carolina Department of Transportation Utilities Unit



Utilities Accommodation Manual

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Contents

- Acronyms and Abbreviationsvi**
- Section 1 Preamble.....1-1**
 - 1.1 General.....1-1
 - 1.1.1 Purpose.....1-2
 - 1.1.2 How Utilities and Non-Utilities Occupy NCDOT Right of Way1-2
 - 1.1.3 Today’s Encroachment is Tomorrow’s Conflict1-3
 - 1.1.4 Encroachment Request within NCDOT-Owned Rail Corridors.....1-3
 - 1.2 Definitions1-3
 - 1.2.1 Forms of Property Ownership and Interest1-3
 - 1.2.2 Types of Right of Way Access Control1-4
 - 1.2.3 Digital Signature1-4
 - 1.2.4 Maintenance.....1-4
 - 1.3 NCDOT Authority1-5
 - 1.3.1 Law1-5
 - 1.3.2 Policy1-5
 - 1.3.3 Public Utilities vs. Private Utilities1-5
 - 1.3.4 Applicability of This Manual1-7
 - 1.3.5 NCDOT Permanent Utility Easement1-7
 - 1.3.6 NCDOT Aerial Utility Easement.....1-7
 - 1.3.7 Non-Utility Facilities in NCDOT Right of Way1-8
 - 1.3.8 Joint Jurisdiction.....1-8
 - 1.3.9 Joint Use Agreements1-8
 - 1.3.10 North Carolina 8111-8
 - 1.3.11 Abandonment.....1-8
 - 1.3.12 Right of Way Conveyances1-9
 - 1.4 Utility and Non-Utility Maintenance Activities1-9
 - 1.5 Emergency Work1-10
 - 1.6 Erosion and Sediment Control1-10
 - 1.7 Median Installations1-10
 - 1.8 Work near Adjacent Transportation Facilities1-10
 - 1.9 Utility Acquisitions1-10
 - 1.10 Utility Facilities Not Permitted in NCDOT Right of Way1-11
 - 1.11 Disputes.....1-11
 - 1.12 Exceptions1-11
 - 1.13 Corrective Measures.....1-11
 - 1.14 Enforcement1-12
 - 1.15 Standards and Source Documents1-12
 - 1.15.1 United States Code Title 23.....1-12
 - 1.15.2 Code of Federal Regulations Title 231-12
 - 1.15.3 North Carolina General Statutes.....1-12
 - 1.15.4 North Carolina Administrative Code1-13
 - 1.15.5 NCDOT Publications1-13
 - 1.15.6 Other Agencies and Codes1-14
 - 1.15.7 Associations and Publications1-14
- Section 2 Encroachment2-1**
 - 2.1 General.....2-1
 - 2.1.1 Purpose.....2-1

2.1.2	Encroachment Agreements	2-3
2.1.3	Aboveground Facilities	2-3
2.1.4	Underground Facilities	2-3
2.1.5	Non-Utility Facilities	2-4
2.2	Types of Control for Right of Way Access	2-4
2.3	Types of Encroachment Agreements and their Requirements	2-5
2.3.1	Utility Encroachment Agreements	2-5
2.3.2	Non-Utility Encroachment Agreements	2-9
2.3.3	Blanket Encroachment Agreements	2-17
2.4	Pre-Submittal Considerations	2-22
2.4.1	Encroachment Request for Street Lighting	2-22
2.4.2	Coordination among Utility Owners using NCDOT Right of Way	2-23
2.4.3	No Guarantee of Right of Way	2-23
2.4.4	Installations Spanning Multiple Counties	2-23
2.4.5	Single Encroachment with Numerous Facilities	2-24
2.4.6	Encroachments Involving Major Deployment of Facilities	2-24
2.4.7	Emergency Encroachment Approval	2-24
2.4.8	Installations that Involve Both Controlled Access and Non-Controlled Access Right of Way	2-24
2.4.9	Proposed Attachment to Highway Structures	2-25
2.4.10	Joint Use of NCDOT Signal Poles	2-25
2.4.11	Provision for Known or Planned Expansion of Facilities	2-25
2.4.12	Utilities near Freeway and Other Controlled Access Facilities	2-25
2.4.13	Temporary Shoring Requirements	2-25
2.4.14	Encroachments within NCDOT Project Limits	2-26
2.4.15	Utilities on Subdivision Roads	2-27
2.4.16	Installations that Involve Small Cell	2-27
2.5	Submittals	2-28
2.5.1	Encroachment Agreement Form Requirements	2-28
2.5.2	Plan Requirements	2-28
2.5.3	Street Lighting Encroachment Requests	2-28
2.5.4	Encroachment Submittal Checklist	2-28
2.5.5	Utility and Non-Utility Encroachment Agreement Requests	2-29
2.5.6	Requests to Establish a Blanket Encroachment Agreement	2-31
2.5.7	Requests to Work Under Existing Blanket Encroachment Agreement	2-32
2.5.8	Requests Involving Small Cell Facilities	2-33
2.6	Review and Approval	2-33
2.6.1	Approval Authority	2-33
2.6.2	Approval of Private Facilities in NCDOT Right of Way Easements	2-35
2.6.3	Standard Review and Approval Procedures	2-35
2.7	Post Approval	2-40
2.7.1	Encroachment Agreement Required Onsite	2-41
2.7.2	Notification to NCDOT Prior to the Start of Work	2-41
2.7.3	Work under Blanket Encroachment Agreements that Do Not Require Prior NCDOT Notice	2-41
2.7.4	Utility Construction, Maintenance, and Traffic Control	2-42
2.7.5	Encroachment Enforcement and Inspection	2-42
2.7.6	Bonding	2-42
2.8	Miscellaneous Special or Unique Considerations	2-45
2.8.1	Attachments to Highway Structures	2-45
2.8.2	Temporary Shoring	2-48

2.8.3	Private Facilities	2-48
Section 3	Engineering, Construction, and Maintenance	3-1
3.1	General.....	3-1
3.1.1	Purpose.....	3-1
3.1.2	Planning and Design	3-1
3.2	Plan Requirements	3-5
3.2.1	Encroachment (Non-STIP)	3-6
3.2.2	Encroachment (STIP).....	3-9
3.2.3	Utility Relocation Plans.....	3-9
3.2.4	Street Lighting Plans	3-9
3.2.5	Quality Control	3-10
3.3	Aboveground Utilities.....	3-10
3.3.1	General Requirements	3-10
3.3.2	Aboveground Objects.....	3-11
3.3.3	Location and Alignment.....	3-11
3.3.4	Clear Zone	3-13
3.3.5	Vertical Clearance.....	3-16
3.3.6	Small Cell Nodes and Antenna Systems	3-16
3.3.7	Street Lighting	3-21
3.4	Underground Utilities	3-24
3.4.1	Location and Alignment.....	3-25
3.4.2	Minimum Bury Depth.....	3-27
3.4.3	Encasement Requirements	3-29
3.4.4	Cathodic Protection.....	3-31
3.4.5	Acceptable Pipe Materials	3-31
3.4.6	Unsuitable Pipe Materials.....	3-34
3.4.7	Underground Electric and Communication Lines.....	3-34
3.4.8	Manholes, Vaults, and Handhole Enclosures	3-36
3.4.9	Appurtenances.....	3-37
3.4.10	Tunnel Liners	3-38
3.4.11	Box Type Utility Tunnels.....	3-39
3.4.12	Bore Pits	3-40
3.4.13	Temporary Shoring.....	3-40
3.4.14	Aerial Crossings	3-43
3.5	Utilities on or near Highway Structures	3-43
3.5.1	Utilities Attached to Structure	3-44
3.5.2	Utilities Near Structure	3-46
3.5.3	Utilities in Vehicular Tunnels	3-52
3.6	Construction and Maintenance	3-52
3.6.1	North Carolina 811	3-52
3.6.2	Encroachment Agreement Required Onsite	3-52
3.6.3	Notification to NCDOT Prior to the Start of Work	3-53
3.6.4	Traffic Control.....	3-53
3.6.5	Parking of Vehicles and Equipment.....	3-54
3.6.6	Staging and Storage of Materials	3-54
3.6.7	Driveways and Adjacent Property Access	3-55
3.6.8	Approved Trenchless Installation Methods	3-55
3.6.9	Open Cut Trench.....	3-59
3.6.10	Excavation Guidance	3-62
3.6.11	Underground Utilities Protection.....	3-63

3.6.12	Disturbance of Items in the Right of Way.....	3-63
3.6.13	Restoration or Remediation of Disturbed Right of Way.....	3-64
3.6.14	Vegetation Control.....	3-65
3.6.15	Out-of-Service or Deactivated Utilities	3-68
3.6.16	Adherence to Approved Agreement & Plans	3-69
3.7	Emerging Issues.....	3-70
3.7.1	Shallow Trenching.....	3-70
3.7.2	AASHTO Manual for Assessing Safety Hardware	3-70
3.7.3	Air Hammers in Horizontal Directional Drilling (HDD)	3-70
Section 4	Coordination.....	4-1
4.1	General.....	4-1
4.1.1	Purpose.....	4-1
4.1.2	Avoid, Minimize, & Accommodate Approach to Utility Relocations	4-1
4.1.3	Consideration of Total Project Cost.....	4-2
4.1.4	Definition of a Utility Conflict.....	4-2
4.1.5	Construction and Financial Responsibility	4-3
4.1.6	Encroachments with Prior Rights.....	4-3
4.1.7	Failure to Comply	4-4
4.1.8	Federal Highway Administration.....	4-4
4.1.9	Rights and Eligibility to Occupy NCDOT Easements	4-4
4.1.10	Private Utilities	4-5
4.2	Coordination Process.....	4-6
4.2.1	Minimize Delays and Project Cost.....	4-7
4.2.2	NCDOT Responsibilities on Projects.....	4-8
4.2.3	Determine Construction and Financial Responsibility	4-8
4.2.4	Utility Estimates for State Transportation Improvement Program Projects.....	4-8
4.2.5	Subsurface Utility Engineering	4-9
4.2.6	Stakeholders	4-10
4.2.7	Expected and Suggested Meetings for Coordination	4-11
4.2.8	Utility Conflict Analysis	4-12
4.3	Considerations during Utility Design	4-13
4.3.1	Schedule	4-13
4.3.2	Plans	4-14
4.3.3	Temporary Relocations	4-14
4.3.4	Exceptions to the Policies in this Utility Accommodation Manual.....	4-14
4.3.5	Permits and Regulations	4-14
4.3.6	NCDOT Acquired Easements.....	4-15
4.4	Cost Responsibility Determination	4-16
4.4.1	Encroaching Utilities.....	4-16
4.4.2	Utilities in Recorded Easement or Property	4-18
4.4.3	Utilities not in Valid Easement.....	4-19
4.4.4	Utilities within Right of Way not Belonging to NCDOT	4-19
4.4.5	Relocation Resulting from Projects not Initiated by NCDOT	4-20
4.4.6	Other Considerations	4-20
4.4.7	Emergency Relocation	4-21
4.4.8	School Road Improvement.....	4-21
4.4.9	Determining the Share of Cost Responsibility.....	4-21
4.4.10	Inability to Reach Agreement on Cost Responsibility.....	4-24
4.5	Utility Agreements.....	4-24
4.5.1	Types of Agreements	4-24

4.5.2	Schedule	4-26
4.5.3	Cost Estimate.....	4-27
4.5.4	Betterments.....	4-29
4.5.5	Determination of Credits.....	4-32
4.6	Utility Construction Phase.....	4-33
4.6.1	Communication between Utility Owners using NCDOT Right of Way	4-33
4.6.2	Coordination Meetings	4-33
4.6.3	Occupational Safety and Health Administration Clearances	4-34
4.6.4	Agreement and Plans Onsite.....	4-34
4.6.5	Inspection.....	4-34
4.6.6	Traffic Control Plans and Safety	4-34
4.6.7	New Utility Installations within a Highway Project.....	4-34
4.6.8	Buy America.....	4-34
4.6.9	Change Orders.....	4-35
4.7	Project Invoicing and Payments.....	4-35
4.7.1	Reimbursements, Invoicing, and Payments.....	4-35
4.7.2	Variances and Exceptions to Policies.....	4-36
4.8	Additional Broadband Guidance	4-36
4.8.1	FHWA Broadband Infrastructure Deployment Rule	4-36
4.8.2	Dig Once Policy.....	4-37
4.9	Emerging Issues and Unique Conditions	4-40

Tables

Table 3-1.	Minimum Bury Depths using Trenchless Methods.....	3-28
Table 3-2.	Minimum Bury Depths using the Open Cut Method.....	3-29
Table 3-3.	Encasement Pipe Size and Wall Thickness.....	3-31
Table 4-1.	Utility Agreement Chart.....	4-26
Table 4-2.	Example Computation of Elective Betterment Percentage	4-31
Table 4-3.	Estimate Summary*	4-31

Figures

Figure 1-1.	Relationship of Utilities Accommodation Manual and Sections.....	1-2
Figure 2-1.	NCDOT Encroachment Process	2-2
Figure 3-1.	Clear Zone Distances.....	3-15
Figure 3-2.	Temporary Shoring	3-41
Figure 3-3.	Required Clearances for Aerial Installations Near Bridge Structures.....	3-48
Figure 4-1.	Utility Coordination Process Flowchart*	4-7
Figure 4-2.	Utility Crossing Cost Responsibility Diagrams, Anchoring Appurtenances	4-22

Appendices

Appendix A.	Glossary
Appendix B.	Figures
Appendix C.	NCDOT Forms
Appendix D.	NCDOT and Related Memos
Appendix E.	Grading on Right of Way – Encroachment Fee Forms
Appendix F.	Horizontal Directional Drilling Requirements

Acronyms and Abbreviations

AASHTO	American Association of State Highway Transportation Officials
ADA	Americans with Disabilities Act
ANSI	American National Standards Institute
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
AUE	aerial utility easement
AWWA	American Water Works Association
C/A	controlled access
CFR	Code of Federal Regulations
DUE	drainage utility easement
FCC	Federal Communications Commission
FHWA	Federal Highway Administration
G.S.	General Statute
HDD	horizontal directional drilling
HDPE	high-density polyethylene
IEEE	Institute of Electrical and Electronics Engineers (creators of NESC)
LLC	Limited Liability Corporation
MASH	<i>AASHTO Manual for Assessing Safety Hardware</i>
MDPE	medium-density polyethylene
MPH	miles per hour
MUTCD	Manual on Uniform Traffic Control Devices
MUTCG	NC DOT Maintenance / Utility Traffic Control Guidelines
NC-	North Carolina Route
NC811	North Carolina 811
NC DOT	North Carolina Department of Transportation; also referred to as the Department
NCID	North Carolina Identity
NEC	<i>National Electrical Code</i>
NESC	<i>National Electrical Safety Code</i>
PE	Professional Engineer
PUE	permanent utility easement
PVC	polyvinyl chloride
R/W	right of way
SCTE	Society of Cable Telecommunications Engineers

SDR	standard dimension ratio
SR-	Secondary Road
STIP	State Transportation Improvement Program
SUE	subsurface utility engineering
TIP	Transportation Improvement Project
TUE	temporary utility easement
UAM	Utilities Accommodation Manual
US-	US Highway
USC	United States Code
WBS	work breakdown structure (project numbering that includes phasing and other categories)

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Section 1 Preamble

1.1 General

The North Carolina Department of Transportation (NCDOT or the Department) is responsible for maintaining the State-owned right of way under its jurisdiction as necessary to preserve the integrity, visual quality, operational safety, and function of the highway facility. The Department has authority to accommodate the use of utilities and non-utility facilities on highways. Because the location and manner in which facilities cross or otherwise occupy NCDOT right of way can materially affect the visual quality, safe operation, and maintenance of the highway, it is necessary that such use and occupancy be authorized and regulated.

The mission statement of the NCDOT Utilities Unit is to

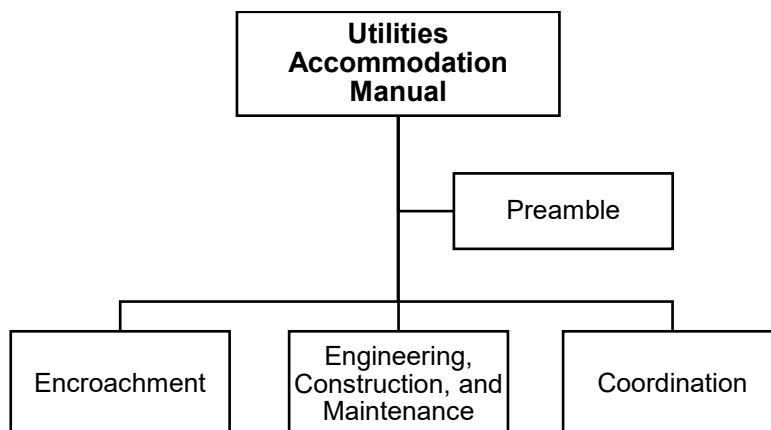
Facilitate and manage the relocation, adjustment, removal, and addition of utilities and non-utilities along NCDOT highways and rights of way while maintaining the integrity of the highway system and ensuring the safety of its users.

The Utilities Accommodation Manual (UAM) is a document through which NCDOT provides for the accommodation of utilities and non-utilities in State-maintained rights of way and that conforms to sound engineering principles. The demand for use of NCDOT rights of way has continued to increase over time. The presence of a utility within the right of way may significantly impact proposed highway construction if its facilities have to be relocated. The policies in this UAM were established in an effort to regulate NCDOT right of way use. These policies specify the conditions under which existing, proposed, adjusted, or relocated utilities and non-utilities may be accommodated. Although NCDOT strives to accommodate utility and non-utility facilities whenever possible, the authorized use and occupancy of NCDOT right of way for non-highway purposes is subordinate to the primary interests and safety of the traveling public.

The UAM further defines the policies and requirements for a utility or non-utility to occupy NCDOT right of way and stipulates the conditions under which existing, proposed, adjusted, or relocated utilities or non-utilities may be accommodated. The intent of these policies and procedures is to establish and administer reasonable uniform utility and non-utility accommodation practices in the interest of developing and preserving safe roadsides and minimizing possible interference with and impairment to structures and the visual quality, safe operation, and maintenance of highways within NCDOT-maintained rights of way.

The UAM includes this preamble and three additional sections—Encroachment; Engineering, Construction, and Maintenance; and Coordination—as shown in [Figure 1-1](#). These sections work in concert with each other. The accommodation policies are for use by the Department, utility companies, and encroaching parties in accommodating utilities and non-utilities on State-maintained rights of way.

Figure 1-1. Relationship of Utilities Accommodation Manual and Sections



1.1.1 Purpose

The purpose of the UAM is to:

- establish the process of getting permission for new facilities to encroach on the NCDOT maintained right of way for both utility and non-utility facilities;
- define the responsibility of the encroaching party and NCDOT in the approval process;
- establish the technical requirements and practices for design, construction, and maintenance of encroachments for protection of the right of way and safety of the motorist;
- define the review and approval process for utility relocations on NCDOT highway projects, including the responsibilities of the utility owner, whether encroaching or affected as a result of right of way acquisition, and the responsibilities of NCDOT to the utility owner.

The UAM is not intended to:

- impose technical requirements sufficient to meet industry standards or the requirements of regulating agencies;
- specify all technical requirements for non-utility or utility encroachments (Other standards may be required by the NCDOT reviewers.);
- establish processes for the relocation of non-utility facilities during an NCDOT highway project or the installation of new facilities by encroachment (These relocations and new installations are governed by additional guidelines in [Section 4](#), Coordination.).

1.1.2 How Utilities and Non-Utilities Occupy NCDOT Right of Way

Utilities and non-utilities come to occupy NCDOT right of way through one of the following:

- **Encroachment Agreement.** NCDOT gives permission for the use of NCDOT right of way for utility or non-utility purposes related to new installations in NCDOT right of way.
- **Right of way expansion.** NCDOT captures existing utilities and non-utilities when right of way is expanded by a construction project or a road is adopted for state maintenance.

1.1.3 Today's Encroachment is Tomorrow's Conflict

The importance of developing and adhering to policies for the accommodation of utilities and non-utilities in NCDOT rights of way is paramount because the encroachment approved today will create the potential conflict of tomorrow. All accommodations should consider the following factors:

- The accommodation must not adversely affect the safety, design, construction, operation, maintenance, or stability of the highway.
- The accommodation must not interfere with or impair the present use or future expansion of the highway.
- Any alternative location would be contrary to the public interest.

The demand for use of NCDOT right of way has continued to increase over time. The presence of a utility or non-utility within the right of way may significantly impact proposed highway construction if its facilities have to be relocated. Although NCDOT strives to accommodate utility and non-utility facilities whenever possible, the authorized use and occupancy of NCDOT right of way for non-highway purposes is subordinate to the primary interests and safety of the traveling public. In addition, NCDOT encourages collaboration, cooperation, and joint use among various utilities (and non-utilities where appropriate) to be placed within NCDOT right of way.

Exceptions to the accommodation policies may be approved at the discretion of the State Utilities Manager if the facilities or the work involved does not (1) create a hazard, (2) seriously disrupt traffic, or (3) have the potential to damage adjacent facilities.

NCDOT uses the regulations of the Federal Highway Administration (FHWA) under [23 Code of Federal Regulations \(CFR\) 645, Subpart B](#) for the accommodation of utilities within NCDOT right of way, except as otherwise noted in the policies in this UAM.

Issuance of an encroachment permit by NCDOT does not include approval of the design or inspection of the installation for compliance with state or federal regulations or industry standards. Compliance with standards not under the control of NCDOT is the sole responsibility of the encroaching party.

1.1.4 Encroachment Request within NCDOT-Owned Rail Corridors

Requests for encroachments that are within State-owned rail corridors are not covered by this UAM. For these encroachment requests, please contact the [NCDOT-Rail Division](#).

1.2 Definitions

The definitions in this section are critical to the understanding of the utility's or non-utility's occupation of NCDOT rights of way. Additional definitions are provided in the glossary in [Appendix A](#).

1.2.1 Forms of Property Ownership and Interest

NCDOT occupies strips of land, referred to as right of way, for the purposes of building, maintaining, and operating the transportation system, which includes highway, rail, and public transportation. The following are terms that define the legal ownership or interest that establishes the right to occupy or use the strips of land:

- **Right of way.** Right of way is a general term denoting land, property, or interest therein, devoted to transportation purposes.

- **Fee title (or fee simple).** A land interest owned in fee simple is owned completely, without any limitations or conditions. This type of unlimited estate is called [absolute](#). Generally, fee simple right of way is recorded in the county courthouse from either land purchased with Department funds or dedicated to the Department at no expense to the Department.
- **Easement.** An easement is a right, other than the acquisition of title, acquired to use or control property for a designated purpose. This applies to some right of way, often when passing through federal land, across railroads, and across utility-owned (fee simple) property.
- **Maintained limits.** This term applies when there is no deed or agreement to describe the right of way. The width is normally considered to be from back of ditch to back of ditch on either side of the roadway and includes ditches, back slopes, or any area that has been mowed or otherwise maintained by NCDOT.

1.2.2 Types of Right of Way Access Control

The different types of right of way access control for roads on the state highway system are briefly defined as follows; detailed definitions can be found in the [NCDOT Facility Type & Control of Access Definitions](#):

- **Fully controlled access.** Connections to a facility are provided only via ramps at interchanges. All cross-streets are grade-separated. No private driveway connections are allowed. Controlled access fence is typically present.
- **Limited controlled access.** Connections to a facility are provided via ramps at interchanges (major crossings) and at-grade intersections (minor crossings and service roads). No private driveway connections are allowed. Controlled access fence is typically present.
- **Partially controlled access.** Connections to a facility are provided via ramps at interchanges, at-grade intersections, and private driveways. Controlled access fence is typically present.
- **Non-controlled access.** Connections to a facility are provided via at-grade intersections and private driveways. No controlled access fence exists.

1.2.3 Digital Signature

Digital signature. A digital signature is a complex string of electronic data embedded in an electronic document for the purposes of verifying document integrity and signer identity. Acceptable methods must include use of encryption and certificates. Any vendor of digital signatures that meets the requirements of the [North Carolina Digital Signature Policy Guidelines](#) is acceptable. Whether the signature is actually an individual's scanned, uploaded or imported signature or just cursive font has no bearing on the acceptability of the signature. A digital signature by the facility owner and NCDOT personnel may be required for any agreement for new, adjusted, or relocated facility within NCDOT right of way.

1.2.4 Maintenance

By virtue of an installation by encroachment in NCDOT right of way, perpetual maintenance of the installed facility is required by the owner of the facility. Maintenance begins when construction is complete for encroachments installed in the right of way and a final inspection and acceptance of work is provided to an encroaching party after any applicable warranty period or when NCDOT accepts an installation for long-term maintenance.

See also Section 1.4 Utility Maintenance Activities and 2.1.2 Encroachment Agreements.

1.3 NCDOT Authority

The State Utilities Manager, under the direction of the Chief Engineer, will oversee the management, interpretation, execution, agreements, processes, and procedures for accomplishing the policies in this UAM. The State Utilities Manager will be responsible for obtaining concurrence on utility issues from FHWA, where required by FHWA policy, in accordance with [North Carolina General Statute \(G.S.\) §62-180](#).

1.3.1 Law

Utility occupations, relocations, and adjustments in NCDOT right of way are governed by various legal requirements. These requirements can be categorized as follows:

- **Statutes (North Carolina General Statutes).** Statutes often require the state or federal agency to establish rules and regulations to carry out the intent of the legislation. These rules and regulations are published in either the [North Carolina General Statutes](#) or, for federal agencies, the [Federal Register](#). The published and adopted rules are commonly referred to as administrative laws.
- **Administrative laws (North Carolina Administrative Code).** Administrative laws have the force and effect of law. The North Carolina Administrative Code contains the North Carolina administrative law. The [CFR](#) contains the federal government's administrative law. These codes form the basis for adjusting and accommodating utilities for NCDOT transportation projects. More information about these codes and laws may be found at <https://www.ncdot.gov/about-us/how-we-operate/policy-process/rules/Pages/resources.aspx>.

1.3.2 Policy

The declared objective of NCDOT is to implement the statutes and administrative law to accommodate utilities in NCDOT rights of way. These objectives are included in this UAM and other NCDOT manuals referenced herein. Collectively, the NCDOT manuals are used as a standard guide and basis for making decisions when utilities and non-utilities are accommodated in NCDOT rights of way.

1.3.3 Public Utilities vs. Private Utilities

The authority of NCDOT is derived from, and conforms with, the following statutes.

1.3.3.1 Utilities

For the purposes of this UAM, a utility is the pipes, lines, wires, appurtenances, equipment, and other built infrastructure necessary for the utility's operation, support, and protection, permitted by [G.S. §136-18](#) to occupy the highway rights of way with approval of NCDOT. An entity owning and operating a utility as defined herein may or may not be subject to regulation by the North Carolina Utilities Commission as defined in [G.S. §62-3\(23\)](#). Telecommunication providers are not typically regulated by the Utilities Commission, but rather by the Federal Communications Commission (FCC). Telecommunication providers function similar to other regulated utilities found in NCDOT rights of way. Therefore, telecommunication providers are treated as utilities for NCDOT purposes and are subject to using the same utility agreement forms as utility-regulated companies. Also included in this definition are non-utility owned or operated communications or data transmission infrastructure, authorized to occupy the right of way by [G.S. §136-18\(2\)c.2](#).

Additionally, NCDOT practice is to treat any drainage feature related to safe highway travel and maintenance as a non-utility. Therefore, drainage-related facilities are not considered utilities by NCDOT. Any work involving drainage by an encroaching party is subject to non-utility guidelines found in Section 2.3.2, Non-Utility Encroachment Agreements.

1.3.3.2 Public Utilities

Public utilities are utilities providing service to the public, serving at least 15 customers or intending to serve at least 15 customers, as defined in [G.S. §62-3\(23\)a.2.](#); utilities providing service to utilities that directly serve the public, such as electric power generation; pipelines that indirectly serve the public by transportation of consumer goods, such as petroleum products; or utilities owned by the State of North Carolina, or political subdivisions of the State of North Carolina, for the exclusive use of the owner. Public utilities may be publicly owned, investor-owned, or privately held. Public utilities are defined by use and not by ownership.

1.3.3.3 Private Utilities

Private utilities are all utilities not defined as public utilities. Private utilities typically are facilities serving a single user or an exclusive set of users. Utilities connecting facilities owned by a utility company that are for the exclusive use of the company and perform a business function are private utilities. For example, a fiber optic line connecting two buildings occupied by a telecommunications company carrying only interoffice communications is a private utility, while a fiber optic line owned by a water utility company carrying Supervisory Control and Data Acquisition control signals is part of the public utility facilities even if that fiber optic cable also carries interoffice data traffic. When a private utility requests a lateral or longitudinal installation within the public right of way, these encroachment requests will be handled on a case-by-case basis, and additional requirements for obtaining the Encroachment Agreement may be required.

1.3.3.4 Clearance of Subordinate Interests

It is the policy of NCDOT that “all interests which are adverse or detrimental to the interests of the Department of Transportation and to the purposes for which land or easement in land is being acquired should be eliminated from property being acquired” ([NCDOT Right of Way Manual](#), Chapter 11, Section 11.01). Any easement limiting maintenance or construction within NCDOT right of way or that might be interpreted as superseding encroachment review is detrimental to NCDOT’s interests. Under the authority of the [NCDOT Right of Way Manual](#), Chapter 11, Clearance of Subordinate Interests, Section 11.06, Public Utility Easements, all utility easements in right of way acquired by NCDOT will be extinguished by agreement with the utility occupying the easement. In exchange for relinquishing easement, utilities remaining in the right of way will be granted encroachment with prior rights, to be considered as the sole payment for the rights in the easement. If any conditions within the extinguished easement render the utility unsafe to remain in its existing location, the utility will be relocated according to the rules outlined in this UAM, Section 4.4.

When easements are extinguished by purchase, whether voluntary or by condemnation, NCDOT will allow encroachment in designated NCDOT utility easements or right of way.

NCDOT recognizes the grave safety concerns inherent with some utility facilities. If the utility has concerns about the safety of planned construction or any routine maintenance activity performed in the vicinity of their facilities, the utility will be considered in conflict and unsafe to remain in its existing location. The utility should make all adjustments necessary to make possible the safe

performance of routine maintenance activities, including drainage maintenance as described in [Section 4](#), Coordination.

Nothing in this section should be construed to relieve NCDOT of the duty to use sound engineering judgment and follow safety regulations in the performance of any construction or maintenance activity in the proximity of utility facilities.

Future use by utilities of all easements extinguished will be governed solely by General Statute and NCDOT policy, including this UAM.

1.3.4 Applicability of This Manual

This UAM applies to all public and private utilities. In addition, this UAM applies to all existing utility facilities relocated, replaced, retained, or adjusted in, and to new utility facilities installed in, NCDOT rights of way, including those needed for highway purposes (such as for lighting, rest areas, or weigh stations).

These policies apply to utility facility owners and operators, as well as to contractors working for these entities.

These policies apply to utility facilities located aboveground, at the surface, or underground, either singularly or in combination.

A utility must have a fully executed Encroachment Agreement before beginning work within the right of way under NCDOT's jurisdiction. At the discretion of the Division Engineer and the State Utilities Manager, performance and indemnity bonds or continuing indemnity bonds may be required from the Encroachment Agreement applicant. See [Connect NCDOT- Utilities](#) for the submission requirements and process.

1.3.5 NCDOT Permanent Utility Easement

A permanent utility easement (PUE) is an easement controlled by NCDOT to install, maintain, and accommodate aboveground or underground utilities. A PUE may be used by NCDOT for additional working area during construction of the highway project. The underlying fee owner(s) retain(s) the right to continue to use the permanent utility easement area(s) in any manner and for any purpose, including, but not limited to, access and parking, which is not inconsistent with the reasonable use and enjoyment of the easements by the Department of Transportation, its successors and assigns.

PUEs are subject to the provisions of [G.S. §136-18 and §136-19.5](#). See the [NCDOT Right of Way Manual](#), Chapter 7, for further information.

1.3.6 NCDOT Aerial Utility Easement

An aerial utility easement (AUE) is an easement controlled by NCDOT to accommodate the placement of utility poles and aboveground utility installations only. No buried parallel installations are allowed within this corridor. However, a buried service tap from the pole to serve the underlying property owner would be permitted. This type of installation for service would be between the underlying property owner and the utility company providing the requested service. The underlying fee owner(s) retain(s) the right to continue to use the permanent utility easement area(s) in any manner and for any purpose, including, but not limited to, access and parking, which is not inconsistent with the reasonable use and enjoyment of the easements by the Department of Transportation, its successors and assigns.

AUEs are subject to the requirements of [G.S. §136-19.5](#). See the [NCDOT Right of Way Manual](#), Chapter 7, for further information.

1.3.7 Non-Utility Facilities in NCDOT Right of Way

Any type of aboveground facility proposed within any NCDOT right of way must be approved through an Encroachment Agreement before installation. This includes aboveground non-utility facilities. See [Section 2](#), Encroachment, for further information.

1.3.8 Joint Jurisdiction

Joint jurisdiction occurs when two governmental agencies or departments have oversight of the same area of right of way, and the needs and the responsibilities of both are required. State-maintained roads are often within jurisdictional boundaries of municipalities. However, municipalities do not have the authority to reduce or lessen NCDOT's requirements for utility installations or other work performed under an approved encroachment application. Additionally, NCDOT approval of an encroachment application, by itself, may not be sufficient. It is the responsibility of the encroaching party to determine if approval is also required from a local government, state, or federal agency.

1.3.9 Joint Use Agreements

A joint use agreement allows two utilities that are both permitted to place poles in the right of way or NCDOT controlled easements to jointly use their poles. This is different from a pole attachment agreement, typically used by utilities not permitted to set their own poles (e.g., cable television).

1.3.10 North Carolina 811

[North Carolina 811](#) (NC811) is a non-profit organization funded by its member facilities whose mission is "to provide an efficient, affordable communication network service of the highest industry standards to contractors, utilities, and the general public for the purpose of requesting location of buried utilities prior to excavation activities in the interest of promoting job safety and damage prevention." NC811 can be reached by dialing 811 within North Carolina or its toll free number, 1-800-632-4949, from anywhere in the continental United States. NC811 does not mark utility lines but does provide an easy communication link between excavators and utility owners. The utility owner, or contractor as appropriate, shall notify NC811 before any excavation or demolition activities occur, in accordance with [G.S. §87, Article 8, Underground Damage Prevention](#) ([G.S. §87-115, Underground Utility Safety and Damage Prevention Act](#), or the most current applicable legislation). This requirement shall not relieve the utility owner from its obligation to notify NCDOT as required by the Encroachment Agreement and this UAM, [Section 3](#), Engineering, Construction, and Maintenance.

1.3.11 Abandonment

A utility is designated as placed out of service or abandoned when the utility owner is allowed to leave its facilities in place within NCDOT right of way after the facility is no longer active or used for a period of 6 months. This abandonment is allowed only by mutual agreement when immediate removal would cause greater disruption of the public's use of the facility than obstruction by allowing it to remain. The utility shall notify NCDOT in writing of the intention to abandon its facilities in place. Such abandoned installations within the right of way shall remain the responsibility of the utility or non-utility. Abandonment must follow the guidelines in [Section 3.6.15](#), Out-of-Service or Deactivated Utilities.

1.3.12 Right of Way Conveyances

When a right of way is conveyed to another entity, the utility or non-utility owner will be allowed to remain as governed by the [NCDOT Right of Way Manual](#).

1.4 Utility and Non-Utility Maintenance Activities

Utilities and Non-Utilities not owned or maintained by NCDOT within NCDOT right of way have a right and obligation to maintain their facilities. NCDOT must be notified by the facility owner prior to beginning any maintenance work activity in NCDOT right of way. The facility owner shall be responsible for safe and efficient traffic control. See Section 3.6.4, Traffic Control, for applicable requirements.

Additional requirements are placed on access to utility and non-utility facilities within controlled access right of way. See Section 2.4.11, Provision for Known or Planned Expansion of Facilities; Section 2.4.12, Utilities near Freeway and Other Controlled Access Facilities; and Section 3.3.3, Location and Alignment, for additional information.

For facility encroachments which retain long-term maintenance by an external owner, NCDOT may require a review of any proposed maintenance work to address any safety concerns which did not previously exist prior to any proposed maintenance activity. NCDOT must be notified a minimum of 3 days in advance of maintenance activity. The following examples are considered maintenance activity and distinctly different from situations warranting a new encroachment permit:

- Routine inspection (accompanied by any required inspection reports to NCDOT)
- Normal repair work (and when capacity of the facility and location remains effectively unchanged)
- Upgrading a utility to meet current regulatory requirements imposed on the facility owner such as:
 - New poles directly in line with an existing parallel overhead utility line with the same parallel distance from edge of pavement as an adjacent pole and specifically designed and installed to support existing aerial utility lines.
 - New guy support wires for an existing pole (installed outside Clear Zone or adequately behind guardrail or other permanent shielding).

For any proposed maintenance activity meeting the criteria above, NCDOT reserves the right to require maintenance to occur outside of peak travel hours affecting lanes closures and safety. Any prior rights from the existing utility will be conveyed to any new poles or guy wires installed to meet regulations. Any attachment to NCDOT structures does not convey prior rights. All maintenance activity is subject to appropriate traffic control according to the latest [Manual on Uniform Traffic Control Devices \(MUTCD\)](#) and [NCDOT Maintenance / Utility Traffic Control Guidelines \(MUTCG\)](#). More guidance regarding traffic control can be found in [Section 3, Engineering, Construction, and Maintenance](#).

The following non-exhaustive list of examples are NOT considered maintenance and require a new encroachment agreement with NCDOT:

- Adding capacity or any additional facilities regardless of any existing conduit, fiber-strand count, gage of wire, dimension of carrier pipe, etc.
- “Lighting” any existing dark fiber or installation of fiber in an existing empty conduit (e.g. new service by the same company or new service leased to a different company)

- Any new pole installed due to regulatory upgrade to current standard in a different location or requiring a guy support in a different location
- Relocation of existing utilities associated with NCDOT projects (Refer to Section 4 Coordination)
- Pavement cuts to replace or upgrade existing facilities under pavement

See also Section 2.1.2 Encroachment Agreements.

1.5 Emergency Work

Situations that could affect public safety, disrupt utility service, or damage the NCDOT right of way may develop suddenly and unexpectedly, and demand immediate action. In the event of major natural disasters, NCDOT will work with utilities to re-establish service as quickly as possible. In those situations, the utility shall proceed immediately with all necessary actions. When emergency repairs become necessary, written permission will not be necessary before beginning the needed repairs. The utility shall be responsible for safe and efficient traffic control and shall notify NCDOT of all actions as soon as practical.

1.6 Erosion and Sediment Control

Before beginning any utility work, the utility is responsible for following and complying with all local, state, and federal requirements regarding control of soil, erosion, and sedimentation. See Section 3.6.13, Restoration or Remediation of Disturbed Right of Way, regarding erosion and sediment control.

1.7 Median Installations

New utility installations shall not be allowed longitudinally within the median area. However, utilities serving the highway, such as irrigation, are allowed within the median area. On highways that do not have fully controlled access or limited control access, utilities that would be impractical to locate elsewhere are allowed within the median area and are subject to approval by the State Utilities Manager.

Existing utilities may be allowed to remain longitudinal within the median area of NCDOT right of way when impractical to relocate.

1.8 Work near Adjacent Transportation Facilities

When a utility owner is working near adjacent transportation facilities, including, but not limited to, airports, railroads, and ports, the utility shall be aware that the Encroachment Agreement requirements in these areas may be more restrictive. NCDOT is not obligated to represent or include the requirements of these adjacent transportation facilities.

1.9 Utility Acquisitions

One of the key objectives of the utility accommodation process is to maintain accurate records of the type, capacity, location, and ownership of each utility located in NCDOT right of way. Ownership changes have an effect on sureties, agreements, and data management and administration. When a utility undergoes a transfer of ownership or changes the name under which it will operate, NCDOT State Utilities Manager must be notified as soon as practical.

1.10 Utility Facilities Not Permitted in NCDOT Right of Way

Certain utility appurtenances and facilities will not be permitted within NCDOT right of way. For a complete list of prohibited appurtenances and facilities, see Sections 3.1.2.7 and 3.1.2.8.

1.11 Disputes

Utility and non-utility owners may appeal a denied accommodation request or document a disagreement with the accommodation policies only by submitting in writing at the District level the reasons why the accommodation should be granted. If the dispute cannot be resolved at the District level, it can be elevated to the Division level by the encroaching party.

If the utility or non-utility is not satisfied with the appeal decision, it may submit a written request through the original appeal channels for a review by the State Utilities Manager or review panel. The State Utilities Manager's decision is final.

1.12 Exceptions

Exceptions to the policies in this UAM may be allowed if the utility owner can demonstrate that extreme hardships or unusual conditions provide justification and where alternative measures can be provided to fulfill the intent of these policies. All requests for exceptions must be fully documented with design data and related information.

For each request for exception, the utility must clearly demonstrate the following:

- The accommodation will not adversely affect the safety, design, construction, operation, maintenance, or stability of the highway.
- The accommodation will not be constructed or serviced by direct access from the main lanes of a fully controlled access highway or connecting ramps to any fully controlled access highway.
- The accommodation will not interfere with or impair the present use or future expansion of the highway, and any alternative location would be contrary to the public interest, as demonstrated by an evaluation of the direct and indirect environmental and economic effects that would result from the disapproval of the proposed use of the right of way.

Requests for exceptions must include an evaluation of the direct and indirect design, environmental mitigation, safety, and economic effects that would result from the exception, and any other pertinent information. Exceptions shall be:

- requested by an authorized utility representative to the NCDOT District;
- recommended for approval by the NCDOT District;
- recommended for approval by the NCDOT Division;
- reviewed by FHWA and granted FHWA concurrence (if required);
- approved by the State Utilities Manager.

1.13 Corrective Measures

When NCDOT determines that an existing utility facility is a potential hazard or poses an unacceptable risk to the highway user, NCDOT shall initiate, in consultation with the affected utility, corrective measures to provide for a safer highway environment.

The corrective measures may include changes to the utility or highway facilities and will be prioritized to achieve the maximum safety benefit in the most cost-effective manner. Corrective measures must be a joint effort between the utility and NCDOT in identifying the problem areas and helping establish schedules for corrective measures. The schedule should take into consideration, wherever possible, both utility- and NCDOT-planned activities, upgrades, and replacements to create an orderly and effective process for safety improvements.

1.14 Enforcement

NCDOT shall enforce the policies in this UAM as provided by all cited State statutes and federal rules and regulations. Establishing good working relationships with utility owners based on coordination, cooperation, and communication helps facilitate this effort.

Enforcement may include, but is not limited to, the following:

- Suspension of utility field work
- Requesting that law enforcement have utility workers vacate the right of way
- Requiring the utility to pay the NCDOT restoration costs when the utility has begun work without an Encroachment Agreement
- Potential suspension of future Encroachment Agreements until past non-compliance is resolved

1.15 Standards and Source Documents

The policies in this UAM were developed in accordance with the following standards and source documents. Please be advised to always refer to the latest version of these standards and source documents.

1.15.1 United States Code Title 23

In United States Code (USC) Title 23, Highways, the following sections apply to utilities accommodation:

- [Section 103](#) – National Highway System
- [Section 109\(l\)\(1\) – Standards](#) [Pertaining to accommodation of utilities]
- [Section 111](#) – Agreements relating to use of and access to rights-of-way – Interstate System
- [Section 123](#) – Relocation of utility facilities

1.15.2 Code of Federal Regulations Title 23

In CFR Title 23, Highways, Part 645 pertains to utilities, as follows:

- [Part 645, Subpart A](#) – Utility Relocations, Adjustments, and Reimbursement
- [Part 645, Subpart B](#) – Accommodation of Utilities

1.15.3 North Carolina General Statutes

North Carolina General Statutes pertaining to utilities accommodation include the following:

- [G.S. §1-40](#) – Twenty years adverse possession

- [G.S. §62-180](#) – Use of railroads and public highways
- [G.S. §62-182.1](#) – Access to dedicated public right-of-way
- [G.S. Chapter 87, Article 8A](#) – Underground Utility Safety and Damage Prevention Act
- [G.S. Chapter 95, Article 19A](#) – Overhead High-Voltage Line Safety Act
- [G.S. §136-18](#) – Powers of Department of Transportation
- [G.S. §136-18\(2\)c](#) – Non-utility owned or operated communications or data transmission infrastructure
- [G.S. §136-19.5](#) – Utility right-of-way agreements [G.S. referring to Permanent Utility Easements]
- [G.S. §136-27](#) – Connection of highways with improved streets; pipelines and conduits; cost
- [G.S. §136-27.1](#) – Relocation of water and sewer lines of municipalities, nonprofit water or sewer corporations or associations, and local boards of education
- [G.S. §136-27.2](#) – Relocation of county-owned natural gas lines located on Department of Transportation right-of-way
- [G.S. §136-27.3](#) – Relocation of municipalities’ utilities by Department; repayment by municipalities
- [G.S. §136-93](#) – Openings, structures, pipes, trees, and issuance of permits
- [G.S. §136-93.1](#) – Express permit review program
- [G.S. §136-102.6](#) – Compliance of subdivision streets with minimum standards of the Board of Transportation required of developers
- [G.S. §153A-241](#) – Closing public roads or easements
- Chapter 189–201 – Supersurface Uses (provided in Appendix D)

1.15.4 North Carolina Administrative Code

In North Carolina Administrative Code, Title 19A – Transportation, Chapter 02 – Division of Highways, the following subchapters are applicable to utilities accommodation:

- [SubChapter 02B](#) – Highway Planning
- [SubChapter 02C](#) – Secondary Roads Section
- [SubChapter 02E](#) – Miscellaneous Operations

1.15.5 NCDOT Publications

The following NCDOT publications are relevant to utilities accommodation:

- [NCDOT Standard Specifications for Roads and Structures](#)
- [NCDOT Maintenance / Utility Traffic Control Guidelines](#)
- [NCDOT Roadway Design Manual](#)
- [NCDOT Roadway Standard Drawings](#)
- [NCDOT Right of Way Manual](#)

- [NCDOT Subdivision Roads Minimum Construction Standards](#)
- [NCDOT Location & Surveys Subsurface Utility Engineering Guidelines](#)
- [NCDOT Best Management Practices for Construction and Maintenance Activities](#)

1.15.6 Other Agencies and Codes

Other federal agencies and their codes that pertain to utilities accommodation are as follows:

- [FHWA Manual on Uniform Traffic Control Devices](#)
- [Federal Register of FCC](#)

1.15.7 Associations and Publications

Associations and their publications that are relevant to utilities accommodation include the following:

- American Association of State Highway and Transportation Officials (AASHTO)
 - *AASHTO LRFD Bridge Design Specifications* – [By Purchase](#)
 - *A Guide for Accommodating Utilities Within Highway Right-of-Way*
 - *A Policy on the Accommodation of Utilities Within Freeway Right-of-Way* – [By Purchase](#)
 - *Roadway Lighting Design Guide* – [By Purchase](#)
 - *Roadside Design Guide* – [By Purchase](#)
 - *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* – [By Purchase](#)
 - *A Policy on Geometric Design of Highways and Streets* – [By Purchase](#)
 - *Manual for Assessing Safety Hardware* – [By Purchase](#)
- American Society of Civil Engineers (ASCE)
 - *CI/ASCE 38-02, Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data* – [By Purchase](#)
- American National Standards Institute (ANSI) Illuminating Engineering Society
 - *The Lighting Handbook* – [By Purchase](#)
 - Recommended Practice 8-18 – [By Purchase](#)
- American Petroleum Institute (API)
 - [API Standards](#)
- American Water Works Association (AWWA)
 - [AWWA Standards](#)
- IEEE Standards Association
 - [National Electrical Safety Code \(NESC\)](#)
- National Fire Protection Association

- [*National Electrical Code \(NEC\)*](#)
- Society of Cable Telecommunications Engineers (SCTE)
 - [SCTE Standards](#)

Section 2 Encroachment

2.1 General

To comply with the North Carolina General Statutes and the North Carolina Board of Transportation policies, no utility or non-utility shall cross or otherwise occupy right of way of any road on the state highway system without issuance of an Encroachment Agreement by NCDOT. These roads include freeways and other controlled access highways, primary and secondary rural and urban highways, and roads and streets within municipalities that are on the State-maintained system.

When a utility or non-utility located within the maintained limits of right of way demonstrates the existence of that facility with prior rights to NCDOT maintenance, an Encroachment Agreement is not required. In this case, an approval to coordinate the relocation at the owner's request must be obtained in writing from the Division Engineer for that relocation. Otherwise, with the exception of routine maintenance, no utility or non-utility that has been placed in the right of way of any road on the state highway system shall be relocated or changed without issuance of an Encroachment Agreement by NCDOT. The removal or abandonment of any facility within NCDOT rights of way must be left in a condition that will not compromise the highway asset or cause an environmental issue.

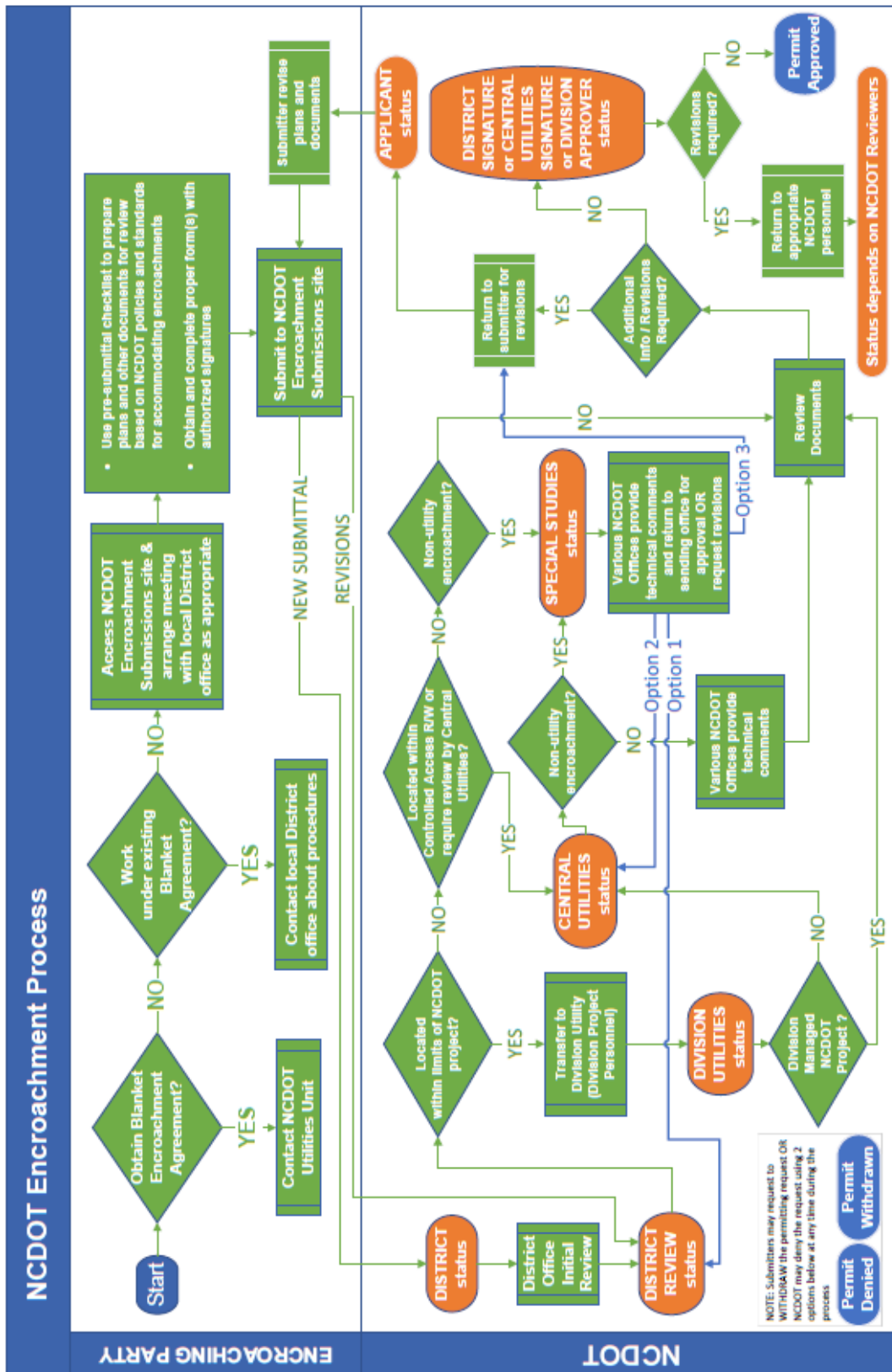
2.1.1 Purpose

The purpose of this section of the UAM is to establish submittal requirements and procedures to process Encroachment Agreements covering the use and occupancy within NCDOT right of way by utilities and non-utility facilities. It is intended to provide information and guidance to the following persons:

- NCDOT staff who participate in the review, execution, and acceptance of encroachment activities (Divisions, Districts, Utilities Unit, and other central Raleigh units)
- NCDOT project personnel (Division-managed, Design Build, and centrally managed project staff in various units)
- Utility and non-utility owners (including their engineers, consultants, and contractors) who design, submit, and construct the requested encroachments
- Attorneys for NCDOT, utility owners, or both, who prepare legal documents for property and easement transfers

Figure 2-1 shows the NCDOT encroachment process for a utility or non-utility Encroachment Agreement. The flowchart shows the general activities and sequence of steps carried out by the encroaching party (applicant) and NCDOT and defines the submittal process and the review and approval process for encroachment requests. See [Appendix B](#) for a large-format version of this figure.

Figure 2-1. NCDOT Encroachment Process



2.1.2 Encroachment Agreements

An Encroachment Agreement is required for the new installation of utilities and non-utility facilities within NCDOT right of way. Relative to utility encroachments, new installation shall also mean the relocation, expansion, or substantive change of existing aboveground and underground utility facilities within NCDOT right of way. Examples of changes that require a new Encroachment Agreement include changing the size or capacity of a facility or adding a single or multiple utility poles. Any upgrading of existing facilities for capacity, aesthetics, or current industry standards when the facility changes in function or nature shall require a new Encroachment Agreement, including, but not limited to, replacing wood poles with metal poles and adding additional fibers/cables or other capacity. If an empty conduit was previously installed, any new installation within the empty conduit shall require a new Encroachment Agreement. Replacement of any facility “in kind” shall be treated as a maintenance activity and shall not require a new Encroachment Agreement. Maintenance work “in kind” not requiring a new Encroachment Agreement means any work performed to maintain the currently installed facility without substantively changing the nature of the installation by its original capacity, location, engineering casing, or structural material. For example, replacing a 6-inch polyvinyl chloride (PVC) water line with another 6-inch PVC water line is considered in kind. However, the following examples could affect safety and have potential impacts on NCDOT right of way, and are NOT considered in kind from the original installation:

- Replacing a 4-inch line with a 6-inch line, which changes capacity
- Replacing a PVC pipe with a copper pipe, which changes material
- Replacing a wood pole with a metal pole, which changes material

Additionally, in some instances, NCDOT may have purchased utility easement adjacent to the right of way. In such cases, an Encroachment Agreement is also required for new installations of aboveground and underground utilities and non-utility facilities. It is the responsibility of the encroaching party or its representative to determine if any utility easement exists in the vicinity of the proposed installation.

2.1.3 Aboveground Facilities

Examples of aboveground utilities that require prior approval and an Encroachment Agreement for installation include, but are not limited to, the following:

- Utility poles, guy wires and supports, and overhead wires and cables for lighting, power electrical, and telecommunications
- Non-utility aerial installations such as pedestrian bridges not maintained by the State or awnings as overhangs onto right of way attached to buildings located off of right of way

2.1.4 Underground Facilities

Examples of underground facilities that require prior approval and an Encroachment Agreement for installation include, but are not limited to, the following:

- Pipelines for steam, raw water, finished water (potable), reclaimed water, sanitary sewer, force main, gas, petroleum, and oil
- Conduit, direct bury wires, and utility vaults for lighting and power electrical
- Conduit, direct bury lines, and utility vaults for telecommunications (that is, telephone, cable television, internet)

- Certain aboveground appurtenances associated with buried facilities (such as fire hydrants and markers)

2.1.5 Non-Utility Facilities

Non-utility facilities include both aboveground and underground installations and require prior approval and an Encroachment Agreement from NCDOT for installation.

Examples of aboveground non-utility facilities include, but are not limited to, the following:

- Private bridges
- Pedestrian structure crossings
- Golf cart or motor vehicle structure crossings
- Transit stop structures
- Roadside art (see [NCDOT Public Art on the Right of Way Policy](#))
- Canopies
- Fences
- Sidewalks
- Driveway entrances
- Items related to road construction (paving, grading, striping, signage, guardrails)

Examples of underground non-utility facilities include, but are not limited to, the following:

- Storm drainage
- Irrigation
- Monitoring wells
- Ditch and shoulder grading
- Pedestrian tunnels

2.2 Types of Control for Right of Way Access

Control of access to highways refers to limiting driveways and cross streets along the highway to allow higher speeds of traffic. Thus, the higher speed for a highway generally correlates to more restrictive access to the highway from at-grade driveways and/or cross streets. There are four types of right of way access control for roads on the state highway system, as follows:

- Fully controlled access
- Limited controlled access
- Partially controlled access
- Non-controlled access

Definitions for each type of right of way access control are provided in Section [1.2.2](#). Detailed definitions can be found in [NCDOT Facility Type & Control of Access Definitions](#).

2.3 Types of Encroachment Agreements and their Requirements

There are three general types of Encroachment Agreements: utility Encroachment Agreements, non-utility Encroachment Agreements, and Blanket Encroachment Agreements. In the following sections, the parties to the agreements, the requirements, and the applicable forms are discussed for each of type of agreement. While detailed below, general requirements for Encroachment Agreement forms are provided in Section 2.5.1, Encroachment Agreement Form Requirements.

2.3.1 Utility Encroachment Agreements

Utility Encroachment Agreements are intended for one-time use on individual utility installations, and not for “routine” installations that would be better covered by a Blanket Encroachment Agreement.

Utility Encroachment Agreements shall be used for requests involving utility facilities and their appurtenances as described in Section 2.1.3, Aboveground Facilities, and Section 2.1.4, Underground Facilities.

The guidelines for submittal of a utility Encroachment Agreement are covered in Section 2.5.5.

The review and approval process for a utility Encroachment Agreement is covered in Section 2.6.

2.3.1.1 Party Types

The Encroachment Agreement can be a two-party or three-party agreement. For utility Encroachment Agreements, NCDOT is the first party on the agreement. The following describes the party types and entities for each type of agreement.

Two-Party Agreement

In a two-party agreement, the second party is the facility owner or maintainer entering into the Encroachment Agreement with NCDOT. The second party to the agreement shall not be the contractor, consultant, or any party other than the facility owner or maintainer.

Three-Party Agreement

In a three-party agreement, the second party is:

- the intermediate owner or maintainer (commonly a developer) entering into the Encroachment Agreement with NCDOT;
- the intermediate owner or maintainer (commonly a developer) who, through municipal requirement or other agreement, is charged with the funding and installation of the subject facilities;
- responsible for ownership and maintenance of the facility until legally transferred to the third party by way of formal letter and notification to NCDOT;
- not the contractor or consultant.

In a three-party agreement, the third party is:

- the entity responsible for long-term ownership and future maintenance; and/or
- a municipality, county, authority (such as a county water authority), or utility owner.

2.3.1.2 Requirements and Provisions

Proper completion of the Encroachment Agreement form is essential to its timely processing. If Encroachment Agreement forms and the corresponding plans and supporting documents are not properly completed at the time of package submittal, the encroachment package may be returned to the applicant, and encroachment review will not begin until a properly completed Encroachment Agreement form is submitted. When an encroachment package has met NCDOT requirements in the review process, NCDOT will execute the agreement and provide a cover letter with provisions associated with the Encroachment Agreement contract and associated plans and supporting documents.

Guidance on Completing Utility Encroachment Agreement Forms

The following guidance should be used to complete each field on the Encroachment Agreement form.

Route

Each state road to be encroached upon should be listed by its state road number (e.g., US Highway 70 [US-70], North Carolina Route 55 [NC-55], Secondary Road 1287 [SR-1287]). Local road names (e.g., New Hope Road, Johnson Street) may be included in addition to the state road numbers for reference. If a road carries more than one route concurrently, additional state road numbers are appropriate to include.

Affected roadways should be listed first by roadway type (interstates, followed by US highways, then state highways, and finally secondary roads) and then numerically. This format should be used regardless of the alignment of the proposed utility. For example, an encroachment request involving NC-50, SR-1822, SR-1820, US-70, and I-440 should list these roadways in the Route field as follows: I-440, US-70, NC-50, SR-1820, SR-1822.

State road numbers and local road names can be found at [NCDOT State Maintained Network Map](#).

Project

If the encroachment being requested is located within the limits of an NCDOT project, the NCDOT project number should be placed in this field (e.g., U-2134, R-5631AB).

NCDOT project locations can be found using the [NCDOT GIS Online State Transportation Improvement Program Map](#). This online map may not display ALL current NCDOT projects.

This field should not be used to provide utility owner project numbers.

County

This field should indicate the county in which the encroachment is being requested.

If the proposed work involves multiple counties, a separate Encroachment Agreement should be completed for each county. It has been generally accepted that multiple counties may be included IF they are within the same District. This is generally a decision to be made by the District Engineer prior to the submittal of the encroachment package. The exception to this requirement is Blanket Encroachment Agreements, on which including multiple counties on one agreement is acceptable (see Section 2.3.3, Blanket Encroachment Agreements).

Agreement Date

This field is to be completed by NCDOT. Upon approval of the Encroachment Agreement, this field will show the official approval date of the agreement.

Project Description

The project description should include the following items:

- Length of installation, in feet
- Size (diameter) of utility, in inches
- Size (diameter) of encasement, in inches, if applicable
- Type of material
- Type of encasement material, if applicable
- Type of utility
- Installation method
- Type and number of utility structures (e.g., vaults, handholes, manholes, poles)

Examples of project descriptions are as follows:

- 917 feet of buried 2-inch standard dimension ratio (SDR) 11 high-density polyethylene (HDPE) conduit with fiber optic cable installed by horizontal directional drilling (HDD); 2 handholes
- 382 feet of buried 12-inch ductile iron pipe sewer line within 24-inch steel encasement pipe installed by bore and jack
- 522 feet of aerial 1/0 25kV electric cable installed on existing poles
- New 35-foot wooden pole with telecommunications equipment attached

Department of Transportation Signature

This field is to be completed by NCDOT upon approval of the Encroachment Agreement.

Facility Owner Signatures and SealsCorporations and Municipalities

When the facility owner is a corporation or a municipality, the following guidance applies:

- The Encroachment Agreement must have the corporate or municipal seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered city official is on file with the office of the State Utilities Manager.
- Requests by corporations or municipalities to waive the corporate or municipal seal and attestation from Encroachment Agreements should be made in writing to the State Utilities Manager. The request should include the names and titles/positions of the corporation or municipality for which the applicant is requesting to have signature authorization. The list of authorized names, when updated and acknowledged by the State Utilities Manager, is distributed to NCDOT staff. It is the responsibility of the facility owner's corporate office to update the list. The most recent list is available by contacting the State Utilities Manager.

Non-Corporations

When the facility owner is not a corporation, the signature must be witnessed by one person.

Limited Liability Corporations

When the facility owner is a Limited Liability Corporation (LLC), the agreement shall be executed by a manager of the LLC or an authorized signatory. In the space provided beneath the applicant's signature, the signer's title shall be identified in print as "Manager." The signature must be witnessed by one person. Corporate seals are not required of LLCs in North Carolina. The LLC may also request signature authorizations in writing to the State Utilities Manager from personnel other than the LLC manager.

Authorized Signatures

A senior- or executive-level employee of a corporation, municipality, or LLC shall be the only authorized person to sign and enter legal Encroachment Agreements with NCDOT except where a senior- or executive-level employee provides a list of names authorized to execute agreements on behalf of the encroaching company. This list must be submitted on company letterhead to the State Encroachment Engineer providing names, titles, and any contract company names as they apply. Once a letter of recognition of these names is provided to the encroaching party, it is distributed to all appropriate NCDOT offices which look for the names on this authorized list with submitted Encroachment Agreement forms. It is the responsibility of the Corporation, Municipality, or LLC to provide an updated list to the State Encroachment Engineer.

In each Encroachment Agreement, the space provided for signatures should include the following information in addition to the necessary signatures:

- The corporation or municipality name, if applicable
- The name(s) and title(s) of all persons signing the agreement, typed directly below each signature

2.3.1.3 Forms

The following forms (provided in [Appendix C](#)) shall be used for utility Encroachment Agreement requests:

- [R/W 16.1 - Encroachment Agreement for Utilities on Primary and Secondary Highways](#)

Form R/W 16.1 is a two-party Encroachment Agreement between NCDOT and the utility owner used for the installation of utility facilities within non-controlled of access rights of way.

Examples of appropriate use include a telecommunications company wishing to install fiber optic cable or a municipality wishing to install sanitary sewer.
- [R/W 16.2 - Encroachment Agreement for Utilities on Interstate and Other Controlled Access Highways](#)

Form R/W 16.2 is a two-party Encroachment Agreement between NCDOT and the utility owner used for the installation of utility facilities within controlled access rights of way.

An example of appropriate use includes a natural gas company wishing to install a gas line across an interstate highway.
- [R/W 16.6 - Three-Party Encroachment Agreement for Utilities and Non-Utilities on Primary and Secondary Highways](#)

Form R/W 16.6 is a three-party Encroachment Agreement between NCDOT (first party), the entity responsible for a facility's installation with short-term maintenance (second party), and the facility's owner and long-term maintainer (third party) used for the installation of utility and non-utility facilities within non-controlled access rights of way.

An example of appropriate use includes a developer who is required to extend a water line in the right of way as part of its development. The developer would be the second party on the agreement. The municipality that would ultimately own and maintain the water line upon its completion would be the third party on the agreement.

For three-party agreements, it is the responsibility of the second party to document the transfer of the maintenance of the encroachment to the third party and to provide the Division Engineer a copy of that transfer. It is recommended that prior to issuing a three-party Encroachment Agreement, the second party and the third party submit written documentation signed by the appropriate and respective authorities to describe the conditions and time associated with the transfer of the encroaching second party to the third party (long-term owner).

- [R/W 16.6A - Three-Party Encroachment Agreement for Utilities and Non-Utilities on Interstate and Controlled Access Highway](#)

Form R/W 16.6A is a three-party Encroachment Agreement between NCDOT (first party), the entity responsible for a facility's installation and short-term maintenance (second party), and the facility's owner and long-term maintainer (third party) used for the installation of utility or non-utility facilities within controlled access rights of way.

An example of appropriate use includes a developer who is required to extend a water line across interstate highway right of way as part of its development. The developer would be the second party on the agreement. The municipality that would ultimately own and maintain the water line upon its completion would be the third party on the agreement.

For three-party agreements, it is the responsibility of the second party to document the transfer of the maintenance of the encroachment to the third party and to provide the Division Engineer and the State Utilities Manager a copy of that transfer. It is recommended that prior to issuing a three-party Encroachment Agreement, the second party and the third party submit written documentation signed by the appropriate and respective authorities to describe the conditions and time associated with the transfer of the encroaching second party to the third party (long-term owner).

2.3.2 Non-Utility Encroachment Agreements

Non-utility Encroachment Agreements are intended for one-time use on individual non-utility installations. These agreements shall be used for requests involving non-utility facilities as described in Section 2.1.5.

The guidelines for submittal of a non-utility Encroachment Agreement are covered in Section 2.5.5.

The review and approval process for a non-utility Encroachment Agreement is covered in Section 2.6.

2.3.2.1 Party Types

The Encroachment Agreement can be a two-party or three-party agreement. For utility Encroachment Agreements, NCDOT is the first party on the agreement. The following describes the party types and entities for each type of agreement.

Two-Party Agreement

In a two-party agreement, the second party is the facility owner or maintainer entering into the Encroachment Agreement with NCDOT. The second party to the agreement shall not be the contractor, consultant, or any party other than the facility owner or maintainer.

Three-Party Agreement

In a three-party agreement, the second party is:

- the intermediate owner or maintainer (commonly a developer) entering into the Encroachment Agreement with NCDOT;
- the intermediate owner or maintainer (commonly a developer) who, through municipal requirement or other agreement, is charged with the funding and installation of the subject facilities;
- responsible for ownership and maintenance of the facility until legally transferred to the third party by way of formal letter and notification to NCDOT;
- not the contractor or consultant.

In a three-party agreement, the third party is:

- the entity responsible for long-term ownership and future maintenance; and/or
- a municipality, county, authority (such as a county water authority), or utility owner.

2.3.2.2 Requirements and Provisions

Proper completion of the Encroachment Agreement form is essential to its timely processing. If Encroachment Agreement forms and the corresponding plans and supporting documents are not properly completed at the time of package submittal, the encroachment package may be returned to the applicant, and encroachment review will not begin until a properly completed Encroachment Agreement form is submitted. When an encroachment package has met NCDOT requirements in the review process, NCDOT will execute the agreement and provide a cover letter with provisions associated with the Encroachment Agreement contract and associated plans and supporting documents.

Guidance on Completing Non-Utility Encroachment Agreement Forms

The following guidance should be used to complete each field on the Encroachment Agreement form.

Route

Each state road to be encroached upon should be listed by its state road number (e.g., US-70, NC-55, SR-1287). Local road names (e.g., New Hope Road, Johnson Street) may be included in addition to the state road numbers for reference. If a road carries more than one route concurrently, additional state road numbers are appropriate to include.

Affected roadways should be listed first by roadway type (interstates, followed by US highways, then state highways, and finally secondary roads) and then numerically. This format should be used regardless of the alignment of the proposed utility. For example, an encroachment request involving NC-50, SR-1822, SR-1820, US-70, and I-440 should list these roadways in the Route field as follows: I-440, US-70, NC-50, SR-1820, SR-1822.

State road numbers and local road names can be found at [NCDOT State Maintained Network Map](#).

Project

If the encroachment being requested is located within the limits of an NCDOT project, the NCDOT project number should be placed in this field (e.g., U-2134, R-5631AB).

NCDOT project locations can be found using the [NCDOT GIS Online State Transportation Improvement Program Map](#). This online map may not display ALL current NCDOT projects.

This field should not be used to provide utility owner project numbers.

County

This field should indicate the county in which the encroachment is being requested.

If the proposed work involves multiple counties, a separate Encroachment Agreement should be completed for each county. It has been generally accepted that multiple counties may be included IF they are within the same District. This is generally a decision to be made by the District Engineer prior to the submittal of the encroachment package. The exception to this requirement is Blanket Encroachment Agreements, on which including multiple counties on one agreement is acceptable (see Section 2.3.3, Blanket Encroachment Agreements).

Agreement Date

This field is to be completed by NCDOT. Upon approval of the Encroachment Agreement, this field will show the official approval date of the agreement.

Project Description

The project description should include the following items:

- Length of installation, in feet
- Width of non-utility, in inches or feet, as appropriate
- Type of material
- Type of non-utility
- Installation method
- Type and number of non-utility structures (e.g., fence posts, monitoring wells, sidewalks)

Examples of project descriptions are as follows:

- 917 feet of curb and gutter with pavement widening
- 382 feet of sidewalk
- 522 feet of fencing to replace existing controlled access fencing
- New storm drainage

Department of Transportation Signature

This field is to be completed by NCDOT upon approval of the Encroachment Agreement.

Facility Owner Signatures and Seals

Corporations and Municipalities

When the facility owner is a corporation or a municipality with a corporate or municipal seal, the following guidance applies:

- The Encroachment Agreement must have the corporate or municipal seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered city official is on file with the office of the State Utilities Manager.
- Requests by corporations or municipalities to waive the corporate or municipal seal and attestation from Encroachment Agreements should be made in writing to the State Utilities Manager. The request should include the names and titles/positions of the corporation or municipality for which the applicant is requesting to have signature authorization. The list of authorized names, when updated and acknowledged by the State Utilities Manager, is distributed to NCDOT staff. It is the responsibility of the facility owner's corporate office to update the list. The most recent list is available by contacting the State Utilities Manager.

Non-Corporations

When the facility owner is not a corporation, the signature must be witnessed by one person.

Limited Liability Corporations

When the facility owner is a Limited Liability Corporation (LLC), the agreement shall be executed by a manager of the LLC or an authorized signatory. In the space provided beneath the applicant's signature, the signer's title shall be identified in print as "Manager." The signature must be witnessed by one person. Corporate seals are not required of LLCs in North Carolina. The LLC may also request signature authorizations in writing to the State Utilities Manager from personnel other than the LLC manager.

Authorized Signatures

A senior- or executive-level employee of a corporation, municipality, or LLC shall be the only authorized person to sign and enter legal Encroachment Agreements with NCDOT except where a senior- or executive-level employee provides a list of names authorized to execute agreements on behalf of the encroaching company. This list must be submitted on company letterhead to the State Encroachment Engineer providing names, titles, and any contract company names as they apply. Once a letter of recognition of these names is provided to the encroaching party, it is distributed to all appropriate NCDOT offices which look for the names on this authorized list with submitted Encroachment Agreement forms. It is the responsibility of the Corporation, Municipality, or LLC to provide an updated list to the State Encroachment Engineer.

In each Encroachment Agreement, the space provided for signatures should include the following information in addition to the necessary signatures:

- The corporation or municipality name, if applicable
- The name(s) and title(s) of all persons signing the agreement, typed directly below each signature

2.3.2.3 Forms

The following forms (provided in [Appendix C](#)) shall be used for non-utility Encroachment Agreement requests:

- [R/W 16.1A - Encroachment Agreement for Non-Utility Facilities Not Related to Road Construction on Primary and Secondary Roads](#)

Form R/W 16.1A is a two-party Encroachment Agreement between NCDOT and a party wishing to construct a non-utility facility within non-controlled access right of way.

For this agreement to be used, the applicant, who wishes to construct the non-utility facility and is the second party on the agreement, is responsible for the installation and future maintenance of the facility in question.

The items covered under this Encroachment Agreement are not utilities and are not related to road construction. They include, but are not limited to, the following:

- Signs, such as those at the entrance to a subdivision (General advertising or signs for businesses are not allowed within NCDOT right of way.)
- Monitoring wells
- Irrigation systems
- Fence (This does not apply to the replacement of controlled access fence. Replacement of controlled access fence requires Form R/W 16.2.)
- Sidewalk (This is applicable when only sidewalk is being constructed and is not in conjunction with additional road construction. If sidewalk is being constructed in conjunction with additional road construction, it should be included with the other road work on Form R/W 16.1B.)
- Aerial pedestrian facilities over a highway

Examples of appropriate use include a homeowners' association wishing to install a new sign at the entrance of its subdivision or a company wishing to install monitoring wells on a contaminated site due to environmental requirements.

- [R/W 16.1B – Encroachment Agreement for Curb and Gutter, Pavement Widening and Storm Drainage \(Items Related to Road Construction\)](#)

Form R/W 16.1B is a two-party Encroachment Agreement between NCDOT and a party wishing to construct items related to road construction. This agreement is applicable to controlled and non-controlled access right of way.

For this agreement to be used, the applicant, who wishes to construct the non-utility facility and is the second party on the agreement, is responsible for only the installation of the facilities. NCDOT will ultimately own and maintain the facilities. The only exception to this is sidewalk, which will not be owned or maintained by NCDOT but is still covered under this agreement when installed in conjunction with other road construction.

The items covered under this Encroachment Agreement are not utilities and are related to road construction. They include, but are not limited to, the following:

- Pavement widening
- Curb and gutter
- Storm drainage
- Ditch and shoulder grading (when performed in conjunction with roadway work)

- Sidewalk (This is applicable when sidewalk is being constructed in conjunction with additional road construction. If only sidewalk is being constructed, it should be submitted on Form R/W 16.1A.)

Examples of appropriate use include a developer constructing a left-turn lane as a requirement of its new development or a municipality upgrading a storm drainage system involving state roads.

Installations made under this agreement (other than sidewalks) become the responsibility of NCDOT to own and maintain. The following should always be noted: “All right of way and easements necessary for construction and maintenance shall be dedicated to NCDOT, with proof of dedication furnished to the District Engineer prior to beginning work.”

- [R/W 16.1C – Two-Party Encroachment Agreement for Piping of Treated Effluent on Primary and Secondary Roads](#)

Form R/W 16.1C is a two-party Encroachment Agreement between NCDOT and a party wishing to convey treated effluent within NCDOT right of way.

This agreement is used for the installation of pipe for treated effluent to flow from a contaminated soil site to a discharge point approved by the North Carolina Department of Environmental Quality, formerly known as North Carolina Department of Environment and Natural Resources. To be considered for approval, the applicant must have and adhere to a remediation plan approved by the North Carolina Department of Environmental Quality as well as by NCDOT. The installation must also adhere to the Memorandum of Agreement between NCDOT and the North Carolina Department of Environment and Natural Resources dated January 25, 1999. See Appendix D.

For this agreement to be used, the encroaching party, who wishes to pipe the treated effluent and is the second party on the agreement, is responsible for the installation and future maintenance of the facility in question. Upon completion of the site remediation, the second party is responsible for the removal or abandonment of the installation as required by NCDOT and the North Carolina Department of Environmental Quality.

Installations are limited to primary and secondary roadways and are not allowed within controlled access rights of ways.

An example of appropriate use includes a service station required to treat and remediate soils contaminated by leaking fuel tanks and wishing to pipe the treated effluent from the remediation site to an approved discharge point.

- [R/W 16.7 – Grading or Alteration of Drainage – Interstate or Other Controlled Access Highways](#)

Form R/W 16.7 is a two-party Encroachment Agreement between NCDOT and a party wishing to grade and/or alter drainage within controlled access rights of way. If the work is being done in conjunction with additional road construction, a separate agreement for grading or alteration of drainage may not be required. This should be discussed with the applicable District Office for clarification.

For this agreement to be used, the applicant, who wishes to perform the work and is the second party on the agreement, is responsible only for installation. NCDOT will ultimately own and maintain the facilities in question.

A \$1,500 non-refundable processing fee is required with the submittal of this Encroachment Agreement. If the proposed grading removes dirt from the right of way, a per-cubic-yard fee is applied in addition to the processing fee, as follows:

- 0 to 1,000 cubic yards

Cut or fill in this quantity shall be handled and approved by the Division Engineer through the use of Form R/W 16.7. The cost shall be \$1.50 per cubic yard for excavated materials removed from the right of way. When approved, this cubic yardage removal fee shall be forwarded directly to the NCDOT Accounting Operations Office by the Division Engineer along with the \$1,500 processing fee for deposit. The Division Engineer is to provide the appropriate Maintenance work breakdown structure (WBS) number that will be credited according to the Division and County in which the grading occurs. The value of earth material and the administrative fee should be applied to the same Maintenance WBS number. Blank and example copies of the Encroachment Fee Form are provided in [Appendix E](#).

If the proposed work is denied, the cubic yardage removal fee will be returned to the applicant.

- 1,000 cubic yards and above

Cut and fill above 1,000 cubic yards shall be handled and approved by the State Utilities Manager. The procedure for handling shall be as follows:

1. Requests for alteration of fully controlled and partially controlled access rights of way shall be submitted to the Division Engineer, in writing, accompanied by a plan and/or a description in sufficient detail to easily determine the extent of the proposal.
2. If the request is not feasible or practical, the Division Engineer is authorized to deny the request.

If the Division Engineer considers the request to have merit, the Division Engineer shall have the applicant furnish the engineered plans and adequate cross-sections to show the alterations proposed. The applicant shall also include a schedule of work indicating the number of days necessary to complete the proposed alteration. The plans and cross-sections shall be referenced to highway stationing, intersecting roads, drainage structures, or other identifiable highway features. Transition grading is required at each end of the encroachment area to blend the encroachment grading into slope conditions on adjoining sections of right of way and must be shown on the plans. The plans and documents are subject to a submittal process like other encroachment requests. The Division Engineer will verify the volume in cubic yards of material to be removed from the right of way.

Grading shall conform to current North Carolina standard slopes or as close thereto as is possible within existing right of way. Necessary precautions shall be taken and grading methods shall be used that will minimize erosion, siltation, and pollution throughout the grading operations. Grass cover shall be established promptly after grading. The encroaching party shall submit erosion and traffic control plans where applicable.

3. It shall be the Division Engineer's responsibility to have the proposed alteration investigated by the Hydraulics Unit, Roadside Environmental Unit, or other

- Units of the Division of Highways deemed necessary prior to submission to the State Utilities Manager in the Raleigh office.
4. The Division Engineer shall verify the quantity of excavation to be removed from NCDOT right of way as shown in the plans and cross-sections. In the interest of uniformity of administration, a standard charge of \$1.50 per cubic yard for excavation removed from right of way plus a \$1,500 processing fee will be made. The Division Engineer shall advise and obtain the processing fee and excavation fee at the time the application is received. Payment shall be by cashier's or certified check; personal checks or cash shall not be accepted.
 5. The Division Engineer shall inform the applicant that a performance bond shall be posted to guarantee the restoration of the right of way. Bonds may be in the form of a corporate surety bond or may be certified or cashier's checks. Personal checks or cash shall not be accepted. The amount of the bond is to be determined by the Division Engineer and should be in an amount necessary for State Forces to completely restore the right of way.
 6. On locations where existing controlled access fencing is removed for grading, such fencing of equal quality must be restored by the applicant at no expense to NCDOT. On properties where no fencing has been erected by NCDOT, it shall be the responsibility of the Division Engineer to determine whether new fencing shall be required. In those cases where new fencing is required, same shall be installed at no expense to NCDOT.
 7. The Division Engineer will forward the following information to the State Utilities Manager: engineered plans, cross-sections, landscape and hydrographic reports, any supplemental information, the Encroachment Agreement form, and the Division Engineer's additional comments or recommendations.
 8. The State Encroachment Engineer will prepare the Encroachment Agreement, including all conditions, specifications, and special conditions imposed by the Division Engineer and Unit Heads.
 9. Upon approval of the executed Encroachment Agreement, a performance bond shall be submitted to and retained by the Division Engineer prior to authorization for construction. Bonds in the form of certified or cashier's checks shall be forwarded to the Accounts Receivable Unit. Monies for excavated materials shall also be forwarded to the State Utilities Manager along with the non-refundable \$1,500 processing fee. The Division Engineer is to provide the appropriate Maintenance WBS number that will be credited according to the Division and County in which the grading occurs. The value of earth material and the administrative fee should be applied to the same Maintenance WBS number. Blank and example copies of the Encroachment Fee Form are provided in [Appendix E](#).
 10. After execution by the State Utilities Manager, the encroachment approval will be uploaded to the online Permits system and copies provided electronically to the following:
 - Encroaching party
 - Division Engineer
 - District Engineer
 - FHWA

- State Maintenance Engineer
 - Municipality (if applicable)
11. The State Maintenance Engineer shall monitor each Encroachment Agreement to ensure that work is completed within the time limit prescribed in the agreement. If an Encroachment Agreement completion date has expired and the State Maintenance Engineer has not received notification that the work is completed, he/she shall contact the Division Engineer to determine the status of the work.
 12. If the applicant has not begun work under the terms of the Encroachment Agreement prior to the expiration of the time given to complete the project, the Division Engineer may rescind all rights of entry onto NCDOT right of way and declare the Encroachment Agreement null and void. If the applicant enters into the right of way and begins work under the terms of the Encroachment Agreement but fails to complete the work within the time allowed, then the applicant shall be given 30 days' written notice, with copy to surety company, to complete the work described in the Encroachment Agreement. If said work is not completed within 30 days after notice is given, the Division Engineer may complete the project or restore the right of way to their satisfaction and charge the applicant for the work done, plus 15 percent of the total cost for administrative expense. If the bill for this work is not paid within 30 days from receipt thereof, then written demand for payment shall be made on the party furnishing the performance bond.
 13. The Division Engineer shall have the authority to extend time limits if the encroaching party provides adequate justifications. If a time extension is approved, the State Maintenance Engineer and State Utilities Manager should immediately be notified. The Division Engineer shall also have the authority to rescind the Encroachment Agreement if the encroaching party has not begun work prior to the completion date and cannot provide adequate justification for a time extension.
 14. Upon completion of work, the Division Engineer shall have the completed work inspected for compliance with the approved Encroachment Agreement. The Division Engineer shall notify the State Maintenance Engineer so he or she can have a representative present during final inspection. Upon acceptance of completed work, the Division Engineer shall notify the State Utilities Manager and the encroaching party in writing, with copies to the State Maintenance Engineer and FHWA. The Division Engineer will release the bond following expiration of the 12-month warranty period as provided for in this UAM in Section 2.7.6, Bonding.

2.3.3 Blanket Encroachment Agreements

Blanket Encroachment Agreements apply to specific types of utility facilities and specific types of utility installation methods, and are best suited for utility owners who regularly perform routine installations within NCDOT right of way on a regional or statewide scale.

2.3.3.1 Requirements and Provisions

Requirements and provisions for the use of Blanket Encroachment Agreements include the following:

- A utility owner's original Blanket Encroachment Agreement must be approved by the State Utilities Manager or designated representative.
- Blanket Encroachment Agreements may be used on both primary and secondary highways. Blanket Encroachment Agreements will not, however, be allowed on fully, limited, or partially controlled access right of way (such as interstate highways), or allowed to install facilities within the limits of NCDOT programmed construction projects, also known as State Transportation Improvement Program (STIP) projects.
- If provisions required by Blanket Encroachment Agreements are not followed by the encroaching party, NCDOT may rescind the Blanket Encroachment Agreement and require the utility owner to submit individual utility Encroachment Agreements until further notice from NCDOT, at which time, a new Blanket Encroachment Agreement must be obtained.
- The guidelines for submitting a request to establish a Blanket Encroachment Agreement are covered in Section 2.5.6, and the guidelines for submitting a request to work under an existing Blanket Encroachment Agreement are covered in Section 2.5.7.
- The review and approval process for establishing a Blanket Encroachment Agreement and for requesting to work under an existing Blanket Encroachment Agreement are covered in Section 2.6.

2.3.3.2 Forms

The following forms (provided in [Appendix C](#)) shall be used for Blanket Encroachment Agreement requests:

- [R/W 16.3 - Blanket Encroachment Agreement for Plowed-In Telephone Cable on Primary and Secondary Roads](#)

Form R/W 16.3 is a two-party agreement between NCDOT and a utility owner used specifically for routine telecommunication installations using the plowing method.

The following work cannot be performed under this agreement:

- HDD, also known as directional bore, or any type of trenchless installation
- Boring greater than 6 inches in diameter
- Construction within fully, limited, or partially controlled access right of way
- Construction within the limits of a STIP highway or rail project already under contract for construction or within 12 months of the scheduled let date if the encroaching party's construction cannot be completed prior to the highway project let date. If the encroaching party can complete construction prior to the NCDOT project let date and can guarantee that the location will not create a utility conflict for the NCDOT project, then an exception may be granted at the discretion of the NCDOT Utility Coordinator. If the utility construction is not complete prior to NCDOT project letting, the facility in question is subject to ceasing and perhaps removing any or all facilities associated with the encroachment at no cost to NCDOT and at the discretion of the Division Engineer. See [Section 4](#), Coordination, for more detail.
- Cutting of pavement for service taps across the roadway
- Cutting of pavement for shallow trenching
- Attachments to highway structures (bridges, culverts, etc.)
- Disturbance of highway drainage pipes and culverts

- [R/W 16.3A – Blanket Encroachment Agreement for Telecommunications Cable Installed by Trenching on Primary and Secondary Roads](#)

Form R/W 16.3A is a two-party agreement between NCDOT and a utility owner used specifically for routine telecommunication installations using the trenching method.

The following work cannot be performed under this agreement:

- HDD, also known as directional bore, or any type of trenchless installation.
 - Trenches greater than 12 inches in width.
 - Construction within fully, limited, or partially controlled access right of way.
 - Construction within the limits of a STIP highway or rail project already under contract for construction or within 12 months of the scheduled let date if the encroaching party's construction cannot be completed prior to the highway project let date. If the encroaching party can complete construction prior to the NCDOT project let date and can guarantee that the location will not create a utility conflict for the NCDOT project, then an exception may be granted at the discretion of the NCDOT Utility Coordinator. If the utility construction is not complete prior to NCDOT project letting, the facility in question is subject to ceasing and perhaps removing any or all facilities associated with the encroachment at no cost to NCDOT and at the discretion of the Division Engineer. See [Section 4](#), Coordination, for more detail.
 - Cutting of pavement for service taps across the roadway.
 - Cutting of pavement for shallow trenching.
 - Attachments to highway structures (bridges, culverts, etc.).
 - Disturbance of highway drainage pipes and culverts.
- [R/W 16.4 - Blanket Encroachment Agreement for Cablevision on Primary and Secondary Roads](#)

Form R/W 16.4 is a two-party agreement between NCDOT and a utility owner used specifically for routine cable television installations by plowing.

The following work cannot be performed under this agreement:

- HDD, also known as directional bore, or any type of trenchless installation.
- Boring greater than 6 inches in diameter.
- Construction within fully, limited, or partially controlled access right of way.
- Setting of utility poles within NCDOT right of way (Aerial installations are limited to attachments to existing poles or poles installed outside of NCDOT right of way.).
- Construction within the limits of a STIP highway or rail project already under contract for construction or within 12 months of the scheduled let date if the encroaching party's construction cannot be completed prior to the highway project let date. If the encroaching party can complete construction prior to the NCDOT project let date and can guarantee that the location will not create a utility conflict for the NCDOT project, then an exception may be granted at the discretion of the NCDOT Utility Coordinator. If the utility construction is not complete prior to NCDOT project letting, the facility in question is subject to ceasing and perhaps removing any or all facilities associated with the encroachment at no cost to NCDOT and at the discretion of the Division Engineer. See [Section 4](#), Coordination, for more detail.

- Cutting of pavement for service taps across the roadway.
- Attachments to highway structures (bridges, culverts, etc.).
- Disturbance of highway drainage pipes and culverts.
- [R/W 16.5 - Blanket Encroachment Agreement for Underground Utility Service Connections on Primary and Secondary Roads](#)

Form R/W 16.5 is a two-party agreement between NCDOT and a utility owner used specifically for routine utility service connections to customers on non-NCDOT property adjacent to the right of way.

Minor longitudinal installations associated with the service connections are allowed under this agreement. Road crossings by the method of driving, jacking, or boring holes up to 6 inches in diameter will be allowed. These limited longitudinal installations must be plowed in and shall not exceed 500 linear feet in length.

Plowing will be permitted across unpaved roads.

Bores in excess of 6 inches in diameter and road crossings by the HDD method will require an Encroachment Agreement approved by the Division Engineer.

Underground utility service connections may be approved under individual utility Encroachment Agreements. However, to reduce the number of Encroachment Agreements, and in the interest of time, underground service connections may cross or otherwise occupy NCDOT right of way, except controlled access highways, on the basis of a Blanket Encroachment Agreement.

The following work cannot be performed under this agreement:

- HDD, also known as directional bore.
- Longitudinal installations requiring open-cut or trenching greater than 500 feet.
- Trenching across paved and unpaved roads.
- Boring greater than 6 inches in diameter.
- Trenchless installation with less than 3 feet of cover.
- Construction within fully, limited, or partially controlled access right of way.
- Setting of utility poles within NCDOT right of way (Aerial installations are limited to attachments to existing poles or poles installed outside of NCDOT right of way.).
- Construction within the limits of a STIP highway or rail project already under contract for construction or within 12 months of the scheduled let date if the encroaching party's construction cannot be completed prior to the highway project let date. If the encroaching party can complete construction prior to the NCDOT project let date and can guarantee that the location will not create a utility conflict for the NCDOT project, then an exception may be granted at the discretion of the NCDOT Utility Coordinator. If the utility construction is not complete prior to NCDOT project letting, the facility in question is subject to ceasing and perhaps removing any or all facilities associated with the encroachment at no cost to NCDOT and at the discretion of the Division Engineer. See [Section 4](#), Coordination, for more detail.
- Cutting of pavement for service taps across the roadway (Shoulders stabilized with bituminous material or crushed stone will be considered as pavement.).

- Attachments to highway structures, bridges, or culverts.
- Disturbance of highway drainage pipes and culverts.

Once the initial Blanket Encroachment Agreement has been properly executed by NCDOT, underground service taps performed under this agreement do not require prior NCDOT notification or approval so long as there is strict compliance with the special provisions of the agreement.

Underground service connections must emanate from a distribution line, feeder line, or main line outside NCDOT right of way or from an existing distribution, feeder, or main line occupying right of way by virtue of an approved Encroachment Agreement. If the service connection is to be owned and installed by any person or firm other than the owner or owner's agent of the distribution, feeder, or main line, a utility Encroachment Agreement shall be secured.

A Blanket Encroachment Agreement will apply to all highways except controlled access highways. All service connections on controlled access highways shall be approved by the State Utilities Manager under an individual utility Encroachment Agreement.

Traffic control devices and warning signs shall be displayed in accordance with the [Manual on Uniform Traffic Control Devices \(MUTCD\)](#) and [NCDOT Maintenance / Utility Traffic Control Guidelines \(MUTCG\)](#). More guidance regarding traffic control can be found in [Section 3](#), Engineering, Construction, and Maintenance.

- [R/W 16.5A - Blanket Encroachment Agreement for Aerial Utility Crossings and Taps on Primary and Secondary Roads](#)

Form R/W 16.5A is a two-party agreement between NCDOT and a utility owner used specifically for routine aerial utility crossings and taps.

For this agreement to be used, the applicant, who is the utility owner and the second party on the agreement, is responsible for the installation and future maintenance of the facility in question.

Overhead crossings of NCDOT right of way, such as power, telephone, and cablevision, regardless of voltage or carrying capacity, may be authorized by Blanket Encroachment Agreement on all highways open to traffic except controlled access highways.

The following work cannot be performed under this agreement:

- Construction within fully, limited, or partially controlled access right of way.
- Setting of new utility poles within NCDOT right of- way (Aerial installations are limited to attachments to existing poles or poles installed outside of NCDOT right of way.).
- Construction within the limits of a STIP highway or rail project already under contract for construction or within 12 months of the scheduled let date if the encroaching party's construction cannot be completed prior to the highway project let date. If the encroaching party can complete construction prior to the NCDOT project let date and can guarantee that the location will not create a utility conflict for the NCDOT project, then an exception may be granted at the discretion of the NCDOT Utility Coordinator. If the utility construction is not complete prior to NCDOT project letting, the facility in question is subject to ceasing and perhaps removing any or all facilities associated with the encroachment at no cost to NCDOT and at the discretion of the Division Engineer. See [Section 4](#), Coordination, for more detail.

Once the initial Blanket Encroachment Agreement has been properly executed by NCDOT, aerial utility crossings and taps performed under this agreement do not require prior NCDOT notification or approval so long as there is strict compliance with the special provisions of the agreement. The exception to this is the installation of temporary supports, which require prior approval by NCDOT.

While it is the intent of NCDOT to simplify service connection and aerial crossing procedures, the Division Engineer or designated representative reserves the right to require a utility Encroachment Agreement on any service connection where there may be unusual circumstances or where, in their opinion, they deem it necessary.

A Blanket Encroachment Agreement will apply on all highways except controlled access highways. All service connections on controlled access highways shall be approved by the State Utilities Manager under a utility Encroachment Agreement.

Temporary supports may be installed under a Blanket Encroachment Agreement for road crossings; however, the Division Engineer or designated representative shall approve the location of same.

The Division Engineer or designated representative shall be given prior notice before any temporary supports are installed within NCDOT right of way. This prior notice need not necessarily be in writing. Details shall be resolved as to location, traffic control devices, time of installation, and time of removal.

If a service connection crossing or tap is to be owned and installed by any person or firm other than the owner, or owner's agent, of the distribution, feeder, or main line, a utility Encroachment Agreement shall be secured.

2.4 Pre-Submittal Considerations

Where installations are proposed by the utility owner, a pre-submittal may be required before the proposed installations are considered for approval. The pre-submittal should include plans and other information as to the maintenance of traffic, traffic control devices, and controls and construction methods to be employed. These measures are to ensure the necessary protection of the encroaching facility and the integrity of the highway facility.

Where installations are proposed for attachments to structures, justification shall be provided to warrant consideration of this request, and a justification package of the attachment from the State Utilities Manager must be obtained prior to the formal encroachment submittal. See Section 3.5.1, Utilities Attached to Structure, for more information.

The information contained in this section should be considered prior to the submittal of the encroachment request. When applicable, items below may require additional information to be submitted, prompt a change in design or construction approach, necessitate additional NCDOT review, and extend NCDOT review time.

2.4.1 Encroachment Request for Street Lighting

Because of the varying illumination intensities and uniformity ratios required on the different functional classifications of roadways throughout the state, the encroaching party must submit a request for classification prior to submitting the encroachment request for street lighting to NCDOT. The request for classification ensures that encroachment requests for roadway lighting designed by the encroaching party meet minimum AASHTO requirements.

The request for classification shall be made by email to LightingElectrical@ncdot.gov. The request for classification shall include the limits of the proposed encroachment and a vicinity map. The vicinity map shall include road numbers (e.g., Interstate, US Route, North Carolina Route, Secondary Road) and road or street names, and shall be large enough for someone unfamiliar with the area to be able to locate the proposed encroachment location and extent of installation. For NCDOT to provide an accurate roadway classification, the encroaching party shall also include any information pertaining to known land use development in the area of the encroachment request.

The roadway classification provided by NCDOT to the encroaching party shall include the minimum average maintained foot-candle level on the pavement surface, the average to minimum uniformity ratio, an area classification describing land use, the posted speed limit, veiling luminance ratio, and the average daily traffic count, when available.

Classifications are valid for a period of 1 year from the date of issuance, after which the encroaching party must request an updated classification prior to submitting the encroachment request.

2.4.2 Coordination among Utility Owners using NCDOT Right of Way

In addition to coordination with NCDOT, the utility owner(s) are responsible for coordinating with one another when more than one utility desires to use the same right of way. Such coordination is to ensure that all utility facilities will be placed in such a way as to adhere to appropriate regulations and to avoid interference with each other during construction, normal use, and maintenance.

When applications for encroachments are submitted to NCDOT for approval, it shall be the responsibility of the encroaching party to determine what, if any, facilities of others are in existence in the encroachment area.

Plans attached to Encroachment Agreements shall show, as accurately as possible, the location of other facilities that may pose installation conflicts or be unearthed, moved, or exposed to potential damage. The encroaching party shall be responsible for providing protection and safeguards during construction to prevent damage of existing facilities and to ensure that existing facilities will not be rendered inaccessible.

2.4.3 No Guarantee of Right of Way

NCDOT does not guarantee the right of way in which the encroaching party desires to place utility facilities. It is the facility owner's responsibility to do adequate property research to confirm the nature and extent to which right of way exists.

NCDOT will not be responsible for any claim for damages brought about by any property owner by reason of an encroaching party's installation.

2.4.4 Installations Spanning Multiple Counties

In cases where work spans multiple counties, separate Encroachment Agreements shall be completed for each county. This reduces complications caused by a single encroachment involving the jurisdiction of multiple Divisions or multiple Districts.

The exception to this requirement is Blanket Encroachment Agreements, which may include multiple counties on one agreement.

2.4.5 Single Encroachment with Numerous Facilities

Generally speaking, there is no limit to the amount of facilities that can be installed with a single Encroachment Agreement. When considering numerous facilities on a single encroachment request, applicants should be advised that NCDOT is very rarely in favor of partial approval of encroachment requests. Numerous facilities on a single encroachment request increases the likelihood that issues with one portion of the request will delay approval of another portion of the request. Encroaching parties should be aware of the effect these delays may have on construction schedules and service commitments.

2.4.6 Encroachments Involving Major Deployment of Facilities

For encroachments involving small cell telecommunication deployment or major projects by a facility owner (e.g., cross-country pipeline crossing multiple counties), applicants are encouraged to meet with local District Engineer's office personnel and the State Utilities Manager or designated representative as appropriate to address any concerns and review preliminary plans prior to submittal of the Encroachment Agreement. These such preliminary meetings should focus on what concerns arise for NCDOT review personnel regarding the proposed installation and should promote collaboration with all personnel involved in addressing procedures for encroachment approval to facilitate an expeditious review. Such meetings discourage delays in encroachment approval caused by multiple revisions stemming from minimum requirements not being satisfied as outlined in this UAM.

2.4.7 Emergency Encroachment Approval

Inevitably, there is a need to work in the right of way to repair a pipeline break or leak, or to replace damaged or failed electrical or communications equipment. An Encroachment Agreement gives the utility owner the right and obligation to repair its facilities. Sometimes, an emergency situation occurs (typically following a declared disaster) and necessitates a new location within the same proximity of existing facilities to restore service. A new Encroachment Agreement would not be required UNLESS a new location or method is required for an installation to remain operational for an extended time. In instances where a temporary installation is required while the existing facility is being repaired, the Division Engineer may decide whether or not to require an Encroachment Agreement for the temporary installation. When these situations arise, the utility owner shall contact the NCDOT Division or District Office at the earliest possibility, depending on when the emergency repair occurs relative to NCDOT standard business hours, to obtain an emergency encroachment approval.

If the emergency work involves lane closures, all traffic control measures apply as indicated in normal encroachments. If emergency work involves attachment to an NCDOT structure, justification must be obtained from the State Utilities Manager.

2.4.8 Installations that Involve Both Controlled Access and Non-Controlled Access Right of Way

Encroachment installations inside of controlled access right of way require different Encroachment Agreements than installations outside of controlled access right of way. When proposed installations encroach into both controlled access and non-controlled access rights of way, two separate Encroachment Agreement forms should be submitted. Only the portion within the controlled access right of way should be submitted as associated with the controlled access Encroachment Agreement form. The associated plans and Encroachment Agreement form should coincide, and applicants should avoid submitting an entire set of plans involving installation along non-controlled access if the proposed encroachment is located along a controlled access

highway. However, reference to the larger extent of the separate submittal should be available (e.g., an entire project plan cover sheet) with the submittal.

2.4.9 Proposed Attachment to Highway Structures

NCDOT highly discourages attachments to highway structures. NCDOT requirements for attachment to highway structures can be found in Section 3.5.1, Utilities Attached to Structure.

Justification for attachments must be submitted to the State Utilities Manager for consideration. Pre-approval from the State Utilities Manager must be obtained prior to submitting the formal Encroachment Agreement form and fully engineered plans. When attachment is pre-approved, the pre-approval letter from the State Utilities Manager must also be submitted with the encroachment documents. These encroachment requests should be submitted directly to the State Encroachment Engineer.

Information regarding the submittal and the review and approval of proposed attachments can be found in Section 2.6. For technical content and design criteria, see Section 3.5.1, Utilities Attached to Structure.

2.4.10 Joint Use of NCDOT Signal Poles

If joint use of NCDOT traffic signal poles or other traffic-related poles is requested, the Division Traffic Engineer shall be contacted to obtain approval in writing for the installation prior to submittal of the Encroachment Agreement form. If the traffic pole is located within controlled access right of way, approval by the State Utilities Manager is also required.

2.4.11 Provision for Known or Planned Expansion of Facilities

On new installations or adjustments of existing utility lines, provision should be made for known or planned expansion of the utility facilities, particularly those attached to highway structures or located underground. They should be planned so as to minimize hazards and interference with highway traffic when additional overhead or underground lines are installed at some future date. More information regarding this topic can be found in Section 3.3, Aboveground Utilities, and Section 3.5, Utilities on or near Highway Structures.

2.4.12 Utilities near Freeway and Other Controlled Access Facilities

Utilities shall be located and designed in such a manner that they can be constructed or serviced without direct access from the fully controlled access through-traffic roadways or connecting ramps.

While temporary construction access from the controlled access facility is discouraged, NCDOT acknowledges that this temporary access is at times necessary to install utility facilities. The approval of temporary construction access from a controlled access facility will be handled on a case-by-case basis.

Perpetual maintenance access from the fully controlled access facility will not be allowed.

For limited and partially controlled access highways, similar principles apply, but must be approved for installation by the State Utilities Manager.

2.4.13 Temporary Shoring Requirements

For certain excavations, a standard trench box may be required to protect workers, but is not an approved shoring device. In instances where temporary shoring is required, an engineered design

for this temporary shoring must be submitted to and approved by NCDOT prior to the beginning of the subject excavation. Further information regarding temporary shoring requirements can be found in Section 3.4.13.

2.4.14 Encroachments within NCDOT Project Limits

Encroachment requests within NCDOT STIP project limits will require approval from either the Utilities Unit or the NCDOT Utility Coordinator for the STIP project.

A STIP project encompasses the following project phases:

- Planning
- Design
- Construction

The requirements for encroachment requests will depend on the project development phase of the STIP project. The District Engineer's office should determine the project development phase and associated personnel assigned to handle encroachments. If the project is in the planning phase, then the Utilities Unit will ascertain this information and provide the review and approval for centrally managed projects, and Division Project personnel will ascertain this information and provide the review and approval for Division managed projects. The District Engineer's office should transfer the encroachment involving a STIP project to the appropriate office for further handling. If enough information on plans is available during the design phase or if the project is under construction, then the encroachment is subject to further criteria and more rigorous details to be submitted. See Section 4.5.1, Types of Agreements, for more detail.

When an encroachment falls within the limits of a STIP project, the encroaching party may be required to submit separate encroachment requests for the portion of the encroachment within the STIP project and the portion of the encroachment outside of the STIP project because the review process differs for each and may require additional review time. Due to the developing nature of highway project design and construction, the encroachment request for the portion within the STIP project may be denied or delayed depending on the stage of the highway project. In some cases, encroachment may not be allowed until the STIP project is complete or accepted by the Department. To mitigate delays, encroachers have the option to resubmit the encroachment request for review at a later date or withdraw the encroachment request to find alternative solutions for installation along other routes.

Encroachment requests to install new facilities within the limits of a highway project that has been awarded to a highway contractor require a hold harmless letter before the encroachment request can be approved. The hold harmless letter releases the Department from any delay claims caused by the encroaching party as a result of the new facility installation.

- The hold harmless letter is issued by the highway contractor to the NCDOT. The hold harmless arrangement is between the highway contractor and the Department, not between the contractor and the encroacher.
- The hold harmless letter should be on the highway contractor's letterhead.
- It is the encroacher's responsibility to coordinate with the highway contractor to obtain the hold harmless letter.
- The highway contractor is not obligated to issue a hold harmless letter. The Department is not obligated to require the highway contractor to issue a hold harmless letter.

- If the highway contractor declines to issue a hold harmless letter, the encroachment request will not be approved. The encroaching party is encouraged to investigate installation alternatives outside of the highway project limits or to wait until the project has been completed to re-apply.

The hold harmless letter is not required for facilities that are being relocated as part of the highway project. It is only required for new installation requests within the project limits. Occasionally, the highway contractor will discover existing utility facilities within the limits of the project that were not captured during the project's utility coordination efforts (i.e. not included in the Utilities by Others (UBO) plans). Existing utilities discovered in this fashion do not require a hold harmless letter in order to be relocated.

2.4.15 Utilities on Subdivision Roads

A subdivision road is one that serves a parcel or tract of land that is subdivided into two or more lots, building sites or other divisions for sale or building development for residential purposes where such subdivisions include a new road or change in an existing road. A complete definition of subdivision roads can be found in the [NCDOT Subdivision Roads Minimum Construction Standards](#).

Utility requirements for subdivision roads are as follows:

- No utility shall be placed on the right of way of a subdivision road which is to be added to the state system until the applicable Division Engineer has given written approval of the location of such utilities. Written approval may be in the form of exchange of correspondence until such time as it is requested to add the road(s) to the state system, at which time an Encroachment Agreement shall be executed between the owner of the utility and the NCDOT.
- The right of any utility located on a subdivision road that is added to the state system shall be subordinate to the NCDOT's right of way, and the utility shall be subject to regulation by the NCDOT.
- Utilities requiring adjustment or relocation to conform to NCDOT requirements shall be made at no expense to the NCDOT. Existing and/or relocated utilities may remain within the right of way of any subdivision road added to the state system provided the location of same meets NCDOT approval and further provided the utility owner executes an Encroachment Agreement with the NCDOT.
- Longitudinal locations of utilities under pavement should be avoided. However, for residential subdivision roads and residential collector roads, underground utilities may be allowed to run longitudinally under the pavement. Approval for longitudinal installations under the pavement should be obtained from the Division Engineer prior to installation.
- Design requirements for utilities in NCDOT right of way are provided in Sections 3.3 and 3.4 for aboveground and underground utilities, respectively.

2.4.16 Installations that Involve Small Cell

A Small Cell provider seeking to co-locate on an existing pole in NCDOT Right of Way is responsible for familiarity with the policies and procedures of both NCDOT and the pole owner. Particular attention must be given to a potential meter base stub pole to be required by the pole owner within the Right of Way as well as NCDOT's policies to allow the installation requiring a stub pole. If a selected pole will not meet the minimum requirements of both NCDOT and the

pole owner, the pole owner will deny the attachment request, and an encroachment will also be denied by NCDOT.

In anticipation of an approval by the pole owner, the encroaching party must apply for the co-location attachment with the pole owner **prior to submitting an encroachment** to NCDOT. It is recommended to obtain confirmation from the pole owner that the selected pole falls within the pole owner's guidelines to be an acceptable pole and based on the equipment and plans presented within the application process. The pole owner must determine if the proposed attachments can be accommodated for the make-ready requirements which may involve changing out the pole to a taller/higher class pole. If the selected pole does not meet the pole owner's guidelines, the attachment may be denied by the pole owner.

If the co-location attachment is approved by the pole owner and the pole must be changed out with a taller/higher class pole, the Small Cell provider must apply for the encroachment to the DOT and will include the make ready pole replacement requirements within the encroachment request. Upon approval by NCDOT, the Small Cell provider must provide a copy of the approved DOT encroachment to the pole owner. See also [Section 3.3.6.3](#).

2.5 Submittals

2.5.1 Encroachment Agreement Form Requirements

Types of right of way Encroachment Agreement forms and requirements to complete these forms are covered in Section [2.3](#).

2.5.2 Plan Requirements

Plan requirements and format will depend on whether new installations (encroachment requests) fall within or outside the limits of a STIP project. These are provided in detail in Section [3.2](#), Plan Requirements.

2.5.3 Street Lighting Encroachment Requests

All street lighting requests must be reviewed by the Utilities Unit via the State Utilities Manager. Any other lighting requests may be reviewed and approved by the Division Engineer.

Requirements for street lighting design and detailed plan requirements are provided in Section [3.3.7](#), Street Lighting.

2.5.4 Encroachment Submittal Checklist

When an encroaching party, its design firm, permitting personnel, or construction crews are unfamiliar with the permitting process and NCDOT requirements, a preliminary meeting with the District Engineer is HIGHLY encouraged to cover basics for submittals and construction. To facilitate the preparation of encroachment submittals, a checklist and pre-submittal guides are available at the following links:

- The applicant should review the following checklist: [NCDOT Encroachment Submittal Checklist](#).

- If the request is for a non-utility encroachment, the applicant (with user access to NCDOT's Permits site) should review the following document for additional assistance prior to submittal: [NCDOT Permits site Pre-submittal Meeting Guidelines](#).

If an encroachment involves any of the following elements, see [Section 3](#), Engineering, Construction, and Maintenance, for additional information and requirements:

- Bridge and structure attachments
- Encasements
- Structures
- Sanitary sewers
- Water
- Buried facilities
- Temporary shoring

2.5.5 Utility and Non-Utility Encroachment Agreement Requests

The following guidelines shall apply to utility and non-utility Encroachment Agreement requests for individual encroachments and do not apply to Blanket Encroachment Agreements. Requests for a new Blanket Encroachment Agreement are covered in [Section 2.5.6](#), and requests to work under an existing Blanket Encroachment Agreement are covered in [Section 2.5.7](#).

2.5.5.1 Applicable Forms

The applicable utility and non-utility encroachment request forms were listed previously in [Sections 2.3.1](#) and [2.3.2](#), respectively.

2.5.5.2 Where and How to Submit

As of 2017, NCDOT requires utility and non-utility encroachment submissions to be uploaded via a Microsoft SharePoint site referred to as the Permits site. To access the Permits site, a new user/applicant must obtain a business North Carolina Identity (NCID) and submit that business NCID to the State Encroachment Engineer to be granted access. That three-step process is completed at [Encroachment Submission Help](#), and several guides and resources for submittals are also available there.

If an applicant is not a regular user of the Permits site, they may contact the local District Office to inquire about the possibility of the local District Engineer's personnel uploading the required electronic documents into the Permits site. In this case, the District Engineer has discretion to determine who submits the documents to the Permits site. It should also be noted that encroachment requests submitted to the Permits site by NCDOT personnel may not be accessible for download after approval. In this case, the approved encroachment documents must be obtained directly from the District Engineer's office.

It is the intent that ALL encroachment requests are uploaded to the Permits site so that they may eventually be automatically archived in a central location and linked or archived to the NCDOT District files. Encroachments that are within the limits of NCDOT STIP projects may be submitted by Division or Utilities Unit staff after the execution of the agreement but must also be recorded in the Permits site.

The ability to submit as a facility owner, or a design or permitting firm on behalf of the facility owner, occurs only after access to the Permits site has been granted. Once permission is granted, the following link will be activated to allow the submission: <https://connect.ncdot.gov/site/Permits/Pages/New-Encroachment-Submission.aspx>.

Once the encroachment request has been submitted, NCDOT electronically routes the encroachment documents to the appropriate District Office. Some encroachment requests are required to be submitted to the State Utilities Manager for review and approval after initial review by the District Engineer's office (see Section 2.6.3). Some other encroachment requests happen to be located within the limits of a NCDOT STIP project. If enough information on plans is available during the design phase or if the project is under construction, then the encroachment is subject to further criteria and more rigorous details to be submitted. See Section 4.5.1, Types of Agreements, for more detail.

The District Engineer's office is responsible for determining if additional review and approval is required, and to transfer the encroachment documents to the Utilities Unit, Division Project personnel or other NCDOT Unit as appropriate.

The review and approval process will vary based on the type of encroachment, nature of the work, and location of the proposed installation. Additional information on the review and approval process can be found in Section 2.6.

Maps of the District and Division boundaries can be found at [NCDOT Division Map](#).

Additional contacts can be found at [NCDOT Directory - District Offices](#).

2.5.5.3 What to Submit

Package contents must be submitted in PDF format and include the following:

- Cover letter, including contact information for any representative, engineer, designer, or party NCDOT may need to contact to complete the encroachment review.
- NCDOT checklist.
- Design plans.
- Encroachment Agreement form.
- Engineering calculations (if applicable).
- Supporting product or equipment specifications (if applicable or as determined by the NCDOT reviewer).
- [Form VCER-1](#), Verification of Compliance with Environmental Regulations (required with [Form R/W 16.1A](#) for two-party agreements for non-utility facilities not related to road construction encroachments; [Form R/W 16.1B](#) for two-party agreements related to road construction; and [Form R/W 16.7](#) for grading or alteration of drainage on controlled access highways). Form VCER-1 is required to be sealed by a licensed North Carolina Professional Engineer. If any other encroachment submittal involves disturbance of ground exceeding 1 acre in area, then Form VCER-1 is required for that encroachment.
- Other documents (as appropriate and applicable), such as boring logs and material test reports.

For encroachments involving the method of HDD installation, the following are required prior to construction, and examples are provided in Appendix F:

- HDD requirements list.

- Soil report for the specific site from the US Department of Agriculture (see <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>). An example is provided in [Appendix F](#). This document is required prior to issuance of an Encroachment Agreement.
- Contingency Frac-Out Plan. This document is required prior to issuance of an Encroachment Agreement. A Frac-Out Plan is NOT required if the HDD is outside the theoretical 1:1 slope from the edge of pavement and as close to the right of way as practical that any possible frac out would not heave pavement.
- Drilling equipment and drilling fluid specifications.

2.5.6 Requests to Establish a Blanket Encroachment Agreement

The following guidelines shall apply to obtaining a new Blanket Encroachment Agreement with NCDOT. This guidance does not apply to proposals of work to be covered under an existing Blanket Encroachment Agreement on file with NCDOT. Those requests are covered in [Section 2.5.7](#). In addition, this guidance does not apply to non-blanket encroachment requests. Those are covered in [Section 2.5.5](#).

No utility work can be performed under a Blanket Encroachment Agreement on controlled access right of way or for a utility installation or relocation within an NCDOT STIP project. See [Section 4](#), Coordination, for the appropriate agreements and approvals.

A continuing indemnity bond may be required to be filed with the State Utilities Manager prior to approval of a Blanket Encroachment Agreement. [Form R/W 16B - Continuing Indemnity Bond](#) must be completed and submitted with the filing of a continuing indemnity bond. See [Section 2.7.6.2](#), Acceptable Forms of Bonds, for additional information.

2.5.6.1 Applicable Forms

The applicable Blanket Encroachment Agreement request forms are described in [Section 2.3.3](#).

2.5.6.2 Where and How to Submit

Blanket Encroachment Agreement forms must be sent in electronic format directly to the State Utilities Manager for approval. The intent is to have all Blanket Encroachment Agreements managed in one location for reference and document retention as well as for distribution to all applicable NCDOT offices. Because Blanket Encroachment Agreements are separate in nature from utility and non-utility Encroachment Agreements and because the Permits site is currently designed for utility and non-utility encroachment review and approvals for individual submittals, the submittal of these documents should NOT be via the Permits site.

2.5.6.3 What to Submit

Package contents must include the following:

- Cover letter, including contact information for any representative, engineer, designer, or party NCDOT may need to contact to complete the blanket encroachment review.
- Blanket Encroachment Agreement meeting the State Government [electronic signature policy guidelines](#) and signed by the authorized representative of the facility owner or maintainer. Authorized personnel should be an officer or delegated representative by an officer in the company of the facility owner or maintainer.

The following parties will receive a copy of the final, approved Blanket Encroachment Agreement package:

- Encroaching party
- Each Division Office affected by the Blanket Encroachment Agreement
- Each District Office affected by the Blanket Encroachment Agreement
- State Utilities Manager

2.5.7 Requests to Work Under an Existing Blanket Encroachment Agreement

The following guidelines shall apply to proposed work covered under an existing Blanket Encroachment Agreement on file with NCDOT. This guidance does not apply to requests to establish a Blanket Encroachment Agreement. Those are covered in Section 2.5.6.

No utility work can be performed under a Blanket Encroachment Agreement for a utility relocation project or within controlled access right of way. See Section 4, Coordination, for the appropriate agreements and approvals involving a STIP project.

2.5.7.1 Applicable Forms

The applicable Blanket Encroachment Agreement request forms were listed previously in Section 2.3.3.

2.5.7.2 Where and How to Submit

The encroaching party should notify the appropriate District Office prior to construction. The submittal should be in electronic format using email or other electronic delivery options as determined by the District Engineer's office. The review and approval process will vary based on the type of encroachment, nature of the work, and location of the proposed installation. Because Blanket Encroachment Agreements are separate in nature from utility and non-utility Encroachment Agreements and because the Permits site is currently designed for utility and non-utility encroachment review and approvals, the submittal of these documents should NOT be via the Permits site.

NCDOT Divisions and Districts can be found at [NCDOT GIS Online Divisions and Districts Map](#).

Additional contact information for NCDOT District Offices can be found at [NCDOT Directory - District Offices](#).

2.5.7.3 What to Submit

Package contents must include the following:

- Cover letter, including contact information for any representative, engineer, designer, or party NCDOT may need to contact to complete the blanket encroachment review, and describing the hours and dates of construction, which may be altered at the discretion of the District Engineer's office
- Map or sketch to accurately and legibly show the location of the proposed work and the extent of the encroaching party's project limits
- Copy of the existing Blanket Encroachment Agreement, in PDF format, that is on file with NCDOT
- A traffic control plan, if required by the District Engineer's office, prior to construction
- Any other information as required by the District Engineer

2.5.8 Requests Involving Small Cell Facilities

Where they apply, Blanket Encroachment Agreements should be used for power associated with encroachments involving small cell nodes. It should be noted that Blanket Encroachment Agreements do not allow for installation of new poles or for installation methods such as HDD. Each Blanket Encroachment Agreement in place dictates the terms of what is allowed under that agreement. When a Blanket Encroachment Agreement does not cover the installation of the power for a small cell facility, a submittal and approval for EACH small cell encroachment request must include two separate Encroachment Agreement forms: one form for the power company for the power portion (typically the second party on the agreement will be the power company) and a separate form for the small cell equipment (where the second party as owner or maintainer is the small cell company involved). See also Section 2.4.16.

2.6 Review and Approval

This section identifies who has the authority to review and approve encroachment requests and describes the review and approval procedures for each type of Encroachment Agreement.

2.6.1 Approval Authority

To exercise more direct control and in the interest of time, it is the intent that the responsibility and authority for approving as many Encroachment Agreements as possible be held locally by the Division Engineer and/or respective District Engineer offices. However, there are instances when agreements must be processed through the Utilities Unit for approval.

The Division Engineer can, at any time and for any encroachment submittal, request that review or approval be handled by the Utilities Unit.

2.6.1.1 Requests Approved at the Division Office

The following types of encroachment requests do not require Utilities Unit review and approval, and can be executed by the Division Engineer:

- Utility encroachments on non-controlled access right of way, including maintenance projects for existing facilities installed by encroachment (except within the limits of NCDOT STIP projects).
- New encroachments within the limits of Division-let STIP projects. In this case, the appropriate NCDOT office will contact the applicant for more information (see [Section 4](#), Coordination).
- Encroachments involving subdivision streets, specifically regarding subdivision street additions to the state highway system.
- Groundwater monitoring wells on non-controlled access right of way, unless technical assistance from the Utilities Unit is desired by the Division Engineer.
- Security or other non-street lighting in subdivisions or other locations that is not primarily intended for lighting the roadway. Lighting intended to illuminate the roadway should be reviewed by the Utilities Unit.
- Work covered under an existing Blanket Encroachment Agreement. Original Blanket Encroachment Agreement requests should be submitted to the Utilities Unit (State Utilities Manager).
- Non-utility encroachments on non-controlled access right of way, except for major traffic generators.

- Curb and gutter, pavement widening, storm drainage, and general items related to road construction on non-controlled access right of way. This includes, but is not limited to, the following:
 - All drainage that can be handled in accordance with NCDOT Drainage Structure Standards (e.g., catch basins, drop inlets).
 - Paving of unpaved secondary roads by the private sector.
 - Construction of turn lanes, with proper pavement design, curb and gutter, and sidewalk.
- Replacement of controlled access fence, per the NCDOT Chief Engineer’s memo dated July 7, 2010 (see [Appendix D](#)).
- Municipal and county “gateway” signs, per guidance issued April 23, 2012 (see [Appendix D](#)).
- Grading on the right of way (non-controlled access right of way OR when less than 1,000 cubic yards of excavated earth removal).

2.6.1.2 Requests Approved at the Utilities Unit

The following types of encroachment requests require Utilities Unit review and approval, and shall be executed by the State Utilities Manager or designated representative:

- All encroachments within controlled access right of way (fully controlled, limited controlled, and partially controlled), with the exception of any encroachment located within the limits of NCDOT STIP Projects as noted below.
- Requests for new Blanket Encroachment Agreements.
- Requests to attach utilities to highway structures.
- Encroachments within the limits of NCDOT STIP projects that are centrally managed or assigned to the Utilities Unit. If the encroachment request is submitted to the Utilities Unit via the Permits site, then the State Encroachment Engineer will transfer the encroachment request to the appropriate NCDOT project utility personnel (in the Utilities Unit). See also Section 2.6.1.3 for encroachments Approved by the Division Project or Utility personnel.
- Encroachments requiring excavations greater than 10 feet deep.
- Street lighting intended to illuminate the roadway.
- Curb and gutter, pavement widening, storm drainage, and general items related to road construction within controlled access right of way.
- Piping of Treated Effluent.
- Grading on the right of way (controlled access highway with excavation removal more than 1,000 cubic yards).

2.6.1.3 Requests Approved by the Division Project Personnel

The following types of encroachment requests require Division Project personnel review and approval, and shall be executed by the Division Engineer, Division Project personnel or designated representative:

- NCDOT Maintenance projects. Encroachments located within Division Maintenance project limits can be reviewed and approved by the Division Engineer.

- All Locally Administered Projects (LAP) where NCDOT has a STIP project number assigned for funding but the design, construction and administration is handled by a local municipality. Processing of such encroachments within the Permits site shall be handled by Division Project personnel or District personnel as delegated by the Division Engineer.
- All Division-managed projects. These encroachment requests are to be handled by the Division Utilities Agent. If the encroachment request is submitted to the Utilities Unit via the Permits site, then the State Encroachment Engineer will transfer the encroachment request to the appropriate NCDOT Division Project personnel. The District Engineer's office may also transfer the request to the appropriate Division Project personnel. More information regarding encroachments within the limits of Division-managed projects can be found in Section 4, Coordination.

2.6.2 Approval of Private Facilities in NCDOT Right of Way Easements

In an effort to ensure that property owner rights are respected when private facilities are permitted within NCDOT right of way easements, the following condition applies prior to issuance of any encroachment approval of a private facility:

If at any time the private facility is proposed to occupy right of way of which the State of North Carolina is not the fee owner, the encroaching party shall obtain the consent of the underlying fee owner prior to the start of construction in that location. NCDOT does not verify right of way. Right of way confirmation, as well as deed and property research, is the responsibility of the encroaching party. In locations where the State is the fee owner, this consent is not required. In locations where the NCDOT right of way is held by easement with the underlying property belonging to the adjacent property owners, a Private Facility Hold Harmless declaration signed by all adjacent property owners must be submitted prior to encroachment approval. The Private Facility Hold Harmless Declaration form is attached in [Appendix C](#).

The District Engineer's office may have some information on file regarding the fee simple versus easement status of the roadway affected by the proposed encroachment. NCDOT may require evidence of the right of way being held in fee simple prior to issuance of an Encroachment Agreement.

2.6.3 Standard Review and Approval Procedures

This section describes the NCDOT review and approval process for utility and non-utility Encroachment Agreements and Blanket Encroachment Agreements. Specific review and approval procedures are provided below. The review and approval process will vary based on the type of encroachment, nature of the work, and location of the proposed installation.

The process for reviewing and approving encroachment requests that are within the limits of an NCDOT STIP project is not included in this section. These requests are submitted to the appropriate District Office and forwarded to the Utilities Unit or appropriate Division Project personnel for handling. If the STIP project has sufficient details in the design or construction process for NCDOT projects, the process for these types of encroachment requests are provided in [Section 4](#), Coordination.

2.6.3.1 Utility and Non-Utility Encroachment Requests to be Approved by Division Office

Application to cross or otherwise occupy NCDOT right of way for highways shall be made directly to the appropriate District Engineer using documents outlined in [Section 2.5](#), Submittals. The following procedures shall be used in the review and approval process:

- On behalf of the Division Engineer, the District Engineer shall investigate the request and determine the acceptability of the encroachment based on policies and criteria provided in this UAM.
- Any deviations from this UAM (or other referenced documents) must be thoroughly justified and documented in the file for the particular encroachment.
- If the District Office does not find the encroachment request acceptable (e.g., the package is incomplete, the plans are insufficient, the Encroachment Agreements are not filled out correctly, etc.), the permittee shall be notified that the encroachment request is unacceptable or deficient. While other means are also available to be used (email, phone, etc), this notification shall be performed using the Permits site. The encroaching party will be required to resubmit a proper package before any further review by NCDOT.
- There will be instances where, while still responsible for the ultimate approval of the encroachment request, the District Engineer may require specific aspects of the proposed work to be reviewed by the Utilities Unit. At their discretion, the District Engineer can request that the Utilities Unit perform a technical review on any and all aspects of the encroachment request. This technical review process is detailed in Section 2.6.3.5.
- It is intended for the District Engineer, at the discretion of and on behalf of the Division Engineer, to execute all utility and non-utility Encroachment Agreements on non-controlled access roadways, with the exceptions outlined in Section 2.6.3. However, the District Engineer may forward the encroachment request to the State Utilities Manager for final approval if, in their opinion, there are circumstances or deviations in policy or from this UAM that warrant NCDOT approval by the State Utilities Manager. In this case, the District or Division Engineer shall thoroughly investigate the request and submit their recommendations for approval or disapproval. The standard review and approval process for a request forwarded to the State Utilities Manager is outlined in Section 2.6.3.2.
- If there are questions, concerns, or desired revisions regarding the submittal, the District Engineer shall provide comments regarding the issues to the applicant or the applicant's representative (e.g., applicant's engineering consultant). The applicant or applicant's representative shall then resubmit the required changes or additional information to the District Engineer to continue the review. Once the District Engineer determines the encroachment request is acceptable, the agreement will be executed by the Division Engineer or by delegated authority to the District Engineer on behalf of the Division Engineer.
- The District Office shall retain an approved package in the Permits site. This package will serve as the official NCDOT file copy of the approved Encroachment Agreement. The encroaching party or its representative has access to obtain a digital copy of the approved encroachment following the approval status in the Permits site. When the approval status is changed by NCDOT personnel, the submitter is automatically notified by email. The approved documents are available for download by the submitter for a period of 90 days. It is the intent that electronic archiving procedures will automatically move these approved files to the NCDOT District files after 90 days following the approval in the Permits site for permanent accessibility by Division personnel.
- If the final determination for the encroachment request is denied, the applicant will be notified in writing with an explanation of the reason for the denial. The written communication will also be provided via the Permits site.

2.6.3.2 Utility and Non-Utility Encroachment Requests to be Approved by Utilities Unit

Application to cross or otherwise occupy NCDOT right of way for highways shall be made directly to the appropriate Division Engineer using documents outlined in Section 2.5, Submittals. The following procedures shall be used in the review and approval process:

- On behalf of the Division Engineer, the District Engineer shall investigate the request and determine the acceptability of the encroachment based on policies and criteria provided in this UAM.
- Any deviations from this UAM (or other referenced documents) must be thoroughly justified and documented in the file for the particular encroachment.
- If the District Office or Utilities Unit does not find the encroachment request acceptable (e.g., the package is incomplete, the plans are insufficient, the Encroachment Agreements are not filled out correctly), the permittee shall be notified that the encroachment request is unacceptable or deficient. The encroaching party will be required to resubmit a proper package before any further review by NCDOT.
- If the encroaching facilities or installation methods are not allowed within NCDOT right of way, the District Office should deny the encroachment request. The package should not be forwarded to the Utilities Unit for further review.
- Once the District Office finds the submittal acceptable, the package shall be forwarded to the Utilities Unit at the attention of the State Encroachment Engineer. The following information shall be included in the package via the Permits site:
 - Cover letter with District Office file numbers, District Office contact information, and any other information that would aid coordination of review.
 - Localized special provisions that the District Office would like included in the approval letter. These provisions may include special District or Division contact instructions for the applicant or contractor, non-standard traffic control restrictions, special Municipality instructions, etc.
 - A desired bond amount, if any.
- On behalf of the State Utilities Manager, the State Encroachment Engineer shall investigate the request and determine the acceptability of the encroachment based on policies and criteria provided in this UAM. The State Encroachment Engineer shall route the request to the appropriate Utilities Unit personnel and/or appropriate staff for review.
- Depending on the scope of the encroachment request, the State Encroachment Engineer may seek a technical review from other NCDOT Units (e.g., Geotechnical Engineering, Structures Management, Lighting and Electrical, Traffic, Roadway Design, etc). Generally, the comments from these units are provided to the State Encroachment Engineer, who then forwards all comments back to the encroaching party.
- If there are questions, concerns, or desired revisions regarding the submittal, the State Encroachment Engineer shall provide comments regarding the issues to the applicant or the applicant's representative (e.g., applicant's engineering consultant) and shall copy the District Engineer on any correspondence if the District Engineer desires to be included. While other means are available to be used (email, phone, etc), the applicant shall be notified using the Permits site. The applicant or applicant's representative shall then resubmit the required changes or additional information to the State Encroachment Engineer to continue the review, unless otherwise directed.

- Once the State Encroachment Engineer has completed the review of the package, the package will be either approved or denied.
- If the decision is to deny the encroachment request, the State Encroachment Engineer will update the status to Denied in the Permits site and will add appropriate documentation to the Permits site providing a written explanation of the denial, which is accessible to the applicant. The Permits site automatically notifies the applicant of the denial.
- If the decision is to approve the encroachment request, the State Encroachment Engineer will execute the Encroachment Agreement on behalf of the State Utilities Manager and will provide the approval package in the Permits site. The Permits site automatically notifies the designated submitter of the approval. If the approval involves grading in controlled access right of Way with removal of 1,000 cubic yards of material or greater, then the check(s) for the administrative fee and earth material removal fee will be forwarded to the State Encroachment Engineer. Upon approval, the checks will be sent by the State Encroachment Engineer to the Accounting Operations Office.
- The encroaching party or its representative has access to obtain a digital copy of the approved encroachment following the approval status in the Permits site. When the approval status is changed by NCDOT personnel, the submitter is automatically notified by email. The approved documents are available for download by the submitter for a period of 90 days. It is the intent that electronic archiving procedures will automatically move these approved files to the NCDOT District files after 90 days following the approval in the Permits site for permanent accessibility by Division personnel.

2.6.3.3 Utility and Non-Utility Encroachment Requests to be Approved by Division Project or Division Utilities Personnel

If the encroachment submission is located within the limits of a NCDOT STIP project in advanced design or construction phase, then the District Engineer should determine which office is handling the project and transfer the review to the appropriate office. If a centrally managed project, the encroachment should be transferred to Central Utilities for further handling. If a Division managed project, the encroachment should be transferred to the Division Project personnel. This transfer should be recorded in the Permits site. See also Section [2.4.14](#) and Section [4](#).

2.6.3.4 Requests to Establish a Blanket Encroachment Agreement to be Approved by Utilities Unit

Blanket Encroachment Agreement requests shall be reviewed and approved by the Utilities Unit and shall include the following process:

- Applications to establish a Blanket Encroachment Agreement with NCDOT should be submitted directly to the State Utilities Manager at the attention of the State Encroachment Engineer using appropriate documents as outlined in Section [2.5](#), Submittals.
- On behalf of the State Utilities Manager, the State Encroachment Engineer shall investigate the request and determine the acceptability of the encroachment based on policies and criteria provided in this UAM.
- By their nature, installations covered under Blanket Encroachment Agreements have limited oversight by NCDOT. Therefore, as necessary, the State Encroachment Engineer will obtain input from the Division or District Office affected by the Blanket Encroachment Agreement request regarding the applicant's history of installation issues within the right of way to better determine if a Blanket Encroachment Agreement should be issued.

- If the State Encroachment Engineer determines that the encroachment is acceptable, the agreement will be executed on behalf of the State Utilities Manager, and copies will be distributed as outlined in Section 2.6.
- The Utilities Unit shall retain an approved package that shall serve as NCDOT's official file copy of the Blanket Encroachment Agreement. A copy may also be stored in the NCDOT District Files site.

2.6.3.5 Requests to Work under an Existing Blanket Encroachment Agreement

This section applies to the following Blanket Encroachment Agreements:

- R/W 16.3 - Blanket Encroachment Agreement for Plowed-In Telephone Cable on Primary and Secondary Roads
- R/W 16.3A - Blanket Encroachment Agreement for Telecommunications Cable Installed by Trenching on Primary and Secondary Roads
- R/W 16.4 - Blanket Encroachment Agreement for Cablevision on Primary and Secondary Roads

Work performed under R/W 16.5 - Blanket Encroachment Agreement for Underground Utility Service Connections on Primary and Secondary Roads and R/W 16.5A - Blanket Encroachment Agreement for Aerial Utility Crossings and Taps on Primary and Secondary Roads does not require prior notice to NCDOT. Therefore, the process outlined in this section does not apply to work performed under R/W 16.5 and R/W 16.5A. The guidelines that must be followed when working under R/W 16.5 and R/W 16.5A are provided in Section 2.5.7.

The criteria to be followed for installations covered under Blanket Encroachment Agreements when the installation is on or near highway structures will be the same as outlined in Section 2.5.7 and in the provisions included in the Blanket Encroachment Agreement form.

2.6.3.6 Requests for Technical Review by Utilities Unit

There will be instances where, while still responsible for the ultimate approval of the encroachment request, the District Engineer or Division Project personnel may want specific aspects of the encroachment request and proposed work to be reviewed by the Utilities Unit. At the discretion of the District Engineer, a request can be made to the Utilities Unit to perform a technical review of any and all aspects of the encroachment request.

Application for permission to cross or otherwise occupy NCDOT right of way of all highways shall be made directly to the appropriate District Engineer or Division Project personnel using documents outlined in Section 2.5, Submittals. The following procedures shall be used in the review and approval process:

- On behalf of the Division Engineer, the District Engineer or Division Project personnel shall investigate the request and determine the acceptability of the encroachment based on policies and criteria provided in this UAM.
- If at this time in the review process, the District Engineer or Division Project personnel determines that a technical review by the Utilities Unit is necessary to complete the review, the encroachment package should be forwarded to the State Utilities Manager at the attention of the State Encroachment Engineer. See Section 2.6.3.2 for additional information.
- In the package transmittal documents, the District Engineer or Division Project personnel shall convey what specific aspect of the package needs to be reviewed by the Utilities Unit.

- Depending on the scope of the encroachment request and the direction provided by the District Engineer or Division Project personnel, the State Encroachment Engineer will forward the package to the appropriate Central Office units (e.g., Geotechnical Engineering, Structures Management, Utilities Unit, etc.). Generally, the comments from these units are provided back to the State Encroachment Engineer, who then forwards the comments back to the District Engineer.
- Once the technical review units are satisfied and the District Engineer or Division Project personnel determines that the encroachment is acceptable, the Agreement will be executed on behalf of the Division Engineer, and copies will be distributed as outlined in Section 2.6.3.1.

2.6.3.7 Requests Involving Air Rights

All design of encroachments involving air rights involving privately maintained facilities must be reviewed and approved by the State Utilities Manager. After recommended approval of the design, the encroachment can be issued by the State Utilities Manager or the Division Engineer. Air rights requiring Board of Transportation approval prior to the granting of an encroachment agreement generally apply when a privately maintained encroachment spans or crosses the entire right of way (examples include conveyors or pedestrian walkways serving a golf course or hospital). See also NC General Statute 136-18.

Air rights which may be granted an encroachment without legislative approval by the Division Engineer generally apply to the following:

- Overhangs of awnings, eaves, roofs and the like hanging over NCDOT right of way and attached to buildings and structures located off NCDOT right of way constituting a simple encroachment with no special regard to air rights. As for the structural aspect, the design should be reviewed by central Raleigh NCDOT personnel for any engineering and safety considerations which may impact NCDOT right of way.
- Highway Lighting where the support structure is located off NCDOT right of way must be reviewed by the State Utilities Manger for design. Approval may be granted by the Division Engineer or State Utilities Manger.
- Any utility attached to a support structure located outside of NCDOT right of way but a portion of the utility hangs in NCDOT air space. An encroachment is required and NCDOT considers this case outside NCDOT right of way for future relocation purposes regarding conflicts by utilities in NCDOT projects.
- Any aerial facility constructed by a private party or by non-NCDOT controlled funds but will be maintained by a state agency or governmental agency (county, federal or municipal) after construction. Encroachments of this nature are still subject to the normal NCDOT encroachment review process for compliance to safety rules and regulations for engineering. Examples include a skybridge pedestrian walkway connecting two governmental buildings or greenway trail bridge maintained by a municipality.

Any signage or advertising shall comply with NCDOT policy and practices for Outdoor Advertising. (see <https://connect.ncdot.gov/resources/Asset-Management/Pages/Outdoor-Advertising-Contracts.aspx>) and NCDOT Art Policy.

2.7 Post Approval

This section describes activities and procedures that take place after the Encroachment Agreement has been obtained, and utility (or non-utility) installation and related construction work has commenced.

2.7.1 Encroachment Agreement Required Onsite

The encroaching owner or their agent or contractor must have an executed copy of the approved Encroachment Agreement and all associated documents at all times on the construction site. A digital copy of the executed Encroachment Agreement and all associated documents (including Blanket Encroachment Agreements) may suffice to satisfy this requirement.

Failure to produce this agreement along with approved plans, provisions, and associated documents at the site may result in stoppage of work until the applicant or their agent or contractor can show evidence that the proposed installation has been approved in accordance with NCDOT policies, and the work is being performed in accordance therewith.

2.7.2 Notification to NCDOT Prior to the Start of Work

2.7.2.1 Notification to Division Engineer

With the exception of underground utility service connections and aerial utility crossings and taps installed under Blanket Encroachment Agreements (Forms R/W 16.5 and R/W 16.5A, respectively), the Division Engineer or designated representative (often the District Engineer) shall be given notice by the encroaching owner prior to beginning work in NCDOT right of way. Where an approved encroachment involves attachment to a structure, the encroaching owner or designated representative shall notify the Division Bridge Maintenance Engineer before the attachment work begins.

There must be a mutual understanding among the encroaching party, its contractor, and NCDOT representatives as to when work will commence and on any other conditions deemed necessary. NCDOT reserves the right to require a meeting prior to construction activity and the right to stop work by an encroaching party or its contractor until the satisfaction of the terms of the agreement are met or unless otherwise directed by the Division Engineer.

2.7.2.2 Exceptions for Notification to Division Office

In accordance with Blanket Encroachment Agreements for underground utility service connections (Form R/W 16.5) and Blanket Encroachment Agreements for aerial utility crossings and taps (Form R/W 16.5A), NCDOT does not require notification to NCDOT prior to construction, as discussed in Sections 2.5.6 and 2.5.7.

The encroaching party shall be in strict adherence with the provisions outlined in Blanket Encroachment Agreements for underground utility service connections (Form R/W 16.5) and Blanket Encroachment Agreement for aerial utility crossings and taps (Form R/W 16.5A). See also the appropriate forms in [Appendix C](#) for the provisions for their use.

While it is the intent of NCDOT to simplify service connections and aerial crossings and taps, the Division Engineer reserves the right to require an individual utility Encroachment Agreement on any service connection where there may be unusual circumstances or where, in his/her opinion, it is deemed necessary.

2.7.3 Work under Blanket Encroachment Agreements that Do Not Require Prior NCDOT Notice

Work to be performed under existing Blanket Encroachment Agreements for underground utility service connections (Form R/W 16.5), by the nature of these agreements, does not require notice to NCDOT prior to the start of work.

Blanket Encroachment Agreements must be executed by the State Utilities Manager. The procedure for establishing a Blanket Encroachment Agreement with NCDOT can be found in Section 2.5.6.

Installations that do not meet the criteria for a Blanket Encroachment Agreement for underground utility service connections shall be requested under utility or non-utility Encroachment Agreements. The procedure for submitting these requests can be found in Section 2.5.5.

2.7.4 Utility Construction, Maintenance, and Traffic Control

The utility owner or developer requesting approval to conduct work within NCDOT right of way shall take, provide, and maintain all necessary precautions during construction and future maintenance activities to protect the general public, pedestrians, bicyclists, and road users, and to prevent injury or damage to persons and property.

Proper signs, signal lights, flagmen, and other warning devices shall be installed in conformance with the latest [MUTCD](#) and [NCDOT MUTCG](#). Guidance regarding traffic control can be found in Section 3.6.4.

Activities, procedures, and guidelines for parking vehicles and equipment, excavation within right of way and near signalized intersections, removal of excavated materials, pavement cut repairs, and related work items are provided in Section 3.6, Construction and Maintenance.

2.7.5 Encroachment Enforcement and Inspection

2.7.5.1 Enforcement

In the case of noncompliance by the encroaching party or its contractor with the terms of the Encroachment Agreement and the approved plans, NCDOT reserves the right to stop all work until the facility or associated encroachment work has been brought into compliance or removed from the right of way at no cost to NCDOT.

2.7.5.2 Construction Inspection

At the discretion of the Division Engineer, a highway inspector may be assigned to inspect an approved Encroachment Agreement on highways open to traffic or on a highway project if, in the Division Engineer's opinion, inspection is necessary. The cost of such inspections shall be the responsibility of the encroaching party.

Any inspector assigned to inspect the installation operations will have full authority to act on behalf of NCDOT and to stop all work adversely affecting highways provided that the work is in violation of the agreement executed between NCDOT and the encroaching party based on NCDOT standards.

Generally, inspection costs to the encroaching party will not be applicable on highway construction projects. The inspector shall have the authority to perform field tests and take material samples for laboratory tests, and should not accept work or materials from an encroaching party that NCDOT would not accept from its own forces or contractor.

2.7.6 Bonding

If the applicant or its agent damages the roadway, drainage, shoulders, structures, pavement markings, signage, traffic signals or other highway features in the right of way and fails to restore this damage to the satisfaction of the Division Engineer, after sufficient notification by the Division

Engineer, the non-betterment cost of restoring or repairing same by NCDOT will be borne by the encroaching party.

At the discretion of the Division Engineer or State Utilities Manager, bonds may be required from the applicant of an Encroachment Agreement for facility installations to be placed within the limits of NCDOT right of way, including attachments to structures. The purpose of such bonds is to indemnify the Department for any damages within NCDOT right of way caused by the installation.

2.7.6.1 Who Can Provide a Bond

A facility owner or contractor can provide a bond. Ultimately, the posting of a bond is the responsibility of the facility owner.

Generally, bonds will not be required for utility poles or aerial wires and cables erected within the right of way; however, there may be unusual situations where, in the judgment of the Division Engineer, a bond is warranted. The amount of any such bond shall be determined by the Division Engineer. See Section 2.7.6.4, Bond Amount Criteria, for additional information.

Bonds must be issued by an institution that has a resident office in North Carolina to prevent any unnecessary out-of-state travel to collect a bond if deemed necessary. The bonding company may issue the bond from another state but must provide a contact for the bonding company with an office address in North Carolina.

2.7.6.2 Acceptable Forms of Bonds

Bonds may be in the form of a corporate surety bond, continuing indemnity bond, or certified or corporate check. Where surety bonds are furnished, they must be signed by an authorized agent of the surety company with an office in North Carolina. The following describes the specifics for securing Encroachment Agreements:

- Corporate surety bonds or individual performance bonds (hereafter referred to as performance bonds) correspond to individual encroachments.
 - Where performance bonds are furnished, they must be signed by an authorized agent of the surety/bonding company, which must be a company with offices in North Carolina, and a Power of Attorney authorizing the signatory to sign must be attached to the bond.
 - The amount of the performance bond shall be determined by the Division Engineer.
 - Where a performance bond is furnished, one the following forms shall be executed:
 - [Form R/W 16 - Performance and Indemnity Bond](#): This form should be submitted with the bond if the party posting the bond is the second party on the Encroachment Agreement.
 - [Form R/W 16A - Performance and Indemnity Bond by Contractor](#): This form should be submitted with the bond if the party posting the bond is the contractor for the encroaching party on the Encroachment Agreement.

Performance bonds shall be retained by the Division Engineer until such time as the bond is released.

- Continuing indemnity bonds correspond to Blanket Encroachment Agreements and large revenue companies conducting work generally on a statewide basis or in more than one county. The following apply to continuing indemnity bonds ([Form R/W 16B - Continuing Indemnity Bond](#)):

- Utility companies and contractors that perform a substantial amount of work in NCDOT right of way from year to year are encouraged to provide continuing indemnity bonds for their operations on a system basis, a one or more county basis, or a statewide basis.
 - The amount of the continuing bond shall be determined by the State Utilities Manager or designated representative.
 - [Form R/W 16B - Continuing Indemnity Bond](#) should be submitted with the bond when a continuing indemnity bond is being furnished.
 - The continuing indemnity bond shall be issued and kept on file in the office of the State Utilities Manager and copies supplied to all appropriate Division offices.
 - It is the responsibility of the utility owner to provide regular updates as notification from the bonding company that the continuing bond remains in effect. If NCDOT determines or is notified that a continuing indemnity bond is no longer in effect, then the encroaching party must submit individual performance bonds at the discretion of the Division Engineer until a new continuing indemnity bond is issued and on file in the office of the State Utilities Manager.
 - Continuing indemnity bonds shall be retained by the State Encroachment Engineer or designated representative until such time as the bond is released.
- Certified or cashier's check
 - A certified or cashier's check is the only acceptable form of bond when the bond amount is \$500.00 or less.
 - The check should be made payable to the North Carolina Department of Transportation – Division of Highways.
 - Certified or cashier's checks will, immediately upon receipt, be forwarded to the Accounting Operations Office and will not be retained by the Division Engineer or State Utilities Manager. The Division Office should also provide documentation to identify the check as an encroachment bond and include specific information (such as county, encroachment number, and name of the encroaching party) sufficient enough to identify the bonded encroachment.

2.7.6.3 Unacceptable Forms of Bonds

The following forms of securities are not acceptable:

- Personal and business checks
- Cash
- Irrevocable letter of credit

2.7.6.4 Bond Amount Criteria

If an encroaching party does a significant amount of encroachments, then consideration should be given to providing a continuing indemnity bond rather than individual performance bonds. The purpose of such bonds is to offset any costs incurred by the Department for any damages within NCDOT right of way caused by the installation.

Where performance bonds are required, minimum amounts for underground installations are provided in [Appendix D](#), except for municipalities.

Depending on the size and complexity of any installation, the Division Engineer may exercise their judgment in requiring a larger bond.

Performance bonds shall be retained by the Division Engineer until such time as the bond is released. A certified or cashier's check shall immediately upon receipt be forwarded to the Accounting Operations Office in Raleigh and shall not be retained by the Division Engineer.

2.7.6.5 Release of Bonds

Release of bonds will be as follows:

- Performance bonds will be released by the Division Engineer no sooner than 1 year following the satisfactory completion of the work.
- NCDOT reserves the right to hold a performance bond for longer than 1 year if, in the opinion of the Division Engineer, additional restoration of right of way to equal the condition prior to the installation is needed and to ensure that the continued observation from the installation will not cause future damage to the roadway or right of way.
- The encroaching party shall be responsible for notifying the bonding company by providing a copy of the encroachment authorization letter. The bonding company shall then submit to the Division Engineer a request for release along with a copy of the encroachment authorization letter.
- Continuing indemnity bonds may be released upon written request to the State Utilities Manager indicating that the encroaching party will no longer conduct work to maintain or expand their facilities in North Carolina. Additionally, the surety company may cancel this continuing indemnity bond by giving 60 days' written notice to NCDOT. If the continuing indemnity bond is cancelled, NCDOT will require individual performance and indemnity bonds for future installations as determined by the Division Engineer. If and when a continuing indemnity bond is cancelled, the appropriate Division and District Offices will be notified by the State Utilities Manager.

Release of bonds posted by certified or cashier's checks will be as follows:

- The Division Engineer will notify the Accounting Operations Office for release of bonds posted by certified or cashier's checks.
- When requesting release of bonds posted by certified or cashier's checks, the Division Engineer shall inform the Accounting Operations Office as to the amount of bond to be released and to whom the warrant is to be made payable.
- The Accounting Operations Office will forward the warrant directly to the Division Engineer for their disposition with the party who posted bond.

2.8 Miscellaneous Special or Unique Considerations

2.8.1 Attachments to Highway Structures

This section discusses submittal, review, and approval guidelines for attachments to highway structures. Technical requirements are provided in [Section 3](#), Engineering, Construction, and Maintenance.

To facilitate the handling of Encroachment Agreements, it will be necessary for the applicant to obtain approval for each attachment to an existing structure prior to the formal submission of an Encroachment Agreement form to the Division Engineer for review.

Structure attachment approval has two parts: preliminary justification and encroachment approval for the structural design and any other pertinent design plans related to the structural attachment. When requesting to attach to a structure, justification of the attachment must be provided to and accepted by the State Utilities Manager. Only upon acceptance of the justification and approval of the structural design by the State Utilities Manager can an encroachment request that includes attachment to a structure be submitted to the District Office to begin the encroachment review process. The pre-submittal attachment approval process is described below.

2.8.1.1 Structure Attachment Justification

Where to Submit

Structure attachment justification should be submitted to the State Utilities Manager or designated representative unless the encroaching party is otherwise instructed. In general, such requests with justification should be sent to the State Encroachment Engineer.

What to Submit

The requirements for the justification package are outlined in Section 3.5.1. In addition to those requirements, the following items shall be provided in the justification submittal:

- The county in which the structure is located.
- The NCDOT road number that the structure carries. NCDOT road numbers can be found at [NCDOT GIS State Maintained Network Map](#).
- The NCDOT structure number. NCDOT structure numbers can be found at [NCDOT GIS Bridges Map](#).

Review and Approval Procedure

The attachment justification shall be submitted directly to the appropriate District Engineer for eventual forwarding to the State Encroachments Engineer.

The following procedures shall be used in the review and approval process for structure attachment justification:

- On behalf of the Division Engineer, the District Engineer shall investigate the request and review the justification submittal for completeness. If the package is found acceptable, it should be forwarded to the State Encroachment Engineer for Utilities Unit review.
- If the District Office does not find the package acceptable, the encroaching party should be notified that the package is unacceptable and should be required to resubmit a proper package before any further review by NCDOT.
- If the utility facilities or installation methods are not allowed within NCDOT right of way, the District Office should inform the encroaching party that the request cannot be approved. The package should not be forwarded to the Utilities Unit for further review.
- On behalf of the Division Engineer, the District Engineer has the right to recommend denial or acceptance of the justification.
- If the recommendation is to deny, the justification should be forwarded to the State Encroachment Engineer in the Utilities Unit for a concurring review. If, upon concurrence with the State Encroachment Engineer, the recommendation is to deny, the District Engineer shall notify the applicant of the denial. The submittal for pre-approval shall be submitted to the State

Utilities Manager to the attention of the State Encroachment Engineer for further review. If the recommendation from the Division Engineer's office differs from the Utilities Unit, then the matter may be decided by NCDOT upper level management.

- Once at the Utilities Unit, the State Utilities Manager or designated representative has the right to deny the justification or to accept it.
- If the recommendation is to either approve or deny, the State Encroachment Engineer will return a decision to the encroaching party with a written explanation. The District Engineer shall be copied on the response from the Utilities Unit.

2.8.1.2 Structure Attachment Design

Where to Submit

The attachment design package shall be submitted directly to the District Engineer via the Permits site.

What to Submit

If the recommendation is to approve the structure attachment, the encroaching party should conduct a formal and fully engineered submittal for an encroachment. This submittal should follow the procedures described in Section 2.5.5.2, Where and How to Submit, and should also include a copy of the preliminary approval documents. Details on what to submit can be found in Section 2.5.5.3, What to Submit, and Section 3.5, Utilities on or near Highway Structures.

Review and Approval Procedure

The following procedures shall be used in the review and approval process for structure attachment design (after the justification for attachment has been authorized):

- On behalf of the Division Engineer, the District Engineer shall investigate the request and review the design submittal for completeness. If the package is found acceptable, it should be forwarded to the State Encroachment Engineer for Utilities Unit review.
- If the District Office does not find the package acceptable, the applicant should be notified that the package is unacceptable and should be required to resubmit a proper package before any further review by NCDOT.
- If the utility facilities or installation methods are not allowed within NCDOT right of way, the District Office should inform the encroaching party that the request cannot be approved. The package should not be forwarded to the Utilities Unit for further review.
- Once at the Utilities Unit, the State Utilities Manager or designated representative will review the design package. The Utilities Unit will coordinate necessary reviews with other NCDOT units (e.g., Roadway Design, Hydraulics, Structures Management).
- If there are questions, concerns, or desired revisions regarding the submittal, the State Utilities Manager or designated representative shall provide comments regarding the issues to the encroaching party or its representative (e.g., the hired engineering consultant) and shall copy the District Engineer on any correspondence if the District Engineer desires to be included. The encroaching party or its representative will then resubmit the required changes or additional information directly to the Utilities Unit to continue their review, unless otherwise directed.

- After the design documents have been reviewed and found satisfactory, the Utilities Unit shall issue approval documentation for the attachment to the owner, copying the Division Engineer, District Engineer, and Bridge Maintenance Superintendent.

2.8.2 Temporary Shoring

When temporary shoring designs are required, packages should be submitted to the appropriate District Office via the Permits site, under the corresponding encroachment number, unless the encroaching party or its representative is otherwise instructed.

Design submittal guidelines, package contents, and review and approval procedures for shoring designs and installations are provided in Section [3.4.13](#).

2.8.3 Private Facilities

When private facilities are permitted, they shall adhere to the following conditions.

2.8.3.1 Where NCDOT Highways Exist by Easement

In cases where NCDOT highways are not fee simple right of way (that is, where NCDOT maintains the highway between the ditch lines and the highway exists by easement), then an encroaching party must obtain written permission from the adjacent property owners. In these cases, a Hold Harmless declaration letter (see [Appendix C](#)) must be signed by all adjacent property owners affected by the installation. If a three-party agreement is used and the third party on that agreement is a public entity (such as a county or municipality), then the Hold Harmless declaration is not needed because the intended maintainer of the facility is the public entity. An Encroachment Agreement that has been previously granted by NCDOT does not confer any property rights to a private utility owner or diminish the rights of the abutting property owners in those situations where the abutting property owner is different from the owner of the private utility.

2.8.3.2 Where NCDOT Highways Exist by Right of Way

Encasement may be required for all piping of treated effluent installed within NCDOT right of way at the discretion of the Division Engineer.

Installations shall cross perpendicular to highways and shall be a minimal length in crossing the right of way.

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Section 3 Engineering, Construction, and Maintenance

3.1 General

Because utility and non-utility encroachments on NCDOT right of way directly and indirectly affect public safety on public highways, facilities, and future transportation projects, sound engineering design and acceptable installation methods shall be followed for both utility and non-utility encroachments across all NCDOT Divisions. This section addresses processes and criteria for the justification, planning, engineering design, installation, maintenance, and decommissioning of utility and non-utility facilities.

Engineering requirements will apply to public and private utilities; existing utility and non-utility facilities relocated, replaced, retained, or adjusted; and new utility and non-utility facilities installed in NCDOT right of way, including those needed for highway purposes (such as for lighting, rest areas, or weigh stations).

Utility owners are responsible for the design, construction, and inspection of all utility installations, even if performed by others.

3.1.1 Purpose

The purpose of this section of the UAM is to prescribe regulation and accommodation requirements for utility and non-utility facilities along, across, or in right of way under the jurisdiction of NCDOT.

Even though private utilities serve select groups and do not directly or indirectly serve the general public, requests for occupancy within NCDOT right of way will be processed similar to requests from public utilities. When a private utility requests a lateral or longitudinal installation within NCDOT right of way, NCDOT may require additional elements pertaining to the design and encroachment request. See [Section 2, Encroachment](#), for additional information.

3.1.2 Planning and Design

Engineering criteria and requirements for the planning and design of utility and non-utility facilities within the NCDOT right of way for new installations as well as relocations or adjustments required by state highway projects and maintenance activities are included in this section.

The utility owner shall be responsible for the design of the utility facility to be installed within NCDOT right of way or attached to a highway structure.

3.1.2.1 General Criteria

All utility facilities shall be of durable materials and designed to minimize routine maintenance. Utility facilities requiring routine maintenance or inspection shall be designed and located to minimize impacts on the right of way and the traveling public.

Longitudinal locations of utilities under pavement shall be avoided. Where impracticable, the utility owner shall provide justification for accommodation under pavement.

All buried utilities placed within NCDOT right of way shall be electronically locatable from the surface. When utility facilities are not of ferrous material, then tracer wire, marker balls, or other measures should be used to ensure that the facilities can be located electronically without the need for excavation.

No utility work shall be allowed in medians less than twice the clear zone for the posted speed limit plus the width required for the utility work.

Non-utility installations shall conform to NCDOT design standards.

3.1.2.2 Practice of Engineering and Land Surveying

Projects involving public and private property where the safety of the public is directly involved shall be designed under the responsible charge of a licensed North Carolina Professional Engineer for engineering projects or a licensed North Carolina Professional Land Surveyor for land surveying projects. See [G.S. Chapter 89C, Engineering and Land Surveying](#).

3.1.2.3 Product Specifications

Additional manufacturer information for materials or equipment may be required in order to facilitate review of the proposed installation within the right of way.

3.1.2.4 Engineering Calculations

Engineering calculations (e.g., settlement calculations, corrosion projections) may be required in order to facilitate review of the proposed installation within the right of way. These calculations shall be signed and sealed by a licensed North Carolina Professional Engineer.

3.1.2.5 Street Lighting Design

Street lighting systems installed in NCDOT right of way must meet the design criteria shown for the roadway classification provided to the applicant by NCDOT. See Section [3.3.7](#), for plan preparation and design requirements, and Section [2.4.1](#) for pre-submittal considerations.

3.1.2.6 Other Lighting Design

Other lighting, such as pedestrian, security, and decorative lighting, is subject to encroachment standards for aboveground utilities. See Section [3.3.2](#) for design requirements for aboveground utilities and Section [2.4.1](#) for pre-submittal considerations.

3.1.2.7 Utility Facilities Not Permitted in Right of Way

The following are not permitted in NCDOT right of way:

- Substations (power)
- Regulator stations (gas)
- Metering stations (water, sewer, and gas)
- Lift stations (sewer)
- Pump stations (water)
- Sewage treatment plants
- Water treatment plants
- Blowoffs greater than 2 inches in diameter
- Large cell towers (Large cell towers are designed to support one or more cell sites, and the tower is typically manufactured from steel. Large cell towers are typically greater than 50 feet in height and could be lattice or self-support towers, or guy towers. These types of facilities

are not permitted in right of way. Small cell, which consist of an individual cell site that is smaller in size, power, and coverage radius, are allowed in right of way through the NCDOT permitting process. See Sections 2.5.8 and 3.3.6 for additional information.)

- Cathodic protection facilities (anode beds, rectifier equipment), with the exception of header wires, zinc ribbon, and other appurtenances, which may be allowed if structurally sound and outside clear zone
- Non-traditional power generation (e.g., solar panels, wind turbines)
- Private-use communications and data transmission infrastructure (e.g., private-use small cell)

Incoming and outgoing pipelines (gravity and pressure, force mains, distribution and transmission mains, and services), conduits, and underground conductors to the aforementioned facilities are allowed in NCDOT right of way in accordance with this UAM.

3.1.2.8 Other Installations and Discharges Not Permitted in Right of Way

The following encroachments on NCDOT right of way are not allowed:

1. Non-naturally occurring runoff or discharges, including, but not limited to, effluent from heating and air conditioning systems, wastewater treatment facilities, and contaminated groundwater remediation systems
2. Conduits or pipes carrying treated wastewater from hazardous petroleum products or other hazardous wastes (Conduits or pipes for public sewage is allowed by permit.)

3.1.2.9 Access for Servicing Utilities on Fully Controlled Access Right of Way

Utility facilities shall be located and designed in such a manner that they can be constructed and/or serviced without direct access from the controlled access through-traffic roadways or connecting ramps.

Access for servicing aboveground and underground utilities along or across fully controlled access roadways shall be limited to access from:

- frontage roads where provided;
- nearby or adjacent public roads and streets;
- manway or vehicle swing gates in the controlled access fence (approval required by State Utilities Manager and/or Right-of-way Access Committee and considered on a case-by-case basis); or
- trails along or near the NCDOT right of way lines.

Access connecting only to an intersecting road, from any one or all of which entry may be made to the outer portion of the NCDOT right of way, is allowed.

Direct access to a utility facility is highly discouraged but may be permitted when alternative locations and means of access are not available or are impractical, as long as this access does not adversely affect safety or traffic operations, or damage any facility.

NCDOT has the authority to control access to all highways under its jurisdiction. Any utility that plans to access its facilities for non-emergency maintenance from the controlled access through lanes or ramp roadways must have written permission from NCDOT before beginning any work. See [Section 2](#), Encroachment, for the request process and requirements.

3.1.2.10 Longitudinal Installations within Fully Controlled Access Right of Way

Criteria and conditions for longitudinal installations within fully controlled access right of way are as follows:

1. New utilities shall not be permitted longitudinally within fully controlled access right of way except when all of the special circumstances listed in item 3 are met and under strictly controlled conditions. Very rare exceptions may be considered with the approval of the Chief Engineer. When permitted by NCDOT, such installations must be located as close to the right of way line as possible.
2. Existing utilities may remain in place within a new controlled access right of way when an existing highway is changed to a freeway and all of the special circumstances listed in item 3, except item 3.d, are met.
3. A utility owner must demonstrate the following special circumstances for longitudinal installations within fully controlled access right of way to the satisfaction of NCDOT:
 - a. The accommodation will not adversely affect the safety, design, construction, traffic operations, maintenance, or stability of the roadway.
 - b. It is not feasible to accommodate the utilities on frontage roads or adjacent public roads or streets.
 - c. Alternative locations are not available or are cost prohibitive from the standpoint of providing efficient utility services.
 - d. The utility will not interfere with or impair the present use or future expansion of the roadway.
 - e. The location of the utility outside of the right of way would result in the loss of productive agriculture land, or loss of productivity of agricultural land, if any. In this case, the utility must provide information on the direct and indirect environmental and economic effects, which will be evaluated and considered by NCDOT pursuant to [23 USC 109\(l\)\(1\)](#).
 - f. The utility facilities will not be constructed or maintained by direct access from any fully controlled access roadway or connecting ramp, except for attachments to structures over major valley crossings.
4. When a longitudinal installation is allowed under the special circumstances listed in item 3, the following criteria are required:
 - a. The utility shall be located as close to the right of way line as possible.
 - b. Access for construction shall not require closure of a travel lane.
 - c. Service taps or other connections will be allowed only at interchanges.
 - d. In no case will utilities that transport a hazardous material be allowed in vehicular tunnels.
 - e. The lateral location of underground installations shall be suitably offset from the slope, ditch, and/or curb line.
 - f. The lateral location of poles or other ground-mounted utility facilities shall comply with the clearances set forth in Section [3.3](#).
 - g. Aerial installations are to be limited to self-supporting single-pole construction, preferably with vertical configuration of conductors and cables. Not more than one line

of support poles for aerial facilities will be permitted within the area. Joint-use facilities will be allowed.

3.1.2.11 Restrictions within Scenic Areas

The following conditions cover restrictions applicable to areas that include, but are not limited to, scenic strips, scenic overlooks, rest areas, roadside picnic tables, recreation areas, scenic byways, and the rights of way of highways adjacent thereto, as well as the rights of way of sections of highways that pass through public parks and historical sites:

- Within areas acquired or set aside for their scenic quality, historic value, or recreational use, new facility installations may be permitted only where they do not require extensive removal or alteration of trees or other natural features visible to the highway user, or do not impair the visual quality of the lands being traversed.
- Within areas acquired or set aside for their scenic quality, historic value, or recreational use, new aerial installations are to be avoided unless the following are applicable:
 - Other locations are unusually difficult, unreasonably costly, or more undesirable from the standpoint of visual quality.
 - Underground installation is not technically feasible or is unreasonably costly.
 - The proposed aerial installation can consist of suitable designs and materials, and can be made at a location that will give adequate consideration to the visual qualities of the areas being traversed.

The above conditions also apply to facility installations needed for a highway purpose, such as for highway lighting, or to serve a weigh station or rest areas.

3.2 Plan Requirements

Properly formatted, complete drawings with sufficient, applicable information shall be prepared for NCDOT review. If proper plans are not submitted, plan reviews for both utility and non-utility encroachment requests and utility relocation projects required by NCDOT STIP projects may be returned, and formal review will not begin until proper plans are resubmitted.

The plan requirements in this section apply to the following types of utility and non-utility installation and utility relocation project requests:

- **Encroachment (non-STIP).** These are new utility and non-utility installations that are outside the limits of a STIP project.
- **Encroachment (STIP).** These are new utility and non-utility installations that fall within the limits of a STIP project.
- **Utility Relocation Plans.** These cover the relocation of existing utility facilities within a STIP project.

Requirements for street lighting plans and quality control are also discussed in this section.

3.2.1 Encroachment (Non-STIP)

3.2.1.1 Plan Format

The format of plan sheets shall adhere to the following guidelines:

- Plans shall be legible.
- Plans shall be in PDF format, unless otherwise requested.
- Plan sheet size of 11"x17" or 8.5"x11" is preferred.
- Full-size plan sheets (22"x34") shall be submitted only if requested.
- Plans shall show the entire project limits.
- Plan sheets and details for work outside of NCDOT right of way, including work on city and non-NCDOT maintained roadways, shall be clearly marked as being outside of NCDOT right of way.

3.2.1.2 Plan Title Sheet

The following information shall be included on the plan title sheet:

- Vicinity map. A vicinity map shall be included to provide a quick and easy reference to the location of the proposed work. The following aspects shall be included in the vicinity map:
 - North arrow
 - Road labels
 - Labels identifying the beginning and end of proposed work area
- County name.
- Contact information. This information shall consist of names, telephone numbers, and email addresses of key people involved in encroachment plan development and encroachment construction, and shall, whenever possible, include a 24-hour contact to address issues during construction.
- Utility owner project number.
- Engineering firm information.
- Project scope. This information shall include a brief description of the work being proposed, with a general to and from provided (e.g., 8-inch sanitary sewer along SR 1324 from SR 1875 to NC 431).

3.2.1.3 General Notes

If included, general notes shall not only reflect utility owner and/or encroaching party requirements, but also NCDOT requirements.

3.2.1.4 Legend and Symbology

All features shown within the plan set shall have a corresponding symbol. The legend shall include all applicable symbols and line styles.

3.2.1.5 Detail Sheets

The following detail sheets shall be included, if applicable:

- Aerial detail with minimum vertical clearance. This aerial detail shall be included even if the proposed work is an overlash of an existing crossing.
- Minimum bury depth.
- Road crossing detail for controlled access and/or non-controlled access roadways, depending on which is applicable.
- Culvert crossing detail.
- Utility structures. ANSI tier rating for outside of pavement or AASHTO HS-20 load compliance under pavement should be noted for all proposed structures. If the proposed structure is not ANSI Tier 22 or HS-20 load rated or stronger, the NCDOT Approved Product number shall be provided.
- Applicable details for handholes, vaults, manholes, and other utility structures proposed.
- Installation/sidewalk repair detail if utility structures are proposed to be installed within the sidewalk.
- Bore pit detail. This detail shall note the standard size and depth of proposed bore pits.
- Bore detail. This detail shall show maximum proposed bore diameter.
- Other utility and non-utility details, as applicable.
- Site-specific details. Instances may occur when a standard detail is not applicable to a certain situation. In these instances, a site-specific detail shall be required to provide more detailed guidance for the situation.

3.2.1.6 General Plan View

The following aspects shall be included on all plan view sheets:

- North arrow.
- Road labels.
- Scale and dimension. All plans shall be either to scale or properly and accurately dimensioned, and shall include the following:
 - Scaled plans shall show the scale, which shall be no greater than 1" = 100'.
 - Dimensioned plans shall provide the information requested in Sections [3.2.2](#) and [3.2.3](#).
- Facility features, including the following:
 - Length of the installation or segment.
 - Size of the facility (carrier and encasement pipe, as applicable).
 - Utility and non-utility material.
- Installation method.
- Utility and non-utility structures with dimensions, if necessary.

- Bore diameter. This should be the actual diameter of the drilled bore or ream hole, and not the diameter of the carrier or encasement pipe.
- Bore pit locations, including the following:
 - Dimensions of bore pit.
 - Offsets from roadway features (i.e., offsets of bore pits from the edge of pavement or back of curb, the right of way line, and other relevant roadway features).
- Roadway features, including the following:
 - Edge of pavement and/or back of curb, with roadway width labeled for existing and proposed, if applicable.
 - Right of way line and/or controlled access line, with right of way width labeled for existing and proposed, if applicable.
 - Guardrail.
 - Storm drainage features (e.g., cross drainage pipes, longitudinal drainage pipes, catch basins and drop inlets, driveway pipes) with culvert diameters.
 - Ditch line and/or toe of fill.
- Bridges.
- Applicable non-utility features, including, but not limited to, curb ramps, sidewalk, and fencing type (e.g., chain link, woven wire).
- Offsets from proposed facilities. If not clearly conveyed by plan scaling, dimensions shall be included to show the offset of the proposed facility from the following roadway features:
 - Edge of pavement or back of curb.
 - Right of way line.
 - Guardrail.
 - Culverts, drainage structures, etc.
 - Bridge components, including the substructure of the bridge if the encroaching utility is proposed in close proximity to a bridge.
 - Existing utilities and utility appurtenances (e.g., utility poles, hydrants, valves, manholes, handholes, cabinets) in proximity to the proposed installation.

3.2.1.7 General Profile View

A profile view is required when crossing a roadway. At a minimum, a standard detail shall be included to show how roadways will be crossed. The following aspects shall be included on all profile view sheets:

- Roadway
- Right of way limits
- The entire crossing section through the right of way
- Minimum vertical dimensions and clearances
- Bore pit locations

- Elevations, sizes, and materials for potential utility conflicts
- Grade and/or cover on proposed utilities
- Scale of profile view
- Rim and invert elevations for proposed utility structures
- 1:1 slope from the edge of pavement
- Maximum bore diameter
- Applicable roadway characteristics (for non-utility encroachments):
 - Roadway grades of vertical alignments (existing and/or, if applicable, proposed)
 - K values
 - Design speed

The plan requirements identified in Sections 3.2.1.1 through 3.2.1.7 are provided at the [Connect NCDOT - Utilities](#) site ([NCDOT Standard Utility Encroachment Plan Requirements](#)).

3.2.2 Encroachment (STIP)

For new installations within the limits of a STIP, plans shall include the following:

- All applicable encroachment (non-STIP) plan requirements in Sections 3.2.1.1 through 3.2.1.7 shall be followed.
- Plans shall be formatted to full size (22"x34").
- Installation shall be shown in the most recent NCDOT STIP project plans (if plans are available), as follows:
 - DGN files shall be provided to the applicant by NCDOT.
 - The applicant shall provide the DGN file showing the proposed installation on NCDOT STIP project plans, and shall submit a PDF generated from this DGN file.

3.2.3 Utility Relocation Plans

For relocation of existing utility facilities within a STIP, plans shall include the following:

- All applicable encroachment (non-STIP) plan requirements in Sections 3.2.1.1 through 3.2.1.7 shall be followed.
- Existing and proposed right of way lines, existing and proposed utilities and non-utilities, and the proposed roadway shall be shown to delineate the conflict causing the relocation.
- Installation shall be shown in the most recent NCDOT STIP project plans (if plans are available), as follows:
 - DGN files shall be provided to the applicant by NCDOT
 - The applicant shall provide the DGN file showing the proposed installation on NCDOT STIP project plans, and shall submit a PDF generated from this DGN file.

3.2.4 Street Lighting Plans

Street lighting plans shall be prepared in accordance with standard engineering practices. Street lighting plans and submittals shall comply with the requirements listed in Section 3.3.7.

3.2.5 Quality Control

The encroaching party and its designated representatives (e.g., engineering consultants, subconsultants) are ultimately responsible for the quality of the engineering design and plan preparation.

Quality control should include an internal plan design review process that includes detailed elements of the design and report, calculation, design, and specification checking protocols.

Plans that clearly define the scope of improvements and are fully detailed, thorough, and professionally designed will expedite the NCDOT review and approval process.

3.3 Aboveground Utilities

3.3.1 General Requirements

3.3.1.1 Type of Construction, Vertical Clearance, and Location

For aboveground utilities, the type of construction, the vertical clearance above the pavement, and the location of aboveground utility facilities along the roadside are important design factors in preserving a safe traffic environment, the appearance of the highways, and the efficiency and economy of highway maintenance.

It is important to keep the clear zone as free as practical from fixed objects such as poles, cabinets, and related facilities. Such facilities shall be placed as far as practical from the traveled way and beyond the clear zone. These facilities shall also be placed as close to the right of way line as practical.

3.3.1.2 Roadway Terrain

The nature and extent of roadside development and the nature of the terrain being traversed are recognized as controlling factors for locating poles, guys, and other facilities close to the right of way lines.

3.3.1.3 AASHTO and FHWA Guidelines and Regulations

Vertical clearance and locations of aboveground utility facilities shall be in conformance with AASHTO and FHWA ([Clear Zones](#)) guidelines and regulations.

3.3.1.4 Pole Design and Attachment Loads

Poles shall be designed to accommodate all facilities and equipment to be attached to the pole. Equipment shall be attached only to poles that have been engineered to support the attachment. Poles designed to accommodate small cell equipment shall include a North Carolina Professional Engineer's seal on the plans submitted.

For requests involving attachment of equipment to poles, documentation may be required certifying the pole's ability to function appropriately and to safely withstand the proposed attachment loads.

3.3.1.5 Poles Solely for Cable Television Lines

NCDOT will not grant Encroachment Agreements covering the installation of poles erected solely for the purpose of cable television lines.

3.3.1.6 Attachment to Existing Poles Preferred

When a utility wants to install a new facility attached to a pole, attachment to existing utility poles is encouraged and preferred. Once permission is secured from the utility pole owner, an Encroachment Agreement can be submitted. If the attachment is related to small cell installations, see also Section 3.3.6.

3.3.1.7 Joint Use of Poles

Joint-use, single-pole construction is encouraged at locations where more than one utility or type of facility is involved. This use is of particular significance at locations where the right of way widths approach the minimum needed for safe operations or maintenance requirements, or where separate installations may require extensive removal or alteration of trees.

In situations where one utility is attaching a facility to a pole constructed by another utility, the attaching party shall obtain permission from the first utility that installed the pole. If the attachment is related to small cell installations, see also Section 3.3.6.

3.3.1.8 Prohibition of Multiple Pole Lines on the Same Shoulder

New poles within the right of way shall be installed such that they do not create multiple pole lines on the same side of the road.

3.3.2 Aboveground Objects

Any part of the facility that extends above the existing ground level by 4 inches or more is considered an aboveground utility object.

An aboveground utility object protruding greater than 4 inches above the existing ground level that is in the clear zone shall meet breakaway criteria or be shielded by a traffic barrier approved by NCDOT.

3.3.3 Location and Alignment

3.3.3.1 Criteria

The following criteria shall apply to the design and placement of aboveground utilities in NCDOT right of way:

1. On and along roadways with shoulder sections, poles and other aboveground facilities shall be located as near as practical to the right of way line and outside the clear zone for the highway section involved.
2. According to the [AASHTO Roadside Design Guide](#), because curbs do not have a significant redirection capability, poles and other aboveground facilities behind a curb should be located at or beyond the suggested clear zone distances for the highway section involved.

Additionally, aboveground facilities shall be located as near as practical to the right of way line and behind the sidewalk if possible. The utility accommodation shall not interfere with existing/proposed curb ramp and sidewalk from being Americans with Disabilities Act (ADA) compliant.

3. In urban areas and other locations where several of the following circumstances exist, consideration may be given to allowing the placement of non-breakaway structures within the clear zone:

- a. Right of way is limited.
- b. Driver speeds are slower (e.g., less than 45 miles per hour [MPH]).
- c. Non-breakaway facilities near the travel lane are prevalent in the immediate area.
- d. Existing conditions establish a driver expectation of non-breakaway facilities close to the travel lane.

For information regarding the placement of small cell facilities, see Section 3.3.6.

4. Aboveground utilities on urban streets with closely abutting improvements are special cases that must be resolved in a manner consistent with the prevailing limitations and conditions.
5. Exceptions to these offsets may be made where poles and other aboveground facilities are of a breakaway design or can be placed at locations behind guardrails, beyond deep drainage ditches, beyond the top of steep slopes and retaining walls, or in other similar protected locations.
6. Supports for longitudinal installations shall be limited to single-pole construction on each side of the right of way.
7. Guy wires to ground anchors and stub poles shall not be placed between a pole and the closest traveled way and shall be located outside the clear zone.
8. Where irregular-shaped portions of the right of way extend beyond or do not reach the normal right of way limits, variances in the location of poles shall be allowed to maintain a reasonably uniform alignment for longitudinal installations. Such installations will reduce the need for guys and anchors between poles and the roadway.
9. Aboveground utilities shall not interfere with highway drainage facilities and their maintenance.
10. The positioning of any new or replacement aboveground installation that would obstruct a portion of the line of sight of a highway or commercial driveway, and that would have a width of more than 18 inches, shall not be permitted.
11. Locating aboveground facilities in potential target locations, such as beyond lane drops, sections where the pavement narrows, and tee intersections, shall be avoided.
12. Longitudinal installations of poles, guys, or other related facilities shall not be located in a highway median and shall be located outside the clear zone.
13. On crossings of a highway, aboveground facilities shall not be located in a highway median less than 80 feet wide.
14. The angle of crossing for aboveground utility crossings shall be as close to perpendicular to the highway alignment as practical.

3.3.3.2 Utilities in Fully Controlled Access Right of Way

The following criteria apply to aboveground utility installations on fully controlled access right of way with one exception. Utilities for servicing facilities required solely for the purpose of operating the controlled access highway are exempt from the provisions of this section provided that such utilities do not traverse scenic, historic, or recreational areas.

Longitudinal Installations

The special circumstances required to permit a longitudinal installation within fully controlled access right of way, as well as the location requirements if a longitudinal installation is allowed, are outlined in Section [3.1.2.10](#).

Access for Servicing Utilities

Utility facilities shall be located and designed in such a manner that they can be constructed and/or serviced without direct access from the controlled access through-traffic roadways or connecting ramps. Additional information regarding this access can be found in Section [3.1.2.9](#).

Overhead Utility Crossings

Overhead utility crossings of fully controlled access right of way shall adhere to the following criteria:

1. The utility owner shall provide at least 24 feet of vertical clearance for aboveground facilities crossing any controlled access roadway. All other clearances shall conform to the NESC, US Department of Commerce, and National Bureau of Standards. See Section [3.3.5](#) for additional requirements.
2. New utility installations, and adjustments or relocations of existing utilities, may be permitted to cross a fully controlled access roadway.
3. Crossing shall be generally perpendicular to the roadway alignment and shall preferably be located under the roadway.
4. Installation and maintenance shall be conducted without access from the fully controlled access roadway or ramps.
5. Installation and maintenance may be accessed from a crossroad or street that crosses over or under a fully controlled access roadway.
6. Aboveground utility lines crossing a controlled access highway shall be adjusted to locate supporting poles and structures outside the controlled access line. No pole or structure installation shall be placed within the clear zone.
7. Under special circumstances, and in accordance with items 3, 4, and 5 above, intermediate supporting poles, manholes, and service access points may be placed in medians that have sufficient width to provide the clear zone from the edges of both existing and future traveled ways.
8. Under special circumstances, a restricted access locked gate along the controlled access fence may be used to meet periodic service access needs.

3.3.3.3 Pole Placement Relative to Bridges

As is practical, poles shall be placed at a sufficient distance from the approaches and end bents of structures as to not conflict with future bridge construction or maintenance. See Section [3.5.2.1](#), Figure 3-3, for minimum horizontal clearances.

3.3.4 Clear Zone

Clear Zone shall be applied in accordance with the latest version of the [AASHTO Roadside Design Guide](#) specifically, but not limited to, Chapter 3: Roadside Topography and Drainage

Features, Chapter 10: Roadside Safety in Urban or Restricted Environments, and Chapter 12: Roadside Safety on Low-Volume Roads and Streets.

The [AASHTO Roadside Design Guide](#) uses the term “clear zone” to designate the unobstructed, traversable area provided beyond the edge of the traveled way for the recovery of errant vehicles. The clear zone includes shoulders, bike lanes, and auxiliary lanes, except those auxiliary lanes that function like through lanes. The current edition of the AASHTO Roadside Design Guide presents information on the latest state-of-the-practice in roadside safety. It presents procedures to determine a recommended minimum clear zone on tangent sections of roadway with variable side slopes and adjustments for horizontal curvature.

3.3.4.1 Clear Zone Application and Suggested Distances

The width of a clear zone varies with design speed, traffic volumes, and slope configurations. It should be noted that clear zone distances provided in this section approximate the center of a range and should not be held as absolutes. Clear zone distances provided in the [NCDOT Roadway Design Manual](#) (Chapter 1, General Design) are shown as Figure 3-1, below. (This table can also be found as Table 3-1 in the latest edition of the AASHTO Roadside Design Guide). The foreslopes and backslopes are typical of a ditch and shoulder section.

Regarding the application of these suggested distances, the latest edition of the AASHTO Roadside Design Guide states in Section 3.1: The Clear-Zone Concept:

“[Figure 3-1] can be used to determine the suggested clear-zone distance for selected traffic volumes and speeds. However, [Figure 3-1] provides only a general approximation of the needed clear-zone distance. These data are based on limited empirical data that were extrapolated to provide information for a wide range of conditions. The designer should keep in mind site-specific conditions, design speeds, rural versus urban locations, and practicality. The distances obtained from [Figure 3-1] should suggest only the approximate center of a range to be considered and not a precise distance to be held as absolute. For roadways with low traffic volumes, it may not be practical to apply even the minimum values found in [Figure 3-1].”

All aboveground objects should be placed as close to the right of way line as possible and outside the clear zone as defined by the latest edition of the AASHTO Roadside Design Guide. If installation within the clear zone is unavoidable, the aboveground objects shall be constructed to acceptable safety criteria (e.g., be of a breakaway design) or shielded (e.g., set behind guardrail). Aboveground objects that can neither be placed outside of the clear zone, nor constructed to acceptable safety criteria or shielded may be prohibited from installation within the right of way at the desired location.

The latest edition of the AASHTO Roadside Design Guide states that, due to a variety of factors, “In some cases, it is reasonable to leave a fixed object within the clear zone; in other instances, an object beyond the clear-zone distance may require removal or shielding.” If, through analysis of the proposed installation and location, the encroacher believes it is safe and appropriate to install a non-breakaway aboveground object within the suggested clear zone, plans signed and sealed by a Professional Engineer licensed in North Carolina must be submitted certifying the safety of the installation.

Figure 3-1. Clear Zone Distances

CLEAR ZONE DISTANCES

1 - 4N

**CLEAR ZONE DISTANCES
(IN FEET FROM EDGE OF TRAVEL LANE)**

DESIGN SPEED	DESIGN ADT	FORESLOPES			BACKSLOPES		
		1V:6H or flatter	1V:5H to 1V:4H	1V:3H	1V:3H	1V:5H to 1V:4H	1V:6H or flatter
40 mph or less	UNDER 750	7 - 10	7 - 10	**	7 - 10	7 - 10	7 - 10
	750 - 1500	10 - 12	12 - 14	**	10 - 12	10 - 12	10 - 12
	1500 - 6000	12 - 14	14 - 16	**	12 - 14	12 - 14	12 - 14
	OVER 6000	14 - 16	16 - 18	**	14 - 16	14 - 16	14 - 16
45 - 50 mph	UNDER 750	10 - 12	12 - 14	**	8 - 10	8 - 10	10 - 12
	750 - 1500	14 - 16	16 - 20	**	10 - 12	12 - 14	14 - 16
	1500 - 6000	16 - 18	20 - 26	**	12 - 14	14 - 16	16 - 18
	OVER 6000	20 - 22	24 - 28	**	14 - 16	18 - 20	20 - 22
55 mph	UNDER 750	12 - 14	14 - 18	**	8 - 10	10 - 12	10 - 12
	750 - 1500	16 - 18	20 - 24	**	10 - 12	14 - 16	16 - 18
	1500 - 6000	20 - 22	24 - 30	**	14 - 16	16 - 18	20 - 22
	OVER 6000	22 - 24*	26 - 32*	**	16 - 18	20 - 22	22 - 24
60 mph	UNDER 750	16 - 18	20 - 24	**	10 - 12	12 - 14	14 - 16
	750 - 1500	20 - 24	26 - 32*	**	12 - 14	16 - 18	20 - 22
	1500 - 6000	26 - 30	32 - 40*	**	14 - 18	18 - 22	24 - 26
	OVER 6000	30 - 32*	36 - 44*	**	20 - 22	24 - 26	26 - 28
65 - 70 mph	UNDER 750	18 - 20	20 - 26	**	10 - 12	14 - 16	14 - 16
	750 - 1500	24 - 26	28 - 36*	**	12 - 16	18 - 20	20 - 22
	1500 - 6000	28 - 32*	34 - 42*	**	16 - 20	22 - 24	26 - 28
	OVER 6000	30 - 34*	38 - 46*	**	22 - 24	26 - 30	28 - 30

* Clear zone distances can be limited to 30 feet unless in a high accident rate area.

** Since 3:1 slopes are not recoverable, additional run out area must be provided at the toe of the slope. Please refer to figure 1 on sheet 1-4M.

3.3.4.2 Urban Locations and Curb and Gutter Sections

In accordance with the latest edition of the [AASHTO Roadside Design Guide](#), because curbs do not have a significant redirection capability, obstructions behind a curb should be located at or beyond the suggested clear-zone distances shown in Figure 3-1, above. If installation within the clear zone is unavoidable, the aboveground objects shall be constructed to acceptable safety criteria (e.g., be of a breakaway design) or shielded (e.g., set behind guardrail). Aboveground objects that can neither be placed outside of the clear zone, nor constructed to acceptable safety criteria or shielded may be prohibited from installation within the right of way at the desired location.

Regarding the clear zone in urban areas, the latest edition of the AASHTO Roadside Design guide states:

“For arterials and other non-controlled access facilities in an urban environment, right-of-ways often are extremely limited and, in many cases, establishing a clear zone using the guidance in [Figure 3-1, above] is not practical. These urban environments are characterized by sidewalks beginning at the face of the curb, enclosed drainage, numerous fixed objects, and frequent traffic stops. These environments typically have lower operating speeds and, in many instances, on-street parking.

Clear zone applications in urban locations shall conform to the latest edition of the AASHTO Roadside Design Guide, specifically, but not limited to Chapter 10: Roadside Safety in Urban or Restricted Environments. If, through analysis of the proposed installation and location, the encroacher believes it is safe and appropriate to install a non-breakaway aboveground object within the suggested clear zone, plans signed and sealed by a Professional Engineer licensed in North Carolina must be submitted certifying the safety of the installation.

3.3.4.3 Breakaway Supports

If installation of an aboveground object within the clear zone is unavoidable, the object shall be shielded (e.g., set behind guardrail) or constructed to acceptable safety criteria (e.g., be of a breakaway design).

Breakaway support design must comply with the most recent editions of the following guidance:

- [AASHTO Roadside Design Guide](#)
- [AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals](#)

Care should be taken when considering the installation of breakaway poles on streets in densely developed areas, particularly those with sidewalks, due to the potential of interference with pedestrians if struck. The designer should analyze the proposed pole and location to determine the safest installation possible for vehicular and pedestrian traffic.

If power is being supplied to equipment on a breakaway pole, the power installation should use appropriate breakaway power connections.

Requests to install breakaway poles shall be accompanied by documentation certifying the pole's compliance with the design guidance above or with an NCDOT-approved design for breakaway poles that are related to small cell and/or street lighting encroachments.

3.3.5 Vertical Clearance

The minimum vertical clearance provided for aboveground utility facilities shall be the following for the listed crossing types:

- Crossing a roadway – 18 feet
- Wires longitudinal or parallel to a roadway – 16 feet
- Crossing a controlled access highway – 24 feet
- Crossing an [over-height and/or over-weight route](#) – 24 feet

Clearances published by the Occupational Safety and Health Administration are required to maintain a safe distance from electric facilities when operating a crane or derrick. See [29 CFR 1926, Subpart CC – Cranes and Derricks in Construction](#).

In accordance with [NESC](#), NCDOT vertical roadway clearances meet or exceed published values for electric distribution and communication facilities. Electric transmission facilities must adhere to current NESC clearance requirements.

3.3.6 Small Cell Nodes and Antenna Systems

This section applies to what [G.S. §136-18\(2\)c](#) refers to as “non-utility owned or operated communications or data transmission infrastructure.” These facilities transmit radio frequencies and include, but are not limited to, small cell antennas, distributed antenna systems and their

associated poles, cabinets, and appurtenances. These facilities do not include traditional cell towers, which are not permitted in NCDOT right of way.

Only public-use small cell nodes and antenna systems (i.e., those used for public telecommunication services as defined or regulated under state or federal law) will be permitted in NCDOT right of way. Private-use small cell nodes and antenna systems are not allowed in NCDOT right of way except as otherwise approved by the NCDOT Chief Engineer.

The encroaching party agrees to meet any and all requirements by other governing laws, statutes, or authorities associated with governance over the installation (e.g., FCC, Federal Aviation Administration, Federal Railroad Administration, FHWA, Federal Transit Administration, Homeland Security, North Carolina Utilities Commission, municipal zoning ordinances, other state agencies, railroads).

3.3.6.1 New, Replacement, and Existing Poles

For the purposes of these requirements, new, replacement, and existing poles are defined as follows:

- New pole: A new pole installed in a new location.
 - Commonly, this pole is intended for the sole purpose of accommodating pole-mounted small cell nodes and antenna systems, and is not intended to carry other types of utilities.
- Replacement pole: A pole installed to replace an existing pole.
 - Most often, a replacement pole is requested when an existing pole cannot accommodate the additional loads of proposed small cell nodes and antenna systems to be attached.
 - This pole may carry additional types of utilities, including street lighting facilities.
 - A replacement pole shall be installed in the same location as, right next to, or reasonably close to the location of the pole being replaced, and the pole being replaced shall be removed from the right of way.
 - A proposed pole whose location is not deemed reasonably close to the existing pole location shall be considered a new pole.
- Existing pole: A pole already installed within the right of way.
 - This pole may carry additional types of utilities, including street lighting facilities.
 - If the existing pole is structurally capable of supporting the addition of small cell nodes and antenna systems, the equipment owner and/or pole owner may choose to not replace the pole. More information about use of existing poles is provided in Section [3.3.6.3](#).

3.3.6.2 Controlled Access Right of Way

Small cell nodes and antenna systems in controlled access right of way shall be as follows:

- Small cell nodes and antenna systems are highly discouraged within fully controlled access right of way. Rare exceptions may be allowed with the approval of the Chief Engineer. If allowed, facilities shall be designed and located in such a manner that they can be constructed and serviced without direct access from the controlled access through-traffic roadways or

connecting ramps. See Section 3.1.2.9 for additional information regarding access of facilities within controlled access right of way.

- Limited or partially controlled access right of way installations of small cell nodes and antenna systems will be permitted.
- All permitted installations within controlled access right of way shall be placed at the outer limits of the right of way, outside the clear zone.

3.3.6.3 Criteria for Location and Pole Placement

The following criteria shall apply to the location and pole placement for small cell nodes and antenna systems.

Location of Small Cell Nodes and Antenna Systems

Small cell nodes and antenna systems shall be located where:

- maintenance can be performed with minimal disruption to the traffic flow on the roadway (Installations that will require lane closures to perform maintenance are discouraged);
- the equipment will not protrude into the clear zone;
- the equipment will not be a hazard to roadway users, including pedestrians and bicyclists.

Use of Existing Poles and Justification of New Poles

Co-location of facilities, including attachment of new small cell nodes and antenna systems to existing poles, is highly desired.

Careful consideration and earnest investigation shall be given to attaching equipment to existing poles. If attachment to an existing pole cannot be achieved, documentation should be provided noting why attachment cannot be achieved and the efforts taken to attempt attachment.

When an existing pole cannot be used, the option of replacing that pole with one suited to accommodate the small cell node and antenna system should be pursued and eliminated before requesting to install a new pole.

New poles solely for power meters are highly discouraged in the right of way. In no case shall a new pole be installed or allowed for the sole purpose of mounting a power meter within the clear zone.

A stub pole (typically 5 feet in height or less above ground and considered non-breakaway) for the sole purpose of mounting a meter or power disconnect may be considered only in cases where proper shielding is previously in place of an existing utility pole on which the pole owner's policies, regulations, statutes, or laws require mounting a meter and other equipment associated with the Small Cell installation on a separate pole. A stub pole location and associated equipment to be mounted on the stub pole shall comply with [Section 3.3.2](#) and [Section 3.4.7.3](#) and must be located in the immediate vicinity of an existing pole. Prior to approval and at the discretion of NCDOT, a report may be required for a justification of a separate stub pole demonstrating efforts taken by the Small Cell provider to locate all equipment on an existing pole and any appropriate response from the pole owner. See also [Section 2.4.16](#) and NCDOT Roadway Standard Drawing 1700.01 "Electrical Service Options" as a typical when a stub pole is required.

Location of Existing Poles

When equipment is mounted on existing poles, those poles shall be located outside of the clear zone whenever practical.

When it is necessary to mount equipment on an existing pole located within the clear zone, the pole may be required to be of a breakaway design. See Section 3.3.4.3 for more information regarding breakaway poles. Exceptions may be considered in accordance with Section 3.3.3.1, item 3.

For ease in reviews, an encroaching party may elect to request a breakaway pole design to be reviewed and approved for addition to the NCDOT approved products list. Guidance for submitting breakaway pole designs for preapproved products is available at <https://connect.ncdot.gov/resources/Products/Pages/default.aspx>.

Location of Replacement Poles

If an existing pole is to be replaced to accommodate the installation of small cell nodes and antenna systems, the replacement pole shall be placed no closer to the edge of the travel lane and preferably farther away.

NCDOT reserves the right to request that a replacement pole be placed farther from the travel way than the existing pole being replaced.

If the replacement pole is located within the clear zone, the pole may be required to be of a breakaway design. See Section 3.3.4.3 for more information regarding breakaway poles. Exceptions may be considered in accordance with Section 3.3.3.1, item 3.

Replacement Poles Requiring an Encroachment Agreement

When a pole is being replaced to accommodate new small cell nodes and antenna systems, this pole replacement shall be covered under an Encroachment Agreement. A separate encroachment request should be submitted for the pole replacement in addition to the small cell equipment encroachment request. If possible, the pole replacement documents should reference the small cell encroachment number.

Pole replacement to accommodate small cell nodes and antenna systems will not be considered a maintenance activity. Additionally, this work cannot be covered under a Blanket Encroachment Agreement that allows pole replacement (e.g., Form R/W 16.5A) because those Blanket Encroachment Agreements are intended for pole replacement in kind, not pole upgrades for the purpose of accommodating additional facilities. Pole replacement to accommodate small cell nodes and antenna systems must be reviewed and approved through an NCDOT encroachment request.

Location of New Poles

Installation of a new pole is highly discouraged when there is an existing pole line, existing utility poles, or existing streetlight poles on the same side of the roadway in close proximity to the desired location, as discussed previously in this section under [Use of Existing Poles and Justification of New Poles](#).

New poles shall be located outside of the clear zone if practical and as close to the right of way line as possible.

If a new pole must be located within the clear zone, the pole may be required to be of a breakaway design. See Section 3.3.4.3 for more information regarding breakaway poles. Exceptions may be considered in accordance with Section 3.3.3.1, item 3.

New poles in excess of 50 feet above ground height shall require review and approval by the NCDOT Utilities Unit, and may be subject to additional requirements for approval.

Aesthetics

Design and construction of any aboveground structure shall consider aesthetics and the appearance of the surrounding area in accordance with NCDOT guidelines, including, but not limited to, the [NCDOT Aesthetics Guidance Manual](#).

Pole density (i.e., number of existing utility poles in a given area) shall be considered for new poles in relative proximity to any existing poles. An effort to prevent “pole farms” shall be pursued by the owner with written justification for pole density of any proposed new poles and in combination with existing poles. This requirement may be subject to coordination and approval from the municipality of the small cell equipment and any new pole locations.

Panel or dish type antennas are not allowed.

Power Meters

Power meters shall be remote-read type.

Meters and other equipment shall be placed in a safe location, at a height and in a manner that they do not impede pedestrian and/or bicycle traffic according to current ADA standards, municipal ordinances, or other governmental laws, statutes, and policies.

Meters associated with power for small cell nodes must be located on a new pole designed for the small cell node or other existing pole.

Power Supplies

Permanent power generators will not be allowed in NCDOT right of way.

Alternative power supplies, such as batteries and fuel cells, are not allowed in NCDOT right of way.

Portable power generators may be used only for temporary emergency situations, when parked outside of the clear zone or with proper traffic control.

The encroaching party should provide documentation that breakaway couplings will be used on the incoming power to the small cell facility.

Electrical Lines Installed to Supply Power

Electrical lines installed to provide power to small cell nodes and antenna systems shall be covered under an Encroachment Agreement.

If the installation parameters do not violate the provisions of the power owner’s Blanket Encroachment Agreements for buried lines and/or service connections, the power owner can install these electrical lines under those agreements.

If the installation parameters for the electrical lines do not comply with the power owner’s standing Blanket Encroachment Agreements (e.g., installation involves directional drilling, pavement cuts) then a separate encroachment agreement should be submitted for the power installation.

Ground-Mounted Equipment

Cabinet-style components of small cell nodes and antenna systems that are mounted on the ground shall be considered “communication enclosures with power,” and its accommodation shall be subject to Sections 3.3.2 and 3.4.7.3.

Fiber and Other System Facilities

The lines connecting antenna, nodes, and hubs shall be permitted as telecommunication lines.

Local, State, and Federal Regulations

Where the NCDOT policy for small cell nodes and antenna systems in or over the NCDOT right of way is in conflict with local ordinances or state or federal regulations, the more restrictive requirements shall apply.

3.3.7 Street Lighting

Because lighting directly affects motorists, NCDOT must verify that lighting systems installed in NCDOT right of way meet acceptable design criteria. To do this, sufficient information must be provided. The plans should be prepared in accordance with standard engineering practices.

3.3.7.1 General

In addition to the applicable plan elements, details, and information described in Section 3.2.4, plans for street lighting requests shall also include the following:

1. Roadway typical section with typical pole location
2. Pole labels for each light pole location, which shall include the following:
 - New pole or existing pole, pole material type, and breakaway type (for poles inside the clear zone)
 - Mounting height of luminaire
 - Light bracket arm length
 - Pole setback, including setback distance from edge of travel for pole installed in shoulder section, and setback distance from face of curb for pole installed in curb and gutter section

This information may be redundant as shown in the typical sections, but it is beneficial for NCDOT Roadway Lighting to perform photometric check calculations.

3. Photometric file name (*.ies) used in the lighting design
4. Roadway classification (previously provided by NCDOT Roadway Lighting; see Section 2.5.2), which shows the following:
 - Required and designed [AASHTO lighting requirements](#)
 - Average maintained illuminance (foot-candle)
 - Uniformity
 - Veiling luminance ratio

3.3.7.2 Illumination Design Certification Statement

This is a statement of the amount and quality of illumination that will be provided by the lighting system. It is usually expressed as a level (average maintained foot-candles) and uniformity (ratio of average foot-candles to minimum foot-candles) of light that will be on the pavement in accordance with the AASHTO guidelines provided in the classification. Design calculations specifically applicable to the proposed lighting encroachment should be presented as certification that the lighting system will meet design values shown in the classification.

3.3.7.3 Photometric Calculations

Calculations shall be provided for the following:

- Illuminance foot-candle plot for travel lanes
- Lighting calculation based on roadway typical section and pole placement
- Lighting calculation summary

3.3.7.4 Electrical Design Certification Statement

This is a statement of the standard used to ensure that the electrical installation is adequate and safe. It shall be noted as a reference that the work conforms to either the NEC or NESC. Sufficient details including the operating voltage, type and size of wire, overcurrent protective devices, and grounding methods shall be shown or noted on the plans.

3.3.7.5 Structural Design Certification Statement

This is a statement of the standard used to ensure that the installation will withstand rain, wind, and ice loads under the soil and mechanical conditions. It shall be noted as a reference that the work conforms to the loading requirements of the NESC or AASHTO. Sufficient details including pole length and class, size of guy strand and anchors, foundation materials and dimensions, anchor bolt material and dimensions, and light standard material and dimensions shall be shown or noted on the plans.

3.3.7.6 Luminaire Certification Statement

The luminaire specifications shall include the style, light source type, wattage, voltage, photoelectric control, and photometric data. Catalog cuts, including all of the above data, may be presented as supplemental attachments to the plans if they are clearly referenced on the plans by a specific manufacturer's catalog number.

The encroaching party shall use luminaires with the appropriate lumen output and backlight, upright, and glare (BUG) ratings to optimize the lighting design and reduce the number of poles. In no case shall the use luminaires with an upright rating of greater than 1 be used in a roadway lighting design.

3.3.7.7 Pole and Arm Certification Statement (Light Standard)

The pole and arm specifications shall include the type of material, arm length, pole length, anchorage, and base details.

3.3.7.8 Foundation Details

The foundation details should include the type of material, size, reinforcing, anchor bolt projection, and top of the foundation elevation relative to finished earth grade.

3.3.7.9 Pole and Luminaire Placement Details

The traverse (setback) distance of the light standard foundation from the travel lanes shall be clearly indicated. This shall include a typical section (profile view) showing the distance of the light standard/foundation from the edge of the traffic lane for each appropriate situation, such as curb and gutter, guardrail, paved and unpaved shoulders, sidewalks, and ditches. The typical section shall also show the mounting height and overhand distance of the luminaire from the edge of the traffic lane.

The longitudinal locations of the lights along the roadway shall be clearly indicated, preferably by the roadway alignment survey station, but may be located by dimensioned distances from obvious features such as bridges or drainage structures. The actual plotted location on drawings may be acceptable for showing the longitudinal location if the plan drawing scale is 50 feet or less per 1 inch.

The position of the luminaire relative to pavement surface (mounting height) and to the edge of the traffic lane (overhang) shall be clearly indicated and shall be in accordance with the photometric design computations. The bracket arm length shall be noted on the plans and shall correlate with the pole placement (setback) and luminaire overhang dimensions.

The mounting height should be optimized for economy and uniformity. The same mounting height shall be used throughout the encroachment, where practical.

Overhang of the luminaire relative to the edge of the traffic lane may be a plus or minus distance, and will usually range from plus 2 feet to minus 10 feet. Special situations may dictate considerably different distances. The overhang distance is measured from the edge of the travel lane, which is usually marked as the white line on the pavement. It may or may not coincide with the edge of pavement because paved shoulders ranging from 2 feet to 10 feet in width may be outside the travel lane. The edge of travel may be considered as the gutter line in curb and gutter sections.

The setback requirements for poles (light standard/foundation) are described in Section [3.3.3](#).

Placement of poles behind a guardrail shall allow for deflection of the guardrail in the event of impact by a vehicle. Where a guardrail is present, poles shall be placed 5 feet 6 inches behind the face of the guard rail. Standard placement may be reduced to 3 feet 6 inches behind the face of the guardrail when the spacing for guardrail posts is reduced to 3 feet 1.5 inches. The 3-foot, 1.5-inch guardrail post spacing begins at a point 25 feet before reaching the pole and is extended along the length of the guardrail.

Poles (light standard/foundation) located near the end of the guardrail should have sufficient clearance to prevent a vehicle from impacting both the end of the guardrail and the pole. Clearance of 50 feet or greater either way from the end of the guardrail should be provided.

Poles shall be located in accordance with clear zone requirements found in Section [3.3.4](#).

It is desirable that all poles (breakaway and non-breakaway) be located outside the clear zone and 2 feet beyond the back-ditch slope. All poles shall be located behind the bottom of the ditch and no closer than 2 feet from the bottom of a ditch to prevent drainage blockage and scouring. See Section [3.3.4](#) for clear zone distances.

Minimum acceptable setback distances for breakaway poles is difficult to determine because any obstacles close to the traffic lanes, whether breakaway or not, are undesirable. Motorists tend to shy away from objects adjacent to the roadway depending on the distance of the object from the roadway and the speed at which the motorists are traveling. Even breakaway poles should not be

located closer to the travel lane than the shy line offset distance listed in the [AASHTO Roadside Design Guide](#).

All of the foregoing comments on placement of poles are applicable to locations on the outside of the roadway (to the right of traffic), and they can be equally applied to locations in the median of roadways. Except for concerns regarding maintenance and the hazard to opposing traffic of falling poles, lights located in the median usually provide better illumination on the roadway at considerably less cost. Lights may be located in medians when the width of the median allows the same clearances from both directions of travel as noted above for poles (light standards/foundations) located on the outside of the roadway and provided there is adequate area for maintenance vehicles.

All luminaire pole locations shall be designed to accommodate future roadway and/or pedestrian improvements to avoid conflict.

3.3.7.10 Identification

Each light standard and electrical service point shall be identified for ease of communication of specific situations. It is recommended that the service points be identified by letter and the light standard be identified by number.

3.3.7.11 Circuitry Details

Circuitry details may be presented as typical sections showing depth of bury, width of trench, backfill, and so on for underground circuits, and vertical clearance for overhead circuits. Methods of crossing pavement and repair of damaged areas shall be noted.

Overhead circuitry for lighting will not be allowed inside controlled access areas except adjacent to crossroads (Y-lines), where there are existing overhead lines and where the proposed overhead circuitry can be serviced from the crossroad.

3.3.7.12 Exceptions

Exceptions to the lighting requirements established in this UAM will apply to street lighting proposed on State-maintained roads in residential areas and other locations, where the lighting is not primarily intended for lighting the roadway, as determined by the Division Engineer.

Deviation from the lighting policy that is based on the above criteria must be approved by the Division Engineer or Manager of Right of Way.

3.3.7.13 Lighting within Controlled Access Right of Way

Encroachment requests inside of controlled access right of way require special design considerations. Light poles installed along the high-speed corridor (typically referred to as the L-line) and the ramps/loops are required to be metal poles on concrete foundations with impact attenuation (breakaway) devices. The light poles must be installed a minimum of 15 feet from the edge of travel and must meet NCDOT [Standard Specifications for Roads and Structures](#), Section 1404, and NCDOT [Roadway Standard Drawings](#), Sections 1404 and 1406. Light poles installed along the low-speed corridor (typically referred to as the Y-line) are allowed to meet the requirements found in this UAM.

3.4 Underground Utilities

Placement of underground facilities varies from site to site because of the different types of geographical features, either natural or manmade, at each site. The location and placement of

underground facilities are of major importance to preserving a safe traffic environment, the appearance of the highway, and the efficiency and economy of highway maintenance and reconstruction.

Underground utility design and construction shall:

- conform to all applicable local, state, and federal codes, standards, and specifications;
- support existing and future traffic loads;
- minimize the adverse effects on pavement, base, and other transportation facilities or other utility installations.

3.4.1 Location and Alignment

3.4.1.1 Criteria

The following criteria shall apply to the design and placement of underground utilities in NCDOT right of way:

1. On longitudinal installations, the utilities shall be on a uniform alignment at, or adjacent to, the right of way line to minimize interference with highway drainage, the structural integrity of the traveled way, shoulders and embankment, the safe operation of the highway, and maintenance of the right of way.
2. Longitudinal locations of utilities under pavement should be avoided. Where impracticable, the utility owner shall provide justification for accommodation under pavement.
3. Utility crossings of the highway are preferred to be as near perpendicular (90 degrees) to the highway alignment as practical.
4. Conditions that are generally unsuitable or undesirable for underground crossings shall be avoided. These include locations such as in deep cuts; near footings of structures; across intersections at grade or ramp terminals; at cross drains where flow of water, drift, or stream bed load may be obstructed; within basins of an underpass drained by a pump; and in wet or rocky terrain where it will be difficult to attain minimum bury.
5. Crossings of traffic circles and roundabouts shall be done in a way to avoid crossing the circle or roundabout itself and minimize the amount of facilities under pavement.
6. Service connection points placed by the utility shall be at or beyond the right of way line to prevent the utility's customers from entering the NCDOT right of way to make a connection.

3.4.1.2 Private Utilities

Generally, private utilities should follow the same location and alignment guidance as public utilities with the exception of private sewers.

Private sewer crossings of the highway shall be as near perpendicular (90 degrees) to the highway alignment as practical. Longitudinal locations of private sewers along the right of way are not permitted.

3.4.1.3 Utilities in Fully Controlled Access Right of Way

The following criteria apply to underground utility installations on fully controlled access right of way with one exception. Utilities for servicing facilities required solely for the purpose of operating

the controlled access highway are exempt from the provisions of this section provided that such utilities do not traverse scenic, historic, or recreational areas.

Longitudinal Installations

The special circumstances required to permit a longitudinal installation within fully controlled access right of way, as well as the location requirements if a longitudinal installation is allowed, are outlined in Section 3.1.2.10.

Access for Servicing Utilities

Utility facilities shall be located and designed in such a manner that they can be constructed and/or serviced without direct access from the controlled access through-traffic roadways or connecting ramps. Additional information regarding this access can be found in Section 3.1.2.9.

Underground Utility Crossings

New utility installations, and adjustments or relocations of existing utilities, may be permitted to cross under a controlled access right of way. To the extent possible, the crossing shall be as near perpendicular (90 degrees) to the highway alignment as practical.

Utilities crossing under a controlled access highway shall be of durable material and so installed as to preclude any necessity for disturbing the roadway to perform maintenance or expansion operations.

The underground utility installation shall be constructed using an approved trenchless method described in Section 3.6.8. Open trench installation is generally not permitted, however it may be considered in instances projects where NCDOT will have the controlled access highway roughly graded at the utility crossing site, and the installation occurs before pavement placement.

Manholes and other points of access to underground utilities may be permitted within the right of way of a controlled access highway only when the manholes and other points of access are located beyond the shoulders of the through-traffic roadway or connecting ramps as planned for later widening, if any, and only where they can be serviced or maintained without access from the through-traffic roadways.

Utilities that Follow Crossroads or Street Crossings

Where a utility follows a crossroad or street that is carried over or under a fully controlled access roadway, provisions shall be made for the utility to cross the roadway at the location of the crossroad or street in such a manner that the utility can be serviced without access from the through-traffic roadways or connecting ramps.

Generally, the utilities shall be located within the normal right of way of the crossroad or street, existing or relocated. The utilities may cross over or under the fully controlled access roadway, or may be carried on or through the highway grade-separation structure, provided that installation and servicing thereof can be accomplished without access from the through-traffic roadways or connecting ramps.

Where distinct advantage and appreciable cost savings are affected by locating the utilities outside the normal right of way of the crossroad or street, NCDOT may consider utility installation crossing the fully controlled access roadway at points removed from the grade-separation structures.

3.4.1.4 Median Installations

New utility installations shall not be allowed longitudinally within the median area, except in the following situations:

- The installation is for irrigation or other utilities serving the highway.
- The roadway is not a fully or limited controlled access facility and it is impractical to locate the utility elsewhere.

Existing utilities may be allowed to remain longitudinal within the median area of NCDOT right of way when impractical to relocate.

3.4.2 Minimum Bury Depth

The minimum depth of bury is the distance from the top of the utility pipe to the ground surface or, if a casing pipe is installed, from the top of the casing pipe to the ground surface. The depths provided in this section are minimums. The Department may require deeper bury depths depending on circumstances.

3.4.2.1 Trenchless Methods

The minimum depth of bury will vary depending on the casing pipe and drill hole diameter and the method of trenchless installation. Trenchless methods include bore and jack, HDD, pipe ramming, and tunneling (see Section 3.6.8 for additional information on these methods). The minimum bury depths are shown in [Table 3-1](#).

Table 3-1. Minimum Bury Depths using Trenchless Methods

Method	Minimum Depth of Cover
Bore and Jack or Auger ^a	3 feet
HDD ^b (transverse installations under pavement)	
Drilled/ream hole diameter (inches)	
2–6	5 feet
>6–15	12 times hole diameter
>15–36 ^c	15 feet or greater
HDD ^b (longitudinal installations parallel to pavement and outside theoretical 1:1 slope from edge of pavement)	
Drilled/ream hole diameter (inches)	
Any size	3 feet
Pipe ramming	
Pipe or casing diameter (inches)	
2–6	4 feet
>6–14	6 times pipe diameter
>14–72	8 feet
Driving/Moling/Pneumatic Hammer	3 feet or 10 times the diameter, whichever is greater
Tunneling	5 feet or 1.5 times the diameter of the bore, whichever is greater

^a Auger is limited to 6" or less in diameter.

^b These minimum cover depths apply to HDD installations on roadways with limited controlled access, partially controlled access, or non-controlled access. The minimum cover depth for transverse HDD installations of any size on fully controlled access roadways is 15 feet. Minimum cover depth for longitudinal installations is 3 feet for all highways, with horizontal alignment outside of the theoretical 1:1 slope from edge of pavement and as close to right of way line as practical.

^c The minimum cover depth for HDD installations of pipe greater than 36 inches in diameter shall be 15 feet and may be greater. These large HDD installations will be reviewed on a case-by-case basis.

Regardless of which trenchless method is used, the minimum depth for crossing under ditches is 2 feet under the unsilted original ditchline. See also Section [3.5.2.2](#) for HDD installations near structures.

3.4.2.2 Open Cut Method

The minimum depth of bury for cased and uncased utility construction shall be as shown in [Table 3-2](#).

Table 3-2. Minimum Bury Depths using the Open Cut Method

Utility or Crossing Type	Minimum Depth of Cover
Crossings under roadways (including shoulders)	3 feet
Crossings under ditches (paved and unpaved)	2 feet
Longitudinal electric power primary	3 feet
Longitudinal electric power secondary, and trenched communications	2 feet
Longitudinal (other utilities not listed)	3 feet
Street lighting	2.5 feet
Plowed-in communication lines/cable	1.5 feet

For cased utility construction, the minimum bury depth shall be measured to the top of the encasement.

3.4.3 Encasement Requirements

General encasement requirements include the following:

- For the protection of the roadway, encasement of the buried utility is required under any of the following circumstances, even if the installation method is open trench:
 - The bore diameter is greater than 6 inches, and the boring method will leave the bored hole unsupported at any time.
 - The proposed bury depth of the facility is less than the minimum depth required.
 - The installation is in close proximity to the footings of highway structures.
 - The installation is across unstable or subsiding ground.
 - The installation is near other locations that may be hazardous.
 - The facility being installed is a liquid under any pressure (low or high).
 - The installation crosses a controlled-access roadway (all types of access control).
 - The facility is private-use liquid that is being installed by a method other than HDD using joint-free pipe.
- Encasement of the buried utility is not required where any of the following apply:
 - The installation is longitudinal with no roadway crossings.
 - The function of the facility being installed would be negatively impacted by the addition of encasement. An example would be a steel encasement and a steel carrier pipe. A steel encasement would have increased corrosive effects on a welded steel natural gas line.
 - The facility is being installed using the HDD method.
 - The facility being installed carries non-pressurized liquid (e.g., gravity sewer).

- The inclusion of encasement may complicate the precise grades and elevations necessary for the proper function of the facility being installed (e.g., gravity sewer). Be advised that not all of these types of installations qualify for encasement exclusion. The installation method may still necessitate the use of an encasement to support the bore hole.
- The buried facilities include aerial portions (e.g., creek and river crossings).
NCDOT will allow the utility owner to install an encasement when it is not required.
- Encasement shall extend as follows (these are minimum distances):
 - Roadway cut sections: ditch line to ditch line
 - Roadway fill sections: 5 feet beyond the toe of slope
 - Curb and gutter sections: 3 feet beyond the curb
 - Encased gas or liquid fuel lines: to the right of way line
 - Controlled access highway or other NCDOT projects planned for future construction: from right of way line to right of way line or as otherwise directed to allow for future construction
 - Fully controlled access crossings less than 15 feet deep: controlled access line to controlled access line, where practical
 - Private-use liquid facility crossings: right of way line to right of way lineIn addition to these minimums, encasement shall extend beyond the 1:1 slope from the edge of pavement (whichever is further).
At the discretion of NCDOT, additional encasement lengths may be required.
- Vents shall be as follows:
 - Encased pipelines carrying gas or liquid fuel should be vented.
 - Vents for encased pipelines carrying gas or liquid fuel should be extended to the right of way line, or as otherwise required.
 - For encasements 150 feet long and less, a vent shall be placed on the high end of the encasement.
 - For encasements greater than 150 feet long, vents shall be placed on both ends
 - If vents are not of a breakaway design, shielded by guardrail, or otherwise protected, they shall be located outside of the clear zone.
- An encasement design sealed by a licensed North Carolina Professional Engineer may be required for large-diameter bores or variations to the encasement policy, or both.

3.4.3.1 Design and Thickness

Encasements shall be designed to support the load of the highway and superimposed loads. At a minimum, encasements shall equal or exceed the structural requirements for highway drainage pipe.

Encasement shall be of an equal or greater strength as that required on NCDOT highway drainage pipe.

Encasements shall be composed of materials of satisfactory durability for the conditions to which they may be exposed.

The annular space between the casing and carrier pipe at each end of the casing shall be sealed.

Size and minimum wall thickness of smooth wall or spiral welded steel encasement pipe shall be as shown in [Table 3-3](#).

Table 3-3. Encasement Pipe Size and Wall Thickness

Encasement Pipe Size, Outside Diameter (inches)	Wall (inches)	Thickness
4–12	0.188	
14–24	0.250	
30	0.312	
36	0.375	
48	0.500	

3.4.3.2 Encasement Pipe Fill

Flowable fill; grout; or Class III, Class IV, or Class V select materials shall be pumped or placed into the annular void between the carrier pipe and steel encasement pipes 24 inches or larger. Otherwise, the use of non-ferrous encasement or certification of durability with a design life of 100 years is required.

3.4.4 Cathodic Protection

Cathodic protection facilities include sacrificial anodes, cathodic protection test stations (above grade and below grade) and wires, and rectifier and meter loop poles. Cathodic protection facilities shall be located outside of the right of way, with the exception of header wires, zinc ribbon, and other appurtenances, which may be allowed if structurally sound and outside clear zone. Header wires connecting cathodic protection facilities to the pipe being protected will be permitted within the right of way. Any exception to this is at the discretion of the Division Engineer or the State Utilities Manager.

If a regulatory agency requires certain cathodic protection measures, NCDOT will consider this request when reviewing the cathodic protection request.

3.4.5 Acceptable Pipe Materials

Acceptable pipe materials for installation in NCDOT right of way are provided in this section by utility type.

3.4.5.1 Pressure Pipe

Watertight Joints

The type of joint and gasket material for pressure pipe installation, including fittings, coupling, and tie-ins, shall provide a watertight leakproof joint. Newly installed pipeline shall be pressure tested to a minimum of 1.5 times the maximum operating pressure of the system. If requested, test results of the passing pressure test shall be provided to NCDOT.

Joint Restraint at Bends, Tees, and Reducers

To prevent joint separation, thrust forces (unbalanced hydrostatic and hydrodynamic forces) generated from changes in direction of the pipeline shall be balanced. NCDOT preference for balancing thrust forces in underground pipelines is with a restrained joint system. If a tie-in to an existing system creates an unbalanced thrust force on the existing system, NCDOT will consider bearing or gravity thrust blocks. The restrained joint system shall be designed with a factor of safety of 1.25 for the test pressure specified and for the actual field conditions.

Potable, Raw, and Reclaimed Water and Sewer Force Main

Materials for pressure pipe containing liquids shall accommodate a minimum operating pressure of 200 psi. Acceptable pipe materials include the following:

- Polyethylene (PE) pipe
 - Conforms to AWWA C901 or C906
 - Minimum pressure class of 200 psi
- PVC pipe
 - Pressure Class Pipe
 - PVC
 - Conforms to AWWA C900
 - Minimum DR of 18
 - Minimum pressure class of 235 psi
 - Push-on type joints conforming to ASTM D3139 or butt fused joints made from ASTM D1784 Class 12454B plastic formulated for fusing
 - Pressure Rated Pipe
 - PVC
 - Conforms to ASTM D2241 or AWWA C905
 - Minimum SDR of 21
 - Minimum pressure rating of 200 psi
 - Push-on type joints conforming to ASTM D3139 or butt fused joints made from ASTM D1784 Class 12454B plastic formulated for fusing
 - PVCO
 - Conforms to ASTM F1483 or AWWA C909
 - Minimum pressure rating of 200 psi
 - Push-on type joints conforming to ASTM D3139
- Ductile iron pipe
 - Conforms to AWWA C151
 - Fittings and specials
 - Standard size fittings conform to AWWA C110

- Compact fittings conform to AWWA C153
- Mechanical or push-on joints conforming to AWWA C111
- Joint restraints (if used): minimum working pressure rating of 200 psi with a safety factor of 2
- Spiral welded steel pipe – Conforms to AWWA C200/M11
- Smooth wall steel pipe – Conforms to API 5L Grade B
- Reinforced concrete pressure pipe, cylinder type – Conforms to AWWA C300, C301, and C303
- Water services:
 - HDPE plastic pipe 0.75 inch through 2 inches
 - SDR 7 meeting ASTM D2239
 - SDR 9 meeting ASTM D2737
 - Copper pipe 0.75 inch through 2 inches
 - Type K
 - Conforms to ASTM B88

3.4.5.2 Gravity Sewer Pipe

Acceptable gravity sewer pipe materials include the following:

- Ductile iron
 - Pipe – ASTM A746 or ANSI/AWWA C151/A21.51
 - Fittings and Specials – ANSI/AWWA C110/A21.10 for standard size fittings or ANSI/AWWA C153/A21.53 for compact fittings
 - Pipe and fittings push on joints – ANSI/AWWA C111/A21.11
- PVC pipe
 - AWWA C900 and C905, DR14 and DR18
 - ASTM D2241, SDR 21
 - ASTM F794, ASTM F949 (A2000), and Schedule 40 and Schedule 80
- PVC pipe – ASTM D3034, minimum SDR 35, push-on type joints conforming to ASTM D3212
- Centrifugally cast fiberglass reinforced polymer mortar pipe (e.g. Hobas) – Conforms to– ASTM D3262
- Reinforced concrete sewer pipe
 - Conforms to ASTM C76 or AASHTO M 170 with a Class III minimum rating.
 - Gasket joints conforming to ASTM C443 or AASHTO M 198 Type A or B.
- Extra Strength Vitrified Clay Sewer Pipe
 - Conforms to ASTM C700 with factory fabricated joints meeting ASTM C425

- Acrylonitrile butadiene styrene composite sewer pipe, which shall be used for domestic sewage only:
 - Pipes 8 inches through 15 inches – ASTM D2680
 - Pipes 4 inches and 6 inches for laterals – ASTM D2751

3.4.5.3 Natural Gas

Acceptable natural gas pipe materials include the following:

- Smooth wall steel pipe – API 5L Grade B
- Spiral welded steel pipe – ASTM A211
- Circular black steel pipe – ASTM A120 or A589
- Galvanized steel pipe – ASTM A120
- Polyethylene plastic:
 - Pipe – ASTM D2239, SDR 7
 - Tubing (sizes 0.75 inch through 2 inches only) – ASTM D2737, SDR 9
- HDPE plastic pipe (high molecular weight and medium molecular weight) – SDR 11.5, PE3408 and PE2406 with a maximum operating pressure of 60 pounds per square inch gauge

3.4.5.4 Petroleum

Acceptable petroleum pipe materials include the following:

- Smooth wall steel pipe – API 5L Grade B

3.4.5.5 Conduit

All conduit material shall be of a strength adequate to withstand the loads it will be subjected to.

3.4.6 Unsuitable Pipe Materials

Asbestos cement pipe for new installations or relocations will not be allowed inside NCDOT right of way.

PVC SDR 26 pipe will not be allowed inside NCDOT right of way for pressure applications (e.g., water line, force main).

Lead-jointed pipe is not allowed to remain in NCDOT right of way if load conditions over the pipe change.

3.4.7 Underground Electric and Communication Lines

There is a wide variation in the techniques and practices used for installing electric power and communication lines underground because of differences in factors such as water conditions, type of subsoil, and facility congestion. Accepted methods for the underground installation include trenching for conduit or duct construction or for uncased buried cable, direct burial for plowing of buried cable, jacking, or pushing of pipe conduit on highway crossings where soil conditions permit.

Any concrete foundations or slabs required for a cabinet, pedestal, or other appurtenance shall not protrude more than 4 inches above the surrounding ground surface.

3.4.7.1 Spare Conduit/Casing

On either cased or uncased installations, particularly on crossings of the highway, consideration shall be given for placing spare conduit or duct to accommodate known or planned expansion of the underground system.

3.4.7.2 Service Connection/Meter Points

The utility shall place service connection points at or beyond the right of way line to prevent the utility's customers from entering NCDOT right of way to make a connection.

3.4.7.3 Communications Enclosures with Electrical Power

The following design guidance shall be used for communications enclosures with electrical power:

1. Communications enclosures (cabinets) shall:
 - a. not be allowed in controlled access right of way;
 - b. be located no closer than 300 feet from intersecting roadways and AASHTO sight distance triangles, whichever is greater;
 - c. be located no closer than 100 feet from intersecting roadways on the statewide tier¹ and out of AASHTO sight distance triangles, whichever is greater;
 - d. be located no closer than 100 feet from intersecting roadways and out of AASHTO sight distance triangles on the regional and sub-regional tiers, whichever is greater;
 - e. be located at the right of way line or out of the AASHTO clear zone, whichever is greater for all tiers.
2. Owners of communication enclosures with electrical power shall do as follows:
 - a. Provide 15 days' advanced notice prior to construction to municipalities and adjacent property owners of the proposed enclosure location. The requirement of advanced notice will be a condition of the Encroachment Agreement approval.
 - b. Determine the safe location of the proposed enclosure by providing computations and drawings indicating that the location is outside of sight distance and the clear zone in accordance with AASHTO requirements and items 1.b through 1.e above. The applicant (utility owner) is required to provide this information sealed by a licensed North Carolina Professional Engineer unless the applicant (utility owner) is exempt by [G.S. §89C-25](#).
3. System tier (statewide, regional, and sub-regional) information can be found at NCDOT ([NC Transportation Network](#)).
4. See [Section 2](#), Encroachment, for types of Encroachment Agreements and requirements for submittals and the review and approval process.

Content for Section [3.4.7.3](#) was taken from NCDOT Memo, dated May 7, 2009, issued by the Chief Engineer (see [Appendix D](#)).

¹ The statewide tier refers to the North Carolina Multimodal Investment Network. Statewide tier highway facilities serve long-distance trips, connect regional centers, support efficient movement of people and goods, have the highest use, and mostly provide a mobility function as opposed to a land access function. All other state-maintained highways fall into either the regional or sub-regional tier. The North Carolina Multimodal Investment Network may be associated with the [NCDOT National Highway System Map](#).

3.4.7.4 Transmission of Non-Traditionally Generated Power

Transmission of non-traditionally generated power from its point of generation to the public grid is allowed within the right of way. This source of energy shall not be treated differently than traditionally generated power.

Power generation equipment and devices from non-traditional sources (e.g., solar panels, wind turbines) are not allowed within the right of way. However, solar farms that sell power directly to power-providing companies will be treated as a public utility and allowed to run power lines to the power-providing company along NCDOT rights of way according to established guidelines for their accommodation covered in other sections of this UAM.

3.4.8 Manholes, Vaults, and Handhole Enclosures

NCDOT will permit the construction or installation of the following:

- Brick or concrete block utility manholes
- Precast reinforced concrete utility manholes and vaults
- Cast-in-place reinforced concrete utility manholes and vaults
- Precast concrete, fiberglass reinforced polymer, or high-density polyethylene underground enclosures

Installation of these structures within the pavement should be avoided. If location within pavement is required, installation in wheel paths and at roadway intersections should be avoided.

Thermoplastic enclosures are acceptable for street lighting and intelligent transportation system purposes if NCDOT is to own the facility after installation; however, a polymer concrete ring and lid are required.

Manholes, vaults, and handhole enclosures are defined as follows:

- **Utility manholes.** An underground structure cylindrical in shape and tapered off at the top to provide for an access manhole cover and ring.
- **Utility vaults.** An underground structure rectangular in shape and composed essentially of a floor slab, vertical walls, top slab, manhole covers, and manhole rings or frames.
- **Utility manholes and vaults** are sized to allow personnel to enter a confined space for the purpose of inspecting, installing, operating, or maintaining equipment, wiring, cable, pipes, and related appurtenances.
- **Handhole enclosures.** An underground enclosure that houses and protects underground distribution equipment, including, but not limited to, splice cases, excess cable, and construction or pull-box equipment. These enclosures are typically non-metallic. The removable cover is typically installed flush to grade and supports the anticipated loading requirements of the installation. A handhole enclosure is sized to allow personnel to reach into, but not enter, the enclosure to install, operate, or maintain equipment, wiring, and cable.

3.4.8.1 Design Loads

When manholes, vaults, and handhole enclosures are constructed or placed within NCDOT right of way, the design loading for these structures shall be as follows:

- When under concrete or asphalt roadway pavement, the manholes, vaults, and handhole enclosures shall be rated for AASHTO HS-20 live load with traffic-bearing manhole frames or rings with covers, for deliberate heavy vehicular traffic applications.
- When outside of concrete or asphalt roadway pavement but within NCDOT right of way, handhole enclosures shall be rated for ANSI/SCTE Tier 22 for off-roadway applications subject to occasional, non-deliberate heavy vehicular traffic.
- When outside of concrete or asphalt roadway pavement, the manholes and vaults shall be rated for AASHTO HS-20 live load with traffic-bearing manhole frames or rings with covers, for deliberate heavy vehicular traffic applications.

For additional information on underground enclosure integrity testing, see the [ANSI/SCTE Standards](#).

All material and construction shall be subject to inspection, sampling, testing, and approval of NCDOT.

3.4.8.2 Specifications

Construction or installation of brick or concrete block utility manholes shall adhere to the following specifications:

- For depths up to, but not exceeding, 12 feet, the minimum wall thickness shall be 8 inches for brick and 6 inches for concrete block.
- For depths greater than 12 feet, the minimum wall thickness shall be 12 inches for both brick and concrete block construction.

Construction and installation of utility manholes, precast and cast-in-place manholes and vaults, and manhole rings and covers shall be in accordance with NCDOT [Standard Specifications for Roads and Structures](#).

Manhole covers should be flush mounted.

Installation of underground enclosures shall meet the loading requirements in Section [3.4.8.1](#).

Deviations from the criteria and specifications in this section shall require approval from the State Utilities Manager.

For submittals and review and approvals of all utility structures, see [Section 2](#), Encroachment.

3.4.9 Appurtenances

As part of the underground system, an aboveground appurtenance that extends more than 4 inches above the ground shall be located outside of the clear zone or be of breakaway type.

Cabinets, pedestals, vents, and any other aboveground utility appurtenances installed as part of the underground system shall be located at or near the right of way line, outside of the clear zone, outside sight distance triangles, and shall not interfere with ADA requirements.

Metering stations, regulator stations, pressure reducers, lift stations, pad-mounted transformers, pad-mounted switchgear, sprinkler pits, enclosures covering utility main pipe joints, backflow preventers, valves, vent pipes, cross connections, pumps, grinders, irrigation assemblies, transformers, generators, and other similar large appurtenances shall not be located within NCDOT right of way. Meters shall be located on the same side of the highway as the customer being served.

Drains, shut-off valves, manholes, handholes, and other access structures shall be located in such a manner that will cause the least interference to traffic operations during initial construction and future access and maintenance needs.

See Section 3.3.4 for clear zone requirements and distances.

3.4.9.1 Fire Hydrants

Fire hydrants shall be of breakaway type and shall be placed a minimum distance of 6 feet from back of curb and gutter sections and from back of ditch in roadway sections. Where there is no ditch, the hydrant will be placed as far as possible from the pavement edge within right of way outer limits.

3.4.9.2 Drains

Drains are appurtenances by which liquids or heavy gases are evacuated, exhausted, or discharged. Where feasible, they should be provided for casings, tunnels, or galleries enclosing carriers of liquid, liquefied gas, or heavy gas. Drains may outfall into roadside ditches or natural water courses at locations approved by NCDOT. Such outfall should not be used as a wasteway for purging the carrier unless specifically authorized by NCDOT and the North Carolina Department of Environmental Quality.

3.4.9.3 Markers

The utility should place readily identifiable and suitable markers at the right of way line where the right of way is crossed by pipelines carrying materials that are flammable, corrosive, expansive, energized, or unstable, particularly if carried at high pressure or potential, except where a vent will serve as a marker. Markers are also desirable for other pipelines.

3.4.9.4 Shut-Off Valves

Shut-off valves, preferably automatic, should be installed in lines at or near ends of structures and near unusual hazards where permitted by industry or governmental codes, unless hazardous segments can be isolated by other sectionalizing devices within a reasonable distance.

3.4.10 Tunnel Liners

3.4.10.1 Plans, Specifications, and Design Computations

When the utility owner proposes to construct a tunnel under an existing highway, approval shall be obtained from the State Utilities Manger. The utility owner's engineer or design consultant shall prepare plans and specifications and provide complete design computations for the excavation, design, and installation of the steel tunnel liner plate, sheeting, shoring, and related work. The engineering design shall take into consideration protection of pedestrian and vehicular traffic, adjacent property, and the stability of the roadway section.

Tunnel liner plate design shall be in accordance with the latest edition of the [AASHTO LRFD Bridge Design Specifications](#).

Plans, specifications, and design computations for the pit shoring shall be sealed and signed by a licensed North Carolina Professional Engineer.

3.4.10.2 Plan Requirements

The utility owner shall prepare plans for the proposed tunnel liner installation in accordance with Section 3.2, Plan Requirements, and shall provide the following plan and profile items:

- Plan view
 - Distance to intersection with another route on the state highway system
 - Location of the tunnel
 - Type and location of the structure and the shortest distance between the existing structure and the proposed tunnel if any portion of the proposed tunnel is 200 feet or closer to any portion of an existing highway structure
 - Location and dimensions of the tunneling pit and the minimum distance to the edge of existing pavement
 - Location for disposal of soils
 - Location of manholes and/or utility access vaults
- Profile/section view (along tunnel centerline)
 - Entire cross-section of the work, including pits ground line from ditch to ditch, including the roadway typical section
 - Vertical location of the proposed tunnel, including grade and invert elevation
 - Distance from the top of the tunnel to the surface at the centerline of the roadway
 - Size and depth of pits
 - Pertinent elevations and dimensions of manholes and utility access vaults

Pits are to be located outside of the clear zone and beyond the theoretical 1:1 slope from the edge of pavement if practical. If pits must be located within the clear zone, traffic lanes shall be closed to create the necessary clear zone distance. If pits must be located within the theoretical 1:1 slope from the edge of pavement, temporary shoring will be required (see Section 3.4.12, Bore Pits, for additional information).

In addition to the required plan information detailed above, the following information must be submitted to NCDOT for review and approval of the tunnel liner installation:

- Properties of all structural components of the tunnel liner
- Properties of soils to be encountered, both in-situ and backfill

3.4.11 Box Type Utility Tunnels

Box type utility tunnels are reinforced concrete box tunnels, closed at each end to prevent drainage, with access manholes for entrance into the tunnel.

NCDOT will permit the construction of a box type utility tunnel within the limits of the right of way by an approved method. Because the design requires specialized structural and hydraulic analysis, plans and sketches for the proposed construction shall require the approval of the State Utilities Manager.

On active STIP highway construction projects, the State Utilities Manager will be responsible for coordinating and obtaining any necessary approval for the adjustment of existing facilities and the installation of new facilities.

Design and construction of a box type utility tunnel shall be as follows:

1. Design, specifications, and construction shall be in compliance with NCDOT [Standard Specifications for Roads and Structures](#) and in accordance with the latest edition of the [AASHTO LRFD Bridge Design Specifications](#). NCDOT shall have the right of access to the work at all times for inspection, sampling, and testing. All materials used shall be subject to approval of NCDOT.
2. The utility owner's design engineer shall prepare plans for the proposed box type utility tunnel in accordance with Section 3.2, Plan Requirements.
3. Notes are to be shown on the plans and are to include the specifications for the design, materials, and special instructions relative to the proposed construction.
4. Design computations are to be submitted for review.
5. The utility owner may be required to submit a Form and Falsework Plan to the State Utilities Manager for approval prior to beginning any phase of the proposed work.
6. Information for the headwalls, wingwalls, and scour apron are not required.
7. Full details of the closed ends of the tunnel are to be furnished with a continuation of the bar designation number and spacing of the reinforcing steel for this portion, and a detail of the tie-in of the access manhole to the tunnel.
8. For box type structures that have not been previously approved or determined to meet NCDOT standards, the plans, specifications, and design computations submitted to NCDOT for review shall be sealed and signed by a licensed North Carolina Professional Engineer.

In addition to the required plan information detailed above, the following information must be submitted to NCDOT for review and approval of the box type utility tunnel installation:

- Properties of all structural components of the box type utility tunnel
- Properties of the soils to be encountered, both in-situ and backfill

3.4.12 Bore Pits

Bore pit information, including location, dimensions, and offsets from roadway features, shall be included on plans whenever bore pits are within the right of way or in close proximity to the right of way. See Section 3.2.1 for additional information.

Bore pits are subject to Temporary Shoring guidance as provided in Section 3.4.13.

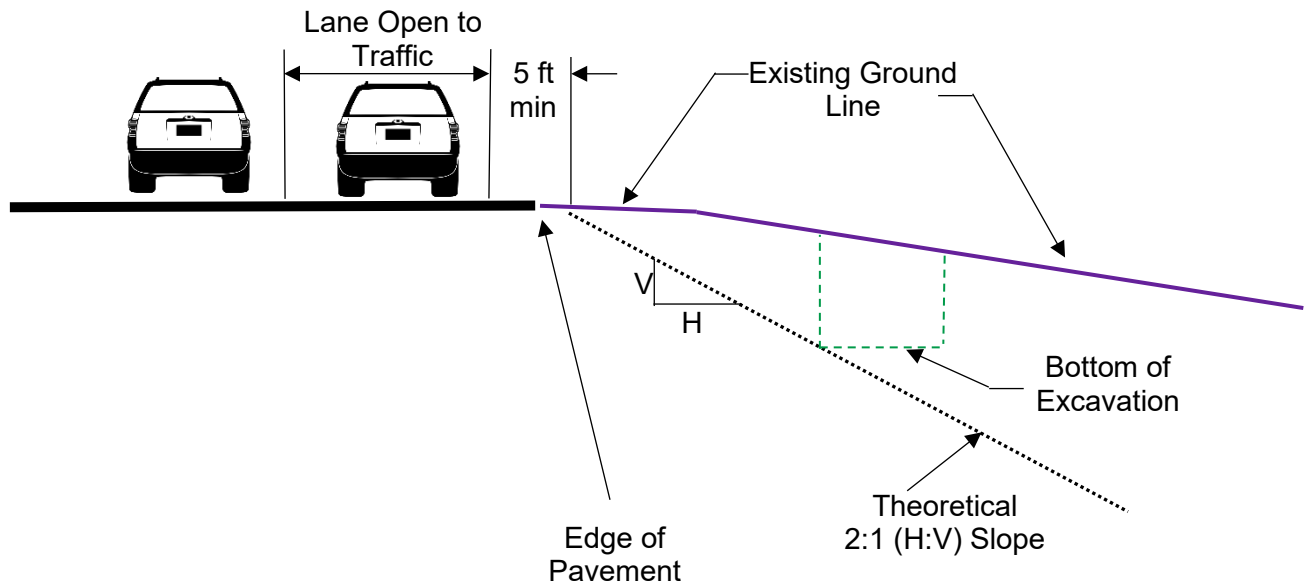
Guidance for bore pit excavation can be found in Section 3.6.10.

3.4.13 Temporary Shoring

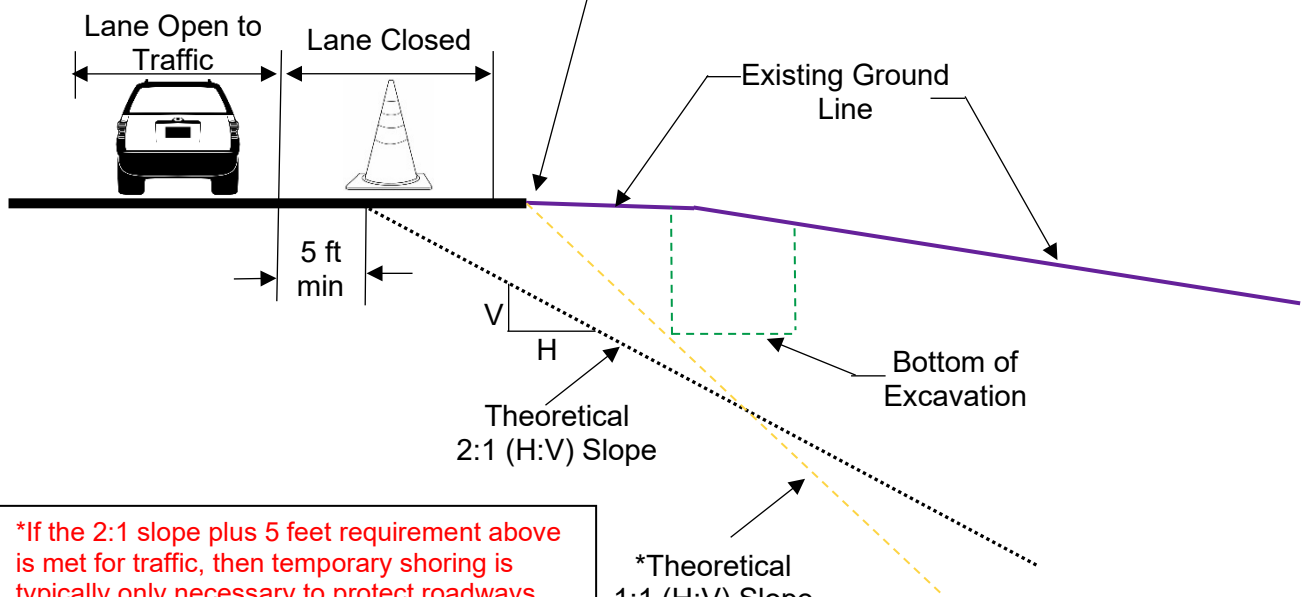
Temporary shoring is regularly required to maintain traffic but is also used to protect existing structures, supports (for lighting, signals, signs, etc.), utilities, property (off the right of way), roadways (pavements), etc. Temporary shoring is required when a theoretical 2:1 slope from the bottom of excavation will intersect the existing ground line less than 5 feet from the outside edge of an open travel lane as shown in the Figure 3-2, below or when a theoretical 2:1 slope from the bottom of excavation will intersect any existing structure, support, utility, property, etc. to be protected.

Figure 3-2. Temporary Shoring

Traffic in Outside Lane



Traffic Shifted (Outside Lane Closure)



*If the 2:1 slope plus 5 feet requirement above is met for traffic, then temporary shoring is typically only necessary to protect roadways from damage when a theoretical 1:1 slope from the edge of pavement intersects the nearest excavation wall. This rule of thumb should be used with caution and does not apply to all subsurface conditions, surcharge loadings and excavation geometries. Additional guidance provided below.

*Theoretical 1:1 (H:V) Slope (from Edge of Pavement)

If the 2:1 slope plus 5 feet requirement above is met for traffic, then temporary shoring is typically only necessary to protect roadways from damage when a theoretical 1:1 slope from the edge of pavement intersects the nearest excavation wall. This rule of thumb should be used with caution and does not apply to all subsurface conditions, surcharge loadings and excavation geometries. Situations where this 1:1 slope is not recommended include groundwater depth is above bottom of excavation or excavation is deeper than 10 feet or in [Type B or C soils as defined by OSHA Technical Manual](#). Temporary shoring may be avoided by locating trenches, bore pits, and other excavations far enough away from the open travel lane, edge of pavement and any existing structure, support, utility, property, etc. to be protected.

Temporary shoring shall be designed and constructed in accordance with current NCDOT standards and generally include the following shoring types:

- Anchored, braced or cantilever shoring
- Temporary mechanically stabilized earth (MSE) walls
- Temporary soil nail wall

Trench boxes will not be approved for use in instances where shoring is required.

Shoring design and installation shall comply with the latest version of the following technical guidance:

- [NCDOT Temporary Shoring Special Provision \(SP11 R02\)](#)
- [NCDOT geotechnical standard Temporary Soil Nail Wall Provision \(No. 12\)](#)

A temporary shoring design must be submitted to and approved by NCDOT prior to the start of any work in the right of way that requires shoring. The design submittal package shall include the following:

1. Cover letter, including contact information for any representative, engineer, designer, or party NCDOT may need to contact to complete the encroachment review
2. Shoring design report sealed by a licensed North Carolina Professional Engineer and including the following documents:
 - a. Shoring plans that include plan view, elevation view, and typical cross-section
 - b. Notes on plans
 - c. Design calculations
 - d. Soil parameters from a subsurface investigation and, if necessary, laboratory testing or chosen by a geotechnical engineer in accordance with [AASHTO LRFD Bridge Design Specifications](#) (see AASHTO Article 11.10.5.1)
 - e. Construction sequence
 - f. Dewatering plan, if necessary
3. Subsurface investigation report, which shall be site specific within the vicinity of the excavation, and sealed by a licensed North Carolina Professional Geologist or Professional Engineer

See Section [2.8.2](#), Temporary Shoring, for submittal, review, and approval requirements.

In addition to the circumstances above, temporary shoring can be required regardless of the location of the excavation at the discretion of the Division Engineer or State Utilities Manager.

3.4.14 Aerial Crossings

In special cases where a utility cannot be attached to or buried over, under, or around an existing structure, it may be necessary to support the utility:

- longitudinally aboveground to maintain grade or to span a waterway; or
- transversely under a span of an existing bridge

In such cases, the utility may be supported on piers, piles, cradle supports, or by a method suggested by the utility owner.

3.4.14.1 Supports for Longitudinal Installations

Supports are to be located as near to the right of way line as possible or as far from the nearest part of an existing structure as is practical. The design and location of the supports are to be such that the hydrological character of the area at the structure involved is not adversely affected. Generally, supports are to be aligned with the bents of the bridge.

Consideration shall be given to avoiding unsightly support systems, locations, and elevations that will adversely affect proper and efficient maintenance of the existing structure, especially those systems that would create backwater at bridges or that would hamper the removal of debris and log jams.

At existing box, arch, and pipe culverts, the supports shall not be located in the main water course or on the embankment in such a manner as to create an erosion problem.

Cradled supports in the barrels of box or arch culverts shall be avoided due to diminishing the cross-sectional area of the culvert and increasing the possibility of silting and/or accumulating of debris.

3.4.14.2 Supports for Transverse Installations

Supports at existing bridges shall be located to avoid interference with access to the superstructure and substructure of the bridge for proper and efficient maintenance.

Additional loads on or adversely affecting the footing of the structure on the earth-bearing capacity in the proximity of the footing shall be avoided. Proper precaution shall be taken to prevent erosion.

3.5 Utilities on or near Highway Structures

Highway structures are bridges (both vehicular and pedestrian), culverts, drainage piping, walls (both noise and earth retaining), tunnels (both vehicular and pedestrian), headwalls, and wing walls.

Utility facilities, including street lighting, attached to or near a highway structure can materially affect the structure, the safe operation of traffic, the efficiency of maintenance and reconstruction, and the appearance.

Feasible and reasonable actions are to be taken to locate utility facilities elsewhere. NCDOT highly discourages attachments to structures. However, it is recognized that the installation of utility facilities on or near a structure sometimes is the most practical solution and may be permitted when justified and where found to be in the public interest.

For procedural guidance for attachments to structures, see [Section 2](#), Encroachment, and [Section 4](#), Coordination.

3.5.1 Utilities Attached to Structure

3.5.1.1 Justification for Attachment to Structure

For all highway structures, as defined in Section 3.5, a detailed engineering report justifying the attachment shall be provided that clearly demonstrates all of the following:

- Significant economic and/or environmental savings will occur by locating the utility on or near the structure.
- Installation and maintenance will not significantly impact traffic operations of the highway.
- The aesthetics of the utility will not detract from the current conditions of the area.
- The utility facilities are safe for public exposure.
- Alternative installation methods have been investigated, and attachment to a structure is the only practical option. The approximate costs of alternatives as compared to the proposed attachment method, as well as approximate costs of the total proposed facility project, shall be included.
- The highway structure is adequately rated to support the additional load and to accommodate the utility facility without compromise of highway features, including ease of bridge inspection and maintenance.

The proposed utility facility:

- shall not hamper structure maintenance and inspection;
- shall not degrade the integrity of the structure;
- shall be removable without requiring a replacement facility;
- shall be removable without causing damage to the structure.

Conditions such as increased cost, the presence of existing attached facilities, or the challenges that existing rock might present to boring will be considered. However, it is unlikely that one of these conditions alone will justify attachment.

The applicant should obtain NCDOT acceptance of attachment justification prior to the formal submission of the Encroachment Agreement that covers the proposed work. The following information shall be included in the justification package:

- Bridge or culvert number (see NCDOT ArcGIS Bridge Map)
- Desired location as to the side of the bridge
- Number of units to be attached
- Method of attachment and general installation plan
- Method of transition on and off the bridge
- Approximate weight of the entire facility per foot, including the hanger assembly or messenger
- Additional pertinent sketches, drawings, or other information
- For attachment to culvert, the following information in addition to that above:
 - A sketch of the culvert in plan and profile showing the size and number of barrels and the approximate skew to the centerline of the road

- A detailed sketch showing the dimensions of the existing culvert in the vicinity of the proposed attachment

Once the attachment justification is accepted by NCDOT, a detailed, engineered design of the utility attachment and analysis of the accommodating bridge structure will be required, as appropriate.

3.5.1.2 Structural Attachment Guidelines

Guidelines for attaching utilities to each type of highway structure are as follows:

1. All structures: When metallic pipes or conduits are attached to an existing or proposed structure, the utility owner shall insulate the hanger assemblies so that stray currents will not flow into the structure.
2. Attachment to bridges
 - a. Utility attachment to bridges of a box beam or cored slab design is prohibited.
 - b. On grade separation bridges (i.e. bridges carrying one road over another), all utility facilities should be attached between the bridge beams or girders. On stream and railroad crossings, attachment to the overhang may be permitted if it does not result in overstress.
 - c. Utility facilities attached to the bridge shall maintain a vertical clearance such that the lowest part does not extend below the bottom of any beam or girder at any point.
 - d. Only longitudinal utility attachments to bridges will be allowed; transverse attachments to the superstructure will not be permitted.
 - e. Attachment to beams is not allowed.
 - f. Generally, the utility should be on a straight alignment. Curved alignments and bends require detailed designs demonstrating that live loads are not transmitted to the structure.
 - g. Access points through the superstructure shall be avoided.
 - h. Pipes and conduits that are carried through curtain walls or back walls shall be sleeved and tightly sealed with mastic and jute.
 - i. Hangers or rollers will be suspended from inserts in the bottom of the superstructure with steel rods. Bolting through the bridge floor will not be permitted.
 - j. Where welded steel pipe is used, or on very long bridges, provisions for expansion couplings should be provided for longitudinal expansion and contraction due to temperature changes.
 - k. Communication and electric power line attachments should be suitably insulated, grounded, and carried in protective conduit or pipe from the point of exit from ground to reentry.
 - l. When leaving the bridge, the utility should be aligned outside the roadway in as short a distance as operationally practicable.
3. Attachment to culverts and piping
 - a. Without exception, a hydraulic analysis shall be performed to ensure that any attachment to or through a culvert will not adversely affect its function.

- b. For box culverts, utilities will be allowed inside reinforced concrete box culverts only under the following conditions:
 - i. The culvert has a minimum vertical and horizontal opening of 60 inches.
 - ii. The hydraulic capacity will not be lowered below the 100-year flood capacity.
 - iii. No detrimental effects on the natural environment will occur.
 - iv. There is adequate room for maintenance and inspection of the culvert.
 - v. Crossing transversely occurs above the 25-year flood water surface elevation.
 - vi. Transverse attachments may be made to the outside face of the headwall, in the area between the bottom of headwall and above the bottom of the top slab of the culvert barrel without using the wing walls for bearing support. In extreme cases, attachment may be allowed through the vertical walls of the culvert.
 - vii. Longitudinal attachments may be made to the bottom or top slab through the box culvert.
 - c. For piping, utilities will be allowed within drainage pipe only under the following conditions:
 - i. Crossing transversely occurs above the 10-year flood water surface elevation.
 - ii. The utility is inside of a reinforced concrete interference box that allows access for inspection and maintenance.
4. Attachment to walls
- a. Attachment to the face of a wall will be allowed only when included in the original construction of the wall. Retrofit attachments are not allowed.
 - b. Attachment to the top of a wall will be allowed on culvert wing walls only.
 - c. If passing through walls, no forces can be applied perpendicular to the face of the wall, and openings shall be sealed to prevent water movement.

3.5.2 Utilities Near Structure

Because of the complexities involved, it is impossible to develop specifications to cover all conditions encountered in the field relative to the installation of aboveground and underground utilities. However, the following policies and procedures set forth the minimum standards to be adhered to for the installation of aboveground and underground utilities at existing highway structures most commonly encountered.

3.5.2.1 Aboveground Utility

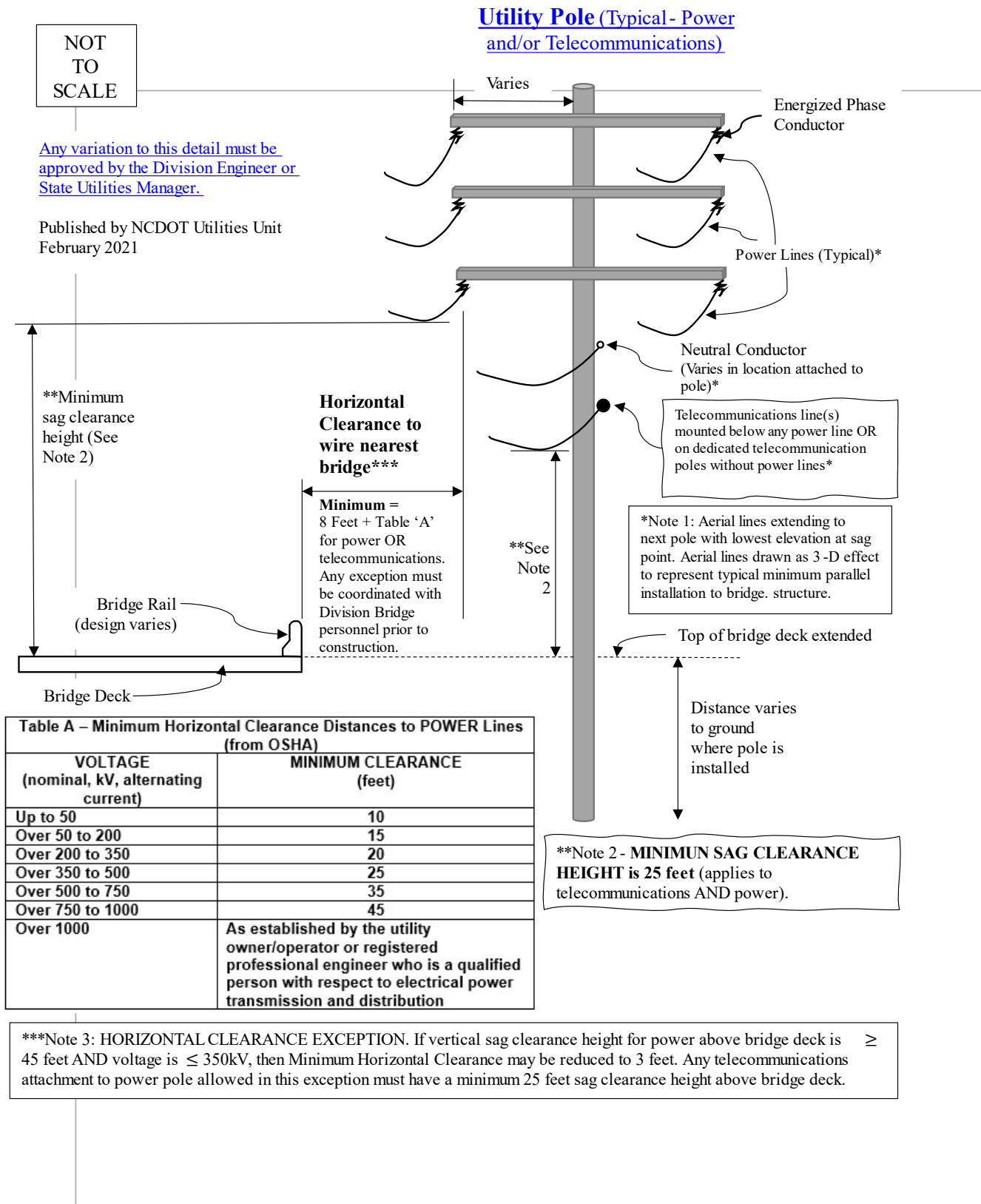
Adequate space shall be given for the safe operation and maintenance of both the highway structure and utility facility. For bridge maintenance using a snooper crane adjacent to power lines, the horizontal clearances shown in Figure 3-3, at a minimum, shall be provided.

Designs shall facilitate future reconstruction and/or emergency work that may occur on the highway structure.

Installations may be longitudinally adjacent to or transversely over or under the structure. Angled (oblique) crossings are strongly discouraged.

All vertical clearance requirements must be met for facilities both over and under structures. NESC and Occupational Safety and Health Administration clearances must be met for both final disposition and construction, respectively.

Figure 3-3. Required Clearances for Aerial Installations Near Bridge Structures



Bridges

Aerial installations may be longitudinally adjacent to, or transversely over or under, the superstructure of an existing bridge.

When an aerial installation is made longitudinally adjacent to a bridge, the following controls shall apply:

- Where feasible, the installation should be of a single-span construction with supports located a minimum distance of 20 feet from the fill face of the end bents. Where multi-span construction is required, the supports are to be set so as not to adversely affect the function of the structure or bridge maintenance.
- Where water courses are involved, the supports are to be set a minimum of 10 feet from the top of the bank of the main water course and are not to adversely affect the hydrological character of the area.
- The utility shall be aligned as near parallel to the roadway and as near the right of way line as conditions permit.
- If the utility is located near the overhang of the structure, the vertical clearance is to be determined by the reach of a snoopers crane operation.
- Where lines have vertical clearance below the overhang of a structure, the necessary horizontal and vertical clearances are to be determined by the Bridge Maintenance Superintendent.

When an aerial installation is made transversely over or under the superstructure of an existing bridge, the following controls shall apply:

- When the utility is over an existing bridge, the vertical clearance of the lowest utility shall conform to the currently applicable NESC, but shall not be less than 18 feet in any case.
- When the utility is under the superstructure of an existing bridge, except for power lines, the utility is to be installed so that all parts of the utility maintain a minimum distance of 2 feet from any beam.
- When a power line, regardless of voltage, is to be installed transversely under the superstructure of an existing bridge, the vertical clearance of the lowest wire aboveground is to conform with the NESC, and the highest wire is to be a minimum distance of 10 feet below any part of the superstructure of the bridge. In the event these minimum distances cannot be obtained, the power lines may be encased in underground conduit or installed over the superstructure. In the case of underground conduit, the utility is to comply with all applicable policies for underground utilities.
- The supports are to be set a minimum distance of 20 feet from the nearest part of the left or right overhang of the bridge to allow for proper and efficient bridge maintenance.
- When an aerial installation is to be made obliquely over the superstructure of an existing bridge, the vertical clearance of the lowest utility shall conform to the NESC. The supports should be located 20 feet beyond the fill face of the end curtain walls; however, if this is not practical, they are to be set so as not to create a hazard to traffic, nor to mar the appearance of the approaches to the bridge, nor to adversely affect proper and efficient bridge maintenance.

Culverts

For culverts, aerial installations may be made longitudinally adjacent to and transversely over an existing culvert. See Section 3.5.1 for guidance.

3.5.2.2 Underground Utility

Vertical and horizontal clearances between the utility facility and structure must be sufficient to permit safe operation and maintenance of both the utility facility and highway structure, and future reconstruction of the highway structure.

Installation shall take into account that the movement of the earth/soil surrounding the foundation (or substructure) may have negative impacts on the stability of the structure as a whole. NCDOT may require settlement calculations.

Utilities shall be located a minimum of 10 feet from any part of the structure when installed by HDD.

The utility shall not adversely affect the drainage character of the area near the structure.

Bridges and Retaining Walls

For underground utilities near bridges and retaining walls, the following apply:

- Underground utilities installed by the open cut method shall be aligned longitudinally or transversely adjacent to footings or piles, or under spans.
- The utility shall be located a minimum of 5 feet horizontally from the nearest part of the bridge, retaining wall footings, pier cap, or endwall.
- Under hardship case, NCDOT may allow the utility to be installed closer than 5 feet horizontally. For pressure pipelines, the joints shall be restrained, and the pipeline shall be encased in steel pipe of sufficient size and strength or encased in concrete of sufficient thickness and strength to prevent rupture of the line for a horizontal distance of 10 feet beyond the extremity of the footing or pier cap.
- Underground utilities installed by HDD method shall be located a minimum of 10 feet horizontally from the nearest part of the bridge structure.
- Where installed longitudinally adjacent to an existing bridge over a stream, the utility is to be buried at a minimum depth of 2 feet below the stream bed. For piers, piles, or cradle supports, see Section 3.4.14.
- If the bottom elevation of the trench is to be at an elevation below the top of the footing, the excavation is to be made at 1.5:1 backslope beginning at the natural grounds from the extremity of the footing.
- No excavation shall be permitted that will create a hazard to the stability of any foundation.
- Only in extreme cases will blasting be permitted near an existing structure and then only under the supervision of qualified NCDOT personnel with adequate protection being provided by the utility owner for the structure.
- The Division Engineer may require the encasement of a utility if the location and conditions warrant it, even though not set forth herein.

Reinforced Concrete and Structural Plate Culverts

For underground utilities near reinforced concrete and structural plate culverts, the following apply:

- The installation does not adversely affect the drainage character of the area near the culvert.
- When a utility is buried in the fill over a culvert, it must be located at least 18 inches from the inside face of the headwall.
- A minimum of 6-inch earth cushion between the bottom of the utility and top of the top slab of the culvert is desirable; however, it is not always possible to provide this cushion. The utility may be allowed on top of the top slab of the culvert provided the following conditions are adhered to:
 - The fill is excavated by hand when within 6 inches of the inside face of the headwall or top of culvert.
 - If deemed necessary by the Division Engineer, the utility will be encased in a metallic pipe of sufficient size and strength or concrete of sufficient thickness and strength for a distance of 10 feet beyond the exterior faces of the walls of the culverts. If encased in concrete, a felt cushion is to be placed on the top slab and/or against the headwall to prevent bonding of encasement to culvert.
 - The utility shall be buried around the end of the culvert if, in the judgment of the Division Engineer, sufficient cover cannot be provided over the utility to allow for proper road maintenance and safety.
- When burying around the end of a culvert, the utility should be located a minimum of 5 feet from the nearest part of the culvert including the wingwalls and scour apron, and buried at a minimum depth of 2 feet below the stream bed. In hardship cases, the utility may be permitted closer than 5 feet from the nearest part of the culvert; however, at the discretion of the Division Engineer, pressure lines may be required to be encased in a metallic encasement or in concrete for a distance of 10 feet outside the extremities of the culvert. For piers, piles, or cradle supports, see Section 3.4.14.
- If conditions at a culvert prohibit the installation of a utility by either of the aforementioned methods, consideration may be given to burying the utility under the bottom slab of the culvert by boring and jacking an encasement or by an open cut method, as follows:
 - If the boring and jacking method is used, the top of the encasement is to be at a minimum depth of 1 foot below the bottom slab and is to extend 10 feet beyond the extremities of the culvert.
 - Because of the complexities and hazards involved when a utility is to be buried under the bottom slab of an existing box culvert by an open cut method, the utility owner is to make a formal request to the State Utilities Manager for approval to install before submission of the Encroachment Agreement to the Division Engineer.

Pipe Culverts

For underground utilities near pipe culverts, the following apply:

- A utility may be buried in the fill over a pipe culvert. Bury to an elevation at the top of the pipe culvert may be permitted to obtain sufficient cover subject to the following conditions:
 - The Division Engineer is to take into account the width of the trench, the weight of the utility, and the condition of the pipe culvert in approving this method of installation.

- The excavation for the last 6 inches is to be performed by hand.
- The owner is to indicate clearly the minimum amount of cover to be maintained between the top of the utility and the top of the fill at all pipe culverts.
- If a utility is buried around the end of a pipe culvert, it is to be located a minimum of 5 feet from the nearest part of the utility to any part of the pipe culvert and 2 feet below the stream bed.
- If conditions at a pipe culvert prohibit the installation of a utility by either burying in the fill over the culvert or burying around the end of the culvert, the utility may be permitted to bury under the pipe culvert by a method acceptable to the Division Engineer.
- Any pipe culvert that is disturbed or damaged is to be replaced in its original condition and position.
- No utility will be permitted inside pipe culverts.

3.5.3 Utilities in Vehicular Tunnels

As a general rule, utilities will not be permitted to occupy vehicular tunnels on fully controlled access highways (freeways) except in extreme circumstances, which will be reviewed on a case-by-case basis.

Utilities that transport a hazardous material shall not be allowed in a vehicular tunnel under any circumstances.

Where a utility occupies space in an existing vehicular tunnel that is converted to a freeway, relocation of the utility may not be required. Utilities that have not previously occupied an existing vehicular tunnel that is converted to a freeway will not be permitted therein.

3.6 Construction and Maintenance

The utility owner or developer requesting approval to conduct work within NCDOT right of way shall take, provide, and maintain all necessary precautions during construction and future maintenance activities to protect the general public, pedestrians, bicyclists, and road users, and to prevent injury or damage to persons and property.

The following section describes activities and procedures that take place after the Encroachment Agreement has been obtained, and utility and non-utility installation and related construction work has commenced.

3.6.1 North Carolina 811

The encroaching party or contractor, as appropriate, shall notify NC811 before any excavation or demolition activities in accordance with [G.S. §87, Article 8, Underground Damage Prevention \(G.S. §87-115, Underground Utility Safety and Damage Prevention Act\)](#), or the most current applicable legislation). See Section 1.3.10 for additional information.

3.6.2 Encroachment Agreement Required Onsite

The encroaching owner or their agent or contractor must have at the construction site an executed copy of the approved Encroachment Agreement or Utility Relocation Agreement (see Section 4.5.1.5). A digital copy of the executed Blanket Encroachment Agreement may suffice to satisfy this requirement.

Failure to produce this agreement along with approved plans, provisions, and associated documents at the site may result in stoppage of work until the permittee or their agent or contractor can show evidence that the proposed installation has been approved in accordance with NCDOT policies, and the work is being performed in accordance therewith.

3.6.3 Notification to NCDOT Prior to the Start of Work

With the exception of underground utility service connections and aerial utility crossings and taps installed under Blanket Encroachment Agreements (Forms R/W 16.5 and R/W 16.5A, respectively), the Division Engineer or designated representative shall be given notice by the permittee prior to beginning work in NCDOT right of way.

Work performed under Blanket Encroachment Agreements for underground utility service connections (Form R/W 16.5) and for aerial utility crossings and taps (Form R/W 16.5A) does not require notice to NCDOT prior to starting work within the right of way. All other encroachments outside the limits of a state highway project require notification to the District Engineer's office prior to construction. Prior to relocation work associated with a state highway project, or encroachment work within the highway project limits, the Resident Engineer shall be notified.

Where an approved encroachment involves attachment to a structure, the permittee or its representative shall notify the Division Bridge Maintenance Engineer before the attachment work begins.

There must be a mutual understanding between utility and NCDOT representatives as to when work will commence and on any other conditions deemed necessary. NCDOT reserves the right to stop work by a permittee until the satisfaction of the terms of the agreement are met or unless otherwise directed by the Division Engineer or designated representative.

3.6.4 Traffic Control

The encroaching party is ultimately responsible for ensuring the safe movement of traffic and pedestrians moving through the work zone and overall safety of the general public near the construction area.

Traffic control measures shall be implemented in accordance with the prevailing local, state, federal, and NCDOT policies, standards, and procedures, including the following:

- [MUTCD](#) – NCDOT has adopted the [FHWA MUTCD](#) to provide basic principles and guidelines for traffic control device design, application, installation, and maintenance. NCDOT uses the [MUTCD](#) as a minimum requirement where higher supplemental standards specific to NCDOT are not established.
- [MUTCG](#) – The [NCDOT MUTCG](#) enhances the fundamental principles and best practices established in [MUTCD](#) Part 6, Temporary Traffic Control, incorporating NCDOT-specific standards and details. It also covers important safety knowledge for a wide range of work zone job responsibilities.

3.6.4.1 Lane and Road Closures

Any work requiring equipment or personnel within 5 feet of the edge of any travel lane of an undivided facility and within 10 feet of the edge of any travel lane of a divided facility shall require a lane closure with appropriate tapers and signage in accordance with the [MUTCD](#) and the [MUTCG](#).

All lane and road closures shall comply with the [MUTCG](#) where applicable.

For detours, NCDOT must review and approve the corresponding detour route before granting permission to close a road. The encroaching party shall reimburse NCDOT for any costs incurred in developing, improving, signing, marking, and maintaining a detour route.

The contractor shall not begin the construction until after the traffic control and erosion control devices have been installed to the satisfaction of the District Engineer.

3.6.4.2 Pedestrian and ADA Traffic Control

Work within the right of way must adhere to the NCDOT guidelines for accommodating pedestrians in work zones.

Short-term utility construction activities blocking sidewalks with equipment or disruption of service to pedestrians shall be mitigated as follows:

1. For work activities impacting pedestrian access to sidewalks for 1 hour or less, provide a dedicated traffic control employee to assist pedestrians and direct them around the worksite or to the nearest intersection. This traffic control employee shall be capable of orally communicating with persons with visual impairments so they understand the assistance the traffic control employee is providing.
2. For work activities impacting pedestrian access to sidewalks for greater than 1 hour but less than 1 work day, provide a dedicated traffic control employee as stated above, or close the sidewalk and either detour the pedestrians to the sidewalk on the opposite side of the street or divert the pedestrians around the work site on the same side of the street. See [MUTCD](#), Figure 6H-28, Typical Application 28. Barricades must be ADA compliant.
3. For work activities impacting pedestrian access to sidewalks for greater than 1 work day but less than 7 work days, close the sidewalk and either detour the pedestrians to the sidewalk on the opposite side of the street or divert the pedestrians around the work site on the same side of the street. See [MUTCD](#), Figure 6H-28, Typical Application 28. Barricades must be ADA compliant.
4. For work activities impacting pedestrian access to sidewalks for 7 work days or greater, a Traffic Management Plan shall be designed by a licensed North Carolina Professional Engineer to address pedestrian and ADA access issues with this work site.

3.6.5 Parking of Vehicles and Equipment

During operations, parking of vehicles and equipment on areas of installation or maintenance will not be permitted in the traveled way, except where proper traffic control has been installed.

During non-working hours, equipment shall be properly barricaded outside of the clear zone and as close to the right of way line as possible.

Do not sever or move pedestrian facilities for non-construction activities such as parking for vehicles and/or equipment or installed traffic control devices (e.g., portable signs, changeable message signs, flashing arrow boards).

3.6.6 Staging and Storage of Materials

The staging and storage of materials on the roadway will not be permitted except in extreme instances, and then only by permission from the Division Engineer or designated representative, and where proper traffic control is in place.

3.6.7 Driveways and Adjacent Property Access

Driveways altered or disturbed during construction shall be restored to a condition comparable to the driveway condition prior to construction.

Ingress and egress shall be maintained to all businesses and residences affected by construction. Special attention shall be paid to police and fire stations, fire hydrants, and hospitals.

3.6.8 Approved Trenchless Installation Methods

Because the location and installation of utility facilities and non-utility construction may impact the NCDOT right of way, it is necessary that all installations conform to sound engineering principles and related requirements, and be authorized by NCDOT.

Utilities crossing NCDOT roadways shall be installed by trenchless methods, preferably. Trenchless methods include bore and jack, HDD, pipe ramming, microtunneling, pipe bursting, driving, and tunneling. If necessary, the open cut trench method, described in Section 3.6.9, may be permitted. This section describes the trenchless methods and their applicability to the individual types of utilities and types of construction. The methods discussed in this section are more commonly used for water, sanitary sewers, gas, electric, and telecommunication utilities.

Under no circumstances shall jetting or wet boring with water of utility pipelines or encasements be allowed.

Bored holes shall be continuously supported.

Timber tunnel lining or shoring will not be permitted to remain as a part of a permanent installation.

Submittal of installation calculations may be required based on the complexity of the scope of work. Each trenchless design for installation shall use industry best practices for its respective applications.

3.6.8.1 Bore (Horizontal Auger) and Jack

Bore and jack is a technique for performing a bore from an entry pit to a receiving pit by means of a rotating cutting head. Spoil is removed back to the drive shaft by helically wound auger flights rotating in a steel casing. This method is typically used with the jacking of a smooth wall or spiral weld steel pipe through the dry bore, which is slightly larger than the pipe being pushed or jacked behind the advancing auger. As the dry boring operation progresses, each new section of the encasement pipe shall be butt-welded to the section previously jacked into place.

The contractor shall minimize the overbore. The overbore shall match the cutter diameter to the outside diameter of the encasement pipe and shall be limited to no more than 2 inches of the encasement pipe outside diameter.

If voids are encountered or occur outside the encasement pipe, grout holes shall be installed in the top section of the encasement pipe at 10-foot centers and the voids filled with 1:3 portland cement grout at sufficient pressure to prevent settlement in the roadway. If an obstruction is encountered during the boring and jacking operation, the auger is to be withdrawn, and the excess pipe is to be cut off, capped, and filled with 1:3 portland cement grout at sufficient pressure to fill all voids before moving to another boring site.

Entry and/or receiving pits will not be allowed within the median of divided highways unless the median width is sufficient to maintain the clear zone in accordance with the [AASHTO Roadside Design Guide](#) from each direction of travel.

3.6.8.2 Horizontal Directional Drilling (HDD)

HDD is a technique using a steerable system to install pipes, conduits, and cables with a surface-launched drilling rig. It is a multi-stage process consisting of drilling a pilot bore along a predetermined path and then pulling the desired product back through the drilled space. The vertical profile of the bore alignment is typically in the shape of an inverted arc. When necessary, enlargement of the pilot bore hole to accommodate a product larger than the pilot bore cross-section is accomplished by back reaming. Orientation and tracking of the drill bit is determined by an aboveground radio detection device that picks up a signal generated from a radio transmitter in the drilling bit. This radio signal is translated into depth and alignment. To minimize friction and provide a soil-stabilizing agent, a drilling fluid is introduced into the annular space created during the boring operation. The rotation of the bit in the soil wetted by the drilling fluid creates slurry. This slurry acts to stabilize the surrounding soil and prevents collapse of the bore hole and loss of lubrication. Drilling fluids must be designed for the soil and groundwater conditions.

Directionally drilled or reamed holes must not exceed 1.5 times the outside diameter of any pipe up to 12 inches in diameter and the outside diameter plus 6 inches for pipes exceeding 12 inches in diameter.

The increase of pressure or flow of drilling fluid is not allowed to free stuck drillheads, reamers, or piping. No open cutting is allowed to locate or assist in freeing stuck drill heads without written permission from the District Engineer's office.

See also Section [3.7.3](#) Air Hammers in Horizontal Directional Drilling.

3.6.8.3 Pipe Ramming

Pipe ramming is a technique for installing steel casing or carrier pipe from an entry pit to a receiving pit using the dynamic energy from a percussion hammer attached to the end of the pipe. A continuous casing support is provided, and over-excavation or water is not required.

3.6.8.4 Microtunneling

Microtunneling is a trenchless construction method for installing pipelines and has the following features:

- **Remote Controlled.** The microtunnel boring machine is operated from a control panel, normally located on the surface. It simultaneously installs pipe as spoil is excavated and removed.
- **Guided.** The guidance system usually refers to a laser beam projected onto a target in the microtunnel boring machine, capable of installing gravity sewers or other types of pipeline to the required tolerance for line and grade.
- **Jacking Pipe.** This process constructs a pipeline by consecutively pushing the microtunnel boring machine through the ground using a jacking system.
- **Face Support.** Continuous pressure is provided to the face of the excavation to balance groundwater and earth pressure.

3.6.8.5 Pipe Bursting

Pipe bursting is a technique for breaking existing pipe by brittle fracture, using force from within, applied mechanically. Pipe remains are forced into the surrounding soil. At the same time, a new pipe of the same or larger diameter is drawn behind the bursting tool. Submittal of calculations showing the potential upheaval of the roadway due to the increase in pipe size may be required.

3.6.8.6 Driving

Driving, also called impact moling or piercing method, is a technique for placement of small-diameter pipes, ducts, and cables no larger than 6 inches, in which percussive or hammering action of a pneumatic piercing tool is used to create the bore by compacting and displacing the soil rather than removing it. The method typically is non-steerable, although steerable systems are becoming more prevalent.

The following requirements shall be adhered to:

- The diameter shall be a maximum of 6 inches
- Influence of the water table will not justify installation at a depth less than the minimum required.
- Bore pits shall be outside the theoretical 1:1 slope from edge of pavement.
- Cradles and scopes should be used if necessary to improve accuracy.

3.6.8.7 Tunneling (Pipe Jacking)

Tunneling, which consists of jacking pipe under highways with simultaneous removal of spoil, is generally adopted for pipe sizes 36 inches to 96 inches in diameter.

The removal of spoil shall not extend more than 18 inches ahead of the jacked pipe. The over-diameter of excavated hole to accommodate jacked pipe shall be no larger than is necessary to keep pipe moving freely. A special lubricant may be used to facilitate movement or lessen the danger of jacked pipe from freezing.

Jointing of sections of jacked pipe shall be butt-welded, or lap jointed and bolted.

Jacking the pipe shall be done as rapidly as possible. After the entire pipe is jacked into place, grout holes shall be installed, and the void around the pipe shall be filled with 1:3 portland cement grout under sufficient pressure.

If an immovable obstruction is encountered during the operation, the excess pipe shall be cut off and the entire void filled with grout. If the pipe freezes before final installation, the tunneling and jacking may be continued from the opposite end.

The tunneling and jacking operation shall always be conducted in such a manner so as not to create a hazard or impede the flow of traffic.

Portal limits of pipeline crossings shall be no closer than the clear zone; however, at the discretion of the Division Engineer, portal limits may be allowed where same will be behind ditch lines. In no event shall a pit exceed 10 feet in depth in fill sections. Any exceptions to this requirement shall be approved by the Division Engineer.

3.6.8.8 Tunneling (Liner Plate)

Tunneling with liner plate is a method typically consisting of excavating (tunneling) a short entrance hole for the shield, assembling liner plate (quarter sections), and then advancing the shield by pushing off the assembled liner plate. When the liner plate assembly has advanced beyond the face of the tunnel wall, the annular space is grouted. Liner plates are typically steel and consist of 2-flange (with lap joint) or 4-flange design.

Tunneling operations shall proceed only a distance sufficient for placing one section of tunnel liner, and the tunnel liner shall be placed before proceeding further. At no time will jetting be allowed.

When blasting is required, only small controlled charges of 40 percent dynamite or plastic explosives are to be used. The depth of the holes for these charges shall be deep enough only to clear an area for placing one section of tunnel liner. The charges for the initial series of blasting shall be placed in the triangle method. The second series shall be placed in the radial method a minimum distance from the desired diameter of the tunnel. The triangular charges shall be set to go off first, with the radial charges to go off following a short interval or using the time-lag method.

Where rock is encountered before approaching the shoulder or pavement, the first four series of charges will be used to determine the amount of controlled blasting to be used before beginning any blasting beneath the shoulders or pavement of the highway. However, if rock is encountered after proceeding beneath the pavement, only small charges shall be used until the proper amount of charge is determined. In no case will an overshoot be permitted. If a boulder is encountered and is removed by blasting or by other methods, a bulkhead will be formed immediately after removal of the boulder and the area filled with grout before proceeding with the tunneling operations.

If there is an indication of a vertical split in the rock formation, or an indication of settlement of the roadway during the tunneling operations, all operations shall be stopped and the NCDOT Division Engineer shall be notified immediately. If it is determined that the vertical split is not of too great a magnitude or too close to the pavement, the split shall be filled with grout. Prior to grouting operations, a grouting plan that outlines the method and applied pressure shall be prepared by the utility owner's licensed engineer for review and approval by the Division Engineer. After grouting has been completed and allowed to set, tunneling operations may continue. If it is determined that the vertical split is of too great a magnitude or too close to the pavement, the Division Engineer shall advise the utility owner and contractor of the proper method to be used to correct the vertical split. If settlement of the roadway occurs, the Division Engineer will advise the utility owner and contractor of the proper steps to be taken to correct the settlement.

The space outside the liner plates is to be held to a minimum. The voids outside the liner plates shall be grouted with a minimum of 1:3 portland cement grout at sufficient pressure to completely fill all voids, created by excavation for and installation of the liner plates, through 2-inch openings on 4-foot, 6-inch centers provided in the top of the steel liner plates. This grouting operation will be done with the installation of the liner plates so that at no time will the grouting operation be further than 25 feet from the front end or head of tunnel construction. At the end of each day's operations, the space outside the liner plates is to be grouted whether 25 feet or less. Grout will be forced into each grout hole. If the grout from one hole should flow along the liner plate so as to plug the next grout hole, the plugged hole will be opened by punching through the grout layer so that each hole may be used for grouting. The grouting operation will be continued at each hole until all spaces outside the liner plates are filled and no grout will flow.

Liner plate shall be sealed at both ends to prevent flowing water and debris from entering the annular space between the liner plate and carrier. Plug with concrete, brick and mortar, link seal, or material approved by the District Engineer.

Proper drains shall be provided at the lower end of the tunnel and shall be shown on the plans.

All shoring material shall be removed in such a manner so as to avoid collapse and to allow proper backfill. The backfill shall be placed in accordance with NCDOT specifications.

The entire operation shall be subject to inspection by the Division Engineer or inspector on the project. The Division Engineer or inspector shall have full authority to stop work if, in the opinion of the Division Engineer or inspector, continued work shall cause damage to the roadway section or endanger traffic.

All material shall be subject to inspection by NCDOT.

The method of shoring the pits for tunneling operations shall be approved by the State Utilities Manager prior to any work beginning at the site.

3.6.9 Open Cut Trench

NCDOT discourages the cutting of pavement to accommodate the installation of utility facilities or drainage systems. There are instances, however, when pavement cuts are allowed or required. Pavement cuts will be allowed at the discretion of the Division Engineer, taking into account variables including, but not limited to, the condition of the roadway, roadway traffic and subsequent traffic impacts from open cut construction, the risk of damage to other roadway features and existing utilities, and the feasibility of other installation methods.

No longitudinal pavement cuts will be permitted on NCDOT-maintained roads except in cases of extreme hardship.

For traffic control, pedestrian, and ADA requirements, see Sections 3.6.4.

The integrity of the pavement structure, shoulders, and embankment slopes shall be protected.

3.6.9.1 Open Cut Provisions

The following provisions shall apply to the open cut method of utility installation:

1. Open cuts shall not exceed 10 feet in depth. Depths greater than 10 feet shall be approved by the State Utilities Manager.
2. The pipe shall be properly bedded. The backfill around and under pipes or other utility installations on all open cut sections across or parallel to highways within construction limits shall be made of approved material free from rocks in 6-inch loose layers, or other approved methods, and shall be compacted to at least 95 percent of standard density as determined by AASHTO Method T-99. When compacting in layers, each layer must be thoroughly tamped by a mechanical tamp before the next layer is placed. A pneumatic tamp, a gasoline ram type tamp, or a vibrating tamp will be required to meet the specifications of a mechanical tamp.
3. All excess excavated material shall be removed and disposed of outside the limits of the right of way in such a manner as not to interfere with the drainage of highways unless otherwise permitted or directed by the Division Engineer or designated representative. Care shall be taken to not place excavated materials on private property beyond the right of way without the permission of the property owner.
4. The following shall apply when necessary to open cut across concrete pavement or concrete base pavement:
 - a. Cuts shall be made by sawing and removing the concrete pavement. A section of pavement of a minimum length of 6 feet shall be removed in the travel direction and replaced with new concrete.
 - b. For all cases of concrete slab removal, the entire 12 feet width and a minimum of 6 feet in the travel direction shall be removed. Any remaining portion of a slab that is removed shall not be less than 6 feet in the travel direction.
 - c. Where the edge of the patch or section of removed pavement is less than 6 feet from the transverse expansion or contraction joint or crack, the entire section of pavement shall be removed up to the joint or crack and replaced with new concrete.

- d. New concrete shall be doweled into the existing concrete by drilling holes into the existing concrete and installing dowels. All replaced concrete shall have a depth of 1 inch greater than the depth of the original slab.
 - e. Immediately under the replaced concrete, a thoroughly compacted 3-inch layer of soil-type base course, sand, screening, or other granular material shall be placed.
 - f. All replaced concrete, dowels, joint filler, and subgrade reinforcing material shall meet the specifications of NCDOT, both for material and performance of work. Where the existing pavement is badly cracked or has been patched to a state where resurfacing will be required in the immediate future, the Division Engineer may authorize the use of a bituminous patch to meet NCDOT's patching procedure.
5. The following shall apply when necessary to open cut across roads with surfaces other than concrete:
 - a. The pavement repair shall be as directed by NCDOT. Pavement shall be repaired with a minimum of 3 inches of surface course (S9.5B or S9.5C) and asphalt base course (B25.0C) to the original subgrade, or a minimum of 8 inches, whichever is greater.
 - b. Asphalt surface course shall be placed in lifts not to exceed 1.5 inches in depth. Asphalt base course shall be placed in lifts not exceeding 5.5 inches and not less than 4 inches in depth.
 - c. Work shall be performed by cutting the existing pavement to a neat vertical joint and uniform line; removing and disposing of pavement, base, and subgrade material as approved or directed by NCDOT; coating the area to be repaired with a tack coat; and furnishing, placing, and compacting the asphalt plant mix. An approved compaction pattern shall be used to achieve proper compaction.
 - d. The replacement asphalt surface course and asphalt base course shall extend a minimum of 1 foot on each side of the excavated opening. The thickness of the replacement material shall be sufficient to provide a base and surface of equivalent strength to the undisturbed base and surface.
 - e. Milling and replacement of 1.5 inches of asphalt surface course should extend at least 1 foot beyond the edge of the pavement cut to create a benched asphalt joint. Additional milling and overlay may be required.
 6. All replaced asphalt plant mix shall meet NCDOT's specifications for material and performance of work.
 7. Openings in the shoulders, side ditches, and cut or fill slopes of the road shall be repaired in accordance with NCDOT standards and to the satisfaction of the Division Engineer.
 8. Wherever the traveled portion of the roadway is cut normal to the highway alignment, only one-half of the road width shall be opened at one time in order to maintain traffic. Before the other half is cut, the first opening shall be made usable, safe, and maintained for traffic.
 9. No trench made in the travel portion of the roadway, either normal or parallel, shall be left open overnight except in an emergency, and only then when adequate traffic control devices, warning signs, and lights are prominently displayed to protect the traveling public. See Section 3.6.4 for traffic control guidance.
 10. Where the shoulder is open cut parallel to pavement, adequate traffic control devices and warning signs are to be placed, and if necessary, flagmen are to be employed to control traffic.

11. If trenches are left open overnight, a sufficient number of traffic control devices, warning signs, and lights must be prominently displayed so that the traveling public will be adequately protected. See Section 3.6.4 for traffic control guidance.
12. Parallel trench excavation requirements can be found in Section 3.6.10.

3.6.9.2 Approved Pavement Cut Operations

The following guidelines apply for approved pavement cut operations:

1. In plowing cable, the pavement of intersecting roads shall not be cut except in situations approved by the Division Engineer.
2. The cutting of pavement for service taps across the road will not be permitted, and the cutting of pavement for additional terminals where existing cables have been paved over shall be done only upon approval of the Division Engineer. Except on controlled access highways, the policy for crossings by the method of driving, jacking, or boring holes up to 6 inches in diameter without casing is acceptable subject to the approval of the Division Engineer.
3. In situations where an unpaved road is paved over an existing cable or where an existing pavement is widened over a cable, permission will not be granted to cut the pavement for the purpose of restoring or repairing the cable except in cases of emergency involving utility services. In these cases, the Division Engineer may authorize the cutting of pavement for emergency restoration of service.

3.6.9.3 Plowed-In Cable

This method of installation applies to cable installed by the “plowing in” method and does not cover cable installed by open trenching, except for laterals or branch cables, loops to terminals, load coils or splice points, and occasional trenching, where necessary, to pass over, under, or around obstructions encountered. The following requirements shall apply for plowing in cable:

1. Where cable is to be plowed in, it shall be installed as close to the right of way line as is practical. Shoulders stabilized with bituminous material and/or compacted crush stone will be considered as pavement. Cable shall be placed as far as practical from the centerline of unpaved roads. Plowing in will be prohibited in unstable soils caused by adverse weather conditions or other reasons.
2. The cable shall be placed a minimum depth of 18 inches below the surface of the shoulder except in passing over obstructions. Service taps and laterals shall be placed a minimum of 24 inches below the bottom of side ditches.
3. In plowing cable, the pavement of intersecting roads shall not be cut.
4. The cutting of pavement for service taps across the road and for additional terminals where existing cables have been paved over will not be permitted. Except on controlled access right of way, the requirement for crossings by the method of driving, jacking, or boring holes up to 6 inches in diameter without casing is acceptable subject to the approval of the Division Engineer.
5. In situations where an unpaved road is paved over an existing cable or where an existing pavement is widened over a cable, permission will not be granted to cut the pavement for the purpose of restoring or repairing the cable except in cases of emergency involving utility services. In these cases, the Division Engineer may authorize the cutting of pavement for emergency restoration of service.

6. Equipment used in plowing in cable shall be of such types as not to cause damage to pavement.
7. In plowing in cable, the owner shall be responsible for warning signs, lights, flagmen, and other traffic control devices for the protection and maintenance of traffic, in accordance with Section [3.6.4](#).

3.6.10 Excavation Guidance

3.6.10.1 Excavations within the Right of Way

The following guidelines apply to excavations within the right of way:

1. Excavation material shall not be stored on the pavement if it can be reasonably handled otherwise; in cases where storing excavated material on pavement is absolutely necessary, the excavated material shall be removed as quickly as practical, and the pavement shall be thoroughly cleaned.
2. Excavation in the immediate vicinity of drainage structures shall be done with special care so as not to damage or interfere with the use of the existing drainage facilities.
 - a. Temporary shoring may be required due to excavation depth and proximity to the roadway. See [Section 3.4.13](#) for temporary shoring guidance.
3. Parallel open trench installations that do not require shoring should be closed at the end of each workday. Where shoring is required, the trench should be properly shielded with traffic barriers, signs, and lights, and allowed to remain open until completed.
4. Bore pits adjacent to, or that may be hazardous to, traffic should not be left open or unshielded overnight. Shielding in conformity with the most recent edition of the [MUTCD](#) shall be allowed in the case of large pits or extensive bore and jack operations. In some situations, the opening will be allowed to be covered with a steel plate, in conformance with Section 3.6.10.4. Pits outside the clear zone or behind guardrail need not be shielded.

3.6.10.2 Excavations near Signalized Intersections

Excavations within 1,000 feet of a signalized intersection will require notification by the encroaching party to the appropriate Division Traffic Engineer.

All traffic signal or detection cables must be located prior to beginning excavation.

3.6.10.3 Permanent Removal of Excess Excavated Material

All excess excavated material shall be removed and lawfully disposed of outside the limits of the right of way in such a manner as to not interfere with the drainage of highways unless otherwise permitted or directed by the Division Engineer.

3.6.10.4 Use of Steel Plates to Cover Open Excavations

When a temporary excavation, vault or manhole within the Clear Zone is proposed to be left open, it shall not be exposed to errant vehicles (or pedestrians and other conditions as determined by NCDOT). If a temporary excavation, vault, or manhole is left exposed during any period appropriate traffic control measures are absent, the Encroaching Party shall install a minimum Grade 36 steel plate without deformation to cover the hole. The steel plate must be placed and anchored to prevent displacement and shall be designed large enough to span the excavation and exceed it by a minimum of 15 inches on all sides of the excavation. The steel

plate shall be installed daily or as directed by NCDOT until the hole exceeds minimum backfill material meeting NCDOT Standards.

For spans or trench widths less than 5'-3", the steel plate thickness shall be determined by Steel Plate Thickness Table below. For spans or trench widths greater than 5'-3", the design of the steel plate must be sealed by a North Carolina licensed Professional Engineer. If the steel plate is exposed to continuous traffic, the design must meet the AASHTO LRFD HL-93 loading criteria and appropriate signage must be installed in advance of the job site in accordance with the MUTCD for a bump and slippery when wet conditions.

Table 3-4. Steel Plate Thickness Table

Maximum Clear Span or Trench Width	Minimum Total Plate Thickness
1'-11"	3/4"
3'-5"	1"
5'-3"	1 3/4"

3.6.11 Underground Utilities Protection

All new or replaced underground utilities within the right of way shall be made detectable without excavation using techniques available to the industry.

When markers and/or witness posts are used, they shall be constructed of a durable weatherproof material and shall be located outside of the clear zone and as close to the right of way line as is practical. Markers and witness posts shall include the following:

- Name of utility owner
- Contents of utility facility
- Emergency contact number

All buried utilities placed within NCDOT right of way shall be electronically locatable from the surface. When utility facilities are not of ferrous material, the use of tracer wire, marker balls, or other measures shall be taken to ensure that the utilities can be located electronically without the need for excavation.

3.6.12 Disturbance of Items in the Right of Way

Items in the right of way that could be disturbed during utility and non-utility installation and maintenance are listed below, along with applicable guidelines:

- Drainage facilities. Drainage facilities that are damaged shall be immediately reported to the Division Engineer. The damaged facility must be repaired immediately and to the satisfaction of the Division Engineer.
- Controlled access fence. Temporary removal of controlled access fence to accommodate utility installation and maintenance will be allowed only with the permission of the Division Engineer or designated representative. Removed controlled access fence should be reset as soon as possible in accordance with applicable NCDOT standards and as directed by the Division Engineer or designated representative.

- Guardrail. Temporary removal of guardrail to accommodate utility installation and maintenance will be allowed only with the permission of the Division Engineer or designated representative. Any disturbed guardrail shall be reset according to the applicable standard or as directed by the Division Engineer or designated representative.
- Right of way monuments. Right of way monuments disturbed during construction shall be referenced by a licensed North Carolina Professional Land Surveyor and reset after construction.
- Roadway signs. All roadway signs that are temporarily removed due to construction shall be reinstalled as soon as possible.
- Natural barriers. NCDOT is not responsible for any increase in highway noise resulting from removal of the natural sound barrier.

3.6.13 Restoration or Remediation of Disturbed Right of Way

All areas disturbed during construction or maintenance shall be restored or remediated in accordance with the NCDOT [Roadway Design Manual](#), [Roadway Standard Drawings](#), and [Standard Specifications for Roads and Structures](#), and the [AASHTO Roadside Design Guide](#). The party or parties requesting approval to conduct work within the NCDOT-maintained right of way shall take, provide, and maintain all necessary precautions to prevent injury or damage to persons and property affected by operations.

The encroaching party is responsible for damages that occur as a result of the installation for a minimum of one year from the date of completion of the work unless otherwise specified by the Division Engineer or the State Utilities Manager. If the encroaching party or its agent damages the right of way, including, but not limited to, the roadway, shoulders, ditches, and structures, and fails to restore the right of way to the satisfaction of the Division Engineer, then after sufficient notification by the Division Engineer, the non-betterment cost of restoring or repairing same by NCDOT will be borne by the applicant. In some cases, this may involve the performance and indemnity bond posted for the subject work. Additional bond information can be found in Section [2.7.6](#).

3.6.13.1 Roadway

Any pavement replacement or repair required because of utility or non-utility construction or maintenance shall be the responsibility of the permittee. All pavement cuts, including asphalt, concrete, and decorative pavers, shall be repaired or patched in accordance with the NCDOT [Roadway Design Manual](#) (Chapter 1, Section 1-3, Pavement) and Section [3.6.9.1](#), items 4 and 5.

Any pavement markings that are damaged or obliterated shall be restored at no expense to NCDOT.

3.6.13.2 Landscaping

To protect the public investment in highways, NCDOT uses grass and legume cover to prevent roadside erosion, and shrubs, trees, and wildflower plantings to reduce mowing areas and improve roadside aesthetics. If plants require relocation or removal for utility construction, reconstruction, maintenance, or safety, Encroachment Agreement applicants will immediately, after notification by NCDOT, complete such removal or relocation entirely at their expense.

Regarding trees and shrubs, the Encroachment Agreement applicant shall follow NCDOT guidelines for planting within NCDOT right of way.

3.6.13.3 Turf

After completing construction or land-disturbing activities, all disturbed areas must be stabilized to prevent future erosion. Establishing good vegetative cover helps protect soil from the impact of rain and reduces the erosive forces of runoff.

3.6.13.4 Seeding and Mulching

The utility owner shall follow the NCDOT [Best Management Practices for Construction and Maintenance Activities](#), Chapter 5.6, Ground Stabilization.

3.6.13.5 Sidewalks, Multi-Use Paths, and Pedestrian Ways

Partial or full excavation sections must be temporarily backfilled with compacted suitable backfill. The permanent repair shall be a full section replacement with like material (e.g., asphalt, concrete) and be a joint-to-joint replacement (for concrete) in accordance with ADA requirements.

3.6.14 Vegetation Control

Good vegetation control includes maintenance practices for vegetation that will encourage economically the protection, environmental compatibility, operation, stability, continuance, aesthetics, and safety of the right of way.

NCDOT embraces this goal and practices vegetation control to provide a clear zone; improve sight distances at curves and intersections; increase overall safety; ensure adequate drainage; reduce and control erosion; maintain or improve the appearance of the roadside; protect desirable native vegetation, signs, markers, guardrails, and other appurtenances; eliminate or control noxious weeds and brush; reduce maintenance costs where possible; and otherwise enhance the roadside.

To achieve this same goal, utilities will be required to use vegetation control that does not detract from the natural beauty of the roadside or cause an abrupt change in the roadside vegetation conditions. Many native wild flower species in North Carolina are beautiful and enhance the aesthetic quality of the roadside. NCDOT delays mowing in the spring and fall, and limits areas treated with chemicals to encourage the development of many of these native wild flower species. Utilities are expected to comply with NCDOT policies in the treatment and preservation of wild flowers. In addition, NCDOT cooperates with the US Fish and Wildlife Service to minimize vegetation control impacts on endangered or threatened wildlife and plants. Utilities in NCDOT right of way will be required to operate in the same manner.

Specific guidance related to trees, brush, and shrubs; removal or alteration of vegetation; and chemical control of vegetation is provided in the following sections.

3.6.14.1 Trees, Brush, and Shrubs

The limited pruning of trees or other large vegetation in NCDOT right of way for utility lines is an acceptable practice when it is used to ensure and maintain safe operation of facilities.

Except in the process of an authorized construction, maintenance, or safety project, the utility shall not cut down trees unless:

- the trees pose a potential danger to persons or property; or
- NCDOT approves the cutting down of the tree.

No ornamental trees may be cut or removed without prior approval, and in certain situations, NCDOT may require that ornamental trees or shrubs be carefully dug and replanted or replaced by new plants.

When NCDOT gives permission for cutting, trimming, digging, bulldozing, discing, or other removal or alteration of trees, shrubs, or other vegetation in NCDOT right of way for the purposes of construction and maintenance by an encroaching party, it shall be subject to the following standard requirements:

- The permission applies only to the interest of NCDOT in the vegetation and is not to be construed as freeing the encroaching party from liability to the adjacent property owner(s).
- All cutting shall be done as close to flush with the ground as is practical. Under exceptional conditions, such as very large-diameter trees or swamp growth such as cypress, flush cuts may not be practical. The burden of proof for leaving high stumps will rest with the encroaching party.
- Trimming of specimen trees in NCDOT right of way shall be done in accordance with generally accepted tree surgery practice, and any trimming necessary to leave the tree with a good balanced appearance must be done in addition to the minimum trimming needed for line clearance. Climbing irons or spurs must not be used on any specimen tree.
- If wood chipping machines are used for brush disposal, the mulch may be left on the right of way provided it is scattered uniformly and not piled or rowed. No mulch shall be placed in an area that is susceptible to being washed into streams, into drainage structures, or onto adjacent properties. Mulched material shall not be spread on grassed areas.
- If bulldozers, discs, or similar equipment are used for clearing, all debris shall be removed from the NCDOT right of way and out of view unless otherwise stated in the Encroachment Agreement. There shall be no blocking of highway drainage due to the operation, and the ground surface shall be left in a smooth and uniform condition.
- Removal or alteration of vegetation for aboveground utility facilities is limited to a normal width of clearance for the size and type of utility line involved. Proposed encroachments that require a wide cleared area will be considered only on the basis of:
 - removing only trees that pose a potential danger;
 - retaining large, sound, strong-trunked trees;
 - trimming such large, sound, strong-trunked trees only for wire clearance instead of complete side trimming; or
 - additional justification from the utility.

Under some circumstances, a condition of NCDOT granting permission for overhead utility facilities will be the preservation of shrubs and low-growing trees within the clearing area. NCDOT will determine the need and extent of such preservation for specific locations.

When excavating for underground utility installation or maintenance occurs near trees, the cutting of tree roots shall be limited to the minimum amount necessary and shall be done in accordance with generally accepted tree surgery practice. The tunneling under and retention of principal support roots may be required when considered necessary based on the location, size, and quality of the tree involved.

The work site must be left in an acceptable condition on a daily basis, with the proper removal of all waste and debris. If the area is mowable, it must be acceptable for mowing by conventional

mowing equipment. All trees and/or vegetation that are cut must be removed from the site or mulched.

Replacement of damaged trees shall be as discussed in Section [3.6.14](#).

3.6.14.2 Removal or Alteration of Vegetation

Any removal or alteration of vegetation within NCDOT right of way shall be in accordance with [G.S. Chapter 136](#).

Temporary and permanent erosion and sediment control measures shall be constructed, installed, maintained, and removed by the permittee in accordance with all applicable local, state, and federal laws, regulations, ordinances, and policies, including the NCDOT [Roadway Design Manual](#). All erosion control devices shall be placed as needed prior to disturbance and maintained throughout the project.

Matters concerning vegetation in NCDOT right of way that are involved with encroachment activities are to be referred to the Area Roadside Environmental Engineer for investigation and approval before final approval of the Encroachment Agreement. Encroachment Agreements will not be approved until matters pertaining to the cutting or trimming of vegetation in NCDOT right of way have been settled, and then permission for allowable cutting and trimming will accompany the approved Encroachment Agreement to the utility.

3.6.14.3 Chemical Control of Vegetation

Herbicides may be permitted to control vegetation. The use of herbicides is permissible only if they are applied as a part of a scheduled program to eliminate undesirable brushy growth, so that the initial overall browning of vegetation on any given area will not recur, but will be followed only by periodic but consistent selective or spot treatment until undesirable brushy growth has been replaced by low-growing ground cover that will not cause a maintenance problem.

Herbicide applications that kill grass or other herbaceous vegetation indiscriminately will not be permitted. No application of herbicides that are harmful to existing grass, legumes, vines, or other low-growing ground cover plants shall be used:

- on highway cut slopes or fill slopes where such vegetation has been planted or has become established naturally;
- on highway shoulders between the highway surfacing and the ditch line; or
- on other areas where it is obvious that mowing is done as a part of the regular highway maintenance.

Where specific plants have been selected and preserved, they shall be protected against damage by the herbicide treatment of other vegetation.

Vegetation shall be sprayed or otherwise treated with herbicides while in its first growing season after cutting, or before it has reached the average height of 6 feet unless there are exceptional conditions existing in a particular and limited area of rapid plant growth. In that case, dead plant material above the height limit shall be removed after the completion of chemical treatment.

Stump treatment following original clearing for utility construction and basal sprays following the initial overall herbicide treatment for utility maintenance shall have preferential use to the extent that they are feasible according to the latest technical requirements.

When the use of herbicides is permitted for control of vegetation beneath utility lines, liability for damage to adjacent property shall rest entirely with the utility. Careless or excess herbicide

application will not be tolerated, and special precaution must be taken to avoid pollution of streams and ponds.

3.6.15 Out-of-Service or Deactivated Utilities

3.6.15.1 Placing Facility Out of Service

The utility owner shall not leave an out-of-service or deactivated underground facility in place that does any of the following:

- Compromises the safety of any transportation facility user during construction or maintenance operations.
- Prevents other utilities from being placed in the area when alternatives are unavailable.
- Creates a maintenance condition that would be disruptive to the transportation facility.

If none of these conditions apply, see Section 3.6.15.4 for methods to leave in place.

3.6.15.2 Leaving Out-of-Service Line in Place (Abandoned in Place)

NCDOT expects all out-of-service utilities to remain out-of-service and may require the utility to be removed at any time in the future. When leaving an out-of-service or deactivated utility in place, the utility shall do the following:

- Maintain records of the utility's location, size, and type of material.
- Furnish such records to NCDOT upon request.
- Show such utilities on all utility work / relocation plans when required by NCDOT.

3.6.15.3 Returning Facility to Service

To return an out-of-service utility to active service, the utility shall obtain a new Encroachment Agreement. This requirement does not apply if the service is temporarily restored for an emergency or for an NCDOT construction need. With the exception of a construction need, NCDOT does not accept financial responsibility to adjust or relocate an inactive, out-of-service, or abandoned facility.

3.6.15.4 Abandoning and Removing Facilities

The methods for abandoning and removing facilities within NCDOT right of way are described in the following sections.

Abandoning Pipe

Utility pipes shown in the plans or designated by the Engineer shall be abandoned as follows:

- Empty the pipeline contents and plug the ends with grout or flowable fill. Prepare grout to a consistency that will flow and be vibrated in order for the mix to flow uniformly into the pipe to be filled. Use the construction methods in NCDOT [Standard Specifications for Roads and Structures](#), Article 340-3.
- Fill or remove the following abandoned utility pipes:
 - Pipe larger than 24 inches.

- Pipe located within the roadway typical section or the project slope stake line and one of the following:
 - Pipe 12 inches to 24 inches in diameter located less than 20 feet below finished grade.
 - Pipe 6 inches to 12 inches in diameter located less than 12 feet below finished grade and not made of cast iron, ductile iron, high-density polyethylene, or PVC.
 - Pipe located below the groundwater table that could become a conduit for water movement.
- Excavate, remove, and dispose of properly any abandoned pipe to be removed. Backfill the resulting trench, and properly compact the trench using local excavated material or select backfill as required.
- Fill abandoned pipe with grout or flowable fill to at least 90 percent full or completely full when on railroad right of way.
- Remove any abandoned utility pipe exposed by grading operations to a minimum depth of 12 inches below subgrade elevation of the proposed roadbed or completed grading template.
- Use grout to plug all abandoned utility pipes at the entrance to all manholes whether the manhole is to be abandoned or not. Use grout to plug all abandoned water mains after new mains are placed in service. Abandon valves by removing the valve box and backfilling with approved material.

Abandoning Manholes

Utility manholes shall be abandoned as follows:

- Remove the top of the manhole to the manhole spring line or to an elevation of 2 feet below the roadway subgrade, whichever is greater, and fill the manhole barrel with approved material.
- Plug connecting utility pipes before filling or removing the manhole.
- Remove the manhole taper, wall, and base on all manholes to be removed.

Removing Water Meters

Water meters shall be removed as follows:

- Disconnect and plug the water service piping at the source main, and plug the piping at the right of way line.

Removing Fire Hydrants

Fire hydrants shall be removed as follows:

- Disconnect and plug the hydrant leg piping as close to the water main as possible.
- If the hydrant valve is within 4 feet of the main, close the valve, plug the outlet side of the valve, and remove the valve box.

3.6.16 Adherence to Approved Agreement & Plans

Facilities should be installed in reasonable compliance with the approved agreement and plans. Any deviation from the approved plans should be discussed with and approved by the NCDOT

prior to commencement of the change. Encroaching utilities who are eligible for reimbursement under [G.S. §136-27.1](#) may be denied reimbursement if the conflicting facility is found to have not been installed in accordance with its approved encroachment agreement and plans.

3.7 Emerging Issues

3.7.1 Shallow Trenching

Shallow trenching is a quick, low-impact deployment method. Shallow trenching involves cutting a small groove in the roadway pavement, back of curb, or sidewalk to install fiber or cable in a duct bank within the groove. Then the groove is backfilled with flowable fill, special epoxy, or another sealant, and may include a pavement overlay.

Shallow trenching is divided into three different methods:

- Macrotrenching – relies on a trench that is 12 to 36 inches deep and up to 3 inches across.
- Microtrenching – relies on a trench that is 6 to 12 inches deep and usually 1.25 inches across.
- Nanotrenching – uses a much smaller trench that is typically only 2 inches deep and less than 1 inch wide.

The trenching is typically in the pavement at or near the curb line or back of curb.

These methods are not approved for statewide use. NCDOT currently has a pilot program underway.

3.7.2 AASHTO Manual for Assessing Safety Hardware

NCDOT is moving away from [National Cooperative Highway Research Program \(NCHRP\) Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features](#), and toward the [AASHTO Manual for Assessing Safety Hardware](#) (MASH) guidelines for breakaway supports for any structure located in the clear zone. Specific guidelines related to breakaway supports involving encroachments will be clarified in future updates to this UAM. For breakaway supports installed within NCDOT construction projects, NCDOT has agreed to implement the new MASH requirements for breakaway devices by December 31, 2019.

3.7.3 Air Hammers in Horizontal Directional Drilling (HDD)

An air hammer attachment to the drill string without a Bentonite slurry may be considered when hard rock is encountered. If drilling straight, then use of air only to remove the spoils is acceptable. A foam with biodegradable oils must be added to lubricate to be able to turn (in any direction) up to 1.5 feet in direction for every 100 feet of length through rock. When an air hammer is determined to be required, typically during the drilling process, then a written drill report must be provided to the Division Engineer immediately following construction indicating depth, alignment, and pressures encountered. At the discretion of the Division Engineer, NCDOT may deny the use of Air Hammers in HDD and require an alternate method of traversing through rock.

Section 4 Coordination

4.1 General

Utility coordination facilitates the removal, relocation, or adjustment of utility facilities when construction of highway improvements by NCDOT makes such removal, relocation, or adjustment necessary. NCDOT works to ensure that utilities are removed, relocated, or adjusted by the utility owner in a timely and efficient manner to the benefit of NCDOT, the utility owner, the traveling public, and utility customers. NCDOT establishes close-working relationships with utility owners, keeping them abreast of highway projects, project schedules, policy changes, and other highway utility-related issues.

Utility coordination involves all stakeholders in developing a solution to accommodate utilities within a project in an orderly fashion. The result is that utility stakeholders including owners, NCDOT, designers, project managers, and the Utility Coordinator have agreed that the proposed resolution of utility conflicts on a particular project is the best and most efficient solution, and has the least impact collectively without undue impact on the project.

For utilities occupying NCDOT right of way by encroachment, the conditions of an Encroachment Agreement dictate that conflicting utilities must be relocated. It is the utility owner's responsibility to relocate the utility when notified by NCDOT. The authority of NCDOT to require the relocation of utilities in NCDOT right of way is contained in [G.S. §136-18\(10\)](#).

4.1.1 Purpose

The purpose of this section of the UAM is to describe the coordination process for utility conflict resolution and utility relocation for NCDOT projects at a level that:

- guides the decision making of Utility Coordinators;
- provides descriptions of, and guidelines for, interpretation of regulations, statutes, federal guidelines, and other sources of policy;
- documents sources of policy affecting utility relocation; and
- provides a high-level guide to the process of utility relocation for utility owners who are encroaching on NCDOT right of way or have compensable interest.

The primary intended audience of this UAM is Utility Coordinators within NCDOT, Utility Coordinators in firms working for NCDOT, Division and Utilities Unit management, and personnel of the utility companies working with NCDOT on relocations. The secondary audience includes attorneys for the State or utility companies, NCDOT and contract Right of Way Agents, land owners, and the general public.

This section is intended to set policy for utility coordination at a high level to guide relocations during project development..

4.1.2 Avoid, Minimize, & Accommodate Approach to Utility Relocations

The Avoid, Minimize, Accommodate approach is being used to position utility coordination as early as possible in the project planning process. These approaches are listed in order of preference. Avoiding the relocation of a utility is a benefit to the utility owner, customers, taxpayers, motorists, and NCDOT. All groups will benefit from cost savings and a reduction in the time required to complete the project. Value engineering is encouraged as a strategy for use in each of these methods. The Avoid, Minimize, & Accommodate approach is as follows:

1. **Avoid.** Once a utility conflict has been identified, the first step is for both the utility and NCDOT to evaluate various design options. The preferred outcome is to completely eliminate the need to adjust or relocate the utility; that is, to eliminate the conflict.
2. **Minimize.** During the evaluation of design options, it may be determined that the conflict cannot be completely eliminated. In this case, both the utility and NCDOT will look at options to minimize the impact of the conflict.
3. **Accommodate.** If conflict cannot be avoided or minimized, then NCDOT will accommodate the relocation of the utility. The utility will adjust or relocate the existing facility to eliminate the conflict with the proposed roadway improvements.

4.1.3 Consideration of Total Project Cost

When evaluating project and utility relocation alternatives NCDOT will attempt to reduce total project costs. Decisions will be made by NCDOT without regard to whether the costs are to be borne by NCDOT or by the utility owner. The evaluation will also consider the effect of the alternatives on the project schedule. The consideration of the value of the effect of the duration of relocations on the project schedule will vary depending on the individual circumstances of the project.

4.1.4 Definition of a Utility Conflict

A utility is considered to be in conflict with a project if it meets any of the following criteria:

1. Construction of the project will obliterate any of the utility facilities.
2. Construction poses an unacceptable risk to the utility facilities.
3. Construction of a project cannot proceed safely because of the proximity of equipment or personnel to the facilities.
4. Final or intermediate grades reduce the cover over underground utilities to unsafe depths or to depths unacceptable under published specifications, accepted practice, or regulation; reduce clearance of aboveground facilities to below acceptable heights; or render facilities unusable or structurally unsound.
5. As a result of final grade or conditions of access, the utility is rendered inaccessible for normal operation and maintenance.
6. The utility facilities are not compatible with routine operation and maintenance activities by NCDOT. These routine activities include repair of drainage facilities, repairs to the subgrade, repaving, and vibratory compaction.
7. The facilities are constructed from an unsuitable material (see Section 3.4.6, Unsuitable Pipe Materials), and the grade over the facilities will be changed by the project or heavy equipment is likely to be operated over the facilities.
8. The location of the existing facilities creates an unsafe situation for traffic or pedestrians in the finished project.
9. The location of the facilities is considered by NCDOT to be incompatible with the finished project.

Utilities in conflict by condition 5 (inaccessibility for maintenance) may be relocated at the discretion of the owner. The responsibility for the relocation costs will be determined according to the policy on determination of cost responsibility (see Section 4.4). If the utility chooses not to

relocate at the time of the project, NCDOT will not assume financial responsibility for a subsequent relocation not associated with the project that rendered the facilities inaccessible.

4.1.5 Construction and Financial Responsibility

This section describes who is responsible for utility relocation or adjustment and construction due to a conflict imposed by a STIP project on a utility facility. FHWA considers the cost of adjusting reimbursable utility facilities as a cost of right of way acquisition.

4.1.5.1 Construction of Utilities

Utility owners are responsible for relocating their own facilities. Utility owners relocating their own facilities must complete relocations by the project let date unless another date is agreed to by NCDOT.

A utility may request that NCDOT include utility relocations in the roadway construction contract. NCDOT will agree to that request if it is in the best interest of NCDOT and the project. NCDOT may construct utilities using plans that are certified by a licensed North Carolina Professional Engineer and provided by the utility owner, provided that those plans are acceptable to NCDOT. NCDOT will not provide plans for use in construction by the utility owner.

NCDOT may enter into agreements with municipalities or other utility owners to provide the necessary engineering and utility construction to be accomplished by NCDOT on a reimbursement basis. Reimbursement will be as described in Section 4.7.1, Reimbursements, Invoicing, and Payments.

4.1.5.2 Financial Responsibility

NCDOT will assume the financial responsibility for the non-betterment costs of adjusting or relocating utilities when the conflicting utilities are occupying a valid utility right of way or have other compensable interests. A valid utility right of way for the purposes of reimbursement consideration is one in which the utility owner has a compensable interest.

Responsibility for relocation costs will be determined according to Section 4.4. The utility owner is responsible for all costs except those reimbursable by NCDOT.

4.1.5.3 Bonds

In some cases, a bond may be required by NCDOT for construction and performance requirements. See Section 2.7.6, Bonding, for additional information.

4.1.6 Encroachments with Prior Rights

It is the policy of NCDOT to extinguish subordinate claims to land acquired as right of way, including utility easements ([NCDOT Right of Way Manual](#), Section 11.01, General Requirements). In exchange for voluntarily relinquishing claims to easements, NCDOT will allow the utility to remain within NCDOT right of way or NCDOT-owned easement by encroachment with prior rights. Utilities encroaching with prior rights retain some of the rights afforded by their prior easement. These rights are as follows:

1. The right to be reimbursed for all future moves required by NCDOT when exercising the right to require encroaching utilities to relocate.
2. The right to modify and upgrade facilities encroaching with prior rights without loss of those rights. Examples of covered upgrades to facilities include upsizing a pipe or duct bank, adding cables to an existing duct bank, replacing poles with taller poles, and adding cable

to a pole line. A second pipe or a second pole line not completely replacing the first would not be covered by prior rights.

When utilities desire to modify facilities encroaching with prior rights, NCDOT requires the utility to submit the plans for review as an encroachment. This review is to ensure the safety of the modification within the roadway and does not affect the right for future reimbursement. When proving prior rights for upgraded facilities, the utility should submit the approved Encroachment Agreement describing the modifications along with the original utility agreement.

For a utility, entering into an agreement granting encroachment with prior rights is voluntary. Easement allows the utility owner the ability to install and maintain utilities. The future benefits of the prior rights are considered payment for easement rights relinquished in the agreement. If a utility chooses not to voluntarily relinquish claims to easements captured by the right of way, NCDOT will purchase the easement right through negotiation or by condemnation. When easement rights are transferred by purchase to NCDOT, prior rights will not be conveyed if those facilities encroach. Responsibility for the cost of relocations due to future projects will be determined as described in [Section 4.4, Cost Responsibility](#).

4.1.7 Failure to Comply

A utility will be deemed as non-responsive if NCDOT notifies the utility and gives it reasonable time to respond and relocate as needed, and either no information is given, or data and schedule commitments have not been met. After determining non-responsiveness, NCDOT will send written notification to the utility owner.

In those cases where NCDOT and the utility cannot reach an agreement, NCDOT has identified the utility as non-responsive, or the utility refuses to relocate or refuses to claim ownership, the NCDOT Board of Transportation will issue an order on the authority of [G.S. §136–18\(10\)](#) requiring the necessary adjustments.

If the utility does not comply with the order, NCDOT will consider the utility facilities placed out of service and subject to removal in whole or in part for the construction of the highway improvement. NCDOT may remove the utility facilities by inclusion in the highway improvement contract. After completing the work, the owner of the utility will be invoiced for the work performed. If the invoice is not paid, NCDOT will refer the matter to the Office of the Attorney General for further action.

4.1.8 Federal Highway Administration

FHWA, by issuance of a Federal Project Authorization and Agreement, documents the approval of federal cost participation in a right of way project and the relocation of utilities based on the utility estimates provided by NCDOT.

The State Utilities Manager will be responsible for obtaining concurrence on utility issues from FHWA where required by FHWA policy.

4.1.9 Rights and Eligibility to Occupy NCDOT Easements

Right of Way

All relocating utilities are eligible to occupy NCDOT right of way by encroachment. Permission to occupy the right of way will be granted according to the policies in this UAM. The need for utility relocation resulting from a project does not create an obligation for NCDOT to accommodate the utility within right of way if it is not possible to do so safely and according to policy.

NCDOT-Owned Utility Easement

NCDOT will acquire and maintain utility easements when necessary for the purpose of relocating utilities as required by a project. The occupation of NCDOT-owned utility easements (PUE, AUE, and DUE) is governed by [G.S. §136-18\(2\)](#), [G.S. §136-19](#), and [G.S. §136-19.5](#). All relocating utilities are eligible to occupy NCDOT-owned utility easements.

NCDOT will purchase utility easements under these circumstances:

1. For the purpose of accommodating a utility relocating at NCDOT expense. Other relocating utilities may encroach within this easement according NCDOT policy.
2. When an agreement has been executed with a relocating utility pursuant to [G.S. §136-19.5](#), in which an encroaching utility pays a proportional share of the cost of acquisition of the easement. Utilities entering into such an agreement will occupy the easement by encroachment with prior rights.
3. In extenuating circumstances, when there is no other location available, and to prevent delays of a project due to utility construction, as authorized by [G.S. §136-19\(e\)](#).

When acquiring easements, NCDOT will avoid harm to structures. NCDOT will not acquire utility easements that result in relocation of a tenant if any viable alternative is available.

Transfer of Easements

NCDOT has the authority under [G.S. §136-19.5\(c\)](#) to purchase utility easements and to transfer those interests in easements to a utility. It is the policy of NCDOT that this authority will be used only to replace utility easements that granted the utility the right to approve and deny the right of other utilities to occupy the same easement, or that allow the utility rights outside of the easement, such as the right to cut trees that pose a potential danger. NCDOT is not obligated to purchase and transfer easements under this policy. It is the policy of NCDOT not to purchase and transfer easements unless absolutely necessary to advance the project.

NCDOT may choose to transfer to the occupying utility rights in an easement accommodating utility crossings if that easement is not likely to be used for longitudinal occupancy by encroaching utilities.

Future Utilities

Pursuant to [G.S. §136-19\(e\)](#), NCDOT has the authority to acquire easements for the accommodation of planned utilities. This authority should be used only when necessary for the efficient planning of utilities associated with a project or planned in the vicinity of a project.

4.1.10 Private Utilities

Private utilities required to be adjusted or relocated for a STIP project are handled in the right of way process normally as a “Cost to Cure.” NCDOT may choose to relocate private utilities using the standard process in place for public utilities. NCDOT will provide guidance in these circumstances. Private utilities are defined in Section [1.3.3](#).

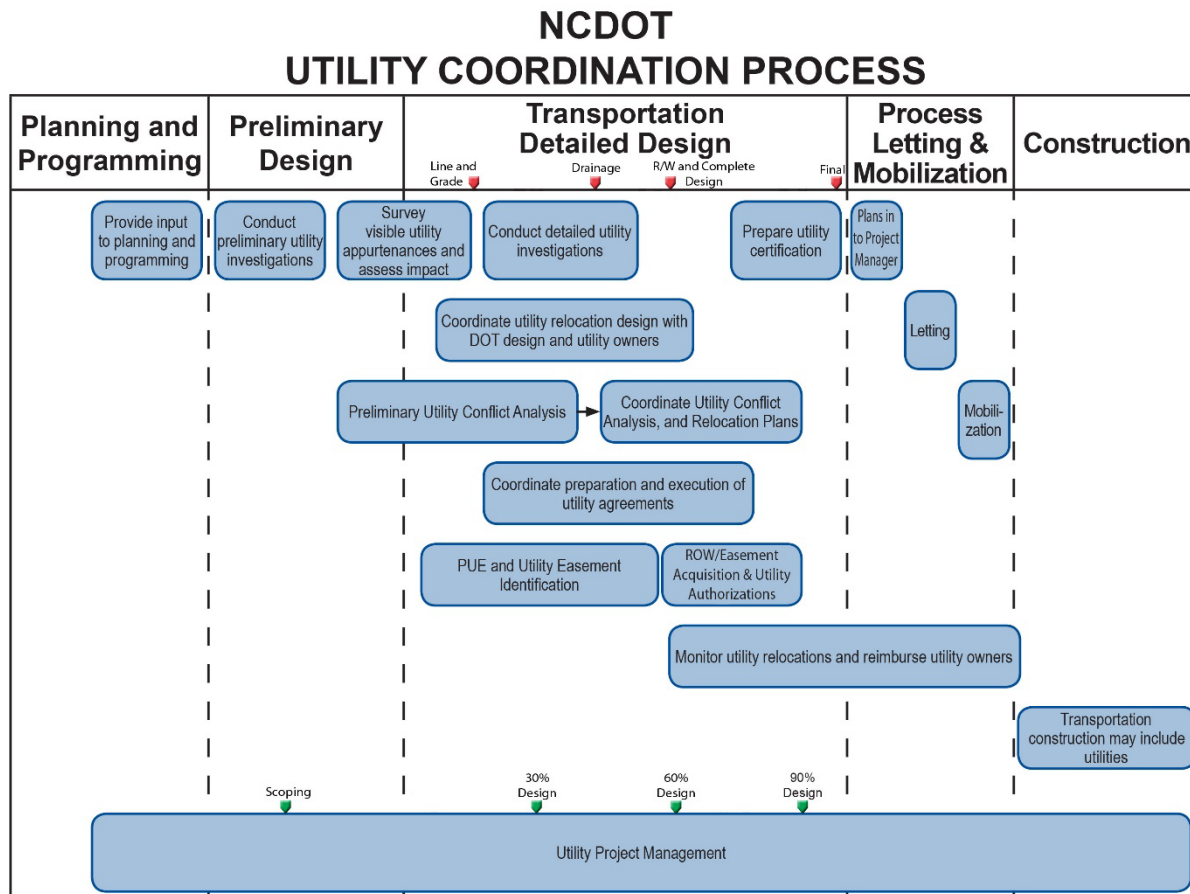
4.2 Coordination Process

Early consideration of utility issues will give all parties time to work out the details of avoiding, minimizing, and accommodating the utility, including protecting or relocating the utilities, during project design. Success in reducing cost and delay is the result of cooperation and collaboration among the numerous stakeholders, including the project manager or prime consultant, utility owners, and Utility Coordinators. Key steps are shown at a project level in [Figure 4-1](#) and outlined as follows (see [Appendix B](#) for a large-format version of [Figure 4-1](#)):

1. During the project planning phase, NCDOT's Utility Coordinator and surveyors will gather information about utilities in the vicinity of the project. The surveyors will gather location data visually on-site as well as information using either utility records or SUE methods to locate the facilities in x-y coordinates. This information will be depicted on project surveys. The Utility Coordinators will interview representatives of the utility companies to gather information on the types and nature of facilities in the project area, the expected difficulty and risks associated with relocation of those facilities, rough estimates of the cost of relocation, and expected schedule requirements for relocation design and construction. The Utility Coordinator will assess the potential impacts to the utilities and risks to the project. This assessment will be used to influence the design of the project and minimize overall project costs.
2. Utility owners attend an NCDOT utility kickoff meeting, review the roadway plans, and provide the following information:
 - a. Existing utility facilities along the project corridor, whether shown on the plans or not. This includes high value lines and individual appurtenances (e.g., vaults, metering stations).
 - b. Facilities that would not be impacted that the utility wishes to retain.
 - c. Facilities to be replaced because of age, size, condition, etc.
3. The Utility Coordinators, project managers, and roadway project designers collaborate with the utilities for a value engineered resolution that minimizes impacts on all stakeholders. Examples include the following:
 - a. Identify utility facilities that may be protected in place, such as including a protective concrete slab, retaining wall, or construction method.
 - b. Identify areas in which a minor design change can avoid a utility relocation, such as a grade change in a drainage ditch, location of a drainage structure, or minor change in a roadway profile. Whether the cost of relocation is borne by NCDOT or the utility owner, ultimately it is the citizens of North Carolina who pay, whether through taxes or utility bills. When evaluating the economic practicality of designing around an existing utility, the designer should consider the total cost of the project, including the utility relocation.
 - c. For utility conflicts that cannot be avoided or protected, collaborate in selecting the route for the relocated utility facility.
 - d. Determine available or additional right of way needs for required utility relocations. The Utility Coordinator facilitates communication among the entire design team and utilities during the development of the right of way plans. Instead of waiting for complete designs, preliminary designs and concepts should be shared with utilities to facilitate the design of their relocating facilities and identification of easement needs.

- Utility Coordinators and utility companies coordinate to prepare utility agreements for relocating the utility facility.

Figure 4-1. Utility Coordination Process Flowchart*



November 1, 2019 *The Design Build Process may vary from the process as shown.

*Design Build may vary from this process, although the components will remain the same.

4.2.1 Minimize Delays and Project Cost

STIP projects often require that utility facilities be adjusted to accommodate the design and construction of proposed transportation facilities. Failure to accommodate utility conflicts in the design process or to relocate facilities in a timely manner can result in unscheduled delays and increased project costs.

Early in the utility coordination process, including initial meetings with the utility, items that may impact the project schedule must be identified, such as moratoriums on service interruptions, funding issues, lead times for material fabrication, or replacement easements. Many of these items will need to be factored into the project’s critical path.

While early coordination and relocating of utility facilities is a benefit to a STIP project’s schedule, roadway design changes may cause additional impacts or require the utility to move a second time. For this reason, the transportation plans that are given to utilities must be adequate for the utility to plan the relocation with a high degree of confidence that the relocation can be

accommodated if the roadway design is modified. NCDOT will make every effort to avoid design changes that affect utilities already relocated, and will minimize impacts to relocated facilities if such changes cannot be avoided.

Proposed utility installations and relocations within the STIP project limits are encroachments on right of way or relocations at NCDOT expense. Proposed plans are reviewed by NCDOT to minimize interference of the proposed utility with existing or proposed highway facilities or with highway operation and maintenance, and to ensure compliance with the rules governing reimbursement for relocation. When the utility has known plans for future expansion of facilities on a project, provisions should be made for that known or planned expansion of the utility facilities, particularly those located underground or attached to bridges. They should be planned so as to minimize hazards and interference with highway traffic when additional overhead or underground lines are installed at some future date. NCDOT requires encroachment review for those facilities installed at a later date.

In addition, coordination is required among utility owners when more than one utility desires to use the same right of way to ensure that all utility facilities will be placed in such a way to avoid interference with each other during construction, normal use, and maintenance.

4.2.2 NCDOT Responsibilities on Projects

NCDOT will provide the utility with sufficient plans and specifications to enable the utility to determine if its facilities are in conflict with a project, and to reasonably determine the future location, including depth of cover and required clearances. NCDOT will provide the schedule for the highway project and other project constraints. NCDOT will conduct meetings and communication to give feedback on the proposed relocation plans and other utilities in the vicinity. NCDOT will provide the required forms for relocation and reimbursements.

4.2.3 Determine Construction and Financial Responsibility

The Utility Coordinator and the utility will consult to determine whether utility relocation construction will be performed by NCDOT, or by the utility. See Section 4.1.5 for guidance.

If the utility believes NCDOT should be responsible for the cost of the relocation, the utility is responsible for providing documentation to support the claim. Determination of financial responsibility will be made according to Section 4.4.

4.2.4 Utility Estimates for State Transportation Improvement Program Projects

During the initial phases of a STIP project, NCDOT determines the order of magnitude of utility impacts for both cost and schedule. STIP projects will include utility relocation impacts and cost estimates prepared for right of way funding.

Utility owners are expected to provide estimates to NCDOT at other points in the project when requested. In addition, coordination with utility owners provides information that NCDOT can share with its project delivery teams to help develop project estimates. Utilities can provide input by doing the following:

- Verifying the depiction of their facilities on NCDOT plans
- Reviewing NCDOT plans to identify conflicts with the project
- Participating in project meetings
- Submitting plans, schedules, cost estimates, and easement needs for relocations

- Evaluating alternatives for larger projects

4.2.5 Subsurface Utility Engineering

[CI/ASCE 38-02, Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data](#), defines subsurface utility engineering as “a branch of engineering practice that involves managing certain risks associated with utility mapping at appropriate quality levels, utility coordination, utility relocation design and coordination, utility condition assessment, communication of utility data to concerned parties, utility relocation cost estimates, implementation of utility accommodation policies, and utility design.” NCDOT has adopted [CI/ASCE 38-02](#) SUE guidelines in its [NCDOT Location & Surveys Subsurface Utility Engineering Guidelines](#). FHWA encourages the use of SUE data, which need to be gathered early enough to avoid conflicts.

NCDOT encourages utility companies to request SUE data through NCDOT. NCDOT surveys are quality controlled to ensure that project coordinates are used and that the elevation data are consistent. NCDOT will not use outside data for design decisions. If utility companies use SUE data they have collected, they should ensure that their surveyors are using project benchmarks and coordinate systems, and that data are consistent with the project data to ensure good decisions are made. See [NCDOT Location & Surveys Subsurface Utility Engineering Guidelines](#) for further information.

NCDOT may not obtain data at all points requested. Points close together where elevations are unlikely to vary will be consolidated. No data will be obtained for lines that are to be abandoned anyway. No data will be obtained for lines that have a high probability of conflict, a low level of difficulty for construction of the relocation, a low probability of affecting the project schedule, and low cost of replacement such that the expected return on the investment in SUE is less than the cost of the SUE.

Utility quality levels are a professional opinion of the quality and reliability of utility information. Such reliability is determined by the means and methods deemed necessary by the Professional Engineer. Each of the following four utility quality levels is established by different methods of data collection and interpretation:

- **Utility quality level A.** Precise horizontal and vertical location of utilities obtained by the actual exposure and subsequent measurement of subsurface utilities, or verification of previously exposed and surveyed utilities, usually at a specific point. Minimally intrusive excavation equipment is typically used to minimize the potential for utility damage. A precise horizontal and vertical location, as well as other utility attributes, is shown on plan documents. Horizontal and vertical accuracy is typically set to 0.05' (15-mm).
 - **Utility quality level B.** Information obtained through the application of appropriate surface geophysical methods to determine the existence and approximate horizontal position of subsurface utilities. Quality level B data should be reproducible by surface geophysics at any point of their depiction. This information is surveyed to applicable tolerances defined by the project and reduced onto plan documents.
 - **Utility quality level C.** Information obtained by surveying and plotting visible aboveground utility features and by using professional judgment in correlating this information to quality level D information.
 - **Utility quality level D.** Information derived from existing records or oral recollections.

Potential SUE needs and requirements should be identified early in design so utility facilities may be avoided or the impacts minimized.

On-the-ground markers, flags, and paint will have standard American Public Works Association color coding, as follows:

- White: proposed excavation site
- Pink: temporary survey marks (SUE)
- Red: electric power lines (distribution, transmission, service, and lighting)
- Yellow: gas, oil, or petroleum products
- Orange: communication, signal
- Blue: potable water (drinkable)
- Green: sewer and force mains
- Purple: reclaimed, raw, or slurry water (non-drinkable)

4.2.6 Stakeholders

Stakeholders play a critical role in the success of utility coordination on NCDOT projects.

4.2.6.1 Project Stakeholders (NCDOT Disciplines)

The following NCDOT disciplines are project stakeholders:

- Project management
- Traffic, signals, lighting
- Hydraulics
- Right of way

4.2.6.2 External Stakeholders (Non-NCDOT)

Utility Companies

On NCDOT projects, utility companies provide information and coordinate with NCDOT's project delivery teams on the location of their facilities. Utility companies do the following:

- Verify the depiction of their facilities on NCDOT plans.
- Assist with unidentified utilities if possible.
- Review NCDOT plans and participate in project meetings.
- Submit plans, schedules, cost estimates, and easement needs for relocation.
- Perform final utility relocation work.

Government Agencies

Government agencies have an interest in and coordinate with NCDOT for the accommodation, installation, and relocation of publicly owned utility facilities in NCDOT right of way. Government agencies may have an oversight role or require additional permitting for the area of responsibility they oversee. Government agencies include the following:

- City and county agencies

- National Park Service
- US Forest Service
- Military Facilities
- Environmental agencies
 - State Historic Preservation Officer
 - US Environmental Protection Agency
 - Environmental Protection Organizations
- Quasi-governmental agencies and entities, including educational entities and toll road systems

Railroads

- Railroads require permits to occupy or work in their right of way or areas of joint use with NCDOT

Property Owners

Property owners may have private utility-like facilities (e.g., pump stations, lighting, water, irrigation lines). Relocation of these facilities for private property owners is usually handled as part of the right of way process or settlement with the owner, but may become part of the utility relocation process when warranted by project conditions.

Property owners (private and public) also have a stake in right of way issues, which may include aesthetics, access, and maintenance. NCDOT and utilities should consider the impact of easement on property owners.

4.2.7 Expected and Suggested Meetings for Coordination

4.2.7.1 Public Hearing (Suggested)

The public hearing allows the general public to participate in the transportation planning process. It is a coordinated effort for NCDOT to gather input from all parties in order to make educated decisions on its planned projects. A utility company may attend the meeting, get information, and comment on the effect of the project on its facilities as a member of the public.

NCDOT maintains a current list of all public meetings, public hearings, and maps on the [NCDOT website](#), which can be searched by keyword, region, county, or type.

4.2.7.2 Utility Kickoff Meeting (Expected)

Utility companies are expected to send a capable representative to the project utility kickoff meeting. The purpose of this meeting is to exchange information about the project among the affected utility owners and NCDOT. NCDOT will provide project plans and important schedule dates. The utility representatives should be knowledgeable about their facilities and future upgrade plans in the area of the project, and should be capable of providing a tentative schedule for relocation of their facilities.

The utility representative should inform NCDOT of risks to the construction schedule for the project posed by the location or relocation of the company's facilities. If a utility representative is

aware of utilities currently or planned to be in the area that are not represented at the meeting, the representative should make NCDOT aware of those utilities.

At or soon after the utility kickoff meeting, the utility should do the following:

- Verify the depiction and location of its facilities on the plans.
- Inform NCDOT of facilities not shown on the plans.
- Inform NCDOT of the location of abandoned facilities in the project area.
- Identify any utilities shown as unknown on the plans that belong to the utility.
- Inform NCDOT of any request by NCDOT or documentation from NCDOT needed to establish the utility's project budget, and secure timely appropriation of funding for the relocation. Identify the schedule required for receipt and use of the documentation or request.

4.2.7.3 Project Progress Meetings (Expected)

Project progress meetings may be held for complicated or accelerated projects to assist in locating facilities or to monitor and coordinate construction progress. Utility companies are expected to send a representative knowledgeable about the construction plans and progress on the project, and capable of giving expected dates for completing milestones important to the project schedule. These meeting may be held during the design phase of the utility relocation if there is significant difficulty expected in coordinating relocations with project construction, or in coordinating design among the utilities.

4.2.7.4 Utility Relocation Scheduling Conference (Expected)

A utility relocation scheduling conference is attended by the utility company and the Resident Engineer, normally held within 10 days of authorization, to discuss construction and the schedule for the relocation.

4.2.7.5 Pre-Construction Meeting (Expected)

A pre-construction meeting is held between NCDOT and the contractor to discuss and review the project. Utility companies are expected to attend to provide the contractor with status reports and other information, and to facilitate future coordination with the contractor if construction is ongoing.

4.2.7.6 Field Inspection Meetings (Expected, if Invited)

Field inspection meetings are multi-disciplinary meetings including construction management to review plans for local issues and constructability. Utility companies do not usually attend these meetings. However, if the utility owner is invited, attendance is expected.

4.2.8 Utility Conflict Analysis

Utility conflict analysis is a process used to identify all potential utility conflicts on a highway project with the proposed design and construction elements. Documentation of these conflicts can be a written report or in tabular format (e.g., conflict matrix).

4.2.8.1 Record Data Collection and Distribution of Transportation Highway Plans

NCDOT will provide roadway design plans to the utility. The utility will verify their existing facilities, as depicted in the survey, for NCDOT. If any facilities are missing, the utility will mark up the plans to identify the location of any missing facilities and to identify abandoned facilities or facilities

shown in error, and will return this information to NCDOT. The utility will provide markups identifying facilities to be removed or abandoned, facilities to remain in place, any required temporary relocations, and preliminary relocation alignments. The utility will include information on any future facilities in the project area.

Coordination should include a discussion of design alternatives based on current plans for the following:

- Potential conflict mitigation
- Possible relocation options
- Constructability
- Identification of potential utility easement requirements

4.2.8.2 Conflict Analysis and Resolution

In a conflict analysis, an existing utility facility may have a potential conflict with a design element, such as one of the following:

- Proposed cut and fill sections
- Proposed drainage features
- Proposed highway structures or slope protection

In cases where the conflict cannot be determined from plans or cross-sections, the utility facility will have to be physically exposed to determine its exact location both horizontally and vertically (SUE utility quality level A).

Conflicts may be resolved by one of the following:

- A design element will be changed to avoid the utility conflict.
- Construction will be in close proximity, but the facility can be protected in place and impacts minimized instead of the facility having to be relocated.
- No design modification will be made, and the utility must relocate or be mitigated to resolve the conflict.

4.3 Considerations during Utility Design

On new installations or adjustments of existing utility lines, provision should be made for known or planned expansion of the utility facilities. The expansion should be planned so as to minimize hazards and interference with highway traffic when additional overhead or underground lines are installed at some future date. Utility companies must verify that all of their facilities are identified and that potential conflicts are addressed. If information regarding abandoned lines or lines listed as unidentified is available, this information should be provided to NCDOT.

Projects cannot be properly coordinated to avoid or minimize conflicts or stay on schedule if utility design does not proceed concurrently with project design. NCDOT requires identification of proposed utility easements prior to Right of Way Plans. While utility design need not be final at that point, it should have progressed for enough to determine easement needs accurately.

4.3.1 Schedule

It is important that utility companies provide their utility relocation schedules to NCDOT so they can be included in the critical path of the STIP project because utilities are one of the most

common causes of project delays. Occasionally, it is impossible to relocate utilities prior to construction of segments of the roadway (in deep cut sections, for example), and coordination between the utility and the highway contractor must be included in the Special Provisions of the contract. The utility must be a part of the development of the project schedule and phasing when in the project contract.

The utility company's schedule is an important part of any NCDOT contract or agreement, and must be clearly defined to be enforceable. The schedule must be realistic and mutually agreed to by all parties. All Utility Relocation Agreements shall include a schedule that identifies a start date of relocation, the duration for construction activities, and a completion date that can be relied upon by NCDOT and contractors. Additional milestone dates may be added as mutually agreed upon by NCDOT and the utility.

NCDOT relies on relocation schedules provided by the utility companies to keep projects on schedule. When the utility companies are unable to keep their schedules or have unrealistic schedules, the delays to the project can result in significant loss of public funds.

4.3.2 Plans

The utility relocation plans must provide a clear presentation of the work required. A vicinity map may be used to illustrate the scope of an adjustment and the extent to which the utility system is affected. Plan sheets should clearly indicate the conflict between the existing utility facilities and the proposed highway work, and the location and type of relocated facilities. For further information on utility relocation plans, see Section 3.2.3. The relocation plans will be attached to the utility agreement and will be used to support the estimate.

4.3.3 Temporary Relocations

Temporary relocations may be necessary for some projects. NCDOT prefers a single relocation where feasible. Temporary relocations that are required during a STIP project are reimbursable under the same policies and agreements as permanent relocations or adjustments. The temporary relocation cost should be itemized separately from the permanent relocation cost in the agreement estimate.

Temporary relocations should be moved back to their original or final location as soon as the temporary relocation is no longer needed. In all cases, the utility should be in the final location before the construction project is accepted.

Temporary relocations must be shown on the relocation plans, along with the time line and project phasing required.

4.3.4 Exceptions to the Policies in this Utility Accommodation Manual

In cases where the utility shows an extreme hardship or an unusual condition exists, an exception to the policies in this UAM may be requested. See [Section 1](#), Preamble, for guidance.

4.3.5 Permits and Regulations

All activities related to the removal, relocation, and adjustment of a utility facility, including the development and reimbursement of costs, any environmental requirements, and retention of records, will be in accordance with all applicable state and federal laws, rules, and regulations, including, but not limited to, the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act ([42 USC 4601 et seq.](#)), the National Environmental Policy Act ([42 USC 4321 et seq.](#)), and the Buy America provisions of [23 USC 313](#) and [23 CFR 635.410](#).

4.3.5.1 Utility Environmental Permits

Environmental permitting for roadway projects is more complicated than most utility projects because of the amount of land disturbance. Utility relocations caused by road construction are part of the impact of the project. NCDOT must obtain all required environmental permits for all utility work that would not be performed but for the project. This includes all relocation work done outside of the project limits because of the project. Utility companies will be required to provide plans suitable for use in preparation of environmental permits, including a description of method of construction. Profiles may be required for both aerial and underground installation.

For new facilities unrelated to the project but constructed at the same time, the utility owner will be responsible for obtaining the required permits unless NCDOT requires the work to be permitted under the project at the request of an agency.

Work on all utility relocations may begin only after issuance of permits. In special circumstances, after the approval of the NCDOT Environmental Analysis Unit and the Roadside Environmental Unit, NCDOT may authorize work in upland areas prior to receipt of a permit. Compliance with the permit is required.

4.3.5.2 Erosion and Sediment Control Plan

Before beginning authorized work, utilities must have an approved Erosion and Sediment Control Plan for relocations performed in advance of the highway project. Cooperation among utilities in performing work under a single approved plan may be required by the circumstances of the relocations. In some circumstances, NCDOT may elect to let an advance clearing contract for utility relocation and may be responsible for the Erosion and Sediment Control Plan. NCDOT is responsible for the Erosion and Sediment Control Plan for all relocations performed by the highway project contractor.

4.3.5.3 Railroad Permits

The utility is responsible for obtaining permits to occupy railroad right of way and must do so in a time frame to accommodate the project schedule. If NCDOT is designing the relocation of a utility, NCDOT will prepare the railroad permit application for the utility's approval.

4.3.5.4 Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission is the [federal agency](#) that regulates the transmission and wholesale sale of electricity and natural gas in interstate commerce, and regulates the transportation of oil by pipeline in interstate commerce. The Federal Energy Regulatory Commission also reviews proposals to build interstate natural gas pipelines, natural gas storage projects, and [liquefied natural gas](#) terminals.

When the project requires modification to an existing facility regulated by the Federal Energy Regulatory Commission, NCDOT will provide the owner of the facility with documentation required for permitting of the modification required by the project. Relocating utilities may be asked to provide plans as required for the permitting process.

4.3.6 NCDOT Acquired Easements

Easements to be acquired in advance of the relocation of a utility must be identified early so there will be time to go through the required acquisition process. All NCDOT easements have defined rights allowing occupancy by utilities. See the [NCDOT Right of Way Manual](#), Chapter 7, for template deed language. Easements are identified early in the design phase. Utilities should determine where permanent easements or temporary easements are needed. NCDOT may ask

utilities to accept an aerial easement in some circumstances. Types of property interest or easements that may be acquired include the following:

- **Permanent utility easement (PUE).** An easement controlled by NCDOT to accommodate aboveground or underground utility installations. Once NCDOT and the utility company agree on a PUE corridor, the PUE will be made a part of the NCDOT right of way plans.
- **Temporary utility easement (TUE).** An easement required for a limited period of time. An example is a temporary (construction) easement that is used when a utility must enter a property for temporary use during construction of the project. Temporary easements expire upon acceptance of the project. All facilities in a temporary easement must be removed or suitably abandoned before that time.
- **Drainage utility easement (DUE).** An easement for the purpose of maintaining proper utility facilities and drainage. This easement is controlled by NCDOT. It embodies all rights of a PUE as well as all rights of a permanent drainage easement.
- **Aerial utility easement (AUE).** An easement for the installation and maintenance of an aerial utility facility, with all necessary poles and appurtenances. Underground service drops are allowed in an AUE.

4.4 Cost Responsibility Determination

This section describes the laws and policies guiding NCDOT, and agencies acting with the authority of NCDOT, in determining cost responsibility for utility relocations that are necessary as the result of a construction or maintenance project. Agencies acting with the authority of NCDOT also bear the responsibilities of NCDOT described in this section. Application of this policy will result in uniform treatment of utilities and will enable a stable environment for planning by utilities.

The assignment of cost responsibility between NCDOT and the utility involves determining the location and cause of the conflict, and the rights of the utility. The rights of the utility are determined based on the conditions of its occupancy of the underlying land. This section focuses first on examining the rights of the conditions of occupancy, and then on examining how those rights are applied to conflicts when determining cost responsibility.

The cost of relocating a utility includes the cost of design, right of way, and construction of the utility facilities. Design costs include the costs of planning, engineering, and permitting, as well as administrative costs relating to planning and engineering. Right of way costs include the costs of the right of way, property, or easement, and the costs of acquisition of those interests. Construction costs include the costs of materials, equipment, labor, and inspection, as well as administrative costs relating to construction and letting. The cost of relocation does not include any costs associated with betterment of facilities. See Section 4.5.4 for a discussion of what constitutes betterment.

In all cases where the utility is requesting reimbursement, the burden of proof of eligibility for reimbursement rests with the utility. It is the responsibility of NCDOT to diligently examine documentation provided by the utility and to arrive at the proper conclusion. Historical documentation is sometimes inconclusive. In the absence of evidence to the contrary, NCDOT should evaluate and consider historical documentation indicating possession of compensable interest as sufficient.

4.4.1 Encroaching Utilities

Under the authority of [G.S. §136-18\(10\)](#), NCDOT may, under certain circumstances, require utilities encroaching on the right of way to relocate. The circumstances requiring relocation include

a conflict between the utility facilities and the construction of the project, and the need to correct unsafe conditions caused by the utility facilities.

Except as provided under law or this policy, the encroaching facility is responsible for the cost of these relocations.

4.4.1.1 Encroachment with Prior Rights

NCDOT is responsible for the relocation costs of a utility encroaching with prior rights. A utility agreement between NCDOT and the utility describing the facilities granted encroachment with prior rights is sufficient proof of prior rights.

4.4.1.2 Occupancy by Joint Use Agreement

Financial responsibility for the relocation of aerial utility facilities located on a pole line via a joint use agreement is determined by the provisions of this policy. For example, if the facility in question were encroaching at the time of installation, it would be treated as encroaching even if the facilities of the pole owner have prior rights.

4.4.1.3 Right of Way Control Assumed by the State

Some roads existed prior to being taken into the state highway system for maintenance (e.g., under [G.S. §136-51](#)). Right of way may also be expanded during projects. Proof of occupation of right of way prior to NCDOT control must be established by verifiable documents acceptable to NCDOT. These documents may include historical deeds, accounts from contemporaneous publications, affidavits sworn by persons with personal knowledge of the history of the area and facilities, historical pictures from publications or local or State archives, and utility company records.

Utilities occupying subdivision streets pursuant to [G.S. §136-102.6](#) are not considered to pre-date NCDOT control of the right of way.

4.4.1.4 G.S. §136-27.1

[G.S. §136-27.1](#) requires NCDOT to pay a percentage of the non-betterment cost for relocating certain public water and sewer facilities, located within the existing State transportation project right of way, that are necessary to be relocated for a State transportation improvement project.

For the purposes of this section, an “improvement project” is one that installs new state facilities or increases the size, capacity, or footprint of existing state facilities. Examples include pavement widening, crossline replacement with a larger diameter pipe, or installation of new ground mounted signs. Projects that should not be considered “improvement projects” are those that more closely pertain to the maintenance of existing facilities. Examples include milling and overlaying of existing pavement, crossline replacement with the same diameter pipe, or maintenance of shoulders and ditches.

To determine if municipal water and sewer facilities are eligible for reimbursement, population is determined according to the latest decennial census.

NCDOT is responsible for 100 percent of the non-betterment relocation costs for eligible projects for water and sewer utilities owned by:

- municipalities with a population of 10,000 or less;
- nonprofit water or sewer associations or corporations;
- water and sewer authorities (organized under [G.S. §162A](#));

- a county rural water system operated as an enterprise system;
- sanitary sewer districts (organized under [G.S. §130A, Article 2, Part 2](#));
- a local school board; or
- a private water or sewer utility organized pursuant to [Chapter 62 of the General Statutes](#) serving 10,000 or fewer customers.²

NCDOT is responsible for 100 percent of the non-betterment relocation costs for eligible projects for water and sewer facilities constructed by a water and sewer authority and sold or transferred to a municipality.

NCDOT is responsible for 75 percent of the non-betterment relocation costs for eligible projects for water and sewer facilities owned by a municipality with a population greater than 10,000 but less than 50,000.

NCDOT is responsible for 50 percent of the non-betterment relocation costs for eligible projects for water and sewer facilities owned by a municipality with a population of 50,000 or greater but less than 100,000.

Municipalities with a population of 100,000 or greater are responsible for 100 percent of their relocation costs.

The requirements of this section will not be construed to invalidate prior rights granted under a utility agreement between NCDOT and the utility.

Reimbursement eligibility under [G.S. §136-27.1](#) may be denied if the conflicting facility is found to have not been installed in accordance with its approved encroachment agreement and plans.

4.4.1.5 G.S. §136-27.2

[G.S. §136-27.2](#) requires NCDOT to pay a percentage of the non-betterment cost for relocating county-owned natural gas lines, located within the existing State transportation project right of way, that are necessary to be relocated for a State transportation improvement project.

For the purposes of this section, an “improvement project” is one that installs new state facilities or increases the size, capacity, or footprint of existing state facilities. Examples include pavement widening, crossline replacement with a larger diameter pipe, or installation of new ground mounted signs. Projects that should not be considered “improvement projects” are those that more closely pertain to the maintenance of existing facilities. Examples include milling and overlaying of existing pavement, crossline replacement with the same diameter pipe, or maintenance of shoulders and ditches.

Reimbursement eligibility under [G.S. §136-27.2](#) may be denied if the conflicting facility is found to have not been installed in accordance with its approved encroachment agreement and plans.

4.4.2 Utilities in Recorded Easement or Property

In the course of constructing projects, NCDOT may acquire additional right of way. Parcels within this additional right of way may contain utility facilities. NCDOT is responsible for the cost of

² For the purposes of application of this policy, a “private water or sewer utility organized pursuant to Chapter 62 of the General Statutes” means a water or sewer utility regulated by the North Carolina Utilities Commission. The number of customers is the number of households served by the utility when the agreement is executed. The provisions of this clause are retroactive to expenses incurred by the utility on or after March 1, 2020.

relocating these utility facilities that are in conflict with the project if the utilities are located within a recorded easement or on property deeded to the utility.

4.4.3 Utilities not in Valid Easement

NCDOT is not responsible for the cost of relocating utility facilities that are within newly acquired right of way but that are not within a recorded easement, unless the utility can demonstrate a legal right to occupy the land. Usually, this right is demonstrated through adverse possession or a ruling of prescriptive rights. Application of these rights is discussed in Sections 4.4.3.1 and 4.4.3.2, respectively.

Utilities encroaching on railroad right of way without valid permit from the railroad are not considered to be in a valid easement for determination of cost responsibility.

4.4.3.1 Adverse Possession

Adverse possession can be demonstrated according to [G.S. §1-40](#). Adverse possession cannot be claimed against the State in NCDOT right of way ([G.S. §1-45.1](#)). To have a compensable interest by adverse possession, possession must have begun 20 years prior to the facilities being taken into NCDOT right of way.

If the utility has reasonable proof of adverse possession, NCDOT will accept the claim of compensable interest for determination of cost responsibility. Proof of adverse possession may be established by verifiable documents acceptable to NCDOT. These documents may include historical deeds, accounts from contemporaneous publications, affidavits sworn by persons with personal knowledge of the history of the area and facilities, historical pictures from publications or local or State archives, and utility company records.

4.4.3.2 Prescription

A utility can show legal right to occupy an area by proof of a ruling giving prescriptive rights of occupancy.

4.4.4 Utilities within Right of Way not Belonging to NCDOT

NCDOT may construct portions of projects in right of way not owned by NCDOT, such as on federal lands, municipal right of way, or railroad right of way. Cost responsibility for utilities within these areas is governed by several North Carolina General Statutes, agreements between NCDOT and other agencies, and agreements between municipalities and utilities.

4.4.4.1 Municipal Right of Way

When NCDOT projects cross municipal streets, those streets may need to be modified to safely tie those streets in to the state highway system. Cost responsibility for relocating utilities within that right of way will be determined according to the policies in this section.

For utilities within municipal right of way under the terms of a franchise agreement, NCDOT will require the municipality to exercise its rights under the franchise agreement to affect the relocation or removal of the utility. NCDOT will be responsible for the utility relocation expense required by the franchise agreement to be paid by the municipality.

NCDOT is responsible for the non-betterment cost of relocating utilities owned by municipalities and located within municipal street rights of way provided that:

1. the highway construction does not constitute an improvement to the municipal-system street in which the utilities are located; and

2. the municipal-system street in which the utilities are located is not incorporated into or obliterated by the highway project.

Crossing a street at grade or by grade separation does not constitute incorporation into a project. Division of a through street into two dead end sections does not constitute obliteration. Modifications to a municipal-system street necessary for construction of the State-system road are not considered improvements to a municipal-system street.

A copy of the January 1965 memorandum from the League of Municipalities to its members announcing and interpreting this policy is provided for reference in Appendix D.

4.4.4.2 Railroad Right of Way

Utilities legally occupying railroad easement or right of way are considered as occupying valid easement for the purpose of determining cost responsibility. NCDOT is responsible for the cost of relocating facilities in the railroad right of way, including permit fees, but is not responsible for the cost of future occupation of the railroad easement.

4.4.5 Relocation Resulting from Projects not Initiated by NCDOT

Projects not initiated by NCDOT but that require relocation or modification of a road, such as realignment or expansion of a railroad, may require utility relocations. The involvement of NCDOT in such a project is in the role of encroaching party. As a result, the responsibility of NCDOT for utility relocations is limited to those relocations caused by NCDOT in the construction of the road modifications. Those NCDOT-caused relocations are governed by the policies applied to NCDOT projects. If a utility is required by the railroad to relocate, NCDOT would be responsible only for the portion of the relocation necessary for road modification.

4.4.6 Other Considerations

4.4.6.1 Existing Encasement Pipes

On existing facilities for which NCDOT is responsible for the cost of relocation, NCDOT is also responsible for the cost to replace existing encasement pipes if replacement is requested by the utility.

4.4.6.2 Second Relocations and Rework by Utilities Responsible for Cost

Delivering NCDOT projects on schedule requires all parties involved to plan and design based on the best information available at the time. NCDOT expects utilities to actively and aggressively pursue the project schedule. If a utility, making a good faith effort to pursue the project schedule, expends funds designing or constructing a relocation in a manner approved by NCDOT and must rework the design or relocate a second time as the result of a scope change by NCDOT, NCDOT will be responsible for the cost of the abandoned work and facilities. NCDOT is not responsible for any additional quantity of facilities caused by such a decision. The utility is responsible for the cost of relocation of the final configuration installed. NCDOT will be responsible for the cost of the work unnecessary for the final product that is the result of NCDOT decisions. Relocation under this circumstance does not confer encroachment with prior rights based on NCDOT payment for abandoned work.

4.4.6.3 Non-Conflicting Utilities Relocated for the Convenience of Another Utility

If an encroaching utility not otherwise in conflict with a project is requested by NCDOT to relocate in order to facilitate the convenient and efficient movement of another utility, NCDOT will assume

the responsibility for the costs of the affected facilities. Relocation under this circumstance does not confer encroachment with prior rights.

4.4.7 Emergency Relocation

If an emergency situation arises and the utility chooses to effect emergency repairs by relocating a portion of the utility facility to the approved location for the project, NCDOT may reimburse approved relocation expenses according to this policy. NCDOT and the owner must concur on the emergency nature and scope of the work. If required, a Utility Relocation Agreement should be completed as quickly as possible to authorize that portion of the work. The utility is responsible for confirming availability of right of way or utility easement.

4.4.8 School Road Improvement

On school road improvement projects reimbursed to the school board by NCDOT pursuant to [G.S. §136-18\(29b\)](#), NCDOT will invoke the right to require encroaching utilities to relocate. The cost responsibility for eligible relocations will be determined according to this policy. These projects are considered State transportation improvement projects, so the provisions of [G.S. §136-27.1](#) and [G.S. §136-27.2](#) apply. Project management and utility agreements are the responsibility of the school board.

[19A North Carolina Administrative Code 02C .0116](#) exempts reimbursement by NCDOT for any utility relocation that is not directly associated with, and in conflict with, access points to the state highway system and their compliance with State law. Such facilities are not eligible for reimbursement by NCDOT. The relocation of new utilities placed at the school's discretion, direction, or convenience and then moved for the transportation improvement is ineligible for reimbursement by NCDOT.

4.4.9 Determining the Share of Cost Responsibility

In cases where the entirety of a utility to be relocated is encroaching or in easement, the determination of share of cost responsibility is trivial. In these cases, the cost responsibility will be 100 percent NCDOT or 100 percent utility, or the prescribed proportional split of responsibility for utilities covered by [G.S. §136-27.1](#). In cases where cost responsibility varies along the facilities, complicated and pedantically precise allocation of relocation costs will use considerable administrative, design, and construction resources that will add to the overall cost of relocation for both NCDOT and the utility. Therefore, in these circumstances, it is in the best interest of NCDOT and the utility to arrive at a simplified allocation of the relocation costs. This section describes the policy to be used for determining the share of cost responsibility.

4.4.9.1 Utility Crossings in the Right of Way

For utilities crossing the right of way, the cost responsibility will be determined by an analysis of the points of conflict. For utilities that have all points of conflict within the right of way or all points of conflict outside of the right of way, the allocation of cost responsibility is trivial.

If all points of conflict are located within the right way, the cost responsibility is determined according to the policy in Section 4.4.1, Encroaching Utilities, including the cost of relocating facilities outside of the right of way that are moved solely to clear the conflict within the right of way.

If all points of conflict are outside of the right of way, the cost responsibility for relocation is determined according to Section 4.4.2, Utilities in Recorded Easement or Property.

If the utility crossing has points of conflict both inside and outside of existing right of way, NCDOT will be responsible for the relocation costs if the crossing meets all of the following conditions:

1. There is at least one point outside of NCDOT right of way eligible for NCDOT reimbursement involving appurtenances that anchor the alignment of facilities and create straight line segments, such as a pole or a manhole.
2. The relocation required to clear the conflicts for which NCDOT is responsible will also clear the conflicts for which the utility is responsible.
3. The conflicts for which the utility is responsible are cleared in the same relocation phase as the conflicts for which NCDOT is responsible, unless NCDOT requests a multiphase relocation. For example, if a utility elects to de-energize a power line in conflict with bridge construction (utility responsibility) and move the supporting poles outside existing right of way (NCDOT responsibility) in a later operation, NCDOT will not pay for the cost of de-energization unless NCDOT requested that construction sequence.

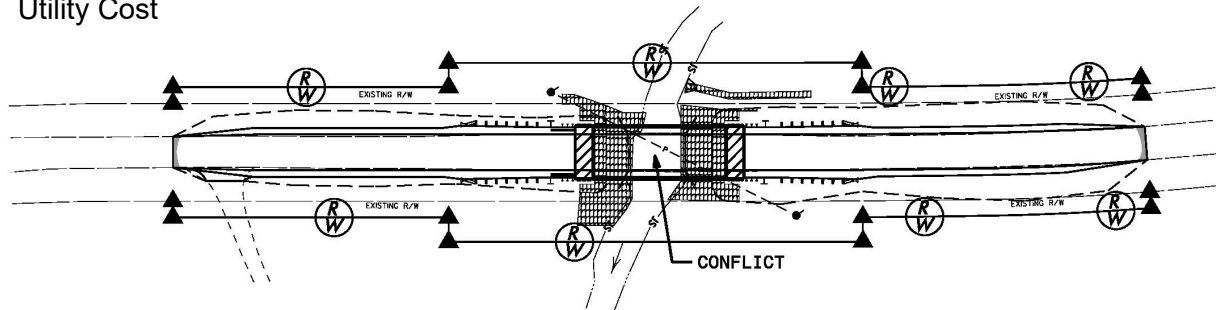
The cost responsibility for facilities without anchoring appurtenances dividing installations into straight line segments will be determined as described in Section 4.4.9.2 for longitudinal installations.

NCDOT will not convey encroachment with prior rights to the portion of utilities relocated under these conditions that were already encroaching.

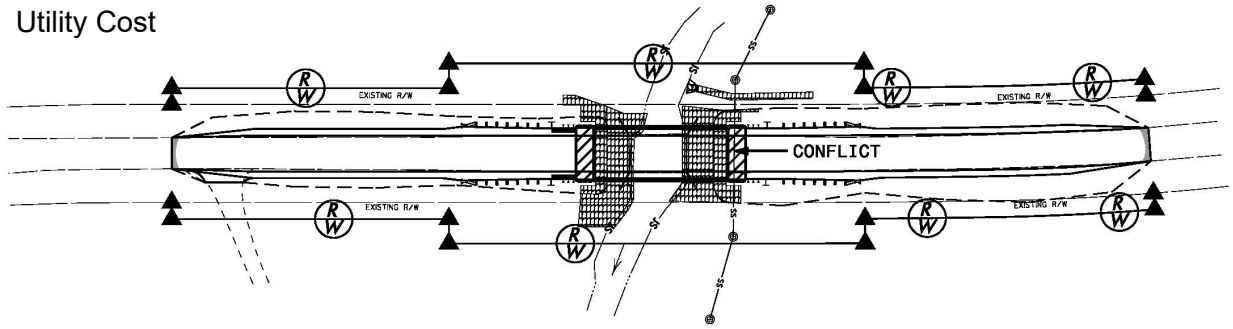
See diagrams for examples of the application of this policy to commonly encountered situations.

Figure 4-2. Utility Crossing Cost Responsibility Diagrams, Anchoring Appurtenances

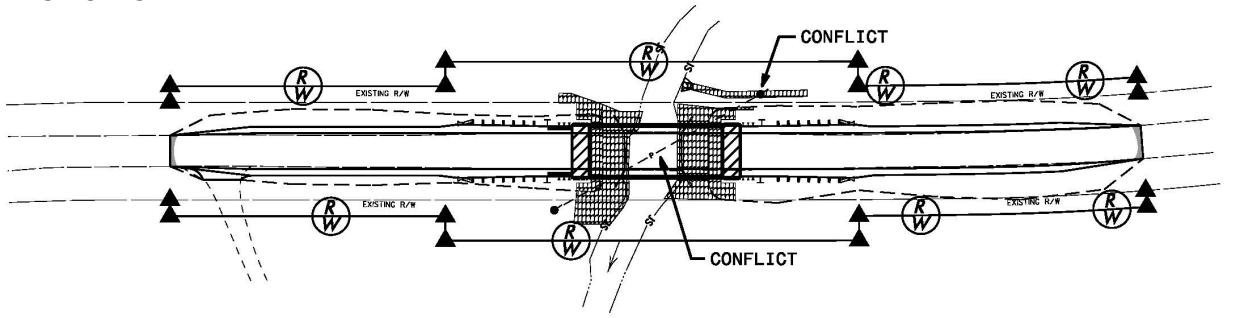
Utility Cost



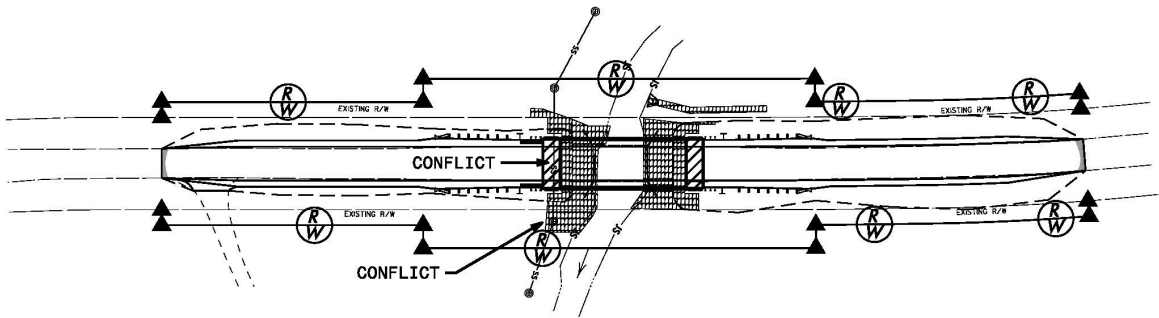
Utility Cost



NCDOT Cost



NCDOT Cost



4.4.9.2 Utility Longitudinal Installations in the Right of Way

Often, the relocation of longitudinal installations includes portions of the facility for which NCDOT is financially responsible and portions for which the utility is financially responsible. The method for allocating the share of cost responsibility should be administratively simple and fair to both NCDOT and the utility.

If the relocation can be divided into a few large segments where responsibility for the relocation cost is clear, the preferred method would be to track the cost of construction of each segment separately. Administration and design costs should be divided proportionately by length of the facility. Adjustments to the proportion should be made where needed to account for the complexity of design of one segment compared to other segments.

If the relocation cannot be divided into a few large segments where responsibility for the relocation cost is clear, then a mutually agreeable allocation of the total cost of relocation should be negotiated. The proportion should reflect the proportion of utilities for which NCDOT is financially responsible. This agreed-upon allocation will be in effect for the project unless there are significant changes in the scope of the relocation or in the underlying determination of cost responsibilities.

4.4.10 Inability to Reach Agreement on Cost Responsibility

If NCDOT and the utility are unable to reach agreement on a determination of cost responsibility, NCDOT will require the utility to relocate without agreement to maintain the project schedule. If work does not begin, the utility will be considered non-responsive.

At that point, responsibility within NCDOT for the determination of cost responsibility will be assumed by a panel composed of the State Utilities Manager, two NCDOT employees with utilities expertise who are not involved in the project, and a representative of the Right of Way Unit. This panel will consider documentation of compensable interest provided by the NCDOT project manager for utilities and by the utility owner. The decision of this panel will be final.

4.5 Utility Agreements

Agreements are used to define the terms and conditions between NCDOT and utility owners for accommodation of utility facilities; reimbursement of utility relocations, including utility work in the NCDOT construction contract; and receiving reimbursement from a utility owner. Agreements provide a clear, written understanding of the responsibilities of NCDOT and the utility owner, and help fulfill the requirements of federal regulation ([23 CFR 645, Subpart A](#)).

An agreement is required for all relocation work performed under a project. Work must be authorized before construction begins.

4.5.1 Types of Agreements

The different types of utility agreements are discussed in the following sections. Then [Table 4-1](#), located at the end of Section [4.5.1](#), presents a chart showing which type of agreement to use based on which party is responsible for the cost and construction.

4.5.1.1 Utility Construction Agreement

A [Utility Construction Agreement](#) is used on projects when the utility owner will be responsible for reimbursing NCDOT for any of the utility relocation work that is included in the roadway contract. This agreement includes construction and engineering costs. If betterment is included in the contract, the Utility Construction Agreement will explicitly describe how betterment costs will be calculated. Engineering costs will be billed when the engineering is completed.

4.5.1.2 Utility Engineering by Owner Agreement

A [Utility Engineering by Owner Agreement](#) is a reimbursement agreement covering engineering costs only for developing utility company relocation plans for facilities being relocated at NCDOT's expense. This agreement is usually used for the design of facilities to be constructed under the NCDOT roadway contract when the owner chooses to provide NCDOT with utility construction plans. The cost of owner design and inspection of facilities may be covered under this agreement if NCDOT is responsible for the cost of relocation of the facilities.

This agreement may also be used for the design of utility relocations that could accumulate extensive engineering charges. Payment will be made only for engineering charges prior to the utility company proceeding with the relocations. This agreement would be followed by the execution of a Utility Relocation Agreement to cover relocation costs. For the majority of relocations, the Utility Relocation Agreement is used to capture both engineering and relocation costs.

4.5.1.3 Utility Engineering by Department Agreement

At the option of NCDOT or the utility, a Utility Engineering by Department may be used as the agreement covering reimbursement to NCDOT for the design of utilities constructed under the NCDOT roadway contract for which the utility is financially responsible. The Utility Construction Agreement, discussed in Section [4.5.1.1](#), is usually the preferred alternative for these expenses.

4.5.1.4 16.1, 16.2 Encroachment Agreements

A 16.1 or 16.2 Encroachment Agreement is used for facilities being relocated because of a highway project and at the owner's expense. These agreements may cover new facilities and betterments in addition to the facilities being relocated.

All facilities relocated as the result of a project receiving Federal aid are subject to Buy America Provisions. See [Section 4.6.8](#).

4.5.1.5 Utility Relocation Agreement

A [Utility Relocation Agreement](#) is a reimbursement agreement covering utilities relocated because of a highway project and that are being relocated at NCDOT's expense. New encroaching utilities and betterments may be included in the Utility Relocation Agreement along with the facilities being relocated at NCDOT expense. This agreement will include facilities descriptions, plans, a cost estimate, and a schedule for construction. In this agreement, the owner will relinquish interest in easements captured within NCDOT right of way in exchange for continued recognition of prior rights by NCDOT.

4.5.1.6 Use and Occupancy Agreement

A Use and Occupancy Agreement sets forth the conditions of occupancy when the utility relocation is being handled as part of the NCDOT roadway contract entirely at NCDOT expense. It includes an agreement to allow NCDOT to perform construction of the relocation.

4.5.1.7 Utility Remain-in-Place Agreement (Reserved for future use)

(Reserved for future use)

4.5.1.8 Utility Construction Request

The Utility Construction Request is a request by a utility for NCDOT to include the construction of the utility relocation in NCDOT’s highway contract. The Utility Construction Request should specify whether NCDOT will be responsible for managing the design of the relocation, or if the utility will provide plans for inclusion in the contract. Plans provided by the utility must conform to NCDOT standards.

4.5.1.9 No Use of Blanket Encroachment Agreements for Relocation

No relocation work for a STIP project may be performed under a Blanket Encroachment Agreement.

Table 4-1. Utility Agreement Chart

	Cost Responsibility		
	Owner	NCDOT	
Owner Constructs (Utilities by Others, UbO)	16.1. or 16.2	Utility Relocation Agreement (URA, for construction costs, but may include engineering if there is not a separate UEO) (If NCDOT has ANY cost responsibility)	Utility Engineering by Owner Agreement ^a (UEO, owner hires PEF or internal staff. Sometimes included in URA.) (If NCDOT has ANY cost responsibility)
NCDOT Constructs (Utilities Construction, UC)	Utility Construction Agreement ^b (UCA, for construction) Utility Engineering by Department Agreement (UED, for engineering costs) ^c Optionally, engineering costs may be in UCA. (UED for design costs, NCDOT hires PEF) (If Owner has ANY cost responsibility)	Use and Occupancy Agreement (U&O) (If 100% NCDOT cost, no betterment)	Utility Engineering by Owner Agreement ^a (UEO, owner hires PEF or internal staff) (If NCDOT has ANY cost responsibility)

^a Formerly Utility Preliminary Engineering Agreement

^b Formerly Utility Agreement

^c Formerly Water and/or Sewer Engineering Agreement

4.5.2 Schedule

For STIP projects to be completed successfully on schedule, NCDOT and the utility must have a realistic schedule that is mutually agreed to by all parties. All utility agreements will include a schedule that identifies a start date for utility relocation, the duration for construction activities, and the completion date. Additional milestone dates may be added as mutually agreed upon by NCDOT and the utility.

4.5.3 Cost Estimate

There are multiple methods for building a cost estimate and establishing a cost basis for reimbursement, as follows:

- Fixed amount (lump sum) estimate
- Actual direct and related indirect cost estimate
- Assembly unit cost estimate

4.5.3.1 Fixed Amount (Lump Sum) Estimate

The fixed amount (lump sum) method should be used only where the project scope and costs can be clearly and concisely defined. The cost estimate in support of the lump sum agreement must be accurate, comprehensive, verifiable, and in sufficient detail to give a clear picture of the work involved and the cost of the individual items.

Lump sum estimates should list major items of material and supplies by components or individual items, with a description and the specific quantity required, along with the unit price and extension.

Lump sum estimates should itemize wages and salaries anticipated on a particular adjustment by class and type. The costs must be representative of actual rates per hour or average rates based on the actual amount paid to individuals for productive time incurred under the agreement.

Lump sum estimates require the reviewer to verify overhead costs to ensure that all items are eligible and that the rates are not established arbitrarily.

4.5.3.2 Actual Cost Estimate

Documenting actual costs is often time consuming and expensive for both NCDOT and utility companies. Supporting documentation and evidence of actual costs require more detailed accounting records, which often are difficult or time consuming to gather for reimbursement.

Records of actual costs incurred form the basis for reimbursement to the utility. In many cases for billing purposes, certified ledgers and other indirect methods can be used to substantiate costs, but cost estimates need to be built from actual costs expected, whether internal or external resources are used to complete the adjustment.

The cost estimate should allow comparison with the actual records of cost accumulation at billing. Additionally, the records and documentation of actual costs is required at the time of billing.

4.5.3.3 Assembly Unit Cost Estimate

An assembly unit cost is the cost to be incurred for work and/or materials to install a defined unit of a utility facility. This may include the cost (per foot) for associated work and/or materials of a water line or utility poles (each) associated with a utility relocation.

When construction assembly units are used in estimating the cost of the work, labor costs may be shown on an assembly unit basis.

The estimate may be prepared by construction assembly units and quantities to support any item included in any account.

When estimates are prepared on a construction assembly unit basis, a copy of the utility's current specification sheet for each construction unit is required.

4.5.3.4 Cost Estimate Categories

The cost estimate submitted in support of the agreement will set forth the items of work to be performed, as broken down into the following categories:

- Materials and supplies
- Labor
- Overhead
- Transportation and equipment
- Traffic control
- Right of way
- Salvage, abandoned facilities, and removal of materials
- Credits
- Betterments
- Items to be paid in highway contract or directly to the utility

All of the above items must be sufficiently detailed to provide a reasonable basis for analysis.

Estimates of cost should adhere to [General Accounting Procedures](#) and [Federal Acquisition Regulations](#).

Overhead

Payroll additives and other overhead factors should be shown individually, with a statement of what is included in each account and an explanation of the method used for accumulating such costs.

Common ineligible costs that may not be claimed in the utility's overhead account are the following:

- Advertising and sales promotions
- Interest on borrowed funds (allowance for funds used during construction)
- Charges for the utility's own funds
- Resource planning and research programs
- Stock and stockholder's expenses
- State and federal income taxes
- Provisions for contingent reserves
- Directors' salaries
- Special management studies
- Bad debts
- Sales and rate studies
- Contributions
- Fines and penalties

- Entertainment
- Lobbying
- Revenue loss (not to be confused with product loss during construction)

Transportation and Equipment

Transportation and equipment charges should have sufficient documentation and explanation of necessity, including the following:

- Personal expenses may include meals and lodging required by use of the utility's forces in remote areas. Reimbursement will not exceed the amount allowed by the utility under its own published policies. If the utility does not have published expense policies, reimbursement will not exceed the amount allowed by State policy for State workers.
- Equipment should be shown by type, size, and rate. Charges should reflect the utility's normal accounting procedures. Rentals should also be shown by type, size, and rate.

Other Costs

Care should be taken when arriving at the estimated cost of relocation to ensure all costs are included. The following costs should be included in the estimate:

- Reimbursable miscellaneous items
 - **Storm Water Pollution Prevention Plan.**
 - **Security.** The utility may contract with a security service to provide security for its onsite equipment and materials during the utility adjustment.
 - **Re-vegetation.** Performed in accordance with this UAM.
 - **Product Loss (not to be confused with revenue loss).** The following four-step calculation will be used to estimate gas loss when relocating pipelines containing natural gas:

$$(1) FPV = 1 + P2/1000 * 0.847$$

$$(2) V2 = [P1 * [D1/12 * D1/12/4] * L1 * [(P2 + 14.65)/14.65] * FPV]/1000$$

$$(3) R1 = V2 * 1000 * S1$$

$$(4) \text{Gas Loss} = R1/2000$$

Where:

FPV = super-compressibility factor; P2 = pressure (PSIG); V2 = volume of gas in pipeline segment (in MCF); P1 = original absolute pressure; D1 = internal diameter of pipe; L1 = length of pipeline; R1 = gas release weight in lbs/cf; S1 = sample of gas in lbs/cf.

- Trench safety plan
- Testing and removal of contaminated soils

4.5.4 Betterments

Betterment is any upgrading of the utility facility being relocated that is done solely for the benefit of, and at the election of, the utility and not attributable to the highway construction. A utility owner may take advantage of the roadway project to upgrade facilities in that corridor.

Betterments incorporated into utility work will fall into one of the following categories:

- **Required betterments.** Required betterments, also known as non-elective betterments, are those necessitated by STIP project construction, as shown below. A required betterment is a reimbursable cost item. The following are reimbursable items and must be properly documented by the utility:
 - When required by code, regulation, or statute, including relocation to eliminate unsuitable materials as defined in [Section 3](#), Engineering, Construction, and Maintenance.
 - When required to meet the published specifications regulating all construction of facilities by the utility.
 - When evolving industry standards and good engineering practice dictate the betterment for safety reasons.
 - When equivalent materials are no longer available or are uneconomical. The new materials should be of the next highest grade or size.
 - When there are direct benefits to, or are required for, the STIP project. Betterment resulting in overall cost savings will not require credit.
- **Elective betterments.** Elective betterments are those constructed at the election of the utility and are not attributable to the STIP project (e.g., increased service capacity or service improvements). An elective betterment is always a non-reimbursable cost item. Credit will be required and must be indicated in the estimate as an elective betterment.

NCDOT cost participation is based on the cost of providing the most economical replacement facility or restoration of functionally equivalent service to the facility being replaced. The costs of elective betterment items are ineligible for NCDOT and federal participation. Such elective betterments should be depicted on the plan as part of the work proposed.

4.5.4.1 Construction by Utility Owner

The utility should record all relocation costs on a single work order account. It is impractical for a utility to accurately separate reimbursable and non-reimbursable portions of the relocation cost, particularly labor, overhead, equipment, and transportation.

The following procedures should be used to determine State cost participation:

1. Prepare a plan and estimate of cost for replacement of the existing facility in the most economical manner, as required by the transportation construction project: (A).
2. Prepare a second plan and estimate including the betterments that the utility elects to build: (B).
3. Subtract the two items above from one another to arrive at the difference between the two: (B) - (A) = (X)
4. Compute a betterment credit percentage based on the ratio of the result (X) in step 3 to the betterment estimate (B):

$$\frac{(X)}{(B)} = \text{Elective Betterment Credit Percentage}$$

5. Apply the elective betterment credit percentage to the final billing of actual costs incurred in building the “bettered” facility before deducting accrued depreciation, if applicable, and salvage credits.

Table 4-2 and Table 4-3 show an example computation of an elective betterment percentage and an estimate summary, respectively.

Table 4-2. Example Computation of Elective Betterment Percentage

Estimated total cost of relocation	\$1,000,000 (B)
Non-betterment estimate	- 700,000 (A)
	\$ 300,000 (difference) (X)
Elective betterment credit percentage	\$ 300,000 (X)
	30% Betterment Credit
	\$1,000,000 (B)

Table 4-3. Estimate Summary*

Total billing (including betterments)	\$1,200,000
Less 30% betterment credit	\$ 360,000
Less accrued depreciation (if applicable)	\$ 0
Less salvage (if applicable)	\$ 122,000
Eligibility ratio (if applicable)	\$ 0
Estimated reimbursement	\$ 698,000

*Actual cost may differ from the estimated cost.

4.5.4.2 Construction by NCDOT Highway Contract

The determination of betterment costs for facilities relocated by NCDOT follows the guidelines in this section. The betterment cost share assigned to the owner is the difference between the cost of upgraded facilities and the cost of relocating the baseline (existing) facilities. The portion paid for betterment should be determined by actual cost or supported by an analysis of the cost of relocating the existing facilities versus the cost of upgrading the facilities. Costs will be determined for each pay item and will be applied to the actual quantity of installed materials.

The preferred method for determining betterment costs is using contract unit prices in the construction contract. To use this method, sufficient quantities of the existing facility type under similar conditions of construction must exist within the contract to ensure that the baseline price is accurate and reasonable. The cost per unit of betterment is the difference between the existing item and the upgraded item at the contract price.

When determining betterment costs using the analysis of cost method, historical bid averages are the preferred method of the cost of baseline facilities and upgraded facilities. If historical bid data are insufficient to reach agreement on price, an analysis of the costs of material, labor, and equipment may be used. When determined using this method, the unit cost of betterment may be a fixed unit betterment price or may be a proportion of the contract price.

In any single project, different methods may be applied to different pay items to determine the overall betterment cost.

Betterment costs will be included in a Utility Construction Agreement.

4.5.5 Determination of Credits

The utility agreement estimate must contain appropriate credits for salvage and accrued depreciation value, if applicable, as follows:

- If existing materials are to be removed from the project as part of the adjustment or relocation of the utility's facilities, a credit must be given for their value against the net cost of the adjustment.
- If materials are to be re-stocked, the credit should be in an amount comparable to the prices charged for similar materials when issued from the utility's stock.
- If the salvaged materials are to be sold as junk or for scrap value, that amount should be credited to the net cost of the adjustment.
- If the salvaged materials are deemed to have no value and are disposed of with no value being returned to the utility, then a credit does not need to be applied to the adjustment's net cost. Justification should be provided to substantiate removal.
- The construction inspector should verify the disposition of salvage materials in their construction diary, and a statement as to the disposition should accompany the billing for the adjustment.
- Materials reused on the same project or another project with the same federal aid status will not require salvage credit.
- Credit is not required when the removed material becomes the property of the contractor.

State and federal regulations require that, in most cases, credits to the utility adjustment project must be given. Generally, these credits will fall into one of the following categories:

- Betterment credits due to elective increases in functional capacity, improvement of utility service, or superior and improved materials in the replacement facility that are not required because of the highway project.
- Capital improvements. There may be occasions when, to clear right of way for highway construction, the cost of any required adjustment of buildings and other similar structures of a utility used primarily for the production, transmission, or distribution of the utility's products is eligible for reimbursement. These include the following:
 - Switching stations
 - Power substations
 - Pumping stations
 - Metering and regulatory stations
 - Lift stations
 - Storage tanks
 - Field offices

- Garages
- Other similar structures

When it is not necessary to retain the existing building or facilities in service until a replacement is constructed, reimbursement will be limited to the most economical method of adjustment.

The reimbursement estimate should indicate the method of work to be used on the building or the facilities, including listing major items of materials, if applicable, and should be limited to the most economical method of adjustment. This will enable the reviewer to determine if any credits should be applied to these costs.

Credits to the utility project should be set forth separately and in sufficient detail to show the method used for establishing the amounts. In addition, credits should be included in the summary of costs to arrive at the net cost of adjustment.

A credit is required for accrued depreciation of a utility facility being replaced, as shown in the following computation of credit formula (i.e., Handy Whitman Index):

$$\frac{\text{Actual Service Length}}{\text{Total Life Expectancy Credit}} \times \text{Original Cost} = \text{Accrued Appreciation}$$

The information for determining the required credit must be furnished by the utility and based on its own records and depreciation schedule.

Credit for accrued depreciation is not required when any of the above-described facilities are only being relocated and not replaced. Depreciation credit is not required for transmission lines, distribution lines, pipes, and service lines.

In no case will credit exceed actual total cost of relocation.

4.6 Utility Construction Phase

4.6.1 Communication between Utility Owners using NCDOT Right of Way

In addition to coordinating with NCDOT, utility owners must coordinate with one another when more than one utility desires to use the same right of way. Such coordination is required to ensure that all utility facilities will be placed in a way that avoids interference with each other during construction, normal use, and maintenance. All relocating utilities must be constructed as authorized so as not to interfere with other relocating or existing utilities. NCDOT may require utilities not relocated per the authorized plans to bring their facilities into compliance with authorized plans at no expense to NCDOT.

NCDOT will enforce this policy as provided by all cited federal rules or regulations and State statutes. NCDOT recognizes that good working relationships with utility owners based on coordination, cooperation, and communication help facilitate this effort.

When utility owners are not in compliance with this policy on relocation efforts, NCDOT will need to take measures to enforce this policy. Enforcement will be according to Section 1.14.

4.6.2 Coordination Meetings

Coordination meetings among NCDOT, the highway contractor, and the utility are essential to maintaining schedules and avoiding additional conflicts. Construction phase meetings that the utility is expected to attend include the utility relocation scheduling conference, progress

meetings, and the pre-construction meeting. See Sections 4.2.7.3 through 4.2.7.5 for additional information.

4.6.3 Occupational Safety and Health Administration Clearances

All vertical and horizontal clearance requirements must be met for facilities both over and under structures. NESC and Occupational Safety and Health Administration clearances must be met for both final disposition and construction, respectively. See Section 3.3.5 of this UAM for NCDOT requirements.

4.6.4 Agreement and Plans Onsite

An approved utility agreement and plans must always be on site for review while utility construction is being performed.

4.6.5 Inspection

At the discretion of the Division Engineer, a highway inspector may be assigned to any work covered under an approved utility agreement on highways open to traffic or on a highway project if, in Division Engineer's opinion, inspection is necessary. Any inspector assigned to the installation operations will have full authority to act on behalf of NCDOT and to stop all work not complying with approved plans and this UAM. The inspector shall have the authority to perform field tests and take material samples for laboratory tests.

The degree of inspection of utility construction may vary with the nature and location of the work because it affects the completed transportation facility. Certain phases of the work may require a close check to ensure that the transportation facility will not be adversely affected. The degree of inspection may vary from spot-checking of the overhead installations to continuous and close observation of the installation and backfilling of underground facilities.

4.6.6 Traffic Control Plans and Safety

Safety precautions apply to utility construction as well as to the STIP project contractor's operations because they affect the safety and convenience of the project users and the property owners abutting the project. Safety precautions actually begin in the planning stages of both transportation projects and utility adjustments because the design of both types of work must take into consideration the method and timing of the work.

NCDOT requires compliance with [MUTCD](#). See Section 3.6.4 for further detail.

4.6.7 New Utility Installations within a Highway Project

New installations (not relocations) allowed via the encroachment process are subject to the requirements of Sections 4.6.1 through 4.6.6. If utility construction occurs after the highway project has been let, NCDOT may require the utility to obtain the approval of the highway contractor before approval.

4.6.8 Buy America

Buy America requires the use of domestic steel and iron in Title 23 funded highway contracts. The use of foreign steel or iron materials or products in a federal-aid project is prohibited with few exceptions (e.g., use on a temporary basis; use of manufactured products that are not predominantly steel and iron; minimal use; under nationwide or individual waivers [very rare]). The Buy America statute at [23 USC 313](#) was modified by the Moving Ahead for Progress in the

21st Century Act, Section 1518, to require Buy America on the basis of a contract's associated National Environmental Policy Act documentation. All contracts, irrespective of funding source, are subject to Buy America compliance if any contract to construct a portion of a project subject to the National Environmental Policy Act is or has been funded under Title 23.

Buy America requirements apply to all utility relocations regardless of whether the utility or NCDOT is financially responsible for the relocation if the Buy America requirements apply to the project.

Enforcement of Buy America requirements will be by NCDOT Construction personnel.

4.6.9 Change Orders

When it is necessary for a utility to make substantial changes in its utility relocation plans, whether such changes are necessitated by change in utility requirements or because of highway construction changes, NCDOT will determine if the proposed utility changes are acceptable from a construction standpoint. The utility owner will be asked to submit revised plans or an estimate to cover the changes. If upon review by NCDOT, the changes are found to be acceptable, NCDOT will notify the utility owner that the changes are acceptable and to proceed with the work.

Where changes are of a minor nature and will not adversely affect the construction project or appreciably change the cost of relocation, then the Resident Engineer may authorize such changes.

4.7 Project Invoicing and Payments

4.7.1 Reimbursements, Invoicing, and Payments

4.7.1.1 NCDOT Reimbursement to Utility Owner

Upon completion of utility relocation work being done under a reimbursement agreement, the utility owner is to submit a final invoice to the NCDOT Utilities Unit for payment. NCDOT will compare it with the company's estimate and relocation drawings to determine if the material, labor, and overall invoice cost is in line with the estimated cost, and to verify that the work billed has been accomplished according to plans. Any material discrepancies concerning the invoice will then be resolved by negotiations between NCDOT and the utility.

To expedite final invoice payment, NCDOT compares the estimate with the invoices. The more detailed the original estimate and invoices are, the quicker the review can be completed and payment made.

NCDOT will require a written explanation when the final costs exceed estimated costs by 10 percent or more.

Regular progress billings can be made by the utility to NCDOT as the utility work progresses. However, the total progress billing payments cannot exceed 95 percent of the approved non-betterment estimate. Progress billing forms can be obtained from the Utilities Unit.

One final and detailed complete billing of all costs will be made by the utility to NCDOT at the earliest practicable date after completion of the utility work and within 6 months after completion of the roadway work.

The following items may cause a utility invoice to be rejected by NCDOT:

- Information is incorrect or insufficient.
- The invoice does not match the estimate.
- The invoice is greater than the estimate, and no change order or amendment is included.
- Backup data are incomplete or missing.

4.7.1.2 Utility Owner Reimbursement to NCDOT

Reimbursement to NCDOT for work performed under a Utility Construction Agreement or Utility Preliminary Engineering Agreement will be due after completion of the work and within 60 days after the date of the invoice. Interest shall be on any unpaid balance due at a variable rate of the prime rate plus 1 percent under the power granted in [G.S. §136-18\(10\)](#).

Work completed under a lump sum agreement will be billed based on the original lump sum estimate provided. Normally, a 100 percent invoice is submitted once work is completed and approved. Depending on the size of the project, percent complete billings may be allowed on a case-by-case basis. No compensation will be given for cost overruns or credits for underruns.

The final invoice will follow guides set forth in this section for permanent relocation invoicing.

4.7.1.3 Exceptions

Exceptions for reimbursement involving work performed outside of federal policy as stated in [23 CFR 645](#) must be approved by FHWA and will be subject to the following conditions (pursuant to [23 CFR 645](#)):

- Approval will not adversely affect the public.
- There is substantial compliance with all other requirements prescribed by NCDOT and full compliance with requirements mandated by federal statute.
- The cost to the federal government will not be in excess of the cost that it would have incurred had there been full compliance.
- The quality of work undertaken has not been impaired.

4.7.2 Variances and Exceptions to Policies

Requests for exceptions that are approved should be retained to show the utility's extreme hardship or unusual condition, documentation, and approval.

4.8 Additional Broadband Guidance

4.8.1 FHWA Broadband Infrastructure Deployment Rule

The Federal Highway Administration (FHWA) [Broadband Infrastructure Deployment rule](#), effective March 3, 2022, aims to “facilitate the installation of broadband infrastructure” and sets four requirements for State Departments of Transportation:

- To identify a broadband utility coordinator who is responsible for facilitating the infrastructure ROW efforts within the State.
- To establish a registration process for broadband infrastructure entities that seek to be included.

- To establish a process for electronically notifying broadband infrastructure entities, on an annual basis, of the State Transportation Improvement Program (STIP) and providing other notifications as necessary.
- To coordinate initiatives with other statewide telecommunication and broadband plans and State and local transportation and land use plans, including strategies to minimize repeated excavations that involve broadband infrastructure installation in a ROW.

4.8.1.1 Broadband Utility Coordinator

The NCDOT Broadband Utility Coordinator is staffed within the Utilities Unit. Contact information for the Broadband Utility Coordinator can be found in the [NCDOT staff directory](#).

4.8.1.2 Broadband Provider Registration

Broadband providers wishing to be included in annual State Transportation Improvement Program (STIP) notifications, Dig Once notifications, and other notifications as a part of this rule can register at the [NC Department of Information Technology – Division of Broadband and Digital Equity website](#).

4.8.2 Dig Once Policy

In compliance with the FHWA Broadband Infrastructure Deployment Rule (effective March 3, 2022) and Executive Order No. 91, issued by Governor Roy Cooper, a Dig Once Policy has been established to reduce the scale and number of repeated excavations related to state road projects for the installation and maintenance of broadband infrastructure in rights-of-way. A copy of the formal policy can be found in the Appendix D of this manual.

This policy applies to broadband and/or associated conduit longitudinal installations on state-maintained routes that are not part of the National Highway System (NHS) and where the proposed installation method is by conventional open trench installation. This policy applies to installations within the limits of state transportation improvement projects (TIPs) and applies to new installations as well as facilities being relocated to accommodate a state highway project.

For the purpose of this policy, “broadband conduit” is considered conduit, pipe, innerduct, or microduct for fiber optic or other cables that accommodate current or future broadband and wireless facilities for broadband service. Additionally, an Internet Service Provider (ISP) will also include any owner and/or maintainer of broadband facilities.

4.8.2.1 Requirements for ISPs Relocating Existing Facilities

1. An ISP who desires to use conventional open trench construction to relocate existing facilities within the limits of a state highway project, where the open trench construction includes excavation of more than 1,000 linear feet in any one contiguous area, shall discuss this desire with Department’s utility coordinator prior to providing notice of a joint-trench opportunity. In order to avoid impacts to the project schedule, this decision to use conventional open trench construction should be made prior to the highway project’s 30% design threshold.
2. Once the ISP has decided on conventional open trench construction, it shall provide notice of a joint-trench opportunity on the North Carolina Department of Information Technology’s (NCDIT’s) [Division of Broadband and Digital Equity website](#).

The notice shall conform to a form and content approved by the Department and include the following:

- The highway project's TIP number
- County where the project is located
- A general description of the location of the work (e.g. NC 64 from Murphy Street to Manteo Road)
- Contact information for the NCDOT utility coordinator (Central Office or Division depending on who is managing the project) and the consultant utility coordinator

The notice shall run at least two consecutive weeks.

The intent for the notice is to publicize the general scope of the proposed installation within the ROW providing other interested broadband providers the opportunity to express an interest in installing additional broadband and/or wireless access facilities as part of the open trench construction.

3. Immediately following the close of the notice period, the advertising ISP shall notify the Department whether any other entities expressed interest or not.
4. In response to an open trench notice, an ISP not currently located within the state highway project limits (i.e. not involved in active utility coordination on the project) may desire to install facilities as part of this trench sharing arrangement. The Department will incorporate this ISP into the utility coordination process.
5. For those entities that have expressed their interest in participating in the project, the ISP should make reasonable efforts to enter into an agreement between the two (or more) entities, outlining the responsibilities and financial obligations of each, with respect to the installation within the ROW. In the event a formal agreement is entered into between the parties, a copy of the executed agreement, or, alternatively, a joint letter stating that agreement has been reached regarding joint access to the open trench, shall be provided to the Department's utility coordinator prior to beginning installation. In the event agreement is not reached on joint use of the open trench, the ISP shall provide the Department's utility coordinator notice that such agreement has not been reached. The Department will store these agreements and correspondence on the project's Preconstruction SharePoint site.
6. All joint-trench agreements and the designs for all facilities to occupy the trench shall be finalized prior to the Department's issuance of Utility Authorizations for relocation (generally aligned with the highway project's 60% design threshold). The date for issuance of Utility Authorizations shall not be impacted by the requirements of this policy nor shall compliance with this policy compromise the Department's highway project schedule.

4.8.2.2 Requirements for ISPs Installing New Facilities within Project Limits

1. In reviewing an encroachment request to install new facilities within the right of way, the Department may discover that the proposed installation is within the limits of a state highway project. When this happens, and utility coordination for the project is underway, this request is incorporated into the utility coordination process, with the ISP subject to this and all other policies that govern utility installations within state highway projects.
2. The Department requires all utilities, including ISPs, to declare their desired installation method at the time of encroachment request submittal. Once contacted by the

Department's utility coordinator to begin the coordination process, ISPs shall notify the utility coordinator if they desire to install facilities by conventional open trench. The utility coordinator and the ISP will discuss the project status and schedule, to investigate the viability of establishing a joint trench arrangement.

3. If determined that pursuance of a joint trench arrangement is reasonable, with limited risk of compromising the highway project schedule, the ISP it shall provide notice of a joint-trench opportunity on the North Carolina Department of Information Technology's (NCDIT's) [Division of Broadband and Digital Equity website](#).

The notice shall conform to a form and content approved by the Department and include the following:

- The highway project's TIP number
- County where the project is located
- A general description of the location of the work (e.g. NC 64 from Murphy Street to Manteo Road)
- Contact information for the NCDOT utility coordinator (Central Office or Division depending on who is managing the project) and the consultant utility coordinator

The notice shall run at least two consecutive weeks.

The intent for the notice is to publicize the general scope of the proposed installation within the ROW to providing other interested broadband providers the opportunity to express an interest in installing additional broadband and/or wireless access facilities as part of the open trench construction.

4. Immediately following the close of the notice period, the advertising ISP shall notify the Department whether any other entities expressed interest or not.
5. In response to an open trench notice, an ISP not currently located within the state highway project limits (i.e. not involved in active utility coordination on the project) may desire to install facilities as part of this trench sharing arrangement. The Department will incorporate this ISP into the utility coordination process.
6. For those entities that have expressed their interest in participating in the project, the ISP should make reasonable efforts to enter into an agreement between the two (or more) entities, outlining the responsibilities and financial obligations of each, with respect to the installation within the ROW. In the event a formal agreement is entered into between the parties, a copy of the executed agreement, or, alternatively, a joint letter stating that agreement has been reached regarding joint access to the open trench, shall be provided to the Department's utility coordinator prior to beginning installation. In the event agreement is not reached on joint use of the open trench, the ISP shall provide the Department's utility coordinator notice that such agreement has not been reached. The Department will store these agreements and correspondence on the project's Preconstruction SharePoint site.
7. All joint-trench agreements and the designs for all facilities to occupy the trench shall be finalized prior to the Department's issuance of Utility Authorizations for relocation (generally aligned with the highway project's 60% design threshold). The date for issuance of Utility Authorizations shall not be impacted by the requirements of this policy

nor shall compliance with this policy compromise the Department's highway project schedule.

4.9 Emerging Issues and Unique Conditions

Guidance will be placed in this section of the UAM while policy is being developed. When the policy has been developed, guidance will be removed from this section, and the policy will be placed in the appropriate section of this UAM. Application of guidance in this section should be in consultation with the Utilities Unit to facilitate policy development and ensure consistent application throughout NCDOT.

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Appendix A. Glossary

Aboveground facilities/utilities	By definition an aboveground utility protruding > 4 inches above the ground line; Includes, but is not limited to, electric power facilities, electric poles, light poles, guys and anchors, small cell antennas, distributed antenna systems, cabinets and enclosures.
Adverse possession	Sometimes colloquially described as “squatter’s rights,” is a legal principle that applies when a person who does not have legal title to a piece of property—usually land (real property)—attempts to claim legal ownership based upon a history of possession or occupation of the land without the permission of its legal owner for a period of 20-years.
Aerial utility easement (AUE)	An easement controlled by NCDOT to accommodate the placement of utility poles and aboveground utility installations only. No buried parallel installations would be allowed within this corridor. However, a buried service tap from the pole to serve the underlying property owner would be permitted. This type of installation for service would be between the underlying property owner and the utility company providing the requested service. These easements are subject to the requirements of G.S. §136-19.5 .
Air rights	<p>In property law, owning land includes owning the earth under the surface and air above the surface. Landowner’s property interest in the land extends to the airspace directly over the property, to the extent that the airspace can be used to benefit the underlying land. This issue comes into play when a line crosses a roadway but the poles supporting the crossing are not in conflict.</p> <p>Where lines cross NCDOT right of way they are there by encroachment. However, if the line in question was constructed prior to NCDOT constructing the road or taking it over for maintenance, then the utility may have had a valid right of way by recorded easement or adverse possession. In such cases NCDOT would be responsible for the costs associated with the relocation of said line or lines.</p> <p>For an adverse possession claim concerning air rights, the utility would need to have an established pole line for 20 years prior to NCDOT constructing or taking the road over for maintenance.</p>
Approval authority	Public authority or government agency responsible or exercising autonomous authority over some area of human activity in a regulatory or supervisory capacity. In the context of the Utilities Accommodation Manual the approval authority is NCDOT.
Armless	Void of conventional protruding mechanical structural members
Average Daily Traffic (ADT)	The average 24-hour volume, being the total volume during a stated period divided by the number of days in that period. Unless otherwise stated, the period is a year.
Backfill	Replacement of soil around and over a pipe or underground installation
Bedding	Organization of soil to support a pipe or underground installation.

Betterment	<p>Replacing with any more than the minimum required (e.g., increased size/capacity, better material).</p> <p>The definition of betterments is per 23 CFR 645, Subpart A, Section 645, 117(h) and further explained in the FHWA Program Guide: Utility Relocation and Accommodation on Federal-Aid Highway Projects.</p> <p>NCDOT is only responsible to participate in the cost of the minimum relocation work required to make the utility system functional as in their existing configuration. Additional work required in the contract either as increased quantities, increased size or the installation of new and no previously existing equipment is a betterment.</p>
Board	Board of Transportation, an agency of the State of North Carolina.
Bond	A sum of money posted as a guarantee to indemnify the Board or NCDOT for damages to the roadway or highway facility resulting from encroaching installations.
Bore and jack	Also called auger boring, is the most common trenchless method for installing pipe, that simultaneously “jacks” casing while rotating helical augers within the casing removes spoil (rock or soil). A cutting head is attached to the 'lead' auger and can protrude just ahead, sit flush, or sit within the casing depending on the job requirements. Hydraulic jacks located on the bore machine in the sending shaft provide the thrust that push the casing through the ground. The rotating augers carry the spoil to the back of the casing pipe for removal by muck bucket, excavator or conveyor.
Bury	Depth below grade of roadway or ditch to top of pipe or other facility installation.
Buy America	Requirement that substantial amount of steel and iron used on the project is American produced and fabricated; All product parts must be American produced and fabricated.
Carrier	Pipe directly enclosing a transmitted fluid or gas.
Casing	A larger pipe enclosing a carrier.
Clear zone	That portion of the roadside, adjacent to the traveled way and shoulders, having slopes safely traversable by vehicles and which has been designated as the area to be kept as free as practical from those aboveground physical obstructions that would be a hazard. The width of such an area varies according to the type of highway involved and may vary on different sections of the same type of highway.
Coating	Material applied to or wrapped around a pipe.
Communication lines	Lines and associated equipment for the transmission of intelligence through the use of electrical signals.
Compensable interest	A right or interest in real property and/or facilities placed upon real property that qualify under State law for reimbursement for some or all of the cost of the relocation of the facilities as necessitated by NCDOT.
Conduit	An enclosure for protecting wires or cables; same as duct.
Conflict analysis	Process that is used to identify all potential utility conflicts on a highway project with the proposed design and construction elements. Documentation of these conflicts can be in the form of a written report or in tabular format (Conflict Matrix).

Controlled access	The condition where the right of owners or occupants of abutting land or other persons to access, light, air, or view in connection with a controlled access facility or right of way line is fully or partially controlled by NCDOT.
Controlled access, fully	Means that the authority to control access is exercised to give preference to through traffic by providing access connections with selected public roads only by prohibiting crossings at grade or direct private driveway connections.
Controlled access, partial	Means that the authority to control access is exercised to give preference to through traffic to a degree that, in addition to access connections with selected public roads, there may be some crossings at grade and some private driveway connections.
Conventional Highway	A highway primarily for through traffic, usually on a continuous route, without access control.
Direct burial	Installing a utility or facility underground without encasement.
Directional boring	Also called Horizontal Directional Drilling (HDD); A minimal impact trenchless method of installing underground pipe, conduit, or cables in a relatively shallow arc or radius along a prescribed underground bore path by using a surface-launched drilling rig.
District Engineer	District Engineer of NCDOT - Division of Highways, acting directly or through designated representatives.
Division Engineer	Division Engineer of NCDOT - Division of Highways, acting directly or through designated representatives.
Drainage utility easement (DUE)	Used for the installation of permanent drainage and permanent utility facilities, dual use site.
Dry utility	General reference to power, telecommunication and gas.
Duct	An enclosed tubular casing used to protect wires, lines, or cables, often flexible or semi-rigid.
Easement	A right, other than the acquisition of title, acquired to use or control property for a designated purpose.
Electric Power, Primary Service	The induced voltage of a specified transformation above 7200-volt phase to ground.
Electric Power, Secondary Service	The induced voltage of a specified transformation below 7200-volt phase-to-ground.
Encasement	Structural element surrounding a pipe or other installation.
Encroachment	Use of right of way for non-highway purposes.
Encroachment Agreement	A document by which the Board or NCDOT regulates, gives approval or both, for the use and occupancy of right of way by utilities and facilities.
Engineer	The Chief Engineer, Division of Highways, NCDOT, acting directly or through a designated representative.
Federal-Aid Program Guide	<u>FHWA Program Guide: Utility Relocation and Accommodation on Federal-Aid Highway Projects</u> . Published by the Office of Program Administration of the Federal Highway Administration.

Freeway	An expressway with fully controlled access, also referred to as fully Controlled Access (C/A) right of way. No driveways or at-grade intersections are allowed along fully controlled access highways.
Frontage road	A local street or road auxiliary to and located on the side of an arterial highway for service to abutting property and adjacent areas and for controlled access.
Gallery	An underpass for two or more pipelines or other installations.
Highway, Street or Road	A general term denoting a public way for purposes of vehicular travel, including the entire area within the right of way.
Inspector	The authorized representative of the Engineer assigned to make a detailed inspection of any or all work and materials.
Joint attachments	Facilities that are joint attached to utility poles. Normally there is a joint user or pole attachment agreement that defines the terms and conditions of the attachment. These need to be considered when relocating poles; time needs to be allocated for the sequence of each of the joint users to relocate to new poles and then vacate the existing poles so the existing poles can be removed.
Joint use agreement	An agreement between two utilities, both permitted to place poles in the right of way, to jointly use their poles. This is different from a pole attachment agreement, typically used by utilities not permitted to set their own poles (CATV).
Large cell tower	Designed to support one or more cell sites, and typically manufactured from steel. Large cell towers are typically greater than 50 feet in height and could be lattice or self-support towers, or guy towers. These types of facilities are not permitted in right of way.
Manager of Right of Way	Manager of Right of Way of NCDOT - Division of Highways, acting directly or through designated representatives.
Manday	Historic reference to staff-hour estimate (8 man-hours = man-day)
Manhole	An opening in an underground system which workmen or others may enter for the purpose of making installations, inspections, repairs, connections, and tests.
Median	The portion of a divided highway, road or street separating the traveled ways.
Memorandum of Understanding	Abbreviated agreement process to be used by NCDOT that lists out project specific scope of work, design, construction and cost responsibilities.
Moratorium	Temporary pause in activity. Can be related to a utility due to system loads or seasonal requirements. Communities may also have moratoriums due to special events (e.g., car race, festivals, holiday, political conventions)
National Electrical Code (NEC)	The code that electricians must adhere to in construction. Generally after the meter.
National Electrical Safety Code (NESC)	The code that electric power companies must adhere to for clearances. Generally before the meter.

New Utility Installations	Means initial installations on the right of way and the replacement of existing facilities with those of a different type, capacity, or design or replacement at a new location on the right of way. Any replacement of an existing facility or portion thereof with another of the same type, capacity, and design at the same location is considered to be maintenance.
Non-reimbursable work	Within right of way by an Encroachment Agreement; and does not fall under the terms of G.S. §136-27.1 and §136-27.2 .
Non-utility communications or data transmission infrastructure	Includes, but is not limited to, small cell antennas, distributed antenna systems and their associated poles, cabinets and appurtenances.
Open cut installation	Excavated opening (trench or larger) for installing underground facilities.
Order of magnitude	Rough estimation of the level of effort and cost to complete a specific utility task.
Out-of-service facility	An underground facility that is no longer in use. An out-of-service facility may still be connected to a portion of the operating facility that is in use or still carries service. The utility owner retains ownership along with maintenance, records, and designation responsibilities of such a facility.
Overhead facilities	Includes, but is not limited to, electric power facilities, electric poles, light poles, guys and anchors.
Pavement structure	The combination of subbase, base course, and surface course placed on a subgrade to support the traffic load and distribute it to the roadbed.
Permanent utility easement (PUE)	An easement controlled by NCDOT to accommodate above or below ground utility installations. These easements are subject to the provisions of G.S. §136-19.5 .
Plowing	Installation of underground utilities in a narrow slot made in the soil by a plow with a minimum displacement of soil. The slot is closed immediately behind the plowing operation simply by driving over the slotted area with a heavy vehicle, restoring the ground to substantially its original condition. Plowing is not allowed larger than two inches.
Prescriptive easement/prescription	A prescriptive easement is an easement upon another's real property acquired by continued use without permission of the owner for a legally defined period.
Pressure	Relative internal pressure in psig (pounds per square inch gauge - measure of relative internal pressure).
Private lines	Privately owned facilities that are devoted exclusively to private use.
Reimbursable work	Within documented easement; Prior rights documented and approved by NCDOT; Previous agreement negotiation documented and accepted by NCDOT
Resident Engineer	Resident Engineer of NCDOT - Division of Highways, acting directly or through designated representatives.
Right of way	A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes.

Roadside	A general term denoting the area adjoining the outer edge of the roadway. Extensive areas between the roadways of the divided highway may also be considered roadside.
Service connection	Means a service connection from a utilities distribution or feeder line or main to the premises served.
Shoulder	The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles for emergency use, and for lateral support of base and surface courses.
Sidefill	Backfill alongside a pipe or other underground installation.
Sleeve	Short casing through a structural element.
Small cell	An individual cell site that is smaller in size, power, and coverage radius than a large cell tower, and is allowed in right of way through the NCDOT permitting process.
Specimen tree	A tree (or group of trees) of any species that, because of size, shape, location, or growth characteristics, is distinctive or different and contributes appreciably to the quality of the environment of which it is a part.
Structure	A functional unit including the foundation thereof for which the component parts and the method of assembly or construction were determined by the laws of structure mechanics to support predetermined loads. The term shall include but not be limited to bridges, pedestrian overpasses and underpasses, reinforced concrete box culverts, retaining walls, sign support frames, high mount lighting supports and masts, structure plate pipe, and tunnel liners.
Temporary construction easement (TCE)	Used for temporary construction needs as required by the highway project. These types of easements will be eliminated upon completion of the highway project.
Temporary drainage easement (TDE)	Used for temporary drainage installations. These types of easements will be eliminated upon completion of the highway project.
Temporary shoring	Continuous contact of the shoring to the retained soil. In order for the shoring system to be considered "positive" the entire shoring wall must be installed from the ground surface and prior to any excavating. Types of shoring walls include (but not limited to) sheet piles, anchored tie-back wall, soldier pile wall, slide rail, and soil nail wall.
Temporary utility easement (TUE)	Used for temporary utility installations. These types of easements will be eliminated upon the completion of the highway project.
Traffic control plan (TCP)	Organized plan that conforms to guidelines established by the Federal Highway Administration Manual on Uniform Traffic Control Devices and Traffic Control Devices Handbook along with the North Carolina Supplement to the Manual on Uniform Traffic Control Devices designed to minimize the severity of impact construction and maintenance operations have on the motoring public. TCP illustrate the traffic patterns (shifts and detours) that will be used during the construction phase(s) of the utility and/or roadway improvement project.
Traveled way	The portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.
Trenched	Installed in a narrow open excavation.

Trenchless method, new utility installation	Includes horizontal directional drilling (directional bore), bore and jack (auger bore), tunneling (tunnel boring machine) and pipe jacking.
Trenchless method, rehabilitation of existing infrastructure	Includes slip lining, cured-in-place lining, spray on lining, and pipe bursting.
Trenchless technology	The use of construction methods to install and repair underground infrastructure without digging a trench or open cut excavation.
Untrenched	Installed without breaking ground or pavement surface, such as by jacking or boring.
Utility	All lines such as pipes, wires, pole lines and other appurtenances used to transport or transmit electricity, water, waste, gas, voice or data, or radio signals.
Utility facilities, Utilities or both	Includes privately, publicly or cooperatively owned lines, facilities and systems for producing, transmitting or distributing communications, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, storm water not connected with highway drainage, and other similar commodities, including fire and police signal systems and street lighting systems, which directly or indirectly serve the public or any part thereof. The term utility means the utility company, i.e., any person or private or public entity owning and/or operating utility facilities as defined in this paragraph, including any wholly owned or controlled subsidiary.
Utility relocation	Means the adjustment of utility facilities required by the highway project, such as removing and reinstalling the facility, including necessary rights of way, on new location, moving or rearranging existing facilities or changing the type of facility, including any necessary safety and protective measures. It shall also mean constructing a replacement facility functionally equal to the existing facility, where necessary for continuous operation of the utility service, the project economy, or sequence of highway construction.
Visual quality	Those desirable characteristics of the appearance of the highway and its environment, such as harmony between or blending of natural and man-made objects in the environment, continuity of visual form without distracting interruptions, and simplicity of designs which are desirably functional in shape without clutter.
Wet utility	General reference to water, gravity sewer and force mains.

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Appendix B. Figures

Figure 2-1. NCDOT Encroachment Process

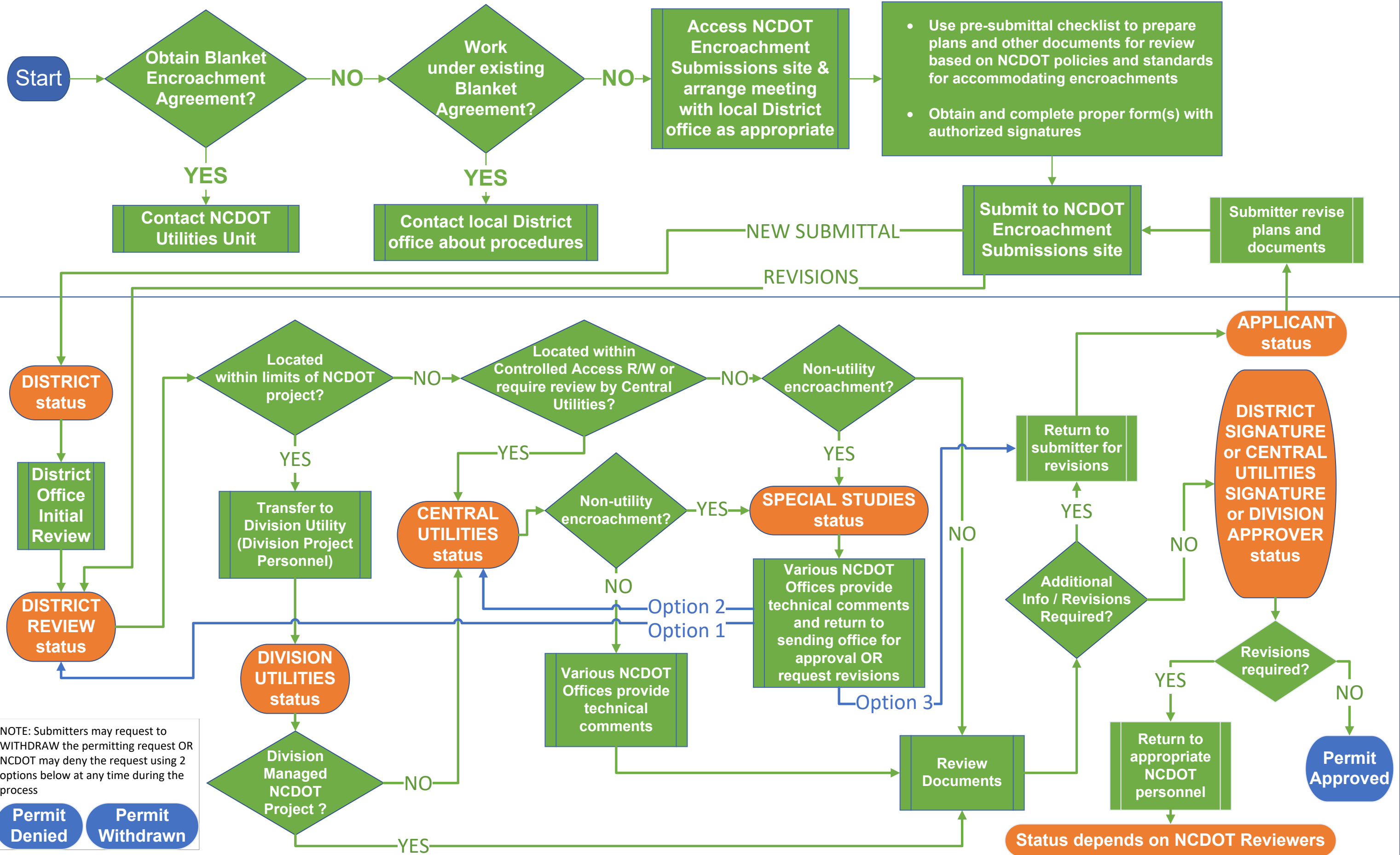
Figure 4-1. Utility Coordination Process Flowchart

Figure 4-2. Cost Responsibility Chart

NCDOT Encroachment Process

ENCROACHING PARTY

NCDOT



NOTE: Submitters may request to WITHDRAW the permitting request OR NCDOT may deny the request using 2 options below at any time during the process

Permit Denied Permit Withdrawn

Status depends on NCDOT Reviewers

NCDOT UTILITY COORDINATION PROCESS

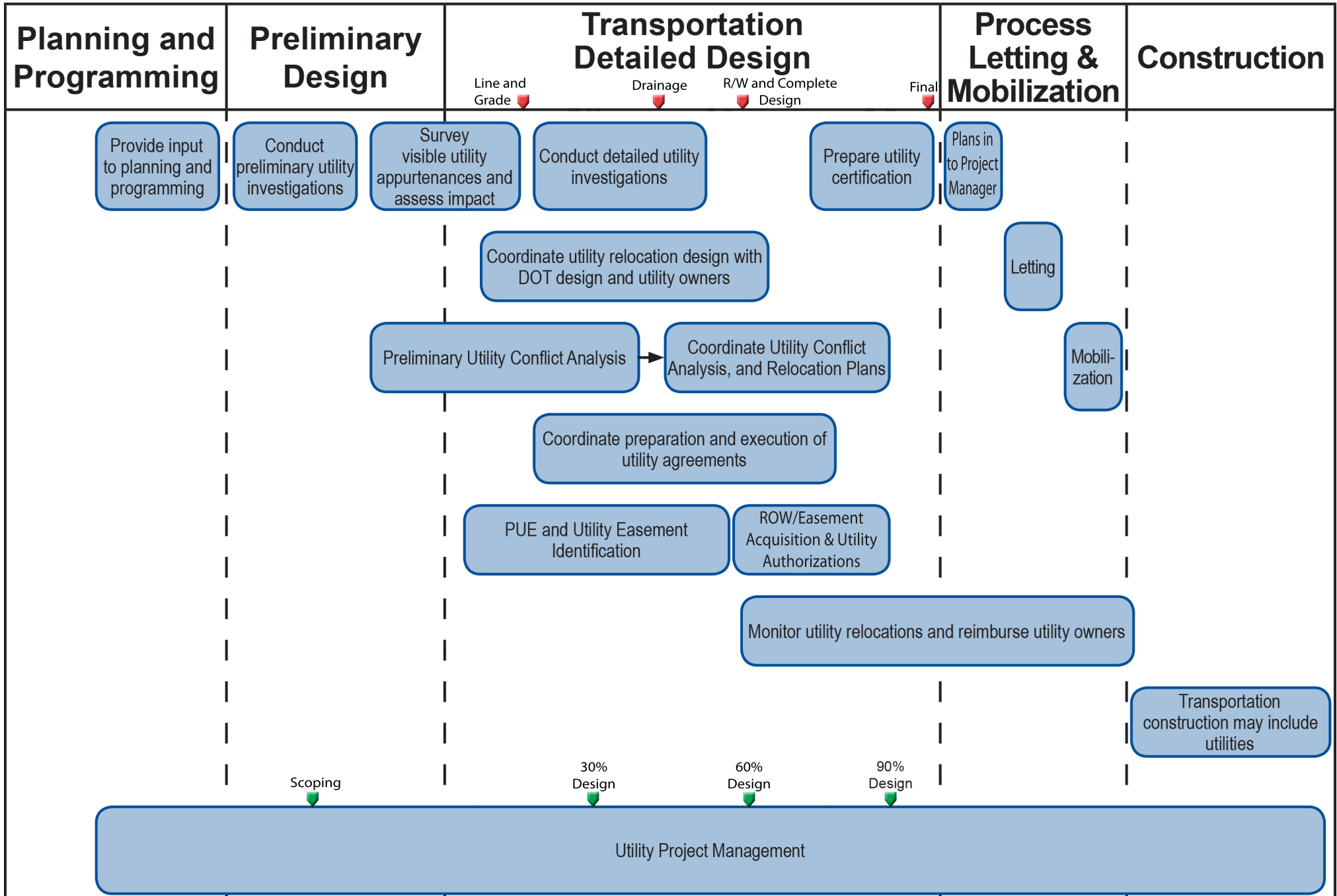
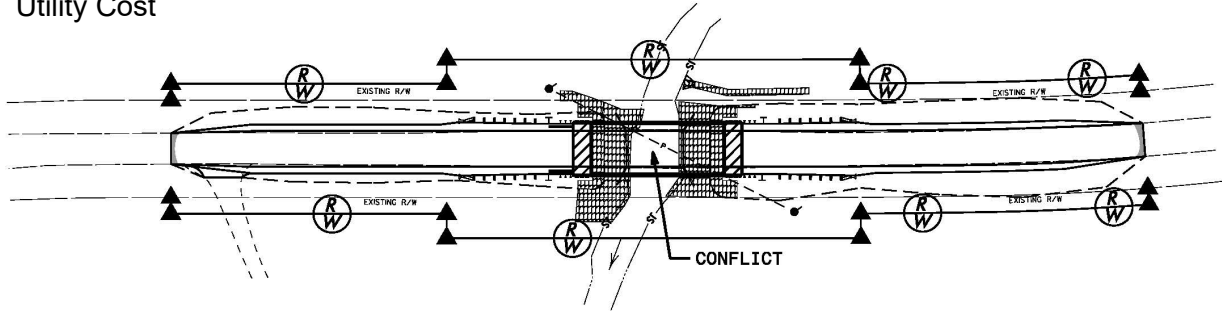


Figure 4-2. Utility Crossing Cost Responsibility Diagrams, Anchoring Appurtenances

Utility Cost



Utility Cost

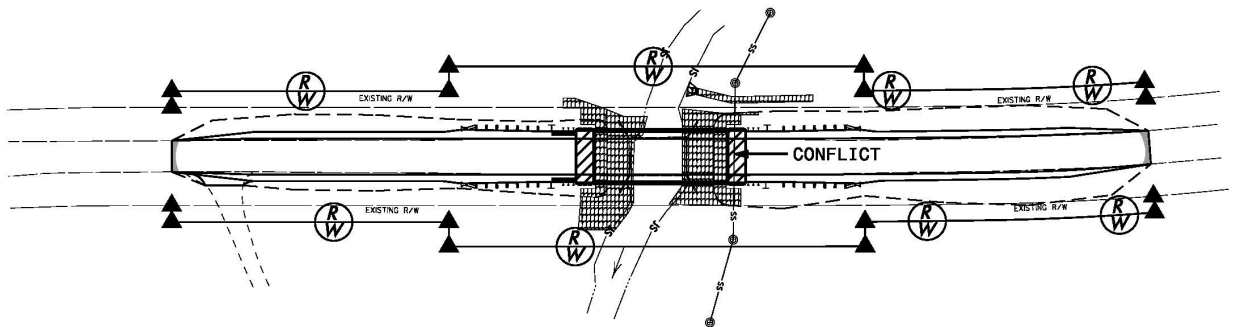
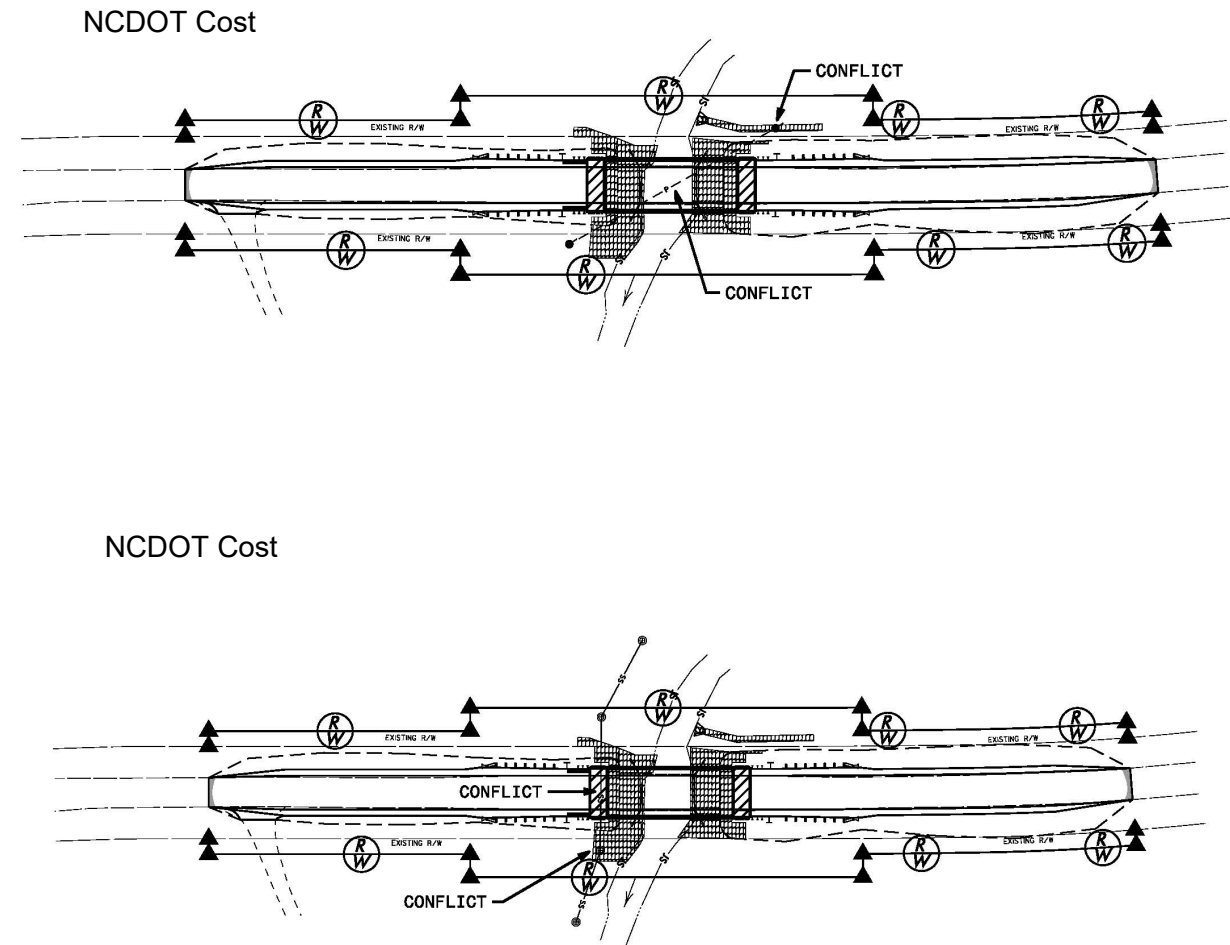


Figure 4-2. Utility Crossing Cost Responsibility Diagrams, Anchoring Apparutenances (continued)



Appendix C. NCDOT Forms

Utility Encroachment Agreement Form Requirements

Utility Encroachment Plan Requirements

16.1 - Two-Party, Utility, Primary and Secondary Highways (Non-C/A)

16.1A - Two-Party, Non-Utility, Not Related to Road Construction

16.1B - Two-Party, Related to Road Construction

16.1C - Two-Party, Piping of Treated Effluent

16.2 - Two-Party, Utility (C/A)

16.3 - Blanket, Plowed-In Telecommunications Cable

16.3A - Blanket, Trenched-In Telecommunications Cable

16.4 - Blanket, Cablevision

16.5 - Blanket, Underground Utility Service Connection

16.5A - Blanket, Aerial Utility Crossings & Taps

16.6 - Three-Party, Utility (Non-C/A)

16.6A - Three-Party, Utility (C/A)

16.7 - Grading or Alteration of Drainage (C/A)

Corporate Surety Bond - Form 16

Corporate Surety Bond - Form 16A

Continuing Indemnity Bond - Form 16B

Form VCER-1, Verification of Compliance with Environmental Regulations

Private Facility Encroachment Hold Harmless Declaration

North Carolina Department of Transportation
Utility Encroachment Agreement Form Requirements

General

- Proper completion of the Encroachment Agreement is essential to its timely processing. If Encroachment Agreements are not properly completed at the time of package submittal, the encroachment request package may be returned to the Applicant and encroachment review will not begin until a proper Encroachment Agreement is submitted.
- The following information will provide guidance on the completion of each field of the agreement. All Encroachment Agreements can be found on the [Encroachment Agreements page of Connect NCDOT](#).

Routes

- All state roads to be encroached upon should be listed. Each road should be listed by its state road number (e.g. NC 55, US 70, SR 1287, etc.). Local road names (e.g. New Hope Road, Johnson Street, etc.) may be included **in addition** to the State Road numbers for reference.
- Affected roadways should be listed first by roadway type (Interstates, followed by US Highways, then State Highways, and finally Secondary Roads) and then numerically. This format should be used regardless of the alignment of the proposed utility.
- For example, an encroachment request involving NC 50, SR 1822, SR 1820, US 70, and I-440 should list these roadways in the Route field as follows: I-440, US 70, NC 50, SR 1820, SR 1822.
- State road numbers and local road names can be found using the [NCDOT GIS Online State Maintained Network Map](#).

Project

- If the encroachment request is located within the limits of an NCDOT project, the NCDOT project number should be placed in this field (e.g. U-2134, R-5631AB, etc.).
- NCDOT project locations can be found using the [NCDOT GIS Online State Transportation Improvement Program Map](#).
- This field should **not** be used to provide Utility Owner project numbers.

County

- This field should be completed with the county in which the work is to be requested.
- If the proposed work involves multiple counties, a separate encroachment agreement should be completed for each county. The exception to this requirement is Blanket Encroachment Agreements, on which including multiple counties on one agreement is acceptable.

Second Party (Two-Party Agreement)

- The Applicant, the party entering into the Encroachment Agreement with NCDOT, should be named here. Additionally, the Applicant's mailing address should be listed in this field.
- In a two-party agreement, the Second Party to the agreement should not be the contractor, consultant or any party other than the owner of the utility.

Second Party (Three-Party Agreement)

- The Applicant, the party entering into the Encroachment Agreement with NCDOT, should be named here. Additionally, the applicant's mailing address should be listed in this field.
- In a three-party agreement, the second party is an entity who, through municipal requirement or other agreement, is charged with the installation of the subject facilities. In these agreements the second party is not the entity who will be responsible for ownership and future maintenance of the facility.
- In a three-party agreement, the Second Party to the agreement should not be the contractor or consultant.

Third Party (Three-Party Agreement)

- In a three-party agreement, the third party is the utility owner who will ultimately own and maintain the facilities being installed by the Second Party to the agreement. Additionally, the third party's mailing address should be listed in this field.
- In a three-party agreement, the third party is not an entity who, through municipal requirement or other agreement, is charged with the installation of the subject facilities.
- In a three-party agreement, the Third Party to the agreement should not be the contractor or consultant.

Agreement Date

- This field, upon approval of the agreement, will show the official approval date of the encroachment agreement.
- This field is to be completed by NCDOT. This field is **not** to be completed by the Applicant.

Second Party (Body of the Agreement)

This field should be completed with the name of the same Second Party that was provided at the top of the Agreement.

Routes (Body of the Agreement)

Routes should be listed in the same format as was provided at the top of the agreement.

Location

- This field should describe the general route of the proposed installation.
- Longitudinal installations should provide the following information in the location description:
 - Starting point referencing the nearest intersecting roads
 - Approximate lengths of segments
 - Bearing direction
 - Side of the road
 - Example of a longitudinal installation location description:
Beginning approximately 700 feet west of the intersection of Ancroft Ave and SR 1171 (Riddle Rd) and running east along the south side of SR 1171 (Riddle Rd) for approximately 2600 feet, crossing SR 1171 (Riddle Rd) at SR 1945 (S Alston Ave) and continuing east along the north side of SR 1171 (Riddle Rd) for approximately 1150 feet, crossing SR 1173 (Ellis Rd) and continuing north along the east side of SR 1173 (Ellis Rd) for approximately 900 feet, and terminating at the intersection of SR 1173 (Ellis Rd) and SR 1940 (Glover Rd).
- Individual crossings and single point installations (e.g. individual utility poles) should provide a distance of the installation from the nearest intersecting roads and side of the road when applicable.
Examples of these location descriptions:
 - *Crossing I-40 approximately 1200 feet east of the I-40/US 1 interchange*
 - *Crossing I-77 at the grade separation of I-77 and Jane Sowers Rd.*
 - *Pole placed on the west side of SR 1926 (Alston Ave), 50 feet south of the intersection of SR 1926 (Alston Ave) and SR 1955 (Wrenn Rd)*

Project Description

- Project Description should include the following items:
 - Length of installation, in feet
 - Size (diameter) of utility, in inches
 - Size (diameter) of encasement, in inches, if applicable
 - Type of material
 - Encasement material, if applicable
 - Type of utility
 - Installation method
 - Type and number of utility structures (e.g. vaults, handholes, manholes, poles)
 - Examples of project descriptions:
 - *917 feet of buried 2" SDR-11 HPDE conduit with fiber optic cable installed by horizontal directional drill; 2 handholes*
 - *382 feet of buried 12" DIP sewer line within 24" steel encasement pipe installed by bore and jack*
 - *522 feet of aerial 1/0 25kV electric cable installed on existing poles*
 - *New 35 foot wooden pole with telecommunications equipment attached*

Department of Transportation signature

This field is to be completed by NCDOT upon approval of the encroachment request.

Applicant Signatures and Seals

- Corporations and Municipalities
 - When the applicant of an encroachment agreement is a corporation or a municipality, the agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered city official is on file with the office of the State Utilities Manager, the Utilities Unit.
 - Request by corporations or municipalities to waive the corporate or municipal seal and attestation from encroachment agreements should be made in writing to the State Utilities Manager. The request should include the titles or positions of the corporation or municipality which the applicant is requesting to have signature authorization.
- Non-Corporations
When the applicant is not a corporation, then his signature must be witnessed by one person.
- Limited Liability Corporations
When the applicant of an encroachment agreement is a Limited Liability Corporation, the agreement shall be executed by a manager of the limited liability company. In the space provided beneath the applicant's signature, the signer shall be identified as "Manager". The signature must be witnessed by one person. Corporate Seals are not required of Limited Liability Corporations in North Carolina.
- In each agreement, the space provided for signatures should include the following information in addition to the necessary signatures:
 - The corporation or municipality name, if applicable
 - The name and title of all persons signing the agreement, typed directly below each signature.

North Carolina Department of Transportation **Standard Utility Encroachment Plan Requirements**

General

Only properly formatted, complete drawings with sufficient, applicable information should be submitted with encroachment requests. If proper plans are not submitted, encroachment requests may be returned to the Applicant and encroachment review will not begin until proper plans are resubmitted.

Plan Format

- Plans should be legible.
- Plan sheet size of 11"x17" or 8.5"x11" is preferred. Full size plan sheets should only be submitted if requested.
- Plans should show the entire project limits
- Only applicable plan and detail sheets should be submitted. Plan sheets and details for work outside of NCDOT right of way, including work on City and non-NCDOT maintained roadways should be removed from the submittal.

Professional Engineer Seals

Certain utility encroachment requests require plans to be sealed by a licensed North Carolina Professional Engineer. Guidance on what requests have this requirement can be found in the [NCDOT Utilities Accommodations Manual](#).

Plan Title Sheet

- Location / Vicinity Map: A vicinity map should be included in the submittal to provide a quick and easy reference to the location of the proposed work. The following aspects should be included in the vicinity map:
 - North arrow
 - Roads labeled
 - Proposed work area should be labeled.
- County name
- Contact information: This information should consist of names, telephone numbers, and email addresses of key people involved in encroachment plan development and encroachment construction and should, whenever possible, include a 24-hour contact to address issues during construction.
- Utility owner project number
- Engineering firm information
- Project scope: This information should include a brief description of the work being proposed with a general to and from provided (e.g. "8 inch sanitary sewer along SR 1324 from SR 1875 to NC 431")

General Notes

If included, general notes should not only reflect Utility Owner requirements but also NCDOT requirements.

Legend / Symbology

All features shown within the plan set should have a corresponding symbol. The legend should include all applicable symbols and linestyles.

Detail Sheets

The following details should be included if applicable:

- Standard Details
 - Aerial detail with minimum vertical clearance: This aerial detail should be included even if the proposed work is an overlash of an existing crossing.
 - Minimum bury depth
 - Road crossing detail for controlled access and/or non-controlled access roadways, depending on which is applicable.
 - Culvert crossing detail
 - Utility Structures – NCDOT product number
 - Applicable details should be provided for handholes, vaults, manholes and other utility structures proposed.
 - Use of a structure included on the [NCDOT Approved Products List](#) is preferred. When using a structure from the NCDOT Approved Products List, the NCDOT Product number should be included with the structure detail.
 - If proposing to use a utility structure that is not included on the [NCDOT Approved Products List](#), the proposed structure must be approved by NCDOT prior to use in the right of way.
 - If utility structures are proposed to be installed within the sidewalk, an installation/sidewalk repair detail should be included.
 - Bore pit detail: This detail should note the standard size and depth of proposed bore pits.
 - Bore detail: This detail should show maximum proposed bore diameter.
 - Other utility details as applicable
- Site-specific Details: Instances may occur when a standard detail is not applicable to a certain situation. In these instances, a site-specific detail should be required to provide more detailed guidance for the situation.

General Plan View

The following aspects should be included on all plan view sheets:

- North arrow
- State routes labeled
- Scale / Dimension: All plans should either be to scale or properly and accurately dimensioned
 - Scaled plans
 - Scale should be shown
 - Scale should be no greater than 1" = 100'
 - Dimensioned plans should be sure to provide the information requested in sections below.
- Facility details
 - Length of the installation or segment
 - Size of the facility
 - Utility material
 - Installation method
 - Utility structures with dimensions, if necessary
 - Bore diameter
 - Bore pit locations
 - Include dimensions of bore pit
 - Offsets from roadway features should be included (i.e. offsets of bore pits from the edge of pavement or back of curb, the right of way line, other relevant roadway features).
- Roadway Details: The following roadway details should be shown on the plan set:
 - Edge of pavement and/or back of curb, with roadway width
 - Right of way line and/or control of access line, with right of way width
 - Guardrail
 - Storm drainage features (e.g. cross drainage pipes, longitudinal drainage pipes, catch basins and drop inlets, driveway pipes, etc.), with culvert diameters
 - Ditch line and/or toe of fill
 - Bridges
- Offsets from proposed facilities: If not clearly conveyed by plan scaling, dimensions should be included to show the offset of the proposed facility from the following roadway features:
 - Edge of pavement or back of curb
 - Right of way line
 - Guardrail
 - Bridge components, including the substructure of the bridge if the encroaching utility is proposed in close proximity to a bridge. Further guidance regarding what is required when proposing a facility in close proximity to a bridge can be found in the [NCDOT Utilities Accommodations Manual](#).
- Existing utilities
 - Existing at-grade and above-ground utility features should be shown on plans. This includes, but is not limited to, utility poles, hydrants, valves, manholes, handholes, cabinets, etc.
 - Existing underground and above-ground utilities should be shown on plans under the following circumstances:
 - In locations where the presence of existing utilities will prohibit the proposed facility from being installed in accordance with NCDOT alignment preferences (e.g. as close to the right of way line as possible, as far away from the roadway as possible, etc.)
 - In sensitive areas (e.g. near bridges and/or other NCDOT structures, areas of very limited right of way, etc.)
 - In situations where, at the discretion of the NCDOT, existing utility locations will aide in the proper review of the proposed utility installation.
- Distance from encroachment to nearest State route, when placing a single-point installation.

General Profile View

A profile view is required when crossing a roadway. At a minimum, a standard detail should be included to show how roadways will be crossed. The following aspects should be included on all profile view sheets:

- Roadway
- Right of way limits
- The entire crossing section through the right of way
- Minimum vertical dimensions
- Bore pit locations
- Elevations, sizes and materials for potential utility conflicts
- Grade and/or cover on proposed utilities
- Scale of profile view
- Rim and invert elevations for proposed utility structures
- 1:1 slope from the edge of pavement
- Maximum bore diameter

ROUTE _____ PROJECT _____ COUNTY OF _____

DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY ENCROACHMENT AGREEMENT

-AND-

PRIMARY AND SECONDARY HIGHWAYS

THIS AGREEMENT, made and entered into this the _____ day of _____ 20 _____ by and between the Department of Transportation, party of the first part; and _____ party of the second part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) _____, located _____

with the construction and/or erection of: _____

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the installation, operation, and maintenance of the above described facility will be accomplished in accordance with the party of the first part's latest UTILITIES ACCOMMODATIONS MANUAL, and such revisions and amendments thereto as may be in effect at the date of this agreement. Information as to these policies and procedures may be obtained from the Division Engineer or State Utilities Manager of the party of the first part.

That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the construction site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

- a. Compliance with Regulations: The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- b. Nondiscrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials

and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

- c. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- e. Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,
 - (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
 - (2) cancellation, termination or suspension of the contract, in whole or in part.
- f. Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

R/W (161) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (161) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____

DIVISION ENGINEER

ATTEST OR WITNESS:

Second Party

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the State Utilities Manager. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

1. All roadways and ramps.
2. Right of way lines and where applicable, the control of access lines.
3. Location of the existing and/or proposed encroachment.
4. Length, size and type of encroachment.
5. Method of installation.
6. Dimensions showing the distance from the encroachment to edge of pavement, shoulders, etc.
7. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
8. Drainage structures or bridges if affected by encroachment (show vertical and horizontal dimensions from encroachment to nearest part of structure).
9. Method of attachment to drainage structures or bridges.
10. Manhole design.
11. On underground utilities, the depth of bury under all traveled lanes, shoulders, ditches, sidewalks, etc.
12. Length, size and type of encasement where required.
13. On underground crossings, notation as to method of crossing - boring and jacking, open cut, etc.
14. Location of vents.

GENERAL REQUIREMENTS

1. Any attachment to a bridge or other drainage structure must be approved by the State Utilities Manager in Raleigh prior to submission of encroachment agreement to the Division Engineer.
2. All crossings should be as near as possible normal to the centerline of the highway.
3. Minimum vertical clearances of overhead wires and cables above all roadways must conform to clearances set out in the National Electric Safety Code.
4. Encasements shall extend from ditch line to ditch line in cut sections and 5' beyond toe of slopes in fill sections.
5. All vents should be extended to the right of way line or as otherwise required by the Department.
6. All pipe encasements as to material and strength shall meet the standards and specifications of the Department.
7. Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings.
8. The Department's Division Engineer should be given notice by the applicant prior to actual starting of installation included in this agreement.

ROUTE _____ PROJECT _____ COUNTY OF _____

DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY ENCROACHMENT AGREEMENT
FOR NON-UTILITY ENCROACHMENTS ON
PRIMARY AND SECONDARY HIGHWAYS

-AND-

THIS AGREEMENT, made and entered into this the _____ day of _____, 20_____, by and between the Department of Transportation, party of the first part; and _____ party of the second part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) _____, located _____

with the construction and/or erection of: _____

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

It is clearly understood by the party of the second part that the party of the first part will assume no responsibility for any damage that may be caused to such facilities, within the highway rights of way limits, in carrying out its construction and maintenance operations.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the encroaching site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

R/W (161A) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (161A) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
DIVISION ENGINEER

ATTEST OR WITNESS:

Second Party

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the State Utilities Manager. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

1. All roadways and ramps.
2. Right of way lines and where applicable, the control of access lines.
3. Location of the proposed encroachment.
4. Length and type of encroachment.
5. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
6. Drainage structures or bridges if affected by encroachment.
7. Typical section indicating the pavement design and width, and the slopes, widths and details for either a curb and gutter or a shoulder and ditch section, whichever is applicable.
8. Horizontal alignment indicating general curve data, where applicable.
9. Vertical alignment indicated by percent grade, P.I. station and vertical curve length, where applicable.
10. Amount of material to be removed and/or placed on NCDOT right of way, if applicable.
11. Cross-sections of all grading operations, indicating slope ratio and reference by station where applicable.
12. All pertinent drainage structures proposed. Include all hydraulic data, pipe sizes, structure details and other related information.
13. Erosion and sediment control.
14. Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings.
15. The Department's Division Engineer should be given notice by the applicant prior to actual starting of installation included in this agreement.
16. Method of handling traffic during construction where applicable.
17. Scale of plans, north arrow, etc.

ROUTE _____ PROJECT _____ COUNTY OF _____

DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY ENCROACHMENT AGREEMENT FOR CURB AND GUTTER, PAVEMENT WIDENING AND STORM DRAINAGE

-AND-

THIS AGREEMENT, made and entered into this the _____ day of _____, 20_____, by and between the Department of Transportation, party of the first part; and _____

party of the second part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) _____, located _____

with the construction and/or erection of: _____

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the said party of the second part binds and obligates himself to install the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway.

That the party of the second part agrees to provide during construction proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

It is clearly understood by the party of the second part that the party of the first part will assume no responsibility for any damage that may be caused to such facilities, within the highway rights of way limits, in carrying out its construction.

That the party of the second part agrees to restore all areas disturbed during construction to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any construction operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the encroaching site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

R/W (161B) : Party of the Second Part certifies that this agreement is true and accurate copy of the form

R/W (161B) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
DIVISION ENGINEER

ATTEST OR WITNESS:

Second Party

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the State Utilities Manager. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

1. All roadways and ramps.
2. Right of way lines and where applicable, the control of access lines.
3. Location of the proposed encroachment.
4. Length and type of encroachment.
5. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
6. Drainage structures or bridges if affected by encroachment.
7. Typical section indicating the pavement design and width, and the slopes, widths and details for either a curb and gutter or a shoulder and ditch section, whichever is applicable.
8. Horizontal alignment indicating general curve data, where applicable.
9. Vertical alignment indicated by percent grade, P.I. station and vertical curve length, where applicable.
10. Amount of material to be removed and/or placed on NCDOT right of way, if applicable.
11. Cross-sections of all grading operations, indicating slope ratio and reference by station where applicable.
12. All pertinent drainage structures proposed. Include all hydraulic data, pipe sizes, structure details and other related information.
13. Erosion and sediment control.
14. Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings.
15. The Department's Division Engineer should be given notice by the applicant prior to actual starting of installation included in this agreement.
16. Method of handling traffic during construction where applicable.
17. Scale of plans, north arrow, etc.

ROUTE _____ PROJECT _____ COUNTY OF _____

DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY ENCROACHMENT AGREEMENT FOR THE PIPING OF TREATED EFFLUENT ON PRIMARY AND SECONDARY HIGHWAYS

-AND-

THIS AGREEMENT, made and entered into this the _____ day of _____, 20_____, by and between the Department of Transportation (DOT), party of the first part; and _____ party of the second part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) _____, located _____

with the following:

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement, and the Memorandum of Agreement (MOA) between DOT and the Department of Environmental Quality (DEQ) dated January 25, 1999, and the laws and regulations of this State and the instructions contained herein;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part, after approval by DEQ pursuant to the MOA, the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the installation, operation, and maintenance of the above described facility will be accomplished in accordance with the party of the first part's latest UTILITIES ACCOMMODATIONS MANUAL, and such revisions and amendments thereto as may be in effect at the date of this agreement. Information as to these policies and procedures may be obtained from the Division Engineer or State Utilities Manager of the party of the first part.

That the said party of the second part binds and obligates himself to install the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways, drainages and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds itself, its successors and assigns, to promptly remove, to alter, or close down the said facilities, in order to conform to the said requirement and laws of this State, without any cost to the party of the first part..

That the party of the second part agrees to provide during construction of the encroachment and any subsequent maintenance and/or repairs proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment. This will include any and all third party claims for damages and claims from adjoining land owners, businesses, etc. that may be affected by said encroachment activities.

The encroaching party is responsible for posting a bond, the amount to be set by DOT and DEQ, which will be used to cover any expenses, lawsuits, judgments, etc. related to the encroaching activity.

It is clearly understood by the party of the second part that the party of the first part will assume no responsibility for any damage that may be caused to such facilities, within the highway rights of way limits, and any areas outside those limits that are affected by said encroachment activities in carrying out its construction and maintenance operations. DOT may allow piped water across its fee-owned or dedicated right-of-way and not be in violation of any and all applicable environmental laws and DEQ regulations and NPDES permit conditions. Piping across DOT right of way that DOT does not own in fee or dedicated will require written approval of all adjoining land owners to be obtained by the encroaching party.

That the party of the second part agrees to restore all areas disturbed during construction to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. The party of the second part shall comply at all times and be responsible for such compliance with applicable rules and regulations of DEQ, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution control and prevention that may be affected in any way by this encroachment activity. When any installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the DOT Division Engineer.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the DOT Division Engineer or DEQ representative pursuant to the MOA. The party of the second part agrees to abide by any and all NPDES permits, DEQ rules or regulations and any and all other applicable laws.

That the party of the second part agrees to have available at the encroaching site, at all times during construction, a copy of this agreement showing evidence of approval by the parties. DOT and DEQ reserve the right to stop all work unless evidence of approval can be shown. Other documents may be required to remain on-site as well as may be required by a representative of DEQ.

That the party of the second part agrees to give written notice to both DOT Division Engineer and DEQ representative when all work contained herein has been completed.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to DOT. This can be done by any party, including a request by DEQ pursuant to their regulatory authority and the MOA at any time, for any reason.

The party of the second part hereby covenants that any action pursuant to the allowed encroachment will not violate any law or environmental rules or standards applicable during the term of the encroachment. Any such violations will be the sole responsibility of the party of the second part. DEQ will not cite, file, or hold DOT in violation of any state laws or regulations if caused by the action/discharge by the party of the second part. Also, the party of the second part is wholly liable for any proximately caused damages (i.e., off site ground water contamination, surface water contamination, erosion or siltation problems, etc.) that may occur due to the encroaching activity, regardless if DOT is negligent for any reason in partly causing any said damages. DOT is entitled to any reimbursement or payment of any costs incurred due to any problem or occurrence initially caused by the encroaching party, to be paid out of the posted bond monies.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

DOT has the specific right to end this agreement at any time for any reason. This agreement may be modified, with the consent of the parties, in writing.

R/W (161C): Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (161C) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

RECOMMENDED BY:

DIVISION ENGINEER

DEPARTMENT OF TRANSPORTATION

BY: _____
STATE UTILITIES MANAGER

ATTEST OR WITNESS: _____

Second Party

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the State Utilities Manager. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

1. All roadways and ramps.
2. Right of way lines and where applicable, the control of access lines.
3. Location of the proposed encroachment. Locations should be shown on the appropriate [USGS topographic map](#) including location of the discharge. If this discharge involves piping across lands outside of DOT right of way, or to existing sewer systems, such written grant of authority must be attached.
4. Length and type of encroachment.
5. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
6. Drainage structures or bridges if affected by encroachment.
7. Typical section indicating the pavement design and width, and the slopes, widths and details for either a curb and gutter or a shoulder and ditch section, whichever is applicable.
8. Amount of material to be removed and/or replaced on DOT right of way, if applicable.
9. Cross-sections of all grading operations, indicating slope ratio and reference by station where applicable.
10. All pertinent drainage structures proposed. Include all hydraulic data, pipe sizes, structure details and other related information.
11. Erosion and sediment control.
12. Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings.
13. The Department's Division Engineer must be given notice by the applicant prior to actual starting of installation included in this agreement.
14. Method of handling traffic during construction where applicable.
15. Scale of plans, north arrow, etc.
16. Copies of all applicable permits issued for the installation, operation and maintenance of the encroaching facility and any other permits or authorizations as may be necessary.
17. Seal and signature of the North Carolina Registered Professional Engineer in direct charge of the design, installation, operation, and maintenance of the encroaching facility.
18. Posting for an appropriate bond to ensure payment by party of the second part for any compensable violations it may incur pursuant to its encroaching activities. Such bond must be submitted in a form acceptable to DOT, prior to the grant of any encroachment.
19. The discharge from the encroachment must be shown. Where applicable, the encroaching party must first obtain the necessary permits for such discharge and make copies available to the Division Engineer.
20. All plans and the encroachment must adhere to the dictates of the MOA between DOT and DEQ dated January 25, 1999, that provides for such encroachments on DOT right of way.
21. The encroaching party must obtain a copy of the agreement and instructions from the DOT Division Engineer. The encroaching party supplies all necessary information and returns such to DOT. DOT will review and if approved, forward such to the responsible DEQ official for their review. Upon DEQ review and approval, an addendum will be signed by DEQ and the encroaching party and be sent to DOT for signature, along with the encroachment agreement. If DOT then approves the encroachment agreement, it will sign such, and the addendum, and send copies to the encroaching party. The encroaching party will send a copy of these documents to DEQ.
22. If DOT does not own the right of way needed for the encroachment in fee, the encroaching party must provide DOT signatures of all underlying landowners and/or adjoining property owners approving of the encroachment on their property before DOT can consider the encroachment request.

ROUTE _____ STATE PROJECT _____ STATE OF NORTH CAROLINA
FEDERAL PROJECT _____ COUNTY _____

DEPARTMENT OF TRANSPORTATION
-AND-

RIGHT OF WAY
ENCROACHMENT AGREEMENT
INTERSTATE AND OTHER CONTROLLED
ACCESS HIGHWAYS

THIS AGREEMENT, made and entered into this the _____ day of _____, 20_____, by and between the Department of Transportation, party of the first part; and _____ party of the second part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) _____, located _____

with the construction and/or erection of: _____

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the installation, operation, and maintenance of the above described facility will be accomplished in accordance with the party of the first part's latest UTILITIES ACCOMMODATIONS MANUAL, and such revisions and amendments thereto as may be in effect at the date of this agreement. Information as to these policies and procedures may be obtained from the Division Engineer or State Utilities Manager of the party of the first part.

That the said party of the second part hereby agrees that access for servicing its facilities will be limited to access via (a) frontage roads where provided, (b) nearby or adjacent public roads and street, or (c) trails along or near the highway right of way lines, connecting only to an intersecting road; from any one or all of which entry may be made to the outer portion of the highway right of way. The party of the second part's rights of access to the through-traffic roadways and ramps shall be subject to the same rules and regulations as apply to the general public, except if an emergency situation occurs, and the usual means of access for service operation as herein provided will not permit the immediate action required by the party of the second part in making emergency repairs as required for the safety and welfare of the public, the party of the second part shall have a temporary right of access to and from the through-traffic roadways and ramps as necessary to accomplish the required emergency repairs, provided that the party of the second part complies with the regulations established by the party of the first part for policing and control to protect the highway users.

That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the construction site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

- a. Compliance with Regulations: The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- b. Nondiscrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.
- c. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- e. Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,
 - (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
 - (2) cancellation, termination or suspension of the contract, in whole or in part.
- f. Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

R/W (162) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (162) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
STATE UTILITIES MANAGER

ATTEST OR WITNESS:

Second Party

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the State Utilities Manager. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

GENERAL REQUIREMENTS

1. Wherever possible, freeway crossing should be parallel to and within the prevailing right of way of intersecting roads.
2. Crossings should be as near as possible normal to the center line of the freeway.
3. Parallel encroachments will not be permitted except outside of control of access lines.
4. The Department's Division Engineer should be given notice by the applicant prior to actual starting of installations included in this agreement.

For Overhead Wire Lines

1. Minimum vertical clearances of overhead wires above all roadways must conform to clearances set out in the National Electric Safety Code.
2. Supporting poles or structures must be clear of control of access lines, and be at least 30 feet clear of the edge of shoulders of through lanes and 20 feet clear of the shoulders of interchange ramps.

For Underground Utilities

1. Open-cut installation for crossings will be permitted only when a highway project is in rough grading stage prior to paving. Generally, on rough grading projects, open-cut will not be permitted in fills of over 10 feet in depth and back filled material must be compacted to maximum density meeting Department requirements.
2. Encasements under an existing freeway must be installed by means of tunneling, jacking, or boring and any voids outside the encasement must be filled with lean concrete grout and the ends of encasements be satisfactorily closed.
3. In cut section, encasement must extend continuously from ditch line to ditch line and in fill section, encasement must extend continuously five feet beyond toe to slopes.
4. Vents for encasement should be extended to the right of way line or as otherwise required by the Department.
5. All pipe encasements as to material and strength shall meet the standards and specifications of the Department.
6. When trenching is carried down cut slopes, excavation must be backfilled to maximum density and the disturbed portion of the slope be stabilized and sodded to the satisfaction of the Department's Engineer.

Plans

This Encroachment agreement must be accompanied, in the form of an attachment, by a plan showing the following:

1. All roadways and ramps
2. Right of way and control of access lines
3. Drainage structures or bridges if affected by encroachment
4. Location of the proposed encroachment
5. Length, size and type of encroachment
6. Dimensions, showing the distance from the encroachment to roadways, shoulders, structures, etc.
7. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road intersection, etc. (To assist in preparation of the encroachment plan, Department roadway plans may be seen at the various Highway Division Offices or at the Raleigh Office.)

All encroachment agreements involving the crossing of the right of way, roadways and/or ramps of a freeway, must be accompanied, in the form of an attachment, by a profile showing the following information:

1. The profile should extend from right of way line to right of way line and show all slopes (cut or fill), ditches, shoulders, pavements, medians, etc.
2. A vertical dimension from bottom of road ditches and from surface of pavement to encroaching structures.
3. Length, size, and type of encasement where required.
4. Notation of portion to be installed by open-cut.
5. For underground encroachments involving encasements that must be vented, the location of vents must be shown.
6. Method of installation must be shown in detail on either the plan or profile.
7. Any attachment to a bridge or other drainage structure must be approved by the Department's Bridge Design Unit.
8. Where profile is required, it should be on same sheet with the plan.

SPECIAL PROVISIONS OR SPECIFICATIONS

Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment, provided that such information cannot be shown on the plan and profile sheet.

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

BLANKET ENCROACHMENT AGREEMENT

-AND-

PLOWED-IN TELEPHONE CABLE ON
PRIMARY AND SECONDARY ROAD SYSTEM

THIS AGREEMENT, made and entered into this _____ day of _____, 20_____, by and between the Department of Transportation, party of the first part, and _____, party of the second part,

WITNESSETH:

THAT WHEREAS, the party of the second part desires to install underground cables, and other facilities and equipment on the right of way of certain public roads on the State Primary and/or Secondary Road System in the above County or Counties, North Carolina; and

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment with in the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to encroach and construct facilities in the County or counties mentioned above, subject to strict compliance to the following 22 numbered special provisions;

1. This agreement applies only to telephone cable installed by the "plowing in" method and does not cover cable installed by open trenching except laterals or branch cables, loops to terminals, load coils or splice points, and occasional trenching where necessary to pass over, under or around obstructions encountered.
2. This agreement applies to roads on the Primary and Secondary System of State roads which are not classified as Freeways.
3. This agreement does not apply to Freeways including Freeway interchange ramps.
4. Any work to be done under this agreement must be reported to the party of the first part's Division Engineer in writing with attached map or sketch showing location and extent of work, and a letter of concurrence be received from the Division Engineer before commencing the work.
5. That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.
6. It is clearly understood by the party of the second part that the party of the first part will assume no responsibility for a ny damage that may be caused to such facilities, within the highway right of way limits, in carrying out its construction and maintenance operations.
7. Cable should not be installed closer than 3 feet from the edge of pavement, except in unusual situations approved by the party of the first part's Division Engineer. Shoulders stabilized with bituminous material and/or compacted crushed stone will be considered as pavement. Plowing in will be prohibited in unstable shoulders caused by adverse weather conditions or other reasons.
8. The cable shall be placed a minimum depth of 18 inches (24 inches preferable) below the surface of the shoulder except in passing over obstructions. Service taps and laterals should be placed a minimum of 24 inches below the bottom of side ditches.
9. Cable is to be placed as far as practical from the centerline of unpaved roads.
10. Plowing in will be scheduled for other than winter months as far as practical.
11. The pavement of intersecting roads shall not be cut except in unusual situations approved by the part of the first part's Division Engineer.
12. The cutting of pavement for service taps across the road will not be permitted, and the cutting of pavement for additional terminals where existing cables have been paved over shall be done only upon approval of the party of the first part's Division Engineer. Crossings by the methods of driving, jacking or boring holes up to 6 inches in diameter are acceptable subject to the approval of the party of the first part's Division Engineer.
13. In situations where an unpaved road is paved over an existing cable or where an existing pavement is widened over a cable, permission will not be granted to cut the pavement for the purpose of restoring or repairing the cable except in cases of emergency involving services. In these cases, the party of the first part's Division Engineer may authorize the cutting of pavement for emergency restoration of service.
14. In installing cable, highway drainage pipes and culverts are not to be disturbed.
15. No attachments may be made to bridges or culverts without the prior written approval of the State Utilities Manager.
16. Equipment used in plowing in cable shall be of such types as not to cause damage to pavement.

17. The party of the second part shall provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and amendments or supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.
18. That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollutions of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and the existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.
19. The party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.
20. All work is to be completed promptly with a minimum of delay.
21. The party of the second part agrees to have available at the construction site, at all times during construction, a copy of the letter of authorization and sketches from the Division Engineer (see Item #4 above) showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence approval can be shown.
22. That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

- a. Compliance with Regulations: the contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- b. Nondiscrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contracts covers a program set forth in Appendix B of the Regulations.
- c. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment. each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- e. Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,
 - (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
 - (2) cancellation, termination or suspension of the contract, in whole or in part.
- f. Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
STATE UTILITIES MANAGER

ATTEST OR WITNESS

(COMPANY)

(TYPE NAME AND TITLE)

COUNTY OR COUNTIES OF

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

BLANKET ENCROACHMENT AGREEMENT

-AND-

TELECOMMUNICATIONS CABLE INSTALLED BY
TRENCHING ON PRIMARY AND SECONDARY ROAD
SYSTEM

THIS AGREEMENT, made and entered into this _____ day of _____, 20_____, by and between the Department of Transportation, party of the first part, and _____, party of the second part,

WITNESSETH:

THAT WHEREAS, the party of the second part desires to install underground cables, and other facilities and equipment on the right of way of certain public roads on the State Primary and/or Secondary Road System in the above County or Counties, North Carolina; and

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment with in the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to encroach and construct facilities in the County or counties mentioned above, subject to strict compliance to the following 30 numbered special provisions;

1. Installations shall be in strict compliance with the party of the first part's latest Utilities Accommodation Manual and any such revisions and amendments thereto.
2. This Agreement applies only to telecommunications cable installed by the trenching method and is limited to trenches 12 inches and less in width.
3. This agreement applies roads on the Primary and Secondary System of State roads which are not classified as Freeways.
4. This agreement does not apply to Freeways including Freeway interchange ramps.
5. Any work to be done under this agreement must be reported to the party of the first part's Division Engineer in writing with attached map or sketch showing location and extent of work, and a letter of concurrence be received from the Division Engineer before commencing the work.
6. Any work to be done under this agreement shall be covered by a current Continuing Indemnity Bond on file with the Department of Transportation.
7. That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.
8. The party of the second part hereby agrees to indemnify and save harmless the party of the first part for all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.
9. The cable shall be placed a minimum depth of 24 inches below the surface of the shoulder except in passing over obstructions. Service taps and laterals should be placed a minimum of 24 inches below the bottom of side ditches.
10. Installations shall be made as close to the right of way line as practical. In no case shall installations be allowed within the theoretical 1:1 slope from the existing edge of pavement to the bottom of the nearest excavation wall. Shoulders stabilized with

bituminous material and/ or compacted crushed stone will be considered as pavement.

11. All splice boxes and/or handholes and other appurtenances shall be located as close to the right of way line as practical. All splice boxes and/or handholes shall be of a design pre-approved by the Department of Transportation.
12. Trench backfill shall be made of approved material free from rocks in 6" loose layers, or other approved methods, and shall be compacted to at least 95% density in accordance with AASHTO METHOD T-99 as modified by the Department of Transportation.
13. Marking tape shall be buried in the trench approximately 1 foot below the surface of the ground. Where conduit is installed in the right of way and is not of ferrous material, locating tape or detection wire shall be installed with the conduit.
14. All trenches shall be closed at the end of each work day.
15. Excavation material shall not be stored on the pavement if it can be reasonably handled otherwise; in cases where storing of excavated material on pavement is absolutely necessary, same shall be removed and the pavement shall be thoroughly cleaned at the end of each work day.
16. Excavation within 1000 feet of a signalized intersection will require notification by the party of the second part to the Division Traffic Engineer. All traffic signal or detection cables must be located prior to excavation.
17. Traffic signal or detection cables or parts of utility lines to any other NCDOT equipment that are inadvertently damaged must be reported immediately to the Division Traffic Engineer. The cost to repair any damage to NCDOT signs, signals or other equipment and/or associated utilities shall be the responsibility of the party of the second part.
18. Excavation in the immediate vicinity of drainage structures shall be made with special care so as not to interfere with the use of the existing drainage facilities.
19. Highway drainage pipes and culverts are not to be disturbed. Drainage facilities that are inadvertently damaged must be repaired immediately.
20. Cable is to be placed as far as practicable from the centerline of unpaved roads.
21. The pavement of intersecting roads shall not be cut except in unusual situations approved by the party of the first part's Division Engineer.
22. The cutting of pavement for service taps across the road will not be permitted, and the cutting of pavement for additional terminals where existing cables have been paved over shall be done only upon approval of the party of the first part's Division Engineer. Crossing by the methods of driving, jacking or boring holes up to 6 inches in diameter are acceptable subject to the approval of the party of the first part's Division Engineer.
23. In situations where an unpaved road is paved over an existing cable or where an existing pavement is widened over a cable, permission will not be granted to cut the pavement for the purpose of restoring or repairing the cable except in cases of emergency involving services. In these cases, the party of the first part's Division Engineer may authorize the cutting of pavement for emergency restoration of service.
24. Equipment used shall be of such types as not to cause damage to pavement.
25. The party of the second part shall provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and amendments or supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.
26. That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollutions of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and the existing ground cover, the party of the second part agrees to remove and replace the ground cover or otherwise reestablish permanent vegetative cover to meet the satisfaction of the Division Engineer of the party of the first part. When surface area in excess of one acre will be disturbed, the party of the second part shall submit documentation that a Sediment and Erosion Control Plan has been approved by the regulatory agency or authority prior to beginning work on the right of way. Failure to provide this information shall be grounds for suspension of operations.
27. The party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.
28. All work is to be completed promptly with a minimum of delay.
29. The party of the second part agrees to have available at the construction site, at all times during construction, a copy of the letter of authorization and sketches from the Division Engineer (see Item #5 above) showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence approval can be shown.
30. That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the

right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

- a. Compliance with Regulations: the contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- b. Nondiscrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contracts covers a program set forth in Appendix B of the Regulations.
- c. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment. each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- e. Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,
 - (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
 - (2) cancellation, termination, or suspension of the contract, in whole or in part.
- f. Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
STATE UTILITIES MANAGER

ATTEST OR WITNESS

(COMPANY)

(TYPE NAME AND TITLE)

COUNTY OR COUNTIES OF

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

BLANKET ENCROACHMENT AGREEMENT

-AND-

CABLEVISION ON
PRIMARY AND SECONDARY ROAD SYSTEM

THIS AGREEMENT, made and entered into this _____ day of _____, 20_____, by and between the Department of Transportation, party of the first part, and _____, party of the second part,

WITNESSETH:

THAT WHEREAS, the party of the second part desires to install cablevision cable, hereinafter referred to as CATV, and other facilities and equipment on the right of way of certain public roads on the State Primary and/or Secondary Road System in the above County or Counties, North Carolina; and

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to encroach and construct facilities in the County or counties mentioned above, subject to strict compliance to the following 23 numbered special provisions;

1. This agreement applies only to:
 - (a) CATV installed by the "plowing-in" method and does not cover CATV installed by open trenching except laterals or branch cables, loops to terminals, load coils or splice points, and occasional trenching where necessary to pass over, under or around obstructions encountered.
 - (b) CATV installed by attachment to existing electric power, telegraph, and telephone poles provided permission is secured from the owner of such poles. Permission is not granted herein for the installation of poles erected solely for the purpose of CATV.
2. This agreement applies to roads on the Primary and Secondary System of State roads which are not classified as Freeways.
3. This agreement does not apply to Freeways including Freeway interchange ramps.
4. Any work to be done under this agreement must be reported to the party of the first part's Division Engineer in writing with attached map or sketch showing location and extent of work, and a letter of concurrence be received from the Division Engineer before commencing the work.
5. All installations shall conform to the provisions of the National Electric Safety Code.
6. That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.
7. It is clearly understood by the party of the second part that the party of the first part will assume no responsibility for any damage that may be caused to such facilities, within the highway right of way limits, in carrying out its construction and maintenance operations.
8. CATV should not be installed closer than 3 feet from the edge of pavement, except in unusual situations approved by the party of the first part's Division Engineer. Shoulders stabilized with bituminous material and/or compacted crushed stone will be considered as pavement. Plowing in will be prohibited in unstable shoulders caused by adverse weather conditions or other reasons.
9. CATV shall be placed a minimum depth of 18 inches (24 inches preferable) below the surface of the shoulder except in passing over obstructions. Service taps and laterals should be placed a minimum of 24 inches below the bottom of side ditches.
10. CATV is to be placed as far as practical from the centerline of unpaved roads.
11. Plowing in will be scheduled for other than winter months as far as practical.
12. The pavement of intersecting roads shall not be cut except in unusual situations approved by the part of the first part's Division Engineer.
13. The cutting of pavement for service taps across the road will not be permitted, and the cutting of pavement for additional terminals where existing cables have been paved over shall be done only upon approval of the party of the first part's Division Engineer. Crossings by the methods of driving, jacking or boring holes up to 6 inches in diameter are acceptable subject to the approval of the party of the first part's Division Engineer.
14. In situations where an unpaved road is paved over an existing cable or where an existing pavement is widened over a cable, permission will not be granted to cut the pavement for the purpose of restoring or repairing the cable except in cases of emergency involving services. In these cases, the party of the first part's Division Engineer may authorize the cutting of pavement for emergency restoration of service.

15. In installing CATV, highway drainage pipes and culverts are not to be disturbed.
16. No attachments may be made to bridges or culverts without the prior written approval of the State Utilities Manager.
17. Equipment used in plowing in CATV shall be of such types as not to cause damage to pavement.
18. The party of the second part shall provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and amendments or supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.
19. That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollutions of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and the existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.
20. The party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.
21. All work is to be completed promptly with a minimum of delay.
22. The party of the second part agrees to have available at the construction site, at all times during construction, a copy of the letter of authorization and sketches from the Division Engineer (see Item #4 above) showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence approval can be shown.
23. That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

- a. Compliance with Regulations: the contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- b. Nondiscrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contracts covers a program set forth in Appendix B of the Regulations.
- c. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment. each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- e. Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,
 - (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
 - (2) cancellation, termination, or suspension of the contract, in whole or in part.
- f. Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
STATE UTILITIES MANAGER

ATTEST OR WITNESS

(COMPANY)

(TYPE NAME AND TITLE)

COUNTY OR COUNTIES OF

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
AND

BLANKET ENCROACHMENT AGREEMENT
UNDERGROUND UTILITY SERVICE CONNECTIONS
ON PRIMARY AND SECONDARY ROAD SYSTEM

THIS AGREEMENT, made and entered into this the _____ day of _____, 20____, by and between the Department of Transportation, party of the first part; and _____ party of the second part,

WITNESSETH:

THAT WHEREAS, the party of the second part desires to install underground service connections on the right of way of certain public roads on the State Primary and/or Secondary Road System in the above County or Counties, North Carolina; and

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part, in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to encroach and construct underground service connections in the County or counties mentioned above, without giving prior notification to the party of the first part, subject to strict compliance to the following 18 numbered special provisions;

1. This Agreement applies only to underground service connections that emanate from a distribution line, feeder line, or main line outside highway right of way or from existing distribution line, feeder line, or main line occupying highway right of way by virtue of an approved encroachment agreement. Any service connection which is to be owned and/or installed by any person or firm other than the owner or owner's agent of the distribution line, feeder line, or main line shall not be included in this agreement.
2. This agreement applies on all highways except Freeways.
3. No pavement shall be cut. Shoulders stabilized with bituminous material and/or crushed stone will be considered as pavement.
4. Plowing will be permitted across unpaved roads.
5. Trenching will not be permitted across unpaved roads.
6. No longitudinal installations requiring open-cut or trenching will be allowed.
7. Longitudinal installations up to 500' will be allowed provided the plowing-in method of installation is utilized.
8. Road crossings by the methods of driving, jacking, or boring holes up through 6" in diameter will be allowed. Bores in excess of 6" in diameter will require an encroachment agreement approved by the Division Engineer.
9. Minimum bury beneath roadways shall be 3 feet; and 2 feet below the bottom of side ditches and sidewalks.
10. Highway drainage pipes and culverts are not to be disturbed.
11. No attachment shall be made to bridges or culverts.
12. That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways, and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said

facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

13. It is clearly understood by the party of the second part that the party of the first part will assume no responsibility for any damage that may be caused to such facilities, within the highway right of way limits, in carrying out its construction and maintenance operations.
14. During installation, the party of the second part shall be responsible for signs, lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and amendments or supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.
15. That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and the existing round cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.
16. All work is to be completed promptly with a minimum of delay.
17. That in the case of noncompliance with the provisions of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.
18. The party of the first part reserves the right to void this agreement at any time by submitting written notification to the party of the second part.

R/W (165) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (165) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed in the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
STATE UTILITIES MANAGER

ATTEST OR WITNESS:

(COMPANY)

(TYPE NAME AND TITLE)

COUNTY OR COUNTIES OF

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

BLANKET ENCROACHMENT AGREEMENT

-AND-

AERIAL UTILITY CROSSINGS AND TAPS ON
PRIMARY AND SECONDARY ROAD SYSTEM

THIS AGREEMENT, made and entered into this _____ day of _____, 20_____, by and between the Department of Transportation, party of the first part, and _____, party of the second part,

WITNESSETH:

THAT WHEREAS, the party of the second part desires to install aerial utility crossings and taps on or over the right of way of certain public roads on the State Primary and/or Secondary Road System in the above County or Counties, North Carolina; and

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to encroach and construct aerial utility crossings and taps in the County or counties mentioned above, without giving prior notification to the party of the first part, subject to strict compliance to the following 13 numbered special provisions;

1. This agreement applies only to aerial utility crossings of highway right of way, such as power, telephone, cablevision, and the like, regardless of voltage or carrying capacity, provided no permanent poles or other permanent supporting structures are installed within highway rights of way, or provided the utility crossing emanates from an existing pole already occupying the right of way by virtue of an approved encroachment agreement. This Agreement includes taps from existing poles on highway right of way spanning to the field side of the highway.
2. This agreement applies on all highways except Freeways.
3. No new poles shall be placed on highway right of way. Replacement poles at the same location to accommodate a crossing or tap will not constitute a new pole.
4. Temporary supports may be installed under this Agreement for road crossings; however, the Division Engineer of the party of the first part or appointed representative shall be given prior notice before installing any temporary supports within the highway right of way. This prior notice need not necessarily be in writing. Details shall be resolved as to location, traffic control devices, time of installation, and time of removal. Temporary supports in medians shall be avoided except where absolutely necessary. Where sufficient right of way is provided, temporary supports on the field side of travel way shall be 30' from edge of pavement. Exceptions to these clearances may be made where the right of way is inadequate, supports can be placed at locations behind guard rails, beyond deep drainage ditches, the toe of steep slopes or retaining walls, and other similar protected locations.
5. Vertical clearances shall comply with the National Electric Safety Code.
6. The party of the second part, or their agent, shall provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and amendments or supplements thereto.
7. If a service connection crossing or tap is to be owned and installed by any person or firm other than the party of the second part, or their agent, an encroachment agreement shall be secured.

8. That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.
9. It is clearly understood by the party of the second part that the party of the first part will assume no responsibility for any damage that may be caused to such facilities, within the highway right of way limits, in carrying out its construction and maintenance operations.
10. That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollutions of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and the existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.
11. All work is to be completed promptly with a minimum of delay.
12. That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.
13. The party of the first part reserves the right to void this agreement at any time by submitting written notification to the party of the second part.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
STATE UTILITIES MANAGER

ATTEST OR WITNESS

(COMPANY)

(TYPE NAME AND TITLE)

ROUTE _____ PROJECT _____ COUNTY OF _____

DEPARTMENT OF TRANSPORTATION

THREE PARTY RIGHT OF WAY
ENCROACHMENT AGREEMENT ON
PRIMARY AND SECONDARY SYSTEM

-AND-

-AND-

THIS AGREEMENT, made and entered into this the _____ day of _____, 20_____, by and between the Department of Transportation, party of the first part; and _____ party of the second part; and _____ party of the third part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) _____, located _____

with the construction and/or erection of: _____

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the installation, operation, and maintenance of the above described facility will be accomplished in accordance with the party of the first part's latest UTILITIES ACCOMMODATIONS MANUAL, and such revisions and amendments thereto as may be in effect at the date of this agreement. Information as to these policies and procedures may be obtained from the Division Engineer or State Utilities Manager of the party of the first part.

That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the construction site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

- a. Compliance with Regulations: The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- b. Nondiscrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.
- c. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- e. Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,
 - (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
 - (2) cancellation, termination or suspension of the contract, in whole or in part.
- f. Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

That when title to the subject that constitutes the aforesaid encroachment passes from the party of the second part and vests in the party of the third part, the party of the third part agrees to assume all responsibilities and rights and to perform all obligations as agreed to herein by the party of the second part.

R/W (166) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (166) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
DIVISION ENGINEER

WITNESS:

Second Party

WITNESS:

Third Party

DEPARTMENT OF TRANSPORTATION

THREE PARTY RIGHT OF WAY

-AND-

ENCROACHMENT AGREEMENT ON INTERSTATE
AND OTHER CONTROL ACCESS HIGHWAYS

-AND-

THIS AGREEMENT, made and entered into this the ____ day of _____, 20 ____, by and between the Department of Transportation, party of the first part; and _____ party of the second part; and _____ party of the third part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) _____, located _____ with the construction and/or erection of: _____.

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment with in the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the installation, operation, and maintenance of the above described facility will be accomplished in accordance with the party of the first part's latest UTILITIES ACCOMMODATIONS MANUAL, and such revisions and amendments thereto as may be in effect at the date of this agreement. Information as to these policies and procedures may be obtained from the Division Engineer or State Utilities Manager of the party of the first part.

That the said party of the second part hereby agrees that access for servicing its facilities will be limited to access via (a) frontage roads where provided, (b) nearby or adjacent public roads and street, or (c) trails along or near the highway right of way lines, connecting only to an intersecting road; from any one or all of which entry may be made to the outer portion of the highway right of way. The party of the second part's rights of access to the through-traffic roadways and ramps shall be subject to the same rules and regulations as apply to the general public, except if an emergency situation occurs, and the usual means of access for service operation as herein provided will not permit the immediate action required by the party of the second part in making emergency repairs as required for the safety and welfare of the public, the party of the second part shall have a temporary right of access to and from the through-traffic roadways and ramps as necessary to accomplish the required emergency repairs, provided that the party of the second part complies with the regulations established by the party of the first part for policing and control to protect the highway users.

That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and

regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the round surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the construction site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

- a. Compliance with Regulations: The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- b. Nondiscrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.
- c. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- e. Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,
 - (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
 - (2) cancellation, termination or suspension of the contract, in whole or in part.
- f. Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

That when title to the subject that constitutes the aforesaid encroachment passes from the party of the second part and vests in the party of the third part, the party of the third part agrees to assume all responsibilities and rights and to perform all obligations as agreed to herein by the party of the second part.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
DIVISION ENGINEER

WITNESS:

WITNESS:

Second Party

Third Party

R/W (166A): Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (166A) incorporating all revisions to date.

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the State Utilities Manager. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

GENERAL REQUIREMENTS

1. Wherever possible, freeway crossing should be parallel to and within the prevailing right of way of intersecting roads.
2. Crossings should be as near as possible normal to the center line of the freeway.
3. Parallel encroachments will not be permitted except outside of control of access lines.
4. The Department's Division Engineer should be given notice by the applicant prior to actual starting of installations included in this agreement.

For Overhead Wire Lines

1. Minimum vertical clearances of overhead wires above all roadways must conform to clearances set out in the National Electric Safety Code.
2. Supporting poles or structures must be clear of control of access lines, and be at least 30 feet clear of the edge of shoulders of through lanes and 20 feet clear of the shoulders of interchange ramps.

For Underground Utilities

1. Open-cut installation for crossings will be permitted only when a highway project is in rough grading stage prior to paving. Generally, on rough grading projects, open-cut will not be permitted in fills of over 10 feet in depth and back filled material must be compacted to maximum density meeting Department requirements.
2. Encasements under an existing freeway must be installed by means of tunneling, jacking, or boring and any voids outside the encasement must be filled with lean concrete grout and the ends of encasements be satisfactorily closed.
3. In cut section, encasement must extend continuously from ditch line to ditch line and in fill section, encasement must extend continuously five feet beyond toe to slopes.
4. Vents for encasement should be extended to the right of way line or as otherwise required by the Department.
5. All pipe encasements as to material and strength shall meet the standards and specifications of the Department.
6. When trenching is carried down cut slopes, excavation must be backfilled to maximum density and the disturbed portion of the slope be stabilized and sodded to the satisfaction of the Department's Engineer.

Plans

This Encroachment agreement must be accompanied, in the form of an attachment, by a plan showing the following:

1. All roadways and ramps
2. Right of way and control of access lines
3. Drainage structures or bridges if affected by encroachment
4. Location of the proposed encroachment
5. Length, size and type of encroachment
6. Dimensions, showing the distance from the encroachment to roadways, shoulders, structures, etc.
7. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road intersection, etc. (To assist in preparation of the encroachment plan, Department roadway plans may be seen at the various Highway Division Offices or at the Raleigh Office.)

All encroachment agreements involving the crossing of the right of way, roadways and/or ramps of a freeway, must be accompanied, in the form of an attachment, by a profile showing the following information:

1. The profile should extend from right of way line to right of way line and show all slopes (cut or fill), ditches, shoulders, pavements, medians, etc.
2. A vertical dimension from bottom of road ditches and from surface of pavement to encroaching structures.
3. Length, size, and type of encasement where required.
4. Notation of portion to be installed by open-cut.
5. For underground encroachments involving encasements that must be vented, the location of vents must be shown.
6. Method of installation must be shown in detail on either the plan or profile.
7. Any attachment to a bridge or other drainage structure must be approved by the Department's State Utilities Manager.
8. Where profile is required, it should be on same sheet with the plan.

SPECIAL PROVISIONS OR SPECIFICATIONS

Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment, provided that such information cannot be shown on the plan and profile sheet.

ROUTE _____

COUNTY OF _____

DEPARTMENT OF TRANSPORTATION
AND

RIGHT OF WAY ENCROACHMENT AGREEMENT FOR
GRADING OR ALTERATION OF DRAINAGE ON INTERSTATE
OR OTHER CONTROLLED ACCESS HIGHWAYS

THIS AGREEMENT, made and entered into this the _____ day of _____, 20_____, by and between the Department of Transportation, party of the first part; and _____ party of the second part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) _____, located _____ with the construction and/or erection of: _____

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part, in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on the attached plan sheet(s), specifications and special provisions which are attached hereto and made a part hereof upon the following conditions, to wit:

That any work as set out herein performed under this agreement shall be accomplished without access from or to the through-traffic roadways and interchange ramps of the interstate or other controlled access highway facility.

That all grading shall be done as shown on the attached plan sheet(s), specifications and special provisions with slope intersections being well rounded and berm ditches, if any, adjusted to be entirely within the right of way. Staking for the grading and the finished grading shall be approved by the Division Engineer and the State Roadside Environmental Engineer.

That the traveled lanes, shoulders and interchange ramps of the interstate or other controlled access highway facility shall not be used for any construction operations.

That grass cover shall be established by the party of the second part over the entire disturbed area of the right of way be seeding, mulching, and jute mesh, if necessary, in accordance with the standard erosion control procedures of the party of the first part.

During the performance of this concept, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"). agrees as follows:

- a. **Compliance with Regulations:** The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- b. **Nondiscrimination:** The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.
- c. **Solicitations for Subcontracts, including Procurements of Materials and Equipment:** In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. **Information and Reports:** The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- e. **Sanctions for Noncompliance:** In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,

(1) withholding of payments to the contractor under the contract until the contractor complies, and/or

(2) cancellation, termination, or suspension of the contract, in whole or in part.

f. Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways. Information as to the above may be obtained from the District Engineer of the party of the first part. The party of the first part reserves the right to stop any work for noncompliance.

The party of the first part does not guarantee that the highway right of way will be kept free from tree growth. Eventually trees may be planted or developed from volunteer growth and the party of the first part reserves the right to establish a complete screen on the right of way if the adjacent property is allowed to become unsightly as viewed from the highway.

That the party of the second part shall make no alteration of drainage which shall affect the lands of adjoining property owners other than the party of the second part, except upon written authorization from such adjoining property owners and such written authorization shall be attached to this agreement prior to the execution thereof by the party of the first part.

The party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the construction and maintenance of this encroachment.

A final inspection of the work will be made by the Division Engineer and other employees of the party of the first part and designated representative of the Federal Highway Administration and the party of the second part agrees to promptly correct any deficiencies in the work as may be required by the Division Engineer. The party of the second part further agrees to assume the actual costs of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part shall furnish to the party of the first part a performance bond in the sum of \$ _____ Dollars to be attached hereto, the conditions of said bond to be that if the party of the second part, its heirs, successors and assigns shall, properly comply with, carry out, and perform all of the conditions, terms and obligations of this agreement, the said bond to be null and void, otherwise to remain in full force and effect, for a period of not less than one year from the date of completion of the work as set out herein.

That the said party of the second part binds and obligates himself to accomplish the encroachment herein described in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, and if at any time the party of the first part shall require the changes in said encroachment; that the said party of the second part binds himself, his heirs, successors, and assigns, to promptly alter the said encroachment in order to conform to the said requirement, without any cost to the party of the first part.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
STATE UTILITIES MANAGER

ATTEST OR WITNESS

(COMPANY)

(TYPE NAME AND TITLE)

R/W (167): Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (167) incorporating all revisions to date.

PERFORMANCE AND INDEMNITY BOND

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION - HIGHWAY ENCROACHMENT INSTALLATION

PRINCIPAL (Second Party to encroachment agreement)

SURETY

DESCRIPTION OF ENCROACHMENT AGREEMENT:

AMOUNT OF BOND

Encroachment Number

Route or Highway No.

County

Date of Encroachment Agreement

DATE OF BOND

Specific Location of Encroachment:

Between &

Type of Encroachment

(Water, Sewer, Gas, etc.)

KNOW ALL MEN BY THESE PRESENTS, That we the PRINCIPAL and SURETY above named, are held and firmly bound unto the Department of Transportation, an agency of the State of North Carolina, hereinafter called the DEPARTMENT, in the amount stated above for the payment for which sum we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the PRINCIPAL entered into a certain Encroachment Agreement with the DEPARTMENT hereinabove described and incorporated herein by reference;

NOW, THEREFORE, if the PRINCIPAL shall well and truly install the said encroaching facilities on and along the highway in accordance with the "Utilities Accommodations Manual" and any supplements thereto and in accordance with the other provisions of the said Encroachment Agreement and shall indemnify the DEPARTMENT for the failure to install the encroachments in accordance with the foregoing manual and provisions of the said Encroachment Agreement, then, this obligation to be void; otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

(Seal of Principal)

PRINCIPAL (Type Name of Principal)

Attest:

BY:

Clerk or Secretary

Mayor or Corporate Officer

(Seal of Surety)

(Name of SURETY or Bond Company)

BY:

Attorney-in-Fact

NOTE: Attach Power of Attorney and Certificate of Authority of Attorney-in-Fact.

This form to be used only by second party to encroachment agreement.

PERFORMANCE AND INDEMNITY BOND
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION – HIGHWAY ENCROACHMENT INSTALLATION

PRINCIPAL (Contractor for second party to encroachment agreement)

SURETY

DESCRIPTION OF ENCROACHMENT AGREEMENT:

ENCROACHMENT NUMBER _____

Route(s) or Highway No(s). _____

County _____

Amount of Bond _____

Date of Encroachment Agreement _____

Specific Location of Encroachment:

Between _____ & _____

Date of Bond _____

Type of Encroachment _____

(Water, sewer, gas, etc.)

Second Party to Encroachment Agreement _____

KNOW ALL MEN BY THESE PRESENTS, That we the PRINCIPAL and SURETY above named, are held and firmly bound unto the Department of Transportation, an agency of the State of North Carolina, hereinafter called the DEPARTMENT, in amount stated above for the payment for which sum we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the above indicated second party to an Encroachment Agreement named above entered into an Encroachment Agreement with the DEPARTMENT, and the PRINCIPAL (contractor) entered into a contract with the said second party to an Encroachment Agreement named above to perform certain work, including the installation or relocation of certain encroachments described in a certain Encroachment Agreement with the DEPARTMENT hereinabove described and incorporated herein by reference; NOW, THEREFORE, if the PRINCIPAL shall well and truly install the said encroaching facilities on and along the highway in accordance the "Utilities Accommodations Manual" and any supplements thereto and in accordance with the other provisions of the said Encroachment Agreement, then, this obligation to be void; otherwise to remain in full force and effect.

IN WITNESS THEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, then name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

(Seal of Principal)

PRINCIPAL (Type Name of Principal)

ATTEST:

Clerk or Secretary

BY: _____
President or Vice President
(Cross out Inappropriate Title)

(Name of SURETY)

(Seal of Surety)

BY: _____
Attorney-in-Fact

NOTE: Attach Power of Attorney and Certificate of Authority of Attorney-in-Fact.
FORM R/W 16A (This form to be used only by Contractor for second party to encroachment agreement.)
Revised April 2021 (Previously revised July 1978)

CONTINUING INDEMNITY BOND
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION – HIGHWAY ENCROACHMENT INSTALLATIONS

Amount of Bond: _____

PRINCIPAL (or Second Party): _____

SURETY (or Bonding Company): _____

KNOW ALL MEN BY THESE PRESENTS: that we, _____, with principal office at _____, _____, _____, _____, as PRINCIPAL and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____, as SURETY, are held and firmly bound unto the Department of Transportation, an agency of the State of North Carolina, in the sum of _____, for payment of which we bind ourselves, heirs, executors, administrators, successors and assigns, firmly by these presents.

Signed, sealed and dated this _____ day of _____, 20____.

THE CONDITIONS OF THIS OBLIGATION IS SUCH, that whereas the said _____, hereinafter called the PRINCIPAL, agrees to reimburse the Department of Transportation for any repairs made necessary by damage to any roads occasioned by the operations of the PRINCIPAL.

NOW, THEREFORE, the conditions of this obligation are such that if the PRINCIPAL shall well and truly perform and comply with all the duties and obligations imposed on it, then this obligation shall be null and void; otherwise in full force and effect.

This bond is executed by the SURETY upon the following express conditions:
That the SURETY may, if it shall so elect, cancel this bond by giving sixty (60) days notice in writing to the Department of Transportation, Raleigh, North Carolina, and this bond shall be deemed cancelled at the expiration of said sixty (60) days; the SURETY remaining liable, however, subject to all the terms, conditions and provisions of this bond, for any act or acts covered by this bond which may have been committed by the PRINCIPAL up to the date of such cancellation.

(Seal of Principal)

PRINCIPAL (Company Name)

ATTEST:

Clerk or Secretary (of Principal)

BY: _____
Signature of President (or Authorized Person)

ATTEST:

Clerk or Secretary (of Surety)

SURETY (Bonding Company Name)

(Seal of Surety)

BY: _____
Signature of Attorney-in-Fact for Bonding Company

COUNTERSIGNED

BY: _____
NCDOT State Utilities Manager

NOTE: Attach Power of Attorney and Certificate of Authority of Attorney-in-Fact.
R/W 16B: Party of the Second Part (PRINCIPAL) certifies that this agreement is true and accurate copy of the form R/W 16B: incorporating all revisions to date. Revised April 2021 (Previously revised July 1978)

**VERIFICATION OF COMPLIANCE WITH
ENVIRONMENTAL REGULATIONS**

(Check Appropriate Box)

Permits from the N.C. Department of Environment and Natural Resources and the U.S. Army Corp of Engineers are not required for this project. However, all applicable federal and state regulations have been followed.

The required permits from the N.C. Department of Environment and Natural Resources and the U.S. Army Corp of Engineers have been obtained for this project. Copies of permits and Completion Certificates are attached.

All applicable NPDES Stormwater Permit requirements have been met for this project. (The applicant should contact the N.C. Division of Water Quality in Raleigh to determine if a stormwater permit is required.)

The project is in compliance with all applicable sedimentation and erosion control laws and regulations.

Project Name: _____

Township: _____ County: _____

Project Engineer: _____ Phone No.: _____

Project Contact: _____

Applicant's Name: _____

P.E. SEAL

Date Submitted: _____

**Private Facility Encroachment
Hold Harmless Declaration**

(to be completed by all property owners affected by the proposed encroachment)

Encroachment Agreement Second Party:

Encroachment Number:

County: _____

The party of the second part of the above-referenced encroachment agreement agrees to indemnify and save harmless the North Carolina Department of Transportation from all claims of liability for the overburdening of right of way easements caused by the installation of private facilities owned by the party of the second part and installed under the approval of the above-referenced encroachment agreement.

Second Party:

Attest or Witness:

Date: _____

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Appendix D. NCDOT and Related Memos

UAM Section	Memo	Issue Date
Section 1.15.3	<i>American Jurisprudence</i> , 2 nd Edition, Volume 39, Highways, Streets, and Bridges § 201, Supersurface Uses	2000
Section 2.3.2.3	Piping Effluent on Highway Rights of Way	November 15, 1999
Section 2.6.1.1	Guidelines for Control of Access Fence	July 7, 2010
Section 2.6.1.1	NCDOT's Standard Practice for Gateway Signs	April 23, 2012
Section 2.7.6.4	Minimum Amounts for Performance and Indemnity Bonds	2019
Section 3.4.7.3	Communication Enclosures with Power	May 7, 2009
Section 4.4.4.1	North Carolina League of Municipalities memorandum	January 1965
Section 4.8.2	Dig Once Policy	March 1, 2021 (revised)

American Jurisprudence, 2nd Edition

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Lucas Martin, J.D., Mitchell Waldman, J.D., and Anne E. Melley, J.D., of the
National Legal Research Group

Highways, Streets, and Bridges

VI. Title and Rights of Public and Abutting Owners(§§ 182-188]

B. Particular Rights and Interests [§§ 189-209] 1.

In General [§§ 189-201]

39 Am Jur 2d HIGHWAYS, STREETS, AND BRIDGES § 201

§ 201 Supersurface uses

The authorities are generally to the *effect* that the abutting owner, even though he owns the fee, has no right to occupy the space above a street or other public way with physical structures for his private use or benefit without the consent of the public authorities.ⁿ⁸⁷ Moreover, an abutting owner may not erect such a structure, nor may a municipality permit him to do so, if the structure in any way obstructs or interferes with the usefulness of the street as such.ⁿ⁸⁸

FOOTNOTES:

ⁿ⁸⁷ Yale University v. City of New Haven, 104 Conn. 610, 134 A. 268, 47 A.L.R. 667 (1926).

ⁿ⁸⁸ National Accident & Health Insurance Co. v. Workmen's Circle Lyceum Federation, 289 Pa. 164, 137 A. 184, 55 A.L.R. 908 (1927) (fire escape over alley).

REFERENCE:

West's Key Number Digest, Turnpikes and Tollroads [westkey]16 West's Key Number Digest, Highways [westkey]83-89, 120(2); A.L.R. Digest: Highways and Streets §§ 20-22, 27.5-64.5

A.L.R. Index: Bridges;

A.L.R. Index: Highways and Streets

Service: LEXSTAT®

Citation: Am Jur 2d HIGHWAYS § 201

View: Full

Date/Time: Thursday, September 13, 2001 - 10:27 AM EDT

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JAMES B. HUNT, JR.
GOVERNOR

DIVISION OF HIGHWAYS
P. O. BOX 25201, RALEIGH, N.C. 27611-5201

DAVID McCOY
SECRETARY

November 15, 1999

MEMORANDUM TO: Division Engineers

FROM: Mr. J. D. Goins, P.E.
Chief Engineer - Operations

SUBJECT: Piping Effluent on Highway Rights of Way

On January 25, 1999 the Department of Transportation and the Department of Environment and Natural Resources entered into a Memorandum Of Agreement which outlined procedures to be followed by both agencies concerning the piping and/or discharge of treated effluent within highway rights of way.

This issue was discussed at the October, 1999 Division Engineers' meeting as well as several previous meetings. Implementation of this procedure is effective upon your receipt of this memorandum.

Enclosed you will find a copy of the following:

- (1) Memorandum Of Agreement
- (2) Right of Way Encroachment Agreement for the Piping of Treated Effluent on Primary and Secondary Highways/Form R/W 16.1C
- (3) Addendum to Right of Way Encroachment Agreement between N. C. Department of Transportation and the Encroachment Applicant.

As specified in the Memorandum Of Agreement and the Encroachment Agreement, the applicant is required to obtain proper certification from DENR and provide documentation for hardship before the encroachment application will be considered by DOT. I believe that the process outlined in

Division Engineers

November 15, 1999

Page 2

the MOA is self-explanatory; however, if you have any questions, please call Aydren D. Flowers, State Utility Agent or David West, Encroachment Agent in Raleigh at (919) 733-4420.

Also, enclosed is a small supply of the encroachment forms and the addendum form. You may either copy these as necessary or call the number listed above for additional supplies.

JDG:cam

Enclosures

MEMORANDUM OF AGREEMENT

between

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

and

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

This Memorandum of Agreement (MOA) is made and entered into this the 25th day of January, 1999, by and between the North Carolina Department of Environment and Natural Resources (DENR) and the North Carolina Department of Transportation (DOT). Both DENR and DOT are agencies of the State of North Carolina and enter into this MOA for the purpose of providing an umbrella agreement between the two sister agencies outlining procedures to be followed when DENR requires responsible parties to perform remediation of petroleum contaminated soils and groundwater from leaking underground storage tank (UST) sites and said permitted remediation will, for the purpose of discharging treated effluent to a permitted discharge point, require the responsible parties to encroach on, over or under rights-of-way under the responsible control of DOT.

WITNESSETH

WHEREAS, both DENR and DOT wish to enter into a cooperative working agreement that will expedite the remediation of UST sites as directed by DENR and required by law; and

WHEREAS, both DENR and DOT recognize that in the remediation of certain UST sites, special hardship circumstances may exist whereby responsible parties may request to encroach on, over or under DOT rights-of-way for the purpose of conveying treated effluent to discharge points permitted by DENR; and

WHEREAS, DENR recognizes that by virtue of having acquired rights-of-way DOT does not in all cases own the land in fee; and

WHEREAS, DOT does not operate or use and does not plan to ever operate or use any UST within any acquired right-of-way; and

WHEREAS, DENR has the experience and expertise in regulatory UST remediation and DOT has the experience and expertise to assist DENR by allowing hardship case encroachments where appropriate onto DOT rights-of-way similar to utility encroachments, with the promise that DENR will not cite DOT for any violations, nor hold DOT liable for any violations. To the extent permitted by the Rules of Professional Conduct, DENR will provide joint legal representation for DOT through DENR's attorneys in the Attorney General's Office along with DOT's legal counsel for any and all potential legal liabilities including, but not limited to, third party claims or actions that may result from the encroachment or any part of the encroachment that may be

granted by DOT pursuant to this Agreement; and

WHEREAS, DENR intends to require that all such remediation efforts and necessary encroachments are conducted in compliance with all applicable standards, rules, regulations, statutes, laws and this Agreement.

THEREFORE, DENR and DOT by entering into this MOA agree that:

(1) Under no circumstance shall this MOA be applied or be construed to apply to the discharge of treated effluent to surface waters except at specific discharge points designated and permitted for that specific discharge by DENR; and

(2) All conveyance of treated effluent shall be through a completely enclosed and encased conduit system satisfactory to both DENR and DOT and said conduit system shall extend continuously from the remediation site to the permitted discharge point; and

(3) The preferred encroachment for constructed conduit systems will be a near perpendicular crossing of the right-of-way. Where no other option exists, DOT will consider a conduit system connection to existing DOT storm water conveyance infrastructure within the right-of-way. New construction of conduit systems which would fall within and parallel the alignment of the right-of-way poses significant long-term concerns for DOT, and, as such, will only be considered in the most extreme situations where none of the previous options are available.

In such cases, DOT reserves the right to require the responsible parties, by having DENR require such as a permit condition, to locate all potentially affected utilities prior to construction, to oversee avoidance during construction and to map the location of the conduit system in relation to all proximate utilities after construction is complete. The responsible parties, through DENR's regulatory requirements and authority, will be responsible for any and all costs associated with all perpendicular crossing, conduit connection and parallel alignment encroachments. In no case will DENR hold DOT responsible for any and all costs associated with said encroachment. Such costs are to be borne by the encroaching party; and

(4) DOT shall develop and maintain a right-of-way encroachment agreement for these specialized non-utility encroachments on primary and secondary highways to be executed in all cases where an encroachment by a responsible party is necessary to comply with remediation orders issued by DENR. The agreement and any future revisions shall be approved by both DOT and DENR, and, for this reason, is incorporated herein by reference; and

(5) The execution of the agreement shall be on a case-by-case basis as follows:

(a) The responsible party shall obtain a copy of the encroachment agreement

and supporting information requirements from the respective DOT Division Engineer and shall sign and return the agreement and all required supporting information regarding the requested encroachment to DOT; and

(b) Upon review and approval by DOT, the agreement shall be signed by the Assistant Manager of the Right-of-Way Branch, DOT and forwarded to DENR; and

(c) Upon review and approval by DENR, an addendum shall be signed by the responsible DENR Section Chief stating the rights and responsibilities between DOT, DENR and the encroaching party, which will be signed by the encroaching party, and returned to DOT; and

(d) Upon receipt of the signed addendum, DOT shall provide a copy to the responsible/encroaching party along with the executed encroachment agreement. The responsible/encroaching party shall furnish a copy of the executed encroachment agreement and signed addendum to DENR as evidence that they have received same from DOT; and

(e) The responsible DENR Section Chief shall not issue an authorization to construct the required remediation until the responsible/encroaching party has provided DENR with the required evidence that DOT has issued to them the executed encroachment agreement and signed addendum.

(6) Requests for these special encroachments are to be evaluated by the proper DOT official and considered on a case-by-case basis as determined by the respective DOT Division Engineer or, ultimately, DOT's Chief Engineer. DOT reserves the right to deny any and all encroachment requests under this Agreement on DOT rights-of-way. Parallel alignment encroachments will only be considered in extreme hardship situations. Both the responsible DENR Section Chief and DOT reserve the right to condition the encroachment agreement on a case-by-case basis to address special concerns; and

(7) DENR will require that the permittee prove that it is economically infeasible to remediate and/or discharge in any other manner before considering a possible DOT encroachment agreement. DENR will assure that its economic evaluation of the permit/discharge is thorough and complete; and

(8) In cases where issues of concern to DOT cannot be satisfactorily addressed by either the responsible party or DENR, DOT reserves the right to deny the encroachment request; and

(9) The encroaching party will be required, as part of any encroachment agreement hereunder, to execute a hold harmless clause to DOT's benefit. The encroaching party must submit an after-use inspection report certifying that no spills have occurred during the remediation, which report will be reviewed and approved by DENR; and

(10) DOT will assure consideration of these encroachment requests on DOT rights-of-way where DOT owns the property in fee simple. In other cases, such as where DOT's underlying property interest is by permanent easement or some lesser property interest, the encroaching party must obtain the written permission of the fee simple property owner(s) and/or the adjoining property owners where the encroachment will be located and present such to DOT before DOT can consider the request. In such cases, DOT will provide access to records to identify the underlying property owners for the encroaching party, and

(11) In all cases DOT reserves the right to require the posting of a performance and/or indemnity bond if deemed necessary in the discretion of DOT. DOT in consultation with DENR shall determine a bond amount adequate to cover the costs for any cleanup from a spill of improperly treated effluent. Said bond shall be payable to DOT and will be released upon DENR approval of the after-use inspection report; and

(12) This MOA may be amended through the written mutual consent of DENR and DOT. Should either party to this MOA choose to withdraw from this MOA, written notification must be given to the Secretary of the other agency ninety (90) days prior to withdrawal.

IN WITNESS WHEREOF, this MOA has been executed, in duplicate, the day and year heretofore set out, on the part of each Agency by authority duly given.

NORTH CAROLINA DEPARTMENT
OF ENVIRONMENT AND NATURAL
RESOURCES

APPROVED AS TO FORM:

BY: *Jonathan Rott Bulluck*
SPECIAL DEPUTY
ATTORNEY GENERAL

BY: *Wayne McKeith*
SECRETARY

WITNESS:

BY: *Roni Jones*

NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION

APPROVED AS TO FORM:

BY: *R.O. Crawford*
~~ASSISTANT~~ *Special Property*
ATTORNEY GENERAL

BY: *Gerris Tolson*
SECRETARY

WITNESS:

BY: *Diana O'Neir*

ADDENDUM TO RIGHT OF WAY ENCROACHMENT AGREEMENT
BETWEEN NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
AND _____

Pursuant to the Memorandum of Agreement between North Carolina Department of Environment and Natural Resources (DENR) and North Carolina Department of Transportation (DOT) dated January 25, 1999, ("the MOA") and in connection with the application of _____ (hereinafter, "the Applicant") dated _____ for a Right of Way Encroachment Agreement for the Piping of Treated Effluent Encroachments on Primary and Secondary Highways (hereinafter, "the Application"), the undersigned DENR employee/official attests as follows:

1. DENR has examined the Application and has reviewed the information provided.
2. DENR will designate and permit the specific discharge of treated effluent at the specific discharge points noted on the Application.
3. The Applicant has proved to the DENR employee/official signing this Addendum that it is economically infeasible to remediate and/or discharge in any other manner other than by the means set forth in the Application.

FURTHERMORE, Applicant, DENR and DOT agree that all terms and conditions of the MOA and the Application shall govern the encroachment described in the Application.

This the _____ day of _____.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES

BY: _____

TITLE: _____

NORTH CAROLINA DEPARTMENT OF
TRANSPORTATION

BY: _____

TITLE: _____

APPLICANT:

(Print or Type Name)



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION


JUL 13 2010

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

July 7, 2010

MEMORANDUM TO: Division Engineers
Virgil Pridemore, Right-of-Way Manager
Debbie Barbour, PE, Director of Preconstruction

FROM: J. G. Nance, PE
Chief Engineer – Operations 

SUBJECT: Guidelines for Control of Access Fence

Issues related to the fencing of control of access limits are becoming a growing cause for concern for the Department of Transportation. Our Division and District offices, in particular, have to deal with a myriad of questions and complaints related to legal property access, requests for breaks in control of access, fencing, type of fencing, lack of fencing, etc. In an effort to address some of these concerns and to promote standards of practice across the state, I am formally establishing the following guidance for placement of fencing on controlled access facilities.

First, it needs to be established that when the Department acquires control of access, of any type, that control of access shall be fenced. An exception to this requirement should only be allowed in areas of partial control where driveway spacing would necessitate that continuous runs of fence be approximately 100 feet, or less, in length. In locations where gaps would fall within these constraints and fencing is not proposed, appropriate treatment will be discussed and agreed upon by the Division Construction Engineer, the Roadway Design Project Engineer and the Division Right of Way Agent. The Division Construction Engineer is expected to confer with, and represent the interests of, the Division Engineer and appropriate District Engineer in these discussions. Further note that in any instances where the fence is omitted, appropriate monumentation will need to be provided in lieu of the fence. (A standard drawing for a control of access monument is being established separately.) Facilities with noise walls will contain appropriate transitions between fencing and walls along the right of way limits.

The Department of Transportation utilizes two standard fence types for control of access delineation - woven wire fence and galvanized chain link fence. In urban areas, where pedestrians are likely to be in close proximity to the fence, chain link fence is usually preferred. Unless specifically required by General Statutes, project commitments, or a permitting agency, fence types other than those described above shall be considered a betterment to the roadway. However, within municipal boundaries, as a matter of course, the Department will agree to a betterment upgrade to black vinyl coated chain link fence, if the municipal agreement specifies

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
CHIEF ENGINEER'S OFFICE
1537 MAIL SERVICE CENTER
RALEIGH NC 27699-1537

TELEPHONE: 919-733-7621
FAX: 919-733-4141
WEBSITE: WWW.NCDOT.GOV

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

that the town will cover the cost differential between our proposed standard fence and the vinyl coated chain link alternative. The agreement shall also specify that the municipality is responsible for the future maintenance of the vinyl coated chain link fence.

Specific property owners or business owners may also petition the Department to install an alternate, specialty fence type along the control of access limits by encroachment. Any proposed fence alternative must meet NCDOT minimum standards for fence height (48") and maximum opening size (4"). Any approved encroachment agreement shall specify that installation and maintenance of the specialty fence will be the owner's responsibility, and entirely at his expense. If, at any time, the encroaching party fails to properly maintain the fence, the Department reserves the right to remove and/or replace the specialty fence with NCDOT standard fence materials. On existing control of access facilities, a change in fence type, associated with an encroachment, shall be approved, or denied, at the Division level and will not require consideration by the Right of Way Disposal and Control of Access Committee.

This guidance for the placement of control of access fence becomes effective immediately. Any specific questions about fence placement, or fence types, should be directed to Director of Field Support Ricky Greene, Jr., PE, or State Highway Design Engineer Art McMillan, PE.

JGN/gwm

cc: Ricky Greene, Jr., PE, Director of Field Support
Art McMillan, PE, State Highway Design Engineer
Jay A. Bennett, PE, State Roadway Design Engineer
Charlie Brown, PLS, PE, State Location and Surveys Engineer
Judy Joines, State Negotiator
John Sullivan, PE, Division Administrator, Federal Highway Administration
District Engineers
Resident Engineers

North Carolina Department of Transportation's Standard Practice for Gateway Signs

The purpose of this standard practice is to establish guidelines for gateway signing at or near municipal limits, county lines, or community limits along North Carolina Department of Transportation (NCDOT) roadways. This practice allows municipalities and counties the flexibility to integrate Context Sensitive components that depict their character or identity on transportation facilities. While the Department's first priority is to provide safe and efficient facilities, it understands that this can be accomplished by ensuring environmental sensitivity while providing transportation infrastructure that is integrated into the natural and human environment in a manner to reflect the local community's aesthetic values and intrinsic qualities. To ensure successful integration of gateway signing, it is critical to maintain collaborative and cooperative partnerships with local and county governments and communities with a preference to install all gateway signs outside of state right of way.

CRITERIA

1. The preference of the Department is to have all gateway signs installed outside of the right of way. However, as a last resort, the Department will allow gateway signs within the right of way only if signs are crashworthy and located in an area deemed safe by the Division Engineer.
2. Gateway signs for unincorporated communities shall be processed through the County and said County will accept all responsibility for this signing.
3. Signs located on sculptures, brick masonry, and other obstructions must be installed outside of the clear recovery zone along the perimeter of the roadway. To avoid potential safety hazards, the requesting agency will be required to place proposed gateway signing as far from the travel lane as possible and outside the clear recovery area. The agency shall provide a traffic safety analysis that is sealed by a licensed Professional Engineer to certify that clear recovery zone distance requirements are maintained and that the selected sign location will not introduce and expose road users to undue risks. Clear zone and lateral object setbacks shall be determined using appropriate American Association of State Highway and Transportation Officials (AASHTO) standards from the most current edition of the AASHTO Roadside Design Guide.
4. Requests for gateway signs should be directed to the appropriate Division Engineer. Each request shall include the required traffic safety analysis, a plan clearly showing requested sign locations and messages (layouts), and sign support designs for each location included. The Division Engineer will use this information when evaluating the request for roadway signs and will determine whether the request is approved. All slogans, emblem designs, and any official seal to be displayed on any gateway sign shall be reviewed and approved by the Division Engineer. Signs requested for installation on freeways will be approved by the Transportation Mobility and Safety Division. Gateway signs should be directed to the appropriate Division Engineer and shall include required traffic safety analysis.
5. All costs associated with administration, design, fabrication, erection, inspection, relocation, and maintenance of any approved gateway sign will be the responsibility of the county/municipality/community. An encroachment agreement, written and executed by the Division Office, is required.

6. Gateway signs shall be erected at or near the municipal boundary/limits at locations approved by the Department. Only one installation of a gateway signing or sign assembly is permitted per direction of roadway.
7. The sign support system for gateway signs located within the roadway clear recovery zone (determined by a private licensed Professional Engineer) shall be break-away, yielding in design, or crashworthy.
8. If the approved sign request is not being implemented by the municipality forces, the requester will be required to hire and pay a pre-qualified private contractor that is approved by the Department and licensed to work in North Carolina, to install and/or maintain the signs. All materials and workmanship must comply with the Department's current Standard Specifications for Roads and Structures. Traffic control shall be in accordance with the MUTCD, North Carolina Supplement to the MUTCD, and current NCDOT Roadway Standard Drawings.
9. Overhead installation of gateway signing shall not be permitted.
10. If a Division Engineer determines it is acceptable to allow a sign installation where a utility requires relocation, all work, coordination, and costs will be the responsibility of the requester.
11. This practice is not intended for use in removal of existing signs; however, when a new project is established for the North Carolina highway system, or when existing signs are in need of replacement, repair, or maintenance, conformance with this practice is required.
12. The Department reserves the right to cover, relocate, or remove any signs for maintenance or construction operations, or when deemed to be in the best interest of the Department or the traveling public, without advance notice. The Department reserves the right to remove signs when roadway improvements or changes in the roadway cross section or configuration will no longer accommodate the existing signs. If the need to remove or relocate a gateway sign is due to construction or maintenance activities, the associated cost is the responsibility of the requester.
13. Gateway signs shall not be installed at or near decision making areas such as exit directional, exit gore, route split, lane drop, etc.
14. If signs are not maintained properly by requester, the Department will remove and bill requester all costs associated in sign removal.
15. Gateway signs shall not obstruct roadway sight distance or resemble a traffic control device.
16. Gateway signs placed in the right of way shall not advertise services or sponsorships.
17. If gateway signs require lighting or irrigation, installations must follow existing policies and standards on lighting and irrigation. Lighting maybe prohibited if it creates a safety hazard.
18. As described in General Statute 136-30 (a), (b), and (d), the Department has the authority to control all signs within the right-of-way of the State Highway System.

§ G.S. 136-30. Uniform signs and other traffic control devices on highways, streets, and public vehicular areas. (a) State Highway System. - The Department of Transportation may number and mark highways in the State highway system. All traffic signs and other traffic control devices placed on a highway in the State highway system must conform to the Uniform Manual. The Department of

Transportation shall have the power to control all signs within the right-of-way of highways in the State highway system. The Department of Transportation may erect signs directing persons to roads and places of importance. (b) Municipal Street System. - All traffic signs and other traffic control devices placed on a municipal street system street must conform to the appearance criteria of the Uniform Manual. All traffic control devices placed on a highway that is within the corporate limits of a municipality but is part of the State highway system must be approved by the Department of Transportation. (d) Definition. - As used in this section, the term "Uniform Manual" means the Manual on Uniform Traffic Control Devices for Streets and Highways, published by the United States Department of Transportation, and any supplement to that Manual adopted by the North Carolina Department of Transportation.

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Minimum Amounts for Performance and Indemnity Bonds

Updated 2019

UTILITY ENCROACHMENTS			
Trenchless methods of installations under highways except where noted			
	Unpaved Road*	\$5,000	
	Paved Two Lane Road*	\$10,000	
	Non-Controlled Access Highway (More than 2 lanes)*	\$15,000	
	Controlled Access Highway	\$20,000	
Longitudinal Installation Outside of Pavement		\$5,000	per mile

*Open Cut or Bored Road Crossing

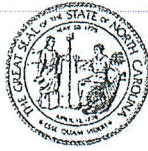
NON-UTILITY ENCROACHMENTS			
Turning Lane Additions			
	Paving	\$12	per square foot
	Curb and Gutter	\$18	per linear foot
	Sidewalk	\$45	per square yard
	Disturbed Area to be Seeded	\$2,500	per acre
Grading or Alteration of Drainage of Control of Access Right of Way			
	Disturbed Area to be Seeded	\$2,500	per acre
	Control of Access Fencing	\$5	per linear foot of woven wire fencing
	Tree or Planting Replacement		per recommendations of Area Roadside Engineer
Monitoring Wells		\$2,500	per well

Note- Mobilization cost and traffic control should be added to the unit cost for the non-utility encroachments.

ALL ENCROACHMENTS			
Traffic Control		\$1,500 to \$2,000	per day depending on the complexity and location of project

Depending on the size and complexity of any installation, the Division Engineer may exercise his/her judgment in requiring a larger bond.

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

May 7, 2009

MEMORANDUM TO: Division Engineers
FROM: Jon G. Nance, PE
Chief Engineer – Operations
SUBJECT: Communication Enclosures with Power

RECEIVED

MAY 11 2009

Contract Standards and Development

As you are aware, utility owners of Communication Enclosures with Power have expressed the desire to be allowed on state rights of ways.

Internal discussions, along with discussions with the industry, have resulted in the development of policy guidance to be used to review encroachment permit applications for these communication enclosures. The attached document outlines the policy guidance to be used when reviewing encroachment permit applications involving communication enclosures with power, effective immediately.

If you have any questions regarding the review of encroachment permit applications involving communication enclosures with power, please contact Tommy Cozart in Raleigh at (919) 250-4128.

JGN:sh

Attachment

cc: Tommy Cozart, PE, Utilities and Encroachments Engineering Manager, Attachment
A. D. Allison, II, Right of Way Branch Manager, Attachment
District Engineers, Attachment

Cozart, Ernest T

From: Powell, Ellis C
Sent: Monday, June 08, 2009 2:21 PM
To: Division Engineers; District Engineers
Cc: Cozart, Ernest T; Nance, Jon G; Gibson, Terry R
Subject: Encroachments involving communication enclosures with electrical power

On May 7, 2009 a memorandum was sent by Chief Engineer Jon Nance regarding communication enclosures with electrical power. This memo addressed criteria to be used when reviewing encroachment permit applications involving these types of enclosures.

Item number 7 of the memorandum attachment addresses the determination of a safe location and requires this determination to be performed by a registered professional civil engineer unless the applicant is exempt per General Statute 89C-25. To comply with the criteria for the permit application, the applicant is required to submit with their permit application, the determination of the safe location for the enclosure device. This determination is to be performed and sealed by a professional engineer or the applicant may submit a letter from a management level employee within their company indicating their company is exempt. If an applicant submits a letter representing their status as exempt, NCDOT will not determine the status but will add the following language to the permit approval letter:

"The Department has received your letter indicating you believe your company is exempt from providing the required safe location information sealed by a professional engineer. The determination of such exemption can only be made by the NC Board of Registration for Professional Engineers and Land Surveyors. Prior to construction and installation of the permitted items, the Department recommends you contact the NC Board of Registration for Professional Engineers and Land Surveyors to validate your exemption status. Furthermore, the Department accepts no responsibility or liability regarding the determination of your exemption status".

If a company has questions regarding the exempt status or acceptable language for such an exemption letter please refer them to David S. Tuttle, *Board Counsel* dstuttle@ncbels.org

If you have any questions regarding this issue please let me know, thanks

May 7, 2009

Communication Enclosures with Electrical Power

The following general guidance is to be used to evaluate encroachment applications for any communication enclosures with electrical power.

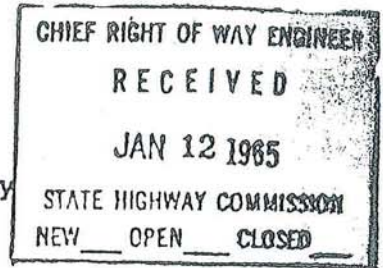
1. Communication Enclosures with Electrical Power are not allowed on control of access facilities.
2. Communication Enclosures with Electrical Power shall be located no closer than 300' from intersecting roadways on statewide tier and out of AASHTO sight distance triangles, whichever is greater.
3. Communication Enclosures with Electrical Power shall be located no closer than 100' from intersecting roadways and of out of AASHTO sight distance triangles on regional and subregional tier, whichever is greater.
4. Communication Enclosures with Electrical Power shall be located at R/W line or out of AASHTO clear recovery zone whichever is greater for all tiers.
5. Owners of Communication Enclosures with Electrical Power are required to provide advanced notice to adjacent property owners of the proposed enclosure location 15 days prior to construction. This requirement shall be listed as a condition of approval on the approved encroachment permit.
6. Owners of Communication Enclosures with Electrical Power are required to provide municipalities 15 days advanced notice prior to construction. This requirement shall be listed as a condition of approval on the approved encroachment permit.
7. Owners of Communication Enclosures with Electrical Power are required to determine the safe location of an enclosure by providing computations and drawings indicating the location is outside of sight distance and clear recovery areas in accordance with AASHTO requirements and conditions 2 and 3 above. The applicant is required to provide this information sealed by a registered NC professional civil engineer unless the applicant is exempt by General Statute 89C-25.
8. Installation other than outlined above will be in accord with NCDOT POLICY AND PROCEDURES FOR ACCOMODATING UTILITIES ON HIGHWAY RIGHTS OF WAY.

NOTE: The roadway tier information can be found at the following link:

http://www.ncdot.org/doh/preconstruct/tpb/SHC/pdf/NCMIN_definitions.pdf

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North Carolina State Highway Commission Policy
Cost of Relocation of Municipal Utilities



Recently, the State Highway Commission revised its policy concerning reimbursement to municipalities of the costs of municipal utility relocations made necessary by Highway Commission projects. The revisions made were favorable to municipalities, and in certain circumstances will lessen the financial burden of such relocations. A statement of the complete policy, as of January 1, 1965, follows:

- A. The municipality must bear the cost of removal, relocation or adjustment of municipal utilities, including any necessary adjustments on connecting streets, necessitated by State highway projects, when the utilities are located:
1. Within an existing Highway system street right of way;
 2. Within a non-system street right of way which will, as the result of being crossed or overlapped by the project, be obliterated and will lose its identity as a part of the municipal street system;
 3. Within an intersecting or connecting non-system street right of way which is improved as a part of the project.
- B. The State Highway Commission will bear the cost of removal, relocation or adjustment of municipal utilities, including any necessary adjustments on connecting streets, necessitated by State highway projects, when the utilities are located:
1. Within a valid utility easement, clear of street right of way;
 2. Within a non-system street right of way which the project crosses by means of a grade separation structure, either over or under, without improvement to the street;
 3. Within a non-system street right of way which is dead-ended without contact on both sides of the project, when the utilities must be carried across the project.

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**North Carolina Department of Transportation
Division of Highways**

Dig Once Policy

March 1, 2021

General

The State of North Carolina (the “State”) Executive Order No. 91 (the “Executive Order”) calls for the North Carolina Department of Transportation (NCDOT or “Department”) and the Department of Information Technology (NCDIT) to jointly develop a policy to reduce the scale and number of repeated excavations related to state road projects for the installation and maintenance of broadband infrastructure in rights-of-way (ROW). The intent of the policy is to reduce the costs of trenching or installation by multiple providers and broadband infrastructure to aid in the expansion of broadband access in the State.

To provide sufficient time for industry and Department staff to prepare for the revised practices, the effective date of this policy is March 1, 2021. This policy applies to broadband and/or associated conduit longitudinal installations on state-maintained routes that are not part of the National Highway System (NHS) and where the proposed installation method is by conventional open trench installation. This policy applies to installations within the limits of state transportation improvement projects (TIPs) and applies to new installations as well as facilities being relocated to accommodate a state highway project. This policy is not intended to revise any of the standard processes and procedures found for Encroachment Agreements in the Department’s Utilities Accommodations Manual. The requirements set forth in this policy do not alter existing rules, policies, and procedures relating to other utility facilities within the ROW or for accommodating utility facilities or other facilities under the control of the Department.

For the purpose of this policy, “broadband conduit” is considered conduit, pipe, innerduct, or microduct for fiber optic or other cables that accommodate current or future broadband and wireless facilities for broadband service.

Detailed guidance regarding this policy can be found in the NCDOT Utilities Accommodations Manual and on the NCDOT Utilities Unit page of Connect NCDOT.

Coordination Requirements

1. An ISP who desires to use conventional open trench construction to relocate existing facilities or install new facilities within the limits of a state transportation improvement project, where the open trench construction includes excavation of more than 1,000 linear feet in any one contiguous area, shall discuss this desire with Department’s utility coordinator prior to providing notice of a joint-trench opportunity.

2. Once the ISP has decided on conventional open trench construction, it shall provide notice of a joint-trench opportunity on the NCDIT's Broadband Infrastructure Office website. The notice shall conform to a form and content approved by the Department, include the contact information of the Department's utility coordinator(s), and shall be posted by NCDIT on its website for at least two consecutive weeks.
3. The intent for the notice provided under paragraph 2. is to publicize the general scope of the proposed installation within the State ROW, providing other interested broadband providers the opportunity to express an interest in installing additional broadband facilities as part of the open trench construction.
4. Immediately following the close of the notice period, the ISP shall notify the Department whether any other entities expressed interest or not.
5. For those entities that have expressed their interest in participating in the project, the ISP should make reasonable efforts to enter into an agreement between the two (or more) entities, outlining the responsibilities and financial obligations of each, with respect to the installation within the ROW. In the event a formal agreement is entered into between the parties, a copy of the executed agreement, or, alternatively, a joint letter stating that agreement has been reached regarding joint access to the open trench, shall be provided to the Department's utility coordinator prior to beginning installation. In the event agreement is not reached on joint use of the open trench, the ISP shall provide the Department's utility coordinator notice that such agreement has not been reached.
6. The processes described in paragraph 5 shall be completed prior to the Department's issuance of Utility Authorizations for relocation. Negotiations between the ISP and other broadband providers over access to an open trench shall not delay the state highway project or otherwise compromise the highway project schedule.

Appendix E. Grading on Right of Way – Encroachment Fee Forms

Blank Encroachment Fee Form

Example Encroachment Fee Form

NC Department of Transportation

Encroachment Fee Form

Date: _____

Division: _____

Encroachment Number: _____

District: _____

Approved Date: _____

County: _____

Division Engineer: _____

Applicant: _____

Reason for Encroachment: _____

Financial Posting:

	General Ledger Account	Cost Center	WBS/Func Area	Amount	Check Number
Administrative Fee	47900027			500.00	
Material Fee	47900027				

Applicant Signature: _____

NCDOT Engineer Signature _____

NC Department of Transportation

Encroachment Fee Form

Date: 3/25/2019

Division: 10

Encroachment Number: E102-60-19-00000

District: 2

Approved Date: 3/15/2019

County: Mecklinburg A

Division Engineer: Scott Cole, PE

Applicant: Massey Developers

Reason for Encroachment: Grading within C/A rights of ways - I 485

Financial Posting:

	General Ledger Account	Cost Center	WBS/Func Area	Amount	Check Number
Administrative Fee	47900027	150408		500.00	1234
Material Fee	47900027	150408	10.106011A/2712	2,500.00	1235

Applicant Signature: _____

NCDOT Engineer Signature _____

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Appendix F. Horizontal Directional Drilling Requirements

HDD Requirements List

Example Soil Report from the US Department of Agriculture

Example Contingency Frac-Out Plan

Example Drilling Equipment and Drilling Fluid Specifications

NCDOT Required Information for Encroachments Using
Horizontal Directional Drilling (HDD)

November 2019

In addition to submittal requirements outlined in the NCDOT Utilities Accommodations Manual, this information must be submitted either explained on this form or in other documentation submitted for the encroachment requests using HDD.

1. **Project schedule and Boring Contractor contact information and experience record.**
2. **Soil Analysis Report for project area.** Obtain report from USDA at <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm> and submit with encroachment package.
3. **Proposed viscosity, density, and composition of drilling fluids**, including whether they are bentonite or polymer based (based on soil analysis). _____
(Manufacturer Data sheet included)
4. **Type of Boring Machine:**
 - a. **Make/Model:** _____
 - i. Thrust: _____
 - ii. Pull Back: _____
 - iii. Max. Torque: _____
 - b. A copy of the Equipment spec. sheet should be attached.
5. **Pilot Drill Manufacturer Name/Spec:** _____
6. **Back Reamer Manufacturer Name/Spec:** _____
7. **Method of Tracking for (pilot and back reamer):** _____
8. **Mud Motor bit (If used):** _____
9. **Method of Compaction (if open trench is used):** _____
10. **Method of containment, collection and disposal of drilling fluid:** _____
11. **Tracer wire used on all bores:** _____

12. **Drilling Pump Efficiency:**
 - a. Mechanical pump rated capacity in gallons: _____
 - b. Stem Length, diameter and radius of curvature. _____
 - c. Angle penetration of rod to ground: _____
 - d. Product being pulled back: _____
13. **Contingency plan for frac-out or drilling hole failure.**
14. **Traffic control plan when applicable** (Needed when personnel and/or equipment is within 5 ft. of the

edge of pavement or 10 ft. on a divided roadway). Show all pavement and lane widths within closure.

15. Upon completion of the drilling operation, supply accurate **as built drawing** within 30 days to the District Engineer's Office. The As-Built drawings must include the following information: Actual path alignment, depth of cover for the casing, actual length, product diameter, casing diameter, and all final elevations. The format as a deliverable must include a PDF drawing with this information and GIS georeferenced datafile (in kmz or ESRI shapefile/geodatabase format) and according to NCDOT standards for GIS data.

Acknowledgment to submit As Built drawings as required:

NCDOT Required Information for Encroachments Using
Horizontal Directional Drilling (HDD)

November 2019

In addition to submittal requirements outlined in the NCDOT Utilities Accommodations Manual, this information must be submitted either explained on this form or in other documentation submitted for the encroachment requests using HDD.

- 1. Project schedule and Boring Contractor contact information and experience record.**
- 2. Soil Analysis Report for project area.** Obtain report from USDA at <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm> and submit with encroachment package.
- 3. Proposed viscosity, density, and composition of drilling fluids,** including whether they are bentonite or polymer based (based on soil analysis). Click or tap here to enter text.
(Manufacturer Data sheet included)
- 4. Type of Boring Machine:**
 - a. **Make/Model:** Click or tap here to enter text.
 - i. **Thrust:** Click or tap here to enter text.
 - ii. **Pull Back:** Click here to enter text.
 - iii. **Max. Torque:** Click or tap here to enter text.
 - b. A copy of the Equipment spec. sheet should be attached.
- 5. Pilot Drill Manufacturer Name/Spec:** Click or tap here to enter text.
- 6. Back Reamer Manufacturer Name/Spec:** Click or tap here to enter text.
- 7. Method of Tracking for (pilot and back reamer):** Click or tap here to enter text.
- 8. Mud Motor bit (If used):** Click or tap here to enter text.
- 9. Method of Compaction (if open trench is used):** Click or tap here to enter text.
- 10. Method of containment, collection and disposal of drilling fluid:** Click or tap here to enter text.
- 11. Tracer wire used on all bores:** Click or tap here to enter text.
- 12. Drilling Pump Efficiency:**
 - a. Mechanical pump rated capacity in gallons: Click or tap here to enter text.
 - b. Stem Length, diameter and radius of curvature. Click or tap here to enter text.
 - c. Angle penetration of rod to ground: Click or tap here to enter text.
 - d. Product being pulled back: Click or tap here to enter text.
- 13. Contingency plan for frac-out or drilling hole failure.**
- 14. Traffic control plan when applicable** (Needed when personnel and/or equipment is within 5 ft. of the edge of pavement or 10 ft. on a divided roadway). Show all pavement and lane widths within closure.

15. Upon completion of the drilling operation, supply accurate **as built drawing** within 30 days to the District Engineer's Office. The As-Built drawings must include the following information: Actual path alignment, depth of cover for the casing, actual length, product diameter, casing diameter, and all final elevations. The format as a deliverable must include a PDF drawing with this information and GIS georeferenced datafile (in kmz or ESRI shapefile/geodatabase format) and according to NCDOT standards for GIS data.



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Columbus County, North Carolina



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
Columbus County, North Carolina.....	13
Co—Coxville loam.....	13
LyA—Lynchburg fine sandy loam, 0 to 2 percent slopes, Southern Coastal Plain.....	14
NoB—Norfolk loamy fine sand, 2 to 6 percent slopes.....	16
References	18

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

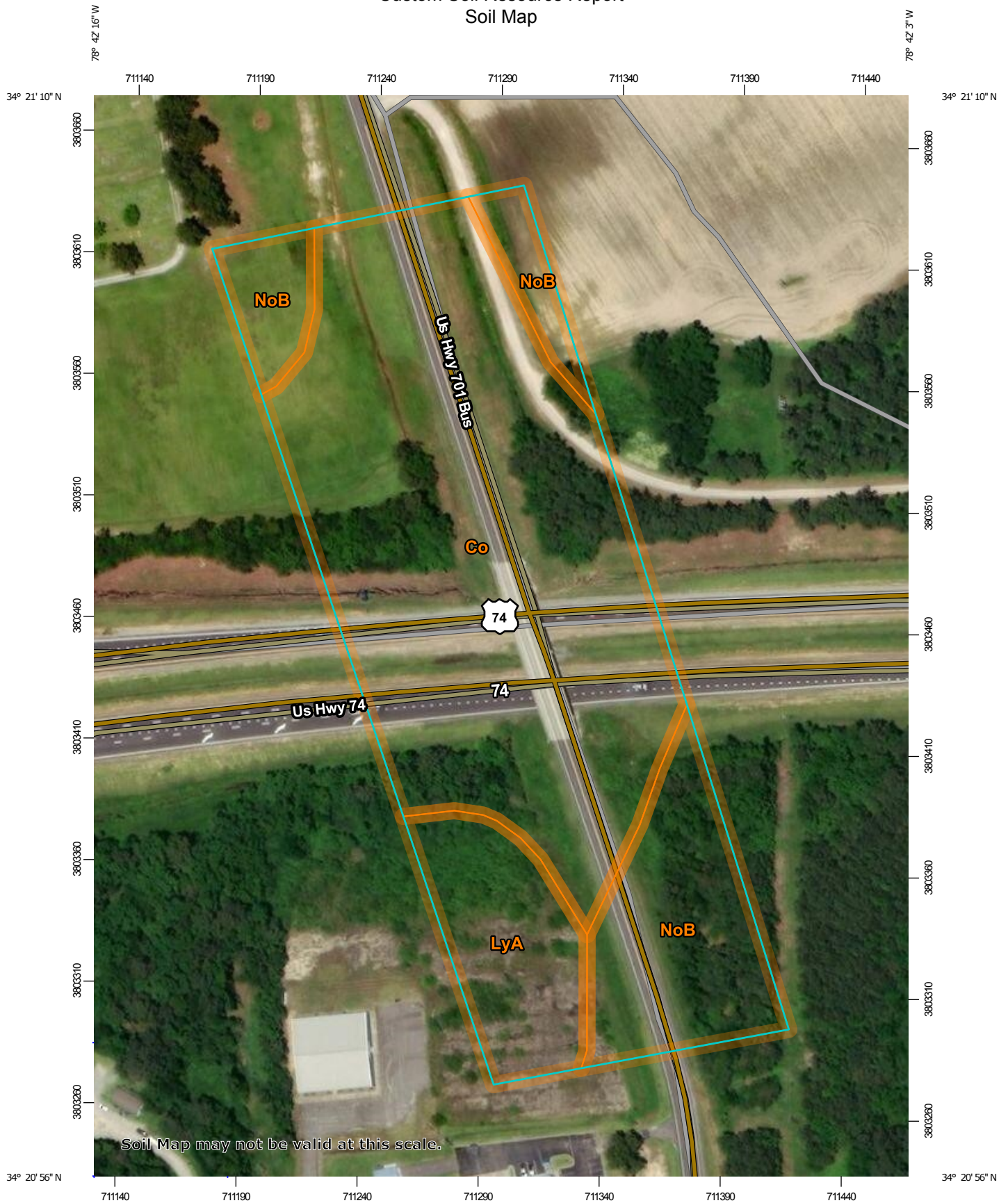
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

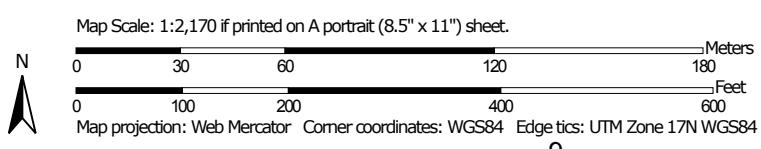
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



















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Soil Map may not be valid at this scale.



MAP LEGEND

	Area of Interest (AOI)		Spoil Area
	Area of Interest (AOI)		Stony Spot
Soils			Very Stony Spot
	Soil Map Unit Polygons		Wet Spot
	Soil Map Unit Lines		Other
	Soil Map Unit Points		Special Line Features
Special Point Features			Streams and Canals
	Blowout		Interstate Highways
	Borrow Pit		US Routes
	Clay Spot		Major Roads
	Closed Depression		Local Roads
	Gravel Pit		Aerial Photography
	Gravelly Spot		
	Landfill		
	Lava Flow		
	Marsh or swamp		
	Mine or Quarry		
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Columbus County, North Carolina
 Survey Area Data: Version 20, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 22, 2015—Nov 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Co	Coxville loam	7.5	66.0%
LyA	Lynchburg fine sandy loam, 0 to 2 percent slopes, Southern Coastal Plain	1.3	11.7%
NoB	Norfolk loamy fine sand, 2 to 6 percent slopes	2.5	22.2%
Totals for Area of Interest		11.4	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

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landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Columbus County, North Carolina

Co—Coxville loam

Map Unit Setting

National map unit symbol: 3wb7

Elevation: 80 to 330 feet

Mean annual precipitation: 38 to 55 inches

Mean annual air temperature: 59 to 70 degrees F

Frost-free period: 210 to 265 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Coxville, drained, and similar soils: 85 percent

Coxville, undrained, and similar soils: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Coxville, Drained

Setting

Landform: Depressions, carolina bays

Landform position (two-dimensional): Summit

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Clayey marine deposits

Typical profile

Ap - 0 to 9 inches: loam

Eg - 9 to 11 inches: loam

Btg - 11 to 72 inches: sandy clay

Cg - 72 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Poorly drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C/D

Hydric soil rating: Yes

Description of Coxville, Undrained

Setting

Landform: Depressions, carolina bays

Landform position (two-dimensional): Summit

Down-slope shape: Concave

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Across-slope shape: Concave

Parent material: Clayey marine deposits

Typical profile

A - 0 to 9 inches: loam

Eg - 9 to 11 inches: loam

Btg - 11 to 72 inches: sandy clay

Cg - 72 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Poorly drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Hydric soil rating: Yes

LyA—Lynchburg fine sandy loam, 0 to 2 percent slopes, Southern Coastal Plain

Map Unit Setting

National map unit symbol: 2vx8m

Elevation: 20 to 200 feet

Mean annual precipitation: 40 to 55 inches

Mean annual air temperature: 64 to 70 degrees F

Frost-free period: 200 to 280 days

Farmland classification: Prime farmland if drained

Map Unit Composition

Lynchburg and similar soils: 82 percent

Minor components: 18 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lynchburg

Setting

Landform: Marine terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loamy marine deposits

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Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bt - 8 to 50 inches: sandy clay loam
Btg - 50 to 68 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Goldsboro

Percent of map unit: 8 percent
Landform: Flats on marine terraces, broad interstream divides on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Rains, undrained

Percent of map unit: 5 percent
Landform: Carolina bays on marine terraces, broad interstream divides on marine terraces, flats on marine terraces
Landform position (three-dimensional): Dip, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Rains, drained

Percent of map unit: 5 percent
Landform: Carolina bays on marine terraces, flats on marine terraces, broad interstream divides on marine terraces
Landform position (three-dimensional): Dip, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

NoB—Norfolk loamy fine sand, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 3wbz
Elevation: 80 to 330 feet
Mean annual precipitation: 38 to 55 inches
Mean annual air temperature: 59 to 70 degrees F
Frost-free period: 210 to 265 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Norfolk and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Norfolk

Setting

Landform: Broad interstream divides on marine terraces, flats on marine terraces
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy marine deposits

Typical profile

Ap - 0 to 9 inches: loamy sand
E - 9 to 14 inches: loamy sand
Bt - 14 to 70 inches: sandy clay loam
C - 70 to 100 inches: sandy clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 40 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Bibb, undrained

Percent of map unit: 3 percent

Landform: Flood plains

Landform position (two-dimensional): Toeslope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: Yes

Johnston, undrained

Percent of map unit: 2 percent

Landform: Flood plains

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: Yes

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Custom Soil Resource Report

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ITEM # 24
ATTACHMENT

**FRACTION MITIGATION
CONTINGENCY PLAN
FOR DIRECTIONAL DRILLING**

TABLE OF CONTENTS

1.0	Introduction and Purpose	3
2.0	Description of Work	3
3.0	Site Supervisor/Foremen Responsibilities	4
4.0	Equipment	4
5.0	Training	5
6.0	Drilling Procedures	5
6.1	Vac-Truck	6
6.2	Field Response to Frac-Out Occurrence	6
6.3	Response Close-out Procedures	7
6.4	Construction Re-start	7
6.5	Bore Abandonment	7
7.0	Notification	7
7.1	Communicating with Regulatory Agency Personnel	8
7.2	Documentation	8
8.0	Project Completion and Clean-up	8

FRAC-OUT CONTINGENCY PLAN (FCP)

1.0 Introduction and Purpose

Directional bore operations have a potential to release drilling fluids into the surface environment through frac-outs (A frac-out is the condition where drilling mud is released through fractured bedrock into the surrounding rock and sand and travels toward the surface.) Because drilling muds consist largely of a bentonite clay-water mixture, they are not classified as toxic or hazardous substances. However, if it is released into water bodies, bentonite has the potential to adversely impact fish and invertebrates.

While drilling fluid seepage associated with a frac-out is most likely to occur near the bore entry and exit points where the drill head is shallow, frac-outs can occur in any location along a directional bore. This Frac-Out Contingency Plan (FCP) establishes operational procedures and responsibilities for the prevention, containment, and clean-up of frac-outs associated with the proposed directional drilling utility project of _____ . All personnel and Sub-Contractors responsible for the work must adhere to this plan during the directional drilling process.

The specific objectives of this plan are to:

1. Minimize the potential for a frac-out associated with directional drilling activities;
2. Provide for the timely detection of frac-outs;
3. Protect the environmentally sensitive riverbed and associated riparian vegetation;
4. Ensure an organized, timely, and "minimum-impact" response in the event of a frac-out and release of drilling bentonite; and
5. Ensure that all appropriate notifications are made immediately to the customer, management and safety personnel.

2.0 Description of Work:

The proposed project consists of: *(Explain work task in detail to crew members.)*

Drilling operations will be halted by the drill rig operators immediately upon detection of a drop in drilling pressure or other evidence of a frac-out. The clean-up of all spills shall begin immediately. Management & safety department shall be notified immediately of any spills and shall be consulted regarding clean-up procedures. A spill kit shall be on-site and used if a frac-out occurs. A vacuum truck and containment materials, such as straw bales, shall also be on-site prior to and during all operations. The Site Supervisor will be immediately notified. In the event of a frac-out, the on-site foreman/supervisor will conduct an evaluation of the situation and direct recommended mitigation actions, based on the following guidelines:

- a. If the frac-out is minor, easily contained, has not reached the surface and is not threatening sensitive resources, drilling operations may resume after use of a leak stopping compound or redirection of the bore;

- b. If the frac-out has reached the surface, any material contaminated with Bentonite shall be removed by hand to a depth of 2-feet, contained and properly disposed of, as required by law. The drilling contractor shall be responsible for ensuring that the bentonite is either properly disposed of at an approved disposal facility or properly recycled in an approved manner. The Site Supervisor shall notify and take any necessary follow-up response actions in coordination with agency representatives. The Site Supervisor will coordinate the mobilization of equipment stored at off-site locations (e.g., vacuum trucks) on an as needed basis;

3.0 Site Supervisor/Foremen Responsibilities:

The Site Supervisor/Foremen has overall responsibility for implementing this FCP. The Site Supervisor/Foremen will ensure that all employees are trained prior to all drilling. The Site Supervisor/Foremen shall be notified immediately when a frac-out is detected. The Site Supervisor/Foremen will be responsible for ensuring that the safety department is aware of the frac-out, coordinating personnel, response, cleanup, regulatory agency notification and coordination to ensure proper clean-up, disposal of recovered material and timely reporting of the incident. The Site Supervisor/Foremen shall ensure all waste materials are properly containerized, labeled, and removed from the site to an approved disposal facility by personnel experienced in the removal, transport and disposal of drilling mud.

The Site Supervisor/Foremen shall be familiar with all aspects of the drilling activity, the contents of this Frac-out Contingency Plan and the conditions of approval under which the activity is permitted to take place. The Site Supervisor/Foremen shall have the authority to stop work and commit the resources (personnel and equipment) necessary to implement this plan. The Site Supervisor/Foremen shall assure that a copy of this plan is available (onsite) and accessible to all construction personnel. The Site Supervisor/Foremen shall ensure that all workers are properly trained and familiar with the necessary procedures for response to a frac-out, prior to commencement of drilling operations.

4.0 Equipment:

The Site Supervisor shall ensure that:

- All equipment and vehicles are to be checked and maintained daily to prevent leaks of hazardous materials;
- Spill kits and spill containment materials are available on-site at all times and that the equipment is in good working order;
- Equipment required to contain and clean up a frac-out release will either be available at the work site or readily available at an offsite location within 15-minutes of the bore site; and
- If equipment is required to be operated near a riverbed, absorbent pads and plastic sheeting for placement beneath motorized equipment shall be used to protect the riverbed from engine fluids;

5.0 Training

Prior to the start of construction, the Site Supervisor/Foremen, shall ensure that the crew members receive training in the following:

- The provisions of the Frac-out Contingency Plan, equipment maintenance and site specific permit and monitoring requirements;
- Inspection procedures for release prevention and containment equipment and materials;
- Contractor/crew obligation to immediately stop the drilling operation upon first evidence of the occurrence of a frac-out and to immediately report any frac-out releases;
- Contractor/crew member responsibilities in the event of a release;
- Operation of release prevention and control equipment and the location of release control materials, as necessary and appropriate; and
- Protocols for communication with agency representatives who might be on-site during the clean-up effort.

6.0 Drilling Procedures

The following procedures shall be followed each day, prior to the start of work. The Frac-out Contingency Plan shall be available on-site during all construction. The Site Supervisor/Foremen shall be on-site at any time that drilling is occurring or is planned to occur. The Site Supervisor/Foremen shall ensure that a Job Briefing meeting is held at the start of each day of drilling to review the appropriate procedures to be followed in case of a frac-out. Questions shall be answered and clarification given on any point over which the drilling crew or other project staff has concerns.

Drilling pressures shall be closely monitored so they do not exceed those needed to penetrate the formation. Pressure levels shall be monitored randomly by the operator. Pressure levels shall be set at a minimum level to prevent frac-outs. During the pilot bore, maintain the drilled annulus. Cutters and reamers will be pulled back into previously-drilled sections after each new joint of pipe is added.

Exit and entry pits shall be enclosed by silt fences and straw. A spill kit shall be on-site and used if a frac-out occurs. A vacuum truck shall be readily available on-site prior to and during all drilling operations. Containment materials (Straw, silt fencing, sand bags, frac-out spill kits, etc.) shall be staged on-site at location where they are readily available and easily mobilized for immediate use in the event of an accidental release of drilling mud (frac-out). If necessary, barriers (straw bales or sedimentation fences) between the bore site and the edge of the water source, shall be constructed, prior to drilling, to prevent released bentonite material from reaching the water.

Once the drill rig is in place, and drilling begins, the drill operator shall stop work whenever the pressure in the drill rig drops, or there is a lack of returns in the entrance pit. At this time the Site Supervisor/Foremen shall be informed of the potential frac-out. The Site Supervisor/Foremen and the drill rig operator(s) shall work to coordinate the likely location of the frac-out. The location of the frac-out shall be recorded and notes made on the location and measures taken to address the concern. The following subsections shall be adhered to when addressing a frac-out situation.

Water containing mud, silt, bentonite, or other pollutants from equipment washing or other activities, shall not be allowed to enter a lake, flowing stream or any other water source. The Bentonite used in the drilling process shall be either disposed of at an approved disposal facility or recycled in an approved manner. Other construction materials and wastes shall be recycled, or disposed of, as appropriate.

6.1 Vac-Truck:

A vacuum truck shall be staged at a location from which it can be mobilized and relocated so that any place along the drill shot, can be reached by the apparatus, within 10 minutes of a frac-out.

6.2 Field Response to Frac-out Occurrence:

The response of the field crew to a frac-out release shall be immediate and in accordance with procedures identified in this Plan. All appropriate emergency actions that do not pose additional threats to sensitive resources will be taken, as follows:

- a. Directional boring will stop immediately;
- b. The bore stem will be pulled back to relieve pressure on frac-out;
- c. The Site Supervisor/Foremen will be notified to ensure that management and the safety department is notified, adequate response actions are taken and notifications made;
- d. The Site Supervisor/Foremen shall evaluate the situation and recommend the type and level of response warranted, including the level of notification required;
- e. If the frac-out is minor, easily contained, has not reached the surface and is not threatening sensitive resources, a leak stopping compound shall be used to block the frac-out. If the use of leak stopping compound is not fully successful, the bore stem shall be redirected to a new location along the desired drill path where a frac-out has not occurred;
- f. If the frac-out has reached the surface, any material contaminated with Bentonite shall be removed by hand, to a depth of 2-feet, contained and properly disposed of, as required by law. A dike or berm may be constructed around the frac-out to entrap released drilling fluid, if necessary. Clean sand shall be placed and the area returned to pre-project contours; and
- g. If a frac-out occurs, reaches the surface and becomes widespread, the Site Supervisor/Foremen shall authorize a readily accessible vacuum truck and bulldozer stored off-site to be mobilized. The vacuum truck may be either positioned at either end of the line of the drill so that the frac-out can be reached by crews on foot, or may be pulled by a bulldozer, so that contaminated soils can be vacuumed up.

6.3 Response Close-out Procedures:

When the release has been contained and cleaned up, response closeout activities will be conducted at the direction of the Site Supervisor/Foremen and shall include the following:

- a. The recovered drilling fluid will either be recycled or hauled to an approved facility for disposal. No recovered drilling fluids will be discharged into streams, storm drains or any other water source;
- b. All frac-out excavation and clean-up sites will be returned to pre-project contours using clean fill, as necessary; and
- c. All containment measures (fiber rolls, straw bale, etc.) will be removed, unless otherwise specified by the Site Supervisor/Foremen.

6.4 Construction Re-start:

For small releases not requiring external notification, drilling may continue, if 100 percent containment is achieved through the use of a leak stopping compound or redirection of the bore and the clean-up crew remains at the frac-out location throughout the construction period.

For releases requiring external notification and/or other agencies, construction activities will not restart without prior approval from the safety department.

6.5 Bore Abandonment:

Abandonment of the bore will only be required when all efforts to control the frac-out within the existing directional bore have failed.

7.0 Notification:

In the event of a Frac-out that reaches a water source, the Site Supervisor/Foremen will notify safety department so they can notify the appropriate resource agencies. All agency notifications will occur within 24 hours and proper documentation will be accomplished in a timely and complete manner. The following information will be provided:

1. Name and telephone number of person reporting;
2. Location of the release;
3. Date and time of release;
4. Type and quantity, estimated size of release;
5. How the release occurred;
6. The type of activity that was occurring around the area of the frac-out;
7. Description of any sensitive areas, and their location in relation to the frac-out;
8. Description of the methods used to clean up or secure the site; and
9. Listing of the current permits obtained for the project.

7.1 Communicating with Regulatory Agency Personnel:

All employees and subcontractors will adhere to the following protocols when permitting Regulatory Agency Personnel arrive on site. Regulatory Agency Personnel will be required to comply with appropriate safety rules. Only the Site Supervisor/Foremen and the safety department are to coordinate communication with Regulatory Agency Personnel.

7.2 Documentation:

The Site Supervisor/Foremen shall record the frac-out event in his or her daily log. The log will include the following: Details on the release event, including an estimate of the amount of bentonite released, the location and time of release, the size of the area impacted, and the success of the clean-up action. The log report shall also include the: Name and telephone number of person reporting; Date, How the release occurred; The type of activity that was occurring around the area of the free-out; Description of any sensitive areas, and their location in relation to the frac-out; Description of the methods used to clean up or secure the site; and a listing of the current permits obtained for the project.

8.0 Project Completion and Clean-up:

- a. All materials and any rubbish-construction debris shall be removed from the construction zone at the end of each workday;
- b. Sump pits at bore entry and exits will be filled and returned to natural grade; and
- c. All protective measures (fiber rolls, straw bale, silt fence, etc.) will be removed unless otherwise specified by the Site Supervisor/Foremen.

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BARO-LUBE GOLD SEAL™

Drilling Fluid Lubricant

Description BARO-LUBE GOLD SEAL™ lubricant is a liquid additive specifically formulated for use in industrial drilling applications where environmental constraints preclude the use of hydrocarbon-based additives. BARO-LUBE GOLD SEAL lubricant is designed to reduce friction under extreme pressure (metal-to-metal) and in the borehole (metal-to-formation).

- Applications/Functions**
- Helps reduce drill rod torque and drag
 - Helps lubricate drill rods and casing in close tolerance boreholes
 - Helps reduce heat generated at bit face
 - Helps reduce bit balling and mud rings on rods
 - Helps minimize potential for differential sticking

- Advantages**
- Water soluble lubricant
 - Mixes in fresh or saltwater-based drilling fluids
 - Compatible with most drilling fluid additives
 - Mild odor - acceptable underground
 - Increases lubricating properties of bentonite and polymer based drilling fluid systems
 - Stable at elevated sub-surface temperatures up to 300°F)

- Typical Properties**
- Appearance Amber liquid
 - Specific Gravity 0.94 (7.8 lb/gal)
 - Flash point, PMCC >200°F (93°C)

Recommended Treatment

Approximate Amounts of BARO-LUBE GOLD SEAL™ lubricant Added to Water-Based Drilling Fluids		
% by Volume	Quarts/100 Gallons	Liters/m ³
1.0 – 2.0	4 - 8	10 - 20

Note:

- Soaping out of this product could take place in drilling fluids containing high concentrations of divalent cations such as Calcium.
- For maximum efficiency maintain drilling fluid slurry density below 10 pounds per gallon (1.2 g/cm³)
- As a friction reducer in problematic zones or deviated holes slug 1 to 2 quarts (1-2 liters) down pipe to reduce torque and drag

Packaging BARO-LUBE GOLD SEAL™ lubricant is packaged in a 5-gallon (19-liter) plastic container.

Availability BARO-LUBE GOLD SEAL lubricant can be purchased through any Baroid Industrial Drilling Products Retailer. To locate the Baroid IDP retailer nearest you contact the Customer Service Department in Houston or your area IDP Sales Representative.

Baroid Industrial Drilling Products

Product Service Line, Halliburton

3000 N. Sam Houston Pkwy. E.

Houston, TX 77032

Customer Service (800) 735-6075 Toll Free (281) 871-4612

Technical Service (877) 379-7412 Toll Free (281) 871-4613

Blue Diamond Conduit Sizes and Dimensions

Based on Controlled Outside Diameter

ASTM F 2160
SDR Pipe Data

SDR 9

SDR 11

SDR 13.5

Nominal Duct Size	Nominal OD	Nominal ID	Min Wall	Weight lbs/ft	Nominal ID	Min Wall	Weight lbs/ft	Nominal ID	Min Wall	Weight lbs/ft
1/2"	0.840	0.633	0.093	0.099	0.667	0.076	0.085	0.696	0.062	0.072
3/4"	1.050	0.797	0.117	0.152	0.839	0.095	0.130	0.874	0.078	0.110
1"	1.315	1.003	0.146	0.235	1.051	0.120	0.200	1.100	0.097	0.169
1 1/4"	1.660	1.270	0.184	0.372	1.338	0.151	0.314	1.394	0.123	0.264
1 1/2"	1.900	1.452	0.211	0.488	1.534	0.173	0.409	1.599	0.141	0.343
2"	2.375	1.816	0.264	0.762	1.917	0.216	0.639	2.002	0.176	0.531
2 1/2"	2.875	2.198	0.319	1.117	2.321	0.261	0.936	2.424	0.213	0.778
3"	3.500	2.676	0.389	1.655	2.825	0.318	1.387	2.950	0.259	1.153
4"	4.500	3.440	0.500	2.737	3.633	0.409	2.293	3.794	0.333	1.906
5"	5.562	4.252	0.618	4.182	4.490	0.506	3.505	4.689	0.412	2.912
6"	6.625	5.064	0.824	5.931	5.348	0.602	4.971	5.585	0.491	4.130

ASTM F 2160
SDR Pipe Data

SDR 15.5

SDR 17

Nominal Duct Size	Nominal OD	Nominal ID	Min Wall	Weight lbs/ft	Nominal ID	Min Wall	Weight lbs/ft
1/2"	0.840	-	-	-	-	-	-
3/4"	1.050	0.895	0.068	0.098	0.906	0.062	0.092
1"	1.315	1.147	0.084	0.151	1.140	0.077	0.139
1 1/4"	1.660	1.426	0.107	0.235	1.445	0.098	0.218
1 1/2"	1.900	1.635	0.123	0.305	1.656	0.112	0.282
2"	2.375	2.049	0.153	0.469	2.076	0.140	0.434
2 1/2"	2.875	2.482	0.185	0.685	2.516	0.169	0.629
3"	3.500	3.021	0.226	1.015	3.064	0.206	0.932
4"	4.500	3.885	0.290	1.678	3.939	0.265	1.540
5"	5.562	4.801	0.359	2.563	4.868	0.327	2.352
6"	6.625	5.719	0.427	3.637	5.799	0.390	3.337

ASTM F 2160
SDR Pipe Data

SCH 40

SCH 80

Nominal Duct Size	Nominal OD	Nominal ID	Min Wall	Weight lbs/ft	Nominal ID	Min Wall	Weight lbs/ft
1/2"	0.840	-	-	-	-	-	-
3/4"	1.050	0.804	0.113	0.148	0.722	0.154	0.189
1"	1.315	1.029	0.133	0.218	0.936	0.179	0.278
1 1/4"	1.660	1.360	0.140	0.295	1.255	0.191	0.384
1 1/2"	1.900	1.590	0.145	0.352	1.476	0.200	0.465
2"	2.375	2.047	0.154	0.472	1.913	0.218	0.644
2 1/2"	2.875	2.445	0.203	0.744	2.290	0.276	0.983
3"	3.500	3.042	0.216	0.974	2.864	0.300	1.316
4"	4.500	3.896	0.282	1.387	3.786	0.337	1.924
5"	5.562	5.009	0.258	1.904	4.768	0.375	2.671
6"	6.625	6.031	0.280	2.444	5.709	0.432	3.674

Please note that some sizes and dimensions may require additional equipment or extended lead times and may be required to be manufactured in straight lengths. Please inquire for details.

Blue Diamond UL Listed Conduit Sizes and Dimensions

Based on Controlled Outside Diameter

UL 651B		SCH 40			SCH 80			SDR 13.5		
Nominal Duct Size	Nominal OD	Nominal ID	Min Wall	Weight lbs/ft	Nominal ID	Min Wall	Weight lbs/ft	Nominal ID	Min Wall	Weight lbs/ft
3/4"	1.050	0.804	0.113	0.148	0.722	0.154	0.189	-	-	-
1"	1.315	1.029	0.133	0.218	0.936	0.179	0.278	-	-	-
1 1/4"	1.660	1.360	0.140	0.295	1.255	0.191	0.384	-	-	-
1 1/2"	1.900	1.590	0.145	0.352	1.476	0.200	0.465	1.599	0.141	0.343
2"	2.375	2.047	0.154	0.472	1.913	0.218	0.644	2.002	0.176	0.531
2 1/2"	2.875	2.445	0.203	0.744	2.290	0.276	0.983	-	-	-
3"	3.500	-	-	-	2.864	0.300	1.316	2.950	0.259	1.153
4"	4.500	3.998	0.237	1.387	3.786	0.337	1.924	3.794	0.333	1.906
5"	5.562	5.009	0.258	1.904	4.768	0.375	2.671	4.689	0.412	2.912
6"	6.625	6.031	0.280	2.444	5.709	0.432	3.674	5.585	0.491	4.130

Blue Diamond Conduit Sizes and Dimensions

Based on Controlled Inside Diameter

Follows Dimensions of ASTM D 2239

		SIDR 9			SIDR 11.5			SIDR 15		
Nominal Duct Size	Nominal ID	Nominal OD	Min Wall	Weight lbs/ft	Nominal OD	Min Wall	Weight lbs/ft	Nominal OD	Min Wall	Weight lbs/ft
1"	1.049	1.302	0.117	0.194	1.251	0.091	0.151	1.209	0.070	0.117
1 1/4"	1.380	1.707	0.153	0.328	1.640	0.120	0.255	1.584	0.092	0.197
1 1/2"	1.610	1.989	0.179	0.444	1.910	0.140	0.343	1.845	0.107	0.264
2"	2.067	2.554	0.230	0.732	2.448	0.180	0.559	2.363	0.138	0.426
2 1/2"	2.469	-	-	-	2.924	0.215	0.798	2.818	0.165	0.600
3"	3.068	-	-	-	3.634	0.267	1.232	3.502	0.205	0.926
4"	4.026	-	-	-	4.768	0.350	2.122	4.595	0.268	1.595
5"	5.046	-	-	-	5.976	0.439	3.334	5.759	0.336	2.506

Follows Dimensions of ASTM D 2239

		True SIDR 9			True SIDR 11.5		
Nominal Duct Size	Nominal ID	Nominal OD	Min Wall	Weight lbs/ft	Nominal OD	Min Wall	Weight lbs/ft
1 1/4"	1.250	1.548	0.139	0.271	1.487	0.109	0.211
1 1/2"	1.500	1.853	0.167	0.385	1.781	0.130	0.300
2"	2.000	2.471	0.222	0.685	2.369	0.174	0.524
4"	4.000	4.942	0.444	2.740	4.737	0.348	2.095

Please note that some sizes and dimensions may require additional equipment or extended lead times and may be required to be manufactured in straight lengths. Please inquire for details.

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