POLICIES AND PROCEDURES FOR ACCOMMODATING UTILITIES ON HIGHWAY RIGHTS OF WAY

DIVISION OF HIGHWAYS

JANUARY 1, 1975

REVISED APRIL 1, 1993

TABLE OF CONTENTS

POLICIES AND PROCEDURES FOR ACCOMMODATING UTILITIES ON HIGHWAY RIGHTS-OF-WAY

ADOPTED BY THE BOARD OF TRANSPORTATION

INTRODUCTION

The Board of Transportation, hereafter referred to in this manual as the "Board", formulates policies for the carrying out of highway functions assigned to the Department of Transportation - Division of Highways, hereafter referred to as "DOT", and it supervises the carrying out of these functions. The Board has the responsibility to maintain the rights-of-way of highways under its jurisdiction as necessary to preserve the integrity, visual quality, operational safety, and function of the highway facility. The Board has various degrees of authority to regulate the use of utilities on highways, and the utilities also have various degrees of authority to install their lines and facilities on the rights-of-way of public roads and streets. Since the location and manner in which utility facilities cross or otherwise occupy highway rights-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.

In order for the Board to regulate the use of highway rights-of-way on all highways under its jurisdiction, uniform policies and procedures are needed to establish the conditions under which existing, proposed, adjusted or relocated utilities may be accommodated. The following statements constitute such policies and procedures. The intent of these policies and procedures is to establish and administer reasonably uniform utility accommodation practices in the interest of developing and preserving safe roadsides and of minimizing possible interference and impairment to the highway, its structure, visual quality, safe operation, maintenance, and improvement.

Application

These policies and procedures apply to all public, private, and cooperative utilities, including electric power, telephone, television, light, heat, telegraph, water, gas, oil, petroleum products, steam, chemicals, sewage, drainage, irrigation, storm water, and similar lines that are to be located, adjusted, or relocated within the rights-of-way of highways under jurisdiction of the Board. Such utilities may involve underground, surface, or overhead facilities, either singularly or in combination. These policies and procedures also apply to the cutting, trimming, digging, herbicide treatment, or other removal or alteration of any vegetation of highway right-of-way involved in the construction or maintenance of the beforementioned utilities along highways, even though there is no actual physical encroachment by the utility facilities.

These policies and procedures shall be effective upon adoption by the Board and will apply to all new installations, as well as facilities relocated or adjusted to accommodate highway construction.

Scope

These policies and procedures are provided for use by DOT in authorizing the location, design within utility standards, and methods for installing, adjusting, accommodating, and maintaining utilities on highway rights-of-way. These policies and procedures are also provided for use by the utility in determining the extent of their use of highway rights-of-way.

Coordination Between Utility Owners Using Highway Rights-of-Way

These policies and procedures are provided primarily to regulate the placement of utilities on highway right-of-way to protect the function of the highway. However, it should be recognized that coordination is required between utility owners when more than one utility desires to use the same right-of-way to assure that all utility facilities will be placed in such a way to avoid interference with each other during construction, normal use, and maintenance.

When applications for encroachments are submitted to the Board for approval, it shall be the responsibility of the applicant to determine what, if any, facilities of other utilities are in existence in the encroachment area. Plans attached to Encroachment Agreements shall show, as nearly as possible, the location of other utilities that may be unearthed, moved, or exposed to potential damage. The applicant shall be responsible for providing protection and safeguards during construction to prevent damage to existing utilities and insure that existing utilities will not be rendered inaccessible.

In accordance with G.S. 87-100 (Underground Damage Prevention Act) which became effective January 1, 1986, the applicant should give prior notice of construction to utility owners having existing facilities in the encroachment area. This notice should be given to avoid damage to existing facilities.

In the event the Board receives a protest from a utility concerning an application that is pending or has been granted for encroachment to another utility alleging that commencement of construction as planned would in some way cause harm to the protestant's existing facilities, the protest will be served by the Board on the applicant who shall respond within ten days to the allegations of the protest. In the event the applicant and protestant are unable to reach a mutually satisfactory agreement, the Board will review the facts of the case and determine if the application should be rescinded, denied, amended, or granted. The Manager of Right-of-Way, Assistant Manager of Right-of-Way, and Division Engineers shall have the authority to act in behalf of the Board, and it will be the intent of the Board to determine the best means of serving the needs of all parties concerned. Encroachment Agreements will not be issued, or if already issued, Agreements will be canceled where it is evident that the proposed construction will damage or interfere with the operation or maintenance of the protestant's existing facilities without just and reasonable compensation by the applicant.

Authority

Private, public, or cooperative utilities by implication of the highway laws have the right to occupy highway rights-of-way permissively, but the law also gives the Board the power to regulate the extent of such occupancy even to the extent of excluding utilities as justified in avoiding hazards to traffic, damage to the highway or its visual quality, or interference with maintenance or improvements. There are also other statutes granting specific utilities the right to occupy highway rights-of-way. The Board recognizes that it is to the benefit of the public generally to provide utility service as economically as possible, and where excessive costs of utility construction or right-of-way is involved, to cooperate with utilities to the extent of allowing utilities to occupy highway rights-of-way provided that safety of the highway is not affected and provided that maintenance and improvement operations are not materially interfered with.

The authority of the utility to occupy highway rights-of-way and the authority of the Board to regulate the use of utilities on highway rights-of-way are contained in the following North Carolina General Statutes and General Ordinances:

1. G.S. 62-180. Use of railroads and public highways. "Any person operating electric power, telegraph or telephone lines or authorized by law to establish such lines, has the right to construct, maintain and operate such lines along any railroad or public highway, but such lines shall be constructed and maintained as not to obstruct or hinder unreasonably the usual travel on such railroad or highway."

2. G.S. 130-146. Rights-of-way granted. "A right-of-way in, along, or across any county or State highway, street or property within a sanitary district is hereby granted to a sanitary district in case such right-of-way is found by the sanitary district board to be necessary or convenient for carrying out any of the work of the district. Any work done in, along, or across any State highway shall be done in accordance with the rules and regulations of the Board of Transportation."

3. G.S. 162A-74. (Metropolitan Sewerage Districts) Rights-of-way and easements in streets and highways. "A right-of-way or easement in, along or across any State highway system road, or street,... within a district is hereby granted to a district in case such right-of-way is found by the district board to be necessary or convenient for carrying out any of the work of the district. Any work done in, along, or across any State highway system, road, street, or property shall be done in accordance with the rules and regulations and any reasonable requirements of the Board of Transportation,..."

4. G.S. 136-93. Openings, structures, pipes, trees, and issuance of permits. "No opening or other interference whatsoever shall be made in any State road or highway other than streets not maintained by the Board of Transportation in cities and towns, nor shall any structure be placed thereon, nor shall any structure which has been placed thereon be changed or removed except in accordance with a written permit from the Board of

Transportation or its duly authorized officers, who shall exercise complete and permanent control over such roads and highways.

No State road or State highway, other than streets not maintained by the Board of Transportation in cities and towns, shall be dug up for laying or placing pipes, conduits, sewers, wires, railways, or other objects, and no tree or shrub in or on any State road or State highway shall be planted, trimmed, or removed, and no obstruction placed thereon, without a written permit as hereinbefore provided for, and then only in accordance with the regulations of said Board or its duly authorized officers, or employees; and the work shall be under the supervision and to the satisfaction of the Board or its officers or employees, and the entire expense of placing the highway in as good condition as before shall be paid by the persons, firms, or corporations to whom the permit is given, or by whom the work is done. The Board, or its duly authorized officers, may, in its discretion, before granting a permit under the provisions of this section, require the applicant to file a satisfactory bond, payable to the State of North Carolina, in such an amount as may be deemed sufficient by the Board or its duly authorized officers, conditioned upon proper compliance with the requirements of this section by the person, firm, or corporation granted such permit. Any person making any opening in a State road or State highway, or placing any structure thereon, or changing or removing any structure thereon without obtaining a written permit as herein provided, or not in compliance with the terms of such permit, or otherwise violating the provisions of this section, shall be guilty of a misdemeanor ..."

5. G.S. 136-102.6 Compliance of subdivision streets with minimum standards of the Secondary Roads Council required of developers.

* * *

(e) No person or firm shall place or erect any utility in, over, or upon the existing or proposed right-of-way of any street in a subdivision to which this section applies, except in accordance with the Division of Highways' POLICIES AND PROCEDURES FOR ACCOMMODATING UTILITIES ON HIGHWAY RIGHTS-OF WAY, until the Division of Highways has given written approval of the location of such utilities. Written approval may be in the form of exchange of correspondence until such times as it is requested to add the street or streets to the State System, at which time an Encroachment Agreement furnished by the Division of Highways must be executed between the owner of the utility and the Division of Highways. The right of any utility placed or located on a proposed or existing subdivision public street right-of-way shall be subordinate to the street right-of-way, and the utility shall be subject to regulation by the Board of Transportation. Utilities are defined as electric power, telephone, television, telegraph, water, sewage, gas, oil, petroleum products, steam, chemicals, drainage, irrigation, and similar lines. Any utility installed in a subdivision street not in accordance with the Division of Highways Accommodations

Policy, and without prior approval by the Division of Highways, shall be removed or relocated at no expense to the Division of Highways.

6. G.S. 136-18 Powers of Board. The said Board of Transportation shall be vested with the following powers:

* * *

(10) "To make proper and reasonable rules, regulations and ordinances for the placing or erection of telephone, telegraph, electric and other lines, above or below ground, signboards, fences, gas, water, sewerage, oil, or other pipelines, and other similar obstructions that may in the opinion of the Board of Transportation, contribute to the hazard upon any of the said highways or in any way interfere with the same, and to make reasonable rules and regulations for the proper control thereof. And whenever the order of the said Board shall require the removal, or changes in, the location of telephone, telegraph, electric, or other lines, signboards, fences, gas, water, sewerage, oil, or other pipe lines, or other similar obstructions, the owners thereof shall at their own expense except as provided in G.S. 136-19.5(c), move or change the same to conform to the order of said Board. Any violation of such rules and regulations or noncompliance with such orders shall constitute a misdemeanor."

7. NORTH CAROLINA ADMINISTRATIVE CODE, SUBCHAPTER 2E, SECTION .0400 - GENERAL ORDINANCES

.0420 CONSTRUCTION WITHIN RIGHT-OF-WAY
"It shall be unlawful for any person or firm to construct, place or erect any power, telephone, or other poles, signboards, fences, water, gas, oil, petroleum products, steam, chemicals, sewage, drainage, irrigation or other pipe lines, wires or cables or other obstructions in, over, or upon any road, highway or right-of-way of the State Highway System without the written permission of the State Highway Administrator or his authorized agent."

.0421 UTILITY WIRES OR CABLES OVER HIGHWAYS
"It shall be unlawful to construct any power, telephone, television, telegraph, or any other utility wires or cables over highways or roads on the State Highway System unless such wires have the minimum vertical clearance above the highest elevation of the road or highway crossed by them as prescribed in the American National Standards Institute's National Electrical Safety Code for the installation and maintenance of electric supply and communication lines, as amended and as may be amended by the National Electrical Safety Code; except a minimum vertical clearance of 18 feet shall be maintained for overhead power and communication lines crossing all highways. The lateral and vertical clearance from bridges should conform

with the National Electrical Safety Code; however, greater clearances at bridges may be required by the Department of Transportation to provide for bridge construction and maintenance. Parallel utility lines occupying highway right of way shall maintain a minimum vertical clearance of (15.5) feet as stated in the National Electrical Safety Code."

DEFINITION OF TERMS

Armless - Void of conventional protruding mechanical structural members.

Average Daily Traffic - 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. The term is commonly abbreviated as ADT.

Backfill - Replacement of soil around and over a pipe or any underground installation.

Bedding - Organization of soil to support a pipe or any underground installation.

Board - Shall mean the Board of Transportation, an agency of the State of North Carolina.

Bond - A sum of money posted as a guarantee to indemnify the Board for any damages to the roadway or highway facility resulting from encroaching installations.

Bury - Depth of top of pipe or other installation below grade of roadway or ditch.

Carrier - Pipe directly enclosing a transmitted fluid or gas.

Casing - A larger pipe enclosing a carrier.

Clear Recovery Area - 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 above-ground 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.

Conduit or Duct - An enclosure for protecting wires or cables.

Control of 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 highway is fully or partially controlled by the Board.

Control of Access, Full - 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.

Control of 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.

Department - Shall mean the N.C. Department of Transportation - Division of Highways.

Direct Burial - Installing a utility facility underground without encasement.

District Engineer - Shall mean a District Engineer of the N. C. Department of Transportation - Division of Highways.

Division Engineer - Shall mean a Division Engineer of the N. C. Department of Transportation - Division of Highways, acting directly or through his duly authorized representatives.

Encasement - Structural element surrounding a pipe or other installation.

Encroachment - Use of highway right-of-way for non-highway purposes.

Encroachment Agreement - A document by which the Board regulates and/or gives approval of the use and occupancy of highway rights-of-way by utility facilities or private lines. Generally, Encroachment Agreements cover utility facilities placed on highway right-of-way wholly at the expense of the owner, whereby the utility is there permissively and not as a matter of right.

Engineer - The Chief Engineer, Division of Highways, North Carolina Department of Transportation, acting directly or through his duly authorized representative.

Expressway - A divided arterial highway for through traffic with full or partial control of access and generally with grade separations at major intersections.

Freeway - An expressway with full control of access.

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 control of 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.

Jacket - Encasement by concrete poured around a pipe or other installations.

Manager of Right-of-Way - Shall mean Manager of Right-of-Way of the N. C. Department of Transportation - Division of Highways, acting directly or through his duly authorized representatives.

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 separating the traveled ways.

New Utility Installations - Means initial installations on the highway rights-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 rights-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.

Normal - Crossing at a right angle.

Open Cut - Excavated opening for underground facilities.

Overfill - Backfill above any underground installation.

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.

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.

Pressure - Relative internal pressure in psig (pounds per square inch gauge - measure of relative internal pressure).

Primary, Electric Power - The inducing voltage of a specified transformation. All nominal voltage above 7200 volt phase-to-ground will be considered primary.

Private Lines - Privately owned facilities that are devoted exclusively to private use.

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.

Rest Area - A roadside area with parking facilities separated from the roadway provided for motorists to stop and rest for short periods. It may include drinking water, toilets, tables and benches, telephones, information, and other facilities for travelers.

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.

Roadside Picnic Table - A single table or a pair of tables provided with at least off-shoulder parking space. Facilities limited to table, trash can, and sometimes a shelter over the table.

Roadway - The portion of a highway, including shoulders, for vehicular use. A divided highway has two or more roadways.

Scenic Overlook - A roadside area provided for motorists to stop their vehicles beyond the shoulder, primarily for viewing the scenery in safety.

Scenic Strip - An area adjacent to the right-of-way, generally but not exclusively parallel and of a width not greater than the normal right-of-way, which has been acquired to preserve its scenic quality.

Secondary, Electric Power - The induced voltage of a specified transformation. All nominal voltage below 7200 volt phase-to-ground will be considered secondary.

Self-Supporting - Having the qualities in itself to maintain a predetermined specified position.

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.

Slab, Floating - Slab between but not contacting pipe or pavement.

Sleeve - Short casing through a structural element.

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 Encroachment - Encroachment on highway right-of-way that is not of a permanent nature. Generally, the time of removal from the right-of-way can be predetermined prior to installation.

Traffic Control Plan - 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.

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.

Untrenched - Installed without breaking ground or pavement surface, such as by jacking or boring.

Use and Occupancy Agreement - A document by which the Board regulates and/or gives approval of the use and occupancy for highway rights-of-way by utility facilities or private lines. Generally, this document will include those utilities occupying highway right-of-way where the owner had prior rights or a compensable interest.

Utility Facilities and/or Utilities - Means and includes all 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.

Visual Quality - Means 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.

GENERAL CONSIDERATIONS

The following general considerations are applicable for the location, design, traffic control devices, open-cuts, installation and maintenance, inspection, and alteration of vegetation as they relate to utilities hereafter installed within highway rights-of-way.

Location

1. Utility lines should be located as far as possible from traveled roadway, preferably near the right-of-way line to minimize need for later adjustment to accommodate future highway improvements and to permit servicing such lines with minimum interference to highway traffic.

2. Longitudinal installations should be located on uniform alignment, preferably near the right-of-way lines as determined satisfactory by the Manager of Right-of-Way or Division Engineer so as to provide a safe environment for traffic operation and to preserve adequate space for planned highway improvements or other utility installations. Longitudinal installations under the traveled way will not be permitted except where the utility demonstrates to the satisfaction of the Manager of Right-of-Way or Division Engineer that an extreme hardship case exists.

3. To the extent feasible and practicable, utility line crossings of the highway should cross on a line generally normal to the highway alignment.

4. Wherever practicable, the attachment of utilities to highway structures should be avoided. Because of natural inherent dangers, this is especially applicable to electrical power lines, liquid petroleum, and gas lines.

5. The horizontal and vertical location of utility lines within the highway right-of-way limits should conform with the type of highway and specific conditions for the particular highway section involved. The location of the above ground utility facilities should be consistent with clear recovery area for the type of highway involved, so as to provide drivers of errant vehicles which leave the traveled portion of the roadway a reasonable opportunity to stop safely or otherwise regain control of the vehicle.

6. In all cases, full consideration should be given to the measures, reflecting sound engineering principles and economic factors, necessary to preserve and protect the integrity and visual quality of the highway, its maintenance efficiency, and the safety of highway traffic.

7. Within areas acquired or set aside for their scenic quality, historic value, or recreational use, new utility 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. Such areas include, but are not limited to: scenic strips, scenic overlooks, rest areas, roadside picnic tables, recreation areas, and the rights-of-way of highways adjacent thereto, as well as the rights-of-way of sections of highways which pass through public parks and historic sites. These conditions also apply to utility installations needed for a highway purpose, such as for highway lighting, or to serve a weigh station or rest areas. (See Page 42 for additional information on the beforementioned areas.)

8. If joint use of North Carolina Department of Transportation signal poles is requested, the Division Traffic Engineer shall be contacted to obtain approval in writing for the installation prior to submittal of the encroachment.

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

Design

1. The utility should be responsible for the design of the utility facility to be installed within the highway rights-of-way or attached to a highway structure. If acceptable, the Manager of Right-of-Way or Division Engineer will approve the utility proposal with respect to pressure, the method and location of the utility facilities to be installed, and the manner of attachment. Upon request, the utility should submit design criteria and design computations.

2. Utility installations on, over, or under the rights-of-way of State highways and utility attachments to highway structures should, as a minimum, meet the following requirements:

   (a) Electric power and communication facilities should conform with the currently applicable National Electrical Safety Code; however, applicable specifications found in other sections of this policy should apply when more restrictive than the National Electrical Safety Code.

   (b) Water and sewer lines should conform with the currently applicable specifications of the American Water Works Association; however, North Carolina Department of Health and local specifications and codes should apply when more restrictive than American Water Works Association specifications.

   (c) Pressure pipelines should conform with the currently applicable sections of ANSI Standard Code for Pressure Piping of the American National Standards Institute, applicable industry codes, and Federal Register including:

      (1) Power Piping, ANSI, B31.1.0
      (2) Petroleum Refinery Piping, ANSI, B31.3
      (3) Liquid Petroleum Transportation, Piping Systems, U.S. Department of Transportation, Title 49, Part 195, Minimum Federal Safety Standards

(4) Gas Transmission and Distribution Piping System, U.S. Department of Transportation, Title 49, Part 192, Minimum Federal Safety Standards.

(d) Liquid petroleum pipelines should conform with the currently applicable recommended practice of the American Petroleum Institute for pipeline crossings under railroads and highways.

3. All utility installations on, over, or under highway rights-of-way and attachments to highway structures shall be of durable materials designed for long service life expectancy and relatively free from routine servicing and maintenance.

4. On new installations or adjustments of existing utility lines, provision should be made for 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. (See "Traffic Control Procedure")

Traffic Control Devices

During construction and any subsequent maintenance, the utility owner shall use proper traffic control procedures and shall provide proper traffic control devices that are in conformance with the latest Manual on Uniform Traffic Control Devices (MUTCD) and the North Carolina Supplement to the MUTCD. Information as to the above may be obtained from the Division Engineer or Division Traffic Engineer responsible for the particular construction area. The Manager of Right-of-Way and the Division Engineer or their representatives reserve the right to stop any work for noncompliance.

Open-Cut on Paved Roads

The Department discourages the cutting of any pavement to accommodate the installation of utility facilities. However, it is recognized there are instances when pavement cuts are reasonable or necessary. The following controls are applicable for open-cuts of pavement for the installation of utilities:

1. Cutting of pavement on freeways will not be permitted.

2. No longitudinal pavement cut will be permitted on any State maintained road except in cases of extreme hardship.

3. Open-cuts across secondary roads with an ADT of 2000 or less may be allowed by permit for the installation of utility facilities larger than 2" in diameter. Any exceptions for facilities 2" in diameter or less will be those mentioned in the following paragraph.

4. Open-cuts will not be allowed across secondary roads with an ADT in excess of 2000, or U.S. and N.C. routes which are not classified as freeways, unless, in the opinion of the Division Engineer, an open-cut is justified by reason of rock, other utilities, state of repair of the

existing pavement, or other causes. In those exceptional cases where open-cut is justified, the Division Engineer should consider in his approval that construction of open-cut be between daylight hours of 9:00 a.m. and 4:00 p.m., with the ditch being closed or traversable by 4:00 p.m.; or night hours between 7:00 p.m. and 6:00 a.m., with the ditch being closed or traversable by 6:00 a.m.

5. For open-cut installation standards, see Pages 37-39.

Installation and Maintenance

1. A written agreement is required for any utility which is to cross or otherwise occupy highway right-of-way. After approval, with the exception of utility service connections and aerial crossings installed under a Blanket Agreement, the Division Engineer or his appointed representative shall be given prior notice before beginning work on highway right-of-way. Where structure attachments are involved, the Division Engineer shall notify the Bridge Maintenance Superintendent before work begins. There must be a mutual understanding between utility and DOT representatives as to when work will commence and on any other conditions deemed necessary.

2. Traffic will not be detoured or rerouted on State roads for the installation unless approved by the Division Engineer. When detours are allowed, the Division Engineer will delineate the detour route and all signing and marking of the detour which may be necessary. The entire cost of the signing and marking, together with the installation, shall be borne by the utility. Where city streets not on the State system are involved in detours, the applicant must obtain permission from city officials.

3. Parking of vehicles on areas of installation or maintenance will not be permitted in the traveled way, except where the prescribed signing or flagmen, or both, are in place.

4. The storage of materials on the roadway will not be permitted except in extreme instances and then only by permission from the Division Engineer or his representative and where proper signing is in place.

5. All areas disturbed during construction or maintenance shall be restored to the satisfaction of the Division Engineer or his representative.

6. In the event the applicant or his agent fails to restore any roadway opening to the satisfaction of the Division Engineer, after sufficient notification by the Division Engineer, the non-betterment cost of restoring or repairing same by DOT forces will be borne by the applicant.

7. If mutual satisfactory arrangements can be made with the Division Engineer, the pavement may be restored by DOT maintenance forces with the applicant assuming the full cost of such replacement. When DOT forces replace pavement, the charge for such will be on a cost reimbursable basis with a minimum charge of $50.00.

8. When DOT forces replace the pavement, the responsibility for barricades, warning, etc., during pavement replacement will be assumed by the DOT. After the replacement of pavement is complete, the responsibility of maintaining the patch will be assumed by the DOT.

9. All installations outside control of access lines on freeways shall be installed so that maintenance of installations can be carried on from outside the control of access lines.

Inspection

1. At the discretion of the Division Engineer, a highway inspector may be assigned to any work covered under an approved Encroachment Agreement on highways open to traffic or completed highway project if, in his opinion, inspection is necessary. The cost of such inspections will be borne by the applicant. Any inspector assigned to the installation operations will have full authority to act in behalf of the Department and to stop all work adversely affecting highways; provided the work is not being performed in accordance with the Agreement executed between the Department and the applicant based on Department standards. Generally, inspection costs to the applicant will not be applicable on active highway construction projects. The inspector shall have the authority to perform field test and take material samples for laboratory tests and should not accept work or materials from an encroaching utility that the State will not accept from our own forces or our contractor.

2. With the exception of service connections and aerial crossings approved under Blanket Agreements, the applicant or his agent or contractor must have available at the utility construction site an executed copy or conformed copy of the approved Utility Agreement. Failure to produce this Agreement at the site may result in stoppage of work until the applicant or his agent or contractor can show evidence that the proposed installation has been approved in accordance with this policy, and the work is being performed in accordance therewith.

Removal or Alteration of Vegetation

1. The encroaching party or their agents shall exercise every required precaution during construction and/or maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs or 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 the various counties, municipalities, and other official regulating agencies relating to sedimentation and pollution prevention and control as referenced in the North Carolina Administrative Code, Title 15, Chapter 4, Sedimentation Control, as may be amended.

2. Where there is excavation for underground installations or when any other installation or maintenance operations disturb the ground surface and the existing ground cover, the encroaching party shall be required to perform erosion control measures as follows:

   (a) Erosion control shall be performed in accordance with requirements contained in the current edition of the N. C. Department of Transportation Standard Specifications for Roads and Structures.

   (b) The use of temporary erosion control measures shall be included to prevent siltation of waterways and adjacent property. The use of

basins, silt check dams, silt fence, temporary slope drains, brush barriers, and temporary seeding and mulching, shall be used, as needed.

(c) Permanent erosion control shall be performed as follows:

1. All disturbed areas shall be dressed to original typical sections and plowed to a depth of 5 inches. The top 2 inches shall be pulverized to provide a uniform seedbed. Lime shall be applied before plowing.

2. Kinds and rates of seed, fertilizer, and limestone shall be specified by the Area Roadside Environmental Engineer.

3. Lime, seeds, and fertilizer shall be applied with necessary equipment to give uniform distribution of these materials. The hand-bucket method is not acceptable.

4. Seeded area shall be cultipacked to firm seedbed and seed shall be adequately covered.

5. Grain straw shall be applied over seeded areas as a mulch. No bare ground shall be visible when riding by a mulched area if proper application is achieved. Thick clumps of straw are not permissible; a uniform coverage is required.

6. Mulched area shall be tacked with asphalt sufficient to hold straw in place.

(d) Ditch treatment shall be used where steep grades could cause ditch erosion. Use of jute mesh, excelsior matting, or fiberglass roving is acceptable. Ditch treatment should be installed before mulching operation.

3. Any removal or alteration of vegetation on Department of Transportation right-of-way will be done in accordance with House Bill 342 - General Statute 136-18.6 - CUTTING DOWN TREES - effective April 19, 1989.

4. No ornamental trees may be cut or removed without prior approval, and, in certain situations, the Department of Transportation may require that ornamental trees or shrubs be carefully dug and replanted or replaced by new plants.

5. When permission for cutting, trimming, digging, herbicide treatment, bulldozing or discing, or other removal or alteration of trees, shrubs or other vegetation on highway rights-of-way for the purposes of construction and maintenance by an encroaching party is given, it shall be subject to the following standard requirements:

(a) The permission applies only to the interest of the State in the vegetation and is not to be construed as freeing the encroaching party from liability to the adjacent property owner. Special attention is called to this provision in cases of specimen trees that are also a part of private development, such as home grounds, schools, churches, etc.

(b) All cutting shall be done as close to flush with the ground as is practicable with modern saw equipment. Under very 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 the necessity of high stumps will rest with the encroaching party.

(c) Trimming of specimen trees on highway rights-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.

(d) All cuttings shall be removed from the highway rights-of-way, and out of view unless otherwise stated in permit. If woodchipping machines are used for brush disposal, the chips may be left on the rights-of-way provided they are scattered uniformly and not piled or windrowed.

(e) Removal or alteration of vegetation for overhead utility facilities is limited to a normal width of clearance for the size and type of utility line involved, and is not to exceed fifteen (15) feet. Proposed encroachments requiring a wider clearing area will be considered only on the basis of (1) removing only danger trees, (2) retaining large, sound, strong-trunked trees, (3) trimming such large sound trees only for wire clearance instead of complete side trimming, or (4) additional justification from the utility.

(f) Under some circumstances the granting of permission related to overhead utility facilities will be conditioned upon the preservation of such shrubs and low-growing trees within the clearing area. The need and extent of such preservation will be determined for specific locations.

(g) When excavating for underground utility installation or maintenance is done near trees, the minimum, but necessary cutting of tree roots 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, according to the location, size, and quality of the tree involved.

(h) 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. The use of herbicides is permissible only if they are applied as a part of a definitely scheduled program aimed at the elimination of 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 desirable brushy growth has been replaced by low-growing ground cover which will not cause a

maintenance problem. Herbicide applications which kill grass or other herbaceous vegetation indiscriminately will not be permitted. 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 developments. Vegetation shall be sprayed or otherwise treated with herbicides while in its first growing season after cutting, or before it has reached an average height of six (6) feet unless there are very exceptional conditions existing in a particular and limited area of rapid plant growth, in which case dead plant material above the height limit shall be removed after the completion of chemical action. No application of herbicides that are harmful to existing grass, legumes, vines, or other low-growing ground cover plants shall be used (1) on highway cut slopes or fill slopes where such vegetation has been planted or has become established naturally; (2) on highway shoulders between the highway surfacing and the ditch line; or (3) on other areas where it is obvious that mowing is done as a part of regular highway maintenance. Where specific plants have been selected and preserved, they shall be protected against damage by the herbicide treatment of other vegetation. Careless or excess herbicide application will not be tolerated, and special precaution must be taken to avoid pollution of streams or ponds.

(i) If clearing is done by bulldozers, discs, or similar equipment, all debris shall be removed from the highway right-of-way, and out of view unless otherwise stated in permit. There shall be no blocking of highway drainage due to such operation, and the ground surface shall be left in a smooth and uniform condition. Necessary precautions as required by the North Carolina Sedimentation Control Commission and the Standard Specifications of the Department of Transportation must be taken to minimize erosion, siltation, and pollution during the clearing operations and required erosion controlling measures must be taken during the clearing operation.

6. No longitudinal installation should be installed adjacent to control of access lines on a freeway that would cause the cutting, trimming or disturbance of any vegetation or other items within the control of access line.

Traffic Control Procedure

This procedure makes reference to five publications. They are the Manual on Uniform Traffic Control Devices (MUTCD) which provides general design and instruction for all traffic devices; the Traffic Control Devices Handbook (TCDH) which serves as a guideline for implementing the standards and applications of the MUTCD; the Work Zone Traffic Control Standards and Guidelines publication should be used to supplement the MUTCD and the TCDH - the Appendix lists a section on Utility Work Zones; the North Carolina

Supplement to the MUTCD* which provides traffic control standards as they apply to North Carolina; and the Highway Design Branch Roadway Standard Drawings (Drawing Nos. 150.01 to 150.12) which provides detailed information for temporary traffic control devices and situations such as temporary lane closures. All four publications should be referred to in order to assure that all construction or maintenance projects are completed safely and efficiently.

* Copies of the N. C. Supplement to the MUTCD can be obtained in the District Engineer's office.

1. Planning and Safety Tips for Traffic Control

   (a) Before starting any construction or maintenance project, check with the proper City or State authority to make sure all necessary permits have been procured.

   (b) Take a good look at the job site, note its general characteristics, then make a general plan for traffic flow. Will it be necessary to utilize parking lanes for traffic? Will detours be needed and if so, where? How will traffic control affect pedestrian traffic? For any road closure, notify the proper authority in advance. Obtain in advance, approval for detour signing from the authority having jurisdiction in the matter.

   (c) Make traffic control devices available prior to the beginning of work. Install the devices properly and maintain them during the time they are required. Keep them in place only as long as they are needed and remove them immediately thereafter. Where operations are performed in stages, keep in place only those traffic control devices that apply to the conditions present during the stage in progress. Keep signs clean, in proper position, and legible at all times. Repair or replace signs that are damaged, defaced, or dirty. Provide barricades and sign supports that are neatly constructed, not ones that appear makeshift or hastily thrown together.

   (d) Keep trucks and other equipment away from the work area when they are not in use and do not use them as barricades. Whenever possible, park all vehicles and equipment on the same side of the street.

   (e) Provide construction signing and traffic control that not only warn the motorist but, convey the idea of what you want him to do. To accomplish this, every effort should be made to establish the following conditions:

      1. Keep traffic moving at or near a normal rate.
      2. Have continuity in guidance. Allow the driver to see from one warning device to the next. Check this personally by driving through the site to see whether your vehicle path is smooth, safe and logical, and that the motorist is adequately forewarned.

3. Use the same system of guidance and control from day to day on the same operation. Do not, however, leave up signs overnight that are not applicable.

(f) Give traffic careful consideration in the planning and scheduling of your work. It is an ever present problem in traffic operations, and the better it is handled, the easier the job will be.

(g) If a major disruption of traffic is to take place, do not overlook the help that can be obtained from Public Affairs Departments and the news media.

2. Application of Standards

(a) The recommended use of traffic control devices for work conditions illustrated herein are, generally, for speeds 35-45 miles per hour. Three advance warning signs are indicated for most approaches to work sites (See Roadway Standard Drawing No. 150.04, "Application of Construction Approach Warning Signs"). Reference should be made to notes on the illustrations, and to tables that are included in the N. C. Supplement to the MUTCD on the size of advance warning signs, recommended distances between signs, and the spacing of traffic devices. (See Tables 1 and 2, page 316 of the Supplement)

(b) The maximum spacing between channelizing devices shall be approximately equal in feet to the speed limit in a taper. A range from two to four times the posted speed limit is suggested for devices placed on a tangent to keep traffic out of the closed lane. In all instances, the actual number, size, and type of devices employed shall be sufficient to adequately warn approaching motorists of conditions ahead. Governed by approach speeds and surrounding conditions, traffic control devices shall be spaced far enough apart for approaching motorists to understand and react accordingly. Special attention shall be given to the location and spacing of signs when construction area is in or near a crest vertical or horizontal curve. The work area shall be extended so that the lane closure begins in advance of the curve and minimum sight distance is met (See Roadway Standard Drawing No. 150.12, "Stopping Sight Distance and Taper Length Charts").

(c) The actual number and type of warning, guide, and regulatory traffic control devices required may vary, depending upon the nature of traffic, its volume, and speed. Traffic control devices may vary from a few simple devices on a minor street with low volume and speed, to an elaborate array of devices for extensive construction on a high-volume expressway.

(d) Some illustrations are appropriate for daytime construction only. At night and during periods of construction inactivity when these illustrations do not apply, Type I barricades or nonmetallic drums are to be placed adjacent to the existing edge of pavement to form delineation.

(e) Operational signs are generally mounted on portable supports. These are normally used for short term operations to warn and guide traffic through or around construction areas within a construction zone. Signs shall be maintained in proper position, clean and legible at all times. If need be, they shall be ballasted or weighted in such a manner that they will be stable under wind and vehicle action. Ballasting shall be done with sandbags or other yielding material placed in such a position that they do not become missiles or cause unreasonable damage if hit. The bottom of the sign shall be a minimum of one foot above the pavement surface.

(f) Work shall not start until all the required signs, barricades, warning and/or channelizing devices are installed.

(g) Reflectorized materials shall have a smooth, sealed outer surface which will display the same approximate color day and night. As a minimum, all reflective sheeting shall be enclosed lens (engineer grade) sheeting.

(h) Where one-way traffic is being maintained, it may be required to be flagged up to twenty-four (24) hours per day. Flagmen shall be equipped with the standard "STOP" and "SLOW" hand held paddles or "STOP" and "SLOW" signs on a rigid pedestal mounted 5" high. Red flags shall be permitted in emergency situations only. The flagmen shall wear a helmet and distinctive apparel such as a fluorescent orange vest, shirt, or jacket. For nighttime conditions, similar outside garments shall be reflectorized. A pilot vehicle shall be used when, in the opinion of the Division Engineer, such assistance to traffic is advisable. Refer to the MUTCD, Part VI, Section F., Control of Traffic Through Work Areas.

3. Traffic Control Devices

(a) Any agency performing construction and maintenance work on or adjacent to a street or highway on the State Highway System is responsible for using the proper traffic control devices. The devices used are subject to approval by the Division of Highways and shall conform to the MUTCD and to the North Carolina Supplement to the MUTCD.

(b) All traffic control devices installed on the State Highway System shall be in conformance with the MUTCD and the North Carolina Supplement to the MUTCD. In addition, since the MUTCD has been approved by the Federal Highway Administrator as a national engineering standard, it is applicable to all highways open to public travel in accordance with Title 23, U.S. Code, Sections 109(b), 109(d), and 402(a), and 23 CFR 1204.4. The MUTCD contains provisions for the design and use of traffic control devices on all streets and highways regardless of type or class or the governmental agency having jurisdiction. These facilities include local

municipal streets and highways, and highways under Federal administration such as the National Park Service, U.S. Forest Service, Bureau of Land Management, Military Reservations, etc.

Corrective Measures

When existing hazards associated with utility facilities located in the highway environment are determined, they should be reviewed and corrective measures taken to reduce such hazards. Evaluation of existing accident experience associated with utility facilities will help determine the higher frequency locations and hopefully help identify those locations which may have a higher than average potential for an accident to occur.

Once specific corrective measures have been determined, it is expected implementation of these will be pursued through a prioritization process which should take into account resources available, replacement and upgrading planned both for the utility and highway physical plants, and overall accident potentials. Corrective measures must be a joint effort between the Department of Transportation and the affected utilities. The utility companies should work closely with the Department of Transportation in identifying problem areas and help establish schedules for corrective measures. Such schedules should take into consideration, wherever possible, the utility's planned activities on line upgradings, replacements, and the like. Also, an orderly, planned effective process of safety improvements should take into consideration the costs to both the highway user and the utility consumer regardless of who pays for the utility relocation.

ENCROACHMENT AGREEMENT INFORMATION

Prior to beginning work within State right-of-way, the utility owner shall obtain an Encroachment Agreement. Forms can be obtained from the District Engineer's office in the area where the utility work is to take place.

UTILITIES ON FREEWAYS
(See "Traffic Control Procedure")

1. Application

The following policy applies to all utility installations on, over, or under freeway rights-of-way with one exception. Utilities for servicing facilities required solely for the purpose of operating the freeway are exempt from the provisions of this policy provided such utilities do not traverse scenic, historic, or recreational areas as described in GENERAL CONSIDERATIONS Location - Par. 7, Page 11.

2. Utilities Along Freeways On New Location

Where a freeway is on new location, a utility will not be permitted to be installed longitudinally within the control of access lines of such freeway, and any utilities located outside the control of access lines cannot be serviced by access from the through-traffic roadways or ramps. Where frontage roads are provided, utilities may be located along the frontage roads, outside the control of access lines, from which they can be serviced without access from through-traffic roadways or ramps.

Where a utility already exists within the proposed right-of-way of a freeway on new location and it can be serviced only by access from the through-traffic roadways or ramps of the completed freeway, the utility shall be relocated or other provisions made so that it can be serviced without access from the through-traffic roadways or ramps.

There may be extreme cases where a utility may be permitted along a freeway on new location under strictly controlled conditions as covered by Item 8.

3. Utilities Along Freeways on Existing Location

A utility presently located on the right-of-way of an existing highway that is reconstructed as a freeway may be permitted to remain thereon without relocation provided it can be serviced without access from the through-traffic roadways or ramps. Where such utility in its original location can be serviced only by access from the through-traffic roadways or ramps, it shall be relocated or other provisions made so that it can be serviced without access from the through-traffic roadways or ramps. No new or additional utility installation shall be made along the freeway except along a frontage road, outside the control of access lines. Exceptions may be made for extreme cases as covered in Item 8.

4. Major Valley Crossings

Where a freeway crosses a major valley or river on an existing high value structure, any utility carried by said structure at the time

the highway route is improved may continue to be so carried when to relocate the utility would be very costly and provided the utility can be serviced without interference with road users. Expansion of a utility carried by an existing structure across a major valley or river may be permitted provided the utility can be installed and serviced without interference with road users.

A new utility will not be permitted to be installed on a structure across a major valley or river at and after the time the highway route is improved, except for extreme cases as covered by Item 8, in which case the utility is to be located off the freeway right-of-way at both approaches to the structure.

5. Utilities Crossing Freeways

New utility installations and adjustments or relocations of existing utilities may be permitted to cross a freeway. To the extent feasible and practicable, they should cross on a line generally normal to the freeway alignment.

a. Utilities Along Roads or Streets Crossing Freeways

Where a utility follows a crossroad or street which is carried over or under a freeway, provision should be made for the utility to cross the freeway on 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 ramps. Generally, the utilities are to be located within the normal right-of-way of the crossroad or street, existing or relocated, and may cross over or under the freeway or be carried on or through the highway grade separation structure, provided installation and servicing thereof can be accomplished without access from the through traffic roadways or ramps. Where distinct advantage and appreciable cost savings are effected by locating the utilities outside the normal right-of-way of the crossroad or street they may be so located, in which case they shall be located and treated in the same manner as utility lines crossing the freeway at points removed from grade separation structures as in (b) and (c) which follow:

b. Overhead Utility Crossings

Overhead utility lines crossing a freeway at points removed from grade separation structures, or those crossing near a grade separation but not within the normal right-of-way of a crossroad or street, should be adjusted so that supporting structures are located outside the outer edges of through-traffic roadway side slopes and, preferably, outside the control of access lines, in any case supporting poles are to be located outside the clear recovery area,

either right or left of the through-traffic roadways as planned for later widening, if any. However, supporting poles shall not be placed in medians 80 feet or less in width. Where right-of-way lines and control of access lines are not one and the same, as where frontage roads are provided, supporting poles may be located in the area between them. In extraordinary cases where such spanning of the roadways is not feasible, consideration may be given to conversion to underground facilities to cross the freeway. At interchange areas, supports for overhead utilities should be permitted only where all of the following conditions are met: (a) the above indicated clearance is provided with respect to the freeway through-traffic lanes, (b) there is sufficient lateral clearance from edge of ramp shoulder outside the clear recovery area, (c) essential sight distance is not impaired, and (d) the conditions of Item 7, Access for Servicing Utilities, are satisfied.

The vertical clearance to overhead utility lines crossing freeways shall be a minimum of 18 feet. All other clearances shall conform to the National Electric Safety Code, U.S. Department of Commerce, National Bureau of Standards.

c. Underground Utility Crossings

Utilities crossing underground below the freeways shall be of durable material and so installed as virtually to preclude any necessity for disturbing the roadways to perform maintenance or expansion operations. The design and types of materials shall conform with appropriate governmental codes and specifications. Manholes and other points of access to underground utilities may be permitted within the right-of-way of a freeway only when they are located beyond the shoulders of the through-traffic roadway or ramps as planned for later widening, if any, and only where they can be serviced or maintained without access from the through-traffic roadways or ramps.

d. Utility Service Connection Crossings

In expanding areas along freeways, the utility should install distribution or feeder line crossings of freeways spaced as needed to serve customers in a general area along either or both sides of the freeway, so as to minimize the need for crossings of the freeway by utility service connections. In areas where utility services are not available within reasonable distance along the side of the freeway where the utility service is needed, crossings of the freeway by utility service connections may be permitted in accordance with the applicable requirements of this Manual.

e. Provision for Expansion of Utilities

When existing utilities are relocated or adjusted in conjunction with construction of a freeway, provision may be made for known and planned expansion of the utility facilities, particularly underground. They should be planned to avoid interference with traffic at some future date when additional or new overhead or underground lines are installed.

6. Utilities in Vehicular Tunnels

As a general rule, utilities will not be permitted to occupy vehicular tunnels on freeways on new location, except in extreme cases as covered by Item 8. Utilities which 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 which have not previously occupied an existing vehicular tunnel that is incorporated in a freeway will not be permitted therein, except in extreme cases as covered by Item 8.

7. Access for Servicing Utilities

Access for servicing a utility along or across a freeway normally should be limited to access via (a) frontage roads where provided, (b) nearby or adjacent public roads and streets, 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 freeway right-of-way. Where utility supports, manholes, or other appurtenances are located in medians or interchange areas, access to them from through-traffic roadways or ramps may be permitted but only by permits issued by the Department to the utility owner setting forth the conditions for policing and other controls to protect highway users.

8. Multiple Use of Freeway Rights-of-Way in Extreme Cases

The Department will preserve the access control feature of all freeways but recognizes the merit and need for accommodating utility facilities under strictly controlled conditions, especially at locations within and approaching municipal areas where land is scarce and right-of-way is expensive. Approval may be given in extreme cases for installing utility facilities within an area on and along the outer border of freeway rights-of-way when the following conditions have been satisfied:

a. The utility satisfactorily demonstrates to the Manager of Right-of-Way that any other utility location is extremely difficult and unreasonably costly to the utility; that the installation on the freeway right-of-way will not adversely affect the design, construction, maintenance, stability, traffic safety, or operation

of the freeway; and that the utility can be serviced without access from the through-traffic roadways or ramps.

b. The utility satisfactorily demonstrates that the direct and indirect environmental and economic effects of any loss of productive agricultural land or any productivity of any agricultural land would result from the disapproval of the use of such right-of-way for accommodation of the utility facility.

c. These environmental and economic effects together with any interference with or impairment of the use of the highway in such right-of-way, which would result from the use of such right-of-way for accommodation of such utility facility will be considered.

d. When longitudinal installations are proposed within existing access control lines, a utility strip shall be established by locating a utility access control line between the proposed utility facility and the through roadway and ramps. Existing fences should be retained and, except along sections of freeways having frontage roads, planned fences should be located at the freeway right-of-way line.

e. The area may be established only where the freeway rights-of-way are of ample width to accommodate utility facilities without adverse effect to the design, construction, integrity, and operational characteristics of the freeway; only where such rights-of-way will not be needed for the foreseeable expansion of the freeway; and only where there can be satisfactory provision for any needed highway and/or utility maintenance without the designated area.

f. Normally, this area is not to be established at locations where it is feasible to accommodate utilities on frontage roads or adjacent public roads or streets.

g. The Department will control and regulate the use and occupancy of the rights-of-way being used by the utility.

h. The lateral location of underground installations shall be suitably offset from the slope, ditch, and/or curb line. For poles or other ground-mounted utility facilities, the lateral location shall comply with the clearances set forth in Item 5(b).

i. 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.

j. Suitable advance arrangements are to be made for servicing the utility facilities without access from through-traffic roadways or ramps, in accordance with Item 7. At interchanges, access to utility supports, manholes, or other appurtenances may be permitted from the through-traffic roadways or ramps in accordance with Item 7, but only by permits issued by the Board to the utility owner setting forth the conditions for policing and other controls to protect highway users.

k. Where a freeway passes through or along area of scenic enhancement and natural beauty, as described in Paragraph 7 of GENERAL CONSIDERATIONS - Location, Page 11 and in OVERHEAD POWER AND COMMUNICATION LINES - Location, Page 40 utility installations shall be limited as provided therein.

1. On submission involving extreme case exceptions, the following minimum information shall be provided on utility plans or in other materials accompanying each agreement:

   (1) The proposed horizontal and vertical placement of the utility within the highway cross-section.

   (2) Lateral clearances from the edge of pavement or shoulder to the utility.

   (3) Location of points of access for installation and servicing of the utility.

   (4) Proposed revisions to the access control lines.

   (5) Sufficient typical details to show:

      (a) The configuration of conductors, spacing of poles, line materials and nominal voltage for aerial installations.

      (b) Trench details, operating pressures, pipe thickness and type for pipelines.

      (c) Trench details, conduit type, and location of manholes for underground telephone, telegraph or electric cable.

   (6) Where applicable, comments on problems encountered on alternates in addition to estimates of cost for alternates.

The provisions of the before mentioned are for application to freeways that are open to traffic or under construction. They have application to proposed freeway projects as necessary to accommodate the longitudinal relocation of existing facilities which fall in the path of the proposed highway construction. However, establishing a utility area shall not be the basis for expending funds for acquiring rights-of-way

widths in excess of that needed for the construction, operation, and maintenance of the freeway.

9. Emergency Repairs

Emergency repairs shall be described as repairs which become necessary by reason of injury to a utility facility caused by the occurrence of accidents, storms or weather disturbances or other unforeseeable events. When emergency repairs shall become necessary, written permission shall not be necessary prior to beginning of said repairs. When the usual means of access for normal service of the utility shall be insufficient to conduct such repairs, the utility may have a temporary right of access to and from roadways and ramps as necessary to accomplish the required repairs. When such temporary right of access is exercised, the utility shall first attempt to notify the State Highway Patrol and the Division Engineer or his representative. All emergency repair vehicles shall be parked as far off the traveled portion of the highway as possible. The utility shall provide standard warning signs as approved by the Department for maintenance and repair operations. (See "Traffic Control Procedure")

10. Removal or Alteration of Vegetation

Cutting, trimming, digging, herbicide treatment or other removal or alteration of any vegetation on freeway rights-of-way will not be permitted except for utility crossings, unusual hardship conditions, or as may be approved as being necessary in connection with an actual physical encroachment by the utility facilities. New parallel utility lines should be engineered so that no such work will be done on the freeway right-of-way during either construction or maintenance of the utility line.

11. Irrigation Ditches and Water Canals

Except for necessary crossings, water canals and irrigation ditches should be excluded from the rights-of-way of freeways, except for extreme cases as covered by Item 8. Existing parallel canals should be avoided in the initial location of the highway. All access and egress for servicing or patrolling such facilities shall be outside the control of access lines. Ditch-walkers or ditch-riders shall not be permitted to cross the freeway indiscriminately at grade. Under appropriate traffic control arrangements, special ditch cleaning equipment may be permitted to cross in those cases where considerable extra travel distance would be required otherwise to utilize grade separation structures. (See "Traffic Control Procedure")

12. Agreements

All Encroachment Agreements on freeways shall be submitted for approval in accordance with PROCEDURES FOR PREPARING AND PROCESSING UTILITY AGREEMENTS, Pages 59-72.

PIPELINES

Location and Alignment

The following controls are applicable for the location and alignment of pipeline installations:

1. For all crossings, the angle of crossing should be based on economic considerations of practical alternates. The crossings should be located as near normal to the highway alignment as practical.

2. Conditions which are generally unsuitable or undesirable for pipeline crossings should 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 bedload may be obstructed; within basins of an underpass drained by a pump if pipeline carries a liquid or liquefied gas; and in wet or rocky terrain where it will be difficult to attain minimum bury.

3. On longitudinal installations, utilities should be located so as to minimize interference with highway drainage, the structural integrity of the traveled way, and the safe operation of the highway (See "Traffic Control Procedure"). They should be located on uniform alignment preferably near the right-of-way line. Longitudinal installations will not be permitted under the pavement, or paved shoulders, except where the utility demonstrates that an extreme hardship case exists.

4. Vertical and horizontal clearance between a pipeline and a structure or other highway or utility facility should be sufficient to permit maintenance of the utility facility and the highway facility.

5. The locations of all pipelines shall be reviewed by the Manager of Right-of-Way, Division Engineer, or State Design Services Engineer to minimize interference of the proposed utility installation with existing or proposed highway facilities or with highway maintenance and operation processes.

6. Uncased pipelines under pavement should be constructed of ductile iron or equal quality materials with satisfactory leak-proof joints. The Department will also accept the use of an uncased 4½" and smaller high molecular weight polyethylene plastic pipe that the gas industry uses, on State roads other than freeways. Any deviation from these requirements shall meet the approval of the Manager of Right-of-Way and State Design Services Engineer.

7. Where pipelines are installed in the right-of-way and are not of ferrous material, a locating tape shall be installed with the pipeline.

8. Acceptable materials for utilities under existing or proposed pavement - materials not listed will be referred to the State Design Services Engineer - Roadway Utilities Section.

a. Smooth Wall Steel Pipe meeting API 5L Grade B Specifications
b. Spiral Welded Steel Pipe meeting ASTM Specification A-211
c. Circular Black Steel Pipe meeting ASTM Specification A-120 or A-589
d. Galvanized Steel Pipe meeting ASTM A-120 Specifications
e. Ductile Iron Pipe - class 50 Min. Strength
f. Concrete Sewer Pipe - Plain and Reinforced Pipe meeting Department of Transportation Standard with Rubber Gasket Joints
g. Reinforced Concrete Pressure Pipe, Steel Cylinder Type for Water and other Liquids meeting AWWA Specifications C-300, C-301 and C-303
h. ABS (Acrylonitrile - Butadiene - Styrene) Composite Sewer Pipe shall meet ASTM D-2680 Specifications for Pipe sizes 8" thru 15", and ASTM D-2751 for Pipe sizes 4" and 6" for Laterals. ABS Sewer Pipe shall be used for Domestic Sewage only; also, P.V.C. Truss Pipe Meeting ASTM D-2321 which has to be specified by a registered Professional Engineer.
i. P.V.C. (Polyvinyl Chloride) Water Pipe (pressure only) - SDR 14 (C-900), SDR 18 (C-900), and SDR 21.
j. P.V.C. (Polyvinyl Chloride) Sewer Pipe (Force Main) SDR 14 (C-900), SDR 18 (C-900) and SDR 21.
k. P.V.C. (Polyvinyl Chloride) pipe (Gravity Sewer) SDR 14 (C-900), SDR 18 (C-900), SDR 21, SDR 26, SDR 35, ASTM F 794, ASTM F 949 (A-2000) and Schedule 40 and 80.
l. V.C. (Vitrified Clay) Sewer Pipe, Extra Strength meeting ASTM Specifications C-700 with Factory Fabricated Joints meeting ASTM Specifications C-425
m. P.E. (Polyethylene) Plastic Pipe - SDR 7 meeting ASTM Specifications D-2239 and Plastic Tubing - SDR 9 meeting ASTM Specification D-2737 for sizes 3/4" thru 2" only
n. Polyethylene Plastic Pipe (High Molecular Weight) and (Medium Molecular Weight) SDR 11 meeting Plastic Pipe Institute Material Designation PE 3408 and PE 2406 in sizes up to 6.625" O.D. for gas with a maximum operating pressure of 60 PSIG.
o. Type K Copper Pipe meeting ASTM Specification B-88 for sizes 3/4" thru 2"

Acceptable materials for utilities outside pavement shall be the same as above. Any materials not listed above, except asbestos cement and PVC SDR 26 for pressure applications, will be permitted only in the outer limits of the right-of-way (as close to the right-of-way line as possible). Asbestos cement pipe will not be allowed inside DOT right-of-way. PVC SDR 26 pipe will not be allowed inside DOT right-of-way for pressure applications (water line, force main, etc.).

9. Fire hydrants shall be of the break-away type and shall be placed a minimum distance of 6 feet back of curb and gutter sections and 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.

Bury

As a minimum, controls for the bury of pipelines follow:

1. The grade of top of pipe or casing within highway rights-of-way should provide minimum bury as follows:

   a. Longitudinal installations. . . . . 3'
   b. Crossings under roadways. . . . . 3'
      (below travel surface)
   c. Crossings under ditches (paved and unpaved) . . . 2'

2. Where less than minimum bury is necessary because of other utilities, highway drainage, water table, ordinances, or similar reasons, the pipe should be rerouted or else protected with a casing or concrete slab, or use should be made of other suitable measures acceptable to the Manager of Right-of-Way, Division Engineer, or State Design Services Engineer.

3. Bury for pipelines carrying materials which are flammable, corrosive, expansive, energized, or unstable, particularly if carried at high pressure potential, must comply with state, federal and utility codes, but in no case shall the depth of bury be less than as shown in No. 1 above.

Encasements - General

Generally, encasement of carrier pipes will not be required where open-cut construction is permitted or where the installation method under existing roads, where open-cut is not permitted, is such that the bored hole is never left unsupported. However, materials, joints, protective coating, grouting, wall thickness of carrier pipe, welds, and cathodic protection shall be in accordance with applicable industry or governmental codes.

Encasements - Freeways

1. Pipelines installed prior to or during construction of a freeway project may be installed without encasement provided the open-cut construction method consistent with Department standards is authorized. Any uncased pipeline crossing under a freeway shall, as a minimum, be constructed of ductile iron or equal quality materials with satisfactory leak-proof joints.

2. All pipelines crossing under existing freeways shall be encased unless the utility demonstrates to the satisfaction of the Manager of Right-of-Way or State Design Services Engineer that the installation method for an uncased crossing is such that the bored hole is never left unsupported.

3. Encasements shall extend from ditch line to ditch line in cut sections and 5' beyond the toe of slopes in fill sections.

4. Encased pipelines carrying gas or liquid fuel should be vented at each end and extended to the right-of-way line, or as otherwise required.

5. All encasement pipe shall be of equal or greater strength as required by the Department on highway drainage pipe.

6. On freeway projects planned for future construction, the encasement and/or carrier pipe should extend from right-of-way line to right-of-way line, or to an indicated line approved by the Department that allows for future construction of the highway.

Encasement - All Other State Roads

The Department strongly discourages the cutting of pavement on any State maintained road; however, on secondary roads where the ADT is 2000 or less, the Division Engineer may allow open-cut for the installation of pipeline crossings larger than 2" in diameter (See "Traffic Control Procedure"). No other secondary paved road or primary road shall be open-cut unless, in the opinion of the Division Engineer, it is justified by reason of rock, other utilities, state of repair of the existing pavement, or other cause. Keeping this in mind, the following encasement policy on all road crossings other than freeways is applicable.

1. Pipelines may be installed under State roads without using an encasement when the open-cut construction method consistent with Board standards is authorized.

2. On crossings where open-cut is not allowed, installations requiring bores of 6" or less may be made without encasement; installations requiring bores in excess of 6" shall be encased unless the utility demonstrates to the satisfaction of the Division Engineer that the installation method for an uncased crossing is such that the bored hole is never left unsupported.

3. Encasements shall extend from ditch line to ditch line in cut sections, 5' beyond the toe of slopes in fill sections, and 3' behind curb sections.

4. Uncased pipelines, regardless of method of installation, should be constructed of ductile iron or equal quality materials with satisfactory leak-proof joints. The Department will also accept the use of an uncased 4½" and smaller high molecular and medium molecular weight polyethylene plastic pipe that the gas industry uses. Any deviations from this requirement shall meet the approval of the Manager of Right-of Way or State Design Services Engineer.

5. Vents for encased pipelines carrying gas or liquid fuel should be extended to the right-of-way line, or as otherwise required. A vent shall be placed at the high end of short casings and at both ends for casings greater than 150' in length.

6. All encasement pipe shall be of equal or greater strength as required by the Department on highway drainage pipe.

7. On highway projects planned for future construction, the encasement and/or carrier pipe should extend from right-of-way line to right-of-way line or to an indicated line approved by the Department that allows for future construction of the highway.

Other Encasement Policies

1. Consideration will be given to encasement or other suitable protection for any pipeline:

   (a) With less than minimum bury.
   (b) Near footings of structures.
   (c) Across unstable or subsiding ground.
   (d) Near other locations that may be hazardous.

2. Casing pipe shall be sealed at the ends to prevent flowing water and debris from entering the annular space between the casing and the carrier.

Appurtenances

Drains, markers, shut-offs, and manholes are appurtenances to pipeline installations. Recommended controls for such appurtenances follow:

Drains

1. Drains are appurtenances by which liquids or heavy gases may be evacuated or exhausted. 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 the Department. Such outfall should not be used as a wasteway for purging the carrier unless specifically authorized by the Department and the Division of Environmental Management.

Markers

2. The utility should place readily identifiable and suitable markers at the right-of-way line where it is crossed by pipelines carrying materials which 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.

Shut-Off Valves

3. 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.

Manholes

4. Manholes should not be located in the pavement or shoulders of any State road. Exceptions may be made on roads at those locations where manholes are essential parts of existing lines that are permitted to remain in place under existing and proposed roadways. Every effort should be made to minimize such installations and to avoid their location in wheel paths or at street intersections, insofar as practicable. Manholes should be designed and located in such a manner that will cause the least interference with roadway users, other utilities, and future highway expansion. (For additional information on manholes, see MISCELLANEOUS - Utility Manholes and Vaults - Page 86.)

Installation Standards

Unpaved roads may be open-cut for pipeline crossings. Paved secondary roads with an ADT of 2000 or less may be open-cut for the installation of pipeline crossings larger than 2" in diameter (See "Traffic Control Procedure"). Pipeline crossings of all other paved (concrete or bituminous surface) roads shall be made by approved means of boring and jacking, jacking, boring, driving, or tunneling unless in the opinion of the Division Engineer,

open-cut is justified by reason of rock, other utilities, state of repair of existing pavement, or other cause. Under no condition shall jetting or wet boring with water of utility pipelines or encasements under pavements be allowed. Timber tunnel lining or shoring will not be permitted to remain as a part of the permanent installation.

Acceptable methods of installation follow:

1. Untrenched Construction

   Acceptable techniques for installing pipelines under a highway without disturbing the surface follow:

   a. Driving - A pipe or tool no larger than 6" in diameter with a pilot shoe can be driven through compressible soils by a steady thrust, hammering, or vibrating. A casing or corrosion resistant carrier must be used.

   b. Boring and Jacking - Smooth wall or spiral weld steel pipe may be jacked through dry bores slightly larger than the pipe bored progressively ahead of the leading edge of the advancing pipe as spoil is mucked by the auger back through the pipe. As the dry boring operation progresses, each new section of the encasement pipe shall be butt-welded to the section previously jacked into place.

      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. In the event 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.

      Size and wall thickness of smooth wall or spiral welded steel encasement pipe for boring and jacking is as follows:

Pipe Sizes (O.D.)	Wall Thickness
4" - 12-3/4"	.188
16"	.250
18"	.250
20"	.250
24"	.250
30"	.312
36"	.375
48"	.500

   c. Boring - Boring a hole with a rotary type power tool without the use of casing.

d. Jacking - Forcing an encasement or carrier pipe through a precut opening.

e. Tunneling - Excavated opening beneath roadway for the purpose of installing a tunnel liner (see MISCELLANEOUS - Tunnel Liners, Page 88)

f. Tunneling and Jacking - This method of installation which consists of jacking pipe under highways with simultaneous removal of spoil, is generally adopted for pipe sizes 36" to 96" in diameter.

The removal of spoil shall not extend more than 18" 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.

The depth of cover under pavement shall be a minimum depth of 3 feet from top of pipe to finished grade.

Jointing of sections of jacked pipe shall be by butt-weld, 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.

In the event that 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 be conducted at all times in such a manner so as not to create a hazard or impede the flow of traffic.

Portal limits of pipeline crossings should be no closer than the clear recovery area; 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' in depth in fill sections. Any exceptions to this policy must have the approval of the Division Engineer.

For other information on installation and maintenance, inspection, and traffic control devices, see Pages 13-15.

g. Wet Boring - Boring a hole with a rotary type power tool with the use of chemicals.

2. Open-cut Construction and Backfill

The integrity of the pavement structure, shoulders, and embankment slopes are primary concern. Applicable controls are as follows:

a. Open cuts shall not exceed 10' in depth. The encroaching party must obtain the approval of the State Design Services Engineer for any exception to this requirement.

b. The pipe shall be properly bedded as provided herein. The pipe shall be laid true to line and grade on a bed which is uniformly firm throughout its entire length and carefully shaped to fit the outside of the pipe for at least 10% of its outside diameter. Where rock is encountered, the trench shall be undercut at least 6" and backfilled with suitable material free of rock.

c. 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" loose layers, or other approved methods, and shall be compacted to at least 95% 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."

d. 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 his representative.

e. Where it is necessary to open-cut across concrete pavement or concrete base pavement, cuts should be made with a concrete saw where practical. A section of pavement of minimum length of 10' shall be removed and replaced with new concrete. Where the edge of the patch or section of removed pavement is less than 10' 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. The 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" greater than the depth of the original slab. Immediately under the replaced concrete, there shall be placed a thoroughly compacted 3" layer of soil type base course, sand, screening, or other granular material. All replaced concrete, dowels, joint filler, and subgrade reinforcing material shall meet the specifications of the Department, both as to material and performance of work. Where the existing pavement is badly cracked or has been patched to a state where a resurfacing will be required in the immediate future, the Division Engineer may authorize the use of a bituminous patch to meet the Department's patching procedure.

f. Where it is necessary to open-cut across roads with surfaces other than concrete, the pavement repair shall be as directed by the Department with no less than a minimum of 2" of surface course and asphalt base course, type HB, to the original subgrade or a minimum of 6" of HB, whichever is greater. The replacement surface and/or base shall extend a minimum of 1' 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. All replaced surfacing shall meet the specifications of the Department both as to material and performance of work.

g. Openings in the shoulders, side ditches and cut or fill slopes of the road shall be repaired to the satisfaction of the Division Engineer.

h. 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. 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 "Traffic Control Procedure")

i. 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. 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 "Traffic Control Procedure")

j. The following requirements are applicable where parallel trenches are made:

   (1) 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 as quickly as practical and the pavement shall be thoroughly cleaned.

   (2) Excavation in the immediate vicinity of drainage structures shall be made with special care so as not to damage or interfere with the use of the existing drainage facilities.

   (3) Drainage facilities that are inadvertently damaged must be repaired immediately.

   (4) The bottom of the excavation for a parallel installation in rural areas, or elsewhere when space will permit, shall not be nearer the edge of the pavement (measured in a horizontal plane) than the depth of the excavations so that the theoretical slope from the edge of the pavement to the bottom

of the ditch will be no steeper than a one-to-one slope. On paved sections under 24' in width, consideration shall be given for future widening and paving of shoulders. Where, in the opinion of the Division Engineer, soil conditions are such that sheet pilings or other shoring are necessary, the utility owner shall submit plans, specifications and design computation for sheeting or shoring, and they shall be sealed and signed by a registered professional engineer. The trench shall not be closer than 3' to the edge of the pavement except in special conditions approved by the Division Engineer.

(5) 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.

(6) Bore pits adjacent to or which may be hazardous to traffic should not be left open or unshielded overnight. Shielding in conformance with the Manual on Uniform Traffic Control Devices shall be allowed in the case of large pits or extensive bore and jack operations. Small bores under two lane roadways should be completed in one continuous operation. Pits 5' beyond the toe of fill slopes and outside the clear recovery area or behind guardrail need not be shielded.

(7) In no case shall separate bores be allowed beneath the travel lanes of divided highways unless the median width is sufficient to maintain the clear recovery area, in accordance with the AASHTO Roadside Design Guide, from each direction of travel.

k. For other information on installation and maintenance, inspection, and traffic control devices and warning signs, see Pages 13-15. (See "Traffic Control Procedure")

Adjustments

Recommended controls for adjusting existing pipelines that fall in the path of proposed highway construction projects follow:

1. An existing or relocated pipeline should be protected in such a manner as normally would be required for a new pipeline at the site.

2. An existing pipeline should be adjusted in line and/or grade where the top of pipe is too close to highway grade.

3. An existing pipeline not structurally adequate to support highway loads including asbestos cement and PVC SDR 26 for pressure applications shall be replaced by stronger pipe.

4. An existing pipeline which would lack adequate cover for protection against vehicular live loads or highway construction operations may be protected by a floating slab or encasement, as deemed necessary by the Manager of Right-of-Way, Division Engineer or State Design Services Engineer.

5. Abandoned pipes 12" in diameter and larger in fills 20' or less shall be removed and backfilled, filled with grout, or plugged, as directed by the Manager of Right-of-Way, Division Engineer or State Design Services Engineer. There may be unusual circumstances where the same requirements will apply on pipes smaller than 12".

6. Any sewer manholes, telephone vaults or valve vaults that are to be abandoned shall either be removed or broken down two (2) feet below subgrade, plugged and filled with suitable material.

Agreements

All Encroachment Agreements covering pipelines shall be submitted for approval in accordance with PROCEDURES FOR PREPARING AND PROCESSING UTILITY AGREEMENTS, Page 59.

OVERHEAD POWER AND COMMUNICATION LINES
(See "Traffic Control Procedure")

General

The type of construction, vertical clearance above pavement, and location of poles, guys, and related ground-mounted utility appurtenances along the roadside are factors of major importance to preserve a safe traffic environment, the visual quality of the highway, and the efficiency and economy of highway maintenance. A critical requirement for locating poles, guys, and related facilities along the roadside is the width of the border area, that is, the space between the back of ditch or curb line and the right-of-way line, and its availability and suitability for accommodating such facilities. The safety, maintenance efficiency, and appearance of highways are enhanced by keeping this space as free as practical from obstacles above the ground. Where ground-mounted utility facilities are to occupy this space, they should be placed as far as practical from the traveled way and beyond the clear recovery area. The nature and extent of roadside development and the ruggedness of the terrain being traversed are controlling factors for locating poles, guys, and related facilities at the right-of-way line.

In the interests of preserving safe roadsides, highway appearance, and efficiency and economy of highway maintenance operations, the following controls shall be used for installations of overhead electric power and communication lines.

Type of Construction

Any longitudinal installation of overhead lines on the highway rights-of-way should be limited to single pole type construction.

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.

The Department will not grant encroachment agreements covering the installation of poles erected solely for the purpose of cable television lines. The Department may permit the installation of cable television lines on highway rights-of-way by attachment to existing telephone, telegraph, and electric poles provided that permission is secured from the owner of such poles.

Vertical Clearance

A minimum vertical clearance of 18' shall be maintained for overhead power and communication lines crossing the highway and the lateral and vertical clearance from bridges should conform with the National Electrical Safety Code. Greater clearances at bridges may be required by the Department to provide for bridge construction and maintenance. Parallel utility lines occupying highway right-of-way shall maintain a minimum vertical clearance of 15.5 feet as stated in the National Electric Safety Code.

Location

Poles and related facilities on and along conventional highways in rural areas shall be located at or as near as practical to the right-of-way line. The poles should be located outside the clear recovery area for the highway sections involved.

In keeping with the nature and extent of roadside development along conventional highways in urban areas, such facilities should be located at or as near as practical to the right-of-way line or outside the clear recovery area. Where there are curbed sections the utilities should be located as far as practical behind curbs and, where feasible, behind the sidewalks. There is no single minimum dimension for setback of poles behind curbs; however, where there are curbed sections and no sidewalks, 6' will be used as a design safety concept guide.

Location of overhead utility installation on highways with narrow rights-of-way or on urban streets with closely abutting improvements are special cases which must be resolved in a manner consistent with the prevailing limitations and conditions. Before locating the utility other than at the right-of-way line, consideration should be given to designs employing self-supporting, armless, single pole construction, with vertical alignment of wires or cables or other techniques permitted by governmental or industry codes, that are conducive to a safe traffic environment. Exception to these clearances may be made where poles and guys 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.

Guy wires to ground anchors and stub poles should not be placed between a pole and the traveled way and should be located outside the clear recovery area.

Where irregular shaped portions of the right-of-way extend beyond the normal right-of-way limits, variances in the location from the right-of-way line will be allowed as necessary to maintain a reasonably uniform alignment for longitudinal overhead and underground installations.

Longitudinal installations of poles, guys, or other related facilities should not be located in a highway median and should be located outside the clear recovery area. On crossings of a highway, any such facility should not be located in a highway median less than 80' in width.

Within areas acquired or set aside for their scenic quality, historic value or recreational use, new aerial installations are to be avoided unless (1) other locations are unusually difficult, unreasonably costly, or are more undesirable from the standpoint of visual quality; (2) underground installation is not technically feasible or is unreasonably costly; and (3) the proposed aerial installation can consist of suitable designs and materials and can be made at a location which will give adequate consideration to the visual qualities of the areas being traversed. Areas referred to herein include but are not limited to scenic strips, scenic overlooks, rest areas, roadside picnic tables, recreation areas, and the rights-of-way of highways adjacent thereto, plus the right-of-way of sections of highways which pass through public parks and historic sites. These conditions also apply to utility installations needed for a highway purpose such as for highway lighting, or to serve a weigh station or rest area.

Agreements

All Encroachment Agreements covering overhead power and communication lines shall be submitted for approval in accordance with PROCEDURES FOR PREPARING AND PROCESSING UTILITY AGREEMENTS, Page 59.

UNDERGROUND ELECTRIC POWER AND COMMUNICATION LINES
(See "Traffic Control Procedure")

There is wide variation in the techniques and practices for installing electric power and communication lines underground due to differences in such factors as water conditions, type of subsoil, facility congestion and the like. Accepted methods for the underground installation of such lines include: trenching for conduit or duct construction or for uncased buried cable; direct burial for plowing of buried cable (see section on PLOWED-IN CABLE); jacking or pushing of pipe conduit on highway crossings where soil conditions permit. The following controls are applicable:

General

1. Underground utility construction should conform to all applicable codes, standards, and specifications.

2. It is suggested that all fiber optic cables be installed in accordance with ANSI fiber optic installation standards.

3. Pedestals or other above ground utility appurtenances installed as part of buried cable plant shall be located at or near the right-of-way line.

4. All proposed locations and utility designs shall be reviewed by the Manager of Right-of-Way or Division Engineer to insure that the proposed construction will not cause avoidable interference with existing or proposed highway facilities or with highway operation or maintenance.

5. On both cased or uncased installations, particularly on crossings of the highway, consideration should be given for placing a spare conduit or duct to accommodate known or planned expansion of underground lines.

6. The controls for installations on or near highway structures shall be followed as outlined in INSTALLATION ON OR NEAR HIGHWAY STRUCTURES, Page 48.

7. The general controls previously outlined for pipelines as related to markers, installation, open cut and untrenched construction, and adjustment shall be followed, as applicable, on underground installations of electric power and communication lines.

Location and Alignment

1. On longitudinal installations, utilities should be located at or as near as practicable to the right-of-way line so as to minimize interference with highway drainage, the structural integrity of the traveled way, and the safe operation of the highway.

2. Crossings should be located as near normal to the highway alignment as practical.

3. Conditions which are generally unsuitable or undesirable for underground crossings should 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.

Bury

The minimum depth of bury for cased and uncased construction shall be as follows:

a. Crossings under all roadways (including shoulders) of electric power and communication lines . . . . . 3'

b. Crossings under ditches (paved and unpaved) and sidewalks of electric power and communication lines . . . . . 2'

c. Longitudinal electric power primary. . . . . 3'

d. Longitudinal electric power secondary, and trenched communication lines. . . . . 2'

e. Plowed-in communication lines. . . . . 18"

Cased and Uncased Construction

1. All crossings under existing freeways shall be encased unless the utility satisfactorily demonstrates that the installation method for an uncased crossing is such that the bored hole is never left unsupported.

2. Encasements shall extend from ditch line to ditch line in cut sections and 5' beyond the toe of slopes in fill sections.

3. Underground crossings of all existing highways other than freeways may be installed without protective pipe, conduit or duct provided such installations are limited to open-cut construction or to small bores for wire or cable facilities where soil conditions permit installation by boring a hole about the same diameter as the cable and pulling the cable through. See open-cut policy on page 13. On crossings where open-cut is not allowed, installations that require bores in excess of 6" shall be encased unless the utility demonstrates to the satisfaction of the Division Engineer that the installation method for an uncased crossing is such that the bored hole is never left unsupported.

4. Where crossings of underground lines are encased in pipe, protective conduit or duct, the encasement should be extended from ditch line to ditch line in cut sections and 5' beyond toe of slopes in fill sections. On curbed sections, it should extend 3' behind curb lines. Where appropriate, the encasement should extend to right-of-way lines, or to an indicated line that allows for future construction of the highway.

5. Considerations should be given to encasement or other suitable protection for any wire or cable facilities (a) with less than minimum bury, (b) near the foundations of structures, or (c) near other locations where there may be a hazard.

6. Where installations are proposed by the utility, the utility will be required to furnish information as to the maintaining of traffic, traffic control devices, and controls and construction methods to be employed before the proposed installations are considered for approval. This is to insure the necessary protection of the utility facility and the integrity and operation of the highway facility. (See "Traffic Control Procedure")

Agreements

All Encroachment Agreements covering underground electric power and communications lines shall be submitted for approval in accordance with PROCEDURES FOR PREPARING AND PROCESSING UTILITY AGREEMENTS, Page 59.

PLOWED-IN CABLE

This policy applies only 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 policies are applicable for plowing in cable:

1. Where cable is to be plowed in, it is not to be installed closer than 3' from the edge of the pavement, except in unusual situations approved by the Division Engineer. Shoulders stabilized with bituminous material and/or compacted crush stone will be considered as pavement. Cable is to be placed as far as practical from the centerline of unpaved roads. Plowing in will be prohibited in unstable shoulders caused by adverse weather conditions or other reasons.

2. The cable shall be placed to a minimum depth of 18" below the surface of the shoulder except in passing over obstructions (see Underground Utilities, Page 53). Service taps and laterals shall be placed a minimum of 24" below the bottom of side ditches except in unusual situations approved by the Division Engineer.

3. In plowing cable, the pavement of intersecting roads shall not be cut except in situations approved by the Division Engineer.

4. 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 freeways, the policy for crossings by the method of driving, jacking, or boring holes up to 6" 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 services. In these cases the Division Engineer may authorize the cutting of pavement for emergency restoration of service.

6. For installations at, near, adjacent to, or attached to structures, or pipe culverts see INSTALLATION ON OR NEAR HIGHWAY STRUCTURES, Page 48.

7. Equipment used in plowing in cable shall be of such types as not to cause damage to pavement.

8. 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 the "Traffic Control Procedure".

9. All areas disturbed during construction or maintenance shall be restored to the satisfaction of the Division Engineer or his representative.

Agreements

All Encroachment Agreements covering plowed-in cable shall be submitted for approval in accordance with PROCEDURES FOR PREPARING AND PROCESSING UTILITY AGREEMENTS - Plowed-in Cable, Page 66.

LIGHTING

Because lighting directly affects motorists, NCDOT must verify that lighting systems installed on highway rights-of-way meet acceptable design criteria. To do this, sufficient information must be presented, in the form of plans (drawings) with the Encroachment Agreement request. A specific drawing number representing the complete set of plans with individual sheet numbers should be used for ease in referencing the plans on the encroachment request. The plans should be prepared in accordance with standard engineering practices.

In addition to the information presented on encroachment plans (edge of pavement, right-of-way lines, lighting system layout, title block, legend, scale, etc.), the following should be shown on the drawings:

1. Vicinity Map: This is a small sketch showing the location of the encroachment. It should show route numbers (SR, NC, US, Interstate, etc.) and names, and it should be sufficiently large enough for someone unfamiliar with the area to be able to locate the encroachment.

2. Illumination Design Criteria: 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 footcandles) and uniformity (ratio of average footcandles to minimum footcandles) of light that will be on the pavement in accordance with AASHTO guidelines. Design calculations in the form of computer print outs or hand computations specifically applicable to the proposed lighting encroachment should be presented as certification that the lighting system will meet acceptable standards.

3. Electrical Design Criteria: This is a statement of the standard used to assure that the electrical installation is adequate and safe. It should 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 should be shown or noted on the plans.

4. Structural Design Criteria: This is a statement of the standard used to assure that the installation will withstand rain, wind and ice loads under the soil and mechanical conditions. It should 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, light standard material and dimensions should be shown or noted on the plans.

5. Luminaire Specifications: This should include the style, type lamp, 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.

6. Pole and Arm Specifications (Light Standard): This should include the type material, arm length, pole length, anchorage, and base details.

7. Foundation Details: This should include the type material, size, reinforcing, anchor bolt projection, and top of foundation elevation relative to finished earth grade.

8. Placement Details: The traverse (setback) distance of the light standard foundation from the travel lanes shall be clearly indicated. This should 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 should also show the mounting height and overhang 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 they 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 fifty feet (50') or less per one inch (1").

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

10. Circuitry Details: These may be presented as typical sections showing depth of bury, width of trench, backfill, etc. for underground circuits, and vertical clearance for overhead circuits. Methods of crossing pavement and repair of damaged areas shall be noted.

As stated previously, lighting directly affects motorists, and NCDOT is responsible for assuring that lighting on DOT right-of-way meets acceptable standards. Lighting systems designed and installed in accordance with the following standards will be acceptable.

American Association of State Highway and Transportation Officials (AASHTO)
"An Information Guide for Roadway Lighting"
"Roadside Design Guide"
"Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals"
National Electrical Code (NEC)
National Electrical Safety Code (NESC)
Illuminating Engineering Society (IES)
"Lighting Handbook"
American National Standards Institute (ANSI)
"Roadway Lighting"

There is too much information in the above standards to be presented in this manual, but the following comments may be helpful in preparing acceptable lighting encroachment designs.

Illumination

Luminaires with output distribution in conformance with appropriate IES classifications are more likely to provide illumination which will meet level and uniformity criteria. Luminaires with IES classification of medium, semicutoff (M,SC) type II, III, or IV as appropriate for the roadway width are used most frequently. Luminaires with IES classification of short, cutoff (S,CO) of the appropriate type for the roadway width, will minimize glare for motorist, but usually require closer spacing to meet uniformity criteria.

Placement

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 design computations. Bracket arm length shall be noted on the plans and shall correlate with the pole placement (setback) and luminaire overhang dimensions.

Mounting height should be correlated with the output of the luminaires. Usually thirty feet to thirty-five feet (30'-35') mounting height is used for luminaires with outputs up to thirty thousand (30,000) lumens, and thirty-five feet to fifty feet (35'-50') mounting height is used for luminaires with outputs ranging from thirty thousand (30,000) to sixty thousand (60,000) lumens. The proposed installation should be in compliance with IES guidelines concerning minimum mounting height, depending on luminaire output and classification.

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

The setback of poles (light standard/foundation) from the edge of the travel lane is often difficult to select because of the variety of roadway typical sections. For pole placement purposes, curb and gutter (C&G) is defined as an approximate six inch (6") high vertical faced curb, not intended to be mountable by a vehicle. Setback distances are measured from the traffic side vertical face of C & G to the nearest surface of the pole (light standard/foundation). Six feet (6') is the normally accepted setback for C & G sections. In situations where buildings or other obstacles prevent 6' setback, it may be acceptable to reduce the setback. Situations that may warrant a reduced setback will be considered on an individual basis. Factors which will be considered in allowing a reduced setback include: existing above ground obstacles, curb side parking, and speed limits of 45 MPH or less. Setback sufficient to allow opening of car doors and avoid contact with tops of trucks shall be provided.

Curb and gutter sections which do not meet the above definition (i.e. 6" vertical face) are considered mountable, and pole setback shall be increased accordingly.

Placement of poles behind guardrail (GR) shall allow for deflection of the guardrail in the event of impact by a vehicle. Acceptable setback behind GR is dependent on speed, type of guardrail, spacing of supporting posts, and alignment curvature. A setback of five feet (5') behind GR is normal for tangent alignment on semi-rigid GR with post spacings of six feet (6') and speed limits up to 60 MPH. Less setback may be acceptable with lower speed limits or closer spacing of GR posts. The setback may be reduced to two feet and six inches (2' 6") behind GR for semi-rigid GR on tangent alignment with post spacings of three feet (3') and a 45 MPH speed limit.

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

It is desirable that all poles (breakaway and non-breakaway) be located outside the recovery zone on roadways with a shoulder (paved or unpaved) section or a mountable curb and gutter. The recovery zone is the area adjacent to the travel lane which permits a large percentage of the vehicles leaving the roadway out of control to recover. The recovery zone distance is a variable based on the traffic volumes, speeds, and roadside geometry. The clear zone distances presented in the AASHTO "Roadside Design Guide" shall be used in determining setback distances for non-breakaway poles (light standard/foundation). Non-breakaway poles shall not be located in the clear zone adjacent to roadways with a paved or unpaved shoulder section or a mountable curb or gutter.

More than two feet (2') distance behind ditches with steeper than three to one (3 to 1) front and back slopes is considered outside the clear and recovery zones, and it is an acceptable location for non-breakaway poles. An elevation more than five feet (5') above the elevation of the pavement of the nearest travel lane is considered outside the clear and recovery zones and is also an acceptable location for non-breakaway poles. All poles shall be located with more than two feet (2') clearance to the bottom of ditches to prevent drainage blockage or scouring.

Minimum acceptable setback distances for breakaway poles is very difficult to determine because any obstacles close to 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." Preferably, they should be located fifteen to twenty feet (15' - 20') from the edge of the travel lanes.

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.

Generally, medians with curb and gutter sections may be considered as acceptable for placement of poles (light standards/foundations) when the width of the median is greater than twelve feet (12'), a minimum distance of eleven feet (11') is available between the pole and the edge of the travel lane, and the speed limit is not in excess of 45 MPH. Medians with shoulder sections may be considered as acceptable for placement of poles (light standard/foundations) when the width of the median, measured between the edge of the travel lane of each direction of traffic, is greater than thirty-six feet (36'). Breakaway poles will be required in median locations when they are located in the clear zone as defined in the AASHTO "Roadside Design Guide".

Overhead Circuitry

Overhead circuitry for lighting will not be allowed inside control of access (CA) 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.

Lighting Policy Exceptions

Exception to the lighting policy will apply to lighting proposed on state maintained roads in residential areas and other locations, which is not primarily intended for lighting the roadway, as determined by the Division Engineer. Deviation from the lighting policy which is based upon the above criteria must be approved by the Division Engineer or Manager of Right of Way.

INSTALLATION ON OR NEAR HIGHWAY STRUCTURES

The attachment of utility facilities to highway structures, and the installation of underground and overhead utilities in close proximity to highway structures can materially affect the structure, its appearance, the safe operation of traffic, and the efficiency of maintenance. However, it is recognized that the installation on or near structures is a practical arrangement and may be permitted when justified and where found to be in the public interest. Where feasible, the installation of utilities on or near highway structures should be avoided. Because of natural inherent dangers, this is especially applicable to electrical power lines, liquid petroleum, and gas lines. However, where other locations for utility lines prove to be impractical, consideration will be given for installations by an acceptable method.

When metallic pipes or conduits are attached to an existing or proposed structure, the owner shall insulate the hanger assemblies so that stray currents will not flow into the structure.

Without exception, attachments to or through structures must be approved by the State Design Services Engineer in Raleigh, and in instances as contained herein, installations in close proximity to structures must also be approved by the State Design Services Engineer. On highways open to traffic, the applicant shall obtain approval directly from the State Design Services Engineer in accordance with procedures on Page 50 prior to formal submission of the Encroachment Agreement to the Division Engineer. On active highway construction projects, the State Utility Agent in Raleigh will be responsible for coordinating and obtaining the approval of the State Design Services Engineer in accordance with procedures on Page 52.

The following policies and procedures will be applicable on attachments to structures and the installation of underground and overhead utilities on or near structures.

A. Attachment to Structures

1. Bridges

a. It is the policy of the Department to limit the maximum size of pipe to be attached to a bridge to 12" I.D.

b. On bridges over railroads, waterways, and certain obstructions, the utility should be attached between beams or girders. However, if attachment between beams or girders is unreasonable, attachment to the overhang may be permitted if it does not result in overstress.

c. On grade separation bridges, those carrying one route over another, the utility shall be attached in the exterior and/or interior bays and not in the overhang.

d. The vertical position of the utility attachment is to be such that the lowest part thereof does not extend below the bottom of the highest adjacent beam or girder.

e. Only longitudinal attachment of utilities to bridges will be allowed; transversel attachments to the superstructure will not be permitted.

f. Access points through superstructure should be avoided.

g. Pipes and conduits that are carried through curtain walls or back walls shall be "sleeved" and tightly sealed with mastic and jute.

h. Suspend hangers or rollers from inserts or expansion anchors in bottom of superstructure with steel rods. Bolting through bridge floor will not be permitted.

i. 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.

j. Communication and electric power line attachments should be suitably insulated, grounded, and carried in protective conduit or pipe from point of exit from ground to re-entry.

k. When leaving the bridge, the utility should be aligned outside the roadway in as short a distance as operationally practicable.

2. Reinforced Concrete Culverts

a. Without exception, a hydraulic analysis shall be made to insure that any attachment to or through a culvert will not adversely affect its function.

b. Transverse attachments may be made to a culvert as follows:

(1) To the outside face of the headwall.
(2) In the area between bottom of headwall and above the bottom of the top slab of the culvert barrel without using the wing-walls for bearing support.
(3) In extreme cases, through the vertical walls of the culvert.

c. Longitudinal attachments may be made to a box culvert as follows:

(1) To the bottom or top slab through the culvert.
(2) In extreme cases, where grade must be maintained for the utility, to the vertical walls of the culvert.

3. On structures to be altered by the DOT which require the relocation of existing utility attachments and on proposed structures to which

new attachments are to be made, the DOT will, under certain conditions, alter the recommended design to provide for the attachment of a utility. In the event additional structural material is needed to make provisions for the attachment, the owner shall reimburse the DOT for the additional structural material at the contract bid price in place.

4. Since highway structure design and site conditions vary at each location, the adoption of a standardized method to accommodate the attachment of utilities to existing structures is not possible.

Procedure for Obtaining Approval of the State Design Services Engineer for Attachments to Existing Structures on Highways Open to Traffic

In order 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 the Encroachment Agreement to the Division Engineer. In order to obtain this approval, the following procedures are to be followed:

1. When an owner deems it necessary to attach to an existing structure, he shall inquire in writing to the State Design Services Engineer in Raleigh as to the possibility of the desired attachments. The owner shall include in this inquiry the following information:

    a. For attachment to existing bridge:

        (1) The project number under which the bridge was built if a plaque is attached thereto.

        (2) The desired location as to the side of the bridge. (i.e., North, Southeast, etc.)

        (3) The type and specification of material to be attached.

        (4) If couplings are to be used, furnish type of material to be used and outside diameter of coupling. Black plastic couplings are not to be used.

        (5) The number of units to be attached.

        (6) The ultimate weight of the entire facility per foot including the hanger assembly or messenger.

        (7) If available, the owner is to furnish a set of his general installation plans and specifications showing north direction on each sheet, state system route number, the type of existing structure involved, and its approximate location from another system road intersecting the proposed route. If general plans are not available, the owner is to show the above information on county and

supplement maps available at the Division Engineer's office.

(8) If the owner so desires, he may submit for review a sketch or sketches showing his preferred location and method of attachment and any other information he considers pertinent to the proposed attachment.

b. For attachment to an existing reinforced concrete culvert:

In many instances, it is difficult to determine the project under which a specific culvert was constructed. Therefore, on request to attach to an existing culvert, it will be necessary for the owner to furnish the same information as outlined above on existing bridges in addition to information as follows:

(1) A sketch of the culvert showing in plan and profile the size and number of barrels, and the approximate skew to the centerline of the roadway.

(2) A detailed sketch showing the dimensions of the existing culvert in the vicinity of the proposed attachment.

2. After this information is furnished to the State Design Services Engineer, a study will be made to see if it is permissible to attach to the structure.

a. If the attachment is permissible, the owner will be furnished plans of the structure showing the location and a suggested method of attachment, provided satisfactory sketch or sketches have not been previously submitted by the owner.

b. Special notes relative to the installation will be sent to the owner for his use in preparing the encroachment sketch or sketches.

c. After the sketch or sketches have been prepared by the owner, two copies each shall be sent to the State Design Services Engineer for review and approval.

d. After the sketch or sketches have been reviewed and all details completed, the owner will be requested to furnish the required number of sketches for the approval stamp of the State Design Services Engineer to be affixed thereon. Approved copies of the sketches, Special Provisions and approval letter for attachment to each copy of the executed Encroachment Agreement will be returned to the owner, with copies of same to the Division Engineer, District Engineer, and Bridge Maintenance Superintendent.

3. After final approval by the State Design Services Engineer, the owner shall then submit necessary copies of the proposed Encroachment Agreement, with the approved sketch or sketches, special provisions, and letter of approval attached to each Agreement to the Division Engineer in accordance with PROCEDURES FOR PREPARING AND PROCESSING UTILITY AGREEMENTS, Page 59.

4. The Division Engineer shall see that the approved sketch or sketches are attached to the Encroachment Agreement, execute the Agreement in behalf of the Department and distribute it to interested parties.

5. The owner shall notify the Division Engineer and shall provide a Traffic Control Plan before beginning proposed attachment to an existing structure. It shall be up to the Division Engineer's judgement whether or not Traffic Engineering should become involved in the Traffic Control Plan review. Upon completion of work, the Division Engineer shall notify the Bridge Maintenance Superintendent so that inspection may be scheduled.

6. The Bridge Maintenance Superintendent shall see that the attachment is installed in accordance with the approved sketch or sketches.

Procedure For Obtaining the State Design Services Engineer Approval for Attachments to Structures on Active Highway Projects

On all active highway construction projects, the State Utility Agent in Raleigh will be responsible for coordinating and obtaining the approval of the State Design Services Engineer for the adjustment of existing utilities and/or the installation of new facilities on structures.

1. The owner will be advised as to proposed changes and limits of construction on existing structures, as well as to location and limits of construction on new structures.

2. It will then become the responsibility of the owner to notify the State Utility Agent in writing on any request for attachments in the same manner as required above for existing structures. In those cases where the utility owner is financially responsible for the attachment, the letter shall contain a statement to the effect that the owner will reimburse the Department of Transportation for any additional cost of redesign, structural material, or construction necessary to provide for the attachment of the utility to the proposed structure.

3. The request shall be made within 30 days after the owner has been notified of the proposed project in order to design the structure to accommodate any attachments. Generally, this notification will be made by the State Utility Agent or his representative by an on-site inspection.

4. In the event a request is made after a project has been let to contract, the owner of the utility must make satisfactory arrangements with the State Design Services Engineer and highway contractor so as not to interfere with or delay the contractor. A three-party agreement shall be executed between the Department, the highway contractor, and utility owner.

B. Installation of Underground and Aerial Utilities in the Proximity of Highway Structures

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

1. Underground Utilities

a. Bridge and Retaining Walls

(1) Underground installations may be buried longitudinally or transversely adjacent to footings, piles, or under spans.

(2) The utility should be located a minimum of 5' from nearest part of bridge or retaining wall footings, or earwalls. In hardship cases, the utility may be permitted closer than 5' from the nearest part of the footing or earwall; however, pressure lines closer than 5' shall be encased in a metallic encasement of sufficient size and strength or in concrete of sufficient thickness and strength to prevent rupture of the line for a distance of 10' outside the extremities of the footing.

(3) Where installed longitudinally adjacent to an existing bridge over a stream, the utility is to be buried at a minimum depth of 2' below the stream bed. (For piers, piles or cradle supports, see SPECIAL CONDITIONS, Page 84).

(4) 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 1/2:1 backslope beginning at the natural ground 5' from the extremity of the footing.

(5) No excavation shall be permitted that will create a hazard to the stability of any foundation.

(6) Only in extreme cases will blasting be permitted in the proximity of an existing structure and then only under the supervision of qualified DOT personnel with adequate

protection being provided by the utility owner for the structure.

(7) The Division Engineer may require the encasement of a utility if the location and conditions warrant it, even though not set forth herein.

b. Reinforced Concrete and Structural Plate Culverts

(1) The installation is not to adversely affect the drainage character of the area in the proximity of the culvert.

(2) When a utility is to be buried longitudinally along a road, the most advantageous location for the utility is in the fill over a culvert.

(3) When a utility is buried in the fill over a culvert, it must be located at least eighteen (18) inches from the inside face of the headwall.

(4) A minimum of 6" earth cushion between the bottom of the utility and top of the top slab of the culvert is desirable; however, it is realized that 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:

(a) Excavates the fill by hand when within 6" of the inside face of the headwall or top of culvert.

(b) 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' 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 headwall to prevent bonding of encasement to culvert.

(c) 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.

(5) When burying around the end of a culvert, the utility should be located a minimum of 5' from the nearest part of the culvert including the wingwalls and scour apron, and buried at a minimum depth of 2' below the stream bed. In hardship cases, the utility may be permitted closer than 5' 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' outside the extremities of the culvert. (For piers, piles, or cradle supports, see SPECIAL CONDITIONS, Page 84.)

(6) If conditions at a culvert prohibit the installation of a utility by either of the beforementioned 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.

(a) If the boring and jacking method is used, the top of the encasement is to be at a minimum depth of 1' below the bottom slab and extend 10' beyond the extremities of the culvert.

(b) Due to 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 owner is to make a formal request to the State Design Services Engineer in Raleigh for approval of the proposed installation prior to submission of the Encroachment Agreement to the Division Engineer.

c. Pipe Culverts

(1) 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:

(a) 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.

(b) The excavation for the last 6" is to be performed by hand.

(c) 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.

(2) If a utility is buried around the end of a pipe culvert, it is to be located a minimum of 5' from the nearest part of the utility to any part of the pipe culvert and 2' below the stream bed. (See Page 84 for SPECIAL CONDITIONS).

(3) 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.

(4) Any pipe culvert that is disturbed or damaged is to be replaced in its original condition and position.

(5) No utility will be permitted inside pipe culverts.

2. Aerial Utilities

a. Bridges

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

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

(a) Where feasible, the installation should be of a 1-span construction with supports located a minimum distance of 20' 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' from the top of the bank of the main water course and are not to adversely affect the hydrological character of the area.

(b) The utility shall be aligned as near parallel to the roadway and as near the right-of-way line as conditions permit.

(c) If the utility is located near the overhang of the structure, the vertical clearance is to be determined by Appendix "A", Page 115, labeled "REQUIRED VERTICAL CLEARANCES FOR SNOOPER 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.

(3) When an aerial installation is made transversely over or under the superstructure of an existing bridge, the following controls shall apply:

(a) When the utility is over an existing bridge, the vertical clearance of the lowest utility shall conform with the currently applicable National Electric Safety Code, but shall not be less than 18' in any case.

(b) When the utility is under the superstructure of an existing bridge, except for power lines, the utility is to be installed so that the highest elevation of the sag is at a minimum distance of 2' from the bottom face of bottom flange of any beam.

(c) 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 above ground is to conform with the National Electric Safety Code and the highest wire is to be a minimum distance of 10' 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.

(d) The supports are to be set a minimum distance of 20' from the nearest part of the left or right overhang of the bridge to allow for proper and efficient bridge maintenance.

(4) 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 National Electric Safety Code. The supports should be located 20' 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.

b. Culverts

Aerial installations may be made longitudinally adjacent to and transversely over an existing culvert. The policies to be used for installation of aerial utilities in the proximity of existing culverts are to be in accordance with the applicable portions of installations at bridge (See Page 56) with substitutions and deletions of (1) "culvert" for bridge (2) "wingwall" and scour apron" for overhang and (3) "wingwalls" for fill face of end bents.

Agreements

All Encroachment Agreements covering utilities in close proximity to structures shall be submitted for approval in accordance with PROCEDURES FOR PREPARING AND PROCESSING UTILITY AGREEMENTS, Page 59. There are instances, however, as covered in the beforementioned policies that require prior

approval of the State Design Services Engineer in Raleigh before submitting the Encroachment Agreement to the Division Engineer.

On Agreements forwarded directly to the Division Engineer, where the method of construction or installation of utilities in close proximity to structures appreciably deviates from Department policies or where, in the opinion of the Division Engineer, it is warranted, all copies of the Encroachment Agreement with attached sketches may be forwarded to the State Design Services Engineer. Upon receipt, the State Design Services Engineer will review sketches and handle with the utility owner for any revisions deemed necessary. After all details relative to the method of construction or installation of the proposed utility have been finalized and approved, all copies of the Encroachment Agreement will be returned to the Division Engineer for execution in behalf of the Department and for proper distribution.

When the Division Engineer investigates a requested utility encroachment in the proximity of an existing structure for conformance with this Manual, handling should be as follows:

1. Notify the Bridge Maintenance Superintendent in order that he may attend any conferences relative to a proposed encroachment in the near proximity of an existing bridge, box culvert, arch culvert or a pipe culvert 60" or greater in diameter. Revise the encroachment sketches to show any changes agreed upon at the conferences and furnish a copy of revised sketches to the Superintendent.

2. Upon completion of the encroachment installation, notify the Superintendent so that a final inspection can be arranged for approval of or recommendations as to necessary adjustments in the installation.

PROCEDURES FOR PREPARING AND PROCESSING UTILITY AGREEMENTS

General Considerations

1. The procedures contained herein are for use by the utility and the DOT in the preparation and processing of utility agreements covering the use and occupancy of highway rights-of-way. To comply with the General Statutes of North Carolina and General Ordinances of the Board, it should be clearly understood that no utility shall cross or otherwise occupy rights-of-way of any road on the State System without written permission of the Department; furthermore, with the exception of routine maintenance, no utility which has been placed on the right-of-way of any State road shall be changed or removed without written permission of the Department. These roads include freeways, primary roads, secondary roads, and roads or streets within municipalities that are on the State system. Standard Encroachment Agreement Forms may be obtained from the State Utility Agent in Raleigh or Division and District Engineers at locations shown on Pages 108-114.

2. In order to exercise more direct control, and in the interest of time, it is the intent that the responsibility and authority of approving as many utility agreements as possible be made locally by the Division Engineer; however, it should be recognized that there are instances when Agreements must be processed through the Raleigh office of the Department of Transportation for approval. Please use the following procedures for the processing of Encroachment Contracts:

   A. Raleigh Office

      (1) All control of access (full, partial and limited). This includes anything that pertains to control of access. (Forms R/W 16.2, 16.6A and 16.7 - 1000 cubic yards and above)

      (2) Original request for Blanket Contracts. (Forms R/W 16.3, 16.4, 16.5 and 16.5A)

      (3) Certain utilities as contained in Utility Manual - INSTALLATIONS ON OR NEAR HIGHWAY STRUCTURES.

      (4) Projects in the plan development or right-of-way stage, projects assigned to Utility Agents, and active contract construction projects. (This does not include force account or maintenance projects.)

      (5) Curb and gutter, pavement widening, and storm drainage for major traffic generators. (Forms R/W 16.1B or 16.2)

      (6) Lighting. (Lighting in predominantly residential areas or other locations, which is not primarily intended for lighting the roadway, as determined by the Division Engineer may be approved by the Division Engineer.)

      (7) Non-Utility Encroachments - major traffic generators. (Form R/W 16.1A)

B. Division Engineer

(1) All utility encroachments on primary and secondary highways, including force account or maintenance projects. (Form R/W 16.1)

(2) Any utility encroachments along primary and secondary highways included in the current TIP that you can determine will not affect future projects except for major traffic generators.

(3) Non-utility encroachments on primary and secondary roads except for major traffic generators. (Form 16.1A)

(4) Curb and gutter, pavement widening, and storm drainage on primary and secondary roads. (Form 16.1B)

a. All drainage that can be handled in accordance with North Carolina Department of Transportation Drainage Structure Standards. (Includes catch basins, drop inlets, etc.)

b. Paving of unpaved secondary roads by the private sector.

c. Construction of turn lanes with proper pavement design, curb and gutter, and sidewalk on minor traffic generators.

(5) Residential subdivisions - Encroachment Agreements to be secured for all encroachments on subdivision streets at the time of addition to maintenance system.

(6) All groundwater monitoring wells unless technical assistance of central office is required by the Division Engineer.

(7) Lighting in predominantly residential areas or other locations, which is not primarily intended for lighting the roadway, as determined by the Division Engineer.

C. Definitions

(1) Non-Utility

a. Flag Poles
b. Signs
c. Fences
d. Decorative Columns
e. Flower Boxes
f. Sprinkler System
g. Sidewalks (only)

(2) Major Traffic Generator

a. Shopping Center
b. Office Park
c. Industrial Park, etc.

(3) Major Drainage

a. Any Concrete Box Culvert
b. Special Junction Box
c. Drainage tied into existing Culvert
d. Extra Deep Manhole or Vaults

3. At the discretion of the Department, the form of written agreement may vary depending upon the type of encroaching utility and the type of highway being encroached upon. The format may be standard Encroachment Agreements provided by the Department, special Use and Occupancy Agreements, Reimbursement Agreements, or through exchange of correspondence. However, except as provided herein, the Agreements setting forth the terms under which the utility is to cross or otherwise occupy highway rights-of-way must include or by reference incorporate:

a. The State standards for accommodating utilities.

b. A general description of the size, type, nature, and extent of the utility facilities being located within the highway rights-of-way.

c. Adequate drawings or sketches showing the existing and/or proposed location of the utility facilities within the highway, the traveled way, the rights-of-way lines, and where applicable, the control of access lines and approved access points. Where facilities of another utility are to be unearthed, or exposed to potential damage, drawings shall show as nearly as possible the location of said facilities.

d. The extent of liability and responsibilities associated with future adjustment of the utilities to accommodate highway improvements.

e. The action to be taken in case of noncompliance with State requirements.

f. A Traffic Control Plan to provide for ease of traversability of the motorist. (See Traffic Control Procedure.)

g. Other provisions as deemed necessary.

4. When applications for encroachments are submitted to the Department for approval, it shall be the responsibility of the applicant to determine what, if any, facilities of other utilities are in existence in the encroachment area. Plans attached to Encroachment Agreements shall show, as nearly as possible, the location of other utilities that may be unearthed, moved, or exposed to potential damage. The applicant shall be responsible for providing protection and safeguards during construction to prevent damage to existing utilities and ensure that existing utilities will not be rendered inaccessible.

In accordance with G.S. 87-100 (Underground Damage Prevention Act) which became effective January 1, 1986, the applicant should give prior notice of construction to utility owners having existing facilities in the encroachment area. This notice should be given to avoid damage to existing facilities.

5. Emergency approval of encroachments may be given by the Division Engineer on conventional and partial control of access highways on an oral basis with later written approval. The type of encroaching utility and the type of highway being encroached upon will dictate the form of written agreement to be used as mentioned in Item 3 above. The Manager of Right-of-Way may give emergency approval of encroachments on Freeways. The Division Engineer and Manager of Right-of-Way shall use their judgment in determining what constitutes an emergency.

6. When the applicant of an 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 in the Raleigh office of the Manager of Right-of-Way. In the space provided in each agreement for execution, the name of the corporation or municipality shall be typed above the signature, and the name and title of all persons signing the Agreement shall be typed directly below their signature. When the applicant is not a corporation, then his signature must be witnessed by one person. The address of the applicant should be included in the Agreement and the names of all persons signing the Agreement should be typed directly below their signature.

7. Plans showing details of structure attachments shall be furnished the State Design Services Engineer for approval before the Encroachment Agreement is submitted. (See INSTALLATION ON OR NEAR HIGHWAY STRUCTURES for details on obtaining approval of the State Design Services Engineer Page 50.)

8. If deemed necessary by the Division Engineer, the applicant requesting permission to occupy highway right-of-way shall post a performance bond (surety bond, certified or cashier's check) or letter of credit adequate to indemnify the Department for damages to the roadway or highway facility caused by the installation. For additional information on bonds, see Page 101.

9. When an application is made for a new (initial) utility installation on a highway project that is under construction, the applicant must make satisfactory arrangements with the highway contractor, so as not to interfere with or delay the contractor. In the case of structure attachments, a three-party agreement between the Department, the highway contractor and the applicant shall be entered into. In all other cases,

a three-party agreement shall be entered into, or the Manager of Right-of-Way shall be furnished a letter from the highway contractor to the effect that the installation of such encroachment will not be the basis of a claim for delay or additional cost against the Department. This requirement does not apply to the adjustment or relocation of existing utilities necessitated by highway construction.

10. Matters concerning vegetation on highway right-of-way that are involved with utility installations in an encroachment request are to be referred to the Area Roadside Environmental Engineer for investigation and approval before final approval of the encroachment. Encroachment Agreements will not be approved until matters pertaining to the cutting or trimming of vegetation on highway right-of-way have been settled, and then permission for allowable cutting and trimming will accompany the approved Encroachment Agreement to the utility.

11. With the exception of underground utility service connections and aerial crossings installed under Blanket Agreements, the Division Engineer or his appointed representative shall be given prior notice by the applicant before beginning work on highway right-of-way. Where structure attachments are involved, the Division Engineer or his appointed representative shall notify the Bridge Maintenance Superintendent before the attachment work begins.

12. Except as noted below, the applicant of Encroachment Agreements shall notify the Division Engineer in writing when all work contained in the Agreement has been completed. Written notification of completion will not be required for encroachments on (1) active highway projects, and (2) any utility installed under a Blanket Agreement.

13. The Division Engineer or his designated representative shall make a final inspection of all authorized encroachments on highways open to traffic. Where applicable, the Division Engineer or representative shall be accompanied by the Bridge Maintenance Superintendent on final inspection.

    For clarification the responsibility of final inspection of completed Agreements on active highway projects will rest with the Resident Engineer. Final inspection of encroachments under Blanket Agreements may be handled at the discretion of the Division Engineer without giving written notice to the Manager of Right-of-Way.

Freeways Open To Traffic

The applicant for encroachment should submit to the Division Engineer an original and three (3) copies of a properly executed Encroachment Agreement along with provisions for traffic control or a Traffic Control Plan (if deemed necessary). The Encroachment Form, which contains instructions for completion, may be obtained from the Division Engineer. After investigation by the Division Engineer, and if found to be acceptable and in accordance with UTILITIES ON FREEWAYS, Pages 23-29, all copies are to be submitted to the Manager of Right-of-Way in Raleigh, along with recommendations, for approval. Upon approval by the Department, the distribution of copies will be as follows:

Original----------Manager of Right-of-Way
Executed copy--------Applicant
1 copy----------Division Engineer
1 copy----------District Engineer

Active Highway Projects

For the purpose of these procedures, a project which is to be let to contract will be considered active from the time right-of-way and/or construction plans are developed until the date of final acceptance of the project; thereafter, it will be considered completed. A project which is to be constructed by State forces will be considered active from the time plans are developed until construction is completed by state forces. The following procedures are applicable on active projects:

1. Contract Projects - On active highway projects which are to be let to contract, all Agreements covering utility occupancy of highway rights-of-way should be submitted directly to the State Utility Agent in Raleigh for approval. This will include Reimbursement Agreements where the Department is financially responsible for all or part of the adjustment or relocation work, special Use and Occupancy Agreements, standard Encroachment Agreements covering relocated utilities, or new utility installations being financed wholly by the applicant. These Agreements will be processed for approval by the State Utility Agent. Installations that require the approval of the State Design Services Engineer will be coordinated for approval by the State Utility Agent.

   On a limited basis, the handling of utilities on this type project will be coordinated between the State Utility Agent and the Division Right-of-Way Agents. On projects where existing utilities are of a minor nature, the Division Right-of-Way Agent will be responsible for making on-the-site utility inspections with the prospective utility owners and then will submit his report to the State Utility Agent in Raleigh. The State Utility Agent will then be responsible for obtaining all Agreements, whether reimbursable or non-reimbursable. The utility owner will submit all Agreements directly to the State Utility Agent for approval.

The number of copies to be submitted covering the above-mentioned Agreements will vary depending on the type of active highway project; therefore, the required number of copies will be determined by the State Utility Agent and requests from the utility will be made accordingly.

2. State Force Projects - The responsibility for implementation and coordination of Utility Agreements on active highway projects which are to be constructed by State forces rests with the Division Right-of-Way Agent. The Division Right-of-Way Agent or his representative will make on-the-site utility inspections with each utility owner of projects of this type. All Encroachment Agreements covering new installations or utilities to be relocated which are of a non-reimbursable nature shall be obtained from the utility by the Division Right-of-Way Agent and forwarded to the Division Engineer for his approval and distribution. An original and three (3) copies of this type encroachment will be necessary, with distribution by the Division Engineer as follows:

Original----------Manager of Right-of-Way
Executed copy--------Applicant
1 copy----------Division Engineer
1 copy----------District or Resident Engineer

On those utilities where all or any part thereof are to be adjusted or relocated at the expense of the Department, the Division Right-of-Way Agent will submit his report, after the utility inspection, to the State Utility Agent who will then assume the responsibility of obtaining an Agreement with the utility owner. Copies will be distributed the same as above.

On State Projects where utilities are of a complex nature, the State Utility Agent may handle all Agreements upon request of the Division Right-of-Way Agent.

All Other Highways

Application for permission to cross or otherwise occupy highway rights-of-way of all highways, with the exception of those previously mentioned, shall be made directly to the Division Engineers, using appropriate forms furnished by the Department. An original and three copies of the encroachment are required, accompanied by plans or sketches showing clearly the work to be done in accordance with Item 3 of "General Considerations", Page 61.

The Division Engineer shall investigate the request and determine the acceptability of the encroachment, based on Department utility accommodation policies as contained herein. Any deviations from Department policies must be thoroughly justified and documented in the file on the particular encroachment. When the Division Engineer determines that the encroachment is acceptable, he will execute the Agreement and distribute copies as follows:

Original----------Manager of Right-of-Way
Executed Copy--------Applicant
1 copy----------Division Engineer
1 copy----------District Engineer

While it is intended for the Division Engineer to execute all encroachments as covered in this section, he may forward the encroachment to the Manager of Right-of-Way in Raleigh for final approval if, in his opinion, there are circumstances or deviations in policy that warrant Department approval by the Manager of Right-of-Way; however, the Division Engineer shall thoroughly investigate the request and submit his recommendations for approval or disapproval.

As outlined in the policy for INSTALLATION ON OR NEAR HIGHWAY STRUCTURES, certain utility installations near or on highway structures should have approval of the State Design Services Engineer prior to the submission of the Encroachment Agreement to the Division Engineer. However, in the event an Agreement is received by the Division Engineer that requires, but has not received the approval of the State Design Services Engineer, then the Division Engineer shall forward all copies of the Agreement directly to the State Design Services Engineer for his approval. Upon approval, all copies will be returned to the Division Engineer for execution and distribution.

Blanket Agreement - Plowed-in Cable

The procedure as outlined for "All Other Highways" is to be followed, unless the utility elects to execute a Blanket Encroachment Agreement furnished by the Department.

Blanket Agreements may be approved by the Department on a utility system wide basis; any subsequent work to be performed under the provisions of this type Agreement must be authorized in advance of the work by the Division Engineer or his representative. Maps or sketches showing the location and extent of work to be done should be submitted to the Division Engineer for approval.

A letter of concurrence from the Division Engineer must be received by the utility prior to commencing the work. The criteria to be followed for the installation of plowed-in cable on or near highway structures will be the same as outlined in INSTALLATION ON OR NEAR HIGHWAY STRUCTURES, Page 48.

When authorizing utility installations by letter, the Division Engineer shall submit a copy of his letter, along with a map or sketch, to the Manager of Right-of-Way in Raleigh. Reference should be made in the letter of transmittal to the utility as to the date of the Blanket Agreement under which the utility is covered.

The use of Blanket Agreements is encouraged by the Department and may be used on both the secondary and primary systems. Blanket Encroachment Agreements will not, however, be employed on freeways.

The Blanket Encroachment Agreement applies only to cable installed by the "plowed-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.

See Page 46 for policy on plowed-in cable.

To obtain approval of a Blanket Encroachment Agreement, the applicant shall forward the original and three (3) copies directly to the Manager of Right-of-Way in Raleigh. Upon approval, the distribution of copies will be as follows:

Original----------Manager of Right-of-Way
Executed copy--------Applicant
1 copy----------Division Engineer
1 copy----------District Engineer

Blanket Agreement - Underground Service Connections

Underground utility service connections may be approved under standard Encroachment Agreements. However, in order to reduce the number of Encroachment Agreements, and in the interest of time, underground service connections may cross or otherwise occupy highway right-of-way, except freeways, on the basis of a Blanket Agreement. Blanket Agreements may be approved on a utility system wide basis and prior notice to the Division Engineer before beginning work will not be required provided the following conditions are strictly adhered to. Those installations not in compliance with the following conditions shall be installed under individual Encroachment Agreements approved by the Division Engineer:

a. Underground service connections must emanate from a distribution line, feeder line, or main line outside highway 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, an individual Encroachment Agreement shall be secured.

b. The Blanket Agreement will apply on all highways except freeways. All service connections on freeways shall be approved by the Manager of Right-of-Way under individual Encroachment Agreement.

c. No pavement shall be cut. Shoulders stabilized with bituminous material and/or crushed stone will be considered as pavement.

d. No trenching will be permitted across unpaved roads.

e. Plowing will be permitted across unpaved roads.

f. No longitudinal installations requiring open-cut or trenching will be allowed.

g. Longitudinal installations up to 500' will be allowed provided the plowing-in method of installation is utilized.

h. 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.

i. Highway drainage pipes and culverts shall not be disturbed.

j. No attachments shall be made to bridges or culverts.

k. Traffic control devices and warning signs shall be displayed in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways and the North Carolina Supplement to the MUTCD. (See "Traffic Control Procedure")

Blanket Agreements must be executed by the Manager of Right-of-Way in Raleigh, and forms for same may be obtained from the Manager of Right-of-Way. Upon execution of Blanket Agreements, the distribution of copies will be as follows:

Original----------Manager of Right-of-Way
Executed copy--------Applicant
1 copy----------Division Engineer
1 copy----------District Engineer

While it is the intent of the Department to simplify service connection procedures, the Division Engineer reserves the right to require an Encroachment Agreement on any service connection where there may be unusual circumstances or where in his opinion, he deems it necessary.

Blanket Agreement - Aerial Utility Crossings and Taps

Overhead crossings of highway right-of-way, such as power, telephone, cablevision, and the like, regardless of voltage or carrying capacity, may be authorized by Blanket Agreement on all highways open to traffic, except freeways, 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 policy includes taps from existing poles on highway right-of-way spanning to the field side of the highway.

Overhead crossings and taps may be authorized by Blanket Agreement, furnished by the Department, on a utility system wide basis and prior notice to the Division Engineer before beginning work will not be required, except for temporary supports, provided the following conditions are strictly adhered to:

1. No permanent supports are installed within the right-of-way.

2. The crossing or tap may emanate from an existing pole occupying the right-of-way by virtue of an approved Encroachment Agreement. 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.

3. Vertical clearances shall comply with the National Electrical Safety Code, but shall be no less than 18' in any case.

4. The utility owner, 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 Signing Requirements and the North Carolina Construction and Maintenance Operations Supplement.

5. Temporary supports may be installed under Blanket Agreement for road crossings; however, the Division Engineer or his appointed representative shall approve the location of same. The Division Engineer or his representative shall be given prior notice before installing any temporary supports within 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 the 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.

6. 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, an Encroachment Agreement shall be secured.

7. The Blanket Agreement will apply on all highways except freeways. All aerial crossings of freeways shall be approved by the Manager of Right-of-Way under Encroachment Agreement.

Blanket Agreements must be executed by the Manager of Right-of-Way in Raleigh, and forms for same may be obtained from the Manager of Right-of-Way. Upon execution of Blanket Agreements, the distribution of copies will be as follows:

Original----------Manager of Right-of-Way
Executed copy---------Applicant
1 copy----------Division Engineer
1 copy----------District Engineer

While it is the intent of the Department to simplify aerial crossing procedures, the Division Engineer reserves the right to require an Encroachment Agreement on aerial crossings where there may be unusual circumstances or where in his opinion, he deems it necessary.

Encroachments Involving Only Removal, Alteration, or Planting of Vegetation

The following shall govern requests which include only removal, alteration, or planting of vegetation. (a) All sizes of woody plants are to be considered. Because a plant is small does not mean it is undesirable "brush". It may be the type to preserve for future growth and development. (b) Vegetation which is removed by any encroachment will often require replacing as a condition of the approval. Species, numbers, and sizes of plants and any special requirements relative to the particular encroachment will be specified in the Agreement. The Area Roadside Environmental Engineer will determine locations of plants or will approve the locations designated by the encroaching party prior to planting. (c) Trimming or removal of vegetation solely for the benefit of others is to be permitted only under exceptional conditions.

1. Control of Access Highways. (a) Requests for removal or alteration of vegetation due to unusual hardship conditions shall be submitted to the Division Engineer. Requests which seem to have sufficient justification shall be reviewed by the Area Roadside Environmental Engineer, and then forwarded by the Division Engineer to the State Roadside Environmental Engineer in Raleigh for final handling. (b) All planting on control of access highways shall be done by DOT personnel, unless under exceptional conditions which may justify planting by other than DOT personnel. Requests shall be submitted to the Division Engineer and accompanied by a plan in sufficient detail that the proposed plant locations, species, etc., can be understood. The request shall be reviewed by the Area Roadside Environmental Engineer and then forwarded by the Division Engineer to the State Roadside Environmental Engineer for handling.

2. Other Highways - Blanket Permission. (a) Blanket permission for removal or alteration of vegetation (except herbicide treatment) will be given by the Division Engineer based upon the recommendations of the Area Roadside Environmental Engineer for all highways having rights-of-way 100 feet or less, with specific exceptions to the Blanket Permission being noted in the letter permit. Such Blanket Permission will be given on a county wide basis and will be subject to the previously stated standard requirements. The Area Roadside Environmental Engineer involved shall be kept advised by the applicant about the applicant's operations affecting vegetation, and the Area Roadside Environmental Engineer shall make inspections as he deems necessary. The Division Engineer shall have authority to revoke the Blanket Permission and order work stoppage if the standard requirements are not being complied with. (b) Requests for planting on highways having right-of-way 100 feet in width or less are to be made through the Division Engineer to the Area Roadside Environmental Engineer in sufficient detail that the Area Roadside Environmental Engineer may investigate the proposed planting. The Area Roadside Environmental Engineer will return the request and his recommendations to the Division Engineer for final handling.

3. Other Highways - Individual Permits. (a) Advance permission in writing must be obtained from the Area Roadside Environmental Engineer before any removal or alteration of vegetation (except herbicide treatment) is started on right-of-way of those non-controlled Access Highways having rights-of-way greater than 100 feet in width. Requests are to be made through the Division Engineer to the Area Roadside Environmental Engineer, who will either deny or grant the permission, along with any special conditions applicable to the particular highway section. If permission is granted, the applicant's maintenance operations may proceed in subsequent years without specific permission being required, provided there is continuing compliance with the standard requirements and with the special conditions of the individual permits. The Area Roadside Environmental Engineer shall be given advance notice of the work schedule, and he will make inspections and have authority to revoke the permit and stop work, as in the case of Blanket Permits. (b) Where planting is proposed on non-controlled access highways having rights-of-way width greater than 100 feet, the request, accompanied by a proposed planting plan, is to be made through the Division Engineer to the Area Roadside Environmental Engineer who will make whatever investigation or inquiry he considers necessary and who will either deny or grant the permission along with any special conditions applicable to the particular highway section. In those instances when the proposed planting involves unusual conditions, the Area Roadside Environmental Engineer may forward the request and his recommendations to the State Roadside Environmental Engineer in Raleigh for final handling.

4. Herbicide Treatment. For both initial and follow-up herbicide treatment work, advance permission in writing must be obtained before any work is started. Requests are to be made through the Division Engineer to the Area Roadside Environmental Engineer. If permission is granted, advance notice must be given so that the Area Roadside Environmental Engineer or

his designated representative can be present at the time the work is started and subsequently make whatever degree of inspection he deems necessary to assure compliance with standard requirements and special conditions of the permit. Use of herbicides on freeway right-of-way will not be permitted.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

POLICY ON ALTERATION OF HIGHWAY RIGHTS-OF-WAY

This policy shall apply to the alteration of highway rights-of-way by any person, or persons, other than Division of Highway personnel. This policy covers any clearing, grading, drainage change, extension of drainage structures, or other physical alteration of highway rights-of-way. Trees and shrubs removed by these type alterations shall be replaced as specified by the Department of Transportation. Other plantings and selective pruning on highway right-of-way are covered under another policy. It applies to all primary (Interstate, U.S., and N. C.) routes, including controlled and non-controlled access facilities, and may apply to secondary roads at the discretion of the Department of Transportation Division Engineers. Any exceptions or deviations from this policy shall be approved by the Secretary of Transportation.

A. INTERSTATE & OTHER CONTROLLED ACCESS HIGHWAY

I. 0-1000 cubic yards of cut or fill may be handled and approved by the Division Engineer through the use of R/W form 16.7. A flat administration fee of $500.00 shall be required plus 50¢ per cubic yard for excavated materials and are to be forwarded to the Controller's office for deposit. Procedure for handling by the Division Engineer will be the same as described under Paragraph A-II except the Encroachment Agreement will be prepared by the Division Engineer and the performance bond will be retained by the Division office.

II. 1000 cubic yards and above shall be forwarded to the State Utility Agent in the Raleigh office with the $500.00 administration fee for standard handling procedure as set forth below.

1. Requests for alteration of full control and partial control 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.

3. If the Division Engineer considers the request to have merit, he shall have the applicant furnish seven (7) clearly legible copies of the plan and adequate cross-sections to show the alterations proposed. He shall also request the applicant to include a schedule of work indicating the number of days necessary to complete the proposed alteration. The plan and cross-sections shall be referenced to highway stationing, intersecting roads, drainage structure, or other identifiable highway features.

4. 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 that he deems necessary prior to submission to the State Utility Agent in the Raleigh office.

If the Division Engineer recommends approval of the request, he shall have the applicant furnish seven (7) copies of a plan and seven (7) copies of adequate cross-sections (if grading is involved) to clearly show the alterations proposed, as related to highway cross-section. 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. Cross-sections submitted with the request are to include sufficient sections to adequately show the transition grading proposed.

The plan and cross-sections are to be tied in with highway stationing, drainage structure or other identifiable highway features. (Copies are to be sufficiently legible to permit further reproduction in the Raleigh office, if necessary). 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; and grass cover shall be established promptly after grading. Encroaching party shall submit an erosion and traffic control plans where applicable.

5. The Division Engineer shall verify the quantity of excavation to be removed from highway rights-of-way as shown on the plans and cross-sections. In the interest of uniformity of administration, a standard charge of 50 cents (50¢) per cubic yard for excavation removed from right-of-way plus a $500.00 administrative fee will be made. The Division Engineer shall advise and obtain the administration 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.

6. 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.

7. On locations where existing control of access fencing is removed for grading, such fencing of equal quality must be restored by applicant at no expense to the Department of Transportation. On properties where no fencing has been erected by the Department of Transportation, it shall be the responsibility of the Division Engineer to determine whether or not new fencing shall be required. In those cases where new fencing is required, same shall be installed at no expense to the Department of Transportation.

8. The Division Engineer will forward seven (7) sets of plans and cross-sections to the State Utility Agent, along with a single copy of each of (a) landscape and hydrographic reports, (b) the supplemental information sheet attached, and (c) the Division Engineer's additional comments or recommendations.

9. The State Utility Agent will prepare the Encroachment Agreement including all conditions, specifications, and special conditions imposed by the Division Engineer and Unit Heads.

10. The appropriate number of copies of Encroachment Agreement as prepared by the State Utility Agent will be submitted to the Division Engineer who will, in turn, submit same to the applicant for execution with a request that the Agreement and performance bond be returned to the Division Engineer.

11. The Division Engineer shall forward all executed copies of the Encroachment Agreement, performance bond, payment for excavated materials and administrative fee to the State Utility Agent for further handling. Performance bonds shall be retained by the State Utility Agent. Bonds in the form of certified or cashier's checks shall be forwarded to the Fiscal Unit. Monies for excavated materials shall also be forwarded to the Controller, using Objective Code 942 for identification. Monies received on Federal Aid Projects except for the $500.00 administration fee will be credited to an active Federal Aid Project of the same funding classification. The $500.00 administration fee will be credited to the Division Engineer's Administrative Budget using objective Code 990 for identification. Monies received on active State Projects will be credited to the project; and if closed, will be credited to the same account as for sale of right-of-way residues.

12. After execution by the Manager of Right-of-Way, copies will be distributed as follows:

    Original----------Retained by Manager of Right-of-Way
    Executed Copy----------Applicant
    One Copy----------Division Engineer
    One Copy----------District Engineer
    One Copy----------Federal Highway Administration
    One Copy----------State Road Maintenance Engineer
    One Copy----------Municipality (if applicable)

13. The State Road Maintenance Engineer shall maintain a log book whereby pertinent information relating to each Encroachment Agreement will be entered, including, but not limited to, Division, County, applicant, location, and completion date. The State Road Maintenance Engineer shall monitor each Agreement to assure that work is completed within the time limit prescribed in the Encroachment Agreement. If an Agreement completion date has expired and the State Road Maintenance Engineer has not received notification that the work is completed, he shall contact the Division Engineer to determine status of the work.

14. If the applicant has not begun work under the terms of the Agreement prior to the expiration of the time given to complete the project, the Division Engineer may rescind all rights of entry onto highway right-of-way and declare the Agreement null and void. If the applicant enters onto the right-of-way and begins work under the terms of the Agreement, but fails to complete the work within the time allowed, then the applicant shall be given thirty (30) days written notice, with copy to surety company, to complete the work described in the Agreement. If said work is not completed within thirty (30) days after notice is given, the Division Engineer may complete the project or restore the right-of-way to his satisfaction and charge the applicant for the work done, plus 15% of the total cost for administrative expense. If the bill for this work is not paid within thirty (30) days from receipt thereof, then written demand for payment shall be made on the party furnishing the performance bond.

15. 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 Road Maintenance Engineer and State Utility Agent should immediately be so notified. The Division Engineer shall also have the authority to rescind the Agreement if the encroaching party has not begun work prior to the completion date and cannot provide adequate justification for a time extension.

16. Upon completion of work, the Division Engineer shall have the completed work inspected for compliance with approved Agreement. The Division Engineer shall notify the State Road Maintenance Engineer so he can have a representative present during final inspection. Upon acceptance of completed work, the Division Engineer shall notify the State Utility Agent and the encroaching party in writing, with copies to the State Road Maintenance Engineer and the Federal Highway Administration. The State Utility Agent will release the bond following expiration of the six months warranty period as provided for in the Utility Manual under Bond Requirements.

B. NON-CONTROLLED ACCESS FACILITY

1. Request shall be submitted to the Division Engineer, in writing, accompanied by a plan and/or description in sufficient detail to easily determine the extent of the proposal, and should include a schedule of work showing the number of days necessary to complete the proposed alteration. The plan or description is to be referenced to highway stationing, intersecting road, drainage structure, or other identifiable highway feature.

2. Division Engineers shall have the authority to deny such requests if they are not feasible or practical. If the Division Engineer considers the request to be practical, he shall have the proposal investigated by the Hydraulics Unit, Roadside Environmental Unit, or other Units of the Division of Highways that he deems necessary.

   If the Division Engineer recommends approval of the request, he may have the applicant furnish copies of a plan and copies of adequate cross-sections (if grading is involved) to clearly show the alterations proposed, as related to highway cross-section. 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. Cross-sections submitted with the request are to include sufficient sections to adequately show the transition grading proposed.

   The plan and cross-sections are to be tied in with highway stationing, drainage structure or other identifiable highway features. 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; and grass cover shall be established promptly after grading.

3. The Division Engineer upon receipt of recommendations from the various Units may approve the request in writing. This letter of approval, with copy to the State Utility Agent and the appropriate District Engineer, shall contain such protective clauses as the Division Engineer deems necessary to protect the State's interest, and to insure that all costs shall be borne by the applicant and not by the State. This letter should also state the number of days allowed for completion of the work.

4. Where practical, all material excavated is to be placed on highway right-of-way at points or sites designated by the Division Engineer. No payment for materials will be required, as excavation in most instances will be disposed of on highway right-of-way.

5. The Division Engineer shall require a performance bond in an amount necessary to guarantee the restoration of right-of-way. The amount of the bond shall be determined by the Division Engineer, and should be in an amount necessary for State Forces to completely restore the right-of-way. Performance bonds shall be retained by the Division Engineer, or his representative, until such time as the bond is released. Certified or cashier's checks shall immediately upon receipt be forwarded to the Controller in Raleigh, and shall not be retained by the Division Engineer. Bonds shall be released upon satisfactory completion of work and upon expiration of the six months warranty period imposed by the Division Engineer in accordance with Bond Requirements as set forth in the Utility Manual. The Division Engineer shall release all performance bonds, and he shall notify the Controller in Raleigh 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 Controller as to the amount of bond to be released and to whom the warrant is to be made payable. The Controller will forward warrant directly to the Division Engineer for his disposition with the party who posted bond. In those cases where the encroaching party fails to restore highway right-of-way to the State's satisfaction, then the procedure for restoration and collection shall be the same as before mentioned on CONTROLLED ACCESS FACILITY.

REQUEST FOR TEMPORARY ENCROACHMENT FROM _____

Supplementary Information

1. Will the proposed work affect traffic operation? If so, what control will be necessary? _____

2. Will the proposed work affect control of access? What existing fences are involved? Will new or additional fencing be needed to ensure adequate control of access? _____

3. Will sight distance be improved? Restricted? Remain unchanged? _____

4. General description of drainage changes proposed (omit when Hydrographic Department has made a field investigation). _____

5. How will proposed alterations in earthwork and drainage affect future maintenance? _____

6. Total quantities and disposition of materials when grading is involved. (Excavation is to be used to improve highway right-of-way in the immediate vicinity if needed.) Also, quantity and value of material removed from the right-of-way. _____

7. What erosion control measures will be needed in addition to the standard requirement that grass cover be established? _____

8. If tree or shrub growth is involved, should any or all of it be (a) preserved, (b) transplanted, or (c) replaced by other plants after grading has been completed? _____

9. Is provision for inspection of work by Commission personnel necessary? _____ Is reimbursement from encroaching party to be required? _____

10. Starting date proposed by applicant. _____

11. Length of time necessary to complete all work; after applicant's starting date or date of notification of final approval of the encroachment, whichever is the later. _____

12. Recommended amount of bond to ensure timely and proper completion of the work. _____

13. Is future project involved? _____

TEMPORARY UTILITY ENCROACHMENTS

Temporary encroachments on conventional highways and partial control of access highways may be approved by the Division Engineer under standard Encroachment Agreement or by exchange of correspondence with the applicant.

Depending on the nature of the temporary encroachment, any special provisions relative to same such as time of installation, location, design, traffic control devices, protective counter measures such as guard rail, delineators, etc., inspection, duration of installation and time of removal shall be at the discretion of the Division Engineer.

Without exception, temporary attachments to or through structures shall be approved by the State Design Services Engineer in Raleigh prior to authorization of such installation by the Division Engineer.

Temporary encroachments associated with permanent installations to be installed on the right-of-way shall be included in an Encroachment Agreement covering the permanent installation.

Temporary encroachments of any nature on freeways shall be handled by Encroachment Agreement and approved by the Manager of Right-of-Way in Raleigh.

It is the intent of the Department to simplify approval of temporary encroachments by letter approval; however, the Division Engineer reserves the right to require an Encroachment Agreement on any temporary installation where there may be unusual circumstances or where, in his opinion, he deems it necessary.

SUBDIVISION STREETS
(See "Traffic Control Procedure")

A subdivision street is considered to be a street or road which has been dedicated to the public to provide ingress and egress for lots or parcels which have been laid out for the purpose of providing home sites by a person or firm by the sale of such parcels. These lots or parcels are of insufficient size to be used primarily for farming purposes. A subdivision street is for the use and convenience of the abutting property owners and not the general traveling public.

Utility Requirements for Subdivision Streets are as follows:

1. No utility shall be placed on the right-of-way of a subdivision street which is to be added to the State System until the applicable Division Engineer of the Department 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 street or streets to the State System, at which time an Encroachment Agreement shall be executed between the owner of the utility and the Department.

2. The right of any utility located on a subdivision street that is added to the State System shall be subordinate to the Department's right-of-way, and the utility shall be subject to regulation by the Department.

3. Utilities requiring adjustment or relocation to conform to Department requirements shall be made at no expense to the Department. Existing and/or relocated utilities may remain within the right-of-way of any subdivision street added to the Secondary Road System provided the location of same meets Department Approval and further provided the utility owner executes an Encroachment Agreement on forms furnished by the Department.

4. Poles and other above-ground utilities which are to remain inside the right-of-way under Encroachment Agreement shall be located at or as near as practical to the right-of-way line. As a minimum, above-ground utilities shall be located outside the clear recovery area for the highway section involved. Where there are curbed sections, above-ground utilities should be located as far as practical behind sidewalks. There is no single minimum dimension for setback of poles, fire hydrants, etc., behind curbs; however, where there are curbed sections and no sidewalks, 6' will be used as a design safety concept guide.

5. For residential subdivision streets and residential collector streets; underground utilities may cross under or run longitudinally under the pavement. For all other streets and highways, underground utilities may cross under but <u>not</u> run longitudinally under the pavement except in unusual situations approved by the Division Engineer.

6. Acceptable Materials for Utilities Under Existing or Proposed Pavement - Materials Not Listed Will Be Referred to the State Design Services Engineer - Roadway Utilities Section.

   a. Smooth Wall Steel Pipe meeting API 5L Grade B Specifications
   b. Spiral Welded Steel Pipe meeting ASTM Specification A-211
   c. Circular Black Steel Pipe meeting ASTM Specification A-120 or A-589
   d. Galvanized Steel Pipe meeting ASTM A-120 Specifications
   e. Ductile Iron Pipe - class 50 Min. Strength
   f. Concrete Sewer Pipe - Plain and Reinforced Pipe meeting Department of Transportation Standard with Rubber Gasket Joints
   g. Reinforced Concrete Pressure Pipe, Steel Cylinder Type for Water and other Liquids meeting AWWA Specifications C-300, C-301 and C-303
   h. ABS (Acrylonitrile - Butadiene - Styrene) Composite Sewer Pipe shall meet ASTM D-2680 Specifications for Pipe sizes 8" thru 15", and ASTM D-2751 for Pipe sizes 4" and 6" for Laterals. ABS Sewer Pipe shall be used for Domestic Sewage only; also P.V.C. Truss Pipe meeting ASTM D-2321 which has to be specified by a registered Professional Engineer.
   i. P.V.C. (Polyvinyl Chloride) Water Pipe (Pressure Only) - SDR 14 (C-900), SDR 18 (C-900), and SDR 21.
   j. P.V.C. (Polyvinyl Chloride) Sewer Pipe (Force Main) SDR 14 (C-900), SDR 18 (C-900) and SDR 21.
   k. P.V.C. (Polyvinyl Chloride) Pipe (Gravity Sewer) SDR 14 (C-900), SDR 18 (C-900), SDR 21, SDR 26, SDR 35, ASTM F 794, ASTM F 949 (A-2000) and Schedule 40 and 80.
   l. V.C. (Vitrified Clay) Sewer Pipe, Extra Strength meeting ASTM Specifications C-700 with Factory Fabricated Joints meeting ASTM Specifications C-425
   m. P.E. (Polyethylene) Plastic Pipe - SDR 7 meeting ASTM Specifications D-2239 and Plastic Tubing - SDR 9 meeting ASTM Specification D-2737 for sizes 3/4" thru 2" only
   n. Polyethylene Plastic Pipe (High Molecular Weight) and (Medium Molecular Weight) SDR 11 meeting Plastic Pipe Institute Material Designation PE 3408 and PE 2406 in sizes up to 6.625" O.D. for gas with a maximum operating pressure of 60 PSIG.
   o. Type K Copper Pipe meeting ASTM Specification B-88 for sizes 3/4" thru 2"

7. Acceptable materials for utilities outside pavement shall be the same as above. Any materials not listed above, except asbestos cement and PVC SDR 26 for pressure applications, will be permitted only in the outer limits of the right-of-way (as close to the right-of-way line as possible). Asbestos cement pipe will not be allowed inside DOT right-of-way. PVC SDR 26 pipe will not be allowed inside DOT right-of-way for pressure applications (water line, force main, etc.).

8. Depth of Cover for Pipe Lines and Other Utilities

   a. Longitudinal pipe lines and electric power primary. . . 3'

   b. Longitudinal electric power secondary, and trenched communication lines . . . . . 2'

   c. Crossings under roadways. . . . . 3'

   d. Crossings under ditches . . . . . 2'

   e. Plowed-in communication lines . . . . . 18"

9. Any utility to be installed within the right-of-way of a State maintained road will require an Encroachment Agreement with the North Carolina Department of Transportation in accordance with their publication entitled Policies and Procedures for Accommodating Utilities on Highway Rights of Way.

TELEPHONE BOOTHS

Telephone pay-station booths or other commercial telephone installations are not permitted on highway rights-of-way, except in rest areas or truck weigh stations.

Requests for commercial telephone installations in rest areas or truck weigh stations are to be made through the Division Engineer to the State Roadside Environmental Engineer prior to development of plans for the installation. The utility will be advised of requirements regarding location or other conditions affecting the installation and the subsequent necessary procedure.

UTILITY FACILITIES

Other facilities that are not permitted on highway rights-of-way are as follows:

1. Sub-Stations (Power)
2. Regulator Stations (Gas)
3. Metering Stations (Water, Sewer, and Gas)
4. Lift Stations (Sewer)
5. Pump Stations (Water)
6. Sewage Treatment Plant
7. Water Treatment Plant

Addendum 1.
May 26, 1993

OTHER INSTALLATIONS

It is the policy of the Department of Transportation not to allow the encroachment of any non-naturally occurring run off onto the highway rights of way. Examples of non-naturally occurring run off include, but are not limited to, effluent from heating and air conditioning systems, waste water treatment facilities, and contaminated groundwater remediation systems.

The Department of Transportation will not allow the encroachment of any form of conduit carrying treated waste water resulting from hazardous petroleum products, or other hazardous wastes, except sewerage from public sewerage systems.

SPECIAL CONDITIONS - PIERS, PILES, AND CRADLE SUPPORTS

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 (1) longitudinally above ground to maintain grade or to span a waterway or (2) 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 owner.

Supports for longitudinal installations 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 should 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 hamper the removal of debris and log jams.

At existing box, arch, and pipe culverts, the supports are not to 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 are to be avoided due to diminishing the cross sectional area of the culvert and increasing the possibility of silting and/or accumulating of debris.

Supports for transversal installations at existing bridges are to be located so as 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 should be avoided. Proper precaution should be taken to prevent erosion.

Procedures

In any instance where a utility is to be supported above ground at existing structures, prior approval must be obtained from the State Design Services Engineer in Raleigh prior to submitting an Encroachment Agreement to the Division Engineer. The owner is to furnish to the State Design Services Engineer scaled plans and information pertaining to location, invert elevation above stream bed, dimensions of the proposed installation from the nearest part of the existing structure, design calculations, and material specifications for each support. All plans, specifications and design computations for the support system shall be sealed and signed by a Registered Professional Engineer. After approval, the approved copies of the plans will be returned to the utility owner with a copy to the Division Engineer. The utility owner shall then submit the proposed encroachment with the approved attachments to the Division Engineer for execution of the Encroachment Agreement. The Division Engineer shall see that the correct attachments are made part of the Encroachment Agreement.

On active highway construction projects, the State Utility Agent in Raleigh will be responsible for coordinating and obtaining the approval of the State Design Services Engineer for the installation of any supports in close proximity with structures. The owner shall furnish on request the design criteria and a copy of the design computations.

UTILITY MANHOLES AND VAULTS

The Department will permit the construction or installation of (1) brick or concrete block utility manholes, (2) precast reinforced concrete utility manholes and vaults, and (3) cast-in-place reinforced concrete utility manholes and vaults. However, in all instances where these utility structures are constructed or placed within the limits of the State's right-of-way, the structures are to be designed for HS-20 Live Load with traffic bearing manhole covers and manhole rings or frames. All material and construction (and a Traffic Control Plan if construction impacts the travelway--See "Traffic Control Procedure") shall be subject to inspection, sampling, testing and approval of the Department.

Utility manholes, as referred to in this section, are those which are in part cylindrical in shape and tapered off at the top to provide for an access manhole cover and ring. Utility vaults, as referred to herein, are those of various shapes but composed essentially of a floor slab, vertical walls, top slab, manhole covers, and manhole rings or frames.

Brick or Concrete Block Manholes

The Division Engineer will approve Encroachment Agreements for the construction or installation of brick or concrete block utility manholes when same meet the following specifications:

1. For depths up to but not to exceed 12', the minimum wall thickness to be 8" for brick and 6" for concrete block.

2. For that portion of a depth greater than 12', the minimum wall thickness is to be increased to 12" for both brick and concrete block construction.

3. The utility manhole may be constructed in accordance with Department standards, which are available from the State Design Services Engineer in Raleigh for a nominal fee.

In the event the Division Engineer receives an Encroachment Agreement for brick or concrete block utility manholes that appreciably deviates from the above specifications, he will forward all copies of the Encroachment Agreement with attached plans to the State Design Services Engineer. Upon receipt, the State Design Services Engineer will review the plans and handle with the utility owner any revisions deemed necessary. After all details relative to design and the method of construction or installation of the proposed manhole have been approved, all copies of the Encroachment Agreement will be returned to the Division Engineer for execution on behalf of the Department and for proper distribution. Design criteria and computations shall be submitted on request.

Precast and Cast-in-Place Manholes and Vaults

The Division Engineer will execute Encroachment Agreements on behalf of Department for installation and/or construction of previously approved precast and/or cast-in-place manholes and vaults. A copy of a previously

"Approved Manholes And Vaults" may be obtained from the office of the Division Engineer or the State Design Services Engineer. If an owner contemplates using manholes and/or vaults that have not been previously approved, said approval should be obtained from the State Design Services Engineer prior to submission of the Encroachment Agreement to the Division Engineer. All plans, specifications and design computations for manholes and vaults which have not been previously approved or determined to meet the standards of the Department shall be sealed and signed by a Registered Professional Engineer. In the event the Division Engineer receives an Encroachment Agreement covering precast or cast-in-place manholes and vaults that have not been previously approved, he shall forward all copies of the Encroachment Agreement along with plans, material specifications, and design calculations to the State Design Services Engineer for approval. The Agreement will be returned to the Division Engineer for execution and distribution. If the proposed work is to be let to contract by the owner, the Division Engineer's approval of the proposed encroachment shall be conditional upon the contractor and/or his subcontractor adhering to the same procedure as required of an owner. The State Design Services Engineer will keep Division Engineers informed as to manholes and vaults that have been approved.

Manhole Rings and Covers

All access manhole rings and covers installed within the State's right-of-way shall be of the traffic bearing type.

The above policies and procedures relate to conventional highways open to traffic. On active highway construction projects, as well as freeways open to traffic, the State Utility Agent in Raleigh will be responsible for coordinating and obtaining any necessary approval of the State Design Services Engineer for the adjustment of existing utility manholes and vaults and the construction of new facilities.

TUNNEL LINERS

When the owner of a utility proposes to construct a tunnel under an existing highway, he shall prepare and submit to the State Design Services Engineer complete design computations, plans and specifications for the excavation, design and installation of the steel tunnel liner plate, sheeting, shoring and all other work, with the design taking into consideration the protection of pedestrian and vehicular traffic, adjacent property and the stability of the roadway section. All plans, specifications and design computations for the pit shoring shall be sealed and signed by a Registered Professional Engineer.

The tunnel liner base metal shall conform to ASTM A569 and shall be designed in accordance with the requirements of Section 16-Division I and constructed to conform to Section 26-Division II of the current or interim Standard Specifications for Highway Bridges, adopted by the American Association of State Highway and Transportation Officials, and published by the Association General Offices, 444 North Capitol Street, N.W., Suite 225, Washington, D.C. 20001.

The minimum mechanical properties of the flat steel plate before cold forming used for the design of the tunnel liner shall be:

Tensile strength of steel	=	42,000 psi
Yield strength of steel	=	28,000 psi
Elongation, 2 inches	=	30 percent

All liner plates shall be galvanized in accordance with the requirements of AASHTO M167. Bolts, nuts, washers and other accessory hardware shall be hot-dip galvanized in accordance with the requirements of AASHTO M232. If additional protection is required, the plate shall be bituminous coated to meet the requirements of AASHTO M190 or M243 (Field Coating). The utility owner shall prepare plans for the proposed installation in view as follows:

1. Plan view showing:

    a. Owner's name and address

    b. County

    c. Route number (N.C., U.S., or S.R.)

    d. North direction arrow

    e. Distance to intersection with another route on the State System

    f. Location of the tunnel

    g. If any portion of the proposed tunnel is 200' or closer to any portion of an existing highway structure, show the type and location of the structure and the shortest distance between the existing structure and the proposed tunnel.

h. The location of the tunneling pit and minimum distance to edge of existing pavement and also location for disposal of spoils.

i. Location of manholes and/or utility access vaults.

2. Profile along the centerline of the proposed tunnel showing:

a. The entire cross-section of the work, including pits ground line from ditch to ditch, including the roadway typical section.

b. The vertical location of the proposed tunnel, including grade and invert elevation.

c. Distance from the top of the tunnel to the surface at the centerline of the roadway.

d. Size and depth of pits which are to be shown located not less than 5' outside of toe of slope or ditch, but a minimum distance of 15' from the edge of pavement with speed limits of 40 MPH or less and 30' with speed limits above 40 MPH.

e. Show pertinent elevations and dimensions of manholes and utility access vaults.

The tunneling specifications are to include the following items and any additional information the owner deems advisable in connection with the proposed construction;

1. The gauge or thickness of liner plates.

2. The moment of inertia, inches to the 4th power per inch of width of liner plate.

3. The outside coatings to be used and thickness of coatings.

4. The inside coating to be used and thickness of coating.

5. A requirement that the tunneling operations should proceed only a distance sufficient for placing one section of the tunnel liner, the tunnel liner placed before proceeding further, and at no time will jetting be allowed.

6. A section stating that where blasting is required, only small controlled charges of 40% dynamite or plastic explosives are to be used. The depth of the holes for these charges shall not exceed the depth necessary for clearing an area sufficient for placing one section of tunnel liner. The charges for the initial series of blasting should 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 in determining 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 any indication of a vertical split in the rock formation, or any indication of settlement of the roadway during the tunneling operations, all operations shall be stopped and the Engineer for the Division of Highways shall be notified immediately. If the vertical split is not determined to be of too great a magnitude or too close to the pavement, the split shall be filled with grout at a pressure specified by the Division of Highways Engineer, allowed to set and tunneling operations may be continued. If it is determined that the vertical split is of too great a magnitude or too close to the pavement, the Division of Highways Engineer shall advise as to the proper method to be used to correct the vertical split. If settlement of the roadway occurs, the Engineer for the Division of Highways will advise the owner and his contractor as to the proper steps to be taken to correct this settlement.

7. A section stating that the space outside the liner plates is to be held to a minimum and 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' - 6" 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' 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' 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.

8. The method of closing both ends of the tunnel and the material to be used. Proper drains should be provided at the lower end of the tunnel. Also, this should be shown on the plans.

9. A statement that 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 the Department of Transportation's specifications.

10. A clause that the entire operation shall be subject to inspection by the Division of Highways' Engineer or Inspector on the project, and shall have full authority to stop work if, in his opinion, it shall cause any damage to the roadway section or endanger traffic.

11. A statement that all material shall be subject to inspection by the Division of Highways.

12. A statement that the method of shoring the pits for tunneling operations shall be approved by the State Design Services Engineer of the Division of Highways prior to any work beginning at the site.

13. Since the owner, upon completion of the tunnel liner installation, shall notify the Division Engineer in writing by letter with a copy to the attention of the State Design Services Engineer, North Carolina Department of Transportation, Division of Highways, Raleigh, North Carolina 27611, the owner should require in his contract the same of the contractor.

14. Since the owner shall reimburse the Division of Highways for repair costs, should any settlement or damage result to the roadway within a period of one (1) year after completion of the tunneling operations, the owner should require in his contract the same of the contractor.

15. A statement that the owner shall specify in his contract that the contractor and any of his subcontractors performing work on the State right-of-way in connection with tunneling operations shall furnish to the Department of Transportation to the attention of the State Design Services Engineer, North Carolina Department of Transportation, Division of Highways, Raleigh, North Carolina 27611, for his approval, a certificate of insurance, in an original and one copy, in the minimum amounts of $500,000 Bodily Injury and $250,000/$500,000 Property Damage as evidence of proper coverage before beginning any work at the site. The Certificate is to show that explosion, collapse and underground insurance coverage is provided and is to make reference to the project, county and the Design Services Unit's file number. The Certificate is also to be countersigned by an authorized North Carolina Resident Agent with the name and address of the agent denoted thereon.

    It will be the responsibility of the contractor and/or his subcontractor to furnish and keep in force the insurance requirements for a period of one (1) year after completion and acceptance of the work by the owner and the Department of Transportation.

Procedures

The utility owner is to handle for approval of the State Design Services Engineer prior to submitting Encroachment Agreements to the Division Engineer. The Division Engineer shall process all Encroachment Agreements for tunnel liners under existing roads in accordance with PROCEDURES FOR PREPARING AND PROCESSING UTILITY AGREEMENTS, Page 59. Complete plans and specifications are to be attached to each copy of Encroachment Agreement.

Encroachment Agreements on active highway construction projects should be submitted directly to the State Utility Agent in Raleigh for approval.

CULVERTS, CULVERT EXTENSIONS, JUNCTION BOXES AND BOX TYPE UTILITY TUNNELS

The Department will permit the construction of (1) a culvert, (2) the extension of an existing culvert, (3) the construction of a junction box, and (4) the construction of a box type utility tunnel within the limits of the right-of-way by an approved method.

Culverts, as referred to in this section, are reinforced concrete box culverts; corrugated metal, structural plate, or reinforced concrete arch culverts; and corrugated metal, structural plate, or reinforced concrete pipe culverts.

Junction boxes, as referred to in this section, are in part or wholly reinforced concrete junction boxes constructed specifically to effect a transition from a proposed drainage structure to an existing drainage structure.

Box type utility tunnels, as referred to in this section, are reinforced concrete box tunnels which are closed at each end to prevent drainage and with access manholes for entrance into the tunnel.

Because the design requires specialized structural and hydraulic analysis, plans and sketches for all proposed construction of the items in this section shall require the approval of the State Design Services Engineer. Also, plans, specifications and design computations for all structures which have not been previously approved or determined to meet the standards of the Department shall be sealed and signed by a Registered Professional Engineer. On active highway construction projects, the State Utility Agent in Raleigh will be responsible for coordinating and obtaining any necessary approval of the State Design Services Engineer for the adjustment of existing facilities and the installation of new facilities.

Design and Construction of a Culvert

The design, specifications, and construction must be in strict compliance with those currently used by the Department. Information as to Department design and specifications may be obtained from the State Design Services Engineer in Raleigh. The DOT 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 the DOT.

a. Reinforced Concrete Box Culvert

   (1) Plans are to be prepared to a minimum standard of those required for construction to be let to contract by the Department.

   (2) "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.

   (3) The design computations are to be submitted for review.

(4) The owner may be required to submit a "Form and Falsework Plan" to the State Design Services Engineer for approval prior to beginning any phase of the proposed work.

b. Metal Arch Culvert

(1) The owner is to specify the gauge, dimensions, and type of arch to be constructed.

(2) At locations where conditions warrant, the owner is to furnish detailed plans, specifications, and design computations for the construction of reinforced earwalls or reinforced wingwalls and scour apron.

c. Reinforced concrete Arch Culvert

(1) The arch is to be designed in accordance with the criteria and specifications currently used by the Department.

(2) The plans are to be prepared to a minimum standard of those required for construction to be let to contract by the Department.

(3) The design computations are to be submitted for review.

(4) The owner shall submit "Form and Falsework Plan" for approval.

d. Pipe Culvert

(1) When corrugated metal and structural plate pipe are to be installed, the gauge and type of pipe are to be specified.

(2) When reinforced concrete pipe is to be installed, the class of pipe is to be specified.

(3) At all locations where conditions warrant, the owner is to furnish detailed plans, specifications, and design computations for the construction of the reinforced concrete earwalls, wingwalls, and scour aprons. In lieu of this, the owner may view the Department Roadway Standards at the Division Engineer's office and select the standards that fit the condition in the field. Copies of the standards may be procured from the State Design Services Engineer.

Extension of an Existing Culvert

The same specifications and conditions are applicable for this section as for "Design and Construction of a Culvert".

a. Reinforced Concrete Box Culvert

(1) The design, plans, and specifications are to be in accordance with those required for the extension of an existing box culvert to be let to contract by the Department.

(2) "NOTES" are to be shown on the plans designating the design and materials specifications, and instructions relative to the construction of the extension.

(3) The design computations are to be submitted for review.

(4) The owner is to submit a "Form and Falsework Plan" to the State Design Services Engineer for approval prior to beginning any phase of the proposed work.

b. Metal Arch Culvert

(1) The owner is to furnish a detailed sketch showing the connection of the proposal extension of the existing arch.

(2) The gauge, dimensions, and type of material to be used for the proposed extension are to be stipulated.

(3) Details for removal of existing endwalls, wingwalls, and scour aprons, if applicable.

(4) Detailed plans, specifications, and computations for proposed reinforced concrete endwalls, wingwalls, and scour aprons, if deemed necessary.

(5) Specifications for the materials to be used for all extensions are to be equal to or better than the specifications for the existing arch.

c. Reinforced Concrete Arch Culvert

(1) Information is to be furnished in accordance with that required for extension of an existing reinforced concrete box culvert with deletion of "box culvert" and substitution of "arch culvert".

Junction Box

The same specifications and conditions are applicable for this section as for "Design and Construction of a Culvert".

a. The owner is to furnish plans in sufficient detail for the construction of the junction box. These plans are to include but not to be limited to the following information and specifications:

(1) The portions of the existing structure to be removed.

(2) The connection of the box to the existing structure.

(3) The bar designation, number, and spacing of the reinforcing steel in the floor slab, walls, top slab, around the proposed and existing drainage structure to which a transition is

to be made, and around the access manhole, if deemed necessary for inspection and cleaning.

(4) "NOTES" are to be shown on the plans and are to include the specifications for the design, materials, and special instruction relative to the proposed construction.

(5) The design computations are to be submitted for review.

b. The owner may specify that the junction box be constructed in accordance with Roadway Standards 840-31, Concrete Junction Box, or 840-32, Brick Junction Box, where single pipes of equal or different diameters are involved. These standards may be purchased from the State Design Services Engineer.

Box Type Utility Tunnel

The same specifications and conditions are applicable for this section as for "Design and Construction of a Culvert".

a. The utility owner is to furnish plans, specifications, computations, and information in accordance with the construction of a reinforced concrete box culvert.

b. Information for the headwalls, wingwalls, and scour apron are not required.

c. 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.

Procedures

In order to facilitate the handling of the Encroachment Agreement, it will be necessary for the owner to obtain the required approval of the State Design Services Engineer prior to the formal submission of the Encroachment Agreement to the Division Engineer. In order to obtain this approval, the following procedures are to be followed:

1. The owner shall make a formal request to the State Design Services Engineer for the proposed construction and forward therewith two (2) copies each of the plans, specifications and the design computations.

2. The State Design Services Engineer will review the plans, specifications, design computations and handle with the owner any revisions deemed necessary. After all details have been completed, the owner will be requested to furnish the required number of plans and specifications for the approval stamp of the State Design Services Engineer to be affixed thereon. Approved copies of the plans and specifications, Special Provisions and approval letter for attachment to each copy of the executed Encroachment Agreement will be returned to the owner with copies for the District Engineer, Division Engineer and Bridge Maintenance Superintendent.

3. The owner shall then submit the proposed encroachment with the approved attachments to the Division Engineer for execution of the Encroachment Agreement.

4. The Division Engineer shall verify that the correct approved attachments are made a part of the Encroachment Agreement, execute the Agreement in behalf of the Department and distribute to interested parties.

5. The owner shall notify the Division Engineer prior to beginning any portion of the proposed work, and the Division Engineer shall, in turn, notify the Bridge Maintenance Superintendent so that inspection can be scheduled.

6. The Bridge Maintenance Superintendent shall see that the proposed construction is performed in accordance with the approved plans and specifications. The cost of inspections and supervision shall be borne by the owner.

In all instances where an owner desires to construct a culvert, extend an existing culvert, construct a junction box, or construct a box type utility tunnel, he is to furnish structure plans and a sketch or sketches to provide general information (and a Traffic Control Plan if construction impacts the travelway - See "Traffic Control Procedure") and to denote specifications as follows:

1. The county and route number involved.

2. The distance from the location of the proposed encroachment to another route on the State System.

3. An arrow showing the north direction.

4. The limits of the right-of-way in the vicinity of the proposed encroachment.

5. The general run of the main water course and direction of flow, if applicable.

6. A full and concise description of the proposed encroachment including the size of the proposed and existing structures.

7. Plans or sketches in plan and profile views showing the location, dimensions, elevations, and, if not normal to the centerline of roadway, the skew of the proposed structure.

8. A cross-sectional view from the natural ground line right and left of and normal to the centerline of the roadway; or if on a skew, the cross-section long the centerline of the proposed structure. The location, length, elevations, and general shape of the proposed structure or the existing structure with the proposed extension is to be superimposed on the cross-section.

9. The specifications for each type of proposed structure are to contain the stipulation that the Departments "Standard Specifications for Roads and Structures", including "Supplements" thereto, will be strictly adhered to in all construction performed on state right-of-way.

10. Any additional information the owner deems pertinent to the proposed encroachment.

11. Any additional information that may be requested by the State Design Services Engineer pertinent to the proposed encroachment.

CURB RAMPS OR CURB CUTS FOR HANDICAPPED PERSONS

The 1973 Session of the North Carolina General Assembly enacted legislations which authorized and directed the Department to develop and distribute guidelines and standards for the implementation of curb ramps or curb cuts on State system streets and roads for the benefit of handicapped persons. The law is as follows:

(a) G.S. 136-44-14. Curb ramps or curb cuts for handicapped persons. - Curbs constructed on each side of any street or road where curbs and sidewalks are provided and at other major points of pedestrian flow, shall meet the following minimum requirements:

(1) No less than two curb ramps or curb cuts shall be provided per lineal block, located at intersections.

(2) In no case, shall the width of a curb ramp or curb cut be less than 40 inches.

(3) The maximum gradient of such curb ramps or curb cuts shall be eight and thirty-three one-hundredths percent (8.33%) (12 inches slope for every one-inch rise) in relationship to the grade of the street or road.

(4) One curb ramp or curb cut may be provided under special conditions between each radius point of a street turnout of an intersection if adequate provisions are made to prevent vehicular traffic from encroaching on the ramp.

(b) Minimum requirements for curb ramps or curb cuts under subsection (a) shall be met (i) in the initial construction of such curbs, and (ii) whenever such curbs are reconstructed, including, but not limited to, reconstruction for maintenance procedures and traffic operation, repair, or correction of utilities.

(c) The Department of Transportation, Division of Highways, Highway Design Section, is authorized and directed to develop guidelines to implement this Article in consultation with the Governor's Study Committee on Architectural Barriers (or the Committee on Barrier-Free Design of the Governor's Committee on Employment of the Handicapped if the Governor's Study Committee on Architectural Barriers ceases to exist). All curb ramps or curb cuts constructed or reconstructed in North Carolina shall conform to the guidelines of the Highway Design Section.

(d) The Department of Transportation, Division of Highways, Highway Design Section, is authorized and directed to provide free copies of this Article together with implementary guidelines and standards, to municipal and county governments and public utilities operating within the State.

In conformance with this law, the Department published a booklet entitled GUIDELINES CURB CUTS AND RAMPS FOR HANDICAPPED PERSONS and this free booklet was distributed, and is available, to all municipal governments, county

governments, public utilities, and Department Division Engineers and District Engineers. These guidelines for curb ramps were developed as part of an overall program of action to remove restrictive barriers which severely impede the daily movements of physically handicapped and elderly persons. The booklet is intended to be a general guide and is not made part of this manual inasmuch as copies have been distributed statewide.

In the case of construction or reconstruction of curbing on any existing or proposed state maintained road, the Department shall require conformance to the law prior to permitting the encroachment for the construction or prior to acceptance of the road onto the state system.

In the case of reconstruction of curbing, the responsibility for providing the curb cut and ramp and all work necessary to accomplish this including any removal and replacement of any existing curbs and sidewalks or any other work required to achieve the complete facility shall be upon the party which causes the curb to be cut.

In the case of new construction of curbing, the responsibility for providing curb cut and ramp and all work necessary to accomplish this shall be upon the party causing the curb to be constructed.

Division Engineers shall be responsible for insuring that Encroachment Agreements on roads open to traffic conform to the law.

The State Utility Agent and/or State Design Services Engineer shall be responsible for insuring that Agreements on active highway construction projects conform to the law.

Requests for clarification or assistance on special problems pertaining to curb ramps or cuts, may be directed to:

State Design Services Engineer
Division of Highways
P. O. Box 25201
Raleigh, North Carolina 27611

BOND REQUIREMENTS

At the discretion of the Division Engineer and State Utility Agent, performance and indemnity bonds may be required from the applicant of an Encroachment Agreement or their contractor for utility installations to be placed within the limits of highway rights-of-way including attachments to structures. The purpose of such bonds is to indemnify the Department of Transportation for any damages within highway rights-of-way caused by the installation.

Bonds may be in the form of a corporate surety bond, continuing indemnity bonds, certified or cashier's check.

Where surety bonds are furnished, they must be signed by an authorized agent of the surety company, who must be a resident of North Carolina, and a Power of Attorney authorizing him to sign must be attached to the bond. For bonds of $500.00 or less, certified or cashier's checks made payable to the North Carolina Department of Transportation - Division of Highways - are preferable to surety bonds. Bonds in the form of personal checks or cash shall not be accepted.

Where surety bonds are furnished by the applicant of an Encroachment Agreement, Form R/W 16 shall be executed (see form on Page 103). Where surety bonds are furnished by the applicant's contractor, Form R/W 16A shall be executed (See form on Page 104).

Utility companies and contractors that perform a substantial amount of work on highway right-of-way from year to year are encouraged to provide continuing bonds, Form R/W 16B, for their operations on a system or statewide basis. The amount of the continuing bond shall be determined by the State Utility Agent and the bond shall be kept on file in the office of the State Utility Agent in Raleigh (See form on Page 105.)

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.

Where bonds are required, minimum amounts for underground installations shall be as follows:

Crossings Open Cut or Bored	Minimum Bond
Concrete of High Type Bituminous Pavements	$1000.00
Other Bituminous Pavements	$ 500.00
Unsurfaced Roads	$ 300.00
Longitudinal Encroachments Outside Pavements (Per Mile)	$ 800.00

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

Performance bonds shall be retained by the Division Engineer and State Utility Agent or their representative until such time as the bond is released. Certified or cashier's check shall immediately upon receipt be forwarded to the Controller in Raleigh and shall not be retained by the Division Engineer or State Utility Agent.

Bonds will be released by the Division Engineer or State Utility Agent one year following satisfactory completion of the work. The encroaching party shall be responsible for notifying the Bonding Company along with 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. These requirements will be incorporated into the encroachment letter of authorization.

The Division Engineer shall release or direct the State Utility Agent to release all performance bonds. The Division Engineer or State Utility Agent shall notify the Controller in Raleigh 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 or State Utility Agent shall inform the Controller as to the amount of bond to be released and to whom the warrant is to be made payable. The Controller will forward warrant directly to the Division Engineer or State Utility Agent for their disposition with the party who posted bond.

PERFORMANCE AND INDEMNITY BOND

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION - HIGHWAY ENCROACHMENT INSTALLATION

PRINCIPAL (Second Party to Encroachment Agreement)

SURETY

AMOUNT OF BOND

DATE OF BOND

DESCRIPTION OF ENCROACHMENT AGREEMENT:

Route or Highway No. _____
County _____
Date of Encroachment Agreement _____
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 "Policies and Procedures for Accommodating Utilities on Highway Rights-of-Way" 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: _____
Mayor or Pres. or Vice President
(Delete Inappropriate Title)

Clerk or Secretary

(Seal of Surety)

(Name of SURETY)

BY: _____
Attorney-in-Fact

NOTE: Attach Power of Attorney and Certificate of Authority of Attorney-in-Fact.
FORM R/W 16 (This form to be used only by second party to Encroachment Agreement)
Revised July 1978

PERFORMANCE AND INDEMNITY BOND

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION - HIGHWAY ENCROACHMENT INSTALLATION

PRINCIPAL (Contractor for second party to Encroachment Agreement)

SURETY

AMOUNT OF BOND

DATE OF BOND

DESCRIPTION OF ENCROACHMENT AGREEMENT:

Route or Highway No. _____
County _____
Date of Encroachment Agreement _____
Specific Location of Encroachment:
Between _____ & _____
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 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 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 with the "Policies and Procedures for Accommodating Utilities on Highway Rights of Way" 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: _____
President or Vice President
(Delete Inappropriate Title)

Clerk or Secretary

(Seal of Surety)

(Name 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 July 1978

CONTINUING INDEMNITY BOND

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION - HIGHWAY ENCROACHMENT INSTALLATIONS

Amount: _____

KNOW ALL MEN BY THESE PRESENTS: that we, _____, with principal office at _____, _____, as Principal and the _____, 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 hereby bind ourselves, heirs, executors, administrators, successors and assigns, firmly by these presents.

Signed, sealed and dated this ____ day of _____, 19___.

THE CONDITIONS OF THIS OBLIGATION ARE 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 haves been committed by the PRINCIPAL up to the date of such cancellation.

ATTEST:
SEAL

_____
NAME OF PRINCIPAL

_____
SECRETARY

BY: _____
PRESIDENT

ATTEST:

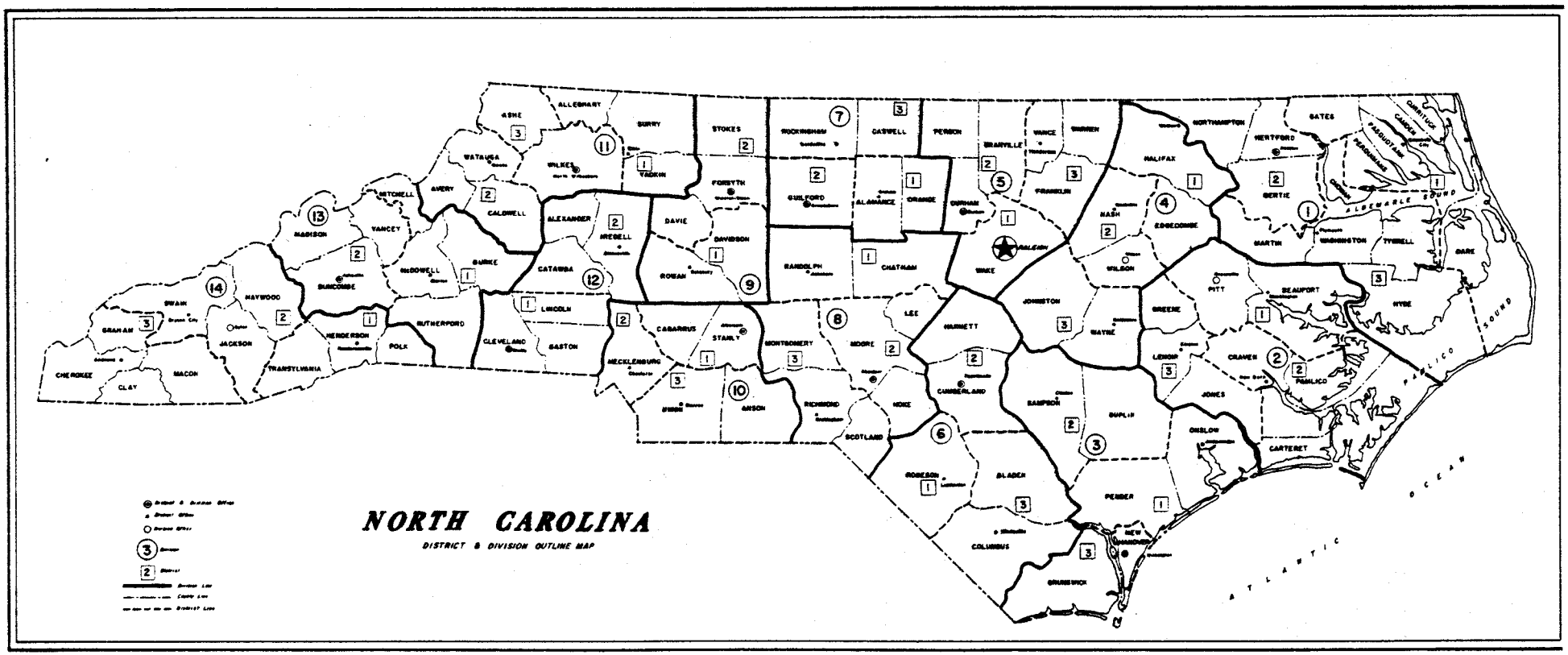
_____
SECRETARY

_____
SURETY

BY: _____
ATTORNEY-IN-FACT (TITLE)

FORM R/W 16B

Revised August 1978


NORTH CAROLINA
DISTRICT & DIVISION OUTLINE MAP
ATLANTIC OCEAN
ALBEMARLE SOUND
PAMLICO SOUND
RALEIGH
CHEROKEE
CLAY
GRAHAM
MACON
SWAIN
JACKSON
HAYWOOD
TRANSYLVANIA
HENDERSON
BUNCOMBE
MADISON
YANCEY
MITCHELL
AVERY
McDOWELL
POLK
RUTHERFORD
BURKE
CALDWELL
WATAUGA
ASHE
ALLEGHANY
WILKES
ALEXANDER
CATAWBA
CLEVELAND
LINCOLN
GASTON
IREDELL
SURRY
YADKIN
STOKES
FORSYTH
DAVIE
DAVIDSON
ROWAN
CABARRUS
MECKLENBURG
STANLY
UNION
ROCKINGHAM
GUILFORD
RANDOLPH
MONTGOMERY
RICHMOND
ANSON
CASWELL
ALAMANCE
ORANGE
CHATHAM
LEE
MOORE
SCOTLAND
PERSON
DURHAM
WAKE
GRANVILLE
VANCE
WARREN
FRANKLIN
HARNETT
CUMBERLAND
HOKE
ROBESON
JOHNSTON
SAMPSON
BLADEN
COLUMBUS
WAYNE
DUPLIN
PENDER
NEW HANOVER
BRUNSWICK
NASH
EDGECOMBE
HALIFAX
NORTHAMPTON
WILSON
GREENE
PITT
LENOIR
JONES
ONSLOW
MARTIN
BERTIE
HERTFORD
GATES
CAMDEN
CURRITUCK
PASQUOTANK
PERQUIMANS
CHOWAN
WASHINGTON
TYRRELL
DARE
HYDE
BEAUFORT
CRAVEN
PAMLICO
CARTERET
3 Division
2 District
Division Line
County Line
District Line

COUNTIES AND DISTRICTS IN DOT DIVISIONS

DIVISION 1

COUNTY	DISTRICT
Bertie	2
Camden	1
Chowan	3
Currituck	1
Dare	1
Gates	1
Hertford	2
Hyde	3
Martin	3
Northampton	2
Pasquotank	1
Perquimans	1
Tyrrell	3
Washington	3

DIVISION 2

Beaufort	1
Carteret	2
Craven	2
Greene	3
Jones	3
Lenoir	3
Pamlico	2
Pitt	1

DIVISION 3

Brunswick	3
Duplin	2
New Hanover	3
Onslow	1
Pender	1
Sampson	2

DIVISION 4

Edgecombe	1
Halifax	1
Johnston	3
Nash	2
Wayne	3
Wilson	2

DIVISION 5

Durham	2
Franklin	3
Granville	2
Person	2
Vance	3
Wake	1
Warren	3

DIVISION 6

COUNTY	DISTRICT
Bladen	3
Columbus	3
Cumberland	2
Harnett	2
Robeson	1

DIVISION 7

Alamance	1
Caswell	3
Guilford	2
Orange	1
Rockingham	3

DIVISION 8

Chatham	1
Hoke	2
Lee	2
Montgomery	3
Moore	2
Randolph	1
Richmond	3
Scotland	3

DIVISION 9

Davidson	1
Davie	2
Forsyth	2
Rowan	1
Stokes	2

DIVISION 10

Anson	3
Cabarrus	1
Mecklenburg	2
Stanly	1
Union	3

DIVISION 11

Alleghany	1
Ashe	3
Avery	2
Caldwell	2
Surry	1
Watauga	2
Wilkes	3
Yadkin	1

DIVISION 12

COUNTY	DISTRICT
Alexander	2
Catawba	2
Cleveland	1
Gaston	1
Iredell	2
Lincoln	1

DIVISION 13

Buncombe	2
Burke	1
Madison	2
McDowell	1
Mitchell	1
Rutherford	1
Yancey	2

DIVISION 14

Cherokee	3
Clay	3
Graham	3
Haywood	2
Henderson	1
Jackson	2
Macon	3
Polk	1
Swain	2
Transylvania	1

ADDRESSES AND TELEPHONE NUMBERS OF DOT DIVISION AND DISTRICT ENGINEERS

DIVISION 1

DIVISION ENGINEER
P. O. BOX 748
AHOSKIE, N. C. 27910
TELEPHONE: 919-332-4021

DISTRICT 1
DISTRICT ENGINEER
P. O. BOX 1405
ELIZABETH CITY, N. C. 27909
TELEPHONE 919-338-5131

DISTRICT 2
DISTRICT ENGINEER
P. O. BOX 748
AHOSKIE, N. C. 27910
TELEPHONE: 919-332-5372

DISTRICT 3
DISTRICT ENGINEER
P. O. BOX 928
PLYMOUTH, N. C. 27962
TELEPHONE: 919-793-4568

DIVISION 2

DIVISION ENGINEER
P. O. BOX 1587
GREENVILLE, N. C. 27834
TELEPHONE: 919-830-3490

DISTRICT 1
DISTRICT ENGINEER
1701 W. 5TH ST.
WASHINGTON, N. C. 27889
TELEPHONE: 919-946-3689

DISTRICT 2
DISTRICT ENGINEER
601 S. GLENBURNIE RD.
NEW BERN, N. C. 28560
TELEPHONE: 919-637-3411

DISTRICT 3
DISTRICT ENGINEER
1620 RICHLANDS RD.
KINSTON, N. C. 28501
TELEPHONE: 919-527-0053

DIVISION 3

DIVISION ENGINEER
124 DIVISION DR.
WILMINGTON, N. C. 28401
TELEPHONE: 919-251-5724

DISTRICT 1
DISTRICT ENGINEER
410 NEW BRIDGE ST., SUITE 7-A
JACKSONVILLE, N. C. 28540
TELEPHONE: 919-346-2040

DISTRICT 2
DISTRICT ENGINEER
220 NORTH BLVD.
CLINTON, N. C. 28328
TELEPHONE: 919-592-6174

DISTRICT 3
DISTRICT ENGINEER
127 CARDINAL EXT.
WILMINGTON, N. C. 28405
TELEPHONE: 919-350-2011

DIVISION 4

DIVISION ENGINEER
P. O. BOX 3165
WILSON, N. C. 27893
TELEPHONE: 919-237-6164

DISTRICT 1
DISTRICT ENGINEER
BOX 98
HALIFAX, N. C. 27839
TELEPHONE: 919-583-5861

DISTRICT 2
DISTRICT ENGINEER
RT. 2, BOX 29C
NASHVILLE, N. C. 27856
TELEPHONE: 919-459-2128

DISTRICT 3
DISTRICT ENGINEER
4218 HWY. 70W.
GOLDSBORO, N. C. 27530
TELEPHONE: 919-731-7938

DIVISION 5

DIVISION ENGINEER
P. O. BOX 15580
DURHAM, N. C. 27704
TELEPHONE: 919-560-6851

DISTRICT 1
DISTRICT ENGINEER
P. O. BOX 33185
RALEIGH, N. C. 27606
TELEPHONE: 919-733-3213 AND 733-7759

DISTRICT 2
DISTRICT ENGINEER
P. O. BOX 15580
DURHAM, N. C. 27704
TELEPHONE: 919-560-6854

DISTRICT 3
DISTRICT ENGINEER
P. O. BOX 205
HENDERSON, N. C. 27536
TELEPHONE: 919-492-0111

DIVISION 6

DIVISION ENGINEER
P. O. BOX 1150
FAYETTEVILLE, N. C. 28302
TELEPHONE: 919-486-1493

DISTRICT 1
DISTRICT ENGINEER
P. O. BOX 2157
LUMBERTON, N. C. 28359
TELEPHONE: 919-618-5546

DISTRICT 2
DISTRICT ENGINEER
P. O. BOX 1150
FAYETTEVILLE, N. C. 28302
TELEPHONE: 919-486-1496

DISTRICT 3
DISTRICT ENGINEER
P. O. BOX 27
WHITEVILLE, N. C. 28472
TELEPHONE: 919-642-3760

DIVISION 7

DIVISION ENGINEER
P. O. BOX 14996
GREENSBORO, N. C. 27415
TELEPHONE: 919-334-3192

DISTRICT 1
DISTRICT ENGINEER
P. O. BOX 766
GRAHAM, N. C. 27253
TELEPHONE: 919-570-6833

DISTRICT 2
DISTRICT ENGINEER
P. O. BOX 14996
GREENSBORO, N. C. 27415
TELEPHONE: 919-334-3161

DISTRICT 3
DISTRICT ENGINEER
BOX 2513
REIDSVILLE, N. C. 27323
TELEPHONE: 919-634-0066

DIVISION 8

DIVISION ENGINEER
P. O. BOX 1067
ABERDEEN, N. C. 28315
TELEPHONE: 919-944-2344

DISTRICT 1
DISTRICT ENGINEER
P. O. BOX 1164
ASHEBORO, N. C. 27204
TELEPHONE: 919-629-1423

DISTRICT 2
DISTRICT ENGINEER
P. O. BOX 1067
ABERDEEN, N. C. 28315
TELEPHONE: 919-944-7621

DISTRICT 3
DISTRICT ENGINEER
P. O. BOX 563
ROCKINGHAM, N. C. 28379
TELEPHONE: 919-997-9210

DIVISION 9

DIVISION ENGINEER
2125 CLOVERDALE AVE.
WINSTON-SALEM, N. C. 27103
TELEPHONE: 919-761-2200

DISTRICT 1
DISTRICT ENGINEER
4770 S. MAIN STREET
SALISBURY, N. C. 28144
TELEPHONE: 704-639-7560

DISTRICT 2
DISTRICT ENGINEER
2125 CLOVERDALE AVE.
WINSTON-SALEM, N. C. 27103
TELEPHONE: 919-761-2410

DIVISION 10

DIVISION ENGINEER
716 W. MAIN ST.
ALBEMARLE, N.C. 28002
TELEPHONE: 704-982-0101

DISTRICT 1
DISTRICT ENGINEER
716 W. MAIN ST.
ALBEMARLE, N. C. 28002
TELEPHONE: 704-982-0104

DISTRICT 2
DISTRICT ENGINEER
P. O. BOX 190
NEWELL, N. C. 28126
TELEPHONE: 704-596-6900

DISTRICT 3
DISTRICT ENGINEER
P. O. BOX 85
MONROE, N. C. 28110
TELEPHONE: 704-289-1397

DIVISION 11

DIVISION ENGINEER
P. O. BOX 250
NORTH WILKESBORO, N. C. 28659
TELEPHONE: 919-667-9111

DISTRICT 1
DISTRICT ENGINEER
P. O. BOX 558
ELKIN, N. C. 28621
TELEPHONE: 919-835-4241

DISTRICT 2
DISTRICT ENGINEER
P. O. BOX 1460
BOONE, N. C. 28607
TELEPHONE: 704-265-5380

DISTRICT 3
DISTRICT ENGINEER
P. O. BOX 250
NORTH WILKESBORO, N. C. 28659
TELEPHONE: 919-667-9117

DIVISION 12

DIVISION ENGINEER
P. O. BOX 47
SHELBY, N. C. 28150
TELEPHONE: 704-480-5400

DISTRICT 1
DISTRICT ENGINEER
P. O. BOX 47
SHELBY, N. C. 28150
TELEPHONE: 704-480-5402

DISTRICT 2
DISTRICT ENGINEER
P. O. BOX 1107
STATESVILLE, N. C. 28677
TELEPHONE: 704-876-3947

DIVISION 13

DIVISION ENGINEER
P. O. BOX 3279
ASHEVILLE, N. C. 28802
TELEPHONE: 704-251-6171

DISTRICT 1

DISTRICT ENGINEER
ROUTE 1, BOX 169C
MARION, N. C. 28655
TELEPHONE: 704-652-3344

DISTRICT 2

DISTRICT ENGINEER
P. O. BOX 3279
ASHEVILLE, N. C. 28802
TELEPHONE: 704-298-2741

DIVISION 14

DIVISION ENGINEER
P. O. BOX 37
SYLVA, N. C. 28779
TELEPHONE: 704-586-2141

DISTRICT 1

DISTRICT ENGINEER
P. O. BOX 1820
HENDERSONVILLE, N. C. 28793
TELEPHONE: 704-891-7911

DISTRICT 2

DISTRICT ENGINEER
P. O. BOX 250
BRYSON CITY, N. C. 28713
TELEPHONE: 704-488-2131

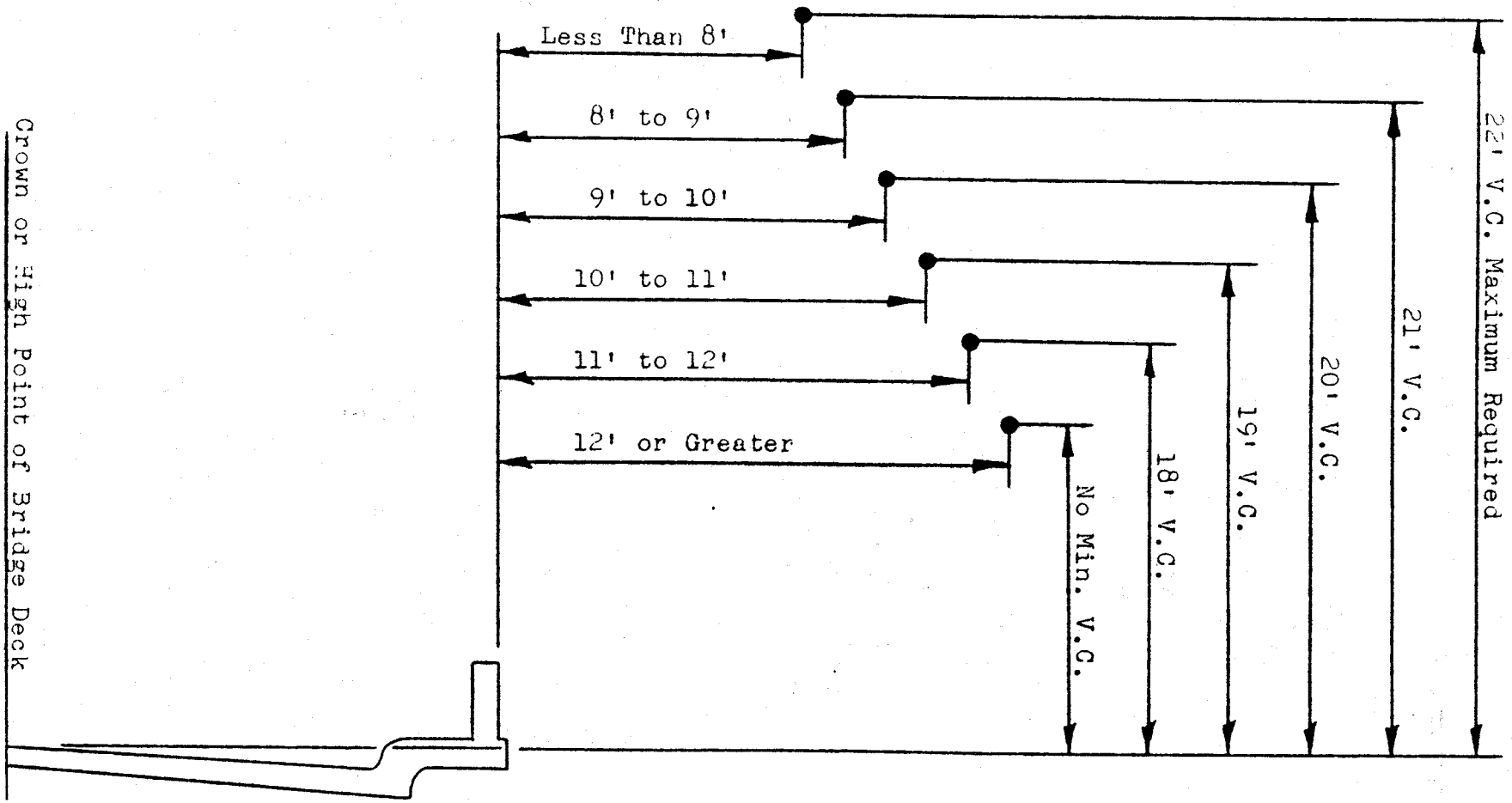
DISTRICT 3

DISTRICT ENGINEER
P. O. BOX 1551
ANDREWS, N. C. 28901
TELEPHONE: 704-321-4105

REQUIRED VERTICAL CLEARANCES FOR SNOOPER CRANE OPERATION

Vertical Clearance Required For Aerial Telephone Open Wire or Cable Adjacent to Side of Bridges.

For Power Distribution Lines, 5 Feet Additional Vertical Clearance Will Be Required To Lowest Wire. For 12 Feet or Greater, Vertical Clearance Shall be Determined By Bridge Maintenance Superintendent. Power Transmission Lines To Be Handled With Bridge Maintenance Superintendent on an Individual Basis.



INDEX