STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 28, 2003

U. S. Army Corps of Engineers
P.O. Box 1890
Wilmington, North Carolina 28402-1890

ATTN: Mr. David Timpy
NCDOT Coordinator

Dear Sir:

Subject: **Application for Section 404 and 401 Permits for Widening of Military Cutoff Road (SR 1409) from North of Eastwood Road (US 74) to Market Street (US 17) in New Hanover County**, Federal Aid No. NHF-1409, State Project No. 8.2251001, TIP No. U-2734, $475.00 Debit work order 8.2251001, WBS Element 34857.1.1

The North Carolina Department of Transportation (NCDOT) proposes to widen Military Cutoff Road (SR 1409) from two lanes to five lanes from north of Eastwood Road (US 74) to Market Street (US 17). The project length is 2.2 miles. These improvements are proposed to increase the capacity and safety of this facility. This project lies in the Coastal Plain Physiographic Province in New Hanover County in the Cape Fear River Basin (Hydrologic Catalog Unit 03030001, Subbasin 03-06-24). Work is scheduled to commence in April 2004. The application package consists of this cover letter, an ENG Form 4345, 8 ½ x 11 inch permit drawings, 11 x 17 inch half size plan sheets, interagency meeting minutes, and the stormwater management plan.

Purpose and Need: The purpose of this project is to increase the capacity and safety of Military Cutoff Road. The project corridor is an important route for accessing the North Carolina Sea Port and Wrightsville Beach. The area is experiencing rapid growth in residential and commercial development. To meet the increasing traffic demand and to reduce the occurrence of accidents along this road, the proposed five-lane widening improvements are needed.

Military Cutoff Road is identified as a planned bike route on the 1999 Bike Route Map for New Hanover County. A bicycle and pedestrian path is proposed at the request of area neighborhood associations and the City of Wilmington. This path will improve bicycle and pedestrian access to a nearby school, a county park, a library, shopping areas, and the beach.

The need for the project is based on a combination of factors including reducing congestion and improving traffic flow by constructing additional travel lanes within the subject project area. Safety will also be improved with the addition of a center turn lane which will remove left turning traffic from the travel lanes reducing the number of rear-end collisions.

Summary of Impacts: Impacts jurisdictional under the Federal Clean Water Act due the proposed project footprint include the following.

- 1.45 acres of permanent impacts to non-riverine wetlands (fill, excavation, and mechanized clearing)
- 1480 linear feet of stream
- No temporary wetland impacts
- No permanent impacts to ponds (filling or draining)

Summary of Mitigation: The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the NEPA and design processes. Detailed descriptions of these actions are presented elsewhere in this application. Compensatory mitigation for the remaining impacts includes the following

- 456 linear feet of on-site stream relocation using natural channel design techniques,
- 614 linear feet of stream preservation within the right-of-way,
- 410 linear feet of stream will be mitigated through the use of the North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (EEP), and
- 1.45 acres of impacts to non-riverine wetlands will be mitigated through the use of EEP.

NEPA DOCUMENT STATUS

The EA for this project was approved on April 28, 2000 and the Finding of No Significant Impact (FONSI) was approved August 26, 2002. After the documents were approved they were circulated to federal state and local agencies. Additional copies will be provided upon request.

INDEPENDENT UTILITY

The project is in compliance with 23 CFR Part 771.111(f) which lists the Federal Highway Administration (FHWA) characteristics of independent utility of a project including the following.

1. The project connects logical termini and is of sufficient length to address environmental matters on a broad scope.
2. The project is usable and a reasonable expenditure, even if no additional transportation improvements are made in the area.
3. The project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

The proposed project is needed to increase the capacity and safety of Military Cutoff Road. The southern terminus will tie into Eastwood Road (US 74) and the northern terminus will tie into

Market Street (US 17). The locations of the proposed project's termini have been coordinated with other programmed TIP projects in the area. The locations of the termini do not preclude the development and assessment of multiple alternates for other programmed TIP projects in the area. In this regard, the proposed project demonstrates logical termini and independent utility.

This project can stand alone as a functioning project and is designed to be compatible with other TIP projects in the area. The environmental impacts of the other projects will be fully evaluated in separate environmental documents. NCDOT has determined this project meets the criteria set forth in 23 CFR 771.111(f).

RESOURCE STATUS

Delineations: Delineations of jurisdictional areas were performed by NCDOT biologists in January 1997 and were updated/re-delineated by Environmental Services, Incorporated (ESI) in July and August 2003. Guidance provided in the 1987 Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987) was used for determining wetland boundaries. Wetland boundaries and stream delineations were verified on August 12, 2003 by David Timpy of the United States Army Corps of Engineers (USACE).

As previously mentioned, jurisdictional impacts include 1.45 acres of permanent impacts to non-riverine wetlands, 1480 linear feet of stream, no temporary wetland impacts, and no permanent impacts to ponds. Detailed descriptions of impacted areas can be found in the EA on pages 41 to 48. The following table summarizes this information.

Table 1. Jurisdictional Impacts for U-2734

Site	Permanent Non-Riverine Wetland Impacts (acres)*	Stream Impacts (linear feet)	Stream Impacts Requiring Mitigation (linear feet)	Natural Channel Design (linear feet)
1A	0	30	30	0
1	0.06	1099	1099	1070
2	0.19	131	131	0
3	0.75	128	128	0
4	0.32	0	0	0
5	0	92	92	0
6	0.11	0	0	0
7	0.02	0	0	0
Total	**1.45**	**1480**	**1480**	**1070**

* -- Includes fill, excavation, and mechanized clearing.

Wetlands: Impacts to jurisdictional wetlands occur at six sites within the project area in the Cape Fear River Basin (Hydrologic Catalog Unit 03030001, Subbasin 03-06-24). Table 2 summarizes information for each of the wetland impact sites associated with U-2734. A description of each site is as follows.

Site 1: The wetland at this site supports a second growth pine forest that forms the headwaters of Howe Creek. The wetland has a canopy of even-aged loblolly pine (*Pinus taeda*) and an understory consisting of sweetbay magnolia (*Magnolia virginiana*), red maple (*Acer rubrum*), and sweet-gum (*Liquidambar styraciflua*). Hydrologic characteristics include inundation, saturated soil, and oxidized root channels.

Site 2: This wetland site is located along the banks of Howe Creek adjacent to SR 1409. The canopy is dominated by black gum (*Nyssa sylvatica*), red maple, and sweet-gum. The understory and shrub layers are composed of red bay (*Persea borbonia*), wax myrtle (*Myrica cerifera*), and fetterbush (*Lyonia lucida*). Herbaceous vegetation is also present in openings where sufficient light penetration occurs. Hydrological indicators include drainage patterns, sediment deposits, drift lines, water marks, saturated soils, and inundation.

Site 3: This wetland site is located south of SR 1471. The canopy is dominated by loblolly pine with a dense understory of sweetbay magnolia, water oak (*Quercus nigra*), and red maple. The shrub layer is composed of sweet-gum, giant cane (*Arundinaria gigantean*), red maple, and greenbrier (*Smilax* sp.). Hydrologic indicators include saturated soils, water marks, and drainage patterns.

Site 4: This wetland site is located adjacent to Site 3 near SR 1471. The canopy is dominated by loblolly pine and the shrub layer is composed of red maple, sweetbay, and greenbrier. Hydrologic indicators include saturated soils and drainage patterns.

Site 6: This wetland site is located immediately south of Carolina Builders. The site is part of the Howe Creek wetland system. The canopy is dominated by red maple and loblolly bay (*Gordonia lasianthus*). The understory is dense and consists of wax myrtle and fetterbush. The herbaceous lay is composed of giant cane, soft rush (*Juncus effusus*), and sedges (*Carex* spp.). Hydrological characteristics are inundation, saturated soils, water marks, drift lines, and drainage patterns.

Table 2. Jurisdictional Wetland Information for U-2734

Site	Cowardin Classification*	DEM Rating	Schafale and Weakley (1990) Classification	Impact Type **	Total Impact (acres)
1	PFO4A	62	Pine Flatwoods	F, M	0.06
2	PFO1C	88	Bottomland Harwood Forest	F, E, M	0.19
3	PFO7B	60	Pond Pine Woodland	F, M	0.75
4	PFO7B	56	Pond Pine Woodland	F, E	0.32
6	PFO1C	70	Bottomland Hardwood Forest	F, M	0.11
7	--	--	--	M	0.02
Total					**1.45**

*--P = palustrine; FO = forested; 1 = broad-leaved deciduous; 7 = evergreen; B = saturated; C = seasonally flooded
**--F = fill; E = excavation; M = mechanized clearing (method III)

Streams: Impacts to jurisdictional streams occur on Howe Creek and tributaries to Howe Creek within the Cape Fear River Basin (Hydrologic Catalog Unit 03030001, Subbasin 03-06-24). Table 3 summarizes the information for each of the stream impact sites associated with U-2734.

Howe Creek: Howe Creek is crossed by the proposed project approximately 2 miles west of its confluence with Greenville Sound. The stream is extensively braided throughout the project area and a large quantity of sediment was observed in the stream channel. The existing culvert is almost completely blocked by sediment and debris greatly restricting flow under SR 1409. The substrate is composed entirely of fine sand. The main channel is approximately 30 feet wide with an average depth of 0.8 foot. Overbank flooding appears to occur on a regular basis as evidenced by debris piles, sediment deposits, and flooded depressions in the floodplain.

Unnamed Tributaries to Howe Creek: The unnamed tributaries to Howe Creek are generally highly channelized throughout the project area; however, the substrate and water characteristics are very similar to those observed in the main stream.

Unnamed Tributary to Howe Creek Proposed for Natural Channel Design: The proposed widening of SR 1409 will result in the impact (fill) of a portion of stream east and west of the existing facility. Approximately 456 linear feet of this impacted channel is targeted for on-site relocation and restoration. The stream design/classification for this stream reach is based on fluvial geomorphic principles and techniques. Existing stream conditions include a substrate composed of fine sand, silt, and organic material; a bankfull width of 7.0 feet; a mean depth of 0.8 foot; a cross-sectional area of 5.8 feet squared; and a sinuosity of 1.1. The restored channel will be designed for stable pattern, dimension, and profile. More detailed descriptions of existing conditions and the proposed reach can be found on Sheets 8 to 15 of 34 of the permit drawings.

Water Quality Information: The portion of Howe Creek and its tributaries within the project have been assigned a DWQ Index No. of 18-87-23 and a best usage classification of SA, ORW. The designation SA refers to surface waters used for commercial shellfishing or marketing. The supplemental classification ORW (Outstanding Resource Waters) is intended to protect unique and special waters having excellent water quality and being of exceptional state or national ecological or recreational significance. Waters with a classification of SA, ORW are High Quality Waters (HQW) by definition.

The plans for this project were designed taking into account the ORW and HQW designations for stream segments within the project area. These efforts include the installation of cross pipes and a box culvert at Howe Creek; grassed swales, typical cut ditches, a ditch between the roadway and bicycle path, and raised grated inlets raised 6-inches above the ditch line throughout the project area to promote stormwater storage and infiltration; and hazardous spill basins. Therefore, measures were taken to minimize impacts to these waters through the use of HQW Best Management Practices (BMPs), HQW Water Guidelines, BMPs for the Protection of Surface Waters, and a stormwater management plan. These efforts are described in more detail in the Minimization section of this letter.

Howe Creek and its tributaries are not listed in any section of the North Carolina 2000 Section 303(d) list.

Table 3. Jurisdictional Stream Information for U-2734

Site	Station No.	Structure	Stream	DWQ Index No./ Classification	Impact (linear feet)	Mitigation Required (linear feet)
1A	13+60 –L- (Lt)	Extend 48" RCP	UT to Howe Creek	18-87-23 SA, ORW	30	30
1	21+00 (Lt) to 23+44 (Rt) –L-	2 @ 54" Steel Pipe	UT to Howe Creek	18-87-23 SA, ORW	1099	1099
2	27+76 to 28+45 (Lt & Rt) –L-	2 @ 9' x 7' RCBC w/ 2' sill	Howe Creek	18-87-23 SA, ORW	131	131
3	31+25 to 34+30 (Lt & Rt) –L-	Extend 42" RCP	UT to Howe Creek	18-87-23 SA, ORW	128	128
5	38+26 (Lt) to 38+50 (Rt) –L-	72" RCP	UT to Howe Creek	18-87-23 SA, ORW	92	92
Total					**1480**	**1480**

PROTECTED SPECIES

Plants and animals with a Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of February 25, 2003, the U.S. Fish and Wildlife Service (FWS) list ten federally protected species for New Hanover County (Table 4).

Table 4. Federally Protected Species for New Hanover County

Scientific Name	Common Name	Status
Alligator mississippiensis	American alligator	Threatened S/A
Chelonia mydas	Green sea turtle	Threatened
Caretta caretta	Loggerhead sea turtle	Threatened
Trichechus manatus	West Indian manatee	Endangered
Charadrius melodus	Piping plover	Threatened
Picoides borealis	Red-cockaded woodpecker	Endangered
Acipenser brevirostrum	Shortnose sturgeon	Endangered
Thalictrum cooleyi	Cooley's meadowrue	Endangered
Lysimachia asperulaefolia	Rough-leaved loosestrife	Endangered
Amaranthus pumilus	Seabeach amaranth	Threatened

Endangered -- a species that is in danger of extinction throughout all or a significant portion of its range.
Threatened -- a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
S/A – denotes a species listed due to similarity of appearance

As reported in the EA, a Biological Conclusion of "No Effect" was rendered for all species. Cooley's meadowrue and rough-leaved loosestrife were the only two species for which potential habitat exists within the project study area. Plant by plant surveys were conducted within the project area for Cooley's meadowrue and rough-leaved loosestrife on August 25, 1998 by NCDOT biologists and again on July 7, 2003 by ESI biologists. No specimens of either plant species were found during the surveys. Prior to the July 2003 re-survey, potential habitat was identified based on soil mapping, but during the field investigation no potential suitable habitat was identified due to the urbanized nature and narrow project study area. Therefore, biological conclusions of "No Effect" remain valid for Cooley's meadowrue and rough-leaved loosestrife; as well as for the eight other listed species.

CULTURAL RESOURCES

Archaeology: The State Historic Preservation Office (SHPO) reviewed the proposed project regarding the identification of archaeological sites. The SHPO found no known archaeological sites within the proposed project area. Based on the SHPO's knowledge of the area, they stated in a letter dated June 9, 1997 (Appendix C of the EA) that "it is unlikely that any archaeological resources which may be eligible for inclusion in the National Register of Historic Places will be affected by the project construction". Therefore, in the letter SHPO recommended no archaeological investigation be conducted in connection with this project.

Historic: The area of potential effect (APE) for historic architectural resources was reviewed in the field by a NCDOT staff architectural historian. No properties over fifty years of age were located within the APE. In a meeting held between the SHPO, Federal Highway Administration (FHWA), and NCDOT on June 5, 1997 a concurrence form was signed supporting the findings. In addition, the SHPO conducted a search of their files and are aware of no structures of historical or architectural importance located within the planning area. Therefore, in a letter dated June 9, 1997 (Appendix C of the EA), the SHPO recommended that no historic architectural survey be conducted for this project.

COASTAL RESOURCES

According to the North Carolina Division of Coastal Management (DCM), the portion of Howe Creek that crosses Military Cutoff Road (SR 1409) within the proposed project area does not meet the criteria for an Area of Environmental Concern (AEC) under the Rules of the Coastal Resources Commission. Therefore, this project as currently proposed will not require a Coastal Area Management Act (CAMA) permit from DCM. However, in accordance with the federal Coastal Zone Management Act, this project will be reviewed for consistency with the State's Coastal Management Program. NCDOT has reviewed this project and has made the determination that this project is consistent with the CAMA to the best of our knowledge. NCDOT requests concurrence on this determination.

UTILITY IMPACTS

In addition to impacts from the construction of the road, impacts often result from the need to move existing utilities. These impacts to jurisdictional areas result from activities that 'but for" the construction of the road would not have occurred. The following paragraphs describe and quantify the "but for" impacts. Occasionally a utility company will decide to upgrade a line or construct a new line near the proposed highway right of way. The impacts from these activities would have occurred whether or not the road project was constructed. Therefore, they do not fall under the "but for" scenario. In those cases the utility company is responsible for obtaining any permits and the impacts are not addressed in the highway project application. However, if the information is available to us we will attempt to identify these non-"but for" actions so that you are kept informed about the actions that may occur near our right of way.

According to the NCDOT, all potential utility impacts have been addressed and are accounted for and no utility relocations will result in additional impacts to jurisdictional areas.

ICE STUDY

An Indirect and Cumulative Effects (ICE) Assessment for Transportation Improvement Program (TIP) project U-2734 in New Hanover County, North Carolina is being finalized and will be submitted to the agencies in early 2004.

The ICE Assessment includes project documentation, background information, and a definition of the study area(s). It also includes the identification of regional influences, growth and development trends, current transportation plans, land use plans, environmental regulations, and an inventory of notable features. The assessment also consists of the identification of activities that cause effects, any potential indirect and cumulative effects, analysis of these indirect and cumulative effects, and finally an evaluation of the results.

FEMA COMPLIANCE

According to the NCDOT hydraulics engineers, no Federal Emergency Management Agency involvement is required for this project.

WILD AND SCENIC RIVERS

The project will not impact any Designated Wild and Scenic Rivers or any rivers included in the list of study rivers (Public Law 90-542, as amended).

ESSENTIAL FISH HABITAT

The project will not impact any Essential Fish Habitat (EFH) afforded protection under the Magnuson-Stevens Act of 1996 (16 U.S.C. 1801 et *seq.*).

MITIGATION OPTIONS

The Army Corps of Engineers has adopted, through the Council on Environmental Quality (CEQ), a wetland mitigation policy that embraces the concept of "no net loss of wetlands" and sequencing. The purpose of this policy is to restore and maintain the chemical, biological, and physical integrity of the waters of the United States. Mitigation of wetland and surface water impacts has been defined by the CEQ to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts (40 CFR 1508.20). Executive Order 11990 (Protection of Wetlands) and Department of Transportation Order 5660.1A (Preservation of the Nations Wetlands), emphasize protection of the functions and values provided by wetlands. These directives require that new construction in wetlands be avoided as much as possible and that all practicable measures are taken to minimize or mitigate impacts to wetlands.

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize wetland impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning, and minimization measures were incorporated as part of the project design.

AVOIDANCE: All wetland areas not affected by the project will be protected from unnecessary encroachment.

1. No staging of construction equipment or storage of construction supplies will be allowed in wetlands or near surface waters.
2. Aquatic Life Movement: The project was designed to avoid disturbance to aquatic life movements.

MINIMIZATION: Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts. Minimization techniques implemented include the following.

1. High Quality Waters BMP: NCDOT has committed that "construction related impacts associated with the proposed action will be minimized through the use of High Quality Waters erosion and sediment control measures. All practical measures have been taken to minimize environmental harm."
2. High Quality Water Guidelines: Since the proposed project crosses waters classified as ORW and a HQW zone, NCDOT's High Quality Water Guidelines (Design Standards in Sensitive Watersheds) will be implemented.
3. Protection of Surface Waters BMP: In order to minimize potential impacts to water resources in the project area NCDOT's BMPs for the Protection of Surface Waters will be strictly enforced during the construction phase of the project.
4. Slopes: Fill slopes in wetlands at a 3:1 ratio are recommended instead of 2:1 because of the nature of soils in the coastal zones. The difference in wetland impacts using 3:1 slopes in this area is negligible.
5. Ditching: It is the policy of the NCDOT to eliminate lateral ditching in wetlands as much as possible, thus preserving the hydrology of adjacent wetlands.
6. Clearing and Grubbing: Clearing and grubbing will be reduced in wetland areas to avoid further impacts.

7. Symmetrical Widening: Impacts to wetlands have been kept to a minimum by symmetrical widening of the roadway.
8. "In-Stream" Construction: "In-stream" construction will be minimized.
9. Stormwater Management: As required by DWQ, a stormwater management plan will be implemented for this project. The plan is enclosed with the application package.
10. Grassed Swales: Grassed swales are proposed at various locations throughout the project area. In addition, typical cut ditches and a ditch that will drain between the proposed roadway and bicycle path will also be used for stormwater storage.
11. Raised Grated Inlets: Where practicable, grated inlets in proposed grassed swales, cut ditches, and the ditch between the roadway and the bicycle path will be raised 6-inches above the ditch line to promote stormwater storage and infiltration.
12. Site 2, Box Culvert: At Station 28+14 –L- (Sheets 16 to 18 of 34 of the permit drawings), the existing double line of 72-inch corrugated metal pipes will be replaced by a double barrel 9-foot by 7-foot reinforced concrete box culvert. The normal stream flow and channel characteristics will be maintained at the crossing by burying the culvert inverts 1-foot below the stream bed and installing a sill in one barrel to divert low flow through the other barrel.
13. Site 2, Cross Pipes at Howe Creek: Additional cross pipes will be installed at Howe Creek to equalize flow across the floodplain (Sheet 16 of 34 of the permit drawings).
14. Site 2, Hazardous Spill Basins at Howe Creek: Hazardous spill catch basins will be constructed along the east side of the roadway and outside of the wetland areas at approximately Station 27+60 –L- Rt and Station 28+60 –L- Rt (Sheet 16 of 34 of the permit drawings). Development in the area eliminated the possibility of placing these structures along the west side of the roadway, as suggested in the November 3, 1999 letter from the Division of Coastal Management, Raleigh Office. The function of these basins will be to aid in the containment and cleanup of potential accidental hazardous spill.
15. Site 3, Station 33+65-L-: The outlet ditch cleanout at Station 33+65-L-Rt (Sheet 20 of 34 of the permit drawings) was eliminated, reducing the impacts to jurisdictional streams.
16. Site 7, Outlet Velocities: Outlet velocities prior to entering the wetland/stream were reduced prior to the wetland/stream by deepening the 2GI, dropping the box invert allowing energy to dissipate in the box, and flattening the outlet pipe (Sheet 31 of 34 of the permit drawings).

COMPENSATION: The primary emphasis of the compensatory mitigation is to reestablish a condition similar to what would have existed if the project were not built. As previously stated, mitigation is limited to reasonable expenditures and practicable considerations related to highway operation. Mitigation is generally accomplished through a combination of methods designed to replace wetland functions and values lost as a result of construction of the project. These methods consist of creation of new wetlands from uplands, borrow pits, and other non-wetland areas; restoration of wetlands; and enhancement of existing wetlands. Where such options may not be available, or when existing wetlands and wetland-surface water complexes are considered to be important resources worthy of preservation, consideration is given to preservation as at least one component of a compensatory mitigation proposal.

FHWA Step Down Compliance: All compensatory mitigation must be in compliance with 23 CFR Part 777.9, "Mitigation of Impacts" that describes the actions that should be followed to

qualify for Federal-aid highway funding. This process known as the FHWA "Step Down" procedures includes the following.

1. Consideration must be given to mitigation within the right-of-way and should include the enhancement of existing wetlands and the creation of new wetlands in the highway median, borrow pit areas, interchange areas and along the roadside.

2. Where mitigation within the right-of-way does not fully offset wetland losses, compensatory mitigation may be conducted outside the right-of-way including enhancement, creation, and preservation.

Based upon the agreements stipulated in the "Memorandum of Agreement Among the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the United States Army Corps of Engineers, Wilmington District" (MOA), it is understood that EEP will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for NCDOT projects that are listed in Exhibit 1 of the subject MOA during the EEP transition period which ends on June 30, 2005.

Since the subject project is listed in Exhibit 1, the necessary compensatory mitigation to offset unavoidable impacts to waters that are jurisdictional under the federal Clean Water Act will be provided by the EEP. The offsetting mitigation will derive from an inventory of assets already in existence within the same 8-digit cataloguing unit. The Department has avoided and minimized impacts to jurisdictional resources to the greatest extent possible as described above. The remaining, unavoidable impacts to 1.45 acres of jurisdictional wetlands and 410 linear feet of jurisdictional streams will be offset by compensatory mitigation provided by the EEP program.

Compensatory mitigation for this project consists of the following.

Wetland Mitigation: Wetland impacts total 1.45 acres to non-riverine wetlands. Compensatory mitigation will be mitigated through the use of EEP for 1.45 acres of wetland impacts.

Stream Mitigation: Stream impacts total 1480 linear feet of impacts to first- and second-order perennial and intermittent streams. The following combination of on-site stream relocation and compensatory mitigation is proposed.

1. Natural channel design and relocation of 456 linear feet of stream impacted within Site 1 of U-2734 at a mitigation ratio of 1:1.
2. Preservation of 614 linear feet of stream within the Site 1 right-of-way of U-2734 at a mitigation ratio of 1:1 (based on conversations with David Timpy of the USACE).
3. Compensatory mitigation will be mitigated through the use of EEP for the remaining 410 linear feet of stream impacts.

REGULATORY APPROVALS

Application is hereby made for a Department of the Army Individual 404 Permit and a 401 Water Quality Certification from the North Carolina Division of Water Quality (DWQ) as

required for the activities described above. In compliance with Section 143-215.3D(e) of the NCAC, we will provide $475.00 to act as payment for processing the Section 401 permit application previously noted in this application (see Subject line). Seven copies of this application are provided to DWQ, for their review.

If you have any questions or need additional information please call Ms. Elizabeth Lusk at (919) 715-1444.

Sincerely,

Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA

cc: Mr. David Timpy, USACE, Wilmington
Mr. John Dorney, NCDWQ (7 copies)
Mr. Travis Wilson, NCWRC
Mr. Ron Sechler, NMFS
Ms. Gail Harrison, USEPA
Mr. Garland Pardue, Ph.D., USFWS
Mr. John Sullivan, P.E., FHWA
Mr. Jay Bennett, P.E., Roadway Design
Mr. Omar Sultan, Programming and TIP
Ms. Debbie Barbour, P.E., Highway Design
Mr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. Allen Pope, P.E. (Div. 3), Division Engineer
Mr. Mason Herndon (Div. 3), Division Environmental Officer

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)	OMB APPROVAL NO. 071-0003 Expires December 31, 2004

The public reporting burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4.DATE APPLICATION COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT=S NAME Gregory J. Thorpe, Ph.D., Environmental Management Director Project Development and Environmental Analysis North Carolina Department of Transportation	8. AUTHORIZED AGENT=S NAME AND TITLE (an agent is not required) Not applicable
6.APPLICANT=S ADDRESS 1548 Mail Service Center Raleigh, North Carolina 27699-1548	9. AGENT=S ADDRESS
7. APPLICANT=S PHONE NOS. WITH AREA CODE a. Residence b. Business (919) 733-3141	10. AGENTS PHONE NOS. WITH AREA CODE a. Residence b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize, ---------- to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT=S SIGNATURE DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE(*see instructions*)

Widening of Military Cutoff Road (SR 1409) from two lanes to five lanes from north of Eastwood Road (US 74) to Market Street (US 17). The project length is 2.2 miles. These improvements are proposed to increase the capacity and safety of this facility. Federal Aid No. NHF-1409, State Project No. 8.2251001, TIP No. U-2734.

13. NAME OF WATERBODY, IF KNOWN (*if applicable*) Howe Creek and tributaries to Howe Creek	14. PROJECT STREET ADDRESS (*if applicable*) NA
LOCATION OF PROJECT **New Hanover** (COUNTIES) **NC** (STATE)	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (*see instructions*)

17. DIRECTIONS TO THE SITE

See the attached permit drawings and half size plan sheets.

18. Nature of Activity (*Description of project, include all features*)
NCDOT proposes to widen Military Cutoff Road (SR 1409) from two lanes to five lanes from north of Eastwood Road (US 74) to Market Street (US 17). The project length is 2.2 miles. These improvements are proposed to increase the capacity and safety of this facility.

19. Project Purpose (*Describe the reason or purpose of the project, see instructions*)
The purpose of this project is to increase the capacity and safety of Military Cutoff Road. The purpose and need are briefly explained in the permit application cover letter and are explained in detail in the April 2000 EA and the April 2002 FONSI.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge
Proposed widening of Military Cutoff Road (SR 1409) from two lanes to five lanes from north of Eastwood Road (US 74) to Market Street (US 17).

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards
See the attached permit drawings.

22. Surface Area in Acres of Wetlands or Other Waters Filled (*see instructions*)
See sheet 32 of the attached permit drawings.

23. Is Any Portion of the Work Already Complete? YES___ NO _X_ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).
See sheet 34 of the attached permit drawings.

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

Agency	Type approval*	Identification number	Date applied	Date approved	Date Denied
Not Applicable					

*Would include but is not restricted to zoning, building, and flood plain permits.

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information is this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE
	10/28/03		

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manor within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statements of entry, shall be fines not more than $10,000 or imprisoned not more than five years or both.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 28, 2003

Mr. William D. Gilmore, P.E.
EEP Transition Manager
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Dear Sir:

Subject: **Widening of Military Cutoff Road (SR 1409) from North of Eastwood Road (US 74) to Market Street (US 17) in New Hanover County,** Federal Aid No. NHF-1409, State Project No. 8.2251001, TIP No. U-2734, $475.00 Debit work order 8.2251001, WBS Element 34857.1.1

The purpose of this letter is to request that the North Carolina Ecosystem Enhancement Program (EEP) provide confirmation that you are willing to provide compensatory mitigation for the project in accordance with the Memorandum of Agreement (MOA) signed July 22, 2003 by the United States Army Corps of Engineers (USACE), the North Carolina Department of Environment and Natural Resources (DENR), and the North Carolina Department of Transportation (NCDOT).

NCDOT proposes to widen Military Cutoff Road (SR 1409) from two lanes to five lanes from north of Eastwood Road (US 74) to Market Street (US 17). The project length is 2.2 miles. These improvements are proposed to increase the capacity and safety of this facility.

Impacts to jurisdictional resources have been avoided and minimized to the greatest extent possible as described in the permit application. A copy of the permit application can be found at http://www.ncdot.org/planning/pe/naturalunit/Applications.html. Of the remaining impacts to jurisdictional resources, 1.45 acres of impacts to non-riverine wetlands and 410 linear feet of impacts to streams will be compensated for by mitigation provided by the EEP program.

The project lies in the Coastal Plain Physiographic Province in New Hanover County in the Cape Fear River Basin (Hydrologic Catalog Unit 03030001, Subbasin 03-06-24). Jurisdictional impacts and proposed compensatory mitigation are as follows.

Wetland Impacts and Compensatory Mitigation: Wetland impacts total 1.45 acres to non-riverine wetlands. Compensatory mitigation is proposed to consist of mitigation provided by the EEP for 1.45 acres of wetland impacts.

Stream Impacts and Compensatory Mitigation: Stream impacts total 1480 linear feet of impacts to Howe Creek and tributaries to Howe Creek (first- and second-order perennial and intermittent streams; DWQ Index No. 18-87-23). The following combination of on-site stream relocation and compensatory mitigation is proposed.

1. Natural channel design and relocation of 456 linear feet of stream impacted within Site 1 of U-2734 at a mitigation ratio of 1:1.
2. Preservation of 614 linear feet of stream within the Site 1 right-of-way of U-2734 at a mitigation ratio of 1:1 (based on conversations with David Timpy of the USACE).
3. Compensatory mitigation is proposed to consist of mitigation provided by the EEP for the remaining 410 linear feet of stream impacts.

Summary of Jurisdictional Impacts for U-2734

Site	Permanent Non-Riverine Wetland Impacts (acres)*	Stream Impacts (linear feet)
1A	0	30
1	0.06	1099
2	0.19	131
3	0.75	128
4	0.32	0
5	0	92
6	0.11	0
7	0.02	0
Total	**1.45**	**1480**

* -- Includes fill, excavation, and mechanized clearing.

Please send the letter of confirmation to David Timpy (USACE Coordinator) at the USACE Wilmington Regulatory Field Office, P.O. Box 1890, Wilmington, North Carolina 28402-1890. The current project let date is April 2004.

If you have any questions or need additional information please call Ms. Elizabeth Lusk at (919) 715-1444.

Sincerely,

Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA

cc: Mr. David Timpy, USACE, Wilmington
Mr. John Dorney, NCDWQ
Mr. Travis Wilson, NCWRC
Mr. Ron Sechler, NMFS
Ms. Gail Harrison, USEPA
Mr. Garland Pardue, Ph.D., USFWS
Mr. John Sullivan, P.E., FHWA
Mr. Jay Bennett, P.E., Roadway Design
Mr. Omar Sultan, Programming and TIP
Ms. Debbie Barbour, P.E., Highway Design
Mr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. Allen Pope, P.E. (Div. 3), Division Engineer
Mr. Mason Herndon (Div. 3), Division Environmental Officer

Subject: Minutes from Interagency Hydraulic Design Review Meeting on March 28, 2002 for U-2734 (Military Cutoff Road Widening), New Hanover County

Participants:

Marshall Clawson, NCDOT Hydraulics	John Hennessey, NCDWQ
Galen Cail, NCDOT Hydraulics	Cathy Brittingham, NCDCM
David Chang, NCDOT Hydraulics	Bill Arrington, NCDCM
Sue Flowers, NCDOT Roadway	Howard Hall, USFWS
Anthony West, NCDOT Roadway	Gus Saparilas, TGS Engineers
Dave Timpy, USACE	Bill Stephens, TGS Engineers
Lindsey Riddick, NCDOT PD & EA	

The meeting began with the distribution of the Stormwater Management Plan and a review of the overall project layout. Marshall Clawson and Bill Stephens proceeded to review each redline plan sheet and field agency comments and questions. The question/comments are summarized as follows:

1) Wetland and Stream Impacts at Howe Creek: The wetland limits at Howe Creek need be reinvestigated. Additional delineation may be required to determine which side is more suitable for hazardous spill basins (East or West side of Military Cutoff Road). Lindsey Riddick will check delineation. It was also questioned whether stormwater could even outlet in the wetlands or within 575' on each side of Howe Creek since it is considered an Outstanding Resource Water and falls under CAMA jurisdiction. Cathy Brittingham investigated and informed that, since no CAMA permit is required for this section of Howe Creek (non-navigatable) and it is not an AEC, stormwater can outlet within the 575' buffer and in the wetlands. However, velocities must be non-erosive.

   It was determined to keep the proposed hazardous spill basins on the east side of Military Cutoff based on the following:
   - *-The extent of the wetland boundaries are comparable on either side of the road*
   - *-The basins will not impact the wetlands except for the minimal ditching required to enable the basin riser pipe to outlet*
   - *-The future Mayfaire development has proposed detention in the Southwest quadrant of the crossing*
   - *-The east side of Military Cutoff is the downstream side of the crossing and thus the discharge in the basins will not have to pass back through the proposed box culvert.*

2) Hazardous Spill Basins at Howe Creek: Dave Timpy emphasized the importance of constructing the basins on the side which will result in the least impact to the wetlands. John Hennessey wanted to know what treatment is provided since the hazardous spill basin is not a treatment facility. He was informed that treatment is acquired as stormwater traverses to the basins through grassed swales and also through storage provided by raised grated inlets (6" at each inlet) in the swales. John also emphasized that outlet velocities into the Howe Creek basin need to be non-erosive and flow spreaders should be considered. Also the basins, as designed, need to be relocated out of the wetlands.

See above responses.

3) Environmental Issues from Prior Review Meetings: Dave Timpy expressed concern that stormwater issues brought up in prior meetings and summarized in memos dated 10/2/200 and 12/5/00 may not have been addressed. He said these issues should have already been incorporated in the plans or justification provided as to why not. The memos will be reviewed and these issues will be addressed in the plans, if they have not been so.

The environmental commitments have been reviewed and will be adhered to including the addition of hazardous spill basins and overflow pipes at Howe Creek, retention in the ditches along the bike path, and the relocation/reconnection of the jurisdictional stream at the beginning of the project with natural stream design.

4) Proposed Pipe Culverts at Sta 21+43 –L- with Natural Stream Design: Bill Stephens and Marshall Clawson informed that the existing stream flowing towards Military Cutoff Road Sta 21+00 –L- (Lt) does not traverse under the road to Sta 21+90 –L- (Rt) as it seemingly should do based on the natural alignment of the stream. However, pipes are proposed to do so along with natural stream design (nsd) for those portions of stream impacted. All agency representatives wanted information detailing the nsd including stream morphology, typicals, and alignment.

NSD info provided in permit.

5) System Sta 35+10 –L- Examined: The 1050 RCP system crossing at Sta 35+10 –L- which outlets at Sta 33+66 –L- (Rt) was questioned as to it's sufficiency at stormwater treatment. It was explained that additional treatment is limited by the proximity of development to the roadway and the lack of suitable outlets. To route the stormwater in a swale would require a deep channel and would impact a building along –L- (Rt) and would impact additional wetlands along –L- (Lt).

6) System Along –Y5 (Covil Farm Road) Right: The system along Covil Farm Road right was explained to be necessary due to the poor condition of the existing ditch right and the constraints of the site development to improve this ditch. Therefore, the system was provided to eliminate future erosion of this ditch. Dave Timpy

questioned whether wetlands were present at the proposed outlet of this system. Lindsey Riddick will investigate to see if delineation has been done or whether if it will need to be. John Hennessey emphasized that if wetlands are present the outlet velocities need to be non-erosive.

System was relocated to left side of road to reduce R/W impacts. Wetlands were delineated at the outlet of the system by Lindsey. Class I rip rap used at outlet.

7) Potential Mitigation Site at Sta 46+00 –L- (Rt) (Hefelfinger Property): Dave Timpy mentioned the Hefelfinger property as a potential mitigation site that had been discussed in the past. The potential acquisition of this site will be investigated by the PD & EA Unit.

8) Sealed System at Intersection of Military Cutoff Road and Market Street: Bill and Marshall pointed out that a sealed system is proposed from Sta 48+83 to the End of Project in the vicinity of the Mid State Petroleum, Inc. property due to the presence of contaminated soil. Agency representatives seemed satisfied with the system.

Subject: Draft Minutes from Interagency Permit Review Meeting on February 20, 2003 for U-2734 in New Hanover County

Team Members:

Dave Timpy-USACE	(via conference call)
John Hennessy-NCDWQ	(absent)
David Cox-NCWRC	(present)
Travis Wilson-NCWRC	(present)
Gary Jordan-USFWS	(absent)
Chris Militscher-EPA	(absent)
Heather Montague-PDEA	(present)
Bill Arrington-NCDCM	(present)
Cathy Brittingham-NCDCM	(present)

Participants:
Marshall Clawson, NCDOT Hydraulics
Galen Cail, NCDOT Hydraulics
Sue Flowers, NCDOT Roadway Design
Anthony West, NCDOT Roadway Design
Greg Thorpe, NCDOT PD&EA
Charles Cox, NCDOT PD&EA
Brian Hanks, NCDOT Structure Design
Barney Blackburn, NCDOT Roadside Env

Prior to the meeting Dave Timpy discussed with Galen, via telephone, some of his concerns/comments. They are the following:

- Make sure all potential impacts due to utilities are addressed. Galen will review with Michael Bright (NCDOT Utilities) to ensure any additional impacts are accounted for.

  Galen reviewed with Michael on 3/3/03. All sites were investigated for potential utility impacts. It was determined the only site that would require additional consideration for these impacts would be the upstream side of the double barrel box culvert at Howe Creek, due to the placement of a sanitary sewer system. Impacts accounted for to construction easement.

- Investigate if the width of mechanized clearing can be reduced from 3m (10') to 1.5m (5'). Galen will check with Joe Blair (Division Construction) to see if this is feasible.

  Discussed with Joe and Kerry Cross (Resident Engineer-Burgaw). It was determined that the additional clearing width is needed, especially in those areas with considerable fill height and where guardrail will be placed (as with the site at Howe Creek). This type of site(s) could be difficult to access/construct from the roadway and may require additional maintenance once the guardrail is placed.

- Review the natural stream design data (Site 1) and investigate whether more stream could be designed for additional mitigation credit. Dave will present any

specific questions/comments once he reviews the stream site in the field. Also, check the impact summary sheet. Stream impact length looks suspect and the length of "Relocated Channel" was not accounted for. Galen will review and make necessary changes.

Galen met with Dave Timpy and Mason Herndon in the field on 3/5/03 and reviewed the stream site. See "Natural Stream Design" summary for issues discussed.

- Need to address the type of "Native Plantings" associated with the natural stream design.

This will need to be addressed by PD&EA and/or Roadside Environmental.

- Investigate potential acquisition of the Hefelfinger property (Site 5) for wetland mitigation.

Heather said Elizabeth Lusk (PD&EA) is to meet with Dave on 2/27/03 to address.

Cathy stated that **all** culvert inverts at wetlands and jurisdictional streams should be buried a minimum of 1'.

The box culvert at Howe Creek has been designed as such. Other relative pipe crossing sites have been investigated and appropriate revisions made.

Site 1:

No additional comments.

Site 2:

Need easement on the inlet side of the Howe Creek box culvert for construction access.

R/W provided.

Show wetland symbology outside of fill limits on cross section.

Done.

Site 3:

Galen stated that not all of the wetland was shown as impacted along the Mayfaire property since the developers permit has already accounted for this portion.

Site 4:

Need to differentiate wetland impact as Excavated, Drained, or Filled. It was noted there is an existing ditch now and the proposed ditch will be of similar dimension. Also, the wetland is shown as a "total take".

Impacts designated as requested.

Site 5:

No additional comments.

Site 6:

No comments.

Review Meeting w/ John Hennessey, Marshall Clawson and Galen Cail on 4/2/03:

It was stated that an additional jurisdictional stream will be added and impacts accounted for at Sta 38+40 –L-.

Site 1:

It was discussed that Dave Timpy requested, after reviewing in the field with Galen, to revise the stream relocation by retaining the existing remnant stream and providing relocation in only the areas that are being filled. He also requested providing more stream relocation than is presently being proposed by starting further Southeast. John thought this was a good idea but to investigate improving the remnant stream dimension, since Galen suggested it was entrenched. Also, need to provide existing and proposed stream profile. Galen will update morphological data and review with John at a later time.

Stream relocation revised per Dave Timpy's recommendations. See "Natural Stream Design" summary.

Site 3:

Galen stated the wetland limits on the Eastside, stop at the boundary of where the "Mayfaire" permit accounted for impacts.

It was stated the outlet ditch cleanout Sta 33+65 –L- Rt will be eliminated, reducing the impacts to the jurisdictional stream.

Site 6:

John questioned if the outlet velocities into the wetland from the 375 (15") and 1200 (48") RCP are less than 2 ft/s. It was stated that the proposed 1200 outlets onto a Class I rip rap pad. Presently, there is an existing 750 (30") that outlets into a swale. The 375 outlet velocity will be checked.

The discharge and velocity for the 375 outlet is 1.8 cfs and 1.5 ft/s, respectively.

Site 7:

John questioned the outlet velocities in the wetland/stream. It was stated that the outlet velocities are greater than 2 ft/s but the topo limits what can be done here. It was decided to deepen the 2GI, dropping the box invert allowing energy to be dissipated in the box, and flatten the outlet pipe, reducing the outlet velocities prior to the wetland/stream.

Revision implemented.

STORMWATER MANAGEMENT PLAN

Project: 8.2251001, TIP No. U-2734 6/10/03
New Hanover County
Hydraulics Project Manager: Gus N. Saparilas and William T. Stephens, Jr., P.E. (TGS Engineers), Galen Cail, P.E. (NCDOT Hydraulics Unit)

ROADWAY DESCRIPTION

The project involves the widening of SR 1409 (Military Cutoff Road) in New Hanover County from just north of US 74 (Eastwood Road) to US 17 (Market Street). The overall length of the project is approximately 2.33 miles. The existing roadway is a predominately 30-foot wide roadway with two 12-foot wide lanes and 2-foot paved shoulders. The existing roadway has been widened in places to accommodate turning lanes due to heavy development along the route. With Project U-2734, it is proposed to widen Military Cutoff Road to a four-lane, shoulder section roadway with a raised grass median. Curb and gutter is proposed to be added to the section along the east side of the roadway starting at -L- Station 34+60 +/- to US 17 and to the west side of the roadway from -L- Station 43+60 +/- to US 17. A 10-foot bicycle path is also proposed along the majority of the east side of the project. The project crosses one stream, (Howe Creek) and a box culvert is proposed at this crossing. The project drainage system consists of cross pipes, grated inlets and associated pipe systems, and side and lateral stormwater ditches and swales.

ENVIRONMENTAL DESCRIPTION

The project is located in the Cape Fear River Basin. The one stream crossing along the project is of Howe Creek at approximate -L- Station 28+12. Howe Creek is designated as an Outstanding Resource Water (ORW) by the Department of Coastal Management and the Division of Water Quality. There are seven wetland sites that will be impacted by the proposed project. Wetland impacts will be kept to a minimum by symmetrical widening of the roadway.

BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES

The primary goal of Best Management Practices (BMPs) is to prevent degradation of the states surface waters by the location, construction and operation of the highway system. BMPs are activities, practices and procedures taken to prevent or reduce stormwater pollution. The BMPs and measures that will be used on this project to reduce stormwater impacts are grassed swales, raised grated inlets in ditch lines, hazardous spill basins and natural stream design. In addition, the proposed 2-barrel box culvert at Howe Creek will be buried 1-foot below the stream bed with a sill installed in one barrel to maintain the normal stream flow and channel characteristics. Infiltration basins were considered as required by the Division of Water Quality during the initial phase of the stormwater management plan. However, the infiltration basins were determined to be an unfeasible measure due to the high water tables in the project area.

The following summarizes the BMPs to be used on the proposed project:

GRASSED SWALES

Grassed swales are proposed at various locations as indicated below in the table. In addition, typical cut ditches and the ditch between the proposed roadway and bicycle path will also be used for stormwater storage by raising grated inlets 6-inches above the ditch bed.

The following table summarizes the location and storage potential for grassed swales and ditches proposed for the project.

Grassed Swale and Ditch Stormwater Runoff Storage

Location of Swale Station to Station	Lt or Rt	Storage Volume (cu. ft) (6" uniform depth)	Pavement Runoff Storage (inches)	Swale Description
-L- 16+80+/- to 18+40+/-	LT	150	0.10	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 17+00+/- to 18+47+/-	RT	122	0.07	"V"- 6:1 FRONT, 3:1 BACK SLOPE
-L- 18+90+/- to 19+60+/-	RT	185	0.25	"V"- 6:1 FRONT, 3:1 BACK SLOPE
-L- 19+00+/- to 20+47+/-	LT	185	0.10	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 21+00+/- to 21+90+/-	RT	246	0.26	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 21+90+/- to 23+20+/-	RT	540	0.46	"V"- 6:1 FRONT, 6:1 BACK SLOPE
-L- 22+00+/- to 23+00+/-	LT	985	0.50	2 FT BASE, 3:1 SLOPES
-L- 23+20+/- to 24+40+/-	RT	493	0.35	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 24+80+/- to 25+50+/-	LT	288	0.24	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 24+80+/- to 25+50+/-	RT	308	0.38	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 25+50+/- to 26+50+/-	LT	370	0.26	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 25+50+/- to 26+50+/-	RT	512	0.52	"V"- 6:1 FRONT, 6:1 BACK SLOPE
-L- 26+60+/- to 27+80+/-	RT	328	0.28	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 27+80+/- to 28+77+/-	RT	288	0.35	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 28+78+/- to 29+80+/-	RT	226	0.29	"V"- 6:1 FRONT, 3:1 BACK SLOPE
-L- 28+80+/- to 30+00+/-	LT	225	0.20	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 30+00+/- to 31+00+/-	LT	144	0.15	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 30+00+/- to 31+80+/-	RT	185	0.11	"V"- 6:1 FRONT, 3:1 BACK SLOPE
-L- 35+40+/- to 37+00+/-	LT	675	0.52	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 35+50+/- to 38+22+/-	RT	1412	0.37	2 FT BASE, 3:1 SLOPES
-L- 37+00+/- to 37+84+/-	LT	356	0.37	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 38+65+/- to 41+20+/-	LT	1080	0.43	"V"- 6:1 FRONT, 4:1 BACK SLOPE
-L- 40+20+/- to 41+30+/-	RT	270	0.14	"V" - 3:1 SLOPES
-L- 41+68+/- to 43+40+/-	LT	850	0.28	2 FT BASE- 4:1 FR., 3:1 B. SLOPE
-L- 41+70+/- to 44+20-/+	RT	1278	0.31	2 FT BASE, 3:1 SLOPES

RAISED GRATED INLETS

Where practicable, grated inlets in proposed grassed swales, cut ditches and the ditch between the roadway and the bicycle path will be raised 6-inches above the ditch line to promote stormwater storage and infiltration.

HAZARDOUS SPILL BASINS

Hazardous spill basins will be provided on both sides of the Howe Creek crossing at approximately -L- Station 27+60 RT and -L- Station 28+60 RT. The function of these basins will be to aid in the containment and cleanup of a potential accidental hazardous spill. These basins will not be used as a storage device during a normal rainfall event. A mechanical gate will be installed at outlet end of the basin to interrupt and contain normal free flow of runoff in the event of a hazardous spill.

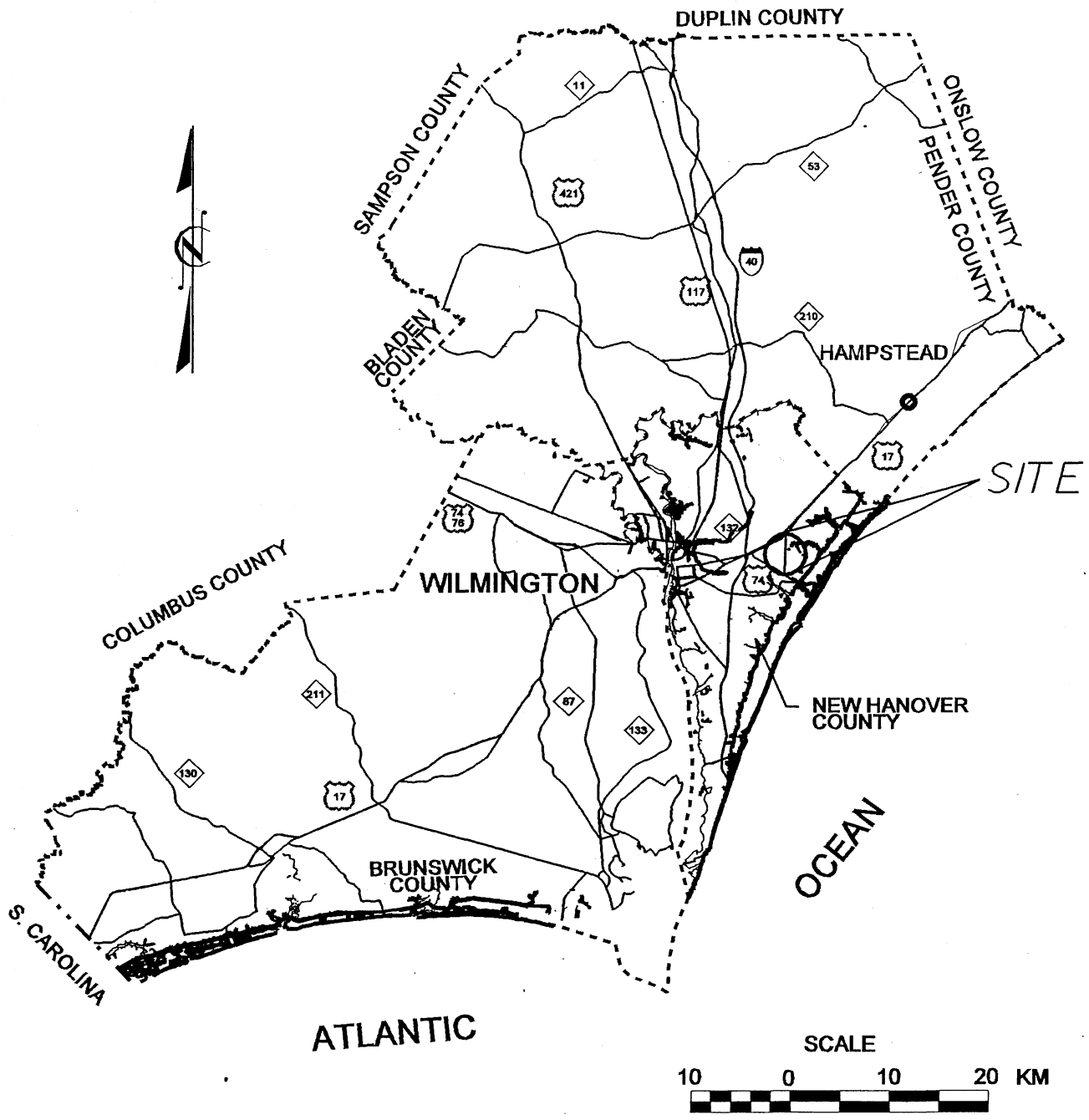
NATURAL STREAM DESIGN

It appears that the stream left of -L- Station 21+00 once crossed Military Cutoff Road and connected with the remnant stream to the right of -L- Station 21+40. Presently, the stream on the left has been channelized into a straight lateral roadway ditch for approximately 650 feet before crossing under Military Cutoff Road and connecting back to the natural stream on the right. It was recommended during a field review by the NCDOT and agency personnel to install a pipe across Military Cutoff Road from the existing live stream on the left of the roadway to the remnant stream on the right at a point further south, thus providing restoration. Natural stream design methods in accordance with those recommended in, "Applied River Morphology" (Rosgen, 1996) will be used to relocate the filled in stream on the right from Station 21+46 to Station 22+07 –L- Rt and from Station 22+80 to Station 23+44 –L- Rt. The length of the natural stream design is approximately 456 feet. The length of restored remnant stream is approximately 246 feet.

BOX CULVERT

At -L- Station 28+14 an existing double line of 72-inch corrugated metal pipes will be replace by a double barrel 9-foot by 7-foot reinforced concrete box culvert. The normal stream flow and channel characteristics will be maintained at the crossing by burying the culvert inverts 1-foot below the stream bed and installing a sill in one barrel to divert low flow through the other barrel. Additionally, 36-inch overflow pipes will be installed in the floodplain on each side of the box culvert to aid floodplain and wetland drainage between the two sides of the roadway.

Two locations where BMP devices are not proposed are on the east side of Military Cutoff Road from -L- Station 13+00 to 17+00 and from -L- Station 45+00 to the end of project. Existing heavy development in these two areas prohibits the use of such devices. Additionally, at the end of the project in the intersection of Military Cutoff Road and US 17 there are properties with groundwater contamination from a service station. A sealed, watertight drainage system will be required in this area in order to prevent combining of the contaminated groundwater and the stormwater. The drainage system which collects stormwater runoff from -L- Station 45+00 to the end of the project will be discharged at approximately -L- Station 46+00 RT into a wetlands area which will aid in the filtration of stormwater before it reaches a receiving stream.



VICINITY MAP

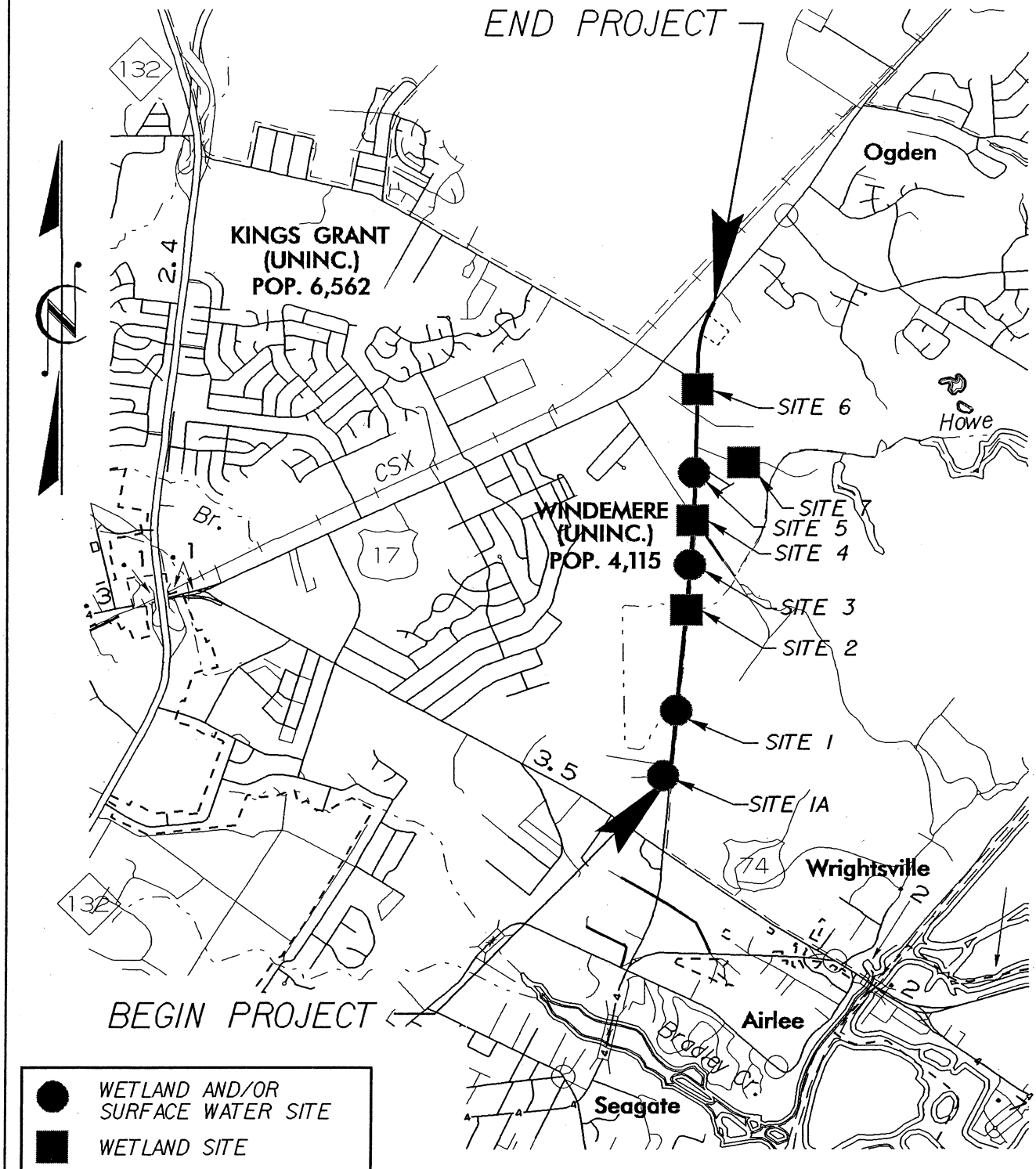
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT 34857.1.1 (U-2734)

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 1 OF 34 9/03



SITE MAP

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 34857.1.1 (U-2734)
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 2 OF 34 9/03

LEGEND

WLB WETLAND BOUNDARY

WETLAND

F F DENOTES FILL IN WETLAND

S S DENOTES FILL IN SURFACE WATER

P P DENOTES FILL IN SURFACE WATER (POND)

T T DENOTES TEMPORARY FILL IN WETLAND

E E DENOTES EXCAVATION IN WETLAND

TS TS DENOTES TEMPORARY FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

FLOW DIRECTION

TB TOP OF BANK

WE EDGE OF WATER

C PROP. LIMIT OF CUT

F PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG NATURAL GROUND

PL PROPERTY LINE

TDE TEMP. DRAINAGE EASEMENT

PDE PERMANENT DRAINAGE EASEMENT

EAB EXIST. ENDANGERED ANIMAL BOUNDARY

EPB EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

CORE FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT
12"-48" PIPES
54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTNG STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

LOG VANE

RIP RAP

5 ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

BZ1 BUFFER ZONE 1

BZ2 BUFFER ZONE 2

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

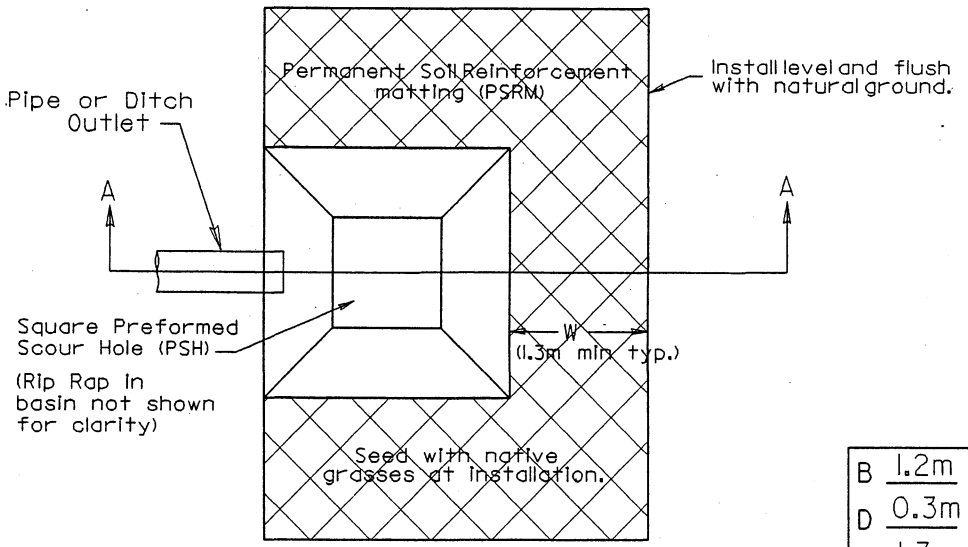
NEW HANOVER COUNTY

PROJECT: 34857.1.1 (U-2734)
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 3 **OF** 34 **9/03**

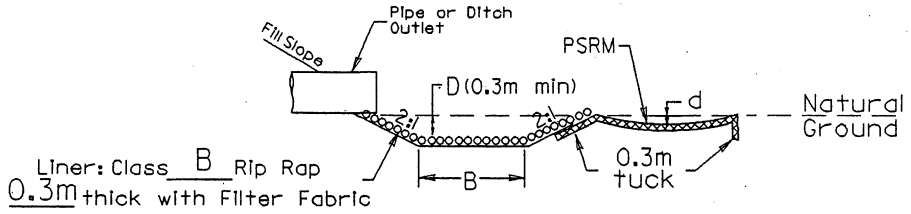
PREFORMED SCOUR HOLE

PLAN VIEW



B	1.2m
D	0.3m
W	1.3m
d	0.15m

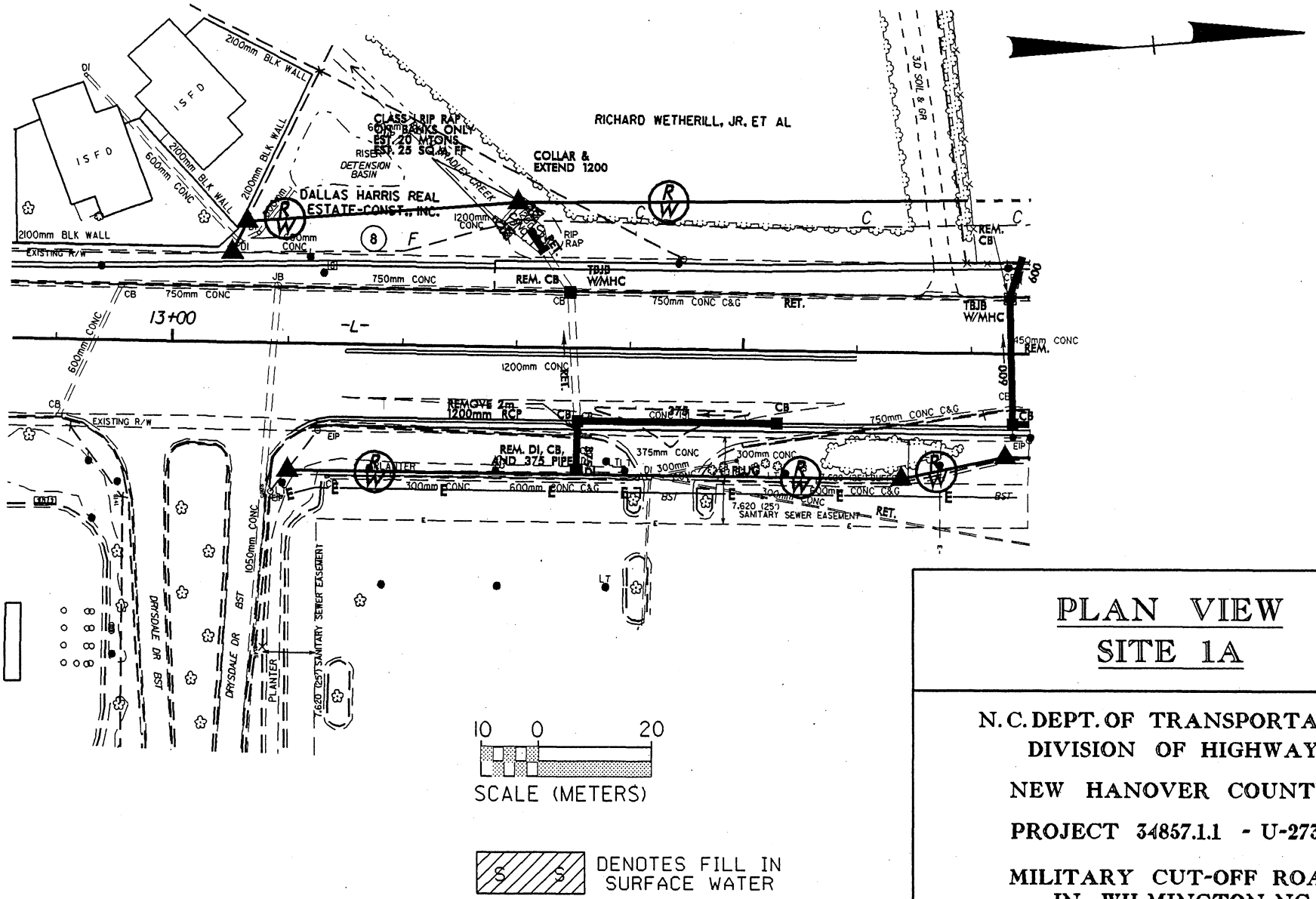
SECTION A-A



NCDOT

DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 34857.1.1 (U-2734)

MILITARY CUTOFF ROAD
IN WILMINGTON, NC



PLAN VIEW
SITE 1A

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DIVISION OF HIGHWAYS

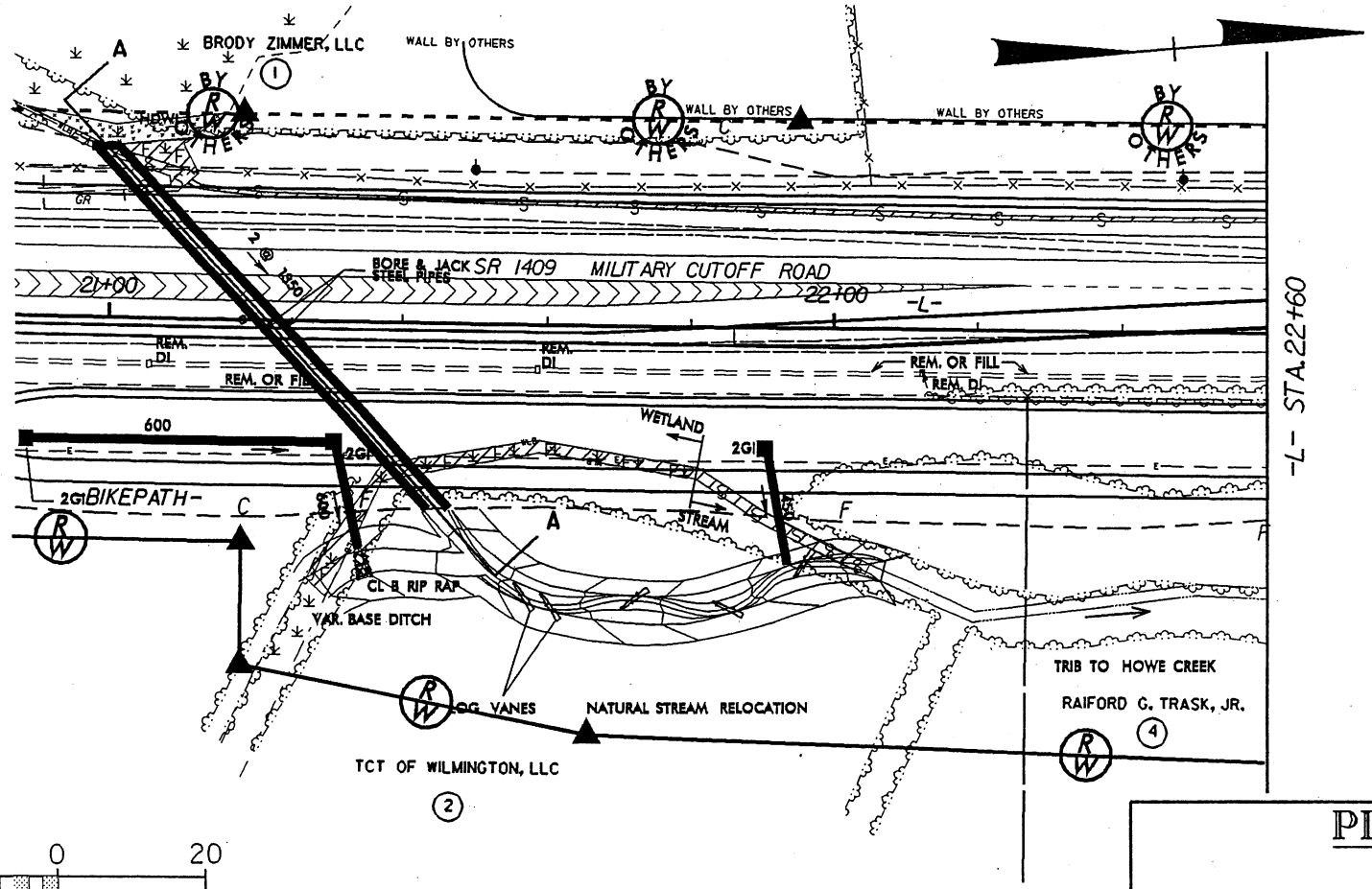
NEW HANOVER COUNTY

PROJECT 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 5 OF 34

9/03



PLAN VIEW
SITE 1

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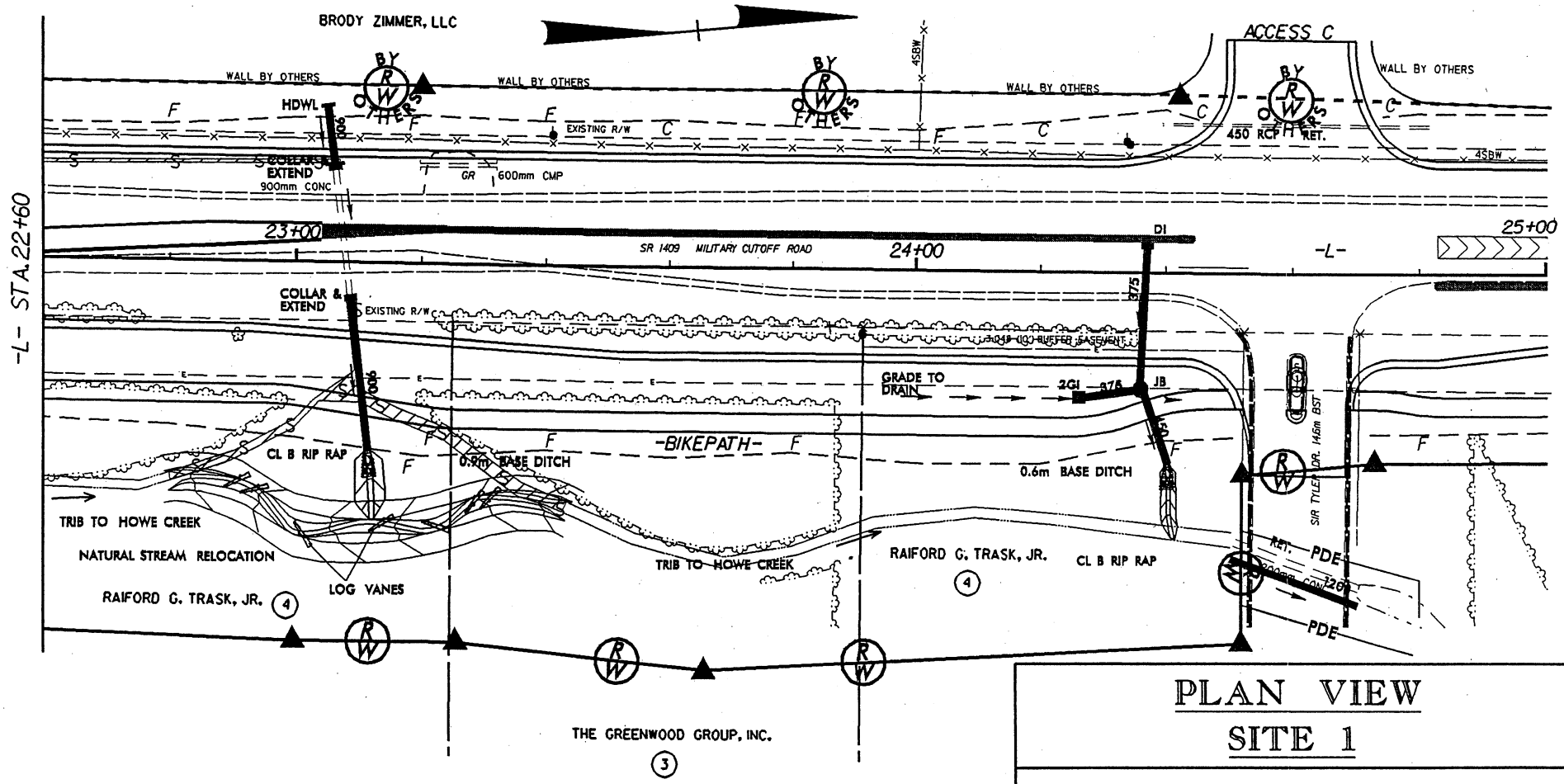
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 6 OF 34 10/03



PLAN VIEW
SITE 1

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

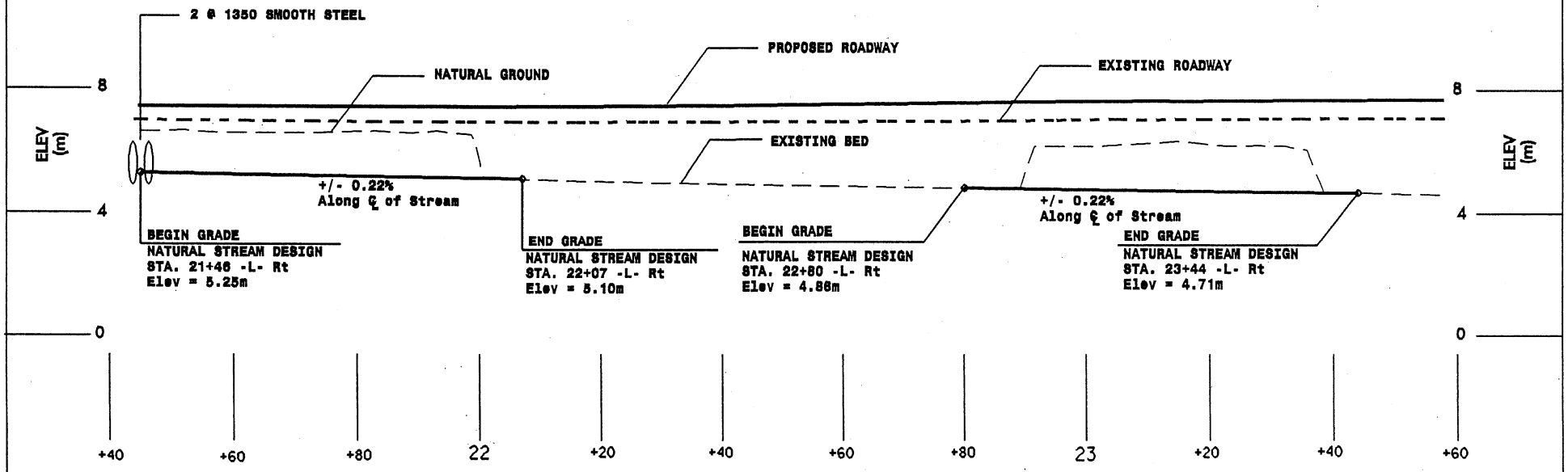
NEW HANOVER COUNTY

PROJECT 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 7 OF 34

10/03



PROFILE

NATURAL STREAM DESIGN
STA 21+46 TO 22+07 -L- (RT)
STA 22+80 TO 23+44 -L- (RT)

NCDOT

DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

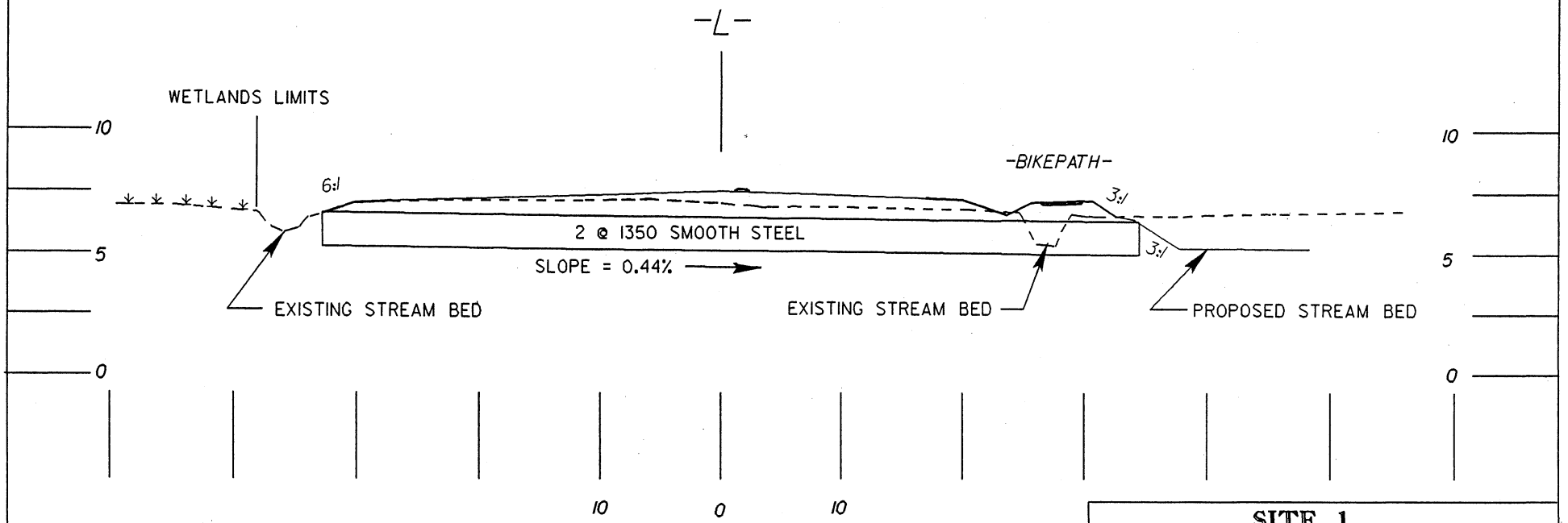
PROJECT: 34857.1.1 (U-2734)

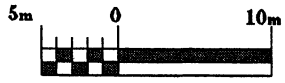
MILITARY CUTOFF ROAD

IN WILMINGTON, NC

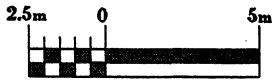
SHEET 8 OF 34

9/03





HORIZONTAL SCALE



VERTICAL SCALE

SITE 1
SECTION A-A

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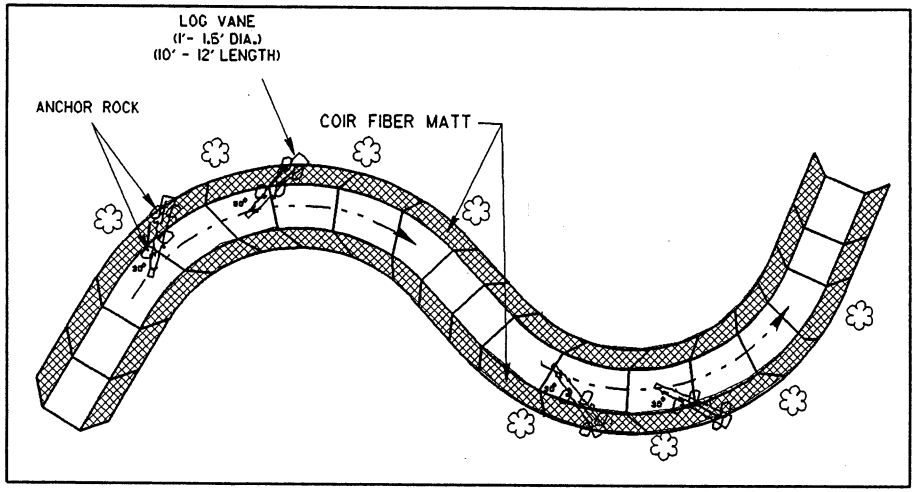
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY

PROJECT: 34857.1.1 (U-2734)
MILITARY CUTOFF ROAD
IN WILMINGTON, NC

9/03



NOTES:

BURY APPROXIMATELY 1/3 OF LOG VANE LENGTH IN THE OUTSIDE POOL BANK AND 1/3 IN THE STREAM BED, WITH THE REMAINING 1/3 EXPOSED.

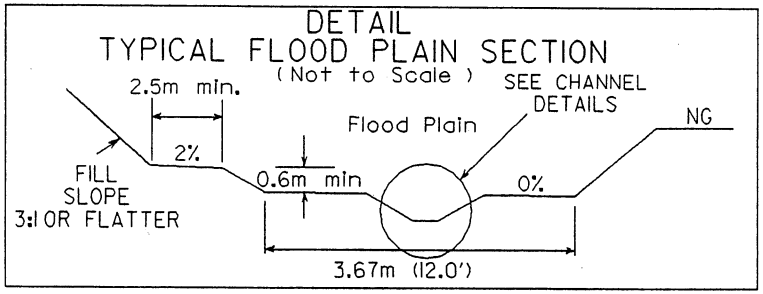
THE EXPOSED PORTION OF LOG VANE SHOULD BE APPROXIMATELY HALF OF THE BANKFULL WIDTH

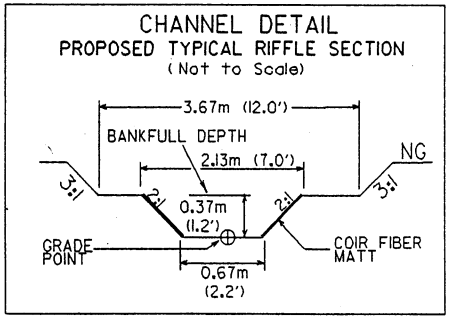
WHEN BACKFILLING OVER AND AROUND LOG VANES AND ANCHOR ROCKS FIRMLY SECURE ALL COMPONENTS INCLUDING JOINTS, CONNECTIONS AND GAPS.

PLANTINGS SHOULD BE PLACED ABOVE BANKFULL DEPTH

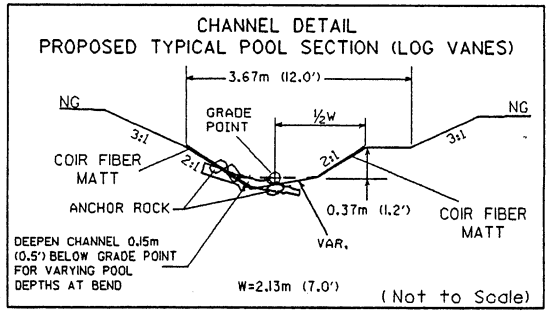
MIN. LOG VANE DIA = 0.3m. UTILIZE LOGS AT SITE.

USE ANCHOR ROCK APPROXIMATELY 100 - 200 LBS.





TYPICAL SECTION BETWEEN BENDS



TYPICAL SECTION AT BENDS

NATURAL STREAM DESIGN
STA 21+46 TO 22+07 -L- (RT)
STA 22+80 TO 23+44 -L- (RT)

NCDOT

DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 34857.1.1 (U-2734)

MILITARY CUTOFF ROAD

IN WILMINGTON, NC

SHEET 10 **OF** 34 **9/03**

PROJECT #: 8.2251001 (U-2734)
COUNTY: New Hanover
DESCRIPTION: Widening of Military Cutoff Road (SR 1409) in Wilmington, NC
STREAM: Tributary to Howe Creek

NATURAL STREAM DESIGN
Sta 21+46 – Sta 22+07 –L- (Rt)
and from Sta 22+80 – Sta 23+44 –L- (Rt)

The proposed widening of Military Cutoff Road (SR 1409) will result in the impact (fill) of a portion of stream east and west of the existing facility. The stream is a tributary to Howe Creek. The stream design/classification will be based on Dave Rosgen's principles and techniques for river morphology.

The basin is urbanizing and is located in the Coastal hydrologic region. Presently, the existing stream approaches the roadway from the southwest, "heads up", and then traverses down the west side in the roadway ditch to a 36" cross pipe. It then traverses through the cross pipe to the east side of Military Cutoff Road and back into the existing natural stream. Also, from previous field meetings with NCDOT personnel and agency representatives, it was observed that another existing stream is located on the east side of Military Cutoff Road south of the location of the 36" outlet. Portions, of which, will be filled in by the widening project. It was therefore recommended to connect to this existing stream at a location further south of the present crossing and provide restoration for those portions of existing stream to be filled in.

The original stream relocation proposed the use of parallel pipe culverts crossing under Military Cutoff Road at an approximate 30° skew and reconnecting to the existing stream at Sta 21+90 –L-(Rt). From this point downstream to Sir Tyler Drive (approximately 890 ft) the stream would be redesigned and relocated. This included portions of the stream that would be filled in by the proposed roadway widening and portions of the stream that would not be impacted by the project but were to be relocated and improved. A stream reach downstream of Sir Tyler Drive was used as the reference. This design was produced in February of 2001 and was recommended until March of 2003. At this time, another field review meeting was held with Dave Timpy (USACE). From this meeting several design changes were recommended. The recommendations included:

Reconnect to the existing stream further south than original proposal, allowing for additional stream restoration.

Eliminate relocating/altering that portion of remnant stream that is not being impacted by the proposed widening.

Use the existing stream along the portion of relocation as the reference reach.

The existing stream was resurveyed to observe its morphological characteristics. These characteristics include bankfull area, depth, width and discharge. This information was then compared to data generated from the available (yet unapproved to date) NC Stream Restoration Institute's Coastal Regional equations and with the USGS Rural Coastal equations. Data was then analyzed using the HEC-RAS modeling system to compare the accuracy of all the characteristics between the surveyed reference and the regional equations.

The reference reach (existing stream) was observed to be stable, yet moderately entrenched. The stream banks were deep but vegetated. The floodplain is also vegetated, except for a portion next to Sir Tyler Road. The stream was observed to have a meandering thalweg within the main channel banks. While the main stream channel is slightly meandering the thalweg has more significant meandering. Also, the stream was observed to have a low sediment supply and deposition. Based on the observed field data, NCSRI regional information and hydraulic modeling the reference stream was classified as an E6 stream.

The proposed stream was designed to retain the bankfull characteristics of the reference stream while improving the dimensions from that of the reference reach. Flatter side slopes and a slightly wider bankfull floodplain are proposed to improve the entrenchment characteristics. A meandering thalweg is also proposed within the main stream channel. To aid in bank stability, log vanes are proposed in the bend/pool areas. Also, coir fiber mat will be placed on the banks. This will assist in stabilizing the banks and thus assist in establishing vegetation along the stream banks. With the modifications to the prescibed channel dimensions it is believed an improved E6 stream will be provided.

In addition, it is proposed to leave the portion of stream that will not be impacted by the widening in its present condition without additional channel form improvements. The proposed stream channel form is similar to that of the existing stream. It is believed the risk of adversely effecting the existing stream vegetation and stability outweighs the attempt to acquire minimal channel form improvement. It is stated in Rosgen's **Applied River Morphology** that E6 streams "are very stable unless the streambanks are disturbed and significant changes in sediment supply and/or streamflow occur." The portion of restored and preserved stream, and their buffers, will be contained within Right-of-Way from the outlet of the dual 54" pipes to Sir Tyler Road.

The bed material was found to be fine sand, silt and organic material. Shear stress and sediment transport properties for fine sand were analyzed. Shear stresses were calculated based on velocities and flow depths generated from the HEC-RAS modeling system. This information was then compared to values for critical velocity and shear stress for fine sand in the HEC-15 and HDS-5 manuals from the FHA. The Shields Diagram was also used to observe the size of particle moved by the stream energy. The comparison showed the proposed stream to be within acceptable velocity and shear stress limits that would allow proper sediment transport under bankfull conditions.

Appendix B Morphological Measurement Table

Variables	Existing Channel	Proposed Reach	USGS Station	** Reference Reach
1. Stream type	E6	E6	N/A	E6
2. Drainage area	110 Ac (44.5 Ha)	110 Ac (44.5 Ha)		110 Ac (44.5 Ha)
3. Bankfull width	7.0' (2.1m)	7.0' (2.1m)		7.0' (2.1m)
4. Bankfull mean depth	0.8' (0.24m)	0.8' (0.24m)		0.8' (0.24m)
5. Width/depth ratio	8.8	8.8		8.8
6. Bankfull cross-sectional area	5.8 ft^2 (0.54m^2)	5.5 ft^2 (0.51m^2)		5.8 ft^2 (0.54m^2)
7. Bankfull mean velocity	1.7 ft/s (0.52 m/s)	1.8 ft/s (0.55 m/s)		1.7 ft/s (0.52 m/s)
8. Bankfull discharge, cfs	10 cfs (0.28 cms)	10 cfs (0.28 cms)		10 cfs (0.28 cms)
9. Bankfull max depth	1.3' (0.40m)	1.2' (0.37m)		1.3' (0.40 m)
10. Width of floodprone area	14.5' (4.4m)	19.2' (5.9m)		14.5' (4.4m)
11. Entrenchment ratio	2.1	2.7		2.1
12. Meander length	50'-75'	50'		50'-75'
13. Ratio of meander length to bankfull width	7.1-10.7	7.1		7.1-10.7
14. Radius of curvature	102' (31m)	50' (15m)		102' (31m)
15. Ratio of radius of curvature to bankfull width	14.6	7.1		14.6
16. Belt width	36' (11m)	33' (10m)		36' (11m)
17. Meander width ratio	5.1	4.7		5.1
18. Sinuosity (stream length/valley length)	1.10	1.10		1.10
19. Valley slope	0.24%	0.24%		0.24%
20. Average slope	0.22%	0.22%		0.22%
21. Pool slope	0.00%	0.00%		0.00%
22. Ratio of pool slope to average slope	0.00	0.00		0.00
23. Maximum pool depth	1.8' (0.55m)	1.7' (0.52m)		1.8' (0.55 m)
24. Ratio of pool depth to average bankfull depth	2.3	2.1		2.3
25. Pool width	7.0' (2.1m)	7.0' (2.1m)		7.0' (2.1m)
26. Ratio of pool width to bankfull width	1.00	1.50		1.00
27. Pool to pool spacing	25'-40'	30'-40'		25'-40'
28. Ratio of pool to pool spacing to bankfull width	3.6-5.7	4.3-5.0		3.6-5.7
29. Ratio of lowest bank height to bankfull height (or max bankfull depth)	0.77	1.0		0.77

Military Cutoff Stream Mitigation Site (U-2734)
Sta 21+46 -L- (Rt) - Sta 23+44 -L- (Rt)

SEDIMENT TRANSPORT ANALYSIS

Station/Description	Flow Depth (ft)	Flow Slope (ft/ft)	Shear Stress (lb/ft^2)	Bed Material	Velocity (ft/s)
Proposed	1.2	0.0022	0.099	Sand/Silt	1.8
Reference	1.3	0.0022	0.105	Sand/Silt	1.7

Note: Velocities determined from HEC-RAS Model

Proposed Morphology

**** Critical Shear Stress** 0.10 lb/ft^2

***** Permissable Velocity** 1.5-2.2 ft/s Clear Water Fine Sand - Firm Loam w/ Fine Sand

*** Shields:**

Particle Size	5.0	mm	
Dimensionless Shear Stress	0.0590	lb/ft^2	
Kinematic Viscosity	0.00001400	ft^2/s	at 50° F
Mass Density	1.94	slugs/ft^3	
Unit Weight (Particle)	165.0	lb/ft^3	
Unit Weight (Water)	62.4	lb/ft^3	
Reynolds Number	265.2		
Dimensionless Shear Stress from Shields Diagram	0.054	lb/ft^2	

References:

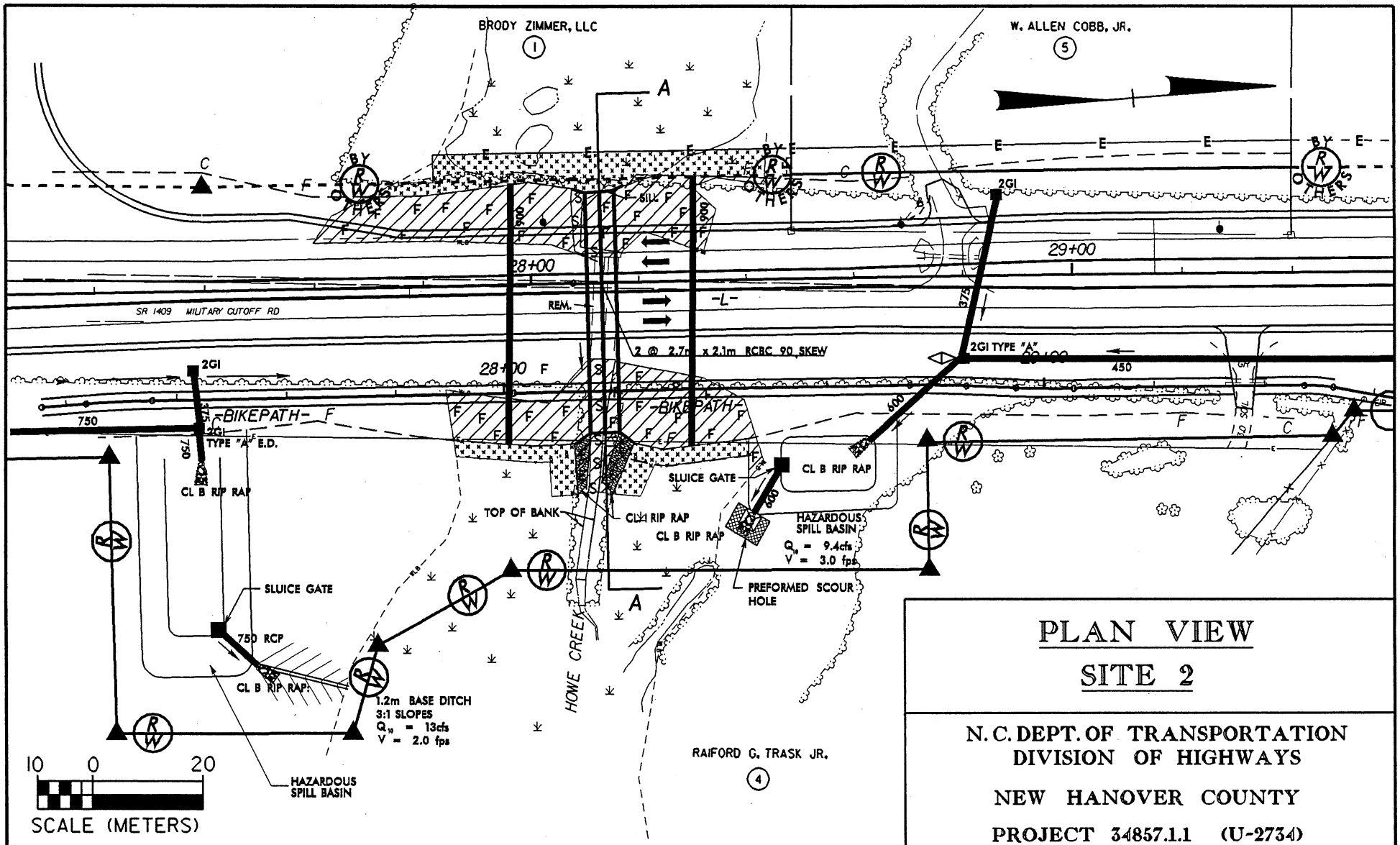
* Shields Diagram
** Hydraulic Engineering (HEC) 15 - Chart 1
*** Hydraulic Design Series (HDS) 3 - Table 2

	Proposed		Reference	
Q_{BKF}	10.0	ft^3/s	10.0	ft^3/s
W/D	8.8		8.8	
Side Slope	2.0		1.0	
Mannings n	0.032		0.003	
Valley Slope	0.0024	ft/ft	0.0024	ft/ft
Sinuosity	1.10		1.10	
Valley Slope/Sinuosity	0.0022	ft/ft	0.0022	ft/ft
Velocity	1.8	ft/s	1.7	ft/s
Area	5.5	ft^2	5.8	ft^2
W_{BKF}	7.0	ft	7.0	ft
Base Width	2.2	ft	2.5	ft
Mean Depth	0.8	ft	0.8	ft
Wetted Perimeter	7.6	ft	7.6	ft
Hydraulic Radius	0.72	ft	0.76	ft
Shear Stress	0.10	lb/ft^2	0.10	lb/ft^2
Particle Moved	5.0	mm	5.0	mm

Stream Power:

Reference:
stream power = 0.025 lb/ft/sec

Proposed:
stream power= 0.026 lb/ft/sec



PLAN VIEW
SITE 2

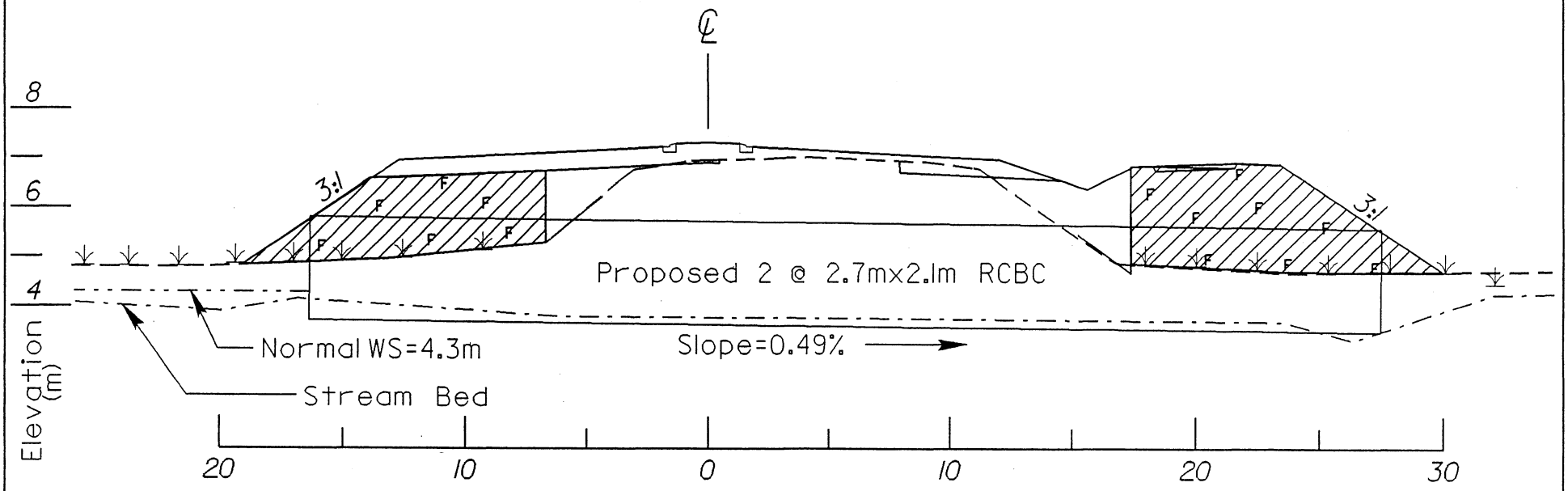
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

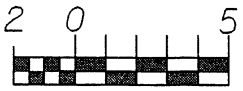
NEW HANOVER COUNTY

PROJECT 34857.1.1 (U-2734)

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

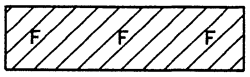
SHEET 16 OF 34 9/03





HORIZONTAL SCALE
(in meters)

VERTICAL SCALE
(in meters)



DENOTES FILL IN WETLAND

SITE 2

SECTION A-A

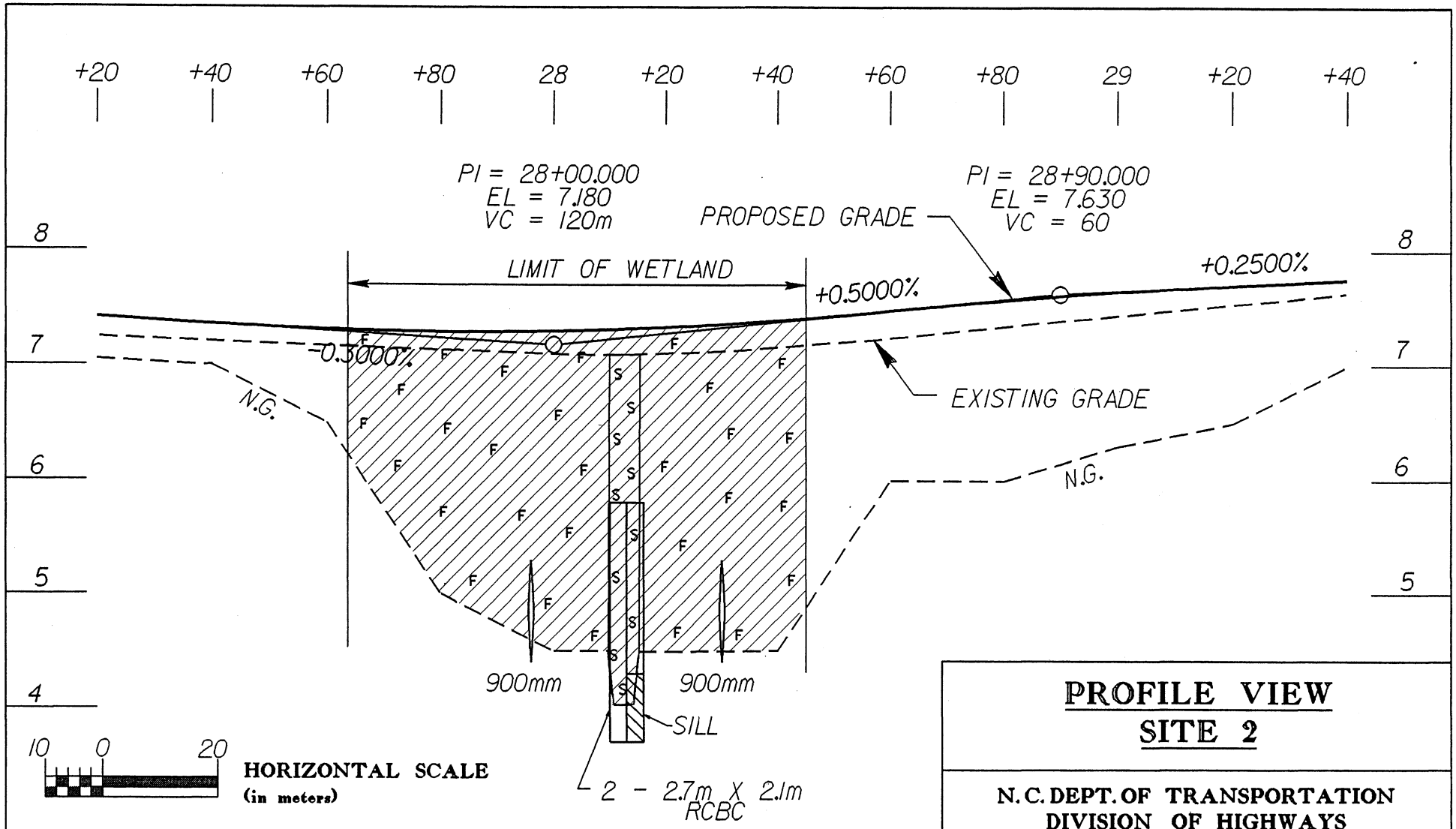
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 17 **OF** 34 **9/03**



PROFILE VIEW
SITE 2

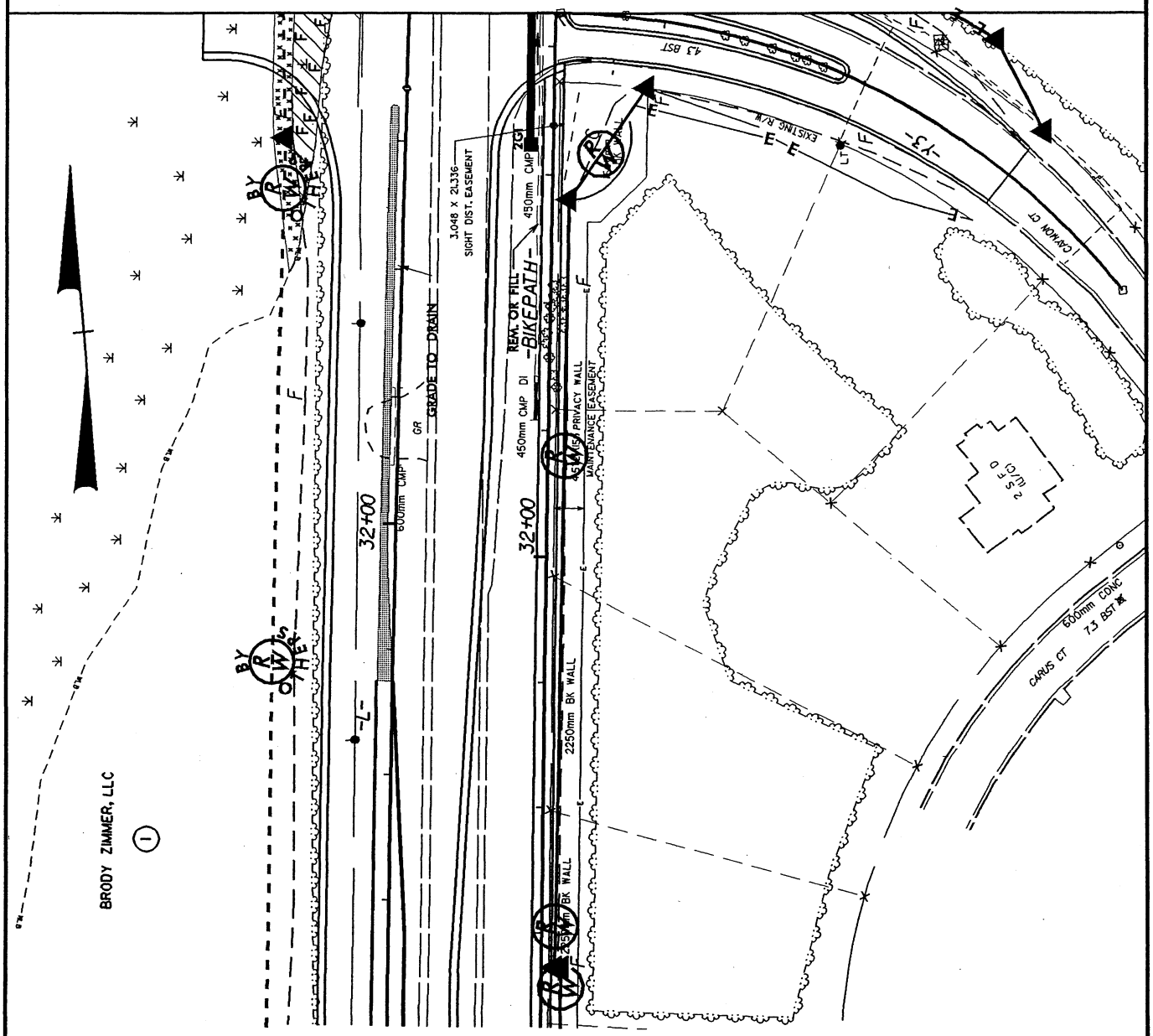
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 18 OF 34 9/03



10 0 20

SCALE (METERS)

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

PLAN VIEW
SITE 3

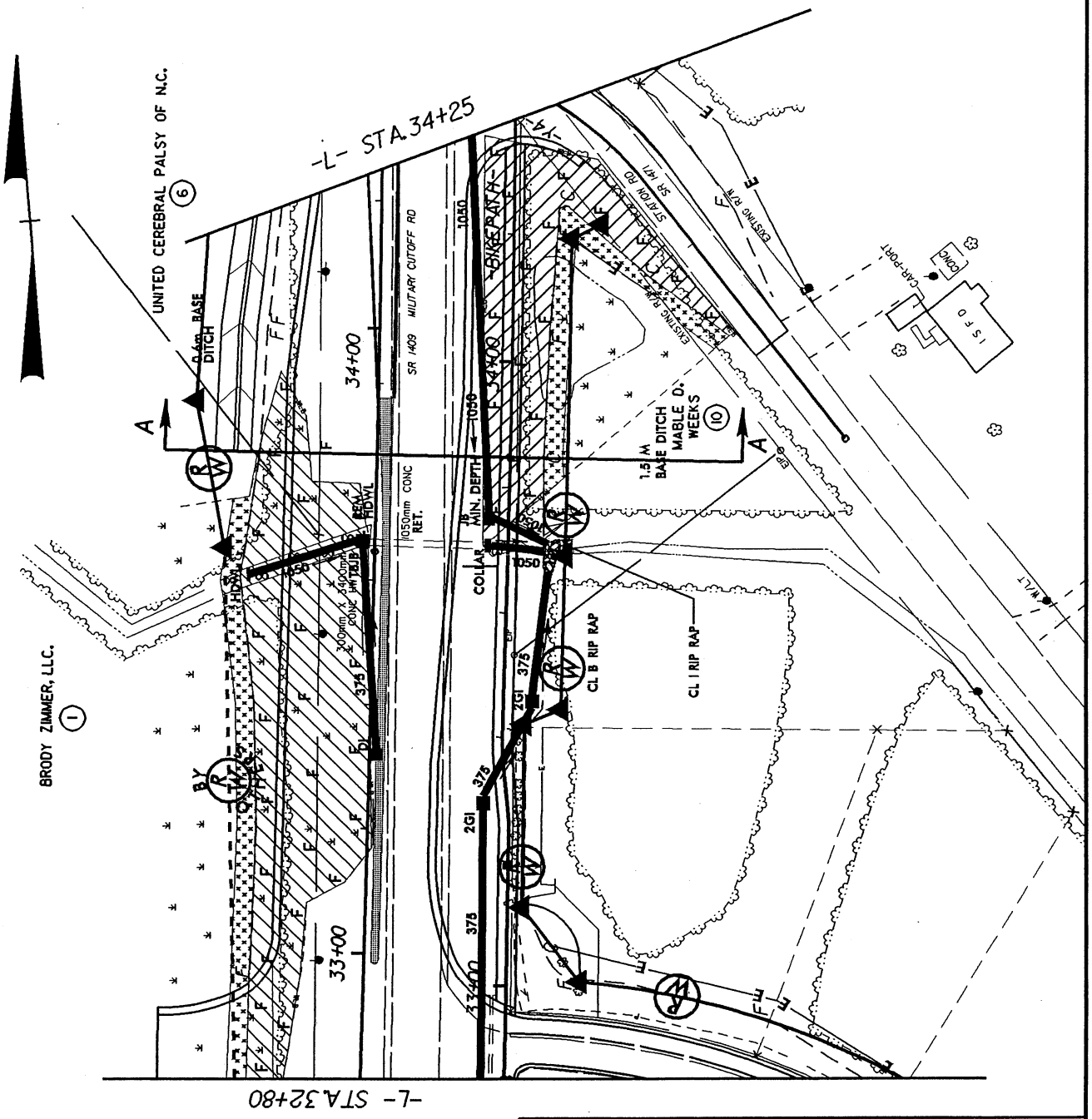
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 19 **OF** 34 **9/03**



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SCALE (METERS)

DENOTES FILL IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

PLAN VIEW
SITE 3

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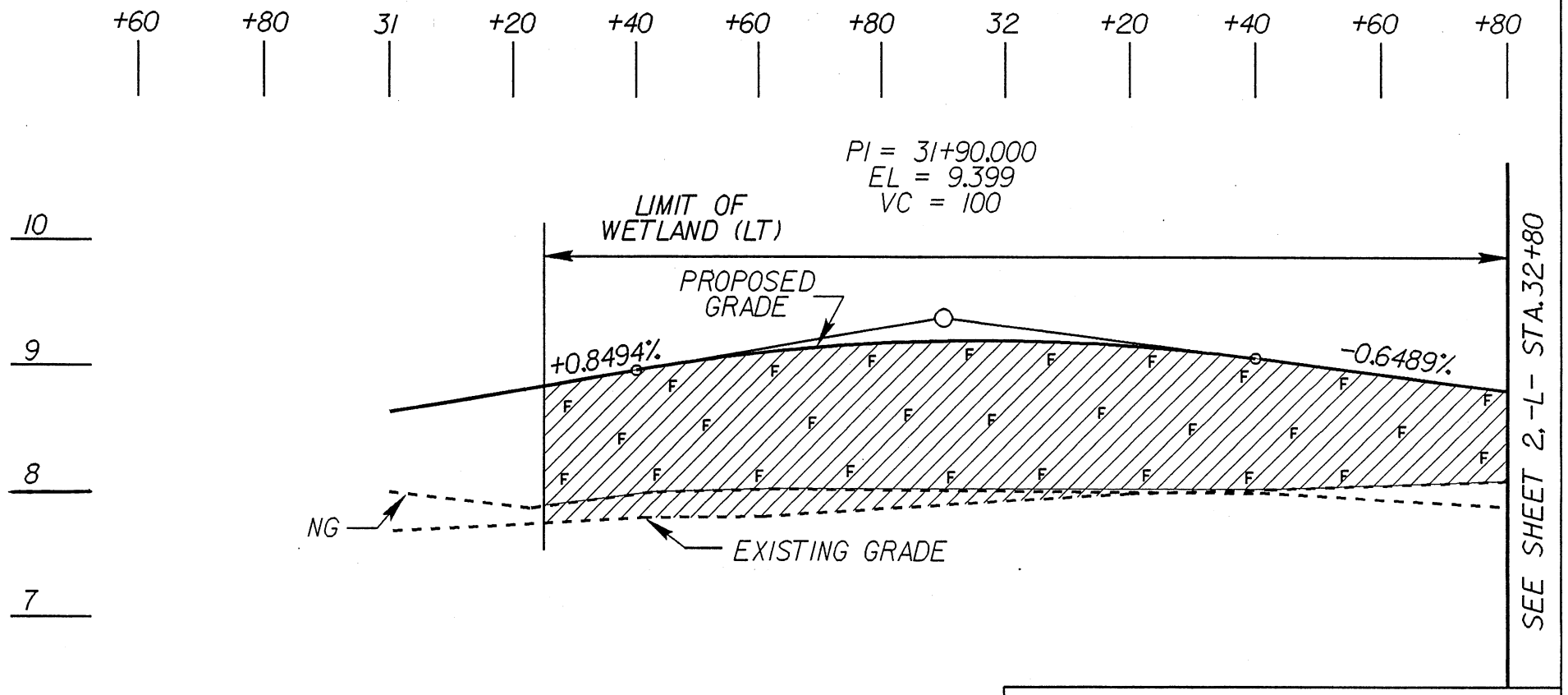
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 20 **OF** 34 **9/03**



10 0 20

HORIZONTAL SCALE
(in meters)

0.5 0 1

VERTICAL SCALE
(in meters)

F F F

DENOTES FILL IN WETLAND

PROFILE VIEW
SITE 3

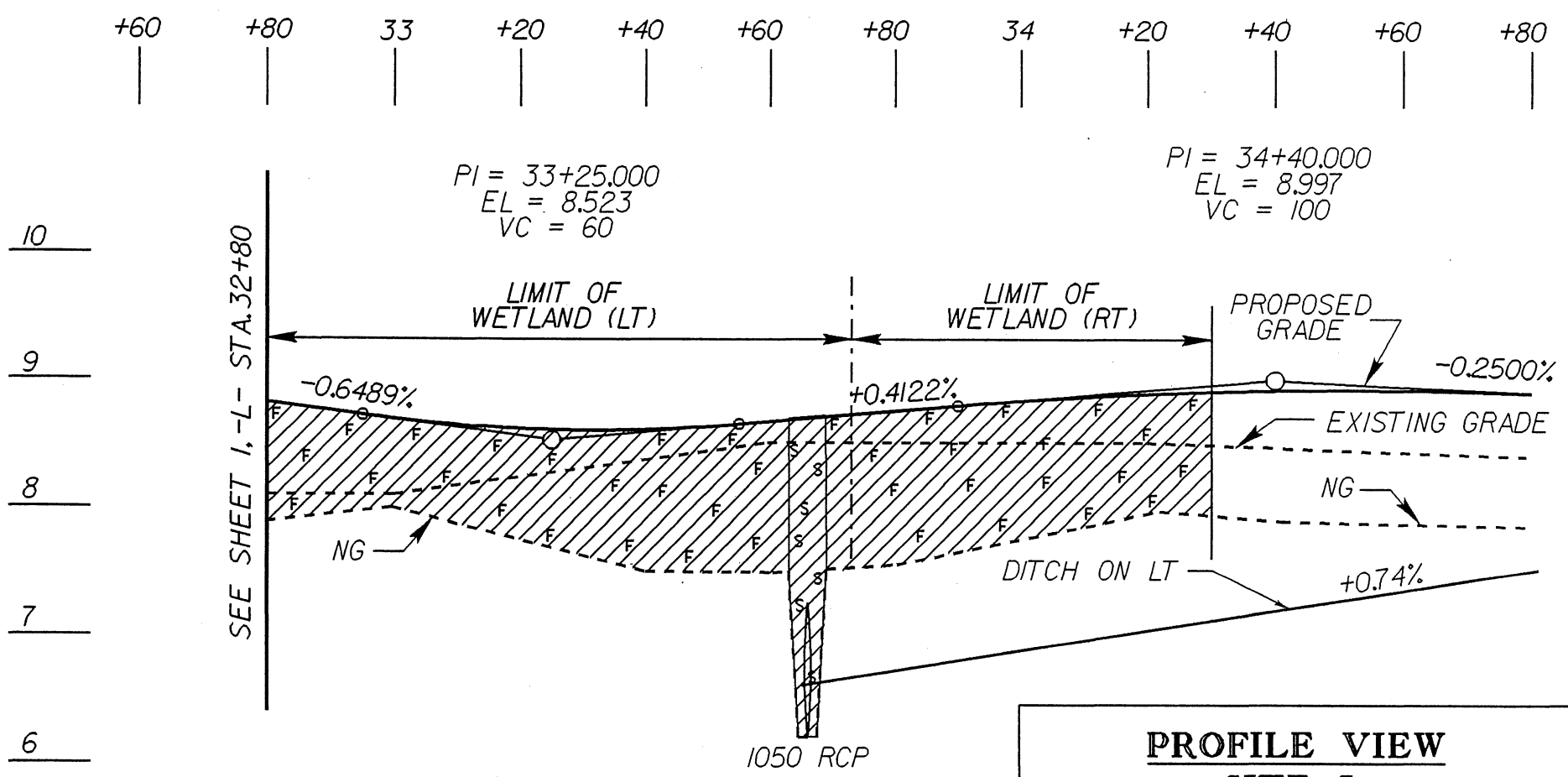
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 21 **OF** 34 **9/03**



10 0 20 HORIZONTAL SCALE (in meters)

0.5 0 1 VERTICAL SCALE (in meters)

F F F DENOTES FILL IN WETLAND

S S S DENOTES FILL IN SURFACE WATER

PROFILE VIEW
SITE 3

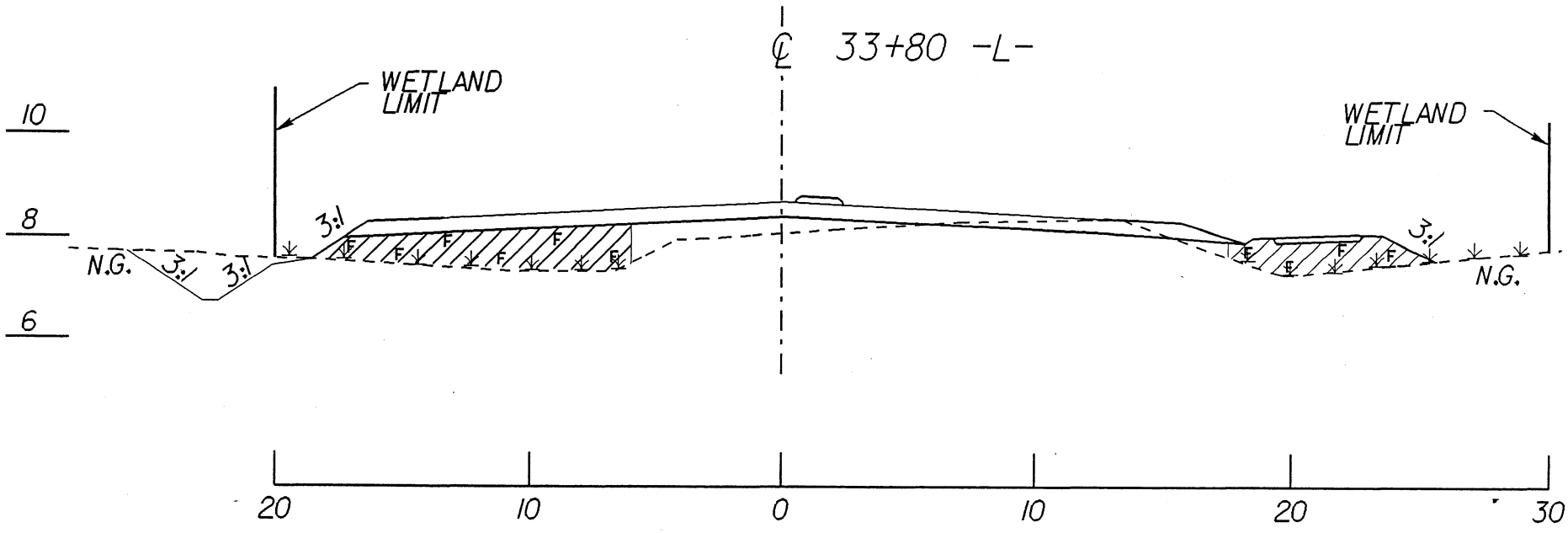
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 22 OF 34 9/03



2 0 5

HORIZONTAL SCALE
(in meters)

1 0 3

VERTICAL SCALE
(in meters)

F F F

DENOTES FILL
IN WETLAND

SITE 3

SECTION A-A

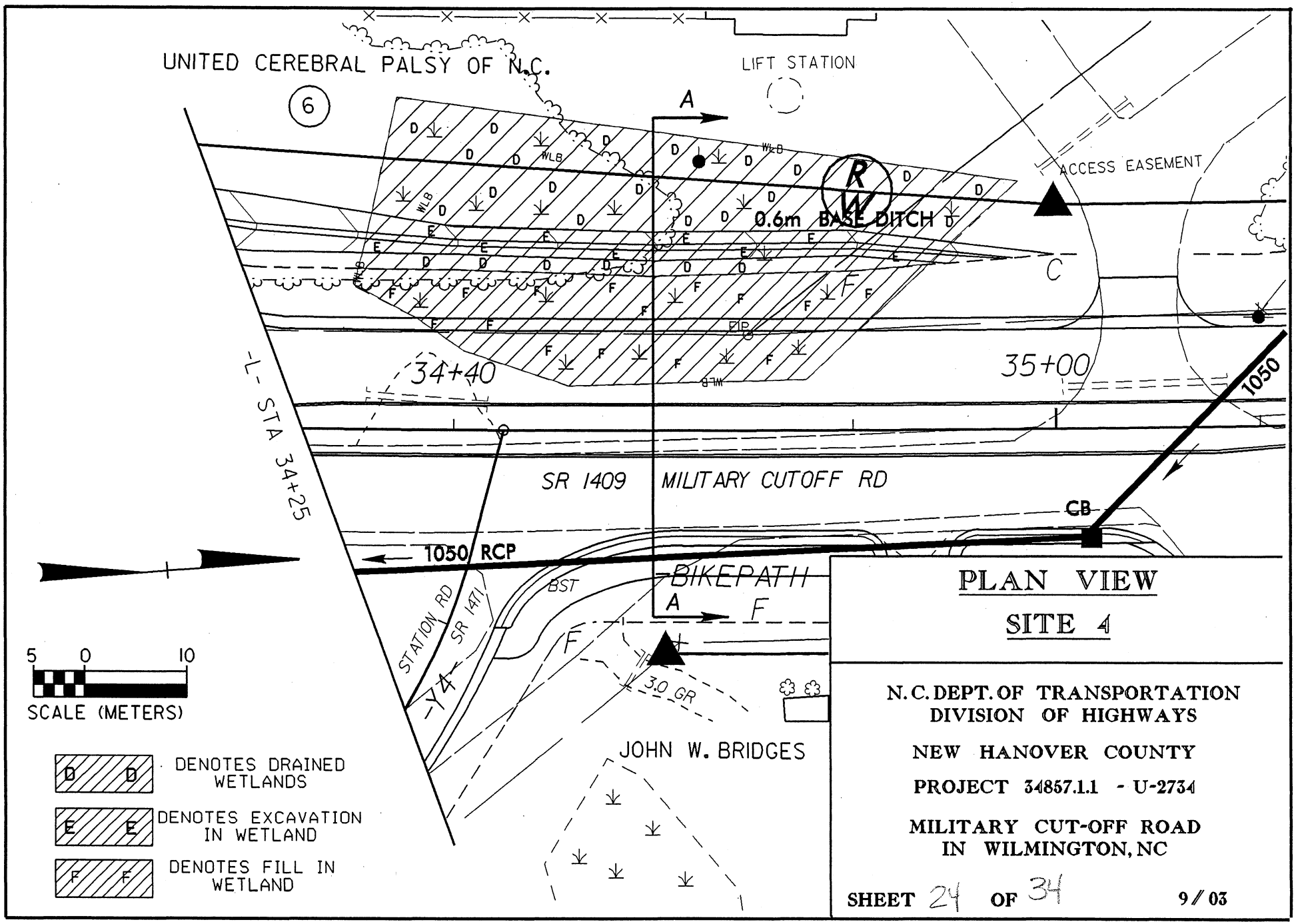
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 23 OF 34 9/03



PLAN VIEW

SITE 4

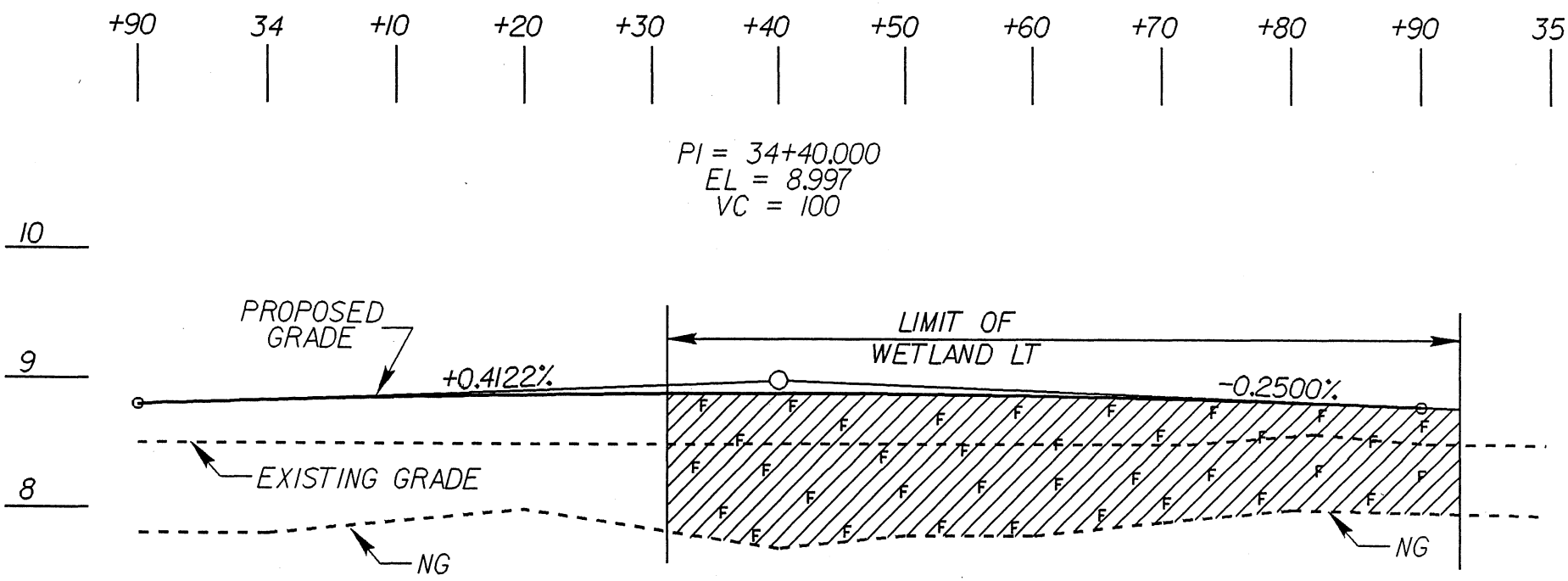
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD IN WILMINGTON, NC

SHEET 24 **OF** 34 **9/03**



5 0 10 **HORIZONTAL SCALE (in meters)**

0.5 0 1 **VERTICAL SCALE (in meters)**

F F F **DENOTES FILL IN WETLAND**

PROFILE VIEW
SITE 4

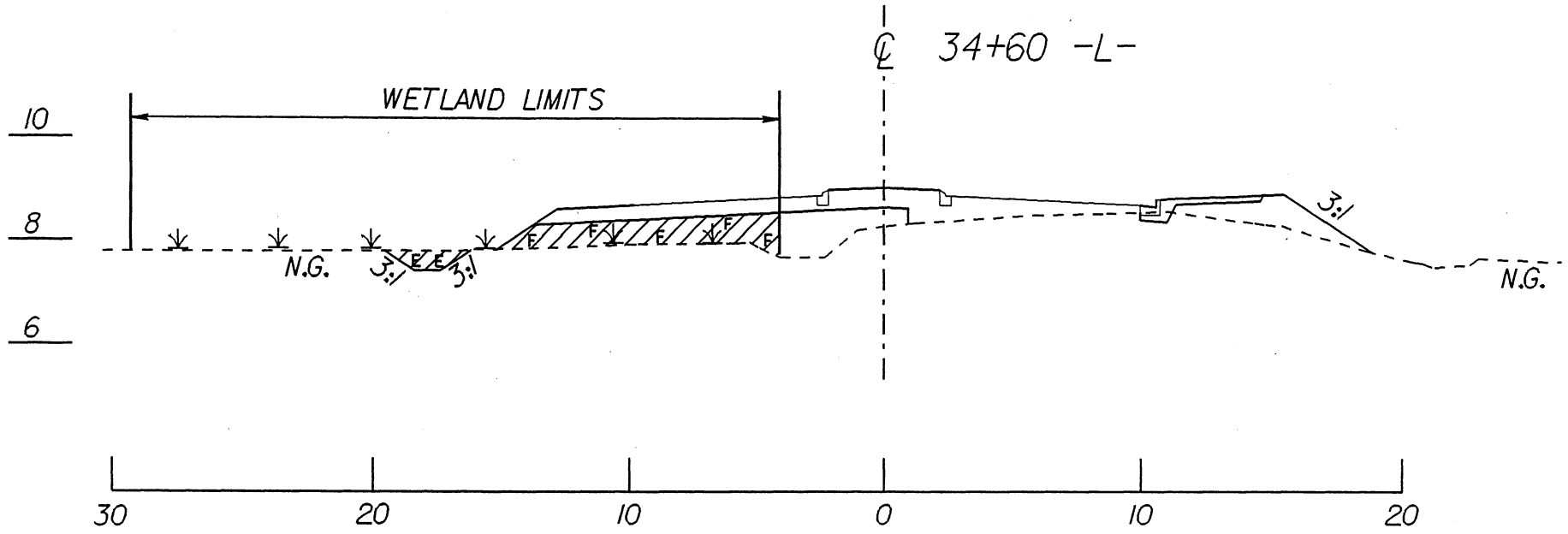
N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD IN WILMINGTON, NC

SHEET 25 **OF** 34 **9/03**



2 0 5

HORIZONTAL SCALE
(in meters)

1 0 3

VERTICAL SCALE
(in meters)

F F F

DENOTES FILL IN WETLAND

SITE 4

SECTION A-A

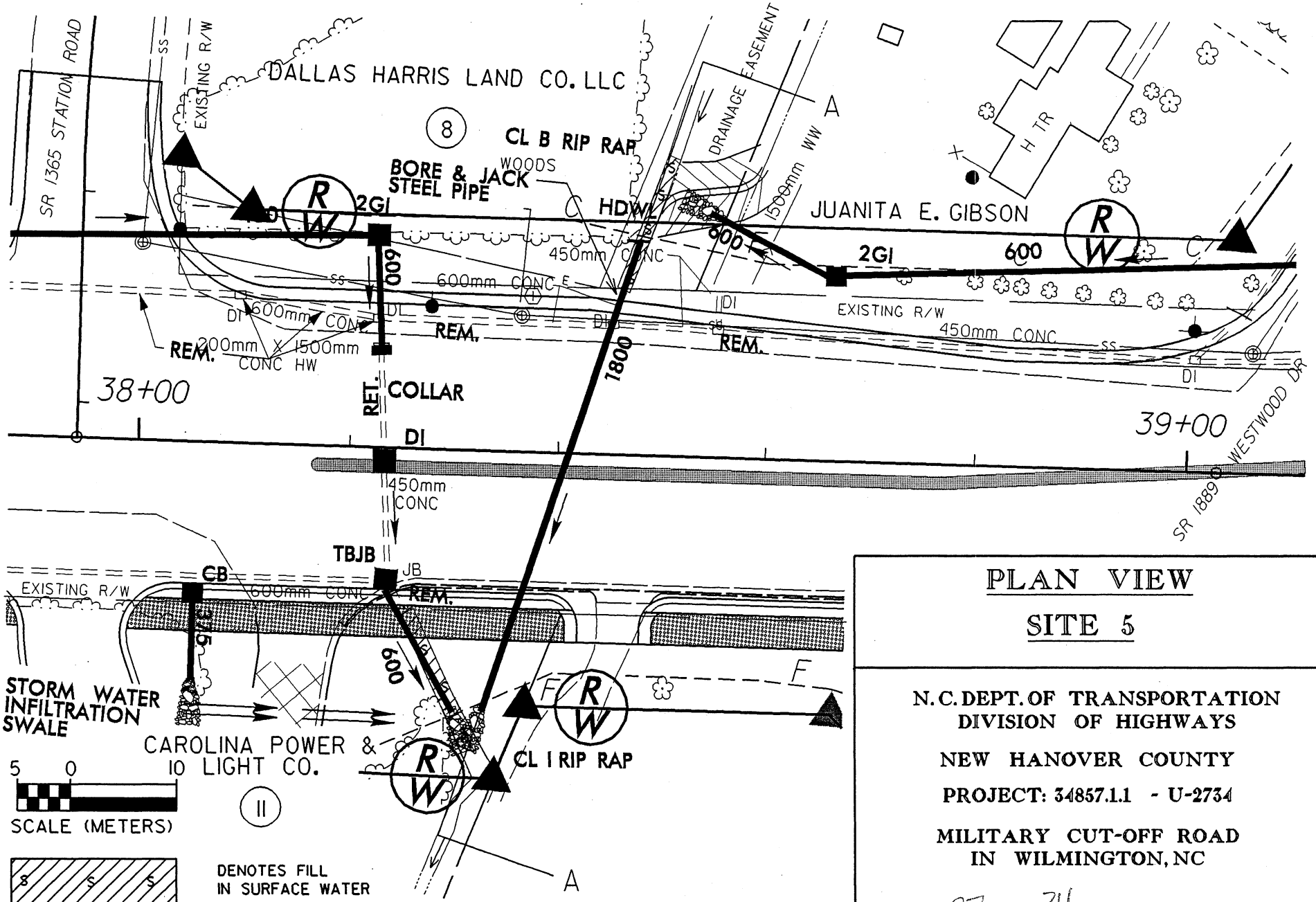
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 26 **OF** 34 **9/03**



PLAN VIEW

SITE 5

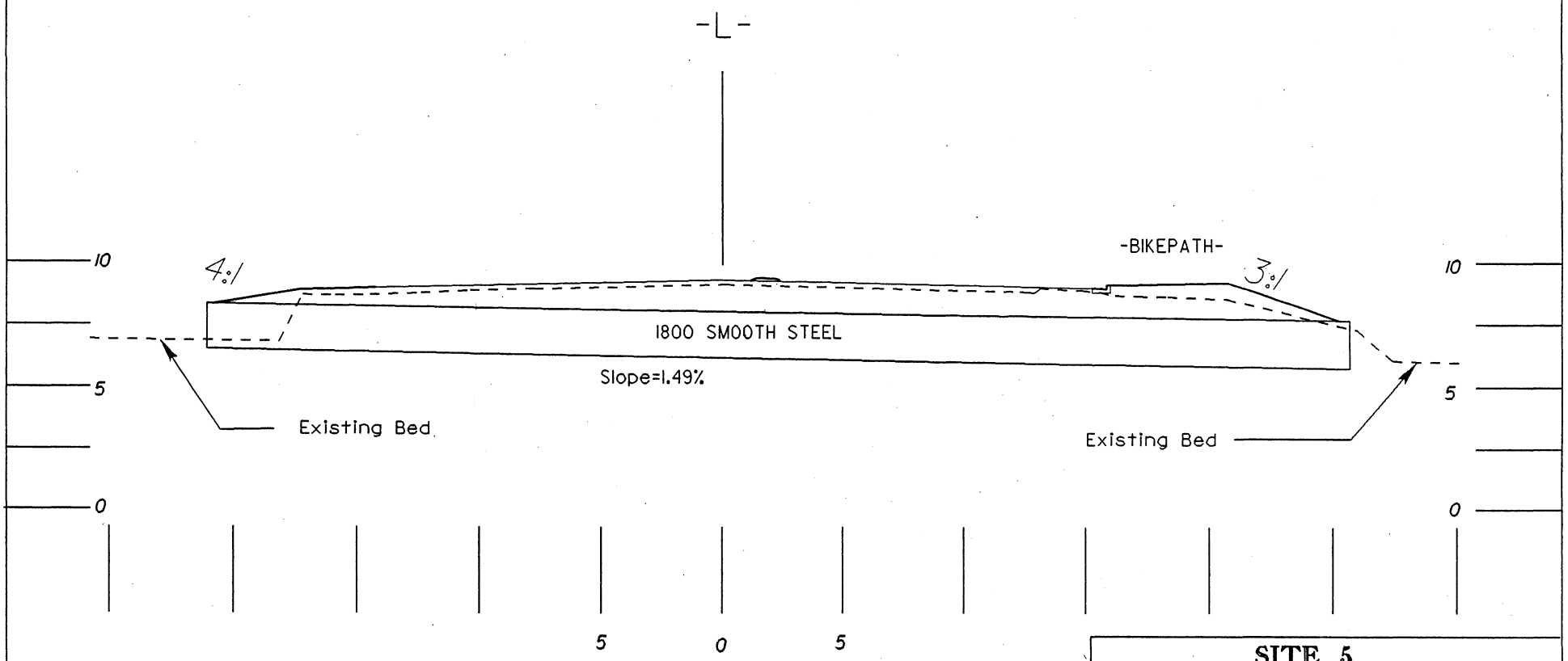
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 27 OF 34 9/03



2.5m 0 5m

HORIZONTAL SCALE

2.5m 0 5m

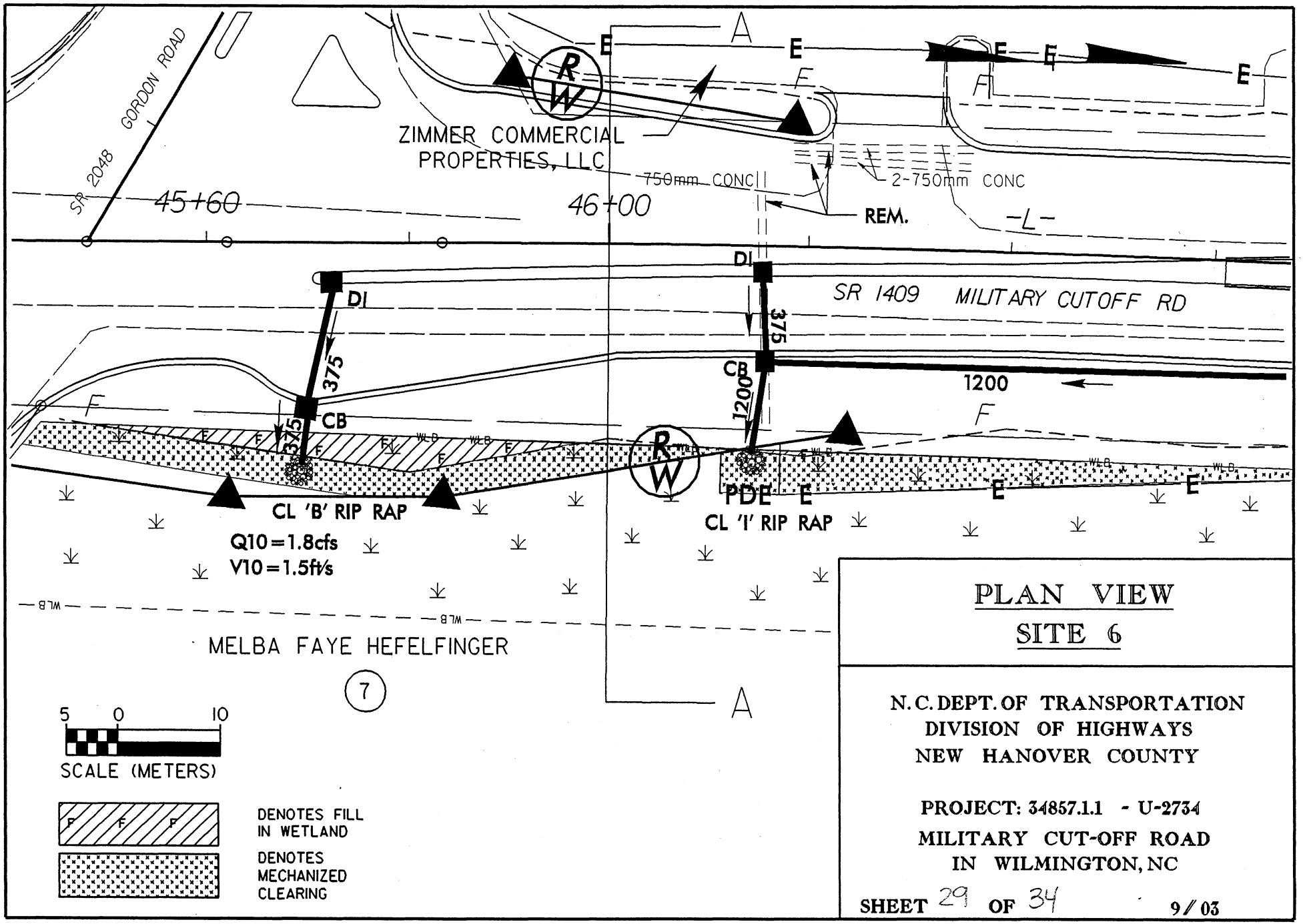
VERTICAL SCALE

SITE 5
SECTION A-A

NCDOT
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY

PROJECT: 34857.1.1 (U-2734)
MILITARY CUTOFF ROAD
IN WILMINGTON, NC

SHEET 28 **OF** 34 **9/03**

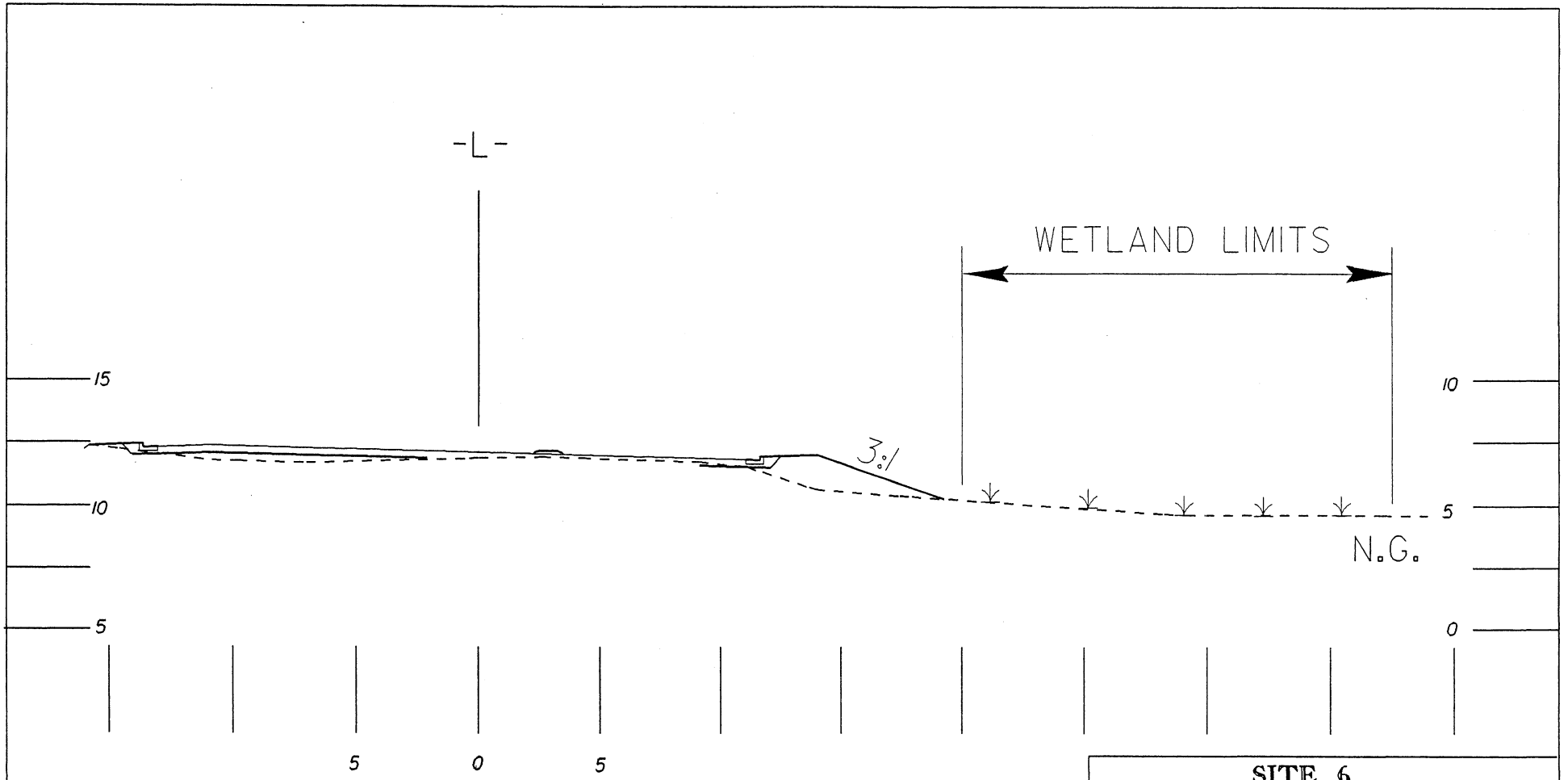


PLAN VIEW
SITE 6

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY

PROJECT: 34857.1.1 - U-2734
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 29 OF 34 9/03



2.5m 0 5m

HORIZONTAL SCALE

2.5m 0 5m

VERTICAL SCALE

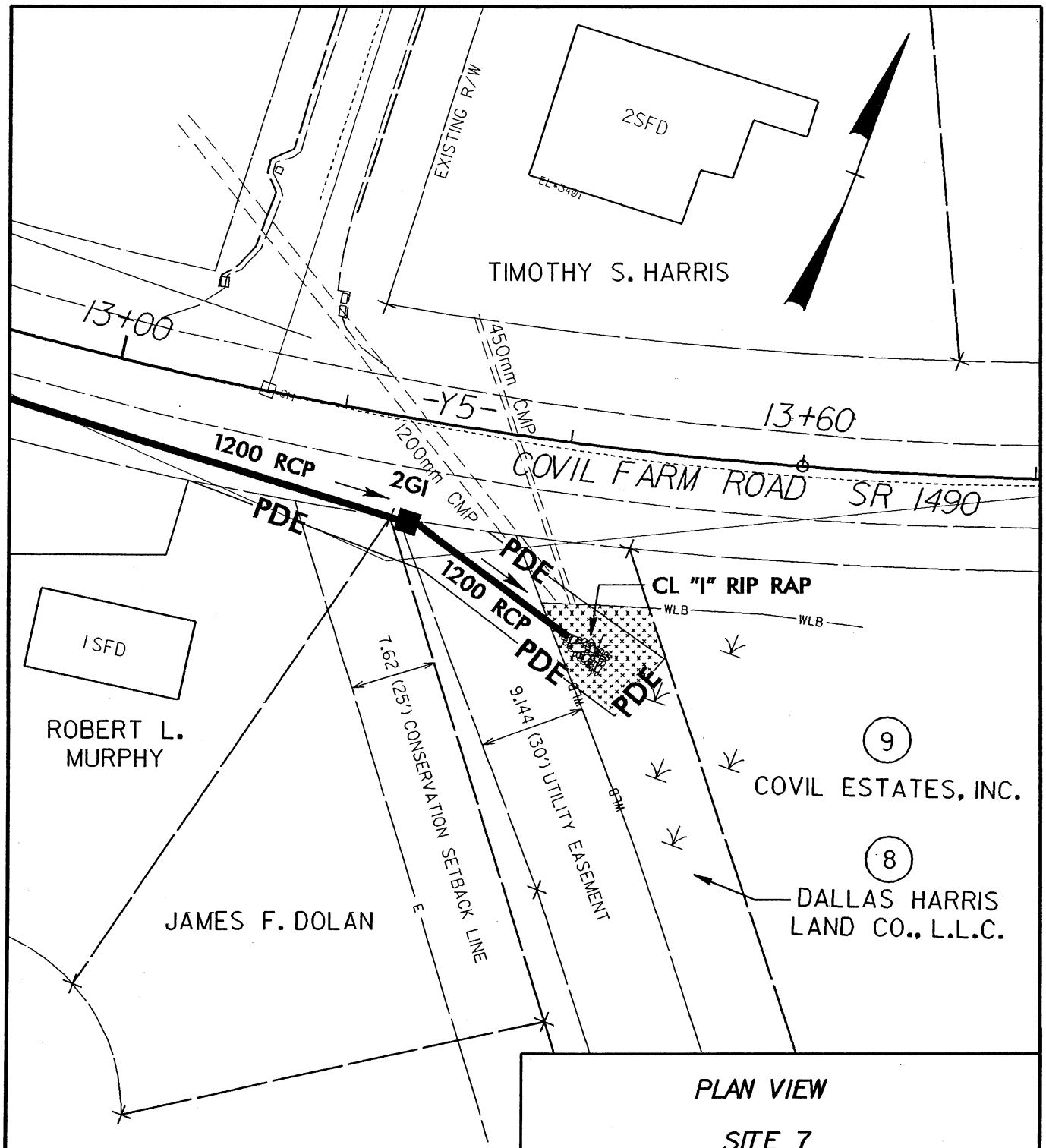
SITE 6
SECTION A-A

NCDOT
DIVISION OF HIGHWAYS
NEW HANOVER COUNTY

PROJECT: 34857.1.1 (U-2734)
MILITARY CUTOFF ROAD
IN WILMINGTON, NC

SHEET 30 OF 34

9/03



PLAN VIEW

SITE 7

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 34857.1.1 - U-2734

MILITARY CUT-OFF ROAD
IN WILMINGTON, NC

SHEET 31 **OF** 34

9/03

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Fill In Wetlands (ac)	WETLAND IMPACTS: Temp. Fill In Wetlands (ac)	WETLAND IMPACTS: Excavation In Wetlands (ac)	WETLAND IMPACTS: Mechanized Clearing (Method III) (ac)	SURFACE WATER IMPACTS: Fill In SW (Natural) (ac)	SURFACE WATER IMPACTS: Fill In SW (Pond) (ac)	SURFACE WATER IMPACTS: Temp. Fill In SW (ac)	SURFACE WATER IMPACTS: Existing Channel Impacted (ft)	SURFACE WATER IMPACTS: Natural Stream Design (ft)
1A	13+60 -L- (Lt)	Extend 48" RCP					0.01			30	
1	21+00 (Lt)	2 @ 54"Steel Pipe	0.04			0.02	0.081			1099	*1070
	to 23+44 (Rt) -L-										
2	27+76 to 28+45	2 @ 9' x 7'	0.031		0.02	0.14	0.03			131	
	(Lt & Rt) -L-	RCBC w/ 2' sill									
3	31+25 to 34+30	Extend 42" RCP	0.6			0.15	0.02			128	
	(Lt & Rt) -L-										
4	34+40 to		0.12		** 0.20						
	34+70 (Lt) -L-										
5	38+26 (Rt) to	72" RCP					0.01			92	
	38+50 (Lt) -L-										
6	45+40 to		0.02			0.09					
	46+30 (Rt) -L-										
7	13+40 (Rt) -Y5-	48" RCP				0.02					
TOTALS:			0.81	0	0.22	0.42	0.151	0	0	1480	1070

* Includes 456' of relocated natural stream design + 614' of preserved (in R/W) stream = 1070' Total

** 0.16 Ac Drained + 0.04 Ac Excavated = 0.20 Ac Total

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT: 34857.1.1 (U-2734)
NEW HANOVER COUNTY
MILITARY CUTOFF ROAD

Oct-03

Form Revised 3/22/01

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS				
			Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Fill In SW (Natural) (ha)	Fill In SW (Pond) (ha)	Temp. Fill In SW (ha)	Existing Channel Impacted (m)	Natural Stream Design (m)
1A	Sta 13+60 -L- (Lt)	Extend 1200 RCP					0.004			9	
1	21+00 (Lt)	2 @ 1350 Steel Pipe	0.015			0.006	0.034			335	*326
	to 24+50 (Rt) -L-										
2	27+76 to 28+45	2 @ 2.7m x 2.1m	0.127		0.008	0.058	0.011			40	
	(Lt & Rt) -L-	RCBC w/ 0.6m sill									
3	31+25 to 34+30	Extend 1050 RCP	0.242			0.060	0.008			39	
	(Lt & Rt) -L-										
4	34+40 to		0.047		** 0.080						
	34+70 (Lt) -L-										
5	38+26 (Rt) to	1800 RCP					0.004			28	
	38+50 (Lt) -L-										
6	45+40 to		0.009			0.035					
	46+30 (Rt) -L-										
7	13+40 (Rt) -Y5-	1200 RCP				0.008					
TOTALS:			0.440		0.088	0.167	0.061			451	326

* Includes 139m of relocated natural stream design + 187m of preserved (in R/W) stream = 326m Total

** 0.064 Ha Drained + 0.016 Excavated = 0.080 Ha Total

Form Revised 3/22/01

NCDOT

DIVISION OF HIGHWAYS
NEW HANOVER COUNTY
PROJECT: 34857.1.1 (U-2734)

MILITARY CUTOFF ROAD
IN WILMINGTON, NC

Oct-03

PROPERTY OWNER

PROP. NO.	SITE NO.	OWNER'S NAME	ADDRESS
1	1, 2, 3	BRODY ZIMMER, L.L.C.	3111 PRINCESS ST. WILMINGTON, NC 28401
2	1	TCT OF WILMINGTON, L.L.C.	P.O. BOX 1810 WILMINGTON, NC 28401
3	1	THE GREENWOOD GROUP, INC.	1122 OBERLIN RD. RALEIGH, NC 27605
4	1, 2	RAIFORD G. TRASK, JR.	1202 EASTWOOD RD. WILMINGTON, NC 28403
5	3	W. ALLEN COBB, JR.	P.O. BOX 1064 WILMINGTON, NC 28402
6	4	UNITED CEREBRAL PALSEY OF N.C.	P.O. BOX 27707 RALEIGH, NC 27611
7	6	MELBA HEFELFINGER	62 PELICAN DRIVE WRIGHTSVILLE BEACH, NC 28480
8	1A, 5, 7	DALLAS HARRIS LAND CO., L.L.C.	P.O. BOX 531 WRIGHTSVILLE BEACH, NC 28480
9	7	COVIL ESTATES, INC.	7158 MARKET ST. WILMINGTON, NC 28405
10	3	MABLE D. WEEKS	3413 BELLEVUE RD. RALEIGH, NC 27609
11	5	CP & L (PROGRESS ENERGY)	P.O. BOX 1551 RALEIGH, NC 27602

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

PROJECT: 34857.1.1 (U-2734)
MILITARY CUT-OFF ROAD
IN WILMINGTON, NC