



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

March 27, 2008

U.S. Army Corps of Engineers  
Wilmington District Headquarters  
P.O. Box 1890  
Wilmington, NC 28402-1890

ATTENTION: Mr. Richard Spencer  
NCDOT Coordinator, Division 8

Dear Sir:

SUBJECT: **Application for Section 404 Nationwide Permit 42 and Section 401 Water Quality Certification** for the proposed Endor Iron Furnace Greenway (Phase I) from Kiwanis Family Park on SR 1009 (Carbonton Road) to Boone Circle (an unopened road), Sanford, Lee County, Division 8. WBS Element 33906.1.1, TIP No. E-4981.

\$240.00 Debit from WBS element 33906.1.1.

The North Carolina Department of Transportation (NCDOT) Division of Bicycle and Pedestrian Transportation (DBPT) proposes to build Phase I of the Endor Iron Furnace Greenway from Kiwanis Family Park on SR 1009 (Carbonton Road) to Boone Circle (an unopened road) in the City of Sanford. Phase I of this bicycle and pedestrian trail will provide transportation as well as recreational trail access between Kiwanis Family Park and commercial/residential destinations in Sanford. The multi-use trail, when all phases are completed, will eventually connect to the proposed nature preserve and park at the Endor Iron Furnace historic site. The subject project will be approximately 1.43 miles long and will consist of a 10-foot wide asphalt path with 2-foot wide crushed stone shoulders. A majority of the project will be built on new location. The project proposes the installation of short sections of curb and gutter at both Carbonton Road and the intersection corners of SR 1100 (Spring Lane) and the construction of concrete retaining walls at several points along the greenway. This project also proposes the installation of a reinforced concrete box culvert (RCBC) at two locations along an unnamed tributary (UT) of Big Buffalo Creek (UT 1) and the placement of a 75-foot long prefabricated bridge structure where the greenway crosses another UT of Big Buffalo Creek (UT 2). The bridge will span the creek and result in no impacts to jurisdictional waters.

Please see the enclosed copies of the Pre-Construction Notification (PCN), permit drawings, design plans, U. S. Army Corps of Engineers (USACE) Jurisdictional Determination (Rapanos) form, and Natural Resources Technical Report (NRTR; July 2007) for the above-referenced project. The Independent Bicycle/Pedestrian Project Categorical Exclusion (CE) is currently being drafted and has an estimated completion date of April 2008. The CE will be distributed shortly thereafter. Copies of this document will be available upon request.

**MAILING ADDRESS:**  
NC DEPARTMENT OF TRANSPORTATION  
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS  
1598 MAIL SERVICE CENTER  
RALEIGH NC 27699-1598

TELEPHONE: 919-715-1334  
FAX: 919-715-5501  
WEBSITE: [WWW.NCDOT.ORG](http://WWW.NCDOT.ORG)

**LOCATION:**  
2728 CAPITAL BLVD., SUITE 240  
RALEIGH NC 27604

## IMPACTS TO WATERS OF THE UNITED STATES

### General Description

The project is located in the Cape Fear River Basin (sub-basin 03-06-11). This area is part of Hydrologic Cataloging Unit 03030003. UT 1 and UT 2 to Big Buffalo Creek are the only water resources being traversed by the greenway. There are no wetlands associated with this project. No Jurisdictional Determination (JD) site visit with the USACE was performed for this project because both streams were perennial and, therefore, jurisdictional.

UTs 1 and 2 are tributaries to Big Buffalo Creek and are, therefore, assigned the same stream classification as the portion of Big Buffalo Creek that receives them. The segment of Big Buffalo Creek associated with this project has been assigned Stream Index Number 17-40 (09/01/1974) by the North Carolina Division of Water Quality (NCDWQ) and has a best usage classification of C.

UT 1 to Big Buffalo Creek is a perennial stream that flows into Big Buffalo Creek from the east, just north of Spring Lane. The project runs adjacent to this UT from where the greenway turns northwest away from U.S. Route 1 to near the creek's confluence with Big Buffalo Creek. This creek has a channel width of approximately 12 to 14 feet, a wetted width of 4 to 10 feet, a bankful height of 4 to 6 feet, and a water depth of between 6 inches and 1 foot. During a field visit associated with the NRTR on May 21, 2007, the water clarity ranged between clear and slightly cloudy, the latter resulting from sediment input from nearby development and urban areas. The flow was slow to moderate and the substrate was composed of silt, sand, gravel, cobble, and boulder.

UT 2 to Big Buffalo Creek is a perennial stream that flows into Big Buffalo Creek from the east and crosses the project approximately halfway between Spring Lane and Boone Circle. The creek has a channel width of approximately 8 to 10 feet, a wetted width of 6 to 8 feet, a bankful height of 1 to 7 feet, and a water depth of between 0 inches and over 1 foot. During the field visit on May 21, 2007, the water clarity ranged between clear and somewhat cloudy/murky, the flow was moderate, and the substrate was composed of silt, sand, gravel, cobble, and boulder.

**No High Quality Waters (HQW), Water Supplies (WS-I or WS-II), or Outstanding Resource Waters (ORW) occur within 1.0 mile of the project study area.** However, a review of NCDWQ's 2006 Final 303(d) List of Impaired Waters for North Carolina indicated that Big Buffalo Creek, from its source to the Deep River, is listed for impaired biological integrity, possibly due to stormwater runoff.

### Permanent Impacts

#### *Site 1*

A total of 28 linear feet of permanent stream impacts will occur to UT 1 to Big Buffalo Creek. These impacts are a result of the placement of a double-barreled RCBC into the creek.

#### *Site 2*

A total of 28 linear feet of permanent stream impacts will occur to UT 1 to Big Buffalo Creek. These impacts are a result of the placement of a double-barreled RCBC into the creek.

## Temporary Impacts

### *Site 1*

A total of 124 linear feet of temporary stream impacts will occur to UT 1 to Big Buffalo Creek due to the placement of the above-mentioned RCBC. As part of its construction, impervious sand bag dikes will be built upstream and downstream of where the RCBC will be installed and the area between them will be dewatered. A temporary 5-foot base diversion ditch will also be constructed to redirect water from the creek around the area of construction. This non-jurisdictional ditch will be excavated just south of UT 1 and will tie into the creek upstream and downstream of the impervious dikes.

### *Site 2*

A total of 132 linear feet of temporary stream impacts will occur to UT 1 to Big Buffalo Creek due to the placement of the above-mentioned RCBC. As part of its construction, impervious sand bag dikes will be built upstream and downstream of where the RCBC will be installed and the area between them will be dewatered. A temporary 5-foot base diversion ditch will also be constructed to redirect water from the creek around the area of construction. This non-jurisdictional ditch will be excavated just west of UT 1 and will tie into the creek upstream and downstream of the impervious dikes.

## Utility Impacts

No impacts to jurisdictional waters will occur as a result of utility work associated with this project.

## **RESTORATION PLAN**

Upon the completion of each culvert, flow will be redirected through the culvert from the diversion ditches, impervious sand bag dikes will be removed from the creek both upstream and downstream of the culvert, and the diversion ditches will be obliterated and filled. Any additional foreign material will be removed from the streambed. The temporary fill areas will be restored back to their pre-project elevations. NCDOT will also restore the streambed to its pre-project contours.

## **REMOVAL AND DISPOSAL PLAN**

All materials used in the construction of the RCBCs will be removed from the stream after work is completed. This construction material will be removed by the contractor using standard excavation and extraction equipment. The contractor will be required to submit a reclamation plan for the removal and disposal of all material off-site at an upland location. The contractor will have the option of reusing any of the materials that the engineer deems suitable in the construction of project.

## **AVOIDANCE, MINIMIZATION, AND COMPENSATORY MITIGATION**

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and National Environmental Policy Act (NEPA) compliance stages; minimization measures were incorporated as part of the project design.

According to the Clean Water Act (CWA) §404(b) (1) guidelines, NCDOT must avoid, minimize, and mitigate, in sequential order, impacts to waters of the U.S. The following is a list of the project's avoidance/minimization activities proposed or completed by NCDOT:

Avoidance/Minimization

- Retaining walls will be constructed at several locations to avoid impacts to jurisdictional waters and surrounding properties.
- The 75-foot long prefabricated bridge will span UT 2 to Big Buffalo Creek, resulting in no impacts to this jurisdictional water.
- Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of stringent erosion control methods and use of NCDOT’s Best Management Practices (BMP) for Protection of Surface Waters.

Compensatory Mitigation

No mitigation is proposed for the 56 linear feet of permanent stream impacts to UT 1 to Big Buffalo Creek (28 linear feet at both Site 1 and Site 2) because of the minimal amount of impact.

**FEDERALLY PROTECTED SPECIES**

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of its most recent update on January 31, 2008, the U.S. Fish and Wildlife Service (USFWS) website lists three federally protected species for Lee County. These species and their associated biological conclusions are listed below in Table 1.

**Table 1. Federally Protected Species for Lee County**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Federal Status</b>	<b>Habitat Present</b>	<b>Biological Conclusion</b>
Cape Fear shiner	<i>Notropis mekistocholas</i>	E	No	No Effect
red-cockaded woodpecker*	<i>Picoides borealis</i>	E	No	No Effect
harperella*	<i>Ptilimnium nodosum</i>	E	No	No Effect

E - Endangered.

\* - Historic record; the species was last observed in the county more than 50 years ago.

A field survey/ habitat evaluation for the Cape Fear shiner was performed by NCDOT biologists Neil Medlin, Jared Gray, Anne Burroughs, and Cheryl Gregory on June 7, 2007. No individuals were observed and no suitable habitat existed within the project study area. Additionally, a search of the North Carolina Natural Heritage Program (NCNHP) database (GIS shapefiles most recently updated on February 13, 2008) revealed no known populations of this species within 1.0 mile of the project. Given the results of the site visit/habitat evaluation and the distance to the nearest known population of this species, the completion of this project will have “No Effect” on the Cape Fear shiner.

A red-cockaded woodpecker (RCW) survey/habitat assessment of the project study area and the surrounding habitat was performed by NCDOT biologists Ashley Cox, Jim Mason, and James Pflaum on May 21, 2007. The survey took a total of 19.5 man-hours to complete. Much of the habitat present within the project study area was Maintained/Disturbed and highly urbanized. No foraging or nesting habitat was observed within the study area, nor were any individuals observed. Habitat present within 0.5 mile of the project was highly urbanized and very similar to habitat found in the study area. All pine stands within the study area and the 0.5 mile radius appeared to be younger than 30 years or age. Additionally, these stands were too dense to support RCW’s. In addition to the field survey, a search of the NCNHP database on March 11, 2008 revealed no known populations of this species within 1.0 mile

of the project study area. Since no habitat is present, no individuals were observed, the species records in the county are historic, and no known populations are present within 1.0 mile of the project, a biological conclusion of "No Effect" has been assigned to this species.

A harperella survey/habitat assessment was performed by NCDOT biologists Jim Mason and Duncan Quinn on July 6, 2007. The survey took a total of 4.5 man-hours to complete. No suitable habitat or individuals were observed in Big Buffalo Creek or UTs 1 and 2 to Big Buffalo Creek. In addition to the field survey, a search of the NCNHP database on March 11, 2008 revealed no known populations of this species within 1.0 mile of the project study area. Since no habitat is present, no individuals were observed, the species records in this county are historic, and no known populations are present within 1.0 mile of the project, a biological conclusion of "No Effect" has been assigned to this species.

### SCHEDULE

It is anticipated that construction on this project will begin some time during the 2008 calendar year. A more specific start date will be determined upon receipt of Section 404 and Section 401 permits.

### REGULATORY APPROVALS

Section 404 Permit: The NCDOT requests that activities described in this application be authorized by a Nationwide Permit 42 (72 FR 11092-11198; March 12, 2007).

Section 401 Permit: We anticipate that Section 401 General Water Quality Certification (WQC) 3705 will apply to this project. All general conditions of these WQCs will be met. Written concurrence is required for WQC 3705. In compliance with Section 143-215.3D(e) of the NCAC, we will provide \$240.00 to act as payment for processing this Section 401 permit application. In accordance with 15A NCAC 2H, Section .0500 and 15A NCAC 2B, Section .0200, we are providing five copies of this application to the North Carolina Department of Environment and Natural Resources (NCDENR), NCDWQ, for their review and approval.

A copy of this permit application will be posted on the NCDOT website at: <http://www.ncdot.org/doh/preconstruct/pe/>. If you have any questions or need additional information, please contact Mr. Jim Mason at (919) 715-5531 or [jmason@dot.state.nc.us](mailto:jmason@dot.state.nc.us).

Sincerely,



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

w/attachment

Mr. Brian Wrenn, NCDWQ (5 Copies)  
Mr. Travis Wilson, NCWRC  
Mr. Gary Jordan, USFWS

w/o attachment (see website for attachments)

Dr. David Chang, P.E., Hydraulics  
Mr. Mark Staley, Roadside Environmental  
Mr. Greg Perfetti, P.E., Structure Design  
Mr. Victor Barbour, P.E., Project Services Unit  
Mr. Tim Johnson, P.E., Division 8 Engineer  
Mr. Art King, Division 8 Environmental Officer  
Mr. Jay Bennett, P.E., Roadway Design  
Mr. Majed Alghandour, P. E., Programming and TIP  
Mr. Art McMillan, P.E., Highway Design  
Mr. Scott McLendon, USACE, Wilmington  
Mr. Kumar Trivedi, P.E., Division of Bicycle and Pedestrian Transportation  
Mr. Robert Hayes, Division of Bicycle and Pedestrian Transportation

**Office Use Only:**

Form Version March 05

**USACE Action ID No.** \_\_\_\_\_ **DWQ No.** \_\_\_\_\_

(If any particular item is not applicable to this project, please enter "Not Applicable" or "N/A".)

**I. Processing**

1. Check all of the approval(s) requested for this project:

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> Section 404 Permit              | <input type="checkbox"/> Riparian or Watershed Buffer Rules      |
| <input type="checkbox"/> Section 10 Permit                          | <input type="checkbox"/> Isolated Wetland Permit from DWQ        |
| <input checked="" type="checkbox"/> 401 Water Quality Certification | <input type="checkbox"/> Express 401 Water Quality Certification |

2. Nationwide, Regional or General Permit Number(s) Requested: Nationwide 42

3. If this notification is solely a courtesy copy because written approval for the 401 Certification is not required, check here:

4. If payment into the North Carolina Ecosystem Enhancement Program (NCEEP) is proposed for mitigation of impacts, attach the acceptance letter from NCEEP, complete section VIII, and check here:

5. If your project is located in any of North Carolina's twenty coastal counties (listed on page 4), and the project is within a North Carolina Division of Coastal Management Area of Environmental Concern (see the top of page 2 for further details), check here:

**II. Applicant Information**

1. Owner/Applicant Information

Name: Gregory J. Thorpe, Ph.D., Environmental Management Director  
Mailing Address: North Carolina Department of Transportation  
1598 Mail Service Center  
Raleigh, NC 27699-1598

Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794

E-mail Address: \_\_\_\_\_

2. Agent/Consultant Information (A signed and dated copy of the Agent Authorization letter must be attached if the Agent has signatory authority for the owner/applicant.)

Name: \_\_\_\_\_

Company Affiliation: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Telephone Number: \_\_\_\_\_ Fax Number: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

### III. Project Information

Attach a **vicinity map** clearly showing the location of the property with respect to local landmarks such as towns, rivers, and roads. Also provide a detailed **site plan** showing property boundaries and development plans in relation to surrounding properties. Both the vicinity map and site plan must include a scale and north arrow. The specific footprints of all buildings, impervious surfaces, or other facilities must be included. If possible, the maps and plans should include the appropriate USGS Topographic Quad Map and NRCS Soil Survey with the property boundaries outlined. Plan drawings, or other maps may be included at the applicant's discretion, so long as the property is clearly defined. For administrative and distribution purposes, the USACE requires information to be submitted on sheets no larger than 11 by 17-inch format; however, DWQ may accept paperwork of any size. DWQ prefers full-size construction drawings rather than a sequential sheet version of the full-size plans. If full-size plans are reduced to a small scale such that the final version is illegible, the applicant will be informed that the project has been placed on hold until decipherable maps are provided.

1. Name of project: The proposed Endor Iron Furnace Greenway (Phase I) from Kiwanis Family Park on SR 1009 (Carbonton Road) to Boone Circle (an unopened road) in the City of Sanford.
2. T.I.P. Project Number or State Project Number (NCDOT Only): E-4981
3. Property Identification Number (Tax PIN): N/A
4. Location  
County: Lee Nearest Town: Sanford  
Subdivision name (include phase/lot number): N/A  
Directions to site (include road numbers/names, landmarks, etc.): From points north, take U.S. Route 1 south to Sanford. Exit highway onto Spring Lane, take right. Greenway will cross Spring Lane at its intersection with River Birch Shopping Center entrance.
5. Site coordinates (For linear projects, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)  
Decimal Degrees (6 digits minimum): \_\_\_\_\_°N \_\_\_\_\_°W
6. Property size (acres): please see attached drawings
7. Name of nearest receiving body of water: Big Buffalo Creek
8. River Basin: Cape Fear  
(Note – this must be one of North Carolina's seventeen designated major river basins. The River Basin map is available at [http://h2o.enr.state.nc.us/admin/maps/.](http://h2o.enr.state.nc.us/admin/maps/))
9. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: A majority of the greenway will be built on new location. Land use in the area includes residential, business, and forested areas.

10. Describe the overall project in detail, including the type of equipment to be used: See attached cover letter for project description. Heavy duty excavation equipment will be used such as trucks, dozers, and other various equipment necessary for greenway construction.
11. Explain the purpose of the proposed work: Phase I of this bicycle and pedestrian trail will provide transportation as well as recreational trail access between Kiwanis Family Park and commercial/residential destinations in Sanford. The multi-use trail, when all phases are completed, will eventually connect to the proposed nature preserve and park at the Endor Iron Furnace historic site.

**IV. Prior Project History**

If jurisdictional determinations and/or permits have been requested and/or obtained for this project (including all prior phases of the same subdivision) in the past, please explain. Include the USACE Action ID Number, DWQ Project Number, application date, and date permits and certifications were issued or withdrawn. Provide photocopies of previously issued permits, certifications or other useful information. Describe previously approved wetland, stream and buffer impacts, along with associated mitigation (where applicable). If this is a NCDOT project, list and describe permits issued for prior segments of the same T.I.P. project, along with construction schedules. N/A

**V. Future Project Plans**

Are any future permit requests anticipated for this project? If so, describe the anticipated work, and provide justification for the exclusion of this work from the current application.  
N/A

**VI. Proposed Impacts to Waters of the United States/Waters of the State**

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. Each impact must be listed separately in the tables below (e.g., culvert installation should be listed separately from riprap dissipater pads). Be sure to indicate if an impact is temporary. All proposed impacts, permanent and temporary, must be listed, and must be labeled and clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) should be shown on a delineation map, whether or not impacts are proposed to these systems. Wetland and stream evaluation and delineation forms should be included as appropriate. Photographs may be included at the applicant's discretion. If this proposed impact is strictly for wetland or stream mitigation, list and describe the impact in Section VIII below. If additional space is needed for listing or description, please attach a separate sheet.

Provide a written description of the proposed impacts: See attached cover letter.

1. Individually list wetland impacts. Types of impacts include, but are not limited to mechanized clearing, grading, fill, excavation, flooding, ditching/drainage, etc. For dams, separately list impacts due to both structure and flooding.

Wetland Impact Site Number (indicate on map)	Type of Impact	Type of Wetland (e.g., forested, marsh, herbaceous, bog, etc.)	Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Area of Impact (acres)
Total Wetland Impact (acres)					0.00

2. List the total acreage (estimated) of all existing wetlands on the property: 0.00

3. Individually list all intermittent and perennial stream impacts. Be sure to identify temporary impacts. Stream impacts include, but are not limited to placement of fill or culverts, dam construction, flooding, relocation, stabilization activities (e.g., cement walls, rip-rap, crib walls, gabions, etc.), excavation, ditching/straightening, etc. If stream relocation is proposed, plans and profiles showing the linear footprint for both the original and relocated streams must be included. To calculate acreage, multiply length X width, then divide by 43,560.

Stream Impact Number (indicate on map)	Stream Name	Type of Impact	Perennial or Intermittent?	Average Stream Width Before Impact	Impact Length (linear feet)	Area of Impact (acres)
1	UT 1 to Big Buffalo Creek	Double-barreled RCBC (Permanent)	Perennial	12-14	28	0.01
1	UT 1 to Big Buffalo Creek	Temporary dewatering and diversion ditch	Perennial	12-14	124	0.04
2	UT 1 to Big Buffalo Creek	Double-barreled RCBC (Permanent)	Perennial	12-14	28	0.01
2	UT 1 to Big Buffalo Creek	Temporary dewatering and diversion ditch	Perennial	12-14	132	0.03
Total Stream Impact (by length and acreage)					312	0.09

4. Individually list all open water impacts (including lakes, ponds, estuaries, sounds, Atlantic Ocean and any other water of the U.S.). Open water impacts include, but are not limited to fill, excavation, dredging, flooding, drainage, bulkheads, etc.

Open Water Impact Site Number (indicate on map)	Name of Waterbody (if applicable)	Type of Impact	Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)	Area of Impact (acres)
Total Open Water Impact (acres)				0.0

5. List the cumulative impact to all Waters of the U.S. resulting from the project:

Stream Impact (acres):	0.09
Wetland Impact (acres):	0.00
Open Water Impact (acres):	0
Total Impact to Waters of the U.S. (acres)	0.09
Total Stream Impact (linear feet):	312

6. Isolated Waters

Do any isolated waters exist on the property?  Yes  No

Describe all impacts to isolated waters, and include the type of water (wetland or stream) and the size of the proposed impact (acres or linear feet). Please note that this section only applies to waters that have specifically been determined to be isolated by the USACE.

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7. Pond Creation

If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.

Pond to be created in (check all that apply):  uplands  stream  wetlands

Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.): \_\_\_\_\_

Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.): \_\_\_\_\_

Current land use in the vicinity of the pond: \_\_\_\_\_

Size of watershed draining to pond: \_\_\_\_\_ Expected pond surface area: \_\_\_\_\_

## VII. Impact Justification (Avoidance and Minimization)

Specifically describe measures taken to avoid the proposed impacts. It may be useful to provide information related to site constraints such as topography, building ordinances, accessibility, and financial viability of the project. The applicant may attach drawings of alternative, lower-impact site layouts, and explain why these design options were not feasible. Also discuss how impacts

were minimized once the desired site plan was developed. If applicable, discuss construction techniques to be followed during construction to reduce impacts. See attached cover letter.

### VIII. Mitigation

DWQ - In accordance with 15A NCAC 2H .0500, mitigation may be required by the NC Division of Water Quality for projects involving greater than or equal to one acre of impacts to freshwater wetlands or greater than or equal to 150 linear feet of total impacts to perennial streams.

USACE – In accordance with the Final Notice of Issuance and Modification of Nationwide Permits, published in the Federal Register on January 15, 2002, mitigation will be required when necessary to ensure that adverse effects to the aquatic environment are minimal. Factors including size and type of proposed impact and function and relative value of the impacted aquatic resource will be considered in determining acceptability of appropriate and practicable mitigation as proposed. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland and/or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferable in the same watershed.

If mitigation is required for this project, a copy of the mitigation plan must be attached in order for USACE or DWQ to consider the application complete for processing. Any application lacking a required mitigation plan or NCEEP concurrence shall be placed on hold as incomplete. An applicant may also choose to review the current guidelines for stream restoration in DWQ's Draft Technical Guide for Stream Work in North Carolina, available at <http://h2o.enr.state.nc.us/ncwetlands/strmgide.html>.

1. Provide a brief description of the proposed mitigation plan. The description should provide as much information as possible, including, but not limited to: site location (attach directions and/or map, if offsite), affected stream and river basin, type and amount (acreage/linear feet) of mitigation proposed (restoration, enhancement, creation, or preservation), a plan view, preservation mechanism (e.g., deed restrictions, conservation easement, etc.), and a description of the current site conditions and proposed method of construction. Please attach a separate sheet if more space is needed.

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2. Mitigation may also be made by payment into the North Carolina Ecosystem Enhancement Program (NCEEP). Please note it is the applicant's responsibility to contact the NCEEP at (919) 715-0476 to determine availability, and written approval from the NCEEP indicating that they are will to accept payment for the mitigation must be attached to this form. For

additional information regarding the application process for the NCEEP, check the NCEEP website at <http://h2o.enr.state.nc.us/wrp/index.htm>. If use of the NCEEP is proposed, please check the appropriate box on page five and provide the following information:

Amount of stream mitigation requested (linear feet): 0  
Amount of buffer mitigation requested (square feet): 0  
Amount of Riparian wetland mitigation requested (acres): 0.00  
Amount of Non-riparian wetland mitigation requested (acres): 0.00  
Amount of Coastal wetland mitigation requested (acres): 0.00

**IX. Environmental Documentation (required by DWQ)**

1. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land? Yes  No
2. If yes, does the project require preparation of an environmental document pursuant to the requirements of the National or North Carolina Environmental Policy Act (NEPA/SEPA)?  
Note: If you are not sure whether a NEPA/SEPA document is required, call the SEPA coordinator at (919) 733-5083 to review current thresholds for environmental documentation.  
Yes  No
3. If yes, has the document review been finalized by the State Clearinghouse? If so, please attach a copy of the NEPA or SEPA final approval letter. Yes  No

**X. Proposed Impacts on Riparian and Watershed Buffers (required by DWQ)**

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to required state and local buffers associated with the project. The applicant must also provide justification for these impacts in Section VII above. All proposed impacts must be listed herein, and must be clearly identifiable on the accompanying site plan. All buffers must be shown on a map, whether or not impacts are proposed to the buffers. Correspondence from the DWQ Regional Office may be included as appropriate. Photographs may also be included at the applicant's discretion.

1. Will the project impact protected riparian buffers identified within 15A NCAC 2B .0233 (Neuse), 15A NCAC 2B .0259 (Tar-Pamlico), 15A NCAC 02B .0243 (Catawba) 15A NCAC 2B .0250 (Randleman Rules and Water Supply Buffer Requirements), or other (please identify \_\_\_\_\_)? Yes  No

2. If “yes”, identify the square feet and acreage of impact to each zone of the riparian buffers. If buffer mitigation is required calculate the required amount of mitigation by applying the buffer multipliers.

Zone*	Impact (square feet)	Multiplier	Required Mitigation
1	0	3 (2 for Catawba)	0
2	0	1.5	0
Total	0		0

\* Zone 1 extends out 30 feet perpendicular from the top of the near bank of channel; Zone 2 extends an additional 20 feet from the edge of Zone 1.

If buffer mitigation is required, please discuss what type of mitigation is proposed (i.e., Donation of Property, Riparian Buffer Restoration / Enhancement, or Payment into the Riparian Buffer Restoration Fund). Please attach all appropriate information as identified within 15A NCAC 2B .0242 or .0244, or .0260. \_\_\_\_\_

**XI. Stormwater (required by DWQ)**

Describe impervious acreage (existing and proposed) versus total acreage on the site. Discuss stormwater controls proposed in order to protect surface waters and wetlands downstream from the property. If percent impervious surface exceeds 20%, please provide calculations demonstrating total proposed impervious level. N/A

**XII. Sewage Disposal (required by DWQ)**

Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility. N/A

**XIII. Violations (required by DWQ)**

Is this site in violation of DWQ Wetland Rules (15A NCAC 2H .0500) or any Buffer Rules?  
 Yes  No

Is this an after-the-fact permit application? Yes  No

**XIV. Cumulative Impacts (required by DWQ)**

Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality? Yes  No

If yes, please submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent North Carolina Division of Water Quality policy posted on our website at <http://h2o.enr.state.nc.us/ncwetlands>. If no, please provide a short narrative description: \_\_\_\_\_

N/A

---

**XV. Other Circumstances (Optional):**

It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g., draw-down schedules for lakes, dates associated with Endangered and Threatened Species, accessibility problems, or other issues outside of the applicant's control).

N/A

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*E. P. Lust*

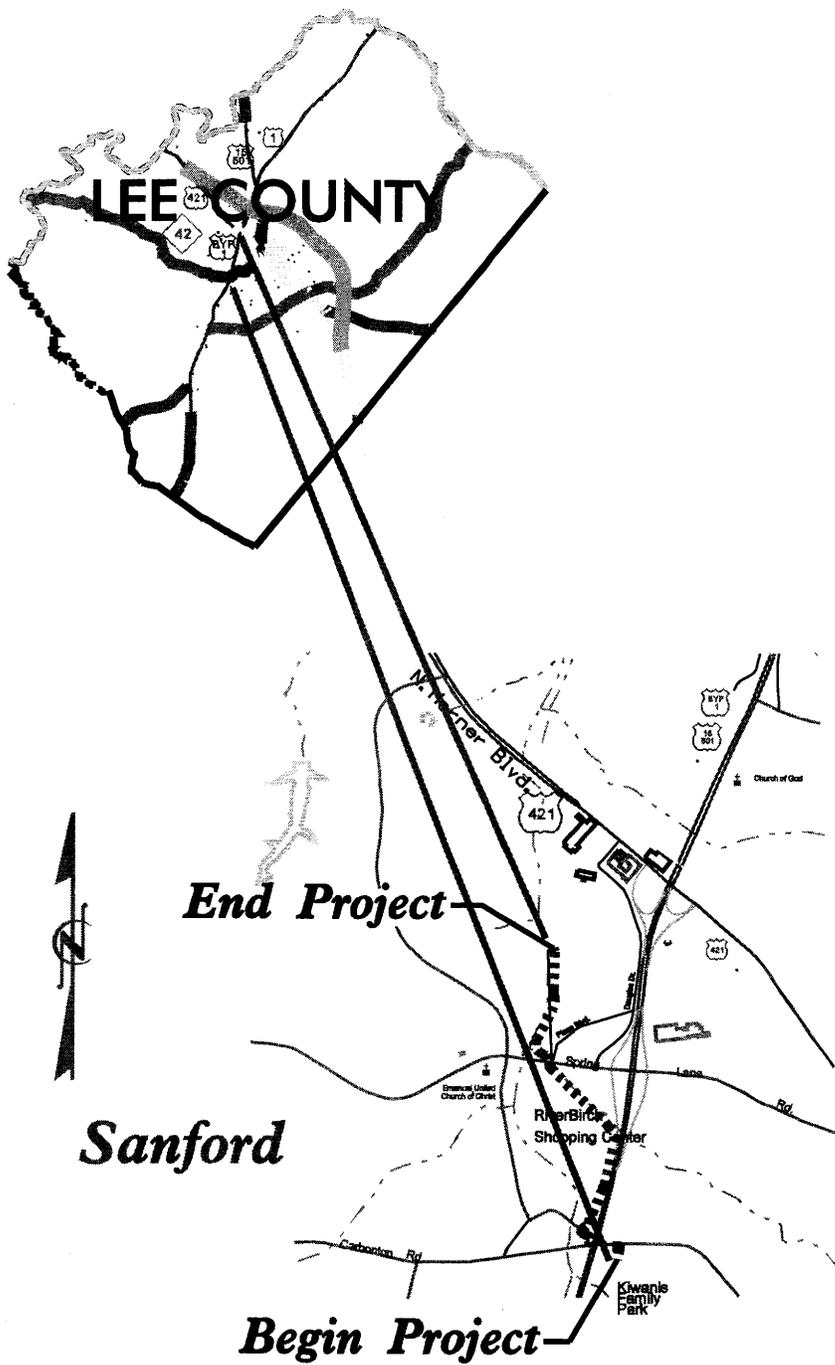
3.26.08

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**Applicant/Agent's Signature**

**Date**

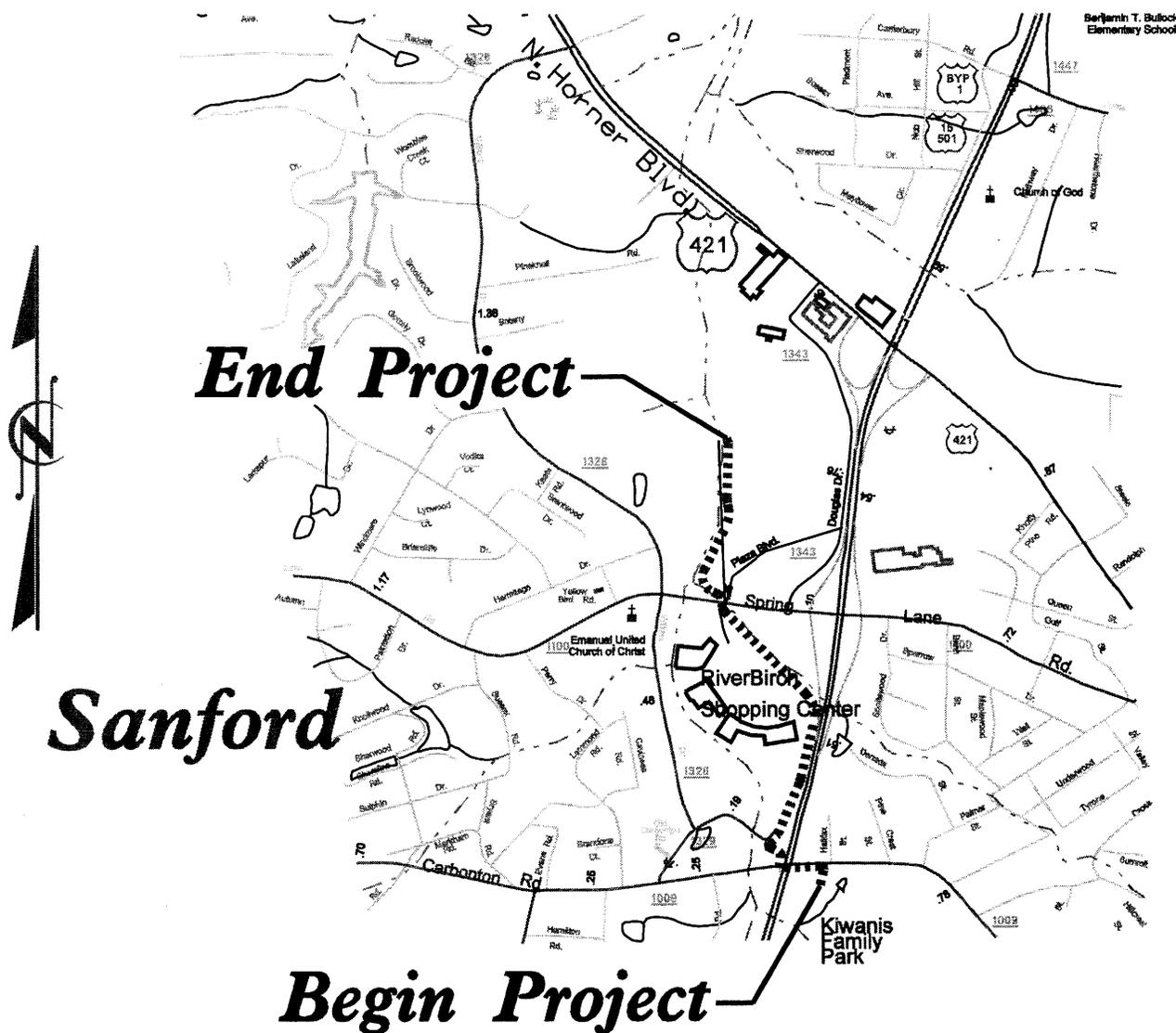
(Agent's signature is valid only if an authorization letter from the applicant is provided.)



# VICINITY MAP

**Endor Iron Furnace Trail, Phase 1  
Sanford, Lee County**

N.C. DEPT. OF TRANSPORTATION  
DIVISION OF BICYCLE AND PEDESTRIAN  
CITY OF RALEIGH, WAKE COUNTY  
PROJECT TIP NO. E-4981  
ENDOR FURNACE GREENWAY, PHASE 1  
SHEET 1 OF 6 02/25/2008



**End Project**

**Sanford**

**Begin Project**

**VICINITY MAP**

**Endor Iron Furnace Trail, Phase 1  
Sanford, Lee County**

N.C. DEPT. OF TRANSPORTATION  
 DIVISION OF BICYCLE AND PEDESTRIAN  
 CITY OF RALEIGH, WAKE COUNTY  
 PROJECT TIP NO. E-4981  
 ENDOR FURNACE GREENWAY, PHASE 1  
 SHEET 2 OF 6 02/25/2008

# Property Owners

**Parcel Number**

**Names**

**Addresses**

DB 499 PG 229

Mr. Ivon D. Rohrer, Jr

Birch Field Creek Road  
Newland, NC 28657

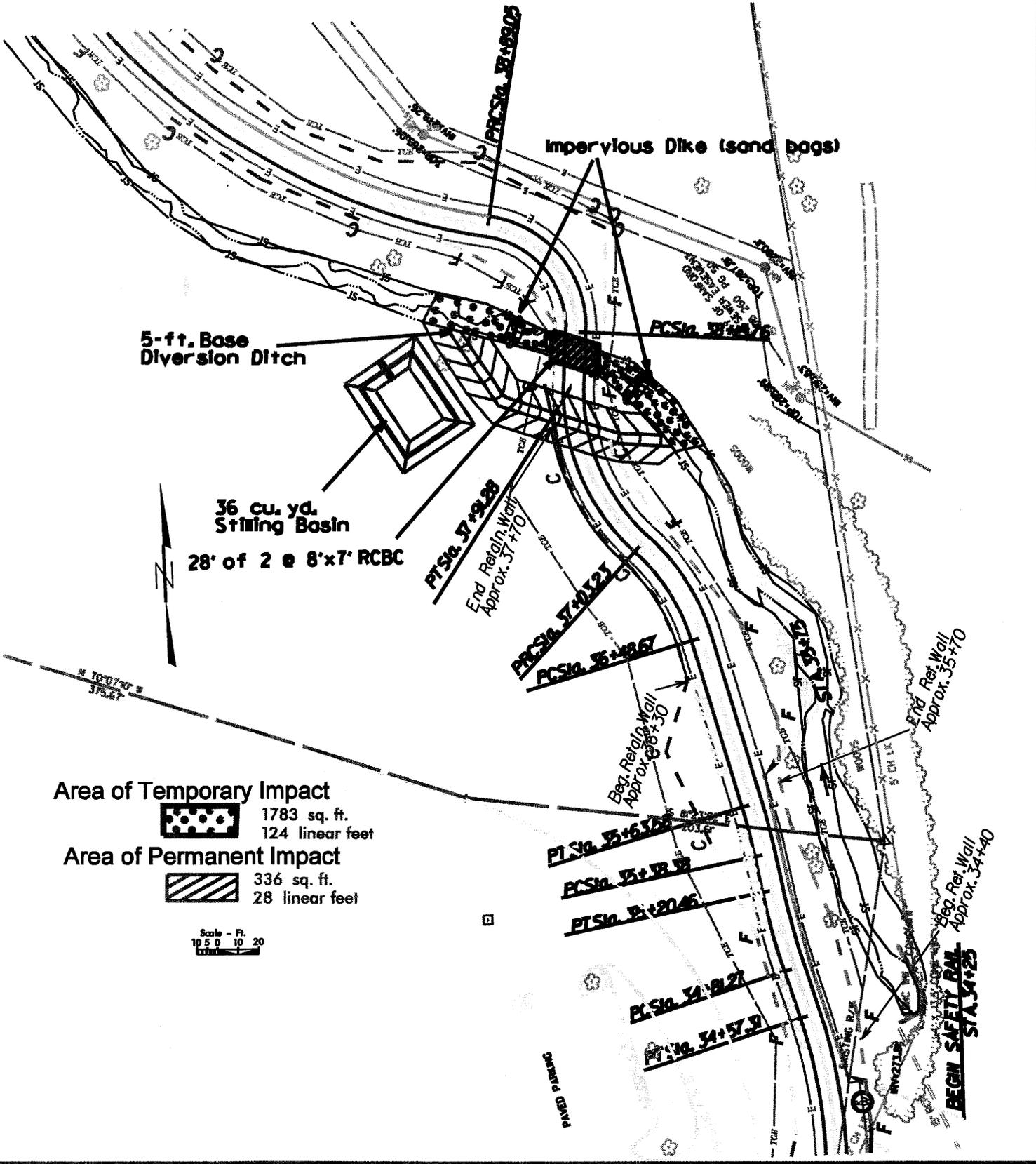
NC DEPARTMENT OF TRANSPORTATION  
DIVISION OF BICYCLE AND PEDESTRIAN

LEE COUNTY  
WBS - 33906.1.1 (E-4981)

SHEET 3 of 6

3/11/2008





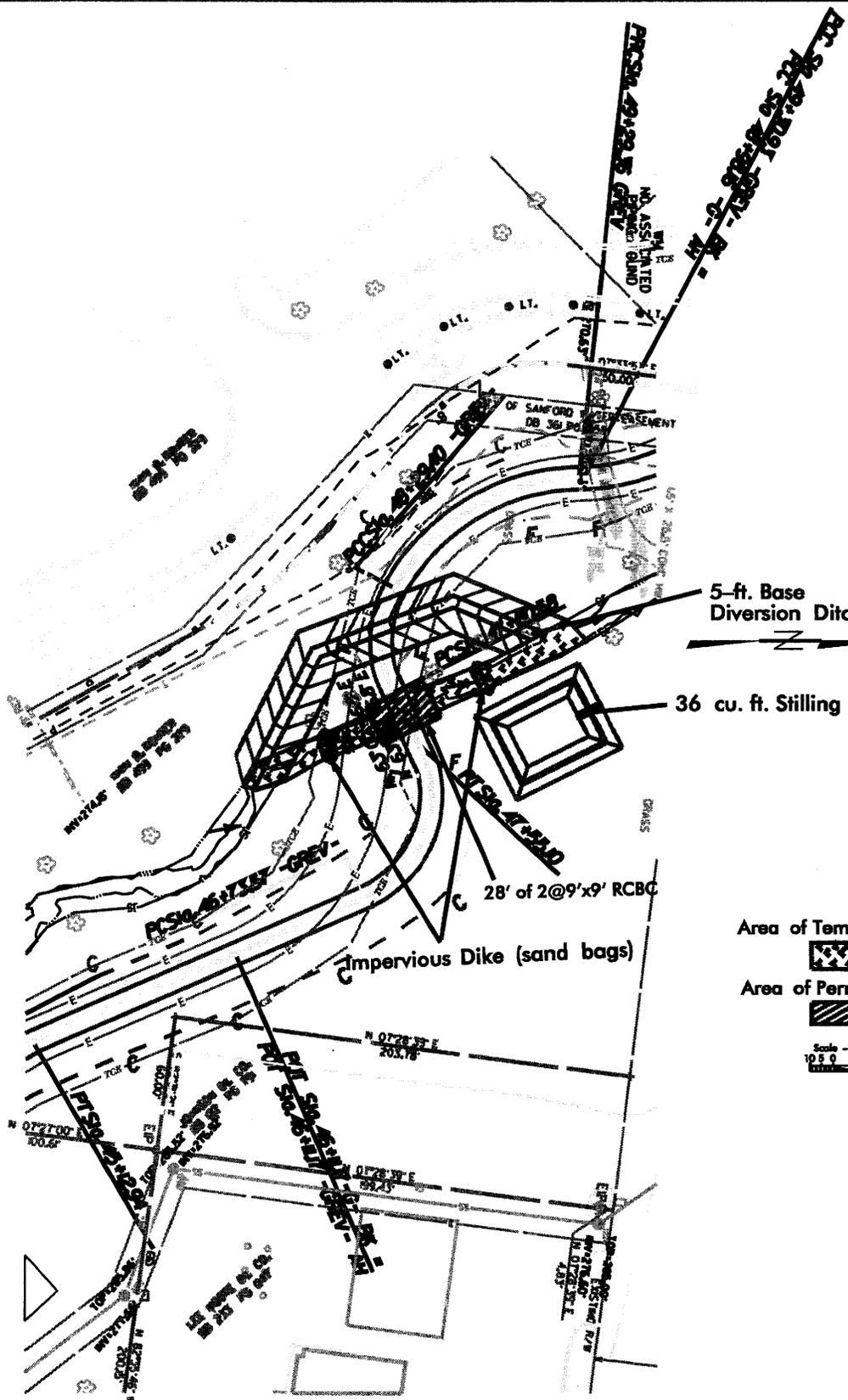
**Area of Temporary Impact**  
 1783 sq. ft.  
 124 linear feet

**Area of Permanent Impact**  
 336 sq. ft.  
 28 linear feet

Scale - Ft.  
 0 5 10 20

Site 1

N.C. DEPT. OF TRANSPORTATION  
 DIVISION OF BICYCLE AND PEDESTRIAN  
 CITY OF RALEIGH, WAKE COUNTY  
 PROJECT TIP NO. E-4981  
 ENDOR FURNACE GREENWAY, PHASE 1  
 SHEET 5 OF 6 02/25/2008



5-ft. Base  
Diversion Ditch

36 cu. ft. Stilling Basin

28' of 2@9'x9' RCBC

Impervious Dike (sand bags)

Area of Temporary Impact  
 1495 sq. ft.  
 132 linear feet

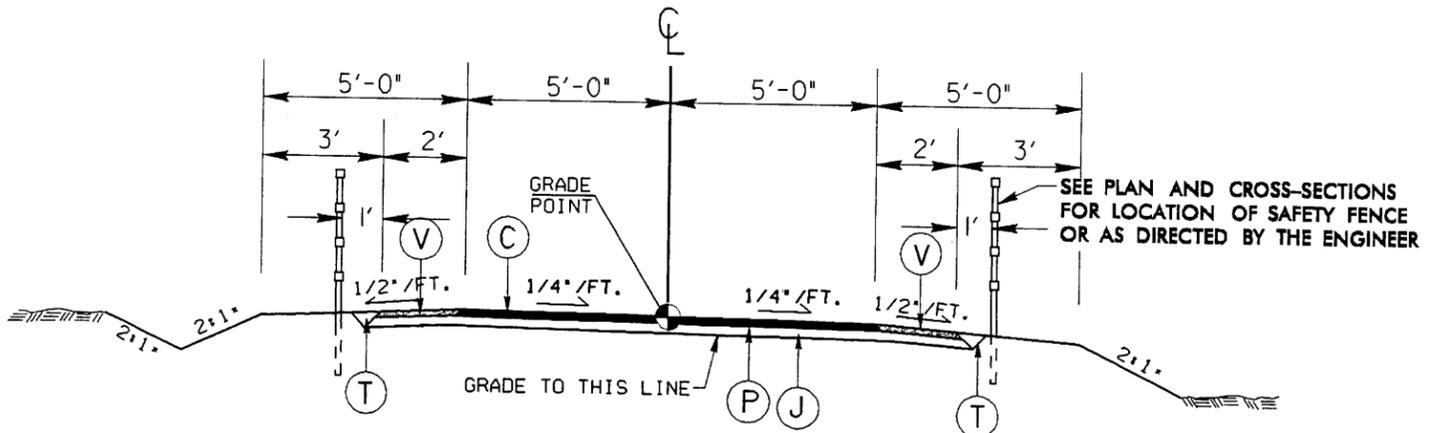
Area of Permanent Impact  
 504 sq. ft.  
 28 linear feet

Scale - Ft.  
 10 5 0 10 20

Site 2

N.C. DEPT. OF TRANSPORTATION  
 DIVISION OF BICYCLE AND PEDESTRIAN  
 CITY OF RALEIGH, WAKE COUNTY  
 PROJECT TIP NO. E-4861  
 ENDORURNACE GREENWAY, PHASE 1  
 SHEET 6 OF 6 02/28/2008

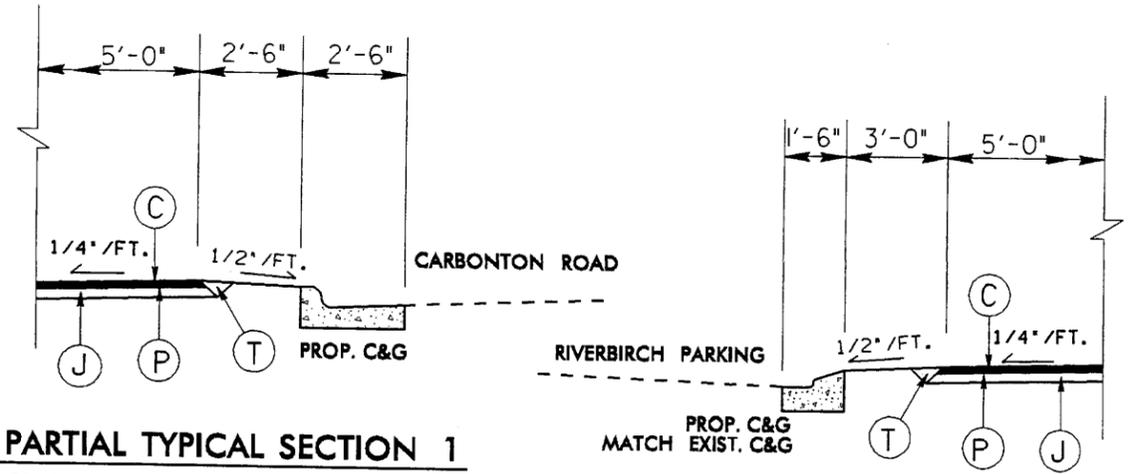




\* SEE CROSS-SECTIONS FOR SIDE SLOPES  
\*\* SEE PARTIAL TYPICAL SECTIONS 1, 2 & 3

**TYPICAL SECTION NO. 1**

FROM STA. 10+00 TO STA. 15+68.85\*\*  
FROM STA. 16+03.13 TO STA. 17+85.36  
FROM STA. 19+72.50 TO STA. 49+97.23\*\*  
FROM STA. 53+65.11 TO STA. 65+20.50 (BEGIN BRIDGE)  
FROM STA. 65+95.50 (END BRIDGE) TO STA. 85+41.64

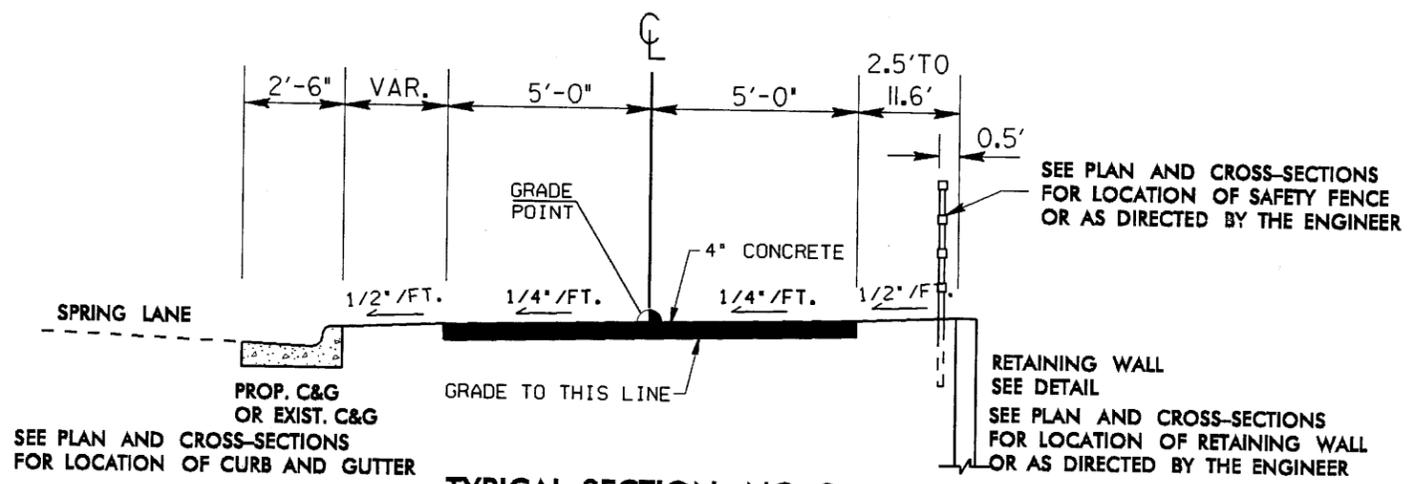


**PARTIAL TYPICAL SECTION 1**

FROM STA. 10+00 TO STA. 15+68.85

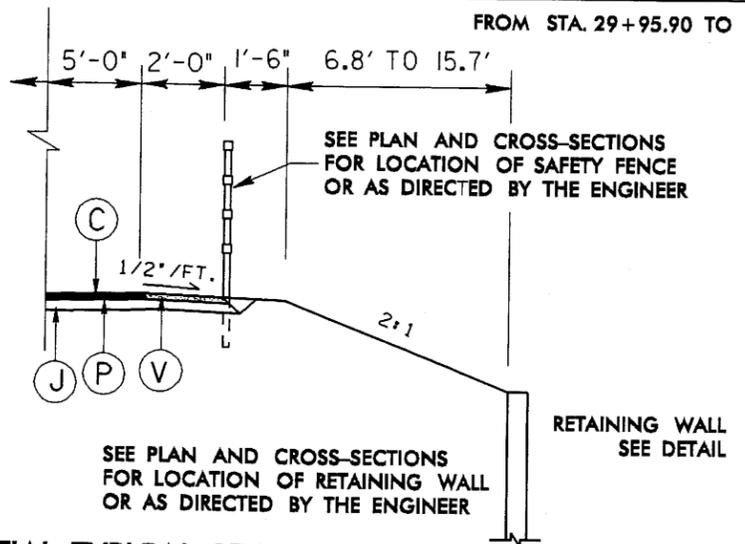
**PARTIAL TYPICAL SECTION 2**

FROM STA. 29+95.90 TO STA. 30+85.50



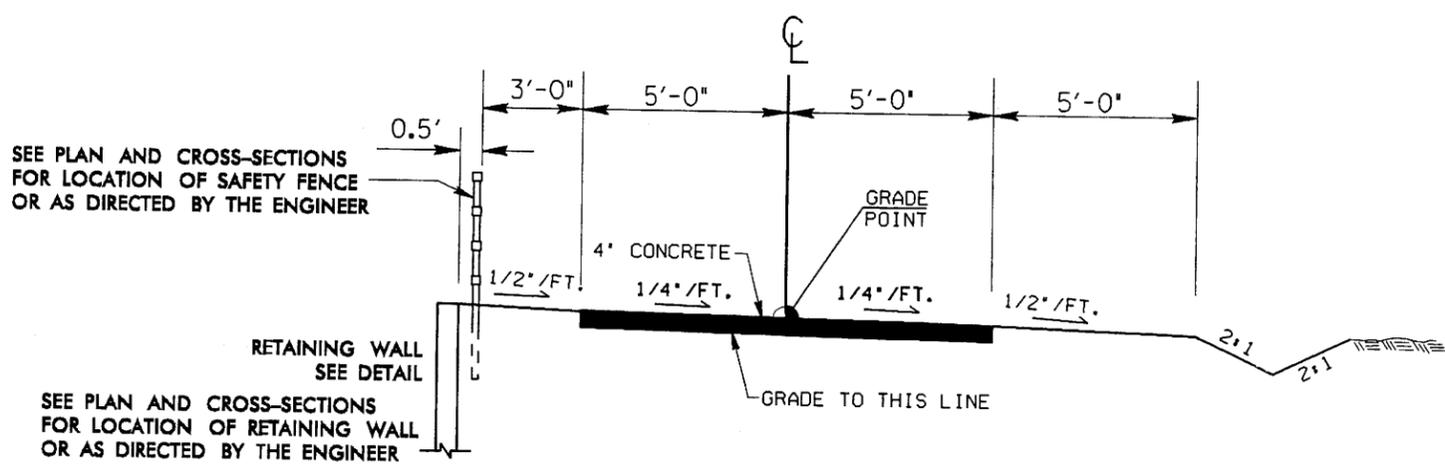
**TYPICAL SECTION NO. 2**

FROM STA. 50+43.25 TO STA. 51+08.57



**PARTIAL TYPICAL SECTION 3**

FROM STA. 34+40.00 TO STA. 35+70.00



**TYPICAL SECTION NO. 3**

FROM STA. 51+68.30 TO STA. 53+65.11

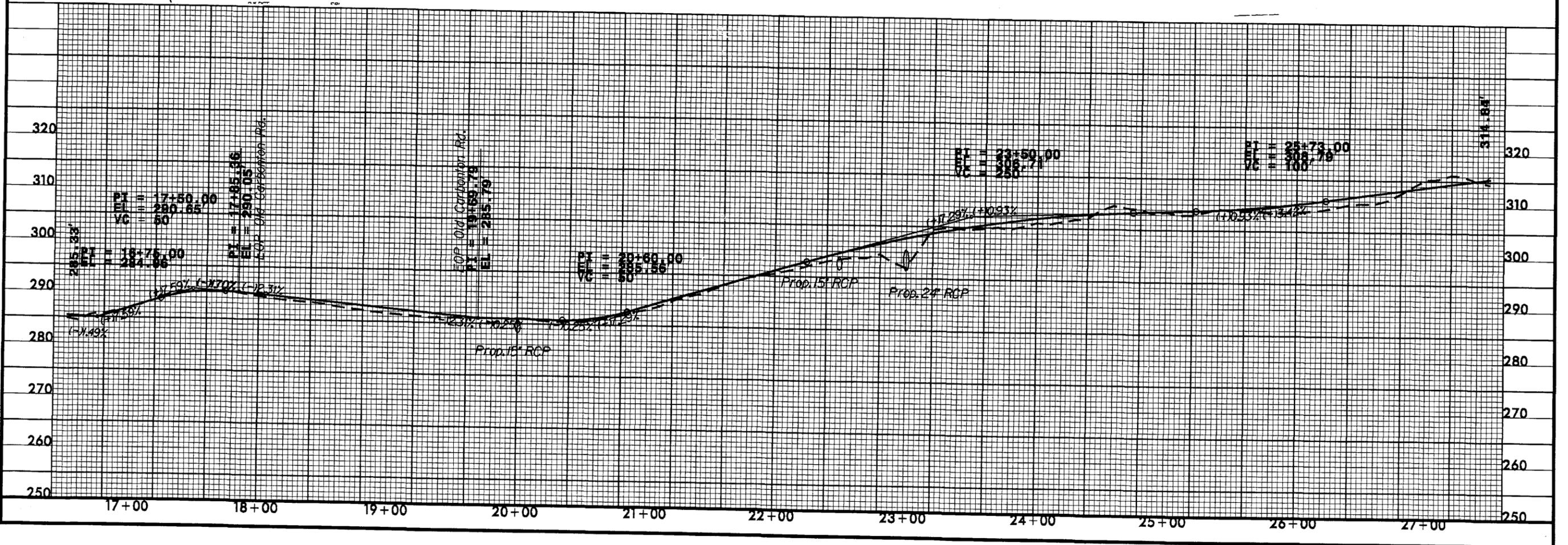
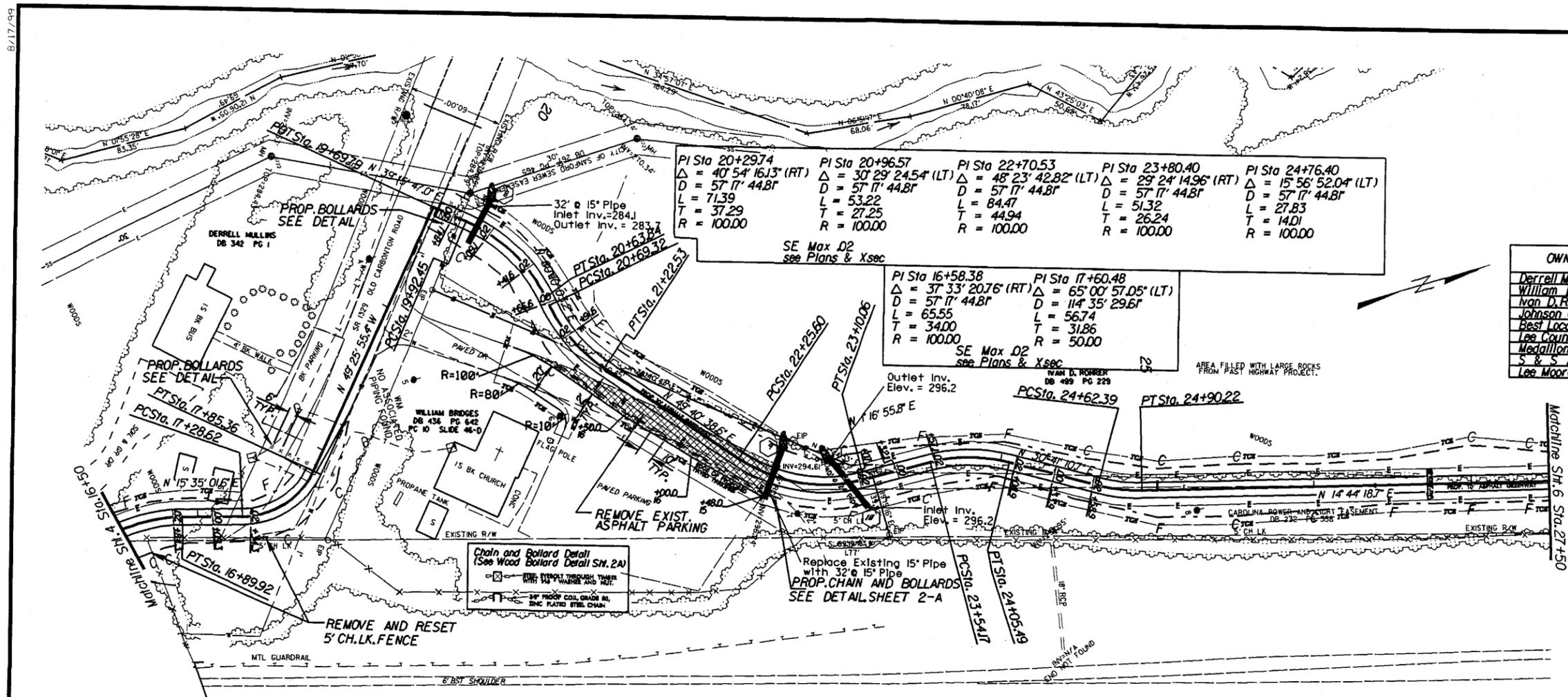
PAVEMENT SCHEDULE	
C	PROP. APPROX. 2" BIT. CONC. SURFACE COURSE. TYPE SF 9.5 A. AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
J	PROP. 6" AGGREGATE BASE COURSE.
P	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YD.
T	EARTH MATERIAL
V	PROPOSED APPROXIMATE 2" OF SELECT GRANULAR MATERIAL.

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1.

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OWNER	EASEMENT (SF/AC)	TEMP. EASEMENT (SF/AC)
Derrell Mullins	1762/0040	592/0014
William Bridges	5218/0120	4497/0103
Ivan D. Rohrer	55842/1282	59364/1363
Johnson Oil Co.	-	161/0004
Best Locations	2879/0066	4223/0091
Lee County	-	2542/0081
Medallion Partners	10667/0245	6508/0149
S & S Associates	2411/0554	19166/0454
Lee Moore Oil Co.	4138/0095	4151/0095



21-FEB-2008 09:41 R:\E\681\Endor\_Furcose\Trail\PlanSheets\E4981.sh5.dgn  
 8/17/99

8.17.199

PI Sta 30+02.64 Δ = 30° 18' 38.70" (RT) D = 60' 18" 40.85" L = 50.26 T = 25.73 R = 95.00	PI Sta 30+62.13 Δ = 28° 48' 28.18" (LT) D = 60' 18" 40.85" L = 47.77 T = 24.40 R = 95.00	PI Sta 31+44.71 Δ = 43° 05' 04.74" (RT) D = 38' 11" 49.87" L = 112.80 T = 59.21 R = 150.00	PI Sta 33+40.78 Δ = 59° 21' 51.04" (LT) D = 22' 55' 05.92" L = 259.03 T = 142.49 R = 250.00	PI Sta 35+00.89 Δ = 6° 24' 58.07" (RT) D = 16' 22' 12.80" L = 39.19 T = 19.62 R = 350.00	PI Sta 35+50.99 Δ = 4° 48' 51.08" (LT) D = 19' 05' 54.94" L = 25.21 T = 12.61 R = 300.00	PI Sta 36+76.65 Δ = 31° 15' 56.29" (LT) D = 57' 17" 44.81" L = 54.57 T = 27.98 R = 100.00	PI Sta 37+50.34 Δ = 50° 26' 43.41" (RT) D = 57' 17" 44.81" L = 88.04 T = 47.10 R = 100.00	PI Sta 38+60.77 Δ = 83° 58' 47.78" (LT) D = 114' 35' 29.61" L = 73.29 T = 45.00 R = 50.00
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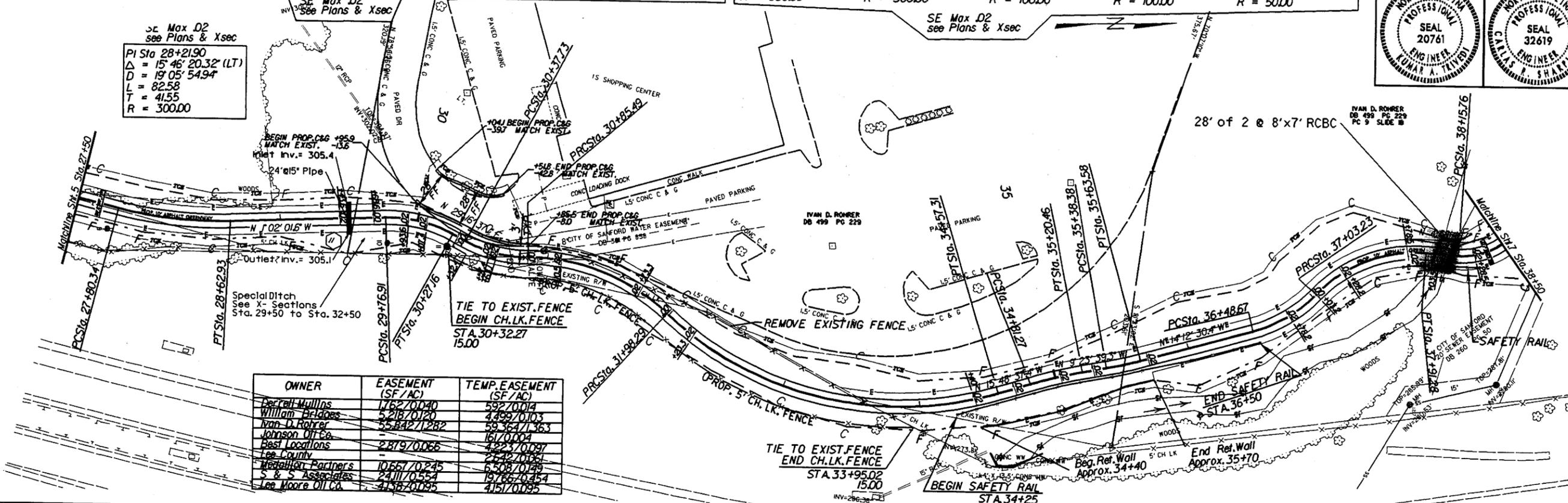
SE Max D2  
see Plans & Xsec

SE Max D2  
see Plans & Xsec

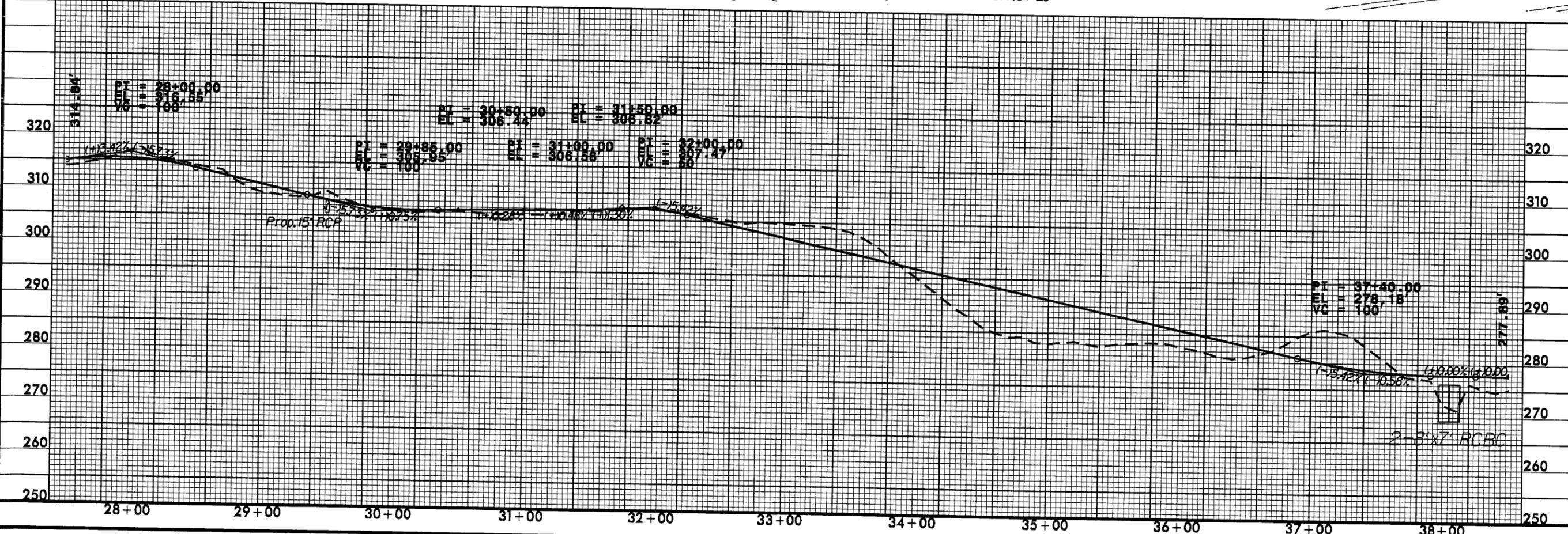
SE Max D2  
see Plans & Xsec

PI Sta 28+21.90  
Δ = 15° 46' 20.32" (LT)  
D = 19' 05' 54.94"  
L = 82.58  
T = 41.55  
R = 300.00

PROJECT REFERENCE NO. E-4981	SHEET NO. 6
RW SHEET NO.	
FACILITY DESIGN ENGINEER KUMAR, RAJENDR	HYDRAULICS ENGINEER KUMAR, RAJENDR
SEAL 20761	SEAL 32619



OWNER	EASEMENT (SF/AC)	TEMP. EASEMENT (SF/AC)
Dezell Mullins	1762/0040	592/0014
William Bridges	5218/0120	4489/0103
Ivan D. Rohrer	55842/1282	58364/1363
Johnson Oil Co.		161/0001
Best Locations	2819/0066	4223/0091
Lee County		242/0061
Medallion Partners	10667/0045	6508/0149
S & S Associates	24111/0154	19766/0454
Lee Moore Oil Co.	4156/0095	4151/0095



8.17.1998 09:44  
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OWNER	EASEMENT (SF/AC)	TEMP. EASEMENT (SF/AC)
Derrell Mullins	1762/0040	592/0014
William Bridges	5218/0120	4309/0103
Ivan D. Rohrer	55,842/1282	59,363/1363
Johnson Oil Co.	-	161/0004
Best Locations	2,819/0086	4,223/0097
Lee County	-	2,642/0061
Medallion Partners	10,667/0245	6,508/0149
S & S Associates	24,111/0554	19,166/0454
Lee Moore Oil Co.	4,138/0095	4,151/0095

PROJECT REFERENCE NO. E-4981 SHEET NO. 7

R/W SHEET NO.

FACILITY DESIGN ENGINEER

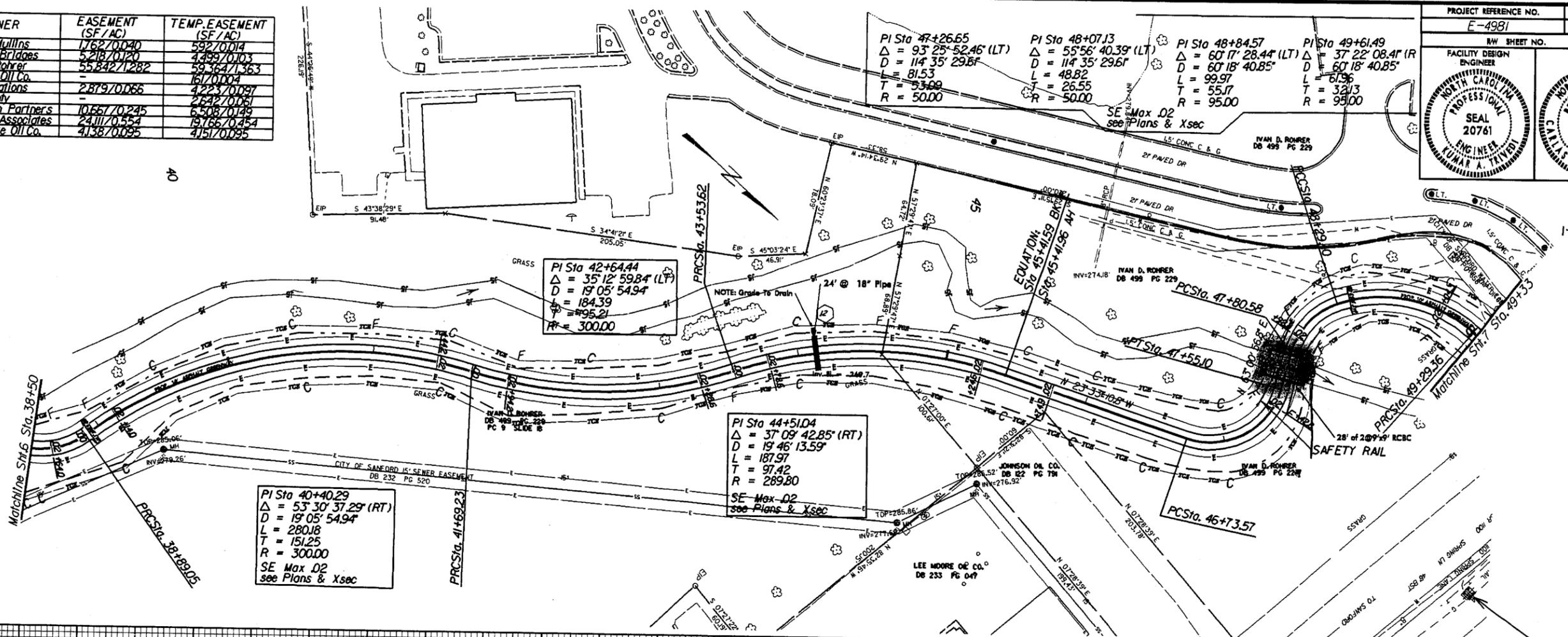
HYDRAULICS ENGINEER

SEAL 20761

SEAL 32619

IVAN D. ROHRER DB 498 PG 229

KUMAR A. TRIVEDI



PI Sta 42+64.44  
 $\Delta = 35^\circ 12' 59.84" (LT)$   
 $D = 19^\circ 05' 54.94"$   
 $L = 184.39$   
 $T = 95.21$   
 $R = 300.00$

PI Sta 44+51.04  
 $\Delta = 37^\circ 09' 42.85" (RT)$   
 $D = 19^\circ 46' 13.59"$   
 $L = 187.97$   
 $T = 97.42$   
 $R = 289.80$   
 SE Max D2  
 see Plans & Xsec

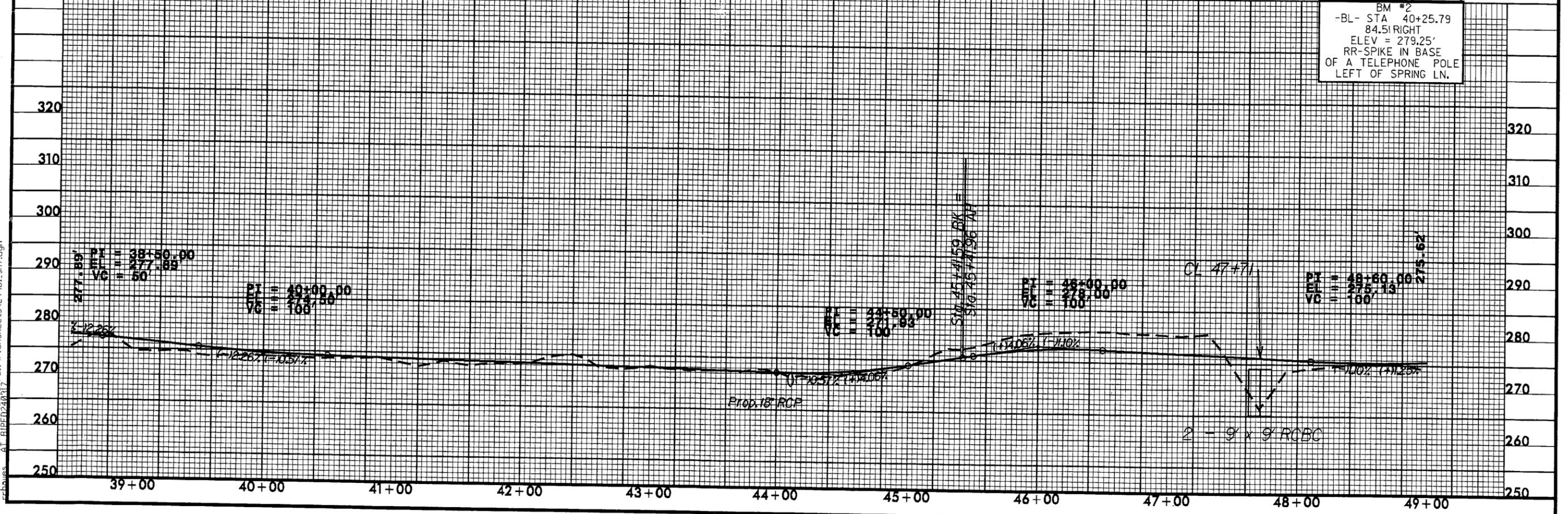
PI Sta 40+40.29  
 $\Delta = 53^\circ 30' 37.29" (RT)$   
 $D = 19^\circ 05' 54.94"$   
 $L = 280.18$   
 $T = 151.25$   
 $R = 300.00$   
 SE Max D2  
 see Plans & Xsec

PI Sta 47+26.65  
 $\Delta = 93^\circ 25' 52.46" (LT)$   
 $D = 114^\circ 35' 29.61"$   
 $L = 81.53$   
 $T = 53.00$   
 $R = 50.00$

PI Sta 48+07.13  
 $\Delta = 55^\circ 56' 40.39" (LT)$   
 $D = 114^\circ 35' 29.61"$   
 $L = 48.82$   
 $T = 26.55$   
 $R = 50.00$

PI Sta 48+84.57  
 $\Delta = 60^\circ 17' 28.44" (LT)$   
 $D = 60^\circ 18' 40.85"$   
 $L = 99.97$   
 $T = 55.17$   
 $R = 95.00$

PI Sta 49+61.49  
 $\Delta = 37^\circ 22' 08.41" (R)$   
 $D = 60^\circ 18' 40.85"$   
 $L = 61.96$   
 $T = 32.13$   
 $R = 95.00$



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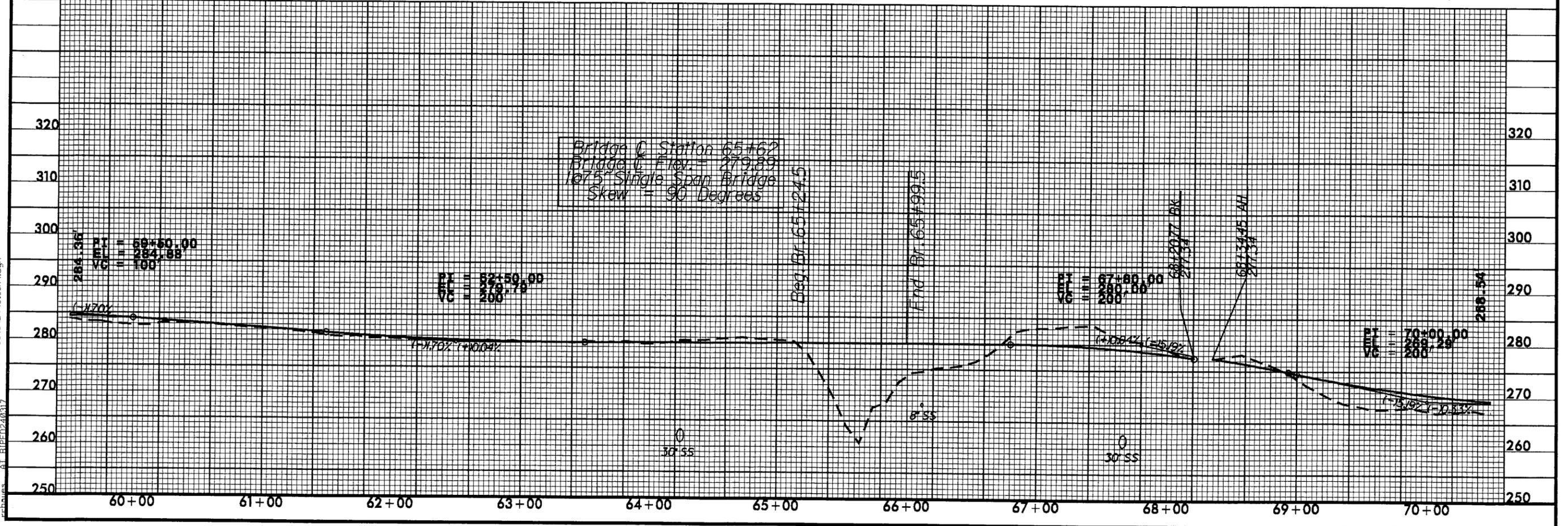
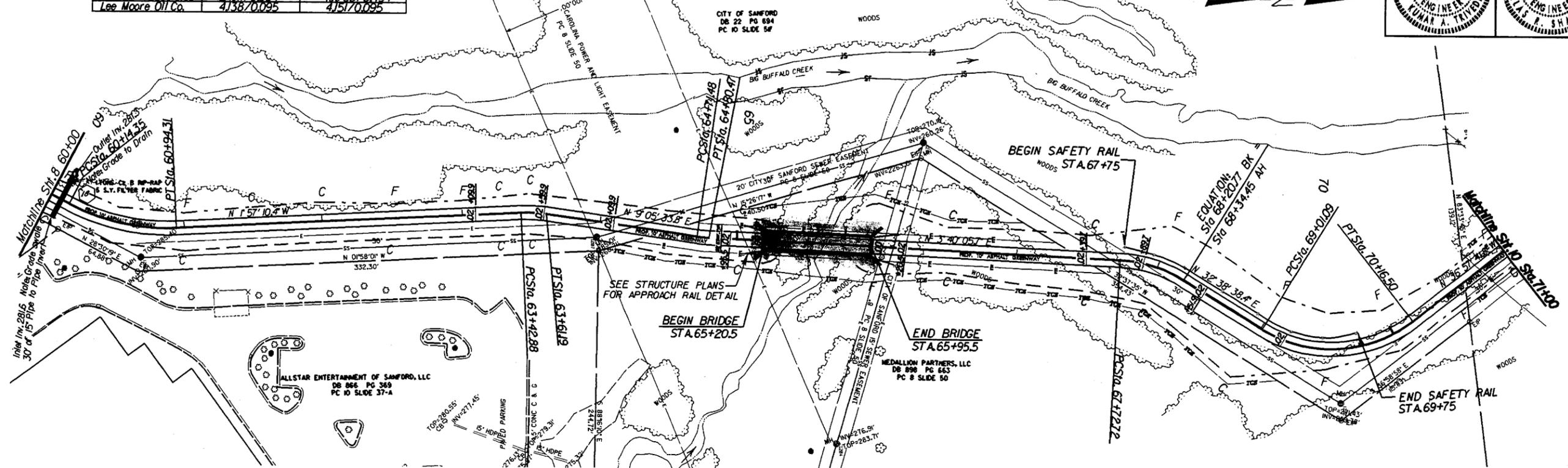
OWNER	EASEMENT (SF/AC)	TEMP. EASEMENT (SF/AC)
Derrell Mullins	1762/0.040	592/0.014
William Bridges	5218/0.120	4499/0.103
Nan D. Rotter	55842/1.282	59364/1.363
Johnson Oil Co.		161/0.004
Best Locations	2879/0.066	4223/0.091
Lee County		2542/0.061
Medallion Partners	10661/0.245	6508/0.148
S & S Associates	2411/0.054	19766/0.454
Lee Moore Oil Co.	4136/0.095	4151/0.095

PI Sta 63+52.07 Δ = 11°02' 44.22" (RT) D = 60' 18" 40.85" L = 18.31 T = 9.19 R = 95.00	PI Sta 64+75.98 Δ = 5' 25" 28.09" (LT) D = 60' 18" 40.85" L = 8.99 T = 4.50 R = 95.00	PI Sta 67+97.27 Δ = 28' 58" 32.36" (RT) D = 60' 18" 40.85" L = 46.04 T = 24.55 R = 95.00
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SE Max D2  
see Plans & Xsec

PI Sta 69+67.13 Δ = 69' 36" 19.86" (LT) D = 60' 18" 40.85" L = 115.41 T = 66.03 R = 95.00
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PROJECT REFERENCE NO. E-4981	SHEET NO. 9
RAW SHEET NO.	
FACILITY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 20761 LUNAR A. TRIVEDI	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 32619 R. SHARPLESS

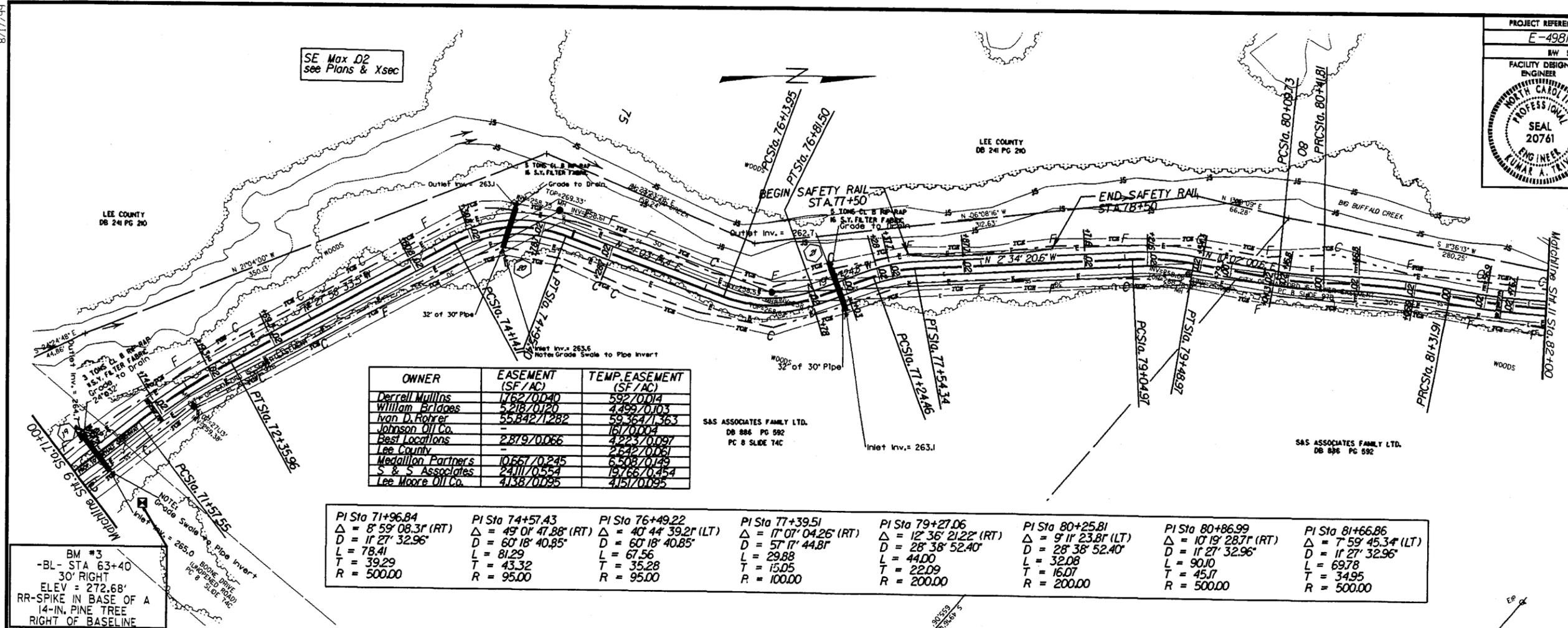


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8/17/99

PROJECT REFERENCE NO. E-4981	SHEET NO. 10
REV SHEET NO.	
FACILITY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 20761 KIMAR A. TRIVEDI	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 32619 C. SHARPLESS

SE Max D2  
see Plans & Xsec



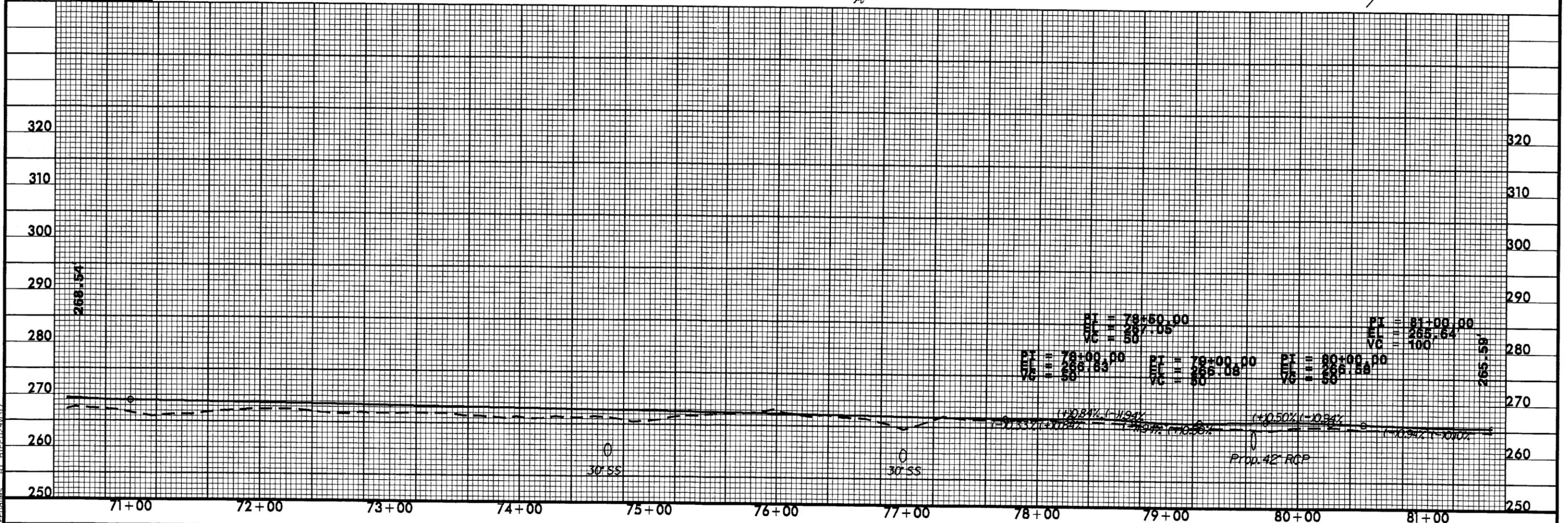
OWNER	EASEMENT (SF/AC)	TEMP. EASEMENT (SF/AC)
Derrill Mullins	1762/0040	592/0014
William Bridges	5218/0120	4499/0103
Ivan D. Rohrer	55842/1282	59364/1363
Johnson Oil Co.	-	161/0004
Best Locations	2819/0066	4223/0097
Lee County	-	2642/0061
Medallion Partners	10667/0245	6509/0149
S & S Associates	24111/0354	19768/0454
Lee Moore Oil Co.	4138/0095	4151/0095

S&S ASSOCIATES FAMILY LTD.  
DB 886 PG 992  
PC 8 SLIDE 74C

S&S ASSOCIATES FAMILY LTD.  
DB 886 PG 992

PI Sta 71+96.84 Δ = 8° 59' 08.3" (RT) D = 11' 27" 32.96" L = 78.41 T = 39.29 R = 500.00	PI Sta 74+57.43 Δ = 49° 01' 47.88" (RT) D = 60' 18" 40.95" L = 81.29 T = 43.32 R = 95.00	PI Sta 76+49.22 Δ = 40° 44' 39.2" (LT) D = 60' 18" 40.85" L = 67.56 T = 35.28 R = 95.00	PI Sta 77+39.51 Δ = 17° 07' 04.26" (RT) D = 57' 17" 44.81" L = 29.88 T = 15.05 R = 100.00	PI Sta 79+27.06 Δ = 12° 36' 21.22" (RT) D = 28' 38" 52.40" L = 44.00 T = 22.09 R = 200.00	PI Sta 80+25.81 Δ = 9° 11' 23.81" (LT) D = 28' 38" 52.40" L = 32.08 T = 16.07 R = 200.00	PI Sta 80+86.99 Δ = 10° 19' 28.71" (RT) D = 11' 27" 32.96" L = 90.10 T = 45.17 R = 500.00	PI Sta 81+66.86 Δ = 7° 59' 45.34" (LT) D = 11' 27" 32.96" L = 69.78 T = 34.95 R = 500.00
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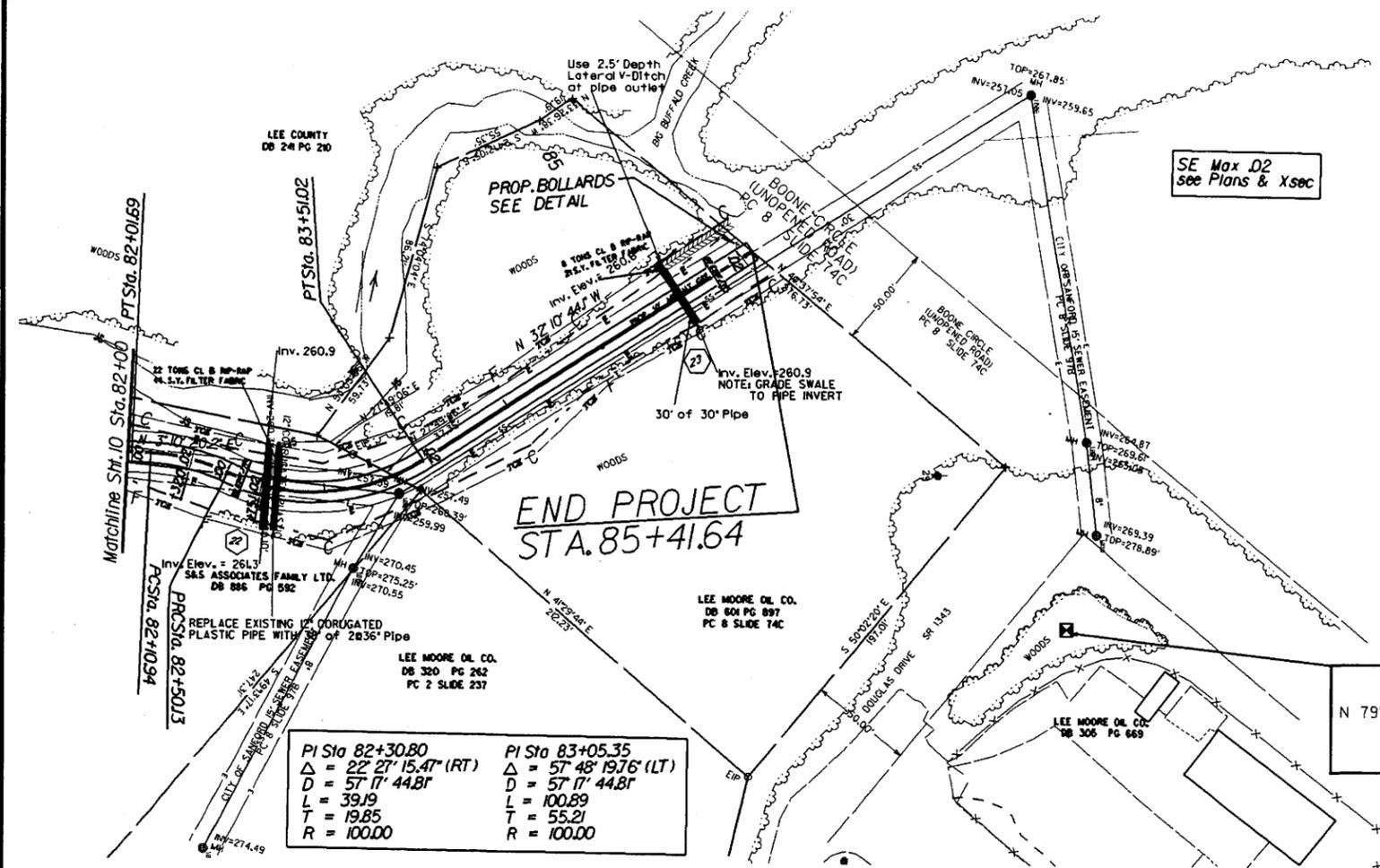
BM #3  
-BL- STA 63+40  
30' RIGHT  
ELEV = 272.68'  
RR-SPIKE IN BASE OF A  
14-IN. PINE TREE  
RIGHT OF BASELINE



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8/17/99

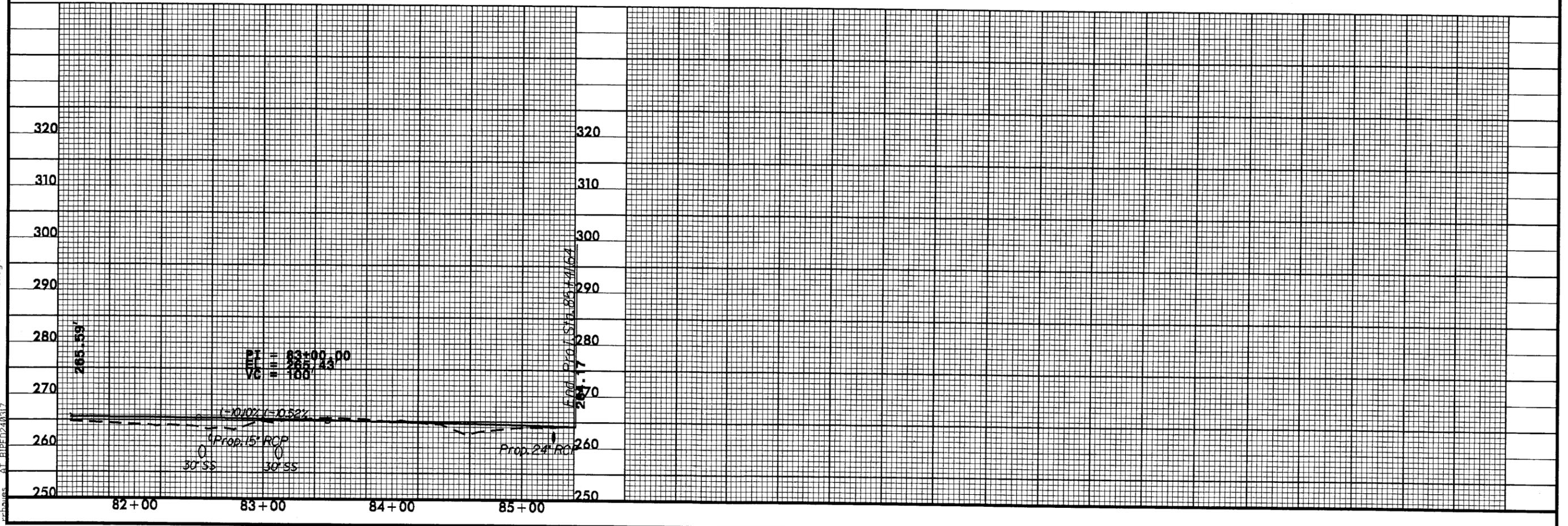
PROJECT REFERENCE NO. E-4981	SHEET NO. 11
NW SHEET NO.	
FACILITY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20761 KUMAR A. TRIVEDI	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 32619 CALLEAS P. SHARPLESS



PI Sta 82+30.80 Δ = 22° 27' 15.47" (RT) D = 57' 17" 44.81" L = 39.19 T = 19.85 R = 100.00	PI Sta 83+05.35 Δ = 57° 48' 19.76" (LT) D = 57' 17" 44.81" L = 100.89 T = 55.21 R = 100.00
--	---

OWNER	EASEMENT (SF/AC)	TEMP. EASEMENT (SF/AC)
Darrell Mullins	176270040	59270014
William Bridges	521870120	449970103
Ivan D. Rohrer	5584271282	5936471363
Johnson Oil Co.	-	1670004
Best Locations	287970066	422370097
Lee County	-	264270161
Medallion Partners	106670245	650870149
S & S Associates	241170554	1976670454
Lee Moore Oil Co.	413870095	41570095

BM #4  
BL STA 78+96.44  
N 79° 45' 53.5" E DIST 50.74'  
ELEV = 286.28'  
RR-SPIKE IN BASE  
OF 10-IN. POPLAR TREE



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 8/17/99

**APPROVED JURISDICTIONAL DETERMINATION FORM**  
**U.S. Army Corps of Engineers**

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

**SECTION I: BACKGROUND INFORMATION**

**A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):**

**B. DISTRICT OFFICE, FILE NAME, AND NUMBER: E-4981 - Endor Iron Furnace Greenway (Phase I) in Sanford**

**C. PROJECT LOCATION AND BACKGROUND INFORMATION:** form for Unnamed Tributaries (UT) 1 and 2 to Big Buffalo Creek (BBC).

State: NC County/parish/borough: Lee City: Sanford  
Center coordinates of site (lat/long in degree decimal format): Lat. ° **Pick List**, Long. ° **Pick List**.  
Universal Transverse Mercator: 17 663166E 3928621N

Name of nearest waterbody: Big Buffalo Creek

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Big Buffalo Creek flows into Deep River

Name of watershed or Hydrologic Unit Code (HUC): 03030003

Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

Check if other sites (e.g., offsite mitigation sites, disposal sites, etc...) are associated with this action and are recorded on a different JD form.

**D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**

Office (Desk) Determination. Date:

Field Determination. Date(s):

**SECTION II: SUMMARY OF FINDINGS**

**A. RHA SECTION 10 DETERMINATION OF JURISDICTION.**

There **Are no** "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [Required]

Waters subject to the ebb and flow of the tide.

Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

Explain:

**B. CWA SECTION 404 DETERMINATION OF JURISDICTION.**

There **Are** "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [Required]

**1. Waters of the U.S.**

**a. Indicate presence of waters of U.S. in review area (check all that apply):<sup>1</sup>**

- TNWs, including territorial seas
- Wetlands adjacent to TNWs
- Relatively permanent waters<sup>2</sup> (RPWs) that flow directly or indirectly into TNWs
- Non-RPWs that flow directly or indirectly into TNWs
- Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
- Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
- Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- Impoundments of jurisdictional waters
- Isolated (interstate or intrastate) waters, including isolated wetlands

**b. Identify (estimate) size of waters of the U.S. in the review area:**

Non-wetland waters: 427 linear feet: width (ft) and/or acres.

Wetlands: acres.

**c. Limits (boundaries) of jurisdiction based on: **Established by OHWM.****

Elevation of established OHWM (if known):

**2. Non-regulated waters/wetlands (check if applicable):<sup>3</sup>**

Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.

Explain:

<sup>1</sup> Boxes checked below shall be supported by completing the appropriate sections in Section III below.

<sup>2</sup> For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

<sup>3</sup> Supporting documentation is presented in Section III.F.

### SECTION III: CWA ANALYSIS

#### A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW

Identify TNW:

Summarize rationale supporting determination:

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is "adjacent":

#### B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody<sup>4</sup> is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

##### 1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size:

Pick List

Drainage area:

Pick List

Average annual rainfall: inches

Average annual snowfall: inches

(ii) Physical Characteristics:

(a) Relationship with TNW:

Tributary flows directly into TNW.

Tributary flows through Pick List tributaries before entering TNW.

Project waters are Pick List river miles from TNW.

Project waters are Pick List river miles from RPW.

Project waters are Pick List aerial (straight) miles from TNW.

Project waters are Pick List aerial (straight) miles from RPW.

Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW<sup>5</sup>:

Tributary stream order, if known:

<sup>4</sup> Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

<sup>5</sup> Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

- Tributary is:**  Natural  
 Artificial (man-made). Explain:  
 Manipulated (man-altered). Explain:

**Tributary properties with respect to top of bank (estimate):**

Average width:        feet  
Average depth:        feet  
Average side slopes: **Pick List**.

**Primary tributary substrate composition (check all that apply):**

- |  |  |                                   |
|--|--|-----------------------------------|
| <input type="checkbox"/> Silts           | <input type="checkbox"/> Sands                     | <input type="checkbox"/> Concrete |
| <input type="checkbox"/> Cobbles         | <input type="checkbox"/> Gravel                    | <input type="checkbox"/> Muck     |
| <input type="checkbox"/> Bedrock         | <input type="checkbox"/> Vegetation. Type/% cover: |                                   |
| <input type="checkbox"/> Other. Explain: |  |                                   |

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:

Presence of run/riffle/pool complexes. Explain:

Tributary geometry: **Pick List**

Tributary gradient (approximate average slope):        %

(c) Flow:

Tributary provides for: **Pick List**

Estimate average number of flow events in review area/year: **Pick List**

Describe flow regime:

Other information on duration and volume:

Surface flow is: **Pick List**. Characteristics:

Subsurface flow: **Pick List**. Explain findings:

- Dye (or other) test performed:

**Tributary has (check all that apply):**

- |   |   |
|---|---|
| <input type="checkbox"/> Bed and banks  |   |
| <input type="checkbox"/> OHWM <sup>6</sup> (check all indicators that apply): |   |
| <input type="checkbox"/> clear, natural line impressed on the bank            | <input type="checkbox"/> the presence of litter and debris          |
| <input type="checkbox"/> changes in the character of soil                     | <input type="checkbox"/> destruction of terrestrial vegetation      |
| <input type="checkbox"/> shelving   | <input type="checkbox"/> the presence of wrack line                 |
| <input type="checkbox"/> vegetation matted down, bent, or absent              | <input type="checkbox"/> sediment sorting                           |
| <input type="checkbox"/> leaf litter disturbed or washed away                 | <input type="checkbox"/> scour                                      |
| <input type="checkbox"/> sediment deposition                                  | <input type="checkbox"/> multiple observed or predicted flow events |
| <input type="checkbox"/> water staining                                       | <input type="checkbox"/> abrupt change in plant community           |
| <input type="checkbox"/> other (list):  |   |
| <input type="checkbox"/> Discontinuous OHWM. <sup>7</sup> Explain:            |   |

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> High Tide Line indicated by:   | <input checked="" type="checkbox"/> Mean High Water Mark indicated by: |
| <input type="checkbox"/> oil or scum line along shore objects      | <input type="checkbox"/> survey to available datum;                    |
| <input type="checkbox"/> fine shell or debris deposits (foreshore) | <input type="checkbox"/> physical markings;                            |
| <input type="checkbox"/> physical markings/characteristics         | <input type="checkbox"/> vegetation lines/changes in vegetation types. |
| <input type="checkbox"/> tidal gauges                              |  |
| <input type="checkbox"/> other (list):                             |  |

(iii) **Chemical Characteristics:**

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain:

Identify specific pollutants, if known:

<sup>6</sup>A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

<sup>7</sup>Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- Riparian corridor. Characteristics (type, average width):
- Wetland fringe. Characteristics:
- Habitat for:
  - Federally Listed species. Explain findings:
  - Fish/spawn areas. Explain findings:
  - Other environmentally-sensitive species. Explain findings:
  - Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size:        acres

Wetland type. Explain:

Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain:

Surface flow is: **Pick List**

Characteristics:

Subsurface flow: **Pick List**. Explain findings:

Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

- Directly abutting
- Not directly abutting
  - Discrete wetland hydrologic connection. Explain:
  - Ecological connection. Explain:
  - Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List**.

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- Riparian buffer. Characteristics (type, average width):
- Vegetation type/percent cover. Explain:
- Habitat for:
  - Federally Listed species. Explain findings:
  - Fish/spawn areas. Explain findings:
  - Other environmentally-sensitive species. Explain findings:
  - Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately (        ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)

Size (in acres)

Directly abuts? (Y/N)

Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

### C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

**Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:**

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:
2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:
3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

### D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:

TNWs: linear feet width (ft), Or, acres.  
 Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**

- Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: There are two RPWs associated with this project. Water flows within Unnamed Tributaries (UT) 1 and 2 to BBC year-round. Additionally, the tributaries have established, stable banks and possessed several geomorphological and hydrological indicators indicative of perennial tributaries. UTs 1 and 2 flow into BBC and BBC flows into the Deep River.
- Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):

- Tributary waters: 427 linear feet width (ft).
- Other non-wetland waters: acres.

Identify type(s) of waters: .

3. **Non-RPWs<sup>8</sup> that flow directly or indirectly into TNWs.**

- Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):

- Tributary waters: linear feet width (ft).
- Other non-wetland waters: acres.

Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**

- Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
- Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
- Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**

- Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**

- Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.<sup>9</sup>**

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

- Demonstrate that impoundment was created from "waters of the U.S.," or
- Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
- Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):<sup>10</sup>**

- which are or could be used by interstate or foreign travelers for recreational or other purposes.
- from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- which are or could be used for industrial purposes by industries in interstate commerce.
- Interstate isolated waters. Explain: .
- Other factors. Explain: .

<sup>8</sup>See Footnote # 3.

<sup>9</sup>To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

<sup>10</sup>Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

**Identify water body and summarize rationale supporting determination:**

Provide estimates for jurisdictional waters in the review area (check all that apply):

- Tributary waters:        linear feet        width (ft).
- Other non-wetland waters:        acres.  
Identify type(s) of waters:        .
- Wetlands:        acres.

**F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):**

- If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:        .
- Other: (explain, if not covered above):        .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- Non-wetland waters (i.e., rivers, streams):        linear feet        width (ft).
- Lakes/ponds:        acres.
- Other non-wetland waters:        acres. List type of aquatic resource:        .
- Wetlands:        acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

- Non-wetland waters (i.e., rivers, streams):        linear feet,        width (ft).
- Lakes/ponds:        acres.
- Other non-wetland waters:        acres. List type of aquatic resource:        .
- Wetlands:        acres.

**SECTION IV: DATA SOURCES.**

**A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):**

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - Office concurs with data sheets/delineation report.
  - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps:
  - Corps navigable waters' study:
  - U.S. Geological Survey Hydrologic Atlas:
    - USGS NHD data.
    - USGS 8 and 12 digit HUC maps.
  - U.S. Geological Survey map(s). Cite scale & quad name:        .
  - USDA Natural Resources Conservation Service Soil Survey. Citation:        .
  - National wetlands inventory map(s). Cite name:        .
  - State/Local wetland inventory map(s):        .
  - FEMA/FIRM maps:        .
  - 100-year Floodplain Elevation is:        (National Geodetic Vertical Datum of 1929)
  - Photographs:  Aerial (Name & Date):        .  
or  Other (Name & Date):        .
- Previous determination(s). File no. and date of response letter:        .
- Applicable/supporting case law:        .
- Applicable/supporting scientific literature:        .
- Other information (please specify):        .

**B. ADDITIONAL COMMENTS TO SUPPORT JD: No wetlands were located within the project study area.**

# Natural Resources Technical Report

## Phase I – Endor Iron Furnace Bicycle and Pedestrian Trail Lee County, North Carolina

TIP No. E-4981  
WBS Element No. 33906.1.1



The North Carolina Department of Transportation  
Project Development and Environmental Analysis Branch  
Raleigh, North Carolina

Prepared By:  
Jim Mason, Environmental Biologist  
Natural Environment Unit

July 2007

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**APPENDIX A: FIGURES**

- Figure 1. Project Vicinity and Study Area
- Figure 2a. Jurisdictional Streams and Terrestrial Communities
- Figure 2b. Jurisdictional Streams and Terrestrial Communities

**APPENDIX B: STREAM RATING FORMS**

## **1.0 INTRODUCTION**

The following Natural Resources Technical Report (NRTR) is submitted to assist in the preparation of a Categorical Exclusion (CE) for the proposed project. This project is located in Lee County, within the city limits of the City of Sanford (Figure 1).

### **1.1 Project Description**

The North Carolina Department of Transportation (NCDOT) proposes to construct the first phase of the Endor Iron Furnace Bicycle and Pedestrian Trail. The trail will begin at the Kiwanis Family Park on Carbondon Road (SR 1009) and run approximately 1.43 miles north to Boone Circle (an unopened road) (Figure 1). A portion of the trail will run adjacent to U.S. Route 1 (U.S. 1), while another portion will run along Big Buffalo Creek and one of its unnamed tributaries (UT 1). Based on preliminary plans, the trail will consist of a 10-foot wide asphalt path with 2-foot wide crushed stone shoulders. Curb and gutter work has also been proposed along Carbondon Road and where the path intersects Spring Lane (SR 1100). It is also expected that either culverts or bridges will be used to cross UT 1 to Big Buffalo Creek at three locations and UT 2 to Big Buffalo Creek at one location.

### **1.2 Purpose**

The purpose of this technical report is to inventory, catalog, describe, and quantify the various natural resources that may be impacted by the proposed action. Evaluations conducted for this study include: 1) an assessment of physical resources, including soil and water resources, 2) an assessment of biotic resources, including plant communities, aquatic habitats, terrestrial wildlife, and aquatic species, 3) an evaluation of waters of the U.S., including surface waters and wetlands, 4) an assessment of rare and protected species habitat, and 5) an evaluation of potential impacts resulting from construction, as well as recommendations for measures which may minimize resource impacts.

These assessments and estimates are relevant only in the context of existing preliminary design concepts and the current project study area. If design parameters, study area limits, or criteria change, additional field investigations will be required.

### **1.3 Methodology**

Research was conducted prior to field investigations. Information sources used in this research included the following:

- U.S. Geological Survey (USGS) 100K Quadrangle Map for Southern Pines and 24K Quadrangle Map for Sanford (SANFOR)
- 1998 Color-Infrared (IR) Digital Orthophotography 24K Quadrangle Map for Sanford
- U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory (NWI) maps
- Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service) Soil Survey of Lee County (1989)
- NRCS Soil Data Mart website

- USFWS list of federally protected species (website; last updated May 10 2007)
- N.C. Natural Heritage Program (NCNHP) database of state protected species, rare species, and rare habitats (website; last updated July 2,2007)
- NCNHP lists of rare plants and animals of North Carolina (2006)
- NCNHP County Inventory for Lee County (Cotterman 1996)
- N.C. Department of Environmental and Natural Resources (NCDENR), N.C. Division of Water Quality (NCDWQ), and N.C. Wildlife Resources Commission (NCWRC) resource information

Field visits were performed to determine the approximate boundaries of plant communities. These boundaries were transcribed onto aerial photography while in the field, then digitized in the office into ArcGIS shapefiles for use in mapmaking and data analysis. Communities were assessed within the project study area. Dominant plant species were identified in each stratum for each plant community. When necessary, Radford et al. (1968), Weakley (unpublished), and similar literature pertaining to the characteristics of vascular flora were used to assist in plant identification. When possible, plant community descriptions were based on the classifications utilized by Schafale and Weakly (1990). Jurisdictional waters were also examined during the current field investigation to determine aquatic habitat and wildlife.

Wildlife occurrences were determined through field observations, habitat evaluation within the project study area, the analysis of secondary indicators left by terrestrial and avian fauna (tracks, scat, burrows, nests, and evidence of feeding), as well as by performing reviews of supporting literature. Literature that was either reviewed or used in species identification included Elbroch (2003), Sibley (2000), Menhinick (1991), Webster, et al. (1985), and Martof, et al. (1980). The NCDWQ Stream Fish Community Assessment Program database was also utilized to assess ichthyofauna. Habitat assessments and species surveys were conducted for federally listed Endangered or Threatened species. Field evaluations were also performed to determine whether suitable habitat for Federal Species of Concern (FSC) existed.

Jurisdictional streams were identified based upon the methodology outlined in the NCDWQ publication, *Identification Methods for the Origins of Intermittent and Perennial streams, Version 3.1* (2005). Where the status of a stream was questionable, an NCDWQ Stream Identification Form and a U.S. Army Corps of Engineers (USACE) Stream Quality Assessment Worksheet were completed. Potential jurisdictional wetlands were examined using the methodology outlined in the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987).

NCDOT biologists Jim Mason, Ashley Cox, and James Pflaum conducted a majority of the field investigations for this project on May 21, 2007. An additional site visit by NCDOT biologists Jim Mason and Duncan Quinn was made on July 6, 2007 to perform a harperella (*Ptilimnium nodosum*) survey and to re-evaluate portions of the study area.

#### 1.4 Qualifications of Field Investigators

##### Principal

Investigator: James S. Mason

Education: Bachelor of Arts, Biology, Colby College

Master of Science, Biology/Ecology, University of North Carolina at Charlotte

Experience: Environmental Biologist, NCDOT, Raleigh, NC, January 2007 – Present

Environmental Specialist, NCDOT, Raleigh, NC, June 2006 – January 2007

Coastal Waterbird Monitor, Massachusetts Audubon Society, Westport, MA, April 2005 – August 2005  
 Osprey Monitor, Project Osprey Watch, Martha's Vineyard, MA, May 2002 – August 2002  
 Coastal Waterbird Monitor, Massachusetts Audubon Society, Barnstable, MA, April 2001 – August 2001

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 Meteorologist, National Climatic Data Center, June 1994 – May 1999

Expertise: Natural resource investigations, wetland and stream delineation, ecological restoration, technical report writing

## 1.5 Definitions

The definitions used for area descriptions in this report are as follows:

- **Project Study Area** denotes an area 50 feet wide (25 feet on either side of the proposed centerline) along the length of the project.
- **Project Vicinity** describes an area extending 0.5 mile on all sides of the project study area.
- **Project Region** is equivalent to an area represented by a 7.5 minute USGS quadrangle map, with the project study area occupying the central position.

## **2.0 PHYSICAL RESOURCES**

### **2.1 Regional Characteristics**

The entire project is located in Lee County, North Carolina, specifically within the incorporated limits of the City of Sanford. Lee County is a borderline county in terms of physiography, with portions in both the Piedmont Plateau and upper Coastal Plain Physiographic Provinces. The project study area is located in the Piedmont Plateau Physiographic Province. It is also located within the Triassic Basin Ecoregion, which is a broad, low-lying geologic feature created approximately 250 million years ago during the Triassic period (Ecoregion 45g; Griffith et al. 2002). Topography in the Triassic Basin is generally flat to gently rolling with relatively wide valleys and meandering, sometimes sluggish creeks (Cotterman 1996).

Within the project study area itself, the topography is gently rolling, with moderately-sized hills rising from the low-lying areas adjacent to Big Buffalo Creek and UT 1 to Big Buffalo Creek. A majority of the study area is located within these low-lying stream sections. Elevation ranges between 260 to 270 feet along the creeks to a high of 330 feet at the crest of a hill along U.S. 1. One noteworthy characteristic of this hill along U.S. 1 is that there is a large field of boulders present on the south-facing slope of the hill. The boulders are just west of a power line right-of-way (ROW) and are within the project study area. Current land use within the project vicinity is primarily urbanized, with commercial and residential development, and forested areas.

### **2.2 Soils**

Soil associations are classified as a group of defined and named taxonomic soil units occurring together in an individual and characteristic pattern over a general region. The soils within an association generally vary in depth, slope, stoniness, drainage, and other characteristics. Based on information contained in the Soil Survey of Lee County (1989), the majority of the soils located within the project study area are of the Mayodan-Pinkston and Chewacla-Wehadkee-Congaree associations. The Mayodan-Pinkston association typically consists of gently sloping to steep, well drained soils that have a loamy surface layer and clayey and loamy subsoils. This association is usually found on uplands in the western and northern parts of Lee County and comprises 40 percent of the county's soil content. The Chewacla-Wehadkee-Congaree association consists of nearly level, well drained to poorly drained soils that have a loamy surface layer and a loamy subsoil or underlying material. This association comprises five percent of the county's soil content, with one of the largest areas occurring along Big Buffalo Creek.

Soil series include soils that have similar profiles except for differences in texture of the surface layer or of the underlying material. They can also differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics. On the basis of such differences, soil series are divided into soil phases and are depicted in the soil survey as mapping units. A description of each of the four (4) identified mapping units, their general location in the project area, and their hydric status are listed below in alphabetical order.

### Chewacla silt loam (Ch)

This is the dominant soil type within the project study area. It is located throughout the floodplains of Big Buffalo Creek and its tributaries and makes up a large majority of the northern three-fourths of the project. This soil type is nearly level, somewhat poorly drained, and is frequently flooded for brief periods. Chewacla silt loam has inclusions of both Congaree and Wehadkee soils, the latter of which gives this soil type a “hydric rating”. Approximately five percent of the area mapped as Chewacla silt loam in Lee County contains areas of Wehadkee soil, which is a relatively undrained soil type.

### Congaree silt loam (Cp)

Congaree silt loam is located in two small areas within the floodplain of Big Buffalo Creek. These areas are near the southern end of the project, in close proximity to Carbonton Road. This soil is nearly level, well drained to moderately well drained, and is frequently flooded for brief periods. Congaree silt loam has inclusions of both Chewacla and Wehadkee soils, the latter of which gives this soil type a “hydric rating”. Approximately five percent of the area mapped as Congaree silt loam in Lee County contains areas of Wehadkee soil, which is a relatively undrained soil type.

### Mayodan fine sandy loam, 8 to 15 percent slopes (MfD)

This soil type is scattered throughout the project study area, with patches at the southern end along Carbonton Road, along U.S. 1, and near Boone Circle at the northern end of the project. Mayodan fine sandy loam is typically well drained and found along drainageways on short side slopes of Piedmont uplands. Within the project study area, this soil is located on upland slopes adjacent to the floodplains of Big Buffalo Creek and UT 1 to Big Buffalo Creek. This soil type may have inclusions of both Pinkston and Creedmoor soils, with the former located on slightly steeper slopes and the latter located in depressions. Mayodan fine sandy loam is non-hydric.

### Mayodan-Urban land complex, 2 to 8 percent slopes (MrB)

Only one area within the project study area contains this soil type. The area is associated with a large shopping complex that is accessed via Spring Lane and adjacent to U.S. 1. This map unit typically consists of approximately 60 percent Mayodan soil that is well drained, 30 percent Urban land, and 10 percent other soils including soil areas disturbed during urbanization. It is the dominant map type in the City of Sanford. Within this mapping unit, there are also inclusions of Pinkston, Chewacla, and Dothan soils, with Pinkston soils on side slopes near drainage ways, Chewacla on narrow flood plains, and Dothan in the southern part of Sanford at the boundary between the Piedmont and the Coastal Plain. The Mayodan-Urban land complex is non-hydric.

## **2.3 Water Resources**

This section contains information concerning surface water resources likely to be impacted by the proposed project. Water resource assessments include the physical characteristics, best usage standards, and water quality aspects of the water resources, along with their relationship to major regional drainage systems. Probable impacts to surface water resources are also discussed, as are means to minimize impacts.

### 2.3.1 Surface Water Characteristics

The proposed project may impact surface waters within the Cape Fear River Basin [Hydrologic Unit (HU) code 03030003]. This river basin is the largest one in the state, covering 9,322 square miles in 26 counties (NCDWQ 2000). The project study area is also located within NCDWQ subbasin 03-06-11. A total of four surface waters were identified within the project study area, including Big Buffalo Creek, two perennial UTs to Big Buffalo Creek (UTs 1 and 2), and an intermittent stream (UT 3) (Figures 2 and 3). All study waters except UT 3 drain into Big Buffalo Creek, which drains into the Deep River (NCDWQ 2005). **No jurisdictional wetlands are located within the project study area.**

Big Buffalo Creek is a perennial stream that flows north just inside the boundary of and adjacent to the northern half of the project study area. It has a channel width of approximately 30 to 35 feet and a wetted width of 20-plus feet within the project study area. The creek has a bankfull height of 6 to 10 feet and a water depth of between a few inches and 1 to 2 feet. During the field visit on May 21, 2007, the water was clear to slightly murky with moderate flow and the creek had a substrate of silt, sand, gravel, cobble, and boulder.

UT 1 to Big Buffalo Creek is a perennial stream that drains into Big Buffalo Creek from the east, just north of Spring Lane. The project study area follows this UT from where the project turns northwest away from U.S. 1 to near its confluence with Big Buffalo Creek. It has a channel width of approximately 12 to 14 feet and a wetted width of 4 to 10 feet within the project study area. The creek has a bankfull height of 4 to 6 feet and a water depth of between 6 inches and 1 foot. During the field visit on May 21, 2007, the water was clear to slightly cloudy due to sediment input from nearby development and urban areas. The flow was slow to moderate and the creek had a substrate of silt, sand, gravel, cobble, and boulder.

UT 2 to Big Buffalo Creek is a perennial stream that flows into Big Buffalo Creek from the east and crosses the project study area approximately 1,000 feet north of UT 1's confluence with the main creek. The creek has a channel width of approximately 8 to 10 feet and a wetted width of 6 to 8 feet within the project study area. It has a bankfull height of 1 to 7 feet and a water depth of between 0 inches and over 1 foot. During the field visit on May 21, 2007, the water was clear to somewhat cloudy/murky, the flow was moderate, and the creek had a substrate of silt, sand, gravel, cobble, and boulder.

UT 3 is located at the far northern end of the project. The stream originates at the top of a large hill, springing from the ground at the base of a roadside ditch. The origin of the water is unknown, but it is likely a non-natural source (possibly a leaking water pipe). The channel proceeds west and downhill into the project study area, turns north, and goes subterranean in the middle of a sanitary sewer line. UT 3 does not have an aboveground connection to Big Buffalo Creek. During the original field visit on May 21, 2007, UT 3 received an NCDWQ Stream Classification rating of 16.5 within the study area. However, since flow was observed throughout the aboveground reach of the channel and it had not rained in some time, best professional judgement was used to determine that it was at least intermittent. Flowing water was also observed during a subsequent re-visit on July 6, 2007. UT 3 has a channel width of approximately 1 foot and a wetted width of 8 inches within the project study area. The stream had a bankfull height of 1 to 6 inches and a water depth between less than 1 inch and 2 inches. There was a 10 inch deep pool at the northwestern end of the stream, where it goes underground. The water was observed as being clear, the flow was slow, and the substrate was silt.

### **2.3.1.1 Best Usage Classification**

Big Buffalo Creek has been assigned a best usage classification of C [NCDWQ Index No. 17-40 (09/01/1974)]. The C designation denotes waters suitable for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation refers to human body contact with waters on an infrequent or incidental basis.

**No High Quality Waters (HQW), Water Supplies (WS-I or WS-II), Outstanding Resource Waters (ORW), or Critical Areas (CA) occur within 1.0 mile of the project study area.** Additionally, none of the streams located within the project study area support trout or anadromous fish. No essential fish habitat has been designated for any of the streams located within the project study area, nor are there any listed streams within one mile of the project study area.

### **2.3.2 Water Quality**

This section describes the water quality for the water resources within the project study area. Waters listed on the Section 303(d) List of Impaired Waters are discussed, as are potential impacts to water quality from point and non-point sources. Water quality assessments are based upon published resource information and field study observations.

#### **2.3.2.1 Listed Waters in Section 303(d) of the Clean Water Act**

Section 303(d) of the Clean Water Act (CWA) requires states to develop a list of waters not meeting water quality standards or which have impaired uses. **A review of the 2006 Final 303(d) List of Impaired Waters for North Carolina indicates that Big Buffalo Creek, from its source to the Deep River, is listed as an impaired waterway due to reduced biological integrity.** This impairment is a result of habitat degradation (NCDWQ 2007).

#### **2.3.2.2 Point and Non-Point Source Discharges**

Point source wastewater discharge sites are permitted through the National Pollutant Discharge Elimination System (NPDES) program. Any discharger is required to apply for a permit. Based upon NCDWQ's database, there are no NPDES permit locations located either within the project study area or within 1.0 mile upstream of the project study area (NCDWQ 2005).

Non-point source discharge refers to runoff that enters surface waters through stormwater, snowmelt, or atmospheric deposition. Non-point source runoff from land development, construction, failing septic systems, roads and other impervious surfaces (including parking lots), and lawns are likely the primary contributors of non-point source pollutants to the water resources within the project vicinity. The land use surrounding and within the project study area is mainly forested, residential, and commercial.

#### **2.3.2.3 Benthic Macroinvertebrate and Fish Sampling Stations**

The NCDWQ has initiated a whole-basin approach to water quality management for the 17 river basins within the state. To accomplish this goal, NCDWQ collects biological, chemical, and physical data that can be used in basinwide assessment and planning. All basins are reassessed every five years. Information pertaining to the water quality for subbasin 03-06-11 and the project study area, in particular, is summarized in the Cape Fear River Basinwide Water Quality Plan (NCDWQ 2005).

One type of NCDWQ water quality monitoring performed within the Cape Fear River Basin involves the assessment of benthic macroinvertebrate communities. This assessment is comprised of macroinvertebrate sampling at fixed monitoring sites throughout the river basin. Benthic macroinvertebrates, in general, have varying tolerances to pollution and can be used as indicators for changes in water quality conditions. By determining the species present and their relative abundance, the quality of a stream can be assessed and the presence or absence of pollutants can be determined. A total of seven benthic macroinvertebrate monitoring sites are present within subbasin 03-06-11. However, none are located within 1.0 mile of the project study area. The closest monitoring site that was assessed for the current Basinwide Water Quality Plan report is located on Little Buffalo Creek (station BB291), approximately 3.0 miles away. The site was last monitored in 2003 and was "Not Rated" (NCDWQ 2005).

Fish communities are also sampled by NCDWQ under the Stream Fish Community Assessment Program. The core mission of this program is to sample a set of fixed sites on lower Strahler-order, wadeable creeks, streams, and rivers to support the NCDWQ's Basinwide Management Plan Program. The assessment program uses methods developed for the application of the North Carolina Index of Biotic Integrity (NCIBI; NCDWQ 2006). There are two fish monitoring sites within subbasin 03-06-11. However, no stations are located within 1.0 mile of the project study area. The closest station is located approximately 3.5 miles downstream along Big Buffalo Creek (station BF37). This station was last sampled in 2003 and was rated as "Fair" (NCDWQ 2005).

### **2.3.3 Anticipated Impacts to Water Resources**

Construction of the proposed project may impact water resources, but the estimated linear impact is not known since the project is still in the design phase. Project construction may result in the following impacts to surface waters:

- Increased sedimentation and siltation from construction and/or erosion.
- Changes in incident light levels and turbidity due to increased sedimentation rates and vegetation removal.
- Alteration of water levels and flows due to interruptions and/or additions to surface and ground water flow from construction.
- Increases in nutrient loading during construction through runoff from temporarily exposed land surfaces.
- Increased concentration of toxic compounds from runoff and/or construction.
- Changes in water temperature due to removal of streamside vegetation.

Measures to minimize these potential impacts include formulation of an erosion and sedimentation control plan, provisions for waste material and storage, stormwater management measures, and appropriate maintenance measures. NCDOT's Best Management Practices (BMPs) for Protection of Surface Waters and Sedimentation Control guidelines shall be strictly enforced during the construction stages of the project. Limiting in-stream activities and revegetating stream banks immediately following the completion of grading can further reduce impacts. No adverse long-term impacts to water resources are expected to result from the proposed project.

### 3.0 BIOTIC RESOURCES

Biotic resources include terrestrial and aquatic communities. This section describes the communities encountered and the relationships between fauna and flora found within these communities. The composition and distribution of biotic communities within the project study area are reflective of the topography, hydrologic influences, and the project area's past and present land uses. Descriptions of the terrestrial systems are presented in the context of plant community classifications and generally follow those presented by Schafale and Weakly (1990), where possible. The dominant flora and fauna observed, or likely to occur, in each community are described and discussed.

#### 3.1 Terrestrial Communities

Three (3) primary community types were identified within the project study area. These included: 1) Maintained/Disturbed areas, 2) Mixed Pine/Hardwood Forest, and 3) Floodplain Forest. Figures 2 and 3 present how each community is represented within the study area.

##### 3.1.1 Maintained/Disturbed

The Maintained/Disturbed community type was present throughout the entire project study area and included: 1) commercial facilities and their associated properties, 2) roads and associated roadsides, 3) parking lots, 4) power line and sewer line ROWs, 5) disturbed, wooded stream buffers, and 6) individual homes and their maintained lawns.

In the southern portion of the project study area, the proposed bike trail runs west along Carbondon Road, then north through the yards of several residences and along a power line ROW. The dominant herbaceous and vine species observed in these areas included fescue (*Festuca* spp.), various lawn grass mixes, Japanese grass (*Microstegium vimineum*), white clover (*Trifolium repens*), red clover (*Trifolium pratense*), common dandelion (*Taraxacum officinale*), wild onion (*Allium* spp.), goldenrod (*Solidago* spp.), sawtooth blackberry (*Rubus argutus*), daisy fleabane (*Erigeron annuus*), bush clover (*Lespedeza cuneata*), Japanese honeysuckle (*Lonicera japonica*), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy (*Toxicodendron radicans*). One area along Carbondon Road, where it crosses under U.S. 1, was inundated with kudzu (*Pueraria montana*). Tree and shrub species observed within or on the edge of these areas included red maple (*Acer rubrum*), white oak (*Quercus alba*), black cherry (*Prunus serotina*), sweet gum (*Liquidambar styraciflua*), red cedar (*Juniperus virginiana*), loblolly pine (*Pinus taeda*), and Chinese privet (*Ligustrum sinense*).

The largest Maintained/Disturbed area was located in the area adjacent to Spring Lane, with a large shopping center and associated businesses present on the south side of the road and additional commercial buildings and lots present on the north side of the road. In this area, a majority of the land is covered by buildings, parking lots, roads, and maintained yards/fields. In areas where plant growth was possible, herbaceous and vine species observed included fescue, various lawn grass mixes, common dandelion, daisy fleabane, crown vetch (*Securigera varia*), common mullein (*Verbascum thapsus*), curly dock (*Rumex crispus*), Queen Anne's lace (*Daucus carota*), wild lettuce (*Lactuca canadensis*), pokeweed (*Phytolacca americana*), wild geranium (*Geranium carolinianum*), and pennywort (*Hydrocotyl* spp.). Tree and shrub species included several ornamental species, tree-of-heaven (*Ailanthus altissima*), sycamore (*Platanus*

*occidentalis*), and river birch (*Betula nigra*), the latter two species being found adjacent to UT 1 to Big Buffalo Creek.

### 3.1.2 Mixed Pine/Hardwood Forest

The Mixed Pine/Hardwood Forest community occurred in the upland forested areas of the project study area. Dominant canopy species throughout this community type included: loblolly pine, sweet gum, red maple, white oak, tulip poplar (*Liriodendron tulipifera*), northern red oak (*Quercus rubra*), mockernut hickory (*Carya alba*), and pignut hickory (*Carya glabra*). Sycamore, river birch, American elm (*Ulmus americana*), swamp chestnut oak (*Quercus michauxii*), and box elder (*Acer negundo*) were more prevalent along lower slopes adjacent to the floodplain of Big Buffalo Creek, where this community intergrades into the Floodplain Forest community. Dominant shrub and understory species included black cherry, sweet gum, red cedar, red maple, American elm, box elder, flowering dogwood (*Cornus florida*), southern sugar maple (*Acer barbatum*), sourwood (*Oxydendrum arboreum*), and white mulberry (*Morus alba*). Herbaceous and vine species identified included poison ivy, sawtooth blackberry, Christmas fern (*Polystichum acrostichoides*), Japanese honeysuckle, Japanese grass, common greenbrier (*Smilax rotundifolia*), wisteria (*Wisteria floribunda*), English ivy (*Hedera helix*), and wild strawberry (*Fragaria* spp). This forest community most resembles the Dry-Mesic Oak-Hickory Forest community described by Schafale and Weakley (1990).

### 3.1.3 Floodplain Forest

This community type was found within the floodplain of Big Buffalo Creek in the northern one-third of the project study area. It is generally confined to the floodplain itself; however, species common to this community were also located slightly up-slope, where the community type intergrades into Mixed Pine/Hardwood Forest. Dominant canopy species included sycamore, river birch, sweet gum, American elm, box elder, swamp chestnut oak, and green ash (*Fraxinus pennsylvanica*). Dominant understory species included box elder, sweet gum, red maple, green ash, American elm, sycamore, river birch, Chinese privet, ironwood (*Carpinus caroliniana*), and water oak (*Quercus nigra*). Herbaceous species observed included Japanese grass, false nettle (*Boehmeria cylindrica*), orange jewelweed (*Impatiens capensis*), and deer tongue (*Dichantheium clandestinum*). This forest community most resembles the Piedmont/Low Mountain Alluvial Forest community described by Schafale and Weakley (1990).

### 3.1.4 Terrestrial Wildlife

Forest and forest edge habitats located within the project study area provide foraging, drinking, shelter, and nesting opportunities for several avian species. Many of the same species may also be observed in more open, Maintained/Disturbed areas, either passing through those areas to access other forested habitat or foraging for food. Avifauna either visually or aurally observed in one or more of the three identified community types included Carolina chickadee (*Poecile carolinensis*), northern cardinal (*Cardinalis cardinalis*), American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), pileated woodpecker (*Dryocopus pileatus*), barn swallow (*Hirundo rustica*), tufted titmouse (*Baeolophus bicolor*), common grackle (*Quiscalus quiscula*), Carolina wren (*Thryothorus ludovicianus*), mourning dove (*Zenaida macroura*), red-bellied woodpecker (*Melanerpes carolinus*), American crow (*Corvus brachyrhynchos*), fish crow (*Corvus ossifragus*), red-shouldered hawk (*Buteo lineatus*), summer tanager (*Piranga rubra*), and northern parula (*Parula americana*).

A large variety of mammalian species are also likely to be found within each of the terrestrial communities. Forest and forest edge habitats offer similar resources to those available to avian species. Those same species found in forested areas may also be observed in more open, Maintained/Disturbed areas, either passing through, foraging, or nesting. Gray squirrels (*Sciurus carolinensis*) were observed in both forested and open habitat types. Other mammals that are typical to these community types include eastern cottontail (*Sylvilagus floridanus*), several mouse species (*Mus* spp.), white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and gray fox (*Urocyon cinereoargenteus*).

Herpetofauna are also likely to utilize the terrestrial communities found within the study area. Species observed during field visits included eastern box turtle (*Terrapene carolina*), snapping turtle (*Chelydra serpentina*), five-lined skink (*Eumeces fasciatus*), and green anole (*Anolis carolinensis*). Additional reptile species that may be observed include black rat snake (*Elaphe obsoleta*), copperhead (*Agkistrodon contortrix*), garter snake (*Thamnophis sirtalis*), rough green snake (*Opheodrys aestivus*), fence lizard (*Sceloporus undulatus*), and a variety of other skink species (Family: Scincidae). Amphibian species either visually or aurally observed during field visits include gray treefrog (*Hyla chrysoscelis* or *Hyla versicolor*) and green frog (*Rana clamitans*). Both species were observed near water. Other amphibian species that are typical to these terrestrial communities include American toad (*Bufo americanus*), bullfrog (*Rana catesbeiana*), upland chorus frog (*Pseudacris triseriata*), spring peeper (*Pseudacris crucifer*), and several salamander species (families Ambystomatidae and Plethodontidae).

### 3.2 Aquatic Communities

The aquatic communities found within the project study area include Big Buffalo Creek, UTs 1 and 2 to Big Buffalo Creek, and UT 3. Vegetation along the larger, undisturbed streams included riparian species such as sycamore, river birch, red maple, box elder, sweet gum, Chinese privet, and ironwood.

These streams and the terrestrial communities surrounding them may provide breeding, shelter, and feeding opportunities for many amphibians. Common amphibians that either inhabit or use these streams or the community around them may include gray treefrog, upland chorus frog, spring peeper, bullfrog, green frog, pickerel frog (*Rana palustris*), northern cricket frog (*Acris crepitans*), northern dusky salamander (*Desmognathus fuscus*), two-lined salamander (*Eurycea bislineata*), eastern newt (*Notophthalmus viridescens*), marbled salamander (*Ambystoma opacum*), and spotted salamander (*Ambystoma maculatum*).

Aquatic fauna present in jurisdictional waters is dependent upon physical characteristics of the water body and overall condition of the water resource. Terrestrial communities adjacent to a water resource also greatly influence aquatic communities. The larger perennial streams within the project study area are likely to support a variety of benthic macroinvertebrates including mayflies, stoneflies, caddisflies, dragonflies, damselflies, beetles, chironomid midges, craneflies, amphipods, isopods, and crayfish. The intermittent and smaller perennial streams most likely support only chironomid midges, beetles, oligochaetes, crayfish, isopods, and amphipods.

The NCDWQ does not maintain a fish monitoring station on any surface waters within the study area or within 1.0 mile of the project. However, a sampling site for their Stream Fish Community Assessment Program exists along Big Buffalo Creek (station BF37), approximately 3.5 miles downstream of the project. This site was last sampled on June 16, 2003. Common species

observed during these surveys included redbreast sunfish (*Lepomis auritus*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), and coastal shiner (*Notropis petersoni*).

### 3.3 Impacts to Biotic Resources

#### 3.3.1 Potential Terrestrial Impacts

Construction of the subject project will have various impacts on the biotic resources described above. Any construction-related activities in or near these resources have the potential to impact biological functions. Table 1 provides the acreage of the three community types within the project study area. The degree of impact to biological communities associated with the proposed project is dependent on the final design of the project. The amount of impact may be higher or lower than the coverage areas listed below, depending on whether revisions/modifications are made to the design.

**Table 1. Coverage Area of Terrestrial Communities within the Project Study Area**

Community Type	Acreage	Percentage of Project Study Area (%)
Maintained/Disturbed	3.84*	44.05
Mixed Pine/Hardwood Forest	2.12	24.39
Floodplain Forest	2.75	31.56
<b>TOTAL</b>	<b>8.71</b>	<b>100</b>

\* Roadways were included when calculating Maintained/Disturbed acreage.

Impacts to plant communities associated with construction activities include the removal of vegetation, soil compaction, damage to and/or exposing of root systems, as well as potential impacts associated with chemical spills. Since plant communities serve as nesting and sheltering habitat for various species, project construction and/or increased noise resulting from the completion of the new facility may reduce the amount of usable habitat for faunal species. A reduction in habitat has the potential to diminish faunal numbers. Some possible causes for this decrease include: 1) an increase in mortality rates for avian and mammalian young that fall out of nests due to the increase in impervious surfaces or 2) individuals evacuating the area in search of less disturbed patches of habitat. Once construction is completed, some organisms that were displaced are expected to return, settling in areas of remaining suitable habitat in or adjacent to the project study area.

#### 3.3.2 Potential Aquatic Impacts

Aquatic organisms are acutely sensitive to changes in their environment. Therefore, environmental impacts from construction activities may result in long term or irreversible effects to those species and to their habitat. Impacts usually associated with in-stream construction include alterations to the substrate and impacts to adjacent streamside vegetation. Such disturbance within the substrate leads to increased siltation, which can clog the gills and/or feeding mechanisms of benthic organisms, fish, and amphibian species. Siltation may also cover benthic macroinvertebrates with excessive amounts of sediment that inhibit their ability to obtain oxygen.

The removal of streamside vegetation and placement of fill material during construction enhances erosion and possible sedimentation. Quick revegetation of these areas helps to reduce the impacts

by supporting the underlying soils. Erosion and sedimentation may carry soils, toxic compounds, trash, and other materials into the aquatic communities at the construction site. As a result, bars may form near and downstream of the site. Increased light penetration from the removal of streamside vegetation may increase water temperatures. Warmer water contains less oxygen, thus reducing aquatic life that depends on higher oxygen concentrations.

## **4.0 JURISDICTIONAL TOPICS**

### **4.1 Waters of the United States**

Section 404 of the CWA requires regulation of discharges into “Waters of the United States.” The U.S. Environmental Protection Agency (USEPA) is the principle administrative agency of the CWA; however, the USACE has the responsibility for implementation, permitting, and enforcement of the provisions of the Act. The NCDWQ also has regulatory input through Section 401 of the CWA.

The USACE promulgated the definition of “Waters of the United States” under 33 CFR §328.3(a). Waters of the United States include most interstate and intrastate surface waters, tributaries, and wetlands. Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions are considered “wetlands” under 33 CFR §328.3(b). Wetlands generally include swamps, marshes, bogs, and similar areas. Any action that proposes to place dredged or fill materials into Waters of the United States falls under the jurisdiction of the USACE and must follow the statutory provisions under Section 404 of the CWA (33 U.S.C. 1344).

#### **4.1.1 Jurisdictional Topics**

Streams were identified and rated using the NCDWQ Stream Identification Form, which is part of the NCDWQ publication *Identification Methods for the Origins of Intermittent and Perennial streams, Version 3.1* (2005). The purpose of this manual and its accompanying field form is to identify and score geomorphic, hydrological, and biological stream features that distinguish between ephemeral, intermittent and perennial streams. Generally, streams that score below 19 are considered ephemeral, streams that score between 19 and 30 are intermittent, and streams that score greater than or equal to 30 are perennial. Best professional judgement is also used when classifying streams.

The streams located within the project study area, their associated mitigation requirements, and their coverage area within the project study area are listed below in Table 2. Stream characteristics for each stream are listed above in Section 2.3.1 and their locations are shown in Figures 2 and 3. Copies of the NCDWQ Stream Classification Forms, completed for streams that were not definitively perennial, are included in Appendix B.

**Table 2. Jurisdictional Streams within the Project Study Area**

Jurisdictional Stream	Classification	Mitigable or Non-Mitigable	Coverage Area (linear ft.)*
Big Buffalo Creek	Perennial	Mitigable	600
UT 1 to Big Buffalo Creek	Perennial	Mitigable	369
UT 2 to Big Buffalo Creek	Perennial	Mitigable	58
UT 3	Intermittent	Unknown	121
<b>TOTAL</b>			1,148

\* Linear footage of streams is approximate.

The project study area was also surveyed for jurisdictional wetlands in accordance with guidelines in the *1987 Corps of Engineers Wetlands Delineation Manual*. This approach employs the analysis of three criteria for delineating wetlands: 1) the presence of hydrophytic vegetation, 2) the presence of hydric soils, and 3) evidence of wetland hydrology. All three criteria must be present in a given location for an area to be considered a jurisdictional wetland. After performing a field visit on May 21, 2007, it was determined that **no jurisdictional wetlands are present within the project study area.**

A field visit with both USACE and NCDWQ will be scheduled in the immediate future to verify the above-mentioned jurisdictional features.

## **4.2 Permit Issues**

This project will likely be processed as a Categorical Exclusion (CE) under Federal Highway Administration (FHWA) guidelines. It is anticipated that a Nationwide Permit (NWP) 23 (67 FR 2020, 2082, January 15, 2002) will be applicable to this project. This permit authorizes activities undertaken, assisted, authorized, regulated, funded, or financed, in whole or in part, by another Federal agency or department. Additionally, these activities are included within a category of actions that neither individually nor cumulatively have a significant effect on the human or natural environment. The NCDWQ has made available a General 401 Water Quality Certification for NWP 23 (WQC 3632). If temporary structures are necessary for construction activities, access fills, or dewatering of the site, then a NWP 33 (67 FR 2020, 2087; January 15, 2002) permit and the associated General 401 Water Quality Certification (WQC 3634) will be required.

### **4.2.1 Mitigation**

USACE has adopted, through the Council on Environmental Quality (CEQ), a wetland mitigation policy which 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 Waters of the United States, specifically wetlands. Mitigation of wetland impacts has been defined by CEQ to include: avoiding impacts (to wetlands), minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts (40 CFR 1508.20). Each of these three aspects (avoidance, minimization, and compensatory mitigation) must be considered sequentially.

#### **4.2.1.1 Avoidance**

Avoidance mitigation examines all appropriate and practicable possibilities of averting impacts to Waters of the United States. According to a 1990 Memorandum of Agreement (MOA) between the USEPA and USACE, in determining “appropriate and practicable” measures to offset unavoidable impacts, such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes.

#### **4.2.1.2 Minimization**

Minimization includes the examination of appropriate and practicable steps to reduce adverse impacts to waters of the United States. Implementation of these steps will be required through project modifications and permit conditions. Minimization typically focuses on decreasing the proposed project footprint through the reduction of median widths, ROW widths, fill slopes, and/or road shoulder widths. Other practical mechanisms to minimize impacts to Waters of the United States crossed by the proposed project include: 1) strict enforcement of sedimentation control measures during the entire life of the project through BMP's for the Protection of Surface Waters, 2) reduction of clearing and grubbing activity, 3) reduction/elimination of direct discharge into streams, 4) reduction of runoff velocity, 5) re-establishment of vegetation on exposed areas, 6) judicious pesticide and herbicide usage, 7) minimization of "in-stream" activity, and 8) litter/debris control. All efforts will be made to decrease impacts to Waters of the United States.

#### **4.2.1.3 Compensatory Mitigation**

Compensatory mitigation is not normally considered until anticipated impacts to Waters of the United States have been avoided and minimized to the maximum extent possible. It is recognized that “no net loss of wetland” functions and values may not be achieved in each and every permit action. In accordance with 67 FR 2020, 2092; January 15, 2002, USACE requires compensatory mitigation when necessary to ensure that adverse effects to the aquatic environment are minimal. NCDWQ may also require mitigation if water quality effects resulting from the project are not minimized. The size and type of the proposed project impact and the function and value of the impacted aquatic resource are factors considered in determining acceptability of appropriate and practicable compensatory mitigation. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts that remain after all appropriate and practicable avoidance and minimization opportunities have been implemented. Compensatory actions often include restoration, preservation and enhancement, and creation of Waters of the United States. Such actions should be undertaken first in areas adjacent to or contiguous to the discharge site.

In accordance with 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”, July 22, 2003, the North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (NCEEP), will be requested to provide off-site mitigation to satisfy the federal CWA compensatory

mitigation requirements for this project. A final determination regarding mitigation rests with the USACE and the NCDWQ.

### 4.3 Protected Species

#### 4.3.1 Federally Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act (ESA) of 1973, as amended. The term “Endangered Species” is defined as “any species which is in danger of extinction throughout all or a significant portion of its range;” and the term “Threatened Species” is defined as “any species which is likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range” (16 U.S.C. 1532). As of May 10, 2007, the USFWS lists three federally protected species for Lee County: Cape Fear shiner (*Notropis mekistocholas*), red-cockaded woodpecker (*Picoides borealis*), and harperella (Table 3). A brief description of each species' characteristics and habitat follows, along with their biological conclusions associated with this project.

**Table 3. Federally Protected Species for Lee County**

Scientific Name	Common Name	Status	Habitat Present	Biological Conclusion
<i>Notropis mekistocholas</i>	Cape Fear shiner	E	Unknown	Unresolved
<i>Picoides borealis</i>	red-cockaded woodpecker	E	No	No Effect
<i>Ptilimnium nodosum</i>	harperella	E	No	No Effect

E – Endangered.

Cape Fear shiner (*Notropis mekistocholas*) ..... **Endangered**

**Family:** Cyprinidae

**Date Listed:** September 25, 1987

The Cape Fear shiner is a small (approximately 2 inches long), yellowish minnow with a black band along both sides of its body. The shiner’s fins are yellow and somewhat pointed. It has a black upper lip and a lower lip that bears a thin black bar along its margin. The Cape Fear shiner is endemic to the upper Cape Fear River Basin in the Central Piedmont of North Carolina. The species is known from tributaries and mainstreams of the Deep, Haw, and Rocky Rivers in Chatham, Harnett, Lee, Moore, and Randolph counties. Only five populations of the shiner are thought to exist.

The Cape Fear shiner was listed as Endangered with Critical Habitat on September 25, 1987. In the last few decades, the shiner has undergone a reduction in range, population sizes, and population numbers. At the time of listing, only three populations were known; therefore, these areas were designated as critical habitat. Critical habitat is defined under the Endangered Species Act as either: 1) the specific areas within the geographical area occupied by a species which have physical or biological features essential to the conservation of the species and that may require special management considerations or protection or 2) specific areas outside the geographical area occupied by a species which are essential for the conservation of the species. No Designated Critical Habitat is located in the vicinity of Sanford, North Carolina.

The Cape Fear shiner is generally associated with gravel, cobble, and boulder substrates, and has been observed in slow pools, riffles, and slow runs. These areas occasionally support water willow (*Justicia americana*), which may be used as cover or protection from predators [e.g. flathead catfish (*Pylodictis olivaris*), bass (*Micropterus spp.*), and crappie (*Pomoxis spp.*)]. This species can be found swimming in schools of other minnow species, but is never the most abundant species. During the spawning season (May through July), Cape Fear shiner adults move to slower flowing pools to lay eggs on the rocky substrate. Juveniles are often found in slack water, among large rock outcrops of the midstream, and in flooded side channels and pools.

**BIOLOGICAL CONCLUSION ..... Unresolved**

A search of the NCNHP database on July 7, 2007 using GIS-based shapefiles distributed to NCDOT (last updated on July 2, 2007) revealed no known populations of this species within 1.0 mile of the project study area. However, a species survey and habitat assessment of surface waters within and adjacent to the project study area will need to be performed to determine whether habitat and/or individuals are present. This survey will be performed by the NCDOT Biological Surveys Group.

Red-cockaded woodpecker (*Picoides borealis*)..... **Endangered**  
**Family:** Picidae  
**Date Listed:** October 13, 1970

The red-cockaded woodpecker is approximately 7 to 8 inches long, with a wingspan of about 15 inches. There are black and white horizontal stripes on its back and its cheeks and underparts are white. Its flanks are black streaked. The cap and stripe on the side of the neck and the throat are black. The male also has a small red spot on each side of the black cap. Red-cockaded woodpeckers are a territorial, non-migratory, cooperative breeding species, frequently having the same mate for several years. They nest between April and June, with the breeding female generally laying three to four eggs in the breeding male's roost cavity. Group members incubate the small white eggs for 10 to 12 days. Once hatched, the nestlings remain in the nest cavity for about 26 days. Upon fledging, the young often remain with the parents, forming groups of up to nine members, but more typically three to four members. There is only one pair of breeding birds within each group, and they normally raise only a single brood each year. The other group members, called helpers are usually males from the previous breeding season. These helpers assist in egg incubation and help raise the young. Juvenile females generally leave the group before the next breeding season, in search of solitary male groups.

Historically, this woodpecker's range extended from Florida north to New Jersey and Maryland, as far west as Texas and Oklahoma, and inland to Missouri, Kentucky, and Tennessee. Today it is estimated that there are about 6,000 groups of red-cockaded woodpeckers (15,000 birds) from Florida to Virginia and west to southeast Oklahoma and eastern Texas; this represents about one percent of the woodpecker's original range. They have been extirpated in New Jersey, Maryland, Tennessee, Missouri and Kentucky.

For nesting/roosting habitat, open stands of pine containing trees 60 years old and older are preferred. Red-cockaded woodpeckers are unique in that they need live, large older pines in which to excavate their cavities. Longleaf pines (*Pinus palustris*) are most commonly used, but other species of southern pine, including loblolly, slash (*P. elliottii*), and pond (*P. serotina*) pines are also acceptable. Dense stands (stands that are primarily hardwoods, or that have a dense hardwood understory) are avoided. Foraging habitat is provided in pine and pine hardwood stands 30 years old or older with foraging preference for pine trees 10 inches or larger in

diameter. In good, moderately-stocked, pine habitat, sufficient foraging habitat can be provided on 80 to 125 acres.

Roosting cavities are excavated in living pines, usually in those which are infected with a fungus that produces red-heart disease (*Formes pini*). Cavity tree ages range from 63 to 300-plus years for longleaf, and 62 to 200-plus years for loblolly and other pines. The aggregate of cavity trees is called a cluster and may include one to 20 or more cavity trees on three to 60 acres. The average cluster is about 10 acres. Completed cavities in active use have numerous, small resin wells which exude sap. The birds keep the sap flowing apparently as a cavity defense mechanism against snakes and other predators. The territory for a group averages about 200 acres, but observers have reported territories running from a low of around 60 acres, to an upper extreme of more than 600 acres. The expanse of territories is related to both habitat quality and population density.

**BIOLOGICAL CONCLUSION ..... No Effect**

A species survey and habitat assessment of the project study area and the surrounding habitat was performed by NCDOT biologists Ashley Cox, Jim Mason, and James Pflaum on May 21, 2007. The survey took a total of 19.5 man-hours to complete and was performed along with jurisdictional water and terrestrial community assessments. Much of the habitat present within the project study area was Maintained/Disturbed and highly urbanized. The remaining wooded habitat consisted of the hardwood-dominant Mixed Pine/Hardwood Forest and Floodplain Forest communities, both of which had a relatively thick understory. The most abundant pine species found in the project study area was loblolly pine, but pine trees were mostly isolated and interspersed within the hardwood stands. Some patches of loblolly were observed at higher elevations, but they consisted of relatively young trees (25-40 years) and were small in size. No pine trees were observed in the Floodplain Forest. No foraging or nesting habitat was observed, nor were any individuals observed. Similar bird species observed included pileated and red-bellied woodpeckers. Habitat present within 0.5 mile of the project was highly urbanized and very similar to habitat found in the study area. In addition to the field survey, a search of the NCNHP database on July 7, 2007 using GIS-based shapefiles distributed to NCDOT (last updated on July 2, 2007) revealed no known populations of this species within 1.0 mile of the project study area. Since no habitat is present, no individuals were observed, and no known populations are present within 1.0 mile of the project, a biological conclusion of **No Effect** has been assigned to this species.

**Harperella (*Ptilimnium nodosum*) ..... Endangered**

**Family:** Apiaceae

**Date Listed:** September 29, 1988

This annual herb grows to a height of 6 to 36 inches and has leaves that are reduced to hollow, quill-like structures. The small, white flowers of this species occur in heads, or umbels, not unlike those of Queen Anne's lace. Flowers have five regular parts and are either bisexual or unisexual, with each umbel containing both perfect and male florets. Seeds are elliptical and laterally compressed, measuring 0.06 to 0.08 inches in length. In pond habitats, flowering begins in May, while riverine populations flower much later, beginning in late June or July and continuing until frost.

Harperella is known from 12 extant populations rangewide. One population occurs in each of two North Carolina counties: Granville and Chatham. This plant is a relatively prolific annual, and large numbers may occur within each population, especially along rivers. This species

typically occurs in two habitat types: 1) rocky or gravel shoals and margins of clear, swift-flowing stream sections and 2) edges of intermittent pineland ponds in the coastal plain.

**BIOLOGICAL CONCLUSION ..... No Effect**

A species survey and habitat assessment of surface waters within and adjacent to the project study area was performed by NCDOT biologists Jim Mason and Duncan Quinn on July 6, 2007. The survey took a total of 4.5 man-hours to complete. No habitat or individuals were observed in Big Buffalo Creek or UTs 1 and 2 of Big Buffalo Creek. UT 3 was too small to contain habitat and, therefore, was not surveyed. The three surface waters were highly urbanized, with slow moving, turbid water. Surface waters within the project study area are highly impacted by runoff and sedimentation, which has resulted in Big Buffalo Creek's inclusion on NCDWQ's 2006 Final 303(d) List of Impaired Waters. These impacts have also resulted in the creation of a large number of bars and benches composed of silt, sand, and gravel in each of the creeks. These areas, in many cases, were suitable for vegetation such as Japanese grass and Asian dayflower (*Murdannia keisak*) to grow, but were unstable and shifting and did not provide habitat for harperella. Some very small rocky shoals made of either naturally-occurring rocks or rip rap were present in UT 1 and UT 2, but the streams were too small to provide habitat and, considering the slow flow of the water, did not meet the habitat criteria for the species. Additionally, large portions of Big Buffalo Creek within the study area were deep and did not provide any habitat for this species. In addition to the field survey, a search of the NCNHP database on July 7, 2007 using GIS-based shapefiles distributed to NCDOT (last updated on July 2, 2007) revealed no known populations of this species within 1.0 mile of the project study area. Since no habitat is present, no individuals were observed, and no known populations are present within 1.0 mile of the project, a biological conclusion of **No Effect** has been assigned to this species.

**4.3.2 Federal Species of Concern**

There are eight (8) Federal Species of Concern (FSC) listed by the USFWS for Lee County. A review of GIS-based shapefiles supplied to NCDOT by NCNHP (last updated on July 2, 2007) revealed no known occurrences of any of these species within 1.0 mile of the study area. FSCs are not afforded federal protection under the ESA and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. FSCs are defined as species under consideration for listing for which there is insufficient information to support listing as Threatened or Endangered. The status of these species may be upgraded at any time, thus they are included here for consideration. Table 4 lists the FSCs and whether suitable habitat is present.

**Table 4. Federal Species of Concern for Lee County**

Scientific Name	Common Name	State Status	Habitat Present
<i>Amorpha georgiana</i> var. <i>georgiana</i>	Georgia lead-plant	E	No
<i>Anguilla rostrata</i>	American eel	W1	No
<i>Gomphus septima</i>	Septima's clubtail	SR	No
<i>Lilium pyrophilum</i>	Sandhills bog lily	E-SC	No
<i>Lindera sucoriacea</i>	bog spicebush	T	No
<i>Moxostoma</i> spp. 3	Carolina redbhorse	SR	Yes
<i>Parnassia caroliniana</i>	Carolina grass-of-parnassus	E	No
<i>Phacelia covillei</i>	buttercup phacelia	SR-T	No

**State Status: Animals**

*SR* - Significantly Rare: Any species which has not been listed by the N.C. Wildlife Resources Commission as an Endangered, Threatened, or Special Concern species, but which exists in the state in small numbers and has been determined by the N.C. Natural Heritage Program to need monitoring. (This is a N.C. Natural Heritage Program designation.) Significantly Rare species include "peripheral" species, whereby North Carolina lies at the periphery of the species' range (such as Hermit Thrush). The designation also includes marine and estuarine fishes identified as "Vulnerable" by the N.C. State Museum of Biological Sciences (Ross et al., 1988, Endangered, Threatened, and Rare Fauna of North Carolina. Part II. A Reevaluation of the Marine and Estuarine Fishes).

*W1* - Watch Category 1: Includes species that are known to be declining in North Carolina, for one reason or another. The distribution or population sizes of such species in the state are fairly well known; loss of habitat is not necessarily a factor. A large number of species are known to be declining in the state, such as Neotropical migrant birds, but the species in this category must have an N.C. Rank of S3S4 or higher (S3, S2, S1, etc.).

**State Status: Plants**

*E* - Endangered: "Any species or higher taxon of plant whose continued existence as a viable component of the State's flora is determined to be in jeopardy" (GS 19B 106: 202.12). (Endangered species may not be removed from the wild except when a permit is obtained for research, propagation, or rescue which will enhance the survival of the species.)

*-SC* - Special Concern: "Any species of plant in North Carolina which requires monitoring but which may be collected and sold under regulations adopted under the provisions of [the Plant Protection and Conservation Act]" (GS 19B 106:202.12). (Special Concern species which are not also listed as Endangered or Threatened may be collected from the wild and sold under specific regulations. Propagated material only of Special Concern species which are also listed as Endangered or Threatened may be traded or sold under specific regulations.)

*SR* - Significantly Rare: Species which are very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction (and sometimes also by direct exploitation or disease). These species are generally more common somewhere else in their ranges, occurring in North Carolina peripherally to their main ranges, mostly in habitats which are unusual in North Carolina. Also included are some species with 20-100 populations in North Carolina, if they also have only 50-100 populations rangewide and are declining.

*T* - Threatened: "Any resident species of plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (GS 19B 106:202.12). (Regulations are the same as for Endangered species.)

*-T* - Throughout: These species are rare throughout their ranges (fewer than 100 populations total).

## 5.0 REFERENCES

- Cotterman, Laura Mansberg. 1996. A Preliminary Inventory of the Natural Areas of Lee County, North Carolina. North Carolina Department of Environment and Natural Resources, North Carolina Natural Heritage Program, Raleigh, North Carolina.
- Elbroch, Mark. 2003. Mammal Tracks and Sign: A Guide to North American Species. Stackpole Books, Mechanicsburg, Pennsylvania.
- Griffith, G.E., J.M. Omernik, J.A. Comstock, M.P. Schafale, W.H. McNab, D.R. Lenat, T.F. MacPherson, J.B. Glover, and V.B. Shelburne. 2002. Ecoregions of North Carolina and South Carolina (poster). United States Geological Survey, Reston, Virginia.
- Martof, Bernard S., William M. Palmer, Joseph R. Bailey and Julian R. Harrison, III. 1980. Amphibians and Reptiles of the Carolinas and Virginia. The University of North Carolina Press, Chapel Hill, North Carolina.
- Menhinick, Edward F. 1991. The Freshwater Fishes of North Carolina. North Carolina Wildlife Commission, Raleigh, North Carolina.
- Natural Resources Conservation Service (NRCS). Soil Data Mart website, <http://soildatamart.nrcs.usda.gov/State.aspx>.
- North Carolina Division of Water Quality. 2000. 2000 Cape Fear River Basinwide Water Quality Plan. North Carolina Department of Environment and Natural Resources, Division of Water Quality, Raleigh, North Carolina.
- North Carolina Division of Water Quality. 2002. Stream Fish Community Assessment Program Database, <http://www.esb.enr.state.nc.us/NCIBI.htm>.
- North Carolina Division of Water Quality. 2005. 2005 Cape Fear River Basinwide Water Quality Plan. North Carolina Department of Environment and Natural Resources, Division of Water Quality, Raleigh, North Carolina.
- North Carolina Division of Water Quality. 2005. Identification Methods for the Origins of Intermittent and Perennial streams, Version 3.1. North Carolina Department of Environment and Natural Resources, Division of Water Quality, Raleigh, North Carolina.
- North Carolina Division of Water Quality. 2006. Standard Operating Procedures, Biological Monitoring: Stream Fish Community Assessment Program. North Carolina Department of Environment and Natural Resources, Division of Water Quality, Raleigh, North Carolina.
- North Carolina Division of Water Quality. 2007. North Carolina Water Quality Assessment and Impaired Waters List (2006 Integrated 305(b) and 303(d) Report). North Carolina Department of Environment and Natural Resources, Division of Water Quality, Raleigh, North Carolina.
- North Carolina Natural Heritage Program database of state protected species, rare species, and rare habitats, <http://www.ncnhp.org/Pages/heritagedata.html>.

North Carolina Natural Heritage Program. 2006. List of the Rare Animal Species of North Carolina. North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.

North Carolina Natural Heritage Program. 2006. List of Rare Plant Species of North Carolina. North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.

Radford, Albert E., Harry E. Ahles, and C. Ritchie Bell. 1968. Manual of the Vascular Flora of the Carolinas. The University of North Carolina Press, Chapel Hill, North Carolina.

Schafale, Michael P. and Alan S. Weakley. 1990. Classification of the Natural Communities of North Carolina, Third Approximation. North Carolina Natural Heritage Program, N.C. Department of Environment and Natural Resources, Raleigh, North Carolina.

Sibley, David Allen. 2000. The Sibley Guide to Birds. Alfred A. Knopf, New York, New York.

Simpson, Jerry V. 1989. Soil Survey of Lee County, North Carolina. United States Department of Agriculture, Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service).

United States Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Environmental Laboratory, Vicksburg, Mississippi.

United States Fish and Wildlife Service. 2006. Threatened and Endangered Species in North Carolina, <http://www.fws.gov/nc-es/es/countyfr.html>.

Weakley, Alan S. Unpublished. Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas. University of North Carolina Herbarium, University of North Carolina, Chapel Hill, North Carolina.

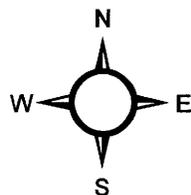
Webster, W.D., J.F. Parnell and W.C. Biggs. 1985. Mammals of the Carolinas, Virginia and Maryland. The University of Chapel Hill Press, Chapel Hill.

# **Appendix A:** Figures



**Legend**

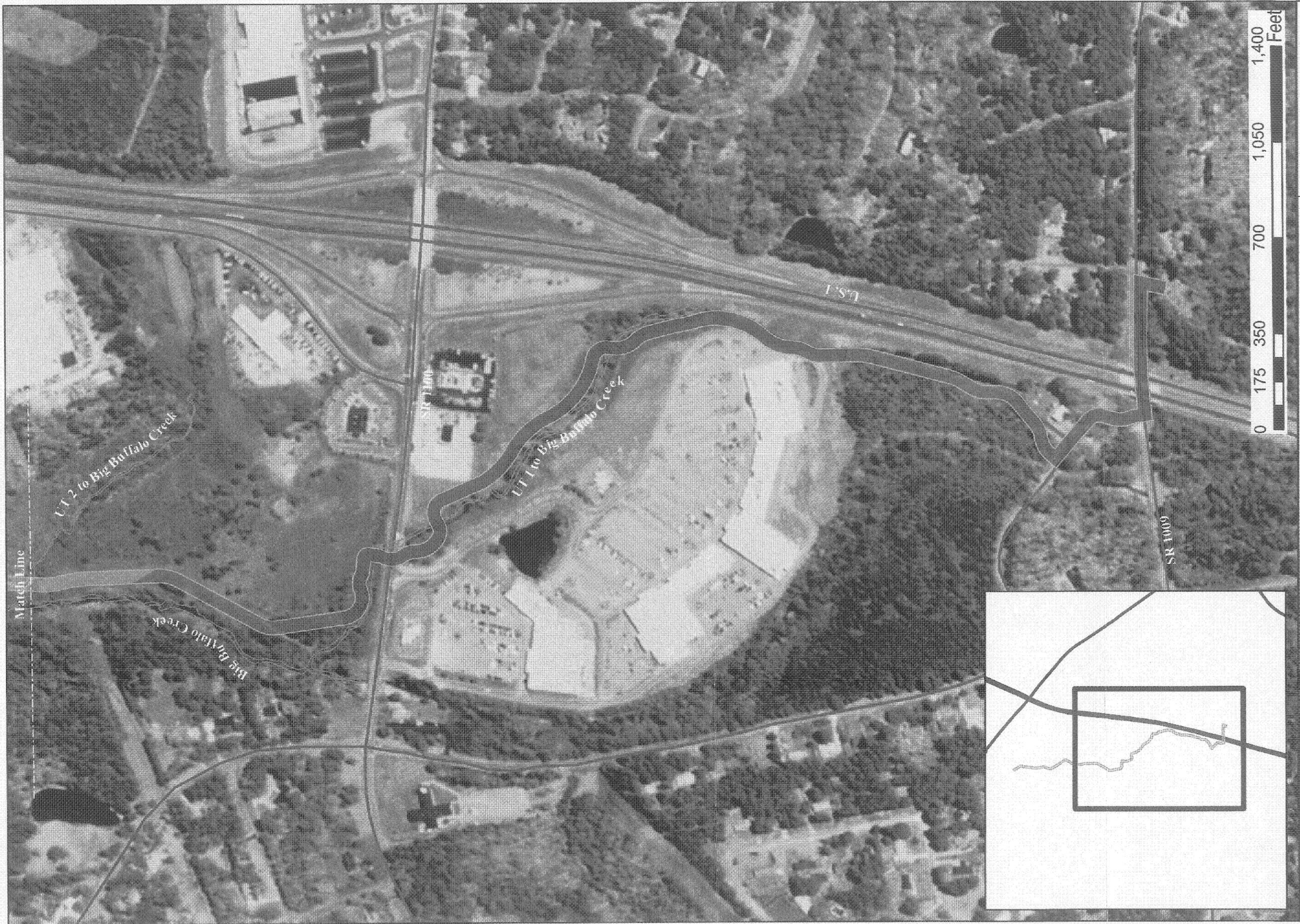
 Project Study Area



**FIGURE 1: PROJECT VICINITY AND STUDY AREA**

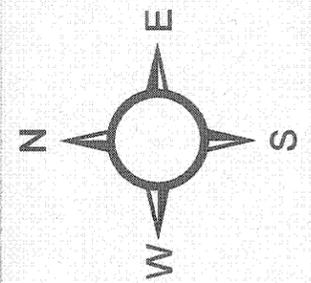
**TIP No: E-4981, Lee Co.**





**Legend**

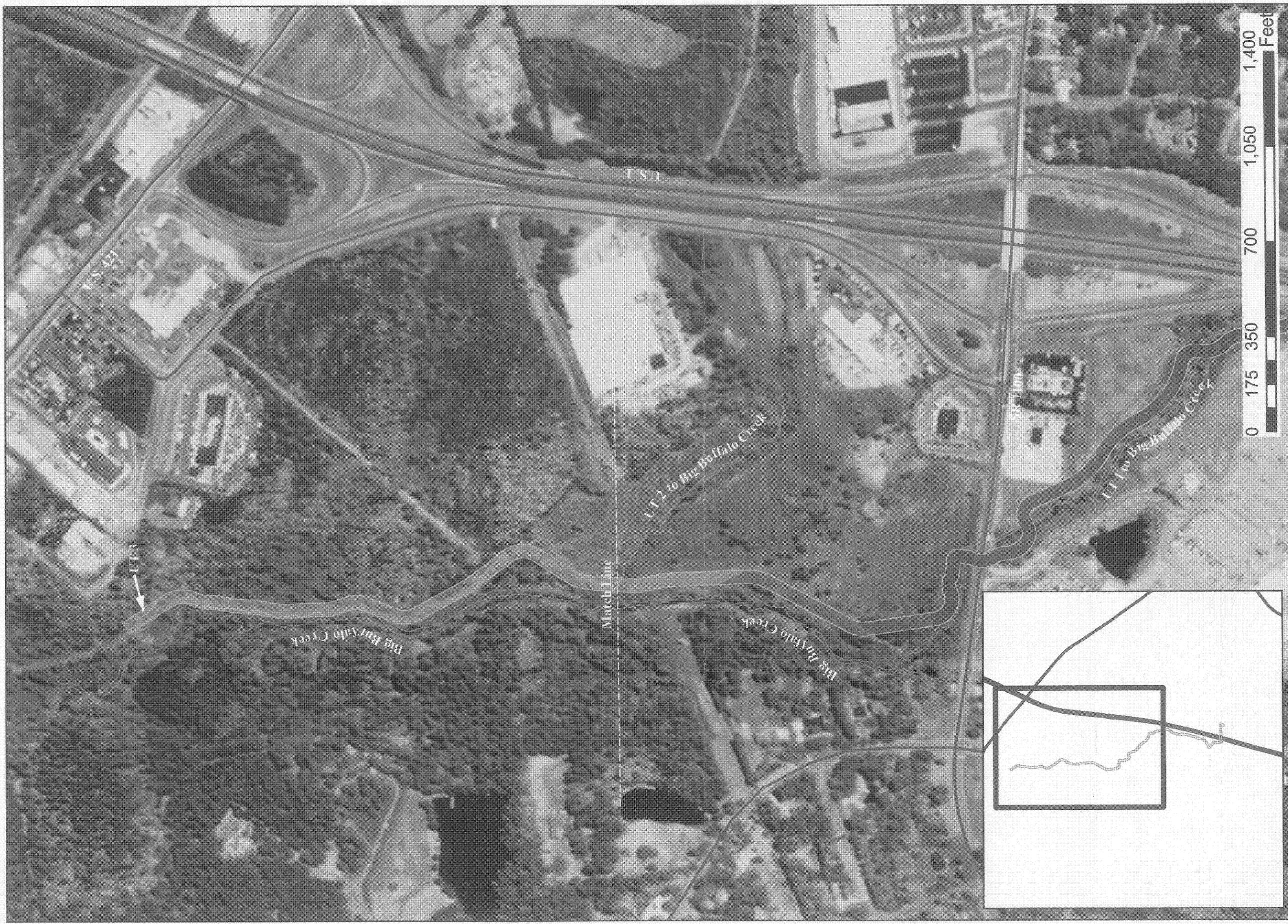
- Project Study Area
- Jurisdictional Streams
- Maintained/Disturbed
- Mixed Pine/Hardwood Forest
- Floodplain Forest



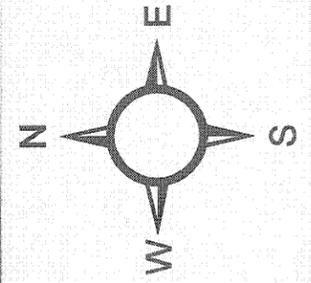
**FIGURE 2A: JURISDICTIONAL STREAMS AND TERRESTRIAL COMMUNITIES**

TIP No: E-4981, Lee Co.



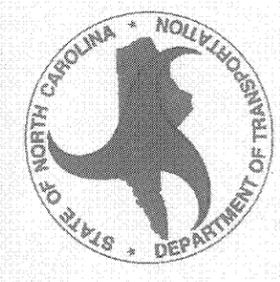


- Legend**
- Project Study Area
  - Jurisdictional Streams
  - Maintained/Disturbed
  - Mixed Pine/Hardwood Forest
  - Floodplain Forest



**FIGURE 2B: JURISDICTIONAL STREAMS AND TERRESTRIAL COMMUNITIES**

TIP No: E-4981, Lee Co.



**Appendix B:**  
**Stream Rating Forms**

North Carolina Division of Water Quality – Stream Identification Form; Version 3.1

Date: 5/21/07	Project: E-4981	Latitude:
Evaluator: Jim Mason, Ashli Fox, James Pfau	Site: VT 3	Longitude:
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30 <b>16.5</b>	County: Lee	Other e.g. Quad Name:

**A. Geomorphology (Subtotal = 6.5)**

	Absent	Weak	Moderate	Strong
1 <sup>a</sup> . Continuous bed and bank	0	1	2	3
2. Sinuosity	0	1	2	3
3. In-channel structure: riffle-pool sequence	0	1	2	3
4. Soil texture or stream substrate sorting	0	1	2	3
5. Active/relic floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	1	2	3
9 <sup>a</sup> Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. Second or greater order channel on existing USGS or NRCS map or other documented evidence.	No = 0		Yes = 3	

<sup>a</sup> Man-made ditches are not rated; see discussions in manual

**B. Hydrology (Subtotal = 6)**

14. Groundwater flow/discharge	0	1	2	3
15. Water in channel and > 48 hrs since rain, or Water in channel – dry or growing season	0	1	2	3
16. Leaf litter	1.5	1	0.5	0
17. Sediment on plants or debris	0	0.5	1	1.5
18. Organic debris lines or piles (Wrack lines)	0	0.5	1	1.5
19. Hydric soils (redoximorphic features) present?	No = 0		Yes = 1.5	

**C. Biology (Subtotal = 4)**

20 <sup>b</sup> . Fibrous roots in channel	3	2	1	0
21 <sup>b</sup> . Rooted plants in channel	3	2	1	0
22. Crayfish	0	0.5	1	1.5
23. Bivalves	0	1	2	3
24. Fish	0	0.5	1	1.5
25. Amphibians	0	0.5	1	1.5
26. Macroinvertebrates (note diversity and abundance)	0	0.5	1	1.5
27. Filamentous algae; periphyton	0	1	2	3
28. Iron oxidizing bacteria/fungus.	0	0.5	1	1.5
29 <sup>b</sup> . Wetland plants in streambed	FAC = 0.5; FACW = 0.75; OBL = 1.5 SAV = 2.0; Other = 0			

<sup>b</sup> Items 20 and 21 focus on the presence of upland plants, Item 29 focuses on the presence of aquatic or wetland plants.

Notes: (use back side of this form for additional notes.)

Sketch:

→ Rate not as ephemeral in PSA; however, since running constant flow best professional judgement is it is at least intermittent; non-judicially, though (stops b/f BBC rock)

→ subs out in SS line in PSA

1) wetted and channel width - 1 ft (w), 18" (c)      5) bank ht - 1-6"

2) depth - < 1"-2"; 10" pool at end      6) flow - weak

3) clarity - clear

4) substrate - silt

USACE AID# \_\_\_\_\_

DWQ# \_\_\_\_\_

Site # \_\_\_\_\_ (indicate on attached map)



### STREAM QUALITY ASSESSMENT WORKSHEET



*UT3 within Project Study Area*

Provide the following information for the stream reach under assessment:

- 1. Applicant's name: NCDOT
- 2. Evaluator's name: Jim Mason, Ashley Cox, James H. Flann
- 3. Date of evaluation: 5/21/07
- 4. Time of evaluation: 3:00p
- 5. Name of stream: UT3
- 6. River basin: Cape Fear
- 7. Approximate drainage area: \_\_\_\_\_
- 8. Stream order: 1st
- 9. Length of reach evaluated: 120-150'
- 10. County: Lee
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_

Latitude (ex. 34.872312): \_\_\_\_\_ Longitude (ex. -77.556611): \_\_\_\_\_

Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_

13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_

north of Spring Lane (SR 1100) East of BB Creek in a SS Line

14. Proposed channel work (if any): N/A

15. Recent weather conditions: clear, dry

16. Site conditions at time of visit: clear, dry, had not rained in sometime, channel free of H<sub>2</sub>O

17. Identify any special waterway classifications known:  Section 10  Tidal Waters  Essential Fisheries Habitat  Trout Waters  Outstanding Resource Waters  Nutrient Sensitive Waters  Water Supply Watershed  (I-IV)

18. Is there a pond or lake located upstream of the evaluation point? YES  NO  If yes, estimate the water surface area: \_\_\_\_\_

19. Does channel appear on USGS quad map? YES  NO  20. Does channel appear on USDA Soil Survey? YES  NO

21. Estimated watershed land use: 50% Residential 30% Commercial \_\_\_\_\_% Industrial \_\_\_\_\_% Agricultural 20% Forested \_\_\_\_\_% Cleared / Logged \_\_\_\_\_% Other ( \_\_\_\_\_ )

22. Bankfull width: 1 foot 23. Bank height (from bed to top of bank): 6 inches

24. Channel slope down center of stream:  Flat (0 to 2%)  Gentle (2 to 4%)  Moderate (4 to 10%)  Steep (>10%)

25. Channel sinuosity:  Straight  Occasional bends  Frequent meander  Very sinuous  Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 41 Comments: rated as ephemeral on DWA Rating sheet. However, there was constant running H<sub>2</sub>O from an unknown source to west of reach to determine if reach is intermittent. Now, it is dry, but since it is not hydrologically connected to the bed, H<sub>2</sub>O's may not be able to likely, source was a leaking pipe.

Evaluator's Signature James Mason Date 5/21/07

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change - version 06/03. To Comment, please call 919-876-8441 x 26.

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	0
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	3
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	4
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	4
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	1
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
STABILITY	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	0
	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	0
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	4
HABITAT	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	3
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	0
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	2
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	0
BIOLOGY	20	<b>Presence of stream invertebrates</b> (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						41

\* These characteristics are not assessed in coastal streams.