STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

February 5, 2008

US Army Corps of Engineers
Raleigh Field Office
6508 Falls of Neuse Road, Suite 120
Raleigh, NC 27615-6814

ATTENTION: Eric Alsmeyer
NCDOT Coordinator, Division 5

Dear Sir:

Subject: **Application for Section 404 Nationwide Permits 23, 33, and 13, Section 401 Water Quality Certification, and Neuse Riparian Buffer Authorization** for the replacement of Bridge No. 29 over Clarks Creek on SR 1007 (Poole Road), Wake County. Federal Aid Project Number BRSTP-1007(8), WBS No. 33637.1.1, State Project No. 8.2409201, Division 5, T.I.P No. B-4300.

$240.00 Debit from WBS Element 33637.1.1.

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 29 over Clarks Creek. The project proposes to demolish the existing bridge and replace with a reinforced concrete box-culvert because the drainage area is less than five square miles. The project involves constructing the box culvert on the existing alignment, while maintaining traffic on-site by a temporary detour. Please see the enclosed copies of the permit drawings, buffer drawings, design plans, and Pre-Construction Notification (PCN) for the above-referenced project. The CE was completed for this project in January 2006 and the Construction Consultation was completed in October 2007; each was distributed shortly thereafter. Additional copies of these documents are available upon request.

IMPACTS TO WATERS OF THE UNITED STATES

The project is located in the Neuse River Basin (subbasin 03-04-02) and USGS hydrologic unit 03020201. Clarks Creek and its unnamed tributary (intermittent stream), located in the project study area, are currently unclassified by the NC Division of Water Quality (DWQ). However, the Neuse River downstream of the project area and nearby named tributaries to the Neuse River all have a DWQ best use classification of C-NSW. No designated Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supply I (WS-I), or Water Supply (WS-II), waters occur within 1.0 mile of the study corridor. No portion of Clarks Creek or its tributary, or other surface waters within 1.0 mile of the project are listed on the North Carolina Division of Water Quality's (NCDWQ) 2006 Final 303(d) List of Impaired Waters.

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

TELEPHONE: 919-715-1334 or
919-715-1335

FAX: 919-715-5501

WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD. SUITE 240
RALEIGH NC 27604

One wetland (Site 1) is located within the project area, approximately 80 feet northeast of the bridge. It is a forested wetland adjacent to Clarks Creek. It is considered riverine based upon its location within the Clarks Creek floodplain and is classified as a palustrine, seasonally flooded, forested wetland supporting broad-leaved deciduous vegetation (PFO1C, Cowardin classification).

Streams and wetlands were verified during a site visit with the USACE on June 8, 2004. No jurisdictional determination letter was sent by the USACE. NCDOT does not request the USACE to evaluate this site using the Rapanos guidance. Instead, NCDOT is satisfied with the delineation as reviewed and approved in the field on June 8, 2004, and request that the USACE evaluate this permit application based on that field review.

Permanent Impacts

There will be 148 feet of surface water impacts to Clarks Creek (Site 1); 63 feet due to the box culvert installation and 85 feet of channel improvements and rip rapping along the stream banks for bank stabilization.

Temporary Impacts

There will be 70 feet (0.04 acre) of temporary impacts to Clarks Creek (Site 1) due to the permanent drainage easement access. Another 55 feet (0.03 acre) of surface water impacts to Clarks Creek (Site 1) will occur resulting from the construction of a temporary culvert for the onsite detour. Also, 0.02 acres of temporary wetland impacts (Site 1) will occur in association with the onsite detour.

Approximately 95 linear feet (<0.01 acre) of surface water impacts to the UT to Clarks Creek (Site 2) will occur due to its close vicinity with the construction of a rip-rap barrier along the roadway fill slope. The rip-rap barrier will help stabilize the roadway fill slope and prevent filling in of the channel of the UT to Clarks Creek.

Utility Impacts

No utility impacts are anticipated from project construction.

Bridge Demolition

The existing bridge was constructed in 1961 and is 61 feet in length. It consists of two spans 29.5 feet each. The superstructure consists of a reinforced concrete floor on timber joists. The deck is composed of prestressed concrete channels and metal railings. The substructure consists of prestressed concrete caps on timber piles. The existing bridge will be removed without dropping components into Clarks Creek. Best Management Practices for Bridge Demolition and Removal will be implemented during the demolition of this bridge.

IMPACTS TO NEUSE RIPARIAN BUFFER

This project is located within the Neuse River Basin and is therefore subject to Neuse River riparian buffer rules (15A NCAC 2B .0233). The construction of the culvert and new road alignment will impact buffers along Clarks Creek. These buffer impacts are classified as impacts resulting from a road crossing and are allowable with mitigation because over 150 linear feet (approximately 195 feet) of stream buffers are being impacted (Table 1). Impacts to the buffers of the UT to Clarks Creek are categorized as road impacts other than crossings of streams. These impacts are allowable with mitigation (Table 1). Temporary buffer impacts classified as allowable will occur along the onsite detour. There will be

11,376 square feet of mitigable buffer impacts for Zone 1 and 3,933 square feet of mitigable buffer impacts for Zone 2.

Table 1. Neuse River Buffer Impacts

	Road Crossing (Culvert)	Impacts Other Than Road Crossing	Onsite Detour (Temporary)
Zone 1 Impact (sq. ft)	10,254	1,122	2,955
Zone 2 Impact (sq. ft)	3,933	0	1,956
Mitigation requirements (exempt, allowable, or allowable with mitigation)	Allowable with mitigation	Allowable with mitigation	Allowable

Practical Alternatives Analysis

This bridge has been determined to be structurally deficient and functionally obsolete. The replacement of this inadequate structure will result in safer and more efficient traffic operations. Because this bridge needs to be replaced, impacts to the riparian buffers of Clarks Creek and the UT to Clarks Creek are unavoidable.

Utility Impacts to Riparian Buffers

No utility impacts are anticipated from project construction.

RESTORATION PLAN

Following construction of the culvert, all material used in the construction of the structure will be removed. The impact area associated with the culvert is expected to recover naturally, since the natural streambed and plant material will not be removed. NCDOT does not propose any additional planting in this area. Class II riprap and filter fabric will be used for bank stabilization. Pre-project elevations will be restored.

Following construction of the culvert, all material used in the construction of the structure will be removed. Class II riprap and filter fabric will be used for bank stabilization. Pre-project elevations will be restored.

REMOVAL AND DISPOSAL PLAN

The contractor will be required to submit a reclamation plan for the removal of and disposal of all material off-site at an upland location. The contractor will use excavation equipment for removal of any earthen material. Heavy–duty trucks, dozers, cranes and various other pieces of mechanical equipment necessary for construction of roadways, bridges, and culverts will be used on site. All material placed in the stream will be removed from the stream at that time. The contractor will have the option of reusing any of the materials that the engineer deems suitable in the construction of project. After the erosion control devices are no longer needed, all temporary materials will become the property of the contractor.

FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under the provisions of the Endangered Species Act of 1973, as amended. As of December 20, 2007 the US Fish and Wildlife Service (USFWS) lists three federally protected species for Wake County (Table 2). One species (bald eagle) was officially delisted on August 8, 2007 (CFR 50 Part 17). The biological conclusion for bald eagle in the CE was "No Effect" with no

habitat available in the project area. The bald eagle still remains protected under the Bald and Golden Eagle Protection Act. A review of the Natural Heritage Program database in December 2007 revealed no occurrences of these species within 1.0 mile of the project study area.

Table 2. Federally Protected Species in Wake County, NC

Common Name	Scientific Name	Federal Status	Biological Conclusion	Habitat Present
Bald eagle	*Haliaeetus leucocephalus*	Delisted	Not Required	No
Red-cockaded woodpecker	*Picoides borealis*	Endangered	No Effect	No
Dwarf wedgemussel	*Alasmidonta heterodon*	Endangered	No Effect	No
Michaux's sumac	*Rhus michauxii*	Endangered	No Effect	No

MITIGATION OPTIONS

Avoidance and 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 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 US. The following is a list of the project's jurisdictional stream, wetland, and Neuse Buffer avoidance/minimization activities proposed or completed by NCDOT:

Avoidance/Minimization

- An anadromous fish moratorium from February 15 to June 15 will be adhered to during project construction.
- The roadway fill slope has been steepened to a minimum of 2 to 1 ratio and lined with rip-rap to avoid permanent impact to the UT to Clarks Creek.
- Best Management Practices for Protection of Surface Waters will be implemented.
- The culvert will be buried one foot below the streambed in order to maintain aquatic habitat and flow regime.

Compensatory Mitigation

The Jeffreys Warehouse Mitigation Site was originally constructed as on-site mitigation for R-1030, US 117 from south of NC 581 in Goldsboro to the US 264 Bypass in Wilson. There are two parcels associated with this mitigation site. The west parcel (approximately 50.2 acres) is bounded on the northwest by the Little River and on the southeast by the US 117 right-of-way. The east parcel (approximately 37.5 acres) is bounded on the northwest by the US 117 right-of-way, on the northeast by a Wayne County Board of Education school bus maintenance shop, and on the east and southeast by private property. The site was constructed in 2007 and has undergone one year of hydrologic and vegetative monitoring.

The site was originally debited for R-1030AA. To offset the unavoidable 15,309 sq. ft. (11,376 sq. ft. for Zone 1 and 3,933 sq. ft. for Zone 2) of buffer impacts associated with T.I.P B-4300, the Jeffreys Warehouse Mitigation Site will be debited 40,028 sq. ft. (0.92 acres) of Neuse Buffer Restoration.

No compensatory mitigation for permanent stream impacts is proposed. Streambanks along Clarks Creek are currently unstable in the project area. Approximately 85 feet of the 148 feet of total permanent impacts are for bank stabilization and do not constitute loss of waters of the U.S. The remaining minimal impact of 63 feet (culvert) is in a degraded section of stream directly under the existing bridge.

SCHEDULE

The project calls for a letting of August 19, 2008 (review date of July 1, 2008) with a date of availability of September 30, 2008. It is expected that the contractor will choose to start construction in October 2008.

REGULATORY APPROVALS

Section 404 Permit: The project has been processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR 771.115(b). The NCDOT requests that these activities be authorized by a Nationwide Permit 23 (72 FR 11092; March 19, 2007). We are also requesting the issuance of a Nationwide Permit 33 for the work associated with the onsite detour and other temporary impacts.

Section 401 Certification: We anticipate 401 General Certification numbers 3701 and 3688 will apply to this project. This project will impact greater than 40 linear feet of stream and impact Neuse Riparian Buffers, requiring written concurrence. In accordance with 15A NCAC 2H, Section .0500(a) and 15A NCAC 2B.0200 we are providing five copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their review. In compliance with Section 143-215.3D(e) of the NCAC we will provide $240.00 to act as payment for processing the Section 401 permit application.

Buffer Authorization: This project has been designed to comply with the Neuse Riparian Buffer Regulations (15A NCAC 2B.0242). NCDOT requests a Neuse Riparian Buffer Authorization from the Division of Water Quality.

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 call Greg Price at 715-5533.

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
- Mr. Michael Street, NCDMF

w/o attachment (see permits 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. J. Wally Bowman, PE., Division Engineer
- Mr. Chris Murray, DEO
- 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
- Ms. Theresa Ellerby, PDEA Project Planning Engineer
- Ms. LeiLani Paugh, NEU
- Mr. Randy Griffin, NEU

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:
   - ☒ Section 404 Permit
   - ☐ Section 10 Permit
   - ☒ 401 Water Quality Certification
   - ☒ Riparian or Watershed Buffer Rules
   - ☐ Isolated Wetland Permit from DWQ
   - ☐ Express 401 Water Quality Certification

2. Nationwide, Regional or General Permit Number(s) Requested: NW 23, 33, & 13

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: North Carolina Department of Transportation
   Mailing Address: Gregory J. Thorpe, Ph.D., Manager
   Project Development and Environmental Analysis Branch
   1598 Mail Service Center
   Raleigh, NC 27699-1598
   Telephone Number: 919-733-3141 Fax Number: 919-733-9794
   E-mail Address: gthorpe@dot.state.nc.us

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: Replace Bridge No. 29 over Clarks Creek on SR 1007 with a culvert.

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-4300

3. Property Identification Number (Tax PIN): N/A

4. Location
   County: Wake Nearest Town: Raleigh
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers/names, landmarks, etc.): Site is located on SR 1007 (Poole Road) near SR 2518 (Hodge Road) intersection.

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): 78.5078 °N 35.7540 °W

6. Property size (acres): Please refer to attached drawings.

7. Name of nearest receiving body of water: Clarks Creek

8. River Basin: Neuse
   (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/.)

9. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: The local area surrounding the proposed project consists of gently rolling hills and land use is best described as residential development and natural forest vegetation.

10. Describe the overall project in detail, including the type of equipment to be used: NCDOT proposes to replace Bridge No. 29 over Clarks Creek with a box culvert on SR 1007. Heavy construction equipment such as cranes, excavators and dump trucks will be utilized during construction.

11. Explain the purpose of the proposed work: The existing bridge was constructed in 1961 and received a sufficiency rating of 7.0 out of a possible 100 for a new structure during the last bridge inspection. Based on this rating, the bridge is considered functionally obsolete and structurally deficient. The project proposes to demolish the existing bridge and replace with a reinforced concrete box-culvert, resulting in safer transportation.

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. Streams and wetlands were verified during site visit on June 8, 2004. No JD letter was sent by USACE. Per personal conversation with Eric Alsmeyer on December 12, 2008, no Rapanos forms are necessary.

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.

1. Provide a written description of the proposed impacts: Approximately 148 linear feet of warm perennial stream will be impacted resulting from a box culvert. Another 125 and 95 linear feet for Clarks Creek and UT to Clarks Creek, repectively, will be temporarily impacted. Aproximately 0.02 acres of wetland will be temporarily impacted by onsite detour.

2. 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)
Site 1	Temporary road fill	Forested	Yes	20	0.02
Total Wetland Impact (acres)					0.02

3. List the total acreage (estimated) of all existing wetlands on the property: approx. 0.1 acre

4. 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)
Site 1 (Perm)	Clarks Creek	Box Culvert	Perennial	25 feet	148	0.08
Site 1 (Temp)	Clarks Creek	Box Culvert	Perennial	25 feet	70	0.04
Site 1 (Temp)	Clarks Creek	Temp Culvert	Perennial	25 feet	55	0.03
Site 2 (Temp)	UT to Clarks Creek	Temp Access	Intermittent	2 feet	95	< 0.01
Total Stream Impact (by length and acreage)					368	0.15

5. 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)
N/A				
Total Open Water Impact (acres)				0

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

Stream Impact (acres):	0.15
Wetland Impact (acres):	0.02
Open Water Impact (acres):	NA
Total Impact to Waters of the U.S. (acres)	0.17
Total Stream Impact (linear feet):	368

7. 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.
N/A

8. 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.): N/A
Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.): N/A
Current land use in the vicinity of the pond: N/A
Size of watershed draining to pond: N/A Expected pond surface area: N/A

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 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.
   Compensatory mitigation for permanent stream impacts is not proposed (see cover letter).

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):_____
Amount of buffer mitigation requested (square feet):_____
Amount of Riparian wetland mitigation requested (acres):_____
Amount of Non-riparian wetland mitigation requested (acres):_____
Amount of Coastal wetland mitigation requested (acres):_____

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	11,376	3	34,128
2	3,933	1.5	5,900
Total	15,309		40,028

* 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. Mitigation will be provided by NCDOT, utilizing surplus credits from the Jeffereys Warehouse mitigation project located in HUC 03020201.

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).

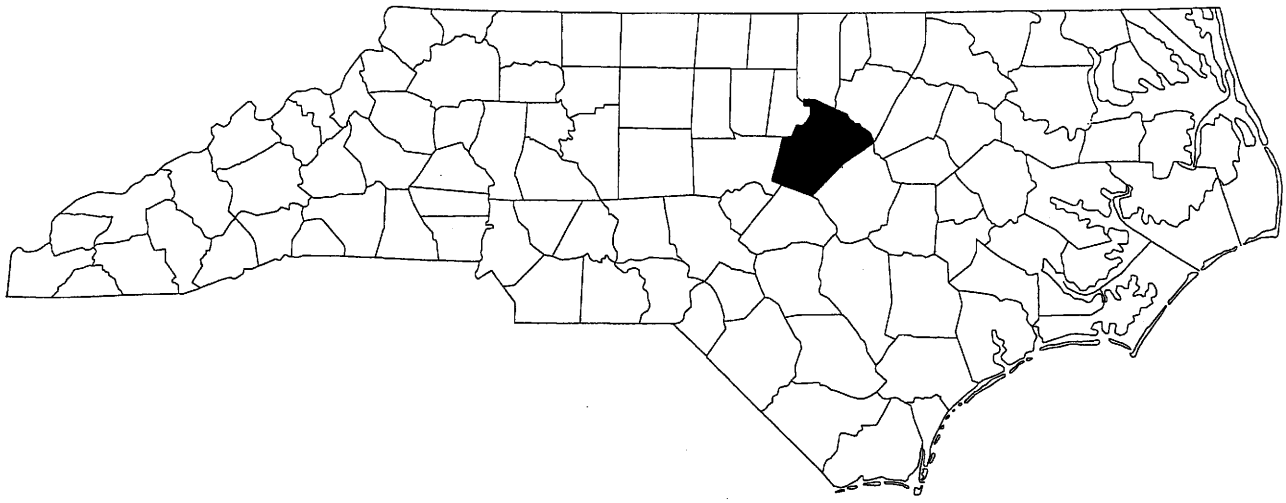
N/A

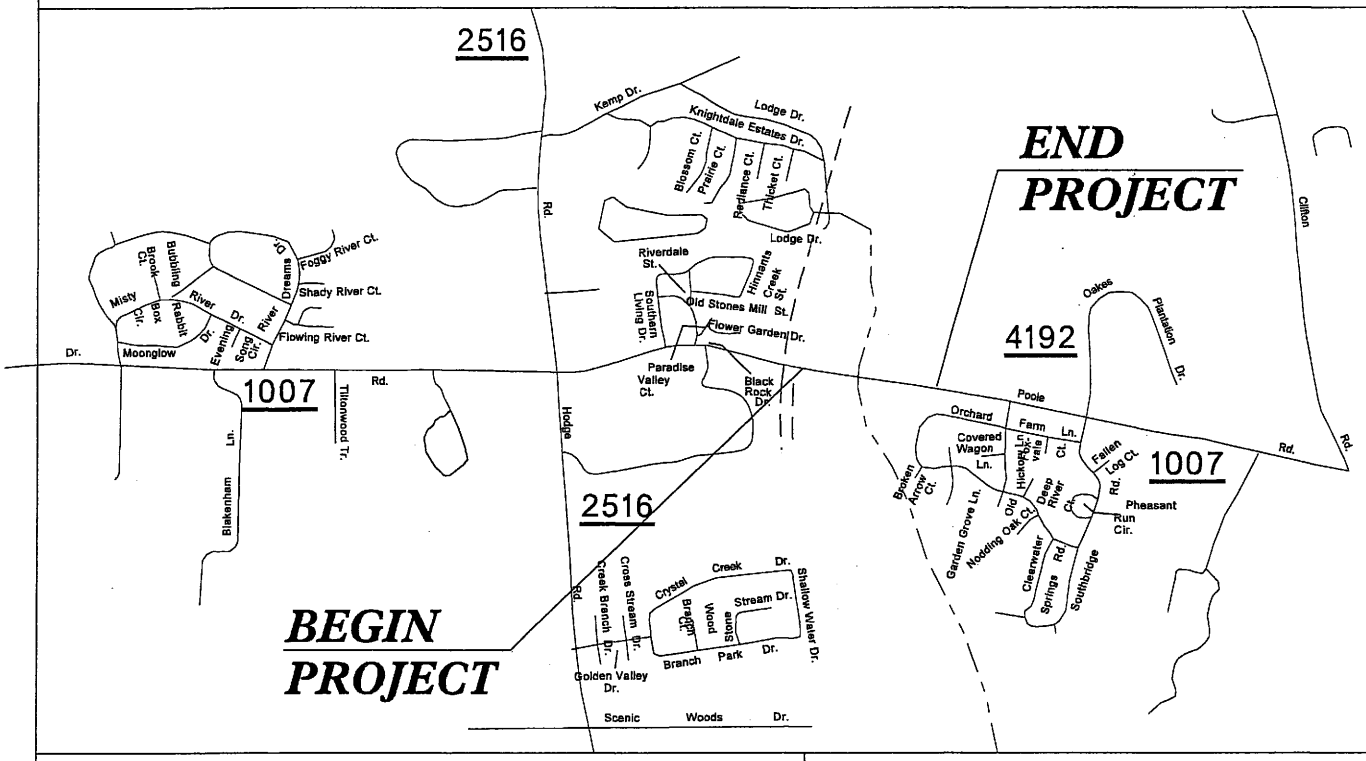
E.L. Lusk 2.5.08

Applicant/Agent's Signature **Date**

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

NORTH CAROLINA





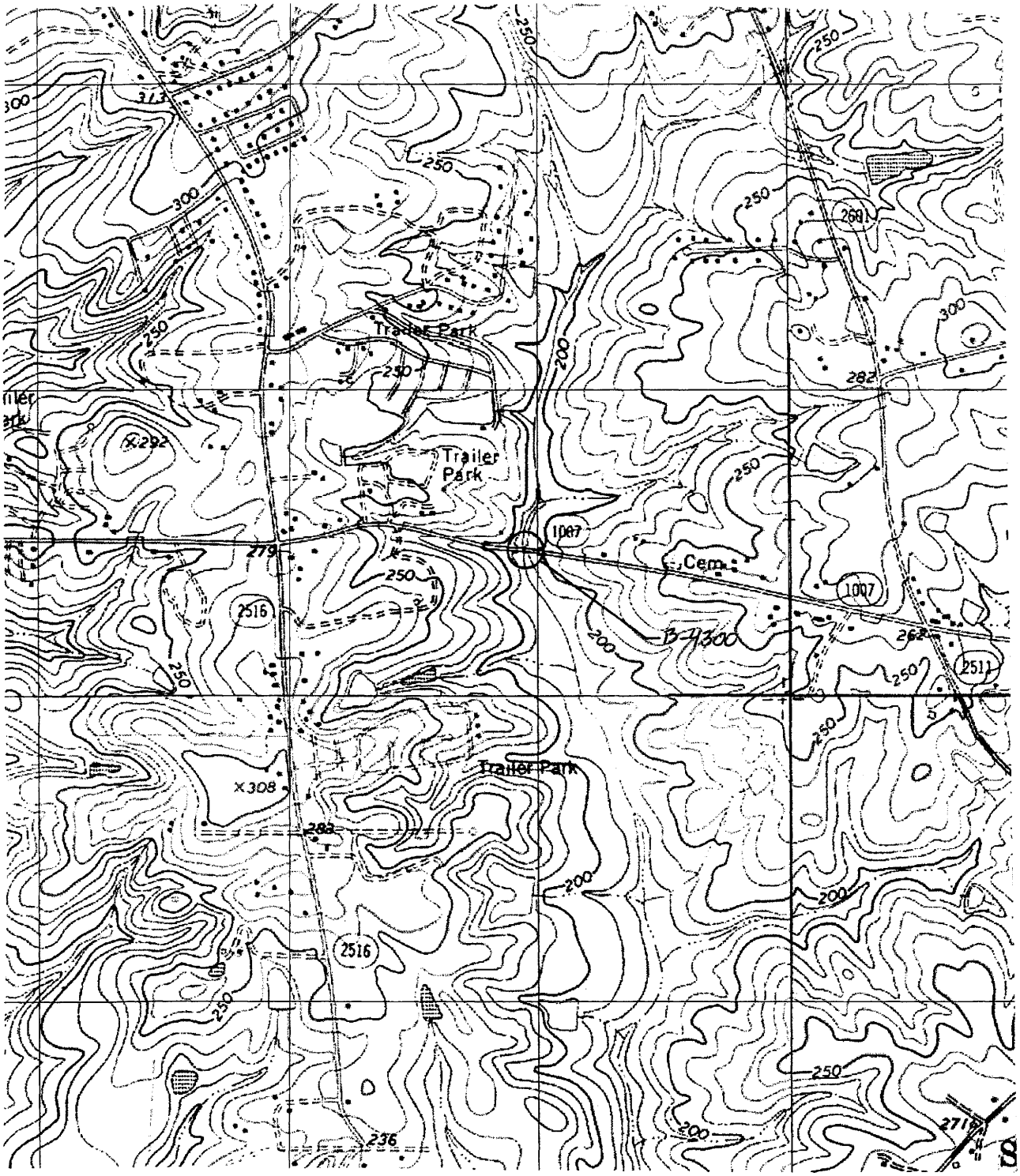
VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4300 (BRIDGE #29)
BRIDGE NO. 29 OVER
CLARKS CREEK
ON SR 1007
(POOLE ROAD)

SHEET 1 OF 10

10/1/2007



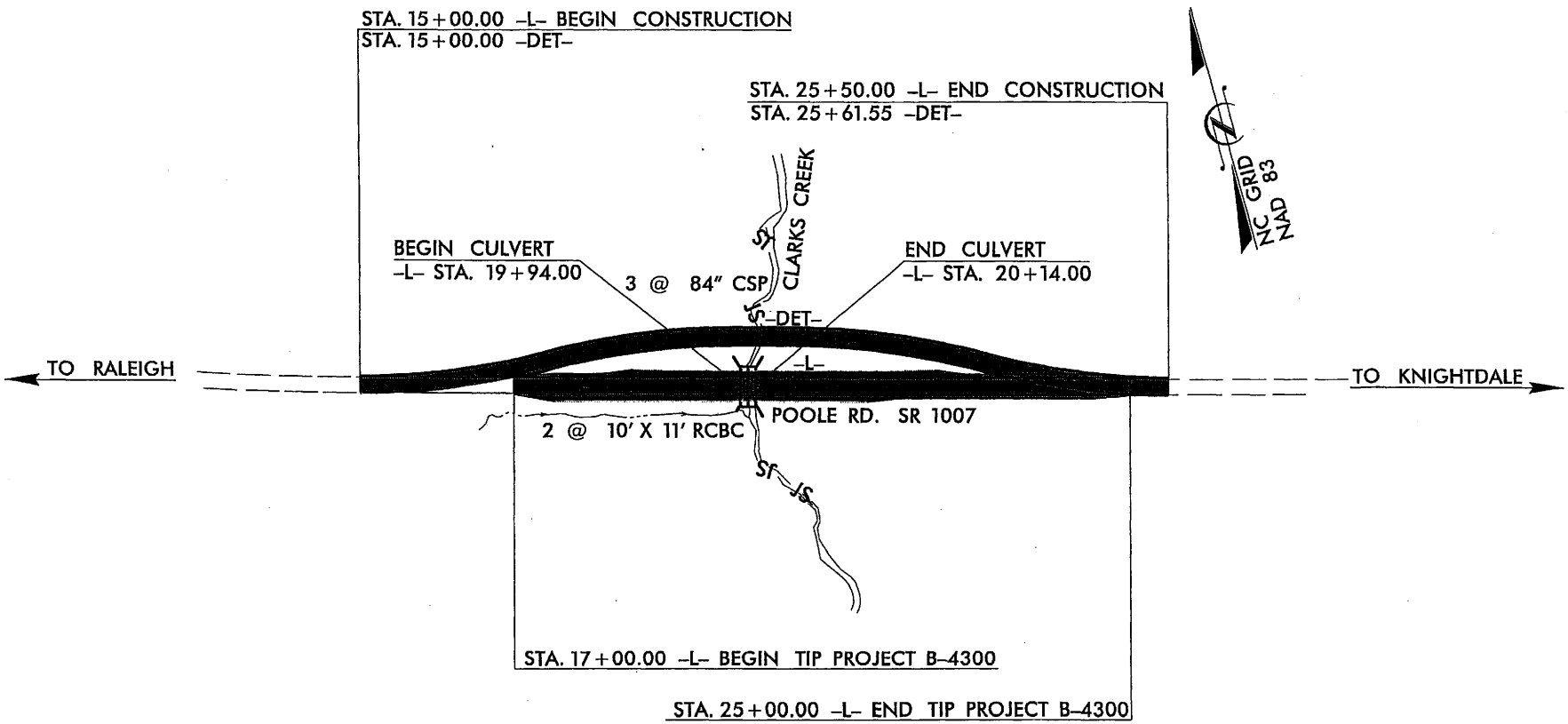
TOPO MAP

SCALE: 1" : 1500'

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4300 (BRIDGE #29)
BRIDGE NO. 29 OVER
CLARKS CREEK
ON SR 1007
(POOLE ROAD)

SHEET 2 OF 10 10/1/2007



SITE MAP

NOT TO SCALE

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4300 (BRIDGE #29)
BRIDGE NO. 29 OVER
CLARKS CREEK
ON SR 1007
(POOLE ROAD)

SHEET 3 OF 10 10/1/2007

PROPERTY OWNERS

NAMES AND ADDRESSES

	NAMES	ADDRESSES
2	George H. Turner	1825 Pictou Road Raleigh, NC 27606
3	Eugene Banks	7429 Poole Road Raleigh, NC 27610
4	Andrew P. Broadie	7409 Poole Road Raleigh, NC 27610
5	Valley Woods Mobile Estates	2725 Hodge Road Knightdale, NC 27545

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4300 (BRIDGE #29)
BRIDGE NO. 29 OVER
CLARKS CREEK
ON SR 1007
(POOLE ROAD)

SHEET 4 OF 10 10/1/2007

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
		TEMPORARY										
1	20+14 TO 20+31-DET- LT	CULVERT (3@84" CSP)							0.03		55	
1	20+04 -L-LT/RT	CULVERT (2@10'X11' RCBC)						0.08	0.04	148	70	
1	20+70 TO 21+15 - DET - LT	Detour Roadway		0.02								
2	19+00 TO 19+94 - L - RT	Mainline Roadway (Unnamed Tributary)							<0.01		95	
TOTALS:				0.02				0.08	0.07	148	220	

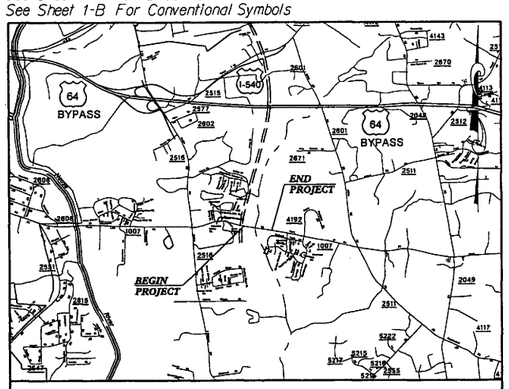
NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
Wake County
Project: B-4300 (Bridge #29)

09/08/99

TIP PROJECT: B-4300

CONTRACT:

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4300	1	

W.B.S. ELEMENT	F. A. PROJ. NO.	DESCRIPTION
33637.1.1	BRSTP-1007(8)	P.E.
33637.2.1	BRSTP-1007(8)	R/W, UTL.

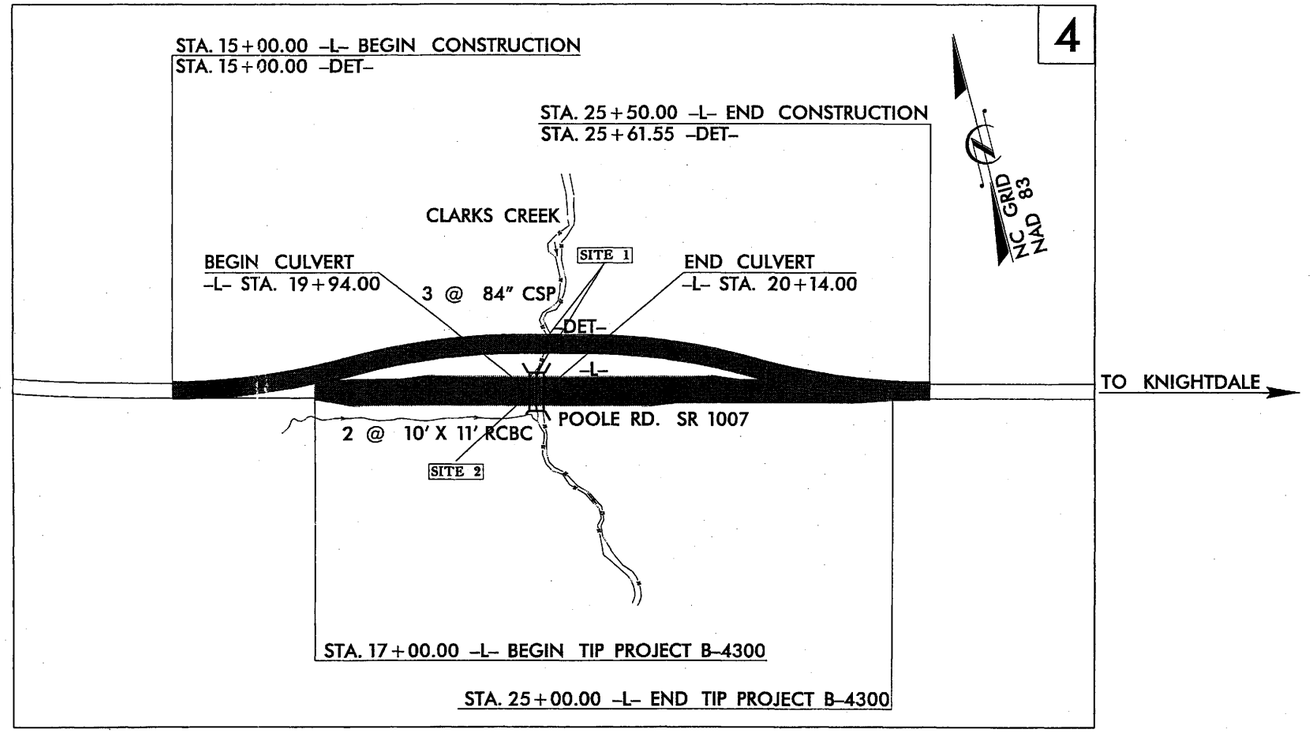
LOCATION: BRIDGE NO. 29 OVER CLARKS CREEK ON SR 1007

TYPE OF WORK: PAVING, GRADING, DRAINAGE AND CULVERT

Permit Drawing
Sheet 6 of 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STREAM & WETLAND IMPACTS



MULKEY
ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
www.mulkeyinc.com

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHOULD BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 8,900
ADT 2030 = 19,500
DHV = 10 %
D = 75 %
T = 6 %*
V = 60 MPH

* TTST 1% DUAL 5%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4300 = .148 MILES
LENGTH STRUCTURE TIP PROJECT B-4300 = .004 MILES
TOTAL LENGTH TIP PROJECT B-4300 = .152 MILES

Prepared In the Office of:
MULKEY
ENGINEERS & CONSULTANTS
FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
AUGUST 17, 2007

LETTING DATE:
AUGUST 19, 2008

TIM JORDAN, PE
ROADWAY PROJECT ENGINEER

JEFF RECK, PE
HYDRAULIC PROJECT ENGINEER

DOUG TAYLOR, PE
NCDOT ROADWAY DESIGN PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

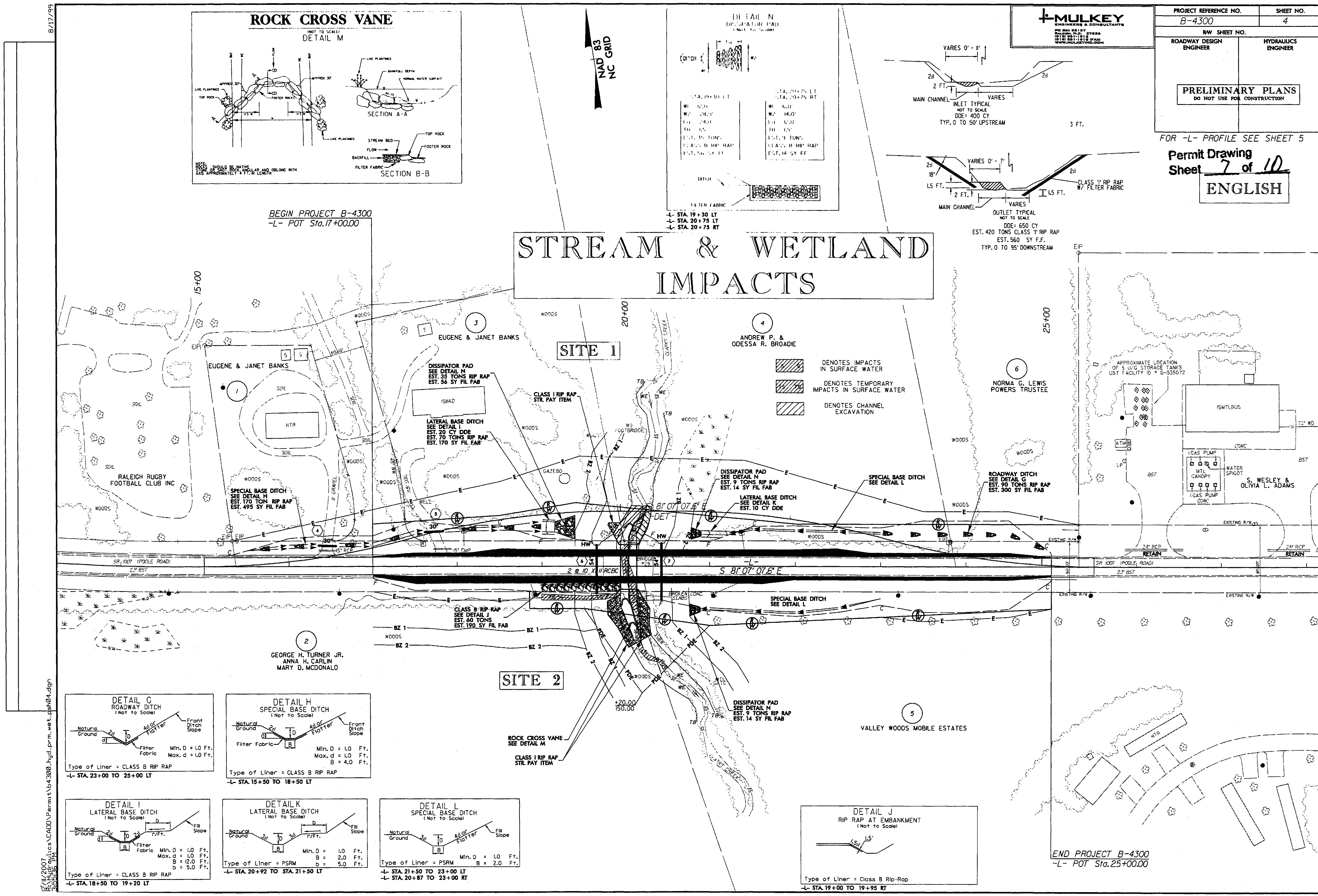
ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

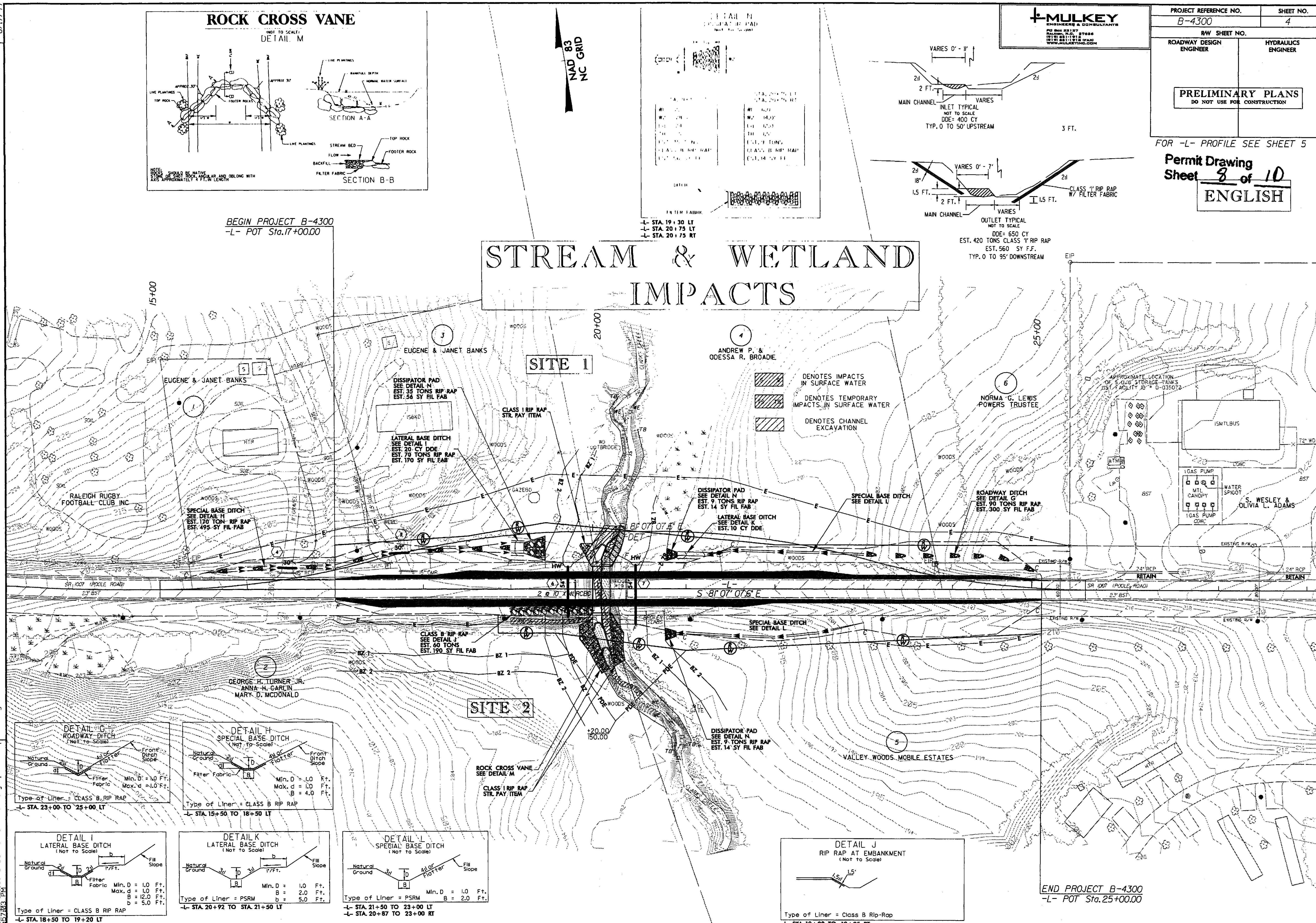
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

11/5/2007
R:\Hydraulics\CADD\Permit\b4300_hyd_prm_wet_tsh.dgn
11:58:14 AM



PROJECT REFERENCE NO. B-4300
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
MULKEY ENGINEERS & CONSULTANTS
FOR -L- PROFILE SEE SHEET 5
Permit Drawing Sheet 7 of 10
ENGLISH
ROCK CROSS VANE
(NOT TO SCALE)
DETAIL M
SECTION A-A
SECTION B-B
DETAIL N
DISSIPATOR PAD
-L- STA. 19+30 LT
-L- STA. 20+75 LT
-L- STA. 20+75 RT
NAD 83 NC GRID
VARIES 0' - 11'
MAIN CHANNEL
INLET TYPICAL
NOT TO SCALE
DDE= 400 CY
TYP. 0 TO 50' UPSTREAM
3 FT.
VARIES 0' - 7'
CLASS 'I' RIP RAP W/ FILTER FABRIC
OUTLET TYPICAL
NOT TO SCALE
DDE= 650 CY
EST. 420 TONS CLASS 'I' RIP RAP
EST. 560 SY F.F.
TYP. 0 TO 95' DOWNSTREAM
BEGIN PROJECT B-4300
-L- POT Sta.17+00.00
STREAM & WETLAND IMPACTS
SITE 1
SITE 2
EUGENE & JANET BANKS
RALEIGH RUGBY FOOTBALL CLUB INC
ANDREW P. & ODESSA R. BROADIE
NORMA G. LEWIS POWERS TRUSTEE
S. WESLEY & OLIVIA L. ADAMS
GEORGE H. TURNER JR. ANNA H. CARLIN MARY D. MCDONALD
VALLEY WOODS MOBILE ESTATES
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES CHANNEL EXCAVATION
DISSIPATOR PAD SEE DETAIL N EST. 35 TONS RIP RAP EST. 56 SY FIL FAB
CLASS I RIP RAP STR. PAY ITEM
LATERAL BASE DITCH SEE DETAIL I EST. 20 CY DDE EST. 70 TONS RIP RAP EST. 170 SY FIL FAB
SPECIAL BASE DITCH SEE DETAIL H EST. 170 TON RIP RAP EST. 495 SY FIL FAB
DISSIPATOR PAD SEE DETAIL N EST. 9 TONS RIP RAP EST. 14 SY FIL FAB
LATERAL BASE DITCH SEE DETAIL K EST. 10 CY DDE
SPECIAL BASE DITCH SEE DETAIL L
ROADWAY DITCH SEE DETAIL G EST. 90 TONS RIP RAP EST. 300 SY FIL FAB
CLASS B RIP RAP SEE DETAIL J EST. 60 TONS EST. 190 SY FIL FAB
ROCK CROSS VANE SEE DETAIL M
SR 1007 (POOLE ROAD)
S 81° 07' 07.6" E
2 @ 10 X 11 RCBC
DETAIL G ROADWAY DITCH (Not to Scale)
Type of Liner = CLASS B RIP RAP
-L- STA. 23+00 TO 25+00 LT
DETAIL H SPECIAL BASE DITCH (Not to Scale)
Type of Liner = CLASS B RIP RAP
-L- STA. 15+50 TO 18+50 LT
DETAIL I LATERAL BASE DITCH (Not to Scale)
Type of Liner = CLASS B RIP RAP
-L- STA. 18+50 TO 19+20 LT
DETAIL K LATERAL BASE DITCH (Not to Scale)
Type of Liner = PSRM
-L- STA. 20+92 TO STA. 21+50 LT
DETAIL L SPECIAL BASE DITCH (Not to Scale)
Type of Liner = PSRM
-L- STA. 21+50 TO 23+00 LT
-L- STA. 20+87 TO 23+00 RT
DETAIL J RIP RAP AT EMBANKMENT (Not to Scale)
Type of Liner = Class B Rip-Rap
-L- STA. 19+00 TO 19+95 RT
END PROJECT B-4300
-L- POT Sta.25+00.00
REVISIONS
8/17/99



PROJECT REFERENCE NO. B-4300
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
MULKEY ENGINEERS & CONSULTANTS
FOR -L- PROFILE SEE SHEET 5
Permit Drawing Sheet 8 of 10
ENGLISH
STREAM & WETLAND IMPACTS
ROCK CROSS VANE
(NOT TO SCALE)
DETAIL M
SECTION A-A
SECTION B-B
NAD 83 NC GRID
DETAIL N
-L- STA. 19+30 LT
-L- STA. 20+75 LT
-L- STA. 20+75 RT
VARIES 0' - 11'
MAIN CHANNEL
INLET TYPICAL
NOT TO SCALE
DDE= 400 CY
TYP. 0 TO 50' UPSTREAM
VARIES 0' - 7'
CLASS 'I' RIP RAP W/ FILTER FABRIC
OUTLET TYPICAL
NOT TO SCALE
DDE= 650 CY
EST. 420 TONS CLASS 'I' RIP RAP
EST. 560 SY F.F.
TYP. 0 TO 95' DOWNSTREAM
BEGIN PROJECT B-4300
-L- POT Sta.17+00.00
END PROJECT B-4300
-L- POT Sta.25+00.00
SITE 1
SITE 2
EUGENE & JANET BANKS
ANDREW P. & ODESSA R. BROADIE
NORMA G. LEWIS POWERS TRUSTEE
RALEIGH RUGBY FOOTBALL CLUB INC
GEORGE H. TURNER JR. ANNA H. CARLIN MARY D. MCDONALD
VALLEY WOODS MOBILE ESTATES
S. WESLEY & OLIVIA L. ADAMS
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES CHANNEL EXCAVATION
DISSIPATOR PAD SEE DETAIL N EST. 35 TONS RIP RAP EST. 56 SY FIL FAB
CLASS I RIP RAP STR. PAY ITEM
LATERAL BASE DITCH SEE DETAIL I EST. 20 CY DDE EST. 79 TONS RIP RAP EST. 170 SY FIL FAB
SPECIAL BASE DITCH SEE DETAIL H EST. 170 TON RIP RAP EST. 495 SY FIL FAB
DISSIPATOR PAD SEE DETAIL N EST. 9 TONS RIP RAP EST. 14 SY FIL FAB
LATERAL BASE DITCH SEE DETAIL K EST. 10 CY DDE
SPECIAL BASE DITCH SEE DETAIL L
ROADWAY DITCH SEE DETAIL G EST. 90 TONS RIP RAP EST. 300 SY FIL FAB
CLASS B RIP RAP SEE DETAIL J EST. 60 TONS EST. 190 SY FIL FAB
ROCK CROSS VANE SEE DETAIL M
CLASS I RIP RAP STR. PAY ITEM
DISSIPATOR PAD SEE DETAIL N EST. 9 TONS RIP RAP EST. 14 SY FIL FAB
S 81° 07' 07.6" E
2 @ 10' X 9' RCBC
SR 1007 (POOLE ROAD)
DETAIL G ROADWAY DITCH (Not to Scale)
Min. D = 1.0 Ft. Max. d = 1.0 Ft.
Type of Liner = CLASS B RIP RAP
-L- STA. 23+00 TO 25+00 LT
DETAIL H SPECIAL BASE DITCH (Not to Scale)
Min. D = 1.0 Ft. Max. d = 2.0 Ft. B = 4.0 Ft.
Type of Liner = CLASS B RIP RAP
-L- STA. 15+50 TO 18+50 LT
DETAIL I LATERAL BASE DITCH (Not to Scale)
Min. D = 1.0 Ft. Max. d = 2.0 Ft. B = 12.0 Ft. b = 5.0 Ft.
Type of Liner = CLASS B RIP RAP
-L- STA. 18+50 TO 19+20 LT
DETAIL K LATERAL BASE DITCH (Not to Scale)
Min. D = 1.0 Ft. B = 2.0 Ft. b = 5.0 Ft.
Type of Liner = PSRM
-L- STA. 20+92 TO STA. 21+50 LT
DETAIL L SPECIAL BASE DITCH (Not to Scale)
Min. D = 1.0 Ft. B = 2.0 Ft.
Type of Liner = PSRM
-L- STA. 21+50 TO 23+00 LT
-L- STA. 20+87 TO 23+00 RT
DETAIL J RIP RAP AT EMBANKMENT (Not to Scale)
Type of Liner = Class B Rip-Rap
-L- STA. 19+00 TO 19+95 RT
REVISIONS
8/17/99

MULKEY
ENGINEERS & CONSULTANTS
PO BOX 33127
RALEIGH, N.C. 27636
(919) 851-1912
(919) 851-1916 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
B-4300	2-B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STREAM & WETLAND IMPACTS

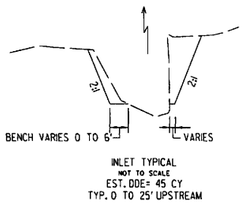
FOR -DET- PROFILE SEE SHEET 5

ENGLISH

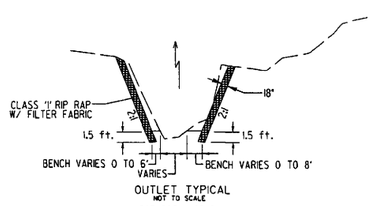
Permit Drawing Sheet 9 of 10

NAD 83 NC GRID

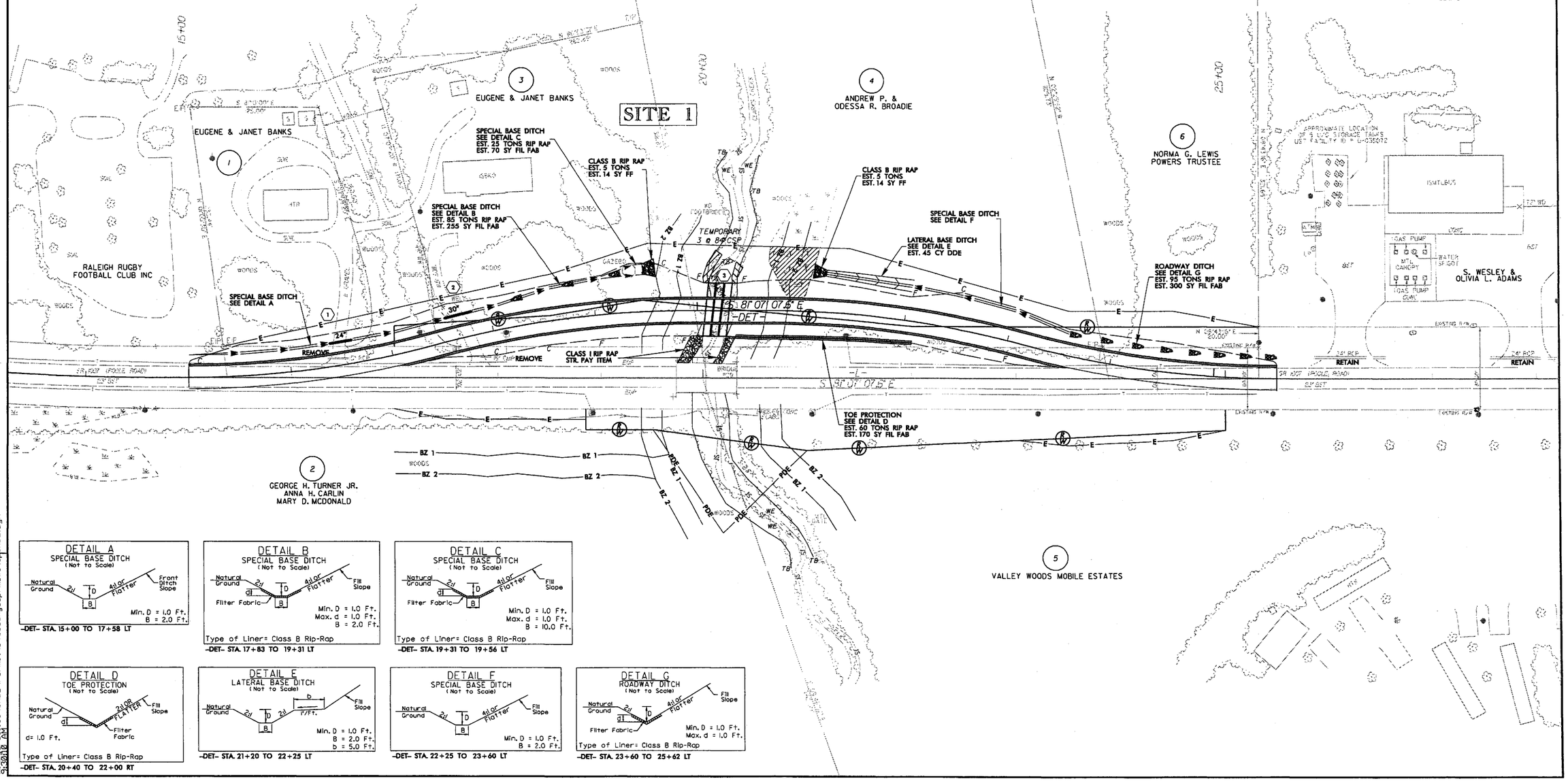
TEMPORARY IMPACTS IN SURFACE WATER
DENOTES TEMPORARY FILL IN WETLAND
DENOTES CHANNEL EXCAVATION



INLET TYPICAL
NOT TO SCALE
EST. DDE= 45 CY
TYP. 0 TO 25' UPSTREAM



OUTLET TYPICAL
NOT TO SCALE
EST. DDE = 65 CY
EST 35 TONS CLASS 'I' RIP RAP
EST 50 SY F.F.
TYP 0' TO 30' DOWNSTREAM



DETAIL A
SPECIAL BASE DITCH
(Not to Scale)

Min. D = 1.0 Ft.
B = 2.0 Ft.

-DET- STA. 15+00 TO 17+58 LT

DETAIL B
SPECIAL BASE DITCH
(Not to Scale)

Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 2.0 Ft.

Type of Liner= Class B Rip-Rap

-DET- STA. 17+83 TO 19+31 LT

DETAIL C
SPECIAL BASE DITCH
(Not to Scale)

Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 10.0 Ft.

Type of Liner= Class B Rip-Rap

-DET- STA. 19+31 TO 19+56 LT

DETAIL D
TOE PROTECTION
(Not to Scale)

d= 1.0 Ft.

Type of Liner= Class B Rip-Rap

-DET- STA. 20+40 TO 22+00 RT

DETAIL E
LATERAL BASE DITCH
(Not to Scale)

Min. D = 1.0 Ft.
B = 2.0 Ft.
b = 5.0 Ft.

-DET- STA. 21+20 TO 22+25 LT

DETAIL F
SPECIAL BASE DITCH
(Not to Scale)

Min. D = 1.0 Ft.
B = 2.0 Ft.

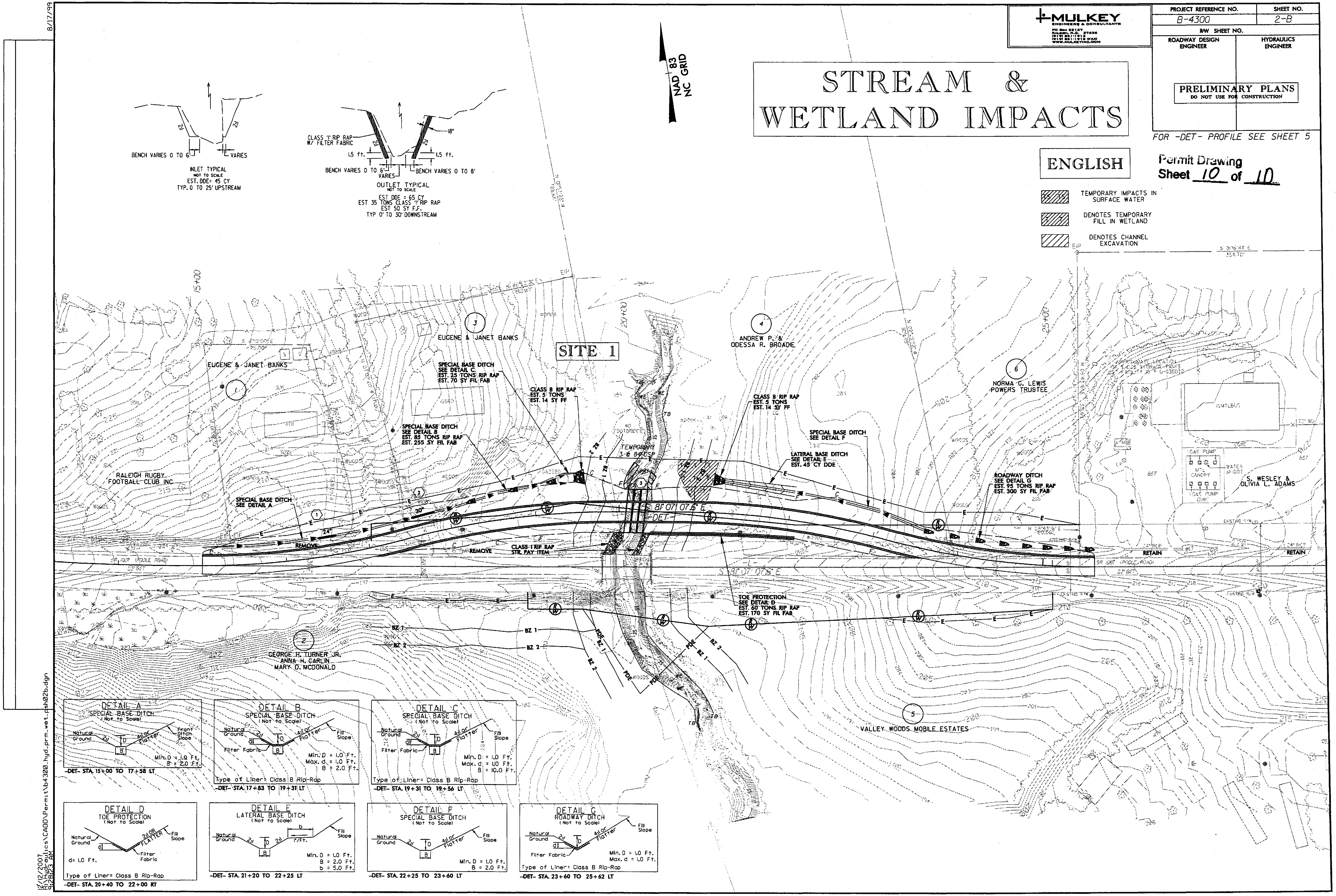
-DET- STA. 22+25 TO 23+60 LT

DETAIL G
ROADWAY DITCH
(Not to Scale)

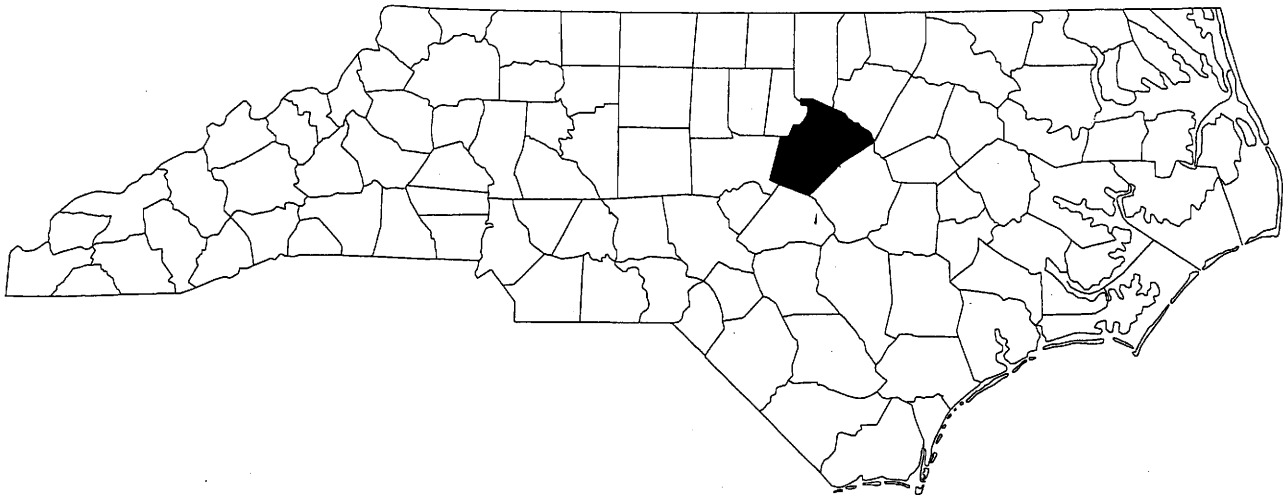
Min. D = 1.0 Ft.
Max. d = 1.0 Ft.

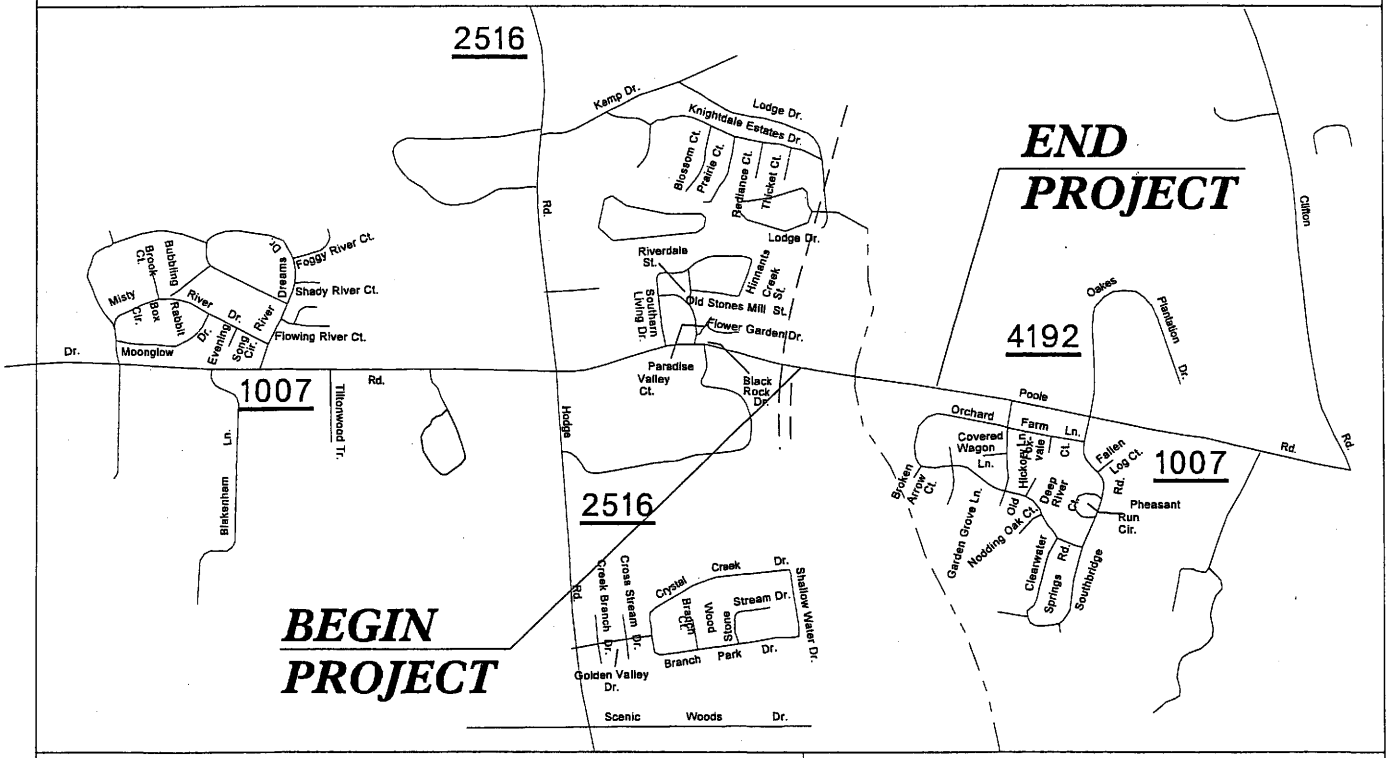
Type of Liner= Class B Rip-Rap

-DET- STA. 23+60 TO 25+62 LT


MULKEY ENGINEERS & CONSULTANTS
PROJECT REFERENCE NO.
B-4300
SHEET NO.
2-B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
FOR -DET- PROFILE SEE SHEET 5
STREAM & WETLAND IMPACTS
ENGLISH
Permit Drawing
Sheet 10 of 10
NAD 83 NC GRID
TEMPORARY IMPACTS IN SURFACE WATER
DENOTES TEMPORARY FILL IN WETLAND
DENOTES CHANNEL EXCAVATION
INLET TYPICAL
NOT TO SCALE
EST. DDE= 45 CY
TYP. 0 TO 25' UPSTREAM
BENCH VARIES 0 TO 6'
VARIES
CLASS 'I' RIP RAP W/ FILTER FABRIC
OUTLET TYPICAL
NOT TO SCALE
EST DDE = 65 CY
EST 35 TONS CLASS 'I' RIP RAP
EST 50 SY F.F.
TYP 0' TO 30' DOWNSTREAM
BENCH VARIES 0 TO 8'
SITE 1
EUGENE & JANET BANKS
ANDREW P. & ODESSA R. BROADIE
NORMA G. LEWIS POWERS TRUSTEE
RALEIGH RUGBY FOOTBALL CLUB INC.
S. WESLEY & OLIVIA L. ADAMS
GEORGE H. TURNER JR. ANNA H. CARLIN MARY O. MCDONALD
VALLEY WOODS MOBILE ESTATES
SPECIAL BASE DITCH SEE DETAIL A
SPECIAL BASE DITCH SEE DETAIL B EST. 85 TONS RIP RAP EST. 255 SY FIL FAB
SPECIAL BASE DITCH SEE DETAIL C EST. 25 TONS RIP RAP EST. 70 SY FIL FAB
CLASS B RIP RAP EST. 5 TONS EST. 14 SY FF
TEMPORARY 3-6 84" CSP
CLASS B RIP RAP EST. 5 TONS EST. 14 SY FF
LATERAL BASE DITCH SEE DETAIL E EST. 45 CY DDE
SPECIAL BASE DITCH SEE DETAIL F
ROADWAY DITCH SEE DETAIL G EST. 95 TONS RIP RAP EST. 300 SY FIL FAB
CLASS I RIP RAP STR. PAY ITEM
TOE PROTECTION SEE DETAIL D EST. 60 TONS RIP RAP EST. 170 SY FIL FAB
REMOVE
RETAIN
-DET-
DETAIL A SPECIAL BASE DITCH (Not to Scale)
Min. D = 1.0 Ft. B = 2.0 Ft.
-DET- STA. 15+00 TO 17+58 LT
DETAIL B SPECIAL BASE DITCH (Not to Scale)
Min. D = 1.0 Ft. Max. d = 1.0 Ft. B = 2.0 Ft.
Type of Liner= Class B Rip-Rap
-DET- STA. 17+83 TO 19+31 LT
DETAIL C SPECIAL BASE DITCH (Not to Scale)
Min. D = 1.0 Ft. Max. d = 1.0 Ft. B = 10.0 Ft.
Type of Liner= Class B Rip-Rap
-DET- STA. 19+31 TO 19+56 LT
DETAIL D TOE PROTECTION (Not to Scale)
d= 1.0 Ft.
Type of Liner= Class B Rip-Rap
-DET- STA. 20+40 TO 22+00 RT
DETAIL E LATERAL BASE DITCH (Not to Scale)
Min. D = 1.0 Ft. B = 2.0 Ft. b = 5.0 Ft.
-DET- STA. 21+20 TO 22+25 LT
DETAIL F SPECIAL BASE DITCH (Not to Scale)
Min. D = 1.0 Ft. B = 2.0 Ft.
-DET- STA. 22+25 TO 23+60 LT
DETAIL G ROADWAY DITCH (Not to Scale)
Min. D = 1.0 Ft. Max. d = 1.0 Ft.
Type of Liner= Class B Rip-Rap
-DET- STA. 23+60 TO 25+62 LT
REVISIONS
8/17/99

NORTH CAROLINA





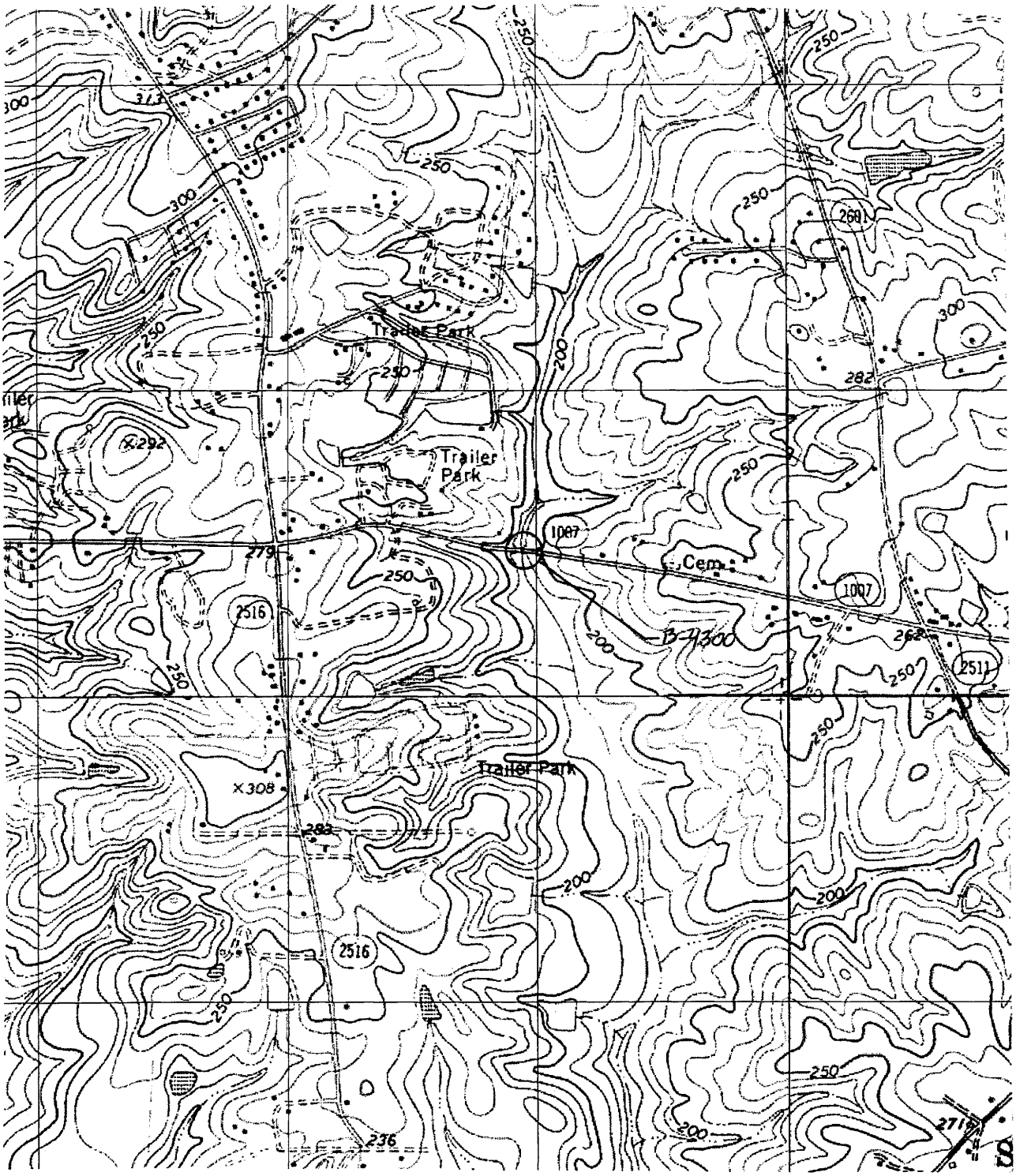
BUFFER IMPACTS

VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4300 (BRIDGE #29)
BRIDGE NO. 29 OVER
CLARKS CREEK
ON SR 1007
(POOLE ROAD)

SHEET 1 OF 8 10/1/2007



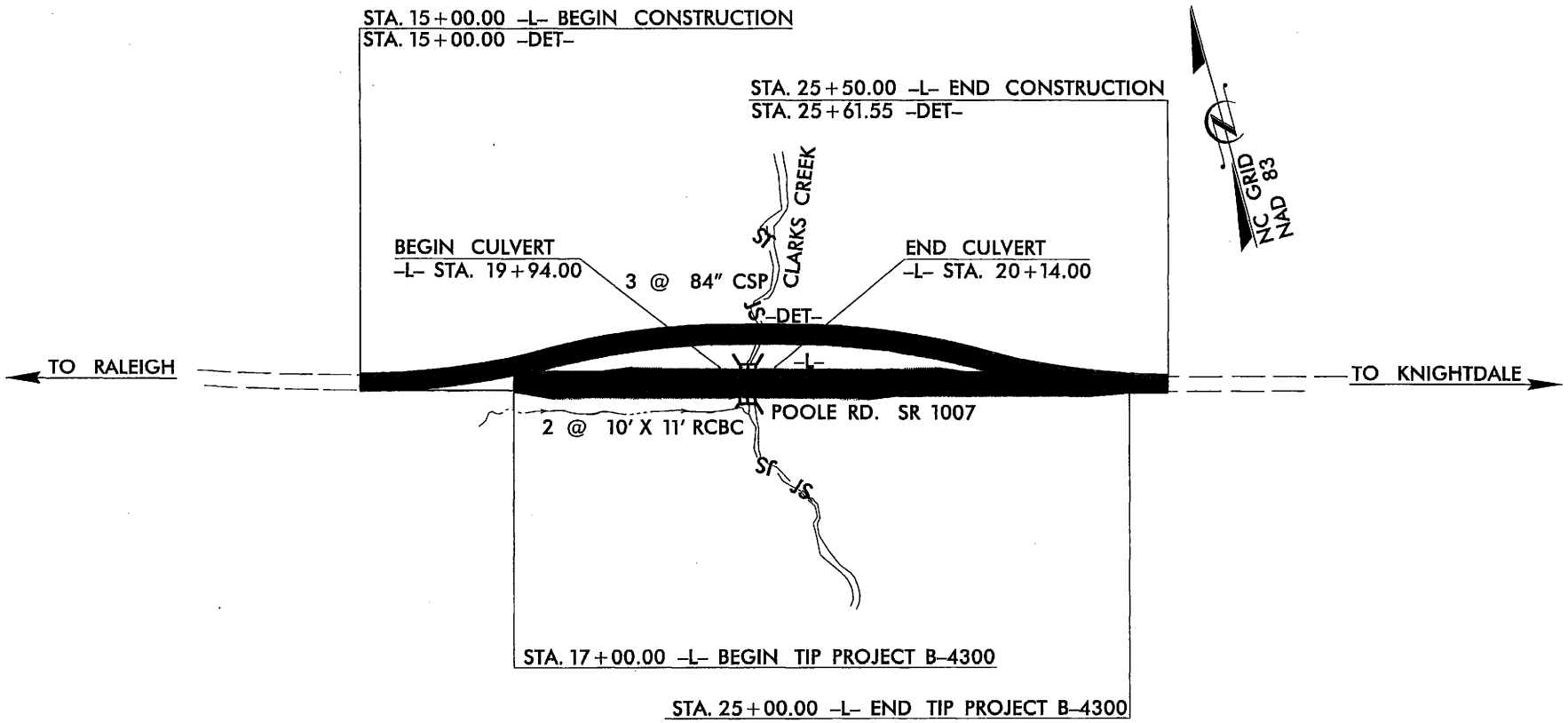
TOPO MAP

SCALE: 1" : 1500'

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4300 (BRIDGE #29)
BRIDGE NO. 29 OVER
CLARKS CREEK
ON SR 1007
(POOLE ROAD)

SHEET 2 OF 8 10/1/2007



SITE MAP

NOT TO SCALE

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4300 (BRIDGE #29)
BRIDGE NO. 29 OVER
CLARKS CREEK
ON SR 1007
(POOLE ROAD)

SHEET 3 OF 9 10/1/2007

PROPERTY OWNERS

NAMES AND ADDRESSES

	NAMES	ADDRESSES
2	George H. Turner	1825 Pictou Road Raleigh, NC 27606
3	Eugene Banks	7429 Poole Road Raleigh, NC 27610
4	Andrew P. Broadie	7409 Poole Road Raleigh, NC 27610
5	Valley Woods Mobile Estates	2725 Hodge Road Knightdale, NC 27545

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4300 (BRIDGE #29)
BRIDGE NO. 29 OVER
CLARKS CREEK
ON SR 1007
(POOLE ROAD)

SHEET 4 OF 9 10/1/2007

BUFFER IMPACTS SUMMARY

SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	IMPACT TYPE: ROAD CROSSING	IMPACT TYPE: BRIDGE	IMPACT TYPE: PARALLEL IMPACT	ALLOWABLE: ZONE 1 (ft^2)	ALLOWABLE: ZONE 2 (ft^2)	ALLOWABLE: TOTAL (ft^2)	MITIGABLE: ZONE 1 (ft^2)	MITIGABLE: ZONE 2 (ft^2)	MITIGABLE: TOTAL (ft^2)	BUFFER REPLACEMENT: ZONE 1 (ft^2)	BUFFER REPLACEMENT: ZONE 2 (ft^2)
1	DETOUR	19+39 to 20+84 -DET-	X			2955	1956	4911					
1	ROAD	19+40 to 20+73 -L-	X						10254	3933	14187		
2	ROAD	17+30 to 19+65 RT -L-			X				1122		1122		
TOTAL:						2955	1956	4911	11376	3933	15309		

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: B-4300 (BRIDGE #29)

11/15/2007
SHEET 5 OF 8

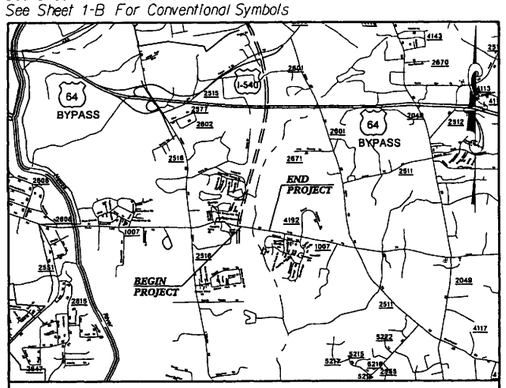
Rev. May 2006

05/08/99

TIP PROJECT: B-4300

CONTRACT:

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4300	1	
W.B.S. ELEMENT	F.A. PROJ. NO.	DESCRIPTION	
33637.1.1	BRSTP-1007(8)	P.E.	
33637.2.1	BRSTP-1007(8)	R/W, UTL.	

Buffer Drawing Sheet 6 of 9

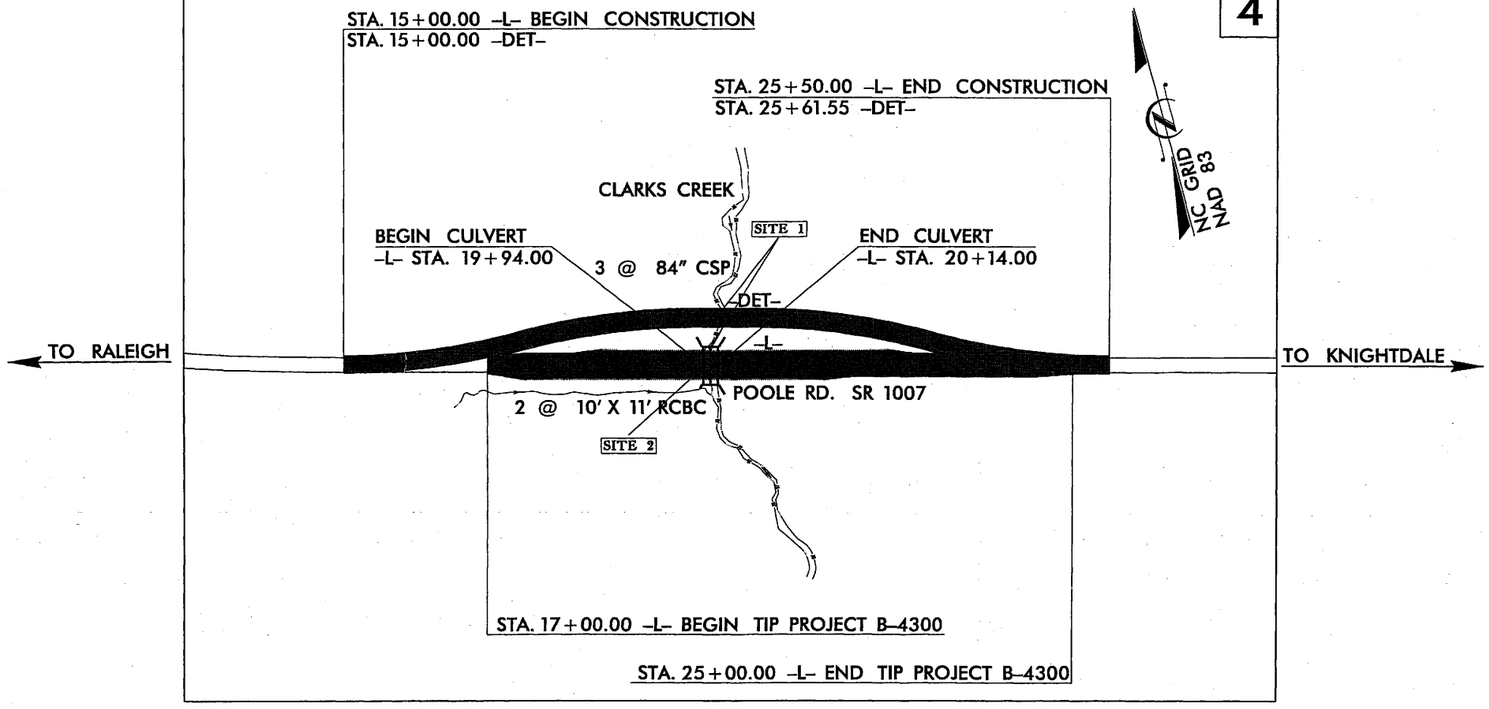
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LOCATION: ***BRIDGE NO. 29 OVER CLARKS CREEK ON SR 1007***

TYPE OF WORK: PAVING, GRADING, DRAINAGE AND CULVERT

BUFFER IMPACTS

4



MULKEY
ENGINEERS & CONSULTANTS
PO Box 33127
RALEIGH, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHOULD BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 8,900
ADT 2030 = 19,500
DHV = 10 %
D = 75 %
T = 6 %*
V = 60 MPH
* TTST 1% DUAL 5%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4300 = .148 MILES
LENGTH STRUCTURE TIP PROJECT B-4300 = .004 MILES
TOTAL LENGTH TIP PROJECT B-4300 = .152 MILES

Prepared In the Office of:
MULKEY
ENGINEERS & CONSULTANTS
FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: AUGUST 17, 2007

LETTING DATE: AUGUST 19, 2008

TIM JORDAN, PE
ROADWAY PROJECT ENGINEER

JEFF RECK, PE
HYDRAULIC PROJECT ENGINEER

DOUG TAYLOR, PE
NCDOT ROADWAY DESIGN PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER *P.E.*

11/5/2007
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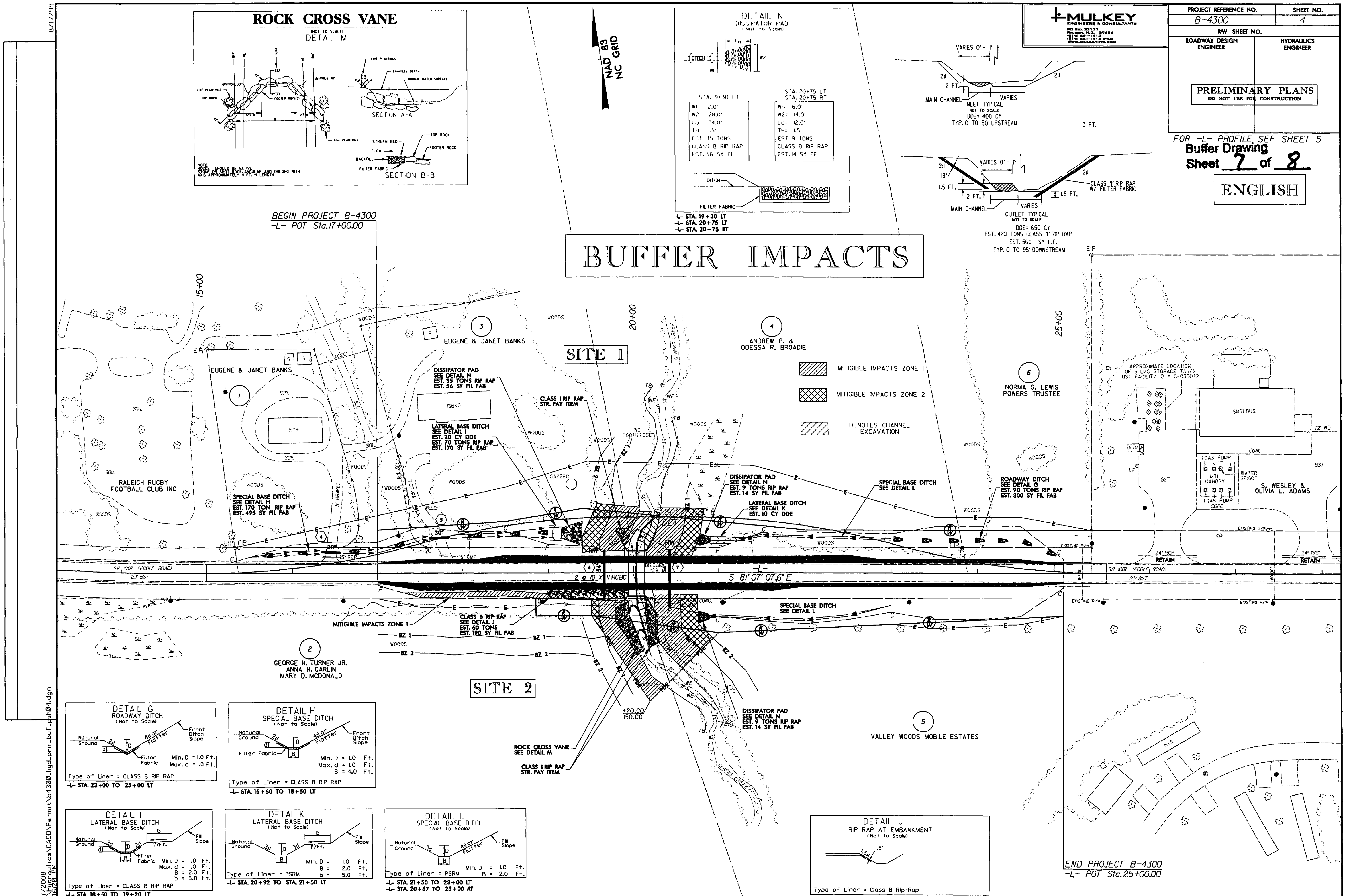

PROJECT REFERENCE NO. B-4300
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
MULKEY ENGINEERS & CONSULTANTS
FOR -L- PROFILE SEE SHEET 5
Buffer Drawing
Sheet 7 of 8
ENGLISH
BUFFER IMPACTS
ROCK CROSS VANE
(NOT TO SCALE)
DETAIL M
SECTION A-A
SECTION B-B
DETAIL N
DISSIPATOR PAD
(Not to Scale)
STA. 19+30 LT
W1 12.0'
W2 28.0'
Lo 24.0'
TH 1.5'
EST. 35 TONS CLASS B RIP RAP
EST. 56 SY FF
STA. 20+75 LT
STA. 20+75 RT
W1 6.0'
W2 14.0'
Lo 12.0'
TH 1.5'
EST. 9 TONS CLASS B RIP RAP
EST. 14 SY FF
-L- STA. 19+30 LT
-L- STA. 20+75 LT
-L- STA. 20+75 RT
NAD 83 NC GRID
INLET TYPICAL
NOT TO SCALE
DDE= 400 CY
TYP. 0 TO 50' UPSTREAM
OUTLET TYPICAL
NOT TO SCALE
DDE= 650 CY
EST. 420 TONS CLASS 'I' RIP RAP
EST. 560 SY F.F.
TYP. 0 TO 95' DOWNSTREAM
CLASS 'I' RIP RAP W/ FILTER FABRIC
BEGIN PROJECT B-4300
-L- POT Sta.17+00.00
END PROJECT B-4300
-L- POT Sta.25+00.00
SITE 1
SITE 2
MITIGIBLE IMPACTS ZONE 1
MITIGIBLE IMPACTS ZONE 2
DENOTES CHANNEL EXCAVATION
EUGENE & JANET BANKS
RALEIGH RUGBY FOOTBALL CLUB INC
GEORGE H. TURNER JR.
ANNA H. CARLIN
MARY D. MCDONALD
ANDREW P. & ODESSA R. BROADIE
NORMA G. LEWIS POWERS TRUSTEE
S. WESLEY & OLIVIA L. ADAMS
VALLEY WOODS MOBILE ESTATES
APPROXIMATE LOCATION OF 5 U/G STORAGE TANKS UST FACILITY ID # 0-035072
DISSIPATOR PAD SEE DETAIL N EST. 35 TONS RIP RAP EST. 56 SY FIL FAB
CLASS I RIP RAP STR. PAY ITEM
LATERAL BASE DITCH SEE DETAIL I EST. 20 CY DDE EST. 70 TONS RIP RAP EST. 170 SY FIL FAB
SPECIAL BASE DITCH SEE DETAIL H EST. 170 TON RIP RAP EST. 495 SY FIL FAB
DISSIPATOR PAD SEE DETAIL N EST. 9 TONS RIP RAP EST. 14 SY FIL FAB
LATERAL BASE DITCH SEE DETAIL K EST. 10 CY DDE
SPECIAL BASE DITCH SEE DETAIL L
ROADWAY DITCH SEE DETAIL G EST. 90 TONS RIP RAP EST. 300 SY FIL FAB
CLASS B RIP RAP SEE DETAIL J EST. 60 TONS EST. 190 SY FIL FAB
MITIGIBLE IMPACTS ZONE 1
ROCK CROSS VANE SEE DETAIL M
CLASS I RIP RAP STR. PAY ITEM
SR 1007 (POOLE ROAD)
2 @ 10' X 11' RCBC
S 81° 07' 07.6" E
CLARKS CREEK
DETAIL G
ROADWAY DITCH
(Not to Scale)
Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
Type of Liner = CLASS B RIP RAP
-L- STA. 23+00 TO 25+00 LT
DETAIL H
SPECIAL BASE DITCH
(Not to Scale)
Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 4.0 Ft.
Type of Liner = CLASS B RIP RAP
-L- STA. 15+50 TO 18+50 LT
DETAIL I
LATERAL BASE DITCH
(Not to Scale)
Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 12.0 Ft.
b = 5.0 Ft.
Type of Liner = CLASS B RIP RAP
-L- STA. 18+50 TO 19+20 LT
DETAIL K
LATERAL BASE DITCH
(Not to Scale)
Min. D = 1.0 Ft.
B = 2.0 Ft.
b = 5.0 Ft.
Type of Liner = PSRM
-L- STA. 20+92 TO STA. 21+50 LT
DETAIL L
SPECIAL BASE DITCH
(Not to Scale)
Min. D = 1.0 Ft.
B = 2.0 Ft.
Type of Liner = PSRM
-L- STA. 21+50 TO 23+00 LT
-L- STA. 20+87 TO 23+00 RT
DETAIL J
RIP RAP AT EMBANKMENT
(Not to Scale)
Type of Liner = Class B Rip-Rap
-L- STA. 19+00 TO 19+95 RT
REVISIONS
8/17/99
R:\Hydraulics\CADD\Permit\b4300_hyd_prm_buf_psh04.dgn

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PROJECT REFERENCE NO.	SHEET NO.
B-4300	2-B
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -DET- PROFILE SEE SHEET 5

Buffer Drawing Sheet 8 of 9

BUFFER IMPACTS

ENGLISH

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

DENOTES CHANNEL EXCAVATION

NAD 83 NC GRID

INLET TYPICAL
NOT TO SCALE
EST. DDE= 45 CY
TYP. 0 TO 25' UPSTREAM

OUTLET TYPICAL
NOT TO SCALE
EST DDE = 65 CY
EST 35 TONS CLASS 'I' RIP RAP
EST 50 SY F.F.
TYP 0' TO 30' DOWNSTREAM

SITE 1

1 RALEIGH RUGBY FOOTBALL CLUB INC

2 GEORGE H. TURNER JR.
ANNA H. CARLIN
MARY D. MCDONALD

3 EUGENE & JANET BANKS

4 ANDREW P. & ODESSA R. BROADIE

5 VALLEY WOODS MOBILE ESTATES

6 NORMA G. LEWIS POWERS TRUSTEE

S. WESLEY & OLIVIA L. ADAMS

SPECIAL BASE DITCH SEE DETAIL A

SPECIAL BASE DITCH SEE DETAIL B
EST. 85 TONS RIP RAP
EST. 255 SY FIL FAB

SPECIAL BASE DITCH SEE DETAIL C
EST. 25 TONS RIP RAP
EST. 70 SY FIL FAB

CLASS B RIP RAP
EST. 5 TONS
EST. 14 SY FF

CLASS B RIP RAP
EST. 5 TONS
EST. 14 SY FF

SPECIAL BASE DITCH SEE DETAIL F

LATERAL BASE DITCH SEE DETAIL E
EST. 45 CY DDE

ROADWAY DITCH SEE DETAIL G
EST. 95 TONS RIP RAP
EST. 300 SY FIL FAB

TOE PROTECTION SEE DETAIL D
EST. 60 TONS RIP RAP
EST. 170 SY FIL FAB

TEMPORARY 3 @ 84" CSP

CLASS I RIP RAP STR. PAY ITEM

REMOVE

RETAIN

APPROXIMATE LOCATION OF 5 U/G STORAGE TANKS UST FACILITY ID # 0-023072

DETAIL A
SPECIAL BASE DITCH
(Not to Scale)
Natural Ground, 2d, D, B, 4d or Flatter, Front Ditch Slope
Min. D = 1.0 Ft.
B = 2.0 Ft.
-DET- STA. 15+00 TO 17+58 LT

DETAIL B
SPECIAL BASE DITCH
(Not to Scale)
Natural Ground, 2d, D, dl, B, 4d or Flatter, Fill Slope, Filter Fabric
Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 2.0 Ft.
Type of Liner= Class B Rip-Rap
-DET- STA. 17+83 TO 19+31 LT

DETAIL C
SPECIAL BASE DITCH
(Not to Scale)
Natural Ground, 2d, D, dl, B, 4d or Flatter, Fill Slope, Filter Fabric
Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 10.0 Ft.
Type of Liner= Class B Rip-Rap
-DET- STA. 19+31 TO 19+56 LT

DETAIL D
TOE PROTECTION
(Not to Scale)
Natural Ground, 2d or FLATTER, Fill Slope, dl, Filter Fabric
d= 1.0 Ft.
Type of Liner= Class B Rip-Rap
-DET- STA. 20+40 TO 22+00 RT

DETAIL E
LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2d, D, B, 2d, b, F/Ft., Fill Slope
Min. D = 1.0 Ft.
B = 2.0 Ft.
b = 5.0 Ft.
-DET- STA. 21+20 TO 22+25 LT

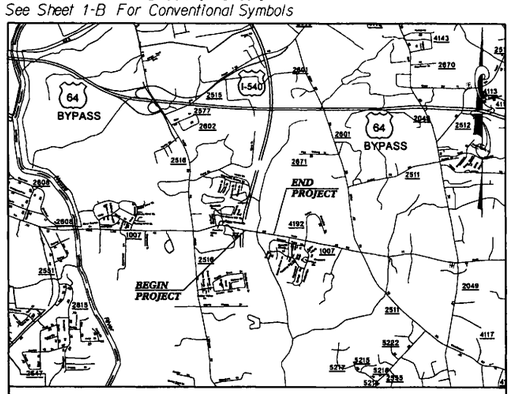
DETAIL F
SPECIAL BASE DITCH
(Not to Scale)
Natural Ground, 2d, D, B, 4d or Flatter, Fill Slope
Min. D = 1.0 Ft.
B = 2.0 Ft.
-DET- STA. 22+25 TO 23+60 LT

DETAIL G
ROADWAY DITCH
(Not to Scale)
Natural Ground, 2d, D, dl, B, 4d or Flatter, Fill Slope, Filter Fabric
Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
Type of Liner= Class B Rip-Rap
-DET- STA. 23+60 TO 25+62 LT

09/08/99

TIP PROJECT: B-4300

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4300	1	

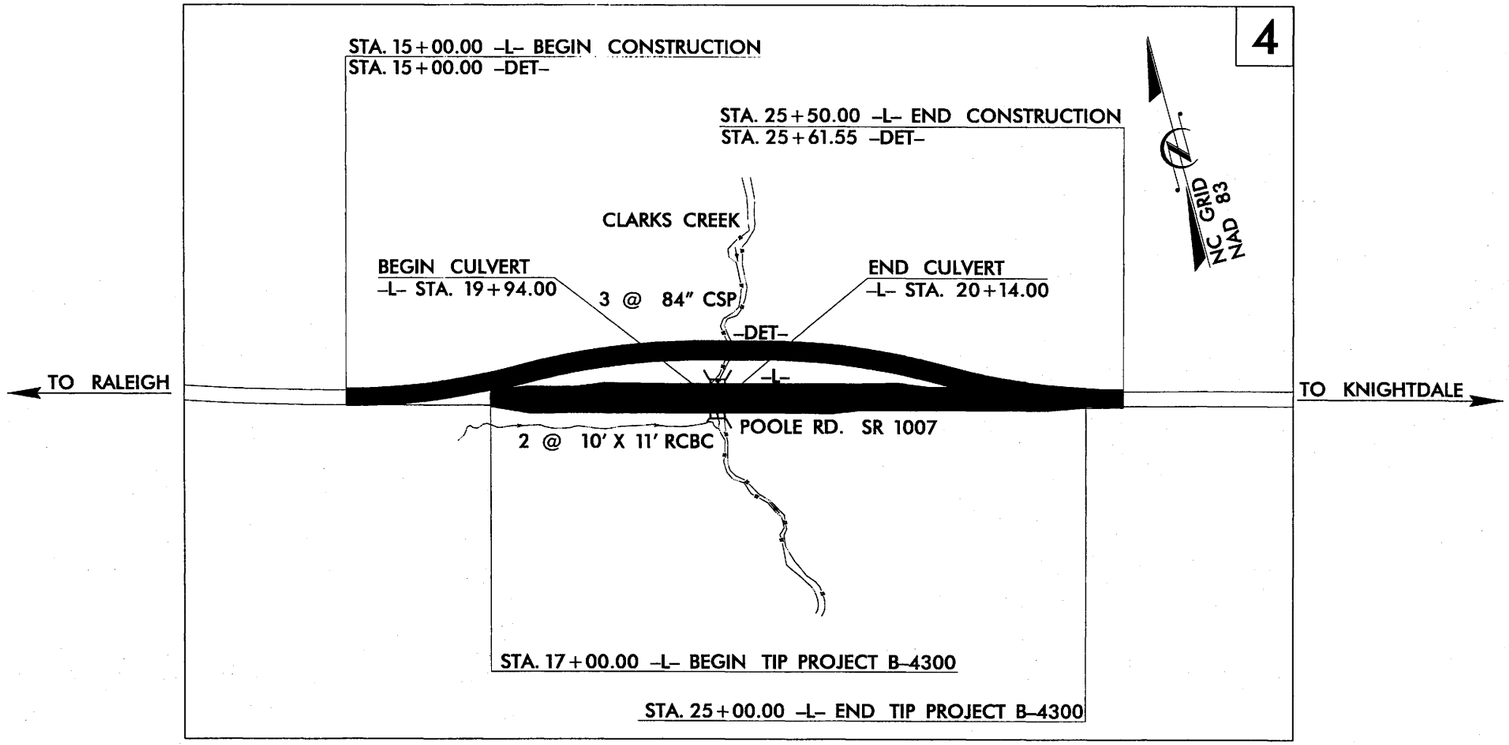
W.B.S. ELEMENT	F. A. PROJ. NO.	DESCRIPTION
33637.1.1	BRSTP-1007(8)	P.E .
33637.2.1	BRSTP-1007(8)	R/W, UTL.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LOCATION: BRIDGE NO. 29 OVER CLARKS CREEK ON SR 1007

TYPE OF WORK: PAVING, GRADING, DRAINAGE AND CULVERT

4



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(919) 851-1918 (FAX)
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THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHOULD BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 8,900
ADT 2030 = 19,500
DHV = 10 %
D = 75 %
T = 6 %*
V = 60 MPH

* TTST 1% DUAL 5%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4300 = .148 MILES
LENGTH STRUCTURE TIP PROJECT B-4300 = .004 MILES
TOTAL LENGTH TIP PROJECT B-4300 = .152 MILES

Prepared In the Office of:
MULKEY
ENGINEERS & CONSULTANTS
FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
AUGUST 17, 2007

LETTING DATE:
AUGUST 19, 2008

TIM JORDAN, PE
ROADWAY PROJECT ENGINEER

JEFF RECK, PE
HYDRAULIC PROJECT ENGINEER

DOUG TAYLOR, PE
NCDOT ROADWAY DESIGN PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER *P.E.*

11/5/2007
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3/15/06

PROJECT REFERENCE NO.	SHEET NO.
B-4300	1-B

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow — FLOW
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Proposed Wheel Chair Ramp Curb Cut — WCC
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

11/5/2007
R:\Roadway\Proj\b4300_rdy_tsh.dgn
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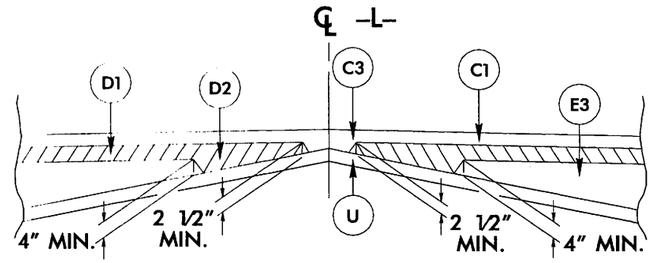
5/14/99

PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1½" IN DEPTH OR GREATER THAN 2" IN DEPTH.
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E2	PROP. APPROX. 5½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 4" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

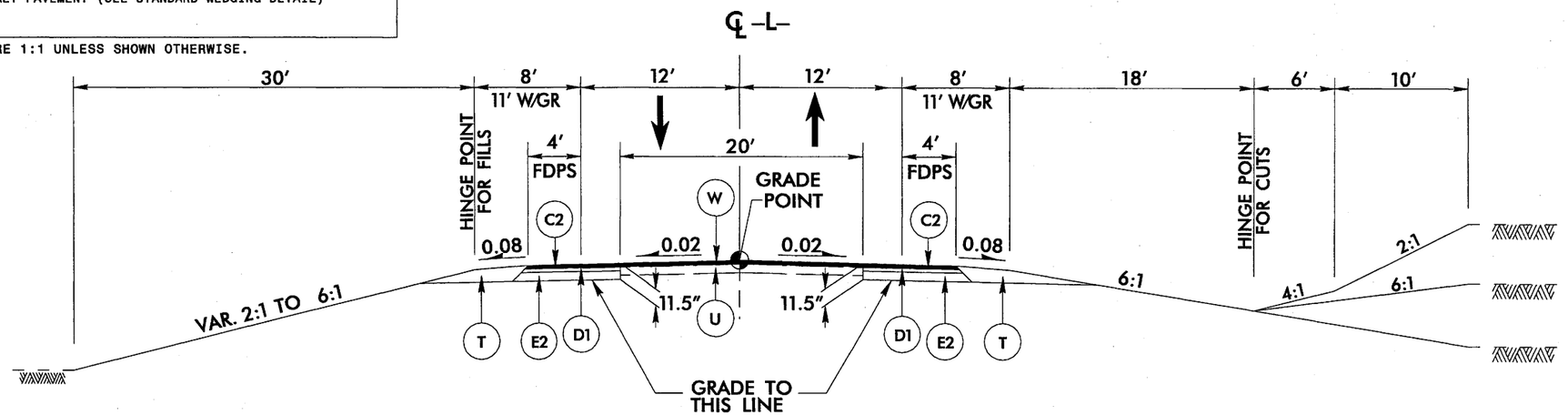


DETAIL SHOWING METHOD OF WEDGING

USE IN CONJUCTION WITH TYPICAL SECTION NO. 1

NOTE: AFTER DETOUR REMOVAL, OVERLAY EXISTING PAVEMENT WITH (C1) FROM

–L– STA. 15+00.00 TO STA. 17+50.00
–L– STA. 24+50.00 TO STA. 25+50.00



TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
AT THE FOLLOWING LOCATIONS

TRANSITION FROM EXISTING TO T.S. NO. 1 FROM
–L– STA. 17+00.00 TO STA. 17+50.00

–L– STA. 17+50.00 TO STA. 19+60.00
–L– STA. 23+75.00 TO STA. 24+50.00

TRANSITION FROM T.S. NO. 1 TO EXISTING
–L– STA. 24+50.00 TO STA. 25+00.00

MULKEY
ENGINEERS & CONSULTANTS
PO BOX 33157
RALEIGH, N.C. 27636
(919) 851-1918
(919) 851-1919 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
B-4300	2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5/14/99

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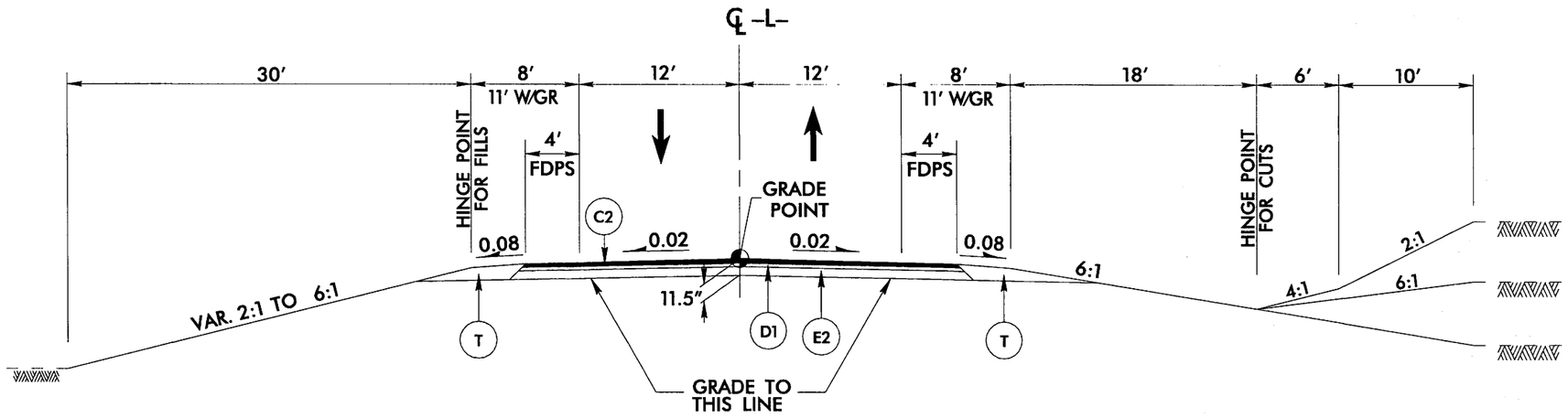
PO Box 33157
Raleigh, N.C. 27636
(919) 851-1151
(919) 851-1178 FAX
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
B-4300	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

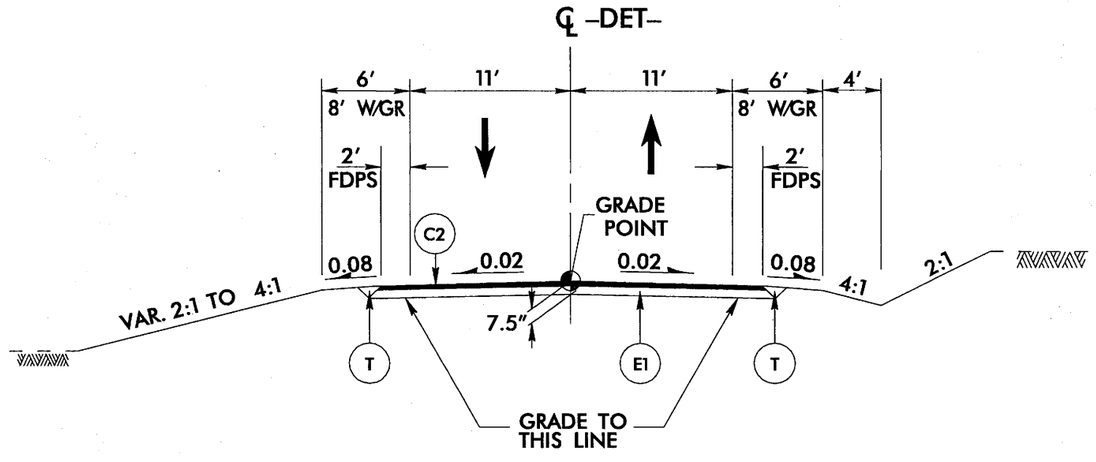
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2
AT THE FOLLOWING LOCATIONS

–L– STA. 19+60.00 TO STA. 23+75.00



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3
AT THE FOLLOWING LOCATIONS

–DET– STA. 16+39.53 TO STA. 24+25.34

PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)	
C2	3" S9.5B
D1	3" I19.0B
E1	4½" B25.0B
E2	5½" B25.0B
T	EARTH MATERIAL

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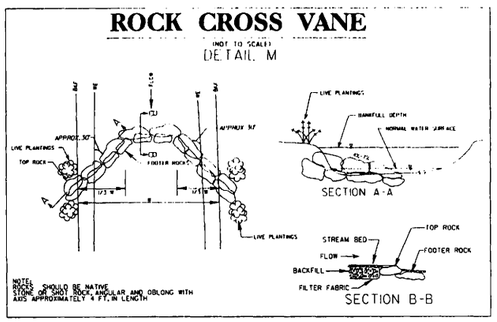
8/17/99

REVISIONS

-L-
PI Sta 13+19.19
Δ = 7° 04' 12.2" (LT)
D = 2° 22' 25.1"
L = 297.86'
T = 149.12'
R = 2,413.84'

ROCK CROSS VANE
(NOT TO SCALE)
DETAIL M



NOTES
ROCK SHOULD BE NATIVE STONE OR SHOT ROCK, ANGULAR AND OBLONG WITH AXIS APPROXIMATELY 4 FT. IN LENGTH

NAD 83 NC GRID

DETAIL N
DISSIPATOR PAD
(Not to Scale)

STA. 19+30 LT
W1 = 5.0'
W2 = 14.0'
TH = 0.5'
EST. 9 TONS
CLASS B RIP RAP
EST. 14 SY FF

STA. 20+75 RT
W1 = 6.0'
W2 = 14.0'
TH = 0.5'
EST. 9 TONS
CLASS B RIP RAP
EST. 14 SY FF

-L- STA. 19+30 LT
-L- STA. 20+75 LT
-L- STA. 20+75 RT

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(919) 851-1918 (FAX)
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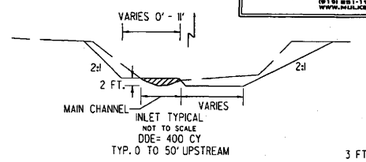
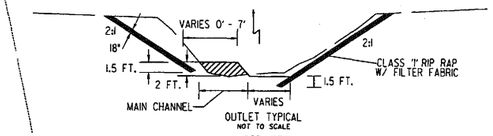
PROJECT REFERENCE NO.	SHEET NO.
B-4300	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 5





DDE= 650 CY
EST. 420 TONS CLASS 'I' RIP RAP
EST. 560 SY F.F.
TYP. 0 TO 95' DOWNSTREAM

BEGIN CONSTRUCTION B-4300
-L- POT Sta.15+00.00

BEGIN PROJECT B-4300
-L- POT Sta.17+00.00

-L- PT Sta.14+67.93

15+00

20+00

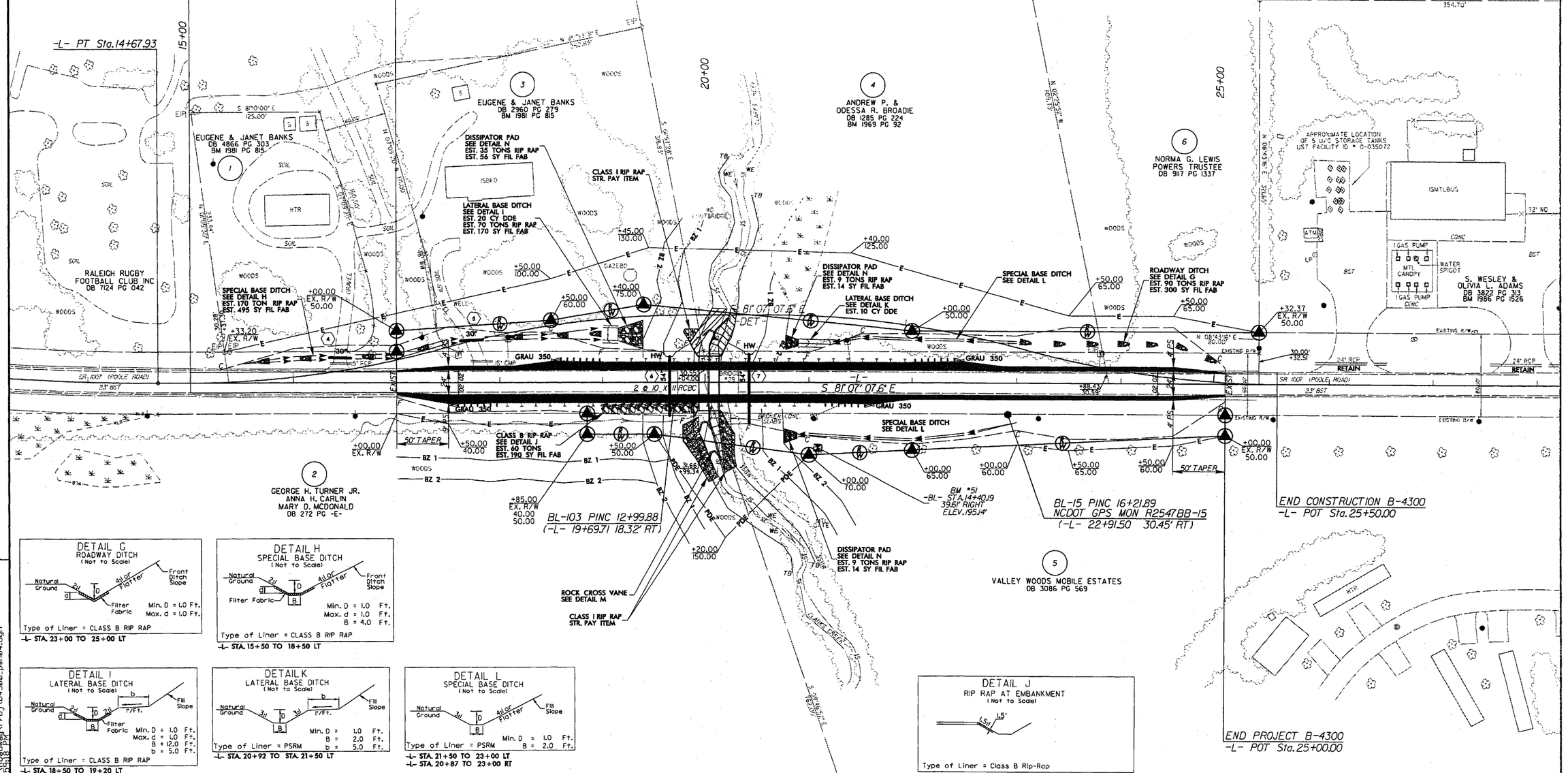
25+00

S 81°00'00" E
125.00'

S 31°16'44" E
354.70'

N 02°25'25" W
109.13'

S 81°07'07.6" E



(1) RALEIGH RUGBY FOOTBALL CLUB INC
DB 7124 PG 042

(2) GEORGE H. TURNER JR.
ANNA H. CARLIN
MARY D. MCDONALD
DB 272 PG -E-

(3) EUGENE & JANET BANKS
DB 2960 PG 279
BM 1981 PC 815

EUGENE & JANET BANKS
DB 4866 PG 303
BM 1981 PG 815

(4) ANDREW P. & ODESSA R. BROADIE
DB 1285 PG 224
BM 1969 PG 92

(5) VALLEY WOODS MOBILE ESTATES
DB 3086 PG 569

(6) NORMA G. LEWIS POWERS TRUSTEE
DB 9117 PG 1337

S. WESLEY & OLIVIA L. ADAMS
DB 3822 PG 313
BM 1986 PG 1526

APPROXIMATE LOCATION OF 5 U/C STORAGE TANKS UST FACILITY ID # 0-035072

DISSIPATOR PAD
SEE DETAIL N
EST. 35 TONS RIP RAP
EST. 56 SY FIL FAB

CLASS I RIP RAP
STR. PAY ITEM

LATERAL BASE DITCH
SEE DETAIL I
EST. 20 CY DDE
EST. 70 TONS RIP RAP
EST. 170 SY FIL FAB

SPECIAL BASE DITCH
SEE DETAIL H
EST. 170 TON RIP RAP
EST. 495 SY FIL FAB

DISSIPATOR PAD
SEE DETAIL N
EST. 9 TONS RIP RAP
EST. 14 SY FIL FAB

LATERAL BASE DITCH
SEE DETAIL K
EST. 10 CY DDE

SPECIAL BASE DITCH
SEE DETAIL L

ROADWAY DITCH
SEE DETAIL G
EST. 90 TONS RIP RAP
EST. 300 SY FIL FAB

CLASS B RIP RAP
SEE DETAIL J
EST. 60 TONS
EST. 190 SY FIL FAB

DISSIPATOR PAD
SEE DETAIL N
EST. 9 TONS RIP RAP
EST. 14 SY FIL FAB

ROCK CROSS VANE
SEE DETAIL M

CLASS I RIP RAP
STR. PAY ITEM

BL-103 PINC 12+99.88
(-L- 19+69.71 18.32' RT)

BM #51
-BL- STA.14+40.19
39.61' RIGHT
ELEV.=95.14

BL-15 PINC 16+21.89
NCDOT GPS MON R2547BB-15
(-L- 22+91.50 30.45' RT)

END CONSTRUCTION B-4300
-L- POT Sta.25+50.00

END PROJECT B-4300
-L- POT Sta.25+00.00

DETAIL G
ROADWAY DITCH
(Not to Scale)

Type of Liner = CLASS B RIP RAP
-L- STA. 23+00 TO 25+00 LT

DETAIL H
SPECIAL BASE DITCH
(Not to Scale)

Type of Liner = CLASS B RIP RAP
-L- STA. 15+50 TO 18+50 LT

DETAIL I
LATERAL BASE DITCH
(Not to Scale)

Type of Liner = CLASS B RIP RAP
-L- STA. 18+50 TO 19+20 LT

DETAIL K
LATERAL BASE DITCH
(Not to Scale)

Type of Liner = PSRM
-L- STA. 20+92 TO STA. 21+50 LT

DETAIL L
SPECIAL BASE DITCH
(Not to Scale)

Type of Liner = PSRM
-L- STA. 21+50 TO 23+00 LT
-L- STA. 20+87 TO 23+00 RT

DETAIL J
RIP RAP AT EMBANKMENT
(Not to Scale)

Type of Liner = Class B Rip-Rap
-L- STA. 19+00 TO 19+95 RT

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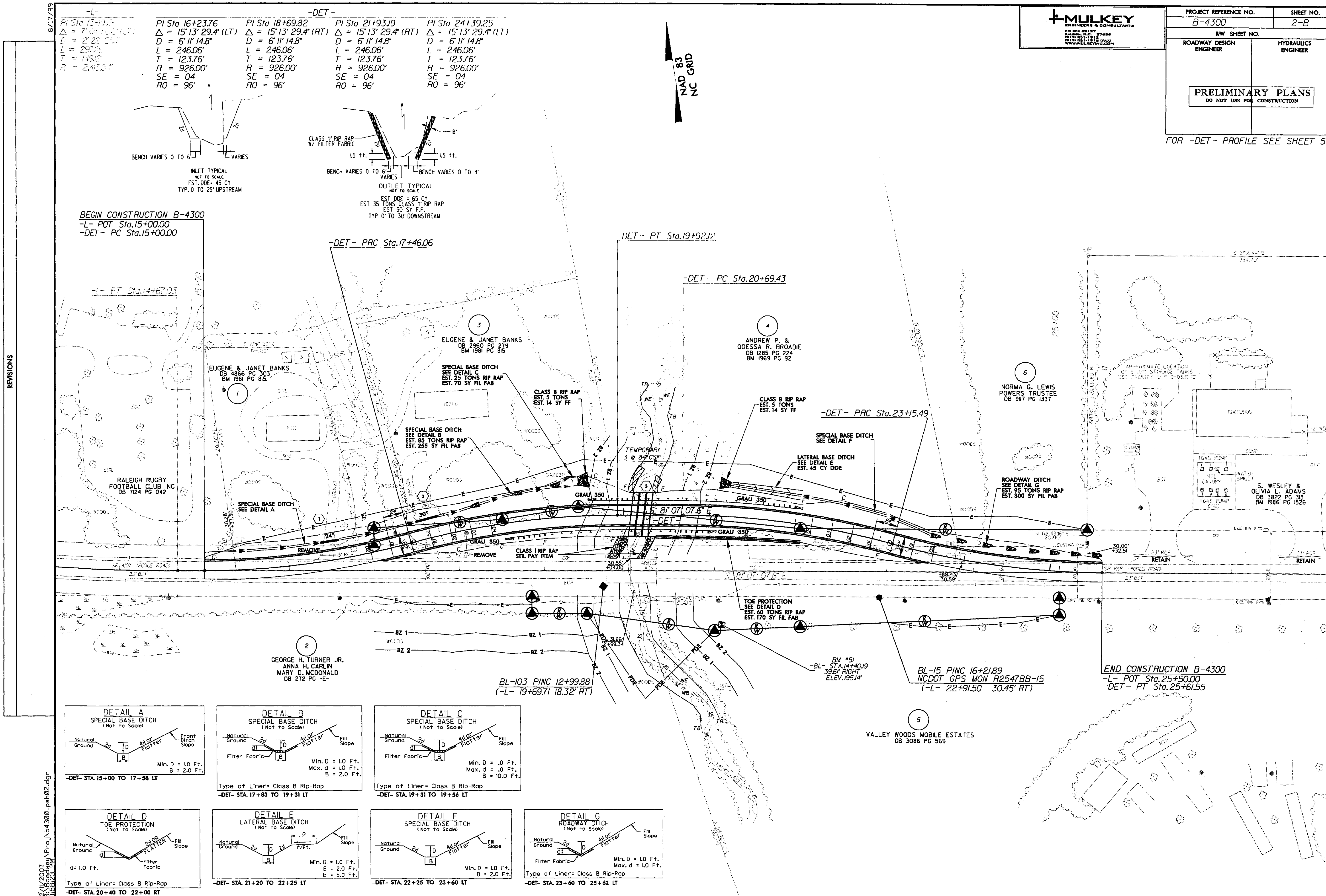

MULKEY ENGINEERS & CONSULTANTS
PROJECT REFERENCE NO. B-4300
SHEET NO. 2-B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
FOR -DET- PROFILE SEE SHEET 5
NAD 83 NC GRID
-DET-
PI Sta 16+23.76 △ = 15°13' 29.4" (LT) D = 6°11' 14.8" L = 246.06' T = 123.76' R = 926.00' SE = .04 RO = 96'
PI Sta 18+69.82 △ = 15°13' 29.4" (RT) D = 6°11' 14.8" L = 246.06' T = 123.76' R = 926.00' SE = .04 RO = 96'
PI Sta 21+93.19 △ = 15°13' 29.4" (RT) D = 6°11' 14.8" L = 246.06' T = 123.76' R = 926.00' SE = .04 RO = 96'
PI Sta 24+39.25 △ = 15°13' 29.4" (LT) D = 6°11' 14.8" L = 246.06' T = 123.76' R = 926.00' SE = .04 RO = 96'
INLET TYPICAL
NOT TO SCALE
EST. DDE= 45 CY
TYP. 0 TO 25' UPSTREAM
BENCH VARIES 0 TO 6'
VARIES
CLASS 'I' RIP RAP W/ FILTER FABRIC
OUTLET TYPICAL
NOT TO SCALE
EST DDE = 65 CY
EST 35 TONS CLASS 'I' RIP RAP
EST 50 SY F.F.
TYP 0' TO 30' DOWNSTREAM
BENCH VARIES 0 TO 8'
BEGIN CONSTRUCTION B-4300
-L- POT Sta.15+00.00
-DET- PC Sta.15+00.00
-DET- PRC Sta.17+46.06
-DET- PT Sta.19+92.12
-DET- PC Sta.20+69.43
-DET- PRC Sta.23+15.49
-L- PT Sta.14+67.93
EUGENE & JANET BANKS DB 4866 PG 303 BM 1981 PG 815
EUGENE & JANET BANKS DB 2960 PG 279 BM 1981 PG 815
ANDREW P. & ODESSA R. BROADIE DB 1285 PG 224 BM 1969 PG 92
NORMA G. LEWIS POWERS TRUSTEE DB 9117 PG 1337
RALEIGH RUGBY FOOTBALL CLUB INC DB 7124 PG 042
S. WESLEY & OLIVIA L. ADAMS DB 3822 PG 313 BM 1986 PG 1526
GEORGE H. TURNER JR. ANNA H. CARLIN MARY D. MCDONALD DB 272 PG -E-
VALLEY WOODS MOBILE ESTATES DB 3086 PG 569
SPECIAL BASE DITCH SEE DETAIL A
SPECIAL BASE DITCH SEE DETAIL B EST. 85 TONS RIP RAP EST. 255 SY FIL FAB
SPECIAL BASE DITCH SEE DETAIL C EST. 25 TONS RIP RAP EST. 70 SY FIL FAB
CLASS B RIP RAP EST. 5 TONS EST. 14 SY FF
TEMPORARY 3 @ 84" CSP
LATERAL BASE DITCH SEE DETAIL E EST. 45 CY DDE
SPECIAL BASE DITCH SEE DETAIL F
ROADWAY DITCH SEE DETAIL G EST. 95 TONS RIP RAP EST. 300 SY FIL FAB
CLASS I RIP RAP STR. PAY ITEM
TOE PROTECTION SEE DETAIL D EST. 60 TONS RIP RAP EST. 170 SY FIL FAB
GRAU 350
REMOVE
RETAIN
BM #51 -BL- STA.14+40.19 39.61' RIGHT ELEV.195.14'
BL-103 PINC 12+99.88 (-L- 19+69.71 18.32' RT)
BL-15 PINC 16+21.89 NCDOT GPS MON R2547BB-15 (-L- 22+91.50 30.45' RT)
END CONSTRUCTION B-4300
-L- POT Sta.25+50.00
-DET- PT Sta.25+61.55
DETAIL A SPECIAL BASE DITCH (Not to Scale) Min. D = 1.0 Ft. B = 2.0 Ft. -DET- STA. 15+00 TO 17+58 LT
DETAIL B SPECIAL BASE DITCH (Not to Scale) Min. D = 1.0 Ft. Max. d = 1.0 Ft. B = 2.0 Ft. Type of Liner= Class B Rip-Rap -DET- STA. 17+83 TO 19+31 LT
DETAIL C SPECIAL BASE DITCH (Not to Scale) Min. D = 1.0 Ft. Max. d = 1.0 Ft. B = 10.0 Ft. Type of Liner= Class B Rip-Rap -DET- STA. 19+31 TO 19+56 LT
DETAIL D TOE PROTECTION (Not to Scale) d= 1.0 Ft. Type of Liner= Class B Rip-Rap -DET- STA. 20+40 TO 22+00 RT
DETAIL E LATERAL BASE DITCH (Not to Scale) Min. D = 1.0 Ft. B = 2.0 Ft. b = 5.0 Ft. -DET- STA. 21+20 TO 22+25 LT
DETAIL F SPECIAL BASE DITCH (Not to Scale) Min. D = 1.0 Ft. B = 2.0 Ft. -DET- STA. 22+25 TO 23+60 LT
DETAIL G ROADWAY DITCH (Not to Scale) Min. D = 1.0 Ft. Max. d = 1.0 Ft. Type of Liner= Class B Rip-Rap -DET- STA. 23+60 TO 25+62 LT
REVISIONS
8/17/99

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-4300	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

MULKEY
ENGINEERS & CONSULTANTS
PO Box 92127 27606
(919) 851-1913
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BM -"5I
RAILROAD SPIKE IN 16" PIN OAK
-BL- STA 14+40 40' RIGHT
EL = 195.14'
-L- STA 21+08.43 63.19' RIGHT

CULVERT HYDRAULIC DATA
54" RCP (WEST)

DESIGN DISCHARGE	= 95	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 196.2	FT
BASE DISCHARGE	= 104	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 196.4	FT
OVERTOPPING DISCHARGE	= 165	CFS
OVERTOPPING FREQUENCY	= 100 +	YRS
OVERTOPPING ELEVATION	= 198.3	FT

CULVERT HYDRAULIC DATA
54" RCP (EAST)

DESIGN DISCHARGE	= 95	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 196.2	FT
BASE DISCHARGE	= 104	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 196.4	FT
OVERTOPPING DISCHARGE	= 165	CFS
OVERTOPPING FREQUENCY	= 100 +	YRS
OVERTOPPING ELEVATION	= 198.3	FT

-L-

FOR -L- PLAN VIEW SEE SHEET 4

CULVERT HYDRAULIC DATA
2 @ 10x11

DESIGN DISCHARGE	= 1600	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 196.2	FT
BASE DISCHARGE	= 1700	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 196.4	FT
OVERTOPPING DISCHARGE	= 2400	CFS
OVERTOPPING FREQUENCY	= 100 +	YRS
OVERTOPPING ELEVATION	= 198.3	FT

-DET-

FOR -DET- PLAN VIEW SEE SHEET 2-B

CULVERT HYDRAULIC DATA
3 @ 84" CSP

DESIGN DISCHARGE	= 750	CFS
DESIGN FREQUENCY	= 5	YRS
DESIGN HW ELEVATION	= 195.0	FT
BASE DISCHARGE	=	CFS
BASE FREQUENCY	=	YRS
BASE HW ELEVATION	=	FT
OVERTOPPING DISCHARGE	= 950	CFS
OVERTOPPING FREQUENCY	= 10 +	YRS
OVERTOPPING ELEVATION	= 196.6	FT

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4300	X-1

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

CROSS-SECTION SUMMARY

IN CUBIC YARDS

Note: Approximate quantities only. Unclassified Excavation, Fine Grading, Clearing and Grubbing, Breaking of Existing Pavement and Removal of Existing Pavement will be paid for at the contract Special Provision price for "Grading".

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT.

LOCATION	UNCLASSIFIED EXCAVATION	EMBANKMENT

LOCATION	UNCLASSIFIED EXCAVATION	EMBANKMENT

LOCATION	UNCLASSIFIED EXCAVATION	EMBANKMENT

Rev 3/6/01

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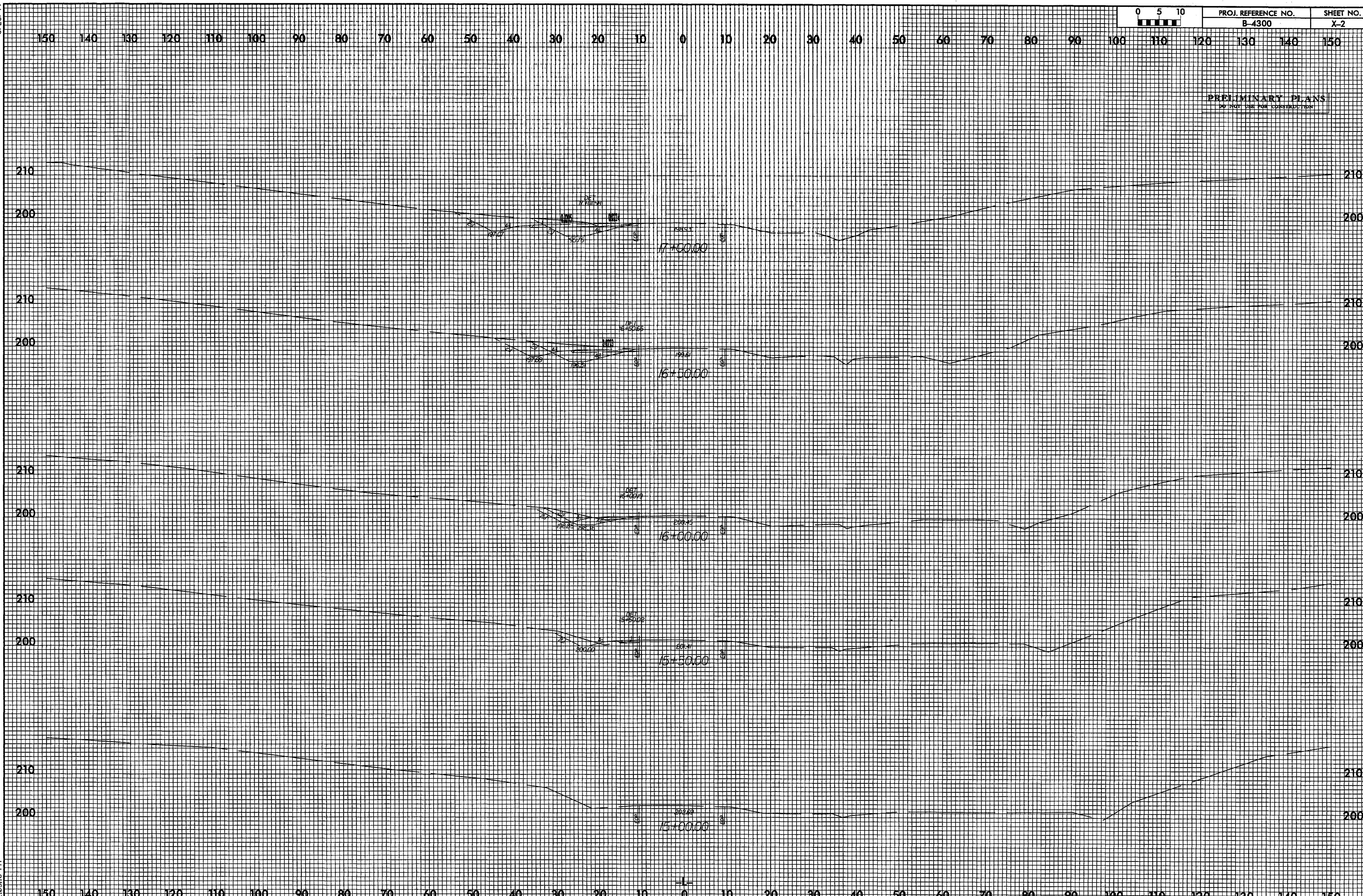

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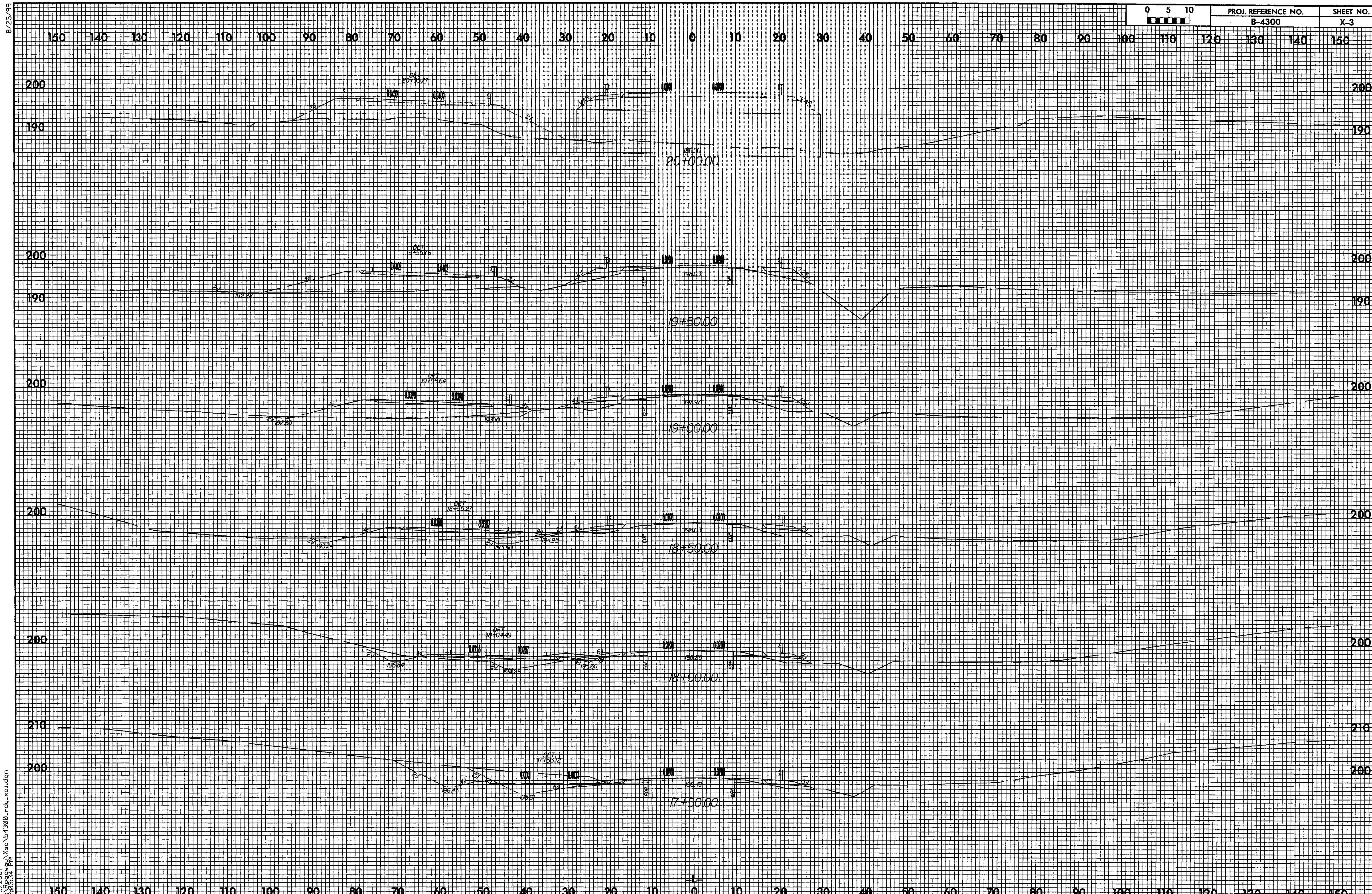
PROJ. REFERENCE NO.	SHEET NO.
B-4300	X-3



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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4300	X-4

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

210

200

DET 22+37.05

19.24 19.30 20.79 19.76

22+50.00

200

DET 22+06.26

19.11 19.65 20.03 19.39

22+00.00

200

DET 21+55.09

19.00 19.30 19.63 19.55

21+50.00

200

DET 21+06.78

19.21 19.59 19.59 19.19

21+00.00

200

DET 20+55.10

19.29 19.19

190

20+50.00

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4300	X-5

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

210

25+50.00

25+00.00

24+50.00

21+00.00

23+50.00

23+00.00

Wake County
Bridge No. 29 on SR 1007 (Poole Road)
Over Clarks Creek
Federal-Aid Project No. BRSTP-1007(8)
State Project No. 8.2409201
WBS No. 33637.1.1
T.I.P. No. B-4300

Categorical Exclusion

United States Department of Transportation

Federal Highway Administration

And

North Carolina Department of Transportation

Division of Highways

Approved:

01/31/06
Date

for Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development and Environmental Analysis Branch, NCDOT

01/31/06
Date

for John F. Sullivan, III, P.E.
Division Administrator
Federal Highway Administration

Wake County
Bridge No. 29 on SR 1007 (Poole Road)
Over Clarks Creek
Federal-Aid Project No. BRSTP-1007(8)
State Project No. 8.2409201
WBS No. 33637.1.1
T.I.P. No. B-4300

Categorical Exclusion

January 2006

Document Prepared by:
Mulkey Engineers & Consultants
Cary, North Carolina

1-30-06
Date

J. A. Bissett, Jr., P.E.
Vice President

1-30-06
Date

Pamela R. Williams
Project Manager

For the North Carolina Department of Transportation

1/30/06
Date

Theresa Ellerby
Project Manager
Consultant Engineering Group

Project Commitments

Wake County
Bridge No. 29 on SR 1007 (Poole Road)
Over Clarks Creek
Federal-Aid Project No. BRSTP-1007(8)
State Project No. 8.2409201
WBS No. 33637.1.1
T.I.P. No. B-4300

In addition to the standard Nationwide Permit No. 23 Conditions, the General Nationwide Permit Conditions, Section 404 Only Conditions, Regional Conditions, State Consistency Conditions, NCDOT's Guidelines for Best Management Practices for the Protection of Surface Waters, Erosion and Sediment Control Guidelines for Contract Construction, General Certification Conditions, and Section 401 Conditions of Certification, the following special commitments have been agreed to by NCDOT:

Division Engineer

The project will adhere to *Stream Crossing Guidelines for Anadromous Fish Passage.* A moratorium on in-water work will be in place from February 15 to June 15 for the American shad.

Hydraulics Unit

All concentrated flows will be discharged outside of Neuse River Riparian Buffers. Concentrated flows will be diffused prior to entering Zone 2 of the riparian buffer.

Wake County
Bridge No. 29 on SR 1007 (Poole Road)
Over Clarks Creek
Federal-Aid Project No. BRSTP-1007(8)
State Project No. 8.2409201
WBS No. 33637.1.1
T.I.P. No. B-4300

Introduction: The replacement of Bridge No. 29 is included in the 2006-2012 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (T.I.P.) and in the Federal-Aid Bridge Replacement Program. The location is shown in Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion."

I. Purpose and Need Statement

Bridge Maintenance Unit records indicate that Bridge No. 29 has a sufficiency rating of 7.0 out of a possible 100 for a new structure. The bridge is considered functionally obsolete and structurally deficient. The replacement of this inadequate structure will result in safer, more efficient traffic operations.

II. Existing Conditions

Bridge No. 29 is located on SR 1007 (Poole Road) in Wake County, North Carolina. SR 1007 is classified as a Rural Major Collector by the statewide functional classification system. In the *Capital Area MPO 2030 Long Range Transportation Plan Update (September 2004 TAC adoption)* SR 1007 was identified as a priority project to be widened to a four-lane facility. The *Capital Area Greenway Master Plan* (Figure 6) shows a proposed greenway corridor along Clarks Creek up to Bridge No. 29.

Land use in the project area includes a mixture of wooded areas and residential. The project site is in the immediate area of the proposed Eastern Wake Expressway (I-540) corridor.

The 2006 estimated average daily traffic (ADT) volume is 14,900 vehicles per day (vpd). The projected 2030 ADT is 30,200 vpd in the design year. The percentages of truck traffic are 3 percent dual tired vehicles (DUAL) and 1 percent truck-tractor semi trailer (TTST). The posted speed limit on SR 1007 is 55 miles per hour (mph) east of the bridge and 45 mph west of the bridge.

Bridge No. 29 was built in 1961. It is a two-lane facility with a clear roadway width of 29.3 feet. The bridge has two spans and totals 61 feet in length. The deck is composed of prestressed concrete channels and metal railings. The substructure consists of prestressed concrete caps on timber piles. The height from crown to stream bed is 10 feet. Bridge No. 29 is posted at 20 tons for single vehicle and 25 tons for TTST.

SR 1007 is approximately 20-foot in width with 5-foot grass shoulders on both sides. The bridge is located in a sag vertical curve.

Overhead telephone utility lines are located along the north side of the bridge. Overhead power lines are located along the south side of SR 1007. Utility impacts are anticipated to be low.

There are approximately 46 school bus crossings on Bridge No. 29 each day.

Fourteen accidents were reported in the project area during the period from September 2001 to August 2004. There were ten property damage only crashes and four non-fatal injury crashes.

SR 1007 at Bridge No. 29 is part of a designated bicycling route in accordance with the City of Raleigh's *Bicycle and Pedestrian Plan (TAC Adopted March 19, 2003)* (Figure 7). This route is designated in the City Wide Transportation Network as a Long Term Corridor. Long Term Corridor routes require major improvements over a period of five to thirty years.

III. Alternatives

A. Project Description

Based on preliminary hydraulic analysis the existing bridge will be replaced on the existing alignment with a double barrel 10-foot by 8-foot reinforced concrete box culvert, approximately 60 feet in length, buried to a depth of one foot. The length and opening size of the proposed culvert may increase or decrease as necessary to accommodate peak flows as determined by a more detailed hydraulic analysis to be performed during the design phase of the project.

The approach roadway will provide two 12-foot travel lanes with 8-foot shoulders, including four-foot paved shoulders (Figure 3A). The A design speed of 60 mph will be provided.

During construction, traffic will be maintained on-site by a temporary detour. Three 78-inch pipes approximately 60 feet in length will be utilized for the detour. The detour roadway will provide two 12-foot travel lanes with 8-foot shoulders including two foot paved (Figure 3B), and a design speed of 50 mph.

B. Build Alternatives

Two build alternatives were studied for this project. They are described below.

Alternative A (preferred) replaces the bridge at the existing location. During construction, traffic will be maintained by an on-site detour north of the existing bridge.

Alternative B replaces the bridge at the existing location. During construction, traffic will be maintained by an on-site detour south of the existing bridge. This alternative is not recommended because the on-site detour would impact approximately 450 linear feet of an unnamed tributary south of SR 1007.

C. Alternatives Eliminated From Further Study

Replacing the bridge on a new alignment was not considered because additional horizontal curves are not desirable in the existing tangent section of roadway.

Replacing the existing bridge with a new bridge was evaluated. Based on preliminary hydraulic analysis the proposed bridge would be approximately 75 feet in length. The minimum clear roadway width would be 40 feet and would provide two 12-foot travel lanes with eight-foot lateral clearance. Replacing the bridge with a culvert is preferred because it is more economical.

An alternative with an off-site detour route along SR 1007, SR 2516, SR 2515, and SR 2601 was evaluated. The detour length is approximately 3.6 miles and has a road user cost of approximately $23,400 per day. This alternative was eliminated because of the high traffic volumes that would be detoured and the high road user cost associated with the off-site detour.

The "do-nothing" alternative will eventually necessitate closure of the bridge. This is not desirable because of the traffic service provided by SR 1007 and Bridge No. 29.

Investigation of the existing structure by the NCDOT's Bridge Maintenance Unit indicates that "rehabilitation" of this bridge is not feasible because of its age and deteriorated condition.

D. Preferred Alternative

Alternative A, replacing the bridge at the existing location using an on-site detour north of the existing bridge during construction, is the preferred alternative. Alternative A was selected because it minimizes stream and wetland impacts and is more economical .

The Division Engineer concurs with Alternative A as the preferred alternative.

E. Design Exception

No design exceptions are anticipated.

IV. Estimated Cost

Table 1 shows estimated costs based on current prices.

Table 1. Estimated Costs

	Alternative A (preferred)	Alternative B
Structure Removal (Existing)	$ 27,000	$ 27,600
Proposed Structure	100,700	100,700
Roadway Approaches	218,300	218,300
Temporary Detour Pipes	63,000	73,500
Detour Approaches	206,000	228,900
Miscellaneous and Mobilization	225,000	232,000
Engineering Contingencies	135,000	144,000
ROW/Const. Easements/Utilities	96,000	89,800
Total	$1,071,000	$1,114,800

The estimated cost of the project as shown in the 2006-2012 Transportation Improvement Program is $1,145,000, including $95,000 for right-of-way, $200,000 in prior years, and $850,000 for construction.

V. Natural Resources

A. Methodology

Field investigations along the study area were conducted by qualified biologists in January 2004. Field surveys were undertaken to determine natural resource conditions and to document natural communities, wildlife, Waters of the U.S., and the presence of protected species or their habitats.

Published information about the study area and region, water resources, and protected species was derived from a number of resources including:

- National Wetlands Inventory (NWI) maps
- USGS 7.5-minute topographical quadrangle maps (Knightdale and Raleigh East, North Carolina)
- Natural Resources Conservation Service (NRCS) soil survey maps of Wake County
- North Carolina Division of Water Quality (NCDWQ) Guidance for Rating the Values of Wetlands in North Carolina; Neuse River Basinwide Water Quality Plan; NC Water Quality Assessment and Impaired Waters List (2004 Integrated 305(b) and 303(d) Report; NCDWQ's Fish Community Database; Neuse River Buffer Rules

- United States Fish and Wildlife Service (USFWS) list of protected species
- North Carolina Natural Heritage Program (NCNHP) database of rare species and unique habitats
- NCDOT aerial photography and Geographic Information Systems Data/ Maps Distribution

Dominant plant species were identified in each stratum of all natural communities encountered. Plant community descriptions are based on those classified in Schafale and Weakley (1990), where applicable. Names and descriptions of plant species generally follow Radford et al. (1968), unless more current information is available. Animal names and descriptions follow Rohde et al. (1994), USFWS (2003), Martof et al.(1980), Parmalee and Bogan (1998), Webster et al.(1985), Russo (2000), and Stokes and Stokes (1996). Scientific nomenclature and common names (when applicable) are provided for each plant and animal listed. Subsequent references to the same organism include the common name only.

During field surveys, wildlife identification involved a variety of observation techniques, which included active searching and capture, visual observations (both with and without the use of binoculars), and observing the characteristic signs of wildlife (sounds, scat, tracks, and burrows). Any organisms that may have been captured during these searches were identified and released without injury. Quantitative aquatic sampling was not undertaken.

Jurisdictional wetland delineations were performed using the three-parameter approach as prescribed in the *Corps of Engineers Wetlands Delineation Manual.* Supplementary technical literature describing the parameters of hydrophytic vegetation, hydric soils, and hydrological indicators were also utilized. Wetland functions were evaluated according to the NCDWQ's rating system, fourth version. Surface waters in the study area were evaluated based on the United States Army Corps of Engineers (USACE) Stream Quality Assessment Worksheet and the NCDWQ Stream Classification Form.

B. Physiography and Soils

The project lies in Wake County, which is situated in the east-central portion of North Carolina and is primarily located in the lower Piedmont ecoregion. The geography of the county consists predominantly of rolling to gently sloping terrain. Floodplains occur in nearly level bands along most of the streams in the area and larger streams have wide terracing floodplains. Wake County is densely populated, with a large portion of the county in commercial or residential development.

Elevations in the study area range from approximately 224 feet above mean sea level (msl) at Clarks Creek north of Bridge No. 29 to approximately 240 feet above msl at the western end of the study area south of Poole Road.

The study area lies within the Raleigh Belt geological region. This section of the Raleigh Belt is comprised of foliated to massive granitic rock. It commonly contains Rolesvile suite, Wise, and Lemon Springs intrusives. The soils in the study area developed from the felsic crystalline system that is part of the Piedmont soil region.

The local soil mapping units in the study area include the following series: Appling, Wedowee, and Wehadkee. Appling soil is the most abundant series mapped in the study area.

- **Appling sandy loam** soils are well drained with a moderate permeability and are strongly acidic. Cobblestones and gravel are common within the top 36 inches of the soil solum. This association is found in the uplands and is dissected by many streams that form a dendritic drainage pattern. Well-drained, deep Appling soils occupy about 70 percent of the association, while the rest of the association is made up of Durham, Wedowee, Vance, Louisburg, Colfax, Worsham, Mantachie, Congaree, Chewacla, Wehadkee, and Bibb series.

- **Wedowee** unit consists of very deep, well drained, moderately permeable soils formed in Piedmont uplands. They occur on narrow ridges and side slopes of uplands, with slopes ranging from 0 to 60 percent though dominantly between 6 and 25 percent. Depth to rock is more than 60 inches. Wedowee soils were formerly mapped as thin solum phases of the Appling series.

- **Wehadkee** silt loam consists of nearly level, poorly drained soils with moderate to moderately-rapid permeability. These soils occur throughout the county on floodplains and streams. Wehadkee soils are considered hydric within Wake County.

Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation. Soils referred to as "Hydric A" are generally completely hydric throughout the mapped soil unit. "Hydric B" soils are non-hydric soils that contain inclusions of hydric soils, usually in depressional areas or along the border with other soil units. Based on the Wake County soil survey, one Hydric A soil map unit occurs in the study area: Wehadkee silt loam.

C. Water Resources

1. Waters Impacted

The project is located within the Neuse River Basin. The project study area is located within Neuse River subbasin 03-04-02 and USGS hydrologic unit 03020201.

2. Water Resource Characteristics

Clarks Creek, an unnamed tributary (UT) to Clarks Creek, and three areas of riparian wetlands make up the Waters of the United States in the study area. The drainage area at Bridge No. 29 is 2.2 square miles. Clarks Creek is a perennial stream that converges with the Neuse River approximately two miles downstream of the project site.

The Clarks Creek UT is not shown on the USGS quad map but is shown on the USGS Wake County soils map. The stream was determined to be intermittent through NCDWQ's stream classification form. It has been channelized for approximately 300 feet upstream of the project site. This portion of the stream is very entrenched, with up to 8-foot tall banks approaching its confluence with Clarks Creek. Clarks Creek UT received a score of 48 on the USACE Stream Quality Assessment Worksheet, and a 22.5 on the NCDWQ Stream Classification Form (Appendix).

Clarks Creek is clear and moderate-flowing, with a sand-silt-clay substrate. The creek received a score of 77 out of 100 on the USACE Stream Quality Assessment Worksheet (Appendix).

A classification system for stream channels based on fluvial geomorphologic principles and landscape position was used for stream analysis. Based on this classification method and field observations during the site visit, Clarks Creek appears to be a Type C5 channel that is slightly entrenched but stable. Clarks Creek UT is highly eroded and appears to be a Type G channel. Characteristics of both streams are presented in Table 2.

Table 2. Stream Dimensions

Stream Feature	Clarks Creek	Clarks Creek UT
Bankfull width	30 feet	3 feet
Channel width	25 feet	1 to 2 feet
Water depth	6 inches to 2 feet	1 to 6 inches
Bank height	15 feet	1 to 5 feet

The NCDWQ classifies surface waters of the state based on their intended best uses. Clarks Creek is currently unclassified; however Mango Creek (upstream of the project and east of Neuse River) and Poplar Creek (downstream of the project and east of the Neuse River) are both classified as "C NSW." Nutrient Sensitive Waters (NSW) are waters needing additional protections because they are subject to excessive microscopic and macroscopic vegetation growth. Class "C" waters are protected in accordance with their usage for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture.

Neither high quality waters (HQW), outstanding resource waters (ORW), trout waters (Tr), 303(d) waters, nor water supply watershed waters (WS-I, WS-II, WS-III, or WS-IV) occur within one mile of the study area. A review of map data available for anadromous fish spawning areas indicates the project site is located within protected waters for the American shad (*Alosa sapidissima*). NCDOT will follow all stream crossing guidelines for anadromous fish passage, and an in-water work moratorium from February 15 to June 15 to protect the American shad.

The Ambient Monitoring System (AMS) is a network of stream, lake, and estuarine water-quality monitoring stations strategically located for the collection of physical and chemical water-quality data. AMS monitoring site A-15 is located on the Neuse River, approximately 1,500 feet downstream of where Clarks Creek enters the river.

The nearest benthic macroinvertebrate sampling site to the study area is located at the mouth of Walnut Creek (B-10), approximately two miles upstream of the mouth of Clarks Creek on the Neuse River. This site was last sampled in 2000, and given a bioclassification rating of "good-fair." The North Carolina Index of Biotic Integrity (NCIBI) is used to assess the biological integrity of streams by examining the structure and health of the fish community. As of April 2000, Clarks Creek had not been given a NCIBI rating.

Point source dischargers throughout North Carolina are regulated through the National Pollutant Discharge Elimination System (NPDES) program. Dischargers are required by law to register for a

permit. There are 52 permitted dischargers in this subbasin of the Neuse River. Two mobile home parks located on Clarks Creek hold minor NPDES discharge permits.

3. Anticipated Impacts to Water Resources

a. General Impacts

Short-term impacts to water quality from construction-related activities include loss of aesthetic values, increased sedimentation, and turbidity. Long-term construction related impacts to water resources include substrate destabilization, bank erosion, increased turbidity, altered flow rates, and possible temperature fluctuations within the channel due to removal of streamside vegetation. Precautions will be taken to minimize impacts to water resources from runoff and erosion in the study area.

b. Impacts Related to Bridge Demolition and Removal

Bridge No. 29 has steel bridge rails, which can be removed without dropping them into Waters of the U.S. There is potential for components of the concrete deck and concrete caps to be dropped into Waters of the U.S. during demolition. The resulting temporary fill associated with the concrete deck and concrete pile caps is approximately 48 cubic yards.

D. Biotic Resources

1. Plant Communities

Three plant communities were observed in the project study area: mixed pine-hardwood forest, bottomland hardwood forest, and man-dominated community. Descriptions are provided below.

a. Mixed Pine-Hardwood Forest

Mixed pine-hardwood forest community is present in the upland area of the site and is typically characterized by a variety of hardwood species in the canopy, a moderate understory, and a sparse herbaceous layer. This forested community is best classified as a variation of Schafale and Weakley's Dry Mesic Oak-Hickory Forest. The Dry Mesic Oak-Hickory Forest community is dominated by a mixture of oak (*Quercus* spp.) and hickory (*Carya* spp.) species. In the study area, dominant canopy species are loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), tulip poplar (*Liriodendron tulipifera*), red maple, northern red oak (*Q. rubra*), southern red oak (*Q. falcata*) and white oak (*Q. alba*). Understory species include dogwood (*Cornus florida*), hickory saplings, American holly (*Ilex opaca*), black cherry (*Prunus serotina*), beech saplings (*Fagus grandifolia*), and sourwood (*Oxydendrum arboreum*). The shrub and vine layer includes blackberry (*Rubus argutus*), greenbriar (*Smilax rotundifolia*), poison ivy (*Toxicodendron radicans*), and Japanese honeysuckle (*Lonicera japonica*). Dominant herbaceous species include Christmas fern (*Polystichum acrosticoides*), crane fly orchid (*Tipularia discolor*), and wild ginger (*Asarum canadense*).

b. Bottomland Hardwood Forest

The bottomland forest community is situated along the banks and adjacent floodplain of Clarks Creek and the UT to Clarks Creek. This forested community is best classified as a variation of a

Piedmont/Mountain Bottomland Forest (Schafale and Weakley). It is characterized by plant species, which are tolerant of occasional flooding and often contains a dense understory and herbaceous layer. Dominant species observed in the mature canopy were red maple and sweetgum. The understory tree, shrub, and vine layer includes sweetgum and red maple saplings, southern arrowwood (*Viburnum dentatum*), Chinese privet (*Ligustrum sinense*), multiflora rose (*Rosa multiflora*), greenbriar, Japanese honeysuckle, crossvine (*Bignonia capreolata*), and poison ivy (*Toxicodendron radicans*). The herbaceous community includes Japanese stilt grass (*Microstegium vimineum*), giant cane (*Arundinaria gigantea*), and various grasses (family Poaceae).

c. Man-Dominated Community

The man-dominated community represents areas that are periodically maintained by human influences, such as roadside and power line rights-of-way, regularly mowed lawns, fields, and open areas. Man-dominated areas comprise a majority of the study area including roadside maintained areas, and residential lawns. The man-dominated roadside areas are primarily covered with herbaceous vegetation that includes various types of grasses and common weedy species such as plantain (*Plantago* spp.), dog fennel (*Eupatorium capillifolium*), chickweed (*Cerastium* spp.), and Indian strawberry (*Duchesnea indica*). Various grasses and ornamental shrubs are the dominant vegetation in the residential and commercial lawns, including Chinese privet (*Ligustrum sinense*), and planted loblolly pine and red maple.

2. Wildlife

The project area was visually surveyed for signs of terrestrial and aquatic wildlife. The mixed pine-hardwood forest and man-dominated community offer a moderate diversity of foraging, nesting, and cover habitat for many species of amphibians, reptiles, birds, and mammals. Species that may be associated with these types of communities are described below. An asterisk (*) indicates the species that were directly observed or that evidence was noted during field reconnaissance.

Reptile species associated with the study area are likely to include the Eastern box turtle (*Terrapene carolina*), five-lined skink (*Eumeces fasciatus*), rough green snake (*Opheodrys aestivus*), Eastern milk snake (*Lampropeltis triangulum triangulum*), black racer (*Coluber constrictor*), and brown snake (*Storeria dekayi*). These reptiles inhabit fields, woodlands, streams, wood piles, and old buildings of the Piedmont and lower mountains in North Carolina.

Many bird species may inhabit or migrate through the study area. Common inhabitants include red-bellied woodpecker (*Melanerpes carolinus*), hairy woodpecker (*Picoides villosus*), downy woodpecker (*P. pubescens*), blue jay (*Cyanocitta cristata*), Carolina chickadee (*Parus carolinensis*), tufted titmouse (*Baeolophus bicolor*), white-breasted nuthatch (*Sitta carolinensis*), American robin (*Turdus migratorius*), Northern cardinal (*Cardinalis cardinalis*), Northern mockingbird (*Mimus polyglottos*), house finch (*Carpodacus mexicanus*), Carolina wren (*Thryothorus ludovicianus*), dark-eyed junco (*Junco hyemalis*), American goldfinch (*Carduelis tristis*), American crow* (*Corvus brachyrhynchos*), and brown-headed cowbird (*Molothrus ater*). Predatory species may include red-tailed hawk (*Buteo jamaicensis*), Eastern screech owl (*Otus asio*), and barred owl (*Strix varia*). A common wetland species likely to frequent the area is the great blue heron (*Ardea herodias*).

A wide variety of mammals are expected to inhabit the study area and surrounding landscape. Virginia opossum (*Didelphis virginiana*), woodchuck (*Marmota monax*), gray squirrel* (*Sciurus*

carolinensis), Eastern harvest mouse (*Reithrodontomys humulis*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), raccoon* (*Procyon lotor*), and white-tailed deer* (*Odocoileus virginianus*) are species most likely to be found. In addition, bats such as the Eastern red (*Lasiurus borealis*), little brown bat (*Myotis lucifugus*), and big brown bat (*Eptesicus fuscus*) may also be present in the project study area.

3. Aquatic Communities

The aquatic habitat of Clarks Creek is expected to be fair based on observed conditions during the field visits. A beaver dam is located under Bridge No. 29 on the upstream side. Clarks Creek has a stream bed of sand, silt, and small pebbles beneficial to macrobenthic invertebrates.

The study area likely exhibits an amphibian population of frogs and toads. Spring peepers (*Hyla crucifer*), pickerel frogs (*Rana palustris*), and green frogs (*R. clamitans*) are most likely to be present in the study area. No frog or toad species were observed during the field investigations.

Reptiles that spend the vast majority of their lives in aquatic communities and are somewhat common throughout this portion of North Carolina include the snapping turtle (*Chelydra serpentina*), eastern musk turtle (*Sternotherus odoratus*), yellowbelly slider (*Chrysemys scripta*), and northern water snake (*Nerodia sipedon*).

Fish that are likely to utilize Clarks Creek include yellow bullhead (*Ameiurus natalis*), largemouth bass (*Micropterus salmoides*), American eel (*Anguilla rostrata*), rosyside dace (*Clinostomus funduloides*), American shad, and creek chub (*Semotilus atromaculatus*). These fish thrive in slow moving, soft substrate waters like those present within the project area. The overhanging vegetation provides good locale for foraging on vegetation and benthic organisms, and hiding from predators.

4. Anticipated Impacts to Biotic Communities

a. Terrestrial Communities

Potential impacts to plant communities are based on the approximate area of each plant community within the proposed right of way and temporary construction easements. Table 3 depicts impacts to terrestrial biotic communities for the two alternatives.

Table 3. Anticipated Impacts for Alternatives

Vegetative Community	Alternative A		Alternative B	
	Permanent	Temporary	Permanent	Temporary
Bottomland Forest	0.52 acres	0.35 acres	0.52 acres	0.80 acres
Mixed Pine and Hardwood Forest	0.20 acres	0.41 acres	0.20 acres	<0.01 acres
Urban/Disturbed Land	1.01 acres	0.92 acres	1.01acres	0.75 acres

b. Aquatic Communities

Aquatic organisms are very sensitive to the discharges and inputs resulting from construction activities. Appropriate measures will be taken to avoid spillage and control runoff. Such measures will include an erosion and sedimentation control plan, provisions for waste materials and storage, stormwater management measures, and appropriate road maintenance measures. NCDOT's *Best Management Practices for Protection of Surface Waters* (BMPs - PSW) and Sedimentation Control guidelines will be strictly enforced during the construction stages of the project. Long-term impacts to water resources may include permanent changes to the stream banks and temperature increases caused by the removal of stream-side vegetation.

The removal of stream-side vegetation and placement of fill material during construction contributes to erosion and possible sedimentation. Quick revegetation of these areas reduces 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, sand bars may be formed both at the site and downstream.

Impacts usually associated with in-stream construction include increased channelization and scouring of the streambed. In-stream construction alters the substrate and impacts adjacent stream-side vegetation. Such disturbances within the substrate lead to increased siltation, which can clog the gills and feeding mechanisms of benthic organisms, fish, and amphibian species.

E. Special Topics

1. "Waters of the United States:" Jurisdictional Issues

Section 404 of the Clean Water Act (CWA) requires regulation of discharges into "Waters of the United States." The U.S. Environmental Protection Agency (USEPA) is the principal administrative agency of the Clean Water Act; however, the USACE has the responsibility for implementation, permitting, and enforcement of the provisions of the Act. The USACE regulatory program is defined in 33 CFR 320-330.

Section 401 of the Clean Water Act grants authority to individual states for regulation of discharges into "Waters of the United States." Under North Carolina General Statutes, 113A "Pollution Control and Environment" and codified in NCAC 15A, the NCDWQ has the responsibility for implementation, permitting, and enforcement of the provisions of the CWA.

Clarks Creek is identified as a perennial stream and the unnamed tributary to Clarks Creek is an intermittent stream. Perennial and intermittent streams are jurisdictional under Sections 401 and 404 of the Clean Water Act.

Wetlands, defined in 33 CFR 328.3, are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetland delineations for the project study area were conducted in January 2004. A general description of the wetlands located within the project study area is presented below. Wetland data forms and NCDWQ ratings are presented in the Appendix. All areas are classified as palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetlands.

Wetland A is situated between the unnamed tributary of Clarks Creek and a steep slope. The vegetation consists primarily of red maple, sweetgum, Japanese honeysuckle, and giant cane. It received a rating of 43 out of a possible 100 on the NCDWQ Wetland Rating Form.

Wetland B is located upstream of Wetland A, contiguous to the unnamed tributary of Clarks Creek. The vegetation consists primarily of red maple, tulip poplar, sweetgum, Chinese privet, giant cane, Virginia chainfern (*Woodwardia virginica*), Japanese honeysuckle, and muscadine grape (*Vitis rotundifolia*). This wetland received a rating of 43 out of a possible 100 on the NCDWQ Wetland Rating Form.

Wetland C is located in the northeast quadrant of the project corridor, adjacent to Clarks Creek. The vegetation consists primarily of red maple, sweetgum, and Chinese privet. Wetland C received a rating of 77 out of a possible 100 on the NCDWQ Wetland Rating Form.

Impacts to wetlands will take place depending on the final design of the bridge replacement. Table 4 depicts the estimated impacts to Waters of the United States for the proposed alternatives. Stream impacts to the UT of Clarks Creek resulting from widening the approach roadway to the proposed culvert are permanent and will likely require mitigation. Wetland impacts resulting from the detour will likely be considered temporary due to the soil being mineral, not organic. Mechanized clearing is generally considered a temporary impact.

Table 4. Estimated Impacts to Waters of the United States

Proposed Alternatives	Wetland (acre)	Wetland in Buffer (acre)	Total Wetland (acre)	Fill in Stream (acre)	Stream (linear feet)	Mechanized Clearing (acre)
Alternative A or B	0	0	0	0.02	80 (100*)	0
Alternative A (preferred) detour	0.007	<0.001	0.007	0.02	64 (0.0*)	0.01
Alternative B detour	0	0	0	0.02	78 (360*)	0

** Impacts to Clarks Creek UT*

2. Permits

Section 404 of the Clean Water Act – In accordance with Section 404 of the Clean Water Act (33 U.S.C. 1344), a permit is required from the USACE for projects of this type for the discharge of dredged or fill material into "Waters of the United States." The USACE issues two types of permits for these activities. A general permit may be issued on a nationwide or regional basis for a category or categories of activities when: those activities are substantially similar in nature and cause only minimal individual or cumulative environmental impacts, or when the general permit would result in avoiding unnecessary duplication or regulatory control exercised by another Federal, state or local agency provided that the environmental consequences of the action are individually and cumulatively minimal. If a general permit is not appropriate for a particular activity, then an

individual permit must be utilized. Individual permits are authorized on a case-by-case evaluation of a specific project involving the proposed discharges.

It is anticipated that this project will fall under Nationwide Permit 23, which is a type of general permit. Nationwide Permit 23 is relevant to approved Categorical Exclusions. This permit authorizes any activities, work and discharges undertaken, assisted, authorized, regulated, funded or financed, in whole or in part, by another federal agency. Also, the activity is "categorically excluded" from environmental documentation because it is included within a category of actions which neither individually nor cumulatively have a significant effect on the environment. Activities authorized under nationwide permits must satisfy all terms and conditions of the particular permit. However, final permit decisions are left to the discretionary authority of the USACE.

Section 401 General Water Quality Certification (WQC) – A Section 401 General Water Quality Certification is necessary for projects that require Section 404 permits. The state has General Certifications which will match the permit type authorized by the USACE. The NCDWQ must issue the 401 Certification before the USACE will issue the 404 Permit. Compensatory mitigation may be required when more than 150 linear feet of stream and/or more than one acre of wetland impacts occur. Written concurrence from the NCDWQ is not required.

Bridge Demolition and Removal - Bridge No. 29 has steel bridge rails, which can be removed without dropping them into Waters of the U.S. There is potential for components of the concrete deck and substructure to be dropped into Waters of the U.S. during demolition. The resulting temporary fill associated with the concrete deck and concrete pile caps is approximately 48 cubic yards.

3. Buffer Rules

The Neuse River Riparian Buffer Rule applies to 50-foot wide riparian buffers directly adjacent to perennial and intermittent surface waters in the Neuse River Basin. This rule does not apply to portions of the riparian buffer where a use is existing and ongoing. The Nutrient Sensitive Waters Management Strategy for the Protection and Maintenance of Riparian Buffers (15 A NCAC 2B .0233) provides a designation for uses that cause impacts to riparian buffers within the Neuse Basin. The buffer is divided into two areas. Zone 1 includes the first 30 feet out from the water and essentially must remain undisturbed. Zone 2 consists of the landward 20 feet which must be vegetated, but allows for certain land uses. Grading and replanting in Zone 2 is allowed provided that the health of the vegetation in Zone 1 is not compromised.

Simple perpendicular bridge crossings are designated **Allowable** within the riparian buffer. The **Allowable** designation means that the intended uses may proceed within the riparian buffer provided that there are no practical alternatives, and that written authorization from the Division of Water Quality is obtained prior to project development. **Allowable with Mitigation** buffer impacts for bridge replacement projects are addressed when parallel impacts to jurisdictional water occur. **Allowable with Mitigation** buffer impacts require written authorization from NCDWQ prior to project development. Table 5 depicts estimated impacts to the riparian buffer for Clark Creek and Table 6 for the UT.

Table 5. Estimated Buffer Impacts to Clark Creek

Proposed Alternatives	Buffers Allowable with Mitigation (sq. ft.)		Total (sq. ft.)
	Zone 1	Zone 2	
Alternative A or B (permanent)	4,505	1,604	6,109
Alternative A detour (temporary)(**preferred**)	4,641	2,672	7,313
Alternative B detour (temporary)	4,830	3,114	7,944

Table 6. Estimated Buffer Impacts to UT

Proposed Alternatives	Buffers Allowable with Mitigation (sq. ft.)		Total (sq. ft.)
	Zone 1	Zone 2	
Alternative A or B (permanent)	5,310	0	5,310
Alternative A detour (temporary)(**preferred**)	0	0	0
Alternative B detour (temporary)	7,841	6,600	14,441

Alternatives A and B will impact buffers associated with Clarks Creek. Vegetation will be replanted after the on-site detour is removed.

4. Mitigation

Mitigation of wetland impacts has been defined by the Council on Environmental Quality to include avoidance, minimization, and compensation. These activities must be considered in sequential order.

Avoidance examines all appropriate and practicable possibilities of averting impacts to Waters of the U.S. It is not feasible for this roadway to completely avoid Waters of the U.S. because it traverses Clarks Creek and because of the need for a temporary on-site detour during construction. The on-site detour is necessary because of the amount of traffic on SR 1007.

Minimization includes the examination of appropriate and practicable steps to reduce adverse impacts to Waters of the U.S. Wetlands can be bridged to minimize temporary impacts, however, this is not highly advocated due to the low quality of Wetland C.

Compensatory **mitigation** includes restoration, enhancement, creation, or preservation of wetland and stream functions and values that are lost when these systems are converted to other uses. The USACE usually requires compensatory mitigation for activities authorized under Section 404 of the Clean Water Act when unavoidable impacts total more than 0.10 acre of wetlands or 150 linear feet of perennial or intermittent streams. The NCDWQ may require compensatory mitigation for activities authorized under Section 401 of the Clean Water Act for unavoidable impacts to more than 1.0 acre of wetlands or more than 150 linear feet of perennial or intermittent streams.

Compensatory wetland mitigation will not be required for either alternative since jurisdictional wetlands since wetland impacts are less than 0.01 acre. The wetland impacted by Alternative A's detour will be restored by removing the temporary fill material and replanting.

Compensatory stream mitigation will likely be required since there are impacts to Clarks Creek UT caused by the widening SR 1007 in the project area.

F. Rare and Protected Species

Federal law (under the provisions of Section 7 of the Endangered Species Act of 1973, as amended) requires that any federal action likely to adversely affect a species classified as federally protected be subject to review by the USFWS. Other species may receive additional protection under separate laws. The latest USFWS species list dated February 25, 2003 was review January 2006 for Wake County species. It listed one Federally Threatened (T), and three Federally Endangered (E) species.

1. Federally Protected Species

A field survey was conducted in January 2004 to determine if suitable habitat is available at the project site for the federally protected species listed in Table 7. Species descriptions and biological conclusions are provided on the next page.

Table 7. Threatened & Endangered Species Listed for Wake County, North Carolina

Common Name	Scientific Name	Federal Listing	Biological Conclusion
Bald eagle	*Haliaeetus leucocephalus*	Threatened (Proposed for delisting)	No Effect
Red-cockaded woodpecker	*Picoides borealis*	Endangered	No Effect
Dwarf wedge mussel	*Alasmidonta heterodon*	Endangered	No Effect
Michaux's sumac	*Rhus michauxii*	Endangered	No Effect

Bald eagle (*Haliaeetus leucocephalus*)
Federal Status: Threatened (Proposed for delisting)
State Status: Threatened
Date Listed: March 11, 1967

The bald eagle is a large raptor that ranges in size from 32 to 43 inches tall and has a wingspan averaging 6 feet. These predators weigh an average of 10 to 12 pounds. Adult body plumage is dark brown to chocolate brown with a white head and tail, while juveniles are brown and irregularly marked with white until their fourth year. They are primarily associated with large bodies of water where food is plentiful. Suitable nesting sites are typically found within 0.5 mile of the water. Nests are made in the largest living tree within the area, with an open view of surrounding land and a clear flight path to water. Nests can be as large as 6 feet across and are made of sticks and vegetation.

These platform nests may be used by the same breeding pair for many years. Breeding begins in December or January and the young remain in the nest at least ten weeks after hatching. Bald eagles eat mostly fish robbed from ospreys or picked up dead along shorelines or other carrion. They may also capture small animals such as rabbits, some birds, and wounded ducks.

Biological Conclusion: ***No Effect***

Bald eagles are year-round but transient species in North Carolina. Suitable habitat for the bald eagle is not present in the study area. Clarks Creek is too small to support and sustain a family of bald eagles. Based upon this, the project will have **NO EFFECT** on the bald eagle.

Red-cockaded woodpecker (*Picoides borealis*)
Federal Status: Endangered
State Status: Endangered
Date Listed: October 13, 1970

This bird is a small, seven to eight-inch tall woodpecker with a black and white barred back and conspicuous large white cheek surrounded by a black cap, nape, and throat. Males have a very small red mark at the upper edge of the white cheek and just behind the eye. The red-cockaded woodpecker (RCW) is found in open pine forests in the southeastern United States. The RCW uses open old growth stands of southern pines, particularly longleaf pine (*Pinus palustris*), for foraging and nesting habitat. A forested stand optimally should contain at least 50 percent pine and lack a thick understory. The RCW is unique among woodpeckers because it nests exclusively in living pine trees. These birds excavate nests in pines greater than 60 years old that are contiguous with open, pine dominated foraging habitat. The foraging range of the RCW may extend 500 acres and must be contiguous with suitable nesting sites.

Living pines infected with red-heart disease (*Formes pini*) are often selected for cavity excavation. Cavities are located from 12 to 100 feet above ground level and below live branches. These trees can be identified by "candles," a large encrustation of running sap that surrounds the tree. Colonies consist of one to many of these candle trees. The RCW lays its eggs in April, May, and June; the eggs hatch approximately 10 to 12 days later.

Biological Conclusion: ***No Effect***

Suitable habitat for RCW does not exist within the study area. The quantity of pine within the study area is not suitable for sustaining the RCW for nesting or foraging. Based upon this, the project will have **NO EFFECT** on the RCW.

Dwarf wedge mussel (*Alasmidonta heterodon*)
Federal Status: Endangered
State Status: Endangered
Date Listed: March 14, 1990

The dwarf wedge mussel is small, rarely exceeding 1.5 inches in length. The shell's outer surface (periostracum) is usually olive brown or yellowish brown in color, with light green rays that are more

noticeable in juveniles. The nacre (inner shell surface) is bluish to silvery white. The shell shape is subtrapezoidal. A unique characteristic of this mussel is its dentition pattern; the right valve possesses two lateral teeth, while the left valve has only one. This trait is opposite of all other North American species having lateral teeth. Three potential fish host species for the glochidia of the dwarf-wedge mussel are the tessellated darter (*Etheostoma olmstedi*), Johnny darter (*Etheostoma nigrum*), and mottled sculpin (*Cottus bairdi*).

The dwarf wedge mussel inhabits creek and river areas with a slow to moderate current and a sandy, gravelly, or muddy bottom. In North Carolina, this mussel is documented in the Neuse and Tar River systems. The dwarf wedge mussel population declines are attributed to industrial, domestic, and agricultural pollution. Loss of habitat due to siltation of streams and chemical pollution, especially in the highly developed Wake County sites, threaten the survival of this mussel.

Biological Conclusion: ***No Effect***

A survey for the dwarf wedge mussel was conducted on May 28, 2004 by qualified biologists. No dwarf wedge mussels were found and it was concluded that the species does not occur in the project footprint. The absence of the dwarf wedge mussel was reportedly due to the combination of Asian clam presence and the urbanized nature of the stream. Based upon this, the project will have **NO EFFECT** on the dwarf wedge mussel.

Michaux's sumac (*Rhus michauxii*)
Federal Status: Endangered
State Status: Endangered – Special Concern
Date Listed: September 28, 1989

Michaux's sumac is a rhizomatous, densely hairy shrub, with erect stems from 1 to 3 feet in height. The compound leaves contain evenly serrated, oblong to lanceolate, acuminate leaflets. Most plants are unisexual; however, more recent observations have revealed plants with both male and female flowers on one plant. The flowers are small, borne in a terminal, erect, dense cluster, and colored greenish yellow to white. Flowering usually occurs from June to July; while the fruit, a red drupe, is produced through the months of August to October. Only 36 extant populations are known, with 31 in North Carolina, three in Virginia, and two populations in Georgia.

Michaux's sumac grows in sandy or rocky open woods in association with basic soils. It spreads by producing cloning shoots from the roots of mature plants. Apparently, this plant survives best in areas where some form of periodic disturbance provides open areas. At least 12 of the plant's populations in North Carolina are on highway rights-of-way, roadsides, or on the edges of artificially maintained clearings.

Biological Conclusion: ***No Effect***

Suitable habitat for Michaux's sumac is not present in the project area. Disturbed areas that may have provided habitat at one time are maintained as residential and commercial lawns. Based upon this, the project will have **NO EFFECT** on Michaux's sumac.

2. Federal Species of Concern

The February 25, 2003 USFWS list also includes a category of species designated as "Federal Species of Concern" (FSC).

Federal Species of Concern (FSC) are not legally protected under the Endangered Species Act and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. Species designated as FSC are defined as taxa, which may or may not be listed in the future. These species were formerly Candidate 2 (C2) species or species under consideration for listing for which there is insufficient information to support listing. FSCs, their state status, and the existence of suitable habitat within the study area are shown in Table 8. Some of these species are listed as Endangered, Threatened, or Special Concern by the NCNHP list of rare plant and animal species and are afforded state protection under the State Endangered Species Act of 1987 and the North Carolina Plant Protection and Conservation Act of 1979.

Table 8. Federal Species of Concern, State Status, and Potential Habitat

Common Name	Scientific Name	State Status	Potential Habitat
Southeastern myotis	*Myotis austroriparius*	SC	Yes
Bachman's sparrow	*Aimophila aestivalis*	SC	No
Southern hognose snake*	*Heterodon simus*	SC	No
Carolina darter	*Etheostoma collis lepidinion*	SC	No
Neuse madtom	*Noturus furiosus*	SC(PT)	No
Pinewoods shiner	*Lythrurus matutinus*	SR	Yes
Diana fritillary*	*Speyeria diana*	SR	No
Atlantic pigtoe	*Fusconaia masoni*	E	Yes
Green floater	*Lasmigona subviridis*	E	Yes
Yellow lance	*Elliptio lanceolata*	E	Yes
Bog spicebush	*Lindera subcoriacea*	E	No
Carolina least trillium	*Trillium pusillum* var. *pusillum*	E	No
Flatrock panic grass	*Panicum lithophilus*	None	No
Sweet pinesap	*Monotropsis odorata*	SR-T	No

Notes:
SC-Special Concern, PT-Proposed Threatened, SR-Significantly Rare, E-Endangered, -T-Throughout, *-Historic Record

No FSC species were observed during the site visit. The review of the NCNHP maps determined that two Endangered species occur within a two-mile radius of the project site. The dwarf wedge mussel (*Alasmidonta heterodon)* is located approximately 1.3 miles west of the project site in the Neuse River. Michaux's sumac (*Rhus michauxii*) is located 1.5 miles west of the project site, adjacent to a mobile home park along SR 2551.

VI. Cultural Resources

A. Compliance Guidelines

This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and implemented by the Advisory Council on Historic Preservation's Regulations for Compliance Section 106, codified at 36 CFR Part 800. Section 106 requires federal agencies to take into account the effect of their undertakings (federally funded, licensed, or permitted) on properties listed in or eligible for the National Register of Historic Places, and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings.

B. Historic Architecture

A field survey of the Area of Potential Effects (APE) was conducted on July 28, 2003. All structures within the APE were photographed, and later reviewed by NCDOT architectural historians and staff at the State Historic Preservation Office (HPO). In a concurrence form dated October 14, 2003, NCDOT, HPO, and FHWA concurred that there are no historic architectural resources either listed in or eligible for listing in the National Register of Historic Places within the APE. A copy of the concurrence form is included in the Appendix.

C. Archaeology

The SHPO, in a memorandum dated March 4, 2004 recommended that "no archaeological investigation be conducted in connection with this project." A copy of the SHPO memorandum is included in the Appendix.

VII. Environmental Effects

The project is expected to have an overall positive impact. Replacement of the structurally deficient and functionally obsolete bridge will result in safer traffic operations.

The project is a Federal "Categorical Exclusion" due to its limited scope and lack of substantial environmental consequences.

The bridge replacement will not have an adverse effect on the quality of the human or natural environment with the use of current NCDOT standards and specifications.

The project is not in conflict with any plan, existing land use, or zoning regulation. No substantial change in land use is expected to result from construction of the project.

No adverse impact on families or communities is anticipated. Right-of-way acquisition will be limited. No relocations of residents or businesses are expected with implementation of the proposed alternative.

This project is in compliance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations) since there are no relocations.

No adverse effect on public facilities or services is anticipated. The project is not expected to adversely affect social, economic, or religious opportunities in the area.

There are no publicly owned recreational facilities, or wildlife and waterfowl refuges of national, state, or local significance in the vicinity of the project.

The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impacts to prime and important farmland soils by all land acquisition and construction projects. Prime and important farmland soils are defined by the Natural Resources Conservation Service (NRCS). Since the proposed bridge will be replaced at the existing location the Farmland Protection Policy does not apply.

The project is located in Wake County, which is within the Raleigh-Durham-Chapel Hill nonattainment area for ozone (O_3) and the Raleigh Durham nonattainment area for carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as moderate nonattainment areas for CO. However, due to improved monitoring data, these areas were redesignated as maintenance for CO on September 18, 1995. The area was designated nonattainment for O_3 under the new eight-hour ozone standard effective June 15, 2004. Section 176 (c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Wake County. The Capital Area Metropolitan Planning Organization (MPO), **2030** Long Range Transportation Plan (LRTP), and the **2006-2012** Metropolitan Transportation Improvement Program (MTIP) has been determined to conform to the intent of the SIP. The USDOT made a conformity determination of the LRTP on 6/15/2005 and the MTIP on 6/15/2005. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There have been no significant changes in the project's design concept or scope, as used in the conformity analyses.

The traffic volumes will not increase or decrease because of this project. There are no receptors located in the immediate project area. The project's impact on noise and air quality will not be substantial.

Noise levels could increase during construction but will be temporary. This evaluation completes the assessment requirements for highway traffic noise (23 CFR Part 772) and for air quality (1990 CAAA and NEPA) and no additional reports are required.

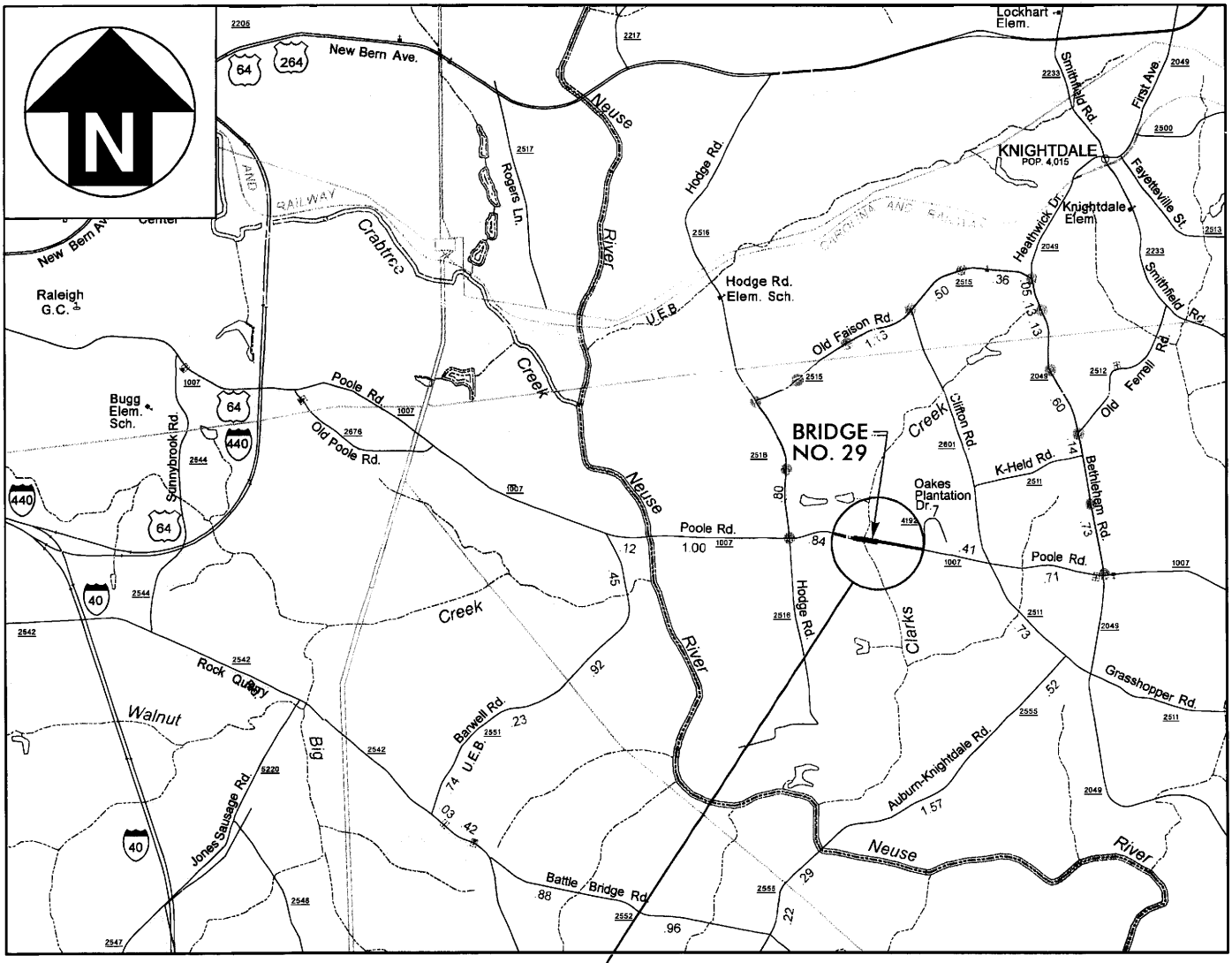
An examination of records at the North Carolina Department of Environment and Natural Resources, Division of Water Quality, Groundwater Section and the North Carolina Division of Solid Waste Management revealed no hazardous waste sites in the project area. Based upon a field reconnaissance survey, no impacts to underground storage tanks (USTs) are anticipated. If any unregulated USTs or any potential source of contamination is discovered during right-of-way initial contacts with impacted property owners, then an assessment will be conducted to determine the extent of any contamination at that time.

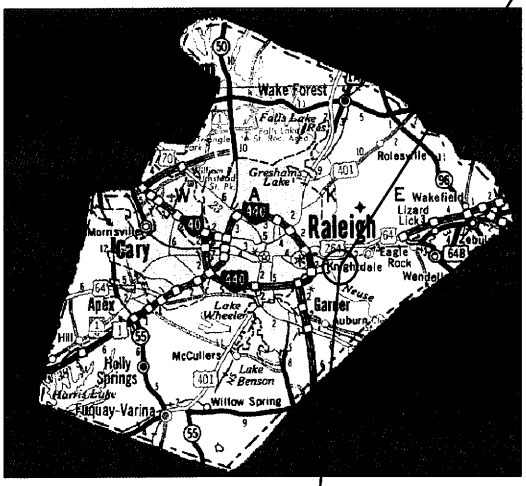
The drainage area of Clarks Creek at the proposed crossing is 2.2 square miles. Wake County is currently participating in the National Flood Insurance Program. This crossing of Clarks Creek is located in Zone AE, a FEMA Special Flood Hazard Zone. A Flood Insurance Rate Map is provided in Figure 5. It is not anticipated that a floodway modification will be required. The proposed replacement structure will be similar in waterway opening size, and it is not anticipated that this project will have any substantial impact on the existing floodplain or floodway.

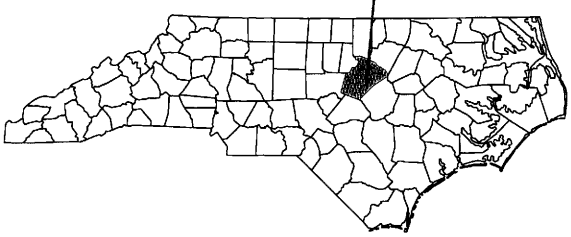
On the basis of the above discussion, it is concluded that no substantial adverse environmental effects will result from implementation of the project.

VIII. Public Involvement

Efforts were undertaken early in the planning process to contact local officials to involve them in the project development with scoping letters. Scoping letters were also sent to various agencies. A newsletter (Appendix) was mailed in February 2005 to area residents and appropriate officials. No responses were received from the newsletter.





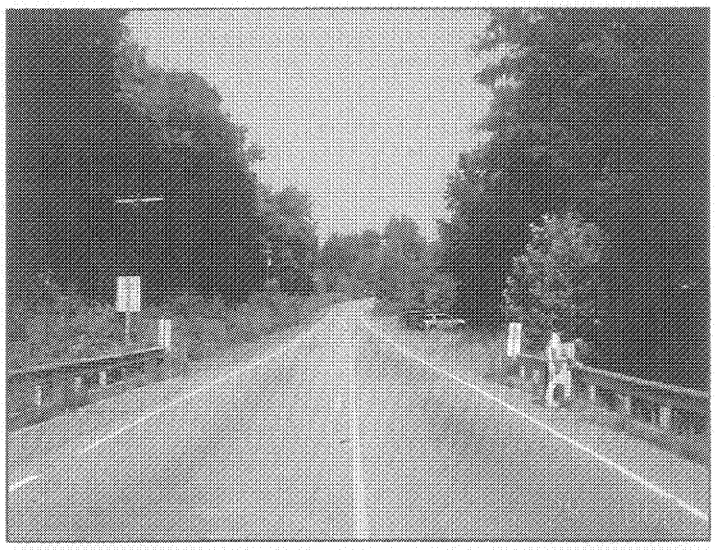


DETOUR ROUTE

North Carolina Department of Transportation
Project Development & Environmental Analysis

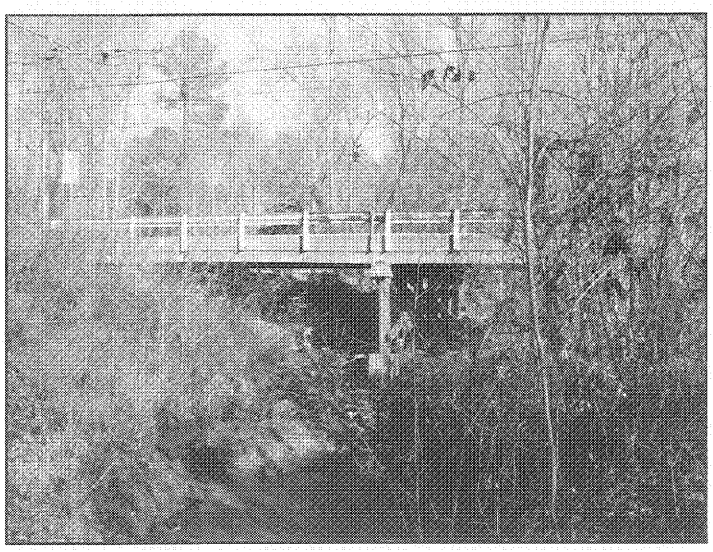
WAKE COUNTY
BRIDGE NO. 29 ON SR 1007
OVER CLARKS CREEK
B-4300

FIGURE 1



View of west approach from Bridge No. 29.

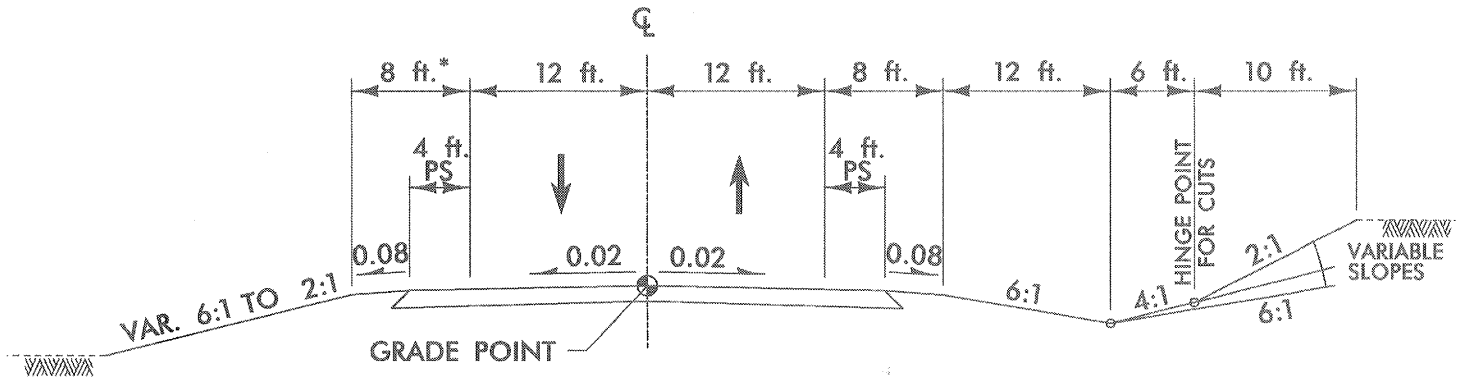
View of east approach from Bridge No. 29.



Bridge No. 29 side view.

Figure 2

B-4300 Bridge No. 29 on SR 1007 over Clarks Creek



TYPICAL APPROACH SECTION
(PROPOSED)

* 11 ft. WITH GUARDRAIL IS WARRANTED

BRIDGE TO BE REPLACED WITH
DOUBLE BARRELL 10' x 8'
REINFORCED CONRETE BOX CULVERT

TRAFFIC DATA	
2006 ADT =	14,900
2030 ADT =	30,200
DUAL	3%
TTST	1%

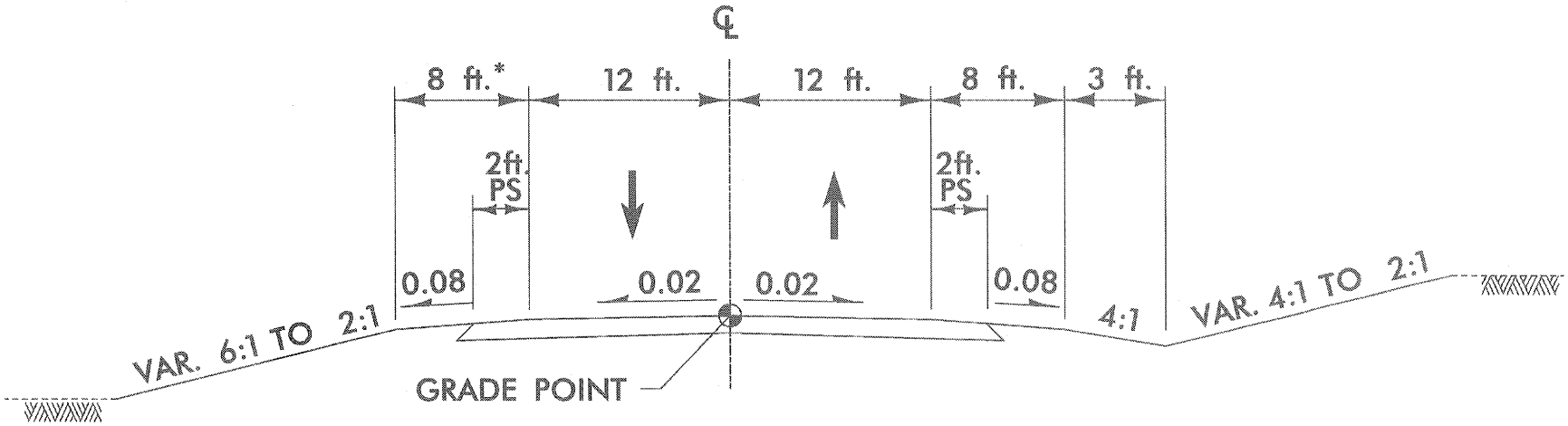
EXISTING BRIDGE LENGTH = 61 ft.

FUNCTIONAL CLASSIFICATION :
MAJOR COLLECTOR – RURAL

North Carolina Department of Transportation
Project Development & Environmental Analysis

WAKE COUNTY
BRIDGE NO. 29 ON SR 1007
(POOLE RD)
OVER CLARKS CREEK
TIP NO: B-4300

FIGURE 3A



TYPICAL APPROACH SECTION
(DETOUR)

* 10 ft. WHEN GUARDRAIL IS WARRANTED

TRAFFIC DATA	
2006 ADT =	14,900
2030 ADT =	30,200
DUAL	3%
TTST	1%

FUNCTIONAL CLASSIFICATION :
MAJOR COLLECTOR – RURAL

North Carolina Department of Transportation
Project Development & Environmental Analysis

WAKE COUNTY
BRIDGE NO. 29 ON SR 1007
(POOLE RD)
OVER CLARKS CREEK
TIP NO: B–4300

FIGURE 3B


ALTERNATIVE A
(PREFERRED)
B-4300
WAKE COUNTY
SR 1007 BRIDGE NO. 29
OVER CLARKS CREEK
NC GRID
NAD 83
3 - 78" PIPES
CLARKS CREEK
DETOUR
TO RALEIGH
TO KNIGHTDALE
POOLE ROAD (SR 1007)
24' BST
POOLE ROAD (SR 1007)
24' BST
CLARKS CREEK LT
2 @ 10' X 8' RCBC
BEGIN CONSTRUCTION
END CONSTRUCTION
CLARKS CREEK
50 0 50 100
SCALE
North Carolina Department
Of Transportation
Project Development &
Environmental Analysis
B-4300
FIGURE 4A


ALTERNATIVE B
B–4300
WAKE COUNTY
SR 1007 BRIDGE NO. 29
OVER CLARKS CREEK
NC GRID
NAD 83
BEGIN CONSTRUCTION
2 @ 10' X 8' RCBC
END CONSTRUCTION
CLARKS CREEK UT
CLARKS CREEK
DETOUR
3 – 78" PIPES
50 0 50 100
SCALE
North Carolina Department
Of Transportation
Project Development &
Environmental Analysis
B–4300
FIGURE 4B

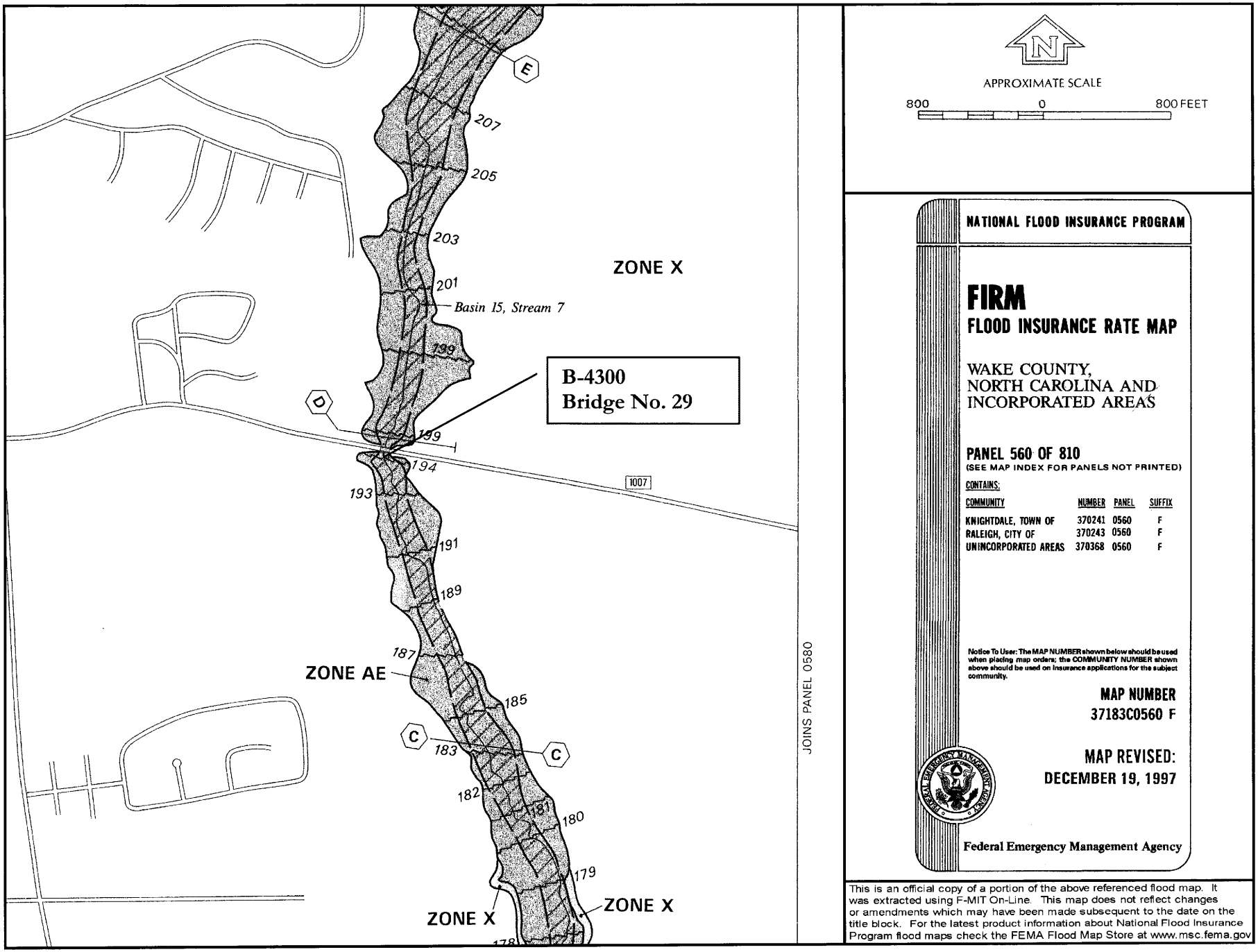
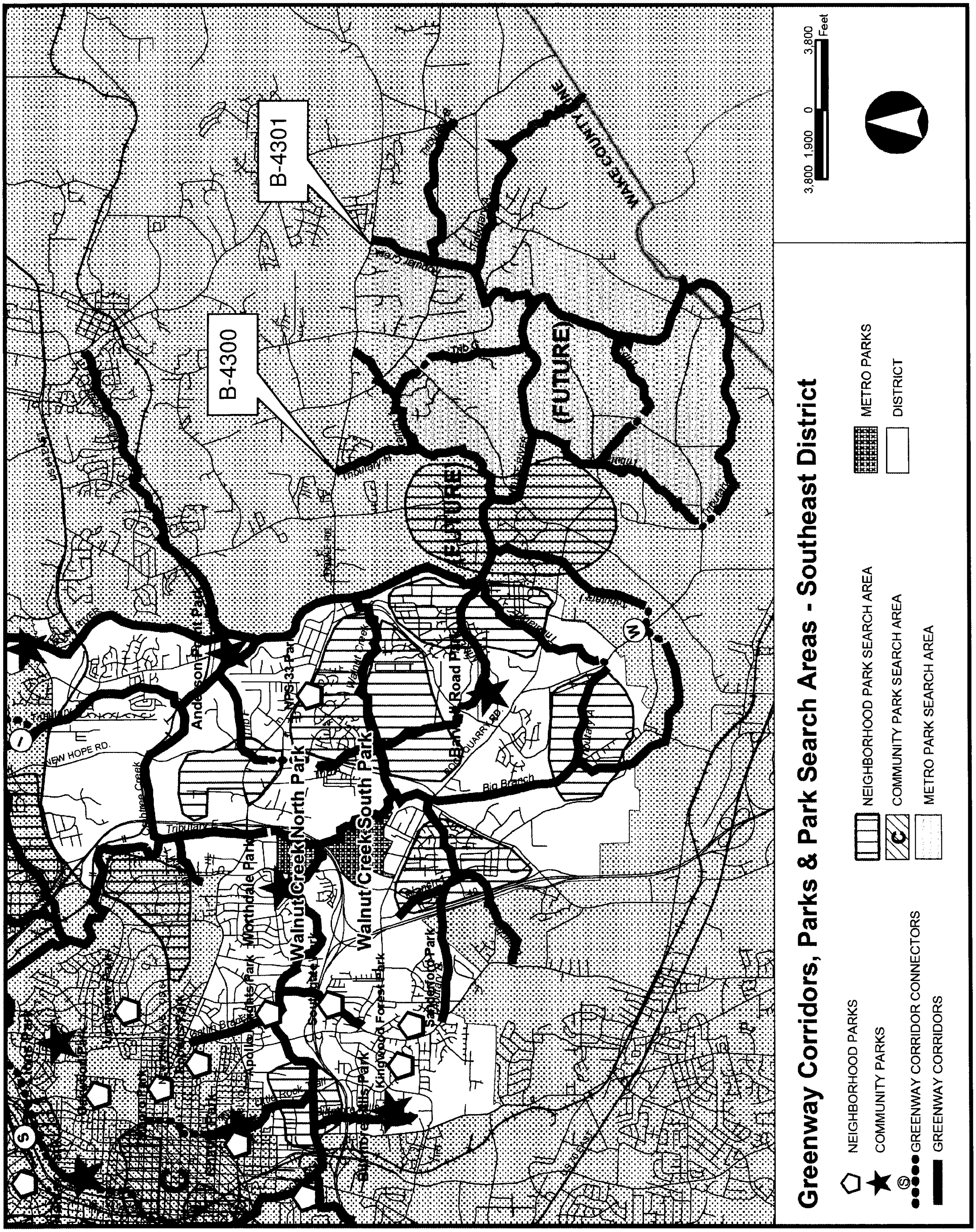
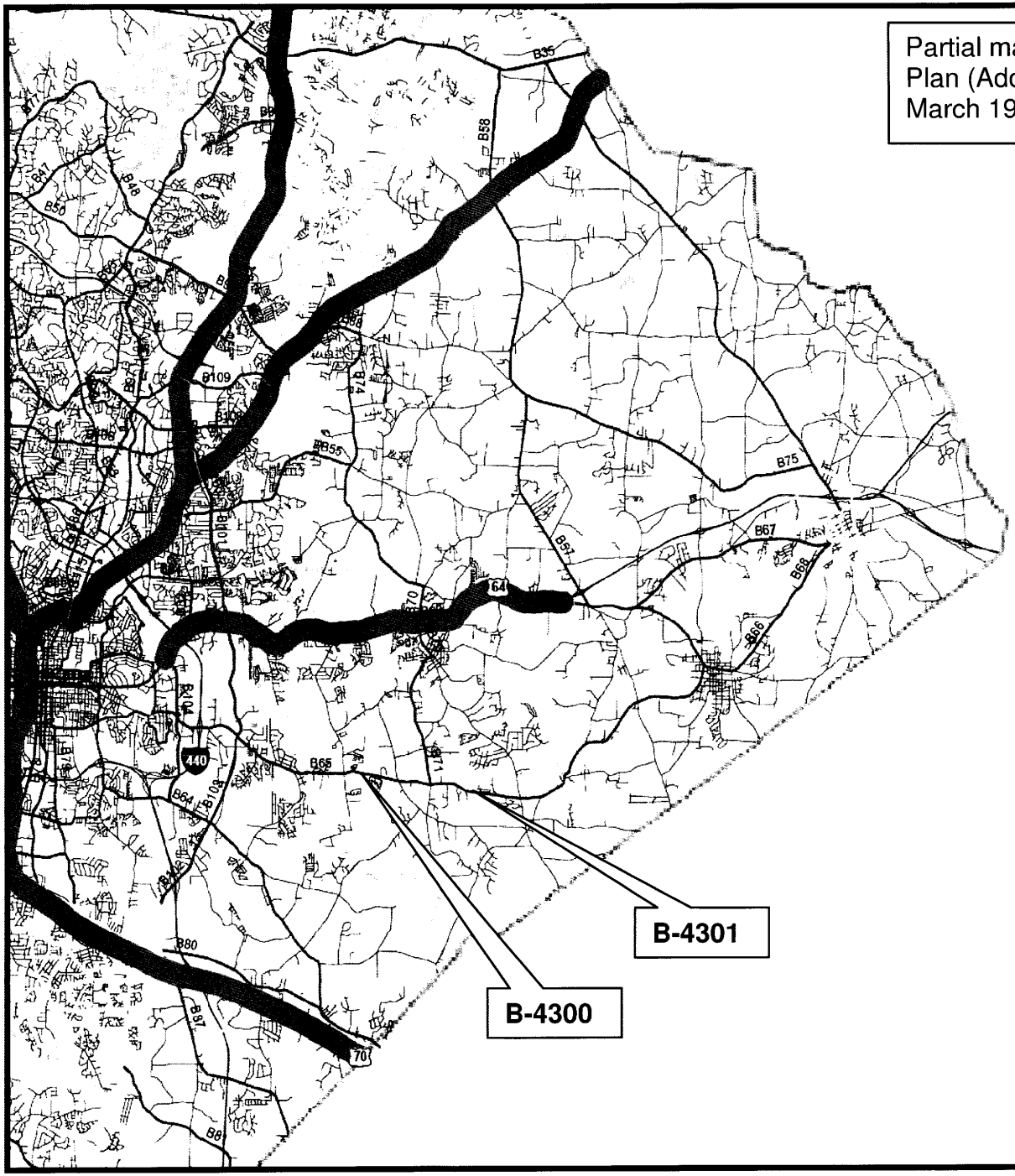

E
207
205
203
201
Basin 15, Stream 7
199
ZONE X
B-4300
Bridge No. 29
D
199
194
193
1007
191
189
187
ZONE AE
185
C
183
C
182
181
180
179
ZONE X
ZONE X
JOINS PANEL 0580
N
APPROXIMATE SCALE
800
0
800 FEET
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
WAKE COUNTY,
NORTH CAROLINA AND
INCORPORATED AREAS
PANEL 560 OF 810
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
KNIGHTDALE, TOWN OF 370241 0560 F
RALEIGH, CITY OF 370243 0560 F
UNINCORPORATED AREAS 370368 0560 F
Notice To User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.
MAP NUMBER
37183C0560 F
MAP REVISED:
DECEMBER 19, 1997
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Figure 5



Greenway Corridors, Parks & Park Search Areas - Southeast District

FIGURE 6



Partial map from CAMPO Bicycle and Pedestrian Plan (Adopted by the Capital Area MPO on March 19, 2003)

FIGURE 7

Current Bike Conditions & Routes

- Priority Corridors of Lesser Needs
- Priority Corridors of Greater Needs
- US Highways with Bicycle Needs
- State Bike Routes
- Cary Bike Routes
- Raleigh Bike Routes

Municipal & Corridor Bike Plans

- Apex Bike Plan
- Planned I-540 MUP
- Garner Bike Plan
- Wake Forest Bike Plan
- Zebulon Bike-Plan
- Wake Co. Centerlines
- Water
- Wake Boundary

APPENDIX

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

February 18, 2004

Gregory J. Thorpe, Ph.D.
North Carolina Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Dr. Thorpe:

This letter is in response to your request for comments from the U.S. Fish and Wildlife Service (Service) on the potential environmental impacts of the proposed replacement of the following ten bridges:

- B-4002, Alamance County, Bridge No. 96 on SR 2116 over Meadow Creek
- B-4063, Chatham County, Bridge No. 20 on NC 902 over Sandy Branch
- B-4109, Durham County, Bridge No. 120 on SR 1303 over Mud Creek
- B-4216, Orange County, Bridge No. 66 on SR 1002 over Strouds Creek
- B-4300, Wake County, Bridge No. 29 on SR 1007 over Clarks Creek
- B-4301, Wake County, Bridge No. 229 on SR 1007 over Poplar Creek
- B-4302, Wake County, Bridge No. 336 on SR 1301 over Terrible Creek
- B-4303, Wake County, Bridge No. 102 on SR 1844 over Lower Bartons Creek
- B-4304, Wake County, Bridge No. 143 on SR 2217 over Beaver Dam Creek
- B-4592, Orange County, Bridge No. 64 on SR 1561 over Eno River

These comments provide scoping information in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661-667d) and section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

For bridge replacement projects, the Service recommends the following general conservation measures to avoid or minimize environmental impacts to fish and wildlife resources:

1. Wetland, forest and designated riparian buffer impacts should be avoided and minimized to the maximum extent practical;

2. If unavoidable wetland impacts are proposed, every effort should be made to identify compensatory mitigation sites in advance. Project planning should include a detailed compensatory mitigation plan for offsetting unavoidable wetland impacts. Opportunities

to protect mitigation areas in perpetuity via conservation easements, land trusts or by other means should be explored at the outset;

3. Off-site detours should be used rather than construction of temporary, on-site bridges. For projects requiring an on-site detour in wetlands or open water, such detours should be aligned along the side of the existing structure which has the least and/or least quality of fish and wildlife habitat. At the completion of construction, the detour area should be entirely removed and the impacted areas be planted with appropriate vegetation, including trees if necessary;

4. Wherever appropriate, construction in sensitive areas should occur outside fish spawning and migratory bird nesting seasons. In waterways that may serve as travel corridors for fish, in-water work should be avoided during moratorium periods associated with migration, spawning and sensitive pre-adult life stages. The general moratorium period for anadromous fish is February 15 - June 30;

5. New bridges should be long enough to allow for sufficient wildlife passage along stream corridors;

6. Best Management Practices (BMP) for Protection of Surface Waters should be implemented;

7. Bridge designs should include provisions for roadbed and deck drainage to flow through a vegetated buffer prior to reaching the affected stream. This buffer should be large enough to alleviate any potential effects from run-off of storm water and pollutants;

8. The bridge designs should not alter the natural stream and stream-bank morphology or impede fish passage. To the extent possible, piers and bents should be placed outside the bank-full width of the stream;

9. Bridges and approaches should be designed to avoid any fill that will result in damming or constriction of the channel or flood plain. If spanning the flood plain is not feasible, culverts should be installed in the flood plain portion of the approach to restore some of the hydrological functions of the flood plain and reduce high velocities of flood waters within the affected area.

A list of federally protected species for each county in North Carolina can be found at http://nc-es.fws.gov/es/countyfr.html . Additional information about the habitats in which each species is often found can also be found at http://endangered.fws.gov . Please note, the use of the North Carolina Natural Heritage Program data should not be substituted for actual field surveys if suitable habitat occurs near the project site. If suitable habitat exists in the project area, we recommend that biological surveys for the listed species be conducted and submitted to us for review. All survey documentation must include survey methodologies and results.

We reserve the right to review any federal permits that may be required for these projects, at the public notice stage. Therefore, it is important that resource agency coordination occur early in

the planning process in order to resolve any conflicts that may arise and minimize delays in project implementation. In addition to the above guidance, we recommend that the environmental documentation for these projects include the following in sufficient detail to facilitate a thorough review of the action:

1. A clearly defined and detailed purpose and need for the proposed project;

2. A description of the proposed action with an analysis of all alternatives being considered, including the "no action" alternative;

3. A description of the fish and wildlife resources, and their habitats, within the project impact area that may be directly or indirectly affected;

4. The extent and acreage of waters of the U.S., including wetlands, that are to be impacted by filling, dredging, clearing, ditching, or draining. Acres of wetland impact should be differentiated by habitat type based on the wetland classification scheme of the National Wetlands Inventory (NWI). Wetland boundaries should be determined by using the 1987 Corps of Engineers Wetlands Delineation Manual and verified by the U.S. Army Corps of Engineers;

5. The anticipated environmental impacts, both temporary and permanent, that would be likely to occur as a direct result of the proposed project. The assessment should also include the extent to which the proposed project would result in secondary impacts to natural resources, and how this and similar projects contribute to cumulative adverse effects;

6. Design features and construction techniques which would be employed to avoid or minimize the fragmentation or direct loss of wildlife habitat and waters of the US;

7. If unavoidable wetland impacts are proposed, project planning should include a detailed compensatory mitigation plan for offsetting the unavoidable impacts.

The Service appreciates the opportunity to comment on these projects. Please continue to advise us during the progression of the planning process, including your official determination of the impacts of this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520, ext. 32.

Sincerely,

John E. Ellis

for Garland B. Pardue, Ph.D.
Ecological Services Supervisor

cc: Eric Alsmeyer, USACE, Raleigh, NC
John Thomas, USACE, Raleigh, NC
Richard Spencer, USACE, Wilmington, NC
John Hennessy, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militscher, USEPA, Raleigh, NC

Federal Aid # BRSTP-1007(8) *TIP* # B-4300 *County*: Wake

CONCURRENCE FORM FOR PROPERTIES NOT ELIGIBLE FOR THE NATIONAL REGISTER OF HISTORIC PLACES

Project Description: Replace Bridge No. 29 on SR 1007 over Clarks Creek

On 10/14/2003, representatives of the

- [x] North Carolina Department of Transportation (NCDOT)
- [x] Federal Highway Administration (FHWA)
- [x] North Carolina State Historic Preservation Office (HPO)
- [ ] Other

Reviewed the subject project at

- [ ] Scoping meeting
- [x] Historic architectural resources photograph review session/consultation
- [ ] Other

All parties present agreed

- [x] There are no properties over fifty years old within the project's area of potential effects.
- [x] There are no properties less than fifty years old which are considered to meet Criteria Consideration G within the project's area of potential effects.
- [ ] There are properties over fifty years old within the project's Area of Potential Effects (APE), but based on the historical information available and the photographs of each property, the property identified as _____ is considered not eligible for the National Register and no further evaluation of it is necessary.
- [x] There are no National Register-listed or Study Listed properties within the project's area of potential effects.
- [x] All properties greater than 50 years of age located in the APE have been considered at this consultation, and based upon the above concurrence, all compliance for historic architecture with Section 106 of the National Historic Preservation Act and GS 121-12(a) has been completed for this project.
- [x] There are no historic properties affected by this project. (*Attach any notes or documents as needed*)

Signed:

Mary Pope Furr — 10.14.2003
Representative, NCDOT — Date

[signature] — 10/14/03
FHWA, for the Division Administrator, or other Federal Agency — Date

Renee Gledhill-Earley — 10/14/03
Representative, HPO — Date

David Brook — 10/15/03
State Historic Preservation Officer — Date

If a survey report is prepared, a final copy of this form and the attached list will be included.

North Carolina Department of Cultural Resources
State Historic Preservation Office

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary
Office of Archives and History

Division of Historical Resources
David L. S. Brook, Director

March 4, 2004

MEMORANDUM

TO: Stacey Baldwin
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: David Brook for David Brook

SUBJECT: Request for comments on Bridge Replacement projects
B-4002, Alamance County
B-4063, Chatham County
B-4109, Durham County
B-4216, Orange County
B-4300, Wake County
B-4301, Wake County
B-4302, Wake County
B-4303, Wake County
B-4304, Wake County
B-4592, Orange County
ER03-0389 through ER03-0398

Thank you for your letters of February 5, 2004, concerning the above projects.

We are unable to comment on the potential effect of these projects on historic resources until we receive further information.

Please forward a labeled 7.5 minute USGS quadrangle map for each of the above projects clearly indicating the project vicinity, location, and termini. In addition, please include the name of the quadrangle map.

There are no known archaeological sites within the proposed project area. Based on our knowledge of the area, it is unlikely that any archaeological resources that may be eligible for conclusion in the National Register of Historic Places will be affected by the project. We, therefore, recommend that no archaeological investigation be conducted in connection with this project.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please cite the above-referenced tracking number.

cc: Mary Pope Furr, NCDOT
Matt Wilkerson, NCDOT

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

February 27, 2004

Dr. Gregory J. Thorpe
N.C. Department of Transportation
Project Development and Environmental Analysis
1548 MSC
Raleigh, NC 27699-1548

Subject: Replacement of Bridges in Alamance, Chatham, Durham, Orange, and Wake counties

Dear Dr. Thorpe:

The Natural Heritage Program has no record of rare species, significant natural communities, or priority natural areas at the site nor within a mile of the project area, for the projects listed below:

B-4002, Alamance County, Bridge No. 96 over Meadow Creek on SR 2116 (Preacher Holmes Road)
B-4063, Chatham County, Bridge No. 20 over Sandy Branch on NC 902
B-4109, Durham County, Bridge No. 120 over Mud Creek on SR 1303 (Pickett Road)
B-4300, Wake County, Bridge No. 29 over Clarks Creek on SR 1007 (Poole Road)
B-4301, Wake County, Bridge No. 229 over Poplar Creek on SR 1007 (Poole Road)
B-4302, Wake County, Bridge No. 336 over Terrible Creek on SR 1301 (Sunset Lake Road).

Our Program does have records of rare species, significant natural communities, or priority natural areas at the site or within a mile of the project area, for the projects listed below:

B-4216, Orange County, Bridge No. 66 over Strouds Creek on SR 1002 (St. Marys Road). This site lies just upstream of the Eno River, where there are numerous rare aquatic animal species. Species recorded at the confluence of Strouds Creek and the river (at Lawrence Road) are –

yellow lampmussel (*Lampsilis cariosa*), State Endangered and Federal Species of Concern
eastern lampmussel (*Lampsilis radiata radiata*), State Threatened
notched rainbow (*Villosa constricta*), State Special Concern
Neuse River waterdog (*Necturus lewisi*), State Special Concern

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR/

B-4303, Wake County, Bridge No. 102 over Lower Bartons Creek on SR 1844 (Mt. Vernon Church Road). The Lower Barton Creek Ultramafic Slopes natural area lies on the south side of the road; this is an unprotected site of Local significance. Just downstream of the bridge is the following –

Carolina ladle crayfish (*Cambarus davidi*), State Significantly Rare

B-4304, Wake County, Bridge No. 143 over Beaver Dam Creek on SR 2217 (Old Milburnie Road). There is a vague, historic record of the following, just downstream –

veined skullcap (*Scutellaria nervosa*), State Significantly Rare

B-4592, Orange County, Bridge No. 64 over the Eno River on SR 1561 (Lawrence Road). See comments for project B-4216. This site is a few miles above Eno River State Park. Also, a tract just upstream of the bridge has been recently acquired, or is in the process of being acquired. In addition, the section of the Eno River from Hillsborough to the confluence with the Neuse River is a Nationally significant aquatic habitat, for many additional rare species than those listed above.

Our program recommends that NC DOT enact strong sedimentation controls to ensure that populations of these rare species, and particularly the water quality of the Eno River, not be impacted during the bridge replacements. The use of Natural Heritage Program data should not be substituted for actual field surveys, particularly if the project area contains suitable habitat for rare species, significant natural communities, or priority natural areas.

You may wish to check the Natural Heritage Program database website at <www.ncsparks.net/nhp/search.html> for a listing of rare plants and animals and significant natural communities in the county and on the topographic quad map. Please do not hesitate to contact me at 919-715-8697 if you have questions or need further information.

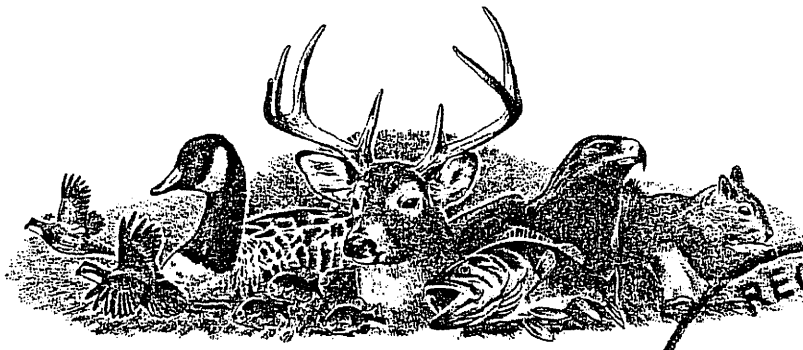
Sincerely,

Harry E. LeGrand Jr

Harry E. LeGrand, Jr., Zoologist
Natural Heritage Program

HEL/hel

cc: Brian Strong, Division of Parks and Recreation, Resource Management Program
David Cook, Superintendent, Eno River State Park



North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

MEMORANDUM

TO: Gregory J. Thorpe
Environmental Management Director, PDEA

FROM: Travis Wilson, Highway Project Coordinator
Habitat Conservation Program

DATE: February 27, 2004

SUBJECT: NCDOT Bridge Replacements in Alamance, Chatham, Durham, Orange, and Wake counties. TIP Nos. B-4002, B-4063, B-4109, B-4216, B-4300, B-4301, B-4302, B-4303, B-4304, and B-4592.

Biologists with the N. C. Wildlife Resources Commission (NCWRC) have reviewed the information provided and have the following preliminary comments on the subject project. Our comments are provided in accordance with provisions of the National Environmental Policy Act (42 U.S.C. 4332(2)(c)) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

Our standard recommendations for bridge replacement projects of this scope are as follows:

1. We generally prefer spanning structures. Spanning structures usually do not require work within the stream and do not require stream channel realignment. The horizontal and vertical clearances provided by bridges allows for human and wildlife passage beneath the structure, does not block fish passage, and does not block navigation by canoeists and boaters.

2. Bridge deck drains should not discharge directly into the stream.

3. Live concrete should not be allowed to contact the water in or entering into the stream.

4. If possible, bridge supports (bents) should not be placed in the stream.

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 733-3633 ext. 281 • **Fax:** (919) 715-7643

5. If temporary access roads or detours are constructed, they should be removed back to original ground elevations immediately upon the completion of the project. Disturbed areas should be seeded or mulched to stabilize the soil and native tree species should be planted with a spacing of not more than 10'x10'. If possible, when using temporary structures the area should be cleared but not grubbed. Clearing the area with chain saws, mowers, bush-hogs, or other mechanized equipment and leaving the stumps and root mat intact, allows the area to revegetate naturally and minimizes disturbed soil.

6. A clear bank (riprap free) area of at least 10 feet should remain on each side of the steam underneath the bridge.

7. In trout waters, the N.C. Wildlife Resources Commission reviews all U.S. Army Corps of Engineers nationwide and general '404' permits. We have the option of requesting additional measures to protect trout and trout habitat and we can recommend that the project require an individual '404' permit.

8. In streams that contain threatened or endangered species, NCDOT biologist Mr. Hal Bain should be notified. Special measures to protect these sensitive species may be required. NCDOT should also contact the U.S. Fish and Wildlife Service for information on requirements of the Endangered Species Act as it relates to the project.

9. In streams that are used by anadromous fish, the NCDOT official policy entitled "Stream Crossing Guidelines for Anadromous Fish Passage (May 12, 1997)" should be followed.

10. In areas with significant fisheries for sunfish, seasonal exclusions may also be recommended.

11. Sedimentation and erosion control measures sufficient to protect aquatic resources must be implemented prior to any ground disturbing activities. Structures should be maintained regularly, especially following rainfall events.

12. Temporary or permanent herbaceous vegetation should be planted on all bare soil within 15 days of ground disturbing activities to provide long-term erosion control.

13. All work in or adjacent to stream waters should be conducted in a dry work area. Sandbags, rock berms, cofferdams, or other diversion structures should be used where possible to prevent excavation in flowing water.

14. Heavy equipment should be operated from the bank rather than in stream channels in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into streams.

15. Only clean, sediment-free rock should be used as temporary fill (causeways), and should be removed without excessive disturbance of the natural stream bottom when construction is completed.

16. During subsurface investigations, equipment should be inspected daily and maintained to prevent contamination of surface waters from leaking fuels, lubricants, hydraulic fluids, or other toxic materials.

If corrugated metal pipe arches, reinforced concrete pipes, or concrete box culverts are used:

1. The culvert must be designed to allow for aquatic life and fish passage. Generally, the culvert or pipe invert should be buried at least 1 foot below the natural streambed (measured from the natural thalweg depth). If multiple barrels are required, barrels other than the base flow barrel(s) should be placed on or near stream bankfull or floodplain bench elevation (similar to Lyonsfield design). These should be reconnected to floodplain benches as appropriate. This may be accomplished by utilizing sills on the upstream and downstream ends to restrict or divert flow to the base flow barrel(s). Silled barrels should be filled with sediment so as not to cause noxious or mosquito breeding conditions. Sufficient water depth should be provided in the base flow barrel(s) during low flows to accommodate fish movement. If culverts are longer than 40-50 linear feet, alternating or notched baffles should be installed in a manner that mimics existing stream pattern. This should enhance aquatic life passage: 1) by depositing sediments in the barrel, 2) by maintaining channel depth and flow regimes, and 3) by providing resting places for fish and other aquatic organisms. In essence, base flow barrel(s) should provide a continuum of water depth and channel width without substantial modifications of velocity.

2. If multiple pipes or cells are used, at least one pipe or box should be designed to remain dry during normal flows to allow for wildlife passage.

3. Culverts or pipes should be situated along the existing channel alignment whenever possible to avoid channel realignment. Widening the stream channel must be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.

4. Riprap should not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be professionally designed, sized, and installed.

In most cases, we prefer the replacement of the existing structure at the same location with road closure. If road closure is not feasible, a temporary detour should be designed and located to avoid wetland impacts, minimize the need for clearing and to avoid destabilizing stream banks. If the structure will be on a new alignment, the old structure should be removed and the approach fills removed from the 100-year floodplain. Approach fills should be removed down to the natural ground elevation. The area should be stabilized with grass and planted with native tree species. If the area reclaimed was previously wetlands, NCDOT should restore the area to wetlands. If successful, the site may be utilized as mitigation for the subject project or other projects in the watershed.

Project specific comments:

1. B-4002, Alamance County, Bridge No. 96 over Meadow Creek on SR 2116. We recommend replacing this bridge with a bridge. Standard recommendations apply.

2. B-4063, Chatham County, Bridge No. 20 over Sandy Branch on NC 902. We recommend replacing this bridge with a bridge. Standard recommendations apply.

3. B-4109, Durham County, Bridge No. 120 over Mud Creek on SR 1303. We recommend replacing this bridge with a bridge. Standard recommendations apply.

4. B-4216, Orange County, Bridge No. 66 over Strouds Creek on SR 1002. We recommend replacing this bridge with a bridge. Due to the close proximity of the Eno River we request conducting a survey for the following state endangered and federal species of concern mussels: Yellow lampmussel and Atlantic pigtoe. Also, a significant fishery for sunfish exists at this site, therefore we request an in-water work moratorium for sunfish from April 1 to June 30. Standard recommendations apply.

5. B-4300, Wake County, Bridge No. 29 over Clarks Creek on SR 1007. We recommend replacing this bridge with a bridge. NCDOT should follow all stream crossing guidelines for anadromous fish passage, including an in-water work moratorium from February 15 to June 15. Standard recommendations apply.

6. B-4301, Wake County, Bridge No. 229 over Poplar Creek on SR 1007. We recommend replacing this bridge with a bridge. NCDOT should follow all stream crossing guidelines for anadromous fish passage, including an in-water work moratorium from February 15 to June 15. Standard recommendations apply.

7. B-4302, Wake County, Bridge No. 336 over Terrible Creek on SR 1301. We recommend replacing this bridge with a bridge. Standard recommendations apply.

8. B-4303, Wake County, Bridge No. 102 over Lower Bartons Creek on SR 1844. We recommend replacing this bridge with a bridge. Standard recommendations apply.

9. B-4304, Wake County, Bridge No. 143 over Beaver Dam Creek on SR 2217. We recommend replacing this bridge with a bridge. Standard recommendations apply.

10. B-4592, Orange County, Bridge No. 64 over the Eno River on SR 1561. We recommend replacing this bridge with a bridge. We request conducting a survey for the following state endangered and federal species of concern mussels: Yellow lampmussel and Atlantic pigtoe. Also, a significant fishery for sunfish exists at this site, therefore we request an in-water work moratorium for sunfish from April 1 to June 30. Standard recommendations apply.

NCDOT should routinely minimize adverse impacts to fish and wildlife resources in the vicinity of bridge replacements. Restoring previously disturbed floodplain benches should narrow and deepen streams previously widened and shallowed during initial bridge installation. NCDOT should install and maintain sedimentation control measures throughout the life of the project and prevent wet concrete from contacting water in or entering into these streams. Replacement of bridges with spanning structures of some type, as opposed to pipe or box culverts, is recommended in most cases. Spanning structures allow wildlife passage along streambanks and reduce habitat fragmentation.

If you need further assistance or information on NCWRC concerns regarding bridge replacements, please contact me at (919) 528-9886. Thank you for the opportunity to review and comment on these projects.

Cc: Gary Jordan, U.S. Fish and Wildlife Service, Raleigh

Michael F. Easley, Governor
William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E., Director
Division of Water Quality
Coleen H. Sullins, Deputy Director
Division of Water Quality

February 25, 2004

MEMORANDUM

TO: Gregory J. Thorpe, PhD, Director
NCDOT Project Development and Environmental Analysis Branch

FROM: Robert Ridings, Env. Tech., DWQ 401 Unit

THROUGH: John Hennessy, Supervisor, DWQ 401 Transportation Unit

SUBJECT: Scoping Review of NCDOT's proposed bridge replacement projects: B-4002, B-4109, B-4063, B-4216, B-4300, B-4301, B-4302, B-4303, B-4304, B-4592, and B-3528

In reply to your correspondence dated February 5, 2004 (received February 11, 2004) to John Hennessy, in which you requested comments for the referenced projects, the NC Division of Water Quality has the following comments:

I. General Comments Regarding Bridge Replacement Projects

1. If corrugated metal pipe arches, reinforced concrete pipes, or concrete box culverts are used to replace the bridge, then DWQ recommends the use of Nationwide Permit No. 14 rather than Nationwide Permit 23.

2. Bridge demolition should be performed using Best Management Practices developed by NCDOT.

3. DWQ prefers spanning structures. Spanning structures usually do not require work within the stream and do not require stream channel realignment. The horizontal and vertical clearances provided by bridges allows for human and wildlife passage beneath the structure, does not block fish passage, and does not block navigation by canoeists and boaters.

4. Bridge deck drains should not discharge directly into the stream; stormwater should be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to NCDOT Best Management Practices for the Protection of Surface Waters

5. Live concrete should not be allowed to contact the water in or entering into the stream. Concrete is mostly made up of lime (calcium carbonate) and when in a dry or wet state (not hardened) calcium carbonate is very soluble in water and has a pH of approximately 12. In an unhardened state concrete or cement will change the pH of fresh water to very basic and will cause fish and other macroinvertebrate kills.

6. If possible, bridge supports (bents) should not be placed in the stream.

7. If temporary access roads or detours are constructed, they should be removed back to original ground elevations immediately upon the completion of the project. Disturbed areas should be seeded or mulched to stabilize the soil and native tree species should be planted with a spacing of not more than 10'x10'. If possible, when using temporary structures the area should be cleared but not grubbed. Clearing the area with chain saws, mowers, bush-hogs, or other mechanized equipment and leaving the stumps and root mat intact, allows the area to re-vegetate naturally and minimizes disturbed soil.

8. A clear bank (rip rap-free) area of at least 10 feet should remain on each side of the steam underneath the bridge.

9. Sedimentation and erosion control measures sufficient to protect water resources must be implemented prior to any ground disturbing activities. Structures should be *maintained regularly*, especially following rainfall events.

10. Bare soil should be stabilized through vegetation or other means as quickly as feasible to prevent sedimentation of water resources.

11. All work in or adjacent to stream waters should be conducted in a dry work area. Sandbags, rock berms, cofferdams, or other diversion structures should be used where possible to prevent excavation in flowing water.

12. Heavy equipment should be operated from the bank rather than in stream channels in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into streams. This equipment should be inspected daily and maintained to prevent contamination of surface waters from leaking fuels, lubricants, hydraulic fluids, or other toxic materials.

II. General Comments if Replacing the Bridge with a Culvert

1. The culvert must be designed to allow for aquatic life and fish passage. Generally, the culvert or pipe invert should be buried at least 1 foot below the natural streambed (measured from the natural thalweg depth). If multiple barrels are required, barrels other than the base flow barrel(s) should be placed on or near stream bankfull or floodplain bench elevation (similar to Lyonsfield design). These should be reconnected to floodplain benches as appropriate. This may be accomplished by utilizing sills on the upstream end to restrict or divert flow to the base flow barrel(s). Silled barrels should be filled with sediment so as not to cause noxiou or mosquito breeding conditions. Sufficient water depth should be provided in the base flow barrel during low flows to accommodate fish movement. If culverts are longer than 40-50 linear feet, alternating or notched baffles should be installed in a manner that mimics existing stream pattern. This should enhance aquatic life passage: 1) by depositing sediments in the barrel, 2) by maintaining channel depth and flow regimes, and 3) by providing resting places for fish and other aquatic organisms. In essence, the base flow barrel(s) should provid a continuum of water depth and channel width without substantial modifications of velocity.

2. If multiple pipes or cells are used, at least one pipe or box should be designed to remain dry during normal flows to allow for wildlife passage.

3. Culverts or pipes should be situated along the existing channel alignment whenever possible to avoid channel realignment. Widening the stream channel must be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.

4. Riprap should not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be professionally designed, sized, and installed.

In most cases, we prefer the replacement of the existing structure at the same location with road closure. If road closure is not feasible, a temporary detour should be designed and located to avoid wetland impacts, minimize the need for clearing and to avoid destabilizing stream banks. If the structure will be on a new alignment, the old structure should be removed and the approach fills removed from the 100-year floodplain. Approach fills should be removed down to the natural ground elevation. The area should be stabilized with grass and planted with native tree species. Tall fescue should not be used in riparian areas. If the area that is reclaimed was previously wetlands, NCDOT should restore the area to wetlands. If successful, the site may be used as wetland mitigation for the subject project or other projects in the watershed.

III. Project-Specific Comments

B-4002, Bridge 96, Varnals Creek, Alamance County
Varnals Creek is classified as C NSW and is in the Cape Fear River Basin. DWQ does not have any special concerns. Please refer to general recommendations listed above.

B-4109, Bridge 120, Mud Creek, Durham County
Mud Creek is classified as C NSW and is in the Cape Fear River Basin. DWQ does not have any special concerns. Please refer to general recommendations listed above.

B-4063, Bridge 20, Sandy Branch, Chatham County
Sandy Branch is classified as C and is in the Cape Fear River Basin. DWQ does not have any special concerns. Please refer to general recommendations listed above.

B-4216, Bridge 66, Strouds Creek, Orange County
Strouds Creek is classified as C NSW and is in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-4300, Bridge 29, Clark's Creek, Wake County
Clark's Creek is not in DWQ records. Mango Creek, upstream of this project, and Poplar Creek, downstream from this project, are both classified as C NSW. This project is in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-4301, Bridge 229, Poplar Creek, Wake County
Poplar Creek is classified as C NSW and is in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-4302, Bridge 336, Terrible Creek, Wake County
Terrible Creek is classified as B NSW and is in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-4303, Bridge 102, Lower Bartons Creek, Wake County
Lower Bartons Creek is classified as WS-IV NSW. There are 30-foot vegetated buffer requirements in WS waters in addition to the requirements to minimize storm water runoff and maximize use of BMPs. Refer to 15A NCAC 2B .0216(3)(b)(i)(F) and (G). This project is also in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-4304, Bridge 143, Beaverdam Creek, Wake County
Beaverdam Creek is classified as C NSW and is in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules. This creek is also on the 303(d) waters list. NCDOT shall maximize the use of Best Management Practices for all work crossing or draining to the Critical Area of the Water Supply Watershed and 303(d)-listed waters. In addition, NCDOT shall strictly adhere to "Design Standards in Sensitive Watersheds" (15A NCAC 04B .0124).

B-4592, Bridge 64, Eno River, Orange County
Eno River is classified as WS-IV/B, NSW. There are 30-foot vegetated buffer requirements in WS waters in addition to the requirements to minimize storm water runoff and maximize use of BMPs. Refer to 15A NCAC 2B .0216(3)(b)(i)(F) and (G). This project is also in the Neuse River Basin. Please follow guidelines for avoiding and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

B-3528, Bridge 429, Sycamore Creek, Wake/Durham Counties

Sycamore Creek is classified as B NSW and is in the Neuse River Basin. Please follow guidelines for av and minimizing impacts to the riparian buffers as required under the state's Neuse Buffer Rules.

Thank you for requesting our input at this time. The DOT is reminded that issuance of a 401 Water Qual Certification requires that appropriate measures be instituted to ensure that water quality standards are me designated uses are not degraded or lost. If you have any questions or require additional information, ple contact Robert Ridings at (919) 733-9817 or John Hennessy at (919) 733-5694.

cc: USACE Raleigh Field Office
File Copy

WAKE COUNTY
PUBLIC SCHOOL SYSTEM

TRANSPORTATION DEPARTMENT
1551 ROCK QUARRY ROAD
RALEIGH, NORTH CAROLINA 27610
PHONE: 919.856.8050
FAX: 919.856.7773

March 3, 2004

Gregory Thorpe
North Carolina Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Mr. Thorpe:

Outlined below are school bus bridge crossings and projected impact Bridge Replacement Projects will have on our ability to transport children to required destinations.

B-4300 to replace Bridge#29: 46 daily school bus crossings which will severely impact school bus routing.

B- 4301 to replace Bridge#229: 46 daily school bus crossings which will severely impact school bus routing.

B-4302 to replace Bridge #336: 52 daily school bus crossings which will severely impact school bus routing.

B-4303 to replace Bridge #102: 16 daily school bus crossing which will moderately impact school bus routing.

B-3528 to replace Bridge #429: 6 daily school bus crossings which will minimally impact school bus routing.

Thanks you for soliciting our input.

Sincerely,

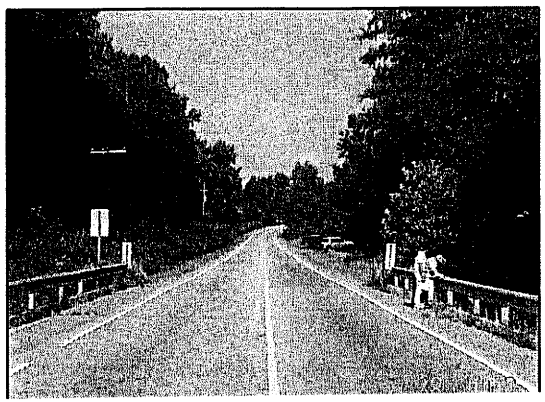
Vernon W. Hatley

VWH/as

Informational Newsletter

NCDOT Proposes Replacement of Bridge No. 29 on SR 1007 (Poole Road) over Clarks Creek, Wake County, NC TIP No. B-4300

February 2005



Ms. Theresa Ellerby
North Carolina Department of Transportation
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Contact Information

If you have questions or comments regarding anything in this newsletter, you may call, write, or e-mail one of the contacts provided below.

Theresa Ellerby
NCDOT-PDEA
1548 Mail Service Center
Raleigh, NC 27699-1548
919-733-7844 ext. 266
tellerby@dot.state.nc.us

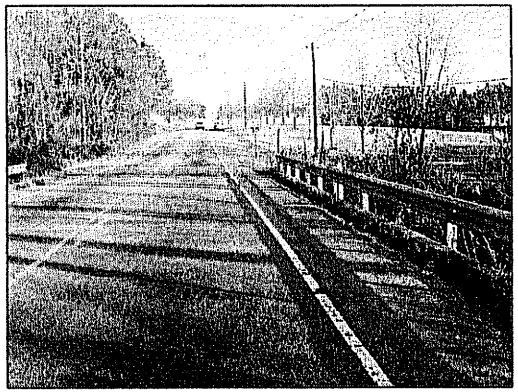
Pam Williams
Mulkey Engineers & Consultants
PO Box 33127
Raleigh, NC 27636-3127
919-858-1908
pwilliams@mulkeyinc.com

We're on the Web!

www.ncdot.org

Project Introduction

The North Carolina Department of Transportation (NCDOT) is proposing to replace Bridge No. 29 on SR 1007 (Poole Road) over Clarks Creek. The new bridge will provide safer, more efficient traffic operations.



Data has been collected on the existing human and natural environments, alternatives have been developed, and the impacts of each alternative have been analyzed. NCDOT realizes that citizens and business owners in the vicinity of the bridge want to be informed of the potential impacts that this project may have on their homes and businesses. This newsletter is part of the public involvement process to provide this information.

Proposed Replacement Structure and Preferred Alternative

NCDOT recommends replacing Bridge No. 29 on the existing alignment with a double barrel 10-foot by 8-foot reinforced concrete box culvert. During construction, traffic will be maintained by an on-site detour.

Two alternatives were studied for the bridge replacement.

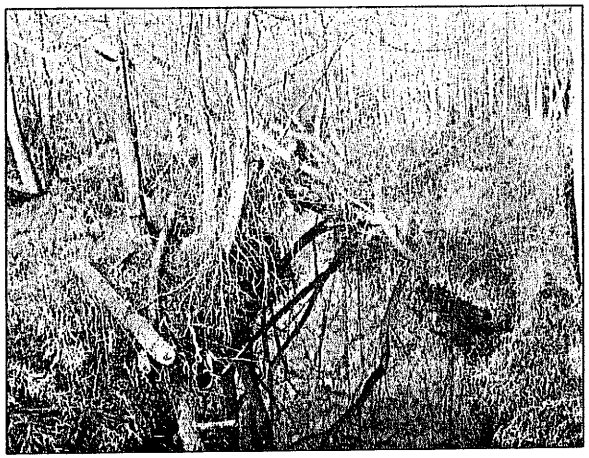
Alternative A replaces the bridge in place with an on-site detour north of the existing structure. **Alternative B** replaces the bridge in place with an on-site detour south of the existing bridge.

Alternative A was selected as the **preferred alternative** because it minimizes stream and wetland impacts more than Alternative B.

Additional Information

Public involvement is an important part of the planning process. The NCDOT encourages citizen involvement on transportation projects, and will consider your suggestions and address all concerns. Please send your comments to one of the contacts listed in this newsletter. Your opinions are important to us!

If you have transportation questions on other projects, call our Customer Service Center toll free at 1-877-DOT-4YOU, or visit the NCDOT website at www.ncdot.org.



Project Development Process

Step 1

Data Collection

Step 2

Alternative Development

Step 3

Environmental Analysis

Step 4

Selection of Preferred Alternative

Step 5 ← **We are here.**

Citizens Informational Newsletter

Step 6

Complete Environmental Document

Construction & Right-of-Way Cost

Preliminary Cost Estimate

$921,000

Schedule

Right-of-way in fiscal year 2006

Construction in fiscal year 2007

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

Site A

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: B-4300 Applicant / Owner: NCDOT Investigator: M.R. TURNER (Mulkey)	Date: 1-16-04 County: Wake State: NC
Do normal circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical situation)? Yes ____ No X Is the area a potential problem area? Yes ____ No X (explain on reverse if needed)	Community ID: PFO1 Transect ID: Site A Plot ID: Wetland A

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Acer rubrum	T,S,Sh	FAC	9.		
2. Liquidambar styraciflua	T,Sh	FAC+	10.		
3. Arundinaria gigantea	Sh	FACW	11.		
4. Lonicera japonica	V	FAC-	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW, or FAC excluding FAC-). 100 %

Remarks: Wetland Vegetation Present Based Upon Greater than 50% of the Plant Species (are)/are not Classified as FAC-OBL in the National List of Plant Species that Occur in Wetlands. Sample plot was taken...

HYDROLOGY

___ Recorded Data (Describe In Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 11 (in.)

Depth to Saturated Soil: 8 (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ___ Inundated
- √ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- √ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- √ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name
(Series and Phase): Wehadkee Silt Loam Drainage Class: ~~Thermic~~ Poorly

Taxonomy (Subgroup): Fluvaquentic Haplaquepts Confirm Mapped Type? Yes ___ No ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
1/2"	Oi				organic/litter
4 1/2"	A	10YR 6/1	10YR 5/8	15%	Coarse sand
10"	B	10YR 5/2	10YR 5/7	20%	loamy clay (wet)

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ✓ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed On Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ✓ No ___
Wetland Hydrology Present? Yes ✓ No ___
Hydric Soils Present? Yes ✓ No ___

Is the Sampling Point Within a Wetland? Yes ✓ No ___

Remarks: Location (described) **is/is not** classified as a wetland based upon the criteria set forth in the 1987 Army Corps of Engineers Wetlands Delineation Manual.

Site A

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: B-4300 Applicant / Owner: NCDOT Investigator: M. R. TURNER (MULKEY)	Date: 1-16-04 County: Wake State: NC
Do normal circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical situation)? Yes ____ No X Is the area a potential problem area? Yes ____ No X (explain on reverse if needed)	Community ID: ~~P.F.O.~~ Transect ID: ____ Plot ID: Wetland A

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Quercus alba	T	FACU	9.		
2. Liquidambar styraciflua	T, S	FAC+	10.		
3. Oxydendrum arboreum	T		11.		
4. Fagus grandifolia	T, S	FACU	12.		
5. Arundinaria gigantea	S, H	FACW	13.		
6. Polystichum acrostichoides	H	FAC	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW, or FAC excluding FAC-). ~~50~~ %

Remarks: Wetland Vegetation Present Based Upon Greater than 50% of the Plant Species are/~~are not~~ Classified as FAC-OBL in the National List of Plant Species that Occur in Wetlands. Sample plot was taken...

HYDROLOGY

___ Recorded Data (Describe In Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: Deep (in.)

Depth to Saturated Soil: 20 (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- ___ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Fairly typical piedmont Mesic-Forest upland

SOILS

Map Unit Name (Series and Phase): Wake, 2 to 10% Slope Drainage Class: ~~GLS~~ Poorly ~~Thermic~~

Taxonomy (Subgroup): Lithic Udipsamments Confirm Mapped Type? Yes ___ No ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
9	A	10YR 6/3	—		SANDY LOAM
14+	B	10YR 7/5			Sandy Loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed On Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ___ No ✓
Wetland Hydrology Present? Yes ___ No ✓
Hydric Soils Present? Yes ___ No ✓

Is the Sampling Point Within a Wetland? Yes ___ No ✓

Remarks: Location (describe) is (is not) classified as a wetland based upon the criteria set forth in the 1987 Army Corps of Engineers Wetlands Delineation Manual.

WRT

SHEET 1

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: B-4300 Applicant / Owner: NCDOT Investigator: M. R. TURNER (MUKKEG)	Date: 1-16-04 County: Wake State: NC
Do normal circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical situation)? Yes ____ No X Is the area a potential problem area? Yes ____ No X (explain on reverse if needed)	Community ID: PFO1 Transect ID: ____ Plot ID: Wetland B

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Acer rubrum	T, S	FAC	9.		
2. Liriodendron tulipifera	T	FAC	10.		
3. Liquidambar styraciflua	T, S	FAC+	11.		
4. Ligustrum sinense	Sh	FAC	12.		
5. Arundinaria gigantea	Sh	FACW	13.		
6. Woodwardia virginica	H	OBL	14.		
7. Lonicera japonica	V	FAC-	15.		
8. Vitis rotundifolia	V	FAC	16.		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 100 %

Remarks: Wetland Vegetation Present Based Upon Greater than 50% of the Plant Species (are) / are not Classified as FAC-OBL in the National List of Plant Species that Occur in Wetlands. Sample plot was taken...

HYDROLOGY

___ Recorded Data (Describe In Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 14 (in.)

Depth to Saturated Soil: 8 (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- ✓ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ✓ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Alluvial Drainage Class: Poorly

Taxonomy (Subgroup): Fluvaquentic Haplaquepts Confirm Mapped Type? Yes ___ No ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
1½	A	10YR 5/1			Sandy
2½	B_1	10YR 6/3			
4	B_2	10YR 6/2	10YR 5/8	10%	Sandy loam
Deep	B_3	10YR 7/2	10YR 5/7	15%	Sandy

Hydric Soil Indicators:

___ Histosol	___ Concretions
___ Histic Epipedon	___ High Organic Content in Surface Layer in Sandy Soils
✓ Sulfidic Odor	___ Organic Streaking in Sandy Soils
___ Aquic Moisture Regime	___ Listed On Local Hydric Soils List
___ Reducing Conditions	___ Listed on National Hydric Soils List
✓ Gleyed or Low-Chroma Colors	___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ✓ No ___

Wetland Hydrology Present? Yes ✓ No ___

Hydric Soils Present? Yes ✓ No ___

Is the Sampling Point Within a Wetland? Yes ✓ No ___

Remarks: Location (described) is/~~is~~ **not** classified as a wetland based upon the criteria set forth in the 1987 Army Corps of Engineers Wetlands Delineation Manual.

Site B1

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: B-4300 Applicant / Owner: NCDOT Investigator: M. R. TURNER (MULKEY)	Date: 1-16-04 County: Wake State: NC
Do normal circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical situation)? Yes ____ No X Is the area a potential problem area? Yes ____ No X (explain on reverse if needed)	Community ID: ~~PFO1~~ Transect ID: ____ Plot ID: Wetland B

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Quercus alba	T	FACU	9.		
2. Liquidambar styraciflua	T, S	FAC+	10.		
3. Oxydendrum arboreum	T		11.		
4. Fagus grandifolia	T, S	FACU	12.		
5. Arundinaria gigantea	SH	FACW	13.		
6. Polystichum acrostichoides	H	FAC	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW, or FAC excluding FAC-). ~~50~~ 60%

Remarks: Wetland Vegetation Present Based Upon Greater than 50% of the Plant Species are (are not). Classified as FAC-OBL in the National List of Plant Species that Occur in Wetlands. Sample plot was taken...

HYDROLOGY

___ Recorded Data (Describe In Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: Deep (in.)

Depth to Saturated Soil: 20 (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- ___ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: FAirly typical piedmont Mesic Forest upland

SOILS

Map Unit Name (Series and Phase): WAKe, 2 to 10% Slope Drainage Class: GLS = thermic

Taxonomy (Subgroup): Lithic Udipsamments Confirm Mapped Type? Yes ___ No ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
9	A	10YR 6/3	—		SANDY LOAM
14+	B	10YR 7/5			Sandy Loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed On Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ___ No ✓
Wetland Hydrology Present? Yes ___ No ✓
Hydric Soils Present? Yes ___ No ✓

Is the Sampling Point Within a Wetland? Yes ___ No ✓

Remarks: Location (describe) is (is not) classified as a wetland based upon the criteria set forth in the 1987 Army Corps of Engineers Wetlands Delineation Manual.

Wet Powerline Sites B2

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: B-4300
Applicant / Owner: NCDOT
Investigator: M.R. TURNER (MUKKEY)

Date: 1-16-04
County: Wake
State: NC

Do normal circumstances exist on the site? Yes X No ____
Is the site significantly disturbed (Atypical situation)? Yes ____ No X
Is the area a potential problem area? Yes ____ No X
(explain on reverse if needed)

Community ID: PFO1
Transect ID: ____
Plot ID: Wetland B2

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Liquidambar styraciflua	T	FAC+
2. Liriodendron tulipifera	T	FAC
3. Acer rubrum	T	FAC
4. Ligustrum sinense	Sh	FAC
5. Rosa sp.	Sh	
6. Rubus sp.	Sh	
7. Lonicera japonica	V	FAC-
8. Fagus grandifolia	T	FACU
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW, or FAC excluding FAC-). 75%

Remarks: Wetland Vegetation Present Based Upon Greater than 50% of the Plant Species (are)/are not Classified as FAC-OBL in the National List of Plant Species that Occur in Wetlands. Sample plot was taken...

HYDROLOGY

___ Recorded Data (Describe In Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0.5 (in.)

Depth to Free Water in Pit: 2-6 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ✓ Inundated
- ✓ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- ✓ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ✓ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Wehadkee Silt Loam Drainage Class: Poorly

Taxonomy (Subgroup): Fluventic Haplaquepts Confirm Mapped Type? Yes ___ No ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
1/2	O	10YR 4/1			Litter
1	A_1	10YR 5/2			Sandy
1	A_2	10YR 6/2	10YR 6/8	10-15%	Sandy loam
Deep	B	10YR 7/1	10YR 6/8	15-20%	Clay loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ✓ Sulfidic Odor
- ✓ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ___ Listed On Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ✓ No ___

Wetland Hydrology Present? Yes ✓ No ___

Hydric Soils Present? Yes ✓ No ___

Is the Sampling Point Within a Wetland? Yes ✓ No ___

Remarks: Location (described) is **not** classified as a wetland based upon the criteria set forth in the 1987 Army Corps of Engineers Wetlands Delineation Manual.

Powerline
Site B2

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: B-4300 Applicant / Owner: NCDOT Investigator: M. A. TURNER	Date: 1-16-04 County: Wake State: NC
Do normal circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical situation)? Yes ____ No X Is the area a potential problem area? Yes ____ No X (explain on reverse if needed)	Community ID: ~~PFO1~~ Transect ID: ____ Plot ID: Wetland B2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Fagus grandifolia	T	FACU	9.		
2. Liquidambar styraciflua	T	FAC+	10.		
3. Acer rubrum	T	FAC	11.		
4. Oxydendrum arboreum	T		12.		
5. Cornus florida	S	FACU	13.		
6. Ligustrum sinense	Sh	FAC	14.		
7. Arundinaria gigantea	Sh	FACW	15.		
8. Toxicodendron radicans	V	FAC	16.		

Percent of Dominant Species that are OBL, FACW, or FAC excluding FAC-). 62.5

Remarks: Wetland Vegetation Present Based Upon Greater than 50% of the Plant Species are/are not Classified as FAC-OBL in the National List of Plant Species that Occur in Wetlands. Sample plot was taken...

HYDROLOGY

___ Recorded Data (Describe In Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: Deep (in.)

Depth to Saturated Soil: Deep (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- ___ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): WAKE, 2 to 10% slopes Drainage Class: somewhat excessive ~~Thermic~~

Taxonomy (Subgroup): Lithic Udipsamments Confirm Mapped Type? Yes ___ No ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
1/2	O;				organic litter
7	A	10YR 6/3			sand
Deep	B	10YR 7/5			loamy sand

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed On Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ___ No ✓
Wetland Hydrology Present? Yes ___ No ✓
Hydric Soils Present? Yes ___ No ✓

Is the Sampling Point Within a Wetland? Yes ___ No ✓

Remarks: Location (describe) is (is not) classified as a wetland based upon the criteria set forth in the 1987 Army Corps of Engineers Wetlands Delineation Manual.

CWT
Site C

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: B-4300 Applicant / Owner: NCDOT Investigator: M. R. TURNER (MULLICAN)	Date: 1-16-04 County: Wake State: NC
Do normal circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical situation)? Yes ____ No X Is the area a potential problem area? Yes ____ No X (explain on reverse if needed)	Community ID: PFO1 Transect ID: ____ Plot ID: Wetland C

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Liriodendron tulipifera	T	FAC	9. Smilax rotundifolia	V	FAC
2. Acer rubrum	T	FAC	10.		
3. Liquidambar styraciflua	T, Sh	FAC+	11.		
4. Cornus amomum	Sh	FACW+	12.		
5. Ligustrum sinense	Sh	FAC	13.		
6. Sambucus canadensis	Sh	FACW-	14.		
7. Rubus sp.	Sh		15.		
8. Lonicera japonica	V	FAC-	16.		

Percent of Dominant Species that are OBL, FACW, or FAC excluding FAC-). 89%

Remarks: Wetland Vegetation Present Based Upon Greater than 50% of the Plant Species (are) / are not Classified as FAC-OBL in the National List of Plant Species that Occur in Wetlands. Sample plot was taken...

HYDROLOGY

___ Recorded Data (Describe In Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 13 (in.)

Depth to Saturated Soil: 5-8 (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- ✓ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ✓ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Wehadkee Silt Loam Drainage Class: Poorly

Taxonomy (Subgroup): Fluventic Hapludepts Confirm Mapped Type? Yes ___ No ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
1/2	O	10YR 3/2			ORGANIC
1½	A	10YR 4/2			LOAMY
2"	B_1	10YR 6/1			LOAMY SAND
Deep	B_2	10YR 6/1	10YR 6/6	25%	SANDY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ✓ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed On Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ✓ No ___

Wetland Hydrology Present? Yes ✓ No ___

Hydric Soils Present? Yes ✓ No ___

Is the Sampling Point Within a Wetland? Yes ✓ No ___

Remarks: Location (described) **is/is not** classified as a wetland based upon the criteria set forth in the 1987 Army Corps of Engineers Wetlands Delineation Manual.

Site C

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Determination Manual)

Project / Site: B-4300 Applicant / Owner: NCDOT Investigator: M.R. TURNER	Date: 1-16-04 County: Wake State: NC
Do normal circumstances exist on the site? Yes X No ____ Is the site significantly disturbed (Atypical situation)? Yes ____ No X Is the area a potential problem area? Yes ____ No X (explain on reverse if needed)	Community ID: ~~PFO1~~ Transect ID: ____ Plot ID: Wetland ~~A~~ C

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Liquidambar styraciflua	T	FAC+	9.		
2. Acer rubrum	T	FAC	10.		
3. Liriodendron tulipifera	T	FAC	11.		
4. Ligustrum sinense	Sh	FAC	12.		
5. Arundinaria gigantea	Sh	FACW	13.		
6. Rosa sp.	Sh		14.		
7. Lonicera japonica	V	FAC-	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW, or FAC(excluding FAC-). 86%

Remarks: Wetland Vegetation Present Based Upon Greater than 50% of the Plant Species are/are not Classified as FAC-OBL in the National List of Plant Species that Occur in Wetlands. Sample plot was taken...

HYDROLOGY

___ Recorded Data (Describe In Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: Deep (in.)

Depth to Saturated Soil: Deep (in.)

Wetland Hydrology Indicators

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12"
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators:
- ___ Oxidized Roots Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): ~~Wabee~~ Wedowee fine Sandy Loam Drainage Class: ~~Excessive~~ well

Taxonomy (Subgroup): Typic Hapludults Confirm Mapped Type? Yes ___ No ✓

Profile Description:

Depth (inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
1½	O	10YR 3/1			Litter Layer
1½-5	A	10YR 4/3			Loam
5-20+	B	10YR 5/8			Sandy Loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed On Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes ___ No ✓
Wetland Hydrology Present? Yes ___ No ✓
Hydric Soils Present? Yes ___ No ✓

Is the Sampling Point Within a Wetland? Yes ___ No ✓

Remarks: Location (describe) is (is not) classified as a wetland based upon the criteria set forth in the 1987 Army Corps of Engineers Wetlands Delineation Manual.

WETLAND RATING WORKSHEET (4th VERSION)

Project Name:	*B-4300*	County:	Wake
Nearest Road:	*Poole Rd.*	Date:	*1/6/2004*
Wetland Area (ac):	*<.5*	Wetland Width (ft):	
Name of Evaluator(s):	*J. Gibson*		*Wetland A,B*

WETLAND LOCATION:

_____ on sound or estusuary, pond or lake
_____ on perennial steam
__x__ on intermittent stream
_____ within interstream divide
_____ other _____

ADJACENT LAND USE:

(within 1/2 mile upstream, upslope or radius)

__x__ forested/natural vegetation — 75 %
_____ agricultural/ urbanized — 10 %
__x__ impervious surface — 15 %

Adjacent Special Natural Areas

_____

SOILS:

Soil Series: *Wehadkee*

_____ predominantly organic (humus, muck or peat)
__x__ predominantly mineral (non-sandy)
_____ predominantly sandy

DOMINANT VEGETATION:

1 *Rubus argutus*
2 *Lonicera japonica*
3 *Sambucus canidensis*
4 *Rosa multiflora*

HYDRAULIC FACTORS:

__x__ freshwater
_____ brackish
_____ steep topography
_____ ditched or channelized
_____ total wetland width >= 100 feet

FLOODING AND WETNESS:

_____ semipermanently to permenently flooded or inundated
_____ seasonally flooded or inundated
__x__ intermittently flooded or temporary surface water
_____ no evidence of flooding or surface water

WETLAND TYPE: (select one)*

_____ Bottomland Hardwood Forest
_____ Swamp Forest
_____ Carolina Bay
_____ Pocosin
_____ Pine Savannah
_____ Freshwater Marsh
_____ Bog/Fen
__x__ Headwater Forest
_____ Bog Forest
_____ Ephemeral Wetland
_____ Other: _____

* The rating system cannot be applied to salt and brackish marshes or stream channels.

DEM RATING

WATER STORAGE	1		X 4.00 =	4
BANK, SHORELINE STABILIZATION	4		X 4.00 =	16
POLLUTANT REMOVAL	3	*	X 5.00 =	15
WILDLIFE HABITAT	2		X 2.00 =	4
AQUATIC LIFE HABITAT	1		X 4.00 =	4
RECREATION/EDUCATION	0		X 1.00 =	0
			TOTAL WETLAND SCORE =	43

* Add one point if in sensitive watershed and >10% nonpoint disturbance within 1/2 mile upstream, upslope, or radius.

WETLAND RATING WORKSHEET (4th VERSION)

Project Name:	*B-4300*	County:	Wake
Nearest Road:	*Poole Rd.*	Date:	*1/6/2004*
Wetland Area (ac):	*<.5*	Wetland Width (ft):	
Name of Evaluator(s):	*J. Gibson*		*Wetland C*

WETLAND LOCATION:

_____ on sound or estusuary, pond or lake
__x__ on perennial steam
_____ on intermittent stream
_____ within interstream divide
_____ other _____

ADJACENT LAND USE:

(within 1/2 mile upstream, upslope or radius)

__x__ forested/natural vegetation — 75 %
_____ agricultural/ urbanized — 10 %
__x__ impervious surface — 15 %

Adjacent Special Natural Areas

SOILS:

Soil Series: *Wehadkee*

_____ predominantly organic (humus, muck or peat)
__x__ predominantly mineral (non-sandy)
_____ predominantly sandy

DOMINANT VEGETATION:

1 *Acer rubrum*
2 *Lonicera japonica*
3 *Ligustrum sinense*
4

HYDRAULIC FACTORS:

__x__ freshwater
_____ brackish
_____ steep topography
_____ ditched or channelized
_____ total wetland width >= 100 feet

FLOODING AND WETNESS:

_____ semipermanently to permenently flooded or inundated
_____ seasonally flooded or inundated
__x__ intermittently flooded or temporary surface water
_____ no evidence of flooding or surface water

WETLAND TYPE: (select one)*

__x__ Bottomland Hardwood Forest
_____ Swamp Forest
_____ Carolina Bay
_____ Pocosin
_____ Pine Savannah
_____ Freshwater Marsh
_____ Bog/Fen
_____ Headwater Forest
_____ Bog Forest
_____ Ephemeral Wetland
_____ Other: _____

* The rating system cannot be applied to salt and brackish marshes or stream channels.

DEM RATING

WATER STORAGE	2	X 4.00 =	8
BANK, SHORELINE STABILIZATION	5	X 4.00 =	20
POLLUTANT REMOVAL	4 *	X 5.00 =	20
WILDLIFE HABITAT	4	X 2.00 =	8
AQUATIC LIFE HABITAT	5	X 4.00 =	20
RECREATION/EDUCATION	1	X 1.00 =	1
		TOTAL WETLAND SCORE =	77

* Add one point if in sensitive watershed and >10% nonpoint disturbance within 1/2 mile upstream, upslope, or radius.

UT Clarks Creek

NCDWQ Stream Classification Form

Project Name: B-4300 River Basin: Neuse County: Wake Evaluator: Julie Gibson
DWQ Project Number: Nearest Named Stream: Clarks Creek Latitude: Signature: Julie Gibson
Date: 1-8-03 USGS QUAD: Raleigh E Longitude: Location/Directions:

***PLEASE NOTE:** *If evaluator and landowner agree that the feature is a man-made ditch, then use of this form is not necessary. Also, if in the best professional judgement of the evaluator, the feature is a man-made ditch and not a modified natural stream—this rating system should not be used**

Primary Field Indicators: (Circle One Number Per Line)

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	(1)	2	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	(2)	3
3) Are Natural Levees Present?	(0)	1	2	3
4) Is The Channel Sinuous?	0	1	(2)	3
5) Is There An Active (Or Relic) Floodplain Present?	0	(1)	2	3
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	0	(1)	2	3
8) Is There A Bankfull Bench Present?	(0)	1	2	3
9) Is a Continuous Bed & Bank Present?	0	1	2	(3)
*(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)*				
10) Is a 2nd Order Or Greater Channel (As Indicated On Topo Map *And/Or* In Field) Present?	*Yes*=3		*No*=0	

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 10

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	(1)	2	3

PRIMARY HYDROLOGY INDICATOR POINTS: 1

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	3	(2)	1	0
2) Are Rooted Plants Present In Streambed?	3	(2)	1	0
3) Is Periphyton Present?	(0)	1	2	3
4) Are Bivalves Present?	(0)	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: #4

Secondary Field Indicators: (Circle One Number Per Line)

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	0	.5	(1)	1.5
2) Is There A Grade Control Point In Channel?	(0)	.5	1	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	.5	(1)	1.5

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 2

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last Year's) Leaflitter Present In Streambed?	1.5	1	(.5)	0
2) Is Sediment On Plants (Or Debris) Present?	0	(.5)	1	1.5
3) Are Wrack Lines Present?	(0)	.5	1	1.5

4) Is Water In Channel *And* >48 Hrs. Since Last *Known* Rain? *(*NOTE: If Ditch Indicated In #9 Above Skip This Step And #5 Below*)*	0	.5	1	1.5
5) Is There Water In Channel During Dry Conditions *Or* In Growing Season)?	0	.5	1	1.5
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?	*Yes=1.5*			*No=0*

SECONDARY HYDROLOGY INDICATOR POINTS: 4.5

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fish Present?	0	.5	1	1.5
2) Are Amphibians Present?	0	.5	1	1.5
3) Are AquaticTurtles Present?	0	.5	1	1.5
4) Are Crayfish Present?	0	.5	1	1.5
5) Are Macrobenthos Present?	0	.5	1	1.5
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	.5	1	1.5
7) Is Filamentous Algae Present?	0	.5	1	1.5

8) Are Wetland Plants In Streambed?	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*)*	2	1	.75	.5	0	0

SECONDARY BIOLOGY INDICATOR POINTS: 1

TOTAL POINTS (Primary + Secondary) = 22.5 *(If Greater Than Or Equal To 19 Points The Stream Is At Least Intermittent)*

Notes: Intermittent stream

B-4300

USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

STREAM QUALITY ASSESSMENT WORKSHEET

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: Julie Gibson
3. Date of evaluation: 1-8-04
4. Time of evaluation: 11 am
5. Name of stream: Clark's Creek
6. River basin: Neuse
7. Approximate drainage area: 5 sq. miles
8. Stream order: 2
9. Length of reach evaluated: 300'
10. County: Wake
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): adjacent to Pade Rd., Bridge No. 29

14. Proposed channel work (if any): bent removal of old bridge
15. Recent weather conditions: clear, cold
16. Site conditions at time of visit: normal
17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters X 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: 15 % Residential ___% Commercial ___% Industrial ___% Agricultural 70 % Forested 15 % Cleared / Logged ___% Other (_____)
22. Bankfull width: 30'
23. Bank height (from bed to top of bank): 15-30'
24. Channel slope down center of stream: ___Flat (0 to 2%) X Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)
25. Channel sinuosity: ___Straight X 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): 77 **Comments:** _____

Evaluator's Signature Julie Gibson **Date** 1-8-04

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	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	4
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	4
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	3
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	4
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	3
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	2
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	3
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	2
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 3	3
	10	**Sediment input** (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	3
	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	2
STABILITY	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	3
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	4
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	4
	15	**Impact by agriculture, livestock, or timber production** (substantial impact =0; no evidence = max points)	0 – 5	0 – 4	0 – 5	4
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	4
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	5
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	4
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	4
BIOLOGY	20	**Presence of stream invertebrates** (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	4
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	2
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	2
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on first page)				77

* These characteristics are not assessed in coastal streams.

USACE AID#_____ DWQ #_____ Site #____ (indicate on attached map)

STREAM QUALITY ASSESSMENT WORKSHEET

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: Julie Gibson
3. Date of evaluation: 1-8-04
4. Time of evaluation: 10 am
5. Name of stream: UT of Clarks Creek
6. River basin: Neuse
7. Approximate drainage area: 21 acres
8. Stream order: 1
9. Length of reach evaluated: approximately 1,000'
10. County: Wake
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 Soil map

13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): adjacent to Poole Rd. (parallel) @ Bridge # 29 crossing Clarks Creek

14. Proposed channel work (if any): - bridge replacement
15. Recent weather conditions: clear, cold
16. Site conditions at time of visit: normal
17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters X Nutrient Sensitive Waters (Clarks Creek) ___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: 25% Residential ___% Commercial ___% Industrial ___% Agricultural 25% Forested 50% (Cleared (powerline)) / Logged ___% Other (_____)
22. Bankfull width: 3'
23. Bank height (from bed to top of bank): 1 - 5'
24. Channel slope down center of stream: ___Flat (0 to 2%) X Gentle (2 to 4%) X Moderate (4 to 10%) ___Steep (>10%)
25. Channel sinuosity: ___Straight X 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): 48 **Comments:** under powerline in project area, next to Poole

Evaluator's Signature Julie Gibson **Date** 1-8-04

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STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE	
			Coastal	Piedmont	Mountain		
PHYSICAL	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	2	
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	1	powerline above
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	2	
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	4	
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	3	wetlands
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	2	"
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	2	only evidence near m
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	1	Small wet
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 3	2	
	10	**Sediment input** (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	2	
STABILITY	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	0	sand
	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	3	
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	3	
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	1	
	15	**Impact by agriculture, livestock, or timber production** (substantial impact =0; no evidence = max points)	0 – 5	0 – 4	0 – 5	4	
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	3	
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	3	not to roa
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	3	primarily
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	4	sand
BIOLOGY	20	**Presence of stream invertebrates** (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	1	
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0	
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0	
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	1	raccoon
		Total Points Possible	100	100	100		
		TOTAL SCORE (also enter on first page)				48	

* These characteristics are not assessed in coastal streams.