STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 25, 2004

US Army Corps of Engineers
Raleigh Field Office
6508 Falls of Neuse Road, Suite120
Raleigh, NC 27615-6814

ATTENTION: Eric Alsmeyer
NCDOT Coordinator, Division 5

Dear Sir:

Subject: **Application for Nationwide Permit 23 and 33 and Neuse Riparian Buffer Certification** for the replacement of Bridge No. 317 over Middle Creek on SR 1404, Wake County. Federal Aid Project No. BRZ-1404(4), State Project No. 8.2407801, Division 5, T.I.P. No. B-3703:

Please find enclosed three copies of the project planning report for the above referenced project. The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 317 over Middle Creek [DWQ Index # 27-43-15-(4)] a Division of Water Quality Class "C NSW" Waters of the State. The project involves replacing the current bridge in its existing location, while using an off-site detour to maintain traffic during construction. The proposed bridge will be a 3-span, 147 foot cored slab bridge with a width of 36 feet. The approaches will be two, 12 ft lanes with eight foot shoulders. Enclosed with this permit application is a project site map, permit drawings, PCN form, Categorical Exclusion (CE) document, United States Fish and Wildlife Service (USFWS) concurrence letter and half size plan sheets.

IMPACTS TO WATERS OF THE UNITED STATES

Temporary Impacts: The construction of the bridge will require the use of two rock causeways consisting of Class II and Class B riprap to provide access to the site for the construction equipment. The resulting temporary surface water fill will be 0.07 ac. Construction of the proposed temporary rock causeway is depicted in the attached drawings (Permit Sheets 3-7).

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

TELEPHONE: 919-715-1500
FAX: 919-715-1501
WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD.
PARKER LINCOLN BUILDING, SUITE 168
RALEIGH NC 27604

Permanent Impacts: Jurisdictional wetlands associated with the flood plain forest along Middle Creek will be affected by construction of the project by a small amount of fill and mechanized clearing. These riverine wetland impacts are 0.0002 ac of fill and 0.01 ac of mechanized clearing. Total wetland impacts are 0.01 ac. We are providing compensatory mitigation for these riverine wetland impacts through the Ecosystem Enhancement Program (EEP). The EEP acceptance letter is enclosed with this application. In addition, two 48-inch pipes will be installed approximately 400 feet north of the bridge to enhance wetland nourishment, no jurisdictional impacts will occur at this site.

One bridge bent is proposed to be constructed in the creek. Permanent surface water impacts from this bent is 0.01 ac. We do not plan to mitigate for these impacts.

AVOIDANCE AND MINIMIZATION

Bridge No. 317 over Middle Creek will be a 3-span, 147-foot cored slab bridge. The following measures were taken during the design of the proposed bridge to minimize impacts to the stream, wetlands and buffers. The proposed bridge will be replaced in its existing location and is 9.7 feet longer and 8.8 feet wider than the existing bridge. This will increase the floodplain under the bridge. The existing bridge has three bents in the creek and the proposed bridge will only have one bent in the creek. A preformed scour hole will be constructed on the north side of the bridge to filter stormwater runoff.

BRIDGE DEMOLITION

Existing Bridge No. 317 is 136 ft long with eight spans. The bridge superstructure consists of a reinforced concrete floor on timber joists. The substructure consists of timber caps and piles. One reinforced concrete abutment and one pier are in the water. There is the potential for 68.5 cubic yards to be temporarily placed into Waters of the United States, although all guidelines for bridge demolition and removal will be followed in addition to Best Management Practices for the Protection of Surface Waters. This project is classified as Case 1 in which in-water work is limited to an absolute minimum, due to the presence of special resource waters or threatened or endangered species, except for the removal of the portion of the sub-structure below the water.

UTILITIES

An underground electrical line will be relocated for this project. Bore pits will be necessary near Stations 15+00 & 25+00 outside the wetland boundary to directional bore the 4-6" PVC Conduits. No jurisdictional or buffer impacts will result from the relocation of this electrical line.

RESTORATION PLAN

The project schedule calls for a January 2005 let date. It is expected that the contractor will chose to start construction of the causeways shortly after that date.

The materials used as temporary fill in the construction of the rock causeways will be completely removed. The entire causeway footprint shall be returned to the original contours and elevations after the purpose of the causeway has been served.

After the causeways are no longer needed, the contractor will use excavating equipment to remove all materials. The rip rap used in the causeways may be placed as riprap slope protection. All causeway material will become the property of the contractor. The contractor will be required to submit a reclamation plan for removal of and disposal of all materials off-site.

FEDERALLY-PROTECTED SPECIES

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 29, 2003, the United States Fish and Wildlife Service (USFWS) lists four federally protected species for Wake County. Table 1 lists the species, their status and biological conclusion.

Table 1. Federally-Protected Species for Wake County

Common Name	Scientific Name	Federal Status	Biological Conclusion
dwarf wedgemussel	*Alasmidonta heteradon*	E	Not Likely to Adversely Affect
bald eagle	*Haleaeetus leucephalus*	T	No Effect
red-cockaded woodpecker	*Picoides borealis*	E	No Effect
Michaux's sumac	*Rhus michauxii*	E	Not Likely to Adversely Affect

"E" denotes Endangered (a species that is in danger of extinction throughout all or a significant portion of its range).
"T" denotes Threatened (a species that is likely to become an endangered species within the foreseeable future throughout all or significant portion of its range).

Biological conclusions of "No Effect" were given in the CE for the bald eagle and red-cockaded woodpecker based on no suitable habitat. Habitat for Michauxi's sumac was determined unsuitable in the CE document but since then it was determined there was suitable habitat for this species. Surveys were conducted July 22, 2003 for Michauxi's sumac for this project, although it was not found. The Biological Conclusion for this species has changed to "Not Likely to Adversely Affect". A concurrence letter from USFWS dated July 8, 2004 concurrs with these biological conclusions for these species.

The dwarf wedgemussel is known to Middle Creek in Johnston County. Surveys for this species were conducted by NCDOT biologists on October 11, 2000. Habitat in the vicinity of the bridge is somewhat degraded due to sediment loads. No dwarf wedge mussels were found. A few state listed species were found such as triangle floater (*Alasmidonta undulata*), eastern

lampmussel (*Lampsilis radiata*), and creeper *(Strophitus undulatus*).). An additional survey was conducted in May 28, 2004 by Biologists with The Catena Group and NCDOT biologists. A letter from the USFWS dated September 13, 2004, which is enclosed with this application, concurs with the Biological Conclusion of "May Affect-Not Likely to Adversely Affect" for dwarf wedgemussel with the notion that NCDOT will implement the following commitments:

- NCDOT shall conduct an in-stream survey just prior to the construction let date.
- Bridge deck drains shall be configured so that run-off does not fall into the stream.
- The resident engineer will alert the Biological Surveys Unit two months prior to the project being awarded so that they may plan and implement the required in-stream mussel survey.
- There will be a moratorium on clearing and grubbing-no work between November 15 and April 1.
- Weep holes shall be configured so that the run-off does not fall into the stream.
- NCDOT resident engineer is responsible for providing a written invitation to the NC Wildlife Resources Commission, Nongame and Protected Species Branch, and the US Fish and Wildlife Service prior to construction.
- NCDOT will adhere to Design Standards in Sensitive Watersheds (15A NCAC 04B.0124) to protect endangered and/or threatened aquatic species.

- Erosion control plans will include the following requirements:

  1) Sediment and Erosion controls must be in place prior to land clearing activities. No sediment from either bridge demolition or construction activities shall be allowed to enter the flowing stream.

  2) "Environmentally Sensitive Areas" will be defined on the plans which consist of a 50 ft buffer zone on both sides of the stream.

  3) The Contractor may perform clearing operations, but not grubbing operations in the "Environmentally Sensitive Areas", until immediately prior to beginning grading operations.

  4) Once grading operations begin in "Environmentally Sensitive Areas", as specified on the plans, work will progress in a continuous manner until complete.

  5) Seeding and mulching will be performed immediately following final grade establishment.

  6) Stage seeding will be performed on cut and fill slopes as grading progresses.

SUMMARY

It is anticipated that the construction of the causeway will be authorized under Section 404 Nationwide Permit 33 (Temporary Construction Access and Dewatering). We are, therefore, requesting the issuance of a Nationwide Permit 33 authorizing construction of the causeway. All other aspects of this project are being 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 (FR number 10, pages 2020-2095; January 15, 2002). We anticipate 401 General Certifications numbers 3361 and 3366 will apply to this project. In accordance with 15A NCAC 2H .0501(a) we are providing two copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their records.

If you have any questions or need additional information, please call Rachelle Beauregard at 715-1383.

Sincerely,

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

w/attachment
- Mr. John Hennessy, Division of Water Quality (7 copies)
- Mr. Travis Wilson, NCWRC
- Mr. Gary Jordan, USFWS
- Mr. David Chang, P.E., Hydraulics
- Mr. Greg Perfetti, P.E., Structure Design
- Mr. Jon Nance, P.E., Division 5 Engineer
- Mr. Chris Murray, DEO Division 5

w/o attachment
- Mr. Jay Bennett, P.E., Roadway Design
- Mr. Omar Sultan, Programming and TIP
- Mr. Art McMillan, P.E., Highway Design
- Mr. Mark Staley, Roadside Environmental
- Mr. David Franklin, USACE, Wilmington
- Mr. John Conforti, PDEA Project Planning Engineer
- Ms. Beth Harmon, EEP

NEUSE BUFFER ADDENDUM

The purpose of this addendum is to provide the NCDWQ with the information needed to evaluate the impacts of the project on the Neuse Buffer areas. In addition, we are presenting material in this addendum to illustrate that the project has been designed to comply with the Riparian Buffer Mitigation Program (15A NCAC 2B .0242) and the Neuse River Basin Riparian Buffer Rules (15A NCAC 2B .0233). Therefore, we request that the DWQ issue an Authorization Certificate pursuant to 15A NCAC 2B .0233 for the proposed use.

The North Carolina Department of Transportation proposes to replace Bridge No. 317 over Middle Creek on SR 1404 at its existing location.

Neuse Buffer Impacts. Impacts to buffers include that of construction of the new bridge, including the temporary rock causeway (Permit Sheets 3 and 4). Impacts to buffers are shown in Table 2 below. Under the Neuse Buffer Rules, impacts to buffers from the construction of bridges is allowable and no mitigation is required.

Table 2. Neuse River Buffer Impacts (Square Feet)

	Bridge Construction
Zone 1 Impact (sq ft)	4299
Zone 2 Impact (sq ft)	2282
Mitigation requirements (exempt, allowable or allowable with mitigation)	allowable

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 at Middle Creek are unavoidable. Replacing the existing bridge at its existing location provides the least amount of impacts to riparian buffers.

NCDOT has developed measures in the design of the bridge to minimize impacts to buffers and water quality. The new bridge is 9.8 feet longer than the existing bridge and has three less spans. Bridge deck drains shall be configured so that the run-off does not fall into the stream. Other conditions are being conducted due to protected species in the area (see Federally Protected Species Section).

Office Use Only: Form Version May 2002

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

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

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 Wetlands Restoration Program (NCWRP) is proposed for mitigation of impacts (verify availability with NCWRP prior to submittal of PCN), 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: **NCDOT/Project Development and Environmental Analysis**
   Mailing Address: **1548 Mail Service Center,**
   Raleigh, NC 27699-1548
   Telephone Number: **919-733-3141** Fax Number: **919-733-9794**
   E-mail Address:

2. Agent/Consultant Information (A signed and dated copy of the Agent Authorization letter must be attached if the Agent has signatory authority for the owner/applicant.)
   Name:
   Company Affiliation:
   Mailing Address:
   Telephone Number: Fax Number:
   E-mail Address:

III. Project Information

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

1. Name of project: **Replacement of Bridge No. 317 over Middle Creek on SR 1404**

2. T.I.P. Project Number or State Project Number (NCDOT Only): **B-3703**

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, landmarks, etc.): **See map in permit drawings**

   Site coordinates, if available (UTM or Lat/Long): **35.942°N, 78.582°W**
   (Note – If project is linear, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)

5. Property size (acres): **N/A**

6. Nearest body of water (stream/river/sound/ocean/lake): **Middle Creek**

7. 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/.)

Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: **forested**

8. Describe the overall project in detail, including the type of equipment to be used:
   Bridge No. 317 will be replaced on existing location with a temporary causeway to provide access for construction equipment to the site. Heavy duty excavation

equipment will be used such as trucks, dozers, cranes and other various equipment necessary for roadway construction.

9. Explain the purpose of the proposed work: **To replace a deteriorating bridge**

IV. Prior Project History

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

N/A

V. Future Project Plans

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

N/A

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

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. The applicant must also provide justification for these impacts in Section VII below. All proposed impacts, permanent and temporary, must be listed herein, and must be clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) must 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: **Jurisdictional impacts include temporary impacts to Middle Creek due to the temporary causeway and permanent fill in riverine wetlands due to the new bridge.**

2. Individually list wetland impacts below:

Wetland Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)	Located within 100-year Floodplain** (yes/no)	Distance to Nearest Stream (linear feet)	Type of Wetland***
See cover letter					

* List each impact separately and identify temporary impacts. 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.

** 100-Year floodplains are identified through the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM), or FEMA-approved local floodplain maps. Maps are available through the FEMA Map Service Center at 1-800-358-9616, or online at http://www.fema.gov.

*** List a wetland type that best describes wetland to be impacted (e.g., freshwater/saltwater marsh, forested wetland, beaver pond, Carolina Bay, bog, etc.) Indicate if wetland is isolated (determination of isolation to be made by USACE only).

List the total acreage (estimated) of all existing wetlands on the property: **0.2 ac**
Total area of wetland impact proposed: **0.01 ac**

3. Individually list all intermittent and perennial stream impacts below:

Stream Impact Site Number (indicate on map)	Type of Impact*	Area of Impact (acres)	Stream Name**	Average Width of Stream Before Impact	Perennial or Intermittent? (please specify)
See cover letter					

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: culverts and associated rip-rap, dams (separately list impacts due to both structure and flooding), relocation (include linear feet before and after, and net loss/gain), stabilization activities (cement wall, rip-rap, crib wall, 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.

** Stream names can be found on USGS topographic maps. If a stream has no name, list as UT (unnamed tributary) to the nearest downstream named stream into which it flows. USGS maps are available through the USGS at 1-800-358-9616, or online at www.usgs.gov. Several internet sites also allow direct download and printing of USGS maps (e.g., www.topozone.com, www.mapquest.com, etc.).

Cumulative impacts (linear distance in feet) to all streams on site:_____

4. Individually list all open water impacts (including lakes, ponds, estuaries, sounds, Atlantic Ocean and any other water of the U.S.) below:

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

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: fill, excavation, dredging, flooding, drainage, bulkheads, etc.

5. 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.):_____

Size of watershed draining to pond:_____ Expected pond surface area:_____

VII. Impact Justification (Avoidance and Minimization)

Specifically describe measures taken to avoid the proposed impacts. It may be useful to provide information related to site constraints such as topography, building ordinances, accessibility, and financial viability of the project. The applicant may attach drawings of alternative, lower-impact site layouts, and explain why these design options were not feasible. Also discuss how impacts were minimized once the desired site plan was developed. If applicable, discuss construction techniques to be followed during construction to reduce impacts.

The new bridge is 9.7 feet longer than the existing bridge and has three less spans than the existing bridge. The new bridge is being replaced on existing location.

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 March 9, 2000, 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 NCWRP 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.
   Mitigation of 0.01 ac of riverine wetlands provided by EEP

2. Mitigation may also be made by payment into the North Carolina Wetlands Restoration Program (NCWRP). Please note it is the applicant's responsibility to contact the NCWRP at (919) 733-5208 to determine availability and to request written approval of mitigation prior to submittal of a PCN. For additional information regarding the application process for the NCWRP, check the NCWRP website at http://h2o.enr.state.nc.us/wrp/index.htm. If use of the NCWRP is proposed, please check the appropriate box on page three and provide the following information:

   Amount of stream mitigation requested (linear feet): **N/A**
   Amount of buffer mitigation requested (square feet): **N/A**
   Amount of Riparian wetland mitigation requested (acres): **N/A**
   Amount of Non-riparian wetland mitigation requested (acres): **N/A**
   Amount of Coastal wetland mitigation requested (acres): **N/A**

IX. Environmental Documentation (required by DWQ)

Does the project involve an expenditure of public (federal/state) funds or the use of public (federal/state) land?

Yes ☒ No ☐

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 ☐

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.

Will the project impact protected riparian buffers identified within 15A NCAC 2B .0233 (Neuse), 15A NCAC 2B .0259 (Tar-Pamlico), 15A NCAC 2B .0250 (Randleman Rules and Water Supply Buffer Requirements), or other (please identify_____)?

Yes ☒ No ☐ If you answered "yes", provide the following information:

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	4299	3	0
2	2282	1.5	0
Total	6581		0

* Zone 1 extends out 30 feet perpendicular from 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, Conservation Easement, Riparian Buffer Restoration / Enhancement, Preservation or

Payment into the Riparian Buffer Restoration Fund). Please attach all appropriate information as identified within 15A NCAC 2B .0242 or .0260.

No mitigation required

XI. Stormwater (required by DWQ)

Describe impervious acreage (both 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.

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. Other Circumstances (Optional):

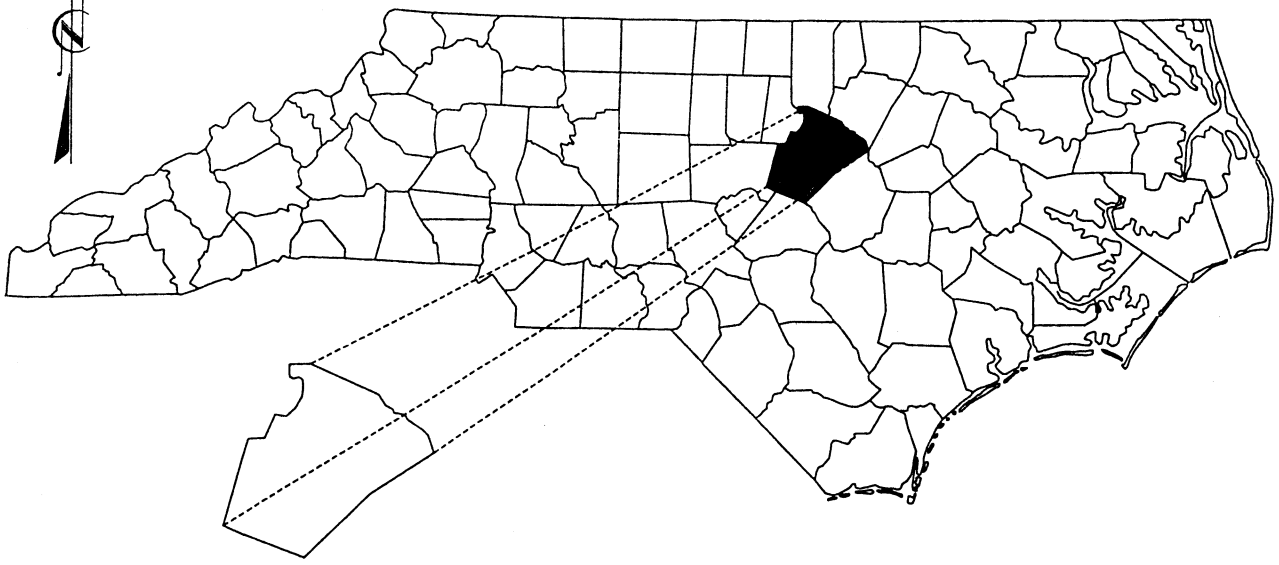
It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g.,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

10/25/04

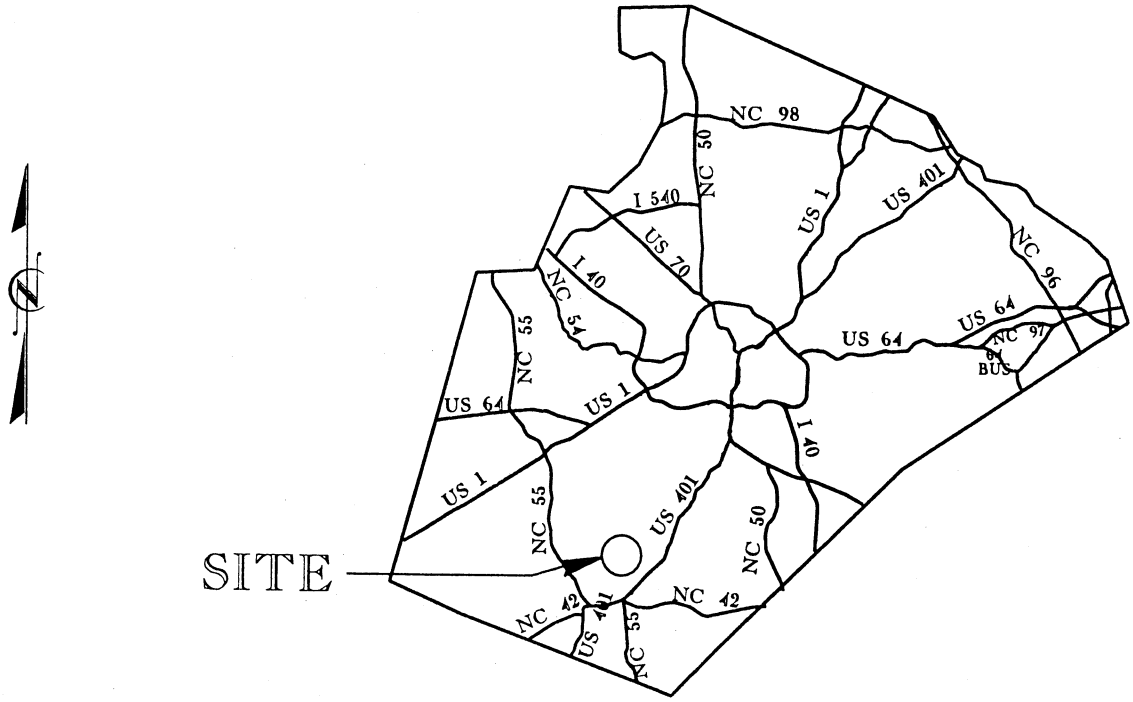
Applicant/Agent's Signature **Date**

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

NORTH CAROLINA



WAKE COUNTY



VICINITY MAP

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

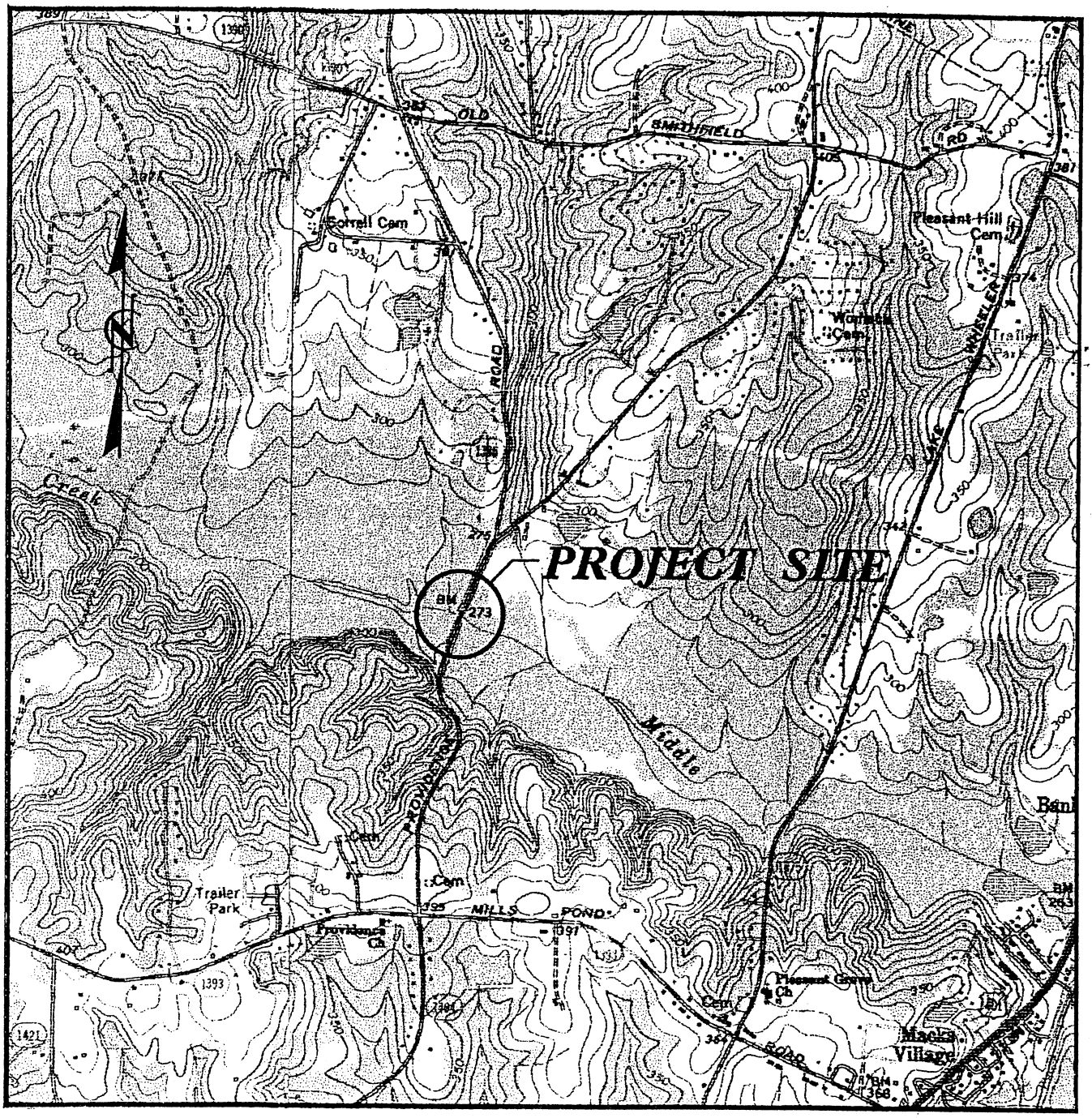
WAKE COUNTY

PROJECT: 8.2407801 (B-3703)

SR 1404

BETWEEN SR 4734 AND SR 1386

SHEET 1 OF 10 DATE 9/20/04



SITE MAP

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 8.2407801 (B-3703)

SR 1404

BETWEEN SR 4734 AND SR 1386

SHEET 2 OF 10 DATE 9/20/04

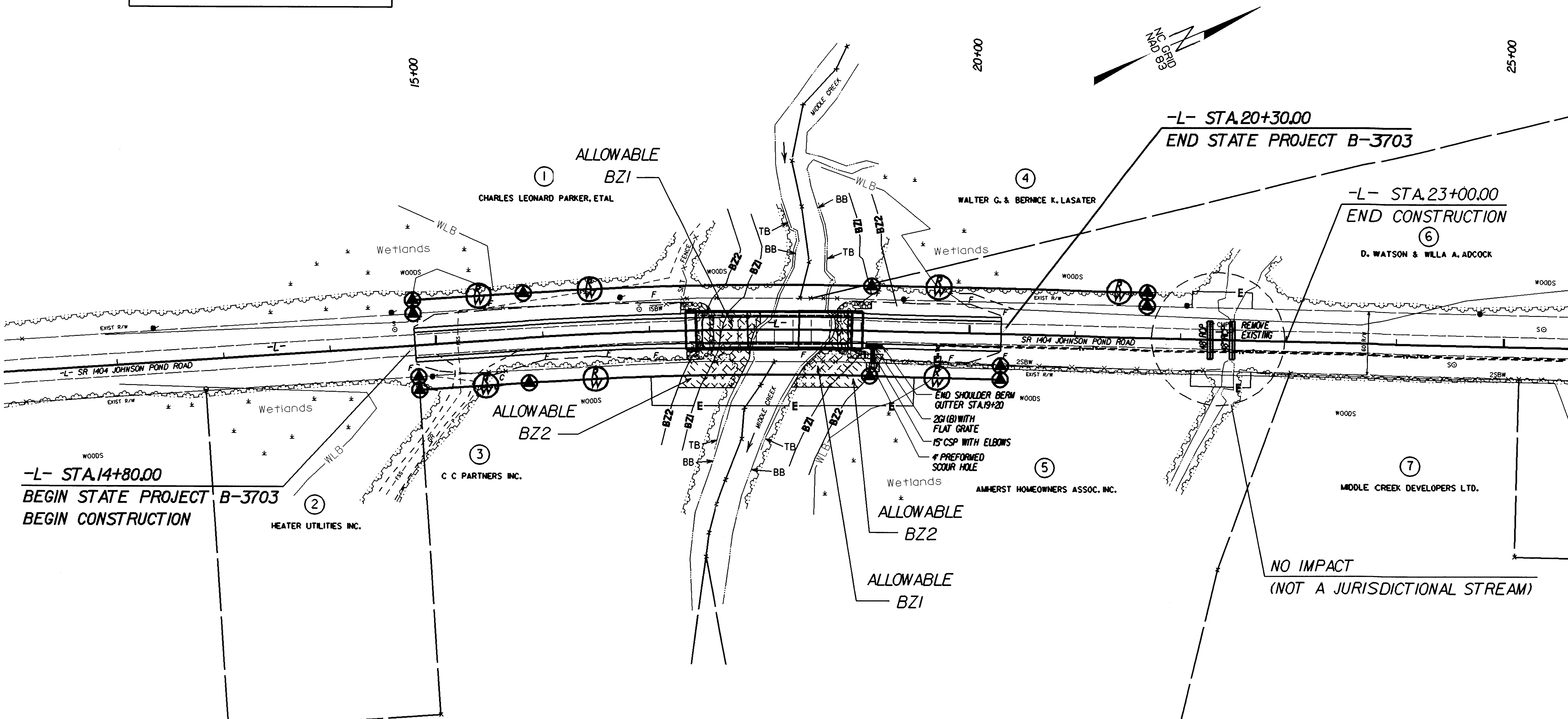
PROJECT REFERENCE NO.	SHEET NO.
B-3703	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
sheet 3	of 10

ENGLISH

0 100'

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3703-1"
WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 690589.8255(ft) EASTING: 2077980.3432(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988555
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3703-1" TO -L- STATION 14+80.00 IS
S 36° 41' 37.81" W 2615.0552 FT
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD88



PLAN VIEW

NOTES

▨ DENOTES ALLOWABLE BUFFER IMPACT ZONE 1

▨ DENOTES ALLOWABLE BUFFER IMPACT ZONE 2

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

20-SEP-2004 13:16
\B projects\B3703\TranSystem Permit\B3703_prmt_buffl.dgn
agamber AT

DATUM DESCRIPTION

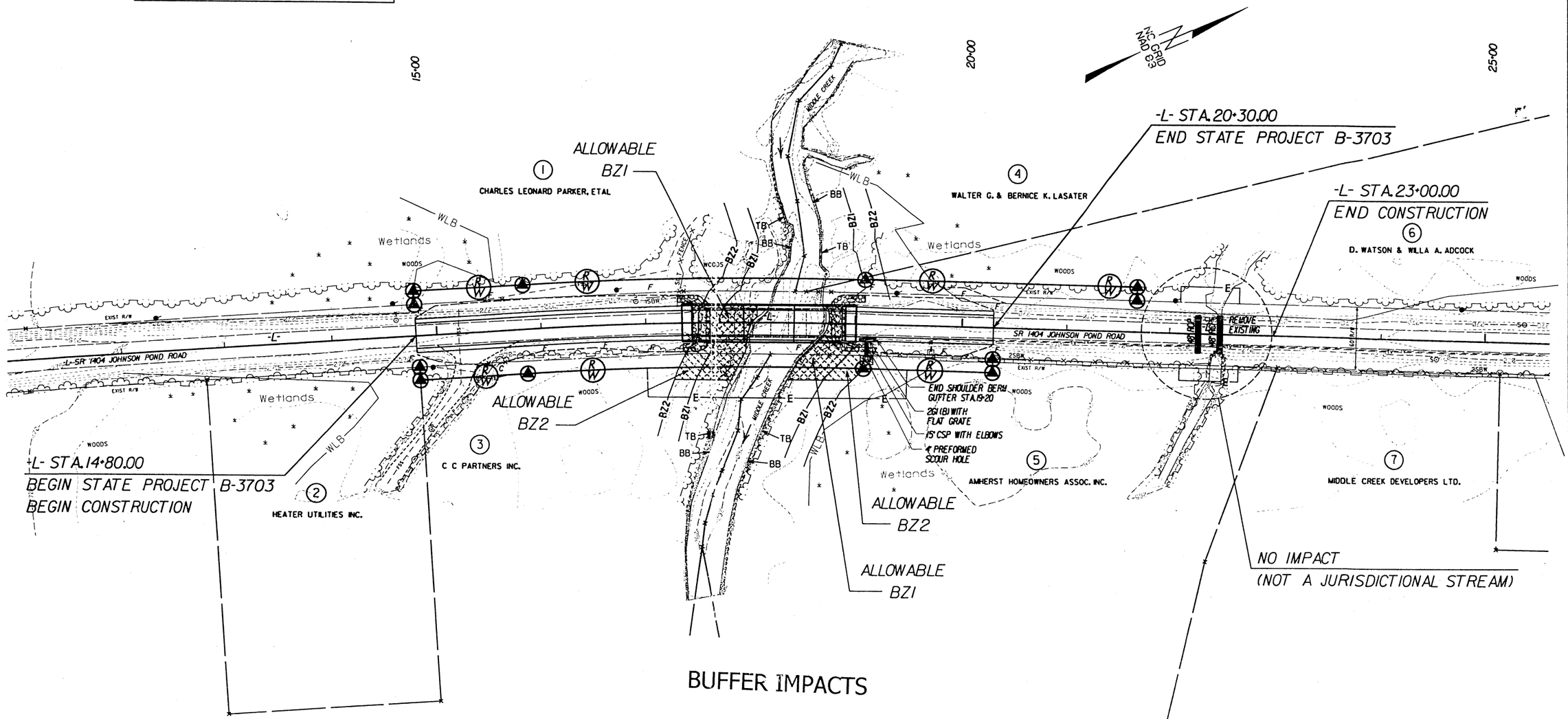
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3703-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 6905892.5511 EASTING: 2077980.3432(11) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988555 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3703-1" TO -L- STATION 14+80.00 IS S 36° 41' 37.81" W 26150.552 FT ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD88

ENGLISH

0 100'

PROJECT REFERENCE NO.	SHEET NO.
B-3703	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
Sheet 4	of 10

TRANSYSTEMS CORPORATION 4917 Waters Edge Drive, Suite 235 Raleigh, NC 27606 (919) 233-8825



BUFFER IMPACTS

PLAN VIEW

NOTES

DENOTES ALLOWABLE BUFFER IMPACT ZONE 1

DENOTES ALLOWABLE BUFFER IMPACT ZONE 2

PRELIMINARY PLANS
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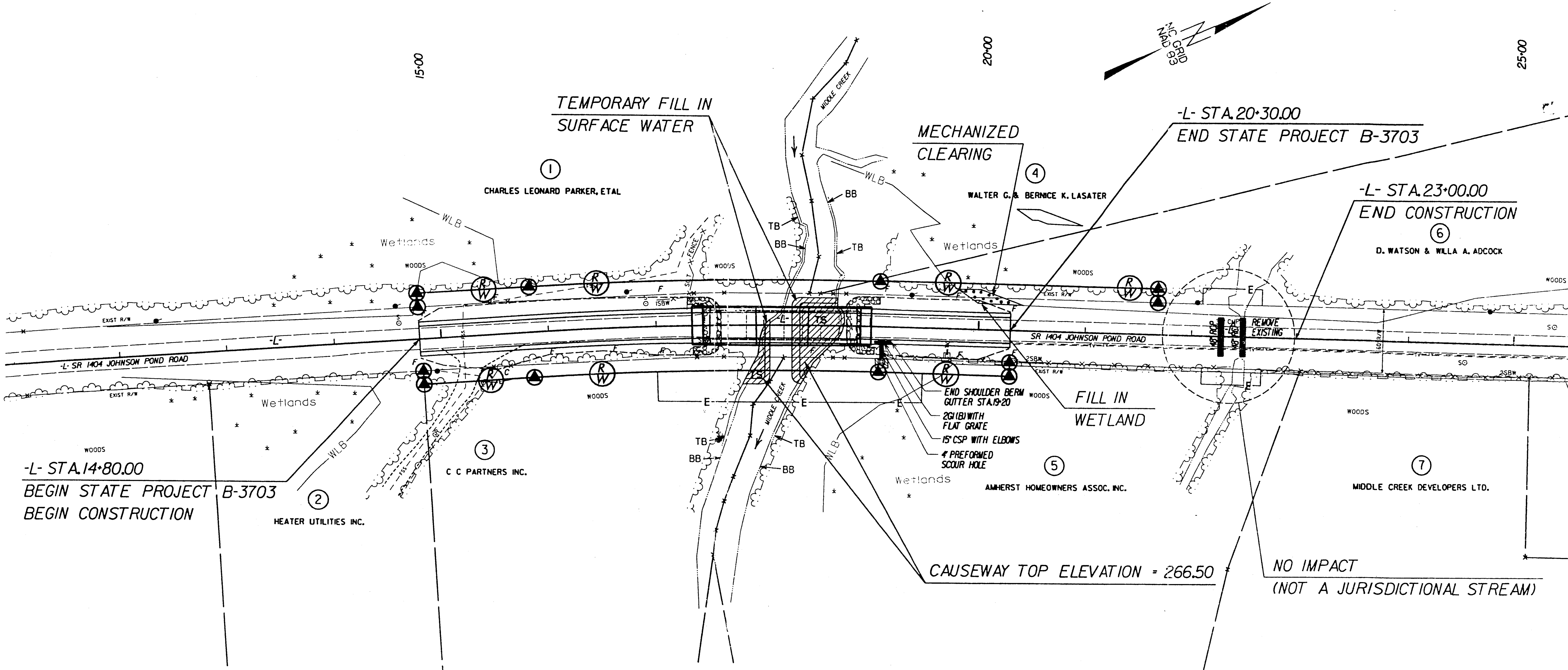
VERTICAL DATUM USED IS NAVD88

ENGLISH

0 100'

PROJECT REFERENCE NO.	SHEET NO.
B-3703	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
sheet 5	of 10

TRANSYSTEMS CORPORATION 4917 Waters Edge Drive, Suite 235 Raleigh, NC 27606 (919) 233-8125



WETLAND AND STREAM IMPACTS

PLAN VIEW

NOTES

1. CAUSEWAY REQUIRED TO PLACE DRILLED SHAFTS.
2. PROPOSED BRIDGE IS A 3 SPAN BRIDGE.

▨ TS TS — DENOTES TEMPORARY FILL IN SURFACE WATER

▨ F F — DENOTES FILL IN WETLAND

⁘ — DENOTES MECHANIZED CLEARING

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PROJECT REFERENCE NO.	SHEET NO.
B-3703	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
Sheet 6	of 10

TRANSYSTEMS CORPORATION 4917 Waters Edge Drive, Suite 235 Raleigh, NC 27606 (919) 233-8125

ENGLISH

0 100'

DATUM DESCRIPTION

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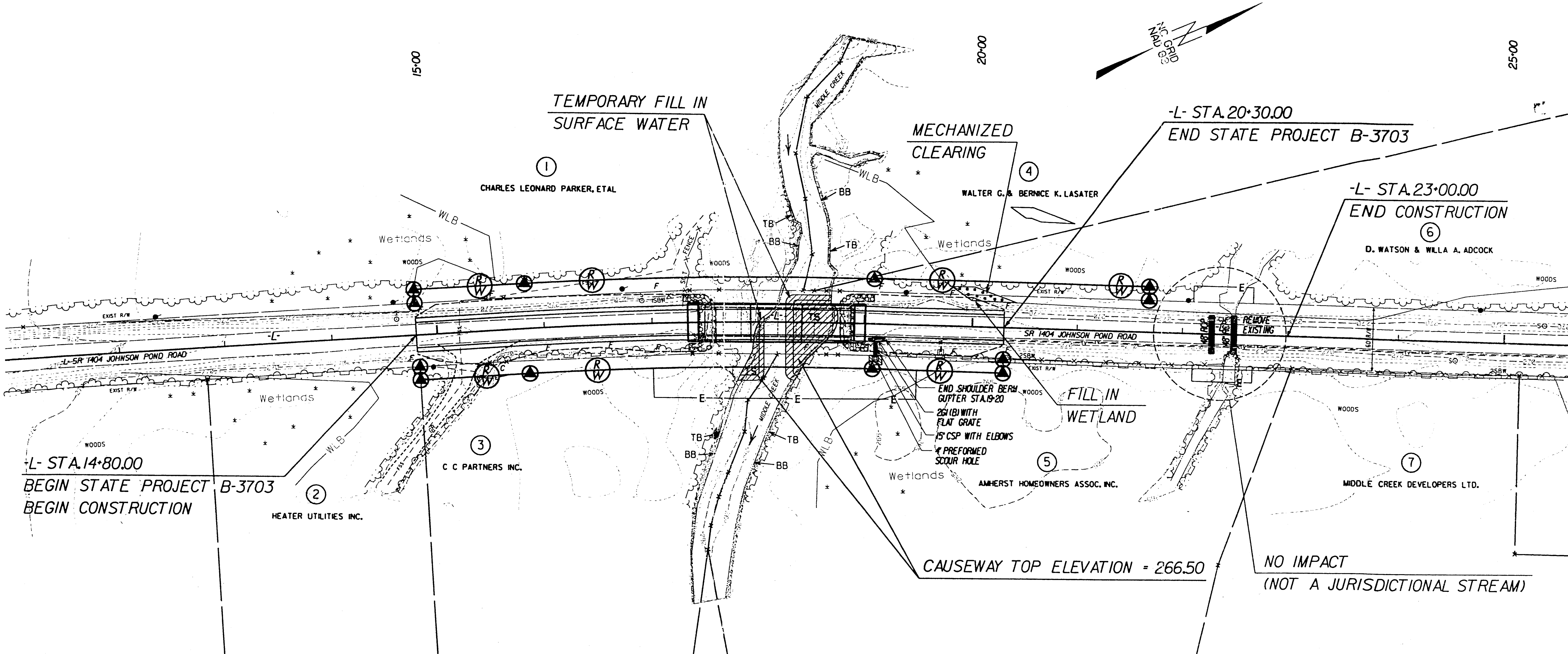

WETLAND AND STREAM IMPACTS

PLAN VIEW

NOTES

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2. PROPOSED BRIDGE IS A 3 SPAN BRIDGE.

▨ TS TS	DENOTES TEMPORARY FILL IN SURFACE WATER
▨ F F	DENOTES FILL IN WETLAND
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PROJECT REFERENCE NO.	SHEET NO.
B-3703	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Sheet 7 of 10

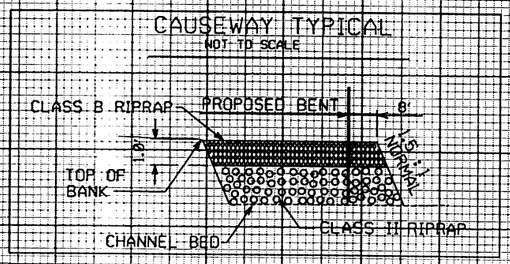
TRANSYSTEMS CORPORATION
4917 Waters Edge Drive, Suite 235
Raleigh, NC 27606 (919) 233-8825

ENGLISH

0 100'
HORIZONTAL 1"=50'

0 20'
VERTICAL 1"=10'

CAUSEWAY TYPICAL
NOT TO SCALE

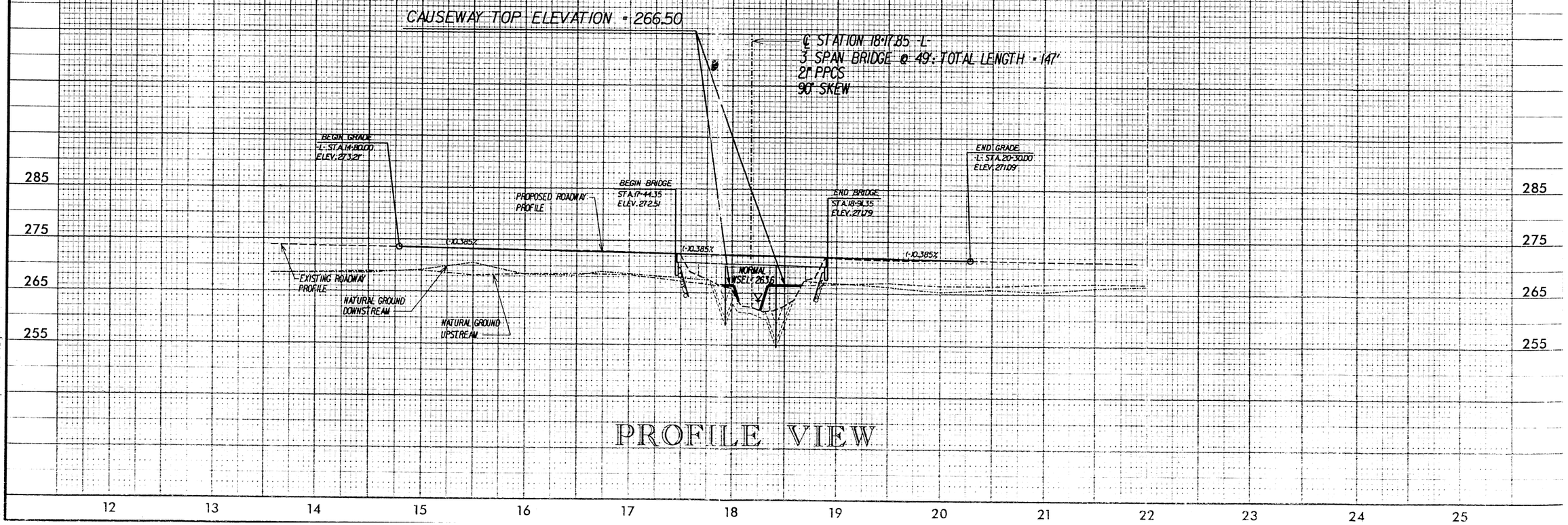


QUANTITY OF RIPRAP

	SOUTH CAUSEWAY	NORTH CAUSEWAY
CLASS B	18.8 TONS	99.2 TONS
CLASS II	75.8 TONS	477.1 TONS

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 5,600 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 272.1 FT
BASE DISCHARGE	= 7,000 CFS
BASE HW ELEVATION	= 272.7 FT
OVERTOPPING DISCHARGE	= 3,000 CFS
OVERTOPPING FREQUENCY	= 10 YRS
OVERTOPPING ELEVATION	= 270.16 FT



PROFILE VIEW

PROPERTY OWNER

NAME AND ADDRESS

	OWNER'S NAME	ADDRESS
1	CHARLES LEONARD PARKER, ETAL	P.O. BOX 123 FUQUAY VARINA, NC 27526-0123
3	C C PARTNERS, INC.	4621 SHADY GREENS DRIVE FUQUAY VARINA, NC 27526-8488
4	WALTER G. & BERNICE K. LASATER	8736 BELLS LAKE ROAD APEX, NC 27539-8810
5	AMHERST HOMEOWNERS ASSOC., INC.	c/o BRADY, SCHILAWSKI & INGRAM 102 COMMONWEALTH COURT SUITE A CARY, NC 27511-4400
6	D. WATSON & WILLA A. ADCOCK	8020 KENSINGTON DRIVE FUQUAY VARINA, NC 27526-9471

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 8.2407801 (B-3703)

SR 1404

BETWEEN SR 4734 AND SR 1386

SHEET 8 OF 10 DATE 9/20/04

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS				
			Fill In Wetlands (acres)	Temp. Fill In Wetlands (acres)	Excavation In Wetlands (acres)	Mechanized Clearing (Method III) (acres)	Fill In SW (Natural) (acres)	Fill In SW (Pond) (acres)	Temp. Fill In SW (acres)	Existing Channel Impacted (ft.)	Natural Stream Design (ft.)
1	17+44 to 18+91	3 Span Bridge	0.0002			0.01					
1		TEMPORARY CAUSEWAY							0.07		
TOTALS:			0.0002			0.01			0.07		

WETLAND & SURFACE WATER

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 8.2407801 (B-3703)
SR 1404
BETWEEN SR 4734 AND SR 1386

DATE Rev. 9/04

BUFFER IMPACTS SUMMARY

			IMPACT								BUFFER REPLACEMENT	
			TYPE		ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	3 Span Bridge	17+44 to 18+91	X		4299.0	2282.0	6581.0					
				X								
TOTAL:					4299.0	2282.0	6581.0					

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY
PROJECT: 8.2407801 (B-3703)

9/20/04

SHEET 10 OF 10

Ecosystem Enhancement PROGRAM

October 19, 2004

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

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

B-3703, Bridge 317 over Middle Creek, Wake County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide wetland mitigation for the subject project. Based on the information supplied by you in a letter dated October 11, 2004, the impacts are located in CU 03020201 of the Neuse River Basin in the Central Piedmont Eco-Region, and are as follows:

Riverine Wetland: 0.01 acre

As stated in your letter, the subject project is listed in Exhibit 2 of the Memorandum of Agreement among the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U. S. Army Corps of Engineers, Wilmington District dated July 22, 2003. The wetland mitigation for the subject project will be provided in accordance with this agreement.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

William D. Gilmore

William D. Gilmore, P.E.
Transition Manager

cc: Eric Alsmeyer, USACE-Raleigh
John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: B-3703

Ecosystem Enhancement PROGRAM

October 19, 2004

Mr. Eric Alsmeyer
U. S. Army Corps of Engineers
Raleigh Regulatory Field Office
6508 Falls of the Neuse Road, Suite 120
Raleigh, North Carolina 27615

Dear Mr. Alsmeyer:

Subject: EEP Mitigation Acceptance Letter:

B-3703, Bridge 317 over Middle Creek, Wake County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) proposes to provide preservation to compensate for the unavoidable 0.01 acre of riverine wetland impacts of the subject project in the following manner:

Wetland Preservation (10:1) in same eco-region (0.10 acre)
Langley Cypress Creek, Franklin County

The subject TIP project is listed in Exhibit 2 of the Memorandum of Agreement among the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U. S. Army Corps of Engineers, Wilmington District dated July 22, 2003. The compensatory mitigation for the project will be provided in accordance with Section IX, EEP Transition Period, of the Agreement.

If you have any questions or need additional information, please contact Ms. Beth Harmon at (919) 715-1929.

Sincerely,

William D. Gilmore

William D. Gilmore, P.E.
Transition Manager

cc: Phil Harris, Office of Natural Environment, NCDOT
John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: B-3703

Beauregard

United States Department of the Interior

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

September 13, 2004

Gregory J. Thorpe, Ph.D.
North Carolina Department of Transportation
Project Development and Environmental Analysis
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Dr. Thorpe:

This letter is in response to your letter of September 2, 2004 which provided the U.S. Fish and Wildlife Service (Service) with the biological determination of the North Carolina Department of Transportation (NCDOT) that the replacement of Bridge No. 317 on SR 1404 over Middle Creek in Wake County (TIP No. B-3703) may affect, but is not likely to adversely affect the federally protected dwarf wedgemussel (*Alasmidonta heterodon*) and Michaux's sumac (*Rhus michauxii*). In addition, NCDOT has determined that the project will have no effect on the federally protected red-cockaded woodpecker (*Picoides borealis*) and bald eagle (*Haliaeetus leucocephalus*) These comments are provided in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

The Service previously concurred, in a letter dated July 8, 2004, with your determination that the project may affect, but is not likely to adversely affect Michaux's sumac and will have no effect on the red-cockaded woodpecker and bald eagle. In that letter, we were unable to concur with your determination for the dwarf wedgemussel. Your most recent letter provides additional information, including the results of a more recent mussel survey conducted on May 28, 2004 and a list of environmental commitments. Based on the information provided, and assuming implementation of the proposed environmental commitments, the Service concurs with your determination that the project may affect, but is not likely to adversely affect the dwarf wedgemussel. We believe that the requirements of section 7(a)(2) of the ESA have been satisfied. We remind you that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered in this review; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by this identified action.

The Service appreciates the opportunity to review this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520 (Ext. 32).

Sincerely,

John Ellis
Acting Ecological Services Supervisor

cc: Eric Alsmeyer, USACE, Raleigh, NC
Nicole Thomson, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militscher, USEPA, Raleigh, NC

Wake County

SR 1404

Bridge No. 317 Over Middle Creek

Federal Aid Project No. BRZ-1404(4)

State Project 8.2407801

TIP Project No. B-3703

CATEGORICAL EXCLUSION

US DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

AND

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

APPROVED:

7-29-02
DATE

for L. Gail Grimes, P.E., Assistant Manager
Project Development and Environmental Analysis Branch
NCDOT

7/30/02
DATE

for Nicholas L. Graf, P.E.
Division Administrator, FHWA

Wake County

SR 1404

Bridge No. 317 Over Middle Creek

Federal Aid Project No. BRZ-1404(4)

State Project 8.2407801

TIP Project No. B-3703

CATEGORICAL EXCLUSION

July 2002

Document Prepared by

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

NORTH CAROLINA PROFESSIONAL SEAL 022546 ENGINEER EDWARD B McFALLS

Edward B. McFalls, P.E., Project Manager
Earth Tech

for the North Carolina Department of Transportation

Brian F. Yamamoto, Unit Head
Consultant Engineering Unit
Project Development and Environmental Analysis Branch

REGISTERED ENVIRONMENTAL MANAGER JOHN G. CONFORTI REM 9766 NREP

John Conforti, R.E.M., Project Manager
Consultant Engineering Unit
Project Development and Environmental Analysis Branch

SPECIAL PROJECT COMMITMENTS

Wake County
SR 1404
Bridge No. 317 Over Middle Creek
Federal Aid Project No. BRZ-1404(4)
State Project 8.2407801
TIP Project No. B-3703

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 Bridge Demolition and Removal, NCDOT's Guidelines for Best Management Practices for the Protection of Surface Waters, General Certification Conditions, and Section 401 Conditions of Certification, the following special commitments have been agreed to by NCDOT:

Highway Design Branch

Two 48-inch (1.22 m) pipes will be installed approximately 400 feet (122 m) north of the bridge to enhance wetland nourishment.

There will be a moratorium on clearing and grubbing-no work between November 15 and April 1. Other phases of construction can take place during the moratorium as long as the environmentally sensitive areas have been stabilized.

Bridge deck drains shall be configured so that the run-off does not fall into the stream.

The erosion control plans for Protected Aquatic Species must be used. These plans include the following requirements:

- Sediment and erosion controls must be in place prior to land clearing activities. No sediment from either bridge demolition or construction activities shall be allowed to enter the flowing stream.
- "Environmentally Sensitive Areas" will be defined on the plans, which consist of a 50 ft. buffer zone on both sides of the stream.
- The Contractor may perform clearing operation, but not grubbing operations in the "Environmentally Sensitive Areas", until immediately prior to beginning grading operations.
- Once grading operations begin in "Environmentally Sensitive Areas", as specified on the plans, work will progress in a continuous manner until complete.
- Seeding and mulching will be performed immediately following final grade establishment.

- Stage seeding will be performed on cut and fill slopes as grading progresses.

Project Development and Environmental Analysis Branch

The stream impacts associated with the project will likely be lower than the 150 linear-foot (45.7 m) threshold for mitigation set by Division of Water Quality Wetland Rules. If it becomes apparent during final design that more than 150 linear feet (45.7 m) of stream will be impacted, mitigation measures will be considered.

NCDOT will conduct an in-stream survey for the dwarf wedge mussel just prior to the construction let date.

NCDOT Division 5

The NCDOT resident engineer will alert the Project Development and Environmental Analysis Branch two months prior to the project being awarded so that they may plan and implement the required in-steam survey for dwarf wedge mussels.

NCDOT resident engineer is responsible for providing a written invitation to the North Carolina Wildlife Resources Commission, Nongame and Protected Species Branch, and the US Fish and Wildlife Service for the pre-construction meeting prior to construction.

There will be a moratorium on clearing and grubbing-no work between November 15 and April 1. Other phases of construction can take place during the moratorium as long as the environmentally sensitive areas have been stabilized.

The erosion control plans for Protected Aquatic Species must be used. These plans include the following requirements:

- Sediment and erosion controls must be in place prior to land clearing activities. No sediment from either bridge demolition or construction activities shall be allowed to enter the flowing stream.
- "Environmentally Sensitive Areas" will be defined on the plans, which consist of a 50 ft. buffer zone on both sides of the stream.
- The Contractor may perform clearing operation, but not grubbing operations in the "Environmentally Sensitive Areas", until immediately prior to beginning grading operations.
- Once grading operations begin in "Environmentally Sensitive Areas", as specified on the plans, work will progress in a continuous manner until complete.
- Seeding and mulching will be performed immediately following final grade establishment.
- Stage seeding will be performed on cut and fill slopes as grading progresses.

Wake County
SR 1404
Bridge No. 317 Over Middle Creek
Federal Aid Project No. BRZ-1404(4)
State Project 8.2407801
TIP Project No. B-3703

INTRODUCTION: The replacement of Bridge No. 317 is included in the 2002–2008 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (TIP) and in the Federal Aid Bridge Replacement Program. **Figure 1** shows the project location. Substantial environmental impacts are not anticipated. The project is classified as a Federal "Categorical Exclusion".

I. PURPOSE AND NEED

NCDOT Bridge Maintenance Unit records indicate the bridge has a sufficiency rating of 20.2 out of a possible 100 for a new structure. The bridge is considered structurally deficient and functionally obsolete. The replacement of this inadequate structure will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

SR 1404 (Johnson Pond Road) in Wake County is functionally classified as a "Rural Local" route in the Statewide Functional Classification System.

Through the project area, SR 1404 has 20-foot (6.1 m) wide pavement and 4-foot (1.2 m) unstabilized shoulders. The existing right-of-way is 60 feet (18.3 m) wide. The posted speed limit near the bridge on SR 1404 is 45 miles per hour. There is an advisory speed of 35 mph near the bridge. **Figure 2** shows the existing bridge and roadway.

The existing bridge was constructed in 1955. The superstructure consists of a reinforced concrete floor on timber joists. The substructure consists of timber caps on timber piles. The abutments are vertical. The existing bridge consists of eight spans, each approximately 17 feet (5.2 m) long—a total of approximately 136 feet (41.6 m). The clear roadway width is 24 feet (7.3 m). The crown of the roadway is approximately 10 feet (3.0 m) over the bed of Middle Creek. Presently, the posted weight limit is 18 tons for single vehicles and 26 tons for trucks with trailers. The bridge is located in a tangent section which transitions into a curve. The bridge crosses Middle Creek at 90 degrees. The horizontal and vertical alignments of the bridge and its approaches are good. **Figure 4** includes photographs of the existing bridge and its approaches.

The average daily traffic volume on SR 1404 at Bridge No. 317 was 3,700 vehicles per day in 1999. By the design year 2025, the average daily traffic volume is expected to increase to 11,500 vehicles per day. The projected traffic volume includes two percent dual-tired vehicles and one percent truck-tractor semi-trailers. Ten school buses each cross the bridge two times daily. SR 1404 is not a designated bicycle route.

One accident was reported within 500 feet (152 m) of Bridge No. 317 in the period between January 1, 1998 and December 31, 2000. The accident involved one vehicle. The vehicle was traveling north on SR 1404. The driver of the vehicle ran off the right side of the roadway, skidding while on the shoulder of the road and struck the end of the bridge rail. Circumstances contributing to the accident were exceeding safe speed and failing to keep vehicle entirely within a single lane.

An aerial power line is located on the west side of SR 1404. As of October 2000, a 6-inch water main was being constructed just south of the existing bridge. There is a pump station southeast of the bridge.

III. ALTERNATIVES

A. Project Description

The project will replace the existing bridge carrying SR 1404 over Middle Creek with a new bridge. **Figure 3** shows the proposed typical cross-sections for the roadway approaches and bridge. Two 48-inch (1.22 m) pipes will be installed approximately 400 feet (122 m) north of the bridge to enhance wetland nourishment.

B. Build Alternatives

Four alternatives were carried forward for detailed study in this Categorical Exclusion. They are shown on **Figure 2** and described below.

Alternative 1 replaces Bridge Number 317 in its existing location, while using an off-site detour to maintain traffic during construction. The off-site detour consists of SR 1390 (Optimist Farm Road), SR 1375 (Lake Wheeler Road), SR 1393 (Hilltop-Needmore Road), and SR 1404 (Johnson Pond Road). The total off-site detour length is 5.73 miles (9.22 km). The new bridge would be approximately 150 feet (46 m) long.

Alternative 2 replaces Bridge Number 317 in its existing location, while using an on-site temporary detour east of the existing bridge to maintain traffic during construction. The temporary bridge would be approximately 105 feet (32 m) long and the new bridge would be approximately 150 feet (46 m) long.

Alternative 3 replaces Bridge Number 317 in its existing location, while using an on-site temporary detour west of the existing bridge to maintain traffic during construction. The temporary bridge would be approximately 105 feet (32 m) long and the new bridge would be approximately 150 feet (46 m) long.

C. Alternatives Eliminated from Further Study

No Action. This alternative consists of short-term minor reconstruction and maintenance activities that are part of an ongoing plan for continuing operation of the existing bridge and roadway system in the project area. Many of the wood structural elements are decaying. The bridges safe load-bearing capacity has already been reduced due to the decay. Although further maintenance activities will slow the decay, eventually the bridge will have to be closed.

D. Preferred Alternative

Alternative 1, replacing the existing bridge in its existing location, while using an off-site detour to maintain traffic during construction, is the preferred alternative. **Alternative 1** was selected because it has the least natural resources impacts and is the least costly to construct.

IV. ESTIMATED COSTS

Construction and right-of-way cost estimates for the alternatives studied are presented below in **Table 1**.

Table 1: Estimated Costs

	Preferred		
Items	**Alternative 1**	**Alternative 2**	**Alternative 3**
Structure Removal	$27,838	$27,838	$27,838
Structure	$292,500	$292,500	$292,500
Roadway Approaches	$362,925	$362,925	$362,925
Detour Structure & Approaches	$0	$651,800	$609,800
Miscellaneous and Mobilization	$307,737	$600,937	$581,937
Engineering and Contingencies	$159,000	$314,000	$325,000
Right-of-way/Utilities/Relocations	$45,000	$63,500	$67,500
Total	**$1,195,000**	**$2,313,500**	**$2,267,500**

There are no relocations for all alternatives. The estimated cost of the project, as shown in the 2002-2008 Transportation Improvement Program, is $785,000, including $60,000 for right-of-way and $600,000 for construction. Right-of-way acquisition is scheduled for Federal Fiscal Year 2002, with construction to follow in Federal Fiscal Year 2003.

V. NATURAL RESOURCES

An evaluation of natural resources in the immediate area of potential project impact was performed. The evaluation included 1) an assessment of biological features along the alignment including descriptions of vegetation, wildlife, protected species, wetlands, and water quality issues; 2) an evaluation of probable impacts resulting from construction; and 3) a preliminary determination of permit needs and conceptual mitigation options. The information included in this report was taken from the Natural Resources Technical Report, which is on file in the Project Development and Environmental Analysis Branch.

A. Methodology

Published information and resources were collected prior to the field investigation. Information sources used to prepare this report include the following:

- United States Geological Survey (USGS) quadrangle map (Lake Wheeler, 1987)
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Map (Lake Wheeler, 1987)
- NCDOT aerial photograph of project area (1:1200)
- Soil Survey of Wake County (Natural Resources Conservation Service [NRCS] 1970)
- North Carolina Department of Environment and Natural Resources (NCDENR) basin-wide assessment information (NCDENR, 1996)
- USFWS list of protected and candidate species.
- North Carolina Natural Heritage Program (NHP) files of rare species and unique habitats

Water resource information was obtained from publications posted on the World Wide Web by NCDENR Division of Water Quality (DWQ). Information concerning the occurrence of federally protected species in the study area was obtained from the USFWS list of protected and candidate species (March 2002), posted on the World Wide Web by the Ecological Services branch of the USFWS office in North Carolina. Information concerning species under state protection was obtained from the NHP database of rare species and unique habitats. NHP files were reviewed for documented sightings of species on state or federal lists and locations of significant natural areas.

A general field survey was conducted along the proposed project route by Earth Tech biologists on November 11, 2000. Water resources were identified and their physical characteristics were recorded. For the purposes of this study, a brief habitat assessment was performed within the project area of Middle Creek. Plant communities and their associated wildlife were identified using a variety of observation techniques, including active searching, visual observations, and

identifying characteristic signs of wildlife (sounds, tracks, scats, and burrows). Terrestrial community classifications generally follow Schafale and Weakley (1990) where appropriate and plant taxonomy follows Radford *et al.* (1968). Vertebrate taxonomy follows Potter *et al.* (1980), Martof *et al.* (1980), and Webster *et al. (*1985). Vegetative communities were mapped using aerial photography of the project site. Predictions regarding wildlife community composition involved general qualitative habitat assessment based on existing vegetative communities.

Jurisdictional wetlands, if present, were delineated and evaluated based on criteria established in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (USACE, 1987). Wetlands were classified based on Cowardin *et al.* (1979).

For the purposes of this report, the following terms are used for describing the limits of natural resources investigations. "Study corridor" and "project area" denote an area with a width of 80 to 100 feet (24.4 to 30.5 m) along the full length of the project alignment. The "project vicinity" is an area extending 1 mile (1.6 km) on all sides of the project area, and "project region" is an area equivalent in size to the area represented by a 7.5-minute USGS quadrangle map (about 61.8 sq miles or 163.3 sq km). When referring to stream banks, "left bank" and "right bank" are relative to an observer facing downstream.

B. Physiography and Soils

Soil and water resources that occur in the project area are discussed with respect to possible environmental concerns.

The project area lies in the central portion of North Carolina within the Piedmont physiographic province. Elevations in the project area are approximately 265 feet (80.3 m) above mean sea level (National Geodetic Vertical Datum, 1929). The topography of the project vicinity is hilly with moderately steep slopes rising from the floodplain of a medium size stream.

The proposed project is in a rural-to-urban transition area in Wake County on Johnson Pond Road (SR 1404) between Optimist Farm Road (SR 1390) and Hilltop/Needmore Road (SR 1393). Wake County's major economic resources are business, education, and industry. The population of Wake County in 1999 was 592,218 (North Carolina Office of State Budget, Planning and Management 1999).

Information about soils in the project area was taken from the *Soil Survey of Wake County, North Carolina* (NCRC, 1970). The map unit in the project area is Chewacla loam.

- **Chewacla loams, 0 to 2 percent,** are formed by alluvial deposits of fine material and are mapped along the banks of Middle Creek within the project area. This soil type is found in nearly level, frequently but briefly flooded areas, and is somewhat poorly drained. The seasonally high water table is 1.5 feet (0.45 m). Chewacla soils are classified as a hydric soil by the NRCS.

Site index is a measure of soil quality and productivity. The index is the average height, in feet, that dominant and co-dominant trees of a given species attain in a specified number of years (typically 50). The site index applies to fully-stocked, even-aged, unmanaged stands. The Chewacla soils have a site index of 100 for tulip poplar (*Liriodendron tulipifera*), 97 for sweetgum (*Liquidambar styraciflua*), 96 for loblolly pine (*Pinus taeda*), and 86 for water oak (*Quercus nigra).*

C. Water Resources

This section contains information concerning water resources likely to be impacted by the proposed project. Water resources assessments include the physical characteristics likely to be impacted by the proposed project (determined by field survey), best usage classifications, and water quality aspects of the water resources. Probable impacts to surface waters are also discussed, as well as means to minimize impacts.

1. Waters Impacted

The project is located in the Neuse River basin (NEU034 sub-basin). Middle Creek originates about 12.4 miles (19.9 km) northwest of the project area. From the project area, the stream meanders in an east-southeasterly direction about 45 miles (72.4 km) to its confluence with the Neuse River.

Middle Creek is approximately 35 feet (10.7 m) wide in the study area. Upstream of Bridge No. 317, Middle Creek flows to the southeast, running perpendicular to SR 1404. The substrate of Middle Creek at this point consists of sand, silt and some gravel over silty clay. The stream had moderate flow and the water was clear the day of the site visit. Water depth ranged from about 1 to 3 feet (0.3 to 0.9 m). The banks are nearly vertical to a height of 2 to 5 feet (0.6 to 1.5 m).

The creek is about 5 to 15 percent shaded by scattered shrubs near the road right-of-way and becomes 90 to 100 percent shaded by trees and shrubs at 50 feet away from NCDOT right-of-way. The banks are covered almost completely by multiflora rose.

2. Water Resource Characteristics

Surface waters in North Carolina are assigned a classification by the DWQ that is designed to maintain, protect, and enhance water quality within the state.

Middle Creek [Index # 27-43-15-(4)] is classified as a *Class C NSW* water body (NCDENR, 1999) in the vicinity of the project area. *Class C* water resources are waters protected for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner. There are no restrictions on watershed development activities. The supplemental *NSW* classification refers to nutrient sensitive waters. This supplemental classification is intended for waters needing additional nutrient management because of excessive growth of microscopic or macroscopic vegetation. In general, management strategies for point and non-point source pollution control require no increase in nutrients over background levels.

3. Anticipated Impacts to Water Resources

a) General Impacts

No waters classified as High Quality Water (HQW), Water Supplies (WS-I or WS-II) or Outstanding Resource Waters (ORW) occur with 1 mile (1.6 km) of the project study area.

This section describes the quality of the water resources within the project area. Potential impacts to water quality from point and non-point sources are evaluated. Water quality assessments are based upon published resource information and field study observations.

The project area is in a forested, moderately developed watershed. No disturbances to the landscape were observed in the immediate vicinity, and the area is largely unsuitable for most agricultural, residential, or industrial uses. However, the project vicinity is heavily developed. Potential threats to stream quality are residential development and increased nutrients, and silts and sediment in runoff.

Basin-wide water quality assessments are conducted by the Environmental Sciences Branch, Water Quality Section of the DWQ. The program has established monitoring stations for sampling selected benthic macroinvertebrates, which are known to have varying levels of tolerance to water pollution. An index of water quality can be derived from the number of taxa present and the ratio of tolerant to intolerant taxa. Streams can then be given a bioclassification ranging from Poor to Excellent.

There are ten monitoring stations on Middle Creek. Information for each station can be found below in **Table 2**.

Table 2: DWQ Monitoring Stations on Middle Creek

Monitoring Station	Distance from Project Area in Miles (km)	Date Sampled	Bioclassification
Upper tributary, above Lufkin	9 (15) upstream	02/87	Poor
Upper tributary, below Lufkin	8 (13) upstream	02/87	Poor
Basal Creek, near NC55	4 (6) upstream	05/86	Good-Fair
SR 1301	2.5 (4) upstream	05/86	Fair
Near Tallicud Rd.	1 (2) upstream	05/86	Fair
SR 1375	1 (2) downstream	08/95 07/91 05/86	Good-Fair Good-Fair Fair
Off SR 2752 near airport	2.5 (4) downstream	06/86	Good-Fair
SR 2739	5 (8) downstream	06/86	Fair
SR 1507	8 (13) downstream	06/86	Fair
NC 50	11 (18) downstream	08/95 07/91 07/90 07/87 07/87	Good-Fair Good-Fair Good-Fair Fair Good-Fair

Point source discharges in North Carolina are permitted through the National Pollutant Discharge Elimination System (NPDES) program administered by the DWQ. Municipal, industrial, and other facilities that discharge directly into surface waters must obtain a permit. Homes that use a municipal wastewater system or a septic system, and do not discharge to surface waters do not require a permit under the program. There are eleven permits issued to discharge in Middle Creek as of February 2001 (NCDENR 2001). Information about these permits can be found below in **Table 3**.

Table 3: NPDES Permits for Discharge into Middle Creek

Permit Number	Facility	Permit Type	Distance from Project Area in Miles (km)
NC0022217	Star Enterprise Sales Terminal	Minor Non-Municipal	10.5 (17.01) upstream
NC0035181	NC Center for Mature Adults	Minor Non-Municipal	1 (1.62) downstream
NC0061638	Utilities, Incorporated	Minor Non-Municipal	0.5 (0.81) downstream
NC0062715	Heater Util./Crooked Creek	Minor Non-Municipal	Within project area
NC0062740	Heater Util./Briarwood Farms	Minor Non-Municipal	8 (12.96) upstream
NC0064050	Apex (Town) Middle Creek WWTP	Major Municipal	11.5 (18.63) upstream
NC0065102	Cary (Town) South WWTP	Major Municipal	1.5 (2.43) upstream
NC0066150	Brookfield Prop-Brighton	Minor Non-Municipal	1 (1.62) downstream
NC0073679	Heater Util./Oak Hollow WTP	Minor Non-Municipal	5.5 (8.91) downstream
NC0082996	Heater Util./Hollybrook WTP	Minor Non-Municipal	8 (12.96) upstream
NC0084654	Motiva Enterprises-Apex Terminal	Minor Non-Municipal	10.5 (17.01) upstream

Any action that affects water quality can adversely affect aquatic organisms. Temporary impacts during the construction phases may result in long-term

impacts to the aquatic community. In general, replacing an existing structure in the same location with an off-site detour is the preferred environmental approach. Bridge replacement at a new location results in more severe impacts, and physical impacts are incurred at the point of bridge replacement.

Project construction may result in the following impacts to surface water resources:

- Increased sediment loading and siltation as a consequence of watershed vegetation removal, erosion, and/or construction.
- Decreased light penetration/water clarity from increased sedimentation.
- Changes in water temperature with vegetation removal.
- Changes in the amount of available organic matter with vegetation removal.
- Increased concentration of toxic compounds from highway runoff, construction activities and construction equipment, and spills from construction equipment.
- Alteration of water levels and flows as a result of interruptions and/or additions to surface and groundwater flow from construction.

Construction impacts may not be restricted to the communities in which the construction activity occurs, but may also affect downstream communities. Efforts will be made to ensure that no sediment leaves the construction site. NCDOT's Best Management Practices for the Protection of Surface Waters will be implemented, as applicable, during the construction phase of the project to ensure that no sediment leaves the construction site.

b) Impacts Related to Bridge Demolition and Removal

Demolition and removal of a highway bridge over Waters of the United States requires a permit from the U.S. Army Corps of Engineers if dropping components of the bridge into the water is the only practical means of demolition. Effective 9/20/99, this permit is included with the permit for bridge reconstruction. The permit application henceforth will require disclosure of demolition methods and potential impacts to the body of water in the planning document for the bridge reconstruction.

Section 402-2 "Removal of Existing Structures" of NCDOT's Standard Specifications for Roads and Structures stipulates that "excavated materials shall not be deposited....in rivers, streams, or impoundments," and "the dropping of parts or components of structures into any body of water will not be permitted unless there is no other practical method of removal. The removal from the water of any part or component of a structure shall be done so as to keep any resulting siltation to a minimum." To meet these specifications, NCDOT shall adhere to Best Management Practices for the Protection of Surface Waters, as

supplemented with Best Management Practices for Bridge Demolition and Removal.

In addition, all in-stream work shall be classified into one of three categories as follows:

> **Case 1)** In-water work is limited to an absolute minimum, due to the presence of special resource waters or threatened and/or endangered species, except for the removal of the portion of the sub-structure below the water. The work is carefully coordinated with the responsible agency to protect the Special Resource Water or T&E species.
>
> **Case 2)** No work at all in the water during moratorium periods associated with fish migration, spawning, and larval recruitment into nursery areas.
>
> **Case 3)** No special restrictions other than those outlined in Best Management Practices for Protection of Surface Waters.

Middle Creek contains populations of Dwarf Wedge Mussel and has important spawning grounds for certain anadromous fishes (shad, herring). Therefore, Case 1 applies to the proposed replacement of Bridge No. 317 over Middle Creek.

The superstructure consists of reinforced concrete, timber joints, timber caps, and timber piles. The substructure consists of timber caps and timber piles. One reinforced concrete abutment and one pier are in the water. The maximum potential fill is 68.5 cubic yards (52.3 cubic meters).

The stream bed in the project area is nearly all sand and silt. Therefore, conditions in the stream raise sediment concerns and a turbidity curtain is recommended.

D. Biotic Resources

Terrestrial and aquatic communities are included in the description of biotic resources. Living systems described in the following sections include communities of associated plants and animals. These descriptions refer to the dominant flora and fauna in each community and the relationships of these biotic components. Descriptions of the terrestrial systems are presented in the context of plant community classifications. These classifications follow Schafale and Weakley (1990) where possible. They are also cross-referenced to *The Nature Conservancy International Classification of Ecological Communities: Terrestrial Vegetation of the Southeastern United States* (Weakley *et al.,* 1998), which has recently been adopted as the standard land cover classification by the Federal Geographic Data Committee. Representative animal species that are likely to occur in these habitats (based on published range distributions) are also cited.

Scientific nomenclature and common names (when applicable) are used for the plant and animal species described. Subsequent references to the same species are by the common name only.

1. Terrestrial Communities

Three terrestrial communities were identified within the project area: a maintained roadside community, floodplain forest, and a bottomland forest. Dominant faunal components associated with these terrestrial areas will be discussed in each community description. Many species are adapted to the entire range of habitats found along the project alignment, but may not be mentioned separately in each community description.

a) Maintained Roadside Community

This community covers the area along the road shoulders in the project area. Species include Bermuda grass (*Cynodon dactylon*), grasses (*Panicum* sp.), rushes (*Juncus* sp.), sedges (*Carex* sp.), plantain (*Plantago* sp.), and dandelion (*Taraxacum officinale*).

The animal species present in these disturbed habitats are opportunistic and capable of surviving on a variety of resources, ranging from vegetation to both living and dead faunal components. European starling (*Sturnus vulgaris*), and American robin (*Turdus migratorius*) are common birds that use these habitats. The area may also be used by the Virginia opossum (*Didelphis virginiana*), various species of mice (*Peromyscus* sp.), and Eastern garter snake (*Thamnophis sirtalis*).

b) Floodplain Forest

This community occurs along the left bank of Middle Creek and extends beyond the end of the project area. Numerous narrow slough-like features crisscross this wetland. There was no flowing water in these sloughs although some pools of water were present. Canopy species in this community include river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica*), and red maple (*Acer rubrum*). Canopy height is about 50 feet (15 m). Other species found are winterberry (*Ilex verticillata*), privet (*Ligustrum sinense*), sweetgum, poison ivy (*Toxicodendron radicans*), Virginia bugleweed (*Lycopus virginicus*), false nettle (*Boehmeria cylindrica*), rushes and sedges.

This community probably represents an example of a Piedmont/Mountain Levee Forest as described by Schafale and Weakley (1990). Although it lack the presence of sycamore, the TNC classification is most likely I.B.2.N.d.5 *Betula nigra* – (*Platanus occidentalis*) - Temporarily Flooded Forest Alliance.

Animals that may be expected here are the eastern towhee (*Pipilo erythrophthalmus*), Carolina wren (*Thryothorus ludovicianus*), downy woodpecker (*Picoides pubescens*), raccoon (*Procyon lotor*), pickeral frog (*Rana palustris*), spring peeper (*Hyla crucifer*), three-lined salamander (*Eurcycea guttolineata*), eastern kingsnake (*Lampropeltis getulus*), northern water snake (*Nerodia sipedon*), and yellowbelly slider (*Chrysemys scripta*).

c) Bottomland Forest

This community occurs on the floodplain south of Middle Creek. Canopy species include swamp chestnut oak (*Quercus michauxii*), water oak (*Quercus nigra*), sweetgum, red maple and a few scattered loblolly pines. The understory includes American holly (*Ilex opaca*), ironwood (*Carpinus caroliniana*) and arrow-wood (*Viburnum dentatum*). This mature forest has a canopy height of 80 to 90 feet (24.4 to 27.4 m). Although the species do not appear to change, at the southern end of the project area portions of this community become jurisdictional wetlands.

This community probably represents an example of a Piedmont/Mountain Bottomland Forest as described by Schafale and Weakley (1990). The equivalent TNC classification is most likely I.B.2.N.d.16 *Quercus* (*michauxii, pagoda, shumardii*) – *Liquidambar sytraciflua* - Temporarily Flooded Forest Alliance.

Tufted titmouse (*Parus bicolor*), Carolina chickadee (*Parus carolinensis*), red-bellied woodpecker (*Melanerpes carolinus*), northern flicker (*Colaptes auratus*), and ruby-crowned kinglet (*Regulus calendula*) may be expected here. Other inhabitants may include white-tailed deer (*Odocoileus virginianus*), gray squirrel (*Sciurus carolinensis*), striped skunk (*Mephitis mephitis*), southern two-lined salamander (*Eurycea bislineata*), bullfrog (*Rana catesbeiana*) leopard frog (*Rana pipiens*), northern water snake, eastern box turtle (*Terrapene carolina*), and black racer (*Coluber constrictor*).

2. Wildlife

Wildlife in the project area is described with its respective community above.

3. Aquatic Communities

Within the project area, Middle Creek is a mid-gradient, third-order stream. The bed material consists mostly of sand and silt, with a small percentage of gravel. On the day of the site visit, the water was clear with no suspended sediment. The riparian community is mostly deciduous trees and mixed evergreen-deciduous shrubs, and is described in Section V.D.1.b and Section V.D.1.c.

Middle Creek has been identified by North Carolina Wildlife Resources Commission Fisheries Biologists as an important spawning area for some anadramous fishes such as shad and herring. According to a communication from, District 3 Fisheries Biologist, Middle Creek contains populations of Dwarf Wedge Mussel (*Alasmidonta heterodon)*, which are Federally listed as "endangered". A mussel survey conducted by biologist with NCDOT Project Development and Environmental Analysis Branch identified a number of state-listed mussels in Middle Creek.

4. Anticipated Impacts to Biotic Communities

Project construction will have various impacts to the previously described terrestrial and aquatic communities. Any construction activities in or near these resources have the potential to impact biological functions. This section quantifies and qualifies potential impacts to the natural communities within the project area in terms of the area impacted and the plants and animals affected. Temporary and permanent impacts are considered here along with recommendations to minimize or eliminate impacts.

a) Terrestrial Communities

Terrestrial communities in the project area will be impacted permanently by project construction from clearing and paving. Estimated impacts are based on the length of the alternative and the entire study corridor width. The bridge replacement portion of the Alternatives is 90 feet (27.45 m) wide and 800 feet (244 m) long. The onsite detour for Alternative 2 is 80 feet (24.4m) wide and 1473.7 feet (449.5 m) long. The onsite detour for Alternative 3 is 80 feet (24.4 m) wide and 1467.4 feet (447.6 m) long. **Table 4** describes the potential impacts to terrestrial communities by habitat type. Because impacts are based on the entire study corridor width, the actual loss of habitat will likely be less than the estimate.

Table 4: Estimated Area of Impact to Terrestrial Communities

	Area of Impact in Acres (Hectares)				
	Alternative 1 (Preferred)	Alternative 2		Alternative 3	
Community	**Permanent**	**Permanent**	**Temporary**	**Permanent**	**Temporary**
Maintained Roadside	0.63 (0.26)	0.63 (0.26)	0.34 (0.14)	0.63 (0.26)	0.55 (0.22)
Floodplain Forest	0.35 (0.14)	0.35 (0.14)	0.94 (0.38)	0.35 (0.14)	0.84 (0.34)
Bottomland Forest	0.18 (0.07)	0.18 (0.07)	0.70 (0.28)	0.18 (0.07)	0.67 (0.27)
Total Impact	**1.16 (0.47)**	**1.16 (0.47)**	**1.98 (0.80)**	**1.16 (0.47)**	**2.06 (0.83)**

Destruction of natural communities along the project alignment will result in the loss of foraging and breeding habitats for the various animal species that utilize the area. Animal species will be displaced into surrounding communities. Adult

birds, mammals, and some reptiles are mobile enough to avoid mortality during construction. Young animals and less mobile species, such as many amphibians, may suffer direct loss during construction. The plants and animals that are found in the upland communities are generally common throughout eastern Piedmont North Carolina.

Impacts to terrestrial communities, particularly in locations having steep to moderate slopes, can result in the aquatic community receiving heavy sediment loads as a consequence of erosion. Construction impacts may not be restricted to the communities in which the construction activity occurs, but may also affect downstream communities. Efforts should be made to ensure that no sediment leaves the construction site.

b) Wetland Communities

Wetlands occur within the project area and will be impacted by project construction. Wetlands are present north of the bridge on both sides of Johnson Pond Road, and in the southern portion of the project area. The channel ranges from 35 to 40 feet (10.7 to 12.2 m) wide within the project area.

c) Aquatic Communities

Impacts to aquatic communities include fluctuations in water temperatures as a result of the loss of riparian vegetation. Shelter and food resources, both in the aquatic and terrestrial portions of these organisms' life cycles, will be affected by losses in the terrestrial communities. The loss of aquatic plants and animals will affect terrestrial fauna which rely on them as a food source.

Temporary and permanent impacts to aquatic organisms may result from increased sedimentation. Aquatic invertebrates may drift downstream during construction and recolonize the disturbed area once it has been stabilized. Sediments have the potential to affect fish and other aquatic life in several ways, including the clogging and abrading of gills and other respiratory surfaces, affecting the habitat by scouring and filling of pools and riffles, altering water chemistry, and smothering different life stages. Increased sedimentation may cause decreased light penetration through an increase in turbidity.

Wet concrete should not come into contact with surface water during bridge construction. Potential adverse effects can be minimized through the implementation of NCDOT *Best Management Practices for Protection of Surface Waters*. Additional provisions will be adhered to as described in Section V.F.1 to prevent adverse affects to aquatic federally endangered species.

E. Jurisdictional Topics

This section provides inventories and impact analyses for two federal and state regulatory issues: "Waters of the United States." and rare and protected species.

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

Wetlands and surface waters fall under the broad category of "Waters of the United States" as defined in 33 CFR § 328.3 and in accordance with provisions of Section 404 of the Clean Water Act (33 U.S.C. 1344). These waters are regulated by the U.S. Army Corps of Engineers (USACE). Any action that proposes to dredge or place fill material into surface waters or wetlands falls under these provisions.

Jurisdictional wetlands occur within the project area and will be impacted by project construction. Wetlands are present north of the bridge on both sides of Johnson Pond Road, and in the southern portion of the project area. Middle Creek meets the definition of surface waters, and is therefore classified as Waters of the United States. The channel ranges from 35 to 40 feet (10.7 to 12.2 m) wide within the project area.

Project construction cannot be accomplished without infringing on jurisdictional Waters of the US. Anticipated impacts fall under the jurisdiction of the USACE and the DWQ. Within the project area, Middle Creek is 40 feet (12.2 m) wide. Assuming a study corridor of 90 feet (27.45 m) for each alternative, the construction of the new bridge will impact 90 linear feet (27.45 m) of stream, and a total area of 3,600 sq. feet (753.59 sq m) of surface waters. A bottomland wetland was identified within the project area. Bridge replacement would permanently impact 0.34 acres (0.14 ha) of the wetland community. Alternative 2 detour would temporarily impact 1.19 acres (0.48 ha) of the wetland community and Alternative 3 detour would temporarily impact 0.92 acres (0.37 ha).

2. Permits

Impacts to jurisdictional surface waters are anticipated from the proposed project. Permits and certifications from various state and federal agencies may be required prior to construction activities.

a) Nationwide Permit No. 23

Construction is likely to be authorized by Nationwide Permit (NWP) No. 23, as promulgated under March 9, 2000 Part VIII, Volume 65, Number 47, Pages 12817 - 12899. This permit authorizes activities undertaken, assisted, authorized, regulated, funded, or financed in whole or in part, by another Federal agency or department where that agency or department has determined that,

pursuant to the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act:

- the activity, work, or discharge 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 human environment; and

- the Office of the Chief Engineer has been furnished notice of the agency's or department's application for the categorical exclusion and concurs with that determination.

b) Section 401 Water Quality Certification

This project will also require a 401 Water Quality Certification or waiver thereof, from the Department of Environment and Natural Resources (DENR) prior to issuance of the NWP 23. Section 401 of the Clean Water Act requires that the state issue or deny water quality certification for any federally permitted or licensed activity that results in a discharge into Waters of the U.S. Final permit decision rests with the USACE.

c) Neuse River Basin: Nutrient Sensitive Water Management Strategy

Pursuant to 15 NCAC 2B.0233, Riparian Area Rules for Nutrient Sensitive Waters apply. The rules state that roads, bridges, stormwater management facilities, ponds, and utilities may be allowed within the 50-foot riparian buffer area of subject streams where no practical alternative exists. They also state that these structures shall be located, designed, constructed, and maintained to have minimal disturbance, to provide maximum erosion protection, to have the least adverse effects on aquatic life and habitat, and to protect water quality to the maximum extent practical through the use of best management practices. Every reasonable effort will be made to avoid and minimize wetland and stream impacts.

Estimated impacts to the riparian buffers are quantified below in **Table 5.** Impacts to Zone 1 are based on a buffer width of 30 feet measured landward from the top of bank or rooted vegetation. Impacts to Zone 2 are based on a buffer width of 20 feet measured landward from the outer edge of Zone 1. The Authorization Certificate for Neuse Buffer Impacts will be requested along with the 401 Water Quality Certification.

Table 5: Estimated Impacts to Riparian Buffers for Middle Creek

	Zone 1	Zone 2	Total
	acres (ha)	acres (ha)	acres (ha)
Alternative 1	0.095 (0.15)	0.011 (0.02)	0.106 (0.17)
Alternative 2	0.095 (0.15)	0.011 (0.02)	0.106 (0.17)
Alternative 3	0.095 (0.15)	0.011 (0.02)	0.106 (0.17)
Detour Portion of Alternative 2	0.075 (0.12)	0.014 (0.02)	0.089 (0.14)
Detour Portion of Alternative 3	0.078 (0.13)	0.017 (0.03)	0.095 (0.15)

3. Mitigation

Because this project will likely be authorized under a Nationwide Permit, mitigation for impacts to surface waters may or may not be required by the USACE. In accordance with the Division of Water Quality Wetland Rules [15A NCAC 211 .0506 (h)] "Fill or alteration of more than one acre of wetlands will require compensatory mitigation; and fill or alteration of more than 150 linear feet of streams may require compensatory mitigation." Because wetland impacts will be less than an acre, wetland mitigation likely will not be required. A total of 90 linear feet (27.5 m) of Middle Creek are located within the study corridor for the proposed project. If the final length of stream impact is greater than 150 linear feet (45.6 m), compensatory mitigation may be required.

F. Rare and Protected Species

Some populations of plants and animals are declining either as a result of natural forces or their difficulty competing with humans for resources. Rare and protected species listed for Wake County, and any likely impacts to these species as a result of the proposed project construction, are discussed in the following sections.

1. Federally Protected Species

Plants and animals with a federal classification of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended.

The USFWS lists four species under federal protection for Wake County as of March 2002. These species are listed in **Table 6**.

Table 6: Species Under Federal Protection for Wake County

Common Name	Scientific Name	Federal Status
Vertebrates		
Bald eagle	*Haliaeetus leucocephalus*	Threatened (proposed for delisting)
Red-cockaded woodpecker	*Picoides borealis*	Endangered
Invertebrates		
Dwarf wedge mussel	*Alasmidonta heterodon*	Endangered
Vascular Plants		
Michaux's sumac	*Rhus michauxii*	Endangered
Notes: E	Endangered-A species that is threatened with extinction throughout all or a significant portion of its range.	
T	Threatened-A species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.	

A brief description of the characteristics and habitat requirements of each species follows, along with a conclusion regarding potential project impact.

***Haliaeetus leucocephalus* (bald eagle) Threatened (proposed for delisting)**

Family: *Accipitridae*
Federally Listed: 1967

A large raptor, the bald eagle has a wingspread of about 7 feet (2.12 m). Its plumage is mainly dark brown, and adults have a pure white head and tail. First year juveniles are often chocolate brown to blackish, sometimes with white mottling on the tail, belly, and underwings. The head and tail become increasingly white with age until full adult plumage is reached in the fifth or sixth year. An opportunistic predator, the bald eagle feeds primarily on fish but also takes a variety of birds, mammals, and turtles (both live and as carrion) when fish are not readily available.

The bald eagle is primarily riparian, associated with coasts, rivers, and lakes, usually nesting near bodies of water where it feeds. Selection of nesting sites varies tremendously depending on the species of trees growing in a particular area. In the Southeast, nests are constructed in dominant or codominant pines or cypress. Nests are usually constructed in living trees, but bald eagles will occasionally use dead ones.

Biological Conclusion: No Effect

No suitable nesting sites exist in the project area, and Middle Creek is not large enough in the project area to provide an adequate food source for bald eagles. A review of the NHP files did not reveal any records of bald eagles in the project vicinity. It can be determined that the project will not impact this threatened species.

***Picoides borealis* (red-cockaded woodpecker)** **Endangered**

Family: *Picidae*
Federally Listed: 1970

The red-cockaded woodpecker is 7 to 8 in (18 to 20 cm) long with a wing span of 13.8 to 15 in (35 to 38 cm). There are black and white horizontal stripes on its back, and its cheeks and underparts are white. Its flanks are black streaked. The cap and stripe on the side of the neck and the throat are black. The male has a small red spot on each side of the black cap. After the first post-fledgling molt, fledgling males have a red crown patch. This woodpecker's diet is composed mainly of insects, which include ants, beetles, wood-boring insects, caterpillars, and corn ear worms if available. About 16 to 18 percent of the diet includes seasonal wild fruit.

Open stands of pines with a minimum age of 80 to 120 years, depending on the site, provide suitable nesting habitat. Longleaf pines (*Pinus palustris*) are most commonly used, but other species of southern pine are also acceptable. Dense stands (stands that are primarily hardwood, or that have a dense hardwood understory) are avoided. Foraging habitat is provided in pine and pine hardwood stands 30 years old or older with foraging preference for pine trees 10 in (25.4 cm) or larger in diameter. In good, well-stocked, pine habitat, sufficient foraging substrate can be provided on 80 to 125 acres (29.2 to 45.6 hectares).

Biological Conclusion: **No Effect**

Within the project area no suitable red-cockaded woodpecker habitat exists. These birds are not associated with mixed hardwood riparian areas or human-dominated maintained habitats. A search of the NHP files did not reveal any records of red-cockaded woodpeckers in the project vicinity. It can be concluded that the project will not impact this endangered species.

***Alasmidonta heterodon* (dwarf wedge mussel)** **Endangered**

Family: *Unionidae*
Federally Listed: 1990

The dwarf wedge mussel is a small brown to yellowish brown mussel that rarely exceeds 1.5 inch (3.81 cm) in length. It is the only North American freshwater mussel that has two lateral teeth on the right valve, but only one on the left. The female's shell is inflated in the back where the marsupial gills are located. Little is known about the species' life history and reproductive cycle. Gravid females have been observed from late August until June. Like other freshwater mussels, this species' eggs are fertilized in the female as sperm passes through its gills; the resulting larvae than attaches to a fish host. Although this host is still

unknown, strong evidence suggests that it is an anadromous fish which migrates from the ocean into freshwater to spawn.

The dwarf wedge mussel occurs along the Atlantic Coast from Canada south to North Carolina. There are a number of documented populations in North Carolina streams, including Middle Creek. The habitat is described as creek and river areas with a slow to moderate current and a substrate that consists of sand, gravel, or muddy bottom. These areas must be silt free.

Major factors contributing to the endangered status of the species include water quality and loss of habitat. The mussel needs slow to moderate currents and a silt-free environment. Construction of dams alters these conditions. Another significant factor is its anadromous fish host has been blocked for some habitat areas by impoundment and dams. Increased acidity, runoff of agricultural chemicals and fertilizers and the mussels sensitivity to potassium, zinc, copper, cadmium and other elements associated with industrial pollution also contribute.

Biological Conclusion: **Not Likely to Adversely Affect**

A search of the NHP files revealed a record of dwarf wedge mussel occurring within 1 mile downstream from the project area. At the site of the project, Middle Creek is somewhat degraded due to sediment. A mussel survey was conducted on October 11, 2000. No dwarf wedge mussels were found near the project site. Provided that the following provisions are adhered to, it can be concluded that project construction is "Not Likely to Adversely Affect" this species.

1. NCDOT shall conduct an in-stream survey just prior to the construction let date.

2. The NCDOT resident engineer shall be responsible for alerting the Project Development and Environmental Analysis Branch two months prior to the project being awarded so that they may plan the required in-steam survey.

3. There will be a moratorium on clearing and grubbing-no work between November 15 and April 1. Other phases of construction can take place during the moratorium as long as the environmentally sensitive areas have been stabilized.

4. Bridge deck drains shall be configured so that the run-off does not fall into the stream.

5. NCDOT resident engineer is responsible for providing a written invitation to the North Carolina Wildlife Resources Commission, Nongame and Protected Species Branch, and the US Fish and Wildlife Service for the pre-construction meeting prior to construction.

6. The erosion control plans for Protected Aquatic Species must be used. These plans include the following requirements:

   - Sediment and erosion controls must be in place prior to land clearing activities. No sediment from either bridge demolition or construction activities shall be allowed to enter the flowing stream.
   - "Environmentally Sensitive Areas" will be defined on the plans, which consist of a 50 ft. buffer zone on both sides of the stream.
   - The Contractor may perform clearing operation, but not grubbing operations in the "Environmentally Sensitive Areas", until immediately prior to beginning grading operations.
   - Once grading operations begin in "Environmentally Sensitive Areas", as specified on the plans, work will progress in a continuous manner until complete.
   - Seeding and mulching will be performed immediately following final grade establishment.
   - Stage seeding will be performed on cut and fill slopes as grading progresses.

***Rhus michauxii* (Michaux's sumac)** **Endangered**

Family: *Anacardiaceae*
Federally Listed: 1989

Michaux's sumac or false poison sumac is a densely hairy colonial shrub with erect stems, which are 1 to 3 feet (0.3-0.9 m) in height. The shrub's compound leaves are narrowly winged at their base, dull on their tops, and veiny and slightly hairy on their bottoms. Each leaf is finely toothed on its edges. Flowers are greenish-yellow to white and are 4 to 5 parted. Each plant is unisexual. With a male plant the flowers and fruits are solitary, with a female plant all flowers are grouped in 3 to 5 stalked clusters. The plant flowers from April to June; its fruit, a dull red drupe, is produced in October and November.

Michaux's sumac grows in sandy or rocky open woods in association with basic soils. Apparently, this plant survives best in areas where some form of disturbance has provided an open area. Most of the plant's remaining populations are on highway rights-of-way, roadsides, or on the edges of artificially maintained clearings. Other populations are in areas with periodic fires, or on sites undergoing natural succession. One population is situated in a natural opening on the rim of a Carolina bay. Currently, the plant survives in the following North Carolina Counties: Davie, Franklin, Hoke, Moore, Richmond, Robeson, Scotland and Wake.

Biological Conclusion: **No Effect**

No habitat exists in the project area for Michaux's sumac. The soils in the project area are all acidic. A search of the NHP database found no occurrences of Michaux's sumac in the project vicinity. It can be concluded that the project will not impact this threatened species.

2. Federal Species of Concern

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. **Table 7** includes FSC species listed for Wake County and their state classifications. Organisms which are listed as Endangered, Threatened, or Special Concern on the North Carolina Natural Heritage Program list of Rare Plant and Animal Species are afforded state protection under the State Endangered Species Act and the North Carolina Plant Protection and Conservation Act of 1979. However, the level of protection given to state-listed species does not apply to NCDOT activities.

Table 7: Federal Species of Concern in Wake County

Common Name	Scientific Name	State Status	Habitat present
Vertebrates			
Bachman's Sparrow *	*Aimophila aestivalis*	SC	NO
Carolina Darter	*Etheostoma collies lepidinion*	SC	YES
Pinewoods Shiner	*Lythrurus matutinus*	SR	YES
Southeastern Bat *	*Myotis austroriparius*	SC	NO
Southern Hognose Snake **	*Heterodon simus*	SR	NO
Invertebrates			
Atlantic Pigtoe	*Fusconaia masoni*	T	YES
Diana Fritillary **	*Speyeria diana*	SR	YES
Green Floater	*Lasmigona subviridis*	E	YES
Yellow Lance	*Elliptio lanceolata*	T	YES
Vascular Plants			
Bog Spicebush	*Lindera subcoriacea*	E	NO
Carolina Least Trillium *	*Trillium pusillum* var *pusillum*	E	NO
Sweet Pinesap *	*Monotropsis odorata*	C	NO

Sources: Amoroso, ed., 1999; LeGrand and Hall, eds., 1999
Key: T = Threatened, E = Endangered, SC = Special Concern, C = Candidate, SR = Significantly Rare
*=Historic record. The species was last observed in the county more than 50 years ago.
**=Obscure record. The date and/or location of observation is uncertain.

Bog spicebush does not appear on the March 2002 USFWS list of protected species for Wake County, however this species is listed by the NC NHP on their website (last updated July 2001) as a Federal Species of Concern. The Data Systems Manager of the NC NHP, stated on August 21, 2001 that the NC NHP has one record of bog spicebush from northern Wake County in 1997. For this reason the bog spicebush remains on **Table 7**.

No FSC species were observed during the site visit, however there is one recorded at NHP as occurring within 2 miles (3.2 km) of the project area. The NHP lists current records of Squawfoot (*Strophitus undulatus*) within the project area, and a recent stream survey of the site by a NCDOT biologist indicated the presence of squawfoot.

3. Summary of Anticipated Impacts

No impacts to federally protected species are anticipated if the provisions listed on page 20 and 21 for the dwarf wedge mussel are followed.

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, implemented by the Advisory council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR Part 800. Section 106 requires that if a federally funded, licensed, or permitted project has an effect on a property listed on or eligible for the National Register of Historic Places, the Advisory Council on Historic Preservation be given an opportunity to comment.

B. Historic Architecture

A field survey of the Area of Potential Effect (APE) was conducted in December 1999. All structures within the area were photographed, and later reviewed by the State Historic Preservation Office (SHPO). In a concurrence form dated February 17, 2000 and a memorandum dated November 7, 2000, the SHPO 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. Copies of the concurrence form and memorandum are included in the Appendix.

C. Archaeology

The State Historic Preservation Office, in a memorandum dated November 7, 2000 said they had reviewed the project and are aware of no properties of architectural, historic, or archaeological significance, which would be affected by the project. In addition, they have no comment on the project as currently proposed. A copy of the memorandum is included in the Appendix.

VII. ENVIRONMENTAL EFFECTS

Anticipated impacts to the resources in the project area are described in this section. The project is considered to be a Federal "Categorical Exclusion" because of its limited scope and insignificant environmental consequences. The project is expected to have an overall positive impact. Replacement of the structurally deficient bridge will result in safer traffic operations.

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

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.

No adverse effect on families or communities is anticipated. Right-of-way acquisition will be limited. There are no relocations.

There are no publicly owned parks, 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 U.S. Natural Resources Conservation Service. No prime or important farmlands will be impacted by the proposed project. In addition, the proposed project is anticipated to be limited to the existing right of way, and the land use adjacent to the project is residential.

This project is an air quality "neutral" project, so it is not required to be included in the regional emission analysis and a project level CO analysis is not required. This project is not anticipated to create any adverse effects on the air quality in this project area.

Traffic volumes will not increase or decrease because of this project; therefore there will not be substantial changes in noise and air quality due to this project.

Noise levels could increase during construction but will be temporary. If vegetation is disposed of by burning, all burning shall be done in accordance with applicable local laws and regulations of the North Carolina SIP for air quality in compliance with 15 NAACO 2D.0520. 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 available environmental records revealed neither underground storage tanks, hazardous waste sites, regulated or unregulated landfills, nor dump sites in the project area.

Wake County is a participant in the National Flood Insurance Program (NFIP). Flood Insurance Study maps for Wake County show that Bridge No. 317 is located in a Federal Emergency Management Administration (FEMA) 100-year floodplain. The 100-year floodplain is in the vicinity of the bridge. The flood profiles show that the 100-year flood overtops the bridge.

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

VIII. PUBLIC INVOVLEMENT

Because of the limited nature of impacts to area residents and businesses, there were no formal public involvement activities during this study.

IX. AREAS OF CONTROVERSY

There are no known areas of controversy on this project.

X. AGENCY COMMENTS

A. Federal

Natural Resources Conservation Service, October 30, 2000: Does not have any comments at this time.

B. State

State Historic Preservation Office, November 7, 2000: They are aware of no properties of architectural, historic, or archaeological significance, which would be affected by the project.

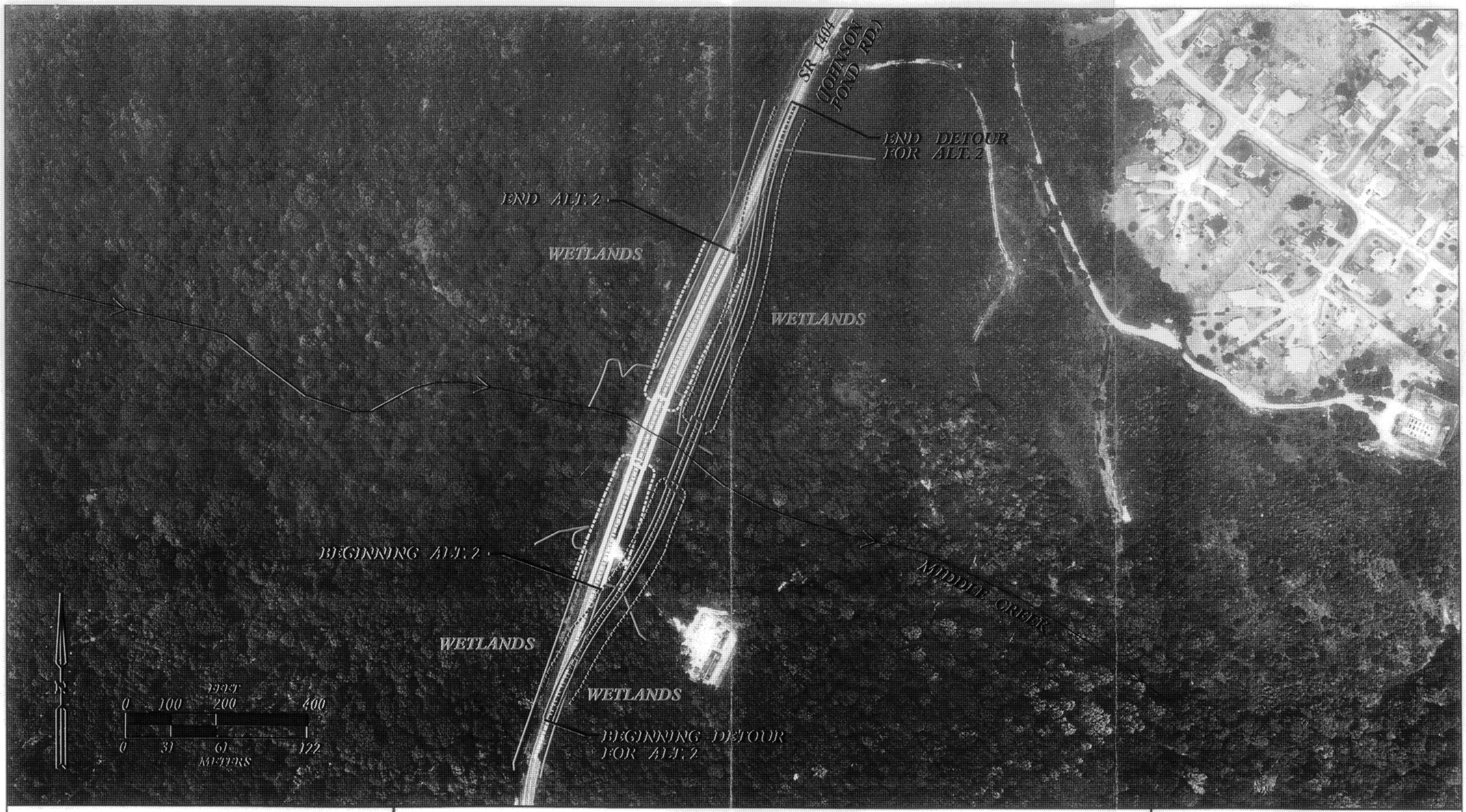
Wildlife Resource Commission, October 8, 2001: There are records of state listed mussels upstream of the project. Therefore, due to the potential for impacts to listed species, they request that NCDOT perform a mussel survey prior to the construction of this bridge.

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Branch

FUNCTIONAL DESIGN LEGEND

- Alt. 1, Centerline
- Alt. 1, Edge of Pavement
- Alt. 1, Construction Limits

FIGURE 2a
ALTERNATIVE 1
REPLACEMENT OF BRIDGE NO. 317
ON SR 1404 OVER
MIDDLE CREEK
WAKE COUNTY
TIP NO. B–3703

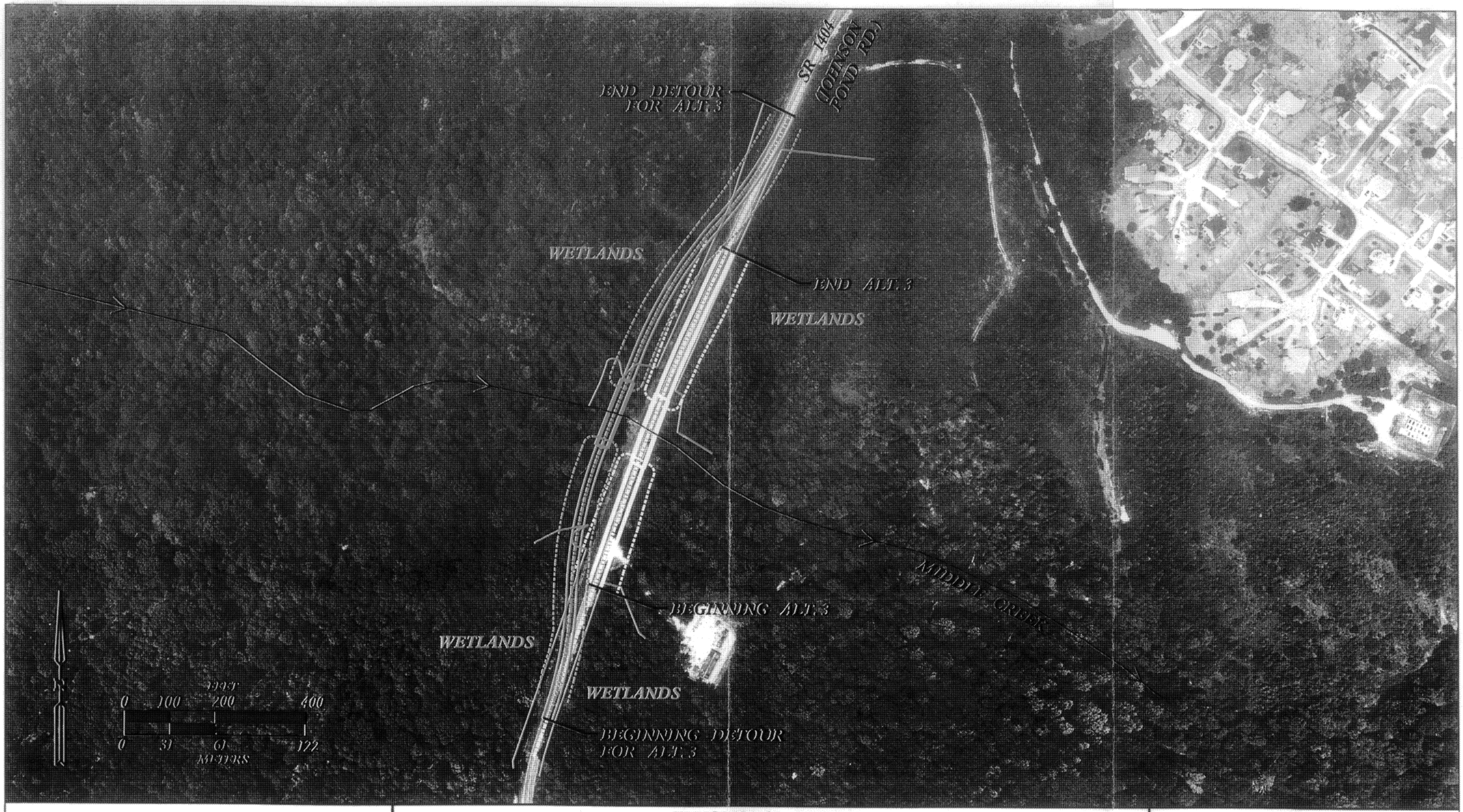


North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Branch

FUNCTIONAL DESIGN LEGEND

- Alt. 2, Centerline
- Alt. 2, Edge of Pavement
- Alt. 2, Construction Limits
- Detour for Alt. 2, Centerline
- Detour for Alt. 2, Edge of Pavement
- Detour for Alt. 2, Construction Limits

FIGURE 2b
ALTERNATIVE 2
REPLACEMENT OF BRIDGE NO. 317
ON SR 1404 OVER
MIDDLE CREEK
WAKE COUNTY
TIP NO. B-3703



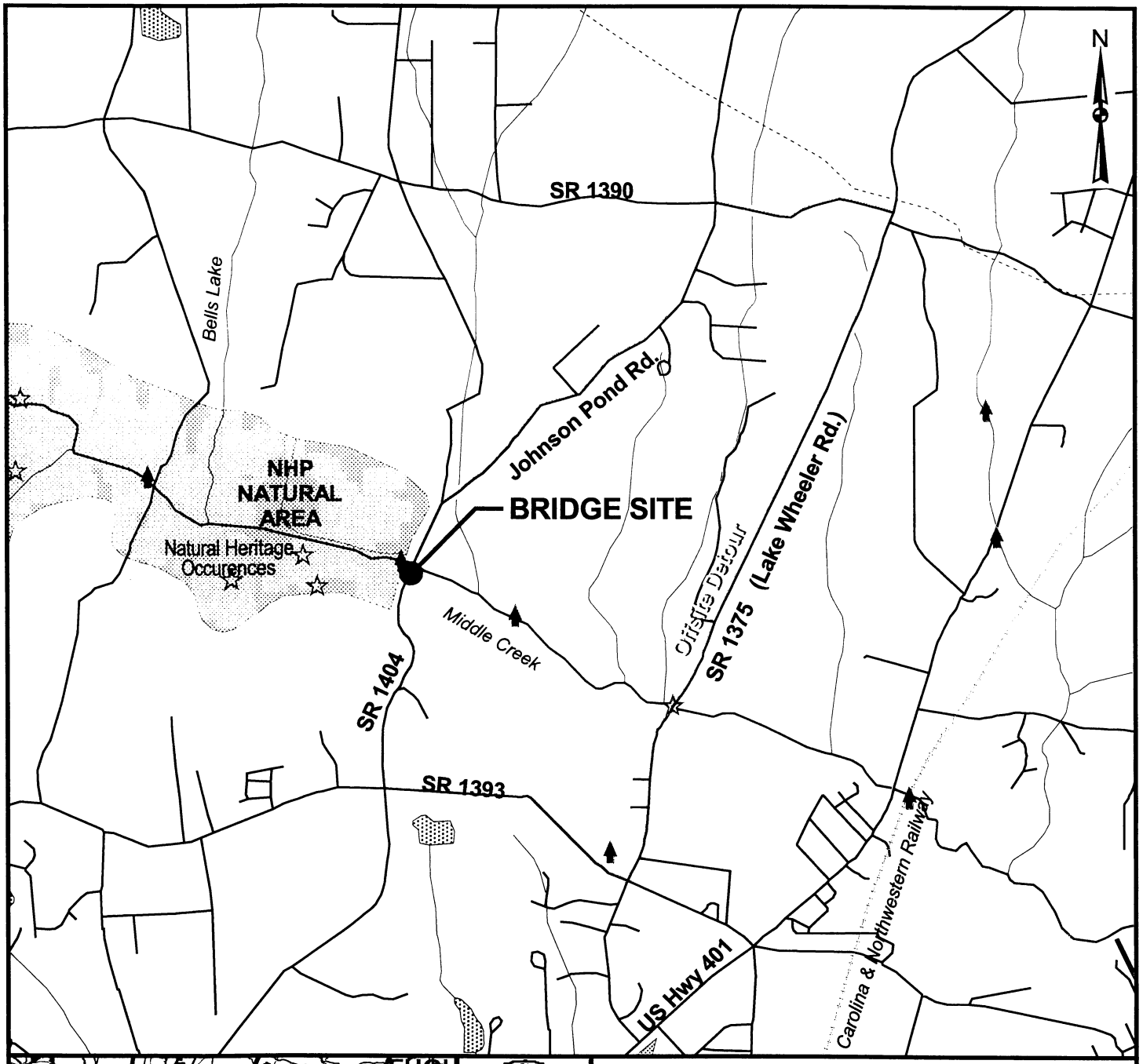
North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Branch

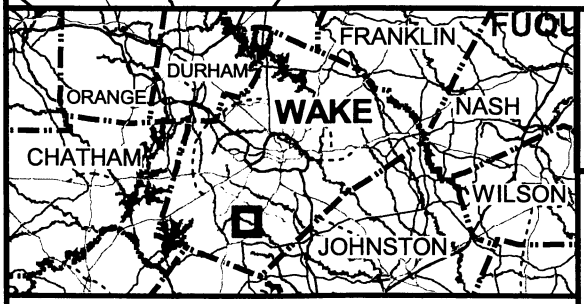
FUNCTIONAL DESIGN LEGEND

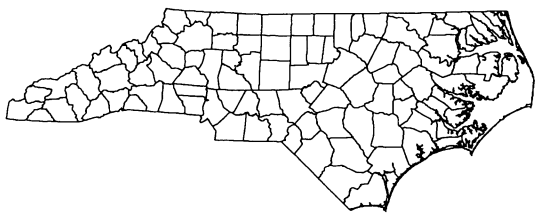
- Alt. 3, Centerline
- Alt. 3, Edge of Pavement
- Alt. 3, Construction Limits
- Detour for Alt. 3, Centerline
- Detour for Alt. 3, Edge of Pavement
- Detour for Alt. 3, Construction Limits

FIGURE 2c
ALTERNATIVE 3
REPLACEMENT OF BRIDGE NO. 317
ON SR 1404 OVER
MIDDLE CREEK
WAKE COUNTY
TIP NO. B-3703

Figures







North Carolina - Department of Transportation
Division of Highways
Project Development and Environmental Analysis Branch

FIGURE 1
VICINITY MAP

REPLACEMENT OF BRIDGE NUMBER 317
ON SR 1404 OVER MIDDLE CREEK
WAKE COUNTY
TIP NO. B-3703

0.5 0 0.5 1 Miles

Downstream side of the bridge.

Looking north at the bridge.

North Carolina – Department of Transportation

Division of Highways

Project Development and
Environmental Analysis Branch

FIGURE 4a

REPLACEMENT OF BRIDGE NUMBER 317
ON SR 1404 OVER MIDDLE CREEK
WAKE COUNTY
TIP NO. B-3703

Looking upstream from the bridge.

Looking downstream from the bridge.

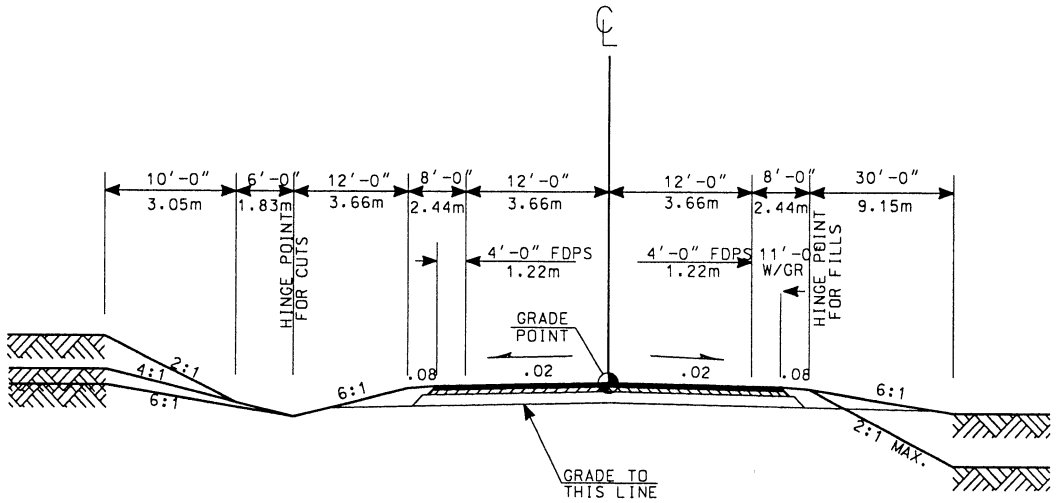
North Carolina – Department of Transportation

Division of Highways

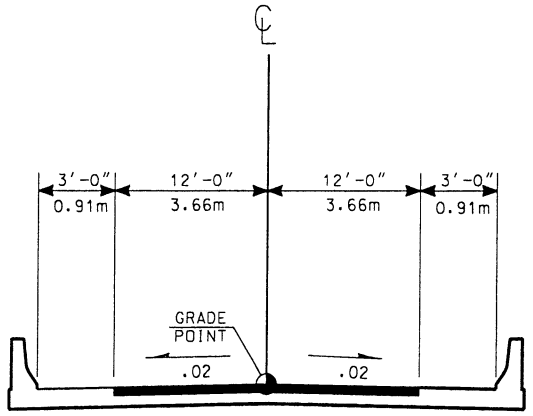
Project Development and
Environmental Analysis Branch

FIGURE 4b

REPLACEMENT OF BRIDGE NUMBER 317
ON SR 1404 OVER MIDDLE CREEK
WAKE COUNTY
TIP NO. B-3703



TYPICAL ROADWAY APPROACH SECTION



TYPICAL SECTION ON STRUCTURE

TRAFFIC DATA

ADT 1999	3700
ADT 2025	11500
DUAL	2%
TTST	1%

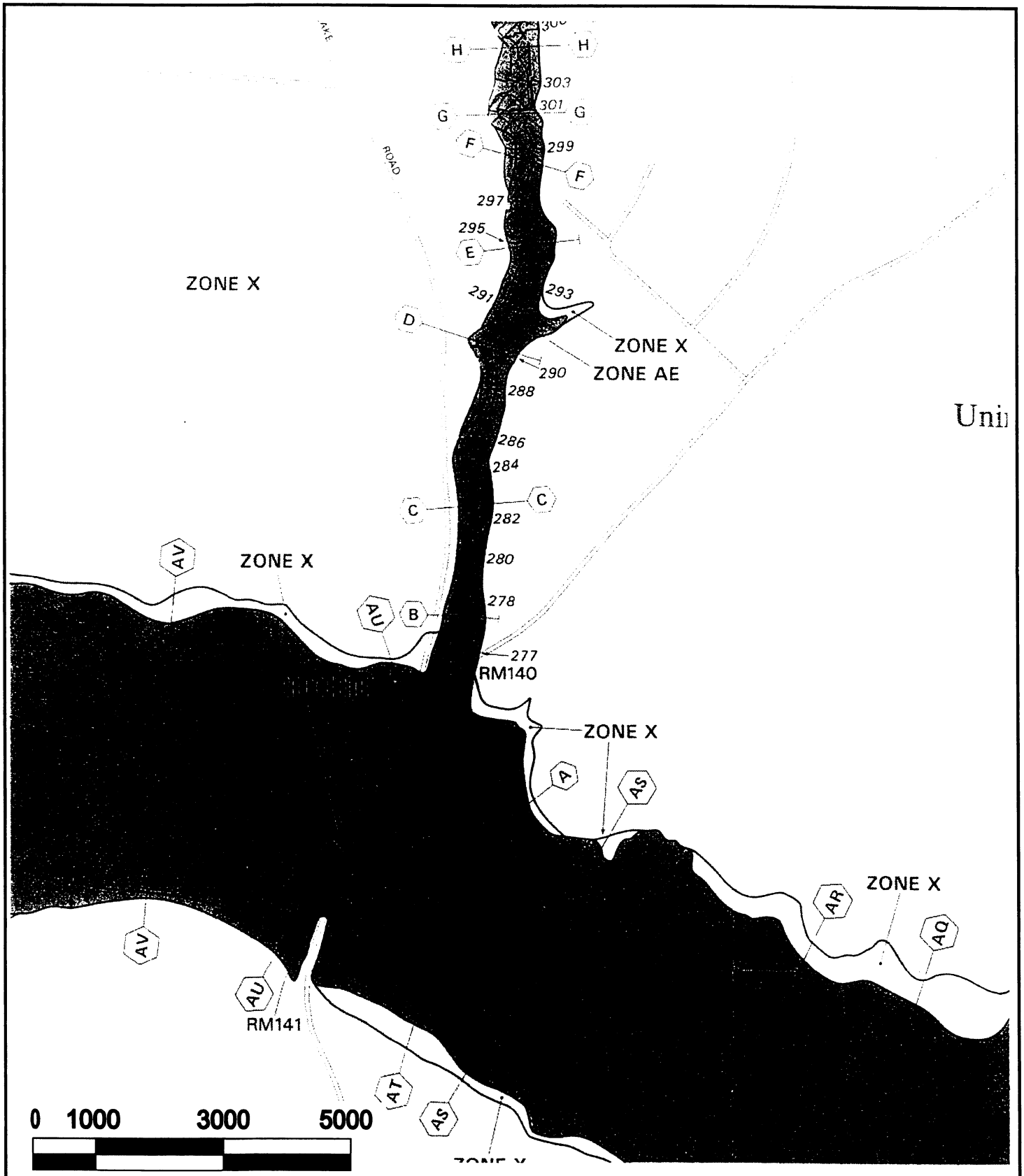
FUNCTIONAL CLASSIFICATION: RURAL LOCAL

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

TYPICAL SECTION
WAKE COUNTY
BRIDGE NO. 317 ON SR 1404
OVER MIDDLE CREEK
TIP B-3703

FIGURE 3

NOT TO SCALE



North Carolina – Department of Transportation

Division of Highways

Project Development and Environmental Analysis Branch

FIGURE 5
FEMA 100 – YEAR FLOODPLAIN MAP
REPLACEMENT OF BRIDGE NUMBER 317
ON SR 1404 OVER MIDDLE CREEK
WAKE COUNTY
TIP NO. B-3703

Appendix A

USDA

ıited States
·partment of
ıriculture

ıtural
ısources
ınservation
ırvice

·05 Bland Rd.
ıite 205
ıleigh, NC 27609

19) 873-2134

October 30, 2000

Mr. John Conforti
Project Development & Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Mr. Conforti:

Thank you for the opportunity to provide comments on Bridge Group XXVIII bridge replacement projects listed below:

TIP Project No.	County	Bridge Number	Road Carried	Stream Crossed
B-3643	Granville	72	SR1004 (Providence Rd.)	Hachers Run
B-3644	Granville	226	SR1120 (Veasey Rd.)	Knap of Reeds Creek
B-3645	Granville	201	SR 1435 (Davis Chapel Rd.)	Little Grassy Creek
B-3653	Halifax	162	SR1450 (Branch Rd.)	Chockoyotte Creek
B-3853	Halifax	82	NC561	Marsh Swamp
B-3702	Vance	19	SR 1305 (Barker Rd.)	Flat Creek
B-3915	Vance	21	SR 1303 (Hicksboro Rd.)	Flat Creek
B-3521	Wake	273	SR 1006 (Old Stage Rd.)	Middle Creek
B-3523	Wake	525	SR 1300 (Kildaire Farm Rd.)	Swift Creek
B-3530	Wake	174	SR 2320 (Riley Hill Rd.)	Buffalo Creek
B-3703	Wake	317	SR 1404 (Johnson Pond Rd.)	Middle Creek
B-3704	Wake	108	SR 1834 (Norwood Rd.)	Lower Bartons Creek
B-3705	Wake	125	SR 2045 (Burlington Mills Rd.)	Smiths Creek
B-3917	Wake	311	SR 1379 (Penny Rd.)	Lake Wheeler (Swift Cr.)
B-3918	Wake	127	SR 2044 (Ligon Mill Rd.)	Tom Creek

The Natural Resources Conservation Service does not have any comments at this time.

Sincerely,

Mary K. Combs
State Conservationist

B-3703

Division

North Carolina Department of Cultural Resources

State Historic Preservation Office

David L. S. Brook, Administrator

James B. Hunt Jr., Governor
Betty Ray McCain, Secretary

Division of Archives and History
Jeffrey J. Crow, Director

November 7, 2000

MEMORANDUM

To: William D. Gilmore, P.E., Manager
Project Development and Environmental Analysis Branch

From: David Brook RSH for David Brook
Deputy State Historic Preservation Officer

Re: Bridge Group XXVIII Bridge Replacement Projects, Wake County, ER 01-7792

Thank you for your memorandum of October 2, 2000, concerning the above project.

We have conducted a review of the project and are aware of no properties of architectural, historic, or archaeological significance, which would be affected by the project. Therefore, we have no comment on the project as currently proposed.

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, contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919/733-4763.

DB:kgc

3703

	Location	Mailing Address	Telephone/Fax
ADMINISTRATION	507 N. Blount St., Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919) 733-4763 • 733-8653
ARCHAEOLOGY	421 N. Blount St., Raleigh NC	4619 Mail Service Center, Raleigh NC 27699-4619	(919) 733-7342 • 715-2671
RESTORATION	515 N. Blount St., Raleigh NC	4613 Mail Service Center, Raleigh NC 27699-4613	(919) 733-6547 • 715-4801
SURVEY & PLANNING	515 N. Blount St., Raleigh NC	4618 Mail Service Center, Raleigh NC 27699-4618	(919) 733-6545 • 715-4801

Federal Aid #BRZ-1404(4) *TIP* #B-3703 *County*: Wake

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

Project Description: Replace Bridge No. 317 on SR 1404 over Middle Creek

On February 17, 2000, representatives of the

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

Reviewed the subject project at

- [ ] a scoping meeting
- [x] 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 effect.
- [x] there are no properties less than fifty years old which are considered to meet Criterion Consideration G within the project's area of potential effect.
- [ ] there are properties over fifty years old (list attached) within the project's area of potential effect, but based on the historical information available and the photographs of each property, properties identified as _____ are considered not eligible for the National Register and no further evaluation of them is necessary.
- [x] there are no National Register-listed properties located within the project's area of potential effect.

Signed:

Mary Pope Furr — 2-17-2000
Representative, NCDOT — Date

Richard J. Gibson — 2/17/00
FHWA, for the Division Administrator, or other Federal Agency — Date

[signature] — 2/17/2000
Representative, SHPO — Date

[signature], Deputy — 2/23/2000
State Historic Preservation Officer — Date

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

B-3645

North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

TO: Yvonne G. G. Howell, PE
Earth Tech

FROM: David Cox, Highway Project Coordinator
Habitat Conservation Program

DATE: October 8, 2001

SUBJECT: NCDOT Bridge Replacements in Granville, Halifax, Vance, and Wake counties of North Carolina. TIP Nos. B-3643, B-3644, B-3645, B-3653, B-3853, B-3702, B-3915, B-3521, B-3523, B-3530, B-3703, B-3704, B-3705, B-3917, and B-3918.

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).

On bridge replacement projects of this scope our standard recommendations 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.

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. Tim Savidge 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 fish passage. Generally, this means that the culvert or pipe invert is buried at least 1 foot below the natural stream bed. If multiple cells are required the second and/or third cells should be placed so that their bottoms are at stream bankful stage (similar to Lyonsfield design). This could be

accomplished by constructing a low sill on the upstream end of the other cells that will divert low flows to another cell. This will allow sufficient water depth in the culvert or pipe during normal flows to accommodate fish movements. If culverts are long, notched baffles should be placed in reinforced concrete box culverts at 15 foot intervals to allow for the collection of sediments in the culvert, to reduce flow velocities, and to provide resting places for fish and other aquatic organisms moving through the structure.

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 so that no channel realignment or widening is required. Widening of the stream channel at the inlet or outlet of structures usually causes a decrease in water velocity causing sediment deposition that will require future maintenance.

4. Riprap should not be placed on the stream bed..

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 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.

Project specific comments:

1. B-3643 – Granville County – Bridge No. 72 over Hatchers Run. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

2. B-3644 - Granville County – Bridge No. 226 over Knap of Reeds Creek. NCDOT should be aware that NCWRC has designated NCWRC gamelands in the vicinity of this bridge. Impacts to gameland properties should be avoided. There are also records of state listed mussels upstream of the project. Therefore, due to the potential for impacts to listed species we request that NCDOT perform a mussel survey prior to the construction of this bridge.

3. B-3645 – Granville County – Bridge No. 201 over Little Grassy Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

4. B-3653 – Halifax County – Bridge No. 162 over Chockoyotte Creek. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. We are not aware of any threatened of endangered species in the project vicinity. Standard comments apply.

5. B-3853 – Halifax County – Bridge No. 82 over Marsh Swamp. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

6. B-3702 – Vance County – Bridge No. 19 over Flat Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

7. B-3915 - Vance County – Bridge No. 21 over Flat Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

8. B-3521– Wake County – Bridge No 273 over Middle Creek. Due to the potential for anadromous fish at this location, NCDOT should closely follow the "Stream Crossing Guidelines for Anadromous Fish Passage". This includes an in-water work moratorium from February 15 to June 15. There are also records of state listed mussels upstream of the project. Therefore, due to the potential for impacts to listed species we request that NCDOT perform a mussel survey prior to the construction of this bridge. Standard comments apply.

9. B-3523 – Wake County – Bridge No. 525 over Swift Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

10. B-3530 - Wake County – Bridge No. 174 over Buffalo Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

11. B-3703 – Wake County – Bridge No. 317 over Middle Creek. There are records of state listed mussels upstream of the project. Therefore, due to the potential for impacts to listed species we request that NCDOT perform a mussel survey prior to the construction of this bridge. Standard comments apply.

12. B-3704 – Wake County – Bridge No. 108 over Lower Bartons Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

13. B-3705 – Wake County – Bridge No. 125 over Smiths Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

14. B-3917 Wake County – Bridge No. 311 over Lake Wheeler (Swift Creek). Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

15. B-3918 – Wake County – Bridge No. 127 over Tom Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

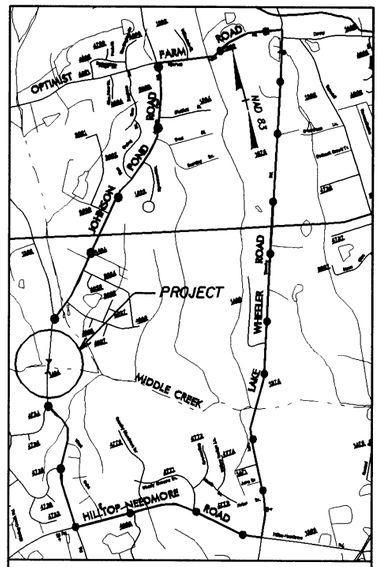
We request that NCDOT routinely minimize adverse impacts to fish and wildlife resources in the vicinity of bridge replacements. The NCDOT should install and maintain sedimentation control measures throughout the life of the project and prevent wet concrete from contacting water in or entering into these 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, reducing habitat fragmentation and vehicle related mortality at highway crossings.

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.

09/08/99

CONTRACT: C200863 TIP PROJECT: B-3703

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



VICINITY MAP
OFF SITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

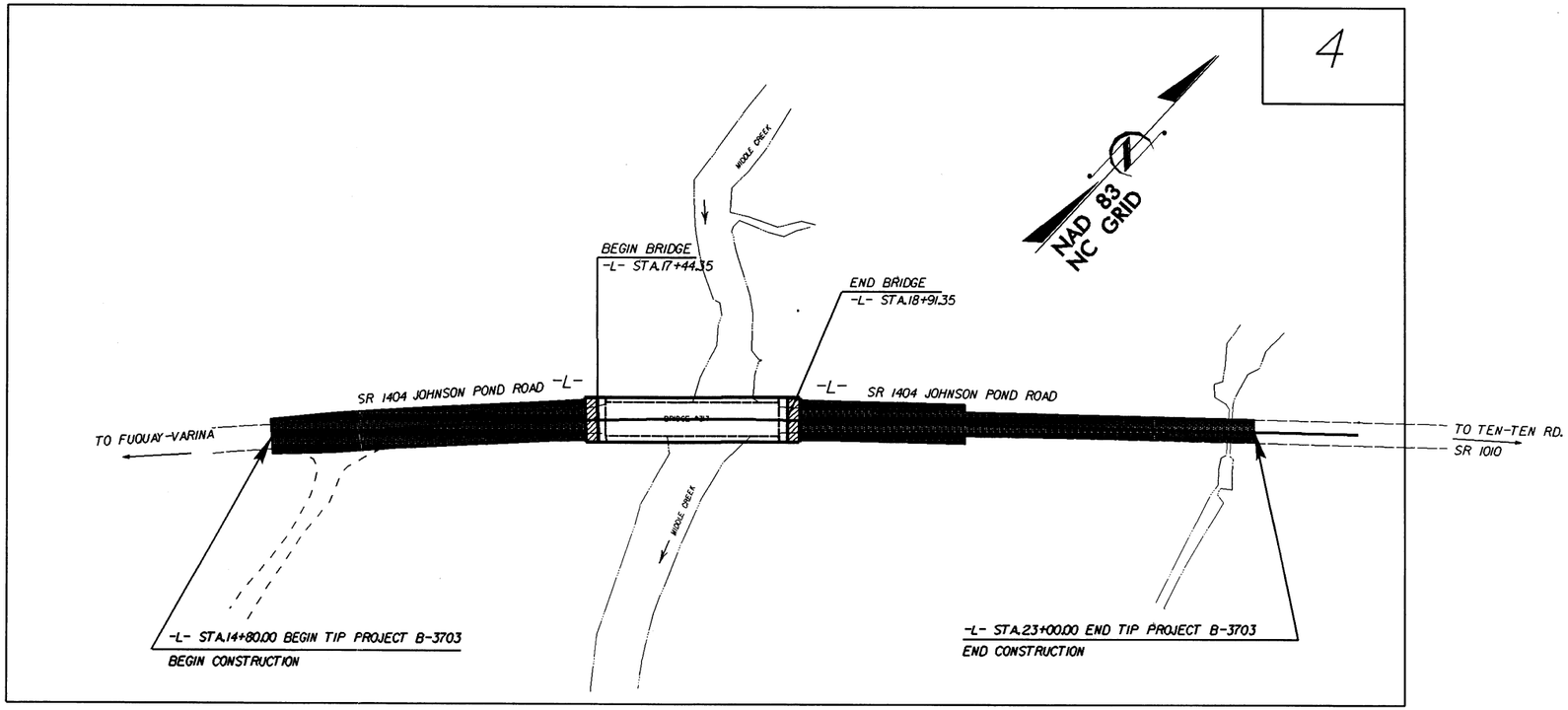
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3703	1	

WBS NO.	F.A. PROJ. NO.	DESCRIPTION
33243.1.1	BRZ-1404(4)	PE
33243.2.2	BRZ-1404(7)	ROW, Utility

LOCATION: ***BRIDGE NO. 317 OVER MIDDLE CREEK ON SR 1404 (JOHNSON POND ROAD)***

TYPE OF WORK: ***GRADING, PAVING, DRAINAGE, STRUCTURE, AND GUARDRAIL***

4



NCDOT CONTACT: TERESA M. BRUTON, PE
PROJECT ENGINEER – DESIGN SERVICES

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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 2004 = 5,200
ADT 2024 = 11,200
DHV = 10 %
D = 60 %
T = 3 % *
V = 50 MPH

(TTST 1 % + DUAL 2%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-3703 = 0.127 MI
LENGTH STRUCTURE TIP PROJECT B-3703 = 0.028 MI
TOTAL LENGTH TIP PROJECT B-3703 = 0.155 MI

Prepared In the Office of:
RS&H ARCHITECTS-ENGINEERS-PLANNERS INC.
8008 CORPORATE CENTER DRIVE, SUITE 120
CHARLOTTE, NC 28226 (704)752-0610
CORPORATE CERTIFICATE NO. F-0493
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:
JUNE 15, 2004

VERONICA McGRIFF WALLACE, PE
PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER *P.E.*

DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

30-MAR-2004 13:39
R:\Roadway\Proj\B3703_RDY_TSH.dgn
BTKyle AT

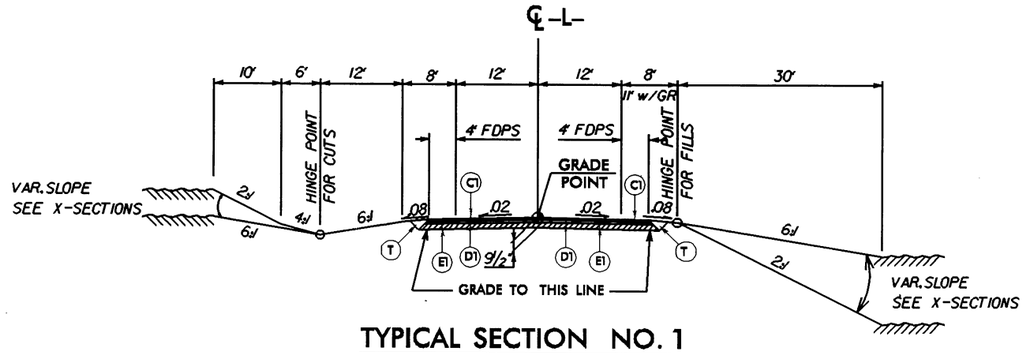
6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-3703	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERATE RATE OF 140 LBS. PER SQ. YD. IN EACH OF TWO LAYERS
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
T	EARTH MATERIAL.

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

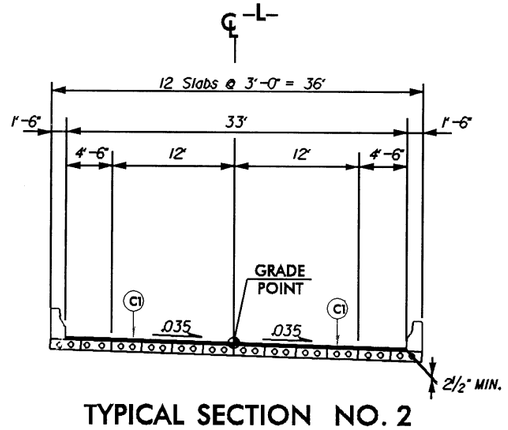


TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1

-L- STA. 14+80.00 TO -L- STA. 17+44.35 (BEGIN BRIDGE)
-L- STA. 18+91.35 (END BRIDGE) TO -L- STA. 20+30.00

NOTE: RESURFACE EXISTING FROM -L- STA. 20+30.00 TO -L- STA. 23+00.00 WITH (C1) (OVERLAY EXISTING PAVEMENT MARKINGS)



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

-L- STA. 17+44.35 TO -L- STA. 18+91.35

30-MAR-2004 14:00
R:\Roadway\Projects\B3703_RDY_TYP.dgn
RTKolb AT PROJ B3703_RDY_TYP.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-3703	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

5/14/99

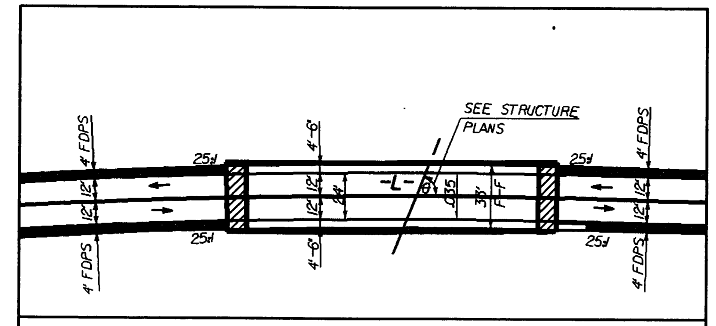
DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3703-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 690589.8255(ft) EASTING: 2077980.3432(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988555 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3703-1" TO -L- STATION 14+80.00 IS S 36° 41' 37.81" W 2615.0552 FT ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD88

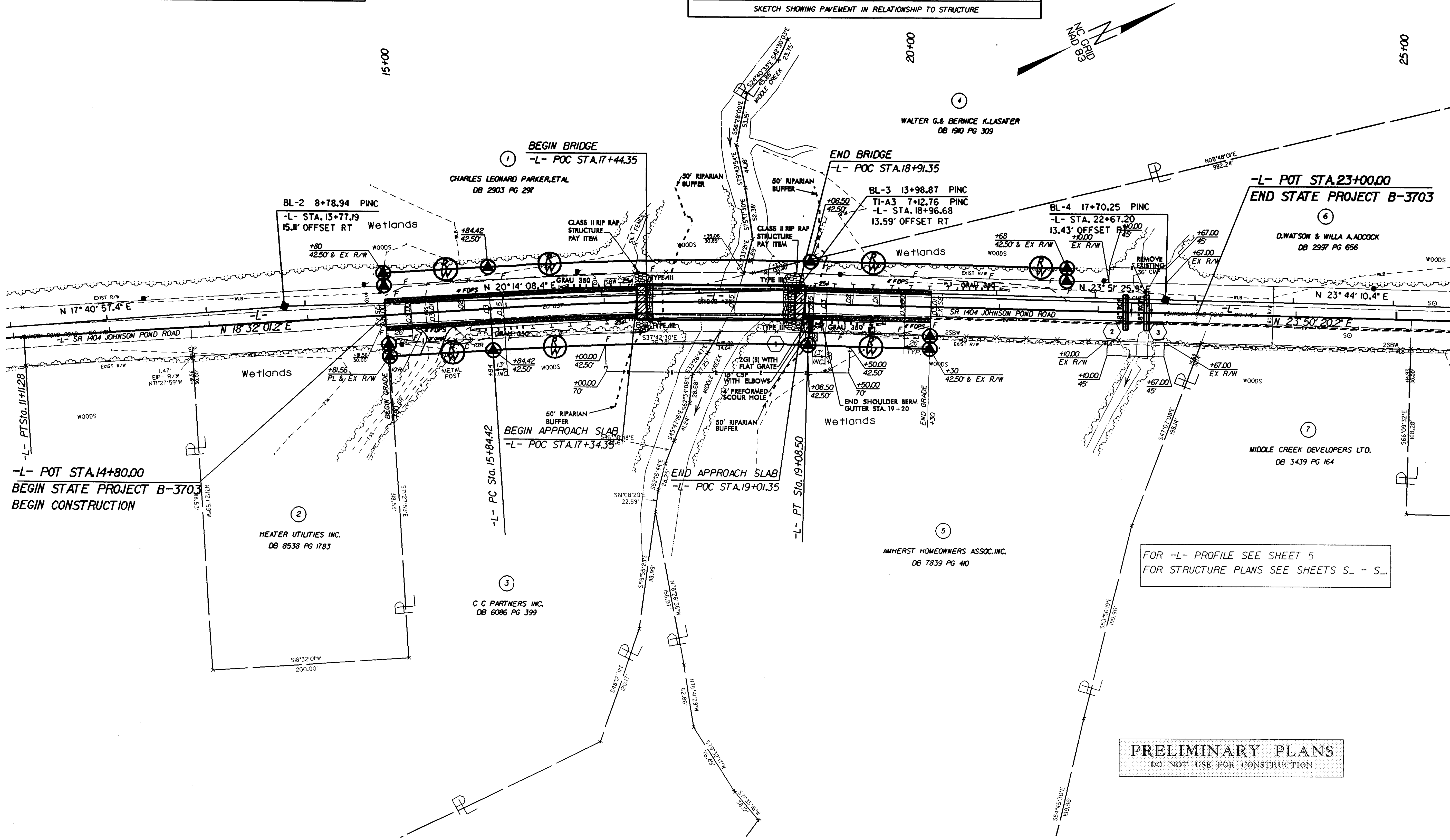
-L-

PI Sta 10+69.25	PI Sta 17+46.57
Δ = 4° 49' 06.5" (RT)	Δ = 5° 18' 19.0" (RT)
D = 5° 43' 46.5"	D = 1° 38' 13.3"
L = 84.10'	L = 324.08'
T = 42.07'	T = 162.16'
R = 1,000.00'	R = 3,500.00'
	RUNOFF = SEE PLANS
	SE = .035*
	DESIGN SPEED = 50 mph

*SE = .035 USED DUE TO DRAINAGE SPREAD ACROSS BRIDGE.



SKETCH SHOWING PAVEMENT IN RELATIONSHIP TO STRUCTURE



FOR -L- PROFILE SEE SHEET 5
FOR STRUCTURE PLANS SEE SHEETS S_ - S_.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

30-MAR-2004 08:53
R:\Roadway\Proj\B3703_Rdy_PSH.dgn
BTKyle