STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 26, 2007

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

ATTENTION: Eric Alsmeyer
NCDOT Coordinator

Dear Sir:

Subject: **Application for Section 404 Nationwide Permits 23 and 33, Section 401 Water Quality Certification, and Neuse Riparian Buffer Authorization** for the replacement of Bridge No. 229 over Poplar Creek on SR 1007 (Poole Road), Wake County. Federal Aid Project Number BRSTP-1007(9), WBS No. 33638.1.1, State Project No. 8.2409301, Division 5, T.I.P. No. B-4301

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 229 over Poplar Creek. The project involves constructing the new bridge at the existing location, while maintaining traffic on a temporary on-site detour south (downstream) of the existing bridge during construction. The existing bridge is currently in poor condition and in need of replacement. The new bridge is intended to provide a safer bridge structure consistent with federal and state bridge standards.

The proposed structure will be approximately 100 feet in length, consisting of two 50-foot cored slab spans with end bents and one bent on piles. The proposed bridge has 36 feet 6 inches of clear roadway and will provide two travel lanes. The travel lanes will be 12 feet wide each with a 6 feet 3 inches wide shoulder on both lanes. Please find the enclosed permit drawings, design plans, and Pre-Construction Notification for the subject project. A Categorical Exclusion (CE) and Right of Way Consultation were completed for this project in November 2005 and April 2007, respectively, and distributed shortly thereafter. Additional copies are available upon request.

IMPACTS TO WATERS OF THE UNITED STATES

The project is located in the Neuse River Basin (subbasin 03-04-02). This area is part of Hydrologic Cataloging Unit 03020201 of the South Atlantic-Gulf Coast Region. Poplar Creek [DWQ Index # 27-35] and two areas of riverine wetlands comprise the Waters of the U.S. within the project area. Poplar Creek is assigned a Best Usage Classification of C NSW. No designated Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supply I (WS-I), Water Supply (WS-II), or 303(d) Waters occur within 1.0 mile of the study corridor.

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

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

FAX: 919-715-5501

WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD. SUITE 240
RALEIGH NC 27604

Two areas of riverine wetlands located on the floodplain east of Poplar Creek occur within the project area. These wetlands, separated by the existing roadway, are classified as PFO1A and support plant communities dominated by red maple, sweetgum, water oak, swamp chestnut oak, black willow, American holly, sweet bay, elderberry, greenbriar, Japanese honeysuckle, blackberry, and soft rush. Both wetlands received a rating of 56 out of a possible 100.

Permanent Impacts

Improvements to the approach of the new bridge will require extending the base of the fill slope into the wetland on the north side of Poole Road (Site 2, Sheet 8 of 9). Additionally, the replacement of two existing 15-inch corrugated metal pipes providing hydrologic equalization between the two wetlands with one 24-inch reinforced concrete pipe will require a small area of fill be placed in the wetlands at both ends of the new pipe. These activities will result in a combined total of 0.02 acres of fill being placed in the riverine wetlands.

One bridge bent consisting of eight (8) driven HP steel piles will be constructed in Poplar Creek. Permanent surface water impacts from the bent are less than 0.01 acres (Site 1, Sheet 8 of 9). [Each of the eight piles will cover 1.5 sq ft for a total surface water impact of 12.0 sq ft.]

Temporary Impacts

Construction of the on-site detour will result in 0.18 acres of temporary fill being placed in the wetland south of Poole Road (Site 2, Sheet 6 of 9). Upon completion of the new bridge, the temporary detour will be removed and the original (natural) grade will be restored. The temporary detour will have no bents in Poplar Creek.

Additionally, temporary fill in wetlands of 0.04 acres in the hand clearing areas is proposed for the installation of erosion control measures, including some or all of the following: Temporary Silt Fence, Special Sediment Control Fence, and Temporary Rock Silt Checks.

Hand Clearing

Construction of both the new bridge and on-site detour will require hand clearing of vegetation in wetlands on both the north and south sides of Poole Road encompassing 0.11 acres and 0.10 acres, respectively (Site 2, Sheet 8 of 9 and Site 2, Sheet 6 of 9). Hand clearing is necessary to allow construction equipment unimpeded overhead access to areas where fill is to be placed or installation of various structures is to occur. Once construction is completed, vegetation in these areas will be allowed to recover naturally.

Utility Impacts

A new, taller power pole will be constructed within the wetland approximately 38 feet left of Station 23+50 -L- (on the north side of the road) to replace an existing pole in the same location in order to accommodate the temporary placement of power lines away from the bridge construction area. After construction, this new power pole will remain in use. Total impacts to riverine wetlands resulting from the proposed power pole are approximately 4 square feet. There are no other utility impacts to waters of the U.S. or riparian buffers associated with this project.

Bridge Demolition

The existing bridge, built in 1961, consists of two spans and totals 59 feet in length. The deck is composed of precast prestressed concrete channels and metal rails. The substructure consists of precast prestressed concrete caps on timber piles with timber abutments. NCDOT will remove the existing structure without dropping any components into the creek. Piles at the existing bent in Poplar Creek will be removed down to the streambed. No workpads or causeways in the creek will be needed to facilitate bridge removal. Best Management Practices for Bridge Demolition and Removal will be implemented during removal of the bridge.

IMPACTS TO NEUSE RIPARIAN BUFFER

Construction of the new bridge, its approaches, and the on-site detour will result in impacts to the Neuse Riparian Buffers of Poplar Creek. Buffer impacts are described in Table 1 below. Under the Neuse Buffer Rules, impacts to buffers resulting from the construction of a bridge are allowable. Impacts resulting from construction of the approaches are exempt because the impacts are less than 40 linear feet along the stream. Impacts resulting from construction of the on-site detour are allowable under the buffer rules' temporary roads for bridge construction classification.

Table 1. Neuse River Buffer Impacts

	Bridge	Road Crossing	On-Site Detour
Zone 1 Impact (sq. ft)	631	404	3261
Zone 2 Impact (sq. ft)	136	539	2138
Total Impact (sq. ft)	767	943	5399
Mitigation requirements (exempt, allowable, or allowable with mitigation)	Allowable	Exempt (impacts less than 40 linear feet)*	Allowable

* Buffer impacts associated with the construction of the approaches are 18 linear feet.

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 are unavoidable, and there are no practicable alternatives.

Utility Impacts to Riparian Buffers

Construction of the bridge and on-site detour will not require any existing utilities structures located in any buffer zones to be removed or relocated. There will be no utility impacts to any buffers in association with this project.

RESTORATION PLAN

Following construction of the bridge and approaches, all material used in construction will be removed. The impacted area of temporary fill in wetlands associated with the installation of temporary erosion control measures is expected to recover naturally, since these impacts will occur in areas of wetlands that will be hand cleared. NCDOT does not propose any additional planting in this area. All temporary erosion control devices will be removed upon completion of construction. Pre-project elevations will be restored.

REMOVAL AND DISPOSAL PLAN

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

MITIGATION OPTIONS

Avoidance and Minimization and Compensatory Mitigation

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

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

Avoidance/Minimization

- Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of stringent erosion control methods and use of Best Management Practices (BMPs).
- Design Standards in Sensitive Watersheds will be implemented.
- Best Management Practices for Protection of Surface Waters will be implemented.
- 1.5 to 1 and 2 to 1 side slopes will be used to reduce the footprint of the project in the vicinity of the crossing, minimizing impacts to surface waters.
- Bridge deck drains will not be allowed to discharge directly into surface waters. All concentrated flows will be discharged outside of the Neuse River Basin Riparian Buffers. Concentrated flows will be diffused prior to entering Zone 2 of the riparian buffer.
- A preformed scour hole will be constructed on the southeast side of the bridge outside of the buffer zones.
- The new bridge will be approximately 41 feet longer than existing bridge, thereby restoring a greater area of the floodplain in the vicinity of the crossing to its original grade.
- The bridge will be replaced in the existing location, minimizing impacts to adjacent surface waters, wetlands, and buffers.
- The North Carolina Wildlife Resources Commission requested a moratorium on in-water work from February 15 to June 15 to protect anadromous fish. The project will adhere to *Stream Crossing Guidelines for Anadromous Fish Passage* to protect the American shad (*Alosa sapidissima*).

Compensatory Mitigation:

The project will impact surface waters, wetlands, and riparian buffers. Mitigation is not proposed for the minimal (<0.01 ac) impacts to Poplar Creek or to the riverine wetlands (0.02 ac) adjacent to Poole Road. Mitigation is not proposed for buffer impacts since all impacts are exempt or allowable under the Neuse Buffer Rules. No compensatory mitigation is proposed for this project.

FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. The United States Fish and Wildlife Service (USFWS) lists 4 species for Wake County. Table 2 lists the species and their federal status.

Table 2. Federally Protected Species in Wake County, NC

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

*E= endangered, T=threatened

Biological conclusions of "No Effect" were issued for the red-cockaded woodpecker and dwarf wedgemussel due to lack of appropriate habitat. Surveys for Michaux's sumac were most recently conducted on 6/26/2007 and 6/9/2006 by NCDOT biologists. Potential habitat exists along roadsides and forest edges within the project area. No specimens of Michaux's sumac were found; therefore, the biological conclusion of "No Effect" remains valid.

The bald eagle has been delisted as of August 8, 2007 but is still protected under the Bald and Golden Eagle Protection Act. Poplar Creek is too small to support bald eagles and no other water bodies large enough to provide a suitable feeding source are located within one mile of the bald eagle survey area. Therefore, this project will not affect the bald eagle.

SCHEDULE

The project calls for a letting of May 20, 2008 (review date of April 1, 2008) with a date of availability of July 1, 2008. It is expected that the contractor will choose to start construction in July 2008.

REGULATORY APPROVALS

Section 404 Permit: The project has been processed by the Federal Highway Administration as a "Categorical Exclusion" in accordance with 23 CFR 771.115(b). The NCDOT requests that these activities be authorized by Nationwide Permits 23 and 33 (72 FR 11092; March 12, 2007).

Section 401 Permit: We anticipate 401 General Certification numbers GC3632 and GC3634 will apply to this project. This project will impact Neuse Riparian Buffers and written concurrence will be required. In accordance with 15A NCAC 2H, Section .0500(a) and 15A NCAC 2B.0200 we are providing five

copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their review.

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

A copy of this permit application will be posted on the NCDOT website at: http://www.ncdot.org/doh/preconstruct/pe/. If you have any questions or need additional information, please call Duncan Quinn at 919-715-5524.

Sincerely,

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

w/attachment
- Mr. John Hennessy, NCDWQ (5 Copies)
- Mr. Travis Wilson, NCWRC
- Mr. Gary Jordan, USFWS
- Mr. Michael Street, NCDMF
- Dr. David Chang, P.E., Hydraulics
- Mr. Mark Staley, Roadside Environmental
- Mr. Greg Perfetti, P.E., Structure Design
- Mr. Victor Barbour, P.E., Project Services Unit
- Mr. J. Wally Bowman, P.E., Division Engineer
- Mr. Chris Murray, DEO

w/o attachment
- Mr. Jay Bennett, P.E., Roadway Design
- Mr. Majed Alghandour, P. E., Programming and TIP
- Mr. Art McMillan, P.E., Highway Design
- Mr. Scott McLendon, USACE, Wilmington
- Ms. Theresa Ellerby, PDEA

Office Use Only: Form Version March 05

USACE Action ID No. _____ **DWQ No.** _____

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

I. Processing

1. Check all of the approval(s) requested for this project:
   - ☒ Section 404 Permit
   - ☐ Section 10 Permit
   - ☒ 401 Water Quality Certification
   - ☒ Riparian or Watershed Buffer Rules
   - ☐ Isolated Wetland Permit from DWQ
   - ☐ Express 401 Water Quality Certification

2. Nationwide, Regional or General Permit Number(s) Requested: NWP 23, NWP 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 Ecosystem Enhancement Program (NCEEP) is proposed for mitigation of impacts, attach the acceptance letter from NCEEP, complete section VIII, and check here: ☐

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

II. Applicant Information

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

   Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
   E-mail Address: _____

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

   Telephone Number: _____ Fax Number: _____
   E-mail Address: _____

III. Project Information

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

1. Name of project: Replacement of Bridge No. 229 over Poplar Creek on SR 1007 (Poole Road)

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-4301

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

4. Location
   County: Wake Nearest Town: Knightdale
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers/names, landmarks, etc.): From I-440 in Raleigh, take Poole Rd exit and travel 6.4 miles east on Poole Rd to bridge site.

5. Site coordinates (For linear projects, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)
   Decimal Degrees (6 digits minimum): _____ °N _____ °W

6. Property size (acres): N/A

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

8. River Basin: Neuse
   (Note – this must be one of North Carolina's seventeen designated major river basins. The River Basin map is available at http://h2o.enr.state.nc.us/admin/maps/.)

9. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: SR 1007 (Poole Rd) is classified as a rural major collector by the statewide functional classification system. Land use includes wooded areas and open fields interspersed with single-family residences.

10. Describe the overall project in detail, including the type of equipment to be used: The project involves removal of the existing structure and construction of a new bridge on the existing alignment, while maintaining traffic on a temporary on-site detour south (downstream) of the existing bridge during construction. The proposed structure will be approximately 100 feet in length, consisting of two 50-foot cored slab spans with end bents and one bent on piles. The proposed bridge has 36 feet 6 inches of clear roadway and will provide two travel lanes. The travel lanes will be 12 feet wide each with a 6 feet 3 inches wide shoulder on both lanes. Heavy duty excavation equipment will be used such as trucks, dozers, cranes, and other various equipment necessary for roadway construction.

11. Explain the purpose of the proposed work: The existing bridge, built in 1961 and having a sufficiency rating of 21.5 out of a possible 100 (for a new structure), is considered functionally obsolete and is in need of replacement. The new bridge is intended to provide a safer bridge structure consistent with federal and state bridge standards.

IV. Prior Project History

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

V. Future Project Plans

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

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

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. Each impact must be listed separately in the tables below (e.g., culvert installation should be listed separately from riprap dissipater pads). Be sure to indicate if an impact is temporary. All proposed impacts, permanent and temporary, must be listed, and must be labeled and clearly identifiable on an accompanying site plan. All wetlands and waters, and all streams (intermittent and perennial) should be shown on a delineation map, whether or not impacts are proposed to these systems. Wetland and stream evaluation and delineation forms should be included as appropriate.

Photographs may be included at the applicant's discretion. If this proposed impact is strictly for wetland or stream mitigation, list and describe the impact in Section VIII below. If additional space is needed for listing or description, please attach a separate sheet.

1. Provide a written description of the proposed impacts:

Permanent Impacts

Improvements to the approach of the new bridge will require extending the base of the fill slope into the wetland on the north side of Poole Road (Site 2, Sheet 8 of 9). Additionally, the replacement of two existing 15-inch corrugated metal pipes providing hydrologic equalization between the two wetlands with one 24-inch reinforced concrete pipe will require a small area of fill be placed in the wetlands at both ends of the new pipe. These activities will result in a combined total of 0.02 acres of fill being placed in the riverine wetlands. One bridge bent consisting of eight (8) driven HP steel piles will be constructed in Poplar Creek. Permanent surface water impacts from the bent are less than 0.01 acres (Site 1, Sheet 8 of 9). [Each of the eight piles will cover 1.5 sq ft for a total surface water impact of 12.0 sq ft.]

Temporary Impacts

Construction of the on-site detour will result in 0.18 acres of temporary fill being placed in the wetland south of Poole Road (Site 2, Sheet 6 of 9). Upon completion of the new bridge, the temporary detour will be removed and the original (natural) grade will be restored. The temporary detour will have no bents in Poplar Creek. Additionally, temporary fill in wetlands of 0.04 acres in the hand clearing areas is proposed for the installation of erosion control measures, including some or all of the following: Temporary Silt Fence, Special Sediment Control Fence, and Temporary Rock Silt Checks.

Hand Clearing

Construction of both the new bridge and on-site detour will require hand clearing of vegetation in wetlands on both the north and south sides of Poole Road encompassing 0.11 acres and 0.10 acres, respectively (Site 2, Sheet 8 of 9 and Site 2, Sheet 6 of 9). Hand clearing is necessary to allow construction equipment unimpeded overhead access to areas where fill is to be placed or installation of various structures is to occur. Once construction is completed, vegetation in these areas will be allowed to recover naturally.

Utility Impacts

A new, taller power pole will be constructed within the wetland approximately 38 feet left of Station 23+50 -L- (on the north side of the road) to replace an existing pole in the same location in order to accommodate the temporary placement of power lines away from the bridge construction area. After construction, this new power pole will remain in use. Total impacts to riverine wetlands resulting from the proposed power pole are approximately 4 square feet. There are no other utility impacts to waters of the U.S. or riparian buffers associated with this project.

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

Wetland Impact Site Number (indicate on map)	Type of Impact	Type of Wetland (e.g., forested, marsh, herbaceous, bog, etc.)	Located within 100-year Floodplain (yes/no)	Distance to Nearest Stream (linear feet)	Area of Impact (acres)
Site 2	Permanent fill	Bottomland HW forest	yes	60	0.02
Site 2	Temporary fill	Bottomland HW forest	yes	100	0.18
Site 2	Temp. fill (erosion ctrl)	Bottomland HW forest	yes	60-100	0.04
Total Wetland Impact (acres)					0.24

3. List the total acreage (estimated) of all existing wetlands on the property: 2.7

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

Stream Impact Number (indicate on map)	Stream Name	Type of Impact	Perennial or Intermittent?	Average Stream Width Before Impact	Impact Length (linear feet)	Area of Impact (acres)
Site 1	Poplar Creek	Fill: bridge piles	perennial	12 feet	39	<0.01
Total Stream Impact (by length and acreage)					39	<0.01

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

Open Water Impact Site Number (indicate on map)	Name of Waterbody (if applicable)	Type of Impact	Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)	Area of Impact (acres)
Total Open Water Impact (acres)				0

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

Stream Impact (acres):	<0.01
Wetland Impact (acres):	0.24
Open Water Impact (acres):	0
Total Impact to Waters of the U.S. (acres)	0.24
Total Stream Impact (linear feet):	39

7. Isolated Waters
Do any isolated waters exist on the property? ☐ Yes ☒ No
Describe all impacts to isolated waters, and include the type of water (wetland or stream) and the size of the proposed impact (acres or linear feet). Please note that this section only applies to waters that have specifically been determined to be isolated by the USACE.

8. Pond Creation
If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.
Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands
Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.):
Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.):
Current land use in the vicinity of the pond:
Size of watershed draining to pond: Expected pond surface area:

VII. Impact Justification (Avoidance and Minimization)

Specifically describe measures taken to avoid the proposed impacts. It may be useful to provide information related to site constraints such as topography, building ordinances, accessibility, and financial viability of the project. The applicant may attach drawings of alternative, lower-impact site layouts, and explain why these design options were not feasible. Also discuss how impacts were minimized once the desired site plan was developed. If applicable, discuss construction techniques to be followed during construction to reduce impacts.
Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of stringent erosion control methods and use of Best Management Practices (BMPs). Design Standards in Sensitive Watersheds and Best Management Practices for Protection of Surface Waters will be implemented. Fill slopes of 1.5:1 and 2:1 will be used to reduce the footprint of the project in the vicinity of the crossing, minimizing impacts to surface waters. Bridge deck drains will not be allowed to discharge directly into surface waters. All concentrated flows will be discharged outside of the Neuse River Basin Riparian Buffers. Concentrated flows will be diffused prior to entering Zone 2 of the riparian buffer. A preformed scour hole will be constructed on the southeast side of the bridge outside of the buffer zones. The new bridge will be approximately 41 feet longer than existing bridge, thereby restoring a

greater area of the floodplain in the vicinity of the crossing to its original grade. The bridge will be replaced in the existing location, minimizing impacts to adjacent surface waters and wetlands.

VIII. Mitigation

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

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

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

1. Provide a brief description of the proposed mitigation plan. The description should provide as much information as possible, including, but not limited to: site location (attach directions and/or map, if offsite), affected stream and river basin, type and amount (acreage/linear feet) of mitigation proposed (restoration, enhancement, creation, or preservation), a plan view, preservation mechanism (e.g., deed restrictions, conservation easement, etc.), and a description of the current site conditions and proposed method of construction. Please attach a separate sheet if more space is needed.
   No mitigation is proposed.

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

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

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

IX. Environmental Documentation (required by DWQ)

1. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land? Yes ☒ No ☐

2. If yes, does the project require preparation of an environmental document pursuant to the requirements of the National or North Carolina Environmental Policy Act (NEPA/SEPA)? Note: If you are not sure whether a NEPA/SEPA document is required, call the SEPA coordinator at (919) 733-5083 to review current thresholds for environmental documentation. Yes ☒ No ☐

3. If yes, has the document review been finalized by the State Clearinghouse? If so, please attach a copy of the NEPA or SEPA final approval letter. Yes ☒ No ☐

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

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

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

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

Zone*	Impact (square feet)	Multiplier	Required Mitigation
1	3892	3 (2 for Catawba)	N/A
2	2274	1.5	N/A
Total	6166		N/A

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

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

XI. Stormwater (required by DWQ)

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

XII. Sewage Disposal (required by DWQ)

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

XIII. Violations (required by DWQ)

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

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

XIV. Cumulative Impacts (required by DWQ)

Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality? Yes ☐ No ☒
If yes, please submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent North Carolina Division of Water Quality policy posted on our website at http://h2o.enr.state.nc.us/ncwetlands. If no, please provide a short narrative description:
N/A

XV. Other Circumstances (Optional):

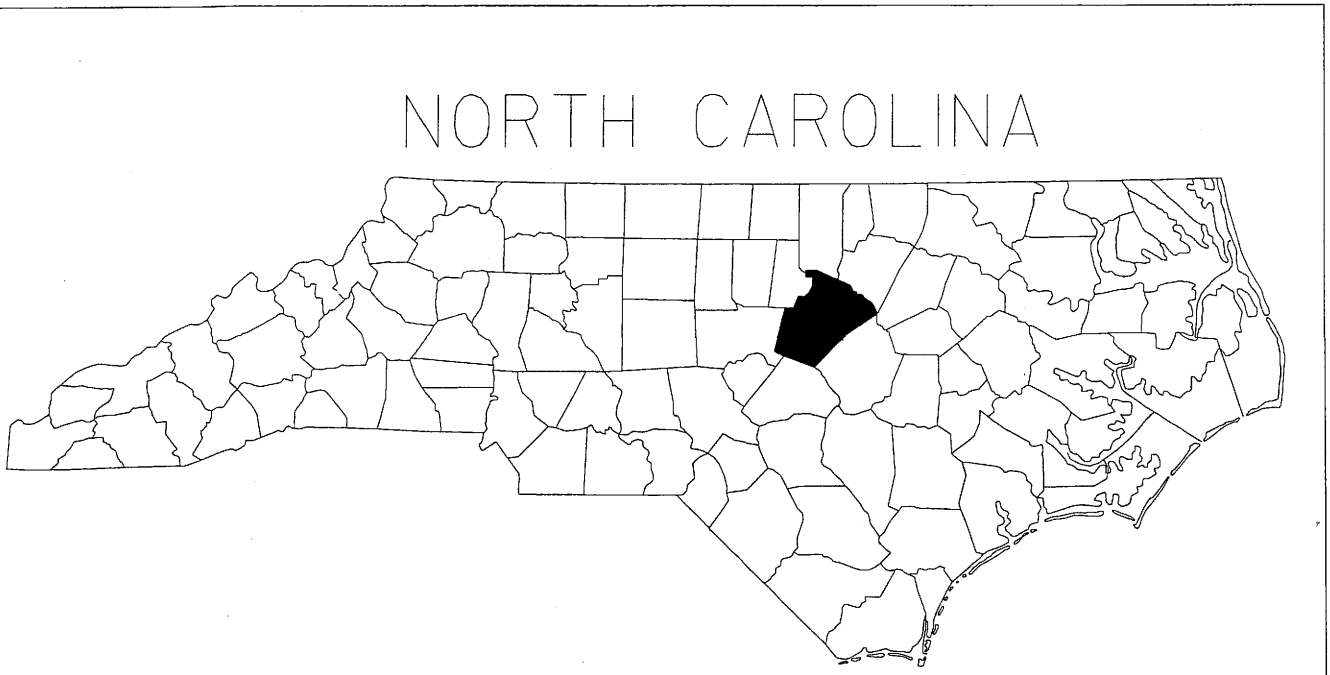
It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g.,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

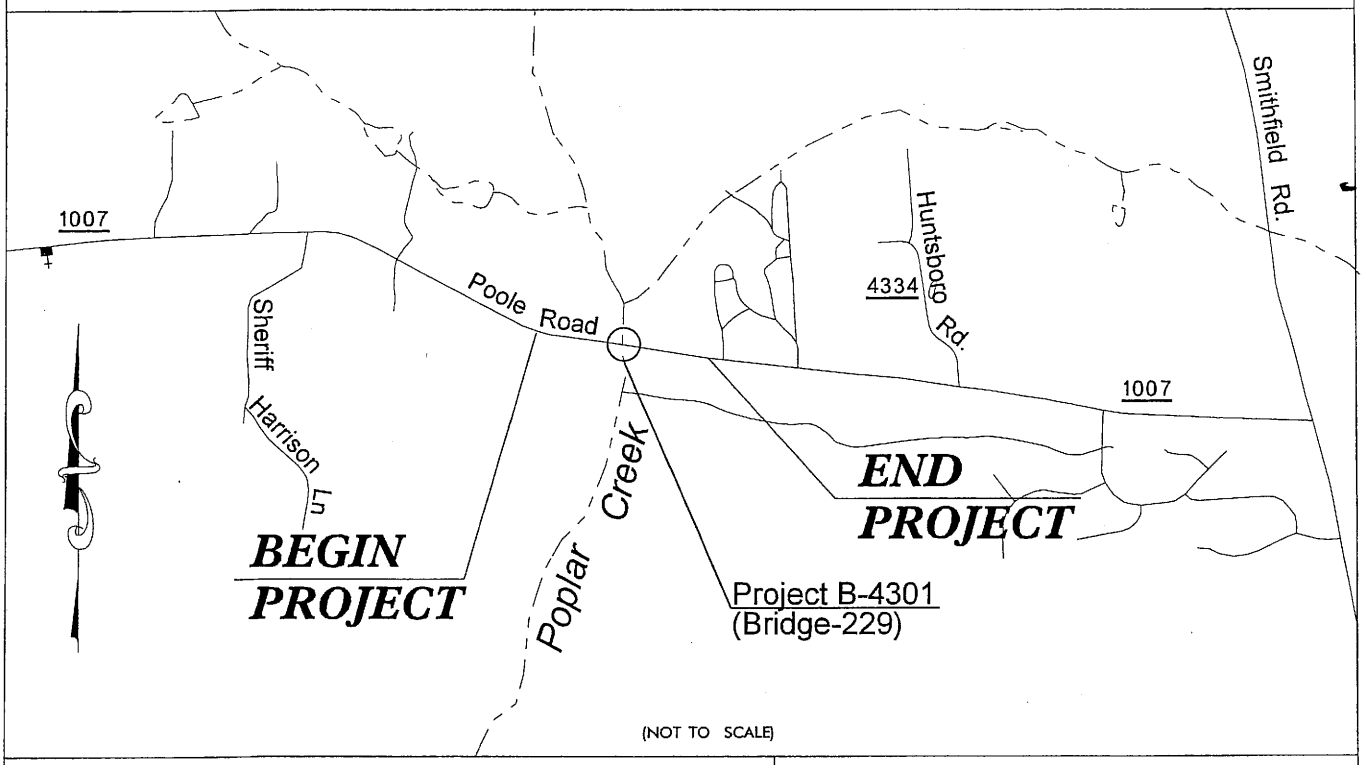
N/A

E.L. Lusk 10·26·07

Applicant/Agent's Signature **Date**

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



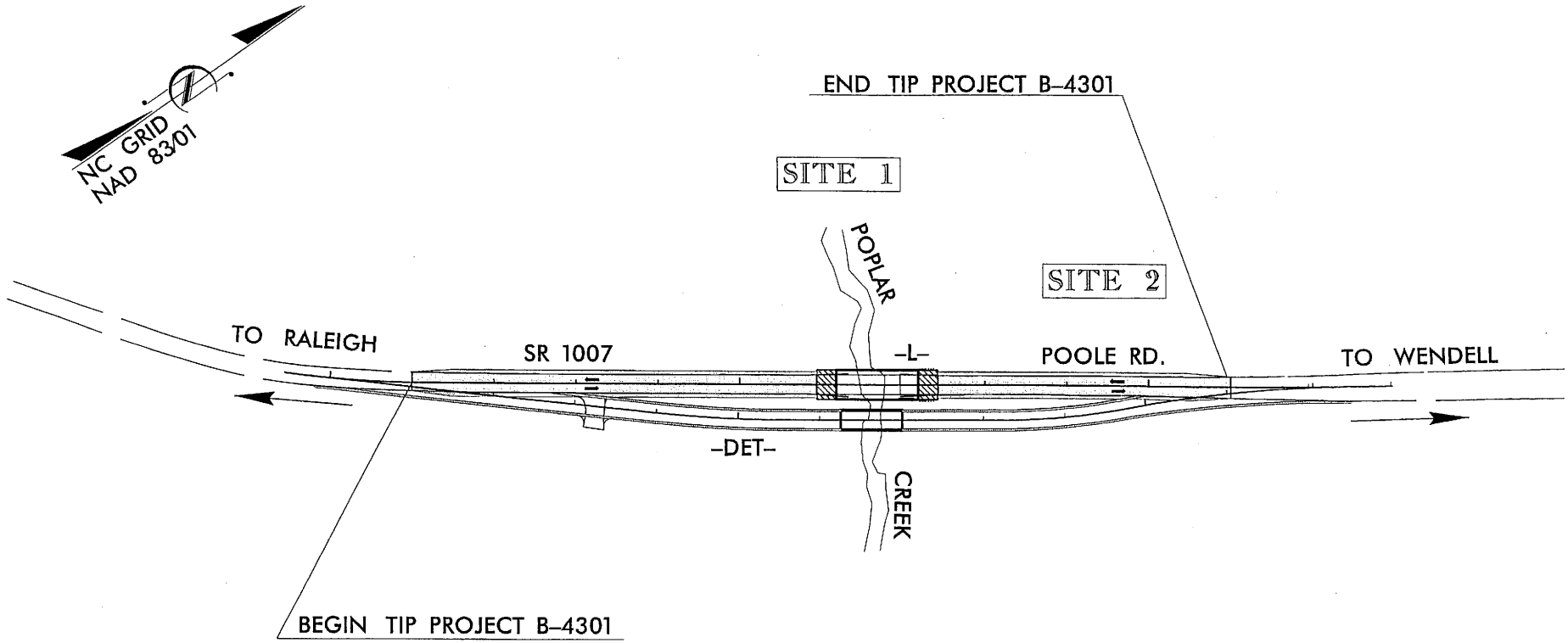


VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4301 (BRIDGE #229)
BRIDGE NO. 229 OVER
POPLAR CREEK
ON SR 1007
(POOLE ROAD)

SHEET 1 OF 9 04 / 20 / 2007



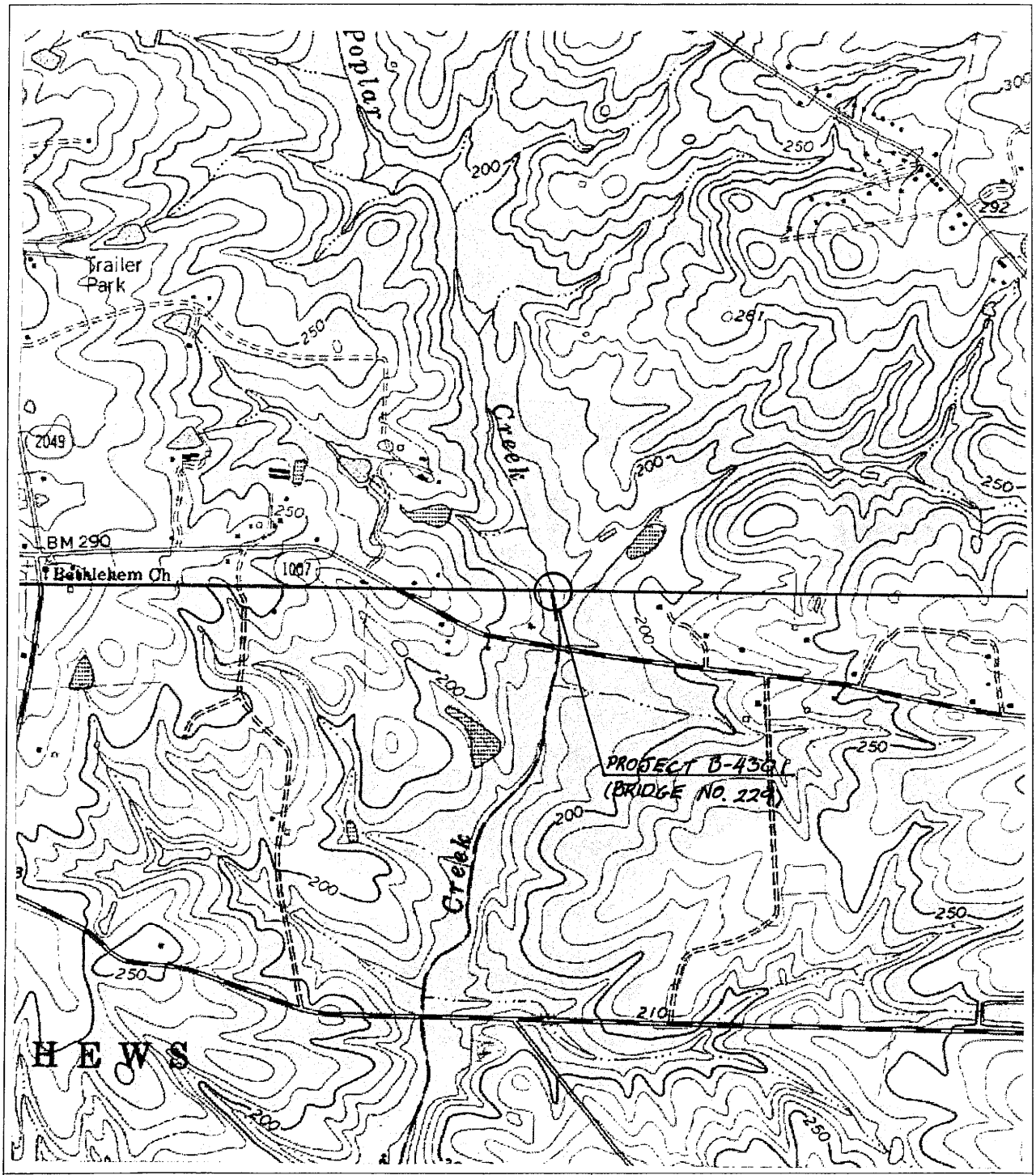
SITE MAP

NOT TO SCALE

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4301 (BRIDGE #229)
BRIDGE NO. 229 OVER
POPLAR CREEK
ON SR 1007
(POOLE ROAD)

SHEET 2 OF 9 04/20/2007



TOPO MAP

SCALE: 1" : 1500'

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4301 (BRIDGE #229)
BRIDGE NO. 229 OVER
POPLAR CREEK
ON SR 1007
(POOLE ROAD)

SHEET 3 OF 9 04 / 20 / 2007

PROPERTY OWNERS

NAMES AND ADDRESSES

	NAMES	ADDRESSES
2	Charles Fredrick Kirk	8824 Poole Road, Knightdale, NC 27545
5	T. G. Adams & Sons, Inc.	8709 Poole Road Knightdale, NC 27545
6	R & D Development, LLC	P.O. Box 216 Zebulon, NC 27597
7	Eden Croft Development Co., Inc.	P. O. Box 19307 Raleigh, NC 27619

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4301 (BRIDGE #229)
BRIDGE NO. 229 OVER
POPLAR CREEK
ON SR 1007
(POOLE ROAD)

04/20/2007

WETLAND PERMIT IMPACT SUMMARY

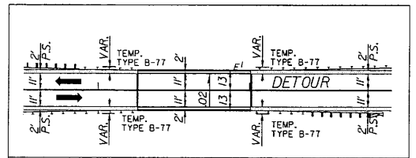
			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	21+68 -L-	21" CORED SLAB						< 0.01				
		BRIDGE (2@50')										
2	23+34 -L-	24" RCP	0.02				0.11					
		Detour Roadway		0.18			0.10					
TOTALS:			0.02	0.18			0.21	< 0.01				

Notes:
Additionally, there will be 0.04 acres of Temporary Fill in Wetlands in the Hand Clearing areas for erosion control measures

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
Wake County
Project: B-4301 (Bridge #229)

STREAM & WETLAND IMPACTS

DETOUR



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

PROJECT REFERENCE NO.	SHEET NO.
B-4301	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 6 of 9

ENGLISH

DENOTES TEMPORARY FILL IN WETLAND

DENOTES HAND CLEARING

NC GRID NAD 8395

SITE 2

FOR R/W AND EASEMENT LOCATION SEE PLAN SHEET 4

5 T.G. ADAMS & SONS, INC. D.B. 8732, PG 1490

6 RUTLEDGE LANDING PHASE I OPEN SPACE

6 RUTLEDGE LANDING PHASE I OPEN SPACE B.M. 2001, PG 1257

8 KAYCHACK PHANETHONG & ASHLEY PHANETHONG

7 KJR, INC. & STAFFORD LAND CO., INC.

3 CHARLES FREDRICK KIRK

2 CHARLES F. KIRK

4 EARNEST L. DRIVER, JR. & AVA H. DRIVER

180' PROGRESS ENERGY POWER EASEMENT

15+00 20+00 25+00

-L-

S 76° 17' 05.5" E

S 82° 08' 26.5" E

S 83° 06' 28.0" E

DETOUR

PROP. SPECIAL CUT DITCH -L- STA. 15+00 TO 18+75 RT. SEE PROFILE

PROP. SPECIAL CUT DITCH -L- STA. 22+50 TO 23+50 LT. SEE PROFILE

DO NOT DISTURB WELL

CLASS B RIP RAP EST. 1 TONS EST. 5 SY FF

CLASS 'II' RIP RAP (RDY. PAY ITEM)

TEMPORARY 15" CS

TEMP 15" 2GI

PIPE PLUG

TEMP COLLAR

REMOVE 9 LF FROM BOTH 15" CMP PLUG ONE 15" CMP COLLAR OTHER 15" CMP TO 24" RCP

TEMPORARY 24" EQUALIZER PIPE

PLUG ONE 15" CMP

RETAIN

0.80' EIP TO R/W

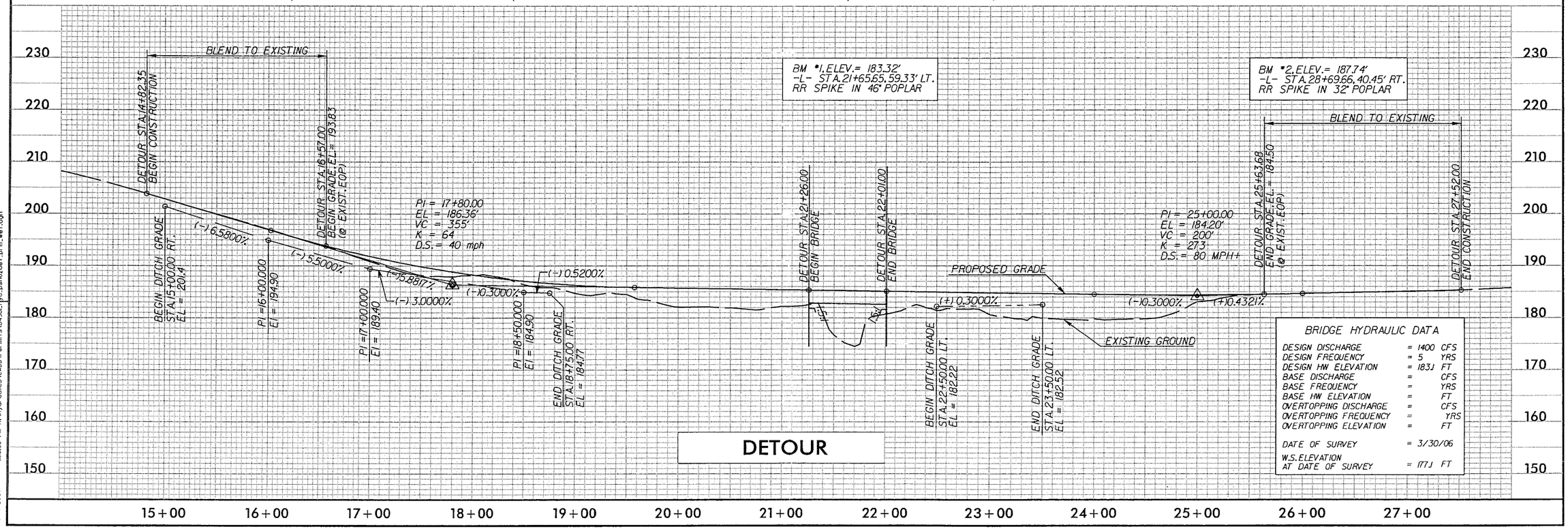
0.80' R/W TO EIP

PROP. DRIVE

NOTES:

1) REMOVE DETOUR AND RETURN TO NATURAL CONTOURS IN WETLANDS AND RIPARIAN BUFFERS.

2) FOR -L-, SEE SHEET 4.



DETOUR

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1400 CFS
DESIGN FREQUENCY	= 5 YRS
DESIGN HW ELEVATION	= 183.1 FT
BASE DISCHARGE	= CFS
BASE FREQUENCY	= YRS
BASE HW ELEVATION	= FT
OVERTOPPING DISCHARGE	= CFS
OVERTOPPING FREQUENCY	= YRS
OVERTOPPING ELEVATION	= FT
DATE OF SURVEY	= 3/30/06
W.S. ELEVATION AT DATE OF SURVEY	= 177.1 FT

REVISIONS

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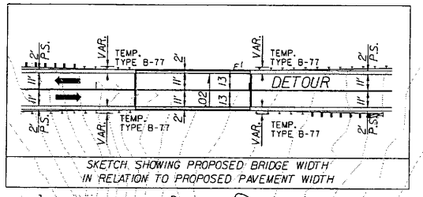
STREAM & WETLAND IMPACTS

DETOUR



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PROJECT REFERENCE NO.	SHEET NO.
B-4301	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 7 of 9

DENOTES TEMPORARY FILL IN WETLAND

DENOTES HAND CLEARING

NC GRID NAD 8395

SITE 2

FOR R/W AND EASEMENT LOCATION SEE PLAN SHEET 4

5 T.C. ADAMS & SONS, INC. D.B. 8732, PG 1490

6 RUTLEDGE LANDING PHASE I OPEN SPACE

6 RUTLEDGE LANDING PHASE I OPEN SPACE B.M. 2001, PG 1257

8 KAYCHACK PHANETHONG & ASHLEY PHANETHONG

180' PROGRESS ENERGY POWE

15+00

20+00

25+00

PLUG ONE 15" CMP

TEMP 15"

TEMP 24"

PIPE PLUG

TEMP COLLAR

RETAIN

EPK

S 83° 06' 28.0" E
DETOUR

S 76° 17' 05.5" E

C 90' EIP TO R/W

10.0' R/W TO EIP

PROP. SPECIAL CUT DITCH
-L- STA. 15+00 TO 18+75 RT.
SEE PROFILE

DO NOT DISTURB WELL

PROP. DRIVE

TEMPORARY 15" CS

CLASS B RIP RAP
EST. 1 TONS
EST. 5 SY FF

DETOUR
S 82° 08' 26.5" E

CLASS B RIP RAP
EST 1 TONS
EST 5 SY. FF

CLASS "II" RIP RAP (RDY. PAY ITEM)

PROP. SPECIAL CUT DITCH
-L- STA. 22+50 TO 23+50 LT.
SEE PROFILE

REMOVE 9 LF FROM BOTH 15" CMP PLUG ONE 15" CMP COLLAR OTHER 15" CMP TO 24" RCP

TEMPORARY 24" EQUALIZER PIPE

3 CHARLES FREDRICK KIRK

4 EARNEST L. DRIVER, JR. & AVA H. DRIVER

2 CHARLES F. KIRK

2 CHARLES F. KIRK

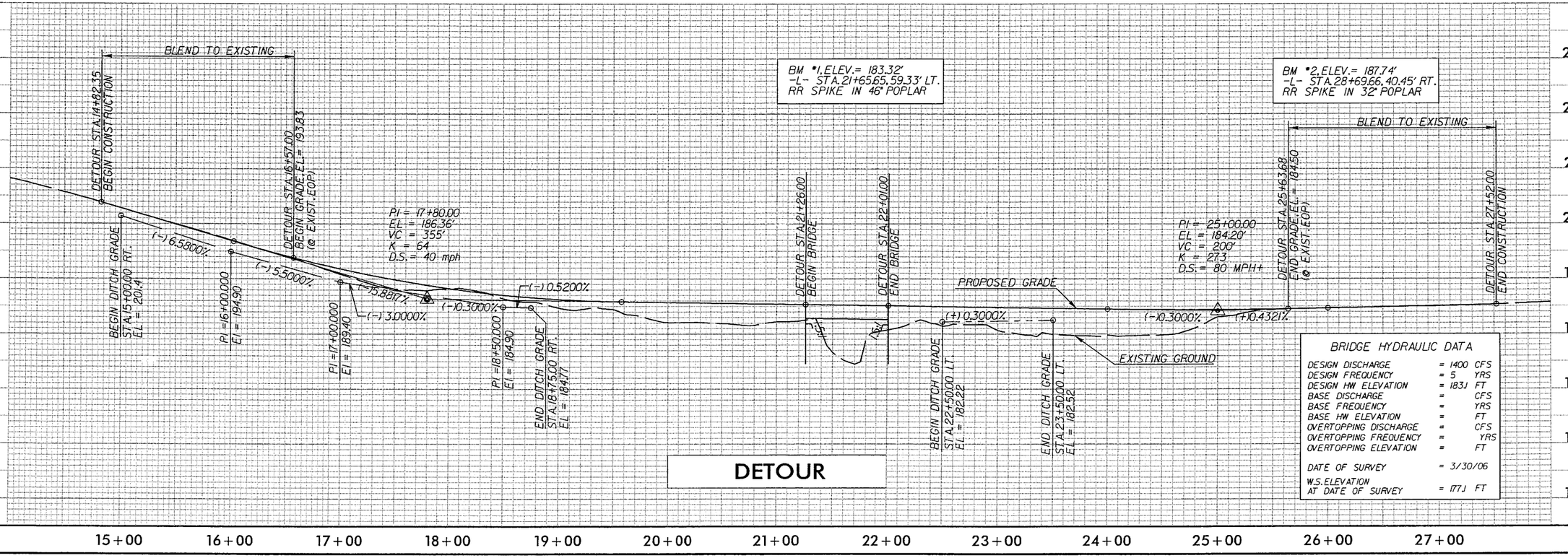
180' PROGRESS ENERGY POWER EASEMENT

7 KJR, INC. & STAFFORD LAND CO., INC.

NOTES:

1) REMOVE DETOUR AND RETURN TO NATURAL CONTOURS IN WETLANDS AND RIPARIAN BUFFERS.

2) FOR -L-. SEE SHEET 4.



DETOUR

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1400	CFS
DESIGN FREQUENCY	= 5	YRS
DESIGN HW ELEVATION	= 183.1	FT
BASE DISCHARGE	=	CFS
BASE FREQUENCY	=	YRS
BASE HW ELEVATION	=	FT
OVERTOPPING DISCHARGE	=	CFS
OVERTOPPING FREQUENCY	=	YRS
OVERTOPPING ELEVATION	=	FT
DATE OF SURVEY	= 3/30/06	
W.S. ELEVATION AT DATE OF SURVEY	= 177.1	FT

REVISIONS

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STREAM & WETLAND IMPACTS

ENGLISH

PROJECT REFERENCE NO.	SHEET NO.
B-4301	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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(919) 851-1918 (FAX)
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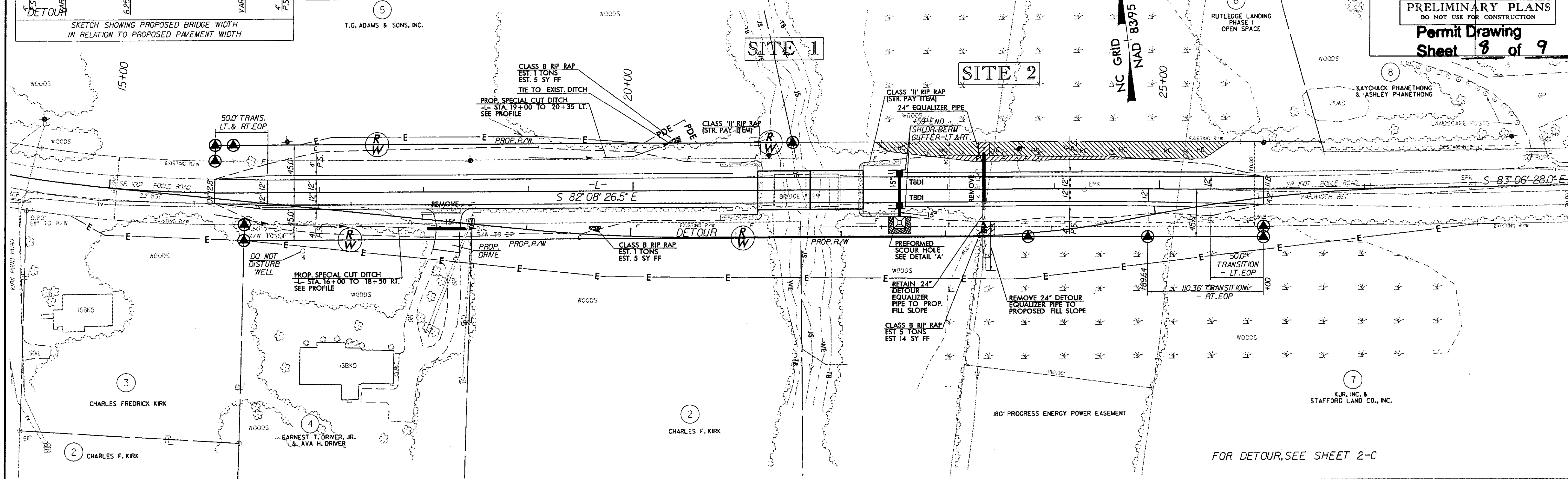
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 8 of 9

DENOTES FILL IN WETLAND

DENOTES HAND CLEARING

SKETCH SHOWING PROPOSED BRIDGE WIDTH IN RELATION TO PROPOSED PAVEMENT WIDTH



SITE 1
SITE 2
NC GRID NAD 83/95
180' PROGRESS ENERGY POWER EASEMENT
RUTLEDGE LANDING PHASE I OPEN SPACE
T.G. ADAMS & SONS, INC.
KAYCHACK PHANETHONG & ASHLEY PHANETHONG
CHARLES FREDRICK KIRK
CHARLES F. KIRK
EARNEST T. DRIVER, JR. & AVA H. DRIVER
KJR, INC. & STAFFORD LAND CO., INC.
CLASS B RIP RAP EST. 1 TONS EST. 5 SY FF
TIE TO EXIST. DITCH
PROP. SPECIAL CUT DITCH -L- STA. 19+00 TO 20+35 LT. SEE PROFILE
CLASS 'II' RIP RAP (STR. PAY ITEM)
24" EQUALIZER PIPE
SHLDR. BERM GUTTER -LT.&RT.
50.0' TRANS. LT.& RT.EOP
S 82° 08' 26.5" E
S 83° 06' 28.0" E
BRIDGE
DETOUR
PROP. R/W
DO NOT DISTURB WELL
PROP. SPECIAL CUT DITCH -L- STA. 16+00 TO 18+50 RT. SEE PROFILE
PREFORMED SCOUR HOLE SEE DETAIL 'A'
RETAIN 24" DETOUR EQUALIZER PIPE TO PROP. FILL SLOPE
CLASS B RIP RAP EST 5 TONS EST 14 SY FF
REMOVE 24" DETOUR EQUALIZER PIPE TO PROPOSED FILL SLOPE
50.0' TRANSITION - LT. EOP
110.36' TRANSITION - RT. EOP
FOR DETOUR, SEE SHEET 2-C

BM #1 ELEV.= 183.32'
-L- STA.21+65.65, 59.33' LT.
RR SPIKE IN 46" POPLAR

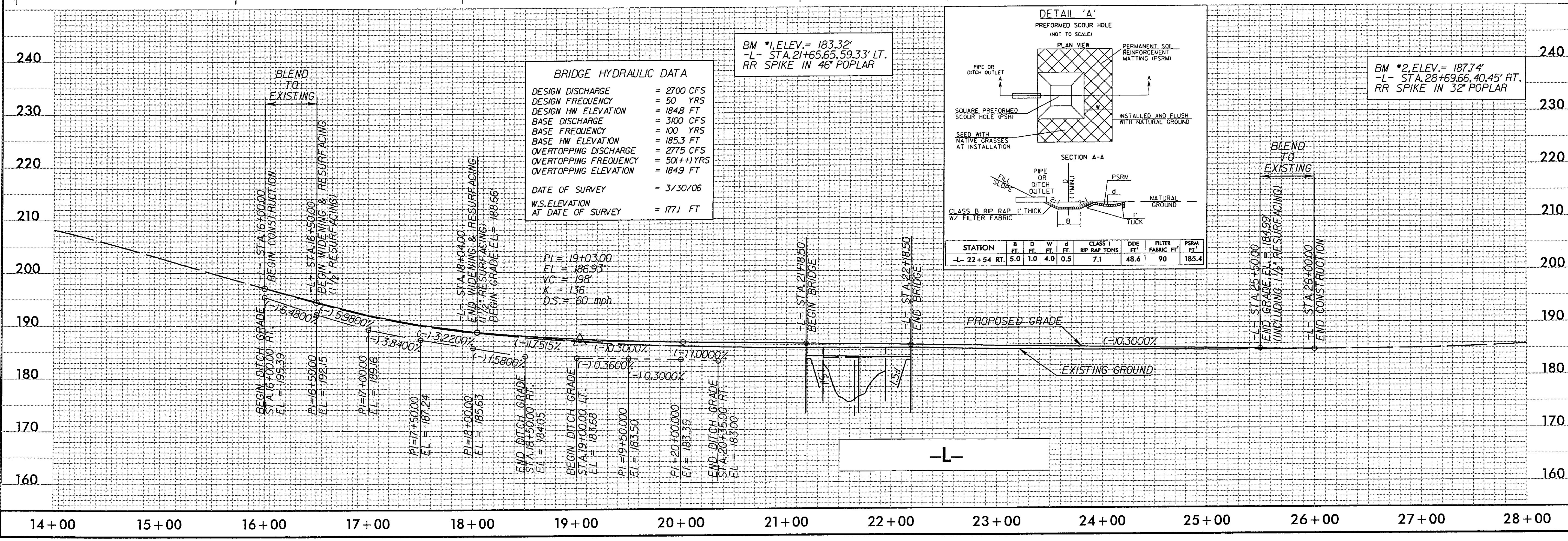
BM #2 ELEV.= 187.74'
-L- STA.28+69.66, 40.45' RT.
RR SPIKE IN 32" POPLAR

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2700 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 184.8 FT
BASE DISCHARGE	= 3100 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 185.3 FT
OVERTOPPING DISCHARGE	= 2775 CFS
OVERTOPPING FREQUENCY	= 50(+/-) YRS
OVERTOPPING ELEVATION	= 184.9 FT
DATE OF SURVEY	= 3/30/06
W.S. ELEVATION AT DATE OF SURVEY	= 177.1 FT

DETAIL 'A'
PREFORMED SCOUR HOLE (NOT TO SCALE)

STATION	B FT.	D FT.	W FT.	d FT.	CLASS I RIP RAP TONS	DDE FT³	FILTER FABRIC FT²	PSRM FT²
-L- 22+54 RT.	5.0	1.0	4.0	0.5	7.1	48.6	90	185.4



BLEND TO EXISTING
PI = 19+03.00
EL = 186.93'
VC = 198'
K = 136
D.S. = 60 mph
PROPOSED GRADE
EXISTING GROUND
-L- STA.16+00.00 BEGIN CONSTRUCTION
-L- STA.16+50.00 BEGIN WIDENING & RESURFACING (1 1/2" RESURFACING)
-L- STA.18+04.00 END WIDENING & RESURFACING (1 1/2" RESURFACING) BEGIN GRADE EL= 188.66'
-L- STA.21+18.50 BEGIN BRIDGE
-L- STA.22+18.50 END BRIDGE
-L- STA.25+50.00 END GRADE EL= 184.99' (INCLUDING 1 1/2" RESURFACING)
-L- STA.26+00.00 END CONSTRUCTION
-L-

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STREAM & WETLAND IMPACTS

ENGLISH

PROJECT REFERENCE NO.	SHEET NO.
B-4301	4
R/W SHEET NO.	

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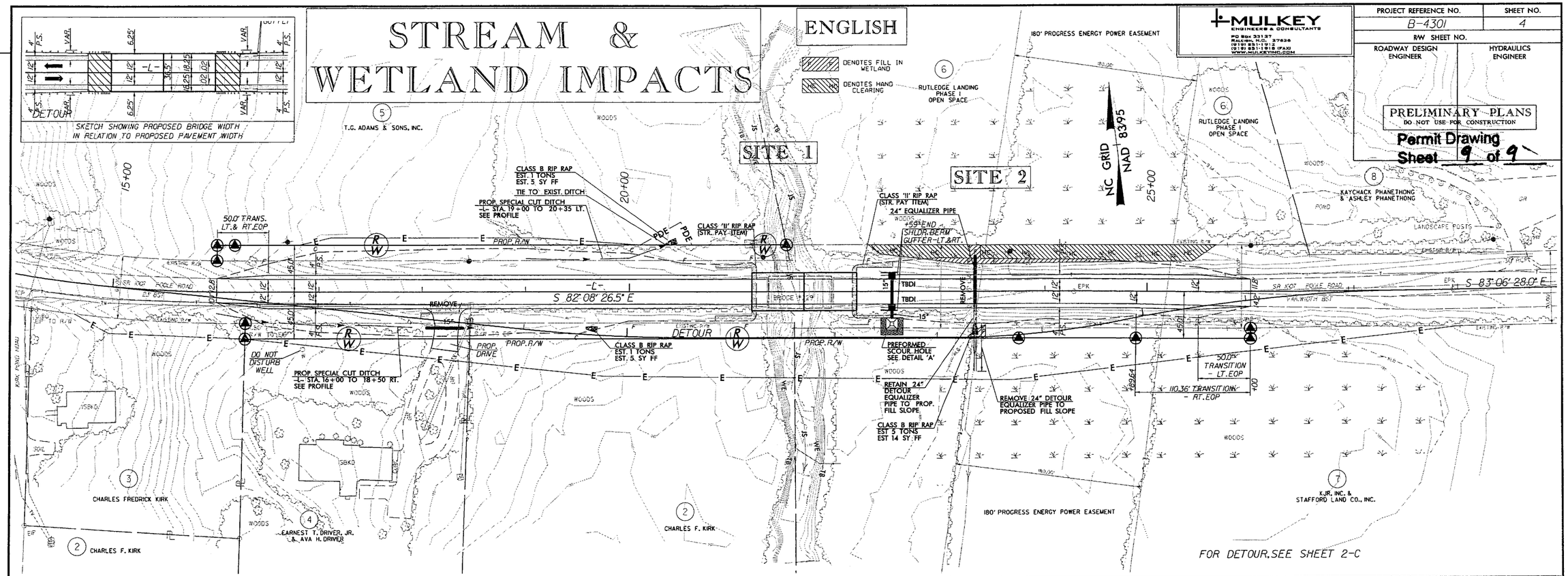
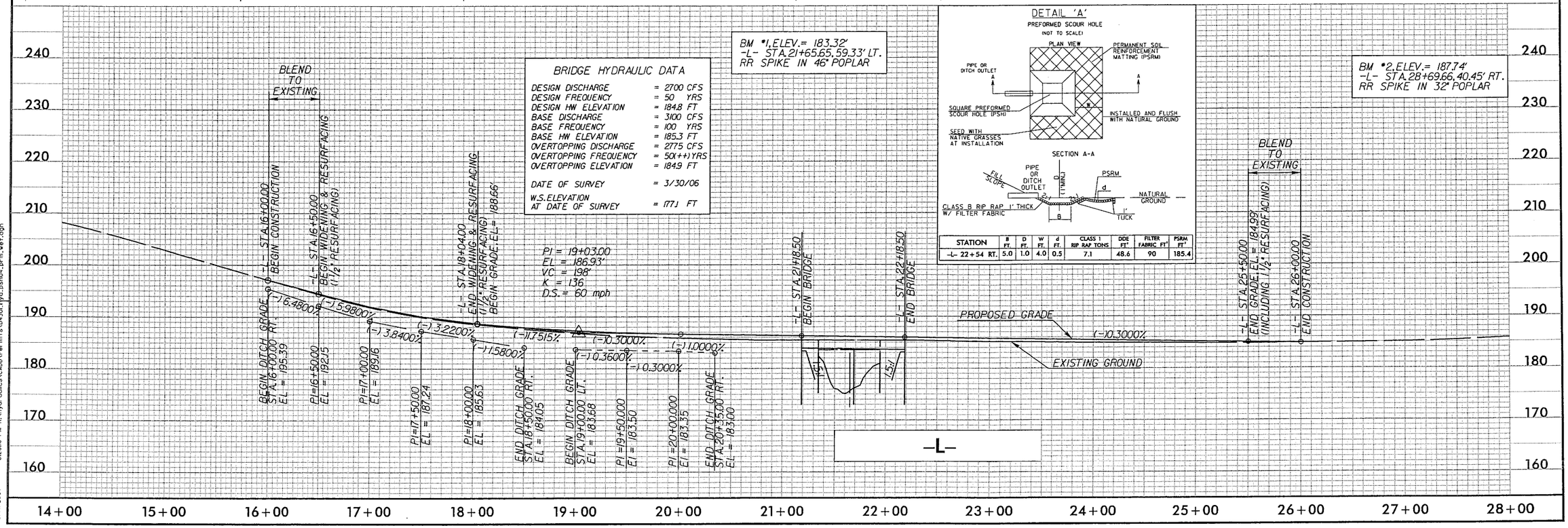
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 9 of 9





BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2700 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 184.8 FT
BASE DISCHARGE	= 3100 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 185.3 FT
OVERTOPPING DISCHARGE	= 2775 CFS
OVERTOPPING FREQUENCY	= 50(++) YRS
OVERTOPPING ELEVATION	= 184.9 FT
DATE OF SURVEY	= 3/30/06
W.S. ELEVATION AT DATE OF SURVEY	= 177.1 FT

PI = 19+03.00
EL = 186.93'
VC = 198'
K = 136
D.S. = 60 mph

BM #1, ELEV.= 183.32'
-L- STA. 21+65.65, 59.33' LT.
RR SPIKE IN 46" POPLAR

BM #2, ELEV.= 187.74'
-L- STA. 28+69.66, 40.45' RT.
RR SPIKE IN 32" POPLAR

DETAIL 'A'
PREFORMED SCOUR HOLE
(NOT TO SCALE)

STATION	B FT.	D FT.	W FT.	d FT.	CLASS I RIP RAP TONS	DDE FT²	FILTER FABRIC FT²	PSRM FT²
-L- 22+54 RT.	5.0	1.0	4.0	0.5	7.1	48.6	90	185.4

REVISIONS

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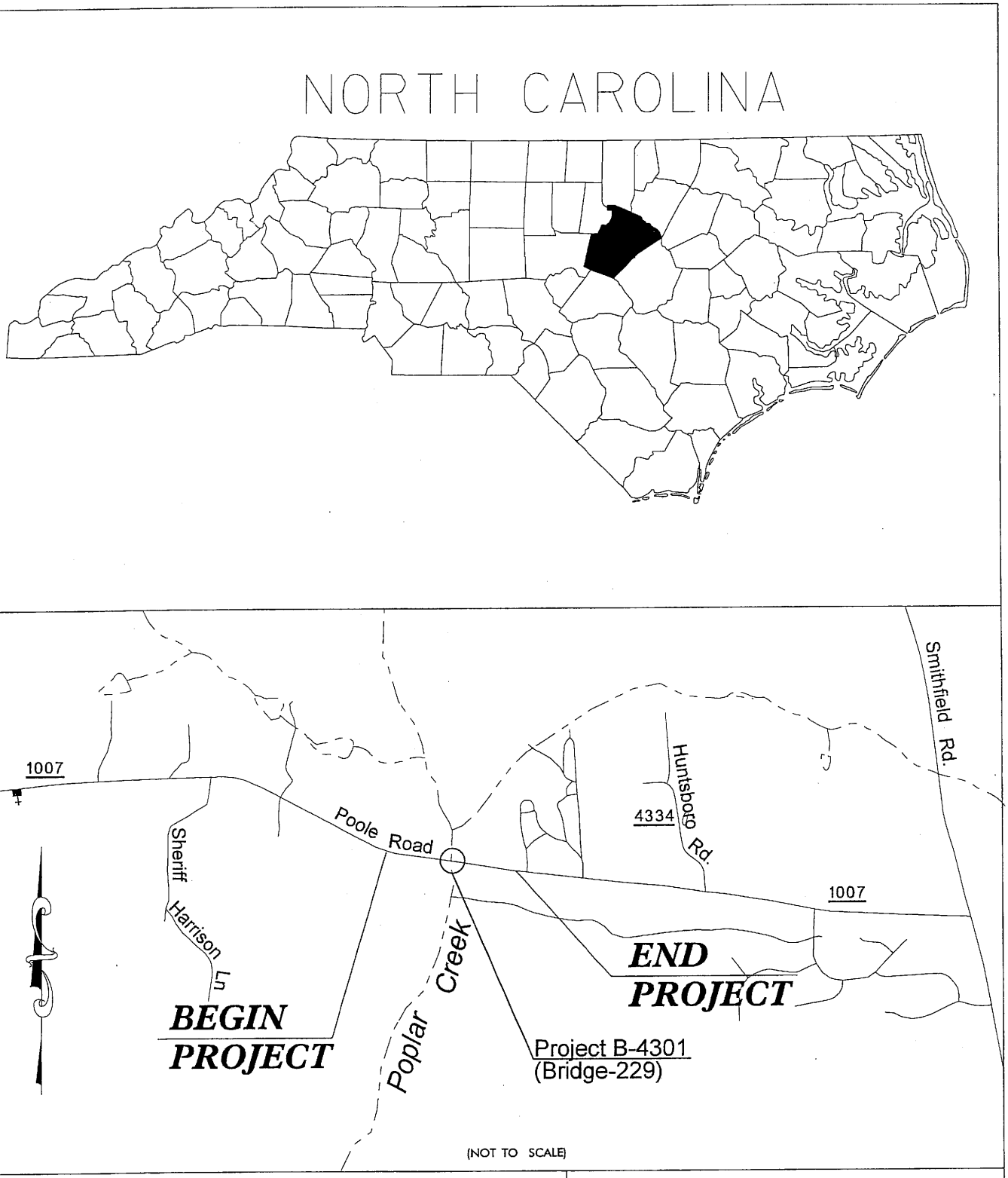
8/14/2007



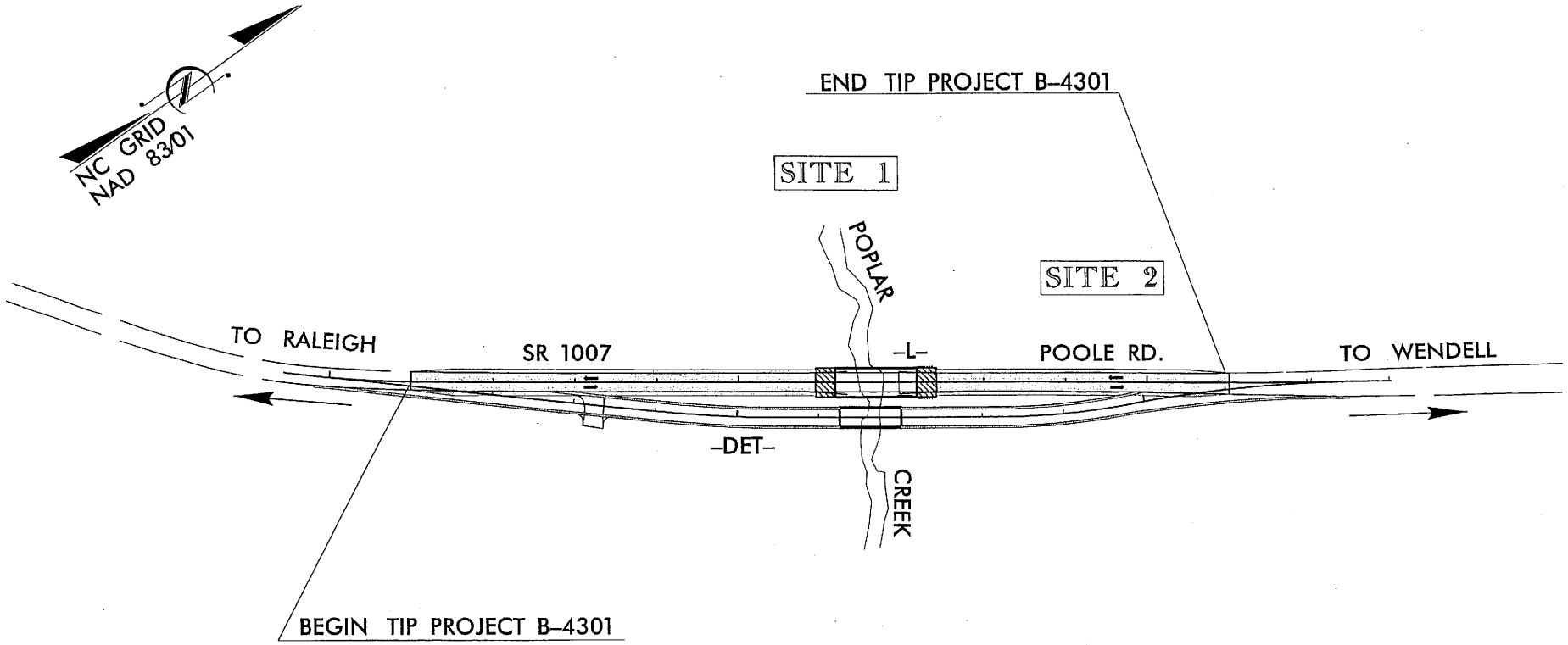
Buffer Impact Drawings

VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4301 (BRIDGE #229)
BRIDGE NO. 229 OVER
POPLAR CREEK
ON SR 1007
(POOLE ROAD)

SHEET 1 OF 10 04/20/2007



SITE MAP

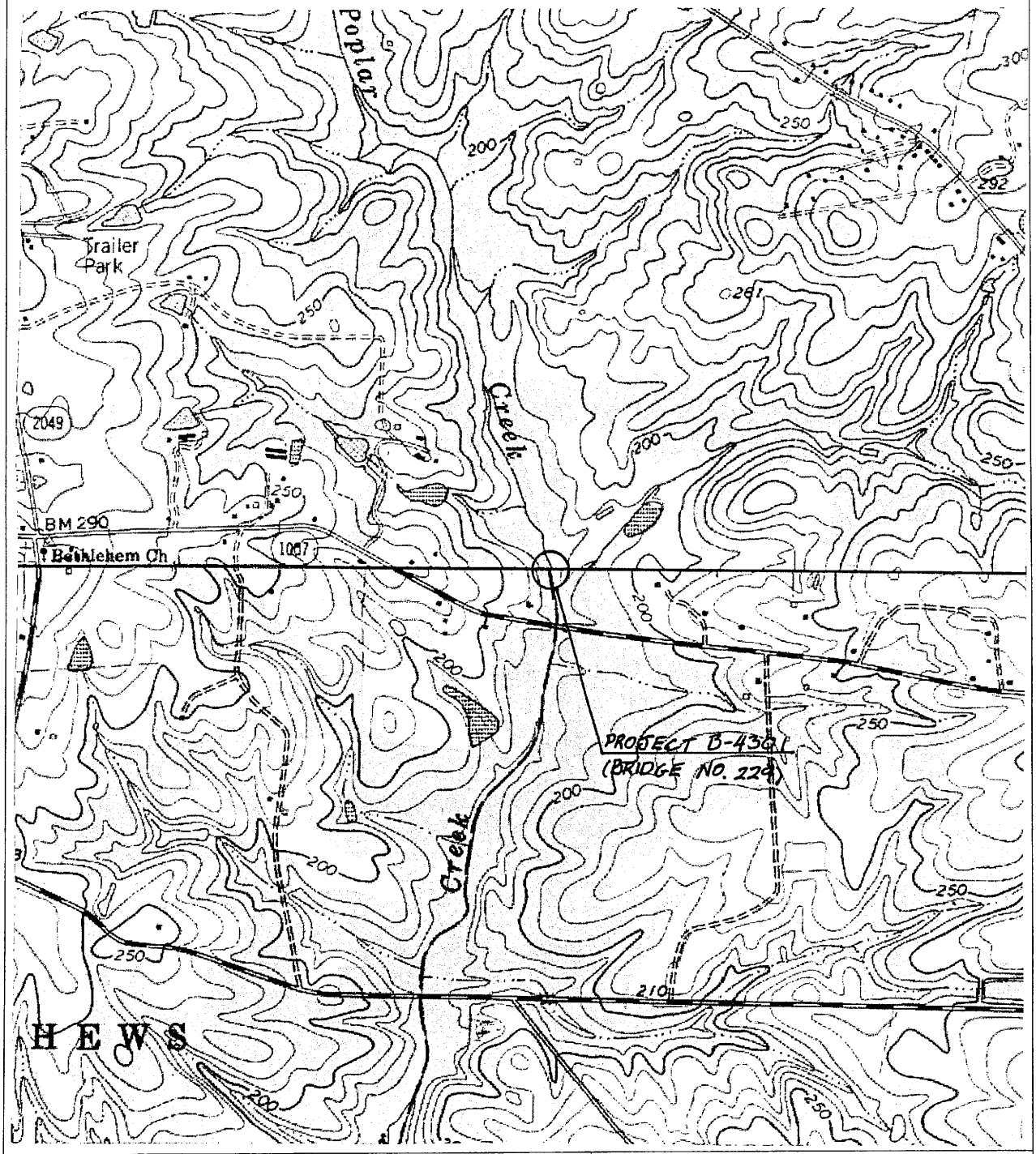
NOT TO SCALE

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4301 (BRIDGE #229)
BRIDGE NO. 229 OVER
POPLAR CREEK
ON SR 1007
(POOLE ROAD)

SHEET 2 OF 10

04/20/2007



TOPO MAP

SCALE: 1" : 1500'

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4301 (BRIDGE #229)
BRIDGE NO. 229 OVER
POPLAR CREEK
ON SR 1007
(POOLE ROAD)

SHEET 3 OF 10 04 / 20 / 2007

PROPERTY OWNERS

NAMES AND ADDRESSES

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5	T. G. Adams & Sons, Inc.	8709 Poole Road Knightdale, NC 27545
6	R & D Development, LLC	P.O. Box 216 Zebulon, NC 27597
7	Eden Croft Development Co., Inc.	P. O. Box 19307 Raleigh, NC 27619

NCDOT

DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: B-4301 (BRIDGE #229)
BRIDGE NO. 229 OVER
POPLAR CREEK
ON SR 1007
(POOLE ROAD)

 04/20/2007

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	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	BRIDGE	21+19 to 22+19 -L-		X		631	136	767					
1	DETOUR	20+85 to 22+41 DETOUR	X			3261	2138	5399					
TOTAL:						3892	2274	6166					

Notes:

* Total linear feet of buffer impacts associated with the permanent road facility along the stream is 18 Feet. Therefore, road crossing impacts are exempt, so road crossing impacts associated with the permanent road facility have been excluded from this table.

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

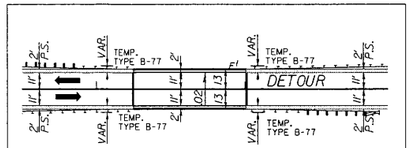
WAKE COUNTY
PROJECT: B-4301 (BRIDGE #229)

8/14/2007
SHEET 5 OF 10

Rev. May 2006

BUFFER IMPACTS

DETOUR



SKETCH SHOWING PROPOSED BRIDGE WIDTH IN RELATION TO PROPOSED PAVEMENT WIDTH

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PROJECT REFERENCE NO.	SHEET NO.
B-4301	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

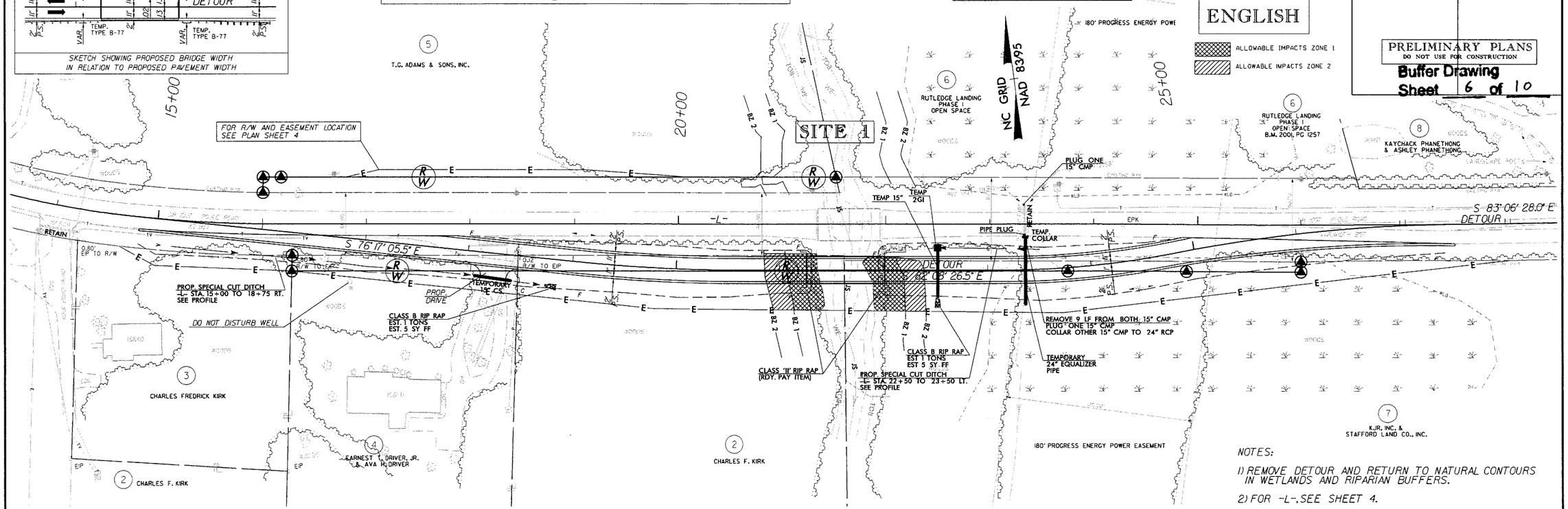
ENGLISH

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

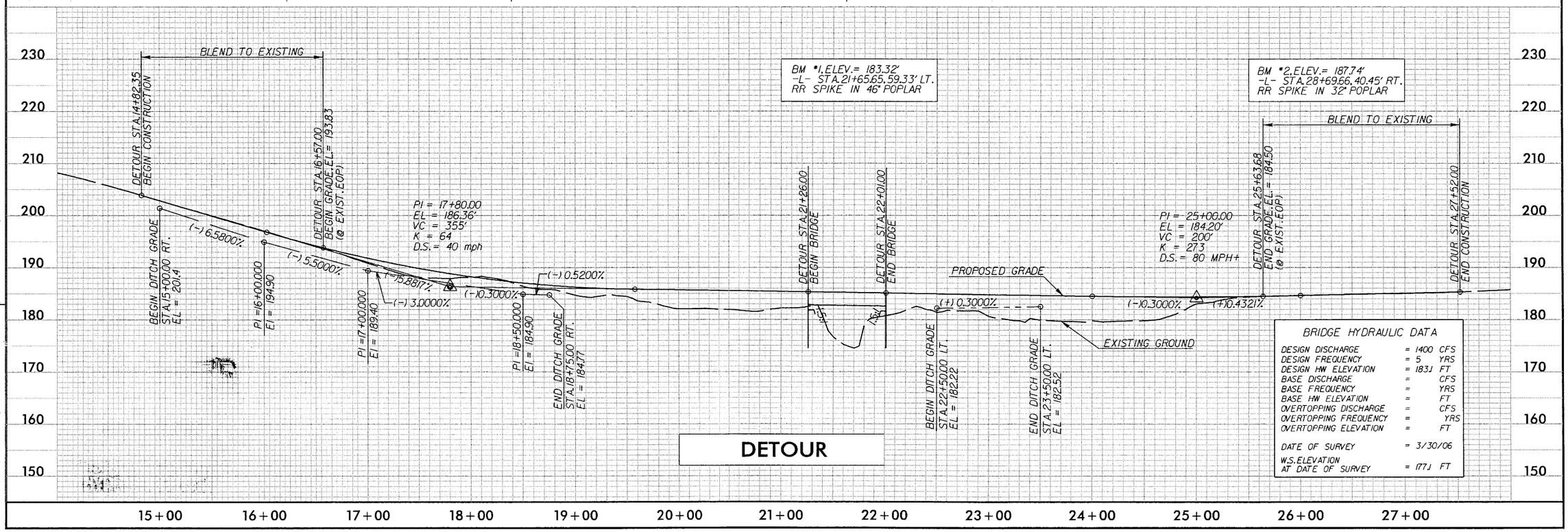
Buffer Drawing Sheet 6 of 10



NOTES:

1) REMOVE DETOUR AND RETURN TO NATURAL CONTOURS IN WETLANDS AND RIPARIAN BUFFERS.

2) FOR -L-, SEE SHEET 4.



DETOUR

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	1400 CFS
DESIGN FREQUENCY	=	5 YRS
DESIGN HW ELEVATION	=	183.1 FT
BASE DISCHARGE	=	CFS
BASE FREQUENCY	=	YRS
BASE HW ELEVATION	=	FT
OVERTOPPING DISCHARGE	=	CFS
OVERTOPPING FREQUENCY	=	YRS
OVERTOPPING ELEVATION	=	FT
DATE OF SURVEY	=	3/30/06
W.S. ELEVATION AT DATE OF SURVEY	=	177.1 FT

REVISIONS

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BUFFER IMPACTS

DETOUR

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PROJECT REFERENCE NO.	SHEET NO.
B-4301	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

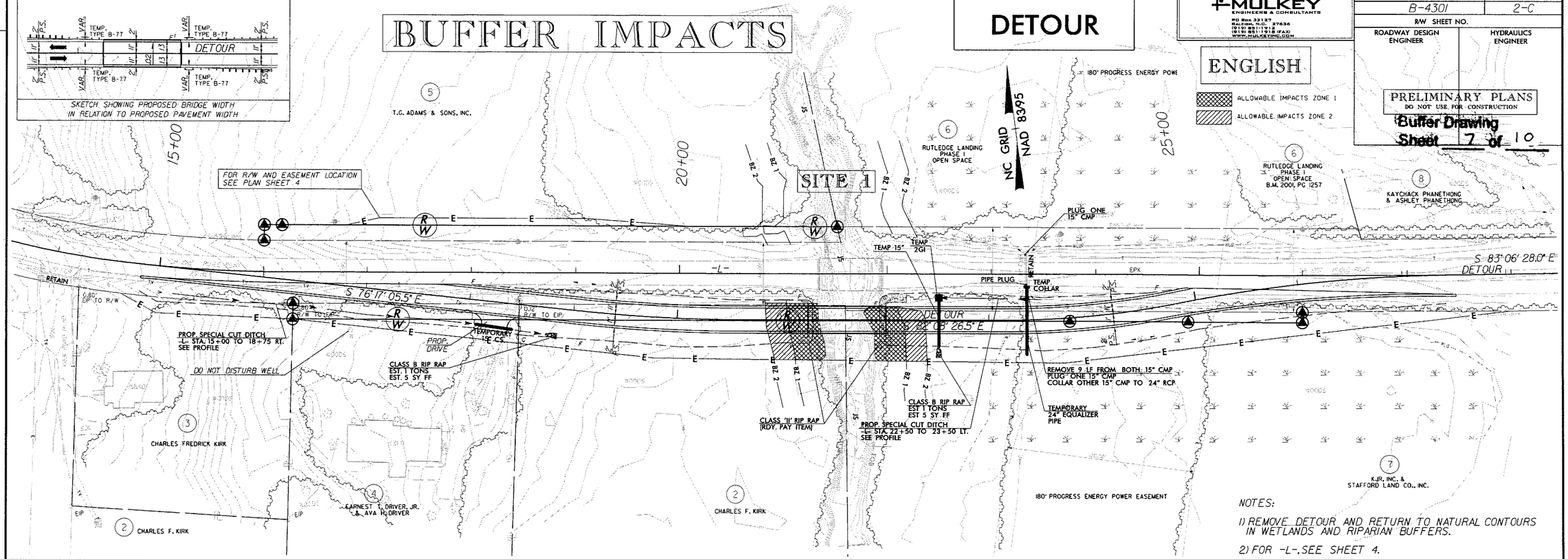
ENGLISH

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

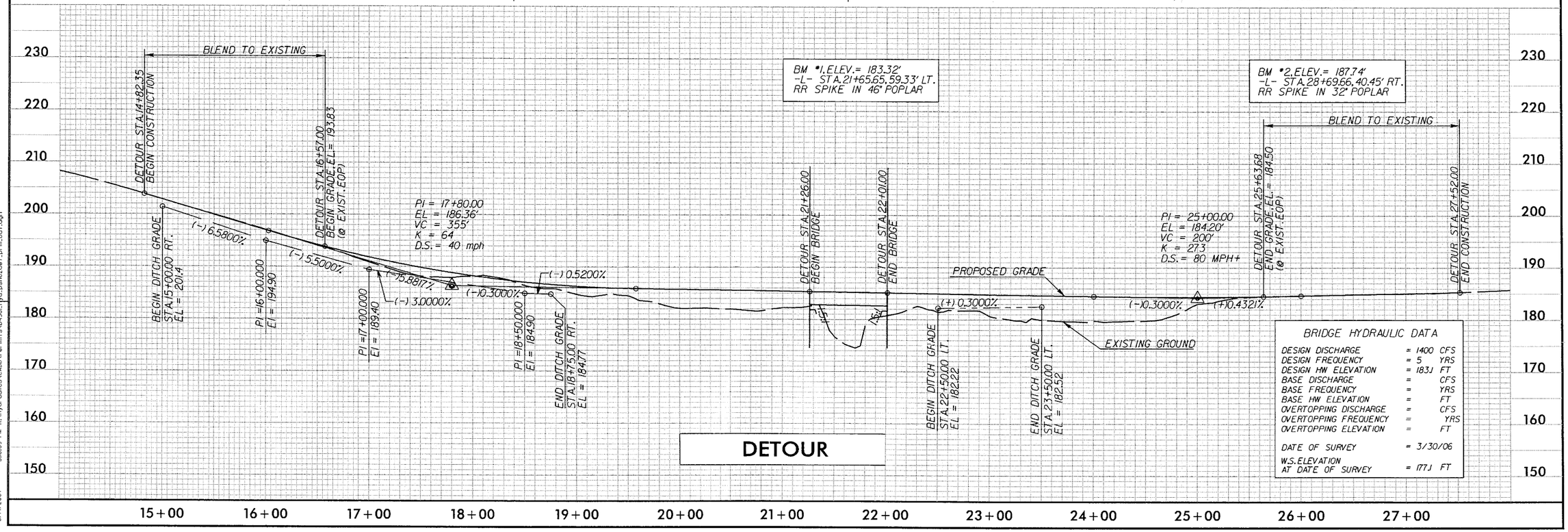
Buffer Drawing Sheet 7 of 10



NOTES:

1) REMOVE DETOUR AND RETURN TO NATURAL CONTOURS IN WETLANDS AND RIPARIAN BUFFERS.

2) FOR -L-, SEE SHEET 4.



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1400	CFS
DESIGN FREQUENCY	= 5	YRS
DESIGN HW ELEVATION	= 183.1	FT
BASE DISCHARGE	=	CFS
BASE FREQUENCY	=	YRS
BASE HW ELEVATION	=	FT
OVERTOPPING DISCHARGE	=	CFS
OVERTOPPING FREQUENCY	=	YRS
OVERTOPPING ELEVATION	=	FT
DATE OF SURVEY	= 3/30/06	
W.S. ELEVATION AT DATE OF SURVEY	= 177.1	FT

REVISIONS

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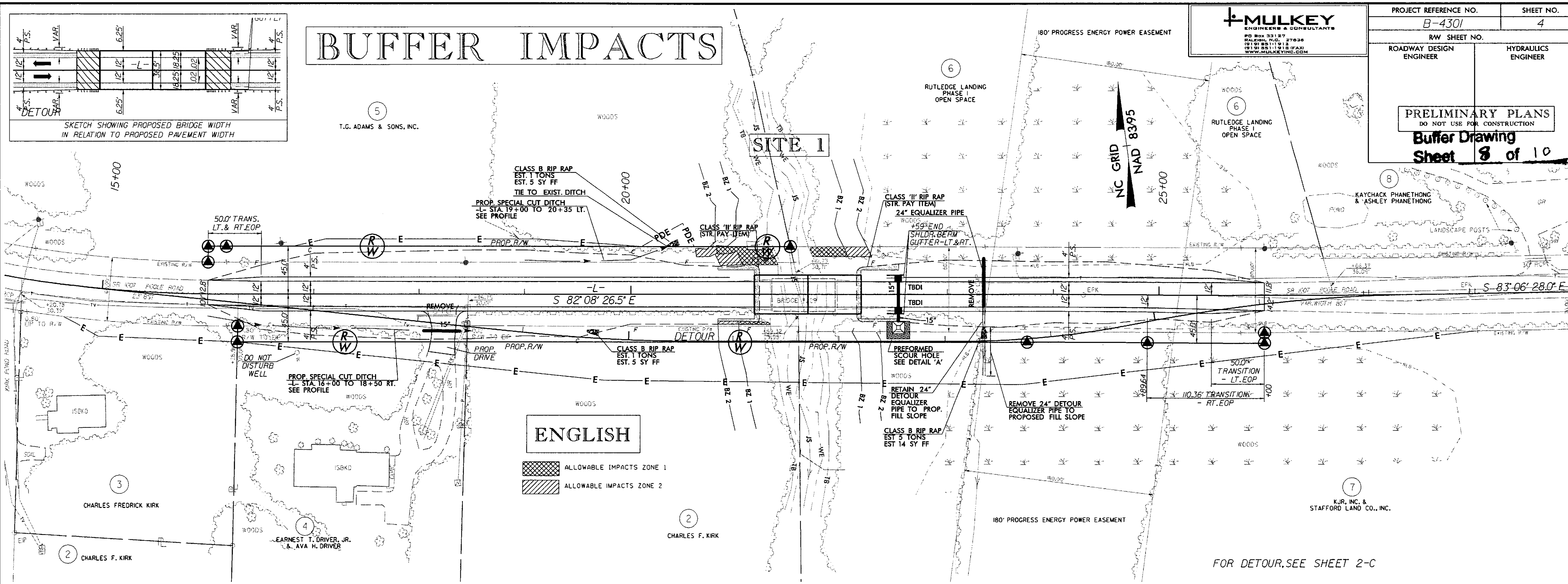
PROJECT REFERENCE NO.	SHEET NO.
B-4301	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

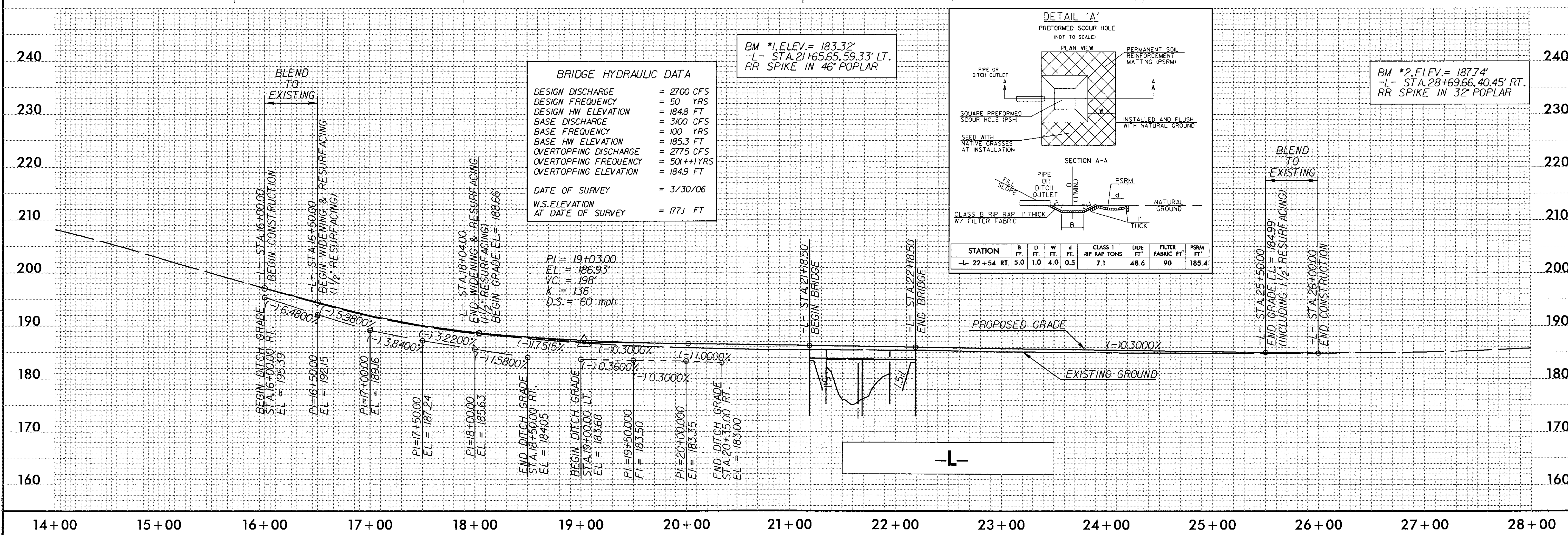
Buffer Drawing Sheet 8 of 10

MULKEY ENGINEERS & CONSULTANTS

BUFFER IMPACTS



SKETCH SHOWING PROPOSED BRIDGE WIDTH IN RELATION TO PROPOSED PAVEMENT WIDTH
SITE 1
NC GRID NAD 83/95
T.G. ADAMS & SONS, INC.
RUTLEDGE LANDING PHASE I OPEN SPACE
180' PROGRESS ENERGY POWER EASEMENT
KAYCHACK PHANETHONG & ASHLEY PHANETHONG
CHARLES FREDRICK KIRK
EARNEST T. DRIVER, JR. & AVA H. DRIVER
CHARLES F. KIRK
K.J.R. INC. & STAFFORD LAND CO., INC.
S 82° 08' 26.5" E
S 83° 06' 28.0" E
DETOUR
CLASS B RIP RAP EST. 1 TONS EST. 5 SY FF
TIE TO EXIST. DITCH
PROP. SPECIAL CUT DITCH -L- STA. 19+00 TO 20+35 LT. SEE PROFILE
PROP. SPECIAL CUT DITCH -L- STA. 16+00 TO 18+50 RT. SEE PROFILE
CLASS 'II' RIP RAP (STR. PAY ITEM)
24" EQUALIZER PIPE
PREFORMED SCOUR HOLE SEE DETAIL 'A'
RETAIN 24" DETOUR EQUALIZER PIPE TO PROP. FILL SLOPE
REMOVE 24" DETOUR EQUALIZER PIPE TO PROPOSED FILL SLOPE
CLASS B RIP RAP EST 5 TONS EST 14 SY FF
DO NOT DISTURB WELL
ENGLISH
ALLOWABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2
FOR DETOUR, SEE SHEET 2-C



BM #1, ELEV.= 183.32' -L- STA. 21+65.65, 59.33' LT. RR SPIKE IN 46" POPLAR
BM #2, ELEV.= 187.74' -L- STA. 28+69.66, 40.45' RT. RR SPIKE IN 32" POPLAR
PI = 19+03.00
EL = 186.93'
VC = 198'
K = 136
D.S. = 60 mph
BLEND TO EXISTING
PROPOSED GRADE
EXISTING GROUND
-L- STA. 21+18.50 BEGIN BRIDGE
-L- STA. 22+18.50 END BRIDGE
-L-

BRIDGE HYDRAULIC DATA

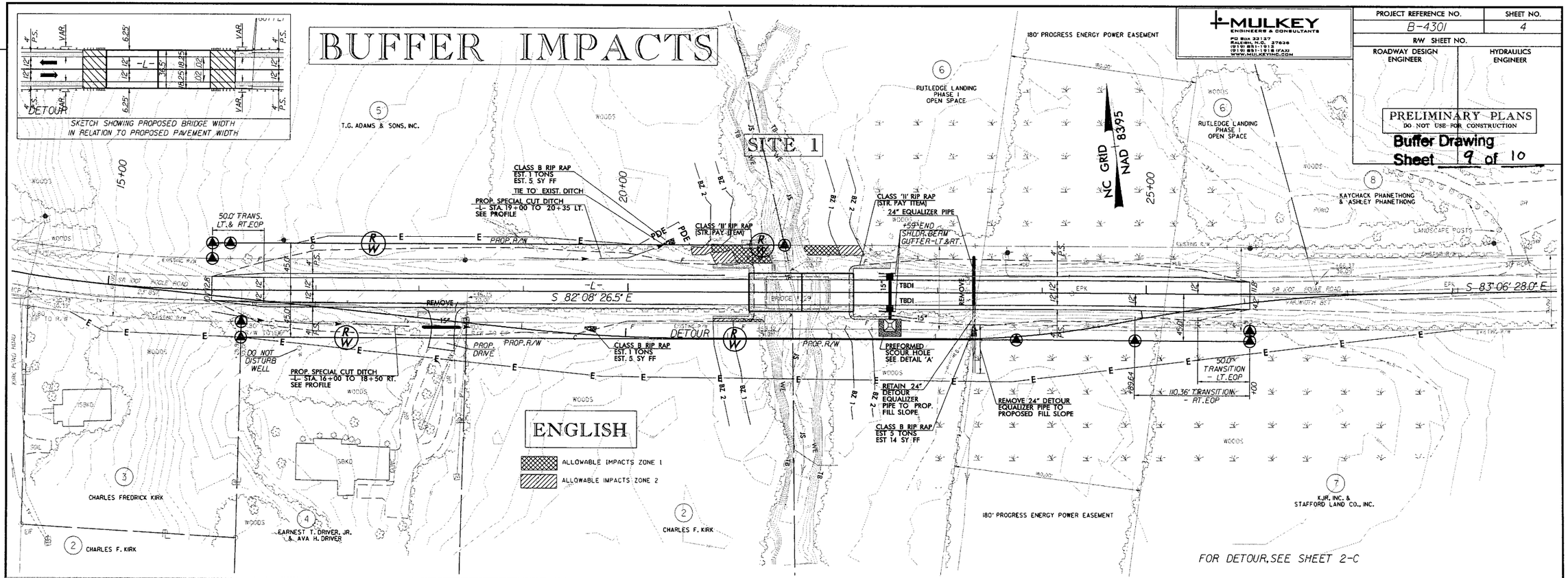
DESIGN DISCHARGE	= 2700 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 184.8 FT
BASE DISCHARGE	= 3100 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 185.3 FT
OVERTOPPING DISCHARGE	= 2775 CFS
OVERTOPPING FREQUENCY	= 50(+) YRS
OVERTOPPING ELEVATION	= 184.9 FT
DATE OF SURVEY	= 3/30/06
W.S. ELEVATION AT DATE OF SURVEY	= 177.1 FT

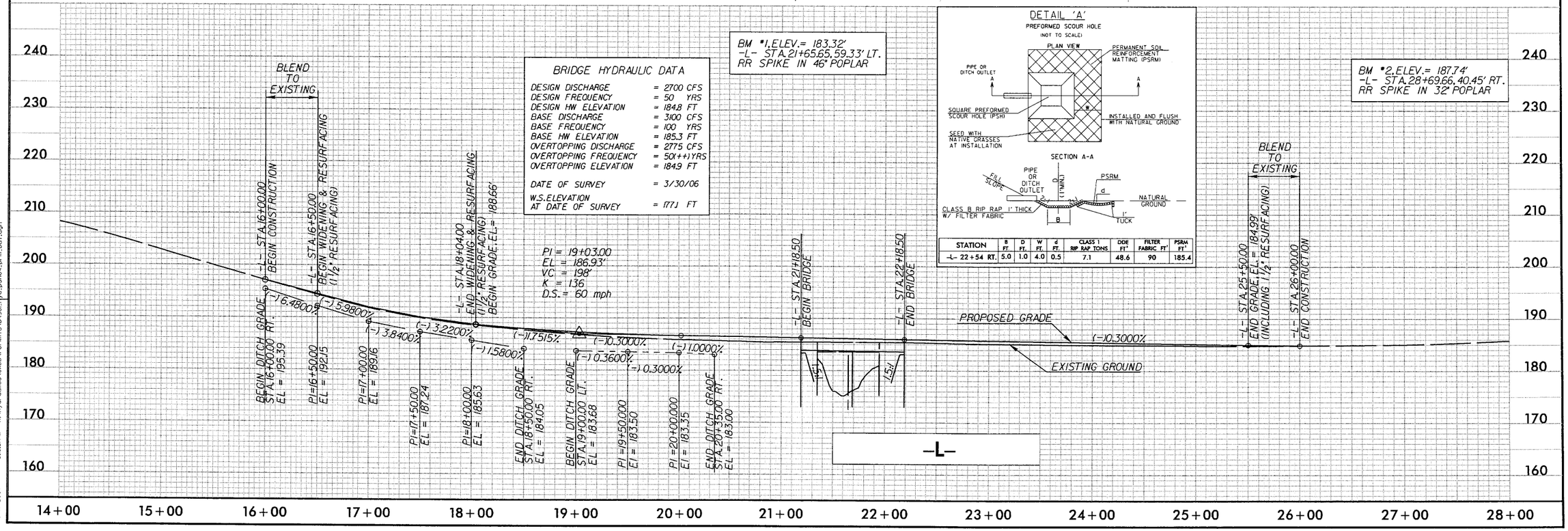
DETAIL 'A'
PREFORMED SCOUR HOLE
(NOT TO SCALE)

STATION	B FT.	D FT.	W FT.	d FT.	CLASS 1 RIP RAP TONS	DDE FT³	FILTER FABRIC FT²	PSRM FT²
-L- 22+54 RT.	5.0	1.0	4.0	0.5	7.1	48.6	90	185.4

BUFFER IMPACTS

SKETCH SHOWING PROPOSED BRIDGE WIDTH IN RELATION TO PROPOSED PAVEMENT WIDTH





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PROJECT REFERENCE NO.	SHEET NO.
B-4301	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Buffer Drawing Sheet 9 of 10

REVISIONS

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0 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4301	X-5

Buffer Drawing
Sheet 10 of 10

-L- STA. 22+18.50 +/-
END BRIDGE

DETOUR
22+02.23

22+00.00

DETOUR STA. 22+01.00 +/-
END BRIDGE

DETOUR
21+52.23

-L- STA. 21+18.50 +/-
BEGIN BRIDGE

21+50.00

DETOUR STA. 21+26.00 +/-
BEGIN BRIDGE

TOTAL LINEAR FEET OF BUFFER
IMPACTS ALONG THE STREAM= 18 FT.

BUFFER
WIDTH = 17 FT.

DETOUR
21+02.23

BUFFER WIDTH = 1 FT.

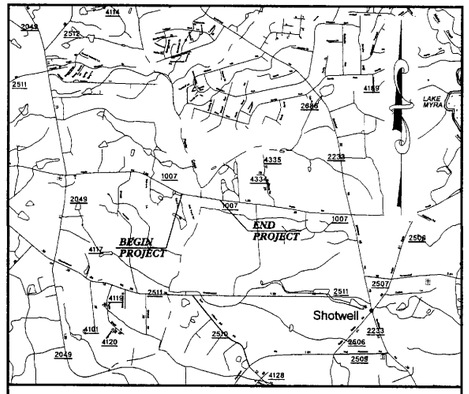
21+00.00

-L- w/ DETOUR

TIP: B-4301

CONTRACT:

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



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

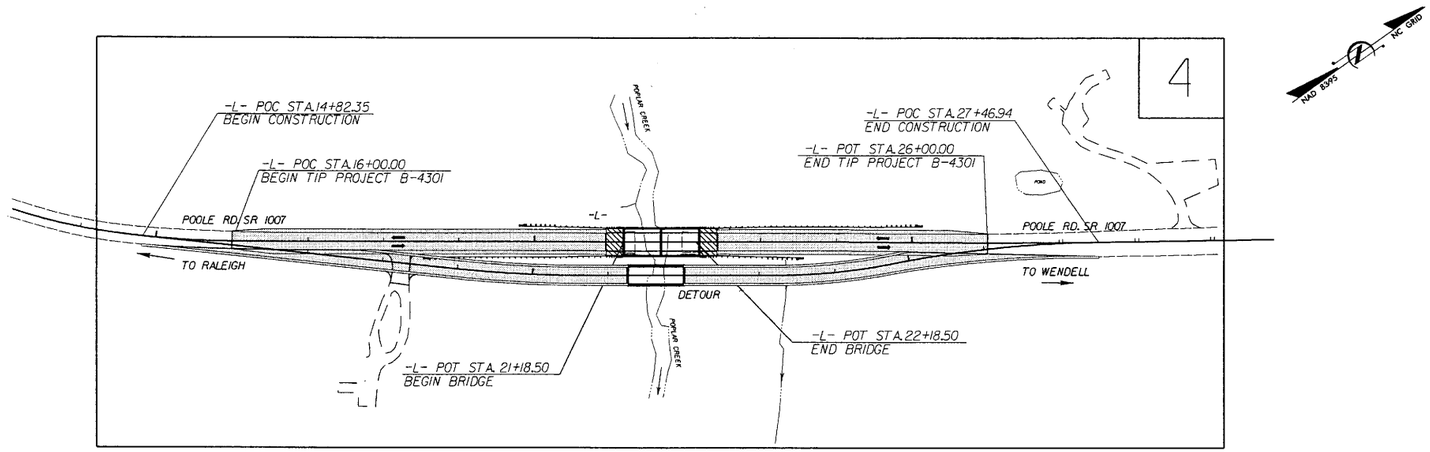
WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4301	1	

WBS NO.	F. A. PROJ. NO.	DESCRIPTION
33638.1.1	BRSTP-1007(9)	P.E.
33638.2.1	BRSTP-1007(9)	R/W, UTIL

LOCATION: BRIDGE NO. 229 OVER POPLAR CREEK ON SR 1007

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



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NCDOT CONTACT : DOUG TAYLOR, PE
PROJECT ENGINEER – ROADWAY DESIGN

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

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

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2008 = 5,804
ADT 2030 = 13,800
DHV = 10 %
D = 75 %
T = 4 % *
V = 60 MPH
FUNCTION. CLASS. = RURAL MAJOR COLLECTOR
* (TTST 1% + DUALS 3%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4301 = 0.170 MI
LENGTH STRUCTURE TIP PROJECT B-4301 = 0.019 MI
TOTAL LENGTH TIP PROJECT B-4301 = 0.189 MI

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MAY 18, 2007

LETTING DATE: MAY 20, 2008

TIM S. HAYES, PE
PROJECT ENGINEER

JOHNNY R. BANKS
PROJECT MANAGER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
P.E.
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

ART McMILLAN, P.E.
STATE HIGHWAY DESIGN ENGINEER

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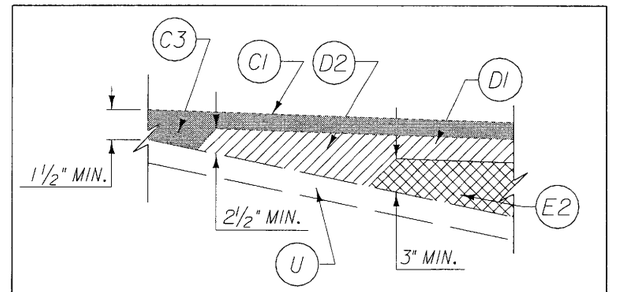
PROJECT REFERENCE NO.	SHEET NO.
B-4301	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

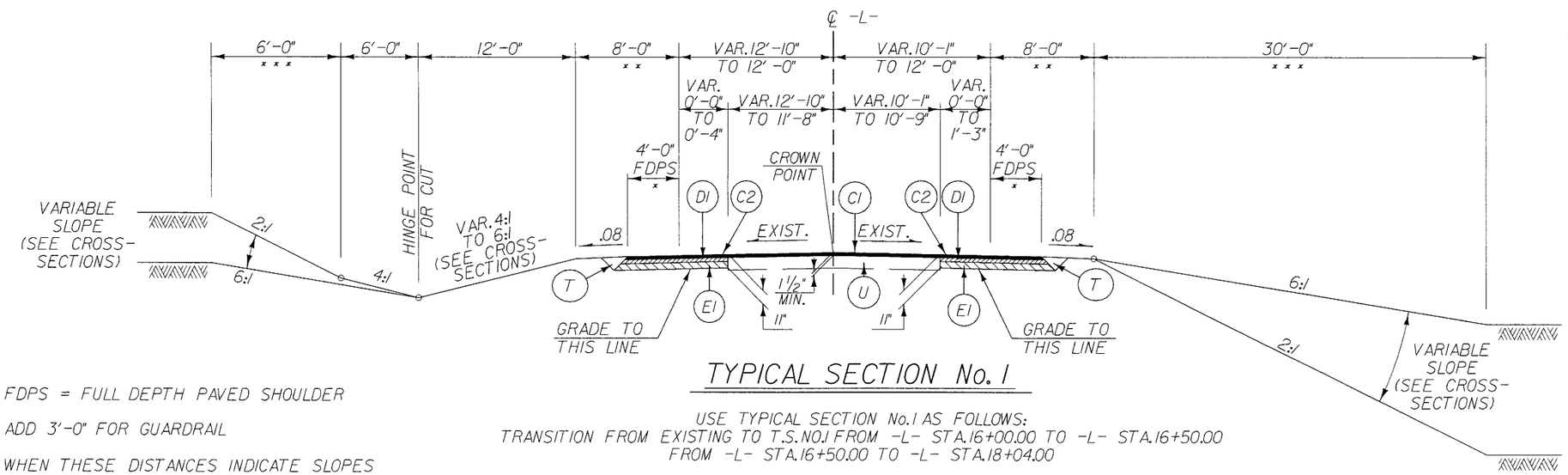
PAVEMENT SCHEDULE

C1	PROPOSED APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YARD
C2	PROPOSED APPROX. 3 " ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.
C3	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1 1/2" OR GREATER THAN 2" IN DEPTH.
D1	PROPOSED APPROX. 3 " ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YARD
D2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" OR GREATER THAN 4" IN DEPTH.
E1	PROPOSED APPROXIMATE 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YARD.
E2	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD, PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3 " OR GREATER THAN 5 1/2" IN DEPTH.
J1	8" AGGREGATE BASE COURSE
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING DETAIL

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



WEDGING DETAIL (W)



TYPICAL SECTION No. 1

USE TYPICAL SECTION No.1 AS FOLLOWS:
TRANSITION FROM EXISTING TO T.S.NO.1 FROM -L- STA.16+00.00 TO -L- STA.16+50.00
FROM -L- STA.16+50.00 TO -L- STA.18+04.00

* FDPS = FULL DEPTH PAVED SHOULDER

** ADD 3'-0" FOR GUARDRAIL

*** WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS OF 6:1 TO 2:1 THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

REVISIONS

7/16/2007 10:29:03 AM R:\Roadway\Proj\b4301_rdy_typ.dgn

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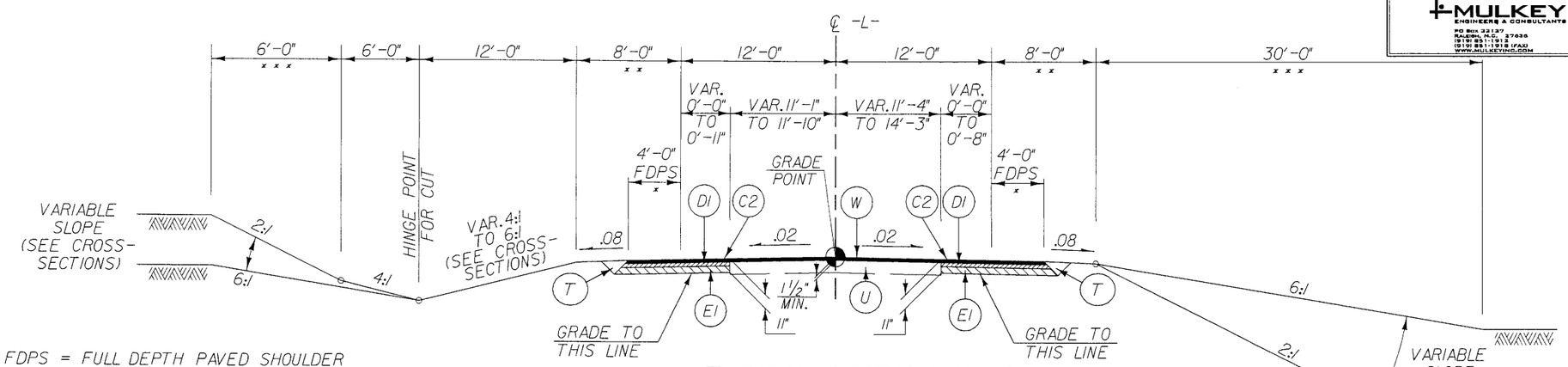
PROJECT REFERENCE NO.	SHEET NO.
B-4301	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



* FDPS = FULL DEPTH PAVED SHOULDER

** ADD 3'-0" FOR GUARDRAIL

*** WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS OF 6:1 TO 2:1 THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

TYPICAL SECTION No. 2

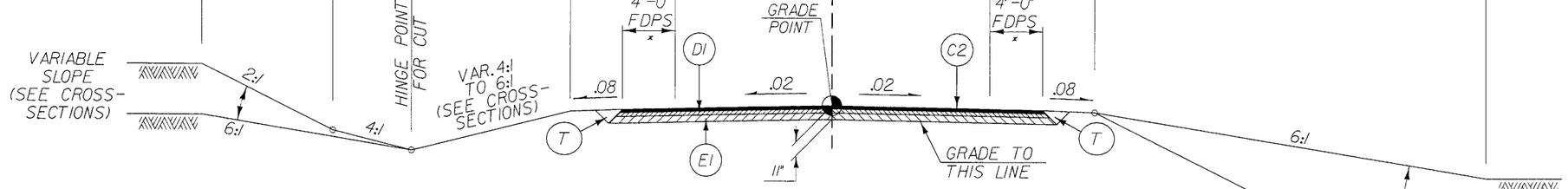
USE TYPICAL SECTION No. 2 AS FOLLOWS:
FROM -L- STA. 18+04.00.00 TO -L- STA. 20+50.00
FROM -L- STA. 23+00.00 TO -L- STA. 25+50.00
TRANSITION FROM T.S. NO.1 TO EXISTING FROM -L- STA. 25+50.00 TO -L- STA. 26+00.00

C1	1½" SF9.5B
C2	3" SF9.5B
C3	VAR. DEPTH SF9.5B
D1	3" 119.0B
D2	VAR. DEPTH 119.0B
E1	5" B25.0B
E2	VAR. DEPTH B25.0B
J1	8" ABC
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

NOTE:

1. SEE SHEET 2 FOR DETAILED DESCRIPTION OF PAVEMENT SCHEDULE

2. ALL PAVEMENT EDGES ARE 1:1 UNLESS OTHERWISE NOTED



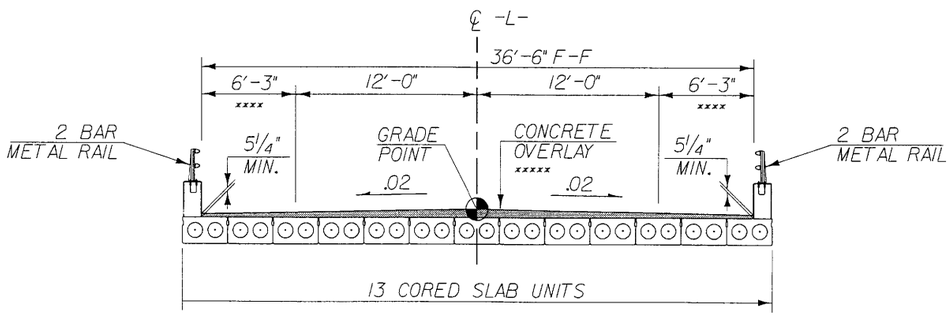
* FDPS = FULL DEPTH PAVED SHOULDER

** ADD 3'-0" FOR GUARDRAIL

*** WHEN THESE DISTANCES INDICATE SLOPES OUTSIDE THE LIMITS OF 6:1 TO 2:1 THE DISTANCE BECOMES VARIABLE AND THE MAXIMUM OR MINIMUM SLOPE MAINTAINED.

TYPICAL SECTION No. 3

USE TYPICAL SECTION No. 3 AS FOLLOWS:
FROM -L- STA. 20+50.00 TO -L- STA. 21+18.50 (BEGIN BRIDGE)
FROM -L- STA. 22+18.50 (END BRIDGE) TO -L- STA. 23+00.00



TYPICAL SECTION No. 4

USE TYPICAL SECTION No. 4 AS FOLLOWS:
FROM -L- STA. 21+18.50 (BEGIN BRIDGE) TO -L- STA. 22+18.50 (END BRIDGE)

**** OFFSET INCREASED TO 6'-3" TO ACCOUNT FOR HYDRAULIC SPREAD
***** STRUCTURE PAY ITEM

REVISIONS

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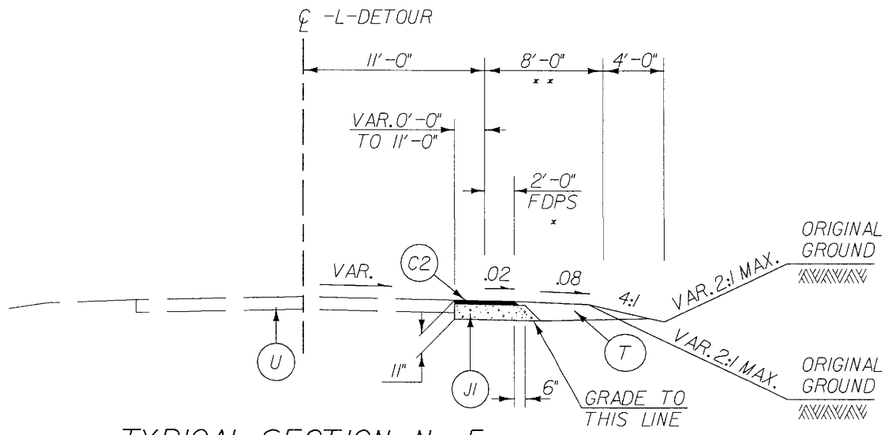
PROJECT REFERENCE NO.	SHEET NO.
B-4301	2-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



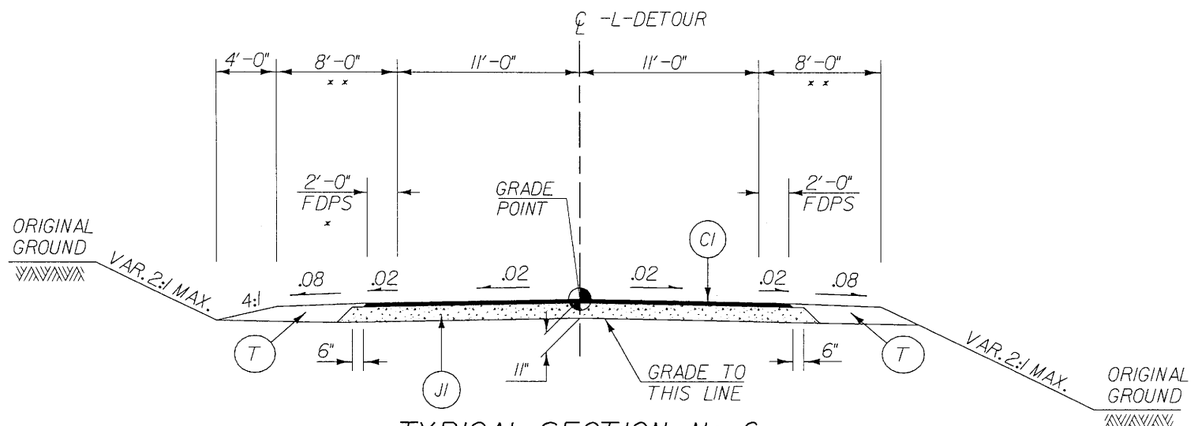
TYPICAL SECTION No. 5

USE TYPICAL SECTION No.5 AS FOLLOWS:

FROM DETOUR STA.14+82.35 TO DETOUR STA.16+57.00
FROM DETOUR STA.25+63.68 TO DETOUR STA.27+52.00

* FDPS = FULL DEPTH PAVED SHOULDER

** ADD 2'-0" FOR GUARDRAIL



TYPICAL SECTION No. 6

USE TYPICAL SECTION No.6 AS FOLLOWS:

FROM DETOUR STA.16+57.00 TO DETOUR STA.21+26.00 (BEGIN BRIDGE)
FROM DETOUR STA.22+01.00 (END BRIDGE) TO DETOUR STA.25+63.68

C1	1½" SF9.5B
C2	3" SF9.5B
C3	VAR. DEPTH SF9.5B
D1	3" I19.0B
D2	VAR. DEPTH I19.0B
E1	5" B25.0B
E2	VAR. DEPTH B25.0B
J1	8" ABC
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

NOTE:

1. SEE SHEET 2 FOR DETAILED DESCRIPTION OF PAVEMENT SCHEDULE

2. ALL PAVEMENT EDGES ARE 1:1 UNLESS OTHERWISE NOTED

REVISIONS

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DETOUR

PROJECT REFERENCE NO.	SHEET NO.
B-4301	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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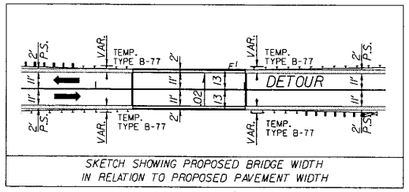
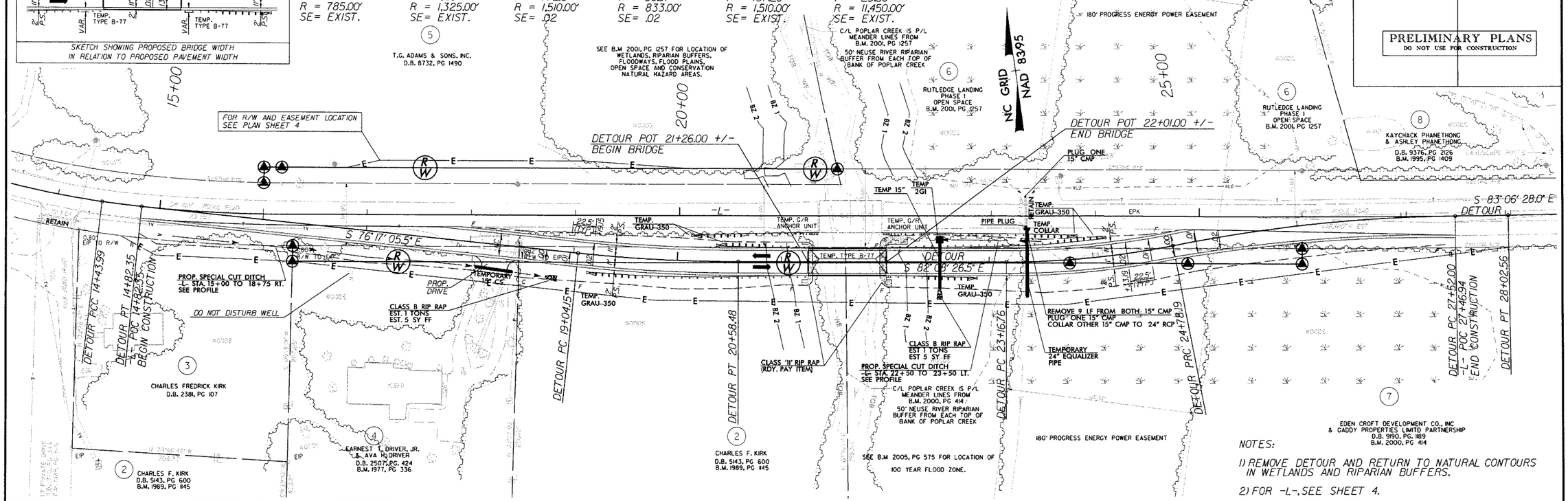
REVISIONS



DETOUR

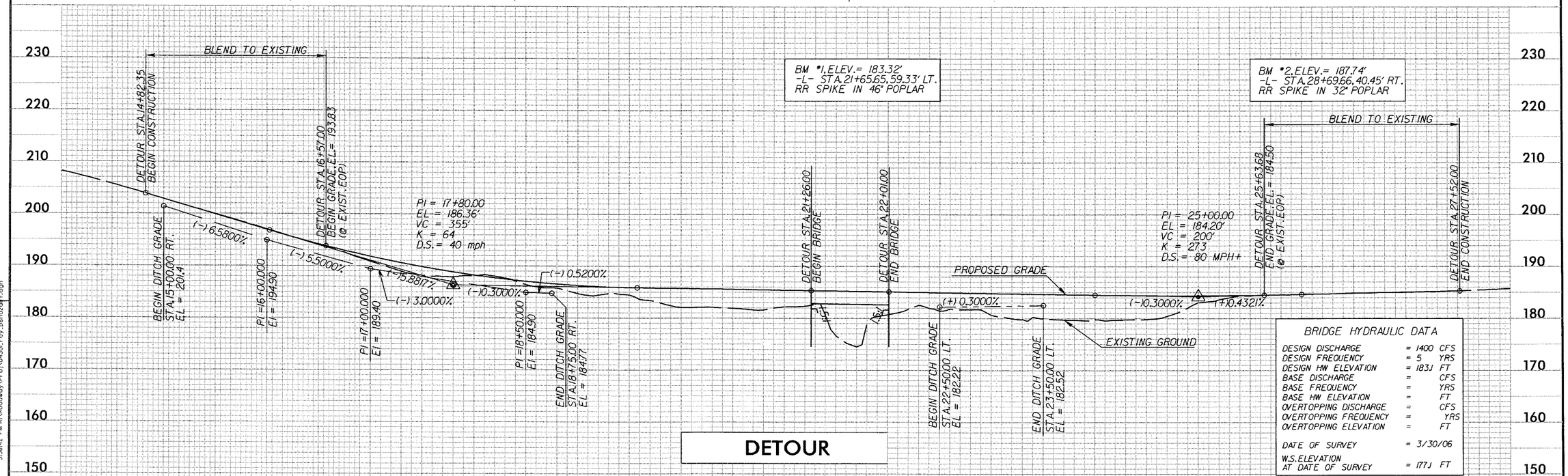
PI Sta 13+64.68	PI Sta 14+63.17	PI Sta 19+81.38	PI Sta 23+97.73	PI Sta 26+15.47	PI Sta 27+77.28
Δ = 11° 37' 00.6" (LT)	Δ = 1° 39' 31.7" (LT)	Δ = 5° 51' 21.0" (LT)	Δ = 11° 06' 13.0" (LT)	Δ = 10° 23' 22.3" (RT)	Δ = 00° 15' 10.9" (LT)
D = 7° 17' 55.8"	D = 4° 19' 27.2"	D = 3° 47' 39.9"	D = 6° 52' 41.7"	D = 3° 47' 39.9"	D = 00° 30' 01.4"
L = 159.16'	L = 38.36'	L = 154.33'	L = 161.43'	L = 273.81'	L = 50.56'
T = 79.85'	T = 19.18'	T = 77.23'	T = 80.97'	T = 137.28'	T = 25.58'
R = 785.00'	R = 1,325.00'	R = 1,510.00'	R = 833.00'	R = 1,510.00'	R = 11,450.00'
SE = EXIST.	SE = EXIST.	SE = .02	SE = .02	SE = EXIST.	SE = EXIST.



NOTES:

1) REMOVE DETOUR AND RETURN TO NATURAL CONTOURS IN WETLANDS AND RIPARIAN BUFFERS.

2) FOR -L-, SEE SHEET 4.



DETOUR

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1400	CFS
DESIGN FREQUENCY	= 5	YRS
DESIGN HW ELEVATION	= 183.1	FT
BASE DISCHARGE	=	CFS
BASE FREQUENCY	=	YRS
BASE HW ELEVATION	=	FT
OVERTOPPING DISCHARGE	=	CFS
OVERTOPPING FREQUENCY	=	YRS
OVERTOPPING ELEVATION	=	FT
DATE OF SURVEY	= 3/30/06	
W.S. ELEVATION AT DATE OF SURVEY	= 177.1	FT

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

PROJECT REFERENCE NO.	SHEET NO.
B-4301	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

FOR DETOUR, SEE SHEET 2-C

BM #1, ELEV.= 183.32'
-L- STA.21+65.65, 59.33' LT.
RR SPIKE IN 46" POPLAR

BM #2, ELEV.= 187.74'
-L- STA.28+69.66, 40.45' RT.
RR SPIKE IN 32" POPLAR

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2700 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 184.8 FT
BASE DISCHARGE	= 3100 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 185.3 FT
OVERTOPPING DISCHARGE	= 2775 CFS
OVERTOPPING FREQUENCY	= 50(++) YRS
OVERTOPPING ELEVATION	= 184.9 FT
DATE OF SURVEY	= 3/30/06
W.S. ELEVATION AT DATE OF SURVEY	= 177.1 FT

STATION	B FT.	D FT.	W FT.	d FT.	CLASS 1 RIP RAP TONS	DDE FT^3	FILTER FABRIC FT^2	PSRM FT^2
-L- 22+54 RT.	5.0	1.0	4.0	0.5	7.1	48.6	90	185.4

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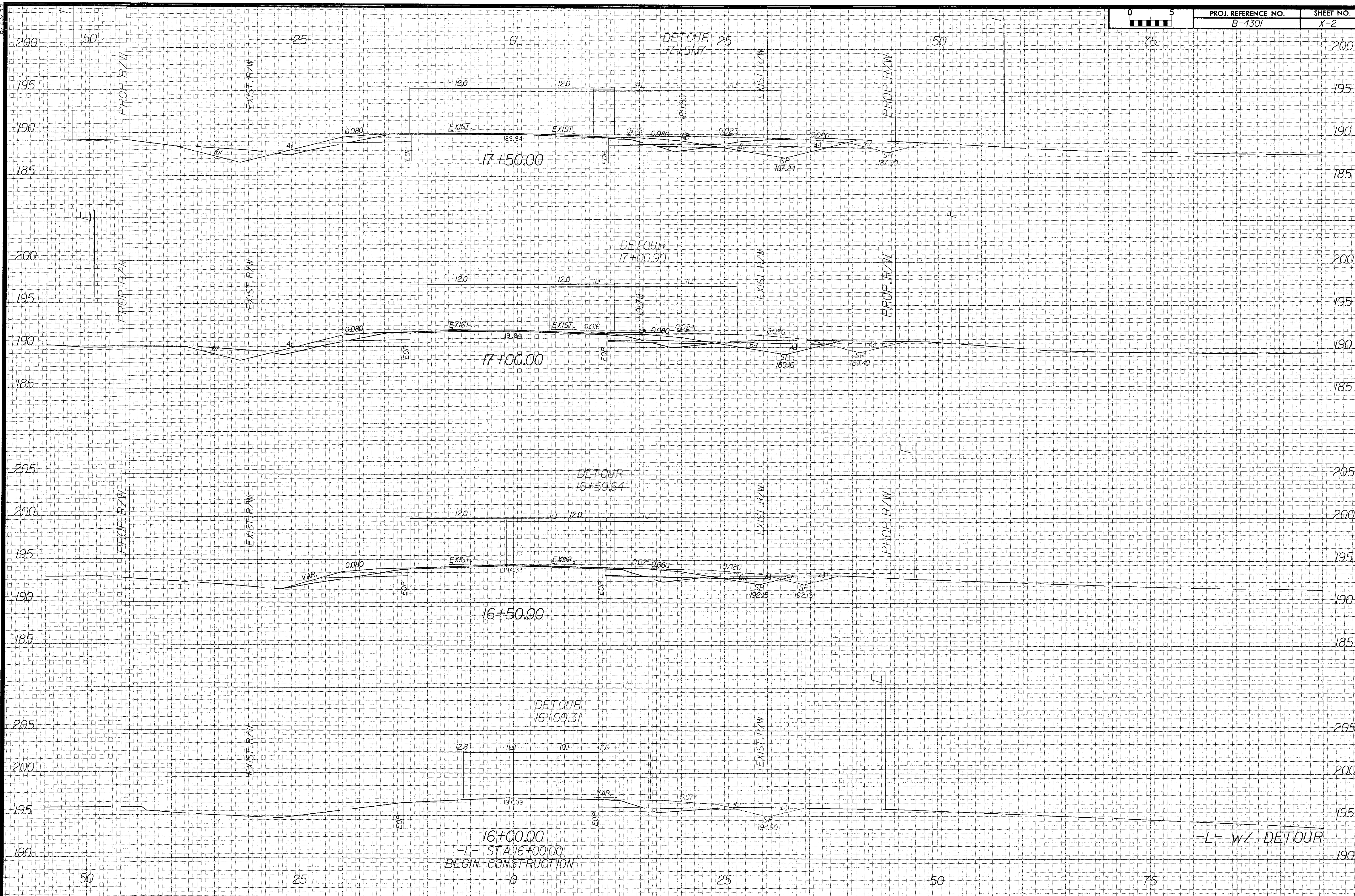
PROJ. REFERENCE NO. B-4301
SHEET NO. X-2
DETOUR 17+51.17
17+50.00
DETOUR 17+00.90
17+00.00
DETOUR 16+50.64
16+50.00
DETOUR 16+00.31
16+00.00
-L- STA.16+00.00
BEGIN CONSTRUCTION
-L- w/ DETOUR
PROP. R/W
EXIST. R/W
EXIST.
EOP
SP 187.24
SP 187.90
SP 189.16
SP 189.40
SP 192.15
SP 194.90
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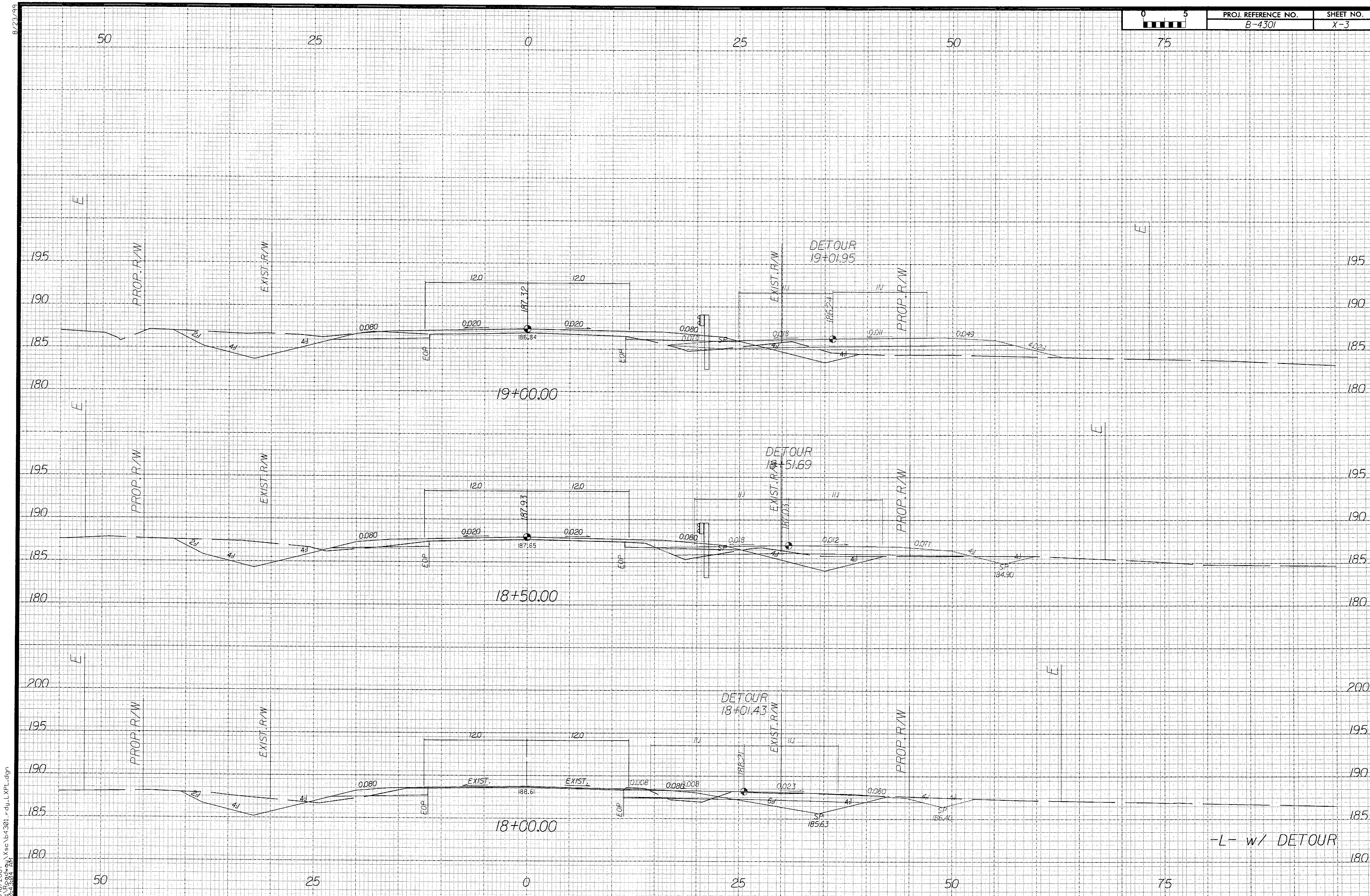
PROJ. REFERENCE NO.
B-4301
SHEET NO.
X-3
DETOUR 19+01.95
19+00.00
DETOUR 18+51.69
18+50.00
DETOUR 18+01.43
18+00.00
PROP. R/W
EXIST. R/W
EOP
-L- w/ DETOUR
8/23/99
7/16/2007

8/23/99

0 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4301	X-4

50 25 0 25 50 75

195 190 185 180

PROP. R/W EXIST. R/W

12.0 12.0 186.49 0.080 0.020 0.020 0.080 185.61 SP 3:1 4:1 EOP EOP

20+50.00

DETOUR
20+52.23

EXIST. R/W PROP. R/W

11.0 11.0 0.080 0.020 0.020 0.040 2:1

195 190 185 180 175

PROP. R/W EXIST. R/W

12.0 12.0 186.64 0.080 0.020 0.020 0.080 185.88 SP 4:1 4:1 SP 183.35 EOP EOP

20+00.00

EXIST. R/W PROP. R/W

DETOUR
20+02.22

11.0 11.0 185.70 0.080 0.020 0.020 0.040 2:1

195 190 185 180 175

PROP. R/W EXIST. R/W

12.0 12.0 186.88 0.080 0.020 0.020 0.080 186.25 2:1 4:1 4:1 SP 183.50 EOP EOP

19+50.00

EXIST. R/W PROP. R/W

DETOUR
19+52.15

11.2 11.0 185.85 0.079 0.079 0.041 4:1 4:1 2:1

-L- w/ DETOUR

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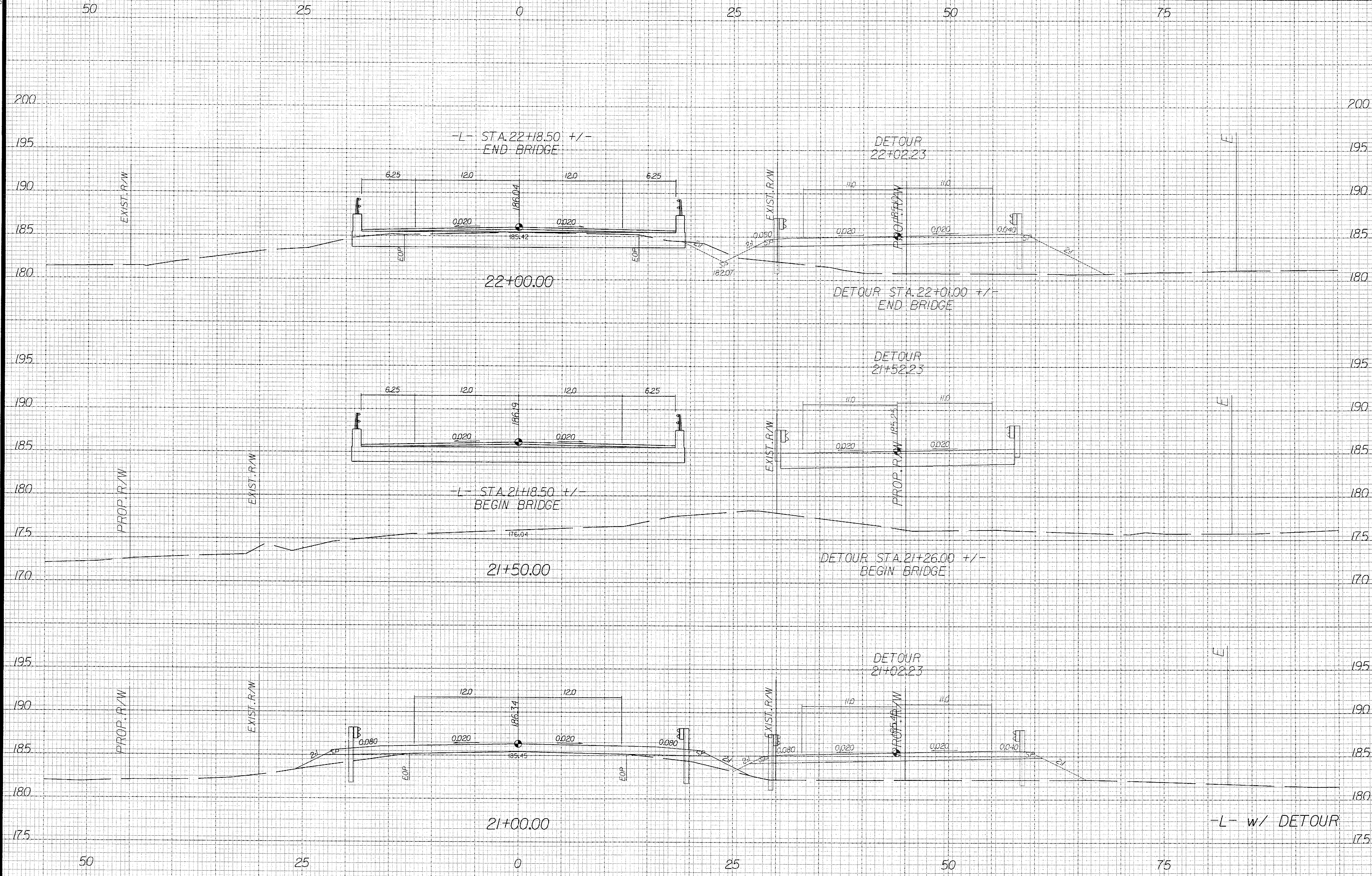
B-4301	X-5



0 5
-L- STA. 22+18.50 +/-
END BRIDGE
DETOUR
22+02.23
6.25
12.0
12.0
6.25
186.04
0.020
0.020
185.42
EOP
EOP
EXIST. R/W
EXIST. R/W
PROP. R/W
11.0
11.0
0.050
0.020
0.020
0.040
182.07
22+00.00
DETOUR STA. 22+01.00 +/-
END BRIDGE
DETOUR
21+52.23
186.19
185.25
-L- STA. 21+18.50 +/-
BEGIN BRIDGE
176.04
21+50.00
DETOUR STA. 21+26.00 +/-
BEGIN BRIDGE
DETOUR
21+02.23
186.34
0.080
0.080
185.45
0.020
21+00.00
-L- w/ DETOUR
50
25
0
25
50
75
200
195
190
185
180
175
170

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0 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4301	X-6

50 25 0 25 50 75

195 190 185 180 175

EXIST. R/W

12.0 12.0 185.59 185.03

0.080 0.020 0.020 0.080

2:1 SP EOP EOP SP 2:1

23+50.00

DETOUR
23+52.24

EXIST. R/W

11.0 11.0 184.65

PROP. R/W

0.080 0.020 0.020 0.040 2:1

℄

23+00.00

12.0 12.0 185.74 185.14

0.080 0.020 0.020 0.080

2:1 SP EOP EOP SP 2:1 SP 152.37

EXIST. R/W

11.0 11.0

PROP. R/W

0.080 0.020 0.020 0.040 2:1

DETOUR
23+02.23

℄

22+50.00

12.0 12.0 185.89 185.30

0.080 0.020 0.020 0.080

2:1 SP EOP EOP SP 2:1 SP 152.22

EXIST. R/W

11.0 11.0

PROP. R/W

0.080 0.020 0.020 0.040 2:1

DETOUR
22+52.23

℄

-L- w/ DETOUR

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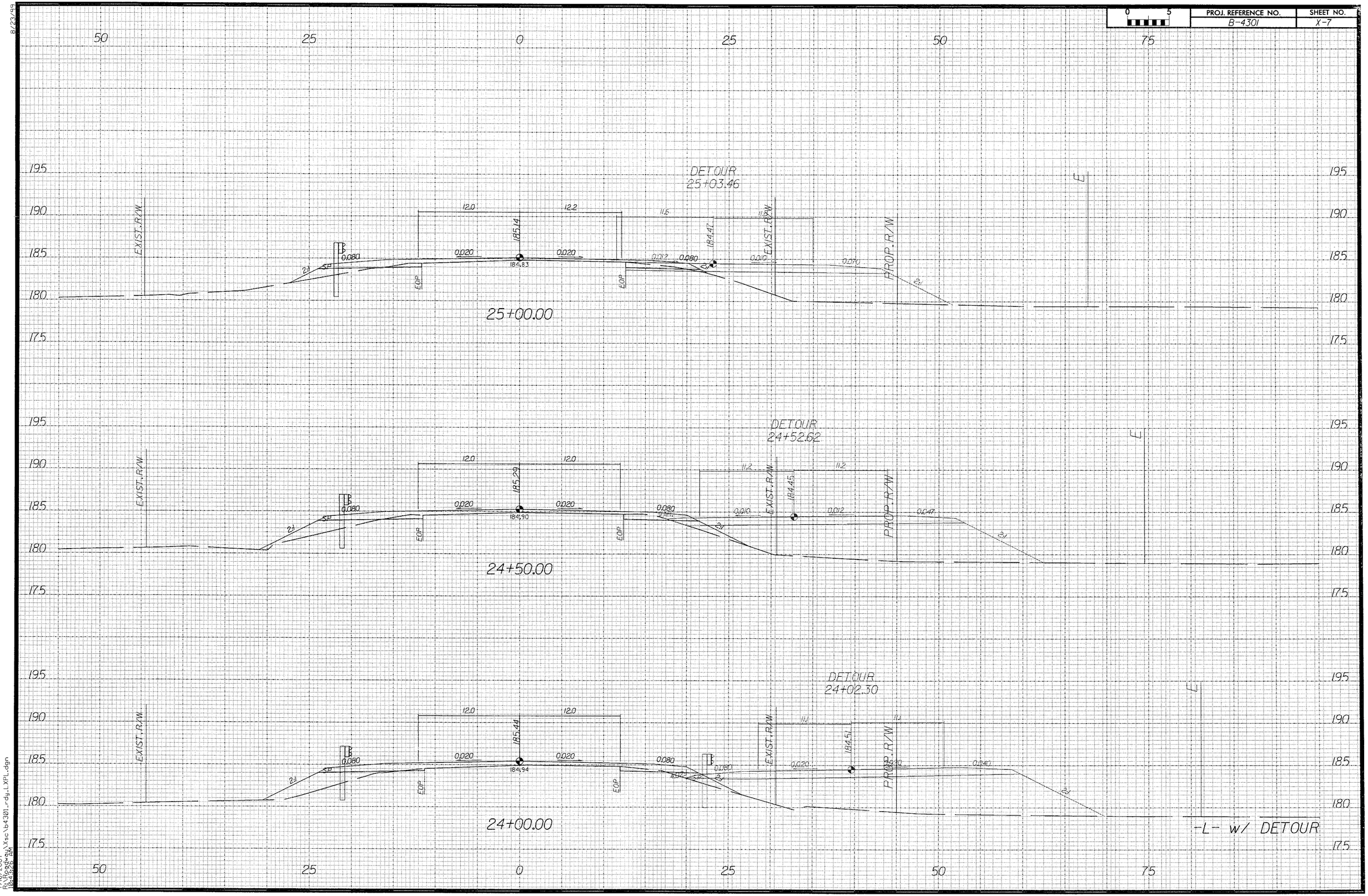

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0 5	PROJ. REFERENCE NO.	SHEET NO.
	B-4301	X-8

50 25 0 25 50 75

DETOUR
26+54.96

EXIST. R/W

13.3 15.7

184.93

0.020 0.080

EOP EOP

2:1

℄

26+50.00

-L- STA. 26+00.00
END CONSTRUCTION

DETOUR
26+04.72

11.8 12.7 14.3 14.4

184.86

26+00.00

DETOUR
25+54.25

12.0 13.0 12.1 13.1

184.99 184.67

184.79

0.080 0.020 0.020 0.080 0.020 0.080

2:1

PROP. R/W

-L- w/ DETOUR

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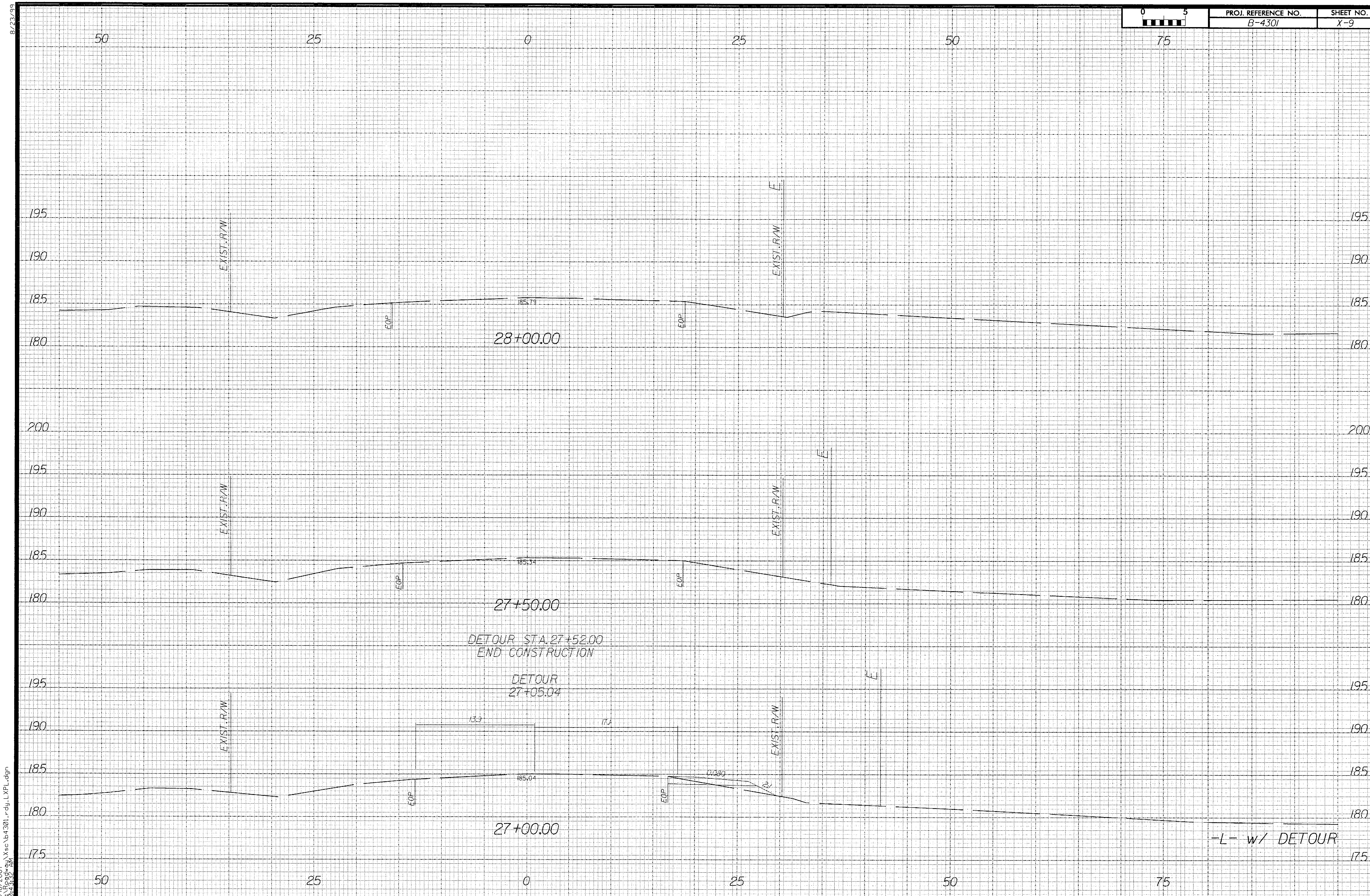
B-4301	X-9



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North Carolina Department of Transportation
PROJECT ENVIRONMENTAL CONSULTATION FORM

T.I.P. No. **B-4301**
Wake County

I. General Information

Consultation Phase:	Right of Way Consultation	
Project Description:	Replacement of Bridge No. 229 over Poplar Creek on SR 1007 (Poole Road).	
State Project No.:	8.2409301	
Federal Aid Project No.:	BRSTP-1007(9)	
Document Type:	Categorical Exclusion (CE)	November 2005

II. Conclusions

The above environmental document has been reevaluated as required by 23 CFR 771. It was determined that the current proposed action is essentially the same as the original proposed action. Proposed changes, if any, are noted below in Section III. It has been determined that anticipated social, economic, and environmental impacts were accurately described in the above referenced documents unless noted otherwise herein. Therefore, the original Administrative Action remains valid.

III. Changes in Proposed Action and Environmental Consequences

There are no changes in potential environmental effects from those presented in the Categorical Exclusion (CE). The attached memorandum, dated October 3, 2006, addresses the water resources and the protected species potentially impacted by the project and serves to update the referenced Categorical Exclusion (CE). A biological conclusion of " No Effect" remains valid for all four species.

The water resource classifications have not changed since the CE was completed.

There has been no change in the design of the project.

IV. List of Environmental Commitments

See the attached Project Commitments, Green Sheet, for the environmental commitments developed during the planning and design process of this project.

V. Coordination

PDEA Branch personnel have discussed current project proposals with others as follows:

Environmental Specialist	Erica McLamb	Date 10-3-06
Roadway Design Engineer	Bryan D. Taylor	Date 04-04-07
Structures Design Engineer	Charles Hunt	Date 04-04-07
Hydraulics Design Engineer	Marshall Clawson	Date 04-04-07

VII. NCDOT Concurrence

Ahmad Al-Sharawneh — 4/4/07
Project Manager, PDEA — Date

Stacy Oberhausen, PE — 04/04/07
Consultant Engineering Group Leader, Western Region — Date

Project Commitments

Wake County
Bridge No. 229 on SR 1007 (Poole Road)
Over Poplar Creek
Federal-Aid Project No. BRSTP-1007(9)
State Project No. 8.2409301
WBS No. 33638.1.1
T.I.P. No. B-4301

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

Division Engineer

At the request of the North Carolina Wildlife Resources Commission, a moratorium on in-water work will be in place from February 15 to June 15 to protect anadromous fish. The project will adhere to *Stream Crossing Guidelines for Anadromous Fish Passage* to protect the American shad (*Alosa sapidissima*).

The construction of T.I.P. Project No. B-4300 will be clustered with this project.

Hydraulics Unit

Bridge deck drains will not be allowed to discharge directly into surface waters. All concentrated flows will be discharged outside of Neuse River Riparian Buffers. Concentrated flows will be diffused prior to entering Zone 2 of the riparian buffer.

Structures

AASHTO standard bicycle safe bridge railing will be provided.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 3, 2006

MEMORANDUM TO: Theresa Ellerby
Project Planning Engineering Unit

FROM: Erica McLamb, Environmental Specialist
Natural Environment Unit

SUBJECT: Right of Way Consultation – Water resources and protected species review for proposed project to replace Bridge No. 229 over Poplar Creek on SR 1007 (Poole Rd.), Wake County, Division 5. Federal Project No. BRSTP-11007(9), WBS No. 33638.1.1, State Project No. 8.2409301, T.I.P B-4301.

REFERENCES: Categorical Exclusion prepared by NCDOT, approved November 2005

The following memorandum provides information to assist in the preparation of a FHWA Right of Way Consultation for the proposed project. It addresses water resources and federally-protected species potentially impacted by the project and serves to update the previously submitted Categorical Exclusion (CE) document with respect to these two issues.

WATER RESOURCES

The project study area is located within the Neuse River Basin subbasin 03-04-02, hydrologic unit 03020201. Poplar Creek is the only surface water within the project study area. Water resource classifications have not changed since the CE was prepared. Poplar Creek has been assigned a best usage classification of "C-NSW". The designation "C " waters are protected in accordance with their usage for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation includes wading, boating, and other uses not involving human body contact with waters on an organized for frequent basis. NSW refers to nutrient sensitive waters that require additional nutrient management to control excessive vegetative and algal growth.

Neither High Quality Waters (HQW), Water Supplies (WS I: undeveloped watersheds or WS II: predominately undeveloped watersheds) nor Outstanding Resource Waters (ORW) occur within 1.0 mile of the project study area. Poplar Creek is not included on the Division of Water Quality 2002, Draft 2004, or Draft 2006 303(d) list of impaired water.

PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the

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

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

FAX: 919-715-5501

LOCATION:
2728 CAPITAL BLVD. SUITE 240
RALEIGH NC 27604

Endangered Species Act of 1973, as amended in 1979. The U.S. Fish and Wildlife (USFWS) website (updated April 27, 2006) lists 4 federally protected species for Wake County (Table 1).

Table 1. Federally protected species in Wake County

Scientific Name	Common Name	Federal Status	Biological Conclusion	Habitat
Haliaeetus leucocephalus	Bald Eagle	T	No effect	No
Picoides borealis	Red-cockaded woodpecker	E	No effect	No
Alasmidonta heterodon	Dwarf wedgemussel	E	No effect	No
Rhus michauxii	Michaux's sumac	E	No effect	Yes (marginal)

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.

The species listed and the associated biological conclusions are provided in the referenced CE document. A Biological Conclusion of "No Effect" was issued for all species. There is no habitat for the bald eagle, red-cockaded woodpecker, or dwarf wedgemussel within the project area and no further surveys are needed.

The biological conclusion for Michaux's sumac documented in the referenced CE was "No Effect" due to lack of potential habitat. North Carolina Department of Transportation (NCDOT) biologists Erica McLamb, Erin Schubert, and Amy James evaluated the project area for potential habitat on June 9, 2006. It was determined that marginal habitat is found within the project area along the roadside and forest edges. Surveys were conducted on foot with complete visual coverage of potential habitat. No specimens of Michaux's sumac were observed during the 1.0 man-hour survey. The Biological Conclusion of "No Effect" remains valid for Michaux's sumac.

WAKE COUNTY
BRIDGE NO. 229 ON SR 1007 (POOLE ROAD)
OVER POPLAR CREEK
FEDERAL-AID PROJECT NO. BRSTP-1007(9)
STATE PROJECT NO. 8.2409301
WBS NO. 33638.1.1
T.I.P. NO. B-4301

CATEGORICAL EXCLUSION

UNITED STATES DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

AND

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

APPROVED:

11/01/05
Date

for Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation

11/04/05
Date

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

WAKE COUNTY
BRIDGE NO. 229 ON SR 1007 (POOLE ROAD)
OVER POPLAR CREEK
FEDERAL-AID PROJECT NO. BRSTP-1007(9)
STATE PROJECT NO. 8.2409301
WBS NO. 33638.1.1
T.I.P. NO. B-4301

CATEGORICAL EXCLUSION

OCTOBER 2005

DOCUMENT PREPARED BY:
MULKEY ENGINEERS & CONSULTANTS
CARY, NORTH CAROLINA

10/28/05
Date

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

10/28/05
Date

Pamela R. Williams
Project Manager

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

10/28/05
Date

Theresa Ellerby
Project Manager
Consultant Engineering Unit

Project Commitments

Wake County
Bridge No. 229 on SR 1007 (Poole Road)
Over Poplar Creek
Federal-Aid Project No. BRSTP-1007(9)
State Project No. 8.2409301
WBS No. 33638.1.1
T.I.P. No. B-4301

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Hydraulics Unit

Bridge deck drains will not be allowed to discharge directly into surface waters. All concentrated flows will be discharged outside of Neuse River Riparian Buffers. Concentrated flows will be diffused prior to entering Zone 2 of the riparian buffer.

Structures

AASHTO standard bicycle safe bridge railing will be provided.

WAKE COUNTY
BRIDGE NO. 229 ON SR 1007 (POOLE ROAD)
OVER POPLAR CREEK
FEDERAL-AID PROJECT NO. BRSTP-1007(9)
STATE PROJECT NO. 8.2409301
WBS NO. 33638.1.1
T.I.P. NO. B-4301

INTRODUCTION: The replacement of Bridge No. 229 is included in the 2006-2012 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (T.I.P.) and in the Federal-Aid Bridge Replacement Program. The location is shown in Figure 1. No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion."

I. PURPOSE AND NEED STATEMENT

Bridge Maintenance Unit records indicate that Bridge No. 229 has a sufficiency rating of 21.5 out of a possible 100 for a new structure. The bridge is considered functionally obsolete. The replacement of this inadequate structure will result in safer, more efficient traffic operations.

II. EXISTING CONDITIONS

Bridge No. 229 is located on SR 1007 (Poole Road) in Wake County, approximately 3.5 miles south of Knightdale, North Carolina. SR 1007 is classified as a Rural Major Collector by the statewide functional classification system. The *Capital Area Greenway Master Plan* (Figure 6) shows a proposed greenway corridor along Poplar Creek south of Bridge No. 229.

Land use in the project area includes wooded areas and open fields interspersed with single-family residences. A new housing community, Rutledge Landing, is located approximately 900 feet east of Bridge No. 229.

The 2005 estimated average daily traffic (ADT) volume is 12,300 vehicles per day (vpd). The projected ADT is 25,300 vpd by the design year 2030. The percentages of truck traffic are 3% dual tired vehicles (DUALS) and 1% truck-tractor semi trailer (TTST). The posted speed limit on SR 1007 in the vicinity of Bridge No. 229 is 55 miles per hour (mph).

Bridge No. 229 was built in 1961 (Figure 2). It is a two-lane facility with a clear roadway width of 29.3 feet. The bridge has two spans and totals 59 feet in length. The deck is composed of precast prestressed concrete channels and the metal rails. The substructure consists of precast prestressed concrete caps on timber piles with timber abutments. The height from crown to streambed is 11 feet. Bridge No. 229 is posted at 23 tons for single vehicle and 26 tons for TTST.

The approach roadway is a tangent two-lane facility with two 11-foot travel lanes and 8-foot shoulders.

Progress Energy has a three phase joint use power line along the north side of SR 1007 at the bridge site. Progress Energy high voltage transmission line crosses SR 1007 approximately 250 feet east of Bridge No. 229. Utility impacts are anticipated to be low.

There are approximately 46 school bus crossings on Bridge No. 229 each day.

Four accidents were reported in the project area during the period from September 2001 to August 2004. There were two injuries and no fatalities.

SR 1007 at Bridge No. 229 is part of a designated bicycling route in accordance with the *City of Raleigh Bicycle Plan*, which was adopted in 1991. This route is designated in the City of Raleigh's transportation network as a Long Term Corridor, indicating that major improvements over a period of five to thirty years will be required.

III. ALTERNATIVES

A. PROJECT DESCRIPTION

The proposed replacement structure is a bridge approximately 85 feet in length. The length may increase or decrease as necessary to accommodate peak flows as determined by further hydrologic studies. The bridge will provide two 12-foot travel lanes with 8-foot shoulders (Figure 3A). Standard bicycle safe bridge railing 54 inches in height will be provided. A minimum 0.3 percent grade is recommended to facilitate deck drainage. The bridge will be designed to allow for future widening.

The approach roadway will provide two 12-foot travel lanes with 8-foot shoulders, including 4-foot paved shoulders (Figure 3A). The design speed will be 60 mph.

The proposed greenway corridor ends immediately south of Bridge No. 229 and no greenway accommodations are anticipated with this project.

During construction, traffic will be maintained on site by a temporary detour. The detour structure will be approximately 90 feet in length and 30 feet in width. It will provide for two 12-foot travel lanes with 3-foot shoulders (Figure 3B). The detour approach roadway will provide two 12-foot travel lanes with 8-foot grass shoulders, including 2-foot paved, and a design speed of 50 mph.

B. BUILD ALTERNATIVES

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

Alternative A replaces the bridge at the existing location (Figure 4A). During construction, traffic will be maintained by an on-site detour north of the existing bridge. This alternative is not recommended because of impacts to wetlands north of the bridge.

Alternative B (preferred) replaces the bridge at the existing location (Figure 4B). During construction, traffic will be maintained by an on-site detour south of the existing bridge.

C. ALTERNATIVES ELIMINATED FROM FURTHER STUDY

An alternative with an off-site detour was evaluated. The detour route follows along SR 2049, SR 2511 and SR 2233 (Figure 1). It is approximately 3.5 miles in length and has a road user cost of approximately $16,400 per day. This alternative was eliminated because of the high traffic volumes that would be detoured and the high road user cost associated with the off-site detour.

The "do-nothing" alternative will eventually necessitate closure of the bridge. This is not desirable because of the traffic service provided by SR 1007 and Bridge No. 229.

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

Alignments on new location were eliminated because they would introduce reverse curves in an existing tangent section of the roadway.

D. PREFERRED ALTERNATIVE

Alternative B was selected as the preferred alternative because it minimizes impacts to wetlands.

The Division Engineer concurs with Alternative B as the preferred.

IV. ESTIMATED COST

Table 1 shows estimated costs based on current prices.

Table 1. Estimated Cost

	Alternative A	Alternative B (Preferred)
Structure Removal (Existing)	17,300	17,300
Proposed Structure	285,600	285,600
Roadway Approaches	130,200	127,900
Temporary Detour Bridge	84,000	98,600
Detour Approaches	100,000	113,900
Miscellaneous and Mobilization	161,900	169,200
Engineering Contingencies	121,000	137,500
ROW/Const. Easements/Utilities	82,300	88,000
TOTAL	982,300	1,038,000

The estimated cost of the project as shown in the 2006-2012 Transportation Improvement Program is $1,185,000, including $150,000 in prior years, $85,000 for right-of-way, and $950,000 for construction.

V. NATURAL RESOURCES

A. METHODOLOGY

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

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

- National Wetlands Inventory (NWI) maps
- USGS 7.5-minute topographical quadrangle maps (Knightdale and Raleigh East, North Carolina)
- Natural Resources Conservation Service (NRCS) soil survey maps of Wake County
- North Carolina Division of Water Quality (NCDWQ)
- United States Fish and Wildlife Service (USFWS) list of protected species (last updated list 2/25/03)
- North Carolina Natural Heritage Program (NCNHP) database of rare species and unique habitats
- North Carolina Department of Transportation aerial photography; Geographic Information Systems Data/ Maps Distribution

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

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

Jurisdictional wetland delineations were performed using the three-parameter approach as prescribed in the *Corps of Engineers Wetlands Delineation Manual.*

Supplementary technical literature describing the parameters of hydrophytic vegetation, hydric soils, and hydrological indicators was also utilized. Wetland functions were evaluated according to the NCDWQ's rating system, fourth version. Surface waters in the study area were evaluated based on the United States Army Corps of Engineers (USACE) Stream Quality Assessment Worksheet.

B. Physiography and Soils

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

Elevations in the study area range from approximately 174 feet above mean sea level (msl) at Poplar Creek under Bridge No. 229 to approximately 214 feet above msl at the western end of the study area south of Poole Road.

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

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

The Appling-Louisburg-Wedowee soil association consists of gently sloping to steep, deep and moderately deep, well-drained and somewhat excessively drained soils that have a subsoil of very friable coarse sandy loam to firm clay. The soil is derived mostly from granite, gneiss, and schist. This association is found on broad ridges in the uplands and on sloping to steep soils on the sides of ridges near drainageways and streams. Appling soils occupy about 20 percent of the association, while Louisburg soils make up about 20 percent of the association, and Wedowee soils occupy about 18 percent of the association. The rest of the association is made up of Wake, Durham, Vance, Colfax, Worsham, Chewacla, Wehadkee, and Bibb series.

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

C. WATER RESOURCES

1. Waters Impacted

The project is located within the Neuse River Basin. The drainage area of Poplar Creek at the proposed crossing is 5.65 square miles. The project study area is located within Neuse River subbasin 03-04-02 and USGS hydrologic unit 03020201. Poplar Creek and two areas of riparian wetlands comprise the Waters of the U.S. in the study area. The stream is depicted on the USGS quad map as a perennial stream through the study area. It converges with the Neuse River approximately two miles downstream of the project site.

2. Water Resource Characteristics

Poplar Creek is slow-flowing, with an unconsolidated bottom of sand, silt, clay, and gravel. The stream contains run, slack, and pool areas, with minimal riffles. Stream banks have some undercutting and erosion. Evidence of beaver activity was present. Poplar Creek received a score of 77 out of 100 on the USACE Stream Quality Assessment Worksheet found in the Appendix.

A classification system for stream channels based on fluvial geomorphologic principles and landscape position was used for stream analysis. Based on this classification method and field observations during the site visit, the stream appears to be a Type C5 channel that is slightly entrenched but stable. Specific channel information relating to Poplar Creek is presented in Table 2.

Table 2. Stream Dimensions

Approximate Stream Dimensions of Poplar Creek (feet)	
Bankfull width	25
Channel width	12
Water depth	1 to 3
Bank height	2 to 8

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

Neither high quality waters (HQW), outstanding resource waters (ORW), trout waters (Tr), 303(d) waters, nor water supply watershed waters (WS) occur within one mile of the study area. The North Carolina Wildlife Resources Commission (NCWRC) requests that the NCDOT follow all stream crossing guidelines for anadromous fish passage, including an in-water work moratorium from February 15 to June 15th to protect American shad (*Alosa sapidissima*).

The Ambient Monitoring System (AMS) is a network of stream, lake, and estuarine water quality monitoring stations strategically located for the collection of physical and chemical water quality data. AMS monitoring station A-16 is located on Poplar Creek at SR 2049. Poplar Creek has no noted parameters on water quality.

The nearest benthic macroinvertebrate sampling sites to the study area (SB-16 and SB-17) are located on two tributaries of Poplar Creek, downstream of the project site. These sites are not given a rating. The North Carolina Index of Biotic Integrity (NCIBI) is used to assess the biological integrity of streams by examining the structure and health of the fish community. As of April 2000, Poplar Creek had not been assigned an NCIBI rating.

Point source dischargers throughout North Carolina are regulated through the National Pollutant Discharge Elimination System (NPDES) program. Dischargers are required by law to register for a permit. There are 52 permitted dischargers in this subbasin of the Neuse River. Two dischargers holding minor NPDES permits are located upstream of the project site.

3. Anticipated Impacts to Water Resources

Short-term impacts to water quality from construction-related activities include loss of aesthetic values, increased sedimentation, and turbidity. Long-term construction related impacts to water

resources include substrate destabilization, bank erosion, increased turbidity, altered flow rates, and possible temperature fluctuations within the channel due to removal of streamside vegetation.

No adverse long-term impacts to water resources are expected to result from the alternative being considered. The proposed project calls for replacement of the bridge at the existing location, which will allow for continuation of present stream flow within the existing channel, thereby protecting stream integrity.

4. Impacts Related to Bridge Demolition and Removal

The steel bridge rails can be removed without being dropped into Waters of the U.S.; however, there is potential for components of the deck and substructure to be dropped into Waters of the U.S. during construction. The resulting potential temporary fill associated with the concrete deck and a concrete cap is approximately 46 cubic yards.

D. Biotic Resources

1. Plant Communities

Three plant communities were observed in the project study area: mixed pine-hardwood forest, bottomland hardwood forest, and urban/disturbed community (maintained easements, lawns, utility rights-of-way). Wetlands were delineated within some areas.

a. Mixed Pine-Hardwood Forest Community

Mixed pine-hardwood forest community is present in the upland area of the study area and is typically characterized by a variety of hardwood species in the canopy, a moderate understory, and a sparse herbaceous layer. This forested community is best classified as a variation of Schafale and Weakley's Dry Mesic Oak-Hickory Forest. The Dry Mesic Oak-Hickory Forest community is dominated by a mixture of oak (*Quercus* spp.) and hickory (*Carya* spp.) species. In forests with a frequent disturbance regime, loblolly pine (*Pinus taeda*), red maple (*Acer rubrum*), and sweetgum (*Liquidambar styraciflua*) may become dominant canopy species. The southeast quadrant of the study area contains a young stand of loblolly pines with many sweetgum, red maple, northern red oak (*Quercus rubra*), water oak (*Quercus nigra*), and black cherry (*Prunus serotina*). Shrub and vine species include blackberry (*Rubus argutus*), blueberry (*Vaccinium stamineum*), greenbriar (*Smilax rotundifolia*), and Japanese honeysuckle (*Lonicera japonica*).

b. Bottomland Forest Community

The bottomland forest community is situated in the floodplain of Poplar Creek, between the levee and upland. This forested community is best classified as a variation of Schafale and Weakley's Piedmont/Mountain Bottomland Forest. It is characterized by plant species which are tolerant of occasional flooding and often contains a dense understory and herbaceous layer. Dominant species observed in the mature canopy were red maple, sweetgum, water oak, swamp chestnut oak (*Quercus michauxii*), and tulip poplar (*Liriodendron tulipifera*). The understory tree and shrub layer includes sweetgum and red maple saplings, sweet bay (*Magnolia virginiana*), blackberry, elderberry (*Sambucus canadensis*), American holly (*Ilex opaca*), and tag alder (*Alnus serrulata*). Woody vines observed were

greenbriar, Japanese honeysuckle, and poison ivy (*Toxicodendron radicans*). The herbaceous layer included Japanese stilt grass (*Microstegium vimineum*), giant cane (*Arundinaria gigantea*), soft rush (*Juncus effusus*), and various grasses (family Poaceae) and sedges (*Carex* spp.).

c. Urban/ Disturbed Communities

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

d. Wetlands

Wetland delineations for the project study area were conducted in January 2004. Two wetlands were delineated during field surveys. A general description of the wetlands located within the project study area is presented below and the wetland locations are shown in Figures 4A and 4B. Wetland data forms and NCDWQ rating forms are presented in the Appendix.

Wetland A is situated in the floodplain (between the upland slope and the levee) of Poplar Creek south of Poole Road. The vegetation consists primarily of red maple, sweetgum, water oak, swamp chestnut oak, American holly, sweet bay, greenbriar, Japanese honeysuckle, blackberry, and soft rush. Wetland A received a rating of 56 out of a possible 100.

Wetland B is situated in the floodplain (between the upland slope and the levee) of Poplar Creek north of Poole Road. The vegetation consists primarily of red maple, black willow (*Salix nigra*), elderberry, Japanese honeysuckle, blackberry, and soft rush. Wetland B received a rating of 56 out of a possible 100.

2. Wildlife

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

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

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

A wide variety of mammals are expected to inhabit the study area and surrounding landscape. Virginia opossum (*Didelphis virginiana*), woodchuck (*Marmota monax*), gray squirrel* (*Sciurus carolinensis*), Eastern harvest mouse (*Reithrodontomys humulis*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and white-tailed deer (*Odocoileus virginianus*) are species most likely to be found. In addition, bats such as the Eastern red bat (*Lasiurus borealis*) and big brown bat (*Eptesicus fuscus*) may also be present in the project study area.

3. Aquatic Communities

The aquatic habitat of Poplar Creek is expected to be good based on observed conditions during the field visits and the existing NCDWQ water quality assessment. Poplar Creek has a streambed of sand, silt, and small pebbles beneficial to macrobenthic invertebrates.

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

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

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

4. Anticipated Impacts to Biotic Communities

a. Terrestrial Communities

The study area consists of approximately 13.1 acres of vegetative community habitat, with 1.59 acres of bottomland hardwood; 3.33 acres of mixed pine/hardwood forest; and 8.16 acres of urban/disturbed land. Table 3 depicts impacts to terrestrial biotic communities that have been estimated based on the approximate construction limits of the two alternatives.

Table 3. Anticipated Terrestrial Impacts

Vegetative Community	Alternative A Permanent Temporary	Alternative B (preferred) Permanent Temporary
Bottomland Forest	0.67acre 0.97 acre	0.67 acre 0.97 acre
Urban/Disturbed Land	0.03 acre 0.15 acre	0.03 acre 0.18 acre
Mixed Pine-Hardwood Forest	0.00 acre 0.00 acre	0.00 acre 0.00 acre

b. Wetland Communities

Impacts to wetlands will take place depending on the final design of the bridge replacement. Table 4 depicts the estimated impacts to Waters of the U.S. for the proposed alternatives. Permanent wetland impacts are a result of the widening of the approach roadway to the proposed new permanent bridge. Temporary wetland impacts are a result of the temporary road leading to the temporary bridge. Mechanized clearing is generally considered a temporary impact.

Table 4. Potential Impacts to Waters of the U.S.

Proposed Alternatives	Wetland (permanent)	Wetland (temporary)	Stream	Mechanized Clearing
Alternative A	<0.01 acre	0.34 acre	0	0.11 acre
Alternative B (preferred)	<0.01 acre	0.15 acre	0	0.11 acre

c. Aquatic Communities

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

The removal of streamside vegetation and placement of fill material during construction contributes to erosion and possible sedimentation. Quick revegetation of these areas helps to reduce the impacts by supporting the underlying soils. Erosion and sedimentation may carry soils, toxic compounds, trash, and other materials into the aquatic communities at the construction site. As a result, sand bars may be formed both at the site and downstream.

Impacts usually associated with in-stream construction include increased channelization and scouring of the streambed. In-stream construction alters the substrate and impacts adjacent streamside vegetation. Such disturbances within the substrate lead to increased siltation, which can clog the gills and feeding mechanisms of benthic organisms, fish, and amphibian species. These organisms are slow to recover and may never, once the stream has been impacted.

E. Special Topics

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

Surface waters within the embankments of Poplar Creek are subject to jurisdictional consideration under Section 404 of the Clean Water Act as "waters of the United States" (33 CFR 328.3). The USACE has the responsibility for implementation, permitting, and enforcement of the provisions of the Clean Water Act. The USACE regulatory program is defined in 33 CFR 320-330. The NCDWQ also has responsibility for implementation, permitting, and enforcement of the provisions of the Clean Water Act.

Poplar Creek is identified as a perennial stream. Perennial streams are jurisdictional under Sections 401 and 404 of the Clean Water Act. Poplar Creek is jurisdictional surface water.

2. Permits

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

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

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

Bridge Demolition and Removal - The bridge demolition activities associated with this replacement will strictly follow NCDOT's *Best Management Practices for Construction and Maintenance.* All methods of demolition shall be considered and implemented where practical, other than dropping the bridge in the water. The steel bridge rails can be removed without being dropped into Waters of the U.S.; however, there is potential for components of the deck and substructure to be dropped into Waters of the U.S. Permitting will be coordinated such that any permit needed for bridge construction will address issues related to bridge demolition. If there is a practical alternative to dropping bridge components into the water, that alternative shall be followed.

3. Neuse River Buffer Rules

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

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

Table 5. Estimated Buffer Impacts

Alternatives	Allowable (acre)		Allowable with Mitigation (acre)		Total
	Zone 1	Zone 2	Zone 1	Zone 2	
Alternative A	0.030	0.047	0.067	0.071	0.22
Alternative B (preferred)	0.030	0.047	0.069	0.071	0.22

Alternatives A and B both propose to impact buffers associated with Poplar Creek. Vegetation will be replanted after the temporary bridges are removed.

4. Mitigation

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

Avoidance examines all appropriate and practicable possibilities of averting impacts to Waters of the U.S. Alternatives A and B both impact the riparian wetland in the project area. It is not feasible for this roadway to completely avoid the wetland due to the need of a temporary on-site detour. An on-site detour is necessary because of the high volume of traffic on SR 1007. Since the project necessitates traversing Poplar Creek, totally avoiding surface water impacts is not practical.

Minimization includes the examination of appropriate and practicable steps to reduce adverse impacts to Waters of the U.S. Alternatives A and B minimize the amount of in-stream activity (both permanent and temporary impacts) due to the use of a bridge as opposed to a culvert. The new permanent bridge will be approximately 25 feet longer than the current bridge, pushing end bents farther away from the water's edge. Best Management Practices will be used to minimize impacts.

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

Compensatory wetland mitigation is not anticipated for either project alternative. Temporarily impacted wetlands will be restored by removal of temporary fill and be replanting. Compensatory stream mitigation will not be required for Alternatives A or B.

F. Rare and Protected Species

Species with the Federal classification of Threatened (T), Federally Endangered (E) and Proposed Threaten (PT) are protected under the provisions of Section 7 of the Endangered Species Act of 1973, as amended.

Natural Heritage Program maps were reviewed on December 30, 2003 and in March 2005 to determine if any federal or state protected species have been identified near the study area. This map review revealed no records of protected species occurrences within a two-mile radius of the project site. A field survey was conducted in January 2004 to determine if suitable habitat is available at the project site for any protected species.

1. Federally Protected Species

Table 6 shows federally listed threatened and endangered species for Wake County (USFWS list dated 2/25/03, reviewed 4/1/2005). Species descriptions and biological conclusions follow.

Table 6. Federally Listed Threatened & Endangered Species for Wake County

Common Name	Scientific Name	Federal Listing
Bald eagle	*Haliaeetus leucocephalus*	Threatened (Proposed for delisting)
Red-cockaded woodpecker	*Picoides borealis*	Endangered
Dwarf wedge mussel	*Alasmidonta heterodon*	Endangered
Michaux's sumac	*Rhus michauxii*	Endangered

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

The bald eagle is a large raptor that ranges in size from 32 to 43 inches tall and has a wingspan averaging 6 feet. These predators weigh an average of 10 to 12 pounds. Adult body plumage is dark brown to chocolate brown, and white on the head and tail. Juveniles are brown and irregularly marked with white until their fourth year. Bald eagles are primarily associated with large bodies of water where food is plentiful and suitable nesting sites are typically found within 0.5 miles of the water. Nests are made in the largest living tree within the area, with an open view of surrounding land and a clear flight path to water. Nests can be as large as 6 feet across and are made of sticks and vegetation. These platform nests may be used by the same breeding pair for many years. Breeding begins in December or January and the young remain in the nest at least ten weeks after hatching. Bald eagles eat mostly fish robbed from ospreys or picked up dead along shorelines, or other carrion. They may also capture small animals such as rabbits, some birds, and wounded ducks.

Biological Conclusion: *No Effect*

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

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

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

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

Biological Conclusion: *No Effect*

Suitable habitat for RCW does not exist within the study area. The age and size of the pine stands within the study area are not suitable for sustaining the red-cockaded woodpecker for nesting or foraging. Based upon this, the project will have **NO EFFECT** on the RCW.

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

The dwarf wedge mussel is small, rarely exceeding 1.5 inches in length. The shell's outer surface (periostracum) is usually olive brown or yellowish brown in color, with light green rays that are more noticeable in juveniles. The nacre (inner shell surface) is bluish to silvery white. The shell shape is subtrapezoidal. A unique characteristic of this mussel is its dentition pattern; the right valve possesses two lateral teeth, while the left valve has only one. This trait is opposite of all other North American species having lateral teeth. Three potential fish host species for the glochidia of the dwarf wedge mussel are the tessellated darter (*Etheostoma olmstedi*), Johnny darter (*Etheostoma nigrum*), and mottled sculpin (*Cottus bairdi*).

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

especially in the highly developed Wake and Johnston County sites, threaten the survival of this mussel.

Biological Conclusion: ***No Effect***

A survey for the dwarf wedge mussel was conducted on March 25, 2004, by qualified biologists. No freshwater mussels were found and it was concluded that the dwarf wedge mussel does not occur in the project footprint. The absence of the dwarf wedge mussel was reportedly due to the combination of Asian clam presence, a minimal amount of riffles, and beaver dams in the stream. Based upon this, the project will have **NO EFFECT** on the dwarf wedge mussel.

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

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

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

Biological Conclusion: ***No Effect***

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

2. State Listed Species and Federal Species of Concern

State protected species and Federal Species of Concern (FSC), their status, and the existence of suitable habitat within the study area are shown in Table 7.

Table 7. Federal Species of Concern and their State Status

Common Name	Scientific Name	State Status	Potential Habitat
Southeastern myotis	*Myotis austroriparius*	SC	Y
Bachman's sparrow	*Aimophila aestivalis*	SC	N
Southern hognose snake	*Heterodon simus*	SC	N
Pinewoods shiner	*Lythrurus matutinus*	SR	Y
Diana fritillary butterfly	*Speyeria diana*	SR	N
Atlantic pigtoe	*Fusconaia masoni*	E	Y
Green floater	*Lasmigona subviridis*	E	Y
Yellow lance	*Elliptio lanceolata*	E	Y
Bog Spicebush	*Lindera subcoriacea*	T	N
Carolina least trillium	*Trillium pusillum var pusillum*	E	N
Sweet pinesap	*Monotropsis odorata*	SR-T	N

Notes:

SC A Special Concern species is one which requires monitoring but may be taken or collected and sold under regulations adopted under the provisions of Article 25 of Chapter 113 of the General Statutes (animals) and the Plant Protection and Conservation Act (plants). Only propagated material may be sold of Special Concern plants that are also listed as Threatened or Endangered.

E An Endangered species is in danger of extinction throughout all or a significant portion of its range.

T A Threatened species is any native or once native species which is likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range, or one that is designated as a threatened species pursuant to the Endangered Species Act.

SR A Significantly Rare species is not listed as "E", "T", or "SC", but exists in the state in small numbers and has been determined to need monitoring.

-T Throughout – The species is rare throughout its range.

FSCs are not legally protected under the Endangered Species Act and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. Species designated as FSC are defined as taxa which may or may not be listed in the future. These species were formerly Candidate 2 (C2) species or species under consideration for listing for which there is insufficient information to support listing.

Some of these species are listed as Endangered, Threatened, or Special Concern by the NCNHP list of rare plant and animal species and are afforded state protection under the State Endangered Species Act of 1987 and the North Carolina Plant Protection and Conservation Act of 1979.

VI. Cultural Resources

A. Compliance Guidelines

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

B. Historic Architecture

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

C. Archaeology

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

VII. Environmental Effects

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

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

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

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

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

In compliance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations) a review was conducted to determine whether minority or low-income populations were receiving disproportionately high and adverse human

health or environmental impacts as a result of this project. The investigation determined the project would not disproportionately impact any minority or low-income populations.

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

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

The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impacts to prime and important farmland soils by all land acquisition and construction projects. Prime and important farmland soils are defined by the Natural Resources Conservation Service. The proposed bridge will be replaced at the existing location. No impacts to prime or locally important farmland are anticipated.

The project is located in Wake County, which is within the Raleigh-Durham nonattainment area for 1-hour ozone (O_3) and carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as 1/3 moderate nonattainment areas for O_3 and CO. However, due to improved monitoring data, these areas were redesignated as maintenance areas for O_3 on June 17, 1994, and maintenance areas for CO on September 18, 1995. Section 176 (c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Wake County. The *Capital Area 2025 Long Range Transportation Plan* (LRTP) and the 2004-2010 Metropolitan Transportation Improvement Program (MTIP) have been determined to conform to the intent of the SIP. The USDOT air quality conformity approval of the LRTP was 8/20/2002 and the USDOT air quality conformity approval for the MTIP was 10/12/2003. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There have been no significant changes in the project's design concept or scope, as used in the conformity analyses. Wake County was designated by the Environmental Protection Agency as a nonattainment area for the 8-hour ozone standard on April 15, 2004. The effective date of the nonattainment designation is June 15, 2004. 40 CFR Parts 51 and 93 are not applicable until June 15, 2005 (one year after the nonattainment designation becomes effective).

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

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

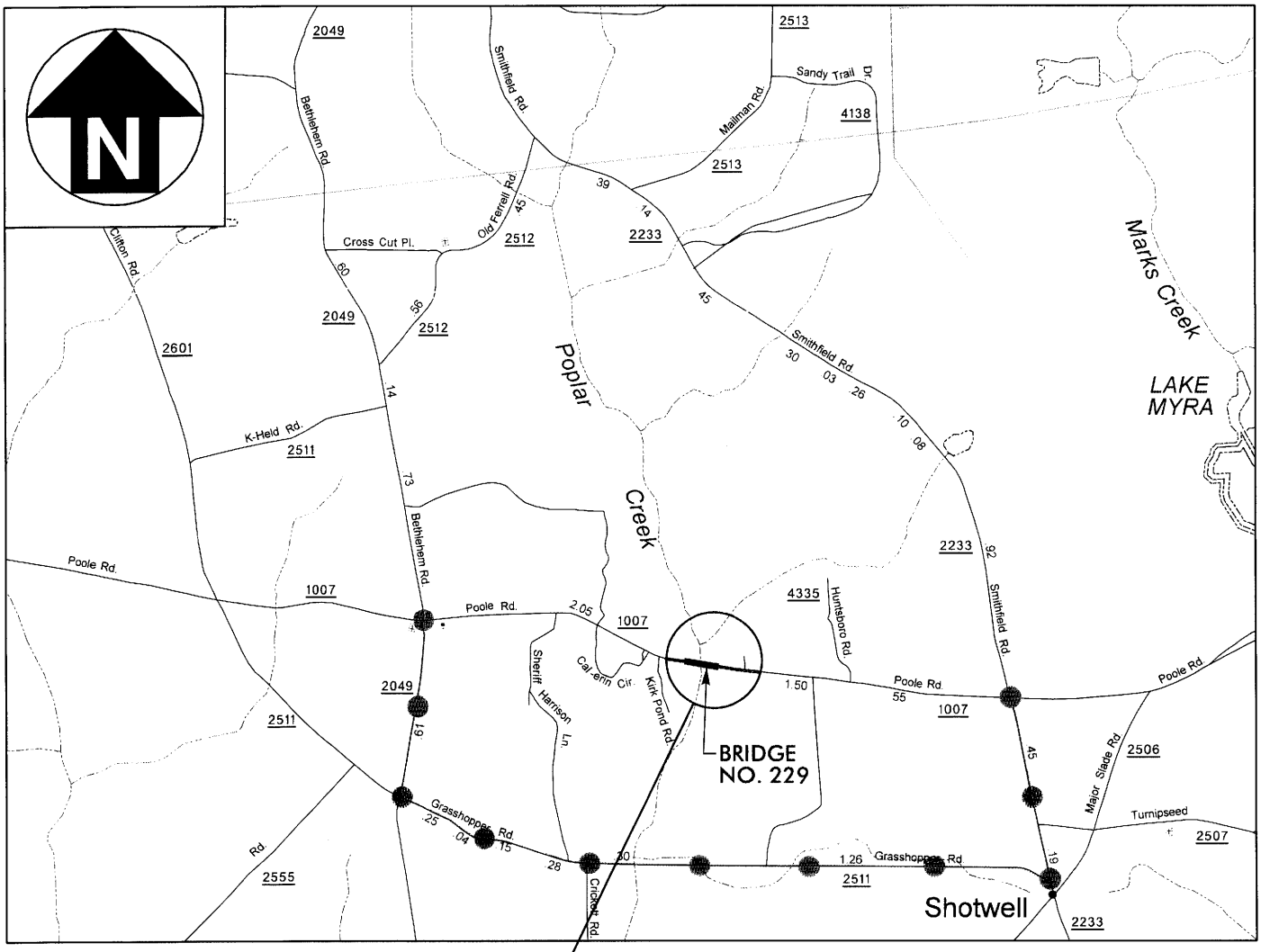
An examination of records at the North Carolina Department of Environment and Natural Resources, Division of Water Quality, Groundwater Section, and the North Carolina Division of Solid Waste Management revealed no hazardous waste sites in the project area. A field reconnaissance survey was performed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

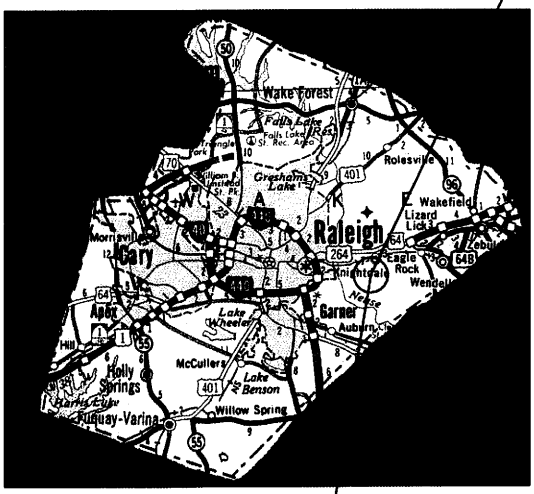
The drainage area of Poplar Creek at the proposed crossing is 5.65 square miles. Wake County is currently participating in the National Flood Insurance Program. This crossing of Poplar Creek is located in a FEMA Special Flood Hazard Zone, Zone AE. This reach of stream is in a detailed flood study with a published floodway. A Flood Insurance Rate Map (Figure 5) is included. The published 100-year base flood appears to overtop the existing roadway. Further detailed analysis during final design will be required to adequately address all impacts associated with the floodplain.

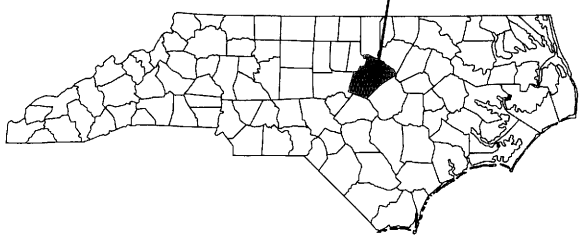
On the basis of the above discussion, it is concluded that no substantial adverse environmental effects will result from implementation of the project.

VIII. Public Involvement

Efforts were undertaken early in the planning process to contact local officials to involve them in the project development with scoping letters. Scoping letters were sent to various agencies. A newsletter was mailed in February 2005 describing the planning process and the preferred alternative to state and local officials and residents in the immediate project area. No comments were received on the newsletter.







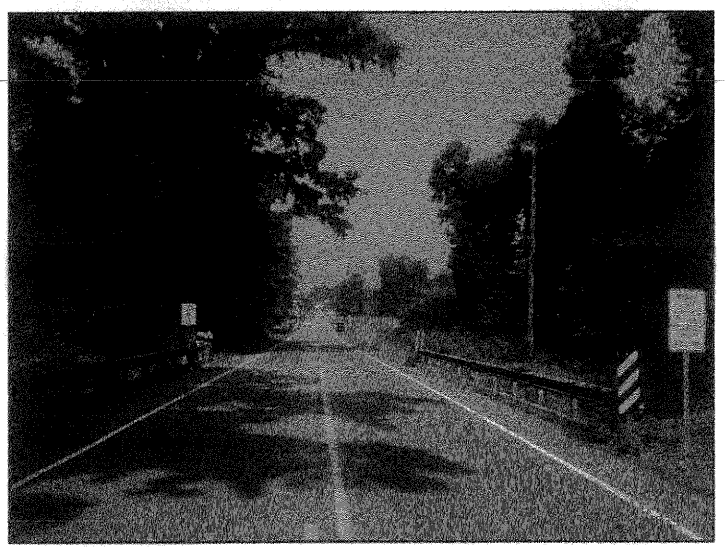
DETOUR ROUTE

North Carolina Department of Transportation
Project Development & Environmental Analysis

WAKE COUNTY
BRIDGE NO. 229 ON SR 1007
OVER POPLAR CREEK
B-4301

FIGURE 1

View of east approach from Bridge No. 229.

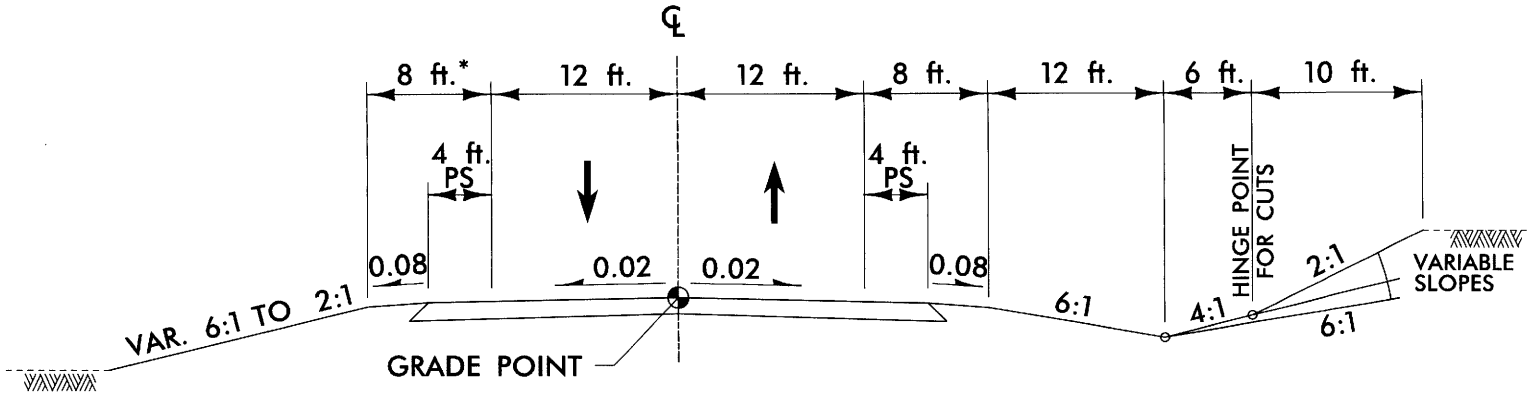


View of west approach from Bridge No. 229.

South side of Bridge No. 229.

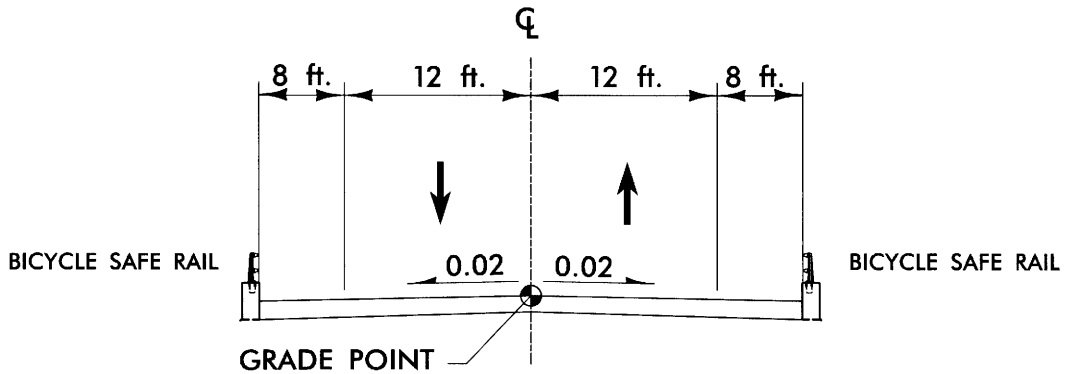
Figure 2

B-4301 Bridge No. 229 on SR 1007 over Poplar Creek



TYPICAL APPROACH SECTION
(PROPOSED)

* 11 ft. WITH GUARDRAIL IS WARRANTED



TYPICAL BRIDGE SECTION
(PROPOSED)

TRAFFIC DATA

(CONST. YR.) 2006 ADT = 12,500
(DESIGN YR.) 2030 ADT = 25,300
DUAL 3%
TTST 1%

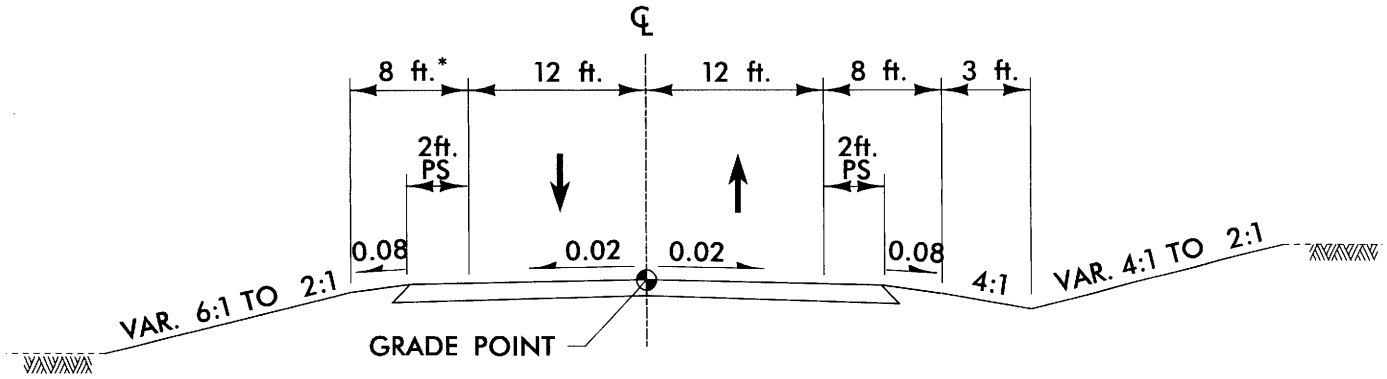
EXISTING BRIDGE LENGTH = 59 ft.

FUNCTIONAL CLASSIFICATION :
MAJOR COLLECTOR – RURAL

North Carolina Department Of Transportation
Project Development & Environmental Analysis

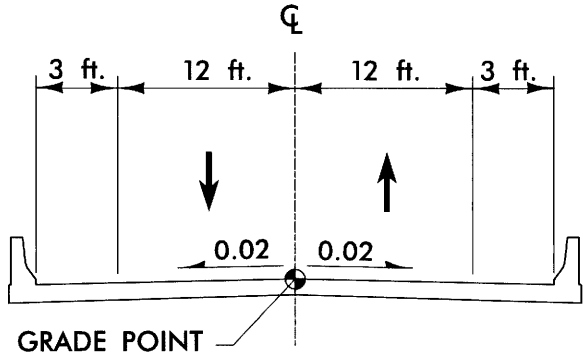
WAKE COUNTY
BRIDGE NO. 229 ON SR 1007
(POOLE RD)
OVER POPLAR CREEK
TIP NO: B–4301

FIGURE 3A



TYPICAL APPROACH SECTION
(DETOUR)

* 10 ft. WITH GUARDRAIL IS WARRANTED



TYPICAL BRIDGE SECTION
(DETOUR)

TRAFFIC DATA

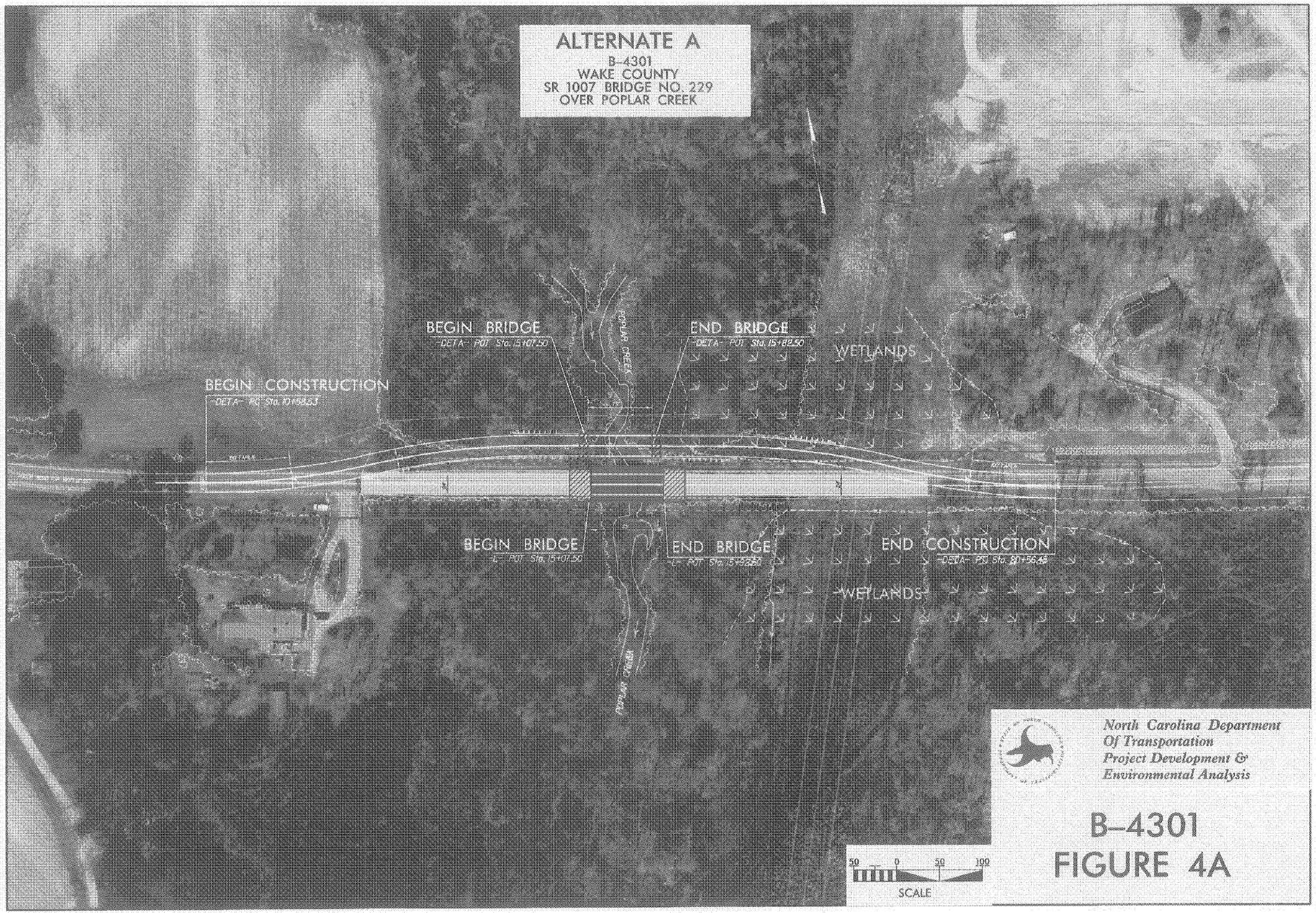
(CONST. YR.) 2006 ADT = 12,500
(DESIGN YR.) 2030 ADT = 25,300
DUAL 3%
TTST 1%

FUNCTIONAL CLASSIFICATION :
MAJOR COLLECTOR – RURAL

North Carolina Department Of Transportation Project Development & Environmental Analysis

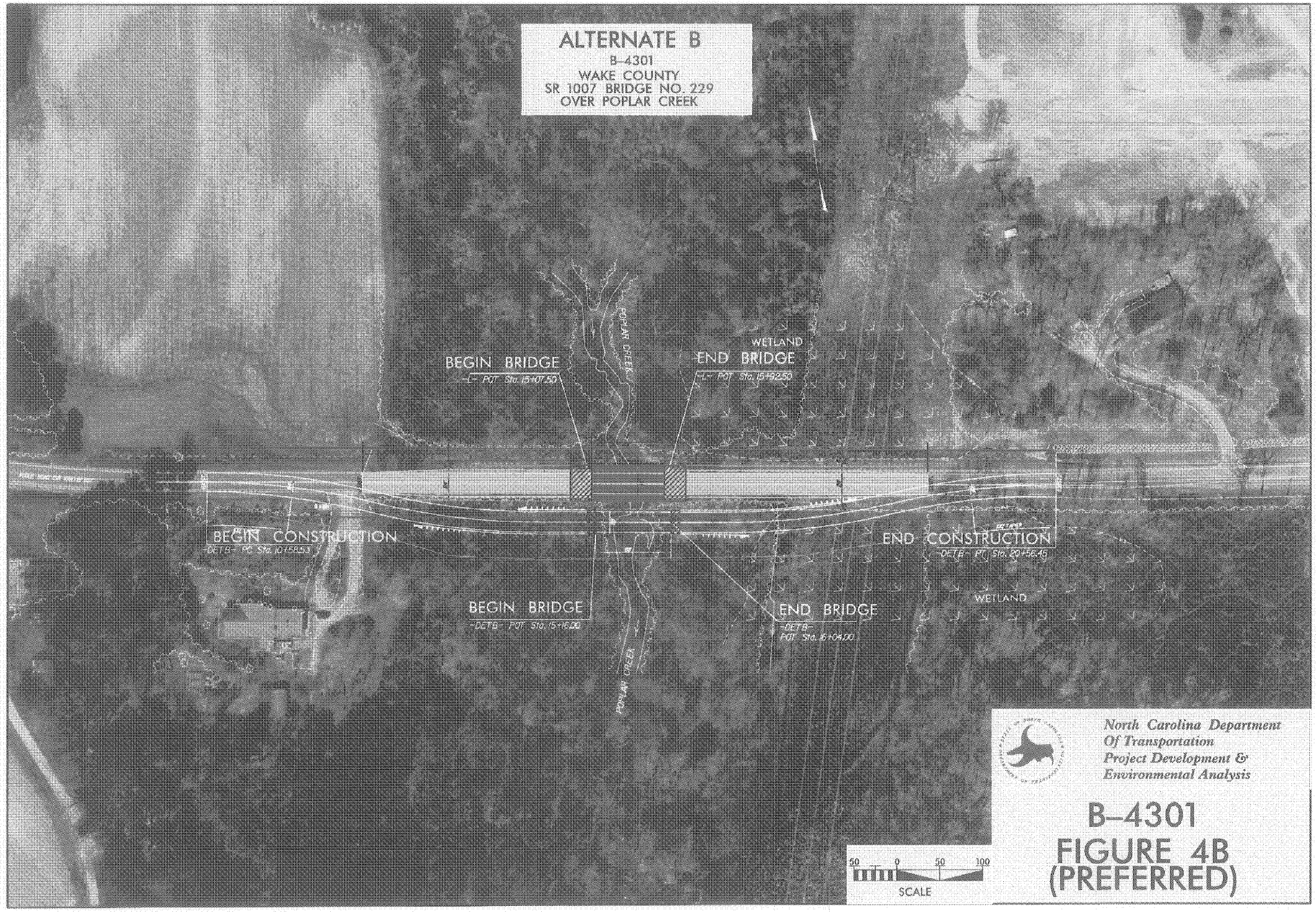
WAKE COUNTY
BRIDGE NO. 229 ON SR 1007
(POOLE RD)
OVER POPLAR CREEK
TIP NO: B–4301

FIGURE 3B



North Carolina Department Of Transportation
Project Development & Environmental Analysis

B-4301
FIGURE 4A



North Carolina Department Of Transportation
Project Development & Environmental Analysis

B-4301
FIGURE 4B (PREFERRED)

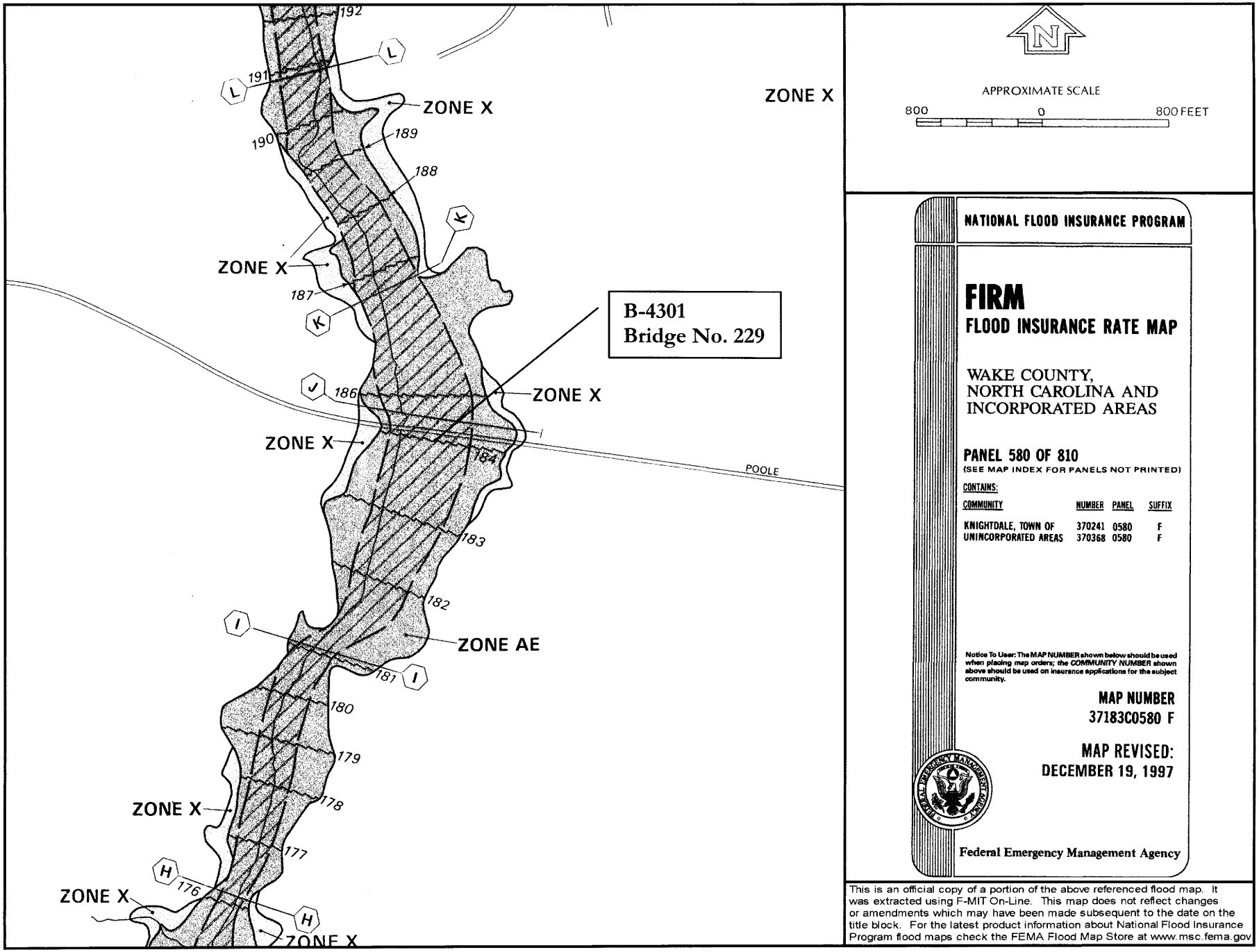

192
L
191
L
ZONE X
ZONE X
189
190
188
K
ZONE X
187
K
B-4301
Bridge No. 229
J
186
ZONE X
ZONE X
184
POOLE
183
182
I
ZONE AE
I
181
180
179
ZONE X
178
177
H
176
ZONE X
H
ZONE X
N
APPROXIMATE SCALE
800
0
800 FEET
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
WAKE COUNTY,
NORTH CAROLINA AND
INCORPORATED AREAS
PANEL 580 OF 810
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
KNIGHTDALE, TOWN OF 370241 0580 F
UNINCORPORATED AREAS 370368 0580 F
Notice To User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.
MAP NUMBER
37183C0580 F
MAP REVISED:
DECEMBER 19, 1997
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Figure 5

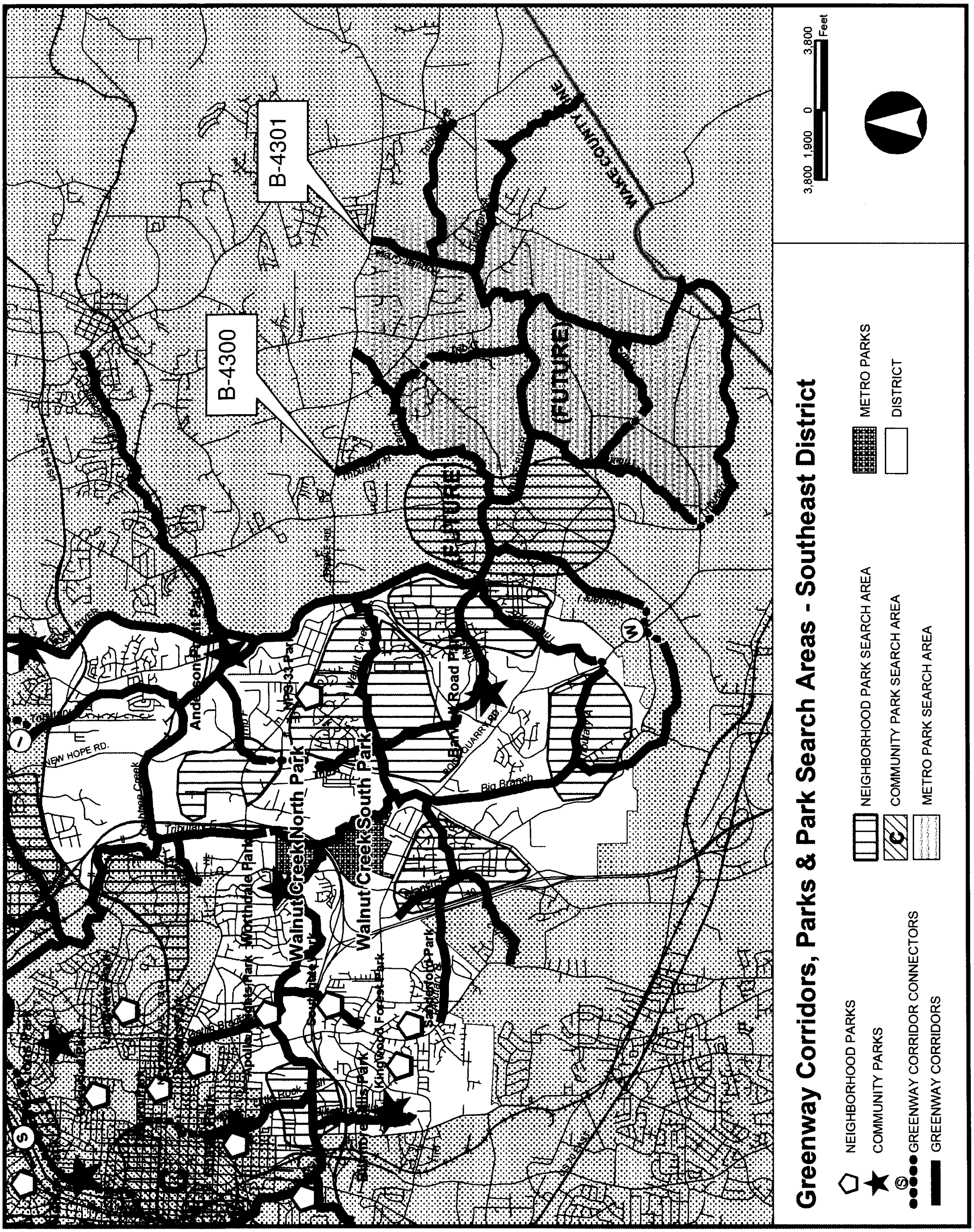

Greenway Corridors, Parks & Park Search Areas - Southeast District
NEIGHBORHOOD PARKS
COMMUNITY PARKS
GREENWAY CORRIDOR CONNECTORS
GREENWAY CORRIDORS
NEIGHBORHOOD PARK SEARCH AREA
COMMUNITY PARK SEARCH AREA
METRO PARK SEARCH AREA
METRO PARKS
DISTRICT
3,800 1,900 0 3,800
Feet
B-4300
B-4301
WAKE COUNTY LINE
FUTURE
Walnut Creek North Park
Walnut Creek South Park
Worthdale Park
Anderson Point Park
NEW HOPE RD.
Big Branch
Walnut Creek

FIGURE 6

APPENDIX

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

COPY

Action ID. 200420706 County: Wake U.S.G.S. Quad: Clayton

NOTIFICATION OF JURISDICTIONAL DETERMINATION

RECEIVED
FEB 03 2005
REGULATORY

Property Owner/Agent: NCDOT - Division of Highways
Address: Attn: Gregory J. Thorpe, Ph.D., Dir., PDEA
1548 Mail Service Center
Raleigh, NC 27699
Telephone No.: (919) 733-7844, ext. 266

Property description:
Size (acres) n/a
Nearest Waterway Poplar Creek
USGS HUC ____
Nearest Town Knightdale
River Basin Neuse
Coordinates N 35.748624 W 78.46566
Location description Study area for bridge replacement (TIP B-4301) as shown in drawings submitted on 3/29/04.

Indicate Which of the Following Apply:

_ Based on preliminary information, there may be wetlands on the above described property. We strongly suggest you have this property inspected to determine the extent of Department of the Army (DA) jurisdiction. To be considered final, a jurisdictional determination must be verified by the Corps. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331).

_ There are Navigable Waters of the United States within the above described property subject to the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

X There are waters of the U.S. including wetlands on the above described project area subject to the permit requirements of Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ We strongly suggest you have the wetlands on your project area delineated. Due to the size of your property and/or our present workload, the Corps may not be able to accomplish this wetland delineation in a timely manner. For a more timely delineation, you may wish to obtain a consultant. To be considered final, any delineation must be verified by the Corps.

X The waters of the U.S. including wetland on your project area have been delineated and the delineation has been verified by the Corps. We strongly suggest you have this delineation surveyed. Upon completion, this survey should be reviewed and verified by the Corps. Once verified, this survey will provide an accurate depiction of all areas subject to CWA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

_ The wetlands have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on _____. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ There are no waters of the U.S., to include wetlands, present on the above described project area which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Wilmington, NC, at (910) 395-3900 to determine their requirements.

Action ID. **200420706**

Placement of dredged or fill material within waters of the US and/or wetlands without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). If you have any questions regarding this determination and/or the Corps regulatory program, please contact **Eric Alsmeyer** at **(919) 876-8441, ext. 23**.

Basis For Determination: **The study area contains a stream channel of Poplar Creek, a tributary of the Neuse River, with indicators of ordinary high water marks, and wetlands adjacent to Poplar Creek.**

Remarks: ____

Corps Regulatory Official: _____

Date **01/31/2005** Expiration Date **01/31/2010**

Corps Regulatory Official (Initial): ECA

FOR OFFICE USE ONLY:

- A plat or sketch of the property and the wetland data form must be attached to the file copy of this form.
- A copy of the "Notification Of Administrative Appeal Options And Process And Request For Appeal" form must be transmitted with the property owner/agent copy of this form.
- If the property contains isolated wetlands/waters, please indicate in "Remarks" section and attach the "Isolated Determination Information Sheet" to the file copy of this form.

Copy furnished (with drawings): Julie Gibson
Mulkey Engineers
PO Box 33127
Raleigh, NC 27636

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: NCDOT **(TIP B-4301)**	File Number: **200420706**	Date: **01/31/2005**
Attached is:		See Section below
☐ INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)		A
☐ PROFFERED PERMIT (Standard Permit or Letter of permission)		B
☐ PERMIT DENIAL		C
☒ APPROVED JURISDICTIONAL DETERMINATION		D
☐ PRELIMINARY JURISDICTIONAL DETERMINATION		E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: Eric Alsmeyer Raleigh Regulatory Field Office US Army Corps of Engineers 6508 Falls of the Neuse Road, Suite 120 Raleigh, North Carolina 27615	If you only have questions regarding the appeal process you may also contact: Mr. Michael Bell, Administrative Appeal Review Officer CESAD-ET-CO-R U.S. Army Corps of Engineers, South Atlantic Division 60 Forsyth Street, Room 9M15 Atlanta, Georgia 30303-8801

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

DIVISION ENGINEER:
Commander
U.S. Army Engineer Division, South Atlantic
60 Forsyth Street, Room 9M15
Atlanta, Georgia 30303-3490

United States Department of the Interior

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

February 18, 2004

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

Dear Dr. Thorpe:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Sincerely,

John E. Ellis

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

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

Federal Aid # BRSTP-1007(9) *TIP* # B-4301 *County*: Wake

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

Project Description: Replace Bridge No. 229 on SR 1007 over Poplar Creek

On 10/14/2003, representatives of the

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

Reviewed the subject project at

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

All parties present agreed

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

Signed:

Mary Pope Furr — 10.14.2003
Representative, NCDOT — Date

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

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

David Brook — 10-14-03
State Historic Preservation Officer — Date

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

North Carolina Department of Cultural Resources
State Historic Preservation Office

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

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

March 4, 2004

MEMORANDUM

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

FROM: David Brook for David Brook

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

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

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

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

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

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

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

cc: Mary Pope Furr, NCDOT
Matt Wilkerson, NCDOT

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

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

February 25, 2004

MEMORANDUM

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

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

THROUGH: John Hennessy, Supervisor, DWQ 401 Transportation Unit

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

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

I. General Comments Regarding Bridge Replacement Projects

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

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

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

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

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

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

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

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

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

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

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

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

II. General Comments if Replacing the Bridge with a Culvert

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

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

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

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

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

III. Project-Specific Comments

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

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

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

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

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

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

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

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

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

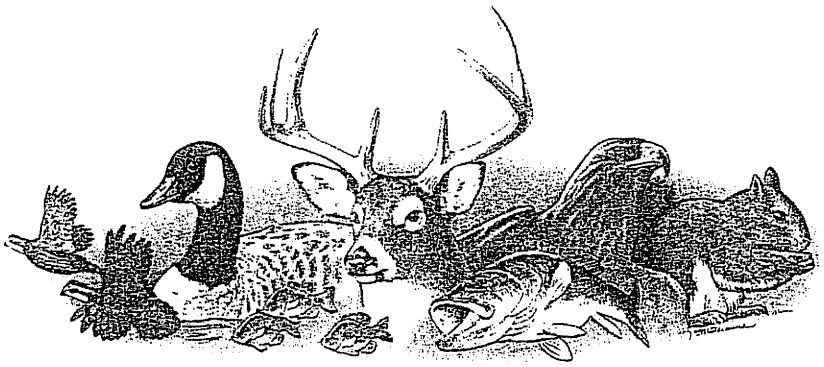
B-4592, Bridge 64, Eno River, Orange County
Eno River is classified as WS-IV/B, NSW. There are 30-foot vegetated buffer requirements in WS waters in addition to the requirements to minimize storm water runoff and maximize use of BMPs. Refer to 15A NCAC 2B .0216(3)(b)(i)(F) and (G). This project is also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

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

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

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

cc: USACE Raleigh Field Office
File Copy



North Carolina Wildlife Resources Commission

Richard B. Hamilton, Executive Director

MEMORANDUM

TO: Gregory J. Thorpe
Environmental Management Director, PDEA

FROM: Travis Wilson, Highway Project Coordinator
Habitat Conservation Program

DATE: February 27, 2004

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

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

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

1. We generally prefer spanning structures. Spanning structures usually do not require work within the stream and do not require stream channel realignment. The horizontal and vertical clearances provided by bridges allows for human and wildlife passage beneath the structure, does not block fish passage, and does not block navigation by canoeists and boaters.
2. Bridge deck drains should not discharge directly into the stream.
3. Live concrete should not be allowed to contact the water in or entering into the stream.
4. If possible, bridge supports (bents) should not be placed in the stream.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Project specific comments:

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

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

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

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

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

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

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

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

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

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

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

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

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

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

February 27, 2004

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

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

Dear Dr. Thorpe:

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

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

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

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

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

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

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

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

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

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

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

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

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

Sincerely,

Harry E. LeGrand, Jr.

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

HEL/hel

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

WAKE COUNTY
PUBLIC SCHOOL SYSTEM

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

March 3, 2004

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

Dear Mr. Thorpe:

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

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

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

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

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

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

Thanks you for soliciting our input.

Sincerely,

Vernon W. Hatley

VWH/as

Pam Williams

From: Lebsock, Victor [Victor.Lebsock@ci.raleigh.nc.us]
Sent: Wednesday, April 07, 2004 1:05 PM
To: Lamb, Eric; Pam Williams
Subject: RE: Bridge Replacement projects in Wake County

You have picked up most of the greenway issues, but must note that the Southeast Raleigh Urban Service area extends to the east and encompasses Poplar Creek. Poplar Creek is on the Capital Area Greenway Master Plan and accommodations in replacing the Poole Road Bridge over the creek should take into account the future greenway trail. For further information you can contact me.

Victor (Vic) Lebsock
Park and Greenway Planner
P. O. Box 590
Raleigh, NC 27602
Telephone (919) 890-3293
email victor.lebsock@ci.raleigh.nc.us

-----Original Message-----
From: Lamb, Eric
Sent: Tuesday, March 30, 2004 8:35 AM
To: 'Pam Williams'
Cc: Lebsock, Victor
Subject: RE: Bridge Replacement projects in Wake County

Pam:

Sorry it's taken me so long to get back to you. I hope this information helps – please let me know if you have any questions. Thanks once again for seeking our input and coordinating with us on these NCDOT projects.

B-4300
Although this is slightly outside of my jurisdiction, there are a few elements of concern that I have.

1) Poole Road is an arterial thoroughfare in the City of Raleigh's plan and will likely be widened to a multilane facility at some point. The design of the bridge should accommodate this future widening.
2) The Eastern Wake Expressway (I-540) will be coming through this immediate area in the future. You should extrapolate an approximate corridor based on the location of the interchange with US 64 Bypass.
3) US 64 Bypass is severing your detour route. In fact, you may want to consider building the project with a full closure and use the bypass as your detour route.

Also, please coordinate this project with the Town of Knightdale.

B-4301, B-4302
Both are way outside of my jurisdiction, and you'll be dealing with Knightdale and Fuquay-Varina respectively.

B-4303
This is just outside the City of Raleigh, but I know the area. I think your detour route looks fine. There will need to be a greenway accommodations beneath the bridge as Lower Barton's Creek is part of our greenway master plan. Please contact Vic Lebsock at 890-3293 for more information. You also need to contact Tim Clark at Wake County Planning at 856-6320 for additional input.

B-4304
Old Milburnie Road is classified as a major thoroughfare, whose ultimate section will be a five-lane roadway with sidewalks on both sides. Any bridge design should accommodate for this ultimate section. There are also significant impacts to Old Milburnie Road in association with the construction of I-540 (R-2000G). This project is also identified as a greenway corridor on the City's greenway master plan, and will also require accommodations

as part of the project.

With respect to the detour route, I-540 will also be an issue. You may wish to check the construction schedule for this project and familiarize yourself with the interchange locations.

Thanks again,

Eric

Eric J. Lamb, PE
Manager, Transportation Services Division
City of Raleigh Public Works Department
P.O. Box 590, Raleigh, NC 27602

eric.lamb@ci.raleigh.nc.us
http://www.raleigh-nc.org
(919) 890-3430
fax(919) 890-3786

B-4301

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

STREAM QUALITY ASSESSMENT WORKSHEET

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT
2. Evaluator's name: J. Gibson
3. Date of evaluation: 1/12/04
4. Time of evaluation: 2pm
5. Name of stream: Poplar Creek
6. River basin: Neuse
7. Approximate drainage area: ~9sq miles
8. Stream order: 3
9. Length of reach evaluated: 300'
10. County: Wake
11. Site coordinates (if known): prefer in decimal degrees.
12. Subdivision name (if any):

Latitude (ex. 34 872312): _____ Longitude (ex. -77 556611): _____

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

13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): Bridge No. 229 on Poole Rd

14. Proposed channel work (if any): -

15. Recent weather conditions: sunny

16. Site conditions at time of visit: sunny

17. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters X Nutrient Sensitive Waters ___Water Supply Watershed ____(I-IV)

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

19. Does channel appear on USGS quad map? (YES) NO

20. Does channel appear on USDA Soil Survey? (YES) NO

21. Estimated watershed land use: 20 % Residential ___% Commercial ___% Industrial ___% Agricultural 70 % Forested 10 % Cleared / Logged ___% Other (_____)

22. Bankfull width: 25'

23. Bank height (from bed to top of bank): 2.5'

24. Channel slope down center of stream: ___Flat (0 to 2%) X Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)

25. Channel sinuosity: ___Straight X Occasional bends ___Frequent meander ___Very sinuous ___Braided channel

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

Total Score (from reverse): 77 **Comments:** stable Piedmont stream

Evaluator's Signature _____ **Date** 1/12/04

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

STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	4
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	4
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	3
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	4
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	3
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	3
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	4
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	4
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 3	3
	10	**Sediment input** (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	3
	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	1
STABILITY	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	4
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	5
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	3
	15	**Impact by agriculture, livestock, or timber production** (substantial impact =0; no evidence = max points)	0 – 5	0 – 4	0 – 5	4
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	3
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	5
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	3
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	3
BIOLOGY	20	**Presence of stream invertebrates** (see page 4) (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	4
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	2
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	5
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on first page)				77

* These characteristics are not assessed in coastal streams.

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

Project/Site: B-4301
Applicant/Owner: NCDOT
Investigator(s): J. Gibson/ H. Brady

Date: 1/12/2004
County: Wake
State: NC

Do Normal Circumstances exist on the site? [Yes] No
Is the site significantly disturbed (Atypical Situation)? Yes [No]
Is this area a potential Problem Area? Yes [No]
(If needed, explain on reverse)

Community ID: PFO1A
Transect ID: WA10
Plot ID:

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1.	*Liquidambar styraciflua*	overstory	FAC+	9.	*Rubus argutus*	shrub	FACU+
2.	*Quercus nigra*	overstory	FAC	10.	*Magnolia virginiana*	understory	FACW+
3.	*Acer rubrum*	overstory	FAC	11.	*Smilax rotundifolia*	vine	FAC
4.	*Quercus michauxii*	overstory	FACW-	12.	*Juncus effusus*	herbaceous	FACW+
5.	*Liquidambar styraciflua*	understory	FAC	13.			
6.	*Acer rubrum*	understory	FAC	14.			
7.	*Alnus serrulata*	shrub	FACW	15.			
8.	*Ilex opaca*	understory	FAC-	16.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 92%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks)
___ Stream, Lake, or tide Gauge
___ Aerial Photographs
___ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: - (in.)
Depth to Free Water in Pit: 0 (in.)
Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
x Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
x Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
x Water-Stained Leaves
___ Local Soil Survey Data
x FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:
seasonal flooding caused by beaver activity
good microtopography; hummocks present

SOILS

Map Unit Name (Series and Phase): *Wehadkee*

Drainage Class: Field Observations: *Poorly drained*

Taxonomy (Subgroup): *Fluventic hapluquepts*

Confirm Mapped Type? Yes [ ] No [ ]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1	*Oa*				*roots & organic materials*
1-2	*A*	*10YR4/2*			*SCL*
2-12+	*B*	*2.5Y5/1*			*SCL*

Hydric Soil Indicators:

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

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? [Yes] No

Wetland Hydrology Present? [Yes] No

Hydric Soils Present? [Yes] No

Is this Sampling Point Within a Wetland? [Yes] No

Remarks:

point taken 20' downhill of WA10

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

Project/Site: B-4301
Applicant/Owner: NCDOT
Investigator(s): J. Gibson/ H. Brady

Date: 1/12/2004
County: Wake
State: NC

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is this area a potential Problem Area?	Yes	No

(If needed, explain on reverse)

Community ID: *Upland*
Transect ID: *WA10*
Plot ID:

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1.	*Liquidambar styraciflua*	*overstory*	*FAC+*	9.	*Rubus argutus*	*shrub*	*FACU+*
2.	*Liriodendron tulipifera*	*overstory*	*FAC*	10.			
3.	*Acer rubrum*	*understory*	*FAC*	11.			
4.	*Quercus rubra*	*overstory*	*FACU*	12.			
5.	*Lonicera japonica*	*vine*	*FAC-*	13.			
6.	*Magnolia virginiana*	*understory*	*FACW+*	14.			
7.	*Smilax rotundifolia*	*vine*	*FAC*	15.			
8.	*Ilex opaca*	*understory*	*FAC-*	16.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). *66%*

Remarks:

HYDROLOGY

____ Recorded Data (Describe in Remarks)
____ Stream, Lake, or tide Gauge
____ Aerial Photographs
____ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: ____ - ____ (in.)
Depth to Free Water in Pit: ____ - ____ (in.)
Depth to Saturated Soil: ____ - ____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
____ Inundated
____ Saturated in Upper 12 Inches
____ Water Marks
____ Drift Lines
____ Sediment Deposits
____ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
____ Oxidized Root Channels in Upper 12 Inches
____ Water-Stained Leaves
____ Local Soil Survey Data
____ FAC-Neutral Test
____ Other (Explain in Remarks)

Remarks:
2-6% slope along Poole Rd.

SOILS

Map Unit Name (Series and Phase): *Wedowee*

Drainage Class: Field Observations: *Well drained*

Taxonomy (Subgroup): *Typic Hapludults*

Confirm Mapped Type? Yes [ ] No [ ]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	*A*	*10YR2/2*			*many fine roots, Loam*
2-12+	*B*	*10YR4/3*			*Sandy Loam*

Hydric Soil Indicators:

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

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? [Yes] No

Wetland Hydrology Present? Yes [No]

Hydric Soils Present? Yes [No]

Is this Sampling Point Within a Wetland? Yes [No]

Remarks:

point taken 10' uphill of WA10

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

Project/Site: B-4301
Applicant/Owner: NCDOT
Investigator(s): J. Gibson/ H. Brady

Date: 1/12/2004
County: Wake
State: NC

Do Normal Circumstances exist on the site? [Yes] No
Is the site significantly disturbed (Atypical Situation)? Yes [No]
Is this area a potential Problem Area? Yes [No]
(If needed, explain on reverse)

Community ID: *PFO1A*
Transect ID: *WB13*
Plot ID:

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1.	*Salix nigra*	*understory*	*OBL*	9.			
2.	*Rubus argutus*	*shrub*	*FACU-*	10.			
3.	*Acer rubrum*	*understory*	*FAC*	11.			
4.	*Sambucus canadensis*	*understory*	*FACW-*	12.			
5.	*Juncus effusus*	*herbaceous*	*FACW+*	13.			
6.	*Lonicera japonica*	*vine*	*FAC-*	14.			
7.				15.			
8.				16.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). *67%*

Remarks:

powerline cutover

HYDROLOGY

___ Recorded Data (Describe in Remarks)
___ Stream, Lake, or tide Gauge
___ Aerial Photographs
___ Other
_X_ No Recorded Data Available

Field Observations:

Depth of Surface Water: ___-___ (in.)
Depth to Free Water in Pit: ___10___ (in.)
Depth to Saturated Soil: ___0___ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
_x_ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
_x_ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
_x_ Local Soil Survey Data
_x_ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

floodplain and associated inner wetland (between upland slope and levee) of Poplar Creek

SOILS

Map Unit Name (Series and Phase): *Wehadkee*

Drainage Class: Field Observations: *Poorly drained*

Taxonomy (Subgroup): *Fluventic hapluquepts*

Confirm Mapped Type? Yes [ ] No [X]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	*A*	*10YR5/4*			*SiCL, many fine roots*
4-12+	*B*	*10YR4/1*	*10YR4/6*	*few, med, distict*	*CL, oxidized root channels*

Hydric Soil Indicators:

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

Remarks:

oxidized root channels

WETLAND DETERMINATION

Hydrophytic Vegetation Present? [X] Yes [ ] No

Wetland Hydrology Present? [X] Yes [ ] No

Hydric Soils Present? [X] Yes [ ] No

Is this Sampling Point Within a Wetland? [X] Yes [ ] No

Remarks:

point taken 15' downhill of WB13

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

Project/Site: B-4301
Applicant/Owner: NCDOT
Investigator(s): J. Gibson/ H. Brady

Date: 1/12/2004
County: Wake
State: NC

Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (Atypical Situation)?	Yes	No
Is this area a potential Problem Area?	Yes	No

(If needed, explain on reverse)

Community ID: *Upland*
Transect ID: *WB13*
Plot ID:

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1.	*Quercus alba*	*overstory*	*FACU*	9.			
2.	*Liriodendron tulipifera*	*overstory*	*FAC*	10.			
3.	*Acer rubrum*	*understory*	*FAC*	11.			
4.	*Andropogon virginicus*	*herbaceous*	*FAC-*	12.			
5.	*Lonicera japonica*	*vine*	*FAC-*	13.			
6.	*Magnolia virginiana*	*understory*	*FACW+*	14.			
7.	*Smilax rotundifolia*	*vine*	*FAC*	15.			
8.				16.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). *57%*

Remarks:

HYDROLOGY

____ Recorded Data (Describe in Remarks)
____ Stream, Lake, or tide Gauge
____ Aerial Photographs
____ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: ____ (in.)
Depth to Free Water in Pit: ____ (in.)
Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
____ Inundated
____ Saturated in Upper 12 Inches
____ Water Marks
____ Drift Lines
____ Sediment Deposits
____ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
____ Oxidized Root Channels in Upper 12 Inches
____ Water-Stained Leaves
____ Local Soil Survey Data
____ FAC-Neutral Test
____ Other (Explain in Remarks)

Remarks:
5-10% slope

SOILS

Map Unit Name (Series and Phase): *Wedowee*

Drainage Class: Field Observations: *Well drained*

Taxonomy (Subgroup): *Typic Hapludults*

Confirm Mapped Type? Yes [ ] No [ ]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1	*A*	*10YR3/4*			*Sandy Loam*
1-12+	*B*	*10YR5/8*			*coarse Sandy Loam*

Hydric Soil Indicators:

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

Remarks:

likely fill material

WETLAND DETERMINATION

Hydrophytic Vegetation Present? [Yes] No

Wetland Hydrology Present? Yes [No]

Hydric Soils Present? Yes [No]

Is this Sampling Point Within a Wetland? Yes [No]

Remarks:

point taken 25' uphill of WB13

WETLAND RATING WORKSHEET (4th VERSION)

Project Name:	*B-4301*	County:	Wake
Nearest Road:	*Poole Rd.*	Date:	*1/12/2004*
Wetland Area (ac):	*both >1 aci*	Wetland Width (ft):	*average 400*
Name of Evaluator(s):	*J. Gibson*		*Wetlands A and B*

WETLAND LOCATION:

- ____ on sound or estusuary, pond or lake
- x on perennial steam
- ____ on intermittent stream
- ____ within interstream divide
- ____ other ____

ADJACENT LAND USE:

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

x	forested/natural vegetation	80 %
____	agricultural/ urbanized	10 %
x	impervious surface	10 %

Adjacent Special Natural Areas

SOILS:

Soil Series: *Wehadkee*

- ____ predominantly organic (humus, muck or peat)
- x predominantly mineral (non-sandy)
- ____ predominantly sandy

DOMINANT VEGETATION:

1. *Liquidambar styraciflua*
2. *Acer rubrum*
3. *Quercus nigra*
4. *Magnolia virginiana*

HYDRAULIC FACTORS:

- x freshwater
- ____ brackish
- ____ steep topography
- ____ ditched or channelized
- x total wetland width >= 100 feet

FLOODING AND WETNESS:

- ____ semipermanently to permenently flooded or inundated
- x seasonally flooded or inundated
- ____ intermittently flooded or temporary surface water
- ____ no evidence of flooding or surface water

WETLAND TYPE: (select one)*

- x Bottomland Hardwood Forest
- ____ Swamp Forest
- ____ Carolina Bay
- ____ Pocosin
- ____ Pine Savannah
- ____ Freshwater Marsh
- ____ Bog/Fen
- ____ Headwater Forest
- ____ Bog Forest
- ____ Ephemeral Wetland
- ____ Other: ____

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

DEM RATING

WATER STORAGE	4		X 4.00 =	16
BANK, SHORELINE STABILIZATION	0		X 4.00 =	0
POLLUTANT REMOVAL	3	*	X 5.00 =	15
WILDLIFE HABITAT	4		X 2.00 =	8
AQUATIC LIFE HABITAT	4		X 4.00 =	16
RECREATION/EDUCATION	1		X 1.00 =	1
			TOTAL WETLAND SCORE =	56

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