STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 12, 2006

North Carolina Division of Water Quality
Transportation Permitting Unit
1650 Mail Service Center
Raleigh, NC 27699-1650

ATTENTION: Mr. Rob Ridings
NCDOT Coordinator

Dear Sir:

Subject: **Application for Neuse Riparian Buffer Certification** for the replacement of Bridge No. 255 over an unnamed tributary to Swift Creek on SR 1006 (Old Stage Rd.), Wake County. Federal Aid Project No. BRSTP-1006 (14), WBS No. 33636.1.1, State Project No. 8.2408401, Division 5, T.I.P. No. B-4299:

Please find enclosed a copy of the project planning report for the above referenced project. The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 255 over an unnamed tributary (UT) to Swift Creek [DWQ Index # 27-43-5-(1.5)], a Division of Water Quality Class "WS-III NSW" Waters of the State. The project involves replacing the current bridge in its existing location, while using an off-site detour to maintain traffic during construction. The proposed structure will be a 70 foot, single span, pre-stressed, precast box beam spill through bridge with 41'-10" of clear roadway width. The structure will provide two 12-foot travel lanes with 8-11" of lateral clearance on each side of the bridge. The roadway approaches will provide two 12-foot travel lanes with 8-foot shoulders (4.0 feet paved). Enclosed with this permit application is a project site map, buffer permit drawings, PCN form, Categorical Exclusion (CE) document, and half size plan sheets.

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. US Army Corp of Engineers (USACE) representative Eric Alsmeyer, during field meetings held in June and July 2003, determined that there are two jurisdictional streams located in the project area, a perennial UT to Swift Creek (UT1) and an intermittent UT to Swift Creek (UT2). The proposed bridge will span UT1. UT2 flows into UT1 and is located parallel to Old Stage Rd. The two tributaries are assigned a Best Usage Classification of WS-III NSW. Traffic will be maintained by the use of an offsite detour. There will be no permanent or temporary impacts to jurisdictional waters associated with this project.

No designated Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supply I (WS-I), or Water Supply (II), waters occur within 1.0 mile of the study corridor. Neither tributary is listed on

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

the 2002, Draft 2004, or Draft 2006 List of impaired waters [Section 303(d)] for the Neuse River Basin. Listed waters do not meet water quality standards or have impaired uses.

NEUSE BUFFER IMPACTS

UT1 is subject to the Neuse Buffer Rules. The North Carolina Division of Water Quality (NCDWQ) had previously determined that UT2 was subject to the Neuse Riparian Buffer regulations (June and July 2003 field meetings). However, during a site visit on July 7, 2006, NCDOT biologists reevaluated UT2. A NCDWQ stream identification form was completed and the stream received a rating of 13.5, indicating that it was an ephemeral stream. NCDWQ representative Rob Ridings concurred with this finding and determined that UT2 is not subject to the Neuse Buffer Rules (July 2006 field meeting). Therefore, although considered jurisdictional by USACE, UT2 is not subject to the Neuse Buffer Rules.

Construction of the new bridge and approaches will result in impacts to the buffers of the UT1 (Permit drawing 4). A lateral base ditch will be constructed within Buffer Zone 1. This ditch, as discussed in a field meeting with NCDWQ in 2005, will replace an existing lateral base ditch currently located with Buffer Zone 1. Impacts to buffers are shown in Table 2 below. Under the Neuse Buffer Rules, impacts to buffers from the construction of bridges are allowable; impacts associated with construction of the approaches which impact less than 150 linear feet or one-third of an acre are also allowable. Mitigation in not proposed for this project.

Table 2. Neuse River Buffer Impacts to UT1(Square Feet)

	Bridge Construction	Road Crossing Impacts*
Zone 1 Impact (sq. ft)	4969	1317
Zone 2 Impact (sq. ft)	0	3066
Mitigation requirements (exempt, allowable or allowable with mitigation)	Allowable	Allowable

*129 linear feet of impacts to UT1 buffers

This bridge has been determined to be structurally deficient and functionally obsolete. The replacement of this inadequate structure will result in safer and more efficient traffic operations. Because this bridge needs to be replaced, impacts to the riparian buffers of UT1 are unavoidable. Replacing the existing bridge at its existing location provides the least amount of impacts to riparian buffers.

UTILITY IMPACTS

Aerial telephone lines and poles located on the west side of the bridge will be removed from the project area. One pole, on the northwest side of the bridge, is located within Buffer Zone 2. A crane positioned on the Bridge No. 255 will be used to remove the pole from the project area. If removal can not be achieved in this manner, the pole will be removed manually by sawing the pole just below ground level. Therefore, there will be no impacts to jurisdictional waters or riparian buffers associated with the removal of the telephone lines and poles.

AVOIDANCE AND MINIMIZATION

The NCDOT is committed to the incorporation of all reasonable and practicable design features to avoid and minimize buffer impacts. The following measures were taken during the design of the proposed bridge to avoid and minimize impacts to the streams and buffers:

- Best Management Practices for Protection of Surface Waters will be implemented.
- The proposed project includes complete bridging of UT1, without any bents located in the stream, allowing for pre-project stream flows to maintain the current water quality, aquatic habitat, and flow regime.
- Impacts to UT2 will be avoided by utilizing the existing pavement width and tying into the existing shoulder.
- Rock plating will be utilized at the end bent to avoid impacts to UT2
- The proposed bridge will be replaced in its existing location.
- The roadway grade was kept close to the existing, minimizing fill height.
- The proposed bridge will be 17 feet longer and 8.6 feet wider than the existing bridge, increasing the floodplain under the bridge.
- An off-site detour will be utilized during construction.
- Two preformed scour holes will be constructed on the north side of the bridge to filter stormwater runoff.
- 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).

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) website (updated April 27, 2006) lists 4 federally protected species for Wake County: bald eagle (*Haliaeetus leucocephalus*), red-cockaded woodpecker (RCW)(*Picoides borealis*), dwarf wedge mussel (DWM) (*Alasmidonta heterodon*), and Michaux's sumac (*Rhus michauxii*). Table 1 lists the species and their federal status.

Table 1. Federally-Protected Species for Wake County

Scientific Name	Common Name	Status	Biological Conclusion	Potential Habitat
Picoides borealis	Red-cockaded woodpecker	E	No Effect	No
Haliaeetus leucocephalus	Bald Eagle	T*	No Effect	No
Alasmidonta heterodon	Dwarf wedge mussel	E	No Effect	No
Rhus michauxii	Michaux's sumac	E	No Effect	No

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

A biological conclusion of "No Effect" has been issued for the bald eagle due to the lack of potential habitat within the project area. The project area does not contain large areas of open water, and therefore lacks potential foraging habitat for bald eagles. There are no large ponds or lakes within one-mile of the project area.

A biological conclusion of "No Effect" has been issued for the RCW due to lack of potential habitat within the project area. A pine forest is located within the project area does not contain trees of an age suitable to support RCW nesting. There is no suitable foraging habitat within the project area.

On March 15, 2005 the project area was evaluated for potential habitat for Michaux's sumac. A powerline right-of-way is located within the floodplain of UT1 and, therefore, does not provide potential habitat. Roadside and pasture edges also do not provide potential habitat due to regular

mowing and competition for other vegetation. A biological conclusion of "No Effect" has been issued for Michaux' sumac due to the lack of potential habitat.

Mussel surveys were conducted on October 15, 2005. No DWM were observed and it was determined that suitable habitat does not occur within the project area. A biological conclusion of "No Effect" has been issued for the DWM.

REGULATORY APPROVALS

This project has been designed to comply with the Neuse River Basin Riparian Buffer Rules (15A NCAC 2B.0233). NCDOT requests written authorization for a Buffer Certification from the Division of Water Quality. This project has been reviewed for jurisdiction under the Federal Clean Water Act (CWA). There are no impacts to Waters of the US, therefore none of the actions of this project fall under jurisdiction of the CWA. Therefore, no permits pursuant to the CWA are required.

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 Erica McLamb at 715-1521.

Sincerely,

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

Cc:
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. Jon Nance, 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, Project Planning Engineer
- Ms. Beth Harmon, EEP
- Mr. Todd Jones, NCDOT External Audit Branch
- File-B-4299

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: None

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: 1598 Mail Service Center
   Raleigh, NC 27699-1548
   Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
   E-mail Address:

2. Agent/Consultant Information (A signed and dated copy of the Agent Authorization letter must be attached if the Agent has signatory authority for the owner/applicant.)
   Name: N/A
   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.255 over UT to Swift Creek on SR 1006

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-4299

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

4. Location
   County: Wake Nearest Town: Garner
   Subdivision name (include phase/lot number):
   Directions to site (include road numbers/names, landmarks, etc.): see map in permit drawings

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): 35.7050 °N 78.6562 °W

6. Property size (acres): N/A

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

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

9. Describe the existing conditions on the site and general land use in the vicinity of the project at the time of this application: The project is located in a residential community consisting of primarily maintained/distrubed areas with some forested area.

10. Describe the overall project in detail, including the type of equipment to be used: Bridge No. 225 will be replaced on existing location with a offsite detour. 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: To replace a deteriorating bridge

IV. Prior Project History

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

V. Future Project Plans

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

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

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to wetlands, open water, and stream channels associated with the project. 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: none

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)
Total Wetland Impact (acres)					

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

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)
Total Stream Impact (by length and acreage)						

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)				

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

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

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. Please refer to the attached cover letter

VIII. Mitigation

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

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

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

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

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	6286	3 (2 for Catawba)	0.0
2	3066	1.5	0.0
Total	9352		0.0

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

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. Mitigation is not required for this project.

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)

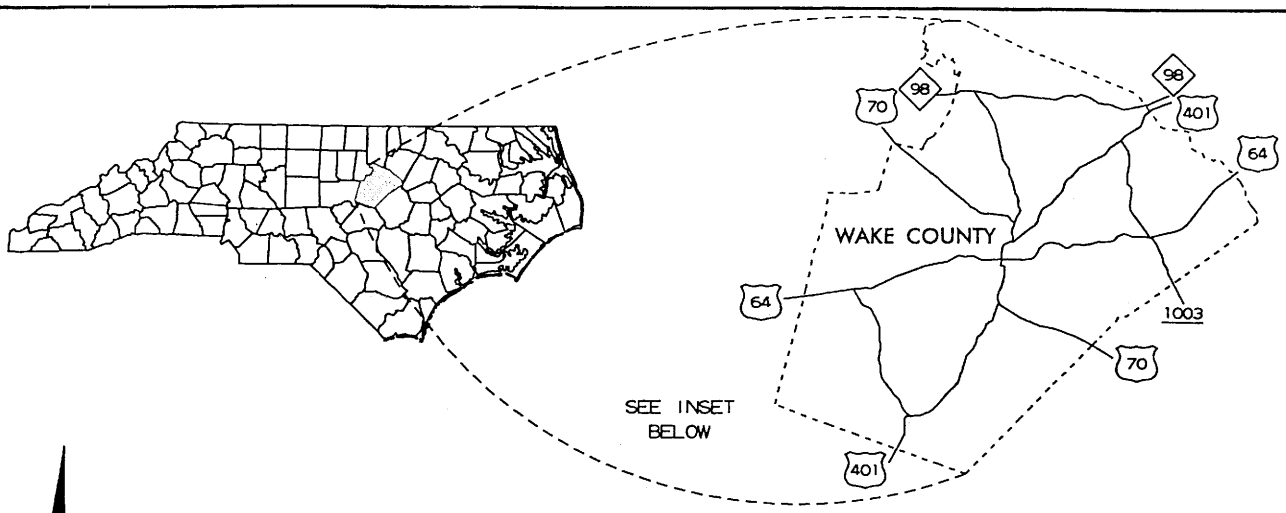
Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality? Yes ☐ No ☒
If yes, please submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent North Carolina 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:

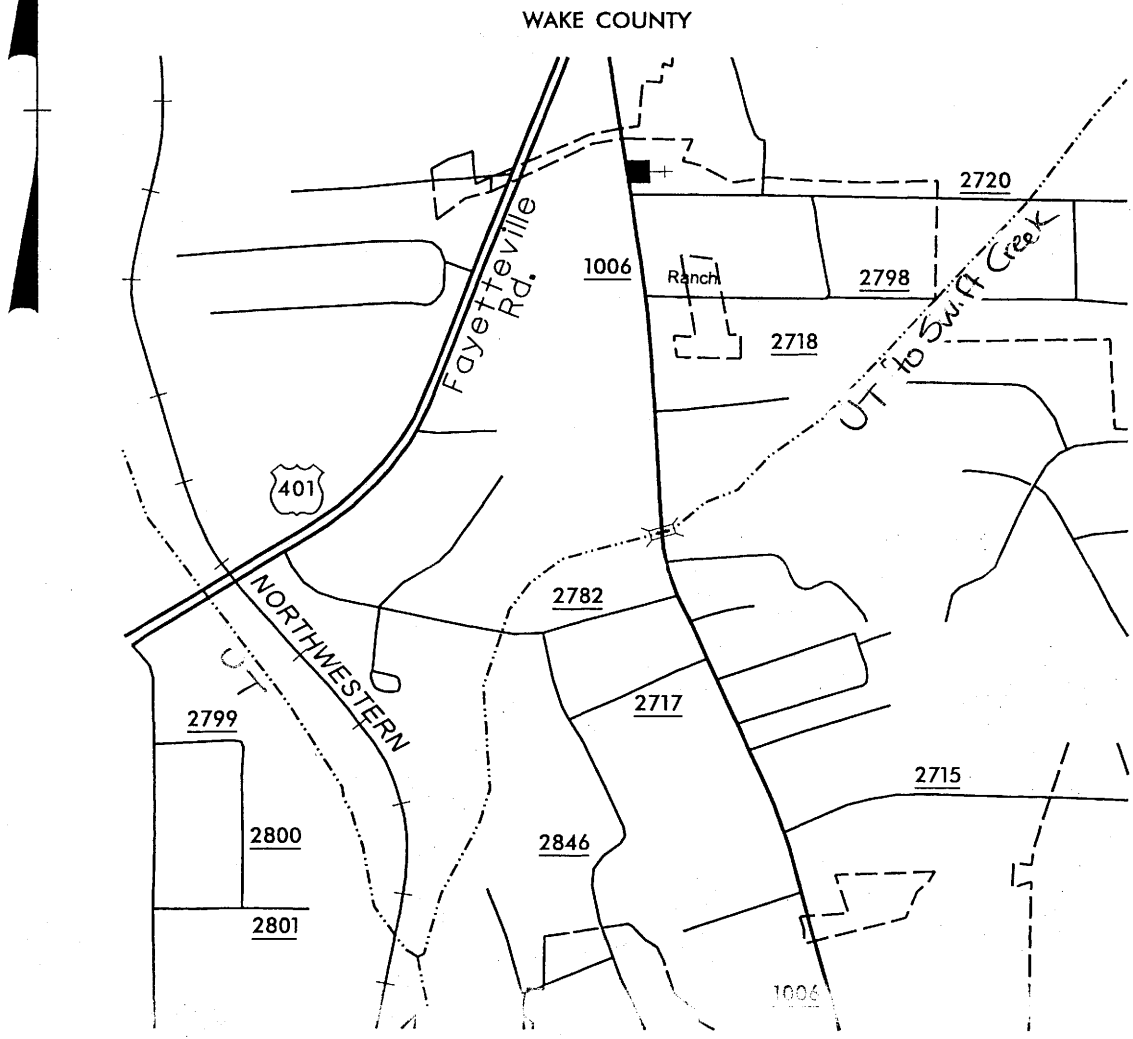
XV. Other Circumstances (Optional):

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).
None

E.L. Lusk 10.12.06

Applicant/Agent's Signature **Date**
(Agent's signature is valid only if an authorization letter from the applicant is provided.)





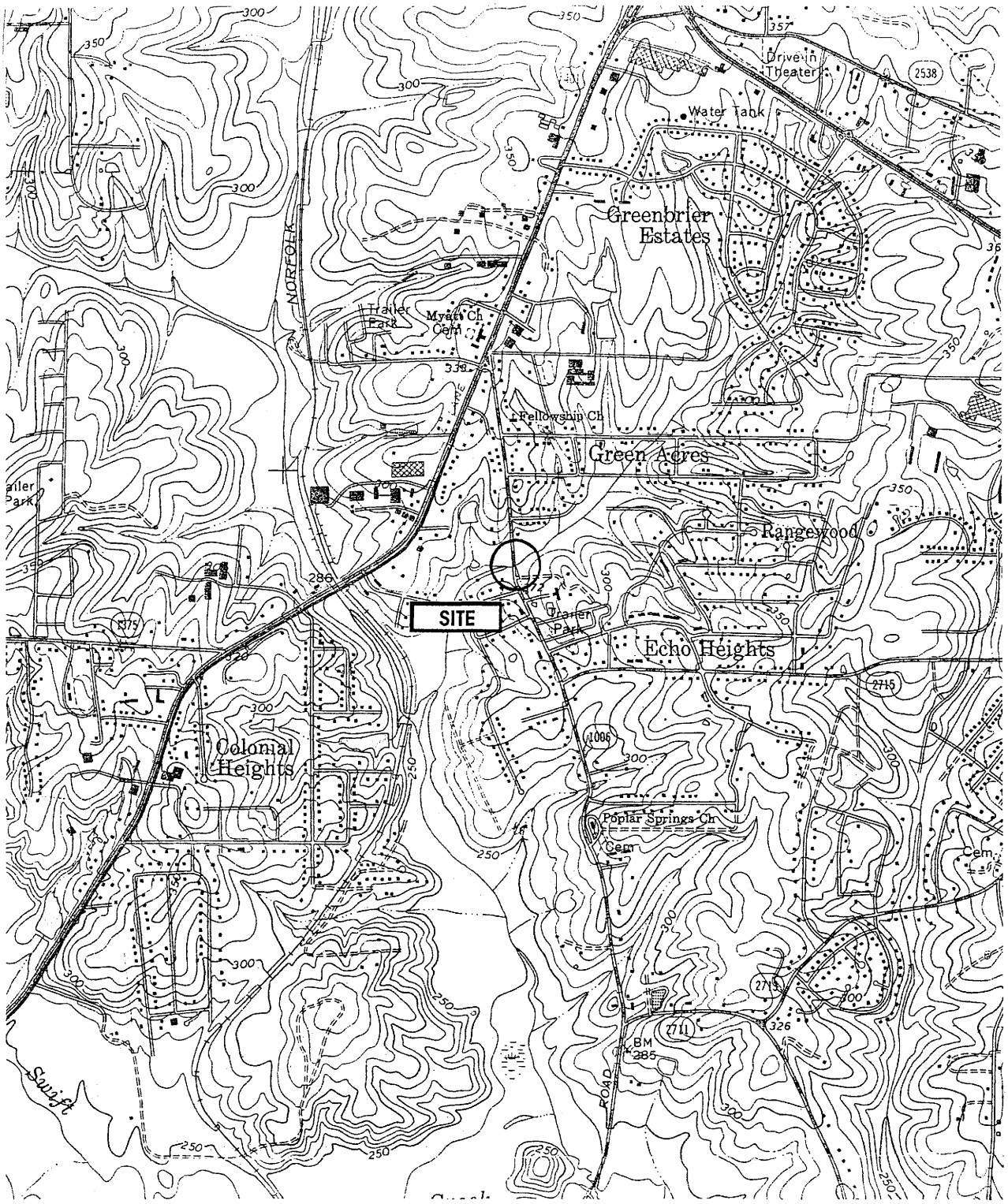
SCALE
.5 0 1 Mile

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 33636.1.1 (B-4299)
BRIDGE NO. 255 OVER
UT to Swift Creek
ON SR 1006

SHEET 1 OF 9 01 / 27 / 05



N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

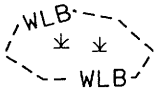
WAKE COUNTY

PROJECT: 33636.1.1 (B-4299)
BRIDGE NO. 255 OVER
UT to Swift Creek
ON SR 1006

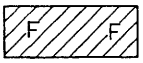
SHEET 2 **OF** 8 **01 / 27 / 05**

LEGEND

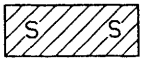
---WLB--- WETLAND BOUNDARY



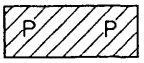
WETLAND



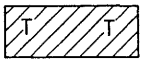
DENOTES FILL IN WETLAND



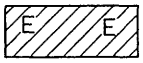
DENOTES FILL IN SURFACE WATER



DENOTES FILL IN SURFACE WATER (POND)



DENOTES TEMPORARY FILL IN WETLAND



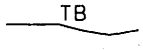
DENOTES EXCAVATION IN WETLAND

DENOTES TEMPORARY FILL IN SURFACE WATER

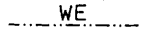

DENOTES MECHANIZED CLEARING

—— BZ —— RIPARIAN BUFFER ZONE

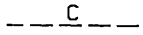
FLOW DIRECTION



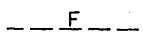
TOP OF BANK



EDGE OF WATER



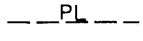
PROP. LIMIT OF CUT



PROP. LIMIT OF FILL


PROP. RIGHT OF WAY

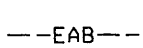
—— NG —— NATURAL GROUND



PROPERTY LINE

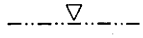
TEMP. DRAINAGE EASEMENT

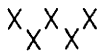
PERMANENT DRAINAGE EASEMENT



EXIST. ENDANGERED ANIMAL BOUNDARY

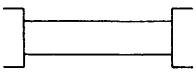
PLANT BOUNDARY

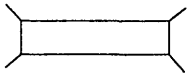

WATER SURFACE


LIVE STAKES


BOULDER

COIR FIBER ROLLS

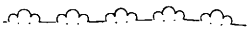

PROPOSED BRIDGE


PROPOSED BOX CULVERT

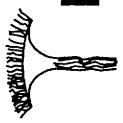

PROPOSED PIPE CULVERT

(DASHED LINES DENOTE EXISTNG STRUCTURES)


SINGLE TREE

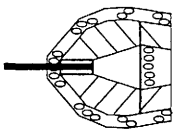

WOODS LINE


DRAINAGE INLET


ROOTWAD


RIP RAP

ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE


RIP RAP ENERGY DISSIPATOR BASIN

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 33636.1.1 (B-4299)
BRIDGE NO. 255 OVER
UT to Swift Creek
ON SR 1006

SHEET 3 **OF** 8 **01 / 27 / 05**

Project No. 33636.1.1 (B-4299)

Property Owner List

Parcel Number	Name	Address
2	John Henry Battz	5500 Old Stage Road Raleigh, NC 27603
5	Richard D. Abernathy	5616 Old Stage Road Raleigh, NC 27603
6	George F. Horton	5412 Old Stage Road Raleigh, NC 27603

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 33636.1.1 (B-4299)
BRIDGE NO. 255 OVER
UT to Swift Creek
ON SR 1006

SHEET 4 OF 8 01/27/05

BUFFER IMPACTS SUMMARY

SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	IMPACT TYPE: ROAD CROSSING	IMPACT TYPE: BRIDGE	IMPACT TYPE: PARALLEL IMPACT	ALLOWABLE: ZONE 1 (ft^2)	ALLOWABLE: ZONE 2 (ft^2)	ALLOWABLE: TOTAL (ft^2)	MITIGABLE: ZONE 1 (ft^2)	MITIGABLE: ZONE 2 (ft^2)	MITIGABLE: TOTAL (ft^2)	BUFFER REPLACEMENT: ZONE 1 (ft^2)	BUFFER REPLACEMENT: ZONE 2 (ft^2)
1	-L- Roaday Fill	-L- 22+00 / -L- 22+35	X			622.0	1613.0	2235.0					
1	Bridge, 1 @ 70'-0" Box Beam	-L- 22+35 / -L- 23+05		X		4969.0		4969.0					
1	-L- Roaday Fill	-L- 23+05 / -L- 23+40	X			695.0	1452.0	2147.0					
TOTAL:						6286.0	3065.0	9351.0					

Linear feet of buffer impacts = 129 feet

N.C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT 33636.1.1 (B-4299)
BRIDGE #255 OVER UT TO SWIFT CREEK
ON SR 1006

REV 9/2005
5/5/2006

SHEET 5 OF 8

Revised 8/24/2006

REVISIONS
5-8-06 -ADDITION OF RIGHT -OF-WAY PROPERTY TIES

PROJECT REFERENCE NO.	SHEET NO.
B-4299	4
RW SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 27771 ENGINEER MATTHEW B. COPPLE

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 18442 ENGINEER RICHARD LEON BOLLINGER JR.

Sheet 6 of 8

NC GRID NAD 83/95

SHELTON R. GREY HEIRS D.B. 1626 PG. 340

NATHAN ROBERT RAY, JR. D.B. 2924 PG. 74

G.F. HORTON, ET UX EVELYN M. ODOM D.B. 1533 PG. 200 D.B. 8077 PG. 554

MACON LED EVANS & PEARLENE T. EVANS REVOCABLE LIVING TRUST D.B. 9332 PG. 855

BRADLEY BENEDICT CARIVEAU D.B. 4854 PG. 623

JEFFERY LAWRENCE COATS D.B. 8474 PG. 107

JOHN HENRY BATTZ D.B. 2009 PG. 279

G.F. HORTON, ET UX D.B. 1533 PG. 200

GEORGE FENNER HORTON, JR. ET UX D.B. 1616 PG. 472

G.F. HORTON, ET UX D.B. 1049 PG. 109

ELSIE MAE BARRICK HEIRS D.B 2978 PG. 72

ROBERT R. COOPER, ET UX D.B. 5854 PG. 899 D.B. 2544 PG. 000

KYLE WHITE ENTERPRISES, L.L.C D.B. 5369 PG. 2417

RICHARD DEAN ABERNATHY, ET UX D.B. 7472 PG. 666

WILLIAM RAY MACEY, ET UX D.B. 1846 PG. 207

LARRY CHESTER WOODALL ET UX D.B. 1903 PG. 285

DAN RICHARD MYERS, ET UX D.B. 2692 PG. 543

UT1 to Swift Creek

POT -Y- Sta. 10+00.00

BL-103 PINC 16+63.32 = -L- 22+30.92 17.13 LT.

POT -Y- Sta. 13+01.55 = POT -L- Sta. 19+20.41

BM = 203 BL STA. 16+55.48 30.00' LT. ELEV.=264.75'

BM = 204 BL STA.=22+72.47 14.00' LT. ELEV.=289.46'

BEGIN CONSTRUCTION BEG PROJECT B-4299 -L- POT STA 18+45.00

END PROJECT B-4299 -L- POT STA 25+25.00

END CONSTRUCTION -L- POT STA 26+00.00

BL-102 PINC 13+37.80 = -L- 19+05.03 27.12 RT

BL-104 PINC 22+00.34 = -L- 27+67.93 15.48 LT

PC -L- Sta. 19+42.92

PT -L- Sta. 22+27.44

PC Sta. 20+82.59

PAVEMENT TRANSITIONS FROM 37' TO 24'

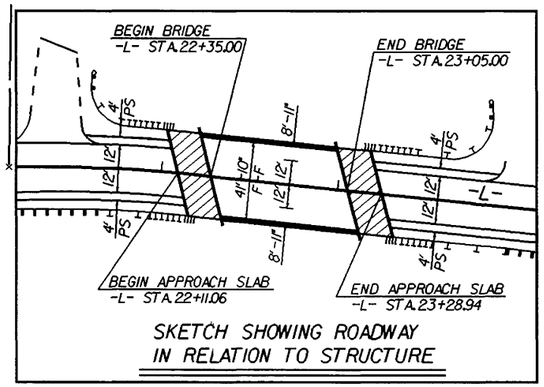
TO ANGIER

TO RALEIGH

OLD STAGE RD. S.R.1006

-L-

PI Sta 20+86.85
Δ = 21° 20' 19.2" (RT)
D = 7° 30' 00.0"
L = 284.52'
T = 143.93'
R = 763.94'
emax = 6%
RUNOFF = SEE PLANS

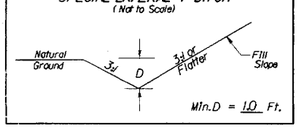


SKETCH SHOWING ROADWAY IN RELATION TO STRUCTURE

DENOTES ALLOWABLE IMPACTS ZONE 1

DENOTES ALLOWABLE IMPACTS ZONE 2

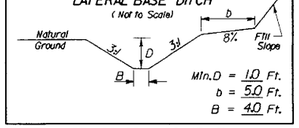
DETAIL 1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min.D = 1.0 Ft.

STA. 24+00 to 25+70 LT
STA. 20+75 to 21+35 LT.

DETAIL 2
LATERAL BASE DITCH
(Not to Scale)



Min.D = 1.0 Ft.
b = 5.0 Ft.
B = 4.0 Ft.

STA. 22+00 to 22+45 LT

DENOTES APPROACH SLAB

SEE SHEET NO.6 FOR PROFILE

SEE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

TRANSITE CONSULTING ENGINEERS, INCORPORATED 1800 Sandeck Drive, Suite G-10 Raleigh, N.C. 27609

RAMEY KEMP & ASSOCIATES, INC. 4121 Windy Hill Drive Raleigh, North Carolina 27609 919-872-5115 FAX 919-878-0410 www.rameykemp.com

REVISIONS
5-8-06 -ADDITION OF RIGHT -OF-WAY PROPERTY TIES

PROJECT REFERENCE NO.	SHEET NO.
B-4299	4
RW SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 27771 ENGINEER MATTHEW B. COPPLE

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 18442 ENGINEER RICHARD LEON BOLLINGER JR.

Sheet 7 of 8

NC GRID NAD 83/95

SHELTON R. GREY HEIRS
D.B. 1626 PG. 340

NATHAN ROBERT RAY, JR.
D.B. 2924 PG. 74

G.F. HORTON, ET UX
EVELYN M. ODOM
D.B. 1533 PG. 200
D.B. 8077 PG. 554

MACON LEE EVANS & PEARLENE T. EVANS REVOCABLE LIVING TRUST
D.B. 9332 PG. 855

BRADLEY BENEDICT CARIVEAU
D.B. 4654 PG. 623

JEFFERY LAWRENCE COATS
D.B. 8474 PG. 107

G.F. HORTON, ET UX
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GEORGE FENNER HORTON, JR. ET UX
D.B. 1616 PG. 472

G.F. HORTON, ET UX
D.B. 1049 PG. 109

ELSIE MAE BARRICK HEIRS
D.B 2978 PG. 72

JOHN HENRY BATTZ
D.B. 2009 PG. 279

RICHARD DEAN ABERNATHY, ET UX
D.B. 7472 PG. 666

DAN RICHARD MYERS, ET UX
D.B. 2692 PG. 543

WILLIAM RAY MACEY, ET UX
D.B. 1846 PG. 207

LARRY CHESTER WOODALL ET UX
D.B. 1903 PG. 285

ROBERT R. COOPER, ET UX
D.B. 5854 PG. 899
D.B. 2544 PG. 000

KYLE WHITE ENTERPRISES, L.L.C
D.B. 3969 PG. 2417

POT -Y- Sta. 10+00.00

POT -Y- Sta. 13+01.55 = POT -L- Sta. 19+20.41

BL-103 PINC 16+63.32 = -L- 22+30.92 17.13 LT.

BM = 203
BL STA. 16+55.48
30.00' LT.
ELEV.=264.75'

BM = 204
BL STA.=22+72.47
41.00' LT.
ELEV.=289.46'

BEGIN CONSTRUCTION
BEG PROJECT B-4299
-L- POT STA 18+45.00

END PROJECT B-4299
-L- POT STA 25+25.00

END CONSTRUCTION
-L- POT STA 26+00.00

BL-102 PINC 13+37.80 = -L- 19+05.03 27.12 RT

BL-104 PINC 22+00.34 = -L- 27+67.93 15.48 LT

PC -L- Sta. 19+42.92

PT -L- Sta. 22+27.44

PC Sta. 28+82.59

PAVEMENT TRANSITIONS FROM 3% TO 2%

TO ANGIER

TO RALEIGH

UTI to Sq. ft Creek

-L-
PI Sta 20+86.85
Δ = 21° 20' 19.2" (RT)
D = 7° 30' 00.0"
L = 284.52'
T = 143.93'
R = 763.94'
emax = 6%
RUNOFF = SEE PLANS

BEGIN BRIDGE
-L- STA. 22+35.00

END BRIDGE
-L- STA. 23+05.00

BEGIN APPROACH SLAB
-L- STA. 22+11.06

END APPROACH SLAB
-L- STA. 23+28.94

SKETCH SHOWING ROADWAY IN RELATION TO STRUCTURE

DENOTES ALLOWABLE IMPACTS ZONE 1

DENOTES ALLOWABLE IMPACTS ZONE 2

DETAIL 1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground, 3:1, D, 3:1 or Flatter, Fill Slope
Min.D = 1.0 Ft.

STA. 24+00 to 25+70 LT
STA. 20+75 to 21+35 LT.

DETAIL 2
LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, 3:1, b, 8%, Fill Slope, B
Min.D = 1.0 Ft.
b = 5.0 Ft.
B = 4.0 Ft.

STA. 22+00 to 22+45 LT

DENOTES APPROACH SLAB

SEE SHEET NO.6 FOR PROFILE

SEE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

TRANSITE CONSULTING
ENGINEERS, INCORPORATED
1800 Neadack Drive, Suite C-10
Raleigh, N.C. 27609

RAMEY KEMP & ASSOCIATES, INC.
4121-4 WINDY HILL DRIVE
RALEIGH, NORTH CAROLINA 27609
919-872-5115 TEL. 919-878-0410 FAX WWW.RAMEYKEMP.COM

PROJECT REFERENCE NO.	SHEET NO.
B-4299	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

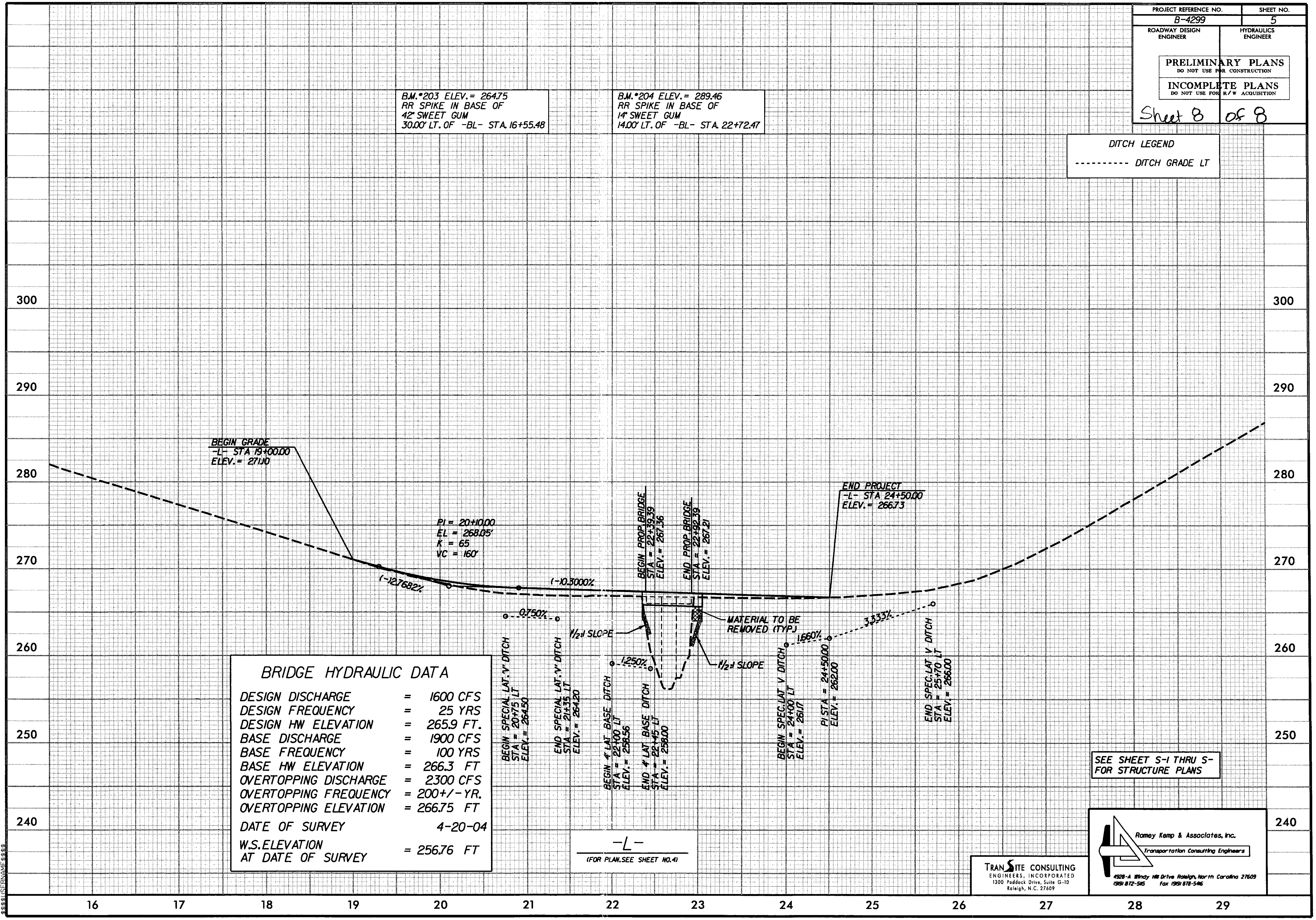
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Sheet 8 of 8

B.M.#203 ELEV.= 264.75
RR SPIKE IN BASE OF
42" SWEET GUM
30.00' LT. OF -BL- STA. 16+55.48

B.M.#204 ELEV.= 289.46
RR SPIKE IN BASE OF
14" SWEET GUM
14.00' LT. OF -BL- STA. 22+72.47

DITCH LEGEND
--------- DITCH GRADE LT



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE = 1600 CFS
DESIGN FREQUENCY = 25 YRS
DESIGN HW ELEVATION = 265.9 FT.
BASE DISCHARGE = 1900 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 266.3 FT
OVERTOPPING DISCHARGE = 2300 CFS
OVERTOPPING FREQUENCY = 200+/-YR.
OVERTOPPING ELEVATION = 266.75 FT
DATE OF SURVEY 4-20-04
W.S. ELEVATION AT DATE OF SURVEY = 256.76 FT

SEE SHEET S-1 THRU S-
FOR STRUCTURE PLANS

TRANSITE CONSULTING
ENGINEERS, INCORPORATED
1300 Paddock Drive, Suite G-10
Raleigh, N.C. 27609

Ramey Kemp & Associates, Inc.
Transportation Consulting Engineers
4928-A Windy Hill Drive Raleigh, North Carolina 27609
(919) 872-5115 fax (919) 878-5416

$$$$$$$$SYSTIME$$$$$$$$
$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$$$USERNAME$$$$$$$$

WAKE COUNTY
BRIDGE NO. 255 ON SR 1006 (OLD STAGE ROAD)
OVER UNNAMED CREEK

FEDERAL-AID PROJECT NO. BRSTP-1006(14)
STATE PROJECT NO. 8.2408401
T.I.P. NO. B-4299

CATEGORICAL EXCLUSION

JANUARY 2004

Document Prepared by Ramey Kemp & Associates, Inc.
4928-A Windy Hill Dr.
Raleigh, NC 27609

Philip D. Edwards, P.E., Project Manager
Ramey Kemp & Associates, Inc.

1/30/04
Date

For the North Carolina Department of Transportation
Project Development and Environmental Analysis Branch

Theresa Ellerby, Project Manager
Project Development and Environmental Analysis Branch

PROJECT COMMITMENTS

WAKE COUNTY
BRIDGE NO. 255 ON SR 1006 (OLD STAGE ROAD)
OVER UNNAMED CREEK

FEDERAL-AID PROJECT NO. BRSTP-1006(14)
STATE PROJECT NO. 8.2408401
T.I.P. NO. B-4299

In addition to the standard Nationwide Permit #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, NCDOT's Guidelines for Best Management Practices for Bridge Demolition and Removal, General Certification Conditions, and Section 401 Conditions of Certification, the following special commitments have been agreed to by NCDOT:

NCDOT Division 5, Roadway Design and Hydraulic Unit

The Neuse River Riparian Buffer Rule will be implemented during design, construction and maintenance of the project.

WAKE COUNTY
BRIDGE NO. 255 ON SR 106 (OLD STAGE ROAD)
OVER UNNAMED CREEK

FEDERAL-AID PROJECT NO. BRSTP-1006(14)
STATE PROJECT NO. 8.2408401
T.I.P. NO. B-4299

INTRODUCTION

The replacement of Bridge No. 255, located on SR 1006 (Old Stage Road) over an unnamed creek, in Wake County, is listed in the North Carolina Department of Transportation (NCDOT) 2004-2010 Transportation Improvement Program (TIP) as B-4299 and is included in the Federal-Aid Bridge Replacement Program (BRSTP-1006(14)). The project location is shown in Figures 1 and 7.

No substantial environmental impacts are anticipated. The project is classified as a Federal "Categorical Exclusion".

I. PURPOSE AND NEED

The NCDOT Bridge Maintenance Unit records indicate Bridge No. 255 has a sufficiency rating of 53.7 out of a possible 100 for a new structure. Prior to March 2002, the bridge had a sufficiency rating of 38.2 and was considered structurally deficient. In May 1999, a joist was replaced and two bent caps were repaired. These repairs raised the sufficiency rating to its current rating of 53.7. However, the bridge is still considered functionally obsolete. The replacement of this inadequate structure will result in safer and more efficient traffic operations.

II. EXISTING CONDITIONS

Bridge No. 255 is located on SR 1006 (Old Stage Road) approximately 0.5 mile south of the intersection of SR 1006 with US 401 in Garner in Wake County. Refer to Figures 2 and 3 for photos of the existing project study area.

Bridge No. 255 was constructed in 1966 and has a sufficiency rating of 53.7 out of a possible 100. The bridge is currently posted to restrict weight limits, 16 tons for single vehicles and 23 tons for truck-tractor semi-trailers.

The overall length of the two-span structure is 53.0 ft. It has a clear roadway width of 33.4 ft that includes two travel lanes over the bridge. The superstructure consists of a reinforced concrete floor on timber joists with an asphalt wearing surface. The end and interior bents are constructed of timber piles and caps. The height from crown to streambed is 11 ft.

SR 1006 is classified as an urban minor arterial in the Statewide Functional Classification System. The estimated 2003 average daily traffic (ADT) volume is 12,800 vehicles per day (vpd). The percentages of truck traffic are 2 percent TTST vehicles and 3 percent dual-tired vehicles. The projected 2030 ADT is 23,200 vpd.

The two-lane facility measures approximately 24 ft in width and has variable (approximately 2 - 4 ft) grassed shoulders on each side of the roadway. The horizontal alignment of SR 1006 is straight north of the bridge. South of the bridge there is a left curve beginning near the bridge. The vertical alignment is generally flat within the project area with slight upward grades both north and south from the bridge. The speed limit in the immediate vicinity of the bridge is posted at 35 miles per hour (mph). Existing right-of-way is approximately 60 ft in width.

Utilities parallel both the east and west sides of SR 1006. Aerial telephone wires are located along the west side. To the east, and just outside of the immediate project study area, aerial power lines parallel SR 1006. There are no utilities attached to the existing structure. Utility impacts are expected to be minimal.

This section of SR 1006 is not part of a designated bicycle route nor is it listed in the Transportation Improvement Program as needing incidental bicycle accommodations. There is no indication that an unusual number of bicyclists use this roadway.

Land use within the project study area is a mixture of predominant residential properties interspersed with cultivated / wooded areas and a small number of service-type business uses.

Twenty (20) school busses cross this bridge each day. School officials did not indicate there would be significant problems with the proposed off-site detour.

There have been five (5) crashes reported in the vicinity of Bridge No. 255 during the period of August 1, 1999 and July 31, 2002. Three of the five accidents occurred at the intersection of Old Stage Road (SR 1006) with Legend Road (SR 2782).

III. ALTERNATIVES

A. Project Description

Based upon the preliminary hydraulics report the proposed replacement structure will consist of a 70 foot spill through bridge with a 40 ft clear roadway width. The structure will provide two 12 ft travel lanes with 8 ft of lateral clearance on each side of the bridge.

The length and opening size of the proposed structure may increase or decrease as necessary to accommodate peak flows as determined by a more detailed hydraulic analysis to be performed during the final design phase of the bridge.

The roadway approaches will provide two 12 ft travel lanes with 10 ft shoulders (4.0 ft paved). The grade will be approximately the same as the existing roadway. The design speed is 40 mph.

B. Build Alternatives

Two (2) build alternatives studied for replacing the existing bridge are described below:

Alternative A (Preferred)

Alternative A consists of replacing the bridge in-place. During construction, traffic will be maintained by an off-site detour. The total length of approach work for this alternative is approximately 470 ft. Refer to Figure 4 for illustration of this alternative.

Existing traffic will be detoured via US 401 and SR 2782 (Legend Road). Legend Road has a structure posted at 31/39 tons with both limits exceeding the current posting on Bridge No. 255. The detour is estimated to be 1.5 miles long. See Figure 1 for the proposed off-site detour route.

Alternative B

Alternative B consists of replacing the bridge on new alignment east of SR 1006. During construction, the existing bridge will be used to maintain traffic. The total length of roadway approach work for this alternative is approximately 1700 ft. Refer to Figures 5 and 6 for illustration of this alternative.

Alternative B was not selected as the preferred because of the higher construction costs and greater environmental impacts associated with the new alignment.

C. Alternates Eliminated From Further Consideration

The "Do-Nothing" alternative will eventually necessitate closure of the bridge due to its poor condition. This is not desirable due to the traffic service provided by SR 1006.

Investigation of the existing structure by the NCDOT Bridge Maintenance Unit indicates that rehabilitation of the old bridge is not feasible due to its deteriorated condition.

D. Preferred Alternative

Alternative A consists of replacing the bridge in-place. During construction, traffic will be maintained by an off-site detour. This alternative was selected as the preferred alternative because it has the lowest construction costs and avoids impacts to an Unnamed Tributary which is subject to the Neuse River Buffer Rules.

School officials did not indicate there would be significant problems with the proposed off-site detour.

The Division Engineer concurs with Alternative A as the Preferred Alternative.

IV. ESTIMATED COSTS

The estimated costs for each alternative, based on current dollars, are shown below:

Table 1
Estimated Project Costs

	Alternative A (Preferred)	Alternative B
Structure Removal (Existing)	$14,028	$14,028
Structure Proposed	$159,000	$210,000
Detour Structure and Approaches	$0	$0
Roadway Approaches	$92,198	$373,672
Miscellaneous and Mobilization	$119,774	$267,300
Engineering and Contingencies	$65,000	$135,000
Right-of-Way/Easement and Utilities	45,425	90,425
Total Project Cost	**$495,425**	**1,090,425**

The estimated cost of the project, as shown in the 2004-2010 NCDOT Transportation Improvement Program is $690,000 including $100,000 spent in prior years, $90,000 for right-of-way and $500,000 for construction.

V. NATURAL RESOURCES

Natural resources within the project study area were evaluated to provide: 1) an assessment of existing vegetation, wildlife, protected species, streams, wetlands, and water quality; 2) an evaluation of probable impacts resulting from construction; and 3) a preliminary determination of permit needs.

A. Methodology

Materials and research data in support of this investigation have been derived from a number of sources. The Lake Wheeler, NC U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map (USGS 1993) was consulted to determine physiographic relief and to assess landscape characteristics. Additional resources utilized include U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping, and the *Soil Survey of Wake County, North Carolina* (USDA 1970). Recent aerial photography (scale 1:2400) was furnished by NCDOT prior to starting the field investigation.

Aerial photography served as the basis for mapping plant communities and wetlands. Plant community patterns were identified using available mapping sources and then field verified in February 2001. Plant community descriptions are based on a classification utilized by the N.C. Natural Heritage Program (NHP) (Schafale and Weakley 1990). When appropriate, community classifications were modified to better reflect field observations. Vascular plant names typically follow nomenclature found in Radford *et al.* (1968).

Jurisdictional wetland areas were identified using the three parameter approach (hydrophytic vegetation, hydric soils, and wetland hydrology) following the U.S. Army Corps of Engineers (USACE) delineation

guidelines (DOA 1987). Jurisdictional areas were characterized according to a classification scheme established by Cowardin *et al.* (1979). Jurisdictional stream channels were identified using criteria outlined by the USACE and the N.C. Division of Water Quality (DWQ).

Water resource information for project study area streams was derived from the most recent versions of the Neuse River Basinwide Water Quality Plan (DWQ 1998) and several DWQ internet resources. Quantitative sampling was not undertaken to support existing data.

At the time of the field investigation, the most current USFWS list of federal protected species listed for Wake County was dated February 26, 2001, and this list was reviewed prior to the field investigation. Currently, the most recent USFWS list is dated February 25, 2003. No additional species have been listed for Wake County. In addition, NHP records, documenting the presence of federal or state-listed species within the project study area were consulted before commencing the field investigation. An updated NHP records search was conducted on December 20, 2001 and November 25, 2003.

Direct observations of terrestrial and aquatic wildlife were documented, and expected population distributions were determined through observations of available habitat and review of supportive documentation found in Martof *et al.* (1980), Webster *et al.* (1985), Menhinick (1991), Hamel (1992), Rohde *et al.* (1994), and Palmer and Braswell (1995).

B. Physiography and Soils

The project study area is located in the Piedmont physiographic province of North Carolina. The topography in the project study area is generally characterized as nearly level to gently sloping. Elevations in the project study area range from 260 to 290 feet above mean sea level (MSL) (USGS 1993). The project study area consists of maintained/disturbed land, agricultural land, residential areas, and forested land.

The project study area crosses three soil mapping units (USDA 1970). The soils mapped include the Cecil (*Typic Hapludults*) series, Chewacla (*Typic Haplaquents*) series, and Worsham (*Typic Ochraquults*) series. The Worsham series is the only hydric soil series mapped in the project study area. Non-hydric soils that may contain hydric soil inclusions within the project study area include the Chewacla series. Cecil series is a non-hydric, upland soil.

C. Water Resources

C.1. Water Impacted

The project study area is located within sub-basin 03-04-02 of the Neuse River Drainage Basin (DWQ 1998) and is part of USGS hydrologic accounting unit 03020201 (USGS 1974). This perennial tributary to Swift Creek originates southeast of the intersection of SR 2538 and U.S. 70 / N.C. 50 in the Town of Garner, in Wake County, NC. It flows south to its confluence with another unnamed tributary to Swift Creek until finally converging with Swift Creek approximately 1.8 miles south of the project study area. The unnamed perennial tributary in the project study area is a tributary to another perennial stream that originates around Silver Lake and flows through Yates Millpond, which is approximately 2.0 miles upstream. The tributary flowing from Yates Millpond has been assigned Stream Index Number (SIN) 27-43-5-(1.5) by DWQ from the dam at Silver Lake, through Yates Millpond, to a point 0.5 mile upstream of the mouth. This area includes the point of convergence between the project study area stream and the

stream flowing from Yates Millpond. A small, intermittent stream channel exists within the project study area and flows into the larger, unnamed perennial stream.

C.2. Water Resource Characteristics

The unnamed tributary is a perennial stream with moderate flow over substrate consisting of sand and silt. Water clarity was good at the time of the field investigation. The main channel is approximately 20 feet wide and has a bankfull depth of approximately 2.5 feet. A geomorphic characterization of the perennial stream reach within the project study area indicates the tributary is an "G" type channel (Rosgen 1996). "G" type channels are entrenched with a low width/depth ratio (Rosgen 1996).

The small intermittent stream also represents a "G" type channel, which is indicative of a gulley or ditch (Rosgen 1996). This intermittent channel has been disturbed in the past and portions currently resemble a small ditch.

The unnamed tributary, into which the perennial stream located in the project study area flows, has been assigned a Best Usage Classification of **WS-III NSW** (DEM 1993, DENR 2001a). Therefore, both the perennial channel and the intermittent channel located in the project study area share the same Best Usage Classification. The **WS-III** designation indicates waters that are protected as water supplies, which are generally in low to moderately developed watersheds. These waters are suitable for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. The **NSW** designation indicates nutrient sensitive water which requires limitations on nutrient inputs. Point source discharges of treated wastewater are permitted in these waters, pursuant to Rules .0104 and .0211 of 15A NCAC 2B; however, local programs to control nonpoint source and stormwater discharge of pollution are required.

No Outstanding Resource Waters (**ORW**), High Quality Waters (**HQW**), **WS-I** or **WS-II** Waters occur within 3.0 miles upstream or downstream of the project study area (DEM 1993, DENR 2001a). This tributary is not designated as a North Carolina Natural and Scenic River, or as a national Wild and Scenic River.

One method used by DWQ to monitor water quality is through long-term monitoring of macroinvertebrates. In 1995, benthic macroinvertebrate samples were taken at SR 1152 on Swift Creek. This location is approximately 6.0 miles upstream on Swift Creek. This location received a bioclassification of Fair (DWQ 1998). Benthic samples were also taken in 1995 from a sampling location on SR 1525 at Swift Creek. This location is approximately 12.0 miles downstream of the project study area on Swift Creek (DWQ 1998). This location received a bioclassification of Good-Fair (DWQ 1998). No samples were taken from the unnamed tributary to Swift Creek into which the subject stream flows.

Another measure of water quality being used by the DWQ is the North Carolina Index of Biotic Integrity (NCIBI), which assesses biological integrity using the structure and health of the fish community. The location at SR 1525 (downstream of the project study area) was evaluated based on NCIBI ratings in 1991 and 1995. This location received ratings of Good to Excellent in 1991 and Fair in 1995 (DWQ 1998). No samples were taken from the unnamed tributary to Swift Creek into which the subject stream flows.

Discharges that enter surface waters through a pipe, ditch or other well-defined point of discharge are broadly referred to as "point sources". No permitted dischargers are located upstream of the project study area. There are three permitted point source dischargers located downstream on unnamed tributaries to

Swift Creek (DENR 2001b). One of these is located on the unnamed tributary into which the project study area streams flow.

C.3. Anticipated Impacts to Water Resources

Short-term impacts to water quality, such as sedimentation and turbidity, may result from construction-related activities. Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of a stringent erosion control schedule and the use of BMP's. The contractor will follow contract specifications pertaining to erosion control measures as outlined in 23 CFR 650 Subpart B and Article 107-13 entitled Control of Erosion, Siltation, and Pollution pursuant to *NCDOT's Standard Specifications for Roads and Structures.* These measures include: the use of dikes, berms, silt basins, and other containment measures to control runoff and elimination of construction staging areas in floodplains and adjacent waterways. Disturbed sites will be revegetated with herbaceous cover after any temporary construction impacts.

Other impacts to water quality, such as changes in water temperature as a result of increased exposure to sunlight due to the removal of stream-side vegetation or increased shade due to the construction of the bridges, and changes in storm water flows due to changes in the amount of impervious surface adjacent to the stream channels, can be anticipated as a result of this project. However, due to the limited amount of overall change in the surrounding areas, impacts are expected to be temporary in nature.

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

C.4. Impacts Related to Bridge Demolition and Removal

In order to protect the water quality and aquatic life in the area affected by this project, the NCDOT and all potential contractors will follow appropriate guidelines for bridge demolition and removal. These guidelines are presented in three NCDOT documents entitled *Pre-Construction Guidelines for Bridge Demolition and Removal, Policy: Bridge Demolition and Removal in Waters of the United States*, and *Best Management Practices for Bridge Demolition and Removal.*

The superstructure of Bridge No. 255 consists of a concrete deck on timber joists. The bridge has three spans and totals 53 ft in length. There is potential for portions of the concrete deck to be dropped into waters of the United States during demolition and removal. The maximum resulting temporary fill associated with the removal of Bridge No. 255 is approximately 8.6 cubic yards.

Because no moratoriums apply, this project falls under Case 3 (no special restrictions) of the *Best Management Practices for Bridge Demolition and Removal.*

D. Biotic Resources

D.1. Plant Communities

Distribution and composition of plant communities throughout the project study area reflect landscape-level variations in topography, soils, hydrology, and past and present land use practices. When appropriate, the plant community names have been adopted and modified from the NHP classification system (Schafale and Weakley 1990) and the descriptions written to reflect local variations within the project study area.

Five plant communities were identified within the project study area: Piedmont alluvial forest, mixed pine/hardwood forest, pine forest, agricultural land, and maintained/disturbed areas.

Piedmont Alluvial Forest – The Piedmont alluvial forest within the project study area is associated with the floodplain of the unnamed perennial stream. Piedmont alluvial forests are typically located in river and stream floodplains in which separate fluvial landforms and associated vegetation zones are too small to distinguish (Schafale and Weakley 1990). This community is dominated by tree species such as river birch (*Betula nigra*), red maple (*Acer rubrum*), tulip poplar (*Liriodendron tulipifera*), and boxelder (*Acer negundo*). Groundcover species consist primarily of Japanese honeysuckle (*Lonicera japonica*), jack-in-the-pulpit (*Arisaema triphyllum*), and poison ivy (*Toxicodendron radicans*).

Mixed Pine/Hardwood Forest – The pine/hardwood forest within the project study area is located at higher elevations than the Piedmont alluvial forest. Dominant tree species include loblolly pine (*Pinus taeda*), red maple, sweetgum (*Liquidambar styraciflua*), and flowering dogwood (*Cornus florida*). Groundcover consists primarily of poison ivy and Japanese honeysuckle.

Pine Forest – Dominant tree species is limited to loblolly pine. Shrub species consist of sweetgum and red maple. Groundcover species consist primarily of Japanese honeysuckle, poison ivy, trumpet creeper (*Campsis radicans*) and greenbrier (*Smilax rotundifolia*).

Agricultural Land – The agricultural land within the study area consists of active and fallow areas. Several horses were observed. Various grasses dominated this community type including fescue (*Festuca* sp.) and Bermuda grass (*Cynodon dactulon*).

Maintained/Disturbed Areas – The maintained and/or disturbed areas include the existing road right-of-way, maintained residential yards, and a powerline right-of-way. The impervious surface associated with SR 1006 (1.3 acres) is not included in this area. Dominant species include grasses such as fescue, Bermuda grass, and broomsedge (*Andropogon* sp.). Maintained yards also contain some ornamental species.

D.2. Wildlife

The project study area was visually surveyed for signs of terrestrial and aquatic wildlife; however, little evidence of wildlife was observed during the field effort. The project study area is surrounded by a state-maintained road, commercial areas, pasture, and residential yards. The Piedmont alluvial forest along the stream provides cover and food and allows animals to travel between more optimal habitats. Expected wildlife species are those adapted to ecotones between the maintained roadsides and adjacent natural forests.

Few bird species were observed within or adjacent to the project study area. Bird species observed include an unidentified vireo (*Vireo sp.*), Carolina wren (*Thryothorus ludovicianus*), American robin (*Turdus migratorius*), northern cardinal (*Cardinalis cardinalis*), common grackle (*Quiscalus quiscula*), and American goldfinch (*Carduelis tristis*). Other species expected to occur in the project study area include barred owl (*Strix varia*), belted kingfisher (*Megaceryle alcyon*), and pileated woodpecker (*Dryocopus pileatus*).

A gray squirrel (*Sciurus carolinensis*) was the only mammal documented in the project study area. Other mammals expected to be found in and around the project study area include raccoon (*Procyon lotor*),

Virginia opossum (*Didelphis virginiana*), red fox (*Vulpes vulpes*), and eastern cottontail (*Sylvilagus floridanus*). Other species that may use the floodplain as a travel corridor include white-tailed deer (*Odocoileus virginianus*).

No terrestrial reptiles were observed within the project study area. Species expected to occur within the project study area include eastern box turtle (*Terrapene carolina*), eastern garter snake (*Thamnophis sirtalis*), ringneck snake (*Diadophis punctatus*), and black rat snake (*Elaphe obsoleta*).

No terrestrial amphibians were observed within the project study area. Species expected to occur within the project study area include slimy salamander (*Plethodon cylindraceus*), Fowler's toad (*Bufo woodhouseii*), spring peeper (*Pseudacris crucifer*), and northern cricket frog (*Acris crepitans*).

D.3 Aquatic Communities

Fish species documented in the reach of the unnamed tributary to Swift Creek within the project study area include redfin pickerel (*Esox americanusi*), yellow bullhead (*Ameiurus natalis*), redbreast sunfish (*Lepomis auritus*), green sunfish (*Lepomis cyanellus*), pumpkinseed (*Lepomis gibbosus*), johnny darter (*Etheostoma nigrum*), creek chubsucker (*Erimyzon oblongus*), and eastern silvery minnow (*Hybognathus regius*).

No aquatic reptiles were observed within the project study area. Species expected to occur within the project study area include the northern water snake (*Nerodia sipedon*), queen snake (*Regina septemvittata*), painted turtle (*Chrysemys picta*), and common snapping turtle (*Chelydra serpentina*).

No aquatic amphibians were observed within the project study area. Species expected to occur within the project study area include red-spotted newt (*Notophthalmus viridescens*), bullfrog (*Rana catesbeiana*), and pickerel frog (*Rana palustris*).

Aquatic macroinvertebrate surveys included kick-net surveys, limited bottom sampling, and walking all streambanks in the project study area to locate freshwater mussel middens. Visual observation of streambanks along the unnamed perennial tributary of Swift Creek revealed evidence of the variable spike (*Elliptio icterina*) and non-native Asiatic clams.

Benthic macroinvertebrates were sampled according to current DWQ protocol. Benthic organisms collected within the unnamed perennial tributary were identified to at least Order and Family if possible and include: dragonflies and damselflies (Odonota: Libellulidae), caddisflies (Trichoptera: Lepidostoma), crane flies (Diptera: Tipulidae), midges (Diptera: Chironomidae), mayflies (Ephemeroptera), beetles (Coleoptera), Asiatic clams (Corbicula), blackfly larvae (Diptera: Simuliidae), and crayfish (Decapoda: Crustacea). Identifications are based on McCafferty (1998).

D.4. Anticipated Impacts to Biotic Communities

D.4.a. Terrestrial Community Impacts

Potential impacts to plant communities are estimated based on the approximate area of each plant community present within both the proposed final right-of-way and the temporary construction limits of any on-site detour or easement that falls outside the estimated permanent right-of-way limit. A summary of potential plant community impacts is presented in Table 2. All plant community impacts are based on aerial photograph base mapping. A portion of the permanent plant community impact amount will consist

of proposed right-of-way for the road after bridge replacement is complete. Impervious surface and open water areas are not included in this analysis.

Table 2
Potential Impacts to Plant Communities

PLANT COMMUNITY	POTENTIAL IMPACTS acres	
	ALT A (Preferred)	ALT B
Piedmont Alluvial Forest	0.18	0.30
Mixed Pine/Hardwood Forest	0.0	0.10
Pine Forest	0.0	0.0
Agricultural Land	0.06	0.0
Maintained/Disturbed Areas	0.25	2.16
TOTAL FOR ALT	**0.49**	**2.56**

Permanent community impacts for Alternative A represent the least amount of the two alternatives. The plant community with the largest amount of potential permanent impacts for all proposed alternative is the Maintained/Disturbed Areas.

D.4.b. Aquatic Communities Impacts

The proposed bridge replacement will not result in substantial loss or displacement of known aquatic wildlife population. Potential down-stream impacts to aquatic habitat will be avoided by bridging the stream to maintain regular flow and stream integrity. In addition, temporary impacts to downstream habitat from increased sediment during construction are expected to be reduced by limiting in-stream work to an absolute minimum, except for the removal of the portion of the sub-structure below the water. BMP-BDRs will be followed to minimize impacts due to anticipated bridge demolition.

E. Special Topics

E.1. Waters of the United States

Surface waters within the embankments of the perennial unnamed tributary to Swift 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 waters in the unnamed perennial tributary to Swift Creek exhibit characteristics of riverine, lower perennial, unconsolidated bottom, permanently flooded waters (R2UBH) (Cowardin *et al.* 1979). The unnamed intermittent stream channel exhibits characteristics of riverine, intermittent streambed (R4SB) (Cowardin *et al.* 1979). Surface waters within the intermittent channel are also subject to jurisdictional consideration. Impacts for stream channels will be assessed by the linear footage of stream channel impacted and area of open water.

Wetlands subject to review under Section 404 of the Clean Water Act (33 U.S.C. 1344) are defined by the presence of three primary criteria: hydric soils, hydrophytic vegetation, and evidence of hydrology within 12 inches of the soil surface for a portion (12.5 percent) of the growing season (DOA 1987). Based on this three-parameter approach, jurisdictional wetlands do not occur within the project study area.

E.2. Potential Impacts to Waters of the United States

Temporary and permanent impacts to wetlands and surface waters are estimated based on the amount of each jurisdictional area within the project limits. Permanent impacts are those areas that will be in the final construction limits and/or the proposed right-of-way of the new structure and approaches. Temporary impacts include those impacts that will result from temporary construction activities outside of the proposed right-of-way and/or those associated with staging areas and/or temporary detours. Temporary impacts will be restored to their original condition after the project has been completed. Potential wetland and surface water impacts are included in Table 3. There are no jurisdictional wetland impacts associated with this project.

Table 3
Potential Impacts to Jurisdictional Surface Waters

JURISDICTIONAL AREAS	POTENTIAL IMPACTS WITHIN EACH ALTERNATE	
	ALT A (Preferred)	ALT B
Perennial Channel acres	0.0	0.0
Perennial Channel feet	0.0	0.0
Intermittent Channel feet	30	270

Note: Permanent impacts are approximate and include the proposed final right-of-way and the temporary construction easement associated with the approximate slope-stake limits as provided by the project engineer. Temporary impacts are approximate and are based on the area potentially affected by bridge demolition and/or temporary detours.

Neither Alternative A nor Alternative B is expected to permanently impact perennial surface waters. Potential permanent impacts for Alternative A include approximately 30 linear feet of intermittent stream channel that is within the final right-of-way and/or construction limits. Potential permanent impacts for Alternative B include approximately 270 linear feet of intermittent stream channel that is within the final right-of-way and/or construction limits.

E.3. 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 Water Quality Certification – A 401 Water Quality Certification, administered through the DWQ, will also be required. This certification is issued for any activity which may result in a discharge into waters for which a federal permit is required. According to the DWQ, one condition of the permit is that the appropriate sediment and erosion control practices must be utilized to prevent exceedances of the appropriate turbidity water quality standard.

E.4. Neuse River Buffer Rules

The project study area is within the Neuse River Drainage Basin, therefore jurisdictional surface waters may be subject to the Neuse River Riparian Buffer Rules. The Buffer Rules apply to a 50-foot wide riparian buffer directly adjacent to some surface waters in the Neuse River Drainage Basin. This includes intermittent streams, perennial streams, lakes, ponds, and estuaries that are depicted on the most current versions of either the USGS maps or county soil survey maps, but does not include jurisdictional wetlands (non-surface waters) regulated under Section 404 of the Clean Water Act. The riparian buffer consists of two distinct zones. Zone 1 comprises a 30-foot wide area adjacent to the surface water that cannot be disturbed except for those specific activities that are allowed by the Buffer Rules. Zone 2 comprises a 20-foot wide area adjacent to Zone 1 that is to be left undisturbed except for those activities specifically allowed by the Buffer Rules. The unnamed perennial tributary to Swift Creek and the unnamed intermittent stream are mapped on USGS maps and the Wake County soil survey maps and are subject to the Buffer Rules.

Activities in the buffer area beyond footprint of the existing use are classified as either "exempt", "allowable", "allowable with mitigation", or "prohibited." Table 4 provides a list of activities that may be subject to Buffer Rules within the project study area along with their classifications. Depending upon project alternatives, not all of the uses listed may apply, and other uses not listed here, such as utility crossings and roadside drainage ditches, among others, may be regulated under the Buffer Rules. Guidelines will be consulted in entirety to review all project related uses subject to the Buffer Rules.

"Exempt" activities will be designed, constructed, and maintained to minimize soil disturbance and to provide the maximum water quality protection practicable. "Allowable" activities may proceed within the riparian buffer provided that there are no practicable alternatives to the requested use. Activities deemed "allowable with mitigation" may proceed within the riparian buffer if there are no practicable alternatives to the requested use and an appropriate mitigation strategy has been approved. "Prohibited" activities, none of which are listed below, may not proceed within the riparian buffer unless a variance is granted from the DWQ or delegated local authority.

Table 5
Activities That May Be Subject To the Buffer Rules in the Project Study Area

Use	Exempt	Allowable	Allowable With Mitigation	Prohibited
Bridges		X		
Road crossings that impact less than or equal to 40 linear feet	X			
Road crossings that impact greater than 40 linear feet but less than or equal to 150 linear feet or 0.33 acre of riparian area.		X		
Road crossings that impact greater than 150 linear feet or greater than 0.33 acre of riparian buffer			X	
Temporary roads used for bridge construction or replacement provided that restoration activities such as soil stabilization and revegetation occur immediately after construction.		X		

Alternative A expands the existing right-of-way from 60 feet to 100 feet, resulting in 40 feet of impact to riparian buffer in Zones 1 and 2 along the perennial stream. The proposed right-of-way will also impact the riparian buffer of the intermittent channel. Approximately 225 feet of riparian buffer for the intermittent stream occurs inside of or within 50 feet of the proposed right-of-way limits. This entire 225 feet of intermittent stream buffer is currently within 50 feet of the existing (pre-construction) right-of-way limits. DWQ may consider the intermittent stream buffer to be previously impacted by the current right-of-way limits. Mitigation should not be required if only the perennial stream buffer is considered to be an impact since it is less than or equal to 40 feet. Buffer mitigation may be required if the intermittent channel buffer is assessed as an impact by DWQ.

Alternative B expands the existing right-of-way from 60 feet to as much as 140 feet near the bridge resulting in 80 feet of impact to riparian buffer in Zones 1 and 2 along the perennial stream. The proposed right-of-way will also impact the riparian buffer of the intermittent channel. Approximately 365 feet of riparian buffer for the intermittent stream occurs inside of or within 50 feet of the proposed right-of-way limits. Approximately 225 feet of this amount is currently within 50 feet of the existing (pre-construction) right-of-way limits. DWQ may consider this portion of intermittent stream buffer to be previously impacted by the current right-of-way limits, which would leave 140 feet of new buffer impact. Buffer mitigation will be required for Alternative B even under the best-case scenario with DWQ considering the 225 feet as previous buffer impact.

E.5. Mitigation Evaluation

The USACE has adopted, through the Council on Environmental Quality (CEQ), a wetland mitigation policy which embraces the concept of "no net loss of wetlands" and sequencing. The purpose of this policy is to restore and maintain the chemical, biological, and physical integrity of the waters of the United States,

specifically wetlands. Mitigation of wetland impacts has been defined by the CEQ to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts (40 CFR 1508.20). Each of these three aspects (avoidance, minimization, and compensatory mitigation) must be considered sequentially.

Avoidance – Mitigation by avoidance examines appropriate and practicable measures for averting impact to Waters of the United States. A 1990 Memorandum of Agreement between the Environmental Protection Agency (EPA) and the USACE, states that in determining appropriate and practicable measures to offset unavoidable impacts; such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes.

The proposed alternative involves replacing the bridge "in-place" and utilizing an off-site detour thereby avoiding any impacts.

Minimization – Minimization of adverse impact to Waters of the United States includes examination of appropriate and practicable measures to reduce such impacts. Implementation of these steps will be required through project modifications and permit conditions. Adverse impacts are typically minimized by decreasing the proposed project footprint through reduction of median widths, right-of-way widths, and/or fill slopes.

Other practical mechanisms to minimize impacts to waters of the United States include strict enforcement of sedimentation control BMPs for protection of surface waters during the entire life of the project; reduction of clearing and grubbing activity; reduction/elimination of direct discharge into streams; reduction of runoff velocity; reestablishment of vegetation on exposed areas, with judicious pesticide and herbicide management; minimization of instream activity; and litter/debris control.

No measures are proposed for this project because there are no jurisdictional wetlands within the project study area. However, there is an intermittent stream subject to minimization.

Compensatory Mitigation – Compensatory mitigation, including restoration, creation and enhancement of Waters of the United States, is typically not considered unless anticipated impacts to Waters of the United States have been avoided and minimized to the maximum extent practicable. Further, it is recognized that "no net loss of wetlands" may not be achievable in every permit action. Therefore, compensatory mitigation is required for unavoidable adverse impacts which remain after all appropriate and practicable minimization measures have been required.

Compensatory mitigation is not expected to be required for the buffer impacts associated with this project. A final determination regarding mitigation requirements rest with the USACE.

F. Protected Species

F.1. Federally Protected Species

Species with the federal classification of Endangered (E) or Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The following federally

protected species are considered to have ranges extending into Wake County (USFWS list dated February 25, 2003).

Table 6
Federally Protected Species Listed for Wake County, North Carolina

Common Name	Scientific Name	Status	Biological Conclusion
Bald eagle	*Haliaeetus leucocephalus*	T	No Effect
Red-cockaded woodpecker	*Picoides borealis*	E	No Effect
Dwarf wedgemussel	*Alasmidonta heterodon*	E	No Effect
Michaux's sumac	*Rhus michauxii*	E	No Effect

Endangered (E) – any native or once-native species in danger of extinction throughout all or a significant portion of its range.
Threatened (T) - 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.

Bald eagle - Bald eagles typically nest in tall, living trees in a conspicuous location near water and forage over large bodies of water with adjacent trees available for perching (Hamel 1992). Preventing disturbance activities within a primary zone extending 750 to 1500 feet outward from a nest tree is considered critical for maintaining acceptable conditions for eagles (USFWS 1987). USFWS recommends avoiding any disturbance activities, including construction and tree cutting, within this primary zone. Within a secondary zone extending from the primary zone boundary out to a distance of 1.0 mile from a nest tree, construction and land-clearing activities should be restricted to the non-nesting period. USFWS also recommends avoiding alteration of natural shorelines where bald eagles forage, and avoiding significant land-clearing activities within 1500 feet of roosting sites.

BIOLOGICAL CONCLUSION – No Effect

NHP records indicate the closest occurrence of a bald eagle is documented from the head of Yates Millpond in 1989. This location is approximately 2.1 miles northwest of the project study area. No bald eagles have been observed there since 1989 based on the updated NHP records search.

The project study area does not contain large areas of open water, and therefore lacks potential foraging and nesting habitat for bald eagles. No large ponds or lakes were observed outside the project study area. This project will not have any effect on the bald eagle.

Red-cockaded woodpecker (RCW) - This small woodpecker measuring 7 to 8.5 inches long has a black head, prominent white cheek patch, and black-and-white barred back. Males often have red markings (cockades) behind the eye, but the cockades may be absent or difficult to see (Potter *et al.* 1980). Primary nest sites for RCWs include open pine stands greater than 60 years of age with little or no mid-story development. Foraging habitat is comprised of open pine or pine/mixed hardwood stands 30 years of age or older (Henry 1989). Primary habitat consists of mature to over-mature southern pine forests dominated by loblolly, long-leaf (*Pinus palustris*), slash (*P. elliotii*), and pond (*P. serotina*) pines. Nest cavities are constructed in the heartwood of living pines, generally older than 60 years, that have been infected with red-heart disease. Nest cavity trees tend to occur in clusters, which are referred to as colonies. The woodpecker drills holes into the bark around the cavity entrance, resulting in a shiny, resinous buildup around the entrance that allows for easy detection of active nest trees. Pine flatwoods or pine-dominated

savannas which have been maintained by frequent natural fires serve as ideal nesting and foraging sites for this woodpecker. Development of a thick understory may result in abandonment of cavity trees.

BIOLOGICAL CONCLUSION – No Effect

NHP records do not document any occurrences of the RCW within 3.0 miles of the project study area.

Mature pine trees with open understories exist primarily within residential yards located within the project study area. These trees were searched for evidence of RCW activity. No cavity trees were found within the project study area. The pine forest community does not contain trees of an age suitable to support RCW nesting and also lacks potential foraging habitat. This project will not effect the RCW or suitable habitat.

Dwarf wedgemussel - The dwarf wedgemussel is relatively small, averaging 1.0 to 1.5 inches long. The shells are olive-green to dark brown in color and are subrhomboidally shaped. The shells of females are swollen posteriorly, while males are generally flattened (TSCFTM 1990). The preferred habitats are shaded streams with moderate flow velocities and bottoms varying in texture from gravel and coarse sand to mud, especially just downstream of debris and on banks of accreting sediment. This species was previously known only from a few, populations in the Neuse River basin (Johnston County) and Tar River basin (Granville County). Statewide surveys conducted since 1992 have expanded this species' range in North Carolina. This species is now known from the Neuse Basin in Orange, Wake, Johnston, and Nash Counties; and from the Tar River Basin in Granville, Vance, Warren, Franklin, Halifax, and Nash Counties.

NCDOT Environmental Specialists Mary Frazer and Sharon Snider visited the project site on April 23, 2003. Reconnaissance of the stream for freshwater mussels was conducted by wading in the water and using batiscopes. The evaluated reach extended from approximately 925 feet downstream, where the channel became dammed due to beavers and then intersected with SR 2782 (Legend Road) to 330 feet upstream of the existing bridge. The downstream habitat was surrounded by horse farms, where horses had access to the creek. The 10-13 foot wide channel was straight with unconsolidated substrate. Recent sand deposits were observed. Upstream the substrate possessed more gravel than sand and the channel, although narrower, was more sinuous. One live and one relict shell of the eastern elliptio (*Elliptio complanata*) was observed. No other freshwater mussel species were observed.

BIOLOGICAL CONCLUSION – No Effect

Given the survey results, and unsuitable habitat, it is apparent that the Dwarf wedgemussel does not occur in the project footprint. Additionally, no known records of the dwarf wedgemussel exist within 1 mile downstream of the project. In conclusion, project construction will not impact this species.

Michaux's sumac - Michaux's sumac is a densely pubescent, deciduous, rhizomatous shrub, usually less than 2 feet high. The alternate, compound leaves consist of 9 to 13 hairy, round-based, toothed leaflets borne on a hairy rachis that may be slightly winged (Radford *et al.* 1968). Small male and female flowers are produced during June on separate plants; female flowers are produced on terminal, erect clusters followed by small, hairy, red fruits (drupes) in August and September. Michaux's sumac tends to grow in disturbed areas where competition is reduced by periodic fire or other disturbances, and may grow along roadside margins or utility rights-of-way. In the Piedmont, Michaux's sumac appears to prefer clay soil

derived from mafic rocks or sandy soil derived from granite (Weakley 1993). Michaux's sumac ranges from south Virginia through Georgia in the inner Coastal Plain and lower Piedmont.

BIOLOGICAL CONCLUSION – No Effect

NHP records do not document the occurrence of Michaux's sumac within 3.0 miles of the project study area as of December 20, 2001.

Potential habitat for Michaux's sumac does not exist within the project study area. The maintained powerline right-of-way is in the floodplain of the perennial stream, and the roadside and adge of the pasture do not provide potential habitat for this species. This project will not affect any populations of Michaux's sumac.

F.2. Federal Species of Concern

The February 25, 2003 FWS list also includes a category of species designated as "Federal Species of Concern" (FSC). The FSC designation provides no federal protection under the ESA for the species listed. The presence of potential suitable habitat (Amoroso 1999, LeGrand and Hall 2001) within the project study area has been evaluated for the following FSC listed for Wake County and are presented in Table 7.

NHP files document the occurrence of one FSC within 3.0 miles of the project study area. The Carolina least trillium has been documented 2.1 miles northwest of the project study area near Yates Mill Pond. This species has not been observed there since 1971. Habitat for this species consists of ecotones between savannas and non-riverine wet hardwood forests over marl (Amoroso 1999). This habitat type does not exist within the project study area. No FSC were identified during the field investigation.

Table 7
Federal Species of Concern (FSC) for Wake County, North Carolina

Common Name	Scientific Name	Potential Habitat	State Status*
Bachman's sparrow	*Aimophila aestivalis*	N	SC
Carolina darter	*Etheostoma collis lepidinion*	Y	SC
"Neuse" madtom	*Noturus furiosus*	Y	SC-PT
Southern hognose snake	*Heterodon simus*	N	SR
Pinewoods shiner	*Lythrurus matutinus*	Y	SR
Southeastern myotis	*Myotis austroriparius*	Y	SC
Yellow lance	*Elliptio lanceolata*	Y	T
Atlantic pigtoe	*Fusconaia masoni*	Y	T
Green floater	*Lasmigona subviridis*	Y	E
Diana fritillary butterfly	*Speyeria diana*	Y	SR
Bog spicebush	*Lindera subcoriacea*	N	E
Flatrock panic grass	*Panicum lithophilum*	N	SR-T
Sweet pinesap	*Monotropsis odorata*	N	C
Carolina least trillium	*Trillium pusillum* var. *pusillum*	N	E

Endangered (E) – any native or once-native species in danger of extinction throughout all or a significant portion of its range.

Threatened (T) - 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.

Special Concern (SC) – any species which requires monitoring but which may be collected and sold under specific regulations.

Candidate(C) – a species for which USFWS has enough information on file to support proposals for listing as endangered or threatened.

Watch List (WL) – any species believed to be rare and of conservation concern but not warranting active monitoring.

Proposed (P) – a species which has been formally proposed for listed as endangered, threatened, or special concern, but has not yet completed the legally mandated listing process.

Significantly Rare (SR) – species which are very rare, generally with 1-20 populations in the state, and generally reduced in numbers by habitat destruction.

F.3. State Protected Species

Plant and animal species which are on the North Carolina state list as Endangered (E), Threatened (T), or Special Concern (SC), receive limited protection under the North Carolina Endangered Species Act (G.S. 113-331 *et seq.*) and the North Carolina Plant Protection Act of 1979 (G.S. 106-202 *et seq.*).

NHP records (November 25, 2003) do not document any state-listed species within 3.0 miles of the project study area with the exception of the Carolina least trillium.

VI. CULTURAL RESOURCES

A. Compliance Guidelines

This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, implemented by the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR Part 800. Section 106 requires Federal agencies to take into account the effect of their undertakings (federally funded, licensed, or permitted) on properties included in or eligible for inclusion in the National Register of Historic Places and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. This project has been coordinated with the North Carolina State Historic Preservation Officer (SHPO) in accordance with the Advisory Council's regulations and FHWA procedures.

B. Historic Architecture

In their August 6, 2001, letter, the SHPO stated "We have conducted a review of the project and are aware of no properties of architectural, historic, or archaeological significance, which would be affected by the project. Therefore, we have no comment on the project as currently proposed." A copy of the SHPO memorandum is included in the Appendix.

C. Archaeology

In their August 6, 2001, letter, the SHPO stated "We have conducted a review of the project and are aware of no properties of architectural, historic, or archaeological significance, which would be affected by the project. Therefore, we have no comment on the project as currently proposed." 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 inadequate bridges will result in safer traffic operations.

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

Replacement of Bridge No. 255 will not have an adverse effect on the quality of the human or natural environment. The project should have an overall positive impact due to the improvement of existing, poor bridge conditions.

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 the construction of the project.

No adverse impact on families or communities is anticipated. Right-of-way acquisition will be limited. No relocates 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 of low-income populations were receiving disproportionately high and adverse human health and 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 expected. The project is not expected to adversely affect social, economic, or religious opportunities in the area.

The studied route does not contain any bicycle accommodations, nor is it a designated bicycle route; therefore, no bicycle accommodations have been included as part of this project.

This project has been coordinated with the United States Department of Agriculture, Natural Resources Conservation Service. The Farmland Protection Policy Act requires all federal agencies or their representatives to consider the potential impact to prime farmland for all land acquisition and construction projects. The project area is within an urbanized area of Wake County. Therefore, the project will not involve the direct conversion of farmland acreage within these classifications.

No publicly owned parks or recreational facilities, wildlife and waterfowl refuges, or historic sites of national, state or local significance in the immediate vicinity of the project will be impacted. The proposed project will not require right-of-way acquisition or easement from any land protected under Section 4(f) of the Department of Transportation Act of 1966.

The project is located in Wake County, which is within the Raleigh-Durham nonattainment area for ozone (O_3) and carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as "moderate" nonattainment area for O_3 and CO. However, due to improved monitoring data, these areas were redesignated as "maintenance" for O_3 on June 17, 1994 and "maintenance" 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) has been determined to conform to the intent of the SIP. The USDOT air quality conformity approval of the LRTP was August 20, 2002 and the USDOT air quality conformity approval for the MTIP was October 1, 2003. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There has been no significant changes in the project's design concept or scope, as used in the conformity analyses.

Ambient noise levels may increase during the construction of this project; however this increase will be only temporary and usually confined to daylight hours. There should be no notable change in traffic volumes after this project is complete. Therefore, this project will have no adverse effect on existing noise levels. Noise receptors in the project area will not be impacted by this project. This evaluation completes the assessment requirements for highway noise set forth in 23 CFR Part 772. No additional reports are required.

Observation revealed no evidence of underground storage tanks or hazardous waste sites in the project area.

Wake County is a participant in the National Flood Insurance Regular Program. The bridge is located in a Detailed Study Area. The replacement structure is proposed as an in-kind replacement. It is anticipated that this project will not have any adverse effect or impact on the existing floodplain or the adjacent properties and existing structures. The approximate 100-year floodplain in the project study area is shown in Figure 8.

Geotechnical borings for the bridge foundation will be necessary.

Based on the above discussion, it is concluded that no substantial adverse environmental impacts will result from the replacement of Bridge No. 255.

VIII. PUBLIC INVOLVEMENT

No formal public involvement program was initiated. Efforts were undertaken early in the planning process to contact local officials to involve them in the project development with a scoping letter.

IX. AGENCY COMMENTS

Wake County Emergency Medical Services: Indicated by telephone conversation that road closure will have no impact on their response times.

IIX. REFERENCES

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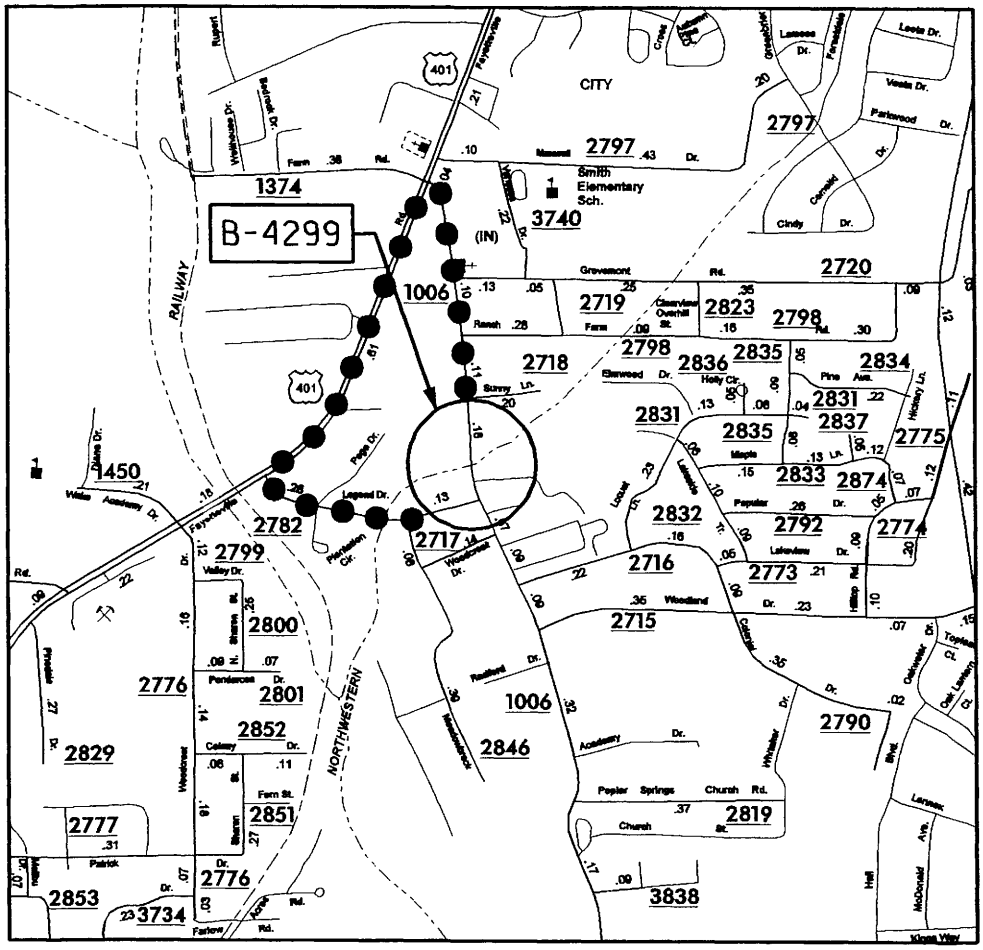
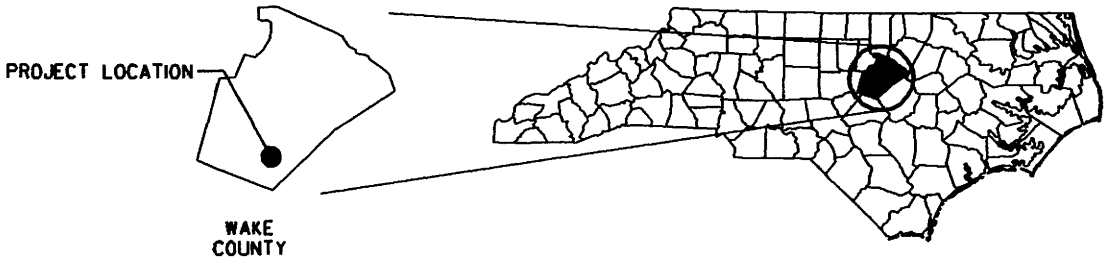
FIGURES





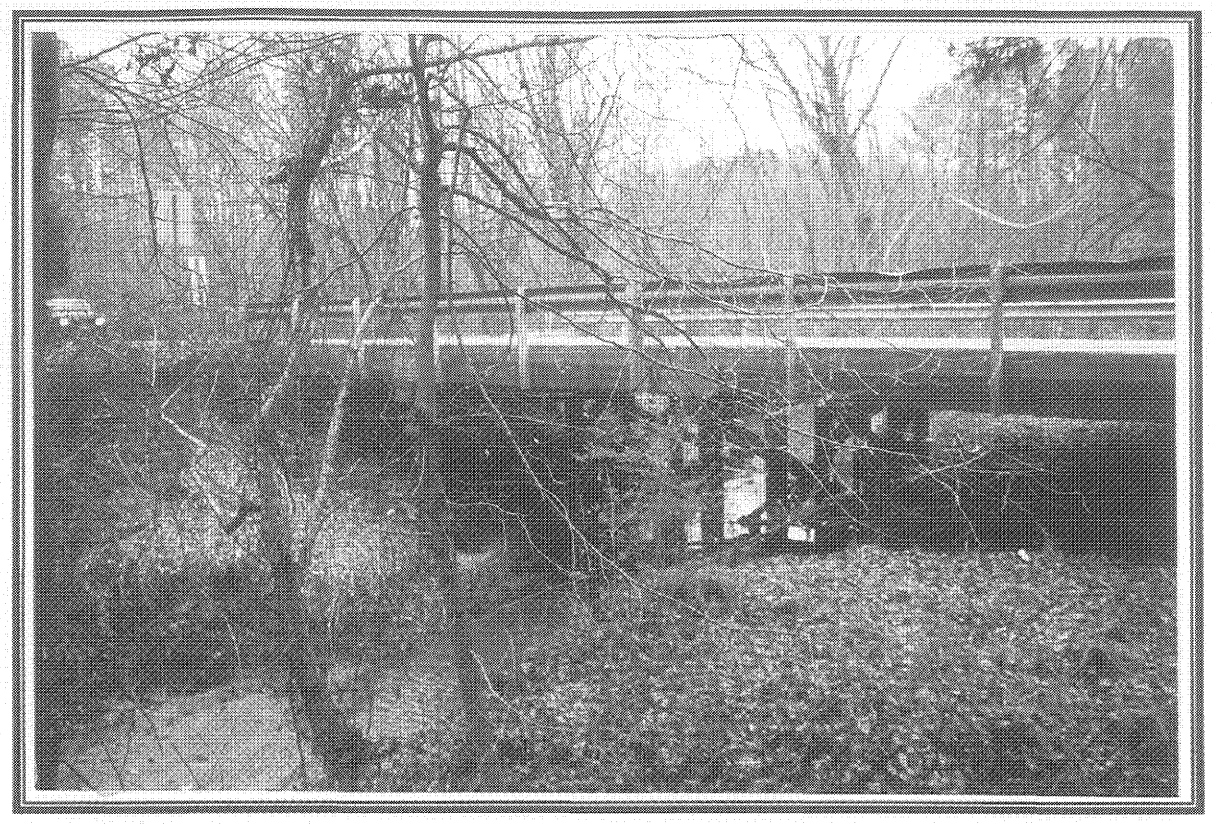
SCALE IN MILES

0.5 0 0.5 1

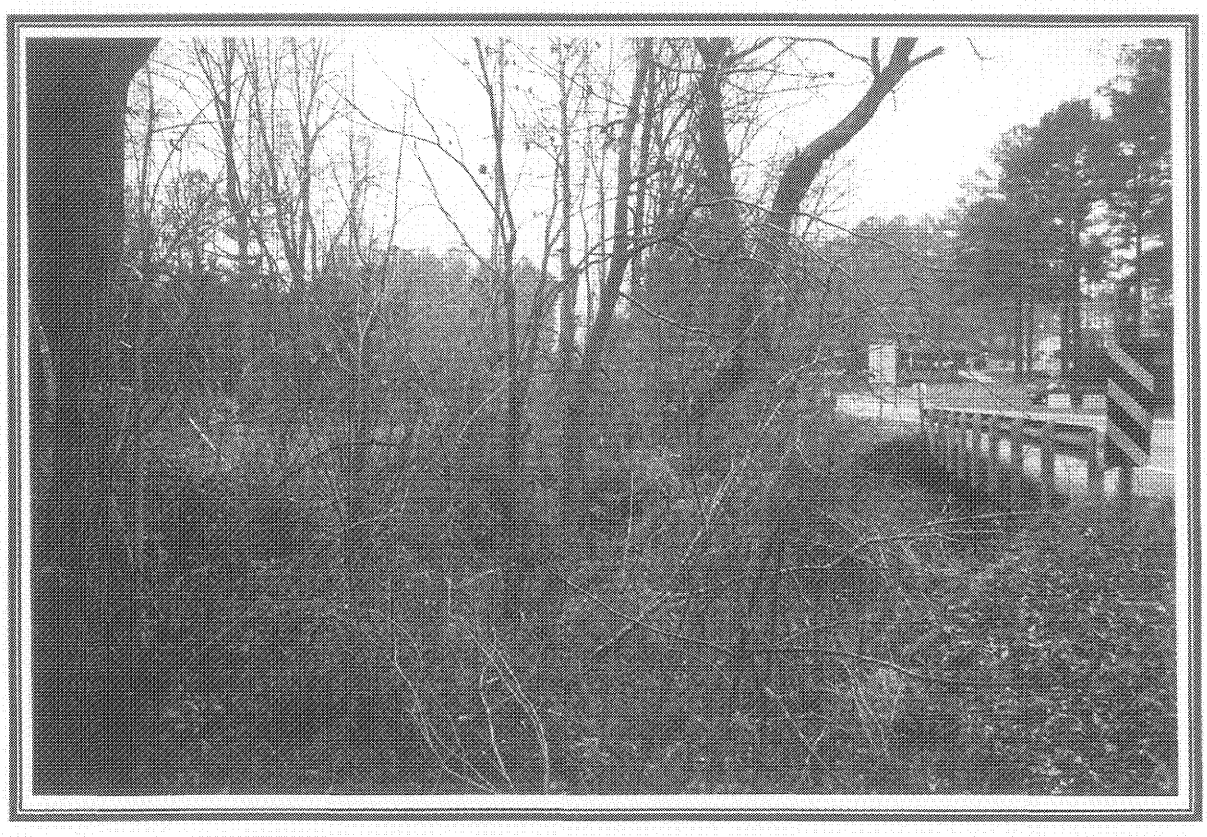
STUDIED DETOUR

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

FIGURE 1
PROJECT VICINITY MAP
SR 1006
REPLACE BRIDGE NO. 255
OVER UNNAMED CREEK
WAKE COUNTY, NORTH CAROLINA
TIP PROJECT B-4299



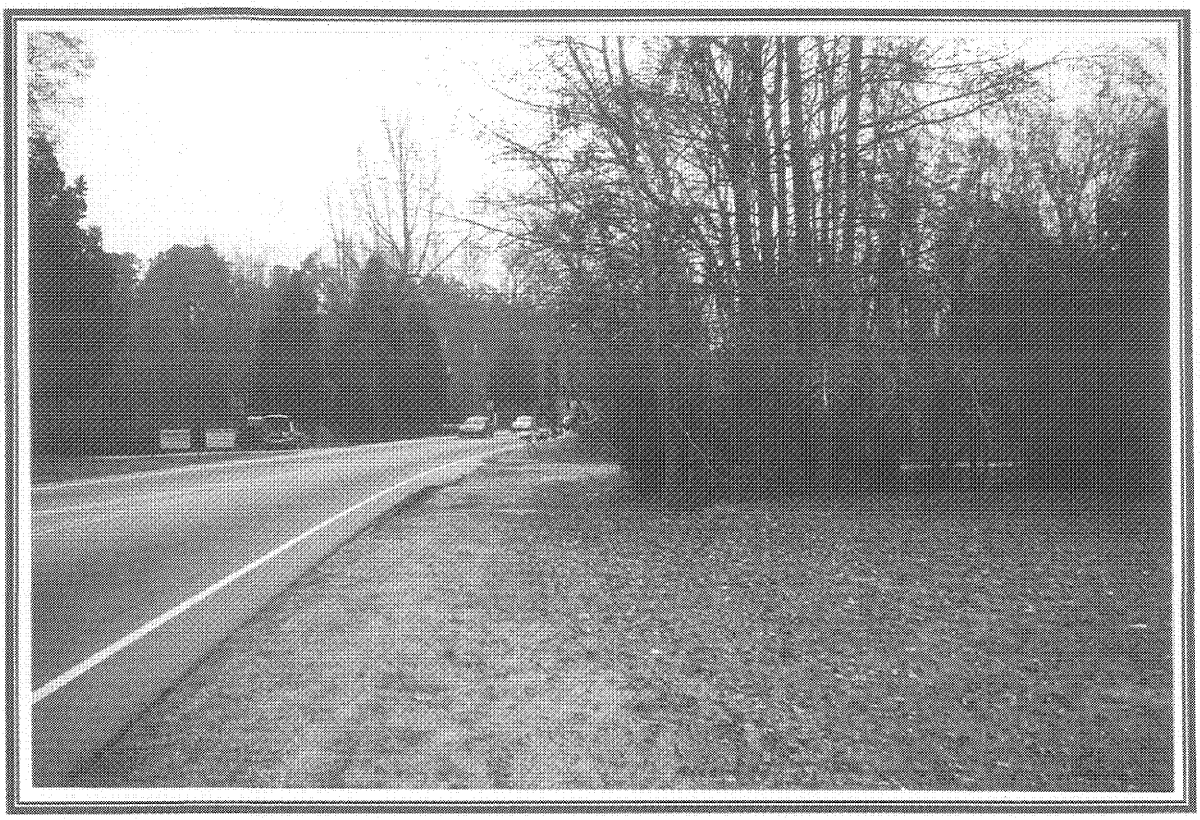
LOOKING AT WEST SIDE OF BRIDGE NO. 255



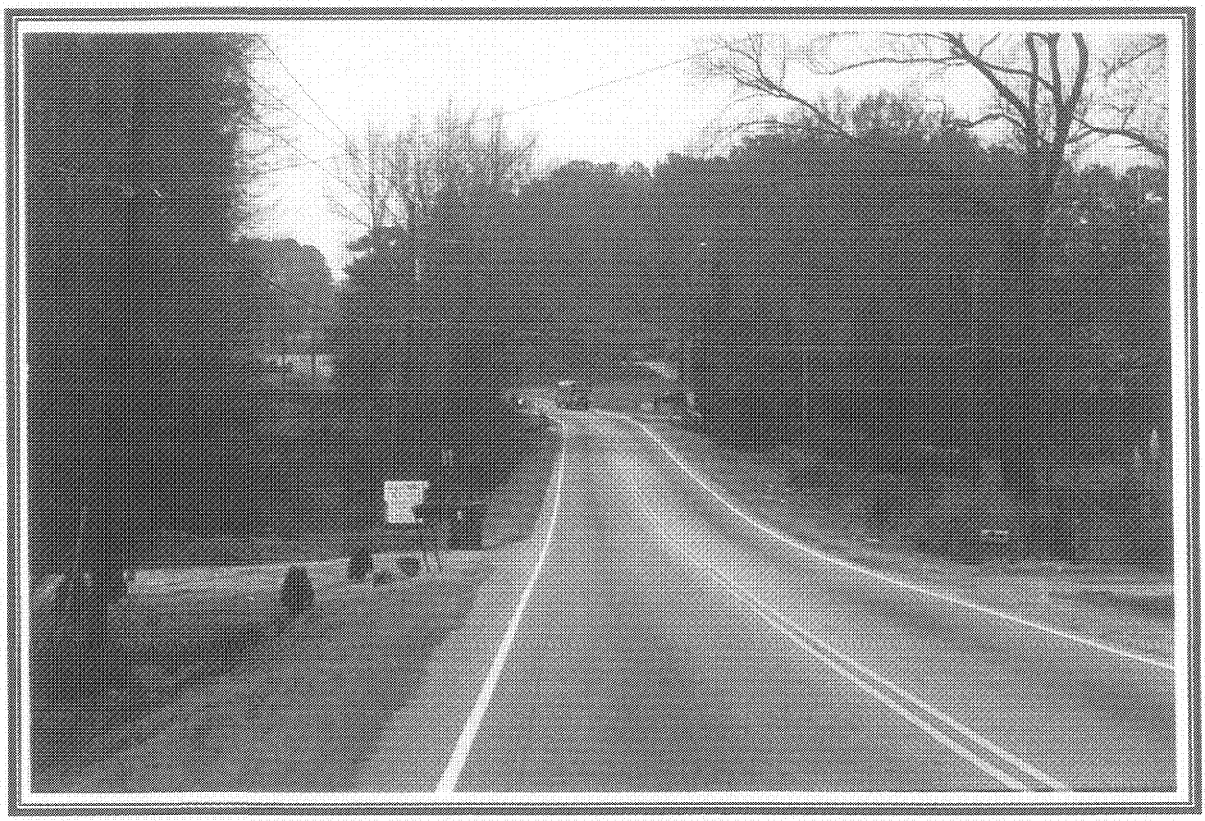
LOOKING AT EAST SIDE OF BRIDGE NO. 255

B-4299 WAKE COUNTY
REPLACE BRIDGE NO. 255 ON SR 1006 OVER UNNAMED CREEK

FIGURE 2
PROJECT PHOTOGRAPHS



LOOKING AT BRIDGE NO. 255 FROM SOUTH APPROACH



LOOKING AT BRIDGE NO. 255 FROM NORTH APPROACH

B-4299 WAKE COUNTY
REPLACE BRIDGE NO. 255 ON SR 1006 OVER UNNAMED CREEK

FIGURE 3
PROJECT PHOTOGRAPHS

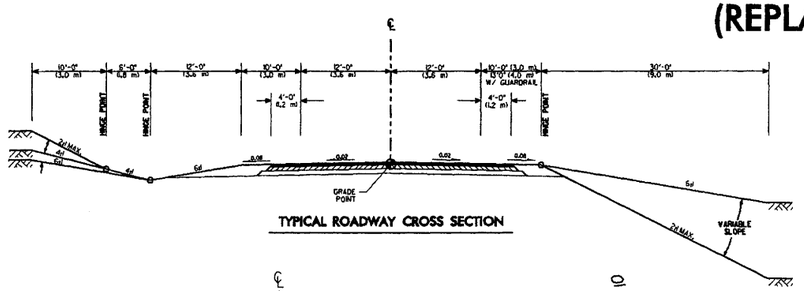
(REPLACE IN-PLACE WITH OFF-SITE DETOUR)
ALTERNATE A

PROJECT REFERENCE NO.	SHEET NO.
B-4299	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

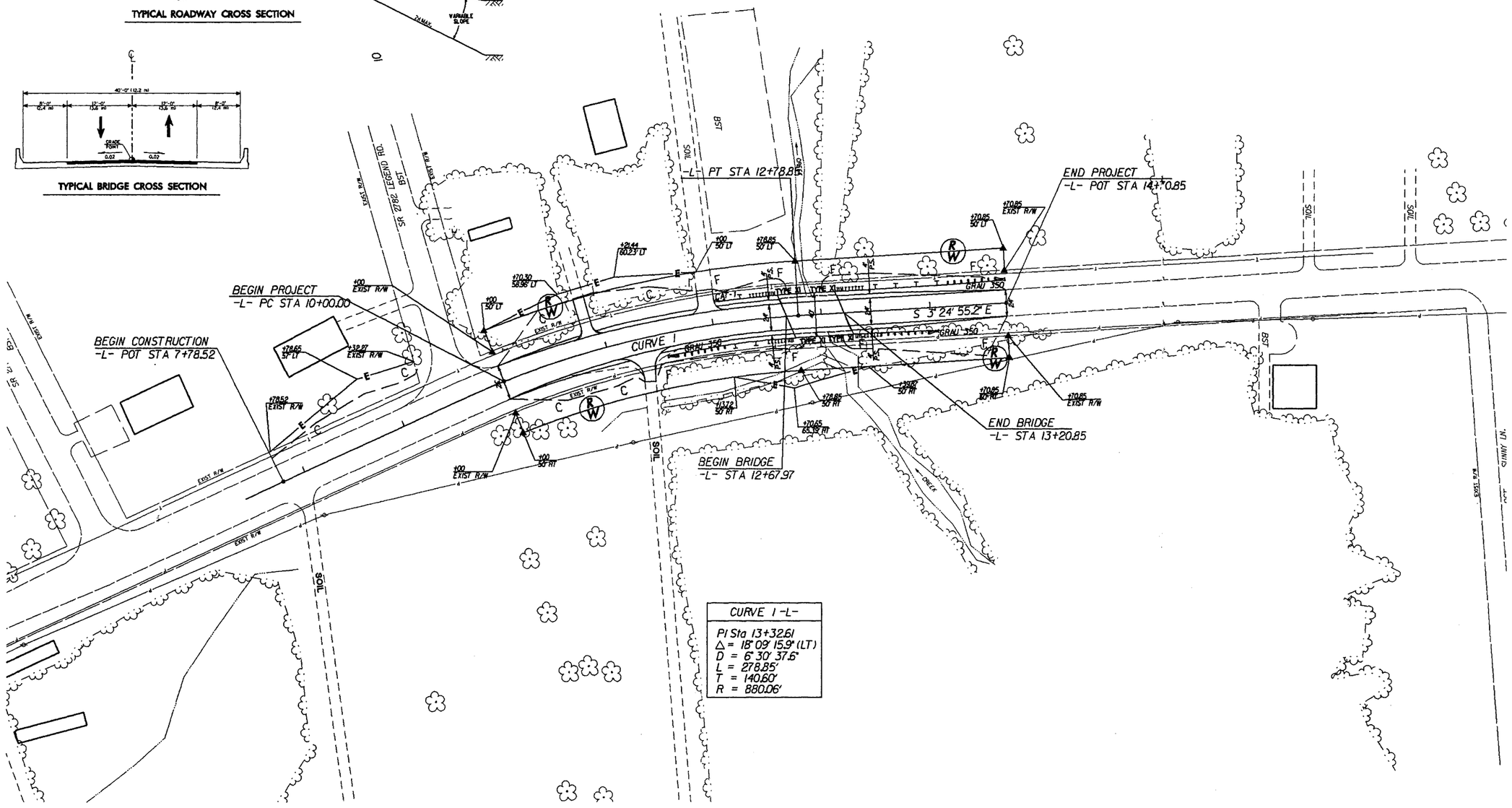
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83



TYPICAL ROADWAY CROSS SECTION

TYPICAL BRIDGE CROSS SECTION



CURVE 1 -L-

PI Sta 13+32.61
Δ = 18° 09' 15.9" (LT)
D = 6° 30' 37.6"
L = 278.85'
T = 140.60'
R = 880.06'

50 0 50 100
SCALE

FIGURE 4

DESIGN DATA

DESIGN SPEED	40 mph (65 km/h)
POSTED SPEED	35 mph (60 km/h)
CURRENT YEAR ADT (2000)	12,000 vpd
DESIGN YEAR ADT (2025)	21,200 vpd
% TTST ,% DUALS	2% ,3%
FUNCTIONAL CLASSIFICATION	Urban Minor Arterial
TERRAIN	Rolling
MAX RADIUS	468 ft (143 m)
MAXIMUM GRADE	8%
SUPERELEVATION RATE	Se = 0.08

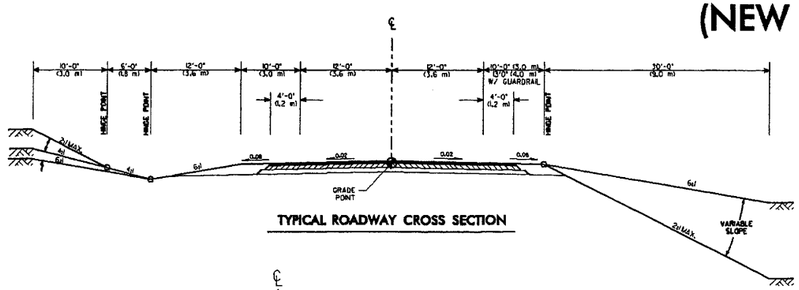
PROJECT REFERENCE NO.	SHEET NO.
B-4299	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

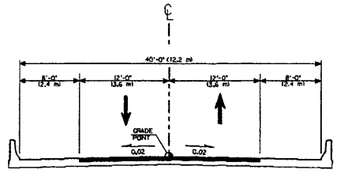
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

(NEW LOCATION EAST OF EXISTING BRIDGE)
ALTERNATE B

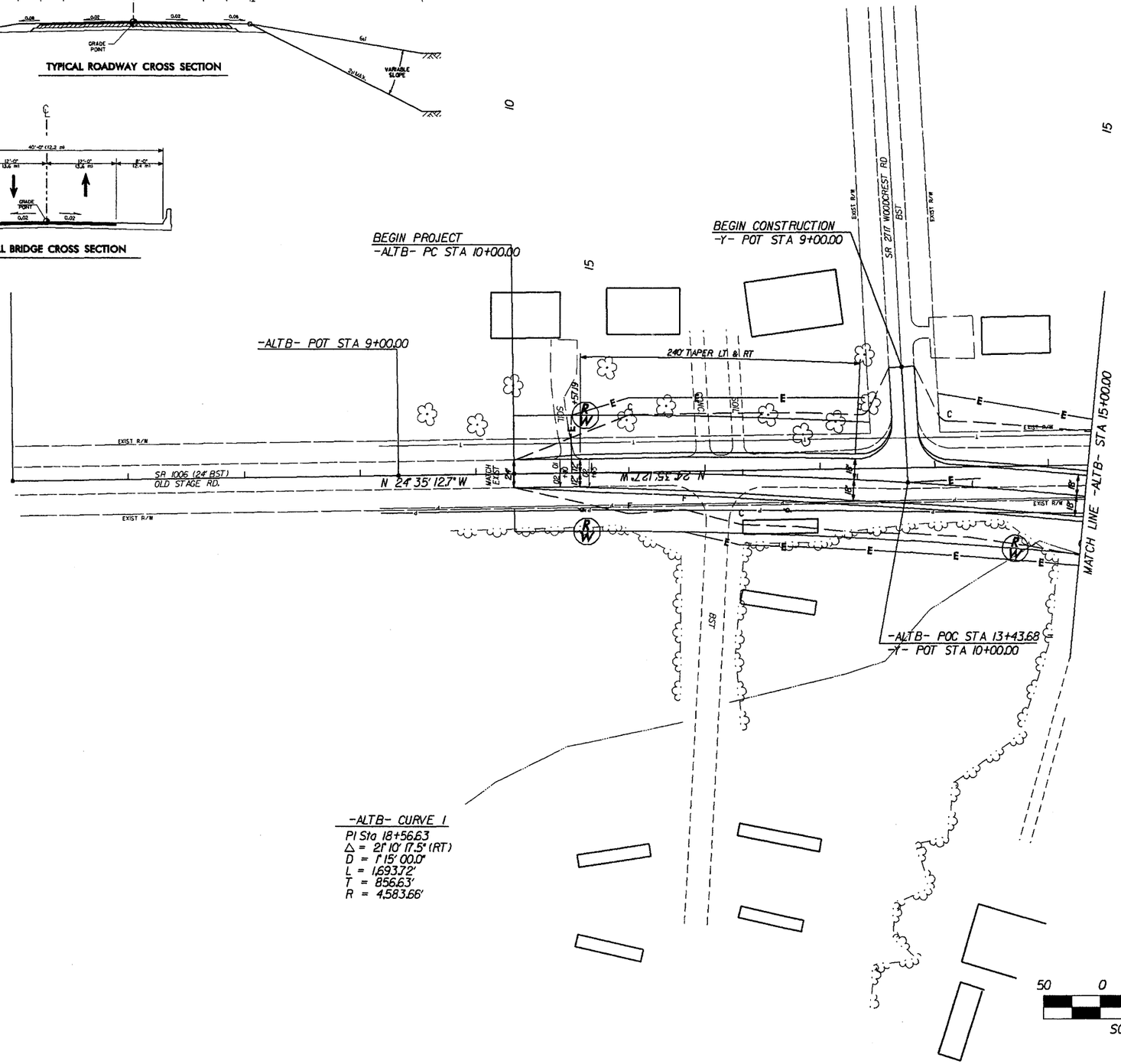
NAD 83



TYPICAL ROADWAY CROSS SECTION



TYPICAL BRIDGE CROSS SECTION



-ALTB- CURVE 1
PI Sta 18+56.63
△ = 21° 10' 17.5" (RT)
D = 1° 15' 00.0"
L = 1,693.72'
T = 856.63'
R = 4,583.66'

FOR -ALTB- AND -Y- PROFILES, SEE SHEET 6.

ALL SHOULDER TAPERS ARE 15:1, UNLESS NOTED OTHERWISE.

DESIGN DATA

DESIGN SPEED	40 mph (65 km/h)
POSTED SPEED	35 mph (60 km/h)
CURRENT YEAR ADT (2004)	12,000 vpd
DESIGN YEAR ADT (2025)	21,200 vpd
% TTST, % DUALS	2%, 3%
FUNCTIONAL CLASSIFICATION	Urban Minor Arterial
TERRAIN	Rolling
MAX RADIUS	468 ft (143 m)
MAXIMUM GRADE	8%
SUPERELEVATION RATE	Se = 0.08

FIGURE 5

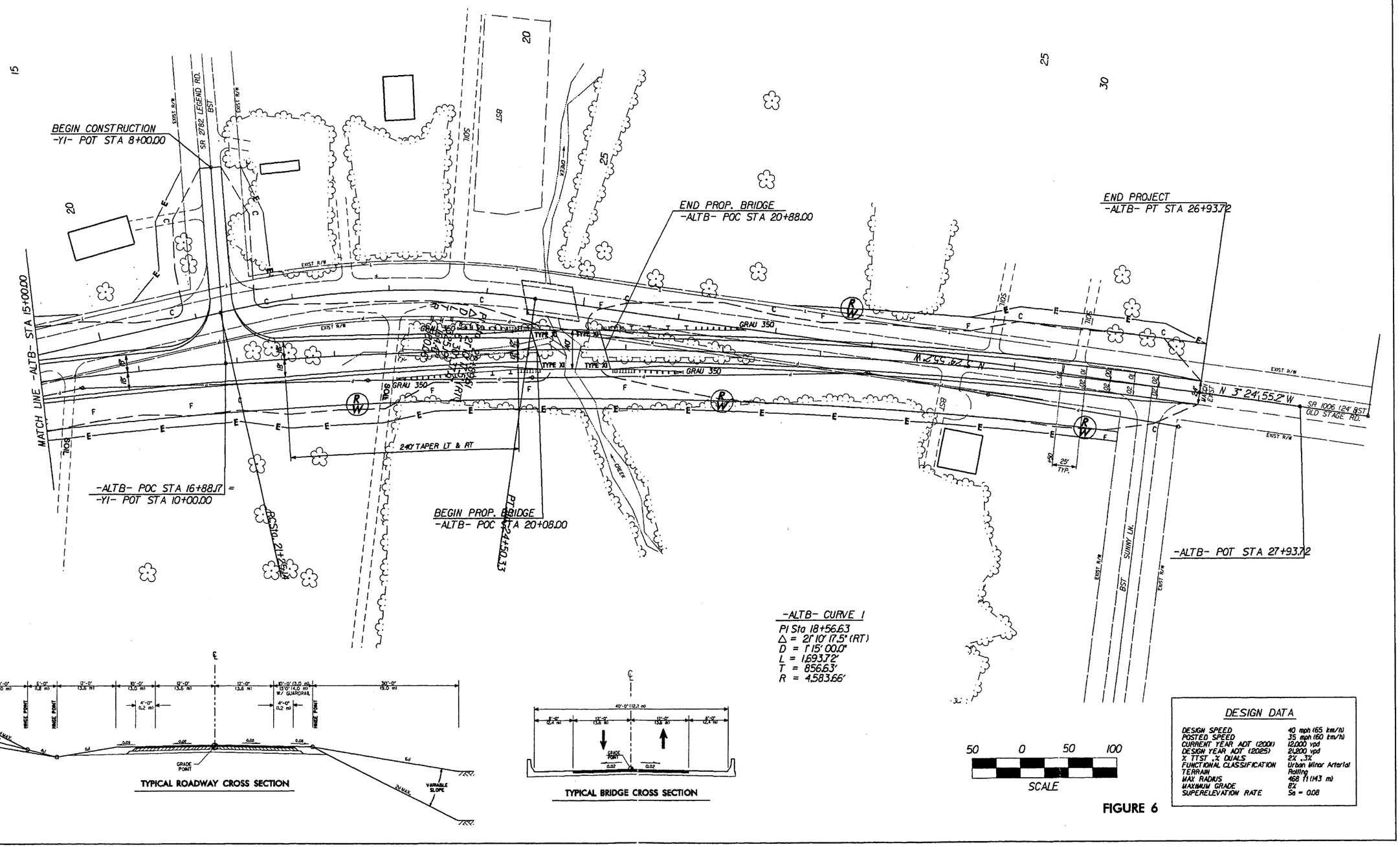
PROJECT REFERENCE NO.	SHEET NO.
B-4299	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

(NEW LOCATION EAST OF EXISTING BRIDGE)
ALTERNATE B

NAD 83



-ALTB- CURVE 1
PI Sta 18+56.63
△ = 21° 10' 17.5" (RT)
D = 1° 15' 00.0"
L = 1,693.72'
T = 856.63'
R = 4,583.66'

TYPICAL ROADWAY CROSS SECTION

TYPICAL BRIDGE CROSS SECTION

50 0 50 100
SCALE

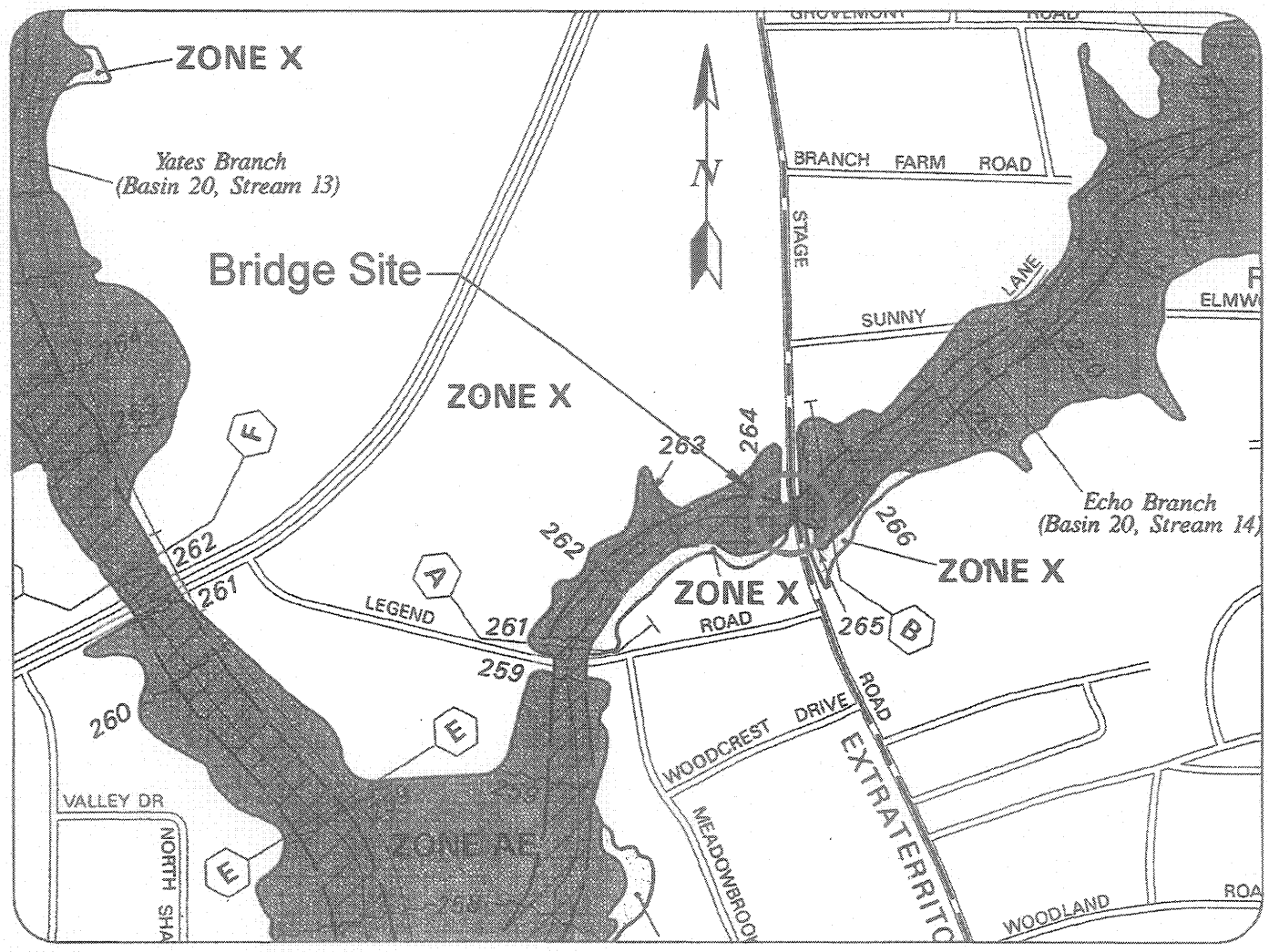
DESIGN DATA

DESIGN SPEED	40 mph (65 km/h)
POSTED SPEED	35 mph (60 km/h)
CURRENT YEAR ADT (2001)	12,000 vpd
DESIGN YEAR ADT (2025)	21,200 vpd
% TTST, % DUALS	2%, 3%
FUNCTIONAL CLASSIFICATION	Urban Minor Arterial
TERRAIN	Rolling
MAX RADIUS	468 ft (143 m)
MAXIMUM GRADE	6%
SUPERELEVATION RATE	Sa = 0.08

FIGURE 6

SR 1006 (Old Stage Road)
Replace Bridge No. 255 over
Unnamed Creek
Wake County, North Carolina

Figure 7
Project Vicinity



FIRM
FLOOD INSURANCE RATE MAP

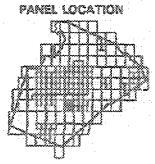
WAKE COUNTY,
NORTH CAROLINA AND
INCORPORATED AREAS

PANEL 540 OF 810
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GARNER, TOWN OF	370240	0540	E
RALEIGH, CITY OF	370243	0540	E
UNINCORPORATED AREAS	370368	0540	E

PANEL LOCATION



MAP NUMBER:
37183C0540 E
EFFECTIVE DATE:
MARCH 3, 1992

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SR 1006
Replace Bridge No. 255 over
Unnamed Creek
Wake County, North Carolina

TIP NO. B-4299
FEMA 100-YEAR FLOOD PLAIN MAP

Not to Scale

FIGURE 8

APPENDIX

North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

TO: Theresa Ellerby
Project Development Engineer, NCDOT

FROM: David Cox, Highway Project Coordinator
Habitat Conservation Program

DATE: October 8, 2001

SUBJECT: NCDOT Bridge Replacements in Franklin and Wake counties of North Carolina. TIP Nos. B-4515, B-3916, and B-4299.

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

On bridge replacement projects of this scope our standard recommendations are as follows:

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

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

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

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

5. If temporary access roads or detours are constructed, they should be removed back to original ground elevations immediately upon the completion of the project. Disturbed areas should be seeded or mulched to stabilize the soil and native tree species should be planted with a spacing of not more than 10'x10'. If possible, when using temporary structures the area should be cleared but not grubbed. Clearing the area with chain

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

saws, mowers, bush-hogs, or other mechanized equipment and leaving the stumps and root mat intact, allows the area to revegetate naturally and minimizes disturbed soil.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Project specific comments:

1. B-4515 – Franklin County – Bridge No. 40 over Bear Swamp Creek. There are records of state and federally listed mussels in the project vicinity. Therefore, due to the potential for impacts to listed species we request that NCDOT perform a mussel survey prior to the construction of this bridge. Standard comments apply.

2. B-3916 – Wake County – Bridge No. 63 over Middle Creek. There are also records of state listed mussels upstream of the project. Therefore, due to the potential for impacts to listed species we request that NCDOT perform a mussel survey prior to the construction of this bridge. Standard comments apply.

3. B-4299 – Wake County – Bridge No. 255 over unnamed Creek. Standard comments apply. We are not aware of any threatened of endangered species in the project vicinity.

We request that NCDOT routinely minimize adverse impacts to fish and wildlife resources in the vicinity of bridge replacements. The NCDOT should install and maintain sedimentation control measures throughout the life of the project and prevent wet concrete from contacting water in or entering into these streams. Replacement of bridges with spanning structures of some type, as opposed to pipe or box culverts, is recommended in most cases. Spanning structures allow wildlife passage along streambanks, reducing habitat fragmentation and vehicle related mortality at highway crossings.

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

Dear Bob Hatley

United States Department of the Interior

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

August 10, 2001

Mr. William D. Gilmore, P.E., Manager
NCDOT
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Mr. Gilmore:

Thank you for your June 21, 2001, request for information from the U.S. Fish and Wildlife Service (Service) on the potential environmental impacts of proposed bridge replacements in Franklin and Wake Counties, North Carolina. This report provides scoping information and is provided in accordance with provisions of the Fish and Wildlife Coordination Act (FWCA) (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). This report also serves as initial scoping comments to federal and state resource agencies for use in their permitting and/or certification processes for this project.

The North Carolina Department of Transportation (NCDOT) proposes to replace the following bridge structures:

1. B-4515 Bridge No. 40 on SR 1235 over Bear Swamp Creek;

2. B-3916 Bridge No. 63 on US 401 over Middle Creek; and,

3. B-4299 Bridge No. 255 on SR 1006 over unnamed creek.

The following recommendations are provided to assist you in your planning process and to facilitate a thorough and timely review of the project.

Generally, the Service recommends that wetland impacts be avoided and minimized to the maximum extent practical as outlined in Section 404 (b)(1) of the Clean Water Act Amendments of 1977. In regard to avoidance and minimization of impacts, we recommend that proposed highway projects be aligned along or adjacent to existing roadways, utility corridors, or previously developed areas in order to minimize habitat fragmentation and encroachment. Areas exhibiting high biodiversity or ecological value important to the watershed and region should be avoided. Crossings of streams and associated wetland systems should use existing crossings and/or occur on a structure wherever feasible. Where bridging is not feasible, culvert structures that maintain natural water flows and hydraulic regimes without scouring, or impeding fish and wildlife passage, should be employed. Highway shoulder and

median widths should be reduced through wetland areas. Roadway embankments and fill areas should be stabilized by using appropriate erosion control devices and techniques. Wherever appropriate, construction in sensitive areas should occur outside fish spawning and migratory bird nesting seasons.

The National Wetlands Inventory (NWI) maps of the Ingleside and Lake Wheeler 7.5 Minute Quadrangles show wetland resources in the specific work areas. However, while the NWI maps are useful for providing an overview of a given area, they should not be relied upon in lieu of a detailed wetland delineation by trained personnel using an acceptable wetland classification methodology. Therefore, in addition to the above guidance, we recommend that the environmental documentation for this project include the following in sufficient detail to facilitate a thorough review of the action.

1. 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. Wetland boundaries should be determined by using the 1987 Corps of Wetlands Delineation Manual and verified by the U.S. Army Corps of Engineers (Corps).

2. If unavoidable wetland impacts are proposed, we recommend that every effort 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, preferably via conservation easement, should be explored at the outset.

The document presents a number of scenarios for replacing each bridge, ranging from in-place to relocation, with on-site and off-site detours. The Service recommends that each bridge be replaced on the existing alignment with an off-site detour.

The enclosed list identifies the federally-listed endangered and threatened species, and Federal Species of Concern (FSC) that are known to occur in Franklin and Wake Counties. The Service recommends that habitat requirements for the listed species be compared with the available habitats at the respective project sites. If suitable habitat is present within the action area of the project, biological surveys for the listed species should be performed. Environmental documentation that includes survey methodologies, results, and NCDOT's recommendations based on those results, should be provided to this office for review and comment.

FSC's are those plant and animal species for which the Service remains concerned, but further biological research and field study are needed to resolve the conservation status of these taxa. Although FSC's receive no statutory protection under the ESA, we would encourage the NCDOT to be alert to their potential presence, and to make every reasonable effort to conserve them if found. The North Carolina Natural Heritage Program should be contacted for information on species under state protection.

The Service appreciates the opportunity to comment on this project. Please continue to advise us during the progression of the planning process, including your official determination of the impacts of the project. If you have any questions regarding these comments, please contact Tom McCartney at 919-856-4520, Ext. 32.

Sincerely,

for Dr. Garland B. Pardue
Ecological Services Supervisor

Enclosures

cc: COE, Raleigh, NC (Eric Alsmeyer)
NCDWQ, Raleigh, NC (John Hennessey)
NCDNR, Creedmoor, NC (David Cox)

FWS/R4:TMcCartney:TM:08/10/01:919/856-4520 extension 32:\bdgfran.wak

Theresa Ellerby

North Carolina Department of Cultural Resources
State Historic Preservation Office
David L. S. Brook, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary

Division of Archives and History
Jeffrey J. Crow, Director

August 6, 2001

MEMORANDUM

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

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

Re: Replace Bridge No. 255 on SR 1006 over Creek,
BRSTP-1006(14), 8.2408401, B-4299, Wake County, ER 01-10082

Thank you for your memorandum of June 21, 2001, concerning the above project.

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

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

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919/733-4763.

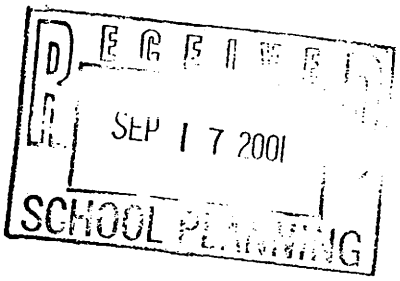
DB:kgc

cc: Mary Pope Furr, NCDOT
T. Padgett, NCDOT

	Location	Mailing Address	Telephone/Fax
Administration	507 N. Blount St, Raleigh, NC	4617 Mail Service Center, Raleigh 27699-4617	(919) 733-4763 •733-8653
Restoration	515 N. Blount St, Raleigh , NC	4613 Mail Service Center, Raleigh 27699-4613	(919) 733-6547 •715-4801
Survey & Planning	515 N. Blount St, Raleigh, NC	4618 Mail Service Center, Raleigh 27699-4618	(919) 733-4763 •715-4801

WAKE COUNTY PUBLIC SCHOOL SYSTEM

Bill McNeal
Superintendent



September 4, 2001

SEP 18

Mr. Gerald H. Knott
Department of Public Instruction
Section Chief, School Planning
301 North Wilmington Street
Raleigh, North Carolina 27601 - 2825

Dear Mr. Knott:

Impact to school sites and school bus routes by bridge replacement, B-3916 would be minimal provided a temporary structure is used to maintain four lanes of travel. As for bridge replacement, B-4299, school bus routes would be impacted by adding five minutes in each direction if an off-site detour is used.

Thank you for soliciting our input.

Sincerely,

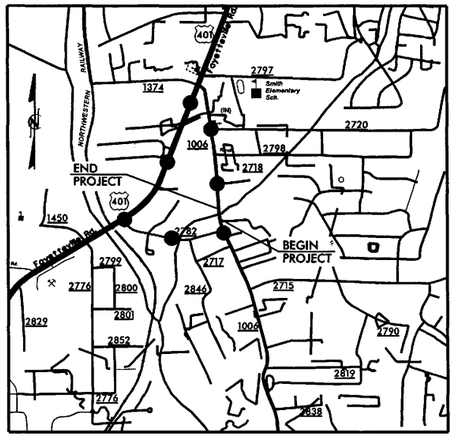
William R. McNeal, Jr.

[illegible] • Post Office Box [illegible] • Raleigh, North Carolina 27611-5011 • Telephone (919) 850-1000 • Fax (919) 850-8952

TIP PROJECT B-4299

CONTRACT: C201446

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



DENOTES OFFSITE DETOUR

VICINITY MAP

NAD 8395

NC GRID

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

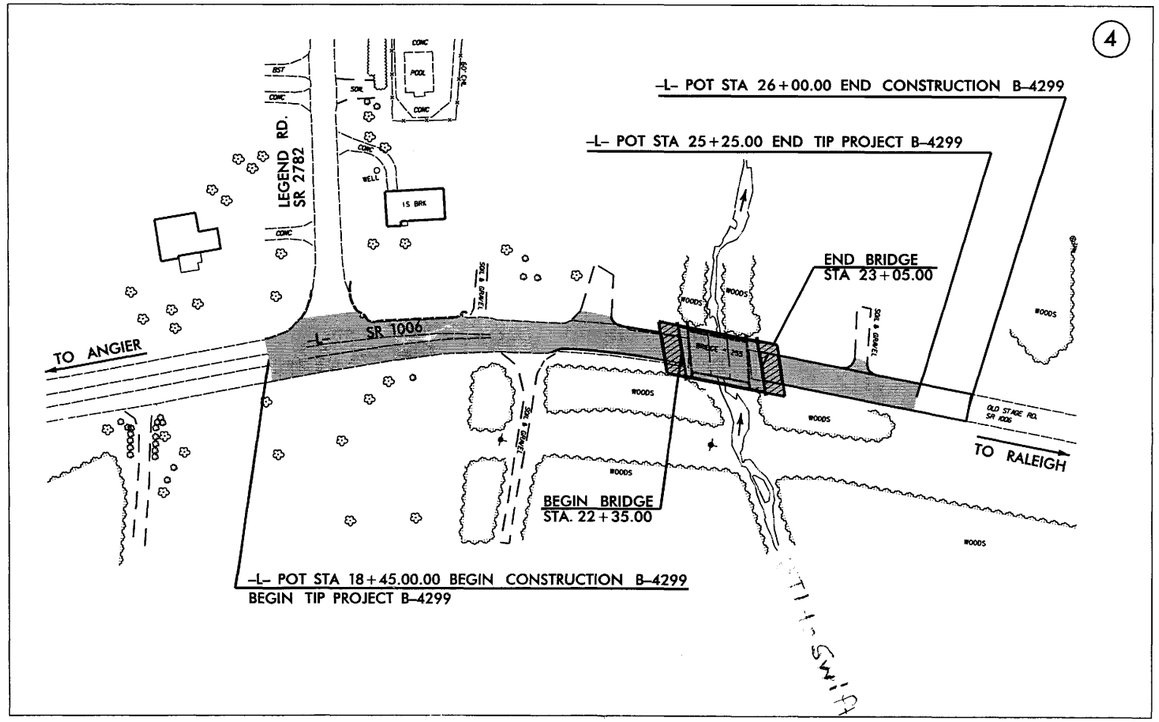
LOCATION: BRIDGE NO. 255 OVER UNNAMED TRIBUTARY TO SWIFT CREEK ON SR 1006

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4299	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33636.1.1	BRSTP-1006(14)	P.E.
33636.2.1	BRSTP-1006(14)	RW & UTIL.
33636.3.1	BRSTP-1006(14)	CONST.

SUBMITTAL: 90% PLANS



TRANSITE CONSULTING
ENGINEERS, INCORPORATED
1300 Paddock Drive, Suite G-10
Raleigh, N.C. 27609

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

5 2.5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2006	=	13,885
ADT 2026	=	21,585
DHV	=	11 %
D	=	63 %
T	=	5 % *
V	=	40 MPH

* TTST 2 % DUAL 3 %

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4299	=	0.116 mi
LENGTH STRUCTURE TIP PROJECT B-4299	=	0.013 mi
TOTAL LENGTH OF TIP PROJECT B-4299	=	0.129 mi

Plans prepared in the office of:

RAMEY KEMP & ASSOCIATES, INC.
TRANSPORTATION ENGINEERS
4825-A Windy Hill Drive
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-1418 Fax - www.rameykemp.com

for the North Carolina Department of Transportation

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 18, 2005

LETTING DATE:
DECEMBER 19, 2006

N.C.D.O.T. CONTACT:
MALCOLM WATSON
PROJECT DESIGN ENGINEER
ROADWAY DESIGN

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18442 ENGINEER RICHARD LEON BOLLINGER, JR.

RICHARD LEON BOLLINGER, JR. *P.E.*

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 27171 ENGINEER MATTHEW B. COPPLE

MATTHEW B. COPPLE *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-4299	1-B

*S.U.E = SUBSURFACE UTILITY ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

ROADS & RELATED ITEMS

- Edge of Pavement
- Curb
- Prop. Slope Stakes Cut (C)
- Prop. Slope Stakes Fill (F)
- Prop. Woven Wire Fence
- Prop. Chain Link Fence
- Prop. Barbed Wire Fence
- Prop. Wheelchair Ramp (WCR)
- Curb Cut for Future Wheelchair Ramp (CCFR)
- Exist. Guardrail
- Prop. Guardrail
- Equality Symbol
- Pavement Removal

RIGHT OF WAY

- Baseline Control Point
- Existing Right of Way Marker
- Exist. Right of Way Line w/Marker
- Prop. Right of Way Line with Proposed R/W Marker (Iron Pin & Cap)
- Prop. Right of Way Line with Proposed (Concrete or Granite) R/W Marker
- Exist. Control of Access Line (CA)
- Prop. Control of Access Line (CA)
- Exist. Easement Line (E)
- Prop. Temp. Construction Easement Line (E)
- Prop. Temp. Drainage Easement Line (TDE)
- Prop. Perm. Drainage Easement Line (PDE)

HYDROLOGY

- Stream or Body of Water
- River Basin Buffer (RBB)
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Shoreline
- Falls, Rapids
- Prop Lateral, Tail, Head Ditches (FLOW)

STRUCTURES

MAJOR

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

MINOR

- Head & End Wall (CONC HW)
- Pipe Culvert
- Footbridge
- Drainage Boxes (CB)
- Paved Ditch Gutter

UTILITIES

- Exist. Pole
- Exist. Power Pole
- Prop. Power Pole
- Exist. Telephone Pole
- Prop. Telephone Pole
- Exist. Joint Use Pole
- Prop. Joint Use Pole
- Telephone Pedestal (T)
- U/G Telephone Cable Hand Hold (TH)
- Cable TV Pedestal (C)
- U/G TV Cable Hand Hold (TH)
- U/G Power Cable Hand Hold (PH)
- Hydrant
- Satellite Dish
- Exist. Water Valve
- Sewer Clean Out
- Power Manhole (P)
- Telephone Booth
- Cellular Telephone Tower
- Water Manhole (W)
- Light Pole
- H-Frame Pole
- Power Line Tower
- Pole with Base
- Gas Valve
- Gas Meter
- Telephone Manhole (T)
- Power Transformer
- Sanitary Sewer Manhole
- Storm Sewer Manhole (S)
- Tank; Water, Gas, Oil
- Water Tank With Legs
- Traffic Signal Junction Box (S)
- Fiber Optic Splice Box (F)
- Television or Radio Tower
- Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement (TS)

- Recorded Water Line (W)
- Designated Water Line (S.U.E.*) (W)
- Sanitary Sewer (SS)
- Recorded Sanitary Sewer Force Main (FSS)
- Designated Sanitary Sewer Force Main(S.U.E.*) (FSS)
- Recorded Gas Line (G)
- Designated Gas Line (S.U.E.*) (G)
- Storm Sewer (S)
- Recorded Power Line (P)
- Designated Power Line (S.U.E.*) (P)
- Recorded Telephone Cable (T)
- Designated Telephone Cable (S.U.E.*) (T)
- Recorded U/G Telephone Conduit (TC)
- Designated U/G Telephone Conduit (S.U.E.*) (TC)
- Unknown Utility (S.U.E.*) (?UTL)
- Recorded Television Cable (TV)
- Designated Television Cable (S.U.E.*) (TV)
- Recorded Fiber Optics Cable (FO)
- Designated Fiber Optics Cable (S.U.E.*) (FO)
- Exist. Water Meter
- U/G Test Hole (S.U.E.*)
- Abandoned According to U/G Record (ATTUR)
- End of Information (E.O.I.)

BOUNDARIES & PROPERTIES

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Property Line Symbol (PL)
- Exist. Iron Pin (EIP)
- Property Corner
- Property Monument (ECM)
- Property Number (123)
- Parcel Number (6)
- Fence Line (WW & ISBW)
- Existing Wetland Boundaries (WLB)
- High Quality Wetland Boundary (HQ WLB)
- Medium Quality Wetland Boundaries (MQ WLB)
- Low Quality Wetland Boundaries (LQ WLB)
- Proposed Wetland Boundaries (WLB)
- Existing Endangered Animal Boundaries (EAB)
- Existing Endangered Plant Boundaries (EPB)

BUILDINGS & OTHER CULTURE

- Buildings
- Foundations
- Area Outline
- Gate
- Gas Pump Vent or U/G Tank Cap
- Church
- School
- Park
- Cemetery
- Dam
- Sign (S)
- Well (W)
- Small Mine
- Swimming Pool

TOPOGRAPHY

- Loose Surface
- Hard Surface
- Change in Road Surface
- Curb
- Right of Way Symbol (R/W)
- Guard Post (GP)
- Paved Walk
- Bridge
- Box Culvert or Tunnel
- Ferry
- Culvert
- Footbridge
- Trail, Footpath
- Light House

VEGETATION

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard (VINEYARD)

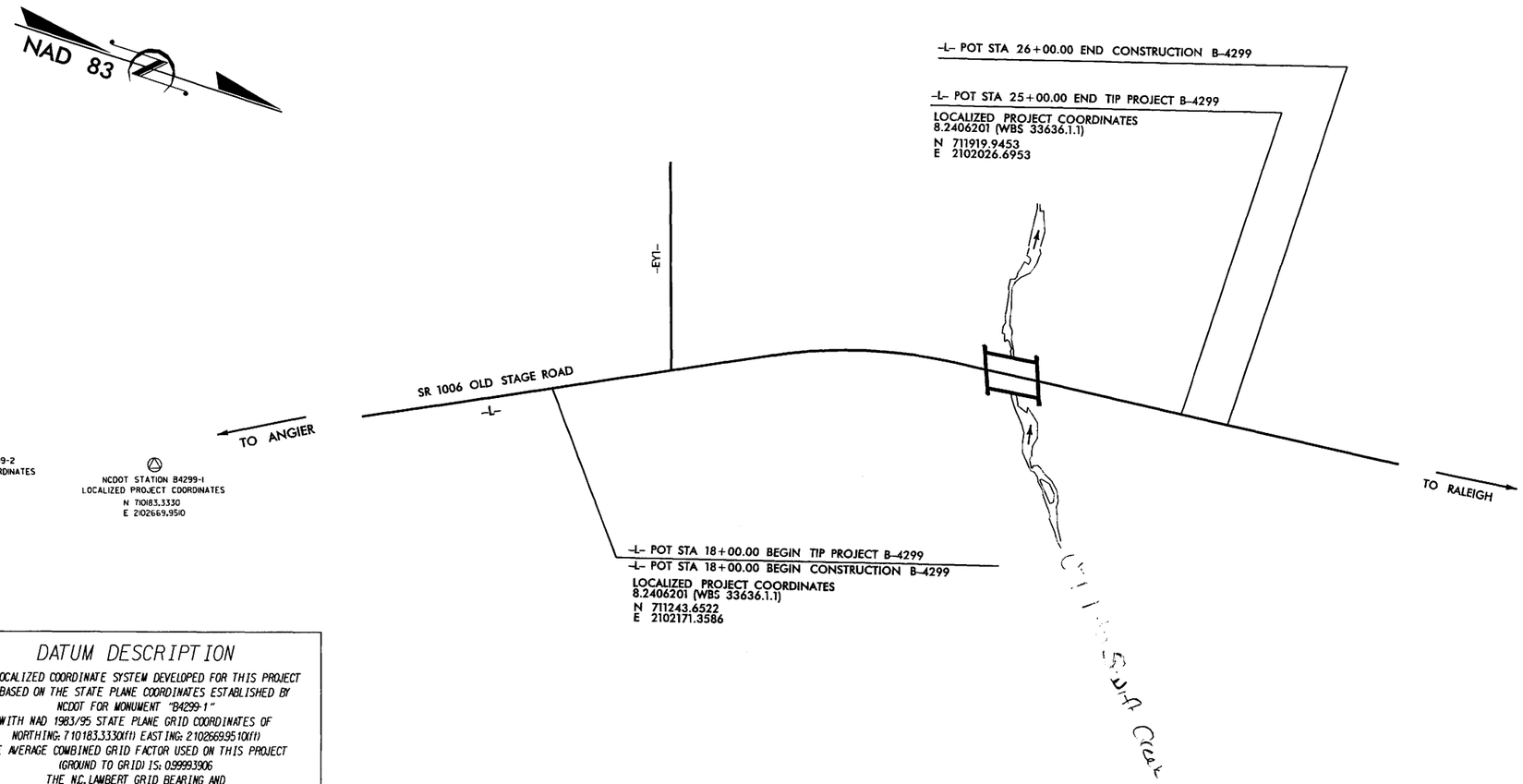
RAILROADS

- Standard Gauge (CSX TRANSPORTATION)
- RR Signal Milepost (MILEPOST 35)
- Switch (SWITCH)

RAMEY KEMP & ASSOCIATES, INC.
TRANSPORTATION ENGINEERS
4928-A Windy Hill Drive
Raleigh, North Carolina 27609
919-872-5115 or 919-878-3418 fax e-mail@rameykemp.com

PROJECT REFERENCE NO.	SHEET NO.
B-4299	1-C
Location and Surveys	

SURVEY CONTROL SHEET B-4299



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4299-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 710183.3330(ft) EASTING: 2102669.9510(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999993906 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4299-1" TO -L- STATION 18+00.00 IS N 25°11'03.12" W 1,17.170' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
101	B-4299 BL-101	710568.4520	2102452.8310	299.35	10+68.97	26.83 LT
102	B-4299 BL-102	711350.3960	2102152.0460	268.75	19+05.03	27.12 RT
103	B-4299 BL-103	711650.3210	2102025.5180	266.65	22+30.92	17.13 LT
104	B-4299 BL-104	712186.4890	2101995.3820	275.70	27+67.93	15.48 LT
105	B-4299 BL-105	712575.4390	2102010.3250	299.69	31+54.91	24.77 RT

.....
203 ELEVATION = 264.75
N 711638 E 2102016
L STATION 16+55 14 LEFT
R/R SPIKE IN 42" SWEET GUM
.....

.....
204 ELEVATION = 289.46
N 712260 E 2101968
L STATION 22+72 30 LEFT
R/R SPIKE IN 14" SWEET GUM
.....

NOTES:

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: HTTP:\WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT THE FILES TO BE FOUND ARE AS FOLLOWS B4299_LS_CONTROL_041115.TXT

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

◎ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

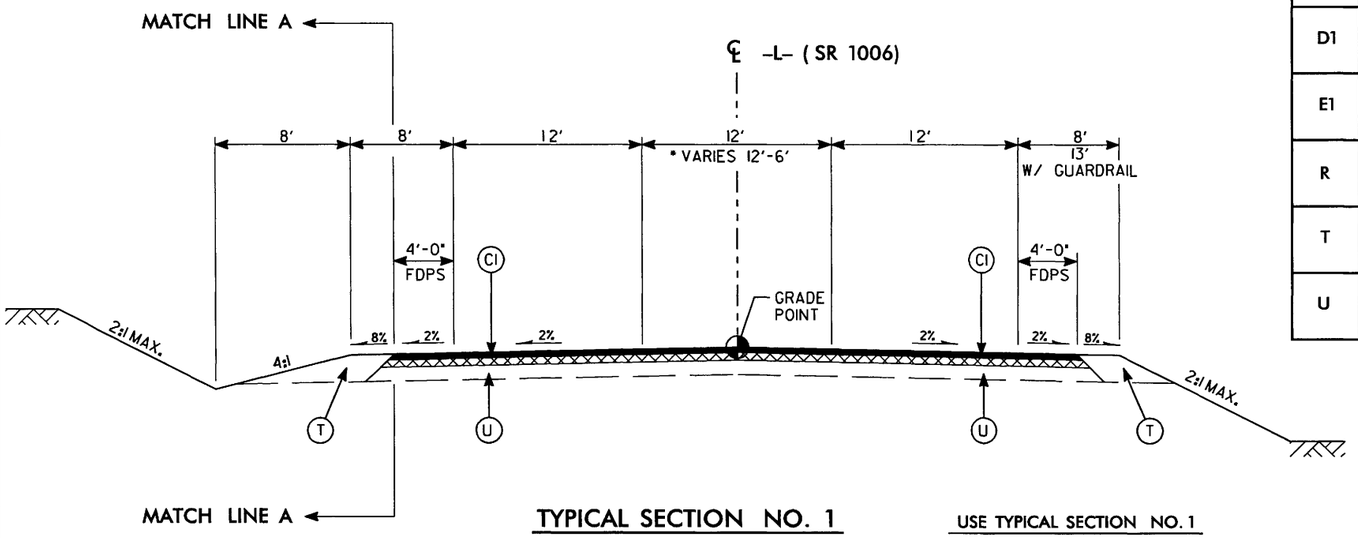
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NOTE: DRAWING NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
B-4299	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 27771 ENGINEER MATTHEW B. COPPLE

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 140 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
R	48" EXPRESSWAY GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.

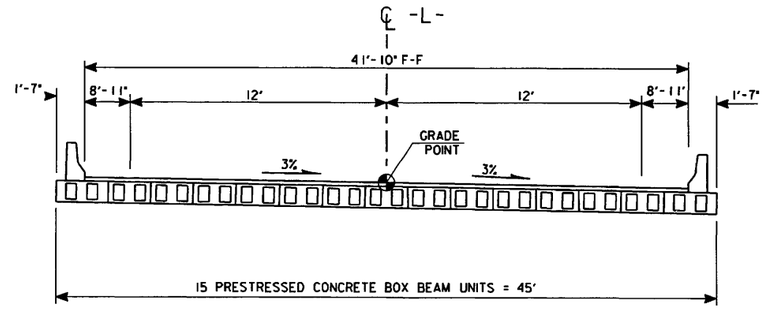


TYPICAL SECTION NO. 1

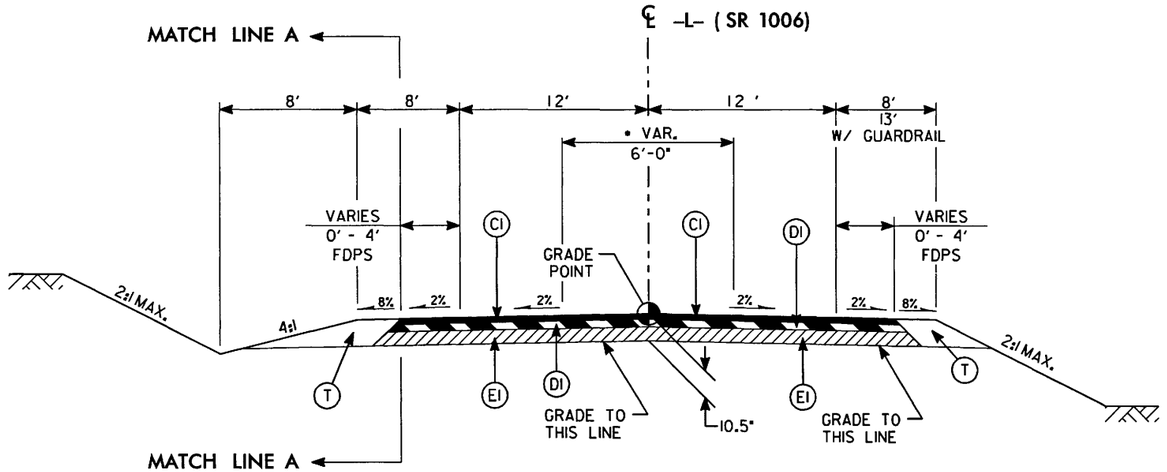
NOTE:
FEATHER TO EXISTING PAVEMENT FROM
-L- STA. 18+45.00 TO STA. 18+70.00 AND
FROM -L- STA. 25+00.00 TO STA. 25+25.00

USE TYPICAL SECTION NO. 1

-L- STA. 18+70.00 TO STA. 19+20.70
• -L- STA. 19+20.70 TO STA. 20+00.00
-L- STA. 24+50.00 TO STA. 25+00.00



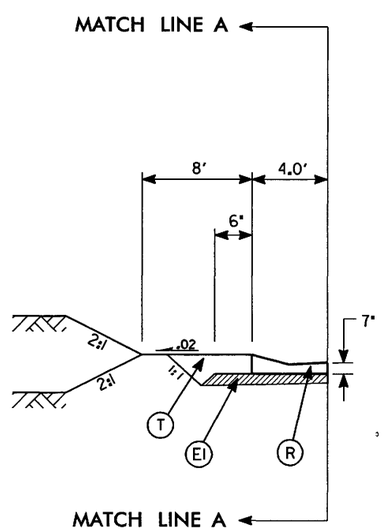
BOX BEAM DETAIL



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

* -L- STA. 20+00.00 TO STA. 21+94.29
-L- STA. 21+94.29 TO 22+35.00 (BEGIN BRIDGE)
-L- STA. 23+05.00 (END BRIDGE) TO STA. 24+50.00



USE THIS SECTION

-L- STA. 19+51.10 TO STA. 20+45.00

RAMEY KEMP & ASSOCIATES, INC.
TRANSPORTATION ENGINEERS

PROJECT REFERENCE NO.	SHEET NO.
B-4299	2-A

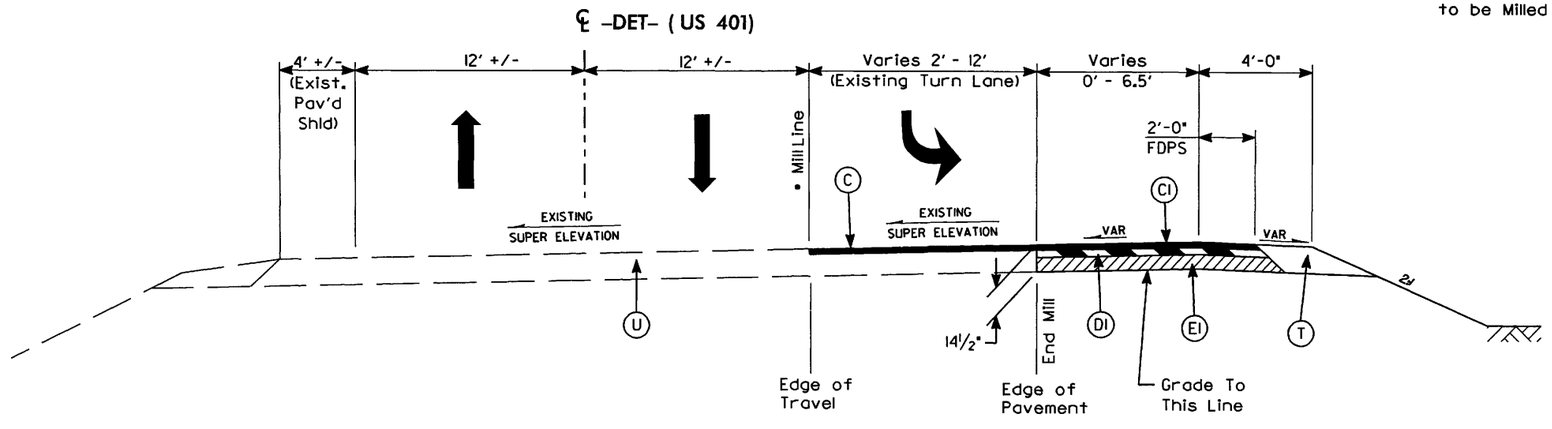
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 27771 ENGINEER MATTHEW B. COPPLE

PAVEMENT DESIGN ENGINEER

PAVEMENT SCHEDULE	
C	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E1	PROP. APPROX. 7 1/2" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 855 LBS. PER SQ. YD.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.

• Existing Left Turn Lane and Shoulders to be Milled Approximately 1½".



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3

-DET- STA. 11+72.00 TO STA. 17+02.00

RAMEY KEMP & ASSOCIATES, INC.
TRANSPORTATION ENGINEERS
4928-A Westpark Drive
Raleigh, North Carolina 27606
919-872-5115 tel 919-870-5418 fax - www.rameykemp.com

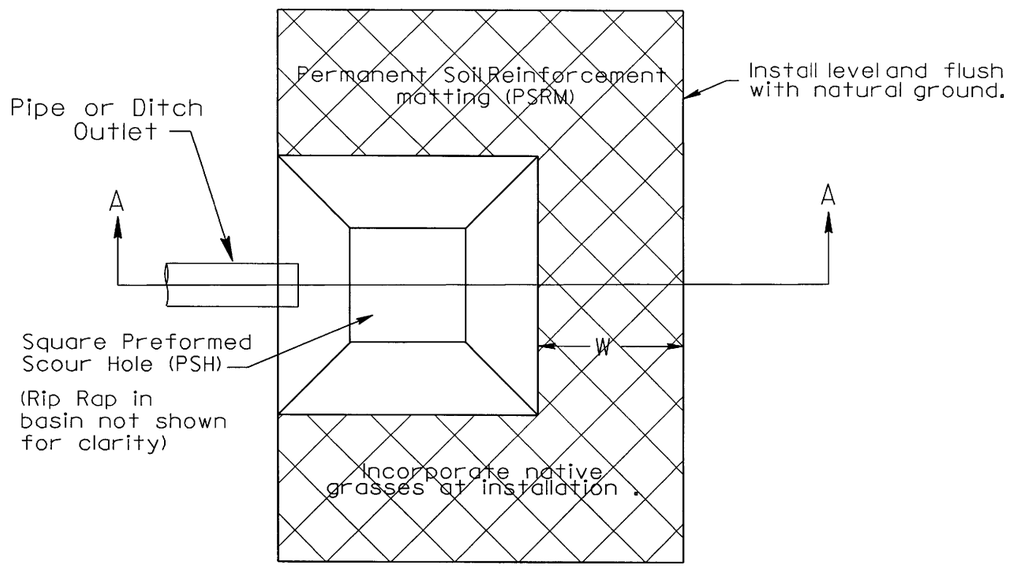
PROJECT REFERENCE NO.	SHEET NO.
B-4299	2-B

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 27771 ENGINEER MATTHEW B. COPPLE

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 18442 ENGINEER RICHARD LEON BOLLINGER JR.

PREFORMED SCOUR HOLE DETAIL

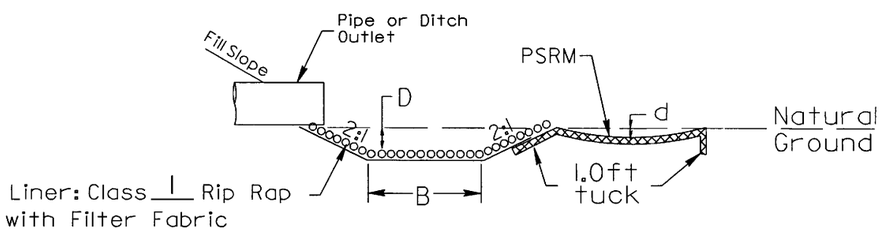
PLAN VIEW



LOCATION (AT OUTLET)
Sta 23+42 -L- (Lt)
Sta 23+75 -L- (Rt)

B	5.0	ft
D	2.0	ft
W	5.0	ft
d	0.5	ft

SECTION A-A



TRANSITE CONSULTING ENGINEERS, INCORPORATED
1900 Paddock Drive, Suite G-18
Raleigh, N.C. 27609

RAMEY KEMP & ASSOCIATES, INC.
TRANSPORTATION ENGINEERS
4928-A Windy Hill Drive
Raleigh, North Carolina 27609
919-872-5115 tel. 919-878-5418 fax - www.rameykemp.com

PROJECT REFERENCE NO.	SHEET NO.
B-4299	3

SUMMARY OF QUANTITIES

RAMEY KEMP & ASSOCIATES, INC.
TRANSPORTATION ENGINEERS
4928-A Windy Hill Drive
Raleigh, North Carolina 27609
919-872-5115 tel. 919-878-5416 fax - www.rameykemp.com

6/21/00

COMPUTED BY: D. PETRY DATE: 9/1604
CHECKED BY: M. COPPLE DATE: 11405

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
B-4299	3-A

ASPHALT PAVEMENT REMOVAL SUMMARY

STATION TO STATION	SQUARE YARDS
-L- STA. 20+00 TO -L- STA. 22+37	754.75
-L- STA. 22+92 TO -L- STA. 24+50	424.62
PROJECT TOTAL	1,179.37
SAY	1,180.00

NOTE: APPROXIMATE QUANTITIES ONLY. UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, SHOULDER BORROW, FINE GRADING, CLEARING AND GRUBBING, BREAKING OF EXISTING PAVEMENT, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING".

SUMMARY OF EARTHWORK

STATION TO STATION	UNCLASIFIED EXCAVATION (cu. yds)	UNDERCUT (cu. yds)	ROADWAY EMBANKMENT (cu. yds)	BORROW (cu. yds)	WASTE (cu. yds)
SUMMARY #1					
-L- STA. 18+70.00 -L- STA. 22+35.00 (BEGIN BRIDGE)	315		271	0	44
SUMMARY #2					
-L- STA. 23+05.00 (END BRIDGE) -L- STA. 25+00.00	149		611	462	
SUBTOTAL (SUMMARIES 1-2)	464		882	462	44
EST. LOSS DUE TO CLEARING & GRUBBING	-150			150	
WASTE IN LIEU OF BORROW				-44	-44
PROJECT TOTALS	314		882	568	0
EST. 5% FOR REPLACING TOPSOIL				28	
ON BORROW PITS					
GRAND TOTAL	314		882	596	0
SAY	320			600	

ESTIMATED UNDERCUT = 200 CY.
ESTIMATED DRAINAGE DITCH EXCAVATION = 65 CY.

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH: STRAIGHT	LENGTH: SHOP CURVED	LENGTH: DOUBLE FACED	WARRANT POINT: APPROACH END	WARRANT POINT: TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH: APPROACH END	FLARE LENGTH: TRAILING END	W: APPROACH END	W: TRAILING END	ANCHORS: XI MOD	XI	GRAU 350	AT-1	XIII	CAT-A	VI MOD	BIC	TYPE III	IMPACT ATTENUATOR TYPE 350	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
-L-	21+72.50	22+35.00	LT.		62.50'			22+35.00	4'	13'		43.75'		4.92'				1					1					
-L-	21+22.50	22+35.00	RT.	112.50'			22+35.00		4'	13'	93.75'			4.92'			1						1					
-L-	23+05.00	24+42.50	RT.	137.50'				23+05.00	4'	13'		118.75'		5.64'			1						1					
-L-	23+05.00	23+67.50	LT.		62.50'		23+05.00		4'	13'	43.75'							1					1					
																	2	2					4					
SUBTOTAL				250.00'	125.00'																							
DEDUCTION FOR ANCHOR UNITS:				-187.50'													DEDUCTIONS FOR ANCHOR UNITS:											
											ADDITIONAL GUARDRAIL POSTS ..... 5 EA.						2 GRAU-350 @ 50.00' = 100.00'										
																	4 TYPE III @ 18.75' = 75.00'											
TOTAL				187.50													2 AT-1 @ 6.25' = 12.50'											
			SAY	200.00'													TOTAL			187.50'								

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE): 12"	15"	18"	24"	30"	36"	42"	48"	BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHRWISE): 12"	15"	18"	24"	30"	36"	42"	48"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS: STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	ENDWALLS: STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YDS. C.S.P.	QUANTITIES FOR JUNCTION BOX STRUCTURES * TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. A + (1.3 X COL. B) PER EACH (0' THRU 5.0')	LIN. *FT. A: 5.0' THRU 10.0'	LIN. *FT. B: 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	TRAFFIC BEARING DROP INLET STD. 840.35	M.D.I. FRAME WITH TWO GRATES STD. 840.29	CONCRETE DROP INLET STD. 840.14	DROP INLET FRAME & COVER STD. 840.16	PREFORMED SCOUR HOLE (SEE SHEET 2-B)	2GI /TRAFFIC BEARING JUNCTION BOX (SEE SHEET 2-K)	M.D.I. TYPE 'A' STD. 840.17 OR 840.26	M.D.I. FRAME W/TWO GRATES STD. 840.24	PIPE REMOVAL	CORR. STEEL ELBOWS NO. & SIZE (BITUMINOUS COATED)	REMARKS
-L- 19+55	LT.	1		269.00																							1					1	1									
-L- 19+55	LT.	1	2		266.88	265.08					88																													88		
-L- 20+42	LT.	2		268.58																							1							1	1						
-L- 20+42	LT.	2	3		265.16	264.66					36																													28		
-L- 21+70	LT.	4	-		264.20	258.56					76																															
-L- 23+73	LT.	5	-																						56														30		
-L- 23+75	RT.	6		266.33																							1							1	1						
-L- 23+75	RT.	6	7		263.16					20																									1						2-15"	
-DET- 15+45	RT.	8																									1														
-DET- 15+45	RT.	8	9						80																																
-DET- 16+27	RT.	9																									1												1	1	
TOTALS									80		200							20							56		5							2	2	1	1	2	1	1	1	146	2-15"	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
M.D.I.	MEDIAN DROP INLET
M.D.I. (N.S.)	MEDIAN DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUCTION BOX

RAMEY KEMP & ASSOCIATES, INC.
TRANSPORTATION ENGINEERS
4839-A Windy Hill Drive
Raleigh, North Carolina 27609
919-872-5115 ph 919-870-1828 fax - www.rameykemp.com

REVISIONS
5-8-06 -ADDITION OF RIGHT -OF-WAY PROPERTY TIES

PROJECT REFERENCE NO.	SHEET NO.
B-4299	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 27771 ENGINEER MATTHEW B. COPPLE

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 18442 ENGINEER RICHARD LEON BOLLINGER JR.

NC GRID
NAD 83/95

SHELTON R. GREY HEIRS
D.B. 1626 PG. 340

NATHAN ROBERT RAY, JR.
D.B. 2924 PG. 74

G.F. HORTON, ET UX
EVELYN M. ODOM
D.B. 1533 PG. 200
D.B. 8077 PG. 554

MACON LED EVANS & PEARLENE T. EVANS REVOCABLE LIVING TRUST
D.B. 9332 PG. 855

BRADLEY BENEDICT CARRVEAU
D.B. 4854 PG. 625

JEFFERY LAWRENCE COATS
D.B. 8474 PG. 107

G.F. HORTON, ET UX
D.B. 1533 PG.200

GEORGE FENNER HORTON, JR. ET UX
D.B. 1636 PG.472

G.F. HORTON, ET UX
D.B. 1049 PG. 109

ELSIE MAE BARRICK HEIRS
D.B 2978 PG. 72

ROBERT R. COOPER, ET UX
D.B. 5455 PG.889
D.B. 2544 PG.100

KYLE WHITE ENTERPRISES, I.L.L.C
D.B. 9369 PG. 2417

JOHN HENRY BATTZ
D.B. 2009 PG. 279

RICHARD DEAN ABERNATHY, ET UX
D.B. 7472 PG. 666

WILLIAM RAY MACEY, ET UX
D.B. 1846 PG. 207

LARRY CHESTER WOODALL ET UX
D.B. 1903 PG. 285

DAN RICHARD MYERS, ET UX
D.B. 2692 PG. 543

UT2 South Fork Creek

POT -Y- Sta. 10+00.00

POT -Y- Sta.13+08.55 =
POT -L- Sta.19+20.41

BL-103 PINC 16+63.32 =
-L- 22+30.32 17.13 LT.

BM = 203
BL STA. 16+55.48
30.00' LT.
ELEV.=264.75'

BM = 204
BL STA.=22+72.47
14.00' LT.
ELEV.=289.46'

BEGIN CONSTRUCTION
BEG PROJECT B-4299
-L- POT STA 18+45.00

BL-102 PINC 13+37.80 =
-L- 19+05.03 27.12 RT

PC -L- Sta. 19+42.92

PT -L- Sta. 22+27.44

PC Sta. 28+62.59

END PROJECT B-4299
-L- POT STA 25+25.00

END CONSTRUCTION
-L- POT STA 26+00.00

BL-104 PINC 22+00.34
-L- 27+67.93 15.48 LT.

-L-
PI Sta 20+86.85
Δ = 21° 20' 19.2" (RT)
D = 1° 30' 00.0"
L = 284.52'
T = 143.93'
R = 763.94'
emax = 6%
RUNOFF = SEE PLANS

PAVEMENT TRANSITIONS FROM 3% TO 24'

CLASS II RIP RAP SEE STRUCTURE PLANS

BEGIN BRIDGE
-L- STA.22+35.00

END BRIDGE
-L- STA.23+05.00

BEGIN APPROACH SLAB
-L- STA.22+11.06

END APPROACH SLAB
-L- STA.23+28.94

SKETCH SHOWING ROADWAY IN RELATION TO STRUCTURE

DETAIL 1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground, 3:1, D, 3:1 or Flatter, Fill Slope

Min.D = 1.0 Ft.

STA.24+00 to 25+70 LT
STA.20+75 to 21+35 LT.

DETAIL 2
LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 3:1, D, 3:1, b, 8% Fill Slope, B

Min.D = 1.0 Ft.
b = 5.0 Ft.
B = 4.0 Ft.

STA.22+00 to 22+45 LT

DENOTES APPROACH SLAB

SEE SHEET NO.6 FOR PROFILE

SEE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

TRANSITE CONSULTING
ENGINEERS, INCORPORATED
1800 Woodcock Drive, Suite G-10
Raleigh, N.C. 27609

RAMEY KEMP & ASSOCIATES, INC.

10/26/98

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-4299	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 21771 ENGINEER MATTHEW B. COPPLE

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 18442 ENGINEER RICHARD LEON BOLLINGER, JR.

NC GRID NAD 83/95

488.57'
S61°12'55"W

96.41'
N35°20'24"W

55.04'
N21°23'23"W

N31°08'44"W
3.86'

98.29'
N57°07'47"E

100.47'
N52°15'36"E

99.51'
N47°48'57"E

99.19'
N42°17'53"E

219.31'(TOTAL)
S48°37'48"E

199.50'
N39°08'48"W

278.43'
N39°53'20"W

10

15

PRIVATE ACCESS EASEMENT BM 1993 PG 1174

NORFOLK SOUTHERN R.R.

R=1350.00'
L=449.70'
CHORD=N 25° 02' 56" W
449.70'

COC PROPERTIES, INC.
DB 5859 PG 269
BM 1933 PG 1074

BANNISTER PROPERTIES
DB 4823 PG 107

BANNISTER PROPERTIES
DB 4823 PG 107

-DET-
PI Sta 15+08.60
Δ = 16° 16' 44.3" (LT)
D = 3° 57' 05.2"
L = 411.98'
T = 207.39'
R = 1,450.00'

POT -DET- Sta. 10+00.00

BEGIN CONSTRUCTION
-L- STA. 11+72.00

PC-DET- Sta. 13+01.22

POT -DET- Sta. 17+50.09

PT -DET- Sta. 17+13.20

EXISTING R/W

N 59° 11' 56.2" E

N 42° 55' 11.9" E

18" CONC

INV=280.21

INV=281.34

INV=283.09

TOP=284.25

INV=280.54

INV=280.59

INV=284.58

INV=286.79

INV=281.71

INV=284.28

INV=287.98

INV=287.05

INV=286.77

INV=286.22

INV=286.05

TOP=289.71

TOP=284.15

TOP=284.45

TOP=287.03

TOP=289.05

12"

15"

8"R

RETAIN

200' TAPER

2GI (9)

END PSRM +25

BEGIN PSRM +50

54.2'

REMOVE DI
CONSTRUCT 2GI / TBJB
SEE DETAIL 2-K

END CONSTRUCTION
STA. 17+02.00 -DET-

GPS 84299-4
ELEV. 297.26'

GPS 84299-3
ELEV. 287.23'

RM#1
ELEV. 290.54'
R/R SPIKE SET
IN 12" PINE

42" PLASTIC RAIL

RIP RAP

INACCESSIBLE

WOODS

POST & WIRE

ACCESS/EGRESS EASEMENT DB 4706 PG 1452

13.88' R/W TO EIP

0.60' EIP TO R/W

0.53' R/W MON TO R/W

0.64' R/W MON. TO R/W

28.61' R/W MON

S15°24'58"E
125.80'

S15°24'58"E

S42°03'12"E
283.35'

S42°03'12"E
18.09'

S34°57'18"W
227.18'

S16°41'45"E
197.42'

S36°15'W
195.58'

S42°22'22"E
238.64'

N66°58'02"W
244.82'

285.58'

W. H. & FONNIE J. ADAMS
DB 1372 PG 35
BM 1957 PG 20

WILLIAM H. ADAMS
DB 6459 PG 30
BM 1957 PG 20

WILLIAM H. ADAMS
BM 1957 PG 20

BANNISTER 1995 FAMILY LIMITED PARTNERSHIP
DB 6718 PG 631
BM 1958 PG 7

DORTHY W. PAGE
DB 9506 PG 1462

CLYDE E. & PATRICIA F. SIMMONS
DB 5173 PG 91

LEGEND

MILLING AND OVERLAY

FULL DEPTH PAVEMENT SECTION

PSRM - PERMANENT SOIL REINFORCED MATTING

TRANSITE CONSULTING
ENGINEERS, INCORPORATED
1300 Paddock Drive, Suite G-10
Raleigh, N.C. 27609

RAMEY KEMP & ASSOCIATES, INC.
TRANSPORTATION ENGINEERS
4839-A Westy Hill Drive
Raleigh, North Carolina 27609
919-872-3115 tel. 919-878-3419 fax www.rameykemp.com

PROJECT REFERENCE NO.	SHEET NO.
B-4299	6

ROADWAY DESIGN ENGINEER
SEAL 27771
MATTHEW B. COPPLE

HYDRAULICS ENGINEER
SEAL 18442
RICHARD LEON BOLLINGER, JR.

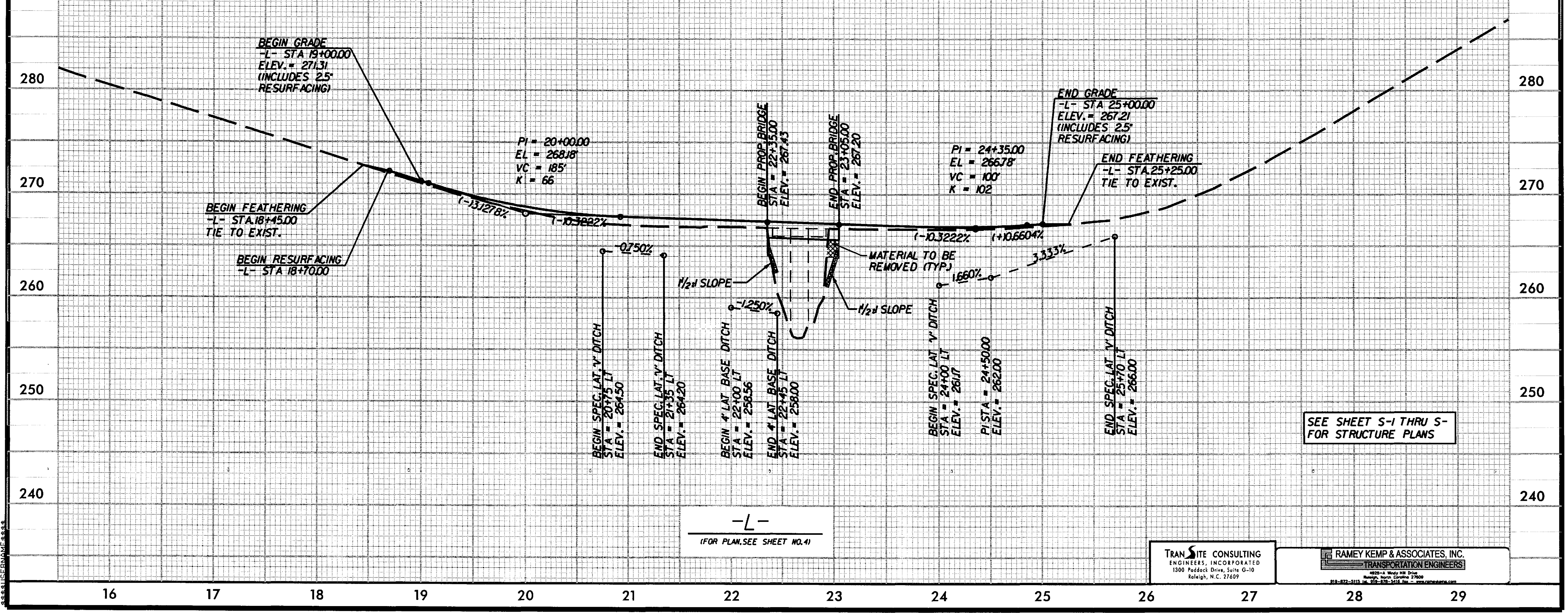
B.M.#203 ELEV.= 264.75
RR SPIKE IN BASE OF
42" SWEET GUM
30.00' LT. OF -BL- STA. 16+55.48
27.50' LT. OF -L- STA. 22+19.25

B.M.#204 ELEV.= 289.46
RR SPIKE IN BASE OF
14" SWEET GUM
14.00' LT. OF -BL- STA. 22+72.47
38.03' LT. OF -L- STA. 28+42.61

DITCH LEGEND
– – – – DITCH GRADE LT

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	1600 CFS
DESIGN FREQUENCY	=	25 YRS
DESIGN HW ELEVATION	=	265.9 FT.
BASE DISCHARGE	=	1900 CFS
BASE FREQUENCY	=	100 YRS
BASE HW ELEVATION	=	266.3 FT
OVERTOPPING DISCHARGE	=	2300 CFS
OVERTOPPING FREQUENCY	=	200+/-YR.
OVERTOPPING ELEVATION	=	266.75 FT
DATE OF SURVEY		4-20-04
W.S. ELEVATION AT DATE OF SURVEY	=	256.76 FT



SEE SHEET S-1 THRU S-
FOR STRUCTURE PLANS

-L-
(FOR PLAN, SEE SHEET NO. 4)

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RAMEY KEMP & ASSOCIATES, INC.
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4928-A Windy Hill Drive
Raleigh, North Carolina 27609
919-872-5115 tel. 919-878-5416 fax - www.rameykemp.com

PROJ. REFERENCE NO.	SHEET NO.
B-4299	X-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CROSS-SECTION SUMMARY

NOTE: EMBANKMENT COLUMN INCLUDES BACKFILL FOR UNDERCUT

Station	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
-L-		
18+45.00	0	0
19+00.00	45	1
19+50.00	80	1
20+00.00	70	2
20+50.00	38	7
21+00.00	33	17
21+50.00	31	27
22+00.00	12	107
22+35.00 (BEG. BRIDGE)	6	64
23+05.00 (END BRIDGE)	6	64
23+50.00	11	111
24+00.00	40	182
24+50.00	56	105
25+00.00	36	47
25+25.00	0	0
TOTAL	464	735

Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for "Grading."

RAMEY KEMP & ASSOCIATES, INC.
TRANSPORTATION ENGINEERS
www.rameykemp.com

PROJECT REFERENCE NO.	SHEET NO.
B-4299	X-2

70 60 50 40 30 20 10 ℄ -L- 10 20 30 40 50 60 70

280
270

2.40 %
4.40 %

EP
EP

STA. 18+50
EL. 272.67

BEGIN PROJECT -L- STA. 18+45.00

280
270

EP
EP

STA. 18+00
EL. 274.25

280
270

EP
EP

STA. 17+50
EL. 275.84

70 60 50 40 30 20 10 ℄ -L- 10 20 30 40 50 60 70

$$$$$$$SYSTIME$$$$$
$$$$$$$SYSDATE$$$$$
$$$$$$$DGNFILE$$$$$
$$$$$$$DGNNAME$$$$$
$$$$$$$DGNUSER$$$$$
$$$$$$$DGNLEVEL$$$$$
$$$$$$$DGNSCALE$$$$$
$$$$$$$DGNSIZE$$$$$
$$$$$$$DGNORIGIN$$$$$
$$$$$$$DGNDELTA$$$$$
$$$$$$$DGNROTATION$$$$$
$$$$$$$DGNVIEWS$$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-4299	X-3

70 60 50 40 30 20 10 ℄ -L- 10 20 30 40 50 60 70

280 270 260

G.P. = 268.83

2:1 2.89 % 4.57 % 2:1

EP EP

STA. 20+00
EL. 268.44

280 270 260

G.P. = 269.88

2:1 2.78 % MATCH EXIST 5.80 % MATCH EXIST 4:1 2:1

EP EP

STA. 19+50
EL. 269.68

280 270 260

G.P. = 271.31

2.50 % MATCH EXIST 5.30 % MATCH EXIST 4:1 2:1

EP EP

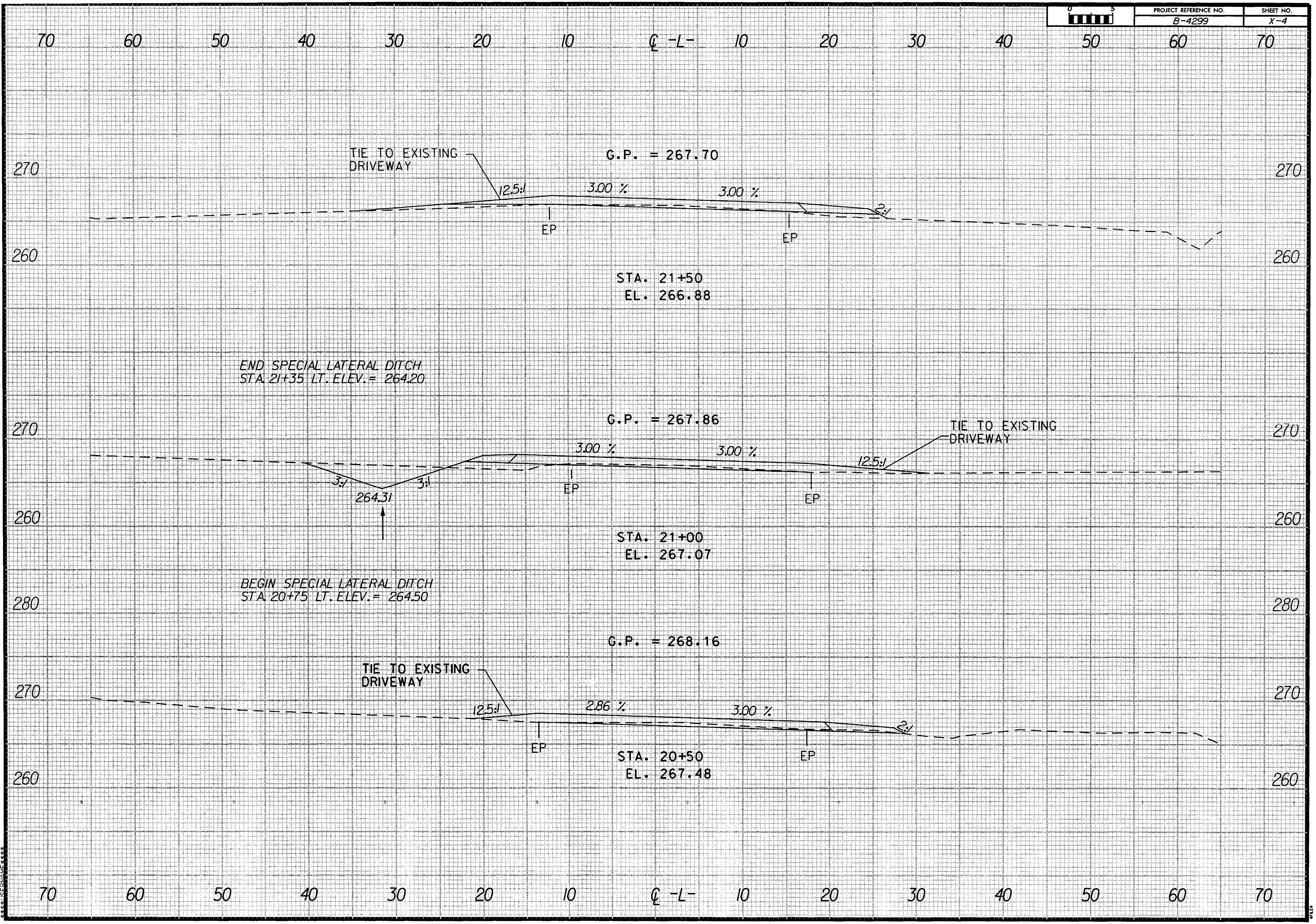
STA. 19+00
EL. 271.10

70 60 50 40 30 20 10 ℄ -L- 10 20 30 40 50 60 70

$$$$$$$$SYSTIME$$$$$$
$$$$$$$$SYSNAME$$$$$$
$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$$$DGNNAME$$$$$$

PROJECT REFERENCE NO. B-4299

SHEET NO. X-4



PROJECT REFERENCE NO.	SHEET NO.
B-4299	X-5

70 60 50 40 30 20 10 ℄ -L- 10 20 30 40 50 60 70

270

260

G.P. = 267.05

3.00 %

3.00 %

2:1

2:1

EP

EP

STA. 23+50
EL. 266.69

END BRIDGE STA. 23+05.00

G.P. = 267.22

EP

EP

STA. 23+00
EL. 266.75

BEGIN BRIDGE STA. 22+35.00

END 4' LATERAL BASE DITCH
STA. 22+45 LT. ELEV. = 258.00

G.P. = 267.54

3.00 %

3.00 %

2:1

2:1

EP

EP

STA. 22+00
EL. 266.89

3:1

3:1

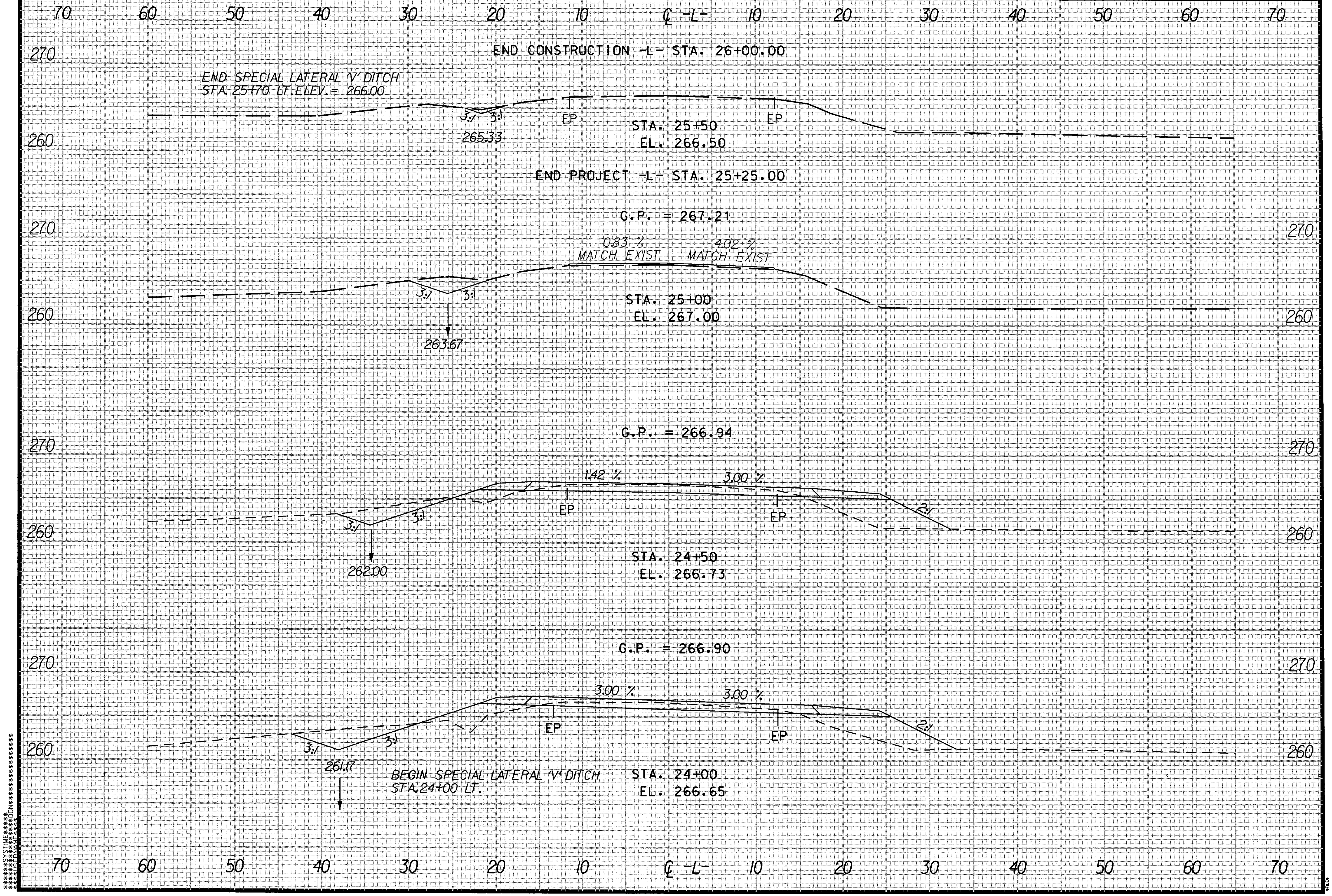
258.56

BEGIN 4' LATERAL BASE DITCH
STA. 22+00 LT. ELEV. = 258.56

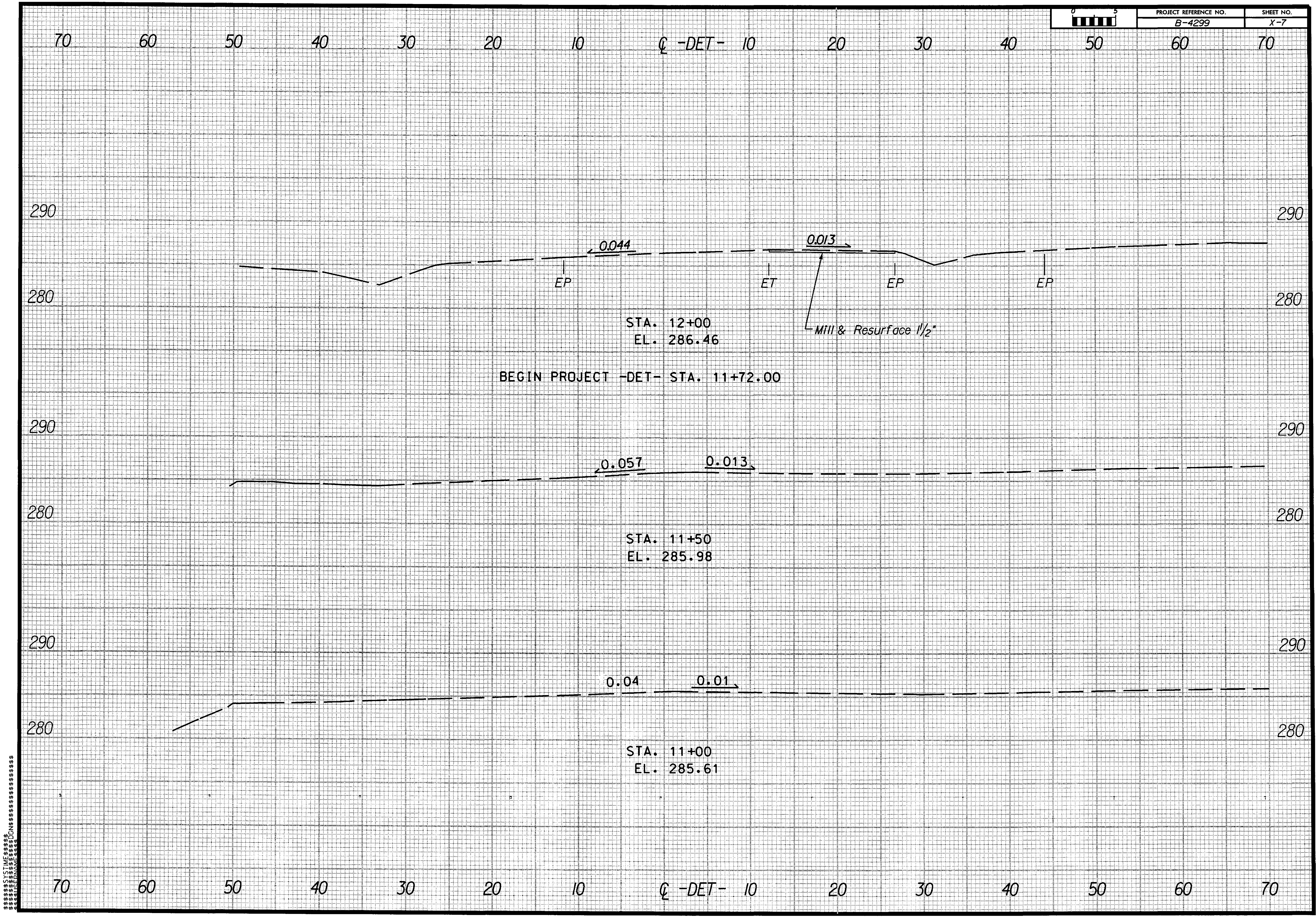
70 60 50 40 30 20 10 ℄ -L- 10 20 30 40 50 60 70

$$$$$$$$SYSTIME$$$$$$
$$$$$$$$SSDESIGN$$$$$$$$$$$$$$$$$$$$
$$$$$$$$CADNAME$$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-4299	X-6



PROJECT REFERENCE NO.	SHEET NO.
B-4299	X-7



0 5	PROJECT REFERENCE NO.	SHEET NO.
	B-4299	X-8

70 60 50 40 30 20 10 ℄ -DET- 10 20 30 40 50 60 70

290
280

0.077 0.083 0.033 2:1

EP ET EP EP

STA. 13+50
EL. 288.61

Mill & Resurface 1½"

290
280

0.062 0.066 0.04

EP ET EP EP

STA. 13+00
EL. 287.91

Mill & Resurface 1½"

290
280

0.057 0.052 0.02

EP ET EP EP

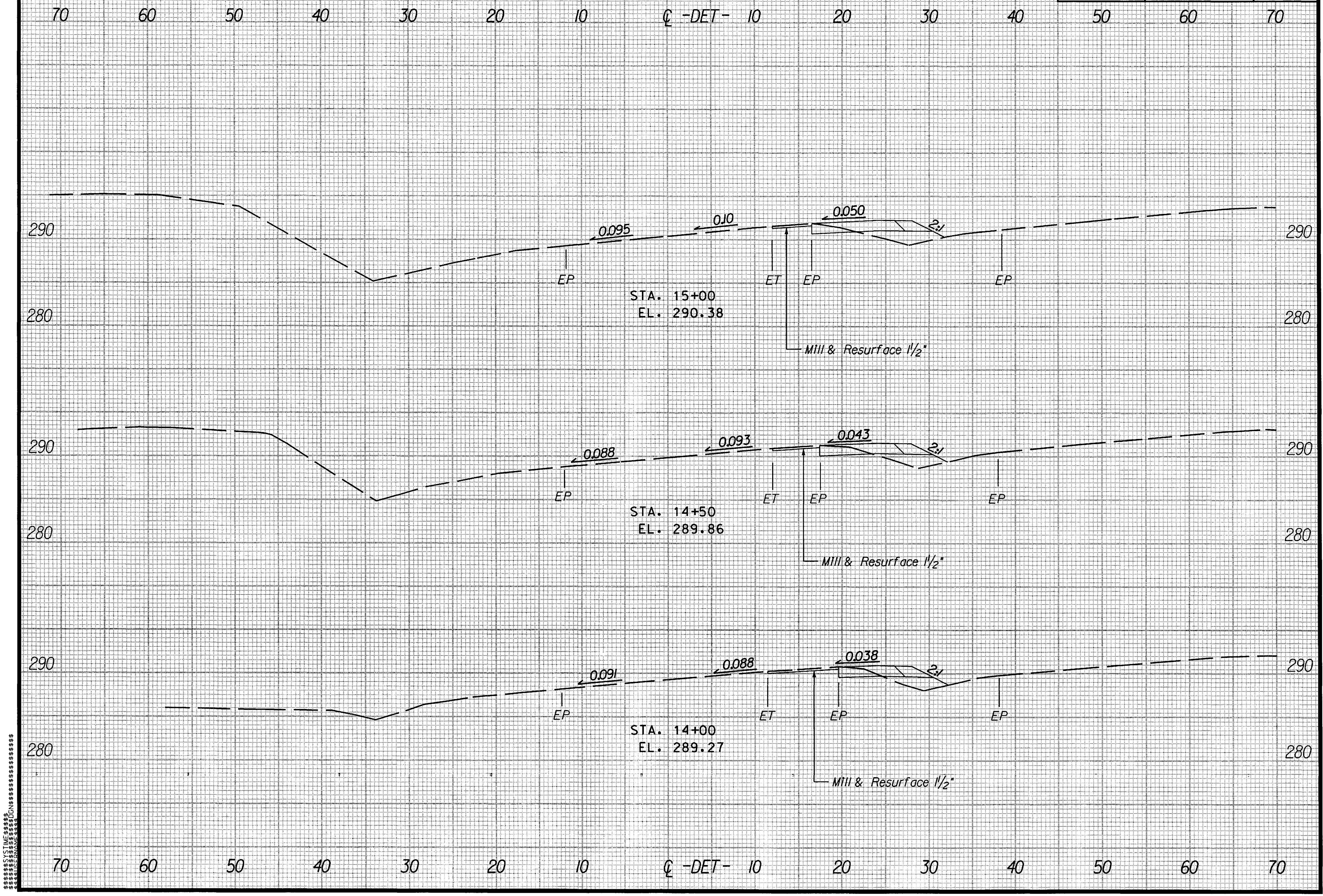
STA. 12+50
EL. 287.16

Mill & Resurface 1½"

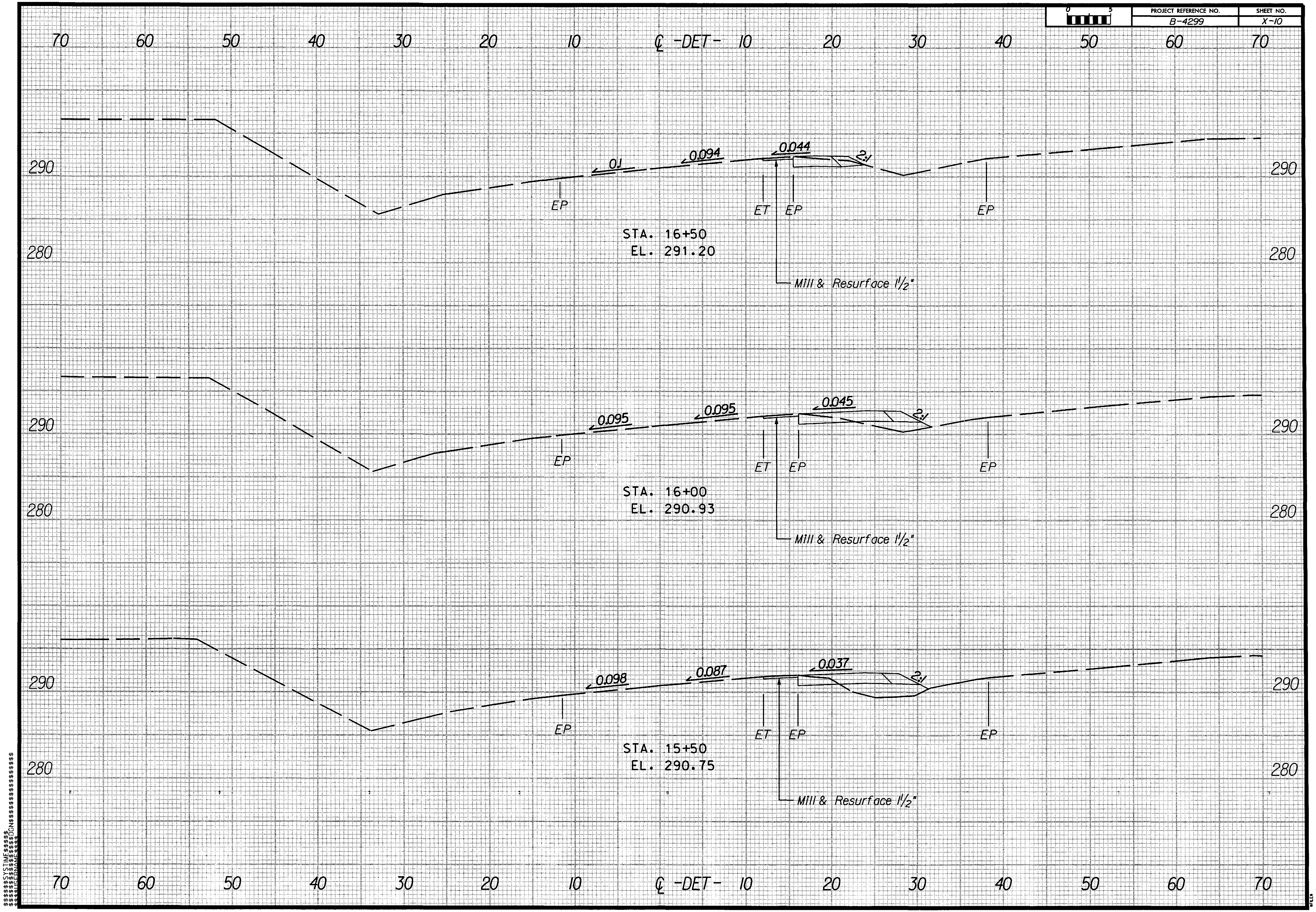
70 60 50 40 30 20 10 ℄ -DET- 10 20 30 40 50 60 70

$$$$$$$SYSTIME$$$$$
$$$$$$$USERNAME$$$$$
$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$$RFS$$$$$$$$$$$$$$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-4299	X-9



PROJECT REFERENCE NO.	SHEET NO.
B-4299	X-10



PROJECT REFERENCE NO.	SHEET NO.
B-4299	X-11