STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

April 3, 2007

U. S. Army Corps of Engineers
Regulatory Field Office
6508 Falls of the Neuse Road, Suite 120
Raleigh, NC 27615

ATTENTION: Mr. Monte Matthews
NCDOT Coordinator

SUBJECT: **Application for Regional General Permit 31 and Section 401 Water Quality Certification** for the proposed replacement of Bridge No. 90 over Gunpowder Creek on SR 1718 (Deal Mill Road) in Caldwell County. NCDOT Division 11, Federal Aid Project No. BRZ-1718(3), State Project No. 8.2732701, TIP No. B-3126. $475.00 Debit Work Order 8.2732701, WBS Element 32880.1.1.

Dear Sir:

Please see the enclosed Pre-Construction Notification (PCN), Ecosystem Enhancement Program (EEP) mitigation acceptance letter, U.S. Fish and Wildlife Service (USFWS) Biological Opinion (2003), USFWS Amended Biological Opinion (2006), Monitoring Plan for Natural Stream Design, permit drawings, design plans and Categorical Exclusion (CE) for the above referenced project. The North Carolina Department of Transportation (NCDOT) proposes to replace the 111-foot, three span Bridge No. 90, northwest of the existing alignment, with a new 160-foot, 54-inch pre-stressed girder bridge that will span Gunpowder Creek. The existing road curves at the bottom of a steep hill with poor horizontal alignment on the south approach and poor vertical alignment in both directions. The proposed bridge and approaches will provide an improved alignment, thereby enhancing safety at the bridge location. During construction, traffic will be

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1548 MAIL SERVICE CENTER
RALEIGH NC 27699-1548

TELEPHONE: 919-733-3141
FAX: 919-733-9794

WEBSITE: WWW.NCDOT.ORG

LOCATION:
PARKER LINCOLN BUILDING,
2728 CAPITAL BLVD., SUITE 240
RALEIGH NC 27604

maintained on the existing bridge for as long as practicable. For the remainder of the construction period, an off-site detour on existing roads will be used. The new alignment of the road is going to impact an unnamed tributary to Gunpowder Creek (UT1) for a total of 350 linear feet of permanent stream impacts. There will be a total of 0.05 acre of temporary impacts associated with a temporary causeway for pier construction, removal of existing piers and the realignment of UT1 into the Natural Stream Design. There are no jurisdictional wetlands within the project study area.

IMPACTS TO WATERS OF THE UNITED STATES

General Description:
The water resources impacted for project B-3126 are Gunpowder Creek and UT1. Gunpowder Creek is located in the Catawba River Basin (Division of Water Quality (DWQ) subbasin 03-08-32), and is approximately 45 feet wide and one foot deep within the project study area. The DWQ Index number for this section of Gunpowder Creek is 11-55-(1.5) and the Hydrological Cataloguing Unit is 03050101. The North Carolina Department of Environmental and Natural Resources classifies Gunpowder Creek and UT1 as Class WS-IV. There are no High Quality Waters (HQW), Water Supplies (WS-I or WSII), or Outstanding Resource Waters (ORW) within one mile of the project study area.

Permanent Impacts:
There will be 350 linear feet of permanent stream impacts to UT1 as a result of realignment of the road. UT1 will be realigned northwest of its existing location and then tied back into the existing stream.

Temporary Impacts:
There will be 0.02 acre of temporary stream impacts associated with a temporary causeway in Gunpowder Creek. This causeway will be used to construct pier no. 2 of the new bridge. There will be an additional 0.01 acre of temporary impacts associated with the removal of the existing piers in Gunpowder Creek. There will also be 0.02 acre of temporary impacts associated with the realignment of UT1 into the Natural Stream Design. The temporary causeway will be removed once the construction is complete. The stream and banks will then be restored to their original condition. The temporary stream impacts combined total 0.05 acre.

Utility Impacts:
There will be no jurisdictional impacts associated with relocation of utility lines on the project site. In addition, there will be no relocation of water or sewer lines due to the construction on this project site.

Schedule:
The project schedule calls for a July 17, 2007 LET date with a date of availability on August 28, 2007.

BRIDGE DEMOLITION

The existing bridge is composed of an asphalt overlay wearing surface on a steel plank floor on steel I-beams. The end and interior bents are timber caps and posts with concrete sills. The deck of the existing bridge is 28 feet above the stream bed. Bridge components are slated to be removed without dropping any components into Gunpowder Creek. However, due to the presence of asphalt overlay in the superstructure of the bridge, the potential exists for approximately 18 cubic yards of temporary fill requiring excavation from Gunpowder Creek as a result of demolition activities. All guidelines for bridge demolition and removal will be followed in addition to Best Management Practices (BMPs) for the Protection of Surface Waters and BMPs for Bridge Demolition and Removal.

FEDERALLY PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE) and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of December 11, 2006, the United States Fish and Wildlife Service (USFWS) lists five federally protected species for Caldwell County (**Table 1**).

Table 1. Federally Protected Species for Caldwell County.

Common Name	Scientific Name	Status	Survey Notes	Biological Conclusion
Bog turtle	*Clemmys muhlenbergii*	T(S/A)	No Habitat	No Effect
Spruce-fir moss spider	*Microhexura montivaga*	E	No Habitat	No Effect
Virginia big-eared bat	*Plecotus townsendii virginianus*	E	No Habitat	No Effect
Dwarf-flowered heartleaf	*Hexastylis naniflora*	T	Habitat and Plants Present	May Affect, Likely to Adversely Affect
Heller's blazing star	*Liatris helleri*	T	No Habitat	No Effect

One of the five species listed above, the Dwarf-flowered heartleaf, is present within the project area. A Biological Opinion (BO), dated September 23, 2003 and Amended BO, dated May 24, 2006 have been rendered by the USFWS (see attached). The commitments in the Amended BO include the acquisition of additional right of way in the northeast quadrant of the project area in order to permanently protect a portion of the Dwarf-flowered heartleaf population in that quadrant. In addition, a temporary staff position will be funded (as compensatory mitigation) for 2 months to assist the USFWS Recovery Coordinator with the 5-year status review for Dwarf-flowered heartleaf.

AVOIDANCE, MINIMIZATION AND MITIGATION

Avoidance and Minimization:
Avoidance examines all appropriate and practicable possibilities of averting impacts to "Waters of the United States." The NCDOT is committed to incorporating all reasonable

and practicable design features to avoid and minimize jurisdictional stages; minimization measures were incorporated as part of the project design. The use of best management practices for construction should reduce impacts to plant communities.

- The entire stream is being spanned by the new bridge, therefore eliminating any permanent impacts to Gunpowder Creek.
- The existing bridge is being used to maintain traffic as long as possible, then an off-site detour will be utilized until the new bridge is complete. This eliminates the need for a temporary on-site detour.
- Water will not be directly discharged into Gunpowder Creek via deck drains.

In addition, Best Management Practices will be followed as outlined in "NCDOT's Best Management Practices for Construction and Maintenance Activities".

Mitigation:
NCDOT is performing Natural Stream Design along 315 linear feet of UT1 and then tying it back into the existing channel. (Please see attached Natural Channel Design plans.) This will compensate for 315 linear feet of permanent impacts to UTI, leaving 35 linear feet remaining which will be mitigated for by EEP. (Please see attached Mitigation Acceptance Letter dated March 13, 2006.)

REGULATORY APPROVALS

Section 404 Permit:
It is anticipated that the bridge replacement, including construction of the temporary causeway, removal of the existing piers, relocation of the UT and tie-in of the natural stream design will be authorized under Section 404 Regional General Permit (RGP) No. 31 (NCDOT Bridges). We are therefore requesting the issuance of RGP 31 authorizing the activities associated with this project in accordance with Section 10 of the Rivers and Harbors Act of March 3, 1899 (33 U.S.C. 403), and Section 404 of the Clean Water Act (33 U.S.C. 1344).

Section 401 Permit:
In compliance with Section 143-215.D9(e) of the NCAC, we will provide $475.00 to act as payment for processing the Section 401 (General Certification Number 3404) permit application previously noted in this application (see Subject line). We are providing five copies of this application to the North Carolina Department of Environmental and Natural Resources, Division of Water Quality, for their review.

We also anticipate that comments from the North Carolina Wildlife Resources Commission (NCWRC) will be required prior to authorization by the Corps of Engineers. By copy of this letter and attachment, NCDOT hereby requests NCWRC review. NCDOT requests that NCWRC forward their comments to the Corps of Engineers and the NCDOT within 30 calendar days of receipt of this application.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Erin Schubert at ekschubert@dot.state.nc.us or (919) 715-5529.

Sincerely,

E. L. Lusk

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

cc:
w/attachment

Mr. John Hennessy, NCDWQ (5 Copies)
Ms. Marla Chambers, NCWRC
Ms. Marella Buncick, USFWS
Dr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Greg Perfetti, P.E., Structure Design
Mr. Michael A. Pettyjohn, P.E. Division 11 Engineer
Mr. Heath Slaughter, Division 11 Environmental Officer

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. Dennis Pipkin, P.E., PDEA Project Planning Engineer
Mr. Scott McLendon, USACE, Wilmington
Ms. Beth Harmon, EEP
Mr. Todd Jones, NCDOT External Audit Branch

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: GP 31

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
   Telephone Number: (919) 733-3141 Fax Number: (919) 733-9794
   E-mail Address: ekschubert@dot.state.nc.us

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

III. Project Information

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

1. Name of project: Bridge No. 90 over Gunpowder Creek on SR 1718 (Deal Mill Road)

2. T.I.P. Project Number or State Project Number (NCDOT Only): B-3126

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

4. Location
   County: Caldwell Nearest Town: Granite Falls
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers/names, landmarks, etc.):

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 50'38.22" °N -81 26'10.25" °W

6. Property size (acres): N/A

7. Name of nearest receiving body of water: Catawba River

8. River Basin: Catawba River Basin
   (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: 50% wooded, 50% farmland

10. Describe the overall project in detail, including the type of equipment to be used:
    Standard construction equipment will be used (backhoes, bulldozers, cranes and/or other heavy machinery)

11. Explain the purpose of the proposed work: The purpose of the project is to replace a functionally and structurally obsolete structure (sufficiency rating 32.4 out of 100) and improve the alignment of the road at the bridge crossing.

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:Temporary: 0.02 acre (48 linear feet) of impact due to natural stream design tie-in, 0.02 acre (66 linear feet) of impact due to temporary causeway for construction of pier no. 2, and 0.01 acre (31 linear feet) of impact due to removal of the existing piers (for a total of 0.05 acre of temporary stream impacts). Permanent: 350 linear feet of stream impact to UT1.

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)
No Wetlands					
Total Wetland Impact (acres)					

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

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

Stream Impact Number (indicate on map)	Stream Name	Type of Impact	Perennial or Intermittent?	Average Stream Width Before Impact	Impact Length (linear feet)	Area of Impact (acres)
Site 1	Gunpowder Creek	Temporary	Perennial	45 ft.	48	0.02
Site 2	Gunpowder Creek	Temporary	Perennial	45 ft.	66	0.02
Site 3	UT1	Permanent	Perennial	2 ft	350	0.02
Site 4	Gunpowder Creek	Temporary	Perennial	45 ft.	31	0.01
Total Permanent Stream Impact (by length and acreage)					350	0.02

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)
No open water impacts				
Total Open Water Impact (acres)				

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

Stream Impact (acres):	0.05 (temp) 0.02 (permanent)
Wetland Impact (acres):	0
Open Water Impact (acres):	0
Total Impact to Waters of the U.S. (acres)	0.05 (temp) 0.02 (permanent)
Total Stream Impact (linear feet):	145 (temp) 350 (permanent)

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

8. Pond Creation
   If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.
   Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands
   Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.):_____
   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. The entire stream is being spanned by the new bridge, thus eliminating permanent impacts to Gunpowder Creek. The existing bridge will be used to maintain traffic as long as possible, then an off-site detour will be utilized until the new bridge is complete, thus eliminating the need for a temporary on-site detour. No deck drains will be used and NCDOT's Best Management Practices will be followed.

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.
   315 linear feet of stream will be mitigated for on-site through natural stream design for UT1. EEP will be handling mitigation of the remaining 35 linear feet of permanent impacts 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): 35
   Amount of buffer mitigation requested (square feet): 0
   Amount of Riparian wetland mitigation requested (acres): 0
   Amount of Non-riparian wetland mitigation requested (acres): 0
   Amount of Coastal wetland mitigation requested (acres): 0

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		3 (2 for Catawba)	
2		1.5	
Total			

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

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

XI. Stormwater (required by DWQ)

Describe impervious acreage (existing and proposed) versus total acreage on the site. Discuss stormwater controls proposed in order to protect surface waters and wetlands downstream from the property. If percent impervious surface exceeds 20%, please provide calculations demonstrating total proposed impervious level. Impervious surfaces will not significantly increase as a result of this project. There will be no deck drains installed.

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:
The new bridge will be constructed very near the old bridge.

XV. Other Circumstances (Optional):

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

E. L. Lusk 4.3.07

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

Ecosystem Enhancement PROGRAM

March 13, 2006

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

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

B-3126, Bridge Number 90 over Gunpowder Creek on SR 1718**,** Caldwell County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream mitigation for the subject project. Based on the information supplied by you in a letter dated February 22, 2006, the impacts are located in CU 03050101 of the Catawba River Basin in the Northern Mountains (NM) Eco-Region, and are as follows:

Stream: 35 feet

Mitigation for this project will be provided in accordance with the Memorandum of Agreement between the N. C. Department of Environment and Natural Resources, the N. C. Department of Transportation, and the U. S. Army Corps of Engineers. EEP will commit to implementing sufficient compensatory stream mitigation to offset the impacts associated with this project by the end of the MOA year in which this project is permitted, in accordance with Section X of the Tri-Party MOA. If the above referenced impacts amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

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

Sincerely,

James B. Stanfill Jr.

William D. Gilmore, P.E.
EEP Director

cc: Mr. John T. Thomas, Jr., USACE-Raleigh
Mr. John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: B-3126

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Asheville Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

September 23, 2003

Mr. John F. Sullivan, III
Division Administrator
Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, North Carolina 27601

Subject: Replacement of Bridge No. 90 on SR 1718 over Gunpowder Creek in Caldwell County, North Carolina, Federal Aid No. BRZ-1718 (3), TIP No. B-3126

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) based on our review of the replacement of Bridge No. 90 on SR 1718 over Gunpowder Creek located in Caldwell County, North Carolina, and its effects on the federally threatened dwarf-flowered heartleaf (*Hexastylis naniflora*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) (Act). We received your May 30, 2003, request for formal consultation on June 3, 2003.

This Opinion is based on information provided in the May 2003 biological assessment, field investigations, and other sources of information. A complete administrative record of this consultation is on file in our office.

CONSULTATION HISTORY

In May 2001 we were notified by telephone that the dwarf-flowered heartleaf had been found in the construction footprint of the subject proposed bridge replacement project. On June 13, 2001, a member of our staff met in the field with the North Carolina Department of Transportation (NCDOT), where alternatives for minimizing impacts to *Hexastylis naniflora* were explored. On October 18, 2001, we met with the NCDOT in Raleigh to discuss further efforts to minimize impacts by exploring varying design and construction techniques.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The NCDOT proposes to replace the existing 111-foot-long two-lane Bridge No. 90 (completed in 1965) over Gunpowder Creek in Caldwell County, North Carolina. Current horizontal alignment of the roadway at the south end of the existing bridge is considered poor, and the vertical alignment is very poor in both directions. The replacement two-lane bridge will be approximately 160 feet long, on an improved alignment.

The proposed project will intersect a population of the dwarf-flowered heartleaf consisting of approximately 130 plants; approximately 60 plants will be directly impacted by the project. The population occurs along Gunpowder Creek, on both banks, on the west side of SR 1718. Subpopulation A, located southwest of the bridge, has approximately 80 plants, and Subpopulation B, located directly adjacent to SR 1718 and northwest of the bridge, has approximately 50 plants. No secondary impacts are expected because the replacement bridge will not increase accessability to adjacent parcels.

The NCDOT evaluated three alternatives to avoid or minimize impacts to the dwarf-flowered heartleaf, including: (1) doing nothing, (2) Alternate One, replacing the bridge at the existing location, (3) Alternate Two, minimizing fill slopes and cuts along a new alignment west of the existing roadway. Impacts to the dwarf-flowered heartleaf were considered, along with safety concerns, community impacts, and engineering and construction costs. Alternate Two is the recommended alternative.

In the May 2003 biological assessment, the NCDOT proposed to offset project-related impacts by avoiding impacts to 20 plants within the existing right-of-way and purchasing additional right-of-way to include the remainder of Subpopulation A for protection in perpetuity. This conservation area is the least disturbed habitat for the dwarf-flowered heartleaf on Gunpowder Creek and contains approximately 50 of the most vigorous plants. The NCDOT also plans to regrade and revegetate the existing bridge area after the structure is removed, which could provide future habitat for *H. naniflora*.

STATUS OF THE SPECIES AND ITS CRITICAL HABITAT

Species Description and Life History

Hexastylis naniflora is a low-growing herbaceous plant in the birthwort family (Aristolochiaceae). Blomquist (1957) described the species in his revision of the genus *Hexastylis*. The plant's heart-shaped dark green leaves are evergreen and leathery and are supported by long thin petioles from a subsurface rhizome. Maximum height rarely exceeds

15 centimeters (6 inches). The jug-shaped flowers are usually beige to dark brown in color and appear from mid-March to early June. The flowers are small and inconspicious and are found near the base of the petioles. The fruit matures from mid-May to early July (Blomquist 1957; Gaddy 1980, 1981). *Hexastylis naniflora* grows in acidic soils, usually along north-facing bluffs and adjacent slopes and in floodplains next to streams and creek heads in the upper Piedmont Region of North Carolina and South Carolina. It is most often found on Madison and Pacolet soils and is frequently associated with *Kalmia* (laurel). Its small flower distinguishes this species from other members of the genus *Hexastylis*.

Thrips (sucking insects) and flies are the major pollinators of most plant species in the genus *Hexastylis*. As yet, the pollination method for dwarf-flowered heartleaf is unproven, but biologists speculate that it may use the same method as its related species. With most *Hexastylis* species, the vectors--flies and thrips--spend most of their lives in the plant's flower tissues and feed on pollen grains or on portions of the plant's outer skin. Once the flowers have been fertilized, their seeds are distributed by ants. These ants eat the coating of the seeds and leave the seeds near the plant site or by the ant nest. Seed germination takes place in the spring after the seeds have been exposed to cool temperatures. Germination in the dwarf-flowered heartleaf generally occurs in clusters. Some flowering *Hexastylis* plants, probably including the heartleaf, do not reach flowering age for 7 to 10 years. The plant's flowering period is mid-March to early June; fruit production begins in mid- to late May, and buds come in late July and develop by October. In the buds are next spring's flowers, and next year's leaf will not grow until the plant flowers again.

Status and Distribution

The dwarf-flowered heartleaf was listed as a threatened species on April 14, 1989 (54 FR 14964), under the authority of the Act. No critical habitat has been designated. Threats to the species at the time of listing included residential and industrial development, conversion of its habitat to pasture or small ponds, timber harvesting, and cattle grazing. When the Service listed *Hexastylis naniflora*, 24 populations were known in an eight-county area of the upper Piedmont Region of North Carolina and adjacent South Carolina. Since listing, the number of known extant dwarf-flowered heartleaf sites has increased from 24 to approximately 124, and the estimated number of known individuals has increased from about 5,900 to more than 198,000 (North Carolina Natural Heritage Program, in litt.; South Carolina Department of Natural Resources, in litt.; G. Newberry, University of South Carolina at Spartanburg, in litt.; North Carolina Department of Transportation, in litt.). The known species' range has also been expanded to include Polk and Caldwell Counties, North Carolina. The documented *Hexastylis naniflora* distribution is comprised of 17 sites (14 percent) with more than 1,000 individual plants each, 8 sites (7 percent) with more than 500 plants, and 42 sites (34 percent) with more than 100 plants. Twenty-four sites (19 percent) have greater than 50 but fewer than 100 plants, and 19 sites (15 percent) have fewer than 50 plants. Fourteen sites (11 percent) have no size estimates.

Analysis of the Species Likely to be Affected

The project area, including the expanded right-of-way conservation area, contains about 130 dwarf-flowered heartleaf plants. There are 60 dwarf-flowered heartleaf plants within the proposed footprint of the project that will be adversely impacted by bridge construction and approach realignment. The remaining 70 plants are located outside the area needed for construction and will not be impacted by this project. The project area contains about 0.06 percent of the known individuals of *Hexastylis naniflora*; approximately 0.03 percent of the total known individuals of *Hexastylis naniflora* will be adversely impacted by the subject bridge replacement.

ENVIRONMENTAL BASELINE

Under section 7(a)(2) of the Act, when considering the effects of an action on federally listed species, we are required to take into consideration the environmental baseline. The environmental baseline includes past and ongoing natural factors and past and present impacts from all federal, state, or private actions and other activities in the action area (50 CFR 402.02), including federal actions in the area that have already undergone section 7 consultation and the impacts from state or private actions that are contemporaneous with the consultation in progress.

Status of the Species Within the Action Area

The project area contains approximately 0.06 percent of the known individuals of *Hexastylis naniflora*. Construction will impact 46 percent of the total number of plants in the project area; the remainder of the plants will be preserved in perpetuity. There are no other federal actions ongoing or proposed for the action area at the present time.

Factors Affecting the Species' Environment Within the Action Area

The habitat in the project area has been impacted by clearing at a pasture edge and by cattle grazing. Along its eastern edge, Subpopulation A has been impacted by cutting the large trees at the top of the slope and pushing them down the slope, effectively covering the slope in dense brush. Few individuals (10<) of *H. naniflora*. occur in this area. In addition, the majority of these plants were not flowering, most likely due to the dense brush cover. Subpopulation B is somewhat affected by cattle grazing.

EFFECTS OF THE ACTION

Under section 7(a)(2) of the Act, "effects of the action" refers to the direct and indirect effects of an action on the species or its critical habitat, together with the effects of other activities that are interrelated or interdependent with that action. Under section 7 of the Act, the federal agency is

responsible for analyzing these effects. The effects of the proposed action are added to the environmental baseline to determine the future baseline, which serves as the basis for the determination in this Opinion. Should these effects of the federal action result in a situation that would jeopardize the continued existence of the species, we may propose reasonable and prudent alternatives that the federal agency can take to avoid violation of section 7(a)(2) of the Act. The discussion that follows is our evaluation of the anticipated direct and indirect effects of implementing the proposed bridge replacement. Indirect effects are those caused by the proposed action that will occur later but that are still reasonably certain to occur (50 CFR 402.02). We have determined that there are no interrelated or interdependent actions apart from the action under consideration.

Factors to be Considered

The proposed bridge replacement will provide a safer bridge crossing and roadway for the local traveling public. The life span of the new bridge is approximately 50 years. Although there are direct impacts to approximately 60 individuals of the dwarf-flowered heartleaf, the remainder of the plants on the site will be protected from future disturbance. The total number of known plants (more than 198,000) is not considered a limiting factor toward recovery of the species; rather, it is the protection of populations that is limiting the species' recovery. The NCDOT has recently purchased approximately 1,000 acres that contain more than 13,000 dwarf-flowered heartleaf plants to help meet recovery goals for this species.

Analyses of the Effects of the Action

Direct Effects: An estimated 46 percent (60 plants) of this dwarf-flowered heartleaf population will be lost to the proposed project, with a corresponding loss of habitat (approximately 1 acre). However, viability of the local dwarf-flowered heartleaf population in the action area can be maintained. Actions that will be taken to reduce impacts to the dwarf-flowered heartleaf include limiting the disturbance area and protecting additional habitat for the species. Specific actions to be carried out include:

1. Fill slopes and cuts along the new alignment would be kept to a minimum. Cut and fill slopes would be set at 2:1, the maximum allowed by soil standards in the area.

2. Storm-water discharge will be directed to the east side of the road to avoid discharge into Subpopulation A.

3. Construction limits in the area where the dwarf-flowered heartleaf is found would be limited to 5 feet outside the slope stakes.

4. Areas containing dwarf-flowered heartleaf plant, but not impacted by the project, will be clearly marked prior to any ground-disturbing activity on the site to assure construction does not affect those plants.

5. A Service biologist will attend the preconstruction meeting to discuss (a) the importance of avoiding the plants and (b) other environmental commitments on the project.

6. The area of the existing bridge will be regraded and revegetated to mimic adjacent conditions and provide future potential habitat for *H. naniflora* at that site.
7. The NCDOT will protect approximately 70 dwarf-flowered heartleaf plants within their right-of-way.

Indirect Effects: Because the proposed new alignment will not make adjacent parcels more accessible and because the NCDOT proposes to purchase the remainder of the intact dwarf-flowered heartleaf population, no indirect effects are expected to occur to the subject dwarf-flowered heartleaf population. Further, because only 60 of the estimated 198,000 known plants will be lost, no indirect negative effects should occur that would limit the species' recovery potential.

Species' Response to the Proposed Action

It is expected that this bridge replacement, with the protective measures described above, can be carried out with the loss of only 46 percent (60 plants) of one population of the dwarf-flowered heartleaf and not result in the loss of the entire population. The loss of 60 plants represents only three one-hundredths of one percent of the number of known plants, and the loss will not have negative effects on the recovery of the species. Although a great many of the plants and populations have been discovered since the species was listed, relatively few are afforded any protection. The purchase of the remainder of the population (an estimated 70 plants), coupled with other NCDOT conservation efforts for this species, will significantly contribute to the recovery of the species.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require a separate consultation pursuant to section 7 of the Act.

Because the NCDOT has agreed to purchase additional right-of-way that contains the remainder of the dwarf-flowered heartleaf population and has agreed to protect the population in perpetuity,

there are no state, tribal, local, or private actions reasonably certain to occur here within the future that would affect the dwarf-flowered heartleaf.

CONCLUSION

After reviewing the current status of *Hexastylis naniflora*, the environmental baseline for the action area, the effects of the proposed bridge replacement, the cumulative effects, and the proposed conservation measures, it is our biological opinion that the project as proposed is not likely to jeopardize the continued existence of *Hexastylis naniflora*. No critical habitat has been designated for this species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulations pursuant to section 4(d) of the Act prohibit the taking of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, such as breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not for the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act, provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, section 9(a)(2)(B) provides limited protection of listed plants from take to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage to such plants on areas under federal jurisdiction or the destruction of endangered plants on nonfederal areas in violation of state law or regulation or in the course of any violation of a state criminal trespass law. Therefore, for this Opinion, incidental take does not apply, and an incidental take statement is not necessary.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to

minimize or avoid the adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We request that the following conservation recommendations be implemented by the NCDOT as part of the project plan:

1. Notify the North Carolina Plant Conservation Program (NCPCP) that 60 plants will be lost to the proposed construction. Allow a qualified botanist from the NCPCP to transplant, if desired, any of the plants that would be lost to a different area (outside the acquisition area) for protection.

2. Monitor the dwarf-flowered heartleaf population inside the acquisition area annually for 5 years to determine its stability and detect any construction effects (positive or negative) that could occur which have not been anticipated (increased light, hydrology changes, etc.).

In order for us to be kept informed about actions that minimize or avoid adverse effects or that benefit listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION/CLOSING STATEMENT

This concludes formal consultation on the action outlined in your May 30, 2003, request for formal consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over an action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion, (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the action.

If you or your staff have any questions concerning this Opinion, please contact Ms. Marella Buncick of our staff at 828/258-3939, Ext. 237, or me, Ext. 223. We have assigned our Log No. 4-2-03-415 to this project; please refer to it in any future correspondence concerning this project.

Sincerely,

Brian P. Cole
State Supervisor

cc:

Mr. John Thomas, U.S. Army Corps of Engineers, Raleigh Regulatory Field Office, 6508 Falls of the Neuse Road, Suite 120, Raleigh, NC 27615

Ms. Marla J. Chambers, Highway Projects Coordinator, North Carolina Wildlife Resources Commission, 12275 Swift Road, Oakboro, NC 28129

Regional Director, FWS, Atlanta, GA (ES/TE, Attention: Mr. Joe Johnston)

References

Blomquist, H. L. 1957. A revision of the *Hexastylis* of North America. Brittonia 8:255-281.

Gaddy, L. L. 1980. Status report on *Hexastylis naniflora*. Prepared for the U.S. Fish and Wildlife Service. Unpublished report. 25 pp.

-----. 1981. The Status of *Hexastylis naniflora* Blomquist in North Carolina. Unpublished report. 58 pp.

File copy

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Asheville Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

May 24, 2006

Mr. John F. Sullivan, III, P.E.
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, North Carolina 27601

Dear Mr. Sullivan:

We issued a Biological Opinion (Opinion) on September 23, 2003, for the replacement of Bridge No. 90 on SR 1718 over Gunpowder Creek in Caldwell County, North Carolina (Federal Aid No. BRZ-1718(3), TIP No. B-3126), after a determination that the proposed project "may affect" the federally threatened dwarf-flowered heartleaf (*Hexastylis naniflora*). This document constitutes an amendment to that Opinion based on our review of information provided by the Federal Highway Administration (FHWA) and the North Carolina Department of Transportation (NCDOT). This amendment is provided pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543).

This amendment is necessary because another survey of the project area revealed more plants would be impacted by project construction than previously determined. We developed this amendment to the Opinion based on the results of field surveys, the 2003 Biological Assessment (BA), and the 2006 amendments to the BA. A complete record of this consultation is on file in this office.

CONSULTATION HISTORY

The September 23, 2003, Opinion described details of the consultation history to that date. Additional details since that date include:

- On April 19, 2005, the NCDOT conducted a visit to the site and located more plants than were originally found in the impact area.

- On June 1, 2005, the NCDOT resurveyed to obtain individual plant counts.

- On June 20, 2005, NCDOT and our staff discussed, by telephone, the updated survey data and what measures could be taken to minimize impacts.

- On April 12, 2006, we received an amended BA from the FHWA/NCDOT, including a request to reinitiate formal consultation.

- On May 5, 2006, in a telephone conversation with the NCDOT, remaining questions were answered, the BA was accepted as complete, and an agreement was reached to attempt to process the amendment by the end of May.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The project description has not changed since 2003. The NCDOT proposes to replace the existing 111-foot-long two-lane Bridge No. 90 (completed in 1965) over Gunpowder Creek in Caldwell County, North Carolina. The current horizontal alignment of the roadway at the south end of the existing bridge is considered poor, and the vertical alignment is very poor in both directions. The replacement two-lane bridge will be approximately 160 feet long, on an improved alignment.

The 2003 BA described the proposed project as intersecting a population of the dwarf-flowered heartleaf that occurs along Gunpowder Creek on both banks on the west side of SR 1718. In 2003 this population was estimated at 130 plants, and approximately 60 plants would be directly impacted by the project. Further surveys in 2006 located an additional 250 plants, 124 of which would be impacted with project construction (Table 1). In 2003, two Subpopulations were described--Subpopulations A and B. In 2006 another Subpopulation--Subpopulation C--was described as being inside the right-of-way.

TABLE 1

Site	Estimated Impacts (# plants) 2003	Estimated Impacts (# plants) 2006
Subpopulation A	10	44
Subpopulation B	50	67
Subpopulation C	n/a	73
Total	60	184

Direct Effects

The direct impacts to plants described in the 2003 BA have not changed because of changes in the project, but rather, because more plants were discovered at the site. Additionally, the 2005 surveys were conducted in June (when the plants were not in flower), so the NCDOT assumed all plants were *H. naniflora*. Given that *H. heterophylla* also occurs in the project area, impacts to *H. naniflora* likely are less than the total counts for the impact area.

Conservation Measures

In the 2003 BA, the NCDOT agreed to permanently protect and monitor 70 plants within the currently owned or expanded right-of-way at the site. In the current recount of plants, Subpopulation C contains a total of 163 plants; 90 of these will be avoided and will be permanently protected on the site. It was determined that additional on-site protection was not feasible. To offset the additional impacts, the NCDOT/FHWA has agreed to fund a temporary staff position for 2 months to assist our Recovery Coordinator with the 5-year status review for *H. naniflora* (reference commitment on page 2 of the amended BA).

CONCLUSION

In summary, 184 plants will be impacted by project construction, and 160 plants will be protected on the site. After reviewing the current status of the dwarf-flowered heartleaf; the environmental baseline for the action area; the additional effects of the proposed project that were not considered in our Opinion of September 23, 2003; the cumulative effects; and the proposed conservation measures, it is our biological opinion that the project as proposed is not likely to jeopardize the continued existence of the dwarf-flowered heartleaf. No critical habitat has been designated for this species; therefore, none will be affected.

REINITIATION/CLOSING STATEMENT

This again concludes formal consultation on the action outlined in your April 11, 2006, request for formal consultation. As provided in 50 CFR 402.16, the reinitiation of formal consultation is required where discretionary federal agency involvement or control over an action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion, (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the action.

If you have any questions or concerns about this consultation or the consultation process in general, please feel free to contact Ms. Marella Buncick of our staff at 828/258-3939, Ext. 237, or me, Ext. 223.

Sincerely,

Brian P. Cole
Field Supervisor

cc:
Ms. Elizabeth Lusk, Project Development and Environmental Analysis, North Carolina Department of Transportation, 1598 Mail Service Center, Raleigh, NC 27699-1598

NCDOT Project I.D. B-3126
Caldwell County, NC
Replacement of Bridge #90 over Gunpowder Creek on SR 1718

Prepared by: Stantec Consulting
801 Jones Franklin Road, Suite 300
Raleigh, NC 27606

September 3, 2002

NATURAL CHANNEL DESIGN

TRIBUTARY TO GUNPOWDER CREEK

Left of Project Station 16+10 to Left of Station 18+85
Permit Site 1

The replacement of Bridge Number 90 over Gunpowder Creek in Caldwell County will require that a portion of a Tributary to Gunpowder Creek be relocated from Left of Project Station 16+10 –L- to Left of Station 18+85 –L-, approximately 315 feet in length. The proposed channel relocation is designed according to "natural channel" design principles proposed by Dave Rosgen.

The Tributary's drainage area is mostly rural and wooded in nature. The stream was also found to be perennial in nature.

There is no hydraulic gage data available on this stream or on nearby streams. Current discharges were estimated using the NCDOT procedures for rural watersheds.

EXISTING CHANNEL

A representative portion of the existing channel (upstream of the proposed relocation) was surveyed in detail for the purpose of channel classification. The existing channel was measured to have an entrenchment ratio of 1.43, a width/depth ratio of 8.00, a sinuosity of 1.06 and an average slope of 0.026 ft/ft. A pebble count was preformed and the channel was found to have a classification of sand bottom. The channel was found to be a G5 stream type according to the Rosgen classification system.

REFERENCE REACH

The reference reach was surveyed in detail for the purpose of channel classification and use in natural channel design. A 127 ft long reach was surveyed in detail. The reference reach channel was measured to have an entrenchment ratio of 3.08, a width/depth ratio of 8.25, a sinuosity of 1.09 and an average slope of 0.023 ft/ft. A pebble count was preformed and the channel was found to have a classification of sand bottom. The channel was found to be a C5b stream type according to the Rosgen classification system.

PROPOSED CHANNEL

Based upon the existing valley type and the flood prone width desired, the proposed channel design has a C5 stream type classification. Design data is given in the attached table along with existing reach and reference reach data. A proposed cross-vane will control the channel gradient upstream, while a step-pool structure will control the gradient downstream. Mean "bankfull" depth was set at 0.60 feet. Above bankfull depth it is proposed to excavate an approximately 15 foot wide flood plain (including the channel).

It is believed that by forming a flood plain above bankfull depth channel stability will be enhanced by reducing velocities for those discharges above the bankfull discharge. This should lead to a more stable channel. It is anticipated that the proposed channel will have a sand bottom. Maximum pool depths of 1.74 feet are proposed at outside bends of meanders.

Sediment transport computations were performed, using the proposed channel geometry. This stream has been determined as having a sand bed material and entrainment calculations are not appropriate for sediment transport in sand bed systems. Determination and evaluation of the stream power is an acceptable approach in regards to sediment transport in sand bed material streams. The affected section has been classified as a G type stream, it is entrenched and has a low width to depth ratio. When converting a channel from a type G to C, the design approach is to reduce the stream power to minimize degradation. The proposed design has reduced the stream power from 2.76 to 2.59 (lbs/ft s) and the shear stress from 0.80 to 0.11 (lbs/sq ft). Therefore the proposed type C stream will be a stable channel because the slight reduction of stream power and shear stress will maintain values similar to those found within the existing conditions.

Proposed channel stabilization is shown on the attached detail sheet. It is anticipated that channel banks will be planted with native trees and shrubs above bankfull depth. Root-Wads, Rock Weirs, Cross Vanes and a Step-Pool Structure will be utilized to control the near bank shear stress in the meanders, along the proposed roadway.

AS BUILT

An As Built will be submitted within sixty (60) day of completion of the project. The As-built will document changes in the dimension, pattern, profile, vegetation plantings, and structures installed of the constructed channel from the proposed design.

MONITORING

The following components of Level 1 monitoring will be performed each year of the 5-year monitoring period: Reference photos, plant survival (i.e., identify specific problems areas (missing, stressed, damaged or dead plantings), estimated causes and proposed/required remedial action); visual inspection of channel stability. Physical measurements of channel stability/morphology will not be performed. A monitoring report will be submitted within sixty (60) days after completing the monitoring.

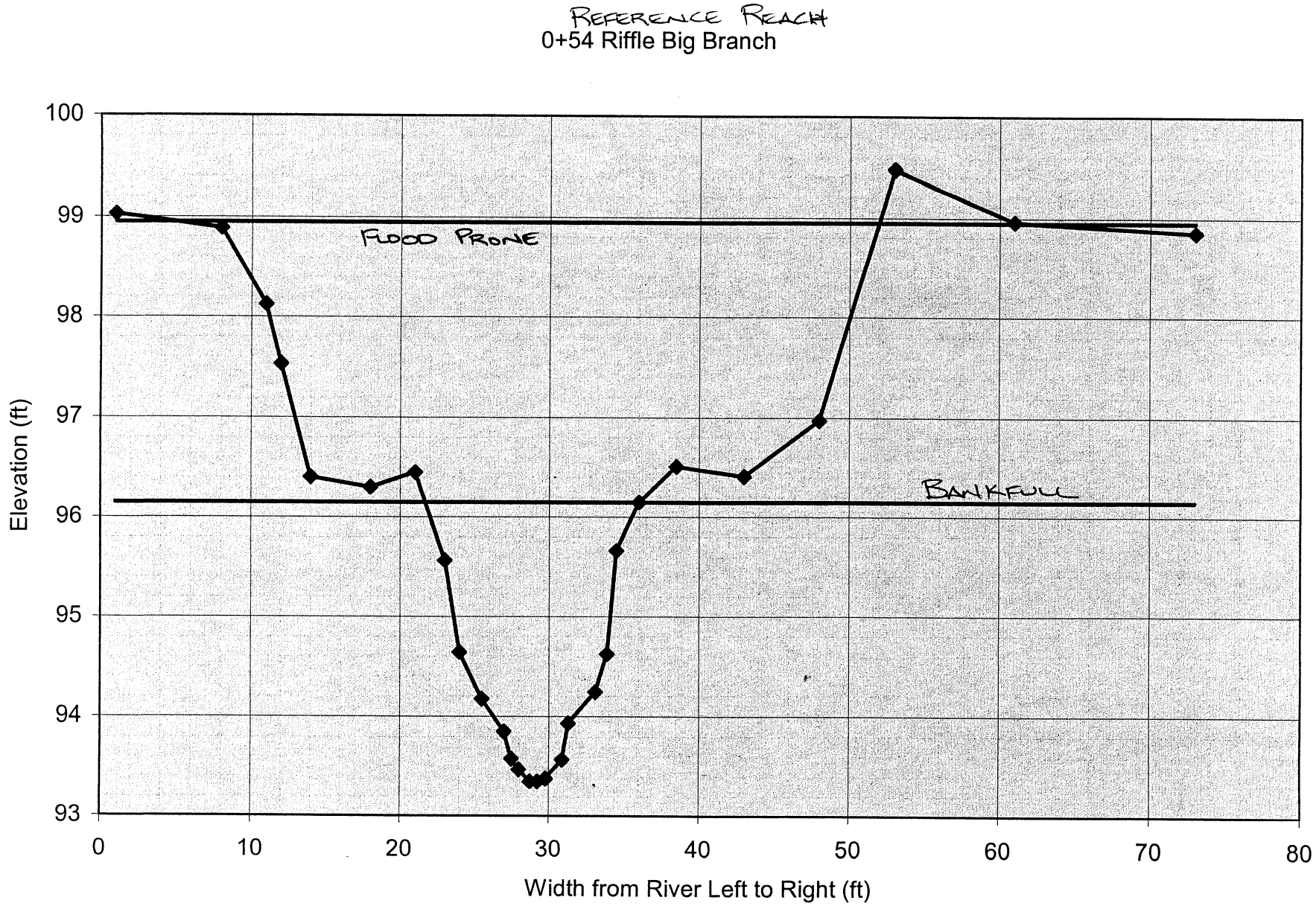
Table 5.1.1 Morphological Characteristics of Project Stream Channels

Stantec

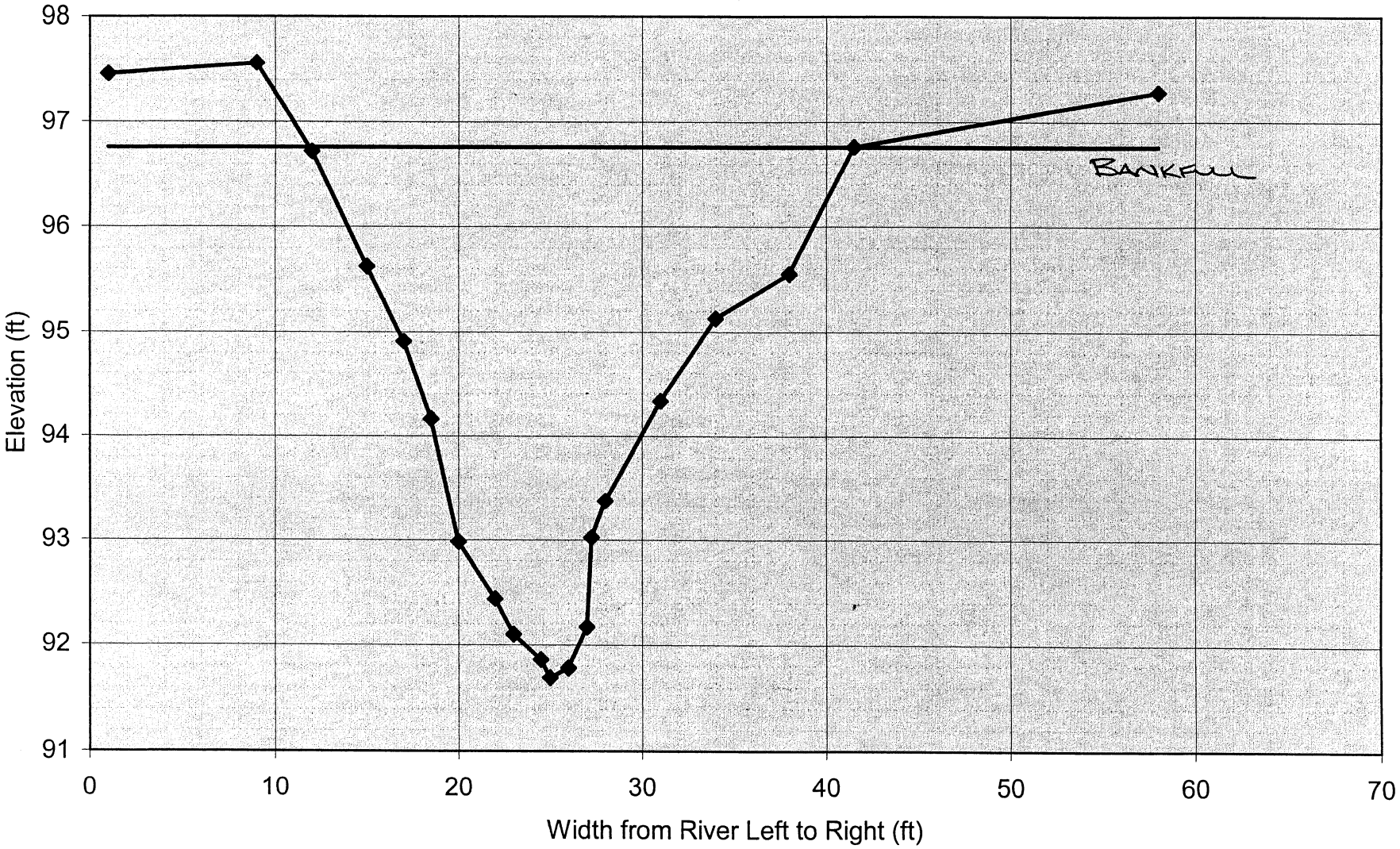
Trib to Gunpowder Creek Proposed Channel Design
B-3126
Design by: Kevin Williams, PE
Checked by: Kevin Williams, PE

ITEM	Existing Conditions	Trib to Gunpowder Creek Proposed Channel Design	Reference Reach
STREAM NAME	B-3126	B-3126	Big Branch
STREAM TYPE	G5	C5	C5b
DRAINAGE AREA (DA)	32 Ac	32 Ac	941 Ac
BANKFULL WIDTH (W_{bkf})	4.9 ft	5.20 ft	14.30 ft
BANKFULL MEAN DEPTH (d_{bkf})	0.61 ft	0.60 ft	1.73 ft
WIDTH/DEPTH RATIO (W_{bkf}/d_{bkf})	8.00	8.70	8.25
BANKFULL X-SECTION AREA (A_{bkf})	3.00 ft^2	3.06 ft^2	24.80 ft^2
BANKFULL MEAN VELOCITY, ft/s	3.43 fps	3.30 fps	4.76 fps
BANKFULL DISCHARGE, cfs	10 cfs	10 cfs	118.00 cfs
BANKFULL MAX DEPTH (d_{max})	0.89 ft	0.90 ft	2.80 ft
WIDTH Flood-Prone Area (W_{fpa})	7 ft	15.2 ft	44.00 ft
ENTRENCHMENT RATIO (ER)	1.43	2.92	3.08
MEANDER LENGTH (Lm)	0 - 0 ft	13 - 23 ft	30 - 55 ft
RATIO OF Lm TO W_{bkf}	0 - 0	2 - 4	2.1 - 3.8
RADIUS OF CURVATURE*	4 - 11 ft	12 - 18 ft	13 - 23 ft
RATIO OF Rc TO W_{bkf}	0.7 - 1	2.0 - 3	0.91 - 2.79
BELT WIDTH	15 ft	24 ft	25 ft
MEANDER WIDTH RATIO	3.1	4.0	1.75
SINUOSITY (K)	1.06	1.29	1.09
VALLEY SLOPE	0.028 ft/ft	0.009 ft/ft	0.025 ft/ft
AVERAGE SLOPE (S)	0.026 ft/ft	0.004 ft/ft	0.023 ft/ft
POOL SLOPE	0.000 ft/ft	0.001 ft/ft	0.000 - 0.003 ft/ft
RATIO OF POOL SLOPE TO AVERAGE SLOPE	0.00	0.14	0.02 - 0.14
MAX POOL DEPTH	1.10 ft	1.74 ft	4.80 - 5.10 ft
RATIO OF POOL DEPTH TO AVERAGE BANKFULL DEPTH	1.80	2.90	2.8 - 2.9
POOL WIDTH	4.60 ft	10.20 ft	30 ft
RATIO OF POOL WIDTH TO BANKFULL WIDTH	0.94	1.74	2.07
POOL TO POOL SPACING	15.0 ft	10 - 26 ft	25 - 62 ft
RATIO OF POOL TO POOL SPACING TO BANKFULL WIDTH	3.06	2 - 4	1.7 - 4.3

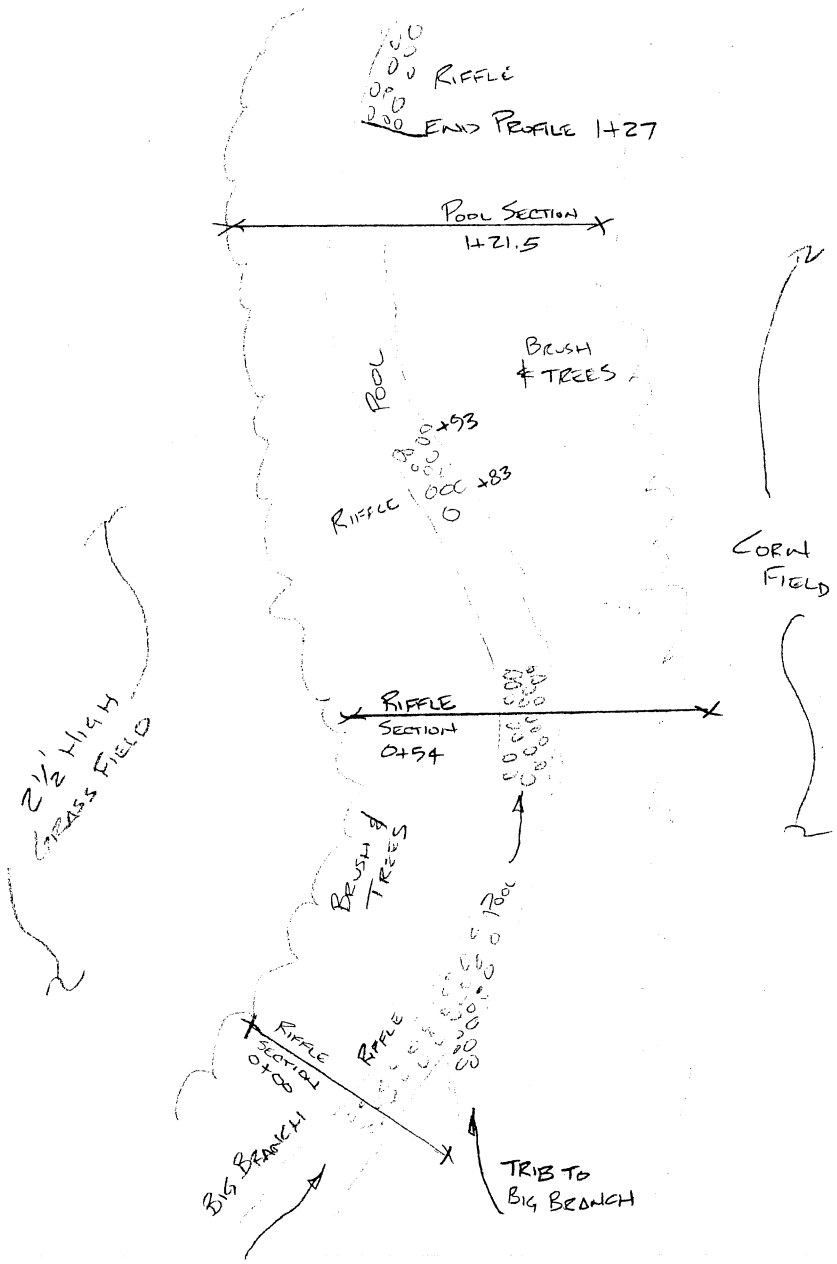
* Due to mature vegetation root mass in the Reference Reach's side slopes and floodplain, the reference reach data will not be matched in proposed design. The use of a higher ratio will allow the meanders to be stable while the root system is established


Reference Reach
0+54 Riffle Big Branch
Flood Prone
Bankfull
Elevation (ft)
100
99
98
97
96
95
94
93
0
10
20
30
40
50
60
70
80
Width from River Left to Right (ft)

Reference Reach
1+21.5 Pool Big Branch

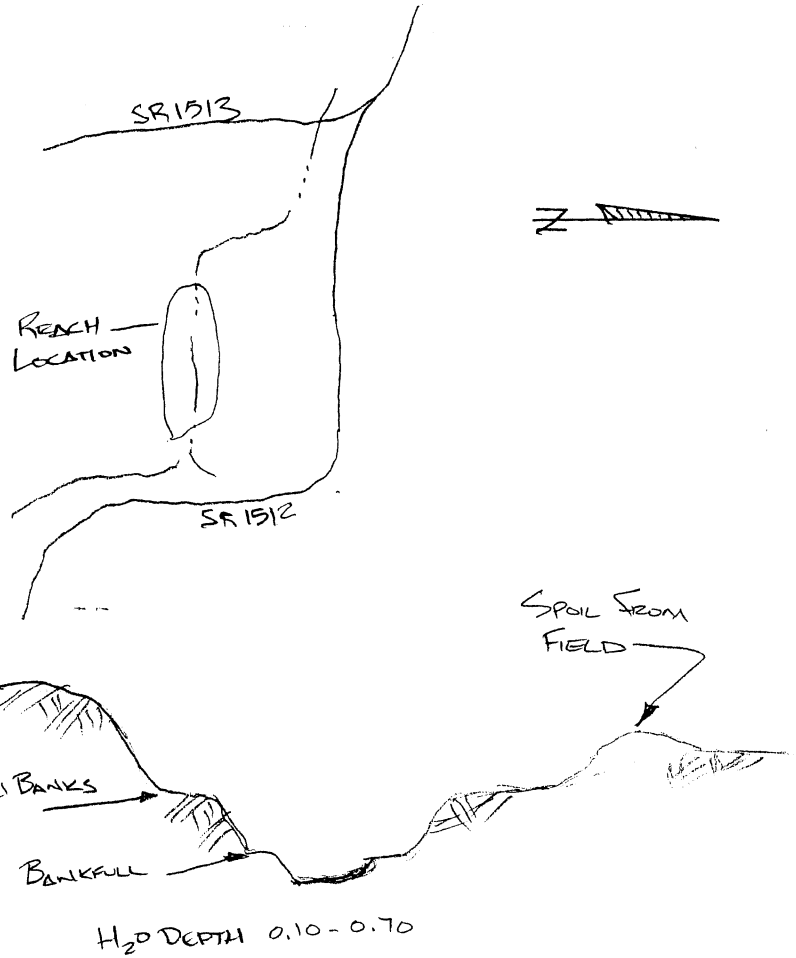


BIG BRANCH REFERENCE REACH
RKW 6/19/01



BIG BRANCH
RKW, PRK 6-19-01 82-56-30 35 34 30

- MIKE EDGAN FOUND A STONE FLY IN THE CREEK INDICATOR OF GOOD WATER QUALITY
- REACH IS UPSTREAM OF SR 1513 HYDER MOUNTAIN ROAD
-



H_2O DEPTH 0.10 - 0.70

SURVEY DATA ⟹ CROSS - SECTION Part I

SITE: Big Branch Date: 6-19-01

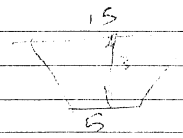
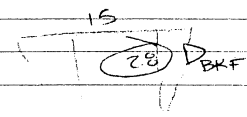
Location:

Party / Notes:

Item	Distance; Point; or STATION Ft.	Back-Sight BS Ft.	Height of Instrument HI Ft.	Fore-Sight FS Ft.	Height; Depth; or Elevation Ft.	NOTES / COMMENT / REMARKS
1	@Hickory	4.75				** Riffle Section 0+00 **
2	0+03			4.75		Ground Shot
3	+17			4.84		top Bank
4	+19			5.37		Break
5	+22			6.98		Break
6	+25			8.63		Break
7	+28			9.05		BKF
8	+30.75			9.57		Lef Edge Water
9	+32			9.63		(0.12 H_2O)
10	+33.25			9.74		(0.20 H_2O)
11	+34.75			9.83		Thalweg (0.31 H_2O)
12	+35.5			9.66		Right Edge (0.15 H_2O)
13	+36.0			9.28		top Channel
14	+38.75			8.76		Bankfull
15	+40			8.34		Break
16	+44			7.53		
17	+47.5			7.20		
18	+53			7.05		
19						
20	⊕	3.73		6.32		
21						
22	** Pool Section			1+21.5 **		(Bankfull Depth 3.0 ±)
23	+01			4.70		GS
24	+09			4.60	-	top Channel
25	+12	3		5.44	- 0	
26	+15	3		6.54	1.1	
27	+17	2		7.25	1.81	
28	+18.5	1.5		8.00	2.56	
29	+20	1.5		9.18	3.74	
30	+22	2		9.72	4.28	Lt Edge Water
31	+23	1		10.06	4.62	(.36)
32	+24.5	1.5		10.30	4.86	(0.58)
33	+25	0.5		10.47	5	Thalweg (0.74)
34	+26	1		10.38	4.94	(0.64)
35	+27	1		9.99	4.55	Rt Edge (0.27)

SURVEY DATA ⟹ CROSS - SECTION Part II

SITE: Big Branch Date: 6-19-01

Item	STATION Ft.	BS Ft.	HI Ft.	FS Ft.	Elevation Ft.	NOTES / COMMENT / REMARKS
36	+27.25	0.25		9.14	3.7	Bank Shot
37	+28	.75		8.79	3.35	WFPA = 51 ±
38	+31	3		7.83	2.39	
39	+34	3		7.03	1.59	
40	+38	4		6.61	1.17	
41	+41.5	3.5		5.40	0	
42	+58			4.88		
43						
44						
45	**	Riffle Section		0+54 **		WFPA = 44
46	+01			3.13		
47	+08			3.27		
48	+11			4.04		
49	+12			4.63		
50	+14			5.76		
51	+18			5.86		+21.6 - 6.0
52	+21			5.71		
53	+23	1.3		6.60	.6	top Bank
54	+24	1		7.52	1.5	
55	+25.5	1.5		7.99	2	BKFull
56	+27	1.5		8.31	2.3	Break
57	+27.5	0.5		8.58	2.58	Left Edge H_2O
58	+28	0.5		8.69	2.69	(0.13)
59	+28.75	0.75		8.81	2.81	Thalweg (0.24)
60	+29.25	0.5		8.81	2.81	(0.22)
61	+29.8	0.5		8.78	2.78	(0.19)
62	+30.9	1.1		8.59	2.59	Right Edge H_2O
63	+31.3	0.4		8.23	2.23	Bank
64	+33.1	1.8		7.92	1.92	Bankfull
65	+33.9	0.8		7.54	1.54	
66	+34.5	0.6		6.5	- 0.5	
67	+36	1.5		6.01	0	top Bank
68	+38.5			5.65		
69	+43			5.75		
70	+48			5.19		
71	+53			2.69		
72	+61			3.2		
73	+73			3.31		
74						

SURVEY DATA ⟹ **LONGITUDINAL PROFILE** Part I

SITE: Big Branch Date: 6-19-01

Location:

Party / Notes:

Item	Distance; Point; or STATION Ft.	Back-Sight B S Ft.	Height of Instrument H I Ft.	Fore-Sight F S Ft.	Height; Depth; or Elevation Ft.	NOTES / COMMENT / REMARKS
1	@ Hickory	4.75	104.75			
2	0+00 **			9.68	95.07	Riffle (0.25 H2O)
3	+00			8.69		BKF
4	+00			7.40		Low Bank (Right)
5	+7.75			9.90		(0.31)
6	+7.75			9.09		
7	+14			10.09		(0.36)
8	+18.5			10.07		(0.20)
9	+18.5			9.29		Bankfull
10	+28			10.57		(0.25)
11	+28			9.26		Bankfull
12	+28			9.09		Low Bank (Right)
13	+35			10.90		End Riffle (0.30)
14	+35			10.06		Bankfull
15				9.08		Low Bank Left
16	+38.5			11.19		Pool (0.43)
17	+45			11.14		Glide (0.36)
18	+47.8			11.14		Top Riffle (0.27)
19	+51			11.35		Riffle (0.33)
20	+54 **			11.46		(0.38)
21				10.38		Bankfull
22				8.56		Low Bank (Right)
23	+59			11.81		Run (0.34)
24	+64.5			11.96		Run ~~(0.~~
25				11.04		Bankfull
26				9.00		Low Bank
27	@1	3.73	102.16	6.32	98.43	
28	+70			9.46		(0.36 H2O)
29				8.28		Bankfull
30				6.39		Low Bank (Left)
31	+75			9.43		(0.28)
32				6.52		Low Bank (Right)
33	+78			9.53		(0.38)
34				8.75		Bankfull
35						

SURVEY DATA ⟹ **LONGITUDINAL PROFILE** Part II

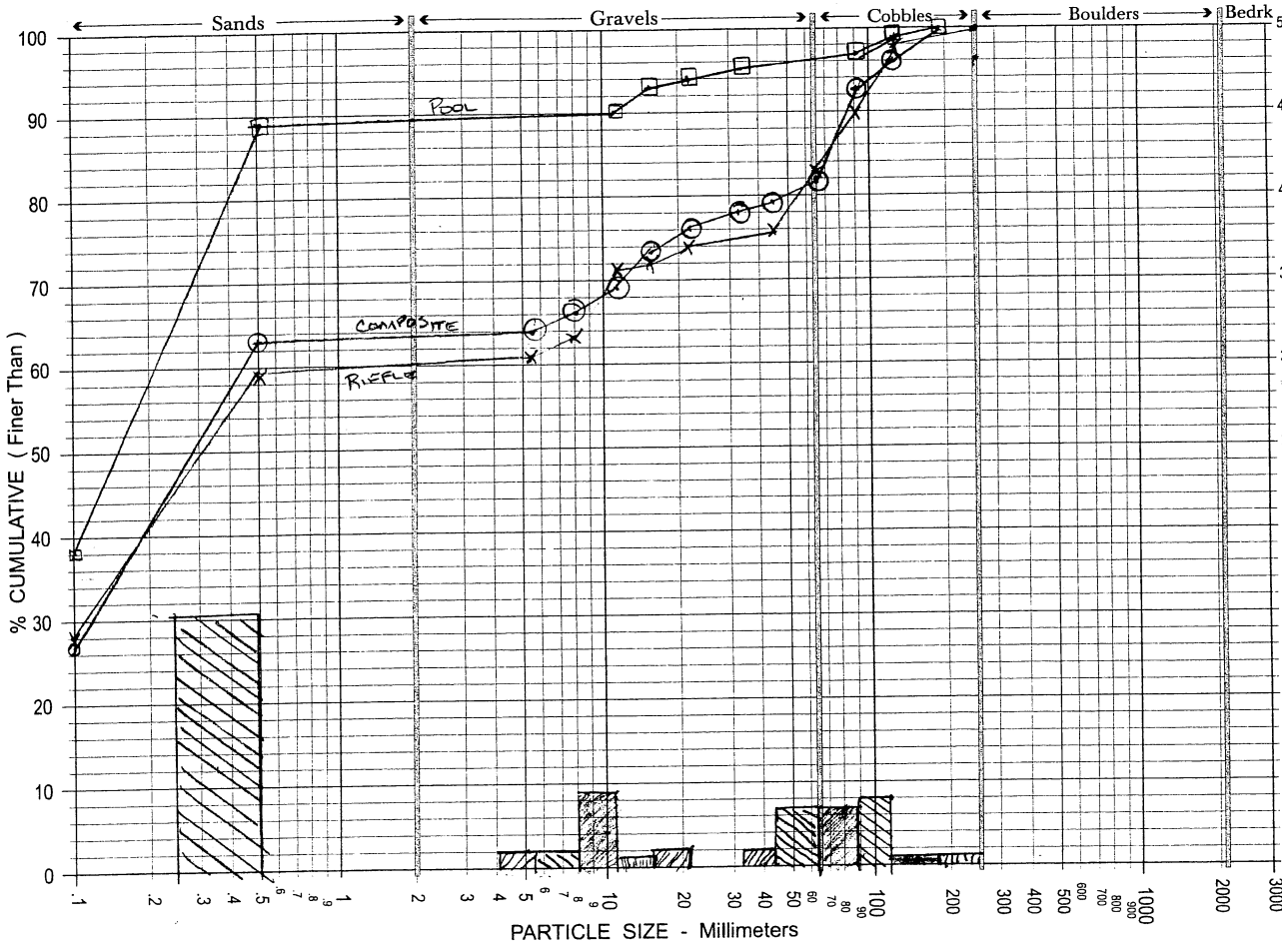
SITE: Date: 6-19-01

Item	STATION Ft.	B S Ft.	H I Ft.	F S Ft.	Elevation Ft.	NOTES / COMMENT / REMARKS
36	+83			9.47		Top Riffle (0.32)
37	+88.5			9.67		Riffle (0.20)
38	+93			9.92		End Riffle (0.24)
39	+96.4			10.19		Pool (0.50)
40				8.63		Bankfull
41				7.61		Low Bank (Right)
42	1+00			10.59		(0.87)
43	1+07			10.51		(0.80)
44				9.94		Bankfull
45				8.08		Low Bank (Right)
46	1+14			10.38		Pool (0.65)
47	1+21.5 **			10.41		Pool (0.68)
48				8.79		Bankfull
49				6.79		Low Bank (Right)
50	1+27			10.15	92.01	Top Riffle (0.43)
51						
52						
53						
54						
55						$\frac{95.32 - 92.44}{127} = 0.0227$
56				Slope =		
57						
58						
59						
60						
61						
62						
63						
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						

PEBBLE COUNT

Site: BIG BRANCH
Party: PRK, MPE LEM
Reach: EXISTING REFERENCE
Date: 6-19-01

Inches	PARTICLE	Millimeters		RIFFLE	POOL 2	COMP 3	TOT #	ITEM %	% CUM	PEBBLE COUNT Reach: Date: TOT #	ITEM %	% CUM	PEBBLE COUNT Reach: Date: TOT #	ITEM %	% CUM
	Silt / Clay	< .062	SAC	28	28	28	28	28	28	36	38	38	27	27	27
	Very Fine	.062 - .125	SAND												
	Fine	.125 - .25													
	Medium	.25 - .50		31	31	59	49	52	89	36	36	63			
	Coarse	.50 - 1.0													
.04 - .08	Very Coarse	1.0 - 2													
.08 - .16	Very Fine	2 - 4	GRAVEL	2	2	61				1	1	64			
.16 - .22	Fine	4 - 5.7		2	2	63				2	2	66			
.22 - .31	Fine	5.7 - 8		9	9	71	1	1	90	3	3	69			
.31 - .44	Medium	8 - 11.3		1	1	72	2	2	93	4	4	73			
.44 - .63	Medium	11.3 - 16		2	2	74	1	1	94	3	3	76			
.63 - .89	Coarse	16 - 22.6					1	1	95	2	2	78			
.89 - 1.26	Coarse	22.6 - 32		2	2	76				1	1	79			
1.26 - 1.77	Very Coarse	32 - 45		7	7	83				3	2	82			
1.77 - 2.5	Very Coarse	45 - 64													
2.5 - 3.5	Small	64 - 90	COBBLE	7	7	90	2	2	97	11	11	93			
3.5 - 5.0	Small	90 - 128		8	8	98	2	2	99	3	3	96			
5.0 - 7.1	Large	128 - 180		1	1	99	1	1	100	4	4	100			
7.1 - 10.1	Large	180 - 256		1	1	100									
10.1 - 14.3	Small	256 - 362	BOULDER												
14.3 - 20	Small	362 - 512													
20 - 40	Medium	512 - 1024													
40 - 80	Large-Vry Large	1024 - 2048													
	Bedrock		BDRK												
						TOTALS →	101			95			100		



GAGE:
Reach: BIG BRANCH
No:
Date:

PEBBLE COUNT DATA

PROJECT REFERENCE NO.	SHEET NO.
B-3126	4

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

Stantec

*L-LINE

PI Sta 9+23.34
Δ = 24° 30' 02.3" (RT)
D = 13° 54' 59.5"
L = 176.05
T = 89.39'
*R = 411.71'
SE = .08

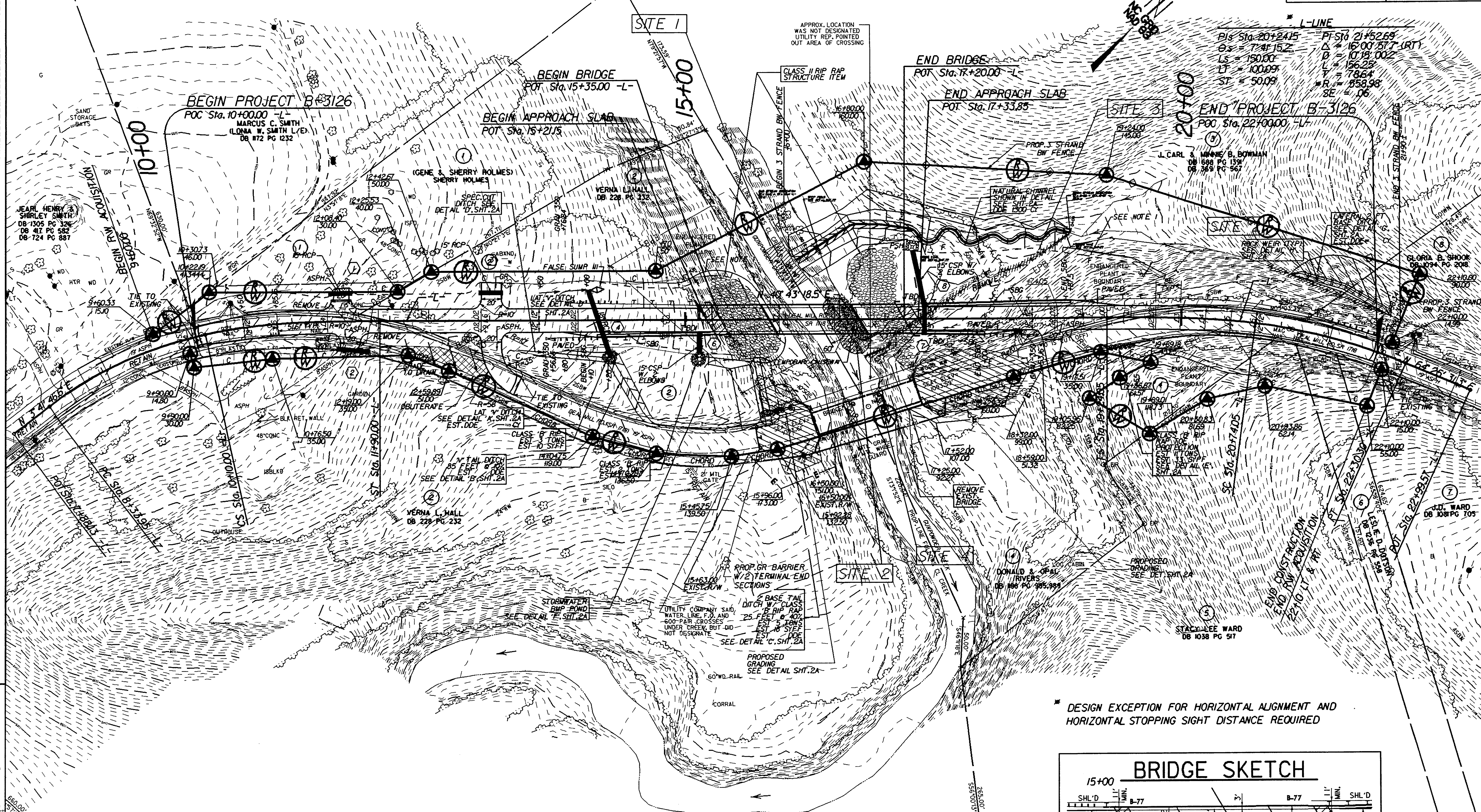
PIs Sta 10+70.27
θs = 12° 31' 29.6"
Ls = 180.00'
LT = 120.30'
ST = 60.27'

TS DENOTES TEMPORARY IMPACTS TO SURFACE WATER

*L-LINE

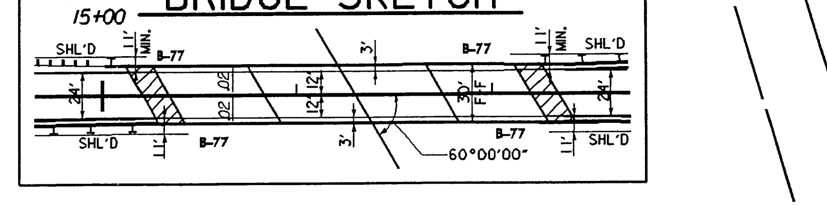
PIs Sta. 20+24.15
θs = 7° 41' 15.2"
Ls = 150.00
LT = 100.09
ST = 50.09

PI Sta 21+52.69
Δ = 16° 00' 57.7" (RT)
D = 10° 18' 00.2
L = 156.25'
T = 78.64'
*R = 558.98'
SE = .06



* DESIGN EXCEPTION FOR HORIZONTAL ALIGNMENT AND HORIZONTAL STOPPING SIGHT DISTANCE REQUIRED

BRIDGE SKETCH



NOTE 1: LIMITS WHERE ENDANGERED PLANTS ARE LOCATED WILL BE LIMITED TO 5' OUTSIDE THE SLOPE STAKES ON PARCELS 2,3,4 AND 5

REFERENCES:
1. FOR -L-LINE PROFILE, SEE SHEET 5
FOR PROP. GRADING DETAIL, SEE SHEET 2B
2. FOR DITCH DETAILS, SEE SHEET 2B

REVISIONS

8/17/99

15-MAR-2007 08:08

PROJECT REFERENCE NO.	SHEET NO.
B-3126	5

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

Stantec
Stantec Consulting Inc.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

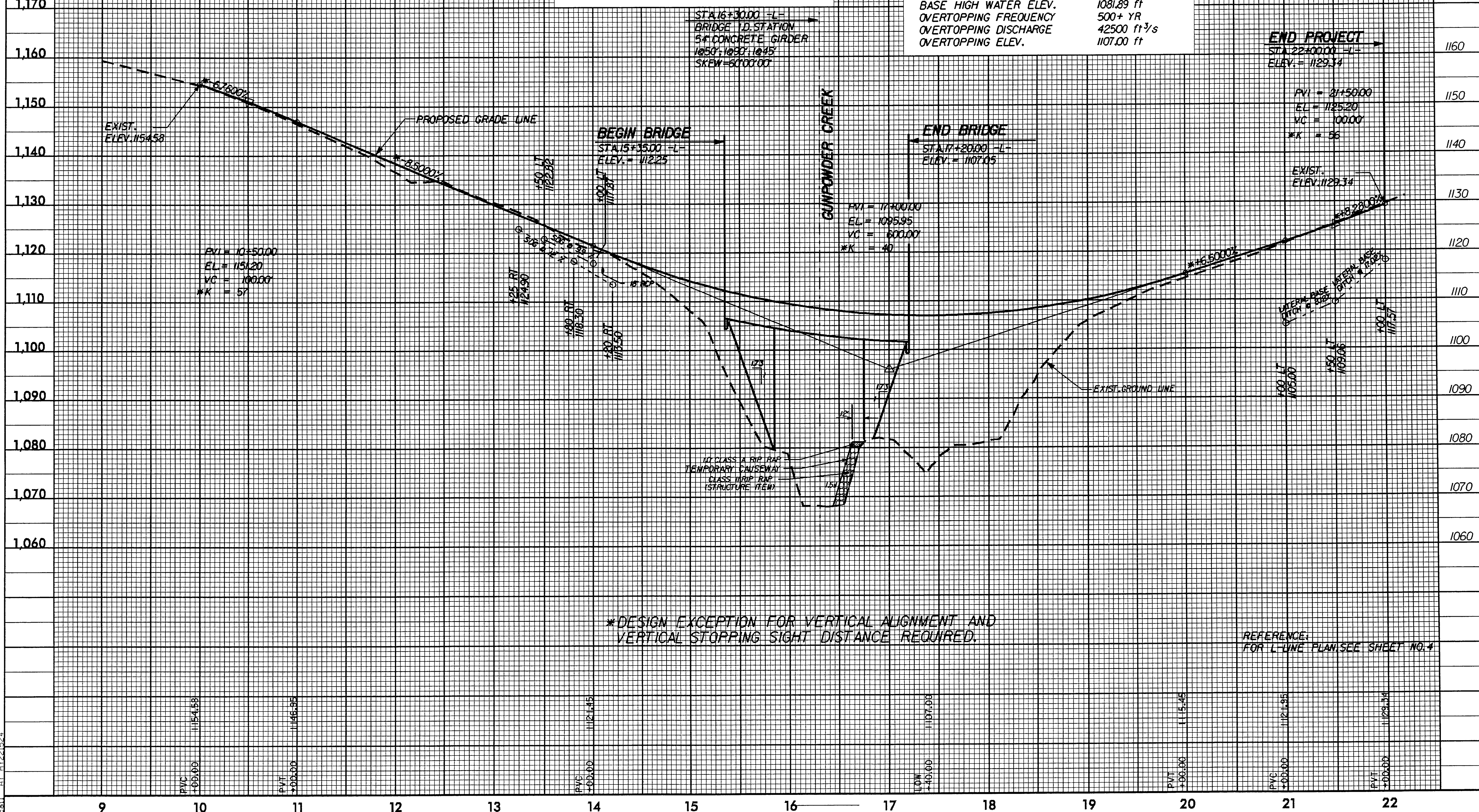
BM-2
RR SPIKE IN BASE OF 36" MAPLE TREE, BL 19+12.00
89.00' RT ELEV. = 1084.85

PROP. 18" RCP STA. 14+10

DRAINAGE AREA	0.56 Ac
DESIGN FREQUENCY	25 YR
DESIGN DISCHARGE	1.40 ft^3/s
DESIGN HIGH WATER ELEV.	1118.51 ft
Q100 DISCHARGE	1.70 ft^3/s
Q100 HIGH WATER ELEV.	1118.58 ft
OVERTOPPING FREQUENCY	500+ YR
OVERTOPPING DISCHARGE	13.5 ft^3/s
OVERTOPPING ELEV.	1121.45 ft

HYDRAULIC DATA

DRAINAGE AREA	20.2 Sq.MI.
DESIGN DISCHARGE	3400 ft^3/s
DESIGN FREQUENCY	25 YR.
DESIGN HIGH WATER ELEV.	1079.30 ft
BASE DISCHARGE	5000 ft^3/s
BASE HIGH WATER ELEV.	1081.89 ft
OVERTOPPING FREQUENCY	500+ YR
OVERTOPPING DISCHARGE	42500 ft^3/s
OVERTOPPING ELEV.	1107.00 ft



5/14/99

16-MAR-2007 08:09

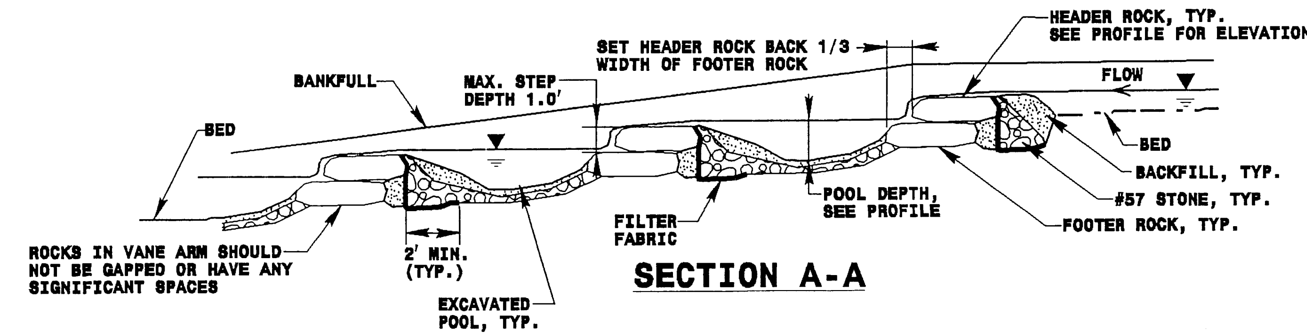
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-3126	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

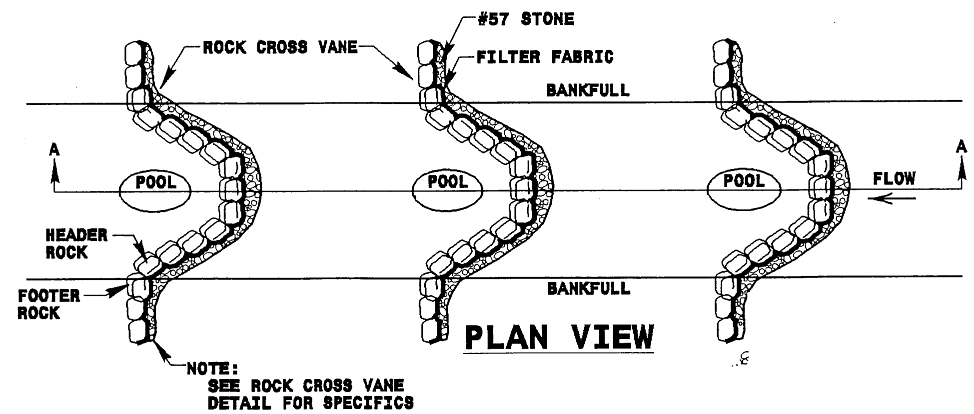
STEP POOL DETAIL

NOT TO SCALE

Sta 16+11 to 17+27 -L- Lt
(Sta 3+15 to 1+92 -NSD-)



SECTION A-A

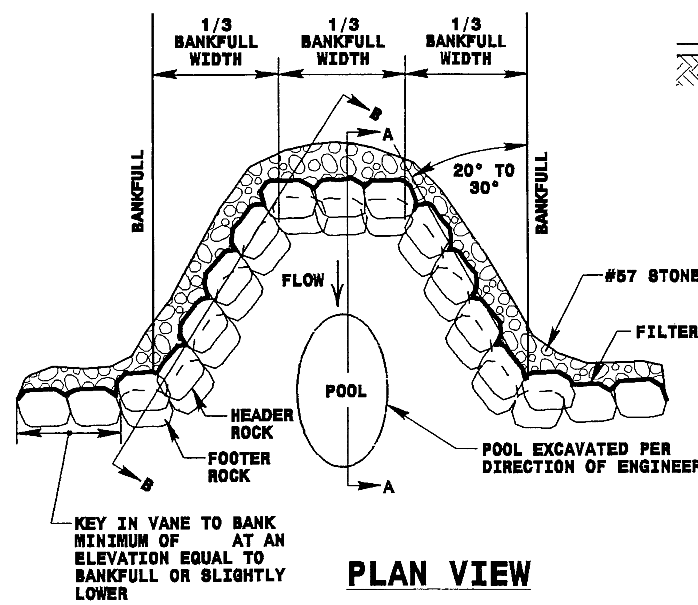


PLAN VIEW

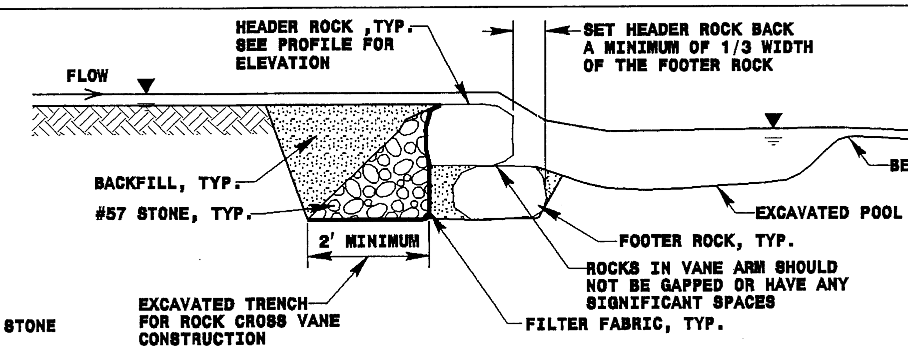
NOTES:
1. STEPS TO BE SHORT, FREQUENT, AND CLOSELY SPACED.
2. POOL SPACING SHALL BE INVERSELY PROPORTIONAL TO STREAM SLOPE, AND DIRECTLY PROPORTIONAL TO BANKFULL WIDTH.
3. POOL DEPTHS AT BANKFULL ELEVATION SHALL BE TYPICALLY 2 TO 3 TIMES DEEPER THAN STEP DEPTHS AT BANKFULL ELEVATION.
4. ADEQUATE NUMBER OF FOOTER BOULDERS TO BE USED IN ORDER TO HOLD UP THE BOULDERS AT HEAD OF STEPS DURING HIGH ENERGY/HIGH FLOW EVENTS.
5. STEP POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

ROCK CROSS VANE DETAIL FOR STEP POOLS OR PER EACH

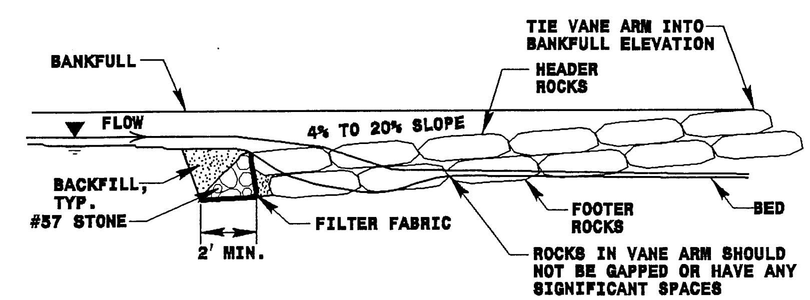
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

	BOULDER DIMENSIONS (FEET)		
STATION	HEIGHT	LENGTH	WIDTH
**	1.5'	2.0'	1.5'
17+38-L-Lt =1+77 -NSD-	1.5'	2.0'	1.5'
18+82-L-Lt =0+05 -NSD-	1.5'	2.0'	1.5'

** Begin Sta 16+11 -L- Lt and Space Every 11' to Sta 17+27 -L- Lt

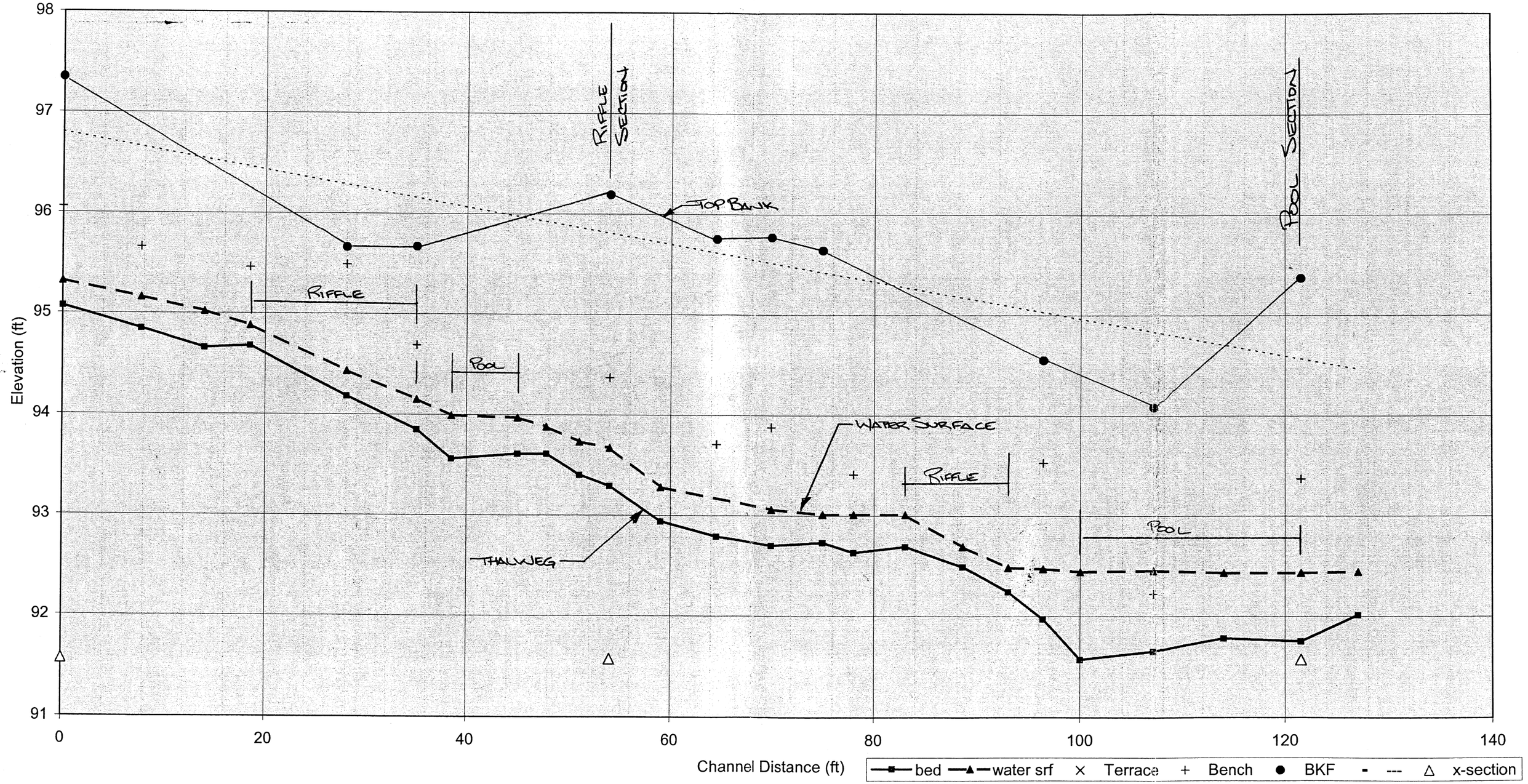
NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

7/2/99

16-MAR-2007 08:52
r:\drainage\step_pool.dgn
gcoil AT HY221524

Reference Reach

Big Branch, French Broad River Basin, East of SR1513 & south of SR 1512



8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-3126	2A
R/W SHEET NO.	
	HYDRAULICS ENGINEER

10 0 20

CONST. REV.

R/W REV.

Stantec

Stantec Consulting Inc.
Suite 700, 801 Jones Franklin Road
Raleigh NC USA
27606
Tel. 919.28 1.0000
Fax. 919.28 1.3101
www.stantec.com

NOTE 1: -L- STA. 14+52.24 TO -L- STA. 15+45.22 AND -L- STA. 18+80.35 TO -L- STA. 19+78.77, CONSTRUCTION LIMITS IN AREAS WHERE ENDANGERED PLANTS ARE LOCATED WILL BE LIMITED TO 5' OUTSIDE THE SLOPE STAKES.

L. HALL
8 PG 232

50.84'
N19°27'13"E

EIP

57.34'
N19°27'13"E

15+00

20+00

PROP. LINE FOLLOWS CL CREEK

GUNPOWDER CREEK

N79°21'57"W
310.45'

END STREAM RELOCATION
STA 3+15 = STA 16+11 -L-
60' Lt

STEP POOLS
SEE DETAIL SHT.??

BEGIN STREAM RELOCATION
STA 0+00 = STA 18+87 -L-
86.5' Lt

SEE NOTE 1

SEE NOTE 5

ENDANGERED PLANT BOUNDARY

+97.0
96' Lt

+24.0
82' Lt
Rc=10

+45.0
87.5' Lt
Rc=10

+86.0
86' Lt
Rc=10

+25.0
88' Lt
Rc=10

+55.0
90' Lt
Rc=10

+73.0
80.5' Lt
Rc=16

+65.0
81.5' Lt
Rc=10

+09.0
75' Lt
Rc=10

+41.0
75' Lt
Rc=10

+73.0
80' Lt
Rc=10

CROSS VANE
SEE DETAIL SHT.??

PSH

15" CSP W/ 2 ELBOWS

24" CMP REMOVE

SOIL

SBW

SBG

END SBG
+87.5

+74.05

PAVED

TBDI

DEAL MILL RD.
SR 1118
19' ASPH

ASPH.

5'

25' TYP.

EXISTING GROUND ALONG STREAM CENTERLINE

BEGIN GRADE
ELEV.= 1081.50
STA 0+00 -NSD-
= STA 18+87 -L-

ELEV.= 1080.68
STA 1+92 -NSD-
= 17+27 -L-

S = 0.427.2%

STANDARD REACH
FROM STA 0+00 TO STA 1+92

END GRADE
ELEV.= 1069.20
STA 3+15 -NSD-
= STA 16+11 -L-

S = 9.333%

STEP - POOL REACH
FROM STA 1+92 TO STA 3+15

GUNPOWDER CREEK

1085
1080
1075
1070

400 300 200 100 0

NATURAL CHANNEL DETAILS

16-MAR-2007 11:04
r:\drainage\b3126_rdu_typ_2a.dgn
gail
11"x17"

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-3126	2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
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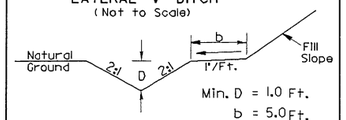
Raleigh NC U.S.A.
27606
Tel. 919.851.6866
Fax. 919.851.7024
www.stantec.com

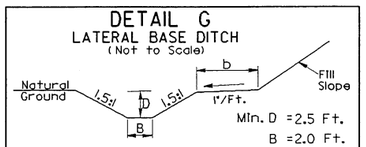
DETAIL A
LATERAL 'V' DITCH
(Not to Scale)



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

STA 13+80 RT TO 14+20 RT

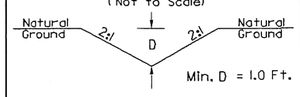
DETAIL G
LATERAL BASE DITCH
(Not to Scale)



Min. D = 2.5 Ft.
B = 2.0 Ft.
b = 3.0 Ft.

STA 21+00 LT TO 22+00 LT

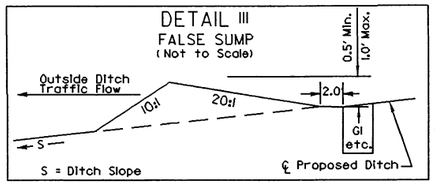
DETAIL B
TAIL 'V' DITCH
(Not to Scale)



Min. D = 1.0 Ft.

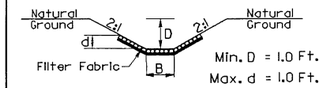
STA 14+50 RT

DETAIL III
FALSE SUMP
(Not to Scale)



S = Ditch Slope

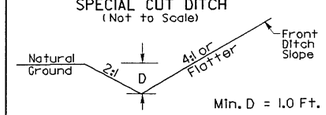
DETAIL C
STANDARD BASE DITCH
(Not to Scale)



Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 2.0 Ft.
Type of Liner = CLASS 'B' RIP RAP

STA 15+90 RT

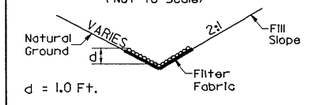
DETAIL D
SPECIAL CUT DITCH
(Not to Scale)



Min. D = 1.0 Ft.

STA 13+50 LT TO 14+00 LT
STA 13+25 RT TO 13+80 RT

DETAIL E
TOE PROTECTION
(Not to Scale)

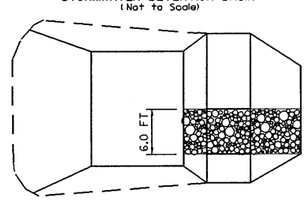


d = 1.0 Ft.

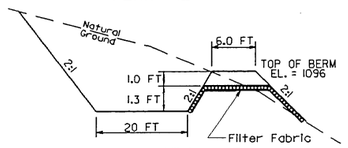
Type of Liner = CLASS 'B' RIP RAP

STA 19+24 RT TO 19+55 RT

DETAIL F
STORMWATER DETENTION BASIN
(Not to Scale)

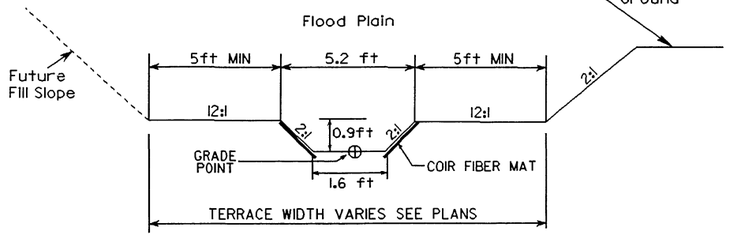


PLAN VIEW

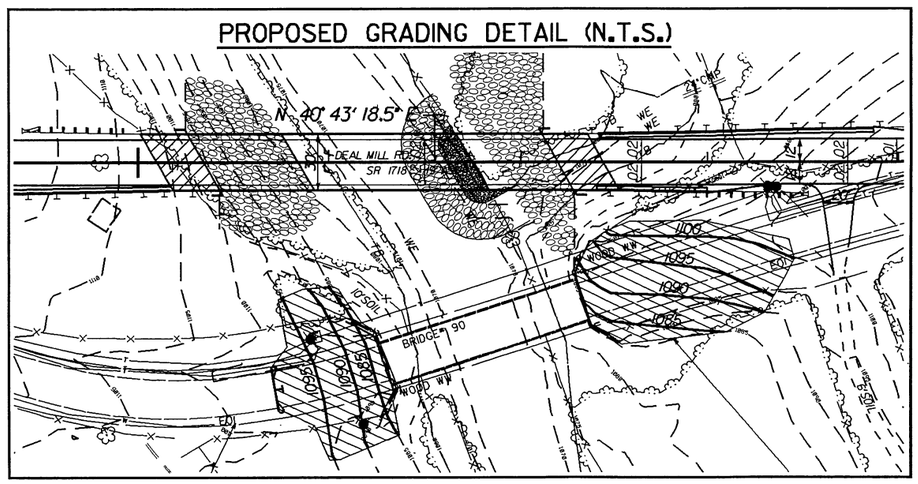


CROSS-SECTION VIEW
SPILLWAY LINER = CLASS 'B' RIP RAP

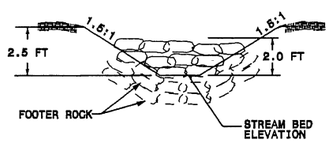
TYPICAL FLOOD PLAIN SECTION
(Not to Scale)



PROPOSED GRADING DETAIL (N.T.S.)



DETAIL H ROCK WEIR
SCALE: NTS

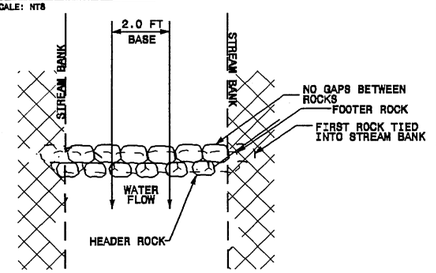


CROSS SECTION

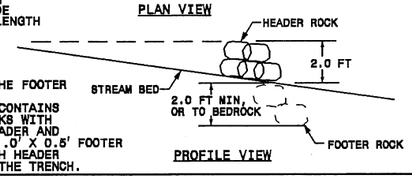
NOTES:
1. GAPS BETWEEN ROCKS SHALL BE MINIMIZED BY FITTING ROCKS TOGETHER AND PLUGGING WITH COBBLE, GRAVEL AND FILTER FABRIC.
2. FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF STRUCTURE.

INSTALLATION OF ROCK WEIR

A TRENCH SHALL BE DUG IN SUCH A MANNER THAT THE FOOTER ROCKS ARE BURIED BENEATH THE BED SURFACE ELEVATION. AN EXCAVATOR, WITH A BUCKET THAT CONTAINS A HYDRAULIC THUMB, SHALL BE USED TO PLACE ROCKS WITH THE SUPERVISION OF THE RESIDENT ENGINEER. HEADER AND FOOTER ROCKS SHALL BE NO SMALLER THAN 1.0' X 1.0' X 0.5' FOOTER ROCKS SHALL BE PLACED IN THE TRENCH FIRST WITH HEADER ROCKS PLACED ON TOP PRIOR TO BACK FILLING OF THE TRENCH.



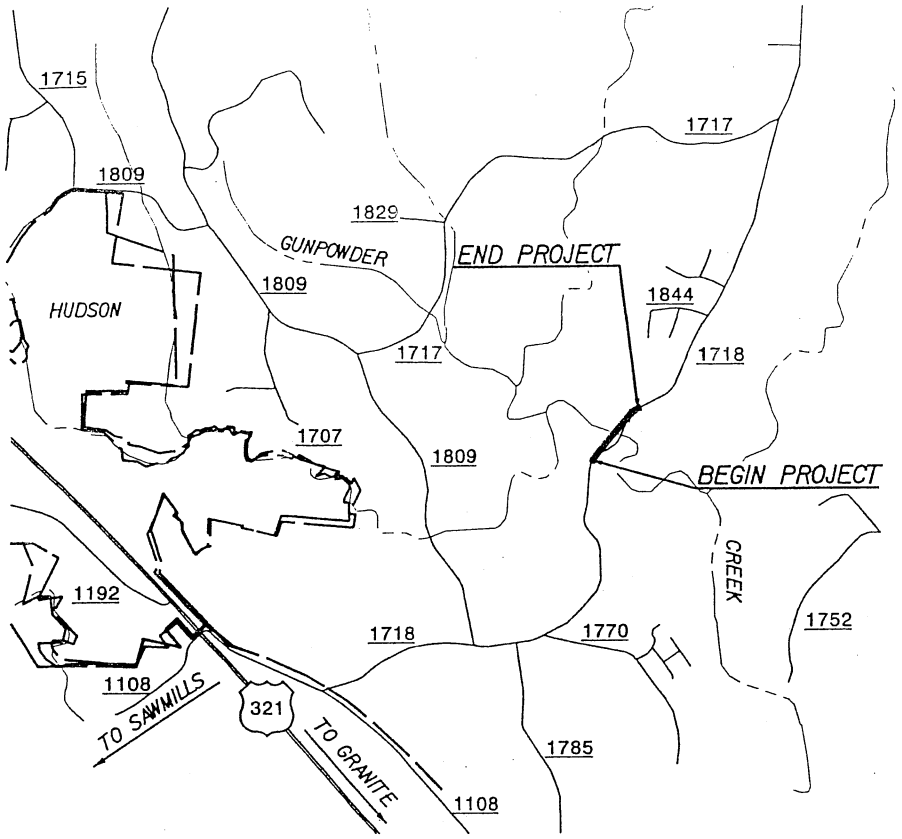
PLAN VIEW



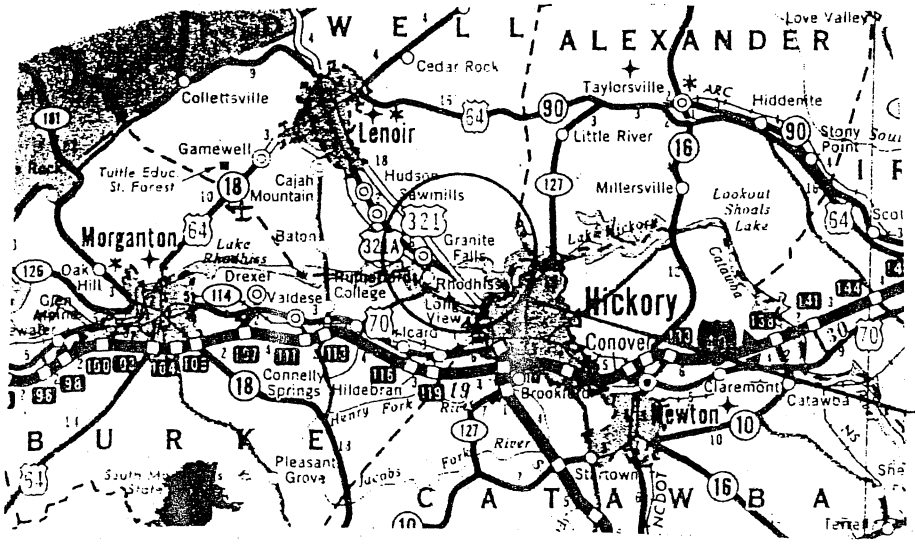
PROFILE VIEW

HYDRAULIC DETAILS

16-MAR-2007 08:56
r:\drainage\b3126_rdy_typ_2b.dgn
gral AT HY221524



PORTION OF CALDWELL COUNTY MAP



PORTION OF STATE MAP

VICINITY/SITE MAP
WETLAND/STREAM

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

CALDWELL COUNTY
8.2732701(B-3126)
BRIDGE #90 OVER GUNPOWDER CREEK
ON SR 1718

Permit Drawing
Sheet 1 of 6
SCALE AS SHOWN

SHEET ___ OF ___

WETLAND / STREAM LEGEND

WLB —— WETLAND BOUNDARY

WLB / WLB — WETLAND

F F — DENOTES FILL IN WETLAND

S S — DENOTES FILL IN SURFACE WATER

P P — DENOTES FILL IN SURFACE WATER (POND)

T T — DENOTES TEMPORARY FILL IN WETLAND

E E — DENOTES EXCAVATION IN WETLAND

TS TS — DENOTES TEMPORARY FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

—— —— FLOW DIRECTION

TB — TOP OF BANK

WE — EDGE OF WATER

C — PROP. LIMIT OF CUT

F — PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG — NATURAL GROUND

PL — PROPERTY LINE

TDE — TEMP. DRAINAGE EASEMENT

PDE — PERMANENT DRAINAGE EASEMENT

EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

EPB — EXIST. ENDANGERED PLANT BOUNDARY

▽ — WATER SURFACE

LIVE STAKES

BOULDER

CORE FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT
12"-48" PIPES
54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTNG STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 — ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE (PSH)

LEVEL SPREADER (LS)

GRASS SWALE

Permit Drawing
Sheet 2 of 6

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

CALDWELL COUNTY
8.2732701(B-3126)
BRIDGE #90 OVER GUNPOWDER CREEK
ON SR 1718

Permit Drawing
Sheet ___ of ___

SCALE AS SHOWN

SHEET ___ OF ___

1/24/2004
11:27:27 AM
J:\Roadway\Proj\permits\B3126_RDY_PSH_LEGEND.dgn

PROJECT REFERENCE NO.	SHEET NO.
B-3126	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

Stantec

TS DENOTES TEMPORARY SURFACE WATER IMPACTS

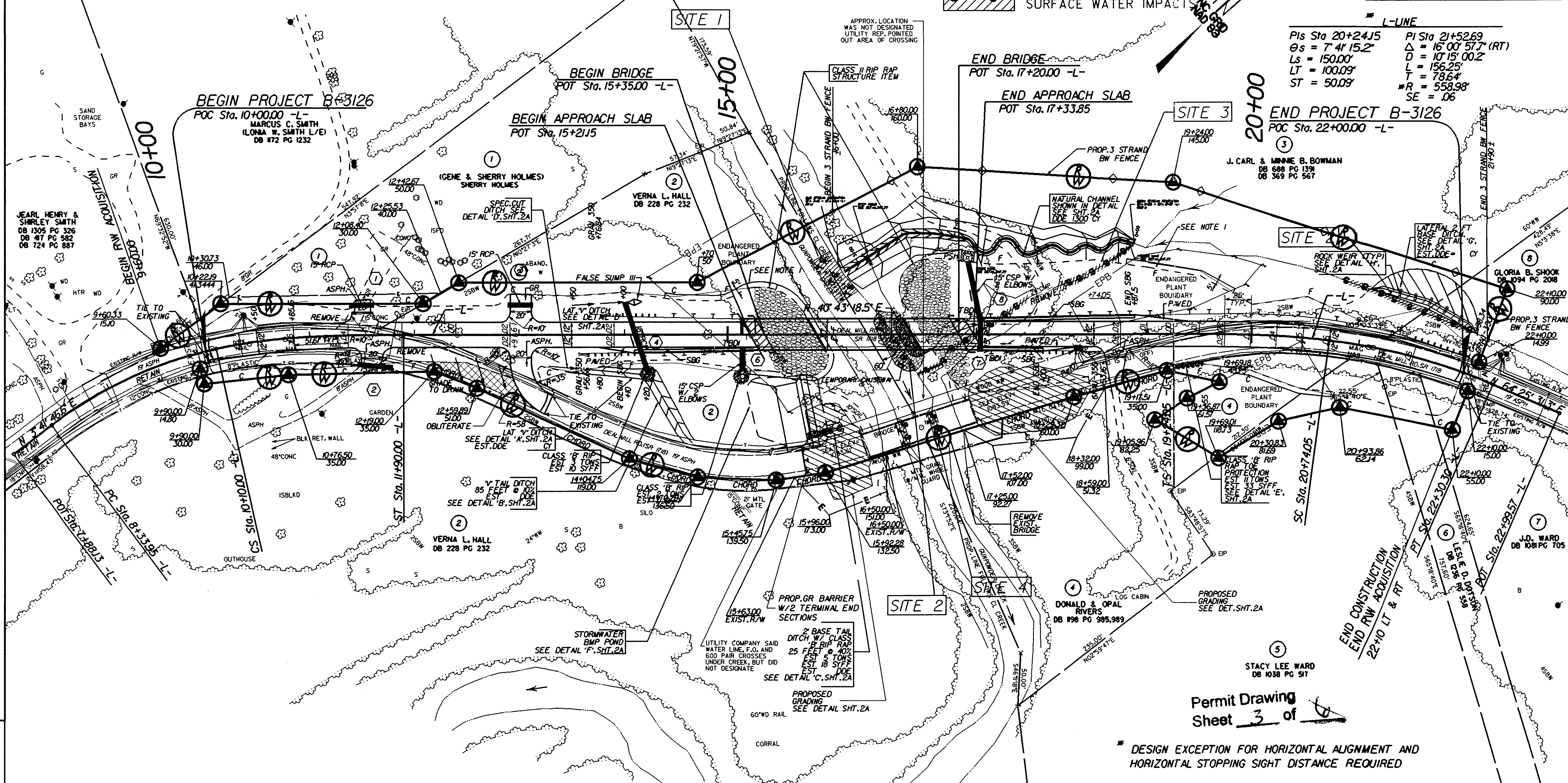
S DENOTES PERMANENT SURFACE WATER IMPACTS

*L-LINE
PI Sta 9+23.34
Δ = 24° 30' 02.3" (RT)
D = 13° 54' 59.5"
L = 176.05'
T = 89.39'
*R = 411.71'
SE = .08

PIs Sta 10+70.27
θs = 12° 31' 29.6"
Ls = 180.00'
LT = 120.30'
ST = 60.27'

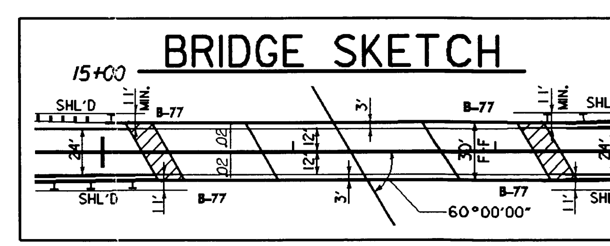
*L-LINE
PIs Sta 20+24.15
θs = 7° 41' 15.2"
Ls = 150.00'
LT = 100.09'
ST = 50.09'

PI Sta 21+52.69
Δ = 16° 00' 57.7" (RT)
D = 10° 15' 00.2"
L = 156.25'
T = 78.64'
*R = 558.98'
SE = .06



Permit Drawing
Sheet 3 of 6

* DESIGN EXCEPTION FOR HORIZONTAL ALIGNMENT AND HORIZONTAL STOPPING SIGHT DISTANCE REQUIRED

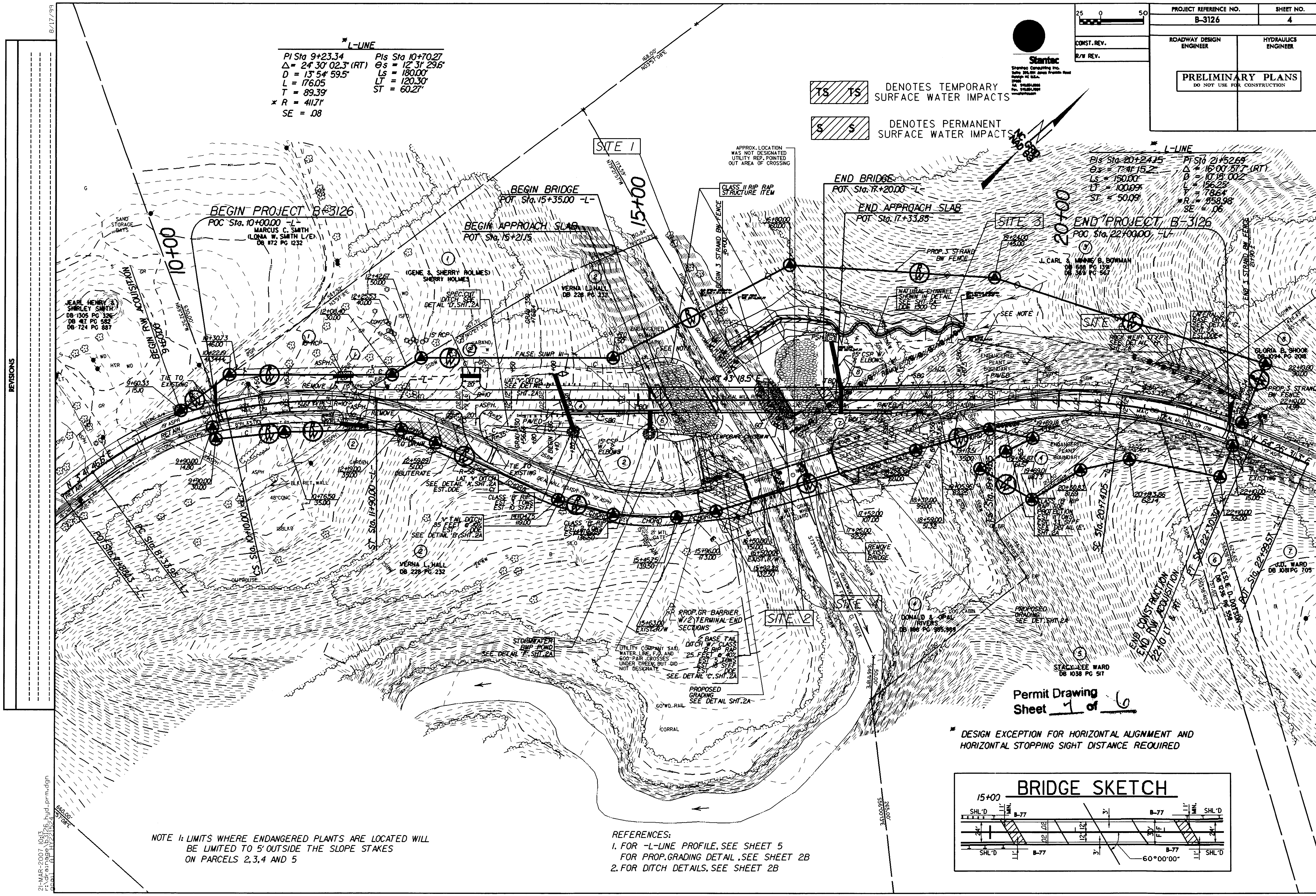


NOTE 1: LIMITS WHERE ENDANGERED PLANTS ARE LOCATED WILL BE LIMITED TO 5' OUTSIDE THE SLOPE STAKES ON PARCELS 2,3,4 AND 5

REFERENCES:
1. FOR -L-LINE PROFILE, SEE SHEET 5 FOR PROP. GRADING DETAIL, SEE SHEET 2B
2. FOR DITCH DETAILS, SEE SHEET 2B

REVISIONS

21-MAR-2007 10:13
8/17/99



PROJECT REFERENCE NO. B-3126
SHEET NO. 4
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST. REV.
R/W REV.
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Stantec
REVISIONS
8/17/99
* L-LINE
PI Sta 9+23.34
Δ = 24° 30' 02.3" (RT)
D = 13° 54' 59.5"
L = 176.05'
T = 89.39'
* R = 411.71'
SE = .08
PIs Sta 10+70.27
Θs = 12° 31' 29.6"
Ls = 180.00'
LT = 120.30'
ST = 60.27'
TS DENOTES TEMPORARY SURFACE WATER IMPACTS
S DENOTES PERMANENT SURFACE WATER IMPACTS
* L-LINE
PIs Sta. 20+24.15
Θs = 7° 41' 15.2"
Ls = 150.00'
LT = 100.09'
ST = 50.09'
PI Sta 21+52.69
Δ = 16° 00' 57.7" (RT)
D = 10° 18' 00.2"
L = 156.25'
T = 78.64'
* R = 558.98'
SE = .06
BEGIN PROJECT B-3126
POC Sta. 10+00.00 -L-
BEGIN BRIDGE
POT Sta. 15+35.00 -L-
BEGIN APPROACH SLAB
POT Sta. 15+21.5
END BRIDGE
POT Sta. 17+20.00 -L-
END APPROACH SLAB
POT Sta. 17+33.85
END PROJECT B-3126
POC Sta. 22+00.00 -L-
SITE 1
SITE 2
SITE 3
SITE 4
10+00
15+00
20+00
MARCUS C. SMITH
(LONIA W. SMITH L/E)
DB 1172 PG 1232
(GENE & SHERRY HOLMES)
SHERRY HOLMES
VERNA L. HALL
DB 228 PG 232
J. CARL & MINNIE B. BOWMAN
GLORIA B. SHOOK
DONALD & OPAL RIVERS
STACY LEE WARD
DB 1038 PG 517
J.D. WARD
EARL HENRY & SHIRLEY SMITH
BEGIN R/W ACQUISITION
END CONSTRUCTION
END R/W ACQUISITION
APPROX. LOCATION WAS NOT DESIGNATED UTILITY REP. POINTED OUT AREA OF CROSSING
CLASS II RIP RAP STRUCTURE ITEM
NATURAL CHANNEL SHOWN IN DETAIL
PROP. 3 STRAND BW FENCE
FALSE SUMP
REMOVE
TIE TO EXISTING
SEE NOTE
REMOVE EXIST. BRIDGE
PROP. GR BARRIER W/2 TERMINAL END SECTIONS
UTILITY COMPANY SAID, WATER LINE, F.O. AND 600 PAIR CROSSES UNDER CREEK BUT DID NOT DESIGNATE
STORMWATER BMP POND SEE DETAIL 'F' SHT. 2A
PROPOSED GRADING SEE DETAIL SHT. 2A
PROPOSED GRADING SEE DET. SHT. 2A
CORRAL
OUTHOUSE
SILO
Permit Drawing
Sheet 4 of 6
* DESIGN EXCEPTION FOR HORIZONTAL ALIGNMENT AND HORIZONTAL STOPPING SIGHT DISTANCE REQUIRED
BRIDGE SKETCH
15+00
SHL'D
B-77
60°00'00"
NOTE 1: LIMITS WHERE ENDANGERED PLANTS ARE LOCATED WILL BE LIMITED TO 5' OUTSIDE THE SLOPE STAKES ON PARCELS 2,3,4 AND 5
REFERENCES:
1. FOR -L-LINE PROFILE, SEE SHEET 5
FOR PROP. GRADING DETAIL, SEE SHEET 2B
2. FOR DITCH DETAILS, SEE SHEET 2B
21-MAR-2007 10:43

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	15+70 TO 16+28 -L- Lt	Tie-In of NSD							0.022		48	
2	16+42 to 16+58 -L-	Temp Causeway to Construct Pier #2							0.017		66	
3	16+79 Rt to 18+89 -L- Lt & 20+78 to 22+00 -L- Lt	Existing Trib to Gunpowder Crk						0.017		350		315
4	16+57 to 16+95 -L- Rt	Remove Existing Piers							0.007		31	
TOTALS:			0.00	0.00	0.00	0.00	0.00	0.02	0.05	350	145	315

Permit Drawing Sheet 5 of 6

ATN Revised 3/31/05

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CALDWELL COUNTY
B-3126

3/07

SHEET ########

SUMMARY OF AFFECTED PROPERTY OWNERS

TRACT NO.	PROPERTY OWNER	ADDRESS	SITE NO.
1	JOESPH C. AND MINNIE BOWMAN	3490 DEAL MILL RD. HUDSON, NC 28638	1
2	GLORIA SHOOK	3433 DEAL MILL RD. HUDSON, NC 28638	2
3	DONALD AND OPAL RIVERS	4538 DIAMOND ST. HUDSON, NC 28638	2
4	STACY LEE AND REBECCA WARD	3167 KIRBY WARD LANE HUDSON, NC 28638	2
5	LESLIE DALE DOTSON	PO BOX 628 HUDSON, NC 28638	2
6	J.D. WARD	4169 LOWER CEDAR VY. HUDSON, NC 28638	2

Permit Drawing
Sheet 6 of 6

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

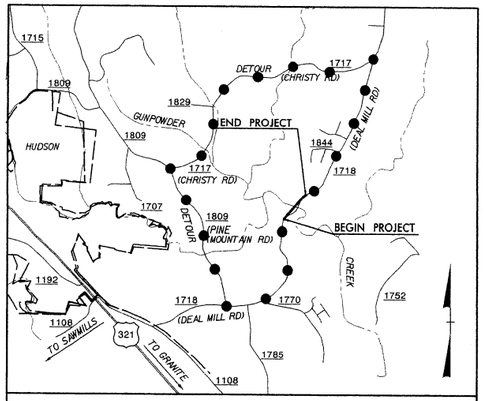
CALDWELL COUNTY
8.2732701(B-3126)
BRIDGE #90 OVER GUNPOWDER CREEK
ON SR 1718

SCALE AS SHOWN

SHEET ___ OF ___

PROPERTY OWNERS

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Symbology



VICINITY MAP

● ● ● TEMPORARY DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

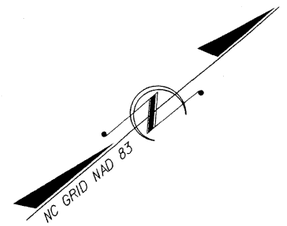
CALDWELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3126	1	

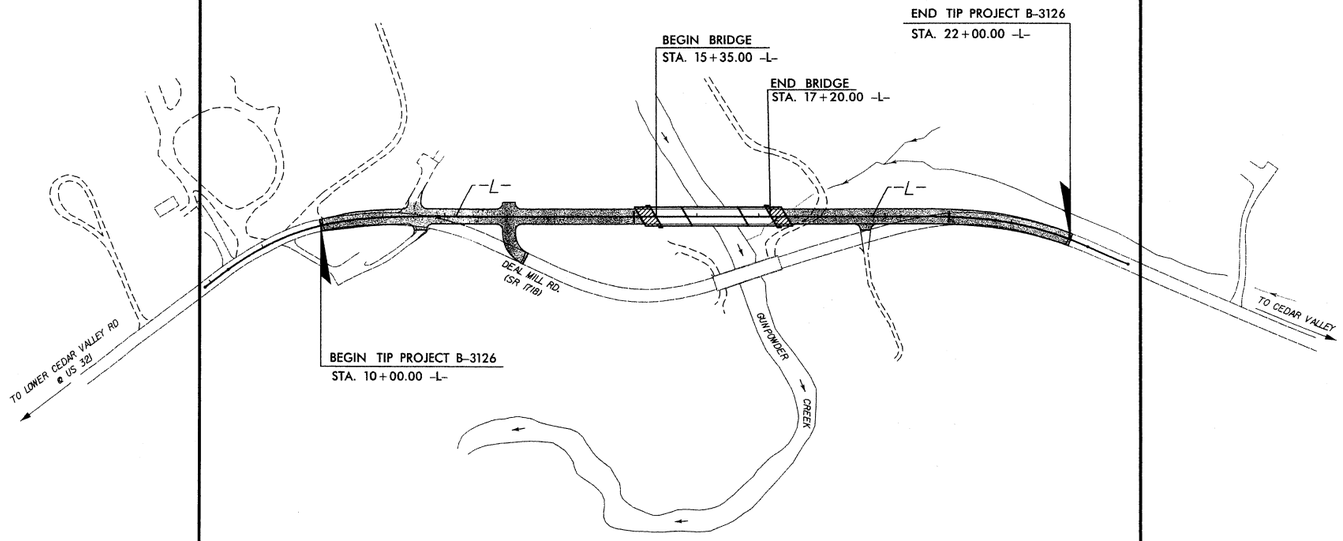
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
32880.1.1	BRZ-1718(3)	PE
32880.2.2	BRZ-1718(3)	R/W & UTIL.
32880.3.1	BRZ-1718(6)	CONSTR.

LOCATION: ***BRIDGE #90 OVER GUNPOWDER CREEK ON SR 1718***

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



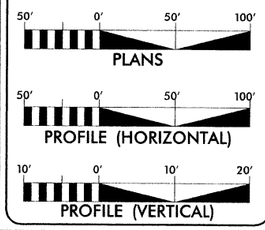
4



* DESIGN EXCEPTION FOR HORIZONTAL AND VERTICAL ALIGNMENT, AND HORIZONTAL AND VERTICAL STOPPING SIGHT DISTANCE REQUIRED.

CONTRACT: 201468 TIP PROJECT: B-3126

GRAPHIC SCALES



DESIGN DATA

ADT = 2,800 (2007)
ADT = 4,350 (2027)
DHV = 10 %
D = 65 %
T = 4 % (1%TTST +3%DUAL)
V = 60 MPH *

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-3126 = 0.192 MI.
LENGTH OF STRUCTURE TIP PROJECT B-3126 = 0.035 MI.
TOTAL LENGTH OF TIP PROJECT B-3126 = 0.227 MI.

Prepared In the Office of:
Stantec
Stantec Consulting Inc.
801 Jones Franklin Road, Suite 300
Raleigh, NC U.S.A.
27606
Tel. 919.851.6866 Fax. 919.851.7024
www.stantec.com

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 21, 2005

LETTING DATE:
JULY 17, 2007

G. SCOTT BOYLES, P.E.
PROJECT ENGINEER

KEITH HUDSON
PROJECT DESIGN ENGINEER

NCDOT-CONTACT: ***CATHY S. HOUSER P.E.***
PROJECT ENGINEER - ROADWAY DESIGN

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15755 ENGINEER G. SCOTT BOYLES

SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

3/9/2007
5:20:38 PM
u:\roadway\proj\b3126_roy_tshudgn

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
B-3126	1-A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL SHEETS, AND LIST OF STANDARDS
1-B	CONVENTIONAL SYMBOLS
1-C	SURVEY CONTROL SHEET
1-D	CENTERLINE COORDINATES LISTING
2	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2-A THRU 2-C	HYDRAULIC / NATURAL STREAM DETAILS
2-D	ANCHORAGE FOR FRAMES DETAIL
2-E	PARCEL INDEX SHEET
3	SUMMARY OF QUANTITIES
3-A	DRAINAGE SUMMARY
3-B	EARTHWORK SUMMARY, PAVEMENT REMOVAL AND GURADRAIL SUMMARY
4	PLAN SHEET
5	PROFILE SHEET
TCP-1 THRU TCP-7	TRAFFIC CONTROL PLANS
EC THRU EC___	EROSION CONTROL PLANS
RF-1	REFORESTATION PLAN
UC-1 THRU UC-	UTILITY CONSTRUCTION
UO-1 THRU UO-2	UTILITY BY OTHERS
X-1	CROSS SECTION SUMMARY SHEET
X-2 THRU X-10	CROSS-SECTIONS
S-1 THRU S-___	STRUCTURE PLANS

ROADWAY STANDARD DRAWINGS

EFF. 07-18-06
REV. 01-02-07

2006 ROADWAY STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation - Method 'A'
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.03	Pipe Underdrain and Blind Drain
816.01	Concrete Pads - for Shoulder Drain Installation
840.00	Concrete Base Pad for Drainage Structures
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.02	Drop Inlet Installation in Expressway Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
866.04	Barbed Wire Fence with Wood Posts (2 - 7 Strands)
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

GENERAL NOTES

GENERAL NOTES: 2006 SPECIFICATIONS
EFFECTIVE: 07-18-06
REVISED: 07-18-06

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

SAFETY CLEARING:

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE AREAS IN THE PLANS DESIGNATED SAFETY CLEARING. THE LIMITS ARE AS SHOWN AND THE CLEARING AND GRUBBING IS CONSIDERED A PART OF THE LUMP SUM ITEM FOR "CLEARING AND GRUBBING".

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3' RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING" OR "TEMPORARY SHORING-BARRIER SUPPORTED" DEPENDING UPON THE LOCATION OF THE SHORING.

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE Blue Ridge EMC, Sprint, Caldwell

County Water District, Roanoke EMC Power

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT.

3/29/2007
U:\Roadway\Proj\B3126_RDY_PSH_1A.dgn
jaadd

PROJECT REFERENCE NO.	SHEET NO.
B-3126	1B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- River Basin Buffer — RBB
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

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

MINOR:

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

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
32880.1.1	1C
Location and Surveys	

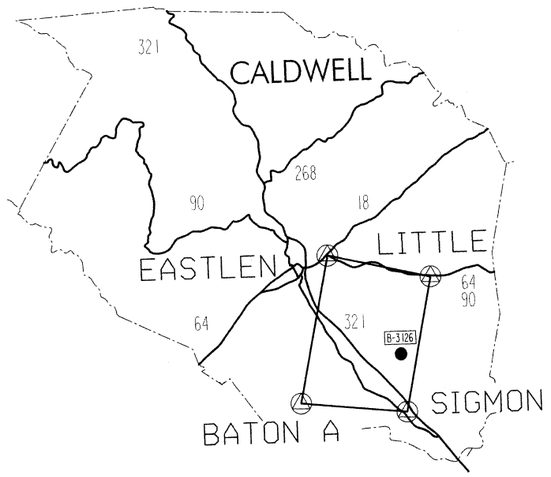
SURVEY CONTROL SHEET B-3126

BL

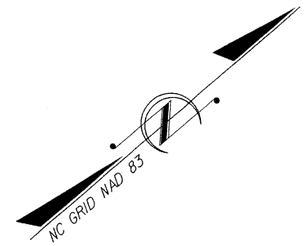
POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
11	GPS B3126-1	769885.0420	1277545.8540	1190.48'	OUTSIDE PROJECT LIMITS	
12	GPS B3126-2	770704.4100	1277655.3680	1148.48'	11+05.80	33.32 LT
1	BL-1	770887.9170	1278043.2470	1104.36'	14+96.35	142.31 RT
2	BL-2	771121.7500	1278166.2150	1094.77'	17+53.79	82.95 RT
3	BL-3	771393.8970	1278275.5910	1117.29'	20+30.50	14.13 LT
4	BL-4	771639.2810	1278694.8880	1156.15'	OUTSIDE PROJECT LIMITS	

****
BM#1 ELEVATION = 1190.48'
N 769885 E 1277546
OUTSIDE PROJECT LIMITS
GPS B3126-1 REBAR AND CAP
-BL- STA. 5+00.00 0.00' LT/RT
****
****
BM#2 ELEVATION = 1084.85
N 770985 E 1278195
L STATION 16+69 194' RIGHT
R/R SPIKE IN BASE OF 36" MAPLE TREE
-BL- STA. 19+12 89' RT.
****

****
BM#3 ELEVATION = 1155.97
N 771672 E 1278732
OUTSIDE PROJECT LIMITS
R/R SPIKE IN BASE OF 12" OAK TREE
49' BEYOND BL-4 AND 30' NORTH OF CL OF
DEAL MILL ROAD
****

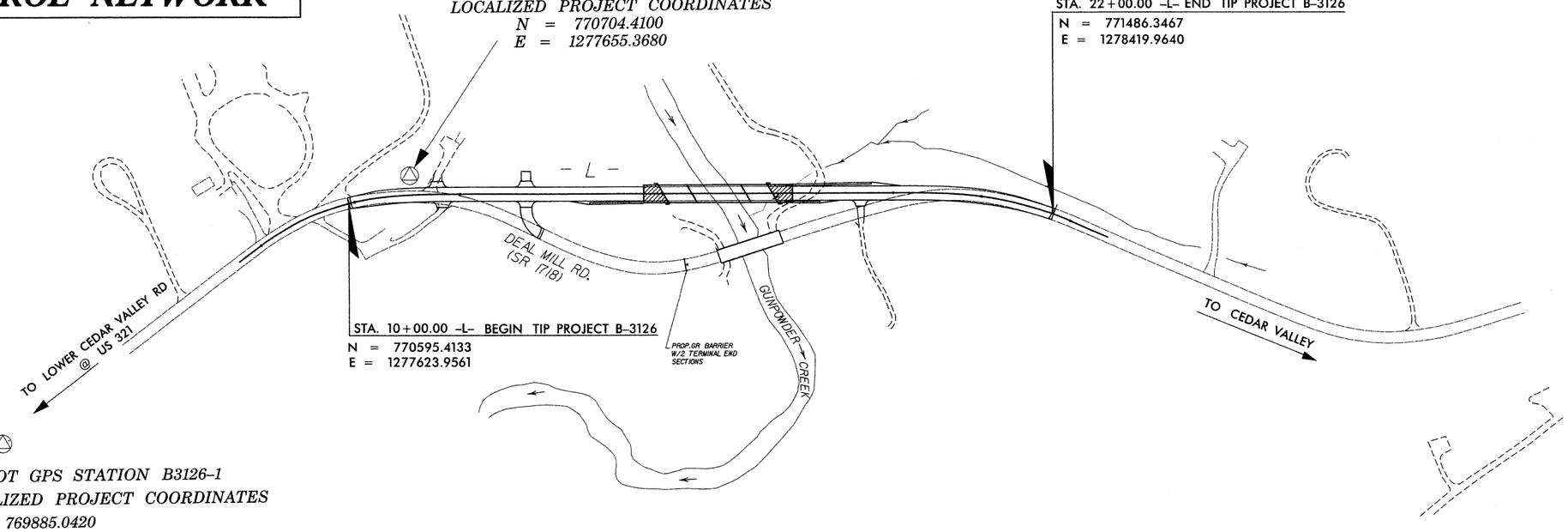


GPS CONTROL NETWORK



NC DOT GPS STATION B3126-2
LOCALIZED PROJECT COORDINATES
N = 770704.4100
E = 1277655.3680

STA. 22+00.00 -L- END TIP PROJECT B-3126
N = 771486.3467
E = 1278419.9640



STA. 10+00.00 -L- BEGIN TIP PROJECT B-3126
N = 770595.4133
E = 1277623.9561

NC DOT GPS STATION B3126-1
LOCALIZED PROJECT COORDINATES
N = 769885.0420
E = 1277545.8540

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B3126-2" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 770704.4100(ft) EASTING: 1277655.3680(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999874710 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B3126-2" TO -L- STATION 10+00.00 IS S 16°04'35" W 113.43' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29

NOTES:

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT
B3126_LS_CONTROL_050308.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

3/22/2007
u:\LocationSurveys\B3126_ls_lc_050308.dgn

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

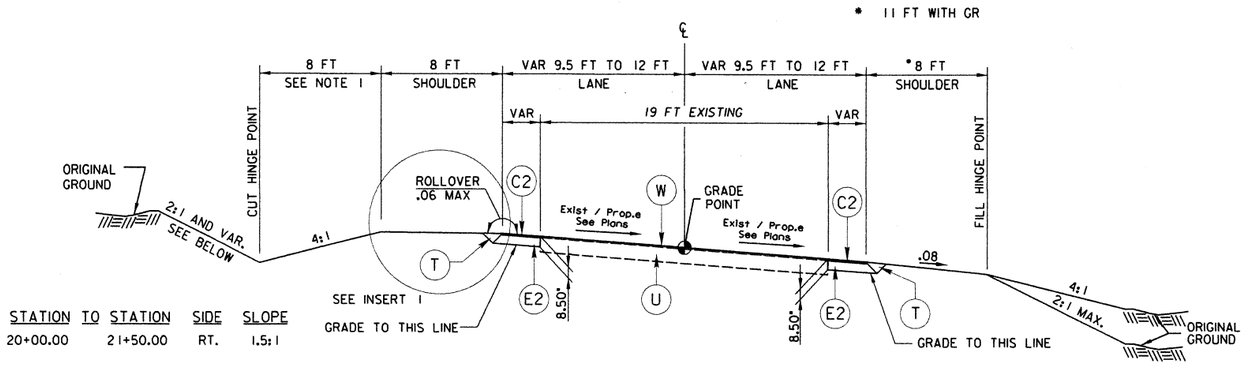
CENTERLINE COORDINATE LISTING

Disclaimer: This coordinate list is provided for the convenience of interested contractors and is intended for use during the project bidding process only. Coordinates are localized to this particular project and any conversion to state grid coordinates or other formats will be the responsibility of the recipient. While every effort has been made to provide up–to–date, accurate information, NCDOT makes no express guarantee as to the validity or potential for revision of this information prior to project letting.

Point #	Chain	Station	Northing(Y)	Easting(X)
1	L	7+88.133	770390.5735	1277577.6186
2	L	8+00.000	770402.4154	1277578.3836
3	L	9+00.000	770501.5841	1277590.0886
4	L	10+00.000	770595.4133	1277623.9561
5	L	11+00.000	770679.3210	1277678.0818
6	L	12+00.000	770756.1586	1277742.0607
7	L	13+00.000	770831.9472	1277807.2993
8	L	14+00.000	770907.7359	1277872.5380
9	L	15+00.000	770983.5245	1277937.7767
10	L	16+00.000	771059.3131	1278003.0153
11	L	17+00.000	771135.1017	1278068.2540
12	L	18+00.000	771210.8904	1278133.4927
13	L	19+00.000	771286.6790	1278198.7314
14	L	20+00.000	771361.8927	1278264.6241
15	L	21+00.000	771430.7828	1278336.9819
16	L	22+00.000	771486.3467	1278419.9639
17	L	22+99.568	771530.0631	1278509.4085

PROJECT REFERENCE NO.	SHEET NO.
B-3126	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	

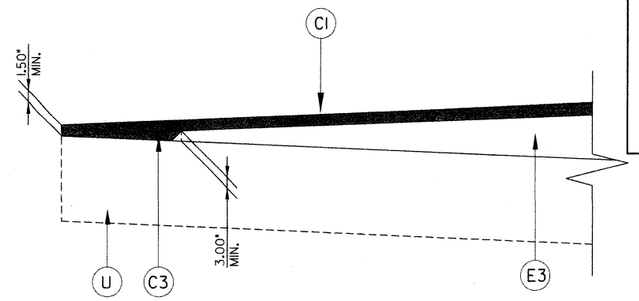
NORTH CAROLINA PROFESSIONAL SEAL 15755 ENGINEER G. SCOTT BAILES
2/16/07



STATION	TO	STATION	SIDE	SLOPE
20+00.00		21+50.00	RT.	1.5:1

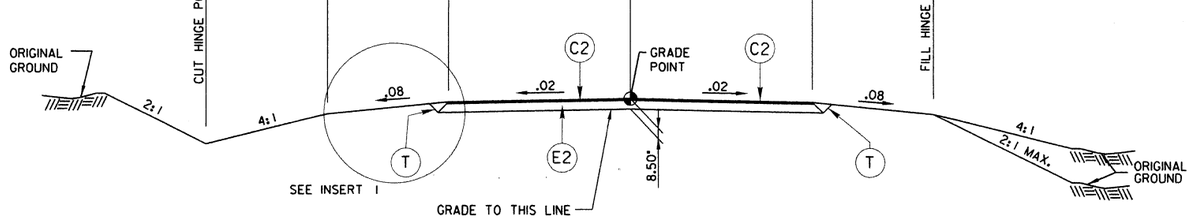
ROADWAY	FROM STATION	TO STATION	REMARKS
-L-	10+00.00	12+20.00	SEE INSERT 1
-L-	19+40.00	22+00.00	

TYPICAL SECTION NO. 1
NARROW WIDENING



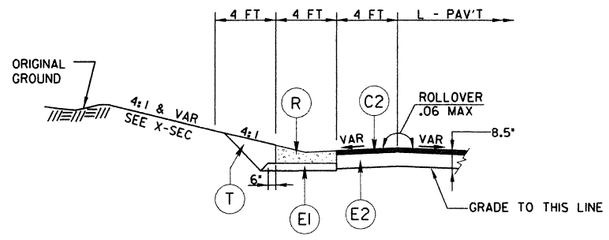
WEDGING DETAIL

Stantec
Stantec Consulting Inc.
Suite 300, 801 Jones Franklin Road
Raleigh NC U.S.A.
27606
Tel. 919.851.6866
Fax. 919.851.7024
www.stantec.com



ROADWAY	FROM STATION	TO STATION	REMARKS
-L-	12+20.00	15+35.00 (BEG BR)	SEE INSERT 1
-L-	17+20.00 (END BR)	19+40.00	

TYPICAL SECTION NO. 2



ROADWAY	STA	TO	STA	SIDE
-L-	10+25.00		12+77.00	LT.

INSERT 1
USE IN CONJUNCTION W/ TS NO'S 1&2

PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.50" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165.0 LBS. PER SQ. YD.
C2	PROP. APPROX. 3.00" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165.0 LBS. PER SQ. YD. IN EACH OF TWO LAYERS
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1" OR GREATER THAN 1.5".
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH
R	CONCRETE EXPRESSWAY GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	PROP.VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

NOTES:

1. DISTANCE WILL VARY TO REACH THE DESIRED ELEVATION AS ESTABLISHED BY THE DITCH GRADE.(SEE PROFILES AND X-SECTIONS)

2. ALL PAVEMENT STRUCTURE SLOPES ARE 1:1 UNLESS OTHERWISE SPECIFIED.

2/14/2007
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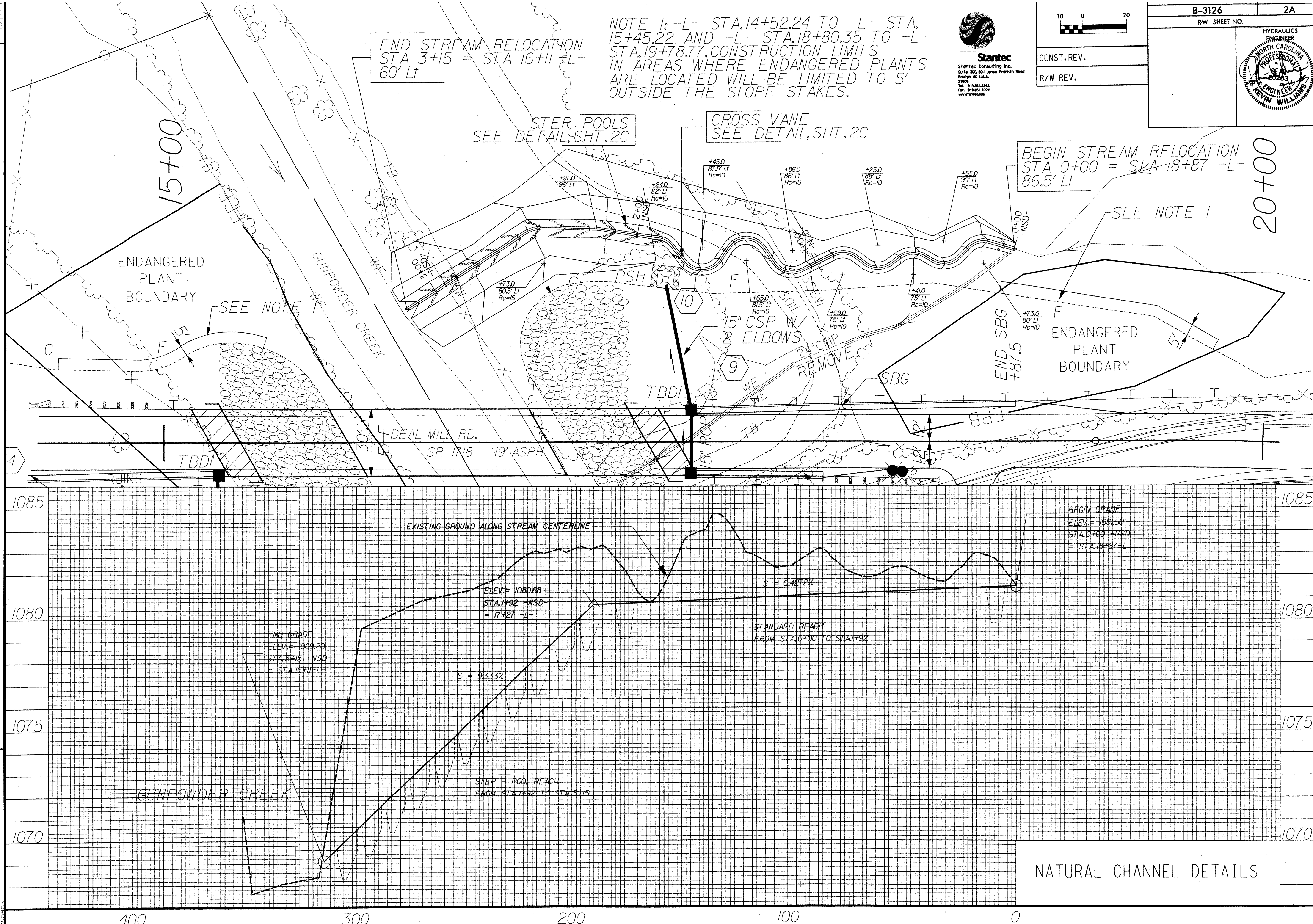

B-3126
2A
R/W SHEET NO.
HYDRAULICS ENGINEER
CONST. REV.
R/W REV.
Stantec
NOTE 1: -L- STA. 14+52.24 TO -L- STA. 15+45.22 AND -L- STA. 18+80.35 TO -L- STA. 19+78.77, CONSTRUCTION LIMITS IN AREAS WHERE ENDANGERED PLANTS ARE LOCATED WILL BE LIMITED TO 5' OUTSIDE THE SLOPE STAKES.
END STREAM RELOCATION STA 3+15 = STA 16+11 -L- 60' Lt
STEP POOLS SEE DETAIL, SHT. 2C
CROSS VANE SEE DETAIL, SHT. 2C
BEGIN STREAM RELOCATION STA 0+00 = STA 18+87 -L- 86.5' Lt
SEE NOTE 1
15+00
20+00
ENDANGERED PLANT BOUNDARY
GUNPOWDER CREEK
15" CSP W/ 2 ELBOWS
24" CMP REMOVE
END SBG +87.5
DEAL MILL RD.
SR 1718
19' ASPH
RUINS
TBDI
PSH
1085
1080
1075
1070
EXISTING GROUND ALONG STREAM CENTERLINE
BEGIN GRADE ELEV.= 1081.50 STA. 0+00 -NSD- = STA. 18+87 -L-
S = 0.4272%
ELEV.= 1080.68 STA. 1+92 -NSD- = 17+27 -L-
STANDARD REACH FROM STA. 0+00 TO STA. 1+92
END GRADE ELEV.= 1069.20 STA. 3+15 -NSD- = STA. 16+11 -L-
S = 9.333%
STEP - POOL REACH FROM STA. 1+92 TO STA. 3+15
GUNPOWDER CREEK
NATURAL CHANNEL DETAILS
400
300
200
100
0
2A

PROJECT REFERENCE NO.	SHEET NO.
B-3126	2B
R/W SHEET NO.	

HYDRAULICS ENGINEER

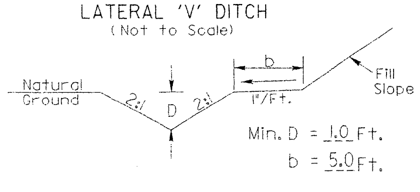
Stantec
Stantec Consulting Inc.
Suite 300, 801 Jones Franklin Road
Raleigh NC U.S.A.
27606
Tel. 919.851.6866
Fax. 919.851.7024
www.stantec.com

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20685 KEVIN WILLIAMS

REVISIONS

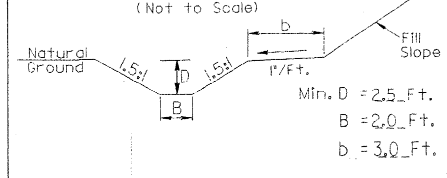
8/17/99

DETAIL A
LATERAL 'V' DITCH
(Not to Scale)



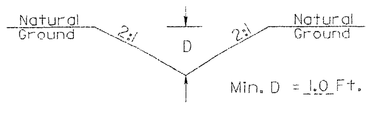
STA 13+80 RT TO 14+20 RT

DETAIL G
LATERAL BASE DITCH
(Not to Scale)



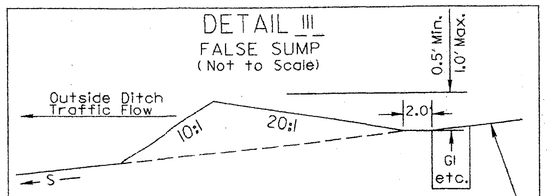
STA 21+00 LT TO 22+00 LT

DETAIL B
TAIL 'V' DITCH
(Not to Scale)

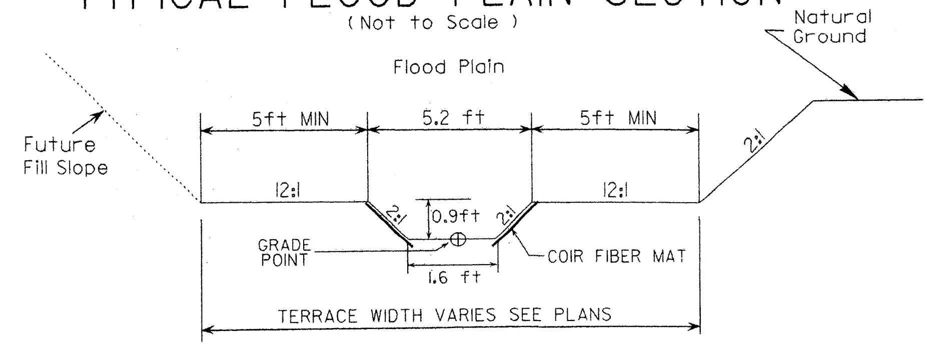


STA 14+50 RT

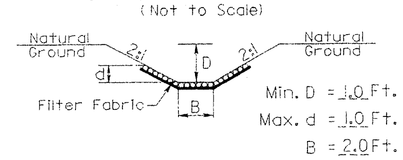
DETAIL III
FALSE SUMP
(Not to Scale)



TYPICAL FLOOD PLAIN SECTION
(Not to Scale)



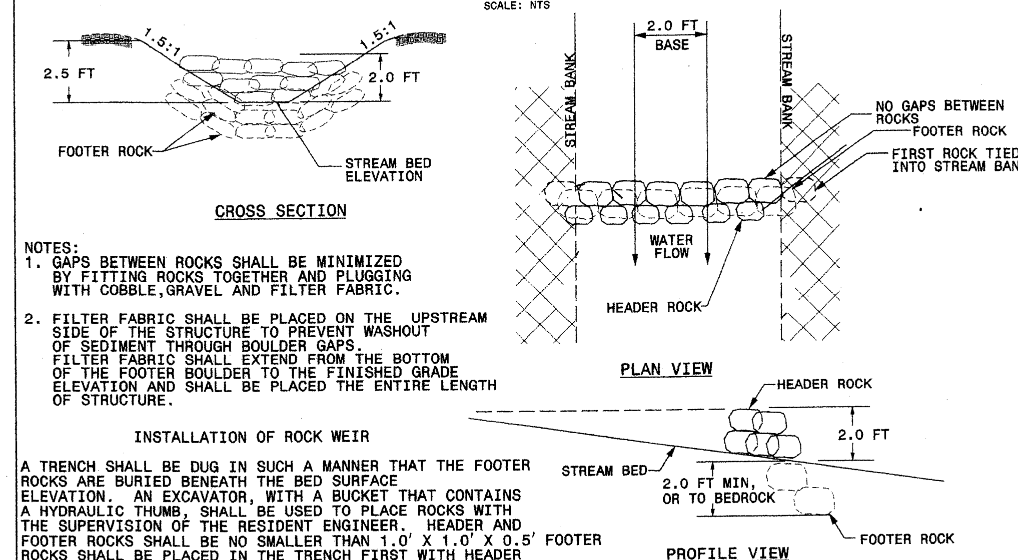
DETAIL C
STANDARD BASE DITCH
(Not to Scale)



Type of Liner = CLASS 'B' RIP RAP

STA 15+90 RT

DETAIL H ROCK WEIR
SCALE: NTS



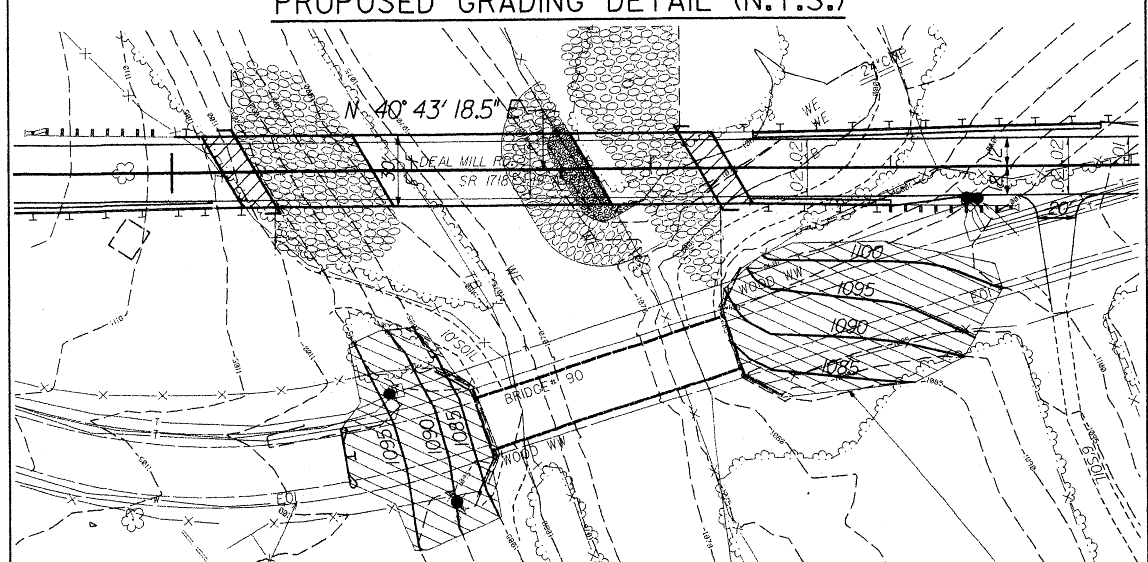
NOTES:
1. GAPS BETWEEN ROCKS SHALL BE MINIMIZED BY FITTING ROCKS TOGETHER AND PLUGGING WITH COBBLE, GRAVEL AND FILTER FABRIC.

2. FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF STRUCTURE.

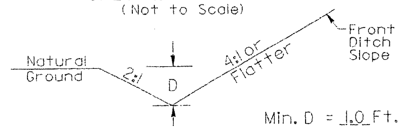
INSTALLATION OF ROCK WEIR

A TRENCH SHALL BE DUG IN SUCH A MANNER THAT THE FOOTER ROCKS ARE BURIED BENEATH THE BED SURFACE ELEVATION. AN EXCAVATOR, WITH A BUCKET THAT CONTAINS A HYDRAULIC THUMB, SHALL BE USED TO PLACE ROCKS WITH THE SUPERVISION OF THE RESIDENT ENGINEER. HEADER AND FOOTER ROCKS SHALL BE NO SMALLER THAN 1.0' X 1.0' X 0.5' FOOTER ROCKS SHALL BE PLACED IN THE TRENCH FIRST WITH HEADER ROCKS PLACED ON TOP PRIOR TO BACK FILLING OF THE TRENCH.

PROPOSED GRADING DETAIL (N.T.S.)

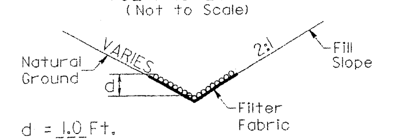


DETAIL D
SPECIAL CUT DITCH
(Not to Scale)



STA 13+50 LT TO 14+00 LT
STA 13+25 RT TO 13+80 RT

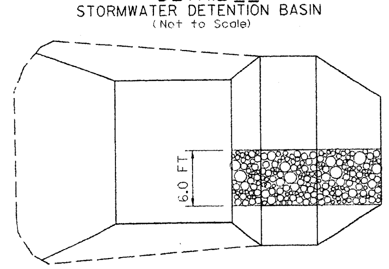
DETAIL E
TOE PROTECTION
(Not to Scale)



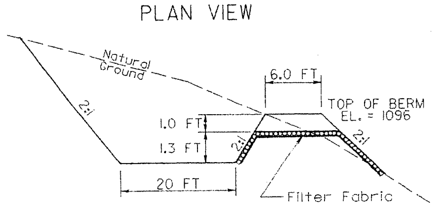
Type of Liner = CLASS 'B' RIP RAP

STA 19+24 RT TO 19+55 RT

DETAIL F
STORMWATER DETENTION BASIN
(Not to Scale)



PLAN VIEW



CROSS-SECTION VIEW

SPILLWAY LINER = CLASS 'B' RIP RAP

HYDRAULIC DETAILS

9/07/2005
...\Roadway\Proj\B3126_RDY_TYP_2b.dgn

7/2/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-3126	2C
R/W SHEET NO.	

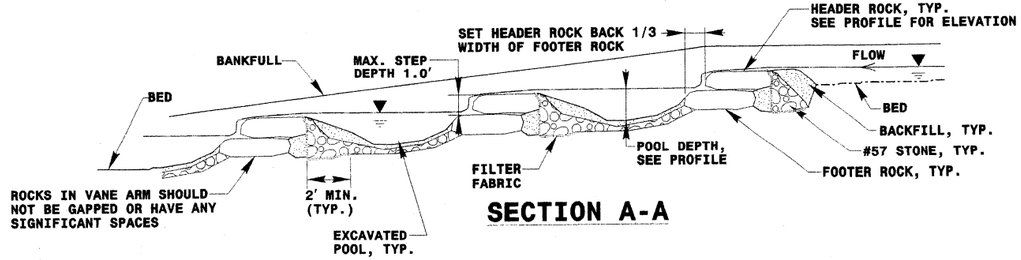
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022655 ENGINEER KEVIN WILLIAMS 9-15-05

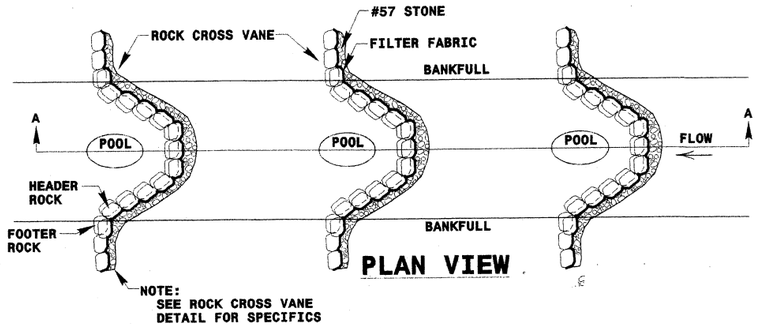
STEP POOL DETAIL

NOT TO SCALE

Sta 16+11 to 17+27 -L- Lt
(Sta 3+15 to 1+92 -NSD-)



SECTION A-A

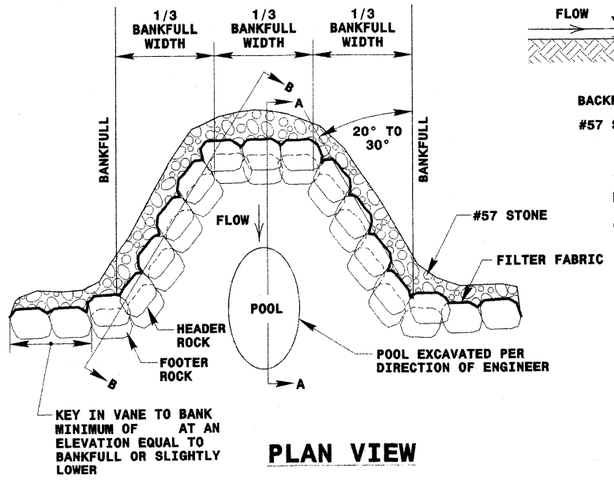


PLAN VIEW

NOTES:
1. STEPS TO BE SHORT, FREQUENT, AND CLOSELY SPACED.
2. POOL SPACING SHALL BE INVERSELY PROPORTIONAL TO STREAM SLOPE, AND DIRECTLY PROPORTIONAL TO BANKFULL WIDTH.
3. POOL DEPTHS AT BANKFULL ELEVATION SHALL BE TYPICALLY 2 TO 3 TIMES DEEPER THAN STEP DEPTHS AT BANKFULL ELEVATION.
4. ADEQUATE NUMBER OF FOOTER BOULDERS TO BE USED IN ORDER TO HOLD UP THE BOULDERS AT HEAD OF STEPS DURING HIGH ENERGY/HIGH FLOW EVENTS.
5. STEP POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

ROCK CROSS VANE DETAIL FOR STEP POOLS OR PER EACH

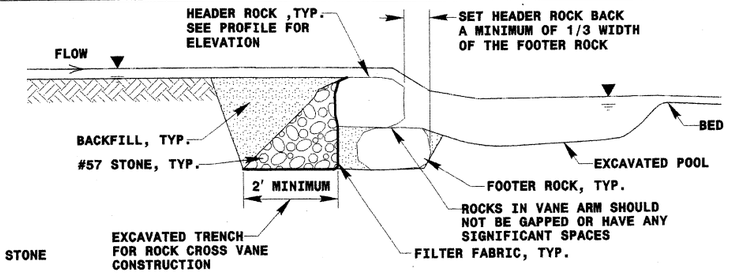
NOT TO SCALE



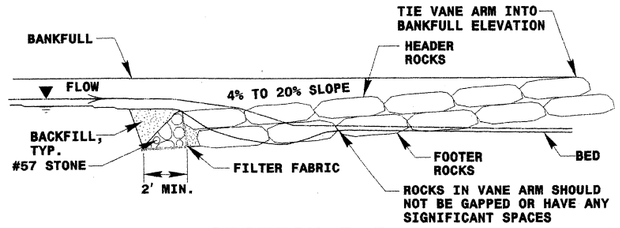
PLAN VIEW

	BOULDER DIMENSIONS (FEET)		
STATION	HEIGHT	LENGTH	WIDTH
**	1.5'	2.0'	1.5'
17+36-L-Lt =1+77 -NSD-	1.5'	2.0'	1.5'
18+82-L-Lt =0+05 -NSD-	1.5'	2.0'	1.5'

** Begin Sta 16+11 -L- Lt and Space Every 11' to Sta 17+27 -L- Lt



SECTION A-A



SECTION B-B

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

PROJECT REFERENCE NO.	SHEET NO.
B-3126	2-D

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

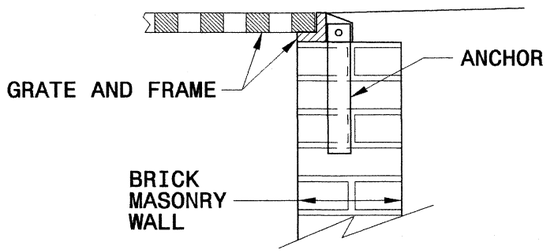
ENGLISH DETAIL DRAWING FOR

ANCHORAGE FOR FRAMES

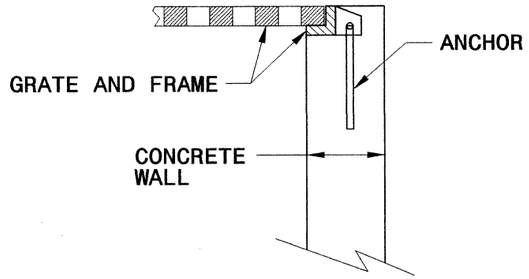
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1

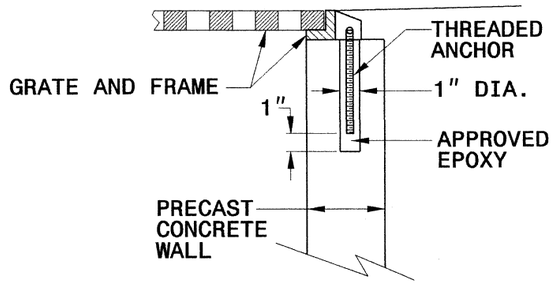
840D25



BRICK MASONRY CONSTRUCTION



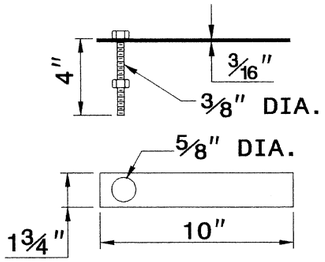
CONCRETE CONSTRUCTION



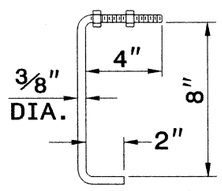
PRECAST CONCRETE CONSTRUCTION

DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

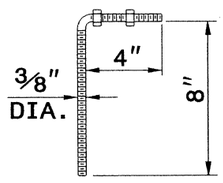
NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



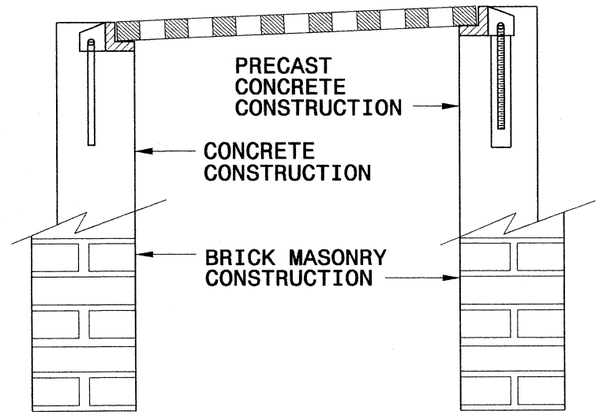
MASONRY ANCHOR
3/8" DIA. BOLT WITH PLATE



CONCRETE ANCHOR
3/8" DIA. BENT BAR



PRECAST CONCRETE ANCHOR
3/8" DIA. BENT BAR



FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

ANCHORAGE FOR FRAMES

BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1

840D25

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: 2006 STD 840.25 DATE: 07/18/06
MODIFIED BY: E.E. WARD DATE: 9/25/06
CHECKED BY: DATE:
FILE SPEC.:

PROJ. REFERENCE NO.	SHEET NO.
B-3126	2-E

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	Sherry Homes
2	4	Verna L. Hall
3	4	J. Carl & Minnie B. Bowman
4	4	Donald & Opal Rivers
5	4	Stacy Lee Ward
6	4	Leslie D. Dotson
7	4	J. D. Ward
8	4	Gloria B. Shock

PARCEL No.	SHEET No.	PROPERTY OWNER NAME

PROJECT REFERENCE NO.	SHEET NO.
B-3126	3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

5/28/99

6/17/2005
I:\Roadway\Proj\B3126_RDY TSH.dgn
mwhite

COMPUTED BY: Jim Davis DATE: 2/17/2005

CHECKED BY: Jason Gaddy DATE: 3/21/2007

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
B-3126	3A

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 OTHERWISE) 12"	15"	18"	24"	30"	36"	42"	45"	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	CU. YARDS C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	LIN. FT. A 5.0' THRU 10.0'	LIN. FT. B 10.0' AND ABOVE	"TOTAL L.F. FOR PAY" QUANTITY SHALL BE COL. "A" + (1.3 X COL. "B")	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	TRAFFIC BEARING D.I. STD.840.35	G.D.I. TYPE "S" STD 840.18 OR 840.27	PREFORMED SCOUR HOLE	CORR. STEEL ELBOWS NO. & SIZE		PIPE REMOVAL LIN. FT.	REMARKS
SIZE																																											
THICKNESS OR GAUGE		FROM	TO													.064	.064	.064	.064	.079	.079	.109	.109																					
11+50	LT																																									DRAINAGE STR. NO. 1 & 5 NOT BEING USED
11+65	RT	2																						36																		24	REMOVE EXIST. 15" PIPE
12+79	LT	3		1131.35	1128.60																								1			1		1						20	REMOVE EXIST. 15" PIPE
12+79	LT	3	3A	1131.35	1128.60	1125.59			44																																	
14+00	LT	4			1117.8	1113.5				72																																	
15+26	RT	6		1113.85	1110.54																								1			1		1								
15+26	RT	6	7	1113.85	1110.54	1108.00											20																								2 @ 15			
17+40	RT	8		1106.63	1103.46																								1			1		1								
17+40	RT	8	9	1106.63	1103.46	1103.32			28																																	
17+40	LT	9		1106.63	1103.32																								1			1		1								
17+40	LT	9	10	1106.63	1103.32	1081.00											56																								1	2 @ 15		
18+00	LT																																									24	REMOVE EXIST. 24" PIPE
TOTAL									72	72							76							36					4			4	3	1						1	4@15"		68	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	MEDIAN DROP INLET
G.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 JUNCTION BOX

COMPUTED BY: JTG DATE: Oct. 2006
CHECKED BY: KFH DATE: Mar. 2007

PROJECT NO.	SHEET NO.
B-3126	3B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

CUBIC YARDS					
STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
SUMMARY NO. 1					
10+00.00	15+81.99	773	3,014	2,241	
TOTAL SUMMARY NO. 1		**773**	**3,014**	**2,241**	
SUMMARY NO. 2					
16+82.12	22+00	1,391	15,366	13,975	
TOTAL SUMMARY NO. 2		**1,391**	**15,366**	**13,975**	
SUBTOTALS:		**2,164**	**18,380**	**16,216**	
ADJUSTMENT DUE TO:					
Est. Loss Due to Clearing & Grubbing		-550		550	
PROJECT TOTALS:		**1,614**		**16,766**	
Est. 5% for Replacing Top Soil on Borrow Pits				838	
GRAND TOTALS:		1,614		17,604	
SAY:		**1,700**		**17,700**	

Est. Undercut Excavation = 110 CY
Est. Pavement Structure Volume = 121 CY

SUMMARY OF ASPHALT PAVEMENT REMOVAL

SQUARE YARDS					
LINE	STA	STA	LOC	ASPHALT REMOVAL	ASPHALT BREAK-UP
-L-	11+00.00	13+25.00	RT	267.8	
-L-	15+70.00	16+29.00	RT	125.4	
-L-	17+35.00	20+12.00	RT	468.8	
TOTAL				**862**	
SAY				**865**	

Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

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".

GUARDRAIL SUMMARY

W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

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.

LINE	BEG. STA.	END STA.	LOC.	LENGTH			WARRANT POINT		'N" DIST	TOTAL	FLARE LENGTH		W		ANCHORS						IMP. ATTEN. TYPE 350			REMOVE		REMARKS
				STRAIGHT LIN. FT.	SHOP CURVED	DOUBLE FACED	APPR. END	TRAIL. END	FROM E.O.L.	SHLDR WIDTH	APPR. END	TRAIL. END	APPR. END	TRAIL. END	B-77		GRAU 350		Term. Section			EA	G	NG	EXISTING GRDRAIL		
-L-	13+76.34	15+26.34	LT	150.0				15+26.34	3'	11'		131.25		2.375	1		1									
-L-	13+56.16	15+43.66	RT	187.5			15+43.66		3'	11'	168.75		3.125		1		1									
-L-	15+70.00	---	RT	25.0			Dead End												2							
-L-	17+11.34	21+98.84	LT	487.5			21+98.84		8'	11'	218.75	250	3.000	5.00	1		1									
-L-	17+28.66	18+53.66	RT	125.0				17+28.66	3'	11'		106.25		1.875	1		1									
		SUB TOTAL=		**975.0**											4.0		4.0		2.0							
	DEDUCTION FOR ANCHOR UNITS=																									
		TYPE B-77 =	4 @ 18.75	-75																						
		GRAU 350 =	4 @ 50	-200																						
		GRAND TOTAL =		**700.0**											**4.0**		**4.0**		**2.0**							
		SAY =		**700.0**																						

ADDITIONAL GUARDRAIL POST 5 EA.

PROJECT REFERENCE NO.	SHEET NO.
B-3126	4

CONST. REV.

R/W REV.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15755 ENGINEER G. SCOTT BOYLES

Stantec
Stantec Consulting Inc.

REVISIONS

* L-LINE

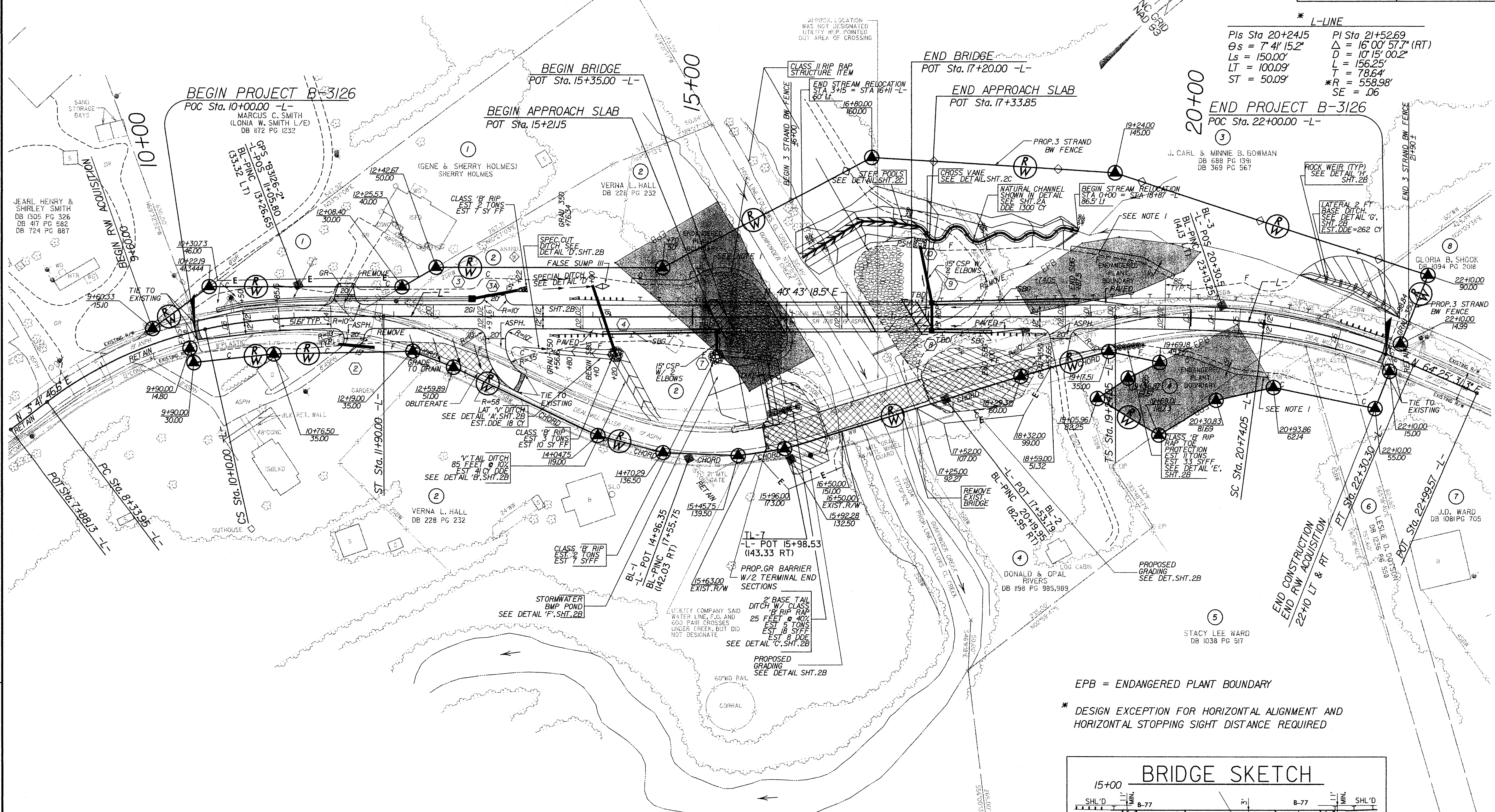
PI Sta 9+23.34
Δ = 24° 30' 02.3" (RT)
D = 13° 54' 59.5"
L = 176.05'
T = 89.39'
* R = 411.71'
SE = .08

PIs Sta 10+70.27
Θs = 12° 31' 29.6"
Ls = 180.00'
LT = 120.30'
ST = 60.27'

* L-LINE

PIs Sta 20+24.15
Θs = 7° 41' 15.2"
Ls = 150.00'
LT = 100.09'
ST = 50.09'

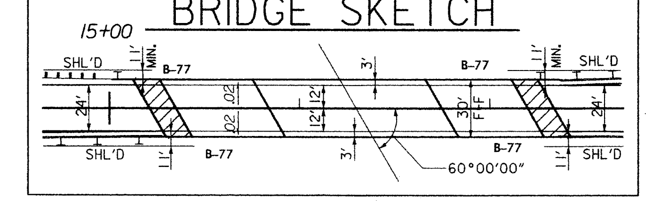
PI Sta 21+52.69
Δ = 16° 00' 57.7" (RT)
D = 10° 15' 00.2"
L = 156.25'
T = 78.64'
*R = 558.98'
SE = .06



EPB = ENDANGERED PLANT BOUNDARY

* DESIGN EXCEPTION FOR HORIZONTAL ALIGNMENT AND HORIZONTAL STOPPING SIGHT DISTANCE REQUIRED

BRIDGE SKETCH



NOTE 1: LIMITS WHERE ENDANGERED PLANTS ARE LOCATED WILL BE LIMITED TO 5' OUTSIDE THE SLOPE STAKES ON PARCELS 2,3,4 AND 5

REFERENCES:
1. FOR -L-LINE PROFILE, SEE SHEET 5
FOR PROP. GRADING DETAIL, SEE SHEET 2B
2. FOR DITCH DETAILS, SEE SHEET 2B

8/17/99

3/23/2007 U:\Roadway\Proj\B3126_RDY_PSH_04.dgn

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-3126	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15755 ENGINEER G SCOTT BOYLES

Stantec
Stantec Consulting Inc.
Suite 300, 801 Jones Franklin Road
Raleigh NC U.S.A.
27606
Tel. 919.851.6866
Fax. 919.851.7024
www.stantec.com

BM#2
RR SPIKE IN BASE OF 36" MAPLE TREE, BL 19+12.00 89.00' RT ELEV. = 1084.85 -L- 16+69.194 RT

PROP. 18" RCP STA. 14+10

DRAINAGE AREA	0.56 Ac
DESIGN FREQUENCY	25 YR
DESIGN DISCHARGE	1.40 ft^3/s
DESIGN HIGH WATER ELEV.	1118.51 ft
Q100 DISCHARGE	1.70 ft^3/s
Q100 HIGH WATER ELEV.	1118.58 ft
OVERTOPPING FREQUENCY	500+ YR
OVERTOPPING DISCHARGE	13.5 ft^3/s
OVERTOPPING ELEV.	1121.45 ft

HYDRAULIC DATA

DRAINAGE AREA	20.2 Sq. MI.
DESIGN DISCHARGE	3400 ft^3/s
DESIGN FREQUENCY	25 YR.
DESIGN HIGH WATER ELEV.	1079.30 ft
Q100 DISCHARGE	5000 ft^3/s
Q100 HIGH WATER ELEV.	1081.89 ft
OVERTOPPING FREQUENCY	500+ YR
OVERTOPPING DISCHARGE	42500 ft^3/s
OVERTOPPING ELEV.	1107.00 ft

BEGIN PROJECT
STA. 10+00.00 -L-
ELEV. = 1154.58

STA. 16+30.00 -L-
BRIDGE I.D. STATION
54" CONCRETE GIRDER
1@50°; 1@90°; 1@45°
SKEW=60°00'00"

END PROJECT
STA. 22+00.00 -L-
ELEV. = 1129.34

EXIST. ELEV. 1154.58

*-6.7600%

PROPOSED GRADE LINE

*-8.5000%

PVI = 10+50.00
EL. = 1151.20
VC = 100.00'
*K = 57

BEGIN BRIDGE
STA. 15+35.00 -L-
ELEV. = 1112.25

+22 LT 1125.59
+00 LT 1117.87
+25 RT 1124.90
+80 RT 1118.30
+20 RT 1113.50

30" @ 9.5%
36" @ 12.1%

18" RCP

GUNPOWDER CREEK

END BRIDGE
STA. 17+20.00 -L-
ELEV. = 1107.05

PVI = 17+00.00
EL. = 1095.95
VC = 600.00'
*K = 40

PVI = 21+50.00
EL. = 1125.20
VC = 100.00'
*K = 56

EXIST. ELEV. 1129.34

*+8.2800%

*+6.5000%

LATERAL BASE DITCH @ 8.12%

LATERAL BASE DITCH @ 11.00%

+00 LT 1117.57
+50 LT 1109.06
+00 LT 1105.00

EXIST. GROUND LINE

1:3
1:3
12'

10' CLASS A RIP RAP
TEMPORARY WORK PAD
CLASS II RIP RAP (STRUCTURE ITEM)

DITCH LEGEND

RIGHT DITCH ----------

LEFT DITCH ——·——·——

*DESIGN EXCEPTION FOR VERTICAL ALIGNMENT AND VERTICAL STOPPING SIGHT DISTANCE REQUIRED.

REFERENCE:
FOR L-LINE PLAN, SEE SHEET NO. 4

PVC +00.00 1154.58
PVT +00.00 1146.95
PVC +00.00 1121.45
LOW +40.00 1107.00
PVT +00.00 1115.45
PVC +00.00 1121.95
PVT +00.00 1129.34

3/22/2007
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Caldwell County
Bridge No. 90, on SR 1718
Over Gunpowder Creek
Federal Aid Project BRZ-1718(3)
State Project 8.2732701
TIP Project B-3126

CATEGORICAL EXCLUSION

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

AND

N.C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

APPROVED:

9/17/04
DATE

for Gregory J. Thorpe, PhD
Environmental Management Director
Project Development and Environmental Analysis Branch

9/22/04
Date

for John F. Sullivan, III
Division Administrator, FHWA

Caldwell County
Bridge No. 90, on SR 1718
Over Gunpowder Creek
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State Project 8.2732701
TIP Project B-3126

CATEGORICAL EXCLUSION

Documentation Prepared in Project Development and Environmental Analysis Branch By:

Sept. 17, 04
Date

Dennis Pipkin
Dennis Pipkin, P.E.
Project Planning Engineer

9/17/04
Date

William T. Goodwin, Jr.
William T. Goodwin, Jr., P.E.
Unit Head, Bridge Replacement Planning Unit

ENVIRONMENTAL COMMITMENTS:

Caldwell County
Bridge No. 90, on SR 1718
Over Gunpowder Creek
Federal Aid Project BRZ-1718(3)
State Project 8.2732701
TIP Project B-3126

1. Roadway Design Unit, Roadside Environmental Unit, Resident Engineer:

Revegetation: The existing bridge and approaches will be removed after the new bridge is completed, and the area will be revegetated with appropriate plant species.

2. Roadway Design Unit, Structure Design Unit, Project Development & Environmental Analysis Branch (Permits), Resident Engineer:

Bridge Demolition:

The bridge railings, deck, and superstructure are composed of steel. The substructure is composed of timber on concrete sills. The bridge rail, asphalt wearing surface, superstructure, and timber components of the substructure will be removed without dropping any material into Waters of the United States. However, there is potential for other components of the bridge to be dropped into Waters of the U.S. during construction. The resulting temporary fill associated with the concrete sills would be approximately 18 cubic yards. During construction, Best Management Practices for Bridge Demolition and Removal will be followed.

Federally Protected Species:

The dwarf-flowered heartleaf plant will be affected by the proposed project. Mitigation activities will be carried out as agreed during the Section 7 Process and as specified in the Biological Opinion rendered by the US Fish & Wildlife Service. The major mandatory requirements of the Biological Opinion are summarized as follows; see appendix to this Categorical Exclusion document for further details:

1. Cut and fill slopes to be kept to a maximum of 2:1.
2. Storm-water discharge directed to east side of road.
3. Construction limits in areas where the endangered plants are located will be limited to five feet outside the slope stakes.
4. All areas near the project containing the dwarf-flowered heartleaf plants will be protected from disturbance by construction activities.
5. A biologist from the US Fish & Wildlife Service will attend preconstruction meetings.
6. The area of the existing bridge to be removed will be graded and revegetated to mimic adjacent conditions.
7. The NCDOT will protect approximately 70 dwarf-flowered heartleaf plants within the Right-of-Way.

Construction Access:

Construction access shall be from east side of the proposed bridge, if practical.

Caldwell County
Bridge No. 90, on SR 1718
Over Gunpowder Creek
Federal Aid Project BRZ-1718(3)
State Project 8.2732701
TIP Project B-3126

I. SUMMARY OF PROJECT:

NCDOT proposes to replace Bridge No. 90, in Caldwell County. Bridge No. 90 carries Highway SR 1718 over Gunpowder Creek, in the southeastern part of Caldwell County. NCDOT and FHWA classify this action as a Categorical Exclusion, due to the fact that no notable environmental impacts are likely to occur as a result of project construction. NCDOT will replace Bridge No. 90 at a new location, as shown in Figure 2. The existing bridge will be replaced with a structure consisting of a new bridge approximately 160 feet long. A paved travelway of 24 feet will be accommodated, with 3 foot offsets on each side. The new structure will be at approximately the same elevation as the existing bridge.

The estimated cost is $1,594,000 including $44,000 for Right-of-Way acquisition and $1,550,000 for construction. Bridge No. 90 is included in the 2004-2010 North Carolina Department of Transportation (NCDOT) Transportation Improvement Program and in the Federal-Aid Bridge Replacement Program.

II. ANTICIPATED DESIGN EXCEPTIONS:

A design exception for this project is anticipated for vertical and horizontal curvature.

III. EXISTING CONDITIONS

NCDOT classifies SR 1718 as a Rural Local Route in the Statewide Functional Classification System. The land use of the surrounding area is rural residential, with scattered small businesses.

Near Bridge No. 90, SR 1718 is a two lane, paved facility, 19 feet in width, with grassed shoulders on each side. The existing bridge carries two lanes. Horizontal alignments on the south approach is very poor, and the vertical alignment is very poor in both directions.

Bridge No. 90 was built in 1965. The bridge is 111 feet long, with a 24 foot roadway width. The bridge has an asphalt overlay wearing surface on a steel plank floor on steel I-beams. The end and interior bents are of timber caps and posts with concrete sills. The deck of Bridge No. 90 is 28 feet above the stream bed. Two lanes of traffic are carried and the load limit is posted at 28 tons for single vehicles (SV) and 32 tons for Truck-Tractor Semi-Trailers (TTST). According to Bridge Maintenance records, the bridge's sufficiency rating is 32.4 out of a possible 100.0.

The current traffic volume at the bridge vicinity is 2100 vehicles per day (VPD), projected to increase to 4200 VPD by the design year (2025). No speed limit is posted in area, therefore it is assumed to be 55 mph by statute.

NCDOT Traffic Engineering accident records indicate there were three vehicle crashes reported in the vicinity of Bridge No. 90 during a recent three year period. The Transportation Director of Caldwell County schools indicates that there are four school busses crossing the bridge twice per day, for a total of eight trips per day. Road closure can be accommodated but would cause rerouting with some resulting delays for school busses.

IV. ALTERNATES:

Two methods of replacing Bridge No. 90 were studied. These alternates involve a replacement structure consisting of a new bridge approximately 160 feet in length. A paved travelway of 24 feet will be provided, with 3 foot offsets on each side. The approach roadway will consist of a 24 foot travelway with a minimum of 8 foot shoulders on each side.

The project alternates studied are as follows:

Alternate One: - Replace bridge on existing location with a new bridge approximately 160 feet in length. Traffic would be maintained by a temporary on-site bridge placed to the west.

Alternate Two: (Recommended) - Replace bridge on new alignment to the west of existing, with a new bridge approximately 160 feet in length. Traffic would be maintained on the existing bridge for as long as practicable during the construction period. It appears from preliminary design that traffic may be maintained on-site for a portion of the construction period. For the remainder of the construction period, an off-site detour using existing local roads will be required. The Division 11 Engineer concurs with detouring traffic off-site.

The "do-nothing" alternate is not practical; requiring eventual closing of the road as the existing bridge completely deteriorates. The sufficiency rating of the existing bridge is only 32.4 out of 100.0. Rehabilitation of the existing deteriorating bridge is neither practical nor economical.

V. COST ESTIMATE

Estimated costs of the alternates studied are as follows:

	Alternate 1	**Alternate 2 (Recommended)**
Structure	$ 283,000	$ 311,000
Roadway Approaches	1,186,000	1,011,000
Structure Removal	22,000	22,000
Temporary Detour & Structure	83,000	0
Engineering & Contingencies	226,000	206,000
Total Construction Cost	1,800,000	1,550,000
Right-of-Way and Utilities	43,000	44,000
Total Project Cost	**$1,843,000**	**$1,594,000**

VI. RECOMMENDED IMPROVEMENTS

NCDOT will replace Bridge No. 90 at a new location, as shown in Figure 2. The existing bridge will be replaced with a structure consisting of a new bridge approximately 160 feet long. A paved travelway of 24 feet will be accommodated, with 3 foot offsets on each side. The new structure will be at approximately the same elevation as the existing bridge. The approach roadway width will consist of 24 feet of paved travelway and an 8 foot grassed shoulder on each side. The shoulder width will be increased by 3 feet where guardrail is warranted. The project will require approximately 800 feet of new approach roadway work.

A design speed of 60 MPH is proposed for the project. A design exception is anticipated for vertical and horizontal curvature.

NCDOT recommends that alternate 2 be constructed, in order to minimize costs. Also, alternate 2 will provide an improved alignment, thereby enhancing safety at the bridge location. The offsite detour recommended is via SR 1809 and SR 1717 (See location map in appendix). The additional travel distance for this offsite detour is 0.65 mile.

NCDOT's Division 11 Engineer concurs with the selection of the recommended alternate.

SR 1718 is not designated as a bicycle route, and there is no indication that an unusual number of bicyclists use the road.

VII. ENVIRONMENTAL EFFECTS

A. General Environmental Effects

The project is considered to be a "Categorical Exclusion" (CE) due to its limited scope and insubstantial environmental consequences.

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

The project is not in conflict with any plan, existing land use, or zoning regulation. No change in land use is expected to result from construction of the project. No adverse effect on families or communities is anticipated. Right–of-way acquisition will be limited.

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.

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

Construction of the project will not have a significant adverse impact on the floodplain or associated flood hazard. The elevation of the 100-year flood will not be increased by more than 12 inches.

NCDOT expects utility conflicts to be of a medium level for a project of this size and magnitude.

There are no known hazardous waste sites in the project area.

B. Architectural & Archaeological Resources

This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, & implemented by Advisory Council on Historic Preservation's regulations for compliance with Section 106, codified at 36 CFR Part 800. Section 106 requires that if a federally funded, licensed, or permitted project has an effect on property listed on or eligible for the National Register of Historic Places, the Advisory Council on Historic Preservation will be given an opportunity to comment.

Architectural Resources

A meeting was held with the State Historic Preservation Office (SHPO) to evaluate potential effects of the project. No historic structures are located within the area of potential effect; therefore, the SHPO recommended that no historic surveys be conducted for the project.

Archaeological Resources

The SHPO indicated that there are no known recorded archaeological sites within the area of potential effect, and it is unlikely that any archaeological resources could be affected by the project. Therefore, the SHPO recommended that no archaeological investigation be conducted in connection with this project. Thus, it is concluded that the project will have no effect on archaeological resources.

C. Natural Systems

Physical Resources

Soils

There are two soil types located in the project area. A brief description of each soil type is provided.

Chewacla loam, occasionally flooded (Cm) is a nearly level, poorly drained soil found on floodplains along streams. It has a surface layer of 8-inch thick brown loam. It has moderate permeability, with low shrink-swell potential. The seasonal high water table is 0.5 ft to 1.5 ft below the surface most of the year. This soil is subject to brief, occasional flooding. The main limitations of this soil are wetness and flooding. The Capability Unit is IIIw.
Pacolet fine sandy loam, 15-25% slope (PaE) is a well-drained soil on ridges and side slopes in the Piedmont uplands. It has a surface layer of 7-inch thick fine sandy loam. Bedrock depth in these areas is more than 60 inches. This soil has moderate permeability and moderate shrink-swell potential.

Water Resources

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

Best Usage Classification

Water resources within the study area are located in the Catawba River Drainage Basin. There is one water resource in the project study area. SR 1718 crosses Gunpowder Creek, a tributary to the Catawba River.

Streams have been assigned a best usage classification by the Division of Water Quality (DWQ), formerly Division of Environmental Management (DEM), which reflects water quality conditions and potential resource usage. The classification for Gunpowder Creek [DEM Index No. 11-55-(1.5), 8/3/92] is classified as WS-IV. WS-IV (Water Supply IV) refers to those waters protected as water supplies which are generally in moderately to highly developed watersheds; suitable for all class C uses (aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture). No registered point source dischargers are located in or directly upstream from the project study area.

No waters classified as High Quality Waters (HQW), Water Supplies (WS-I or WS-II) or Outstanding Resource Waters (ORW) occur within 1.0 mile of the project study area.

Physical Characteristics of Surface Waters

Gunpowder Creek at SR 1718 is approximately 45.0 ft wide and is approximately 1.0 ft deep. The creek has substrate composed primarily of silt, sand, and gravel.

Water Quality

Benthic Macroinvertebrate Ambient Network

The Basinwide Monitoring Program, managed by the DWQ, is part of an ongoing ambient water quality-monitoring program that addresses long-term trends in water quality. The program monitors ambient water quality by sampling at fixed sites for selected benthic macroinvertebrates organisms, which are sensitive to water quality conditions. **There are no benthic monitoring stations on Gunpowder Creek in or above the project area.**

Summary of Anticipated Impacts

In order to minimize potential impacts to water resources in the project area, NCDOT's Best Management Practices for the Protection of Surface Waters will be strictly enforced during the

construction phase of the project. Impacts can be further reduced by limiting instream activities and revegetating stream banks immediately following the completion of grading.

Biotic Resources

Scientific nomenclature and common names (when applicable) are provided for each animal and plant species described. Subsequent references to the same organism refer to the common name only. Fauna observed during the site visit are denoted in the text with an asterisk (*).

Biotic Communities

Biotic communities include terrestrial and aquatic elements. Much of the flora and fauna described within biotic communities utilize resources from adjacent communities, making boundaries between contiguous communities difficult to define. There are three communities located in the project area: disturbed/maintained roadside, riparian, and aquatic.

Disturbed /Maintained Roadside

This irregularly maintained community is located on the west side of the existing bridge and will be impacted by the on-site detour or new alignment. The primary tree species include yellow poplar (*Liriodendron tulipifera*), Virginia pine (*Pinus virginiana*), sycamore (*Platanus occidentalis*), and red maple (*Acer rubrum*). The shrub and ground layers are composed of blackberry (*Rubus argutus*), multiflora rose (*Rosa multiflora*), Japanese honeysuckle (*Lonicera japonica*), panic grass (*Panicum* sp.), fescue (*Festuca* sp), ragweed (*Ambrosia artemisifolia*), oxeye daisy (*Chrysanthemum leucanthemum*), buckhorn plantain (*Plantago* sp.), dog fennel (*Eupatorium capillifolium*), and Asiatic dayflower (*Commelina communis*).

Riparian Community

The riparian community is located on either side of Gunpowder Creek and is composed of species such as soft rush (*Juncus effusus*), Asiatic grass (*Microstegium virmineum*), carex (*Carex sp.*), St. John's-Wort (*Hypericum perforatum*), virgin's bower (*Clematis viorna*), Joe-Pye weed (*Eupatorium maculatum*), black willow (*Salix nigra*), multiflora rose, and pokeweed (*Phytolacca americana*). Tree species observed include yellow poplar, river birch (*Betula nigra*), black cherry (*Prunus serotina*), smooth alder (*Ilex serrulata*), silky dogwood (*Cornus amomum*), and red maple.

D. Aquatic Community

This community consists of Gunpowder Creek. Aquatic insects found in this community include the water strider (*Gerris* spp.), netmaking caddisflies (*Hydropsychae spp.*), crane fly (*Tipula* spp.), swimming mayfly (Ephemeroptera), and black-winged damselfly (*Calopteryx maculata*).
Wildlife

Maintained\disturbed communities adjacent to forested tracts provide rich ecotones for foraging, while the forests provide forage and cover. Common mammals and birds associated with ecotones and upland forests are woodchuck (*Marmota monax*), least shrew (*Crypototis parva*), southern short-tailed shrew (*Blarina carolinensis*), hispid cottonrat (*Sigmodon hispidus*), eastern cottontail rabbits (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), gray squirrel* (*Sciurus*

carolinesis), Northern mockingbird* (*Mimus polyglottos*), Northern cardinal (*Cardinalis cardinalis*), European starling (*Sturnus vulgaris*), and common grackle (*Quiscalus quiscula*).

Summary of Anticipated Impacts

Terrestrial Impacts

Impacts to terrestrial communities will result from project construction due to the clearing and paving of portions of the project area, and thus the loss of community area. Table 1 summarizes potential losses to these communities, resulting from project construction. Calculated impacts to terrestrial communities reflect the relative abundance of each community present in the study area. Estimated impacts are derived based on the project lengths described previously where they intersect with the natural communities, and the entire proposed right-of-way width of 80.0 ft for the bridge replacement and another 20.0 ft for the on-site detour. However, project construction often does not require the entire right-of-way; therefore, actual impacts may be considerably less.

Table 1. Estimated area impacts to terrestrial communities.

Community	Impacted Area (ac)		
	Alternate 1 (On-site detour / Bridge Replacement)	Alternate 2 (Bridge Replacement)	Alternate 3 (Improved Alignment)
Disturbed/Maintained Roadside	0.10 ac	0.00 ac	1.19 ac
Riparian	0.06 ac	0.06 ac	0.28 ac
Total Impacts	0.16 ac	0.06 ac	1.47 ac

T Temporary Impacts
P Permanent Impacts

Aquatic Impacts

Impacts to the aquatic community of Gunpowder Creek will result from the replacement of Bridge No. 90 and/or improving the alignment of SR 1718. Impacts are likely to result from the physical disturbance of aquatic habitats (i.e. substrate and water quality). Disturbance of aquatic habitats has a detrimental effect on aquatic community composition by reducing species diversity and the overall quality of aquatic habitats. Physical alterations to aquatic habitats can result in the following impacts to aquatic communities.

- Inhibition of plant growth.
- Algal blooms resulting from increased nutrient concentrations.
- Loss of benthic macroinvertebrates through scouring resulting from an increased sediment load.

Impacts to aquatic communities can be minimized by strict adherence to BMP's.

Jurisdictional Topics

This section provides inventories and impact analyses pertinent to two significant regulatory issues: Waters of the United States and rare and protected species. These issues retain particular significance because of federal and state mandates that regulate their protection. This section deals

specifically with the impact analyses required to satisfy regulatory authority prior to project construction.

Waters of the United States

Surface waters and wetlands fall under the broad category of "Waters of the United States," as defined in Section 33 of the Code of Federal Register (CRF) Part 328.3. Any action that proposes to dredge or place fill material into surface waters or wetlands falls under the jurisdiction of the U.S. Army Corps of Engineers (COE) under Section 404 of the Clean Water Act (33 U.S.C. 1344). Surface waters include all standing or flowing waters which have commercial or recreational value to the public. Wetlands are identified based on the presence of hydric soils, hydrophytic vegetation, and saturated or flooded conditions during all or part of the growing season.

Characteristics of Wetlands and Surface Waters

Criteria to delineate jurisdictional wetlands include evidence of hydric soils, hydrophytic vegetation and hydrology. There are no wetlands in the project area. Physical aspects of surface waters are described elsewhere in this document.

Impacts to jurisdictional surface waters are calculated based on the linear feet of the stream that are located within the proposed right-of-way. A combined length of 100.0 ft of Gunpowder Creek and 0.10 ac of streambed may be permanently or temporarily impacted by the proposed bridge replacement using Alternate 1. Alternate 2 would permanently impact up to 80.0 ft and up to 0.08 ac of the stream bed. Physical aspects of surface waters are described elsewhere in this section.

Permits

Impacts to jurisdictional surface waters are anticipated from the proposed project. As a result, construction activities will require permits and certifications from various regulatory agencies in charge of protecting the water quality of public water resources

A Nationwide Permit 33 CFR 330.5(a) (23) is likely to be applicable for all impacts to Waters of the United States resulting from the proposed project. This permit authorizes activities undertaken, assisted, authorized, regulated, funded or financed in whole, or part, by another Federal agency or department where that agency or department has determined that pursuant to the council on environmental quality regulation for implementing the procedural provisions of the National Environmental Policy Act:

(1) that the activity, work, or discharge is categorically excluded from environmental documentation because it is included within a category of actions which neither individually nor cumulatively have a significant effect on the human environment, and;
(2) that the office of the Chief of Engineers has been furnished notice of the agency's or department's application for the categorical exclusion and concurs with that determination.

This project will also require a 401 Water Quality Certification from the DWQ prior to the issuance of the Nationwide Permit. Section 401 of the Clean Water Act requires that the state issue or deny water certification for any federally permitted or licensed activity that may result in a discharge

to Waters of the United States. Section 401 Certification allows surface waters to be temporarily impacted for the duration of the construction or other land manipulation. The issuance of a 401 permit from the DWQ is a prerequisite to issuance of a Section 404 permit.

Bridge Demolition

Bridge No. 90 is located on SR 1718 over the Gunpowder Creek in Caldwell County. It has three spans totaling 111 feet in length. The bridge railings, deck, and superstructure are composed of steel. The substructure is composed of timber on concrete sills. The bridge rail, asphalt wearing surface, superstructure, and timber components of the substructure will be removed without dropping any material into Waters of the United States. However, there is potential for other components of the bridge to be dropped into Waters of the U.S. during construction. The resulting temporary fill associated with the concrete sills would be approximately 18 cubic yards.

Avoidance, Minimization, Mitigation

The COE has adopted through the Council on Environmental Quality (CEQ) a wetland mitigation policy which embraces the concept of "no net loss of wetlands" and sequencing. The purpose of this policy is to restore and maintain the chemical, biological and physical integrity of Waters of the United States, specifically wetlands. Mitigation of wetland impacts has been defined by the CEQ to include: avoiding impacts (to wetlands), minimizing impacts, rectifying impacts, reducing impacts over time and compensating for impacts (40 CFR 1508.20). Each of these three aspects (avoidance, minimization and compensatory mitigation) must be considered sequentially.

Avoidance mitigation examines all appropriate and practicable possibilities of averting impacts to Waters of the United States. According to a 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency (EPA) and the COE, 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.

Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts to Waters of the United States. Implementation of these steps will be required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction to median widths, right-of-way widths, fill slopes and/or road shoulder widths.

Compensatory mitigation in not normally considered until anticipated impacts to Waters of the United States have been avoided and minimized to the maximum extent possible. It is recognized that "no net loss of wetlands" functions and values may not be achieved in each and every permit action. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts that remain after all appropriate and practicable minimization has been required. Compensatory actions often include restoration, creation and enhancement of Waters of the United States, specifically wetlands. Such actions should be undertaken in areas adjacent to or contiguous to the discharge site.

Compensatory mitigation is required for those projects authorized under Nationwide Permits that result in the fill or alteration of:

More than 1.0 ac of wetlands will require compensatory mitigation;
And/or more than 150.0 linear ft of streams will require compensatory mitigation.

The impacts from this project do not meet the minimum mitigation thresholds. Therefore, no mitigation requirement is anticipated. However, final permit/mitigation decisions rest with the COE.

Rare and Protected Species

Some populations of fauna and flora have been in, or are in, the process of decline either due to natural forces or their inability to coexist with human development. Federal law (under the provisions of the Endangered Species Act of 1973, as amended) requires that any action, likely to adversely affect a species classified as federally-protected, be subject to review by the United States Fish and Wildlife Service (USFWS). Other species may receive additional protection under separate state laws.

Federally-Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under the provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of February 5, 2003, the latest revision of the USFWS list has three federally protected species for Caldwell County. Brief descriptions of the characteristics and habitat requirements for these species are included.

Summary: Surveys were carried out for all the species listed as Federally-Protected. One species, the dwarf-flowered heartleaf, was found to exist within the area of potential effect. Consequently, the Section 7 process was carried through. A Biological Assessment was prepared by NCDOT biologists and forwarded to the US Fish & Wildlife Service. The Service rendered their official Biological Opinion (see appendix) and specified measures to be taken in order for the project to go ahead. These requirements in the US FWS Biological Opinion will be adhered to by NCDOT, as referenced in the Green Sheet (Project Environmental Commitments) attached to this Document.

Table 2. **Federally Protected Species for Caldwell County.**

Common Name	Scientific Name	Status
Spruce-fir moss spider	*Microhexura montivaga*	Endangered
Heller's blazing star	*Liatris helleri*	Threatened
Dwarf-flowered heartleaf	*Hexastylis naniflora*	Threatened

Note:

- "Endangered" denotes a species in danger of extinction throughout all or a significant portion of its range.
- "Threatened" denotes a species likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

Descriptions of Federally Protected Species found in Caldwell County, NC

Microhexura montivaga (spruce-fir moss spider) **Endangered**
Animal Family: Dipluridae
Federally Listed: January 27, 1994

The spruce-fir moss spider occurs in well-drained moss and liverwort mats growing on rocks or boulders. These mats are found in well-shaded areas in mature, high elevation (≥ 5000 ft) Fraser fir and red spruce forests. The spruce-fir moss spider is very sensitive to desiccation and requires situations of high and constant humidity. The need for humidity relates to the moss mats which cannot become too parched or else the mats become dry and loose. The moss mats cannot be too wet either because large drops of water can also pose a threat to the spider. The spider constructs its tube-shaped webs in the interface between the moss mat and the rock surface. Some webs have been found to extend into the interior of the moss mat. No prey has been found in the webs, but the probable prey for the spruce-fir moss spider is the abundant springtails found in the moss mats.

BIOLOGICAL CONCLUSION: **NO EFFECT**

NCDOT environmental biologists Logan Williams, Shannon Simpson, Teryn Smith, and Wendee Britt surveyed this site on June 24, 1999. There was no suitable habitat and the NCNHP database has no records indicating that this species exists in the project area. Therefore, there will be no impacts to this species during construction of the project.

Liatris helleri (Heller's blazing star) **Threatened**
Plant Family: Asteraceae
Federally Listed: November 19, 1987
Flowers Present: late June - August

Heller's blazing star is a short, stocky plant that has one or more erect stems that arise from a tuft of narrow, pale green basal leaves. Leaves are accuminate and diminish in size and breadth upward on the stem. Heller's blazing star has small lavender flowers and its fruits appear from September to November.

Heller's blazing star is endemic to high elevation ledges of rock outcrops of the northern Blue Ridge Mountains in North Carolina. Known populations of this plant occur at elevations of 3500-6000 ft. Heller's blazing star is an early pioneer species growing on grassy rock outcrops where it is exposed to full sunlight. Heller's blazing star prefers shallow acid soils associated with granite rocks.

BIOLOGICAL CONCLUSION: **NO EFFECT**

NCDOT environmental biologists Logan Williams, Shannon Simpson, Teryn Smith, and Wendee Britt surveyed this site on June 24, 1999. No suitable habitat for Heller's blazing star was identified. The site does not meet habitat nor elevation requirements for Heller's blazing star. Also,

there are no records of occurrence in the NCNHP database. Therefore, no effects to this species will result from construction of the proposed project.

Hexastylis naniflora (dwarf-flowered heartleaf) **Threatened**
Plant Family: Aristolochiaceae
Federally Listed: April 14, 1989
Flowers Present: mid March - mid May

The dwarf-flowered heartleaf is found only in eight northern piedmont counties in North Carolina and the adjacent portions of South Carolina.

This plant has heart-shaped leaves, supported by long thin petioles that grow from a subsurface rhizome. It rarely exceeds 6 inches in height. The leaves are dark green in color, evergreen, and leathery. Flowers are small, inconspicuous, jugshaped, and dark brown in color. They are found near the base of the petioles. Fruits mature from mid-May to early July.

Dwarf-flowered heartleaf populations are found along bluffs and their adjacent slopes, in boggy areas next to streams and creekheads, and along the slopes of nearby hillsides and ravines. It grows in acidic soils in regions with a cool moist climate. Regional vegetation is described as upper piedmont oak-pine forest and as part of the southeastern mixed forest.

BIOLOGICAL CONCLUSION: **May Affect**

SEE APPENDIX for Section 7 Resolution of dwarf-flowered heartleaf.

Federal Species of Concern and State Listed Species

There are sixteen federal species of concern listed by the USFWS for Caldwell County (Table 3). Federal species of concern (FSC) are not afforded federal protection under the Endangered Species Act and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. However, the status of these species is subject to change, and so should be included for consideration. Federal Species of Concern are defined as species that are under consideration for listing for which there is insufficient information to support listing. In addition, organisms which are listed as Endangered (E), Threatened (T), or Special Concern (SC) by the North Carolina Natural Heritage Program (NCNHP) list of Rare Plant and Animal Species are afforded state protection under the NC State Endangered Species Act and the NC Plant Protection and Conservation Act of 1979.

Table 3 lists the FSC, the state status of these species (if afforded state protection), and the potential for suitable habitat in the project area for each species. **A review of the NCNHP database of rare species and unique habitats shows no occurrence of FSC species within 1.0 mi of the project study area.** This species list is provided for information purposes as the protection status of these species may be upgraded in the future.

Table 3. Federal Species of Concern for Caldwell County

Scientific Name	Common Name	NC Status	Habitat Present
Aegolius acadicus	Southern Appalachian saw-whet owl	SC/PT	No
Neotoma magister	Alleghany woodrat	SC	No
Loxia curvirostra	Southern Appalachian red crossbill	SR/PSC	No
Poecile atricapillus practicus	Southern Appalachian black-capped chickadee	SC	No
Sphyrapicus varius appalaciensis	Southern Appalachian yellow-bellied sapsucker	SR/PSC	No
Macromia margarita	Margarita River skimmer	SR	Yes
Ophiogomphus edmundo	Edmund's snaketail dragonfly	SR	Yes
Speyeria diana	Diana fritillary butterfly	SR	No
Abies fraseri	Fraser fir	C	No
Cardamine clematitis	Mountain bittercress	C	Yes
Geum geniculatum	Bent avens	T	Yes
Juglans cinerea	Butternut	W5	No
Lilium grayi	Gray's lily	T-SC	No
Monotropsis odorata	Sweet pinesap	C	No
Verbena riparia	Riparian vervain	C	Yes
Plagiochila sullivantii var. sullivantii	A liverwort	C	No

NOTE: NC Status

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

C - Candidate) any species which are very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction.

PT (PSC) - Proposed Threatened (Special Concern) are species that have been formally proposed for listing as Threatened (Special Concern), but have not yet completed the legally mandated listing process.

T - A Threatened species is one which is likely to become endangered species within the foreseeable future throughout all or a significant portion of its range.

W5 - A Watch Category 5 species is a species with increasing amounts of threats to its habitat; populations may or may not be known to be declining.

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

D. Air Quality and Traffic Noise

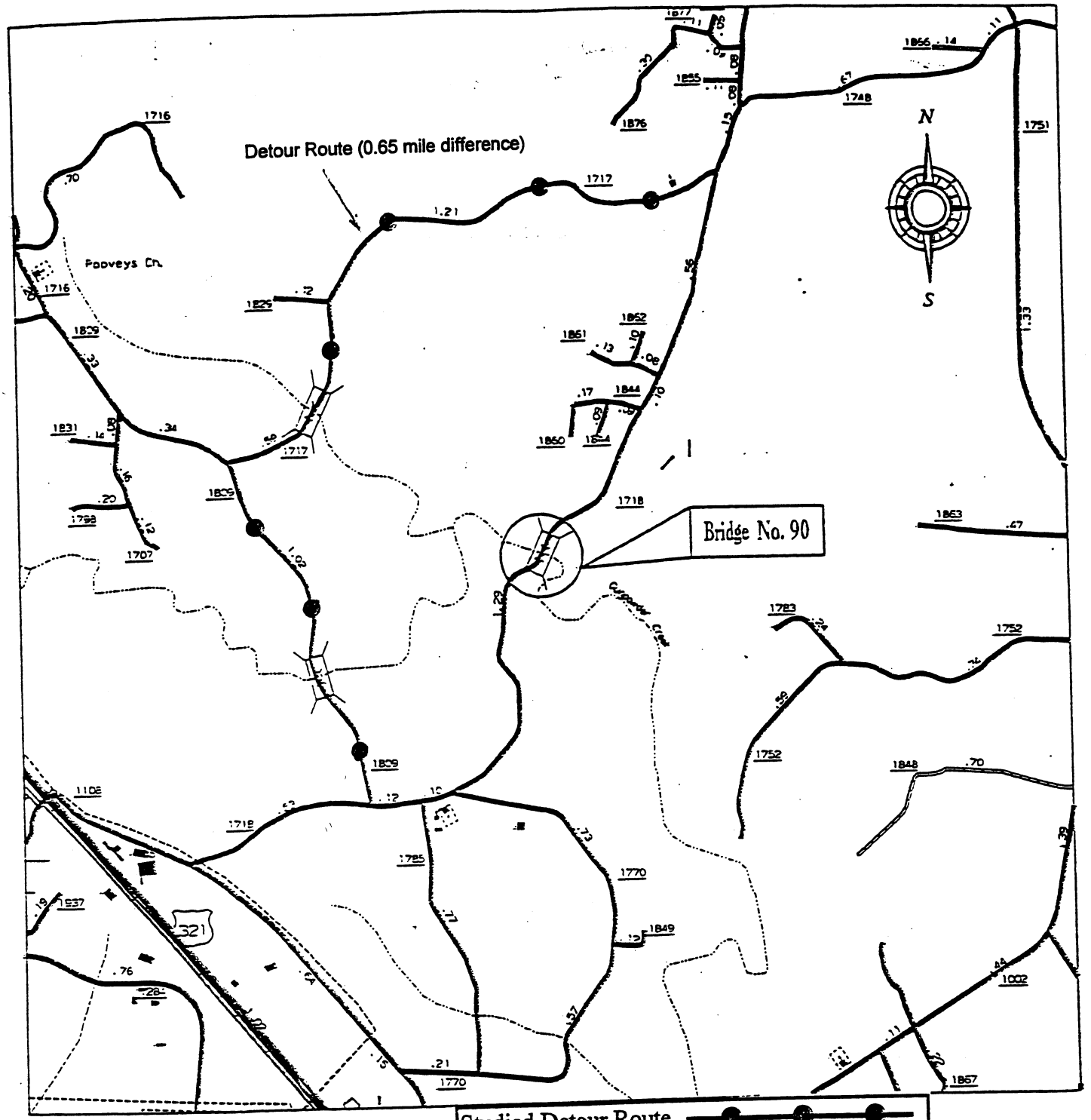
This project is an air quality "neutral" project, thus it is not required to be included in the regional emissions analysis (if applicable) and a project level CO analysis is not required.

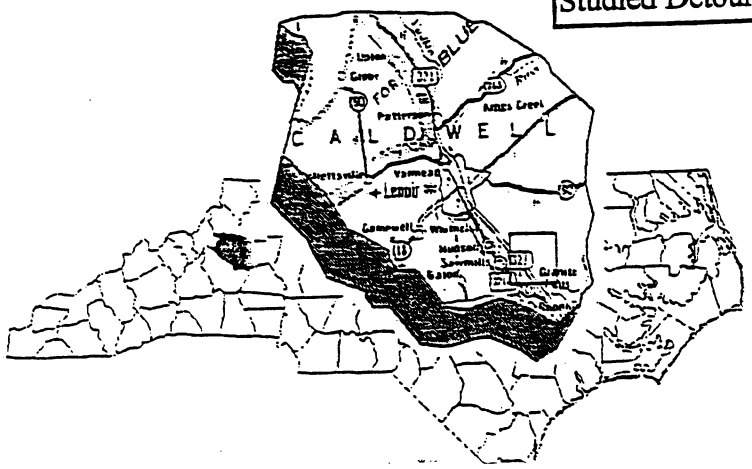
If the project disposes of vegetation by burning, all burning shall be done in accordance with applicable local laws and regulations of the North Carolina SIP for air quality in compliance with 15 NCAC 2D.0520.

The project will not substantially increase traffic volumes. Therefore, it will have no substantial impact on noise levels. Temporary noise increases may occur during construction.

E. Farmland

The Farmland Protection Policy Act of 1981 requires that all federal agencies or their representatives, to consider the impact of land acquisition and construction projects on prime and important farmland soils. These soils are determined by the US Natural Resources Conservation Service (NRCS) based on criteria such as potential crop yield and possible level of input of economic resources. The project will result in the conversion of a small amount of land but the area to be converted is void of agricultural uses. Therefore, no further consideration of impacts to farmland is required.

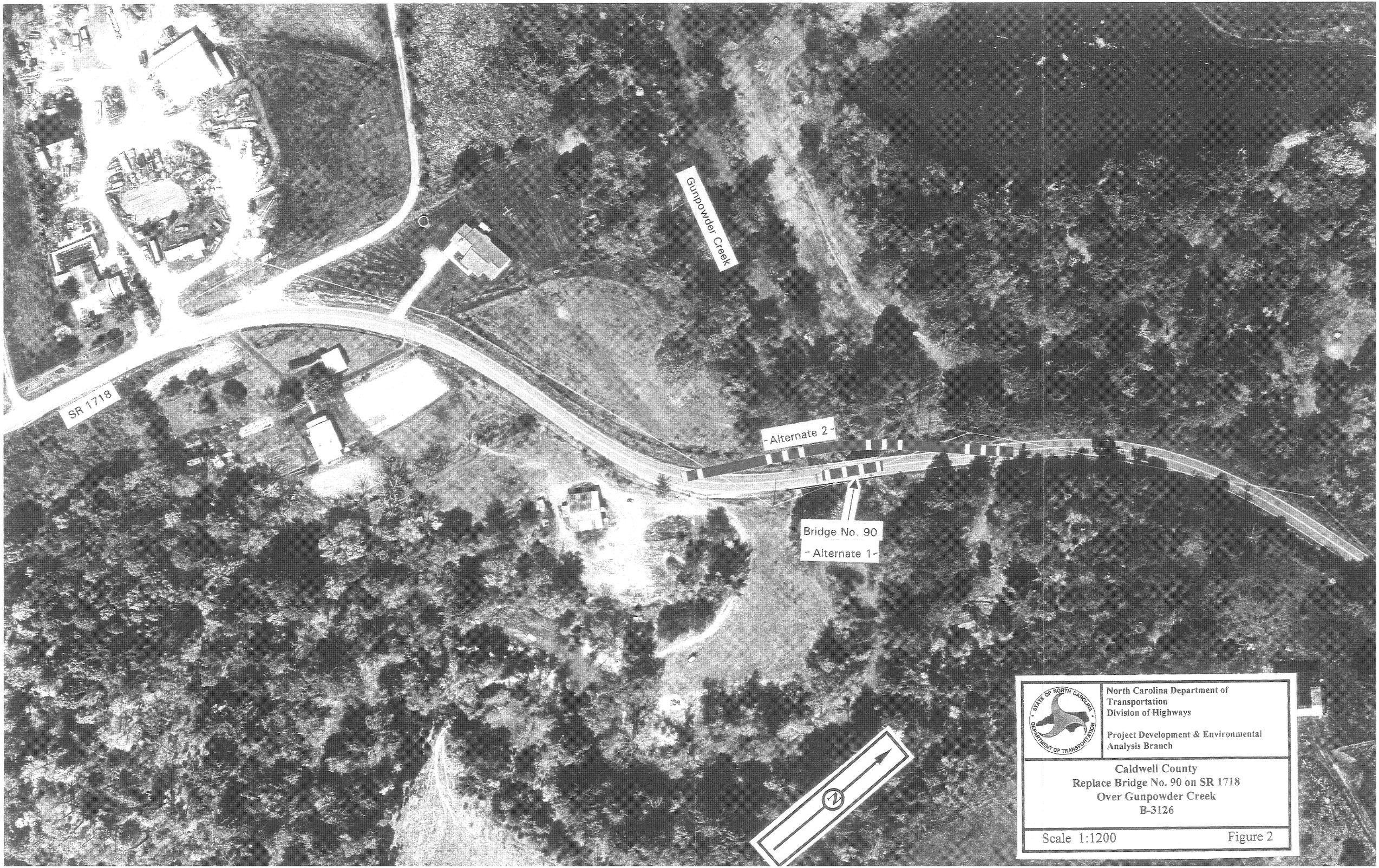




North Carolina
Department of Transportation
Division of Highways
Planning & Environmental Branch

Caldwell County
Replace Bridge No. 90 on SR 1718
Over Gunpowder Creek
B-3126

Figure 1

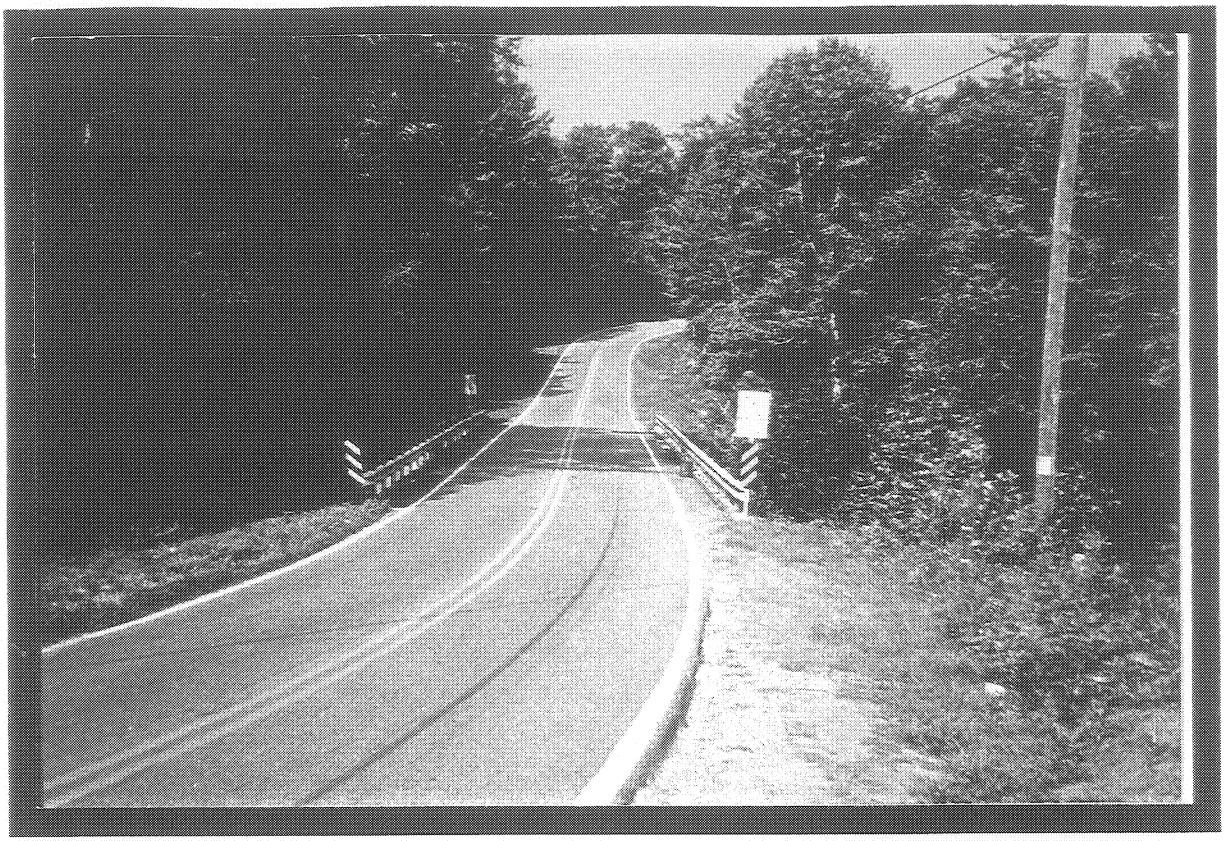


North Carolina Department of Transportation
Division of Highways

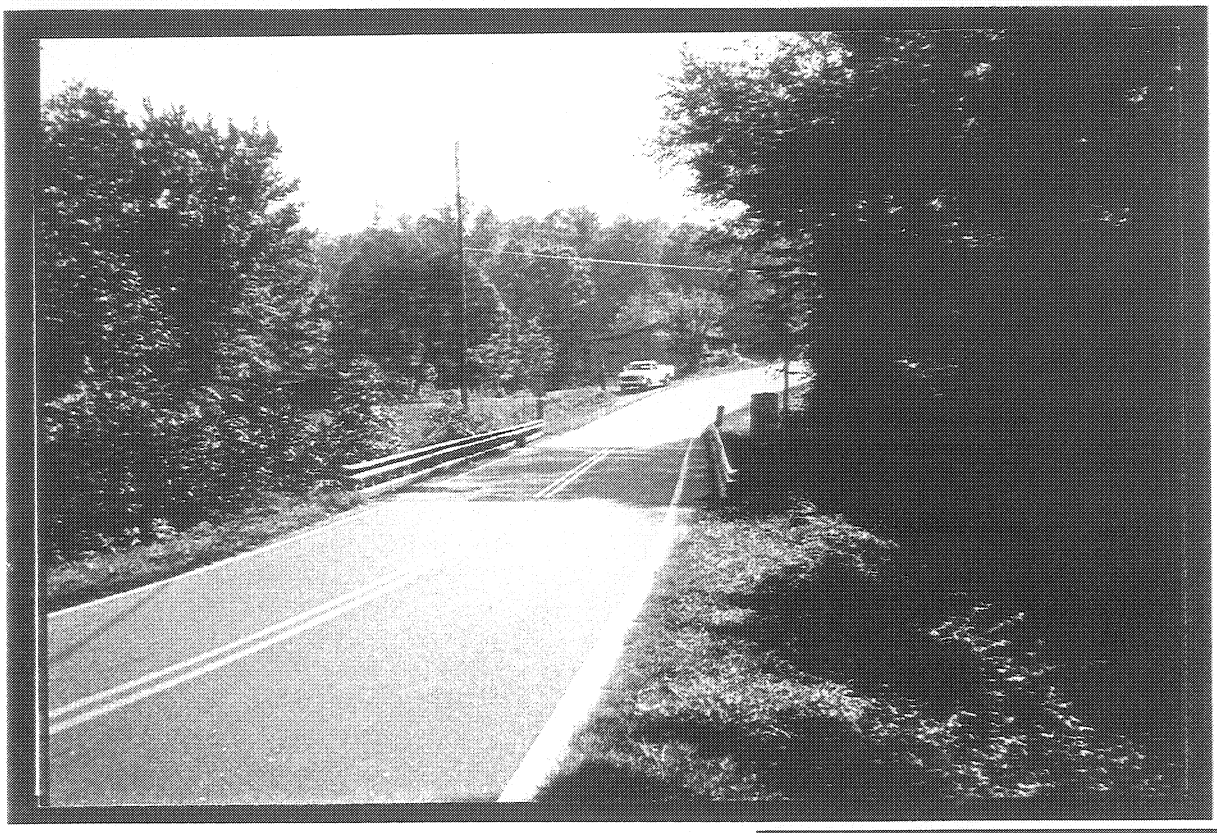
Project Development & Environmental Analysis Branch

Caldwell County
Replace Bridge No. 90 on SR 1718
Over Gunpowder Creek
B-3126

Scale 1:1200 Figure 2



Looking north across Bridge No. 90



Looking south across Bridge No. 90

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

Caldwell County
Replace Bridge No. 90 on SR 1718
Over Gunpowder Creek
B-3126

Figure Three

North Carolina Department of Cultural Resources

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

Division of Archives and History
Jeffrey J. Crow, Director

February 24, 1999

MEMORANDUM

TO: William D. Gilmore, P.E., Manager
Project Development and Environmental Analysis Branch
Division of Highways
Department of Transportation

FROM: David Brook
Deputy State Historic Preservation Officer

SUBJECT: Bridge No. 90 on SR 1718 over Gunpowder Creek, B-3126, Caldwell County, ER 99-8178

Thank you for your letter of January 29, 1999, concerning the above project.

We have reviewed our files and are aware of no historic structures in the project area. We, therefore, do not recommend an architectural survey be conducted for this project. We look forward to checking the aerial maps and photographs.

There are no known archaeological sites within the proposed project area. Based on our present knowledge of the area, it is unlikely that any archaeological resources which may be eligible for inclusion in the National Register of Historic Places will be affected by the project.

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

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763.

DB:slw

cc: N. Graf
B. Church
T. Padgett

North Carolina Wildlife Resources Commission

512 N. Salisbury Street, Raleigh, North Carolina 27604-1188, 919-733-3391
Charles R. Fullwood, Executive Director

MEMORANDUM

TO: Dennis Pipkin, Project Planning Engineer
Project Development & Environmental Analysis Branch, NCDOT

FROM: David Cox, Highway Project Coordinator
Habitat Conservation Program

DATE: March 19, 1999

SUBJECT: NCDOT Bridge Replacements in Caldwell, Davidson, Randolph, and Wake counties. TIP Nos. B-3125, B-3126, B-3314, B-3448, B-3503 and B-3527.

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

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

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

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

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

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

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

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

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

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

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

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

If corrugated metal pipe arches 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 will allow sufficient water depth in the culvert or pipe during normal flows to accommodate fish movements. If culverts are long, baffle systems are required to trap gravel and provide resting areas for fish and other aquatic organisms.

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-3125 – Caldwell – Bridge No. 34 over Blue Creek. Our field biologists took a backpack electrofishing unit to sample this site. No trout found. The stream was heavily silted and no critical habitat was found near the bridge. Standard comments apply.

2. B-3126 – Caldwell County – Bridge No. 90 over the Gunpowder Creek. Our field biologists took a backpack electrofishing unit to sample this site. No trout found. This stream has a sand substrate with little other habitat. We recommend avoiding a nice riffle area approximately 15 meters downstream of the bridge. Species found at the site were creek chubs and shiners: and to our surprise a smallmouth and two largemouth bass from a single piece of woody debris. Standard comments apply.

3. B-3314 – Caldwell County – Bridge No. 163 over the Buffalo Creek. Our field biologists took a backpack electrofishing unit to sample this site. No trout found. This stream is wide and shallow with almost exclusive riffle-run habitat. There was no critical habitat in either direction of the bridge. We found hogsuckers, darters, black nose dace, central stonerollers, and creek chubs. Standard comments apply.

4. B-3448 – Davidson County – Bridge No. 166 over Kendall Creek. No specific comments.

5. B-3503 – Randolph County – Bridge No. 382 over Little River. The Little River is a very high quality stream with a cobble and large gravel substrate. The bridge has nice riffles both upstream and downstream, which provide excellent sunfish habitat. We request specifically that a spanning structure replace the existing bridge. We request that no in-water work occur from April 1 to June 30. There are freshwater mussels at this site listed as federal species of concern as well as several state-listed species. Due to the diversity of mussels and the quality of the habitat at this location, we request a field meeting to discuss conservation measures that should be employed to protect these resources.

6. B-3527 – Wake County – Bridge No. 437 over Lower Barton's Creek. No specific comments.

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.

North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

May 23, 2000

Mr. Dennis Pipkin
Project Development Engineer
Bridge Replacement Unit
PO Box 25201
Raleigh, North Carolina

RE: Proposed NCDOT Project, TIP No. B-3126, Gunpowder Creek, Caldwell County

Dear Mr. Pipkin:

This correspondence is in response to your letter of May 22, 2000 regarding the replacement of Bridge No. 90 over Gunpowder Creek on SR1718. The North Carolina Wildlife Resources Commission (NCWRC) is authorized to comment and make recommendations which relate to the impacts of this project on fish and wildlife through the Federal License of Water Resource Project Act (Federal Power Act-16 U.S.C. 791a et seq.), and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

Based on our review and the previous comments provided by David Cox, we have no objection to the project providing that conditions specified by Mr. Cox earlier are followed. Additionally, the following conditions should also be met:

1. If concrete will be used, work must be accomplished so that wet concrete does not contact stream water. This will lessen the chance of altering the stream's water chemistry and causing a fish kill.

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

3. 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.

4. Stringent erosion control measures should be installed where soil is disturbed and maintained until project completion.

5. The dimension, pattern, and profile of the stream and floodplain (above and below) the bridge should not be modified by stream widening or by reducing the depth of the stream.

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

6. The NC Natural Heritage Program should concur that no endangered or threatened species are likely to be impacted by demolition and construction activities.

All activities must follow 404 Permit and 401 Certification requirements in addition to any other special conditions specified by the NC Department of Environment and Natural Resources. If you have any questions regarding these comments, please contact me at 336/769-9453.

Sincerely

Ron Linville
Regional Coordinator
Habitat Conservation Program

cc: Steve Lund, USACOE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Asheville Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

September 23, 2003

Mr. John F. Sullivan, III
Division Administrator
Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, North Carolina 27601

Subject: Replacement of Bridge No. 90 on SR 1718 over Gunpowder Creek in Caldwell County, North Carolina, Federal Aid No. BRZ-1718 (3), TIP No. B-3126

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) based on our review of the replacement of Bridge No. 90 on SR 1718 over Gunpowder Creek located in Caldwell County, North Carolina, and its effects on the federally threatened dwarf-flowered heartleaf (*Hexastylis naniflora*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) (Act). We received your May 30, 2003, request for formal consultation on June 3, 2003.

This Opinion is based on information provided in the May 2003 biological assessment, field investigations, and other sources of information. A complete administrative record of this consultation is on file in our office.

CONSULTATION HISTORY

In May 2001 we were notified by telephone that the dwarf-flowered heartleaf had been found in the construction footprint of the subject proposed bridge replacement project. On June 13, 2001, a member of our staff met in the field with the North Carolina Department of Transportation (NCDOT), where alternatives for minimizing impacts to *Hexastylis naniflora* were explored. On October 18, 2001, we met with the NCDOT in Raleigh to discuss further efforts to minimize impacts by exploring varying design and construction techniques.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The NCDOT proposes to replace the existing 111-foot-long two-lane Bridge No. 90 (completed in 1965) over Gunpowder Creek in Caldwell County, North Carolina. Current horizontal alignment of the roadway at the south end of the existing bridge is considered poor, and the vertical alignment is very poor in both directions. The replacement two-lane bridge will be approximately 160 feet long, on an improved alignment.

The proposed project will intersect a population of the dwarf-flowered heartleaf consisting of approximately 130 plants; approximately 60 plants will be directly impacted by the project. The population occurs along Gunpowder Creek, on both banks, on the west side of SR 1718. Subpopulation A, located southwest of the bridge, has approximately 80 plants, and Subpopulation B, located directly adjacent to SR 1718 and northwest of the bridge, has approximately 50 plants. No secondary impacts are expected because the replacement bridge will not increase accessability to adjacent parcels.

The NCDOT evaluated three alternatives to avoid or minimize impacts to the dwarf-flowered heartleaf, including: (1) doing nothing, (2) Alternate One, replacing the bridge at the existing location, (3) Alternate Two, minimizing fill slopes and cuts along a new alignment west of the existing roadway. Impacts to the dwarf-flowered heartleaf were considered, along with safety concerns, community impacts, and engineering and construction costs. Alternate Two is the recommended alternative.

In the May 2003 biological assessment, the NCDOT proposed to offset project-related impacts by avoiding impacts to 20 plants within the existing right-of-way and purchasing additional right-of-way to include the remainder of Subpopulation A for protection in perpetuity. This conservation area is the least disturbed habitat for the dwarf-flowered heartleaf on Gunpowder Creek and contains approximately 50 of the most vigorous plants. The NCDOT also plans to regrade and revegetate the existing bridge area after the structure is removed, which could provide future habitat for *H. naniflora*.

STATUS OF THE SPECIES AND ITS CRITICAL HABITAT

Species Description and Life History

Hexastylis naniflora is a low-growing herbaceous plant in the birthwort family (Aristolochiaceae). Blomquist (1957) described the species in his revision of the genus *Hexastylis*. The plant's heart-shaped dark green leaves are evergreen and leathery and are supported by long thin petioles from a subsurface rhizome. Maximum height rarely exceeds

15 centimeters (6 inches). The jug-shaped flowers are usually beige to dark brown in color and appear from mid-March to early June. The flowers are small and inconspicious and are found near the base of the petioles. The fruit matures from mid-May to early July (Blomquist 1957; Gaddy 1980, 1981). *Hexastylis naniflora* grows in acidic soils, usually along north-facing bluffs and adjacent slopes and in floodplains next to streams and creek heads in the upper Piedmont Region of North Carolina and South Carolina. It is most often found on Madison and Pacolet soils and is frequently associated with *Kalmia* (laurel). Its small flower distinguishes this species from other members of the genus *Hexastylis*.

Thrips (sucking insects) and flies are the major pollinators of most plant species in the genus *Hexastylis*. As yet, the pollination method for dwarf-flowered heartleaf is unproven, but biologists speculate that it may use the same method as its related species. With most *Hexastylis* species, the vectors--flies and thrips--spend most of their lives in the plant's flower tissues and feed on pollen grains or on portions of the plant's outer skin. Once the flowers have been fertilized, their seeds are distributed by ants. These ants eat the coating of the seeds and leave the seeds near the plant site or by the ant nest. Seed germination takes place in the spring after the seeds have been exposed to cool temperatures. Germination in the dwarf-flowered heartleaf generally occurs in clusters. Some flowering *Hexastylis* plants, probably including the heartleaf, do not reach flowering age for 7 to 10 years. The plant's flowering period is mid-March to early June; fruit production begins in mid- to late May, and buds come in late July and develop by October. In the buds are next spring's flowers, and next year's leaf will not grow until the plant flowers again.

Status and Distribution

The dwarf-flowered heartleaf was listed as a threatened species on April 14, 1989 (54 FR 14964), under the authority of the Act. No critical habitat has been designated. Threats to the species at the time of listing included residential and industrial development, conversion of its habitat to pasture or small ponds, timber harvesting, and cattle grazing. When the Service listed *Hexastylis naniflora*, 24 populations were known in an eight-county area of the upper Piedmont Region of North Carolina and adjacent South Carolina. Since listing, the number of known extant dwarf-flowered heartleaf sites has increased from 24 to approximately 124, and the estimated number of known individuals has increased from about 5,900 to more than 198,000 (North Carolina Natural Heritage Program, in litt.; South Carolina Department of Natural Resources, in litt.; G. Newberry, University of South Carolina at Spartanburg, in litt.; North Carolina Department of Transportation, in litt.). The known species' range has also been expanded to include Polk and Caldwell Counties, North Carolina. The documented *Hexastylis naniflora* distribution is comprised of 17 sites (14 percent) with more than 1,000 individual plants each, 8 sites (7 percent) with more than 500 plants, and 42 sites (34 percent) with more than 100 plants. Twenty-four sites (19 percent) have greater than 50 but fewer than 100 plants, and 19 sites (15 percent) have fewer than 50 plants. Fourteen sites (11 percent) have no size estimates.

Analysis of the Species Likely to be Affected

The project area, including the expanded right-of-way conservation area, contains about 130 dwarf-flowered heartleaf plants. There are 60 dwarf-flowered heartleaf plants within the proposed footprint of the project that will be adversely impacted by bridge construction and approach realignment. The remaining 70 plants are located outside the area needed for construction and will not be impacted by this project. The project area contains about 0.06 percent of the known individuals of *Hexastylis naniflora*; approximately 0.03 percent of the total known individuals of *Hexastylis naniflora* will be adversely impacted by the subject bridge replacement.

ENVIRONMENTAL BASELINE

Under section 7(a)(2) of the Act, when considering the effects of an action on federally listed species, we are required to take into consideration the environmental baseline. The environmental baseline includes past and ongoing natural factors and past and present impacts from all federal, state, or private actions and other activities in the action area (50 CFR 402.02), including federal actions in the area that have already undergone section 7 consultation and the impacts from state or private actions that are contemporaneous with the consultation in progress.

Status of the Species Within the Action Area

The project area contains approximately 0.06 percent of the known individuals of *Hexastylis naniflora*. Construction will impact 46 percent of the total number of plants in the project area; the remainder of the plants will be preserved in perpetuity. There are no other federal actions ongoing or proposed for the action area at the present time.

Factors Affecting the Species' Environment Within the Action Area

The habitat in the project area has been impacted by clearing at a pasture edge and by cattle grazing. Along its eastern edge, Subpopulation A has been impacted by cutting the large trees at the top of the slope and pushing them down the slope, effectively covering the slope in dense brush. Few individuals (10<) of *H. naniflora*. occur in this area. In addition, the majority of these plants were not flowering, most likely due to the dense brush cover. Subpopulation B is somewhat affected by cattle grazing.

EFFECTS OF THE ACTION

Under section 7(a)(2) of the Act, "effects of the action" refers to the direct and indirect effects of an action on the species or its critical habitat, together with the effects of other activities that are interrelated or interdependent with that action. Under section 7 of the Act, the federal agency is

responsible for analyzing these effects. The effects of the proposed action are added to the environmental baseline to determine the future baseline, which serves as the basis for the determination in this Opinion. Should these effects of the federal action result in a situation that would jeopardize the continued existence of the species, we may propose reasonable and prudent alternatives that the federal agency can take to avoid violation of section 7(a)(2) of the Act. The discussion that follows is our evaluation of the anticipated direct and indirect effects of implementing the proposed bridge replacement. Indirect effects are those caused by the proposed action that will occur later but that are still reasonably certain to occur (50 CFR 402.02). We have determined that there are no interrelated or interdependent actions apart from the action under consideration.

Factors to be Considered

The proposed bridge replacement will provide a safer bridge crossing and roadway for the local traveling public. The life span of the new bridge is approximately 50 years. Although there are direct impacts to approximately 60 individuals of the dwarf-flowered heartleaf, the remainder of the plants on the site will be protected from future disturbance. The total number of known plants (more than 198,000) is not considered a limiting factor toward recovery of the species; rather, it is the protection of populations that is limiting the species' recovery. The NCDOT has recently purchased approximately 1,000 acres that contain more than 13,000 dwarf-flowered heartleaf plants to help meet recovery goals for this species.

Analyses of the Effects of the Action

Direct Effects: An estimated 46 percent (60 plants) of this dwarf-flowered heartleaf population will be lost to the proposed project, with a corresponding loss of habitat (approximately 1 acre). However, viability of the local dwarf-flowered heartleaf population in the action area can be maintained. Actions that will be taken to reduce impacts to the dwarf-flowered heartleaf include limiting the disturbance area and protecting additional habitat for the species. Specific actions to be carried out include:

1. Fill slopes and cuts along the new alignment would be kept to a minimum. Cut and fill slopes would be set at 2:1, the maximum allowed by soil standards in the area.

2. Storm-water discharge will be directed to the east side of the road to avoid discharge into Subpopulation A.

3. Construction limits in the area where the dwarf-flowered heartleaf is found would be limited to 5 feet outside the slope stakes.

4. Areas containing dwarf-flowered heartleaf plant, but not impacted by the project, will be clearly marked prior to any ground-disturbing activity on the site to assure construction does not affect those plants.

5. A Service biologist will attend the preconstruction meeting to discuss (a) the importance of avoiding the plants and (b) other environmental commitments on the project.

6. The area of the existing bridge will be regraded and revegetated to mimic adjacent conditions and provide future potential habitat for *H. naniflora* at that site.
7. The NCDOT will protect approximately 70 dwarf-flowered heartleaf plants within their right-of-way.

Indirect Effects: Because the proposed new alignment will not make adjacent parcels more accessible and because the NCDOT proposes to purchase the remainder of the intact dwarf-flowered heartleaf population, no indirect effects are expected to occur to the subject dwarf-flowered heartleaf population. Further, because only 60 of the estimated 198,000 known plants will be lost, no indirect negative effects should occur that would limit the species' recovery potential.

Species' Response to the Proposed Action

It is expected that this bridge replacement, with the protective measures described above, can be carried out with the loss of only 46 percent (60 plants) of one population of the dwarf-flowered heartleaf and not result in the loss of the entire population. The loss of 60 plants represents only three one-hundredths of one percent of the number of known plants, and the loss will not have negative effects on the recovery of the species. Although a great many of the plants and populations have been discovered since the species was listed, relatively few are afforded any protection. The purchase of the remainder of the population (an estimated 70 plants), coupled with other NCDOT conservation efforts for this species, will significantly contribute to the recovery of the species.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require a separate consultation pursuant to section 7 of the Act.

Because the NCDOT has agreed to purchase additional right-of-way that contains the remainder of the dwarf-flowered heartleaf population and has agreed to protect the population in perpetuity,

there are no state, tribal, local, or private actions reasonably certain to occur here within the future that would affect the dwarf-flowered heartleaf.

CONCLUSION

After reviewing the current status of *Hexastylis naniflora*, the environmental baseline for the action area, the effects of the proposed bridge replacement, the cumulative effects, and the proposed conservation measures, it is our biological opinion that the project as proposed is not likely to jeopardize the continued existence of *Hexastylis naniflora*. No critical habitat has been designated for this species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulations pursuant to section 4(d) of the Act prohibit the taking of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, such as breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not for the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act, provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, section 9(a)(2)(B) provides limited protection of listed plants from take to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage to such plants on areas under federal jurisdiction or the destruction of endangered plants on nonfederal areas in violation of state law or regulation or in the course of any violation of a state criminal trespass law. Therefore, for this Opinion, incidental take does not apply, and an incidental take statement is not necessary.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to

minimize or avoid the adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We request that the following conservation recommendations be implemented by the NCDOT as part of the project plan:

1. Notify the North Carolina Plant Conservation Program (NCPCP) that 60 plants will be lost to the proposed construction. Allow a qualified botanist from the NCPCP to transplant, if desired, any of the plants that would be lost to a different area (outside the acquisition area) for protection.

2. Monitor the dwarf-flowered heartleaf population inside the acquisition area annually for 5 years to determine its stability and detect any construction effects (positive or negative) that could occur which have not been anticipated (increased light, hydrology changes, etc.).

In order for us to be kept informed about actions that minimize or avoid adverse effects or that benefit listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION/CLOSING STATEMENT

This concludes formal consultation on the action outlined in your May 30, 2003, request for formal consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over an action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion, (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the action.

If you or your staff have any questions concerning this Opinion, please contact Ms. Marella Buncick of our staff at 828/258-3939, Ext. 237, or me, Ext. 223. We have assigned our Log No. 4-2-03-415 to this project; please refer to it in any future correspondence concerning this project.

Sincerely,

Brian P. Cole
State Supervisor

cc:
Mr. John Thomas, U.S. Army Corps of Engineers, Raleigh Regulatory Field Office, 6508 Falls of the Neuse Road, Suite 120, Raleigh, NC 27615
Ms. Marla J. Chambers, Highway Projects Coordinator, North Carolina Wildlife Resources Commission, 12275 Swift Road, Oakboro, NC 28129
Regional Director, FWS, Atlanta, GA (ES/TE, Attention: Mr. Joe Johnston)

References

Blomquist, H. L. 1957. A revision of the *Hexastylis* of North America. Brittonia 8:255-281.

Gaddy, L. L. 1980. Status report on *Hexastylis naniflora*. Prepared for the U.S. Fish and Wildlife Service. Unpublished report. 25 pp.

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